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Federal Communications Commission
Office of the Secretary

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

In the Matter of:

Telocator Petition For Rulemaking to Amend Part 22 of the Commission's Rules Concerning The Use of 930-931 MHz For An Advanced Messaging Service	)))))	RM - 7617

ORIGINAL FILE

TELOCATOR PETITION FOR RULEMAKING

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TELOCATOR PETITION FOR RULEMAKING

Telocator, by its attorneys, hereby submits its Petition for Rulemaking to allow use of 930-931 MHz for a new Advanced Messaging Service ("AMS"). As detailed below, the proposed rulemaking envisions a next generation of communications services far beyond what the Commission conceived when originally reserving 930-931 MHz for "advanced technology paging," and would afford American consumers with many exciting and innovative telecommunications services. Moreover, the proposed Advanced Messaging Service would enhance the attractiveness and utility of many new Personal Communications Services ("PCS") now being explored in the Commission's ongoing inquiry.[1]

I. SUMMARY

In 1982, the Commission reserved 930-931 MHz for future use by advanced paging systems. In the intervening years,

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[1] Amendment of the Commission's Rules to Establish New Personal Communications Systems, 5 FCC Rcd 3995 (1990).

the nation's paging industry has experienced phenomenal growth, participated in unprecedented technological progress, and achieved remarkable spectrum efficiencies. As a result, the advanced technology paging systems envisioned for the 930-931 MHz band have already been deployed in the limited, existing spectrum allocated for traditional paging services.

We are now on the verge of another great leap forward in telecommunications. The American consumers' demand for personalized paging services has been growing geometrically. At the same time, increasingly sophisticated digital telecommunications capabilities have opened the door to new opportunities for responding to expanding public needs. The product of these converging forces is a potential new generation of paging best described as "Advanced Messaging Services".

As detailed below, Advanced Messaging Services contemplate a wide range of highly creative applications. AMS would go well beyond paging's current ability to alert and inform. They would include electronic mail, voice mail, facsimile and graphic services delivered to miniaturized, personal receivers. They would not only produce increased efficiencies for American businesses, but meet important consumer needs as well.

AMS would also complement and facilitate the emergence of many other Personal Communications Services now being considered in the Commission's ongoing PCS inquiry. The

attractiveness of CT-2, DECT and PCN services would be heightened by the presence of a low cost, highly efficient messaging service to reach such PCS subscribers wherever they happen to be. AMS would provide an essential, low cost bridge between calling and called parties that could transcend problems associated with limited service areas, different networks and incompatible equipment that might otherwise plague the emerging PCS services.

The sole obstacle to the achievement of an Advanced Messaging Service's potential benefits for the public is the availability of suitable spectrum. These new services cannot be accommodated within existing paging allocations due to lack of frequencies in the largest markets; the general unavailability of common frequencies for wide area operations in most markets; and, important technical considerations.

In such respects, the 930-931 MHz advanced technology paging reserve band represents a perfect home for a new Advanced Messaging Service. The frequencies are well-suited for AMS systems and an allocation for those purposes would be a natural extension of the Commission's original intent to reserve that spectrum for future advanced technology paging needs. Furthermore, this 1 MHz of spectrum is not suitable or sufficient for other potential uses such as Low Earth Orbit Satellite or CT-2 services. Accordingly, prompt release of 930-931 MHz for AMS would affirmatively serve the public interest.

Finally, Telocator believes that the optimum approach for encouraging innovative Advanced Messaging Services would be to pursue "flexible" regulatory policies. Within a broad regulatory framework designed to ensure compatibility and promote the introduction of new, high speed digital transmission systems, AMS entrepreneurs should be allowed to deploy a wide variety of service options and concepts responsive to consumer needs. This flexibility would facilitate improved and expanded service to the public.

