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MOTOROLA

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December 2, 1999

Thomas J. Sugrue
Chief, Wireless Telecommunications Bureau
Federal Communications Commission
445 12th Street, S.W.
Room 3-C252
Washington, D.C. 20554

Re: WT Docket No. 99-168

Dear Tom:

I want to bring to your attention a number of filings in the 746-806 proceeding that have a direct bearing on the Motorola suggestion for 1.5 MHz guard bands for public safety to be allocated to private spectrum users. Copies of the filings are attached. In particular:

- The Major City Chiefs call for "buffer zones" (guard bands) and that they be "occupied only by services utilizing technologies similar to public safety," in order to protect public safety from destructive interference like that which they have been experiencing from adjacent CMRS carriers in other bands.

- The Major County Sheriffs' Association highlights existing interference problems from adjacent commercial providers and notes that "[p]lacement of such technically dissimilar radio services in close proximity to our public safety systems is severely compromising the integrity of our mission critical communications." They also call for "buffer zones of similar communications technologies immediately next to the new public safety spectrum." They finally note the "economies of scale for manufacturers, which should result in lower prices and greater number of choices for our member counties." In our *ex parte* of November 24, 1999, Motorola noted that there are a number of informal and formal sharing agreements between public safety entities and those who provide similar critical services in the private sector. The Sheriffs' similarly note that mutual aid arrangements will be facilitated by placing private wireless users near public safety users to "also allow us voluntary interoperability with public service providers such as utilities and railroads, which will help us to save lives and property during emergencies and disasters."

- The International Association of Chiefs of Police (IACP) likewise notes interference problems in the 800 MHz band and changes in the low power TV rules that have raised concern among public safety users. Therefore, the IACP urges "[t]he creation of spectrum buffer zones of similar communication technologies will help assure public safety of interference-free communications." The IACP also notes the benefits to be gained by cooperation between public safety agencies and other land mobile users including "public service providers such as utilities, railroads, pipelines, etc., thereby improving overall response to our citizens during disasters and emergencies."

- The Federal Law Enforcement Wireless Users Group (FLEWUG) reports that "[t]here are benefits in allocating a service such as Private Mobile Radio Service or other like services adjacent to the band allocated for public safety," including, minimizing the potential for interference, managing interference through a coordination process, creating

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a region over which adjacent band emissions would be attenuated sufficiently to protect public safety, and making efficient use of spectrum that would otherwise lie fallow to protect public safety receivers. In contrast, FLEWUG found that allocating spectrum adjacent to public safety transmitters to a service employing low power transmitters has "both benefits and drawbacks" including possible coordination difficulties caused by not knowing the location and number of devices in a given location and the aggregate interference caused by multiple transmitters.

- And finally, I would call to your attention Congressional support for addressing private wireless user needs for spectrum, as noted by the attached letters from Chairman Dingell and Congressmen Deutsch and Foley.

Sincerely,

Jeanine Poltronieri
Director, Telecommunications Strategy and Regulation
Motorola

Attachments

cc:

Magalie Roman Salas	Kathleen O'Brien Ham	Robert Calaff
Ari Fitzgerald	James Schlichting	Stanley Wiggins
Mark Schneider	Diane Cornell	Thomas Stanley
Peter Tenhula	Dale Hatfield	Julius Knapp
Bryan Tramont	Robert Pepper	Michael Wilhelm
Adam Krinsky	Gary Michaels	

MAJOR CITIES CHIEFS

October 5, 1999

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The Honorable William E. Kennard, Chairman
Federal Communications Commission
The Portals
445 Twelfth Street, SW
Washington, DC 20554

Reference: **WT Docket Number 99-168**

Dear Chairman Kennard:

The Phoenix Police Department has brought to my attention problems they have been experiencing from destructive radio interference to their communication systems. This interference is emanating from an adjacent public carrier communications system. This problem has been well documented and serves to underline the risk to the public's safety, from disrupted police, fire and EMS communications, when dissimilar radio services are located in close proximity to each other.

The Commission is currently in the process of defining rules, which will establish the permitted out-of-band emission and other adjacent channel protection in the new 746-806 MHz band. We urge you to take the necessary regulatory steps to recognize the need for compatible technologies in the adjacent bands. We recognize that you have certain congressional mandates for auctioning the spectrum to the highest bidder but we believe that it was never Congress' intent to jeopardize communications involving the safety of life and the protection of property, to obtain the maximum economic return.

We request that the Commission establish sufficient buffer zones adjacent to the new public safety band, 764-776 and 794-806 MHz, and that these buffer zones be occupied only by services utilizing technologies similar to public safety. The lessons of locating dissimilar services adjacent to public safety need not be repeated in this new band.

The Major City Chiefs organization represents the largest police organization in the country. The new public safety 700 MHz radio spectrum represents an opportunity for many of our members to resolve the problems of existing overloaded communication systems as well as introduce new emerging technology that will improve the effectiveness considerably and protection from outside interference must be assured.

William E. Kennard
October 5, 1999
Page 2

Your immediate consideration of this matter will be appreciated.

Sincerely,

Ruben B Ortega

RUBEN B. Ortega, Chairman
Major City Chiefs

RBO/nw

Cc: Commissioner Susan Ness
Commissioner Harold W. Furchgott-Roth
Commissioner Michael K. Powell
Commissioner Gloria Tristani
Chief Thomas J. Sugrue – Wireless Radio Bureau
Chief Kathleen Wallman, Esq., Chairman, NCC
Mr. Harlen McEwen, Asst. Deputy Director, FBI

PATRICK D. McGOWAN
HENNEPIN COUNTY SHERIFF
ROOM 6 COURTHOUSE
350 SOUTH FIFTH STREET
MINNEAPOLIS, MN 55415

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EX PARTE OR LATE FILED

OFFICE OF THE SHERIFF

DEC - 2 1999
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October 28, 1999

99-168

The Honorable William E. Kennard, Chairman
Federal Communications Commission
The Portals
445 Twelfth Street, SW
Washington, DC 20554

Dear Chairman Kennard:

I am writing on behalf of the Major County Sheriffs' Association (MCSA), a professional organization of Sheriffs across America who represent population bases of at least 500,000 people. We wish to express our concern over the potential for destructive radio interference from immediately adjacent commercial services in the new public safety 700 MHz frequency band. MCSA represents over 75 of this nation's largest counties, which also contain the heaviest populated metropolitan areas in the U.S. This includes Maricopa County in Arizona, where the City of Phoenix has been experiencing significant interference to their 800 MHz system from an adjacent commercial service provider. Placement of such technically dissimilar radio services in close proximity to our public safety systems is severely compromising the integrity of our mission critical communications.

