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

In the Matter of	)	
	)	
Amendment of Section 90.20(e)(6) of the Commission's Rules	)	WT Docket No. 06-142
	)	RM-11135

REPORT AND ORDER

Adopted: August 12, 2008 **Released: August 13, 2008**

By the Commission:

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I. INTRODUCTION

1. In this Report and Order, we address proposed revisions to the Commission's rules and policies regarding stolen vehicle recovery systems (SVRS) and the use of frequency 173.075 MHz.[1] We issued the *Notice of Proposed Rulemaking* (*NPRM*) in response to a petition for rulemaking filed by

[1] Amendment of Section 90.20(e)(6) of the Commission's Rules, *Notice of Proposed Rulemaking*, WT Docket No. 06-142, RM-11135, 21 FCC Rcd 8870 (2006) (*NPRM*).

LoJack Corporation (LoJack),[2] in which LoJack sought to modify Section 90.20(e)(6) of the Commission's rules[3] to accommodate its future narrowband operations on frequency 173.075 MHz, to improve the recovery services its products provide, and to permit other services in addition to SVRS.[4] As discussed below, this Report and Order implements some of the proposals set forth in the *NPRM*, as well as additional changes related to operations on frequency 173.075 MHz. This Report and Order furthers the public interest by promoting flexibility and allowing SVRS licensees to operate with some relaxed restrictions while ensuring the continued interference protection of incumbent users.

II. EXECUTIVE SUMMARY

2. The major decisions in this Report and Order are as follows:

- Increases the effective radiated power (ERP) limit for narrowband (12.5 kHz bandwidth or less) base stations from 300 watts to 500 watts.
- Increases the power output limit for narrowband (12.5 kHz bandwidth or less) mobile transceivers from 2.5 watts to five watts.
- Modifies the duty cycle for base stations from one second every minute to five seconds every minute.
- Increases the tracking duty cycle for mobile transceivers from 200 milliseconds every ten seconds to 400 milliseconds every ten seconds and, correspondingly, increases the tracking duty cycle for mobile transceivers that are being tracked actively from 200 milliseconds every second to 400 milliseconds every second.
- Increases the uplink duty cycle for mobile transceivers from 1800 milliseconds every 300 seconds to 7200 milliseconds every 300 seconds.
- Retains the requirement for TV Channel 7 interference studies and requires that the studies be served upon affected TV Channel 7 stations.
- Permits the licensing of mobile transceivers by rule.
- Expands the scope of Section 90.20(e)(6) to permit the tracking and recovery of lost and stolen cargo and hazardous materials, missing or wanted persons, and individuals at risk or of interest to law enforcement when established boundaries are violated. Also permits mobile transceivers to transmit automatic collision notifications, vehicle fire notifications, and carjacking alerts.
- Relaxes the limitation on emissions to permit flexibility in modulation as well as analog and digital signals.

[2] LoJack Corporation Petition for Rulemaking, RM-11135 (filed Oct. 25, 2004) (Petition).

[3] 47 C.F.R. § 90.20(e)(6).

[4] Petition at 1-2.

III. BACKGROUND

3. In 1989, the Commission designated frequency 173.075 MHz for use by SVRS licensees[5] on a shared basis with the Federal Government.[6] LoJack has developed and operates a stolen vehicle recovery network in cooperation with state and local police departments across the nation.[7] According to LoJack, its system has been deployed in twenty-six states and the District of Columbia, has been installed in more than three million vehicles,[8] and has assisted in the recovery of more than 100,000 vehicles.[9] The LoJack system also is used in twenty-five other countries.[10] Although the Commission licenses SVRS operations on frequency 173.075 MHz on a shared, non-exclusive basis, LoJack currently is the only SVRS operator in the United States.

4. LoJack's stolen vehicle recovery network operates as follows. LoJack and the licensed law enforcement agency install in each LoJack-registered vehicle a vehicle location unit (VLU) that remains dormant until the owner reports a vehicle theft.[11] Once police receive a stolen vehicle report, the officials send an electronic message to a central law enforcement computer, which causes a network of radio base stations licensed to the police to broadcast a message that instructs the particular VLU to begin transmitting a brief "tracking" message.[12] The base stations transmit activation messages every fifteen minutes for the first two hours, then once an hour thereafter until the vehicle is recovered or thirty days have passed, whichever is sooner.[13] The VLU tracking message contains a unique reply code that is received by vehicle tracking units (VTUs) located in law enforcement vehicles.[14] Police identify the vehicle make, model and registration from the reply code, and then use that information to track and recover the stolen vehicle.[15] LoJack currently uses an alternative, uplink duty cycle to facilitate its "Early

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[5] *See* Amendment of Parts 2 and 90 of the Commission's Rules to Provide for Stolen Vehicle Recovery Systems, *Report and Order*, Gen. Docket No. 88-566, 4 FCC Rcd 7558, 7558 ¶ 1 (1989). In 1986, the Commission granted experimental authority to LoJack and the Massachusetts Department of Public Safety (Department) to conduct a market test in Massachusetts of a stolen vehicle recovery system. Prior to that time, the Department had been operating this system experimentally under the auspices of the Federal Bureau of Investigation of the U.S. Department of Justice. On October 18, 1988, the Commission granted LoJack authority to expand its experiment to the state of Florida. *See* Amendment of Parts 2 and 90 of the Commission's Rules to Provide for Stolen Vehicle Recovery Systems, *Notice of Proposed Rulemaking,* Gen. Docket No. 88-566, 3 FCC Rcd 7195, 7195 ¶ 2 (1988).

[6] The 162.0125-173.2 MHz band is allocated on a primary basis to the Federal Government for fixed and mobile operations. Non-Federal Government SVRS operations may also be authorized on frequency 173.075 MHz on a primary basis. *See* 47 C.F.R. § 2.106 n.US312.

[7] *See* Petition at 3.

[8] *See* Comments of LoJack Corporation (filed Sept. 22, 2006) at 2 (LoJack Comments).

[9] *See* Petition at 4.

[10] *See* LoJack Comments at 3.

[11] *See* Amendment of Section 90.20(e)(6) of the Commission's Rules to Revise the Authorized Duty Cycle on 173.075 MHz, *Report and Order*, WT Docket No. 01-97, 17 FCC Rcd 16938, 16940 ¶ 4 (2002) (*Second SVRS Report and Order*); *see also* Petition at 4.

[12] *See* Petition at 4. Base stations and VLUs both transmit on frequency 173.075 MHz.

[13] *Id.*

[14] *Id.*

[15] *Id.*

Warning Detector" (EWD) operations.[16] When activated, the EWD detects external movements of the vehicle or determines that the vehicle has been started without use of a key and, thereupon, instructs the VLU to begin transmitting a brief periodic tracking message, which contains a unique reply code.[17] The nearest base station processes and forwards the message to the LoJack central control center, whereupon LoJack personnel immediately alert the car owner that the vehicle is possibly being stolen.[18]

5. According to Section 90.20(a)(6), SVRS systems may be operated only to recover stolen vehicles and not for any other purpose. The rule limits mobile transmitters to 2.5 watts power output, and base station transmitters to 300 watts ERP. Base station transmissions are limited to a total of one second every minute. Transmissions from mobile units are routinely limited to 200 milliseconds every ten seconds (the tracking duty cycle), and to 200 milliseconds every second during periods that a vehicle is being tracked actively (the active tracking duty cycle). As revised in 2002, the rule also permits an alternative duty cycle to the tracking duty cycle, which enables SVRS operations to incorporate an early warning feature that minimizes lag time and, thus, assists in the expeditious recovery of a stolen vehicle.[19] Specifically, mobile operations may be conducted with a duty cycle of 1800 milliseconds every 300 seconds (the uplink duty cycle) with a maximum of six messages in any thirty-minute period. Transmissions from base stations must be limited to a total time of one second every minute.[20] Finally, the rule requires applicants to perform an analysis for each base station located within 169 kilometers (105 miles) of a TV Channel 7 transmitter of potential interference to TV Channel 7 viewers.

