

**FEDERAL COMMUNICATIONS COMMISSION**  
**MEDIA BUREAU STAFF REPORT**  
**CONCERNING**  
**OVER-THE-AIR BROADCAST TELEVISION VIEWERS**

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## I. INTRODUCTION

1. This Report is intended to aid Congress in directing this country's transition from analog to digital television ("DTV"). A timely and successful conclusion to the DTV transition would benefit the American public by: (1) preserving a free, universal broadcasting service in a digital world; (2) bringing consumers the benefits of new digital services; and (3) promoting spectrum efficiency and rapid recovery of broadcast spectrum for other uses.<sup>1</sup>

2. In particular, the need to make more efficient use of the electromagnetic spectrum has become increasingly acute over the past several years. At the end of the DTV transition, 108 MHz of spectrum in the 700 MHz band currently used by broadcast channels 52-69 will be made available for other wireless services - 24 MHz for urgent public safety needs and the remainder for advanced commercial wireless services. Thus, beyond the immediate auction revenues for the commercial wireless spectrum - which could be significant - freeing the 700 MHz spectrum for other uses would result in immense benefits to the United States in terms of homeland security, innovation and investment in new technologies, new employment opportunities, and international competitiveness.

3. But bringing the transition to a timely conclusion may also entail potential costs. Some consumers, especially those that rely on over-the-air television service and have not made the switch to digital when the transition occurs, may have to take action to avoid a disruption in service. Specifically, these consumers will have to: (1) purchase a new DTV set with a built-in digital broadcast tuner; (2) obtain a digital-to-analog converter box that will convert over-the-air digital signals to analog for viewing on legacy analog sets; or (3) subscribe to a multichannel video service provider ("MVPD"), typically cable television or Direct Broadcast Satellite ("DBS").

4. In order to explore this issue, on May 27, 2004, the Commission released a Public Notice<sup>2</sup> posing several questions about U.S. television households<sup>3</sup> that receive broadcast television only in analog format and "over the air" via an indoor or outdoor antenna ("analog OTA households").<sup>4</sup>

5. The Public Notice asked, first, for factual data about how many OTA households there are, who their members are, where they are located, and why they do not subscribe to an

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<sup>1</sup> See *Fourth Further Notice of Proposed Rulemaking/Third Notice of Inquiry* in MM Docket No. 87-268, 11 FCC Rcd 6235 (1995).

<sup>2</sup> *Media Bureau Seeks Comment on Over-the-Air Broadcast Television Viewers*, 19 FCC Rcd 9468 (2004).

<sup>3</sup> We define a "television household" or "TV household" as a household that has at least one television receiver in it. TV households are estimated to be slightly more than 98% of all households in the U.S. CEA Comments at 2 (citing 2002 Census data). Nielsen projects that in January 2005 there will be approximately 109.9 million TV households in the U.S. Press Release, Nielsen Media Research (Aug. 24, 2004), *Nielsen Media Research Estimates 109.6 Million TV Households in the U.S.*, <http://www.nielsenmedia.com/> (visited Nov. 19, 2004).

<sup>4</sup> A small number of TV households (177,000, according to NAB/MSTV) view digital television today (exclusively over-the-air and not via cable or satellite service). NAB/MSTV Comments at 5 n.14, Attachment A at 5. Because of that small number and for simplicity, we will sometimes refer to analog OTA households as "OTA households." We do not count as an OTA household a TV household that subscribes to an MVPD but also has one or more additional television sets that receives only over the air signals (*infra* ¶ 9).

MVPD. Second, the Public Notice asked for advice about how best to provide for OTA households when analog broadcast television service is ended (“the switch-over date”).<sup>5</sup> Comment was sought on whether a government support system should reach all such households or only those that satisfy a means test, whether support should be given for one or more TV sets in such households, and what form any government support system should take.

6. The Commission received comments from 47 parties, and reply comments from 12. The following paragraphs summarize the commenters’ statements and opinions. We also include our own research, and that of some others, about the subjects raised in the Public Notice.

## II. RECORD EVIDENCE

### A. Analog OTA Television Sets in TV Households

7. Analog OTA Households. Commenters estimate that the percentage of TV households that are OTA-only range from 13%<sup>6</sup> to 19%.<sup>7</sup> The Commission’s current estimate, as reported in its annual report on competition in the MVPD market, is 14.86%.<sup>8</sup> This number has

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<sup>5</sup> Some households that subscribe to MVPD service could lose their local over-the-air channels when analog broadcasting ends. These are households whose MVPD does not provide them with local channels, such as DBS subscribers who do not (or cannot) subscribe to local channels, or subscribers to Satellite Master Antenna TV systems. These households are similar to OTA households in that, when analog broadcasting ends, they will need to upgrade to digital service or buy a converter if they wish to continue to view local channels on their analog TV sets.

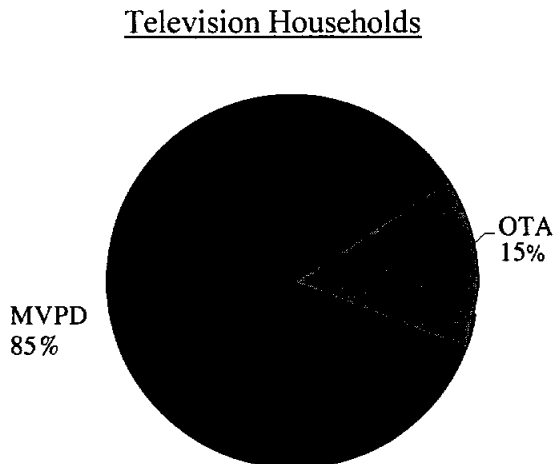
<sup>6</sup> CEA Comments at 2-3 (“under 13%,” taking data from various sources between 2001 and 2003 and measuring households); *see also* Sinclair Comments at 3-4 (“approximately 13 percent,” from a recent telephone survey of “approximately 2,000 households” in markets where Sinclair operates stations); *see also* Capitol Broadcasting Comments at 4 (OTA broadcaster in the Charlotte and Raleigh-Durham DMAs puts the percentages there at 13-17%, evidently of TV households, based on 2003-04 data from various sources); Disney Comments at 2 (based on two recent professional telephone surveys it commissioned, putting the percentages at 9.1 of TV households in New York City and 15.3 in Los Angeles).

<sup>7</sup> NAB/MSTV Comments, Attachment A at 7. NAB/MSTV estimate that the number of households in this category is 20.5 million. *Id.* at ii, 2, Attachment A at 3 (based on 2003-04 data from various sources). NAB, citing Knowledge Networks/SRI’s *Home Technology Monitor Survey* (Spring 2004), estimates that the mean number of TV sets per OTA household is 2.2. *Id.*, Attachment A at 5.

We note that the U.S. Government Accountability Office, apparently relying on the same Knowledge Networks survey as NAB/MSTV, recently testified that 19% of U.S. households rely exclusively on OTA service. *See* Statement of Mark L. Goldstein, Director, Physical Infrastructure Issues, GAO, Before the House Subcommittee on Telecommunications and the Internet, Committee on Energy and Commerce, February 17, 2005, at 2-3, 18.

<sup>8</sup> *See Annual Assessment of the Status of Competition in the Market for the Delivery of Video Programming*, Report FCC 05-13 (“*Eleventh Annual MVPD Competition Report*”) in MB Docket No. 04-227, released Feb. 4, 2005, at 115. This and other estimates in the *Report* are based on data from A.C. Nielsen Co., Paul Kagan Associates, Inc., and other sources named at ¶ 19 of the *Report*). The estimates of OTA households herein may include a number of households that are using MVPD service without paying for it, and thus overstate the number of OTA households. On the other hand, estimates of MVPD households herein may overstate their number by counting as two MVPD households each TV household that subscribes to both cable and DBS service. One source opines that approximately 3% of households subscribe to both these services. CEA Comments at 3. The net effect of these inaccuracies is unknown.

fallen slowly but generally steadily in recent years.<sup>9</sup> In the absence of a definitive study, the following pie chart illustrates our best estimate of current conditions (rounding up to 15%):



8. The foregoing data and estimates are nationwide. It appears that the percent of OTA households varies substantially from one market to another. For example, in ten of Nielsen's Designated Market Areas ("DMAs"), over 80% of TV households subscribe to cable service.<sup>10</sup> When DBS subscribers to local-into-local service are added, the total MVPD subscribership in most of these markets exceeds 85%. In contrast, in thirteen DMAs, under 50% subscribe to cable.<sup>11</sup> Given the importance of an accurate assessment, funding of a formal study would be helpful to establish the precise number of OTA households on a market-by-market basis, and to forecast how those numbers are expected to change over the next several years.

