ERICSSON

LTE BROADCAST

HTE MediaNet
2013. okt. 4.

Novák Csaba
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Practice Mobile Broadband

MARKET TREND

INCREASED DEVICE CAPABILITY

› Larger and higher quality screens

› More memory and processing capability

CONTENT EXPERIENCES

INCREASING CONSUMER DEMAND FOR VIDEO SERVICES

GROWING MOBILE DATA TRAFFIC

12x

› Mobile data traffic will grow 12 times by the end of 2018

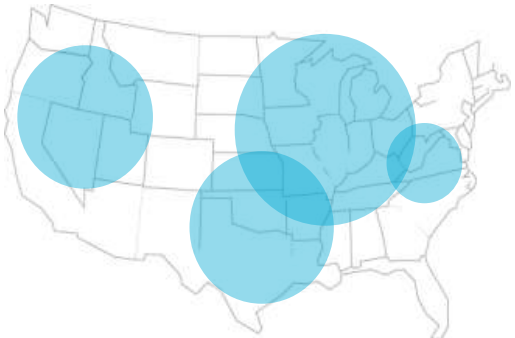
10 BILLION MOBILE SUBSCRIPTIONS BY 2020

NEW BUSINESS MODELS EMERGING

INCREASING LTE DEPLOYMENTS

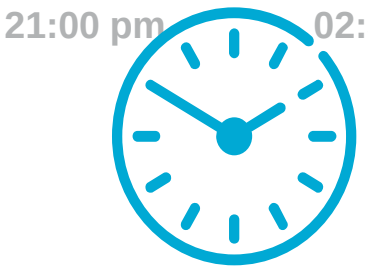
SERVICE DYNAMIC

GEO DYNAMIC



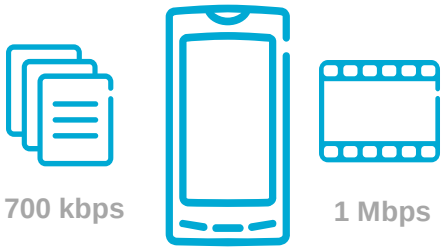
Services activate in defined area in the LTE network

TIME DYNAMIC



Services activate for scheduled duration

QUALITY DYNAMIC



Bitrates are dimensioned to the service requirement

CHARGING DYNAMIC

Premium content services and guaranteed user experiences open up new business models for media services and content packages

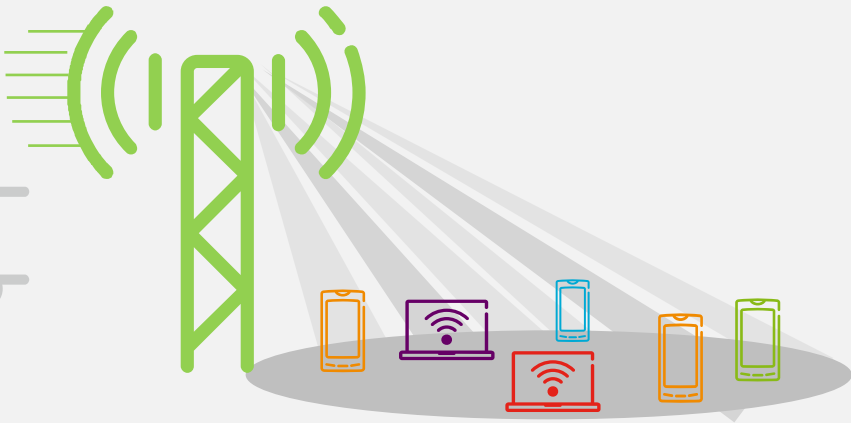
See Ericsson Consumer Lab report on TV and Media

http://www.ericsson.com/res/docs/2013/consumerlab/tv-and-media-consumerlab2013.pdf

