



# THE FREE STATE FOUNDATION

A Free Market Think Tank for Maryland.....Because Ideas Matter

***Perspectives from FSF Scholars***  
***December 13, 2016***  
***Vol. 11, No. 44***

**Focusing on Communications Infrastructure Development:  
Completing the Incomplete Obama Administration Spectrum Report Card**

by

**Randolph J. May \* and Gregory J. Vogt \*\***

## **Introduction and Summary**

When the new Trump Administration assumes office, with a potentially cooperative Congress, it is likely to focus as a high priority on rebuilding and modernizing America's infrastructure. Infrastructure investment likely to be targeted includes transportation, energy, and telecommunications. A positive, targeted, economically-grounded focus on infrastructure promotion would be a welcome development for broadband services, an area in which the Obama Administration's policy has been somewhat lacking.

Indeed, both wired and wireless communications infrastructure development should be at the core of providing more ubiquitous, faster, modern broadband services. Focusing here particularly on wireless broadband, allocating sufficient spectrum – itself the key “infrastructure” for wireless networks – for use by commercial interests should be at the heart of an infrastructure development program to support future mobile broadband, including next-generation 5G deployment.

---

**The Free State Foundation**  
**P.O. Box 60680, Potomac, MD 20859**  
**[info@freestatefoundation.org](mailto:info@freestatefoundation.org)**  
**[www.freestatefoundation.org](http://www.freestatefoundation.org)**

The Obama Administration's final report card on its 500 MHz wireless spectrum search effort shows an incomplete, as evidenced by the disappointing "[Quantitative Assessments of Spectrum Usage](#)" report issued by NTIA in November 2016. The long overdue assessment identifies potentially 960 MHz of spectrum for mobile broadband use. At best, however, the Quantitative Assessments report is very preliminary and does not clearly outline what portion of the identified spectrum could be reallocated to, or even shared by, commercial interests. So the task of completing the spectrum reallocation part of mobile broadband infrastructure development has been left to the new Trump Administration.

Wireless communications demand is increasing every year and is slated to increase geometrically as the Internet of Things (IoT) and latest technology 5G networks are deployed in earnest, perhaps as early as 2019. Mobile broadband produces significant increases in annual consumer welfare, and contributes significantly to jobs, tax revenues, and U.S. GDP, including the revenues associated with export of wireless know-how and products worldwide that produce tangible benefits retained in the U.S.

Fortunately, the country is not at ground zero in its quest for achieving 5G deployment. The Obama Administration announced a plan in 2010 to locate and reallocate 500 MHz of spectrum for wireless broadband use by 2020. Although this bipartisan plan adopted the right approach, at least on paper, it was fairly soon diverted into a growing emphasis on sharing spectrum between commercial and government users. The plan then quickly became out of date when, at the five-year mark, it became apparent that another 350 MHz of spectrum would be required. The plan has become increasingly bogged down by failing sufficiently to focus on making government use of spectrum more efficient, ultimately freeing up dedicated spectrum for commercial use.

The recent NTIA Quantitative Assessments report seeks to analyze 960 MHz of spectrum for possible reallocation and/or sharing with commercial wireless interests. In our estimation, a close examination of the report only identifies about 115 MHz of spectrum that looks at all promising for such reallocation. And even that modest amount is potentially riddled with conditions and uncertainties, such as geographic exclusion zones and possible future government spectrum moves.

Thus, there are four serious problems with the Quantitative Assessments report: (1) it relies excessively on sharing between commercial and government users, (2) the Administration plan is now outdated and falling further behind the demand for spectrum, (3) there is a need to get more spectrum in the pipeline now, and (4) consequently real government incentives need to be used to encourage agencies to vacate spectrum.

The Senate has attempted to focus on these Obama Administration spectrum plan shortcomings, most recently culminating in the bipartisan MOBILE NOW Act jointly introduced by Senators Thune and Nelson. MOBILE NOW itself was built on the encouraging forerunner legislation introduced by Senators Rubio and Booker, and it seeks to put teeth into government spectrum reallocation efforts. But MOBILE NOW has been sidelined by partisan issues unrelated to the merits of the legislation. It is time for these welcome legislative developments to be dusted off and moved forward.

As importantly, the Trump Administration needs to devote real attention to spectrum issues, including removing impediments that unreasonably slow the necessary “densification” build-out of cell structures, as part of its infrastructure development initiatives.

