

# The next generation is here

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The logo for TELE2, featuring the word "TELE2" in a bold, stylized, sans-serif font. The letters are black and have a slightly irregular, blocky appearance. The "2" is particularly large and prominent.



H&M

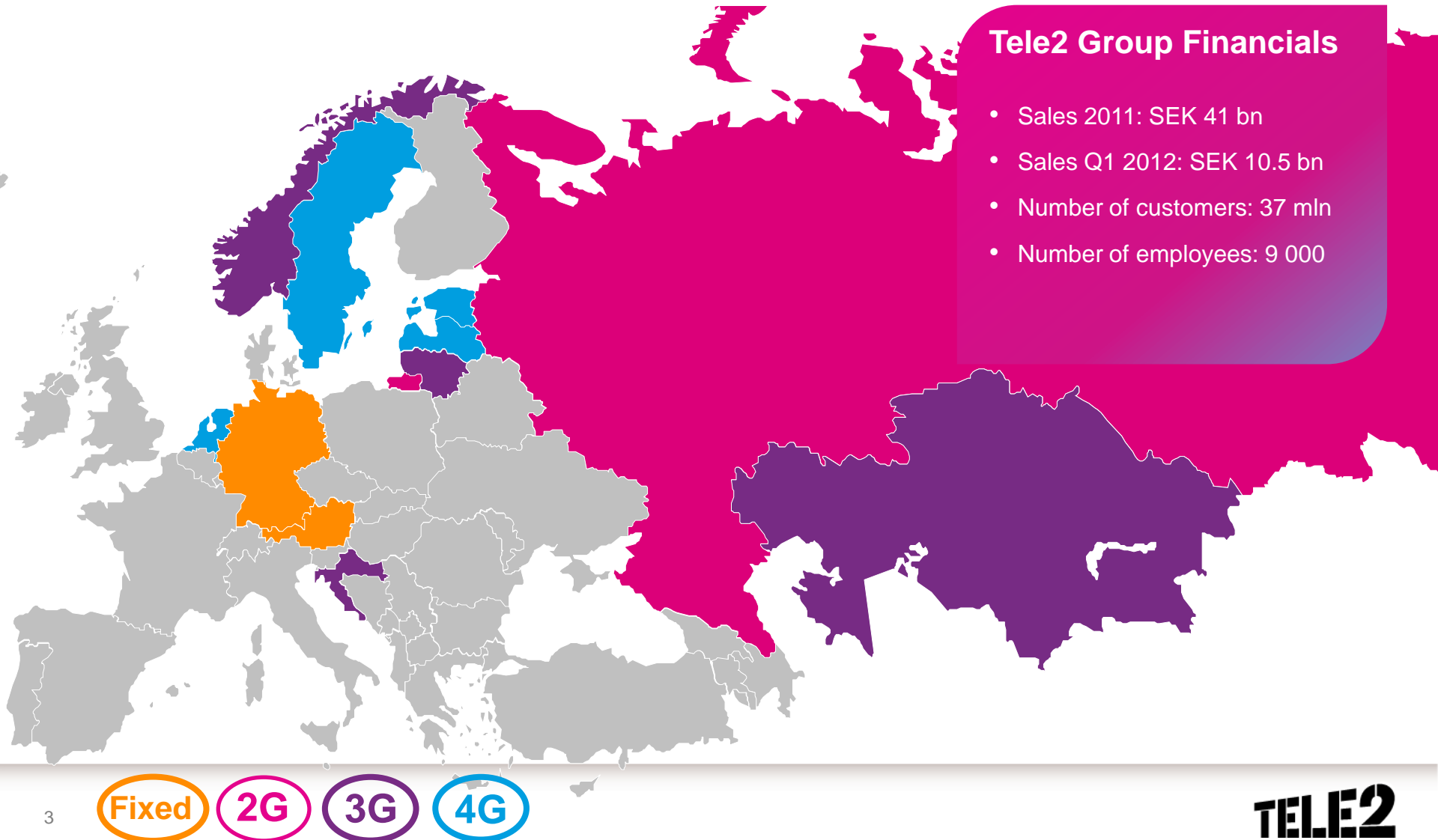
Nästa generation är här.

