

HIGH DEFINITION TELEVISION AND RELATED MATTERS

HEARING BEFORE THE SUBCOMMITTEE ON TELECOMMUNICATIONS, TRADE, AND CONSUMER PROTECTION OF THE COMMITTEE ON COMMERCE HOUSE OF REPRESENTATIVES ONE HUNDRED SIXTH CONGRESS SECOND SESSION

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HIGH DEFINITION TELEVISION AND RELATED MATTERS

TUESDAY, JULY 25, 2000

HOUSE OF REPRESENTATIVES,
COMMITTEE ON COMMERCE,
SUBCOMMITTEE ON TELECOMMUNICATIONS,
TRADE, AND CONSUMER PROTECTION,
Washington, DC.

The subcommittee met, pursuant to notice, at 10:10 a.m., in room 2123, Rayburn House Office Building, Hon. W.J. "Billy" Tauzin (chairman) presiding.

Members present: Representatives Tauzin, Oxley, Stearns, Gillmor, Shimkus, Pickering, Fossella, Ehrlich, Markey, Eshoo, Wynn, Luther, Sawyer, Green, and McCarthy.

Staff present: Mike O'Rielly, majority professional staff; Cliff Riccio, legislative clerk; and Andy Levin, minority counsel.

Mr. TAUZIN. Good morning. The committee will please come to order. We would ask our guests to take seats and be comfortable.

I want to take a moment before we get started this morning to welcome some students from my home district and my alma mater, Harvard on the Bayou, Nicholas State University. Would you please welcome the Free Enterprise students, the winners of the Free Enterprise Program at Nicholas State University. Would you please welcome their attendance today?

Welcome to this morning's hearing regarding high definition television and the myriad of issues surrounding our nationwide transition to digital. The rollout of HDTV is a very important issue to this committee, and I am looking forward to today's discussion. We have a lot of testimony to hear.

We have assembled an amazing panel of 11 very prestigious witnesses today. My apologies for the shoulder-to-shoulder situation here, but I learned a long time ago that two panels don't work on these serious issues. If we put you all together, we can generally get a good give-and-take.

We are going to hear, of course—also see a number of technical demonstrations today, and so I am going to keep the remarks as brief as I can. I am going to ask members to do the same thing.

In 1996, we generally endorsed the Reagan administration's plan to allow the television broadcast industry to make a transition from analog television to digital. We afforded each incumbent television broadcast licensee an additional channel, basically 6 megahertz of spectrum that can be used during this transition.

Despite the flexibility provided in the transition framework, it now seems quite possible that industry will not meet the FCC's

conversion timetable. Some suggest this can be attributed to uncertainties over technological standards as they relate to the transmission of digital signals. The incompatibility between HDTV sets and cable systems and/or the overall software problems encountered by the set-top box manufacturers. Yet others have suggested that some broadcasters have no ultimate intention of rolling out HDTV but instead are looking to sell off the bulk, if not all, of their 6 megahertz of spectrum.

Whatever the reasons for the complications, we are generally concerned that we will not meet our goal for digital broadcasting in our top 40 markets, much less markets not so inclined to receive full digital signals before the year 2006.

As a result, we have assembled this very large, very qualified panel ranking from broadcasters, television networks, engineers, cable providers, retailers and producers to help us get to the bottom of the number of important questions that I and many members have about the transition to digital television in the U.S.; namely:

Why rollout across the country appears, at least at this stage, to be less than uniform; Whether some broadcasters intend to sell off some of their allotted 6 megahertz of spectrum for windfall profits, which of course was never intended by Congress.

Which technological modulation standard for HDTV is better, the 8-VSB or the COFDM; Whether America's cable systems and networks are having interoperability problems with HDTV systems and sets and whether such problems have any substantial implications for digital must-carry; and, finally, what retailers across the country are experiencing with respect to the sale of new television sets and set-top boxes.

With these issues serving as a basic frame of reference outlining the direction in which I would like the hearing to go today, I will yield back the balance of my time and look forward to hearing from this esteemed panel of witnesses and yield to my friend, Mr. Markey, for an opening statement.

Mr. MARKEY. Thank you, Mr. Chairman, very much.

This is a historic day. It is the first day we have ever had a computer testify before our committee. And this demonstration over here of an HDTV set, the big issue has always been, could you get it in your living room; and now it turns out you have to get the antenna in your living room as well. So we are probably trying to move, but we have made great progress in 13 years, without question, in this issue area.

I want to thank you all so much for coming here today. This subcommittee has a long history of working on this issue which began with the hearing on HDTV in 1987, a hearing with the top executive in Japan showing us what their technology had already accomplished and which continued as the technology evolved into digital television. The evolution of HDTV from a foreign analog technology into an American digital technology is one which this subcommittee closely monitored and at times prodded the Federal Communications Commission and the various industry participants toward progress.

In addition, it became increasingly clear over time that the DTV standard-setting endeavor at the FCC was more than about simply

creating prettier pictures, but rather encompassed a national plan to get the broadcast television industry into the emerging digital domain in a more robust multimedia way.

The result of that effort is a standard that is highly versatile. A broadcaster can use it to show one channel or several channels of video programming at different frame rates, in interlaced format or in the more commuter-like progressive format. All broadcasters can use a portion of the bit stream for enhanced data services.

Today, we return to assess progress in the transition, and this morning, we will hear allegations that the DTV standard is flawed. Whether the standard is flawed or not is not a policy issue, but rather an engineering issue. At this point, there does not appear to be any consensus among engineers as to the level of importance to associate with any performance measure for indoor reception of the current standard.

The policy issue is whether there is significant justification or benefit to changing course at this moment or embracing delay in order to more fully explore the issue.

A little over 2 years ago, the subcommittee also held an oversight hearing on the digital TV issue. We still have the leftover issues from that last oversight hearing in the previous Congress. Those issues implementing cable must carry rules, the lack of sufficient digital programming from content producers, the lack of progress on promoting a competitive set-top box marketplace, the public interest obligations of digital broadcasters, and whether the broadcasters have any obligation to offer HDTV at all or can simply blast data services to the public remain as issues for today as well.

In the midst of all this, we are now set to embark upon the first of a series of very ill-considered, budget-driven spectrum options of the broadcasters' analog spectrum as mandated by Congress. According to that directive, the FCC is supposed to auction off spectrum in the areas now occupied by Channels 60 to 69. Obviously, stations occupying those channels have yet to leave and are unlikely to vacate such spectrum any time soon, at least not unless they are heavily compensated for leaving.

In addition, we are also scheduled to sell the rest of the analog spectrum even though there is no longer a soul in the industry who thinks this transition will be over by the year 2006.

In 1997, during the budget deliberations, I offered an amendment in this committee based upon the 1962 All-Channel Receiver Act. That spurred the development of the UHF television industry to ensure that starting next year, the year 2001, all TV sets in the United States had to be at least capable of displaying a digital signal. That amendment wasn't adopted, and as a result, we will continue to talk about the national need to recapture the analog spectrum at the earliest possible date and policymakers will be wringing their hands about the slowness of the transition, even as consumers continue to purchase analog-only receivers through the year 2006, but remembering that in 1997 it was the industry that killed the amendment which would have mandated that every television set, by the year 2001, sold in the United States had the capacity to receive a digital signal even if it was an analog set.

So this, ladies and gentlemen, is the moment at which we have arrived, pretty predictably, given the course of events over the last

3 or 4 years. And I hope throughout the course of the day we might be able to find from our witnesses what the best course is to take from this point on. Thank you.

Mr. TAUZIN. Thank the gentleman. The Chair recognizes the vice chairman of the committee, the coach of the Republican baseball team this week, Mr. Mike Oxley.

Mr. OXLEY. Thank you, Mr. Chairman. The tension builds as we work toward tomorrow night. We would expect, of course, everybody within the sound of my voice to be attending that game and root for whomever you want. We would like to have you there. And we'd like to have your money for charity.

Mr. TAUZIN. Good pitch.

Mr. OXLEY. Mr. Chairman, I thank you for calling this morning's hearing on DTV conversion. I am pleased to see that the subcommittee is conducting rigorous oversight on spectrum management practices.

DTV holds enormous potential for American consumers and American businesses alike. There are a lot of exciting technologies competing for attention in the marketplace, and that is how it should be. I reviewed the testimony, which is in all cases thoughtful and most interesting.

I do find it a little ironic that our broadcaster friends, while insisting on maximum flexibility for themselves and how they utilize their additional free spectrum, are demanding mandates on cable operators and set manufacturers—and, by extension, their customers—to accelerate the acceptance of digital television. An all-signal reception mandate for set manufacturers and simultaneous analog and digital must carry regulations for cable systems are ideas whose time has not come, in my opinion.

Those are matters to be settled between industry and consumers. I am not sure that there is a role for the Federal Government. My advice is: trust the market.

We all knew perfectly well that the time lines we were setting for digital conversion were unrealistic when we put them in place. It was publicly noted at the time by Members on both sides of the aisle, myself included. As anxious as I am to see the analog spectrum return and brought to the marketplace, I don't see any point in kidding ourselves about when it is going to happen.

Also, with respect to digital must carry, I am looking forward to a resumption of the Cox-Markey dialog on "must carry" rights and local content undertaken during consideration of the rural loans bill. While the "liberal-left, libertarian-right coalition" never quite struck the right balance, all of us have to admit that it is an interesting discussion, and I look forward to more of it.

I yield back.

Mr. TAUZIN. I thank the gentleman.

Further requests for opening statements?

The gentleman from Ohio, Mr. Sawyer.

Mr. SAWYER. Mr. Chairman, honoring your request that we keep our statements short, just let me say thank you for calling this hearing. If I were to put our inquiry today into three succinct arenas, it would come down to how are we doing so far, are there technological or policy impediments that are standing in the way of our getting where we are to where we need to go, and are there actions

to be taken in this forum or some other forum to facilitate this transition? I hope that we can talk about those topics, among others, today.

I yield back the balance of my time.

Mr. TAUZIN. I thank the gentleman.

The gentleman from Illinois, Mr. Shimkus.

Mr. SHIMKUS. Thank you, Mr. Chairman.

In keeping with the hearing, I will be short, but I did bring along my expert TV analyst, my son David, who is awaiting high definition TV for Pokemon. And we look forward to that.

Two other things to note, that Harris Communications manufactures the 8-level vestigial side band, 8-VSB, in my district; or—I have portions of the city of Quincy, WGM Quincy, Illinois, is one of the smallest public—I mean, broadcasters to be now broadcasting in high definition TV in Quincy, Illinois. We are excited about that.

And I look forward to the hearing and seeing progress across the Nation. With that, I yield back my time.

Mr. TAUZIN. I thank the gentleman.

Further requests for opening statements? Neither side.

Then the Chair is pleased to welcome our panel. Let me first make unanimous consent that all members' written statements be made a part of the record. Without objection, so ordered.

[Additional statements submitted for the record follow:]

PREPARED STATEMENT OF HON. TOM BLILEY, CHAIRMAN, COMMITTEE ON COMMERCE

Mr. Chairman, thank you for calling this hearing today.

Today's hearing is focused on an important subject matter that this Committee has been following for years. In fact, it troubles me to say that. It is troubling to be here debating this topic given the enormous work we have already done here.

At the beginning of this Congress, I hoped that we would not have to hold a hearing on H-D-T-V. I hoped that the marketplace was going to decide the fate of this technology. I hoped that consumers would be given the chance to accept or reject HDTV on their own. I had hoped that there would be no need of another flashy demonstration of what "could be." Sadly, that did not turn out to be the case.

At this particular time, the picture of HDTV still has some analog snow. There are disagreements at the FCC and within the industry over HDTV. Not only do these issues stall the sale of new television sets, but these internal squabbles prevent digital television from becoming a reality.

You might say these issues are like the Woodrow Wilson bridge in Alexandria. The fighting over a new bridge continues until the old bridge collapses. I say resolve these issues and let's finally see if the marketplace has any interest in this technology.

I applaud all of the manufacturers, retailers, and broadcasters striving to get this technology out to consumers. In some respects, all we hear about are the negatives of digital television. In reality, digital televisions are selling at a quick pace. I hope that this continues.

Let me briefly address one outstanding issue. Many parties are discussing the use of the HDTV spectrum to offer supplemental or extraneous services. Some broadcasters would rather use the spectrum which Congress gave to them for free, to offer datacasting and other wireless-type services. Indeed, it has been proposed that one reason we are having this debate over which standard to use is because one standard permits greater ancillary services. I think that these broadcasters have been watching too many episodes of "Who Wants to be a Millionaire."

Let me be abundantly clear to the broadcasting community: You asked that Congress provide you with an opportunity to offer HDTV. We did that. Now some of you are getting cold feet. If you want to offer other services with the HDTV spectrum, you should pay for it, like you would in an auction.

In fact, as the FCC considers and reconsiders what to charge such broadcasters for using the spectrum for other purposes, I recommend that the value be pegged to the price paid for 3G licenses in Britain. This is a highly valuable spectrum and

its price should match its value. If some broadcasters are willing to pay this as if they are traditional wireless companies, so be it. If the FCC sets the value too low, then the FCC should expect to see a request to appear before this Committee for a discussion.

Moreover, there has been talk of broadcasters trying to leverage the timing of their exit from the old analog portion of their licenses for some financial benefit. This is pure nonsense.

Broadcasters are merely one side of the equation in the transition to digital television. If we learn that some broadcasters are withholding digital programming and thus falsely extending the digital transition, then the Committee should revisit the standard in the Balanced Budget Act of 1997 or prepare additional penalties for broadcasters that would not harm consumers.

It would be a mockery of the laws passed by this Congress to allow the broadcasters to create secondary markets for the spectrum they should return to the FCC as soon as possible. America's wireless industry seeks to use this spectrum to offer new services. The wireless industry should not be held at the mercy of a broadcaster unwilling to exit the band.

Thank you, Mr. Chairman.

PREPARED STATEMENT OF HON. ANNA G. ESHOO, A REPRESENTATIVE IN CONGRESS
FROM THE STATE OF CALIFORNIA

Thank you Mr. Chairman.

During the administration of President Reagan, the FCC initiated a plan that would allow the television broadcast industry to make a transition from analog to digital television.

In 1996, the Telecommunications Act brought this picture into sharper focus. The Act provided the FCC with guidelines to regulate the additional spectrum that broadcasters were given for use during the transition period.

Today, we're working toward a target date of 2006 before the broadcasters will hopefully have completed the transition to digital television in certain markets. Not until then will the FCC be able to reacquire the analog spectrum and assign it to the highest bidders at an auction to be conducted later this year.

I recite this timeline because even after such a substantial period of time has been devoted to HDTV, I see now that we are faced with even tougher issues which must be resolved before we can get this technology to the public.

We must resolve these issues—but we should do so with the assistance of the industry. I'm pleased that the Consumer Electronics Association (CEA) and the National Cable Television Association (NCTA) have worked together to resolve some difficult matters, and I encourage all parties to engage in similar efforts with regard to remaining issues.

At the same time, I believe that at least some of the problems in this arena will be solved as the available technology improves.

One of the larger issues facing us relates to which digital standard should be used. To that end, we may have to decide whether the question is resolved by opening the marketplace to competition between the two standards, or by assessing the ramifications of delay at this juncture. Moreover, we should consider whether we are creating unnecessary delay in the technology before it finally reaches the consumer.

Considering how far along we are in the HDTV process, certainly some relevant inquiries are (1) "why are we questioning the applicable standard after a thorough analysis was already performed?" (2) "if we change standards, how will a two to four year delay effect this industry," and (3) "what will happen to the investments in digital programming and equipment that have been made to this point?"

Above all, however, after considering all the facts, let's get it right. In striving to achieve that goal, I look forward to the information our panel of witnesses can provide for us.

PREPARED STATEMENT OF HON. GENE GREEN, A REPRESENTATIVE IN CONGRESS FROM
THE STATE OF TEXAS

Mr. Chairman: I appreciate this opportunity to address some of the problems dealing with the national rollout of HDTV.

I want to begin by saying I am very concerned the FCC is not exercising proper oversight during the transition from analog to digital television.

The FCC sends out press releases touting the number of new stations broadcasting a digital format, but neglects to mention that almost no one is watching the new signal.

Digital television, and HDTV in particular, is supposed to provide viewers with an enhanced quality picture resolution and sound capability.

However, consumers have been extremely slow in beginning the switch from their old analog televisions sets to new digital versions.

The FCC has indicated that 2006 is the target date when broadcasters are supposed to begin returning their analog spectrum for reallocation.

Mr. Chairman, that target date is not going to be met.

The FCC has pushed our broadcasters to upgrade to a digital format that now may not be able to penetrate the walls of an average house.

In addition, the FCC appears to be doing little to harmonize the technology needed to allow the digital broadcast signal access to our nation's cable systems.

The FCC is allowing almost any issue dealing with HDTV to drift among competing parties without even attempting to provide guidance.

Mr. Chairman, hundreds of millions of dollars have already been expended in rolling out digital television throughout the country, but when are we going to have something to show for our effort.

Our broadcasters did their job and got the digital signal up and running.

Now the question is can consumers receive it without having to purchase expensive accessories.

As with all household electronics, consumer acceptance is critical.

I am looking to today's panel for evidence that the technology laid out by the FCC works and that consumers will be able to receive this new signal at a reasonable price.

I am sure everyone here today remembers the Betamax VHS debate when Video Cassette Recorders first came out.

Competition in this instance was beneficial because consumers decided which technology would become the standard.

There are competing digital formats, but the FCC has chosen to elevate one format over the others and I want to make sure that they did not pick the Betamax equivalent for HDTV.

I would like to hear from today's panel on when they believe consumers will begin switching over to HDTV in large numbers.

And if anyone can suggest steps the FCC could take to help streamline this conversion process, I, along with the rest of the Subcommittee, would be very interested.

Mr. Chairman, we can throw millions of dollars at providing a digital broadcast signal, but if consumers lack the infrastructure to receive that signal, then digital is going to vanish into thin air.

Thank you Mr. Chairman and I yield back the balance of my time.

Mr. TAUZIN. Second, I ask that all our panel members' written statements be made a part of the record without objection. It is so ordered.

I was just remarking to my friend, Mr. Markey, that the one nice thing about a computer testifying is we can probably keep the computer within the 5-minute rule. The challenge will be to keep the rest of our panel within the 5-minute rule.

We have 11 members of the panel. We have some demonstrations. So you notice the members have been very good about keeping their opening statements short, staying within the 5-minute rule. There is a timer device somewhere on the desk in front of you. It will light up green and then yellow and red. When red is on, it is time to wrap up; so wrap it up as quickly as you can.

Let me quickly introduce the panel. Then we will go to those who will make demonstrations so we can get the demonstrations done as quickly as possible: Mr. Dale Hatfield, Chief of the Office of Engineering and Technology of the Federal Communications Commission, is with us today and is accompanied by Deborah Lathen, Chief of the Cable Services Bureau; Mr. Richard Lewis, Senior Vice President of Research and Technology of Zenith Electronic Corpora-

tion; Mark Hyman, the Vice President of Corporate Relations of Sinclair Broadcasting; Gary Shapiro, President and CEO of Consumer Electronics Association; Gary Chapman, CEO and President of LIN Television Corporation; Richard Green, President and CEO of Cable TV Laboratories; Matt Miller, who is President and CEO of NxtWave Communications; Robert Miller, who is President of Viacel of New York; Tom Campbell, Corporate Director of Ken Crane's Home Entertainment Centers; Tim Fern, representing Pace Micro Technology, Director of Engineering of that company; and Terence Rainey, President of the Association of Imaging and Sound Technology here in Vienna, Virginia.

We will start with Mr. Mark Hyman, Vice President of Sinclair Corporation, who I understand has a demonstration for us. Mr. Hyman is recognized.

STATEMENTS OF MARK HYMAN, VICE PRESIDENT OF CORPORATE RELATIONS, ACCOMPANIED BY NAT OSTROFF, VICE PRESIDENT OF NEW TECHNOLOGY, SINCLAIR BROADCAST GROUP; GARY SHAPIRO, PRESIDENT AND CEO, CONSUMER ELECTRONICS ASSOCIATION; DALE N. HATFIELD, CHIEF, OFFICE OF ENGINEERING AND TECHNOLOGY, FEDERAL COMMUNICATIONS COMMISSION, ACCOMPANIED BY DEBORAH LATHEN, CHIEF, CABLE SERVICES BUREAU; TOM CAMPBELL, CORPORATE DIRECTOR, KEN CRANE'S HOME ENTERTAINMENT CENTERS; RICHARD M. LEWIS, SENIOR VICE PRESIDENT, RESEARCH AND TECHNOLOGY, ZENITH ELECTRONICS CORPORATION; MATT MILLER, PRESIDENT AND CEO, NxtWAVE COMMUNICATIONS; RICHARD R. GREEN, PRESIDENT AND CEO, CABLE TV LABORATORIES; ROBERT T. MILLER, PRESIDENT, VIACEL; GARY CHAPMAN, CEO AND PRESIDENT, LIN TELEVISION CORPORATION; TIM FERN, VICE PRESIDENT, PACE MICRO TECHNOLOGY; AND TERENCE J. RAINEY, PRESIDENT, ASSOCIATION OF IMAGING AND SOUND TECHNOLOGY

Mr. HYMAN. Thank you, Mr. Chairman.

Do you want the demonstration first?

Mr. TAUZIN. Yes.

Mr. HYMAN. I would like to call forward Mr. Nat Ostroff, who will be conducting our actual demonstration.

Mr. TAUZIN. Those of you who have demonstrations, it will not be assessed against your 5 minutes. So we will proceed with the demonstrations first and then get the testimony in.

Mr. OSTROFF. Thank you for the opportunity.

Mr. TAUZIN. Please identify yourself for the record.

Mr. OSTROFF. My name is Nat Ostroff. I am Vice President of New Technology at Sinclair Broadcast Group.

We have a short videotape which will be displayed on the screen in the back, which describes some of the efforts made to illustrate the differences in reception of the two transmission technologies that are in debate today. After that, we will have a short, live demonstration as well.

So, if possible, we could go to the videotape and roll that, and then we can go to the live demo.

Mr. TAUZIN. Let's do that. If you will roll the videotape.

[Videotape played.]

Mr. TAUZIN. I understand now you will do a live demonstration.

Mr. OSTROFF. Yes.

What you saw in that attempt, to take away from that, is the fact that the stations that were received, the antenna was not pointed in the same direction for each station, which means—at least in that experiment—that any channel changing would require antenna readjustment.

What I want to show you now——

Mr. TAUZIN. I want to stop and ask you something.

The antenna you demonstrated was an indoor set-top box antenna, as opposed to the large antennas that are normally found for television outdoors?

Mr. OSTROFF. That is correct. I would say, of the 250 million TV sets in use today, 40 percent of them are not connected to cable or satellite and the vast majority of those are relying on rabbit ears or loop antennas in the broadcasters' prime coverage area. So we are dealing with small, simple antennas to get analog.

Mr. TAUZIN. Tell us what you will do in the live demonstration.

Mr. OSTROFF. What we have done—for live demonstration, I want to show that we can receive a COFDM-based signal from WRC here in Washington with the bow-tie antenna sitting on the witness table. And the point being made is, it is not necessary to point the antenna out the window. As you will find out today, in 8-VSB, it doesn't need to be critically adjusted. It was dropped down on the table. I would walk around the room with it, and we could receive high definition television.

I want to point out it is at a data rate that is higher than the data rate in ATSC, so there is no attempt or no reason to reduce the data rate in order to get robustness of reception with simple indoor antennas.

Mr. TAUZIN. Would you do that?

Mr. OSTROFF. We are going to actually turn the receiver on and display what we are receiving off that bow-tie antenna.

The video is on a loop. And, of course, naturally the loop ends just as we start the demo. It takes about 7 seconds or 8 seconds to restart; it will in just a moment.

Mr. TAUZIN. So we understand what we are seeing, this is an actual broadcast?

Mr. OSTROFF. This is an actual broadcast over the air right now instantaneously being received from WRC in Georgetown with the bow-tie antenna sitting on the witness table.

Mr. TAUZIN. That is the small antenna we are looking at here.

Mr. OSTROFF. That is the small antenna we are looking at. That could probably be replaced with something even smaller, but for purposes of the demonstration, you can buy that for about \$1.98 at Radio Shack.

Mr. TAUZIN. This is using the COFDM?

Mr. OSTROFF. This is using the COFDM modulation system that is incorporated in the DVB-T standard.

Mr. TAUZIN. This is obviously some film, right, being broadcast?

Mr. OSTROFF. That is correct. It is not live from New York.

Mr. TAUZIN. But it is a live broadcast from the station of this film?

Mr. OSTROFF. That is correct. It is a live broadcast from the station in this room.

Mr. TAUZIN. This is a real-time, over-the-air broadcast of this film?

Mr. OSTROFF. That is correct. If this was the Super Bowl and you wanted to watch it in your home and you happened to be in this location, a bow-tie antenna on the back of your TV set would get you high definition Super Bowl coverage.

Mr. TAUZIN. The point of your demonstration is that such an antenna could not work effectively using the 8-VSB technology?

Mr. OSTROFF. We want to make the point that it may work in some locations, but it is a question of ease-of-reception reliability. And under those circumstances the consumer is the final judge and jury on everything we do; and if the consumer is dissatisfied with reception on the signal, he is not going to buy the TV receiver.

Mr. TAUZIN. All right. I think it is appropriate now if we take your 5 minutes of testimony, Mr. Hyman.

Mr. HYMAN. Thank you.

Mr. TAUZIN. Then we will go to the second demonstration. Mr. Hyman is recognized for 5 minutes.

Mr. HYMAN. Thank you, Mr. Chairman, members of the committee, fellow panel members. I am pleased to be here to address an issue we consider very crucial to the future of free over-the-air television. I am speaking on behalf of the several hundred TV stations which supported Sinclair's petition for notice of a proposed rulemaking for a second DTV transmission system. The petition, I might add, was summarily dismissed by the FCC.

We are here to request this committee use its resources to urge the FCC to adopt a second digital television standard, giving broadcasters the free market choice on how to best serve their markets. The current U.S. standard is called ATSC, and we request the adoption of a second standard called DVB. It is our view the ATSC standard fails in its most fundamental requirement, to replicate the ease of reception that exists with today's analog television.

To paraphrase the cover title of the magazine on display in front of you, we have stepped back 50 years. Broadcasters serve the American public for free and, therefore, have a strong interest in making certain we can do just that in the simplest, most efficient way possible.

Digital TV has all the promise of a newborn child. However, during its development, no one ever conducted any meaningful, real-world perception test using indoor antennas in areas where most Americans live, the urban and suburban environments. It is now freely admitted by most, knowledgeable, independent observers that ATSC doesn't work today as most people think it should. I won't bore you with the history of how we got here other than to tell you, it was sobering for us to learn that millions of Americans who now easily receive free television using simple antennas will not be able to do so in the digital world due to the ATSC's transmission system.

This system, called 8-VSB, is extremely fragile in the presence of a naturally occurring phenomenon in the world of radio waves called "multipath." Multipath occurs when you do not have direct line of sight between the TV transmitter and your antenna, and

the signal is degraded as it is reflected off a wide variety of objects including buildings, foliage, automobiles, and people.

On analog TV, multipath is seen as ghosted images or snow. While annoying, TV is still watchable. However, in digital you either receive a picture or you do not. In our industry, we call the no picture the “blue screen of death.”

Indeed, former FCC Chairman Newton Minow’s admonition that “television is a vast wasteland” has new meaning today. A cell phone company used to run a commercial that said the phone is no good unless the call goes through. This is how we feel; our broadcast must get through.

The number of ATSC countries has dropped from five to three as Argentina and Taiwan announced their decisions to rescind adoption of the ATSC standard, citing the failure of 8-VSB. In contrast, 32 countries worldwide, representing 2 billion people, have adopted a standard using the transmission system we favor, COFDM. Side-by-side comparisons have demonstrated the superiority of COFDM over 8-VSB, a fact validated by the marketplace. Thus far, European countries with a total population of 68 million have over 800,000 DTV receivers in consumers’ homes in less time that it took this country, 273 million, to acquire less than 34,000.

Given this stark contrast, it is not surprising that independent observers expect the global adoption of COFDM to continue. Soon the U.S. will be an island of 8-VSB in a sea of COFDM.

American isolation on this technology issue is damaging not only because we have adopted a flawed standard, but also because of the tremendous economic and trade implications. Americans will not have DTV equipment that is interoperable with the worldwide standard, and the U.S. will not be able to capitalize on the tremendous scales of economy offered by a global standard. This means Americans may possibly pay the highest prices in the world for digital television.

We believe the U.S. should be making dust, not eating dust.

When we first raised this issue, our critics denied there was a problem. Then they admitted there was a problem, but they had solved it. Then they admitted they had not solved it but they soon would. Now they tell us the solution may be a few years away, but we should stay the course and rely on the subscribing to satellite or cable or installing an expensive, cumbersome outdoor antenna such as the one on display in the back of the room.

The chart before you is CEA’s answer to the people of Washington DC. Have an electronics store locate your house on the map. Find the antenna that matches the color of the area in which you live, bring it home and install it. You will notice that most Washingtonians live in a red zone, requiring that they install a large-size outdoor antenna, just as we display today.

Another important issue bears mentioning. The FCC’s table of allotments, which assigns corresponding digital channels to existing analog channels, managed to exclude the Nation’s 9,700 TV translators. Translators provide over-the-air television coverage in terrain-challenged markets, as well as deliver signals to cable head end, the origin for cable carriage of all local stations.

The survey summary before you shows that nearly one out of three American homes is located in an area that is served by one

or more translators. While the ATSC standard provides no relief for this dilemma, the DVB standard does because it permits the use of on-channel repeaters, thereby ensuring the availability of free and local TV service throughout the Nation.

In closing, at the risk of sounding melodramatic, we believe the future of free TV rests on what happens with the DTV standard. Maintaining the status quo will assign to broadcasters a digital death sentence unable to easily reach millions of viewers. Such an outcome could end free TV, leaving television in the hands of the cable and satellite gatekeepers that are not free and are controlled by too few.

Thank you very much.

[The prepared statement of Mark Hyman follows:]

PREPARED STATEMENT OF MARK HYMAN, VICE PRESIDENT FOR CORPORATE
RELATIONS, SINCLAIR BROADCAST GROUP, INC.

INTRODUCTION

We at Sinclair Broadcast Group, Inc. ("Sinclair") sit before this Subcommittee today because we want to realize the full promise of digital service in our communities. To this end, we are committed to rolling out our digital television service to loyal viewers in our markets as quickly as possible. Unfortunately, at the moment, this promise remains unfulfilled. We and other broadcasters have found that the current DTV technologies and standards in the U.S. have simply not been conceived or designed well enough for us to provide those services to the majority of consumers. Despite the critical importance of ease of reception, the current DTV system was designed around the flawed concept that TV households would uniformly deploy outdoor rooftop antennas and thereby enjoy a line-of-sight connection to DTV transmitters. The American public seems aware of these reception problems, since only a tiny fraction of consumers are buying DTV receivers right now. And we at Sinclair don't blame them. It doesn't make any sense to buy a receiver today that doesn't work and that will surely be obsolete tomorrow.

Right now, it just doesn't look like the FCC or the industry is headed towards a solution to this digital dilemma. The equipment manufacturers blame Hollywood for not producing enough digital programming, Hollywood blames copyright problems and the cable industry, and the FCC does not know who to blame and is left with the status quo. Meanwhile, the law requires Sinclair to spend hundreds of millions of dollars to set up its digital stations, and the broadcast industry as a whole to spend billions of dollars in this effort. And, at the end of the day, because of these technology problems, Sinclair can't even be sure that it will have a viable business or an independent means of delivering its digital signal that is not forced to rely on the cable and satellite gatekeepers.

As a result, Sinclair respectfully requests that this Subcommittee urge a crucial change in the FCC's DTV policy, one that will address the ongoing technical problems and enable broadcasters to provide *ease of reception* and reliable over-the-air DTV service to American consumers. Specifically, the FCC should give broadcasters flexibility with respect to their choice of a DTV transmission standard, a key technical piece of the DTV system. The FCC should allow broadcasters to operate using either the current U.S. transmission standard, which we and others believe does not meet our requirements for ease of reception in our core coverage areas, or a second transmission standard, DVB-T, that has been implemented with great success in other countries. This policy change is fundamental to the future of digital television in the United States.

WHO IS SINCLAIR?

Sinclair is a publicly traded company with thousands of shareholders and a multi-billion dollar market capitalization. We are among the nation's largest group television owners, owning, applying for, or programming more than sixty commercial television stations. Given the magnitude of our broadcast interests, we have a huge stake in the development of DTV. As a matter of fact, we have already invested millions of dollars to upgrade our facilities and expect to spend a total of \$300 million during the DTV conversion. We are extremely interested in the key policy issues affecting the transition to digital television, and we have been extremely active before this Subcommittee and the FCC on these matters. In particular, we were the first

broadcaster in late 1996 to recognize that the FCC's original DTV Table of Allotments assigned UHF stations too little DTV power for them to provide adequate service to their core business areas. We were at the forefront of an effort that led the FCC to raise the DTV power ceiling for these UHF licensees, enabling them to be competitive in the digital environment.¹

THE DTV TRANSITION IS STALLED

There is a dire need for the technical change that we seek today. By any measure, the DTV conversion has to this point been a failure. The Consumer Electronic Association ("CEA") indicates that fewer than 50,000 DTV receivers capable of receiving DTV service have been sold in the United States (most of those probably to distributors, retailers, and broadcasters), a paltry one-twentieth of one percent of U.S. TV households. At this rate, it will likely be fifteen to twenty years (a decade or more after the 2006 DTV transition deadline) before U.S. broadcasters will be able to turn in their analog spectrum and the federal government will be able to auction off those channels.

While some biased observers point elsewhere, this ongoing failure results from a key flaw in the current transmission standard for DTV in the United States, the Advanced Television Systems Committee ("ATSC") standard, which relies on 8-Vestigial Sideband ("8-VSB") technology for modulation of the digital signal. The FCC adopted this standard in 1996 without conducting any field trials of its own. Deficiencies in the ATSC 8-VSB standard for digital modulation prevent DTV broadcasters today from providing consumer-expected *ease of reception* and reliable over-the-air service to millions of television households lacking a clear line-of-sight between their TV antennas and broadcasters' DTV transmitters. For the most part, these are the millions of households that use the small, simple, inexpensive set-top antennas so common today, rather than a large rooftop antenna.

Without a direct line-of-sight, a DTV signal traveling to a TV receiver can be degraded as it is reflected off a wide variety of structures and objects; such obstacles can be natural or man-made, stationary or moving, and include walls and furniture within a house, the exterior of adjacent houses and buildings, lighting and electricity poles, hills, mountains and other nearby terrain, moving people or animals, automobiles, aircraft, rain or other precipitation, moving leaves, and any wind-blown object. These obstacles are clearly common, and have the potential to affect TV reception in most urban and suburban areas. While analog multipath reflections typically lead only to picture "snow" and "ghosting," for 8-VSB DTV such reflections can often mean a complete loss of reception.

During the summer of 1999, we conducted field trials in Baltimore, open to in-process peer review, which demonstrated severe problems with ATSC 8-VSB performance under real-world, multipath conditions. Within our Grade A contour, there was successful reception of our ATSC 8-VSB signal through small, simple antennas little more than one-third of the time, but our DVB-T signal was received 100% of the time. Even where the ATSC 8-VSB signal was successfully received, antennas for the most part could be moved only slightly before losing reception.² Clearly, this lack of robustness makes "channel surfing" a thing of the past in the ATSC 8-VSB world.

Since then, there has been an ongoing technical debate on the issue of ATSC 8-VSB reception, with a number of consumer electronics manufacturers arguing that improvements in ATSC 8-VSB reception have been and will continue to be made. Recently, however, this debate effectively came to a close. The ATSC itself, the expert organization that recommended and is now charged with governing the DTV standard, has now confirmed that the existing ATSC 8-VSB standard does not and will in all likelihood *never* support *ease of reception* or reliable over-the-air service to viewers using small, simple antennas in broadcasters' core business areas.

First, on June 28, 2000, Robert Graves, the Chairman of ATSC, conceded that the ATSC isn't satisfied with the performance of ATSC 8-VSB technology, and he announced that ATSC would begin formal work towards developing a modified VSB

¹See Petition for Reconsideration, Sinclair Broadcast Group, Inc., MM Docket No. 87-268 (June 13, 1997); Memorandum Opinion and Order on Reconsideration of the Sixth Report and Order, Advanced Television Systems and Their Impact on the Existing Television Broadcast Services, 13 FCC Rcd 7418, paras. 58-85 (1998).

²See "Comparative Reception Testing of 8-VSB and COFDM in Baltimore," Nat Ostroff, Vice President New Technology, Sinclair Broadcast Group, and Mark Aitken, Advanced Technology Group, Sinclair Broadcast Group (September 24, 1999).

standard.³ Then, in a July 10, 2000 draft of a report on ATSC 8-VSB, the “Ad Hoc Group to the ATSC Task Force on RF System Performance” (“Ad Hoc Group”)—a special committee formed by the ATSC—indicated that current ATSC 8-VSB receivers are “unable to assure robust reception” under the complex multipath conditions that are common to urban and suburban environments.⁴ With respect to the future development of the ATSC 8-VSB standard, the Ad Hoc Group found that any real improvements in ATSC 8-VSB performance under multipath conditions “are expected to be of an incremental rather than a revolutionary nature” and “will require new invention and new technological innovation, and the schedule for these new devices to the consumer marketplace cannot be reliably predicted at this time.” Ad Hoc Committee Draft Report at 20. Finally, the Ad Hoc Group concluded that if and when any solutions to these multipath problems are discovered, “the cost of implementing those solutions may be a significant impediment to market acceptance.” *Id.*

This Subcommittee should bear in mind that these ATSC 8-VSB reception problems are largely the result of a fundamental flaw in the concept of the current DTV system. In designing its technology, ATSC designed a system around a test method developed by ACATS, the advisory committee that helped develop the U.S. DTV system in the mid-1990’s. Receiver manufacturers adopted a concept for over-the-air consumer DTV service that was also based on ACATS’ test methods. For DTV signal strength measurements, ACATS wanted line-of-sight DTV reception, and it used 30-foot rooftop or tower-mounted antennas for its tests. While this may have been appropriate for that testing, such reception conditions are clearly not the right model for reception of free over-the-air broadcast service by today’s consumers, millions of whom use small, simple antennas. Not surprisingly, the current DTV system does not perform well under actual, real-world multipath conditions.

THREE ALTERNATIVE APPROACHES FOR THE FCC

With the permanent deficiency of the current ATSC 8-VSB standard now confirmed, the FCC can choose any of three strategies in its efforts to revive the DTV transition. First, the FCC can give broadcasters flexibility with respect to DTV transmission technology; here, each broadcaster could be granted the option of using either the existing ATSC 8-VSB standard or a second DTV transmission standard that has been adopted outside the U.S., with proven, high-quality performance under multipath conditions. This is the DVB-T standard, developed and finalized in 1997 by the Digital Video Broadcasting Project (“DVB”), a global organization consisting of broadcasters, manufacturers, network operators, and regulatory bodies. (Incidentally, the transmission system selected by a broadcaster would be invisible to its viewers, just as in the case of the DTV scanning standard.) Multi-standard receivers are available today, and adding DVB-T should not be a limiting factor. Second, in an effort to improve multipath performance, the FCC can initiate a process to modify the existing ATSC 8-VSB standard in a fully or partially “backwards-compatible” fashion. Finally, the FCC can do nothing and hope against hope that the promises of a small number of consumer electronics and chipset manufacturers regarding alleged improvements in ATSC 8-VSB receiver technology—claims now contradicted by the ATSC itself—will prove to be true.

THE ONLY VIABLE STRATEGY—ADOPTION OF AN OPTIONAL DTV TRANSMISSION STANDARD

We believe that the only viable approach to solving the current DTV reception problem is to give broadcasters the flexibility to choose between two transmission options, the ATSC 8-VSB and DVB-T standards. With such flexibility, broadcasters will be able to select the option that best suits their business plans and enables them to maximize service to their local communities. We proposed this approach in a Petition to the FCC in October 1999,⁵ and, in the wake of that filing (which was dismissed by the FCC without public notice), companies representing half of all licensed broadcast stations indicated to us that they also favor this strategy.

We do not inherently favor one DTV transmission standard or another. We do not have a direct financial stake in any of these technologies. Nothing would please us more than to have a workable ATSC 8-VSB system, now! However, a decision to

³“ATSC Initiates Standards Activity to Explore VSB Enhancements,” Advanced Television Systems Committee (June 28, 2000).

⁴Performance Assessment of the ATSC Transmission System, Equipment and Future Directions, Report of the VSB Performance Ad Hoc Group to the ATSC Task Force on RF System Performance, Draft 1.0, at 19 (July 10, 2000).

⁵See Petition for Expedited Rulemaking, Sinclair Broadcast Group, Inc., MM Docket No. _____ (October 8, 1999).

give broadcasters the flexibility to use the COFDM-based DVB-T standard would at the very least provide the American public with a safety net, and would likely provide a certain, low-risk solution to the current 8-VSB reception problems.

Why do we believe that a DVB-T system would provide the American public with the benefits of DTV to which it is entitled? The basis for our position lies in the design of COFDM technology. Unlike the ATSC 8-VSB standard, COFDM technology was designed specifically to overcome the known effects of multipath conditions. The DVB-T standard thereby permits and has been demonstrated to provide *ease of reception* and reliable over-the-air DTV service to viewers using small, simple antennas in broadcasters' core business areas. And, as shown in Sinclair's own field trials and in tests in Brazil, it can provide such high-quality reception while providing HDTV at data rates above 19.4 Mbps (the maximum data rate for ATSC 8-VSB) over U.S.-sized 6 MHz channels.

Largely for this reason, the DVB-T standard has been adopted around the world, and has been implemented in several countries with much greater commercial success than currently enjoyed by ATSC 8-VSB in the United States. To date, DVB-T has been selected as the DTV modulation standard in the majority of European nations, including Austria, Belgium, Croatia, the Czech Republic, Denmark, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Lithuania, Luxembourg, the Netherlands, Norway, Poland, Portugal, Slovakia, Slovenia, Spain, Sweden, Switzerland, the Ukraine, and the United Kingdom ("U.K."). DVB-T has also been chosen in Australia, India, New Zealand, Singapore and Turkey. (In Japan, broadcasters will utilize an alternative COFDM-based DTV standard.) In particular, the U.K.'s DTV service, called "OnDigital," began service in November 1998 within a few days of the DTV launch in the U.S., and almost eight hundred thousand TV households in the U.K. are now enjoying reliable, robust DTV reception. In addition, Brazil recently conducted an exhaustive, head-to-head laboratory and field trial comparison between ATSC 8-VSB, DVB-T, and other COFDM-based technologies, using 6 MHz channels, and the Brazilian government has decided to exclude the ATSC 8-VSB standard from further consideration. Argentina also announced recently that it will formally rescind its 1998 adoption of the ATSC standard. Overall, in the near term, COFDM will be adopted by countries with an aggregate market potential of almost two billion people. This in itself provides economies of scale.

Adoption of DVB-T as an optional standard would also permit the use of "on-channel DTV retransmitters," potentially a critical tool in preventing the loss of over-the-air TV service in many rural and remote areas. Today, gaps in broadcasters' signal coverage in these areas, often caused by rugged terrain, are filled in through the use of TV translator facilities. During the DTV transition, however, there will be tremendous congestion in the broadcast TV spectrum, and a substantial proportion of analog translators will likely have to be shut down.⁶ If broadcasters have the option of using the DVB-T standard, they will be able to use repeaters to receive signals from their full-power DTV stations and retransmit that programming to these areas on the same channel. In comparison, it would be almost pointless to operate these on-channel retransmitters if the FCC maintains its exclusive reliance on the ATSC 8-VSB standard, because the retransmitted signals would in most instances lead to effects similar to multipath conditions in these rural areas and could not be received by consumers there.⁷

Finally, if broadcasters and consumers alike are given a free market choice between the two DTV transmission standards, new competitive forces will be unleashed, greatly benefiting the public interest. With both standards available, manufacturers of ATSC 8-VSB and DVB-T chipsets and transmitters will have a strong incentive to optimize the performance of their chosen system. In fact, even though DVB-T is not yet permitted in the U.S., we have already seen the benefits of such competition—it was only after Sinclair and others brought the issue of poor ATSC 8-VSB performance to the fore and requested a DVB-T option that manufacturers of ATSC 8-VSB receivers and chipsets began to make some incremental (albeit insufficient) improvements to their DTV receivers. In addition, a flexible transmission standard would actually be consistent with the FCC's overall approach to DTV technology, as well as its approach to regulating almost all other communications services, where licensees have access to a variety of transmission technologies.

