

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

In the Matter of )  
 )  
Amendment of the Commission’s Rules with ) GN Docket No. 12-354  
Regard to Commercial Operations in the 3550- )  
3650 MHz Band )

**COMMENTS OF MICROSOFT CORPORATION**

Microsoft Corp. (“Microsoft”) appreciates the opportunity to comment further on the regulatory and licensing structure for small-cell Internet access on the 3.5 GHz band.<sup>1</sup> In particular, Microsoft writes to underscore the Public Notice’s recognition of the need to include dynamic, unlicensed connectivity in the Commission’s 3.5 GHz plan. Just as Wi-Fi transformed Internet access over the past decade, opportunistic and dynamic small-cell devices in the 3.5 GHz band can deliver speed, quality, and agility that consumers and businesses have never before seen. Accordingly, the Commission’s final rules in this proceeding should accommodate dynamic, opportunistic technology, known as General Authorized Access (“GAA”), for the Citizens Broadband Service. The Commission should reserve at least 50 MHz on the 3.5 GHz band for GAA, and allow GAA devices to operate on an unlicensed basis, providing GAA with the flexibility that is necessary to develop and refine new wireless technology. Additionally, Microsoft continues to encourage the Commission to fairly structure the licensing system for the Priority Access tier.

**I. THE REVISED FRAMEWORK SHOULD RESERVE AT LEAST 50 MHZ FOR GAA DEVICES**

Abundant research demonstrates that consumer-empowered, dynamic technology is essential to the deployment of new broadband technology. Thus, the 3.5 GHz plan should

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<sup>1</sup> Amendment of the Commission’s Rules with Regard to Commercial Operations in the 3550-3650 MHz Band, Docket No. 12-354, Public Notice (Nov. 1, 2013) (“Public Notice”).

allocate a sufficiently large amount of continuous spectrum to unlicensed, opportunistic GAA devices.

Opportunistic communications have revolutionized Internet connectivity over the past decade. Wi-Fi carries 69 percent of the world's smartphone and tablet data traffic, and 57 percent of the traditional PC and laptop traffic.<sup>2</sup> Mobile operators are increasingly using Wi-Fi to offload some of their voice and data traffic, saving between \$30 billion and \$93 billion annually.<sup>3</sup> Quite simply, Wi-Fi offers tremendous cost, quality, and efficiency benefits in spectrum management.

The possibilities of unlicensed, dynamic connectivity reach far beyond Wi-Fi. Opportunistic devices are becoming increasingly more important to consumers and businesses. In recent years, companies have connected everyday objects, such as home appliances, fire detection systems, and cars, to the Internet. Also known as the "Internet of Things," this phenomenon is expected to revolutionize the way that we use everyday items. These connected devices are expected to increase to 100 billion by 2020.<sup>4</sup> Richard Thanki, a former economist for the UK telecommunications regulator, Ofcom, estimates that connecting devices to license-exempt, dynamic Internet technology would add between \$560 billion to \$870 billion annually in economic value.<sup>5</sup> As Thanki observes, license-exempt technologies "are cost-effective, power-

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<sup>2</sup> Richard Thanki, THE ECONOMIC SIGNIFICANCE OF LICENSE-EXEMPT SPECTRUM TO THE FUTURE OF THE INTERNET (2012), available at [http://research.microsoft.com/en-us/projects/spectrum/economic-significance-of-license-exempt-spectrum-report\\_thanki.pdf](http://research.microsoft.com/en-us/projects/spectrum/economic-significance-of-license-exempt-spectrum-report_thanki.pdf), at 1.1.

<sup>3</sup> *Id.*

<sup>4</sup> *Id.* At 1.2.1.

<sup>5</sup> *Id.*

efficient and provide users a range of technologies and fine control over the networks and infrastructure[.]”<sup>6</sup>

Recognizing the potential of dynamic Internet access, in a report last year the President’s Council of Advisors on Science and Technology noted the “remarkable economic growth” that was caused by opportunistic technology.<sup>7</sup> Similarly, a comprehensive study commissioned by the European Union strongly recommended a shift to dynamic, opportunistic access, concluding that “[s]tatic rules dedicating radio resources to a single licensee, who may only need them from time to time, guarantee that the resources lie fallow the rest of the time.”<sup>8</sup> Focusing on the 3.5 GHz band, Michael Calabrese of the New America Foundation aptly concluded that mobile carriers cannot keep pace with the growing demand for wireless data access, and “[i]t is critical that a substantial portion of the [3.5 GHz] band should always be available for unlicensed use (‘General Authorized Access’) in every market nationwide.”<sup>9</sup>

Opportunistic communications such as the Citizens Broadband Service will only flourish in the 3.5 GHz band if the Commission dedicates sufficient spectrum to GAA. Manufacturers and service providers are prepared to meet the demand for dynamic technology and deploy products and services for the 3.5 GHz band. But they are unlikely to significantly invest in new technology unless they are certain that sufficient bandwidth will be available.

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<sup>6</sup> *Id.*

<sup>7</sup> President’s Council of Advisors on Science and Technology, Report to the President, Realizing the Full Potential of Government-Held Spectrum to Spur Economic Growth, July 2012 at p. 2.

<sup>8</sup> Simon Forge, et. al., PERSPECTIVES ON THE VALUE OF SHARED SPECTRUM ACCESS: FINAL REPORT FOR THE EUROPEAN COMMISSION at 9 (February 2012), available at [http://ec.europa.eu/digital-agenda/sites/digital-agenda/files/scf\\_study\\_shared\\_spectrum\\_access\\_20120210.pdf](http://ec.europa.eu/digital-agenda/sites/digital-agenda/files/scf_study_shared_spectrum_access_20120210.pdf).

