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FCC Notice of Inquiry: GEN Docket 90-314

NOTICE OF INQUIRY

Attached is the NOTICE OF INQUIRY, GEN Docket 90-314. This document is the basis for the Response of IEEE P802 to this Inquiry as given in Doc IEEE P802.11/90-7.

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

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37968

In the Matter of)	
)	
Amendment of the Commission's Rules)	GEN Docket No. 90-314
to Establish New Personal)	RM-7140
Communications Services)	RM-7175

NOTICE OF INQUIRY

Adopted: June 14, 1990

; Released: June 28, 1990

By the Commission:

1. By this action, the Commission commences a broad inquiry into the development and implementation of new personal communications services (PCSs), such as advanced cordless telephones and portable radio systems for personal use. The Commission seeks information that will assist it in developing regulatory policies concerning the possible implementation of such services. Specifically, the Commission is requesting information to determine which new PCSs are needed, where in the spectrum those services should be provided if at all, how much spectrum should be allocated to them, whether and how the services should be regulated, and what technical standards should be adopted. This Notice of Inquiry also discusses, by way of example, two petitions for rule making, from Cellular 21, Inc. (Cellular 21) and PCN America, Inc. (PCN America), that propose establishment of particular types of PCSs.

BACKGROUND

2. PCSs encompass a broad range of radio communications services that free individuals from the constraints of the wireline public switched telephone network and enable them to communicate when they are away from their home or office telephone. Basic forms of PCSs include the current cordless telephone, which enable individuals to receive communications almost anywhere in or immediately adjacent to their home or office, and paging services, which notify individuals that someone is attempting to communicate with them. Car telephones represent a more advanced form of PCSs. Car telephone service has been in operation for over twenty years, but was available only to a limited number of users until the middle 1980's when cellular radio service began to be offered in most of the major cities in the United States. Since then, this form of PCS has experienced a very

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rapid growth. This growth is expected to continue into the 1990's with the continued increased use of hand-held portable telephones, as opposed to car installed telephones. Portable telephones enable individuals to call or be called at any time they are within a cellular system.

3. As the public has become more aware of PCSs and their benefits, demand has begun to appear for even more advanced forms of PCSs. The PCSs being developed today have significant improvements over those that are currently available, including cellular service. The most significant feature of the next generation of these services appears to be a movement towards person-to-person, instead of station-to-station, communications. Existing PCSs require the user to have a different telephone instrument depending upon whether the user is at home, in the office, or in the car. In addition, each of these devices requires its own telephone number. Advancements in PCSs technology have made light-weight, portable telephones more feasible; thus, future PCSs are expected to permit individuals to use the same device in several different environments, including in the home, in the office, perhaps in conjunction with a wireless PBX, or for mobile public telephone service.¹ Thus, it may soon be possible to reach individuals at any time in any place using a single telephone number. Moreover, future systems can be expected to have greater capacity, thus reducing the likelihood of a call being blocked. Finally, unlike most current PCSs communications, the digitization of future communications can be expected to make them more difficult to intercept and, therefore, more private.

4. Global interest in new PCSs has been developing rapidly over the last few years. This interest has arisen, in part, from some countries' desire to provide competition with existing cellular service, and to provide their citizens with new and better services. The United Kingdom has been especially active in the area of PCSs. It has allocated spectrum for an advanced digital cordless telephone technology, referred to as CT-2.²

1 These advancements include: digital technology, such as more efficient speech encoding; software, such as better protocols that provide more efficient switching and intelligence to a network; the use of new access modes such as time division multiple access (TDMA) and code division multiple access (CDMA) to make more efficient use and reuse of the spectrum; automatic power control devices to limit the range of communications; and the development of microcell technology. Microcell technology is much like cellular technology, where frequencies are used over and over again in different cells, except that most of the cells are much smaller than the average cellular cell in use today. In urban areas, some cells will be as small as a city block or a floor of an office building.

2 We use the term CT-2 herein to refer to advanced digital cordless telephones in general and not just to the technology developed in Britain.

CT-2 can be used in the home, at the office, or as a pay telephone at public access locations.³ Other European countries are also considering the implementation of an advanced cordless telephone using the developing digital European cordless telephone (DECT) technology.

