APCO REPORTS

ASSOCIATED PUBLIC-SAFETY COMMUNICATIONS OFFICERS, INC.
2040 S. Ridgewood Ave.
South Daytona, Florida 32119-2257
(904) 322-2500

Alan W. Chase, Editor

Volume 8 Number 6 June 1992

The Public Safety Microwave Committee (PSMC) has submitted comments and reply comments in response to the Federal Communications Commission's Notice of Proposed Rulemaking in the matter of Redevelopment of Spectrum to Encourage Innovation in the Use of New Telecommunications Technologies (ET Docket No. 92-9).

PSMC represents state and local government agencies throughout the United States which use more than 6,000 2 GHZ (1850-1990 MHz and 2130-2150/2180-2200 MHz) fixed-microwave facilities for critical public safety communications. PSMC consists of the APCO, the National Association of State Telecommunications Directors (NASTD), the International Bridge, Tunnel & Turnpike Association (IBTTA) and the County of Los Angeles, California.

NASTD, a cooperating organization with the Council of State Governments, is an association of telecommunications directors from 49 states. NASTD's members administer telecommunications systems serving state public safety agencies including emergency medical service, fire, law enforcement, corrections, public works and transportation.

IBTTA is the association of the worldwide toll industry, with members in 22 countries. Many of its members are state turnpike authorities who use 2 GHz microwave facilities to provide vital communications links for highway patrol and emergency maintenance mobile radio systems.

The County of Los Angeles has a population of 9.2 million, representing more than one-third of the population of the State of California. The Los Angeles County Sheriff's Department is the third-largest police agency in the United States and operates one of the largest and most sophisticated public safety communications systems in the world. Mobile voice and data communications for the system are provided through a countywide network of transmitters tied together through a microwave system that includes eighteen 2 GHz paths.

INTRODUCTION AND SUMMARY:

The Commission proposes to reallocate the 2 GHz bands for new technologies such as personal communications services (PCS). PSMC supports efforts to promote new communications technologies and believes that some new technologies, such as private PCS networks, could have important public safety applications. However, PSMC and its members have consistently opposed,

and continue to oppose, allocating frequencies for these new services in the 2 GHz microwave bands because of the potential harm to existing public safety communications facilities.

The Commission now proposes that existing state and local government licensees of fixed microwave facilities be allowed to remain on 2 GHz frequencies indefinitely. PSMC strongly supports this "grandfathering" provision, which is rooted in the statutory requirement that public safety radio services receive "top priority" in frequency allocation matters. PSMC remains deeply concerned, however, that the FCC's proposal does not extend similar primary status to new and expanded state and local government 2 GHz systems that will be needed in the future.

The Commission stated in the Notice that 2 GHz applications filed after January 16, 1992, will be granted only on a "conditionally secondary" basis. On May 14, 1992, the Commission issued a Public Notice stating that it would continue to grant applications for major modifications to existing 2 GHz systems on a primary basis during the pendency of ET Docket 92-9. The Commission also stated that primary status would apply "in certain situations where additional links may be required to complete a communications network, or where new facilities and/or frequencies are operationally connected to a system licensed prior to January 16, 1992.

State and local governments are facing growing demand for microwave facilities to expand existing operations and to provide critical backbone for new area-wide mobile radio systems. The Commission's proposal will force state and local governments to seek alternatives to 2 GHz to meet those increasing demands for microwave capacity. However, in many circumstances, feasible alternatives to 2 GHz frequencies are unavailable. At least in those situations, the Commission should allow state and local governments to obtain 2 GHz licenses on a primary basis.

The Commission should also allow state and local government users to switch frequencies within the 2 GHz bands without losing their primary status. This would protect important public safety needs, while providing a voluntary mechanism to create "open space" for new users of the band.

Finally, PSMC is also concerned about the serious danger of interference to 2 GHz public safety fixed-microwave operations from new co-primary mobile operations in the same band. If sharing of the band is allowed, new users must protect existing state and local government operations from any interference that might compromise vital public safety communications operations. These protections should include use of regional frequency coordination committees and mandatory transmitter identification systems to prevent and locate interference.

