Millimeter wave up-converted UWB based positioning system

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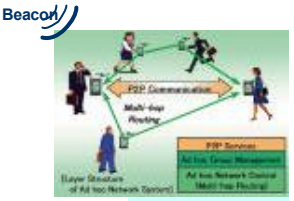
Targeted objective : providing physical inputs for location based routing algorithms

Considered scenario:

- A : Each Mobile Station performs its position (x_i, y_i) by processing incoming signals from the **unique beacon.**
- B : Position information periodically floods the network to update "neighborhood table".

Approach complying with both *On Demand and Proactive* protocols such as:

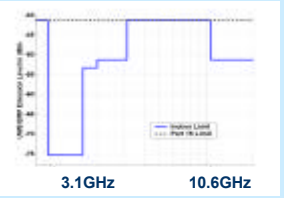
- **LAR (Location Aided Routing)**
- **DREAM (Distance Routing Effect Algorithm for Mobility)**



Ad hoc network

Technical aspects: allocated frequencies

Moving from UWB FCC mask to UWB ERO recommendation



Unlicenced Millemeter band

59GHz — 62GHz

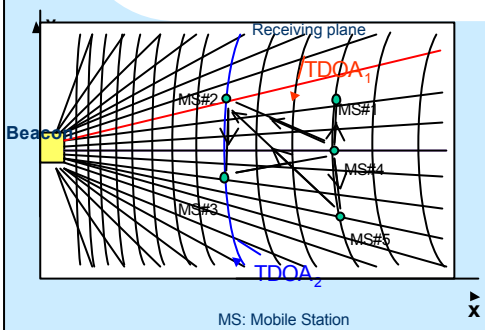
- Less constrained power
- Small size antennas

Constrained transmitting power: -41.3dBm / MHz

Leading to less than 0.5mW for full band transmission

- High data rate (hundreds of Mbit/s)
- Multipath mitigation thanks to the wide bandwidth
- Accurate Indoor location

Principle: using Enhanced Time Difference Of Arrival approach (E-TDOA)



MS: Mobile Station

TDOAs are constant on hyperbolas

Experimental results

Frequency band 59 - 62 GHz