II. PAGING HAS BEEN ONE OF THE MOST PRODUCTIVE AND EFFICIENT USES OF SCARCE RADIO SPECTRUM

In 1982, the Commission allocated 3 MHz of new spectrum for paging services.[2] This critically important action opened the door for the astonishing growth and success of paging services in this country. During the past decade, paging has evolved from a business "beeper" service to offer capabilities that the Commission considered "advanced technology paging services" in its 1982 Report and Order. Moreover, the paging industry achieved this progress through the highly efficient exploitation of the limited spectrum dedicated for traditional paging services. As detailed

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[2] Amendment of Parts 2, and 22 of the Commission's Rules to Allocate Spectrum in the 928-941 MHz Band and to Establish Other Rules, Policies, and Procedures for One-Way Paging Stations in the Domestic Public Land Mobile Radio Service, First Report and Order, 89 F.C.C.2d 1337 (1982) ("1982 Order").

below, Telocator's members are now poised to make another leap forward into the next generation of messaging services.

The allocation of spectrum to paging has been one of the Commission's great success stories. Paging's astonishing penetration of the business and consumer marketplace has exceeded everyone's expectations. Since that time, the paging industry has been growing at a rate of roughly 26 percent per year. Today, approximately 10 million subscribers use paging services, with each customer generating an average revenue of about $300 a year (including equipment rental, basic service and usage charges). Thus, paging has become a $3 billion a year business.

This paging progress has been accomplished through a highly efficient utilization of limited spectrum. Today, for example, literally thousands of tone-only, numeric and alphanumeric paging subscribers can be accommodated on a single radio channel.

At the same time, remarkable reductions in the cost of pagers and improvements in service have set the stage for major penetration of the consumer market. Tone only pagers are already available for under $100 and inexpensive wristwatch pagers will be available in the near term. A study by Frost and Sullivan concludes that "paging has the potential to become a principal lifeline for the nuclear

family of the 1990's."[3] In particular, Frost & Sullivan believes that "the wrist watch pager . . . will be a major breakthrough product for the industry . . . [and] bring the convenience of paging to a mass market."[4]

Paging, while meeting the traditional "call alerting" needs of the public, has not been a static technology. Indeed, the industry has already introduced numerous new services that the Commission regarded as futuristic "advanced technology paging services" at the time of the 1982 allocation action. The introduction of powerful yet cost-effective integrated circuits, including new memory chips, has led to growth in demand for pagers that can store and replay numeric and alphanumeric messages. Alphanumeric paging alone has been assuming an increasingly important role in the marketplace with Frost & Sullivan predicting that 12 percent of all pagers will be alphanumeric by 1995. Furthermore, these advanced service capabilities are now available on wide area, regional and even national paging networks offering extensive and high quality coverage for the customer.

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[3] Frost & Sullivan, Radio Paging Market Summer 1990 ("F&S Study") at 71.

[4] F&S Study at 99.

III. PAGING IS NOW ON THE VERGE OF MOVING INTO THE NEXT GENERATION OF "ADVANCED MESSAGING SERVICES"

As a result of technological advances and increased demand for personal telecommunications services, the paging industry is now on the verge of moving into a new generation of services. Telocator believes that the resulting new offerings will combine computer capabilities with miniaturized receivers to produce what can best be described as "Advanced Messaging Services." These services will not simply alert the subscriber that a call or message is waiting, but actually offer the subscriber the ability to access and interact with that message on a customer-controlled basis.

The emergence of AMS is made possible by the remarkable progress in the development of memory chips, voice compression techniques and digital coding and transmission technologies. These advancements permit an increasingly sophisticated marriage of paging transmission systems and messaging services. Indeed, they also provide a low cost means of responding to the dramatically increasing demands for personal communications that employ powerful, but inexpensive, digital technologies.

In particular, Telocator sees AMS as (1) offering a variety of new and advanced technology communications applications including innovative electronic mail, imaging transmission and new consumer applications; and, (2)

facilitating and complementing the advent of important new Personal Communications Services ("PCS"). These significant possibilities are discussed below.

A. New and Advanced Technology Communications Applications

The technological developments in digital systems have created both conditions spawning demand for new sophisticated messaging services and the means of satisfying those new communications requirements. Conspicuous among these developments is the advent of powerful but inexpensive, lightweight laptop and handheld computers (e.g., pocket organizers) which has presented new ways of improving business productivity. More than 10 million of these devices are expected to be in service by as early as 1994, and this figure could grow to nearly 100 million by the end of the decade. As these devices become ever more common in the workplace, users will increasingly rely on a variety of new telecommunications services to further enhance business productivity.[5]

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[5] Many laptops and pocket organizers already provide communications capability -- over 500,000 of these devices will be equipped with modems by 1994. With the availability of AMS, the addition of an inexpensive RF demodulator will transform these devices into highly productive, "wireless" communications terminals that will permit access to, and interaction with, a host of digital messaging services.

