## Strategic Planning: The Role of the Macro Cell

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BTS BOB 2 Antenna BOB 2

Warning Laser Nazard

Iris Barcia, COO CW eMBB, Cambridge, May 2019



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# Macros & Coverage

The environment and the characteristics of the radiating element define how far it propagates.

- Clutter
- Frequency
- Antenna Characteristics
- Power

Region Geodata Maps Technology Network Analysis Optimization Automation Tools Help

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### Macro Coverage Blanket

### Comparison 2100 MHz vs 3.5 GHz



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### Macro Coverage Blanket (Beamforming Gain)

Comparison 2100 MHz vs 3.5 GHz







# Macros & Capacity

#### Beamforming strategy

- Steering angle
- Interference mitigation (e.g. zero forcing)
- mmWave and massive MIMO

#### More spectrum

Increased bandwidth

- More antennas
  - Sectorization
  - Densification



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## Interference Continuum: ~ -65 dBm EIRP = Mordor

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Interference Continuum: Low SE (deafened small cells)





MCS Leaend

MCS-2 (JPSK R=1/3) MCS-4 (JPSK R=1/3) MCS-4 (JPSK R=1/3) MCS-5 (JPSK R=1/2) MCS-6 (JPSK R=4/3) MCS-7 (JPSK R=4/5) MCS-8 [16 QAM R=2/3] MCS-10 [16 QAM R=2/3] MCS-11 [64 QAM R=3/4] MCS-12 [64 QAM R=3/4]



1 of 1 Sites Selected 4 of 16 Radios Selected 3 40.7153, -73.9798

Macro cells must coexist with other HetNet solutions

Uncontrolled power reduces network performance

Challenging propagation at higher frequencies

Macros are already available over large areas, including rural

## **Strategic Planning**

Macro placement analysis Macro repurpose strategy, use cases Beyond beamforming and massive MIMO



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### 5G: The Macro is Dead, Long Live the Macro



Macro Adaptability



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#### IMT-2020 Requirements: Macro Advantages

- Macros are typically provisioned with high capacity backhaul
- Controlled access locations with large cabinet/associated space
- Higher feasibility to place advanced antenna systems
- Higher feasibility to accommodate complex technology combinations

