

SUMMARY

To justify the use of scarce spectrum in the 930-931 MHz "reserve band" which the Commission has set aside for enhanced paging and messaging, the service approved must offer capabilities which are truly advanced, *i.e.*, which are not available from currently-authorized paging services and which are designed to meet the needs of customers not just today or tomorrow, but well into the next century. PageMart's proposed "Personal Information Messaging Service" is the first truly personal, portable and ubiquitous wireless messaging service, and is clearly the only proposal now before the Commission which meets all the criteria necessary for an advanced messaging service meriting the allocation of scarce spectrum reserved for enhanced paging services.

The basic ability to exchange short bursts of text—the dominant use of private or public network E-mail—is important but not sufficient to meet consumer demand for advanced messaging. The key factor which will distinguish wireless messaging of the future from the simple tone or alphanumeric paging services of today is the vastly increased volume of information—number of bits—that will have to be delivered to the subscriber. At the same time, advanced wireless services cannot achieve these necessary increases in information "throughput" by sacrificing service ubiquity or subscriber capacity, since a service which can only support relatively few users or few locations is hardly an efficient choice for scarce radio spectrum.

To be worthy of assignment in the 930-931 MHz enhanced paging reserve band, therefore, an "advanced" messaging service should meet all of these criteria:

- transmission of lengthy complex text, graphic and facsimile files
- very high “throughput” measured not in transmission speed but more importantly in *total bits delivered to total subscribers*
- high degree of spectrum efficiency
- system capacity for a large number of users regionally and nationally
- communications equipment is small, lightweight, and low-priced
- communications equipment is low-powered with low battery drain
- “two-way” service available

The basic approach to throughput adopted by most of the applicants petitioning for 930-931 MHz services in this consolidated docket is an increase in transmission speed, through data rate and modulation scheme (such as PacTel AAP and MTel). Each of these options, however, conflicts with one or more of the necessary criteria for advanced messaging. Data rate increases sufficient to accomplish the purpose necessitate dedication of increased bandwidth and the use of more costly communications equipment. Modulation scheme changes similarly require more complex communications equipment with extraordinarily high power and battery requirements. And except for PageMart’s, virtually all of the proposed services employ a simulcasting technique for message delivery, thus dramatically limiting the system capacity and number of potential subscribers, because the system usually transmits messages to one subscriber at a time.

Only the Personal Information Messaging Service (“PIMS”) proposed by PageMart supports adequate throughput in terms of total information delivered to a large number of total subscribers for complex, lengthy text, facsimile and graphics

files while permitting low-powered and low-priced communications equipment. Indeed, the petitions other than PageMart's either offer little that is new or that cannot be provided using existing allocations and systems, or merely offer minor improvements in one or two areas while falling far short of any conception of truly advanced wireless messaging services in most other areas. PageMart's Personal Information Messaging Service is the only proposal that meets all the criteria of an advanced system worth the allocation of scarce spectrum.

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

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In the Matter of:)
)
Petitions for Rule Making for)
Opening of the 930-931 MHz) ET Docket No. 92-100
Paging Reserve Band)
) RM-7977, RM-7978, RM-7979,
Requests for Pioneer's Preferences) RM-7860, RM-7980
to Provide Data or Paging Services at)
Frequencies In the 930-931 MHz) PP-35, PP-36, PP-37, PP-38,
Paging Reserve Band) PP-39, PP-40

COMMENTS OF PAGEMART, INC.

PageMart, Inc. ("PageMart"), by its attorneys, hereby submits its comments on the petitions for rulemaking and requests for pioneer's preferences for allocation of the 930-931 MHz paging reserve band on which the Commission has requested comment by June 1, 1992.¹

INTRODUCTION

In this consolidated docket, the Commission has before it six alternative proposals for use of portions of the 930-931 MHz band for widely varying data and messaging services. As demonstrated in these comments, PageMart's proposed "Personal Information Messaging Service" is the first truly personal, portable and ubiquitous wireless messaging service, and is clearly the only proposal now before the Commission which meets all the criteria necessary for an advanced messaging

¹ By Public Notices released April 30, 1992, the Chief Engineer accepted for filing, and established a schedule for public comment on, the proposals by Dial Page, Inc. ("Dial Page"), Echo Group, L.P. ("Echo Group"), Mobile Telecommunications Corp. ("MTel"), PacTel Paging ("PacTel") and PageMart for opening of the reserve band for the provision of paging and messaging services. PacTel has submitted two separate proposals, as further discussed below. The Public Notices consolidated all the petitions for rulemaking and requests for pioneer's preferences into ET Docket No. 92-100.

service meriting the allocation of scarce spectrum reserved for enhanced paging services.