### **More Spectrum Is Crucial to Support Growing Telecommunications Infrastructure**

Telecommunications and broadband are infrastructure platforms necessary to support various economic and social activities, which are predicted to continue to increase dramatically in the future. Telecommunications infrastructure is equally important to other physical infrastructure needs such as transportation and electricity. Just one aspect of the communications revolution is the current planning and innovative thinking surrounding future wireless services, such as next-generation 5G networks. 5G wireless services are capable of supporting much faster wireless connections, with quicker response time and greater bandwidth. 5G service capabilities will surpass current wireless offerings of voice, video, and data, with some 5G innovators focusing on industrial devices, personal home electronic management, video services, as well as autonomous vehicle functionality, among many others.

Demand for wireless communications has been exploding. A June 2016 [white paper](#) released by CTIA is just one of many studies that describe the growing interest in the IoT, which enables a variety of new and innovative developments through its lower latency and higher bandwidth capabilities, as I point out [here](#). The number of IOT devices is estimated to be from 35 to 50 billion by 2020. This significant growth in demand promises to produce a number of economic benefits, both in America as well as worldwide.

A number of econometric studies have demonstrated the huge enhanced consumer welfare value associated with wireless services. In a May 2015 report, the Brattle Group [estimated](#) that every dollar spent on wireless contributes to \$2.32 of total spending in the U.S. economy. For every one person employed in the wireless industry, an additional 6.5 people find employment. In another study, Recon Analytics [reported](#) in December 2015 that for every 100 MHz of spectrum allocated for wireless use, \$3.1 billion is added to the GDP and over 100,000 jobs are added to the U.S. economy.

An April 2016 Recon Analytics [report](#) indicated that the U.S. wireless industry in 2014 generated \$282.1 billion in U.S. GDP, up 44 percent since 2011. Total U.S. jobs attributable to the wireless industry was about 4.7 million, with the total impact to the economy due to the multiplier effect of these jobholders, termed induced employment, is over 7 million. The report concludes that the global economic activity attributable to wireless was about \$332.9 billion in 2015, with \$282.1 billion of that increased value retained in the U.S, as represented in the following chart:

**Exhibit 1: Wireless Industry Value-Add**

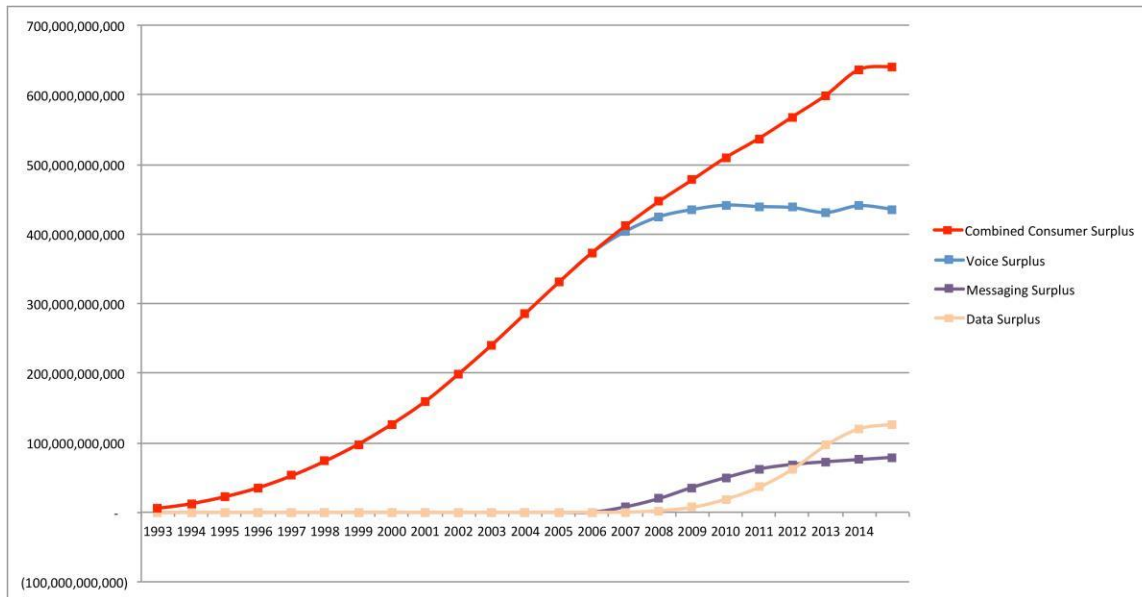
Sector	Value Retained from Domestic Activities	Global Economic Activity	Value Retained in the US
Device and Accessories Manufacturers	\$14.9	\$106.2	\$83.9
Device Component Suppliers	\$1.6	\$5.3	\$1.6
Device Trade-in Programs	\$1.4	\$1.4	\$1.4
Wireless Operators	\$87.0	\$91.6	\$87.0
Wireline Operators	\$2.1	\$2.1	\$2.1
MVNOs	\$0.9	\$1.2	\$0.9
Retailers & Third Party Dealers	\$8.1	\$8.1	\$8.1
Advertising Agencies, PR, and Related	\$0.6	\$0.8	\$0.6
TV, Radio, Print, Internet Ad Channels	\$5.4	\$5.4	\$5.4
Network Equipment Suppliers	\$1.0	\$3.4	\$1.0
Other suppliers of capital equipment	\$2.5	\$4.1	\$2.5
Professional Services	\$27.3	\$39.0	\$27.3
Platform and Component Suppliers	\$1.6	\$2.7	\$1.6
Application and Content Stores	\$1.1	\$9.9	\$9.9
Content	\$14.1	\$15.7	\$14.1
App Developers	\$11.6	\$12.9	\$11.6
Mobile Advertising Networks	\$9.2	\$18.7	\$18.7
On-Demand Economy	\$4.4	\$4.4	\$4.4
<b>Total</b>	<b>\$194.8</b>	<b>\$332.9</b>	<b>\$282.1</b>

