

Ms. Cora Beebe  
April 15, 1993  
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The number of jobs created per dollar of manufacturing output is consistent with the current employment practices of large telecommunications manufacturers with whom we consulted in crafting this analysis.

Please give me a call with any questions about this analysis. We have not forgotten your invitation for comments on specific auction processes that could be utilized and will provide comments to you on that matter soon.

Very truly yours,



Kurt A. Wimmer

Enclosure

cc: Ronald L. Plesser, Esq.

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higher export-import ratio would be justified, and more jobs would be created.

# PCS ACTION, INC.

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September 8, 1993

## REFUTATION OF CTIA'S SPECTRUM-RELATED WHITE PAPERS

CTIA incorrectly contends that the April study by COMSEARCH "was manipulated" to support the views of PCS Action.<sup>1/</sup>

### CTIA's Charges of "Manipulation" Are Wrong

COMSEARCH is an independent frequency coordination firm. It conducted the April study<sup>2/</sup> on its own, following discussions held at the February 25, 1993 Telocator Technical & Engineering meeting. No one commissioned, funded, or sponsored the study. Indeed, PCS Action did not even exist when COMSEARCH undertook its study.

PCS Action, however, in its original white paper submitted to the Federal Communications Commission, has cited this study as support for one of the principal rationales justifying the allocation of 40 MHz licenses for PCS. The April COMSEARCH study confirms that the allocation of 20 MHz will make the timely roll-out of PCS impossible.

CTIA has asserted that a more recent study, sponsored by a CTIA member, refutes the April study's conclusions.<sup>3/</sup> CTIA states that the April study's power specification for handsets (1 watt) was too high and the technology assumed (time division duplex or "TDD") was inappropriate. When COMSEARCH's model is applied using lower power and assuming different technology, CTIA asserts that the microwave interference "disappears."

This is flatly wrong, partly because in focusing on handset power levels, the CTIA ignored base station power. With base station power levels factored in, the interference characteristics stay virtually the same, even assuming lower handset power. As both the April and the recent COMSEARCH studies indicate, 20 MHz allocations for PCS will make timely roll-out of PCS impossible, while 40 MHz allocations will promote timely implementation of PCS.

PCS Action has fairly presented the April Comsearch study. In fact, Mark Fowler, President of Bell Atlantic Personal Communications, a sponsor of the new study and member of CTIA, has disavowed CTIA's charges of manipulation:

"[W]e're distressed about CTIA's characterization of the PCS Action white paper as involving manipulation to produce [the April COMSEARCH study's] conclusions."<sup>4/</sup>

\* \* \*

CTIA incorrectly asserts that the new COMSEARCH study shows (a) that far less potential for interference exists between PCS systems and microwave incumbents than indicated by the April study and (b) that the April study's conclusion's are invalid.

#### The Studies Reached Consistent Results

The results of the new study are thoroughly consistent with the results and conclusions of the April study:

- . The studies conclude that operation of PCS in 20 MHz or 40 MHz bands is feasible if sufficient microwave users are relocated and that smaller allocations require the relocation of more microwave users before PCS can be deployed -- a process that delays the deployment of PCS.
- . The timing of microwave relocations is crucial to the rapid deployment of PCS, and 40 MHz allocations will facilitate deployment of PCS because they offer PCS operators more time to relocate microwave incumbents who are willing to move.<sup>5/</sup>
  - . The April study showed that a 40 MHz allocation plan would require the relocation of 3 microwave users to launch PCS, as compared to 14 microwave users under a 20 MHz allocation plan.<sup>6/</sup>
  - . The new study showed that a 40 MHz allocation plan would require the relocation of 5 microwave users to launch PCS, as compared to 22 microwave users under a 20 MHz allocation plan.<sup>7/</sup>

#### The Relocation of Microwave Incumbents is Unavoidable

The results of the new study do not reveal a lesser spectrum interference problem.

