BLE Scan Analysis

1) Classroom

- Devices Detected: 5
- Strongest Signal: DESKTOP-2OFONJ2 at -68 dBm (2.82 m)
- Weakest Signal: UUID 01744B8C... at -90 dBm (35.48 m)
- Observations: 1)Presence of a desktop device suggests fixed infrastructure. 2)Most devices have 0 ms advertising intervals, indicating frequent broadcasts. 3)Signal attenuation likely due to walls, furniture, and electronic interference.

2) Hallway

- Devices Detected: 5
- Strongest Signal: UUID C5B34604... at -39 dBm (0.1 m)
- Weakest Signal: UUID 00AC8370... at -94 dBm (56.23 m)
- Observations: 1)High signal strength from a very close device suggests proximity to a wearable or phone. 2)Two devices are “Not Connectable,” likely passive beacons or privacy-preserving sensors. 3)Hallways may act as signal corridors, allowing longer-range detection.

3) Street

- Devices Detected: 5
- Strongest Signal: JBL TUNE FLEX-LE at -61 dBm (1.26 m)
- Weakest Signal: MOMENTUM 4 at -100 dBm (112.2 m)
- Observations: 1)Outdoor scan shows wider signal dispersion and weaker average RSSI. 2)Duplicate JBL entries with different UUIDs suggest multi-profile broadcasting. 3)Environmental noise is lower, but physical obstructions like buildings still affect signal.

Technical Interpretation

RSSI vs. Distance

RSSI generally decreases with distance, but not consistently due to:

1. Obstructions (walls, furniture, people)
2. Device orientation
3. Transmission power variability

*Example: MOMENTUM 4 at -100 dBm is farthest, while C5B34604… at -39 dBm is closest.

Advertising Behavior

- ✓ Most devices advertise at 0 ms intervals—common for consumer electronics.
- ✓ Longer intervals (e.g., 1150 ms) seen in less interactive or energy-saving devices.

Device Types

- ✓ Named Devices: JBL, MOMENTUM, Venu Sq—likely wearables and audio gear.
- ✓ Unnamed Devices: Possibly IoT sensors, beacons, or privacy-hardened devices.

BLE Usage and Security/Privacy Implications

Everyday Usage

BLE powers:

- ✓ Wearables (fitness trackers, smartwatches)
- ✓ Audio devices (headphones, earbuds)
- ✓ Smart home tech (lights, locks, sensors)
- ✓ Retail beacons and location services

Risks and Considerations

- ✓ Tracking: Persistent UUIDs can be used to monitor movement.
- ✓ Identifier Exposure: Static MACs or UUIDs may reveal device type or user identity.
- ✓ Passive Scanning: Attackers can silently collect BLE advertisements.

Mitigation Strategies

- ✓ MAC Randomization
- ✓ Limited Advertising Windows
- ✓ User Awareness and Permissions

Final Conclusion

- BLE scans reveal rich device ecosystems, with signal behavior shaped by environment.
- Indoor scans show more devices with stronger signals; outdoor scans show wider dispersion but weaker RSSI.
- Signal strength is a useful but imperfect proxy for distance.
- BLE is deeply embedded in modern tech, but its openness raises privacy concerns.
- Awareness and configuration are key to balancing convenience with security.