LTE
LICENSE ASSISTED
ACCESS
MOBILITY DEMAND

41% mobile users highly satisfied with indoor mobility – users will pay more for better service

Willingness to pay: Indoor vs. Outdoor

<table>
<thead>
<tr>
<th>Service</th>
<th>Indoor</th>
<th>Outdoor</th>
</tr>
</thead>
<tbody>
<tr>
<td>Per service</td>
<td>60%</td>
<td>56%</td>
</tr>
<tr>
<td></td>
<td>47%</td>
<td>35%</td>
</tr>
</tbody>
</table>

8x Growth in Smartphone Traffic by 2020 . . . Growing & Emerging Indoor Apps

- Video on Command
- Virtual group activities
- Real-time assistance & learning
- Wearable devices
- Real Time Calling
- Contextual augmented reality shopping

Source: Ericsson November Mobility Report & Ericsson ConsumerLab

Source: Ericsson ConsumerLab analytical platform 2014
Base: Internet users using smartphone, tablet or PC, 23 countries
MOBILITY SUPPLY

Wireless spectrum is finite

Higher data speeds & more capacity requires better spectrum utilization

LTE Carrier Aggregation optimizes spectrum use & increases data speeds
5 GHz Spectrum
A Wireless Opportunity

Band Availability
- Large amount of unlicensed spectrum available in 5 GHz band

Regulatory Activity
- Extensive collection of global regulations within 3GPP RP-140054
- Mid 5 GHz radar detection in most regions
- Japan has a 4ms max transmission duration and listen before talk (LBT)
- Europe has LBT, max transmission duration & transmission BW requirements
LICENSE ASSISTED ACCESS (LAA)
Applying LTE-A Benefits to Unlicensed Spectrum

LTE
Consumer, Business, Enterprise and Industrial Users

Wi-Fi
Residential, Enterprise

LAA
Aggregation of LTE onLicensed & Unlicensed Spectrum

Licensed Spectrum

Wireless Network Demand

Supply of Unused Spectrum

Unlicensed Spectrum
LAA
Unlocks 5 GHz spectrum for LTE

LTE licensed spectrum for performance

PLUS

LTE unlicensed spectrum for speed boost

• Speed boost to carry additional data payload

• Using only 4 percent of the 5 GHz band, LAA can provide up to a 150 Mbps speed increase

• LTE efficiencies applied to unlicensed spectrum

Using LTE Advanced Technology to Aggregate Licensed & Unlicensed Spectrum
Sharing Goal – LAA not to impact Wi-Fi services more than an additional Wi-Fi network on the same carrier

• 2-step approach
  • On start up, choose least busy carrier
  • Share channel access time fairly with Wi-Fi, conforming to regulations in various regions

• 3GPP studying coexistence options
FAIR SHARING TRIAL
Wi-Fi Performance Maintained

Two Wi-Fi operators only

Simultaneous Wi-Fi and LAA (with coexistence solution)

Source: Ericsson
LAA IMPROVING APP COVERAGE

LTE In-Building
• Two Carrier LTE with peak speeds up to 300 Mbps
• Performance maintained under load

Wi-Fi In-Building
• Peak speeds of 1 Gbps
• Performance may degrade under load
LAA IMPROVING APP COVERAGE
LAA Delivers Performance and Speed

LAA Performance

• Excellent LTE performance on Licensed Band

• Speed bursts & performance of LTE on Unlicensed Band

• Real-time Apps supported with LTE on Unlicensed Band

Real Time Video Call
LAA IMPROVING APP COVERAGE
All Users Benefit

LAA Benefits All Users

• Additional capacity and efficiencies of LAA can offload LTE and Wi-Fi

• More capacity to support indoor applications for all users
DEVELOPING ECOSYSTEM

STANDARDS

DEVICES

NETWORK

Device availability
Regulatory activity
Band availability
Standards development

LAA chipsets expected to be available late 2015
LAA BENEFITS SUMMARY

Improving App Coverage

**Consumer**

- Faster mobile broadband data speeds
- Excellent network performance – both indoors and outdoors
- Seamless Indoor / Outdoor Mobility
- Carrier-grade security, reliability and QoS
- LAA increases system capacity which benefits all consumers (LTE, Wi-Fi, LAA)

**LTE Operator**

- Access to unlicensed spectrum for increased network capacity and higher data speeds
- Quality LTE coverage with LTE spectral efficiencies
- Management of a single network
- Enhanced performance for Enterprise
- Enables operators to realize full LTE-A potential

Consumers Receive Excellent Performance and High Data Speeds
3GPP Study Item approved in RAN #65

- This study will evaluate LTE enhancements for a single global solution framework for licensed-assisted access to unlicensed spectrum.
- High priority is on the completion of the DL only scenario.

RAN1 and RAN4 Work Items expected to start afterwards
LAA SMALL CELL ENHANCEMENT

LAA Available on Pico Cell (RBS 6402), 2015

Pico Cell Configuration

- Licensed LTE Band
- Unlicensed 5 GHz LAA
- Optional Wi-Fi

LAA on rest of small cell portfolio as per market demand

3GPP Rel. 13 solution expected 2016 - 2017

Small Cell Portfolio

- RBS 6302
- RBS 6501
- mRRUS
- RBS 6401
- RBS 6402
- Wi-Fi
- Radio Dot System

LAA on RBS 6402 Indoor Pico Cell

- LTE
- LAA
- Wi-Fi
LAA – ON THE ROAD TO 5G

LAA 5G Components:

- Combines licensed and unlicensed spectrum
- Utilizes High Band 5 GHz
- Small Cell Based
LAA SUMMARY

• LAA Boosts LTE data speeds with unlicensed 5 GHz band
• 4% or less of 5 GHz band provides up to 150 Mbps boost
• Unlicensed spectrum to be shared fairly between Wi-Fi and LTE
• LTE LAA is on road to 5G
• Ericsson first to announce availability of commercial LAA in 2015