I. THE COMMISSION CORRECTLY PROPOSES TO MAINTAIN THE PRIMARY STATUS OF PUBLIC SAFETY AGENCY USE OF THE 2 GHz MICROWAVE BANDS.

Continued state and local government operation of fixed microwave systems in the 2 GHz band on a "primary" basis is vital to the safety of life and property. Therefore, the Commission's proposal to maintain this "primary" status is dictated by the Communications Act, which requires that public safety radio communications operations receive top priority over other potential users of the spectrum.

Any contrary approach would breach this statutory mandate, creating an enormous financial burden for state and local governments. Moreover, it would have compromised the ability of state and local governments to provide the communications services necessary for the protection of life and property.

A. The Nature and Extent of Public Safety Use of 2 GHz

State and local governments use 2 GHz microwave facilities to provide the backbone for critical mobile radio communications systems for police, fire, emergency medical and other public safety agencies. Microwave provides critical links between remote radio sites and key facilities for mobile radio and data communications, and connects command and control networks vital for efficient public safety agency activities.

An example of public safety use of 2 GHz microwave is the Arkansas State Police statewide 800 MHz trunked mobile radio system. This highly spectrum-efficient communications system uses eighty-four 2 GHz microwave paths to tie together the numerous base stations and remote transmitter sites necessary to provide statewide mobile police radio coverage.

Similar systems exist or are being built in other jurisdictions throughout the country to accommodate increased use of area-wide trunked communications, often at the Commission's own urging through the National Public Safety Plan. Examples include the Indiana State Police, which has a statewide communications system utilizing 50 microwave paths, 44 of which are using frequencies in the 2 GHz band, and the State of Kentucky, which has a statewide microwave network that supports, among other public safety services, its Emergency Warning System. Kentucky's system makes use of eighty-two 2 GHz microwave paths.

The Los Angeles County Sheriff's Department's communication system also depends heavily on 2 GHz microwave to integrate 38 remote communications sites which use 276 transmitters and 630 receivers. The critical role of its microwave system was demonstrated during the recent Los Angeles riots, which required extraordinary area-wide coordination among the thousands of police officers and other users of the County microwave system, including firefighters on the streets, police and fire stations, and command centers. On May 1, during the peak of the rioting, there were a record 600,000 data messages transmitted over the County's communications system. Microwave communications links have proven to be invaluable to the Sheriff's Department both during extraordinary events such as the recent riots, and on the day-to-day basis as it attempts to satisfy the public safety needs of more than 9.2 million people.

One of the largest 2 GHz microwave systems in the country is operated by the State of California. Its statewide microwave system currently has ninety-eight 2 GHz paths and is used primarily to interconnect dispatch centers with remote base stations associated with the state's public safety mobile radio communications systems. Among the agencies that depend upon this microwave network are the California Highway Patrol, Department of Forestry and Fire Protections, Department of Transportation, Office of Emergency Services (which coordinates response to earthquakes and other disasters), and Department of Justice (for its anti-drug and anti-organized crime operations).

These are just a few examples of the vital role of 2 GHz microwave facilities for public safety communications operations. Comparable public safety uses of 2 GHz microwave frequencies can be found in cities, counties and states throughout the nation. The Commission's Office of Engineering and Technology (OET) Study indicates that there are more than 6,000 2 GHz microwave facilities licensed to state and local government agencies.

