Technology comparison for interface selection in mmWave Vehicular Networks

Davide Peron

August 22, 2018

Outline

Introduction

Introduction

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

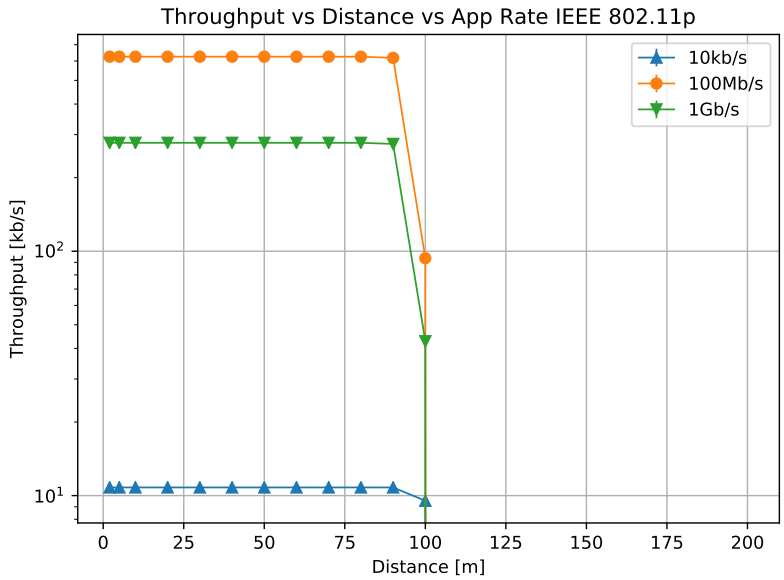
DSRC Introduction

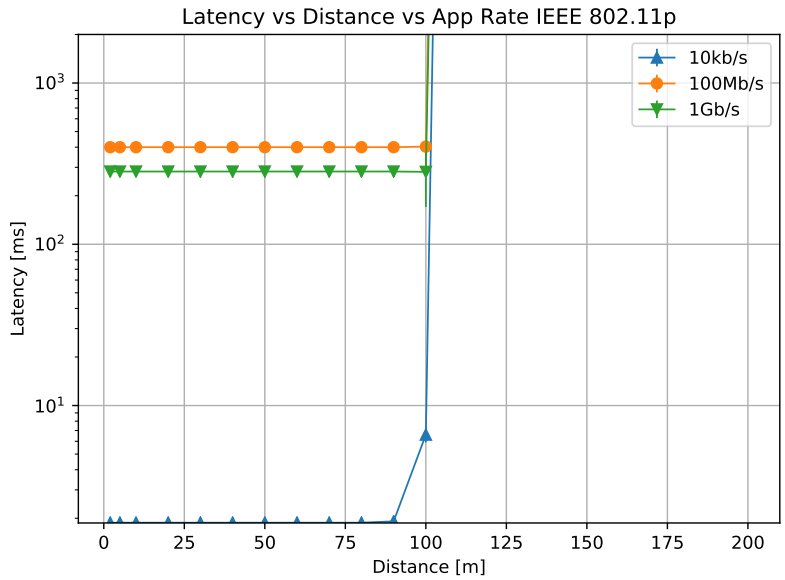
- Used for a V2V scenario
- **Physical data rate:** $6Mb/s$
- **Bandwidth:** 10MHz
- **Application data rates simulated:** $10kb/s$, $100Mb/s$, $1Gb/s$
- **Packet Size:** 1000 bytes

