The problems in defining multiplexing rules, the increased costs as a result of spreading duplicative overhead time over less available time and thus increasing costs and wasting spectrum, and the delay in rapid response to a customer in an emergency condition are only a few of the considerations described by Dr. Pickholtz that demonstrate the impracticality of TDMA in this application. Taken together, the considerations detailed in the Pickholtz Statement present an insurmountable hurdle to this overly simplistic solution. It is not surprising, therefore, that no other wideband commenter supports Pinpoint's advocacy of TDMA to permit frequency sharing.

3. Pinpoint's Proposal to Rescind Existing Licenses, Even Those Already Operational, is Simply a Subterfuge to Guarantee Its Forced Entry in the Marketplace.

Pinpoint's proposal for dealing with the substantial difficulties of TDMA in the wideband LMS setting, difficulties the other wideband commenters assert cannot be overcome under actual operating conditions, is preposterous, at best, and simply audacious, at worst. Having applied for its first LMS license in February 1993, having entered the field to develop the necessary technology a half a dozen years after the pioneers in the field, and having admitted that system difficulties will delay the introduction of its technology for at least another eighteen months,[14] Pinpoint would have all LMS participants throw their licenses, investments and toil into a pool where the

[14] *Pinpoint Hopes to Debut Prototype Next Month, But Future is Scary,* Land Mobile Radio News, April 23, 1993 at p. 5.

participants -- the "haves" as well as "have nots" -- will voluntarily determine time division protocols among themselves. Of course it would so propose, for Pinpoint there is nothing to lose and everything to gain; in fact, in the absence of such a regulatory sleight-of-hand, Pinpoint will be left far behind by its own technological underachievement.

MobileVision cannot envision that the Commission would adopt such a superficially self-serving scheme, nor that the individual aspects of the proposal require dissection.

B. Fragmentation of the 8 MHz Wideband Segments Will Diminish Capacity to the Detriment of the Public Interest.

In its Comments (and accompanying Technical Appendix), MobileVision described the need for an LMS wideband system to utilize the full 8 MHz allocated for that purpose. It also described the deleterious consequences of a division of that spectrum, including lost accuracy, diminished capacity, and reduced capabilities, accompanied by significant increased costs to the provider and consumer. MobileVision's Comments, as well as those filed by Teletrac, Location Services and Pinpoint are unanimous in the position that the licensing of wideband systems using 4 MHz (or other bandwidth less than 8 MHz) will not permit the construction and operation of a system that provides accurate location services, ancillary communication services, and adequate capacity necessary for such a system's economic viability. Further, all other wideband commenters agree that the result of such spectrum fragmentation is an exponential decrease in the

aggregate capacity available to serve the needs of the marketplace.

The capacity of a wideband system and its accuracy are both proportional to the chipping rate (other parameters being held constant). To operate on less than 8 MHz would either reduce the capacity, if the same level of accuracy is to be maintained, or degrade the accuracy, if capacity is maintained. Furthermore, the reduction in capacity is not linear but is exponential; thus, if other parameters are held constant, a reduction from 8 MHz to 4 MHz equates to a reduction to one-fourth of initial capacity.[15] The wideband system commenters are unanimous - but for one - that a viable wideband pulse-ranging LMS system requires 8 MHz (or more) of spectrum.

The only wideband commenter that urges the Commission to fragment the spectrum on the specious claim that four 4 MHz bands will increase competition is Southwestern Bell. This solitary proposal should be rejected since (1) the accompanying reduction in aggregate capacity is not in the public interest and will ultimately deprive the potential users of diversity of services; and (2) the systems that can be designed within Southwestern Bell's licensing scheme will not be economically viable. Furthermore, the Southwestern Bell licensing scheme will, in fact, reduce competition since it will not increase the number of service providers within the spectrum, as SBMS claims, but will limit competition among technologies that can serve an LMS market

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15 See Technical Annex 2 and MobileVision Comments, Technical Appendix, Section I.

by advantaging those in that market, such as SBMS, who will provide LMS services only as an adjunct to existing cellular services. By eliminating the capacity and ability to provide ancillary communications services, adoption of the SBMS proposal would actually preclude all other licensees from providing competing LMS services.