9. MVPD Households with OTA TV Sets. Millions of TV households subscribe to MVPD service but also have one or more OTA television sets. One commenter estimates that almost half of DBS subscribers, approximately nine million households, watch their local

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<sup>9</sup> See *Eleventh Annual MVPD Competition Report*, *supra* note 8 at 115, Appendix B, Table B-1 (OTA households 17.69% of total TV Households as of June 2000, 15.78% as of June 2001, 16.96% as of June 2002, 15.82% as of June 2003, and 14.86% of total TV households as of June 2004). One commenter opines that the percentage of OTA households is growing. See Civil Rights Organizations Comments at 9; see also The Minority Media & Telecomm. Council Comments at 1 (incorporating the statistics used in Civil Rights Organization's Comments). But this appears based on a misinterpretation of an abrupt increase, stated in the Commission's *Ninth Annual MVPD Competition Report*, 17 FCC Rcd at 26975, in the number of television households in the most recent year (July 2001 through June 2002). The abrupt increase results from an actual number from the 2000 Census being used after years of using estimates based on the 1990 Census that proved low. In our opinion, it does not reflect the actual increase in TV households in that year or a decrease in MVPD households.

<sup>10</sup> These markets are Honolulu, Hartford-New Haven, Boston, Springfield-Holyoke, San Diego, Philadelphia, Palm Springs, Providence, New York, and Harrisburg-Lancaster-Lebanon-York.

<sup>11</sup> These markets are Fresno-Visalia, Dallas-Ft. Worth, Bangor, Meridian, Duluth-Superior, Harlingen-Weslaco-McAllen-Brownsville, Salt Lake City, Missoula, Twin Falls, Springfield, MO, Idaho Falls-Pocatello, Boise, and Fairbanks. DBS local-into-local penetration brings all but one of these markets (Fairbanks) above 50% total MVPD penetration in 2004.

channels over the air.<sup>12</sup> Many more households, several commenters note, subscribe to MVPD service but also have one or more OTA TV sets for television viewing in kitchens, on patios, in recreational vehicles and at sports events,<sup>13</sup> and for non-television uses such as playing games, VCR tapes, and DVDs.<sup>14</sup> Two commenters estimate the number of OTA sets in MVPD households at around 30 million.<sup>15</sup>

10. Demographic Characteristics. Commenters state that analog OTA households are somewhat disproportionately African-American,<sup>16</sup> Hispanic,<sup>17</sup> and low-income.<sup>18</sup>

11. Some commenters also state that households with certain demographic factors are more likely to be OTA households, including households being headed by women with

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<sup>12</sup> Univision Reply Comments at 3 n.6 (citing Nielsen 2003-04 research). These households may watch their local channels on the same TV set on which they receive DBS, or on another TV set. *See also* APTS Comments at 5-8; Univision Comments at 2 n.1, 6.

<sup>13</sup> Envisioneering Group Comments at 3; Univision Comments at 6; *see also* CEA Comments at 4 (32% of all cable- and DBS-subscribing households have at least one OTA TV set); CEA Reply Comments at 2 (same); Disney Comments at 2 (20% of viewers in New York City and 22% in Los Angeles); Envisioneering Group Comments, Attachment at 1-2 (stating that there are 184 million small-screen TV sets in daily or weekly use and 59 million more public-facility and handheld TV sets; the latter are “on the go, at jobs, and in public” at places such as in offices, airports, hospitals, and waiting rooms).

<sup>14</sup> CEA Comments at 4; CEA Reply Comments at 2; *see also* NAB/MSTV Comments, Attachment A at 4 (18 million households have one or more OTA-only TV sets); RadioShack Comments at 3 (citing Representative Boucher as stating that at least 30% of households use one or more TV sets to receive signals over the air).

<sup>15</sup> *See* APTS Comments at 10 (citing a 2001 NAB estimate of 34.5 million); NAB/MSTV Comments at ii, 2 (estimate of 28 million based on 2003-04 data). Assuming the accuracy of NAB/MSTV’s 28 million estimate and its estimate that there are 45 million sets in OTA-only households, there are a total of 73 million OTA TV sets in U.S. households.

<sup>16</sup> APTS Comments at 9 (18% vs. 12% “general population,” based on Nielsen data provided to PBS and “generally confirmed” by a study named *The Broadcast Household Story*, conducted by Knowledge Networks, and commissioned by the Corporation for Public Broadcasting); NAB/MSTV Comments, Attachment A at 7 (23% vs. 19%, based on Spring 2004 Home Technology Monitor Survey by Knowledge Networks/SRI); Sinclair Comments at 5 (18.57% nonwhite vs. 11.83% white, based on study by Sinclair’s recent telephone survey of “approximately 2,000 households” in markets where Sinclair operates stations). *But see* Disney Comments at 2 (61% of nonsubscribers to pay TV service are non-white adults; data drawn from New York City and Los Angeles only in two recent telephone surveys); CEA Comments at 3 (ethnicity is not a major factor, based on a CEA survey conducted in November 2001).

<sup>17</sup> Entravision Comments at 1 (28% of Hispanic households, citing the 2004 US Hispanic Market Report); Sinclair Comments at 5 (18.57% nonwhite vs. 11.83% white); NAB/MSTV Comments, Attachment A at 7 (27% vs. 19%); Univision Comments at i, 8-9 & n.11 (33% of Hispanic viewers or households and, according to Nielsen data, growing; citing Nielsen Media Research, NHTI, 2004 and 1999-2004). Univision Comments at 9 n.12 note that Hispanic households have more people in them than average U.S. households.

<sup>18</sup> Capitol Broadcasting Comments at 4 (data drawn from Charlotte and Raleigh-Durham only, citing Scarborough Media Research data from 2003 and 2004); NAB/MSTV Comments, Attachment A at 7-8; Sinclair Comments at 5; Disney Comments at 2. *See also* Civil Rights Organizations Comments at 11-14 (stating that in poor households there are probably millions of TV sets that are passed along from parents to children, or in informal disbursements of poor decedents’ estates, and thus remain in homes and in use although they are not reflected in records of commercial sales). *But see* CEA Comments at 3 (income is a minor factor, based on CEA study noted above).

children,<sup>19</sup> having few children,<sup>20</sup> or having unemployed adults.<sup>21</sup> Individual commenters allege that Hispanic households are more likely to be OTA households if Spanish is the first language spoken in them,<sup>22</sup> no one has more than a high school education,<sup>23</sup> or the household is in certain locations.<sup>24</sup>

12. Commenters disagree as to whether particular age groups are more likely to comprise OTA households.<sup>25</sup> One commenter notes that college education or its absence is not a predictor that a household is an OTA household<sup>26</sup> while another correlates high school or less education with being an OTA household.<sup>27</sup>

13. Geographic Characteristics. One commenter states that OTA households are not disproportionately located in urban, suburban, or rural areas.<sup>28</sup> It also points out wide disparities in the percentage of OTA households in different communities, for which there is no immediately obvious explanation. For example, the Palm Springs, California, and Parkersburg, West Virginia, DMAs<sup>29</sup> have the lowest percentages of OTA households in the country (6%), and the percentages of OTA households in the most populated DMAs range from about 10% in the Atlanta, New York City, Philadelphia, and San Diego to nearly 30% in Dallas, Minneapolis, and Salt Lake City.<sup>30</sup>

14. Some commenters state that disproportionate numbers of OTA households are in certain southwestern<sup>31</sup> and western areas.<sup>32</sup> Two commenters imply that there are especially high percentages of Hispanic OTA households close to the Mexican border and that they use analog OTA television to receive not only U.S. OTA analog stations, but also Mexican stations.<sup>33</sup> They

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<sup>19</sup> APTS Comments at 9 (slight factor).

<sup>20</sup> CEA Comments at 3, citing CEA study noted above.

<sup>21</sup> Capitol Broadcasting Comments at 4 (data drawn from Charlotte and Raleigh-Durham only).

<sup>22</sup> NAB/MSTV Comments, Attachment at 7-8.

<sup>23</sup> *Id.*

<sup>24</sup> See *infra* ¶¶ 13-14, citing above sources and Dennis Haarsager & Television Bureau of Advertising (November 2003) and Hispanic Fact Pack in Annual Guide to Hispanic Advertising & Marketing, Supplement to ADVERTISING AGE at 35 (2004).

<sup>25</sup> APTS Comments at 9 (under 55, citing same data as above and 2004 telephone survey conducted by Magid Media Futures); CEA Comments at 3 (under 34 and over 55); Envisioneering Group Comments at 5 (over age 50, citing its own 2003-04 research of multiple TV owners); Disney Comments at 2 (over 50; data noted above from New York City and Los Angeles only).

<sup>26</sup> APTS Comments at 9 (citing same data as above, except Magid Media Futures study).

<sup>27</sup> NAB/MSTV Comments, Attachment at 7-8.

<sup>28</sup> APTS Comments at 9.

<sup>29</sup> Nielsen has divided the continental United States, Hawaii, and parts of Alaska into 210 "DMAs," or Designated Market Areas. DMA boundaries are based on viewing patterns. No two DMAs overlap.

