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High-Definition Digital Television and Related Matters

before the

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Mr. Chairman and Members of the Subcommittee, thank you for the opportunity to appear before you today to discuss digital television (DTV). Before I begin, I do want to clarify that any opinions I express today are my own, and may not necessarily reflect the views of the Commission.

I would like to commend you, Mr. Chairman and other members of the Subcommittee, for holding this hearing on this important topic. This hearing is indeed very timely and consistent with the Commission's own ongoing review of the progress of the DTV conversion process.

In the proceedings establishing the DTV transition, the Commission stated that it would conduct a review every two years to "ensure that the introduction of digital television" serves the public interest. The Commission has commenced its first periodic review of DTV with the adoption of a *Notice of Proposed Rule Making* in March of this year. This *Notice* addresses a number of issues that we believe require resolution to ensure that progress with the DTV conversion continues and potential sources of delay are eliminated.

DTV Build-Out Status

I would like to begin with a brief overview of where we are in the rollout of DTV. As you know, the Commission has established an aggressive schedule for television stations to construct their DTV facilities. All network-affiliated DTV stations (i.e., ABC, CBS, NBC and Fox stations) in the top ten television markets were to be constructed by May 1, 1999 and all network-affiliated DTV stations in the top 30 TV markets were to be constructed by November 1, 1999. All remaining commercial DTV stations are to be constructed by May 1, 2002, and all non-commercial DTV stations are to be constructed by May 1, 2003.

Given the breadth and complexity of the efforts needed for the building of a DTV station, these requirements are clearly ambitious. Yet, the broadcast industry has done an admirable job of embarking upon this challenge.

The FCC has granted permits to 515 stations for the construction of DTV facilities. There are now 139 stations in the United States transmitting digital programming (108 licensed and 31 operating under Special Temporary Authority or experimental authority). In the top ten TV markets, 36 of the 40 network-affiliated stations are on the air (33 with full facilities). In markets 11-30, 59 of the 79 network-affiliated stations are on-the-air.[1]

In fact, much of the delay in construction to date has been the result of matters generally beyond broadcasters' control – such as obtaining local zoning approval, completing international coordination requirements, facing delays in obtaining equipment, finding adequate transmitter sites and encountering difficulties in scheduling construction

[1] A complete summary of the specific DTV stations that are on-the-air is attached as an Appendix to this statement.

personnel. Delays have also resulted from broadcaster petitions to change their DTV channel.

Nevertheless, despite these obstacles, broadcasters have done a good job of *starting* the DTV transition process. However, I am concerned that this good initial progress is now being threatened at a critical time when more needs to be done and the pace of the transition needs to accelerate.

Why the Digital Transition Needs to Take Place Quickly

Let me begin with why I believe it is in the best interests of broadcasters to make this transition happen as quickly as possible. I am convinced that broadcasters must make the transition from analog to digital transmission quickly for three basic reasons.

First, all other segments of the telecommunications industry -- commercial wireless service providers, such as cellular and PCS; wired services, such as DSL and cable television systems; direct broadcast satellites; mutichannel multipoint distribution systems; and, others -- have made, or are in the process of making, the conversion to digital. I know of no significant exceptions.

Given that cable, satellite and other video competitors have already made the transition to digital, broadcast television cannot afford to be left behind. I believe that broadcasters, out of self-preservation and in order to serve the viewing public for which they have received licenses, must quickly make this transition in order to remain competitive.

These other services are either direct competitors with over-the-air broadcasting or indirect competitors in the sense that they represent alternative means of delivering entertainment and other content to end users. Over-the-air broadcasting must make the conversion from analog to digital transmission in order to remain competitive in the long run. And, as we all recognize, in Internet time the long run is not necessarily all that long. In short, it is my belief that the broadcast industry must make the conversion to digital for both "offensive" and "defensive" reasons.

Second, from a technological perspective, the overall advantages of converting from analog to digital transmission are now overwhelming. The advantages of using digital techniques for representing, storing, processing and transmitting signals are clear. These include:

- the greater robustness of digital signals;
- the ability to detect and correct transmission errors when they do occur;
- the ease with which digital signals can be encrypted;
- the facility with which the signals can be manipulated or processed using modern computer techniques and, especially, the associated ability to take advantage of the greater computing power and falling costs associated with Moore's Law; and,

- the ease with which different types of signals or services can be multiplexed or provided on a common transmission facility.

Third, the broadcast industry must make the conversion from analog to digital because the public interest demands that spectrum be used more efficiently. I would like to expound briefly on this point.

