

THE "MULTIPOINT DISTRIBUTION SERVICE"

A THREAT OR A PROMISE?

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The program originally scheduled for this time slot will not be seen due to technical difficulties completely within our control. While we would very much like to talk about our multi-channel CARS equipment, we are just completing a second generation design, and in light of the broad coverage being devoted to this subject by other speakers later in the schedule, we accepted Del Ports' invitation to switch the topic to the new Multipoint Distribution Service.

This does not mean that we would rather "switch than fight". We definitely favor the AM translator approach to Multichannel TV relay systems and have been using this technique for many years in furnishing 2500 MHz multi-channel systems for the Instructional Television Service.

The new topic — "MDS - A Threat or a Promise" was suggested by Del to acquaint you with the recent FCC action as related to the CATV industry.

First, a little history. In 1963 the FCC established ITFS, the Instructional Television Fixed Service, and allocated 31 TV channels in the 2500-2700 MHz range for use by schools and universities. Varian, along with several other manufacturers, assisted school administrators in applying for Federal Funds to implement innovative systems, and some rather unique installations were accomplished. A typical example is the four channel system used by the Diocese of Brooklyn to transmit instructional programs to over 250 schools. Several multi-channel repeaters are used to provide coverage of the entire Borough. The Brooklyn system and about 100 other systems around the nation represented the first successful application of omnidirectional transmission at microwave frequencies. With an available power output of 10 watts at 2500 MHz (provided by a traveling wave amplifier), omnidirectional antennas having a power gain of 15 dB, and parabolic receiving antennas giving up to 30 dB gain, path losses of about 130 dB or 20 miles could be overcome. Thus, the technology of multi-channel omnidirectional microwave transmission was developed using standard TV format and frequencies, and simply translating or heterodyning to the desired 2500 MHz channels. The receivers, or down-converters (Fig. 1) consist of a preselector, a local oscillator and an amplifier covering the high band VHF Channels 7 to 13. Several CATV operators use Varian down-converters at their cable head-end to pick up special school programs or school board meetings televised by the

local TTFS studio. The cost for a typical receiving installation is about \$1000.

While the 2500 MHz instructional television business was quite active as long as federal funding lasted, it began to dry up and has been very quiet during the last 4 years. As a result, we began looking for other markets for our products. We started by reading the three foot book-shelf known to the trade as the FCC Rules. Anyone who has read these volumes will agree that the plot is rather elusive, but the cast of characters in Washington is quite interesting. When we finally found an obscure reference to omnidirectional transmission at 2 GHz in Part 21, we went to Washington to meet some of the characters and found them most helpful and encouraging. \$5,000 later, our lawyers reported progress.

Part 21 is the Bible for those of you who are already common carriers. If the trend towards regulation of CATV continues, more of you may very well become familiar with this Part, in addition to the many controls and regulations that already apply to CATV. The particular paragraph that interested us was 21.703(g) which referred to a bandwidth limitation of 3.5 MHz in the 2150-2160 MHz range. While pretty good monochrome TV can be transmitted in this bandwidth, we really needed at least 6 MHz for color and could use 10 MHz. An exhaustive review tracing FCC actions through several generations finally convinced the Common Carrier Branch that the 3.5 MHz limitation was never really intended to apply to the small segment of spectrum between 2150 and 2160 MHz; so on July 31st, 1970, the FCC released Memorandum Opinion and Order #FCC-70-819 changing paragraph 21.703(g) to permit 10 MHz of authorized bandwidth. The first step towards MDS had been accomplished.

While all this was going on in the Common Carrier Branch, we had also submitted transmitter type acceptance data to the Chief Engineer's Office. The first submittal was for a color TV transmitter at 2150-2160 MHz which required a 6 MHz band. Our application was rejected due to the then effective 3.5 MHz limitation. We therefore modified the transmitter to provide monochrome transmission within a 3.5 MHz bandwidth, and type acceptance was granted. This established the fact that TV could legally be transmitted in the 2150 band, using an omnidirectional antenna pattern. As soon as the 3.5 MHz restriction was removed, we reactivated our type acceptance request for the 6 MHz color transmitter which was promptly granted.