⁶Roy Stewart, Chief of the Mass Media Bureau, recently stated that "[I]t is well established that there is insufficient broadcast spectrum to accommodate thousands of LPTV stations with full interference protection without substantially impacting the transition to digital television, particularly in the rural areas." See "FCC Questions Low Power TV Broadband Bill," Newsbytes (June 15, 2000).

⁷See, e.g., "Application of On-channel Boosters to Fill Gaps in DTV Broadcast Coverage," R.W. "Sam" Zborowski, ADC Telecommunications.

ARGUMENTS AGAINST ADOPTION OF THE DVB-T OPTION SHOULD BE REJECTED

Those who argue that the FCC should maintain exclusive reliance on ATSC 8-VSB have repeatedly made the same basic arguments against the optional use of DVB-T. These parties claim that (i) such a decision would increase potential for interference and require substantial modification of the DTV Table of Allotments, (ii) such a decision would lead to a multi-year delay of the DTV roll-out, (iii) this decision would require that an additional modulation standard be incorporated into DTV receivers, thereby increasing manufacturers' costs and raising the price of these receivers, and (iv) such a decision would be unfair to those consumers who have already purchased an ATSC 8-VSB receiver. While these arguments may be appealing to some, they are meritless. No one has advanced a legitimate reason against broadcasters having the *option* to operate using the DVB-T standard.

First, a flexible transmission policy won't require any modifications to the DTV Table of Allotments. As a basic matter, we believe that the FCC should require DVB-T broadcasters to limit their power levels to the extent necessary to avoid causing greater interference than what would result from 8-VSB stations' operations at maximum permitted power levels. This rule would ensure that the DTV Table could remain unchanged. While this policy might reduce DVB-T stations' signal coverage, this is no reason to prohibit DVB-T operations. Such coverage would in all likelihood still be sufficient, far exceeding the DTV power levels and coverage originally assigned to UHF stations by the FCC in 1996. In any case, no broadcaster will be required to operate using the DVB-T standard, and each broadcaster could simply factor any reduction in coverage into its analysis when deciding which transmission standard to utilize.

On the second issue, it is the FCC's exclusive reliance on ATSC 8-VSB that is the real threat of delay for the DTV conversion. The DTV transition is already down to a snail's pace, and, given the deficiencies of ATSC 8-VSB reception, most rational consumers should not even consider purchasing an ATSC 8-VSB receiver at this time. As a result, sticking with the status quo would likely lead to a decade-plus delay in the digital transition. In contrast, a decision to give broadcasters the flexibility to operate using either the ATSC 8-VSB or the proven DVB-T standard would bring certainty to the DTV roll-out. It should not take any longer to implement DVB-T than to determine whether there is a fix for 8-VSB—Sinclair believes that the resolution of any outstanding technical issues for DVB-T operations could likely be conducted in less than a year, and that DVB-T set-top boxes could become rapidly available thereafter.

In addition, we believe that the cost of incorporating an additional reception mode into DTV receivers would be marginal, and that the adoption of a flexible DTV transmission policy would therefore have little effect on the price of DTV receivers. DTV receivers sold today in the U.S. market are *already* configured to receive signals with multiple digital modulation modes—these receivers are typically designed to receive signals from DBS systems, cable systems, NTSC, and 8-VSB broadcasters. Moreover, there are already more than eight hundred thousand DVB-T receivers in service today in the U.K. and Europe, and, given the global economies of scale resulting from such widespread DVB-T operations, it is likely that the necessary equipment and expertise are available to incorporate this technology into DTV receivers in the U.S. at minimal expense. In any case, as the Ad Hoc Group acknowledges, whatever effect such a policy would have on the price of DTV receivers, this effect would likely be dwarfed by the price increases associated with any adaptive equalizer or other receiver-based solution to the ATSC 8-VSB reception problem.⁸

Finally, concern over consumers' prior investment in ATSC 8-VSB technology is also no reason to maintain exclusive reliance on the ATSC 8-VSB standard. Fundamentally, under a flexible transmission policy, ATSC 8-VSB service will be able to continue. In any case, not many ATSC 8-VSB receivers are even in the hands of consumers. Currently, there is no reliable data on exactly how many receivers have been bought by consumers; surely, many of the receivers that have been sold are in the distribution chain, and even that number is miniscule. Instead, this Subcommittee and the FCC should be more concerned about the fate of the existing "legacy" analog television sets, which today total approximately 240 million nationwide. As time goes on, many households will want to receive digital programming through their current analog sets, and, with DVB-T service available, consumers who own analog TV sets and simple antennas will be able to receive DTV programming by using a digital-to-analog converter box. If the FCC relies on ATSC 8-VSB

⁸As indicated above, the Ad Hoc Group found that the cost of such receiver-based solutions "may be a significant impediment to market acceptance." Ad Hoc Group Draft Report at 20.

alone, such analog sets will be unable to receive that digital programming over-the-air unless a large outdoor antenna is also deployed.

THE 8-VSB ALTERNATIVES—THE ROAD TO MORE DELAY

We believe that the two other approaches to resolving the ATSC 8-VSB reception problems are fundamentally flawed. First, any effort to create a new, fully or partially “backwards-compatible” version of 8-VSB that provides better performance under multipath conditions would likely require a lengthy technical debate, followed by an even longer standards-setting process. Sinclair believes that such a complex technical process would take a minimum of three to five years to complete. It is unreasonable to ask American consumers to wait that long for the promised benefits of free, over-the-air DTV, when digital television services are thriving in other countries around the world. In contrast to this strategy, the implementation of an optional DVB-T standard would be largely an administrative task, with the most complicated aspect, the determination of interference criteria, likely taking little more than six months.

The second of these 8-VSB strategies—simply waiting for consumer electronics manufacturers to improve their ATSC 8-VSB receivers—is simply untenable. (Unfortunately, while untenable, this is the FCC’s approach at the moment.) It is true that many equipment and chipset manufacturers maintain that nothing is wrong with the ATSC 8-VSB standard and urge the Commission to leave this standard unchanged. As an initial matter, this support for the ATSC 8-VSB standard is not at all surprising, given the trail of money winding through these corporations. One of these companies has a direct, longstanding intellectual property interest in this standard, another’s business is focused exclusively on the design, manufacture, and sale of ATSC 8-VSB chipsets, a third has a significant investment in that 8-VSB chipset manufacturer, and a fourth company has a formal partnership with DirecTV and therefore benefits if terrestrial DTV fails and satellite subscribership grows.

In an effort to promote the existing standard, several of these companies last summer and fall made sweeping claims regarding a resolution of the ATSC 8-VSB reception problems.⁹ These promises have gone unfulfilled, however, and after almost four years of failure, there isn’t any basis for entrusting these parties with the future of the conversion to digital television by the U.S. broadcast industry. (While these companies point to the large number of DTV receiver models and variations they have produced to date, none of these receivers have been shown to provide adequate off-air reception.)

The ATSC itself has now confirmed that the ATSC 8-VSB standard will likely never support robust DTV reception under multipath conditions. As a result, if the FCC chooses to continue its exclusive reliance on the ATSC 8-VSB standard, broadcast viewers will be forced either to obtain a line-of-sight to DTV stations’ transmitters through a large rooftop antenna (a rotor antenna if competing stations’ transmitters are at different locations) or to give up free over-the-air service altogether by subscribing to pay TV service from a cable or satellite gatekeeper. We believe that such inaction by the FCC will ultimately mean the end of free over-the-air TV and all of the economic, social, political, and public safety benefits that come with that service.

Accordingly, we urge this Subcommittee to implore the FCC to take action that will enable broadcasters to provide a ubiquitous and interference-free DTV service, unrestricted by the need to go through the ever-strengthening cable and satellite gatekeepers. Only in this way can the FCC preserve the viability of free over-the-air TV service.

CONCLUSION

With the ATSC’s confirmation that the existing ATSC 8-VSB standard cannot and will not be able to support *ease of reception* and reliable over-the-air service to millions of American consumers, it is time for the FCC to give broadcasters the flexibility to operate using either the ATSC 8-VSB standard or the globally proven DVB-T standard. If the FCC continues its current policy of inaction, this Subcommittee should strongly urge the FCC to move forward to enable the American public to realize the full promise of digital television in the twenty-first century.

Mr. TAUZIN. Thank you, Mr. Hyman.

⁹See “NxtWave Communications’ Breakthrough Chip Makes Mobile and Indoor Reception of Broadcast Digital Television Possible,” Business Wire (August 24, 1999); “New Digital Receiver from Motorola Enhances 8-VSB Reception, Solves Multipath Problems,” Business Wire (August 23, 1999).

Our second panelist with a demonstration will be Mr. Gary Shapiro, President and CEO of Consumer Electronics Association. Mr. Shapiro.

STATEMENT OF GARY SHAPIRO

Mr. SHAPIRO. Thank you very much, Mr. Chairman. I am going to turn this over, if you will.

Mr. Chairman, members of the subcommittee, as a trade association, we represent the consumer technology industry; and we have 600 members including more than 20 manufacturers of digital television. I am pleased to introduce a collaborative demonstration of the extraordinary viewing experience that is high definition television, or HDTV, which is not something you just heard about.

We have recreated two DTV environments. The demonstration features both a living room environment, where the vast majority of Americans watch TV, and a PC environment to highlight two points. First, American broadcasters show that the DTV transmission standard actually does work. As Richard Lewis of Zenith Electronics will demonstrate, it is capable of delivering DTV services, including HDTV programming and ancillary data services reliably over very many different delivery paths, including over-the-air reception to antennas, indoor antennas.

Second, the American DTV standard is very flexible. As Matt Miller of NxtWave Communications will demonstrate, it is equally adept as a computer-based application, thus fulfilling DTV's promise to bring about convergence between television and computing.

The equipment we have arranged here represents a cross-section of what is now commercially available today in the United States in almost 1,000 retail outlets across the country. Without further ado, let me introduce Richard Lewis, with Zenith Electronics, who will conduct the living room portion of the examination.

Mr. TAUZIN. Mr. Lewis. Mr. Miller will go first?

Mr. Lewis. I am sorry.

Mr. LEWIS. Thank you. Members of the subcommittee, before starting this demonstration, I would like to introduce the equipment that you will be seeing today and also the setup that we have here. In the far corner here, we have a fully integrated HD television. It is a Zenith, by rare coincidence. It is a top-of-the-line, commercially available DTV product for the early adopter seeking the best possible viewing experiences. It is capable of high resolution television.

In the—sort of directly across from me we have an RCA 38-inch, fully integrated, direct view HDTV. This product is being introduced to the market this week with retail price of \$4,000, half of what this manufacturer's lowest-price HDTV cost only a year ago.

And then slightly to the left of that is the set-top box, the aforementioned DTC 100, which is a device selling for around \$600. It provides consumers with one of the most affordable means by which to receive DTV, including HDTV. We are using the set-top box to feed both the HDTVs, so you can see the pictures and the sound from them, and we are feeding them with the silver sensor antenna, which is in the window behind you, just sitting there.

Our experience is much different than others, we placed it in the window. It worked. And we are able to get multiple channels.

So, first, I would like to show you Channel 50, which is just an NTSC channel, to allow you to kind of benchmark what that reception is like.

Mr. TAUZIN. Let's again, to make sure we understand, this is a real-time broadcast?

Mr. LEWIS. Everything you see will be received from a television station transmitting in the Washington area.

Mr. TAUZIN. It will be received on an antenna that you have on the window here?

Mr. LEWIS. Same antenna as this.

Mr. TAUZIN. It is behind the curtain. I am afraid to pull the curtain. Curtain number 1, number 2. It is behind there and it looks just like that, I understand.

Mr. LEWIS. So what you will see is the rather marginal NTSC transmission or environment. It is a very harsh environment. Lots of multipath, lots of interference.

If we could then go to Channel 27. Without moving the antenna, we moved from Channel 50 analog to Channel 27 digital. We are now experiencing the HD television experience.

[Video played.]

Mr. TAUZIN. This is probably real time. This is real-life experience.

Mr. LEWIS. As we all like to channel surf, I would like now to move to a different channel, once again, without adjusting the antenna. We are now on Channel 35, WHD.

Mr. TAUZIN. This was without moving this antenna. The antenna is stationary.

Mr. LEWIS. Just stuck in a window.

And moving once again to another channel without moving the antenna, the simulcast, or this is more of a standard definition of conversion. And so, as you can see, our experiences—

Mr. TAUZIN. So we understand the demonstration, we moved through some of the same channels that we saw earlier in the previous demonstration; and your testimony and demonstration is that you are doing this with one antenna that is not being moved around looks exactly like that?

Mr. LEWIS. That is right.

Mr. TAUZIN. And they were all 8-VSB technologies?

Mr. LEWIS. Those were all 8-VSB signals. In fact, we had been in the room previously; we were receiving five different stations with very robust signals and a very diverse set of receivers—the Zenith receiver, the Harris receiver, the Thompson receiver, the Phillips receiver, all the receivers—the NxtWave, sorry; I got there eventually—all received all the channels without any problems.

So I think this is a good testimony to the progress and to the ease of reception that has been referred to previously.

I would now like to move to Matt Miller to allow you to see a computer-based application.

Mr. MATT MILLER. Good morning, Mr. Chairman and members of the committee. What we are showing on the PC is again a real-time reception of the same collection of channels and essentially the same receiving environment. It is a silver sensor. It is behind curtain number 1. It does take a degree in engineering to change the channels because it is software. However, my degree is in phys-

ics so I can't help you there. So we have tuned to a signal channel, but we can in fact tune all the channels.

The purpose of this demonstration, however, is to show some of the progress that is been made on convergence, cost reduction and flexibility. What is being used inside there is this video card. This is a device which is going to be produced by multiple manufacturers. It will be introduced to consumers later this fall. Our chip is this little jobber here; everything else is provided by someone else. We have done the reference design.

This card will retail for less than \$300. It will be available this fall and essentially has on it all the components for reliable reception and decoding of digital television, plugs into a garden-variety PC and converts the PC into basically a high definition television set for less than \$300.

Equally importantly, what we are demonstrating here is live, reliable, real-time indoor reception into one of these antennas. A very, very low-cost consumer entry to the pleasures and interaction capabilities of digital television, and equally importantly, fulfilling the objectives of digital convergence on a PC.

What you have now is this PC is connected up to a 19.4 megabit per second wireless broadband link to the broadcaster. Television is one of the applications, but we have envisioned numerous other data applications as well, and this card will then enable that PC to get connected to whatever data the broadcaster chooses to transmit.

So, in conclusion, we believe that the technology is very solid. You have seen a variety of demonstrations here from high-end to low-end to consumer plug-in devices, digital data. And with those comments, I would like to conclude my demonstration.

Mr. TAUZIN. Thank you.

Mr. Shapiro, does that conclude the demonstration?

Mr. SHAPIRO. Yes. I have a statement I would like to make.

Mr. TAUZIN. Then the gentleman is recognized for 5 minutes.

Mr. SHAPIRO. Thank you, Mr. Chairman and distinguished members of the subcommittee. I do very much appreciate the opportunity to report to you where we are with the national mission that actually Congressman Markey laid out many years ago.

It is a national mission to shift to digital television for many reasons; and I am pleased to report to you that the transition is actually doing very well. Despite limited broadcast programming and confusion asserted by some who advocate delay, consumers are buying DTV products in record numbers. Indeed, we just announced that in the first 6 months of this year our industry has sold more DTV products than in all of 1999. In 1999, we sold over 121,000 DTV products.

Ten percent of all consumer dollars spent on TV is now believed to be spent on digital TV. And more than two dozen manufacturers have introduced more than 200 different DTV products, which are being sold at some 1,000 retail stores around the country. Receiver prices have plummeted and the performance and features offered by DTV receivers continue to improve greatly. There is no doubt that after 10 years of research and development, our industry, the consumer electronics industry, has upheld its end of the bargain. We have made a wide selection of digital television products avail-

able at retail at all sorts of affordable prices. But best of all, consumers love digital television. When they experience it, they want it.

But if there is one key to a successful DTV transition it is a steady supply of high-quality programming. The good news is that the amount of nonbroadcast TV content is increasing every day. Virtually every media provider has good news to report, and some of this is detailed in my written statement. I will refer you to it, but satellite and cable each have major success stories. The motion picture industry has gone almost completely over to digital production for a variety of reasons, most of which are cost saving, not involving film prints; and even, indeed, prerecorded media has played a surprising but critical role in the success of DTV. With more than 7 million units sold in just a few years, Americans have embraced the high quality of DVD, digital versatile disc.

Many of these DVD consumers are buying digital television to get the best possible picture and sound quality. This validates arguments that Americans want the best in home theater. They want the better pictures and sound that digital television can offer.

With DTV drivers, DVD will soon be followed by prerecorded digital recorders like TiVo and replay, prerecorded HDTV on video cassettes, Internet HDTV and, of course, high resolution video games. Indeed, cable, satellite, prerecorded media and the Internet will all be providing higher quality content.

With respect to over-the-air broadcast content, though, we are sorry to report that the picture is not as pretty. Despite leadership from CBS, PBS and several broadcast pioneers, such as North Carolina's WRIL, Washington's WETA and others, the broadcast industry is lagging behind in this transition.

This is unfortunate and surprising considering the history of promises of broadcasters that they would use their loaned spectrum to provide abundant high-quality content to American consumers. These promises of abundant programming have not come to pass. Most of the programming now seen on the digital channels includes one of the programs you just saw is simply of converted analog with a quality level far less than HDTV. And with some notable exceptions the amount of HD programming is negligible and even less appears to be in development for next season. It—indeed it looks like we may be going the way of Europe, which does not have HDTV in their plans and they are not providing it. It is just simply, basically a little bit better than analog.

More troubling are recent reports that some broadcasters are not interested in providing HDTV or digital television at all. Some are considering new standards in business models based on providing subscription data services rather than free over-the-air television. I would submit to you that Sinclair is not planning for digital television or HDTV. They are planning for subscription data and other services, and they have not even begun the implementation phase.

Most disturbing are reports that a handful of broadcasters want to lease out the public spectrum loaned to them by Congress for mobile data services. We are seriously concerned by these developments. We find it unfair and inconceivable that a small group of broadcasters who receive their spectrum for free would presume to sell this spectrum capacity for commercial mobile uses and thus

enter into direct competition with those who paid billions of dollars for their spectrum at auction.

Sinclair asked to be able to use the European COFDM standard, which they say is more suitable for indoor reception and mobile data applications. However, the fact is manufacturers are not receiving complaints from any consumers about indoor reception.

It is also to put this question of indoor reception in perspective. Fewer than 5 percent of consumers currently receive their primary signal via an indoor antenna. The rest is an outdoor antenna, cable, satellite, et cetera.

The bottom line is that renewed broadcast wrangling over business plans and standards has serious consequences for American consumers in the entire DTV transition. If some broadcasters offer a new nonbackwards compatible system, many DTV products in consumers' homes today will be orphaned by the government and unable to work with the new transmission system.

Consumers who invest in DTV products expect them to work for a long time. It is difficult to convince consumers to buy digital television products with built-in tuners if they learn that broadcasters are seeking to switch their transmission system in midstream.

Realistically, the addition of a new standard will take 2 to 4 years. Sinclair's claim that we should simply add the European standard defies credulity. That standard is not even being used for high definition television, and it uses 8 megahertz of spectrum, a much wider spectrum rather than 6 megahertz. Even if broadcasters somehow agree to add COFDM in the next several months, we don't know which standard it will be and how broadcasters can adjust to fit it in the table of allotments without radically reducing the energy and, therefore, the coverage. Any further delay will halt DTV's momentum, penalizing those broadcasters who have invested in digital equipment, depriving American consumers of a wide array of broadcast digital services and postponing the timetable for the return to analog spectrum.

Mr. Chairman, members of the subcommittee, we do commend you for your commitment to ensuring a smooth, rapid and consumer friendly transition. Under your oversight, the U.S. has assumed the position that this subcommittee first aspired to in its first hearings, that as being the world leader in digital television. And indeed we are. DTV sets are in the stores, consumers have embraced the product, many manufacturers are going 24 hours, 7 days a week, producing them; and a wide variety of providers are recognizing the potential of DTV programming. Having come this far, it is clearly not in the public interest to bring this forward progress to a grinding halt and engage in yet another standards debate.

Thank you, Mr. Chairman and members of the subcommittee. I would be pleased to answer any questions.

[The prepared statement of Gary Shapiro follows:]

PREPARED STATEMENT OF GARY SHAPIRO, PRESIDENT AND CEO, CONSUMER
ELECTRONICS ASSOCIATION

Thank you Mr. Chairman and distinguished Members of the Subcommittee. I appreciate this opportunity to report to you on the status of our national mission to shift to digital television.

I am Gary Shapiro, president and CEO of the Consumer Electronics Association, the association that represents the consumer technology industry. Our 600 members represent \$81 billion dollars in annual sales, and our products are found in more than 99 percent of American homes. CEA members invented digital television, and have spent more than a decade and a billion dollars bringing it from the research labs to the retail shelves.

I will report on where we are today, the challenges we face, and the steps that are necessary to complete the transition to DTV.

MANUFACTURERS HAVE DELIVERED ON DTV

I am pleased to report to you that the transition to digital television is going well. Despite limited broadcast programming and the efforts of some who advocate delay, consumers are buying DTV products in record numbers.

Indeed, in the first six months of this year our industry has sold more DTV products than in all of 1999. More than two dozen manufacturers have introduced more than 200 different DTV products, which are being sold at more than 300 different retail locations around the country. Availability increases every day as prices come down, more models are introduced and new retailers begin stocking DTV.

In just over a year, some receiver prices have plummeted by half, and a variety of set-top boxes in the \$600 range have been introduced, including boxes that incorporate reception for satellite and over-the-air DTV signals as well as analog signals.

At the same time, the performance and features offered by DTV receivers continue to improve. This price competition is characteristic of our industry, and is rapidly making this extraordinary technology more affordable to Americans at all economic levels.

There is no doubt that, after ten years of research and development, the consumer electronics industry has upheld its end of the bargain by making a wide selection of digital television products available at retail.

CONSUMER INTEREST AND SATISFACTION ARE HIGH

Best of all, as my co-panelist Tom Campbell and other retailers will tell you, consumer satisfaction with DTV is very high. When consumers see the extraordinary sound and video experience offered by DTV, they want it—and today's analog television never looks the same again.

Indeed, a recent survey by the National Consumers' League indicated that DTV owners are overwhelmingly satisfied with the performance of their DTV products, although they are dissatisfied with the amount of available broadcast programming.

Consumers are buying DTV even in those markets where broadcast programming is limited or unavailable. Americans are finding that digital and high-definition displays enhance the analog TV experience, and provide the best available display for DVD and other pre-recorded content.

CONTENT IS KING

If there is one key to a successful DTV transition, it is a steady supply of high quality program content. This is the first law of our industry: product sales will only take off when sufficient content is available to consumers. No matter how remarkable HDTV or any technology may be, consumers will only buy it if there is something to watch.

One obstacle to greater content availability is the need for the development of adequate and reasonable standards for DTV copy protection. CEA is committed to working with other parties to ensure that copyrighted content, when transmitted in digital formats, is adequately protected against copying in a manner that preserves the fair use rights of American viewers.

The good news is that the amount of non-broadcast DTV content is increasing every day, and virtually every media provider has good news to report. Direct-to-home satellite providers Echostar and DirecTV are each providing two full time channels of HDTV programming to consumers nationwide. Congress' recent passage of the Satellite Home Viewer Act will soon accelerate the number of viewers receiving HDTV via satellite.

In addition, major cable operators such as Time Warner and Cablevision are providing their subscribers in select markets with HDTV programming. This summer cable subscribers in New York can enjoy Yankees and Mets baseball in HDTV.

And recent technical agreements between the consumer electronics and cable industries help enable seamless interoperability between DTV and cable systems, and will make it even easier for cable companies to provide HDTV to viewers.

Prerecorded media also is an important part of the DTV equation. DVD sales have exploded, with more than seven million units sold. Americans have embraced the

high quality of DVD, which validates our view that viewers want and will pay for better pictures and sound. Now many consumers are using their digital television to take their DVD experience to the next level—the wide-screen, high-resolution playback DVDs provide. Similarly, many consumers are exploiting the high-resolution performance of digital recorders such as those produced by TIVO and Replay.

Finally, the future will bring broadband Internet to the American living room and with it yet another conduit for digital television. We encourage members of this committee to move forward on legislation that will bring us closer to ubiquitous broadband in the home.

We are pleased with this explosion in non-broadcast DTV programming. While the broadcasters have an important role to play in bringing DTV to all Americans, the fact is that 70 percent of U.S. households receive their primary video signal through cable, and an additional 12 percent through direct to home satellite. We expect these trends to continue and increase in the digital world.

LOANED SPECTRUM SHOULD BE USED PRIMARILY FOR FREE, OVER-THE-AIR BROADCASTING

With respect to over the air broadcast content, we are sorry to report that picture is not as pretty. Despite leadership from CBS, PBS, and several local broadcast pioneers such as Capitol Broadcasting's WRAL, the broadcast industry is lagging behind in the DTV transition.

This is unfortunate and surprising, considering the history of this issue and the numerous public representations that have been made by the broadcasters.

Let's look at the history of DTV. In 1987, this Subcommittee held its first hearings on "advanced" television. The main concern was that the United States was falling behind in the global HDTV technology race and that Americans might become second-class citizens in the digital television future.

At the same time broadcasters came to Congress and asked for a loan of billions of dollars in public spectrum so that they could transition to the digital age. The bargain was that this spectrum would be used primarily to provide free over-the-air digital television to the American people.

Congress largely agreed that the broadcasters needed some amount of loaned spectrum, but many believed that they should receive only the bandwidth required to transmit one standard definition channel.

The broadcast industry responded that they required the full 6 megahertz (MHz) of spectrum, because 6 MHz was needed to bring American consumers the holy grail of digital technology: high definition television, or HDTV.

For example, in 1995 testimony, NBC Chairman Robert Wright promised Congress that:

"We intend to lead the industry in the introduction of digital television, and, in particular, motion picture quality, high definition television. All broadcasters are committed to doing so. We realize we must provide truly high definition television service in order to remain competitive."

Similarly, the National Association of Broadcasters assured the FCC that "HDTV programming will be a significant or even dominant element of the business strategy of most broadcasters."

ABC, CBS and NBC even supported the imposition of HDTV programming requirements. Indeed, in January of 1996 when the DTV spectrum loan agreement appeared to be in jeopardy, the heads of the three networks sent a letter to President Clinton in which they stated:

"At a time when we as a country are legitimately concerned about creating information havens and have nots, it makes no sense to deprive the public of the opportunity to receive for free the high-quality picture and sound that would otherwise only be available on a subscription basis... As it has since television was invented, the public should have the opportunity to receive such high quality transmissions as part of our country's free, over-the-air service."

Based on these representations—but not without misgivings—Congress agreed to loan every broadcaster 6 MHz of spectrum, free of charge, in order to ensure the survival of free, over the air television in the digital age.

Congress was assured that, after a rapid transition, broadcasters would return their analog spectrum for public auction. Based on the broadcasters' commitments to Congress and American consumers, the consumer electronics and other industries moved forward to make DTV and HDTV a reality.

Unfortunately, broadcaster promises of abundant HDTV programming have not come to pass. Most of the programming now seen on the digital channels is unconverted analog, with a quality level far less than HDTV. With some notable ex-

ceptions, the amount of HDTV programming is negligible, and even less appears to be in development for next year.

More troubling are recent reports that a number of broadcasters are not interested in providing HDTV or digital television at all. Some state that they are considering new business models primarily based on providing subscription data services, rather than free over the air television.

Others claim that, after ten years of development and with DTV sets already in American homes, they would like to revisit and change the DTV transmission standard.

Most disturbing, there are reports that a handful of broadcasters want to lease out the public spectrum loaned to them by Congress for wireless data applications.

We are seriously concerned by these developments.

Having received their public spectrum, we believe that broadcasters must keep their end of the bargain. Decisions by a minority of broadcasters to move away from free over-the-air television are an abrogation of the agreement with Congress and a denial of public trust.

We especially find it unfair and inconceivable that a small group of broadcasters who received their spectrum for free would presume to sell this spectrum's capacity for commercial mobile uses—and thus enter into direct competition with those who paid billions for their spectrum at auction.

These broadcasters give a variety of reasons for their newfound reluctance to move forward. One group led by Sinclair Broadcasting submitted a petition to the FCC—which the Commission correctly rejected—asking that they be allowed to use the European COFDM standard, which they say is more suitable for indoor reception and mobile data applications.

We do believe that the existing, FCC-approved American transmission standard is the best choice for the U.S. broadcast environment. The American standard was chosen by broadcasters after a decade of competitive analysis and testing because it allows them to replicate the current coverage radius of analog TV service to fixed receivers; reduces interference with existing analog or other digital signals, has a data capacity sufficient for HDTV, and allows for efficient power use. The standard has been reaffirmed by recent tests, such as those conducted by CBS and the FCC, as well as the “real world” usage by consumers.

Throughout the DTV process, manufacturers have been making every effort to recognize and meet broadcaster concerns. However, the fact is that manufacturers are not receiving complaints from consumers about indoor reception.

On the contrary, purchasers of early generation DTV products justifiably expect a high degree of performance, and all indications are that they are getting it. In the National Consumers' League survey, four out of five DTV owners report that they are satisfied with their signal reception.

At the same time, investment in 8-VSB DTV receiver technology is unprecedented and ongoing. New chipsets and continued innovation by manufacturers are providing marked improvements in 8-VSB performance in high-multipath and other difficult reception environments. Just as with all other consumer electronics products, future generations of DTV receivers will provide improved features and performance.

It is also important to put the indoor reception issue into perspective. Fewer than five percent of consumers currently receive their primary programming via an indoor antenna.

Indeed, reception of today's DTV signal using indoor antennas is often superior to today's analog reception, since there is no snow or ghosting with digital signals.

Similarly, CEA is not opposed to spectrum flexibility, or to broadcasters providing ancillary data services. To the extent that consumers are interested in purchasing devices that access such services, our industry looks forward to supplying them. Indeed, the DTV standard is extensible and can fully accommodate future uses and services in a way that will be fully backward compatible with existing equipment.

To the extent that some broadcasters may have recently changed their business plan to put more emphasis on mobile or subscription applications, we ask that they work with manufacturers to utilize the full capabilities of the U.S. standard to provide those services.

At the same time, we believe that ancillary services should remain ancillary. Congress' intent was to allow broadcasters to make use of capacity bits not needed for high definition to provide supplementary services. This should not be confused with what appear to be plans by some broadcasters to make data delivery the primary focus of their services, to the detriment of broadcasting video or HDTV programming.

The bottom line is that this renewed broadcaster wrangling over business plans and standards has serious consequences for American consumers and the entire DTV transition.

In fact, broadcasters' lingering debates already are impacting the ability of consumer electronics manufacturers to deliver DTV to American viewers.

Based on broadcasters' commitments to the DTV standard, manufacturers have invested billions of dollars in developing compliant receivers and displays. Now, if some broadcasters opt for a new non-backwards compatible system, many DTV products in consumers' homes will be orphaned and unable to work with the new transmission system.

Looking ahead, it is hard for manufacturers to plan and build products—especially “integrated” televisions with built-in tuners—when some broadcasters are still wavering at this late date over the system they want to use to transmit programming.

We have heard that the possibility of a change in the standard is already causing some broadcasters to postpone purchasing DTV equipment. Broadcasters know that if the system changes, existing transmission equipment would need to be modified or could become obsolete.

As unfortunate as these consequences may be, the worst aspect of a change in broadcast systems would be the undermining the public's confidence in the DTV transition. Consumers who invest in DTV products justifiably expect them to work for a long time. It will become difficult to convince consumers to purchase digital television products with built-in tuners if they learn that broadcasters are seeking to switch their transmission system in mid-stream.

DELAY IS THE GREATEST THREAT TO THE DTV TRANSITION

Congress should be concerned about the harmful consequences that would result from the delay caused by the consideration of a non-compatible standard such as COFDM.

Even the proponents of alternative standards acknowledge that any change to the DTV standard would require extensive study and debate of the numerous engineering issues regarding channel allotments, system information and receiver design.

Realistically, the development of consensus around a specific alternative DTV system, its standardization, the FCC rulemaking, and the necessary amendments to the FCC's table of allotments would take two to four years. Even this appears conservative, considering that the process that brought us today's standard took more than a decade to complete.

Any further delay will halt DTV's momentum, penalizing those broadcasters who have invested in digital equipment and programming, depriving American consumers of a wide array of broadcast digital services and significantly postponing the Congressional timetable for the return of the analog spectrum.

By contrast, delay would reward a handful of undeserving winners: The small minority of broadcasters who, having asked for and received public spectrum, now have no plans for digital television broadcasting, no digital programming, or no investment in deployment.

CONCLUSION

Mr. Chairman and members of this Subcommittee, CEA commends you for your decade long commitment to ensuring a smooth, rapid, and consumer-friendly transition to DTV.

Under your oversight, the U.S. has assumed the position that this Subcommittee aspired to at that first advanced television hearing in 1987 on world leadership in digital television.

DTV sets are in the stores, and consumers have embraced the product. A wide variety of providers are recognizing its potential and producing DTV programming. And CEA remains committed to working with broadcasters, cable providers and all other interested parties to ensure the fastest, most consumer-friendly transition to DTV.

Having come this far, it is clearly not in the public interest to halt our forward progress to engage in yet another standards debate.

Thank you Mr. Chairman. I would be happy to answer any questions you or the Members of the Subcommittee may have.

Mr. TAUZIN. Thank Mr. Shapiro.

Next will be Mr. Dale Hatfield, Chief of the Office of Engineering and Technology of the FCC, accompanied by Deborah Lathen, the Chief of Cable Services Bureau. Welcome to you both.

Mr. Hatfield.

STATEMENT OF DALE N. HATFIELD

Mr. HATFIELD. Mr. Chairman, Mr. Markey, and members of the subcommittee, thank you for the opportunity to appear before you today. Before I begin, I want to clarify, that the opinions that I am expressing here are my own and may not necessarily reflect the views of the Commission itself. I would like to commend you for holding this important and timely hearing. As you know, the Commission is currently conducting the first of its own 2-year periodic review of the DTV system.

The Commission has established an aggressive schedule for television stations to construct their digital facilities. To date, the Commission has granted DTV construction permits to 515 stations. There are now 139 stations in the United States transmitting digital programming. In the top 10 markets, 36 of the 40 network-affiliated stations are on the air. In markets 11 through 30, 59 of the 79 network-affiliated stations are on the air.

Given the scope and complexity of the required effort, I believe that broadcasters have done a good job of starting the DTV transition process. However, I am concerned that the pace of the transition is now being threatened. I believe that broadcasters must make the transition from analog to digital transmission as quickly as possible for three basic reasons. First, all segments, and I know of no exceptions—all segments of the communications industry—cable, DBS, telephony and so forth—have begun or have made the conversion to digital. If broadcasters do not make the transition promptly, they risk falling behind their competitors.

Second, the overall technical advantages of converting from analog to digital are overwhelming in terms of the number and richness of the services that can be delivered.

Third, the public interest demands that spectrum be used more efficiently. Let me elaborate briefly on the third point.

As head of the Office of Engineering and Technology, I see firsthand the problem of increasing demand for the precious radio spectrum. As an engineer, I know that with modern digital techniques you can do much more with a 6-megahertz channel than send a single channel of analog television. Therefore, a successful digital transition will free up valuable spectrum for other uses.

As you know, the current uncertainty over the choice of a transmission standard threatens that transition. In February, the Commission denied the Sinclair Broadcast Group's request that we modify our rules to allow COFDM in addition to the current ATSC 8-VSB standard. Sinclair had raised questions regarding the adequacy of 8-VSB reception with simple indoor antennas under complex multipath conditions.

In denying Sinclair's petition, the Commission noted that it believed that what Sinclair had highlighted was a shortcoming of early DTV receivers, rather than, A, any basic flaw in the ATSC standard or, B, 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 problems that Sinclair

had raised. We are continuing to look at this issue in our periodic review to ensure that adequate progress is being made by receiver manufacturers and others, and we are undertaking our own field tests to further assure ourselves of such progress.

I am concerned that one of the motivations for consideration of a different standard appears to be a purported advantage of COFDM in providing new portable and mobile services, rather than any advance of COFDM in providing improved or enhanced television broadcast service.

I believe this raises fundamental issues regarding the intent of Congress and the Commission's rules in providing broadcasters with a free second channel for DTV operations. And I want to emphasize that I did not oppose efforts to reconfirm that 8-VSB operates as designed to replicate NTSC, today's standard coverage; indeed, I welcome efforts to develop information to improve that technology. However, these efforts should be limited to performance attributes that are relevant to broadcasting and are consistent with the goals established by the Commission for DTV.

More specifically, any such efforts must be premised upon, one, the requirement that no changes be made to the DTV table of allotments—this is essential, absolutely essential, to avoid years of unacceptable delay—and, two, must be premised upon adherence to the Commission's service replication and minimum interference goals. These are necessary to ensure that the American public will not be deprived of free over-the-air television service.

I should add that the FCC Chairman Kennard expressed similar sentiments in a letter he sent to the NAB and to MSTV yesterday; and with your permission, I would like to have that letter be part of the record.

Mr. TAUZIN. Without objection, it is. And try to wrap up.

Mr. HATFIELD. Let me close by emphasizing that I personally remain very bullish on the long-term future of HDTV. I am convinced that HDTV fundamentally changes the nature of the viewing experience and will be very successful in the marketplace. And, of course, DTV, as you have heard and seen demonstrated today, can do even more.

There are simply too many potential benefits to be had from the introduction of digital television not to move forward as quickly as possible. At the Commission, we stand ready to do our part in helping to ensure that outcome.

Thank you very much for the opportunity to appear today. I would be pleased, of course, to answer any questions that you may have.

[The prepared statement of Dale N. Hatfield follows:]

PREPARED STATEMENT OF DALE N. HATFIELD, CHIEF, OFFICE OF ENGINEERING AND TECHNOLOGY, FEDERAL COMMUNICATIONS COMMISSION

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 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; multichannel 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;

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

- 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 firsthand 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.

SUMMARY OF DTV APPLICATIONS FILED

July 19, 2000

ALL MARKETS

ALL BUT 38 TV STATIONS HAVE FILED THEIR DTV CONSTRUCTION PERMIT APPLICATIONS. THOSE 38 HAVE REQUESTED EXTENSIONS OF TIME TO FILE.

515 STATIONS HAVE BEEN GRANTED DTV CONSTRUCTION PERMITS - 108 ARE ON THE AIR WITH LICENSED FACILITIES. 31 OTHERS ARE ON THE AIR WITH SPECIAL OR EXPERIMENTAL DTV AUTHORITY

THE REMAINING APPLICATIONS ARE AWAITING ADDITIONAL INFORMATION; MEXICAN, CANADIAN OR OTHER CLEARANCES OR ARE THE NON-CHECKLIST OR MAXIMIZATION TYPE. THESE

APPLICATIONS ARE CURRENTLY BEING PROCESSED IN PROPER PRIORITY ORDER .

TOP TEN MARKET NETWORK AFFILIATES

ALL 40 OF THESE STATIONS HAVE FILED APPLICATIONS; 39 HAVE BEEN GRANTED CPs - 33 ARE ON THE AIR WITH LICENSED FACILITIES. SEVEN HAVE REQUESTED THIRD EXTENSIONS OF TIME UNTIL 11/1/00 TO GO ON THE AIR. THREE OF THESE ARE ON THE AIR WITH STAs FOR LESSER FACILITIES. 36 TOTAL STATIONS ARE ON THE AIR

MARKETS 11 - 30 - NETWORK AFFILIATES

78 - OUT OF 79 OF THESE STATIONS HAVE FILED APPLICATIONS; 72 HAVE BEEN GRANTED CPs - 3 OTHERS HAVE BEEN GRANTED STAs TO OPERATE WHILE ACTION ON THEIR APPLICATIONS IS PENDING - 53 ARE ON THE AIR WITH LICENSED FACILITIES 23 HAVE REQUESTED SECOND EXTENSIONS OF TIME UNTIL 11/1/00 TO GO ON THE AIR. FOUR STATIONS IN THIS GROUP HAVE STAs TO OPERATE WITH LESSER FACILITIES. 60 TOTAL STATIONS ARE ON THE AIR

TOP TEN MARKET NETWORK AFFILIATES

TV EARLY BUILDER APPLICATION STATUS JULY 19, 2000

CITY	CALL (C)AFL	CP APPLICATION STATUS	BUILDOUT PROBLEMS
11/1/98 On Air Voluntary-- 5/1/99 On Air Mandatory		Applications were due 5/1/98	
New York	WCBS (2) CBS	CP Granted	ON THE AIR
Los Angeles	KABC (7) ABC	CP Granted	ON THE AIR
	KTLA (5) **	CP Granted	ON THE AIR
	KNBC (4) NBC	CP Granted	ON THE AIR
Chicago	WMAQ (5) NBC	Application Filed	Third extension requested until 11/1/00 to complete construction DTV/STA
Philadelphia	WTXF (29) FOX	CP Granted	ON THE AIR
	WPVI (6) ABC	CP Granted	ON THE AIR
	KYW (3) CBS	CP Granted	ON THE AIR

	WCAU(10)NBC	CP Granted	ON THE AIR
S.F. - Oakland	KGO (7)ABC	CP Granted	ON THE AIR
	KPDx (5)CBS	CP Granted	ON THE AIR
	KRON(4)NBC	CP Granted	ON THE AIR
Boston	WCVB (5) ABC	CP Granted	ON THE AIR
	WMUR (9) **ABC, FOX	CP Granted	ON THE AIR
Washington	WJLA (7) ABC	CP Granted	ON THE AIR
	WUSA(9) CBS	CP Granted	ON THE AIR
	WRC (4)NBC	CP Granted	ON THE AIR
Dallas - Ft. W.	KDFW (4) FOX	CP Granted	ON THE AIR
	WFAA (8)ABC	CP Granted	ON THE AIR
	KXAS (5)NBC	CP Granted	ON THE AIR
Detroit	WJBK (2)FOX	CP Granted	ON THE AIR
	WWJ(62)CBS	CP Granted	ON THE AIR
Atlanta	WXIA(11) NBC	CP Granted	ON THE AIR
	WSB (2) ABC	CP Granted	ON THE AIR
May 1, 1999 On Air Date			
New York	WABC (7)ABC	CP Granted	Third extension requested until 11/1/00 to complete construction
	WNYW (5)FOX	CP Granted	ON THE AIR
	WNBC (4)NBC	CP Granted	Third Extension requested until 11/1/00 to complete construction
Los Angeles	KCBS (2)CBS	CP Granted	ON THE AIR
	KTTV(11)FOX	CP Granted	ON THE AIR
Chicago	WLS (7)ABC	CP Granted	Third Extension requested until 11/1/00 to complete construction
	WBBM (2)CBS	CP Granted	Third Extension requested until 11/1/00 to complete construction
	WFLD(32)FOX	CP Granted	ON THE AIR
SF - Oakland	KTVU (2)FOX	CP Granted	ON THE AIR
Boston	WBZ(4)CBS	CP Granted	Third extension requested until 11/1/00 to complete construction DTV STA*

	WPXT(25)FOX	CP Granted	ON THE AIR
	WHDH (7)NBC	CP Granted	ON THE AIR
Washington	WTTG (5)FOX	CP Granted	ON THE AIR
Dallas	KTVT(11)CBS	CP Granted	Third extension requested until 11/1/00 DTV STA*
Detroit	WXYZ (7) ABC	CP Granted	ON THE AIR
	WDIV(4)NBC	CP Granted	ON THE AIR
Atlanta	WAGA(5)FOX	CP Granted	ON THE AIR
	WGNX(46)CBS	CP Granted	ON THE AIR

* DTV STA means that the station has been granted a Special Temporary Authority to broadcast Digital Television with less than authorized or requested facilities during unspecified time periods.