Our members are looking toward this new public safety band, 764-776 and 794-806 MHz, to solve our current shortage of communications channels, and to provide the much needed expansion spectrum that will allow us to introduce new and emerging advanced technologies such as wideband data file transfers and full motion video transfers. We urge the Commission to establish rules and regulations that are compatible with our systems and call for buffer zones of similar communications technologies immediately next to the new public safety spectrum. We implore you not to repeat the 800 MHz interference scenarios in this new 700 MHz spectrum band. MCSA members make significant investments in their public safety communications and they must be assured of the complete integrity and usability of this new spectrum upon making such investments.

An added benefit of placing similar land mobile radio technology in the adjacent bands is that this will provide economies of scale for manufacturers, which should result in lower prices and greater number of choices for our member counties. It will also allow us voluntary interoperability with public service providers such as utilities and railroads, which will help us to save lives and property during emergencies and disasters.

Recycled Paper

Our county sheriffs must be 100% sure that they can rely on their communications to protect the lives and property of our citizens. We urge you to define rules and regulations that make this reliance a reality in the new 700 MHz band.

Sincerely,

Sheriff Patrick D. McGowan
President
Major County Sheriffs' Association

cc: Commissioner Susan Ness
Commissioner Harold W. Furchgott-Roth
Commissioner Michael K. Powell
Commissioner Gloria Tristani
Chief Thomas J. Sugrue – Wireless Radio Bureau
Ms. Magalie Roman Salas – Office of the Secretary
Sheriff Kevin Beary
Sheriff James Karnes
Sheriff Margo Frazier

International Association of Chiefs of Police
515 North Washington Street
Alexandria, VA 22314-2357
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Cable Address: IACPOLICE
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Director
Office of Public Safety
Illinois Secretary of State
Springfield, IL

Executive Director
Daniel N. Rosenblatt
Alexandria, VA

Deputy Executive Director/
Chief of Staff
Eugene H. Cromartie
Alexandria, VA

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October 18, 1999

EX PARTE OR LATE FILED

The Honorable William E. Kennard, Chairman
Federal Communications Commission
The Portals
445 Twelfth Street, SW
Washington, DC 20554

Reference: WT Docket Number 99-168

Dear Chairman Kennard:

On behalf of the International Association of Chiefs of Police (IACP), I am writing to express our continued support for the immediate and uncompromised usability of the much-needed spectrum allocated over a year ago to public safety in the new 764-776 and 794-806 MHz frequency band. We wish to express to you, and the other commissioners, our concern for the inclusion of adequate protection for our new spectrum now that the Commission is defining rules for the frequency bands immediately adjacent to these public safety bands.

The Commission must protect the usability of public safety communications by not allowing construction and transmission of adjacent technically dissimilar services. As the Commission is aware, the proximity of existing commercial (CMRS) carriers is currently creating damaging interference to public safety in the 800 MHz band. Recent changes in the low power TV rules have raised considerable concern among public safety users in Northern New Jersey that their critical operations will be compromised due to the construction of new, low power, television stations. Even more alarming is the potential for severe interference problems in the new public safety 700 MHz band. This placement of dissimilar services, such as new television broadcast services, immediately adjacent to the new 700 MHz public safety band will greatly reduce the use of this band. The rules for these adjacent channel services must be compatible with the public safety communications systems. The creation of spectrum buffer zones of similar communication technologies will help assure public safety of interference-free communications.

The public safety community will benefit further from the inclusion of such technology similar requirements in the adjacent bands through economics of scale for manufacturers which will result in lower prices and broader choices for our agencies. Further, these adjacent buffer zones would be ideal locations for other land mobile radio services facilitating voluntary interoperability among public safety agencies and public service providers such as utilities, railroads, pipelines, etc., thereby improving overall response to our citizens during disasters and emergencies.

The IACP membership, which consists of over 18,000 law enforcement professionals, is dedicated to enhancing the art and science of law enforcement. We participated in the current proceeding from its inception to the current National Coordinating Committee (NCC). Mr. Harlin R. McEwen, Deputy Assistant Director of the FBI and former Chief of Police of the City of Ithaca, New York, is the chairman of the IACP Communications and Technology Committee and serves on the NCC steering committee. Chief McEwen participated in the NCC General meeting held on September 24, 1999 in Lansing, Michigan. At that meeting he expressed our concern for the need to provide a buffer zone on all sides of the new public safety spectrum.

We urge you to define rules and regulatory mechanisms that recognize the need for similar technologies in the channels immediately adjacent to public safety frequencies. Your rules must recognize that this country's law enforcement agencies depend on reliable and secure communications to fight crime and protect the lives and property of the citizens we serve.

Sincerely,

Ronald S. Neubauer
President

Cc: Commissioner Susan Ness
Commissioner Harold W. Furchtgott-Roth
Commissioner Michael K. Powell
Commissioner Gloria Tristani
Chief Thomas J. Sugrue, Wireless Telecommunications Bureau
Ms. Kathleen Wallman, Esq., Chairman, NCC
Chief Harlin R. McEwen, Criminal Justice Information Services Division, FBI

FEDERAL LAW ENFORCEMENT
WIRELESS USERS GROUP
WASHINGTON, D.C.

November 17, 1999

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Kathleen Wallman, Chair
National Coordination Committee
445 12th Street, NW
Suite 321
Washington, DC 20004

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99-168

Ms. Wallman,

During the National Coordination Committee (NCC) conference call held on October 12, the band plans proposed by Motorola and FreeSpace Communications were discussed. The NCC Steering Committee members suggested that it would be beneficial to establish a receiver interference protection limit for the public safety receivers operating in the 764-776/794-806 MHz bands. The receiver interference protection limit could then be used to justify a band plan proposing suggested allocations of the services in the band segments that are adjacent to the 764-776/794-806 MHz public safety spectrum. The NCC Steering Committee requested that the Federal partners provide assistance in the development of a public safety receiver interference protection limit.

In response to the NCC's request, the Federal Law Enforcement Wireless Users Group (FLEWUG) has provided: 1) a methodology that could be used in the development of a receiver interference protection limit for the public safety receivers in the 764-776/794-806 MHz bands, 2) a proposal for adjacent band emission limits to protect public safety receivers from yet-to-be determined transmitters, and 3) an examination of the proposed band plans.

The FLEWUG recommendations and supporting technical material are provided in the enclosed document. These recommendations are intended to establish a reasonable balance between the spectrum needs of the commercial services and protection of public safety operations.

Any questions on these matters can be directed to the undersigned.

Sincerely,

Julio R. Murphy
Co-Chair, FLEWUG
Department of the Treasury

Derek M. Siegle
Co-Chair, FLEWUG
Department of Justice

Enclosure

FLEWUG RECOMMENDATIONS

Based on the attached analysis, the following recommendations are submitted on behalf of the Federal Law Enforcement Wireless Users Group:

1. The interference protection limit for public safety receivers should be 6 dB below the noise power level of the receiver. This is based on a 1 dB degradation in the receiver noise level. This conservative approach is warranted because the services to be allocated in the spectrum adjacent to the public safety spectrum and their associated technical characteristics are unknown.

