



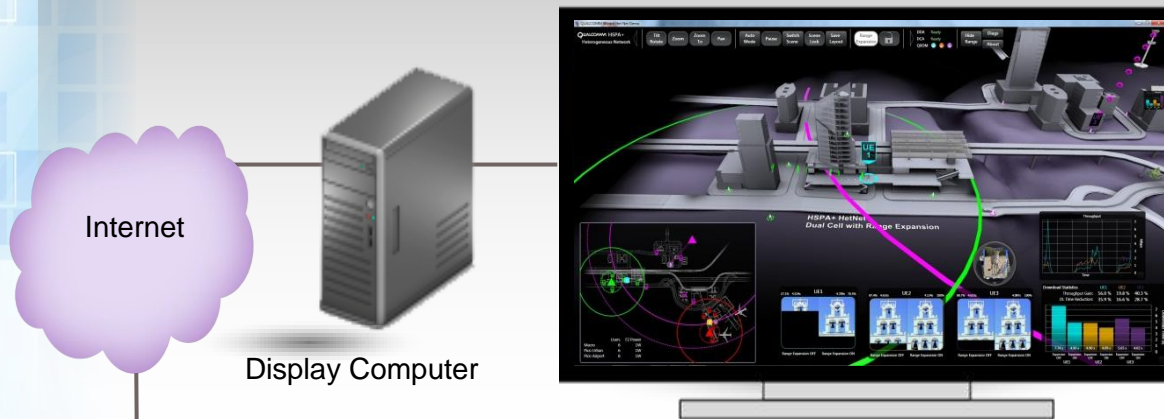
# HSPA+ HetNets Demo

MWC, February 2012



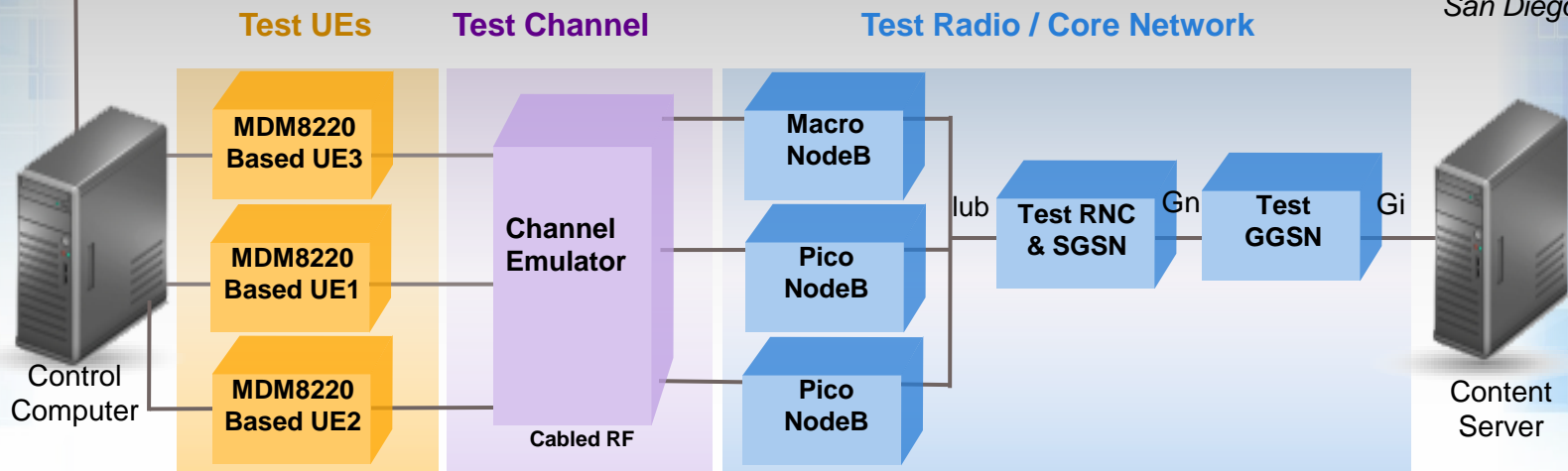