** May 1, 2002 On Air Mandatory

MARKETS 11-30 NETWORK AFFILIATES

TV Buildout Application Status July 19, 2000

CITY	CALL (CH)AFF	CP APPLICATION STATUS	BUILDOUT PROBLEMS
Nov. 1, 1999 On Air Deadline		CP Applications were due August 3, 1998	
Houston	KTRK(13)ABC	CP Granted	ON THE AIR
	KHOU(11)CBS	CP Granted	ON THE AIR
	KRIV(26)FOX	CP Granted	ON THE AIR
	KPRC(2)NBC	CP Granted	ON THE AIR
Seattle-Takoma	KOMO(4)ABC	CP Granted	ON THE AIR
	KIRO(7)CBS	CP Granted	ON THE AIR
	KCPQ(13)FOX	Application filed	Second extension of time requested until 8/1/00
	KING(5)NBC	CP Granted	ON THE AIR
Cleveland	WEWS(5)ABC	CP Granted	ON THE AIR
	WOIO(19)CBS	CP Granted	ON THE AIR

	WJW(8)FOX	CP Granted	ON THE AIR
	WKYC(3)NBC	CP Granted	ON THE AIR
Minn. - St. Paul	KSTP(5)ABC	CP Granted	Second extension of time requested until 11/1/00 DTV STA*
	WCCO(4)CBS	CP Granted	Second extension of time requested until 11/1/00
	WFTC(29)FOX	Application filed Awaiting Amendment	Second extension of time requested until 11/1/00
	KARE(11)NBC	CP Granted	Second extension of time requested until 11/1/00
Tampa-St Pete.	WFTS(28)ABC	CP Granted	ON THE AIR
	WTSP(10)CBS	CP Granted	ON THE AIR
	WTVT(13)FOX	CP Granted	ON THE AIR
	WFLA(8)NBC	CP Granted	ON THE AIR
Miami - Ft. Laud.	WPLG(10)ABC	CP Granted	ON THE AIR
	WFOR(4)CBS	CP Granted	Second extension of time requested until 11/1/00
	WSVN(7)FOX	CP Granted	ON THE AIR
	WTVJ(6)NBC	Second Extension requested until FCC acts on RM to change channel from Ch. 30 to Ch. 31.	Second extension of time requested until 11/1/00
Phoenix	KNXV(15)ABC	CP Granted	ON THE AIR
	KPHO(5)CBS	CP Granted	ON THE AIR
	KSAZ(10)FOX	CP Granted	ON THE AIR
(Mesa, AZ)	KPNX(12)NBC	CP Granted	ON THE AIR
Denver	KMGH(7)ABC	CP Granted	Second extension of time requested until 11/1/00 DTV STA*
	KCNC(4)CBS	CP Granted	Second extension of time requested until 11/1/00
	KDVR(31)FOX	CP Granted	ON THE AIR
	KUSA(8)NBC	CP Granted	Second extension of time requested until 11/1/00
Pittsburgh	WTAE(4)ABC	CP Granted	ON THE AIR

	KDKA(2)CBS	CP Granted	ON THE AIR
	WPGH(53)FOX	Application filed STA Granted	DTV STA*
	WPXI(11)NBC	CP Granted	ON THE AIR
Sacramento- Stockton-Mod.	KXTV(10)ABC	CP Granted	ON THE AIR
	KOVR(13)CBS	CP Granted	Second extension of time requested until 11/1/00
	KTXL(40)FOX	CP Granted	ON THE AIR
	KCRA(3)NBC	CP Granted	ON THE AIR
St. Louis	KDNL(30)ABC	Application filed STA Granted	
	KMOV(4)CBS	CP Granted	DTV STA*
	KTVI(2)FOX	CP Granted	ON THE AIR
	KSDK(5)NBC	CP Granted	ON THE AIR
Orlando-Da.Bch. - Melbourne	WFTV(9)ABC	CP Granted	Second extension of time requested until 11/1/00
	WKMG(8)CBS	CP Granted	Second extension of time requested until 11/1/00
	WOFL(35)FOX	CP Granted	ON THE AIR
	WESH(2)NBC	CP Granted	Second extension of time granted until 11/1/00
Baltimore	WMAR(2)ABC	CP Granted	ON THE AIR
	WJZ(13)CBS	CP Granted	Second Extension of time requested until 11/1/00
	WBFF(45)FOX	Application filed STA Granted	DTV STA*
	WBAL(11)NBC	CP Granted	ON THE AIR
Portland	KATU(2)ABC	CP Granted	ON THE AIR
	KOIN(6)CBS	CP Granted	Second extension of time requested until 11/1/00 DTV STA*
(Vancouver, WA)	KPDY(49)FOX	CP Granted	ON THE AIR
	KGW(8)NBC	CP Granted	ON THE AIR
Indianapolis	WRTV(6)ABC	CP Granted	ON THE AIR
	WISH(8)CBS	CP Granted	ON THE AIR
	WXIN(59)FOX	CP Granted	ON THE AIR

	WTHR(13)NBC	CP Granted	ON THE AIR
San Diego	KGTU(10)ABC	CP Granted	ON THE AIR
	KFMB(8)CBS	CP Granted	ON THE AIR
	XETV(6)FOX	Mexican Station- outside FCC Authority	Mexican Station- outside FCC Authority
	KNSD(39)NBC	CP Granted	ON THE AIR
Hartford- New H	WTNH(3)ABC	CP Granted	ON THE AIR
	WFSB(3)CBS	CP Granted	Second extension of time requested until 11/1/00 DTV STA*
	WTIC(61)FOX	CP Granted	Second extension of time requested until 11/1/00
(New Britain)	WVIT(30)NBC	CP Granted	Second extension of time requested until 11/1/00
Charlotte	WSOC(9)ABC	CP Granted	ON THE AIR

FEDERAL COMMUNICATIONS COMMISSION

WASHINGTON

July 24, 2000

Mr. Edward O. Fritts
 President and Chief Executive Officer
 National Association of Broadcasters
 1771 N Street, N.W.
 Washington, D.C. 20036

Dear Mr. Fritts:

The Commission and the broadcast industry have worked together for many years to develop and implement a plan to bring digital technology to the broadcast television service in a manner that will benefit both consumers and broadcasters. While much progress has been made in this transition for which broadcasters are to be commended, I am concerned that the industry's current review of the digital television (DTV) transmission standard may be considering options for uses that are inconsistent with the intent of both Congress and the Commission in providing broadcasters with a free second channel for DTV operations.

Congress and the Commission gave each broadcaster temporary use of an extra six megahertz for the DTV transition and 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 video programming to television viewers. Broadcasters need to plan for the digital transition in accordance with this purpose.

In the DTV rulemaking process, the Commission agreed with the overwhelming consensus of the broadcast industry that the 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, the 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.

Given that cable, satellite and other video competitors have already made the transition to digital technologies, 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.

It is my understanding that broadcasters are now looking at COFDM technology as a possible alternative to the 8-VSB standard because of its reputed benefits for new service applications, including mobile and data transmission operations. 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 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.

While I have urged broadcasters to develop new business models for digital television, in addition to high definition television (HDTV) programming, it is wrong to read into my comments that broadcasters should abandon their core business of television. Quite the contrary, my intent is to encourage broadcasters to recognize the potential of the broadcast digital transmission technology in order to explore the flexibility of that technology to the fullest extent to provide new, enhanced broadcast and ancillary services.

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 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.

As you may know, the FCC staff is conducting a field study of DTV receiver performance and is coordinating their work with MSTV's study team. I look forward to results that will help to resolve the questions currently surrounding the DTV technical standard so that the transition can continue forward expeditiously.

Sincerely,



William E. Kennard
Chairman

CC: Ms. Margita White, MSTV

Mr. TAUZIN. Thank you, Mr. Hatfield.

We will next turn to Mr. Tom Campbell, the Corporate Director of Ken Crane's Home Entertainment Centers in Rancho Palos Verdes in—pronounce that for me.

Mr. CAMPBELL. Rancho Palos Verdes.

Mr. TAUZIN. [continuing] California.

Mr. Campbell.

STATEMENT OF TOM CAMPBELL

Mr. CAMPBELL. Mr. Chairman, thank you so much. I want to say thank you for holding this hearing and to the entire committee here for examining this important issue, the transition to digital television.

I would like to also thank you for inviting me here today. If I may just add for a moment, I was very touched by seeing the students from Louisiana that are here. This is our future, the consumer. That is what I am here to really address.

Mr. TAUZIN. Better than that, they are the winners of a Free Enterprise Program.

Mr. CAMPBELL. And also to your son, Mr. Shimkus, who wanted to watch Pokemon on HDTV. That is what we do. We recovered the very first HDTV on August 6th, 1998. The consumers were enthralled, just blown away by the quality of the picture and the performance.

I would like to mention I have been involved in consumer electronics retailing for more than 25 years. Currently, I serve as Corporate Director for Ken Crane's Home Entertainment Centers. We are a 51-year-young company. Our founder is—I better not say his age—but he still goes to the office every day, and he meets and greets our customers many times.

And we first started carrying HDTV in August, 2 years ago. We had three sets on the floor. And Mr. Crane talks to our customers. He was amazed at how excited they were about it. So what we started doing was to carry more and more HDTV. And as part of my testimony here you will see the percentages that have skyrocketed up to now over 60 percent of our big screen sales are HDTV.

And I want to mention that Sinclair mentioned, "The consumer," I believe, said, "dictates what we do; we must keep the consumer satisfied." Well, in all honesty, I am the one that talks to the consumer. They come to our stores to purchase this product. I can tell you, in my opinion, DTV and HDTV meet and exceed their expectations.

We have sold close to 3,000 sets so far in 2 years. That is 3,000 sets for eight stores in Los Angeles or Orange County. That is just us alone. Those are phenomenal numbers. Set-top boxes, I believe the first year was around 30 boxes. This year we are up to a total of 400 and some set-top boxes. So we are seeing, even with the lack of some programming, a real interest in over-the-air.

I have a HDTV in my home, and I have to surf the channels to find out who is on the air. The latest is Mexico XETV Channel 6 that I receive in my home from Tijuana with a crystal-clear picture with an indoor antenna. I would like to invite any of you who come

out to California, please come by my house. You can see it for yourself. It is very exciting.

Now, granted, some people do need an outdoor antenna, some use an indoor antenna or rabbit ears. I will tell you right now, our customer is very, very excited about this product. During the past 2 years we have sold more than 2,000 digital television sets. It constitutes two-thirds of our big-screen sales.

Now the pricing is down to 1,000—I sound like a commercial here; I am sorry. We are down to \$1,999 for an HDTV-ready set. The set-top decoder that receives on-the-air signals, as well as direct TV, \$649. So that means you can purchase a total HDTV solution today at Ken Crane's for just over \$2,600. That is a notable decrease from prices a year ago of \$7,000.

Overall, consumer interest in digital televisions led to a marked increase in store traffic force. Those consumers who are buying DTV products are highly satisfied. Less than 1 percent of the DTV products we have sold have been returned. And one was because his wife demanded a fur coat; if he got the HD, she got a fur coat. He said no and brought it back. True story.

We are very excited about HDTV. It represents a huge quantum leap in the quality of home entertainment for Americans. Trust me when I say, when they see it, they love it. Mr. Bill Ott, who lives in Palos Verdes, my neighbor, came into my house, saw my HDTV; he said, "I want it right now," went down to the store, purchased one; and right now, with an indoor antenna, he is watching HDTV.

We have nine signals in Los Angeles, three in San Diego. I live in a high area; I get San Diego as well. So I have a total of 11—no—yeah, 11 channels; do my math here—that I can watch.

Now, for consumer electronic retailers, confidence is the key to our success. If we sell our customers products that don't meet their satisfaction because of poor performance, or fall short of their expectations, we are not going to be in business very long. It is obvious from our sales success that consumer confidence in digital and HDTV is very high.

Mr. Chairman, I am not a digital engineer. I can't provide you with the technical argument favoring current or any other standard. But I can speak with authority about consumer expectations. Right now, from my personal experience, DTV products exceed consumer expectations.

But the DTV customers are not going to be happy if someone suddenly changes the rules. They are going to be very upset if they learn their new DTV set is not going to work anymore, that it won't work with all the local broadcast stations because some of the stations are being changed to a broadcast system their set won't receive.

I support the current format for two reasons—three, actually. It works, it already has solid performance and proving as manufacturers do make improvements in every generation of equipment, it has been established—implemented, rather—in TV stations and consumer homes across the country. We should not disenfranchise consumers by changing rules on them midstream. I really urge us to stay the course.

Thank you very much, Mr. Chairman. If there are any questions, I will be happy to answer.

[The prepared statement of Tom Campbell follows:]

PREPARED STATEMENT OF TOM CAMPBELL, CORPORATE DIRECTOR, KEN CRANE'S
HOME ENTERTAINMENT CENTERS

Chairman Tauzin, I'd like to thank you for holding this hearing to examine the important issues regarding the transition to digital television. And, of course, I want to thank you and the other members of the subcommittee for inviting me here today.

Mr. Chairman, I have been involved in consumer electronics retailing for more than twenty-five years. Currently, I serve as corporate director for Ken Crane's Home Entertainment Centers. Ken Crane's is a fifty-one year-old company with eight stores serving southern California, including Los Angeles and Orange County. We are known nationally and internationally for introducing new, cutting-edge technologies to consumers. Our stores carry high end, mid and entry-level products and range from custom design all the way to a warehouse clearance center.

I have been involved with digital television for many years. In 1998, as director of and prior to the sale of Dow Stereo/Video of San Diego, California, I had the personal honor of introducing and selling to consumers the first high definition television monitor with a separate set-top box. Press worldwide covered this significant event. The first set was sold to Kathy and Ed Davis. Mr. Davis, employed by the U.S. Navy, bought the set on the spot after seeing HDTV for the first time. We also sold the first integrated set in November of 1998. At each of the events launching these products, we attracted more than 5,000 people. We soon sold out our entire inventory of HDTV products even though there were no digital broadcasts in the market at that time! I am proud and honored to say that we were recognized in the congressional record for our leadership in successfully launching HDTV to the public.

During the past two years, Ken Crane's has sold more than 2,900 digital television sets. DTV products now constitute almost two-thirds of our current big screen sales. Many consumers are buying HD display units to enjoy the phenomenal, high-quality picture that comes when the display is combined with their DVD player. Others are purchasing these displays to watch improved analog TV and in anticipation of receiving high definition signals via over-the-air broadcast, cable and satellite.

We sell DTV displays beginning at under \$1,999 and a set top box decoder for just \$649 meaning a consumer can purchase a total HDTV solution today for slightly more than \$2,600. This is a notable decrease from prices just a year ago of more than \$7,000. Overall, consumer interest in digital television has led to a marked increase in store traffic. And those consumers who are buying DTV products are highly satisfied with their purchase. Less than one percent of the DTV products we have sold have been returned.

Our experience is not unique. Consumer electronics retailers across the United States are reporting the same consumer excitement over DTV. In the Washington, DC area for example, Myer-Emco reports that two out of every three of their large screen television sales are DTV sets. We hear similar reports from chains like Now Stereo and Video with locations throughout the Southern United States and Ultimate Electronics Stores in the Midwest.

Clearly, consumers are excited about digital television. And they should be. DTV represents a huge leap in the quality of home entertainment for Americans. It is a product that exceeds consumer expectations. Trust me when I say, "When they see it, they love it" and want it now!

For consumer electronics retailers, consumer confidence is the key to our business. If we sell our customers products that do not meet their satisfaction because of poor performance or fall short of their expectations, we won't be in business very long. It is obvious from our sales success that consumer confidence in digital and HDTV is high.

That is why I am concerned about the efforts of some who seek to change the existing DTV broadcast system. The current broadcast standard was adopted largely so that consumers can be confident that the new DTV products they purchase will always be capable of receiving the same local broadcast stations they enjoyed with their analog set.

I'm not a digital engineer, Mr. Chairman, so I can't provide you with a technical argument favoring the current standard versus any other. But I can speak with authority about consumer expectations. Right now, from my personal experience, DTV products exceed consumer expectations. But our DTV customers will not be happy if someone suddenly changes the rules. They will understandably be upset if they learn that their new DTV set is not going to work any more or that it won't work

with all of the broadcast stations in their local area because some stations have changed to a broadcast system their set won't receive.

In my opinion, this kind of scenario would definitely undercut consumer confidence, resulting in a major setback in consumer acceptance of digital television and a potential major backlash from early adopters who already have purchased DTV sets.

Mr. Chairman and members of the committee, as a retailer I support the existing, approved American standard. Why? 1) It works; 2) Its already solid performance is improving as manufacturers make improvements in every new generation of equipment; 3) It has been established and is implemented in TV stations and consumer homes across the country; and 4) We should not disenfranchise consumers by changing the rules on them mid-stream.

In my experience dealing directly with consumers, digital television not only meets, but exceeds consumer expectations. As prices continue to come down, more and more consumers are making the transition from their old analog TV to a new digital television set. And, of course, they are eagerly awaiting more programming and HDTV from local stations, satellite and cable. I ask you today to help consumers and retailers continue the transition to DTV. Let's not derail the transition and deny consumers this wonderful new technology.

Thank you again for allowing me to appear before you today. I'll be happy to answer any questions.

Mr. TAUZIN. Thank you very much.

Next we will have Mr. Richard Lewis, Senior Vice President, Research and Technology, for Zenith Electronics Corporation in Glenview, Illinois.

STATEMENT OF RICHARD M. LEWIS

Mr. LEWIS. Thank you, Mr. Chairman. Briefly, Zenith has an 80-year history and experience building receivers for American consumers. We have participated in the DTV standard-setting process since its inception in 1987. I would like to make just three brief points. One, the transition is underway. We have strong sales and we are out of stock on our integrated receiver on a regular basis. We are expanding our product line. We are moving beyond HDTV compatible sets into lower cost and direct view sets. These, from Zenith's perspective, are not the signs of a transition in trouble.

Second, any call for a change in the modulation system is unfounded and without merit. Arguments to the contrary failed to examine all aspects of the issue. Coverage, that being from a transmitter, how much of the area will receive a signal, interference both into analog and digital transmission, and then, of course, reception issues. Lately much of the talk has been about reception, but the other 2 issues are extremely important also, and part of the reason that DSB was selected.

In fact, these criteria were the main focus of a multiyear scientifically rigorous and peer review process to obtain a system optimized for the American market. Other systems, such as COFDM have been engineered for a different network architecture. In the U.K., for instance, in London, there are fewer channels with national content versus many channels with local content. London, for instance, would have 6, 8 megahertz physical channels versus 10 or 12 channels, physical channels in a New York or a Chicago.

So switching to COFDM would also be a choice between fewer channels or millions of lost viewers according to recent studies by Jules Cohen, showing the impact of COFDM on interference levels and using the FCC modeling.

Also in the U.K., multiple main transition towers are used versus a single main tower with broad coverage as we use in the United

States. The recent NAB filing for the biannual review comments points to the difficulty in adding towers and antenna structures with local zoning issues.

It is these criteria that have made the U.S. broadcast industry a success and make 8-VSB the superior and the only viable transmission service to provide the replication of services, that being those who can get analog reception today to also get digital reception while still allowing each broadcaster an additional channel during the transition.

Third, and moving to reception, receivers are working today as evidenced by the recent CBS study showing that virtually 100 percent reception in the Philadelphia market where their test was conducted. Previous issues with multipath interference, especially, have been related to rushed implementation and not any limitations in the standard. This should be important to note also that COFDM does not work in every location and every situation just as your cell phone does not work in every location. VSB can and will have multipath interfere performance equal to COFDM and, in some cases, better.

So in closing, I would like to point out that any change in the transmission standard at this point would be disastrous for consumers, broadcasters and consumer electronics manufacturers. A new standard will significantly delay the implementation and provision of DTV services to the public and jeopardize the return to the analog spectrum by 2006 as mandated by Congress.

Mr. Chairman, thank you for the opportunity to speak. I would be happy to take any questions. I also ask that the aforementioned CBS Report is entered into the report.

[The prepared statement of Richard M. Lewis follows:]

PREPARED STATEMENT OF RICHARD M. LEWIS, SENIOR VICE PRESIDENT, RESEARCH
AND TECHNOLOGY, ZENITH ELECTRONICS CORPORATION

Mr. Chairman, my name is Richard M. Lewis, and I am Senior Vice President for Research and Technology for Zenith Electronics Corporation, a long-time leader in consumer electronics and digital high-definition television (HDTV). I appreciate the opportunity to appear before you today to discuss the nation's transition to digital television (DTV) technology, an issue in which Zenith has a long-standing and continuing interest.

By way of background, Zenith was a founding member of the FCC Advisory Committee on Advanced Television Services in 1987 when we launched our research and development program for high-definition television (HDTV). Zenith proposed one of the original 23 HDTV systems in 1988, and created the first HDTV research consortium in 1989. In 1990, the FCC mandated that the HDTV standard would be based on the "simulcast" approach proposed by Zenith, and one year later we at Zenith completed our initial development work on the vestigial sideband (VSB) digital transmission system. Zenith joined the Digital HDTV Grand Alliance in 1993, in combination with other manufacturers to jointly develop a best-of-the-best digital television system for America, and in 1994, the Grand Alliance chose Zenith's VSB technology as its broadcast and cable transmission system. In 1995, the Advisory Committee recommended the Grand Alliance system to the FCC, and in 1996, the Commission adopted the digital television broadcast standard based on the Grand Alliance system, which includes Zenith's VSB technology. Since then, our company has worked aggressively to help launch HDTV. So, Mr. Chairman, Zenith has a long involvement and expertise regarding the digital television issue.

There are four main points that I wish to make to you today:

1. Nearly four years after the 8-VSB system was approved, the DTV transition is well underway. Consumers, broadcasters and manufacturers have already made significant investments in 8-VSB. Digital TV sales to consumers are growing and customer satisfaction levels are high.

2. Calls for changing the 8-VSB system are absolutely unfounded. The 8-VSB system provides superior coverage of existing analog National Television Systems Committee (NTSC) service areas, presents less interference potential, and utilizes the spectrum efficiently. The FCC made the right choice in selecting this standard, Congress did the right thing in setting a schedule to transition to DTV, and we should stay the course.
 3. Early DTV receivers encountered some multipath interference and indoor reception difficulties. However, these problems were associated with some first-generation receivers, not with the standard, and I am happy to tell you today that these limitations are being remedied.
 4. Any change in the transmission standard at this point would be disastrous for consumers, broadcasters, and consumer electronics manufacturers. A new standard will significantly delay the implementation and provision of DTV services to the public, and jeopardize the return of the analog spectrum by 2006, as mandated by Congress.
- Please permit me to amplify on these points.

THE DIGITAL CONVERSION IS WELL UNDERWAY

The conversion to DTV is progressing and most broadcasters are working to convert to digital broadcasting, pursuant to the schedule set out by Congress and the FCC. The National Association of Broadcasters reports that 147 television stations are currently broadcasting digitally using the 8-VSB standard, covering almost two-thirds of the nation's television households.¹ CBS is broadcasting 12 prime-time hours a week in high definition, while ABC, Fox, NBC and PBS are all offering digital television programming. Cable and direct broadcast satellite program providers such as HBO and Showtime also are initiating new digital programming, including high definition.

Zenith is concerned, however, that the current lack of high-definition programming and other compelling applications will hinder the rapid rollout of digital television. An analysis by the Consumer Electronics Association (CEA) of the potential growth of DTV receiver sales, assuming various levels of HDTV programming content, underscores the need for broadcasters to step up their programming efforts to help spur receiver sales.²

The real success of the DTV transition rests with consumers, and here the news is good. According to CEA, more than 200,000 digital television products have been sold to date, and the number of DTV products sold in 2000 is expected to be more than triple that sold in 1999. Retailers report that consumers are enthusiastic about the improved video and audio quality that DTV delivers, and consumer satisfaction is high among the early purchasers of digital receivers. A recent survey conducted by the National Consumers League shows about three-fourths of DTV owners describe themselves as "very satisfied" with both the picture and the sound quality of their new sets. DTV picture quality received a striking 96 percent overall consumer satisfaction rating. Consumer excitement is certain to build, as more DTV programming becomes available.

These facts indicate that the DTV transition is well underway and the momentum is growing.

THERE IS NO BASIS FOR REOPENING THE DTV STANDARD

Despite the progress that has been made to date, a few parties are pursuing an agenda that would delay and disrupt the timely delivery of DTV to the public. These entities are urging that the DTV standard be modified to permit the inclusion of a COFDM-based modulation scheme. This request, proposed by broadcasters seeking to delay investments in digital and high-definition television, is based primarily on one aspect of the 8-VSB system: its capability to provide adequate over-the-air service using simple indoor antennas in a comparatively small number of urban areas that are subject to strong multipath interference. It is true that some early generation DTV receivers fell short of expectations with regard to reception in strong multipath environments. However, this shortcoming was due to the state of

¹ These include stations in New York, Los Angeles, Boston, Philadelphia and Washington, D.C.

² According to CEA, if broadcasters choose the "fast lane" to DTV and demonstrate 100 percent compliance with the FCC's rollout schedule while providing a high percentage of digitally-originated content to consumers, DTV product penetration could reach 50 percent by 2006. If broadcasters take a "middle of the road" approach and experience continued station conversion delays while providing consumers with a high percentage of up-converted analog content, DTV product penetration will be no more than 30 percent by 2006. Finally, if broadcasters choose the "off ramp" on the road to DTV—characterized by non-HDTV business models and delays related to reopening the DTV standard—DTV product penetration will only be 15 percent by 2006.

technology in some early receivers that were rushed to the marketplace to jumpstart the DTV transition, not to any intrinsic deficiency in the 8-VSB modulation system. I am happy to report to you today that Zenith and other manufacturers have been working diligently to resolve these difficulties, and they are well on their way to being corrected.

It is important to remind ourselves that the 8-VSB transmission standard was chosen over a decade through an open, scientifically rigorous and peer-reviewed process. Extensive laboratory and field testing of various competing systems was conducted before the 8-VSB system was selected, and the analysis included studies of the relative merits of 8-VSB and COFDM. The FCC's exhaustive record on digital television fully documents both the industry's and the FCC's unanimous conclusions to adopt the 8-VSB standard.

Why was the 8-VSB standard chosen? This standard was selected principally because of its ability to replicate the signal coverage of existing NTSC service areas, because it minimizes interference with other signals, and because of its high data-rate capacity.

Since the beginning of DTV, a top priority has been insuring that a DTV station's service area is generally equal to or better than its NTSC service area, thereby allowing digital broadcasting to reach the maximum number of viewers possible. This is a critical factor for the success of the transition. The 8-VSB system was selected in large part because of its superior signal coverage. Indeed, use of COFDM would result in a significant loss of suburban and rural viewers who live on the fringe of a station's NTSC service area.

The conclusion that 8-VSB is superior for purposes of NTSC service replication is well documented by studies conducted at literally thousands of field test sites.³ In a well-documented scientific study, CBS recently conducted extensive DTV reception tests at 128 outdoor and 42 indoor sites within the coverage area of KYW-DT in Philadelphia, Pennsylvania, and concluded that "it is evident that the current ATSC system is replicating the NTSC reception coverages for both indoor and outdoor reception."⁴ Using second and third generation 8-VSB receivers from Zenith, Motorola and NxtWave, CBS found that these receivers could produce a perfect DTV picture 94 percent of the time using indoor antennas when even a marginal NTSC picture was available.⁵ With outdoor antennas, the receivers produced a high-quality DTV picture 99 percent of the time when even a marginal analog picture was viewable.⁶ Noting that the tests demonstrated "a continuous level of improvement" in VSB receiver technology, the CBS study concludes, "8-VSB remains a viable system for providing DTV service and replication of the broadcasters' service area."⁷

A highly experienced and well qualified professional consulting engineer, Jules Cohen, has recently conducted an analysis of real-world parameters comparing ATSC/8-VSB and DVB/COFDM systems in a 6 MHz channel for New York City, a heavily populated area in terms of TV viewers and TV transmitting facilities. This report is attached to my testimony as an appendix.⁸

The study "shows a clear preference for the use of 8-VSB rather than COFDM from an allotment viewpoint" and concludes that:

With identical effective radiated power and antenna height above average terrain, use of COFDM provides less coverage and results in more interference to other stations than 8-VSB. If the COFDM effective radiated power is increased to overcome the reduction of service from that provided by use of 8-VSB, interference is further aggravated, particularly to the analog stations continuing to operate at their assigned power levels. *Consequently, either fewer stations can be accommodated using a specified number of channels, or service areas must be reduced substantially.*⁹

³See OET Report at page 14.

⁴KYW-DT DTV Field Test Report, Walter Sidas, P.E., CBS Engineering, March 28, 2000.

⁵Id.

⁶Id.

⁷Id.

⁸Jules Cohen has more than five decades of experience as a professional consulting engineer in the field of broadcasting. Mr. Cohen has represented the Association for Maximum Service Television (MSTV) in Advanced Television Systems Committee (ATSC) Subcommittees and Technology Groups, served on ATSC's Executive Committee and co-chaired a number of ATSC Technology Groups. Mr. Cohen's clients have included all five of the major television networks, the National Association of Broadcasters, MSTV, the Electronics Industries Association, major broadcast group owners and individual radio and television stations. The depth of Mr. Cohen's knowledge and expertise is further detailed in his professional background statement attached as an appendix to this testimony.

⁹Engineering Statement, Channel Allotment Considerations Comparing the Use of 8-VSB or COFDM, Jules Cohen, P.E., June 9, 2000 at p. 2 (emphasis added).

Using the FCC's own computer calculation technique, coverage calculations for three New York City DTV stations (WNBC-DT, WABC-DT and WPIX-DT) show that COFDM, operating at the same power level as 8-VSB, would result in an average of 656,000 fewer viewers for each of the stations. This result is, of course, contrary to the goal of bringing the benefits of DTV to all Americans, and fails one of the principal objectives of the DTV transition plan.

The 8-VSB system allows broadcasters to replicate their entire NTSC coverage area from a single transmitter site at three-and-a-half times less power than COFDM requires. Increasing COFDM's transmitting power to obtain coverage comparable to that provided by 8-VSB (in order to match existing NTSC service areas) would result in increased interference to existing NTSC services and other DTV services. It would also force broadcasters to incur significantly higher costs for more powerful transmitters and additional electric power.¹⁰

An important advantage of the 8-VSB standard is its ability to minimize co-channel and adjacent channel interference to broadcasters' analog and digital signals. By contrast, a COFDM signal using the same power level as 8-VSB would not only provide less coverage but cause substantial interference with other NTSC and DTV stations. If COFDM power levels were increased to overcome the reduction of service from that provided by use of 8-VSB, the interference problem would only be exacerbated. Therefore, allowing broadcasters to use COFDM transmission would require the creation and adoption of a new DTV Table of Allotments, a formidable task considering the long and arduous process that the FCC went through to finalize the current DTV Table of Allotments. It is highly unlikely that a digital channel assignment plan could be adopted that would accommodate all U.S. broadcasters.

As the Cohen study demonstrates, interference calculations for the same three New York City DTV stations reveal that their use of COFDM would have a significant impact on existing analog and new DTV stations in the Northeast, resulting in the loss of almost 10 million viewers. For example, 1.9 million fewer viewers would be served by the three New York DTV stations using COFDM rather than the FCC-mandated VSB standard. The number of viewers lost for other digital television stations due to COFDM interference would be about 7 million. Significantly, the effect of interference caused by COFDM would adversely affect *analog* TV reception for 986,000 to 1.1 million New York viewers depending on transmission power level.¹¹

But 8-VSB has other advantages compared to COFDM, which is optimized for network architectures used in Europe. COFDM may make sense for a place like the United Kingdom where only six channels providing nationwide video content (not HDTV, by the way) are broadcast using multiple transmitters. By contrast, our television broadcast model in the United States is built around localized content transmitted by many stations (a dozen or so in major metropolitan markets) primarily from single transmitters reaching a wide coverage area. The fact is COFDM makes many trade-offs in terms of coverage area, interference and data rate to achieve its transmission properties, while VSB is optimized for the United States and other countries with similar broadcast models.

In addition to offering broadcasters a greater coverage area, superior interference protection for existing NTSC and new DTV services, and lower costs, the 8-VSB system also provides greater immunity to impulse noise interference (which is essential for VHF transmissions). The 8-VSB system also delivers a higher data-rate capacity than COFDM, an advantage that is important not only for HDTV transmissions but datacasting services as well. The FCC has stated that the 8-VSB system's data rate advantage over COFDM could impact the ability of broadcasters to provide HDTV programming.¹²

Finally, while it is clear that 8-VSB meets the performance goals for which it was designed and selected—service area replication, interference rejection, and maximum data rate—I would note that VSB technology has the flexibility for future enhancements. Recently, some in the broadcast industry have focused attention on the potential portable and mobile applications of DTV technology. If broadcasters and consumers desire such options in the future—options that were not contemplated when the DTV standard was developed and adopted—VSB transmissions can be augmented by employing a mixed data mode of two or more simultaneous transmissions of varying data rates and robustness. Any such extensions to the standard, however, should be pursued in parallel with ongoing 8-VSB receiver improvements so as not to hinder the transition to free over-the-air digital television. In fact, the

¹⁰ See *DTV Report on COFDM and 8-VSB Performance*, FCC/OET 99-2 (dated Sept. 30, 1999) (the "OET Report").

¹¹ *Id.* at Figures 2-7.

¹² OET Report at page 27.

Advanced Television Systems Committee is pursuing this parallel path approach in establishing a formal standards activity related to possible VSB enhancements to meet emerging broadcaster needs, an effort that Zenith is supporting.

SIGNIFICANT PROGRESS IS BEING MADE TO IMPROVE INDOOR RECEPTION

Zenith and other manufacturers acknowledge the inadequate multipath reception performance of some first-generation DTV receivers. These problems are the result of a shortcoming in the first generation of digital receivers, not a flaw in the 8-VSB standard.¹³ Since the introduction of this first generation of receivers, Zenith and other manufacturers have taken aggressive steps to improve indoor reception. Zenith recently demonstrated its third- and fourth-generation demodulator chips, which show dramatic improvement in multipath performance for VSB receivers.

The need for such improvements is typical whenever a complex new technology is implemented for the first time. It took decades for improved NTSC receiver designs to be refined and perfected, whereas DTV receiver refinements are being accomplished in just a few short years. Indeed, Zenith is confident that new generations of chips and receivers will continue to improve indoor reception, and other manufacturers of DTV receivers and chips are making similar progress. A chart detailing the evolution of 8-VSB receiver performance is attached as an appendix to my testimony. This "technology roadmap" illustrates that significant enhancements are being made in each new generation of receivers (already vastly exceeding the multipath performance of analog receivers), and that the issue of indoor reception will soon be limited to only a handful of multipath environments with very poor NTSC reception.¹⁴

CHANGING THE STANDARD WILL DISRUPT AND DELAY THE DIGITAL TRANSITION

The FCC has stated that a single transmission standard will ensure that broadcasters, equipment manufacturers and the public have sufficient confidence and certainty to promote the introduction of DTV service.¹⁵ The DTV standard has been in place for almost four years and the transition to DTV is well underway. Any attempt to change the DTV transmission standard now would result in a multi-year effort, requiring at least the development of a complete COFDM standard, the achievement of an industry consensus on that standard, and extensive laboratory and field testing. This would take years.

Moreover, the FCC has also noted that allowing more than one standard might result in compatibility problems that could cause consumers and licensees to postpone purchasing DTV equipment, thereby leading to significant delay in the implementation and provision of DTV services to the public. Even the main proponent of multiple standards recognizes this delay potential. According to Sinclair Broadcasting, multiple standards "would not only create chaos but would so fragment the market so that no serious business could invest in the tooling to produce multiple standard receivers into such a market."¹⁶ This delay in deployment is not consistent with Congress' intent in having a rapid rollout of DTV services.

Including COFDM in the transmission standard would require the development of a severely modified spectrum use plan, system design and extensive research and testing (both by all affected industries and the FCC) to determine COFDM's interference characteristics and allowable transmission powers. Further study would have to ascertain whether COFDM could support satisfactory service on VHF and lower UHF channels due to impulse noise concerns.¹⁷ Moreover, COFDM's power requirements for equal coverage and associated interference problems would require, as I mentioned earlier, the DTV Table of Allotments to be re-analyzed and revised, with little assurance that every existing broadcaster could be loaned a second channel for the DTV transition.

¹³The OET Report concludes that multipath reception problems identified in early DTV receiver designs are solvable with improved adaptive equalizer performance and that a well-designed 8-VSB receiver should be able to provide satisfactory reception where strong multipath conditions exist. OET Report at page 24.

¹⁴Broadcasters need to do their part as well. Reception is affected adversely when broadcasters transmit signals at less than their full-authorized power, from antennas that are less than their full-authorized height, or with incorrect technical parameters (which can cause "jitter" and other problems).

¹⁵*Fourth Report and Order*, 11 FCC Rcd at 17787-17791 (1996).

¹⁶Nat Ostroff, Vice President, Sinclair Broadcasting Group and Chairman, ALTV Engineering Committee, *A White Paper: Facing the Final "Sign Off," Why We Need a Digital Standard* (formerly available at <<http://www.transmitter.com/DTV/NatOstroff.html>, visited October 8, 1999).

¹⁷OET Report at page 24.

Considering a change in the standard also threatens to freeze the development and deployment of DTV technology by causing uncertainty for manufacturers who must invest tens of millions of dollars in product development and who must be confident that they are designing to a standard that will guarantee a national purchasing base. Few manufacturers, chip designers or information providers would continue to produce digital television products while a new, non-compatible standard was being considered because of the considerable risks associated with this uncertainty.

The mere possibility of a change in the standard already is causing some broadcasters to postpone purchasing DTV equipment for fear that such equipment would be incompatible. Moreover, if the standard were to change, existing DTV transmitters and receivers would need to be modified or could become obsolete, involving serious cost implications.

The confusion fostered by a potential change in the transmission standard is causing consumers to postpone their decisions to purchase DTV receivers, because they do not want to invest in what might soon be an obsolete technology, or because they believe different technologies could soon be available.¹⁸ Moreover, a change in the standard would harm those consumers who already have purchased DTV equipment expecting that their sets would have the capability to receive all existing over-the-air channels, be transportable to other broadcast markets without diminished or complete loss of functionality, and receive over-the-air broadcasts for many years to come.

The lengthy delay inherent in a changed DTV transmission standard would do much more than forestall the introduction of new innovations and services to the public. It would be incompatible also with a key consideration of Congress in awarding additional spectrum to broadcasters—namely, the ability to auction spectrum recovered at the end of the DTV transition. Although the spectrum will not be recovered until broadcasters vacate it at the end of the transition, Congress has mandated that auctions for that spectrum commence this year so that the money raised can be deposited in the nation's treasury. If the end date of the transition is extended (as would be required by a change in the standard), it could detrimentally impact the Federal budget by lowering the value of the spectrum to be auctioned, because bidders would face extreme uncertainty as to when they may be able to utilize the spectrum for their own purposes.

STAY THE COURSE

The 8-VSB standard is achieving the principal goals for which it was selected: superior signal coverage to replicate existing service areas, a high bit-rate capacity, and interference rejection. DTV receivers are improving significantly in their capability to handle multipath interference under the standard. This year, the FCC reaffirmed the 8-VSB standard by rejecting a petition seeking to add a European modulation scheme to the U.S. standard.

Changing the standard would lead to delay in deployment of digital television, impose costs on consumers, delay consumer purchases of DTV equipment, lead to viewers losing their signals, and delay the recovery of the spectrum allocated for the transition (with resulting loss of revenues to be deposited in the Treasury).

Broadcasters in general and manufacturers are working to ensure that the digital television deployment continues without disruption and complies with the timeline set by Congress. Congress needs to ensure that broadcasters continue their progress toward meeting these goals and meeting the demands by consumers for more digital programming. Accordingly, there is no reason to reconsider the transmission standard. To do otherwise would needlessly disrupt the transition and delay the availability of digital television to American viewers.

¹⁸ See *Fourth Report and Order*, 11 FCC Red at 17788.

APPENDIX A

**ENGINEERING STATEMENT
CHANNEL ALLOTMENT CONSIDERATIONS
COMPARING THE USE OF 8-VSB OR COFDM****Introduction**

A study¹ has been made of the impact on digital channel allotments using, alternatively, 8-VSB or COFDM modulation. In addition to comparing the effect on a single primary station, the impact on other cochannel and adjacent channel analog and digital stations was studied also.

In order to provide the analysis under "real world" conditions, three New York City stations and stations potentially affected by those operations were considered. The primary stations studied and their digital assignments are: WNBC-DT, channel 28, WABC-DT, channel 45, and WPIX-DT (WB Network), channel 33. New York City, in the northeastern part of the United States, was chosen because the high density of television stations in that region presents a challenging television allotment problem. In an area already seemingly pressed to the limit, the need to maintain existing analog stations for an indefinite period of time while simultaneously providing for the new digital service required doubling the number of channel allotments with no increase in spectrum usage assigned to the television service.

Summary of Conclusions

The analysis provided in detail herein, based on Brazilian laboratory determinations of white noise threshold and appropriate desired-to-undesired (D/U) ratios for digital-to-digital and digital-to-analog cochannel signals, shows a clear preference for the use of 8-VSB rather than COFDM from an allotment viewpoint. With identical effective radiated power and antenna height above average terrain, use of COFDM provides less coverage and results in more interference to other stations than 8-VSB. If the COFDM effective radiated power is increased to overcome the reduction of service from that provided by use of 8-VSB, interference is further aggravated, particularly to the analog stations continuing to operate at their assigned power levels. Consequently, either fewer stations can

¹ Sponsor of the study was Zenith Electronics Corporation.

be accommodated using a specified number of channels, or service areas must be reduced substantially.

Methodology and Results

To provide the analysis shown herein, use was made of the computer software developed by the United States Federal Communications Commission (FCC) except that the input to the program was modified as appropriate to use the Brazilian developed parameters² for noise-limited coverage and interference. The FCC program uses contour distance calculations employing field strength versus distance data from its own rules, but determines population lost due to interference by the Longley-Rice method, a program that better accounts for terrain irregularities. The Longley-Rice model was developed originally in 1965 by scientists at the National Bureau of Standards (now the National Institute of Standards and Technology) and improved substantially over the years through a number of changes and adaptation to computer use.

As an initial step after input of data defining the study to be made, the program determines what stations, derived from a database including all United States and adjacent foreign station assignments, may be affected. The program then permits the calculation of station-by-station service provided and interference received. Output includes total coverage, coverage limited by terrain, interference from authorized analog stations, additional interference from digital allotments, interference from digital allotments only, and remaining interference-free service.

In accompanying tabulations, results of the computation process are shown. Figure 1 shows the analyses of digital service calculated to be provided by the primary stations WNBC-DT, WABC-DT and WPIX-DT. These stations are assigned channels 28, 45 and 33, respectively. Figures 2 through 7 illustrate the impact of the operation of the primary stations on other cochannel and adjacent channel stations, both analog and digital.

² As measured in the SET/ABERT Final Report on the Comparative Trials of the Digital Television Systems, First Part, February, 2000.

	8-VSB	COFDM
White noise threshold	15 dB	20 dB
D/U limit, Cochannel digital into digital	15 dB	20 dB
D/U limit, Cochannel digital into analog, ITU-R Grade 4	37 dB	40 dB

With respect to analog stations, calculations have been made assuming 8-VSB. COFDM operating at the same effective radiated power as for 8-VSB, and COFDM with the primary station effective radiated power increased by 5 decibels to extend noise-limited coverage to equal that of 8-VSB. Since only the primary station and no other digital operation was assumed to operate at the higher power level, interference to the analog stations is substantially understated since interference is received from more than one digital station.

With respect to digital stations, COFDM power was assumed only at the same level as for 8-VSB. To do otherwise would have required extensive changes in the station database. In producing this limited, illustrative study, such changes did not appear to be justified.

In the analog station analyses, noise-limited coverage (NLC) is determined solely by the operating parameters of the analog station and terrain, so it remains the same no matter what digital modulation method may be used. In many instances, additional service lost due to interference from digital sources does not change when the primary digital station power is increased. The reason for this is that stations other than the primary station are determining the extent of digital interference and those other station powers have not been increased in this study. For a determination of the total magnitude of service lost through use of COFDM with greater power to match the NLC achievable with 8-VSB at less power, the study would have to be extended by modifying the power of all digital stations in the database.

Impact on Broadcast Television Service

Impact of the use of COFDM rather than 8-VSB can be summarized by data extracted from the accompanying tabulations. If digital operations employed COFDM modulation rather than 8-VSB, and the same effective radiated power is assumed for both systems, the additional population losses to analog cochannel and first adjacent channel operations potentially affected by WNBC-DT, WABC-DT and WPIX-DT would be 515,338, 264,059 and 206,708, respectively. In order to achieve COFDM noise-limited coverage comparable to that achievable with 8-VSB, effective radiated power of the three digital operations would have to be increased 5 decibels (3.16 times). The consequence of raising the power at only the single New York station in each instance would result in cochannel and adjacent channel analog stations losing the following populations beyond the impact of the use of 8-VSB: 580,387, 298,373 and 258,214, respectively. If all assigned digital

operations increased power by 5 decibels over their 8-VSB assignments, the foregoing population losses would be increased substantially.

