

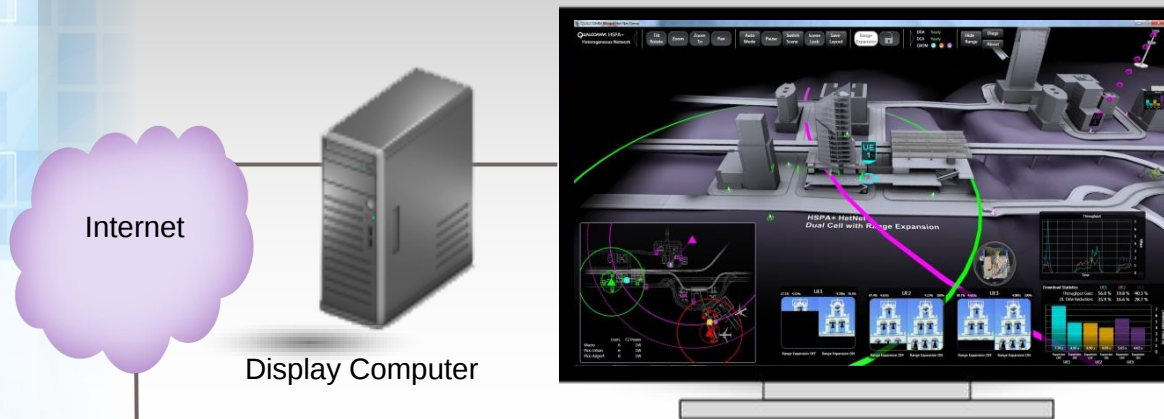


> HSPA+ HetNets Demo
MWC, February 2012



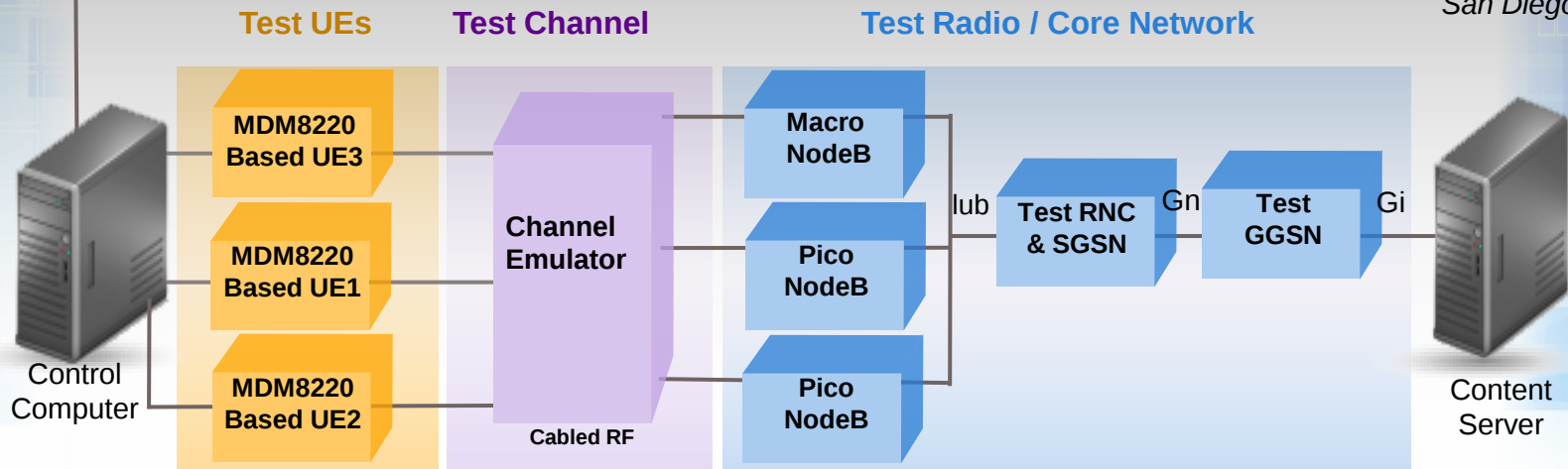
HSPA+ HetNets with Range Expansion

MWC 2012



Real Time Display and
Control of System
Performance

Equipment Room
San Diego



Control
