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EXECUTIVE SUMMARY

The Media Bureau has issued a *Public Notice* seeking comment on options for minimizing the disruption to consumers when the switch-over to digital broadcasting occurs. As the 85% test for ending analog broadcasting is met in market after market, analog television sets without converters will go dark, and consumers in 20.5 million households that rely solely on over-the-air (“OTA”) broadcast television will lose all television service if they have not procured digital television-capable receivers or converters. This situation has the sure signs of significant disruption.

Thus, the Media Bureau is wise to explore now ways to minimize the certain disruption that will occur when analog television begins to shut off. This is not a problem limited to households that receive television solely over-the-air. Approximately 18.3 million MVPD households have one or more television sets that rely solely on over-the-air television reception. There are today approximately 280.5 million analog sets in use. Consumers may not readily dispose of these sets, even if they have purchased a new digital television receiver.

The Bureau is inquiring as to the identity, demographic and geographic characteristics of over-the-air television viewers. NAB and MSTV provide statistics showing that there are approximately 73 million unwired analog sets in U.S. television households. While under the market-driven transition established by Congress, some of the disruptive effects of ending analog service would have been reduced, proposals to complete the transition without regard to consumer DTV acceptance would impact much larger numbers of consumers.

The Commission has already set in motion measures that will foster the DTV transition by providing incentives for consumers to buy DTVs. At some point, however, Congress and the FCC must decide whether analog-only sets and households should be protected from obsolescence. Clearly, the free, universal OTA broadcast service must be preserved and the 20.5 million households that rely on it must be protected against loss of television service.

A substantial percentage of OTA households will likely have purchased DTV-capable receivers by the time analog broadcasting ends. But for the remaining OTA households (and for analog sets in all households), there must be a solution, or rather, a series of solutions. One answer is the subsidization of digital-to-analog converters for “non-digital” OTA households. Another measure is promotion and education about DTV, to encourage consumers to purchase DTVs. A near term measure the Commission could adopt would be to require warning labels on analog-only sets, alerting consumers to the limited useful life of these sets

A key to ending the transition, to not disenfranchising large numbers of consumers and to mitigating the disruption for consumers with analog sets will be making digital-to-analog converters widely available at a reasonable price. Some government subsidization likely may be necessary here. The FCC’s practice of requiring auction winners to bear the costs of moving incumbent spectrum users would seem to be a useful idea, particularly as broadcasters have shouldered DTV transmission costs.

Current digital converters cost \$300, but experience in the United Kingdom suggests that volume production can bring that cost down substantially. Digital converters should be able to display a usable picture from all types of DTV signals, and

should do so under the same reception conditions that consumers have experienced with analog.

Clearly, something must be done to mitigate the consumer disruption that is certain to occur if consumer sets throughout the home become obsolete at the flip of a switch. It would seem that making converter boxes affordable is the key to this brewing problem.

The Problem

The Media Bureau is looking ahead to the time when Congress' benchmark is met for ending analog broadcasting and completing the conversion to digital television. At that point, in 2006 or when 85% of television households in a market can receive the digital signal of every local broadcast station, either through a multichannel video programming distributor ("MVPD"), an off-air digital television set or an analog set equipped with a digital-to-analog converter, analog broadcasting in that market will cease.⁴ As the 85% test is met in market after market, analog television sets without digital converters will go dark, and consumers in 20.5 million households that rely solely on over-the-air ("OTA") broadcast television will lose all television service if they have not procured digital television-capable receivers or digital converters. In addition to the 45 million sets in those homes, there are 28 million unwired analog sets in homes that subscribe to cable or satellite that will go dark.⁵ In other words, a shift from analog to digital service today would (assuming wired analog sets were served by downconverted signals from cable or satellite providers) affect approximately 26% of the televisions in use today.

This situation has the sure signs of significant disruption. Consumers in a typical household use television 8 hours a day,⁶ and 59% of citizens report that they regularly use

⁴ 47 U.S.C. § 309(j)(14).

⁵ Knowledge Networks/SRI *Home Technology Monitor* survey, Spring 2004, and Nielsen Media Research U.S. TV Household estimates, 2003-04. (*See infra* for a description of the calculations leading to these statistics.)

