

we are unable to evaluate the innovativeness of MobileComm's proposal under our rules on the sparse information it has chosen to submit. We further note that MobileComm did not submit additional specific information in response to arguments submitted in opposition to its request that its proposal was vague and perhaps only conceptual in nature. Accordingly, based on the information submitted by MobileComm we are unable to conclude that its proposal is innovative as required by our **rules.**¹⁰³ Accordingly, we conclude that the information submitted by MobileComm fails to demonstrate the innovativeness of its proposal, and MobileComm's responsibility for an innovation as required by our rules for award of a preference. Based on MobileComm's failure to file sufficient information to determine innovativeness, we deny its request for a pioneer's preference.

135. In addition, MobileComm has not demonstrated the technical feasibility of its proposal, which provides an additional basis for denial. In a pleading with **BellSouth**, MobileComm argues that due to the rapidity with which the Commission considered pioneer's preferences related to PCS, applicants were deprived the opportunity of receiving a grant of experimental authority, conducting experiments and submitting the results of those experiments to prove technical feasibility. We note that the subject of PCS has been publicly before this Commission since 1989, and that we addressed narrowband PCS services in the 900 MHz range when we opened this docket in 1990. With regard to advanced paging services in particular, Telocator filed the first petition initiating consideration January, 1991. Furthermore, with regard to late-breaking development of innovative proposals, applicants are permitted to submit written technical filings demonstrating the technical feasibility of their claimed innovations. Applicants are not required to file the results of technical experiments. In any event, as noted above, the dearth of information regarding innovativeness proves an independent basis to deny MobileComm's request for a pioneer's preference.

136. Montauk Telecommunications Company (PP-83). Montauk proposes to broadcast news/information and advertising to facsimile machines. In the Tentative Decision, we stated that Montauk had not demonstrated the technical feasibility of its system nor addressed why 900 MHz spectrum should be used for a fixed service. In a petition for reconsideration to the Tentative Decision, Montauk acknowledges that it has not conducted **over-the-air** tests of its technology in the 900 MHz

¹⁰³ We also find contradictory to its claim of innovativeness MobileComm's argument that it did not provide certain information because it considers such information to be routine network design.

range, **but** states that it has conducted tests over a satellite link. Montauk further states that there is sufficient 900 MHz spectrum to satisfy all proposed advanced messaging services for which pioneer's preference requests have been filed, and that use of this spectrum would result in a lower cost facsimile service.

137. Montauk has not demonstrated the technical feasibility of its service at 900 **MHz**. Even assuming that **Montauk's** proposal is feasible in this spectrum, the rules we adopt today governing narrowband PCS limit its use to mobile, with fixed use permitted only if ancillary to mobile use. Accordingly, we deny Montauk's pioneer's preference request.

138. Paging Network, Inc. (PP-84). **PageNet** proposes a service it named "**VoiceNow**" which, as **described** by **PageNet**, would provide a digitized voice paging service with acknowledgement capability. **PageNet** requests a total of 250 kilohertz to provide this service: one 25 **kHz** simulcast paging channel for control of **paggers**, one 25 **kHz** return channel for page acknowledgement and radiolocation purposes, and eight 25 **kHz** channels for digital voice message transmission. **PageNet's VoiceNow** service would employ a cellular reuse scheme similar to that proposed by **PageMart** for its system, supra, e.g., a 4 cell reuse pattern combined with radiolocation capability. In the Tentative Decision, we proposed to deny **PageNet's** request for failure to demonstrate with particularity the part of its proposal that it claims to be new and innovative, and for failure to demonstrate its role in developing a specific new and innovative service.

139. Dial Page asserts that **PageNet** should not receive a preference because its proposal requires a relatively large amount of spectrum which, if granted, would limit competition. **PageMart** argues that **PageNet's** network is very similar to **PageMart's** PIMS, except that **PageNet** limits its proposed service to voice-only services. **PageMart** also asserts that **PageNet** has not designed its system to use micro or **pico** cells to increase frequency reuse, and therefore would have to use 16 QAM modulation equipment to attain sufficient capacity to provide the service as proposed. **PageMart** questions the availability and feasibility of 16 QAM equipment for paging services, stating that such equipment is untested and will not be commercially available in the near future.

140. Mtel contends that **PageNet's** technical feasibility showing lacks meaningful engineering support. **Mtel** asserts that **PageNet's** request offers only an overview of brief technical commentary on its service. **Mtel** claims that the technical feasibility exhibits raise concerns that a four cell reuse plan suffers from co-channel interference. **Mtel** asserts that some modulation schemes could possibly operate in the four cell reuse

environment, but that 16 QAM cannot.¹⁰⁴ Mtel maintains that the "Webb paper," relied upon by PageNet, states that a 16 QAM signal theoretically requires a signal-to-noise ratio on the order of 25 dB, which Mtel claims cannot be achieved by PageNet's proposal. Mtel asserts that VoiceNow's proposal results in a signal-to-noise ratio of 13 dB at the cell edge and that it is unlikely to achieve a 25 dB signal-to-noise ratio elsewhere in the cell. Mtel also asserts that PageNet's 2400 bps voice encoder's technology and quality is highly suspect as proposed for this service and has not been demonstrated to be feasible or effective.