5. The Europeans have also expressed substantial interest in personal communications networks (PCNs). While no precise definition of PCNs exists, in general, the current prevailing view is that PCNs will be cordless radiotelephone networks based on digital and microcell technologies. PCNs will be self-contained, but will have the capability of accessing the public switched telephone network (PSTN). Even though it has not yet identified a specific band for PCN, the United Kingdom already has licensed three PCN service providers, who are required to commence operations by the end of 1992. Also, the European Telecommunication Standards Institute (ETSI) is actively pursuing the establishment of a pan-European standard for digital mobile communications by 1992. Further, it is anticipated that the 1992 World Administrative Radio Conference (1992 WARC) will consider allocating spectrum in the 1700 MHz to 2300 MHz band for PCNs in Region 1 and possibly will address a similar allocation for the other Regions as well.⁴ The 1992 WARC may even consider providing a worldwide allocation for PCSs in this portion of the spectrum.

6. Canada and Japan have also demonstrated considerable interest in advanced PCSs. The Canadian Department of Communications recently issued a gazette entitled, "Provision for Field Trials of Public Cordless Telephone Service in Canada and Public Consultation for Policy Direction," in an effort to begin development and implementation of PCSs in Canada.⁵ The

³ The latter aspect of CT-2 is referred to as "telepoint service." The United Kingdom has licensed four "telepoint service" providers, who are currently constructing their systems and are operating on a limited basis. These providers set up base stations in public places, such as airports, shopping centers, restaurants, etc. Subscribers to the service access it with their personal CT-2 handsets when they are within range of a base station. They are billed periodically by the provider for the service and the actual calls made.

⁴ For the purposes of international allocations the world is divided into three regions. Generally they are: Region 1 - Europe and Africa; Region 2 - the Americas; and Region 3 - the rest of the world.

⁵ See Gazette Notice No. DGTP-014-89, Canadian Department of Communications released November 25, 1989. The gazette serves two purposes. First, it establishes a framework for interested parties to apply for an experimental license to provide trial public access service. Second, it

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gazette concerns the establishment of advanced cordless telephone communications, similar to CT-2 in the United Kingdom. The Japanese are active in developing personal communications systems and equipment for the next generation of microcell telecommunications. For instance, they are developing equipment that will provide increased system capacity and mobile controlled hand-off for multi-carrier TDMA systems.⁶

7. The apparent market demand for PCSs, the new technological developments, and the growing world interest in these services has also stimulated interest in new PCSs in the United States. Several entrepreneurs have approached the Commission in recent months seeking authorizations and rule changes related to development of domestic PCSs. In particular, the Commission has received several requests for experimental authorizations to develop equipment and to conduct market studies to assist in the implementation of CT-2 and PCN-type services.⁷ In addition, the Commission has received two petitions for rule making from Cellular 21 and PCN America, a subsidiary of Millicom, Inc., requesting that the Commission commence rule making proceedings to allocate spectrum for PCSs. We discuss the two petitions below as examples of possible PCSs. Parties responding to this

requests comment upon possible allocations for the new service, the appropriate regulatory structure, and the need for technical standards, such as a common air interface (CAI) for the telephone equipment.

6 For example, see "A Conceptual Design of Microcellular Radio Communications System" by Y. Akaiwa, Kyushu Institute of Technology, and "A Multi-Carrier Switching TDMA-TDD Microcell Telecommunications System" by I. Horikawa and M. Hirone, Nippon Telegraph and Telephone, IEEE CH2846-4/90/000-161 and 167 (1990).

7 The Commission has granted the following experimental authorizations for PCS-type systems: Cellular 21, Inc., was authorized September 29, 1989, to use the 866-868 MHz band in Ithaca, NY; Cellular General, Inc., was authorized October 10, 1989, to use the 866-868 MHz band in Deerfield, FL; Cellular 21, Inc., was authorized on January 18, 1990, to use the 940-941 MHz band in New York, NY; American Personal Communication, Inc., was authorized on February 22, 1990, to use the 901-902 MHz, 930-931 MHz, and 940-941 MHz bands in Washington, D.C.; PCN America, Inc., was authorized on May 8, 1990, to use the 1850-1990 MHz band in Orlando, FL and Houston, TX; and Matrix Personal Communications, Inc., was authorized on June 4, 1990, to use the 901-902 MHz, 930-931 MHz, and 940-941 MHz bands in Chicago, IL. The Commission also has pending requests for experimental authorizations for PCS systems from Advanced Mobilecom Technologies, Inc., Graphic Scanning Corp., Timex Communications Corp., American Personal Communications, Inc., Personal Communications Systems, Litel Telecommunications Corp., and Motorola, Inc.

inquiry, however, are strongly encouraged to address any other potential PCSs as well as those proposed by Cellular 21 and PCN America. Further, commenters should not limit themselves to any particular personal communications service or technology; rather, comparative consideration of all types of services is requested.