BROADCAST VS. UNICAST
DIVERSE CAPABILITY WITHIN ONE NETWORK

BROADCAST

UNICAST



Brings scalability and cost optimization

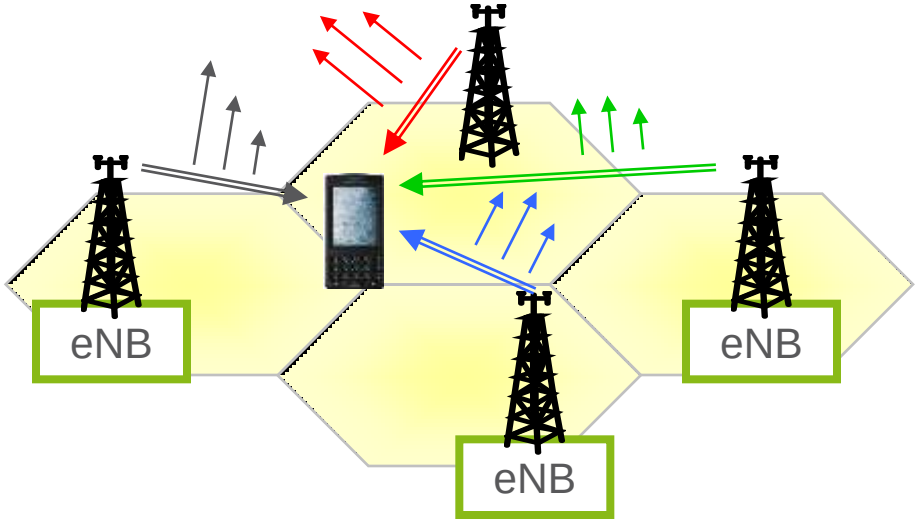
- One data channel per content
- Limited data channels and unlimited number of users
- Offer popular services over dense areas

Brings advanced personalized services

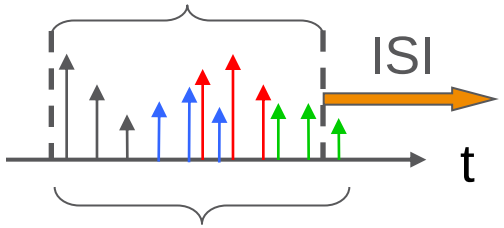
- One data channel per user
- Unlimited channels and limited number of users
- Any content, any time, anywhere

MBSFN TRANSMISSION MODE

- MBMS = Multimedia Broadcast and Multicast Services
- SFN = Single Frequency Network
- MBMS + SFN = MBSFN
- Synchronous transmission of same signal from all cells in MBSFN area
  - Radio links appear as multipath signal of one waveform
  - No interference from neighboring cells within MBSFN area
    - Improved performance, higher bit-rates
  - No inter-symbol interference (ISI) if multipath delay spread within OFDM cyclic prefix (CP)

