Before the

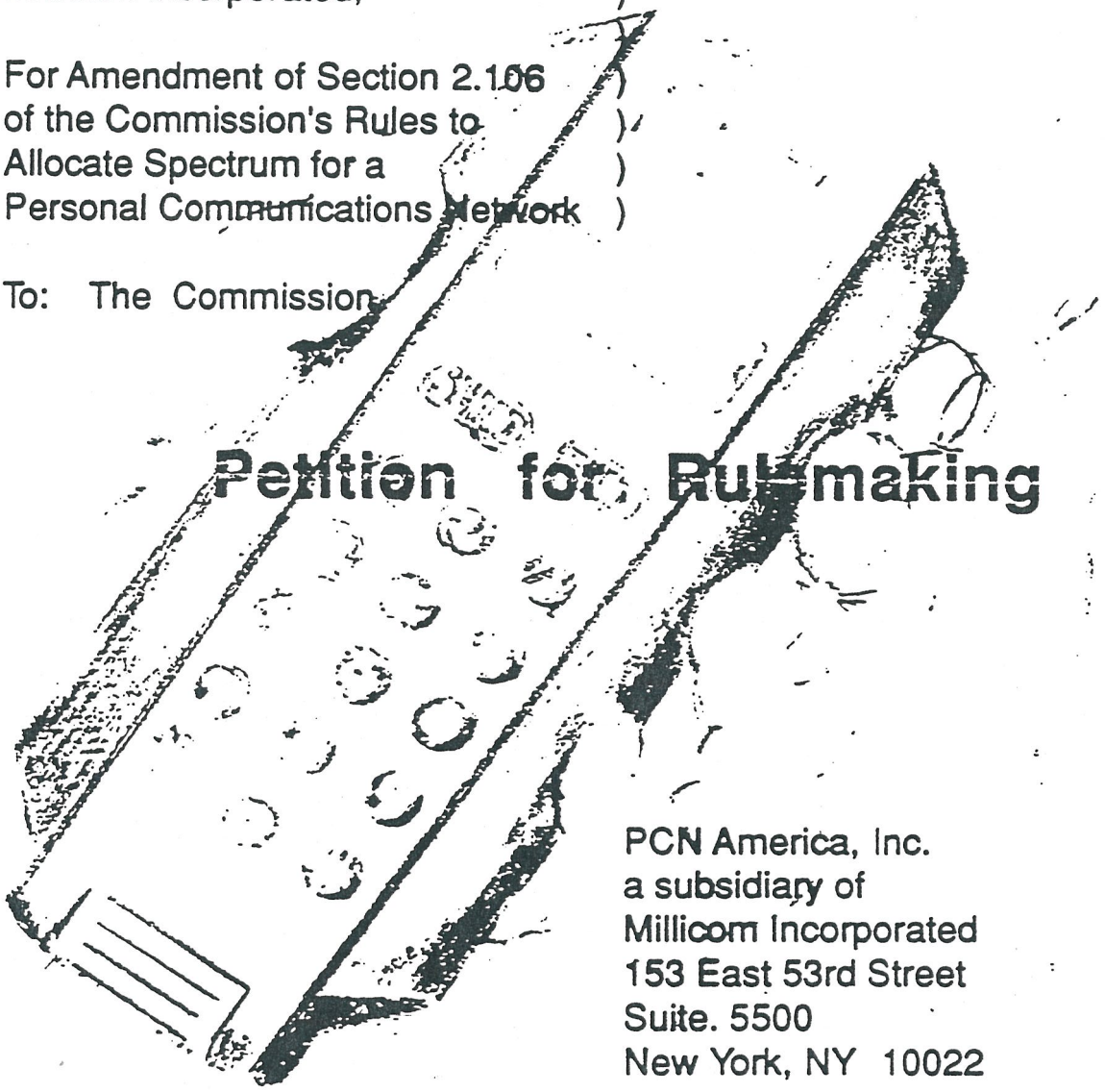
Federal Communications Commission

Washington, D.C. 20554

In the Matter of the Petition of	)	
	)	
PCN America, Inc., a subsidiary of Millicom Incorporated,	)	RM-
	)	
For Amendment of Section 2.106 of the Commission's Rules to Allocate Spectrum for a Personal Communications Network	)	

To: The Commission

Petition for Rulemaking



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SUMMARY

PCN America, Inc., and its parent company Millicom Incorporated, petition the Commission to commence a rulemaking proceeding that will open the way for the next generation of telephonic and data communications -- the personal, totally portable, wireless communications network known as PCN.

PCN, or "Personal Communications Network," features a lightweight wallet-sized wireless telephone, connected to other telephones on and off the wireless network via a honeycomb of radio-based microcells supported by an intelligent network, together with state-of-the-art modulation techniques. PCN offers advanced voice and data communications totally independent of, or in tandem with, the public switched telephone network. The new service is proposed to operate within a portion of the spectrum in the 1.7 to 2.3 GHz range.

PCN is a generation beyond "mobile phones" as we know them in the cellular service today. Because it uses microcells, which greatly expand frequency use and re-use, PCN will be available to greater masses of users. Likewise because of its microcell architecture, low power, lightweight and inexpensive handsets will be available. Because of its intelligent network, through use of personalized "smart cards," PCN will offer advanced service features -- such as highly selective call ringing and rejection, virtual private networks and ISDN features -- heretofore discussed in this country only

in futuristic terms. In short, PCN offers personalized communications, totally portable by the user, wherever he or she may be, and additionally offers the unique ability to call a person without knowledge of his or her location, if the called person has notified the system that he or she will receive calls from any or selected callers.

