REMARKS OF
COMMISSIONER JESSICA ROSENWORCEL
SILICON FLATIRONS CONFERENCE
BOULDER, COLORADO
SEPTEMBER 6, 2018

Good afternoon. It's great to be in Boulder and it's a treat to kick off this Silicon Flatirons conference. To the organizers of this event at the University of Colorado, let me offer my congratulations, because you really know how to get a party started—you've gathered us here for what you're calling the Spectrum Hall of Shame.

I admit I spent some time considering whether it's an honor or a slight that you asked me to get a conversation about shame started. But I think we can learn a lot from shame. I think owning up to our mistakes is powerful. It provides us with the opportunity to do better with what lays ahead. In fact, I think there's a deep, undercurrent of optimism in studying what went wrong—so that in the future we can get it right.

Of course, in the United States a lot has gone right with our spectrum policy. In fact, it is hard to overstate the audacity of United States spectrum policy. Over the long arc of history, we have done so many unconventional things—and we have done them first.

More than two decades ago we took the academic ideas of Ronald Coase and reimagined how we distribute our airwaves. Instead of doling out specific licenses for specific uses based on political cues, we ushered in a new era of spectrum auctions—selling access to bidders and allowing them to use it however they choose. It's difficult to remember now, but these ideas were once mocked by experts, opposed by industry, and dismissed by policymakers. However, in the rear-view mirror, they have been a resounding success. The Federal Communications Commission has held nearly 90 auctions, issued more than 44,000 licenses and raised more than $140 billion in revenue. As a result, our efforts have been a model for regulators worldwide.

We also pioneered the use of unlicensed spectrum. We took a handful of underused frequencies known as "garbage bands" in the 900 MHz, 2.4 GHz, and 5.8 GHz bands and decided to test a new model. Instead of dismissing these airwaves as junk we put in place a new model that set technical parameters and then did something radical—gave the public access to these airwaves. This was edgy stuff. It was a move away from command and control spectrum policy. But this experiment was a wild success. Because in time a standard was developed known as 802.11—and this is the spectrum where Wi-Fi was born.

More recently, we blazed a trail for incentive auctions. The two-sided broadcast incentive auction that the Commission just held was the first of its kind worldwide. We tested the proposition that existing spectrum licensees might voluntarily relinquish their rights in exchange for a portion of the proceeds from the subsequent reauction of their airwaves for new flexible use. And so far, so good—the auction concluded successfully last year. Regulators globally are taking note.

But our audacious good works have not been without their equal and opposite counterpart—failures. We have no shortage of initiatives that did not go as well as planned. Pioneer's preference, anyone? Or maybe spending more than a decade on 800 MHz rebanding? Well, you get the idea.

Today, in the spirit of learning from the past and building a brighter future, I want to focus on two specific bands where I believe we can do better—the 5.9 and 2.5 GHz bands. I want to walk you through their history and then—no shame—provide some ideas about what we can do right now to ensure these airwaves become the stuff of spectrum success.

Idea #1: Let's Rethink the 5.9 GHz Band.

It is hard to avoid the buzz about driverless cars. You can question if these vehicles are ready for prime time, or quibble with the change they require to our roadways and civic life, but you can't deny that a lot is riding—literally—on the future of how we drive.

But here's the thing—enthusiasm for autonomous vehicles is not new. In fact, if you fall down the internet rabbit hole looking into self-driving cars, eventually you'll land on Francis Houdina and the American Wonder. You see, all the way back in 1925, Francis Houdina founded a radio equipment firm called Houdina Radio Control Company. From the get-go, this company was focused on reinventing transportation. In fact, it built the first radio-operated automobile.

Here's how it happened: Houdina took a 1926 Chandler Sedan and rigged it with an antenna. Then he set it up so that the radio signals it received operated small electric motors that controlled speed and direction. A crew trailing close behind in a second car maneuvered the remote-controlled Chandler. He christened this makeshift effort the American Wonder.

The American Wonder was the first driverless car to roll down the streets of New York City. Of course, Houdina made sure to take all the appropriate precautions. By that I mean he clung to the running board of the car, ready to take the wheel in an emergency.

