Technology comparison for interface selection in mmWave Vehicular Networks

Davide Peron

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Outline

Introduction

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In the near future, vehicles will communicate each other for several reasons. Nowadays technologies are not suitable for every kind of application.

A set of technologies have to cohexist to ensure good connection in every situation

Introduction

In this work a comparison between the following three technologies is made:

- IEEE 802.11p / DSRC
- LTE
- mmWaves

DSRC

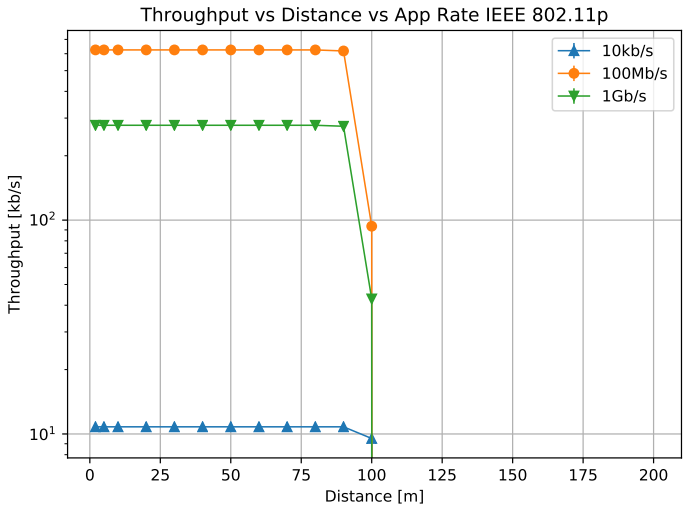
DSRC Introduction

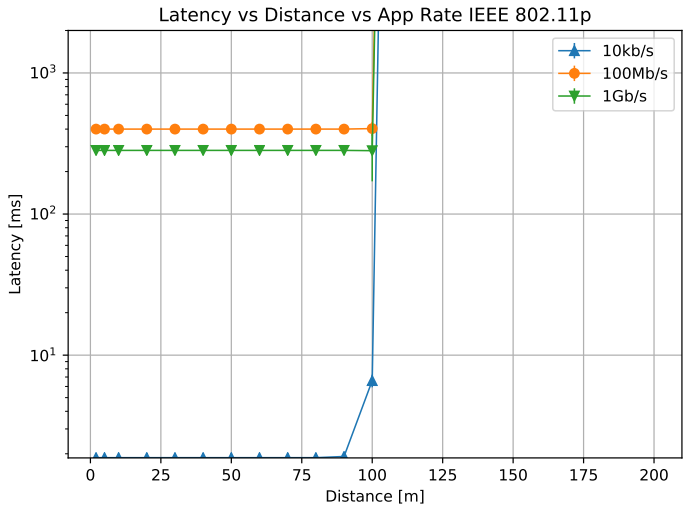
- Used for a V2V scenario
- **Physical data rate:** $6Mb/s$
- **Bandwidth:** 10MHz
- **Application data rates simulated:** $10kb/s$, $100Mb/s$, $1Gb/s$
- **Packet Size:** 1000 bytes

