AI/ML gyakorlati hasznosítása IT hálózatok üzemeltetésében

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Clico ConnAction 2025.04.03.

juniper NETWORKS | Engineering Simplicity

AI is the Next Step in the Evolution of Automation

Reinforcement Learning
RRM

Shapley ✓
Feature assessment

Unsupervised Learning
Location

LSTM- Neural Network
PreConnection Anomaly Detection,
Wired Anomaly ✓

GAI / LLM / Transformers
Marvis Conversational Assistant

DEEP LEARNING

ARTIFICIAL INTELLIGENCE

MACHINE LEARNING

K-Means Clustering
Scope failure analysis

Decision Tree
AP / Switch Health, DHCP Health, Coverage Hole, bad cable

XGBoost Decision Tree
Zoom Prediction
Switch Uplink Detection

Logistic Regression
AP Health, Switch Health
Port Stuck, High CPU ✓

Sematic Search / Cosine Similarity
Doc Search
Production Push Verification

Mutual Information
SLE Feature Discovery
Anomaly Scope Cause A
Zoom Root Cause Analy

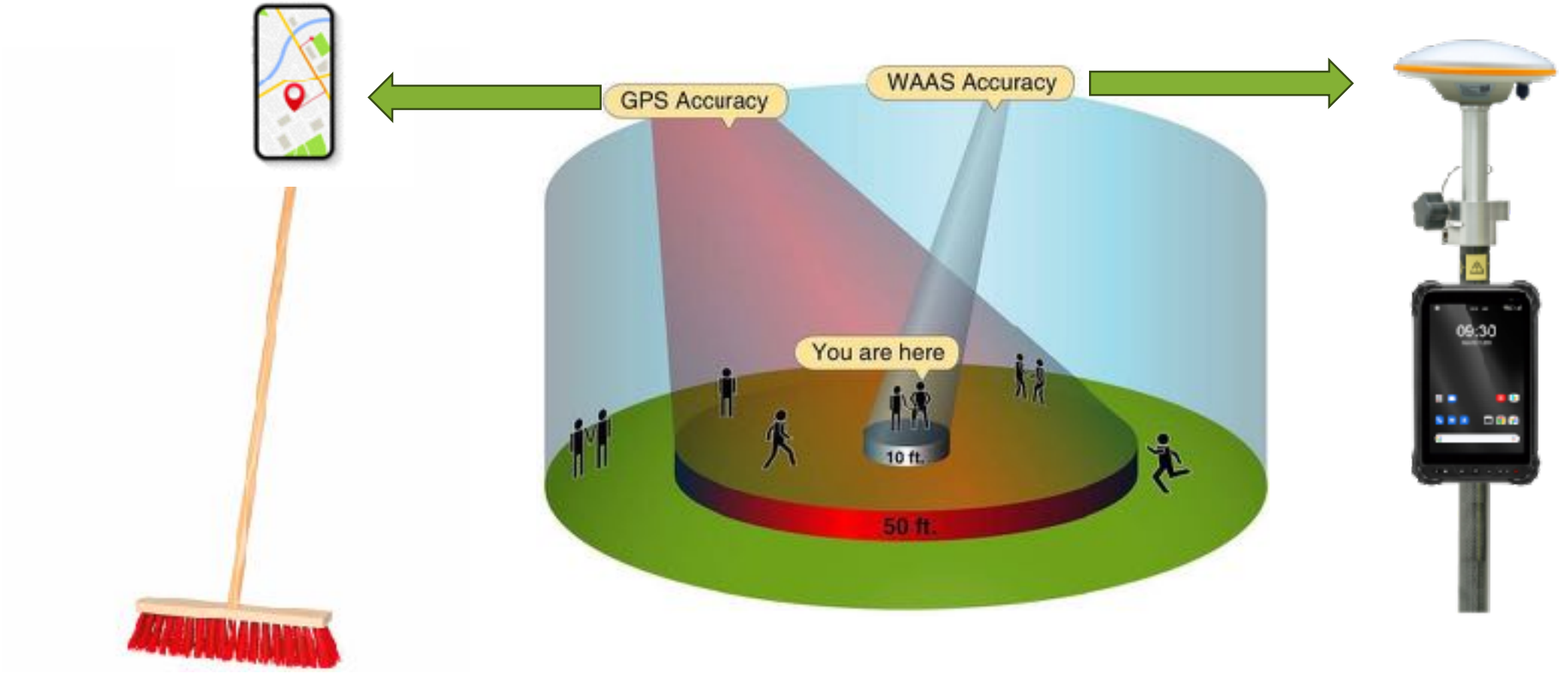
Domain Expertise Classification
Service Level Metrics, Event Timeline

Bayesian Inference
Anomaly Root Cause Analysis
Persistently Failing Clients
Auto Placement of AP