1. Electronic and Voice Mail

Among the important new advanced messaging services that will emerge over the next few years are store and forward electronic mail services -- both text and voice. Electronic mail ("E-mail") is already proliferating in the business environment, and it will undoubtedly shortly become as common a business tool as word processing. As laptop computers and other user terminals with large memory capacities become pervasive, E-mail will also become well-suited to mobile and portable conditions.

Cost-effective and sophisticated digital store and forward capabilities will also provide the impetus for enhanced voice paging. When this service was offered initially several years ago, it suffered from two defects related to real time operating constraints which severely compromised its utility -- inconvenient broadcast times and an inability to replay messages. Advances in memory chips and the ability to transmit voice signals in compressed digital form have overcome these problems. Hence, it is now possible for a hand-held user terminal to store and replay synthesized voice transmissions at will, and these types of services are staged to become important, attractive offerings.

2. Imaging Applications of AMS

The technological and societal changes which will precipitate the new voice and E-mail message services will also trigger demand for image message service. A decade ago, when the Commission was crafting its new 900 MHz paging allocations, few businesses employed facsimile. Today, because the need to deliver images rapidly is so great, businesses without fax capabilities can be severely handicapped.[6] It is now possible to cost-effectively and reliably deliver facsimile and other electronic images to portable and mobile terminals over narrowband radio channels. As the population of portable computer terminals grows, businesses will begin to require such services more and more frequently.

3. Consumer Applications

As the benefits of large scale integration begin to be reflected in equipment prices, and the range of services grows, consumer use of one-way messaging will grow substantially. As indicated above, the so-called "wristwatch pager", for example, has the potential to ignite consumer interest in a wide range of advanced message services. The

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[6] In 1988, for example, there were between 1 and 1.1 million telecopiers shipped at a total value of $2.6 billion. Annual unit shipments are predicted to reach 2.9 million by 1992 -- an average growth of almost 27 percent. "An Abundance of Fax," Direct Marketing Magazine, Vol. 52 No. 12 at 69 (April, 1990).

consumer market has been described as "one of the most important areas" for one way messaging,[7] and Telocator's AMS petition is intended to make that prediction a reality.

B. Advanced Messaging Services Complement and Facilitate New Personal Communications Services

Today's paging and cellular telephone services enjoy a complementary and mutually beneficial relationship that feeds demand for both services. It has been estimated that fully one in five cellular subscribers also subscribes to a paging service and uses it to cull through incoming calls and generally employ cellular service more effectively.[8] In fact, it is now becoming increasingly common for paging and cellular operators to promote and market their services jointly.[9] As cellular subscribership burgeons, demand for AMS will also increase.

Even more extensive relationships will develop between advanced messaging services and the new emerging personal communications services ("PCS"). It is anticipated that tens of millions of users will ultimately employ a variety of wireless technologies, each providing a unique set of service offerings and geographic coverage. Advanced messaging

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[7] F&S Study at 71.

[8] See, Clifford A. Bean, "Paging Outlook 1995," Telocator Vol. 13, No. 1. at 25 (January 1989) ("Paging Outlook 1995").

[9] Id.

service will provide the critical "bridging" mechanism that will be needed to link these various PCS users to other systems and to the PSTN.[10]

Moreover, some personal communications services under development have no inward calling capabilities (e.g., CT-2), and users of these must rely solely on other services to alert them of an incoming call. It is envisioned that some terminal equipment may even include built-in AMS receivers to overcome the one-way calling limitations of these PCS system architectures.