6. LoJack is required to migrate its operations from 20 kHz bandwidth to 12.5 kHz by 2019.[21] According to LoJack, it will need to expend significant resources to redesign its SVRS operations for narrowband use. Specifically, LoJack indicates that it will need to redesign and redeploy its RF infrastructure and supporting software.[22] Over a four year period, LoJack technicians and field engineers will have to travel throughout the country to install equipment that will upgrade over 11,000 VTUs, 125 base stations, and 125 uplink receivers.[23] Following this effort, there will still be over three million wideband VLUs in consumer vehicles that LoJack will service over a period of ten years.[24] LoJack will need to operate parallel wideband and narrowband systems during this ten-year transition period to track existing wideband VLUs that have not been serviced as well as the upgraded VLUs.[25] LoJack states that

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[16] *See Second SVRS Report and Order*, 17 FCC Rcd at 16942-44 ¶¶ 9-11.

[17] *Id.* at 16940 ¶ 5.

[18] *Id.*

[19] *NPRM*, 21 FCC Rcd at 8877 ¶ 18. *See also Second SVRS Report and Order*, 17 FCC Rcd at 16940 ¶ 4.

[20] *See Second SVRS Report and Order*, 17 FCC Rcd at 16940 ¶ 4.

[21] *See* Amendment of Parts 2 and 90 of the Commission's Rules to Provide for Narrowband Private Land Mobile Radio Channels in the 150.05-150.8 MHz, 162-174 MHz, and 406.1-420 MHz Bands that are Allocated for Federal Government Use, *Report and Order*, ET Docket No. 04-243, 20 FCC Rcd 5793 (2005); *Erratum*, 20 FCC Rcd 9882 (OET 2005) (*Federal Narrowbanding R&O*).

[22] Petition at 5.

[23] *See id.* The number of base stations has increased from 125 to 175 in the span of time between LoJack's Petition and its Comments. *See* LoJack Comments at 3.

[24] Petition at 5.

[25] *Id.*

the redesign of its network provides an opportunity to update its technology.[26] Specifically, LoJack plans to incorporate GPS and cellular technology into its VLUs.[27] LoJack submits that many of its requested rule changes are necessary due to transitioning the SVRS frequency (173.075 MHz) from wideband to narrowband operations.[28]

7. To effectuate its plans to redesign and redeploy its SVRS facilities, LoJack specifically requests that the rule be amended to: (1) increase VLU output power from 2.5 watts to 5 watts; (2) increase maximum base station ERP from 300 watts to 500 watts to compensate for the alleged reduced range of narrowband channels; (3) permit use of digitally modulated emissions, in addition to the modulation schemes already specified in the Commission's rules; (4) eliminate limitations on duty cycles to enable parallel wideband and narrowband SVRS operations and any additional public safety and security services;[29] and (5) eliminate the requirement of Channel 7 interference studies.[30] In addition to these requested technical changes, LoJack requests that the Commission license mobile transceivers by rule, thus permitting mobile telephony transmissions to activate VLUs on a nationwide basis, and modify the rule to expand the scope of services that may be offered on frequency 173.075 MHz.[31]

8. We now turn to a brief overview of the history of this proceeding. On October 25, 2004, LoJack filed its Petition. On January 5, 2005, the Consumer and Governmental Affairs Bureau placed the Petition on *Public Notice*.[32] The Commission received more than one hundred comments, all in support of granting the Petition.[33] On July 24, 2006, we released the *NPRM*. Comments were filed by ABC Owned Television Stations (ABC); Cohen, Dippell, and Everist, P.C. (CDE); LoJack; and Joint Comments of the Association for Maximum Service Television, Inc. and the National Association of Broadcasters (MSTV/NAB).[34] Reply Comments were filed by LoJack and MSTV/NAB.[35] All commenters and reply commenters to the *NPRM*, with the exception of LoJack, oppose the proposed rule changes.

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[26] *Id.*

[27] *Id.* at 6. LoJack does not require a rule change to use these technologies since Section 90.20(e)(6) is technology neutral. *Id.*

[28] *See id.* at 1, 5.

[29] Subsequently, LoJack proposed to increase the duty cycles limits rather than eliminate them. *See* LoJack Comments at 9.

[30] Petition at 2.

[31] *Id.* at 6-7.

[32] *See* Petition for Rulemaking Filed, Consumer & Governmental Affairs Bureau Reference Information Center, Report No. 2686, *Public Notice* (rel. Jan. 5, 2005).

[33] For a list of parties commenting in response to the *Public Notice*, *see NPRM*, Appendix C, 21 FCC Rcd at 8890-8891.

[34] Comments of ABC Owned Television Stations (filed Sept. 22, 2006) (ABC Comments); Comments of Cohen, Dippell, and Everist, P.C. (filed Sept. 22, 2006) (CDE Comments); LoJack Comments; and Joint Comments of the Association for Maximum Service Television, Inc. and the National Association of Broadcasters (filed Sept. 22, 2006) (MSTV/NAB Comments).

[35] Reply Comments of LoJack Corporation (filed Oct. 10, 2006) (LoJack Reply Comments); Joint Reply Comments of the Association for Maximum Service Television, Inc. and the National Association of Broadcasters (filed Oct. 10, 2006) (MSTV/NAB Reply Comments).

9. On March 26, 2007, LoJack filed a written *ex parte* presentation to clarify what rule changes are required to satisfy each goal in its Petition.[36] First, LoJack states that increased base station power levels and increased duty cycles are necessary to operate a narrowband system.[37] Second, LoJack states that increased base station power levels and one additional second per minute in the base station duty cycle are required to operate both a wideband and a narrowband system during the narrowband transition.[38] Finally, LoJack states that three additional seconds per minute in the base station duty cycle, increased VLU power levels, licensing by rule, and expanding the scope of permitted services are required to make LoJack's system more effective.[39]

10. On October 5, 2007 and October 30, 2007, LoJack filed written *ex parte* presentations to clarify its need for an expanded uplink duty cycle.[40] LoJack states that a longer uplink duty cycle would allow VLUs to send more information on uplink transmissions, which will be necessary for LoJack to provide additional services such as tracking cargo and hazardous materials.[41] LoJack uses the uplink duty cycle transmission for its EWD operations, sending brief uplink transmissions from VLUs as an alert that a vehicle may have been stolen, and to acknowledge receipt of activation messages in order to reduce unnecessary repetition of messages from the base stations.[42] Each of these uplink messages lasts 1.8 seconds.[43] For any additional new service that LoJack provides, LoJack would need to send a different reply code identifier from what it uses for stolen vehicle recovery operations.[44] To transmit GPS information to provide police with the exact longitude and latitude of a stolen vehicle, hijacked hazardous materials or other dangerous cargoes, however, the uplink message will require sending 124 bits.[45] Therefore, LoJack requests a longer uplink transmission time, as it will need to send at least four successive uplink messages of 1.8 seconds duration to the base station, equivalent to a duty cycle of 7200 milliseconds every 300 seconds.[46]

11. In a related matter, on December 29, 2005, the former Public Safety and Critical Infrastructure Division (PSCID) of the Wireless Telecommunications Bureau granted LoJack a waiver of certain provisions of the rule.[47] Specifically, PSCID permitted LoJack (a) to use digital modulation for its SVRS; (b) to operate its base stations with a duty cycle of three seconds per minute; and (c) to operate its

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[36] *Ex Parte* Presentation, WT Docket No. 06-142, filed by LoJack on March 26, 2007 (March 26, 2007 *Ex Parte*).

[37] *Id.* at 7.