Expedited action on the requested allocation is needed if the United States is to stay abreast of similar communications developments now deployed or planned in Europe and Japan. It has been recognized by FCC Chairman Sikes and several members of Congress, that government, however well-intentioned, must not stand in the way of technological development. Millicom, a United States company, has applied with others for one of the United Kingdom licenses to operate a PCN service expected to be awarded within the next several months. We are ready, willing and able to employ our expertise and capital at home for development of similarly advanced services in the United States, and we urge the FCC to act expeditiously so that we may do so.

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To: The Commission

PETITION FOR RULEMAKING

Pursuant to Section 1.401 of the Rules of the Federal Communications Commission, 47 C.F.R. § 1.401, PCN America, Inc., ("PCN America") petitions the Commission to allocate radio frequency spectrum for a new Personal Communications Network ("PCN") service. PCN America is a wholly owned subsidiary of Millicom Incorporated ("Millicom").

Millicom is a diversified communications company with interests in mobile communications in the United States and abroad. Millicom was a pioneer in the development of cellular services in the United States, having been awarded one of the

first three cellular licenses issued by the Commission. 1/ In addition to the provision of domestic paging and specialized mobile radio services, Millicom currently participates in numerous cellular telecommunications ventures throughout the world -- including the United Kingdom, Hong Kong, the Philippines, Pakistan, Costa Rica, Chile, Mauritius and Sri Lanka -- and is part of the consortium Deutsche Mobilfunk AG, which is seeking the second cellular license in the Federal Republic of Germany. 2/ Millicom is also a member of a consortium with Pacific Telesis International, Matra Communication and British Aerospace Space Systems seeking one of the licenses that the Department of Trade and Industry will award to provide PCN service in the United Kingdom.

Based on this extensive, worldwide experience with cellular and other portable technologies, PCN America now petitions the Commission to commence rulemaking proceedings

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1/ In 1981, Millicom, working with its affiliate Millidyne, was granted an experimental license to develop a cellular system in Raleigh-Durham, North Carolina. Millicom later held a majority position in the partnership awarded a cellular license in Omaha, Nebraska and a minority position in the partnership awarded a cellular license in Charleston, South Carolina.

2/ Other members of the Deutsche Mobilfunk AG consortium are Southwestern Bell Corporation, Comvik International AB, and a group of privately-owned West German companies known collectively as PT-Beteiligungsgesellschaft des Mittelstands mbH.

that will open the way in the United States to the next generation of telephonic and data communication: personal, totally portable communications, to be provided through an independent, intelligent radio network -- PCN.

I. INTRODUCTION

PCN represents a major step forward in the delivery of digital communications for both mobile and fixed applications. PCN will use intelligent network architecture combined with state-of-the-art modulation techniques to provide voice and data services, including ISDN services, through microcell base stations to small, inexpensive, low power wireless terminals. A detailed description of PCN's technical basis is described in Section II; spectrum considerations are discussed in Section III; and the myriad public interest benefits of the proposed service, including illustrations of specific applications, are laid out in Section IV.

PCN America requests amendment of the table of allocations, 47 C.F.R. § 2.106 to allocate a portion of the spectrum within the 1710-2290 MHz range for operation of PCN, possibly on a shared basis with users of services now permitted under existing allocations. 3/ We emphasize, however, that the

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3/ Millicom understands that these frequencies are within the range that may be considered for allocation to services like

[Footnote continued]

allocation suggested here is not intended to be definitive, and we urge the Commission to consider allocation of all practical alternatives. We hope that this Petition for Rulemaking promotes immediate discussion of the proper allocation for the fastest possible implementation of this technology. 4/

3/ [Footnote continued]

PCN at the 1992 World Administrative Radio Conference ("WARC"). Allocation of spectrum to PCN was an issue discussed by the 1989 International Telecommunication Union ("ITU") Plenipotentiary Conference (Nice) for consideration at the scheduled 1992 WARC. See generally International Telecommunication Union, Final Acts of the Plenipotentiary Conference, Nice, 1989. The ITU Administrative Council meeting in 1990 will most likely decide whether to include this issue on the agenda for the WARC.

4/ The National Telecommunications and Information Administration's recently announced policy review of the use and management of radio spectrum in the United States should prove helpful in making the allocation decision. See National Telecommunications and Information Administration, Comprehensive Study of the Radio Frequency Spectrum, 54 Fed. Reg. 35366 (1989); and National Telecommunications and Information Administration, Spectrum Use and Management: Background Paper (August 1989). Likewise, there is considerable Congressional interest in making available for commercial application certain portions of the spectrum now dedicated to Federal Government use. See, e.g., H.R. 2965, 101st Cong., 1st Sess. (1989); see also Statement of the Honorable John D. Dingell, Chairman, House Committee on Energy and Commerce; The Emerging Technologies Act of 1989: Hearings on H.R. 2965 Before the House Subcommittee on Telecommunications and Finance, 101st Cong., 1st Sess. (Nov. 2, 1989) (exhorting that U.S. regulatory agencies must reallocate spectrum "for commercial development of new technologies to carry ourselves well into the 21st century"). Chairman Dingell added that government users "are inhibiting growth and innovation . . . causing us to lag behind other countries in market development . . . . It is a stiffening and unwise use of the spectrum by the government." Communications Daily, Nov. 6, 1989, at 3, 4.