B. The Communications Act Requires That the FCC Give Top Priority to Public Safety Use of the Spectrum

The crucial public safety uses of scarce radio spectrum described above must receive preference over other less critical services. Congress has repeatedly mandated that "public safety consideration

should be a top priority when frequency allocation decisions are made." House Rep. No. 98-356, 98th Cong., 1st Sess. 27 (1983), reprinted in 1983 U.S. Code Cong. & Admin. News 2219, 2237 (emphasis added). As the United States Court of Appeals explained in National Association of Broadcasters v. FCC, 740 F.2d 1190, 1213-14 (D.C. Cir. 1984), Section 1 of the Communications Act, subsequent amendments to the Act, and the underlying legislative history thereto, make clear that the Commission must allocate spectrum in a manner that promotes the "safety of life and property." 47 U.S.C. ¶151. The Court noted that the legislative history of the Communications Amendments Act of 1982 states that

> "radio services which are necessary for the safety of life and property deserve more consideration in allocating spectrum than those services which are more in the nature of convenience or luxury." S.Rep. No. 191, 97th Cong., 2d Sess. 14 (1981), reprinted in [1982] U.S. Code Cond. & Ad. News 2237, 2250.

740 F.2d at 1213.

This fundamental statutory obligation would be violated if public safety agencies were forced to give up their 2 GHz frequencies for other services which "are more in the nature of convenience or luxury." Fortunately, the Commission does not take such a radical step in its proposal, making it consistent with the Congressional mandate, at least as to existing public safety licenses. However, to be fully consistent with the dictates of the Communications Act, the Commission should revise its proposal to accommodate future public safety microwave needs (at least where there are no viable alternatives to 2 GHz microwave frequencies) and to protect state and local government microwave systems from harmful interference caused by new users of the band. Sections II. and III. in next month's APCO Reports address these issues in greater detail.

C. The Commission's "Grandfathering" of State and Local Government Licensees is Further Justified by the Substantial Costs of Moving to Alternative Frequencies.

As discussed above, the Commission's proposal to "grandfather" existing state and local government users of the 2 GHz band is consistent with its statutory obligation to give priority to public safety users of the spectrum. Forcing state and local governments to vacate the band would also have exposed taxpayers to billions of dollars in expenses for replacement facilities.

The OET Study, at page 32, estimates that the costs involved in moving from 2 GHz to alternative frequency bands would range from $62,500 to $83,000 per microwave facility. Those estimates appear to be low, based on independent information that PSMC has gathered from state and local governments. However, regardless whose estimates are used, there is no dispute that the costs are far more than state and local governments should be required to pay.

The State of California estimates that it would cost $150,000 per microwave path to move from 2 GHz to 4 GHz, for a total cost of $14.4 million for its 96 paths. (This estimate is based on labor costs of nearly $17,000 and equipment costs of $130,000 per microwave path).

Los Angeles County projects that such a move would cost its taxpayers $3.8 million, or $211,000 per path. (This estimate is based on total labor costs of $795,000, total equipment costs of $3 million and frequency coordination fees of $12,600). These estimates assume, of course, that frequencies would be available (which is unlikely in many areas of California), that equipment suitable for private (as opposed to wide-band common carrier) microwave operation is available, and that no new sites or expanded building facilities would be necessary.

Similarly, the State of Florida estimates that moving to 4 GHz would cost approximately $186,000 for

each 2 GHz path, in large part because of the need to erect new, stronger towers necessary to accommodate heavier antennas.

Moving to 6 GHz also requires greater space diversity between antennas to maintain consistent path performance. That requires either increasing the height of existing towers or building additional towers. The State of Utah's experience is that building a new microwave tower costs approximately $1,000 per foot. Costs are nearly double that in California because of higher labor costs and the need to meet stringent earthquake-resistant construction requirements. Los Angeles County recently spent $750,000 for two 200-foot towers.

Many existing 2 GHz paths are too long for higher frequency bands, and could be moved only with the addition of new transmitter sites. In those instances, the costs will be multiplied many times because of the enormous cost of site acquisition and development in many parts of the country. (Los Angeles County recently had to spend nearly $1 million for a single microwave site.).

