

**Before the  
Federal Communications Commission  
Washington, D.C. 20554**

In the Matter of )  
 )  
Amendment of Part 2 and 90 of the ) RM No. 11715  
Commission’s Rules to Create a )  
New Frequency Allocation for )  
Wireless Broadband Services )

To: The Commission

**COMMENTS OF  
Open Technology Institute at the New America Foundation  
Public Knowledge**

The undersigned nonprofit groups, the Open Technology Institute at the New America Foundation and Public Knowledge (hereinafter “OTI and PK”), are pleased to submit these Comments in response to the Public Notice (“*Public Notice*”) released on March 11, 2014 in the above-captioned proceeding<sup>1</sup> and in general support of the Petition for Rulemaking (“Mimosa Petition”) filed by Mimosa Networks, Inc. (“Mimosa”).<sup>2</sup>

**I. INTRODUCTION AND SUMMARY**

New America Foundation’s Open Technology Institute and Public Knowledge are nonprofit public interest groups dedicated to promoting ubiquitous and affordable wireless broadband connectivity, as well as more efficient spectrum use and more effective mobile market competition, through the reallocation of underutilized spectrum bands for unlicensed access and dynamic spectrum sharing. OTI and PK have participated in wide variety of proceedings related to these goals, both as individual organizations and as members of the broader Public Interest Spectrum Coalition.

---

<sup>1</sup> *Public Notice*, Report No. 3002 (rel. March 11, 2014).

<sup>2</sup> Petition of Mimosa Networks, Inc., for a Rulemaking to Create a new Frequency Allocation for Wireless Broadband Services (*filed* May 1, 2013) (*hereinafter* “Mimosa Petition”).

OTI and PK urge the Commission to adopt and release a Notice of Proposed Rulemaking to invite comment and develop a full record on Mimosa's proposal and on other potential uses of the band in addition to relatively high-power, long-distance backhaul links. Although outdoor and long-distance backhaul links at the power levels permitted under Part 90, subpart Z, of the Commission's Rules would be a very productive use of the band, the Commission should also consider authorizing low-power use of the band for personal/portable devices, including off-the-shelf consumer devices. With respect to the appropriate regulatory framework, OTI and PK agree that authorizing non-exclusive access under the "lightly licensed" approach in Part 90, Subpart Z, of the Commission's rules has many advantages, particularly for fixed wireless broadband providers. We suggest that the Commission also consider and request comment on whether Part 15 of the Commission's Rules, or even the proposed new rules to govern dynamic spectrum sharing in the 3550-to-3650 MHz band, would enable the most open, diverse, and spectrally intense use of the band.

Although OTI and PK have no view at this time about the efficacy of Mimosa's proposed interference-avoidance mechanisms – or even whether they are necessary – we commend Mimosa for advancing protections that have proven effective in other bands. OTI and PK suggest that the Commission request comment and data in the NPRM that will allow it to consider whether the interference mitigation measures it imposes could be quite different depending on different use cases, including potentially small cell and indoor applications that would not present the same risk of interference to either the amateur service or to radar operations as would long-distance microwave links.

## II. THE COMMISSION SHOULD ADOPT A NOTICE OF PROPOSED RULEMAKING AND DEVELOP A FULL RECORD

OTI and PK support Mimosa's Petition requesting a Notice of Proposed Rulemaking to amend the Commission's rules to make spectrum in the 10-10.5 GHz band available on a shared basis for wireless broadband services. If Mimosa is correct that there is substantial unused capacity on this 500 megahertz band – and if licensed incumbents can be protected from harmful interference – then we agree the Commission should permit open access on a secondary basis for a wide variety of compatible uses, including point-to-point and point-to-multipoint backhaul.

Adopting the NPRM that Mimosa requests would be consistent with Recommendation 5.15 of the FCC's National Broadband Plan, which concluded that the Commission and NTIA should cooperate “to identify additional candidate federal and non-federal spectrum that can be made accessible for both mobile and fixed wireless broadband use, on an exclusive, shared, licensed and/or unlicensed basis.”<sup>3</sup> A rulemaking to open this underutilized band for additional productive uses would also be consistent with the approach recommended in 2012 by the President's Council of Advisors on Science and Technology (PCAST),<sup>4</sup> an approach the Commission has endorsed and largely adopted in its pending proposal to expand both secondary licensed and unlicensed access to the 3.5 GHz band.<sup>5</sup>

While we generally support the PCAST's admonition that underutilized bands should be opened for dynamic spectrum sharing, we specifically agree here with Mimosa's observation that

---

<sup>3</sup> Omnibus Broadband Initiative, FCC, CONNECTING AMERICA: THE NATIONAL BROADBAND PLAN, GN Docket No. 09-51, at 3 (2010).

