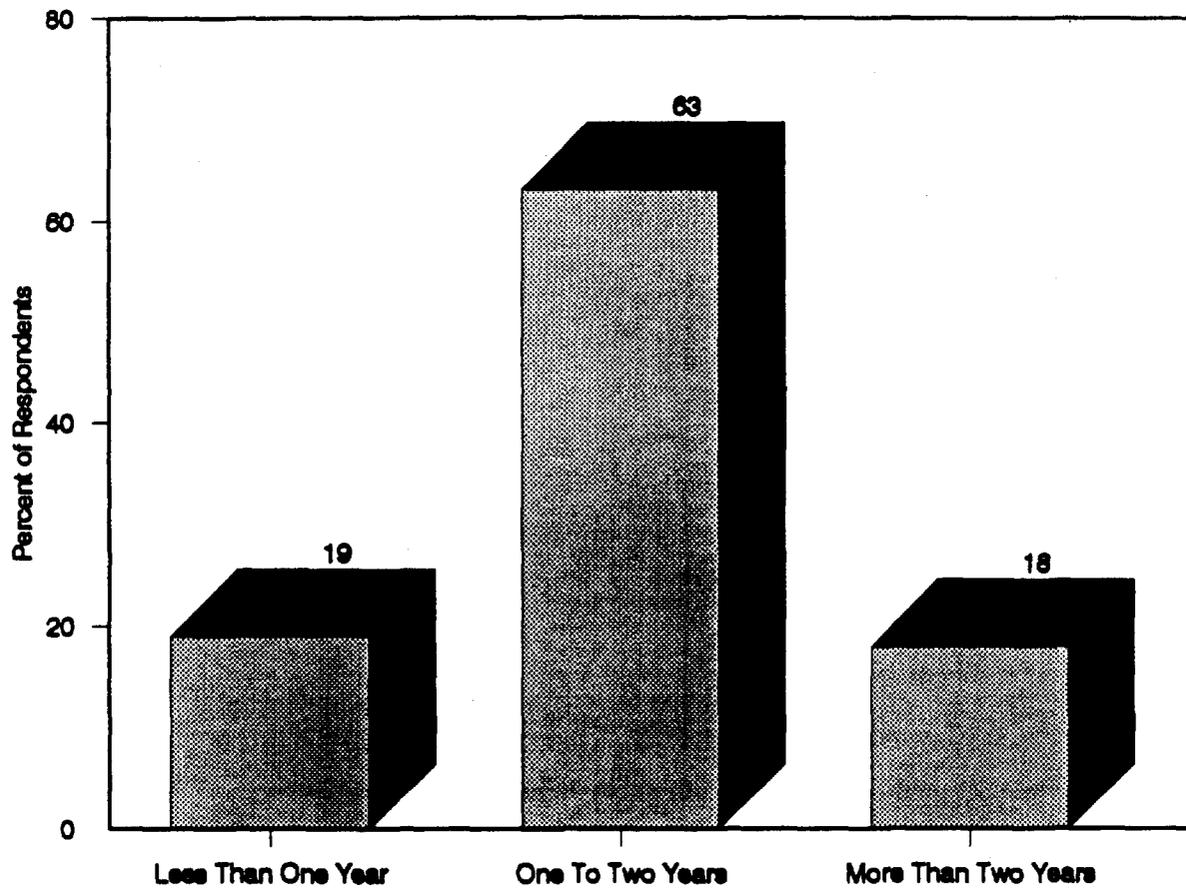