Having progressed to this point, our next step was to probe various groups associated with communications. These groups were the broadcasters, the CATV operators, and the radiotelephone and radio paging operators. We also contacted Ma Bell and Western Union. In time, construction permit applications began to appear at the FCC in sufficient numbers to create a new problem. While the applications were strictly in accordance with the existing Part 21 rules, and while there was no reason why the applications could not be processed in routine fashion, no construction permits were forthcoming. After

months of waiting, we found that the common carrier people at the FCC were pretty well buried under some 2000 applications for point-to-point stations for MCI, DATRAN, and a host of operators seeking to compete with Bell. We also found that the MDS applications had been tabled, pending the creation of rules to cover the service. This was a real shocker, as it was obvious that many more months would pass before the new rules could be drafted. To complicate the picture a little more, there was another docket on the books which proposed the use of the 2150-2160 MHz band for aural studio-to-transmitter links.

In spite of all the problems, a few dedicated individuals in the Common Carrier Bureau hammered out a set of rules creating the "Multipoint Distribution Service". This was during mid 1971, and the rumor was that the new rules would be issued "next month". By January 1972, the rumor changed to "next week". On April 19th, 1972 it was reduced to "tomorrow" — and sure enough, Report No. 7686, Docket No. 19493 appeared on April 20th.

While all this was going on within the cloistered walls of the FCC, Washington attorneys and engineering firms were busy preparing applications. The statistics change on a daily basis, but there are now close to 200 construction permit applications on file, and grants are expected next month.

The present MDS applicants represent a cross section of the communications industry, and many are directly or indirectly connected with CATV. Last September Varian invited the existing applicants to a dinner meeting in Washington, and the result was the formation of an industry committee now known as the Multipoint Microwave Common Carrier's Association, MMCCA. In December of 1971, this group presented an "Industry Position Paper" to Commissioner Robert E. Lee, and copies of this comprehensive paper are available from Varian. Optics permitting, I would like to show you portions of the report (attached) and describe the service.

On April 26th the full text of the Commission's "Notice of Proposed Rule Making" for Docket 19493 was issued. This is a 12 page document with many cross references to other rules, and I will not attempt to go into the details. Briefly, it cites the applications on file and states that the requirements of an omnidirectional service differ substantially from those of a fixed point-to-point service — thus the need for new rules, patterned after the 2500 MHz Instructional Television Service.

With this background, let's get to the subject. Is MDS a threat or a promise as viewed by the CATV industry?

As the company responsible for the FCC rule changes which made MDS possible, we sincerely believe it holds a very substantial promise for CATV operators. We further believe that CATV and MDS are complementary services which will benefit by their mutual existence. Our reasons for this belief are as follows: The primary purpose of cable is to reach the home audience. MDS, by its very nature, is not a

home type of medium. Ultimately, cable operators expect to have many specialized channels and services available to the home viewer. In fact, the recent FCC action opening more markets to cable television is a major step in the transition and expansion of cable from a mass home audience medium to one also providing a "narrowcasting" or pinpointing service to specialized audiences.

But — before cable can become the dreamboat delivery system of the future, substantial investments of time, effort, and money will be needed — not only to develop the hardware — but more important, to develop the specialized programs and audience demand for these programs. Using cable, this will be a slow process, but MDS can speed the arrival of this day for cable. Through MDS, producers will be able to test the narrowcast concept on specialized business groups. Once this proves successful, it would only be natural to expect that specialized programs would then be distributed via cable into homes or other points served by the system.

MDS and CATV are complementary services for another reason — economics. Just as economics rule out MDS as a home medium, so too will it be ruled out in many other markets. On the other hand, cable will not be competitive in certain markets where MDS will address itself. Cable likes pay dirt and high density areas with a drop every few feet, whereas MDS is a pinpointing type of service to reach widely separated customers. Under these conditions, it is more economical than cable. Clearly, then, by making use of each other's strengths, MDS and CATV can both prosper, with CATV serving the high density residential areas and MDS serving widely separated industrial areas.

Another example would be the use of MDS to transmit special programs to receiving dishes at the head-ends of cable systems, thereby inter-connecting several systems without the need to run trunk cables across the countryside. In this situation an MDS common carrier might lease a channel from a cable system operator where signal distribution through the cable would be advantageous to the MDS customer. Thus, MDS would use the cable in those areas where channel capacity is available, and would use the airwaves in those areas not served by cable.

If the FCC wanted to foster the growth of CATV, it could not have picked a better partner than MDS for maximum flexibility and compatibility in rendering a complete service.

I hope that this brief discussion has served to dispel any thoughts that MDS is a threat to CATV, and has hopefully served to expose the possible benefits. Several of you are already MDS applicants and there is room for many more, particularly in the areas where CATV found its start.

Thank you for your kind attention, and we will now return to the program originally scheduled for this time!