<sup>30</sup> APTS Comments at 8 & Appendix A.

<sup>31</sup> Univision's Comments at 9-10 (naming Dallas-Ft. Worth, Fresno, Houston, Los Angeles, Phoenix).

<sup>32</sup> NAB/MSTV Comments, Attachment at 8.

predict that if U.S. OTA stations stop analog broadcasting and Mexican stations continue, these Hispanic households will remain OTA-only and will need more than average incentive to obtain digital television from U.S. stations.<sup>34</sup>

**B. Reasons that Households Use OTA Television and Do Not Subscribe to an MVPD**

15. OTA households give several reasons for relying on OTA television and not subscribing to an MVPD. In one commenter's survey, 59% of OTA households indicate that their reason for remaining OTA is that "television is not a priority for them."<sup>35</sup> Similarly, a 1998 study found that, even for the very poor, the decision not to subscribe to cable was more often the result of preference than poverty.<sup>36</sup> A later study reached a comparable conclusion.<sup>37</sup> This consensus is consistent with the statement of one commenter that OTA households watch 30% less television than MVPD households.<sup>38</sup>

16. According to a commenter's survey, fewer than 30% of OTA households state that lack of funds plays a role in their decision not to subscribe to an MVPD.<sup>39</sup> Another commenter states that the dearth of Spanish-language channels explains relatively low subscription to MVPDs among Hispanic households.<sup>40</sup> Assuming that 15% of households are OTA households and that the reasons for their not subscribing to an MVPD are 60% lack of interest, 30% lack of

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<sup>33</sup> Entravision Comments at 2-4; Univision Comments at 10-11 (naming Albuquerque, Harlingen, Laredo, San Antonio, San Diego); *see also* APTS Comments at 8 (observing that southernmost Texas, the Harlingen-Welasco-Brownsville-McAllen DMA has the highest percentage of OTA households of any in the country).

<sup>34</sup> Entravision Comments at 3; Univision Comments at 11.

<sup>35</sup> CEA Comments at 4.

<sup>36</sup> *See* New America Foundation Comments, Attachment (J. H. Snider & Michael Calabrese, *A Consumer Tax Credit Can Unplug Analog TV, Reduce the Deficit & Redeploy Low-Frequency Spectrum for Wireless Broadband* ("New America Foundation Position Paper")), citing Roger Kieschnick & B.D. McCullough, *Why Do People Not Subscribe to Cable Television? A Review of the Evidence* (1998), available at [www.tprc.org/abstracts98/kieschnick.pdf](http://www.tprc.org/abstracts98/kieschnick.pdf). The New America Foundation Position Paper, at 6, also posits that for a poor household, cable television is a rational spending decision – many channels, 24 hours a day for every family member, for the same price as one ticket to a professional basketball game or cultural event.

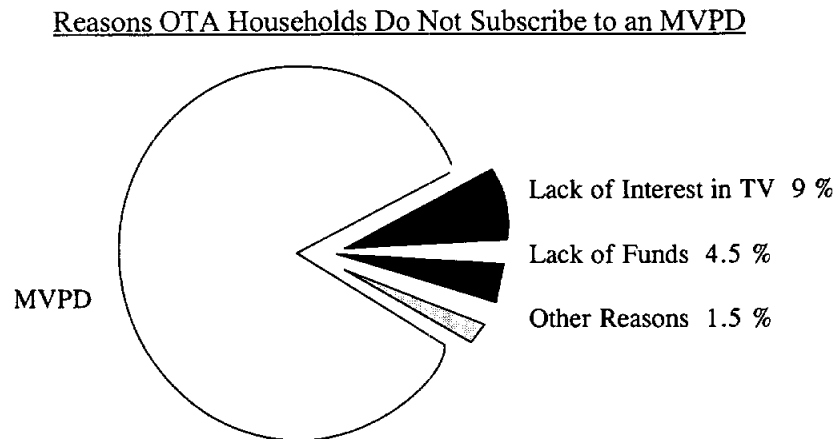
<sup>37</sup> Robert W. Crandall & Harold Furchtgott-Roth, *CABLE TV: REGULATION OR COMPETITION?* at 147 ("Cable demand is only slightly sensitive to household income") (Brookings Inst., Washington, D.C., 1996).

<sup>38</sup> CEA Comments at 4.

<sup>39</sup> CEA Comments at 4; *see also* Disney Comments, Appendix at 1 (in survey of Los Angeles and New York OTA households, 35% cite cost as reason not to subscribe to MVPD, 34% cite personal choice, and 43% say that OTA picture quality is good or excellent). In one commenter's survey, 53% of non-MVPD respondents stated that MVPD service was "too expensive." Sinclair Comments at 6-7 (survey in 37 of 39 markets in which it operates TV stations). "Too expensive" may be a relative statement about a household's spending priorities, however, and may not indicate inability ("lack of funds") to subscribe to an MVPD. Also, the survey did not offer lack of interest in television as one reason for not subscribing to an MVPD. Instead, the other reasons offered to Sinclair's respondents were that they were interested only in local stations (15%), that MVPD service was poor (2.4%), that MVPD service was unavailable (2.4%), and other reasons (28.8%).

<sup>40</sup> Entravision Comments at 2.

funds, and 10% other, the reasons that OTA households use OTA television may be illustrated in the following diagram.



### C. Digital-to-Analog Converters

17. Consumers who do not subscribe to a MVPD or purchase a digital television set can continue to receive OTA television after the transition and view it on their analog television sets if they obtain a digital-to-analog converter. Such a converter may consist of a box with numerous features or a simple device designed only to convert digital signals for display on an analog set.<sup>41</sup> Commenters differ somewhat about the current availability and cost of converters. One commenter claims they are difficult to find,<sup>42</sup> but others quote current prices, indicating that they are available. Current prices range from \$80 to \$1,000, with \$300 the price cited most often.<sup>43</sup> Commenters are unanimous in expecting prices to fall significantly, as with many other consumer electronic products, as demand and manufacturing volumes increase.<sup>44</sup> Different commenters predict prices to be under \$100 by late 2005,<sup>45</sup> \$100 by 2006;<sup>46</sup> \$67 by early 2007;<sup>47</sup> and as low as \$50 by 2008.<sup>48</sup>

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<sup>41</sup> For example, DBS service has always included a receiver box that converts the digital signals received from the satellite to analog for display on subscribers' analog televisions. A converter box would function in a similar fashion for OTA viewers.

<sup>42</sup> Chris Llana Comments at 2; RadioShack Comments at 5-6 (stating that there are very few converters for OTA television that do not also have the ability (with accompanying cost) to downconvert cable or satellite).

<sup>43</sup> APTS Comments at 17 (\$300-400); Civil Rights Organizations Comments at 10 n.16 (Best Buy charged \$400 in 2003); NAB/MSTV Comments at 13 (\$300 or more, but none are currently available with Standard Definition-only outputs); New America Foundation Position Paper, *supra* note 36, at 6 (\$80, not citing any authority); Thomas C. Smith Comments at 5 (noting Motorola converter for \$299); *see also* RadioShack Comments at 7 (citing CEA as claiming that current prices are \$300-\$1,000, but adding that current converters are capable of downconverting cable and satellite transmissions, which capability (and accompanying cost) OTA converters may not need).

<sup>44</sup> Envisioneering Group Comments at 6-7 (eventually will become impulse purchases); NAB/MSTV Comments at 11, 13-14. *But see* Paxson Reply Comments at 7 (cautioning against expecting converter prices to fall very far, noting past predictions of low prices for DTV sets that have not come true).

<sup>45</sup> LG/Zenith Comments at 2 (noting that they will receive and demodulate all 18 DTV formats).

18. There are several proposals for the capabilities that the converters should have. Commenters advocate that converters be able to receive “all of the multiplexed channels transmitted by DTV stations,”<sup>49</sup> to provide down-resolution for signals for connections to analog TV sets, and to work with remote control, closed captioning, and a PSIP-based programming guide, all in compliance with all safety and Energy Star requirements.<sup>50</sup> One commenter advocates requiring that converters receive all digital formats for High Definition and Standard Definition on any VHF or UHF broadcast channel, connect to an existing analog TV receiver via channel 3 (or 4) radio frequency interface, work with digital broadcast signals in the same receiving configuration (antenna, location, etc.) as used for current analog reception, be able to receive and display signals under the most challenging conditions (including low signal level and severe multipath and adjacent channel interference conditions), and be able to accommodate closed captioning, program ratings, and the broadcast flag.<sup>51</sup> Other commenters add that converters should be compatible with remote controls, VCRs, and DVRs, and should be capable of installation by ordinary consumers.<sup>52</sup>

19. A near-term switch-over deadline may be less disruptive to consumers if digital-to-analog converter boxes are readily available and/or their costs are subsidized. Many commenters suggest that the government should aid consumers’ purchase of converters so that analog-only TV sets will continue to display OTA television broadcasts after analog transmissions are terminated.<sup>53</sup> Support is voiced, at a minimum, for programs that would give low-income OTA households<sup>54</sup> part of the price of one converter.<sup>55</sup> If eligibility for a converter were limited to the

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<sup>46</sup> Alfred Manfredi Comments at 1 (predicting that by then television sets with integrated digital tuners will be no more expensive than analog sets are today); *see also* EchoStar Reply Comments at 8 (claiming that converters will be obsolete when HDTV sets become affordable).