8. Cellular 21 Petition. Cellular 21 requests that the Commission allocate the 940-941 MHz band for second generation cordless telephone, CT-2, including telepoint-type services. Cellular 21 contends that CT-2 has technical advantages over today's services, such as the first generation cordless telephones. Cellular 21 states that these "older-style" cordless telephones are subject to both eavesdropping and interference. It proposes that the Commission channelize the band into nine 100 kHz channels with a 50 Hz guardband at each end and limit both the base stations and mobile stations (handset) to 10 milliwatts of power. Furthermore, it proposes that the Commission adopt the CAI signalling protocol that the United Kingdom has adopted for its CT-2 operations.⁸ Cellular 21 also requests that as CT-2 use increases, the 941-944 MHz band be made available for CT-2 operations and the current users of these bands be relocated to other bands.⁹

9. PCN America Petition. PCN America requests that the Commission allocate the 1700-2300 MHz band for PCNs.¹⁰ Under PCN America's proposal, PCNs would be digital cordless telephone radio networks with extensive service areas built on microcell technology. These networks would use

⁸ The United Kingdom's Department of Trade and Industry adopted the CAI specification MPT 1375 in May 1989. We have included a copy of this document in the record in this proceeding. Other European countries are so adopting the CAI signalling protocol. See, "Interface Standard Pact Signals European Acceptance of CT-2" by Lloyd Covens, RCR, page 11, April 9, 1990.

⁹ The 941-944 MHz band was allocated by the Commission for Government and non-Government fixed operations in GEN Docket No. 82-243. See First Report and Order, GEN Docket No. 82-243, 50 FR 4,650 (1985). The licensing issues for this band have recently been resolved; in a public notice dated June 4, 1990, the Commission indicated that it would accept applications for these bands during the week of July 9 -13, 1990. See Second Report and Order, GEN Docket No. 82-243, 4 FCC Rcd 2012 (1989), recon. granted in part, Memorandum Opinion and Order, GEN Docket No. 82-243, 5 FCC Rcd 1624 (1990).

¹⁰ This band is currently allocated to, and used by, the Private Operational-Fixed Microwave Service.

inexpensive pocket-sized terminals, intelligent networks, smart cards,¹¹ and advanced signalling protocols like the SS-7 protocol and would be essentially self-contained, although some interconnection to the PSTN would be built into the network. They would provide integrated services including voice, data, and image delivery. Further, PCN America argues that PCNs can provide these services in a way that makes efficient use of the radio spectrum. In particular, PCN America proposes that PCNs use spread spectrum techniques to allow the sharing of the spectrum with the existing users.

10. Parties responding to this petition express varying views regarding precisely what a PCN would be, who should be the licensee(s), and what technical standards, if any, including protocol standards, should be established. Several parties, such as NYNEX Mobile Communications Company, claim that the perceived PCSs benefits are already being provided by cellular carriers or will be provided by them in the near future by the next generation of cellular equipment. These commenters argue, for example, that the flexibility provided by the Commission in GEN Docket No. 87-390 allows cellular radio to implement PCN-type services.¹²

DISCUSSION

11. Purpose of the Inquiry. We believe that personal communications services will offer significant improvements in communications capabilities for individuals and that it is important to begin planning for the introduction of new services. As noted above, the personal communications requirements in the United States are rapidly changing as our society becomes more mobile and the demand for instantaneous communications grows. We are beginning to see interest, in particular on the behalf of consumers, in a number of new services and technologies, such as: wireless PBXs; smaller, lighter, portable cellular phones; portable fax machines; multi-channel cordless telephones; and services focusing on the ability to contact an individual instead of a particular station. Current cordless telephones, radio paging, and cellular radio may not be capable of meeting the demands for these new types of services beyond the next 5 to 10 years. Current cordless telephones operate on only a few channels, which are congested, are limited in use to the immediate vicinity of their base unit, and are not secure. Radio paging services are only one-way and

¹¹ Smart cards are cards that can be read electronically. They provide information about the user for billing purposes.

