

used.¹⁹⁷ The 220-222 MHz band, however, is the only spectrum band where users must employ 5 kHz, narrowband technology.

100. In the *220 MHz Allocation Order*, we allocated this spectrum for land mobile use as a means for promoting spectrum efficient technologies, and then adopted a 5 kHz channelization plan in the *220 MHz Report and Order*. We now conclude that we should continue to support the ongoing development and implementation of narrowband, 5 kHz systems, and reaffirm our commitment to make the 220-222 MHz band a home for spectrally efficient technology. We do not believe, however, that to do this requires that we devote the entire two megahertz of spectrum in this band *exclusively* to narrowband technology. As discussed *supra*, we believe that some distribution of both contiguous and non-contiguous channel assignments in the Phase II band plan is appropriate. In order to allow the 220-222 MHz band to continue to be used to foster the development of narrowband technology, we now conclude that we should adopt a distribution of non-nationwide channel assignments consisting of *more* non-contiguous than contiguous channel assignments.

101. Under such a channel plan, we will allow Phase I and Phase II licensees operating on the 125 non-nationwide channels to aggregate any of their contiguous channels. A licensee authorized on non-contiguous channel assignments may aggregate contiguous channels by either acquiring several such non-contiguous channel assignments or, in the future, by possibly acquiring "disaggregated" channels.¹⁹⁸ Thus, applicants for Phase II licenses on these channels will be able to seek the type of spectrum authorization that will best meet their needs -- *i.e.*, prospective licensees intending to employ a particular technology or provide a particular service that may require channels greater than 5 kHz will be able to seek one of the available contiguous channel blocks and will be able to aggregate such channels, and use them subject to our spectrum efficiency standard. Applicants who intend to construct systems using narrowband technology would have the option of obtaining *either* a non-contiguous channel assignment or a contiguous channel block. By allowing licensees to aggregate channels, the marketplace will determine the viability of 5 kHz technology, while retaining our commitment to spectrum efficiency. That is, if prospective licensees believe that implementing two-way dispatch systems on narrowband channels will be a successful business venture, then they will likely attempt to acquire the available non-contiguous channel blocks and use their authorized ten or fifteen 5 kHz channels discretely. Conversely, if prospective licensees believe that there is greater potential in operating a spectrally efficient system on contiguous channels, they will likely attempt to acquire contiguous channel authorizations and aggregate their channels.

102. Additionally, we conclude that licensees authorized to operate on the contiguously-assigned public safety/mutual aid and EMRS channels (Channels 161-170 and

¹⁹⁷ These wider channels are found in the 900 MHz and 800 MHz SMR bands, the Cellular Radio band, and the narrowband PCS band. See Sections 90.613 (800 and 900 MHz bands), 22.905 (Cellular radio band), and 24.129 (Narrowband PCS band) of the Commission's Rules, 47 C.F.R. §§ 90.613, 22.905, and 24.129.

¹⁹⁸ See Sections V and VI, *infra*, for discussion of disaggregation.

Channels 181-185, respectively) should not be permitted to aggregate their channels. As explained above, these channels were allocated, in part, to enable public safety entities to communicate with one another in emergencies. To permit licensees to aggregate their channels could result in some licensees employing 5 kHz technology, while others employ non-5 kHz technologies, and this could limit the interoperability we seek to achieve on these channels.

103. Based on the various considerations discussed in the preceding paragraphs, we adopt the following Phase II band plan for non-nationwide channels:

(c) Features of the Band Plan

NON-NATIONWIDE 220 MHz CHANNEL ALLOCATION PLAN¹⁹⁹

EA BLOCK	CHANNELS
A: Channel Groups ²⁰⁰ 2, 13	10
B: Channel Groups 3, 16	10
C: Channel Groups 5, 18	10
D: Channel Groups 8, 19	10
E: Channels 171-180	10
TOTAL	50

REGIONAL BLOCK	CHANNELS
F: Channel Groups 1, 6, 11	15
G: Channel Groups 4, 9, 14	15
H: Channel Groups 7, 12, 17	15
I: Channel Groups 10, 15, 20	15
J: Channels 186-200	15
TOTAL	75

¹⁹⁹ Assignments A, B, C, D, F, G, H and I are composed of channels assigned in a non-contiguous manner. Assignments E and J are composed of contiguously assigned channels.

²⁰⁰ The Channel Groups indicated in the allocation plan are the 5-channel, non-contiguous assignments identified as "Group Nos. 1, 2, 3," etc., in Section 90.721 of the Commission's Rules, 47 C.F.R. § 90.721.

104. This band plan contains a number of features that we believe will, to the extent possible, satisfy the concerns and meet the needs of most, if not all, of the parties in this proceeding. First, we authorize assignments of no less than 10 channels. This addresses the concerns of commenters who believe that more than 5 channels will be needed to enable Phase II licensees to serve their areas of operation adequately. While we believe that 10 channels are the minimum necessary to provide satisfactory service in EAs and Regions, we remain convinced that 5 channels are sufficient for Phase I licensees operating on single stations.

105. Second, we address the concerns of commenters who have observed that, under our original proposal, Phase I licensees authorized on the 5-channel, non-contiguous trunked assignments would have to acquire at least five separate Phase II authorizations in order to expand geographically on their channels. The reason that Phase I licensees would have faced this problem under our proposed band plan is that, for example, a licensee authorized on trunked channel Group No. 1 -- which includes Channels 1, 31, 61, 91, and 121 -- would have to have obtained Phase II authorizations on Channel Blocks 1-10, 31-50, 61-70, 91-100, and 121-125 in order to expand on its channels. However, under the band plan we are adopting in this Order, the EA and Regional assignments derived from the 5-channel, non-contiguous Phase I assignments are composed of groupings of two or three of these assignments (e.g., EA Assignments A, B, C, and D -- each of which are composed of two 5-channel non-contiguous Phase I assignments; and Regional Assignments F, G, H, and I -- each of which are composed of three 5-channel non-contiguous Phase I assignments). Thus, Phase I licensees authorized on Group Nos. 1-20 will be able to expand on all of their channels by obtaining authorization on a single Phase II assignment (e.g., a Phase I licensee authorized on Group No. 1 would, by acquiring Assignment F, be able to expand on all five of its existing channels).

106. Third, by authorizing assignments derived from the Phase I trunked groups, we address commenters' concerns about the need of Phase II licensees to provide co-channel protection to many Phase I licensees. Under our proposed band plan, a Phase II licensee authorized on a contiguous 10- or 20-channel block derived from the Phase I trunked channels (e.g., the proposed EA block consisting of Channels 61-70, or the proposed Regional block consisting of Channels 31-50) would have had to potentially provide protection to a large number of Phase I licensees in their particular area of operation (e.g., a Phase II licensee authorized on the EA block consisting of Channels 61-70 would have had to protect Phase I licensees authorized on channel Groups Nos. 1 through 10, if such licensees were operating in its EA or in an adjoining EA; and the Phase II licensee authorized on the Regional block consisting of Channels 31-50 would have had to protect Phase I licensees authorized on *all twenty* of the trunked channel groups, if such licensees were operating in its Region or in an adjoining Region). Under the plan we are adopting, however, Phase II licensees will potentially have to protect far fewer Phase I licensees -- e.g., EA licensees will only have to protect Phase I licensees in their EA, or in an adjoining EA, operating on the two channel groups that comprise their 10-channel system; and Regional licensees will only have to protect Phase I licensees in their Region, or in an adjoining Region, operating on the three channel groups that comprise their 15-channel system.

107. Fourth, we continue to allocate the 100 non-contiguous Phase I channels in the form of 5 kHz, non-contiguous channel assignments (Assignments A-D, and F-I). This will provide a number of assignments to those licensees who wish to operate 5 kHz, narrowband trunked systems and prefer to operate on channels spaced apart from each other. Licensees authorized on one of the two channel blocks consisting of contiguous channels (Assignments E and J), however, will not be precluded from operating on the individual 5 kHz channels that comprise these blocks (e.g., licensees authorized on Assignment J could operate on 15 discrete 5 kHz channels instead of a single 75 kHz block), and will thus have the option of employing *either* narrowband technology or aggregating their channels to employ other technologies or to provide services that may be more easily accommodated on wider channels, consistent with our spectrum efficiency standard.

