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Keeping Up with the Market: The Urgent Need for More Spectrum

by

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Introduction

The time to locate and begin reallocating more spectrum for mobile broadband use is now. It is laudatory that the Administration has been moving forward with its own plan to allocate 500 MHz for mobile broadband use. But the plan is already out of date, and the reallocation efforts are lagging.

Demand for spectrum is exploding, driven by the market, representing business and individual consumer interests in more information, efficiency, entertainment, and social interaction. Mobility draws our nation and the world closer together. Indeed, the continuing emergence of the Internet of Things (IoT) will only accelerate this demand. But reallocating spectrum takes time, a lot of it, and therefore the government needs to redouble its efforts now to find more spectrum for commercial mobile broadband use. Because government is sluggish to respond to the market, the need should be classified and considered "urgent."

350 MHz of Spectrum Is Needed by 2019

A recent report published by the Brattle Group estimates that by 2019 the United States will need to reallocate an additional 350 MHz of spectrum for high power dedicated mobile broadband use. The report notes that the Federal Communications Commission (FCC) is lagging in addressing its 2010 prediction that there would be a 300 MHz deficit of spectrum for mobile broadband use by 2014. Based on these two separate assessments according to the Brattle Group report, by 2019 the U.S. will need about 650 MHz total of spectrum for high powered mobile broadband use.

The Brattle Group based its additional 350 MHz estimate on the same methodology the FCC used to make its own 300 MHz prediction in 2010. The estimate includes assumptions based on both increased efficiency of technology and off-loading of traffic to Wi-Fi. The Brattle Group's estimation notes that in hindsight, the FCC estimates were fairly accurate as a historical trend, even though certain peaks and troughs occurred within the timeline. Although all estimates are going to be off to some extent, on the whole, there is a good basis on which to rely on the reasonableness of these predictions. Introduction of the IoT, or harnessing the technological capabilities of mobility and the Internet to a whole host of different machinery and appliance applications, along with the ever-increasing demand for video applications, is only going to accelerate these existing demand curves.

More Spectrum Is Good for the Economy and Consumers

This latest demand prediction represents both good news and bad news for consumers. The good news is that consumers want and continue to use mobile broadband for new services as well as existing uses that require more bandwidth. This represents positive consumer welfare advances. The bad news is that the increased consumer demand stands as a warning that these new services are going to suffer both in terms of reliability and the pace of innovation if bandwidth demand is not met.

A number of econometric studies, for example, here and here, have demonstrated the enormous economic value that wireless services produce for the American economy. These estimated values simply identify the value associated with direct and indirect employment, and the consequent increase to GDP. But even these reports fail to identify the difficult-to-quantify revolutionary value of changing the way we interact and communicate with each other or the way wireless improves the efficiency in our business and individual lives. No longer are we chained to our homes and offices in order to communicate, but we can interact, take care of business, or access entertainment options, wherever we happen to be.

The ability to access the Internet almost anywhere represents a quantum leap forward in the value that the Internet alone can provide. That value is about to skyrocket even further as interest grows in the IoT, which relies in large part on both mobility and the Internet.

The Government's Track Record

It is now well known that the Administration has recognized this demand for mobile services. Regulatory agencies have been taking action based on President Obama's policy goal of allocating 500 MHz of spectrum for wireless broadband. However, that policy is now five years old. And the Administration began backtracking somewhat on the original policy when the 2012 PCAST Report refocused this effort to rely more heavily on government-commercial shared spectrum. The refocus on sharing has cast a pall over the original 500 MHz policy goal and limited the amount of spectrum usable by commercial mobile broadband companies.

The National Telecommunications and Information Administration (NTIA) has boasted recently that the government has made "substantial progress" in meeting the Administration's 500 MHz goal. I'm not so sure about this conclusion. Let's look at the facts, first by examining NTIA's own chart of accomplishments, which I reproduce below.

Table B-1 Federal, Non-Federal, and Shared Spectrum Bands Under Investigation				
Frequency Band	*Spectrum Made Available (megahertz)*	*Spectrum Identified and In Process (megahertz)*	*Spectrum Under Study (megahertz)*	*Spectrum for Potential Future Study (megahertz)*
WCS: 2305-2320 and 2345-2360 MHz	30			
H Block: 1915-1920 and 1995-2000 MHz	10			
AWS-4: 2000-2020 and 2180-2200 MHz	40			
AWS-3: 1695-1710, 1755-1780, and 2155-2180 MHz		65		
3550-3650 MHz		100		
Incentive Auction 512-698 MHz		42-144		
Radiosondes 1675-1680 MHz			5	
2020-2025 MHz			5	
5350-5470 MHz			120	
5850-5925 MHz			75	
1300-1390 MHz				90
1680-1695 MHz				15
2700-2900 MHz				200
2900-3100 MHz				200
3100-3550 MHz				450
Totals:	**80**	**207-309**	**205**	**955**

To date, the administration has actually only auctioned off about 145 MHz of this 500 MHz for dedicated wireless broadband usage, including the 80 MHz in its left hand column and the AWS-

3 spectrum identified in the second column. I note that there is some dispute about counting the entire 30 MHz of WCS spectrum as "available," but I do not address this point here. Other spectrum identified in the second column is the subject of significant doubt.