The OET Study appears to underestimate the impact of path length restrictions on the cost of moving existing users out of 2 GHz. It claims that the average path length for existing facilities in the 2 GHz bands is 17 miles, a path length which can, in most cases, be accommodated in frequency bands as high as 6 GHz. *OET Study at 18.* However, there are obviously many 2 GHz path lengths which are not "average" and cannot be easily accommodated in higher frequencies. Indeed, OET itself notes that 10% of the 2 GHz paths exceed 35 miles (OET Study at 17) which translates to an estimated 600 state and local government facilities. (For example, while the State of California's 98 2 GHz microwave paths average approximately 19 miles, many of its 2 GHz paths are much longer, including one 67-mile path). Many of those paths in excess of 35 miles would be too long to move to frequencies above 2 GHz without extraordinary difficulty and expense, if at all.

Finding sites for microwave towers is becoming increasingly difficult because of zoning problems, environmental regulations and the simple lack of undeveloped land in many urban areas. New sites are also unlikely to be available in protected and remote wilderness areas.

Moving existing microwave systems to a lower frequency band (such as 1.7-1.85 GHz were it to become available for non-federal government users) would only be slightly less expensive. The State of Utah estimates that moving its twenty 2 GHz paths to the 1.7-1.85 MHz band would cost more than $1.34 million, for an average cost of $67,000 per path.

Replacing Utah's 12 analog 2 GHz paths with 1.7-1.85 GHz paths would cost between $54,000 and $59,000 per path, which includes $48,000 to $53,000 for equipment (the higher cost would apply to paths using 2100-2200 MHz frequencies, where new antennas would be needed) and $6,000 in labor expenses. Replacing Utah's eight digital paths would be even more expensive, with equipment costs running $100,000 per path. This data is based on estimates received from manufacturers in April 1992.

Los Angeles County estimates that moving its facilities to the 1.7-1.85 GHz band would cost nearly $3.14 million, or more than $174,000 per path.

This estimate is based on total equipment costs of $2.5 million, labor costs of $625,000 and frequency coordination fees of $12,600. The slightly lower equipment and labor costs are based on an assumption that existing antennas and waveguides can be re-used at the lower, but not higher, frequencies.

The variation in cost estimates occurs because some brands of microwave equipment would require more extensive modification, and are more difficult to modify, than others.

While OET's estimates of the cost of relocating users out of 2 GHz are lower than PSMC's, even OET recognizes "that relocation costs could prove especially burdensome to local government licensees using the 2 GHz band." *OET Study at 34.* Thus, OET recommends that "it may be desirable for the Commission to adopt a policy which would not require these users to relocate, but rather allow them to move at their option." Id. The Commission wisely followed that advice.

IN NEXT MONTH'S APCO REPORTS:

A continuation of the comments filed by PSMC, which includes:

II. New and Expanded State and Local Government Microwave Facilities in the 2 GHz Bands Should Also Be Licensed on a Primary Basis Where no Viable Alternatives Are Available.

III. The Commission Must Take Steps to Prevent Interference From Mobile Users to Critical Public Safety Microwave Systems.

NEW PERSONAL COMMUNICATIONS SERVICES PROPOSED: The Commission has taken a significant step toward making personal communications service (PCS) a reality. In combined Notices of Proposed Rulemaking, the Commission proposed possible spectrum allocation, regulatory and licensing schemes for PCS, and sought comprehensive comment on how best to make this family of services available to the public as rapidly as possible.

The Commission said that PCS will likely consist of a variety of new mobile and portable services and technologies, such as small, lightweight telephone handsets that work at home, in the office or on the streets; portable, wireless facsimile machines; wireless PBXs; advanced "smart" paging devices; and wireless electronic mail services.

The advent of PCS could have a great impact on the future development and configuration of all telecommunications networks, the Commission said, adding that any PCS applications will create new markets and provide a greater level of competition in many segments of the telecommunications industry. PCS could also increase productivity and efficiency across a broad array of industries and have a positive impact on the international competitiveness of the nation's economy, it said.

The Commission also said it would stress four values in providing spectrum and establishing a regulatory structure for PCS:

1. competition in the delivery of services
2. speed of deployment
3. universality, and
4. diversity of services.