The effect of the use of COFDM rather than 8-VSB, and at the same effective radiated power level to minimize analog population losses, would substantially decrease the noise-limited coverage of digital operations as well. Considering New York stations WNBC-DT, WABC-DT and WPIX-DT, and cochannel and first adjacent channel digital assignments potentially affected by those three operations, lost populations would be: 1,372,025, 2,928,437 and 2,655,674, respectively.



Jules Cohen, P.E.

June 9, 2000

Figure 1

ANALYSIS OF PRIMARY STATION SERVICE				
	NLC Not Affected by Terrain Losses	Lost to Additional Interference by DTV	Total Losses	Population Served
WNBC-DT, New York, NY (28)				
8-VSB	18,362,207	67,594	235,061	18,127,146
COFDM	17,601,946	36,020	111,228	17,490,718
WABC-DT, New York, NY (45)				
8-VSB	17,927,226	77,437	121,685	17,805,541
COFDM	17,207,332	35,580	53,673	17,153,659
WPIX-DT, New York, NY (33)				
8-VSB	18,010,853	378,608	428,400	17,582,453
COFDM	17,226,212	315,944	326,127	16,900,085

Figure 2

COCHANNEL AND FIRST ADJACENT ANALOG STATIONS POTENTIALLY AFFECTED BY WNBC-DT			
	NLC Not Affected by Terrain Losses	Lost to Additional Interference by DTV	% Loss
WLWC, New Bedford, MA (28)			
8-VSB	4,069,265	40,511	1.0
COFDM	4,069,265	47,317	1.2
COFDM + 5dB	4,069,265	52,815	1.3
WUNI, Worcester, MA (27)			
8-VSB	6,325,925	753	0.0
COFDM	6,325,925	2,205	0.0
COFDM + 5dB	6,325,925	2,205	0.0
WCPB, Salisbury, MD (28)			
8-VSB	341,047	0	0.0
COFDM	341,047	0	0.0
COFDM + 5dB	341,047	1,156	0.3
WHTM-TV, Harrisburg, PA (27)			
8-VSB	1,654,074	210,958	12.8
COFDM	1,654,074	273,263	16.5
COFDM + 5dB	1,654,074	273,263	16.5
WTXF, Philadelphia, PA (29)			
8-VSB	7,561,033	884,376	11.7
COFDM	7,561,033	1,013,559	13.4
COFDM + 5dB	7,561,033	1,024,485	13.5
WBRE-TV, Wilkes-Barre, PA (28)			
8-VSB	1,620,810	32,857	2.0
COFDM	1,620,810	347,887	21.5
COFDM + 5dB	1,620,810	393,869	24.3
WVER, Rutland, VT (28)			
8-VSB	239,430	11	0.0
COFDM	239,430	773	0.3
COFDM + 5dB	239,430	2,060	0.9

Figure 3

COCHANNEL AND FIRST ADJACENT DTV STATIONS POTENTIALLY AFFECTED BY WNBC-DT				
	NLC Not Affected by Terrain Losses	Lost to Additional Interference by DTV	Total Losses	Population Served
WFPT-DT, Frederick, MD (28)				
8-VSB	3,256,531	959,841	1,339,131	1,917,400
COFDM	2,453,207	488,225	735,647	1,717,560
WUNI-DT, Worcester, MA (29)				
8-VSB	6,643,130	941,084	1,037,303	5,605,827
COFDM	6,025,970	895,549	899,816	5,126,154
WGTW-DT, Burlington, NJ (27)				
8-VSB	6,776,515	54,442	284,711	6,491,804
COFDM	6,351,215	35,154	102,934	6,248,281
WTBY-DT, Poughkeepsie, NY (27)				
8-VSB	3,446,810	760,604	1,362,023	2,084,787
COFDM	2,100,793	272,526	464,995	1,635,798

Figure 4

COCHANNEL AND FIRST ADJACENT ANALOG STATIONS POTENTIALLY AFFECTED BY WABC-DT			
	NLC Not Affected by Terrain Losses	Lost to Additional Interference by DTV	% Loss
WGBX-TV, Boston, MA (44)			
8-VSB	5,793,125	412,147	7.1
COFDM	5,793,125	572,299	9.9
COFDM + 5 dB	5,793,125	572,299	9.9
WHRC, Norwell, MA (46)			
8-VSB	2,532,892	354,715	14.0
COFDM	2,532,892	427,281	16.9
COFDM + 5 dB	2,532,892	427,281	16.9
WBFF, Baltimore, MD (45)			
8-VSB	5,808,747	157,511	2.7
COFDM	5,808,747	163,911	2.8
COFDM + 5 dB	5,808,747	193,879	3.3
WSKG-TV, Binghamton, NY (46)			
8-VSB	445,730	491	0.1
COFDM	445,730	1,312	0.3
COFDM + 5 dB	445,730	1,312	0.3
WMHQ, Schenectady, NY (45)			
8-VSB	1,072,931	20,992	2.0
COFDM	1,072,931	26,202	2.4
COFDM + 5 dB	1,072,931	30,548	2.8
WWIA-TV, Scranton, PA (44)			
8-VSB	1,069,341	111,421	10.4
COFDM	1,069,341	130,331	12.2
COFDM + 5 dB	1,069,341	130,331	12.2

Figure 5

COCHANNEL AND FIRST ADJACENT DTV STATIONS POTENTIALLY AFFECTED BY WABC-DT				
	NLC Not Affected by Terrain Losses	Lost to Additional Interference by DTV	Total Losses	Population Served
WEDN-DT, Norwich, CT (45)				
8-VSB	1,906,431	710,039	895,093	1,011,338
COFDM	1,344,157	419,574	562,023	782,134
WBFF-DT, Baltimore, MD (46)				
8-VSB	6,072,848	149,865	154,240	5,918,608
COFDM	5,405,045	73,717	75,655	5,329,390
WNYW-DT, New York, NY (44)				
8-VSB	18,312,706	246,222	342,877	17,969,829
COFDM	17,573,977	56,024	100,096	17,473,881
WNYS-DT, Syracuse, NY (44)				
8-VSB	1,088,472	2,068	14,013	1,074,459
COFDM	979,979	38	3,282	976,697
WFMZ-DT, Allentown, PA (46)				
8-VSB	4,521,750	86,561	182,003	4,339,747
COFDM	2,984,098	35,046	160,656	2,823,442

Figure 6

COCHANNEL AND FIRST ADJACENT ANALOG STATIONS POTENTIALLY AFFECTED BY WPIX-DT			
	NLC Not Affected by Terrain Losses	Lost to Additional Interference by DTV	% Loss
WHMM, Washington, DC (32)			
8-VSB	5,832,825	185,349	3.2
COFDM	5,832,825	344,831	5.9
COFDM + 5dB	5,832,825	344,831	5.9
WMGC-TV, Binghamton, NY (34)			
8-VSB	478,466	3,647	0.8
COFDM	478,466	6,617	1.4
COFDM + 5dB	478,466	6,617	1.4
WXFV, Utica, NY (33)			
8-VSB	625,252	102,472	16.4
COFDM	625,252	113,415	18.1
COFDM + 5dB	625,252	113,415	18.1
WITF-TV, Harrisburg, PA (33)			
8-VSB	1,793,766	62,439	3.5
COFDM	1,793,766	93,946	5.2
COFDM + 5dB	1,793,766	145,454	8.1
WETK, Burlington, VT (33)			
8-VSB	415,590	2,130	0.5
COFDM	415,590	3,934	0.9
COFDM + 5dB	415,590	3,934	0.9

Figure 7

COCHANNEL AND FIRST ADJACENT DTV STATIONS POTENTIALLY AFFECTED BY WPIX-DT				
	NLC Not Affected by Terrain Losses	Lost to Additional Interference by DT	Total Losses	Population Served
WFSB-DT, Hartford, CT (33)				
8-VSB	3,997,520	732,944	748,400	3,249,120
COFDM	3,649,550	647,825	657,302	2,992,248
WEDH-DT, Hartford, CT (32)				
8-VSB	3,146,832	161,683	161,683	2,985,149
COFDM	2,738,612	70,415	70,415	2,668,197
WTWS-DT, New London, CT (34)				
8-VSB	3,312,668	889,203	892,839	2,419,829
COFDM	2,627,077	791,834	792,132	1,834,945
WHMM-DT, Washington, DC (33)				
8-VSB	5,838,719	207,708	290,256	5,548,463
COFDM	5,447,409	127,899	151,613	5,295,796
WNBU-DT, Concord, NH (33)				
8-VSB	1,965,400	42,858	52,865	1,912,535
COFDM	1,592,281	27,249	39,770	1,552,511
WMHT-DT, Schenectady, NY (34)				
8-VSB	1,223,984	2,024	31,045	1,192,939
COFDM	1,127,939	3,467	10,329	1,117,610
WYBE-DT, Philadelphia, PA (34)				
8-VSB	5,743,894	91,730	98,162	5,645,732
COFDM	5,431,610	110,514	113,947	5,317,663
WPSG-DT, Philadelphia, PA (32)				
8-VSB	6,528,380	129,842	159,267	6,369,113
COFDM	6,009,553	20,476	25,073	5,984,480
WSWB-DT, Scranton, PA (32)				
8-VSB	797,433	26,933	31,808	765,625
COFDM	734,752	18,658	26,214	708,538
WETK-DT, Burlington, VT (32)				
8-VSB	446,510	105	528	445,982
COFDM	407,556	731	731	406,825

APPENDIX B

PROFESSIONAL BACKGROUND OF JULES COHEN

Jules Cohen received the degree of Bachelor of Science in Electrical Engineering from the University of Washington (Seattle) in 1938. His first professional experience was with consulting engineering firms in the city of Seattle, then with the Bonneville Power Administration, a division of the U.S. Department of Interior, where he served as a junior engineer and assistant engineer in the substation design section. He was commissioned in the Navy in May of 1942 and served for three and one-half years as a naval officer during World War II. His duties included training at Harvard, at MIT and at the Naval Air Technical Training Center in Corpus Christi. He was a project officer on radar beacons at the Radiation Laboratory at MIT, then at the Bureau of Ships. Under the Commander, Service Forces, Pacific Fleet, he was in responsible charge of the radar beacon program for the Pacific Fleet. His last duty station in the Navy was as Executive Officer of the Electronics Division, Commander, Service Forces, Pacific Fleet.

Following release from the Navy, he entered the field of consulting engineering and has been so engaged for 54 years. During 46 of those 54 years, he has been either a sole principal, a partner, or an officer in a consulting engineering firm. He has been licensed to practice as a professional engineer in the District of Columbia since June of 1952, and has been licensed to practice in the field of electrical engineering as a certified professional engineer in the Commonwealth of Virginia since June of 1954. During the period of his professional practice, he has provided professional engineering services in the field of broadcasting, in particular, and communications, in general. On January 1, 1988, he retired from the presidency of Jules Cohen & Associates, P.C., but has continued providing professional consulting service to selected clients.

Over 10,000 projects of varying levels of complexity have been carried out by the engineering firm of which he was either sole member, partner or officer. Work performed has included radio-frequency propagation studies, interference studies, frequency allocation surveys, radiation hazard evaluations, standard broadcast directional antenna design and adjustment, AM, FM and TV field strength measurements, television picture quality assessment, satellite earth station studies, the planning and placement of cellular and other communications structures, studio and transmitter plant layouts for both radio and television, equipment evaluation, and extensive work involving the engineering aspects of changes in the rules of the Federal Communications Commission (FCC).

He was the author of Appendix C of the 1975 Cable Television Advisory Committee Panel II report to the FCC. That Appendix dealt with the problem of echoes in television systems. He is also the author of the section on low power television in the 1986 edition of the McGraw-Hill Encyclopedia of Science and Technology. He was a co-author of Section 2.9, Human Exposure to RF Radiation in the Eighth Edition of the National Association of Broadcasters Engineering Handbook. As chairman of the engineering committee concerned with interference to television broadcasting from noncommercial FM stations, he played a major role in the development of the rules adopted by the FCC governing the assignment of FM stations in the frequency band from 88.1 to 91.9 MHz. He represented television broadcast interests as co-chairman of the Technical Analysis Working Group of the Land Mobile Radio/UHF Television Technical Advisory Committee.

From the time of its inception in 1983 to 1996, Jules Cohen represented the Association for Maximum Service Television, Inc. (MSTV) in Subcommittees and Technology Groups of the Advanced Television Systems Committee (ATSC). From 1996 to September, 1998, he represented the IEEE Broadcast Technology Society on the Executive Committee of the ATSC. He has participated as a member, co-chairman or vice chairman of a number of ATSC Technical Groups. As stated in its Charter, the purpose of ATSC "[I]s to explore the need for and, where appropriate, to coordinate development of voluntary national technical standards for Advanced Television Systems."

His participation in the work of the Advisory Committee on Advanced Television Service (ACATS) began in November, 1987, the starting date set by the Federal Communications Commission, and continued until the completion of the Advisory Committee's work in November, 1995. He was a member of Working Parties 1 and 2 of the Systems Subcommittee (SS/WP-1 and 2), and Working Parties 3, 4 and 6 of the Planning Subcommittee (PS/WP-3, 4 and 6). Under SS/WP-2, he chaired the Field Testing Task Force. That Task Force completed field testing of the Grand Alliance Digital Television System in October, 1995. Mr.

Cohen had a major role in preparing both the specifications for the field testing and preparation of the report following field testing. Under PS/WP-3, he chaired the Spectrum Analysis Working Group.

Clients have included all five of the major television networks (ABC, CBS, NBC, Fox and PBS), the National Association of Broadcasters (NAB), the Association for Maximum Service Television, the Electronic Industries Association, major group owners, individual radio and television stations, and Cellular System and Personal Communications System providers. He has also provided professional engineering services to community and citizen groups relative to the placement of broadcast or wireless communications facilities.

For more than twenty years, he has worked extensively in the field of nonionizing radiation effects. He has done research in the scientific literature devoted to the subject, participated in the Bioelectromagnetics Society Symposia held yearly from 1979 through 1995, as well as 1998 and 1999, completed courses in Hazardous Electromagnetic Radiation offered by the George Washington University, the Management of Electromagnetic Energy Hazards offered by Cook College, Rutgers University, and Electric and Magnetic Field Health Research: Assessing the Science, offered by the Harvard School of Public Health, attended meetings of the Electromagnetic Radiation Management Advisory Council, participated in Michaelson Research Conferences in 1994, 1995, 1997, 1998 and 1999, moderated panels on the Biological Effects of Nonionizing Radiation at the 1979, 1983 and 1988 annual conventions of the NAB, delivered invited papers on the Biological Effects of Nonionizing Radiation in the 1979, 1984 and 1993 meetings of the Broadcast Technology Society of the Institute of Electrical and Electronics Engineers, and, by invitation, provided a critique of the first and second 1979 drafts and the 1985 draft of a RF/Microwave Criteria document of the National Institute for Occupational Safety and Health.

He was a member of American National Standards Institute (ANSI) Committee C95 that developed the 1982 ANSI Standard C95.1-1982 Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 300 kHz to 100 GHz. He is a member of IEEE Standards Coordinating Committee 28 (SCC 28) and Subcommittee IV which completed a revision to ANSI Standard C95.1-1982 (now identified as IEEE C95.1-1991 or ANSI/IEEE C95.1-1992). Subcommittee IV is continuing evaluation of scientific literature for a possible further updating of the standard. He is a member of SCC 28 Subcommittee I that developed IEEE Standard C95.3-1991, IEEE Recommended Practice for the Measurement of Potentially Hazardous Electromagnetic Fields - RF and Microwave. He is a member of the IEEE Committee on Man and Radiation (COMAR). He is also a member of Committee 89-2 of the National Council on Radiation Protection and Measurements (NCRP). Committee 89-2 has prepared NCRP Report No. 119, A Practical Guide to the Determinations of Human Exposure to Radiofrequency Fields. Under contract to the National Association of Broadcasters, he prepared a suggested revision to FCC OST Bulletin No. 65, taking into account the ANSI/IEEE 1992 exposure guide.

He has made RF exposure measurements at both the World Trade Center and Empire State Building in New York City. Over the past twenty years, he has also made RF exposure measurements at numerous locations on behalf of broadcast station licensees, cell phone operators and municipalities.

He has been qualified as an expert witness in Federal court, other courts, local boards and councils, and in hearings before the FCC and FAA. Most recently, his expert testimony was accepted in the United States District Court for the Southern District of Florida in the matter of CBS, Inc. *et al v. PrimeTime 24 Joint Venture*, C.A. No. 96-3650-CIV-Nesbitt.

He is a member of Tau Beta Pi, engineering scholastic honorary, a member of the National Society of Professional Engineers, a Life Fellow of the Institute of Electrical and Electronics Engineers (IEEE), a Life Fellow of the Society of Motion Picture and Television Engineers, a charter member of the Bioelectromagnetics Society, a past president of the Association of Federal Communications Consulting Engineers and former chairman of that association's Radiation Hazard Subcommittee. He was selected for the 1988 NAB Engineering Achievement Award, a 1990 Achievement Award of the Broadcast Pioneers Washington, D.C. chapter and a 1999 award from the IEEE Broadcast Technology Society for a lifetime of service to the broadcasting industry and to the Society. During the year 2000 convention of the NAB, he received a further award from the NAB engineers for his over fifty years of service to the broadcast community and a Pioneers award from the Broadcasters' Foundation.

APPENDIX C



8 VSB Product Evolution

Model Year	1998	1999	2000	2001	2002
Generation	1st	2nd	3rd	4th	5th
Configuration	3 chip set - Analog demodulator - Sync/Equalizer (EQ) - Error correction (EC)	2 Chip set - Analog demodulator - Sync/EQ/EC	2 Chip set - Analog demodulator - Sync/EQ/EC	- Single chip - Digital demodulator/Sync EQ/EC	- Single chip - Digital demodulator/Sync EQ/EC
Features	First integrated circuit version	Reduced Power & Cost	Longer & Faster Ghosts	Stronger, Faster & Very Short Ghosts	Stronger, Faster & Pre-Ghosts
Labeling Technology	Parallel Tap Update	Smaller IC Geometry	Predictive Slice	Digital Demodulator Improved Sync	Advanced equalization
Performance	20 μ s 3 μ s 70% 5 Hz	20 μ s 3 μ s 70% 5 Hz	44 μ s 3 μ s 80% 8 Hz	44 μ s 20 μ s 90% 12 Hz	44 μ s 25 μ s 95% 20 Hz

Mr. TAUZIN. Without objection. It is so ordered.

Mr. TAUZIN. We will now recognize Mr. Matt Miller, president and CEO of NxtWave Communications in Langhorne, Pennsylvania. Mr. Miller.

STATEMENT OF MATT MILLER

Mr. MATT MILLER. Good morning, Mr. Chairman and distinguished members of this committee. I am Matt Miller. I am the president and CEO of NxtWave Communications. Thank you for this opportunity to address the technical issues and challenges facing digital television.

NxtWave's primary business is designing and selling the chips for digital TV sets that decode the digital signals. Our first chip, the NXT 2000, decodes both the digital cable transmissions, QAM and the digital over-the-air transmissions, 8-VSB. In my written testimony, I have included data that show the improved performance of our second generation chip, the NXT 2002, which will be available by the end of this year. This chip is designed for indoor as well as outdoor over-the-air reception, and it also decodes digital cable signals. We are also introducing a COFDM chip for the European DVB markets. So from a technical perspective, we understand in great depth the pros and cons of both the COFDM and the VSB standards being discussed in this country.

I am happy to have had the opportunity to show you our indoor reception here in this room this morning using our first generation product. We think it is very good. And our second generation chip is going to be even better. In our industry, we typically leapfrog ourselves once a year. PCs, modems, microprocessors, VSB modulators. It is important to understand that the demonstration you saw earlier was based on a standard which was established in 1996, which took nearly 10 years to development and a chip that NxtWave began working on 2½ years ago. That chip will be in consumer products this year, 2000. That is how long it takes to create a standard and initiate production.

So what I want to emphasize today is with our testimony and with our deployment, rollout time is the enemy. The standards we have works and any radical change we introduce will simply bring in unacceptable delay. We have heard much testimony here, a consumer market is emerging. There are many signals on air. DTV broadcast signals already reach 60 percent of American households. Manufacturers have introduced more than 100 different DTV products from fully integrated HDTV receivers and high resolution monitors and digital set top boxes. Prices for consumer equipment have decreased by up to 50 percent this year and will continue to fall. And critical agreements have been reached between cable and consumer electronics industry paving the way toward seamless operability between broadcast DTV and cable systems.

The current standard works. Staying with the current standard allows the U.S. to meet its digital service expectations years ahead of any alternative path to deployment. After a decade of thorough and technically rigorous research, the FCC chose 8-VSB modulation because of its superior power efficiency, large coverage area, resistance to noise and interference present in the U.S. broadcast environment.

Concerns regarding its capabilities are misguided and do not warrant reopening the decade-long standard setting process. Earlier this year, the Commission unanimously rejected a petition to permit the use of a second noncompatible DTV transmission standard. The FCC correctly found that indoor reception difficulties to date reflected deficiencies in early generation DTV receiver technology, not the standard itself. This is a critical distinction. Recent field tests conducted by CBS, the FCC and others have shown that these technical issues have been largely resolved. The natural evolution of technology and chip development in a hotly competitive market will resolve any remaining reception issues. Already, manufacturers have introduced new technology; it improves DTV receivers, indoor reception performance to exceed that of analog TV, and improvements will continue.

To revisit the standard at this late stage is not only unnecessary, it would introduce a minimum of 2 years of delay to develop, test, debate, negotiate review and approve an alternative standard, then design the chips and build the products for the marketplace.

The standard can accommodate future consumer needs and service innovations. It was designed to enable broadcasters to introduce the highest quality over-the-air broadcast digital television, but the standard was designed to be flexible. It can accommodate multiple channels of standard definition television, enhance digital interactive services and ancillary data casting services without causing loss of analog services to consumers during the analog digital transition.

To the extent that the broadcasters' needs change and they wish to provide portable and/or mobile applications and are permitted to do so, the DTV standard can be modified to accommodate these services in a compatible way. These capabilities have not been fully developed and exploited, not because the technology can't provide them, but because only recently were the applications suggested.

More high definition television programming is needed to accelerate this transition. Most of the programming transmitted on the digital channel is just up-converted from analog. As a result the digital picture isn't any better than the original analog. The consumer experience has been far less compelling and attractive than it could be. The dearth of free over-the-air HDTV programming is perhaps the greatest threat to the DTV transition. It threatens to dampen consumer interest and investment in DTV, slow DTV equipment and penetration, and delay the reclamation of broadcasters analog spectrum.

Some may think I am biased in favor of the current standard. I am, because I understand its capabilities and what they can mean for bringing new and better services to the American public in both urban and rural areas. I also have a bias for action. I want to ensure that the U.S. remains the world leader in the industry we created and have nurtured for over a half a century. Pausing now for years while we debate the intricacies of this or that standard is fiddling while Rome burns. The standard is fine. It does the job and will accommodate future requirements. Let's get on with it. Thank you, Mr. Chairman. I would be pleased to answer any question you or other members of the subcommittee may have.

[The prepared statement of Matt Miller follows:]

PREPARED STATEMENT OF MATT MILLER, CHAIRMAN AND CHIEF EXECUTIVE OFFICER,
NXTWAVE COMMUNICATIONS

Good Morning, Chairman Tauzin and distinguished Members of the Subcommittee. I am Matt Miller, President and CEO of NxtWave Communications. Thank you for this opportunity to address the technical issues and challenges facing the digital television industry.

NxtWave Communications, Inc.

NxtWave originated as a spin-off from the Sarnoff Corporation in 1996. We exist for a single reason: to create chips that enable the best possible reception of digital television signals. Our first chip, the NXT2000, decodes both digital cable (QAM) signals and digital over-the-air broadcast (ATSC) signals. We also are introducing a COFDM chip for the European DVB markets, so from a technical perspective we understand in great depth the standards issues being discussed in this country.

Change is Never Easy

We are at the beginning of a new era in television broadcasting—the conversion from analog to digital. This transition brings with it enormous opportunities for better and new services for America's consumers. Broadcasters, programmers, equipment manufacturers, advertisers, and many others will share in creating and providing these services.

But change is never easy. When one heads in a new direction of this magnitude, there always are questions, debates, and sometimes disagreements.

A Single Standard for DTV is Essential

First, let's be very honest about one thing: both DVB, which is based in COFDM technology, and ATSC, which is based in VSB technology, are fully suitable standards for excellent over-the-air reception. Each has different strengths and weaknesses, and engineers can and do argue about which is better for what applications.

To bring the benefits of digital technology to the American public, however, I submit that first and foremost, the most important aspect is to have a single standard that works everywhere. The same TV set that works in Louisiana should work in Massachusetts, and it should receive every digital broadcast station.

In the United States, our digital standard was developed by a united effort. In 1997, after a decade of thorough technical research, design, and prototypes the FCC adopted the DTV standard unanimously recommended by industry. The industry chose 8-VSB modulation after considering all alternatives because of its superior power efficiency, reach to the extremities of our large service areas including rural areas, resistance to the noise and interference present in the U.S. broadcast environment, and its ability to fit in with existing analog signals without impairing their reception during the transition period.

Earlier this year, the Federal Communications Commission correctly reaffirmed its decision by unanimously rejecting a petition to consider adding a European standard based on COFDM technology as an alternative.

Time is the Enemy, Not the Standard

The current DTV standard is the best path to a quick transition to digital broadcasting. The 8-VSB DTV standard allows the U.S. to meet its digital television service requirements sooner and at lower cost than other alternatives. Considering changes to the standard without compelling technical reasons will confuse the marketplace, delay the transition, and prevent timely recovery of the analog spectrum.

The risk and cost of delay greatly exceed the risk and cost of continuing to deploy the DTV standard that we have. The fact is that it will take at least two to four years to develop, test, debate, negotiate, review and approve any alternative broadcast standard. Then, either interference studies with analog and the current 8-VSB signals would have to be conducted and a completely new Table of Channel Allotments constructed, or digital broadcast service areas would have to be made smaller than the analog service areas to prevent destructive interference. This would impair reception especially by rural consumers who could be left without digital reception and all the new services enabled by digital technology.

Those advocating an alternative standard ignore the reality of the lengthy deliberative process necessary to adopt a standard and the technical complexity of having analog NTSC, digital 8-VSB, and digital COFDM signals all having to share the limited number of channels. With just two standards it took two years to figure out acceptable allotments so that consumers would not lose over-the-air service.

Specifically, the most recent comparative tests between the U.S. DTV standard and that of Europe confirmed previous findings that a significant (3-5 dB) difference exists with regard to the signal strength needed to receive the signal. This increase

in power needed for COFDM to equal VSB coverage would create additional interference not heretofore contemplated unless either (1) broadcasters agree to keep their maximum peak powers at previous levels, in which case signals to suburban and rural areas will fall off before the stations' NTSC signals; or (2) stations are required to tolerate the increased interference from other stations, which also would impair reception. Neither of these scenarios augurs well for a rapid and successful transition to digital television.

So, what would be the benefit of two digital standards, or of replacing one with another? If a standard was inadequate to enable reception, that would be one thing. But the best engineers have conclusively determined that the VSB standard is different from COFDM in a critical area: it is fully capable of delivering superior reception at greater distance. Thus the selection of VSB for the U.S., where our service areas are extremely large and where we value bringing all communications services to distant rural areas. Indeed, we currently use VHF channels 2-13 in particular to cover rural areas, and VSB has clear advantages due to the noise and other interference on these channels. Rural areas tend to rely more on over-the-air TV signals because typically they have less coverage by cable.

The VSB standard also minimizes interference with the analog NTSC signals that remain during the transition period. It was a fundamental precept that the new digital signals not interfere with existing analog signals during the transition so that consumers would not be harmed.

Concerns About Reception Are Misplaced

In 1998, NxtWave's engineers understood that reception of ATSC-compliant signals was not meeting its theoretical limits. We analyzed the reasons for this, specifically analyzing whether something intrinsic to the standard itself was the cause, or whether there were basic problems with implementing the standard in transmitters and receivers. We concluded that the standard itself is sound and fully capable of delivering the service intended.

NxtWave's analysis of the first receiver designs and decoder chips concluded that they did not deal adequately with actual over-the-air signal reception in some situations, including certain multipath environments. But equally as important, NxtWave's analysis found that reception IS enabled by the DTV standard; receiver implementation, not the standard itself, required improvement. Our conclusion was, and continues to be, that the ATSC DTV Standard provides a robust signal that is readily viewable with appropriate decoding and has specific advantages for the U.S. market.

Beginning in 1998, NxtWave devoted significant resources to developing better demodulation chip designs to meet what it perceived would be consumer demand for better over-the-air reception than provided by early consumer equipment implementations. Our first chip, the NXT2000 announced in August 1999, exceeded the performance of previous ones in the market. Based upon experience with our first chip, we are finishing our design improvements for our second chip, which is scheduled to be available by the end of the year. Like other chipmakers in this very competitive field, we are racing to produce future generations of chips in order to ensure that consumers achieve flawless reception that replicates the theoretical coverage of the standard.

Changed Service Demands Also Can Be Accommodated Without Impairing the Standard

Recently I have participated in meetings at the ATSC to address the capabilities and reception issues associated with the DTV standard. In addition, I have had numerous discussions with all sectors of the affected industries, including broadcasters. From this, I have concluded that some broadcasters are seriously considering business models that contain new services, such as datacasting, intended to reach portable, and even mobile, receivers. NxtWave is fully prepared to work with interested parties and devote its substantial expertise to enabling these applications by using the most efficient methods that are backward compatible with the current DTV standard if broadcasters intend and are permitted and act to provide such services.

When the ATSC standard was adopted in 1996, broadcasters unanimously supported it and expressed no desire to implement a multi-tiered service. Instead, a fixed standard that maximizes data rate was chosen.

More recently, broadcasters appear to be focusing more on data for portable and even mobile uses, at the expense of transmitting full high definition programming. The DTV standard can support flexible insertion of encoded auxiliary data packets to be received with-portable devices without disrupting the existing installed base of consumer receivers. NxtWave engineers have developed a two-tiered ATSC-com-

pliant extension that multiplexes robust data packets with standard packets so that there is no effect on existing transmitters and receivers. A two-tiered service is possible with reception at signal levels well below those attainable with the DVB-T standard, for example. We gave more detail on this in our comments submitted to the FCC in their DTV biennial review proceeding.¹

NxtWave is a technology enabler. The DTV standard was not designed for some of the applications now being envisaged—not because doing so was impossible, but rather, at the time broadcasters and other stakeholders were not interested in such applications. At that time, the consensus was to emphasize maximum capacity (data rate) and efficient coverage. If such services are permissible and broadcasters want to provide them, the current standard is capable of supporting them.

Improved Performance is Reality

To be honest, DTV reception today works in places where my cellphone fails and analog TV reception is far from ideal, including this room. But there remains substantial headroom for future improvements to the standard even yet.

Our NXT2000 high-speed demodulator chip was introduced in August 1999 for Digital Television (DTV) broadcast and cable receivers. It enables reliable reception of DTV broadcast of digital signals compliant with the standard. Digital signals on cable systems also can be demodulated using the same chip, thereby enabling compatibility. The NXT2000 uses advanced equalization, synchronization, and error correction techniques newly designed in 1998.

Our second-generation demodulator chip will be available in the fourth quarter of 2000. This chip will significantly advance reception capabilities in severely distorted, time-varying propagation conditions. These performance improvements, due to advances in channel equalization, will improve indoor and portable reception even more. Studying reception of the multiple broadcast signals that became available with the roll-out of digital signals starting in November 1998 has greatly facilitated analyses of reception conditions.²

Figure 1 demonstrates our improved performance and compares our performance to COFDM chips. It includes performance curves for four systems: the current generation ATSC-professional unit, the NxtWave second-generation chip, and both the 2K and the 8K COFDM modes compliant with the European DVB-T standard.

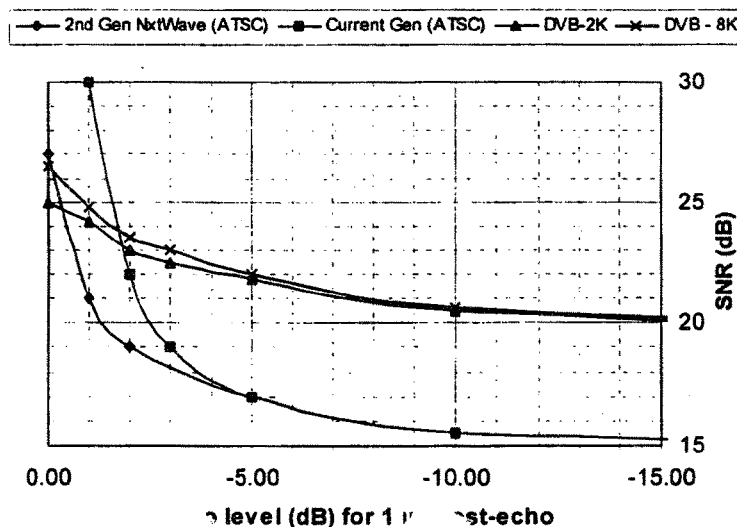


Figure 1: These curves show the Carrier-to-Noise Ratio ("CNR") required to reach Threshold of Visibility ("TOV") for four systems with a single echo at +1 usec. DVB-T and ATSC data is from Brazil laboratory measurements. NxtWave second-generation chip data is obtained using sampled RF data that is passed into a computer model of the chip.

¹ See Comments of NxtWave Communications in MM Docket No. 00-39 (May 17, 2000).

² The NXT2000 was developed prior to the availability of off-air DTV signals.

Figure 1 also demonstrates that the ATSC system operates with low signal levels at which COFDM reception fails.

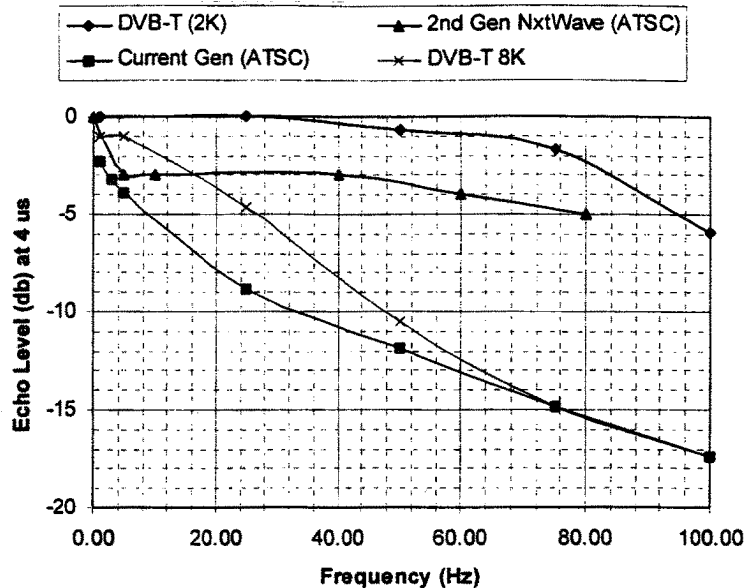


Figure 2: These curves show performance of four systems when a single echo at +4 usec suffers a doppler frequency offset. DVB-T and ATSC data is from Brazil laboratory measurements. NxtWave second-generation chip data is obtained using sampled RF data that is passed into a computer model of the chip.

The NxtWave second-generation chip also will out-perform the current generation ATSC receiver in all relevant aspects. The results depicted in these two figures above demonstrate that the NxtWave second-generation chip will enable ATSC-compliant reception by portable devices such as laptops and hand-held communicators.

To accomplish the superior 8-VSB performance in Figures 1 and 2 and maintain cost-effective chip implementation, NxtWave engineers collected and analyzed numerous data records from over-the-air DTV broadcasts. The chip architecture and hardware implementation of the NXT2000 are modified in the NxtWave second-generation chip for substantially improved indoor reception. NxtWave engineers also have developed, and continue to develop, advanced architectures and algorithms that will be economically feasible. This trend is analogous to the 5-year-old, 300-baud modem that has evolved into today's 56-kilobaud standard, as predicted by Moore's Law. NxtWave's future generations of demodulators will use more sophisticated and accurate signal processing solutions. This will provide consumers with nearly-unbreakable ATSC reception, while maintaining full backward compatibility with all existing digital receivers.

Our results have been validated repeatedly in the field. Recent field tests conducted independently by CBS (reported in "DTV Reception Field Tests," *National Association of Broadcasters*, Las Vegas, NV, April 12, 2000) used the NXT2000 and other current generation demodulators. These tests conclude that the current generation of DTV receivers already replicate viewable analog NTSC coverage. Moreover, since the demodulator chip is only one component of a highly-integrated system, albeit a key component, improvements in other system areas such as the RF tuner, together with a competitive industry fueled by the potential of an emerging market, guarantee that future generation receivers will provide the consumer with exceptional ATSC-compliant reception.

Conclusion

Some may conclude that I am biased in favor of the current standard. I am, because I understand its superior capabilities and what they can mean for bringing

new and better services to the American public in both urban and rural areas. I head up a broadband communications company that makes products that support the ATSC DTV Standard. But in fact, we also make products that support the alternative DVB COFDM standard. NxtWave is a company of communications scientists. We build products compliant with the standards of the countries in which we work.

I am biased, but not for one standard or another. Rather, my bias is simply to ensure that the U.S. remains the world leader in the industry we created and have nurtured for over half a century. Pausing now for years while we debate the intricacies of this or that standard is equivalent to "fiddling while Rome burns." Our DTV standard is fine, it does the job, and it will accommodate future requirements. Let's get on with it.

Thank you, Mr. Chairman. I would be pleased to answer any questions you or other members of the Subcommittee may have.

Mr. TAUZIN. Thank you Mr. Miller.

Next we are pleased to welcome Mr. Richard Green of Cable TV Laboratories in Louisville, Colorado.

STATEMENT OF RICHARD R. GREEN

Mr. GREEN. Thank you, Mr. Chairman, members of the subcommittee. My name is Richard Green. I am president and CEO of Cable TV Labs. Thank you for providing me with this opportunity to comment on the cable industry's role in facilitating inner operability and the transition to DTV.

Thirteen years ago I had the privilege of testifying before this committee on the subject of HDTV. I was, at that time, and still remain today, an enthusiastic advocate of digital television technology. Although it has taken longer than any of us anticipated, I believe that we are on the right course and are making effective progress toward a successful induction of a compelling digital and high definition service to the American people.

I believe that the cable industry deserves more recognition than it gets for its leadership role in implementing DTV. Cable conditions have been working on the transition to digital television since 1988. Today the largest multichannel digital video facility in the world is owned and operated by a cable company, AT&T Broadband. On the programming side, HBO is already providing more HDTV programming in any given week than all the broadcast networks combined. Cable operators are upgrading to digital transmission and are offering an increased range of new services. At present, over 7 million homes subscribe to digital cable, a number that is expected to reach 10 million by the end of the year. Set top boxes being developed this year will marry digital programming, high speed data and Internet content for display on both analog and digital TV receivers.

At Cable Labs, the most important effort that we have ever undertaken is the transition to digital television. For example, our open cable project seeks to develop a new generation of digital set top boxes that are interoperable and offer a new range of services to the consumer. Open cable is also being used to develop specifications to meet many of the FCC's navigation device requirements. A goal of this effort is to keep the time required to develop new equipment to a minimum. We do this by working with equipment designers and manufacturers to cooperatively prepare specifications and reduced risk in development time. It is an open community process bringing together more than 400 companies to prepare and approve the various specifications.

The FCC has asked the affected industries to help reduce the technical barriers to the delivery of digital and high definition television. It has offered companies a chance to develop marketplace solutions rather than have to comply with government and post standards for digital TV. The cable industry is committed to help resolve compatibility problems that exist between cable distribution systems and television receivers, and to do so within the framework of inner industry solutions.

Toward this end, the National Cable Television Association and the Consumer Electronics Association reached agreement on February 22 of this year. This agreement allows future digital television sets to be connected directly to cable systems. The agreement details the technical specifications that will enable consumers to receive DTV programming and services over the capable system.

On May 24th, CEA and NCTA further announced they had reached an agreement on labeling information that will aid consumers in their purchase of new digital television equipment. Consumers will benefit from this agreement because they will know exactly what to look for when they purchase a new digital television receiver. No longer will ambiguous terms like "cable ready" cause consumer confusion. The two industries have agreed to continue their labeling discussion and hope to reach agreement on labels for other equipment, including digital set top boxes that will work with interactive DTV receivers.

We look forward to continuing with CEA and other industry groups, including the consumer electronics retailers, to ensure that consumers have a wide range of clearly labeled equipment from which to choose. We also continue to believe that these inter-industry agreements are preferable to the imposition of government requirements in what is a dynamic and fast-changing market. I thank you, Mr. Chairman. I will stand ready to answer questions. [The prepared statement of Richard R. Green follows:]

PREPARED STATEMENT OF RICHARD R. GREEN, PRESIDENT AND CEO, CABLE TELEVISION LABORATORIES, INC.

INTRODUCTION

Mr. Chairman, Mr. Markey, members of the subcommittee, my name is Richard R. Green and I am President and CEO of Cable Television Laboratories, Inc. (CableLabs), which is located in Louisville, Colorado. CableLabs is a research and development consortium supported by cable companies operating in North America and helps chart the industry's course in matters of technology.¹ It has played an active role in cable's deployment of digital television (DTV), setting standards for cable modems, and ensuring the availability of interoperable set-top boxes at retail stores. Thank you for providing me with this opportunity to comment on the cable industry's role in facilitating interoperability and the transition to DTV.

Mr. Chairman, you may remember that fourteen years ago I had the privilege of testifying before this committee on the same subject that we are considering today. In 1986, I helped conduct a demonstration of the transmission of High Definition Television (HDTV) from Ottawa, Canada, to Washington D.C. That occasion was the first international exchange of digital high definition programs. You may also remember that I was at that time—and still remain today—an advocate of digital television technology. Although it has taken longer than any of us anticipated, I believe that we are on the right course and are making effective progress toward a successful introduction of compelling digital and HDTV service to the American people.

¹ CableLabs was founded 12 years ago to ensure the proper development of technological initiatives for the cable television industry. CableLabs represents more than 90 percent of the cable customers in the United States and 85 percent of customers in Canada.

I believe that the technical and economic problems associated with the introduction of DTV are no different than what we have seen in the past with similar technologies and that the problems are being solved. The progress is not as rapid as we had hoped, but I would like to discuss the work that is being done in this important area.

You may recall that in the case of the introduction of color television, acceptance was slow. The penetration of color receivers took about 8 to 10 years to reach significant levels. So it is not unusual to find that new technologies often take considerable time to reach meaningful economic penetration. Also, the issue of DTV is more complex than the transition to color. We should remember that when color television was introduced, the technical issues could be solved by negotiations among a few participants. The major stakeholders were broadcasters and TV manufacturers. Indeed, color television was largely the product of a single company, RCA. During the introduction of color, issues of production, transmission, and the manufacturing of TV sets could be resolved within one company. Today, there are many stakeholders. Multiple industries are affected by the developments in DTV—not just broadcasters and TV manufacturers. The cable, satellite, computer, content development, and consumer electronics industries all have important stakes in the introduction of digital television and HDTV.

CABLE HAS PLAYED A LEADERSHIP ROLE IN THE TRANSITION TO DIGITAL TV

The most important effort that we have ever undertaken at CableLabs is the transition to digital television. Indeed, I believe that the cable industry deserves more recognition than it gets for its leadership role in implementing DTV.

Cable companies have been working on the transition to digital television since 1988. The industry published what I believe was the first specification for digital video compression equipment for consumers' homes nine years ago in March 1991. Cable companies have been offering digital video service for the last five years. General Instrument (now part of Motorola) first developed the digital compression technology that is at the heart of the broadcast ATSC standard for the cable industry. It was General Instrument's proposal that made digital HDTV feasible. Similarly, the largest multi-channel digital video facility in the world is owned and operated by a cable company, AT&T Broadband. On the programming side, HBO is already providing more HDTV programming in any given week than all the broadcast networks combined. Showtime, Madison Square Garden, A&E, and Discovery are also producing high definition programming. So, as an industry, cable has been at this a long time and can boast a track record of success in developing and deploying digital video technology.

It is also clear that digital television is a technology that the cable industry takes very seriously and continues to deploy as quickly as possible. Cable operators are upgrading to digital and offering an increasing range of new services. At present, over 7 million homes subscribe to digital cable—a number that is expected to reach 10 million by the end of this year. Set-top boxes being deployed this year will marry digital programming, high-speed data, and Internet content for display on both analog and digital TV receivers. And customer satisfaction is high: a survey released by the Cable and Telecommunications Association for Marketing (CTAM) showed that 95 percent of customers polled expressed their satisfaction with cable's upgraded digital service.

