

Spectrum in a Shared Economy: The 5.9 GHz Band

PREPARED BY

Coleman Bazelon
Lucrezio Figurelli
Paroma Sanyal

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Twenty years ago, in October 1999, the FCC allocated 75 megahertz of spectrum in the 5.9 gigahertz (GHz) band to “Intelligent Transportation Systems” (ITS) uses.¹

Figure 1 shows the subsequent evolution of this band. The intent of this allocation was to accelerate the introduction of Dedicated Short Range Communications (DSRC) car-to-car communication technologies and other transportation related functions. However, after two decades and many iterations later, such technologies have not fulfilled their promise. In addition, if the current pace of evolution is maintained, it will be decades before the safety benefits of these technologies will be realized.² As Figure 2 illustrates, after 20 years there has still been no significant ITS usage of the band.

“[T]he Nats are an excellent metaphor for the 5.9 GHz band. Think about it. After years of disappointment, the Nationals’ front office chose a new path.....and the Nats won it all. This is essentially the winning formula the FCC seeks to replicate with the 5.9 GHz band: move on from something we’ve tried for a long time that wasn’t working, and open the door to exciting, new alternatives.”³

– CHAIRMAN AJIT PAI

FIGURE 1

Evolution of the 5.9 GHz Band

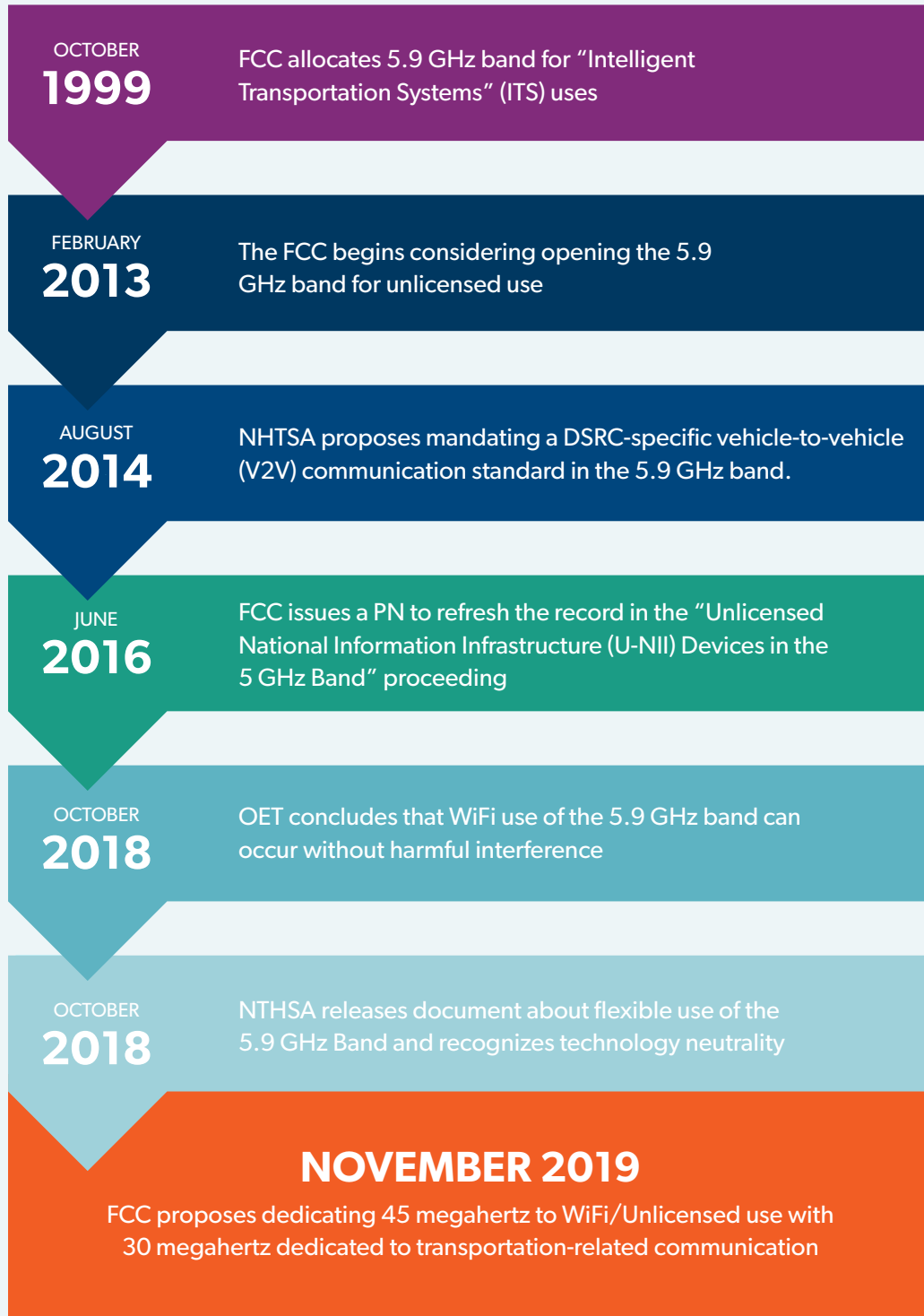
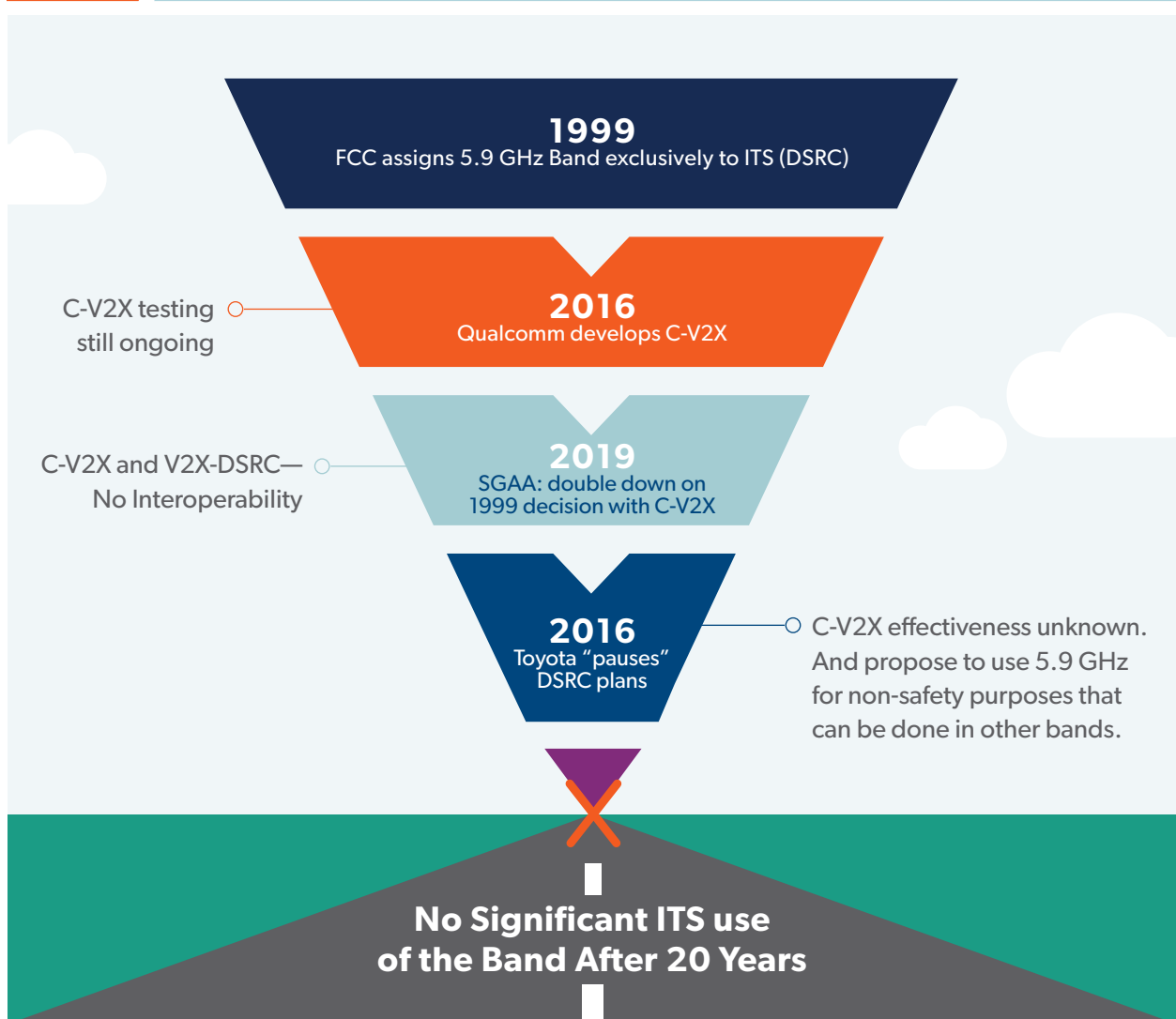


