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

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In the Matter of	)	
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Digital Data Transmission Within the Video Portion	)	MM Docket No. 95-42
of Television Broadcast Station Transmissions	)	
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COMMENTS OF DIGIDECK, INCORPORATED

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Date: June 22, 1995

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I. INTRODUCTION

Pursuant to Rule 1.415 of the Rules of the Federal Communications Commission ("Commission"), Digideck, Incorporated ("Digideck") hereby files these Comments on the Commission's Notice of Proposed Rule Making ("Notice") in the above-referenced proceeding.1/

In the Notice, the Commission proposes to permit the transmission of digital data within the video portion of television broadcast station transmissions, but seeks guidance regarding appropriate rules and regulations to govern such transmissions, and further information on certain subjects, including Digideck's D-Channel system. Digideck agrees with the Commission and urges it to adopt rules that will permit digital data

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1/ Notice of Proposed Rule Making, MM Docket No. 95-42, FCC 95-155 (April 10, 1995).

transmissions with as high a data rate and as strong a level of robustness as possible, consistent with maintaining the quality of NTSC television. We believe that such activity should be encouraged and recognized as vital to the competitiveness of the broadcast television industry.

II. BACKGROUND

As the convergence of computing, television and communications moves the average consumer into the information age, there is a need for an inexpensive means of transmitting vast amounts of data to mass audiences. Broadcast digital television promises to be the most effective and least expensive means of mass distribution. Ultimately, broadcast digital television will provide the on- and off-ramps to the information highway.

But broadcast digital television will be slow in coming. Stations have to invest in new facilities, and consumers have to invest in new receivers. In the meantime, cable and telco systems will have a significant advantage over broadcasters -- a mechanism to provide subscription-based digital data services today.

Vertical blanking interval ("VBI") transmission is available today, but lacks sufficient bandwidth for more than a very limited set of applications. Overscan techniques as mentioned in the Notice have a similar limitation. In contrast Digideck's D-Channel system provides 525 kbps, has been proven extremely robust, yet maintains the quality of the existing NTSC services. By adopting such a system the Commission will provide local broadcasters with a delivery mechanism which allows participation during the vital first phases of the digital revolution. But it is urgent for the Commission to act as soon as possible to level the cable/telco advantage.

III. DISCUSSION

1. High Speed NTSC-Based Data Broadcasting is a Vital Need of Local Broadcasters

The capability to provide enhanced-content services from the studio to the home -- using one-way and two-way interactive digital data transfers -- requires a minimum of 200 to 400 kbps of downstream capacity[2/], and is often viewed as one of the most attractive parts of the first phase of our nation's transfer to digital television.

VBI transmission offers 19.2 kbps of data capacity per line in the existing NTSC signal. This is insufficient to serve the growing numbers of applications for broadcast data. An early version of the ATV signal specified a 500 kbps auxiliary data payload which could be used by broadcasters for just such services. But the all-digital ATV receiver, with its expensive digital video decoder, is expected to have a slow-paced market penetration. As a result, local broadcasters must wait and watch while content providers associated with subscription-based cable and telco systems are able to develop new data services and sign the long term contracts for carriage and advertising rights.

A better alternative is the use of high-rate NTSC-compatible "sub-video" data transmission. Digideck's D-Channel system provides a rugged 525 kbps without disturbing the quality of the existing programming, and without waiting for a sufficient body of ATV sets to appear. As a relatively inexpensive addition to a standard receiver, or as a modification to a digital settop box (under $15 for a receiver chipset, under $5 to modify a digital settop), the parts are affordable to a large percentage of receivers and settops, not just the high end sets.

2/ Private conversations with a future supplier of interactive application programs.

By adopting the D-Channel system, the Commision would provide local broadcasters with a delivery mechanism allowing them to compete during the first phases of the digital revolution -- that vital period when long term marketing/advertising alliances are made and consumers wooed in search of early brand-name loyalty.

2. *Acceptability Tests for Data Broadcasting Methods*

The Notice inquires about objective measures[3/] which could be used to establish acceptability of proposed data transmission methods, particularly with respect to sub-video methods which transmit during the active portion of the video.

The Commission has made reference to the existence and activities of the National Data Broadcasting Committee ("NDBC"), a standards body commissioned jointly by the National Association of Broadcasters ("NAB"), representing television broadcasters, and the Electronic Industries Association ("EIA"), representing receiver manufacturers. The NDBC is studying this very issue, not in an abstract way but by developing critical tests and conducting a thorough evaluation of two competing systems with the objective of establishing a standard, or family of standards for data broadcasting. The NDBC is employing the basic procedure which has served the industry so well for so many years -- relying on the judgement of television experts, using critical materials and stressing the proposed systems. The intent is not to certify whether a particular system is "good enough", but to find the best system that technology can offer.

