ORIGINAL

BEFORE THE

Federal Communications Commission

WASHINGTON, D.C. 20554

In the matter of	GEN Docket No. 90-314 / ET Docket No. 92-100 /
Amendment of the Commission's Rules to Establish New Personal Communications Services	RM-7140, RM-7175, RM-7617, RM-7618, RM-7760, RM-7782, RM-7860, RM-7977, RM-7978 RM-7979, RM-7980

To: The Commission

COMMENTS OF PACTEL PAGING ON THE NOTICE OF PROPOSED RULEMAKING

Mark Stachiw
PacTel Paging
Three Forest Plaza
12221 Merit Drive
Suite 800
Dallas, TX 75251
(214) 458-5212

Carl W. Northrop
Bryan Cave
Suite 700
700 Thirteenth St., N.W.
Washington, D.C. 20005
(202) 508-6000

Date: November 9, 1992

045

TABLE OF CONTENTS

TABLE OF CONTENTS
Page 2

SUMMARY

PacTel Paging ("PacTel"), an active, longstanding proponent of advanced messaging services, is commenting on the proposed allocation of narrowband PCS spectrum in the 900 MHz band in ET Docket No. 92-100.

The comments point out valuable lessons to be learned from the licensing and operating experiences in the paging business which can be applied to formulate a narrowband PCS licensing structure that will prove to be workable and beneficial.

Following consultations with other proponents of narrowband PCS, PacTel sets forth a 900 MHz channel plan and regional licensing scheme that will create diverse services and robust competition.

PacTel has formulated a creative two-tiered application fee structure enabling the Commission to impose fees which will discourage speculation within the existing statutory framework of fees.

BEFORE THE

Federal Communications Commission

WASHINGTON, D.C. 20554

In the matter of	)	GEN Docket No. 90-314
	)	ET Docket No. 92-100
Amendment of the	)	
Commission's Rules to	)	RM-7140, RM-7175, RM-7617,
Establish New Personal	)	RM-7618, RM-7760, RM-7782,
Communications Services	)	RM-7860, RM-7977, RM-7978
	)	RM-7979, RM-7980

To: The Commission

COMMENTS OF PACTEL PAGING ON THE NOTICE OF PROPOSED RULEMAKING

PacTel Paging ("PacTel"), by its attorneys, hereby submits its comments on the Notice of Proposed Rulemaking, 7 FCC Rcd. 5676 (1992) ("Notice") in the above-captioned proceeding.[1/] These comments are limited to addressing issues respecting the narrowband PCS services to be provided in the 900 MHz allocation which are under consideration in ET Docket No. 92-

---

1/ On September 14, 1992, PacTel filed a petition seeking reconsideration of the Commission's "Tentative Decision" to deny PacTel a preference in ET Docket No. 92-100 despite PacTel's pioneering work in the development of Advanced Architecture Paging ("AAP"), a form of narrowband PCS service. See PP-38. Consequently, PacTel will not be addressing the pioneer's preference portions of the Notice in this pleading.

100 in the consolidated proceeding.[2/] The following is respectfully shown:

I. INTRODUCTION

1. PacTel is a fully separated subsidiary of Pacific Telesis Group ("Telesis"). PacTel is one of the leading providers of paging services in the country. The company operates extensive common carrier and private carrier radio paging systems in thirteen states which serve over 750,000 units. PacTel provides a broad array of messaging services over these facilities, including tone, voice, digital display, and alphanumeric services.

2. PacTel is an active longtime proponent of certain advanced messaging services which now are included under the rubric "narrowband PCS". For example, in July of 1991, PacTel's parent, Telesis, notified the Commission that PacTel intended to begin testing an advanced technology platform called "Advanced Architecture Paging" as part of a broad-based PCS experimentation program that Telesis had been authorized to undertake.[3/] The

---

[2/] PacTel's parent, Pacific Telesis Group, will be filing separate comments addressing the wideband PCS aspects of the Notice at issue in GEN Docket No. 90-314.