SBMS's utilization of a 4 MHz band does not derive from carefully adopted solutions to the technical and market realities of the LMS market in the United States, but rather from its decision to license an existing system developed in Australia, which utilizes 4 MHz bandwidths at 400 MHz, rather than develop its own. As a result of this choice, Southwestern Bell now seeks to propose a licensing scheme that fits only its particular case and is inappropriate for systems that relied on the interim rules. In doing so, however, Southwestern Bell may have understated the required occupied bandwidth of the Quiktrak system. Assuming that its request for permissible out-of-band emissions reflects the emissions of its own system, it can be readily ascertained that at the second, and perhaps at the third side lobes, the noise level of the Quiktrak system will be attenuated only by 30 dB or less. Comparing these levels of attenuation with those of MobileVision's system, the Quiktrak system occupies the equivalent of at least 6 MHz and probably 8 MHz, making it ineligible for a license under its own proposed allocation scheme.[16]

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[16] See footnote 61, and accompanying text, <u>infra</u>.

1. Adoption of the Southwestern Bell Proposal to Fragment Spectrum Would Unreasonably Decrease Capacity and Not Serve the Public Interest.

Southwestern Bell's proposal to divide the two 8 MHz bands allocated to wideband pulse-ranging systems by the interim rules and proposed for such continued allocation in the NPRM will significantly diminish the total capacity available to serve the LMS marketplace. There is unanimity among the other wideband commenters that capacity is reduced exponentially as bandwidth is decreased (other parameters such as accuracy remaining constant).[17]

But other parameters may change. In the case of the system licensed by Southwestern Bell, a further technical trade off has been made. As discussed in the Technical Appendix submitted with MobileVision's initial Comments, interference rejection (jamming margin) can be increased by decreasing capacity. Technical Annex 2, hereto indicates that the Australian system operating on 400 MHz in a less congested environment, has increased both jamming margin and range significantly.[18] As a result, however, that system has reduced capacity and when adapted

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17 Technical Annex 2. See, also Teletrac Comments at p. 23 and Pinpoint Comments at pp. 9-10.

18 If SBMS takes advantage of the increased range capabilities of the Quiktrak system, *i.e.*, places fixed antennas further apart, it will "give back" the jamming margin advantages inherent in its system by increasing the probabilities of near/far limit exhaustion. As a practical matter, SBMS cannot take advantage of its range capability because of its limited capacity, *i.e.*, given the vehicle density in the United States marketplaces, more SBMS clusters will be necessary to accommodate the demand for service. As a result, the distances between SBMS towers will be reduced and its range capabilities will go unused.

to the 900 MHz band may have only as little as one-thirteenth (less than 8%) of the capacity of the MobileVision 8 MHz system. If each user made this choice, the resulting dramatic decrease in both individual and aggregate useable capacity would be a colossal waste of spectrum.

2. Southwestern Bell's Proposal Will Defeat the Introduction of Economically Viable Services.

The contraction of the current allowable bandwidth to 4 MHz and the resulting decrease in capacity to a provider committed to accurate location services would negate the ability to provide bundled and individual offerings of location and ancillary services to the mass market of potential users. Market surveys have shown that the public demands bundled services and ancillary communications capabilities are necessary for economic viability. The capacity required for a financially viable system is not merely the theoretical number of location inquiries or subscribers that can be served, but also the ancillary services that can be provided. SBMS proposes a system that simply uses LMS as an adjunct to cellular in order to provide these ancillary services. MobileVision submits that in the absence of such a diversity of services, there would not be sufficient market penetration to justify the investment related to system infrastructure and market entry.

