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WRITER'S DIRECT NUMBER

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June 12, 1992

KF2XEH

Mr. H. Franklin Wright
Chief
Frequency Liaison Branch
Federal Communications Commission
Room 7326
2025 M Street, N.W.
Washington, DC 20554

Re: Experimental License -- Semi-Annual Progress Report

Dear Mr. Wright:

As we discussed, I am enclosing four corrected copies of Omnipoint Corporation's May 1992 Semi-Annual Progress Report. We request that this corrected version be substituted for the report as originally filed, and that all four copies of the original version be returned to Omnipoint.

In light of our conversation this morning, Omnipoint has withheld altogether ten diagrams, charts and figures it otherwise would have filed with a confidentiality request. The company is considering whether to place some or all of these materials in the public record.

Please call if we can answer any questions or provide any additional information.

Sincerely,

David A. Wormser

Enclosures

Omnipoint
CORPORATION

FCC Experimental License
Semi-annual Progress Report
Rev. 01

May 1992

Omnipoint
CORPORATION

FCC Experimental License
Semi-annual Progress Report
May 1992

Outline

3 Hardware Developed (cont)

1. Executive Summary

This report details the efforts of Omnipoint Corporation over the last six months concerning the experimental license granted the company for the Industrial, Scientific, and Medical bands. The partial list of accomplishments includes:

• Measured propagation characteristics both indoor and outdoors. Specifically we have measured propagation coefficients and have found that in the indoor environment results are critically dependent on the building structure in which the system operates. Additionally we have found that signals can propagate between floors with relatively low attenuation.

• Developed true spread spectrum hardware, particularly handheld battery operated portable handsets for voice and data applications. These applications include hardware for PCS services in various licensed and unlicensed bands.

• Established that fading is frequency selective within a 10 MHz bandwidth and that our signal structure is less affected by deep fades. This will allow Omnipoint systems to operate at lower average transmit power and coexist more readily with incumbent OFS installations on a licensed basis.

Omnipoint has continued to fill its role as leader in spread spectrum hardware development with a lengthy list of firsts detailed herein, and will continue to use its best efforts to establish new wireless services with minimal reallocation of precious bandwidth.

2. Overview

2.1 BACKGROUND

On December 20, 1990, Omnipoint Data Company was granted an Experimental License in the Industrial, Scientific, and Medical (ISM) Bands at 902-928 MHz, 2.40-2.4835 GHz, and 5.725-5.850 GHz to test various spread spectrum techniques developed by the company. In January, 1992, Omnipoint Data Company changed it's name to Omnipoint Corporation, and has continued to develop spread spectrum hardware for many applications.

2.2 EXPERIMENTAL LICENSE OBJECTIVES

Omnipoint Corporation has for the last 5 years been designing and developing spread spectrum RF systems for customer driven applications hardware which will allow for sharing of the crowded radio spectrum. This hardware has been produced for use in a variety of applications ranging from wireless modems used in lightweight, handheld commodities trading data terminals and wireless credit card readers to cordless telephone applications, wireless PBX, Centrex, and Key Systems, and *Personal Communications Systems* with data throughput rates from 9600 bps to almost 600 kbps. Omnipoint firsts include:

The first handheld spread spectrum telephones
The first to demonstrate spread spectrum phones in the 1850 - 1990 MHz bands
The first to test spread spectrum microcells
The first to test spread spectrum phones with Advanced Intelligent Networks
The first wireless phone to be used in conjunction with a cable TV network
The first to operate unlicensed phones in the spread spectrum ISM bands
The first palm size spread spectrum data modems
The first modem capable of handling voice, data, and video in a single module

The Experimental License granted to Omnipoint has allowed for development and testing of these systems in a variety of environments where the applications are likely to be commonly found in the near future. Systems have been tested in indoor/outdoor sites which will likely be representative of future PCS-type environments, including urban and suburban locations. These environments include such diverse structures as metropolitan high-rise office buildings, multi-level, multi-million square foot corporate headquarters in a campus-type setting, small suburban office facilities, conference centers, hotels, residential neighborhoods and even large sports arenas.

These tests have yielded a wealth of invaluable data on propagation effects of wideband signals in the 902-928 MHz band and the 2.4 - 2.483 GHz band. This empirical data, when coupled with Omnipoint's extensive theoretical studies on propagation effects and coefficients in various environments, is critical to the design of robust wireless spread spectrum communication systems able to operate in highly destructive frequency selective multipath situations as well as in the presence of non-coherent interference, providing a variety of new services through bandwidth sharing techniques and minimal interference to other users.

The objectives of this experimental license report are to provide the FCC with data on the propagation effects of wideband signals to allow for development of wireless systems (such as PCS services) to better serve the public interests without reallocating precious radio spectrum.

2.3 REPORT CONTENTS

This particular report primarily details Omnipoint's efforts to study the real world environment of the ISM bands where significant new wireless services are likely to be provided in the near future. These studies include data on multipath effects, potential interference rejection requirements, system capacities, and propagation effects of wideband signals in indoor and outdoor environments. This report also details Omnipoint's effort with regard to hardware development

which is anticipated for roll-out of new wireless products in the ISM bands later this year.

3 Hardware Developed

3.1 FIRST GENERATION HANDHELD CORDLESS TELEPHONES

3.1.1 System Description & Overview

Omnipoint's first development efforts in the wireless telephone area resulted in a system in which a single base station can support up to four simultaneous full duplex phone calls (Figure 3.1-1). Primarily an experimental prototype, this system proved that lightweight, handheld, battery driven direct sequence spread spectrum telephones could perform without complications from the classic "near/far" phenomenon and without complicated and expensive power control algorithms.

Omnipoint's technical team was able to quickly produce prototypes which offered a reliable, ubiquitous operating range of 1000 feet line-of-sight (LOS). Even this range hindered the RF performance of the devices artificially as system range was limited by the timing aspects of the TDD design. Later updates of this system allow for greater range (up to 2200 feet) from TDD timing.

The key to economic feasibility lies in the ability of the system to perform in diverse environments and be manufactured and installed cheaply and easily. For example, for inbuilding PBX or Centrex applications range performance in the severe multipath environment that the typical office site represents is imperative. Successful completion of these criteria has provided the foundation for new wireless services in the unregulated ISM bands, as well as future bands licensed for emerging technologies.

