Dockets
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FEDERAL COMMUNICATIONS COMMISSION
WASHINGTON

OFFICE OF
THE CHAIRMAN

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Federal Communications Commission
Office of the Secretary

Mary McManus
Minority Counsel, Committee on Commerce,
Science, and Transportation
United States Senate
554 Dirksen Senate Office Building
Washington, DC 20510

Dear Ms. McManus:

This responds to your letter with follow-up questions from Senators Danforth and Gorton to the Committee's hearing on the Commission's proposal to reallocate 2 GHz spectrum for new services using emerging technologies.

Attached are responses to the Senators' specific questions. One of the Commission's most important goals in this proceeding is to accommodate the requirements of the current users of 2 GHz spectrum while providing for new technologies. We will continue to work closely with existing users of the 2 GHz spectrum, and all parties in this proceeding, to achieve those goals.

Sincerely,

/s/

Linda Townsend Solheim
Director
Office of Legislative Affairs

Enclosures

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List A B C D E

Question Submitted by Senator Danforth

Senate Committee on Commerce, Science, and Transportation

Question Number 1. **Television stations and certain cable television programmers heavily use the 1.99-2.11 GHz portion of the 2 GHz band for electronic newsgathering and other TV transmission of information for the public. I am told that these operations generally will not work as well at higher frequencies. Is there any likelihood that these operations would have to be relocated to other portions of the spectrum?**

Answer: The Commission, in its emerging technologies docket, refrained from proposing reallocation of the 1.99-2.11 GHz band precisely because it is so heavily used by fixed microwave licensees. Relocation of existing users in this band would be particularly difficult due to the nature of electronic newsgathering (ENG), as well as because inception of HDTV service will increase the demand for spectrum to be used for ENG. The Utilities Telecommunications Council petitioned the Commission on May 1, 1992, to consider the 1.99-2.11 GHz band as an alternative to the bands proposed in the emerging technologies docket. The Commission did not include these frequencies with other 2 GHz bands proposed for consideration for the reasons noted above. I believe it highly unlikely that current operations in these bands will be asked to relocate to other portions of the spectrum.

Questions Submitted by Senator Gorton

Senate Committee on Commerce, Science, and Transportation

Question Number 1. The FCC is proposing to move current 2 GHz users to the 4 or 6 GHz bands. But how realistic is it to think you can move them to the 4 GHz band since that's the primary band for satellite television reception? Since most cable television companies have licensed stations in this band, and virtually all backyard satellite dish owners have unlicensed stations in this band, how viable is the FCC's suggestion that new microwave systems that would previously have been located in the 2 GHz band should be constructed in the 4 GHz band? If you do this won't those of us in Congress be besieged by unhappy cable companies or home dish owners?

Answer: The 4 GHz Common Carrier band (3.7-4.2 GHz) is allocated on a co-primary basis to the Domestic Public Fixed and Satellite Communications Services. While the existing uses in this band will limit private fixed microwave use, we believe that capacity for additional user exist in some geographic areas. Common carrier fixed microwave systems currently co-exist in this band with backyard satellite dishes, and new fixed systems continually are being added. Microwave systems can apply engineering practices, such as those currently used in the 4 GHz band to coordinate fixed & satellite uses, by to prevent interference with satellite dishes. Furthermore, microwave paths generally are not aimed at areas that contain backyard earth stations. I note that we propose a number of other bands for reaccommodation, and I expect we will use the 4 GHz band only under circumstances in which no interference to existing systems is created.

Question Number 2. As I understand it, a principal document underlying the FCC proposal is the staff study titled "Creating New Technology Bands for Emerging Telecommunications Technology" that was made by the FCC's Office of Engineering & Technology. That study indicates that about 10% of the 29,000 existing 2 GHz microwave stations have path lengths greater than 35 miles. That far exceeds the average path length in the 6 GHz band which - according to the same study - is 25 miles. How could current 2 GHz users with those long paths be moved to 6 GHz without suffering a loss of reliability?

I'm particularly concerned about this kind of situation. In the Pacific Northwest it would be extremely difficult -- if not impossible-- for the operator in such a case to get the necessary siting and other environmental approvals to build the additional towers that would be necessary to reduce the path length so as to maintain reliability after being moved to the 6 GHz band. How would you propose to solve this problem with the particularly long paths of 2 GHz users?