Since it does not intend to use to full advantage any LMS system license it may obtain, it fails to address the effects on economic viability of a system with diminished capacity and capability that is unable to offer the marketplace diverse

services in varying configurations (the type of system that would in theory result from adoption of the SBMS proposal). Rather, as it makes abundantly clear in its comments, and for reasons discussed below, it will utilize the location capabilities of LMS wideband spectrum simply as an adjunct to its cellular service.[19] The public will, in the end, suffer from the resulting loss of otherwise available services.

3. **Southwestern Bell's Proposal is Anticompetitive.**

Most significantly, adoption of the Southwestern Bell proposal is anticompetitive and contrary to the public interest in several respects:

- First, the LMS licensing scheme proposed by SBMS, particularly if its restrictions on emissions are adopted, will result in the actual use of only 4 MHz in each marketplace by SBMS on the relevant 8 MHz band since, without the capability and incentive to provide ancillary services necessary for the viability of an LMS system, other licensees will not redesign to the remaining 4 MHz bands.

- Second, even if entry occurs on the other 4 MHz, the total capacity for services that can be provided over the two 4 MHz bands will be less than one-half of the capacity available to serve the marketplace with 8 MHz band allotments.

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[19] Southwestern Bell Comments at p. 2.

° Third, the LMS licensing under the 4 MHz licensing scheme will create a "tied" service for SBMS that is clearly anticompetitive.[20]

° Fourth, the LMS licensing of SBMS under the 4 MHz licensing scheme will eliminate the actual and potential competition that exists between the SBMS existing services and 8 MHz LMS systems for basic functions, such as emergency roadside assistance or fleet management.

While many of the commenters, and the NPRM, express concern over creation of a duopoly in LMS services, the adoption of Southwestern Bell's proposal would create a much more real concern that the one participant in the current cellular duopoly in each market would simply absorb these services thus eliminating any new competition for any of these services on the relevant band. SBMS's scheme is nothing more than a predatory effort to preclude competition by the exclusion through regulatory

proposal should be ignored for to do otherwise is to deprive the public of technical diversity and market choice.

C. **Wideband Technology, Competition and Public Benefit.**

Throughout the comments of Pinpoint and Southwestern Bell (as well as those of Amtech and some others in the narrowband service segment) is displayed a sense of imminent technological breakthrough, a promise of an impending leap in system capability if only the Commission does not foreclose the opportunities of the newest, potentially better, soon-to-be-developed system. But facts, rather than theory, and experience over twenty years, rather than speculation, do not support even a remote likelihood of such a quantum advance. Rather, the facts are:

- The basic technological possibilities were understood twenty years ago when Hazeltine urged the Commission to provide 10 MHz bands for two "pulse systems" on an exclusive basis for each market.

- The interrelation of bandwidth, chipping rate, noise (jamming margin) and timing jitter existed then, exists now, and will exist in the future and is determinant of the capacity and accuracy of not merely all presently existing systems and those currently in development but of all possible future systems.

- While the Commission may not, at the time, have been mindful of all the difficulties of system development that would arise, when it selected 8 MHz bands for allocation in the interim rules, it created a

bandwidth environment that permitted trade-offs in system development that could and did result in acceptable accuracy and capacity for the types of services the marketplace desires and at infrastructure and operating costs that will make such systems economically viable, other regulatory conditions being acceptable.

° Each of the prospective licensees who wish to enter this marketplace -- Pinpoint and Southwestern Bell -- have made other trade-offs, and trade-offs at the opposite poles. Pinpoint appears, on the basis of its system description, to have opted for enormous capacity, at the sacrifice of accuracy and, most interestingly, with resultant jamming margin at such minimal levels that there are no real world service environments in which the Pinpoint system will function to locate vehicles.[21] Southwestern Bell, on the other hand, appears to have licensed a system technology that is accurate and resistant to interference but with capacity so diminished that only a cellular provider whose use of location services would be an adjunct to cellular communications that would be used to provide the

[21] While the licensing that is the subject matter of this proceeding is for LMS, Pinpoint's marketing efforts appear to focus almost exclusively on mobile data communication capabilities; it may be that lack of location capabilities are not of serious concern to Pinpoint.

necessary ancillary communications services, could provide such a service on an economic basis.