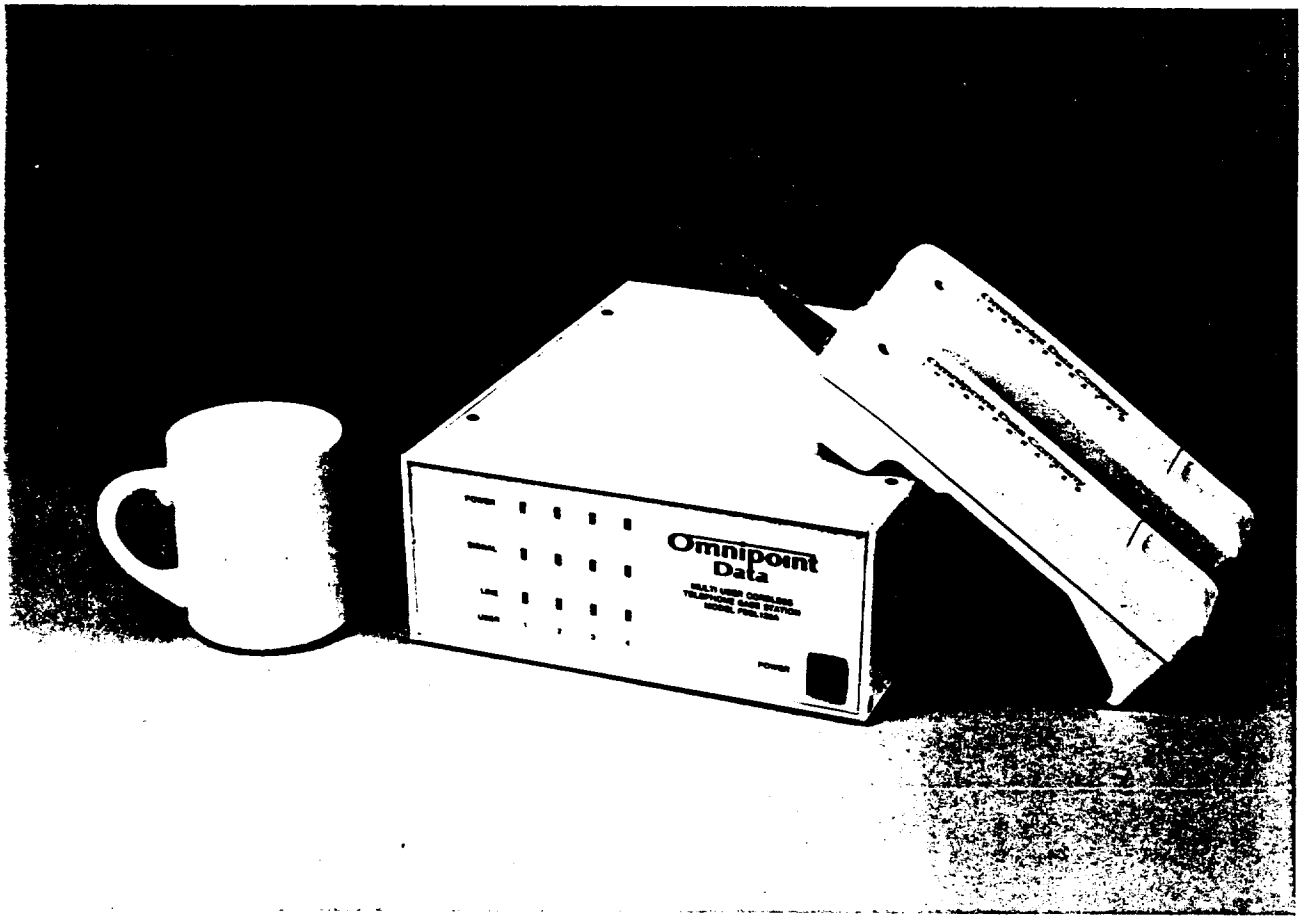


Figure 3.1-1
Omnipoint 1st Generation 900MHz System

3.1.2 Operating Specifications of First Generation System

	Specification
Size:	Cordless phone
Weight:	18 ounces
RF Channels:	1
Operating Band:	902 - 928 MHz
RF Modulation:	BPSK
Transmit Power (Peak):	100 mW
Over-the-Air Channels:	4
Voice:	ADPCM
Operating Range:	1000 ft
Multiplexing Techniques:	TDMA, CDMA

3.1.3 System Operation for Experimental License Purposes

This system has been employed in a variety of operations, including much of the propagation testing performed and detailed in this report. Several of Omnipoint's customers have also employed this system to perform extensive testing in the ISM bands. The list of customers who have or are currently experimenting and are planning on providing new services with Omnipoint systems is fairly extensive, including four publicly known customers/partners: Bell Atlantic, Pactel, Ameritech, and Cox Enterprises.

3.2 SPREAD SPECTRUM POCKET TELEPHONES

3.2.1 System Description & Overview

Omnipoint is actively continuing its leadership in the development of spread spectrum telephony with the introduction of a pocket-sized wireless phone

(Figure 3.2-1) that promises to bring affordable, high performance to PBX, Centrex, and Key systems, home cordless telephones and public PCS. Weighing less than eleven ounces and with the ergonomic "feel" of a high quality cellular telephone, the Omnipoint microcellular system provides business and professional users with the freedom, high quality voice and performance they need.

3.2.2 Operating Specifications of the Pocket Phone System

RADIO:	
RF System:	Direct Sequence Spread Spectrum.
Frequency:	902-928 MHz, 1850-1930 MHz, 2.4-2.4838 MHz
RF Channels:	3, 8, 8 respectively
System RF Bandwidth:	Meets all FCC Part 15 requirements for unlicensed operation for use in ISM bands.
Channel RF Bandwidth:	9 MHz
Modulation:	Bi-Phase Shift Keying (BPSK)
Power Output:	Up to 100 mW.
Processing Gain:	Up to 18 dB.
Receiver Sensitivity:	Nominal -90 - -95 dBm.
Maximum Range:	Up to 2,200 feet communication radius.
Operating Range:	Typical from 300 to 500 feet in-building per base station.
Multiplexing Techniques:	Combination of TDMA, FDMA and CDMA.
BASE STATION:	
Dimensions:	4" x 12" x 9".
Weight:	<5 lb.
Power:	110 VAC @ 60 Hz, 100W maximum.
Network Interface:	Industry Standard 2500 lines via RJ-11 Jacks.
Active Channels:	Up to eight simultaneous user connections.
Active Subscribers:	Thousands of unique subscriber addresses.

Omnipoint Pocket Phone
Figure 3.2-1

BASE STATION (Cont):	
Indicators:	Power, Line Active, Signal Quality.
Antennas:	Standard: Dual omnidirectional 1/4 wave monopole. Optional: Dual radome or hybrid omnidirectional.

HANDSETS:	
Dimensions:	2" x 2.25" x 8".
Weight:	< 11 oz. (including battery and antenna).
Talk Time:	2 Hours Typical.
Controls:	2 external plus 21 button keypad with function shift.
Indicators:	2 x 8 Segment LCD.
Antenna:	Vertically polarized, omnidirectional 1/4 wave monopole.
Features:	Most standard business telephone features.

3.2.3 Applications

3.2.3.1 Wireless Pay phones

Omnipoint has been awarded a contract to provide several thousand wireless pocket phones and hundreds of microcell base stations to Bell Atlantic. For Bell Atlantic's application, the pocket phones will provide user access to the PSTN for calling in public areas such as restaurants, hotels and airports as a focused Telepoint-like service, as well as for use with wireless adjuncts to PBXs and Centrex.

Wireless Telepoint, like pay phone service, will allow PCS service providers the opportunity to begin the immediate, legal deployment of systems operating in the ISM bands. This will allow the service providers to begin deployment of their

infrastructure, and most importantly, plan and negotiate for critical site rights. Once the regulatory issues surrounding the new, emerging technologies bands are settled, and with their site rights already secured, these providers will be able to simply replace the RF modules in their Omnipoint equipment to operate at whatever frequencies are allocated by the FCC.

Omnipoint conducted the first test of a spread spectrum wireless microcell with Bell Atlantic in Silver Springs, Maryland in May 1991 as detailed in the last report (Figure 3.2-2). This test demonstrated the feasibility of using Omnipoint's direct sequence spread spectrum technology in the important early applications of PCS. A new system has been installed at the Bell Atlantic site in Virginia for on-going test purposes. Figure 3.2-3 shows a photograph of this installation while Figure 3.2-4 shows the coverage plot for GOS1 - GOS3 performance levels.

3.2.3.2 Public PCS

In addition to wireless Telepoint services, Omnipoint has been working with Bell Atlantic, Pacific Telesis and Ameritech, along with other providers such as Cox Communications and Cable Labs to develop concepts and equipment for the emerging public PCS market. Omnipoint has studied and evaluated the major possible PCS network architecture's now under consideration including cable television (CATV) and microwave backhaul, Bellcore's Universal Digital Personal Communications (UDPCS, Technical Advisory FA-NWT-001013) model, and several of the RBOC structures and has designed its Network Access Protocol as a standard that can interface to these different topologies.