⁶ Media Dynamics, Inc., *TV Dimensions 2004* (Ed Papazian ed., 2004) at 64.

local broadcast television for news and information about public affairs and current events in the nation, the world and their local areas.⁷

Thus, the Media Bureau is wise and forward-thinking to explore ways to minimize the disruption that will occur when analog television begins to shut off. Clearly, completing the digital television conversion is extremely difficult, with 280.5 million analog televisions⁸ and 108.4 million television households that must be transitioned from one technology to another. And, as the *Notice* acknowledges,⁹ this is not a problem limited to households that receive television solely over-the-air. Approximately 18.3 million MVPD households have one or more television sets that rely solely on over-the-air television reception.¹⁰

Under the marketplace-driven statutory transition scheme, many of these transition problems would have been ameliorated since digital receivers would be widely dispersed among consumers by the time analog service was terminated. The costs of DTV receivers and converters would also have declined, reducing costs to consumers. Increasing pressure to accelerate the DTV transition to accommodate other budgetary and

⁷ <http://people-press.org/reports/display.php3?PageID=834U>. Moreover, 33% of people use broadcast television more than any other source for local and national news and current affairs. FCC Media Ownership Working Group, *Consumer Survey on Media Usage*, Nielsen Media Research (Sept. 2002).

⁸ Knowledge Networks/SRI *Home Technology Monitor* survey, Spring 2004, and Nielsen Media Research U.S. TV Household estimates, 2003-04.

⁹ *Notice* at 1, 3.

¹⁰ While the statute dictating the conditions for the end of analog broadcasting, 47 U.S.C. § 309(j)(14), speaks of “households” without the capability to see all local digital broadcasts, clearly it must be acknowledged that unwired sets in “digital” and MVPD households also will be part of the overall consumer problem. Moreover, the “wired” analog sets in MVPD homes will also be part of the consumer problem, unless one can expect consumers to dispose of them when they purchase a digital television or expect that cable systems will be required to provide a digital converter for them, as cable systems were in Berlin.

spectrum demands, however, have prompted proposals to end the transition regardless of the pace of consumer DTV adoption. The number of affected consumers and the cost burden to them would certainly be exacerbated by such a change. Nonetheless, NAB and MSTV recognize the importance of this issue and the need to consider solutions to minimize the potential adverse impact on consumers.

The main focus of the *Notice* is on consumers and households that rely solely on over-the-air television. Without DTV sets or digital converters, they will be cut off completely from the main form of news,¹¹ information and entertainment¹² in today's homes. Thus, the Bureau is inquiring as to the identity, demographic and geographic characteristics of over-the-air television viewers. NAB is able to provide the Bureau with up-to-date and specific responses to its quantitative questions from data collected in the Knowledge Networks/SRI *Home Technology Monitor* survey, Spring 2004¹³ and applied to Nielsen Media Research U.S. TV Household estimates, 2003-04. We have constructed a series of charts to convey the responses to the questions posed by the *Notice*, which we append as Attachment A.

¹¹ Pew Research Center for People & the Press, *Media Consumption and Believability Study* (June, 2004) at 5.

¹² According to the *2004 Entertainment, Media Advertising Market Research Handbook*, watching television is the American public's favorite way to spend entertainment time, Kelli D. Washington & Richard K. Miller, *2004 Entertainment, Media & Advertising Market Research Handbook* (2004) at 3. The American public spends more hours using television than any other source of entertainment. *Id.* at 4.

¹³ For the Knowledge Networks/SRI survey, NAB had particular questions fielded to elicit data on over-the-air-only television households, on digital television set ownership and on OTA digital television reception capability.

The Statistics

By viewing Attachment A, one can see that viewers in approximately 20.3 million households are at risk of losing television service completely.¹⁴ Another 18.3 million MVPD households have OTA-only analog televisions that will be rendered useless without a digital-to-analog converter.¹⁵ Overall, there are 105.6 million analog-only television sets in OTA and MVPD households with at least one OTA analog-only set.¹⁶ There are approximately 73 million OTA sets in all television households.¹⁷ These statistics represent the dimension of the overall problem of the obsolescence of analog sets once analog broadcasting is shut off.