- . Indeed, the April study required fewer relocations to make spectrum available than did the new study.<sup>8/</sup>
- . A comparison of the relocations required in each study indicates that, to begin operating PCS under a

20 MHz allocation plan, the new study required nearly 60 percent more relocations to make spectrum available: relocations of 22 microwave links versus relocations of only 14 microwave links.<sup>9/</sup>

#### CTIA's "Vanishing" Act

CTIA contends in its showcase illustration that relocation of only three microwave paths yields the virtual disappearance of microwave interference. In fact, the new study shows that the interference zones do not totally disappear: the relocations yield 7.5 MHz (not 10 MHz) of available spectrum.<sup>10/</sup>

- . Moreover, the April study showed that the same three relocations were required to yield the minimum spectrum necessary throughout the MSA to operate a PCS system in that license block.<sup>11/</sup>

#### "Spectrum Clearing" versus "Spectrum Sharing"

The relocation of three microwave links per block does not diminish the challenge of microwave congestion. Even if CTIA were correct that microwave interference could "disappear" with the relocation of three microwave links per block, CTIA's contention fails to undercut the conclusion that clearing the PCS band of most microwave users would be necessary to deploy PCS if a 20 MHz allocation plan were adopted.

If projected nationally, requiring each of five PCS licensees (in each of the 734 license areas proposed by CTIA<sup>12/</sup>) to relocate three microwave links in order to start offering PCS would require the simultaneous relocation of all microwave incumbents, including the grandfathered public safety agencies ( $5 \times 734 \times 3 = 11,010$ ).<sup>13/</sup>

#### Sound Assumptions Underlie The April Study

The April study used an operating power level that would approximate a worst case scenario for a system that is likely to be deployed.

- . A worst case but realistic operating power level is essential because microwave incumbents generally do not use "average" values in predicting interference into their systems.<sup>14/</sup>
- . The April study's operating power level is consistent with the 1 watt maximum transmit power of DCS 1800 and other systems that are being developed. The

1 watt base station assumed in the April study is, if anything, a smaller value than that which actually may be deployed.

CTIA focused on the different assumptions for the power level of handsets, which do not affect the power level of base stations. Yet, in both studies, the interference caused by the base stations -- not the handsets -- was the determinative factor in assessing how many incumbent microwave users would need to be relocated,<sup>15/</sup> which explains why both studies reach similar results.

Further, the use of TDD technology over FDD also was sound. Even Southwestern Bell, a CTIA member, has concluded in a recent study that use of FDD worsens the interference problem and that the "ideal" PCS radio technology for dense sharing environment would use TDD.<sup>16/</sup>

\* \* \*

CTIA incorrectly (a) characterizes microwave incumbency in the PCS band as a "short-term problem" affecting only the 11 largest cities, (b) asserts that large spectrum blocks do nothing to solve the interference problem, and (c) suggests that the process of relocating incumbent public safety agencies will be quick and easy, inexpensive, and automatically successful.

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#### Microwave Incumbency Is Not A "Short-Term Problem"

Microwave incumbency will remain a problem for PCS operators well into the year 2000 -- it is no "short-term problem." For the 20 percent of incumbents that are public safety agencies, the incumbency problem could last indefinitely.

The process for relocating microwave incumbents will require negotiation between multiple parties, coordination and planning by engineers, and approval by the FCC. The process of performing the frequency coordination, engineering, licensing, and installation today often takes 18 months for a single link. The delay would be inordinate if thousands of links were being relocated in the same time frame. There simply are not enough qualified engineers in this country to make such a simultaneous relocation -- or anything remotely close to simultaneous -- possible.

Microwave incumbency will remain a problem for PCS operators well into the year 2000 given that:

- . Thousands of microwave links must be relocated,<sup>17/</sup>
- . Microwave incumbents may not be involuntarily relocated for three years from the commencement of PCS licensing,<sup>18/</sup>
- . Thousands of public safety incumbents are grandfathered permanently and may never be relocated involuntarily,<sup>19/</sup> and
- . FCC resources required for approval of the relocation plans are limited.

#### Microwave Interference Is Not Solely A Large City Phenomenon

Microwave users operate throughout the United States, in mid-sized cities, small towns, and rural areas. While most of the 734 MSAs and RSAs have some part of the 1850-1990 MHz band occupied by microwave incumbents, 175 MSAs have every frequency in that band already occupied by microwave users.

For example, cities such as Orlando, Florida, with 36 paths (32 of which are public safety), Tulsa, Oklahoma, with 24 paths, and Bismarck, North Dakota, with 15 paths, have significant microwave congestion. The fact is that microwave density can be high even in lesser populated areas.

#### The Benefits of a 40 MHz Allocation Plan

Spectrum blocks of 40 MHz will permit PCS licensees to deploy services rapidly, operate viably, and achieve the public benefits expected of PCS.

