

What are the requirements for technology evolution



Wireless media distribution beyond 2020

May 06, 2015, Helmut Schink

Requirements for Media Distribution: food for thought

Let us consider all relevant stakeholders and the drivers

Stakeholders \ Drivers	PSM	Private Media	Regulators	Network Operators	Consumers /Participants	Device vendors	Chip vendors
DRM	Light Blue	Red	Light Blue	Yellow	Light Blue	Light Blue	Red
Reach (Service)	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow
Interactivity	Yellow	Yellow	Light Blue	Red	Yellow	Yellow	Yellow
Flexibility	Light Blue	Red	Light Blue	Red	Red	Light Blue	Light Blue
Global scale	Light Blue	Light Blue	Light Blue	Yellow	Yellow	Red	Red
Spectrum Efficiency	Light Blue	Light Blue	Red	Yellow	Light Blue	Light Blue	Light Blue
Control	Red	Yellow	Light Blue	Light Blue	Light Blue	Light Blue	Light Blue
Coverage	Red	Yellow	Yellow	Yellow	Yellow	Light Blue	Light Blue
Low cost	Red	Red	Light Blue	Red	Light Blue	Light Blue	Light Blue

Very high relevance

High relevance

LTE Broadcast (=eMBMS) opening the door

Broadcast

High Density Areas

- E.g. stadium and concert hall scenarios
- Using existing spectrum
- Short-term, deployment starting currently
- Several trials

Real Time Experience

- Edge video orchestration with eMBMS distribution
- „eMBMS in a box“ hosted in RACS, easy and fast introduction in local scenarios
- MEC based demo system available
- Entertainment and Disaster relief

Large Areas Broadcast

- Using separate Spectrum: UHF other available higher frequencies
- Complement or replacement of current DTT technologies
- Improved spectrum efficiency due to LTLTP architecture (e.g. 100 MHz for 25HD channels)
- Disruptive – longer term

Interactivity from the beginning

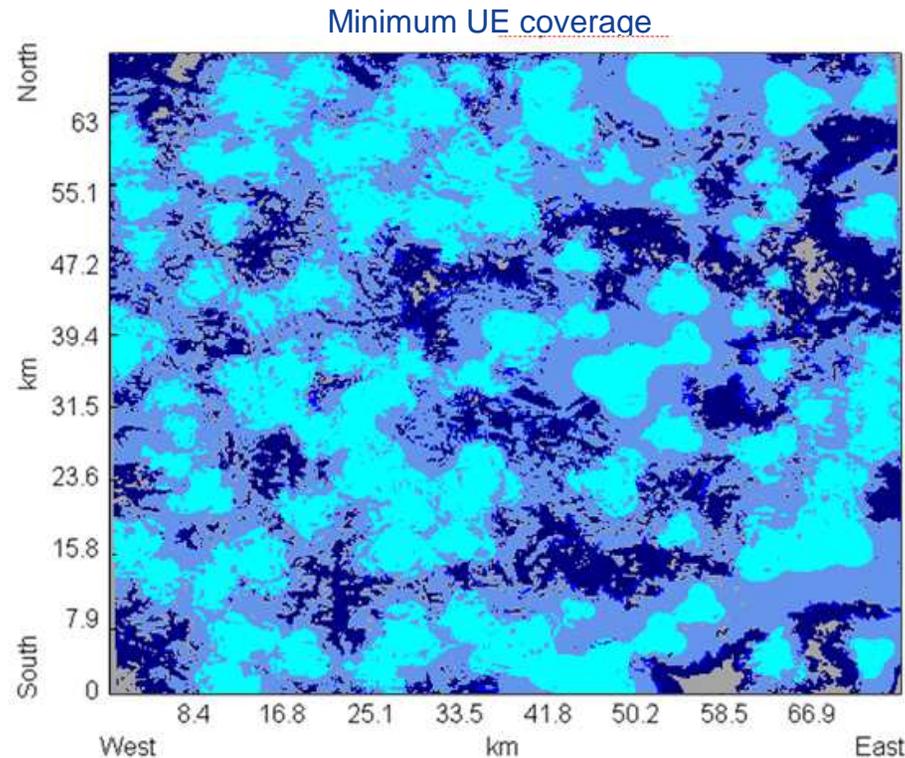
- Games
- User participation in Shows
- Second screen, chatting, social media
- Background information
- File repair
- Unicast for niche channels
- Unicast for coverage gaps
- Upload traffic information
- User behaviour tracking

