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Using Visible Light Communication in the Smart City Context

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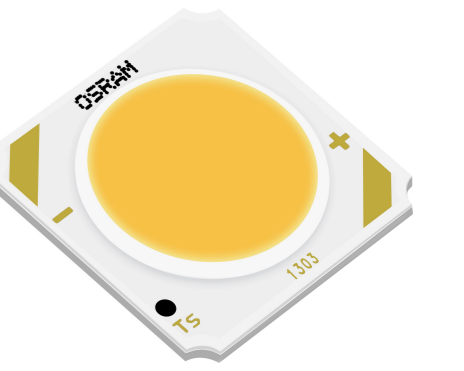
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Context and goals

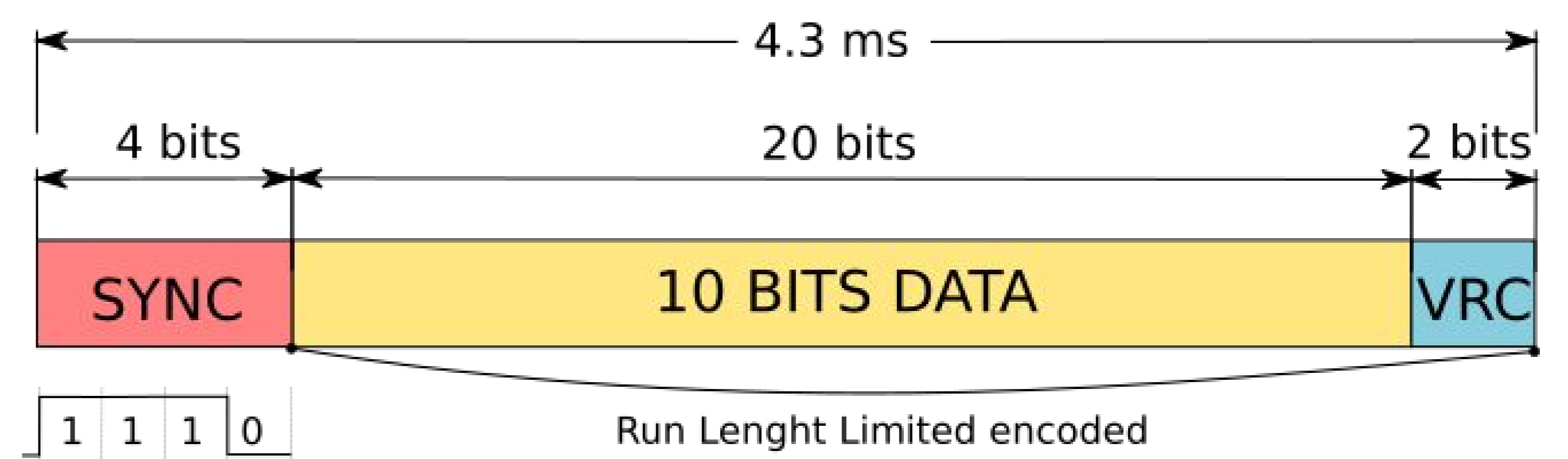
- Evaluate the performance of VLC in different smart city applicative use cases such as smart objects
- Propose a series of smart city services based on VLC
- Propose an efficient communication protocol at the MAC layer to take into account the integration of VLC objects