L. PAGEMART's "PERSONAL INFORMATION MESSAGING SERVICE" IS THE ONLY PROPOSAL BEFORE THE COMMISSION WHICH OFFERS "ADVANCED" MESSAGING CAPABILITIES FOR SPECTRALLY EFFICIENT WIRELESS DATA COMMUNICATIONS INTO THE NEXT CENTURY

The Commission has set aside a spectrum allocation from 930-931 MHz for enhanced paging and advanced messaging service. To justify the use of scarce spectrum, the service approved for this reserve band must offer capabilities which are truly advanced, *i.e.*, which are not available from currently-authorized paging services. Most importantly, the proposed service must be designed to meet the needs that customers will have not just today or tomorrow, but well into the next century.²

The basic ability to exchange short bursts of text—the dominant use of private or public network E-mail—is important but not sufficient to meet consumer demand for advanced messaging. Users are increasingly demanding the ability to exchange lengthy text messages as well as graphic images and faxes. In today's business environment the routine exchange of electronic files, facsimile, images and lengthy mixed graphic and text files is already a business communications necessity.

These newer demands have in common significantly increased "file size." Long text messages, graphic images and facsimiles (because they are transmitted as bit-mapped graphic images) all consist of several orders of magnitude more "bits" of information than do short text messages. This need to exchange complex and

² On these criteria alone, Dial Page's Acknowledgement Paging and PacTel's Ground-to-Air Paging proposals do not qualify for an allocation of any portion of the 930-931 MHz reserve band since they are not advanced messaging services.

lengthy files will only increase over the next decade. Further, as our society becomes increasingly accustomed to the location-independent convenience of wireless communications, users will come to expect the same ubiquity and convenience in electronic file exchange that they currently enjoy in voice communications. Wireless technology will have to provide the new means to transmit and receive the kinds of lengthy, complex data files users are already exchanging on their wired networks.

Thus, the key factor which will distinguish wireless messaging of the future from the simple tone or alphanumeric paging services of today is the vastly increased volume of information—number of bits—that will have to be delivered to the subscriber. At the same time, advanced wireless services cannot achieve these necessary increases in information “throughput” by sacrificing service ubiquity or subscriber capacity, since a service which can only support relatively few users or few locations is hardly an efficient choice for scarce radio spectrum. And to qualify as truly “advanced” wireless messaging, a proposed service should likewise be compatible with low-priced and low-power receiving and transmitting equipment, encouraging widespread manufacturing and user acceptance as well as permitting truly portable applications by minimizing battery drain requirements. Only by combining all of these capabilities can an “advanced” messaging service meet the needs of business and personal users for portable, wireless exchange of the same lengthy text, facsimile and graphic files which they use today.

To be worthy of assignment in the 930-931 MHz enhanced paging reserve band, therefore, an “advanced” messaging service should meet all of these criteria:

- transmission of lengthy complex text, graphic and facsimile files

- very high “throughput” measured not in transmission speed but more importantly in *total bits delivered to total subscribers*
- high degree of spectrum efficiency
- system capacity for a large number of users regionally and nationally
- communications equipment is small, lightweight, and low-priced
- communications equipment is low-powered with low battery drain
- “two-way” service available

Very little “crystal ball” gazing is required to recognize these key factors of any service truly deserving to be called “advanced messaging.” The difficulty is thus not in the conception, but in the execution: the best means to vastly increase the total amount of information delivered to the largest possible total number of subscribers—a significantly more useful definition of “throughput” than the usual association of that term with transmission speed—and still be consistent with the requirements of spectrum efficiency, small size, light weight, low-battery-drain devices and low price for both the service and the communications device.