¹² See Report and Order, GEN Docket No. 87-390, 3 FCC Rcd 7033 (1988) and Memorandum Opinion and Order, GEN Docket No. 87-390, 5 FCC Rcd 1138 (1990).

generally require that the user establish connection by means of another communication link in order to hold a conversation. While cellular radio may be able to offer advanced PCSs, especially after the implementation of digital technology, it is unclear whether this service will satisfy all of the developing consumer demands for PCSs. Moreover, the cost of such services on cellular facilities may be beyond the reach of the average person and restrict its use primarily to businesses, as appears to be the case with the current cellular service.

12. In addition to the apparent domestic consumer interest in PCSs, other considerations may warrant our implementing these services. Internationally, the world appears to be moving towards establishing PCSs operations in the 1700 MHz to 2300 MHz band. In order that U.S. PCSs may be technically consistent with worldwide PCSs, the public interest may best be served if the Commission allocates spectrum for PCSs in or near this portion of the spectrum. Domestically, such an allocation would also enable the United States possibly to establish a nearly wireless telephone network that could provide emergency communications needs when disasters, such as earthquakes or tornados, render the PSTN temporarily inoperable. Furthermore, the establishment of one or more of these services may be warranted as a way of introducing additional competition to the current mobile radio services. We seek comment on these issues below.

13. Need for an allocation. In light of the foregoing, we request comment on the need for one or more allocations for PCSs.¹³ We seek commenters' assessments of the projected demand for various PCS-type services, including but not limited to CT-2 and PCN, and the amount of spectrum required to meet any identified demand. In addition, we seek information addressing the extent to which current services might not be able to meet the demands for new types of mobile services.¹⁴ We also

13 On April 30, 1990, the Telecommunications Industry Association's Personal Communications Section filed a petition for rule making requesting that the Commission allocate to cordless telephones twenty-five duplex channel pairs in the 46 MHz and 49 MHz bands. Existing cordless telephones currently operate in a portion of this spectrum. Under TIA's proposal, cordless telephones would remain secondary to the Government services currently allocated this spectrum, but would be primary in these bands to all other low-powered devices that operate under Part 15. A copy of this proposal will be included in the docket file for this proceeding, and interested parties may comment upon this alternative means of addressing the public's demand for PCS.

14 We also intend to weigh the needs of new PCSs against the needs of other services that may require the spectrum under consideration in this proceeding. As noted below, we are considering reallocating the bands

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request information on the specific frequency bands in which PCSs would need to operate and whether these services can share with existing users or will require an exclusive allocation.

14. Besides the extent to which new PCSs can meet perceived public needs, other factors, such as spectrum efficiency and the time frames for service implementation, are important. For instance, if both CT-2 and PCN can address a particular public need that other current PCSs are unlikely to address but PCN cannot be implemented within a reasonable time, we may wish to consider the possibility of allocating spectrum for both CT-2 and PCN. Therefore, we request comment on how soon PCN-type services can be implemented and whether CT-2-type services might possibly be structured so that they can easily develop into PCN services as technology becomes available and economically feasible. Furthermore, commenters should address whether such considerations as the need for a worldwide PCSs allocation, a radio system that can provide emergency services, or additional competition in the PCSs market would be in the public interest and, thus, would support an allocation of spectrum for either of these two types of services or any other service.

Spectrum Allocation Issues

15. Spectrum allocation options for CT-2. With respect to the possibility of allocating spectrum in the 800/900 MHz bands for CT-2, one alternative is to focus on virgin spectrum in order that CT-2 may be implemented quickly.¹⁵ In this regard, we note that there are only three

901-902 MHz and 940-941 MHz, which are currently allocated to the General Purpose Mobile Radio Service, to CT-2. During the last several months, the Commission has received three petitions seeking the allocation of this spectrum for particular services. See Petition for Rule Making filed by McCaw Cellular Communications, Inc. on January 16, 1990, denied by the Chief Engineer in a letter dated February 8, 1990; Petition for Rule Making filed by American SMR Network Association, Inc. on March 9, 1990; and Petition for Rule Making filed by Land Mobile Communications Council on April 13, 1990. While recognizing that these petitions may have some merit, we believe that the proposals advanced therein should be addressed in this proceeding. Therefore, the Chief Engineer, as he did with the McCaw petition, is denying these two petitions in separate letters. All three petitions, however, will be included in the docket file in this proceeding and interested parties are encouraged to address these alternative allocation proposals.