# HSPA+ HetNets with Range Expansion

MWC 2012



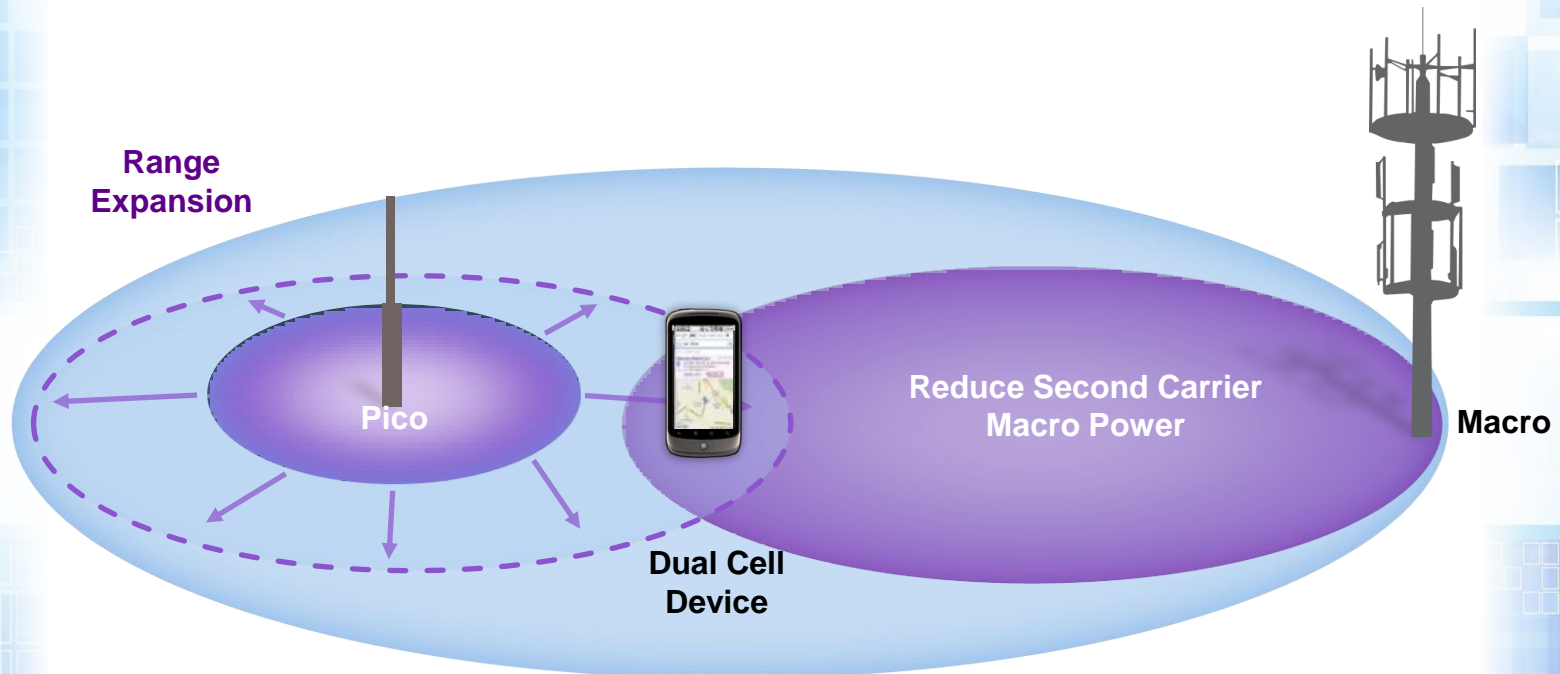
Real Time Display and Control of System Performance

