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Communications

The new name for PacTel

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MAY 11 1994

FEDERAL COMMUNICATIONS COMMISSION
OFFICE OF SECRETARY

May 11, 1994

EX PARTE

Mr. William F. Caton
Acting Secretary
Federal Communications Commission
1919 M Street, NW, Room 222
Washington, DC 20554

RE: PR Docket 93-61
Automatic Vehicle Monitoring (AVM) Systems

Dear Mr. Caton:

On Wednesday, May 11, 1994, William Goshay, Mario Proietti and I, on behalf of AirTouch Teletrac, met with Richard M. Smith, Chief, Field Operations Bureau, Michael J. Marcus, Assistant Bureau Chief of Technology, and Bruce A. Franca, Deputy Chief Engineer, Office of Engineering and Technology regarding the Automatic Vehicle Monitoring issues being addressed in the proceeding indicated above. We discussed the information set forth in the attached documents. Please associate this material with the above-referenced proceeding.

Two copies of this notice were submitted to the Secretary of the FCC in accordance with Section 1.1206(a)(1) of the Commission's Rules.

Please stamp and return the provided copy to confirm your receipt. Please contact me at 202-293-4960 should you have any questions or require additional information concerning this matter.

Sincerely,

Kathleen Q. Abernathy

Attachment

cc: Bruce Franca
Michael Marcus
Richard Smith

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Review of the Issues Regarding FCC Rulemaking on LMS

PR Docket 93-61: Automatic Vehicle Monitoring (AVM) Systems

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Teletrac

May 11, 1994

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Teletrac operates in Six Major Metropolitan Areas

Teletrac provides important services at affordable prices to individuals, businesses, and government agencies in each of its operational cities.

• *Los Angeles*	*December 1990*
• *Chicago*	*May 1991*
• *Detroit*	*July 1991*
• *Dallas*	*October 1991*
• *Miami*	*October 1991*
• *Houston*	*May 1992*

Services offered by Teletrac

The variety of services possible with Teletrac technology is diverse.

Consumer	Commercial
Stolen Vehicle Recovery	Fleet Management
Roadside Assistance	Panic Button Alert
Mobile Yellow Pages	Tractor/Trailer Security
Peace of Mind Location	Status/Messaging
Remote Door Lock/Unlock	Stolen Vehicle Recovery
	Law Enforcement Applications

Law Enforcement Uses of Teletrac

Teletrac's law enforcement customers include:

- **Federal Bureau of Investigation (FBI)**
- **Drug Enforcement Administration (DEA)**
- **Bureau of Alcohol, Tobacco and Firearms (ATF)**
- **U.S. Customs**
- **Los Angeles County Sheriff**
- **California Highway Patrol**
- **Detroit Police Department**
- **Michigan State Police**
- **Many other agencies in Teletrac's operational areas**

Law enforcement agencies use Teletrac in many ways that are not practical with GPS based systems

Most of these applications require hidden antennas, higher signal margins and a built-in radio communications link.

- **Tracking movements of convicted criminals who may strike again (e.g., child molesters, arsonists, etc.)**
- **Breaking up auto-theft rings and "chop-shops"**
- **Sting operations by equipping an attractive car with a Teletrac device and watching for possible theft**
- **Using Teletrac's history files to link suspects to specific crime scenes**

Contrary to claims by others, GPS based systems cannot do everything that Teletrac's LMS does!

GPS was intended primarily for Navigation and time keeping, not for vehicle tracking. Therefore, GPS solutions are disadvantaged in several important ways.

- **Consumer based services are impractical due to lower GPS satellite signaling margins and line-of-sight limitations.**
- **GPS is not accurate in urban areas due to multipath and shadowing (dead-reckoning or map matching needed to compensate).**
- **GPS requires additional spectrum to send the location back to the service provider or dispatcher.**
- **Under any condition GPS requires additional signaling for differential data to achieve comparable accuracy.**
- **GPS is much less suited to portable applications.**

LMS is lower cost to consumer than GPS

The estimated cost of using GPS for LMS-like applications is much higher than what consumers pay today for LMS.

	GPS	LMS
Basic Unit	$300 - $800	$200 - $500
Basic Unit Antenna	30 - 80	10 - 20
Data Radio	150 - 500	0
Radio Antenna	10 - 20	0
Display/Keypad	0 - 400	0 - 400
Dead Reckoning	300 - 900	0
Alarm Module	0 - 300	0 - 300
Equipment Subtotal	$790 - $3000	$210 - $1220
Installation	$300 - $600	$100 - $400
Total Initial Cost	**$1090 - $3600**	**$310 - $1620**
Monthly Fee	$30 - $80	$10 - $50
5 Year Cost	**$2890 - $8400**	**$910 - $4620**

Teletrac understands the issues associated with use of the 902 to 928 MHz frequency band.

The multi-user environment forces compromises among the users for equitable and efficient use of the spectrum.

- **A hierarchical regime for spectrum use has been established.**
- **In an ideal environment all users would get what they want.**
- **In a multiple -use environment compromises are necessary.**
- **The basic principles and rules that govern licensed and unlicensed spectrum users are well established and have been in place for years.**
- **Users of the spectrum take on the responsibilities (and the benefits) associated with operating in this band when they choose to do so.**
- **Rules must be adapted when necessary in response to technological and market developments (hence, the existence of interim rules and the need for permanent rules).**

Teletrac continues to favor separate frequencies for each provider with co-channel protection

It is the best plan to stimulate innovation and meet market demands for location-based services.

- **Assures lowest cost products and services to end users**
- **Maximizes capacity/Hz of bandwidth**
- **Protects existing investment in LMS and has less impact on future providers designs**
- **Permits technical flexibility which stimulates innovation by allowing providers to develop new services independently**
- **Competitive and market environment suggest optimum of two systems per area**
- **Facilitates implementation of critical emergency voice services**

Teletrac compromise.