*(currency values in billions of US\$)*

Source: US Bureau of Economic Analysis, Recon Analytics analysis, 2015

The same 2016 Recon Analytics report estimated that the combined annual consumer surplus represented by mobile voice, messaging, and data services is \$630.9 billion, as represented by the following chart:

**Exhibit 2: Annual Consumer Surplus—Combined, Data, Messaging and Voice (in US\$)**



Source: Recon Analytics, Nielsen Customer Value Metrics, 2014, CTIA 2014 Annual Wireless Indices

CTIA’s President and CEO Meredith Baker in June 2016 estimated that 5G and IoT can add \$2.7 trillion to the U.S. economy over the next 15 years.

Even these reports fail to quantify the difficult-to-quantify revolutionary exponential value of changing the way we interact with and communicate with each other, or the way wireless improves the efficiency in our business and lives. No longer are we Americans chained to our homes and offices in order to communicate, but we can interact, take care of business, and find entertainment options, wherever we happen to be.

### **Government Efforts to Date Started Strong but Are Bogging Down**

In 2010, the Obama Administration established the [policy goal](#) of allocating by 2020 500 MHz of spectrum for wireless broadband that was then allocated to other commercial and government uses. At the time the plan was released, it was believed to include only spectrum below 6 GHz. The government’s 2012 [PCAST Report](#) changed the direction of that policy for current government spectrum allocations to rely almost exclusively on sharing between government and commercial interests. The Administration’s 500 MHz policy is now six years old.

The National Telecommunications and Information Administration (NTIA) has [boasted](#) that the government has made “substantial progress” in meeting the Administration’s 500 MHz goal. Let’s look at the facts, first by examining NTIA’s own [June 2016 chart](#) of accomplishments, which I reproduced below.

<b>Table 1—Federal, Non-Federal, and Shared Spectrum Bands Under Investigation</b>				
<i>Frequency Band</i>	<i>Spectrum Made Available (megahertz)</i>	<i>Spectrum Identified and In Process (megahertz)</i>	<i>Spectrum Identified and Under Study (megahertz)</i>	<i>Spectrum for Potential Future Study (megahertz)</i>
Wireless Communications Service (WCS): 2305-2320 and 2345-2360 MHz	30			
H Block: 1915-1920 and 1995-2000 MHz	10			
Advanced Wireless Services AWS-4: 2000-2020 and 2180-2200 MHz	40			
AWS-3: 1695-1710, 1755-1780, and 2155-2180 MHz	65			
3.5 GHz Citizens Broadband Radio Service (CBRS): 3550-3650 MHz	100			
UHF TV Incentive Auction: 512-698 MHz		42-126		
1675-1680 MHz			5	
2020-2025 MHz			5	
5 GHz Unlicensed National Information Infrastructure (U-NII) U-NII-2B: 5350-5470 MHz			120	
5 GHz U-NII-4: 5850-5925 MHz			75	
1300-1390 MHz				90
1680-1695 MHz				15
2700-2900 MHz				200
2900-3100 MHz				200
3100-3550 MHz				450
<b>Totals (megahertz):</b>	<b>245</b>	<b>42-126</b>	<b>205</b>	<b>955</b>

NTIA, Sixth Interim Progress Report on the Ten-Year Plan and Timetable (Jun. 2016).