With a situation of these dimensions, it must be recognized that a premature end to analog television will result in substantial consumer disruption and complaint. The goal, therefore, of the FCC in this proceeding should be to identify, adopt and recommend to Congress policies and measures that will minimize the level of consumer disruption once analog broadcasting ceases.

The “Solutions”

The objective of the DTV transition is to move consumers from analog television technology to digital television technology. This is best accomplished for the consumer by the purchase of a DTV set, which gives the consumer the extraordinary and varied

¹⁴ In the 20.5 million OTA-only households (FCC Question #1), there are currently approximately 177,000 OTA digital sets. Attachment A at 5. Thus, today, there are roughly 20.3 million OTA-only households with only analog sets.

¹⁵ FCC Question # 2, *see* Attachment A at 4. Again, analog sets in MVPD households that are connected to cable or satellite may also be left without local television service unless cable systems must provide digital converters.

¹⁶ FCC Question # 3, *see* Attachment A at 6.

¹⁷ There are 44.8 million analog sets in OTA-only households and roughly 28 million OTA (*i.e.*, unconnected to a MVPD) analog sets in MVPD households. Attachment A at 6.

features of digital television technology. These include movie-quality pictures, wide screen viewing, surround sound, multiple channels and digitally displayed data and other supplemental and potentially interactive services, in addition to mitigating the visual and aural degradation associated with transmission impairments of analog signals.¹⁸ While digital converters will rid consumers of degraded picture and sound rendition, the benefits of deploying digital technology cannot be obtained by simply converting analog televisions to receive digital television signals. This is because an analog television will only display what *it* is capable of, irrespective of what signal it receives. Analog televisions with digital converters cannot produce many of the marvelous features of digital – they simply produce an analog rendition of the digital signal. Thus, the *best* outcome for consumers is to make DTV sets affordable and desired.

The Commission has already set in motion measures that will foster the full DTV transition by providing incentives for consumers to buy DTVs. The Powell Plan has provided strong encouragement and incentives:

- for broadcasters to be on-air in digital and with high definition encoders (HD signals available off-air),
- for cable to begin carrying broadcast DTV signals (HD and digital signals available to cable consumers),
- for broadcast networks to provide high definition programs (enticement to purchase DTVs),
- for cable and set manufacturers to include inter-operable digital connectors (ease of receiving DTV signals via cable), and
- for set manufacturers to produce televisions with DTV tuners (DTV signal reception and economies of scale to lower prices).

¹⁸ And, the more DTV sets sold, the more the price of DTVs will decline, making them ultimately affordable by most consumers.

Broadcasters have met the challenge of the conversion to DTV. NAB data shows that 1269 stations are on the air with a digital signal, out of approximately 1,600 full-power television stations. DTV stations are on the air in 207 of the Nation's 210 television markets. 87.54% of all television households are in markets with five or more DTV signals, and 69.23% are in markets with eight or more DTV signals. In 40 markets, every station is now broadcasting a digital signal. The transmission side of the DTV equation has been built. The issue now is transitioning consumers.

Unfortunately, a large percentage of cable systems do not carry the signals of these local DTV stations, or carry only part of their DTV offerings. More ubiquitous cable DTV carriage would spur the transition by enticing cable consumers to purchase DTVs in order to receive a panoply of dazzling high-definition and other digital-only programs.

The Commission also pressured consumer electronics manufacturers and the cable industry to conclude their years-long effort to agree on standards for "cable-ready" digital televisions, which has enabled the production of consumer-friendly digital sets. The Commission also required "cable-ready" DTVs to have off-air digital broadcast tuners, which insures that sets will work in OTA environments and enables these sets to "qualify" a household as "digital" for purposes of Congress' 85% test.

Mindful of the 25 million analog televisions sold annually, which compound the problems associated with these sets becoming obsolete at the end of the transition, the Commission also required that, beginning in 2004, on a phased-in basis, all but the smallest television sets sold must include a digital tuner. This not only ensures that new sets will qualify a consumer's household as "digital" for purposes of the 85% test and will not be rendered useless at the conversion, but encourages consumers to "think

digital” and potentially consider purchase of a DTV set. This measure alone, by force of the routine replacement of televisions, will ensure that millions of sets and consumers will have true DTV tuning capability.