2. The adjacent band emission limits proposed by the Commission (43 + 10 Log(Power)) for transmitters in the 746-764/776-794 MHz bands will not adequately protect public safety receivers in the 764-776/794-806 MHz bands.

3. Based on the interference protection limits for public safety receivers approximately 78 dB of attenuation is required to protect public safety receivers from the adjacent band emissions of fixed and mobile transmitters.

4. There are benefits in allocating a service such as the Private Mobile Radio Service or other like services adjacent to the bands allocated for public safety:

- allocating compatible services adjacent to the public safety bands would minimize the potential for interference to the public safety receivers;
- interference to public safety receivers can be managed effectively through a coordination process;
- creates a region over which mobile and fixed commercial transmitters can attenuate adjacent band emissions to a level adequate to protect public safety receivers;
- instead of establishing a guardband where spectrum would lie fallow to protect public safety receivers this approach would make efficient use of the spectrum.

5. Allocating the spectrum adjacent to the public safety spectrum to a service employing low power transmitters is another alternative to protect public safety operations that has both benefits and drawbacks:

- lower power transmitters should be able to achieve adjacent band emission limits adequate to protect public safety receivers with minimum impact and cost to their system design;

- since the location of these devices and the number of devices in a given geographic area may not be known possibly making coordination difficult;

- based on the anticipated high density use of fixed and mobile low power transmitters, the potential adjacent band interference to public safety receivers must take into account the effect of aggregate interference from multiple transmitters.

ATTACHMENT

INTRODUCTION

During the National Coordination Committee (NCC) conference call held on October 12, the band plans proposed by Motorola and FreeSpace Communications were discussed. Both bands plans are similar in that they propose to allocate a segment of the spectrum adjacent to the 764-776/794-806 MHz spectrum allocated for public safety (1.5 MHz in the Motorola plan and 2 MHz in the FreeSpace plan) to a compatible or low power service to create a "transition zone" between public safety and potentially incompatible commercial uses of the band. The NCC Steering Committee members suggested that it would be beneficial to establish a receiver interference protection limit for the public safety receivers operating in the 764-776/794-806 MHz bands. The receiver interference protection limit could then be used to justify a band plan proposing suggested allocations of the services in the band segments that are adjacent to the 764-776/794-806 MHz public safety spectrum. The NCC Steering Committee recommended that the Federal partners provide assistance in the development of a public safety receiver interference protection limit. This paper provides: 1) a methodology that could be used in the development of a receiver interference protection limit for the public safety receivers in the 764-776/794-806 MHz bands, 2) a proposal for adjacent band emission limits to protect public safety receivers, and 3) an examination of the proposed band plans.

METHODOLOGY TO DEVELOP RECEIVER INTEFERENCE PROTECTION LIMITS FOR PUBLIC SAFETY RECEIVERS

Receiver Interference Threshold

The level of interference that is acceptable for a receiver is affected by a number of factors such as the minimum propagation loss between the transmitter and receiver, the probability that a interfering transmitter is at a distance from the public safety receiver where it will cause interference and the probability that the public safety receiver is close to it's limit of coverage. Many of these factors are difficult to estimate. Law enforcement and public safety systems should be designed to support the lowest effective radiated power subscriber set intended for primary usage. In most instances this will necessitate systems be designed to support handheld/portable operation. In these instances it is recommended that the lowest practical power level radio be assumed to determine system performance in a prescribed area of operation.[1]

To develop an interference protection limit for the public safety receivers in the 764-776/794-806 MHz bands a noise limited system will be assumed. A noise limited system is defined as one in which the performance is limited by the receiver noise level. In this case, the carrier-to-noise ratio (C/N) is only slightly greater than the minimum required for acceptable performance. In a noise-limited system, the interference level can be referred to the noise level and an interference-to-noise ratio (I/N) threshold can be

[1] TIA/EIA Telecommunications Systems Bulletin TSB88, Wireless Communications Systems Performance in Noise and Interference-Limited Situations – Recommended Methods for Technology-Independent Modeling, Simulation, and Verification, January 1998.

used as the criterion for acceptable performance of the receiver. Since the threshold is based only on the noise level of the receiver the assumption of a noise limited system will result in a conservative interference protection limit that is somewhat independent of the receiver technology employed. A conservative approach is warranted because the services to be allocated in the spectrum adjacent to the public safety spectrum and their associated technical characteristics are unknown. Furthermore, the Notice of Proposed Rulemaking (NPRM)[2] and the legislative history[3] make it clear that in developing the rules for services that will operate in the 746-764 and 776-794 MHz bands, the Commission should ensure that public safety communications operating in the adjacent bands are not subject to interference from new services.

The relationship between the I/N threshold (I/N_t) and the C/N is given in the equation below:

$$I / N_t = 10\mathrm{Log}(10^{M_I/10} - 1)$$

The interference margin (M_I) is defined by:

$$M_I = C/N - C/(N+I)$$

where

C/N is the carrier-to-noise ratio in the absence of interference (dB);
C/(N+I) is the carrier-to-(noise plus interference) ratio (dB).

An interfering transmitter can increase the noise floor of the public safety receiver causing degraded or lost communication. In the 764-776/794-806 MHz bands digital technology is to be employed. For a digital receiver, the bit error rate (BER) performance is directly related to the receiver noise level by the energy per bit per Hertz (E_b/N_0). An increase in the receiver noise level will decrease the E_b/N_0 resulting in an increase in the BER. Establishing an interference threshold that is equal to or less than the receiver noise level is a common approach for digital receivers. In order to protect public safety receivers in the 764-776/794-806 MHz bands a 1 dB increase in the receiver noise floor will be permitted. Using the equation for I/N threshold the 1 dB increase in the receiver noise floor results in a interference threshold of I/N_t = -6 dB. This means that the interference must be kept at least 6 dB below the noise level of the public safety receivers in the 764-776/794-806 MHz bands.

Receiver Noise Power Level

As described in TIA/EIA TSB88, the receiver noise power level includes external environmental noise, transmission line noise, and internal receiver noise. A standard method of computing the total system noise power is to find the equivalent noise system temperature (T_{SYS}), which is equal to the noise temperature of the antenna (T_{ANT}) plus

[2] *Service Rules for the 746-764 and 776-794 MHz Bands, and Revisions to Part 27 of the Commission's Rules*, Notice of Proposed Rulemaking, WT Docket No. 99-168 (released June 3, 1999) (hereinafter NPRM).