In reality, the Administration has actually auctioned off only about 145 MHz of the 500 MHz target that reliably can be used for dedicated wireless broadband usage. Although NTIA identifies other spectrum efforts within its first two “substantial progress” columns, those claims are still subject to significant doubt about the quantity of spectrum actually to be realized.

In the “spectrum available” column, the FCC did issue an order regarding 100 MHz of spectrum in the 3.5 GHz band. However, that spectrum has not yet been auctioned and its power is too low 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 being conducted right now. The amount of spectrum the incentive auction will reallocate is still subject to many unknowns. The auction is now set to begin on December 13 its fourth round of attempting to marry potential buyers and sellers for this spectrum, currently clearing only 70 MHz of licensable spectrum. Given the “forward” auction results by broadband bidders in the first two rounds, the amount of spectrum achievable may go even lower. I hope that such concerns turn out to be false, but it is nonetheless clear that these latter two allocations are still too questionable to include in the “substantial progress” conclusion.

There are also some 245 MHz listed in the “under study” column, including 120 MHz of U-NII-2B & 4 band spectrum that the FCC has been considering exclusively for shared unlicensed use since 2012, but the agency has not yet evaluated potential interference studies associated with sharing these U-NII bands with government spectrum holders and other users. The identified 75 MHz of 5.9 GHz spectrum listed as “under study” is still subject to much debate, as is outlined in the sharing section below. There is no indication when any of the “under study” bands may be freed up in the future.

It is true that last summer the Federal Communications Commission [allocated](#) some additional 11 GHz of spectrum for mobile broadband use in its *Spectrum Frontiers* proceeding. In that proceeding, the FCC allocated 7 GHz of spectrum for unlicensed use, and 3.85 GHz for dedicated use. The FCC rightfully was not satisfied with these efforts and therefore issued a *Further Notice of Proposed Rulemaking* (FNPRM) identifying additional millimeter-wave spectrum for potential reallocation. The FNPRM identified another 18 GHz of spectrum in eight high-frequency bands for 5G. Although these high-band blocks are very necessary to the 5G effort, there remains the issue of locating sub-6 GHz spectrum that was the focus of the Administration’s 500 MHz allocation plan.

### **The NTIA Quantitative Assessments Report**

Larry Strickling, head of NTIA, after almost a year of promises, finally issued in November 2016 its next installment in its search for additional mobile broadband spectrum to fulfill the Obama Administration’s 500 MHz goal of allocating sub-6 GHz spectrum for mobile broadband use. Even the [Quantitative Assessments of Spectrum Usage](#) describes the report as “an *intermediate* step in a process for identifying and prioritizing strategic *options* for *potential* repurposing of bands.” Three “wobble-words” in one sentence shouts of government-speak in my book, leading to my skeptical conclusions in this *Perspectives*.

The Quantitative Assessments report is a detailed and complicated framework describing current government uses of five bands of spectrum, 1300-1390, 1675-1695, 2700-2900, 2900-3100 & 3100-3550 MHz. The report also specifies a methodology for assessing the usefulness of spectrum for commercial wireless interests, looking at potential 5 MHz of contiguous blocks with specified engineering parameters.

Although these mid-band spectrum blocks being assessed total approximately 960 MHz (including 5 MHz that already is identified in NTIA's "under study" column (1675-1680 MHz)), when the details are examined carefully, only about 115 MHz receive a guarded nod of approval in the NTIA Quantitative Assessments report for reallocation and/or sharing with commercial interests. And even this modest 115 MHz of spectrum appears still to have significant geographic and/or time restrictions that would limit those band's usage by commercial interests. In other words, for most current uses, NTIA seems to indicate that government use would be continued. The Quantitative Assessments report is extremely tentative and preliminary, conditioned partially on hypothetical future moves by government to different spectrum. No timeframes are even discussed on these modest government moves. Thus, although I'm sure that some will debate my conclusion here, I will only discuss the 115 MHz of spectrum that appears to NTIA to be possible, and not to the 845 MHz of spectrum that does not.