Thus, thanks to these measures taken by this Commission, millions of households will have transitioned to DTV capability sooner than would be the case without them. Moreover, the Media Bureau has begun to press for the next important phase of the DTV transition: intensive DTV promotion and consumer education.¹⁹ These efforts will be critical in selling consumers on DTV as the next “must have” thing, selling DTVs and moving the DTV transition significantly ahead in the near term.

In this regard, it is important that off-air DTV reception be demonstrated in retail stores. Unfortunately, many retail outlets have policies barring demonstrations of over-the-air DTV. The two primary reasons are (1) contracts with DTV display companies or others that prohibit additional signals from being shown on display units, and (2) store policies that prohibit over-the-air reception because OTA signals may include advertisements for competing stores. Removal of these impediments would help consumers to understand the benefits of DTV at the point of purchase.²⁰

But, as described above, at the point the 85% threshold is reached, there will be 15% of households that are considered “non-digital,”²¹ and, as well, roughly 73 million

¹⁹ The Media Bureau held its first “Hoedown” on the subject of DTV consumer education on July 21, 2004.

²⁰ Chairman Powell, among others, has discussed the problems caused by the lack of accurate information about DTV among consumer electronics salespersons. *See* Conversation with NCTA President Robert Sachs, May 4, 2004, at 2.

²¹ Contrary to the implication of the *Notice*, the remaining 15% “non-digital” households will not necessarily be OTA-only households. The statute sets out more than one criteria for households to be considered “non-digital” for purposes of the 85%/15% test. One is being an OTA-only household without a digital television or a digital converter. The

OTA-only analog sets that potentially will “go dark” and become the source of consumer frustration and disruption. As discussed above, proposals to end analog broadcasting before the 85% penetration level is reached will increase the number of consumers affected and the financial burden on them. At some point, Congress and the FCC must decide whether analog-only sets and households should be protected from obsolescence. Clearly, the free, universal OTA broadcast service must be preserved and the 20.5 million households that rely on it must be protected against loss of television service. Beyond that, measures are likely to be deemed desirable that will avoid analog sets in all households becoming obsolete.

A substantial percentage of OTA households will likely have purchased DTV-capable receivers by the time analog broadcasting ends. But for the remaining OTA households (and for analog sets in all households), there must be a solution, or rather, a series of solutions. One answer is the subsidization of digital-to-analog converters for “non-digital” OTA households. Another measure is sustained, ubiquitous promotion and education about DTV, on the part of all industries, to encourage more and more consumers (particularly those in OTA households) to purchase DTVs. A near-term measure the Commission could adopt would be to require warning labels on analog-only sets, alerting consumers to the limited useful life of these sets, and providing them with information enabling more informed purchase decisions. Perhaps the receiver manufacturers can be persuaded to speed up the DTV tuner schedule, which would reduce sales of sets without DTV tuners.

other is subscribing to an MVPD that doesn’t carry the digital signals of all local DTV broadcast stations or not being able to view those signals on a connected receiver. Thus, cable carriage of digital broadcast signals remains a key to the end of analog broadcasting.

An important strategy will be to make the remainder of the transition as consumer-friendly as possible – to increase the value proposition of DTV in consumers’ minds – in order to encourage consumer purchases of DTV capable sets. The more consumers value true DTV and its extraordinary features, the more they will want to replace analog sets with DTVs and the less they will mind disposing of analog sets or buying converters to eek out some remaining useful life for them. Also, removing disincentives to adopt digital television will be important. For one thing, the prospect of a steep rise in one’s cable bill, with the purchase or rental of a digital set top box and the recurring charge for the digital cable tier, remains a disincentive to buying a DTV. Cable systems not carrying all DTV broadcast signals remains a disincentive to consumers’ investing in DTV, knowing they won’t necessarily receive all of the digital stations available in their markets. The affected industries and the government should work together to devise methods and stratagems to ward off and mitigate consumer disruption at all levels.

