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The Race to 5G Faces Headwinds Entering 2020

The U.S. government and industry face pressure to compete with China, the EU, and others in the race to implement the next great advance in wireless network technology known as 5G. To this end, the Federal Communications Commission (FCC) has completed its first two [auctions of high-band spectrum](#), is currently auctioning off even [more high-band spectrum](#) for broadband, and has [proposed rules](#) to make mid-band spectrum at the 5.9 GHz band available. These 5G efforts have been met with pushback from several other federal agencies, as well as members of the U.S. Congress who have expressed concerns about the consequences of these actions on weather and traffic safety. The intergovernmental tensions appear to be delaying two spectrum proceedings, which could ultimately harm the 5G aspirations of companies in the wireless, Internet of Things, and autonomous vehicle businesses.

The Battle Between 5G and Weather Forecasting

The FCC completed auctioning off spectrum suitable for 5G wireless services in the 24 GHz band on May 28, 2019, raising a total of over 2 billion dollars. The 2017 Spectrum Frontiers Order found that the 24 GHz is desirable for mobile use because it is already being used in a similar manner internationally. FCC Chairman Pai [described](#) the auction as a "vital step toward promoting U.S. innovation in 5G wireless, the Internet of Things, and many technological 'firsts' in these previously-underused, high-band frequencies."

A portion of the 24 GHz band, specifically the 23.8 GHz frequency, is used to predict weather forecasts. Water vapor emits a faint signal at this frequency that is picked up by satellites to assess humidity. Meteorologists are concerned that allowing spectrum in this band to be used for 5G will interfere with their abilities to gather accurate weather data because 5G equipment transmitting on an adjacent frequency can produce a signal that will mirror characteristics of water vapor.

The House Committee on Science, Space, and Technology sent Chairman Pai a letter, highlighting concerns from the National Aeronautics and Space Administration (NASA), the National Oceanic and Atmospheric Administration (NOAA), and the Department of Defense (DOD), which all use sensors to measure water vapor at the 23.8 GHz frequency. These agencies are asking the FCC to require a larger "noise buffer" between the 5G transmissions and the water vapor signal. The buffer set by the FCC is significantly lower than the World Meteorological Organization recommendation, or the standards set by the EU and the International Telecommunication Union Radiocommunication Sector, which are believed to better protect weather satellite systems from interference.

The FCC declined NASA's request to meet with the FCC to reconcile their differences, and also declined the House committee's request to delay the auction, with Chairman Pai stating in a letter that the commission has evaluated the record and found the claims of interference to be "unverified last-minute assertions." After being dismissed by the FCC, the House committee on December 10, 2019, sent a letter to the U.S. Government Accountability Office (GAO), asking it to conduct an evaluation of how the federal government, including the FCC, resolves interference issues and ensures that spectrum is available to meet critical needs. The House committee further asked GAO to determine in its evaluation whether the interference issues concerning the 24 GHz band were adequately resolved, and if not, how this process could be improved. A GAO inquiry could

cause delays to the use or deployment of spectrum for 5G services.

The DOT Won't Let Go

The FCC unanimously adopted a Notice of Proposed Rulemaking seeking comment on the use of the 5.9 GHz band. For the past two decades, the 5.9 GHz band has been reserved for use by the Dedicated Short Range Communications (DSRC), which enables vehicle-to-vehicle and vehicle-to-infrastructure communication. This was the result of Congress directing the FCC to consider, in consultation with the U.S. Department of Transportation (DOT), allocating spectrum for Intelligent Transportation System (ITS) operations. Although the FCC originally had high hopes that DSRC would promote traffic safety and decrease congestion, the commission now finds that "DSRC has not lived up to its promise," and left "valuable mid-band spectrum largely fallow."

As a result of this change, the commission is proposing to split up the band, so that the lower 45 megahertz of the band can be repurposed for unlicensed operations, e.g., Wi-Fi. Studies project that by 2025 the United States will need more mid-band spectrum, into which the 5.9 GHz band falls, to accommodate the growing demand for Wi-Fi. The actions proposed by the FCC will help meet that need, but by allocating this spectrum to be utilized by 5G, the band will no longer be reserved solely for transportation safety purposes.

The upper 30 megahertz of the 5.9 band will continue to support ITS needs for transportation and vehicle-safety-related communications. However, the commission is proposing to dedicate the majority, if not all, of the 30 megahertz for Cellular Vehicle to Everything (C-V2X) instead of DSRC. A recent technology, C-V2X is envisioned as a method to serve ITS goals by providing a foundation for vehicles to communicate with surrounding vehicles and infrastructure. Projected to allow for non-line-of-sight awareness, C-V2X is expected to enhance road safety and facilitate automated driving. Although both C-V2X and DSRC deliver vehicle-to-vehicle technology, C-V2X is believed to have [superior performance](#) compared to DSRC.

The proposed rulemaking is a product of bipartisan effort by Republican Commissioner O'Rielly and Democratic Commissioner Rosenworcel, and has received widespread industry support. However, the commission has been facing pushback from the DOT, as well as the departments of transportation for all 50 states, the District of Columbia, and Puerto Rico, asserting that the entire 75 megahertz must be preserved for transportation safety purposes. The state DOTs found that 36,750 lives were lost last year on the nation's roads, and that the allocated spectrum is needed to help save lives and improve the safety of our transportation system. Jim Tymon, executive of the American Association of State Highway and Transportation Officials, further elaborated on the state DOTs' position, stating the notice of proposed rulemaking threatens ongoing investments the states have made in infrastructure relying on the 5.9 GHz spectrum, and that the states will incur a loss on these investments if the band is split up.

Significance

Going into the new year, the FCC appears determined to win the race to 5G and will not be delayed by objections from other federal agencies or Congress. These intergovernmental disagreements may create some

short-term uncertainty and delay for businesses determining whether they can rely on recent policies, especially in light of an upcoming 2020 election and the possibility of a new administration. For the 24 GHz band, it remains to be seen whether the response from the GAO will ultimately result in the FCC mandating a greater noise buffer and if not, whether 5G technology companies and meteorologists will find a creative workaround. Similarly, the ultimate adoption of final rules in the 5.9 GHz spectrum proceeding will be a welcome development for the autonomous car industry hoping to use C-V2X technology and 5G to help vehicles better communicate with each other and process large amounts of data. The only question is whether the resolution of these proceedings will be timely given the competitive race for 5G.

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