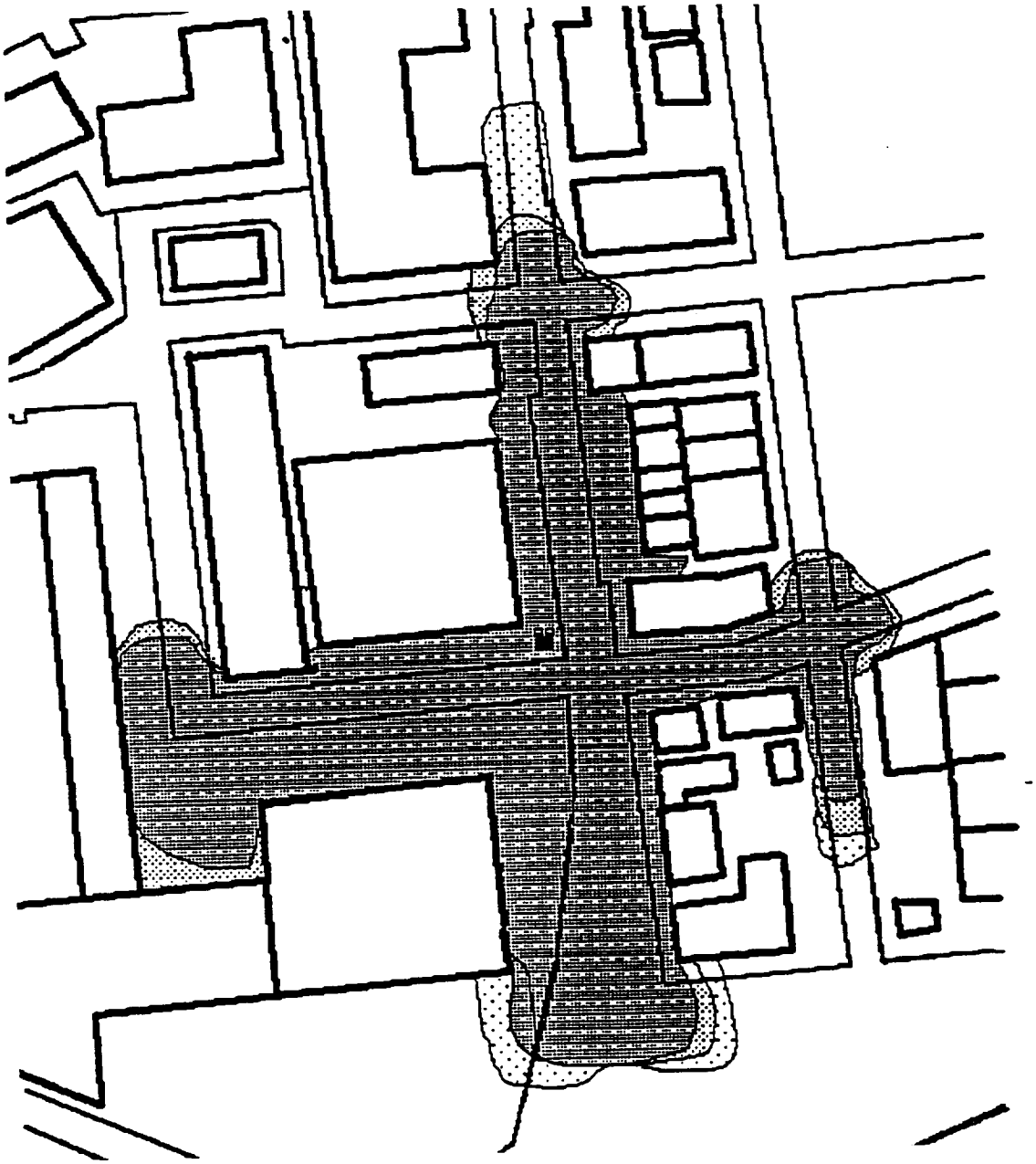
In February, 1992 Omnipoint provided the microcell system and handsets that allowed Cox Communications to place the first telephone call over a CATV network. The Omnipoint microcell was integrated into the Cox cable plant for interconnection and back hauled through the local San Diego cable system to a POP located near the cable headend (Figure 3.2-5). A press conference was held in Washington DC where a long distance phone call from the site in San Diego was placed to FCC Chairman Alfred Sikes.

Omnipoint
CORPORATION

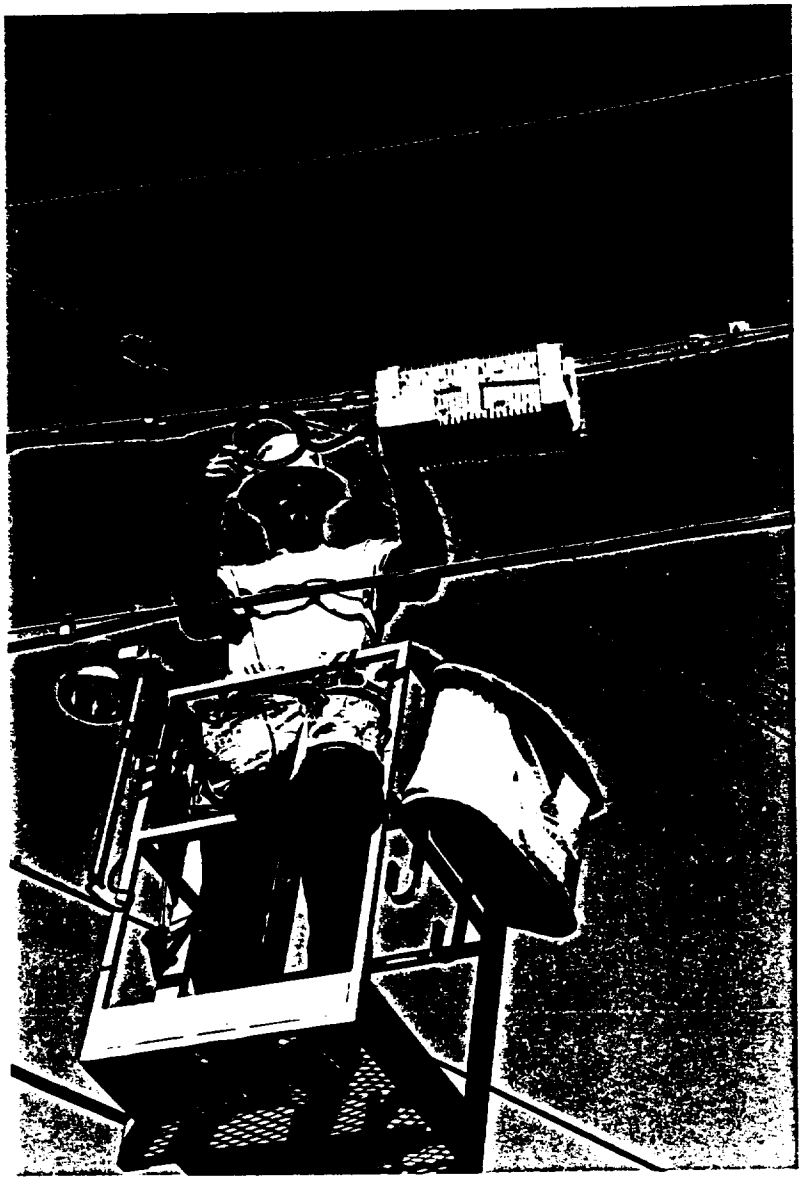
Public Microcell Installation No. 1
Silver Spring, Maryland
Figure 3.2-2