141. In response to arguments that 16 QAM technology may not be feasible and has not been developed for the applications and environment it proposed, PageNet states that its technologies are feasible, that opponents have mischaracterized its request, and that its request is based upon it having proposed an integration of existing technologies to provide a new service. PageNet maintains that the intelligence contemplated in its network will permit the use of 16 QAM in a four cell reuse environment and further asserts that its system design already is a part of the Digital European Cordless Telephone Standard. PageNet also presents a marketing study done by Economic and Management Consultants International, Inc., which states that there appears to be more demand for voice paging than other types because voice paging allows the user to receive a message without having to return a call.¹⁰⁵

142. PageNet expresses optimism that the challenges inherent in developing 16-QAM technology for its application can be overcome. Additionally, PageNet states its "engineers have consulted with experts in the digital modulation field, and have concluded that digital modulation using 16-QAM is likely feasible." Nevertheless, PageNet states that should efforts to develop 16-QAM technology for this purpose not succeed, VoiceNow "can still be provided in a highly spectrally efficient and cost-effective manner using other modulation methods."

143. PageNet acknowledges that 16 QAM mobile equipment does not exist, but states that it "is likely feasible." In support of its statements regarding feasibility, PageNet submits

¹⁰⁴ See Formal Opposition of Mtel at 9.

¹⁰⁵ Voice paging is easy for the caller to use because one simply dials a number and his or her voice is recorded and later transmitted. However, voice paging is limited by the type of information that can be conveyed to the user and by the time it takes to send longer messages. While data messaging may not be as convenient to some users as a voice page, there are fewer time and information constraints on data messaging.

affidavits from two engineers. However, both of the statements notably stop short of stating conclusively that this proposal is feasible to implement, and other parties argue that this implementation is not technically feasible. Furthermore, **PageNet** has not submitted detailed technical information or experimental results of any kind upon which we could determine independently the technical feasibility of its proposal, as required by our **rules.**¹⁰⁶ Consequently, although **PageNet's** proposal may be innovative, it has not demonstrated its specific contribution to development of this technology, nor demonstrated the feasibility of its proposed implementation. We therefore deny **PageNet's** request for a pioneer's preference.

144. **Skycell** Corporation (**PR-95**). **Skycell** proposes to use 900 MHz PCS channels for control applications of CT-2 Telepoint payphone services. In the Tentative Decision we proposed to deny **Skycell's** request for failure to discuss the technical feasibility. **Skycell** did not file comments to the Tentative Decision and no other party addressed **Skycell's** proposal. We continue to believe that **Skycell's** request fails to demonstrate technical feasibility. Accordingly, we deny **Skycell's** pioneer's preference request.

Pioneer's Preference Procedures

145. **BellSouth** raises issues related to the pioneer's preference rules themselves, rather than the merits of our tentative grants and denials. Although these issues have been dealt with in our pioneer's preference rulemaking **orders,**¹⁰⁷ in the interest of clarity we will briefly address the issues raised.

146. **BellSouth** argues that our procedures for awarding pioneer's preference without a hearing are inconsistent with Section 309 of the Communications Act.¹⁰⁸ According to **BellSouth**, award of a pioneer's preference constitutes award of a license and therefore requires an adjudicative hearing to resolve

¹⁰⁶ We note that after experimental evaluation, **PageNet** determined that 2400 bps linear predictive coding is not acceptable and states that it will investigate 4800 bps voice coding.

¹⁰⁷ See note 41, supra.

¹⁰⁸ **PageNet** similarly argues that the Commission improperly granted **Mtel's** pioneer's preference request and denied its pioneer's preference request "without conducting the requisite comparative evaluation.*@ **PageNet** Comment at n. 49; **PageNet** Reply at 30-31. **PageNet's** argument is rejected for the reasons stated herein.

what it characterizes as the substantial and material questions of fact as to whether a pioneer's preference is warranted. After **BellSouth** filed these comments, the Commission addressed this issue in affirming the pioneer's preference rules and denying petitions for further reconsideration of those rules.

147. In responding to arguments that a comparative hearing is required between a pioneer's preference recipient and other applicants, the Commission concluded that the rules are consistent with judicial interpretation of our statutory authority. In the leading case related to this issue, Ashbacker Radio Corn. v. FCC,¹⁰⁹ the Supreme Court held that if two bona fide applications are mutually exclusive they are entitled to a comparative hearing. Later, in United States v. Storer Broadcasting Co.,¹¹⁰ the Supreme Court clarified that when adequately supported by the record in a rule making proceeding, the Commission may establish threshold standards that applicants must satisfy before they are entitled to be eligible for the comparative consideration held to be required by Section 309 in Ashbacker.¹¹¹ In addition to ruling that comparative hearings are not required in pioneer's preference cases, the Commission also indicated that a hearing would be appropriate to the extent a substantial and material question of fact exists with respect to a specific pioneer's preference request. Here, we have determined that no hearing is required because no substantial and material question of fact exists relating to whether Mtel meets the standard for a pioneer's preference¹² set forth in the rules.

148. **BellSouth** also contends that the Commission failed to comply with statutory requirements for hearing cases under the Administrative Procedure Act¹¹³ -- no designation for hearing, no notice of the specific issues to be determined in a hearing, no provision for the filing of proposed findings and conclusions, and no adoption of findings and conclusions. Given that there is

¹⁰⁹ 326 U.S. 327, 333 (1945).

¹¹⁰ 351 U.S. 192 (1956)

¹¹¹ Pioneer's Preference Further Recon. Order, 8 FCC Rcd at 1659 (quoting Pioneer's Preference Report and Order, 6 FCC Rcd at 3492 & note 5).

