

entrepreneurs to provide commercial services to eligible end-users in the Public Service Industrial Pool. As highly regulated industries providing essential public services over expansive operating territories, it is doubtful that entrepreneurs would be capable of providing the quality and quantity of communications that public service utilities require. Moreover, the essential nature of utility communications during emergency situations dictates that utilities maintain control over their communications systems. Further, public service utilities cannot rely on the marketplace to weed-out the inefficient or undercapitalized third-party private carriers. As entrepreneurs, private carriers would be free to vacate the market and discontinue service if their operations prove unprofitable. This kind of instability is an anathema to the reliable communications service demanded by public service utilities.

Finally, private carrier entrepreneurs could tie-up scarce frequencies which could be used by the utilities themselves in implementing new systems or expanding existing systems. Therefore, the Commission should eliminate its proposal to permit "interservice sharing" of VHF and UHF channels by SMRs.^{19/} Further, the Commission should also expressly limit eligibility for private

^{19/} NPRM, Appendix D proposed §88.309.

carrier systems in the Public Service Industrial Service to those entities that are themselves eligible for licensing as end users.

IV. CHANNEL SPLITS/CHANNEL EFFICIENCY STANDARDS FOR THE 150-174 MHz BAND

The FCC proposes to establish narrowband technology as the benchmark for spectrum efficiency, and to move to narrowbanding during two transition periods: the first in 1996, and the second in the period between 2004 and 2012, depending on market size. As a general matter UTC considers the Commission's two-step proposal to be cost-prohibitive both financially and operationally. Moreover, when viewed in conjunction with the proposed power/height reductions, the plan appears to be spectrally inefficient. The FCC's proposals regarding the VHF and UHF bands as well as UTC's recommendations are discussed in greater detail below.

A. Response To FCC Proposal

Under the Commission's proposal, by January 1, 1996, existing users in the 150-174 MHz band would reduce transmitter frequency deviation to reduce occupied bandwidth to 12 kHz (narrowband). According to the FCC, this will eliminate the need for adjacent-channel mileage separation requirements, and thereby permit assignment of more radio channels.

Between 2004-2012, depending on the market, licensees would be required to use 5 kHz (very narrowband) equipment. A new 5 kHz channel would be centered at the licensee's existing frequency, with two new channels 5 kHz above and below the current center frequency. An existing licensee could continue to operate on one of the three channels created during this second phase, or it may keep two channels if it completes the split at least two years ahead of schedule.

The FCC's proposal to require, by 1996, a reduction in transmitter deviation as well as general reductions in transmitter power and antenna heights will result in significant cutbacks in coverage. A study conducted by one large UTC member company indicates it would experience a 40% reduction in coverage from its existing base/repeater stations; that is, for every three base stations or repeaters used in the system, the utility will have to install at least two more to cover the same amount of territory. Reducing deviation could also affect subaudible

assigns new radio users on the "vacated" spectrum. However, if new licensees are authorized to use these "new" channels, serious interference is likely to occur to existing licensees who are still operating wider bandwidth receiving equipment. In particular, UTC notes the intolerable interference that would be caused to a large number of utilities that have employed extensive utility load management systems on an ancillary basis to their land mobile operations in this band.^{20/} These systems are becoming more and more common as the U.S moves to reduce its energy consumption and preserve the environment.^{21/}

Finally, under the FCC's proposal, as currently

in these bands, on a cost-effective basis, until at least the late 1990s.^{23/}

B. The Commission Should Adopt A Gradual Transition That Emphasizes The Use Of 12.5 kHz Channels

UTC considers the FCC's proposed two-step transition plan (generally, 12.5 kHz by 1996 and 6.25 kHz by 2004-2012) to be ill-advised, based on current and projected developments in radio technology, as well as anticipated user needs for greater data throughput. UTC recommends a more conservative transition plan that will permit a graceful conversion to narrower channels (e.g., 12.5 kHz at first), with the possibility of reducing to 6.25 kHz at such point as radio equipment becomes readily available at this bandwidth and only if it is concluded that further channel reductions will actually increase spectrum efficiency. (For example, growth in TDMA may dictate against further channel splitting). The plan should provide for the gradual replacement of equipment with dual-mode 25/12.5 kHz radios so that existing equipment can be fully amortized before any mandatory conversions.