The Commission's action consisted of two separate notices: the first is a proposal for broadband PCS service in the 2 GHz band; the second, for narrowband PCS service in the 900 band. The 2 GHz proposal is contingent upon completion of the Commission's proceeding in Docket ET 92-9, which would make spectrum available for emerging technologies. The Commission also reiterated its desire not to harm the quality of service which can be offered by incumbents now in the 2 GHz band, and asked for general comments on a proposal by incumbents to accommodate possible negotiations with new users.

The 900 MHz allocation is to facilitate PCS services, such as advanced paging, which require only a small amount of spectrum. The Commission stressed that the two rulemakings need not be

concluded simultaneously. If it becomes possible to implement one service before the other, it will do so. In the Notices, the Commission:

- Proposed a broad definition of PCS service, to include the entire family of potential PCS services. Thus, for instance, services such as advanced paging, as well as traditional voice service, could be provided.
- Proposed a 900 MHz PCS allocation of three megahertz, including two megahertz (901-902 and 940-941) currently allocated to the General Purpose Mobile Service and one megahertz (930-931) currently reserved solely for advanced paging.
- Proposed 2 GHZ PCS licenses of 20, 30 or 40 megahertz each, with a preferred option of 30 MHz. The Commission also proposed that the 900 MHz licenses would be provided between 50 kHz and 1 MHz each.
- Proposed a minimum of three PCS licenses at 2 GHz, and sought comment on whether four or five licenses would be more desirable.
- Proposed several possible licensing areas, including 487 "basic trading areas" and 49 "major trading areas" (as defined by Rand-McNally), the 194 LATAs, and nationwide licenses. Because multiple PCS licenses would be assigned, a mixture of these areas could be used.
- Proposed allocation of 20 megahertz in the 2 GHz band for non-licensed PCS service to be provided on a Part 15-type basis.
- Asked for comment on possible reforms of the lottery process and on possible competitive bidding rules (in the event Congress authorized use of competitive bidding). The Commission also sought comment on whether lotteries or competitive bidding would be the more appropriate way to license PCS service.
- Asked for comment on local exchange carrier (LEC) and cellular eligibility, including:
  - whether cellular licensees should be allowed to hold PCS licenses within their cellular service areas, noting the potential impact on competition if they are permitted to do so (no restrictions were proposed for cellular licensees receiving PCS licenses outside their cellular service areas);
  - liberalization of cellular service rules to allow cellular firms to make better use of their existing frequencies;
  - whether LECs should be allowed to receive PCS spectrum (unless they would be barred by their cellular holdings) and, if so, how much they should be allowed to receive (no set-asides would be provided); and
  - whether the BOC-cellular separate subsidiary requirement should be eliminated so as to permit use of cellular spectrum for PCS in their local networks.
- Asked for comment on whether PCS should be regulated as a common carrier or private service, and proposed that PCS licensees be given a federally protected right to interconnect with the public switched network.
- Sought comment on technical and operational issues, including:
  - the appropriate level of technical and operational standards;
  - a decision to not establish a PCS technical advisory committee; and
  - ways to encourage industry development of technical and operational standards.
- Tentatively awarded one Pioneer's Preference in the 900 MHz narrowband PCS service to Mobile Telecommunications Technologies.

The FCC Office of Engineering and Technology contact is Fred Thomas (202-653-6204) and the Office of Plans and Policy contact is James Gattuso (202-653-5940).

The Canada Chapter of APCO
Cordially Invites You to Attend the

APCO Canada
Regional Conference

November 17 - 20
Niagara Falls, Ontario

At the Sheraton Fallsview
6755 Oakes Drive
Niagara Falls, Ontario - Phone 416-374-1077

Conference Chairman: Brian Hay, Niagara Fire Department
Phone 416-688-4111

APCO REPORTS
2040 S. Ridgewood Ave.
South Daytona, FL 32119-2257

Serving
Public Safety Communications
Since 1935

FIRST CLASS MAIL