¹¹² We also find no substantial and material question of fact exists with regard to any of the other pioneer's preference requests that we find clearly do not meet the requirements of the rules.

¹¹³ 5 U.S.C. §§ 556(b)(1), 557(b)(1), 557(c)(1), (3), 557(c) (3) (A).

no right to a hearing, as stated above, these hearing requirements are inapplicable.

149. **BellSouth** also argues that the Commission **has** not precisely specified the issues and criteria used in granting or denying pioneer's preferences. Specifically, **BellSouth** complains that pioneer's preference applicants lack notice of the decisional rules until a final award has been made because "**the pioneer's preference** is to be awarded at the same time as rules are adopted **and** is to be based, at least in part, on whether the rules adopted grew out of any pioneer applicant's proposal and the rules 'lend themselves to the grant of a **preference.**'"¹¹⁴ As a preliminary matter, it should be noted that the tentative denial of a pioneer's preference request from **BellSouth's** subsidiary, **Mobile** Communication Corporation of America (**MobileComm**), is unrelated to the requirement that the rules adopted lend themselves to the proposal. Nonetheless, when we adopted the pioneer's preference rules two years ago, we **addressed** this issue:

it will be our general policy to award a preference to any otherwise qualified innovator meeting our standard even if the Commission's final rules for the service are not identical to the innovator's original proposal. However, if the modifications are so significant that the particular innovator does not meet the eligibility standard, we will not award a preference to that innovator. We believe that such an approach should result in providing innovators with the certainty necessary to garner financial support in a timely manner and should ensure that the benefits **of new** service **can be** realized expeditiously by the public.¹¹⁵

We are satisfied that there is sufficient certainty upon which innovators may base their **proposals.**¹¹⁶

150. **BellSouth** further argues that the Commission "effectively rewrote" the pioneer's preference rules in its Tentative Decision in this **proceeding**¹¹⁷ when it indicated that in evaluating proposals it would consider factors such as "(1) **added** functionality; (2) new use of spectrum; (3) changed

¹¹⁴ **BellSouth** at 8-9.

¹¹⁵ **Pioneer's Preference Rules Report and Order**, 6 FCC Rcd at 3495.

¹¹⁶ See also **Pioneer's Preference Further Recon. Order**, 8 FCC Rcd at 1661 ("**we** believe the pioneer's preference standard is sufficiently clear and **objective**").

¹¹⁷ 7 FCC Rcd at 5734-35, in **paras.** 147-148.

operating or technical characteristics; (4) increased spectrum efficiency; (5) increased speed or quality of information transfer; (6) technical feasibility and (7) reduced cost to the public" among other **things**.¹¹⁸ Contrary to **BellSouth's** assertion, these factors are wholly consistent with and do not deviate from the criteria clearly specified in the Commission's pioneer's preference **rule**¹¹⁹ and merely flesh out those standards.

151. In addition to arguing that our procedures for awarding pioneer's preferences are inadequate, **BellSouth** contends that the pioneer's preference criteria have been applied inconsistently in the tentative decisions in this and the "Big **LEO**" proceeding.¹²⁰ **Bellsouth** states that tentatively none of the Big LEO applicants were granted a preference because their proposals were determined to not be innovative and states that **Mtel's** proposal similarly is not innovative. **BellSouth's** arguments in this regard are discussed more fully below. However, it bears noting that none of the Big LEO applicants were found to have demonstrated technical feasibility of their proposals, whereas **Mtel** was found to have made such a **demonstration**.¹²¹

CONCLUSION

152. The allocation of three megahertz of spectrum to narrowband PCS and its associated services rules will enable many new mobile services, particularly AMS. The flexible regulatory approach adopted should facilitate the quick development and implementation of these new mobile services.

PROCEDURAL INFORMATION

153. Reaulatory Flexibility Analysis. The analysis pursuant to the Regulatory Flexibility Act of 1980, 5 U.S.C. Section 608, is contained in Appendix B.

¹¹⁸ See **BellSouth** at 9 for a complete quotation of the decisional criteria allegedly rewritten.

¹¹⁹ 47 C.F.R. § 1.402(a). These factors were listed in paragraph 48 of the Pioneer's Preference Rules Report and Order, 6 FCC **Rcd** at 3494.

¹²⁰ Mobile-Satellite Service, 7 FCC **Rcd** 6414 (1992).

¹²¹ 7 FCC **Rcd** at 6421-22.

154. Accordingly, IT IS ORDERED that Part 2 of the Commission's Rules IS AMENDED and that a new Part 99 IS ADDED to the Commission's Rules as specified in Appendix A, effective 30 days after publication in the Federal Register. This action is taken pursuant to Sections 4(i), 7(a), 302, 303(c), 303(f), 303(g), and 303(r) of the Communications Act of 1934, as amended, 47 U.S.C. Sections 154(i), 157(a), 302, 303(c), 303(f), 303(g), and 303(r).

155. IT IS FURTHER ORDERED THAT the request for pioneer's preference filed by Mobile Telecommunication Technologies Corporation IS GRANTED. IT IS FURTHER ORDERED THAT the requests for pioneer's preference filed by Advanced Cordless Technologies, Inc.; Advanced Wireless Communications, Inc.; Dial Page, L.P. (PP-11 and PP-38); Echo Group L.P.; Ericsson Business Communications, Inc.; Freeman Engineering Associates, Inc.; Global Enhanced Messaging Venture; Metriplex, Inc.; Mobile Communications Corporation of America; Montauk Telecommunications Company; NAC, Inc.; PacTel Paging (PP-38 and PP-39); PageMart, Inc.; Paging Network, Inc.; Skycell Corporation; and Radio Telecom and Technology, Inc. ARE DENIED.

