RECEIVED
NOV - 9 1992
FEDERAL COMMUNICATIONS COMMISSION
OFFICE OF THE SECRETARY

ORIGINAL FILE

Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, D.C. 20554

In the Matter of	)	
	)	
Amendment of the	)	
Commission's Rules to	)	GEN Docket No. 90-314
Establish New Personal	)	ET Docket No. 92-100
Communications Services	)	

To: The Commission

COMMENTS OF THE
UTILITIES TELECOMMUNICATIONS COUNCIL

Jeffrey L. Sheldon
Mara J. Primosch
Sean A. Stokes

UTILITIES TELECOMMUNICATIONS
COUNCIL
1140 Connecticut Avenue, N.W.
Suite 1140
Washington, D.C. 20036
(202) 872-0030

November 9, 1992

0+4

Table of Contents

Summary iv

Comments 1

Statement of Interest 1

I INTRODUCTION 2

II. FIXED MICROWAVE USERS MUST BE PROTECTED 3

A. Interference Standards Must Protect Fixed Microwave Users 3

B. PCS Technical Advisory Committee May Be Necessary 5

C. UTC Supports The Proposed Interference Standards For Protection Of Fixed Microwave . . . 7

1. UTC Opposes Use Of Statistical Models And Weighting Factors 10

2. Interference Analyses Must Consider Microwave Path Lengths 12

3. FCC Must Include Spectrum Sharing Techniques In PCS Interference Calculations 12

4. The FCC Must Limit The Number Of Transmitting Mobiles To Avoid Interference To Fixed Users 13

5. The FCC Must Impose Emission Limits On Band Edges 14

D. The Proposed 300 Foot Maximum Antenna Height Is Excessive 14

E. Microwave Licensees Need Actual Notice Of PCS Applications 16

F. Spectrum-Sharing Between Unlicensed PCS Users And Fixed Microwave Licenses Is Unworkable 17

1. Proposed Power Limits For 2 GHz Unlicensed Devices Provide Inadequate Protection 17

2. The FCC Must Mandate A Consortium Of PCS Manufacturers/Vendors To Pay Relocation Costs 19

G. More Detailed 2 GHz PCS-to-PCS Interference Standards Are Needed 20

III. PCS SERVICE STRUCTURE MUST PROVIDE NON-COMMERCIAL OPTIONS 21

A. Need For PCS Service 21

B. The PCS Definition Should Be Flexible To Include All Wireless Access Services 22

C. The FCC Should Allocate 110 To 140 MHz Of Spectrum For PCS 22

1. 2 GHz Allocation 23

(a) The FCC Must Establish A 20 MHz Spectrum Block For Non-Commercial Use . 23

(b) At Least Three Commercial Providers Should Be Licensed 27

(c) Size Of Spectrum Blocks 27

(d) Block Allocations 28

(e) Unlicensed Devices 29

2. Negotiations Between PCS Licensees And Microwave Users Must Be Consistent With "Transition Plan" Of ET Docket No. 92-9 29

3. The FCC Should Apportion A Non-Commercial 900 MHz Allocation 30

4. PCS Support Spectrum Is Unnecessary 30

D. Licensing Issues 31

1. PCS Service Areas 31

(a) 2 GHz Service Areas 31

(b) 900 MHz Service Areas 33

2. Eligibility Requirements 33

(a) Incumbent Cellular Licensees Should Not Be Excluded 33

(b) Local Exchange Carriers Should Have Access To A 10 MHz Block of PCS Spectrum 34

(c) Limits On Holding Multiple Licenses 34

3. Term Of License Should Be 10-Years 35

4. Lotteries Must Be Used To Select PCS Licensees 35

5. Competitive Bidding Should Not Be Used 37

6. License Modifications Must Reflect Additional Base Stations 38

E. PCS Regulatory Issues 38

1. PCS Should Be Regulated On A Private Carrier Basis 38

2. PCS Licensees Should Be Permitted To Interconnect With The Public Switched Telephone Network 39

F. Technical Standards For 900 MHz PCS 40

1. 900 MHz PCS Power And Antenna Height Limits Are Excessive And Could Cause Interference 40

2. 900 MHz PCS Out-Of-Band Emissions Need To Be Restricted 41

G. Interoperability And Roaming Are Needed 41

H. PCS Must Be Fully Evaluated Concerning RF Hazards 42

I. International Issues 42

IV. CONCLUSION 43

Summary

Throughout this proceeding, UTC has consistently maintained that the Commission must not allow the development of PCS at the expense of existing users of the 2 GHz band and the public which they serve. Therefore, a fundamental element in this proceeding is the adoption of technical interference standards between PCS service providers and incumbent 2 GHz microwave users.