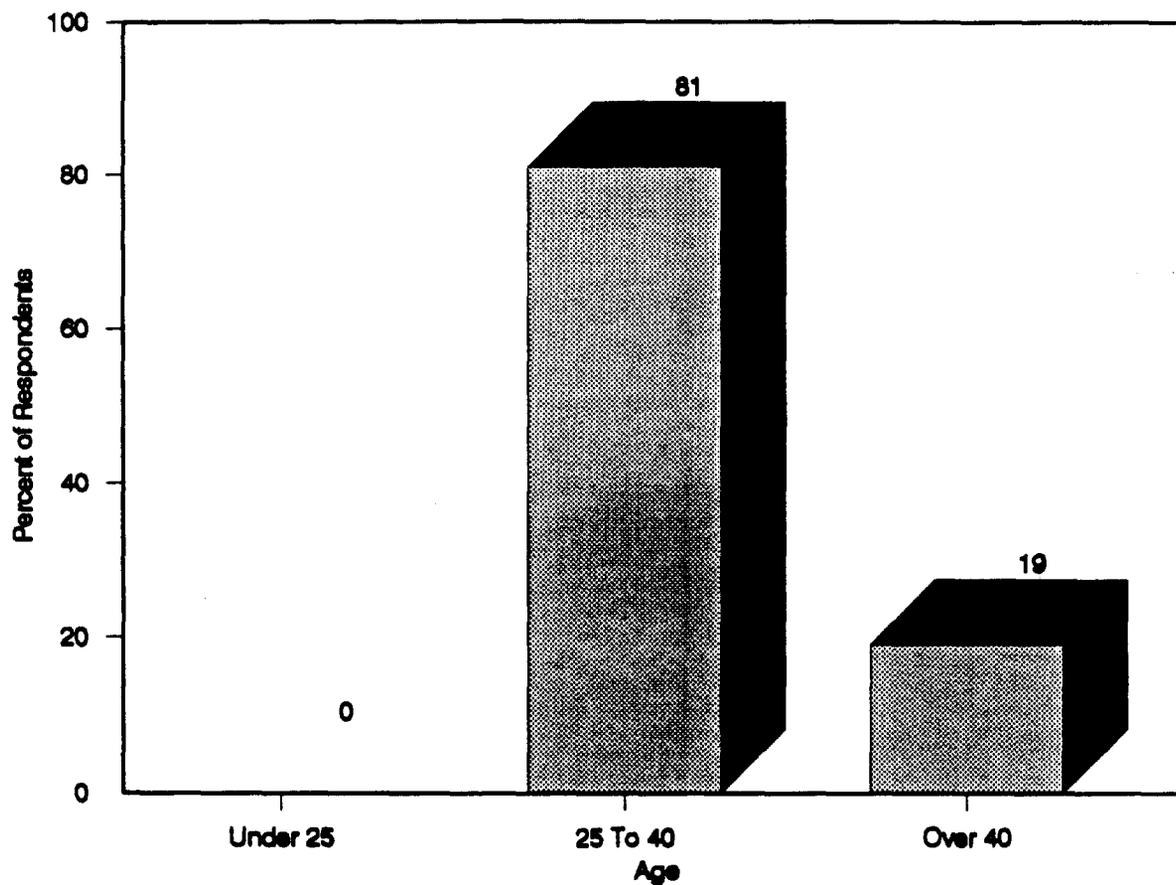