Computer

Test UEs

Test Channel

Test Radio / Core Network

MDM8220
Based UE3

MDM8220
Based UE1

MDM8220
Based UE2

Channel
Emulator

Cabled RF

Macro
NodeB

Pico
NodeB

Pico
NodeB

Iub

Test RNC
& SGSN

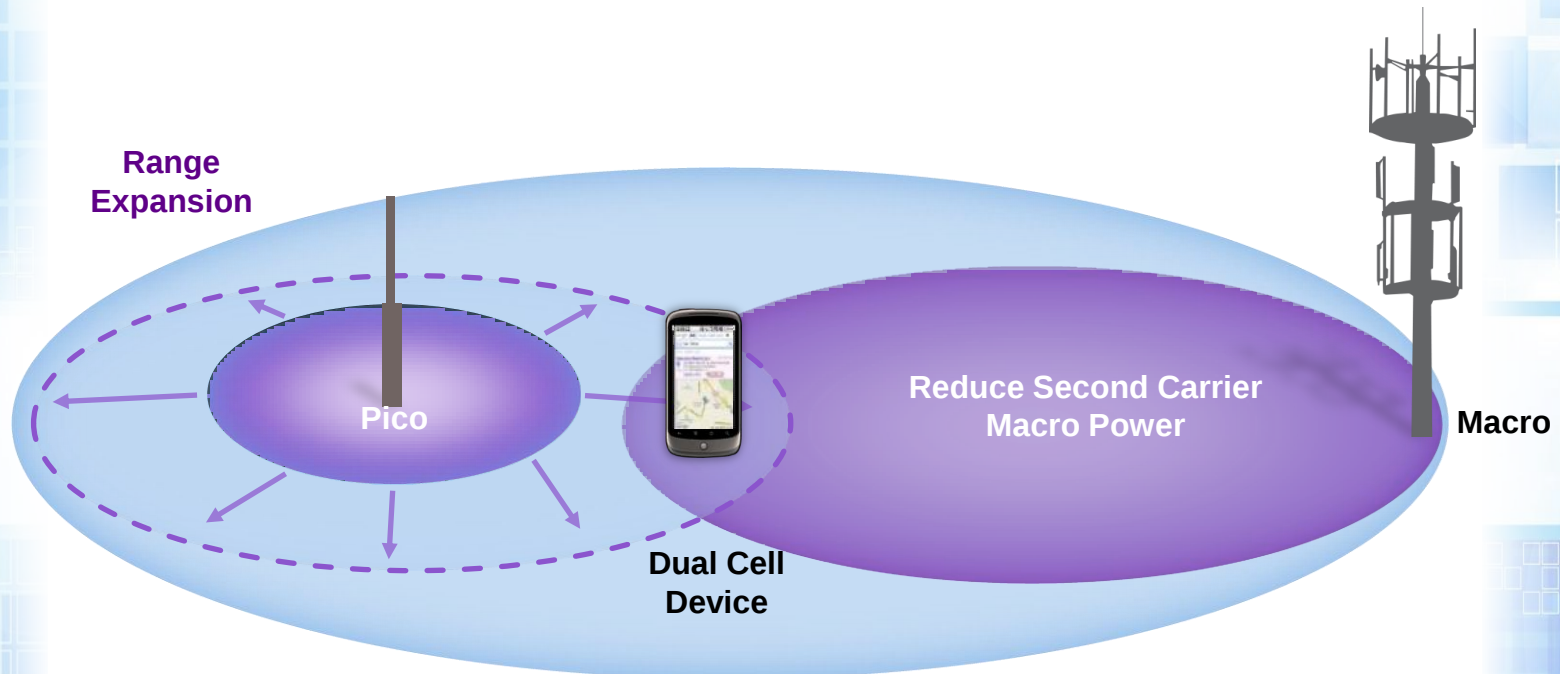
Gn

Test GGSN

Gi

