

April 17, 2023

Stephanie Weiner
Acting Chief Counsel
National Telecommunications and Information Administration

Re: Development of a National Spectrum Strategy (Docket Number: NTIA 2023-0003)

Dear Ms. Weiner,

Hewlett Packard Enterprise (“HPE”) appreciates the opportunity to provide these comments in response to the National Telecommunications and Information Administration (“NTIA”) Request for Comments (“RFC”) on the Development of a National Spectrum Strategy.¹

HPE is a leading provider of wireless infrastructure solutions, with primary business units focused on the Wi-Fi and cellular (both public and private network) markets. As such, HPE has interests across the range of exclusive licensed (e.g. macro cellular 5G), unlicensed (e.g. Wi-Fi), and licensed-by-rule (e.g. CBRS GAA) spectrum. While our wireless solutions almost exclusively operate in spectrum allocated for commercial uses, they are often utilized by federal agencies (the DoD in particular) for a range of uses.

HPE proposes the following three principles to help guide NTIA as it develops the National Spectrum Strategy for the United States. HPE believes that these principles apply across the three pillars of the strategy which NTIA outlines in the RFC.

1. The National Spectrum Strategy Should be Comprehensive, not Balanced

It is clear that our nation, and our world, are becoming increasingly wireless, and more dependant upon wireless technologies. While some parties will argue for a “balanced” spectrum policy, HPE believe that the multiple axes by which spectrum can be classified, for instance Federal/Commercial, Licensed/Unlicensed/Licensed-by-Rule, Exclusive-Use/Shared-Use,

¹ Available at <https://ntia.gov/issues/national-spectrum-strategy>



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Low/Mid/High-band, Terrestrial/Airborne/Satellite, Fixed/Mobile, High Power (Wide Area)/Low Power (Localized), Metropolitan/Rural, Indoor/Outdoor, etc..., inherently makes “balancing” either impossible or impractical. As an example, some have called for “balance” in commercial allocations for macro licensed and unlicensed spectrum, with accompanying graphics implying that there should a MHz-for-MHz parity between these types of spectrum. They don’t bother to explore the huge differences between these types of spectrum along many of the axes noted earlier (indeed, they are “apples and oranges” in many regards). These differences and the unique characteristics of each type of allocation must factor into an informed and well-reasoned approach in the development of a strategy. While calls for “balance” may be useful in advancing a particular industry’s advocacy agenda, they are far too simplistic and one-dimensional to apply in the formulation of our nation’s spectrum strategy.

HPE respectfully submits that the term “comprehensive” more appropriately conveys the principle that should guide policymaking across differing technologies, spectrum bands, use cases/constituencies, access modalities, coverage areas, and deployment models. In contrast, “balance” is often construed to imply like-for-like allocations of spectrum based on these various considerations, which may be neither necessary, desirable, nor achievable. Terminology is critical in guiding documents such as a National Spectrum Strategy, and HPE urges NTIA to carefully consider its use of these terms.

2. An Inclusive Assessment of the Economic Impacts of Spectrum & Policy Incentives

HPE notes the repeated observation by NTIA in the RFC that an effective National Spectrum Strategy is critical to the United States’ economic growth and global competitiveness. HPE agrees and also notes that the macro cellular, Wi-Fi, satellite, private cellular, and fixed wireless industries all generate enormous economic activity to the benefit of American businesses, citizens, and government.



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As just one example, the economic value of Wi-Fi to the United States in 2023 was recently estimated at \$993.07 billion.²

In assessing the economic impacts of various types of spectrum on a National Spectrum Strategy (particularly regarding policy incentives), HPE recommends that broad metrics, such as contributions to Gross Domestic Product (“GDP”) and economic surpluses (producer and consumer surpluses) be included as valuation inputs. Assessments and resulting policy directives that focus solely on Treasury revenue from the auctions of exclusive-use spectrum licenses significantly undervalue the total economic impact of that spectrum and also completely devalue the massive economic contributions of unlicensed and licensed-by-rule spectrum.