**Figure 3.11 Length of Paging Service
Percent of Respondents, Paging Users**



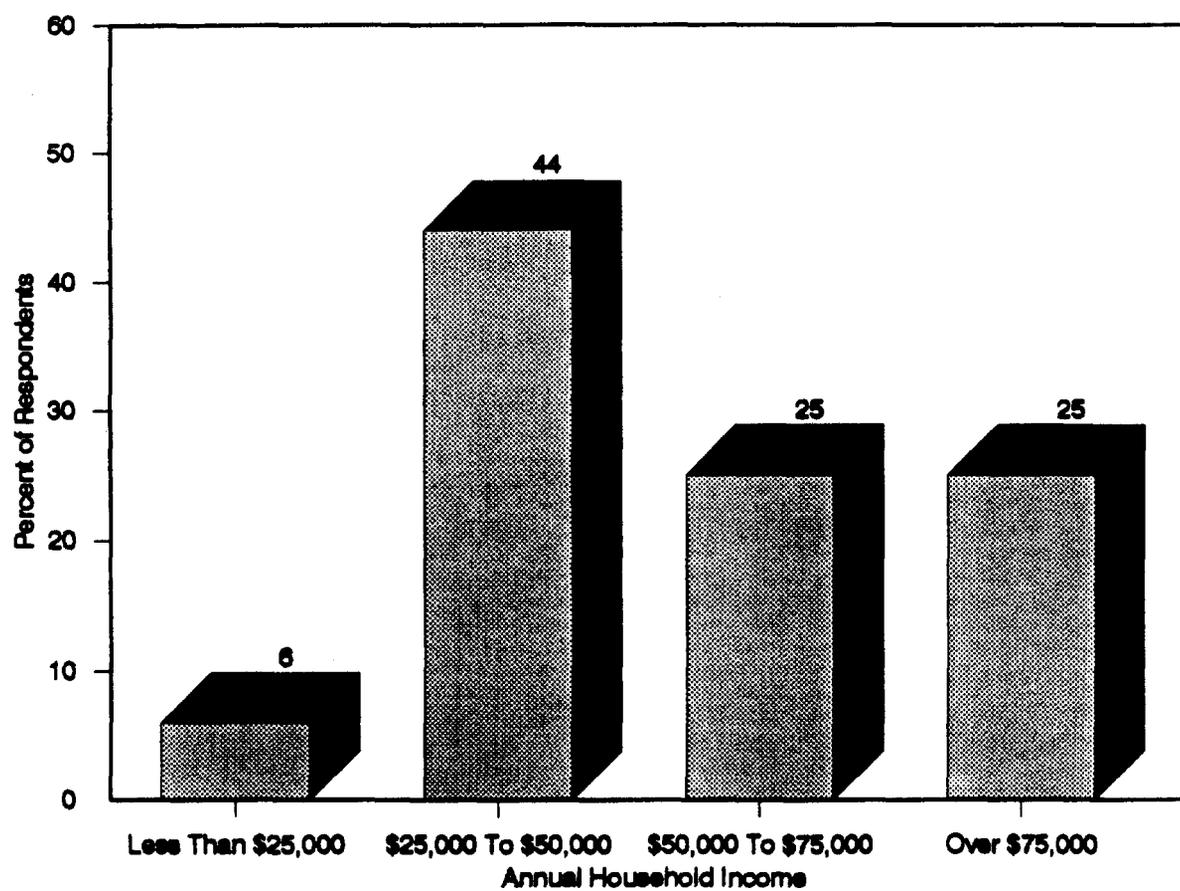
Source: EMCI, Inc.

**Figure 3.12 Age Distribution
Percent of Respondents, Paging Users**



Source: EMCI, Inc.

**Figure 3.13 Income Distribution
Percent of Respondents, Paging Users**



Source: EMCI, Inc.

3.2.3 Communications Needs

The paging users received a range of messages on their pagers to alert them to various work-related messages, including time needed at work, requirements to go to a new job site, service call information, etc. A number of participants used their pager primarily for personal uses, typically to keep in touch with family members and friends. Most agreed that finding a telephone to retrieve a message was a problem. One woman expressed safety concerns with stopping to use a public telephone at night, and others agreed with her.

3.2.4 Interest in the Digital Storage Voice Pager

As with the potential users, the groups were given a product description for the new digital storage voice pager concept and were also shown the prototype pager. Within the voice mail user group, there was unanimous interest in the voice pager concept. In the non-voice mail group, interest before price parameters was 50 percent (see Figure 3.14). At a price level of \$25 per month, the voice mail group remained unanimous in their interest, while interest among the non-voice mail group fell to 12 percent, indicating greater price sensitivity among this group.