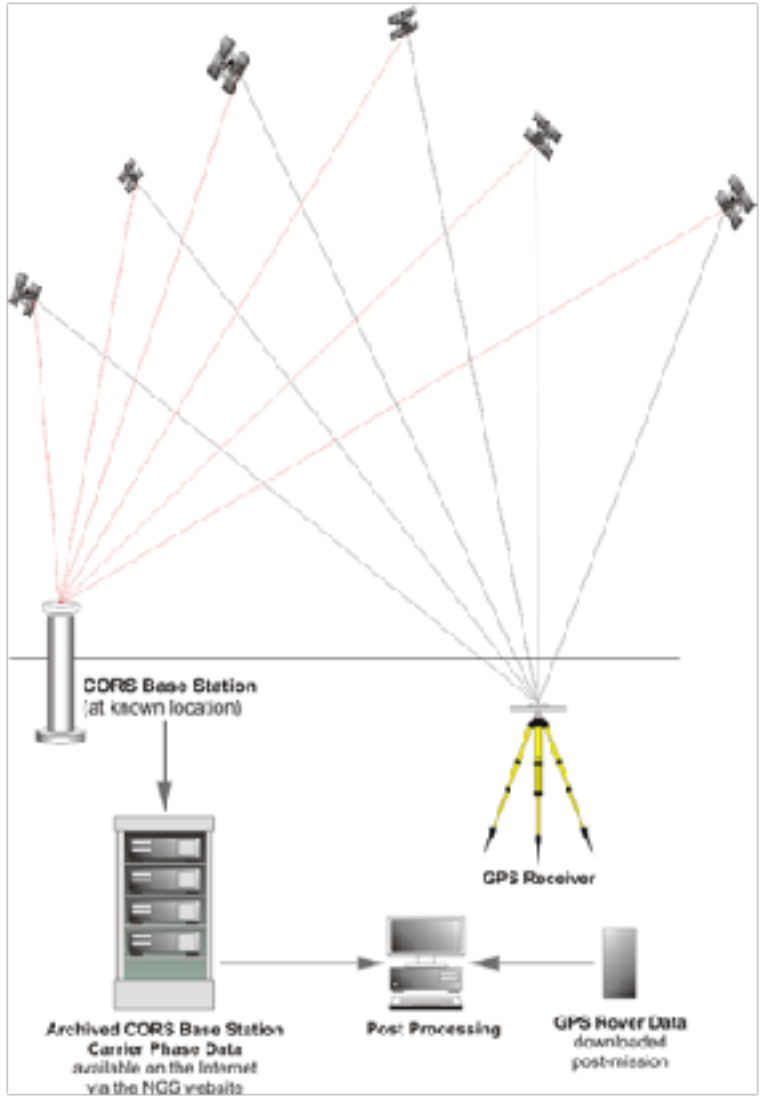
MOBILITY FIELD DAY

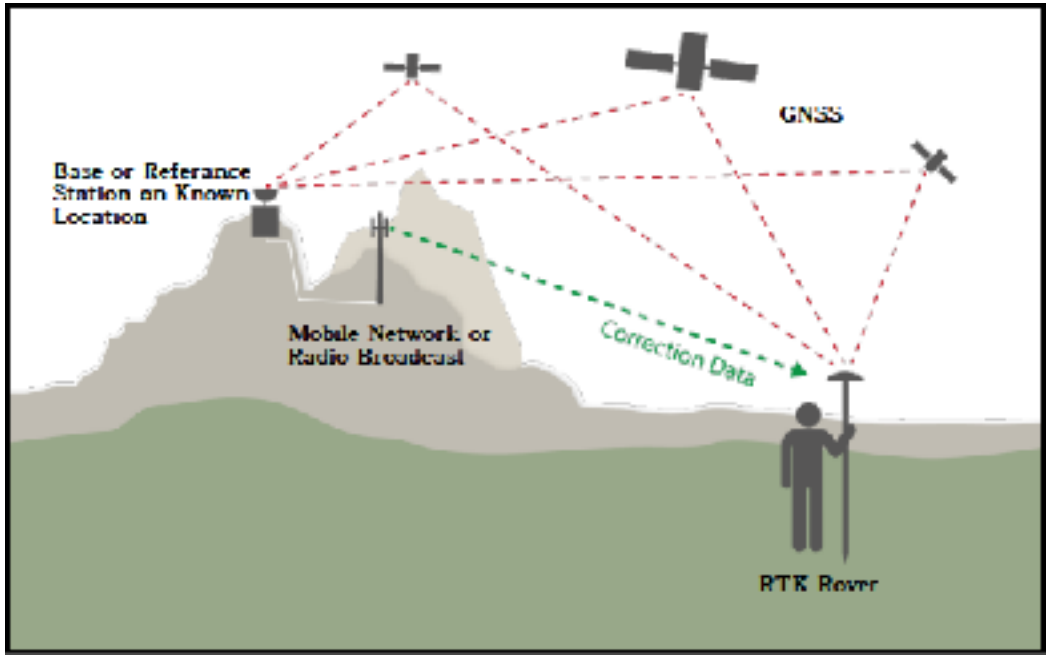
Indoor Location

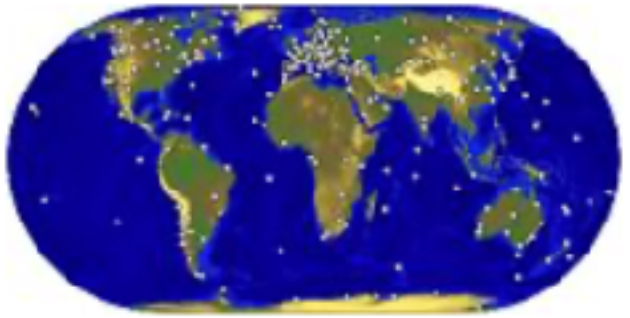
Localisation principles



Precise outdoor localisation







Precise Indoor / Outdoor localisation analogy

Outdoor

GPS Satelite triangulation = 3-8m

GPS Satelite triangulation + surface reference point bias = 0.1m

Indoor

Omnidirection BLE beam triangulation = 10-15m

Omnidirection BLE beam triangulation + BLE beacons =5-7m

Multi-array BLE beams= 3-5m

Multi-array BLE beams + ML assisted distance bias calibration = 1-1.5m

