# 5G Air Interface

MWC 2013

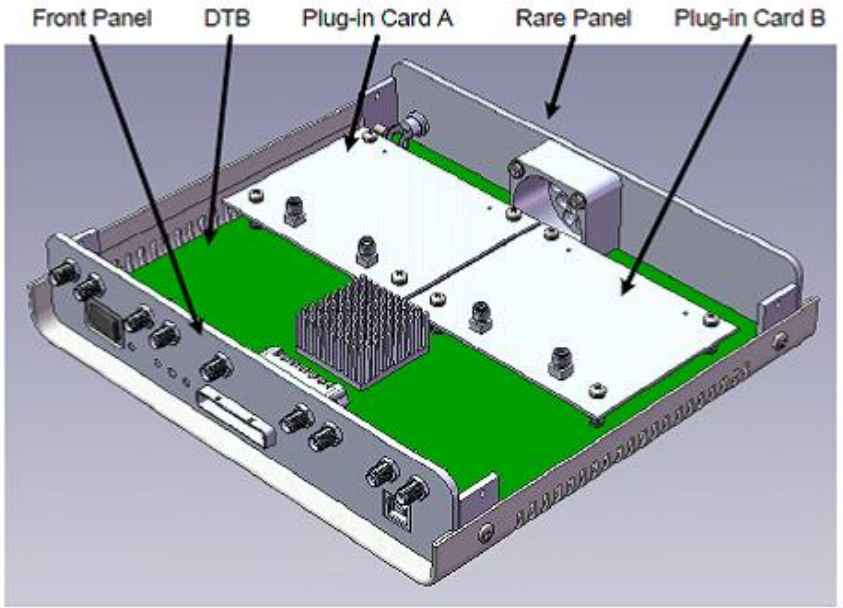
- Advanced Waveforms and RF
- Device to Device
- Millimeter Wave Hotspots

# Advanced Waveforms and RF

## Addressing the limitations of current Physical Layer techniques when used in emerging architectures

### Key Advantages

- **Spectral agility**
  - Improving spectrum utilization of baseband waveforms (e.g. OFDM in 3GPP and WiFi standards) when the available channels are non-contiguous and shared with multiple systems
- **Energy efficiency**
  - Raising efficiency of Multi-channel transmissions with joint RF-Baseband techniques



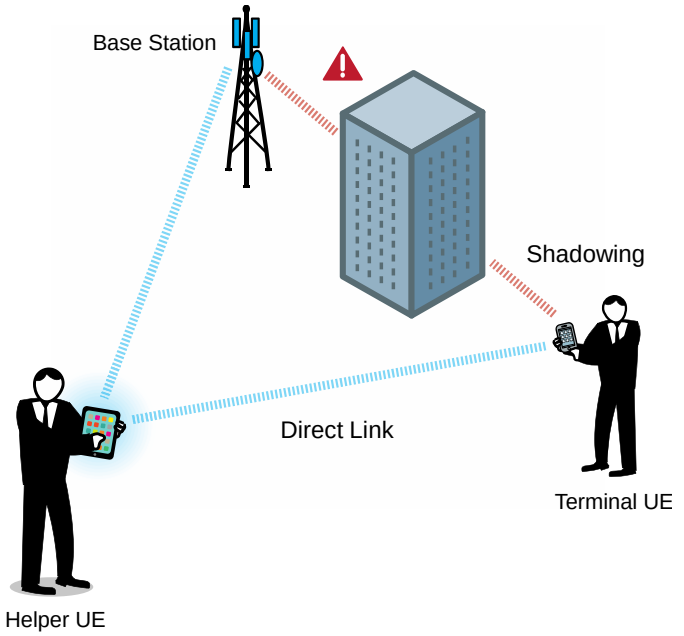

InterDigital Waveform Evaluation Platform

# Waveform Evaluation Platform

- Crest Factor Reduction
- Digital Predistortion
- Envelope Tracking

# Device to Device (D2D)

- Commercial Data Service Operators
  - Device Discovery enables new applications
  - Capacity and Coverage enhancements through “virtual network” built on Helper UEs
  - Offloads local traffic from the base stations
- Public Safety Communications
  - Establish LTE-based public safety broadband network
  - Benefits from the scale of the 3GPP market for PS terminals
- InterDigital provides architecture, design and simulation testbeds
  - Device Discovery
  - Capacity Enhancement
  - Coverage Enhancement
  - Local Traffic Offload

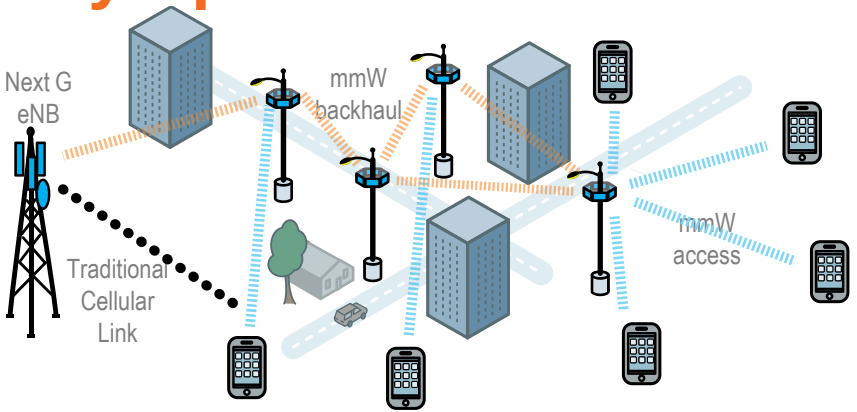


# Small Cells meet High Frequency Spectrum

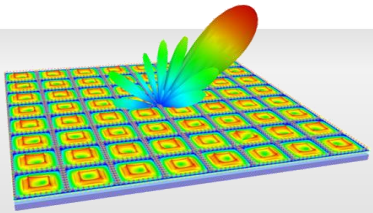
## *mmWave Hotspots (mmH)*

Higher frequency backhaul and access solutions to solve the future wireless capacity problem

- 500X capacity growth by 2020!




Leverage mmW radios which are becoming commercially available



Enable wireless backhaul

**Extend mmW MAC/PHY and add directional mesh networking to provide high capacity, low cost backhaul solution**

Extend support to Access links and integrate with 3GPP

**Adapt 3GPP RAN Architecture to support multi-RAT mmW**

**Full mmH Architecture**





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# Millimeter Wave Hotspots (mmH)






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