

Table 2

Trunked 800 MHz SMRs By State

| State | Number of Channels | | Number of Systems | |
|-------------------------|--------------------|--------------|-------------------|--------------|
| | March 1989 | January 1991 | March 1989 | January 1991 |
| Alabama | 333 | 429 | 58 | 68 |
| Alaska | 129 | 177 | 21 | 28 |
| Arizona | 643 | 795 | 100 | 112 |
| Arkansas | 161 | 307 | 27 | 56 |
| California | 1842 | 2387 | 297 | 331 |
| Colorado | 500 | 737 | 78 | 111 |
| Connecticut | 160 | 222 | 27 | 37 |
| Delaware | 65 | 134 | 9 | 17 |
| District of Columbia | 62 | 67 | 7 | 7 |
| Florida | 2353 | 2835 | 391 | 421 |
| Georgia | 717 | 990 | 121 | 157 |
| Hawaii | 100 | 260 | 17 | 39 |
| Idaho | 194 | 399 | 35 | 65 |
| Illinois | 542 | 833 | 95 | 130 |
| Indiana | 585 | 720 | 99 | 111 |
| Iowa | 414 | 616 | 75 | 96 |
| Kansas | 305 | 467 | 64 | 90 |
| Kentucky | 223 | 337 | 44 | 61 |
| Louisiana | 805 | 965 | 142 | 167 |

| State | Number of Channels | | Number of Systems | |
|----------------|--------------------|--------------|-------------------|--------------|
| | March 1989 | January 1991 | March 1989 | January 1991 |
| Maine | 264 | 323 | 51 | 55 |
| Maryland | 258 | 410 | 40 | 65 |
| Massachusetts | 393 | 578 | 59 | 63 |
| Michigan | 246 | 429 | 47 | 75 |
| Minnesota | 453 | 653 | 78 | 100 |
| Mississippi | 260 | 459 | 51 | 80 |
| Missouri | 493 | 675 | 74 | 95 |
| Montana | 83 | 116 | 14 | 19 |
| Nebraska | 226 | 315 | 40 | 51 |
| Nevada | 373 | 603 | 61 | 98 |
| New Hampshire | 133 | 177 | 26 | 33 |
| New Jersey | 210 | 241 | 42 | 46 |
| New Mexico | 466 | 708 | 81 | 113 |
| New York | 580 | 809 | 98 | 134 |
| North Carolina | 695 | 1002 | 113 | 148 |
| North Dakota | 200 | 424 | 44 | 75 |
| Ohio | 628 | 784 | 115 | 130 |
| Oklahoma | 434 | 532 | 76 | 90 |
| Oregon | 426 | 678 | 71 | 110 |
| Pennsylvania | 651 | 883 | 114 | 147 |
| Rhode Island | 48 | 63 | 13 | 14 |
| South Carolina | 352 | 487 | 67 | 77 |

| State | Number of Channels | | Number of Systems | |
|-----------------------------|--------------------|--------------|-------------------|--------------|
| | March 1989 | January 1991 | March 1989 | January 1991 |
| South Dakota | 100 | 170 | 19 | 29 |
| Tennessee | 407 | 559 | 60 | 83 |
| Texas | 2826 | 3877 | 435 | 598 |
| Utah | 203 | 335 | 30 | 47 |
| Vermont | 30 | 44 | 6 | 10 |
| Virginia | 532 | 835 | 86 | 130 |
| Washington | 449 | 667 | 76 | 109 |
| West Virginia | 83 | 120 | 17 | 20 |
| Wisconsin | 338 | 510 | 56 | 90 |
| Wyoming | 146 | 222 | 19 | 31 |
| Guam | 15 | 35 | 1 | 3 |
| Gulf of Mexico | | 10 | | 2 |
| Northern Mariana Islands | 5 | 15 | 1 | 2 |
| Puerto Rico | 89 | 143 | 15 | 18 |
| Virgin Islands | 25 | 44 | 3 | 6 |
| <hr/> | | | | |
| Nationwide | 23,253 | 32,608 | 3906 | 5100 |