<sup>9</sup> Michael Calabrese, SOLVING THE SPECTRUM CRUNCH: UNLICENSED SPECTRUM ON A HIGH-FIBER DIET (2013) at pp. 15-16.

Unlike licensed communications carriers, the providers of dynamic technology generally do not have control over the amount of bandwidth that their consumers receive after the product is deployed. Manufacturers must have assurance that licensed carriers will not occupy the entire band, and that consumers will be able to use their products without significant interference or interruption.

Accordingly, the Commission should reserve a minimum amount of spectrum on the 3.5 GHz band for GAA use. In the Public Notice, the Commission asked whether reserving 40 percent to 50 percent of *non-incumbent* 3.5 GHz spectrum for GAA users would be sufficient.<sup>10</sup> The short answer is “no.” In areas with large amounts of federal use (such as San Diego and Seattle), much of the 3.5 GHz band is already occupied by incumbents. Forty-to-fifty percent of the small remaining amount of spectrum would not be sufficient for GAA, particularly if carriers reserve most of the Priority Access tier. Instead, the Commission should set aside at least 50 MHz on the 3.5 GHz band for GAA. Based on Microsoft’s experience with developing and deploying opportunistic and dynamic technology, 50 MHz of contiguous spectrum is the minimum amount that is necessary to bring a new technology to commercial viability.

The Commission also noted that, in addition to the reserved GAA spectrum, opportunistic devices could function on unused portions of the Priority Access tier.<sup>11</sup> Unfortunately, unlicensed device users cannot be assured that any such “unused” spectrum would be available, particularly in densely populated areas. Reserved GAA spectrum is necessary to assure dynamic device users and manufacturers that sufficient bandwidth will be available.

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<sup>10</sup> Public Notice ¶28.

<sup>11</sup> *Id.*

## II. GAA DEVICES SHOULD BE UNLICENSED UNDER PARTS 2 AND 15

As the success of Wi-Fi demonstrates, opportunistic devices function best when they are unencumbered by licensing requirements. GAA small-cell devices also should be unlicensed under the equipment authorization rules of Parts 2 and 15. This system provides a nascent technology with the flexibility and agility that it needs to meet consumer demands.

Requiring license-by-rule on the 3.5 GHz band would be a significant departure from the practice of allowing companies to develop unlicensed opportunistic technology. License-by-rule has only been used for a narrow set of technologies, such as Wireless Medical Telemetry Service and the Medical Device Radiocommunications Service. The benefits cited in the NPRM for a license-by-rule regime —namely, the granting of “a great deal of flexibility” to the Commission in establishing service and allocation rules, and “promot[ing] administrative efficiency”— are speculative at best.<sup>12</sup> In contrast, the established, unlicensed framework of Parts 2 and 15 has a clear track record of enabling companies and consumers to work together, with few constraints, to develop new technology that most effectively harnesses the full potential of spectrum.

Moreover, the Part 15 unlicensed framework gives companies more certainty in their investments in opportunistic technology. In contrast, under a new license-by-rule regime, companies may be reluctant to invest significantly out of concern that the Commission will cancel or set new terms for licensees that are broader than those to which they are accustomed in the Part 15 context.

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<sup>12</sup> Amendment of the Commission’s Rules with Regard to Commercial Operations in the 3550-3650 MHz Band, Docket No. 12-354, Notice of Proposed Rulemaking (Dec. 12, 2012) (“NPRM”) ¶ 62.

### **III. THE COMMISSION SHOULD ADOPT APPROPRIATE LIMITS IN THE PRIORITY ACCESS TIER**

Although Microsoft continues to believe there is merit in the Commission's original conclusion in the NPRM that the Priority Access tier should be limited to mission critical users, we agree that that it is appropriate for the Commission to explore other reasonable means of ensuring that the Priority Access tier is efficiently utilized and does not unnecessarily limit the availability of GAA. For example, the Commission should ensure that the licenses do not provide any single company or set of companies with excessive control over the spectrum. If a few companies permanently control the entire band, innovation and consumer benefits will be unlikely to follow. Thus, the Priority Access license system should be structured around robust competition.

Priority Access licenses also should be limited in duration. Microsoft agrees with the Commission's suggestion in the Public Notice that the Priority Access license terms should be limited to one-year, non-renewable terms.<sup>13</sup> But the Commission should avoid allowing a commercial party to obtain multi-year rights by aggregating consecutive Priority Access license terms within the same geographic area. If the Commission were to adopt such a system, it should require a separate bidding system each year, to allow new competitors to attempt to obtain the Priority Access licenses. No commercial party should have a priority in obtaining these licenses.

Moreover, the Commission should issue licenses based on Census block groups rather than Census tracts.<sup>14</sup> Although Census tracts are intended to cover 4,000 residents, tracts

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<sup>13</sup> Public Notice ¶ 13.

<sup>14</sup> See Census Bureau, Geographic Terms and Concepts - Census Tract, *available at* [http://www.census.gov/geo/reference/gtc/gtc\\_ct.html](http://www.census.gov/geo/reference/gtc/gtc_ct.html).

are often far more populous in urban areas. Census tracts can cover large swaths of land in rural areas. In contrast, Census block groups generally contain between 600 and 3,000 people and are also more limited in land size. Issuing Priority Access licenses by Census block group would help limit the amount of control that a single party could exert over the market.



Microsoft looks forward to working with the Commission to ensure that the 3.5 GHz band provides consumers with high-quality, efficient, and affordable Internet access. Every day, the technology community discovers new uses for dynamic, opportunistic technology. The Commission's 3.5 GHz plan should foster this innovation and promote competition. Accordingly, Microsoft urges the Commission to lay the groundwork for a robust Citizens Broadband Service and allow companies and consumers to harness the potential of this new technology.

Respectfully submitted,

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