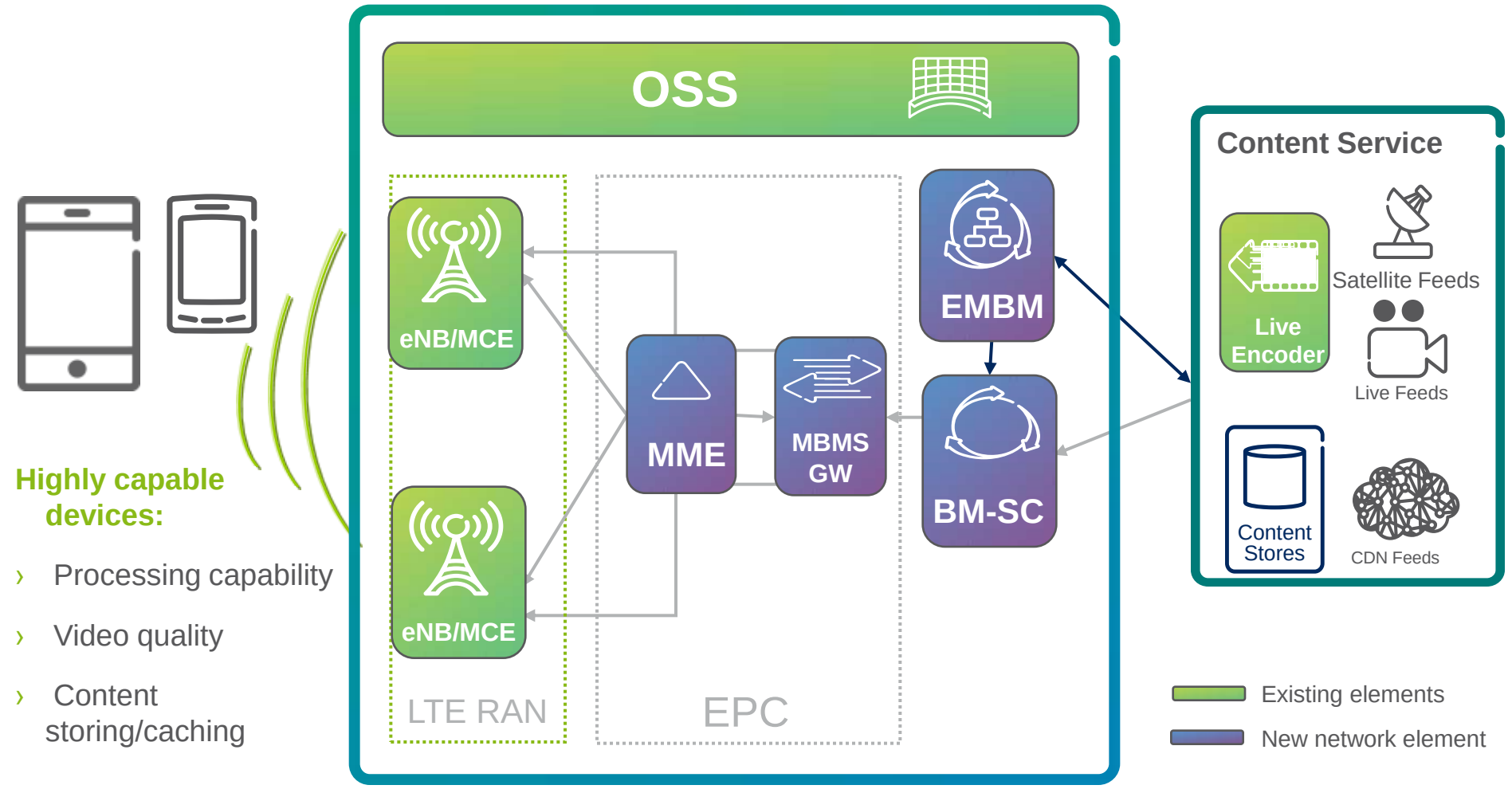


length of CP
16.7 µs



multipath delay spread
~ distance from eNB

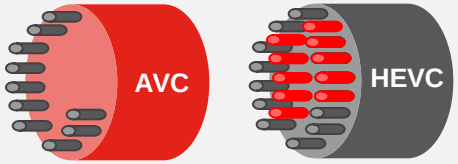
LTE BROADCAST SOLUTION



Highly capable devices:

- Processing capability
- Video quality
- Content storing/caching

VIDEO COMPRESSION EVOLUTION FROM AVC TO HEVC

	AVC (H.264)	HEVC (H.265)	EFFICIENCY
Bandwidth (Mbps)	SD : 1.5 - 2.5 HD : 6.0 - 9.0 4K : 12 - 18	SD : 0.8 - 1.5 HD : 3.0 - 4.5 4K : 6.0 - 9.0	
Better quality of experience/same bandwidth	Standard Definition	High Definition	
More channels/ same Bandwidth	10 channels	20 channels	

