



## Benefits of Expanding Wi-Fi

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***The Federal Communications Commission (FCC) has proposed allowing Globalstar to use its 2.4 GHz spectrum to expand Wi-Fi capacity in the U.S. This ConsumerGram finds that the FCC proposal would lead to significant economic benefits – including the creation of nearly 90,000 jobs – if approved.***

### The Spectrum Crunch

Consumers have become deeply reliant on wireless broadband services for work, e-commerce, applications, entertainment, news and communications. With more than 336 million U.S. wireless subscriber connections, wireless data traffic has more than doubled during 2013, reaching an incredible 3.2 trillion megabytes.<sup>1</sup> However, the problem with this success story is that wireless service demand is outpacing the availability of spectrum. The Council of Economic advisors has predicted that U.S. wireless data traffic would increase twenty times over the next five years, and the FCC has estimated that 275 megahertz of new spectrum would be needed by year's end.<sup>2</sup> As broadband wireless networks approach capacity, experts have

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<sup>1</sup> "Semi-Annual Wireless Industry Survey," CTIA, 2014, at [http://www.ctia.org/docs/default-source/Facts-Stats/ctia\\_survey\\_ye\\_2013\\_graphics-final.pdf?sfvrsn=2](http://www.ctia.org/docs/default-source/Facts-Stats/ctia_survey_ye_2013_graphics-final.pdf?sfvrsn=2). Data are for the end of the year 2013.

<sup>2</sup> See "Vice President Biden Thanks First Responders and Releases Report on the Economic Value of Increasing Spectrum," News Release, Office of the Vice President, White House, February 21, 2012, <http://www.whitehouse.gov/the-press-office/2012/02/21/vice-president-biden-thanks-first-responders-and-releases-report-economy>; and David Goldman, "Sorry, America: Your Wireless Airwaves are Full," *CNN Money*, February 21, 2012, [http://money.cnn.com/2012/02/21/technology/spectrum\\_crunch/index.htm?iid=SF\\_T\\_Lead](http://money.cnn.com/2012/02/21/technology/spectrum_crunch/index.htm?iid=SF_T_Lead).

coined the term *spectrum crunch* to warn of increasing problems from network congestion, including slower and poorer quality of service on wireless networks.<sup>3</sup>

Wi-Fi service is reaching its limits too. These services have become essential in allowing mobile users to access hotspots in a myriad of locations, including airports, hotels, coffee shops, community centers, universities, libraries and other public locations, while using laptops, tablets, smartphones, and other Wi-Fi enabled home and office equipment. Wi-Fi services also allow users to offload wireless traffic, thereby sparing consumers data usage fees on their wireless service plans. The popularity of Wi-Fi services has led to congestion, as two major technology companies note:

*“... although 2.4 GHz unlicensed spectrum is being used very efficiently, it has become saturated during certain times of day in heavily trafficked areas such as city centers, apartment buildings, and public venues. This congestion imposes a large cost on consumers because Wi-Fi is the most heavily used method of wireless broadband connectivity and the 2.4 GHz band is the core Wi-Fi band today.”*<sup>4</sup>

With Wi-Fi service traffic expected to eclipse wireline traffic in less than four years, there is an urgency to get additional spectrum onboard.<sup>5</sup> In fact, Wi-Fi traffic alone accounts for more than twice the traffic carried by wireless service providers.<sup>6</sup> Even as the FCC and Congress take steps to get more spectrum, today’s solutions only forestall issues of a spectrum shortage for another day.<sup>7</sup>

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<sup>3</sup> Jonathan Spalter, “Spectrum for Brighter Mobile Future,” *Huffington Post*, June 26, 2013, at [http://www.huffingtonpost.com/jonathan-spalter/spectrum-for-brighter-mob\\_b\\_3504080.html](http://www.huffingtonpost.com/jonathan-spalter/spectrum-for-brighter-mob_b_3504080.html).

<sup>4</sup> Comments of Google, Inc. and Microsoft Corporation, ET Docket No. 13-49, May 28, 2013, at 3. Also see “In the Matter of Terrestrial Use of the 2473-2495 MHz Band for Low-Power Mobile Broadband Networks; Amendments to Rules for the Ancillary Terrestrial Component of Mobile Satellite Service Systems,” Comments of Cisco Systems, Inc., IB Docket No. 13-213 and RM-11685, filed with the FCC on May 5, 2013, p. 3.