We wholeheartedly support the Committee in its efforts. The NDBC working groups have addressed issues of maintaining host signal quality, potential interference to

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3/ Notice, Para. 31.

other NTSC signals, and ruggedness of the data signal against a variety of interference and multipath conditions. They have employed panels of experts, and have conducted their tests at the Advanced Television Test Center, undoubtedly the premier television test laboratory in the country, with superb equipment facilities and a staff renowned for their fairness and impartiality. The results of these tests are available for public review.4,5/

To be commercially viable it is important that the Commission adopt a system that is robust and does not impact existing NTSC services. We believe the Commission should put a great deal of credence in the work of the NDBC, and feel it would be dangerous to approve use of a system proven inferior by such tests. If a fragile or otherwise inferior system were allowed to compete against the well-established cable, telco and wireless data transport systems in this country, the emerging television-based data broadcasting opportunity could acquire a bad reputation from which it never recovered.

3. D-Channel Characteristics

The Notice requests additional information about Digideck's proposed D-Channel system, with particular attention to its effects on lower adjacent channels.6/ We assert that neither co-channel signals, nor upper or lower adjacent channel signals are adversely affected by the presence of D-Channel data.

4/ "Results of Tests on WavePhore and Digideck Systems, November 28 - December 21, 1994", Submission from NDBC Testing Working Group to NDBC Evaluation Working Group, March 2, 1995.

5/ "Report on the Laboratory Test Results", Presented by the Evaluation Working Group to the National Data Broadcasting Committee, 10 March 1995.

6/ Notice, Para. 31.

The D-Channel signal can be summarized as a continuously broadcast 700 kbps differential quadrature phase shift keyed ("DQPSK") data signal. The data carrier is positioned 1 MHz below the host's picture carrier in frequency, and injected at a level of –30 dBc to –36 dBc (relative to the picture carrier at peak of sync). To avoid interference from the host signal, the lower edge of the modulated video (the vestigial sideband, or "VSB") is attenuated approximately 250 kHz closer to the picture carrier than is specified in §73.682(a)(4) of the Commission's Rules and Regulations (see Figure 5 of §73.699). In the tests conducted by the NDBC there were no observable artifacts created by changing the VSB attenuation (test scores with the data signal off were a perfect 5 out of 5 for all pictures, observers and receivers). One-fourth of the transmitted bit stream is used for forward error correction, leaving 525 kbps of useful data capacity.

Because the data signal is located near the lower edge of the host channel, it seems most likely to affect the lower adjacent channel, and the Commission is justified in inquiring specifically about this aspect. However, the referenced report from the Evaluation Working Group concluded that the D-Channel signal was within the spectral limits allowed by FCC Rules and Regulations §73.687(a)(1).7/ And the expert subjective tests indicated that lower adjacent video was less affected by a signal with D-Channel data than by conventional NTSC (though not significantly so), and that lower adjacent stereo audio continued to be more robust than its video to interference from NTSC+D-Channel data, consistent with interference from conventional NTSC.8/ We can safely conclude that interference to a lower adjacent channel is not a problem caused by a D-Channel signal.

7/ Report of NDBC Evaluation Working Group (op cit), pp 2-3. The FCC requirement is equivalent to EIA 508, referenced in the report.

8/ Report of NDBC Evaluation Working Group (op cit), pp 9-10.

But the referenced NDBC tests provided even more valuable information than a lack of impact to lower adjacent channels. These tests showed that the D-Channel signal:

(a) Did not adversely affect the host channel's audio or video

(b) Did not affect adjacent or co-channel signals more than conventional NTSC

(c) Allowed reception at the Grade B contour with 16 dB of margin

(d) Was highly resistant to impulse noise, multipath, and adjacent and co-channel interference.

The tests further demonstrated across-the-board superiority of the D-Channel approach compared to its competition:

(a) Better grades on picture quality -- on all sets, on all pictures, at both signal levels, by both observers

(b) Better resistance to noise and interference

16 dB better against white noise

17 dB better against impulse noise

20-28 dB better against adjacent and co-channel interference

(c) Better performance in multipath -- success against all four ensembles

(d) Higher data payload -- 525 kbps vs. 384 kbps

As a result, only the D-Channel system has received NDBC recommendation and approval to go forward into field testing. While the formal field tests must still be conducted, informal tests conducted by Digideck at WWOR Channel 9, New York City, have already confirmed the lab results. *In summary, all results to date indicate that Digideck's D-Channel technique is superior and fully capable of providing a satisfactory method for high speed NTSC-compatible data broadcasting.*

IV CONCLUSION

To summarize, one, there is a critical need for adding a high speed NTSC-compatible data transport capability to the NTSC body of standards. Without it, broadcasters will be unable to compete during the early phases of digital television.

Two, the NDBC tests clearly indicate that the D-Channel system is the superior method of data transport which fully meets the requirements of broadcasters and the public -- high quality, high reliability, and high capacity.

We urge the Commission to adopt, without delay, rules for high-speed NTSC-based data transmission which will allow broadcasters to compete fairly in the information highway revolution.

Respectfully submitted,

DIGIDECK, INCORPORATED

By, _____

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