Table 3

TOP TEN SMR MARKETS BY TOTAL LOADING³⁵

| DFA | Total Loading (Mobiles) |
|--------------------------|-------------------------|
| Los Angeles | 51,316 |
| San Francisco/Sacramento | 36,567 |
| New York | 33,524 |
| Dallas/Fort Worth | 30,288 |
| Houston | 25,826 |
| Washington/Baltimore | 25,543 |
| Chicago | 24,723 |
| Miami | 21,643 |
| Boston/Providence | 20,260 |
| Atlanta | 17,548 |

35 Markets are defined by Designated Filing Areas (DFAs) as used in licensing 900 MHz SMRs in the major markets. (See 52 Fed. Reg. 1306, January 12, 1987.) Data is as of the last week of March 1989. Loading figures refer to trunked 800 MHz SMRs only. The number of channels in each DFA varies between 214 in Chicago to 409 in Los Angeles. Most markets have slightly less than the 280 channels allocated to SMRs. The reasons for this variation are that systems may exist just outside the DFA, some of the original 200 trunked channels may have been used by non-SMRs, and in physically larger DFAs, frequency reuse may occur.

The SMR industry is generally considered to be competitive, yet quite profitable, particularly in urban markets. One factor leading to the former conclusion is the large number of distinct licensees, about 1,750 as of March 1989. This works out to an average of only 2 SMR licenses per SMR operator. In the past few years, the industry has begun to consolidate. This consolidation is expected to continue for several years.

The profitability of SMR systems is best illustrated by the tremendous response to our recent lotteries for 900 MHz channels in the top 50 DFAs (see paragraphs on Docket 84-1233 below (p. 41)). It is clear from this response that, despite the relatively high cost of 900 MHz equipment, many people believe they can earn profits from an SMR license. Profitability is also illustrated by the waiting lists for channels in 35 markets. A list of those markets is presented in Table 1 above (pp. 21-22). This list clearly shows the demand for channels exceeds the supply.

The most significant competitor faced by the SMR industry to date is the cellular radio industry. Cellular radio differs from SMRs in several significant ways. For example, cellular radio operators are common carriers and thus subject to state regulation. SMR end users, unlike cellular radio users, must be licensed. SMRs, unlike cellular radio operators, are restricted from reselling interconnection at a profit. Cellular service in a given market is provided by exactly two operators. In most markets, there are many independent SMRs. Each of the cellular operators in a given market has more spectrum than all the SMRs in that market combined.

Technologically, most cellular radio systems are more complex and costly than most SMR systems. In general terms, cellular radio technology is more spectrum efficient for interconnection than traditional SMR technology.³⁶ SMR technology, however, has some advantages, particularly for dispatch service³⁷ (which cellular radio systems are not allowed to offer³⁸). SMR systems are now operating in most parts of the country while cellular radio licenses have not yet been assigned in all rural markets. Finally, current SMR systems are generally smaller and less expensive to construct than cellular radio systems.

A five-channel 800 MHz system is generally estimated to have a start-up cost of between \$60,000 and \$150,000 for equipment. This cost range largely

36 Such efficiency is achieved primarily through more co-channel reuse and by trunking of a larger number of channels. One SMR operator, Fleet Call, Inc. has requested waivers to develop a lower power, multi-site approach similar to cellular systems. Fleet Call's system will also employ digital multiple access techniques. RAM Mobile Data Communications operates several 900 MHz digital data systems. Several cellular operators also plan to utilize digital technology. Digital technology will allow a three to fifteen times improvement in the number of communications carried on a given amount of spectrum.

37 For example, it takes several seconds to set up a typical cellular call, but only a fraction of a second for an SMR to set up a call. This difference is significant for short dispatch messages and critical for short mobile data transmissions.

38 Cellular frequencies may not be used to provide true, over-the-air, dispatch service. Dispatch-type communications can, however, be provided on cellular frequencies as long as the communication is not directly between a dispatcher and end users, i.e., the phone network must be employed. A significant result of this limitation is that fleet calls, the radio equivalent of conference calls, are cumbersome on a cellular system, because an actual telephone conference call has to be arranged. See Report and Order, GEN. Docket No. 87-390, 25 FCC Rcd. 3d 7033.

reflects the range of features available to an SMR system. Equipment for each additional five channels costs about \$50,000. A 900 MHz system has significantly higher start up costs (up to \$100,000 more). One reason is that use of a single antenna would produce unacceptable interference between adjacent channels in the system. To handle this problem, 900 MHz system operators often employ several antennas for their ten-channel systems.