CABLELABS PROJECTS

Let me say a word about the three major CableLabs projects currently underway. The current portfolio of research and development projects at CableLabs includes the OpenCable initiative and development of cable modem and PacketCable specifications. CableLabs is also involved with home networking specifications, which I will not address here.

CableLabs Certified Cable Modems/DOCSIS

The CableLabs® Certified™ Cable Modems project, formerly known as Data Over Cable Service Interface Specification or DOCSIS, defines interface requirements for cable modems. The certified cable modem project provides cable modem equipment suppliers with a method for attaining cable industry acknowledgment of DOCSIS compliance. The process results in high-speed modems being certified for retail sale. The DOCSIS project is four years old, and the DOCSIS specification is an international ITU standard. Currently there are over 50 manufacturers of modems, and a competitive retail market for the sale of these modems is emerging in the U.S. and overseas. We hope that the cable modem process will serve as a model for the

certification of digital set-top boxes which are made commercially available at retail stores.

PacketCable

PacketCable™ is a project aimed at identifying, qualifying, and supporting Internet-based voice and video products over cable systems. These products will represent new classes of services, including telephone calls and videoconferencing over cable networks and the Internet, utilizing cable-based packet communication networks.

OpenCable

Our OpenCable project seeks to develop a new generation of digital set-top boxes that are interoperable and offer a new range of services to consumers. OpenCable is also being used to develop specifications to meet many of the FCC's "navigation device" requirements. A goal of this effort is to keep the time required to develop new equipment to a minimum. We do this by working with equipment designers and manufacturers to cooperatively prepare specifications that reduce risk and development time. It is an open community process bringing together more than 400 companies to prepare and approve the various specifications.

The OpenCable process applies to a family of consumer devices. Although the initial focus was on advanced digital set-tops, we expect this functionality to migrate quickly to television receivers and other consumer electronic devices such as DVDs and DVRs, with the set-top functionality "integrated" into the equipment. In fact, one exhibitor at the 1999 Western Show demonstrated a personal computer that used an OpenCable-compliant POD (Point Of Deployment security card) to access cable services for display on the PC screen.

The OpenCable team has worked very hard to take the experience of the DOCSIS effort and apply it in the design of the OpenCable process. It is not an exact fit—the set-top environment is more complex and has a set of security and legacy equipment issues that were not problems for DOCSIS. But we certainly believe that the some key aspects of the DOCSIS process are directly relevant:

- Our commitment to an open, collaborative, inter-industry process.
- Inclusion of vendors as specification authors and true partners.
- Providing a neutral venue for development work.
- Providing a feedback loop between equipment development and refinement of specifications.

- Building a strong consensus within the cable industry on cable's technical needs.

As such, CableLabs has a process that offers a win-win future to the other industries involved in developing digital television. It is my hope that the cable, computer, broadcast, and consumer electronic industries—as well as content providers—will continue to support this effort, recognizing that the current convergence of technology leads to a convergence of economic self-interest. We will make digital television easy-to-use for the customer. We have addressed and will implement systems to protect the copyright of content providers. Through this infrastructure, we will be able to provide easily accessible digital television and the compelling content that customers desire.

STATUS REPORT ON THE DEVELOPMENT OF DIGITAL TV

The FCC has asked the affected industries to help reduce the technical barriers to the delivery of digital and HDTV television. It has offered companies a chance to develop marketplace solutions rather than have to comply with government-imposed standards for digital TV. The cable industry is committed to help resolve compatibility problems that exist between cable distribution systems and television receivers—and to do so within the framework of voluntary, negotiated solutions.

The Need for Copyright Protection

If a first-run digital program can be immediately recorded and replicated in perfect copies or webcast (without payment to the copyright holders), developers are not going to release their product for distribution. At CableLabs, we are working to provide a technological framework that can be supported by a legal environment in which producers and the content community can be reasonably assured that their products will not be stolen. This is not to say that customers do not have a right to record material for their own use. Indeed, home recording is fundamental to customer satisfaction. However, we need to provide the technical tools that will allow legal duplication and use while preventing pirate duplication and distribution.

1394 Interface: Background

In the past, home video equipment has been connected to television sets using channel 3 or 4. Many existing set-top boxes and video recorders work that way, but these devices are all analog. The new generation of home equipment is, of course, digital. So we must have an equivalent interconnection for TV sets in the digital age. In other words, in the digital world, a DVD player or a digital set-top box should connect to a digital TV set via a digital plug. This is the only way to preserve the original quality of the material.

A consensus among industries has singled out the IEEE 1394 interface as the method of choice for connecting digital equipment to the TV set. The cable industry has supported that choice and has specified 1394 connectors in the current purchase orders for our own digital set-tops. Also, we have included in our OpenCable specification an additional requirement that the cable 1394 connectors include digital copy protection technology called 5C. We have done this in order to preclude pirating of the pristine digital pictures. However, we cannot require this technology on equipment we do not own. Therefore, we have tried to persuade the consumer manufacturers to include the 1394 connector *with 5C* on digital television receivers.

Many manufacturers have indicated that they will build to our specification; others may choose to build sets without this technology. We believe that the latter choice is a mistake since it will lead to customer confusion about interoperability between cable services and television sets. It also will produce TV sets that may not connect to all digital video home equipment in the future. However, as I discuss below, the cable industry has reached a compromise with manufacturers on this issue.

Inter-Industry Agreement on Interoperability, February 22, 2000

The National Cable Television Association (NCTA) and Consumer Electronics Association (CEA) reached voluntary agreements on February 22, 2000, that will allow future consumer digital television sets to be connected directly to digital cable systems (see attached letter from Robert Sachs and Gary Shapiro to FCC Chairman William Kennard). The agreements detailed the technical specifications that will enable consumers to receive DTV programming and services over cable systems. As Robert Sachs, President of NCTA, noted:

This is good news for cable customers contemplating a purchase of a digital television receiver. The cable and consumer electronics industries now have specifications that ensure that signals transmitted on cable will be easily viewed on digital sets. This voluntary solution makes unnecessary government involvement in setting compatibility standards for the dynamic digital TV marketplace.

Similarly, Gary Shapiro, President and CEO of CEA, stated:

While our industries celebrate today's announcement, the true winner is the American consumer. With these agreements, many more consumers will soon be able to access the wonders of digital television through cable. This is yet another giant step forward in the transition to DTV. Indeed, all parties with a true interest in the success of DTV should celebrate today.

The agreements detail the technical requirements that permit the direct connection of digital television receivers to cable television systems, specifying the signal levels and quality as well as video formats. They also provide for the carriage of data which support on-screen guide functions in digital receivers. With roughly two-thirds of U.S. households receiving television programming via cable, the February 22 agreements mark an important milestone in the transition to digital television.

Inter-Industry Agreement on Labeling, May 24, 2000

On May 24, CEA and NCTA announced that they had reached agreement on labeling information that will aid consumers in their purchase of new digital television equipment (see attached letter from Robert Sachs and Gary Shapiro to William Kennard). The CEA-NCTA agreement establishes the labeling that is to be used to inform consumers about the capability of various digital television sets to receive digital and interactive TV services. The May 24 agreement does not require every digital TV set to include a 1394/5C connector allowing reception of the full range of cable interactive services. However, all sets will be packaged with consumer information describing the features and functions of television sets with and without the 1394/5C connector. The descriptive information will appear in consumer electronics product manuals and brochures.

Under the May 24 agreement, all digital sets will be capable of receiving both analog and digital programming from a digital cable system. In addition, digital TV sets with full interactive capabilities will be labeled "Digital TV-Cable Interactive." Digital sets that lack these capabilities will be labeled "Digital TV-Cable Connect."

Sets labeled “Digital TV-Cable Connect”—those without the 1394/5C connector—will be capable of receiving analog basic, digital basic, and digital premium cable programming from any cable system that offers digital service. “Digital TV-Cable Interactive” sets (those with the 1394/5C connector), in conjunction with a digital set-top box, will be able to receive those services and other programming—including impulse pay-per-view, video-on-demand, enhanced program guides, and data enhanced television services.

In announcing the agreement with CEA, Robert Sachs noted:

We’re pleased to take this further step in the transition to digital television. Consumers will benefit from this agreement because they will know exactly what to look for when they purchase a new digital TV receiver. No longer will ambiguous terms like “cable ready” cause consumers confusion.

CEA’s Gary Shapiro agreed:

With this agreement, we have now passed one more milestone on the road to DTV. As our industry brings new DTV products into the marketplace based on this agreement, consumers will have full access to the spectacular picture, sound, and interactive features of digital television via their digital cable system.

CEA and NCTA have agreed to continue their “labeling” discussions and hope to reach agreement on labels for other equipment, including digital set-top boxes that will work with the “Digital TV-Cable Interactive” DTV sets.

We look forward to continuing our work with the CEA and other industry groups (such as consumer electronics retailers) to ensure that consumers have a wide range of clearly labeled equipment from which to choose. We also continue to believe that these inter-industry agreements are preferable to the imposition of governmental requirements in what is a dynamic and fast-changing market.

CONCLUSION

In dealing with the complex give-and-take issues that characterize digital television, no one side can have it all. None of the industries involved can afford to come up empty-handed on an issue as vital as the digital future. However, with continued cooperation and compromise from all parties, industry should be able to find negotiated solutions which obviate the need for federal regulatory intervention. In particular, the cable industry will continue to work hard to resolve questions arising from its labeling and interoperability agreements with consumer electronics equipment manufacturers and retailers as all sides press forward to bring new digital services and technologies to market.



May 24, 2000

The Honorable William E. Kennard
Chairman
Federal Communications Commission
445 12th Street, S.W., Room 8B201
Washington, D.C. 20554

Dear Mr. Chairman:

The Consumer Electronics Association (CEA) and the National Cable Television Association (NCTA) are pleased to inform you that we have reached accord regarding whether or not all digital television ("DTV") sets should have a 1394/5C connector. We have agreed that all DTV sets need not have a 1394/5C connector, but that appropriate labeling is required for sets without that connector.

To this end, we have reached an agreement, subject to trademark searches and related legal due diligence, on the labeling of digital television sets with and without a 1394/5C connector, descriptions of the features and functions of such sets, and a disclaimer, to be included in consumer electronics product manuals and brochures, with respect to the capabilities of DTV sets without the connector.

As described in the attached Appendix, DTV sets without a 1394/5C connector will be labeled "Digital TV-Cable Connect" and those with a 1394/5C connector will be labeled "Digital TV-Cable Interactive."

Since the inter-industry discussions have been so constructive, we will continue such discussions and expect to reach agreement which will define labeling of other digital equipment, more specifically digital set top boxes which will work with the "Digital TV-Cable Interactive" DTV sets. We believe this effort, and our continued discussions to align our marketing messages will help retailers and consumers better understand the features, functions and interoperability of these new digital devices. Once again, we appreciate the Commissions' interest in fostering industry resolution of this and other issues regarding Cable/Consumer Electronics DTV compatibility.

Robert Sachs
President and CEO
National Cable Television Association

Sincerely,

Gary Shapiro
President and CEO
Consumer Electronics Association

Attachment

cc: The Honorable Harold W. Furchtgott-Roth
The Honorable Susan Ness
The Honorable Michael K. Powell
The Honorable Gloria Tristani
Dale Hatfield, Chief, Office of Engineering and Technology
Deborah A. Lathen, Chief, Cable Services Bureau
Dr. Robert M. Pepper, Chief, Office of Policy and Plans



February 22, 2000

The Honorable William E. Kennard
Chairman
Federal Communications Commission
445 12th Street, S.W., Room 8B201
Washington, D.C. 20554

Dear Mr. Chairman:

The Consumer Electronics Association (CEA) and the National Cable Television Association (NCTA) are pleased to inform you of our agreements which will achieve compatibility between consumer digital receiving devices and cable television systems.

First, we have achieved agreement on the technical requirements for the network interface specifications that permit direct connection of consumer digital receivers to cable television systems. These requirements are detailed in the attached Appendix 1. Please note that closed captioning requirements are the subject of an outstanding proceeding at the Commission and therefore have not been an element of our negotiations.

Second, Appendix 2 details our agreement for the carriage of Program and System Information Protocol data on cable systems, including virtual channel tables and event information data, to support the navigation function in digital receivers.

We jointly commit to implementing these agreements promptly. We recognize that achieving a fully deployed digital cable service and market penetration of full capability digital receivers requires the active participation by all industry segments involved.

Third, we are continuing our discussions to devise appropriate labeling to be used in marketing various digital receivers designed to work with cable systems.

Finally, we also plan to jointly test interoperability between cable systems and consumer receivers.

The Commission's interest in expediting industry resolution of the issues regarding cable/consumer electronics DTV compatibility contributed greatly to the success of our joint CEA/NCTA discussions. We thank you and your staff for this commitment to facilitate a solution to these issues.

R. L. Sachs

Sincerely,

Gary Shapiro

Robert Sachs
President and CEO
National Cable Television Association

Gary Shapiro
President and CEO
Consumer Electronics Association

Attachments

cc: The Honorable Susan Ness
The Honorable Harold W. Furchtgott-Roth
The Honorable Michael K. Powell
The Honorable Gloria Tristani
Dale Hatfield, Chief, Office of Engineering and Technology
Dr. Robert M. Pepper, Chief, Office of Policy and Plans
Deborah A. Lathen, Chief, Cable Services Bureau

Mr. TAUZIN. Thank you very much, Mr. Green.

Now we are pleased to welcome Mr. Robert Miller, New York, New York, the president of Viacel. I understand Viacel is a data network.

STATEMENT OF ROBERT T. MILLER

Mr. ROBERT MILLER. Mr. Chairman and members of the subcommittee, Viacel Corporation is a data broadcaster. Viacel believes that DVBT COFDM is a revolutionary broadcast technology that will allow the rebirth of over-the-air broadcast television. Poor television reception gave rise to both the cable and satellite industries. Today, up to 85 percent of viewers define television as cable or satellite.

8-VSB modulation perpetuates the failing NTSC system. 8-VSB is even retrograde. It denies mobile television reception that we enjoy today. Congress should mandate mobile reception capability. COFDM supports mobile television reception in the buses of Singapore and the high speed trains of Europe. The taxicabs and subways of New York City could receive HDTV today using the powerful tools of the revolutionary COFDM DVBT standard. I know of no New Yorker who even tries to receive broadcast television. Multipath scrambles both NTSC and 8-VSB. Until Viacel tested COFDM, we could not get anything to work in the real world of New York City.

However, our COFDM tests results were wildly beyond our expectations. COFDM worked better specifically in those very locations where everything else had failed, including my cell phone. In the shadow of the Empire State Building where 200,000 watt transmitters blast unreceivable 8-VSB HDTV down on New Yorkers from 1100 feet, we tested COFDM. We, however, were broadcasting 22 miles out on Long Island from a 240-foot antenna with 1 percent of the power used by the 8-VSB stations. There was no line of sight. In fact, our first day of test we were driving on Park Avenue, 5th Avenue and Lexington Avenue in midtown Manhattan with 50-story buildings on either side of the street at right angles to and blocking any direct signaling from the transmitting tower. We were also moving at 40 miles an hour. We used simple bow tie and monopole antennas from Radio Shack. They both worked.

When you think of data casters, you may think of e-mail and stock quotes. In fact, HDTV is data and in the digital world, all broadcasters are data casters. On that day in New York when we first tested COFDM, we data cast a movie that filled a 15-inch screen on a laptop with full color and CD quality sound using Internet protocol.

All of Manhattan could have been watching HDTV on that channel at the same time with COFDM and simple indoor antennas. Few people can watch free over-the-air television in Manhattan today. With COFDM, they could watch all 30 stations that broadcast there now in taxicabs, subways and offices and at home.

8-VSB proponents are quick to write off the inner cities. I live in New York and I want HDTV. 8-VSB proponents tell us city slickers, poor and rich alike, that we will just have to be happy paying the cable and satellite companies for our free advertiser-supported TV. No free HDTV over the air for us. How can we sim-

ply write off the cities by continuing with this defective 8-VSB modulation standard? There is a fixed rate VSB right now and it is called COFDM. When, off the record, most engineers Viacel has dealt with see 8-VSB as a peculiar American political disease that has nothing to do with the underlying technology and everything to do with powerful and foreign special interest. Congress correctly specified that a signal equal to the current NTSC signal must be broadcast free. And that the extra spectrum can and should be used for data services.

HDTV is a seductive product. The market will demand it. Congress should allow COFDM. The competition between COFDM and 8-VSB would spur the rollout of HDTV like nothing that Congress could mandate. The passion in this room should tell us that.

By the way Viacel's business plan is a free data casting service including a free receiver, in the same spirit as a current free over the air broadcasting. What an amazing revolutionary concept. COFDM actually allows you to simply and reliably receive an over the air TV signal. Maybe it is hard for some to grasp that concept since we have lived with faulty reception for so long.

There are a lot of canards being put out against COFDM. Congress should look past them and make sure that the tests now being conducted in Washington by MSTV comparing COFDM and 8-VSB continue, are fair and that the results are fully aired. The people do not want a modulation standard, they want great TV. Thank you.

[The prepared statement of Robert T. Miller follows:]

PREPARED STATEMENT OF ROBERT MILLER, PRESIDENT, VIACEL CORPORATION

Mr. Chairman and members of the Subcommittee, my name is Bob Miller and I am the President of Viacel Corporation.

Viacel Corp. is a data-broadcaster. Viacel believes that DVB-T COFDM is a revolutionary broadcast technology that will allow the rebirth of over the air broadcast television.

Poor television reception gave rise to both the cable and satellite industries. Today up to 85% of viewers define television as cable or satellite.

8-VSB modulation perpetuates that failing NTSC system. 8-VSB is even retrograde, it denies mobile television reception that we enjoy now. Congress should mandate mobile reception capability. COFDM supports mobile television reception in the buses of Singapore and the high speed trains of Europe. The taxicabs and subways of New York City could receive HDTV today using the powerful tools of the revolutionary COFDM DVB-T Standard.

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However, our COFDM tests results were wildly beyond our expectations. COFDM worked better specifically in those very locations where everything else had failed, including my cell phone. In the shadow of the Empire State Building where 200,000 watt transmitters blast unreceivable 8-VSB HDTV down on New Yorkers from 1100 ft. we tested COFDM.

We, however, were broadcasting 22 miles out on Long Island from a 240 ft. antenna, with 1% of the power used by the 8-VSB stations.

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When you think of data-casters you may think of e-mail and stock quotes. In fact HDTV is data and in the digital world all broadcasters are data casters. And on that day in New York when we first tested COFDM we data-cast a movie that filled a 15 inch screen on a laptop with full color and CD quality sound using IP (Internet Protocol). All of Manhattan could have been watching HDTV on that channel at the

same time with COFDM and simple indoor antennas. Few people can watch free over the air television in Manhattan today. With COFDM they could watch all thirty stations that broadcast there now, in taxicabs, subways, offices and at home.

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There are a lot of canards being put out against COFDM. Congress should look past them and make sure that the tests now being conducted in Washington by MSTV comparing COFDM and 8-VSB continue, are fair and that the results are fully aired.

The American people do not want a modulation standard, they want great TV. Thank you.

Mr. TAUZIN. Thank you, Mr. Miller.

Next we will have Mr. Gary Chapman. CEO and president on LIN Television Corporation.

Mr. Chapman.

STATEMENT OF GARY CHAPMAN

Mr. CHAPMAN. Thank you, Mr. Chairman. If you and I were to go to a consumer electronics store here in Washington and we wanted to buy a digital television set, you think it would be easy. We just walk in, tell them what you want, take it home, hook it up. Hook it up, right? Wrong. What you would find is the following: Most digital sets don't get digital signals off air without a set top box at additional cost. When you try to hook it up, our set to cable, it probably would not work. Even if it did work with cable, it still wouldn't receive the five digital broadcast stations already on-the-air because local cable doesn't carry those signals in Washington, DC.

My point is there are huge obstacles that lie in the path of consumer acceptance of DTV. Unless the FCC moves forward quickly to resolve these issues, the public will be denied access to DTV. The FCC should do the following three things right now to resolve this consumer problem: First, adapt new carry and retransmission consent rules to digital service. Second, require interoperability of DTV with cable and devices like VCR's. And last, create minimum performance levels for digital television sets.

Broadcasters are working hard on the transition to digital. Nearly 150 stations broadcast digital signals, reaching two-thirds of Americans. Broadcasters are ahead of the schedule in rolling out DTV service. We estimate some \$750 million has already been spent by the first wave of stations. My own company already in-

vested \$22 million on transmission equipment alone. We will need another \$30 million to complete that part of the job. Then we need to spend more money to convert news gathering, studio, master control, and editing equipment. The fact is, broadcasters are doing their part. More stations go on-the-air every day. More digital programming is being produced and provided to consumers.

Unfortunately, our partners in this enterprise are falling short. We don't have sets that will receive digital signals or cable systems that both carry our signal and allow consumers to watch them. We also don't have an FCC that is implementing Congressional mandates. Our millions are being spent for naught.

Now, just think of those small market stations like the one in Quincy, Tom Oakley, that facing a 2002 deadline to complete their DTV buildout. Think of how they are almost mortgaging their future to go digital. They deserve to have certainty that their signals will at least reach their viewers.

Now, let me address an ongoing issue that our industry can and is doing something about. I am chairing a special broadcast industry-wide committee, spending millions of dollars to conduct critical tests to understand and to correct what many perceive to be the disappointing performance of DTV transmission system. These non-partisan scientific tests will determine whether the current 8-VSB technology will work well enough or if improvements are needed. They will also look at the viability of COFDM for the American broadcasting.

Our goal is to expedite the transition, not to disrupt it or to change the DTV table of allocations. We are simply committed to getting these answers as soon as possible. We want to make sure that the service that we provide the public is technically superior, consumer friendly. We will have the answers to this test at the end of the year.

One more word about going digital. Broadcasters are looking at ways to provide enhanced services to benefit the public. When Congress approved going forward with DTV and in the 1996 Telecom Act, it created strict rules for such activity. Any such service must be secondary to our main job of providing free over-the-air television to consumers. Any revenues from such service must be shared with Uncle Sam. Those remain the watchwords of our industry as we investigate new possibilities.

There are four things that I would like to you to take away today, four important elements. These are the hurdles we must overcome. First, the satisfaction with DTV transmission performance, broadcasters are tackling this problem in figuring out how to solve it. The other three obstacles we can do nothing about: cable interoperability, TV set performance and cable carriage. The FCC and our industry partners must step up to the plate. My company, our industry are betting millions of dollars and our future. We are committed to this success. I urge Congress and our DTV players to join us. Thank you.

Mr. TAUZIN. Thank you very much, Mr. Chapman.

Next will be Mr. Tim Fern, vice president of the Pace Micro Technology. Tim Fern is the director of engineering for the company located in Boca Raton, Florida.

Mr. Fern.

STATEMENT OF TIM FERN

Mr. FERN. Thank you, Mr. Chairman. Good morning. This morning I would like to say a few words about Pace Micro Technology and our experience that enables us to speak here today. A little bit about digital television in the U.K.

Mr. TAUZIN. I am sorry, our mike systems only work if you get real close to them.

Mr. FERN. Our perspective on the performance issues recording COFDM and multipath and the practical implications from a set top box or manufacturer technology providers perspective.

Okay. So a little bit about Pace. Pace is the largest dedicated set top box manufacturer in the world. We have supplied digital television boxes in the U.K. to the operator—On Digital—from the start of their service in November, 1998. There has been very high consumer and customer satisfaction with that product. On Digital recently described our technology as exceeding requirements in all respects and accepted without qualifications. I think it is important to note here that that's not the statement of the company that still has concerns over the operation of the technology, and there have been some concerns mentioned about things like impulse noise. That statement describes that.

We are experienced in all platforms, satellite and cable and supply to the U.S. market. We currently have contracts to supply Time Warner Cable, Comcast and BellSouth entertainment. So about digital television in the U.K., it is a huge success. It uses a 2 K version of COFDM. This is mandated by the DVB. It is now, as we sit here today, in over 750,000 homes across the United Kingdom. They are forecasting it will be in a million homes by Christmas. In terms of penetration of TV households, that means to match that success because your launch date was pretty similar, you should already have 5 million digital televisions installed in the United States.

So now, the other thing about television in the U.K. Is that it is not high definition, but there is a number of technological advances going on in television that the committee should be aware of. The difficulty you have when you see big screens is that you see a lot of fuzziness and you see the line structure of the 5-2-5 line system. Those problems can now be dealt with by electronics within the set top box and within the display device. So we forecast that the viewers in Europe will be watching very high quality images, you can't use the expression "high definition," but very high quality images on big screens without the disadvantage of having to send so much data. So they can just send maybe 3 or 4 megabits per second rather than the 19.6 megabits per second.

With our experience in the U.K., we believe that we could have a COFDM-based product for the United States market in about 9 months time. And I think the transmissions could be on-the-air in that time too.

The United Kingdom, I think, leads the world in digital television. We have over 20 percent of our TV households now connected to digital in some form. We have also got a very successful digital satellite and digital cable operators there. So we are heading toward a very early switchoff of analog transmissions some time in this decade, I should imagine.

In the process of inputting this technology into households, we are also bringing the worldwide Web and e-mail into every home in Britain. There will be seamless delivery with broadcast content and Internet originated content arriving on the TV screen.

Okay. Pace perspective on the performance. We are very enthusiastic of all technology. I am not going to go into debate on the details, but we have been looking at the OET study. I think the difficulty with the OET study is it doesn't apportion any weight to the particular technical arguments. We think that the 8-VSB has problems of huge significance in operations of multipath, and this far outweighs any of the problems that are listed in that report. Don't accept anecdotal evidence on the reception performance of this. Scientific study will reveal the COFDM is dramatically superior.

So if you stick with 8-VSB, I think you will become an island of VSB. I think we have heard that expression before. The rest of the world is clearly moving toward COFDM and America is clinging on to a sadly flawed standard.

Sorry. Just allow me to conclude just a few seconds. So we know that COFDM works and there is very high consumer satisfaction. CSB problems will not easily be solved. These have been worked on for many years. There is an opportunity in the U.S. to change. This is a one-time opportunity. This is a very long-term decision you are taking here. This technology will be with you maybe 50 years. If it continues and the problems cannot be solved, I think the political damage is quite clear. Thank you, Mr. Chairman.

Mr. TAUZIN. Thank you, Mr. Fern.

Finally, Mr. Terence Rainey, president of the Association of Imaging and Sound Technology here in Vienna, Virginia.

Mr. Rainey.

STATEMENT OF TERENCE J. RAINEY

Mr. RAINEY. Mr. Chairman, distinguished members of the subcommittee, thank you for the opportunity to contribute to today's discussion. I am the President of ITS, the Association of Imaging Technology and Sound. We are the trade association of the professional community of businesses providing post production services and pictures and sound to the television and film industry. Our companies take over after the director yells cut. We transfer film to videotape for television viewing, edit the picture and sound of TV sound and commercials and create visual effects for visual and television.

Companies in the post production industry are small businesses ranging in size from just a few employees to over 400. Companies typically are privately held small businesses with the annual revenues in the area of \$2- to \$10 million. The full service and special facilities total about 38,000 employees in the U.S. with a payroll of about \$2.5 billion. We create high paying, skilled jobs commanding high levels of compensation. These companies comprise an industry of about \$5 billion in annual domestic revenue.

The FCC, in approving 36 different picture formats for digital television versus the 1 picture format for the legacy NTSC format, has created significant complications for the post-production industry. The major television networks have chosen three different standards. The post-production industry must now be able to work

at all the different standards. All but two of the digital picture formats, the two standards definition formats require that a post-production facility replace its existing equipment with equipment capable of producing high definition.

The broadcasters expressed desire for additional spectrum was to allow them to serve the public interest in broadcasting high definition television. And for the last television season, CBS was the only network to broadcast a high definition prime time television schedule. The CBS prime time high definition programming was partially underwritten by Mitsubishi for that season. The other networks are select high definition programming. For example, ABC Monday night football, which was partially underwritten by Panasonic, and the Jay Leno Show on NBC.

For the coming television season, the only major broadcaster that has expressed any intent to broadcast prime time high definition programming is CBS. However, even as recently as last week, CBS appears to be unwilling to pay increased licensing fees to non CBS-owned production companies for delivery of high definition programming. As a result, members of the post-production industry are reporting to me that production companies are canceling their orders for producing their television shows intended to be broadcast in high definition for the coming television season. This is a step in the wrong direction. The post-production industry is faced with making an additional significant capital investment in high definition equipment.

Most of the incremental cost in producing high definition programming is incurred in the post-production process. Our members are making this investment based upon the mandated schedule for transition to digital television and the broadcaster's expressed intent to broadcast high definition programming. Many post-production companies will not survive or will suffer severe financial hardship if their substantial investments in digital post-production equipment were to lay fallow while new high definition programming becomes available to the American people.

You have heard some concerns regarding the approved digital television transmission standards today. We are urging to you step back from this issue and review the state of affairs as they exist. Broadcasters have the ability today to broadcast high definition programming to millions of Americans. The post industry stands ready to support full programming schedules for high definition content. But if there is no production of high definition television programming to transmit over these systems, an entire industry could be in peril.

America has historically benefited from a strong technical framework supporting its dominance in the creation of entertainment content for the world. The lack of commitment to digital and high definition programming is contributing to the financial decline of the U.S. post-production industry that has been the foundation of the television industry for many, many years. Thank you, Mr. Chairman.

[The prepared statement of Terrence J. Rainey follows:]

PREPARED STATEMENT OF TERRENCE J. RAINEY, PRESIDENT, ITS

Mr. Chairman, distinguished members of the panel, thank you for the opportunity to contribute to today's discussion. I am Terry Rainey, president of ITS.

ITS is the trade association of the professional community of businesses providing creative and technical services in pictures and sound to the television and film industry. The postproduction processes are: 1. Video, Audio & Film Transformation; 2. Video, Audio & Film Manipulation; 3. Video, Audio & Film Finishing and Preparation of Video, Audio & Film for a Distribution System; and 4. Postproduction Video, Audio & Film Creation

Companies in the Production and Post Production Industry range in size from just a few employees to over 400. Companies typically are privately held small businesses with annual revenues of \$2 to \$10 million. The full-service and specialty facilities total about 38,000 employees with a payroll (including benefits & taxes) of about \$2.4 billion dollars. The postproduction industry creates high paying, skilled jobs commanding high levels of compensation. These companies comprise an industry of about \$5 billion dollars in annual domestic revenue.

The FCC in approving 36 different picture formats for digital television versus the 1 picture format for the legacy NTSC format has created significant complications for the post production industry. The major television networks have chosen three different standards. The post production industry must now be able to work at all the different standards.

All but 2 of the digital picture formats (the two standard definition picture formats) require that a post production facility replace its existing equipment with equipment capable of producing high definition.

The Broadcaster's expressed desire for additional spectrum was to allow them to serve the public interest in broadcasting high definition television.

For the 1999/2000 television season, CBS was the only network to broadcast a high definition prime time television schedule. The CBS primetime high definition programming was underwritten by Mitsubishi for the season. The other networks had select high definition programming, for example ABC Monday night football was underwritten by Panasonic.

For the 2000/2001 television season, the only major broadcaster that has expressed any intent to broadcast high definition programming is CBS. However, even as recently as last week, CBS appears to be unwilling to pay increased licensing fees to non CBS owned production companies for delivery of high definition programming. As a result, members of the post production industry are reporting to me that production companies are canceling their orders for producing their television shows intended to be broadcast in high definition for the 2000/2001 television season.

The postproduction industry is faced with making an additional significant capital investment in high definition equipment. Most of the incremental cost in producing high definition programming is incurred in the postproduction process. Our members are making this investment based upon the FCC mandated schedule for transition to digital television and the broadcaster's expressed intent to broadcast high definition programming. Many post production companies will not survive or would suffer severe financial hardship if their substantial investments in digital post production equipment were to lay fallow while no new high definition programming becomes available to the American people.

There are concerns regarding the approved digital television transmission standards that broadcasters were intricately involved in developing. We urge you to step back from this issue and review the state of affairs as they exist today. Broadcasters have the ability today to broadcast high definition programming to millions of Americans. The post industry stands ready to support full programming schedules of high definition content. If there is no production of high definition television programming to transmit over these systems an entire industry could be in peril.

America has historically benefited from a strong technological framework supporting its dominance in the creation of entertainment content for the world. The lack of commitment to digital and high definition programming is contributing to the financial decline of the U.S. post production industry that has been the foundation of the television industry for many, many years.

The postproduction industry is retooling its technical infrastructure to accommodate transmission of digital television per the FCC mandated implementation. Most, if not all, of the analog equipment that has been in use will have to be phased out, and new digital equipment phased in, in less than 5 years. Our members' facilities must support all of the formats to perform their services. The digital equipment to retool our facilities is significantly more expensive than the previous generation of postproduction equipment, with the capital investment for the typical small facility estimated to be in the millions of dollars. To maintain the technological lead and

be competitive, U.S. companies will spend millions of dollars upgrading equipment. With the state of digital and HDTV demand, postproduction companies are not guaranteed a return on their investment.

The industry has continually invested in technology and process and as a result has greatly enhanced the quality of television programming for all Americans. Throughout this process, the postproduction industry has invested hundreds of millions of dollars in building the technical infrastructure that is necessary to support the creation of television programming for the United States legacy NTSC format. The NTSC format stipulates one display format utilizing an interlaced picture with 525 lines of resolution (525i). The NTSC's 525i format is not listed in the new digital ATSC standard (ATSC Doc. A/53 table 3).

The FCC's digital television standard specifies the approved transmission formats and does not mandate the production formats to be used by the postproduction industry. However due to the encoding parameters required for sound and visual images under the FCC's digital television standard, the postproduction industry's current technical infrastructures (built to support the NTSC standard) can only produce standard definition pictures that can satisfy two of the 36 digital formats approved by the FCC. This means that as a result of the FCC mandate requiring the transition to digital television, the postproduction industry will have to completely replace its existing technical infrastructure to support the new digital television standards.

It should be noted that a network's adoption of a transmission format should not imply that they have changed their delivery requirements for their current television production to comply with their approved formats. The current network standards vary from an interlaced high definition image (CBS and NBC) to Fox's adoption of a digital standard definition image. The complexities created for the postproduction process in having to support all of these standards has exponentially increased the cost and complexity of their transition to digital television. Unlike individual broadcasters or networks, the post production industry can not choose one preferred format, but must stand ready to serve the program creation industry with a full range of digital choices. Because of this uncertainty and diversity of choice, the post production industry must bear the burden of significant costs in this transition, even though the market for these services has yet to fully develop.

The road to digital broadcasting was paved with broadcasters' insistence that they needed additional spectrum for High Definition broadcasting. The broadcaster's expressed desire and intent to broadcast high definition programming created the environment for the FCC to be the "early adopters" in high definition television broadcasting and the motivation to change what was an otherwise proven and working model for standard definition programming. Broadcasters are trying to balance their desire to protect their spectrum with the expressed intent to provide high definition programming with the business reality that the advertising revenues associated with high definition programming are effectively the same as for standard definition programming. Given this business dilemma, there is no business motivation for the broadcasters to require high definition television programming which only increases their postproduction costs and provides them with no immediate incremental revenue.

In order to justify the significant capital outlay required to build a digital infrastructure, the postproduction industry anticipated providing additional value by producing high definition entertainment programming for which they would be able to charge incremental fees over the existing rates for their standard definition services. The incremental value that was to have supported the postproduction industry's capital investment in high definition digital television infrastructure is greatly diluted to the extent that a broadcaster only anticipates broadcasting a digital standard definition picture.

Based upon current indications from the networks, absent any competitive pressure from cable and satellite companies, the broadcasters appear to have little motivation or intent to pursue high definition programming. Notwithstanding the uncertainty regarding the broadcasters intentions, the postproduction industry has to invest hundreds of millions of dollars in rebuilding its technical infrastructure to support the government's digital television system.

The postproduction industry continues to support the transition to digital television. As an industry that has consistently embarked on independent research and development to improve the technical quality of television programming, the FCC's transition to high definition television was anxiously awaited.

We believe that we can play a fundamental role in facilitating the transition and creating the value statement that will motivate both producers and consumers of television programming to ultimately adopt a digital high definition standard. However, we are an industry made up of predominately privately owned small busi-

nesses with limited financial resources. Unfortunately, the postproduction industry does not enjoy the financial benefits of the free spectrum that the FCC was in a position to bestow on the nation's broadcasters.

ITS conducted an online survey on expected costs of DTV implementation. Following are the compiled results of the DTV Survey.

Anticipated DTV Expenses

In the next 12 months: \$1,073,971

In the next 36 months: \$3,192,188

Replacement Equipment overall: \$2,006,579

In the next 12 months: \$615,321

In the next 36 months: \$1,961,429

Expansion Equipment overall: \$1,344,737

In the next 12 months: \$765,917

In the next 36 months: \$2,243,333

Anticipated gross revenues from digital post services overall: \$5,542,857

In the next 12 months: \$2,825,000

In the next 36 months: \$8,064,583

These figures are imposing on an industry whose members face enormous capital investment expenses. Remember that the average revenue of an ITS member is about \$7 million per year.

By no means are we assured as in the feature film "Field of Dreams", that if we "build it, they will come". We are hopeful that with these incentives our industry will be able to create cost-effective solutions to the complex challenge of implementing the most sweeping change to television in our history. We are poised to usher in the digital information age, but we cannot do it alone. It is up to all of us—broadcasters, and manufacturers, to build it, so they will come, and be thrilled by the new television.

Mr. TAUZIN. Thank you very much. The Chair recognizes himself and the members in order. First of all, I would hoped that we would not have an engineering dual this morning and I think we had one as we looked at 8-VSB and COFDM demonstrations. But I heard some things and I want to make sure I heard them right. Did I hear correctly, Mr. Hatfield, that the demonstrations were correct in indicating that the 8-VSB standard does have problems when it comes to multipath issues? But your argument is that they can be cured; is that correct?

Mr. HATFIELD. Are you talking about the demonstrations here?

Mr. TAUZIN. Yes.

Mr. HATFIELD. I think we all must be careful about demonstrations that are of one-up anecdotal sort of things, because there are lots of tradeoffs.

Mr. TAUZIN. Without getting into all that, are there multipath problems with the 8-VSB technology?

Mr. HATFIELD. For in-building reception, there has been some concerns raised.

Mr. TAUZIN. Like, for example, in New York, as Mr. Miller said. Those are real problems.

Mr. HATFIELD. What I have got to say though is that there are tradeoffs here. That, for example, if I recall some of the original tests here in Washington, some of the problems in some locations were caused by multipath, some of the reception problems were caused by lack of adequate signal. The one system has some alleged benefits in multipath, the other has some alleged benefits in terms of weak signals. So you choose one—

Mr. TAUZIN. You get a tradeoff. Second, is there a problem with the mobile reception with 8-VSB?

Mr. HATFIELD. Mobile reception goes back to the original—forgive me for being an engineer.

Mr. TAUZIN. Try to be a layman here. What I am trying to do is try to understand from a standpoint of a consumer who is going to enter this world, buy a set, buy a mobile set or set in his home. Are there problems with mobile reception if I wanted to receive data and television signals in a mobile environment?

Mr. HATFIELD. But let me say, when you ask an architect to design an office building versus a parking garage, you get different things.

Mr. TAUZIN. I understand that. Can you just answer the question?

Mr. HATFIELD. The original commission proceeding never focused on mobile reception.

Mr. TAUZIN. You were never asked to do that. Mr. Hatfield, I am not being critical of the Commission, please. I know there are other days I do that ad nauseam. You know that. What I am trying to do is just understand it from a layman's point of view. Does the 8-VSB standard pose problems with mobile reception or not?

Would someone else try?

Mr. HATFIELD. Well, what I am saying is my overall feelings as an engineer that the COFDM system probably has some advantages in a mobile environment.

Mr. TAUZIN. But can 8-VSB be brought up to the same capabilities? Mr. Miller, you want to try?

Mr. MATT MILLER. I will try to answer and attempt at plain English. Neither of these television systems was fundamentally designed to accommodate mobile transmission. When you talk about mobile reception, there is a real discussion about what do you mean by "mobile." So that aside, the capabilities of both systems are, in the end, comparable for the providing mobile reception. The COFDM system has moved a little bit further down that path because they have done the work. But there is no fundamental difference in the laws of physics underlying the two transmissions.

Mr. TAUZIN. Physically, the 8-VSB standard could be improved to the point where it could be as fully capable as COFDM?

Mr. MATT MILLER. Yes.

Mr. TAUZIN. Mr. Hyman raised another issue that nobody talked about. That was the translator issue. Many homes in America who receive their television through a cable system who has had a supply through a transmitter or receive it directly. Mr. Hyman has said there are going to be some problems here. Are there?

Mr. LEWIS. No.

Mr. TAUZIN. Answer first, then I will give you a chance.

Mr. LEWIS. I would refer you to the ATTC submission to the bi-annual review again where they documented on channel repeaters for 8-VSB being used in Utah. There is a public broadcasting co-op there that has a need for this type of activity. So I would like to just say that it is a demonstrated proven fact that you can use on channel repeaters.

Mr. TAUZIN. So you are saying it will work. Mr. Hyman says it won't. Why won't it work, Mr. Hyman?

Mr. HYMAN. Well, I am not an engineer, so I can't get into the all the engineering specifics, but we know that on channel repeaters with 8-VSB can be used in extremely isolated instances where the actual receiver and the transmitter are separated, so there isn't

the back channel, the backflow, if you will, of the signal which creates the same multipath environment that kills 8-VSB today.

Mr. TAUZIN. We are not going to get an engineering answer. Let me do this. Let me ask you this: Obviously, there are an awful lot of Americans who rely upon translators and repeaters in this country, particularly out west. I understand that huge percentages, for example, 35 percent in Texas, much higher percentages as you go out west. We need some clarity on that point. If you can submit for the record.

My time has expired and I am not going to be able to get into what I really want to get into next, which is this blame game going on with people saying there is not enough programming for you guys who build sets and build the equipment and you guys on the broadcast side saying we aren't going to produce any more programming that we are producing until you guys make sure it gets to the consumer through the cable systems and through adequate delivery systems.

So we have a little blame game going on. And we have got a situation where if the numbers are right, Mr. Fern's numbers are right, Mr. Hyman's numbers are right, we are 4.75 million consumers short of where we ought to be in terms of moving this process along. If that is true, then what I will want you to do is help us understand why we are behind and what we can do to speed the process up. But my time has expired, the Chair will yield to the gentleman from Ohio, Mr. Sawyer.

Mr. SAWYER. Thank you, Mr. Chairman. Mr. Campbell, let me recall an offer that you made. In a couple of weeks there are about 15,000 people coming to southern California from all over the United States. Could we have your address and phone number so we can stop by? You prefer not to do that?

Mr. CAMPBELL. I defer, please.

Mr. SAWYER. I just thought it was an opportunity that you couldn't pass up. Let me get—I do want to ask you, Mr. Campbell and Mr. Lewis and Mr. Miller, you seem to have some visible discomfort at one point during Mr. Fern's testimony. Could I ask you to comment on what he was saying?

Mr. CAMPBELL. I am sorry, whose testimony sir?

Mr. SAWYER. Mr. Fern from Pace. I think it was regarding comparative lines of quality.

Mr. CAMPBELL. This is the first time I have testified and this is very unique, because I am hearing certain things and to be very—it wasn't discomfort, it was listening to a situation, we are not talking about HD pictures. I deal with the consumer. I know they get excited when they see a three-dimensional picture. Another thing, in cars they aren't watching a 16-by-9 high resolution picture. If anything, it was listening to what he was saying and I hear him and apply what we are doing in this country.

Mr. SAWYER. All three of you seemed to have a comparable reaction.

Mr. MATT MILLER. One level of discomfort is I would really like to sell him some COFDM chips so I want to be sure he is successful in the U.K., but the second issue—my expertise really is in the transmission area but I have been involved in cable broadcasting satellite. I was right at the birth of digital satellite and digital

cable. The model for the U.K. is so vastly different from what it is here. I find it very difficult to wrestle with the comparisons that are being made. It is a pay TV environment. The boxes are essentially being given away as part of the service. It is more analogous to the U.S. satellite environment where, in fact, digital has been hugely successful, picked a perfectly good transmission standard, gave customers something they couldn't get any other way, and they lined up to buy it.