<sup>5</sup> Jeffrey Burt, “Cisco: WiFi Traffic Will Exceed Wired by 2018,” *eWeek*, June 10, 2014.

<sup>6</sup> One source estimates Wi-Fi to carry 70% of the smartphone traffic in the U.S., compared to cellular (more specifically 3G and LTE) services. See, “Understanding the Role of Managed Public Wi-Fi in Today’s Smartphone User Experience,” Informa Telecoms & Media, white paper sponsored by Mobidia, released April 2014.

<sup>7</sup> A Wi-Fi bill was recently introduced in the Senate for more spectrum and the FCC has recently written rules to increase speed and capacity to reduce congestion in Wi-Fi hotspots. See, “Bipartisan Wi-Fi Bill in Senate Could Up

The solution is to get as much spectrum devoted to wireless broadband services – licensed and unlicensed – by any reasonable means possible. This will require finding untapped spectrum and improving the efficiency of assigned spectrum. One FCC rulemaking proposes the latter solution.

## **The FCC Proposal**

In November 2012, Globalstar petitioned the FCC to modify rules that would enable the company use its 2.4 GHz spectrum in some areas to support Wi-Fi services.<sup>8</sup> After seeking comments, the FCC proposed changes that would allow Globalstar to offer the new service. If adopted, the FCC's proposal would increase 2.4 GHz Wi-Fi capacity in the U.S. by one-third (22 MHz) and allow the satellite operator to deploy network access equipment, thereby permitting a more efficient use of the band and alleviating Wi-Fi congestion.

In addition, the FCC proposal would provide additional benefits by enabling the deployment of 20,000 access points to schools, colleges and hospitals at no cost, as well as providing free satellite service to customers in federally declared disaster areas.<sup>9</sup> While newly purposed spectrum normally takes years to bring into use, the FCC proposal would use 2.4 GHz spectrum that is already accessible with existing Wi-Fi chipsets, which means that consumers could potentially use and benefit from this Wi-Fi spectrum soon after the proposed rules are effective.

## **Spectrum Efficiency is a Key**

Mobile satellite services, including voice and data, are a preferred means of communications for those living in more remote and hard-to-reach corners of the globe, as well

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Speeds, Ease Congestion," CNET, June 20, 2014; and "FCC Increases 5GHz Spectrum for Wi-Fi, Other Unlicensed Uses," New Release, FCC, March 31, 2014.

<sup>8</sup> "In the Matter of Terrestrial Use of the 2473-2495 MHz Band for Low-Power Mobile Broadband Networks; Amendments to Rules for the Ancillary Terrestrial Component of Mobile Satellite Service Systems," Reply Comments of Globalstar, IB Docket No. 13-213 and RM-11685, filed with the FCC on June 4, 2014.

<sup>9</sup> "Globalstar Files Petition for FCC Rulemaking," Press Release, Globalstar, November 13, 2012.

as international travelers, workers on offshore rigs and on defense assignments, hikers, bikers, boaters, hunters, campers, skiers and others. These communications services also have an important role in national emergencies. For example, when most cellular and wireline telephone services were still down weeks after the devastation caused by Hurricane Katrina, satellite services filled the void with the provision of over 20,000 handsets and terminals within two days.<sup>10</sup>

While crucial in markets where wireless and wireline services are lacking, these satellite services have potential capacity in more urbanized areas. This provides a unique opportunity for more fully utilizing this bandwidth for terrestrial broadband services in more densely-settled areas. Many tech companies support the FCC's proposal or have "no opposition in principle" to it, provided that the service does not undermine the "utility" of unlicensed Wi-Fi services.<sup>11</sup>

### **Economic Benefits of Expanding Wi-Fi**

Given the spectrum crunch and increasing Wi-Fi congestion, making more efficient use of unused or underutilized spectrum for Wi-Fi would be an obvious benefit for consumers, and a benefit that can be estimated. It would increase access to broadband services; it would allow the offloading of metered wireless traffic, which would save consumers on their wireless bills; and it would mean better service within hotspots – including better coverage, less congestion, less latency and jitter, and faster Internet speeds. Another benefit, as previously noted, is that the FCC proposal provides 20,000 free access points to schools, colleges and hospitals, while continuing satellite services, including free emergency communications services during national disasters.