° Nor are these services ready for operation in the United States marketplace. Pinpoint has announced, as recently as April 23, 1993, that its system will not be tested for another eighteen (18) months and months beyond that before the system gets to market.[22] Southwestern Bell has not indicated to date how it will adapt its Australian technology license to United States market and band conditions. One thing appears clear, however, their adaptation of the 400 MHz based system licensed by SBMS is untested and untried in conditions that will be experienced under the FCC licenses it seeks.

° The interests of public benefit are often served by competition, but no interest is served when that concept is misused to deny the ready availability of public services.[23] As indicated in MobileVision's

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22 *Pinpoint Hopes to Debut Prototype Next Month, But Future is Scary,* Land Mobile Radio News, April 23, 1993 at p. 5.

23 "While competition is an integral part of the public interest standard, it is not the whole of [the Commission's] statutory mandate." [citations omitted] *In the Matter of an Inquiry Into the Use of the Band 825-845 MHz and 870-890 MHz for Cellular Communications Systems; and Amendment of Parts 2 and 22 of the Commission's Rules Relative to Cellular Communications Systems*, 89 F.C.C.2d 58, 71-72 (1982) ("Cellular Communications Systems"). See, also *Radio Relay Corp. v. FCC*, 409 F.2d 322, 326 (2d Cir. 1969). Indeed, the timely, expedited and efficient delivery of services of proven high quality and coverage is an important criteria to be weighed with the promotion of competition. Cellular Communications Systems, 89 F.C.C.2d at 72, ¶ 29.

Comments, the marketplace for location and ancillary services has available for its selection a number of competing technologies, such as GPS, dead-reckoning, sign post, etc., all of which can be utilized by cellular, SMR, two-way radio and satellite systems. Each offers alternatives to users focused on specific needs. Further delay in the widespread introduction of multilateration systems by adoption of rules that make such systems either technologically preclude or make economically non-viable such systems now for the benefit of those would be providers, whose promises of future improvement cannot be kept, would be inimicable to the public interest.

III. WIDEBAND AND NARROWBAND LMS SYSTEMS SHOULD BE ALLOCATED SEPARATE SPECTRUM AS PROPOSED IN THE NOTICE

The Commission proposes to reserve 10 MHz of the LMS band for use by narrowband providers, on channels separate from those designated for wideband pulse-ranging LMS systems. Predictably, both wideband and narrowband parties perceived their interests to be affected directly by the proposal and commented on it. The wideband group, with the sole exception of Pinpoint, is unanimous in its support for the Commission's proposed dual band allotment scheme. In addition, a significant number of narrowband

commenters argued for some form of separate band allotment scheme either explicitly or implicitly.[24]

On the issue of narrowband/wideband sharing, the Amtech/ Pinpoint comments assert that the LMS band may be licensed on a 'come one, come all' basis. MobileVision remains steadfastly convinced to the contrary. Setting aside for a moment critical issues of economic viability, service to the public, scope of service or market demand, on a purely technical basis, neither Amtech nor Pinpoint's systems could survive, as they claim, in a shared spectrum environment. MobileVision's analysis contained in Technical Annex 3 hereto, in fact, conclusively demonstrates that narrowband tag reader operations such as Amtech are susceptible to destructive interference from co-channel wideband mobile signals -- a conclusion expressly reiterated by at least one Amtech user.[25] Likewise, a study of Pinpoint's 23 MHz bandwidth ARRAY system set forth in Technical Annex 1 hereto proves the system to be dangerously vulnerable at its fixed receive sites to interference from local area, narrowband fixed transmissions. In fact, due to its reduced jamming margin, its susceptibility to interference is so great that the Pinpoint system simply could not tolerate the

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24 Seven of 22 narrowband commenters, including one that uses Amtech equipment, favored separate allotments. See California Department of Transportation ("CalTrans") Comments at p. 7, Florida Department of Transportation Comments at p. 2, Greater New Orleans Comments at pp. 1-2, Hughes Comments at pp. 10-12, IVHS America Comments at pp.19-20, Mark IV Comments at p. 6 and Texas Instruments Comments at p. 11.