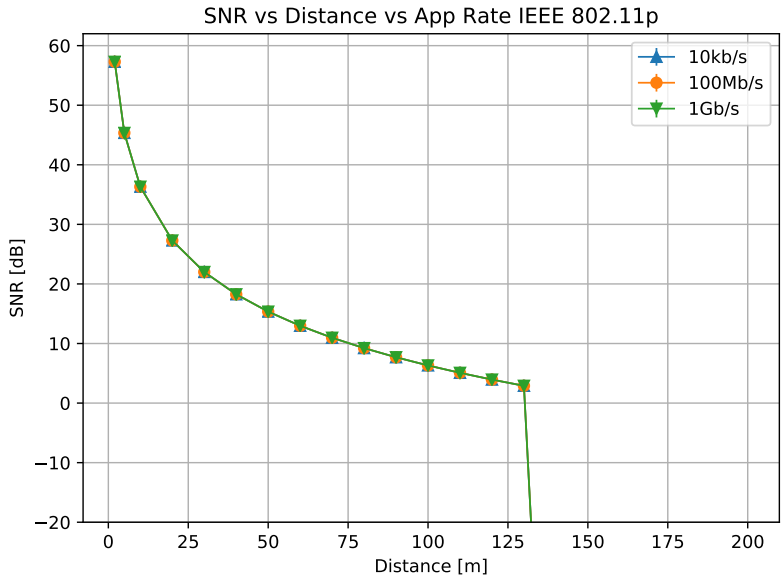
DSRC Simulation Scenario

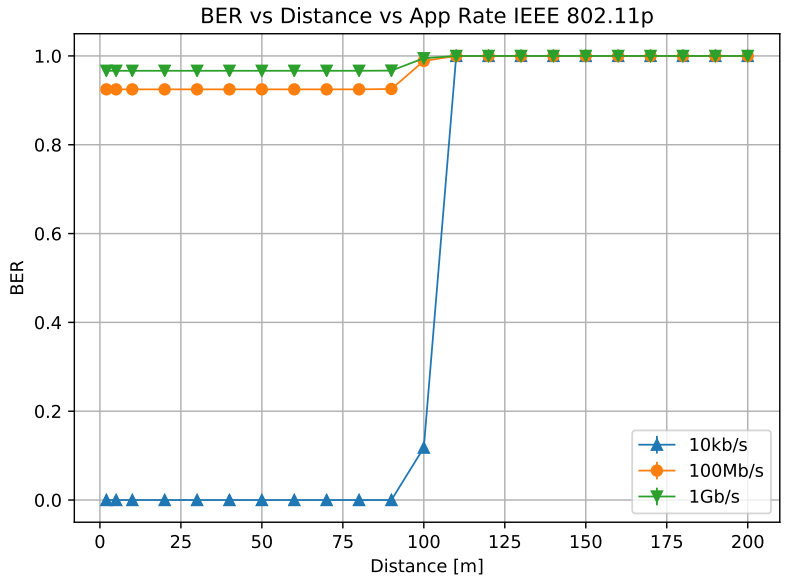
- 2 vehicles in Line-of-Sight share data using UDP
- Distance increases from 2 meters to 200 meters
- 15 runs for each distance and for each data rate