Unfortunately, the misvaluation of commercial spectrum also has profound effects on future allocation decisions due to the direct and indirect policy incentives that currently exist. For example, Federal agencies who occupy spectrum and then make the spectrum available for auction can take advantage of monies made available through the Spectrum Relocation Fund (“SRF”) to cover the costs associated with transitioning their systems. The SRF is in turn funded based on auction revenues. This incentivizes allocation decisions toward exclusive-use licensed spectrum, at the expense of shared-use unlicensed and/or opportunistic spectrum such as the CBRS General Authorized Access (GAA) tier, which do not result in auction revenues but do have major economic impacts.

It also appears that legislators have increasingly been looking to exclusive-use licensed spectrum auctions as a source of future revenue to offset the funding requirements for proposed programs. While identifying and/or clearing spectrum for exclusive licensed use is certainly an appropriate policy outcome, along with determinations for unlicensed and licensed-by-rule allocations,



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those decisions should be based on the overall national good, not on a single data point of estimated auction revenues. It is HPE's view that the policy and regulatory processes work most effectively when NTIA and the Federal Communications Commission ("FCC") are provided flexibility to study identified spectrum ranges and then make independent assessments of potential future uses and allocation types.

3. Spectrum Sharing will be Critical to the Success of the National Spectrum Strategy

HPE is firmly convinced that spectrum sharing will become increasingly important for policymakers, regulators, and spectrum managers.

As the world's most popular form of shared spectrum, unlicensed spectrum is already vital to our nation's interests. Unlicensed spectrum carries the great majority of smartphone wireless data traffic over a Wi-Fi airlink. Unlicensed spectrum is also utilized as the primary or only connectivity by a wide variety of other Wi-Fi and Bluetooth products, including laptops, tablets, headphones, gaming consoles, televisions, and myriad other IoT devices. Additionally, as Telecom Advisory Services noted in an April 2018 report, the future economic value and demand for unlicensed spectrum will be driven not only by Wi-Fi, but also by other unlicensed IoT and cellular technologies (e.g. 5G New Radio Unlicensed ["5G NR-U"]). This continually shifting mix of uses underscores the versatility and adaptability of shared spectrum when it is made available on an opportunistic or permissive basis for the development and deployment of innovative technologies and services. Unlicensed wireless technologies can also share spectrum resources with incumbent services such as the protection of radar systems in the 5 GHz U-NII 2A and U-NII 2C bands via Dynamic Frequency Selection ("DFS") mechanisms, or the protection of 6 GHz fixed microwave incumbents via Automated Frequency Coordination (AFC) systems that have been conditionally approved by the FCC and are soon to enter testing.

While unlicensed is certainly the most established example of spectrum sharing,



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technological advancements in areas such as software defined/frequency agile radios, radio frequency modeling, database coordination, incumbent detection, and deterministic preemption have enabled more sophisticated, dynamic sharing frameworks. HPE was encouraged to see that NTIA has identified these types of technology developments as one of the three pillars of a National Spectrum Strategy.

The 3.5 GHz Citizens Broadband Radio Service (“CBRS”) has provided a compelling example of the value and efficacy of these dynamic frameworks, with over 300,000 CBRS base stations (CBSDs) in service and over 800 models of infrastructure and client devices available for the band. And this ecosystem and momentum has largely formed in just the 3 years since Full Commercial Service was authorized for CBRS in January 2020.

The United States is the global leader in dynamic spectrum sharing, due to experiences such as CBRS and the 6 GHz AFC. This is fortunate, as it is evident that it will be very difficult to identify and clear large swaths of spectrum in the low or mid-bands for exclusive-use, while shared-use may be possible.

Conclusion

HPE is encouraged by NTIA’s efforts in developing our National Spectrum Strategy and this Request for Comments, and appreciates the opportunity to provide our inputs on this critical undertaking.

Very Respectfully,

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/s/ David A. Wright

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