IV. RELEASE OF 930-931 MHZ FOR AMS WOULD SERVE THE PUBLIC INTEREST

As is evidenced by the preceding discussion, there will be substantial need for new and advanced message services arising within the foreseeable future. Although AMS will operate at speeds at least 4 to 9 times that of current paging systems, the higher information requirements of AMS will result in smaller per-channel subscriber densities than today's paging services. A single AMS channel is expected to service only one-tenth to one-third the number of subscribers that a conventional paging channel can support. Because the spectrum requirements of AMS will be so much greater,

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[10] Although ultimately some form of personal telephone number may render this AMS "bridging" function unnecessary, this type of highly advanced network capability will lag behind the introduction of radio-based subscriber terminals by many years.

intermixing advanced and conventional service on the same channel would create interminable transmission delays for all subscribers.

Unfortunately, within existing paging allocations, there is a lack of unassigned channels -- especially wide area and regional allotments.[11] Moreover, there are important technical incompatibilities between AMS' system requirements and those that currently exist. Accordingly, in order for new advanced messaging services to achieve their maximum potential consumer benefit, a new spectrum allocation must be created for them.

A. The Existing Paging Allocations Lack Sufficient Number of Vacant Channels to Accommodate AMS

Four frequency bands are currently allocated to common carrier paging: low VHF (35 and 43 MHz), high VHF (150 MHz), UHF (450 MHz) and 900 MHz. Practical equipment problems, propagation difficulties, and television interference potential make the low VHF band unsuitable for an advanced messaging service. Moreover, channel availability in the other bands is extremely limited, especially in the major markets. For example, the high VHF and UHF common carrier channels have been characterized as being "virtually all

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[11] As an indication of the commercial demand for paging, there were over 1,600 applicants for the last 900 MHz nationwide paging channel. See Industrial Communications, Issue #30 at 10 (August 25, 1989).

committed to established carriers . . . in major U.S. markets."[12] This assessment is supported by Frost & Sullivan which found that "[e]ven with the new channels allocated in 1981, these frequency bands are heavily congested."[13]

Telocator recently commissioned CompComm to investigate the expansion capabilities available in the 900 MHz paging allocation in major markets. CompComm was unable to find any uncommitted channels in seven of the top ten markets.[14] The Commission, in fact, has been forced to resort to lotteries to mete out the last available 900 MHz channels in a number of areas including Washington, D.C.; Miami, Florida; New York, New York; and parts of California.[15]

Channels available to support wide area and regional paging networks are in especially short supply.[16] Beyond the general unavailability of vacant channel capacity needed

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[12] Paging Outlook 1995 at 29.

[13] F&S Study at 43.

[14] CompComm located 6 vacant channels in Dallas, 9 in Houston, and one in Detroit. These cities were the only top ten markets with vacant 900 MHz paging channels available.

[15] See, e.g., Lottery Notice, Mimeo 3142 (July 17, 1990) (New York); Lottery Notice, Mimeo 4943 (September 24, 1990) (Miami); Lottery Notice, Mimeo 2301 (March 21, 1990) (Northern California); and Lottery Notice, Mimeo 2059 (March 6, 1990) (Baltimore/Washington and California).

[16] Clifford Bean estimates "15 percent of the 1991 subscribers will utilize multicity, regional or nationwide roaming services," and notes that "[c]ompetition for providing intercity services is already intense," Paging Outlook 1995 at 21, 29.

to initiate a new service, therefore, there is a critical lack of common unassigned channels that are needed to create wide area and regional AMS networks.[17]

B. AMS is Technically Incompatible With Existing System Architectures

In addition to the problem of inadequate spectrum capacity described above, existing paging systems are not easily converted to the AMS systems. As a practical matter, the new services deliver far greater amounts of information, and, consequently would quickly consume much of the capacity now devoted to traditional paging uses. Even more importantly, however, is the technical incompatibility which exists between AMS and existing paging technical parameters and system architectures.

Because the advanced message services described above employ digital source and channel coding schemes operating with transmission rates between four and nine times faster than current digital paging systems, they are not well suited for use on existing systems. The equalization techniques now used for wide area paging operations, for example, are simply inadequate for the high speed signalling envisioned for AMS. The higher transmission rates will require equalization on

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[17] The growing demand for wider coverage system is reflected in the CompComm data which reveals that of the 900 MHz systems in the Boston, New York, Philadelphia and Washington markets, all but six channels are under some form of common ownership.

the order of microseconds rather than the hundreds of microseconds offered in today's systems. This fact, together with the congestion which exists on many paging systems, renders operating paging systems impractical for the initiation of an advanced messaging service.