Equipment Room  
San Diego



Content Server

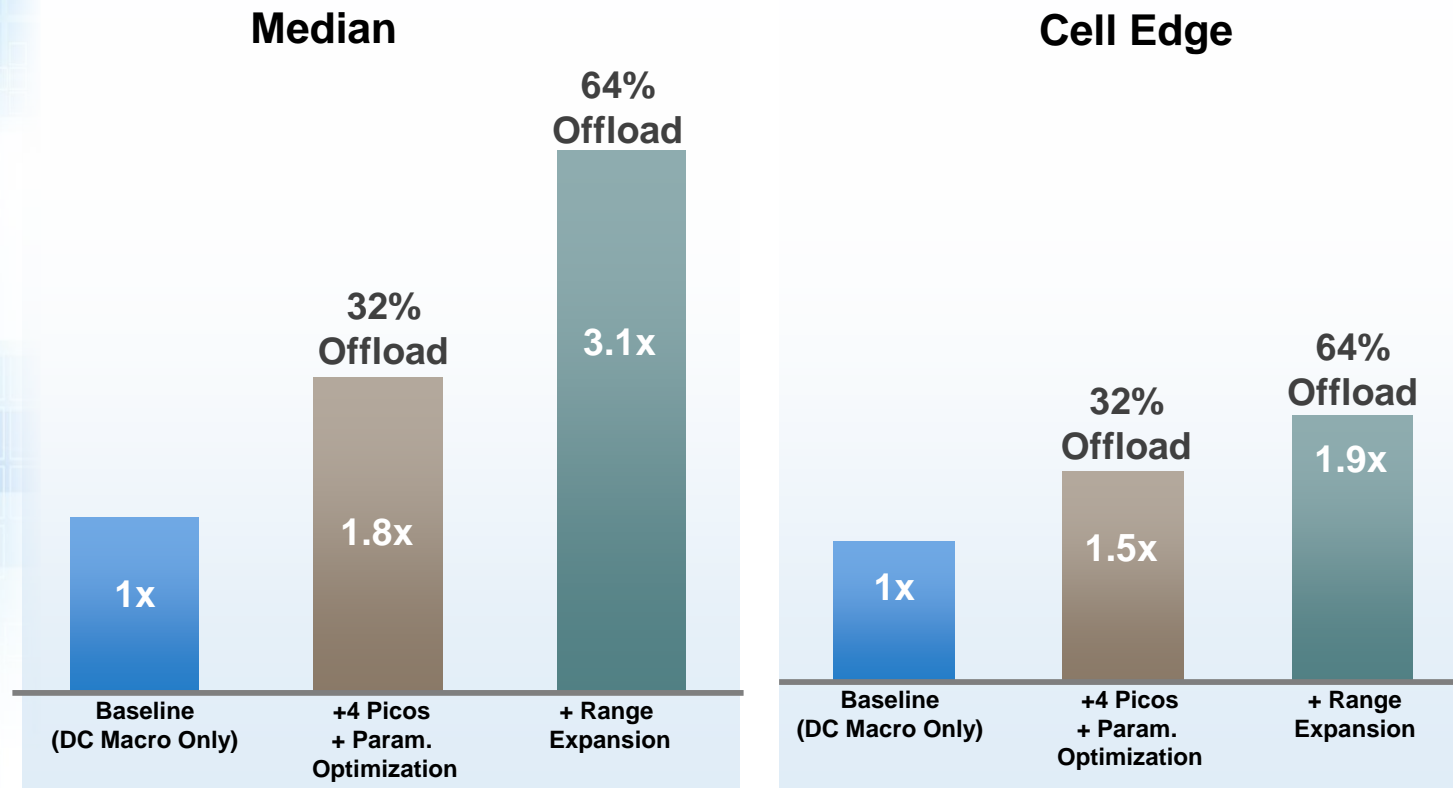
# HSPA+ HetNets Range Expansion Possible Today



- Today: HSPA+ Dual Cell and Reduced Macro Power allows Range Expansion
- HSPA+ Advanced: Dual Frequency Multiflow allows the UE to be served by the best link on each carrier
- Advanced UE Receivers with Interference Cancellation provide additional gain