In the report, NTIA indicated that there is some possibility in the future that it could move radar receive stations currently located in the 1300-1350 MHz band to the 2700-2900 MHz band. The ability to move would entail a possible consolidation of functions among different government agencies to a newer generation system, or system of systems, being terms a Spectrum Efficient Nation Surveillance Radar (SENSR) capability. This could free up the lower 50 MHz band either totally or partially. Although NTIA concludes that there is no opportunity for sharing now in the 2900-3100 MHz band, such SENSR consolidation might also free up part of the 2900-3100 MHz band. Since the Quantitative Assessments report is quite vague on the possibility, I could not count an of the 2900-3100 MHz in the "possible" analysis.

NTIA also reports that the 1675-95 MHz band, currently used for Department of Commerce weather data utilizing radiosonde technology, may be reallocated because such use is planned for migration to the 400 MHz band. The 1675-95 MHz band is probably the most promising for reallocation and/or sharing with commercial interests. It should be noted, however, that 5 MHz of this band would be reserved to Ligado under its most recent [proposal](#) to modify its satellite license to allow for terrestrial mobile broadband use. The FCC has not ruled whether Ligado should have exclusive use of this 5 MHz band. And NTIA is vague about the potential impact of reallocation on non-federal users of Commerce satellite data in the 1675-1695 MHz band.

NTIA identifies the 3505-3550 band as potentially available for sharing subject to certain geographic exclusion zones. NTIA notes, however, that the ability to utilize such spectrum depends on the feasibility of the yet untried Spectrum Access System (SAS) sharing technique established by the FCC for the 3.5 GHz Citizens Broadband Radio Service. NTIA recommends that any allocation await until actual experience is gained from actual 3.5 GHz SAS operations, a point which I've made before [here](#) as a detriment to government sharing proposals.



Outside of this 115 MHz of “possible” spectrum identified for reallocation and/or sharing, NTIA throws cold water on the likelihood of successful reallocation for the rest of the 960 MHz of spectrum identified in the report for further study. NTIA cites heavy government usage in a number of bands, the existence of airborne equipment in others (which presumably would raise interference concerns for terrestrial based wireless operation), as well as some government licensed use for entire bands in unpredictable locations and/or time durations. A casual perusal through the potential geographic exclusion zones for a number of the 5 MHz blocks of the identified spectrum, which is included in the appendix to the report, demonstrates large aggregate government user contours, particularly in large urban areas where wireless broadband spectrum is most needed.

This latest NTIA effort demonstrates that the government is currently skeptical about significant new commercial mobile broadband allocations. Even with respect to the 115 MHz of “possible” reallocations I identify above, NTIA appears adamant about the need for continued sharing.

### **The NTIA Quantitative Assessments Report Is Flawed and Requires Reformation**

If the new Administration is to get more serious on the need to advance telecommunications and broadband infrastructure, particularly for more commercial broadband spectrum to support 5G services and devices, it needs to refocus and energize plans for government users to vacate spectrum and/or become more efficient spectrum users. There are four serious problems with the NTIA Quantitative Assessments report: (1) it relies excessively on sharing between commercial and government users, (2) the Administration plan is now outdated and falling further behind the demand for spectrum, (3) there is a need to get more spectrum in the pipeline now, and (4) consequently real government incentives need to be incentivized to vacate spectrum.

#### *Sharing Spectrum Is an Unsatisfactory Approach*

The biggest problem with the latest NTIA Quantitative Assessments report is the degree to which it relies on potential sharing between commercial and government interests. I have addressed [here](#) the problems with sharing spectrum between commercial and government users. Inevitably sharing reduces the available usable spectrum and the flexibility and reliability that commercial users need to deploy services that consumers want. A number of these sharing problems also can exist among commercial users. There are five serious problems with 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.

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 ultimately must be borne by consumers. Ongoing coordination obligations inevitably reduce available capacity, and sometimes on infrequent and unpredictable occasions, and thus raise potential mobile broadband reliability concerns.

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](#). Even the NTIA Quantitative Assessments report admits that more real-world operational experience is necessary prior to introducing shared spectrum allocations, as previously outlined.