AMS systems will also undoubtedly have different modulation methods, transmitter power requirements, and transmitter site location and design strategies, all distinguishing AMS from current paging systems and making upgrade of current systems practically impossible. This incompatibility between AMS and existing paging systems' architectures underscores the difficulties associated with the lack of vacant channel capacity upon which to initiate AMS.

C. The 930-931 MHz Band is Best Employed for Terrestrial Advanced Messaging Services

As indicated, the 1982 Order, allocating 3 MHz of new spectrum for paging, reserved the 930-931 MHz for future use by advanced technology paging systems. The Commission, at that time, stated "[w]e intend to explore potential uses of this [930-931 MHz] band in another Notice to be issued in the near future."[18] Because of the lack of vacant channels, especially those needed for wide area and regional networks, and the serious technical incompatibilities which exist

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[18] 1982 Order at 1342.

between existing paging systems and the proposed AMS systems, Telocator submits that now is an appropriate time for the Commission to inaugurate a proceeding to permit use of these frequencies for an Advanced Messaging Service.

Telocator recognizes that, in two separate proceedings, the Commission has suggested that this one megahertz band could be employed for either an advanced cordless telephone service (CT-2)[19] or as an uplink in low earth orbit ("LEO") satellite applications.[20] As discussed below, using 930-931 MHz for either of these two applications is problematic, and the band would be far better employed in the one-way terrestrial applications, as it was originally intended.

In the initial round of PCS comments, it was noted that the CT-2 system design now being deployed in the United Kingdom is not well matched to the allocation suggested by the FCC. The UK system design involves a contiguous four megahertz band while the FCC's suggested allocation would encompass three megahertz, including the 930-931 MHz band, spread out over 39 MHz. The cost and performance implications of this difference are dramatic.

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[19] Amendment of the Commissions Rules to Establish New Personal Communications Services, 5 FCC Rcd 3995 (1990).

[20] An Inquiry Relating to Preparation for the International Telecommunication Union World Administrative Radio Conference for Dealing With Frequency Allocations in Certain Parts of the Spectrum, Second Notice of Inquiry, FCC 90-316 (October 2, 1990).

In its comments on the Commission's proposal, GEC Plessey, a manufacturer of CT-2 equipment used in the United Kingdom, urged the FCC to allocate at least four to six megahertz of spectrum capacity to CT-2, but to maintain the frequencies within no more than 20 MHz of total bandwidth.[21] Plessey contended that the basic CT-2 design could not be made to work with an allocation of the sort proposed by the Commission absent a costly and extensive product redesign.

The recent reply comments in the PCS Inquiry further confirm these results.[22] Although supporting a three megahertz allocation "only if no other suitable source of four megahertz contiguous spectrum is available," GEC Plessey indicates that the capacity and equipment performance of a CT-2 system would be reduced by such an allocation.[23] Another party that originally advocated the use of the 930-931 MHz band in fact reversed its position on reply, and now advocates an allocation consistent with the Canadian allocation at 944-948 MHz.[24] Even the handful of parties

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[21] Comments of GEC Plessey at 42, GEN Docket No. 90-314 (October 2, 1990).

[22] Surprisingly, of the over 100 commenters filing in the PCS proceeding, only a limited number have elected to address the proposal to use unlicensed spectrum in the 900 MHz band in the reply round. Telocator has attached, as Appendix A hereto, the pertinent parts of commenters' replies gleaned from an preliminary review of all reply comments.

[23] Reply Comments of GEC Plessey at 45, GEN Docket 90-314 (January 15, 1991).

[24] Reply Comments of Advanced Cordless Technologies, Inc. at 3, GEN Docket 90-314 (January 15, 1991).

like Northern Telecom that support a CT-2 allocation in the 930-931 MHz band continue to request more suitable spectrum, but prefer the 900 MHz spectrum to nothing at all.[25]

In contrast to the lukewarm support for such an allocation, there is, as evidenced by the excerpts in Appendix A, widespread and well-founded opposition to reallocation of 900 MHz spectrum.[26] These excerpts confirm that the Commission's proposal to allocate three megahertz in the 900 MHz band for a CT-2 type of service will not provide a sound foundation for the future.