In any event, it is not yet clear that the public interest would be served by requiring 5 or 6.25 kHz channel splits since there are many unknowns involved in: (a) the

^{23/} Testimony of Wayne Leland Corporate Vice President and Director, Spectrum and Standards Land Mobile Products Sector, at May 6, 1993, FCC hearing on Part 88.

direction of new radio technology; and (b) users' needs in the timeframe 10-20 years from now. For example, it is anticipated that over the next 5-10 years utilities will double or triple their internal radio spectrum requirements and data throughput requirements. Advanced mobile data and distribution automation communications requirements are expected to be the primary applications driving this demand.

If further splitting to very narrowband technology is later found to be warranted, it should be to a uniform 6.25 kHz bandwidth at both VHF high-band and UHF, instead of the FCC's proposal for 5 kHz at the VHF high band and 6.25 kHz at the UHF band. This should improve the economies of scale for equipment manufacturers, and reduce equipment costs for radio users.^{24/}

C. A Modified Version Of LMCC's "Option A" Should Be Adopted

UTC supports the LMCC's "Option A" for introducing new channels in the VHF high-band, modified to allow greater flexibility in non-congested rural areas. UTC's modifications to the LMCC plan are underlined:

^{24/} It should also be noted that in its own version of "refarming" the Federal government is focusing on 12.5/6.25 kHz splits rather than 5 kHz.

1. Effective January 1, 1994,^{25/} licensees on full power channels would have the option of employing true 12.5 kHz bandwidth equipment on a voluntary basis.
2. Effective January 1, 1994, the FCC would establish a new 12.5 kHz frequency plan designating the 12.5 kHz center frequency associated with each of the current 15 kHz frequencies. By making provision for slight frequency shifts, one new 12.5 kHz channel can be created for every 6 existing 15 kHz channels.^{26/}
3. Effective January 1, 1994, a band plan based on 6.25 kHz channelization would be incorporated into the rules for voluntary use by licensees on a coordinated basis. This would allow for the development and use of very narrowband technology on a systematic and planned basis, so that users ~~electing to use this technology will not be~~

equivalent efficiency. Systems not meeting these efficiency standards could continue to operate, but would do so only on a non-interference basis. Systems located beyond 100 miles from any of the top 100 urban areas could continue to operate at wider bandwidths on the 15 kHz channel centers on a primary basis, but would not be eligible for Exclusive Use Overlay (EUO) status. EUO could only be requested if the system operates with 12.5 kHz equipment or equivalent efficiency and on the new center frequencies.

6. Licensees would be allowed to move to the newly designated 12.5 kHz frequencies in advance of January 1, 2004 on a coordinated basis with notification to all licensees within the affected

they convert to narrowband technology. Denial of EUO status would serve as incentive for rural users to employ more efficient technology on a voluntary basis.

This compromise recognizes that there are fundamental differences in the usage level of spectrum in different areas of the country and that the rules must be flexible to accommodate these differences. Moreover, in allowing rural licensees to operate at 25 kHz on a primary basis the rule recognizes the subtle, but critical distinction between primary and secondary licensing status in the shared land mobile bands. Few, if any, licensees would actually be willing to invest time and money into systems that could be rendered worthless without a moment's notice. Finally, it should be noted that under UTC's proposal rural systems will gradually migrate to narrower bandwidth equipment since after 1996 all new equipment will be narrowband.

UTC strongly opposes the "Option B" transition plan contained in the LMCC "Consensus Plan."^{27/} Option B would forego the interim conversion to 12.5 kHz channelization and move directly to 6.25 kHz channels. UTC considers this plan to be ill-advised as it would likely impose a severe economic and operational burden on existing users. Under

^{27/} LMCC "Consensus Plan," pp. 13-14.

Option B there would be no concerted effort to "clean up" noise in the 150-174 MHz band.

The plan also ignores the reality that many large users, such as public service utilities, with on-going operations need to be able to make purchasing decisions based on what is presently available and likely to be available in the immediate future. There is no evidence to suggest that "high tier" 6.25 kHz equipment will be readily available in the near term. Thus, licensees will be forced to either delay equipment purchases until adequate reasonably priced 6 kHz equipment is available or risk the loss of all equipment purchased during the interim conversion to 6.25 kHz.

Finally, Option B would hinder the ability of users such as Public Service utilities to implement wide band mobile data systems, and other advanced technologies requiring higher throughput rates.

