

Testimony of Thomas W. Hazlett  
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The Digital Television Transition  
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## EXIT STRATEGIES FOR THE DIGITAL TV TRANSITION

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The official opening of the Advanced Television proceeding at the Federal Communications Commission occurred in 1987. It was a rather rude response to requests made by cellular equipment manufacturers (such as Motorola) and public safety organizations to reallocate some part of the little-used TV band for other services. Yet, that spectrum – an extremely productive block of frequencies that is more than twice the bandwidth of all the airwaves allotted mobile phone service – continues to support traditional broadcast TV service and virtually nothing else. That constitutes a regulatory debacle for two reasons.

The first is that U.S. consumers would absolutely love the wireless services that the TV band could host. We know, from analyzing the intense usage of the commercial mobile radio services (CMRS) bands, that there is huge pent-up demand to utilize additional bandwidth for voice and data. Currently, wireless phone service in the United States generates about \$90 billion in annual revenues, and historical data indicate that consumer surplus is at least another \$80 annually.<sup>2</sup>

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<sup>2</sup> This calculation is given in Thomas W. Hazlett and Matthew L. Spitzer, *Advanced Wireless Services, Spectrum Sharing, and the Economics of an Interference Temperature*, paper submitted to the Federal Communications Commission, *In the Matter of Establishment of an Interference Temperature Metric to Quantify and Manage Interference and to Expand Available Unlicensed Operation in Certain Fixed, Mobile and Satellite Frequency Bands*, ET Docket No. 03-237 (April 5, 2004).

In recent economic research, Roberto Muñoz and I have found that the price of mobile phone service is strongly related to two important variables: the degree of competition among suppliers, and the amount of bandwidth made available to wireless networks. Based on a model calibrated with data from 29 countries, we estimate that allowing another 80 MHz of radio spectrum to be used by cellular operators would lower per-minute wireless charges nearly 25%, increasing usage by about 47% and generating over \$30 billion annually in consumer benefits. Allowing operators to make productive use of greater TV band radio spectrum would result in still higher social gains. See Figure 1. (Please note that these are gains accruing to consumers rather than suppliers. They should not be confused with license values or expected auction receipts, which are relatively small.)

| Table 1. Annual Consumer Gains from Increased Availability of CMRS Spectrum |               |  |          |             |          |             |          |
|---|---------------|--|----------|-------------|----------|-------------|----------|
|   |               | <i>Increase in Spectrum Available for CMRS</i> |          |             |          |             |          |
|   |               | 80 MHz   |          | 140 MHz     |          | 200 MHz     |          |
| Variable  | Initial Value | Final Value                                    | % Change | Final Value | % Change | Final Value | % Change |
| Average Price/min.  | 0.112         | 0.084  | -24.59%  | 0.069       | -38.42%  | 0.056       | -49.97%  |
| Min. of use/month (millions)  | 78,340        | 115,098  | 46.92%   | 135,763     | 73.30%   | 153,038     | 95.35%   |
| Change in Consumer Surplus (millions)                                       |               | \$31,850                                       |          | \$55,072    |          | \$77,419    |          |

Source: Results are estimates based on empirical model calibrated in: Thomas W. Hazlett and Roberto Muñoz, *Welfare Effects of Spectrum Policy*, Manhattan Institute for Policy Research (June 2004).

One reason that these gains are so large is that the U.S. is spectrum-hungry. European Union countries average between 250 and 300 MHz of allocated radio spectrum, while the U.S. struggles to allocate 189 MHz, nearly 30 MHz of which is involved in the NextWave licensing fiasco and has yet to be productively utilized. In contrast, Germany uses 302 MHz of spectrum, the United Kingdom 340, and the Netherlands 355. If the U.S. could come close to the spectrum allocations of these nations, efficiency would dramatically increase. Consumers would enjoy lower prices and much better service, with cellphone use and highspeed wireless data being far more widely deployed. Additionally, American business users would become much more competitive in both domestic and international markets.

The second basic reason the TV band should be made available for alternative uses is that it offers Americans very little value in its current deployment. Let us be very clear here. The *programs* TV broadcasters create are popular and generate substantial consumer value. The 400 MHz *distribution channel* TV broadcasters plug up, however,

is hugely inefficient. Only about 10 million U.S. households remain without subscription service. At \$300 for a cable “drop” or a satellite dish, a price that includes installation, virtually all of these homes could be added to existing networks at a one-time cost of under \$3 billion. From there, the retransmission of broadcast programming has zero marginal cost to society. While various details of an all-subscriber transition are interesting, none bear costs that come close to the magnitude of the benefits garnered in freeing up radio spectrum for advanced wireless services.