The nation's utility industry places extensive reliance on private microwave systems operating in the 2 GHz band to meet critical communications needs. Utilities cannot tolerate interference to their microwave systems without compromising safety and reliability of service to the public. Thus, at a minimum, utilities and other existing 2 GHz private microwave users must be assured interference protection equal to or better than the current level of protection.

The interference calculations and methodology proposed by the Commission are a good starting point for protecting existing microwave operations from interference. These calculations are in no way overly conservative. Also, since the operating parameters of PCS systems, as well as system architectures, are still undefined, the protection criteria for fixed microwave systems should be set, at least initially, to eliminate any doubt that microwave systems will be adequately protected.

UTC considers TIA Committee TR14.11 to be the most appropriate standard-setting body to develop effective PCS and microwave interference standards. No other existing standard-setting body fairly represents the views and concerns of the private microwave community, or is as well-versed in the interference-protection needs of private microwave systems.

Existing microwave users licensed in the 1910-1930 MHz band will have difficulty securing reimbursement for relocation if this portion of the band is allocated to unlicensed PCS. The only method by which existing users can be assured of reimbursement of relocation expenses is if all manufacturers/vendors of unlicensed PCS equipment are required to join a consortium that guarantees the costs of 2 GHz relocation prior to grant of FCC equipment certification.

UTC's concerns over the protection of existing 2 GHz microwave operations notwithstanding, UTC is not opposed to the concept of PCS. UTC firmly believes that the development of PCS and other "emerging technologies" is a worthy goal. Moreover, UTC sees a strong need for additional private land mobile spectrum to be allocated for advanced technologies to meet the internal communications needs of utilities and other core industries.

Accordingly, UTC concurs with the FCC's proposed definition of PCS as long as it allows the flexibility to accommodate all

forms of wireless services including private utility applications. In order to support these PCS systems, UTC suggests that the FCC allocate between 90 and 120 MHz of spectrum for licensed PCS use. Twenty megahertz (20 MHz) of this licensed PCS spectrum should be reserved for non-commercial, internal use by traditional Private Radio Service eligibles. These internal requirements must be supported apart from the commercial uses that the FCC has contemplated exclusively thus far in its PCS rulemaking.

UTC supports use of lotteries to select licensees for both non-commercial and commercial PCS licenses. UTC favors adoption of a lottery requiring applicants to include complete financial and technical showings with every application, to limit applicants to those with sufficient financing, experience and interest.

UTC opposes use of competitive bidding in any form for licensing of either the non-commercial PCS block or the commercial PCS frequencies. Use of competitive bidding would be highly prejudicial to entities other than large organizations with vast resources. Non-commercial entities would be unable to compete with deep-pocket commercial entities for valuable spectrum.

UTC recommends that PCS licensees be regulated on a private

carrier basis. If PCS is to include diverse service offerings, it will need the flexibility inherent in the private radio regulatory scheme.

From the perspective of the utility industry, both as PCS licensee and third-party end user, some level of interoperability among PCS systems would be highly beneficial. This would allow for better coverage of large utility service areas, mutual aid, economies of scale in purchasing, and the ability to pick and choose among different vendors. Further, a certain degree of interoperability and roaming would seem to be necessary for the type of ubiquitous PCS service the Commission envisions.

Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, D.C. 20554

In the Matter of	)	
	)	
Amendment of the	)	
Commission's Rules to	)	GEN Docket No. 90-314
Establish New Personal	)	ET Docket No. 92-100
Communications Services	)	

To: The Commission

COMMENTS OF THE
UTILITIES TELECOMMUNICATIONS COUNCIL

Pursuant to Section 1.415 of the Federal Communications Commission's (FCC) Rules, the Utilities Telecommunications Council (UTC) hereby submits its comments with respect to the Notice of Proposed Rule Making and Tentative Decision (NPRM), 7 FCC Rcd 5676 (1992), in the above-captioned proceeding. The NPRM seeks comment on various issues related to deployment of personal communications services (PCS).