The approach to throughput adopted by most of the applicants petitioning for 930-931 MHz services in this consolidated docket is an increase in transmission speed, through data rate and modulation scheme (such as PacTel AAP and MTel). Each of these options, however, conflicts with one or more of the necessary criteria for advanced messaging. Data rate increases sufficient to accomplish the purpose necessitate dedication of increased bandwidth and the use of costlier communications equipment. Modulation scheme changes similarly require more complex communications equipment with extraordinarily high power and battery

requirements. And except for PageMart's, virtually all of the proposed services employ a simulcasting technique for message delivery, thus dramatically limiting the system capacity and number of potential subscribers, because the system usually transmits messages to one subscriber at a time. Only the Personal Information Messaging Service ("PIMS") proposed by PageMart supports adequate throughput in terms of total information delivered to a large number of total subscribers for complex, lengthy text, facsimile and graphics files while permitting low-powered and low-priced communications equipment.

Indeed, except for PageMart's, the requests for "Pioneer's Preferences" in the 930-931 MHz reserve band are singularly unimpressive. Neither PacTel's Ground-to-Air Paging proposal nor Dial Page's Acknowledgement Paging offers any of the advanced communication functionalities necessary for wireless messaging. Further, PacTel's GAP represents technology which is available today and compatible with existing Part 22 and Part 90 paging services. Dial Page's AP proposal represents a wasteful doubling of the channels needed for each page, when only a fraction of paging customers are likely to be interested in or satisfied by the return of an "acknowledgement," given that the dominant reason for the page in the first place was to initiate a two-way telephone conversation.³

The proposals presented as supporting wireless messaging services are in reality a mere shadow of the true potential for this next generation of communications technology. Echo Group's MDRS service is simply narrow band

³ In an alphanumeric page (5% of the total market) if the sender requires an acknowledgement, he or she can simply include a request, such as "please acknowledge" in the alpha message. See Section II(C) below.

TDMA cellular radio data service, which requires the construction of a vast new nationwide cellular data network and therefore would not be competitive with existing cellular networks using the IBM CelluPlan IITM technology which will employ data-over-voice to provide a data service "overlay" for existing cellular carriers. PacTel's Advanced Architecture Paging is not advanced; it is ordinary paging at higher speeds in channels twice as wide (50 kHz) as current paging channels. But major vendors are already poised to introduce high-speed coding methods and equipment for use on conventional 25 kHz paging channels to significantly increase data rate.

By the same token, MTel's proposal for a Nationwide Wireless Network (NWN) is a small but entirely inadequate step toward providing a truly "advanced" personal messaging service. MTel's NWN service uses a simulcast modulation approach to increased throughput, which reduces system capacity to an incredibly small 25,000 subscribers in each of MTel's proposed 34 "zones," many of which will by definition cover more than one state. However, when more realistic message sizes such as 15,000 characters per message are used, system capacity is even further reduced, to fewer than 4,000 subscribers per city. And the multitone modulation technology proposed for NWN will require complex and costly subscriber equipment with a power requirement of 7 watts. At this power level, the MTel device will necessarily be significantly larger and use more than ten times the power of portable cellular phones, which even at their 0.6 watts already suffer from user complaints of rapid battery depletion.

One of the important functionalities which will distinguish advanced wireless messaging from traditional wired-network file transfer will be the ability to receive and transmit those files without regard to the user's location. While in their offices, users will have access to office facsimiles and computers. While "on the move" users will have access to a range of portable battery powered devices. Thus, it will be important that users be able to transparently receive their complex wireless messages on any device at any location.

Accomplishing this level of "transparent use" will require that the equipment for receipt and transmission of advanced messaging communications carry its own "address" with it no matter where it is located, and be a small, lightweight, inexpensive, long-life battery powered device that can plug into a wide variety of devices, including, for instance, facsimile machines, office computers, portable computers, "pocket organizers" (such as this generation of Sharp Wizards®) or "palm-top computers" (such as the Hewlett-Packard 95LX®), or the next generation of devices (such as Apple's Newton®). The people who are the natural constituency of such an advanced messaging service are likely to own one or more such devices on which they routinely receive, store, manipulate and send files, and will therefore be much more willing to accept a plug-in communications device than to acquire and carry an additional device solely for the purpose of receiving and sending files, which would have to be transferred between devices for storage and manipulation.

This "device independence" facet of advanced messaging communications equipment is also crucial because "state of the art" changes so rapidly in electronic information processing devices. "Portable" computers of just a few years ago are

laughably heavy and large by today's standards, and today's "small, lightweight" notebook computers will soon be eclipsed by full-function "palmtop" computers. Devices like the Sharp Wizard® or the Hewlett-Packard 95LX®, while "state of the art" today, may soon be eclipsed by devices like the Apple Newton® or other devices still on drawing boards around the world. A "device independent" implementation means that "advanced messaging" customers will not have to constantly update their communications devices in addition to updating their primary data devices; they will simply move the card-size communications module from one device to another.