Unfortunately, this re-harvesting of valuable frequency space has become enmeshed in the digital TV transition, now playing in slow motion for nearly two decades. There are hopeful signs, however, that there may be light – if not at the end of the tunnel – at least gleaming through a crack in the ceiling. The most important is that policy makers appear willing to jettison the industrial policy goal of “high definition television” in favor of pushing airwave reallocation forward. The interminable waste of valuable resources is at long last receiving the public frustration it deserves.

Yet, it is vital that we understand why the digital TV transition has not worked if we are to chart a successful exit. Government has planned this entire policy, and so politics, not market efficiencies, have driven the process. There is nothing exceptional about the digital TV transition – it is a classic “tragedy of the commons.” Nor is the problem particularly challenging in technical terms; Americans are constantly upgrading. But the economic incentives have to be right.

Such incentives are in place where well-defined rights to use radio spectrum are found. Take the strikingly *undisastrous* analog-to-digital transition in cellular. When FCC licenses were awarded in the 1980s, mobile phone carriers were mandated to install analog systems. But the advantages of digital transmissions were already apparent. In 1988, cellular operators were belatedly allowed to use digital standards. By this time, however, scores of major markets – with millions of subscribers -- were offering analog cellular service.

Over a number of years, mobile phone carriers invested billions of dollars to upgrade to digital. They carefully migrated customers, coordinating shared use of cellular frequencies. Carriers gave away digital handsets to customers, subsidizing technology adoption and smoothing transition. This was very expensive but economically smart: by getting customers to use better phones, calls spewed less interference, leaving greater capacity for others. As network operators with exclusively-assigned rights, cellular carriers captured some of the increase in value.

You’ll note that no calamities befell the transition to digital cellular, a delicate and complex process that is nearing completion. The situation contrasts sharply with that in television where rights to control radio spectrum are extremely fragmented. Instead of seeking to subsidize transition, incumbents actively seek to sabotage it. This is not a matter of bad character but of poor public policy. Economic incentives – and the behavior of both incumbents and entrants -- would change instantly were two things to happen:

1. Incumbent broadcasters were awarded flexible use rights to the airspace implicitly defined by their TV station licenses;
2. Similarly flexible rights to use the spectrum allocated to each unoccupied TV channel were allocated to overlay licenses and sold at auction.

This is the plan put forth some eight years ago by U.S. Senator Larry Pressler.<sup>3</sup> It relies on the “overlay” concept successfully deployed in the PCS band,<sup>4</sup> where incumbent users in a band are grandfathered while a new licensee obtains permission to use surrounding frequency space. Vast bandwidth is available for productive use in the TV band. There are only about 1600 full power TV stations for 210 TV markets -- 8 stations per market, compared to a total of between 49 and 67 allocated channels, depending on how one counts. With the right economic incentives, broadcasters and other wireless companies would negotiate to figure out reasonable interference rules, and a plan to rationally use airspace in the new millennium. Rather than blocking new technologies, broadcast stations would seek out more efficient video distribution platforms, capturing part of the social gains created.

Getting these economic incentives in place, of course, is no mean task: broadcast TV regulation is a public policy train wreck. Issuing exclusively-assigned, flexible use spectrum rights – similar to those enjoyed by CMRS operators – offers a reliable exit strategy. What is to be avoided is to impose central planning to yet another generation of wireless service. That is the approach represented by the FCC’s current rule making to consider authorization of unlicensed devices accessing the TV band.

By imposing government-mandated sharing rules, the FCC would block market forces from revealing the value of the band to entrepreneurs and consumers. Technologies not fitting into the FCC’s approved list of very low powered devices – including powerful 4G wireless broadband systems now deployed in Australia and other countries -- would be ruled out by administrative fiat. This approach is the cause of the current problem. The superior solution is to let technologies be selected by market rivals.

The outcome would be that networks would compete to offer current services at much lower prices, and jockey to introduce an array of innovative applications. This is the pro-consumer way to reform, and it is the one way to curb windfalls without punishing consumers with the collateral damage of delay and inefficiency. Seventeen years of “digital TV transition” have already inflicted quite enough of both.

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<sup>3</sup> 142 CONG. REC. 10672, 10672-76 (1996). See discussion in: Hazlett, *An Essay on Airwave Allocation Policy*, 14 HARVARD JOURNAL OF LAW & TECHNOLOGY (2001), 442-43.

<sup>4</sup> See Peter Cramton, Evan Kwerel, and John Williams, *Efficient Relocation of Spectrum Incumbents*, 41 JOURNAL OF LAW & ECONOMICS (Oct. 1998), 647-675.