108. Fifth, our decision to continue to allocate the 100 non-contiguous Phase I channels in the form of 5 kHz, non-contiguous Phase II channel assignments largely addresses the concerns raised by SEA and PCIA regarding possible technical difficulties associated with the construction of base stations on contiguous channel blocks. We *are* allocating two Phase II assignments on contiguous channels (Assignments E and J), but the channels associated with these assignments were assigned contiguously in the *220 MHz Report and Order* -- those concerns notwithstanding.²⁰¹ Furthermore, PCIA's concern that combining up to 20 contiguous channels could result in significant power loss is alleviated to some extent by our decision to employ a maximum of only 10 and 15 contiguous channels, respectively, for Assignments E and J.

109. Finally, we conclude that our decision to license Phase II spectrum in this manner is consistent with the objectives identified in Section 309(j)(4)(C) of the Act. That is, the bandplan -- which contains both EA and Regional licenses and includes both contiguous and non-contiguous assignments -- coupled with our decision to permit paging operations on a primary basis, will enable both large and small entities to provide a wide variety of communications services to the public and promote competition in the CMRS marketplace.

(5) Spectrum Efficiency Standard

(a) *Proposal*

110. In the *Third Notice*, we tentatively concluded that, because we had sought to encourage the development of spectrally efficient technologies at the time we initially reallocated the 220-222 MHz band, we should require licensees choosing to aggregate channels to maintain a degree of spectrum efficiency at least equivalent to that obtained through 5 kHz channelization. We asked, alternatively, whether our proposal to license

²⁰¹ In the *220 MHz Notice*, we noted that the use of contiguous channels in the 220 MHz band would not preclude the use of trunking technology. See *220 MHz Notice*, 4 FCC Rcd at 8597 (para. 27).

through competitive bidding would provide sufficient incentives for licensees to use their spectrum efficiently, thus obviating the need for a specific spectrum efficiency standard.²⁰²

(b) *Comments*

111. Some equipment manufacturers favor the adoption of a spectrum efficiency standard.²⁰³ For example, SEA states that, because we have proposed construction requirements for Phase II 220 MHz licensees and have adopted such deadlines for narrowband PCS, "it would appear that the Commission believes that competitive bidding does not provide sufficient incentives for the timely build-out of systems."²⁰⁴ SEA concludes that if the Commission decides to permit channel aggregation, then "efficiency standards will be needed to encourage spectrum efficient use," and thus proposes that we adopt a standard that would require one voice channel per 5 kHz (for voice communications) and a 4,800 bps data rate (for data communications).²⁰⁵ Securicor, in its reply comments, asks that, if we permit "wide-band systems" in the 220 MHz band, we should avoid taking "a step backward by not requiring the deployment of spectrally efficient technology."²⁰⁶ Securicor therefore proposes that we provide "one high-grade voice channel with performance equaling that of a toll quality telephone circuit and a data rate of 14.4 kbps for every 5 kHz of spectrum aggregated."²⁰⁷

112. Other commenters, however, argue that an efficiency standard is not necessary or appropriate. For example, Comtech believes that "competitive bidding will ensure that spectrum is used as intensively as possible" and that "licensees will have every incentive to derive as much revenue as possible from their spectrum, to offset the cost of securing the spectrum."²⁰⁸ Pagenet notes that "if the Commission were to artificially limit the ability of the 220 MHz license [sic] to offer services, [it] will place 220 MHz licensees at a disadvantage in the marketplace because the other CMRS licensee [sic] are not subject to

²⁰² *Third Notice*, 11 FCC Rcd at 230 (para. 83).

²⁰³ Motorola did not raise the issue of spectrum efficiency standards, but did support our proposal to allow the aggregation of contiguous 5 kHz channels. Motorola *Ex Parte* Comments, March 18, 1996; May 16, 1996; and June 12, 1996.

²⁰⁴ SEA Comments at 16-17. SEA also notes that "[c]ompetitive bidding encourages profitable use of spectrum, but, given the costs of modern efficient technologies, the most profitable use of the spectrum is not always the most efficient use." *Id.* at n. 27.

²⁰⁵ *Id.* at 17.

²⁰⁶ Securicor Reply at 5.

²⁰⁷ *Id.* at 6.

²⁰⁸ Comtech Comments at 9.

narrowband channelization spectrum efficiency requirements.”²⁰⁹ Pagenet further observes that if the Commission were to require licensees to meet a spectrum efficiency standard, it would be limiting the number of service offerings that could be provided in the band. Metricom contends that competitive bidding and the marketplace will “ensure that licensees utilize their spectrum in a technologically efficient manner. [Whereas,] [a]n arbitrary spectral efficiency parameter . . . will only hinder the ultimate development of the band.”²¹⁰

(c) *Decision*

113. One of our principal goals in establishing the 220-222 MHz band was to encourage the development of spectrally efficient technologies. Some commenters believe that a spectrum efficiency standard should be adopted for those licensees aggregating contiguous channels to ensure that spectrum in the band continues to be used efficiently. Other commenters, however, believe that licensees acquiring 220 MHz spectrum through competitive bidding will have sufficient incentives to use that spectrum as efficiently as possible. Still others point out that a spectrum efficiency standard could preclude the provision of certain communications services.

114. We conclude that a spectrum efficiency standard should be adopted for the 220-222 MHz band, and applied to licensees aggregating contiguous 5 kHz channels. In adopting this requirement, we note that we do not disagree with commenters that suggest that licensees acquiring 220 MHz spectrum through competitive bidding will likely have the incentive to use their spectrum efficiently. We believe, however, that our adoption of a mandatory spectrum efficiency standard at this time is an appropriate and effective means of ensuring that licensees aggregating contiguous channels will operate in an efficient manner.

115. Nor do we find it necessary to resolve the claims of those parties that assert that our adoption of a standard could prevent certain types of communications service from being provided in the 220-222 MHz band. In response to such claims, we must emphasize that our purpose in adopting a spectrum efficiency standard is not to prevent the offering of new and innovative services in the band. Rather, we believe that by adopting a spectrum efficiency standard, we will encourage the development of spectrally efficient technologies in any number of other wireless communications services that may eventually be provided in the band. Such an objective is in keeping with our adoption of 5 kHz channelization for the band in the *220 MHz Report and Order* in order to stimulate the development of spectrally efficient technologies in the land mobile radio services.

116. We therefore conclude that Phase I and Phase II licensees combining contiguous 5 kHz channels to operate on channels wider than 5 kHz will be required to meet the following spectrum efficiency standard: For voice communications, a licensee must employ equipment that provides at least one voice channel per 5 kHz of channel bandwidth. For data

²⁰⁹ Pagenet Comments at 14.

²¹⁰ Metricom Comments at 4.

communications, a licensee must employ equipment that operates at a data rate of at least 4,800 bits per second per 5 kHz of channel bandwidth.

117. We will implement this decision through our type acceptance process. Thus, upon the effective date of the rules adopted in this proceeding, a request by any equipment manufacturer or other party for Part 90 type acceptance of transmitters designed to operate in frequencies in the 220-222 MHz band and not designed to operate on channel bandwidths of 5 kHz or less (as currently required by our rules), must demonstrate that the equipment meets the spectrum efficiency standard we have adopted in this Order.

118. We desire to encourage new and innovative efficient technologies to benefit users of this band and the public. Therefore, as we did in our recently adopted *Refarming Reconsideration Order*,²¹¹ we will provide manufacturers with additional flexibility to design spectrally efficient transmitters. Manufacturers may obtain type acceptance for equipment that does not meet the voice or data efficiency standard if: (1) the manufacturer submits a technical analysis with its application for type acceptance demonstrating that the equipment will provide more spectral efficiency than that which would be provided by use of the voice or data efficiency standard; and (2) this technical analysis is deemed to be satisfactory by the Commission's Equipment Authorization Division.²¹² Licensees may employ equipment that does not meet the spectrum efficiency standard only if such equipment has been type accepted in this manner.