# HSPA+ HetNets Range Expansion – Possible Today !

## UE DL Throughput Compared To Baseline Dual Cell Macro Only

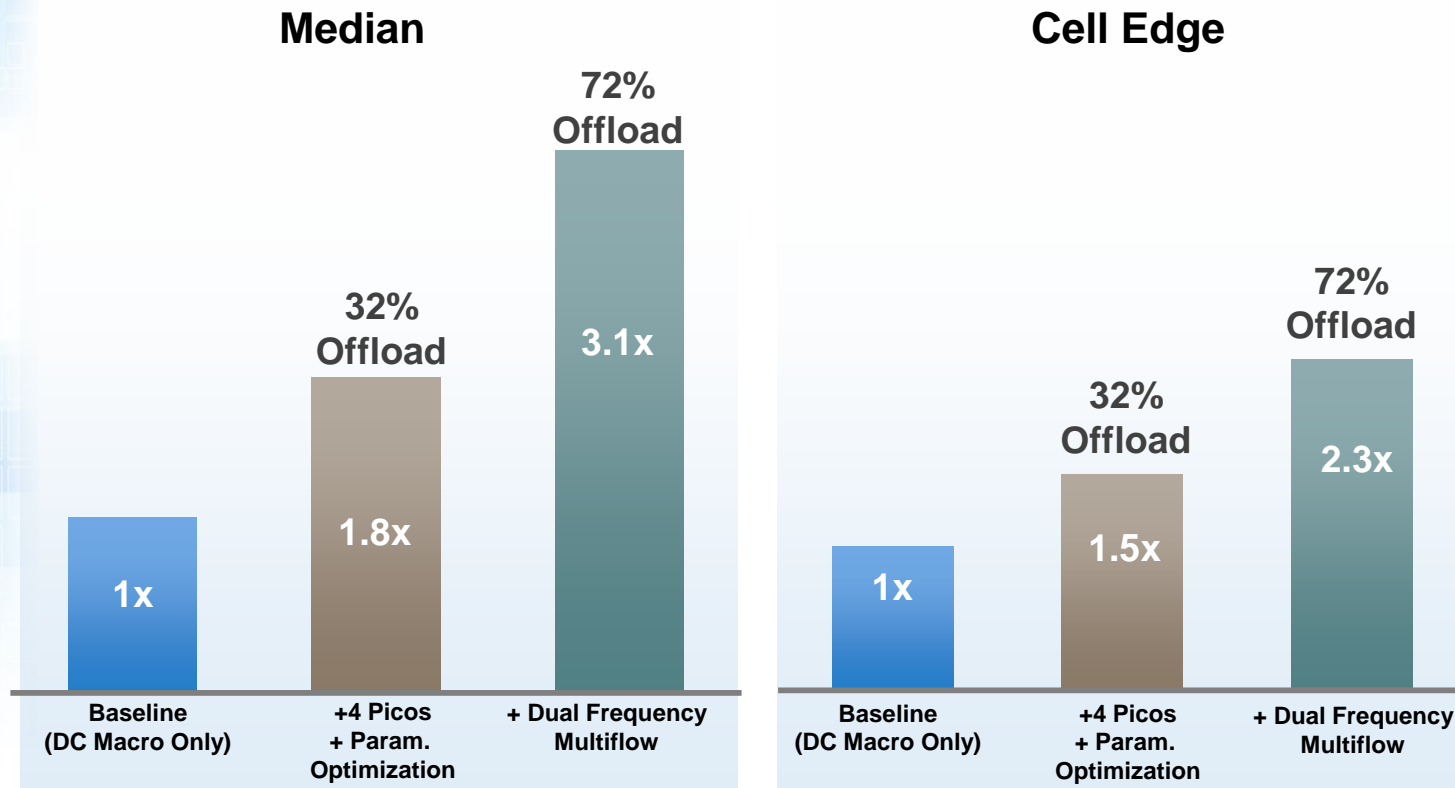


Assumptions: UL & DL on same carrier (Macro & Pico), Macro Tx Pwr 20W, Pico 1W, 4 Picos / Macro, ISD 500m, Rcvr: LMMSE+RxD on DL, RxD Rake on UL, UE-Macro min. separation 35m, UE-Pico min. separation 10m, Path loss Model 1 from 3GPP evaluation methodology TR 36.814, PA3, HS-DPCCH boost: Enabled, NF-Pad: 6 dB, Range expansion CIO=3dB, 16 UEs/macro, 50% clustering, 40m cluster radius, Full buffer traffic, Cell Edge = 5<sup>th</sup> percentile