Content
Server

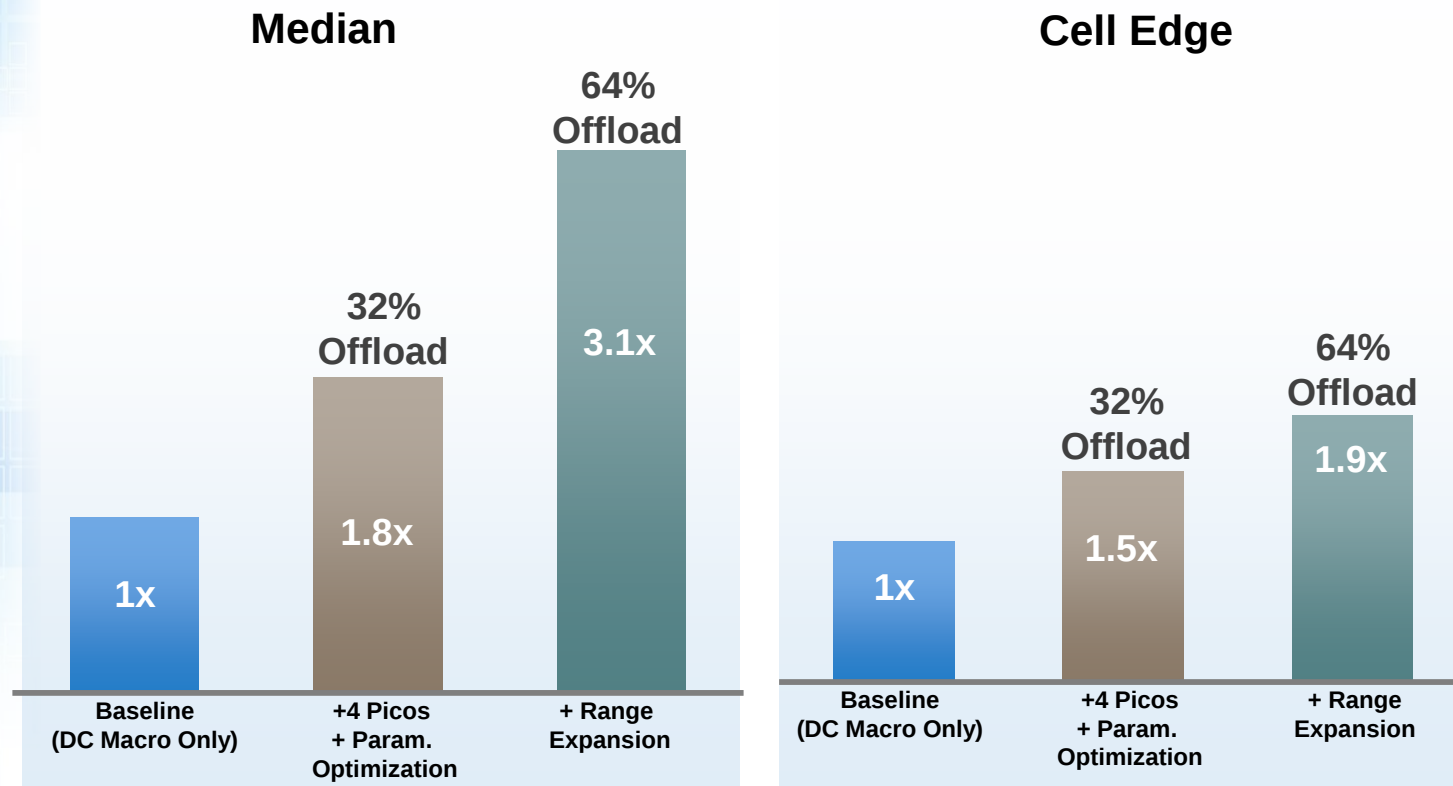
HSPA+ HetNets Range Expansion Possible Today



- 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 !

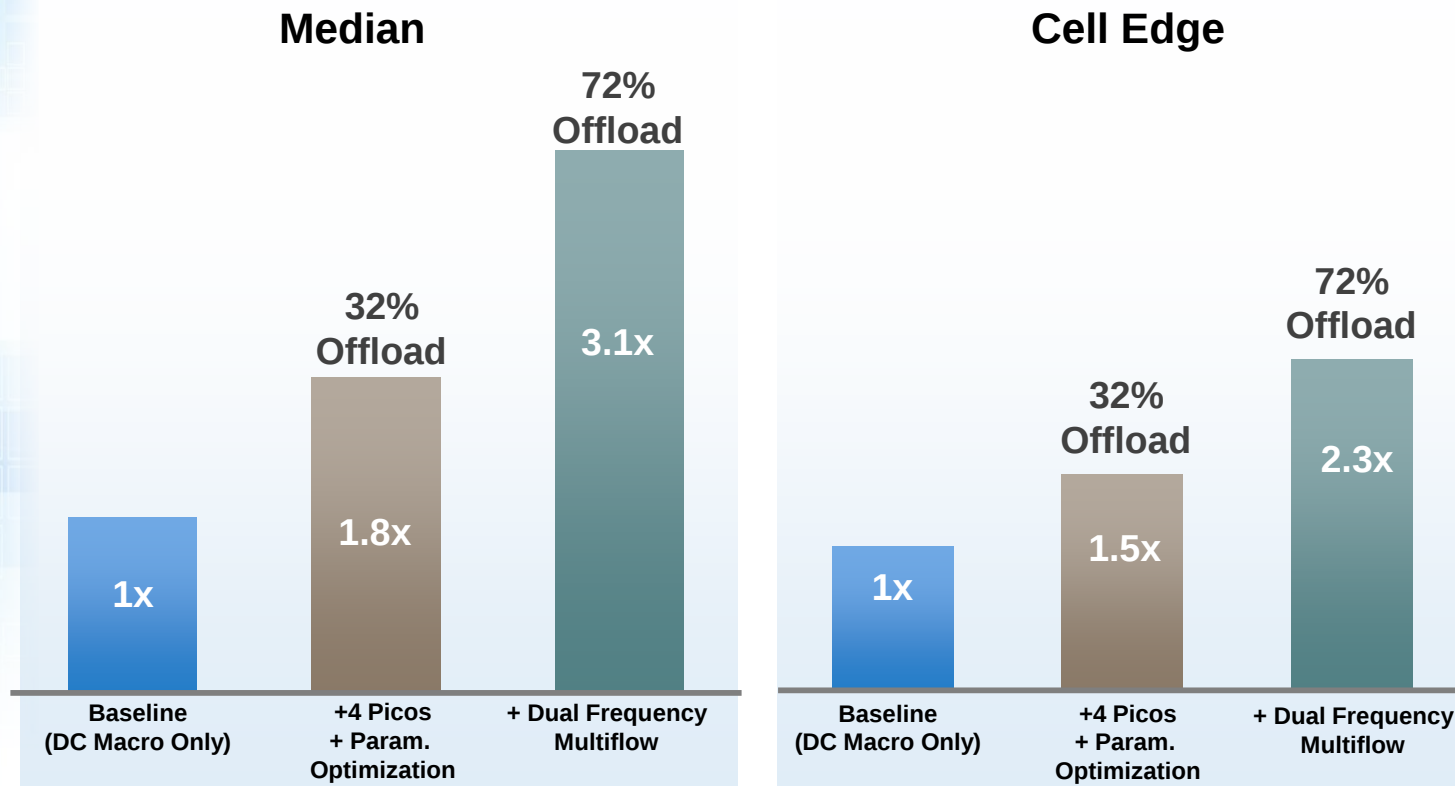
UE DL Throughput Compared To Baseline Dual Cell Macro Only