Bredband  
**4G**

*Kommer  
the future  
Närde*

**TELE2**  
Här är bredbandet

# Tele2 has 37 million customers in eleven national markets



# Tele2's Frequency Portfolio

	800 Mhz	900 Mhz	1800 Mhz	2100 Mhz	2600 Mhz	Strategy
Sweden*	10	20	35 2013	20	40	2G, 3G, 4G
Estonia		11	24,3	15**	20	2G, 3G, 4G
Latvia		11	24,8	20	20	2G, 3G, 4G
Lithuania		11,6	24,6	20		2G, 3G, 4G
Croatia		5	12	15**		2G, 3G, 4G
Norway		5		15		2G, 3G, 4G
Russia		1-2***	15-20			2G, 4G
Kazakhstan		11	5	20		2G, 3G
Netherlands					20	4G

Tech neutral

4G

3G

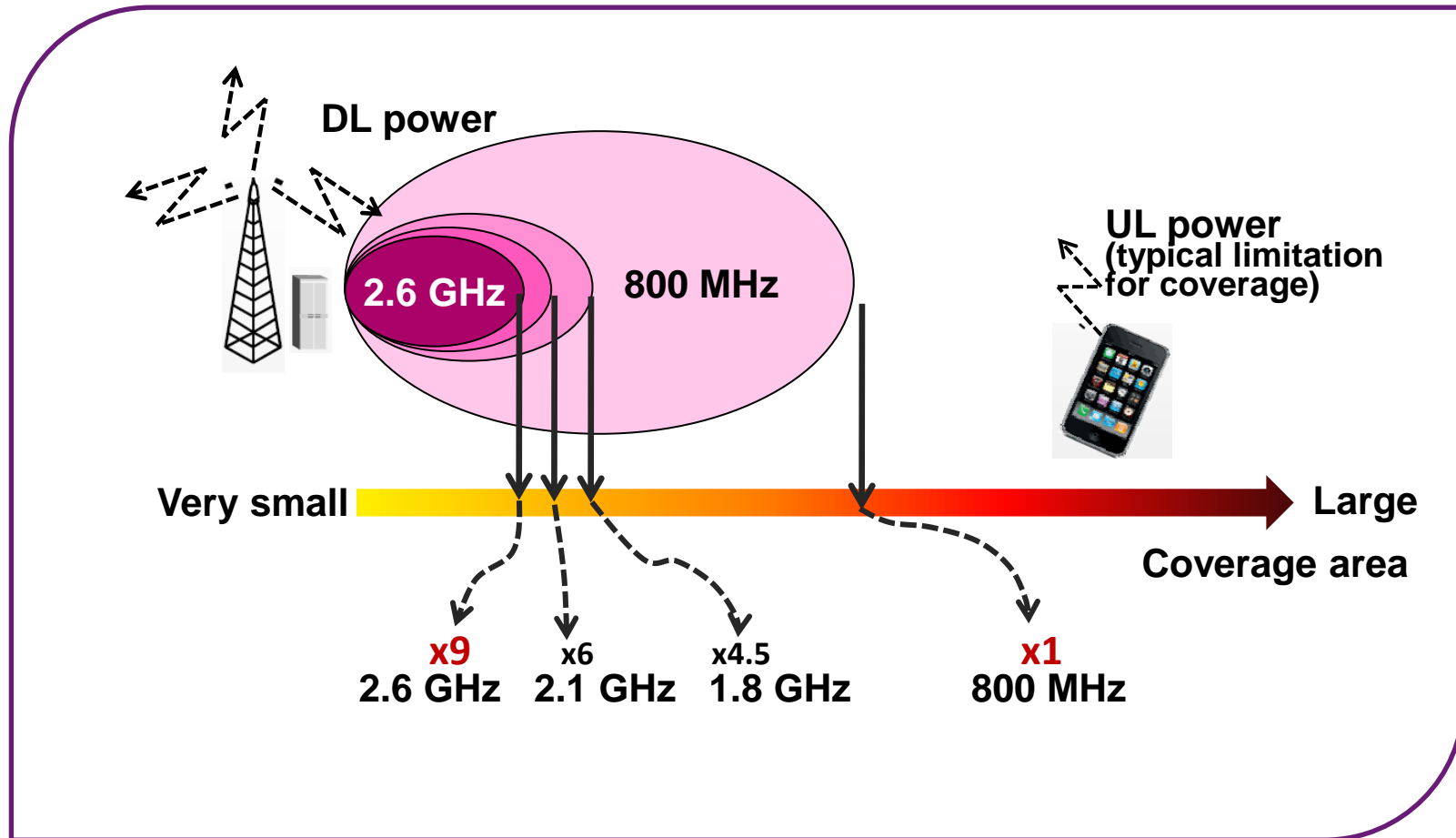
2G

\* Share portfolio in Joint Ventures with Telia 2100MHz and Telenor 800/900/1800/2600MHz