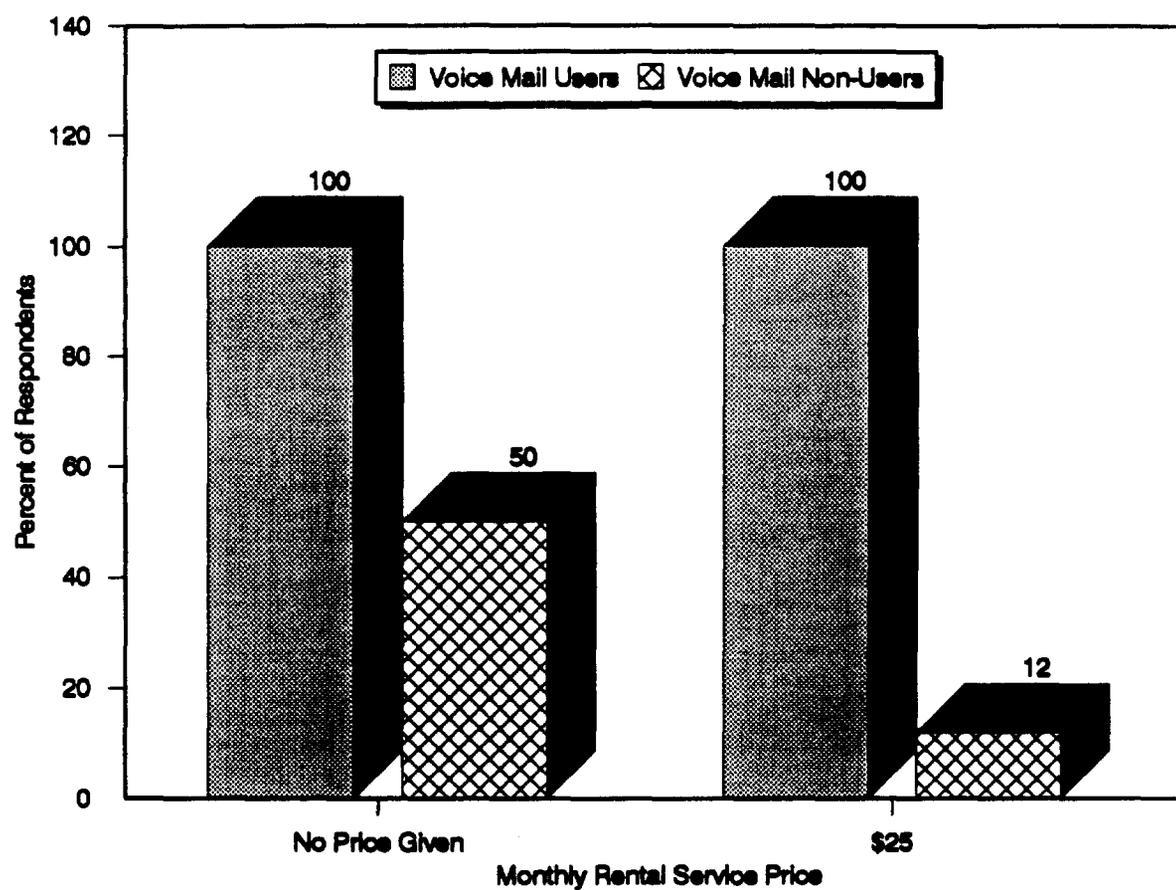
Concerns with the pager/service included a need for clear voice transmission, the 120 second storage capacity, and their existing investment in purchasing a digital display pager. A number of participants expressed concerns related to privacy (third parties hearing the content of the voice message). Use of the volume control satisfied the concerns of most participants.

Based on the two pager user focus groups, a profile emerged of the potential user for this new voice service among existing paging users (see Table 3.2):

- combination voice mail and pager users;
- combination paging and cellular users, who would prefer this type of pager to use as a call screening device;
- among the user groups, males were somewhat more interested than females.

As with the previous groups, there was near unanimous consent that the voice pager was an improvement over digital display pagers, and would be worth a premium price. Participants said "it would be great...you don't have to call people back [because the appointment is already set up], "You currently have to call the phone to get the message and then have to call another time for the caller". The voice mail group stated a strong intent to subscribe at the stated price levels. The non-voice mail pager users recognized the value, but were more divided on whether the extra cost would be worthwhile for

**Figure 3.14 Interest In Subscribing By Price Level,
Voice Mail Users And Non-Users
Percent of Respondents, Paging Users**



Source: EMCI, Inc.

Table 3.2 Interest in Subscribing at \$25 per Month by Respondent Category,
Paging Users

	Interest (Percent of Group)	Number of Observations In Group
Voice Mail		
User	100	8
Non-User	12	8
Coverage Area		
Local	46	13
Regional	na	1
Nationwide	na	1
Number of Messages Per Day		
Fewer Than 6	50	6
6 To 15	62	8
More Than 15	na	1
Percent Messages Business Related		
Less Than 25 Percent	33	3
25 To 60 Percent	86	7
More Than 60 Percent	40	5
Current Cellular User	100	3
Length of Paging Service		
Less Than One Year	67	3
One To Two Years	50	10
More Than Two Years	67	3
Age		
Under 25	75	8
25 To 40	38	8
Over 40	na	0
Income		
Less Than \$25,000	na	1
\$25,000 To \$50,000	43	7
\$50,000 To \$75,000	50	4
Over \$75,000	100	4
Sex		
Male	45	11
Female	80	5