[3] Balanced Budget Act of 1997, Conference Report to Accompany H.R. 2015, 105th Cong., 1st Sess., Report 105-217, at 580 (july 30, 1997).

the noise temperature of the receiver (T_R). (T_{ANT} accounts for both external environmental and transmission line noise). The total receiver noise power N, in dBW, is then given by:

$$N = 10 \text{ Log } (kT_{SYS}B)$$

where

k is Boltzman's constant 1.38×10^{-23} (J/K);
T_{SYS} is $T_{ANT}+T_R$ (K);
B is the receiver bandwidth (Hz).

As stated in TSB88 the receiver's Equivalent Noise Bandwidth (ENBW) should be used for the receiver bandwidth. Table 3 in Annex A of TSB88 provides values of ENBW for various configurations.

The receiver noise temperature is calculated using the standard formula:

$$T_R = T_0 (10^{(F/10)} - 1)$$

where

T_0 is standard temperature of 290 (K);
F is the receiver noise figure (dB).

The antenna noise temperature is given by:

$$T_{Ant} = [290(L_{CR} - 1) + T_{EVMT}]/L_{CR}$$

where

L_{CR} is the receiver cable loss factor;
T_{EVMT} is the external environmental noise temperature.

The external environmental noise temperature is determined using the following equation:

$$T_{EVMT} = [10^{(N_{EVMT}-204)/10}]/k$$

The term N_{EVMT} is the frequency dependent environmental noise level, which takes into account atmospheric (lightning), man-made (urban, suburban, and rural), and galactic noise sources. A C++ program is provided in Annex A that can be used to compute the total receiver noise power. In this program the curves used for the external environmental noise level were derived from ITU-R study group recommendations, and represent measured data for the worst times/worst locations, (Noisy/Urban), best times/best locations (Quiet/Rural), and a median range (Average/Suburban).[4]

[4] Recommendation ITU-R PI.372-6 Radio Noise.

Calculation of the Interference Protection Limit for Public Safety Receivers

To compute the interference thresholds for the public safety receivers in the 764-776/794-806 MHz bands the following parameters will be used:

Frequency: 764 MHz
Bandwidth: 6.25 kHz (ENBW: 5.7 kHz)
Cable Loss: 1 dB
Noise Figure: 9 dB

Using the parameters given above, the total receiver noise power is found to be:

Rural: -127.85 dBm
Suburban: -127.78 dBm
Urban: -127.59 dBm

At 700 MHz the contribution from external environmental noise is negligible. The total receiver noise power is approximately:

$$N = -128 \text{ dBm}$$

Using the I/N threshold developed earlier the interference protection limit for the public safety receivers is given by:

$$I = N + I/N_t = -128 - 6 = -134 \text{ dBm}$$

THE DEVELOPMENT OF ADJACENT BAND EMISSION LIMITS TO PROTECT PUBLIC SAFETY RECEIVERS

For transmitters operating in the 746-764/776-794 MHz bands the Commission has proposed to limit adjacent band emissions below the transmitter power by at least 43+ 10 Log (Power in Watts) or 80 dB whichever is less.[5] This will apply to any emission on all frequencies outside of the authorized spectrum. Two interference scenarios will be considered to develop the required adjacent band emission limits to protect public safety receivers in the 764-776/794-806 MHz band: 1) base-to-mobile and 2) mobile-to-mobile.

Base-to-Mobile Scenario. The interfering signal power level (I) from transmitters in the adjacent 746-764/776-794 MHz bands at the input of a public safety receiver is found by the following equation:

$$I = EIRP - P_{AdjBand} + G_R - L_P - L_{CR}$$

[5] NPRM at ¶ 69.

where

EIRP is the equivalent isotropically radiated power density of the transmitter operating in the 746-764/776-794 MHz band (dBm/6.25 kHz);
$P_{AdjBand}$ is the adjacent band attenuation of the transmitters operating in the 746-764/776-794 MHz bands (dB);
G_R is the public safety receiver antenna gain (dBi);
L_P is the propagation loss between the transmitter operating in the 746-764/776-794 MHz bands and the public safety receiver in the adjacent band (dB);
L_{CR} is the cable/insertion loss of the transmitter system (dB).

To determine the adjacent band emission limit required to protect public safety receivers for the base-to-mobile scenario, a nominal transmitter EIRP of 50 watts (2 watt transmitter power and a 11.85 dBi antenna gain) in a 1 MHz bandwidth will be used. A value of 2 dB will be used for the cable/insertion loss of the transmitter. The public safety receiver antenna gain is assumed to be 0 dBi.

The following equation will be used to compute the propagation loss, based on free space propagation:

$$L_P = 20 \text{ Log } F + 20 \text{ Log } S - 27.55$$

where F is the frequency of the transmitter, in MHz, and

$$S = (D^2 +)h^2)^{0.5}$$

where D is the horizontal distance separation between the transmitter and receiving meters and)h is the vertical separation in the antenna height between the transmitter and receiver antennas in meters. Assuming a horizontal distance separation of 250 meters, a vertical separation of 100 meters and a frequency of 746 MHz the propagation loss is 78.5 dB.

To determine the adjacent band emission level required to protect a public safety receiver the interference power level will be set equal to the receiver interference threshold of −133 dBm. The adjacent band attenuation required to protect public safety receivers is found to be:

$$P_{AdjBand} = -I + EIRP + G_R - L_P - L_{CR} = -(-134) + 24.9 + 0 - 78.5 - 2 = 78.4 \text{ dB}$$

The adjacent band attenuation level proposed by the Commission yields:

$$P_{AdjBand} = 43 + 10 \text{ Log } P = 43 + 10 \text{ Log } (2) = 46 \text{ dB}$$

Therefore an additional 32 dB of adjacent band attenuation to that proposed by the Commission is required to protect public safety receivers from adjacent band emissions of a base station transmitter.

Mobile-to-Mobile Scenario. To determine the adjacent band emission limit required to protect public safety receivers for the mobile-to-mobile scenario a transmitter EIRP of 1 watt in a 1 MHz bandwidth will be used. A value of 2 dB will be used for the cable/insertion loss of the transmitter. The public safety receiver antenna gain is assumed to be 0 dBi.

The same general equations used in the previous section will be used to determine the adjacent band emission level required to protect public safety receivers. A distance separation of 50 meters will be assumed between the mobile transmitter and the public safety receiver. The adjacent band attenuation required to protect public safety receivers is found to be:

$$P_{AdjBand} = -I + EIRP + G_R - L_P - L_{CR} = -(-134) + 7.9 + 0 - 63.8 - 2 = 76.1 \text{ dB}$$

The adjacent band attenuation level proposed by the Commission yields:

$$P_{AdjBand} = 43 + 10 \text{ Log } P = 43 + 10 \text{ Log } (1) = 43 \text{ dB}$$

Therefore an additional 33 dB of adjacent band attenuation to that proposed by the Commission is required to protect public safety receivers from adjacent emissions of a mobile transmitter.