Through the use of innovative microcell digital technology, PCN promises significant advancements over existing telecommunications services. The proposed PCN service will use inexpensive pocket-sized terminals operating through microcell base stations and employing advanced radio modulation techniques, all operating in conjunction with an intelligent network permitting use of special features such as smart cards. Implementation of PCN would help meet the long-recognized need for an intelligent, integrated services network capable of efficient voice, data, and image delivery. And, it will do so in a way that makes the most efficient use of scarce radio spectrum.

There is now no telecommunications service in the United States offering these capabilities. Two or three such systems, however, will be licensed within the next few months in the United Kingdom, and it is understood that similar systems are under active, advanced consideration in Europe and Japan. Attention in the United States to date, however, has been focused on less advanced cordless telephone technology already deployed in the United Kingdom, including the so-called CT-2 service. 5/ In July of this year, the Commission itself

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5/ CT-2 involves a cordless telephone capable of making, but not receiving, calls in designated public areas served by low power base stations.

sponsored a seminar concerning CT-2 and the related Digital European Cordless Telephone ("DECT") technologies. 6/ Although CT-2 represents an important development toward making mobile services more widely available, it does not represent the state-of-the-art.

Since issuing licenses in 1988 for CT-2, the government of the United Kingdom has announced its intention to license within the next few months two or three additional, more advanced types of personal communications systems to be based on DECT or the highly advanced Groupe Speciale Mobile ("GSM") standard. 7/ As stated above, Millicom's United Kingdom subsidiary is part of a consortium applying for one of these licenses. 8/

6/ DECT is an evolving standard for cordless digital telephone systems capable of both making and receiving calls, but not designed for hand-off between cells.

7/ GSM will govern the digitalization of and networking within a pan-European cellular system. Other countries now subscribing to the GSM standard include: Norway, Sweden, Finland, Denmark, Ireland, Belgium, the Netherlands, West Germany, France, Switzerland, Austria, Portugal, Spain, Italy, Greece and Turkey.

8/ See Department of Trade and Industry, Phones on the Move, Personal Communications in the 1990s - Technology and Competition in Service of the User (January 1989). The other parties seeking the U.K. licenses include: Mercury Personal Communications Networks Ltd. (Cable & Wireless, Motorola, Telefonica); PCN One Ltd. (GEC, BellSouth, Kingston Communications, Phillips); Personal Communications Networks Ltd. (Ferranti, GTR, Hanson, Hutchison, Jonathan Clark &

[Footnote continued]

It is evident that there is a special focus in Europe (and in the United Kingdom in particular) on deployment of these new technologies, and on the development of alternative telephone networks employing advanced radio transmission techniques and intelligent network architecture. 9/ Participation in the development and implementation of these new services in the United Kingdom has not been limited to European firms. Instead, United States companies, including Millicom, have committed experience, technical expertise and capital to the new ventures. Customer service employing the PCN concept will be available in the United Kingdom beginning in 1992, and, other European countries are expected to follow soon thereafter. International competitiveness considerations

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8/ [Footnote continued]

Associates); 21st Century Networks; Unitel Ltd. (STC, Thorne EMI, US West); Intouch Ltd. (Gooding Investments Ltd., Murray International Holdings Ltd./Noble Grossart, Welsh Water plc, Technophone Ltd., J. Hambro & Partners, Eurocell, Contel Cellular Inc., MTel); and Mr. R.G. Maling.

9/ In France, where almost the entire national telephone system is digital, ISDN services already are available in the major cities, and nationwide coverage is expected to be completed by 1990. Graham, G., International Telecommunications 13; World's Most Highly Digitalized Network, Financial Times, July 19, 1989. We also note that Japan is implementing a nationwide ISDN system providing videotext, high speed facsimile, home shopping, video conferencing, medical education, voice and message store and forward, motion picture distribution, event listings and directory services. Kelly, J., A Yen For Networking, Network World, May 8, 1989.

demand that similar development should take place in the United States on the same schedule.

Considering the extremely scarce frequency availability in the United States, and the important need to develop and make available within the United States the most advanced telecommunications technologies, Millicom respectfully suggests that -- rather than concentrating on soon-to-be outmoded technologies such as CT-2 -- resources should be devoted now to the implementation of services based on the application of the very latest technologies, such as PCN. This approach is the foundation of Millicom's proposal.

Millicom urges the Commission to take the policy initiative now and commence a rulemaking proceeding that will clear the way for the introduction of PCN. In that way, the public will not be denied the benefits of this new service and our country will remain competitive in the continuing development and application of these crucial new technologies.

II. STRUCTURE OF PCN

The proposed PCN service is designed around three basic concepts:

1) The network should link persons, not stations;

2) The network should provide required bandwidth for voice, data, and image transmission on demand; and

3) The network should make the most efficient use of the frequency spectrum.

PCN addresses these objectives primarily through the use of a microcell structure and advanced modulation techniques in conjunction with an intelligent network architecture. The result is an exceedingly flexible, highly efficient means for meeting a subscriber's communications requirements, whether voice or data, mobile or fixed. Users will be able to access the PCN service through relatively inexpensive (in comparison with traditional cellular) pocket-sized telephones for voice applications and similar wireless PCN interfaces for data applications.

In this respect PCN is not merely a mobile extension of the existing public switched telephone network ("PSTN"), as are today's cellular systems and the CT-2 technology. Instead, PCN will be a self-contained intelligent network, offering voice and data services that existing wireline/mobile networks cannot now provide, and will not be able to duplicate within the foreseeable future.

A. PCN Transmission Methodology

1. Advanced Cellular Techniques

PCN will use radio base stations operating in a microcell structure to establish connections with handsets and other terminals. Use of microcells provides exceptional

flexibility, allowing base stations to be sited wherever user populations are located. For example, base stations may be established on separate floors of office buildings, along pedestrian walkways, and within residential neighborhoods. Thus, microcells are designed to serve people wherever they are, not just primarily those on the move in vehicles.