Source: ENCI, Inc.

them. Part of the reluctance to subscribe to the voice paging service among users without voice mail is due to that almost all of them owned their own pager versus having a rental pager. Subsequently, they expressed concerns regarding the investment they already made in their present pager. This concern will not be as evident among the general population of pager users as approximately 70 percent of users rent their pager, according to EMCI's latest paging survey.

**Appendix A: Potential Paging User Focus Group
Materials**

Focus Group Screener for Non-users

1. Have you been in a focus group in the past six months?

- Yes: terminate
- No: continue

2. Do you work in the cellular or paging industry?

- Yes: terminate
- No: continue

3. Do you currently use or own a pager or beeper?

- Yes: terminate
- No: continue

4. Are you aware of mobile communications devices such as pagers and cellular phones?

- No: terminate
- Yes: continue

5. Are you interested in a low cost mobile communication device for your personal or business use?

- Yes: recruit
- No: terminate
- Maybe/Don't Know: terminate

6. Is your salary or earnings over \$18,000 per year?

- No: terminate interview
- Yes: continue

7. What age group are you in?

- 0-18: terminate
- 18-30: continue
- 30-50: continue
- over 51: terminate

8. What is your occupation?

list _____

9. List male/female (have at least 50% male)

Voice Pager Description

Here is a new pocket-sized voice pager. This pager can play your messages immediately upon receipt or can store voice messages from callers so that you can play them back whenever it is convenient. There is no need to find a telephone to call for your messages, as the voice message is already stored in the pager.

Here is how it works:

You record a greeting for callers, just as you would for a home telephone answering machine. The greeting tells callers to leave a message after the tone. When someone wishes to leave a message, they call your pager number, hear the greeting, and leave a message. After the caller hangs up, your pager will alert you that it has received a message either through a tone or by vibrating. At your convenience, you can replay the message by pressing a button on the pager. The voice pager can also display a numeric message just the same as current numeric display pagers if the caller wishes not to leave a voice message.

Coverage is the same as for existing numeric pagers, with coverage available throughout the metropolitan Washington area. Regional and national coverage is also available. Battery life is also the same as for numeric pagers, approximately one month. The voice pager has the capacity for up to 120 seconds of messages (for example: six 20 second messages).

Please answer questions 1-5 before we start discussions

Name _____

Place of Employment _____

Occupation/Job Title _____

1. Do you currently use any mobile communication device?

- _____ Cellular phone
- _____ SMR
- _____ private two-way radio
- _____ CB radio
- _____ Other (write in _____)

2. Have you ever in the past used a mobile communication device?

- _____ Pager
- _____ Cellular phone
- _____ SMR
- _____ private two-way radio
- _____ CB radio
- _____ Other (write in _____)

3. On average, how many hours of your normal working day is spent away from a standard telephone?

_____ Hours per day

4. What is your age category?

- _____ under 25
- _____ 25-40
- _____ over 40

5. What is your total annual household income level

- _____ less than \$25,000
- _____ \$25,000 - \$50,000
- _____ \$50,000 - \$75,000
- _____ over \$75,000

6. Based on the description of the voice pager, how interested are you in subscribing to a voice pager service?

- definitely subscribe
- probably subscribe
- may/may not subscribe
- probably not subscribe
- definitely not subscribe

7.

- definitely subscribe
- probably subscribe
- may/may not subscribe
- probably not subscribe
- definitely not subscribe

8.

- definitely subscribe
- probably subscribe
- may/may not subscribe
- probably not subscribe
- definitely not subscribe

9.