An additional cost to SMR operators is that of acquiring an antenna site. This site must be above the local terrain to provide good service. The three types of sites used most often are tall buildings, mountain tops and antenna towers. This particular cost is quite variable depending on the geographic region. The typical rental cost, however, is a few hundred dollars per month per repeater. While this cost is significant, the main problem faced in terms of antenna sites by SMR (and cellular) operators is the unavailability of premium sites.

Annual operating costs (excluding equipment costs) of a five-channel SMR system have been estimated at approximately \$100,000 unless the system is operated in conjunction with other related activities that can absorb some of this overhead. Economies of scale, however, are very pronounced in the SMR industry. The minimum workforce required to operate a five-channel system is probably the same as the minimum workforce required to operate a twenty-channel system. Economies of scope, that is, savings in costs from diversifying the activities of an SMR operation, also are prevalent in the SMR industry. In particular, the same workforce that services and markets SMR

equipment and that provides SMR service can often be simultaneously employed to service and market other radio equipment without harming the SMR operation.

A typical flat rate charge for unlimited dispatch service is \$15 to \$20 per month per mobile. Assuming 7 channels, 70 mobiles per channel and a \$17 monthly charge, revenues total about \$100,000 per year without interconnection to the telephone network. Due to the significantly longer average message time for interconnected calls compared to dispatch calls, average revenue per interconnected mobile radio must be higher than for a dispatch mobile radio. Typical revenues per interconnected mobile radio are \$45 to \$100 per mobile per month.³⁹

A growing trend among SMR systems is airtime billing. An SMR operator may compute the amount of radio usage of each of his clients by using a commercially available computer program. The advantage of airtime billing is that it charges end users for their actual time spent on the radio and, therefore, leads to more efficient use of radio airtime by end users. Airtime billing is particularly useful for interconnected systems, which tend to use more airtime.

The mobile radios used by SMR end users list from under \$800 to over \$3000. Motorola, the largest supplier of SMR equipment, has traditionally marketed most of its end user equipment directly. SMR operators using

³⁹ Similar service from a cellular operator averages around \$100 per month.

equipment from other manufacturers often market the two-way mobile radios along with their service. These other manufacturers include E. F. Johnson, Ericsson-General Electric, Uniden, Midland, Americom, Standard, Kokusai, RELM and Bendix King. Of these manufacturers, Motorola, E. F. Johnson, Ericsson-General Electric and Uniden are the largest. As the SMR industry has grown, end user equipment prices have fallen. The supply of high quality, low cost end user equipment has been and will remain a factor in the growth of the SMR industry, particularly given the declining prices of cellular radios.

The SMR industry has grown rapidly since the first system was licensed in 1977. There are currently about one million mobile radios using trunked 800 MHz SMRs. This translates to over \$250 million in annual service revenues for trunked 800 MHz SMR operators. The annualized growth rate in recent months has been about 15 percent.⁴⁰ At that rate, service revenues will double in

⁴⁰ Growth rates are based upon studies of monthly reports issued by the PRB Licensing Division. Growth rates cited for trunked 800 MHz systems are actually the growth rates for the service code YB, trunked 800 MHz business users, which includes mainly SMR end users. A comparison of the Licensing Division's report dated March 31, 1989 and a study of loading records as of the last week of March 1989 indicate that trunked 800 MHz SMR end users represent approximately 97% of the mobile units and over 99.5% of the call signs licensed under the service code YB. Taking into account temporary licensees not noted in either study, one could infer that the actual number of mobile units is above the number currently licensed in the YB service code.

Growth rates for 900 MHz systems are based upon the YU service code, trunked 900 MHz business users. The same studies cited above, plus an additional study of 900 MHz systems as of the end of July 1989, indicate that 900 MHz SMR end users used only slightly more than half the total number of mobiles licensed as YU as of the end of March 1989 and July 1989. This ratio is increasing because non-SMRs have been able to receive licenses in the 900 MHz band for a longer period of time than SMRs. (The ratio rose over one percentage point between March and July 1989.) This may indicate that the

under five years. The recent introduction of 900 MHz SMRs should support strong growth in the industry for several more years. We estimate there were between 36,000 and 39,000 mobile radios licensed to use 900 MHz SMRs as of June 1990. This translates to more than \$10 million in annual service revenues for 900 MHz SMR operators and more than \$25 million a year in end user equipment sales. The number of 900 MHz end users has doubled in approximately one year.⁴¹ The combination of the development of 900 MHz SMRs and the adoption of advanced technologies should permit the overall growth rate for SMR service revenue in the U.S. to remain in double digits for some time.

