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FEDERAL COMMUNICATIONS COMMISSION
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Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, D.C. 20554

In the Matter of	)	
	)	
Amendment of Parts 2 and 15 of Commission's Rules Regarding Spread Spectrum Transmitters	)	**ET Docket No. 96-8**

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To: The Commission

COMMENTS OF ALLIANT TECHSYSTEMS, INC.

Alliant Techsystems, Inc. (Alliant), a manufacturer of defense products and systems based in Minnesota, by and through counsel, and pursuant to Section 1.415 of the Commission's Rules (47 C.F.R. § 1.415), hereby respectfully submits its comments in response to the *Notice of Proposed Rule Making* (the Notice), FCC 96-36, 11 FCC Rcd. 3068 (1996), released February 5, 1996. The Notice proposes to amend Parts 2 and 15 of the Commission's rules to, among other things, permit certain changes in the rules governing spread spectrum transmitters. Alliant, the manufacturer of a gunshot detection system using short-duration transmissions, states as follows with respect to certain issues addressed in the Notice:

1. Paragraphs 39 and 40 of the Notice address the issue of short-duration transmissions. It is noted therein that the Commission has received a number of applications for frequency hopping systems that transmit for only short periods of time, and which, for example, can transmit all necessary information using a single transmission, without the need to hop to a second frequency.

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Those applicants have apparently requested inclusion in the spread spectrum rules in order to be allowed to use transmitters with an output power of one watt. The Notice indicates that current rules and definitions require that the system, consisting of the transmitter and receiver, must be designed to act as a frequency hopping system if the data stream is longer than that which can be completed in a single hop. Systems requiring short duration transmission bursts are specifically accommodated under different rules,[1] at lower power levels.

2. The notice states that short duration pulse devices that do not hop do not exhibit the processing gain at the receiver which is a characteristic of spread spectrum transmissions that reduces the need for transmitter power. Thus, higher transmitter power is necessary for such devices, which ostensibly increases interference potential. At the same time, the potential for interference is *decreased* because of the short duration of the pulse. The notice proposes not to change the regulations, requiring that short-duration pulse transmitters be configured as frequency hopping systems in order to operate at the one-watt level under existing regulations. It asks, however, how short-duration pulse devices might be accommodated.

3. Alliant urges that the Commission's regulations governing short-duration pulse devices are overly restrictive, and do not permit the development of devices and systems which are needed in

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[1] See, Sections 15.231(e) and 15.249.

the United States. The Part 15 rules should be amended in this proceeding to permit devices which utilize *non-spread-spectrum,* infrequent, short-duration pulse transmissions at power levels up to one watt for certain public safety related applications. Alliant's own recent experience with Section 15.249 of the Commission's rules is the best example of the problem that requires immediate solution.

4. Alliant's Advanced Technology Center, located in Arlington, Virginia, has developed a system called SECURES™ (System for the Effective Control of Urban Environment Security) in support of the work of law enforcement agencies. It is a new technology of gunshot detection and reporting to address the critical problem of gun-related violence on America's streets. Developed together with ARPA (Advanced Research Projects Agency), the Department of Justice, the FBI, and the Washington, D.C. Police Department, the system is in the demonstration stage this summer. SECURES™ will instantaneously detect, classify and pinpoint the location of gunfire and will transmit this finding in data form to the police dispatcher or directly to scout cars in the vicinity. This will increase the probability of arrest of the gunman and the survival of any victim. The system utilizes a series of light-pole mounted, battery-operated transmitters, each of which is fitted with the gunshot detector. These pole units are located at street corners in urban areas, and would transmit 60-bit reports at 902-928 MHz on one of two alternative, 200 kHz bandwidth channels, when a gunshot is detected, using FSK modulation. At a 50 kbs transmission rate, each

packet would occupy a 1 millisecond transmission time at less than one watt, using a low-gain antenna.[2] The only other transmissions from the pole units (the transmissions would be made to receivers linked by cellular, wireline or microwave facilities to the police dispatcher) would be weekly status reports from each pole unit in 25-bit transmissions in the middle of the night.