PageMart's PIMS service is the only proposal for advanced messaging which supports the size, power and design characteristics necessary for true device-independent portability. Indeed, the petitions other than PageMart's either offer little that is new or that cannot be provided using existing allocations and systems, or merely offer minor improvements in one or two areas while falling far short of any conception of a truly advanced wireless messaging services in most other areas. PageMart's Personal Information Messaging Service is the only proposal that meets all the criteria of an advanced system worth the allocation of scarce spectrum:

- transmission of lengthy complex text, graphic and facsimile files
- very high "throughput" measured not in transmission speed but more importantly in *total bits delivered to total subscribers*
- high degree of spectrum efficiency
- system capacity for a large number of users regionally and nationally
- communications equipment is small, lightweight, and low-priced

- communications equipment is low-powered with low battery drain
- “two-way” service available

In the next section of these comments, PageMart presents detailed critiques of each of the other five proposals currently before the Commission. These detailed comments are summarized on the chart included as Exhibit 1 on the following page, which illustrates the plain deficiencies of all proposals other than PIMS for advanced messaging. The summary chart and the critiques in Section II demonstrate the clear technical, spectral and functional superiority of the PageMart PIMS proposal.

Comparison of 930-931 MHz Applicants (RM/PP)

(15k bytes per subscriber per 10-hour busy period)

	<u>Busy Hour Capacity/Bandwidth</u>	<u>Spectral Efficiency* (Per City)</u>	<u>Subscriber Unit Power</u>	<u>Major Demand</u>	<u>Competitive Alternatives</u>	<u>Issue</u>
<u>PacTel</u> Advanced Architecture Paging	4,220 subs/City 25-50 kHz Regional	~ 0.27 bits/cycle <u>No</u> Freq. Re-Use	?	Niche?	Regional POPS** carriers with high-speed coding	Service cost/capacity Time to market
<u>PacTel</u> Ground-to-Air	200,000 subs/Nationwide 25 kHz Nationwide	Std. Nationwide Paging <u>No</u> Freq. Re-Use	Std. Paging	- Dedicated pager-none - Freq. synth. pager-little	Nationwide paging carriers	Demand (Airborne Pager)
<u>Dial Page</u> Acknowledgement Paging	10,000 subs/Region 25 kHz Nationwide	Std. Paging <u>No</u> Freq. Re-Use	2 watts	- Niche, if any	Local POPS carriers	Service cost/demand Time to market
<u>Echo Group</u> Mobile Data Radio Service	10,000 est./City 50 kHz Nationwide	~ 1.0 bits/cycle Freq. Re-Use	100-400 mw	- Mobile data users	- Cellular IBM CelluPlan IITM - Mobitex - ARDIS - SMR data	Service cost/competition Time to market In-Building Penetration
<u>MTel</u> Nationwide Wireless Network	3,200 subs/City 50 kHz Nationwide	~ 2.0 bits/cycle <u>No</u> Freq. Re-Use	7 watts	- Niche? - Nationwide messaging	Nationwide POPS carriers with high-speed coding	Service cost/capacity Time to market
<u>PageMart</u> Personal Information Messaging Service	100,000 subs/City/per 50 kHz 500,000 subs/City 250 kHz Nationwide	~ 8.0 bits/cycle Freq. Re-Use	100-500 mw	Mainstream business users	- Cellular IBM CelluPlan IITM(Consumer Prods.)	Service cost/capacity Time to market

EXHIBIT 1

* See C.P. Tou & D.A. Roy, On Efficient Spectrum Utilization from the Standpoint of Communications Theory, IEEE Journal, Vol. 68, No. 12 (Dec. 1980).

** POPS = "Plain Old Paging Service"

II. DETAILED ANALYSIS OF THE PROPOSALS FOR OPENING OF THE 930-931 MHz PAGING RESERVE BAND DEMONSTRATE THAT PAGEMART'S "PERSONAL INFORMATION MESSAGING SERVICE" PROVIDES CLEARLY SUPERIOR TECHNOLOGY, SPECTRUM EFFICIENCY AND FUNCTIONALITY

This section of PageMart's comments sets forth its detailed critiques of each of the other five rulemaking petitions and pioneer's preference proposals currently before the Commission. Measured against the criteria for advanced messaging services discussed in Section I above, PageMart submits that none of the alternative petitions in this docket other than PIMS justifies an allocation of spectrum in the 930-931 MHz paging reserve band.