119. Finally, we believe that the spectrum efficiency standard should only remain in effect through December 31, 2001. This, we believe, will provide a fair and appropriate time period for spectrally efficient technologies to develop in the 220-222 MHz band, and will enable other innovative technologies and services to eventually be introduced into the band as well. We believe that this decision also balances our goal of stimulating the development of spectrally efficient technology with our desire to rely on market forces to spur the production of efficient technology, and to grant licensees flexibility to determine the technology that best suits their needs. We agree with commenters that our decision to use competitive bidding for Phase II licenses will encourage efficient use of the spectrum. We want to ensure, however, the availability of spectrally efficient equipment in this band. We are also confident that, by the beginning of 2002, the state-of-the-art in wireless equipment will have exceeded our

²¹¹ Replacement of Part 90 by Part 88 to Revise the Private Land Mobile Radio Services and Modify the Policies Governing Them and Examination of Exclusivity and Frequency Assignment Policies of the Private Land Mobile Radio Services, PR Docket No. 92-235, Amendment of the Commission's Rules Concerning Maritime Communications, PR Docket No. 92-257, Memorandum Opinion and Order, 11 FCC Rcd 17676 (1996) (*Refarming Reconsideration Order*).

²¹² We recognize that manufacturers may be reluctant to engage in the research and development necessary for new equipment without knowing whether proposed equipment meeting specified standards would be eligible for this option. Accordingly, upon specific request, the Equipment Authorization Division will advise applicants who desire to develop equipment for this band as to the acceptability of their technical analysis.

standard, and there will therefore no longer be a need to mandate a standard for the 220-222 MHz band.

(6) Emission Mask

(a) Proposal

120. In the *Third Notice*, we indicated that, on channel assignments composed of contiguous channels, where licensees may aggregate their channels, licensees would no longer be required to adhere to the existing channel emission masks at the edge of each of their authorized five kHz channels. To prevent adjacent channel interference to licensees operating on channels outside their channel block, however, we proposed that licensees authorized on contiguous channel assignments be required to conform to the mask at the outer edge of their channel blocks.²¹³ We also noted that allowing licensees to refrain from complying with the emission masks of each of the "inside" channels in their block would result in licensees transmitting stronger out-of-band signals than are currently permitted by our rules. We tentatively concluded, however, that, because licensees constructing base stations must adhere to the required co-channel separation criteria with respect to all co-channel licensees in their area, the increased strength of out-of-band signals would not result in any increased likelihood for harmful interference to co-channel licensees.²¹⁴

(b) Comments

121. SEA favors requiring licensees to conform with the emission mask at block edges "to ensure appropriate protection to adjacent channel neighbors," and agrees that "as long as the ERP/HAAT and geographic separations are maintained as specified in the current rules, the increased signal strength between channels will not result in an increased likelihood of harmful interference to co-channel licensees."²¹⁵ Metricom agrees with the proposal, and also proposes eliminating the frequency stability requirements for all inside channels, indicating that this "will have no adverse impact on adjacent channel licensees so long as the emission mask requirements are met at the 'outside' channels."²¹⁶

(c) Decision

122. We adopt our proposal to eliminate the emission mask at the edge of the "inside" channels for Phase I and Phase II licensees authorized on contiguous channel assignments. Such licensees will only have to comply with the emission masks at the outer edge of their channel blocks. We also adopt Metricom's proposal to eliminate the frequency

²¹³ *Third Notice*, 11 FCC Rcd at 230 (para. 84).

²¹⁴ *Id.*

²¹⁵ SEA Comments at 15-16 (emphasis omitted).

²¹⁶ Metricom Comments at 5.

stability requirements for the inside channels of licensees aggregating their channels. Finally, with regard to the issue of whether allowing licensees to refrain from complying with the emission masks of each of the "inside" channels in their block would result in licensees transmitting stronger out-of-band signals and thus potentially causing interference to co-channel licensees, we conclude that because licensees constructing base stations must adhere to the required co-channel separation criteria with respect to all co-channel licensees in their area, the increased strength of out-of-band signals will not result in any increased likelihood for harmful interference to co-channel licensees.

d. Procedures for Assignment of Non-Nationwide Channels

(1) In General

(a) Proposal

123. We have decided in this Order that the 125 non-nationwide channels should be available on an equal basis to licensees using the spectrum for subscriber-based services and licensees using the spectrum to meet their internal communications needs. In the *Third Notice*, we indicated that we would not be able to determine in advance of authorization which of these types of licensees will acquire the spectrum, and thus we would not be able to conclude with absolute certainty the principal use of this spectrum.²¹⁷ We also tentatively concluded that the principal use of the Phase II non-nationwide spectrum on the 125 channels is likely to be for the transmission or reception of communications signals to subscribers for compensation, based upon two factors: (1) most Phase I non-nationwide applicants appear to intend to use their spectrum for for-profit services; and (2) we proposed to continue to allow non-nationwide 220 MHz licensees using spectrum for internal communications to lease excess capacity to provide service to subscribers.²¹⁸ We further tentatively concluded that, in accordance with Section 309(j)(2)(A) of the Communications Act, mutually exclusive applications for initial licensing of these channels should be assigned through competitive bidding, and we sought comment on this decision.²¹⁹

(b) Decision

124. APCO raises a concern about our proposal to assign mutually exclusive applications for the 125 channels through competitive bidding. We address the issue raised by APCO in the following Section (*infra* at para. 128). APCO's concern notwithstanding, we conclude that, based on our analysis in the *Third Notice* that the principal use of the spectrum is likely to be for the transmission or reception of communications signals to subscribers for

²¹⁷ *Third Notice*, 11 FCC Rcd at 224 (para. 70).

²¹⁸ We observed that the *Competitive Bidding Second Report and Order* provides guidance for determining the likely principal use of a service. *Competitive Bidding Second Report and Order*, 9 FCC Rcd at 2353-54 (paras. 30-36).

²¹⁹ *Third Notice*, 11 FCC Rcd at 225 (para. 71).

compensation, we should assign mutually exclusive applications for licenses on the 125 channels through competitive bidding. In reaching this conclusion, we find that assigning this spectrum through competitive bidding will promote Section I of the Communications Act and the objectives described in Section 309(j)(3) of the Communications Act, as discussed in the *Third Notice*. We also adopt our proposal to continue to allow non-nationwide 220 MHz licensees using their spectrum for internal communications to lease excess capacity of their systems, and thereby provide service to subscribers. However, to the extent such a licensee, in leasing excess capacity, meets our definition of a Commercial Mobile Radio Service provider, it will be subject to regulation as a CMRS provider.

(2) Public Safety and EMRS Entities

(a) Proposal

125. In the *Third Notice* we tentatively concluded that we should continue to authorize the 10 Public Safety and five EMRS channels on a first-come, first-served basis -- with stations authorized at a single location, and protected in accordance with our 120-km co-channel separation criteria. We also concluded that, because these channels will not be used principally for the provision of subscriber-based services for compensation, in accordance with Section 309(j) of the Communications Act, they should be assigned through random selection procedures.²²⁰

126. We noted further that our current rules permit Public Safety entities, including those eligible in the EMRS, to apply for *all* of the non-nationwide 220 MHz channels, including the 125 channels. We therefore tentatively concluded that, because we believed that the principal use of the 125 non-nationwide channels was likely to be for the provision of subscriber-based service for compensation and therefore to be assigned through competitive bidding, Public Safety and EMRS entities seeking these channels would also be required to obtain them through competitive bidding. We also noted, however, that because we had only received three applications from Public Safety entities for authorization on the Public Safety channels in Phase I, we believed that Public Safety users would be adequately accommodated by our continued allocation of the 10 channels reserved for their sole use.²²¹

(b) Comments

127. APCO asserts that the fact that only three applications were filed for the Public Safety channels in Phase I "is not an accurate reflection of actual public safety interest in or demand for these frequencies."²²² APCO argues further that, because 10 channels designated for Public Safety use are not enough for many large, state-wide mobile data communications networks, we should "provide realistic opportunity for public safety to obtain more than 10

²²⁰ *Id.* at 225 (para. 72).

