IET FEMTOCELLS: PICOCHIP

May 18
Femto: Real now in many variants

Residential
- ALU / Vodafone
- Juni
- IPAccess

Enterprise
- Cisco / AT&T
- ZTE / CuC
- SpiderCloud
- ALU - Metro
- Contela / SKT

Public Access
- Airspan - LTE
- Belair

3G/4G/WiFi
‘Small Cell’: Market Size 2020

1000X capacity in 10 years

Hitting Shannon bound

2020

~300m small cells

Source: ABI, Dec 2010; Picochip

Source: Ericsson, Sep 2010; AT&T, Feb 2011
Small Cells will be very, very big

**Rural:**
27dBm+/ 2Km: 64 users+
~5m units p.a

**Metro:**
24dBm / <500m: 32-64 users
~10m units p.a

**In-Building:**
(Office | Retail | Apartments)
15dBm -> 24dBm: 8-32 users
~20m units p.a

**Residential:**
(Ethernet | G.Hn | USB | Module)
8dBm -> 15dBm: 8 users
~40m units p.a
Example SoC

- **3GPP Release 8 (2009-03); upgrade to Release 9**

- **Widest range, product for all applications**
  - PC302: 4 users Residential
  - PC312: 8 users Residential, SME
  - PC323: 24 users Enterprise, Metro
  - PC333: 30/60 users LABS: Metro, Rural
  - PC3008: Next-generation 8 user residential

- **Lowest cost to highest performance**
  - 21/28/42Mbps HSDPA performance
  - 11.5Mbps HSUPA performance
  - Rx diversity: Improved performance for 8+ users
  - Tx MIMO: 28/42Mbps HSDPA performance (MIMO)

- **Compatible Family: seamless migration**

- **Trusted, field-proven modem**

- **Reduce risk, accelerate time-to-volume**
Low Cost Residential femtocell

- Femtocells are very complex...
- BUT can be cheap (cheaper than a smartphone...)

Converge with WiFi

Specification
- 8 User low cost femtocell
- 21Mbps / 5Mbps
- 12*12 AQFN package
- Single external DDR3 memory
- Glueless SIM interface
- Soft GPS support
- SISO RF with ADI or Maxim RF
Moore’s Law

18 months halves cost or 2x performance
Volumes of residential drive down costs of metro, rural
Femtocell

- Small Cells = Shannon’s Law
  + Cooper’s Law
  + Moore’s Law

- Push Intelligence to the edge
- Lots of nodes = economies of scale of Silicon
- Computers have evolved...

![Mainframe](image1)
![Mini-computer](image2)
![Personal - computer](image3)

- Networks will evolve...

![Macrocell](image4)
![Picocell](image5)
![Femtocell](image6)

These are **disruptive** changes