Fourth, sharing reduces potential auction revenues because the market will devalue spectrum saddled with significant limitation, as I detailed [here](#). 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 the time of an auction.

Fifth, ongoing sharing between sensitive national security and law enforcement systems and commercial operations pose continuing security concerns to government operations, a position taken in the Obama Administration's [memo](#) promoting sharing.

Sharing difficulties occur not just between commercial and government users, but can be among private users as well. Just three examples demonstrate this. First, Globalstar sought to modify its satellite license to provide terrestrial service. This proposal, which the FCC included in a 2013 [Notice of Proposed Rulemaking](#), is designed to preserve satellite spectrum while finding additional terrestrial mobile uses. After years of delay and testing, the proposal is still mired in a potential-interference controversy mostly among commercial competitors, slowing progress on a decision. Globalstar has recently [abandoned](#) its sharing proposal because of opposition and consequent difficulty with obtaining Commission approval. Second, Ligado Networks, formerly known as LightSquared, has for years been seeking to modify its satellite license for terrestrial wireless use. The latest controversy out for [public comment](#) involves Ligado's proposed access to the 1675 to 1680 MHz band that would be shared with meteorological and oceanographic satellites. Third, the FCC is seeking [comment](#) regarding the reallocation of a portion of the 5.9 GHz band for unlicensed mobile use, 75 MHz of which is currently allocated primarily to short-range wireless communications links for vehicular use, called Dedicated Short Range Communications (DSRC). Although spectrum for DSRC initially was made in the late 1990s, the industry has been slow to develop technologies using this spectrum, and other technologies have been developed, such as radar, to increase vehicular safety functions such as collision avoidance systems.

I do not take a position on the merits of any of these three proceedings or the potential interference issues raised in them by opposing parties. I cite them only as a warning sign about the lengthy delays and problems associated with sharing that more readily could be solved by dedicated reallocation of spectrum for wireless use.

### *The Administration's Plan Is Already Outdated*

The second most serious problem with the latest NTIA Quantitative Assessments report is its failure to make a serious effort to locate more commercial wireless broadband spectrum. As indicated previously, the Administration itself seems to be lagging in evaluating and reallocating spectrum in accordance with the President's [policy goal](#) of allocating 500 MHz of spectrum for wireless broadband.

A June 2015 [report](#) published by the Brattle Group estimated that by 2019 the United States will need to reallocate an additional 350 MHz of spectrum for high power dedicated mobile broadband use, which would not include high band spectrum. The report noted that the 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 an 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.

### *The Government Needs to Get More Spectrum into the Pipeline*

The importance of locating and reallocating more spectrum now is that additional spectrum must be placed into the pipeline (meaning identified as reallocable and an FCC proceeding begun) because of the historically long time frame from conception to actual spectrum deployment. Historically, the government has been agonizingly slow assigning spectrum to a licensee or other authorized user, taking an average of roughly 13 years. A July 2015 study commissioned by CTIA [demonstrates](#) this stark fact in the following table:

SPECTRUM	BANDS	FIRST STEP	AVAILABLE FOR USE	FIRST DEPLOYMENT	APPROXIMATE TIME LAG
Cellular	824-849; 869-894 MHz	1970	1981	1983	13 years
PCS	1850-1920; 1930-2000 MHz	1989	1995	1995	6 years
EBS/BRS	2496-2690 MHz	1996	2006	2009	13 years
SMR	817-824; 862-869 MHz	1995	2012	2013	18 years
700 MHz	698-748; 746-806 MHz	1996	2009	2010	14 years
AWS-1	1710-1755; 2110-2155 MHz	2000	2006	2008	8 years
WCS	2305-2315; 2345-2355 MHz	1997	2012	2015	18 years
AWS-3	1695-1710; 1755-1780; 2155-2180 MHz	2002	2015	2017 (estimated)	15 years
AWS-4	2000-2020; 2180-2200 MHz	2003	2012	2017 (estimated)	14 years
600 MHz	TBD	2014	2016 (estimated)	TBD	TBD

Thomas K. Sawanobori, Dr. Robert Roche, From Proposal to Deployment: The History of Spectrum Allocation Timelines (Jul. 20, 2015).

The tentativeness of the NTIA Quantitative Assessments report demonstrates the inherent delays in the reallocation process as government takes too long to evaluate spectrum, then draws out the process with further reviews and studies. Provisions of the MOBILE NOW Act, described later in this perspective, could help to enforce this speed-of-deployment issue.