<sup>47</sup> Motorola Comments at 7 (estimated price on Dec. 31, 2006). NAB/MSTV’s Comments at 14 and RadioShack’s Comments at 7-8 cite Motorola’s \$67 prediction with evident approval.

<sup>48</sup> LG/Zenith Comments at 2 (noting that they will receive and demodulate all 18 DTV formats).

<sup>49</sup> Civil Rights Organizations Comments at 10 n.16. *See also* Univision Comments at 14 (converters should be able to display all multicast channels, closed captioning, and emergency alert information).

<sup>50</sup> Motorola Comments at 7.

<sup>51</sup> NAB/MSTV Comments at 12-13 & n.27 (pointing to recently approved ATSC Guidelines as a “guiding light” for minimum standards for converters).

<sup>52</sup> Thomas C. Smith Comments at 4; Univision Comments at 13-14.

<sup>53</sup> APTS Comments at 15-19; Civil Rights Organizations Comments at 18; Bill Keough Comments at 1; NAB/MSTV Comments at 9-10 & n.22 (for OTA households); New America Foundation Position Paper, *supra* note 36, at 2. *Cf.* Industrial Communications Association Reply Comments at 2, 4 (there should be some federal funding mechanism to facilitate the provision of digital equipment to over-the-air television viewers).

<sup>54</sup> 700 MHz Advancement Coalition Comments at 5 (support should be available to all persons on some form of low-income government assistance); Aloha Partners Comments at 4 (households below median household income); APTS Comments at 15-19 (at least households making less than \$25,000 a year); Citizens Tel. Cooperative Comments at 2 (one benefit per household, to spread the benefit among as many households as possible); Civil Rights Organizations Comments at 19 (“the truly needy,” defined as households that do not subscribe to more than Basic MVPD service and that are eligible for a federal program for which only low-income persons are eligible, such as housing Choice Vouchers, School Choice Vouchers, National School Lunch Program, Food Stamps); Bill Keough Comments at 1 (low-income consumers); Motorola Comments at 6 (low-income households).

OTA households that did not subscribe to an MVPD due to lack of funds, a small percentage of households would qualify for support. Other commenters advocate broader support,<sup>56</sup> such as for every household,<sup>57</sup> for the full price of a converter,<sup>58</sup> for DTV-ready television sets,<sup>59</sup> and for some element of subscription to an MVPD.<sup>60</sup>

20. Commenters address many other aspects of the support programs they advocate.<sup>61</sup> The vast majority of commenters who express a preference between vouchers and tax credits prefer vouchers.<sup>62</sup> There are many different suggestions of who should pay for any government support program. Those mentioned are consumers generally, some or all 700 MHz licensees (via

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<sup>55</sup> APTS Comments at 15-19 (advocating a one-year support of at least 25% of the purchase price of a converter); Motorola Comments at 7-8 (advocating support for the purchase of a converter or other “digital capable equipment,” at least one per household); *see also* EchoStar Reply Comments at 6 (warning that a generous support program would discourage consumers from purchasing TV sets that can display digital signals received off air).

<sup>56</sup> Civil Rights Organizations Comments at 23-24 (noting that every supported household will bring closer the satisfaction of the 15% test and the return of analog spectrum).

<sup>57</sup> New American Foundation Position Paper, *supra* note 36, at 6-7 (for every household, but for only one television set).

<sup>58</sup> Motorola Comments at 8 (\$67 per household, for a one-time expense of about \$840 million).

<sup>59</sup> 700 MHz Advancement Coalition Comments at 4; Aloha Partners Comments at 3; Citizens Tel. Cooperative Comments at 2; Civil Rights Organizations Comments at 18-19 & n. 30 (a converter or DTV-ready set, noting that the poor will benefit especially from having access to multicasting); Bill Keough Comments at 1; Minority Media & Telecommun. Council Comments at 5; New America Foundation Position Paper, *supra* note 36, at 6-7; EchoStar Reply Comments at 8-9.

<sup>60</sup> 700 MHz Advancement Coalition Comments at 4; Citizens Tel. Cooperative Comments at 2; Bill Keough Comments at 1; Minority Media & Telecommun. Council Comments at 5 (including MVPD will generate more programs oriented at minority and poor audiences); New America Foundation Position Paper, *supra* note 36, at 2, 7 (a DTV set, a cable or DBS set-top box, or the cost of establishing cable or DBS service); EchoStar Reply Comments at 8-9 (noting that including MVPD subscription would reduce the need to invent new converter technology and a new distribution channel). *But see* APTS Comments at 18-19 (warning that any ongoing support for MVPD subscriptions will cost billions a year); EchoStar Reply Comments at 10 (any support for MVPD should end with the sooner of (a) the useful life of the consumer’s analog TV set or (b) the time when the consumer would have bought a digital set in the normal course of life).

<sup>61</sup> *See* Civil Rights Organizations Comments at 18-21 (discussing the funding and administration of a voucher plan involving broadcasters and retailers); RadioShack Comments at 8-9 (government should rely on retailers to administer any support program because they have infrastructure and experience, and government has neither); Univision Comments at 12, 14 (advocating a multi-year support program to avoid being overwhelmed and to allow for consumers that have two jobs or become unemployed). The Civil Rights Organizations state that any support fund could be administered by broadcasters, a trade association, or an organization serving low-income families, and that the National Urban League would help in the latter task. Civil Rights Organizations Comments at 21 & n.36.

<sup>62</sup> APTS Comments at 19-20 (few taxpayers will remember to use tax credits); Civil Rights Organizations Comments at 3; Bill Keough Comments at 1 (many poor households do not pay taxes); Minority Media & Telecommun. Council Comments at 4 (consumers are more familiar with vouchers than with tax credits; abuse and fraud are easier with tax credits); Motorola Comments at 7-8; Univision Comments at 13 (tax breaks would be ineffective, because many poor people do not pay taxes or have much sophistication in filling out forms). *But see* Aloha Partners Comments at 3-4 (tax credits are best, vouchers acceptable); New America Foundation Position Paper at 2, 6 (refundable \$50 tax credit, available during a 12 month period).

their post-auction payments of their winning bids),<sup>63</sup> broadcasters that are slow to begin and expand their digital coverage,<sup>64</sup> advertisers, cable operators, and television set manufacturers and retailers.<sup>65</sup>

#### D. Consumer Education

21. Consumer education efforts, particularly in the next few years, could have a significant impact on the number of analog OTA consumers at the switch-over date. One commenter estimates that there may be 73 million analog-only sets in use in the U.S. that are not connected to an MVPD service.<sup>66</sup> Although the Commission's DTV tuner mandate began to apply in July 2004 to the largest sets, it will not become fully effective on smaller sets until July 2007.<sup>67</sup> Meanwhile, millions of new analog-only sets continue to be sold each year.<sup>68</sup> Many consumers are buying these sets unaware that the DTV transition is occurring and that, when the transition is over, analog-only sets will no longer receive OTA signals without the use of external reception equipment.<sup>69</sup> In sum, there are millions of households that will need to learn that,

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<sup>63</sup> Aloha Partners Comments at 4-5 appear to advocate that all 700 MHz licensees pay for the support program. Motorola Comments at 8, NAB/MSTV Comments at ii, 11, Univision Comments at 11 and EchoStar Reply Comments at 10-11 appear to agree that all 700 MHz licensees, or other licensees, should pay. Aloha Partners Comments at 5 and Mark D. Bulla Comments at 2-3 also note that making future 700 MHz licensees pay will depress future auction revenues and will entail difficult allocation issues. Many present licensees of 700 MHz spectrum stated that they have already paid for their spectrum and that making them, in effect, pay more would be unfairly and perhaps unconstitutionally retroactive. They favor paying for the support program from future auction revenues. They are 3G COMM, LLC; Acumen Technologies, Inc.; Cameron Communications, L.L.C.; Dickey Rural Services, Inc.; Kennebec Tel. Co.; North Dakota Network Co.; PVT Networks, Inc.; Polar Communications Mutual Aid Corp.; The Ponderosa Tel. Co.; Red River Rural Tel. Ass'n; Webster-Calhoun Cooperative Tel. Ass'n; and Whidbey Tel. Co. *Accord* 700 MHz Advancement Coalition Comments at 5-8; Aloha Partners Comments at 5; Motorola Comments at 8. Paxson opposes putting any further obligations on 700 MHz licensees, claiming that they are relatively small and financially weak. Paxson Comments at 11-12.