LEDs as Emitter

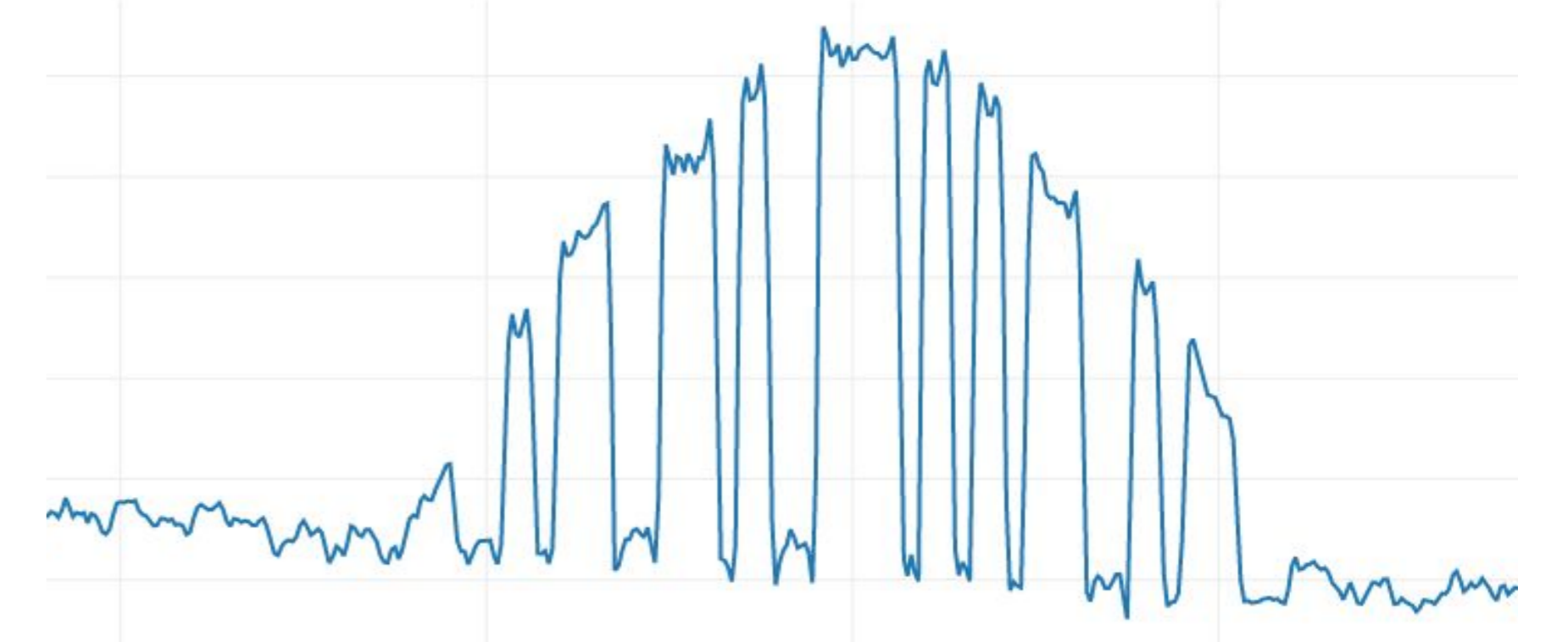
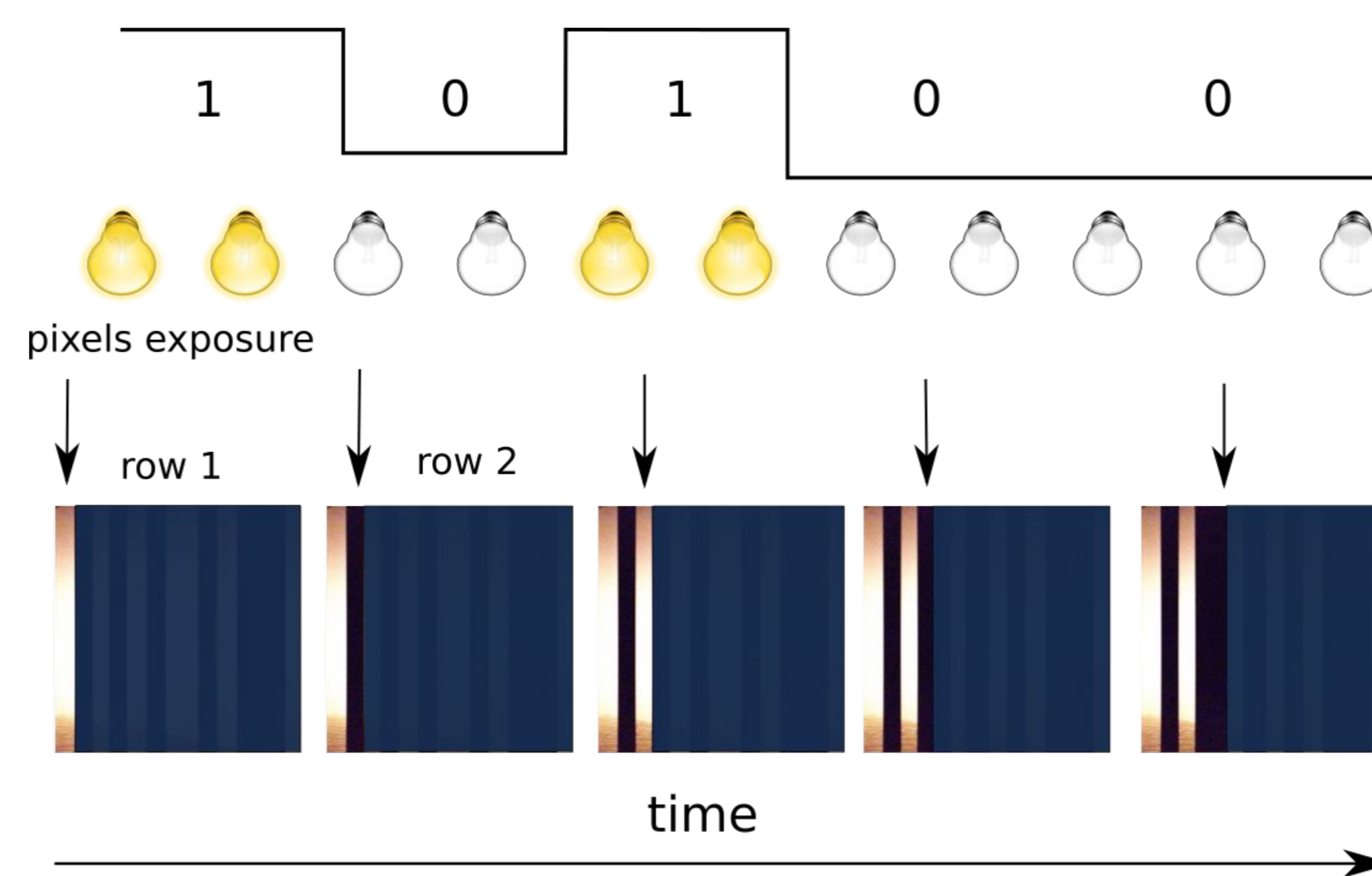
