



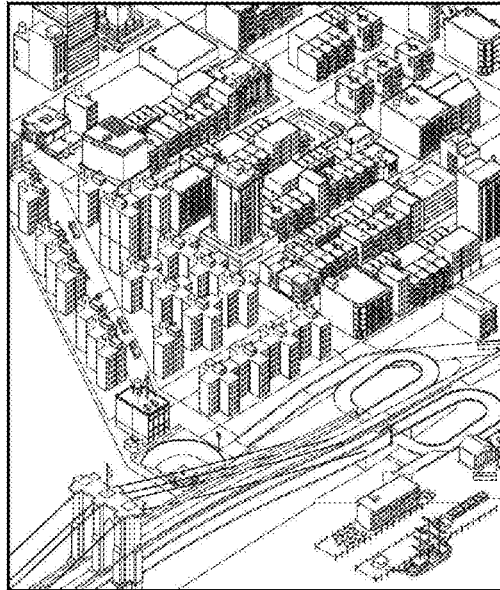
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Khalid(10) **Pub. No.: US 2023/0231639 A1**(43) **Pub. Date: Jul. 20, 2023**(54) **SMART RADIO FREQUENCY
PENETRATION LOSSES ASSESSMENT FOR
DIGITAL CLUTTER**(52) **U.S. Cl.**
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(2013.01); *H04W 24/10* (2013.01)(71) Applicant: **Charter Communications Operating,
LLC, St. Louis, MO (US)**(57) **ABSTRACT**(72) Inventor: **Saran Khalid, Denver, CO (US)**

Methods and apparatus for determining losses due to obstructions in a wireless communications system are described. Pairs of measurements points, one of each side of an obstruction are selected, and wireless device reported received signal energy measurements corresponding to the pair of selected locations are used to determine a path loss through the obstruction. In some embodiments, the pair of measurements points are selected based on one or more of: wireless device orientation at the time of measurement, application in use at the time of measurement, time between measurements, or location between measurements. In one example, a first selected location in the pair corresponds to an outdoor location with a unobstructed line of sight view to the base station, while the second selected location corresponds to an indoor location.

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