UTC is the national representative on communications matters for the nation's electric, gas, water and steam utilities. UTC's approximately 2,000 members range from small, electric cooperatives and water districts each serving a few thousand customers, to large electric-gas-water utilities which serve millions of customers each. Regardless of their size, all utilities depend upon reliable and secure communications facilities to help fulfill their obligations to provide essential services to the public. Many utilities

operate extensive private microwave systems to meet these communications requirements. Utilities rely heavily on private microwave facilities operating in the 1850-1990 MHz band and could be affected by shared use of this band for PCS. At the same time, utilities welcome the development of new communications technologies that could be used in their private, internal communications networks. UTC therefore welcomes the opportunity to comment in this proceeding.

I. INTRODUCTION

The NPRM is the result of an on-going FCC Inquiry, opened June 28, 1990, to consider all issues associated with the development of PCS. The major proponents of PCS targeted the 2 GHz band as the home for these systems due to the allocation of the band for PCS in Europe and Japan. UTC was an active participant in every stage of these proceedings and filed extensive Comments and Reply Comments in response to the FCC's Notice of Inquiry. UTC coordinated testimony on behalf of the utility industry with representatives of the petroleum and railroad industries for the en banc hearing on PCS held December 5, 1991. UTC also filed Comments in response to the hearing.

Throughout this proceeding UTC did not oppose the concept of PCS. UTC did, however, oppose an allocation of spectrum for these technologies at the expense of existing

users of the 2 GHz band and the public. UTC firmly believes that the development of these and other "emerging technologies" is a worthy goal. Moreover, UTC sees a strong need for additional private land mobile spectrum to be allocated for advanced technologies to meet the internal communications needs of utilities and other core industries.

II. FIXED MICROWAVE USERS MUST BE PROTECTED

A. Interference Standards Must Protect Fixed Microwave Users

A fundamental component in this proceeding is the adoption of technical interference standards between PCS service providers and incumbent 2 GHz microwave users. At a minimum, utilities and other existing 2 GHz private microwave users must be assured interference protection equal to or better than the current level of protection.

The nation's utility industry places extensive reliance on private microwave systems operating in the 2 GHz band to meet critical communications needs. Utilities are unable to tolerate interference to their microwave systems without compromising safety and reliability of service to the public.

Some of the daily uses for which utilities depend on 2 GHz microwave systems include:

- Protective relaying -- the ability to remotely detect and isolate electric transmission lines experiencing "fault" (outage) situations, within milliseconds.
- Forwarding of critical telemetry data between and among a utility's substations, operations control centers, generating stations and other utilities.
- Controlling mobile radio base stations and other radio systems used for load control, environmental monitoring, and nuclear plant communications.
- Long and medium-haul remote data/voice communications.

Moreover, private microwave systems are indispensable to utilities during catastrophic situations such as hurricanes and earthquakes. Private microwave systems enable utilities to respond quickly and effectively to emergency situations at times when delays and lack of service pose serious threats to life and property. Interference to utility microwave systems or other vital public service entities during emergency situations is unacceptable and could be catastrophic.

The Commission has explicitly stated that the technical proposals in this proceeding are contingent upon the final outcome of its "spectrum reserve" proceeding, ET Docket No. 92-9.[1/] Therefore the Commission's decision regarding interference standards between PCS and 2 GHz microwave users must be consistent with the "transition framework" that the FCC recently adopted in ET Docket No. 92-9, wherein the

---

[1/] NPRM, paras. 32 and 104.

Commission specifically recognized the "important and essential functions, such as public safety and utility management communications, that 2 GHz fixed microwave operations provide..."[2/]. Part of the transition framework adopted by the Commission in ET Docket No. 92-9 mandates that interference standards adopted in subsequent proceedings must protect existing 2 GHz microwave facilities. Thus, in considering technical interference standards between PCS and 2 GHz microwave users the Commission must approach this task from the standpoint of protecting existing microwave users from potential interference.

B. PCS Technical Advisory Committee May Be Necessary

In its October 1991, Policy Statement the Commission announced its intention to establish a PCS advisory committee to help resolve such technical issues as transmission standards, interference control, inter- and intra- industry protocols and roaming. In its NPRM, however, the FCC states that it no longer feels that such an advisory committee is necessary because of the interim work of industry standards bodies and the volume of data compiled from experimental PCS licenses.