Omnipoint
CORPORATION

Public Microcell Installation No. 2
Bell Atlantic, Arlington, Virginia
Figure 3.2-3



Bell Atlantic Microcell, Arlington Virginia
System Coverage Plot
Figure 3.2-4



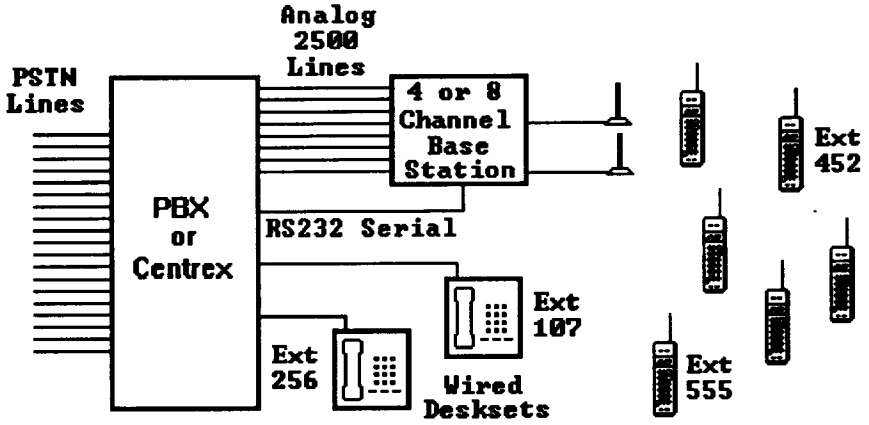
Cox Enterprises installs an Omnipoint spread spectrum microcell into a standard cable television amplifier enclosure.

Figure 3.2-5

The ability to use Omnipoint handsets in both public places and on customer premises has been a key focus in recent months. Omnipoint has developed a version of its standard handset which will be switchable between different operating frequencies, thereby allowing users to access both their own CPE-based wireless system (with no airtime charges) and switch over to the PCS when outside their premises. This dual mode, synergistic capability is viewed as being essential to accelerate the development and deployment of both the CPE and PCS markets.

3.2.3.3 Wireless CPE Products

Originally designed to operate in the PCS environment, the Omnipoint microcellular system is a CPE (customer premise equipment) version that features the same high quality voice, extended coverage range and superior performance developed for the public phone marketplace. A typical Omnipoint wireless PBX application is shown below:



Typical Wireless PBX, Centrex or Key System Adjunct.

In addition to CPE end users, both Bell Atlantic and Pacific Telesis plan on developing wireless Centrex as part of their overall PCS activities. For example,

Omnipoint conducted the first wireless Centrex test during ICA in June 1991 at the Anaheim Convention Center.

The Omnipoint Wireless CPE spread spectrum adjunct system operating in the unlicensed bands offers users numerous advantages over cordless and cellular telephones:

- No Usage Charges (zero monthly, zero per minute)
- High Quality Voice (equivalent to wired phones)
- Excellent Range (up to a 4,400 foot diameter)
- Complete Coverage (a single cell will cover most buildings)
- No Restrictions (no FCC site license is required)
- Multi-Line (up to 8 simultaneous calls per base)
- Shared Resources (more handsets than channels)
- Private Communication (digital, encoded channels)
- Simple Installation (no special wiring or equipment)
- Easy To Use (standard business telephone features)
- Future Growth (add handsets and base stations to grow)

3.2.3.4 Home cordless phones

The use of PCS technology in the home is viewed by Omnipoint as being a slower market to mature relative to the business, professional and PCS environments where there is already strong economic justification for wireless products and services. To penetrate the home market, PCS-compatible wireless phone equipment must become extremely low in cost, there can be no airtime charges, the monthly service fee must be virtually the same cost as today's wired service and there must be broad residential coverage areas.

Given these factors, Omnipoint believes that the home market will be broadly opened only when equipment costs fall significantly due to volume production based on standards and PCS networks become fully developed. However, Omnipoint has determined that the design of its handsets adds only a small premium over the cost of conventional FDMA digital phones such as CT2, and which, in volume production, could therefore make home use practical.

3.2.4 Advantages of the Current Pocket Phone System

Spread spectrum in general, and Omnipoint's patented technology in particular, offer both the PCS and CPE user several significant benefits over conventional analog cordless and cellular phones as shown:

Omnipoint Spread Spectrum	46/49 MHz Cordless Business Phones
• Wired phone voice quality	Very poor voice quality
• Coverage radius up to 2,000 feet	Coverage radius usually less than 25 feet
• 8 simultaneous calls per base	Two co-located phones maximum
• Multiple subscribers per base	Single user for each base
• Data Communications Option	No data communications
• No FCC License Required if operated in unlicensed bands	No FCC site license required

Omnipoint Spread Spectrum (Cont)	46/49 MHz Cordless Bus. Phones (Cont)
• Easy to Install and Use	Very easy to install and use
• Private communications	Very unsecure communications

Omnipoint Spread Spectrum	Standard Cellular
• Wired phone voice quality	Poor voice quality
• Coverage radius up to 1,000 feet	City-wide coverage
• 8 simultaneous calls per base	Max 55 calls per square mile
• Multiple subscribers per base	Contention with public
• High speed data communications	Limited data communications
• No FCC License Required if operated in unlicensed bands	No FCC site license required
• Easy to Install and Use	Very easy to install and use
• Private communications	Unsecure communications

Omnipoint Spread Spectrum	In-Building Cellular
• Wired phone voice quality	Poor voice quality
• Coverage radius up to 1,000 feet	Multipath limited, 500 feet typical
• 8 simultaneous calls per base	Max 3 to 5 users per local cell
• Multiple subscribers per base	Local user or public contention
• High speed data communications	Limited data communications
• No FCC License Required if operated in unlicensed bands	Controlled by cellular operator
• Easy to Install and Use	Extremely expensive to install
• Private communications	Unsecure communications

In order to increase system capacity for better service provision, Omnipoint has developed the current generation of wireless spread spectrum telephone hardware such that it provides multiple frequency channels. Operated under the right circumstances, this system can provide up to 3 distinct frequency channels in

the 902 - 928 MHz ISM band, and 8 channels on the 2.4 - 2.4835 GHz. Each frequency channel will initially support 16 half duplex voice channels using ADPCM coding. The number of voice channels can be upgraded over time, such that in the future up to 144 half duplex voice channels can operate within a single frequency, therefore allowing greater system capacity.