FEDERAL COMMUNICATIONS COMMISSION


William F. Caton
Acting Secretary

APPENDIX A: FINAL RULES

I. Part 2 of Chapter I of Title 47 of the Code of Federal Regulations is amended as follows:

PART 2 -- FREQUENCY ALLOCATIONS AND RADIO TREATY MATTERS; GENERAL RULES AND REGULATIONS

1. The authority citation in Part 2 continues to read:

AUTHORITY: Sec. 4, 302, 303, and 307 of the Communications Act of 1934, as amended, 47 U.S.C. Sections 154, 154(b)(2), 303, 303(r) and 307, unless otherwise noted.

2. Section 2.106, the Table of Frequency Allocations is amended as follows:

- a. In column (1) of the 790-862 MHz and 862-890 MHz bands, add 700B.
- b. In column (2) of the 806-890 MHz and 890-902 MHz bands, add 700A.
- c. In column (1) of the 890-942 MHz band, move 704 from below "Radiolocation." to the end of the band (line above the 942 MHz line).
- d. In column (2) of the 890-902 MHz band: move the 902 MHz line so that the line is parallel to the 902 MHz line in column 8 (4) through (7); and move 704A and 705 to the end of the band.
- e. In column (2) of the 902-928 MHz band, remove the extra lines that separate the services.
- f. In column (2) of the 928-942 MHz band, move 705 from below "Radiolocation." to the end of the band.
- g. In column (3) of the 890-942 MHz band; move 706 from below "Radiolocation." to the end of the band.
- h. In column (4) of the 806-902 MHz band: remove the 896 MHz line; remove the 901 MHz line; and move US116, US268, and G2 to the end of the band.
- i. In column (5) of the 901-902 MHz band: add "MOBILE."; add a period behind the fixed service allocation, i.e., "FIXED."; move US116 and US268 to the left one space; and add US330.

- j. In column (6) of the 901-902 MHz band: delete "GENERAL PURPOSE MOBILE ()"; and add "PERSONAL COMMUNICATIONS SERVICES (99) ."
- k. In column (5) of the 929-932 **MHz** band:
 - (a) Split the band into the 929-930 **MHz**, the 930-931 **MHz**, and the 931-932 **MHz** bands;
 - (b) Begin with the 3 bands empty of previous allocations and footnotes;
 - (c) In the new 929-930 **MHz** band: add "LAND MOBILE."; and add US116, US215, and US268.
 - (d) In the new 930-931 **MHz** band: add "FIXED." and "MOBILE."; and **add** US116, US215, US268, and **US330**.
 - (e) In the new 930-931 **MHz** band: add "LAND MOBILE."; and add US116, US215, and US268.
- l. In column (6) of the 929-932 **MHz** band:
 - (a) Split the band into the 929-930 **MHz**, the 930-931 **MHz**, and the 931-932 **MHz** bands;
 - (b) Begin with the 3 bands empty of previous rule part(s);
 - (c) In the new 929-930 **MHz** band, add "DOMESTIC PUBLIC LAND MOBILE (22) ." and "PRIVATE LAND MOBILE (90) .";
 - (d) In the new 930-931 **MHz** band, add "PERSONAL COMMUNICATIONS SERVICES (99) ."; and
 - (e) In the new 931-932 MHz band, add a reference to "DOMESTIC PUBLIC LAND MOBILE (22) ." and "PRIVATE LAND MOBILE (90) .".
- m. In column (4) of the 935-941 **MHz** band: delete the 940 **MHz** line; and move US268 and **G2** to the end of the band.
- n. In column (5) of the 940-941 MHz band: add "FIXED."; and add **US330**.
- o. In column (6) of the 940-941 **MHz** band: delete "GENERAL PURPOSE MOBILE ()" and add "PERSONAL COMMUNICATIONS SERVICES (99) ."

p. § 2.106 Table of **Frequency Allocations**

International table			United States table		FCC use designators	
Region 1-allocation MHz	Region 2-allocation MHz	Region 3-allocation MHz	Government Allocation MHz	Non-Government Allocation MHz	Rule part(s)	Special-use frequencies
(1)	(2)	(3)	(4)	(5)	(6)	(7)
790-862 FIXED. BROADCASTING. 694 6% 695A 696 697 7008 702	806-890 FIXED. MOBILE. BROADCASTING.		806-902			
862-890 FIXED. MOBILE except aeronautical mobile. BROADCASTING 703. 7008 704	692A 700 700A					
890-942 FIXED. MOBILE except aeronautical mobile. BROADCASTING 703. Radiolocation.	890-902 FIXED. MOBILE except aeronautical mobile. Radiolocation.	890-942 FIXED. MOBILE. BROADCASTING. Radiolocation.				
	700A 704A 705		US116 US268 G2	901-902 FIXED. MOBILE. US116 US268 US330	PERSONAL COMMUNICATIONS SERVICES (99)	
	902-928 FIXED. Amateur. Mobile except aeronautical mobile. Radiolocation.					
	705 707 707A					

928-942
FIXED.
MOBILE except
aeronautical mobile.
Radiolocation.

928-932

929-930
LAND MOBILE.

DOMESTIC PUBLIC LAND
MOBILE (22).
PRIVATE LAND MOBILE
(90).

US116 US215 US268

930-931
FIXED.
MOBILE.