15 Cellular 21's proposal for using the bands between 941-947 MHz, for expansion of CT-2 service is not a feasible option. We recently allocated the band 941-944 MHz for fixed point-to-point and fixed point-to-multipoint

unused bands in the 800/900 MHz bands; i.e. 901-902 MHz, 930-931 MHz, and 940-941 MHz. One option would be to allocate these three bands for CT-2-type operations. However, we are concerned that technical problems could prohibit the development of CT-2 equipment that could operate over all three bands. We seek comment regarding whether CT-2 equipment, and in particular the equipment being developed for the British system, can be used on three, non-contiguous megahertz of spectrum. We also solicit comments as to any other spectrum options that may serve the requirements of CT-2 and what the impact of those options would be on any existing services. In particular, commenters should address the possibility of using any other bands of spectrum below 3 GHz.

16. Spectrum allocation options for PCN-Type Services. In its petition, PCN America states that an allocation in the 1700-2300 MHz range will adequately support a system based on microcell technology. PCN America claims microcell technology is necessary to maximize frequency reuse and thereby create an enormous capacity for PCN systems. It argues that frequencies below this range propagate too far and, therefore, are not appropriate with microcell technology, and frequencies above this range are unsuitable due to their very limited propagation characteristics. Further, PCN America notes that this band is being considered for PCN operations in other parts of the world and that an international allocation will be considered for Region 1 at the 1992 WARC.

17. PCN America observes that domestically this frequency range is divided into five bands. Two bands are allocated for Government use, 1710-1850 MHz and 2200-2290 MHz, and three for non-Government use, 1850-1990 MHz, which is allocated for private operational-fixed microwave use, 1990-2110 MHz, which is allocated for auxiliary broadcast and cable television use, and 2110-2200 MHz, which is allocated for public fixed microwave use. It requests that the Commission consider the possibility of sharing one of these bands, in particular the 1850-1990 MHz band, using spread spectrum technology for PCN-type operations. It states that this

operation in order to provide much needed additional capacity for such operations. See note 9, supra. Further, there are numerous studio-to-transmitter (STL) facilities in the band 944-947 MHz as well as a hundred and twenty-one grandfathered in the band 941-944 MHz." These would have to be moved before CT-2 operations could commence. At this time, there does not appear to be any other frequency bands with adequate spectrum and appropriate propagation characteristics within which to relocate these facilities. In this regard, we note that one commenter suggested moving the STLs to the 901-902 MHz band. However, putting aside the costs of such a move, one megahertz for facilities that are now using 3 MHz would not be adequate to satisfy the needs of broadcasters.

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band holds the most promise for sharing because the other non-Government bands have higher current usage or are used for video transmissions, which cannot share with spread spectrum systems. PCN America does not ask that the two Government bands be considered because the extent of their current usage cannot be determined.

18. Several commenters generally support providing an allocation for PCN-type operations. However, the existing users of the 1850-1990 MHz band are opposed to PCN America's proposal to provide for PCNs in the 1850-1990 MHz band. These users include utilities, public safety entities, and petroleum and natural gas companies. They argue that a reallocation of frequencies in this band would displace a large number of existing users, disrupt their operations to the detriment of the public, and require them to purchase new equipment. They also contend that PCN America's proposal to share this spectrum with PCNs using spread spectrum technology is speculative and premature.

19. We request information on the technical feasibility of operating PCN-type services in the 1850-1990 MHz band on a shared basis as proposed by PCN America and the effects such operation would have on existing and future microwave operations in the 1850-1990 MHz bands. We also invite comments on the availability and appropriateness of considering the other bands in the 1700-3000 MHz range of the spectrum for PCN. We anticipate that the experiment we recently authorized PCN America to perform in Orlando, Florida and Houston, Texas, will provide a substantial amount of information on these subjects.¹⁶ In the meantime, we request information on the following questions:

1. How much spectrum would be required for PCN-type operations if they overlay existing services?
2. How many PCN licensees would this spectrum support?
3. What would be the impact on the existing allocated services?
 - a) How many, if any, existing systems would have to be reaccommodated into other bands?
 - b) Who should pay the cost of any reaccommodation?