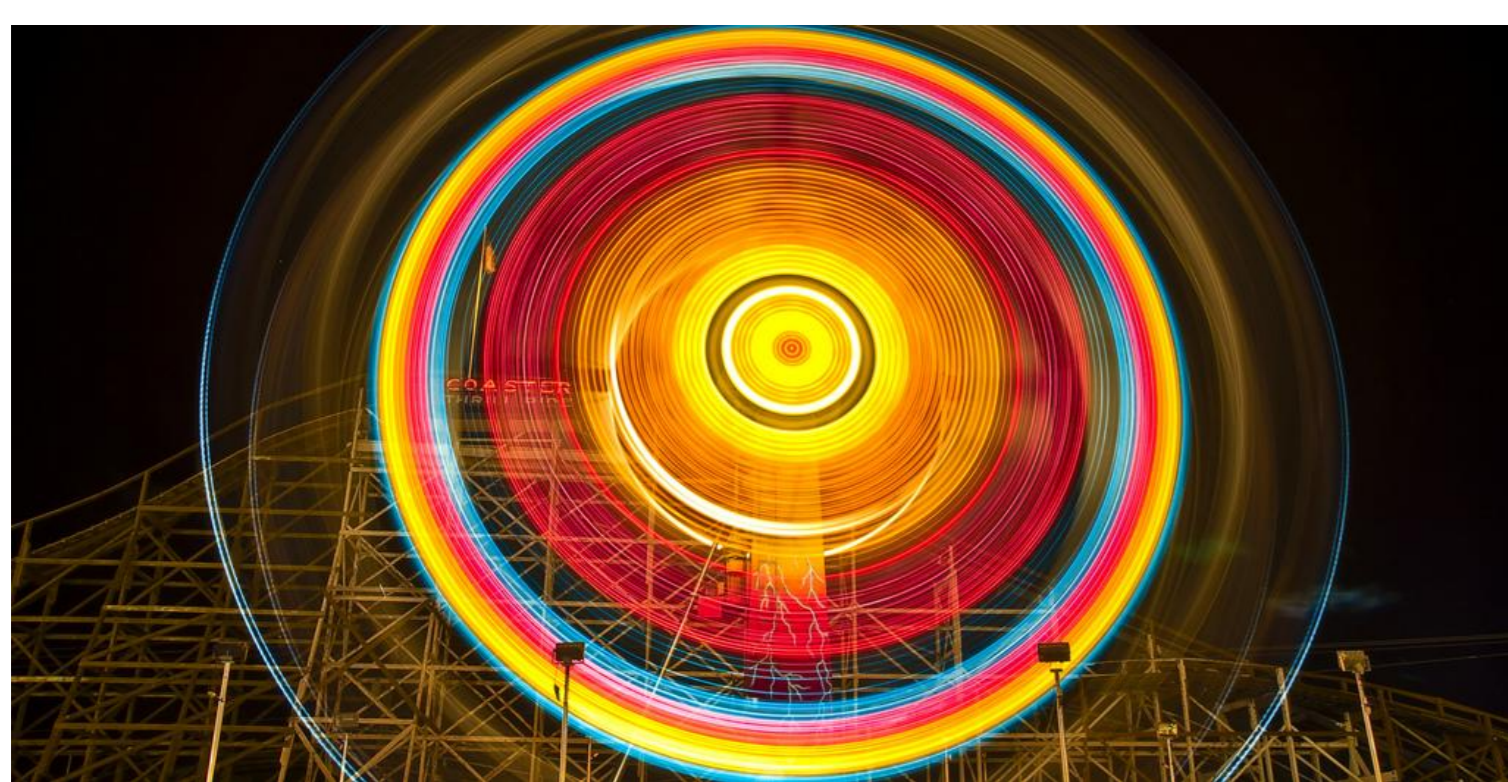
- IM/DD Modulations
 - On-Off Keying
 - Frequency Shift Keying
- Driven by cheap MCU