I head the Office of Engineering and Technology (OET) at the Commission. OET has a number of responsibilities, one of the most fundamental being to handle spectrum allocation matters within the Commission. From that perspective, I see first-hand the problem of increasing demand for a scarce national resource, the radio spectrum. This increasing demand, which is particularly intense in the range from roughly 300 MHz to 3,000 MHz, is propelled by a number of developments. As members of this Subcommittee know, these developments include not only the rapid growth in traditional, voice, commercial mobile radio services, but also intense interest in providing advanced data communications services, including Internet access, to a host of portable end user devices.

A successful transition of television broadcasting from analog to digital will free up spectrum for other uses as determined by the marketplace. We need that to happen sooner rather than later. As an engineer, I know that you can do much more with a 6 MHz channel than today's analog standard definition television. We must act accordingly. We must find ways to speed the build-out of DTV or at least keep it on track. The benefits to the American consumer of new and improved digital broadcast services and the consequent freeing up of spectrum for other services are just too great.

I would like to further emphasize my strongly held belief that, in making the transition to DTV, we must not do anything that would jeopardize the continuation of free, over-the-air television for the American public. Fortunately, technological developments - including better digital compression and modulation techniques - have given us the luxury of having our cake and eating it too. With digital technology, we can continue to have traditional broadcast services as well as exciting new broadcaster-provided services - including High Definition Television, multiple streams of Standard Definition Television, or some combination of these along with other new services such as datacasting. And we can do all of this while freeing up spectrum for other valuable uses, including increased local loop competition.

DTV Transmission Standard

It is my understanding that broadcasters are now undertaking a review of the DTV transmission standard. This review includes looking at COFDM (Coded Orthogonal Frequency Division Multiplex) technology as a possible alternative to the 8-VSB (Vestigial Side Band) standard for its reputed benefits for new service applications, including mobile and data transmission operations.

In the DTV rulemaking process, the Commission agreed with the overwhelming consensus of the broadcast industry that the new DTV channels should provide for replication of existing analog television service so that broadcasters have the ability to reach the audiences that they now serve with a free, over-the-air video service and that viewers continue to have access to the stations that they can now receive. Another objective of the DTV transition process has been to minimize interference to both the existing analog and new digital television services. The Commission's Advisory Committee on Advanced Television Service, a group selected to represent the interests of broadcasters and others in this matter, chose the 8-VSB system as the modulation method that would best allow achievement of these goals. This choice was made after a long and thorough process of laboratory and field testing and subsequent evaluation that found 8-VSB superior to other modulation technologies, including COFDM.

I believe that a mid-course change to introduce a new modulation technology at this late date could lead to lengthy and unacceptable delays in the DTV transition process and could undermine the service replication and interference goals on which the DTV transition is based. Notwithstanding the arguments and claims of the COFDM proponents that allowing optional use of COFDM could be accomplished quickly, any changes to the DTV transmission standard that would necessitate revisions to the DTV Table of Allotments could result in years of delay in the DTV transition process. Such a delay would, at best, be unfortunate for broadcasters and the viewing public, and could lead to uncertainty that might jeopardize the ultimate success of the transition.

As you know, in February the Commission denied the Sinclair Broadcasting Group's request that that we modify our rules to allow broadcasters to transmit DTV signals using COFDM modulation in addition to the current Advanced Television System Committee (ATSC) 8-VSB modulation standard. Sinclair had raised questions regarding the adequacy of 8-VSB reception with simple indoor antennas in a station's core business area under complex multipath conditions. The Commission noted that it believed that what Sinclair had highlighted was a shortcoming of early DTV receiver implementation, rather than any basic flaw in the ATSC standard or an indication that replication of existing analog service is unachievable with the 8-VSB standard. The Commission also noted that receiver manufacturers and their chip-suppliers were aware of the problem and were aggressively taking steps to resolve the multipath handling problems that Sinclair had raised.

In taking the action, the Commission encouraged parties to provide additional information on the topic in the context of the agency's formal periodic review of the progress of the analog-to-digital conversion. We will use that mechanism to monitor the progress being made by receiver manufacturers and others to improve indoor DTV reception under the existing standard. Using the resources of our own Laboratory in Columbia, Maryland, we are undertaking our own field tests to further assure ourselves of such progress. We are also encouraged that the ATSC DTV Task Force has recently committed to look at the issues related to transmission and reception of DTV and to make any appropriate recommendations. Hopefully, taken together, these government and

industry actions will resolve any lingering concerns regarding the choice of the modulation technique and will allow the conversion to move forward with confidence.