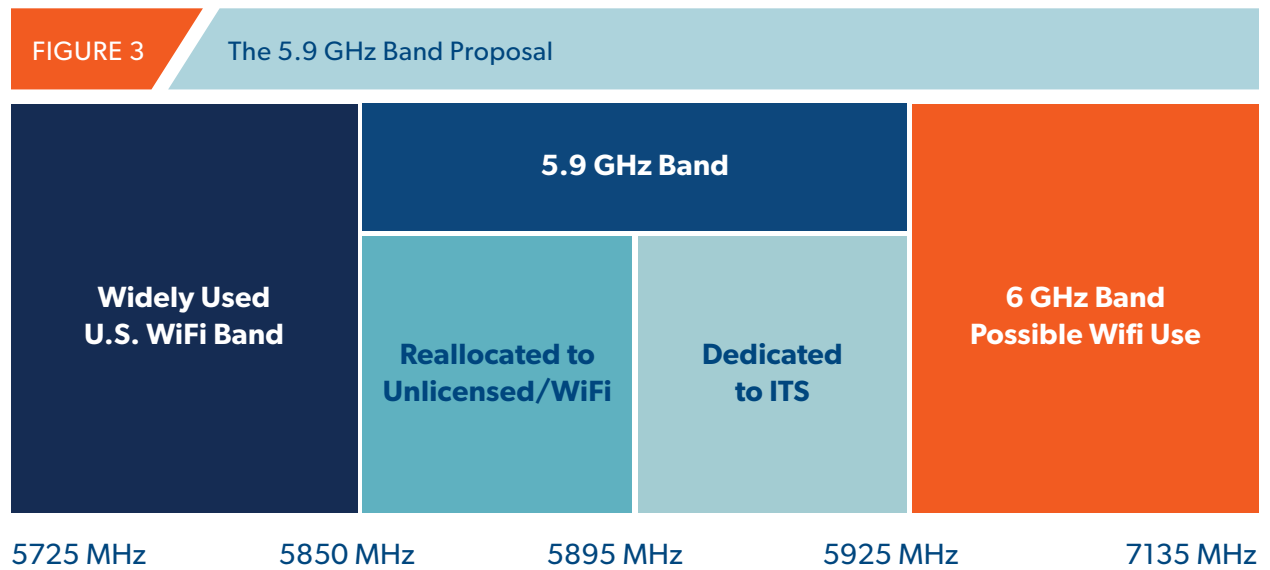
FIGURE 2

History of Vehicle Safety Technology in the 5.9 GHz Band



At the same time, the need for spectrum has exploded; the demand for data has increased 50-fold between 2011 and 2018.⁴ The evolution of 5G networks and the Internet of Things (IoT) is expected to provide seamless communication links between physical objects, such as roadways and bridges with cars, using wired and wireless networks.⁵ Ericsson estimates that worldwide, there could be over 30 billion connected devices by 2023, with nearly 20 billion of those being IoT devices.⁶

This surging demand for data, the expanding use of WiFi and the growing need for unlicensed spectrum all underscore the need for repurposing under-utilized spectrum bands such as the 5.9 GHz band, and allocating them to their highest-valued uses. The FCC’s recent proposal to dedicate the lower 45 megahertz of the 5.9 GHz band exclusively for unlicensed operations, and the upper 30 megahertz exclusively for transportation-related communications (illustrated in Figure 3), appears to be a step in the right direction.⁷ We undertook a preliminary cost benefit analysis to assess the decision more closely. Currently, the adjacent 5.7 – 5.9 GHz bands are widely used for WiFi, and this reallocation will allow for significantly larger WiFi channelization, which will in turn enable new high-throughput applications.



We have weighed several policy options for this band, including:

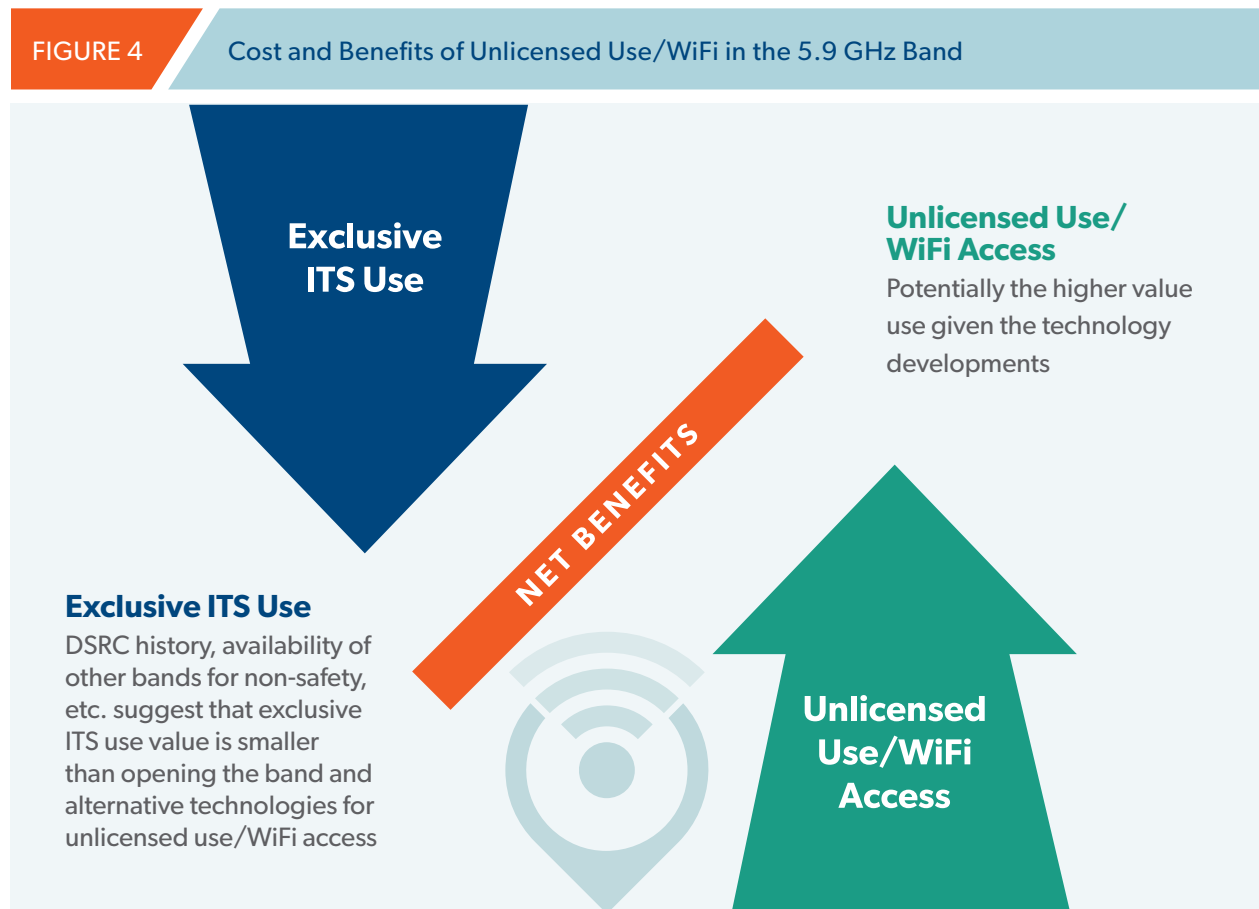
- opening the full 75 megahertz of the 5.8 GHz Band for WiFi;
- splitting the 5.9 GHz Band between ITS and WiFi; and
- reserving the full 75 megahertz of spectrum for exclusive ITS use.

Our analysis also estimated:

- the opportunity cost of the spectrum if all 75 megahertz of the 5.9 GHz Band is dedicated exclusively for ITS;
- the lost value if none of the band is available for unlicensed use; and
- the lost value if only a part of the band is available for unlicensed use.



Given that the vehicle safety benefits will be preserved in the dedicated 30 megahertz ITS portion, the opportunity cost of splitting the band with WiFi is very low. Weighed against the substantial benefits to consumers of the greater WiFi channelization enabled by adding 45 megahertz to the adjacent bands, the FCC’s policy choice is a clear winner (as illustrated in Figure 4).



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ENDNOTES

1. FCC, "FCC Allocates Spectrum in 5.9 GHz Range for Intelligent Transportation Systems Uses," October 21, 1999 https://transition.fcc.gov/Bureaus/Engineering_Technology/News_Releases/1999/nret9006.html.
2. NCTA FCC ExParte, "Revision of Part 15 of the Commission's Rules to Permit Unlicensed National Information Infrastructure (U-NII) Devices in the 5 GHz Band," October 16, 2018 <https://mentor.ieee.org/802.18/dcn/18/18-18-0129-00-0000-fresh-look-ex-parte-10-15-18-et-13-49-dsrc.pdf>.
3. FCC, "Chairman Pai's Remarks on New 5.9 GHz Band Proposal" <https://www.fcc.gov/document/chairman-pais-remarks-new-59-ghz-band-proposal>.
4. "Ericsson Mobility Visualizer: Mobile Data Traffic," Ericsson, February 2019, accessed March 19, 2019 <https://www.ericsson.com/en/mobility-report/mobility-visualizer>.
5. Michael Chui, Markus Löffler, and Roger Roberts, "The Internet of Things," McKinsey Quarterly, March 2010, accessed January 16, 2019 <http://www.mckinsey.com/industries/high-tech/our-insights/the-internet-of-things>.
6. "Ericsson Mobility Report," Ericsson, June 2018, accessed January 18, 2019, p. 16 <https://www.ericsson.com/assets/local/mobility-report/documents/2018/ericsson-mobility-report-june-2018.pdf>.
7. FCC, "Chairman Pai's Remarks on New 5.9 GHz Band Proposal," <https://www.fcc.gov/document/chairman-pais-remarks-new-59-ghz-band-proposal>.

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