

# OpenMesh: Wireless Signal Dataset for Opportunistic Urban Weather Sensing in New York City



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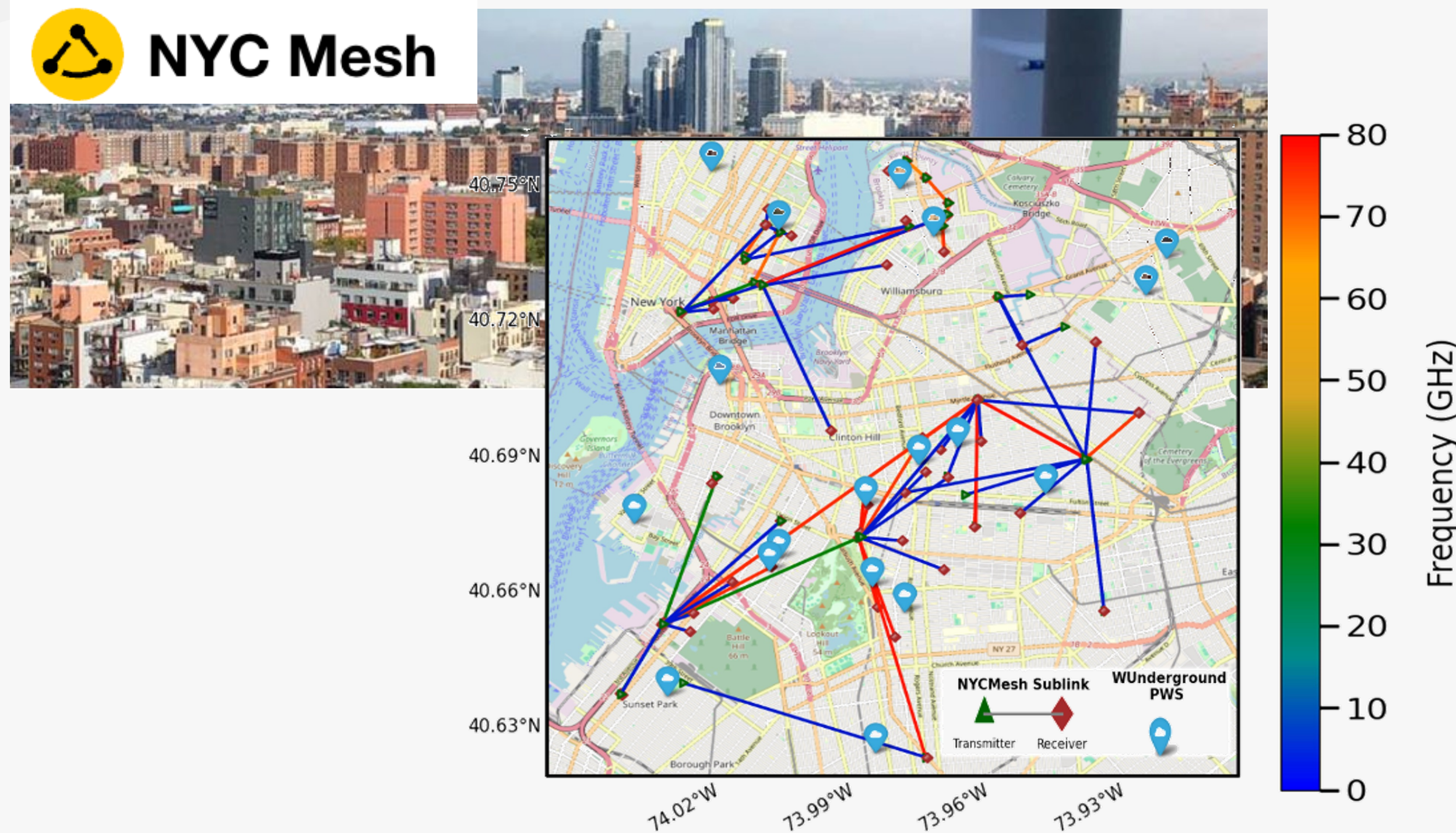
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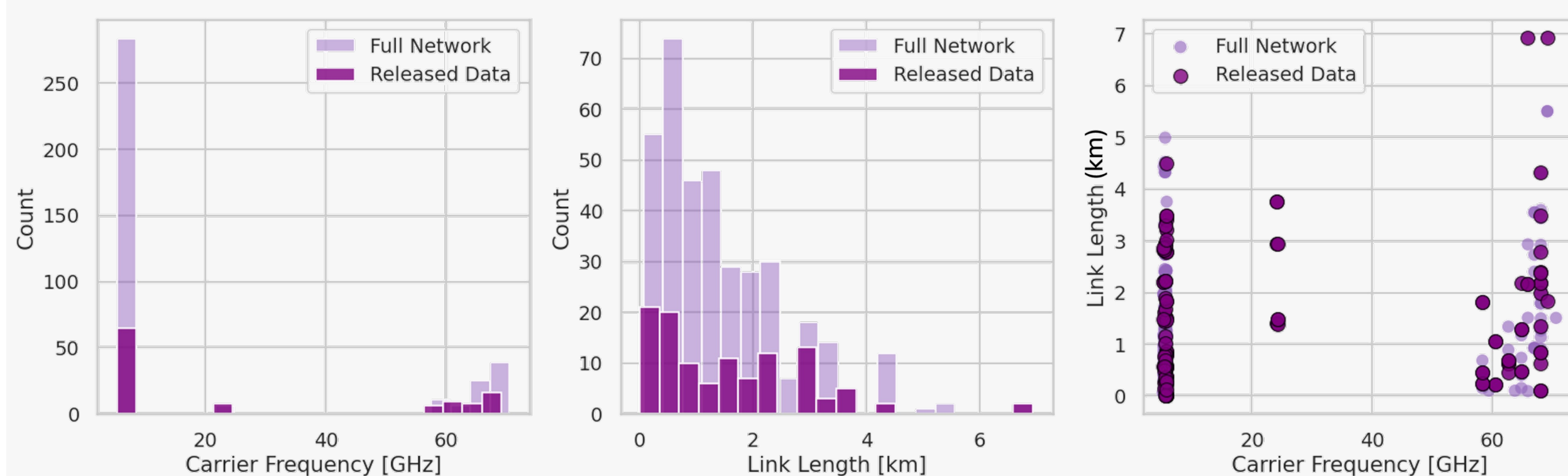
## 1. Introduction