For mobile applications, there will be seamless hand-off between microcells, including those serving within buildings and those serving public rights of way. The size of each microcell employed will depend upon potential usage in a given area, with the smallest microcells serving areas of highest population density. Individual offices or apartment buildings to be equipped for wireless PBX or Centrex service will be served by very small cells specially tailored to subscribers' requirements. The actual size of any given microcell will be defined by the power level of the microcell base station and the handsets, the directionality of the tranceiver antenna, and physical blockages, all of which factors affect the propagation characteristics of signals in the 1.7 to 2.3 GHz frequency range.

2. Advanced Modulation Techniques

Millicom is focusing on the use of spread spectrum and associated Code Division Multiple Access ("CDMA") techniques to permit the most effective frequency use for PCN.

The Commission is already familiar with the significant benefits of spread spectrum technology. 10/ Spread spectrum transmission fully spreads the power of the signal over the assigned bandwidth, instead of concentrating power in a small frequency range as is the case with conventional radio. This results in a low signal-to-noise ratio that minimizes the chance of interference with other users of the same spectrum. Using CDMA, information will be transmitted in the form of packets coded for receipt by specific called parties. There is no frequency "wasted" by allocating a frequency channel, as is the case with Frequency Division Multiple Access ("FDMA"), or even a time slot, as is the case with Time Division Multiple Access ("TDMA").

Traditional cellular mobile providers in the U.S. are now planning to introduce digital modulation techniques through the use of TDMA. 11/ Although TDMA will surely benefit the public in terms of increased access to, and security of, traditional cellular services, it may not be the most efficient approach available for start-up networks and does not represent the state-of-the-art.

10/ See Spread Spectrum Systems, 54 Fed. Reg. 35008 (Aug. 23, 1989); Authorization of Spread Spectrum and Other Wideband Emissions, 101 F.C.C.2d 419 (1985).

11/ U.S. Cellular Body Takes Step Toward GSM Euro-Standard, Computergram International, Jan. 27, 1989.

B. Intelligent Network Architecture

PCN will use an advanced intelligent network architecture that will permit the delivery of voice, data, and image services with features and capabilities not widely available in any network today.

System architecture will be fully based on the Signalling System 7 protocol ("SS-7"), now in various phases of implementation by service providers here and abroad. As in other applications, the SS-7 protocol will be modified, as required, to support PCN in SS-7's so-called "Application Layer."

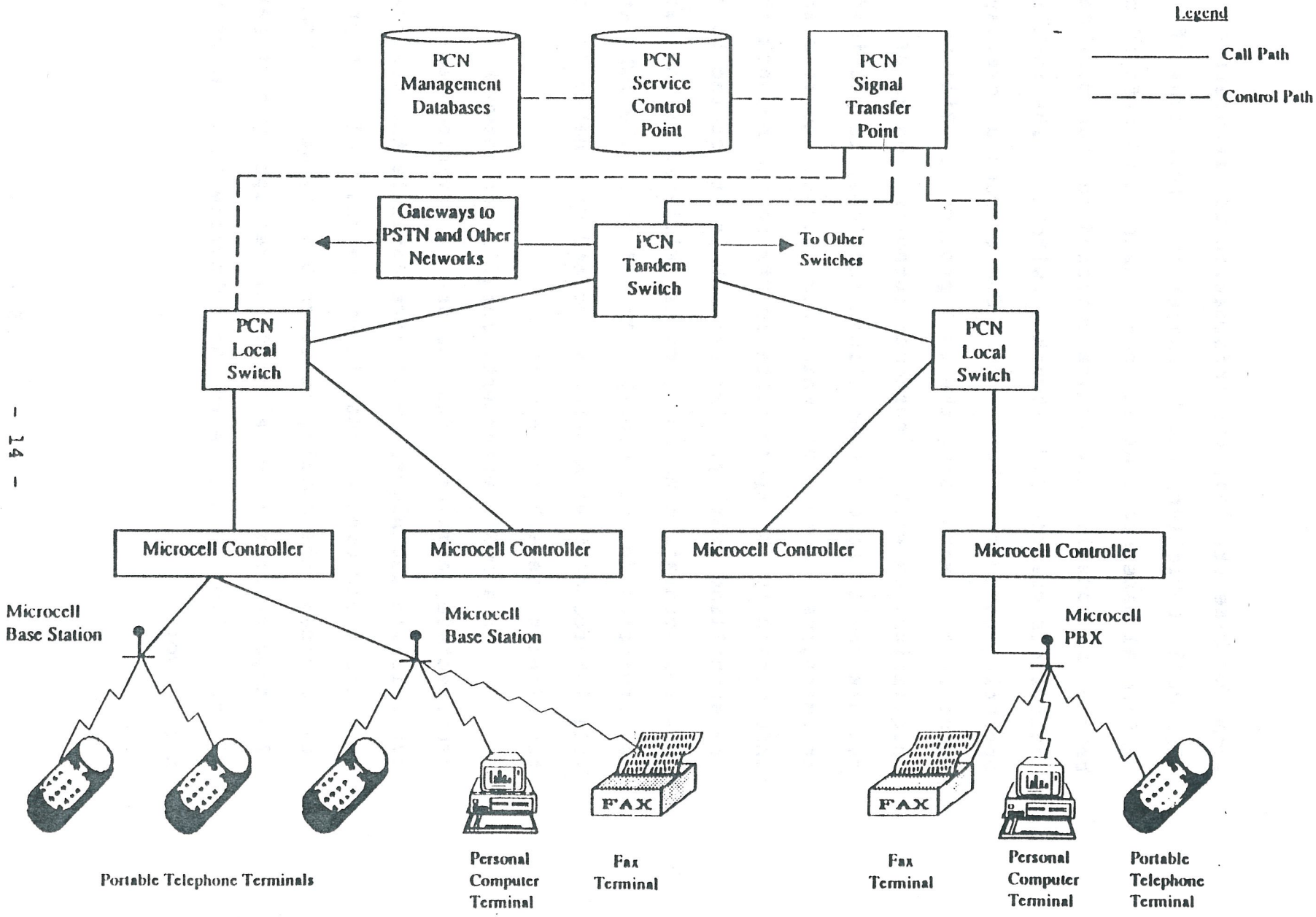
SS-7, in its so-called "Transaction Capabilities Part," permits a switch operated by a service provider to query a database for information on how a call should be handled. The so-called "End User Part" of the SS-7 protocol permits transmission of information through the network on an end-to-end or switch-to-switch basis, such as the identity of the called or calling party, the specialized services and features to which a subscriber is entitled and billing information. SS-7 will support services and features such as selective call ringing and rejection, virtual private networks, "wide-area" Centrex, and ISDN features.

