eMBMS Delivers Mobile Video
To The Mass Audience

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20150808
Content

• eMBMS Overview
• Use Cases
Mobile Video Traffic Is Growing Fast

Large screen and hi res mobile devices

Abundant content

Hi Speed, lo latency network

Global Mobile Data Traffic

Source: Huawei VE Lab 2015

How to improve network efficiency and monetization video in LTE era?
eMBMS Enhances Efficiency

- eMBMS - evolved Multimedia Broadcast and Multicast Service
- Based on LTE (3GPP Rel.9 onwards)
- Saves on air interface spectrum resource and network transmission resource
- Key Features: bandwidth sharing with existing unicast LTE, MBSFN, SYNC, MooD

Highly efficient in delivering popular content to mass number of users

Resource

Unicast VS eMBMS

4 x 2Mbps = 8Mbps

N x 2Mbps = 2Mbps
( multi users to share one link )

MBSFN
- Multicast/Broadcast single frequency network
SYNC
- phase-synchronized network
MooD
- Multicast operation on demand
eMBMS Overview

Use existing LTE spectrum: allocated BW to broadcast as needed

Add 3 new network elements to existing LTE core network

Spectrum Bandwidth Sharing

- **LTE-TDD**
  - 0~50%
  - Unicast
  - Broadcast

- **LTE-FDD**
  - 0~60%
  - Broadcast bandwidth allocated according to demand

- MCE: Multi-Cell/Multicast Coordination Entity
- MBMS GW: MBMS Gateway
- BM-SC: Broadcast-Multicast Service Centre

EPC

- Media Platform
- Advertising Platform
- OTT Server
MBSFN Gain

Unicast transmission
The signal of neighbor cells (P2, P3) and noise (N) can be interference sources to the useful signal (P1).

MBSFN transmission
The UE combines signals of neighbor cells (P2, P3) and serving cell (P1), thus getting a higher SINR gain compared with unicast.

MBSFN: Multimedia Broadcast Multicast Service Single Frequency Network

eNBs in the same MBSFN area need to be phase-synchronized
Examples Of Coverage

- **Venue-specific broadcast**
  - sports arena, exhibition grounds

- **Regional broadcast**
  - e.g. campus-wide or city-wide
  - local events, news, Live TV, VoD, push service, education

- **Nation-wide broadcast**
  - Live TV, national news, VoD, push service
  - World Cup and Olympic Games

eMBMS enables the operator to control the service area to match audience
Flexible Bandwidth Allocation

- bandwidth partitioning needs to be pre-programmed according to time of day

Regular Hours

Unicast or On-Demand Content

Game Time or Special Events

Night Hours

Spectrum bandwidth is only allocated to broadcast as needed

- Broadcast bandwidth can be flexibly allocated as needed
- No Impact on unicast capacity at other times
Popular video content can be delivered to a large number of users more efficiently with broadcast.

Personalized video content can be delivered to individual users with unicast.

MooD – Automatic Bandwidth Partitioning Between Unicast & Broadcast

- available in 3GPP Rel.10 onwards

Optimizes air interface spectrum usage
“No Edge” User Experience

- Weak cell edge signal
- Interferences from neighboring cells
- Decreasing bit rate towards cell edge

- All cells are phase-synced, same content
- Signals from all cells can be combined
- Reduced interference, more gain, higher SINR
- Same bit rate from cell center to cell edge

Enhanced QoE independent of user location
## eMBMSTrials & Commercial Plans

### 25+ trials globally

<table>
<thead>
<tr>
<th>Country</th>
<th>Trial Operator</th>
<th>Trial Network Vendor</th>
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<tbody>
<tr>
<td>China</td>
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<td>3 UK (unconfirmed)</td>
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<td>South Korea</td>
<td>KT</td>
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<tr>
<td>Germany</td>
<td>Bayerischer Rundfunk</td>
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### Already In Service

- **kt**
  - started in Jan 2014

### Commercial Service Planned For 2015
Sample of Huawei Experiences in eMBMS

10+ trials/PoCs globally and more new requests
Ecosystem Development
Huawei Partnerships and Contributions
Ecosystem is Taking Off