For advocacy that future auction winners pay for any government support program, see Citizens Tel. Cooperative Comments at 1-2; New America Foundation Position Paper, *supra* note 36, at 7,

<sup>64</sup> Civil Rights Organizations Comments at 18, 21 (suggesting that slow broadcasters be able to excuse their slowness by generosity to any support program). According to the Civil Rights Organizations, a broadcaster's payment should be less than the value to it of its delay, but enough to pay for much support for the needy. *Id.* at 20-21. *But see* Entravision Comments at 4 n.1 (arguing that broadcasters have already paid much to convert to digital and should not be burdened further).

<sup>65</sup> Civil Rights Organizations Comments at 3-4, 27-28 (calling for a negotiated rulemaking).

<sup>66</sup> See authorities cited *supra* note 15.

<sup>67</sup> The phase-in schedule of the DTV tuner mandate is as follows: (1) of receivers with screens 36 inches and above, 50% must include DTV tuners as of July 1, 2004 and 100% must include DTV tuners as of July 1, 2005; (2) of receivers with screens 25-35 inches, 50% must include DTV tuners as of July 1, 2005 and 100% must include DTV tuners as of July 1, 2006; (3) of receivers with screens 13-24 inches, 100% must include DTV tuners as of July 1, 2007; and (4) of TV Interface Devices (VCRs and DVD players/recorders, etc., that receive broadcast television signals), 100% must include DTV tuners as of July 1, 2007.

<sup>68</sup> In 2003, for instance, 25.4 million analog-only color TV sets were sold in the U.S. That number is expected to drop 17% in 2004 to 23.6 million. CEA, *Digital America, Video, Analog Slips*, [http://www.ce.org/publications/books\\_references/digital\\_america/video/analog\\_slips.asp](http://www.ce.org/publications/books_references/digital_america/video/analog_slips.asp) (visited Jan. 10, 2005).

<sup>69</sup> In 2002, GAO reported that forty percent of the public had never heard of the transition to digital television, and another forty-three percent said they were only "somewhat aware" of the transition.

someday, some or all of their television sets will be inoperable unless they buy a converter, subscribe to an MVPD service, or take some other action.

22. The Commission has pursued various DTV consumer education initiatives within its existing resources and expertise. In 2002, for example, Chairman Powell publicly challenged the industries involved in the transition to do more to educate the public and promote consumers' digital programming options.<sup>70</sup> More recently, the Commission launched a new consumer-oriented web site devoted to the DTV transition, [www.dtv.gov](http://www.dtv.gov). The site provides detailed information about DTV, including web links to broadcasters, MVPDs, manufacturers, retailers, and others.<sup>71</sup> The Commission is also making available a "shopper's guide" for those consumers who are considering purchasing a DTV set and assists consumers through its toll-free Consumer Call Center.<sup>72</sup> In addition, several major retailers have agreed to distribute a consumer "tip sheet" describing DTV terms and explaining the future limitations of analog-only televisions.<sup>73</sup>

23. Some commenters propose more aggressive measures to educate the public, such as mass mailings by the Commission to every U.S. household.<sup>74</sup> In Berlin, Germany, for instance, where analog broadcasting was ended in 2003, an intensive consumer education campaign was launched to inform consumers before the digital switch-over, including public service announcements and "crawls" on broadcast television, and a letter sent by the government to every home.<sup>75</sup> Another proposal in the comments -- and the subject of an ongoing Commission rulemaking -- would require a warning label on analog-only sets to inform consumers about the potential limitations of the equipment at the switch-over date.<sup>76</sup>

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*Additional Federal Efforts Could Help Advance Digital Television Transition*, GAO Report 03-7 at 15 (Nov. 2002) ("GAO Report").

<sup>70</sup> See Letters from FCC Chairman Michael K. Powell to Sen. Ernest F. Hollings and Rep. W.J. "Billy" Tauzin, dated April 4, 2002.

<sup>71</sup> DTV, <http://www.dtv.gov/> (visited Oct. 7, 2004).

<sup>72</sup> DTV Shoppers Guide, <http://www.dtv.gov/shopgde.html> (visited Nov. 9, 2004).

<sup>73</sup> The tip sheet was jointly developed by the Commission, CEA, and the Consumer Electronics Retailers Coalition.

<sup>74</sup> See APTS Comments at 27 (advocating broadcast advertisements, a letter to every household, displays at retail stores, involvement by local civic groups, telephone hotlines, and web sites); CEA Comments at 5-8 (advocating Public Service Announcements by broadcasters); Envisioneering Group Comments at 2-5 (most consumers do not understand what DTV is or how it differs from HDTV; especially needing education are senior citizens, low-income persons and renters; most households think they will need to buy an HDTV and that they will not be able to afford one, or that analog television will end gradually, as CDs replaced LP records and DVDs are replacing VHS); Bill Keough Comments at 1 (same as APTS); Chris Llana Comments at 1 (advocating an FCC mailing to every household); Thomas C. Smith Comments at 6 (advocating that retail sales personnel receive improved training, that devices be easier to install and use, and that recording DTV be easier); Univision Comments at 14 (advocating clear, multilingual written instructions and a toll-free help line). See also GAO Report at 39 (recommending that Commission explore options for raising public awareness).

<sup>75</sup> Mark Landler, *Germany Zaps into Digital Television: Berlin's Hurry-Up Approach Could Set Example for Others*, INT'L HERALD TRIB. at 11 (Nov. 4, 2003); Thomas Hazlett, *Finally, Something Good on German Television*, <http://slate.msn.com/id/2089424/> (visited Nov. 14, 2003).

<sup>76</sup> See NAB/MSTV Comments at ii, 8-9 (advocating that warning labels be placed on all non-DTV set boxes and that retail stores be required to demonstrate off-air DTV reception); *Second Periodic Review of the*

### III. ANALYSIS

#### A. Addressing the Remaining Analog OTA Households at the Switch-Over Date

24. Although current numbers of analog OTA households are instructive, the most relevant figures will be the numbers of households that rely on OTA analog service for information and entertainment on the switch-over date. Various factors will determine how many analog sets will be in use on the switch-over date and how long they will remain in operation. Some factors, such as the price of DTV sets and the amount and popularity of digital programming, are largely marketplace-driven.<sup>77</sup> Other factors, such as setting deadlines for broadcasters to transmit at full power, phasing in digital tuners, and pressing for the development of “plug-and-play” DTV sets,<sup>78</sup> are already the focus of significant government involvement.<sup>79</sup>

25. The Commission will continue to use formal and informal means to ensure progress towards completion of the transition. Additional government efforts, however, could affect the size of the legacy analog problem and its impact on viewers on the switch-over date: (1) the timing and nature of the digital switch-over date itself, including whether analog broadcasting is ended all at once or phased-out gradually; (2) consumer education; and (3) assistance for the purchase of digital-to-analog conversion equipment or services. Each of these factors is discussed below.

##### 1. The Timing and Nature of the Switch-Over

26. The timing and nature of the digital switch-over date will have a direct impact on the number of analog sets still in use. On one extreme, a near-term, nationwide date certain would occur when the greatest number of legacy analog-only sets are still in use. However, a near-term deadline if combined with an intensive consumer education effort could deter many consumers from purchasing additional analog-only equipment. At the opposite extreme, the switch-over date could be set to reflect the natural retirement of analog equipment. For instance, assuming an outside useful life of 25 years for analog sets, the switch-over date could be set for 25 years from the date the DTV tuner mandate is fully effective in 2007 (*i.e.*, 2032). Each extreme, and the variations in between, will affect the number of households that will have purchased digital equipment before the deadline, how much analog equipment will remain in operation, and the price of digital-to-analog converters and DTV sets for those consumers who otherwise might lose service.

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*Commission's Rules & Policies Affecting the Conversion to Digital Television*, 18 FCC Rcd 1279, 1314-1315 (2003) ¶¶ 95-98.

<sup>77</sup> Even in these areas, the Commission has taken steps to spur the marketplace when necessary. In April 2002, for example, Chairman Powell challenged major networks to provide HDTV or other “high-value” digital content during at least 50% of their prime-time hours. In addition to HDTV, “high value” digital content refers to interactive and/or multiple digital programming streams that may prove attractive to viewers.

<sup>78</sup> “Plug-and-play” sets enable cable subscribers to receive digital cable programming without the need for a separate set-top box.

<sup>79</sup> See, e.g., *Second Periodic Review of the Commission's Rules & Policies Affecting the Conversion to Digital Television*, 19 FCC Rcd 18279 (2004); *Implementation of Section 304 of the Telecommunications Act of 1996: Commercial Availability of Navigation Devices and Compatibility Between Cable Systems and Consumer Electronics Equipment (“Plug-and-Play Order”)*, 18 FCC Rcd 20885 (2003).