[38] *Id.*

[39] *Id.*

[40] *Ex Parte* Presentation, WT Docket No. 06-142, filed by LoJack on October 5, 2007 (October 5, 2007 *Ex Parte*); *Ex Parte* Presentation, WT Docket No. 06-142, filed by LoJack on October 30, 2007 (October 30, 2007 *Ex Parte*).

[41] October 5, 2007 *Ex Parte* at 2.

[42] October 30, 2007 *Ex Parte* at 2.

[43] *Id.*

[44] October 5, 2007 *Ex Parte* at 2; October 30, 2007 *Ex Parte* at 3.

[45] October 30, 2007 *Ex Parte* at 3.

[46] *Id.*

[47] LoJack Corporation, Request for Partial Waiver of Section 90.20(e)(6) of the Commission's Rules, *Order*, 20 FCC Rcd 20497 (WTB PSCID 2005) (*Waiver Order*).

SVRS for the additional purpose of tracking and recovery of hazardous materials or cargo.[48] LoJack also sought waiver of the rule to authorize of VLUs on a license-by-rule basis, but PSCID deferred the issue to this proceeding.[49]

IV. DISCUSSION

A. Maximum Mobile Output Power

12. LoJack sought power level increases because it claims that reducing the bandwidth will reduce the range and coverage area of SVRS components.[50] In the *NPRM*, we proposed to increase the output power for mobile transceivers (*i.e.,* VLUs) from 2.5 watts to five watts, which represents an increase of 3.0 dB.[51] We noted that VLUs operate with antenna elevations and power levels significantly lower than the base stations and are generally transient.[52] Due to these characteristics, we also noted that the intermittent transmissions from the VLUs have inherently less potential to cause interference than base station transmissions.[53] We made the initial determination that any interference resulting from increasing the maximum power limit for VLUs would be *de minimis*.[54]

13. MSTV/NAB's consulting engineer states that it is impossible to gauge the impact of a 3.0 dB increase, along with other changes in this proceeding without detailed laboratory experiments of the susceptibility of DTV receivers.[55] To minimize the potential for interference to DTV Channel 7 reception, MSTV/NAB seeks to limit the power increase of 12.5 kHz bandwidth VLUs to two dB, *i.e.*, a maximum output power of four watts.[56] MSTV/NAB also claims that, because each SVRS license has up to hundreds of thousands of VLUs, LoJack's operations could produce "a near steady-state" interfering signal.[57] Likewise, CDE does not believe a rule change is warranted without supporting laboratory equipment tests.[58] CDE observes that LoJack's operation is first-adjacent to many analog full-service Channel 7 television stations across the country that may operate until February 17, 2009.[59] CDE also states that TV translator stations will be affected because it is presumed that current analog translator

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[48] *Id.* at 20502 ¶ 16.

[49] *Id.* at 20501 ¶ 15.

[50] Petition at 8.

[51] *NPRM*, 21 FCC Rcd at 8875 ¶ 13.

[52] *Id.* at 8875 ¶ 12.

[53] *Id.*

[54] *Id.*

[55] MSTV/NAB Comments, attached Statement of Hammett and Edison, Inc., Consulting Engineers (Hammett & Edison Statement) at 2.

[56] *Id.* at 1.

[57] *Id.* at 3.

[58] CDE Comments at 1.

[59] *Id.* at 2.

operations will continue beyond the end of the DTV transition, given that a transition date has not been established for translator stations.[60]

14. In view of the record before us, we continue to believe that any interference that results from increasing VLU output power would be *de minimis*. We are not persuaded by MSTV/NAB's and CDE's argument that testing is required in order to adopt the power level increases requested by LoJack. While DTV receivers have not been specifically tested against LoJack VLU transmitters, as LoJack points out, the industry already has conducted extensive testing to evaluate the differences in susceptibility to interference between analog and digital TV receivers.[61] As LoJack further notes, DTV receivers have at least ten dB greater interference rejection capability than analog receivers.[62] Similarly, the Advanced Television Systems Committee concludes that DTV receivers should be capable of significantly better interference rejection than NTSC receivers.[63] In this regard, we note that the error correction capabilities of DTV receivers should be more than adequate to compensate for any interference caused by an adjacent channel narrowband signal.[64] We also have no reason to believe that the proposed power increase will have an impact on the DTV transition. In this regard, we note that DTV receiver penetration into homes is becoming widespread.[65] In addition, any analog TV operations that remain on channel 7 after the February 17, 2009 cut-off date for full-power analog TV over-the-air broadcasts will similarly be transitioning to digital operations.[66]

15. We also find no basis in MSTV/NAB's assertion that "hundreds of thousands" of mobile units would be transmitting at the same time.[67] As LoJack notes, on average, VLU activations per day are limited to approximately forty mobile units in the portion of the United States in which LoJack's system

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[60] *Id.* According to Commission records, there are 231 TV translator stations and eleven Class A stations nationwide on TV Channel 7 that may continue analog broadcasts after February 17, 2009. No LPTV stations were found on TV Channel 7. *See* http://www.fcc.gov/mb/video/tvq.html (last searched May 22, 2008).

[61] LoJack Reply Comments at 3.

[62] LoJack Comments, Attachment B at 5. LoJack also demonstrated that this 10 dB figure is conservative, because it is based on having an analog television signal as the undesired signal, and for various reasons a SVRS signal has less potential for interfering with DTV reception than an analog television signal. *See* LoJack Reply Comments, Attachment A at 2. A lower adjacent channel analog TV signal has its frequency modulated (FM) aural carrier removed only 250 kHz from the lower edge of the desired TV station's channel, whereas a SVRS signal is removed 925 kHz from the lower edge of the desired Channel 7 TV station's signal. Furthermore, the TV aural bandwidth is at least 50 kHz whereas the SVRS bandwidth is 20 kHz or less. A DTV receiver should provide better performance in rejecting out-of-band emissions from a 20 kHz or less SVRS signal that is 925 kHz removed from the lower channel edge than in rejecting out-of-band emissions from a 50 kHz or more analog TV aural signal that is only 250 kHz from the lower channel edge. *Id.*

[63] Advanced Television Systems Committee, Recommended Practice: Guide to the Use of the ATSC Digital Television Standard, ATSC Doc. A/54A, (dated Dec. 4, 2003) at 88.

[64] Narrowband VLUs will operate on 12.5 kHz channels compared to a 6 MHz DTV signal.

[65] *See* Consumer Electronics Association press release, "More Than Half of U.S. Households Own a Digital Television" (Dec. 28, 2007), http://www.ce.org/Press/CurrentNews/press_release_detail.asp?id=11425 (last visited May 8, 2008).

[66] We note that there are 239 TV translator stations and eleven Class A stations nationwide on TV channel 7 that may continue analog broadcasts after February 17, 2009. No analog LPTV stations are currently operating on TV channel 7. *See* http://www.fcc.gov/mb/video/tvq.html (last searched Apr. 29, 2008).

[67] *See* Hammett & Edison Statement at 3.

operates.[68] In other words, nearly all VLUs are dormant and not transmitting. The only transmitting VLUs are those that reside in vehicles that have been reported stolen, and that are being tracked actively by law enforcement. Thus, there are relatively few VLUs operating within the U.S. at any given time thereby keeping any potential for interference to a minimum. While we are expanding the permitted uses for these devices, we anticipate that the number of devices that are activated and in operation at any given time will remain low and will not significantly raise the risk of harmful interference to TV broadcasting.

16. Finally, we agree with LoJack that reducing bandwidth will reduce the coverage area of VLUs.[69] Thus, providing a modest increase in VLU power will enable police to deploy fewer tracking receivers, thereby freeing up resources for other public safety purposes.[70] We believe that on balance this important public policy benefit outweighs what we believe will be a *de minimis* increase in potential interference to channel 7 operations. Therefore, we are modifying our rules to allow narrowband VLUs to operate with up to 5 watts output power. We make no change to existing wideband VLUs which will continue to operate with 2.5 watts output power until they are replaced by narrowband units.