D. FCC Should Retain Load-Shedding Channels

UTC supports the Commission's proposal to retain the VHF splinter channels, and in particular supports the retention of the utility load-shedding channel.^{28/} As

^{28/} The FCC should correct proposed section 88.1295(d) to indicate that the actual load-shedding channel is 154.46375, and not 154.43275.

noted above, load-shedding and telemetry devices represent a significant investment and are critical to many of the innovative programs that the utility industry has recently undertaken to conserve energy, protect the environment, and minimize the need for additional generating capacity.

While proposed Section 88.1295(d) states that the output power for the utility load shedding channel is limited to 300 watts, it is not clear from the text of the proposed rules whether the Commission intends to apply ERP/HAAT limits to load shedding channels. As discussed more fully below, UTC opposes the proposed general ERP/HAAT limits, and in particular opposes their application to the load shedding channel. The imposition of the Commission's proposed ERP/HAAT limits on the load shedding channels could seriously impair the ability of load shedding devices to receive signals absent the deployment of significantly more master stations than are presently required. Accordingly, UTC seeks a clarification that the Commission's proposed ERP/HAAT limits would not apply to the load shedding channel.

**E. Innovative Shared Use Channels
Should Not Be Implemented**

The FCC has proposed that 250 channel pairs in the 150-162 MHz band be made available to a small number of licensees for very large "innovative shared use" (ISU)

systems. UTC joins with LMCC in adamantly opposing the ISU proposal. Given the recognized need for additional internal private land mobile spectrum the Commission should not reallocate from utilities and other "non-commercial" users a significant number of channels in order to promote commercial, private carrier operations.^{29/} Such an action would constitute an abandonment of the fundamental purpose of the Private Land Mobile Radio Services and would be against the public interest. Again, all channels gained from conversions to narrowband and very narrowband technologies should be retained by the service pools from which they are derived.

Moreover, adoption of the ISU proposal would effectively limit the ability of non-commercial licensees to stack contiguous channels (for example, to employ TDMA) since, under the FCC's proposal, every third channel in the band would be an innovative shared use channel. As indicated above, utilities anticipate an increased need for mobile data communications which will require higher data throughput capabilities than are presently used for traditional voice dispatch.

^{29/} The lack of available 800/900 MHz channels in the Industrial/Land Transportation and Business categories in many of the major urban markets illustrates the pent-up demand for additional internal private land mobile radio spectrum.

Finally, the industry consensus, as represented by LMCC's early-filed comments, indicates that channel-splitting for the VHF high-band should be limited, at least initially, to 12.5 kHz. The FCC's proposal for ISU channels is premised on its proposal to adopt 5 kHz bandwidths for the 150-174 MHz band in the 2004-2012 timeframe. Thus, there is no place for an "ISU" allocation under the LMCC's transition plan.

F. Trunking Should Be Allowed In VHF And UHF Bands

UTC fully supports an amendment to the Commission's Rules to specifically allow trunking in both the 150-174 MHz and 421-512 MHz PLMR bands. Trunking in other bands and in other services has proven to be a spectrum efficient technology and therefore its use in the bands below 512 MHz should be aggressively pursued. However, because of the unique attributes and requirements of the various PLMR users, trunking may not be the most effective or efficient technology for some licensees. Therefore, trunking below 470 MHz should be encouraged rather than mandated.

The rules that will be required for trunking in the PLMR bands below 512 MHz should include provisions relating to frequency coordination, channel loading and construction schedules. All trunking rules and policies must be flexible enough to take the unique nature of different

terrains into consideration. Otherwise, the efficiencies of trunking will not be realized in many areas of the country.

The size of trunked radio systems implemented in the bands below 512 MHz will vary depending on the service area and requirements of the individual licensees. Therefore, different co-channel concurrence rules will have to be developed to account for different sized systems; for example, correlate the area in which a licensee must secure co-channel concurrence to the size of the licensee's service area. However, given the reality that most licensees would be reluctant to implement trunked systems without assurances that there will be no new co-channel licensees, it may be necessary to limit trunking below 512 MHz to systems that have obtained EUO status.

UTC supports the development of mandatory technical

standard.^{30/} The objectives of this standard are as follows: (1) obtain maximum radio spectrum efficiency; (2) ensure competition in system life cycle procurements; (3) allow effective, efficient and reliable intra-agency and inter-agency communications; and (4) provide "user friendly" equipment.

Finally, in order to facilitate trunking the Commission will need to develop a channel pairing scheme for the 150-174 MHz VHF band. For example, in the Public Service Industrial Pool the 153 MHz and 158 MHz channels could be paired.