PCN will also feature the use of smart cards specifically coded with electronic information about the subscriber. When a smart card is inserted into a handset or

other terminal, the PCN network, through SS-7, will be informed automatically of the location of the subscriber and the services and capabilities to which he or she has subscribed. Unlike telephone stations today, PCN terminals will not have a preassigned telephone number. However, each person will have his or her own telephone number or numbers associated with his or her smart card. Therefore, PCN terminals automatically will be identified with the person inserting his or her smart card into the terminal. This ensures billing to the location designated by the subscriber no matter from where in the world he or she places the call. Without insertion of a smart card the terminal cannot be used to make a call (except to designated emergency numbers) or to receive a call. In this way, different subscribers can use the same PCN terminal and have fully personalized access to PCN services.

Figure 1 describes the topology of PCN, demonstrating that PCN is based upon an intelligent network with radio links connecting the user to the network. A user accesses the network through a PCN handset or other terminal device equipped with the appropriate radio interface. Using spread spectrum/CDMA or other advanced modulation techniques, digitized information is sent in the form of data packets to a microcell base station. The microcell base station may serve a variety of different subscribers, a single subscriber or a group of subscribers in the form of a wireless PBX or Centrex.

FIGURE 1
PCN TOPOLOGY



From the base station, the information is transferred to the microcell controller, which manages the operations of individual base stations and coordinates hand-offs of calls between microcells. Calls are switched between microcell controllers via the PCN network's switches. The intelligence operating these switches is provided through an overlay signalling network using the SS-7 protocols. Billing information, as well as customer authorization to use the network and to access specialized services, is provided through the management databases, which communicate the relevant information to the appropriate points in the network through the signalling overlay. Because PCN is structured to operate as a self-contained network, calls initiated on the network can be terminated on the network. In addition, the PCN network will interconnect with other voice and data networks, including the wireline telephone network.

In a PCN environment, intelligent network architecture, combined with the use of advanced radio transmission techniques, will make possible the personal communications concept that is at the heart of this proposed new service: the ability to reach a party with a communication of a type specifically tailored for receipt by that party without caller reference to the subscriber's location within the network.

III. SPECTRUM ALLOCATION

An assessment of the radio frequency spectrum was performed for Millicom by the consulting engineering firm of Cohen, Dippell and Everist, P.C., for the purpose of identifying spectrum for use by PCN. The spectrum review was limited to the frequency bands between 1710 MHz and 2300 MHz. Frequencies below this range are thought to propagate too far, and are, therefore, inconsistent with the use of microcells. 12/ Even to the extent that frequencies below this range could be used, they are assumed to be unavailable in the amounts that appear to be necessary to support provision of PCN services, especially for multiple providers operating on a competitive basis. 13/ Frequencies above this range are thought to be unsuitable for PCN due to their very limited propagation characteristics. In general, doubling the frequency reduces cell radius to approximately one-quarter for the same field strength. General use of the extremely small

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12/ It is the use of the microcell that maximizes frequency reuse and therefore creates the enormous capacity made available by PCN.

13/ To the extent that frequencies below but nearby 1710 MHz share the same propagation characteristics as those in the 1710-2300 MHz range, those frequencies may be suitable for PCN. As developed in the text following, use of spread spectrum techniques may allow PCN to cohabit with such other applications presently using frequencies below 1710 MHz.

cells that would be required at higher frequencies is considered to be uneconomic for PCN service.

The United Kindgom is expected to allocate 100 MHz or less per operator for PCN-type services. 14/ The specific amount of capacity required for the United States allocation should be determined on the basis of further information to be submitted during this rulemaking.

Allocation within the band 1710-2290 MHz is fully in agreement with the primary international allocation. Not surprisingly, this is the band that is also being considered for PCN in Europe (particularly in the United Kingdom) and may also be considered at the 1992 WARC. 15/ We also understand that Japan has already allocated frequencies in this band for advanced digital mobile services. 16/

Domestically, the band 1710-2290 MHz is subdivided into five sub-bands. The first, 1710-1850 MHz, is allocated exclusively to government use. The three non-government sub-bands falling within 1850-2200 MHz are variously allocated

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14/ See Department of Trade and Industry, supra note 8, at ¶ entitled "Frequency Bands," and Mobile Communications: Too Much Too Soon?, Wall St. J., Oct. 3, 1989.