Bluetooth

	Bluetooth (Classic)	BLE
Modulation	Basics Rate (BR): GFSK Enhanced Data Rate (EDR): DQPSK/8DPSK	GFSK
Data Rate	Basics Rate (BR): 1 Mbps Enhanced Data Rate (EDR): 2 Mbps / 3 Mbps	1 Mbps, 2 Mbps
Channels	79	40
Channel Width	1 MHz	2 MHz
Channel Spacing	1 MHz	2 MHz
Max TX Power	Class 1: 100 mW Class 2: 2.5 mW Class 3: 1 mW	Class 1: 100 mW Class 1.5: 10 mW Class 2: 2.5 mW Class 3: 1 mW

Mist BLE Antenna Array

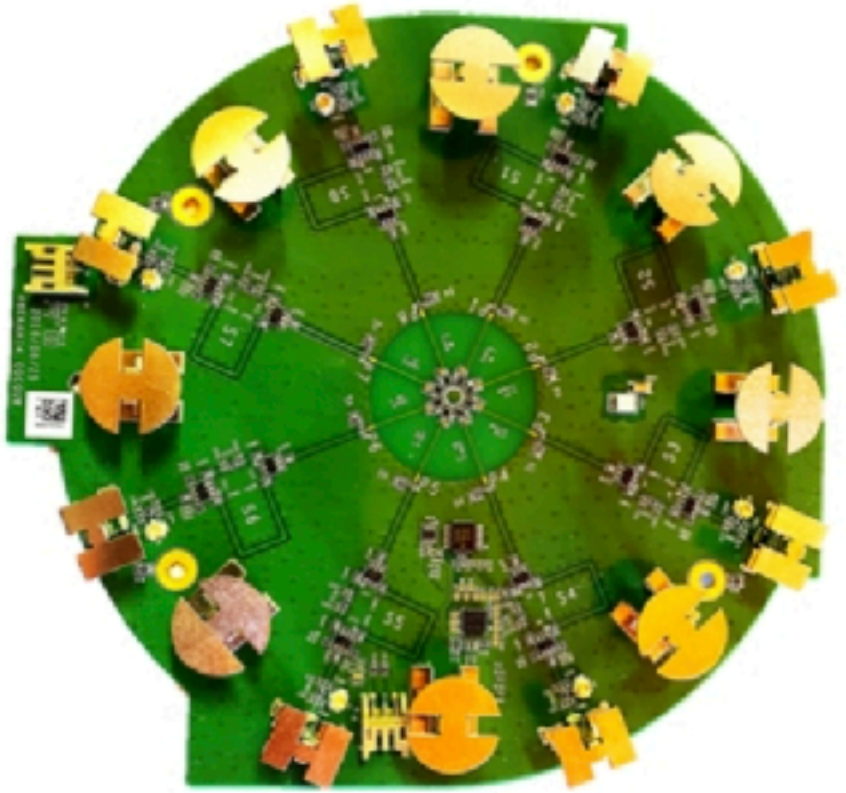
Receive Mode

(BLE Asset Visibility)

Listens for chirps from:

BLE Tags

Bluetooth devices



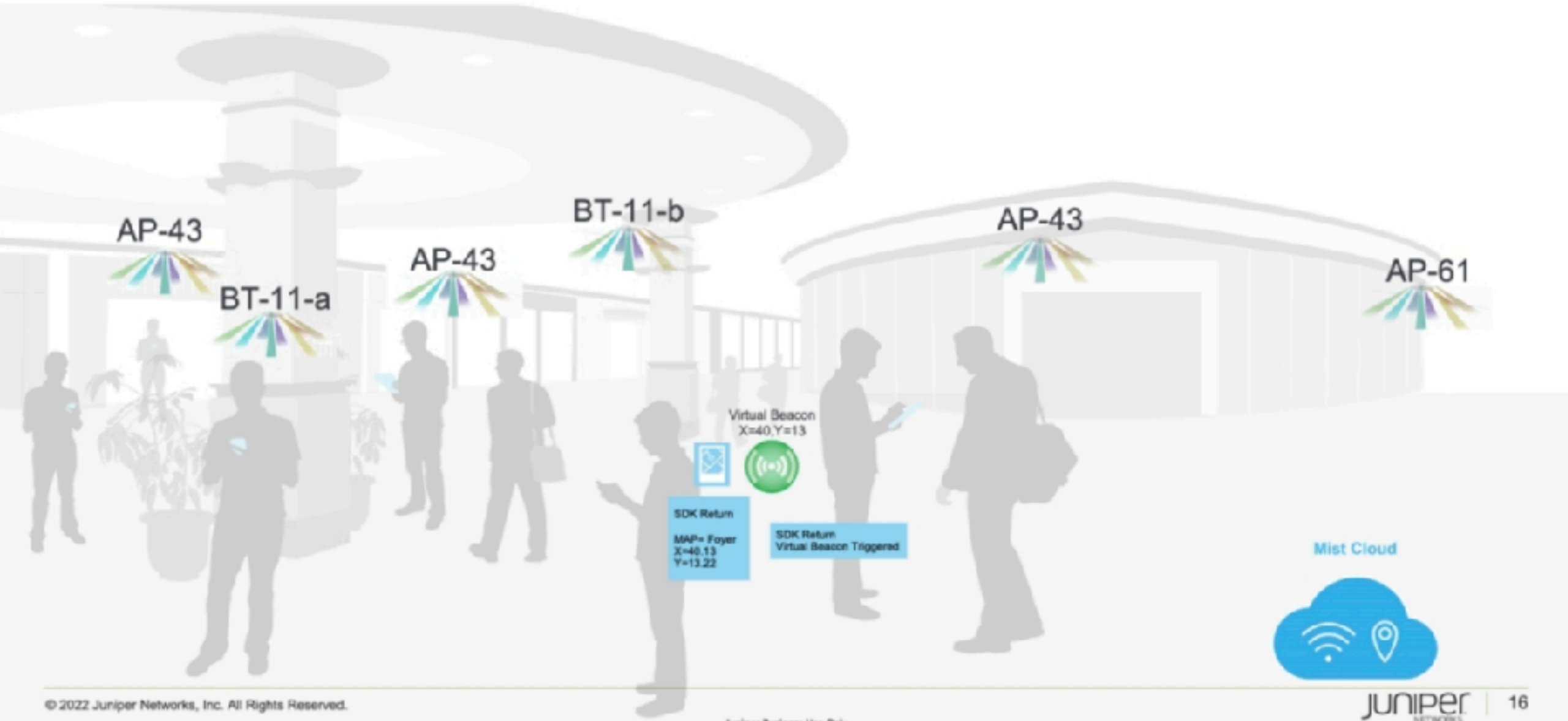
Transmit Mode

(vBLE Engagement)

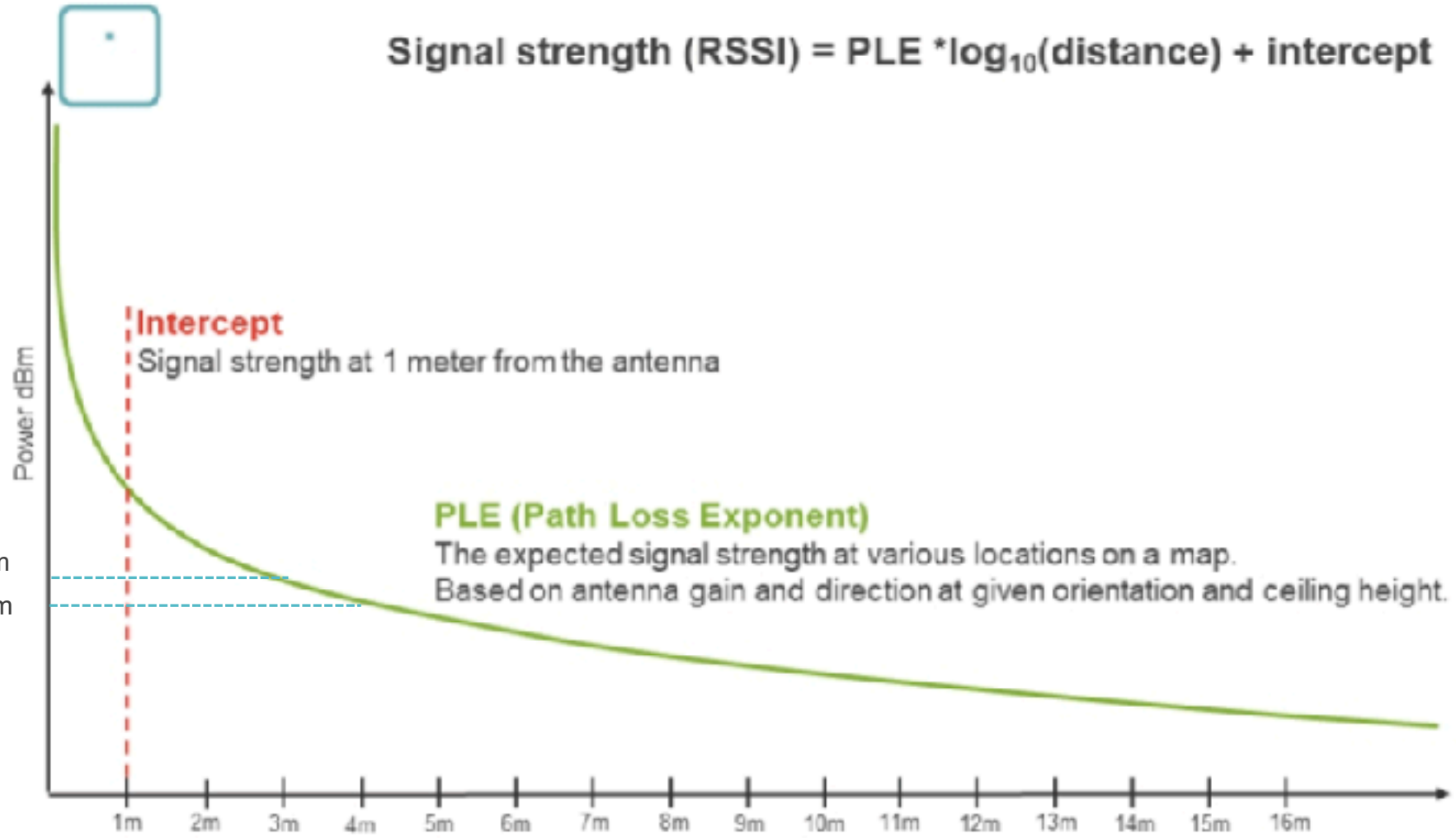
Transmits beams:

Beams received by mobile devices running Mist location SDK

Indoor Location Experiences

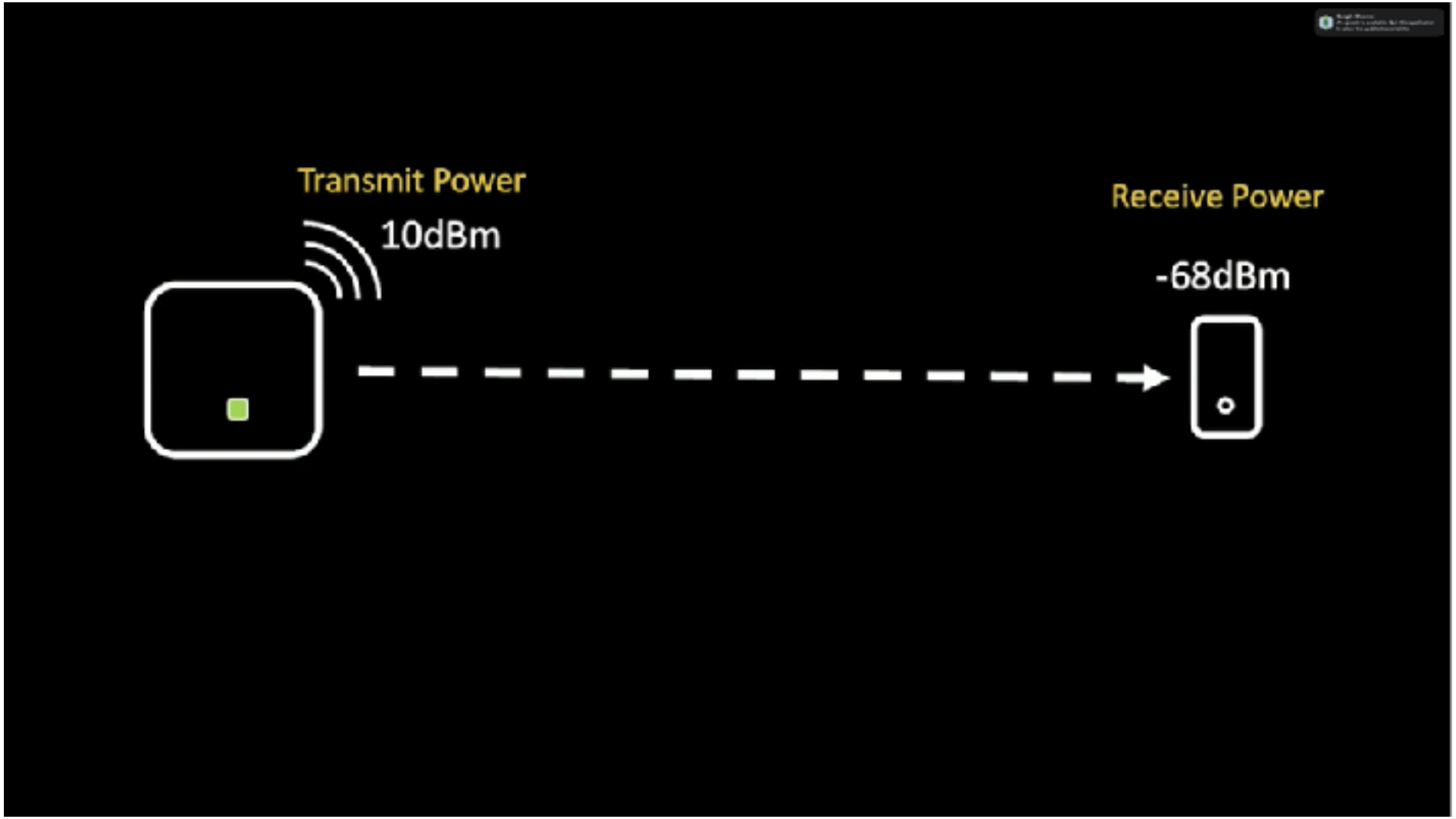