EXAMINATION OF THE PROPOSED BAND PLANS FOR THE 746-806 MHz BAND

Motorola Band Plan

In filings with the Commission Motorola has demonstrated that highly dissimilar services operating in close proximity raise the potential of interference. Motorola described how traditional high-power broadcast operations are incompatible with low power mobile services. Motorola also provided analysis demonstrating the difficulties that traditional low-site, high frequency reuse cellular systems will have on providing the protection necessary to ensure interference-free operation of public safety systems operating in the 24 MHz of spectrum already allotted in the 746-806 MHz band. [6]Motorola maintains that in order to provide proper adjacent-channel protection to public safety services, the types of wider bandwidth technologies currently being deployed for commercial operations will not be able to operate within 1.5 MHz of the public safety services. Based on this, Motorola proposed a band plan that creates four 1.5 MHz band segments within each end of the 746-764 MHz and 776-794 MHz band segments. The 1.5 MHz band segments would be allocated to the Private Mobile Radio Service (PMRS). The remaining portions of the 746-764 MHz and 776-794 MHz would be allocated to the Commercial Mobile Radio Service (CMRS). This band plan would create a "transition region" between public safety and higher powered fixed and mobile commercial uses.

[6] Letter from Steve B. Sharkey, Motorola Inc., to Ms. Magalie Roman Salas, Secretary Federal Communications Commission. *Ex Parte* Notification – WT Docket No. 99-168 (Oct. 12, 1999).

The Motorola Band Plan is based on the following analysis:

- The adjacent band emissions were modeled as a 1.25 MHz CDMA carrier. This is the widest of the existing technologies deployed in the cellular and PCS bands and could be used in the CMRS spectrum.

- The interference protection limit of the public safety receivers is at the same level as the noise floor of the receiver (-127 dBm). This is based on an I/N interference threshold of 0 dB. For an I/N=0 dB the increase in the public safety receiver noise floor would be:

$$C/N - C/N+I = 10 \text{ Log } (10^{I/N/10} + 1) = 10 \text{ Log } (10^{0} + 1) = 3 \text{ dB}$$

  Using this interference protection limit would result in a 3 dB desensitization of the public safety receivers.

- The propagation loss is based on measured data from NEXTEL. For the 90% propagation loss curve the propagation loss was 75 dB. Using the 90% propagation curve means that 10% of the time the propagation loss will be below this value.

- Based on the parameters above the required adjacent band attenuation to protect public safety receivers is found to be:

$$P_{AdjBand} = 24 + 127 - 75 = 76 \text{ dB}$$

- Assuming the existing roll-off of the CDMA emission mask in Part 24 of the Commission's Rules approximately 19 dB of additional attenuation would be required to protect public safety receivers.

The 1.5 MHz band segment allocated to PMRS would be used to provide a transition region for higher powered mobile and fixed commercial transmitters to attenuate their adjacent band emissions to a level adequate to protect public safety receivers. Motorola maintains it's proposal will balance the concerns of spectrum efficiency and protection of public safety operations.

FreeSpace Communications Band Plan

The FreeSpace network is comprised of handsets and modems that transmit data and voice via a wireless link to small antennas that are mounted on either existing transmission towers or small base stations located throughout a community. The base stations can be linked to the internet through either wireline digital subscriber lines or other high speed internet connections. FreeSpace proposes that the Commission adopt the following channelization plan and power spectral density (PSD) limits in order to protect public safety receivers operating in the 764-776/794-806 MHz band[7]:

[7] Letter from A. Richard Metzger, Jr., Ruth M. Milkman, and Charles W. Logan Counsel for FreeSpace Communications to Thomas J. Sugrue, Chief Wireless Telecommunications Bureau Federal

- The channels operating at 763-764 MHz and 793-794 MHz would be required to operate at a peak transmit PSD that does not exceed 4 mW/kHz. If transmitting antennas of directional gain greater than 6 dBi are used, the peak PSD would be required to be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

- The channels operating at 762-763 MHz and 792-793 MHz would be required to operate at a peak transmit PSD that does not exceed 20 mW/kHz. If transmitting antennas of directional gain greater than 6 dBi are used, the peak PSD would be required to be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

The PSD levels proposed by FreeSpace represent in-band limits for their systems. The attenuation of the emissions in the 764-776/794-806 MHz bands were not provided by FreeSpace. Moreover the FreeSpace plan does not provide an analysis demonstrating how the proposed PSD levels will protect adjacent band public safety receivers.

For a given distance separation the adjacent band emission limit of a single FreeSpace transmitter that is required to protect a public safety receiver can be determined using the following equation:

$$P_{AdjBand} = -I_T + P_T + G_T + G_R - 20 \text{ Log } F - 20 \text{ Log } D + 27.55 - L_{CR}$$

where

I_T is the public safety receiver interference protection limit (dBm);
P_T is the FreeSpace transmitter PSD (dBm/6.25 kHz);
G_T is the FreeSpace transmitter antenna gain (dBi);
G_R is the public safety receiver antenna gain (dBi);
F is the FreeSpace transmitter frequency (MHz);
D is the distance separation between the FreeSpace transmitter and the public safety receiver (m);
L_{CR} is the cable/insertion loss of the FreeSpace transmitter (dB).

Using the FreeSpace transmitter PSD limits of 4 mW/1 kHz (14 dBm/6.25 kHz) and 20 mW/1kHz (20.97 dBm/6.25 kHz), an antenna gain for the FreeSpace transmitter of 6 dBi, a frequency of 746 MHz, and a nominal distance separation of 500 meters, the single entry adjacent band emission limits required to protect public safety receivers are computed below:

<u>4 mW/1kHz PSD Limit</u>

$$P_{AdjBand} = -(-134) + 14 + 6 + 0 - 57.45 - 53.9 + 27.55 - 2 = 68.2 \text{ dB}$$

Communications Commission, Written *Ex Parte* Communication Service Rules for the 746-764 and 776-794 MHz Bands, and Revisions to Part 27 of the Commission's Rules WT Docket No. 99-168 (Oct. 13, 1999).

- The channels operating at 763-764 MHz and 793-794 MHz would be required to operate at a peak transmit PSD that does not exceed 4 mW/kHz. If transmitting antennas of directional gain greater than 6 dBi are used, the peak PSD would be required to be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

- The channels operating at 762-763 MHz and 792-793 MHz would be required to operate at a peak transmit PSD that does not exceed 20 mW/kHz. If transmitting antennas of directional gain greater than 6 dBi are used, the peak PSD would be required to be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

The PSD levels proposed by FreeSpace represent in-band limits for their systems. The attenuation of the emissions in the 764-776/794-806 MHz bands were not provided by FreeSpace. Moreover the FreeSpace plan does not provide an analysis demonstrating how the proposed PSD levels will protect adjacent band public safety receivers.