15/ See supra note 3.

16/ It would expedite the implementation of PCN services in the United States if common frequencies and compatible standards were used.

to services falling under Parts 21, 74, 78, and 94 of the Commission's rules. The fifth sub-band, 2200-2290 MHz, is also allocated exclusively to government use.

With respect to the government frequencies within the identified range, it is noted that H.R. 2965, "The Emerging Technologies Act of 1989," is under consideration in the House of Representatives. This bill would "[r]equire the Secretary of Commerce to make additional frequencies available for commercial assignment in order to promote the development and use of new telecommunications technologies, and for other purposes." The bill requires a study identifying and recommending reallocation of not less than 200 MHz of government spectrum to non-government uses. We also note that, independent of this Congressional action, NTIA has commenced its own survey of current spectrum usage. 17/ We urge the Commission, in consultation with other government agencies, to consider current government frequencies among the options for frequencies to be allocated for PCN. 18/

17/ See supra note 4.

18/ Dr. Thomas Stanley, Chief of the FCC's Office of Engineering Technology, mentioned recently in a speech to the 1989 Telocator Conference that the government frequency band 1710 to 1850 MHz might be worthy of consideration for PCN-type services.

Minimal knowledge is available regarding the degree to which the two government sub-bands are used, because such data are not generally available from NTIA. It is known, however, that the three non-government sub-bands are generally heavily used. 19/ To gain more information about frequency uses in urban areas, where frequency occupancy is assumed to be highest, a frequency study was performed for five representative metropolitan areas. The cities selected were Boston, New York, Chicago, New Orleans, and San Diego. All assignments for fixed operations within 35 miles of the cities' reference coordinates are quantified in the following table:

FREQUENCY USAGE
WITHIN 35 MILES OF
IDENTIFIED CITIES

Band MHz	Band Width MHz	Boston	Chicago	New Orleans	San Diego	New York
1850-1990	140	26	109	74	32	63
1990-2110	120	20	66	2	15	49
2110-2200	90	92	238	90	95	84

19/ In 1988, the Commission's Office of Engineering Technology performed a search in the 1850-1860 MHz band related to the radio local area network proposal by Motorola. OET concluded then that the level of usage in this portion of the band might be inconsistent with Motorola's proposed use. See Letter from FCC Chairman Dennis R. Patrick to the Honorable Edward J. Markey, Chairman, House Subcommittee on Telecommunications and Finance (March 31, 1989).

In compiling these data, no effort was made to determine whether assignments listed in the frequency database are actually in operation. Additionally, care should be taken in assessing the figure shown for the band 1990-2110 MHz because the accuracy of information in the frequency database for Part 74 services is uncertain. Moreover, provision is made in Section 74.24 of the FCC rules for short-term operation (up to 720 hours annually per frequency) without specific licenses being required. Such short-term operations were not taken into account.

The table shows that non-government usage in metropolitan areas appears to be significant; therefore reallocation of this spectrum exclusively to PCN may be difficult. Difficulties related to the government bands are unknown due to lack of information concerning their use. The alternative to outright reallocation is the development of sharing arrangements that would be satisfactory to both PCN and existing users. One sharing approach would be to "engineer in" each microcell of a PCN using traditional procedures. Considering the number of microcells that could be required within a large metropolitan area, however, this would be a prohibitive undertaking. Moreover, such an approach could also impede technical changes and growth by existing services in the band. It is believed, therefore, that alternative sharing arrangements need to be carefully studied in order to make the most efficient use of the spectrum.

Spread spectrum is one attractive possibility for frequency sharing. Millicom believes that spread spectrum modulation may offer a solution for sharing with existing users within the band 1710-2300 MHz. Millicom recognizes, however, that careful study will be required before this promising communications technology can be applied for PCN.

The Commission has proceeded very slowly in the area of spread spectrum. When this technology, developed by the military, first became available on a commercial basis nearly a decade ago, frequency users expressed concern about interference that might result from the overlay of spread spectrum systems on the frequency bands in which they were operating. 20/ Therefore, the Commission limited applications of spread spectrum to Part 15 low-power devices and police channels. 21/ Recently, the Commission proposed amendment of the technical standards applicable to spread spectrum transmission, but only "to further encourage the development and operation of Part 15 spread spectrum systems." 22/

20/ See Authorization of Spread Spectrum, supra note 10, at 421-22.

21/ Id. at 425-26.

22/ Spread Spectrum Systems, supra note 10, at 35008.

Spread spectrum offers significant possibilities for addressing our nation's serious problem of frequency scarcity -- it may be the key to more efficient frequency usage through sharing. Without evidence, it cannot be assumed that spread spectrum causes interference in a microcell environment. Indeed, in the spirit of Chairman Dingell's recognition of the need for more efficient use of the spectrum to take U.S. industries into the Twenty-First Century, 23/ this is the time for the FCC to consider expanding use of this spectrum-efficient technology.

IV. THE PUBLIC INTEREST

Numerous public interests support allocation of radio frequency spectrum for the proposed PCN service. The service promises low-cost, portable personal communications, based on a free-standing radio network, a generation beyond existing cellular and wireline services. With the use of a state-of-the-art intelligent network, PCN also offers advanced service features heretofore discussed in this country in only futuristic terms. Perhaps most importantly, allocation of the necessary spectrum for PCN now will allow the United States to stay abreast of personal portable communications and other

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23/ Remarks of Chairman Dingell, supra note 4.

advanced developments already deployed or planned by our trading partners in Europe and Japan. As developed in more detail below each of these factors supports a public interest finding that use of the spectrum for PCN is not only desirable but essential as we plan for telephonic and data communications to take us into the Twenty-First Century.