[3/] On February 20, 1991, the Commission granted Telesis authority to conduct a variety of experimental propagation and system tests in multiple frequency bands. The experimentation has been conducted through the company's (continued...)

experimental program related to the development of a high-speed unformatted digital data stream which provides the platform for a whole host of narrowband PCS services, including enhanced character sets, low and high resolution graphics, E-Mail, facsimile, digitized voice, video and lengthy alphanumeric messages.[4/] PacTel, working in conjunction with Telesis Technologies Laboratory ("TTL"), has aggressively pursued its program of experimentation, to the point where it has developed and is testing a prototype system capable of delivering in a simulcast mode 19.2 kilobits per second of information in an unformatted form over a 25 kilohertz channel.[5/] Assuming that acknowledgment/set-up channels also are made available to couple with such a channel, the capacity of a single system utilizing this advanced technology could be increased to 7.2 million subscribers per channel with an average message length of 5,000 bits. This compares to today's traditional paging systems which

---

[3/](...continued)
research arm, Telesis Technologies Laboratory ("TTL"). See FCC File Nos. 1658 through 1662-EX-PL-90. PacTel has worked with TTL and directed its efforts on the advanced messaging research.

[4/] See "Notice of Details of Experimental Program," filed July 29, 1991, with reference to FCC File No. 1934-EX-TC-91.

[5/] The capacity of the system will be increased even further with the use of an acknowledgment/set-up channel which would allow the message to be transmitted in only a portion of the entire system where the subscriber is located. The capacity also could be doubled to 38.4 K baud if a 50 kilohertz channel assignment were made, as was suggested in the Notice.

can support less than 2,000 such subscribers in the same bandwidth -- a potential 6,000% increase in capacity.[6/]

3. As a result of PacTel's high profile as a strong proponent of advanced messaging services, the company has taken an active role in ET Docket No. 92-100. PacTel has carefully reviewed all of the principal proposals for narrowband PCS services in the 900 megahertz band, and has engaged in an on-going dialogue with other proponents of service in this frequency range in an effort to reach common ground which will promote diverse services and create meaningful licensing opportunities for existing carriers and newcomers alike.[7/]

II. The Commission Must Recognize The Unique Attributes of Narrowband PCS

4. The Commission has broadly defined PCS as a family of mobile or portable radio communication services which encompasses a wide range of capabilities and technologies.

[6/] These calculations have been developed in the course of the ongoing experimentation. The results of the experimentation recently were presented to the Commission in a series of meetings, and will be more fully reflected in the next experimental report filed under the experimental license authority.

[7/] Not surprisingly, there are differences between the various narrowband PCS proposals that exist and cause variations in the particular channel plans and regional plans proposed by each proponent. PacTel believes, however, that important common themes and approaches are emerging, a fact which will be explored more thoroughly at the reply stage of the rulemaking process when all of the separate proposals have been finalized and presented.

Notice, para. 29. Because of the breadth of this definition, the Commission has chosen to propose licensing rules for both wideband PCS (in the 2 GHz band) and narrowband PCS (in the 900 MHz band) in a single proceeding. PacTel understands the rationale for this Commission approach.[8/] However, in order for this approach to make any sense, the rules for the narrowband PCS service must recognize the many critical distinctions between narrowband and wideband PCS services. These distinctions have profound implications and will lead to the adoption of distinct licensing schemes in respect of each band.