So saying that the differences in success of digital television over the air in the U.K. Versus what is happening here is a result of some alleged technical transmission issue is simply not relevant to the discussion. That is the cause of my discomfort.

Mr. SAWYER. That clarifies. That fits in.

Mr. Fern.

Mr. FERN. Thank you for the opportunity to reply. Yes, I am well aware the model is significantly different in the U.K., but I think the goal here is to switch off analog transmissions at the earlier possible date.

On the COFDM issue, we would maintain there is a very significant difference between the performance in a multipath environment. I would just like to give you one short statement here. It can even be affected, ATSC, VSB can be affected by people walking around the room. At the moment, you have to tell your children to be quiet when you are watching TV, now you have tell them to be still in order that you can watch it.

Mr. MATT MILLER. That is just factually untrue. You saw the demonstration here. We have done billions of demos. We have had marching armies at NAB and CES. Ask the sales guy. It is just factually wrong. And that is a source of discomfort.

Mr. TAUZIN. You stirred up a nest now.

Mr. SAWYER. Some of the witnesses have commented on comparative systems in Argentina and in Europe. Some use 8-VSB and the others COFDM. Do any of those countries carry both?

Mr. LEWIS. No, because to have a multitude of standards is to have no standard. The consumers need the security and the comfort of a known standard that people are designing to. I can't afford to design television sets to COFDM.

Mr. SAWYER. I understand your point. Mr. Hyman is disagreeing. Let me also ask you to comment on your disagreement with Mr. Hatfield on the question of mobility before I run out of time.

Mr. HYMAN. First, I appreciate Mr. Lewis, whose company Zenith holds the pattern on 8-VSB, would like to have exclusive reliance on it as would Mr. Miller, whose company NxtWave is a—

Mr. SAWYER. That is fine. Okay.

Mr. HYMAN. So I can appreciate why they want to have exclusive reliance. We have suggested and asked for a second standard that would be agnostic to the consumer, just like we have 18 different scanning formats within digital television today. We want to stimulate this rollout as quickly as possible. And Mr. Fern's points are well made, that they are doing it abroad in other countries. And I think it is imperative we not dictate specifically how consumers watch it as long as they get it and they watch it. We see a success story that we are not doing so well in this country.

As far as the mobility issue, I have got a simple analog TV today; you can call this portable, you can call this pedestrian. If my children get in the back of the minivan and drive around with this, this is mobile. I can watch it today. I can watch it in this room. I don't have the problems, the significant problems that they have. I would love to see them take their antenna out of the windowsill and place it on the witness table as we did. In my house, my wife tells me where the TV goes. If I told her it has to go there, that spot, because we have to run a cable to that window or hang something outside the window, it is not going to happen. She wants to put the TV wherever she does. We saw an antenna that we can put anywhere in this room and it works. I would like to see the same thing done and then see if we get the same type of reception.

Mr. TAUZIN. The gentleman's time has expired. If anyone wants to respond quickly, please. I have to get as many members—

Mr. SHAPIRO. A multiple standard would not only create chaos but would so fragment the market that no serious manufacturer can invest and produce multiple standard receivers in such a market. That is by a Nat Ostroff of Sinclair, by the way, who said that. I would also point out that Sinclair has a very clear interest in analog and delaying. They are a significant owner 32 percent of a company, publicly traded company called Acrodyne. Recent press releases as the debate rages on the industry is beginning to experience resurgence in the purchase of analog equipment. The delay to the conversion from analog to digital has given us the opportunity to reposition the company from a niche to mainstream supplier of transition equipment. This is a company bent on delay of—

Mr. SAWYER. Thank you for your latitude.

Mr. TAUZIN. The Chair recognizes the gentleman from Illinois, Mr. Shimkus.

Mr. SHIMKUS. Thank you, Mr. Chairman. I hope not to get too controversial either. This question is for Mr. Hatfield and Mr. Lewis and Mr. Hyman. Which standard is better for reaching rural areas? I represent rural Illinois, 19 counties stretching 300 miles. Obviously I have been involved in this local broadcast debate for a long time. And my major concern is my local broadcasters being allowed to give the clear signal for public safety and all those other things that they do so well. So we will start with Mr. Hatfield.

Mr. HATFIELD. Thank you. In fact, I would also like at the same time to respond to Mr. Fern's comment that OET did overweighted multipath. And of course, what we were concerned about was the exactly what you said, there is a tradeoff here. There is a tradeoff here. And the 8-VSB modulation is generally regarded as providing additional coverage. So you trade perhaps better in building coverage or multipath performance, but you lose the coverage at the outside areas. That is what we were concerned about in our report and talked about in our report.

Mr. SHIMKUS. Mr. Lewis.

Mr. HYMAN. One of the beauties of a COFDM-based system is the issue regarding single frequency networks, the issue we talked about with translators. Think of it as kind of a cellular phone system we have today with a lot of towers. There are 84 translators that serve the State of Illinois, 1.45 million people live in areas that are served by translators. 8-VSB cannot work in that system,

and therefore some number of those people, 1 out of 3 homes in Illinois, is potentially affected by the lack of service provided by 8-VSB in the translator scenario.

So COFDM clearly provides an opportunity for us to not only reach what we refer to as the core business areas, the urban and suburban areas where harshest, but also in the rural areas where we can reach out and touch our viewers using a variety of systems, such as translators and on channel repeaters that 8-VSB can not do.

Mr. SHIMKUS. Let me go back. Mr. Hatfield, in your statement and in a previous response you talked about I think—someone mentioned weak signal. That was what you were referring to?

Mr. HATFIELD. Yes, that is exactly right.

Mr. SHIMKUS. So Mr. Lewis, can you talk about the implication of a possible weak signal with COFDM?

Mr. LEWIS. Yes. Being somewhat familiar with Illinois, I am aware of your situation. I am assuming that when you are talking about coverage, that you want to have local content and not national content or State content throughout.

Mr. SHIMKUS. I want the consumers to have a choice, but I want to make sure that the local broadcast signal for all the public service things that they do is received.

Mr. LEWIS. I was just trying to point out with the single frequency network you need to have consistent programming. So you can rule that out as an option of COFDM. And then second, again, translators are quite possible. They are being used. But the main issue here is that with coverage, VSB has superior coverage. It has a 5 DB signal-to-noise ratio advantage over COFDM. And that was picked in order to allow us to have the greatest coverage from a single antenna, and therefore would be better served in your great State of Illinois.

Mr. SHIMKUS. I want to move on. Thank you very much. To Mr. Hyman, Mr. Shapiro states in his testimony that some broadcasters want to lease out their public spectrum loaned to them by Congress for wireless data applications. Does Sinclair have any intention of providing ancillary services in the future?

Mr. HYMAN. Congressman, I know there has been a lot of interest in this as of late. I can tell you right up front, Sinclair has not sold, leased, given away or otherwise promised a single bit of our digital spectrum to anyone other than the viewers of our markets to deliver digital television. Having said that, I would be ashamed and embarrassed as a businessman if I didn't examine all the potential possibilities and how I could better serve my markets. I have got community ID and public service commitments, and I have a lot of close ties to the communities in which I serve. If I can deliver services in the future that better serve my communities, then it is something that I certainly need to consider as a businessman.

Mr. SHIMKUS. Thank you. Mr. Shapiro, I have a copy of the March DTV guide here which—March 2000, which one of the quotes by Glen Rogers talks about—and we have heard this testimony also today—my digital TV business now is very strong. HDTV is leading the increases I have had this year in my projection TV business. In fact, I can't get enough. I am oversold. This

is the first time in a long time I have had so many deposits for products that I can't deliver. It is a nice article.

My question is to Mr. Shapiro, is the electronics industry ready to supply the country with DTV products in time for the 2006 transition? And then obviously, from rural America's perspective, will the poor in rural areas be left behind?

Mr. SHAPIRO. The answer to the first question is yes, we are supplying the products and we are ready for 2006. From the very beginning of this debate years back, we agreed with members of the subcommittee who said it is an unrealistic deadline. We projected 30 percent penetration then. In terms of the poor, absolutely not. I think the fact is the prices in the consumer electronics industry continue to come down radically every year as they are with digital television. And the way to keep them up is to have the uncertainty. We are put in a box right now. What you have heard today on this panel from broadcasters is you are not supplying enough sets out there to get a signal. But we want to change the signal, so the sets you sell will be outdated.

So we can't have it both ways. We are prepared and consumers will buy sets that receive signals, provided there is no uncertainty about the standard. In the interim however, there is a tremendous consumer thirst and desire to buy HDTV from a variety of sources. If the broadcasters continue to delay, they will get left behind to alternative media. And that is the situation we are in now. Manufacturers are going full bore, prices will continue to come down, and that is the way that all Americans will be able to receive digital television. But not necessarily from broadcast.

Mr. SHIMKUS. Thank you, Mr. Chairman.

Mr. TAUZIN. The Chair raises the gentleman from New York, Mr. Fossella.

Mr. FOSSELLA. Thank you, Mr. Chairman. I have a question for Mr. Hyman. It can be followed up with Mr. Hatfield and Mr. Miller. It has been alleged, Mr. Hyman, that rollout of the COFDM in the New York market would interfere with analog signals and experience serious interference with some signals and would not be as effective as the other digital signal with the large position of New York. Are you aware of these allegations?

Mr. HYMAN. I am, Congressman. Would you like me to address those?

Mr. FOSSELLA. Sure.

Mr. HYMAN. Sinclair's petition we submitted last year stipulated that if COFDM were adopted, that broadcasters would not be permitted to create any more interference when operating with COFDM, that they would be permitted today using 8-VSB. And there are a number of ways that that can be achieved through beam tilting, directional antennas and so forth. What I find fascinating of the study that Zenith had accomplished was they used laboratory data from the Brazil tests and applied it to two stations that are not on the air in New York in order to come up with in scenario of increased interference, whereas there is real world data from Brazil tests they could have used, and there are stations actually on the air. There are three stations right now in Washington that are configured to operate with COFDM under temporary au-

thority: WRC, WUSA, WETA as well as WBFF in Baltimore and elsewhere.

So far despite all these myths of increased interference, we have yet to see any evidence of any increased interference. As a broadcaster, I don't want any more interference. That damages my business. So I would adopt any technological means necessary if that were the case.

In closing, the FCC's own report they issued last September stated that an adoption of COFDM would create less than 1 percent of additional interference to today's NTSC channels. Those aren't my words, those are the FCC's.

Mr. FOSSELLA. So you are saying it has alleged that millions will all get proper signals and others who will receive analog won't get interference, if you had your way.

Mr. HYMAN. If the FCC adopted our petition or something like that today, we stipulate that broadcasters cannot create any additional interference. So the answer is yes they would not be affected.

Mr. FOSSELLA. Mr. Hatfield.

Mr. HATFIELD. I have a different view of that. In—when you say you would not cause any more additional interference, what that means is that you may have to reduce the power levels, which means the signal is weaker out at the coverage area. So the threat of losing millions or a substantial number of people is very real. Here it goes back to this tradeoff that I keep coming back to that, you know, you can't get something for nothing here. What you gain on one side you lose on the other. If you gain on multipath, what you are going to do is pull back on the coverage. That is what we are concerned about.

In the chairman's letter today, that is what he is talking about. We are concerned that by introducing this new technology you would lose coverage at the edge of the coverage area and also within some buildings and other hard to reach places as well.

Mr. FOSSELLA. So under the existing technology areas that are currently covered would not be covered in your opinion if we shift to the COFDM.

Mr. HATFIELD. That is the concern we have. The sort of technical term that we use is replication of coverage. You would not be able to replicate the current coverage that you get with NTSC because to avoid the interference, you would have to reduce the power level.

Mr. FOSSELLA. Mr. Miller, you care to comment on this at all?

Mr. MATT MILLER. Sure. Again, trying not to get into dueling engineers here, but the laws of physics really do apply to all. I think that is what Mr. Hatfield is referring to. Ultimately, the ability to receive a signal is related only to the spectrum you allocate to it and the amount of energy you put in the channel. The issues that related to the 10-year transition in this country, which is really different from what it is in the rest of the world—we already have a very, very large installed base of current analog TV transmissions that will have to remain on air and coexist with a large population of digital transmissions. The standard that we have got was selected principally by balancing the need to replicate coverage, which means you have got to get energy out at the edge of the signal in the digital environment and not interfere with the existing analog transmissions.

When you go on air with independent or isolated circumstances where the power in the digital signal is ratcheted down to avoid interference, first off, you are not dealing with a totally populated environment; and second, you are not discussing adequately the loss of reception at the edge of coverage. And this goes back to the question from the Congressman from Illinois, and to some of the issues that have been addressed by Mr. Hatfield. The objective here was to guarantee that anybody currently getting a TV signal in the analog world will be able to continue to get a TV signal in the digital world. We have gone through very, very thorough and scientific analysis on this. And the bottom line is in order to accomplish the robust reception that COFDM does, it steals energy and it reduces coverage. You just can't get around that. That is the way it is.

Mr. TAUZIN. The gentleman's time has expired. The Chair raises the gentleman from Mississippi, Mr. Pickering, for a round of questions.

Mr. PICKERING. Thank you, Mr. Chairman. Thank you for holding this hearing today. Let me ask Mr. Hyman a follow-up question concerning the schedule 2006 incentives for you all to be able to meet that. What do you see as the realistic timetable for broadcasters to make the 2006 schedule? Do you think that is a realistic schedule first?

Mr. HYMAN. You mean the rollout of terms of will all broadcasters—will all consumers have 85 percent penetration with respect to the rollout of digital?

Mr. PICKERING. That is correct.

Mr. HYMAN. We certainly believe it is going to be some time after 2006. I think what we have heard today devices are certainly not at affordable prices, even though some of my colleagues at the table would suggest otherwise. I think a 1500, \$2000 device is a pretty expensive for the lunch pail carrying member of the public. I also believe that the inability to provide ease of reception is going to continue the snail's pace of the rollout, again, with the 34,000 receivers. We are nowhere close to the kind of rollout that we envision. This is less than 1/30th of 1 percent of Americans, the American television households have these over-the-air receivers. We believe there needs to be a stimulation in the rollout of affordable product that is work for ease of reception. That will go a long way to this.

Broadcasters are building out, you heard comments from Mr. Chapman as to how quickly that is occurring. But it is the consumer who ultimately is going to decide the success of this. He or she is the one that is going to buy the product. And at the end of the day, if they are not buying the product we are not going to be successful.

Mr. PICKERING. What incentives or regulatory initiatives are reform could we take to get us there on time?

Mr. HYMAN. Well, certainly we believe if the manufacturers can offer affordable products, and also a transmission system or digital standard that works, I can appreciate that they want to sell larger theater-sized devices with higher profit margins, but I think we can get consumers into digital television much quicker if much smaller products that are offered, they allow people to pick the

kind of television that suits their viewing needs as well as their family budgets.

Mr. PICKERING. If broadcasters are able to use some of the spectrum for ancillary or incidental services or other commercial diversification, would that speed or restrain the efforts to make the transition?

Mr. HYMAN. It is really guesswork here. With some deference to Mr. Miller from Viacel, certainly any way to roll out digital in any form intuitively would make sense, but I think we are placing the cart before the horse. My primary business is delivering free over-the-air television into the family room. I can't do that reliably without placing an antenna outside a window and running it through the room. I think we need to solve this dilemma first before we get to the next step.

Mr. PICKERING. Mr. Lewis, Mr. Shapiro, how would you like to respond, and what is your sense that we will see the manufacturing of the market develop in such a way that consumers will buy the product and the transition from the manufacturing side?

Mr. SHAPIRO. I think as Members of Congress, you can make a clear statement to the American public that you are going to stay the course, that several years ago there was this battle. Broadcasters agreed upon a standard. Now, some broadcasters are questioning it. They don't want to make the investment in digital or they have a vested interest in keeping it analog. I think it is important to send out the message to broadcasters, they are going to be held to the deal. The deal was free spectrum in return for broadcasting in digital to the standard. Let us stay with it.

The free marketplace, I think, has already proven that consumers want digital television. They are buying it. The products sold out. The only challenge is in the broadcast end right now, quite frankly. Until broadcasters are broadcasting something, they are not talking about changing the standard, then consumers are going to be questioning whether to invest in the broadcast portion of the television set. But the product is already a marketplace success. We have to make it clear as a country that we are staying the course and we are not tempted to follow the lead in Europe, which is focused on a totally different world envisioning the mobile applications and Internet and all the sorts of things that have nothing to do with free over-the-air broadcasting into the American home.

Mr. CAMPBELL. May I add something, please, sir. I would just like to say, as a retailer, many of our customers are not looking to have a bow tie hanging from their television set on top of their TV. As far as the expense is concerned, I was just curious whether the COFDM, whatever, is that going to lower the price instantly to 499 for a television. I just saw this board over here, for 299, you will be able to receive HDTV on your computer system. If you look at the DTV guide, there is a story in here by Best Buy that talks about DTV, myself included. The sales are incredible. We just went to a high of 63.9 percent of all of our big screen sales right now are DTV or HDTV. It is not a flawed format as far as a retailer. I am tired of hearing of the consumer being bombarded by Sinclair, that they have a defective or format that doesn't work. It does work. Thank you.

Mr. TAUZIN. The gentleman's time has expired. The gentleman from Florida.

Mr. STEARNS. Thank you, Mr. Chairman. And I ask unanimous consent that my opening statement be made part of the record.

Let me ask Mr. Hatfield here. We have the Europeans using the COFDM and the Americans the 8-VSB. And of course, we think it came about because of the private enterprise and the government dictated in Europe, and I guess Japan too. What do you see long term having these two different systems? Do you see any problem?

Mr. HATFIELD. No I, think they are both—I think they are both really fine systems. I should make that clear. But broadcasting is, as we have heard testimony today, broadcasting is different in different parts of the world. We have a system here. Our history is different. The way we organize broadcasting here is different with wide coverage, high-powered stations and so forth. So I am very comfortable with the fact that there may be one country may have one system and another country may have another. Because it reflects the—it may well reflect their own history, their own requirements and so forth.

Mr. STEARNS. You know when Macintosh got started, Apple got started, you had the PC and the Windows, they weren't compatible. Now they are almost compatible. Do you think somewhere down the road we will have that same possibility that Sony or RCA will be able to make the television so that they will be compatible with both systems?

Mr. HATFIELD. You know, I think there is people here at the table that could probably answer that question better than I can. Not that I am trying to duck it. But we are in the business of seeing what, you know, software changes or whatever would be needed to be able to maintain compatibility or ship products into both markets.

Mr. STEARNS. Mr. Lewis. You seem like you would be interested.

Mr. LEWIS. I think in the end the economics of the consumer electronics industry will not allow that convergence that you are talking about. To put the cost into the set of two different standards, and then sell it at retail here is not going to be a viable situation. And so the Mac and the PC share common software, and that may be true with video being converted between the two formats and being sent out, but I don't see that you will have a PC with a Mac inside of it, so to speak, or a Mac with a PC inside of it in the future.

Mr. STEARNS. A lot of us are probably looking at digital television on our computer screens. So when Dell sells a computer in the United States or sells it in Europe, it is going to have to have something different for COFDM or 8-VSB.

Mr. MATT MILLER. Since I am trying to talk to folks who want to do video on PCs, I will address that one. Cost is really the enemy even more than time. In the PC industry especially, they operate on razor-thin margins. Our customers would love to have us do essentially a COFDM version of this board so that they can buy from a common supplier. But the likelihood of their building a universal PC is very slim. So what they will do is they will stuff it with one set of components for use in the U.S., and they will stuff it with a different set of components for use in parts of the world

that have different standards. The likelihood of having a device which receives both transmissions simultaneously is very slim. You don't need it.

Mr. STEARNS. If you had two cards, wouldn't that work if you had—

Mr. MATT MILLER. Twice the cost. That is twice the cost. And cost is really a religion in this environment. It is a religion in everybody's environment. So while it is technically conceivable that you can make one chip that would decode both of these formats, they don't really have a lot in common. So the chip that we have got here decodes both the U.S. cable and U.S. broadcast on a single chip very efficiently. Because those 2 signals co-exist in one market. Right now we don't have the VSP and the COFDM signals co-existing in one market so there is no market need. And technically they really don't have a lot of common. It is a lot of work to put the two together.

Mr. STEARNS. This is dealing, Mr. Hyman, I guess, Mr. Chapman. You know we on this committee always talk about this, providing your HDTV signal. This has probably been asked before, but how much of the 6 megahertz TV channel do you plan on utilizing for ancillary services such as streamlining data? Maybe you can quantify this if it has been talked in a general peripheral way; maybe you can quantify it for us and tell us this is what it is going to be. Is it possible? Mr. Hyman, you can start.

Mr. HYMAN. Thank you, Congressman. We have made no commitments and don't have any plans to broadcast anything other than digital television. Have we looked at it? Yes. Have we discussed it? Yes. But we have been so focused on trying to improve the reception for this primary business that we are in, which has been our core business for 50 years, that to be perfectly frank, we haven't been able to get past that to figure out what would happen next. I would like to, and certainly as anyone who is challenged in a business, would like to be able to do the best they can and improve the services, but it is too far down the road because we have a more immediate—

Mr. STEARNS. As we come across to Mr. Chapman, Mr. Hatfield, you can tell us what you think should be done. In other words, do you think they should be able to use it and how much.

Mr. Chapman?

Mr. CHAPMAN. Let me share our vision, which is somewhat different than many others in this room today. First of all, with regard to spectrum aggregation, there are presently four companies that are involved in this business. We have the local telephone company, and of course, they want to be in this business. We have the cable companies, and they want to be in this business. Cox has high speed modems that deliver that today. We have AT&T, and they want to be in that business. Quite frankly, I think anybody that is going to think that they can set up a toll booth on the television digital signal is going to be very disappointed.

Quite frankly, I would expect in the years to come, and actually many of those that deal with making predictions, indicate that the cost of bit delivery will go down faster than the cost of long distance telephone. So our whole existence as a company has to do with local service to our local communities. Half of the people that

work for LIN television either work in the news department or the technical department to support that. We see our role not changing. Our role is to really service local community.

How do we plan on doing that? Let me give you an example right now. Tonight in New Haven, Connecticut, roughly oh, 1 in almost 2, we will have almost 20 percent of the audience at 6 watching our television station. Our news, WTNH. We have an association right now with Yale New Haven Hospital. And once a week they provide medical reports, the breakthroughs in medicine, health issues, but that, in television, can only be maybe 2 minutes. As you know, a newscast is appointment viewing, 30 minutes in length, 7 minutes in commercial, 3 minutes in weather 3 minutes in sports and 28 stories. This is television; this is what we do. Sight, sound, motion. More Americans get their news from television than any other source today. But we would not be able to provide all the breakthroughs on medicine. So what we do today is we send people from our television news to our Internet. In June, we had one 1.8 million visits. One of the highest in the country on that. Simply because we were providing the consumer with more than just television. We are giving them, in essence, the newspaper of tomorrow. The data newspaper of tomorrow. I think that what we need to do, and I think there is a Cajun phrase, *lagniappe*, which means more, additional——

Mr. TAUZIN. It is pronounced "*lagniappe*." You are going to have to work on that.

Mr. CHAPMAN. That is what we plan on doing. I guess it means a bonus, something additional. So tomorrow we hope to actually be closer to our audience by the use of digital. As you know, predictions 3 years out suggest that people will be getting half of what they get over the Internet today on maybe Palm 7s or telephones. It doesn't matter how it is received. Our interest is ensuring that the American public receives the best and possible technology there is today. We are agnostic when what system that comes to. The American television system is the envy of the world today. Our interest is seeing that universal service, to the rich, to the poor, to the rural, to the urban continues, and that we become a major part of that in the future, just as we have today. We are here to suggest that we need to preserve that system.

Mr. TAUZIN. The gentleman's time has expired. The Chair would ask a couple of questions before we finish and Mr. Stearns would like a few words in closing. I will be glad to recognize him. First of all, Ms. Lathen, where we are on cable must carry at the FCC right now. Where are you?

Ms. LATHEN. We, as you know, we started a proceeding in July 1998. And——

Mr. TAUZIN. You started proceedings in July 1998.

Ms. LATHEN. That is correct.

Mr. TAUZIN. Where are you now?

Ms. LATHEN. In that proceeding, there were two issues we were looking at, one of the cable carriage issue, which is the dual issue of carriage, and the second issue was the compatibility issue. We extracted the compatibility out from that proceeding and put it into OET to take a look.

Mr. TAUZIN. When is that going to happen?

Ms. LATHEN. That is going on right now.

Mr. TAUZIN. When does the carriage issue come to a head?

Ms. LATHEN. I don't know when the Commission is going to schedule the issue for completion. I think what the Commission has done is they have tried to see what things were going to happen in the marketplace. For example, we have seen AT&T and Charter as well as other MSOs enter into retransmission agreements with some of the major broadcast networks.

So I think that for now, we would continue with the compatibility proceeding. We also have a November deadline for completing the Satellite Home Viewer Improvement Act's provisions that deal with analog carriage. So I think we feel that at that time we will be able to look at both digital and analog carriage from the satellite perspective and to harmonize those two proceedings.

Mr. TAUZIN. Second, is the Commission moving on any inter operability standards?

Ms. LATHEN. I believe we are. We mandated that the manufacturers have to separate the security pod from the set top box and the date for that was July 1. Cable labs have told us that, in fact, they have separated the pod, and they met the July 1 date for the digital box. We have had some concerns about the hybrid box. That is the box that is both an analog and a digital box. And there were some systems involving 10 MSOs that were not in compliance with respect to the rules that pertain to that. They have asked for waivers and we are working on that.

Mr. TAUZIN. I don't want to get into the policy questions. We don't have time today, but obviously Mr. Chapman makes a point that until some of these policy questions are addressed, that they have problems in producing the programming. Because they don't know whether to reach the ultimate consumer. So I will be submitting some questions in writing to you about those issues and how the Commission views them, and whether or not you see that as a problem with delaying the rollout or whether that is going to get resolved in the marketplace. I also want a quick question to perhaps Mr. Hyman. And Mr. Chapman, you can answer this, I understand that current technology 1080i, the highest standard of HD television, can be delivered with less than 6 megahertz spectrum; is that correct?

Mr. HYMAN. I think the issue might be in something like 19.39 megabits.

Mr. TAUZIN. Let me ask you, do you need all 6 megahertz to deliver the highest quality HDTV standard today?

Mr. HYMAN. To be perfectly frank, I don't know, we know the answer to that because no one has developed a system smaller than 6 megahertz. The way it is designed today is the 6 megahertz system is used entirely to carry the signal.

Mr. TAUZIN. Is it technologically feasible to deliver the HDTV 1080i highest standard, high definition signal with less than 6 megahertz? Mr. Chapman, you want to try?

Mr. HYMAN. Can I defer to our vice president of new technology who was in that business for several years?

Mr. TAUZIN. Let me get Mr. Chapman's answer.

Mr. CHAPMAN. Let me address it this way: This past April in Indianapolis in our television switch, CBS affiliate, we actually

broadcast 63 basketball games for the NCAA. Some were two or three at the same time. But not in the highest quality.

Mr. TAUZIN. I understand that. I am asking you in the highest standard 1080i technology, what is the spectrum requirement? Can you do it in less than 6 megahertz?

Mr. CHAPMAN. It depends on the programming. If we are going to do Meet the Press or this hearing here today, you don't need that. But if you are going to do a basketball game——

Mr. TAUZIN. A lot of motion you need more output. But it is conceivable to do a lot of programming in HDTV for less than 6 megahertz using the highest standard 1080i, right?

Mr. CHAPMAN. Depending on the program, yes, sir.

Mr. TAUZIN. What would happen if you had this antenna off the window sill and put it on the table? What would happen with the reception?

Mr. HYMAN. It will go away.

Mr. CHAPMAN. My Hyman says it will go away. Is that correct?

Mr. LEWIS. I don't know. We haven't done it.

Mr. TAUZIN. Why didn't you put it on the table as Mr. Hyman did? I am trying to find out among you dueling engineers who is more credible, and one, you put an antenna on the table and one put it in the window, and the other one is telling me if you put it on the table it won't work.

Mr. MATT MILLER. First this issue of dangers of live production. Okay. We are arguing about 20 feet. We have when we were in this room looking at the signals earlier.

Mr. TAUZIN. Did you try it on the table?

Mr. MATT MILLER. Yes, it worked just fine.

Mr. TAUZIN. Why didn't you—why did you put it in the window?

Mr. MATT MILLER. Risk reduction. I wanted to be absolutely sure that it was going to work.

Mr. TAUZIN. Mr. Shapiro.

Mr. SHAPIRO. Only 5 percent of the consumers view using an indoor antenna for primary. It is a tradeoff.

Mr. TAUZIN. I understand the numbers. That is on the record already. I am just asking why when we had 2 engineering demonstrations. You choose a different place to put the antenna. And why it went behind the curtain instead of in front where we could all look at it.

Mr. Miller.

Mr. ROBERT MILLER. In New York a few weeks ago, there was a demonstration of Mr. Miller's board. There was 12 or 13 booths in the Marriott Marquis in Times Square. And they had windows on both sides, you could see in the midtown Manhattan from a moderately high floor, 17th floor or something like that. We were right in the center of New York City, and I asked Mr. Miller about the reception of 8-VSB. He said he had solved the problem of reception on 8-VSB. I said well, that means that everyone here is receiving over-the-air reception and no one was receiving over-the-air reception in that facility and in most places in New York City.

I would like to also make a comment about the single frequency network. You should understand that a single frequency network with 8-VSB means that have you to keep the signal from seeing the

broadcast signal that you are rebroadcasting, whereas with COFDM you can have antennas anywhere you want.

Mr. TAUZIN. I understand. That is one of those tradeoffs. But the question I asked you I want to go back to it is if you put that antenna on the table, that there was a higher risk, that you would be receiving a picture; is that right?

Mr. MATT MILLER. Yes. For the record, there is a higher risk.

Mr. TAUZIN. So that your experiment could have failed if you had to put the antenna on the table.

Mr. LEWIS. I would like to weigh in and say there are three issues that tradeoff: coverage, interference and reception. On reception, we are not to the full extent of what we can achieve with VSB.

Mr. TAUZIN. Let me try to wrap. I will ask Mr. Stearns if he has any other comments at the end, too. We talked a lot about the deal, the agreements we had on the spectrum and HDTV and the digital transition. Let me give you my perspective on what is not in the deal. What is definitely a deal breaker would be for broadcasters to lease off or sell off that spectrum and profit from the sale of lease of it. That is clearly not in the deal. Any broadcasters who did that, I think, would run a risk of Congress revisiting the deal and reclaiming spectrum.

The deal was that the 6 megahertz of digital spectrum was to be used for digital transmission, including HDTV, and that the broadcasters could use it for ancillary services. If they got into any kind of competition with anybody else, they'd have to pay for it. That was the deal. It would be a clear deal breaker for anyone to think they could profit by selling this spectrum off or leasing it off.

Second, what is not in the deal which would be a deal breaker for broadcasters not to show the American public HDTV. Now, I don't know who is in the room representing any broadcaster who thinks that they can provide digital television with that 6 megahertz without giving Americans a chance to look at HDTV. But my understanding of the deal was that Americans were going to see it. And the Americans were going to choose whether they wanted it or not in the marketplace, but they were going to chance to see it.

I got a little sort of thing to tell you about. I have seen HDTV a number of times. I saw it at the Super Bowl. I saw the HDTV coverage of the Super Bowl in the ABC suite. One of the amazing moments was when everyone who competes to get in those seats in the front to see the live action left the seats in the live action to gather around that liquid crystal screen and watch it on HDTV inside the suite. What was more amazing was that John Travolta was a guest in that suite and he was sitting out there by himself. People left the chance to sit and visit with John Travolta to come and watch that liquid crystal screen because it was a series of important plays that nobody wanted to miss this, that incredible, almost 3-D experience of HDTV.

Americans, I think, will want to see that. And I think our deal was that they were going to see it. It would be a very big mistake for broadcasters, networks or anyone else, cable companies, anybody else who kept it from reaching the American consumer. What is also not in the deal in terms of this digital transition is any development of systems that don't reach consumers. The consumers

are left out somewhere in this country, whether they are in the rural parts of America or this urban center of our country, whether they live in mountains or high buildings, that they are entitled to receive these signals from this 6 megahertz of spectrum that we allocated for digital transition. What I think is not in the deal, but I will leave it to your discretion on this one, is that Americans shouldn't have to buy a set for the specific location of living in at a specific time they are living there. That I hope we are going to have a system that works. I can take my television with me when I move, whether it is across town or across country.

I recognize Mr. Stearns that we are not going to take our television with us when we go to Europe, we are going have two different systems obviously. But we ought to be able to move around this country and move around town and still get reception on the same set with the same equipment. I would hope that is what is in the deal is that whatever we do with standards, whether it is in the post production problem area and I understand your concerns, Mr. Rainey, we talked about if privately, I think there are real concerns about how much post production is going to cost when we had too many different formats out there, or whether it is in the question of what, how we transmit a signal and how we receive it.

I would hope that part of the deal is that we get all these new services out to as many people as possible so that prices can come down and more people can afford them, and that free television remains a part of the equation, because that is why we gave 6 megahertz to the broadcasters in the first place was that free television would remain part of the equation. And the final part of the deal of the analog spectrum has to come back. I want to remind everybody of that. We set a date of 2006. It looks like we are not going to make it at the current pace and that is sad.

What is also part of the deal is that we can extend that 2006, but only because we have to.

And so my final question, and I am going to put to all of you and ask you to respond in writing on is what can I do? What can Mr. Stearns do? What can we do as Members of Congress to expedite this process so we can get this new system in place as rapidly as possible for as many Americans as possible at affordable rates as possible without leaving anybody else and get it done in a way that we don't have to have any more battles, or whether the spectrum was allocated correctly or wrongly, and we don't have to have any more battles over which standards work or don't work.

I need all your help on that. What are the steps we have to take between now and 2006 that we haven't taken? Please come back to me on that.

Mr. Stearns.

Mr. STEARNS. Mr. Chairman, I can give you an answer to that question. I think most of them agree, if you give them tax depreciation acceleration or tax credits for the defendant. Of their high definition television as well as you give that to producers of HDTV, I think the market would explode much like we do for some other industries.

Mr. CHAPMAN. Where can I sign up?

Mr. STEARNS. I think incentives are what we need here so we get—American public has HDTV. I think the reason you are not going ahead is because of huge capital expenses, is because you are not sure the public is going to buy it and the TV is \$10,000. So by the tax code like we have done in other industries. But Mr. Fern, as I understand it, Pace Micro Technology is a British broadcaster. Is that what you do? I wasn't sure what you did.

Mr. FERN. We are a manufacturer based in the U.K., but we now have set up a facility in Boca Raton, Florida. We develop and manufacture equipment for television operators. So we are supplying Time Warner Cable, Comcast, BellSouth entertainment.

Mr. STEARNS. I think you are the only one on the panel who is probably understanding the British market. I thought you might give an overview of what you saw here and of whether you could give some insight that maybe perhaps we don't have.

Mr. FERN. Thanks for the opportunity. I think just to—I certainly can talk a little bit about the way the British market is developing where the—obviously, I can't speak for the government, but what it appears that they are doing is managing the transition to digital coordinating between satellite cable and the terrestrial broadcasters to free up the spectrum as early as possible. So they are providing—there is none—there aren't obviously financial incentives, but they are trying to get—

Mr. STEARNS. There are not financial incentives.

Mr. FERN. There are not financial incentives, but what they are doing is ensuring a very healthy competitive environment between the operators.

Mr. STEARNS. What kind of incentives? I didn't quite understand.

Mr. FERN. I don't believe they are financial incentives, but they regulate to ensure that there is a very healthy competition between all operators.

Mr. STEARNS. It must be that the existing cable is so expensive, and this new HDTV is coming down or something?

Mr. FERN. No, there isn't high definition in the U.K. We have the—the picture quality is very good and U.K. Consumers don't have such a large living room, so there is not such big television sets.

Mr. STEARNS. If every British citizen has a choice between HD television, would they care?

Mr. FERN. I think technological advancements give the better picture quality, because you can put some electronics in what you are seeing in the display which gives you much better display.

Mr. STEARNS. Thank you, Mr. Chairman.

Mr. TAUZIN. Thank you. Let me thank you again. You have come from all across America. I hope the audience has recognized that. You have come there around this country to enlighten us today. I hope we are a little more enlightened. I am frankly a little more confused in one area. I apologize for that. You have been very helpful in regard for enlightenment. The record will stay open for 30 days. If you would like to volunteer to submit any other statements, you may not have been able to answer a question, you want to answer it more fully, you have 30 days to do so. My great thanks to you. The hearing stands adjourned.

[Whereupon, at 12:50 p.m., the subcommittee was adjourned.]

[Additional material submitted for the record follows:]

SUPPLEMENTAL TESTIMONY OF SINCLAIR BROADCAST GROUP, INC.

Sinclair Broadcast Group, Inc. ("Sinclair") hereby supplements its testimony for the July 25, 2000 hearing of the Subcommittee on Telecommunications, Trade, and Consumer Protection regarding the current status of the transition to digital television ("DTV"). In his closing remarks at this hearing (the "DTV Hearing"), Subcommittee Chairman W.J. "Billy" Tauzin asked the hearing witnesses to supplement the written record with information relating to a number of different issues facing the DTV transition. Accordingly, Sinclair now offers its views to the Subcommittee on a number of these matters, with a focus on what it believes is the fundamental issue now facing the broadcast industry and the U.S. viewing public: The ATSC 8-VSB reception problem, and broadcasters' urgent need for the flexibility to operate using a second DTV transmission standard, DVB-T, that has been quality-proven and widely adopted around the world.

I. CONGRESSIONAL ACTION NEEDED TO ACCELERATE THE DTV TRANSITION

Most fundamentally, Chairman Tauzin asked the witnesses at the DTV Hearing what Congress can do to facilitate the transition from analog to digital television broadcasting in the United States. As Sinclair urged in its original testimony to the Subcommittee, Congress should expeditiously take a crucial step towards overcoming the delay that now jeopardizes the transition: Congress should implore the FCC to adopt a second, optional DTV transmission standard, DVB-T, that has been quality-proven and widely adopted around the world, and for which an abundant supply of transmitting and receiving equipment is already in place. Flaws in the DTV transmission standard adopted in the U.S. (the "ATSC 8-VSB standard") prevent us and other broadcasters from providing a signal that can be easily received by the millions of consumers using the small, simple antennas now so common. Sinclair is confident that adoption of a policy of flexibility with respect to transmission technology represents a practical, time-efficient solution to the current DTV delay.

As Sinclair's own testing demonstrated last year and an ATSC draft report on 8-VSB recently confirmed, and a detailed study conducted by the University of Massachusetts concluded, the ATSC 8-VSB standard suffers poor performance under "multipath" conditions. As a result, the ATSC 8-VSB standard does not and will in all likelihood never support consumer-expected ease of reception or reliable over-the-air service to millions of television households lacking a clear line-of-sight between their TV antennas and broadcasters' DTV transmitters. For the most part, these are the millions of households that use the small, simple, inexpensive set-top antennas, rather than a large rooftop antenna. (It should be noted that the improved reception performance of DVB-T with simple set top antennas could cause some consumers to discontinue expensive cable and/or satellite subscription service, subscribed to in order to overcome poor over-the-air analog reception.)

Largely because of these reception problems, the DTV transition has stalled. As recent Congressional Budget Office Report explained, there will likely be little consumer acceptance of DTV if consumers have to do more than they now to do watch over-the-air television. Less than 50,000 DTV receivers capable of receiving DTV service have been sold in the United States to date (most of these to distributors, retailers, and broadcasters), and at this rate it will likely be fifteen to twenty years before U.S. broadcasters will be able to turn in their analog spectrum. By comparison, Sweden, with a population of less than nine million, launched DVB-TV in April, 1999, and by July, 2000, there were over 30,000 DTV receivers in consumers' homes. Sinclair believes that by granting each broadcaster the option of using either ATSC 8-VSB or the DVB-T standard, Congress can take an important step towards reviving this transition. DVB-T has been demonstrated to provide ease of reception and reliable over-the-air DTV service—even under multipath conditions—to viewers using small, simple antennas in broadcasters' core business areas, including over U.S.-sized 6 MHz channels at HDTV data rates above 19.4 Mbps, as demonstrated during the DTV hearing.

II. ADOPTION OF AN OPTIONAL DTV TRANSMISSION STANDARD WILL NOT JEOPARDIZE THE UNIVERSAL COMPATIBILITY OF DTV RECEIVERS WITH DTV BROADCAST STATIONS

Chairman Tauzin made clear at the DTV Hearing that American broadcast viewers must have DTV receivers that can tune into every DTV station in every market. With such a universally compatible system, the Chairman points out, viewers will be able to take their DTV receivers anywhere in the U.S. and make use of that investment. Sinclair agrees with Chairman Tauzin that the American public has a

right to such a seamless DTV system, and believes that a decision to give broadcasters the flexibility to operate using DVB-T will not jeopardize this critical goal.

If the FCC gives broadcasters such flexibility, some proportion of DTV stations will operate using ATSC 8-VSB, and some proportion of stations will operate using DVB-T. In this environment, ATSC-only receivers will be unable to receive a signal from DVB-T stations, and vice versa. Sinclair believes strongly, however, that such “single-mode” receivers will be rare. The consumer demand for DTV receivers that can receive service from all DTV stations will likely far outstrip the demand for single-mode receivers, and, as a result, equipment manufacturers will design the vast majority of receivers to be capable of receiving both ATSC 8-VSB and DVB-T programming.

Critically, there will be little or no disincentive weighing against manufacturers’ production of DTV receivers compatible with both the ATSC and DVB-T standards. Counter to the claims of the ATSC proponents at the DTV Hearing, the incremental cost to manufacturers of incorporating a DVB-T demodulation chip into their DTV receivers will in all likelihood be minimal. After all, the DTV receivers sold today in the U.S. market are already configured to receive signals with multiple modulation modes; these receivers are typically designed to receive signals from DBS systems, cable systems, NTSC stations, and 8-VSB broadcasters. In fact, the RCA DTV-100 DTV receiver used by Zenith in its demonstration at the HDTV hearing, which also happens to be the least expensive and largest selling consumer DTV receiver, employs multiple modulation modes. It is irrational to conclude that the addition of one more digital modulation standard will harm the marketability of these receivers. This is particularly the case with respect to the addition of DVB-T capability, since there are already more than seven hundred thousand DVB-T receivers in service today in the U.K. and Europe, many times the number of 8-VSB receivers that have been sold in the United States (largely to retailers) over almost the same period. Clearly, the equipment and expertise needed to incorporate this technology into DTV receivers in the U.S. are readily available.

Certainly, the benefits of having a single, national transmission standard no longer justify exclusive reliance on ATSC 8-VSB technology. Adherence to this regulatory principle clearly becomes counterproductive where, as here, the technology in question has been shown to fall far short of expectations. Moreover, a flexible DTV transmission policy would actually be consistent with the FCC’s overall approach to DTV technology. The ATSC DTV standard itself is not a rigid one—the FCC avoided inflexible standards for numerous other DTV operational parameters. There should be similar flexibility in the basic selection of transmission technology.

The FCC no longer has any justification for singling out broadcasting for application of a “single standard” mandate. The FCC permits licensees in a variety of other services, including DARS, MMDS, DBS, and PCS, to operate using any number of transmission technologies. It is time for similar reliance on marketplace forces in the broadcast context.

III. A FLEXIBLE POLICY THAT PERMITS DVB-T OPERATIONS IN THE U.S. WILL NOT REQUIRE A MODIFICATION OF THE DTV TABLE OF ALLOTMENTS

At the DTV Hearing on July 25, 2000, certain pro-ATSC 8-VSB witnesses asserted that if the FCC gives broadcasters the option to operate using DVB-T, such action will require a modification of the DTV Table of Allotments. This is a scare tactic that should be ignored by both the Subcommittee and the FCC. To date, there is no technical data indicating any additional interference would result from the use of DVB-T. In fact, there is evidence to the contrary. The FCC’s own Office of Engineering and Technology (OET) issued a report (OET 99/2) which stated “most NTSC stations would receive *1 percent or less additional interference* to their predicted service area” (emphasis added). No modifications of the DTV Table of Allotments would be required even if further data demonstrated the possibility of additional interference existed if the FCC follows Sinclair’s proposal and requires DVB-T broadcasters to employ means to avoid additional interference such as antenna beam tilting, antenna cut-outs, reduced power levels and/or use of on-channel repeaters to avoid causing greater interference than what would result from 8-VSB stations’ operations at maximum permitted power levels. This policy would ensure that the DTV Table would remain unchanged.