A minimal set of rules are proposed that assure a stable operating environment for all users of the spectrum while allowing innovation and flexibility in implementation.

- **Part 15 devices continue to have secondary use of all 26 MHz**
- **Licensed use of 10 MHz on a shared basis for the first 2 LMS systems to construct**
- **Part of the spectrum is dedicated (not shared) to each system to recover service quality and capacity lost due to sharing**
- **Subsequent co-channel LMS systems must prove non-interference**
- **AVI systems get secondary use of LMS segment (lower 10 MHz)**
- **LMS and AVI systems could get co-primary use of upper 16 MHz**
- **Existing AVI systems grandfathered**

Benefits of compromise

Although the compromise is far less favorable to LMS, it benefits other services in the band.

- **Accommodates all operational systems in all services**
- **Provides a cleaner environment for Part 15 uses**
- **Allocates spectrum in proportion to public benefit**
- **Allows AVI contiguous spectrum to aid in development**
- **Responds to market demand for services**
- **Protects existing users from stranded investment**
- **Still allows reasonable technical flexibility for all**

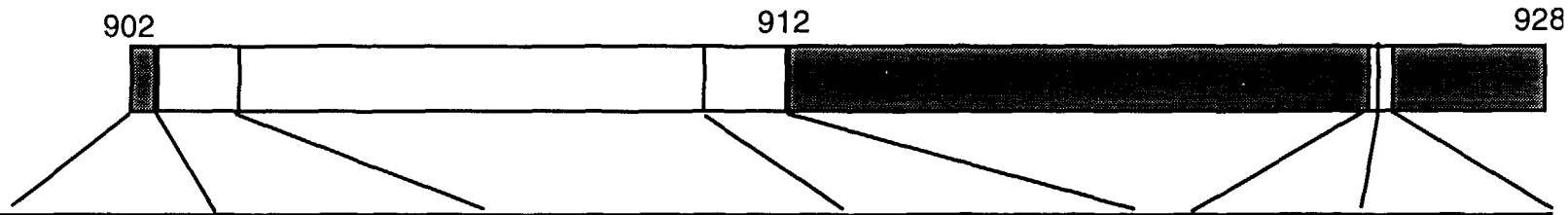
Sharing, if necessary, must be done carefully.

If separate allocation for each LMS provider is not acceptable to the FCC, Teletrac has put forth a compromise proposal in the interest of attaining final rules.

- **A minimum set of rules to allow effective sharing of the LMS spectrum are needed (including power and use limitations)**
- **Separate bands are needed for LMS and narrowband systems**
- **LMS systems can only share reverse (mobile-to-base) channels unless complex and cumbersome coordination is implemented**
- **Authorization for emergency voice should be on a secondary basis**
- **First-to-build protection should be given through licensing**

Technical details of the compromise.

The plan reduces the spectrum allocated for LMS systems from 16 MHz to 10 MHz and includes sharing of 6.5 Mhz.



FREQ	902.0 902.5	902.5 - 904.0	904.0 - 910.5	910.5 - 912.0		924.89 925.14	925.14 925.39
USE	NBFL Upper Segment	WBFL2	LOCATION (shared)	WBFL1		NBFL1	NBFL2
B/W	500 kHz	1.5 MHz	6.5 MHz	1.5 MHz		250 kHz	250 kHz

NOTE: If either system does not use a wideband forward link, it has the option of using 8 MHz of contiguous spectrum (LOCATION sub-segment PLUS their appropriate WBFL sub-segment).

Definition of Sub-Segment Terms:

- LOCATION — Shared Reverse Link for location, data and voice
- NBFL1 — Narrowband Forward Link for System 1
- WBFL1 — Wideband Forward Link for System 1
- NBFL2 — Narrowband Forward Link for System 2
- WBFL2 — Wideband Forward Link for System 2.
- NBFL Upper Segment is for users of the 912 to 928 MHz segment.

Proposed Limitations on Signal Power and Duration

Power limitations on mobile unit signals and time limitations on other signals within the shared sub-segment are needed to maintain tolerable interference levels.

Transmitting Station	Max. Power (Watts ERP)	Maximum Duration
Mobile *	10	1 second
Base Station	500	Continuous
Control Station	10	1 second
Calibration Station	500	50 msec. (1% duty cycle)**
FXOT (Secondary)	10	1 second

* Except data or emergency voice which can transmit up to 30 seconds if limited to 1 Watt ERP.

** System 1 gets first 50 msec of odd numbered seconds (GPS time)

System 2 gets first 50 msec of even numbered seconds (GPS time)

Compromise proposal heavily impacts Teletrac.

The compromise proposal would have significant impacts on Teletrac's system design and is much less preferable than separate frequency allocations.

- **Sharing will require receivers to be upgraded to tolerate competing signals from other system mobiles.**
- **The house keeping signals transmitted by Teletrac today are not compatible with the sharing requirements and will have to be redesigned.**
- **Calibration transmit stations will have to be redesigned.**
- **Higher blocking rates at receiver sites will require location processing software to compensate to maintain acceptable location accuracy and reliability.**
- **Sharing will require greater site redundancy thus increase operating costs.**

Summary

- Part 15 concerns should be taken in context with their allocations outside the ISM band as well as their reduced regulatory oversight. These advantages far outweigh any disadvantages resulting from secondary status.

- Existing customers should not be disrupted. It is more detrimental to the public to displace an existing service than it is to displace one under development.

- The final rules may impact all users of the band, but the end result needs to be a more certain environment in which products and service can continue to develop.

- Real world experience shows Part 15 and LMS do coexist and fears of incompatibility are severely overstated.