\*\* Estonia and Croatia also has 5 Mhz TDD

\*\*\* some regions

# Low Frequencies (700 - 900 MHz) Offer Significant Coverage Advantages



# Tele2 Sweden provides one of the world's first nationwide 4G networks

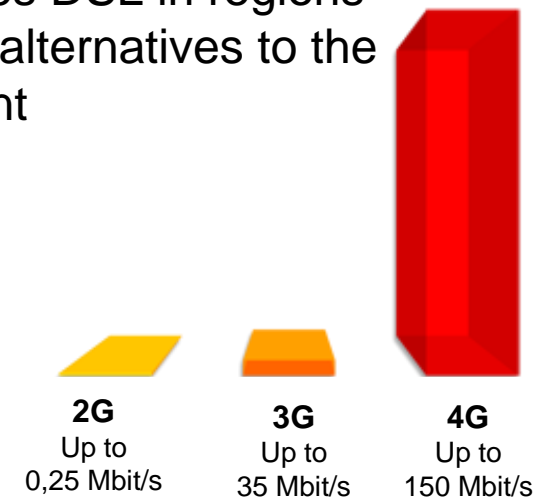
## LTE in Sweden

- 900MHz and 2600MHz
  - 800Mhz upgrade started
  - 1800MHz upgrade starts 1 Jan 2013
- Shared network with Telenor
- Multi standard radio (2G,4G)
- Commercial launch
  - Q3 2010
- 99,5% pop coverage
  - Q1 2013



## LTE Advantage and usage

- Mobile broadband at speeds up to 15 times today's turbo 3G and 4-6 times lower latency
- Replaces DSL in regions that lack alternatives to the incumbent



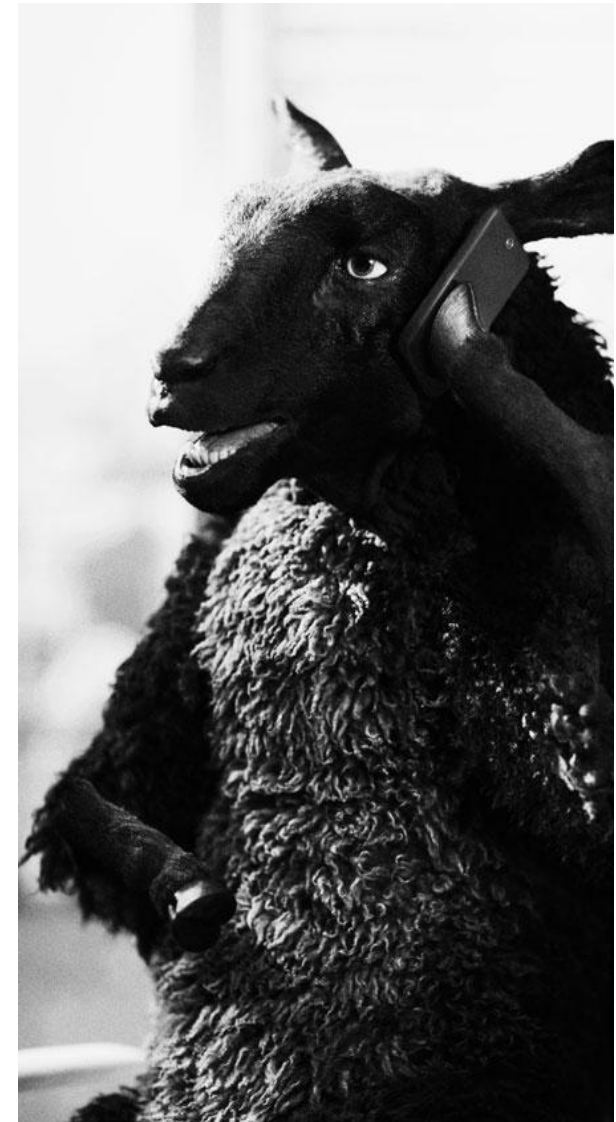
# 4G introduction has been a very positive experience for Tele2