25 Greater New Orleans Comments at pp. 1-2. See discussion, <u>infra</u>, at p. 39.

presence of a local area transmitter anywhere within one of its clusters.

In short, wideband/narrowband sharing is infeasible due to (1) narrowband system interference to wideband systems, especially Pinpoint's, and (2) wideband system interference to narrowband systems, including Amtech's. The Amtech/Pinpoint proposal for band-wide sharing, to the extent it is premised on Amtech's need for multiple 6 MHz channels, is also indefensible. Technology exists today, as reflected in other comments in this proceeding, which demonstrates that utilization of such extensive amounts of spectrum is unwarranted even where tag readers are closely spaced, as in a multi-lane toll plaza.[26] The evidence in the record, MobileVision believes, supports unequivocally the rightness of the Commission's proposed separate band allotment scheme, and that scheme should be adopted. Additionally, narrowband systems operating in the wideband portions of the spectrum should be required to migrate to the allotted narrowband frequencies within six months of the effective date of the new rules, a period of time which certain of the narrowband interests have expressly affirmed is reasonable.

A. The Interference to Wide-Area Systems from Local-Area Systems is Too Great to Permit Co-channel Operation.

The interference which wide-area wideband pulse-ranging systems would experience from co-channel narrowband operations in the same area would be intolerable. The nature and extent of the

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26 Hughes Comments at p. 3.

interference problem are discussed at length in MobileVision's comments and the technical appendix attached thereto.[27] Wideband proponents are unanimous, save one, in echoing that view.[28]

Alone among the wideband commenters, Pinpoint erroneously asserts that wideband and narrowband systems can co-exist on the same frequencies, claiming that concerns over interference have been "grossly overstated by PacTel and others."[29] Pinpoint follows this assertion with a list of recommended cures:

- increased power levels in the mobile units,
- increased power levels in the base station (to 5 kilowatts);
- judicious selection of base station configurations;
- notch filters and interference suppression systems; and
- signal retransmission where lack of response signifies failure of the mobile to receive the signal.[30]

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27 MobileVision Comments at pp. 28-32 and Technical Appendix at Section III.

28 Teletrac Comments at pp. 20-23; SBMS Comments at pp. 11-12; Location Services Comments at pp. 4-5. Tag reader entities who support separate bands for narrowband systems include Hughes Aircraft (Hughes Comments at p. 7) and Mark IV. The latter, the proponent of a short-range, wideband, "tag reader" system, supports separate frequency bands for wideband and narrowband systems even though "to its knowledge, [its system] has never caused harmful interference to any co-located wideband multilateration system." Mark IV Comments at p. 6.

29 Pinpoint Comments at p. 26.

30 *Id.* at pp. 27-31.

The proposed remedies reflect, at best, a lack of technical experience and appreciation for the realities of the marketplace and, at worst, ignorance or indifference to the elements of design required to produce a system capable of meeting the service needs of the public. Any entity having invested the time and effort in the development of wideband LMS technology for today's marketplace, and having the technical expertise amassed in a team such as MobileVision's design group, has often and carefully considered such alternatives and has, to the extent feasible and consistent with an overall requirement to maximize system flexibility and public utility, incorporated them into the technological parameters of its operations. Pinpoint has simply identified the obvious and first avenues of recourse that responsible technicians and designers would consider. MobileVision has certainly considered them; and, judging from its initial Comments and the statements of its advisory experts, so has Teletrac.