¹⁶ In this regard, we note that PCN America has received an experimental grant, 1343-EX-PL-90, to develop and test a spread spectrum system in the 1850-1990 MHz in the cities of Orlando, FL and Houston, TX. We anticipate that the initial results of this experiment, addressing the technical feasibility of sharing this band with the fixed private operational-fixed microwave service, will be available in four months to a year.

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- c) Would it be desirable to restrict future fixed systems in the 1850-1990 MHz band in major metropolitan areas in order to protect PCN systems?

20. In addition to the possibility of overlaying PCN on existing services using spread spectrum techniques, there are other accommodations that should be considered, including the possibility of an exclusive allocation. At best, mobile communications are only feasible on frequencies below 3000 MHz with current technology. However, no large blocks of unallocated spectrum remain available in that range. Therefore, an exclusive allocation for PCN would require the reallocation of spectrum currently allocated for a particular use and the relocation of any licensees using the spectrum. The spectrum allocated for fixed microwave operations appears to present the most feasible source of spectrum for new PCSs. Fixed microwave facilities can operate in higher frequency bands, although shorter path lengths due to higher attenuation may impose greater economic burdens and possibly reduce the quality of the transmission. Further, as the band 1700-2300 MHz contains the largest blocks of contiguous fixed microwave spectrum and appears to be a spectrally efficient place to locate a mobile service based on microcell technology, it would be a prime candidate for PCN operations. Additionally, an allocation in this band would be consistent with international trends.

21. Accordingly, we seek comment on the feasibility of relocating the microwave licensees in the bands 1850-1990 MHz, 1990-2110 MHz, and 2110-2200 MHz.¹⁷ As public safety entities, broadcasters, common carriers, utilities, and other important entities are using these bands at present, we recognize that a reaccommodation of the microwave licensees in these bands could require a considerable amount of time and would likely preclude the implementation of PCN in certain areas for several years. In order to assess the feasibility of reaccommodating licensees in these bands and to consider a possible time frame for that process, we request comment on several issues. Initially, we seek specific comment on the extent of current usage in each of these bands, where in the spectrum these licensees might be reaccommodated, and whether other transmission media, such as fiber

¹⁷ As noted above, the bands 1710-1850 MHz and 2200-2290 MHz are being used by the Government. We intend to enter into dialogues with NTIA regarding the feasibility of these bands being reallocated for non-Government mobile use. Further, we note that Congress is currently considering the Federal Government's use of spectrum. Congressman Dingell has introduced a bill, the "Emerging Telecommunications Technologies Act of 1989" (H.R. 2965), which, if adopted as proposed, would require the Federal Government to review its use of the spectrum and make up to 200 MHz of spectrum available for non-Government use.

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optics or satellite facilities, present a viable alternative for some of these licensees' needs. In particular, commenters should address the availability and feasibility of using the microwave bands above 3000 MHz for microwave service users currently operating in the 1700-2300 MHz band and whether any other bands can be made available for these licensees. Further, we seek comment on the amount of embedded equipment these licensees have, the average life span of that equipment, and the plans of these licensees to implement in the future new or advanced technologies that may require the installation of new equipment. Finally, we ask commenters to address the minimum time period necessary to effectuate a reaccommodation.

22. As an alternative to clearing a band of existing occupants and reallocating it exclusively to PCN, one or more bands could be reallocated to PCN use on a primary basis with a secondary allocation for fixed service and a co-primary, grandfather provision for the existing fixed operations in the band. Fixed use of the band could be allowed to expand under the secondary provision in areas where they do not conflict with PCN use. PCN licensees would then have the option of designing their systems around the grandfathered fixed stations or negotiating other arrangements, which could include the modification or relocation of specific fixed operations to free additional spectrum for PCN use where and when it is required. Such a system could avoid the administrative cost and delay that a forced clearing of the band would entail, as well as provide licensees with more flexibility to achieve the most efficient levels of fixed and PCN services. Since the cost of any reaccommodations would be borne by the same party who reaps the benefits, namely the PCN licensee, only those changes would occur that produce a net benefit. It could be argued, however, that such an approach would create high transactions costs due to the negotiation process. Comments are requested on the advantages and disadvantages of this method of accommodating PCNs.