## Advantages

- Robustness
- Performance
- Lower latency
- Time to maturity
- Throughput
- Single RAN

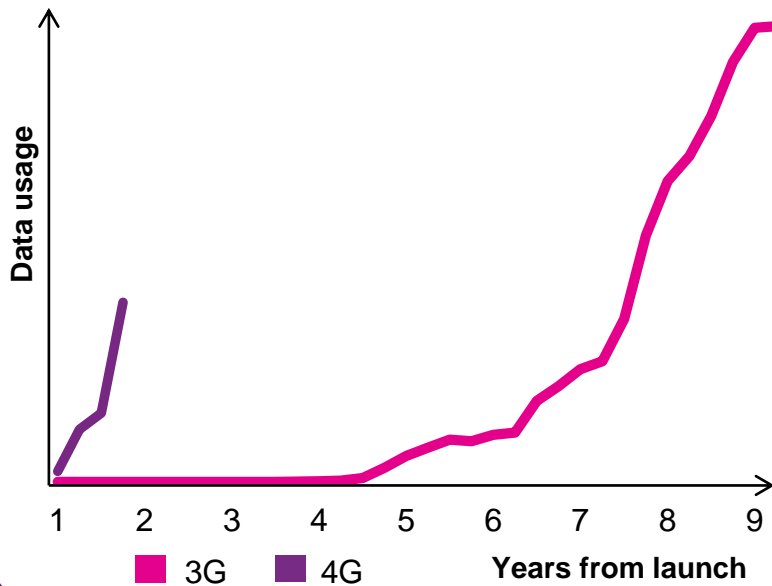
## Challenges

- Voice
- QoS
- Handover
- Roaming

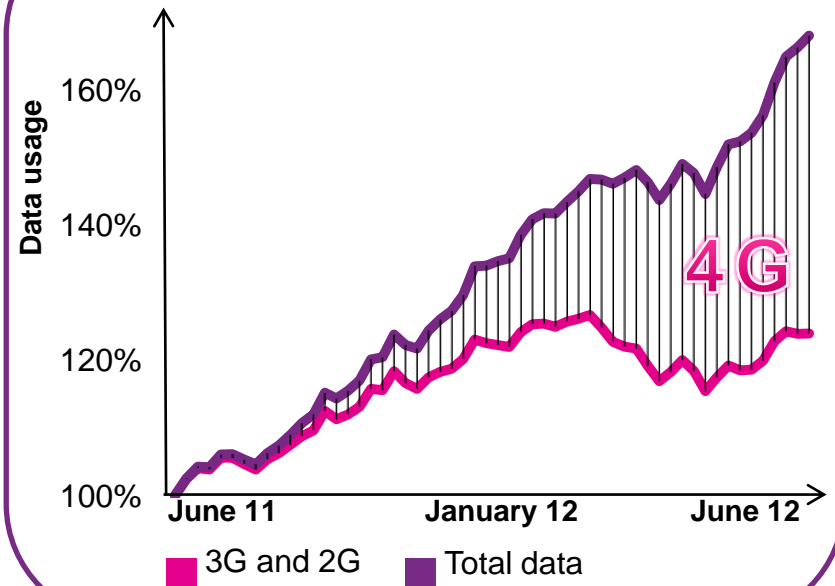


# 4G is being adopted fast and has become the main source of data growth in Sweden

## 4G is adopted faster than 3G

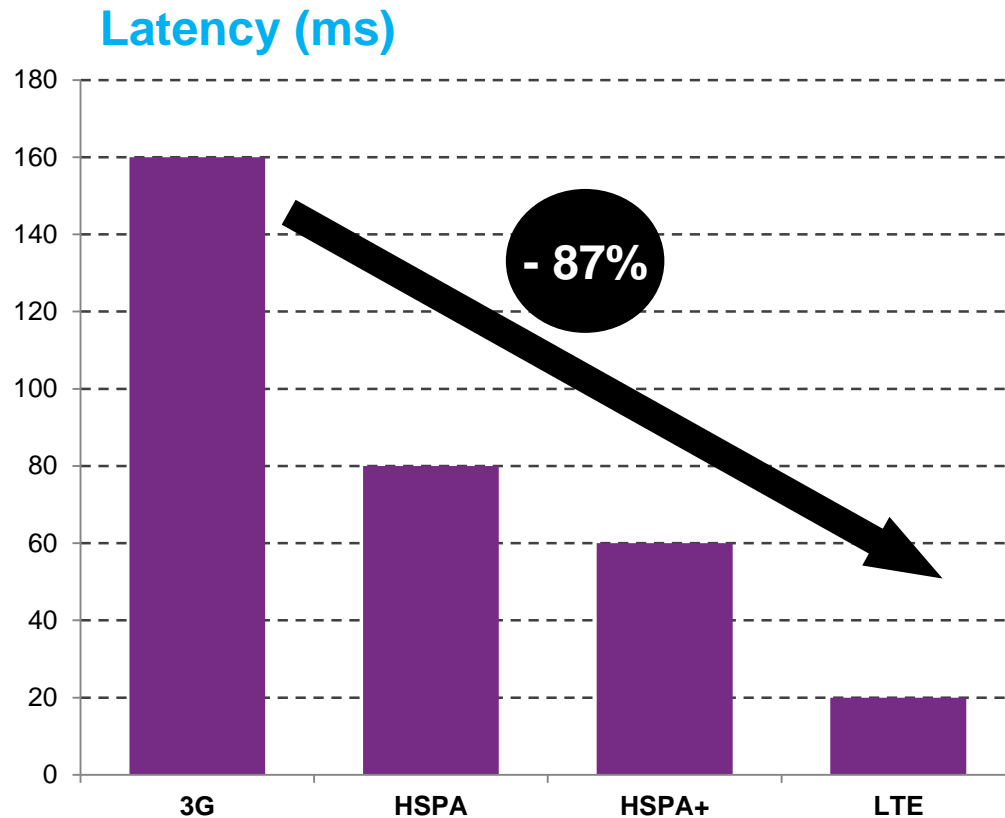


## Data growth in Sweden





# Transition to LTE Offers Improved Customer Experience



# Options for voice in LTE

**CSFB**



**Circuit Switched Fallback: Switch to 2G or 3G to make calls.