2022 Spectrum Policy Initiative Conference

Resolving Interference Conflicts among "Highest and Best" Uses of the Radio Spectrum

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Keynote Remarks Prepared After Delivery

Thank you, Keith, for that kind introduction, and thank you to all of you for welcoming me this morning. Throughout my career, I have had the opportunity to work with many of the excellent telecom professionals who have come out of the University of Colorado's programs – including many talented interns who served with me in Commissioner Starks's office at the Federal Communications Commission. I am excited to finally see where the magic happens, and I look forward to spending the day with you.

Because we all care enough about these issues to gather today, I hope we can start from the shared assumption that getting spectrum policy right is an essential priority. For those of us who spend a lot of time thinking about this unseen but critical resource, it is not difficult to explain that practically every part of the vision President Biden has laid out for our country has a spectrum-dependent component somewhere down the line. We want lower costs for American families and equity for low-income people who are more likely to rely on their smartphones to get online. We want telemedicine that meets people where they are. We want cutting-edge research to fight climate change and advance forecasting to protect Americans during severe weather. We want national defense systems that are ready when we need them. These priorities – and many, many more – all require spectrum resources.

With so many uses competing for a scarce public resource, resolving conflicts is part of the policy process. Today, I hope to convince you that the fact that we have spectrum conflicts – as frustrating as some of them can be – is not itself a sign that something is wrong; it's how we manage them that matters. And then I will suggest some steps we can take to get better at handling spectrum conflicts efficiently and in ways that create the best outcomes for the American people.

I.

But before I dive in, because we have a number of students in the audience, I would like to start by saying a few words about the White House Office of Science and Technology Policy and how we are involved in spectrum issues – and maybe convince some of you to come talk to me between sessions today about how OSTP is a great place to work as a student.

In 1976, Congress established OSTP in recognition of the need to coordinate the Federal science and technology policy and to provide the President with the best possible guidance on advances in science and technology. Nearly fifty years later, OSTP continues to work to maximize the benefits of science and technology to advance health, prosperity, security, environmental quality, and justice for all Americans. To accomplish this mission, OSTP:

- provides advice to the President and the Executive Office of the President on all matters related to science and technology;
- stewards the creation of bold visions, unified strategies, clear plans, wise policies, and effective, equitable programs for science and technology, working with departments and agencies across the Federal government and with Congress;
- engages with external partners, including industry, academia, philanthropic organizations, and civil society; state, local, Tribal and territorial governments; and other nations; and
- works to ensure inclusion and integrity in all aspects of science and technology.

Those activities cover a wide range of domains. Coming from the FCC, I had gotten used to spending my days surrounded by people laser-focused on telecom – the kind of people who casually speak in code to each other about things like UMFUS. At OSTP, my colleagues are military scientists, medical doctors, engineers, and many other kinds of experts. Even in the Office of the Chief Technology Officer, what we call the Tech Team, we are covering a huge swath of subject matter areas from AI and digital assets to data science and the future of aviation. Across all those subjects, the Tech Team is united by the goal of maximizing the benefits of technology for all Americans by ensuring that: (a) government has the tech capacity to effectively deliver its programs and services; (b) policy is informed by tech expertise; and (c) America continues to lead the world in values-driven technological research and innovation.

How does that translate into spectrum and telecom policy? I spend most days engaged in policy development with our partners across the agencies, particularly at NTIA, and with my colleagues on the National Economic Council and National Security Council staffs who share OSTP's commitment to wireless issues. I coordinate with the FCC on spectrum and wireless matters – always in a way that is respectful of

their independence. I work with the Office of Management and Budget to help formulate recommendations on budget issues that impact wireless policy. I provide technical assistance on spectrum legislation and a variety of other documents, including those that our colleagues at the State department will use as part of their diplomacy. And I spend a lot of time meeting with stakeholders in industry, academia, public interest groups, and other organizations to get their input and assistance in deciding how to make our big ideas work in the real world.

Because many of you are working on non-spectrum telecom issues, you should also know that I am not alone on the telecom beat. My colleague Danae Wilson serves as OSTP's Assistant Director for Internet Access. She is particularly focused on Tribal and rural broadband, and she is an excellent point of contact on issues like infrastructure implementation, public-private partnerships, and broadband funding.

So, CU students, if all that sounds interesting to you, let's talk today so I can point you to OSTP's application process. I was an OSTP intern many years ago, and I'm confident I would not be talking with you today without that experience.

II.

Before turning to how to better manage spectrum conflicts, I want to first recognize that, however acute some of today's hot topics in spectrum may seem, the basic situation is not all that different from the spectrum use challenges of the last hundred years. In preparing to talk with you today, I learned a lot from Peter Tenhula's historical presentation at Silicon Flatirons' roundtable earlier this year. I won't summarize the whole thing because I would encourage you all to read it, but I want to note here that his analysis reminds us that spectrum policymakers have been challenged with two sometimes competing roles – preventing interference and encouraging "the larger and more effective use" of radio spectrum – since the 1920s. The needs of existing users and new entrants have always been in tension. As long as there has been spectrum policy, there have been spectrum conflicts to mediate.

