Bluetooth Range Estimator

Path Loss (Propagation) Models

The Bluetooth Range Estimator calculates the expected maximum range between two Bluetooth devices within a typical home, office, industrial or outdoor environment. Below is detail on the specific path loss model used for each environment as well as any default settings that were used within the model.

Outdoor Environments

The **Two-Ray Ground Reflection Model** is used for calculating the expected range within typical outdoor environments. The following default settings were used:

- Link Margin: 15 dB - 20 dB
- Tx Antenna Height: 1 meter
- Rx Antenna Height: 1 meter
- Transmission Frequency：2440Mhz

Industrial Environments

The **Log-Normal Shadowing Model** is used for calculating the expected range within typical industrial environments. As this model was constructed by measuring distances up to 140 meters within several representative industrial facilities, range estimates beyond 140 meters are not provided within the Bluetooth Range Estimator. The following settings were used:

- Link Margin: 7 dB
- Tx Antenna Height: 6 meters
- Rx Antenna Height: 2 meters

Home & Office Environments

The **NIST PAP02-Task 6 Model** is used for calculating the expected range within typical Home and Office environments. As this model was constructed by measuring distances up to 45m within typical home and office environments, range estimates beyond 45 meters are not provided within the Bluetooth Range Estimator. The following default settings were used:

- Link Margin: 0 dB