**

**Double Radio**



**Use LTE and 2G, 3G in parallel using special devices. (U.S, Verizon)**

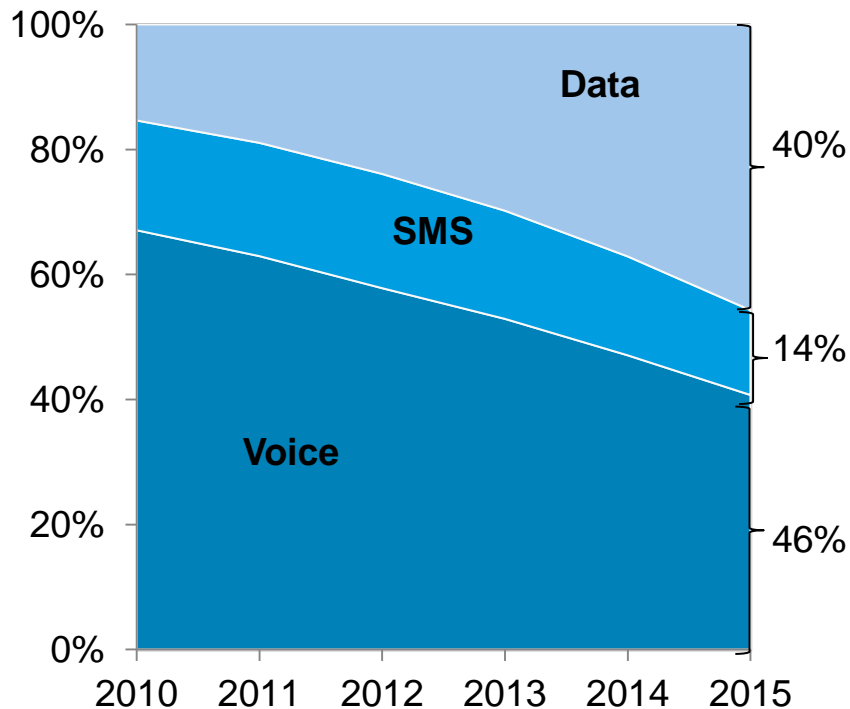
**VoLTE**



**The only carrier grade voice service using LTE itself (Voice over IP).**

# Voice remains to be the most important application, also in LTE

Average Revenue mix of European operators



## Voice needs to be integrated into LTE (VoLTE):

- Quality must be better than 2G/3G
- Roaming to be defined
- Integration with data apps is a big opportunity