Increased mobile unit power levels are impractical because increasing the spread spectrum transmission output power in mobile units beyond the 10 to 12 watt range is impractical and ineffective. Besides incurring additional cost in what is the least cost-effective part of the system (i.e., the mobile power amplifier), battery life, internal self-interference and spectral containment considerations must be taken into account. Of particular significance is the small gain in performance which can be attained by increasing mobile transmission power. With its concomitant increase in interference power levels, even doubling

the transmitted power will only improve range performance in the order of 22% as shown in Technical Annex 1.

Increased power levels in the base station are also not very productive. As shown in Technical Annex 3, if a wideband mobile is five miles away from its fixed site, then a local area system within 3.6 miles of the mobile would block reception of the signal. Increasing the transmitted power from 500 watts to 5000 watts, as suggested by Pinpoint, will almost halve the distance to about two miles which is still a problem. In addition, increasing the power from 500 watts to 5000 watts, increases the degree of interference to the local area system and means that no local area system could exist within two miles of the wideband fixed site (Refer to Technical Annex 3).

Judicious selection of base station locations is to LMS system design what spending cuts are to reducing the national debt. As a practical matter, no licensee can afford to do otherwise. Every site in the system must be chosen with care and consideration for the potential difficulties inherent in a crowded radio environment. To suggest that an LMS system designed to track stolen cars or provide emergency "panic button" responses, for example, could afford to simply avoid sites near narrowband systems operating at automatic toll booths and airport terminal traffic centers, is unrealistic and underestimates the ingenuity of the car thief and the capriciousness of medical and other emergencies. "Black out" areas the size of an airport cannot be tolerated in a commercially viable LMS system. As importantly, no matter how judiciously the fixed base stations sites are selected,

the fact remains that transmissions to and from mobile units will be affected within such "black out" areas, rendering the system inoperable as to those units.

Pinpoint further suggests the use of notch filters and interference suppression systems. Here the issue is one of trade-offs; a balancing of cost -- both monetary and operational -- and effectiveness. As noted by Professor Pickholtz in his statement in support of Teletrac's Comments, the benefits of such measures, even under the most favorable circumstances, assuming cooperative co-channel licensees, is minimal, "probably prohibitively difficult," and costly.[31] In addition, he notes, "such filtering may distort the desired signal, will remove needed signal energy, imposes additional expense at each fixed station, and cannot easily cope with narrowband interference that varies in frequency."[32] MobileVision's experience is that reduction of interfering signals within the main spectral lobe is prohibitively difficult. In addition, continual notching out of interfering signals will eventually render the reception of location pulses impossible, ultimately making the wideband LMS system useless.

Finally, Pinpoint suggests that retransmission of signals which fail to be received can cure the interference problem. While MobileVision's system incorporates this technique

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31 Pickholtz Statement at p. 39.

32 *Id.*, footnote 39. While the passages referenced in the Pickholtz Statement are from a section entitled "Remedying Harmful Interference Between Wideband Pulse-Ranging Systems," the discussion is properly applicable to the question of narrowband/wideband interference and the potential for spectrum sharing.

to the maximum extent feasible, requiring the mobile unit to re-send on a repetitious basis until contact is established, efficient operation of a high capacity system mandates reception and use of the first signal in the normal course.[33] Otherwise, the effect on capacity will be devastating, since retransmitted signals consume time on the system and displace other signals that are necessary to the location function. Moreover, a tag reader transmitter is typically in a constantly transmitting mode creating a permanent black out condition which no amount of resend capability can overcome.