Any broadcaster who felt that any of the foregoing actions would result in inadequate signal coverage of his TV market could then simply use the ATSC 8-VSB standard. Under the Sinclair proposal, a broadcaster would make the free-market decision of which DTV standard best serves his viewers.

IV. UNLIKE ATSC 8-VSB, DVB-T WILL PERMIT THE OPERATION OF ON-CHANNEL RETRANSMISSION FACILITIES

Chairman Tauzin also requested further testimony from the witnesses regarding the ability of the ATSC 8-VSB and DVB-T transmission standards to support the use of on-channel retransmission facilities. As discussed below, only if the FCC gives broadcasters the option of operating using DVB-T technology will broadcasters be able to fully utilize various on-channel retransmission methods. On the other hand, such operations will be extremely limited if the FCC maintains exclusive reliance on the ATSC 8-VSB standard.

In the analog environment, broadcasters fill in areas lacking a sufficiently strong signal through the use of TV translator facilities. These separately-licensed facilities receive a signal from a broadcaster's full-power station, shift that signal to another NTSC channel, and retransmit the same programming into the pertinent areas. During the DTV transition, however, there will be significant congestion in the broadcast TV spectrum, and those analog translators causing interference to DTV operation will have to cease operation during that period. It appears unlikely, moreover, that there will be sufficient spectrum during that time to permit the operation of digital translators.

If the FCC permits DVB-operations in the U.S., however, broadcasters will be able to compensate for the loss of these translators. With DVB-T, broadcasters will be able to utilize a variety of on-channel retransmission facilities to fill in gaps in their coverage areas. Thus, DTV broadcasters will be able to use on-channel repeaters to retransmit their DTV signals into areas otherwise unable to receive service due to mountains or other terrain.

Unfortunately, such on-channel retransmission methods would be largely precluded if the FCC maintains exclusive reliance on the ATSC 8-VSB standard. Due to what would effectively be self-generated multipath conditions, ATSC 8-VSB DTV receivers in areas covered by on-channel retransmission facilities would likely be unable to successfully receive a DTV signal.¹

As a result, if the FCC maintains exclusive reliance on the ATSC 8-VSB standard, those viewers who today rely on translators to receive over-the-air TV will likely have no access to digital over-the-air service during the transition, and may lose access to over-the-air analog service as the DTV transition progresses and forces today's translators off the air. A recently completed study of all licensed translators determined that 32% of the nation's 100 million television households (TVHH) are located in areas served by one or more translators for over-the-air service or for delivery of a local over-the-air broadcast signal to a cable head end. Significantly, far more TV households are likely to lose access to DTV because of the absence of DTV translators and on-channel retransmission facilities than would fail to receive DVB-T service at the far perimeters of TV markets. If the FCC does not permit DVB-T operations, the result will be a true "digital divide" between rural and remote areas of the United States and those households able to receive ATSC 8-VSB service.

V. SINCLAIR IS COMMITTED TO HDTV AND HAS NO PLANS TO LEASE ITS SPECTRUM

In his closing remarks, Chairman Tauzin expressed great concern about the availability of HDTV to American consumers and broadcasters' plans to "lease" their spectrum for use by other parties. Sinclair addresses these points here. First, no matter what decision the FCC makes with respect to the DTV transmission issue, HDTV will remain part of Sinclair's DTV business plan. Sinclair is committed to providing easy, reliable HDTV reception to all of its communities of license, and this overriding goal has driven its efforts to convince the FCC to permit DTV operations using DVB-T.

Contrary to the claims of some proponents of ATSC 8-VSB, DVB-T supports the transmission of HDTV over U.S.-sized 6 MHz channels. In tests conducted by Sinclair in Baltimore during the summer of 1999 and in Las Vegas in April 2000, it transmitted its DVB-T signal at an HDTV data rate of 18.67 Mbps. At the DTV Hearing, Sinclair transmitted its HDTV programming at a data rate of 19.74 Mbps, a higher rate than can be supported by the ATSC 8-VSB standard. In fact, DVB-T's COFDM-based technology will permit significant increases in signal capacity

¹ Sinclair notes that, with DVB-T, broadcasters will be able to operate single-frequency networks that permit on-channel retransmission facilities to operate at much higher power levels and thereby provide greater coverage. In contrast to the simple on-channel feedback limited repeaters proposed for ATSC 8-VSB, single-frequency networks are not possible with that standard, since 8-VSB does not permit the operation of real synchronized transmitters at broadcast-required power levels.

over time, and such improvements will likely permit high-quality reception at even higher rates in the near future. In comparison, the 19.39 Mbps data rate for ATSC 8-VSB is fixed, and this data rate will inevitably be exceeded by an easily receivable DVB-T rate.

Congress and the FCC have sanctioned broadcasters' use of DTV spectrum for the provision of ancillary services, and Sinclair expects to offer such services to its licensed communities. If permitted to operate using DVB-T, Sinclair and other broadcasters will enjoy increased service flexibility, and will be able to simultaneously transmit an HDTV programming stream and other content streams, including Standard Definition Television and various data streams.

In connection with the potential provision of such ancillary services, Sinclair cannot forever rule out any business strategy that might ultimately increase the return on its enormous digital investment and fulfill its fiduciary obligation to its shareholders. Sinclair does not intend to lease or sell spectrum to other businesses or broadcast consortia, however. Sinclair is not a participant in any of the spectrum aggregation projects currently being considered by other broadcasters, and Sinclair does not condone the decisions of other broadcast licensees to pursue such projects.

CONCLUSION

As Sinclair explained in its original testimony, it is time for the FCC to give broadcasters the flexibility to operate using either the ATSC 8-VSB standard or the globally proven DVB-T standard. If the FCC continues its current policy of inaction, Congress should strongly urge the FCC to move forward to enable the American public to realize the full promise of digital television in the twenty-first century.

Consumer Electronics Retailers Coalition

August 2, 2000

The Honorable William J. Tauzin
Chairman
Subcommittee on Telecommunications, Trade
and Consumer Protection
House Commerce Committee
2183 Rayburn House Office Building
Washington, DC 20515

Re: July 25 2000 Oversight Hearing on High Definition Television
(HDTV) and Related Matters; Submission for the Record

Dear Mr. Chairman:

The Consumer Electronics Retailers Coalition ("CERC") supports your commitment to ensuring that consumers be allowed to receive the benefits of digital technology, including HDTV. Accordingly, CERC asks that the attached *Response of the Consumer Electronics Retailers Coalition to the July 7, 2000 Cable Industry Status Report* be included in the hearing record.

In the course of the July 25 hearing, you asked Deborah Lathen, Chief of the Federal Communications Commission's Cable Services Bureau, "Is the Commission moving on any interoperability standards?" Ms. Lathen observed that the cable industry has met the Commission's July 1st deadline for compliance with FCC Navigation Device regulations, by making available some "Point of Deployment" security modules ("PODs") designed to support competitive Navigation Devices. (Ms. Lathen did note with concern that ten cable system operators are not in compliance with the rules pertaining to "hybrid" boxes.)

The attached CERC response provides additional information on this subject and reaches a very different conclusion. The response provides detailed factual and legal material compelling the conclusion that the cable industry has not remotely approached compliance with the July 1, 2000 obligations set forth in FCC regulations:

The Honorable William J. Tauzin
August 2, 2000
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- While some "PODs" may be available, specifications to allow competitive entrants to build Navigation Devices utilizing such PODs were not available on a timely basis. The specifications most important to competitive entry may not be complete for some period of time.
- Even if such products could have been built by July 1, only a "draft" of a license allowing the production, distribution, and connection to cable systems of such products has been available. Negotiations over this draft, which would violate FCC regulations by imposing serious, extraneous constraints on home recording, and on routing HDTV signals to receivers, have been bogged down since late May. The Commission has an open proceeding, PP Docket No. 00-67, that is examining this issue.

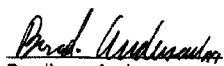
Despite passage, under the leadership of this Committee, of Section 304 of the Telecommunications Act of 1996 (now Section 629 of the Communications Act), and the FCC's issuance of regulations in June of 1998, the cable industry persists in providing separate, and inferior, technological support to competitive entrants. There are no competitive entrants, and a level technological playing field is not yet in sight.

CERC welcomes the subcommittee's continued interest in this subject.

The Honorable William J. Tauzin
August 2, 2000
Page 3

Sincerely,

CONSUMER ELECTRONICS RETAILERS
COALITION



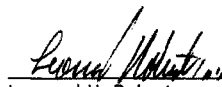
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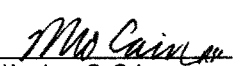


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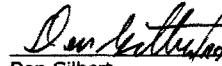
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Before the
Federal Communications Commission
Washington, D.C. 20554

In the Matter of	)	
	)	
Implementation of Section 304 of the	)	
Telecommunications Act of 1996	)	CS Docket No. 97-80
	)	
Commercial Availability of	)	
Navigation Devices	)	

**Response of the Consumer Electronics Retailers Coalition
to the July 7, 2000 Cable Industry Status Report**

August 2, 2000

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	)	
Commercial Availability of	)	
Navigation Devices	)	

**Response of the Consumer Electronics Retailers Coalition
 to the July 7, 2000 Cable Industry Status Report**

The Consumer Electronics Retailers Coalition, through its attorneys, respectfully submits its response to the Status Report filed with the Commission in the above proceeding.¹ CERC urges the Commission, in exercise of its declared oversight obligations, to scrutinize and address the areas in which the Cable industry clearly has failed to enable competitive market entry by CERC members² and others.

I. Introduction and Summary

The July 1 deadline for support of competitive entry by the OpenCable

¹ Status Report, *In the Matter of Implementation of Section 304 of the Telecommunications Act of 1996; Commercial Availability of Navigation Devices*, CS Docket No. 97-80 (filed July 7, 2000) (the "Status Report"). The Status Report was filed by the National Cable Television Association and also signed by AT&T Broadband & Internet Services, Time Warner Cable, Jones Intercable, MediaOne Group, Charter Communications, Advance/Newhouse Communications, Cox Communications, Comcast Cable Communications, Motorola Broadband Communications and Scientific-Atlanta.

² CERC is comprised of the major U.S. retailers of Consumer Electronics ("CE") and Information Technology ("IT") products: Best Buy Co., Inc., of Minneapolis, Minnesota; Circuit City Stores, Inc., of Richmond, Virginia; RadioShack (formerly Tandy) Corporation, of Fort Worth, Texas; and Sears, Roebuck & Co., of Chicago, Illinois. CERC also includes major retail trade associations, the International Mass Retail Association ("IMRA") and the National Retail Federation ("NRF"). CERC has participated actively in the Commission dockets affecting cable devices including: ET Docket 93-7 and PP Docket 00-67, as to "cable compatibility," and CS Docket 97-80, intended to enforce Section 304, the "competitive availability" provision of the 1996 Telecommunications Act. CERC and its members were also active in persuading the Congress to pass Section 629. CERC has filed Reply Comments *In the Matter of Implementation of Section 17 of the Cable Television Consumer Protection and Competition Act of 1992; Compatibility Between Cable Systems and Consumer Electronics Equipment*; ET Docket No. 93-7; Comments and Reply Comments *In the Matter of Implementation of Section 304 of the Telecommunications Act of 1996; Commercial Availability of Navigation Devices*, CS Docket No. 97-80; Reply Comments *In the Matter of Compatibility Between Cable Systems and Consumer Electronics Equipment*, PP Docket No. 00-67.

initiative has come and gone, yet not a single product competitive with those of the entrenched industry suppliers has emerged. NCTA blames retailers, for "not ordering" the products offered by the incumbents.³ In fact, however, it is Cable industry decisions that have kept competitive products off the market:

- The Cable industry has still not extended a production license to competitive entrants. These manufacturers have been offered only an "interim" license for evaluation purposes, which specifically does not allow product production or distribution, and a "draft" production license. The Status Report contains not a single word about the licensing roadblock to production, which was formally called to the attention of the FCC on February 2.
- Specifications for *both* interactive and non-interactive OpenCable devices were not completed in time for any new entrant to go to market by July 1, even if a production license had been available from CableLabs. It is also not clear that the PODs available today would work with competitive products if they were on the market.
- The Status Report claims that OpenCable supports non-interactive products by citing product "offers" to retailers from the entrenched industry suppliers. It calls this "first generation" compliance. It then disclaims any responsibility to support competitive interactive products, even though such products are already being offered by MSOs. It cannot point to a single product offering, interactive or non-interactive, from any competitive entrant.

II. There Cannot Be Competitive Entry Until OpenCable Specifications Adequately Support OpenCable-Compliant Products.

From the moment the Commission issued its Navigation Device Report & Order⁴ requiring technical specifications to enable real competitive entry, and set deadlines for supporting such entry, the Cable industry has pretended that its only obligation would be to make "POD" modules available to entrants. Although having such modules available is meaningless without an adequate specification for "host devices" and a license to build them, the Cable industry has never acknowledged a duty to do more than "have PODs available" by July 1. The situation described in the Status Report is the absurd result of an absurd interpretation.

³ See, e.g., *Status Report* at 6.

⁴ *In the Matter of Implementation of Section 304 of the Telecommunications Act of 1996; Commercial Availability of Navigation Devices*, CS Docket No. 97-80, *Report & Order*, 13 FCC Rcd 14775 (Rel. June 24, 1998) (*Navigation Device R&O*); *Order on Reconsideration*, 14 FCC Rcd 7596 (Rel. May 14, 1999) (*Navigation Device Reconsideration Order*).

In the Navigation Device Report & Order, the Commission soundly rejected arguments that a non-technical approach, based on broader distribution of the products of existing suppliers, would be adequate to comply with Section 629. Rather, the Commission stressed that support for competition, competitive entry, and technical innovation was vital to accomplishing the Congress's goals. Yet by focusing only on an obligation to produce "PODs," and disclaiming any responsibility to provide a technical specification that would support competition with entrenched providers, the Cable industry ignores this Commission determination. By this logic, railroad tracks, without trains, would constitute "rail service."

The OpenCable project has, in general, acknowledged the need to provide specifications enabling the manufacture of competitive products. Through its actions, however, the industry has effectively disclaimed any obligation to enable these specifications to support competitive products:

- It allowed MSO-provided devices to remain on a different technical track from OpenCable devices, ensuring that OpenCable devices would not offer competitive features and functions when they became available.
- It institutionalized the inferior support for OpenCable devices by separating the specifications for interactive and non-interactive OpenCable devices and assigning a lower and slower priority to interactive devices.
- It failed to devote adequate resources to either the non-interactive or the interactive specification. Even the non-interactive specification was not available in time for design and specification of products.

The Commission delegated to OpenCable the responsibility to meet these technical objectives. OpenCable's failure has become the Commission's. The FCC said in the initial Navigation Device Report & Order and on reconsideration that, in the event of any such failure, it would have to consider further courses of action.⁵ Now is the time for such action.

A. The Specification For Non-Interactive Products Was Not Complete In Time To Support Competitive Entry By July 1.

Having a complete and reliable specification is only the beginning of the

⁵ Navigation Device R&O ¶ 120, 132; Navigation Device Reconsideration Order ¶ 41.

process for competitive entrant manufacturers. It takes substantial time, thereafter, to complete processes of product design and specification, design and procurement of components, fabrication of integrated circuits, and product manufacture, testing, and distribution. Scrutiny of the Status Report itself shows that even as to the "higher priority" non-interactive specification, CableLabs fell far short of supporting competitive entry by July 1.

1. The Non-Interactive Specification Was Not Available In Time To Support Competitive Entry, Even If A Production License Had Been Available.

After a specification is published, the specification must be validated before a product design can be finalized and actually released for production. Just because the uni-directional specification and the host-POD interface specification were "finished" does not mean that the process is complete. The finished specifications were not validated until June 2000 – too late to allow any manufacturer to move into production and release products by July 1, 2000.

Moreover, a number of manufacturers still question whether the validation process completed in June included appropriate interoperability and performance testing. While the consumer electronics industry may move ahead despite some validation uncertainties, they must be minimal or manageable. This is not the case even with the non-interactive specification that CableLabs cites as evidence of the Cable industry's compliance with its Navigation Device responsibilities.

This problem is multiplied by the fact that the draft DFAST license includes robustness requirements that impact both electronic and mechanical design elements. These requirements have been and continue to be the subject of discussion and negotiation. No production designs can be completed for manufacture until these requirements, as well as their interpretations, are finalized. Many manufacturers will not assume the risk associated with making consumer electronics devices in the face of such uncertainty, thereby stalling production availability.

2. There Is No Assurance That The Available PODs Would Work With A Range Of Competitive Entrant Host Devices.

As of July 1, the range of testing of PODs – available as yet only from Motorola/General Instrument ("GI") and Scientific Atlanta ("SA") – remains far from

complete.⁶ There is assurance that SA PODs work with SA host devices and GI PODs with GI host devices, and a lesser degree of assurance that GI and SA PODs will work adequately with each others' host devices. As to new entrants, however, the host specifications were so late that there has been only scattershot testing as to whether GI or SA PODs in fact will work with the competitive products once they finally become available.

There will be reliability issues for CERC members until the Cable industry gives consumer electronics manufacturers everything they need to make and sell Navigation Devices that consumers trust will work to receive the full panoply of services offered by their cable company and any other cable company. As of July 1, the Cable industry is nowhere near to fulfilling this requirement even for non-interactive devices and their corresponding PODs.

B. There Is No Interactive Specification That Meets The Essential Competitive Requirements Set Forth By The Commission In Its Report & Order And On Reconsideration.

The authors of the Status Report note correctly that CERC members believe that their products should offer features competitive with those that are routinely included on MSO-provided products. This reasonable expectation is fully supported by the Commission's guidelines set forth in the Navigation Device Report & Order and the Reconsideration Order. To be competitive with MSO-provided products, and useful to consumers as purchases, (1) the device itself should offer one-button interactivity in the selection of on-demand programming or other services, just as MSO-provided devices do today, and (2) as the Commission has observed repeatedly,⁷ to be competitive and useful to consumers the product must access, perform, interact with and otherwise support all functions provided on any OpenCable MSO system.

⁶ This statement applies at best to digital PODs. As NCTA admits "Analog PODs do not exist now – or likely ever." Comments of the National Cable Television Association in Support of Waiver Requests, *In the Matter of Petition for Waiver From Requirement to Provide Point of Deployment Modules*, CSR 5560-Z, at 3 (filed July 20, 2000). Consequently, the PODs needed for hybrid Navigation Devices do not exist, despite the Commission's finding and U.S. Court of Appeals affirmation that such a requirement is needed to fulfill the pro-competitive goals of Section 529.

⁷ See discussion in Section I.B.3 below.

1. User Interactivity Is An Essential Video Programming Service.

Congress explicitly instructed the Commission in Section 629 to assure competitive, commercial availability as to devices necessary to receive *all* services offered by MVPDs. Section 629 says that the Commission, through its regulations, must assure competitive commercial availability of equipment used **"to access multichannel video programming and other services offered over multichannel video programming systems"**⁸

It seems clear that the ability to select video programs is a core feature of a Navigation Device for a Multichannel Video Programming Service. Even were it not so considered, however, the law explicitly applies as well to "other services" offered by the distributor. So, whether or not device interactivity is considered to be a part of the video service, or an additional service, it is clearly covered by Section 629. Failure to achieve competition, with respect to this service, in Navigation Devices constitutes failure of the FCC regulations to assure competitive commercial availability of Navigation Devices.

2. There Is No Specification That Supports Interactivity Such As To Allow Competitive Entry.

Early in the OpenCable project, the cable systems that control CableLabs chose a technical path for the devices they provide themselves that is crucially different from their prescription for competitors. MSOs wanted urgently to support device interactivity in their *own* products. So for these, they allowed design "shortcuts" – tailoring interactive applications to specific proprietary hardware platforms and operating systems. They recognized no such urgency with respect to OpenCable competitors, however. They decided that OpenCable devices should achieve interoperability by a means independent of specific hardware and operating systems. So interactivity for OpenCable devices would have to await the selection and construction of a new "middleware" application layer.

This decision spelled curtains for real competition by July 1, 2000: MSO devices are interactive today, but a similar specification for OpenCable devices

⁸ 47 U.S.C. § 549(a).

remains mired and stalled.⁹ The director of the OpenCable program has been quoted as *hoping* that such capability may be within reach in another 18 months.¹⁰ Rather than admit to this problem, however, the Status Report responds that interactivity could be had sooner – *so long as it is tailored for only one specific MSO system*.¹¹ The Commission has recognized, however, that such a product would not meet its expectations as to competitive commercial availability.

3. The Commission Has Repeatedly Emphasized That Competitive Entry Depends On A National Market And User Portability Among Systems.

In the Navigation Device Report & Order the Commission discussed at length why competitive entry is possible only in the context of a national market and user portability. It said:

- The steps taken in this *Report and Order*, if implemented promptly and in good faith, should result in an evolution of the market for navigation devices so that they become generally and competitively available through commercial outlets. *****¹²
- This requirement will facilitate the development and commercial availability of navigation devices by permitting a larger measure of portability among them, increasing the market base and facilitating volume production and hence lower costs.¹³

⁹ See Time Warner Reply Comments *In the Matter of Compatibility Between Cable Systems and Consumer Electronics Equipment*, PP Docket No. 00-67 (Filed June 8, 2000). Time Warner admits that "[a] digital television equipped with a POD will not, at least initially, be able to perform" such features and services including "impulse pay-per-view and video on demand with one button, interactive ordering and interactive electronic programming guides offered in connection with cable service." "This is because ... a two-way compliant POD/host combination has yet to be developed that is capable of supporting the same level of graphics, two-way interactivity and flash memory capabilities available with a set-top box." *Id.* at 2-3. It also acknowledges that the DFAST license that manufacturers need in order to make and sell all forms of Navigation Devices, including televisions and VCRs, is still a "proposed" license. *Id.* at 9.

¹⁰ Don Dulchinos, Senior Director of Advanced Platforms and Services at CableLabs has said that the first such interactive OpenCable-compliant set top boxes will not become available until the "holiday 2001 time frame." David Iler, *SCTE Seeks Middleware Standard for Set-Tops*, *Broadband Week*, June 5, 2000, at 358.

¹¹ The industry also insists that this drawn-out delivery time is acceptable because the only thing OpenCable had to accomplish by July 1 is POD availability. Cable industry representatives attending the Bureau's June 26, 2000 POD waiver meeting said as much in support of their position that the various POD waiver petitions were properly limited only to the petitioners' inability to provide PODs for hybrid devices. This interpretation cannot be correct because it provides no help for consumers and is contrary to the express wish of the Congress.

¹² *Navigation Device R&O* ¶ 13 (emphasis added).

¹³ *Id.* ¶ 49.

- Any significant disparity among cable operators ... undermines the commercial availability of equipment. Subscribers are more likely to purchase, and not lease from a provider, if they can use the navigation device when they move to an area served by a different operator. *** Geographic portability will enhance the commercial availability of navigation devices and should result in wider choice and lower prices to consumers.¹⁴
- Further, as noted, in requiring the separation of security devices, we seek to expand the portability of equipment, thereby permitting consumers to purchase navigation devices with some assurance that the equipment can be used beyond its present location. *** Our rule provides that when an MVPD supports navigation devices that are portable throughout the continental United States, and are available from retail outlets and other vendors, the requirement for separation of functions is not applicable. We note, however, that a device that is usable on all the systems of one particular cable multiple system operator only, for example, would not be considered portable throughout the continental United States.¹⁵

The Status Report drafters artfully quote the FCC that it did not adopt *specific* portability rules. However, the FCC plainly and repeatedly set forth what it called “general parameters” in this respect, and said it would *expressly rely* on the Cable industry to meet these parameters. Meeting these parameters is what this Status Report is supposed to be all about. The Report & Order concluded:

132. Appreciating the tension reflected in the comments and without any current proposal for specific standards before us, we believe the best course of action at this time is to establish general parameters and to evaluate how the efforts to comply with these mandates progresses. We have made clear that the requirements we do adopt are necessary to commence the evolution to commercial availability of navigation equipment. We are relying on the relevant industries to make progress towards achieving portability and interoperability, and in other areas. **If they do not, or if the effort is unduly delayed, it will be necessary for the Commission to consider whether further action is necessary.**¹⁶

The Navigation Device Reconsideration Order concluded:

¹⁴ *Id.* ¶ 61.

¹⁵ *Id.* ¶ 66.

¹⁶ *Id.* ¶ 132 (emphasis added).

Time Warner also seeks clarification that the phrase "function with other navigation devices" used in Section 76.1204(b) does not mandate portability or interoperability. The Commission did not mandate that navigation devices be portable or interoperable. In this regard, Section 76.1204(b) does not address portability or interoperability. Rather, it requires that MVPDs provide security modules that connect to and function with navigation devices through the use of a commonly used interface or an interface that conforms to appropriate technical standards promulgated by a national standards organization. In the *Navigation Devices Order*, we stated that the Commission has not adopted **specific** rules that mandate portability or interoperability, although we noted that **portability and interoperability increase the likelihood of subscribers obtaining navigation equipment by purchasing it.** The Commission further stated that "[w]e are relying on the relevant industries to make progress towards achieving portability and interoperability, and in other areas. If they do not, or if the effort is unduly delayed, it will be necessary for the Commission to consider whether further action is necessary." **In the cable context, we understand that the specifications being developed as part of the CableLabs\OpenCable project should enable a subscriber that purchases a navigation device manufactured according to the CableLabs specifications to be able to use that device on any MSO's system anywhere in the United States that operates consistent with those specifications.**¹⁷

Clearly, given the failures documented in the Status Report, it is time for the Commission to act.

4. The Cable Industry Has Framed Its Compliance Claims Around A Definition Of "Navigation Device" That Is Too Narrow.

NCTA claims that the OpenCable effort upon which the FCC said it would rely for specification development was at that time only addressing separation of security from non-security functions in **set-top boxes**, not in integrated DTV sets. Therefore, compliance with the Commission's rules does not require CableLabs to develop specifications for integrated TVs, or for that matter any other form of

¹⁷ *Navigation Device Reconsideration Order* ¶ 48 (emphasis added).

consumer electronics devices besides set-top boxes.¹⁸ The Status Report reflects an interpretation that does not comport with the FCC's mandate regarding OpenCable's specification obligations.

Navigation Devices include a variety of consumer electronics equipment, not just set-top boxes. For example, Navigation Devices are defined as "Devices such as converter boxes, interactive communications equipment, and other equipment used by consumers to access multichannel video programming and other services offered over multichannel video programming systems."¹⁹ The FCC also said, "We believe that the statutory language of Section 629 indicates that its reach is expansive.... Equipment used to access video programming ... include televisions, VCRs, cable set-top boxes, personal computers, program guide equipment and cable modems."²⁰ Thus, it is clear that OpenCable was charged with developing Navigation Device specifications that support navigation functionality and separate security in all kinds of equipment used to access video programming. Its responsibility and accountability under the Navigation Device rules does not end until this obligation is fulfilled.²¹

III. There Cannot Be Competitive Entrant Products Until The Cable Industry Extends A Reasonable And Lawful License To Competitive Entrant Manufacturers.

Even if adequate technical specifications are created, manufacturers and retailers are prevented from entering the Navigation Device market until the Cable

¹⁸ Status Report at 10.

¹⁹ 47 C.F.R. § 76.1200(c).

²⁰ Navigation Device R&O ¶ 25.

²¹ CERC also disagrees with NCTA's implied logic that because the FCC elected to rely on OpenCable to develop specifications the agency intended to limit OpenCable's responsibilities to the scope of what OpenCable was working on at the time. The Navigation Device rules and underlying orders make clear that OpenCable's standards obligations extend well beyond set-top boxes and are not fixed by what OpenCable had on its plate in 1998.

industry offers consumer electronics manufacturers a license that allows them to make and sell Navigation Devices that function in accordance with consumer expectations. This is not possible due to the draft nature of the existing license and its illegal provisions with respect to home recording and consumer interfaces.

This state of affairs should come as no surprise to the Commission. Circuit City called the illegal nature of the first DFAST license to the Commission's attention in an *ex parte* filing on February 2 of this year.²² In purporting to impose copy protection constraints on CE and IT host devices, this version, and succeeding drafts, clearly run afoul of a plainly stated rule:

76.1204(c) No multichannel video programming distributor shall by contract, agreement, patent, intellectual property right or otherwise preclude the addition of features or functions to the equipment made available pursuant to this section that are not designed, intended or function to defeat the conditional access controls of such devices or to provide unauthorized access to service.²³

After Circuit City called this issue to the Commission's attention, NCTA and CableLabs rushed to clarify that the "DFAST" production license was merely a draft, not a final document ready for execution. It remains so today and is a key reason why the new entrant market does not yet exist.

A. *No Final Production License Has Been Offered To Any Competitive Entrant Manufacturer.*

The Status Report says that retailers have been given opportunities to sell Navigation Devices but have not accepted any of the offers extended.²⁴ But any "offers" to retailers, by the two major incumbent industry suppliers, of OpenCable products must be based on adherence to the production license that NCTA and CableLabs insist is still a "draft." In addition, negotiations involving manufacturers (including these producers) and CableLabs remain stalled. Simply put, no final

²² *Ex Parte* Letter from Robert S. Schwartz to Magalie R. Salas, CS Docket No. 97-80 (filed Feb. 2, 2000). Others have since echoed this concern. See, e.g., HRRC Compatibility Comments; CEA Compatibility Reply Comments; CERC Compatibility Reply Comments; Thomson Compatibility Reply Comments.

²³ 47 C.F.R. § 76.1204(c).

²⁴ *Status Report* at 11.

production license is available today to any competitive entrant manufacturer. Several of these manufacturers have requested an "interim" production license that would allow them to move forward until a license is finalized, but no action on this request has been taken by CableLabs. *It seems astonishing that NCTA et al. do not even refer to this "showstopper" in claiming compliance with the July 1 deadline.*²⁵

The same problem applies to PODs as, technically, the DFAST license applies to PODs, as well as host devices. So even if NCTA were correct that the July 1 deadline applies only to having PODs available, rather than to supporting the host devices in which the PODs would operate, "compliance" must depend on the requirement of a final production license being waived for the POD manufacturers. CableLabs asserts that it cannot ever bind the MSOs that own or control it. So it seems likely that PODs are being offered without the necessity of a license. This allows NCTA to trumpet that the July 1 deadline is met because PODs are available – even though no Navigation Device production license is available in order to make such PODs useful to consumers for any purpose.

B. The Draft Production License Offered By CableLabs Is Anti-Consumer And Has Been Rejected By Entrant Manufacturers.

The existing "draft" license contains onerous anti-consumer provisions as to product termination, non-support of existing DTV receivers, and home recording by consumers. Competitive entrants have been unwilling to agree to such restrictions. Rather than ignore this issue in the Status Report, the Cable industry should accept responsibility for this roadblock to competitive availability.

More specifically, the DFAST license "compliance rules" would cut off or degrade interfaces without giving recent purchasers of HDTV receivers any opportunity to obtain Navigation Devices to provide HDTV pictures to them.²⁶ They

²⁵ During the June 26 POD waiver meeting, Circuit City informed the Cable Services Bureau once again that the draft nature of the DFAST license, as well as its copy protection provisions, were obstacles to the competitive availability of Navigation Devices. Representatives from NCTA said this and the interactivity issues would be addressed in the July 7 status report. This obviously did not occur.

²⁶ See Circuit City Compatibility Comments at Section IV.

would prevent all home recording at the whim of the content provider or MSO and effectively prevent a VCR from operating as a Navigation Device.²⁷

Whether or not the Commission finds (as we demonstrate below) that such provisions are in clear violation of its regulations, it would be outrageous and an affront to the public for the FCC to allow such unilateral impositions to be put on consumers based solely on the necessity of a license to deregulate the market for home cable equipment. If the FCC were to tolerate such an imposition, it would be taking back from the public more than Congress had charged it with giving.

C. Any Copy Protection Provisions In The DFAST License Are Clearly Subject To Commission Jurisdiction And Must Be Subject To Commission Approval.

Section 76.1201 makes clear that the right to make competitive Navigation Devices available includes the right of consumers to attach and use them on the network, "except in those circumstances where electronic or physical harm would be caused by the attachment or operation of such devices or such devices may be used to assist or are intended or designed to assist in the unauthorized receipt of service."²⁸ Section 76.1203 spells out the limitations on contractual constraints, even when they are addressed to instances of harm to the network or security:

Such restrictions may be accomplished by publishing and providing to subscribers standards and descriptions of devices that may not be used with or attached to its system. **Such standards shall foreclose the attachment or use only of such devices as raise reasonable and legitimate concerns of electronic or physical harm or theft of service.** In any situation where theft of service or harm occurs or is likely to occur, service may be discontinued.²⁹

The discussion of these rules in the Report & Order notes specifically:

²⁷ See Circuit City Compatibility Comments at Section IV; HRRC Compatibility Comments at Section I; CEA Compatibility Reply Comments at Section II.b; CERC Compatibility Reply Comments at Section III; Circuit City Compatibility Reply Comments at Section II; Thomson Compatibility Reply Comments at Section II.

²⁸ 47 C.F.R. § 76.1201.

²⁹ 47 C.F.R. § 76.1203 (emphasis added). As described by the Commission in its Report & Order "[t]he rule we adopt specifically states that the right to attach does not apply to any equipment which can be used to receive, or assist in the unauthorized reception of service." *Navigation Device R&O* ¶ 32.

These standards shall be used only to prevent attachment of navigation devices that raise reasonable and legitimate concerns of electronic or physical harm or theft of service, and not as a means to unreasonably restrict the use of navigation devices obtained from a source other than the MVPD.³⁰

Simply put: to validate the draft DFAST license, the Commission would have to rule that private, non-commercial home recording by consumers amounts to "theft" of cable service. This would effectively overrule the bedrock Supreme Court decision in the *Betamax* case³¹ and would subject consumers to criminal liability for "theft of service" in 48 states.

IV. The Commission's Only Constructive Recourse Is To Require That OpenCable Specifications Apply To MSO-Provided, As Well As Competitive, Devices.

When the Commission first adopted its Navigation Device rules, it entrusted the Cable industry with the responsibility to adopt standards that would facilitate competition and consumer choice. Since that time, the Cable industry has, among other things, disavowed its responsibilities by claiming that CableLabs is not an MVPD subject to Section 629 or the Commission's rules,³² taken a narrow reading of what constitutes a Navigation Device so as to avoid enabling Navigation Device functionality in a variety of consumer electronics equipment used by subscribers,³³ flouted the Commission's mandate to make hybrid PODs available by July 1, 2000,³⁴ and effectively limited manufacturer, retailer and consumer choice in the

³⁰ *Navigation Device R&O* ¶ 38 (emphasis added).

³¹ *Sony Corp. of America v. Universal City Studios, Inc.*, 464 U.S. 417 (1984).

³² NCTA Compatibility Comments at 21.

³³ *Status Report* at 10.

³⁴ See, e.g., *Charter Petition for Waiver from Requirement to Provide Point of Deployment Modules*, CSR 5545-Z (PN Rel. May 5, 2000); *AT&T Petition for Waiver from Requirement to Provide Point of Deployment Modules*, CSR 5548-Z (PN Rel. May 11, 2000) (the "AT&T Petition"); *Insight Petition for Waiver from Requirement to Provide Point of Deployment Modules*, CSR 5558-Z (PN Rel. June 16, 2000); *Cox Petition for Waiver from Requirement to Provide Point of Deployment Modules*, CSR 5561-Z (PN Rel. June 22, 2000); *GCI Petition for Waiver from Requirement to Provide Point of Deployment Modules*, CSR 5564-Z (PN Rel. June 30, 2000); *Cablevision Petition for Waiver from Requirement to Provide Point of Deployment Modules*, CSR 5566-Z (PN Rel. June 30, 2000); *Adelphia Petition for Waiver from Requirement to Provide Point of Deployment Modules*, CSR 5567-Z (PN Rel. June 30, 2000); *Mediacom Petition for Waiver from Requirement to Provide Point of Deployment Modules*, CSR 5569-Z (PN Rel. July 11, 2000); *CableAmerica Petition for Waiver from Requirement to Provide Point of Deployment Modules*, CSR 5570-Z (PN Rel. July 11, 2000); *Time Warner Petition for Waiver from Requirement to Provide Point of Deployment Modules*, CSR 5572-Z (PN Rel. July 11, 2000).

name of system security. These efforts to redefine the scope of the Commission's well-settled Navigation Device rules demonstrate that only marketplace incentives will motivate the Cable industry to comply with federal laws.

A. MSOs Should Rely On The Same Technology That They Have Devised For Their Competitors' Entry.

The July 7 Status Report is, in reality, a compilation of the ways in which the OpenCable specification has defeated the "level playing field" mandate of the Congress and the Commission. Each "tilt" arises from CableLabs having been able to follow one set of specifications for MSO-provided devices, and another for devices to be offered by competitive entrants. Imposing further restraints on CE and IT devices, but not on MSO-provided devices, through the DFAST license would be, if one is necessary, the last straw in breaking the back of their competitiveness.

B. The Date On Which Such Reliance Occurs Must Be Moved Up At Least To January 1, 2002 To Be Meaningful.

The only reasonably reliable way to avoid such discrimination would be to *delay the imposition of any (reasonably balanced) constraints until January 1, 2002, and move up the date for full compliance with OpenCable specifications by MSO-provided boxes also to January 1, 2002.* In the Navigation Device Report & Order, the Commission clearly stated that, upon assessing the prospects for full compliance by July 1, 2000, it was reserving the right to move up this date.³⁵ Now that it has objective proof that the Cable industry is far from fulfilling its obligations, the Commission can no longer take a wait-and-see attitude. The choices are either finer, and intrusive regulation, or marketplace incentives.

³⁵ *Navigation Device R&O* ¶ 69. The failure of CableLabs to provide conditional access support for CE and IT devices on "hybrid" systems in which both digital and analog conditional access measures are employed is another area of discrimination, also in direct violation of FCC rules. See *Opposition of Circuit City Stores Inc.* in response to the pending waiver petitions by Charter, AT&T, Insight, Cox, GCI, Cablevision, Adelphia, Time Warner, CableAmerica, and Mediacom. In proposing to the Commission that the original, full analog conditional access obligations be eased in aid of MSO compliance, Circuit City and others also proposed that the "level playing field" date be moved up. *Ex Parte* Letter from Robert S. Schwartz to Magalie R. Salas, CS Docket No. 97-80 (filed Feb. 2, 2000). The Commission, in accepting the compromise suggestion, declined to move this date up at that time, but again said that it would consider doing so based on compliance developments. *Navigation Device Reconsideration Order* ¶ 33.

V. Conclusion

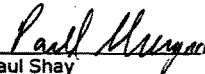
More than four years have passed since the Congress insisted that the days of forcing consumers to lease set-top boxes must end. The Commission cannot allow the Cable industry to drag its feet any longer.

Respectfully submitted,

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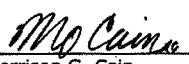
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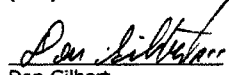

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Certificate of Service

I, Janet Davis, a secretary with the law firm of McDermott, Will & Emery, hereby certify that true copies of the foregoing Response of the Consumer Electronics Retailers Coalition to the July 7, 2000 Cable Industry Status Report was served by hand on August 2, 2000, to the persons listed below.

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William F. Schreiber
 Professor of Electrical Engineering,
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31 July 2000

Hon. Edward J. Markey
 2108 Rayburn House Office Building
 Washington DC 20515

The recent hearing re COFDM vs "8-VSB"

Dear Congressman Markey:

You may recall that I appeared before your subcommittee at the start of the HDTV Inquiry. At that time, I was director of the MIT Advanced Television Research Program. Of the various things that I said, the one that got the most attention was "HDTV is not about pretty pictures; it is about jobs and money." Although we are much less worried today about jobs or money, the shift that is underway in terrestrial TV broadcasting from analog to digital is still very important for the future health of our economy as the importance of information technologies grows.

The FCC was quite correct in deciding that over-the-air (OTA) broadcasting must shift from analog to digital. In my opinion, there is no other way to provide the spectrum that is needed for all the wealth-creating wireless services that we hear so much about. The current NTSC system, using 50-year old technology, is simply too wasteful of spectrum, requiring an allocation of 67.6-MHz channels to provide no more than 20 programs of mediocre technical quality to each viewer. By using digital transmission and the best current technology, it would be possible to provide 20 HDTV programs to each viewer in the country with an overall allocation of only 20.6-MHz channels. Alternatively, for lower technical quality, but still higher than that of NTSC, we could allocate even a smaller amount of spectrum.

Although the FCC deserves a lot of credit for understanding this aspect of OTA broadcasting, it made a serious blunder (no kinder word suffices here) in accepting the "8-VSB" modulation method that was proposed by ACATS. This error was partly technical and partly political. Reed Hundt placed much too much faith in the "free" market's ability to design TV standards that would properly serve the public interest, convenience, and necessity. The design of the system was left entirely to the industry, without adequate supervision by the Commission. In particular, the Commission failed to insist on realistic testing. As a result, *we have a system that is too unreliable to be used*. While this is not the only reason for the failure, so far, of the transition to digital broadcasting, it is a problem that absolutely must be solved for the transition to be successful enough so that analog broadcasting can be turned off without a public outcry.

I was most interested in what transpired at the recent hearing. While one demonstration surely is not sufficient to conclude anything, there have now been many demonstrations of the ease of reception of COFDM (the system demonstrated by Sinclair) under many different kinds of conditions. There have been many other examples that clearly indicate the difficulty of receiving the 8-VSB transmissions on simple antennas, especially in downtown areas. A number of those testifying in favor of 8-VSB gave false and misleading statements on these matters that were, unfortunately, not challenged by members of the Subcommittee. It should be borne in mind that

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the system approved by the FCC was submitted by ACATS in 1995 -- more than five years ago. One would think that any problems in receiver design would long since have been found and fixed if possible. *In my opinion, the 8-VSB scheme will never work well enough, no matter how much time is allowed.*

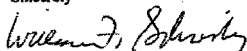
Digital OTA broadcasting using COFDM started in Britain in November 1998, the same time as in the US. Nearly one million subscribers now use the service and there have been few complaints. That penetration, taking account of the different populations, is *100 times greater* than in the US.

It is not as if COFDM was unknown to the American system proponents. The FCC as well as the system proponents in the Grand Alliance were fully informed about the advantages of COFDM -- about its much better performance in the presence of multipath (ghosts), its ability to support single-frequency networks that would completely solve the problem of finding spectrum for LPTV stations, and its ability to provide more service in a given spectrum allocation than single-carrier systems such as 8-VSB. For a variety of reasons, all specious, ACATS turned down COFDM.

In order not to make this letter too long, I have placed in an appendix some material relating to the history of COFDM and my own involvement in it. For the sake of full disclosure, I should say that I have some patents in the field, assigned to MIT, but I do not expect to make any money from them, no matter what happens to digital broadcasting in the US.

I would like to get the substance of this letter into the hands of Mr. Tauzin and whoever on his staff is following this matter, and I solicit your suggestions as to how to do this.

Sincerely



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Appendix: Some OFDM History

I first heard about OFDM on a trip to Europe in the late 80s, and called it to the attention of the chief engineer of the FCC on my return. OFDM was invented at Bell Labs in 1965, and the "C" (coded) was added, by CCETT (a French government lab.) in the middle 80s. By that time, it had been tested for audio in Europe and Canada with good results. Virtually all the labs then working on it had come to the conclusion that it was the right system for DTV broadcasting because of its good multipath performance. When I first described it to the FCC point man, he said that such a system could not possibly work. (A famous mathematician once "proved" that FM was impossible because it has an infinite spectrum.) Eventually, however, the FCC changed its mind and directed ACATS to investigate COFDM, which it reluctantly did.

I was sufficiently impressed by the possibilities of COFDM that I decided to take two more PhD students after my formal retirement from MIT in 1990. The project was funded partly by Scitex, an Israeli company for which I had been a consultant, and partly out of patent royalties due me at MIT, i.e., out of my own pocket. Eventually, the two students, Mike Polley, now at TI, and Susie Wee, now at HP, simulated a complete system. It was a multiresolution system with three levels of quality, using both OFDM and spread spectrum. The base-level signal – about NTSC resolution – had a 6-dB threshold. It worked with 0-dB echoes, and is described in my paper "Advanced Television Systems for Terrestrial Broadcasting," Proc. IEEE, 82, 6, June 1995, pp 958-981. I have a few copies of a complete report, including this paper and the two theses, for anyone who is seriously interested.