V. THE 421-512 MHZ BAND

A. A More Practical Transition Plan is Needed to

transmitting equipment, but all new 12.5 kHz equipment would have to be "true" 12.5 kHz.

The next step would involve the shifting of frequencies up or down by 3.125 kHz and the reduction of channel bandwidth to 6.25 kHz. The implementation of the

~~operation to convert existing channels would take place between~~

narrowbanding requires equipment that is not currently available.

Instead, a more graceful migration plan should be

frequency coordination, on the current offset channels designated for primary operations.

- e. Effective January 1, 2004, all stations within 100 miles of any of the top 100 urban areas must be operating with true 12.5 kHz equipment or equivalent efficiency. Systems not meeting these efficiency standards could continue to operate, but would do so only on a non-interference basis. Systems located beyond 100 miles from any of the top 100 urban areas could continue to operate at wider bandwidths on a primary basis, but would not be eligible for Exclusive Use Overlay (EUO) status. EUO could only be requested if the system operates with 12.5 kHz equipment or equivalent efficiency.
- f. By January 1, 1999, the FCC would commence a follow-up rulemaking to examine whether to develop a transition plan to require licensees in urban areas to convert to 6.25 kHz channels by January 1, 2014.

UTC's transition plan would result in a significant increase in the number of available channels without unnecessarily burdening current users. UTC's plan, like the LMCC "Consensus Plan", would double the number operating frequencies. However, the modifications UTC proposes to the LMCC "Consensus Plan" would allow rural systems to operate wideband channels until there is a need for narrowbanding. Unlike the top 100 urban areas, many rural areas do not suffer from congested frequencies. Consequentially, there is no benefit to be gained by forcing these stations to reduce bandwidths. However, by allowing only systems which meet the efficiency standards to obtain EUO, UTC's plan provides an incentive for rural systems to voluntarily reduce bandwidth. Additionally,

even in the top 100 urban areas, users that are willing to operate on a non-interference basis are able to do so. Therefore, users that are willing to relinquish certain benefits to continue wideband operations may do so without impacting the overall gains in spectrum efficiency.

UTC's plan is practical, calling for the use of equipment technology that exists today. As mentioned in Section IV above, 6.25 kHz equipment is not available. Although a few manufacturers have equipment that can operate in a 6.25 kHz channel, there has been no practical, real-world test of this equipment's reliability and ability to meet the demands of U.S. users. Unlike 6.25 kHz equipment, 12.5 kHz equipment has proven its reliability and can meet the demands of U.S. users. Further, it has not been demonstrated that a graceful migration from 25 kHz directly to 6.25 kHz can be accomplished; for example, through use of dual-mode 25/6.25 kHz equipment.

B. There Is No Need to Designate The 450 MHz Offset Channels In the Special Industrial Pool As Co-Primary

UTC disagrees with the Commission's proposal to designate as co-primary the ten offset channels in the 450 MHz Special Industrial Radio Service pool. Such designation is unnecessary if the Commission provides for a reasonable, graceful transition to narrowband channels. As

explained above, UTC's transition plan calls for a gradual transition to 12.5 kHz channels, with only a voluntary migration down to 6.25 kHz. Because 12.5 kHz channels would make most "offset" channels primary, there would be no reason for the Commission to designate the Special Industrial channels as co-primary.

C. Low Power Telemetry Operations Should Be Authorized in the 450-470 Band

UTC supports, with minor modifications, the Commission's proposal in Section 88.1299(b)^{32/} to authorize low power mobile stations to be assigned in the 450-470 MHz band for telemetry operations. As proposed, these channels would be offset 3.125 kHz from the 6.25 kHz channel centers. Section 88.1299(b), as proposed, is inconsistent with UTC's reasoned narrowband transition plan, which calls for 12.5 kHz channels, and with the Commission's own plan, which calls for 12.5 kHz channels until at least 2004. To attain consistency, these low-power channels should be 6.25 kHz offset from the 12.5 kHz channel centers, and not 3.125 kHz offset.

Further, it is unclear what power levels would be permitted for these operations. Although the text of the NPRM states that the telemetry operations of 20 mW or less

^{32/} NPRM, §88.1299(b).

would be permitted,^{33/} proposed Section 88.1299(b) limits power to 10 mW or less. The Commission should therefore clarify what power output limit would apply to these telemetry operations. UTC recommends that low power telemetry operations of 20 mW or less be permitted.