B. Maximum Base Station ERP

17. LoJack requests that we modify our rules to increase permissible base station ERP from 300 to 500 watts,[71] in order to compensate for what it claims is a seven dB degradation of its base stations resulting from narrowbanding.[72] In the *NPRM*, we expressed concern about any increase in base station power, given that the interference potential of base stations is significantly greater than that of mobile transceivers.[73] To further develop the record on this point, we requested commenters in support of LoJack's proposal to fully justify the need to increase the base station ERP and explain how it would not unreasonably increase the potential for interference with TV Channel 7 analog and digital reception.[74]

18. MSTV/NAB and ABC particularly oppose the proposed power increase because they say that it would create a serious a risk of interference to the viewing public's ability to receive over-the-air TV Channel 7 programming.[75] ABC challenges LoJack's assertion that no interference will result, and argues that the power increases are not justified without a reliable and substantiated engineering showing.[76] ABC and MSTV/NAB are concerned with LoJack's failure to account for the increased risk of interference to Channel 7 operations.[77] ABC states that DTV operations involve a several decibel reduction in energy levels from analog operations, and thus, DTV transmissions are more susceptible to

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[68] LoJack Reply Comments at 10.

[69] Petition at 2, 8.

[70] LoJack Comments at 5.

[71] *See* Petition at 2, 8.

[72] LoJack Comments at 6.

[73] *NPRM*, 21 FCC Rcd at 8875 ¶ 12. We observed that base stations operate at much higher powers and antenna elevations, and they are stationary rather than transient. *Id.*

[74] *Id.* at 8875 ¶ 13.

[75] MSTV/NAB Comments at 1-2; ABC Comments at 2-3.

[76] ABC Comments at 3.

[77] MSTV/NAB Comments at 5; ABC Comments at 3.

interference.[78] ABC's consulting engineer claims that a power increase to compensate for narrowbanding is not necessary because a 12.5 kHz bandwidth enjoys a 2.08 dB advantage in noise power reduction compared to a 20 kHz bandwidth.[79]

19. LoJack argues that narrowbanding results in a seven dB degradation in output signal to noise ratio for base stations.[80] As a result, LoJack asserts that the Bit Error Rate of the narrowband system will be many orders of magnitude worse than the wideband system over much of the dynamic range of the system.[81] LoJack's engineering analysis states that narrowband degradation up to seven dB occurs where the carrier-to-noise ratio is high, while narrowband and wideband systems perform the same where the carrier-to-noise ratio is low.[82]

20. MSTV/NAB filed reply comments asserting that LoJack's analysis to illustrate narrowband system degradation is incorrect and contradictory.[83] MSTV/NAB argues that LoJack's analysis is not accurate because it is based on an analysis of the system's performance degradation in high signal level conditions.[84] MSTV/NAB states that high signal level conditions occur where the probability of reception and detection is high and where excess margin is usually available to compensate for impairments caused by the narrowband system.[85] We agree with MSTV/NAB that the limiting factor is performance in low signal conditions. However, we also believe that a degradation of up to seven dB, even in high signal level conditions, could make SVRS transmissions more difficult to detect by in-vehicle units and ultimately delay in the recovery of stolen vehicles.

21. Further, for the same reasons as articulated above in our decision to allow narrowband VLUs to operate with increased power (*i.e.*, better interference rejection capability of DTV receivers as compared to analog receivers, base stations do not transmit continuously, etc.) we believe a similar increase is justified for base stations. Additionally, as noted below, we will continue to require SVRS applicants to perform channel 7 interference studies prior to operating a new or modified base station. This decision will provide another measure of protection for channel 7 operations. We also note that LoJack has stated that in areas where there is a police licensee and a stolen vehicle is equipped with cellular technology, it will be possible to activate the vehicle's VLU using existing mobile phone networks without having to transmit on the system's base stations.[86] Thus, over time, fewer transmissions will be needed from base stations further minimizing the potential for interference. As an additional measure, we also will only permit activation of 500-watt ERP narrowband base stations after the cessation of full power analog TV broadcasts, scheduled for February 17, 2009. With less than a year until the scheduled end of the DTV transition, we expect that this delay will not cause disruption to LoJack's deployment of equipment.

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[78] ABC Comments at 6.

[79] ABC at Comments 3, attached Engineering Statement (ABC Engineering Statement) at 10.

[80] LoJack Comments at 6.

[81] *See id.*, Attachment A, Analysis of Narrowbanding on LoJack Network Performance.

[82] *Id. See also* LoJack Reply Comments at 4-5; LoJack March 26, 2007 *Ex Parte* at 3.

[83] MSTV/NAB Reply Comments at 6.

[84] *Id.*

[85] *Id.*

[86] *See* Petition at 6.

22. Finally, in reaching this decision, we note that LoJack argues for a base station power increase only as it pertains to narrowband base stations.[87] We therefore increase the power limit to 500 watts ERP with respect to narrowband base stations only. Accordingly, the power limit of 300 watts ERP for wideband base stations will continue to apply.

C. Limitations on Duty Cycles

23. LoJack initially sought to eliminate all limitations in our rules on SVRS duty cycles,[88] in order to enable it to operate parallel narrowband and wideband systems during a multi-year transition period.[89] According to LoJack, eliminating all limitations on SVRS duty cycles will provide an incentive for continued innovation and will make possible the use of LoJack's system for additional public safety and security services.[90]

24. ABC submits that the current limitations on duty cycles must be retained due to potential harmful interference to TV Channel 7 reception.[91] MSTV/NAB states that DTV receivers, which take longer to demodulate signals than analog TV receivers, could be more sensitive to lengthened duty cycles.[92] MSTV/NAB asserts that laboratory tests are needed to ensure satisfactory DTV receiver performance when exposed to certain duty cycles.[93] ABC argues that neither LoJack nor the Commission has pointed to any significant change since 2002 that would justify changing the duty cycle limits.[94] ABC further contends that LoJack's lack of interference complaints does not demonstrate that interference, particularly in short bursts, is not occurring, and thus does not support a waiver of duty cycle limits or other rule changes.[95] ABC believes that the current small duty cycle is the most likely reason that no interference complaints have been received.[96] LoJack responds that, while a viewer experiencing interference may not know to complain to LoJack, it may complain to a Channel 7 or cable system operator that, in turn, would bring the issue to the Commission's attention.[97]

25. In 2005, PSCID declined LoJack's request for waiver to eliminate all the duty cycles, based on the Commission's decision in 2002. In the earlier 2002 decision, the Commission specifically rejected total elimination of the duty cycle limits given concerns of interference to TV reception and a perceived need to keep frequency 173.075 MHz available for Federal Government users.[98] PSCID

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[87] *See id.* at 8.

[88] Petition at 9.

[89] *Id.* at 10.

[90] *Id.*

[91] ABC Comments at 4.

[92] Hammett & Edison Statement at 5.

[93] *Id.*

[94] ABC Comments at 4.

[95] *Id.* at 6.

[96] *Id.*, attached Engineering Statement at 11.

[97] *See* LoJack Reply Comments at 9.

[98] *Waiver Order*, 20 FCC Rcd at 20500 n. 30, citing *Second SVRS Report and Order*, 17 FCC Rcd at 16946-47 ¶ 17.

reiterated that the mobile duty cycle limits would continue to apply.[99] At this juncture, we continue to believe that we should not eliminate the duty cycles, consistent with the Commission's decision in 2002 and PSCID's decision in 2005.