A. PACTEL PAGING GROUND-TO-AIR PAGING (RM-7860/PP-39)

OVERVIEW

The Commission has earmarked the 930-931 MHz band for advanced messaging services, but PacTel Paging offers nothing advanced in either service or technology in its Ground-to-Air Paging (GAP) service. Everything it proposes to do can be done, and is being done, by today's providers using today's frequency allocations and today's technology. It is evident that the PacTel proposal does not meet the criteria for an advanced messaging allocation in the 930-931 MHz band. The PacTel GAP proposal falls short in numerous ways of the criteria for an advanced wireless messaging service:

- the service proposes nothing that is not already being provided by existing paging companies using existing technology
- the service is not capable of, or even designed to, transmit lengthy text, graphic and facsimile files
- the service offers no increase in total information delivered to total subscribers

- the proposal requests additional spectrum when it can be provided using existing allocations
- the service is not two-way
- the service requires users to either “change channels” as they move between air and ground or carry a separate “ground-to-air” paging receiver in addition to any other paging receiver

PacTel’s Ground-to Air petition simply does not provide for anything which is not available (or potentially available) today from nationwide paging providers. PageMart, with just under one-half of its nationwide system constructed, can already provide near-seamless ground-to-air coverage from Dallas/Ft. Worth (DFW) to Los Angeles, DFW to Chicago and DFW to New York on existing paging frequencies.

A more fundamental issue, however, is that the customers for nationwide paging also insist on good wide area coverage on the ground. Further, as most paging companies have discovered, subscribers will not put up with being responsible for “changing channels,” as PacTel’s proposal would require them to do (using a frequency-agile page or frequency synthesized paging receiver) when they change locations either between ground locations or between air and ground locations. This is particularly true when these same subscribers who want ground-to-air coverage can receive this service from existing nationwide paging companies without making any frequency adjustments to their paging receivers when moving from the air to the ground, or from the ground to the air.⁴

⁴ PacTel’s GAP petition essentially asks the Commission to set aside three additional nationwide frequencies which may never be used for the requested purpose, since it is extremely likely that a licensee of GAP frequencies would shortly petition the Commission for nationwide service in the major cities throughout the country, possibly even before construction of GAP to provide a meaningful service to subscribers.

SPECIFIC ISSUES

1. *Need for new spectrum to provide ground-to-air coverage.*

a. PacTel's Position

Pages 6-7 & footnote 6: "The need for a ground-to-air messaging link cannot be fulfilled by any existing allocation. Local paging channels have been assigned on a patchwork basis which renders impossible efficient nationwide signalling. And, the existing nationwide paging systems have been configured and networked in a manner designated to provide terrestrial service and incidental local service, not satellite-controlled simulcast nationwide service to aircraft. . . . Existing nationwide systems are configured to provide maximum coverage on the ground through the use of high gain downtilt antennas. . . . System configurations of this nature are ill-suited to provide GAP" (emphasis in original).⁵

Pages 24-25, ¶ 37: "These preliminary features confirm not only the feasibility of GAP service, but provide further evidence of the need for a special allocation. To engineer a reliable GAP system, transmitters are best located to the side of major commercial aircraft flight routes in areas between major commercial centers. This is significantly different from terrestrial paging operations that concentrate transmitters in major metropolitan areas. Moreover, the configuration needed to direct the signal skyward is much different than that which is used to accomplish reliable terrestrial service. Special uptilt antennas will be necessary to maximize the signal in the appropriate directions. And, direct satellite control systems will have to be

⁵ All citations in this section are to the PacTel petition for rulemaking in RM-7860, filed October 15, 1991.

developed to permit widely spaced transmitters, some in remote areas, to be centrally operated and simulcast. These factors support PacTel's conclusion that channels should be devoted exclusively to this distinct service."