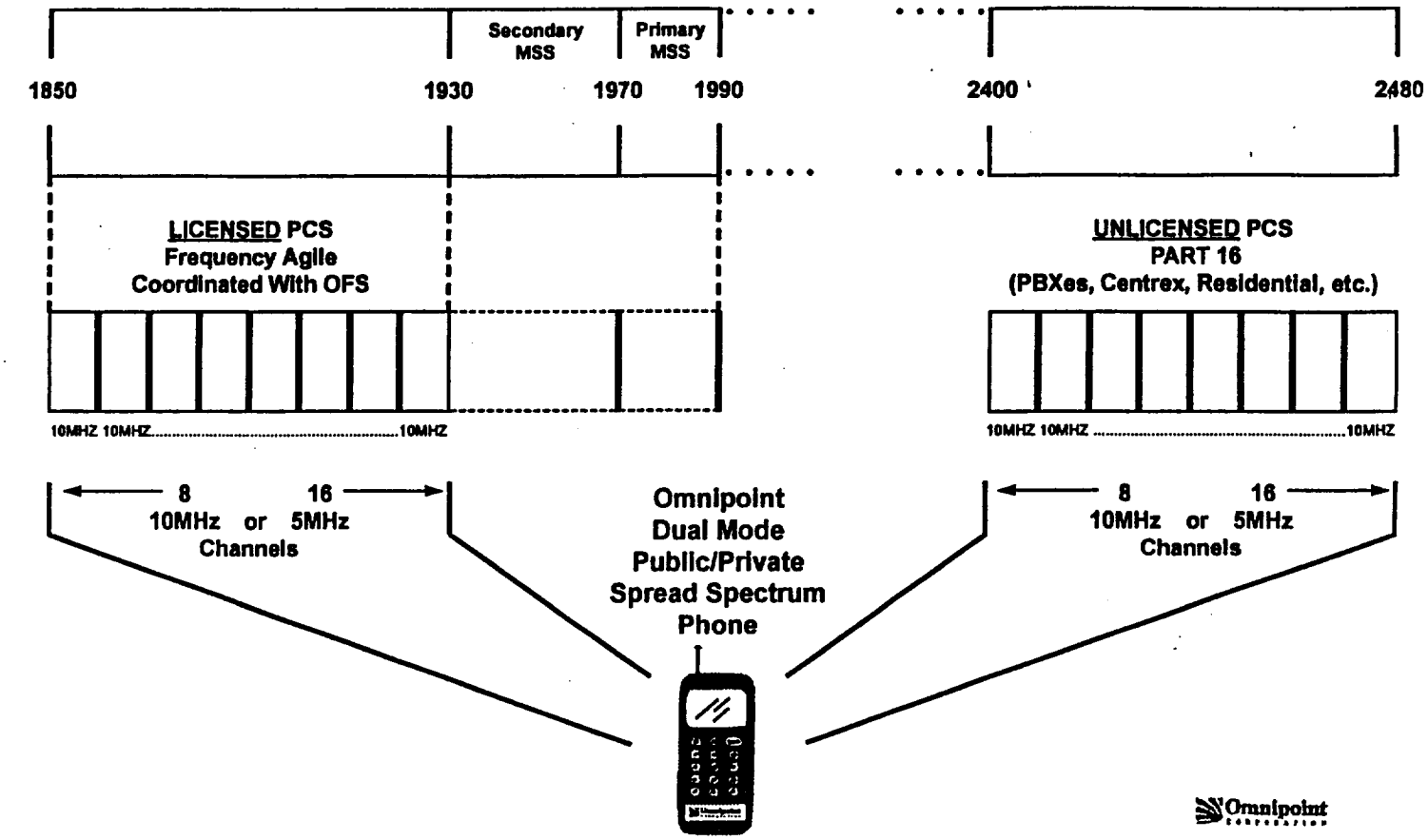
3.3 UPPER BANDS DEVELOPMENT

3.3.1 2.4 GHz Progress Report

With the success of Omnipoint's 900 MHz technology, work has continued in the other ISM bands where more available bandwidth will allow for increased applications. Omnipoint has funded the successful development of a gallium arsenide ASIC which allows for extensive research and development for frequencies from 800 MHz to 2.8 GHz. This will allow for production of a dual mode phone, where (pending future FCC allocations) the device can operate in a public environment outdoors in licensed spectrum (possibly the 1.8 GHz to 1.93 GHz band), and can automatically switch to private systems indoors in the unlicensed ISM band of 2.4 GHz (Figure 3.3-1).

As the development of this technology is evolutionary in nature, it was decided that Omnipoint technical staff should pursue development of upper band hardware in an orderly manner. In conjunction with Omnipoint's 1.8 GHz band experimental license, it was determined that the most logical approach to developing these systems was to implement a 1.8 GHz model first, then solve the 2.4 GHz problem. For this reason, only preliminary propagation and interference testing has been performed, with telephone handsets and complete systems under continued development. It is anticipated that by the middle of May, Omnipoint will have demonstrated the world's first spread spectrum telephone operating in the 2.4 GHz ISM band. Figures 3.3-2 & 3.3-3 show spectral plots of preliminary equipment operating in the 2.4GHz band.

POTENTIAL SPECTRUM ALLOCATIONS



Dual-mode Licensed/Unlicensed
Spread Spectrum Handset Operation
Figure 3.3-1

3.3.2 1.8 GHz Emerging Technologies Band

3.3.2.1 First Generation 1.8 GHz Phone

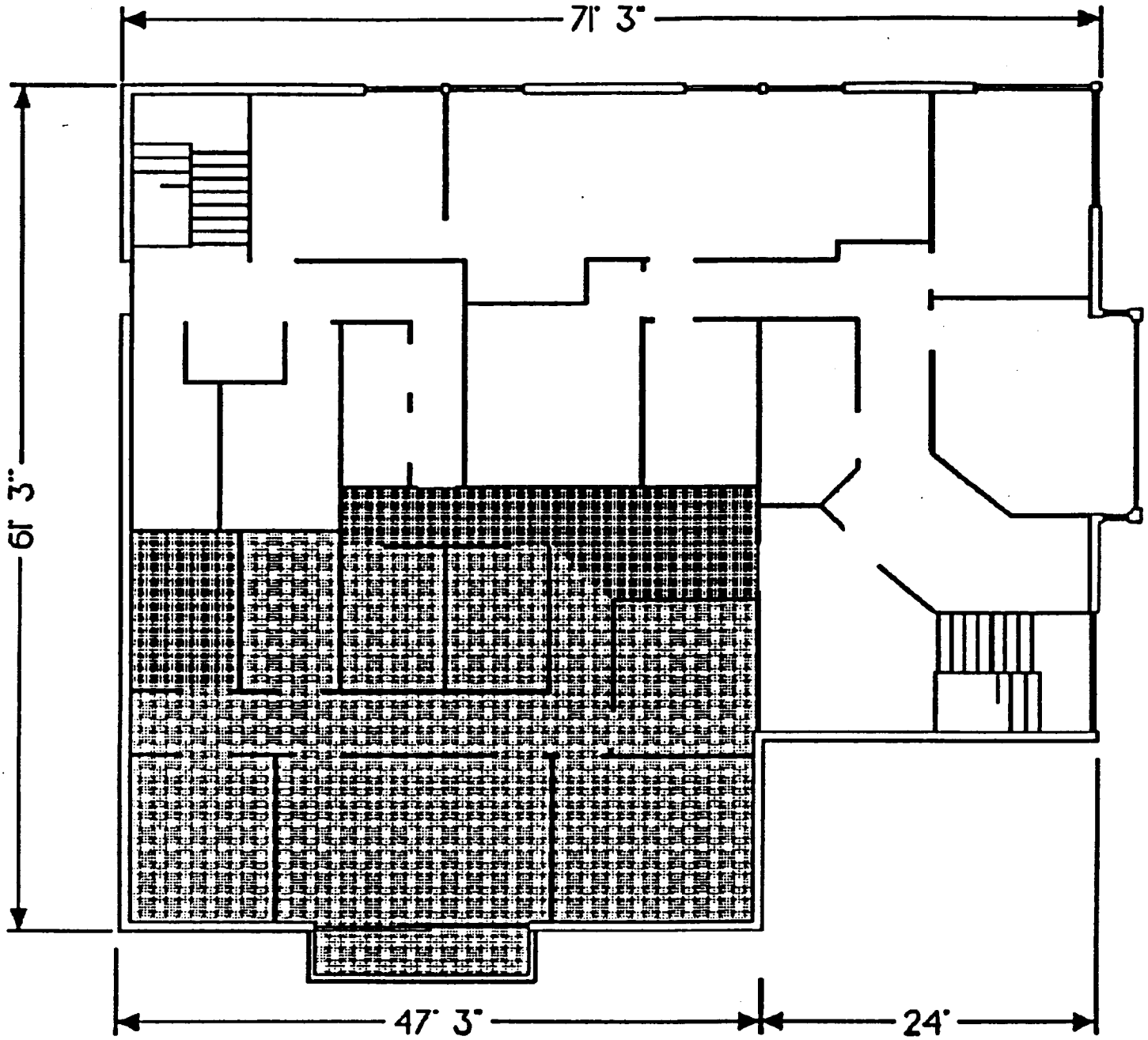
In December, 1991, in conjunction with Ameritech and under its experimental license, Omnipoint demonstrated the world's first 1.8 GHz handheld battery driven cordless phone. As an engineering prototype, the device was able to perform at ranges on the order of 50 - 60 feet inside a building, and up to 1500 ft. outdoors LOS with consistently high Grades of Service Ratings in a simplex mode where the base transmitted and the handset received. (Detailed descriptions of Omnipoint Grades of Service (GOS) Ratings can be found in Section 4.3, page 4-6.) Figure 3.3-4 details the propagation characteristics on the second floor at the original Omnipoint facility. This facility has been described in detail in the first progress report submitted October, 1991.