### a. The Timing of the Switch-Over

27. Providing support for a near-term deadline, sales of DTV equipment are rising rapidly, with approximately 1.4 million DTV units sold in 2001, 2.5 million in 2002,<sup>80</sup> 4 million in 2003,<sup>81</sup> and 7.2 million in 2004.<sup>82</sup> CEA projects 10.77 million DTV units will be sold in 2005, 16.77 million in 2006, 23.25 million in 2007 and 27.05 million in 2008.<sup>83</sup> Up to now, most DTV units sold have been video monitors, without any internal DTV reception capability.<sup>84</sup> As the Commission's DTV tuner mandate becomes effective, however, an increasing percentage of those sets will contain integrated DTV broadcast receivers.<sup>85</sup> In addition, under the Commission's rules, all one-way plug-and-play DTV sets now entering the marketplace must include an over-the-air DTV tuner.<sup>86</sup> The confluence of rapidly increasing set sales and the Commission's DTV tuner and plug-and-play mandates means that every year millions more television sets should be in consumers' homes that will be able to receive broadcast service at the switch-over date. From 2007 on, the figures could approach 20-30 million digital receivers sold per year.<sup>87</sup>

28. As a corollary, the number of analog-only sets in use will decline over time, especially in 2007 and beyond, when the DTV tuner mandate becomes fully effective. Given that analog-only sets will continue to be sold until at least 2007, however, it may be decades before all analog-only sets are retired from service naturally.

### b. The Nature of the Switch-Over

29. Regardless of *when* the switch-over occurs, *how* the government terminates analog service will have an impact on the size and scale of the legacy analog problem. Two general approaches are described below.

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<sup>80</sup> CEA, Press Room, *2002 Sales Turbocharge DTV Transition into New Year* (Jan. 27, 2003), [http://www.ce.org/press\\_room/press\\_release\\_detail.asp?id=10155](http://www.ce.org/press_room/press_release_detail.asp?id=10155) (visited Jan. 10, 2005).

<sup>81</sup> CEA, *Digital America, Video, DTV by the Numbers*, [http://www.ce.org/publications/books\\_references/digital\\_america/video/dtv\\_numbers.asp](http://www.ce.org/publications/books_references/digital_america/video/dtv_numbers.asp) (visited Jan. 10, 2005). CEA defines DTV products to include both sets with integrated DTV receivers and DTV monitors that cannot receive DTV broadcasts without an external reception device.

<sup>82</sup> CEA, Press Room, *Super Bowl XXXIX Boosts Digital Television Sales – Strong December Sales Close Out Record Year* (Jan. 28, 2005), [http://www.ce.org/press\\_room/press\\_release\\_detail.asp?id=10681](http://www.ce.org/press_room/press_release_detail.asp?id=10681) (visited February 4, 2005).

<sup>83</sup> *CEA Announces Another All-Time High for DTV as Cumulative Sales Top 13 Million Units*, CEA Press Release (Nov. 22, 2004).

<sup>84</sup> CEA, *Digital America, Video, Digital Television Inroads*, [http://www.ce.org/publications/books\\_references/digital\\_america/video/dtv\\_numbers.asp](http://www.ce.org/publications/books_references/digital_america/video/dtv_numbers.asp) (visited Jan. 10, 2005).

<sup>85</sup> As of July 2007, the only television sets that may not include a digital broadcast tuner are non-plug-and-play sets that are pure monitors (*i.e.*, have no analog or digital broadcast tuning capability) or have screens less than 13 inches in diameter (7.8 inches for digital sets with 16:9 aspect ratios).

<sup>86</sup> *Plug-and-Play Order*, 18 FCC Rcd at 20900-01 ¶ 34.

<sup>87</sup> In 2003, approximately 29.5 million television sets were sold in the U.S. CEA 2003 Market & Report Analysis. From July 2007 forward, all such sets would include digital broadcast tuners, except as set forth in note 85, *supra*.

**(i) Simultaneous End of Analog Service**

30. Under this approach, all analog broadcasting ends simultaneously in a particular market. That is, analog OTA viewers in a particular market would switch from having their current level of analog service one day to having no analog service the next. This could occur either nationwide or on a market-by-market basis. Section 309(j)(14) of the Communications Act, for instance, contains a target nationwide end of analog service on December 31, 2006, but, under certain conditions (*e.g.*, 85 percent of viewers in a particular market do not have access to the digital signals), market-by-market extensions of the analog shut-off can be granted. In either case, whether the analog signals are terminated nationwide at the end of 2006 or later on a market-by-market basis, Section 309(j)(14) contemplates that analog television service will end all at one time from the point of view of any particular consumer.<sup>88</sup>

**(ii) Analog “Fade to Black”**

31. Another potential approach would ensure that not all analog broadcasting ends at the same time in a particular market. Instead, analog broadcasting would be phased out in order to continue to provide some level of analog broadcast service to existing analog sets. Analog OTA viewers would thus continue to have access to some local broadcast programming on their existing equipment, including emergency information, even if they took no action before the switch-over. There are at least two potential “fade to black” scenarios.

**(a) The “Lifeline” Approach**

32. At the switch-over date, a small number of analog television stations would be licensed to operate in each market.<sup>89</sup> The pool from which these licensees are selected could be limited to existing broadcasters (which would simply be continuing their analog service) or opened to new applicants. This would ensure that analog OTA viewers continue to have access to at least some television programming without digital-to-analog converters. Eventually, when the number of analog OTA viewers is sufficiently small, all analog service would be terminated. This approach provides analog OTA households with an additional choice. Those for whom television service holds little value could do nothing and rely on the truncated analog service, while those who value television service more highly could obtain a digital-to-analog converter to receive the full complement of broadcast programming. In addition, a truncated service may be a preferable solution to converters for non-primary television sets in OTA households (or for those additional sets in MVPD households that are not connected to the MVPD service), especially for small or portable sets for which a converter box may be impractical.

33. Some of the potential issues with a “lifeline” fade-to-black approach are: (a) finding spectrum on which these continuing analog stations could operate; (b) recognizing that not all pre-transition analog programming would be available; (c) establishing an economically viable analog service; and (d) accepting the opportunity costs of not being able to use the spectrum for other uses (*e.g.*, secondary services like low-power television).

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<sup>88</sup> We ignore for the moment the possibility that some consumers may be able to receive out-of-market analog stations if the transition occurs on a market-by-market basis.

<sup>89</sup> Conceivably, only one such station would be licensed.

**(b) The “700 MHz Reclamation” Approach**

34. Analog service would “fade to black” in stages, beginning with stations in the 700 MHz band (channels 52-69). First, a deadline could be set for all stations to be cleared from channels 60-69.<sup>90</sup> This might be accomplished through voluntary means (such as private payments to stations willing to vacate early), but would be followed by a mandatory deadline. Stations on those channels would be required to turn off their analog signals and discontinue service. OTA analog viewers of these stations would lose service from these stations only. Digital stations on channels 60-69 would be moved to channels within the core broadcast spectrum and required to continue to operate.<sup>91</sup> If possible, the Commission would find vacant channels on which to operate in digital within the core; if necessary, however, the digital stations would be required to displace their existing in-core analog operations. This would ensure that the process continues to move the transition forward, not backward. Under the Commission’s current rules, the digital-only stations would then be entitled to mandatory carriage on local cable systems. Next, a second hard deadline would apply to channels 52-59,<sup>92</sup> and a similar process would occur: analog stations would cease operation and digital operations would move into the core. Finally, a third deadline could be established for stations within the core (or no deadline could be set and the marketplace could dictate when the remaining analog stations turn in their licenses).

35. The benefit of a “700 MHz reclamation” fade-to-black approach is, foremost, early reclamation of the 700 MHz spectrum for public safety and advanced wireless services. But it also could have a salutary effect on the transition, by making it clear to consumers that the process is, in fact, moving forward, and that analog service will be diminishing further over time.

36. Some of the potential issues with such an approach are: (1) the greater hardship imposed on stations on channels 52-69 (including the loss of their analog revenue streams and/or the cost of moving digital operations), many of which are relatively new entrants and were allotted those frequencies because lower frequencies were already occupied; (2) the greater hardship imposed on viewers of those channels, which, even though they tend to be more lightly viewed, often provide Spanish-language, religious, educational or other niche programming; (3) the potential of losing a popular analog service from one of the four major networks, whether because it was operating in analog on channels 52-69 or its digital operation on channels 52-69 displaced its in-core analog operation;<sup>93</sup> (4) finding in-core spectrum on which the digital stations can operate without causing undue interference; (5) the likelihood that existing analog stations (and possibly some digital stations) would be subject to interference levels during the phase-out that are unacceptable under current rules;<sup>94</sup> and (6) if no deadline is established for in-core analog

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<sup>90</sup> There are 94 analog stations and 19 digital stations operating on channels 60-69.