²²¹ *Id.* at 225 (para. 73).

²²² APCO Comments at 2.

channels.”²²³ APCO further notes that “if subject to competitive bidding, the channels would be lost forever to commercial interests since state and local government agencies are in no position to compete in spectrum auctions.”²²⁴ APCO concludes, therefore that we should refrain from implementing competitive bidding for all of the remaining 125 non-nationwide channels.²²⁵

(c) *Decision*

128. In the *220 MHz Report and Order*, we decided to allocate 10 channels solely for use by Public Safety eligibles, and in this Order we have decided to retain, but not expand this allocation. We made this decision because while there appears to be some need on the part of public safety entities for use of 220 MHz channels, we have no way to judge, at this time, the actual level of that demand. While APCO may be correct in its assertion that the existing applications for the 220 MHz Public Safety channels do not accurately represent the real demand for these frequencies, we have no other evidence of demand for these channels at this time. In order to ensure that Public Safety entities have access to the spectrum resources they need to fulfill their missions, however, the Commission is currently examining the operational, technical, and spectrum needs of the public safety community through the year 2010.²²⁶ This proceeding will draw extensively from the work of the Public Safety Wireless Advisory Committee, which has released its Final Report. That report noted the existing use of the 220 MHz band for Public Safety, but did not recommend that additional channels from the 220 MHz band be made available for Public Safety use. The concerns that APCO has raised about the possible need for additional spectrum by public safety entities will be fully addressed in the public safety proceeding. We therefore conclude that we should not assign licenses for any of the 125 non-nationwide channels by any means other than competitive bidding.

129. We also conclude that Public Safety Channels 166-170 and the five EMRS channels should be assigned on first-come, first-served basis -- with stations authorized at a single location, and protected in accordance with our existing co-channel separation criteria.²²⁷ If any mutually exclusive applications are filed on the same day, we will choose from among

²²³ *Id.* at 3.

²²⁴ *Id.* at 2.

²²⁵ *Id.* at 3.

²²⁶ *Public Safety NPRM*, 11 FCC Rcd 12460.

²²⁷ See Section 90.723(d) of the Commission's Rules, 47 C.F.R. § 90.723(d). Also, as indicated in the *EMRS Report and Order*, to ensure that use of 220 MHz frequencies be compatible with existing regional and local emergency medical plans, we require that applications for EMRS channels be subject to approval by appropriate regional and local emergency planning authorities. If there are no regional and local plans in an applicant's area of operation, an applicant must make an affirmative statement that no such plans exist. See *EMRS Report and Order*, 8 FCC Rcd at 1459 (para. 29).

these applications based on random selection procedures. Under Section 309(i) of the Act, the Commission has the authority to use random selection procedures for awarding licenses from among mutually exclusive applications if the Commission has determined that the use of the spectrum is not consistent with Section 309(j)(2)(A).²²⁸ Section 309(j)(2)(A) states that competitive bidding may be used if the principal use of the spectrum is reasonably likely to involve a subscriber-based service. Because the Public Safety and EMRS channels are not reasonably likely to be used for subscriber-based services, we find that these channels would not be auctionable under Section 309(j)(2)(A). Therefore, the Commission would have the authority to award licenses from among mutually exclusive applications based on random selection procedures. Channels 161-165 will be available on a non-exclusive, *i.e.*, shared basis and, as such, will not be assigned through random selection procedures. Thus, we will grant all applications for these channels that comply with our Rules. After the effective date of the rules adopted in this proceeding, we will issue a Public Notice announcing the acceptance of applications for authorizations on the 10 public safety channels (Channels 161-165 and Channels 166-170) and the five EMRS channels.

(3) Federal Government Users

(a) *Proposal*

130. In the *Third Notice*, we indicated that our current rules permit Federal Government entities to be authorized on any of the 140 Phase I non-nationwide channels on a co-equal basis with non-Government users. We also observed that, because we received *no* applications from Federal Government entities for non-nationwide 220 MHz spectrum during Phase I, we anticipated that demand for 220 MHz spectrum by Government entities would be satisfactorily met through their future assignment on the 10 Public Safety and 5 EMRS channels.²²⁹ In addition, we suggested that the assignment of these channels to Federal Government agencies would be of particular interest to those agencies responsible for public safety and emergency medical services because it would enable them to communicate with their counterparts at the State and local level. We also concluded that mutually exclusive applications for the channels available to both Government and non-Government entities should be assigned through a single unified lottery.²³⁰

(b) *Comments*

131. The National Telecommunications and Information Administration (NTIA), in its reply comments, relinquished Government rights to the 125 non-nationwide channels. NTIA

²²⁸ Communications Act § 309(i), 47 U.S.C. § 309(i).

²²⁹ *Third Notice*, 11 FCC Rcd at 225-26 (para. 74).

²³⁰ *Id.* at 226 (para. 74). We have noted that, in the *220 MHz Report and Order*, we decided that mutually exclusive applications for 220 MHz channels involving Government and non-Government applicants would be resolved in a "single, unified lottery . . ." *220 MHz Report and Order*, 6 FCC Rcd at 2365 (para. 62).

indicated that in removing the Federal Government's co-primary status with respect to these channels, it "seeks to increase potentially this spectrum's value at auction and to promote the availability of this radio spectrum for commercial services."²³¹

(c) *Decision*

132. We are confident that future demand by Federal Government entities for 220 MHz spectrum will be satisfied by their authorization on the 10 Public Safety and 5 EMRS channels.²³² In addition, we believe that Federal Government use of these channels will be beneficial because it will enable Federal Government agencies involved in public safety and emergency medical services to communicate with State and local agencies with similar responsibilities in times of disasters or emergencies. We therefore conclude that Federal Government entities may only apply for the 10 Public Safety and five EMRS channels, and that any mutually exclusive applications for Channels 166-170 and the EMRS channels among Government and non-Government entities will be assigned through a single lottery.²³³ Channels 161-165 will be available to both non-Government public safety eligibles and Government entities on a non-exclusive, *i.e.*, shared basis and therefore will not be assigned through random selection procedures. After the effective date of the rules adopted in this proceeding, we will issue a Public Notice announcing the acceptance of applications for authorizations on all public safety and EMRS channels by Government, as well as eligible non-Government entities.

(4) *License Term*

133. The license term for Phase I, non-nationwide 220 MHz licensees is five years. In our *CMRS Third Report and Order*, we decided that all Part 90 licensees reclassified as CMRS carriers would be granted a 10-year license term and be afforded renewal expectancy after their current license term expires if they met certain prescribed conditions.²³⁴ In the *Third Notice* we proposed to grant 10-year authorizations to all non-nationwide Phase II licensees -- *i.e.*, EA and Regional licensees and Public Safety and EMRS licensees. We indicated that 10-year authorizations would encourage investment by EA and Regional licensees, and would help to minimize the administrative burden on Public Safety and EMRS

²³¹ Letter from L. Irving, Assistant Secretary for Communications, U.S. Department of Commerce, to R. Hundt, Chairman, Federal Communications Commission (Apr. 15, 1996).

²³² According to Section 90.717 of the Commission's Rules, Federal Government entities may also be authorized on the two 5-channel *nationwide* Government assignments (Channels 111-115 and 116-120) that were made available in Phase I, and continue to be available in Phase II. 47 C.F.R. § 90.717.

²³³ See *220 MHz Report and Order*, 6 FCC Rcd at 2365 (para. 62).

²³⁴ *CMRS Third Report and Order*, 9 FCC Rcd at 8157 (para. 386).

licensees.²³⁵ AMTA and Pagemart support our proposal.²³⁶ Pagemart states that the use of 10-year license terms would "bring 220 MHz licensees in line with existing CMRS licensees and minimize administrative burden on the Commission and . . . licensees."²³⁷ We conclude that we should grant 10-year authorizations to all Phase II, non-nationwide licensees.

