

**STATEMENT OF  
COMMISSIONER AJIT PAI  
APPROVING IN PART AND DISSENTING IN PART**

Re: *Use of Spectrum Bands Above 24 GHz for Mobile Radio Services*, GN Docket No. 14- 177; *Establishing a More Flexible Framework to Facilitate Satellite Operations in the 27.5-28.35 GHz and 37.5-40 GHz Bands*, IB Docket No. 15-256; *Petition for Rulemaking of the Fixed Wireless Communications Coalition to Create Service Rules for the 42-43.5 GHz Band*, RM-11664; *Amendment of Parts 1, 22, 24, 27, 74, 80, 90, 95, and 101 to Establish Uniform License Renewal, Discontinuance of Operation, and Geographic Partitioning and Spectrum Disaggregation Rules and Policies for Certain Wireless Radio Services*, WT Docket No. 10-112; *Allocation and Designation of Spectrum for Fixed-Satellite Services in the 37.5-38.5 GHz, 40.5-41.5 GHz and 48.2-50.2 GHz Frequency Bands; Allocation of Spectrum to Upgrade Fixed and Mobile Allocations in the 40.5-42.5 GHz Frequency Band; Allocation of Spectrum in the 46.9-47.0 GHz Frequency Band for Wireless Services; and Allocation of Spectrum in the 37.0-38.0 GHz and 40.0-40.5 GHz for Government Operations*, IB Docket No. 97-95

This *Notice of Proposed Rulemaking* focuses on the use of spectrum above 24 GHz for mobile operations, but it also gives us a chance to talk about 5G, or the fifth generation of mobile service. That’s an important discussion to have, because there’s a global push to develop this next-generation of wireless technology. However, there is no consensus definition of 5G, so discussions often veer toward the esoteric. 5G has been described as the technology that will blend the virtual and physical worlds, enable the Internet of Things to flourish, create the connected life, and/or bring the world of Big Data to the mobile space. All significant developments, to be sure.

But some of the conversation surrounding our 5G future reminds me of a scene from the TV series *Veep*. No spoiler alerts here, but Julia Louis-Dreyfus’s character, Selina Meyer, is addressing a large audience when her teleprompter goes blank and displays only the phrase “FUTURE WHATEVER.” She must then ad lib her way through a speech about what is to come:

Whatever we have in store cannot be known. But given time, it can be understood. The past was once the future. The future is, I should say, unknown. It is in fact unknowable. So I’m asking you to meet me at the station and join me as we board a train bound for a place called the future. We will be ready for that future whatever.<sup>1</sup>

When it comes to our 5G future, however, “whatever” isn’t good enough; the time for vague generalities is coming to an end. I’m therefore pleased that the Commission is launching a rulemaking today that will allow us to start getting more specific about 5G.

This is all the more important because companies are investing heavily in engineering solutions and achieving technological breakthroughs thought impossible only a short time ago. I’ve had the chance to see some of those efforts firsthand. One year ago today, I visited Samsung’s 5G research lab near Dallas, TX, where engineers are hard at work developing base stations and mobile technologies that use spectrum above 24 GHz. Their experiments with multiple-input, multiple-output antennas no bigger than a Post-it note have already demonstrated that 5G technologies used in those bands can deliver mobile speeds in excess of 1 Gbps. More recently, I attended Intel’s demonstration of its millimeter wave technology here at the FCC’s headquarters. It showed how spectrum above 24 GHz can be used to beam signals off tables, buildings, or other objects to find the most efficient, highest-capacity connection

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<sup>1</sup> See also <https://vine.co/v/euQLPa7V50m>.

between a base station and mobile user. These and many other efforts will enable consumers to enjoy the next generation of wireless connectivity.

As for the FCC's role, my view is that we should put a framework in place that will allow 5G to develop in the United States as quickly as the technology and consumer demand allow. The U.S. has led the world in 4G, and there is certainly a lot of running room left with LTE and LTE-Advanced. But we must continue to lead as mobile technologies transition to 5G. The key is to make sure that the FCC does not become a regulatory bottleneck or send signals that would lead companies to focus their research and investments outside of our country.

And on that score, today's item is a mixed bag. On the plus side, we are proposing to allow mobile operations in some bands above 24 GHz. I had called for the FCC to move quickly to take that step, so I'm pleased that we're doing so now. Moreover, I'm glad that we are seeking comment on additional ways that we can incentivize investment in these bands, including through the use of renewal expectancies when licensees meet their build-out obligations.

