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Licensed Spectrum Sharing Lessens Prospects for Wireless Broadband

by

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Cisco projections of a 13-fold increase in worldwide mobile data traffic over the next five years underscores the urgent need for more commercial spectrum to serve surging consumer demand. Right now the top priority of federal communications policy should be identifying and repurposing spectrum for commercial use. When it comes to spectrum suited for licensing, exclusivity offers wireless carriers the certainty and incentives best calculated to ensure its highest use.

Unfortunately, the federal agency charged with leading the interagency effort to identify and repurpose spectrum appears to have given up on exclusive use when it comes to licensed spectrum. On February 19 NTIA proposed that the 1695-1710 megahertz (MHz) band should be repurposed for commercial use by wireless carriers. But it was proposed for use only on a shared basis with government agencies now operating in that band, rather than on the basis of having the spectrum transferred to the private sector for exclusive use. This comes less than a year after NTIA likewise proposed that the highly-sought 1755-1850 MHz band be shared by wireless carriers and federal agencies.

NTIA's ambitious undertaking to make 500 MHz of both licensed and unlicensed spectrum available for commercial use in the next decade will be undermined if that spectrum repurposed for licensed use must be shared with government agencies.

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Especially when it comes to spectrum primed for wireless broadband use, such as the 1755-1850 MHz band, exclusive use licensing must be the goal. And that goal should be pursued with the utmost persistence.

Recent experience demonstrates how requirements to share licensed spectrum can reduce its value and reduce the incentive to invest. The 700 MHz band D-Block auction bid winner would have been required to build a wireless network that included interoperable IP network functionality for public safety agencies. This requirement's negative impact on the value of the D-Block is revealed by the unwillingness of any bidder to make an offer when it was auctioned in 2008. Also instructive is the fact that the FCC's 700 MHz C-Block "open access" auction rules included restrictions on the use of the auctioned spectrum licenses. [A 2010 paper](#) by economists Gerald Faulhaber and David Farber concluded those encumbrances "decreased the value of the spectrum asset by 60%...reduc[ing] the affected telecommunication asset and thus reduc[ing] the incentive to invest in such assets."

Cisco's [Global Mobile Data Traffic Forecast Update, 2012 - 2017](#) projected that global wireless traffic will increase by a factor of 13 in the coming five years. While North Americans now consume an average of 752 megabytes of data per month, by 2017 their monthly use will average 6,171 MB. The continued upward trajectory of wireless traffic owes, in large part, to growth in video and other data-intensive apps running on increasingly popular and consumption-heavy smartphones and tablets.

A [2012 Government Accountability Office \(GAO\) report](#) suggested that approximately 43% of high-value frequency spectrum is currently being used by various agencies of the federal government. There is good reason to believe that this spectrum is generally underutilized and could be used in a more efficient manner. Much of it could be reallocated for commercial use on either an unlicensed or licensed basis. To this end, the President issued a June 2010 directive tasking NTIA to work with the FCC to "make available a total of 500 MHz of Federal and nonfederal spectrum over the next 10 years, suitable for both mobile and fixed wireless broadband use."

Spectrum in the 200 MHz-3GHz range is widely considered the most suitable for licensing for wireless broadband use. This includes the 1695-1710 MHz band that [NTIA proposed](#) be shared by wireless carriers and government agencies in a February 19 report. It also includes the 1755-1850 MHz band that is so highly sought after by wireless carriers.

In an [October 2011 report](#), NTIA acknowledged that the 1755-1780 MHz band, in particular, "is harmonized internationally for mobile operations, wireless equipment already exists, and the band provides signal characteristics advantageous to mobile operations." The broader 1755-1850 MHz band is adjacent to AWS spectrum already licensed for commercial use, promising technical efficiency gains.