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 = 5th percentile

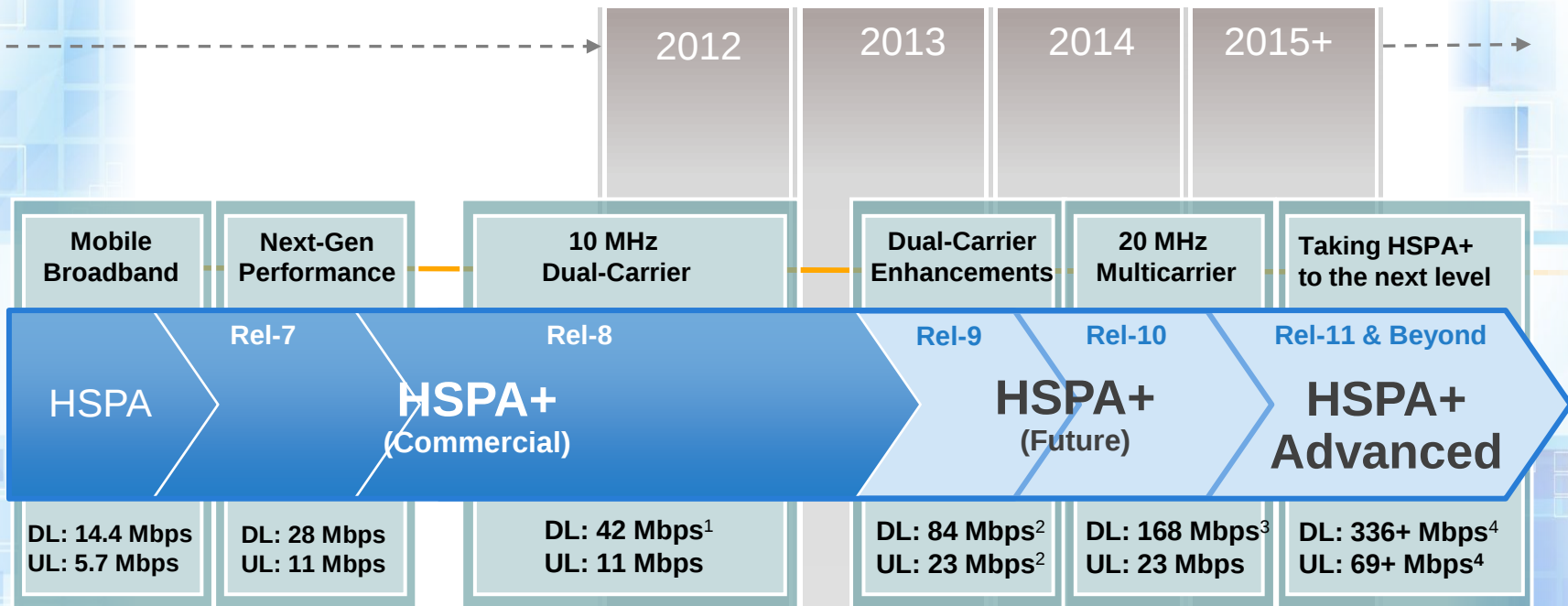
HSPA+ HetNets with Dual Frequency Multiflow

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 = 5th percentile

HSPA+ Has A Strong Evolution Path



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

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

³R10 expands multicarrier to 20 MHz to reach up to 168 Mbps.

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