To be sure, the stakes are high at this particular moment in our history. The greenfield bands are mostly gone, so virtually every spectrum decision impacts an incumbent user. Consumer demand for spectrum-dependent innovations has exploded. Cisco predicts that Internet of Things devices will, at a total of 14.7 billion, account for half of all global networked devices by 2023. By 2023, Americans are expected to have an average of 13.6 devices and connections per person. Last month, CTIA released its latest annual survey of key wireless trends. They found two times more growth in mobile traffic in 2021 compared to 2020. For a longer-term perspective, mobile data traffic in 2021 was

more than 100 times bigger than it was in 2010 when President Obama signed his first spectrum Presidential Memorandum. Demand for Wi-Fi is just as explosive. Globally, the number of Wi-Fi hotspots will grow fourfold in just the years between 2018 and 2023. And consumer use is just one of the factors putting pressure on our spectrum resources. Federal agencies are just as eager as commercial users to take advantage of wireless innovations that will advance their missions. Spectrum is a scarce resource and having lots of innovative options for using it to make people's lives better is a good problem to have.

I don't want to sound pollyannish here. I know that some of you listening today spent the last few years locked in seemingly intractable spectrum disputes that took more time and resources than you had to give. But from my vantage point, there is a mindset that will help turn the temperature down in the title of today's event: *Resolving Interference Conflicts among "Highest and Best" Uses of the Radio Spectrum.* My husband is a commercial real estate valuation expert, so there is a lot "highest and best use" talk in our household. The Appraisal Institute, his equivalent of a bar association, defines highest and best use as "the reasonably probable and legal use of vacant land or an improved property that is physically possible, appropriately supported, financially feasible, and that results in the highest value."

Importantly, Sam would say that you can't just ask what is the highest and best use of a property in a vacuum; you have to ask *when*, because those four conditions are always changing. There was a time when four-story buildings covered Manhattan. Air conditioning and elevators changed what is physically possible, and mid-rises stopped being the highest and best use of many places. That doesn't mean there was anything wrong with the decision to build them in the first place. Things change.

In the spectrum policy world, receiver standards improve, broadcasters compress their signals, and channel sizes change. No wireless technology stays state-of-the-art forever. New, better technologies come along. We do need to be looking for ways to raise our efficiency standards and make the investments needed to upgrade Federal systems were appropriate. Given the enormous benefits efficient spectrum use can offer for our economy, for American leadership in wireless services, and for public safety and national security, we cannot afford not to be exacting on this point. But we shouldn't fool ourselves into thinking the work of resolving spectrum conflicts will ever be finished.

III.

We can't make spectrum conflicts go away, but we can do a better job of managing them and creating a sustainable system that keeps

stakeholders working through the process and not looking for detours around it. Here are a few ideas.

First, we need to institutionalize a trustworthy, predictable process for managing change in spectrum allocations and for resolving disputes. Over the last few months, I have met with dozens of stakeholders in recent spectrum proceedings. It will not surprise folks in this room that many of those stakeholders saw some gaps between the way things are supposed to work on paper and what has actually happened.

During this Administration, the FCC and NTIA have already made big strides in this area, particularly in their recent MOU. We often repeat the basic statement that the FCC and NTIA jointly manage our country's spectrum resources in the public interest. But operationalizing that cooperation is both important and not going to happen by accident. In particular, the MOU sets out procedures for regular coordination and for ensuring Federal considerations get to the right place in the process. That is an important signal to the departments and agencies that care deeply about coordination.

There is more to do. All stakeholders, including Federal users, need assurance that spectrum decisions will be made in a process that provides them notice and an adequate opportunity to be heard. And all stakeholders need to operate with a high degree of transparency so that all the relevant arguments are on the table when decisions are made.

Second, we should be looking for opportunities to strengthen the technical capacity and laboratory resources needed to enhance spectrum research and development. Yesterday, I spent the afternoon at NTIA's Table Mountain Quiet Zone with folks from the Institute for Telecommunications Sciences. As many of you know, ITS is the research and engineering laboratory for NTIA. It also addresses other federal agencies' telecommunications and spectrum research needs via Interagency Agreements, and it engages directly with industry and academia via Cooperative Research and Development Agreements.

Those relationships are incredibly important, particularly for adding capacity, depth, and resources for the many agencies that need reliable spectrum research but aren't in the spectrum management business themselves. And they have real world results. As part of our discussion yesterday, we looked at the map of the original Fast Track CBRS exclusion zones compared to where we are today. Solid research and testing made those zones 77 percent smaller, allowing CBRS to benefit millions more people – and make a compelling commercial case.