SPECIFICATIONS:

RF System:	Direct Sequence Spread Spectrum
Frequency:	1925 MHz
RF Channels:	1
RF Modulation:	Bi-Phase Shift Keying (BPSK)
Voice:	32 kbps ADPCM
Power Output:	4 mW
Processing Gain:	18 dB
Receiver Sensitivity:	-70 dBm
Maximum Range:	Up to 150 feet communication radius
Operating Range:	Typical from 50 - 60 feet in-building

3.3.2.2 Next Generation 1.8 GHz Phone

Upon successful completion and operation of the simplex prototype, Omnipoint engineers embarked on turning this technology into a full duplex Beta



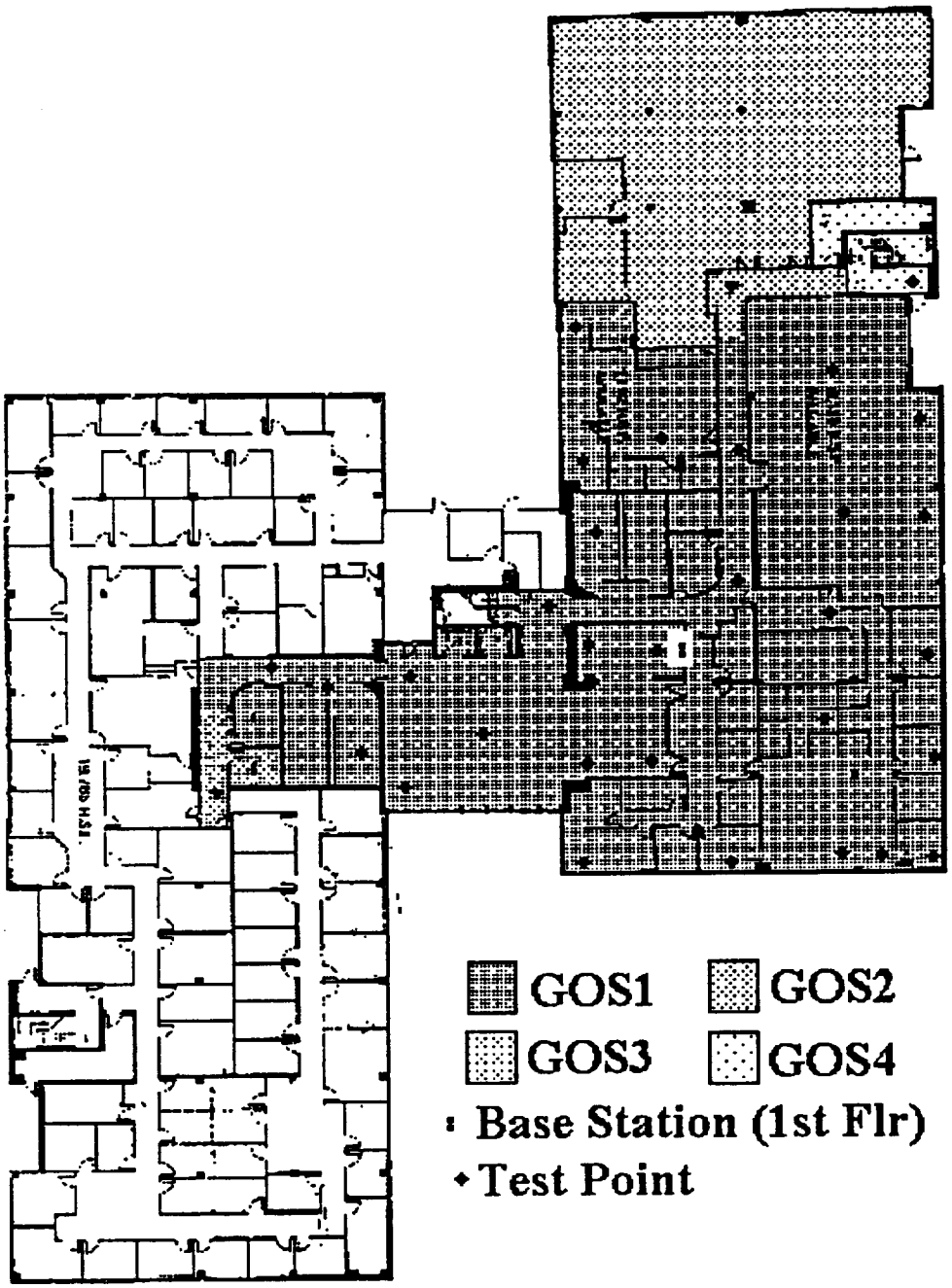
1st Generation 1.8GHz Indoor Coverage Plot
Figure 3.3-4

prototype which would allow for more extensive testing in the 1850 MHz - 2200 MHz band. This development effort was completed in March, 1992, when Omnipoint demonstrated the first full duplex cordless phone system at Colorado Springs, CO. This first prototype unit performed favorably in comparison with existing 900 MHz hardware, and proved that a lightweight 1.8 GHz battery driven handheld telephone is technically feasible. Furthermore, it was proof that the gallium arsenide ASICs that Omnipoint has funded could perform at 1.8 GHz with the same parameters as at 900 MHz.