26. We recognize that significantly longer duty cycle transmissions can pose a threat to the reception of TV Channel 7 and the availability of frequency 173.075 MHz for federal government users. However, unlike the power level issue, we also recognize that some form of relief from the duty cycle restrictions is needed to offset system performance difficulties faced by LoJack as it operates in a dual wideband and narrowband mode pending its complete transition to narrowband operation.[100] We also find that duty cycle relief can enable tangible improvements to SVRS system functionality and performance. Accordingly, we permit limited increases in the duty cycles to accommodate narrowbanding and reflect further developments in the record, as described below.[101]

1. Mobile Unit Tracking Duty Cycle

27. In the *NPRM*, we proposed increasing the duty cycle for narrowband mobile units to 400 milliseconds every ten seconds, and when a vehicle is being actively tracked, to 400 milliseconds every second.[102] Besides compensating for narrowbanding, LoJack states that the extra transmit time will enable it to send information directly to police regarding stolen vehicles.[103] Currently, police must enter a special code into their computers to obtain the make and model of a stolen vehicle.[104] LoJack agrees with the *NPRM* proposal with respect to the mobile unit tracking duty cycle, but adds that the increased duty cycle allowance should include wideband VLUs as well.[105] LoJack argues that operating with different duty cycles for different bandwidth VLUs would be impractical, and that including wideband VLUs would cause no appreciable impact on the potential for interference with TV Channel 7 reception.[106] MSTV/NAB disagrees, contending that such action would be premature without prior scrutiny of the effects of lengthened SVRS duty cycles on DTV reception.[107] As we mentioned above, MSTV/NAB's engineering consultant is concerned that hundreds of thousands of VLUs could produce "a near steady-state" interfering signal.[108]

28. For the reason stated in the *NPRM*, we adopt the proposal to increase the duty cycle for mobile units to 400 milliseconds every ten seconds, and when a vehicle is being actively tracked, to 400

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[99] *Waiver Order* at 20500 ¶ 11.

[100] *See NPRM* at 8876 ¶ 17.

[101] *See infra* paras. 27-33.

[102] *NPRM*, 21 FCC Rcd at 8877 ¶ 18. Section 90.20(e)(6) limits the duty cycle for mobile units to no more than 200 milliseconds every ten seconds. *See* 47 C.F.R. § 90.20(e)(6). The mobile unit is permitted to transmit for 200 milliseconds every second, when the associated vehicle is being actively tracked. *Id.*

[103] March 26, 2007 *Ex Parte* at 4.

[104] *Id.*

[105] *Id.*

[106] *Id.*

[107] MSTV/NAB Reply Comments at 5.

[108] Hammett & Edison Statement at 3.

milliseconds every second.[109] Specifically, we find that this supplementary duty cycle will help offset system performance difficulties when LoJack operates in a dual wideband and narrowband mode pending its complete transition to a narrowband operation and improve the reliability of the SVRS system consistent with avoidance of interference to TV Channel 7 reception.[110] In response to MSTV/NAB's concern about a steady state signal, LoJack has established that nearly all VLUs are dormant and not transmitting.[111] Therefore, we have no reason to conclude that a mobile unit tracking duty cycle increase would cause any significant increase in the potential interference to TV Channel 7 reception. Finally, to the extent implementing separate duty cycles based on bandwidth would be impractical or stifle innovation, we increase the duty cycle for both narrowband and wideband mobile units to 400 milliseconds every ten seconds, and when a vehicle is being actively tracked, to 400 milliseconds every second.

2. Mobile Unit Uplink Duty Cycle

29. In 2002, the Commission amended the SVRS rule to permit an alternative mobile unit duty cycle of 1800 milliseconds every 300 seconds, with a maximum of six messages in any thirty-minute period.[112] LoJack uses this duty cycle for its "early warning system" to send a transmission from a VLU as an alert that a vehicle may have been stolen.[113] LoJack refers to this duty cycle as the uplink duty cycle for VLU operations.[114] Early in this proceeding, LoJack discussed incorporating GPS technology into its system.[115] According to LoJack, having an exact location would provide critical information about a stolen vehicle's location at the outset, making it possible, in those cases in which cellular activation is not used, to confine base station transmissions to a limited area within the vicinity of the stolen vehicle.[116] LoJack had originally requested elimination of duty cycles to permit VLUs to transmit GPS data successfully.[117] Subsequently, LoJack proposed a longer uplink duty cycle in lieu of duty cycle elimination.[118] LoJack states that GPS data transmission requires at least four successive uplink messages of 1.8 seconds duration to the base station, equivalent to a duty cycle of 7200 milliseconds every 300 seconds.[119] LoJack states that without a lengthened uplink duty cycle, new VLUs would not be able to transmit GPS coordinates to uplink receivers.[120]

30. We are persuaded that GPS technology enabled by a lengthened uplink duty cycle can make SVRS systems more efficient by providing law enforcement with the specific location of a stolen

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[109] *NPRM*, 21 FCC Rcd at 8877 ¶ 18.

[110] *See id.*

[111] LoJack Reply Comments at 10.

[112] *See Second SVRS Report and Order*, 17 FCC Rcd at 16940 ¶ 4.

[113] *See* March 26, 2007 *Ex Parte* at 6; October 30, 2007 *Ex Parte* at 2.

[114] *See* March 26, 2007 *Ex Parte* at 6; October 5, 2007 *Ex Parte* at 2; October 30, 2007 *Ex Parte* at 2.

[115] Petition at 10.

[116] *Id.*

[117] *Id.* at 9-11.

[118] October 30, 2007 *Ex Parte* at 2.

[119] *See* October 5, 2007 *Ex Parte* at 2; October 30, 2007 *Ex Parte* at 3.

[120] *See* October 30, 2007 *Ex Parte* at 3-4.

vehicle. A lengthened uplink duty cycle would provide a direct public interest benefit to the extent it would result in quicker recovery of stolen vehicles. Furthermore, we note that quicker recovery of stolen vehicles may translate to fewer VLU tracking transmissions over an extended time period, thus reducing the use of the SVRS frequency. Accordingly, and for the same reasons that we increase the mobile tracking duty cycle, we also amend our rules to increase the mobile uplink duty cycle to 7200 milliseconds every 300 seconds with a maximum of six messages in any thirty-minute period.

3. Base Station Duty Cycles

31. The duty cycle for base stations is defined as limiting the base station transmitting for no more than one second every minute.[121] In 2005, the PSCID granted LoJack a waiver of the base station duty cycle to permit three seconds per minute.[122] In the *NPRM*, we observed that a potential bottleneck for operations of LoJack's SVRS systems during the transition period appears to be in the operation of the base stations.[123] We proposed increasing the duty cycle to five seconds per minute because a five-fold increase would provide significantly more time during which base stations may operate and, thus, should provide ample flexibility to accommodate operation of both narrowband and wideband SVRS systems without degrading the existing SVRS operations.[124] LoJack states that the *NPRM* proposal strikes an acceptable balance between conflicting considerations.[125]

32. In light of the comments and our discussion above,[126] we continue to believe that five seconds per minute would provide ample flexibility to accommodate operation of both narrowband and wideband SVRS systems, without degrading existing SVRS operations or causing potential interference to broadcast stations.[127] In reaching this decision, we continue to believe that the operation of base stations during the narrowbanding transition period presents a potential bottleneck for operation of LoJack's system.[128] Assuming that both narrowband and wideband SVRS systems will be operated from the same base stations, we find it reasonable to increase the amount of time that the base stations may operate.

33. We find that any potential for interference to broadcast stations is mitigated by the fact that, in some cases, the number of base station transmissions is minimal. For example, LoJack states that in areas that have been upgraded to incorporate an "early response" feature, base stations transmit activation messages only until they receive acknowledgement from the stolen vehicle's VLU.[129] The use of cellular infrastructure to perform the functions of base stations may also be a mitigating factor in reducing the extent of base station transmissions.[130] We note that we considered sunsetting the duty cycle

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[121] *See* 47 C.F.R. § 90.20(e)(6).

[122] *Waiver Order*, 20 FCC Rcd at 20500 ¶ 11.

[123] *NPRM*, 21 FCC Rcd at 8876 ¶ 17.

[124] *Id.* at 8877 ¶ 17.