The 1755-1850 MHz band can also be paired with the 2155-2180 MHz band to exponentially enhance performance. The Middle Class Tax Relief and Job Creation Act

of 2012 directed the FCC to auction and license the 2155-2180 MHz band by February 2015. These bands could be paired and simultaneously auctioned and licensed. Provisions of the Job Act authorize the FCC to direct auction proceeds to federal agencies to recoup costs for relocation, with transition processes subject to NTIA approval.

So it was with disappointment that NTIA's much-delayed [March 2012 report](#) ultimately recommended against reallocating the 1755-1850 MHz band for exclusive commercial use. It claimed that moving federal agencies onto new frequencies could take an entire decade and cost some \$18 billion, likely exceeding future proceeds from auctioning the 1755-1850 MHz band. This led NTIA instead to propose band sharing between certain federal agencies and wireless carriers. Similar concerns prompted NTIA's February 19 proposal that the 1695-1710 MHz band be shared.

One might consider unlicensed commercial use of spectrum as a form of sharing. But the sharing of spectrum through fixed wireless technologies such as Wi-Fi is precisely the source of attraction when it comes to unlicensed use. The licensed context poses a different set of dynamics, however. So these concerns over licensed spectrum sharing of repurposed bands presently designated for government use should not be misconstrued as an argument against unlicensed use of spectrum.

For that matter, consistent with the policy imperative that spectrum suited for auctioning should be licensed on an exclusive basis, licensed spectrum sharing may still suffice in limited circumstances. For instance, in certain far reaches of the U.S. where there is only a small population but where government facilities are present, sharing of licensed spectrum by government and private sector users may prove a more workable permanent arrangement.

Also, licensed spectrum sharing may serve as an important transition tool, allowing government agencies to be gradually relocated to ensure continuity of operations. The [FCC has granted](#) T-Mobile special temporary authority to test 4G LTE mobile broadband services on the 1755-1780 MHz band, operating on a shared basis with government agencies. The results of these tests could help strengthen the case for pairing the entire 1755-1850 MHz and 2155-2180 MHz bands for auctioning and licensing, even if on a shared basis. In early February, three major wireless carriers also [announced an agreement](#) with the Defense Department to explore spectrum sharing in the 1755-1850 MHz band.

It goes without saying that government agencies carrying out important policy imperatives, particularly constitutional ones such as national defense, should have at their disposal the spectrum resources commensurate to fulfilling their duties.

Wireless carriers operating in a free market context have the incentives to put spectrum resources repurposed and licensed for the private sector to their highest use in supplying services to consumers and thereby generating the highest economic returns. Even if extremely expensive, relocating federal agencies to free up spectrum for

commercial use should be taken with the present and future of the booming mobile broadband economy in mind.

According to [CTIA's Semi-Annual Survey](#), between June 2011 and 2012 the wireless industry made over \$25 billion in capital investments in the U.S. And the growth in mobile data traffic forecast by Cisco will undoubtedly include a flourishing mobile e-commerce market. The economic benefits offered by wireless broadband in just the few decades ahead will more than make up for the extra costs and efforts to repurpose government spectrum in this decade.

Putting repurposed spectrum to its highest commercial use calls for heavy investment by carriers in next-generation wireless broadband networks. The certainty and incentives required for such multi-billion dollar investments are best supplied by spectrum licenses for exclusive use. Licensed spectrum sharing might be a useful transition tool. But proposals for such sharing now appear prevalent enough that, if adopted, they would undermine the goal of the current undertaking to repurpose spectrum.

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Further Readings

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Randolph J. May, "[Repurposing the FCC](#)," *FSF blog* (March 26, 2012).

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Michelle Connolly, "[Proposed FCC Incentive Spectrum Auctions: The Importance of Re-Optimizing Spectrum Use](#)," *Perspectives from FSF Scholars*, Vol. 6, No. 28 (November 8, 2011).

Seth L. Cooper, "[4G Wireless Future Requires Rapid Action to Make More Spectrum Available](#)," *FSF blog* (October 21, 2011).

Seth L. Cooper, "[Calling for Speedy and Purposeful Action on the Spectrum Plan](#)," *FSF blog* (November 17, 2010).