<sup>4</sup> President's Council of Advisors on Science and Technology, *Realizing the Full Potential of Government-Held Spectrum to Spur Economic Growth* (July 2012) (“PCAST Report”), available at <http://www.whitehouse.gov/administration/eop/ostp/pcast/docsreports>. As the PCAST report stated: “The incongruity between concern about a ‘looming spectrum crisis’ and the reality that only a fraction of the Nation’s prime spectrum capacity is actually in use suggests the need for a new policy framework to unlock fallow bandwidth in all bands, as long as it can be done without compromising the missions of Federal users and ideally by improving spectrum availability for Federal users.” *Id.* at 16.

<sup>5</sup> *Amendment of the Commission's Rules with Regard to Commercial Operations in the 3550-3650 MHz Band*, Notice of Proposed Rulemaking and Order, GN Docket No. 12-354 (rel. Dec. 12, 2012) (“3550-3650 MHz NPRM”).

the 10-10.5 GHz band could be particularly useful for high-capacity wireless backhaul applications. As Mimosa observes in its petition, the 10 GHz band has significant advantages for outdoor and long-distance backhaul applications because “the band is only moderately susceptible to attenuation due to rain-fading effects, especially when compared to spectrum in higher frequencies, including the 71-76 and 81-86 GHz bands.”<sup>6</sup> The propagation characteristics of this band could be particularly beneficial to rural broadband providers, including the nation’s roughly 2,000 wireless internet service providers (WISPs), which often lack access to affordable high-capacity backhaul and connectivity. Moreover, we believe that open access to the 10-10.5 GHz band for this purpose could also serve as an alternative for WISPs and other providers that currently use lower-frequency bands (e.g., at 3650 MHz and 5 GHz) that have propagation characteristics that could be put to use delivering broadband connectivity directly to consumers or to enhance capacity as part of a small cell offload or machine-to-machine network.

In sum, OTI and PK urge the Commission to adopt and release a Notice of Proposed Rulemaking to invite comment on Mimosa’s proposal and on other potential uses of the band, as discussed further below.

### **III. THE NPRM SHOULD PROPOSE A REGULATORY FRAMEWORK THAT PROMOTES OPEN, DIVERSE AND INTENSE USAGE OF THE BAND**

Although OTI and PK support Mimosa’s Petition and the adoption of a Notice of Proposed Rulemaking to expand shared use of the 10-10.5 GHz band for wireless broadband, we also urge the Commission to consider and to request comment on the utility of the band for applications in addition to “high-capacity macrocell backhaul covering long distances, and for both point-to-point and point-to-multipoint operations.”<sup>7</sup> Although outdoor and long-distance

---

<sup>6</sup> Mimosa Petition at 17-18.

<sup>7</sup> Mimosa *Petition* at 20.

backhaul links at the power levels permitted under Part 90, subpart Z, of the Commission's Rules would be a very productive use of the band, the Commission should also consider authorizing low-power use of the band for personal/portable devices, including off-the-shelf consumer devices.

With respect to the appropriate regulatory framework, OTI and PK agree that authorizing non-exclusive access under the "lightly licensed" approach in Part 90, Subpart Z, of the Commission's rules has many advantages, particularly for fixed wireless broadband providers. Open access, low barriers to entry and minimal regulatory delays are hallmarks of not only the "lightly licensed" rules that apply to the 3650 MHz band, but also of unlicensed access to unoccupied TV channels and other unlicensed bands under Part 15. We strongly agree with Mimoso's suggestion that shared access to the band on a secondary basis should not involve exclusive licensing, but should include the sort of coordination that is encouraged by the contention-based protocols required under Part 90, Subpart Z. Nonetheless, OTI and PK suggest that the Commission also consider and request comment on whether Part 15 of the Commission's rules, or even the proposed new rules to govern dynamic spectrum sharing in the 3550-to-3650 MHz band, would enable the most open, diverse, and spectrally intense use of the band.