DSRC Results







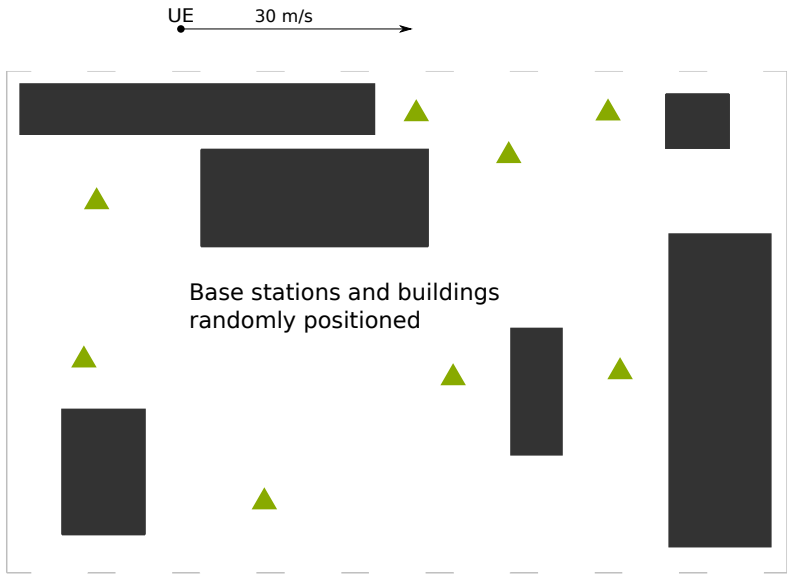


LTE and mmWaves

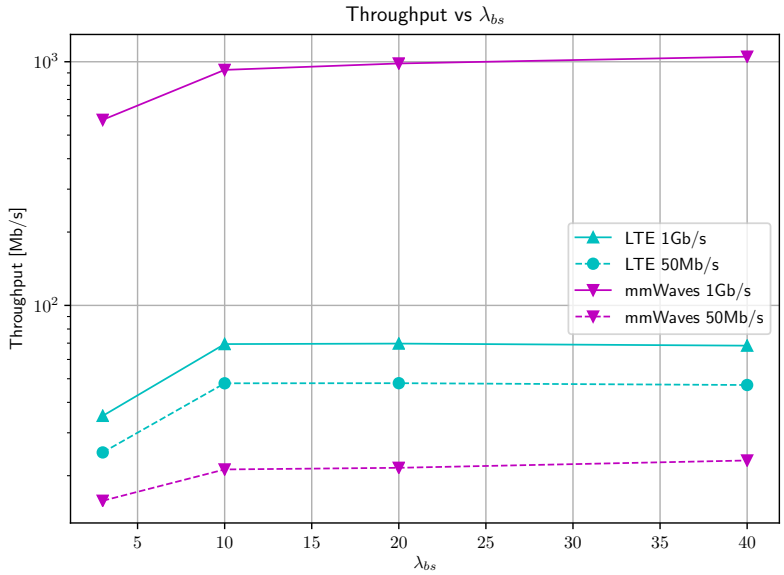
Simulated scenario

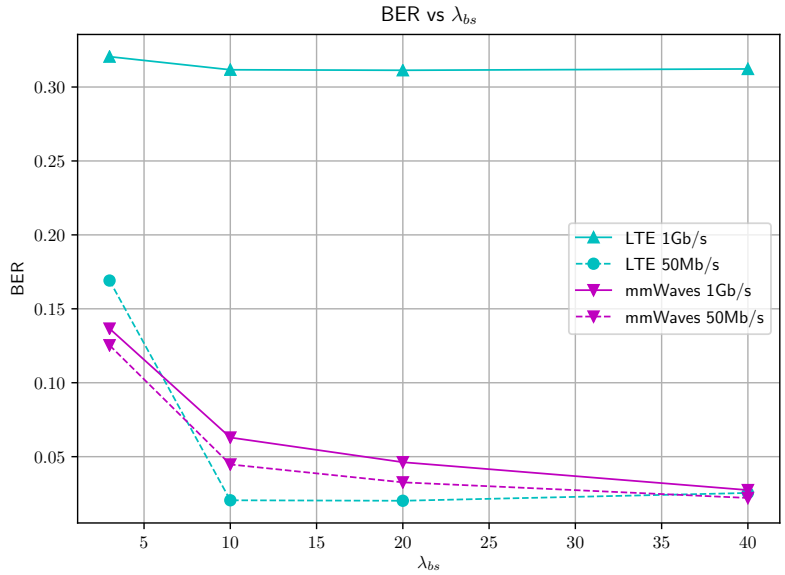
These technologies have been simulated for a V2I scenario, in a square area 500 meters wide with 6 buildings and an increasing number of base stations randomly positioned. The number of base stations increases from

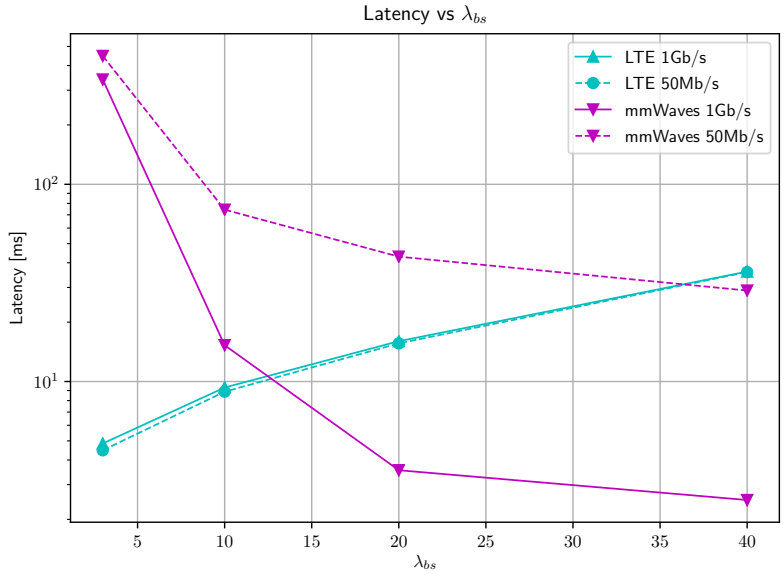
3 to 40, the User Equipment moves $30 m/s$ and sends packets of 1000 bytes each.