<sup>91</sup> The digital stations would not be permitted to discontinue digital service and operate only in analog because this would retard, rather than advance, the digital transition.

<sup>92</sup> There are 98 analog stations and 141 digital stations operating on channels 52-59.

<sup>93</sup> There are 7 analog top-four network affiliates and 5 digital top-four network affiliates operating on channels 60-69, and 18 analog top-four network affiliates and 84 digital top-four network affiliates operating on channels 52-59.

<sup>94</sup> The Commission’s plans have assumed that analog broadcasting will end nationwide on the same day, and thus that channels 2 to 51 (the “core” channels) will be free of analog broadcasting on that day. Especially in densely populated areas, stations that now broadcast on channels 52 to 69 will move to newly freed core channels. If, however, markets switch over on different dates, then one channel may be needed

stations, the inequitable treatment among broadcasters and the possibility that enough analog broadcasting will remain that the complete transition to digital will not occur.

## 2. Consumer Education

37. To the extent an aggressive and comprehensive effort is launched to inform consumers about the coming transition and the limitations of analog-only sets after the switch-over, it is less likely that consumers will buy new analog-only equipment and the legacy problem will be reduced. Such a campaign could also provide an incentive for consumers who would not otherwise have been in the marketplace to purchase digital equipment. If a near-term date certain were established, the message to consumers could become clearer and more effective. By contrast, to the extent the switch-over date is uncertain or more distant, consumer education efforts become more difficult and less effective since consumers cannot be told with specificity when and how to prepare themselves. Indeed, the lack of a clear message on when analog broadcasting will end may contribute to consumers' lack of understanding that analog broadcasting is terminating at all.

## 3. Digital-to-Analog Conversion Equipment

38. As noted above, most commenters expressed a preference for some form of government subsidy of digital-to-analog converter boxes at the end of the transition. If a government subsidy is adopted, it could be limited in one or more ways – e.g., only one converter box per household, only a portion of the converter box price covered, only low income households or only households that do not subscribe to an MVPD qualify, or only a subsidy for converter boxes and not for subscribing to an MVPD service or purchasing a new digital set.

39. The more targeted the subsidy, the greater the number of analog-only OTA sets at risk of going dark on the switch-over date. For instance, a targeted subsidy to provide one converter box to every low-income household could put at risk: (1) second, third or fourth analog sets in low income OTA households; (2) all analog sets in OTA households that do not qualify for the low income subsidy; and (3) analog sets in MVPD households that are not connected to the network.

40. On the other hand, the more targeted the subsidy, the less expensive the program will be for the government. For instance, assuming that there are 113 million television households at the end of 2006 (the statutory target deadline),<sup>95</sup> that converter boxes cost \$67 at that time,<sup>96</sup> and that the number of over-the-air viewers remains constant (15% of households do not subscribe to an MVPD, 4.5% because of lack of funds).<sup>97</sup>

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for digital broadcasting in a market where the switch-over has occurred and the same channel or an adjacent one may still be in use for analog broadcasting in a nearby market.

<sup>95</sup> The predicted number of television households, 113 million, is based on there being 108.4 million households in the U.S. as of June 2004 and that number growing at its most recent annual rate, 1.66%, through December 2006. *Eleventh Annual MVPD Competition Report*, *supra* note 8, at 115 (Appendix B, Table B-1).

<sup>96</sup> A near-term date certain for the end of the transition would accelerate demand and volume and drive down prices.

<sup>97</sup> The following examples do not reflect the costs or complexities of administering the subsidy program itself. Some of the more targeted options – e.g., providing subsidies only to OTA viewers and/or those who

- A government support program for households that do not subscribe to an MVPD due to lack of funds, which provides a free converter box or an equivalent subsidy to purchase a new DTV set or subscribe to an MVPD service, would cost approximately \$340 million.
- A government support program for all households that do not subscribe to an MVPD service, which provides a free converter box or an equivalent subsidy to purchase a new DTV set or subscribe to an MVPD service, would cost approximately \$1.1 billion.
- A government support program that, for administrative simplicity, provides a \$67 subsidy to every TV household to be used towards the purchase of a converter box or new DTV set or to subscribe to an MVPD service, would cost approximately \$7.6 billion.

Instead of direct government subsidies to viewers, broadcasters or participants in the 700 MHz auctions could be required to help OTA viewers avoid disruption at the end of the transition. For instance, broadcasters could be subject to a spectrum fee for use of the analog spectrum beyond December 31, 2006, the proceeds of which could be used to buy converters, digital sets, MVPD subscriptions, or provide other means of ensuring that OTA viewers maintain access to broadcast television. Another approach would be to assign broadcasters bidding credits in upcoming 700 MHz auctions, which could be sold to auction participants. The broadcasters would then be required to provide similar means of ensuring that OTA viewers maintain access to broadcast television. Yet another alternative would be to require that auction winners, before they begin non-broadcast service and before broadcasters end analog service, ensure OTA viewer access to broadcast television.

41. Several commenters express optimism that marketplace forces and the Commission's DTV tuner mandate will help alleviate the risk that OTA households will lose access to broadcast television service.<sup>98</sup> Broadcasters, MVPDs and others have a financial incentive to serve these households and may help cushion the impact at the end of the transition (*e.g.*, a local broadcaster may give away converter boxes with its station logo on it, or MVPDs may offer discounted hook-ups near the switch-over date). In addition, the fade-to-black approaches described above are another way to provide a measure of continuity of service without a direct government subsidy. Finally, of course, as digital-to-analog conversion equipment becomes increasingly affordable, more consumers could be expected to purchase their own equipment at retail. To the extent that the above mechanisms can be relied upon, the government would reclaim the spectrum at a lower cost and would avoid the burdens of creating and administering a subsidy program.

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do not subscribe to an MVPD service due to lack of funds – could be more costly and difficult to administer than less-targeted options.

<sup>98</sup> See Envisioneering Group Comments, Attachment at 2 (large- and small-screen DTVs will become popular); Motorola Comments at 6 (the free market will bring affordable DTV capability to most, but not all, households; non-poor households want high-end video display devices, implicitly for purposes *other than* watching TV); NAB/MSTV Comments at 9 (a substantial number of OTA households will have purchased DTV-capable receivers by the end of the transition period). *Cf.* Steven R. Bartholomew Comments at 3.

## B. Summary of Options

42. Based on the above discussion, this Report summarizes a range of possible options for addressing analog OTA viewers at the end of the transition. These options describe the tension between advancing two important government interests: reclaiming the 700 MHz spectrum for public safety and advanced wireless services, and protecting analog broadcast television viewers from a disruption of service. In brief, the shorter the transition, the more the public interest in spectrum reclamation will be advanced, but at the greatest risk of consumer disruption. The longer the transition, by contrast, the more the government's interest in avoiding consumer disruption will be advanced but at the expense of spectrum reclamation and related economic growth.

43. Based on the above discussion, this Report summarizes a range of possible options for addressing analog OTA viewers at the end of the transition. These options describe the tension between advancing two important government interests: reclaiming the 700 MHz spectrum for public safety and advanced wireless services, and protecting analog broadcast television viewers from a disruption of service. In brief, the shorter the transition, the more the public interest in spectrum reclamation will be advanced, but at the greatest risk of consumer disruption. The longer the transition, by contrast, the more the government's interest in avoiding consumer disruption will be advanced but at the expense of spectrum reclamation and related economic growth.

44. As noted above, the 108 MHz of spectrum that will be recovered at the end of the transition will be used to address the critical needs of first responders and other public safety needs, and will bring tremendous benefits to consumers and the U.S. economy. This is "beachfront" spectrum, with propagation characteristics that make it ideal for providing wireless broadband access through foliage and building walls. Not only would the immediate revenues from an auction of this spectrum potentially be significant (the value substantially increased if there were a date certain when the spectrum will become available) but, more importantly, the advanced services that will be introduced in this spectrum could provide continuing benefits many times greater in terms of the economy, jobs, and international competitiveness. The opportunity costs of keeping this spectrum encumbered by analog broadcasting grows with each passing day.<sup>99</sup>

45. The appropriate balance between rapid recovery of the 700 MHz spectrum and avoiding consumer disruption will depend, in part, on what additional steps the government is willing to take before and during the switch-over to help consumers who otherwise might lose broadcast television service.

- A near-term, nationwide date certain for the termination of all analog service (*e.g.*, December 31, 2006).

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<sup>99</sup> Although we are unaware of specific valuations of the 700 MHz spectrum, one analysis estimated that 60 MHz of additional spectrum for cellular operators would produce a \$24 billion gain in annual consumer surplus. Thomas W. Hazlett & Roberto E. Muñoz, *A Welfare Analysis of Spectrum Allocation Policies* at 18-19 (AEI-Brookings Joint Center for Regulatory Studies 2004), available at <http://www.aei-brookings.org/admin/authorpdfs/page.php?id=1024> (visited Jan. 19, 2005).