Although the FCC has issued an order regarding the 100 MHz associated with the 3.5 GHz band, that spectrum is too low power and licenses are of too short a duration (up to three years without a renewal expectancy) to be reliably usable for the mobile broadband networks that most consumers need, a point which has been highlighted by CTIA. And, as reported by NTIA, significant carve-outs exist in some portions of this band in geographic areas where government users will permanently be present and protected from interference, mostly along the U.S. coasts where a large percentage of Americans live and work.

In addition, NTIA lists as "in process" the incentive auction in the 600 MHz band, comprising between 42-144 MHz in total, which is not scheduled to occur until the first quarter 2016. The amount of spectrum that the incentive auction will re-allocate is still subject to many unknowns because contributing such spectrum is entirely voluntary. The outcome very much depends on whether the FCC actually maximizes broadcaster participation, or instead focuses on skewing the auction toward favored bidders, a concern expressed in FSF blogs here and here. So these latter two "in process" allocations are still too questionable to list in the "substantial progress" column.

Future Efforts to Reallocate Spectrum

Policymakers have been making a number of positive contributions to aid in the goal of reallocating more spectrum. Senator Marco Rubio (R-FL), with Republican co-sponsors, has introduced The Wireless Innovation Act of 2015. That proposed legislation would require government to identify at least 200 MHz of spectrum below 5 GHz for reallocation to private use. It also includes incentives to government agencies to encourage giving up spectrum. He and Senator Booker (D-NJ) previously had introduced legislation that would mandate that spectrum at 5.8 GHz be examined for potential Wi-Fi use, an important component of wireless broadband service, an effort which I highlight here. Commissioner Rosenworcel has played a part in this process, by challenging companies to "think outside the box" for ideas and technologies for using spectrum above 24 GHz. The FCC has begun a proceeding based on the challenge.

NTIA's 2015 progress report also identifies a number of bands above 1 GHz that are under study for possible reallocation (a total of 205 MHz), as well as additional spectrum for possible study in the future (a total of 955 MHz). But much of this spectrum is already occupied with substantial federal users, and reallocation possibly would entail permanent sharing that will reduce its usefulness for commercial mobile broadband. Although shared spectrum bands hold some promise for commercial use, they are not the preferred approach for commercial mobile broadband operations at this time, as Senator Rubio has recognized.

First, existing sharing for commercial users is not working well; one need only look to the white spaces database controversies to understand the defects in current sharing approaches. Second, detect-and-avoid automatic technologies are mostly still under development, and are therefore of uncertain value. Third, sharing rules usually give the existing users (in this case government)

first priority, and therefore may be unreliable for commercial use. Thus, shared use may not be reliable enough for mobile broadband providers to compete with their well-heeled wired competitors which already have significant bandwidth deployments.

It is true that some in government have modified their attitudes about sharing spectrum, and there are signs that some government agencies, particularly the Department of Defense, recognize the need for efficient spectrum use and the way the private sector uses spectrum. This is a welcome crack in the dam of traditionally reticent government behavior.

The most important fact is that it takes a substantial amount of time to reallocate spectrum: past government-to-private reallocations frequently have taken ten years to accomplish. If history is a guide to predicting the future, as is usually the case, any reallocation that should be in place by 2019 needed to be started five years ago!

Conclusion

As the Brattle Group reports, by 2019 the government will need to re-allocate 350 MHz of spectrum on top of the previously identified need of 300 MHz. This is 150 MHz above what the Administration set as a goal in 2010. While I applaud the Administration for its spectrum reallocation decisions over the last five years, I believe it is premature to conclude that it has made "substantial progress" in meeting its 500 MHz policy goal. Implementation of those goals has been exceedingly slow, and still of uncertain value due to sharing issues and other uncertainties.

In order to meet demonstrable consumer needs for fast, reliable advanced wireless broadband services, the government has to get its act together. Instead of taking time to celebrate, it is time to double down on the work and respond to market needs.

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