Thus, Pinpoint's argument that the problems of wideband/ narrowband interference are overblown and readily curable is unpersuasive. Moreover, its support for band-wide sharing is all the more unfathomable as it unaccountably ignores the fact that its own system would, in the event it were ever fully implemented, prove exceptionally susceptible to the debilitating effects of interference from co-channel narrowband operations in the same area. The attached technical analysis of Pinpoint's system, including Technical Annexes 1 and 3 thereto, attests to the fact that Pinpoint's claims of robustness are untrue. The requirements of their system -- i.e., high powered fixed and mobile transmissions, closely spaced towers (at greatly increased infrastructure costs) and monstrous bandwidth (23-26 MHz) -- vastly exceed the parameters for LMS systems established under the interim rules, pursuant to which current wideband technology and

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[33] MobileVision Comments at p. 25.

operating systems have been developed. More importantly, despite its disregard for the requirements that have governed utilization of the band, Pinpoint's system design results in the lowest jamming margin of any system and the poorest range, and while it alleges that it could co-exist with Amtech equipment users and local area systems, a simple analysis show that this is not true.

Annex 3, Section 2.5 evaluates the interference of a local area transmitter on wide area system reception of a location burst. The analysis shows that for a Pinpoint system, with a mobile 5 miles from the fixed site, a local area system transmitting 30 W would need to be 15 miles from the fixed site in order not to block the location signal. Even if the local area transmission was reduced to 300 mW, it would block the location

MobileVision has consistently attempted to focus attention on the differing technological and service offerings of the two types of systems, acknowledging that each has strengths and weaknesses, advantages and disadvantages, each being more or less appropriate depending on the needs of the end user to be served.[35] Without concluding that narrowband or tag reader systems are, by consequence, less effective, efficient, appropriate or competent to perform the tasks they undertake in their particular applications, it must be noted that their ability to share the spectrum with wideband systems, without adverse impact, is illusory. The comments of several users of such systems unequivocally attest to that fact.

The Greater New Orleans has participated in this proceeding by opposing Teletrac's Application for Freeze. It identifies itself as an Amtech system user and a licensee of 12 transmitters in the 904-912 and 918-926 MHz bands -- the bands in which MobileVision and Teletrac also hold licenses for wideband pulse-ranging systems. In opposition to the freeze application, Greater New Orleans expresses its concern about the effect that "broad banded mobile transmitters would have on our Amtech equipment." It further precisely describes the scenario which concerns it:

> It is totally possible one of PacTel's mobile transmitters could go off in the immediate proximity of a toll plaza thus locking up one or more frequencies used by our Amtech TollTag

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35 MobileVision Comments on Teletrac Petition for Rulemaking, dated July 23, 1992, at pp. 8-9; MobileVision Comments at p. 23.

> readers. This would prevent the low level tag response from being detected by the tag reader during the receiver cycle, thus resulting in a potential loss of revenue to the Greater New Orleans Expressway Commission; and most certainly disrupting the smooth and rapid flow of traffic through our toll plazas "Tag Only" lanes during the peak rush hours of commuter traffic.

As the deployment of wideband systems continues and increases, concurrent with the expanding use of narrowband tag systems at toll plazas and like installations, it is not just "totally possible" but absolutely inevitable that a wideband mobile user will enter into the range of the tag reader system with its transmitter on. In a shared spectrum environment where such transmissions would occur on a co-channel basis, the resulting interference to the narrowband system would have direct adverse consequences for the user and the public.[36]

Other narrowband proponents and users recognize that wideband/narrowband sharing is infeasible. CalTrans would have the Commission adopt rules "to prohibit locating a new base station within range of an existing electronic toll collection system and vise versa."[37] Implicitly recognizing that wideband and narrowband systems cannot co-exist on the same spectrum, it

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36 On a similar note, CalTrans stated in its Comments that a VCR channel changer (a Part 15 device) "could be used to jam the toll collection system." CalTrans Comments at last (unnumbered) page.