**Huawei LTE eMBMS Solution**

- Wide Coverage
- Cluster Coverage
- Hot Spot Coverage
- Mobile
- Fixed-like
- eNBs
- Core Network
- MBMS-GW
- BM-SC
- MCE
- IPTV Platform
- OTT Server
- Push Server
- Hybrid Video Solution Platform

**LTE eMBMS Ecosystem is Taking off**

- Unique E2E in industry: chipsets, devices, network & content platforms

- **eMBMS Chipsets**
  - Balong 7x0
  - New Snapdragon Series since Jan 2014
  - SQN 3110
  - ATOM x3-C3440

- **Huawei eMBMS Terminals**
  - Huawei Ascend G6, G620, C8817
  - Huawei MediaPad
  - Huawei CPE
Content

• eMBMS Overview
• Use Cases
Innovative Use Cases

1. Live Video
   - Home Screen
   - In-Video Ad
   - Add Details

2. E-commerce

3. Broadcast & unicast Synergy

4. Pre-Loaded Contents
   - App Screen
   - Content Selection
   - Booking

5. Ad, Sponsored Data

eMBMS unleashes new business potentials
Use Case 1: Venue Casting

For tablets and smartphones

- Live event broadcast – channels only assigned for event duration
- In-video ad menu (user initiated)
- User-selected ad
- Online Betting (user initiated)
- User-selected bet
Use Case 2: Mobile TV

For tablets and smartphones

News Channel
- Channels assigned for all day

Movies Channel

Fashion Channel

In-video ad menu
(user initiated)

User-selected ad
Use Case 3: Pre-Loaded Content

For tablets and smartphones

Home Menu
- User-selected push time

VoD
- Push time selection
  - Tariff discounts during network non-busy hours

Music
- Order confirmation
Use Case 4: Home TV

SD & HD for regular TV

TV Channels
- Channels assigned during viewing hours

Benefits:

- LTE to reduce last mile costs: lack of access fiber/copper
- TV + MBB + voice services through LTE
- TTM

LTE eMBMS network

Electronic Program Guide

Shopping Channel

Online Betting
**Use Case 5: Push Advertisement**

- **Digital Signage**

- **LTE eMBMS network**

- **Push Advertisement Platform**

- **Advertisements**

  - Video usually pushed during off-peak hours
Use Case 6: Connected Cars/Buses

Trial in China:
- Tourist bus route
- Ad, bus schedule & route info and WiFi access at bus stops
- Mobile TV, advertisements and WiFi access on buses
Use Case 7: MVNO/Channel Wholesale/Traditional Broadcasters

MVNO/Broadcasters
- Shares spectrum and eNBs with operator
- Builds its own eMBMS core network
- Has its own mobile network
- Same use cases as normal operator
Use Case 8: Push-To-Talk

Smartphones with PTT App

LTE eMBMS network

PTT Server Platform
Use Case 9: Radio Over eMBMS
Use Case 10: Public Safety
Business Models

Revenue Sharing
- "User" Pay
- Revenue Shared
- Use Cases:
  - Venue Casting
  - Mobile TV
  - Home TV
  - Connected Cars/Buses

Sponsored Data
- Add
- 3rd Party Pay
- Use Cases:
  - Push Ad
  - Pre-Loaded Content
  - Connected Cars/Buses
  - Public Safety

Hybrid
- "User" Pay
- Revenue Shared or 3rd Party Pay
- Use Cases:
  - All

LTE eMBMS enables endless possibilities in B2C or B2B2C scenarios
Promising Estimations of New Revenues

<table>
<thead>
<tr>
<th>Additional broadcast service revenues as % of total data revenue</th>
<th>Year 1~5</th>
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<tr>
<td>Forward</td>
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<tr>
<td>Live TV</td>
<td>+ 06%</td>
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<tr>
<td>Booked Video</td>
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<td>Newspaper</td>
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<td>Datacard Live TV</td>
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<tr>
<td>MiFi Live TV</td>
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<tr>
<td>Backward</td>
<td>+ 14%</td>
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<tr>
<td>Ad/Leased</td>
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<tr>
<td>Total</td>
<td>+ 20%</td>
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</tbody>
</table>

- Reference: one city in Asia, joint study of case with operator
- LTE adoption similar to 3G curve

eMBMS can improve data revenue by ~20% over 5 years