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**Sharing the Road: When Hogging Spectrum Lanes Requires Redirecting
Government Traffic**

by

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Introduction

In implementing President Obama's [policy goal](#) of allocating 500 MHz of spectrum for wireless broadband, the 2012 [PCAST Report](#) predicted that, just as emergency vehicles share public roads with the public, government and commercial users should be able to use the same band of spectrum. Although government and commercial users both need spectrum, the highway analogy is of only limited significance. Occasional emergency use of public highways is acceptable. But just imagine if those government vehicles occupied some of the highway lanes all the time, even if there was no emergency. None of us would tolerate this result. It is for this reason that Congress [has expressed](#) a strong preference for clearing and reallocating government's spectrum "lanes" for commercial use, rather than sharing the same spectrum bands.

Thus, it is perplexing that since the Administration unveiled its 500 MHz mobile broadband policy, it has retreated somewhat by [promoting](#) government-commercial spectrum sharing as the preferred implementation methodology. The FCC has taken up this mantle in recent spectrum allocation actions, such as the [announced AWS-3 auction](#) and [proposed reallocation of the 3.5 GHz band](#).

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Unlike sharing the road, permanent government-commercial spectrum sharing is often unsatisfactory because government users often use technologically outdated and inefficient engineering. Spectrum sharing raises commercial costs and reduces spectrum availability. These downsides leave commercial users without the flexibility and reliability needed to justify the huge investment required for mobile broadband services. Ongoing sharing raises security risks and reduces auction revenues. Thus sharing spectrum potentially produces detriments to government users and large consumer welfare losses. Given these detriments, serious work on actually clearing government bands must proceed. The really hard work has not yet occurred.

It is worth noting that Senator Marco Rubio has recently introduced [S. 2473](#), a promising bill, which mandates a minimum amount of clearance and reallocation of government spectrum for commercial use on a non-shared basis. His bill is a positive step in the important effort to get the government to clear more spectrum for repurposing for private sector use.

Near-Term Government-Commercial Spectrum Sharing Examples

The AWS-3 Auction scheduled for later in 2014 will offer for bid 65 MHz of spectrum for wireless broadband use that includes the 1695-1710 MHz, 1755-1780 MHz, 2020-2025 MHz, and 2155-2180 MHz bands. The FCC has adopted a [DOD proposal](#), which [NTIA endorsed](#), that would relocate a number of government users over time, while continuing to allow permanent sharing by some government users (e.g., military tactical radio, combat radio training, and government space systems) in the 1755-1780 MHz band and expanded use in the 2025-2110 MHz band. The FCC established 27 “protection zones” parts of this spectrum that will require any commercial user to coordinate use within a zone with government prior to operation. Details on federal uses and necessary limitations on commercial operations will not be known until federal users disclose more information to commercial auction winners and coordination negotiations are completed.

The 3.5 GHz band NPRM proposes to create a Citizens Broadband Radio Service which would be available for small cell and other broadband uses. The reallocation includes spectrum now allocated for government (shipboard and ground-based radar) and non-government users (fixed satellite), who would receive priority access and be protected from interference. General access users would be allocated a certain percent of the band and be allowed “opportunistic” use when priority users are not using the spectrum. A third tier of Contained users would include, for example, indoor low power systems, hospitals, and local governments. Although the 3.5 GHz proceeding is at the proposal stage, if adopted it would establish permanent exclusion and/or protection zones for some spectrum based on the [NTIA Fast Track Report](#). Dynamic sharing techniques could also be employed to determine availability of spectrum at specific locations and times.

Reliable and Ubiquitous Broadband is a National Priority

It should be noted that allocations, such as the AWS-3 and 3.5 GHz examples, are to be applauded. Broadband availability and adoption is a bipartisan national goal as evidenced by the administration’s 500 MHz policy, FCC reports, such as the [National Broadband Plan](#), and Congressional action, such as [broadband stimulus legislation](#). Promoting overall broadband

competition, in part by improving mobile broadband capacity, correctly focuses on what FCC Chairman Wheeler [describes](#) as “competition, competition, competition,” a bipartisan policy that improves consumer welfare and grows the U.S. economy.

Spectrum Reallocation is the Congressional Default Choice

The government should be cautious about any permanent sharing option for legal reasons. For instance, permanent sharing of AWS-3 spectrum raises serious questions concerning compliance with the [Middle Class Tax Relief and Job Creation Act of 2012](#), which mandated, among other things, that 15 MHz of government-occupied spectrum be reallocated for commercial use. The Act states a strong preference for reallocation, with reliance on sharing only if “relocation is not feasible because of technical or cost constraints.” Although the PCAST report includes an NTIA estimate that clearing the 1755-1780 MHz band would cost approximately \$18 billion, a [House Communications and Technology Subcommittee memo](#) describes this figure as an untested assertion. There is little evidence in the AWS-3 record that the technical feasibility of completely clearing the bands was actually fully evaluated and coordinated with OMB as required by the Act, and the FCC included no analysis of the figure in its reallocation Order.