Page 30, ¶ 48: "PacTel Paging proposes that GAP licensees be required to construct a minimum of 25 terrestrial base stations within the first 18 months of the issuance of the authorization."

b. PageMart's response

PacTel's suggestion that conventional paging systems cannot effectively provide ground-to-air functionality is fundamentally erroneous. PageMart will provide seamless, nationwide ground-to-air paging as an integral part of its existing paging service. PageMart constructs its paging coverage around the top 150 to 200 or more cities in the U.S. to provide such coverage. PageMart will also place transmitters in the Great Plains states (i.e., Montana, North Dakota, South Dakota, Wyoming and Nebraska) in order to ensure "seamless" ground-to-air coverage over the continental U.S. where the placement of major city coverage areas do not provide for a natural geographical deployment grid.

As the pioneer of direct broadcast satellite (DBS) control of paging transmitters in major systems applications, PageMart thoroughly understands its usefulness without further development. PageMart's experience is that DBS provides excellent control over transmitters operating in remote locations or in major simulcast system environments for GAP.

Contrary to PacTel's argument that existing nationwide paging systems are ill-suited to provide GAP because of a need for specialized antennas, PageMart's and

other nationwide systems are well-designed to serve airborne subscribers, if the system utilizes the widely installed DB809 antenna (zero-degree tilt for maximum range). This popular antenna provides approximately one-half its radiated energy above the vertical horizon and the major lobe transmits a major portion of its energy between zero and three degrees uptilt from the horizon to provide excellent GAP coverage (see Exhibit 2). Even if downtilt antennas are used (which is the case approximately 10% of the time), they too radiate a significant amount of their energy above the vertical horizon. Therefore, there is absolutely no technical foundation to PacTel's argument of requiring a specially designed "uptilt" antenna network. PageMart will provide ground-to-air service to its regional and nationwide subscribers and other nationwide paging companies can selectively populate their systems with additional transmitters if needed (up to 25) to gain the seamless coverage PacTel suggests is needed in its systems.

Therefore, if not already available, nationwide GAP capability can be offered by other nationwide paging system operators. Given that most nationwide companies already have between 400-500 transmitter stations, only 5-6% additional transmitters, at most, would be necessary for PageMart and other nationwide service providers to adequately support any real demand for such service.

2. *Need for specially-sited transmitters to permit signals to enter aircraft*

a. PacTel's Position

Pages 23-24, ¶ 36: "PacTel established a single transmitter system in Texas and had operating personnel travel on aircraft on predesignated routes in Texas while monitoring test pages being sent out on the authorized system. Several important discoveries were made:

At the power levels presently used in terrestrial paging operations, pages can be received routinely in aircraft from transmission locations up to 250 miles away.

Distant paging signals best enter the windows of the plane rather than the body of the aircraft. As a result, the paging transmitter must be oriented so as to permit the signal to approach the aircraft from the side, rather than from the front, the back or below.

Angles of incidence to the aircraft as small as several degrees may be sufficient to permit reliable penetration of the windows of the aircraft. High gain antennas designed for terrestrial paging operations are ill-suited to provide GAP. For optimal result, uptilt configurations specifically oriented to send signals skyward are needed."

Pages 24-25, ¶ 37: "These preliminary findings confirm not only the feasibility of GAP service, but provide further evidence of the need for a special allocation. To engineer a reliable GAP system, transmitters are best located to the side of major commercial aircraft flight routes in areas between major commercial centers. This is significantly different from terrestrial paging operations that concentrate transmitters in major metropolitan areas."

b. PageMart's Response

PacTel has drawn an enormous number of conclusions from a single transmitter test site, but one thing is evident—it is not difficult to page subscribers in

commercial aircraft and it is not necessary to simulcast the country. Moreover, the expert witnesses, Dr. Charles L. Jackson and Dr. Jeffrey Krauss, also support that conclusion. PageMart is providing that capability today, other systems may also be providing in-aircraft coverage, and nothing is restraining other paging companies operating regional or nationwide systems from providing this same service. Thus, it is obvious either that regional and nationwide paging subscribers already expect and receive GAP, or they do not care about GAP, possibly because they also have voice mail or numeric retrieval as a part of their paging service.