Likewise, as Telocator demonstrated in its comments on the Commission's proposals for WARC-92,[27] employing the 930-931 MHz band for LEO service presents serious difficulties. As an initial matter, at least some of the LEO applicants have expressed a preference for VHF allocations, as opposed to higher frequencies. Presumably, this preference is based on the greater power required of higher frequencies, and the resulting size, weight and cost implications. Insofar as demand for LEO services will be sensitive to matters of size, weight and cost, a lower allocation might be better suited for LEO services. This point was best summarized by

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[25] See, e.g., Reply Comments of Northern Telecom, Inc. at 8, GEN Docket No. 90-314 (January 15, 1991).

[26] See Reply Comments reproduced at Appendix A, GEN Docket No. 90-314 (January 15, 1991).

[27] Telocator Comments in Response to The Second Notice Of Inquiry, GEN Docket No. 89-554 (December 3, 1990).

Motorola, Inc., a paging carrier, equipment manufacturer and LEO satellite proponent in its initial comments in the PCS docket:

> [930-931 MHz] is being offered to someone who does not want it in lieu of its deployment for the use for which it was set aside. It is a paging allocation surrounded by paging allocations. Let it be![28]

Beyond these technical and economic problems, the Article 14 coordination needed to use this band in this fashion could be exceedingly difficult to obtain, especially from administrations which employ these frequencies for terrestrial purposes.[29] Because of the potentially easier coordination aspects, LEO services might be better accommodated in frequency bands already allocated for satellite use.

In contrast, the 930-931 MHz band is ideally suited for terrestrial message services. The Commission deliberately created this band between two other assigned paging services on the theory that it could be used to develop advanced technology paging services. Authorizing AMS in this band would facilitate development of cost-effective equipment

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[28] Comments of Motorola, GEN Docket No. 90-314 (October 2, 1990).

[29] Indeed, insofar as LEO use of these frequencies could conflict with off-shore radar employed by the U.S. Navy, coordination with the U.S. government itself could prove to be difficult.

using many of the radio frequency components already employed in conventional paging gear.

Furthermore, as indicated above, the "advanced technologies" the Commission had in mind in 1982 are now common. Nevertheless, completely new, high speed data message services would blossom in this band, and Telocator urges the Commission to grant its petition and commence a rulemaking to allow use of the 930-931 MHz band for an Advanced Messaging Service.

V. THE COMMISSION SHOULD ESTABLISH "FLEXIBLE" REGULATORY POLICIES FOR ADVANCED MESSAGING SERVICES

Telocator is of the view that the optimum approach for encouraging innovative advanced messaging services would be to establish "flexible" allocation policies. Under this approach, a broad regulatory framework would be established that would control interference and promote use of high speed digital transmission systems. At the same time AMS entrepreneurs would be provided with the means and incentives to introduce a wide variety of communications services responsive to consumer needs.

Because of the greater information density AMS systems will transmit, Telocator believes that the formation of AMS technical standards should contemplate larger transmitting facilities (radiated power and antenna height) than that provided by the current rules. In order to provide carriers with flexibility to conform their system architecture to best

meet the needs of their subscribers, however, few, if any, limitations ought to be placed on the source or channel coding carriers use to design their systems.

Moreover, to encourage the inauguration of innovative services and concepts, the Commission is urged to refrain from restricting to the types of services carriers are allowed to offer on these frequencies. The consumer benefits flowing from such a regime are well established. For example, an impressive list of imaginative services and technologies has emerged since cellular carriers were granted similar technical and operational freedoms. When coupled with the robust competition among AMS licensees and those of other one-way services, these policies will better promote consumer welfare than narrowly focused technical and service regulations. Accordingly, Telocator recommends that the Commission establish a flexible regulatory regime for AMS.

VI. CONCLUSIONS

In view of the foregoing, Telocator respectfully requests that the Commission initiate a rulemaking proceeding to allow use of 930-931 MHz for new Advanced Messaging Services. This action would be consistent with the Commission's original intent to reserve that band for advanced technology paging services. More importantly, the relief sought by Telocator would permit the introduction of innovative services that respond to emerging consumer needs