

**Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, DC 20554**

In the Matter of)	
)	
Amendment of Part 90 of the Commission's)	WP Docket No. 07-100
Rules)	

COMMENTS OF WI-FI ALLIANCE

Wi-Fi Alliance®^{1/} submits these comments in response to the Sixth Further Notice of Proposed Rulemaking in the above-referenced proceeding in which the Commission considers how to stimulate expanded use of and investment in the 4.9 GHz band (4940-4990 MHz).^{2/} Wi-Fi Alliance appreciates the Commission's twin efforts to make more intensive use of already-allocated mid-band spectrum and to potentially designate additional spectrum for unlicensed operations. The 4.9 GHz band offers much-needed mid-band spectrum, but the next generations of Wi-Fi technology are designed to use wideband channels that cannot be implemented in the limited bandwidth proposed in the *FNPRM*. In particular, because unlicensed equipment is not expected to be able to access the 4990-5150 MHz band, Wi-Fi devices cannot use the contiguous block of spectrum between 4940 MHz and 5250 MHz that could support the wide channelization utilized by modern equipment. If unlicensed access to that entire band was available, then the

^{1/} Wi-Fi®, the Wi-Fi logo, the Wi-Fi CERTIFIED logo, Wi-Fi Protected Access® (WPA), WiGig®, the Wi-Fi Protected Setup logo, Wi-Fi Direct®, Wi-Fi Alliance®, WMM®, Miracast®, Wi-Fi CERTIFIED Passpoint®, and Passpoint® are registered trademarks of Wi-Fi Alliance. Wi-Fi CERTIFIED™, Wi-Fi Protected Setup™, Wi-Fi Multimedia™, WPA2™, WPA3™, Wi-Fi CERTIFIED Miracast™, Wi-Fi ZONE™, the Wi-Fi ZONE logo, Wi-Fi Aware™, Wi-Fi CERTIFIED HaLow™, Wi-Fi HaLow™, Wi-Fi CERTIFIED WiGig™, Wi-Fi CERTIFIED Vantage™, Wi-Fi Vantage™, Wi-Fi CERTIFIED TimeSync™, Wi-Fi TimeSync™, Wi-Fi CERTIFIED Location™, Wi-Fi Location™, Wi-Fi CERTIFIED Home Design™, Wi-Fi Home Design™, Wi-Fi CERTIFIED Agile Multiband™, Wi-Fi Agile Multiband™, Wi-Fi CERTIFIED Optimized Connectivity™, Wi-Fi Optimized Connectivity™, and the Wi-Fi Alliance logo are trademarks of Wi-Fi Alliance.

^{2/} *In the Matter of Amendment of Part 90 of the Commission's Rules*, Sixth Further Notice of Proposed Rulemaking, FCC 18-33, WP Docket No. 07-100 (2018) ("*FNPRM*").

4.9 GHz band segment would be a feasible candidate for Wi-Fi. But because it is unrealistic to expect unlicensed access to the 4990-5150 MHz band, the Commission should maintain its focus on making the 6 GHz band (5.925-7.125 GHz) available for Wi-Fi and other unlicensed uses.

Wi-Fi Alliance is a global, non-profit industry association of over 800 leading companies from dozens of countries devoted to connecting everyone and everything everywhere. With technology development, market building, and regulatory programs, Wi-Fi Alliance has enabled widespread adoption of Wi-Fi® worldwide, certifying thousands of Wi-Fi products each year. Certified, interoperable Wi-Fi systems are critical to the nation's wireless ecosystem, and are key components of the country's economic growth and catalysts for technological innovation. The mission of Wi-Fi Alliance is to provide a highly effective collaboration forum for Wi-Fi matters, grow the Wi-Fi industry, lead industry growth with new technology specifications and programs, support industry-agreed standards, and deliver greater product connectivity through interoperability, testing, and certification.

The Commission's members^{3/} and Congress^{4/} have appropriately continued to recognize that there is a desperate need for additional spectrum that can be used on an unlicensed basis for

^{3/} See, e.g., Michael O'Rielly, *This is World Wi-Fi Day, let's celebrate the progress we've made*, THE HILL (June 19, 2017) <http://thehill.com/blogs/pundits-blog/technology/338358-this-world-wi-fi-day-lets-celebrate-the-progress-weve-made> ("To say that Wi-Fi is a critical component of Internet access in today's always-connected society doesn't do it justice. . . . But more needs to be done to promote future opportunities. This includes making more spectrum bands available for unlicensed use to allow super-wide Wi-Fi channels."); Statement of Commissioner Rosenworcel before the House Subcommittee on Communications and Technology, Mar. 22, 2016 ("Before we overwhelm Wi-Fi as we know it, we need more efforts to secure more unlicensed spectrum."); *Statement of Commissioner Ajit Pai, In Re Amendment of Part 15 of the Commission's Rules for Unlicensed Operations in the Television Bands* FCC 15-99 (Aug. 11, 2015) ("I am a big proponent of making more spectrum available for unlicensed use").