5. In the licensing of PCS, the Notice seeks to balance four values in allocating spectrum and designing an appropriate regulatory structure for PCS: universality, speed of deployment, diversity of services and competitive delivery. Notice, para. 6. PacTel supports these goals. However, the best

---

[8/] Based upon meetings with representatives of the Commission, PacTel understands that the diversity of proposals in both the 2 GHz and the 900 MHz bands caused a blurring of distinctions between wideband and narrowband service offerings which would have made definitions difficult if the two bands were not dealt with in a single PCS proceeding. PacTel also understands that the Commission desired to expedite the licensing of the 900 MHz spectrum by incorporating it into the on-going 2 GHz PCS proceeding which was on a "fast track". Although PacTel was an early advocate of a separate rulemaking proceeding for the licensing of the 930-931 MHz band which previously was reserved for advanced paging uses, PacTel can accept the common proceeding approach so long as the Commission severs the 900 MHz allocation for prompt resolution in the event that the unique issues respecting the 2 GHz allocation start to delay the rulemaking process.

means of optimizing and balancing these four goals will not be the same for narrowband PCS as for wideband PCS.

A. The Paging Industry Provides A Useful Model for Narrowband PCS

6. Both paging services and cellular services are a form of PCS. There are, however, dramatic differences between the nature of the two services, the manner in which they have been regulated historically, and the industry structures that have evolved. These distinctions deserve attention in connection with the adoption of a PCS licensing scheme.

7. Paging services and cellular services are about as different as any two members of the same family could be:

- Cellular services are generally high functionality services. In contrast, paging services are low functionality communication services. As a result, cellular tends to be dominated by business subscribers, while a vast consumer market for paging services is opening up to individuals with personal uses for communication.[9/]

[9/] In fact, a considerable retail distribution effort is underway by most of the major paging licensees. PageNet reports that its retail net gains already average 6,000 units per month. Ex Parte Presentation, dated October 21, 1992, of Paging Network, Inc. PacTel is also adding a substantial number of retail units.

- Cellular's system architecture is based on small cells operating at relatively low heights and powers. In contrast, paging services generally rely upon relatively high-powered base stations at prominent locations to provide wide-area services, often over a multistate area.[10/]

- Cellular carriers receive a single grant of a relatively large block of spectrum (25 MHz) which is intended to serve all their frequency needs throughout the life of their system. In contrast, paging licensing is done on an incremental basis by which a carrier is generally given a single channel to start with, but is allowed to license additional channels as needs arise.

- Unlike cellular which must construct additional cell sites to keep up with subscriber growth, the same paging infrastructure must be in place for the first unit as for the last; thus, subscriber unit volumes create economies of scale.

[10/] For instance, the maximum power available to 931 MHz paging licenses on internal sites is 3500 watts ERP. Cellular, on the other hand, is limited to 500 watts ERP.

- Cellular services have developed out of a licensing plan geared to metropolitan area service territories arising out of the Commission's MSA/RSA licensing scheme. In contrast, the paging industry has developed out of a much more chaotic licensing approach. Many paging frequencies are licensed on a reliable service area contour basis, leading to service territories with a radius as small as 20 miles.[11/] Others, in particular the most recently allocated 931 MHz common carrier paging frequencies, were made available in part for regional and nationwide licensing.[12/]

- The cellular services were licensed with restrictive eligibility requirements (such as financial showings, etc.) which govern who can provide service, and the manner in which business operations must be conducted. In contrast, historical eligibility restrictions with respect to licensing in the paging services have long

---

11/ This has led to a patchwork of licenses. For example, the paging channel designated P-6 (158.70 MHz) may be licensed to one company in a downtown area, but licensed to someone else in the outlying suburban areas.

12/ See FCC Rules Section 22.501(p)(1). Although these frequencies were made available on a regional basis the licensing of these frequencies is nonetheless done on a reliable service contour basis.

since fallen by the wayside, resulting in market entry largely free of eligibility restrictions.