Answer: The reliability of microwave systems primarily is a function of propagation conditions and generally is measured as the percentage of time the communications system functions properly. Systems are engineered to achieve the reliability level desired by the user. At 6 GHz many systems successfully operate at path lengths in excess of 35 miles -- nearly 500 employ path lengths in excess of 50 miles. In fact, the median path length in 2 GHz is less than the median path length in 6 GHz. While free space loss of signal strength increases with frequency, antenna gain for equally-sized antennas also increases at higher frequencies and offsets the free space losses. The 2 and 6 GHz frequencies are close enough that adjustments in antenna gain and power can achieve communication over equal path lengths with the same reliability. These factors explain why the average path lengths for the 1.85-1.99 GHz and 6.525-6.875 GHz bands are roughly equal. In any event, the Commission intends that any reaccommodation be successful over the same path length with the same reliability. If for some reason this is not achievable in a particular instance, the Commission has waiver procedures under which it would consider any specific instances that for whatever reason indicate that successful reaccommodation is technically infeasible.

Question Number 3. The FCC has proposed allowing utilities and other private microwave users in the 2 GHz band to relocate to some of the higher frequency common carrier microwave bands. However, I understand those bands are "channelized" for 20 and 30 GHz bandwidths, which far exceed the bandwidths required by most utility and other private microwave systems. Wouldn't this be wasteful of spectrum?

I also understand the interference criteria in the common carrier bands are not as stringent as those used in designing utility microwave systems. So by moving utility and other 2 GHz users, which have a very high need for reliability into those common carrier bands, wouldn't you be jeopardizing the reliability those users need?

Answer: The higher frequency common carrier microwave bands are channelized for wider bandwidths than is required by most private operations, and we agree that to allow uncontrolled use of these bands by private operations would be wasteful. This issue is being addressed in proceedings related to the two petitions for rule making, RM-7981 and RM-8004, filed by the Utilities Telecommunications Council and Alcatel Network Systems, Inc., respectively. These two petitions propose, inter alia, amendments to the Commission's rules on channelization, minimum path lengths, minimum channel loading, and frequency coordination on the higher bands. We believe that adopting appropriate rules in

response to these petitions will facilitate sharing of these bands without decreasing the reliability of either service. The Commission will consider these petitions and the associated comments in the near future.

Question Number 4. **In your testimony you state that the British "government has made the rapid development of new radio based services,including PCS a national priority". Please provide me with the detailed information regarding the British experience with PCS. Specifically, how many licenses were initially granted? Describe the services that were deployed? At what prices were the services offered? Quantify the market response? Compare the price and quality of the PCS offerings in the United Kingdom with the price and quality of cellular service in the United States?**

Answer: In 1989 The British Department of Trade and Industry allocated a total of 174 MHz for the development and implementation of PCS-type services at 900 and 1800 MHz. First, the U.K. allocated 864-868 MHz for public telepoint service (a wireless, portable, pay phone service in which base stations are placed in public areas and subscribers make outgoing calls using a handset when in close physical proximity to the base station). Four licenses were originally granted, but only one, Hutchinson Telecommunications, continues to offer service. Difficulties experienced in deployment of this service appear to be due to technical complications, including too little spectrum for too many licensees. The U.K. also allocated 170 MHz, 1710-1880 MHz, for personal communications networks (PCN). The U.K. is requiring incumbent fixed microwave users of this spectrum to relocate to higher frequency bands at their own expense. Three PCN consortia were awarded national licenses. Two have since merged, leaving two licensees, Microtel Communications Ltd. and Unitel-Mercury. The proposed PCN service is a two way, portable phone service with ubiquitous coverage. The PCN licensees began construction in 1990 and expect to initiate service during 1992.

With regard to pricing, Telepoint service fees were about $14.00 per month and $0.20 per minute, with domestic calls beyond 30 miles averaging $0.30 per minute. The handset units ranged in cost from $330 to $390. In the U.S., the cost for cellular service at the end of 1991, according to the Cellular Telecommunications Industry Association, averaged $72.74 monthly; charges for individual calls ranged from $0.20 to $0.75 per minute, depending of the time of day. The cost of handsets ranged from $200 to over $1,000. Experiences in the U.K. and market research in the U.S. indicate that the public desires advanced communications capabilities, but at prices below current cellular rates.