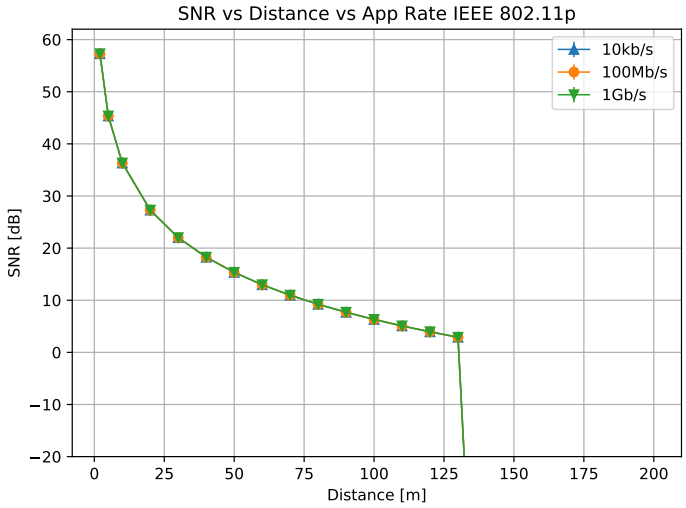
DSRC Simulation Scenario

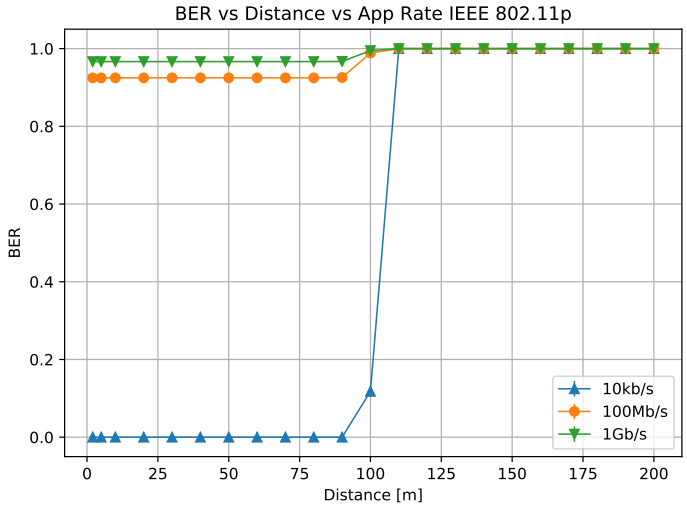
- 2 vehicles in Line-of-Sight share data using UDP
- Distance increases from 2 meters to 200 meters
- 15 runs for each distance and for each data rate