Twenty MHz allocations will cripple the deployment of PCS. With only a 20 MHz spectrum block, a single incumbent microwave user can block all access to spectrum in an important market segment within a licensee's service area.<sup>20/</sup>

A 20 MHz plan would result in extensive disruption, requiring relocation of approximately 50 percent of the 10,000 existing microwave links, including 100 percent of the public safety links, within three years of licensing just to initiate service.<sup>21/</sup>

- . Too-small spectrum allocations would require all PCS licensees to be working to relocate microwave users at essentially the same time!
- \* Equipment for relocation bands, which are just now being rechannelized by the Commission, would

have to be produced in mass quantities in time for this relocation.

- \* Innumerable engineers would have to be deployed to effectuate the relocation.

By comparison, a 40-MHz allocation provides room for the operation of PCS without interference by opening up at least twice as much usable spectrum as would allocations of 20 or 30 MHz<sup>22/</sup>, and by requiring less initial relocation of public safety microwave users than would allocations of 20 or 30 MHz.<sup>23/</sup>

#### The Process of Relocating Incumbent Public Safety Agencies Will Be Slow, Expensive, Uncertain, and Incomplete

Public safety agencies have been clear in stating their opposition to relocation: as a matter of principle, not money, they will not move out of the PCS spectrum.<sup>24/</sup>

Those public safety incumbents willing to move will hold all of the leverage in the negotiation process: they do not have to return the phone calls of PCS operators, let alone move, in order to survive, while PCS operators must pay them merely to launch service.

Even if negotiations can be completed successfully, the logistics of relocating microwave licensees would cause significant time delays. Consequently, too-small allocations for PCS would necessitate a nationwide band-clearing strategy -- time-consuming relocations will be necessary in every major market in virtually the same time frame.

\* \* \*

CTIA ignores other arguments unrelated to microwave congestion that also support 40 MHz allocations for PCS.

#### PCS: More Than Voice Services

Forty MHz is necessary so that PCS can offer a wide range of high-speed data services and information services.<sup>25/</sup>

PCS has always been envisioned as providing more than mere voice applications. Data applications envisioned range from facsimile and E-mail to broadband data, advanced intelligent network services, and multimedia. Information services would include graphics, imaging, and compressed video in real time.

These new applications will require significant bandwidth. If these new services must contend for less than 40 MHz of shared spectrum, it is unlikely that PCS will be able to provide them.

PCS: Mass Market, High-Quality, Mobile Voice Services

Allocations of 40 MHz of spectrum are needed to accommodate the demand for PCS, which is estimated to be six times greater than for current cellular services, and to provide wireline-quality voice transmission.<sup>26/</sup>

- . One study has found that about 50 MHz of clear spectrum per licensee would be required to meet the demand for PCS in the United States.<sup>27/</sup>
- . Other countries have recognized these facts and have allocated 30 MHz (Germany) to 50 MHz (United Kingdom) of clear spectrum for PCS.

NOTES

- 1/ See CTIA, "PCS White Paper No. 3: Justifying 40 MHz PCS Allocations--'Study' Was Based on Invalid Assumptions," Aug. 25, 1993.
- 2/ See Comsearch, "Spectrum Allocations and Their Impact on Microwave User Relocations: A Case Study," April 12, 1993 (hereinafter referred to as the "Comsearch Microwave Relocation Case Study").
- 3/ Both Bell Atlantic and GTE commissioned Comsearch to conduct recent studies. Both studies assumed similar technology for 20 MHz blocks, but only the GTE study applied them to the April study, i.e., to 20 MHz, 30 MHz, and 40 MHz blocks. Because the only new study that CTIA has chosen to reproduce in its "white paper" is that of GTE, this document refers to the GTE study only.
- 4/ PCS News (Sept. 2, 1993).
- 5/ See Comsearch Microwave Relocation Case Study.
- 6/ See Comsearch, "Spectrum Allocations and Their Impact on Microwave User Relocations: A CDMA Study of Detroit," § 4.1 (Aug. 17, 1993) (hereinafter referred to as the "GTE Study").
- 7/ Id.
- 8/ A careful block-by-block comparison of the relocations required in the April study and those required in the new study indicates that, on the whole, the April study required fewer relocations to make spectrum available.  
  