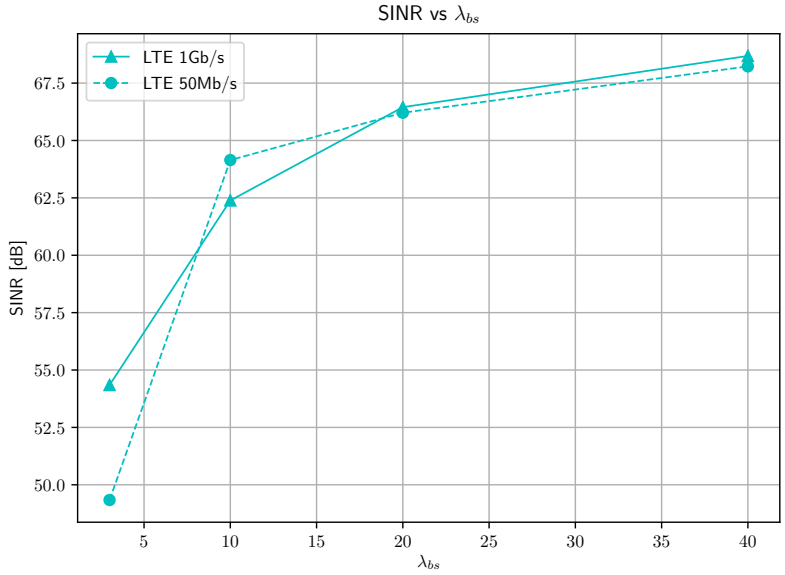


LTE and mmWaves results

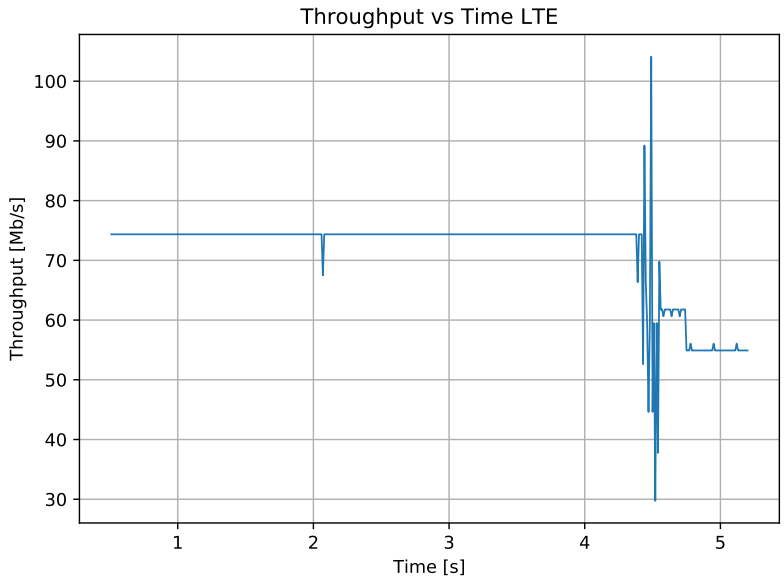


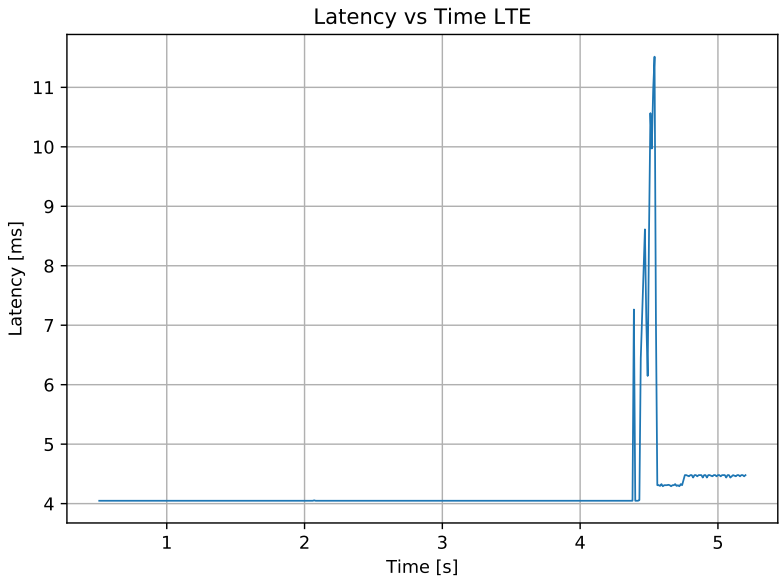


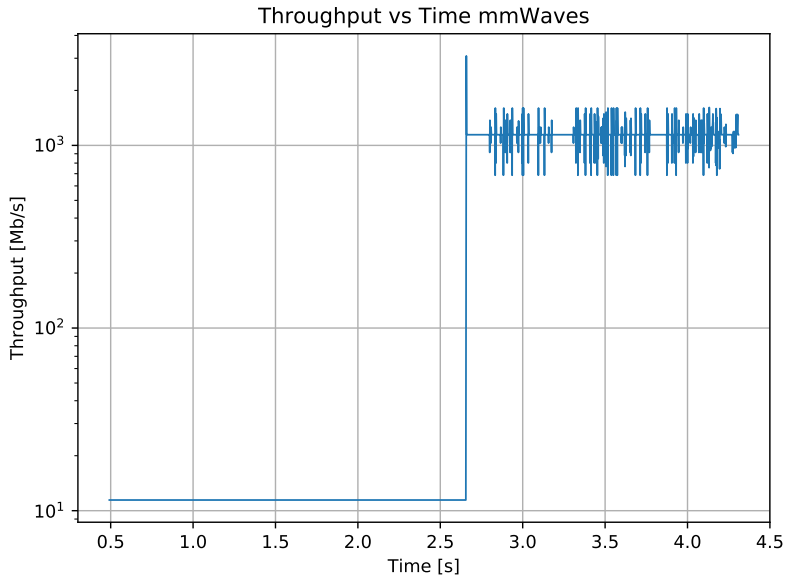