C. TECHNICAL AND OPERATIONAL RULES

1. Fixed Operations

a. Proposal

134. Our rules for the 220 MHz service permit fixed operations only on an ancillary basis to a licensee's primary land mobile operations.²³⁸ We indicated in the *Third Notice* that we had imposed this restriction in the *220 MHz Report and Order* because we wanted to encourage manufacturers to invest in the development of narrowband land mobile technologies.²³⁹ We tentatively concluded, however, that this restriction on the use of fixed communications in the 220 MHz band is no longer appropriate because, to compete effectively in the future mobile communications marketplace, 220 MHz licensees will have to be able to provide a wide array of communications services to the public.

135. We therefore proposed to modify our current rules, that only allow fixed operations on an ancillary basis to primary land mobile communications, in order to permit such operations on a primary basis for 220 MHz licensees. We proposed that the removal of this prohibition should apply to both nationwide and non-nationwide, non-Government and Government, Phase I and Phase II licensees, and to licensees offering service to subscribers as well as licensees using spectrum for internal communications.²⁴⁰

b. Comments

136. No commenters are opposed to allowing 220 MHz licensees to operate fixed stations on a primary basis. In embracing our proposal, AMTA indicates its support for the removal of "certain technical and operational limitations that may no longer serve the public interest" and states that "it is imperative that 220 MHz licensees have technical, operational

²³⁵ *Third Notice*, 11 FCC Rcd at 226 (para. 75).

²³⁶ AMTA Comments at 16; Pagemart Comments at 4.

²³⁷ Pagemart Comments at 4.

²³⁸ Sections 90.731 and 90.733 of the Commission's Rules, 47 C.F.R. §§ 90.731, 90.733.

²³⁹ *Third Notice*, 11 FCC Rcd at 226-27 (para. 76) (citing *220 MHz Report and Order*, 6 FCC Rcd at 2368 (para. 88)).

²⁴⁰ *Third Notice*, 11 FCC Rcd at 227 (para. 77).

and geographic flexibility to allow them to compete effectively."²⁴¹ E.F. Johnson notes that using its technology for fixed applications will "increase its utility and offer more options for communications customers."²⁴² E.F. Johnson also indicates that its equipment "can support fixed, as well as mobile transmissions."²⁴³

c. Decision

137. We recently decided to permit 220 MHz licensees classified as CMRS providers to offer fixed services. This decision was part of a broader decision to grant all CMRS licensees the flexibility to offer fixed services.²⁴⁴ Those 220 MHz licensees not classified as CMRS providers -- *i.e.*, 220 MHz licensees not providing interconnected service or subscriber-based service for profit -- were not covered in that rulemaking. We now conclude that all 220 MHz nationwide and non-nationwide Phase I and Phase II, Government and non-Government licensees, including non-CMRS providers, should be permitted to operate fixed stations and provide fixed communications on a primary basis, *i.e.*, not ancillary to primary land mobile operations. As we stated in the *Third Notice*, we believe that lifting the restriction on primary fixed use in the 220 MHz service will allow 220 MHz licensees to compete more effectively in the wireless communications marketplace and also will broaden the array of services available to consumers. Furthermore, by permitting fixed as well as mobile operations in the 220 MHz service, we will also provide for additional applications of narrowband technology, which will serve our goal of continuing to promote the development and implementation of that technology.²⁴⁵

138. Phase II licensees and Phase I nationwide licensees will be authorized to locate fixed stations transmitting on frequencies in the 220-221 MHz and 221-222 MHz bands anywhere within their area of operation -- subject to compliance with prescribed environmental, air safety and international regulations outlined in para. 80, *supra* -- so long

²⁴¹ AMTA Comments at 12.

²⁴² E.F. Johnson Comments at 5.

²⁴³ *Id.* See also Comtech Comments at 7; Metricom Comments at 3; Pagemart Comments at 4; Kelley Comments at 3; Overall Wireless Comments at 2.

²⁴⁴ See Amendment of the Commission's Rules to Permit Flexible Offerings in the Commercial Mobile Radio Services, WT Docket No. 96-6, First Report and Order and Further Notice of Proposed Rulemaking, 11 FCC Rcd 8965, 8967 (para. 2) (1996).

²⁴⁵ As stated above, however, the Commission makes no warranties about the use of this spectrum for particular services. Applicants should be aware that a Commission auction represents an opportunity to become a Commission licensee in this service, subject to certain conditions and regulations. A Commission auction does not constitute an endorsement by the Commission of any particular services, technologies, or products, nor does a Commission license constitute a guarantee of business success. Applicants should perform their individual due diligence before proceeding as they would with any new business venture. See para. 19, *supra*.

as: (1) transmissions from fixed stations on frequencies in the 220-221 MHz band meet all relevant technical rules of Subpart T required for land mobile base stations (e.g., Sections 90.723 and 90.729); (2) for EA and Regional licensees, the co-channel protection criteria prescribed in Section IV.C.6, *infra*, and the field strength limits prescribed in Section IV.C.7, *infra*, are met for all fixed stations transmitting on frequencies in the 220-221 MHz band; and (3) for Phase II licensees and Phase I nationwide licensees, transmissions on frequencies in the 221-222 MHz band do not exceed 50 watts ERP and are not from antennas that are more than 7 meters above ground, except that transmissions from antennas that are more than 7 meters above ground will be permitted if the effective radiated power from such transmissions is reduced below 50 watts ERP in accordance with the formula provided in Section IV.C.3.b, *infra*. This antenna height and power limitation is consistent with our decision in that section, where we require licensees operating *paging* base stations transmitting on 221-222 MHz frequencies to comply with these power and antenna height restrictions. Applying these restrictions to *all* fixed stations transmitting on 221-222 MHz frequencies is appropriate and necessary to ensure that transmissions from such stations do not cause adjacent channel interference.

139. Phase I, non-nationwide licensees are not authorized to operate within a particular geographic area, but instead are authorized to construct a single land mobile base station for base/mobile operations. We conclude that such licensees should be permitted to operate fixed stations, but that such stations, if transmitting on frequencies in the 220-221 MHz band, must: (1) be located only at the coordinates of the licensee's authorized base station; (2) meet all relevant technical rules of Subpart T required for land mobile base station operations (e.g., Sections 90.723 and 90.729); and (3) operate at the effective radiated power (ERP) and the antenna height-above-average-terrain (HAAT) prescribed in the licensee's land mobile base station authorization.²⁴⁶ Consistent with our decision above with regard to the transmissions from Phase II and nationwide Phase I fixed stations operating on frequencies in the 221-222 MHz band, we will require that transmissions from fixed stations operated by Phase I, non-nationwide licensees on frequencies in the 221-222 MHz band not exceed 50 watts ERP, nor be from antennas that are more than 7 meters above ground, except that transmissions from antennas that are more than 7 meters above ground will be permitted if the effective radiated power from such transmissions is reduced below 50 watts ERP in accordance with the formula provided in Section IV.C.3.b, *infra*. Also, Phase I non-nationwide licensees will be required to comply with the prescribed environmental, air safety, and international regulations outlined in para. 80, *supra*, for fixed stations transmitting on frequencies in the 220-221 MHz and 221-222 MHz bands. Phase I, non-nationwide licensees will be permitted to begin primary fixed operations *only* after meeting the requirement that they construct their land mobile base station (for base/mobile operations) and place it in operation or commence service. Phase I, nationwide licensees will be permitted to begin primary fixed operations *only* after meeting their two-year benchmark to construct the initial

²⁴⁶ Licensees shall be required to operate at their initially authorized ERP and HAAT, and will not be permitted to seek modification of their authorization to operate at a higher ERP or HAAT. Licensees operating at power levels lower than their initially authorized ERP shall be required to seek modification of their authorization to reflect the lower ERP.