One measure of the success of the SMR concept is that several other countries now have SMRs. A recently resolved trade dispute with Japan about cellular systems also involved obstacles that made it difficult for foreign third party trunked systems, i.e., SMRs, to be brought on-line in Japan. The final agreement included a stipulation that the next 16 licenses in Tokyo would be split evenly between Japanese and foreign systems.⁴²

actual growth rate of 900 MHz SMR end users is higher than calculated at the end of this section.

41 From December 1989 through December 1990. Between September 1988 and December 1990, the annualized growth rate was over 240%.

42 See Anthony Langham, "Report on Motorola, Inc.," The NatWest Investment Banking Group, New York (1990).

In the United Kingdom, the Telecommunications Act of 1984 allocated "Band III" (175 - 225 MHz) for public access trunked mobile radio systems. Licensing began in 1987. Unlike U.S. systems, a common signalling standard, MPT-1327, is required. That model has been borrowed by other European countries including West Germany. One analysis predicts that such systems in Europe will grow from 67,000 subscribers in 1989 to 686,000 by 1994.⁴³

Since its inception the SMR industry has been transformed from a little known U.S. private radio service into a substantial multinational industry providing a variety of technologically sophisticated communications service to hundreds of thousands or millions of American, European, and Japanese workers.

⁴³ See Frost & Sullivan, "The European Market for Land Mobile Radio," London (1990).

Appendix

History

The SMR service was established by the Commission in 1974 to permit entrepreneurs to provide communications services to private radio licensees on a commercial basis. It was originally expected that SMRs would primarily provide dispatch communications.

Creation of the SMR Service: Docket No. 18262

In 1970, the Commission allocated 115 megahertz of spectrum in the 806 - 947 MHz band to the Common Carrier Land Mobile Radio, Industrial/Scientific/Medical and Private Land Mobile Radio Services. The source of the greater part of this spectrum was UHF television broadcasting channels 70 - 83.

The original allocation gave 64 MHz of spectrum for use by common carrier cellular systems and 11 MHz of spectrum for public air to ground service. In 1974, the Second Report and Order reallocated this spectrum by eliminating air-to-ground service, providing only 40 MHz to common carrier services and designating 30 MHz (600 channel pairs) from the 800 MHz band for private land mobile communications systems. Of the 600 channel pairs, 200 were allocated to trunked service, 100 to conventional service and 300 were reserved to await experience with the use of the first 300 channels. SMRs were allowed to apply for either conventional or trunked channels.

The approach in this allocation was to assign channels by technology, rather than by user type. Two major objectives were to foster competition and to encourage efficient use of spectrum.

Applicants could apply for up to 5 conventional and up to 20 trunked channel pairs per market. Generally, to retain a trunked channel an SMR had to build its facilities within one year and meet certain loading requirements.⁴⁴ A trunked SMR was estimated to have a loading capacity of 100 mobile radios per channel pair. Trunked SMRs were required to be 70 percent loaded (to 70 mobiles per channel) within 5 years. Systems not meeting these standards would have unloaded channels reassigned to applicants on a waiting list.

Although the details have been changed more than once (see below), loading standards remain a major feature of our regulation of SMRs. Other rules adopted in Docket 18262 for 800 MHz include:

⁴⁴ A conventional SMR system had only eight months to construct.

- a) Trunked systems were required to have a 70 mile separation between co-channel licensees.⁴⁵ (This rule has remained unchanged and has been applied when new frequencies were released for use by trunked SMRs.) A separation of 105 miles is in effect for certain transmitter locations in California and Washington State. A waiver of this rule may be granted provided both co-channel licensees voluntarily sign a "short spacing" agreement.
- b) The separation between the transmit and receive frequencies of a channel pair is 45 MHz.
- c) Each channel has a bandwidth of 25 kHz (or 50 kHz per pair).
- d) Wireline telephone companies were prohibited from owning or operating SMRs. A Notice of Proposed Rule Making (Docket 86-3) proposing to end this prohibition was released in January 1986. (Final disposition has not occurred.)
- e) Interconnection with the public switched telephone network was allowed. However, the interconnection could not be performed at the SMR base station nor could the SMR base station licensee make arrangements for the telephone service. There were additional restrictions, such as a limitation of interconnected communications to 3 minutes. These rules were revised in Docket No. 20846, discussed below.
- f) Once all the channels in a given location were assigned, a waiting list was started. An SMR operator was allowed to apply for additional channels if his existing system was 90 percent loaded. Applications on the waiting list were processed on a "first-in, first-out" basis. Later, in Docket No. 85-6, discussed below, preferences were granted to applicants seeking to expand a fully loaded system.
- g) A licensee could not assign his license to a third party if his system had not been constructed. A major reason for this rule was that while a licensee