37 CalTrans Comments at (unnumbered) p. 5.

proposes that the 902-928 MHz band be split into separate bands for wide-area and short-range systems.[38]

The Florida Department of Transportation states that it has recently concluded an evaluation of various electronic toll collection systems (including AT&T, Mark IV IVHS, Amtech, Saab-Combitech, and Texas Instruments) in connection with its planned procurement of some form of electronic toll collection technology as well as its on-going and future IVHS demonstration projects. The agency concluded, after its winter 1992-1993 study that "it would be in the best interest of the toll collection industry and future intelligent vehicle-highway system projects if the FCC allocated new frequency spectrum above the [902-928 MHz] band for toll collection and IVHS needs."[39]

C. The Allotment of Spectrum for Narrowband Systems As Proposed in the Notice is Sufficient.

In its comments, Amtech argues forcefully that the adjacent channel interference problems experienced by its tag reader installations mandate spectral spacing of the fixed transmitters at 1 to 2 MHz, "depending on site specific factors," and may mandate total bandwidth "in excess of 10 MHz."[40] While no indication is given by Amtech of the actual frequency with which

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38 *Id.* at (unnumbered) p. 6. In order to accommodate the perceived requirement for three 6 MHz channels, CalTrans would divide the band into segments consisting of one 8 MHz band "for AVL" and one 18 MHz band for short-range communications.

39 Florida Department of Transportation Comments at p. 2.

40 Amtech Comments at p. 9.

such bandwidth would, in its estimation, be necessary,[41] it argues at length that such requirements far exceed the 6 MHz allotment between 912-918 MHz proposed in the Notice as well as the 10 MHz total spectrum proposed to be allotted for narrowband operations.[42] Under requirements recently adopted in California, Amtech states, the necessary bandwidth would be as great as 18 MHz.

The spectral appetite that Amtech displays is placed in proper perspective by the comments of Hughes Aircraft Company. The Hughes VRC system utilizes time-sharing techniques so that "a VRC reader can interrogate, identify, and exchange two-way information with every vehicle in a multi-lane environment using only a single reader, operating on a single frequency, even at high speeds."[43] Hughes describes applications that mirror those which Amtech recites in its comments, e.g., toll collection, parking fee assessment, shipping vessel tracking, and a variety of other IVHS-related uses. Providers of such services, Hughes

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41 The number of 20 lane toll plazas is believed to be sufficiently limited as not to justify the permanent institution of an industry-wide allocation scheme to accommodate such situations.

42 Amtech's argument that the allocated bandwidth for narrowband systems proposed in the Notice represents a 40% reduction over its current allocation ignores the plain language of the Interim Order and assumes that narrowband systems have been properly licensed on spectrum which that Order designated for use by wideband pulse-ranging systems. MobileVision recognizes that this point, as the Commission notes in the Notice, has been a subject of great contention. Amtech's "40% reduction" allegation, however, appears to be simply an example of 'sound-bite politics,' stated for effect, without regard to formal substance.

43 Hughes Comments at p. 3.

concludes, "could effectively share the 902-904, 912-918 and 926-928 MHz bands."[44] The Commission should adopt permanent rules reflective of such spectrum efficient technological advances rather than Amtech's exaggerated concerns.

D. Narrowband Systems Should Migrate to Narrowband Channels Within Six Months.

Each of the wideband licensees supports the Commission's proposal that narrowband providers currently operating at 904-912 and 918-926 MHz should relocate service to the bands allocated for the use. SBMS also supports this position.[45]

The Amtech Group opposes any such relocation premised on its view that the entire 26 MHz spectrum should be shared. (Pinpoint, alone among those who intend to provide wideband pulse-ranging services, also does not support the Notice.)

III. THE COMMENTS SUPPORT EXPANSION OF THE PERMISSIBLE LMS USES AND USERS.

Expansion of LMS along the lines the Commission has proposed is essential for the commercial viability of such systems. Permitting private LMS carriers, permitting service to individuals and the Federal Government and expanding the use of LMS to include the location of all animate and inanimate objects

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44 *Id.* at p. 7.

45 MobileVision urges the Commission only to grant licenses for narrowband users in the bands currently allocated for such use on the interim rules, *i.e.*, 903-904 and 926-927 MHz, pending the final rule adoption, in order to avoid interference with properly licensed wideband providers, and unnecessary subsequent migration of narrowband providers.