- PHY Layer
 - 6KHz OOK
 - Manchester
 - 500-4000 bit/s



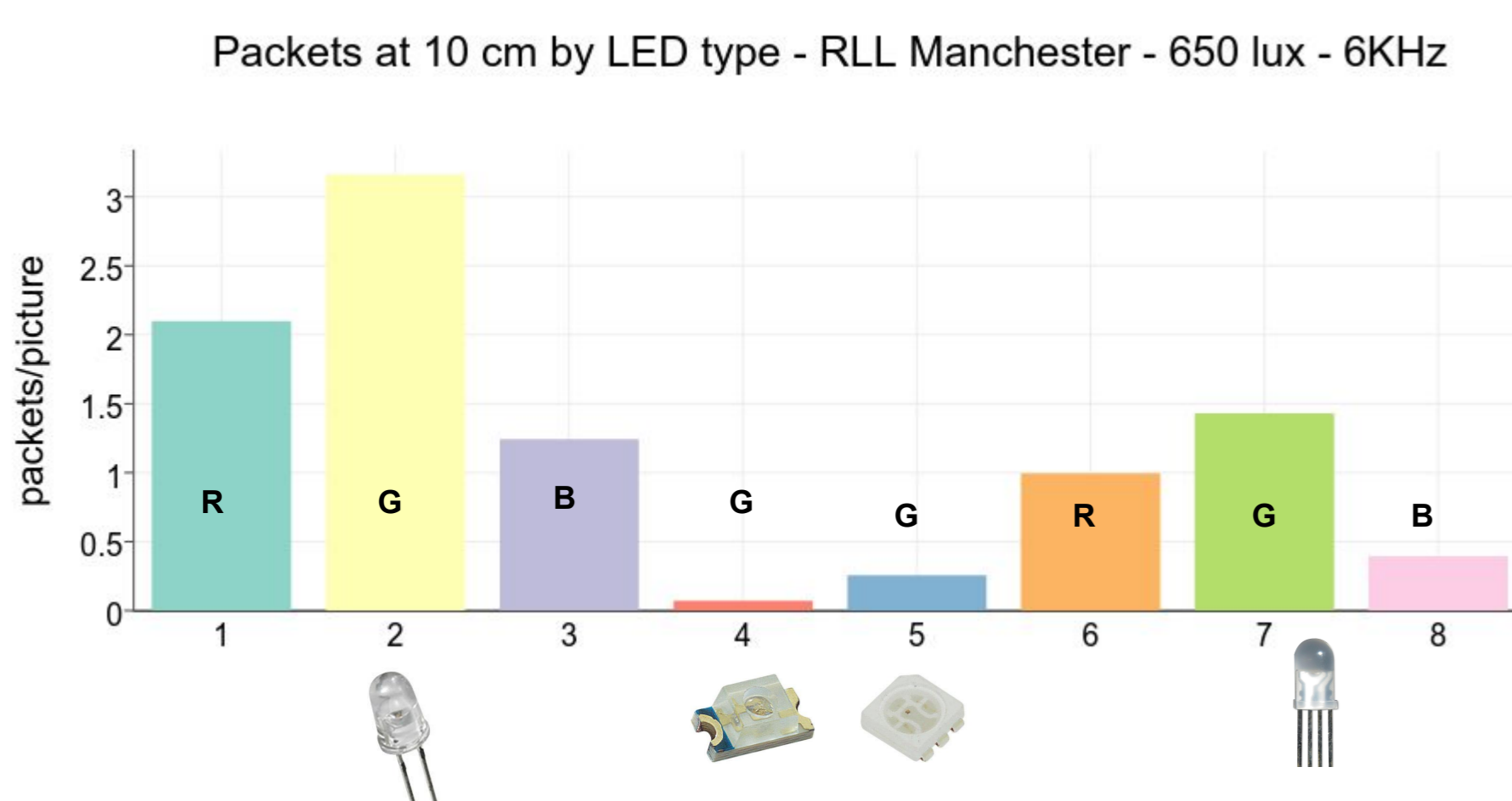
Smartphone as receiver