For a given distance separation the adjacent band emission limit of a single FreeSpace transmitter that is required to protect a public safety receiver can be determined using the following equation:

$$P_{AdjBand} = -I_T + P_T + G_T + G_R - 20 \text{ Log } F - 20 \text{ Log } D + 27.55 - L_{CR}$$

where

I_T is the public safety receiver interference protection limit (dBm);
P_T is the FreeSpace transmitter PSD (dBm/6.25 kHz);
G_T is the FreeSpace transmitter antenna gain (dBi);
G_R is the public safety receiver antenna gain (dBi);
F is the FreeSpace transmitter frequency (MHz);
D is the distance separation between the FreeSpace transmitter and the public safety receiver (m);
L_{CR} is the cable/insertion loss of the FreeSpace transmitter (dB).

Using the FreeSpace transmitter PSD limits of 4 mW/1 kHz (14 dBm/6.25 kHz) and 20 mW/1kHz (20.97 dBm/6.25 kHz), an antenna gain for the FreeSpace transmitter of 6 dBi, a frequency of 746 MHz, and a nominal distance separation of 500 meters, the single entry adjacent band emission limits required to protect public safety receivers are computed below:

<u>4 mW/1kHz PSD Limit</u>

$$P_{AdjBand} = -(-134) + 14 + 6 + 0 - 57.45 - 53.9 + 27.55 - 2 = 68.2 \text{ dB}$$

Communications Commission, Written *Ex Parte* Communication Service Rules for the 746-764 and 776-794 MHz Bands, and Revisions to Part 27 of the Commission's Rules WT Docket No. 99-168 (Oct. 13, 1999).

<u>20 mW/1kHz PSD Limit</u>

$$P_{AdjBand} = -(-134) + 20.97 + 6 + 0 - 57.45 - 53.9 + 27.55 - 2 = 75.2 \text{ dB}$$

Based on the envisioned high density use of fixed and mobile FreeSpace transmitters, the analysis of adjacent band emissions to protect public safety receivers must take into consideration the effect of aggregate interference from multiple FreeSpace transmitters. To compute the aggregate adjacent band attenuation the following equation will be used:

$$P_{AggAdjBand} = -I_T + P_T + G_T + G_R - 20 \text{ Log } F - 20 \text{ Log } D + 27.55 - L_{CR} + 10 \text{ Log } N + 10 \text{ Log } DF$$

This equation is similar to the single entry equation above with the exception of two factors N and DF. N is the number of transmitters in view of a public safety receiver. DF is the duty factor of each transmitter. Making nominal assumptions that ten transmitters are in view of a public safety receiver each transmitting 20% of the time, the adjacent band emission limits for each transmitter that is required to protect public safety receivers assuming multiple transmitters are computed below:

<u>4 mW/1kHz PSD Limit</u>

$$P_{AggAdjBand} = -(-134) + 14 + 6 + 0 - 57.45 - 53.9 + 27.55 - 2 + 10 - 6.98 = 71.2 \text{ dB}$$

<u>20 mW/1kHz PSD Limit</u>

$$P_{AggAdjBand} = -(-134) + 20.97 + 6 + 0 - 57.45 - 53.9 + 27.55 - 2 + 10 - 6.98 = 78.2 \text{ dB}$$

CONCLUSIONS

The adjacent band emission limits ultimately established for the transmitters operating in the 746-764/776-794 MHz bands will impact the use of this spectrum for commercial applications. However, based on the analysis presented in this document it is clear that if the adjacent band emission limits proposed by the Commission are adopted transmitters in the 746-764/776-794 MHz will cause interference to public safety receivers in the 764-776/794-806 MHz bands.

Based on the receiver interference protection limits for public safety receivers approximately 78 dB of attenuation is required to protect public safety receivers from adjacent band emissions of fixed and mobile transmitters.

The analysis performed by Motorola also showed that additional attenuation will be required to protect public safety receivers from the adjacent band emissions of transmitters in the 746-764/776-794 MHz. In order to provide adequate protection for public safety receivers while maximizing the use of this spectrum for commercial applications, an approach similar to that proposed by Motorola could be employed. Instead of creating a guardband of unused spectrum between a less compatible commercial service and the public safety spectrum this approach would allocate the spectrum adjacent to the public safety bands to a compatible service where the interference can be effectively managed. This would create a region over which the

commercial service could attenuate their adjacent band emissions to the level required to protect public safety receivers, thereby minimizing the cost and impact to design of their systems.

Another approach was proposed where the spectrum adjacent to the 764-776/794-806 MHz public safety bands is allocated to a service employing low-powered transmitters. The interference to public safety receivers from these low-powered transmitters will depend on the adopted adjacent band emission limits and the number of devices operating in a given geographic area.