THE FUTURE OF VIDEO

UNIFIED VIDEO TRANSPORT FORMAT

mpeg-DASH

DYNAMIC ADAPTIVE STREAMING OVER HTTP ENABLES HIGH QUALITY STREAMING

- Brings much needed standardization to an area full of proprietary interfaces
- Best-in-breed of both HLS, HDS and Smooth Streaming
- Unified DRM architecture simplifies supporting broad device ecosystems
- Consistent unicast/multicast delivery mechanism
- Maintain strong end-to-end ecosystems for OTT applications, HLS and Smooth Streaming

USE CASES OVERVIEW

Premium Event Service	Deliver live premium contents in high dense areas
Media Services	Offer media services with efficient delivery & manageability
OTT Optimization	Provide additional value for OTT offerings
Data Offload	Relive network congestion by broadcasting contents
Complementing Emergency Services	Provide complementing solution to the public safety domain

USE CASE#1
PREMIUM EVENT SERVICES

Value Proposition

Deliver live premium contents in high dense areas

Use Cases

Target Customers

1. **National live events**
   - Super bowl, royal wedding, Olympics and other popular events which are watched national wide Simultaneously — S
   - Event selling / pay per view
2. **Seasonal sports event**
   - Video service offered to the local event to sell on top of the tickets as added value services, e.g. concerts, stadiums; including views from different angles, reviews and other events performing at the same time — S
   - Subscription based
3. **Venue casting** — B, S
   - Offer enterprise the service to broadcast the content within the venue or to the specific group
   - Offered in museums, shopping mall, etc

Target Customers : B – Business to Business to Customer; S - Subscribers

USE CASE#2
MEDIA SERVICES

Value Proposition

Offer media services with efficient delivery & manageability

Use Cases

Target Customers

1. **Popular TV and video service**
   - › Secure the delivery of video on-demand for the most popular films and contents — B, S

2. **Podcasting - Publishing**
   - › Newspaper subscription delivered over night, over publishing companies app
   - › Subscription over application based content delivery — B, S

3. **M2M content manageability**
   - › Content delivery to TV panels in the airport, bus stops, panels in lifts for advertisements — B
   - › Vending machines management
   - › Traffic lights management

Target Customers : B – Business to Business to Customer; S - Subscribers

USE CASE#3
OTT OPTIMIZATION

Value Proposition

Provide additional value for OTT offerings

Use Cases

Target Customers

1. **"Netflix" or "Hulu" type services** — B
   - › Delivery popular contents with efficient delivery
2. **Breaking news (National broadcast)** — B
   - › Wholesale the broadcasting to CNN with frame agreement. e.g. celebrity news, terrorist attack, presidential speech etc.
3. **Advertising/coupon service**
   - › A "Daily deals" provider could offers deals efficiently to its subscribers or deliver offers to its own mobile apps using LTE Broadcast
   - › Coupons services during holidays

Target Customers : B – Business to Business to Customer; S - Subscribers

USE CASE#4
DATA OFFLOAD

Value Proposition

Relive network congestion by broadcasting contents

Use Cases

Target Customers

1. **SW/OS upgrade**
   - › SW upgrade delivered to vending machines
   - › OS upgrade delivered in all android phones, etc*:*

2. **Top application updates**
   - › Push top 1000 applications upgrades to devices
   - › Delivery during non-rush hour and cashed in devices

3. **Broadcast TOP 5 contents**
   - › Broadcast the most viewed content to optimize the delivery