Unicast

Single Frequency Networks (SFN) with high coverage of large areas are possible

System simulation results

- Indoor handheld**
Population: 55.8 %
Area: 32.7 %
- Outdoor handheld**
Population: 82.5 %
Area: 74.9 %
- Set top box – indoor antenna**
Population: 83.8 %
Area: add 77.6 %
- Set to box – rooftop antenna**
Population: 99.0 %
Area: 97.6 %
- Out of Coverage**
Population: 1.0 %
Area: 2.4 %



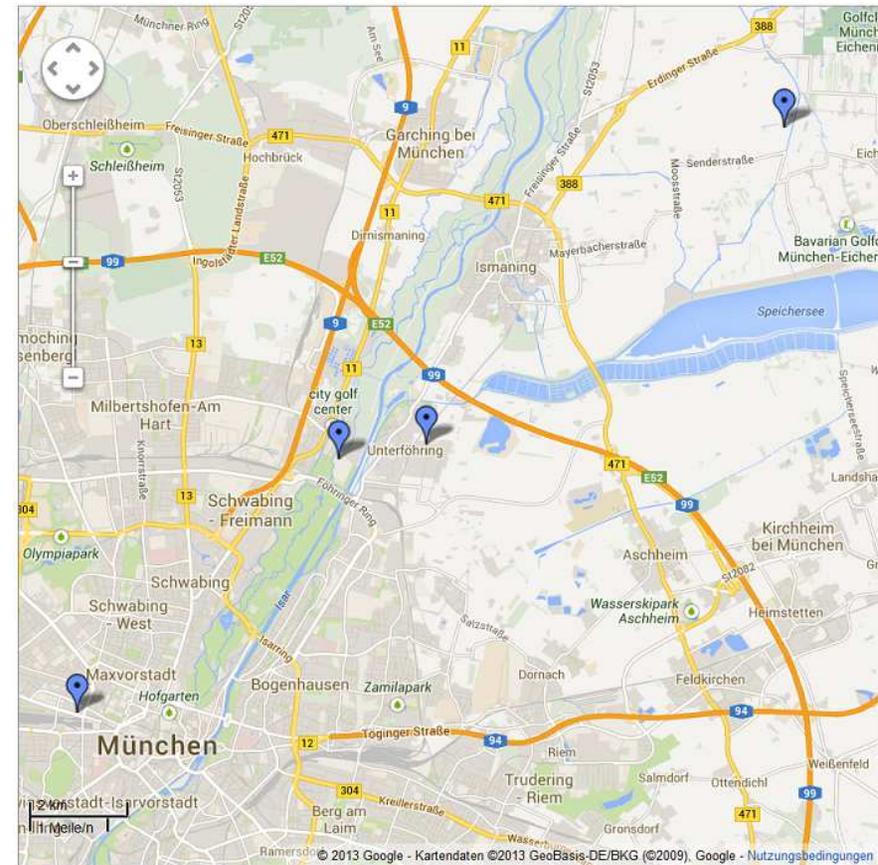
Tight synchronization of neighbor cells

Increased interference robustness

Improved border coverage due to lower TX powers and small cell sizes

IMB5: eMBMS Test Network Munich

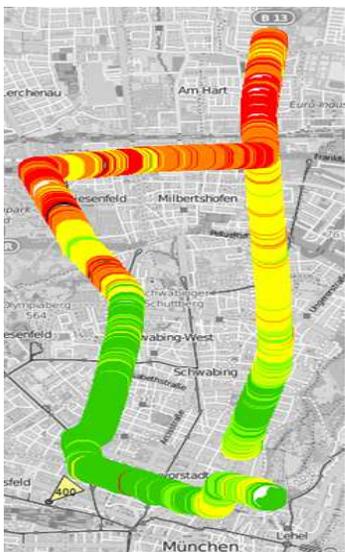
- Topology
 - Testbed is deployed in an area of ~400 km²
 - 4 sites of Bayerischer Rundfunk (BR)
 - Funkhaus (93m), Freimann (107m),
 - Unterföhring, (25m), Ismaning (214m)
 - Inter-site distances
 - FH-UF: 9,1km; FH-FM: 7,4 km; FH-IM: 18,9 km
 - FM-UF: 1,8 km; FM-IM: 11,5 km; UF-IM:9,9 km
- Operational parameters
 - Commercial Nokia LTE radio equipment with special software load
 - Single frequency network (MBSFN)
 - 761-771 MHz (downlink), 706-716 MHz (uplink)
 - 40 Watt per RF module



eMBMS RS SINR compared to single cell RS SINR

- SINR (eMBMS) measurement
- This measurement is performed only on the eMBMS reference signals in the MBMS subframes