phase of their nationwide land mobile system, as prescribed in Section 90.725(a) of our Rules.²⁴⁷

2. Secondary, Fixed Operations

a. Proposal

140. In the *Third Notice* we proposed to allow 220 MHz licensees to obtain secondary authorizations to operate fixed facilities on a non-interference basis to licensees authorized to operate on a primary basis. The issue of secondary, fixed 220 MHz operations had been raised by Fairfield Industries, Inc. (Fairfield), which requested that individuals involved in geophysical telemetry be permitted to operate temporary, fixed 220 MHz facilities, on a secondary basis without the requirement that such operation be on an ancillary basis to the licensee's primary mobile operations.²⁴⁸

141. We found merit in Fairfield's request and believed that it would be in the public interest to allow the type of operation they proposed, but we concluded that rather than limiting secondary, fixed use of 220 MHz spectrum only to licensees employing temporary facilities for geophysical telemetry operations, even greater use of the spectrum could be realized by allowing any and all types of secondary, fixed operations.²⁴⁹ In proposing to expand this permissible use of the spectrum, however, we also believed that certain additional restrictions on this type of operation were appropriate. We therefore proposed that secondary, fixed operation be limited to a maximum of two watts ERP for licensees operating within 60 kilometers of the center of any of the urban areas listed in Section 90.741 of the Commission's Rules,²⁵⁰ and a maximum of five watts ERP for licensees operating beyond 60 kilometers of these areas. We also proposed to accept applications for authorization of secondary, fixed use of the 220 MHz band, without the requirement of frequency coordination, upon adoption of final rules in this proceeding. We requested comment on these proposals, including any suggested changes to the technical restrictions proposed, and any comment as to whether we should further restrict secondary, fixed use of the 220 MHz

²⁴⁷ Section 90.725(a) of the Commission's Rules, 47 C.F.R. § 90.725(a).

²⁴⁸ Fairfield Industries, Inc., Petition for Rulemaking, RM-8506 (filed June 8, 1994). See Public Notice, Report No. 2026 (released Aug. 16, 1994). No comments were filed with the Commission regarding the Fairfield petition. Our current rules allow 220 MHz licensees to provide operational-fixed facilities for ancillary, signalling and data transmission, subject to certain requirements, e.g., that such ancillary operations be on a secondary, non-interference basis to the primary mobile operation of any other licensee. Section 90.731 of the Commission's Rules, 47 C.F.R. § 90.731.

²⁴⁹ *Third Notice*, 11 FCC Rcd at 228 (para. 79).

²⁵⁰ Section 90.741 of the Commission's Rules identifies the coordinates for the center of each of the listed areas. 47 C.F.R. § 90.741.

band to operations at strictly temporary locations, as provided for under Section 90.137 of the Commission's Rules.²⁵¹

b. Comments

142. A number of commenters oppose permitting use of the 220 MHz band for secondary, fixed operations. For example, Johnson "questions the wisdom of secondary, fixed systems where there are primary operations," arguing that secondary, fixed transmitters "can only serve to degrade the quality of service by the primary licensees on the service." Johnson is concerned that "even the relatively low power of transmitters proposed for secondary use -- 2 and 5 watts -- are sufficient to cause interference to other licensees." Johnson therefore suggests that "entities wishing to use secondary fixed operations enter into an agreement with the primary licensee for the use of the channels in the affected area. In that fashion, the primary licensees can be aware of the use of secondary, fixed units."²⁵² Comtech questions why an applicant "would bid on spectrum knowing that there would be potential users, even secondary users on its channels" and believes that secondary users should "arrange to employ spectrum through the auction winner in the area where operations are desired."²⁵³ AMTA, in its reply comments, points out that "while secondary operations are authorized only on a non-interference basis, location and resolution of interference problems can be costly and time-consuming, as well as administratively burdensome to the Commission." AMTA therefore agrees with Comtech and Johnson that "entities wishing to offer secondary fixed services be required to enter into an agreement with any primary licensees potentially affected by secondary operations."²⁵⁴ Fairfield, on the other hand, argues that there is "virtually no risk of interference to primary users because oil and gas exploration occurs in remote, uninhabitable areas" and because "transmitters operate at very low power levels of less than two watts and with duty cycles measured in seconds."²⁵⁵ Fairfield also points out that "geophysical telemetry operations are self-policing: seismic data collection relies on extremely sensitive equipment; hence, before any data can be collected, telemetry crews must monitor the spectrum carefully and avoid any channel on which they detect the slightest signal."²⁵⁶ Fairfield, in its reply comments, contends that commenters' concerns of interference for systems using 220 MHz spectrum for seismic telemetry operations are therefore "groundless," and that those who believe their rights would be infringed by the

²⁵¹ *Third Notice*, 11 FCC Rcd at 228 (para. 79). Section 90.137 of the Commission's Rules provides, among other things, that temporary operation be limited to a period of not more than one year. 47 C.F.R. § 90.137.

²⁵² Johnson Comments at 6.

²⁵³ Comtech Comments at 8.

²⁵⁴ AMTA Reply at 4.

²⁵⁵ Fairfield Comments at 2-3.

²⁵⁶ Fairfield Reply at 2.

existence of secondary users in the band cannot "claim a necessary right to use the spectrum free and clear of all other uses no matter how innocuous."²⁵⁷

c. Decision

143. We have decided in this Order to permit all Phase I and Phase II 220 MHz licensees to perform fixed operations on a co-primary basis with mobile operations. The issue at hand is whether to allow individuals to obtain *secondary* authorizations to operate fixed stations on a non-interference basis to both Phase I and Phase II licensees authorized on a primary basis. We agree with commenters that, under the rules we are adopting for Phase II licensing, which will require licensees to obtain authorizations through competitive bidding, it generally would not be appropriate to allow individuals to obtain unlimited secondary authorizations to operate fixed facilities, even on a non-interference basis.²⁵⁸ According to Fairfield, however, the type of secondary use it proposes -- *i.e.*, the use of the 220-222 MHz band for geophysical telemetry operations -- would occur only in remote, uninhabited areas and at relatively low power levels. We believe that operations of the type envisioned by Fairfield are not likely to present a risk of interference to primary 220 MHz stations. We therefore conclude that individuals using 220-222 MHz spectrum for geophysical telemetry operations should be permitted to obtain secondary authorizations to operate fixed facilities on a non-interference basis to primary licensees. We will, however, require secondary licensees to notify any co-channel primary 220 MHz licensees authorized in the area of their operation of the location of such secondary facilities. Specifically, we will require secondary licensees to provide this notification: (1) to any co-channel licensees operating on a single-station basis (*i.e.*, non-nationwide Phase I licensees) with an authorized base station, or fixed station transmitting on base station transmit frequencies, within 45 km of the secondary licensee's stations; (2) to any co-channel, Phase II EA or Regional licensee authorized to operate in the EA or Region in which the secondary licensee's stations are located; and (3) to any co-channel Phase I or Phase II nationwide licensees. Additionally, while we are confident that there is little risk of interference to primary licensees from secondary licensees performing geophysical telemetry operations, we believe that it is appropriate to restrict such operations on the public safety/mutual aid channels, the EMRS channels, and the Federal Government channels. Operations on these channels will likely involve safety-of-life or emergency communications and we would not want to risk even the slightest possibility of interference to such communications. Secondary, fixed operations will therefore be permitted on all 220 MHz channels except Channels 111-120, 161-170, and 181-185.

144. In the *Third Notice* we asked for comment about restricting secondary, fixed use of the 220 MHz band to operations at strictly temporary locations, as permitted under Section 90.137 of the Commission's Rules. We believe that temporary authorizations would be well suited to the type of operations to be performed by licensees such as Fairfield. Therefore, we will require licensees obtaining secondary authorizations for fixed facilities for geophysical telemetry operations to obtain temporary authorizations under the provisions of Section 90.137

²⁵⁷ *Id.* at 2-3.