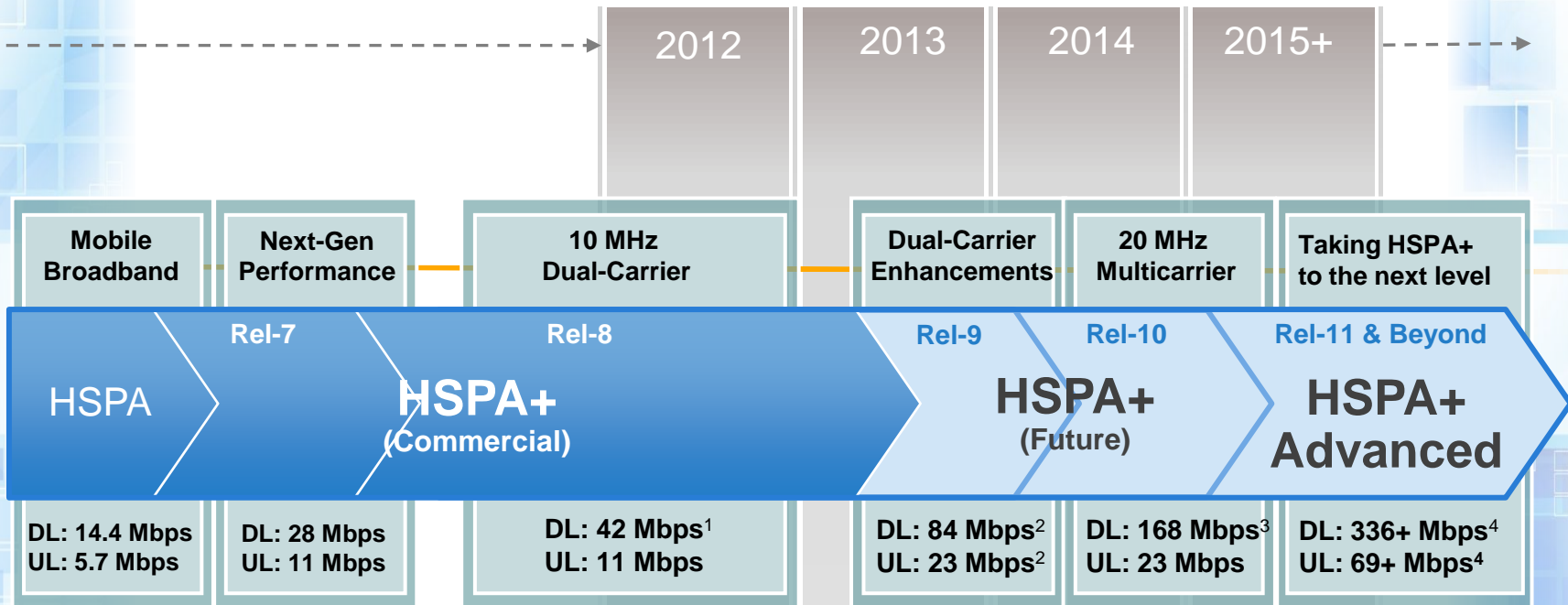
# HSPA+ HetNets with Dual Frequency Multiflow

## UE DL Throughput Compared To Baseline Dual Cell Macro Only



Assumptions: UL & DL on same carrier (Macro & Pico), Macro Tx Pwr 20W, Pico 1W, 4 Picos / Macro, ISD 500m, Rcvr: LMMSE+RxD on DL, RxD Rake on UL, UE-Macro min. separation 35m, UE-Pico min. separation 10m, Path loss Model 1 from 3GPP evaluation methodology TR 36.814, PA3, HS-DPCCH boost: Enabled, NF-Pad: 6 dB, Range expansion CIO=3dB, 16 UEs/macro, 50% clustering, 40m cluster radius, Full buffer traffic, Cell Edge = 5<sup>th</sup> percentile

# HSPA+ Has A Strong Evolution Path



<sup>1</sup>R8 reaches 42 Mbps by combining 2x2 MIMO and HOM (64QAM) in 5 MHz, or by utilizing HOM (64QAM) and multicarrier in 10 MHz.

<sup>2</sup>R9 combines multicarrier and MIMO in 10 MHz to reach 84 Mbps. Uplink multicarrier doubles uplink peak data rate to 23 Mbps in 10 MHz.

<sup>3</sup>R10 expands multicarrier to 20 MHz to reach up to 168 Mbps.

<sup>4</sup>R11 expands multicarrier up to 40 MHz to reach 336 Mbps. Uplink 2x2 MIMO with 64QAM reaches 69Mbps.

■ Commercial

Note: Estimated commercial dates.