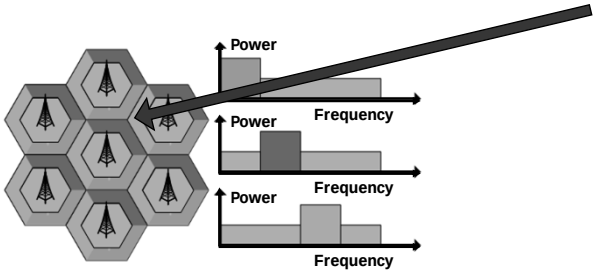
4G & 5G Mobile Technology

LTE-Advanced Part 1

LTE-Advanced

❖ **ICIC (Inter-Cell Interference Coordination) & FFR (Fractional Frequency Reuse)**

- ICIC alleviates data rate degradation at cell edges due to inter-cell interference by FFR



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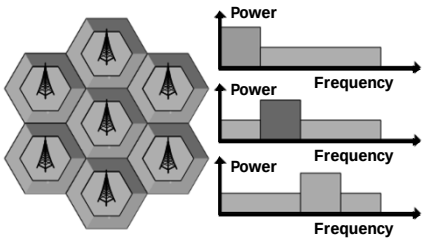
❖ ICIC (Inter-Cell Interference Coordination) & FFR (Fractional Frequency Reuse)

- FFR separates the frequency bands and allocates the band efficiently to prevent signal interference from adjacent eNBs



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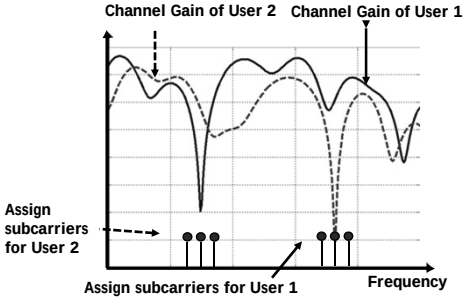
❖ DSA (Dynamic Subcarrier Assignment)

- DSA is an improved resource allocation scheme upon static allocation that dynamically allocate subcarriers considering channel state conditions



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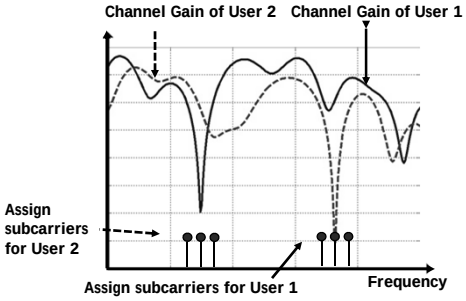
❖ DSA (Dynamic Subcarrier Assignment)

- Due to frequency selective fading, subcarriers have different effects on users, thus DSA can improve the user QoS (Quality of Service)



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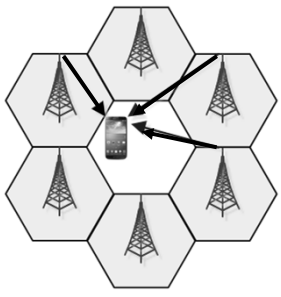
❖ CoMP (Coordinated Multi Point)

- CoMP improves the coverage of high data rate, cell-edge throughput, and system throughput
  - Multi Point = Multi-Point
- CoMP coordinates multiple eNBs to communicate with an UE
  - Increases throughput by reducing inter-cell interference



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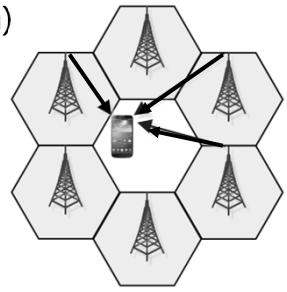
❖ CoMP (Coordinated Multi Point)

- CoMP Technologies
  - CS (Coordinated Scheduling)
  - CB (Coordinated Beamforming)
  - JT (Joint Transmission)
  - DPS (Dynamic Point Selection)



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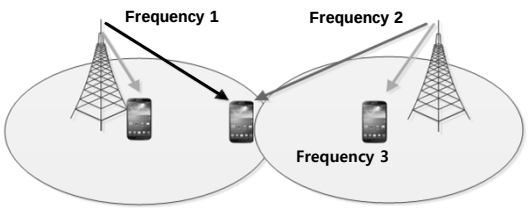
❖ CoMP (Coordinated Multi Point)

- CS (Coordinated Scheduling)
  - Allocates different subcarriers to UEs at the cell edge to avoid inter-cell interference



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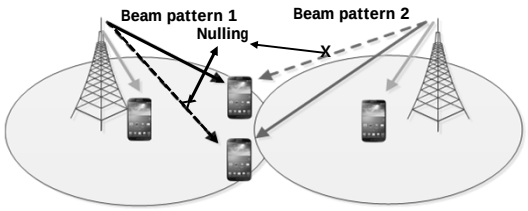
❖ CoMP (Coordinated Multi Point)

- CB (Coordinated Beamforming)
  - Allocates different beam patterns to UEs at the cell edge to avoid interference and also improve the reception performance



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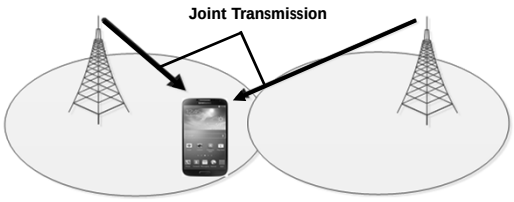
❖ CoMP (Coordinated Multi-Point)

- JT (Joint Transmission)
  - Improves the reception performance by having the UE receive data concurrently from multiple eNBs



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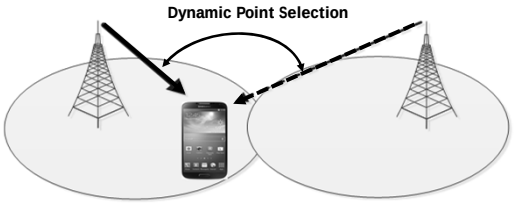
❖ CoMP (Coordinated Multi-Point)

- DPS (Dynamic Point Selection)
  - Selects the TP (Transmission Point) with better channel quality to improve the reception performance
  - TP (Transmission Point) = TX-point (Transmit Point)



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❖ CoMP (Coordinated Multi Point)

	CS	CB	JT	DPS
Resources	Frequency	Frequency, Spatial	Frequency, Spatial	Frequency, Time, Spatial
Number of TPs	Single	Single	Multiple	Multiple
Decreases Interference	O	O	X	X
Reception Performance	X	O	O	O

CS (Coordinated Scheduling) CB (Coordinated Beamforming)
JT (Joint Transmission) DPS (Dynamic Point Selection)

4G & 5G Mobile Technology

References

References

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- 3GPP TR 36.819 v11.2.0, “Coordinated multi-point operation for LTE physical layer aspects,” Sep. 2013.
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