Target Customers : B – Business to Business to Customer; S - Subscribers

USE CASE#5 COMPLEMENTING EMERGENCY SERVICES

Value Proposition

Provide complementing solution to the public safety domain

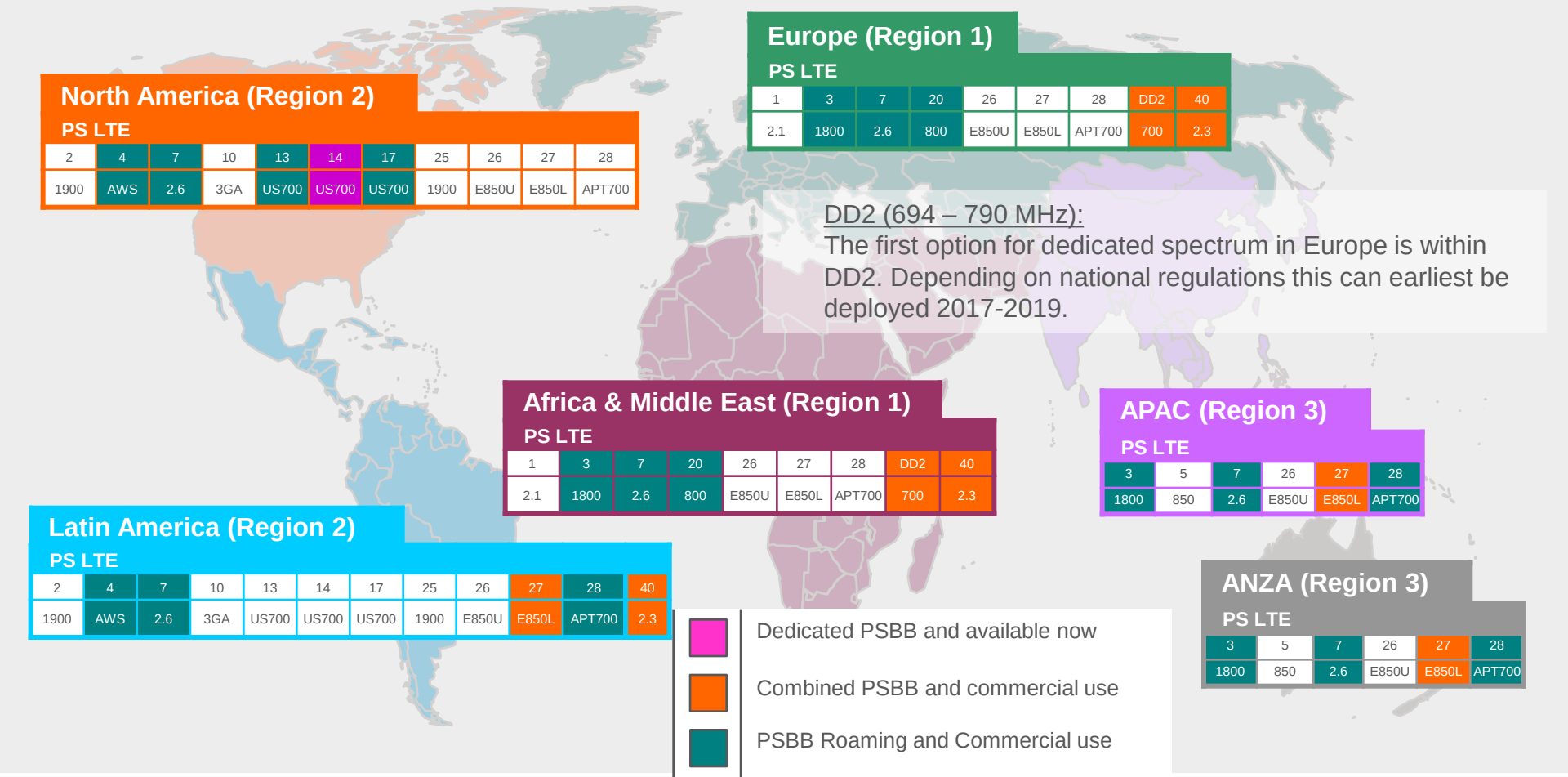
Use Cases

Target Customers

1. **Mass alerts and disaster notifications** — S
   - › complement existing PWS (Public Warning System) with content i.e. adding video but no regulatory/coverage requirements
2. **Navigation devices m2m traffic information** — B
3. **Public Safety: emergency communications from government agencies**
   - › Integrate with Public Safety LTE solution
   - › Providing service to upload content and broadcast instantly video of accident hit area to the police network, targeting to offer to i.e. Motorola