A. Personal, Totally Portable Communications

Responding to our society's ever-increasing demand for communications mobility and smart telephone capability, PCN will serve as a totally portable, intelligent network independent of the PSTN and its adjunct mobile services provided by traditional cellular operations.

Advanced telecommunications services, such as ISDN, have been slow to reach the American public because of the inherent limitations within the wireline telecommunications network. Although some interexchange networks now operate within the advanced SS-7 protocol, local exchange telephone companies generally offer such advanced capabilities only on a very limited basis. 24/ The true intelligent network is, therefore, out of reach of the vast majority of telephone

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24/ See Sweeney, T., ISDN Slow to Catch on in the City, Crain's New York Business, Sept. 11, 1989; Datapoint Corp. and Southwestern Bell Telephone Co. conduct news conference via ISDN, Business Wire, Oct. 11, 1989.

subscribers today, and is likely to remain so for the foreseeable future. 25/

Although today's wireline telephone companies and cellular adjuncts face the reality of sunk investment in facilities and systems that in most cases do not include state-of-the-art digitalization and intelligence, PCN offers the integral flexibility of its intelligent network with features and capabilities that existing telephone services cannot now provide. Moreover, because PCN will be deployed using radio links rather than wire, it will allow a much faster rollout of these advanced features than could be provided by wire-based systems.

Foremost among PCN's advanced features is the concept of "personal communications" in both fixed and mobile applications. That is, PCN uniquely offers the ability to contact a person, without the caller's reference to the called person's location or to any particular station, upon the called person's notification to the system (with simple use of the smart card) that he or she will receive calls from any or selected callers. This person-to-person communication may

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25/ Advanced services such as those to be offered by carriers through ISDN will be available only to the largest customers, and no earlier than the mid 1990s. See Jaffery, N., ISDN Rolls Out, Network World, Sept. 25, 1989.

operate independently or may be used in conjunction with today's wire-based station-to-station modality. It reflects a melding of PCN's intelligent network capabilities -- and its myriad possibilities for tailoring service options to subscribers' specific requirements -- with the system's inherent mobility.

PCN's mobility is integral in the system's small, lightweight telephone, an instrument approximately the size and weight of a wallet, that fits easily into a pocket or purse. This portability feature meets an increasing demand for mobile communications services, a demand evidenced by dramatic growth in cellular telephones, pagers, other mobile services and answering machines. 26/ Mobile communications today reach five percent of the population in developed U.S. markets, and are projected to reach 15 to 20 percent penetration in these markets within the next 10 years. 27/ In the United Kingdom, where numerous portable telephone applications are in use and planned, it is estimated that mobile telephone "lines" could account for almost a quarter of total telecommunications lines

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26/ See Hall, T., With Phones Everywhere, Everyone Is Talking More, N.Y. Times, Oct. 11, 1989.

27/ See Morant, A., International Telecommunications 6: New Ways to Keep in Touch on the Move, Financial Times, Oct. 14, 1989.

by the end of the century. 28/ In Scandinavia, portable telephones already account for 40 percent of the mobile telephone market. 29/ These statistics about use of mobile and portable phones strongly indicate the potential demand for a service truly crafted for portable personal communications on a mass scale.

Although, because of its portability, its use of radio spectrum and its cellular structure, PCN has superficial similarities to present cellular service, we wish to emphasize that, in fact, this new service is dramatically different from today's cellular radio service. Whereas today's cellular telephone service is simply a mobile extension of the wired telephone network primarily designed for calls to and from vehicles, PCN is an integral intelligent voice and data network concept, existing independently of, though enjoying full interconnection with, the wired telephone network. It is designed to provide a two-way link between the world and a person, no matter where in the world that person may be.

PCN's use of spectrum in the 1.7 to 2.3 GHz range gives it unique advantages over today's cellular systems.

28/ See Fagan, M., A Pocket-sized Revolution in Telephones, The Independent, Oct. 24, 1989.

29/ See Paul, F., Mobile Phones Move from Cars to Pockets, High Technology Business, June 1988.

First, with the short transmission range inherent in this portion of the spectrum, PCN will employ microcells, permitting much greater use of the same frequencies. This not only means that PCN will be available to greater masses of users, but also that it will be more affordable for these users because its signal need not travel as far, allowing for smaller, cheaper handsets needing less battery power than today's cellular telephones. These smaller handsets also, in turn, greatly enhance the portability of PCN.

Likewise, PCN's built-in intelligence gives it myriad operational features not available over today's cellular, which is constrained not only by its own predominant analog technology but also by the analog and bandwidth limitations of the wired network with which it must connect. Finally, unlike today's cellular, which is planned to rely on the PSTN for most call connections, one of the main innovations of PCN is that it can provide its service in complete independence from the wired telephone network.

B. Integrated Futuristic Features

The proposed PCN service, thus, promises widely-available portable personal communications, based on a free-standing radio network, a generation beyond existing cellular and wireline services. Moreover, with the use of its state-of-the-art intelligent network, the service also offers

integrated technological features that can be personalized for every individual user. The following examples of personalized use demonstrate that, indeed, the future is now.

A businesswoman attending a late meeting has within her reach a PCN handset with her smart card inserted. The handset softly beeps with a distinctive tone indicating that it is a family member calling. Turning her attention from the meeting to the telephone, she discovers a call from her daughter at college who had expected her mother to be at home. Her daughter is complaining that the smart card her family provided for her use in PCN terminals is too restrictive: it allows only ten dollars in long distance calls per month other than to family members and, unlike her friends' smart cards, blocks access to premium services like computer games.