DSRC Results







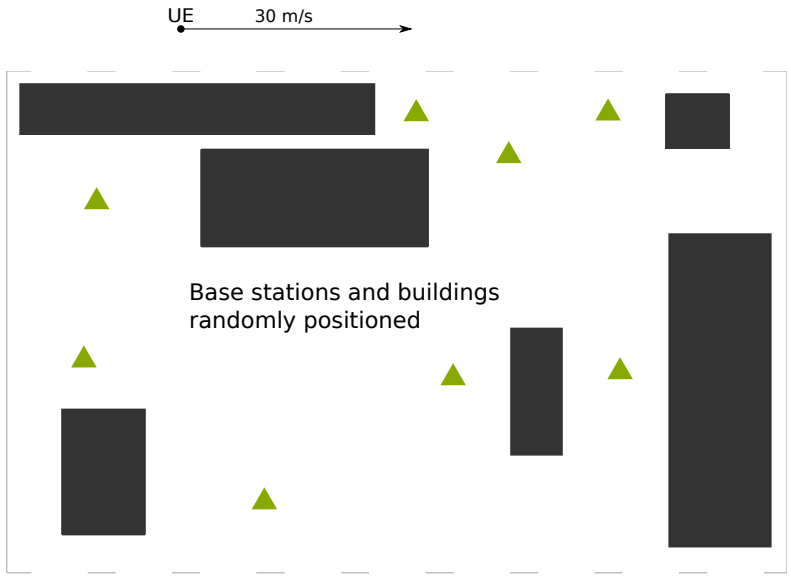


LTE and mmWaves

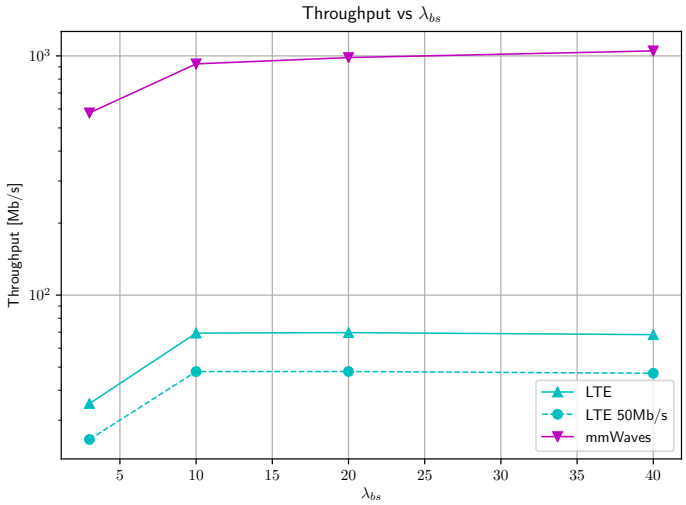
Simulated scenario

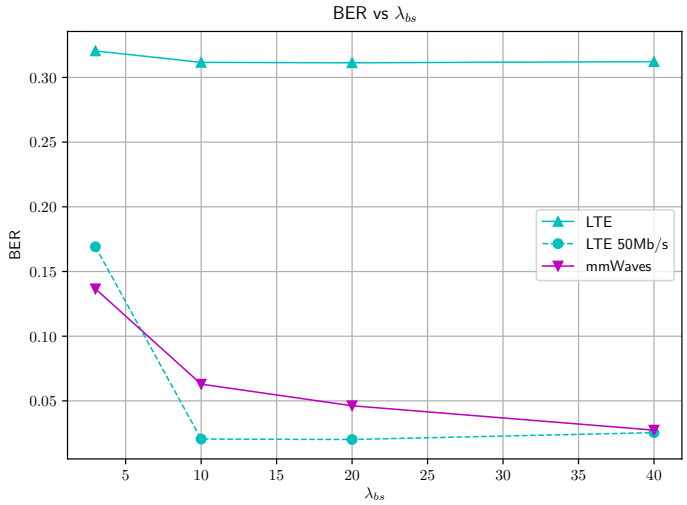
These technologies have been simulated for a V2I scenario, in a square area 500 meters wide with 6 buildings and an increasing number of base stations randomly positioned. The number of base stations increases from

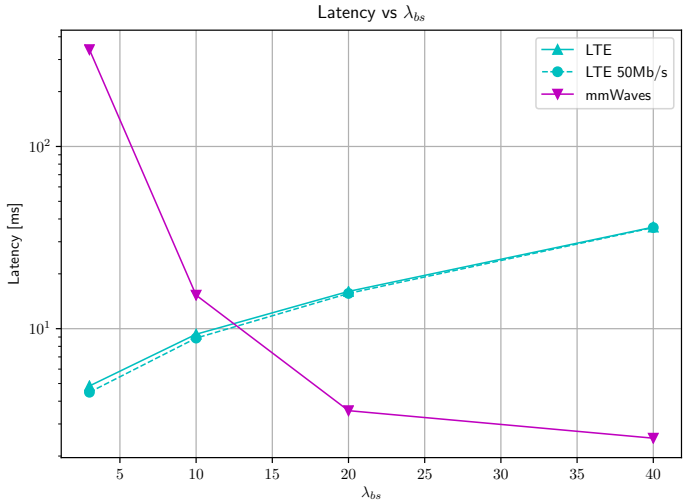
3 to 40, the User Equipment moves $30 m/s$ and sends packets of 1000 bytes each.