- definitely subscribe
- probably subscribe
- may/may not subscribe
- probably not subscribe
- definitely not subscribe

Appendix B: Pager User Focus Group Materials

Focus Group Screener for PageNet Users

1. Do you or your company still receive paging service from PageNet

- **Yes: continue**
- **No: terminate**

2. Do you personally use a PageNet pager.

- **Yes: continue**
- **No: find out who is actual user in company and ask to speak to them**

3. Do you have PageNet's voicemail service

- **Yes: invite to 6:00 group**
- **No: invite to 8:00 group**

Voice Pager Description

Here is a new pocket-sized voice pager. This pager can play your messages immediately upon receipt or can store voice messages from callers so that you can play them back whenever it is convenient. There is no need to find a telephone to call for your messages, as the voice message is already stored in the pager.

Here is how it works:

You record a greeting for callers, just as you would for a home telephone answering machine. The greeting tells callers to leave a message after the tone. When someone wishes to leave a message, they call your pager number, hear the greeting, and leave a message. After the caller hangs up, your pager will alert you that it has received a message either through a tone or by vibrating. At your convenience, you can replay the message by pressing a button on the pager. The voice pager can also display a numeric message just the same as current numeric display pagers if the caller wishes not to leave a voice message.

Coverage is the same as for existing numeric pagers, with coverage available throughout the metropolitan Washington area. Regional and national coverage is also available. Battery life is also the same as for numeric pagers, approximately one month. The voice pager has the capacity for up to 120 seconds of messages (for example: six 20 second messages).

Please answer questions 1-10 before we start discussions.

Name _____

Place of Employment _____

Occupation/Job Title _____

1. What type of pager do you use?

- _____ Digital display pager (numbers only)
- _____ Alphanumeric display pager (numbers and text)

2. Do you use voice mail with your pager?

- _____ Yes
- _____ No

3. Which coverage area do you subscribe to?

- _____ Washington/Baltimore metropolitan area only
- _____ Regional service
- _____ Nationwide service

4. Is the pager you use owned or rented?

- _____ Rental pager
- _____ Customer owned pager

5. What is the average number of messages per day received on your pager? _____

6. What percent of your paging messages are business related and what percent are personal

- _____ % personal
- _____ % business
- Total 100 %

7. What other mobile communication devices, if any, do you use in conjunction with your pager?

- _____ Cellular phone
- _____ SMR
- _____ Private two-way radio
- _____ CB radio
- _____ Other

8. How long have you had paging service?

- _____ Less than 1 year
- _____ 1-2 years
- _____ 2-3 years
- _____ 3-5 years
- _____ over 5 years

9. What is your age?

- _____ under 25
- _____ 25-40
- _____ over 40

10. What is your total annual household income level?

- _____ less than \$25,000
- _____ \$25,000 - \$50,000
- _____ \$50,000 - \$75,000
- _____ over \$75,000

11. Based on the description of the voice pager, would you prefer having a voice pager over your current pager?

- definitely prefer voice pager
- probably prefer voice pager
- may/may not prefer voice pager
- probably not prefer voice pager
- definitely not prefer voice pager

12.

- definitely subscribe
- probably subscribe
- may/may not subscribe
- probably not subscribe
- definitely not subscribe

13.

- definitely subscribe
- probably subscribe
- may/may not subscribe
- probably not subscribe
- definitely not subscribe

14.

- definitely subscribe
- probably subscribe
- may/may not subscribe
- probably not subscribe
- definitely not subscribe

EXHIBIT 2

Figure 2 from Comments of Motorola Inc. in RM-7617

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

RECEIVED
MAR 11 1981
FED. COMM. COMM.

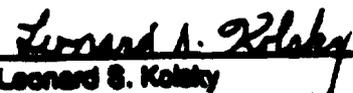
In the Matter of:

Telocator Petition for
Rulemaking to Amend Part 22 of
the Commission's Rules Concerning
the Use of 830-831 MHz for an
Advanced Messaging Service)
)
)
)
)

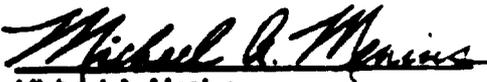
RM - 7817

Motorola Inc. ("Motorola") is pleased to submit its comments in the above-captioned rulemaking.