[2/] First Report and Order and Third Notice of Proposed Rulemaking in ET Docket No. 92-9, FCC 92-437, released October 16, 1992, at para. 21.

The tentative decision not to establish a PCS advisory committee is somewhat troubling to UTC. Throughout this proceeding and the related proceedings dealing with emerging technologies, UTC has raised concerns that the FCC has not been willing to adopt any specifics with regard to PCS. As the FCC's December 1991, En Banc hearing on PCS demonstrated there is virtually no consensus among PCS proponents regarding almost every aspect of PCS. While UTC understands the Commission's reluctance to artificially limit the potential of PCS by setting inflexible standards, there is a need for specifics. In particular, UTC is concerned that as a practical matter it will be difficult to develop adequate interference criteria without first knowing the operating characteristics of the technology to be placed in the band.

Moreover, UTC is concerned that the standards-setting bodies on which the Commission intends to rely are not necessarily responsive to or accessible to full participation by all of the competing interests in this proceeding. A PCS advisory committee comprised of both PCS proponents and existing microwave users would be a step in the right direction. Further, such a committee would appear to be an excellent forum for resolving some of the issues in ET Docket No. 92-9 that the FCC has suggested should be decided through negotiated rulemaking.

C. UTC Supports The Proposed Interference Standards For Protection of Fixed Microwave

Currently, the interference protection standard for 2 GHz fixed microwave operations contained in Section 94.63 of the Commission's rules is the Telecommunications Industry Association's (TIA) Bulletin 10E. However, as the Commission correctly notes, the TIA Bulletin 10E standard was designed to protect against interference between and among private fixed microwave systems and therefore is not adequate to protect against interference to fixed microwave stations from PCS base and mobile operations. Accordingly, the FCC is proposing to modify the TIA 10E standard to take into account PCS operations.

Specifically, the Commission is proposing that each PCS licensee determine potential interference by calculating the signal level from each proposed co-channel and adjacent channel PCS base station and associated mobiles at the inputs of all fixed microwave receivers within a specified coordination zone. To make this determination, PCS licensees would be required to calculate the total PCS power level at the subject microwave receiver from each base station and its associated mobile and portable stations. Under the Commission's proposal if the total PCS power level at the microwave receiver exceeds the TIA 10E standard, the PCS

licensee would have to make the necessary changes to bring its system into conformance with TIA 10E.

The Commission seeks comment on its proposed method of determining potential interference to microwave operations, whether the calculations should include a probability term related to the number of PCS transmitters likely to be in simultaneous operation, and whether the 10E is too conservative and another more flexible standard should be adopted.

As a preliminary matter it must be noted that TIA is currently revising its microwave interference standard. The new standard, TIA 10F, is being formulated to take into account the existence of PCS operations much as the Commission has proposed in its NPRM. UTC has been actively working with the TIA Committee TR14.11 and considers it to be the most appropriate standard-setting body to develop effective PCS and microwave interference standards. No other existing standards-setting body fairly represents the views and concerns of the private microwave community, or is as well-versed in the interference-protection needs of private microwave systems. Therefore, if the FCC elects to have an

outside standard-setting body develop interference standards, UTC urges the Commission to specifically designate TIA.[3/]

An acceptable alternative to the designation of TIA as the sole entity responsible for establishing interference standards between PCS and microwave, is for the Commission to initiate a negotiated rulemaking proceeding to establish appropriate interference standards. A negotiated rulemaking approach would allow the entities actually impacted by co-primary use of the 2 GHz band to determine the appropriate interference criteria. Parties to the negotiated rulemaking should include, at a minimum, representatives of the existing 2 GHz microwave user community, microwave equipment manufacturers, representatives of the PCS industry and PCS equipment manufacturers.

UTC believes that the interference calculations and methodology proposed by the Commission are a good starting point for protecting existing microwave operations from interference. These calculations are in no way overly conservative. As noted above, often utilities are not using

---

[3/] The Commission has, on previous occasions, recognized a single standard-setting body. See, e.g., 47 C.F.R. §1.1307(b), recognizing and adopting ANSI radiation exposure guidelines; and Filing and Review of Open Network Architecture Plans, 4 FCC Rcd 1 (1988), recognizing the Information Industry Liaison Committee (IILC) of the National Exchange Carriers Standards Association as the appropriate body to develop certain ONA standards.