- Camera : CMOS Sensor
- Rolling Shutter Effect

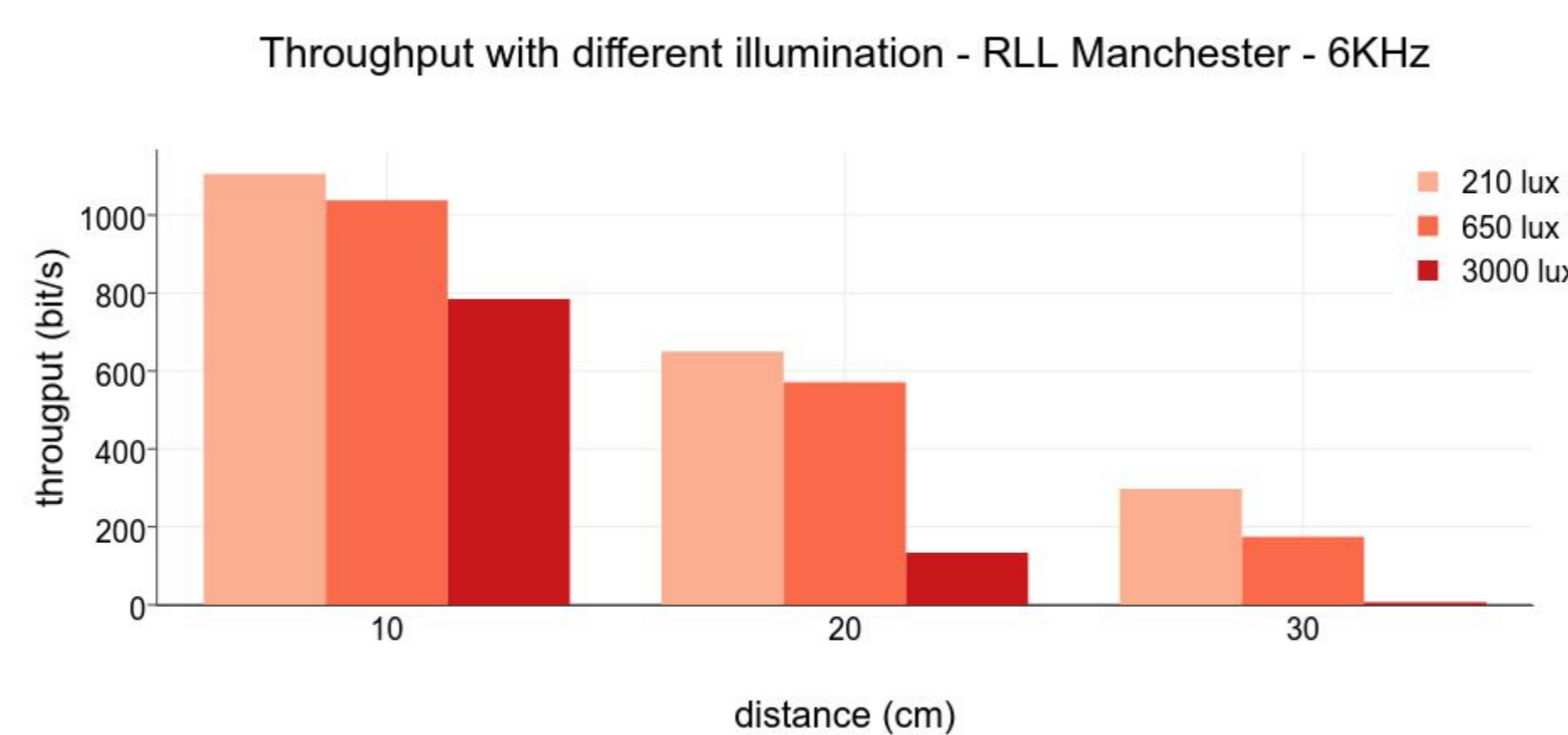


Evaluation

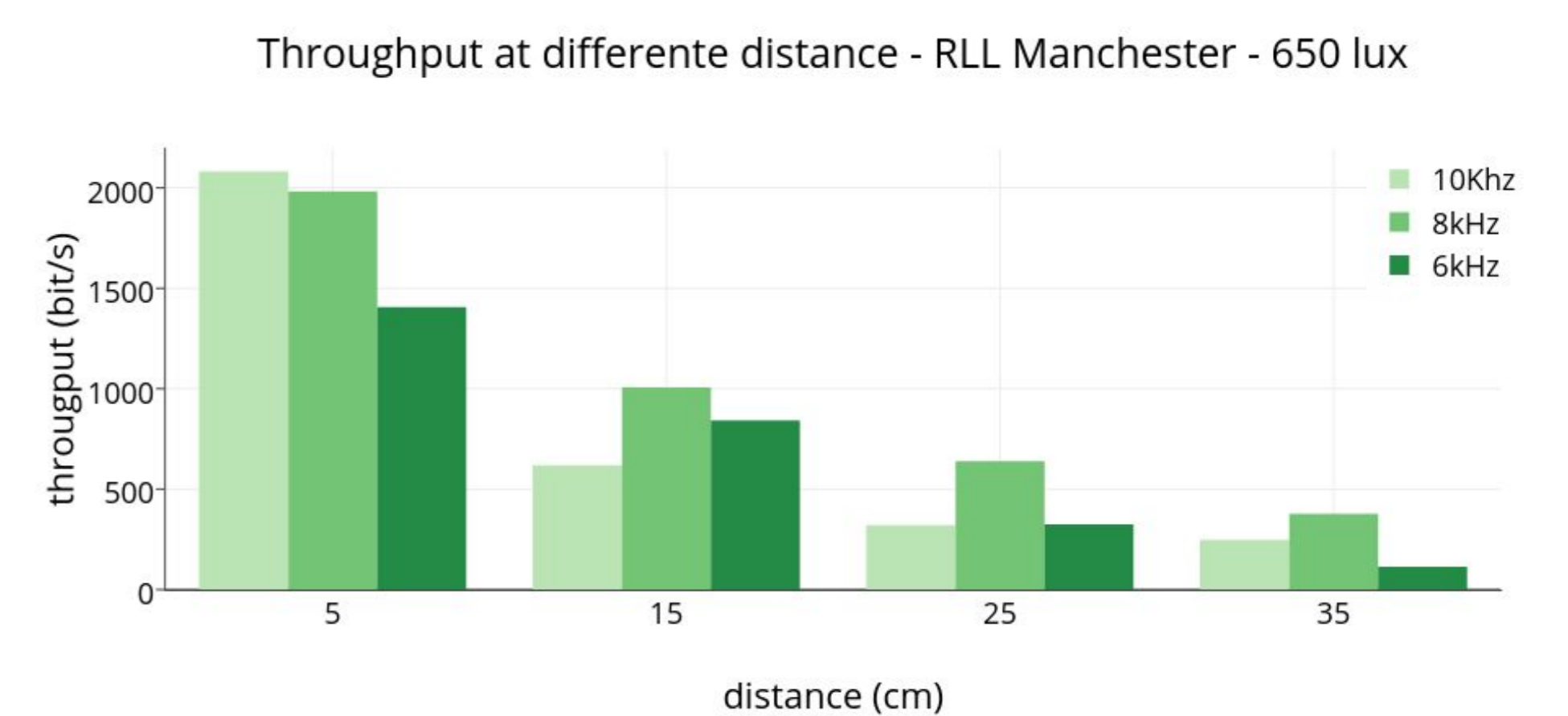