OpenMesh is publicly available in **doi 10.5281/zenodo.15268340**, inviting the community to advance opportunistic sensing in New York City's dense urban environment.



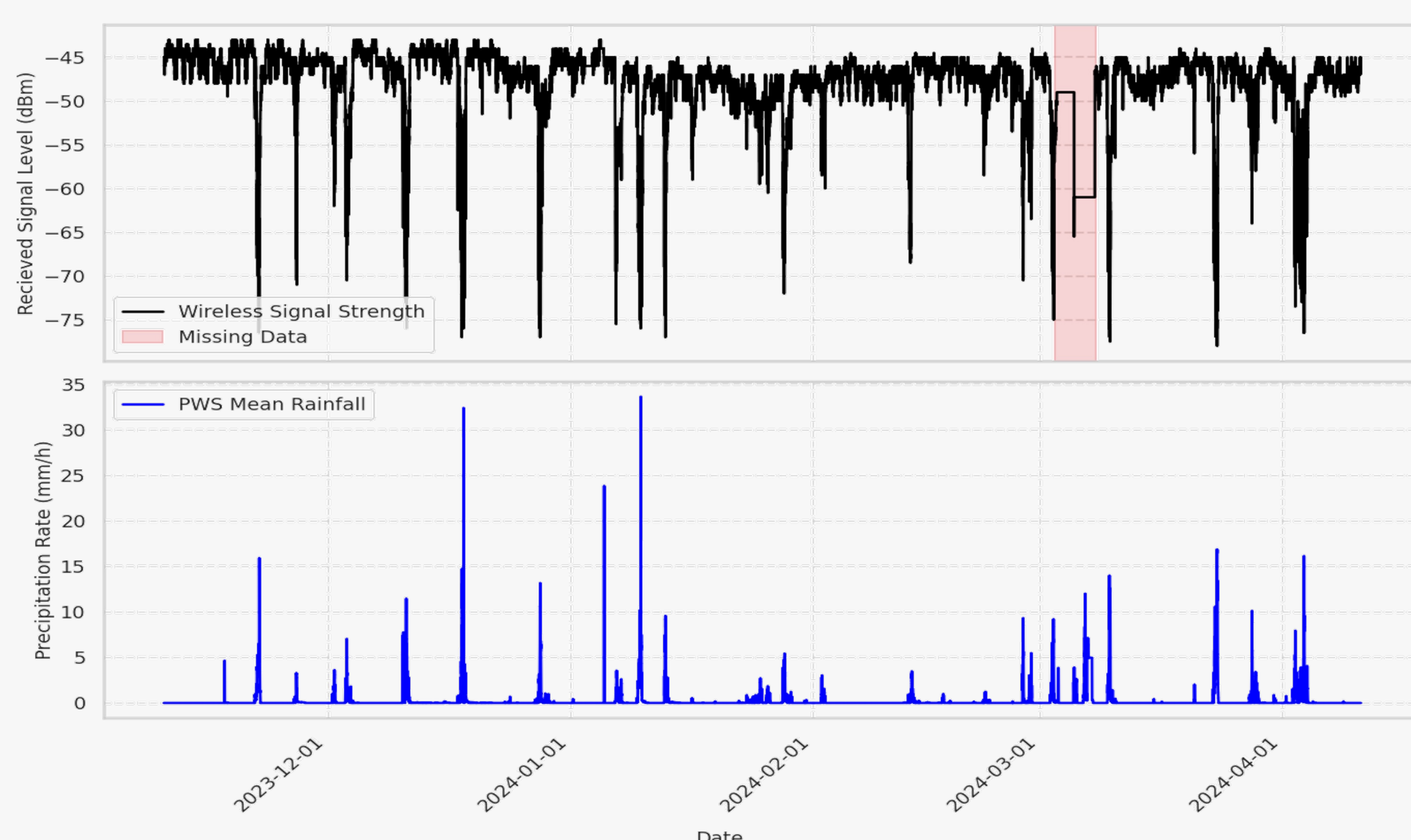
Originally installed for affordable community internet these signals also serve as in-city weather sensors, advancing the opportunistic integrated sensing-and-communication (OISAC) platforms for next-generation networks.