- Cellular services were initially authorized subject to comprehensive technical standards and inter-system operability standards. In contrast, paging services have been licensed with a minimum of technical standards, thereby leaving it to the industry participants to work out paging formats and protocols that would enable inter-system compatibility.[13/]

8. The foregoing distinctions between the cellular and paging businesses are not matters of merely historical interest. As was recently acknowledged in the remarks of Commissioner Sherrie P. Marshall before the Telocator Annual Convention in San Francisco, California, paging services have acted as "the backbone of the mobile communications industry".[14/] Commissioner Marshall further recognized that the narrowband PCS

[13/] In fact, this lack of technical standards in the paging industry has created some problems in the past. Different paging formats have led to inefficiencies in the systems and harmed economies of sale. However, the paging industry, through Telocator, is now taking a more proactive role in technical standards development (evidenced, for example, by the TTNP interterminal standard and adoption of the POCSAG standard).

[14/] See The PCS Experience -- "A Little Touch of Harry In the Night" released September 25, 1992.

allocation represents "the future of today's paging industry". Id. This fact is readily demonstrated by the composition of the parties who have requested pioneer's preferences in ET Docket No. 92-100. The group is heavily populated by major providers of state of the art paging services in the United States.[15/] It is no mere coincidence that so much attention has been paid to the 900 MHz allocation by this group of industry participants.[16/] The common interest of paging service providers in the 900 MHz allocation is grounded in the core similarities between narrowband PCS services and paging services.[17/]

B. Lessons to be Learned from the Paging Industry.

9. Throughout the Notice, the Commission references lessons it has learned in the course of licensing and overseeing

---

15/ Among the preference applicants for narrowband PCS services are PacTel, Mobile Telecommunications Technologies Corporation ("MTel"), Dial Page, L.P., Paging Network, Inc. ("PageNet"), Mobile Communications Corporation of America ("MCCA"), and Page Mart, Inc. This list includes a broad cross-section of paging service providers, including some of the nation's largest carriers.

16/ In fact, the Commission should recognize that industry participation and experimentation is something new. In the past, manufacturers, not service providers, drove product development. Now, it is the service providers who are driving the process. This is exactly what the pioneer's preference procedure was meant to foster, and it has.

17/ To some extent also, these paging service providers are participating because a part of the spectrum being considered for narrowband PCS was originally allocated for advanced paging (930-931 MHz).

cellular telephone operations, and seeks to draw upon those lessons to formulate a PCS allocation scheme that makes sense.[18/] The Commission can use the experience of licensing paging systems to draw valuable lessons for narrowband PCS. The narrowband PCS licensing scheme will evolve in a more appropriate fashion if the paging industry model is the frame of reference rather than the cellular model.

1. Large Geographic Regions Are Required to Satisfy Market Demands.

10. The Notice seeks comment on four alternative geographic plans (nationwide, 49 Major Trading Areas ("MTAs"), 197 LATAs or 487 Basic Trading Areas). Notice, para. 62. None of these demarcations bears any meaningful relationship to the natural service territories that have developed in the marketplace for traditional paging services.

11. Generally, paging services have been authorized based upon reliable service area contours which, on a per-transmitter basis, result in relatively minute geographic service territories. Nevertheless, a survey of the services provided by paging companies throughout the nation reflects an unmistakable

---

[18/] See, e.g., Notice at paras. 7, 23-24, 56-60, 86 and Appendix O. The Notice asks on some issues whether the cellular model is appropriate for narrowband PCS. For instance, the Notice asks whether cellular carriers should be allowed to hold narrowband PCS licenses in view of the Commission's perception that PCS is like cellular, and will compete with it.

evolution of regional systems. What began as essentially a local service (e.g., the ability to page a doctor when he or she was off-duty at home) has become a city-wide, then a metropolitan area, then a state-wide, then a multi-state, and, in some instances, a nationwide service, as the mobility of subscribers increased over time. For example, in order to meet existing demands, PacTel now operates an integrated regional paging system that provides service throughout the western states of California, Nevada, Arizona, Washington, and Oregon and extends from the Canadian border to the Mexican border. The company also is developing regional multi-state systems in other geographic areas, such as the Southeastern United States. This experience has been mirrored by other paging carriers. Notably, systems in the northeast typically extend from Maine all along the eastern seaboard to Virginia and beyond.