LED type & color impact



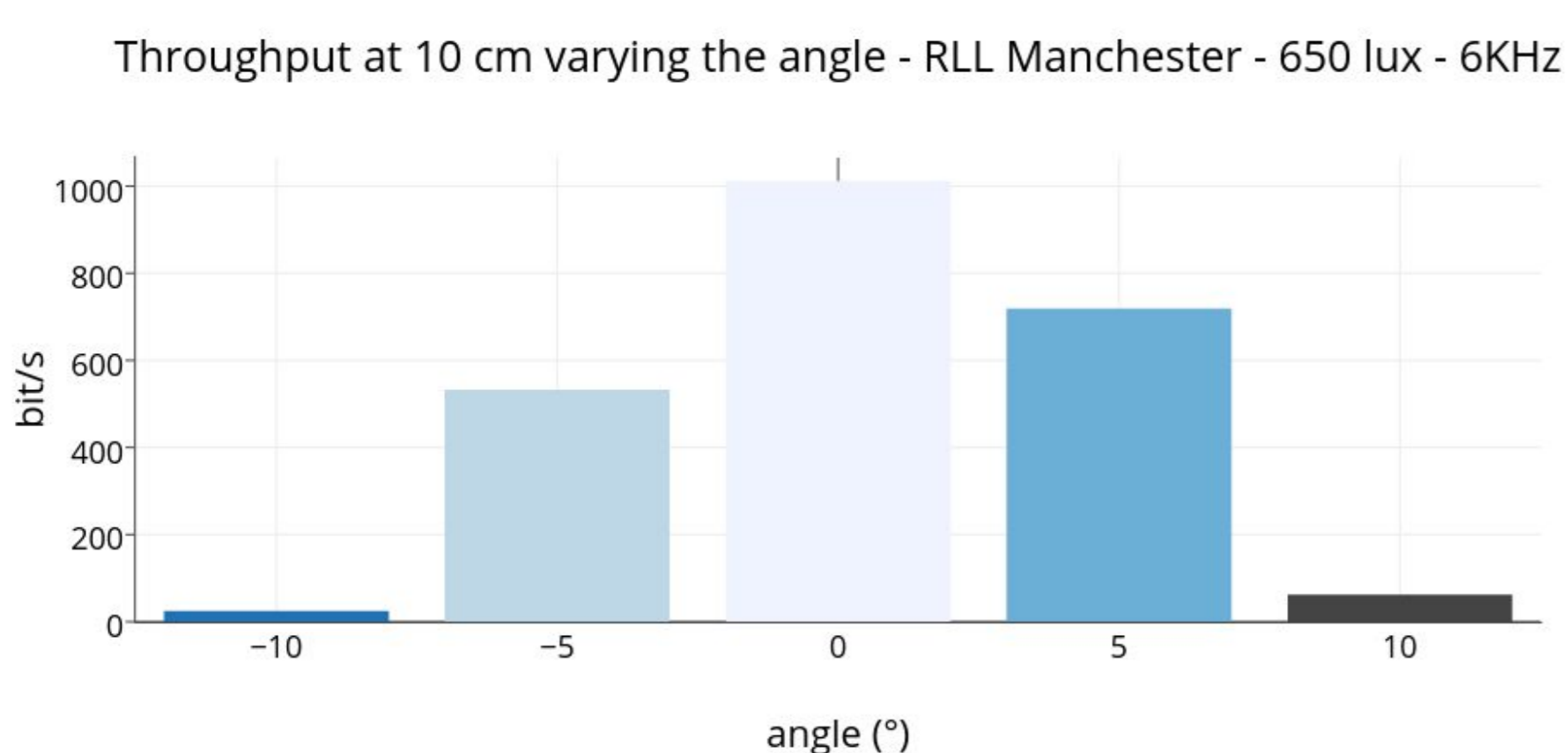
Illumination impact



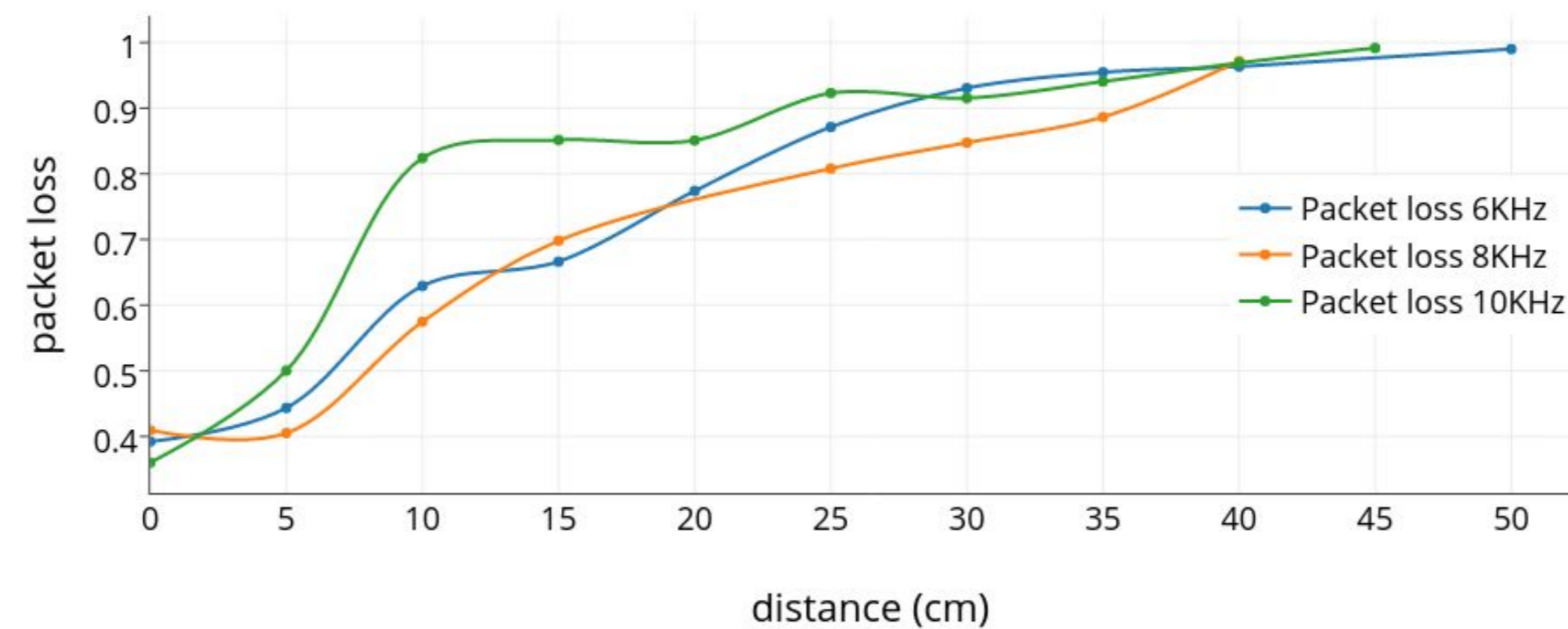