[125] LoJack Comments at 9.

[126] *See supra* paras. 25-26.

[127] *See NPRM*, 21 FCC Rcd at 8877 ¶ 17.

[128] *Id.*

[129] LoJack Comments at 4.

[130] *See infra paras.* 39-41.

back to the waiver level of three seconds per minute after the transition to narrowband operation is complete. However, because growth of SVRS systems is difficult to predict in the long term, we believe that the five-second restriction for base stations should be retained after the transition to narrowband operation is complete[131] to ensure further development and innovation of SVRS operations.

D. TV Channel 7 Interference Studies

34. In the *NPRM*, we noted that the TV Channel 7 study requirement is a valuable regulatory resource that minimizes the potential for interference to over-the-air TV Channel 7 reception from SVRS operations.[132] We also were particularly concerned about interference to digital television reception.[133] Because these policy concerns remain, we find no reason to eliminate this rule as requested by LoJack.

35. LoJack seeks to eliminate this requirement for two reasons. First, LoJack finds the studies technically and financially onerous, with no demonstrable benefit.[134] Second, during the nearly twenty years that the rule has required LoJack to conduct the studies, according to LoJack, there have been no findings of perceptible interference to viewers of TV Channel 7 and no recorded complaints of interference.[135]

36. ABC opposes LoJack's proposal because, if the study requirement were eliminated, viewers would not be expected to know that the source of intermittent interference is LoJack's SVRS system.[136] CDE also opposes LoJack's proposal and doubts that this situation warrants a change in rules without supporting laboratory equipment tests.[137] CDE observes that LoJack's operation is first-adjacent to many analog full-service Channel 7 television stations across the country and that these analog stations are more susceptible to interference than DTV stations.[138] CDE also states that TV translator stations will be affected because it is presumed that current analog translator operations will continue beyond the end of the DTV transition given that a transition date has not been established for translator stations.[139] MSTV/NAB states that a requirement should be added such that studies must be simultaneously served on the affected TV Channel 7 station, so that the TV Channel 7 licensee will have the opportunity to review the study in a timely manner, and, if necessary, file a timely informal objection or petition to deny.[140]

37. We determine to retain the requirement for TV Channel 7 interference studies, in light of rule changes adopted herein. As we acknowledged in the *NPRM,* the public interest is better served by minimizing the potential for interference prior to its occurrence, rather than mitigating interference after it

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[131] *See NPRM*, 21 FCC Rcd at 8877 ¶ 17.

[132] *Id.* at 8878 ¶ 20.

[133] *Id.*

[134] Petition at 11.

[135] *Id.* at 11-12.

[136] ABC Comments at 7.

[137] CDE Comments at 1.

[138] *Id.* at 2.

[139] *Id.*

[140] Hammett and Edison Statement at 4.

occurs.[141] In this regard, we find that this requirement is an important part in our overall policy to avoid the occurrence of harmful interference. We acknowledge LoJack's position that the requirement for TV Channel 7 interference studies imposes administrative reporting activities. However, on balance, we find that the benefits of minimizing potential interference by requiring the interference studies outweigh the inconvenience cited by LoJack in having to submit them. We also are not persuaded by LoJack's assertion citing the lack of complaints about interference as a basis for eliminating this requirement. We find LoJack's observation equally compelling to demonstrate that the requirement for interference studies is working as intended and is therefore a basis to retain this requirement.

38. LoJack also states that it has no objection to the Commission making clear, in connection with an elimination of these procedures, that SVRS applicants must continue to locate their base stations with interference considerations in mind, and must continue to have plans in place, if more than a *de minimis* number of residences would be affected by a base station, to control interference and to make such adjustments in affected TV receivers as may be necessary.[142] We disagree with LoJack's view, because the existing requirement is a valuable regulatory resource that minimizes the potential for interference to over-the-air TV Channel 7 reception from SVRS operations.[143] Because this requirement is consistent with our spectrum management goals, we retain this rule.[144] In reaching our decision to retain the requirement for Channel 7 interference studies, we also agree with MSTV/NAB's request and will require the studies to be served on the affected TV Channel 7 station, because otherwise such stations may not be aware of pending SVRS applications.

E. Licensing Mobile Transceivers by Rule

39. In the *NPRM*, we stated that SVRS operations have been of significant but limited benefit to the public because economic factors have precluded law enforcement agencies from installing a network of base stations that would provide ubiquitous SVRS coverage.[145] LoJack proposes to leverage cellular technology to activate VLUs in an effort to address this limitation.[146] According to LoJack, by employing the existing cellular infrastructure, law enforcement authorities equipped with VTUs would have the capability to activate, track, and deactivate VLUs in stolen vehicles in areas with no base stations.[147] Thus, LoJack requests that SVRS VLUs be "licensed by rule" in order to permit nationwide activation by mobile telephony systems.[148]

40. In the *NPRM*, we stated that, while SVRS operators could eventually provide service on a nationwide basis without modifying our current licensing approach, licensing SVRS systems by rule may

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[141] *See NPRM*, 21 FCC at Rcd 8878 ¶ 20.

[142] LoJack Comments at 11.

[143] *See NPRM*, 21 FCC at Rcd 8878 ¶ 20.

[144] To the extent LoJack pursues plans to implement VLU activations utilizing the existing mobile cellular phone architecture, thus having few base stations, LoJack can minimize the impact of this requirement. *See* Petition at 11.

[145] *See NPRM*, 21 FCC Rcd at 8878 ¶ 21, citing Petition at 6, 11.

[146] *Id.*

[147] LoJack also submits that cellular technology makes it possible, in states in which there is a police licensee, to activate a vehicle's VLU without having to transmit on the system's base station. *Id.* at 6.

[148] *Id.* at 2.

be more expeditious and efficient.[149] We also stated that SVRS mobile units are currently authorized under the base station license under a "system licensing" method.[150] We sought comment on licensing SVRS VLUs by rule,[151] but no parties other than LoJack commented on the issue.

41. We believe that licensing VLUs by rule would permit the rapid deployment of a mobile telephony activation system that could offer nationwide SVRS coverage. Licensing by rule would greatly increase potential for successful VLU activations by expanding the reach of activation signals. Moreover, to the extent licensing by rule would result in a reduction in the number of new base stations needed to provide nationwide SVRS service, it also may help minimize regulatory burdens on both SVRS licensees and the Commission regarding TV Channel 7 interference studies, applications, and licenses. Additionally, in areas where cellular and base station coverage overlap, cellular activation of VLUs could reduce the times during which base stations are in operation, thus reducing the potential for interference to Channel 7 reception and Federal Government operations. For these reasons, we amend our rules to permit SVRS mobile transceivers to be licensed by rule.

F. The Scope of Section 90.20(e)(6) Operations

42. Section 90.20(e)(6) limits the use of frequency 173.075 MHz to the recovery of stolen vehicles and prohibits "general tracking and monitoring."[152] LoJack seeks to permit additional services related to public safety, health and welfare, and national security,[153] such as: (1) tracking stolen articles, such as cargo containers, automated teller machines, or hazardous material; (2) addressing user emergencies by providing automatic collision notification, medical emergency or vehicle fire notification, and carjacking alerts; (3) tracking missing or wanted persons; (4) locating people at risk (such as Alzheimer's patients or autistic children), or of interest to law enforcement officials (such as sex offenders, parolees, and individuals under house detention if established boundaries are violated); and (5) providing location on demand services.[154]

43. In the *NPRM*, we noted that expanding the permissible use of frequency 173.075 MHz beyond the recovery of stolen vehicles could serve the public interest.[155] However, we expressed concern about the breadth and vagueness of LoJack's proposed expansion of uses, as overuse of the frequency could result in spectrum congestion and interference to Federal Government operations sharing the frequency, as well as to television Channel 7 analog and digital reception.[156]

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[149] *NPRM*, 21 FCC Rcd at 8878 ¶ 21.