Respectfully submitted,



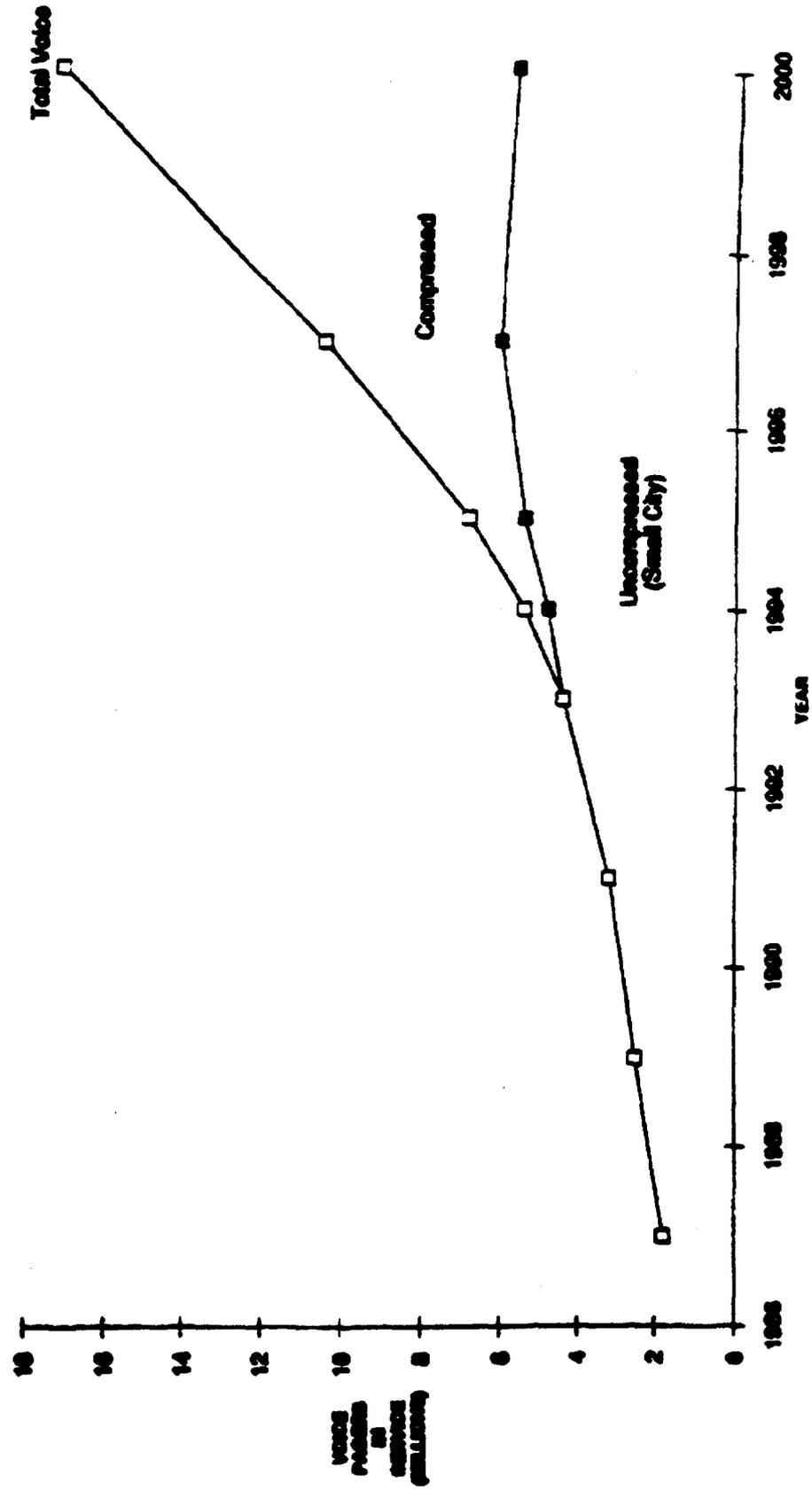
Leonard S. Koloky
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March 11, 1981

**PAGING SPECTRUM NEEDS
NEW SERVICES SCENARIO - PAGER TYPES**



3/8/91

FIGURE 2

EXHIBIT 3

Engineering Report of Moffet, Larson & Johnson, Inc.

MOFFET, LARSON & JOHNSON, INC.

PAGING NETWORK, INC.