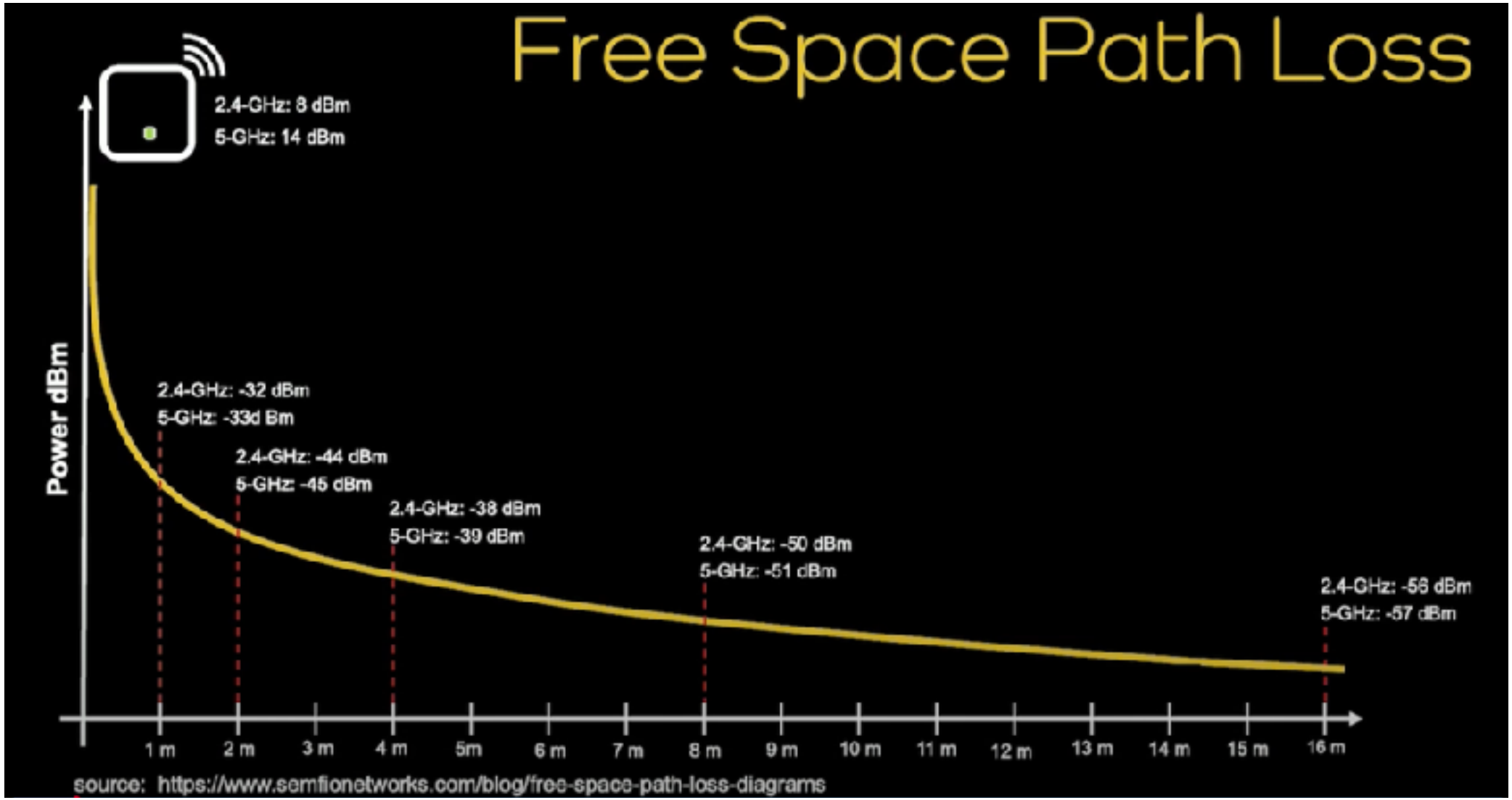
PLE and Intercept

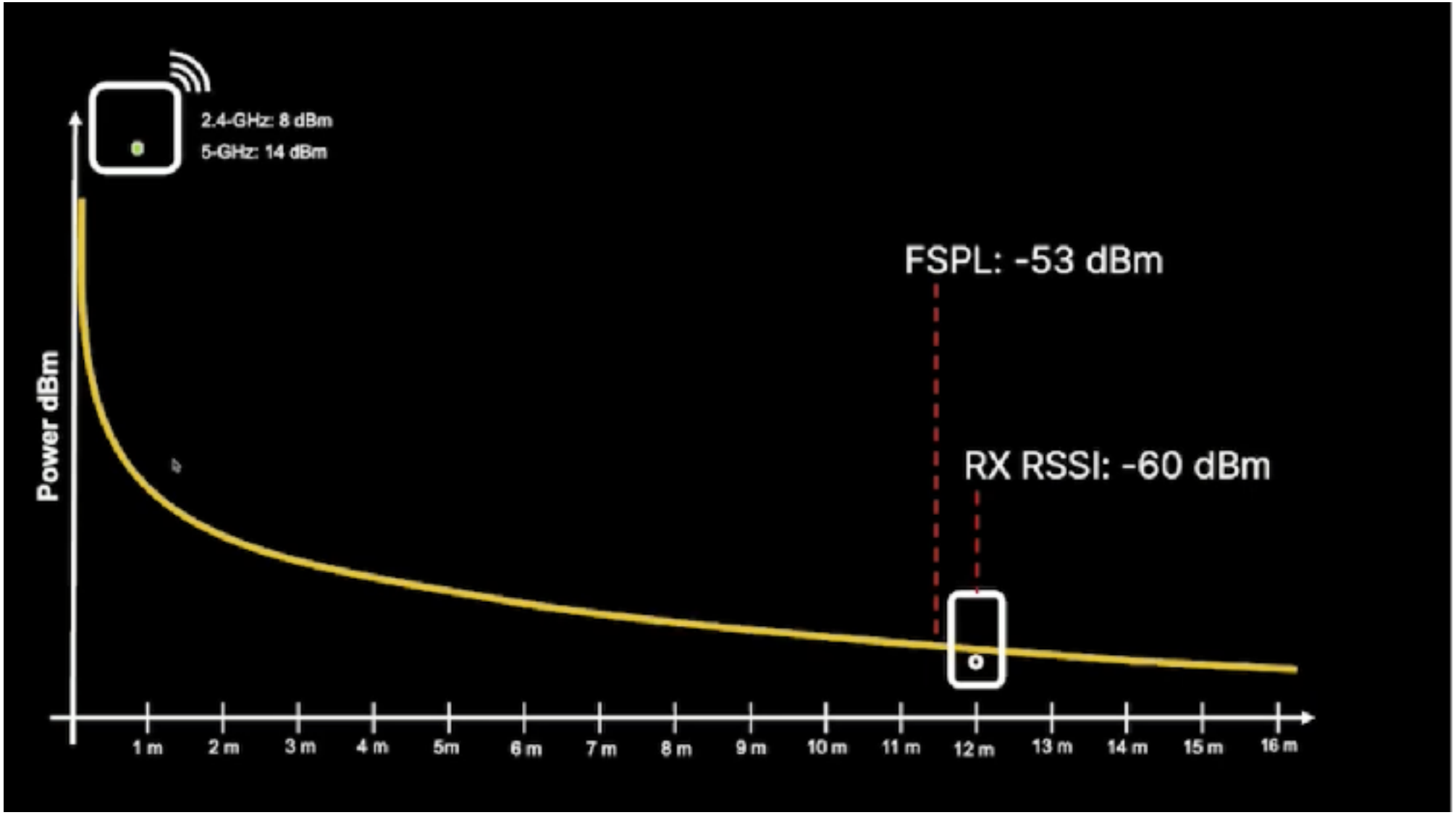


Device A -41dbm

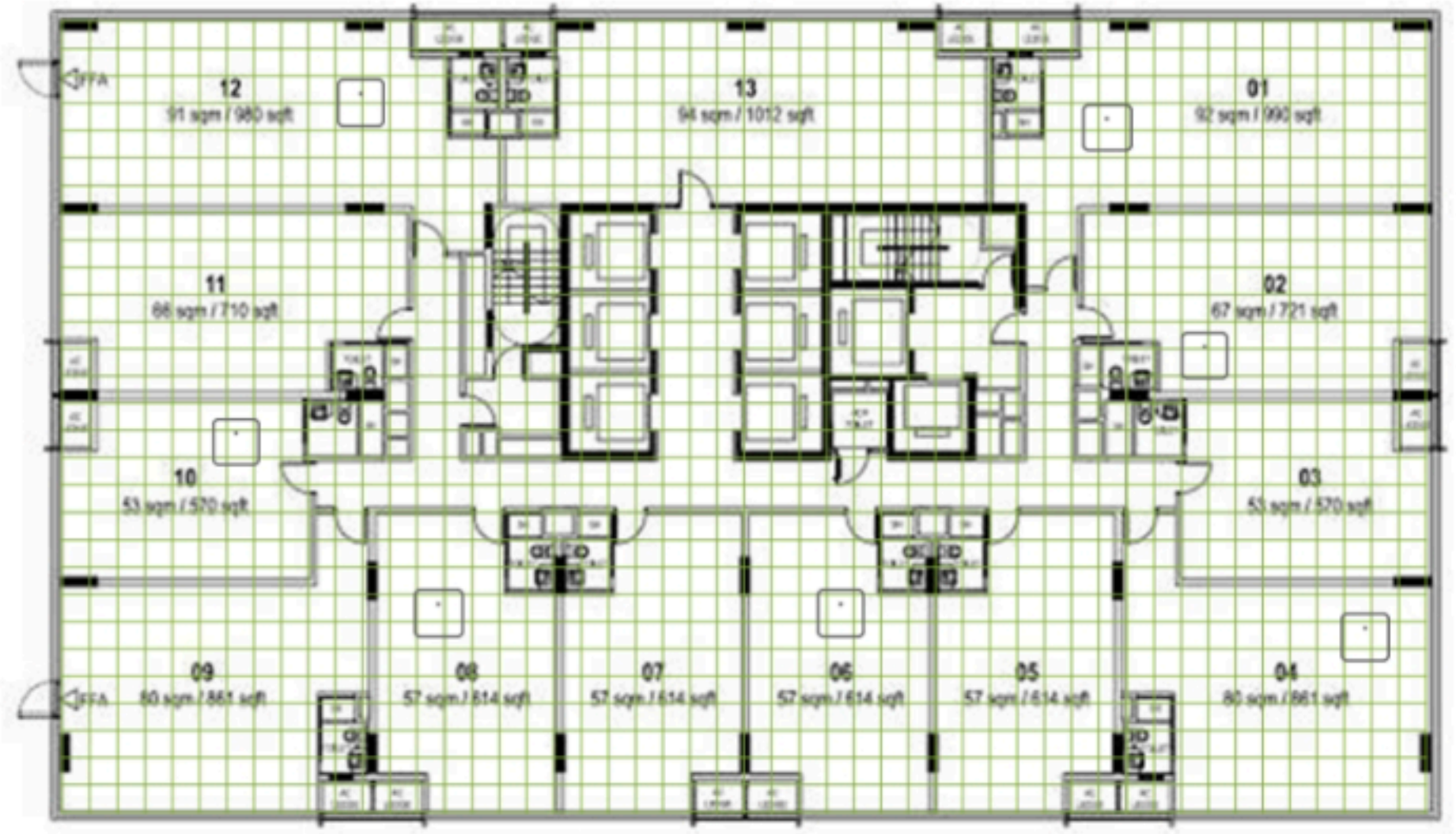