⁴⁵ For conventional systems, a variation of 70 mile separation was the rule. Conventional systems often shared a channel. To prevent overcrowding, no new systems could be added if total loading exceeded a standard (which varied with radio service). Since systems could be located at separate sites, a loading zone was used, i.e. a loading zone for a particular channel was fully loaded in the business radio service if there were 90 mobiles in a 15 mile radius on that channel. The 70 mile separation was applied to the entire loading zone, leading to an effective mileage separation of greater than 70 for conventional systems (including conventional SMRs).

owns his equipment and goodwill, he does not own the spectrum he uses nor the license from the FCC to use that spectrum. The Commission was (and is) willing to transfer a license from an SMRS operator to a third party to facilitate the sale of a business' assets (i.e., equipment and goodwill). The business cannot sell a license, however, because it does not own it. In the case of an unconstructed system, we will not permit the transfer of the license as part of a sale of business assets to a third party, because there are no assets owned by the business associated with that license.

h) SMR systems are private rather than common carriers and, therefore, under Section 332 of the Communications Act of 1934, are not subject to state entry or rate regulation. Many of the specific provisions of Docket No. 18262 discussed above, existed largely to insure the private carrier status of SMR systems. The Commission was concerned that state regulations could slow the development of this new radio service.

i) Each radio equipment manufacturer was limited to one 20 channel trunked system nationwide. They were allowed to own and operate a system because it would allow them to demonstrate whether such facilities made economic and engineering sense at 800 MHz. They were not allowed additional systems because of concern about possible adverse effects on competition.

Release of Additional Spectrum and Subpart S: Docket No. 79-191

The first trunked SMRS began operating in 1978. By that year there were shortages of conventional channels in the major metropolitan areas. To alleviate this spectrum shortage, the Commission in August 1978 released for conventional use 50 of the remaining 300 channels allotted to Private Land Mobile Radio in the 800 MHz band.⁴⁶ However, the shortage of conventional channels continued in major urban markets. Therefore, in October 1979 the Commission modified its rules to increase the mobile loading standards for new and existing conventional channels in the major urban markets.⁴⁷ This action was not sufficient to eliminate shortages in spectrum for conventional systems.

46 See Order, FCC 78-584, adopted June 21, 1978.

47 Memorandum Opinion and Order, Docket No. 79-106, 45 Fed. Reg. 59634 (October 25, 1979). In that proceeding, the Commission also eliminated the extra separation provided for by the so-called "loading zone" in those instances where the extra mileage was not appropriate, thereby reducing the mileage separation between base stations on the same channel from 100 miles to 70 miles (in those situations where the channel is assigned for the exclusive use of a single user or shared conventional station at a single site).

Moreover, by this time, shortages of trunked channels had begun to develop in the country's larger urban areas. In July 1982, there were waiting lists for conventional systems in four markets and for trunked systems in seven markets.⁴⁸ To alleviate this spectrum shortage, we released the remaining 250 private land mobile channels in July 1982. Unlike our previous allocation, these channels were allocated by service category rather than by system technology. In doing so we created a new set of rules, Subpart S, to govern these new channels as well as the conventional channels previously governed by the old set of rules, Subpart M. Of the new channels, 80 were allocated to SMRS, 70 to the Public Safety/Special Emergency Radio Services, 50 to the Industrial/Land Transportation Radio Services and 50 to the Business Radio Service. Licensees in each of these categories were free to use their assigned channels in either the trunked or conventional mode.