ANNEX A
ALGORITHM TO COMPUTE THE RECEIVER NOISE LEVEL

```
/* This algorithm is designed to compute the received noise power at
the receiver.
 * The atmospheric noise temperature, which is accounted for in the
antenna noise temperature
 * is first referenced to the receiver input through a cable with a
user entered loss. The
 * temperature is then added to the receiver noise temperature, which
is computed using the
 * receiver bandwidth and noise figure, to give the effective system
noise temperature. This
 * quantity is then converted to a noise power level.
 *                    Reference: Reference Data for Engineers - Chapter
34 and Recommendation ITU-R PI.372-6.

 */

#include <iostream.h>
#include <math.h>
#include <conio.h>
#include <graph.h>
#include <stdlib.h>
#include <iomanip.h>
#include <fstream.h>
#include <stdio.h>
#include <io.h>

void main()
{
        double Trcvr;                           /* Receiver noise
temperature */
        double Tsys;                            /* System noise
temperature */
        double k=1.38*pow(10.0,-23.0);          /* Boltzman's constant
*/
        double To = 290.;                       /* Reference (ambient)
temperature */
        double TatmosdB;                        /* Atmospheric noise
temperature */
        double Tantenna;                        /* Antenna noise
temperature */
        double Tant_at_rcvr;                    /* Antenna noise
temperature referenced to receiver */
        double P;                               /* Noise figure in dB =
10*log(1+Trcvr/To) */
        double nfactor;                         /* Noise factor - noise
figure converted to fraction */
        double Loss_cable;                      /* Cable loss in dB */
        double Cable_loss;                      /* Cable loss converted
to fraction */
        double BW;                              /* Receiver bandwidth in
KHz */
```

```
        double fo;                              /* Receiver tuned
frequency in MHz */
        double Signal_to_Noise_Threshold;
        double Minimum_Signal_Level_at_Antenna_Terminals;
        double Minimum_Signal_Level_at_Receiver;
        double Antenna_Noise_Power_at_Receiver;
        double Cable_Noise_Power_at_Receiver;
        double Receiver_Noise_Power;
        double ANPR_in_dBm;
        double CNPR_in_dBm;
        double RNP_in_dBm;
        double Comb_Cab_and_Ant_Noise_Power_in_dBm;
        double Total_Noise_Power;
        double System_Noise_Power_in_dBm;
        double Natm;
        long Loc_Code;

        printf("Enter tuned frequency receiver, in MHz: ");
        scanf("%lf", &fo);
        printf("Enter receiver bandwidth, in KHz: ");
        scanf("%lf", &BW);
        printf("Enter receive cable loss, in dB: ");
        scanf("%lf", &Loss_cable);
        printf("Enter receiver noise figure, in dB: ");
        scanf("%lf", &F);
        printf("Enter location code: 1) Rural:,  2) Residential:,  3)
Urban: ");
        scanf("%ld", &Loc_Code);


if(fo >= 0.000001 && fo < .00001)                   /* 1 Hz to 10 Hz */
        Natm = 267. - 30.*log10(fo/0.000001);

if(fo >= 0.00001 && fo < 0.0001)                    /* 10 Hz to 100 Hz
*/
        Natm = 237. - 27.*log10(fo/0.00001);

if(fo >= 0.0001 && fo < 0.000316)                   /* 100 Hz to 316 Hz
*/
        Natm = 210. - 30.0*log10(fo/0.0001);

if(fo >= 0.000316 && fo < 0.001)                     /* 316 Hz to 1 KHz
*/
        Natm = 195. - 60.0*log10(fo/0.000316);

if(fo >= 0.001 && fo < 0.00316)                      /* 1 KHz to 3.16
KHz */
        Natm = 165. - 20.0*log10(fo/0.001);

if(fo >= 0.00316 && fo < 0.01)                       /* 3.16 KHz to 10
KHz */
        Natm = 155. + 16.0*log10(fo/0.00316);

if(fo >= 0.01 && fo < 0.1)                           /* 10 KHz to 100
KHz */
        Natm = 163.0 - 53.0*log10(fo/0.01);
```

```
if(fo >= 0.1 && fo < 1.)                                /* 100 KHz to 1 MHz
*/
        Natm = 110.0 - 37.5*log10(fo/0.1);

if(fo >= 1.0 && fo < 10.0)                              /* 1 MHz to 10 MHz
*/
        Natm = 72.5 - 32.5*log10(fo/1.);

if(fo >= 10. && fo < 31.6)                              /* 10 MHz to 31.6
MHz */
        Natm = 40.0 - 30.0*log10(fo/10.);

if(fo >= 31.6 && fo < 100.)                             /* 31.6 MHz to 100
MHz */
        Natm = 25. -20.0*log10(fo/31.6);

if(fo >= 100. && fo < 1000.)                            /* 100 MHz to 1 GHz
*/
        Natm = 15. - 25.*log10(fo/100.);

if(fo >= 1000.)                                          /* 1 GHz to    */
        Natm = -11.;

if(Loc_Code == 1 )
Natm = Natm - 6.0;

if(Loc_Code == 3)
Natm = Natm + 5.0;


/* Converting the cable loss in dB to a real number. */
Cable_loss = pow(10,Loss_cable/10);


/* Converting the noise figure to noise factor */
nfactor = pow(10,F/10);


/* Computing the receiver noise temperature using: noise factor = 1
+Trcvr/To */
Trcvr = To*(nfactor - 1);


/* Converting atmospheric noise level to an antenna temperature */
TatmosdB = Natm - 204. + 10*log10(BW*1000.);


Tantenna = (pow(10,TatmosdB/10))/(k*BW*1000.);


Antenna_Noise_Power_at_Receiver = (k*Tantenna*BW*1000.)/Cable_loss;

ANPR_in_dBm = 10*log10(Antenna_Noise_Power_at_Receiver) + 30.;

Cable_Noise_Power_at_Receiver = k*To*BW*1000.*(Cable_loss-
1)/Cable_loss;
```

```
if(fo >= 0.1 && fo < 1.)                                /* 100 KHz to 1 MHz
*/
        Natm = 110.0 - 37.5*log10(fo/0.1);

if(fo >= 1.0 && fo < 10.0)                              /* 1 MHz to 10 MHz
*/
        Natm = 72.5 - 32.5*log10(fo/1.);

if(fo >= 10. && fo < 31.6)                              /* 10 MHz to 31.6
MHz */
        Natm = 40.0 - 30.0*log10(fo/10.);

if(fo >= 31.6 && fo < 100.)                             /* 31.6 MHz to 100
MHz */
        Natm = 25. -20.0*log10(fo/31.6);

if(fo >= 100. && fo < 1000.)                            /* 100 MHz to 1 GHz
*/
        Natm = 15. - 25.*log10(fo/100.);

if(fo >= 1000.)                                          /* 1 GHz to    */
        Natm = -11.;

if(Loc_Code == 1 )
Natm = Natm - 6.0;

if(Loc_Code == 3)
Natm = Natm + 5.0;


/* Converting the cable loss in dB to a real number. */
Cable_loss = pow(10,Loss_cable/10);


/* Converting the noise figure to noise factor */
nfactor = pow(10,F/10);


/* Computing the receiver noise temperature using: noise factor = 1
+Trcvr/To */
Trcvr = To*(nfactor - 1);


/* Converting atmospheric noise level to an antenna temperature */
TatmosdB = Natm - 204. + 10*log10(BW*1000.);


Tantenna = (pow(10,TatmosdB/10))/(k*BW*1000.);


Antenna_Noise_Power_at_Receiver = (k*Tantenna*BW*1000.)/Cable_loss;

ANPR_in_dBm = 10*log10(Antenna_Noise_Power_at_Receiver) + 30.;

Cable_Noise_Power_at_Receiver = k*To*BW*1000.*(Cable_loss-
1)/Cable_loss;
```

```
CNPR_in_dBm = 10*log10(Cable_Noise_Power_at_Receiver) + 30.;

Receiver_Noise_Power = k*To*BW*1000.*(nfactor - 1);

RNP_in_dBm = 10*log10(Receiver_Noise_Power) + 30.;

Comb_Cab_and_Ant_Noise_Power_in_dBm =
10*log10(Antenna_Noise_Power_at_Receiver +
Cable_Noise_Power_at_Receiver) + 30.;

Total_Noise_Power = Antenna_Noise_Power_at_Receiver +
Cable_Noise_Power_at_Receiver + Receiver_Noise_Power;
System_Noise_Power_in_dBm = 10*log10(Total_Noise_Power) + 30.;

/* Referencing antenna temperature to receiver input */
Tant_at_rcvr = ((Cable_loss - 1.)*290 + Tantenna)/Cable_loss;

/* Total system noise temperature */
Tsys = Trcvr + Tant_at_rcvr;

//                              OUTPUT
printf("                                    \n");

printf("-------------------NOISE PROGRAM RESULTS --------------------
\n\n\n");

printf("Environmental Noise Level above kToBn (dB): %.2lf\n\n", Natm);

printf("Antenna Noise Temperature (K): %.2lf\n\n", Tantenna);

printf("Antenna Noise Temperature at Receiver (K): %.2lf\n\n",
Tant_at_rcvr);

printf("Receiver Noise Temperature (K): %.2lf\n\n", Trcvr);

printf("System Noise Temperature (K): %.2lf\n\n", Tsys);

printf("Antenna Noise Power at Receiver (W): %e\n\n",
Antenna_Noise_Power_at_Receiver);

printf("                Press <ENTER> to Continue            \n\n");

_getch();                       /* pauses the output until the user hit
s a key. */

printf("Cable Noise Power at Receiver (W): %e\n\n",
Cable_Noise_Power_at_Receiver);

printf("Receiver Noise Power (W): %e\n\n", Receiver_Noise_Power);

printf("Total Noise Power (W): %e\n\n", Total_Noise_Power);

printf("Antenna Noise Power at Receiver (dBm): %.2lf\n\n",
ANPR_in_dBm);

printf("Cable Noise Power at Receiver (dBm): %.2lf\n\n", CNPR_in_dBm);
```

```
printf("Cable + Antenna Noise at Receiver (dBm): %.2lf\n\n",
Comb_Cab_and_Ant_Noise_Power_in_dBm);

printf("Receiver Noise Power (dBm): %.2lf\n\n", RNP_in_dBm);

printf("Total System Noise Power (dBm): %.2lf\n",
System_Noise_Power_in_dBm);

}
```