The group I was then working with at MIT decided that it would be useful to have a meeting of all those working on the subject as a means of informing the FCC and the various DTV system proponents of this new technology, then relatively unknown in the US. We had the assistance of Ken Davies of the Canadian Broadcasting Corp and Gary Tonge of the Independent Broadcast Authority in the UK in organizing the meeting and inducing the Europeans to come. All the American system proponents were invited as well as the FCC. The meeting was held at MIT in October 1992. *Every lab in the world working on COFDM was represented, but almost no system proponents or FCC people came.* I still have a number of the refusal letters; they were all "too busy."

The next year, a committee representing ACATS did go to Europe in accordance with the FCC directive. My opinion is that they were simply going through the motions and were fully determined to find nothing that would change their development plans. One of the stated reasons for the turn-down was that their own system had already been fully developed, and COFDM was in its infancy, to the extent that no equipment could be purchased to be tested under US conditions. Now, seven years later, some of the VSB proponents are asking us to wait while it is further developed. VSB was approved by ACATS in 1995, so one would think that in the ensuing four years, whatever work needed to be done to eliminate its problems would have been done by now.

William F. Schreiber, 13 July 1999



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September 1, 2000

The Honorable W.J. "Billy" Tauzin
Chairman
Subcommittee on Telecommunications, Trade,
and Consumer Protection
2125 Rayburn House Office Building
Washington DC 20515-6115

Dear Chairman Tauzin:

Thank you for allowing me to testify before you and the Subcommittee on June 24. We greatly appreciate the Subcommittee's decade-long commitment to promoting a smooth, rapid, and consumer friendly transition to digital television (DTV).

At the hearing, you asked what Congress could do to help move the DTV transition forward. We urge the following:

Insist that broadcasters fulfill their commitment to the American public by transmitting HDTV programming.

As noted in our testimony, broadcasters publicly committed before Congress to provide free over-the-air high definition television (HDTV) to the American people in exchange for the loan of an additional channel of public broadcast spectrum. Unfortunately, now that the broadcasters have the spectrum in hand, promises of abundant HDTV programming have not been fulfilled. While broadcasters today have the ability to provide HDTV to millions of Americans, HDTV programming is scarce and even less appears to be on the way for the upcoming year.

Instead of transmitting HDTV, most broadcasters are now using their digital channel to show unconverted analog programming. Since unconverted analog has a resolution far below HDTV, it results in a much less compelling viewer experience. During our demonstration before the Subcommittee, as we channel surfed between the PBS/WETA HDTV picture and the unconverted analog offerings of other broadcasters, the difference in quality was manifest.

Indeed, the scarcity of over-the air broadcast HDTV programming is the greatest threat to the DTV transition. Lack of HDTV threatens to diminish consumer interest in this new technology, extending the transition timetable and postponing the return of the spectrum to Congress.

The Honorable W.J. "Billy" Tauzin
 September 1, 2000
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As you noted at the hearing, broadcaster abandonment of HDTV is a "deal breaker". We urge you to insist that broadcasters step up to the plate, fulfill their commitments to Congress and the American public, and provide a reasonable amount of HDTV programming.

Instruct the FCC to reject the cable industry's proposed, "DFAST" license that would allow the cutoff of digital signals to DTV sets that are already in consumers' homes.

The Federal Communications Commission (FCC) is currently in the midst of a proceeding (PP Docket No. 00-67) that will decide whether cable systems will be allowed to deliver high-definition digital signals compatible with the DTV receivers now in consumers' homes. The Commission's order is due to be released on September 14.

At issue is the legality of the cable industry's proposed license (the "DFAST" license") under the Telecommunications Act and the Commission's rules. This license contains provisions, drafted by the content industry that would allow digital cable operators to prevent home recording and not provide HDTV signals to the DTV receivers now available to consumers.

The cable and motion picture industries argue that such a license falls within FCC regulations that allow cable operators to guard against "theft of service." CEA and others have challenged this license because it wrongfully defines as "theft of service" any noncommercial home recording, even if the consumer paid for and is authorized to receive the cable signal.

Practically speaking, this license would allow cable companies unilaterally to cut off or degrade any HDTV signals that move through the only interfaces with which all DTV sets are currently equipped. The "DFAST" license would also grant complete and unilateral authority to program distributors over what consumers can or cannot record.

The DFAST license has tremendous public policy implications for every American consumer, and decisions on this issue should not be made in a regulatory vacuum. We urge you to instruct the FCC not to approve cable's proposed "DFAST" license, and instead to encourage agreement on balanced recording rules that protect consumers' reasonable and customary home recording practices, and do not obsolete current DTV sets.

The Honorable W.J. "Billy" Tauzin
August 31, 2000
Page 3

Promote DTV device portability and consumer confidence by maintaining VSB as the single terrestrial broadcast standard for the United States.

In your remarks at the Hearing, you emphasized the importance of Americans being able to purchase a DTV receiver and move around the country knowing that they will get DTV reception in any location.

We share your priority of nationwide portability of DTV equipment, and that is why we urge that VSB remain the single nationwide DTV broadcast standard for the United States.

The efforts of some parties to add new incompatible DTV broadcast standards such as COFDM to the current system would sow confusion in the marketplace and threaten nationwide portability. With a multiplicity of standards in use, a consumer moving to a new location would have no way of knowing which of the multiple transmission systems were in use in that area.

As retailer Tom Campbell of Ken Crane's Home Entertainment Centers testified during the Hearing:

"DTV customers are not going to be happy if somebody changes the rules. They're going to be very upset if they learn the new DTV set is not going to work anymore...with all local broadcast stations because some of the stations may have changed to a broadcast system that their sets won't receive."

Mr. Campbell's warning is reaffirmed by Lee Simonson of Best Buy, who recently stated:

Personally, I don't know what the industry will do if that standard is revised. [If current products cannot receive the new standard] there will be significant reworking to do, at the risk of alienating every customer who bought one of those sets over the last two years. It could also cause other consumers significant apprehension about buying a digital television of any form in the future" (DTV Guide, July 2000).

Even COFDM proponent Sinclair acknowledges the confusion that the existence of multiple broadcast standards would inflict. In his white paper "Facing the Digital Sign Off: Why We need a DTV standard", Sinclair VP Nat Ostroff admits that:

[multiple broadcast standards] would not only create chaos, but would so fragment the market that no serious manufacturer could invest in the tooling to produce multiple standard receivers in such a market. The effect on the consumer would be to drive up their cost and perhaps render their TV set useless in anyplace but their current hometown.

The Honorable W.J. "Billy" Tauzin
 August 31, 2000
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We agree with Sinclair's conclusion. The fact that Sinclair now asks Congress for assistance in creating the very "chaos" they warned about should give the Committee great pause with respect to their ultimate intentions toward the DTV transition.

The VSB standard was chosen after a decade of research because of its large coverage area, high bit rate, and resistance to noise and interference. Even in its initial implementation, VSB worked very well for the vast majority of consumers in the vast majority of locations.

Since then, subsequent generations of DTV equipment have demonstrated improved performance. Moreover, this trend will continue, propelled by a hotly competitive consumer electronics market. Improvements have been documented by recent field tests such as those conducted by CBS (entered into the Hearing record) which showed that VSB offered virtually 100% reception in the Philadelphia market.

The current standard works and is already implemented in homes and TV stations across the country. We urge that Congress maintain consumer confidence and DTV device portability by ensuring that VSB is maintained as the single terrestrial broadcast standard for the United States.

Vigorously oppose those with proprietary interests in delaying the DTV transition.

The DTV transition is now underway, and a strong consumer market is emerging. More than a dozen manufacturers have produced more than 200 DTV products, which are being sold at more than 900 locations nationwide.

In just over a year, prices of some DTV products have plummeted by half, even as the performance and features offered by DTV products continue to improve. Indeed, at your Hearing Matt Miller of NextWave demonstrated a PC receiver chip that will allow any PC to receive DTV signals for \$299.

Meanwhile sales continue to increase. In the first six months of this year our industry has sold more DTV products than in all of 1999—this in spite of a lack of programming support from most broadcasters.

Most importantly, consumers are satisfied. Retailers—those who deal with customers face-to-face every day—report an overwhelmingly positive consumer response. As Tom Campbell told the Committee, "when [consumers] see it, they love it, and they want it right now...[T]hose consumers who are buying DTV products are highly satisfied." Mr. Campbell went on to report that over 60% of his big screen sales now consist of DTV sets.

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While the sales momentum heads in the right direction, time becomes the enemy of a successful transition, and any radical change in the standard—or even the perception of uncertainty-- would cause unacceptable delay.

It is widely acknowledged that a significant change to the standard, such as the addition of COFDM, would take two to four years. This delay would halt DTV's momentum, shatter consumer confidence while depriving Americans of DTV services, penalize broadcasters who have already invested in transmission equipment, and indefinitely delay the return of the analog spectrum to Congress. Such a result is surely not in America's public policy interest.

For this reason, we ask you to look closely at the motives and interests of those who advocate delay. We are afraid that a vocal minority of broadcasters are using the "standards issue" as a proxy for their desire to embark on different business plans that do not involve free television, to reap a financial windfall on their analog spectrum, or simply to put off investment in DTV for as long as possible.

In fact, broadcasters who urge the implementation of the COFDM standard generally point to COFDM's purported advantage in providing mobile or data services, rather than any advantage in providing free-over-the-air broadcast service. These requests to change the standard solely to enhance mobile services should raise serious issues regarding Congress' intent in providing a free second channel for DTV broadcast services.

In addition, recent reports by the Wall Street Journal and the New York Times [attached] indicate that some broadcasters now occupying bands 60-69 have announced that they will delay handing back their analog spectrum for as long as possible in the hope that the spectrum's value will increase and that mobile providers will be forced to pay inflated sums for an early departure.

It is wrong for any broadcaster to deliberately ignore the intent of Congress, hold the analog spectrum hostage, and delay the transition to DTV in order to reap a windfall with the public airwaves. It is hardly a coincidence that the broadcast groups as identified by the Times and the Journal as engaging in this scheme, such as Paxson and Sinclair, are also the most outspoken advocates for reopening the broadcast standard debate.

In addition, Sinclair VP Nat Ostroff recently assumed the additional position of President and CEO of Acrodyne, a transmitter company in which Sinclair has a major financial interest. As a manufacturer of analog transmitters, Acrodyne stands to benefit from any delay in the DTV transition that perpetuates the analog transmitter market. Acrodyne acknowledges this in its May 16 press release, which notes that:

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"[t]he industry is beginning to experience resurgence in the purchase of analog equipment...delay in the conversion from analog to digital has given [Acrodyne] the opportunity to reposition the company from a niche to a mainstream supplier of transmission and services."

Congress should have little tolerance for those parties who have already received public spectrum and now see financial benefit in delaying DTV and postponing the recovery of the analog channel. We urge Congress to scrutinize the motivations and forcefully reject the claims of those who have proprietary interest in slowing down the DTV transition.

Notwithstanding the efforts of those who seek delay, the DTV transition is well underway. DTV receivers are in the stores, and consumers have embraced the product. A variety of producers, notably cable and direct-to-home satellite, have recognized its potential and are producing programming. And manufacturers remain committed to ensuring the most rapid and consumer friendly transition to DTV.

As the worldwide leader in digital television, it is clearly not in America's interest to bring the transition to a standstill by embracing delay or engaging in yet another prolonged standards debate. DTV stations are on the air. DTV receivers are in the stores and homes. It's time to get on with it.

Please feel free to contact me with any questions that you or your staff may have.

Sincerely,



Gary Shapiro
President and CEO

CC: The Honorable Thomas Bliley
The Honorable Michael Oxley
The Honorable Edward Markey
Members of the House Committee on Commerce
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The Battle of the Bandwidths; Space Is Coveted as Wireless Expands

By STEPHEN LABATON

Traveling recently through Morocco, Lowell W. Paxson marveled when he used his cell phone to view a street map enabling his driver to find an obscure restaurant there.

But to his critics in the telephone and regulatory worlds, Mr. Paxson, the chairman of Paxson Communications, which owns a string of mostly small television stations, now seems to be one of the biggest impediments to the proliferation of such technology in the United States.

With the volume of Internet traffic doubling every 100 days and with that traffic rapidly migrating from personal computers to wireless devices like cell phones and hand-held computers, the airwaves are running out of free space. And much of the airspace coveted by the makers of wireless devices is in the hands of Mr. Paxson and a small group of other broadcasters, including Barry Diller of USA Networks and the Sinclair Broadcast Group, a major broadcaster based in Baltimore.

The spectrum space controlled by the broadcasters was once viewed as virtually worthless, but it is now perhaps one of the most valuable assets in the new information age, as important as oil and coal were in the industrial revolution. Cell phones, hand-held personal digital assistants, laptop computers and other wireless devices need spectrum space to function.

The broadcasters' sliver of spectrum space, occupying channels 60 to 69 in many major markets, was given to them free by Congress four years ago. In exchange, the broadcasters promised to make digital television widely available by 2006 and return the spectrum when they had done so.

But the development of digital television has stalled. And since the stations do not have to give up their spectrum licenses until 85 percent of all television viewers have switched to digital TV -- a milestone that may be decades off -- a bottleneck has developed, with spectrum space in extremely short supply.

As a result, telephone companies, Internet businesses, and the broadcasters

are battling to determine which companies will control the spectrum that makes the new **wireless** technology work, and at what cost. In Britain, five licenses sold for a total of \$35.5 billion in April. And government officials estimate that the space now occupied by Mr. Paxson and the other broadcasters could be worth billions.

The fight is alarming both regulators and industry executives.

"The big story is that our spectrum policy in the United States is totally messed up," said Reed Hundt, a former chairman of the Federal Communications Commission who is now on the boards of eight Internet companies (none of which is seeking a spectrum license). "And right now the F.C.C. is really holding a handful of hot coals."

The broadcasters say they cannot give up their spectrum licenses until the regulators issue rules to help accelerate the transition to digital television. They want the F.C.C. to force cable television companies to carry signals for both traditional TV and the new digital TV, expanding the so-called must-carry rules. They also want the agency to move faster to impose technical standards allowing easier coordination between digital broadcasters and cable companies.

Regulators say they are moving rapidly on some of the rules the broadcasters want but say others are unfair and, in at least one instance, probably unconstitutional.

William E. Kennard, chairman of the F.C.C., said this week that the broadcasters had made unreasonable demands on his agency, trying to use their leverage as holders of valuable spectrum licenses.

"The law put the broadcasters completely in the driver's seat," he said. "The broadcasters made a deal with the United States Congress. They promised a lot of key people in Congress that if you give us this spectrum, we will give the public high-definition television. But nobody really said that the American public wanted it or what the business plan was. There were a lot of promises made, but none has been fulfilled."

For their part, the telephone and Internet companies say they cannot make plans to buy the available spectrum -- or even draw up business plans that include the use of the spectrum -- until they know how and when the broadcasters will make it available and at what price. The telephone companies interested in acquiring frequencies include Verizon Communications, Voicestream, BellSouth, Nextel, Sprint and a joint venture of BellSouth and SBC Communications.

The dispute has raised significant concerns that venture capitalists and investors in **wireless** technology will shift their attention to Europe and Asia. Officials there, unencumbered by the kinds of laws that have restricted the F.C.C., have been moving swiftly this year to liberate the airwaves for newer uses. The effect of this would be to shift technology investment overseas, and, as a result, technology innovation and development as well.

Congress had ordered the F.C.C. to auction the pieces of the channel 60 to 69 spectrum that are not in the hands of the broadcasters -- chiefly pieces outside urban areas -- sometime this year. But many telephone and Internet

companies have been unwilling to put together significant business plans or bids, preferring to wait until spectrum in major markets is available.

As a result, the F.C.C. has rescheduled the auction three times this year, and this month the agency announced it would not sell the available spectrum until next spring. Broadcasters and Internet executives say that even that new date may be overly optimistic because the agency is likely to be undergoing a transition to new leadership after the presidential election. As a consequence, they say it is probable that these issues may not be resolved for more than a year.

Some regulators have blamed Congress for giving away such a valuable asset, while others fault the broadcasters for failing to live up to their promise to rapidly roll out digital television. Had the broadcasters managed to do so, they would have then vacated the extra spectrum they were given for the transition, averting the current situation.

But Mr. Paxson, who was in Washington this week pressing Congressional aides to prod the F.C.C. to adopt must-carry and other rules favorable to the broadcasters, blamed in large part what he called the incompetence of the F.C.C. and its inability to move quickly for the failure of digital television.

"On this subject, digital television, Kennard gets at F," Mr. Paxson said. "Other than that, he has done a great job."

For months, Mr. Kennard has been warning of a spectrum drought caused by demand outstripping supply just as the Internet migrates from the wire to wireless devices like cell phones and hand-held computers.

As consumers increasingly reach the Internet through wireless connections, experts fear that the heavy use of the airwaves will begin to create colliding signals and other problems that could greatly frustrate the further development of the technology.

Mr. Hundt estimates that at the current rate of growth, the government must nearly triple the amount of spectrum available for wireless Internet the next five years.

Signals transmitted on the space occupied by channels 60 to 69 possess highly desirable characteristics: they can pass through walls and other structures with great clarity and little interference.

When Congress decided to give away the spectrum to the broadcasters rather than sell it, there were some, most notably Senators John McCain and Bob Dole, who called it a terrible government giveaway. In his book about his term as chairman, Mr. Hundt has called it the "largest grant of government largess since the 19th century donation of 10 percent of the public land in the West to three dozen railroad companies in order to persuade them to build transcontinental railroads."

But government officials and industry lawyers now say that the giveaway -- valued at the time as high as \$70 billion -- will never be undone because of the enormous political strength of the broadcasters. As a result, they say, the only solution to the current shortage of available spectrum space is a negotiated settlement between the telephone companies and the

broadcasters.

For Mr. Paxson and the other owners of the stations broadcasting from channels 60 to 69, the increasing value of the spectrum presents huge opportunities. He is in the process of developing ways to use digital technology for multiple channels that will enable him to begin new networks in partnership with NBC, and the money he could get for his spectrum space would significantly increase the resources he has at hand.

Paxson Communications, which has a market value of about \$630 million, owns 19 stations in the coveted spectrum, more than any other company. By many estimates, those frequencies are worth billions of dollars to the telephone companies.

Mr. Paxson, the inventor of interactive home shopping on television more than two decades ago, bristles at any suggestion that he has been hoarding the airwaves. He brushes off complaints by rivals that he is holding back as he watches European auctions for spectrum.

"I've been doing this since 1954 and have been involved in developing more of these stations than anyone else," he said. "Am I greedy? Of course not. I've got four million shareholders who say, 'What are you doing with digital? What are you doing with spectrum?'"

Organizations mentioned in this article:

Related Terms:

Telephones and Telecommunications; Cellular Telephones; Computers and the Internet; Paging Systems

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August 11, 2000

Paxson Network Could Reap Billions In Talks With Phone Companies

By NICOLE HARRIS and JILL CARROLL
Staff Reporters of THE WALL STREET JOURNAL

Lowell W. "Bud" Paxson cobbled together broadcasting network Paxson Communications Corp. by purchasing a string of money-losing TV stations starting in the mid-1990s.

Now, like his network's best-known syndicated show, the 65-year-old Mr. Paxson may have been "touched by an angel."

Through the TV stations, Paxson, which is 32% owned by General Electric Co.'s NBC, occupies the largest chunk of the hotly contested airwaves used for UHF channels 60-69. That spectrum, as it is known, is scheduled to be auctioned off next March by the federal government primarily to the nation's cellular-phone companies, which want to use it for their next generation of wireless services.



Lowell "Bud" Paxson

Paxson and the other station owners won't see any of the money from the auctions, which could bring the government upwards of \$30 billion. But since federal rules allow the stations to keep using these airwaves until 2006 or perhaps even longer, the speculation is that the winning cell-phone companies will pay the station owners huge sums to move out of the way sooner.

Already, some say Mr. Paxson is flexing his muscles in talks with the phone companies. One person close to the discussions says the broadcaster repeatedly referred to the prized airwaves as "his spectrum." This person says Mr. Paxson also suggested that his publicly traded company should get at least \$12 billion to move his stations, based on the results of similar spectrum auctions in Britain.

Mr. Paxson, in a recent interview, said he has had very preliminary talks with a few wireless companies, in what he calls meetings of "two foreign countries coming together." But he insisted that he hasn't once mentioned a price or been given one. He conceded, however, that he stands to reap a hefty sum.

"I know I'm going to get a check ... but I have no idea what this is worth. I'm not sitting around computing what it's worth. It's not coming out of my pocket," he said.

Mr. Paxson's potential windfall is a bit of serendipity. The creator of the Home Shopping Network said he set out to build a network to run his blend of feel-good family programming, including reruns of the Viacom Inc. show "Touched By An Angel." He added, however, that he had an inkling that the spectrum would be important as well.

"I kept telling everybody the name of the game is spectrum, spectrum, spectrum," said Mr. Paxson. "I labored in a desert and built a network; now people are finding an oasis with oil under my sand."

Spectrum is a limited natural resource like oil or diamonds. It consists of a collection of various electromagnetic frequencies that surround the Earth and can carry radio and TV transmissions through the air, much like a wire can carry a phone conversation. The 700-megahertz band of spectrum between channels 60 and 69 was selected by the Federal Communications Commission for new services because it has the fewest broadcasters inhabiting it. The FCC thought it would be easier to get existing TV stations to move out of this space as they converted to digital TV and moved to a different part of the spectrum. That would ease the spectrum shortage for the wireless-phone industry.

But the transition has turned into a political quagmire that involves other owners of UHF stations using channels 60-69, including USA Networks Inc. and Sinclair Broadcast Group Inc. The problem: Paxson and the others feel they have no viable alternative.

Mr. Paxson and officials at Sinclair said they would gladly move

to the digital channels provided them by the FCC if they would have as large an audience as their current channels reach. Under current law, the broadcasters don't have to give the spectrum back until 2006. And even then, they don't have to move unless 85% of their markets have switched over to digital TV, which takes up less space on the spectrum because the transmission is compressed. Trouble is, the rollout to digital television is way behind schedule and the broadcasters don't want to move out of the analog band until digital is fully rolled out.

"I'm OK with moving as long as they can move me to a digital channel [that has a significant audience]," said David Smith, president of Sinclair Broadcast Group. But since he doesn't expect digital TV to ever get off the ground, Mr. Smith said he isn't budging no matter what kind of money wireless companies offer him for his spectrum.

The FCC hoped to auction off the band of spectrum to the wireless industry in September, leaving the carriers to figure out how they would persuade the broadcasters to clear out of the band. But the phone carriers didn't want to bid while the broadcasters still occupy the space. The carriers persuaded the FCC to postpone the auctions until March so that some of the issues can be resolved.

For his part, Mr. Paxson said that what he really wants is to persuade the FCC to enforce so-called must-carry rules, which require cable-TV systems to transmit local TV stations. His thinking: If his West Palm Beach, Fla., company has to give up spectrum for the UHF channels, essentially taking its programming off the air, then in return, the FCC should force the cable companies to carry the programming. Earlier this week, the 6-foot-6 Mr. Paxson was in Washington trying to convey his message to congressional staffers.

Seth Grossman, Mr. Paxson's executive vice president and chief strategic officer, puts it this way: "We're not gonna let go of this vine, until we have another one to swing onto."

Mr. Paxson's network was constructed over a number of years, by both building stations from scratch in big markets including Miami and purchasing stations. Among his purchases was a non-network-affiliated New York station partly owned by Dow Jones & Co. Inc., the publisher of The Wall Street Journal and WSJ.com, for which his company paid \$257.5 million. By 1998, the company launched a television network, PAXTV, to feature off-network runs of shows like "Dr. Quinn, Medicine Woman." The network now reaches 81% of the country and features some original programming.

"I was a farmer and I got lucky. Now people want to build a mall on my farm ... God bless America," said Mr. Paxson.



September 6, 2000

The Honorable Billy Tauzin, Chairman
Subcommittee on Telecommunications, Trade
and Consumer Protection
House Commerce Committee
U.S. House of Representatives
Washington, D.C. 20515

Dear Chairman Tauzin:

On behalf of Zenith Electronics Corporation, thank you for the opportunity to testify at the hearing on digital television (DTV) transition held by your Subcommittee in July. Please accept this submission for the hearing record as additional information amplifying some of the points I made at that time, and responding to some of the inaccurate comments made by other witnesses.

When I appeared before your Subcommittee, I made three basic points:

1. The DTV transition is well underway.
2. The current transmission standard works, and calls for changing it are absolutely unfounded.
3. Any change in the transmission standard at this point would be disastrous for consumers, broadcasters, and consumer electronics manufacturers, and would significantly delay the implementation and provision of DTV services to the public.

Mr. Chairman, most of the witnesses who appeared before your Subcommittee agree with these points. Further, they are frustrated that the debate about the digital television standard continues nearly four years after the DTV standard was unanimously adopted by the Federal Communications Commission (FCC). The DTV standard's ATSC 8-VSB system was chosen through an exhaustive scientific process that evaluated a number of competitors, including COFDM. This analysis included consideration of replication of service areas, power requirements, effects on analog signal reception, and carriage of data. Today, the transition to DTV is well underway with DTV signals covering nearly two-thirds of American households. However, as you pointed out at the hearing, most Americans still have not experienced what was intended to be the driving force of a rapid digital transition — high-definition television (HDTV) — and they should have that opportunity.

ZENITH ELECTRONICS CORPORATION

zenith

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The DTV Transition is Underway

Consumers who have been exposed to DTV are extremely satisfied with the technology, despite what was alleged by Mr. Mark Hyman on behalf of Sinclair Broadcasting. For example, a survey conducted this summer by the National Consumers League finds that three quarters of DTV owners describe themselves as "very satisfied" with both the picture and the sound quality of their new sets. The single biggest complaint of those surveyed was a lack of digital programming – particularly HDTV (please see attached). I must agree that, with the exception of CBS, PBS and several individual stations, the industry has been very slow to produce digital programming. Encouraging the distribution of such programming would do much to speed DTV's deployment.

Sinclair claims that the DTV transition has stalled, and that sales of DTV products are lackluster. That is not accurate. According to Mr. Gary Shapiro, who testified for the Consumer Electronics Association, more than 121,000 DTV products were sold in 1999, and in the first six months of this year, that number has already been exceeded. Mr. Tom Campbell testified at the hearing that retail sales of HDTV equipment are strong, and Zenith and other manufacturers are endeavoring to meet the growing demand. Americans are impressed by the technology, as you yourself experienced viewing HDTV during the Super Bowl.

Prices of digital televisions continue to drop. While initial costs were high (as is true of any new technology), they are coming down and various market forces will determine the speed at which these prices will continue to fall. As you pointed out in your closing remarks, consumers need to know that the TV set they use today in one market will work tomorrow in another. This gives consumers the confidence needed to make the investment in DTV, which is really an investment in the future of free, over-the-air television. Sadly, the current debate over the transmission standard and the lack of digital programming do not offer reassurances to consumers. Congress and the FCC can provide that confidence by ending the seemingly endless debate over the standard and holding broadcasters to the promises they made in order to receive free spectrum to make the transition to digital television.

The ATSC 8-VSB Standard is Working, and No Change is Needed

A. The existing standard is working

Mr. Hyman claims that the existing 8-VSB standard does not achieve its objectives and is unworkable in the United States market; therefore, Sinclair suggests we need to permit both 8-VSB and COFDM standards to be available. There is no basis for Sinclair's call to reopen the existing DTV standard. The standard works well and is already being deployed by 151 television stations whose signals cover 64 percent of American homes.

According to Sinclair, the status quo would "force DTV viewers either to obtain a line-of-sight to stations' transmitters through a large rooftop antenna, or to give up free over-the-air service altogether by subscribing to pay TV service from a cable or satellite gatekeeper." Neither of these options is true. Your Subcommittee witnessed the successful reception of multiple digital broadcast signals using the U.S. 8-VSB standard. You will recall that this live



demonstration was conducted using a simple indoor antenna – not the enormous antenna that Sinclair propped up in the rear of the hearing room. Commercially available sets, receivers and remote controls were used to “channel-surf” *without re-adjusting the antenna* – something opponents had alleged was not possible with the existing standard in an urban environment. In fact, prior to your hearing, Sinclair challenged us that: “If they can show it inside the House hearing room, we will congratulate them on having solved the problem.” Needless to say, we’re still waiting for Sinclair to deliver on that promise.

Although some early-generation DTV receivers being rushed to market encountered reception problems in unique urban areas subject to strong multipath interference, those shortcomings stemmed from the first-generation receivers and not any deficiency in the standard. As both our demonstration and the testimony of several witnesses made clear, early multipath reception issues have been addressed and manufacturers continue to improve the technology with each new generation of equipment.

B. Loss of viewers

Mr. Hyman also testified that COFDM is designed to overcome the known effects of multipath conditions, and that the 8-VSB standard fails in its most fundamental requirement – to replicate the ease of reception that exists with today’s analog television. In fact, among the greatest strengths of the 8-VSB standard is its service area replication. Mr. Dale Hatfield of the FCC pointed out at the hearing that use of a COFDM signal would reduce signal coverage and greatly increase broadcast interference, thereby disrupting the digital signal for millions of viewers. Such increased interference would necessitate reducing the power level of COFDM broadcasts, further cutting signal coverage.

My testimony referred to a study by Mr. Jules Cohen, a highly experienced expert with more than five decades of experience as a professional consulting engineer in the field of broadcasting. His analysis, which employed the government’s own computer calculation technique, demonstrates potential viewership loss in New York City. Mr. Cohen correctly observes that use of COFDM provides less coverage and results in more interference to other stations than 8-VSB, a point that Mr. Hatfield made several times during the hearing. (To paraphrase Mr. Hatfield, use of COFDM involves trading off the possibility of improved performance in multipath environments for the loss of viewers that certainly would result from the COFDM modulation scheme.)

Even Mr. Hyman acknowledged at the hearing that a shift to COFDM might reduce a station’s signal coverage. I need not remind you that viewer area replication was at the heart of Congress’ and the FCC’s policy determinations and was a prominent reason for the selection of the current 8-VSB standard. Changing to the COFDM standard will undo that decision and result in the loss of many viewers in existing service areas. Mr. Cohen’s study of three New York DTV stations found that 1.9 million fewer viewers would be served using COFDM rather than the FCC-mandated 8-VSB standard. The number of viewers lost for other DTV stations due to COFDM interference would be about 7 million. Significantly, the effect of interference caused by COFDM would adversely affect analog TV reception for 986,000 to 1.1 million New York viewers depending on the transmission power level (please see Cohen study attached to my testimony at the hearing).



A specific concern of Mr. Hatfield bears repetition: introduction of COFDM will lead to loss of coverage at the edge of existing service areas and also within some buildings and other hard-to-reach places. Current coverage would not be replicated by COFDM, because in order to avoid interference the power level must be reduced.

C. Use of repeaters with various standards

In his testimony, Mr. Hyman accurately described the function provided by repeaters – namely, that they provide over-the-air television coverage in terrain-challenged markets as well as deliver signals to cable headends, the origin for cable carriage of local stations. However, he then asserted that the ATSC 8-VSB standard and repeater usage are incompatible, while the COFDM standard meets this need. Once again, Mr. Hyman is incorrect.

Because repeater use is relatively widespread in the United States, particularly in portions of the South and West, the Advanced Television Technology Center (ATTC) recently conducted analyses in both West Virginia and Utah. These studies document the successful utilization of on-channel repeaters for 8-VSB, concluding that the 8-VSB modulation technique provides sufficient performance margins to allow for practical introduction of on-channel repeaters. (Additional information may be found on the ATTC website at www.attc.org.)

D. Summary

In short, COFDM technology does not offer a feasible means of meeting one of the primary goals of a national digital standard – replication of the existing analog coverage area. The current 8-VSB standard works and works well, without the loss of viewers that would occur with the use of COFDM and which would certainly threaten the DTV transition. The 8-VSB standard also works well with repeaters, particularly in terrain-challenged environments.

Reopening the Standard Would Harm Various Parties and Cause Years of Delay

A. Reopening the standard harms consumers, broadcasters and manufacturers

As noted above, consumers need certainty that their investment will yield a return. Consumers seek the ability to view and enjoy DTV, with all its impressive characteristics. They need to know that the set they purchase today will be usable in the future at various locations.

Similarly, broadcasters must make significant investments to transition to DTV. They need to know the standard to which they must adhere as they purchase equipment and configure their systems to transmit DTV. Multiple standards are confusing and yield inconsistency. They do not encourage broadcasters to make the investments necessary for this transition.

Finally, manufacturers are making significant investments in designing integrated circuits and DTV sets according to the existing standard. Adding an additional standard will necessitate reconfiguration and further research and development, adding costs to the final product and resulting in postponed availability of DTV equipment. As I indicated in my



response to Congressman Stearns' inquiry, it is not economically feasible to manufacture sets that have both 8-VSB and COFDM capabilities.

B. A changed standard will produce delay

At the hearing, Sinclair indicated that implementation of the COFDM standard would likely take little more than six months. This is patently untrue. Reopening the existing standard would cause years of delay in the digital transition. Mr. Matt Miller estimated in his testimony on behalf of NxtWave Communications that revisiting the DTV standard would introduce a minimum of two to four years of delay. An extensive and lengthy series of tests would have to be performed to gauge compatibility and interference issues. Modifying the standard would also force the FCC to reopen the DTV Table of Allotments for revision, a process that would take years to complete.

Sinclair asserted at the hearing that use of COFDM would not require modification to the Table of Allotments; but Sinclair has never explained how this could possibly be true, especially in view of the fact that use of a COFDM signal would require reduced power levels. Indeed, there is no question that changing to COFDM would necessitate the loss of millions of viewers or a radical alteration of the Table, thereby producing extensive delays in the DTV transition and denying the American public the experience of HDTV even longer. In his testimony, Mr. Hatfield agreed, stating adamantly that avoiding any change to the Table is "absolutely essential to avoid years of unacceptable delay." In fact, the consequences of changing the Table could be even more dire. In his letter introduced into the hearing record, FCC Chairman William Kennard warned that the delay attendant with changing the Table "could lead to uncertainty that might jeopardize the ultimate success of the transition."

Sinclair now claims that a dual digital broadcast standard will bring certainty to the DTV roll-out. However, Mr. Nat Ostroff (who conducted the videotaped COFDM demonstration at the hearing on behalf of Sinclair) has stated that "multiple standards would not only create chaos but would so fragment the market so that no serious business could invest in the tooling to produce multiple standard receivers into such a market." (1996 White Paper on U.S. Digital Broadcast Standard). His statement was correct.

Mr. Tim Fern of Pace Micro Technology testified that his company could have a COFDM-based product on the market within nine months. But what Mr. Fern did not consider is that stations could not be broadcasting a COFDM signal in that amount of time even if Congress were to mandate the use of the technology immediately. The testing alone would take years and once that was completed, the manufacturing and installation of the broadcast equipment would add still more time.

Finally, a delay will only further push back the date when the Federal Government recovers the billions of dollars worth of loaned spectrum which it intends to auction.



Additional Issues

A. Mobile applications are ancillary, not primary

Mr. Chairman, in your concluding remarks you referred repeatedly to the "deal" that was struck at the time of the enactment of the DTV transition provisions. The "deal" was that broadcasters were to receive a loan of spectrum, in return for which they would provide digital television services to the public and thereupon return the analog spectrum to the Federal Government. We agree with you and urge you to hold broadcasters to the "deal".

Complaints from those who oppose the existing digital standard may well derive from their sudden fascination with mobile applications. This new emphasis stems from evolving business plans that involve the sale of subscription data services rather than living up to the promises which they made to Congress to provide free over-the-air digital broadcasting – particularly HDTV – in exchange for spectrum loans. Indeed, Mr. Hatfield stated his concern that "one of the motivations for consideration of a different standard appears to be a purported advantage of COFDM in providing new portable and mobile services rather than any advantage of COFDM in providing improved or enhanced television broadcast service."

Mobile applications are not necessary to meet Congress' objectives to provide free over-the-air broadcasting in a digital mode. The current standard was selected in part because of its "headroom" that will allow for additional applications. As Mr. Matt Miller testified, the current standard is flexible and will accommodate multiple channels of standard definition television and/or ancillary services without loss of analog service during the transition. But if we are to meet the original goal of providing digital television to American consumers, the development of new applications must be pursued on a parallel path and not because some broadcasters now have a different business plan. To do otherwise would halt the entire DTV transition.

The FCC has permitted broadcasters to examine other ancillary services as allowed by statute, but never at the expense of the primary goal of implementing HDTV in a timely fashion. While the law provides (as you well know) that this service must be ancillary to DTV service, FCC officials have repeatedly warned that some broadcasters have lost sight of the goal and are veering away from their core business of providing television to citizens free of charge. Indeed, dozens of stations across the nation have already agreed to lease a part of their free spectrum for ancillary services. Some stations are making these arrangements without having met their deadlines in regard to digital broadcasting.

Again, you are right to urge adherence to the "deal" and ensure that other services remain ancillary to the primary objective of providing free over-the-air digital broadcasting.

B. International issues

From Mr. Hyman's testimony, one might infer that countries are abandoning the 8-VSB transmission standard in droves. He warned that soon "the U.S. will be an island of 8-VSB in a sea of COFDM." What were the bases for this allegation? Among other indicators, Mr. Hyman asserted that the Brazilian government "has decided to exclude the ATSC 8-VSB standard from further consideration." Also, he claimed that Argentina and Taiwan have



announced recently that they will rescind their adoption of the ATSC standard. Mr. Chairman, these statements are absolutely untrue.

Within Brazil, largely in response to the uncertainty generated in the United States by broadcasting entities reluctant to make the transition to DTV, some have suggested that the ATSC standard should not be chosen for utilization in Brazil. ANATEL, the Brazilian equivalent of our FCC, is currently studying this issue, and is taking into account both technological as well as economic conditions. The ATSC/8-VSB standard continues to be under active consideration in Brazil. What's more, in both Argentina and Taiwan the ATSC standard remains the law today.

Officials in other countries are watching the DTV process in our own country. The uncertainty about the standard fomented in the United States by parties reluctant to make the investment in DTV or those with new and evolving business plans causes these officials to revisit their decisions, because of trade and other implications that could result from a changed U.S. standard.

Far from being an island of 8-VSB, the United States at present is the world leader in DTV. Our continued adherence to the standard -- and a strong reaffirmation of the standard by American policymakers -- will signal to other countries that DTV's future is secure, because this standard guarantees service area replication and a low level of interference with other signals. In addition, equipment built in accordance with this standard is being deployed and enjoyed today by the American public. The real-world picture is very optimistic, contrary to Mr. Hyman's ominous and misleading warnings.

How to Guarantee Further Progress

Mr. Chairman, you solicited suggestions about how to meet the policy objective defined by the Congress and the FCC and sought by consumers, namely that DTV be made available to the American public in a timely manner.

The digital transition is succeeding but impediments remain to its ultimate success. As was demonstrated at your Subcommittee's hearing, the 8-VSB standard works and works well even in an urban environment. However, the uncertainty fostered by the ongoing and unnecessary debate about the digital standard is harming and delaying the transition. **The most important step that could be taken now by Congress would be to reaffirm the existing standard and end the debate right now.**

Broadcasters also need encouragement to provide HDTV programming. Consumers have made significant investments in the digital transition yet find themselves with little digital or HDTV programming to watch on their DTV sets. **Broadcasters must be reminded of their obligations and the expectations behind the loan of the spectrum to them free of charge.**

The FCC also can continue to play a vital role in the rollout of digital television. You questioned FCC Cable Bureau Chief Deborah Lathen about both compatibility and carriage issues involved with digital must-carry, and about interoperability standards. She replied that these matters were being reviewed by the FCC and the FCC was monitoring what was



happening in the marketplace with regard to some of them. However, several witnesses stated that the failure to resolve these matters produces uncertainty and delays digital programming. I respectfully suggest to you that the FCC must aggressively encourage the resolution of outstanding cable interoperability and copy protection issues (and, if necessary, be prepared to resolve the issues itself), and promptly complete its open rulemaking proceeding concerning DTV must-carry. **Rapid and aggressive action by the FCC on these issues will accelerate the DTV transition.**

Manufacturers need to redouble their efforts to respond to the increasing demand for DTV equipment. Mr. Campbell indicated that two-thirds of big-screen television sets sold in his stores today are DTV sets, and the public is clamoring for more. Zenith and other manufacturers must fill this need. Further, it is essential that manufacturers continue to improve and refine their technologies so as to provide an even better product to consumers. **Armed with marketplace certainty that comes with having a sole government-mandated standard, manufacturers will do their part in accelerating the DTV transition through continued investments in DTV technology and products.**

Conclusion

The 8-VSB system, as you saw, does work, but it must be given a fair chance to work for the average American. To allow ulterior motives and emerging business plans to sow the seeds of uncertainty and therefore undermine the DTV transition would be an injustice to consumers and violate the agreement America's broadcasters made with Congress, the FCC and consumers. **We need to stay the course.**

At Zenith we join the vast majority in urging you to see this transition to its conclusion so as to give the American public the chance to enjoy DTV's benefits. We reiterate our intention to continue every effort to achieve that goal.

Sincerely,

Richard M. Lewis
Senior Vice President
Research & Technology

Attachment

cc: Members, Subcommittee on Telecommunications,
Trade and Consumer Protection,
House Commerce Committee

**SUPPLEMENTAL TESTIMONY OF
SINCLAIR BROADCAST GROUP, INC.**

**Before the Subcommittee on Telecommunications,
Trade, and Consumer Protection**

September 28, 2000

Sinclair Broadcast Group, Inc. ("Sinclair") hereby supplements its testimony for the July 25, 2000 hearing of the Subcommittee on Telecommunications, Trade, and Consumer Protection regarding the current status of the transition to digital television ("DTV"). Below, this supplement responds to the request of Subcommittee Chairman W.J. "Billy" Tauzin for material in the written record regarding the inability of the existing ATSC 8-VSB digital transmission standard to support the operation of DTV on-channel retransmission facilities, or "on-channel repeaters."

In today's NTSC analog environment, areas within broadcasters' Grade B service contours that do not receive a strong enough signal for adequate reception are most commonly filled in through the use of TV translator facilities. These separately-licensed facilities receive a signal from a broadcaster's full-power station, shift that signal to another NTSC channel, amplify the signal, and retransmit the same programming into the pertinent areas. The FCC's rules do not yet provide for similar "off-channel" translator facilities in the digital environment, however, and it is unclear whether the FCC currently contemplates a parallel class of DTV translators either during or after the DTV transition.

The need for such a parallel class of DTV translators would be mitigated greatly if the Commission permits broadcasters to operate using the COFDM-based DVB-T standard. With DVB-T, broadcasters would be able to utilize a variety of on-channel repeaters to fill in gaps in their core business areas; here, a separate facility receives the full-power signal, and then simply amplifies and retransmits that signal on the same channel. Thus, for instance, broadcasters could operate on-channel repeaters to retransmit the DTV signal into large areas otherwise unable to receive service due to terrain limitations. Alternatively, they could operate less powerful, on-

channel DTV boosters to ensure reception in apartment buildings, convention centers and other large complexes, and “urban canyons.”

Such on-channel repeaters would be largely precluded if the FCC maintains exclusive reliance on the ATSC 8-VSB standard. Due to what would be effectively self-generated multipath conditions, a substantial percentage of ATSC 8-VSB DTV receivers in areas covered by on-channel repeaters would likely suffer substantial disruptions of reception. Thus, instead of enhancing broadcasters’ service coverage, these facilities would leave such coverage unchanged or possibly reduce that coverage.

Specifically, TV households in the repeater coverage area would receive not only a signal from the on-channel repeater, but also at least a faint signal from the full-power station – even with terrain-limited propagation, some level of the full-power signal would likely bleed through and reach those receivers. Just as an 8-VSB receiver often fails under dynamic multipath conditions when multiple signals arrive at the receiver over a period of microseconds, 8-VSB receivers will often fail when receiving two identical DTV signals, one from the full-power station and one from the repeater, at substantially different times. Even in instances where 8-VSB receivers’ adaptive equalizers would otherwise be able to process normal multipath effects associated with indoor reception, the operation of on-channel repeaters would likely result in substantial losses of reception, since this phenomenon would likely use up most of these adaptive equalizers’ processing capabilities before they could even address normal multipath effects.

In contrast, the use of the DVB-T standard would avoid these reception failures. Just as DVB-T receivers are able to receive service under complex multipath conditions in broadcasters’ core business areas, DVB-T receivers would be able to process the staggered arrival of identical signals from an on-channel repeater and its associated full-power station. Thus, in contrast to ATSC-8-VSB, the DVB-T standard permits the deployment of single-frequency networks,¹ which requires the operation real synchronized transmitters at broadcast-required power levels.

¹ Single-frequency networks utilizing the DVB-T standard for digital television are in widespread use throughout the United Kingdom and Sweden.