Mobile architectures: LTE, LTE-A, LTE-A-PRO

LTE performance objectives:

- 100Mbps Down, 50 up
- latency down to 10ms
- Scalable bandwidth op to 20MHz
- Backwards compatibility
  - Can make use of existing spectrum allocation
- Wide application

LTE features

- OFDA/OFDMA
  - Incresed spectral efficiency
- All IP-Architecture
- Spectrum flexibility
- Operating in various bands, with variable bandwidth

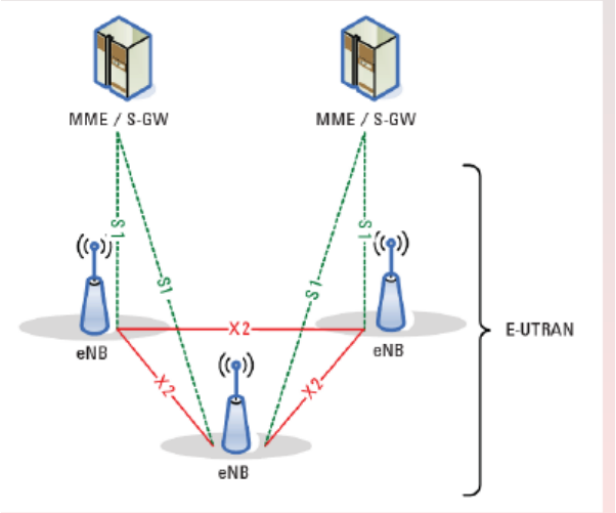
Spectrum flexibility

Can operate in the bands of past generations

Refarms old, unused, spectrum

Higher frequency bands for higher data rate and lower frequency band to support a smooth spectrum migration

Architecture



MME = Mobility Management Entity

S-GW = Serving Gateway

eNB = Evolved Node B

E-UTRAN = Evolved Universal Terrestrial Radio Access Network

Protocol layers

- PDCP used for ip header compression and cyphering and integrity protection
- RLC is in charge od segmentation and concatenation, retransmission handling and in-order delivery to higher layers
- MAC is in charge of uplink and downlink scheduling at eNB

PHY Layer

the two types of duplexing tha occur are FDD and TDD

QPSK could be used in the broadcast channel to make efficient use of the available spectrum and power

Multiple Antenna techniques

MIMO

- Multiple antennas on transmitter and receiver
- Beamforming for signal reliability
  - transmitter should know the wireless channel
- Multiplexing for higher data rate

LTE Advanced (LTE+)

- 1Gbps down, 500Mpbs up
- 3 times greater spectrum efficiency than LTE
- Peak spectrum efficiency: DL - 30 bps/HZ; UL - 15 bps/Hz
- Spectrum use: the ability to support scalable bandwidth use and spectrum aggregation
- Latency about twice as good as LTE
- Better MIMO
- Twice the use throughput at the cell edge
- Average user throughput 3 times greater than that of LTE

Acronyms

LTE: Long Term Evolution FDD: Frequency division duplexing TDD: Time division duplexing OFDM: Orthogonal Frequency Division Multiplexing OFDMA: Orthogonal Frequency Division Multiple Access MME: Mobility Management Entity PDCP: Packet Data Convergence Protocol RLC: Radio Link Control MAC: Medium Access Control MIMO: Multiple Input Multiple Output