### *Government Incentives Are Needed to Free Up More Spectrum*

The NTIA Quantitative Assessments report is proof that government still lacks the incentive to get serious about the need for relinquishing spectrum and/or making efficiency gains in its use of spectrum. As I indicated [here](#), it is time for a bold new approach to provide government with a market-oriented incentive to become more efficient and vacate occupied spectrum.

### **The Senate's MOBILE NOW Initiative**

Given the problems cited above concerning the NTIA's latest spectrum assessment, the incoming Administration could turn to existing legislative efforts to rectify the problem. Recognizing the acknowledged social and economic value in meeting the demand for more wireless broadband services, Senator Thune (R-SD), Chairman, and Senator Nelson (D-FL), Ranking Minority Member, Senate Commerce, Science, and Transportation Committee, introduced bipartisan legislation, the [MOBILE NOW Act](#), S. 2555, on February 11, 2016, that would:

- Mandate that at least 255 MHz of spectrum below 6 GHz be allocated for wireless mobile and fixed broadband use no later than December 31, 2020, in line with the Administration's 2010 500 MHz allocation goal;

- Require a feasibility study for reallocating six specified bands above 24 GHz by the end of 2017, and an FCC NPRM proposing reallocation of such bands where warranted within two years of enactment;
- Require government to conduct a feasibility study for commercial-government sharing of spectrum between 3.1 and 3.5 GHz and between 3.7 and 4.2 GHz;
- Facilitate speedy deployment of communications infrastructure on federal property;
- Require NTIA to report recommendations to Congress that would provide incentives to federal agencies to relinquish or share the spectrum they use;
- Require NTIA to study bidirectional sharing that would permit government to gain flexible access to commercial spectrum on a shared basis;
- Require the FCC to adopt rules permitting unlicensed mobile use of spectrum in guard bands.

The bipartisan effort of Senators Thune and Nelson was commendable for its recognition that government needs to speed up the process of spectrum reallocation usable for 5G. These efforts build on other Senate efforts to advance spectrum legislation, such as (1) Senator Marco Rubio's (R-FL) [Wireless Innovation Act of 2015](#), which would require government to identify at least 200 MHz of spectrum below 5 GHz for reallocation to private use, or (2) a House proposal, [H.R. 1641](#), which provides a one percent set aside of spectrum resources for spectrum efficiency research. Some of the MOBILE NOW provisions represent a needed improvement to the overly cautious approach of the [2015 Spectrum Pipeline Act](#) adopted as part of the 2015 Omnibus Budget Bill, which I described [here](#).

I identify some of the weaknesses of this pending legislation [here](#), including a refusal to set firm time frames for millimeter wave reallocations (which as noted in this perspective the FCC has reallocated, but not yet scheduled for auction), providing sufficient government incentives to relinquish underutilized spectrum, and failure to place firm deadlines on federal government response to tower site applications.

But regardless of the merits of this legislation, MOBILE NOW has been mired in Senate politics for months, to the detriment of the good substance behind the bill. I hope that Congress can get beyond politics so that it can enact needed reforms that can promote 5G spectrum availability and progress.

## **Conclusion**

It is promising that, in conjunction with his economic revival and job creation emphasis, President-elect Donald Trump has recognized the need for establishing public-private partnerships in building out and upgrading the nation's infrastructure, including

telecommunications infrastructure. A renewed focus on locating and reallocating more wireless broadband spectrum for commercial use would build on existing Obama Administration efforts and rectify the “incomplete” on its spectrum report card.

Such a refocus can help meet exploding wireless service demand and significantly add to American consumer welfare and global U.S. leadership in deploying latest-generation wireless services. Wireless networks, services, and applications have been a uniquely American-driven effort that redounds to the benefit of every American, improving GDP, adding jobs, adding to tax revenues, and creating global wealth that produces serious benefits retained in America. The Trump Administration can help to implement its infrastructure improvement agenda – and the nation’s economic growth prospects – by reinvigorating the wireless spectrum push, using as a springboard some excellent groundwork already provided by MOBILE NOW and its predecessor bills.

\* Randolph J. May is President of the Free State Foundation, an independent, nonpartisan free market-oriented think tank located in Rockville, Maryland.

\*\* Gregory J. Vogt is a Visiting Fellow of the Free State Foundation.