Question Number 5. **What steps can an incumbent 2 GHz user who operates critical public safety and communications services take to ensure their reliability would not be compromised by the deployment of PCS in their service areas. Describe the remedies incumbent 2 GHz users could take if a PCS provider licensed in their service area is found causing interference? Since incumbent 2 GHz users currently demand 100% reliability, what level of interference would be considered acceptable?**

Answer: If the 2 GHz band is allocated for sharing with new services as proposed, I anticipate that the Commission would adopt service rules for each specific new service that would protect the incumbent users. If an incumbent's communications are interfered with by a new licensee, it would be the responsibility of the new licensee to correct the interference. If interference persists, the incumbent may contact the Commission to obtain relief, which can include cessation of transmissions until the interference is corrected. I anticipate that interference to incumbents will not exceed that to which they now are subject from other microwave users in the band. The Commission will address specific interference standards in subsequent proceedings that address specific emerging technologies.

Question Number 6. **The Commission proposes to relocate microwave users in the Emerging Technologies Band so that they can assign these frequencies for use by certain varieties of personal communications services. In Mr. Schelle's testimony, he emphasizes the potential for new PCS licensees to share these frequencies with existing microwave facilities. Mr. Schelle also claims that PCS licensees will be able to clear spectrum which is needed through negotiations with incumbent microwave users. If this is true, why is it necessary for the Commission to involuntarily relocate any microwave user to another part of the spectrum?**

Answer: The Commission's NPRM sought public comment on several alternative proposals. These included relocation in 10 or 15 years after the equipment in use today has reached the end of its life expectancy, and reliance on negotiations rather than mandatory relocation. Sharing between microwave and PCS users is, of course, everyone's ideal choice, if practical. The results of experiments and spectrum studies submitted to the Commission, however, indicate that while some unused spectrum is available in some geographic areas and that some modulation techniques permit some sharing, that the ability of the two services to mutually co-exist technically is far from certain, and depends upon the

type of PCS service and total capacity to be provided. In its emerging technologies rulemaking, ET Docket No. 92-9, the Commission sought comment on opportunities for the two services to co-exist and on implementing rules that would permit private negotiations. The Commission's staff currently is considering the first round of public comments on these issues, which were received June 8. A round of reply comments is due on July 8. Relying upon sharing and/or negotiations, rather than requiring relocation, will receive every consideration.

United States Senate

COMMITTEE ON COMMERCE, SCIENCE,
AND TRANSPORTATION

WASHINGTON, DC 20510-6125

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June 5, 1992

The Honorable Alfred C. Sikes
Chairman
Federal Communications Commission
1919 M Street, N.W.
Washington, D.C. 20554

Dear Chairman Sikes:

Thank you for testifying at the June 3, 1992 hearing on the spectrum reallocation of the 2GHz band. Enclosed are several questions that Senators Danforth and Gorton would like you to answer for the record. Please send your answers to me by June 26.

Sincerely,

Mary McManus
Minority Counsel

Enclosures (3)

Questions from Senator Danforth for Chairman Sikes

1. Television stations and certain cable television programmmers heavily use the 1.99-2.11 GHz portion of the 2 GHz band for electronic newsgathering and other TV transmission of information for the public. I am told that these operations generally will not work as well at higher frequencies. Is there any likelihood that these operations would have to be relocated to other portions of the spectrum?

QUESTIONS FOR CHAIRMAN SIKES FROM SENATOR GORTON

(1) The FCC is proposing to move current 2 GHz users to the 4 or 6 GHz bands. But how realistic is it to think you can move them to the 4 GHz band since that's the primary band for satellite television reception? Since most cable television companies have licensed stations in this band, and virtually all backyard satellite dish owners have unlicensed stations in this band, how viable is the FCC's suggestion that new microwave systems that would previously have been located in the 2 GHz band should be constructed in the 4 GHz band? If you do this won't those of us in Congress be besieged by unhappy cable companies or home dish owners?

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Post Hearing Questions for Chairman Sikes

From Senator Gorton

1) In your testimony you state that the British "government has made the rapid development of new radio based services, including PCS a national priority". Please provide me with the detailed information regarding the British experience with PCS. Specifically, how many licenses were initially granted? Describe the services that were deployed? At what prices were the services offered? Quantify the market response? Compare the price and quality of the PCS offerings in the United Kingdom with the price and quality of cellular service in the United States?

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