Nevertheless, the number of relocations required to make spectrum available for PCS throughout the Detroit MSA is essentially the same for both studies. For example, under a 20 MHz allocation plan, to make 50 percent of the block available throughout the MSA, the GTE Study required relocation of 22 microwave links, one less than required by the April study. See GTE Study, Fig. 4.1-1.  
  
Under a 40 MHz allocation plan, on the other hand, to begin operating with at least 25 percent of the block available throughout the MSA, the GTE Study required relocation of five microwave links, two more than required by the April study. See id. Fig. 4.1-2. Ten years after licensing, when 75 percent of the block would be needed throughout the MSA, both studies required relocation of 26 microwave links. See id.
- 9/ See GTE Study Fig. 4.1-1.

10/ See GTE Study Fig. 3.2-8 (discussing Block D, 1960 - 1970 MHz).

11/ See Comsearch Microwave Relocation Case Study, Fig. 4.2-1.

12/ CTIA, "PCS White Paper No. 1: Cellular/IVDS Service Areas for PCS Means Faster Service," Aug. 11, 1993.

13/ In reality, because the degree of microwave congestion varies in different regions of the country, to launch PCS under a 20 MHz allocation scheme would require the relocation of approximately 7,000 microwave incumbents, not 10,000 or 11,000.

14/ See "Compatibility Test of PCN America Spread Spectrum with Point-to-Point Microwave System," Houston Area Microwave Users Group, July 23, 1991.

15/ See GTE Study § 3.1 ("with this set of assumptions the mobile part of the PCS system did not appear to be very interesting"); see also id. §§ 3.2-3.4 (results for base stations for 20, 30, and 40 MHz allocations).

16/ Southwestern Bell Corp., "1.9 GHz PCS Shared Spectrum Availability Analysis for Selected Locations in Houston, Texas," Aug. 18, 1993 (discussed at "Overall Observations and Conclusions 2").

17/ There are approximately 10,000 microwave links in the PCS band. Assuming that a system can begin operating with less than the full spectrum block allocation available for use and migrate microwave users off other parts of the allocated block as demand and cash flow increases, Comsearch has estimated that the minimum clear spectrum everywhere in the license area needed to operate PCS starts at 25 percent of the allocation within three years of licensing and evolves to 75 percent of the allocation within 10 years after licensing. See Comsearch Microwave Relocation Case Study at § 3.0. Federal law requires the FCC to begin licensing PCS by 1994.

18/ See Third Report and Order and Memorandum Opinion and Order, ET Dkt. No. 92-9 (released on Aug. 13, 1993).

19/ See id. Approximately twenty percent of the 10,000 microwave incumbents are public safety agencies.

20/ Microwave licensees typically use two 10 MHz channels -- a total of 20 MHz -- that will correspond PCS allocations. See Comsearch, "Analysis of the 20 MHz, 30 MHz & 40 MHz PCS Block Allocations," filed with Comments of MCI Telecommunications

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20/ Corp. (FCC Gen. Dkt. No. 90-314, Nov. 9, 1992) (hereinafter "Comsearch Analysis of PCS Allocation Plans").

21/ See Comsearch Microwave Relocation Case Study at § 5.0.

22/ See Comsearch Analysis of PCS Allocation Plans.

23/ See Comsearch Microwave Relocation Case Study at § 5.0.

24/ See, e.g., Statement of Capt. B. E. Wenke of Los Angeles County Sheriff's Dep't, FCC En Banc Hrng. (Dec. 5, 1991) at 5 (questions the usefulness of compensation schemes for relocation of microwave users, especially in regions where a "lack of available spectrum in appropriate bands" exists).

25/ See PCS Action, Inc., "White Paper on PCS Spectrum Issues," at 12-13 (July 21, 1993).

26/ See id. at 11-12.

27/ See Telocator PCS Technical and Engineering Committee, "Telocator Spectrum Estimates for PCS Report: An Analysis of Clear Spectrum Required to Support Emerging PCS Services" at 3 (1992).

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## ELIGIBILITY TO BID FOR PCS LICENSES

PCS Action believes that Congress and the FCC must take steps to ensure that PCS is a competitive service providing diversity in wireless communications. Because competition is nullified when an entity is matched up against itself, PCS Action believes that cellular incumbents and their affiliates should be free to apply for PCS licenses anywhere in the country except in their home region. In its home region, a cellular incumbent or its affiliate should be able to apply for a PCS license only if the applicant serves less than 20 percent of the population to be served by the PCS license.