^{4/} See, e.g., *Consolidated Appropriations Act 2018*, Pub. L. No. 115-141, div. P, tit. VI, § 603 (requiring the Commission to identify a minimum of 100 megahertz of spectrum below 8 GHz for unlicensed operation by 2022); § 611 (requiring the Commission to evaluate unlicensed operations in guard bands); § 617 (making the promotion of unlicensed spectrum the official policy of the United States).

radio local area networks (“RLANs”) using Wi-Fi protocols – which play a critical role in getting Americans and their devices online^{5/} and otherwise serve as a key component of the telecommunications ecosystem.^{6/} In fact, as Wi-Fi Alliance has noted, between 500 megahertz and 1.8 gigahertz of new mid-band spectrum will be needed for Wi-Fi in the next few years in order to avoid a major spectrum crunch that will potentially slow down connections and degrade performance.^{7/} That is why Wi-Fi Alliance supports the Commission’s ongoing efforts to make additional spectrum available for unlicensed uses. In particular, Wi-Fi Alliance applauds the Commission’s commitment to Wi-Fi by asking whether the 4.9 GHz band should be available for unlicensed operations, specifically Unlicensed National Information Infrastructure (“U-NII”) operations pursuant to the same rules as the 5150-5250 MHz band.^{8/}

In general, the 4.9 GHz band offers attributes that make it a good candidate for unlicensed use. For example, it is near the existing 5 GHz U-NII band which means equipment can be extended easily from existing 5 GHz into 4.9 GHz. The band’s propagation

and charging the Commission with making unlicensed spectrum a priority); and § 618 (requiring the Commission to work with NTIA to draft a “National Plan for Unlicensed Spectrum” by September 23, 2020 which will lead to increased unlicensed spectrum access); and *Middle Class Tax Relief Act of 2012*, Pub. Law 112-96 §§ 6406 and 6407 (requiring unlicensed operations in the 5 GHz Band and guard bands).

^{5/} CISCO, *The Zettabyte Era: Trends and Analysis* (June 7, 2017), https://www.cisco.com/c/en/us/solutions/collateral/service-provider/visual-networking-index-vni/vni-hyperconnectivity-wp.html#_Toc484556825 (noting that, by 2021, Wi-Fi will carry 53% of the world’s Internet traffic).

^{6/} Telecom Advisory Services, LLC, *2017 Assessment of the Current and Future Economic Value of Unlicensed Spectrum in the United States*, Apr. 2018, <http://glenechogroup.isebox.net/wifi/forward/economic-value-of-unlicensed-spectrum-to-reach-more-than-834-billion-by-2020> (finding that unlicensed networks like Wi-Fi generate over \$500 billion in value each year, a number expected to grow to over \$800 billion by 2020).

^{7/} Wi-Fi Alliance, *Spectrum Needs Study*, Final Report (Feb. 2017) https://www.wi-fi.org/downloads-registered-guest/Wi-Fi%2BSpectrum%2BNeeds%2BStudy_0.pdf/33364.

^{8/} *FNPRM* at ¶ 85.

characteristics are similar to 5 GHz, so that 4.9 GHz equipment could be seamlessly deployed as part of existing or new 5 GHz deployments without extensive engineering cost. However, as noted above, next generation Wi-Fi networks are designed to support broadband connectivity by implementing 80 or 160 megahertz channels.^{9/} Thus, the 50 megahertz of spectrum in the 4.9 GHz band on its own may not effectively address Wi-Fi spectrum needs.^{10/}

This 50 megahertz of spectrum, however, may alleviate some congestion in frequency bands used generally for unlicensed devices (*e.g.*, the 2.4 GHz and 5 GHz U-NII bands), by accommodating other, narrowband, unlicensed technologies. Wi-Fi Alliance, therefore, supports the broad goal of the *FNPRM*'s proposal to maximize spectrum utilization by allowing access to the 4.9 GHz band for unlicensed devices on a noninterference basis.

In case of Wi-Fi technology, the relief necessary to meet current and near-term capacity requirements must come primarily from other mid-band spectrum – in particular, the 5.925-7.125 GHz (the 6 GHz) band identified by the Commission in the Notice of Inquiry it released last year.^{11/} The 6 GHz band is adjacent to current unlicensed U-NII bands, meaning existing technologies designed for the 5 GHz band can be rapidly adapted and deployed in the 6 GHz band. 6 GHz propagation characteristics are similar to the 5 GHz band, making it ideal for Wi-Fi deployments. Importantly, it is the spectrum for which technology under development that will use the 802.11ax standard – which, as noted above, is optimized to support broadband

^{9/} See National Instruments, *Introduction to 802.11ax High-Efficiency Wireless*, White Paper, July 24, 2017, <http://www.ni.com/white-paper/53150/en/>.

^{10/} *FNPRM* at ¶ 10 and ¶ 15. For example, a contiguous block of spectrum from 4940-5150 MHz would provide an additional five 40-MHz wide channels. The 4940-4990 MHz provides just one 40-MHz wide channel that cannot support the 80- or 160-MHz wide channels that are used in the 5 GHz band.

^{11/} *In the Matter of Expanding Flexible Use in Mid-Band Spectrum Between 3.7 and 24 GHz*, Notice of Inquiry, GN Docket No. 17-183 (rel. Aug. 3, 2017).

connectivity with the 80 megahertz and 160 megahertz channels. And in the 6 GHz band there is sufficient contiguous spectrum available to allow those networks to operate to their full capabilities.

Wi-Fi Alliance applauds the Commission's ongoing efforts to identify additional mid-band spectrum for unlicensed access. The *FNPRM*'s proposal may alleviate some unlicensed spectrum congestion, but the Commission should stay focused on spectrum that can be put to productive use immediately, and in support of next generation Wi-Fi technologies, to remedy the ongoing spectrum crunch. Wi-Fi Alliance therefore urges the Commission to proceed with the consideration of unlicensed use in the 6 GHz band.

Respectfully submitted,

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