The increase in Wi-Fi capacity resulting from the FCC proposal would lead to an increase in U.S. economic output, as measured by Gross Domestic Product (GDP). By 2015, a single MHz

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<sup>10</sup> Eugen Leitl, "Information Technology Issues During and After Katrina and Usefulness of the Internet: How We Mobilized and Utilized Digital Communications Systems," *Critical Care*, Vol. 10:1, 2006, p. 100.

<sup>11</sup> For example, see Comments of Cisco Systems, Inc. and Reply Comments of Globalstar, pp. iv and 13.

of broadband spectrum can be expected to generate \$510 million in service-related revenues.<sup>12</sup> If new Wi-Fi capacity could generate just half of this revenue per MHz, the addition of 22 MHz would yield \$5.6 billion in service revenue by 2015. Using multipliers from the Bureau of Economic Analysis (BEA) for the Internet and Information Service industry, the addition of 22 MHz for Wi-Fi services will add \$9.8 billion to GDP by 2015, including direct, indirect and induced effects.<sup>13</sup>

Additional Wi-Fi capacity would also enable the offloading of traffic from cellular networks, which would reduce congestion and improve wireless broadband speeds. The economic benefit of this would increase in GDP by an additional \$0.9 billion in 2015.<sup>14</sup> Therefore, the increase in GDP from increasing Wi-Fi capacity by 22 MHz would total \$10.7 billion per year, or the sum of \$0.9 billion plus \$9.8 billion. Using multipliers from the BEA, the increase in GDP will create roughly 88,500 full time jobs throughout the U.S. economy.<sup>15</sup>

The actually economic benefits will vary. It could take several years longer than assumed for the Wi-Fi bandwidth to be more fully utilized. On the other hand, not included in these GDP and employment figures are the potential economic benefits from increase production and use of wireless-enabled equipment, which means that the estimate provided here is too low. In either case, this provides a starting point for the potential benefits to the U.S. economy, if the FCC proposal were approved.

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<sup>12</sup> CTIA estimates the wireless industry services to have generated \$189.2 billion in 2013, which covers providers that use approximately 409.5 MHz spectrum (such as cellular, PCS, SMR, AWS and 700 MHz). See, "Annual Wireless Industry Survey," CTIA, 2014, <http://www.ctia.org/your-wireless-life/how-wireless-works/annual-wireless-industry-survey>. We assume service revenues will growth by 5% per year through 2015.

<sup>13</sup> "Total Multipliers for Output, Earnings, Employment, and Value Added by Industry Aggregation: National Summary," Bureau of Economic Analysis, 2010 Annual Input-Output, RIMS II, Table 2.5.

<sup>14</sup> The 2015 effect from "return to speed" is estimated in Raul Katz, "Assessment of the Economic Value of Unlicensed Spectrum in the United States," Telecom Advisory Services, LLC, Commissioned for WiFiForward, February 2014, Table III-15, p. 41. We assume that adding one-third to the existing 2.4 GHz spectrum will result in one-fifth of this effect, which amounts to 9% of the FCC proposal's total GDP estimate.

<sup>15</sup> Op. cit., fn. 13.

## **Conclusion**

This ConsumerGram finds that the FCC's proposal to add 22 MHz to support Wi-Fi would provide sizable economic benefits for consumers – generating \$11 billion in GDP per year and creating nearly 90,000 jobs – all while alleviating congestion for broadband users and continuing to maintain satellite services.

Wi-Fi provides tremendous benefits to the public, and the FCC proposal to efficiently utilize this spectrum appears to have substantial upside. Policymakers, particularly Congress and the FCC, need to look for every way to expand the amount of licensed and unlicensed spectrum for broadband use. For this reason, adopting the FCC's proposed rules, while providing substantial economic benefits, should supplement, not replace or delay, other efforts to bring additional licensed and unlicensed broadband spectrum onboard.