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BROADCAST DAILY ARTICLE
NATPE ISSUE
by FCC Commissioner James H. Quello

We have reached a point in our history as a nation at which we find ourselves facing shortages of various basic natural resources. This fact has received widespread public attention insofar as energy is concerned. The public may not be so aware of another shortage which threatens to change the ways we do things in the electromagnetic spectrum.

A vast amount of spectrum has been set aside for broadcast television in the belief that television is capable of providing necessary and desirable services to all citizens. It informs, entertains, educates and illuminates and it is available to all within range of a television transmitter. VHF television has made relatively effective use of the spectrum assigned. UHF is developing at a considerably slower pace for several reasons.

There are increasing pressures to "give up" on large portions of the UHF spectrum and allocate that valuable bandwidth to other services which are growing much more rapidly. The Commission has already permitted some "sharing" of the lower seven UHF channels and the upper portion of the UHF spectrum with land mobile services. It is being strongly suggested that all of the UHF band should be considered available to both UHF television and land mobile services in international allocation tables so that further sharing can more readily take place should the need arise. Many of the arguments advanced appear quite reasonable.

I believe that caution is indicated, however, before there is further erosion in the UHF band. UHF television broadcasting appears to be making

real progress. It's conceivable that we are on the verge of a boom in UHF television which would fully utilize the spectrum space now allocated. More can and should be done to encourage further progress.

There are some things which have been done in the past to enhance the viability of UHF television. The Congress in 1962 passed the "All Channel Receiver Act" which required all television sets to be capable of receiving UHF signals. "Detent Tuning" became a requirement for all sets to reduce the disparity in ease of tuning which favored VHF. Very high transmitter power levels have been authorized. And, there have been other, relatively minor, improvements in the service.

There remain some very significant technical disparities which greatly favor VHF. The VHF tuner in a television receiver, for example, is much more efficient than the UHF tuner. Because of relatively high noise figures generated within the UHF tuner, it must receive correspondingly higher signal levels to overcome that noise. A popular way to illustrate this point is to note that a reduction in the noise figure of only 3 dB is equivalent to an increase of 100% in transmitter power. The FCC currently requires a noise figure for UHF receivers no greater than 18 dB. There is a proposal currently before us to reduce that figure, in stages, down to 10 dB--an eight dB improvement!

Texas Instruments Incorporated currently is completing a contract with the FCC to design a tuner with qualities vastly superior to tuners in general use today. Preliminary indications are that this design effort has been largely successful and that significant noise figure reduction is

economically possible with the TI approach to tuner design. Very little is known about the design capabilities of other electronic manufacturers since, apparently, very little effort has been expended toward reducing the noise figure. Despite this fact, however, the state of the art in semi-conductor manufacturing appears to be gradually forcing the noise figure downward.

The problem seems to be that the television receiver manufacturers appear to have very little incentive to concentrate much serious research effort upon a reduction in noise level. Their efforts have been largely devoted toward reducing costs while maintaining current performance. After all, manufacture and sale of TV receivers is a highly competitive endeavor. And, the consumer is generally unaware of any problem with his UHF tuner except, perhaps, to notice that the UHF picture seems to have more "snow" than he's accustomed to on VHF channels.

The noise figure is not the only source of technical disparity between UHF and VHF television, of course. There are also problems with UHF antennae, antennae lead-ins, selectivity, propagation paths, transmitting antennae, transmitter efficiency, etc. Frankly, some of these problems have no ready solution; a fact which forces the conclusion that "technical parity" between UHF and VHF will always remain a goal instead of a reality. There are also some trade-offs to be made in design which can restrict progress toward improving one condition because it may make another worse. That kind of trade-off applies to some extent in the noise figure versus selectivity balance but it isn't clear that it becomes a serious problem at a 10 dB noise figure or above.

The Texas Instruments contract produced some interesting and innovative design work which may well be utilized by receiver manufacturers in the future. However, the TI design is only one approach to receiver design, exciting as it appears to be. If receiver manufacturers had sufficient incentive to devote a comparable effort to such design, it might be that another approach would prove even more promising.

It may be that the FCC--in furtherance of its long standing policy of encouraging the growth and development of UHF television--must provide the incentive for further technological development in this area. Congress has already expressed its interest in the problem through passage of the "All Channel" legislation. President Carter, in a message to Congress last October, said: "...I urge the Federal Communications Commission to seriously consider pending proposals that would bring public television and radio closer to parity with commercial stations. These include proposals for better standards for TV set reception of UHF channels..." FCC Chairman Ferris, in an enthusiastic response to my memo encouraging prompt action on specific UHF parity issues, let it be known that the new FCC administration is dedicated to to UHF progress. With the catalytic support of the new Chairman and the constant, on-going support of Commissioner Lee, 1978 is destined to be the year that deliberation and dialogue will be finally implemented through action.

There are many approaches to improving the UHF service as a whole and all of them deserve attention. Development of a more efficient klystron tube for UHF transmitters, reduction of losses in receiver antennae lead-ins and other means of delivering better signals will be investigated. I'm convinced, however, that significant reduction in the noise figure offers the most immediate promise of dramatic results.