12. It is particularly important for the Commission to note that this evolution of the paging business has been dictated by market forces and not by the Commission's licensing scheme. In fact, the current manner in which most paging channels are licensed on a reliable service area contour basis tends to frustrate rather than foster the development of wide-area and multistate systems. Nevertheless, the marketplace has demanded the aggregation of territories into comprehensive region-wide

systems, and carriers have responded accordingly.[19/] Unfortunately, in the absence of a licensing scheme that enables a carrier to be licensed as an initial matter for a sufficient geographic area, carriers are subjected to unnecessary expenses and delays in implementing wide-area multistate systems to meet customer demands.[20/]

13. Dividing the country into large geographic regions for the narrowband PCS services[21/] also is supported by the operating experiences of the existing nationwide paging carriers. As the Commission is aware, three channels in the 931 to 932 MHz common carrier paging band are set aside for nationwide network paging service as provided for in Section 22.527 of the Commission's rules. Two of the three available channels already have been developed into extensive nationwide systems by their

---

19/ Consequently, a better approach for licensing narrowband PCS would be to subdivide the country in the first instance into 5 large regions, thereby enabling carriers to be licensed for areas capable of competing with the regional systems that have evolved in the paging marketplace.

20/ In some instances, such as the VHF and UHF paging channels, the channels are licensed in a patchwork of small license areas. The only way to build wide-area systems on these channels is to buy the operating rights from those operating in adjoining areas, thus incurring substantial transaction costs.

21/ A smaller geographic region is appropriate for wideband PCS services which have larger capital requirements and lower power limits requiring a higher concentration of transmitter sites. Telesis is proposing the 487 Basic Trading Areas as the appropriate geographic scope of wideband PCS licenses.

respective licensees, SkyTel and BellSouth.[22/] Notably, however, these two "nationwide" carriers still have subdivided the United States for their internal service purposes into three and five geographic areas, respectively. The subdivisions recognize the fact that much of the subscriber demand is for regional service, not fully nationwide service. So, as an option, nationwide carriers provide regional service to various customers.

14. Since the narrowband PCS industry will demand at least the coverage of existing paging systems, PacTel proposes that the country be subdivided into five geographic regions for the purpose of licensing narrowband PCS services.[23/] Attachment 1 hereto is a copy of the particular regional plan that PacTel has developed. The regional plan is based on the 49 Major Trading Areas ("MTAs") which are grouped into regions according

---

[22/] The third channel was relotteried when the original grantee relinquished the channel. The purchaser of the subsequent grantee, Motorola, is now in the process of system buildout.

[23/] PacTel does not believe that regions of this size serve to create unreasonable barriers to entry to newcomers or risks of delays in construction. Due to differences in the number of channels that will be allocated and the power limitations, narrowband PCS systems can be implemented much less expensively than wideband PCS systems. In fact, given the differences in capital requirements between wideband and narrowband PCS infrastructure, the region can easily be 8 to 10 times larger and not discourage entrepreneurs. Consequently, it is feasible for start-up companies to garner the financing necessary to implement such services in a broad geographic region. Also, there are a number of instances in which relative newcomers to the paging business have implemented large-scale networks in a relatively short period of time, thereby indicating the feasibility of regional or nationwide build-outs of this nature.

to natural service boundaries.[24] The result is a regional plan which includes a western region, a mid-south region, a mid-north region, a northeast region and a southeast region.[25] Based upon its experience in the marketplace, PacTel believes that these proposed regions bear a working relationship to areas of commerce that have emerged in the paging business.[26]

2. Consumers Demand Low Cost Alternatives.

15. The advent of cellular service was considered by some to pose a grave threat to paging services. However, the dire predictions proved to be completely untrue. A substantial number of studies have been conducted to assess the present and future growth of the paging industry. These show paging growth rates for the period 1986 to 1990 approaching 20 percent per

---

[24] For instance, the Western Region is comprised of the following MTAs: Los Angeles, San Francisco, Portland, Seattle, Spokane, Salt Lake City, Phoenix and Denver. These groupings are based primarily upon airline travel among major airline hubs.