²⁵⁸ See Comtech Comments at 8; AMTA Reply at 4.

of the Commission's Rules.²⁵⁹ Under this rule, licensees operating stations at the same location for more than one year will be required to obtain separate authorization for such stations. We will, however, modify Section 90.137(a)(3) to enable licensees to operate more than 180 days without the requirement that they obtain frequency coordination. We will begin to accept applications for such temporary authorizations on the effective date of the rules adopted in this proceeding.

145. Although we proposed to restrict the power transmitted by secondary licensees in order to limit the degree of interference they could cause, commenters raised concerns about the potential for interference from secondary, fixed stations operating at the power levels proposed (e.g., two or five watts ERP). Fairfield indicated in its Petition for Rulemaking, however, that its system is capable of operating at lower power levels (i.e., one watt ERP), and that its antennas are generally located only six feet above ground. We will therefore limit the output power of stations operated by secondary licensees to a maximum of one watt ERP, and restrict antenna height to no more than two meters (6.6 feet) above ground.

146. Additionally, under Section 90.731 of our existing rules, Phase I licensees are permitted to construct and operate operational-fixed stations, i.e., stations that are used only for a licensee's internal communications, to provide fixed signalling and data transmissions on an ancillary basis to its primary land mobile operations, and on a secondary, non-interference basis to the primary mobile operations of other licensees.²⁶⁰ The operation of such facilities will now be permitted on a primary basis (i.e., not ancillary to a licensee's primary land mobile operations and not secondary to the primary mobile operations of other licensees). Thus, Phase I licensees that intend to employ operational-fixed stations to provide fixed signalling and data transmissions must now comply with the technical and operational provisions described in paragraphs 138-139, *supra*, for general fixed operations rather than the technical and operational provisions currently contained in Section 90.731.

3. Paging Operations

a. General Operations

147. We have decided in this Order to permit Phase I and Phase II licensees to operate paging systems on a primary basis -- i.e., not ancillary to primary land mobile operations.²⁶¹ Phase II licensees and Phase I nationwide licensees will thus be authorized to locate paging base stations anywhere within their area of operation -- subject to compliance with prescribed environmental, air safety and international regulations, as outlined in para. 80,

²⁵⁹ Section 90.137 of the Commission's Rules provides, among other things, that licensees operating stations at the same location for more than one year must obtain separate authorization for such stations, and that applicants seeking authority to operate more than 180 days must submit evidence of frequency coordination. 47 C.F.R. §§ 90.137(a)(3), 90.137(b).

²⁶⁰ See Section 90.731 of the Commission's Rules. 47 C.F.R. § 90.731.

²⁶¹ See para. 95, *supra*.

supra -- so long as transmissions from base stations transmitting on frequencies in the 220-221 MHz band meet all relevant technical rules of Subpart T for land mobile base station operations (e.g., Sections 90.723 and 90.729), and for EA and Regional licensees, the co-channel protection criteria prescribed in Section IV.C.6, *infra*, and the field strength limits prescribed in Section IV.C.7, *infra*, are met for all such base stations.

148. Phase I non-nationwide licensees, which are not authorized to operate within a particular geographic area, but instead are authorized to construct a single land mobile base station for base and mobile operations, must locate paging base stations transmitting on 220-221 MHz frequencies *only* at the coordinates of their authorized land mobile base station. Furthermore, such licensees must operate their paging base stations transmitting on 220-221 MHz frequencies: (1) under all relevant technical rules of Subpart T for land mobile base station operations (e.g., Sections 90.723 and 90.729); and (2) at the effective radiated power (ERP) and the antenna height-above-average-terrain (HAAT) prescribed in their land mobile base station authorization.²⁶² Phase I, non-nationwide licensees will be permitted to begin primary paging operations *only* after meeting the requirement that they construct their land mobile base station (for base and mobile operation) and place it in operation, or commence service. Phase I, nationwide licensees will be permitted to begin primary paging operations *only* after meeting their two-year benchmark to construct the initial phase of their nationwide land mobile system, as prescribed in Section 90.725(a) of the Commission's Rules.²⁶³

b. Two-Way Operations

149. In the *Third Notice*, we proposed to permit 220 MHz licensees to operate paging systems on a primary basis, but did not discuss whether 220 MHz licensees could use their mobile channels to transmit return messages from pagers. Various commenters, however, addressed this issue. Pronet, for example, asks that we allow two-way paging because restricting licensees to one-way paging operations would force half of all 220 MHz spectrum used for paging operations to "lie dormant."²⁶⁴ We agree that to restrict 220 MHz licensees to one-way paging systems would not be an efficient use of the spectrum. For this reason, and because we believe that it is appropriate to provide 220 MHz licensees operating paging systems with the flexibility to employ the type of paging systems that best meets the needs of their customers, we will permit both one-way and two-way paging operations.

150. SEA suggests that, if we permit two-way paging, we should continue to limit maximum power on the mobile frequencies to 50 watts ERP, and that we should not allow licensees to construct base stations on the mobile frequencies at heights greater than 7 meters

²⁶² Licensees shall be required to operate at their initially authorized ERP and HAAT, and will not be permitted to seek modification of their authorization to operate at a higher ERP or HAAT. Licensees operating at power levels lower than their initially authorized ERP shall be required to seek modification of their authorization to reflect the lower ERP.

²⁶³ Section 90.725(a) of the Commission's Rules, 47 C.F.R. § 90.725(a).

²⁶⁴ Pronet Reply at 3-4.

above ground. SEA believes that operation of base stations above this height could cause interference to adjacent channel licensees, and that, in general, "[t]o permit paging on the mobile transmit frequencies would result in serious interference problems for Phase I and Phase II half-duplex systems."²⁶⁵ Metricom, in its reply comments, believes that SEA's proposed limit on mobile station power and base antenna height should not be applied to nationwide 220 MHz systems.²⁶⁶

151. We agree with SEA that restrictions on the use of the mobile channels by licensees operating two-way paging systems is appropriate. When we adopted the 50-watt effective radiated power (ERP) limitation for mobile and portable units operating in the 220 MHz band, we did not envision the use of the mobile channels for "base stations" situated at high elevations. To permit such operations without restriction could, as SEA suggests, result in interference to nearby, adjacent channel 220 MHz licensees. We will therefore limit mobile and portable ERP to 50 watts for licensees operating two-way paging systems, and will modify Section 90.729(b) of our rules to require licensees constructing base stations on the mobile channels, *i.e.*, channels in the 221-222 MHz band, to operate such stations at heights no greater than 7 meters above ground -- except that transmissions from antennas that are more than 7 meters above ground will be permitted if the effective radiated power of such transmissions is reduced below 50 watts ERP by $20 \log_{10}(h/7)$ dB, where h is the height of the antenna above ground, in meters.²⁶⁷ This antenna height and power limitation is necessary to ensure that transmissions from paging base stations operating in the 221-222 MHz band do not cause adjacent channel interference. Metricom suggests that such a limitation only apply to non-nationwide licensees. We conclude, however, that the adjacent channel interference that could result from licensees operating at high elevations could be caused by nationwide as well as non-nationwide licensees. We shall therefore apply the height limitation to all 220 MHz licensees. Finally, we will require Phase I non-nationwide licensees to comply with the prescribed environmental, air safety, and international regulations outlined in para. 80, *supra*. for paging base stations transmitting on frequencies in the 221-222 MHz and 220-221 MHz bands.

4. Other Technical Considerations

152. In developing our proposed band plan, we noted in the *Third Notice* that, due to circumstances unique to the 220-222 MHz band, we currently require licensees operating base stations in the upper 40 channel assignments (*i.e.*, Channels 161-200) to reduce power when

²⁶⁵ SEA Comments at 18.

²⁶⁶ Metricom Reply at 5-6.