**FINAL ENGINEERING REPORT
PREPARED FOR PAGING NETWORK, INC.**

This report describes a new paging system, designed to serve millions of voice paging users nationwide. The proposed system employs numerous spectrum conservation technologies, many of which have not previously been utilized in the provision of voice paging services, if at all. These include dynamic frequency reallocation, frequency reuse, voice compression, and predictive propagation techniques.

PageNet's proposal to serve the mass market for one-way wireless voice paging, referred to as VoiceNow, gains much of its increased capacity from a frequency reuse architecture similar to that used in cellular telephony. In brief, the system contemplates a network of paging sites within a given coverage area. Each is equipped with a single simulcast digital paging transmitter and one or more voice message transmitters. Short numeric pages will be sent on the common simulcast channel from all transmitters, while voice pages will be sent on messaging channels arranged in a reuse configuration from the one transmitter determined to best serve the paging subscriber (See Illustrations 1, 2, & 3).

The proposed system is designed to maximize voice capacity, while maintaining high voice quality. The ability to maintain high throughput of voice paging messages (typically of 15 seconds duration) will be accomplished

MOFFET, LARSON & JOHNSON, INC.

PAGING NETWORK, INC.

by use of a large network of message transmitters, deployed to permit the ability to transmit many voice messages simultaneously. Each transmitter will cover a limited geographic area, allowing conservation of spectrum through multiple reuse of the same frequency in a given system (See Illustration 4).

Maps 1-3, contained in Exhibit 1 to this Report, are illustrative of the overall system concept. Tests necessary to PageNet's experiment are being conducted in Los Angeles by PageNet engineers. Map 1 is simply a reproduction of a USGS map of the Los Angeles market. Maps 2 and 3 depicting transmitter and receiver locations and frequency use are illustrative of the overall system concept. Maps 2 and 3 also show how the computerized propagation modeling would likely be employed in the initial Los Angeles VoiceNow system. For further explanation of the propagation modeling, see p. 12 of the Report.

OVERVIEW OF VOICENOW SYSTEM

The system consists of (1) a simulcast paging system, similar to systems licensed under current Rules on other frequencies and now in place and operating, (2) a receive only channel for message acknowledgment from the pager (when a response is needed), and (3) eight message channels.

MOFFET, LARSON & JOHNSON, INC.

PAGING NETWORK, INC.

The system will require transmission and reception frequency allocation as follows:

Simulcast transmitter	25 kHz
ACK Receiver System	25 kHz
Message Transmitter System	25 kHz per channel

Thus, with eight message transmitter frequencies, a total of 250 kHz of spectrum will be occupied. Pagers will acknowledge an address transmitted to them on the simulcast channel by transmitting back an acknowledgment and identification signal (ACK) unique to the pager. Voice pages will be transmitted to the pagers on the messaging channels.

The message transmitters initially will be designed to cover approximately the same area as each transmitter in the simulcast group. As the system use grows, additional message transmitters will be added to increase message throughput capacity. Transmitter design shall be such that any individual message transmitter is frequency agile in order to accommodate PageNet's dynamic frequency reallocation, that is, it can be set by computer control to any assigned message channel frequency, thereby allowing dynamic allocation of system resources. Adjacent transmitter frequency assignment will be based on an N=4 reuse pattern.

MOFFET, LARSON & JOHNSON, INC.

PAGING NETWORK, INC.

Messages, when transmitted, will be directed to a specific reduced coverage area, and will not be transmitted throughout the entire system. Direction of the message to the specific coverage area desired will be accomplished through computer controlled radio location methods based on signal strength and other parameters.

PAGING CONTROL

As shown in Figure 1, the person desiring to communicate with a subscriber creates an incoming message. The message type is identified as either a voice or a numeric message. If the message is voice, it is digitized in the A/D Converter and stored for later retrieval. A request to locate is sent to the Locate Subsystem, which encodes a message including the pager's address and the request to acknowledge. These messages are queued along with the digital pages for transmission on the simulcast channel, much like pages are handled today.

If the message is numeric, the pager simply stores the message and alerts the subscriber. Voice or longer digital messages trigger the pager's acknowledgment transmitter which transmits a brief unique identification code message on the ACK channel. As shown in Figure 2, the Locate Subsystem is alerted to watch for an ACK message from the particular pager. This message will come from one of several ACK receivers and be supplied to the subsystem.