Achieved throughput



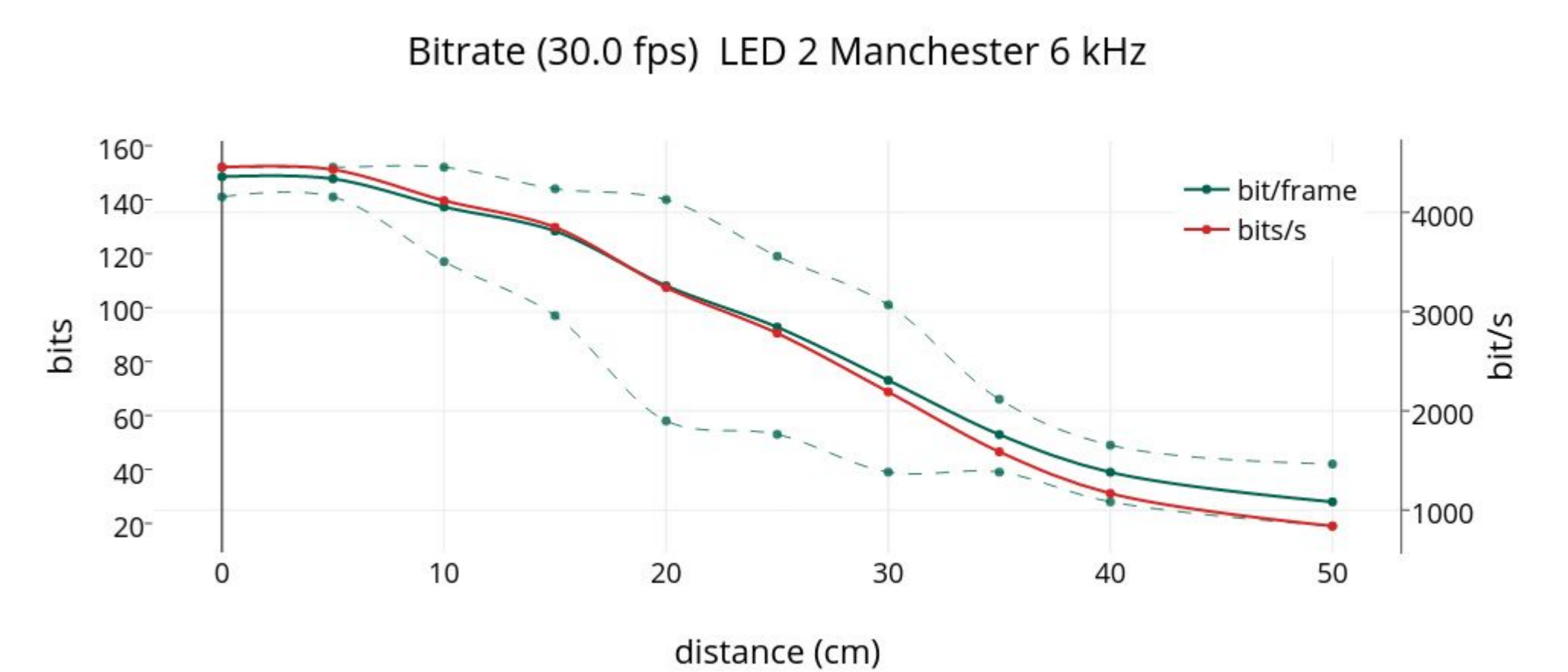
Angle impact



Packet Loss



PHY Bitrate



Use Cases

- Low cost wireless & smart device
- Accurate Indoor Localization
- Secured Near Field Communication
- Contextual Information broadcasting