But, certainly, a key to ending the transition, to not disenfranchising large numbers of consumers and to mitigating the disruption for consumers with analog sets, will be making digital-to-analog converter boxes widely available at a reasonable price. Some government subsidization likely may be necessary here.²²

²² In the Berlin, Germany experience of shutting off analog broadcasting, the authorities recognized that moving millions of consumers from analog to digital, while resulting in significant benefits for consumers, would create burdens that should not fall on broadcasters. Instead, they concluded that “[s]olving the issue of social acceptability of the switchover is a public duty to be fulfilled by the state.” DVB-TV: Das Überall Fernsehen, *Berlin Goes Digital* (accessed at <http://www.mabb.de/start.cfm?content=aktuelles&id=632>) at 12 [hereinafter *Berlin Goes Digital*].

As the Commission established in the *Emerging Technologies* proceedings,²³ it is appropriate for new entrants into a spectrum band to bear the costs of relocating incumbent users to new bands and/or new technologies. This principle holds true even if incumbents must be provided with new and better technology in order for them to use their new band.²⁴ In the transition to digital, *broadcasters* have been and will continue to shoulder the economic burden of constructing new transmission facilities.

It may be appropriate for Congress or the Commission to use the revenue from auctions of spectrum that will be reallocated from broadcasting as a result of the digital transition to contribute to the costs of new reception equipment for *consumers*. Mechanisms to accomplish this could include a requirement that auction winners pay into a Commission-designated fund to support the transition for analog television owners that meet certain income or other criteria, or payment directly by the Government of those costs out of auction revenues. The economic impact of either proposal is likely to be similar since bidders would take relocation obligations into account in making their bids if they were obliged to pay directly. A subsidy for consumers from the value of the broadcast channels to be reclaimed for other uses would be consistent with Commission

²³ See *Redevelopment of Spectrum to Encourage Innovation in the Use of New Telecommunications Technologies (1st Report and Order & Third Notice of Proposed Rulemaking)*, 7 FCC Rcd 6886 (1992); *Second Report and Order*, 8 FCC Rcd 6495, *Third Report and Order*, 8 FCC Rcd 6589 (1993); *Memorandum Opinion & Order*, 9 FCC Rcd 1943; *Second Memorandum Opinion & Order*, 9 FCC Rcd 7797 (1994), *aff'd sub nom. Assn. of Public Safety Communications Officials-International v. FCC*, 76 F.3d 395 (D.C. Cir. 1996).

²⁴ See, e.g., *Improving Public Safety Communications in the 800 MHz Band (Report & Order, Fifth Report & Order, Fourth Memorandum Opinion & Order, & Order)*, WT Docket No. 02-55 (rel. Aug. 6, 2004) at ¶¶ 250-52.

policies and would help to bring the transition to a close with relatively minimal disruption.²⁵

Digital Converters

The Bureau asks what minimum technical capabilities digital converters should have, as well as the current and future cost of such converters. At a minimum, digital converters should be capable of receiving all digital broadcast formats, both HD and SD, on any VHF or UHF broadcast channel, and provide connection to an existing analog TV receiver via a channel 3 (or 4) RF interface.²⁶ Thus, in conjunction with any analog receiver, the digital converter box should be able to receive, render and display usable pictures and sound from high definition as well as standard definition broadcasts, but would not be required to render pictures and sound at more than standard definition quality.

In order not to disenfranchise current OTA-only television viewers, digital converter boxes should be designed so as to maximize the likelihood that they will work with digital broadcast signals in the same receiving configuration (same antenna, location, etc.) as used for current analog NTSC reception. Thus, the digital converters should be able to receive and display signals under the most challenging receiving conditions, including low signal level, severe multipath and adjacent channel interference conditions. While marginal NTSC pictures are often comprehensible and accepted by

²⁵ Berlin limited its converter subsidy mechanism to terrestrial-dependent homes that were already receiving social security/welfare. Its media council provided 75% of the cost; the social security agencies provided the other 25% and organized the distribution of the set-top boxes. *Berlin Goes Digital* at 7. The number of OTA-dependent receivers, however, was extremely small compared to the situation in the United States. *Id.* at 3.

²⁶ Digital converters should also be capable of appropriate recognition of other aspects of television signals such as closed captioning, program ratings and the broadcast flag.

TV viewers, the digital “cliff effect” cleanly separates digital TV viewers into those with watchable pictures and those without pictures at all. Thus, because viewers with poor digital reception would be essentially eliminated as television viewers, allowing less than excellent RF receiver performance in digital converters may sacrifice much of the broadcast-only viewing audience when analog transmissions cease.