5. The entire transmission sequence, assuming a maximum of 200 pole units per square mile, for weekly tests of all transmitters would be, cumulatively, approximately 0.35 seconds, on a scheduled basis. The infrequent transmissions from one or several pole units after a gunshot is detected would amount to no more than 1 millisecond. The interference potential to voice or other data communications on a co-channel basis is therefore essentially non-existent.[3] By comparison, regulations for frequency-hopping spread spectrum transmitters pursuant to Section 15.247 permit transmission on any one channel for 0.4 seconds at one watt, once every 20 seconds. This amounts to 12,000 seconds of a weekly

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[2] The necessary elements of the system require that bandwidth be on the order of 200 kHz; that the power and frequency band utilized permit reliable in-city transmission; that the antenna be compact; that the frequencies be uniform throughout the United States; and, to meet cost requirements, off-the-shelf transmitters be used, with certain cost, size, power drain, fast power-up, short on-times, broad operating temperature range, and relatively high data rate.

[3] Field tests of the system pursuant to experimental license authorization have demonstrated the lack of any interference potential.

cumulative transmission time at one watt, on a minimum of 50 channels.

6. What is available for critical public safety applications in SECURES™ (but for the inflexibility of the Commission's Part 15 rules, in particular Sections 15.231 and 15.249, and the somewhat understandable reluctance of the staff of the Office of Engineering and Technology to grant waivers in individual cases) is a system that has far-reaching law enforcement and public safety benefits, with exceptionally low duty cycles, and extremely infrequent transmissions. It has virtually nonexistent interference potential. *It is, however, not permitted by present Part 15 regulations*. It must, in order to be affordable by municipalities and public safety agencies, utilize non-spread-spectrum transmitters, and it must utilize power levels in excess of those permitted for such devices pursuant to Sections 15.231 or 15.249 of the Commission's Rules. The Commission should authorize, by amendment of Sections 15.231 or 15.249, devices which: (a) utilize infrequent (e.g., less than 5 milliseconds at an average rate of less than .1 transmission per hour) short-burst transmissions, whether frequency hopping spread spectrum (FHSS) or not; and (b) are intended for public safety applications.

7. The Notice, at paragraph 40, discusses the Commission's inclination to continue to require that devices that operate up to one watt must be spread-spectrum systems, to permit the use of processing gain. This is an inflexible requirement that is not necessary in order to avoid interference from systems such as

SECURES™, and in fact the SECURES™ system could not be configured as a FHSS system. Processing gain either will or will not occur in an FH link. It would not make sense to require a transmitter to be able to hop frequencies and yet not require it to do so. If the link is a simplex link, then the transmitter must redundantly transmit over many frequency channels in order to have a link with processing gain. In the SECURES™ system, this would require 75 times more transmit time, and as well, PLL settling times. What would result from the use of FHSS devices in this application would be the following: (a) significant increase in power consumption; (b) significant increase in transmit time; (c) increase in size; (d) increase in cost; (e) increase in complexity; (f) difficulty in meeting temperature range requirements; and (g) unavailability of equipment. All of these burdens exist without any commensurate benefit in interference avoidance. In short, the Commission must, in order to permit certain new lifesaving devices systems, modify its rules to permit low duty-cycle, low-power, short-duration transmission systems, whether or not FHSS.

Therefore, the foregoing considered, Alliant Techsystems, Inc. respectfully requests that the Commission modify Sections 15.231 and 15.249 to permit short duration transmission devices such as the SECURES™ system, with extremely low duty cycles and resultant low interference potential to other radio services in shared bands, or to other Part 15 devices. This is especially urgent for public

safety systems, which should be accommodated in the interim, pending resolution of this proceeding, by waiver.

Respectfully submitted,

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