Regulatory Issues

23. Regulatory structure for CT-2-Type Services. As the home and office operations of CT-2 services are essentially the same as conventional cordless telephone operations, there appears to be little need for anything more than technical regulation of the equipment. However, we are interested in the commenters' views on the need to license the mobile units and any base units used only in the home or office. While mobile units that are used in conjunction with public access service could be licensed under a blanket licensing arrangement, this licensing structure would not be available to users who install CT-2 equipment only in their home or office.

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While Section 301 of the Communications Act (Act)¹⁸ requires all radio transmitting devices to be licensed, we have not required licenses for currently authorized cordless telephones in the past because they are Part 15 devices. As such, the current cordless telephones operate on a secondary, or non-interference, basis to all other authorized services. If we were to adopt a discrete allocation for this service, licensing of the personal base and mobile units would appear to be required under the Act. This would be a substantial administrative burden on the agency. One option would be to ask Congress to modify Section 307(e)(1) of the Act to exclude such facilities, as it did for the citizens band radio service and the radio control service. Comment is requested on this issue.

24. With respect to any CT-2 public access service, several regulatory and licensing issues arise. To the extent that CT-2 equipment can be used at public access locations, we need to determine how these base stations should be licensed, how many public access providers there should be, and how the CT-2 markets should be defined. While the United Kingdom has only four nationwide service providers for its telepoint service, nothing precludes us from authorizing any other number of providers or even permitting anyone who wishes to provide public access to do so, so long as the requisite technical standards are met. We request comment on how many public access providers we should authorize, whether there should be any preferences or restrictions regarding eligibility, and what methods and criteria we could use to select who will provide public access service. Additionally, commenters are requested to address what requirements, if any, should be imposed on the CT-2 licensees and whether they should be regulated as common or private carriers.¹⁹ We further seek comment on both the need and our authority to conclude that state and local regulation of any common carrier activities would be preempted. Interested parties are also requested to address the extent to which public access providers should be

¹⁸ Section 301 of the Communications Act of 1934, as amended, provides that "[n]o person shall use or operate any apparatus for the transmission of energy or communications or signals by radio . . . except under and in accordance with this Act and with a license in that behalf granted under the provisions of this Act." See 47 U.S.C. Section 301.

¹⁹ Commenters should address the applicability of Section 332 of the Communications Act, 47 U.S.C. Section 332, to this service as well as to PCN. See paragraph 28, *infra*. If these services are considered to be, or classified as, radio common carrier telephone exchange services, then the states, under Section 2(b) of the Act, may impose entry and rate regulations upon intrastate operations. If we classify these services as private land mobile, such state regulation would be expressly preempted under Section 332(c)(3).

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required to file tariffs. We further request discussion and information addressing the size of the market that would be most appropriate for licensing service providers, e.g., nationwide, regional, or local.

25. PCN regulatory structure. With regard to licensing of PCN systems, we also solicit comments on the best way to license the mobile units (hand sets). We request comment on whether mobile units should be authorized under a blanket licensing approach or whether licensing of mobile units should be required at all.²⁰ We also request discussion regarding the method for licensing base stations. The number of base stations that will be needed for a PCN system will likely be large. Therefore, we request comment on whether we should require a license for each base station. We are also concerned about the feasibility of finding sites for all of the base stations and whether this consideration may be a reason to limit the number of licensees.

26. We ask that interested parties address how many service providers there should be in each market and, as with CT-2, how the PCN market should be defined.²¹ In particular, we seek the commenters' views regarding whether PCN licenses be issued based on local areas, regional areas, or a nationwide market.

