



Spectrum Interference from Commercial devices in 6 & 7/8 GHz

July 2024

Changing the World's Energy Future

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**Prepared for the
U.S. Department of Energy
Under DOE Idaho Operations Office
Contract DE-AC07-05ID14517**

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Need and Significance

- In 2020, FCC repurposed spectrum in the 6 GHz band allocated to DOE/US Government for commercial use of Wi-Fi 6E/7.
- The 2024 National Spectrum Strategy (NSS) implementation plan is now considering 7/8 GHz band for co-existence of commercial devices with federal incumbents such as DOE.
- A scientific study on any potentially harmful interference caused by the commercial devices in real-world scenarios is critical for future decisions to allow additional spectrum co-existence.

Approach and Innovative Aspects

- Analyze, detect and measure any harmful interference caused by commercial Wi-Fi 6E/7 devices in real-world scenarios to 6 GHz utility links.
- Develop methodology for scientific spectrum interference analysis for spectrum co-existence.
- Conduct security assessment of the Automatic Frequency Co-ordination (AFC) along with its functional effectiveness.
- Investigate autonomous spectrum sharing approach without centralized co-ordination.
- Identify DOE use cases that can benefit from spectrum co-existence.

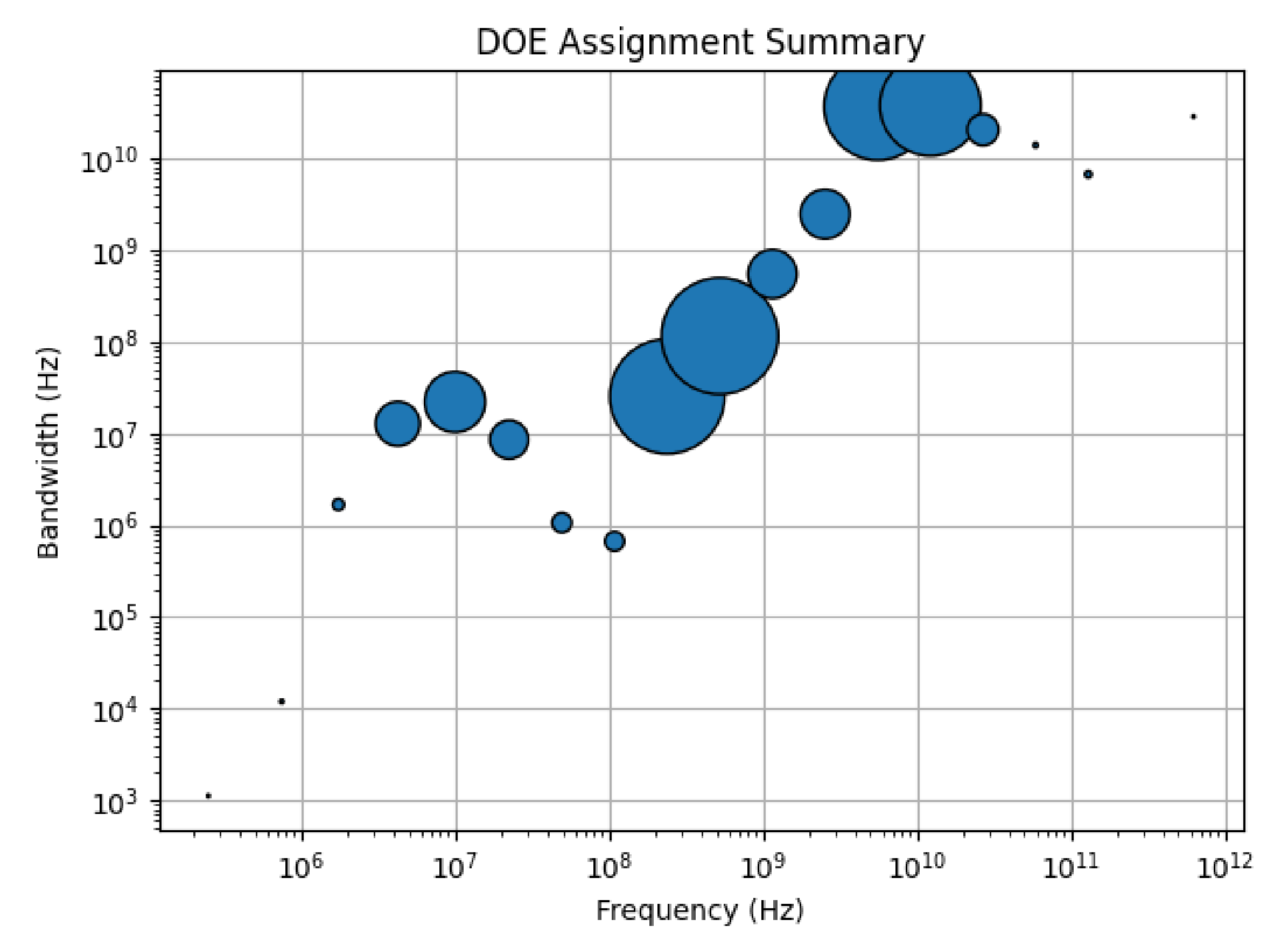
Summary of Results

- DOE allocation analysis provides foundational understanding of DOE spectrum use, DOE's potential to leverage 5G, and practical considerations for DOE spectrum sharing.
- DOE use cases outline the operational purposes for DOE spectrum use and the advanced wireless features necessary to support them.
- Distributed spectrum sharing for 5G provides a secure method for leveraging shared spectrum to support multiple 5G networks.
- Identification of prioritized use cases for 6 GHz interference study captures the practical impacts of unlicensed spectrum on existing incumbents.
- Experimentation in 7/8 GHz for DOE-OE is developing experience for assessing interference impacts to point-to-point links.
- The scope of this work has laid the foundation for INL to lead testing to support the National Spectrum Strategy in 7/8 GHz across all federal usage.

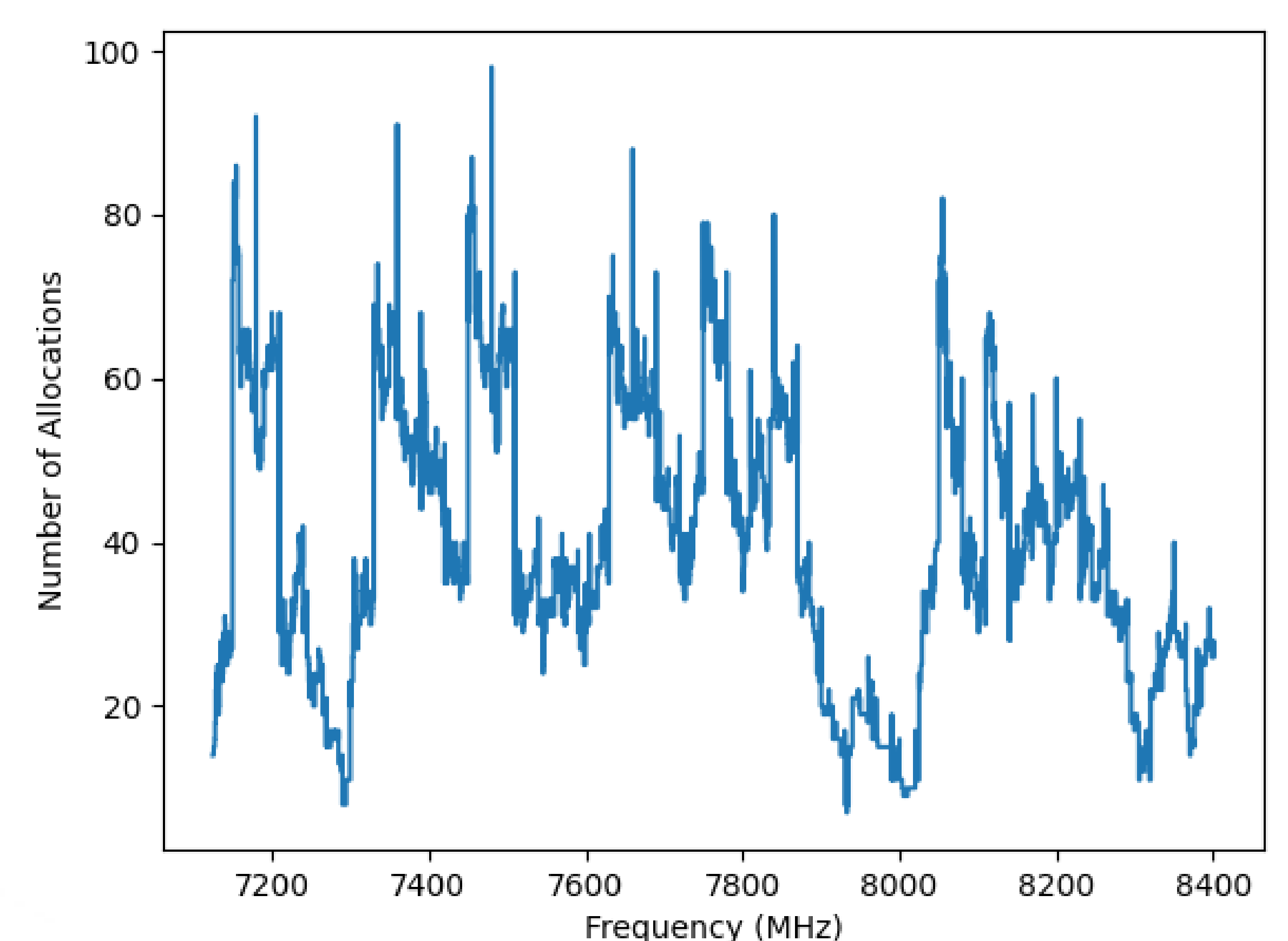
Customers: DOE-CIO, DOE-CESER, DOE-OE, NTIA

