

Qualcomm

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Higher data rates for NB-IoT

Qualcomm, Airtel, Futurewei, Reliance Jio, Sanechips, Telstra, Vodafone, ZTE



Use cases for higher data rates

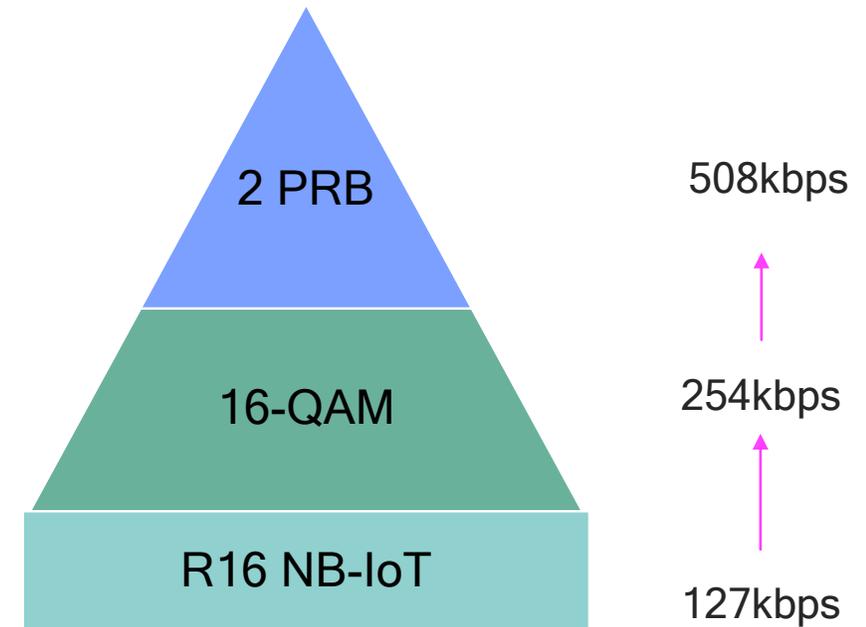
Background

- NB-IoT was originally designed for very low cost sensors, targeting metering applications.
- However, even these sensors require, for some uses cases, **higher data rates**.
 - Also, NB-IoT UEs are used in some other applications that benefit from higher throughput.
- In one example, the case of firmware upgrade (e.g. **FOTA**) is seen in the field to create large battery drain due to long wake-up time.
 - In general, higher data rates increase battery lifetime due to smaller wake up time.
- Additionally, current NB-IoT offers a **lower peak spectral efficiency than EDGE**
 - Difficulty to port some applications from EDGE to NB-IoT

Increase of data rates

Higher order modulation and wider bandwidth

- NB-IoT throughput is limited by the following factors:
 - QPSK modulation
 - 180kHz bandwidth
- Increasing the modulation order only provides advantage to UE in good SNR conditions
 - Cannot be used to guarantee a service over the whole cell
- Proposed enhancements for downlink:
 - Support of higher order modulation
 - Support of larger bandwidth / carrier aggregation
 - At least 2x180kHz



Proposal

- For Rel-17 NB-IoT work item:
 - Support **wider bandwidth** of 2 PRBs in downlink.
 - Support **16-QAM** in downlink
- These two features are optional for UEs and configurable by eNB.