

FCC Form 442  
Omnipoint Data Company, Inc.

Exhibit 1

RESPONSES TO QUESTIONS FOUR, FIVE, SIX, TEN, ELEVEN AND THIRTEEN

I. Introduction

Spread spectrum technology offers the opportunity to make greater use of existing frequencies. Omnipoint Data Company, Inc. ("Omnipoint") has developed a series of techniques and system designs and, pursuant to an Experimental License granted by the Commission on December 21, 1990, has proven those techniques and designs effective in the 902-928 MHz, 2400-2483.5 MHz and 5725-5850 MHz frequency bands. Omnipoint now requests a new Experimental License authorizing it to prove that its technology will permit the efficient and effective use of the 1850-2290 MHz range on a shared basis for mobile personal communications services while requiring that a minimal number of existing users be displaced.<sup>1</sup>

II. Particulars of Operation (Question 4)

A. Omnipoint requests authority to operate within the frequency bands between 1850 and 2290 MHz to experiment with, demonstrate and market test its spread spectrum personal communications system devices.

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1. In General Docket No. 90-217, the Commission established a "pioneer's preference" to encourage innovation in new radio technologies by granting an opportunity for innovators to participate in the new services that they are instrumental in developing. Omnipoint hereby requests that the Commission grant it a pioneer's preference for the services proposed herein.

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B. The maximum R.F. output power at the base station will be less than five watts and almost certainly less than one watt, and the handset will be less than one watt and almost certainly between 10 milliwatts and 100 milliwatts.

C. The maximum effective radiated power will be less than five watts.

D. The maximum effective radiated power will be less than five watts at peak power as defined at 47 C.F.R. § 5.3(n).

E. Modulation: Various Direct Sequence Techniques  
Spread Spectrum

[See Exhibit 2]

F. Necessary Bandwidth: Various bandwidths from 500  
KHz to 50 MHz

**III. Directional Antenna (Question 6)**

Various directional and omnidirectional antennas will be used.

**IV. Description and Theory of Operation**

Omnipoint has developed a unique spread spectrum communications module to be incorporated into a broad range of mobile or non-mobile devices such as cordless phones, handheld computers and portable digital video devices, and other personal communications network devices. Omnipoint also believes the system will permit development of low cost, wireless local area network modems. Omnipoint has already demonstrated spread

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spectrum telephonic alternatives to techniques such as CT2, CT3 and DECT.

V. Specific Objectives

Omnipoint, as stated above, wishes to experiment with spread spectrum technology as applied to a PCS in the bands between 1850 and 2290 MHz.

VI. Program of Investigation Promises Contribution to the Development and Increased Utilization of Radio Frequencies

Omnipoint believes that its experimentation pursuant to the requested Experimental License will demonstrate that PCS networks can operate in the 1850-2290 MHz range while requiring the minimal number of communications systems currently operating in those frequencies to reconfigure or move.

Over the past five years, Omnipoint has developed techniques in its laboratories which dramatically reduce the potential for interference with users already occupying the desired frequencies. The other spread spectrum systems proposed to date for personal communications services suffer from several major disadvantages:

- They require virtually continuous sharing of bands occupied by many users (e.g., ten microwave frequencies) in all geographic locations.
- They employ spread spectrum systems which essentially increase the interference of the spread spectrum system by the number of users (e.g., 30 users in a cell would generate 30 times the interference of one user).

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- They require extremely sophisticated adjustable power controls to operate at all.
- They do not explain how the multiple operators of PCSs can coexist.

Omnipoint's system, by contrast, overcomes these problems with a series of proprietary, patented and patent-pending technologies coupled with its dynamic channel architecture utilizing codes, frequency agility, time agility, geographic separation, and simple power controls such as those used in cellular systems. Moreover, the technology has already been reduced to ASIC-based subsystems which have been tested in the world's first handheld, battery operated true direct sequence systems. These systems currently operate at the ISM frequencies, but can be adjusted for use in the 1850-2290 MHz range since Omnipoint has funded a GaAs chip for this purpose.

Omnipoint's analysis of the actual distribution of users in the bands between 1850 and 2990 MHz warrants experimenting with different spread spectrum ratios and modulation techniques. Systems currently using frequencies in that range typically employ widely dispersed, stationary, point-to-point transmitters. They transmit signals in narrow beams at constant power, typically at heights well above street level. The initial premise is that some existing users in those bands may have to be "moved" in each city. Moving them, however, may

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consist of changing their current frequencies rather than eliminating them.

The principal advantages of Omnipoint's system are that the frequencies can be reused in microcells much closer to the existing point-to-point users than would otherwise be possible using either other spread spectrum techniques or traditional FDMA and TDMA non-spread spectrum techniques. Current analysis suggests reuse may occur ten times closer than the former and up to 100 times closer than the latter. The system will also allow multiple operators to coexist.

VII. Proposed Location (Question 5(d) & (e))

The nature of the experimentation requires that Omnipoint be able to test its devices in a wide variety of environments in an equally wide variety of locations. For technical reasons, Omnipoint requires the flexibility to test its mobile transmitters in various parts of the United States. Omnipoint accordingly requests authority to conduct its experiments throughout the United States. Twenty-four hours prior to conducting any test in the 1850-2290 MHz band in any location, Omnipoint will notify the FCC field engineer (or such other office as the Commission may specify) as well as the microwave user group for the area. Alternatively, Omnipoint requests authorization to conduct its experiments at and around

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its facilities in Colorado Springs, Colorado, and in and around the following metropolitan areas:

Los Angeles, CA  
New York, NY  
Washington, DC  
Chicago, IL  
Houston, TX  
San Francisco, CA  
Denver, CO  
Atlanta, GA  
Boston, MA  
Dallas, TX  
Philadelphia, PA  
St. Louis, MO

VIII. Length of Time Required to Complete Program of Experimentation

Omnipoint requests that the Experimental License extend for a period of two years.

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Exhibit 2

**CONFIDENTIAL TECHNICAL INFORMATION**  
**TO BE WITHHELD FROM PUBLIC INSPECTION**

F. Modulation: Various direct sequence, including:

BPSK  
QPSK  
MSK

- 1) 250 kpbs - 20.44 Mbps
- 2) n/a
- 3) n/a
- 4) 104.17 us, 4000 pls/sec