The demonstration did not end well. As the New York Times recounted it, "the radio car careened from left to right, down Broadway, around Columbus Circle, and south on Fifth Avenue, running down two trucks and a milk wagon." At Forty-Third Street, after a crash into a fire engine was barely averted, the police put an end to the experiment.

But here's where this failure succeeded—his demonstration captured the public's imagination. We still swoon at the prospect of autonomous driving. We still marvel about what it could mean—and we still experiment, just not on the streets of New York.

So it was in 1999—nearly two decades ago—when the United States set aside 75 megahertz of spectrum in the 5.9 GHz band for dedicated short range communications, or DSRC. DSRC was designed for cars to talk to each other in real time to help reduce accidents. As the FCC acknowledged, DSRC can improve safety by warning drivers of an impending dangerous condition in time to take corrective action.

But in the nearly twenty years since the FCC allocated this spectrum, that really hasn't happened. Today, autonomous vehicles have moved beyond DSRC to get around and communicate—whether that's with radar, LIDAR, cameras, sensors, on-board mapping tools, or cellular and Wi-Fi networks. Testing on DSRC continues. But now just a few thousand vehicles have DSRC on board out of the more than 260 million cars on the road.

So let's be honest: Our bet on DSRC didn't pan out the way we thought it would. In fact, the National Transportation Safety Board has said it will be up to three decades before the majority of vehicles on the road have DSRC capability—which is what is needed for this safety technology to be truly effective. Fifty years from spectrum start to finish is a long time. I don't know about you, but I'm hoping we will have flying cars by then.

Let me be clear: we need to support automobile safety. However, our spectrum policies supporting safety need to be current. So we should speed the way for our thinking about DSRC to be up to date. And when we do, let's acknowledge that other countries are doing this using less spectrum than the 75 megahertz that the United States has set aside—in fact, only a small portion of those airwaves were set aside by the FCC for basic safety messaging.

So it's time to take a fresh look at this band and see if we can update our commitment to safety and also develop more unlicensed opportunities for Wi-Fi. This is a subject I've worked on with my colleague Commissioner Mike O'Rielly.

It's important because Wi-Fi is today is congested. Right now, there are over 9 billion Wi-Fi enabled devices. Before the end of the decade, we will see as many as 50 billion new devices connecting to our networks through the internet of things. Add this up, and we will need a significant swath of new unlicensed spectrum to keep up with demand.

Congress saw this coming. Earlier this year, it asked the FCC to identify 100 megahertz of spectrum below 8 GHz for unlicensed use. To meet this threshold, we need to take another look at the 5.9 GHz band. It's the ideal place to explore Wi-Fi expansion because it's adjacent to an existing unlicensed band. That means we have the opportunity to introduce new wideband channels—channels that will be able to take advantage of new standards and deliver speeds even faster than 1 gigabit per second. In other words, this is where we can develop next generation Gigabit Wi-Fi.

The good news is this effort is already underway. Back in 2013 the FCC started a rulemaking to study the opportunities for Wi-Fi in the 5.9 GHz band. In 2016 the FCC developed a test plan in close coordination with the National Telecommunications and Information Administration and the Department of Transportation to determine the feasibility of DSRC and Wi-Fi sharing. The first phase—which involved tests in the FCC lab—is complete.

It is time for the FCC to release the results of this testing. But we need to do more than just make our work public. We need to update this effort. That's because our existing approach emphasizes co-channel sharing, and there are newer solutions that would instead segment the

band. Our test plan needs to be modernized to reflect these changes and then we need to move our testing out from the lab and onto the road.

There is no shame in correcting course. And I think it's time to be ambitious and find a way forward that puts the 5.9 GHz band to fuller use.

Idea #2: Let's Rethink the 2.5 GHz Band.

In his 1960 campaign for president, Senator John F. Kennedy described television as having "the potential to teach more things to more people in less time than anything yet devised." I'm struck by how those words about the educational power of television. That's because they sound so much like the ones we use today to describe the delivery of broadband to our schools and students.

Back to that in a moment.