# Tele2 is a driver to solve Voice and Roaming related issues in LTE

## 1. Tele2 First in Europe launching CSFB Feb 2012

- First step for realizing Voice services in LTE



## 2. VoLTE gives improved mobile data and voice experience compared to CSFB

- Tele2 one of the first in the world conducting VoLTE testing, incl handover to 2G/3G
- Cooperation with major handset vendors
- First call planned before end 2012

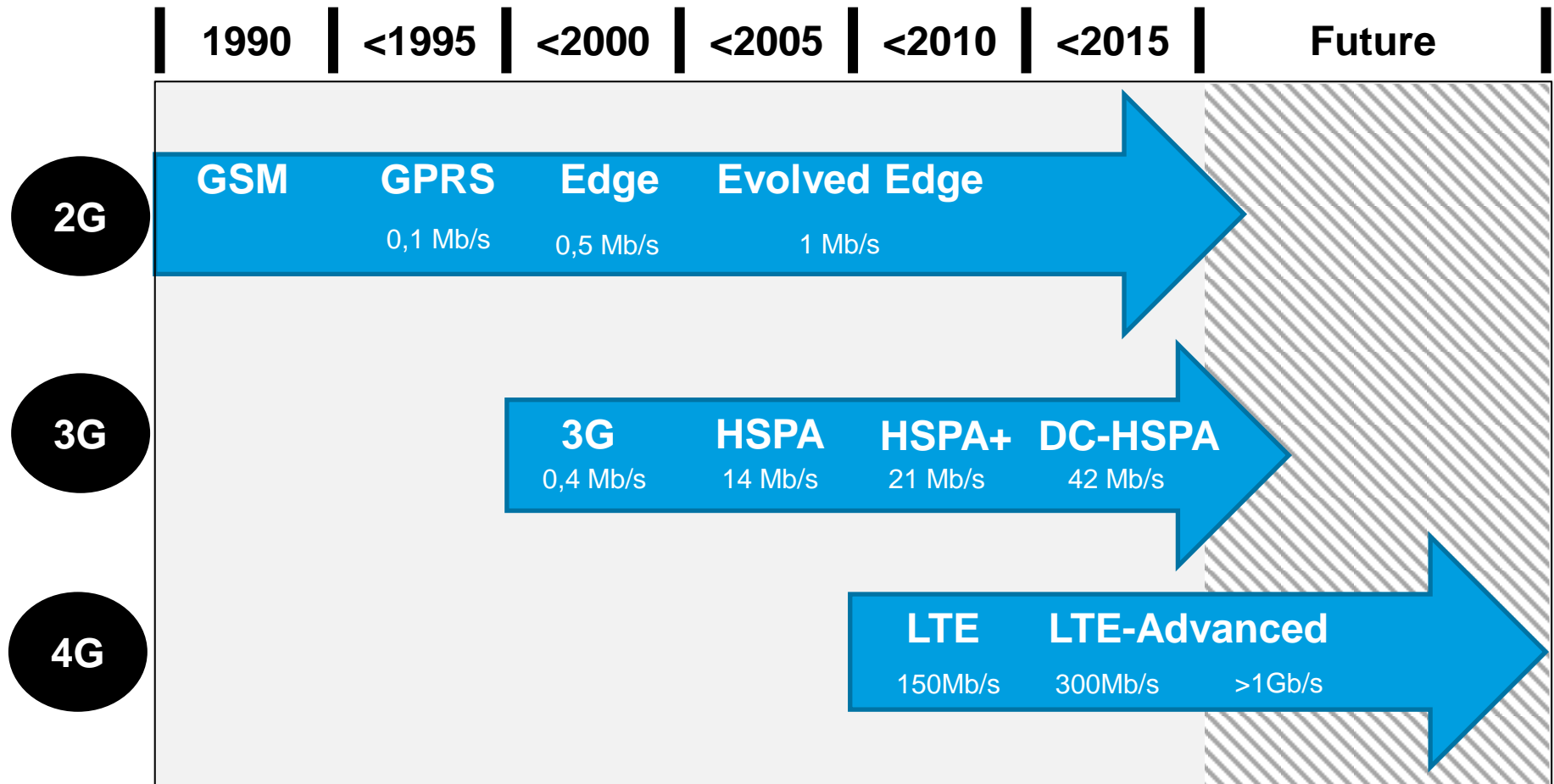


## 3. Tele2 is carrying out tests in LTE roaming

- Tests are ongoing, first roaming call planned beginning of Q1 2013
- Cooperation with GSMA