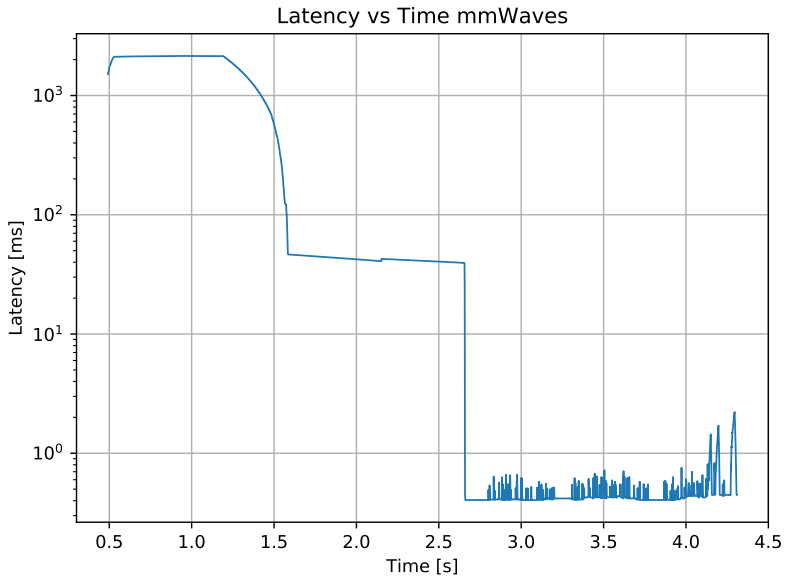


LTE and mmWaves single run









Conclusions

Conclusions

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)