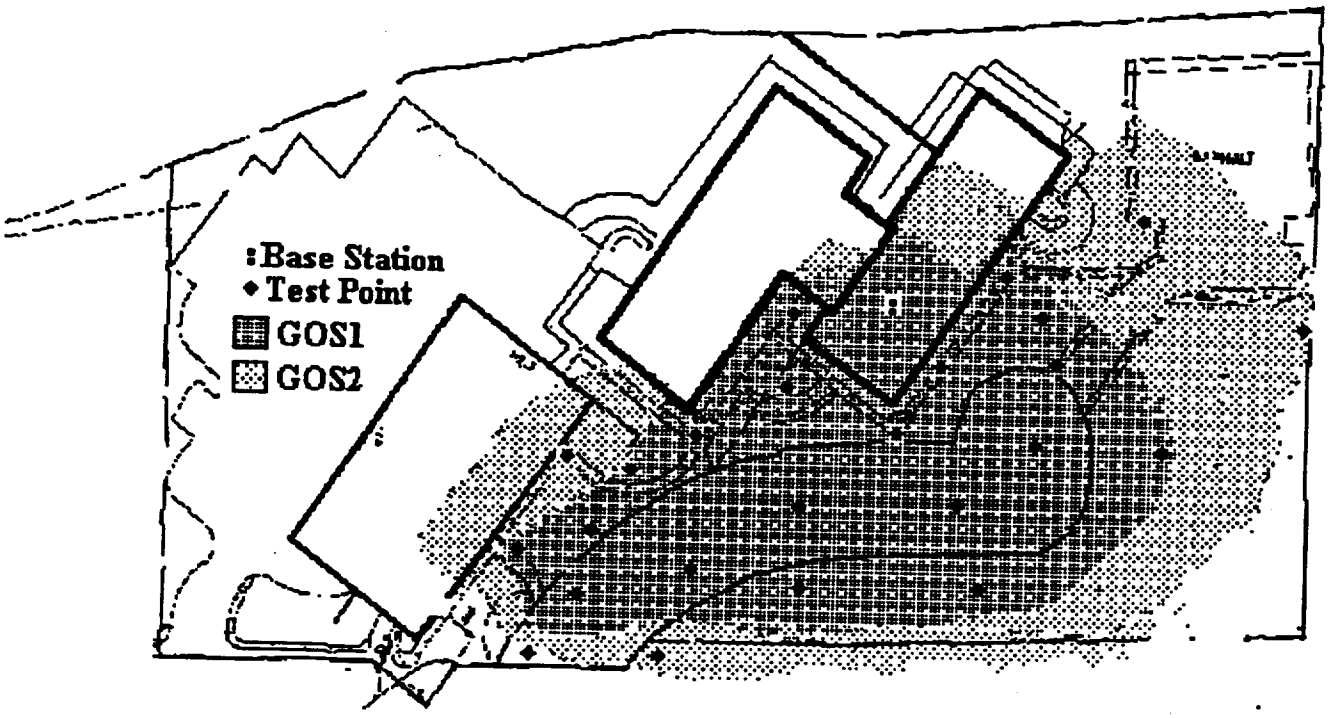
A first test of range for these units was performed indoors at the Omnipoint facility in Colorado Springs, Colorado. (A complete description of this facility can be found in Section 4.3.1.4.2, page 4-13.) With the base station placed in a conference room, the antennas mounted at a height of approximately 8.5 feet and separated horizontally by six feet, coverage at GOS1 levels is provided for most of the East Wing of the building's first floor, with GOS2 levels covering the remainder.(Figure 3.3-5). With a second or third base station strategically placed throughout the facility, ubiquitous coverage can be supplied to the facility, with increased over-the-air capacity.

A second test for line of sight distance was performed by placing the base station outdoors, with the antennas at a height of approximately 15', again separated by about 6 feet. This test was performed at the Omnipoint facility, which is adjacent to an open field, providing an ideal environment for short range, open field testing. This test demonstrated performance of the 1.8 GHz system at GOS1 and GOS2 levels at distances of up to 1100 ft (Figure 3.3-6).

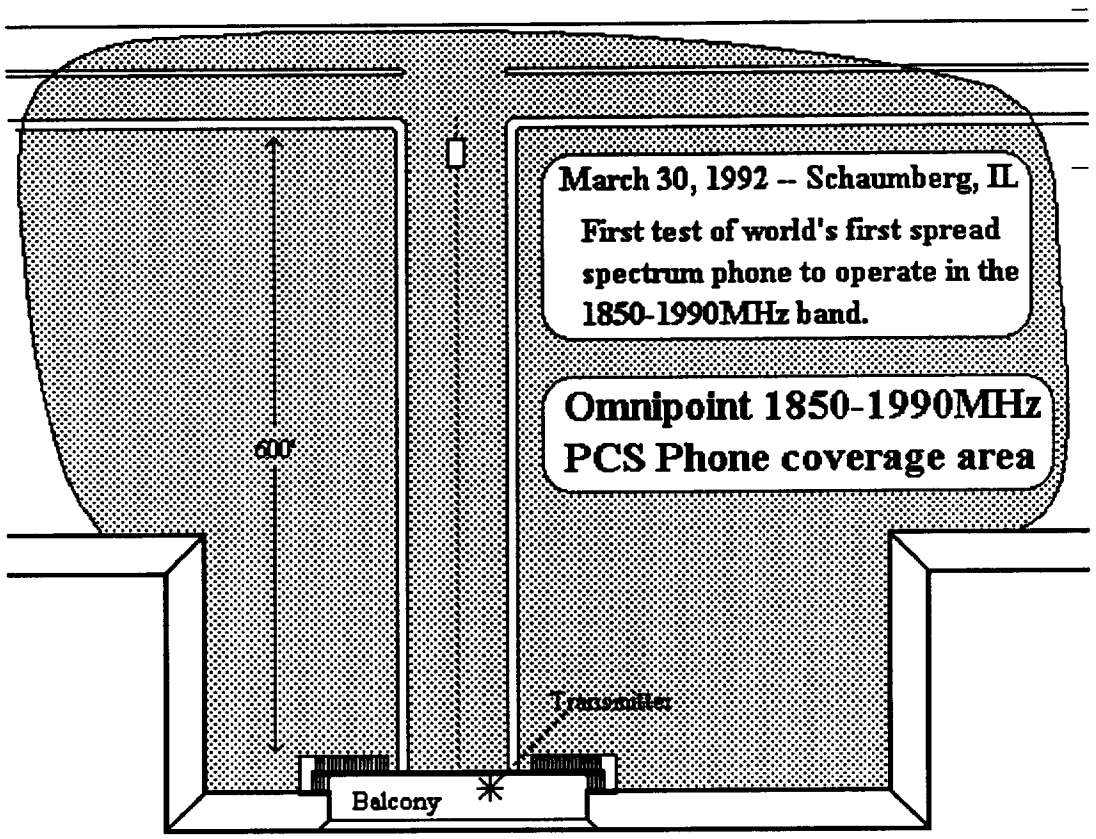
Outdoor propagation tests of this hardware were also performed in Hoffman Estates, Illinois at the Ameritech Corporate Headquarters. A base station was mounted at an elevation of approximately 25 feet on the balcony of the second floor, and a coverage test in an open field was performed, revealing performance similar to that achieved in Colorado Springs (Figure 3.3-7).



1.8GHz Indoor Coverage Plot (1st Floor)
Figure 3.3-5



1.8GHz Outdoor Coverage Plot
Figure 3.3-6



1.8GHz Outdoor Coverage Plot, Ameritech
Figure 3.3-7

The above tests were designed to yield performance data on the particular hardware under test. Other propagation tests have been conducted in which signal strength measurements were taken at short ranges, both indoors and outdoors and at long ranges; up to five miles, the results of which are detailed in Section 4.

2nd Generation 1.8GHz Phone System Specifications

RF System:	Direct Sequence Spread Spectrum
Frequency:	1925 MHz
RF Channels:	1
RF Modulation:	Bi-Phase Shift Keying (BPSK)
Voice	32 kbps ADPCM
Power Output:	90 mW
Processing Gain:	18 dB
Receiver Sensitivity:	-90 dBm
Maximum Range:	Up to 1100 feet communication radius
Operating Range:	Typical from 300 feet in-building

BASE STATION:

Dimensions:	4" x 12" x 9".
Weight:	<5 lb.
Power:	110 VAC @ 60 Hz, 100W maximum.
Network Interface:	Industry Standard 2500 lines via RJ-11 Jacks.
Active Channels:	Four simultaneous user connections.
Indicators:	Power, Line Active, Signal Quality.
Antennas:	Standard: Dual omnidirectional 1/4 wave monopole.