Under the new Subpart S, licensees of trunked systems had to build their systems within one year, had to be loaded with at least 60 mobile units per channel within 3 years and had to be loaded with at least 80 mobile units per channel within 5 years.⁴⁹ No waiting lists were maintained for channels governed by Subpart S. As SMR channels that were previously licensed became available, the Commission issued a public notice identifying both the channels and a window of time during which applications would be accepted. If there were more applications than frequencies during a particular window, a lottery was held. Applications not granted because channels were unavailable in the requested geographic area were dismissed and returned to the applicant.

The new rules also allowed existing trunked licensees loaded to 70 mobile units per channel to be placed on a waiting list for Subpart M trunked channels. In addition, existing trunked licensees were permitted to obtain additional channels (under either Subpart M or Subpart S) if their systems were loaded to 80 mobile units per channel.

This docket also removed the restrictions on licensing of SMRs to radio equipment manufacturers. The Commission felt that entry into the trunked SMR market by manufacturers with their large capital resources would on balance increase competition to obtain SMR customers. Although this regulatory change was expected to have a detrimental effect on some existing SMR licensees who had been previously protected from competition by the constraints our entry

48 There were waiting lists for conventional systems in Los Angeles, New York, Chicago and Houston. There were waiting lists for trunked systems in Los Angeles, New York, Chicago, San Francisco, Washington, D.C., Dallas, Houston, Atlanta, Miami, Phoenix and Tampa.

49 In this docket, a mobile unit was defined as a mobile radio, a portable radio or a control station.

regulation had placed on the market, we felt that end users, who are generally small businesses, would benefit from the increased competition for their business. Since being allowed to freely enter the SMR market, Motorola, the largest producer SMR equipment, has become the largest holder of SMR licenses.

Interconnection: Docket No. 20846

As part of an ongoing review of our rules for interconnection of private land mobile radio with the telephone network, the Commission gradually liberalized the rules governing interconnection by SMRs. The last major restrictions were removed in the Memorandum Opinion and Order released in May 1983.⁵⁰ In that order we allowed SMR operators to act as ordering agents in arranging for telephone service for end users if the service was obtained on a non-profit, non-resale basis. This docket also permitted common point interconnection at the SMR base station, i.e., a single connection to the telephone network could be made at the repeater site which could be used by any and all of the SMR's end users. This made interconnection less costly and significantly less complicated. As a result of this proceeding, both SMR base station licensees and other third party equipment suppliers may provide the interconnection patch on an unrestricted basis.

The remaining limitation on interconnection is that SMR operators must pass along the cost of telephone service without additional charges. This restriction is based on Section 331 of the Communications Act 47, U.S.C. § 332.

Management Contracts: News Release No. 6440

In its decision in Applications of Motorola, Inc., (July 30, 1985), the Private Radio Bureau stated that management contracts are permissible under certain circumstances. A management contract is an agreement between a licensee and a third party under which the third party manages the SMRS owned by the licensee in exchange for a percentage of the revenues of the operation. The Motorola news release stated that these agreements would be permitted by the Bureau provided that the licensee maintains bona fide proprietary interest in, and exercises supervisory control over, its system. Such agreements appear to be commonly used throughout the SMR industry.

Waiting List Preferences: Docket No. 85-6

In August 1985, we issued a Report and Order altering our waiting list procedures for channels governed by Subpart M. We decided to grant a

⁵⁰ See Memorandum Opinion and Order PR Docket No. 20846, 48 Fed. Reg. 29512 (June 27, 1983).

preference to applicants with fully loaded trunked systems. This preference applied to applicants that were already on a list at that time and to all future applicants. The reason for this change was that the first-in, first-out rules did not promote the Commission's goal of spectrum efficiency. Under the old rules, by the time a licensee loaded its system to 70% (as required to be on a waiting list), it was placed at the end of a long waiting list comprised predominantly of new applicants, and was unable to receive additional channels in a timely fashion. As a consequence, the users experienced congestion on the system, and the licensee was unable to expand the system to provide service to others.

900 MHz: Docket No. 84-1233

On September 26, 1986 the Commission released a Report and Order that allocated 399 channel pairs in the 896-901 MHz and 935-940 MHz bands for use by the private land mobile radio services. In that proceeding, the Commission divided this spectrum into three pools as follows: (1) 200 channel pairs for Specialized Mobile Radio Systems; (2) 100 channel pairs for the Business Radio Service; and (3) 99 channel pairs for the Industrial and Land Transportation Radio Services.