[25] Rather than have licensing areas which subdivide many states, PacTel trued-up the geographic boundaries to match state boundaries where possible.

[26] One additional problem with smaller geographic areas is the problem associated with co-channel interference. In the cellular service, co-channel licensees are required to coordinate so as to eliminate interferences. This is generally done by each licensee picking which frequencies it will use at the border areas. In narrowband PCS this is not possible because each licensee will only have one channel. At the borders of the licensing areas there will be no reliable service. Thus, the geographic scheme must minimize the number of boundaries.

year. Many of the studies project this growth rate to continue over the next 5 years and a cumulative growth rate of 10 to 15 percent per annum through 2002.[27/]

16. The resounding success of the paging industry indicates that the marketplace is demanding low cost communications alternatives. In this mobile information age, nearly everyone has the need for channels of communication which enable the user to receive information promptly and efficiently while in transit. There are, however, significant differences in the amount that people are willing or able to pay for such services. As a result, there has proven to be a large, vibrant market for entry level messaging services that can be delivered at a low price.[28/] The demonstrated need for low cost communications alternatives has several implications in terms of narrowband PCS licensing approaches.

17. First, and foremost, a channel plan must be adopted for narrowband PCS services that will enable equipment on common frequencies to be put to common uses so that carriers and subscribers may enjoy the economies of scale and cost savings attendant to the mass production of units. Second, the channel plan should be developed with due consideration to the experimental work that has been done with respect to advanced

---

[27/] See generally studies conducted by Motorola, Frost & Sullivan, Arthur D. Little, Telocator, and ECMI.

[28/] Actually, the market for low cost personal communications devices is two-tiered: some use them as alternatives to higher cost services; others use them as adjunct services.

messaging services so that service providers can enjoy the benefit of prior and ongoing research and development. Third, there should be a sufficient number of licenses to allow all serious operators to participate as licensees, thereby fostering robust competition and resultant competitive pricing.[29/] Fourth, both unequal and equal subscriber-to-base channels should be used to ensure the maximum amount of service possibilities. Finally, the plan should accord licensees a sufficient geographic area to enable each carrier to enjoy the economies of scale that are necessary to survive in what is essentially a low average-revenue-per-unit business.

18. PacTel has developed a proposed 900 MHz narrowband PCS channel plan that accommodates these considerations and that will lead to the development of a narrowband PCS industry capable of delivering a low-cost alternative communications service to the public. The channel plan is set forth in Attachment 2.

3. Financial Wherewithal Is A Key Ingredient To Success.

19. Financial showings were eliminated as an application requirement in the paging services in 1980, based upon a finding that such services could be implemented on a low

---

[29/] Granting too much bandwidth to each licensee will reduce licensing opportunities. Consequently, PacTel does not support subdividing the 900 MHz spectrum into large 250 kHz or 1 MHz blocks as discussed at paragraph 52 of the Notice.

cost, low risk basis. See Elimination of Financial Qualifications in the Public Mobile Radio Services, 82 FCC 2d 152 (1980).[30/] However, the paging business has changed dramatically since that action was taken.

20. Revenues per unit in the paging business have declined markedly.[31/] As average revenue per unit decreases, the carrier must increase volume to sustain operations. The result has been the emergence of large carriers which serve an ever-increasing percentage of the paging market.

21. Other economic factors have led to this consolidation in the paging industry. The proliferation of wide-area multistate systems has substantially increased the minimum investment that is necessary to establish a competitive service offering.[32/] Also, economies of scale have come to play an increasing role in the provision of paging services. Volume discounts in the purchase of carrier and subscriber equipment, and operating efficiencies resulting from the centralization of

---

30/ This decision reflected the view that there was sufficient competition in the paging market to allow some paging operators to fail and go out of business without serious adverse consequences for the user public.