²⁶⁷ Using this power reduction formula, licensees operating at antenna heights greater than 7 meters above ground will provide a signal equivalent to that produced by a 50 watt ERP transmission at 7 meters above ground. This formula was utilized in our Report and Order for LMS systems and adoption of the formula herein is consistent with its use in that proceeding. See Amendment of Part 90 of the Commission's Rules to Adopt Regulations for Automatic Vehicle Monitoring Systems, PR Docket No. 93-61, Report and Order, 10 FCC Rcd 4695, 4715-16 (para. 36) (1995).

located within certain distances of base station receivers of licensees operating on the adjoining Channels 1-40, and we also limit the base station transmitter power for stations authorized on Channels 196-200 to 2 watts.²⁶⁸ We proposed that Phase II EA and Regional licensees on these channel blocks coordinate among themselves to locate their base stations to avoid interference, and proposed to allow licensees operating on Channels 196-200 to operate at power levels greater than 2 watts if such licensees obtain the concurrence of all Phase I and Phase II licensees operating in their area.²⁶⁹ There were no comments on this issue.

153. We will require Phase II licensees authorized on Channels 161-200 and Channels 1-40 to coordinate among themselves to locate their base stations, and fixed stations operating on base station frequencies, to avoid interference and to cooperate to resolve any interference problems that may arise.²⁷⁰ We will also require Phase II licensees authorized on Channels 161-200 to comply with the power limitations prescribed in the Table in Section 90.723(d) of the Commission's Rules, with respect to any authorized base stations, or fixed stations operating on base station transmit frequencies, of Phase I licensees operating on Channels 1-40. We will also require the six Regional licensees operating on Assignment J (Channels 186-200) to operate their authorized base stations or fixed stations transmitting on base station Channels 196-200 at power levels no greater than 2 watts ERP and at antenna heights no greater than six meters (20 feet). Licensees, however, may operate at power levels greater than 2 watts ERP or at antenna heights greater than six meters if: (1) they obtain the concurrence of all Phase I and Phase II licensees operating authorized base or fixed stations on Channels 1-40 within 6 km of their authorized base or fixed stations; and (2) their authorized base or fixed stations are not located in the United States/Mexico or United States/Canada border areas.²⁷¹

5. Construction Requirements

a. Nationwide Licensees

(1) Proposal

154. In the *Third Notice* we observed that, in adopting our original rules for the 220 MHz service, we adopted construction requirements for nationwide licensees that were a reflection of the traditional design of private land mobile radio systems (*i.e.*, the construction and operation of single, high powered base stations providing signal coverage over an extended area). Specifically, we required nationwide 220 MHz licensees to construct base

²⁶⁸ *Third Notice*, 11 FCC Rcd at 223 (para. 67).

²⁶⁹ *Id.* at 223-24 (para. 68).

²⁷⁰ *See, e.g.*, Section 90.173(b) of the Commission's Rules, 47 C.F.R. § 90.173(b).

²⁷¹ As indicated in Section 90.715(c) of the Commission's Rules, 47 C.F.R. § 90.715(c), the U.S./Mexico border area for U.S. licensees is 120 km (74.6 miles) from the U.S./Mexico border. The U.S./Canada border area for U.S. licensees has not yet been determined.

stations in at least 70 different geographic areas over an extended period of time.²⁷² We also noted, however, that, since the adoption of those rules in 1991, we have implemented other communications services, such as broadband and narrowband PCS, where other types of system design are used. In these services, we adopted construction requirements for authorizations based not on the construction of individual base stations, but on requiring licensees to provide a minimum "coverage" within their authorized area of operation.²⁷³

155. In light of the operational flexibility that we proposed to provide for 220 MHz licensees in the *Third Notice*, we decided to propose the adoption of the same type of broad coverage requirements for the Phase II nationwide 220 MHz service as we adopted for these other wireless services. Specifically, we proposed that Phase II nationwide 220 MHz licensees be required to construct base stations that provide coverage to a composite area of 750,000 square kilometers or serve 37.5 percent of the United States population within five years of initial license grant, and to provide coverage to 1,500,000 square kilometers or 75 percent of the population within 10 years of grant.²⁷⁴ Our proposal was based on the construction requirement for nationwide narrowband PCS licensees.²⁷⁵

156. Because we recognized that certain types of service offerings we proposed to allow for 220 MHz licensees -- e.g., fixed, point-to-point operations -- might not lend themselves to compliance with the strict construction requirement we proposed,²⁷⁶ we proposed to permit nationwide 220 MHz licensees to meet their construction requirement alternatively by submitting a showing demonstrating the provision of appropriate levels of "substantial service"²⁷⁷ to the public at the prescribed five-year and 10-year construction

²⁷² Section 90.725 of the Commission's Rules, 47 C.F.R. § 90.725. The rules provide that licensees granted commercial nationwide authorizations must meet construction benchmarks two, four, six, and ten years after initial license grant, and licensees granted non-commercial nationwide authorizations must construct and operate base stations in a minimum of 70 markets within five years of initial license grant.

²⁷³ *Third Notice*, 11 FCC Rcd at 232 (para. 88).

²⁷⁴ *Id.* at 232 (para. 89).

²⁷⁵ Section 24.103(a) of the Commission's Rules, 47 C.F.R. § 24.103(a).

²⁷⁶ Fixed, point-to-point systems, for example, provide service in a linear manner, and thus a coverage "area" calculation is not applicable.

²⁷⁷ A "substantial service" construction requirement is used for licensees in the broadband PCS and 900 MHz SMR services. See Amendment of Parts 2 and 90 of the Commission's Rules to Provide for the Use of 200 Channels Outside the Designated Filing Areas in the 896-901 MHz and the 935-940 MHz Bands to the Specialized Mobile Radio Pool, PR Docket No. 89-553, Implementation of Section 309(j) of the Communications Act--Competitive Bidding, PP Docket No. 93-253, and Implementation of Sections 3(n) and 322 of the Communications Act, GN Docket No. 93-252, Second Report and Order and Second Further Notice of Proposed Rulemaking, 10 FCC Rcd 6884, 6887 (para.

benchmarks.²⁷⁸ In addition, we asked commenters planning to construct systems that would lend themselves to a demonstration of substantial service, to indicate the types of "build-outs" that would be appropriate for their particular systems and the period of time that should be required to achieve such build-outs. Finally, consistent with our rules for the PCS services,²⁷⁹ we proposed that licensees be required to submit maps and other supporting documents to demonstrate compliance with the five-year and 10-year benchmarks, and we proposed that failure on the part of a nationwide licensee to meet either its five-year or 10-year construction requirement would result in forfeiture of its nationwide authorization.

(2) Comments

157. Commenting on our proposal to require licensees to meet their construction benchmarks to retain their authorizations, E.F. Johnson states that "if licensees fail to meet the construction requirements, licenses should be revoked and issued to new entities that will make productive use of the spectrum."²⁸⁰ Comtech seeks assurance that the existing construction requirements will remain in effect for all Phase I licensees.²⁸¹ Metricom addresses the question of how licensees operating fixed systems would meet the "substantial service to the public" standard. Metricom suggests that we adopt separate construction standards for such licensees, and proposes a standard that "considers the potential areas and population capable of being served by a fixed system, based on the equipment placed into service by the licensee."²⁸² Metricom also recommends that we "freely consider waivers of any construction benchmarks [we] may establish for fixed systems in those instances where the applicant can reasonably justify that a waiver would be in the public interest."²⁸³

(3) Decision

158. We will require Phase II licensees implementing nationwide land mobile or paging systems to meet our proposed construction requirement, which is to construct base stations that provide coverage to a composite area of at least 750,000 square kilometers or serve at least 37.5 percent of the United States population within five years of initial license

4) (1995) (900 MHz Second Report and Order). For the broadband PCS rules, see Section 24.203(b) of the Commission's Rules, 47 C.F.R. § 24.203(b).

²⁷⁸ *Third Notice*, 11 FCC Rcd at 233 (para. 90).

²⁷⁹ Sections 24.103(f) and (h) and 24.203(b) and (c) of the Commission's Rules, 47 C.F.R. §§ 24.103(f), (h); 24.203(b), (c).

²⁸⁰ E.F. Johnson Comments at 7.

²⁸¹ Comtech Comments at 12.

²⁸² Metricom Comments at 6 (emphasis omitted).

²⁸³ *Id.* at 7.