# LTE future has just begun...



# LTE Advanced will bring major advantages

## LTE Advanced and Tele2

- Successful trial with Huawei
- Performed in 2600 MHz
- Speeds of 299 Mb/s achieved
- Future releases will achieve more than 1Gbps

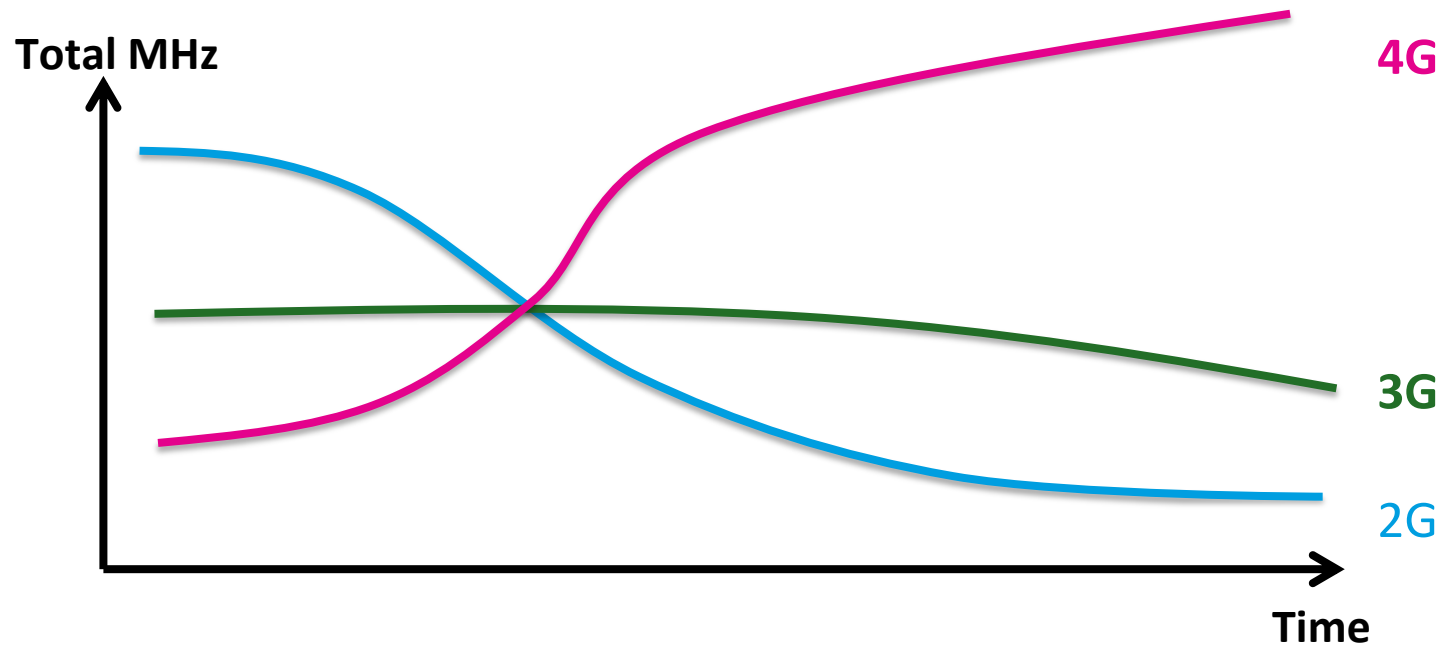
## Key features in LTE Advanced

- Carrier aggregation
- Better QoS
- Relay Nodes
- Uplink MIMO up to 4x4



# Frequencies will be converted to 4G technology over time

Indicative



2G and 3G frequencies will be converted to 4G technology over time

# Conclusions

The next generation is here.





# Conclusions

1

- 4G/LTE is here, growing fast and delivering robust performance

2

- Transition to LTE Offers Improved Customer Experience

3

- Tele2 is a driver to solve Voice and Roaming related issues in LTE

4

- LTE technology will provide many more innovations during the next decade

5

- 2G and 3G frequencies will be converted to 4G technology over time



**Thank you for your attention!**

**TELFE2**