Costs of TV distribution via Mobile Networks

FutureWorks – Broadband Broadcast Convergence

- Helmut Schink
- IRT Kolloquium, October 26, 2015, München
Major cost blocks for Operator

• Network Infrastructure
• Licences
  - Spectrum
  - Content
Who else has costs?
Operator views on drivers are multifold
Technology provides options for business

I have spectrum, content so I could use eMBMS for downlink local stepwise introduction

I am mainly interested in sports transmission: this is the driver

I need eMBMS based TV offering as competitive offering to gain market share

I would like to position us as TV station

I am interested in Audio-Broadcast, experiments in Italy and Germany

I have commercial offerings at Hot Spots

I will bundle eMBMS with my Cable offerings

I will will introduce eMBMS for football stadiums, race tracks, tennis courts

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LTE Broadcast
One network to unify multiple aspects

- Spectrum: existing/new
- Geography: Local/Nation
- Technology: Broadcast • AV streaming • File Delivery
- Broadband • On Demand • Interactivity
- Environment

PSBs

MNOs

Carrier Aggregation / SDL
MFN/SFN
Chips and Terminals available but playout, rendering program guide, etc. need to be made available.

- MBMS packet delivery to eNBs
- MBMS Session Control towards E-UTRAN
- MBMS user service provisioning and delivery
- MBMS Bearer Service authorization and initiation
- MBMS transmission scheduling and delivery
- Entry point for content providers' transmissions

Content Provider

Flow of content

- eMBMS User Traffic
- eMBMS Signalling

eMBMS components

- MBMS admission control
- MBMS radio resource allocation
- MBMS packet delivery to eNBs
- MBMS Session Control towards E-UTRAN
- MBMS user service provisioning and delivery
- MBMS Bearer Service authorization and initiation
- MBMS transmission scheduling and delivery
- Entry point for content providers’ transmissions
Scenario 1/2

- The sites of an existing 2G/3G/4G German mobile network (macro/micro architecture) are used as basis to deploy a dedicated RAN for public TV broadcast
- Spectrum: no spectrum cost considered in this section, see separate slides
- RAN: Dedicated RAN is deployed, enabled for broadcast by eMBMS technology
- Sites: Only existing sites will be used, new sites as an option
- Backhaul/Transport: An additional backhaul link for last mile connection of the eNB is necessary and extra cost has to be considered (additional to transport capacity share) for 20% of sites
- Core: Existing mobile core is partly used and extended by eMBMS components (MBMS GW, BM-SC), (cost is divided by # of sites and allocated to each site)
- Network Management: Separated Network Management System for Network Operation Center (cost is divided by # of sites and allocated to each site)
Scenario 2/2

- **Reference year** for cost and technology is 2016
- **Amortization period**: 7 years
- **Number of sites**: Between 4000 and 15000 for Germany as a working assumption
- **Not considered**:
  - Value added tax
  - Selling, general and administrative expenses
  - Cost for spectrum
  - Operator margin
  - Up-selling options and other business opportunities
3-Sector eNodeB

Two configurations:
- 100 MHz assuming spectral efficiency 1.5: 150 MBPS (~ 25 HD channels)
- 40 MHz assuming spectral efficiency 2: 80 MBPS (8 HD 16 SD channels or 13 HD channels)

Tx power 2x 40 W per sector standard, can be tuned up with standard equipment up to factor 2, for higher Tx power specialized amp needed

Sectorized antennas
Scalable baseband capacity by Flexi Multiradio System Module
Outdoor system module – no need for shelter/cabinet
eMBMS software package

- Very compact, pure outdoor solution
Compact High Performance Sites

LTE BTS

Office building
Air ventilation

Flexi RF Module Triple + Flexi Multiradio System Module
Assumption for Number of Sites Needed

Breakdown of German area according to NSN Planning Department

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<td><strong>Total (sqkm)</strong></td>
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<td>344,793</td>
<td>13,549</td>
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<td><strong>96.2%</strong></td>
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<td>3.8%</td>
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</tbody>
</table>

Results of System Simulation

- **Area Germany 360,000 sqkm**
- **Rural**
  - Area 96%, 90% to be covered
    - Rural area 311,040 sqkm
  - ISD 10 km at spectral eff. 1.7*
  - Area hexagon 86.6 sqkm
    - 3590 eNB sites needed
- **Urban**
  - Area 4%, 100% to be covered
    - Urban area 14,400 sqkm
  - Total number of sites needed: 5440–7750

Comparison of DVB-T and LTE Broadcast

Annual Cost Analysis LTE-eMBMS

Possible range of LTE-B network cost
Comparison of DVB-T and LTE Broadcast

Annual Cost Analysis LTE-eMBMS

- Possible range of LTE-B network cost

4000 eNB 15000 eNB

Nokia: LTE 100 MHz
Nokia: LTE 40 MHz
Expenditures of German Public Broadcasters for DVB-T in 2013
Comparison of DVB-T and LTE Broadcast

Annual Cost Analysis LTE-eMBMS

Possible range of LTE-B network cost

- Nokia: LTE 100 MHz
- Nokia: LTE 40 MHz
- Expenditures of German Public Broadcasters for DVB-T in 2013
- DVB-T Price minus 19% VAT and 50% GM/General Cost

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Cost of Licences
e.g. Spectrum

• Background:
  - Spectrum Licences for TV distribution today: low cost, paid per site per usage
  - Spectrum for Mobile: auctioned -> potential high income for state

• Situation in Germany
  - 2500 mio € for 100 MHz (1,8GHz auction 2015)
  - Higher prices for larger blocks
  - Usage period: ~ 15 years (2018 until 2033)

• Opportunity Cost for State: > 250´ p.a. with current DTT distribution, could be largely avoided with LTE
Conclusions

• Mobile networks can be upgraded and the costs of a LTE based broadcast network infrastructure are in the same ballpark as the current fee paid by public TV community for DTT (DVB-T).

• The decisive questions shift towards:
  - Value of additional audience that can be reached (younger population, mobile users)
  - Optimization strategies for best mix of distribution media
  - Up-selling opportunities for the LTE-Broadcast network beyond the basic DTT use case, e.g. interactivity
  - Content rights/licences need to be re-negotiated
  - Spectrum as a scarce resource needs to be fairly treated