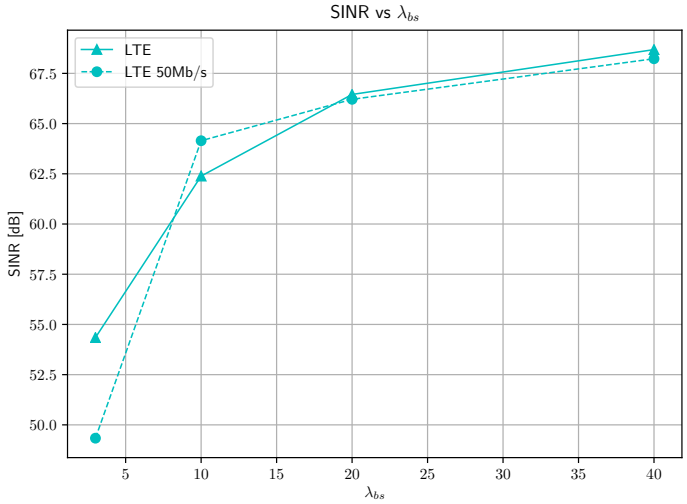


LTE and mmWaves results

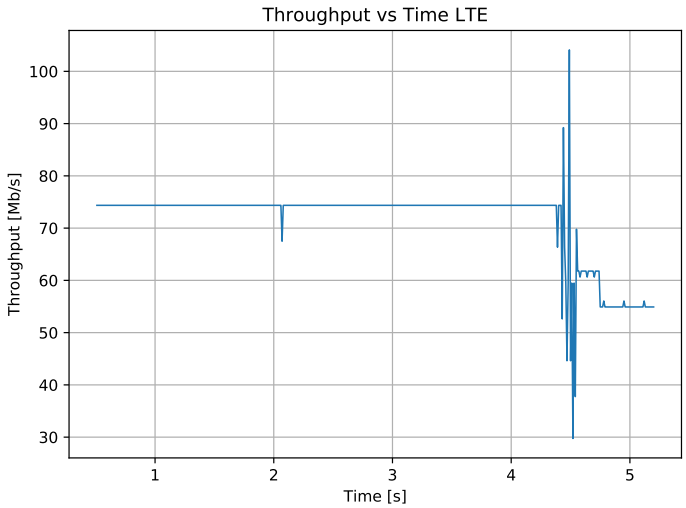


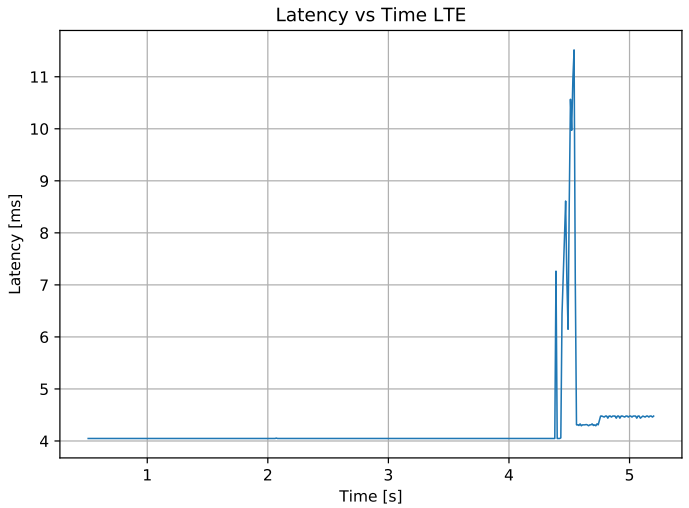


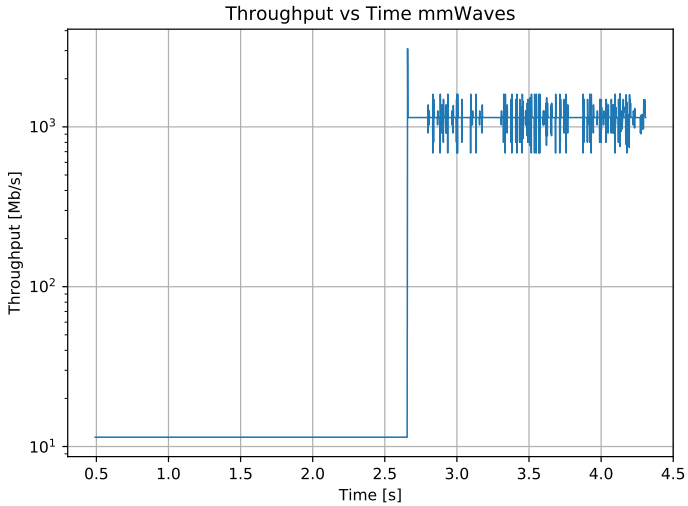


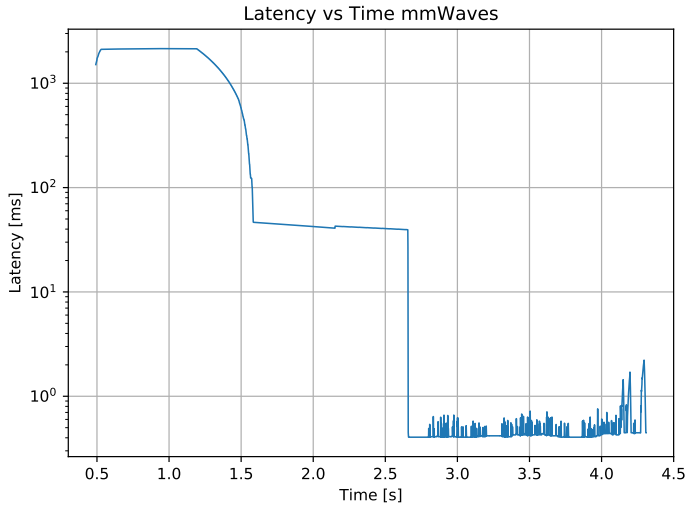


LTE and mmWaves single run









Conclusions

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DSRC

- Uses standard IEEE 802.11 frequency band (5.9GHz), suitable for a dense urban enviornment
- Lower datarate implies slower communications

LTE

- Low frequency but higher datarate, suitable for faster communications in dense urban enviroment
- Can not reach mmWave's datarates

mmWaves

- Very high frequency implies very high datarates
- High sensitivity to blockages (buildings, people, environment conditions)