2 GHz microwave systems for standard voice or data applications but instead are using these systems for instantaneous control of utility systems such as high voltage transmission facilities. Thus, utilities cannot tolerate any interference and must be able to precisely gauge whether a given emerging technology system is going to interfere with a microwave system. Also, since the operating parameters of PCS systems, as well as system architectures, are still undefined, the protection criteria for fixed microwave systems should be set, at least initially, to eliminate any doubt that microwave systems will be adequately protected. Only after enough experience is gained through actual PCS deployment should any thought be given to relaxing the criteria.

1. UTC Opposes Use of Statistical Models and Weighting Factors

UTC opposes the FCC's proposed use of statistical models for calculating path losses for PCS mobile units. Until more is known about the viability of spectrum-sharing, calculations should be based on providing worst case protection and would therefore require line-of-site path loss calculations in determining interference levels rather than basing calculations on probabilities. Calculations should be based on maximum summation of power from all segments in the PCS network at worst case; i.e., when all are transmitting.

If, however, a statistical model is relied upon, UTC supports use of a conservative one that is supported by empirical test data from diverse sources and various regions of the country.[4/]

Moreover, if the Commission elects to establish the use of "weighting" factors in calculating the interference potential of portables, the Commission must adopt different weighting standards depending on the proposed or likely use of individual PCS systems. For example, the FCC should develop one weighting standard for PCS systems that will be used exclusively inside buildings, and another weighting factor for all other PCS systems. Outside and mixed use PCS systems should arrive at weighting factors based on worst case calculations that assume all mobiles and portables on the system are operating outside with no attenuation factor.

[4/] For example, the Hata model would be an inappropriate model on which to predict interference to fixed microwave since this model was developed primarily to determine mobile service coverage areas. As such, it does not necessarily serve as a basis for predicting microwave interference. One PCS proponent has questioned whether the Hata model is useful at distances less than 1 km, suggesting that measurements near a microwave receiver (e.g., less than 10 times the microwave antenna height) are difficult to "fit" a model because of the high potential for "macro environmental impacts," such as reflections from nearby objects. Comments of Motorola, Inc. on Report of PCN America, Inc., filed July 24, 1991, in GEN Docket No. 90-314. Finally, a statistical model such as Hata is based on <u>averages</u>, which necessarily means there will be actual path losses that are less than the predicted losses.

2. Interference Analyses Must Consider Microwave Path Lengths

UTC agrees with the Commission that PCS interference analysis calculations should take microwave path lengths into consideration; e.g., use a C/I ratio for short and medium paths and the existing 1 db threshold for longer paths.

3. FCC Must Include Spectrum Sharing Techniques In PCS Interference Calculations

One area that the Commission has failed to address is how to factor innovative spectrum sharing techniques (e.g., variable power control, frequency agile sharing technologies, etc.) into PCS interference calculations. It would be meaningless for industry and/or the Commission to develop coordination and interference criteria for PCS/microwave sharing if PCS applicants are permitted to simply indicate they will use a "dynamic frequency allocation system" or "variable power controls," the efficacy of which are unproven in the context of fully deployed PCS.

PCS licensees employing novel spectrum sharing techniques should be required to calculate the interference potential to the microwave system without regard to any special spectrum-sharing techniques; i.e., at peak transmitting powers, on all channels, from the maximum number of mobiles for which the system is designed. If these calculations show interference levels that exceed the adopted

interference standard then the PCS licensee would have to either adjust its system (such as by reducing peak operating powers or numbers of mobiles), which adjustments would become a license condition, or the licensee could apply for a waiver to incorporate dynamic interference reduction techniques. The waiver would require the PCS provider to make a special showing demonstrating the absence of interference potential through field testing. All potentially-affected microwave licensees would also be invited to comment on the special showing and contest the waiver.

4. The FCC Must Limit The Number of Transmitting Mobiles To Avoid Interference To Fixed Users

Another important interference issue that the Commission has failed to address involves the potential for interference to 2 GHz microwave systems caused by excessive numbers of PCS handsets and mobiles simultaneously attempting to transmit during emergency situations and natural disasters. As is the case with most other public telephone systems, it is anticipated that PCS usage will surge during large scale emergency situations. In such a situation, the massive number of potential PCS portable and mobile units attempting to access a PCS base station may exceed projected calculations and interfere with 2 GHz microwave communications at precisely the time when those communications are needed most. In order to avoid this

situation, UTC recommends that the Commission adopt a requirement that a PCS mobile or portable station not be capable of transmitting unless it receives prior authorization from an associated base station. In turn, each base station should be limited, by its license, to authorizing no more mobile units than were proposed in the system application and upon which the licensee's interference calculations were made.