For now, it is important to know that this enthusiasm for educational television did not end with the presidential campaign. In 1962, President Kennedy signed the Educational Television Facilities Act, which provided the first funds for noncommercial broadcasting. At the signing ceremony, he was accompanied by Newton Minow, his hand-picked Chairman of the FCC. Of course, Newton Minow famously had his doubts. A year before the passage of this law he called television "a vast wasteland." But a year after passage, Chairman Minow set out to make educational television a reality. Under his leadership, the FCC introduced Instructional Fixed Television Service, or ITFS.

ITFS made its home in the 2.5 GHz band. Licenses were distributed to educational intuitions committed to delivering instructional television services to schools. It was a grand idea. Use the power of broadcasting to teach. Remake education. But history shows even with all this enthusiasm for instructional television, many ITFS licensees had difficulty making full use of their spectrum. So over time the FCC permitted educational licensees to use these airwaves in another way—to lease excess capacity for commercial use.

Fast forward to 2004. The FCC took another look at ITFS. It renamed it the Educational Broadband Service. But it did more than just rebrand these airwaves, it wanted to reimagine their possibilities by encouraging their use not just for instructional television, but for educational broadband. Some truly promising efforts to ensure online access for students followed—in communities as diverse as Albemarle County, Virginia and Desert Sands, California. But not every licensee has been able to put this spectrum to the educational use the FCC imagined.

This brings us to present. The FCC has—you guessed it—another rulemaking to address the 2.5 GHz band. But with the passage of time, this spectrum is considered prime. In fact, these airwaves are considered to have the choice mix of propagation and capacity that are essential for widespread 5G deployment. So what to do?

I think the educational history of this band is important. I think it should inform our actions going forward as we seek to put this band to greater use.

Here's my idea.

Today, seven in ten teachers assign homework that requires access to broadband. But FCC data show that as many as one in three households do not subscribe to broadband service. Where these numbers overlap is what I call the Homework Gap.

According to the Senate Joint Economic Committee, the Homework Gap is real. By their count, it affects 12 million school-aged kids across the country. For students in households without broadband, getting homework done is hard. I've seen it firsthand in rural areas, urban areas, and everywhere in between. Kids sitting in parking lots late into the evening just to get a signal to do their nightly schoolwork. Students sliding into booths at fast food restaurants every afternoon to do their homework with fizzy drinks and fries. Parents cobbling together connectivity with trips to the homes of relatives and libraries with limited hours just to help their children get their assignments done.

It shouldn't be this hard—and we should do something about it. Because to have a fair shot at digital age success, every student needs online access, not only at school, but also at home.

For this reason, we need to move beyond the status quo in the 2.5 GHz band. We need to find a way to honor the educational history of this spectrum and make more effective use in the present. We have an open proceeding that asks lots and lots of questions about this—but I think we need a more focused plan.

Like with the 5.9 GHz band, there's no shame in admitting the 2.5 GHz band has not lived up to its potential. But I think we can take steps now to change that.

The FCC has unused 2.5 GHz licenses in inventory. It also has the authority to hold another *voluntary* spectrum incentive auction. Doing so would require addressing license size, long-term leasing, and other issues unique to the band. But if we were to combine these sources of 2.5 GHz spectrum, we would be able to hold a substantial nationwide auction for new, flexible commercial use of key mid-band airwaves important to 5G service. Then the funds in excess of those required to run the auction and pay for spectrum contributions from existing licensees could be turned into a Homework Gap initiative. This initiative could help fund the connectivity needs of 12 million students who lack broadband at home—through library loans of Wi-Fi hotspots and other creative ideas that help ensure no child is left offline.

In short, we can honor what President Kennedy and his allies tried to do decades ago when they sought to spark educational use in the 2.5 GHz band. We have an opportunity now to nod to this history but do it a way that is thoroughly modern and helps make sure every student has the connectivity they need for schoolwork. I think we should explore it.

I will end my musings here. No matter where you stand on the use of the two bands I've discussed, I hope we can agree both provide opportunities to learn from the past. Our spectrum history features innovative triumphs—and also airwaves that have become afterthoughts. But it's within our power to change that—and conversations like the one you're having today are a terrific place to start.

Thank you.