Device B -42dbm



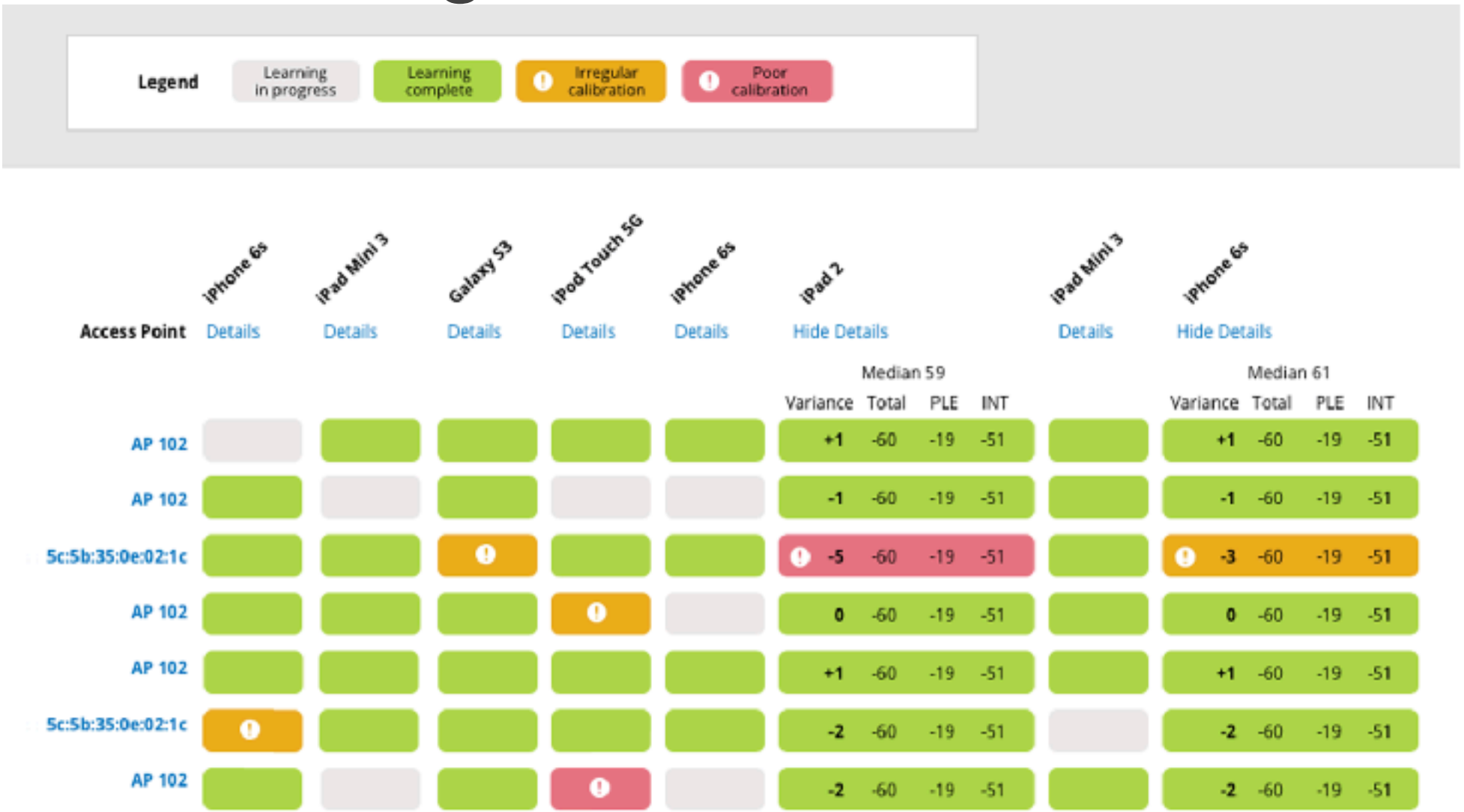




Probability Surface (1 of 2)



Machine learning database



Demo video


Location machine learning
0:20
CC


Thank you
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Driven by Experience