PCS Action's position on cellular eligibility falls squarely within the mainstream of the recommendations of key federal agencies, which uniformly favor prohibiting cellular companies from bidding on PCS licenses covering their own service areas:

### National Telecommunications and Information Administration:

"[W]e recommend that the Commission promote competition among PCS and cellular providers by initially prohibiting the acquisition of PCS licenses by cellular providers in their own service areas . . . . "[T]he Commission should review this limitation, in light of subsequent market developments, three years after initially assigning PCS licenses."<sup>1/</sup>

### U.S. Department of Justice:

"[T]he FCC should not at this time permit any firm to control both a cellular and a PCS license in the same geographic area. That restriction, which should be reexamined in a definite time period (e.g., four years), we believe, should apply equally to both wireline and non-wireline cellular licensees."<sup>2/</sup>

### U.S. General Accounting Office:

"In allocating the spectrum and granting licenses for the new personal communications services, the FCC should consider establishing a policy that gives first preference to firms that are not current cellular telephone service providers in a given market area . . . ."<sup>3/</sup>

1/ Comments of the National Telecommunications and Information Administration at 27, FCC GEN Dkt. No. 90-314 & ET Dkt. No. 92-100 (Nov. 9, 1992).

2/ Comments of the U.S. Department of Justice at 29-30, FCC GEN Dkt. No. 90-314 & ET Dkt. No. 92-100 (Nov. 9, 1992).

3/ U.S. General Accounting Office, "Telecommunications: Concerns About Competition in the Cellular Telephone Service Industry" at 42 (GAO/RCED-92-220 July 1992).

## U.S. Could Win Big in Auction of Airwaves

By ANTHONY RAMIREZ

Tucked within the giant tax bill passed by Congress is a revolutionary proposal to auction off part of the nation's airwaves for the first time.

The frequencies will be used to help start a new personal communications services industry that uses new wireless technologies, and their sale may fetch far more than even the \$10 billion the Government is conservatively estimating.

The personal communications services include smaller, lighter handheld telephones, pagers and other devices not yet invented, principally for want of a designated band of radio frequency. Entrepreneurs in the personal communications business, possibly in a bit of exaggeration, say the industry that could result from using the new frequency spectrum could exceed \$200 billion.

### Worth Billions to Industry

Similar radio frequencies make possible radio, television, cellular telephones and pagers. The assignment of parts of the electromagnetic spectrum in the past has meant billions of dollars for the huge broadcast industries that provide these services but little for the cash-strapped United

States Treasury.

These radio, television and cellular frequencies have been given away by lottery or after hearings, and the Government has collected only nominal charges for administrative fees.

Under legislation passed by the House on Thursday and the Senate Friday, the Congressional Budget Office estimates that the Government might reap \$10.2 billion from the sale of frequencies in other parts of the electromagnetic spectrum.

But if the record of cellular telephones and, more recently, specialized mobile radio, is any guide, the Government may gain several times that figure.

Estimates as high as \$40 billion are even considered fairly conservative, industry analysts said, because the Government is auctioning off a large portion of the spectrum, up to seven times more than that allocated to the cellular-telephone industry, which now has 11 million subscribers.

### Reassigning Some Users

About 340 million hertz of the radio frequency spectrum will be opened for possible commercial use by the Government through the auction, almost seven times the 50 million hertz of spectrum allotted to the cellular telephone industry.

Several factors will affect the value of the spectrum to be auctioned. The most important, the spectrum size and geographical scope of the licenses, have not been determined. A license to use 40 million hertz in an area that stretched from Boston to Washington would fetch a far higher bid than 2 million hertz for Montauk, L.I.

Not all of the 340 million hertz of spectrum will be put up for sale and some will continue to be used by the Government. Other parts will require current users of certain sections of the spectrum, primarily electric utilities and police and fire departments, to go shift to new frequencies, requiring lengthy regulatory hearings and Government compensation for the inconvenienced license holders.

The spectrum potentially opened up to commercial use will be microwave frequencies, which are higher than 800 million hertz range for cellular telephones.

Frequencies for personal communication services are scheduled for 1850 to 1990 million hertz. An additional 200 million hertz is yet to be determined, but most of it is likely to come from frequencies below 1850 million hertz, according to PCS Action, a lobbying group.

# ***PCS ACTION, INC.***

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## **Membership Roster**

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