Although the allocation of spectrum was nationwide, the Report and Order provided that applications for the SMR pool would be accepted initially only in the 50 largest urban centers in the country. Accordingly, we devised a two phase process to assign the channels in these areas. In Phase I, which has not yet been completed, we accepted applications for 50 Designated Filing Areas (DFAs) consisting generally of the counties comprising the top 50 metropolitan statistical areas. An applicant may receive up to 10 channels. We provided for lotteries in cases where we received more applications for channels in a given DFA than available. We, in fact, received over 60,000 applications for the 1000 available systems.⁵¹

There are several significant differences that prevent SMRs in the 800 MHz band from being technically compatible with SMRs in the 900 MHz band. First, in the 900 MHz band, a channel has a width of 12.5 kHz, one half the 25 kHz bandwidth in the 800 MHz band. Second, the upper channel in a pair is 39 MHz above the lower channel in the pair, compared to a 45 MHz separation of the upper and lower channels in the 800 MHz band. Given the incompatibility of 800 MHz and 900 MHz systems, we did not grant operators of fully loaded 800 MHz SMR systems a preference in the allocation of 900 MHz channels.

⁵¹ (200 channel pairs/10 channel pairs per system) times 50 DFAs equals 1000 SMR systems available in Phase I.

We have recently released a Notice of Proposed Rule Making which contains proposals for channel assignment once Phase I is completed.⁵² We have proposed to license nationwide SMRs and to modify the 40 mile rule so as to make regional systems easier to develop.

Inter-Category Sharing: Docket No. 86-160

In January 1987, the Commission issued a Report and Order permitting inter-category sharing of the frequencies allocated to the SMR, Industrial/Land Transportation and Business categories. The revised rules limited the number of additional channels that may be acquired through inter-category sharing to one channel more than a system's current loading level would warrant. The rules also require a system licensee seeking additional channels outside its own frequency category to coordinate its efforts with the appropriate frequency coordinator. When an SMR licensee does acquire additional channels through inter-category sharing, we automatically remove it from appropriate or applicable waiting lists.

Merger of Subpart M and Subpart S: Docket No. 86-404 (aka M and S)

In 1988, the Commission completed a sweeping revision of the regulations for SMR systems. The changes were as follows:

A) Expansion of SMR end user eligibility.

Docket No. 86-404 allowed individuals and federal government entities to become SMR end users. The category of eligibles under Part 90 is sufficiently broad that with this rule change any person or entity is able to become an SMR end user unless they are a foreign government or a representative of a foreign government. The Commission felt that individuals and the federal government (state and local government entities were already permitted to be SMR end users because they are eligibles under Part 90) could be served by SMR systems without significant impact on current eligibles and was in the public interest.

B) Transfer of Subpart M channels to the SMR pool governed by Subpart S.

The Commission transferred the 200 trunked channels previously governed by Subpart M into the SMR pool governed by Subpart S. In doing so, it noted that most of those channels were already being used for SMR operations.⁵³ The

⁵² See Notice of Proposed Rule Making, Gen. Docket No. 89-553, 55 Fed. Reg. 744 (January 9, 1990).

⁵³ Specifically, over 99 percent of the systems operating on those channels are being used by SMRs. See Docket No. 86-404, paragraph 38.

Commission grandfathered any non-SMR licensees operating on these channels and pointed out that under the Commission's intercategory sharing rules, fully loaded non-SMR systems continue to have access to channels in the SMR pool.

C) Replacement of lotteries with waiting lists.

The Commission generally relies on the "first come, first served" concept in granting licenses in the private land mobile radio services. When, however, applications are filed that cannot be granted because insufficient channels are available to satisfy all of the requests, the Commission employs either a "waiting list" (as was the case for channels governed by Subpart M) or a "notice/lottery" procedure (as was the case for channels governed by Subpart S). M and S replaced lotteries for channels governed by Subpart S with waiting lists. Licensees of existing SMR systems that are fully loaded are given a preference on the waiting lists.

D) New loading standards.

The Commission decided to phase out use of loading standards as a trigger for automatic cancellation of channels that a licensee has not fully loaded. The Commission determined that unused channels could be more efficiently reassigned to licensees who need them through the workings of the marketplace. The new rules provide for a transition period by continuing to impose a five year loading requirement of 70 mobiles per channel for any system licensed before June 1, 1993. Systems licensed after that date will not be required to meet any loading requirements to retain their channels.