PERSONAL COMMUNICATIONS
SERVICES (99).

US116 US215 US268
US330

931-932
LAND MOBILE.

DOMESTIC PUBLIC LAND
MOBILE (22).
PRIVATE LAND MOBILE
(90).

US116 US215 US268 G2 US116 US215 US268

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*

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940-941
FIXED.
MOBILE.

PERSONAL COMMUNICATIONS
SERVICES (99).

US116 US268 US330

704

705

706

*

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p. Add new 700A and 700B to the international footnotes and new US330 to the United States footnotes:

* * * * *

INTERNATIONAL FOOTNOTES

* * * * *

700A *Additional allocation:* in Canada, the United States and Mexico, the bands 849-851 MHz and 894-896 MHz are also allocated to the aeronautical mobile service on a primary basis, for public correspondence with aircraft. The use of the band 849-851 MHz is limited to transmissions from aeronautical stations and the use of the band 894-896 MHz is limited to transmissions from aircraft stations.

700B *Additional allocation:* in Belarus, the Russian Federation and Ukraine, the bands 806-840 MHz (Earth-to-space) and 856-890 MHz (space-to-Earth) are also allocated to the mobile-satellite, except aeronautical mobile-satellite (R) service. The use of these bands by this service shall not cause harmful interference to, or claim protection from, services in other countries operating in accordance with the Table of Frequency Allocations and is subject to special agreements between the administrations concerned.

* * * * *

UNITED STATES (US) FOOTNOTES

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US330 In the frequency bands 901-902 MHz, 930-931 MHz, and 940-941 MHz, the only fixed services permitted are ancillary services used in support of mobile personal communications services.

* * * * *

II. A new Part 99 of Chapter I of Title 47 of the Code of Federal Regulations is adopted as follows:

PART 99 -- PERSONAL COMMUNICATIONS SERVICES

1. The authority citation in Part 99 reads:

AUTHORITY: Sacs. 4, 302, 303, 4.0 Stat. 1066, **1082**, as amended: **47 U.S.C.** sections 154, 302, 303, and 332, unless otherwise noted.

2. Part 99 is adopted as follows:

Subpart A - General Information

§ 99.1 Basis and purpose.

This section contains the statutory basis for this part of the rules and provides the purpose for which this part is issued.

(a) **Basis.** The rules for the personal communications services (PCS) in this part are promulgated under the provisions of the Communications Act of 1934, as amended, which vests authority in the Federal Communications Commission to regulate radio transmission and to issue licenses for radio stations. The rules in this part are in accordance with applicable statutes, international treaties and agreements to which the United States is a party.

(b) **Purpose.** This part states the conditions under which stations may be licensed and used to provide PCS in the frequency bands specified in Subpart C of this part.

§ 99.3 Permissible communications.

PCS licensees may provide any mobile communications service on their assigned spectrum. Fixed services may be provided only on an ancillary basis to mobile operations. **Broadcasting as** defined in the Communications Act is prohibited.

§ 99.5 Terms and Definitions.

Assigned Frequency. The center of the frequency band assigned to a station.

Authorized Bandwidth. The maximum width of the band of frequencies permitted to be used by a station. This is normally considered to be the necessary or occupied **bandwidth**, whichever is greater.

Average Terrain. The average elevation of terrain between 3.2 and 16 kilometers from the antenna site.

Base Station. A land station in the land mobile service.

Basic Trading Area (ETA). One of the geographic areas by which narrowband PCS is licensed. The 487 **BTAs** are defined in the Rand McNally 1992 Commercial Atlas & Marketina Guide, 123rd Edition, pp. 36-39. Additionally, American Samoa, Guam, Northern Mariana Islands, Puerto Rico, and United States Virgin Islands are licensed separately and are treated as if **BTAs** for licensing purposes.

Effective Radiated Power (e.r.p.) (in a given direction). The product of the power supplied to the antenna and its gain relative to a half-wave dipole in a given direction.

Fixed Service. A radiocommunication service between specified fixed points.

Fixed Station. A station in the fixed service.

Height Above Average Terrain (HAAT). Height of the center of the radiating element of the antenna above the average terrain. See § 90.309(a)(4) for calculation method.

Land Mobile Service. A mobile service between base stations and land mobile stations, or between land mobile stations.

Land Mobile Station. A mobile station in the land mobile service capable of surface movement within the geographic limits of a country or continent.

Land Station. A station in the mobile service not intended to be used while in motion.

Major Trading Area (MTA). One of the geographic areas by which narrowband PCS is licensed. **MTAs** are defined in the Rand McNally 1992 Commercial Atlas and Marketina Guide, 123rd Edition, pages 36-39. For licensing purposes Alaska is a separate area from the Seattle MTA. Guam and the Northern Mariana Islands will be treated as a single MTA. Puerto Rico and United States Virgin Islands will be treated as a single MTA. American Samoa will be licensed separately.

Mobile Service. A radiocommunication service between mobile and land stations, or between mobile stations.

Mobile Station. A station in the mobile service intended to be used while in motion or during halts at unspecified points.

Narrowband PCS. PCS services operating in the 901-902 MHz, 930-931 MHz, and 940-941 MHz bands.

Personal Communications Services (PCS). Very broadly defined and flexible radio services that encompass a wide array of mobile and ancillary fixed communication services, which could provide

services to individuals and business, and be integrated with a variety of competing networks.

Subpart B - **Applications** and **Licenses**

§ 99.11 Scope.