Putting off that discussion for another day, the businesswoman remembers to call her husband whom she discovers has left his last sales call and is answering the call on his handset while doing the food shopping. Recognizing that she will be at the supermarket soon herself, unless she sends an adequate shopping list now, she quickly jots down the necessary items, together with a note to her husband that she won't be home for dinner. She then inserts her smart card into the nearby high resolution fax machine equipped with a PCN interface, and dials the speedcall code for her husband. The list is automatically sent to a similar, public fax machine in

the supermarket where her husband is shopping because he has inserted his smart card into that PCN terminal.

Now back in her office, the businesswoman again inserts her smart card into her PCN handset to call an associate on his local Centrex extension to obtain some necessary information. Unbeknownst to her, he is travelling and answers his PCN handset on the other side of the country.

Meanwhile, her husband completes the shopping and then, resigned to dinner alone, punches the code in his PCN handset for the location of the nearest Chinese restaurant. The PCN network database, recognizing his location by the microcell he has accessed, suggests one not far away. Some things never change, however: one hour after his Chinese dinner, he is again hungry.

The examples given here could have involved many different features available through PCN: medical data transmitted instantaneously in an accident situation, automatic amplification of any PCN handset for a hearing-impaired subscriber with an appropriately programmed smart card; or even locating a lost child who is carrying a small PCN terminal that automatically and regularly provides its identification code to the nearest microcell base station.

As illustrated here, the services and features to be made available through PCN will meet everyday needs. Public demand for portability in telecommunications services already

is evident in the large growth of today's portable and vehicular telephone sales. 30/ Although today's cellular has made the public more aware of the convenience of mobile communications, PCN promises wider availability, true portability, and advanced features not now offered by any other service. These features make PCN a true personal communications service.

C. U.S. Competitiveness

> "In the past, the FCC didn't always live up to its responsibilities to promote technological advances. The classical example of regulatory delays, of course, is cellular mobile radio, where for about a dozen years there were FCC proceedings on how best to introduce this new, American technology, but no actual service materialized. We debated the issues, in other words, while other countries moved ahead deploying this technology."
>
> - FCC Chairman Alfred C. Sikes 31/

Our country now faces a critical challenge. The United States continues to achieve great technological success. This is especially so in the telecommunications arena. However, many of our trading partners are equally skillful in

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30/ See supra text accompanying notes 26-29.

31/ Remarks of Alfred C. Sikes, Chairman, Federal Communications Commission, Before the Columbia Institute Conference on High Technology and the Future of American Economy (Sept. 11, 1989).

this sector. Telecommunications is a key market, important not only because of the substantial size of the market itself, but because a nation's telecommunications capabilities affect its whole economy. Our trading partners recognize this; and they have placed a strong emphasis on the continuing development and application of advanced telecommunications technologies.

We referred earlier in this petition to developments in the United Kingdom, where CT-2 installations are already in place and the government is about to license even more advanced PCN services conceptually similar to the type Millicom is proposing for our country in this Petition. At least some of the PCN services envisioned by the government of the United Kingdom are expected to rely on the GSM standard, which features an air interface based on TDMA.

GSM is said to offer several advantages over the digitalization expected to be introduced into cellular networks in this country over the next decade. But European policy makers are not content to stop there. The European Community is now proceeding with a project known as the Research and Development for Advanced Communications in Europe ("RACE"). 32/ Among other areas of focus, work is now

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32/ Boult, R., RACE Projects to Build European Data Pipelines, Network World, June 19, 1989.

proceeding on the development of integrated broadband communications ("IBC," sometimes referred to in the United States as broadband ISDN). RACE IBC is targeting development of communications capabilities that will make possible such services as switched high definition television, requiring more than 4,000 times the capacity found in today's few ISDN networks. Although the era of switched HDTV may seem far off, the fact is that many of our trading partners are already focusing in a deliberate and organized fashion on these and other advanced capabilities. The European Council of Ministers has already committed more than $1 billion to this particular program. Of more immediate effect, RACE is also focusing on new modulation methodologies, including very advanced applications of spread spectrum and CDMA technologies that are a focus of this Petition. 33/

Some may debate the extent to which our government should direct such technological development. However, it is inarguable that industry-guided development should be allowed to proceed. Indeed, Chairman Sikes has suggested, and we agree, that government, however well intentioned, should not stand in the way of technological development. 34/ American

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33/ See id.

34/ Remarks of Alfred C. Sikes, supra note 31.

companies, including Millicom, have already demonstrated an interest in putting advanced technologies to work in other countries. The FCC should open the door to make these same advanced telecommunications capabilities available to our own citizens, and our citizens deserve nothing less.

CONCLUSION

The FCC can promote our nation's continuing technological advance by encouraging the creation of new services that rely on the implementation of the very latest practical techniques. Millicom recognizes the difficulty of the FCC's task, particularly where new proposals such as this raise contentious questions concerning competing uses of the radio spectrum. As Chairman Sikes has recognized, however, the public interest is not served by lengthy regulatory proceedings that may ultimately authorize technology that is outmoded even before it is implemented. 35/

With this in mind, Millicom asks the FCC to commence a rulemaking now, looking toward expeditious implementation of a PCN service in the United States that offers the most advanced capabilities, as proposed by Millicom: an intelligent radio-based network totally independent from the PSTN,

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35/ Id.

achieving maximum spectrum efficiency and making available in the immediate future services of significant benefit to millions of Americans, through the use of an advanced microcell structure and the very latest modulation techniques.

Respectfully submitted,

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By _____

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