The Receiver Performance Guideline Recommended Practice (A/74) published by the Advanced Television Systems Committee (ATSC) in June 2004²⁷ represents the result of a collaborative effort of broadcasters, consumer electronics manufacturers, semiconductor manufacturers, and other relevant industry interests to develop voluntary guidelines for broadcast digital television (DTV) receiver performance and should be a guiding light in deciding appropriate minimum technical capabilities for digital converter boxes. In addition, dealing effectively with low signal level environments and indoor reception is paramount in successfully delivering digital service to existing OTA-only households. The amendment to the ATSC DTV standard called Enhanced VSB recently approved by ATSC²⁸ adds a new optional mode of transmission that allows reception under weaker signal conditions. This will also be an important feature for digital converters to make sure that digital reception will be possible under the widest variety of reception conditions.

Current DTV converters are available from about \$300 and up, although none are presently available with SD-only outputs. Like all other electronic components, the manufacturing cost of a digital converter box is closely related to the manufacturing

²⁷ “ATSC Approves Recommended Practice for DTV Receivers,” ATSC press release, June 22, 2004.

²⁸ “ATSC Approves Enhancements to DTV Standard,” ATSC press release, July 20, 2004.

volume. NAB and MSTV previously studied the cost of adding DTV capability to television receivers as well as the likely cost of set top boxes.²⁹ The Arthur D. Little study noted that by the year 2006 digital converter boxes could be expected to sell at retail for under \$200, with a manufacturing cost near \$100, composed mostly of the fixed recurring costs of manufacturing (a physical box with a TV tuner, power supply, cabinet, remote control, switches, knobs, jacks, etc.) and only slightly impacted by the cost of the integrated circuits required to receive and process digital broadcasts.

Motorola's recent testimony before the House of Representative Subcommittee on Telecommunications and the Internet³⁰ that a digital converter box with a retail price of \$67 is possible in 2007 would indicate that further price reductions from large volume production are possible. Experience in the United Kingdom with the recent availability of inexpensive digital converter boxes for Freeview (the British free terrestrial DTV service) bears this out. According to the BBC, there are almost 4.4 million Freeview boxes in British homes,³¹ and a casual review of the market for Freeview boxes shows prices as low as £40 (approximately \$72) among a field of over 50 models.³² Given that the complexity of a Freeview digital converter is roughly equivalent to the digital converter for the U.S. (although the ability to handle HD signals at the front end will carry some nominal cost penalty for the U.S. unit), this would indicate that low cost digital converter boxes are possible in the U.S. given sufficient manufacturing volume.

²⁹ "Assessment of the Impact of DTV on the Cost of Consumer Television Receivers," Final Report to MSTV and NAB, Arthur D. Little, Inc., September 10, 2001.

³⁰ "Motorola Broadband CTO to Speak Before House Subcommittee on Telecommunications Regarding DTV Transition," Motorola press release, July 21, 2004.

³¹ "Four million Freeview homes make BBC digital channels available to more viewers," BBC press release, June 17, 2004.

³² See range of Freeview set top box models and prices listed at, for example, www.idtv.co.uk or www.radioandtelly.co.uk/freeviewreceivers.html.

Similarly priced converters were available in Berlin and many more were ultimately sold at retail than were provided through subsidies, apparently because consumers recognized the benefits that they would receive from digital television. *See Berlin Goes Digital* at 15-16.

Conclusion

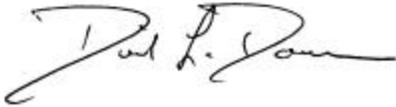
To the extent that the government wishes to change course from a market-penetration end to the DTV transition, it can and should embark on a campaign to drive down the costs of digital converters for the benefit of all analog sets, as well as for OTA-only households. The form and shape of that campaign and the government's direct involvement will be determined over the coming months. Something, however, must be done to mitigate the consumer disruption that is certain to occur if consumer sets

throughout the home become obsolete at the flip of a switch. It would seem that making converter boxes affordable is one key to bringing the DTV transition to a close.

Respectfully submitted,

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