As the Commission is well aware, backhaul remains a critical problem for competitive carriers and providers in rural communities. And as the "Internet of things" proliferates – particularly in rural areas through such innovations as precision farming, sensing and widely dispersed SCADA systems – the need for ambient connectivity and backhaul to the cloud will continue to increase. For this reason, any proposal that can provide, on a shared basis, a pathway to additional wireless backhaul deserves serious consideration. And as we noted in the previous

section, affordable and high-capacity middle-mile backhaul remains a major problem for WISPs and other rural broadband providers.<sup>8</sup>

At the same time, OTI and PK urge the Commission to consider whether small cell and unlicensed use of the band under Part 15 of the Commission’s rules would be a compatible and additional use case for this band. While there is clearly a growing need for open and flexible access to spectrum appropriate for high-capacity backhaul, there is also a growing need for more capacity for Wi-Fi offload and other small cell spectrum re-use. As the Commission stated approvingly in its original NPRM proposing a Citizens Broadband Service that enables more diverse and intensive use of the 3.5 GHz band, small cell sharing of underutilized bands holds great promise for improving the nation’s wireless broadband connectivity:

The PCAST Report identifies two technological advances as holding great promise for increasing our nation’s wireless broadband capabilities. First, increased use of small cell network deployments can multiply wireless capacity within existing spectrum resources. Second, increased spectrum sharing can make large swaths of otherwise “stovepiped” spectrum—nationwide bands set aside for important, but localized, government and non-government uses—newly available for broadband use.<sup>9</sup>

The only proven model to achieve high rates of spectrum re-use on a widespread basis and at low cost is open and opportunistic access to *unlicensed* and *small cell* bands. Increasingly, the widespread availability of Wi-Fi operating on unlicensed spectrum is the single most

---

<sup>8</sup> See Comments of the Wireless Internet Service Providers Association, *Inquiry Concerning the Deployment of Advanced Telecommunications Capability to All Americans in a Reasonable and Timely Fashion Pursuant to Section 706 of the Telecommunications Act of 1996, as Amended*, GN Docket No. 09-137 (Sept. 4, 2009). In a section focused on the rural middle-mile backhaul problem, WISPA stated:

Any discussion of end-user broadband availability that does not adequately address the cost and availability of middle mile facilities is like discussing the speed of a race car without fuel. . . . Often, the only practical alternative for a WISP is to build a multi-hop microwave backbone from the nearest urban source of affordable high-capacity Internet access, a solution that requires significant capital and operating expense. . . . As a result, many rural populations go completely unserved because these large middle mile costs are completely unsupportable by the customer revenue that would be generated.  
*Id.* at 6-7.

<sup>9</sup> 3550-3650 MHz NPRM, *supra* note 5, at ¶3, citing PCAST Report at vi.

important factor in mitigating the “spectrum crunch.”<sup>10</sup> Analysts estimate that despite the ongoing rollout of LTE services, offloading to Wi-Fi will continue to grow, rising from roughly 50 percent today to as much as 60-to-80 percent of the total traffic that would otherwise be on 3G and 4G networks within three to five years.<sup>11</sup> In Western Europe wireline ISPs have created clouds of connectivity by turning more than 10 million residential and business subscribers into Wi-Fi hotspots. A European Commission study released in August projected that Wi-Fi will be offloading nearly 80 percent of mobile device traffic by the end of 2016.<sup>12</sup> Even today, the study concluded, “we believe that a majority of traffic that would otherwise be present on the macro cellular network is already being off-loaded, primarily to Wi-Fi in the home.”<sup>13</sup>

It is the tens of millions of individual consumers, businesses and an array of *non-carrier providers* (e.g., cable company ISPs, retailers, building owners) that are in a superior position to leverage the infrastructure (routers, wireline connections) that is already deployed, typically on their own property, at the very edge of the network. Small cell infrastructure and a common standard (Wi-Fi) are already broadly deployed – and so additional opportunistic spectrum capacity simply needs to be incorporated as a supplement to this proven business model.

In sum, OTI and PK believe the Commission should invite comment on whether the band can also be utilized at lower power on a small cell basis, by personal/portable devices, machine-

---

<sup>10</sup> See Michael Calabrese, “Solving the ‘Spectrum Crunch’: Unlicensed Spectrum on a High-Fiber Diet,” Time Warner Cable Research Program on Digital Communications (Fall 2013), at 6-7.