- Public safety officials and advanced wireless service providers gain access to 700 MHz spectrum most quickly.
  - Auction revenues likely to be higher due to certainty of nationwide, near-term spectrum availability.
  - Date certain would enable concentrated, nationwide consumer education and market promotion efforts.
  - Consumers, broadcasters, wireless providers, manufacturers, and retailers must prepare rapidly for switch-over.
  - Increased urgency of consumer education efforts, including potential labeling requirements on analog-only televisions.
  - The Commission's channel election/"re-packing" schedule would need to be accelerated.<sup>100</sup>
  - Because DTV tuner requirements will not be fully effective until July 1, 2007, sets with screens under 25 inches or peripherals like VCRs may still be sold with analog-only tuners after switch-over date.
  - Likely to have highest number of analog-only sets still in use and highest cost of converter equipment of any option – both of which may affect the cost of any potential government support program.
- A slightly later nationwide date certain (*e.g.*, January 1, 2009), either pursuant to a statutory change establishing a date certain or as contemplated by the transition plan developed by the Media Bureau at the direction of Chairman Powell (*a/k/a* "the Ferree Plan").<sup>101</sup>
    - Statutory change setting date certain would eliminate chance that some markets may not meet current statutory threshold on anticipated switch-over date under Media Bureau Plan.
    - Public safety officials and providers of advanced wireless services gain access to 700 MHz spectrum only two years after target deadline originally set by Congress and can begin preparations (*e.g.*, auctions can be held, equipment can be designed and manufactured).
    - Potential decrease in auction revenues compared to above option because under the above option commercial wireless providers could make use of the spectrum earlier.
    - Consumers, broadcasters, wireless providers, manufacturers, and retailers begin to prepare for date certain switch-over but with less disruption than above option.
    - Government and industry have additional time to educate consumers about the transition and how to prepare themselves for the switch-over date.
    - The Commission's channel election/"re-packing" plan can proceed as scheduled.
    - DTV tuner mandate fully phased in and fully effective for 18 months, thereby increasing digital set penetration and reducing costs of digital equipment.

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<sup>100</sup> The Commission's channel election procedures, adopted in August 2004, are designed to determine the final digital channel for every broadcaster in the U.S. The plan involves several rounds of elections by broadcasters and ultimately requires that the channels be assigned pursuant to a formal rulemaking proceeding. Currently, the Commission anticipates issuing the Notice of Proposed Rulemaking to assign final DTV channels in August 2006, making it unlikely that final channels would be assigned under the current schedule before December 31, 2006.

<sup>101</sup> For a description of the Media Bureau Plan, see Testimony of Kenneth Ferree before the U.S. Senate Committee on Commerce, Science and Transportation, June 9, 2004, found at [http://commerce.senate.gov/hearings/testimony.cfm?id=1220&wit\\_id=3513](http://commerce.senate.gov/hearings/testimony.cfm?id=1220&wit_id=3513).

- Fewer analog-only sets likely still in use, as analog sets being retired are replaced largely with digital sets (especially with aggressive consumer education efforts); coupled with declining cost of converter boxes, cost of potential government subsidy program potentially reduced.
- The current market-by-market statutory test (the “85% test”),<sup>102</sup> relying solely upon consumer purchase of digital reception equipment to reach the statutory threshold – *i.e.*, not counting MVPD households towards the statutory threshold.
  - Potential disruption to OTA viewers reduced, because transition would occur only when the great majority of homes had actually purchased digital reception equipment.
  - Lose benefits of nationwide date certain for public safety and commercial wireless providers waiting to occupy 700 MHz band.
  - Lose benefits of nationwide date certain for consumers, broadcasters, manufacturers, and retailers, who do not know when switch-over will occur in any particular market.
  - Significant decrease in auction revenues likely due to lack of date certain and nationwide transition.
  - Difficult to educate consumers and plan for the switch-over (*e.g.*, ordering and distributing converter boxes) when the switch-over date is uncertain.
  - Difficult and costly to determine when statutory factors are met in a given market.
  - Once statutory factors are found to be present in a particular market, difficult to turn off analog signals to the extent consumers receive little advance notice.
  - Potential disparate switch-over in adjacent markets may interfere with stations’ channel changes (*i.e.*, a station in a market where the switch-over has occurred may need to move to its ultimate digital channel, but that channel or another interfering one may still be in use for analog broadcasting in a nearby market), make consumer education efforts more difficult, and hinder switchover preparation efforts.
- An analog “lifeline” fade-to-black service continues for some period after the switch-over date (in conjunction with any of the options described above).
  - Continuation of truncated analog service complicates consumer education efforts but also makes them less consequential for analog viewers.
  - Government equipment subsidy reduced or eliminated to the extent consumers can rely on “lifeline” service.
  - Potential difficulty of maintaining economic viability of remaining analog stations as number of analog viewers dwindles.
  - Basis for selecting analog “lifeline” broadcasters, programming requirements, and final termination, if any, unclear.
  - Viewers will retain emergency information but could lose popular and/or unique programming.

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<sup>102</sup> While the current statute sets forth three conditions that must be present in a particular market for the transition to occur – *i.e.*, all top-four networks broadcasting in digital, digital-to-analog conversion equipment generally available, and at least 85% of viewers have access to the digital broadcast signals – it is the latter condition that is commonly assumed to be the last factor that will be satisfied in a particular market and thus, for the sake of simplicity, we will refer to the statutory standard as the “85% test.”

- Potential interference difficulties with retaining analog service in congested markets.
- Potential of restricting deployment of other services in broadcast band (e.g., secondary services like low-power television).
- “700 MHz reclamation” fade-to-black approach is adopted – e.g., channels 60-69 reclaimed in 2007, channels 52-59 reclaimed in 2009, and all analog service terminated on channels 2-51 in 2012.
  - Provides certainty for broadcasters, manufacturers, retailers, and new spectrum users including public safety.
  - Auction revenues from channels 60-69 similar to first option, above (December 31, 2006 transition date); auction revenues from channels 52-59 similar to the second option, above (January 1, 2009 transition date).
  - Potential interference problems with additional digital stations being moved into the core spectrum.
  - Viewers will retain emergency information but could lose popular and/or unique programming.
  - Viewers will not lose analog service completely until 2012 but some specialized stations will be disproportionately displaced (e.g., foreign language).
  - Stations currently operating on channels 52-69 will be disproportionately burdened.
  - Government support program for viewers, if needed, less costly to the extent it can begin after all analog service is terminated.
- No analog switch-off until all analog-only equipment is retired naturally.
  - Public safety loses access to vital spectrum for decades.
  - New advanced wireless services delayed for decades.
  - Consumer education and labeling become less important.
  - Auction revenue significantly decreased.
  - Government equipment subsidy unnecessary.
  - Minimal disruption to analog OTA households, which retain access to analog service for the useful life of their analog-only equipment.

#### **IV. CONCLUSION**

46. The Media Bureau Staff hopes that this Report will contribute to the ongoing discussion on these issues and looks forward to working with Congress, the Commission and all interested parties to bring the digital television transition to a speedy and successful conclusion.

**APPENDIX  
LIST OF COMMENTERS**

List of Commenters:

700 MHz Advancement Coalition  
700 MHz Licensees (12 individual filers of identical comments)  
Aloha Partners, L.P.  
Association of Public Television Stations (APTS)  
Steven R. Bartholemew  
Mark D. Bulla  
Capitol Broadcasting Co., Inc.  
Citizens Tel. Cooperative  
Civil Rights Organizations  
The Community Broadcasters Association  
Consumer Electronics Association (CEA)  
Entravision Holdings, LLC  
The Envisioneering Group  
Information Technology Industry Council  
Intel Corp.  
Thomas J. Karnauskas  
Bill Keough  
LG Electronics U.S.A., Inc. (LG/Zenith)  
Chris Llana  
Albert Manfredi  
Michael J. Martel  
Minority Media & Telecommunications Council  
Motorola, Inc.  
National Association of Broadcasters & Association for Maximum Service Television  
(NAB/MSTV)  
New America Foundation  
Paxson Communications Corp.  
Mike Petrozello  
Lance Pickup  
RadioShack Corp.  
Gary Sileski  
Sinclair Broadcast Group  
Thomas C. Smith  
Univision Communications, Inc.  
The Walt Disney Co. (Disney)  
Zappala & Wargo

List of Reply Commenters:

EchoStar Satellite, L.L.C.  
Consumer Electronics Association  
CEA  
Home Box Office  
Industrial Telecommunications Association  
Chris Llana  
NAB/MSTV  
National Cable & Telecommunications Association (NCTA)  
Kent R. Parsons (State of Utah Television Translator Coordinator)  
Paxson Communications Corp.  
Univision Communications, Inc.

List of Ex Parte Presentations

Digital Transition Coalition