Funkhaus



PCI 400

Freimann



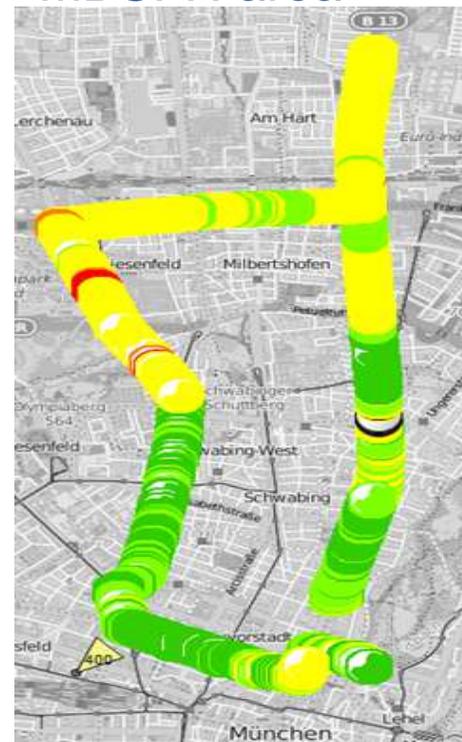
PCI 200

Unterföhring



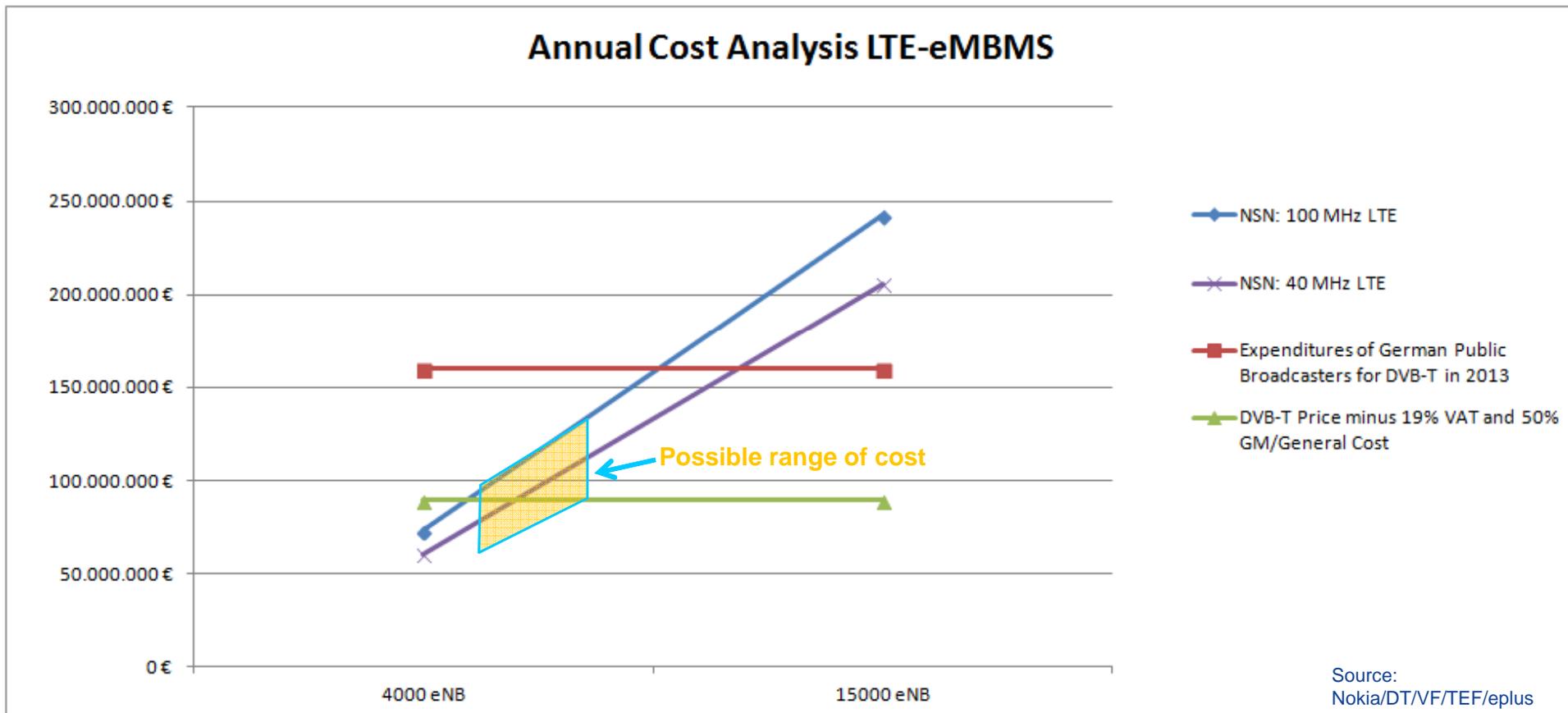
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MBSFN area



Comparison between LTE Broadcast and DVB-T in Germany

LTE and DVB-T Cost are in the same Ballpark



Can we merge LTE into DVB-T 2?

The main promise:
broadcasters (PSBs) can maintain the infrastructure / vertical integration

Great: then it sounds like **LTE, but....**

The devil is in the details:

- HTHP approach leads to low frequency re-use and border problems
- Higher power consumption due to topology
- HTPT: long cyclic prefix -> low speed limit
- No standard, no chip, no terminal
- And: no uplink, no interactivity
- Permanent double transmission of content?
- Increased complexity challenge for LTE

Can this be fixed ?

Can we extend LTE to cover PSM needs

The main promise: broadcasters (PSMs) can focus on content

Great:

- LTE allows flexibility/scalability from existing sites
- LTE is globally accepted, standardized and deployed
- LTE reaches billions of mobile devices
- Interactivity is at its heart

The devil is in the details:

- PSBs would become PSMs: a perception game
- Loss of control of resources generates fear of dependency and loss on QoS insurance
- Coverage in rural areas may be more expensive

Let us fix these problems

Required extension to LTE eMBMS Rel. 12

Agree on most relevant use cases and scenarios

Extend LTE standards to improve Coverage / Cost position for rural areas:
CP beyond 16/33 μ s -> approx. 100 μ s??
Develop dedicated carrier approach, up to 100% for eMBMS

Enable Supplemental downlink for flexible introduction

Agree on operational models that give content providers trust:
Transparency / Control
Reliability / QoS
Choice / Interoperability

Requirements for Media Distribution: how do solutions fit

We should go for a broad solution for entire ecosystem

Stakeholders	PSM	Private Media	Regulators	Network Operators	Consumers /Participants	Device vendors	Chip vendors
Drivers							
DRM							
Reach (Service)							
Interactivity							
Flexibility							
Global scale							
Spectrum Efficiency							
Control							
Coverage							
Low cost							

LTE LTLP and its extension best positioned to cover requirements of entire ecosystem

Current PSM's priorities can possibly be covered by DVB-T HTHP extensions (HTHP)