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JAMES E. DERDERIAN, CHIEF OF STAFF

U.S. House of Representatives
Committee on Commerce
Room 2125, Rayburn House Office Building
Washington, DC 20515–6115

November 18, 1999

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99-168

The Honorable William E. Kennard
Chairman
Federal Communications Commission
445 12th Street, S.W.
Washington, D.C. 20554

Dear Chairman Kennard:

I am writing with regard to the Federal Communications Commission's proceeding to allocate radio spectrum located at 746-806 MHz. The legislative history contained in the Balanced Budget Act of 1997 makes it clear that public safety uses in this band must be fully protected against harmful interference. I understand that in satisfying this requirement, the Commission also has the opportunity to partially remedy the existing shortage of spectrum available for private mobile radio use.

I am sure you will agree it is vitally important that public safety spectrum remains free of harmful interference, and this goal should be achieved in the most spectrally efficient manner. If harmful interference can be avoided by creating adjacent "guard bands" that simultaneously can be used by private mobile radio service, then each of these important policy objectives can be satisfied.

As you know, over the last decade the private mobile radio service has experienced an exponential increase in demand for frequencies, while the spectrum available to it has actually shrunk. Since 1986, the Commission has not allocated any additional spectrum to private use, and it is clear that commercially available wireless services cannot fill the gap. The Commission should begin taking steps to meet the needs of private wireless users, and this proceeding is a wonderful opportunity for the agency to do so.

I urge the Commission to carefully consider both policy goals – *i.e.*, protecting public safety uses from interference, and increasing the available spectrum for private industrial use – in the context of its current allocation proceeding. I hope that the agency will find a technologically efficient way to accommodate both of these objectives.

Thank you for your consideration of this matter.

Sincerely,

JOHN D DINGELL
RANKING MEMBER

cc: Commissioner Susan Ness
Commissioner Harold Furchtgott-Roth
Commissioner Michael Powell
Commissioner Gloria Tristani

PETER DEUTSCH
20TH DISTRICT, FLORIDA

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House of Representatives
Washington, DC 20515–0920

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November 22, 1999

EX PARTE OR LATE FILED

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FEDERAL COMMUNICATIONS COMMISSION
OFFICE OF THE SECRETARY

99-168

The Honorable William E. Kennard
Chairman
Federal Communications Commission
445 12th Street, SW
Washington, DC 20554

Dear Chairman Kennard:

I am writing with respect to a current FCC proceeding on the auction rules for radio spectrum located at 746-806 MHz. The disposition of this spectrum is important to public safety users including police, fire, and emergency medical support because of a prior action, directed by Congress, to allocate 24 MHz of neighboring spectrum to public safety users.

It is a paramount concern of the public safety community that its spectrum remains free from any harmful radio interference. As you know, the safety of the American public depends on reliable communications and controlling interference to public safety communications systems. The public safety community has gone on record supporting allocating the spectrum under consideration in a way that includes the use of guard bands around the public safety spectrum.

One proposal that appears to protect the public safety community provides for allocating segments of spectrum specifically to private mobile radio services (PMRS). These are services which support operations such as manufacturing, hospitals, utilities, railroad control systems, and other enterprises. There is a decades long tradition of coordination among this class of users and the public safety community. Further, the allocation of the spectrum to this community of users provides an another significant public benefit because the systems are often similar if not technologically identical to public safety radio systems. Therefore, the economies of scale from a PMRS allocation would provide the opportunity to reduce the costs of radio equipment for State, Local, and federal public safety entities.

Other proposals have been under consideration for this important spectrum, including proposals for a low power service, but this proposal does not appear to provide the sort of interference protection that critical public safety services need. I would urge the Commission to carefully consider the allocations it will make for the auction and to

ensure that no service be permitted which could interfere with a critical use like public safety.

Sincerely,

Peter Deutsch
Member of Congress

cc: Commissioner Susan Ness
Commissioner Michael Powell
Commissioner Harold Furchtgott-Roth
Commissioner Gloria Tristani

PD/fsh

MARK FOLEY
16TH DISTRICT, FLORIDA
DEPUTY MAJORITY WHIP
WAYS AND MEANS COMMITTEE
HUMAN RESOURCES SUBCOMMITTEE

Congress of the United States
House of Representatives
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99-168

William E. Kennard, Chairman
Federal Communications Commission
445 Twelfth Street, S.W.
Washington, DC 20554

EX PARTE OR LATE FILED

Dear Chairman Kennard,

It is my understanding that the Commission is presently finalizing the rules and band plan for the auction of TV channels 60-69 in the 746-806 MHZ band. I also understand that the Commission is considering allocating a portion of this spectrum to private wireless through the auspices of one or more band managers.

I support this allocation for private use as it would ease some of the frequency congestion private wireless users are currently experiencing and also help protect public safety users on adjacent channels from interference by commercial systems. Private wireless entities, who use spectrum for internal operations, are unlikely to bid in an auction for spectrum against commercial operators. In this plan, private wireless users would have access to this spectrum through band managers. These band managers would bid in the auction and subsequently reallocate the spectrum to private users on a site-by-site basis.

We commend the Commission in its actions to help the private wireless community as their operations are an integral part of our nation's economy and ultimately serve the millions of consumers throughout the country with products and services. I trust the Commission will act quickly in making its decision on how best to meet the spectrum needs of this vital industry.

Sincerely,

Mark Foley
Member of Congress

MF/jmh

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