At the same time, I do not believe that the Commission is acting aggressively enough today to ensure that the United States becomes the global leader in 5G. In particular, the Commission is making decisions today that may needlessly delay the development of 5G technology tomorrow. I cannot support those parts of the *Notice* and therefore will be dissenting in part.

The most prominent shortcoming is the Commission's decision not to move forward on broad swaths of spectrum that might be opened up for flexible use—even though we unanimously teed up those bands in our *Notice of Inquiry* last year and the record contains robust support for moving forward on them now. Getting more spectrum into the hands of consumers and enabling more flexible use of these bands is a critical step towards ensuring that the U.S. maintains its leadership in the wireless space, and I see no downside to starting that process now. Moreover, we don't know which millimeter wave bands will prove to be viable homes for 5G or other wireless uses.

So I suggested adding additional spectrum bands to the *Notice*—including 12,500 MHz of spectrum in the 24 GHz band, 32 GHz band, 42 GHz band, and the 70 and 80 GHz bands. Unfortunately, the votes were not there, and the *Notice* does not propose moving forward on them. The Commission's decision to sit on literally thousands of megahertz of spectrum that could very well be used for licensed and unlicensed innovation is a lost opportunity.

The *Notice* offers no persuasive reason for leaving these bands on the cutting room floor. It claims, for example, that the agency is focusing only on bands with at least 500 MHz of spectrum. But the 42 GHz band offers 500 MHz. The 32 GHz band has 1,600 MHz. And the 70 and 80 GHz bands have 5 GHz of spectrum each! Besides, a 500 MHz floor is artificial and backward-looking. Nokia, which is doing a substantial amount of research into 5G, told the FCC that bands with as little as 300 MHz of contiguous spectrum could be useful sandboxes for wireless innovation. In particular, it urged the FCC to include the 400 MHz of spectrum in the 24 GHz band in this *Notice*. But we don't propose to allow mobile operations in that band, or in others like it.

Similarly, the *Notice's* excuse that some bands lack an existing mobile allocation carries no weight. The 42 GHz band as well as the 70 and 80 GHz bands *do* have mobile allocations. And in any case, the FCC holds the pen: nothing prevents us from using this very proceeding to ink a mobile allocation for any band that lacks one.

The *Notice* also claims that certain bands are being left out because they are not part of the U.S. and CITEL proposal that will be considered at next month's World Radio Conference in Geneva.<sup>2</sup> But if inclusion in the WRC proposal that the U.S. supports were the test, then we should have included all the bands that *are* part of that proposal—yet we fail to expressly advance a number of them in this domestic proceeding.<sup>3</sup> Indeed, nothing within the four corners of the *Notice* indicates that the FCC will *ever* move forward on those bands.

But holding back on spectrum that might be used for next-generation mobile networks isn't my only concern. The *Notice* also contains a number of proposals that are unnecessarily complex. For example, it pursues complicated licensing schemes and novel performance metrics that might require licensees to go so far as to measure the daytime population of their service areas (including tourists and transient populations, the Commission says),<sup>4</sup> and it veers into discussions about technical requirements concerning data authentication that are better left for standards-setting bodies and industry to resolve.<sup>5</sup> I worry that these proposals might be taking us down a path that will make the investment case in these bands more difficult. We recently saw how this can happen in the context of the 3.5 GHz band. There, an IEEE Working Group concluded that the regulatory framework does not justify the time or cost necessary to develop a technical standard.<sup>6</sup> For these millimeter wave bands, the engineering is going to be hard enough; the regulatory framework shouldn't add unnecessary complexity.

In sum, we should ensure that the United States becomes the leader in 5G in the years to come. To do that, we have to make the tough decisions today. While I appreciate that the *Notice* now asks additional questions about the spectrum bands we are not proposing to advance, putting these bands off for consideration in another proceeding at some later date isn't enough. We shouldn't passively hope that the "future whatever" materializes; we should take the concrete steps now that will enable engineers and innovators to develop technologies for these spectrum frontiers.

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<sup>2</sup> See *Notice* at para. 79.

<sup>3</sup> See *id.* at paras. 13, 79.

<sup>4</sup> See *id.* at para. 208.

<sup>5</sup> See *id.* at paras. 260-65.

<sup>6</sup> Comments of IEEE 802.11, GN Docket No. 12-354 (July 13, 2015), <http://go.usa.gov/3h8Eh>.