# REV-080042
# Comments on
# LTE-Advanced Requirements

Matthew Baker

April 07, 2008

# How will success of LTE-Advanced be measured?

- LTE-Advanced must first and foremost be a success **in the market-place**
  - Meeting ITU requirements does not define success
  - 3GPP may define additional, or more demanding, requirements for LTE-Advanced than IMT-Advanced
  - Consider how to prioritise the different IMT-Advanced requirements

- 3GPP should study and define appropriate LTE-Advanced requirements, not just follow IMT-Advanced requirements

Note: WRC'07 identified spectrum for "IMT", not "IMT-Advanced". Therefore membership of IMT-Advanced is not essential in order to gain access to spectrum, although it is preferable

# System-level requirements are key

- In order to promote success in the market place, requirements on the RAN ("RIT") must be related to characteristics at the system level
  - First step is for 3GPP to develop meaningful scenarios and assumptions
    - A 3GPP strength is Operator input
    - Such inputs typically lead to the conditions under which 3GPP technology outperforms other solutions
    - Also need to consider requirements of operators and service providers which are "non-traditional" for 3GPP
  - Link-level performance improvements aggregated over multiple users may bring a significant (efficiency) benefit to operators, so can be of value. But…
  - Improvement in a RAN performance figure may not translate into a significant improvement to the user
    - A 10% performance metric increase does not mean 10% greater value
    - Significant user improvements are related to availability of new services, or changes in interactions with existing services.
      - Typically user value increases as a step function
    - LTE-Advanced needs to offer one or more step-change improvements. Requirements need to be sufficiently increased to achieve this.

# Need to keep up with changing expectations

- The user's expectation of a service changes with time
  - The known requirements for a known service today may not be the appropriate future requirements for the "same" service
  - e.g. 1: Video telephony
    - Was available pre-3G with low data rate and quality.
    - The expected quality of video telephony in the timescale of LTE-Advanced will be much higher, so the requirements will probably be different
  - e.g. 2: Location based services
    - E911 requirements do not permit all the foreseeable location based services

# Need to keep up with changing user behaviour

- The ways in which users interact with services, and each other, are constantly changing
- Some important recent trends:
  - User-generated content
  - Context sharing (e.g. in social networks)
- These can have impacts on requirements, even for known services, e.g.
  - When consuming streaming media, some loss of data and resulting glitches in experience are acceptable. When streaming media directly from the source (e.g. videocamera) to remote archival storage, such losses are not acceptable
    - Hence multiple sets of requirements for a service depending on use-case
  - Uplink traffic may become more prevalent
  - Devices may be active more often, with comparatively low data rates, performing context-gathering and analysis.
    - Therefore high system capacities may be made up with more simultaneous low-rate users, not just low numbers of high rate users

# Interoperation with other systems

- Prevalence of short range and nomadic wireless standards
  - Increased use of e.g. Body Area Networks and in-home networking.
  - LTE-Advanced may act as a gateway between such networks and the Internet/rest of the world
  - Some implications
    - In some cases LTE-Advanced could replace fixed broadband
    - A single LTE-Advanced terminal may be carrying traffic and services for multiple end nodes
    - Where a “terminal” is in fact a BAN, the capabilities may be beyond those traditionally considered for a terminal. e.g. a head-up display could support High-Def (even stereoscopic) content
      - Hence some limitations arising from terminal capability may become less relevant

# Question

- ITU is inviting organisations to submit to act as evaluation groups for proposed RITs
  - Should 3GPP be involved in this (self-)evaluation process?

PHILIPS