[150] *Id.* at 8879 ¶ 22 and note 54, citing Personal Emergency Locator Service, *Notice of Proposed Rule Making*, PR Docket No. 89-599, 4 FCC Rcd 8657, 8659 ¶ 20 (1989).

[151] *NPRM*, 21 FCC Rcd at 8879 ¶ 23.

[152] *See* 47 C.F.R. § 90.20(e)(6).

[153] *See* Petition at 7. LoJack notes that eligibility to use the frequency would remain limited to public safety entities, and would not extend to concierge, convenience, or fleet management.

[154] *Id.*

[155] *NPRM*, 21 FCC Rcd at 8880 ¶ 26.

[156] *Id.*

44. In 2005, PSCID granted LoJack's request for waiver to permit SVRS tracking and recovery of cargo and hazardous materials when conducted by law enforcement entities.[157] The grant permitted LoJack to continue tracking cargo and hazardous materials once removed from a vehicle.[158] PSCID noted that the principal purpose of Section 90.20(e)(6) is to aid law enforcement, and that a waiver is consistent with that purpose.[159] PSCID reasoned that grant of the waiver should give law enforcement entities an additional, important tool to address the security concerns associated with transporting cargo and hazardous materials.[160]

45. MSTV/NAB opposes expanding the scope as that would increase the use of the frequency.[161] Specifically, MSTV/NAB argues that allowing general tracking and monitoring would increase the frequency of transmissions from mobile transmitters, each with a non-synchronized duty cycle with other VLUs.[162] We note that we never sought comment on allowing "general tracking and monitoring," but rather we remarked that such general use has always been prohibited.[163] ABC contends that expanding the scope of operations means there will be more base stations and VLUs.[164] ABC predicts that the interference potential will increase in direct proportion to the number of fixed sites and mobile units in operation.[165] Both ABC and MSTV/NAB believe this would raise the interference threat to TV Channel 7 reception from occasional and tolerable to chronic and intolerable.[166] LoJack responds that the proposed additional uses are narrowly circumscribed, and are not characterized as "general tracking and monitoring."[167] Even if the number of activations were to increase to several times the present figure of forty per day as a result of an expansion in permissible services, LoJack asserts that the number of mobile units in operation would remain small, and in almost all locations no mobile units would be in operation at any given time.[168]

46. We find that a limited expansion of the scope of services permitted on frequency 173.075 MHz would serve the public interest. LoJack's system is created for the purpose of facilitating location and tracking by law enforcement entities. Congress recently has directed the Secretary of Transportation, through the Transportation Security Administration, to develop a program to facilitate the tracking of motor carrier shipments and security sensitive materials.[169] Accordingly, we permit tracking of lost or stolen cargo and hazardous materials, and only by law enforcement. We believe our decision to expand the scope of the rule in this manner is consistent with the directive from Congress. We also find that

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[157] *Waiver Order*, 20 FCC Rcd at 20501 ¶ 13.

[158] *Id.* at 20500-1 ¶ 12.

[159] *Id.* at 20501 ¶ 13.

[160] *Id.*

[161] MSTV/NAB Comments at 5.

[162] Hammett & Edison Statement at 5.

[163] *NPRM*, 21 FCC Rcd at 20501 ¶ 25.

[164] ABC Engineering Statement at 10.

[165] *Id.*

[166] *Id.*, Hammett & Edison Statement at 5.

[167] LoJack Reply Comments at 11.

[168] *Id.*

[169] *See* Pub. L. 110-53, § 1554.

permitting VLUs to transmit automatic collision notification, vehicle fire notification, and carjacking alerts by automatic activation by sensors in the fitted vehicle would serve the public interest.[170] These features would enable quick incident response by police and fire departments. In response to concerns about overuse of the frequency, we expect the number of VLU activations to remain small in relation to the installed base, and use of the frequency will remain limited by the duty cycles imposed by this Order.

47. Next, we address LoJack's proposal to track missing or wanted persons, and locate people at risk or of interest to law enforcement. Given that LoJack's system is created for the purpose of facilitating location and tracking by law enforcement,[171] we believe that tracking and locating such persons would be a natural extension of LoJack's service from recovering stolen and lost vehicles. We perceive a public interest in affording caregivers an ability, through the aid of law enforcement equipped with SVRS technology, to recover individuals in their care who may become lost, such as Alzheimer's patients and individuals with autism.[172] We also perceive a public interest benefit for law enforcement to track missing or wanted persons. By extension, we also find a public interest in allowing law enforcement a method to track and locate individuals of interest, such as sex offenders, parolees, and individuals under house arrest, if established boundaries are violated.[173] Accordingly, we will permit the tracking of missing or wanted persons by law enforcement. We will also allow tracking and locating people at risk or of interest to law enforcement consistent with the purpose of the rule – that is, under the control of law enforcement, and only when such individuals are reported missing, lost, or when established boundaries are violated.

48. We do not expand the scope of permitted operations to include location on demand services beyond those that are authorized above. LoJack did not sufficiently describe what additional location on demand services would actually be, nor did it explain the need for location on demand services that are not already encompassed by those we allow herein. Accordingly, it is unclear, without more specificity as to what any additional services would encompass, how other location on demand service would support public safety. We also conclude that such services generally, without more definition, could be more akin to general purpose tracking or monitoring, which reaches beyond the public safety purpose of the rule. If the public safety community expresses sufficient interest for location on demand service using SVRS in the future, other than those authorized herein, then we may revisit the issue.

G. Emission Designators

49. The rule currently limits SVRS operations to F1D and F2D emissions.[174] LoJack seeks to eliminate the limitation on emission designators, so that it can use analog or digital emissions, as appropriate, to take advantage of technological developments that have occurred since the LoJack system was first implemented.[175] In the *NPRM*, we sought comment on whether it would be appropriate either to

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[170] *See* Petition at 7.

[171] *See* LoJack Comments at 14, note 33.

[172] *See id.* at 13.

[173] *Id.*

[174] *See* 47 C.F.R. § 90.20(e)(6). The first symbol "F" represents frequency modulation on the transmitter carrier; the second symbol "1" or "2" represents digital signal without or with a modulated subcarrier, respectively; and the third symbol "D" represents data, telemetry, and telecommand information. *See* 47 C.F.R. §§ 2.201, 90.207(a).

[175] Petition at 8.

add specific emission designators to the rule, or to eliminate any restriction on permissible emission designators in accordance with LoJack's request.[176] LoJack states that if SVRS operations were limited to specific emission designators, the risk is that the approved list would prove insufficient in the future.[177] Therefore, LoJack argues that the Commission should allow any type of emission. LoJack states that its proposal would avoid another rulemaking in the future and give SVRS licensees the flexibility at the outset to use any emission designators they determine are necessary or desirable.[178] MSTV/NAB remarks that the susceptibility of DTV Channel 7 receivers to a digitally modulated SVRS signal is unknown.[179]

50. In 2005, PSCID granted LoJack a waiver of the emission designator limitations to permit digital modulation.[180] As with the instant request, LoJack sought a waiver of the original analog emission designators so that it could use additional emission modulation schemes, including digital, to enable a more efficient use of the spectrum and its system.[181] PSCID concluded that a waiver to permit digital modulation would further the public interest and would not frustrate the rule's underlying purpose.[182]

51. Coupled with our retention of the power limits and the TV Channel 7 interference study requirement to safeguard broadcast operations, we believe that eliminating the limitation on emission designators would pose little, if any, interference threat. We agree with LoJack that removing the emission limitation would promote flexibility and allow SVRS systems to take advantage of technological developments. We find the public interest would be served if such developments result in more efficient use of the spectrum. Accordingly, SVRS operators may use any type of emission within the authorized bandwidth.