Moreover, it is unrealistic to conclude, as PacTel does, that a special deployment of paging transmitters should be designed "so as to permit the signal to approach the aircraft from the side, rather than from the front, the back or below." It is clear that PacTel has not focused on the fact that the major commercial airlines criss-cross the U.S. in such a way that nearly *all* the air space is used in the continental United States. Consequently, it is difficult and unnecessary to design to this hypothetical criterion by deploying transmitters in sufficient numbers to result in a "grid" of cities providing seamless coverage. PacTel is simply attempting to create the illusion of a need for a "special transmitter deployment grid" as part of its attempt to convince the Commission, incorrectly, that a new allocation is necessary because the regional and nationwide paging carriers do not possess the capability to provide this service today. In addition to the regional and nationwide systems which can provide, and may already be providing, in-aircraft coverage, any of the other regional or nationwide systems could adapt a small fraction of their total

transmitter sites and provide this service as simply as PacTel did in its one-transmitter test site.

3. *Utility of a service dependent on separate paging receivers requiring subscribers to "change channels" when changing locations*

a. PacTel's Position

Page 13, ¶ 16: Notably, the advent of frequency-agile pagers will enable terrestrial 900 MHz paging subscribers to buy units which can synthesize multiple channels and thereby permit them to add the GAP channel and select it with a simple procedure. As a complementary service of this nature, a penetration rate of 5% must be deemed to be quite conservative.

Page 14, ¶ 17: Moreover, the universe of GAP subscribers undoubtedly extends beyond traditional paging customers. Business people who have no need or desire for local terrestrial paging service could find it to be important to keep in touch when they are in transit on airplanes and otherwise incapable of being reached while airborne.

b. PageMart response

In PageMart's extensive experience, professional and business people will not, in any meaningful number, subscribe to a service that requires them (1) to "occasionally carry" a separate "airplane only" pager on airplane trips or (2) to consciously reprogram their pagers in traveling from city to city. The growth of regional and nationwide paging service has been predicated on "one pager-one frequency anywhere in the region or country" for maximum convenience: "turn it on and forget it." It is totally impractical to expect people to develop a routine of

using a separate pager on airplanes only or of having to reprogram their pager once on the ground.

4. *Market and demand forecasts for "airplane only" paging*

a. PacTel's Position

Pages 14-15, ¶ 19: "First, halve the 455,600,000 passenger estimate for 1992 to 227,800,000 in order to eliminate the return trip double counting. Then assume that the average passenger takes 3.4 domestic airline round trips per year, which is based upon Air Transport Association statistics from a 1990 study by the Gallup organization. These assumptions result in the conclusion that the 455,600,000 embarkments reflect approximately 67,000,000 distinct individual flyers. If as few as 1% of these individuals opt to receive GAP service, the number of units will vastly exceed the capacity of two GAP channels" (footnotes omitted).

Pages 15, ¶ 20: "Based upon the foregoing analysis, PacTel recommends that a minimum of three nationwide channels be allocated for GAP" (footnote omitted).

b. PageMart response

PacTel's arithmetic does not demonstrate that there is service demand for GAP either separate from or integrated with regional or nationwide paging. Simply stated, market research cannot be accomplished with the argument that a large number of air travelers multiplied by a small percentage, whether 5%, or 1%, constitutes a viable demand assessment that justifies allocation of three nationwide channels for GAP. The 1% to 5% assertion is simply PacTel's unsupported estimate.

SUMMARY

In summary, PacTel wishes to receive a grant of a nationwide paging channel without any novel technology, based on no evidence of demand, overlooking the fact that other regional and nationwide paging service companies do or could provide the service if they choose, requiring an additional service charge over and above what people pay for a fully integrated PageMart terrestrial and GAP service and using pagers that are either special purpose or expensive frequency agile versions. PacTel's suggestion that it is spectrally efficient to use an additional dedicated GAP frequency in order to support a functionality that Page Mart (and others) accomplishes with its conventional paging frequency is frivolous.

B. PACTEL ADVANCED ARCHITECTURE PAGING (RM-7979/PP-38)

OVERVIEW

PacTel Paging's Advanced Architecture Paging (AAP) petition does not (1) propose a specific technical approach for AAP, (2) indicate the data rates at which AAP would operate to allow comparisons of its benefits with those derived from recent developments in paging technology, or (3) recognize that common carrier paging companies are not restricted to rigid formatting of data received and that unformatted data (subscribers selecting their format in data or text messaging) can be readily handled with hardware or software changes at the paging terminal. Most importantly, PacTel's proposal does not deal with the basic problem inherent in any simulcast system has for delivering data: practically any achievable data rate will