5. The FCC Must Impose Emission Limits on Band Edges

In order to further minimize potential interference to 2 GHz microwave from PCS, the FCC should specify an emission limit for each PCS licensee's authorized band edge. These emission limits should be based on T/I curves for both digital and analog cases.

D. The Proposed 300 Foot Maximum Antenna Height Is Excessive

UTC agrees with the Commission that limits on PCS power and antenna heights are definitely needed, and is in general agreement with the FCC's proposed limits of 10 watts EIRP for base stations and 2 watts EIRP for mobiles as being reasonable. However, UTC finds the proposed 300 foot maximum antenna height to be excessive. The distance to the horizon for a 300 foot antenna is about 25 miles (assuming 4/3 earth), thus establishing a standard for cell size of

approximately 2,000 square miles. Such a large cell size would be inconsistent with a microcell architecture and thus larger than an optimal PCS system would likely need. In addition, base stations at these heights would be inconsistent with the Commission's proposal to use statistical models to calculate PCS/microwave interference due to "clutter in the vicinity of the low antenna." (NPRM, Appendix F). Cell site antennas located 300 feet AAT would not suffer from any ground clutter. UTC suggests that antenna height be limited to 200 feet above average terrain. At these heights, PCS base stations would be at about the same height as typical microwave stations. Those PCS systems needing higher antennas could should be required to file for a waiver and justify the need.

UTC is adamently opposed to the Commission's suggestion that PCS systems be allowed a significantly greater power and antenna height (e.g., 1,000 watts/1969 feet AAT), as levels this high would drastically increase the potential for interference to 2 GHz microwave operations. If the Commission does allow significantly higher power and antenna height levels the interference calculations of 10E would necessarily require larger coordination distances (see below) in order to reflect the increased area of potential interference.

E. Microwave Licensees Need Actual Notice of PCS Applications

The Commission is proposing that PCS licensees demonstrate protection to all co-channel and adjacent channel microwave receivers within 125 miles of any PCS base station. PCS operators would be required to perform the interference calculations described above for each microwave receiver within this area and to coordinate with the licensees of any affected microwave stations.

UTC generally supports this proposal, provided that the PCS power is limited to 10 watts EIRP and the antenna height is limited to 200 feet above average terrain. However, there may be a need for longer coordination distances for PCS systems located in mountainous areas. If PCS power and antenna height limits are not limited to 10 watts/200 feet, the coordination distances listed in Table 1 of the NPRM are acceptable.

In order to adequately alert 2 GHz microwave users to potential interference, UTC supports a requirement that PCS licensees be required to serve all potentially-affected microwave licensees with a prior coordination notice before filing base station applications with the FCC. Due to the largely unproven nature of PCS/microwave spectrum-sharing, and the critical nature of microwave systems operating in

this band, potentially-affected microwave licensees should be given actual notice of PCS applications. The procedures of Section 21.100 of the Commission's Rules provide an acceptable model.

F. Spectrum-Sharing Between Unlicensed PCS Users And Fixed Microwave Licenses Is Unworkable

1. Proposed Power Limits for 2 GHz Unlicensed Devices Provide Inadequate Protection

One of the most troublesome aspects of the FCC's NPRM for existing 2 GHz microwave users is the Commission's proposal regarding the implementation of unlicensed PCS in the 1910-1930 MHz portion of the 2 GHz microwave band. The two primary concerns of the 2 GHz fixed microwave community regarding unlicensed PCS are: (1) it will be extremely difficult to predict or identify interference; and (2) microwave licensees will have no recourse if interference does occur.

The Commission has attempted to address the first issue by proposing to limit the power of unlicensed PCS systems. UTC is skeptical, however, that the proposed peak power levels for unlicensed PCS devices will provide adequate protection for 2 GHz microwave operations. As noted earlier, utilities cannot tolerate interference to their microwave systems and are extremely reluctant to gamble on the FCC's proposal.