This subpart contains procedures and requirements for filing applications for licenses to operate radio facilities in the Personal Communications Services. Part 1 of the Commission's rules contain additional applicable rules governing forms (**§ 1.922**), fees (**§ 1.1102**), processing procedures (**§ 1.953**), special temporary authority (**§ 1.925**), assignment or transfer of control (**§ 1.924**), and environmental impact (**§ 1.1301**). Part 17 contains applicable rules regarding tower lighting (**§§ 17.7 - 17.17**).

§ 99.12 Licensed service areas.

(a) Narrowband PCS nationwide licensed service area: 50 states, District of Columbia, American Samoa, Guam, Northern Mariana Islands, Puerto Rico, and United States Virgin Islands.

(b) Narrowband PCS regional licensed service areas: 47 Major Trading Areas as defined in the Rand McNally 1992 Commercial Atlas & Marketing Guide except that Alaska is separated from the Seattle MTA and will be licensed separately. Guam and the Northern Mariana Islands will be treated as a single MTA. Puerto Rico and United States Virgin-Islands will be treated as a single MTA. American Samoa will be licensed separately.

(c) Narrowband PCS local licensed service areas: 487 Basic Trading Areas as defined in the Rand McNally 1992 Commercial Atlas & Marketing Guide American Samoa, Guam, Northern Mariana Islands, Puerto Rico, and United States Virgin Islands each will be licensed separately.

§ 99.13 Eligibility.

Any person or entity not excluded by 47 U.S.C. § 310 is eligible to hold a license under this part.

§ 99.14 Regulatory Status.

[reserved]

§ 99.15 License Term.

Licenses for service areas will be issued for a term of ten years from the date of original issuance or renewal.

§ 99.17 Construction Requirements.

(a) For narrowband PCS systems:

(1) Licensees of nationwide service area channels must construct at least 250 base stations within five years of being licensed and at least 500 base stations within ten years of being licensed and notify the Commission when each benchmark is met.

(2) MTA licensees must construct base stations to provide coverage to approximately 25% of the geographic area of their licensed service area within five years of being licensed and 50% of the geographic area of their licensed service area within ten years of being licensed. Alternatively, licensees of MTA service area channels **must** construct at least 25 base stations within five years of being licensed and 50 base stations within ten years of being licensed. In either case, the **MTA** licensee must notify the Commission when each benchmark is met.

(3) Licensees of BTA service area channels must construct at least one base station and begin providing service in their licensed service area within one year of being licensed and notify the Commission when the benchmark is met.

(4) In evaluating compliance with the above construction requirements, each base station will be considered to serve a geographic area of 3000 square kilometers. In the case where a licensee constructs low power base stations, compliance with the construction requirements will be determined by aggregating the actual service areas of the low power stations divided by 3000 square kilometers to determine an equivalent number of base stations.

(5) Failure by any licensee to meet the above construction requirements will result in forfeiture of the license and the licensee will be ineligible to regain it.

Subpart C - Technical and Operating Requirements

§ 99.401 Scope.

This subpart sets forth the technical requirements for use of the spectrum and equipment in the radio services governed by this part. Such requirements include frequency channelizations and standards for equipment authorization, transmitter power, antenna height, and signal strength. Included in this subpart are interference criteria for co-channel operations.

§ 99.403 Equipment authorisation.

(a) Each transmitter utilized for operation under **this part and** each transmitter marketed, as set forth in **§ 2.803** of Part 2 of this Chapter, must be of a type that has been authorized by **the** Commission under its type acceptance procedure **for use under this** part.

(b) The Commission periodically publishes a list of type accepted equipment, entitled "**Radio Equipment List, Equipment Accepted for Licensing.**" Copies of this list are available for public reference at the Commission's offices in Washington' D. C., and at each of its field offices.

(c) Any manufacturer of radio transmitting equipment to be used in these services may request equipment authorization following the procedures set forth in Subpart **J** of Part 2 of this chapter. Equipment authorization for an individual transmitter may be requested by an applicant for a station authorization by following the procedure set forth in Part 2. Such equipment if approved or accepted will not normally be included in the **Commission's** Radio Equipment List but will be individually enumerated on the station authorization.

(d) Applicants for type acceptance of transmitters that operate in these services must submit a statement confirming that the equipment complies with IEEE **C95.1-1991, "IEEE Standards for Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3 kHz to 300 GHz."** Measurement methods are specified in IEEE **C95.3-1991, "Recommended Practice for the Measurement of Potentially Hazardous Electromagnetic Fields - RF and Microwave."** The applicant for type acceptance is required to maintain a record showing the basis for the statement of compliance with IEEE **C.95.1-1991.**

§ 99.405 Frequencies.

(a) Licensed personal communications radio services will be authorized in the 901-902 MHz, 930-931 MHz, and 940-941 MHz bands. Licenses under this part will be issued based on the following frequency blocks, which are listed by center frequency. Unless otherwise specified, the frequencies are paired.

Nationwide Blocks (MHz)

<u>Base.</u>	<u>.Mobile</u>
50 kHz.	.50 kHz
940.025.	.901.025
940.075.	.901.075
940.125.	.901.125
940.175.	.901.175
940.225.	.901.225
50 kHz.	.12.5 kHz
w o o o o o o o o	.901.75625
w o o o o o o o o	.901.76875
w o o o o o o o o	.901.78125

50 kHz Unpaired

940.775
 940.825
 940.875.