27. Furthermore, commenters are invited to address whether there is a need for any restrictions on eligibility for a PCN license in a particular market. To the extent that PCN and future generations of cellular would be similar, it could be argued that cellular licensees should not be permitted to apply for a PCN licensee in any market where they are licensed to provide cellular service. Such a policy would appear to promote competition in the personal communications market and thus serve the public interest. On the other hand, it could be argued that local exchange carriers, many of which also provide cellular service, should not be barred from applying for PCN licensees in their service area. For example, we recognize that an argument can be made that, to the extent that PCN systems will provide telecommunications systems that complement the current landline system, the local exchange carriers should be able to participate in PCN service in order that they may continue to provide by radio those services that they have historically provided by wire. Finally, interested parties are invited to comment on whether particular PCN licenses should be set aside for certain groups of service providers. For instance, in

²⁰ See para. 24, supra.

²¹ While it may be premature, commenters may also wish to address the question of how PCN licensees should be selected; i.e. by hearing, lottery, or possibly auctions.

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cellular, only the wireline carriers were permitted to apply for the Block B licenses.²²

28. As with the public access services of CT-2, we envision that PCN-type services could operate on a common carrier or private carrier basis or both. As there will likely be multiple service providers, possibly both private carrier and common carrier in nature, and as this service may be competitive with other existing mobile services, we would likely consider any common carrier PCN service providers to be non-dominant and subject to streamlined regulation. We request comment on these preliminary views. Further, we seek comment on both the need and our authority to conclude that state and local regulation of any common carrier activities would be preempted.

Technical Standards Issues

29. Technical Standards for CT-2-type Equipment. As discussed above, Cellular 21 and several parties request that the Commission adopt technical rules for CT-2 that are compatible with the equipment being used in the United Kingdom, particularly the CAI protocol standard. They assert that this would allow for the expeditious implementation of this service in the United States because it would take advantage of developmental work done in the United Kingdom. However, other commenters respond that this technology might not be the best for providing PCSs both in terms of technology and spectrum efficiency. Therefore, we are soliciting comments on the following technical issues relating to CT-2-type operation:

1. What type of emission and spectrum access mode, e.g., TDMA, Frequency Division Multiple Access (FDMA), or CDMA, would be the most efficient and responsive to the needs of CT-2?
2. What channeling plan and technical standards would best provide for CT-2 services?
3. Should existing protocol standards (e.g., CAI) or a new standard be adopted or would it be desirable not to adopt any standards?
4. Are the units' operations likely to exceed the Commission's guidelines for environmental effects as set forth in Part 1, Subpart I of the rules?

²² See 47 CFR section 22.902(b).

30. Technical Standards for PCN-type Equipment. We also believe that it would be in the public interest to begin developing a public record with regard to what, if any, technical standards to establish for PCNs. Therefore, we are soliciting comments on the following technical issues:

1. What transmission standards, including channeling plan, power limits, and types of emission should be adopted?
2. Should protocol standards that allow for interface between one system and another be adopted and, if so, what should they be?
3. Is there a need to establish a numbering plan for telephone numbers and who should develop and implement this plan?
4. Are base station operations likely to exceed the Commission's guidelines for environmental effects as set forth in Part 1, Subpart I of the rules?

Commenters may raise any other technical issues that they consider appropriate.

31. Any commenter proposing a service other than CT-2 or PCN should address these issues to the extent they are applicable to the PCSs that the commenter is proposing. Again, comparison of the benefits and disadvantages of different types of PCSs is strongly encouraged.

PROCEDURAL MATTERS

32. Pursuant to applicable procedures set forth in Sections 1.415 and 1.419 of the Commission's Rules, 47 CFR section 1.415 and 1.419, interested parties may file comments on or before October 1, 1990 and reply comments on or before November 30, 1990. All relevant and timely comments will be considered by the Commission before taking further action in this proceeding. To file formally in this proceeding, participants must file an original and four copies of all comments, reply comments, and supporting comments. If participants want each Commissioner to receive a personal copy of their comments, an original and nine copies must be filed. Comments and reply comments should be sent to Office of the Secretary, Federal Communications Commission, Washington, D.C. 20554. Comments and reply comments will be available for public inspection during regular business hours in the Dockets Reference Room (Room 239) of the Federal Communications Commission, 1919 M Street N.W., Washington, D.C. 20554.

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33. For further information concerning this Notice of Inquiry contact Mr. Fred Thomas (202) 653-8112, Office of Engineering and Technology, Federal Communications Commission, Washington, D.C. 20554.

FEDERAL COMMUNICATIONS COMMISSION

Donna R. Searcy
Secretary