This congressional preference for clearing and reallocating government spectrum is instructive in evaluating other sharing proposals, including the 3.5 GHz band.

Permanent Sharing is Often Not in the Public Interest

Notwithstanding the legal issue, there are five sound policy reasons why reallocation increases public interest harms and thus is preferable to permanent sharing.

First, sharing is inherently inefficient. Shared spectrum by definition reduces capacity available for broadband use. Some [are concerned](#) that government is utilizing inefficient, outdated technology. Although the PCAST report includes some efficiency improvement proposals, no concrete steps in this direction have yet been taken. Laudably, Senator Rubio’s recently introduced S. 2473 does mandate more efficient use of government spectrum as well as promoting government incentives to vacate spectrum. The lack of government spectrum efficiency is particularly important since the PCAST report states that the government already uses nearly 60 percent of “beachfront” spectrum most viable for mobile broadband use. The government’s inaction here is in stark contrast to the FCC’s continued adoption of new rules to promote commercial spectrum efficiency, such as the [narrowbanding requirement](#) for public mobile radio services.

The AWS-3 auction is a case in point. There, the FCC created 27 permanent “protection zones” for some spectrum that cannot be occupied by commercial users without prior coordination with government users. Because coordination details and procedures have yet to be worked out, it is a big question mark how much capacity within those protection zones can actually be used for commercial operations. The 3.5 GHz proposal would establish an exclusion zone for certain spectrum potentially walling off 60 percent of the U.S. population, which seriously undermines

the usefulness of the spectrum for mobile broadband. Given the announced limitations, these particular “shared spectrum” allocations are unlikely to go far enough in achieving the administration’s 500 MHz spectrum goal.

Second, sharing spectrum undermines investment incentives by increasing costs and potentially reducing reliability. Some [have noted](#) that sharing inevitably increases carrier costs through ongoing coordination and operational work-arounds, costs that must be ultimately borne by consumers. Because the Department of Defense, law enforcement, and other surveillance agency operations are traditionally cloaked in secrecy, coordination costs are even higher. Although some progress has been noted, [Mobile Futures has reported](#) that it is still difficult to evaluate government uses in order to evaluate sharing.

Ongoing coordination obligations inevitably reduce available capacity, and sometimes on infrequent and unpredictable occasions, and thus raise potential mobile broadband reliability concerns. Deloitte [reports](#) that potential interference concerns are higher among multiple government and commercial mobile users, as opposed to relatively fixed and low power operations such as baby monitors, garage door openers, and wireless microphones. Reliability is essential for commercial broadband providers and users alike. Cost and reliability considerations affect commercial investment incentives, which Free State Foundation scholar Seth Cooper [indicates](#) are critical to support the high investment costs of providing mobile broadband.

Third, sharing techniques are not sufficiently advanced to produce efficient results. Although modern dynamic sharing technologies, with more refinement, show some promise to aid in real time sharing of spectrum, such as with white spaces microphone usage, such systems are designed for relatively fixed users and involve a significant amount of manual coordination, as some [have noted](#). [Mobile Futures has demonstrated](#) that these technologies do not have applications for large scale mobile providers.

Fourth, sharing reduces potential auction revenues because the market will devalue spectrum saddled with significant limitation, as I detailed [here](#). The [700 MHz D Block auction](#) failed because bidders were unwilling to pay the FCC’s minimum auction price for spectrum constrained by serious government use obligations. Some have persuasively [argued](#) that the “open access” requirement attached to the C band in the same auction likely reduced auction revenues by some \$3.1 million. The coordination requirements contained in both the AWS-3 auction and proposed 3.5 GHz allocation are particularly significant given that government uses and coordination obligations are likely to remain murky even at auction.

Fifth, ongoing sharing between sensitive national security and law enforcement systems and commercial operations pose continuing security concerns to government operations, a concern expressed in the administration’s [memo](#) promoting sharing. This concern undoubtedly underlies government reluctance to disclose information about spectrum usage.

Conclusion: Clearing the Spectrum Road Is a Smarter Way

Don’t get me wrong, if permanent sharing is required and manageable, it can be an efficient way to expand mobile broadband spectrum, just like we share the highway with emergency vehicles.

But given that government spectrum use is not occasional, but rather is permanent and arguably inefficient, it is time to require older government systems to adopt more efficient technology so that they can utilize less spectrum. It would redirect government traffic to make more highway available to the public.

It is time to dislodge bureaucratic tendencies and engage in the hard work of trying to clear and reallocate government bands for commercial mobile broadband use, which is critical to meeting the future shortage of mobile spectrum.

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