31/ For instance, the average revenue per unit ("ARPU") for digital display pagers, which represent 80% or more of the units placed in service since 1988, has declined from $15.69 to $12.23 for the largest paging carriers. Paging Leadership Association Industry Performance Report (1992). PacTel believes that ARPU will decline a further 8% in 1992.

32/ When the systems covered only a city, 10-20 transmitters would have been sufficient. Now some of these wide-area multistate systems consist of 200 or more transmitters.

administrative functions, benefit large providers of service. As a result of these market-driven trends, access to capital has become an increasingly important ingredient to success in the paging businesses.

22. Also, like other communications ventures, paging transactions are frequently highly leveraged, and do not meet some increasingly stringent bank lending ratios. To overcome this potential impediment, a successful company must either have independent financial resources or a sufficient business plan to enable it to attract the capital necessary to construct systems of the scope demanded by today's subscribers.

23. Based upon the foregoing, the Commission should not conclude that the financial qualifications of the applicant are any less important with respect to narrowband PCS services than for wideband services. There appears to be a direct correlation between financial wherewithal and success in the current paging business. It makes sense, therefore, for the Commission to use financial qualification standards as a means of separating bona fide from insincere applicants in the licensing process. PacTel Paging's proposals in this regard are set forth in greater detail below. See discussion infra at Section III. B.

4. Messaging Subscribers Require Diverse Services.

24. Considerable diversity has developed in the types of paging service that have proliferated in the market. Traditional paging services encompass tone-only (where a tone alert advises a subscriber to call the office), multi-tone (where distinct tones advise the user to call distinct locations), numeric display (where any ten-digit telephone number can be transmitted to the subscriber for call back), alphanumeric (where brief text messages or limited e-mail can be sent), and voice services (where audio messages are sent). A review of the various pioneer's preference requests with respect to narrowband PCS services indicates that the next generation of messaging services will be even more diverse. The proposals include digitized voice, acknowledgment paging, paging coupled with radiolocation techniques, and a variety of advanced platforms which promise to deliver much more lengthy and complex text, graphic, video, facsimile and DOS files.

25. These diverse messaging services all have one thing in common: they represent over-the-air conduits of bits of information to people.[33/] However, the particular bandwidths required, and the optimal manner for channels to be paired, may differ depending upon the particular service and system

---

33/ PacTel, in its original Petition for Rulemaking for Advanced Architecture Paging, analogized these bit streams to T-1s in the wireline telephone environment.

configuration that is adopted. Consequently, PacTel recommends that the Commission accommodate diverse narrowband PCS services by offering a variety of bandwidths and frequency pairings so that diverse narrowband messaging services can develop. Again, PacTel Paging has developed a channel plan that satisfies this concern. See Attachment 2. It includes a mixture of 25, 50, and 100 kilohertz base transmit channels which are paired on both a symmetrical and asymmetrical basis[34/] with return link channels, thereby accommodating a whole host of diverse services.

5. Bandwidths Over 100 kHz Are Not The Answer.

26. Some services, like cellular and wideband PCS, require the assignment of a large block of spectrum to a single carrier in order to achieve the benefits of the operating efficiencies that come from trunking large numbers of channels together and deploying them in an optimal configuration. Paging services, on the other hand, have thrived by the development of technologies that deliver more information at a faster rate

---

[34/] Asymmetrical pairing refers to instances in which the paired return link channel includes less bandwidth than the base transmit channel. This configuration is particularly well-suited to services in which limited information is to be transmitted over the return link (e.g., acknowledgment paging, use of return link as a set-up channel, etc.). Symmetrical pairings, in contrast, would accommodate fully duplexed two-way operations in which the same amount of information could be transmitted in both directions. (e.g., two-way data services).