<sup>11</sup> Wireless Broadband Alliance, “Next Generation Hotspot Whitepaper: Maintaining the Profitability of Mobile Data Services,” October 2012 at 5.

<sup>12</sup> J. Scott Marcus and John Burns, *Study on the Impact of Traffic Off-Loading and Related Technological Trends on the Demand for Wireless Broadband Spectrum*, European Commission (August, 2013), at 3. The study used data from surveys that monitored the actual activity of thousands of mobile devices to project offload rates for the U.K., France, Spain, Germany and Italy.

<sup>13</sup> *Id.* at 9. Among the data sets used was a 2013 survey by Informa and Mobidia finding “that at least two-thirds of mobile data for Android phones is already being off-loaded to ‘self-provisioned’ Wi-Fi, which equates roughly to private Wi-Fi. . . . [T]he same Informa analysis found *only 2% of otherwise mobile traffic from Android smart phones to be transmitted over managed (i.e. public) Wi-Fi hotspots*, although this fraction varied greatly from one country to the next.” *Id.* (emphasis in original). See Informa, “Understanding the Role of Managed Public Wi-Fi in Today’s Smartphone User Experience: A global analysis of smartphone usage trends across cellular and private and public Wi-Fi networks” (Feb. 2013).

to-machine systems, and other applications. In that context, we suggest the Commission also invite comment on whether expanded access to the band should be authorized pursuant to Part 90, Part 15, or some other regulatory framework that will ensure open and streamlined access to a wide variety of local users and uses.

#### **IV. THE NPRM SHOULD CONSIDER MECHANISMS TO PROTECT INCUMBENTS FROM HARMFUL INTERFERENCE THAT ARE LEAST BURDENSOME ON CONSUMERS AND OTHER USERS**

Mimosa suggests several measures to promote the coexistence of wireless broadband and incumbent amateur radio service operations in the 10.0-10.5 GHz band, as well as to avoid harmful interference to incumbent U.S. government and civilian radar operations in the band. Among these measures, Mimosa suggests a 20 MHz channelization plan that would notch out the “amateur calling band” at 10.35 to 10.37 GHz. With respect to radar operations, Mimosa suggests that the Commission require that wireless broadband operations in the band employ Dynamic Frequency Selection (DFS) protocols, as the Commission does currently to enable unlicensed sharing of portions of the 5 GHz band that are occupied by radar systems.<sup>14</sup>

Although OTI and PK have no view at this time about the efficacy of Mimosa’s proposed interference-avoidance mechanisms – or even whether they are necessary – we commend Mimosa for advancing protections that have proven effective in other bands and that could potentially meet the legitimate concerns of band incumbents. We urge the Commission to request comment on these and other potential restrictions on additional open and shared access to the band that will protect incumbents from harmful interference.

As part of that inquiry, we suggest that the Commission also request comment and data on the cost-benefit trade-offs of different approaches, since it would not well serve the public

---

<sup>14</sup> *Mimosa Petition* at 19-20.

interest if mandatory interference-avoidance mechanisms unduly burden entry and innovation. Moreover, we urge the Commission to not assume that relatively high-power and long-distance backhaul applications are the only additional constructive use for this underutilized band. The Commission should ask questions that will allow it to consider whether the interference mitigation measures it imposes should vary depending on different use cases, including potentially small cell and indoor applications that would not present the same risk of interference to either the amateur service or to radar operations as would long-distance microwave links.

### **CONCLUSION**

OTI and PK commend Mimosa for taking the initiative to petition the Commission to consider opening an additional underutilized band for open and shared access in a manner that will promote greater availability of high-capacity wireless broadband connectivity. OTI and PK urge the Commission to adopt and release a Notice of Proposed Rulemaking to invite comment on Mimosa's proposal and on other potential uses of the band, as discussed further above.

Respectfully Submitted,

**Open Technology Institute at the New America Foundation  
Public Knowledge**

Harold Feld  
Executive Vice President  
Public Knowledge  
1818 N Street, NW  
Suite 410  
Washington, DC 20036

/s/ Michael Calabrese  
Michael Calabrese  
Wireless Future Project/Open Technology Institute  
New America Foundation  
1899 L Street, NW  
4<sup>th</sup> Floor  
Washington, DC 20036

April 10, 2014