D. Low Power Operations at 460-470 MHz Should Be Permitted

UTC supports permitting low power operations on a secondary basis in the 460-470 MHz band. However, in accordance with UTC's narrowband transition plan, the Commission's proposal in Section 88.907 should be modified to account for 12.5 kHz channels. Therefore, low power operations in the 460-470 MHz band should be limited in one of two ways to ensure consistency with the migration to 12.5 kHz channels. First, the Commission could designate certain of the current "offset" channels as channels for low power operations and restrict low power operations to these offset channels.^{34/} Alternatively, the Commission could limit the low power channels to new offset channels that are 6.25 kHz offset from the new 12.5 kHz channel centers. UTC would support either of these alternatives.

^{33/} NPRM, 7 FCC Rcd 8129.

^{34/} This is essentially the approach recommended in the LMCC "Consensus Plan".

**E. Fixed Operations at 150-174 and 450-470 MHz
Should Not Be Limited to Areas in Which There is
At Least One EUO Licensee**

UTC disagrees with the Commission's proposal regarding fixed operations in the 150-174 and 450-470 MHz bands, as expressed in Sections 88.1179 and 88.1203 of the proposed rules. These Sections would limit secondary fixed use to situations where: (1) there is at least one Exclusive Use Overlay (EUO) licensee within 50 miles; and (2) the fixed system applicant has the concurrence of all EUO licensees. Requiring applicants to meet both requirements before allowing secondary fixed use is too restrictive and would result in an inefficient allocation of channels.

While UTC does not dispute the need for EUO concurrence, UTC believes that restricting secondary fixed use to situations where there is at least one EUO license is unnecessary and would effectively preclude the use of vacant channels in rural areas where there are few or no EUO licensees. Instead, the Commission should permit secondary fixed use regardless of whether there is an EUO licensee within 50 miles. This would be consistent with the Commission's June 5, 1992, Report and Order (R&O) in PR Docket 91-66, FCC 92-233, in which the Commission expanded the availability of channels for secondary fixed operations in the 450-470 band. In the R&O, the Commission found that:

Over the years, licensees have developed an increased need for both land mobile and fixed systems. Increasing the number of frequencies available for secondary fixed use, therefore, would provide applicants with additional resources to meet their diverse communications requirements.^{35/}

For the same reason, expanding the availability of fixed use operations beyond situations where there is at least one EUO licensee within 50 miles would be in the public interest.

VI. POWER/HEIGHT AND OTHER TECHNICAL ISSUES

A. The Proposed Power/Height Reductions Are Unreasonable

In order to curtail "overly powerful systems" and to simplify reuse of channels at standard 50-mile spacings, the FCC has proposed stringent limits on effective radiated power (ERP) and height above average terrain (HAAT).^{36/} UTC strongly opposes the FCC's proposals for these arbitrary and unrealistic limits on ERP and HAAT, particularly as applied to the wide-area systems typically employed by public service utilities and natural gas pipelines.

One major utility in the Southwest has estimated that most of its base station transmitters would be limited to 5 watts ERP under the FCC's proposals due to its use of

^{35/} R&O, at p. 2.

^{36/} NPRM, 7 FCC Rcd 8113.

relatively high transmitter sites in relation to the generally flat terrain. Reduction of ERP would be particularly problematic for this utility because there are relatively few sites available in this part of the country.

It is also debatable whether the adoption of strict power/height limits will actually produce a net gain in available spectrum. In the case of utilities and pipelines, it probably will not. First, radio systems are designed by utilities to cover their underlying utility service areas. If coverage is reduced due to reductions in power, additional sites must be constructed to replace the lost coverage. Additional frequencies will be needed for these stations, or, if a "simulcast" system is deployed in order to re-use frequencies, additional spectrum would be needed to interconnect the base station sites.^{38/}

While "cookie-cutter" radio systems might be appropriate for private carrier operations, they are entirely unacceptable for the systems required by utilities and pipeline companies to cover their transmission and distribution networks. In making this proposal, the Commission appears to have lost sight of the primary purpose of the Private Land Mobile Radio Services: to provide for the development of radio systems needed by public safety, public service, and other industrial users to meet their internal communications requirements. These users do not have service areas defined by radio coverage;

^{38/} Due to the need to maintain within very strict limits the time delays between simulcast base stations, fixed microwave is the medium of choice when interconnecting simulcast base stations.