## 2. Dataset



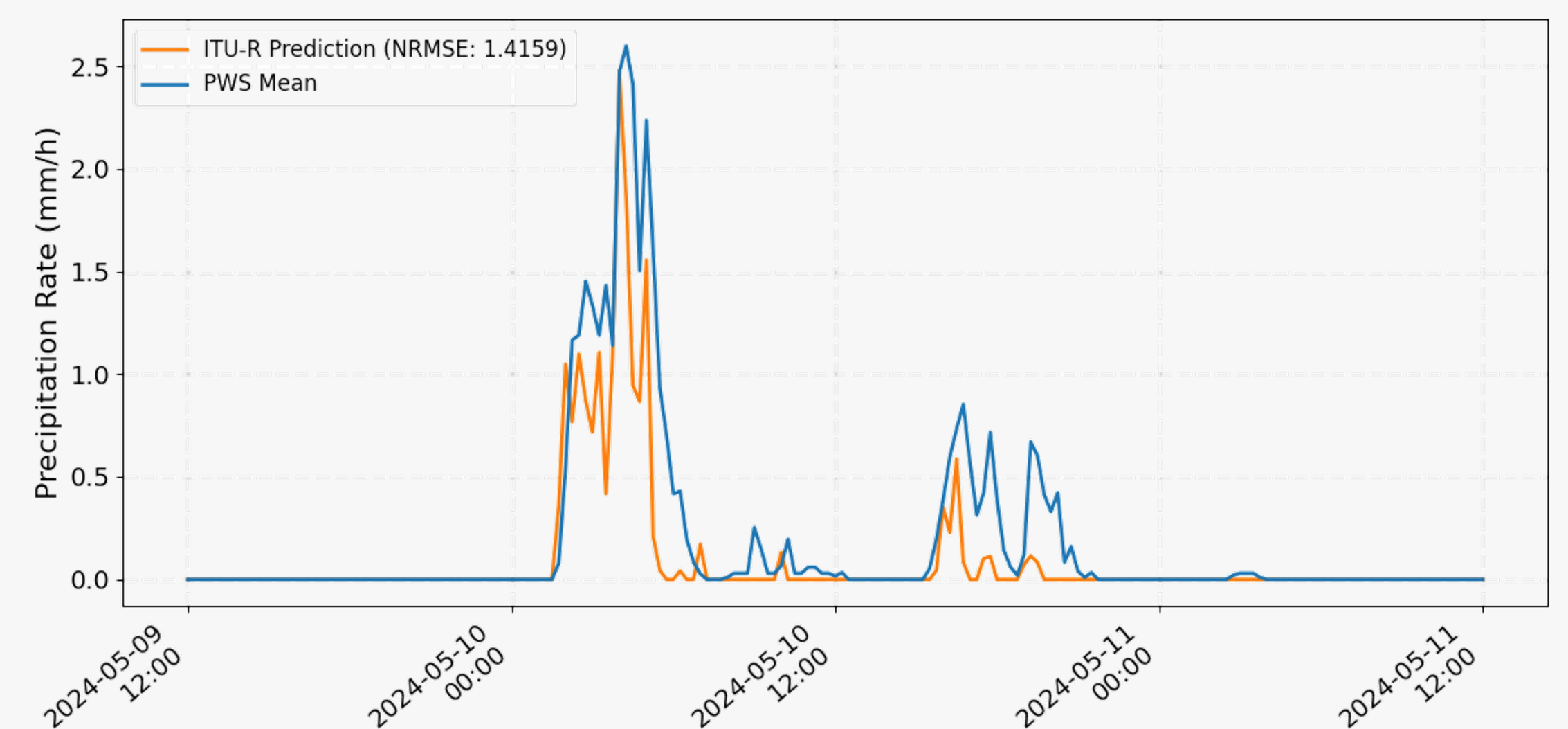
❖ The dataset spans eight months (Nov 2023 – Jun 2024) of 1-min Received Signal Level (RSL) records from 103 sublinks.