I am also concerned that one of the primary motivations behind this review of the DTV standard by some members of the broadcast industry appears to be a purported advantage of COFDM to provide portable and mobile services -- rather than any ability of COFDM to provide improved or enhanced television broadcast service. I believe that this raises fundamental issues regarding the intent of Congress and the Commission's rules providing broadcasters with a free second channel for DTV operations.

Consistent with the direction of Congress, the Commission gave each broadcaster temporary use of an extra six megahertz of spectrum for the DTV transition and it is intended that stations use this resource principally for television broadcasting. Section 336(b)(2) of the Communications Act, 47 U.S.C. 336(b)(2), directed the Commission to permit flexible use of the digital licenses but to "limit the broadcasting of ancillary or supplementary services … so as to avoid derogation of any advanced television services, including high definition television broadcasts…." It is the mandate of Congress and the desire of the American people that the principal service of broadcast television remain the provision of free video programming to television viewers, and broadcasters need to plan for the digital transition in accordance with this purpose. To the extent that some broadcasters may desire to enter the market for the provision of mobile services, they can do so by acquiring licenses in the newly reallocated spectrum at 700 MHz or some other spectrum that is allocated for mobile services.

Any efforts by broadcasters to reallocate their spectrum to new mobile data services at the expense of free, over-the-air television raises serious questions as to whether broadcasters would be operating in a manner consistent with the purpose for which Congress made available to them a second digital license for free. As you know, Congress amended Section 309(j) of the Communications Act in 1997 to require that new licenses be awarded by competitive bidding. One of the few exceptions to this auction requirement was the initial licensing of DTV stations to be used by broadcasters to replicate their existing analog television service. If a principal purpose of this spectrum now becomes mobile data services, it is unclear whether this exception to competitive bidding should continue to be applied to such operations.

I do not oppose efforts to reconfirm that 8-VSB operates as designed to replicate NTSC. Nor do I oppose efforts to improve the 8-VSB standard to permit reception even where NTSC service is not available today. However, these efforts should be focused on performance attributes that are relevant to digital television broadcasting and are consistent with the goals established by the Congress and the Commission for DTV. In particular, any efforts by the broadcast industry should ensure that no changes would be required to the DTV Table of Allotments. In addition, they should adhere to our service replication and minimum interference goals to ensure that the American public will not be deprived of free, over-the-air television service.

DTV Provides Broadcasters with New Opportunities

I believe that DTV provides broadcasters with a tremendous opportunity to enhance and revitalize their core business of television broadcasting, as well as to offer the public new and exciting "datacasting" services on an ancillary basis.

While I applaud broadcasters' initial efforts to build DTV facilities, with few exceptions, broadcasters, in my opinion, have not provided the compelling programming content needed to stimulate consumer demand for DTV. Most digital programming available to date has been merely up-converted, existing analog programming. Consumers have not yet been provided with the tremendous capabilities of DTV.

Nonetheless, I remain very bullish on the long-term future of HDTV. Since the first demonstrations I saw many years ago, I have been convinced that HDTV fundamentally changes the nature of the viewing experience and that it will ultimately be very successful in the marketplace.

And DTV can do even more.

The multiple programming capability of DTV can allow broadcasters to offer their viewers more programming choices. With DTV, broadcasters can provide their viewers with "customized" camera angles so they can watch a sporting event from a particular point of view or follow a favorite player. The ancillary data capabilities of DTV can also be used to provide program-related information to further enhance the viewing experience.

I am also very optimistic about the future of datacasting and DTV. I base this on the advantages of the traditional broadcast architecture coupled with the advantages produced by the conversion from analog to digital transmission. Broadcasts' strength, from an architectural standpoint, lies in the ability of television stations, both individually and collectively, to distribute popular content that large numbers of people want to receive simultaneously (for example, the Super Bowl) or have available simultaneously for viewing at will (for example, stock quotes). High power broadcast stations providing coverage over thousands of square miles represent an extremely efficient way of delivering such content. Said another way, it is a very efficient architecture for one-to-many communications.

There are simply too many potential benefits to be had from the introduction of DTV not to move forward as quickly as possible.

Conclusion

Given the extraordinary benefits that can be realized with DTV, government and the involved industries need to recommit to ensure a successful and rapid DTV transition. In my opinion, the bigger that opportunity, the faster the transition should occur.

Perhaps *The Field of Dreams* adage of “build it and they will come” is also appropriate for DTV with a slight modification --“build it *and show the wonderful capabilities of DTV* and they will come.”

Thank you very much for the opportunity to testify before you today. I would be pleased to answer any questions you may have.