2nd Generation 1.8GHz Phone System Specifications (cont)

HANDSETS:

Dimensions:	2" x 2.25" x 8".
Weight:	< 12 oz. (including battery and antenna).
Talk Time:	2 Hours Typical.
Antenna:	Vertically polarized, 1/4 wave monopole.

3.3.2.3 Newest Generation 1.8 GHz phones

Omnipoint continues to lead in the development of personal communications hardware with the next generation of 1.8 GHz telephones. Designed to provide a platform for extensive testing of propagation and interference characteristics in this band as well as supply hardware for new services when allocations are made, this system will offer frequency agility in 5 to 9 MHz channels in order to co-exist with primary licensed users in this band. (Figure 3.3-8). This equipment (Figure 3.3-9) will also function in a second mode, which consists of full featured operation in the 2.4 GHz ISM band for unlicensed operation. (Figure 3.3-10)

RADIO:

RF System	Direct Sequence Spread Spectrum.
Frequency:	1850 -1930 MHz.
RF Channels	8
System RF Bandwidth:	80 MHz
Channel RF Bandwidth:	9 MHz (null-null)
Modulation:	Bi-Phase Shift Keying (BPSK)
Power Output:	Up to 100 mW.
Processing Gain:	Up to 18 dB.
Receiver Sensitivity:	Nominal -90 dBm.
Maximum Range:	Up to 2,000 feet communication radius.
Operating Range:	Typical from 300 to 500 feet in-building.
Multiplexing Techniques:	Combination of TDMA, FDMA and CDMA.

Omnipoint Wireless Phone Set
Figure 3.3-9

POTENTIAL SPECTRUM ALLOCATIONS

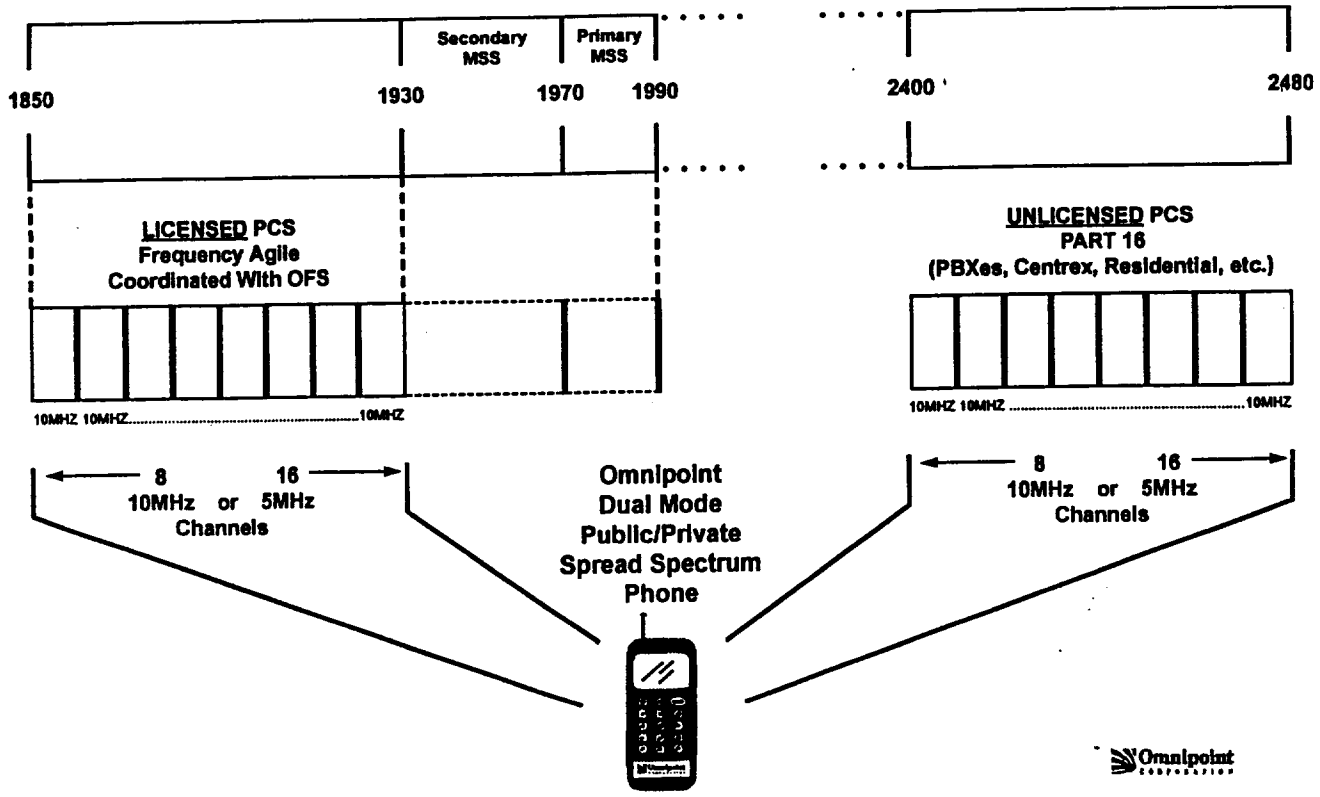


Figure 3.3-10

BASE STATION:	
Dimensions:	4" x 12" x 9".
Weight:	<5 lb.
Power:	110 VAC @ 60 Hz, 100W maximum.
Network Interface:	Industry Standard 2500 lines via RJ-11 Jacks.
Active Channels:	Up to eight simultaneous user connections.
Active Subscribers:	Thousands of unique subscriber addresses.
Indicators:	Power, Line Active, Signal Quality.
Antennas:	Standard: Dual omnidirectional 1/4 wave monopole. Optional: Dual radome or hybrid omnidirectional.

HANDSETS:	
Dimensions:	2" x 2.25" x 8".
Weight:	<12 oz. (including battery and antenna).
Talk Time:	2 Hours Typical.
Controls:	2 external plus 21 button keypad with function shift.
Indicators:	2 x 8 Segment LCD.
Antenna:	Vertically polarized, omnidirectional 1/4 wave monopole.
Features:	Most standard business telephone features.

3.4 DATA MODEMS

3.4.1 Commodities Trading Applications

Omnipoint, in conjunction with Texas Instruments, has developed a trading system which allows commodities traders at the Chicago Board of Trade ("CBOT") and the Chicago Mercantile Exchange ("CME") to perform trades through the traditional "open outcry" method, and then record each transaction

within seconds using a lightweight, hand held wireless terminal as shown in Figure 3.4-1 on the following page. The wireless communications sub-system, including the SSRF data modem, Figure 3.4-2, was designed and developed by Omnipoint and is currently being evaluated by the exchanges. Also see Appendix 1. - Commodities Exchange Site Survey.

The Omnipoint wireless data communications system used by the exchanges is capable of serving thousands of traders simultaneously. The system utilizes high-speed, direct sequence spread spectrum radio modems. The base station and each hand held terminal modem contain on-board processors that transparently control modem transmission, reception and power management and all lower-level protocol functions, thus freeing the terminal's processor to improve overall system throughput and response time.

3.4.2 Hand held Data Terminals

Omnipoint has developed a high-speed wireless data modem for the world's largest provider of communicating hand held terminals (Figure 3.4-2). The direct sequence spread spectrum modem operates at 192,000 bits per second at ranges up to 6 miles. The customer will use Omnipoint modems in place of traditional narrowband UHF devices in those applications where high throughput and extended coverage areas are required.

The modem will also be commercialized for sale on an OEM basis to customers needing wireless communications for portable and pen-based computers, wireless portable video systems and digital radio links for SCADA (Supervisory Control and Data Acquisition), remote site access and local by-pass applications.