❖ The released subset covers four bands—5 GHz, 24 GHz, and 60–70 GHz—with link lengths from tens meters to 7 km.

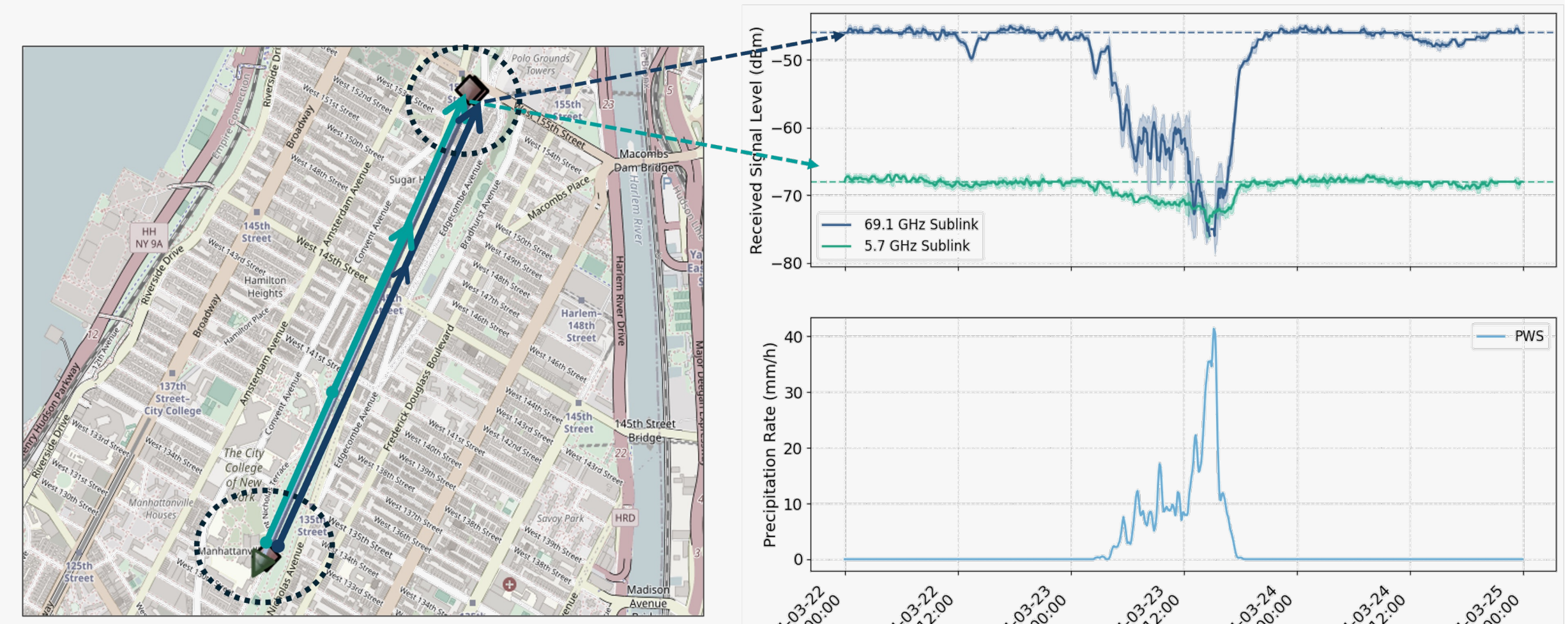


## 3. Analysis

OpenMesh links align with local PWS rain rates, demonstrating real-time urban rainfall sensing, showing high density **rainfall estimation**.



❖ **Dual-band links:** OpenMesh pairs a rain-resilient low and high-capacity (~70 GHz) sublinks on the same path, unlocking new avenues for opportunistic sensing.



❖ **Snow Sensing:** The dataset covers several snowstorm periods, capturing their impact across all monitored frequency bands.