V. PROCEDURAL MATTERS

A. Final Regulatory Flexibility Act Analysis

52. As required by Section 603 of the Regulatory Flexibility Act (RFA), 5 U.S.C. § 604, the Commission has prepared a Final Regulatory Flexibility Analysis of the possible impact of the rule changes contained in this *Report and Order* on small entities. The Final Regulatory Flexibility Act analysis is set forth in Appendix C, *infra*. The Commission's Consumer Information Bureau, Reference Information Center, will send a copy of this *Report and Order*, including the Final Regulatory Flexibility Act Analysis, to the Chief Counsel for Advocacy of the Small Business Administration.

B. Final Paperwork Reduction Act of 1995 Analysis

53. This document contains a modified information collection requirement subject to the Paperwork Reduction Act of 1995 (PRA), Public Law 104-13. It will be submitted to the Office of Management and Budget (OMB) for review under Section 3507 of the PRA. Prior to submission to OMB, the Commission will publish a notice in the Federal Register seeking public comment on the

[176] *NPRM*, 21 FCC Rcd at 8876 ¶ 15.

[177] LoJack Comments at 7-8.

[178] *Id.*

[179] Hammett and Edison Statement at 5.

[180] Waiver Order, 20 FCC Rcd at 20499 ¶¶ 6-7.

[181] *Id.* at 20499 ¶ 6.

[182] *Id.* at 20499 ¶ 7.

modified information collection requirement. In addition, that notice will also seek comment on how the Commission might "further reduce the information collection burden for small business concerns with fewer than 25 employees" pursuant to the Small Business Paperwork Relief Act of 2002, Public Law 107-198, see 44 U.S.C. 3506(c)(4). The modified information collection contained in this order will not go into effect until OMB approves the collection. We will publish a notice in the Federal Register announcing the effective date of the modified information collection.

C. Congressional Review Act Analysis

54. The Commission will send a copy of this *Report and Order* in a report to be sent to Congress and the Government Accountability Office pursuant to the Congressional Review Act, *see* 5 U.S.C. 801(a)(1)(A).

D. Further Information

55. For further information concerning this *Report and Order*, contact Thomas Eng, Policy Division, Public Safety and Homeland Bureau, Federal Communications Commission, Washington, D.C. 20554, at (202) 418-0019, TTY (202) 418-7233, via e-mail at Thomas.Eng@fcc.gov, or via U.S. Mail at Federal Communications Commission, Wireless Telecommunications Bureau, 445 12th Street, S.W., Washington, D.C. 20554.

56. Alternative formats (computer diskette, large print, audio cassette, and Braille) are available to persons with disabilities by sending an e-mail to FCC504@fcc.gov or calling the Consumer and Governmental Affairs Bureau at (202) 418-0530, TTY (202) 418-0432. This *Report and Order* can be downloaded at http://wireless.fcc.gov/releases.html#orders.

VI. ORDERING CLAUSES

57. Accordingly, pursuant to Sections 1, 2, 4(i), 301, 302, and 303 of the Communications Act of 1934, as amended, 47 U.S.C. §§ 151, 152, 154(i), 301, 302, 303, and Sections 1.421 and 1.425 of the Commission's Rules, 47 C.F.R. §§ 1.421, 1.425, IT IS ORDERED that the Report and Order is hereby ADOPTED.

58. IT IS FURTHER ORDERED that Part 90 of the Commission's Rules IS AMENDED as set forth in Appendix B, and that these Rules shall be effective [30 days after publication in the Federal Register].

59. IT IS FURTHER ORDERED that the Commission's Consumer Information Bureau, Reference Information Center, SHALL SEND a copy of this Report and Order, including the Final Regulatory Flexibility Analysis, to the Chief Counsel for Advocacy of the U.S. Small Business Administration.

FEDERAL COMMUNICATIONS COMMISSION

Marlene H. Dortch

Marlene H. Dortch
Secretary

APPENDIX A

List of Commenters

ABC Owned Television Stations (ABC)
Cohen, Dippell, and Everist, P.C. (CDE)
LoJack Corporation (LoJack)
Association for Maximum Service Television, Inc. and the National Association of Broadcasters (Joint Comments) (MSTV/NAB)

APPENDIX B

Final Rules

Part 90 of Title 47 of the Code of Federal Regulations is amended as follows:

PART 90 – PRIVATE LAND MOBILE RADIO SERVICES

1. The authority citation for Part 90 continues to read as follows:

AUTHORITY: Sections 4(i), 11, 303(g), 303(r) and 332(c)(7) of the Communications Act of 1934, as amended, 47 U.S.C. 154(i), 161, 303(g), 303(r) and 332(c)(7).

2. Section 90.20 is amended by revising paragraph (e)(6) to read as follows:

§ 90.20 Public Safety Pool.

* * * * *

(e) * * * * *

(6) The frequency 173.075 MHz is available for stolen vehicle recovery systems on a shared basis with Federal stations in the fixed and mobile services.

(i) Stolen vehicle recovery systems are limited to tracking and recovering vehicles, cargo, and hazardous materials that have been reported stolen or missing; missing or wanted persons; and individuals at risk, or individuals of interest to law enforcement, only when established boundaries are violated. Stolen vehicle recovery systems are not authorized for general purpose tracking or monitoring. Mobile units may also transmit automatic collision notifications, vehicle fire notifications, and carjacking alerts.

(ii) Any type of emission may be used within a maximum authorized bandwidth of 12.5 kHz, except that stations that operate as part of a stolen vehicle recovery system that was authorized and in operation prior to May 27, 2005 may operate with a maximum authorized bandwidth of 20 kHz until May 27, 2019. For a complete listing of emission symbols allowable under this part, see § 2.201 of this chapter.

(iii) Mobile transmitters operating on this frequency with emissions authorized in a maximum bandwidth of 12.5 kHz are limited to 5.0 watts power output. Mobile transmitters operating on this frequency with emissions authorized in a maximum bandwidth of 20 kHz are limited to 2.5 watts power output.

(iv) Base station transmitters operating on this frequency with emissions authorized in a maximum bandwidth of 12.5 kHz are limited to 300 watts ERP before February 18, 2009, and 500 watts ERP thereafter. Base station transmitters operating on this frequency with emissions authorized in a maximum bandwidth of 20 kHz are limited to 300 watts ERP.

(v) Transmissions from mobiles shall be limited to 400 milliseconds for every 10 seconds, except when a vehicle is being tracked actively transmissions are limited to 400 milliseconds for every second. Alternatively, transmissions from mobiles shall be limited to 7200 milliseconds for every 300 seconds with a maximum of six such messages in any 30 minute period.

(vi) Transmissions from base stations shall be limited to a total rate of five seconds every minute.

(vii) Any entity eligible to hold authorizations in the Public Safety Pool in accordance with §§ 90.20(a) and 90.111 of this chapter is authorized by this rule to operate mobile transmitters on this frequency. No license will be issued for mobile transmitters.

(viii) Applications for base stations operating on this frequency shall require coordination with the Federal Government. Applicants shall perform an analysis for each base station that is located within 169 km (105 miles) of a TV Channel 7 transmitter of potential interference to TV Channel 7 viewers. Applicants shall serve a copy of the analysis to the licensee of the affected TV Channel 7 transmitter upon filing the application with the Commission. Such base stations will be authorized if the applicant has limited the interference contour to include fewer than 100 residences or if the applicant:

(A) Shows that the proposed site is the only suitable location (which, at the application stage, requires a showing that the proposed site is especially well-suited to provide the proposed service);

(B) Develops a plan to control any interference caused to TV reception from operations; and

(C) Agrees to make such adjustments in the TV receivers affected as may be necessary to eliminate interference caused by its operations.

(ix) The licensee must eliminate any interference caused by its operation to TV Channel 7 reception within 30 days after notification in writing by the Commission. If this interference is not removed within this 30-day period, operation of the base station must be discontinued. The licensee is expected to help resolve all complaints of interference.

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