MT Blocks (MHz)

Base. . . Mobile

50 kHz. . . 50 kHz
940.275. . . .901.275
940.325. . . .901.325
940.375. . . .901.375
940.425. . . .901.425

50 kHz. . . 12.5 kHz
930.575. . . .901.79375
930.625. . . .901.80625
930.675. . . .901.81875
930.725. . . .901.83125
930.775. . . .901.84375
930.825. . . .901.85625
930.875. . . .901.86875

50 kHz Unpaired

940.925
940.975

BTA Blocks (MHz)

Base. . . Mobile

50 kHz. . . 12.5 kHz
930.925. . . .901.88125
930.975. . . .901.89375

12.5 kHz Unpaired¹

901.90625
901.91875
901.93125
901.94375
901.95625
901.96875
901.98125
901.99375

¹ These mobile station frequencies are restricted to **entities** licensed under Parts 22 and 90 of this chapter.

(b) A single licensee is permitted to hold licenses for up to three 50 **kHz** channels, paired or unpaired. This limit is based on the total spectrum in the licensee's nationwide, regional, and local licenses at any geographic point.

§ 99.406 Authorized Bandwidth

The maximum authorized bandwidth of narrowband PCS channels will be 10 **kHz** for 12.5 **kHz** channels and 45 **kHz** for 50 **kHz** channels.

For aggregated adjacent channels, a maximum authorized bandwidth of 5 kHz less than the total aggregated channel width is permitted.

§ 99.407 Power/antenna height limits.

- (a) Stations transmitting in the 901-902 MHz band are limited to 7 watts e.r.p.
- (b) Mobile stations transmitting in the 930-931 MHz and 940-941 MHz bands are limited to 7 watts e.r.p.
- (c) Base stations transmitting in the 930-931 MHz and 940-941 MHz bands are limited to 3500 watts e.r.p. per authorized channel and are unlimited in antenna height except as provided for in paragraph (d) below.
- (d) MTA and BTA base stations located between 200 kilometers (124 miles) and 80 kilometers (50 miles) from their licensed service area border are limited to the power levels in following table:

Antenna Height Above Average Terrain in meters (feet)	Effective Radiated Power (e.r.p.) (watts)
183 (600) and below.....	350 0
183 (600) to 208 (682).....	350 0 to 2504
208 (682) to 236 (775).....	258 4 to 1883
236 (775) to 268 (880).....	188 3 to 1372
268 (880) to 305 (1000).....	137 2 to 1000
305 (1000) to 346 (1137).....	100 0 to 729
346 (1137) to 394 (1292).....	72 9 to 531
394 (1292) to 447 (1468).....	53 1 to 387
447 (1468) to 508 (1668).....	38 7 to 282
508 (1668) to 578 (1895).....	28 2 to 206
578 (1895) to 656 (2154).....	20 6 to 150
656 (2154) to 746 (2447).....	15 0 to 109
746 (2447) to 848 (2781).....	10 9 to 80
848 (2781) to 963 (3160).....	8 0 to 58
963 (3160) to 1094 (3590).....	5 8 to 42
1094 (3590) to 1244 (4080).....	4 2 to 31
1244 (4080) to 1413 (4636).....	3 1 to 22
Above 1413 (4636)	16

For heights between the values listed above, linear interpolation shall be used to determine maximum e.r.p.

(e) Regional and local base stations located less than 80 kilometers (50 miles) from the licensed service area border must limit their effective radiated power in accordance with the following formula:

$$P_w = 0.0175 \times d_{km}^{6.6666} \times h_m^{-3.1997}$$

P_w is effective radiated power in watts

d_{km} is distance in kilometers

h_m is antenna height above average terrain in meters

(f) All power levels specified above are expressed in terms of the maximum power, averaged over a 100 millisecond interval, when measured with instrumentation calibrated in terms of an rms-equivalent voltage with a resolution bandwidth equal to or greater than the authorized bandwidth.

(g) Additionally, PCS stations will be subject to any power limits imposed by international agreements.

§ 99.409 RF Hazards

Manufacturers are required to comply with IEEE **C95.1-1991**. For the purposes of determining compliance with this standard, all equipment shall be considered to operate in an **"uncontrolled"** environment.

§ 99.411 Emission limits for the 901-902 MHz, 930-931 MHz, and 940-941 MHz bands.

(a) The power of any emission shall be attenuated below the transmitter power (P) in accordance with the following schedule:

(1) For transmitters authorized a bandwidth (B) greater than 10 kHz:

(i) On any frequency outside the authorized bandwidth and removed from the edge of the authorized bandwidth by a displacement frequency (f_d in kHz) of up to and including 40 kHz: at least $116 \text{ Log}_{10} ((f_d + 10) / 6.1)$ decibels or 50 plus $10 \text{ Log}_{10} (P)$ decibels or 70 decibels, whichever is the lesser attenuation;

(ii) On any frequency outside the authorized bandwidth and removed from the edge of the authorized bandwidth by a displacement frequency (f_d in kHz) of more than 40 kHz: at least $43 \text{ Log}_{10} (P)$ decibels or 80 decibels, whichever is the lesser attenuation.

(2) For transmitters authorized a bandwidth (B) of 10 kHz:

(i) On any frequency outside the authorized bandwidth and removed from the edge of the authorized bandwidth by a displacement frequency (f_d in kHz) of up to and including 20 kHz: at least $116 \text{ Log}_{10} ((f_d + 5) / 3.05)$ decibels or 50 plus $10 \text{ Log}_{10} (P)$ decibels or 70 decibels, whichever is the lesser attenuation;

(ii) On any frequency outside the authorized bandwidth and removed from the edge of the authorized bandwidth by a displacement frequency (f_d in kHz) of more than 20 kHz: at least $43 \text{ plus } 10 \text{ Log}_{10} (P)$ decibels or 80 decibels, whichever is the lesser attenuation.