E) Authorization of partial assignments.

A partial assignment occurs when one SMR licensee reassigns to a third party less than the full number of channels for which the licensee is authorized. M and S removed the prohibition on partial assignments which dated back to the original allocation of 800 MHz channels in 1974. The Commission felt that partial assignment is a more efficient mechanism for moving channels to their highest valued use than the previous channel take back and reassignment program.

F) Technical standards.

M and S allows SMR operators to use any channel bandwidth (rather than only 25 kHz for 800 MHz and 12.5 kHz for 900 MHz). Loading standards for systems with non-standard bandwidths will be the loading requirements given the original allocation. Operators of SMR systems will be allowed to employ both trunked and other comparably efficient modes of operation.

Trunking of Conventional Channels: Docket No. 87-213

Effective August 24, 1990, a General Category was created consisting of the 150 channels previously available only for conventional systems. The main implication of this action for SMRs is that additional frequencies were made available for use by trunked SMRs. All entities eligible under Part 90, including SMRs, are eligible to use channels in the General Category. These frequencies are now available for either trunked or conventional use. SMRs can obtain these channels for their use in trunked systems through intercategory sharing. Like all intercategory sharing, to obtain channels, an SMR must demonstrate that no 800 MHz SMR channels are available. An SMR receiving sufficient channels so that it is no longer fully loaded will have its name removed from any appropriate waiting lists. SMRs seeking to expand may apply for unassigned channels or for reassignment of channels from a constructed system in the General Category. In addition, several constructed conventional radio systems licensed under the general category may be combined into a single SMR (or into a multiple licensed non-SMR trunked community repeater). New trunked systems may not, however, be created by using unassigned General Category frequencies. Applications for trunked SMRs using General Category frequencies must be coordinated by one of the three coordinators recognized above 800 MHz.

Expansion in scope and size of trunked systems promotes spectrum efficiency. This action further enhances spectrum efficiency by making many channels previously unused available to radio services with no remaining available frequencies.

Fleet Call, Inc. Waiver

On April 5, 1990, Fleet Call, Inc., one of the largest SMR operators, requested waiver and other relief to permit creation of wide-area digital SMR systems in six frequency congested markets: Chicago, Dallas, Houston, Los Angeles, New York, and San Francisco. Fleet Call sought authority to convert its existing analog systems to digital transmission systems using Time Division Multiple Access (TDMA) multiplexing technology. It would then combine all of their channels in each market into a multi-site, low-power base station configuration employing frequency reuse throughout the system. Fleet Call stated that the combination of TDMA digital transmission technology and frequency reuse will achieve a fifteen-fold (or more) increase in the capacity of its systems over the capacity of existing analog trunked systems in each of the congested markets. Fleet Call stated that its digital networks will offer greater capacity for the broad array of private land mobile services that SMRs

are permitted to offer. For example, its proposed systems would permit automatic hand-off of calls as mobile units travel through a market area, customized voice dispatch, and improved quality interconnect service.⁵⁴

The Commission adopted a Memorandum Opinion and Order on February 13, 1991 stating that it was not necessary or appropriate to grant Fleet Call the full scope of the requested relief and that most of what Fleet Call wanted was already permitted by the current rules. The Commission stated no waiver was required for Fleet Call to use TDMA digital transmissions. Furthermore, Fleet Call did not require a waiver of the 40-mile rule (47 C.F.R. 90.627) because the objectives of Section 90.627 are already met. Fleet Call was granted a waiver of the one-year construction period provided by 47 C.F.R. § 90.631(e), and given five years to construct its systems. The Commission deferred action on two of Fleet Call's requested waivers, for certain short-spacing requirements and for use of a digital station identification. The Commission indicated that rather than waive them, the rules might be amended. Finally, the Commission restated that the changes in system configuration proposed by Fleet Call would not affect their status as a private carrier.

The key implication of this waiver is that SMRs can and will employ more spectrum efficient technology to expand capacity. Technology can and will also improve the quality and scope of the service provided. As a result, Fleet Call and other SMRs will have the necessary capacity and product to grow with the overall expanding communications service industry.

⁵⁴ See Memorandum Opinion and Order in re Request of Fleet Call, FCC 91-56 (released March 14, 1991).