Target Customers : B – Business to Business to Customer; S - Subscribers

SPECTRUM AVAILABILITY PUBLIC SAFETY LTE



North America (Region 2)

PS LTE

2	4	7	10	13	14	17	25	26	27	28
1900	AWS	2.6	3GA	US700	US700	US700	1900	E850U	E850L	APT700

Europe (Region 1)

PS LTE

1	3	7	20	26	27	28	DD2	40
2.1	1800	2.6	800	E850U	E850L	APT700	700	2.3

DD2 (694 – 790 MHz):

The first option for dedicated spectrum in Europe is within DD2. Depending on national regulations this can earliest be deployed 2017-2019.

Africa & Middle East (Region 1)

PS LTE

1	3	7	20	26	27	28	DD2	40
2.1	1800	2.6	800	E850U	E850L	APT700	700	2.3

APAC (Region 3)

PS LTE

3	5	7	26	27	28
1800	850	2.6	E850U	E850L	APT700

Latin America (Region 2)

PS LTE

2	4	7	10	13	14	17	25	26	27	28	40
1900	AWS	2.6	3GA	US700	US700	US700	1900	E850U	E850L	APT700	2.3

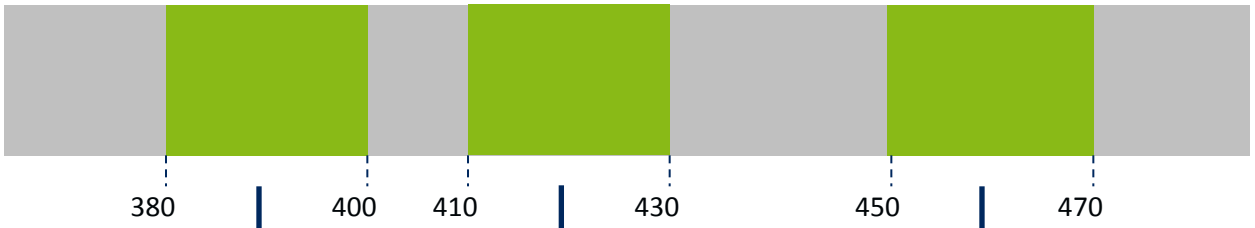
ANZA (Region 3)

PS LTE

3	5	7	26	27	28
1800	850	2.6	E850U	E850L	APT700

- Dedicated PSBB and available now
- Combined PSBB and commercial use
- PSBB Roaming and Commercial use
- Should be avoided

SPECTRUM ASPECTS
380 – 470 SITUATION
WHY 400 CAN NOT BE HARMONIZED



- Already licensed to mobile operators (CDMA 450) in several European countries
- Although Band 31 LTE 450 for Brazil (452.5-457.5-462.5-467.5 MHz) is in 3GPP RAN4, 5+5 MHz of FDD spectrum is considered not enough for PPDR requirements.
  (* LTE FDD supports bandwidth in sets of 1.4, 3, 5, 10, 15 and 20 MHz only)
- Already allocated and used by narrowband PMR in several European countries, time and work is required for the spectrum re-allocation and re-farming
- Used by TETRA today and is a NATO band and cannot be used for PPDR (according to CEPT FM49 decision)

WHY NOW?

- Smart Phones and tablets encourage for Mobile Data Usage
  - Nice large screens, easy to use, CPU, memory, …

- Good network connectivity and coverage
  - Variety of content and services available for mobile consumption
  - But, impossible to provide consistent quality into Sports Arenas

- Accepted by end-users to watch movies their phone
  - “Smartphones trump desktops in Olympics viewing” (Financial Times, August 2012)

ERICSSON 1ST

Ericsson is the ONLY vendor capable of offering an end-to-end solution bringing together three key technologies (HEVC, DASH, eMBMS) that will revolutionize media delivery over mobile networks.

›First mover of new technologies

›End to End capabilities

›Driving force in Standardization and Eco System (in collaboration with Qualcomm)

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