Publications

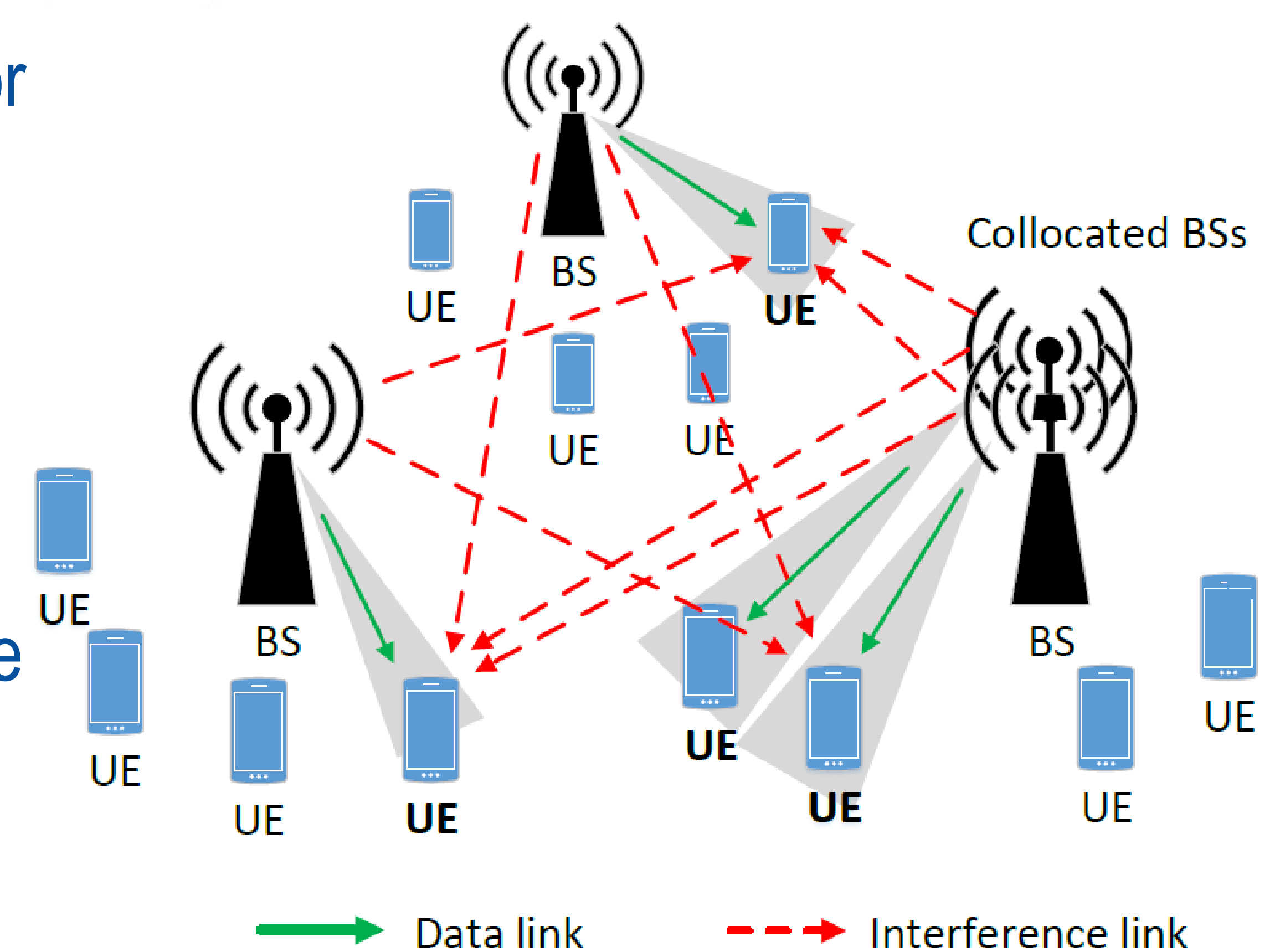
1. "Toward Practical Federal Spectrum Sharing for Advanced Wireless Technologies", 2024 IEEE DySPAN Conference, May 2024.
2. "A noncooperative game-based distributed beam scheduling framework for 5G millimeter-wave cellular networks," IEEE Transactions on Wireless Communications, vol. 21, no. 1, pp. 489–504, Jan 2022.



DOE Spectrum Allocations (all)



DOE Spectrum Allocations (7/8 GHz)



Autonomous 5G Spectrum Sharing