(b) The measurements of emission power can be expressed in peak or average values provided they are expressed in the same parameters as the transmitter power.

(c) When an emission outside of the authorized bandwidth causes harmful interference, the Commission may, at its discretion, require greater attenuation than specified in this section.

(d) The following minimum spectrum analyzer resolution bandwidth settings will be used: 300 Hz when showing compliance with paragraphs (a)(1)(i) and (a)(2)(i); and 30 kHz when showing compliance with paragraphs (a)(1)(ii) and (a)(2)(ii).

§ 99.417 Co-channel separation criteria in the 901-902, 930-931, and 940-941 MHz bands.

The minimum co-channel separation distance between base stations in different service areas is 113 kilometers (70 miles). A co-channel separation distance is not required for the base stations of the same licensee or when the affected parties have agreed to other co-channel separation distances.

§ 99.419 Frequency stability requirements for the 901-902, 930-931, and 940-941 MHz bands.

(a) The frequency stability of the transmitter shall be maintained within $\pm 0.0001\%$ (± 1 ppm) of the center frequency over a temperature variation of -30 degrees to +50 degrees C at normal supply voltage, and over a variation in the primary supply voltage of 85% to 115% of the rated supply voltage at a temperature of 20 degrees C.

(b) For battery operated equipment, the equipment tests shall be performed using a new battery without any further requirement to vary supply voltage.

(c) It is acceptable for a transmitter to exceed this frequency stability requirement over a narrower temperature range provided the transmitter ceases to function before it exceeds these frequency stability limits.

APPENDIX B: FINAL REGULATORY FLEXIBILITY ANALYSIS

Pursuant to 5 U.S.C. Section 603, an initial Regulatory Flexibility Analysis was incorporated in the Notice of Proposed Rule Making and Tentative Decision in combined ET Docket No. 92-100 and GEN Docket No. 90-314. Written comments on the proposals in the Notice, including the Regulatory Flexibility Analysis, were requested.

A. Need for and Objective of Rules: Our objective is to provide an allocation for PCS services that require narrower bandwidth blocks of spectrum than the requests for wider bandwidth blocks at 2 GHz. We believe that the flexibility of the Rules adopted will enable a diversity of services, including enhanced paging and messaging services.

B. Issues Raised by the Public in Response to the Initial Analysis: No party suggested modifications specifically to the initial regulatory flexibility analysis.

C. Any Significant Alternative Minimizing Burdens on Small Entities and Consistent with Stated Objectives: We have reduced burdens wherever possible. The regulatory burdens we have retained are necessary to ensure that the public receives the benefits of innovative new services in a prompt and efficient manner. We will continue to examine alternatives in the future with the objectives of eliminating unnecessary regulations and minimizing any significant impact on small entities. The Secretary will send a copy of this Report and Order to the Chief Counsel for Advocacy of the Small Business Administration.

APPENDIX C: SAFETY LEVEL CALCULATIONS

1. Maximum Permissible Exposure (MPE).

- a. Determine **MPE** for uncontrolled environment for mobile units:

$$S = f/1500 \text{ (mW/cm}^2\text{)} \text{ for } 300 \text{ MHz} \leq f \leq 3000 \text{ MHz}$$

where S is equivalent plane-wave free-space power density as averaged over any 30 minutes, and f is frequency transmitted in MHz.

$$s = 901/1500 = 0.601 \text{ mW/cm}^2$$

- b. Derive separation distance from allowed power density:

$$p_d = \frac{p_a \times g_i}{4 \times \Pi \times R^2}$$

where p is power density at the point of observation (equivalent to S), p_a is power supplied to the antenna, g_i is antenna gain (numeric) in a given direction relative to an isotropic antenna, and R is the distance from the power radiated by the transmitting antenna to the point of observation.

$$\text{e.i.r.p.} = p_a \times g_i$$

Desire 7 watts e.r.p.:

$$\begin{aligned} \text{e.i.r.p.} &= 1.64 \times \text{e.r.p.} = 1.64 \times 7 \\ &= 11.48 \text{ watts} = 11,480 \text{ mW} \end{aligned}$$

Solve for R:

$$R = \sqrt{\frac{\text{e.i.r.p.}}{4 \times \Pi \times p_d}}$$

$$R = \sqrt{\frac{11,480\text{mW}}{4 \times \Pi \times 0.601\text{mW}/\text{cm}^2}}$$

R = 38.99 cm (15.35 in)
 Round to 39 cm (15.4 in).

2. Radiated Power Exclusion.¹²³ Use the exclusion for low-power devices in uncontrolled environments:

For 901-902 MHz mobile-to-base band:

Radiated power $\leq 1.4(450/f)$ watts for 450 **MHz** $\leq f \leq 1500$ **MHz**, and radiating structure ≥ 2.5 cm from the body, except the hands.

Radiated power $\leq 1.4 \times 450 / 902$
 Radiated power ≤ 698 **mW**
 Round to 700 **mW**

Radiated power ≤ 700 **mW**, and the radiating structure ≥ 2.5 cm from the body, except the hands.

¹²³ Note that in the reactive near field of a hand-held device radiated power and not e.i.r.p. is the appropriate term to use.