Expanding capacity at places like ITS and adding new resources can help resolve spectrum disputes in two ways. First, it will help generate trustworthy data and highlight the work of skilled technical interpreters

who can help cut through competing claims about interference. Policymakers cannot always follow the science directly to an answer in every dispute – assessing risk and weighing values will almost always be a part of the equation – but a basic set of shared facts is a prerequisite to working together well across agencies and other stakeholders. Second, adding R&D capacity can better position us to take advantage of innovations in spectrum management that create new options for policymakers, such as new sharing modalities.

There are already talented engineers and academics doing this kind of work, and I am hopeful we can learn from their efforts and build on what works. Last week, I had a great visit at the White House from Nick Laneman, the Founding Director of Spectrum X. I'm sure many of you have already met Nick – especially since he is here today – but for those who have not: [Spectrum X](#) is a large academic hub where all radio spectrum stakeholders can innovate, collaborate, and contribute to maximizing the public benefit spectrum can create. It was created with a center grant from the National Science Foundation and brings together research capabilities from a team of 41 founding researchers and staff from 27 universities, including 14 minority serving institutions. As Nick and I discussed, that kind of cross-institution collaboration has the power to both spark truly pioneering research and to help translate those findings into policy options.

Third, we should support agencies' work on a common technical manual or handbook for Federal users. During my time at the FCC, I often found myself working through a docket full of technical studies that seemed to talk past each other. There are always going to be parties who disagree about even the most basic study design decisions. But inside the Federal government, President Biden has charged us with making evidence-based decisions guided by the best available science and data. In [one of his earliest memoranda to the heads of Departments and Agencies](#), the President declared that when "scientific or technological information is considered in policy decisions it should be subjected [to] well-established scientific processes, including peer review where feasible and appropriate." To advance the goal of evidence-based decision-making and scientific integrity in the area of spectrum policy, we should work toward a compilation of principles, guidelines, accepted technical standards, interference protection criteria, propagation models, and other characteristics that can form the basis for shared assumptions and comparable results.

Fourth, we need to build the corps of people who can do this work, inside and outside the Federal government. I have been lucky throughout my career as a telecom lawyer to have access to many talented spectrum professionals who have at key moments generously explained what's really going on here. As much as we lawyers may wish sometimes that we could conjure up that kind of good guidance on

demand, we all know that the expertise it takes to help resolve spectrum disputes comes at the end of a long path of education, training, and mentorship.

Across the Biden-Harris Administration, agencies have recognized that STEM skills are the foundation for discovery and technological innovation. Under the guidance of the National Science and Technology Council (NSTC), agencies are working to ensure lifelong access to high-quality STEM education for all Americans and to position the United States as the global leader in STEM literacy, innovation, and employment. To achieve this objective, their strategy identifies three overarching goals: build strong foundations for STEM literacy; increase diversity, equity and inclusion in STEM; and prepare the STEM workforce for the future.

Those efforts are consistent with some of the excellent recommendations for developing a talent pipeline from the Aspen Institute's recent report titled *Toward a National Spectrum Strategy*. Notably, Aspen emphasizes the need for educational programs for non-engineering staff who need to be fluent in the latest technical developments in spectrum research and management. In my experience, there's enormous demand for those kinds of programs, particularly among telecom lawyers at all levels.

And we can augment these efforts by attracting new talent to the United States. [The Biden-Harris Administration](#) also believes that one of America's greatest strengths is our ability to attract global talent to strengthen our economy and technological competitiveness, and benefit working people and communities all across the country. In the fields of science, technology, engineering, and mathematics – fields that are critical to the prosperity, security, and health of our Nation – our history is filled with examples of how America's ability to attract global talent has spurred path-breaking innovation. Our commitment as a Nation to welcoming new talent has long provided America with a global competitive advantage, and we must continue to lead in this effort. Earlier this year, the Departments of State and Homeland Security announced new actions to advance predictability and clarity for pathways for international STEM scholars, students, researchers, and experts to contribute to innovation and job creation efforts across America. These efforts will help build the bench in all kinds of STEM fields, including spectrum

Finally, we need strong, values-driven leadership that can cut through institutional conflict, at the highest levels and at every level. I don't think recent interference disputes felt intractable because we have all just become more churlish and difficult with each other. But it can be easy to dig in on one cost or benefit when the solution we're reaching for requires balancing many competing considerations. Strong leaders can help keep the focus on our shared values, even when the stakes are high. Leadership can also keep parties coming back to a reliable

space for negotiation – even when there will sometimes be winners and losers – and it can keep spectrum conflicts from growing into the institutional conflicts that make future spectrum challenges harder to address.

With those ideas on the table, I would be glad to take your questions.