Challenges and strategies under the current framework

# Development of a long term Spectrum Strategy for Sweden

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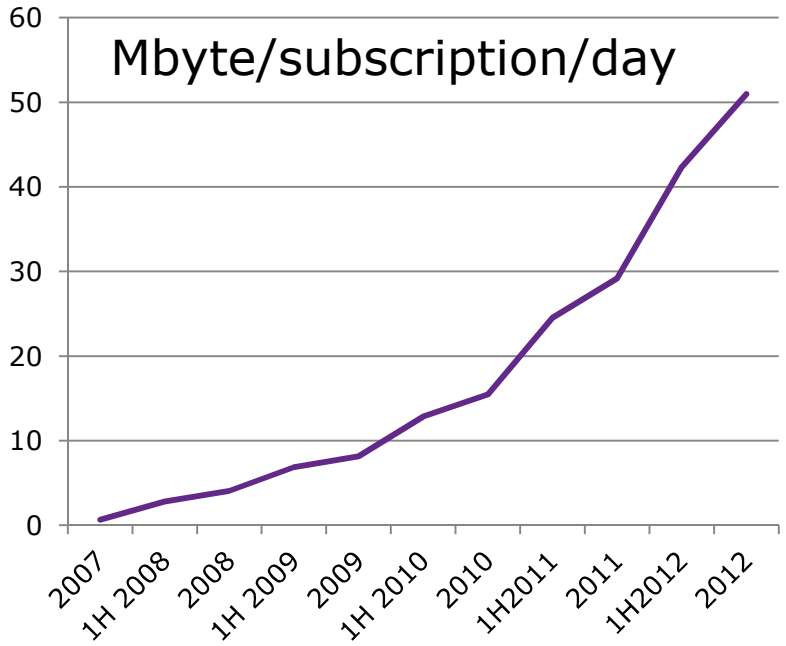
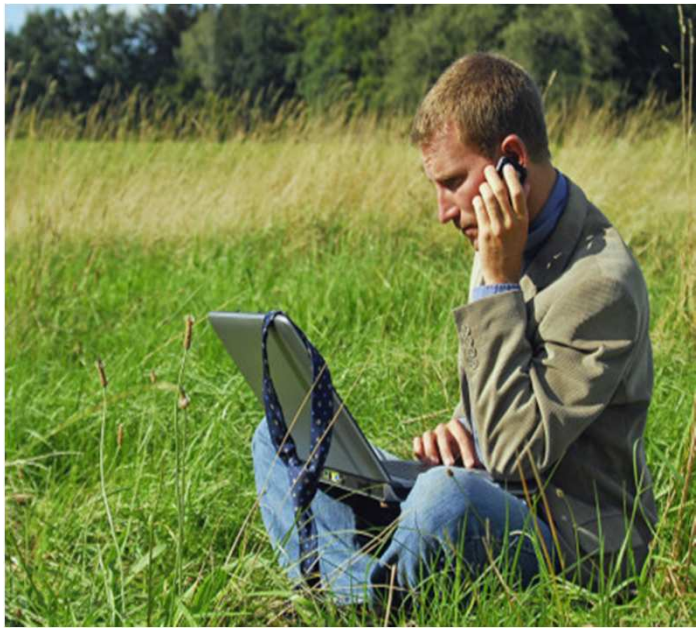
# Explosion in mobile broadband use

- Cisco (2013): “13 times until 2017”
- UMTS Forum (2012): “13 times until 2020”
- Ericsson (2012): “12 times until 2018”



# Sweden has taken a dedicated route towards increased liberalisation (1/2)

- First Swedish spectrum auction 2005
- Spectrum policy published 2006
- Auction 2.6 GHz band in 2008
- New administrative fee model based on amount of spectrum, geography and band January 2010
- Strategic plan “the 500+ MHz plan” September 2010

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# Sweden has taken a dedicated route towards increased liberalisation (2/2)

- Refarming 900 MHz & 1800 MHz
  - Service and technology neutral
  - Partial auction of 1800 MHz band autumn 2011
- Auction 800 MHz band in March 2011
- Service and technology neutrality
  - 2.1 GHz-band spring 2011
  - 900 MHz-band summer 2011
  - 1800 MHz-band 1 Jan 2013

| Band | GSM | UMTS | LTE | CDMA |
|---|---|---|---|---|
| 450 MHz | | | | X |
| 800 MHz | | | X | |
| 900 MHz | X | X | X | |
| 1.8 MHz | X | | X | |
| 2.1 GHz | | X | | |
| 2.6 GHz | | | X | |

*Service and technology neutrality in practice in mobile bands*

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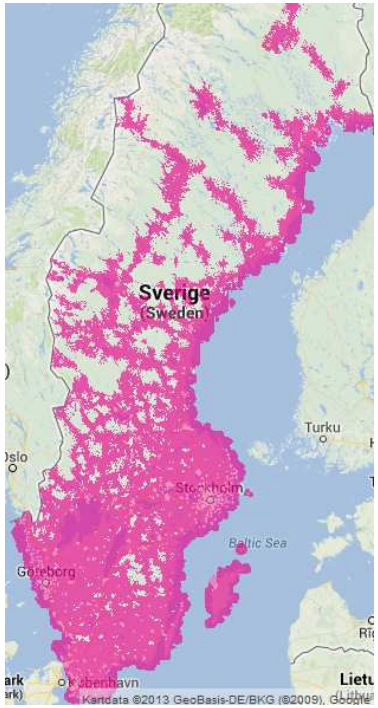
# Current LTE coverage in Sweden

- First LTE network in the world launched in Stockholm Dec 2009
- First transmission over the LTE 800 band in June 2011
- 93 % population coverage (Oct 2012)
- Operators have promised 99% population and 90% area coverage in LTE (not a license condition)
- ~50 % of smartphones sold today in Sweden are LTE






# The PTS spectrum policy

- Licences to use radio transmitters shall be as **technology and service neutral** as possible
- When selection procedures are required, an **auction** should be applied in the first instance
- **Second-hand trading** (transfer of licences) shall be promoted
- **Licence exemption** should be introduced where there is little risk of harmful interference and there are no other impediments

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# The Strategy Work

- Inventory of spectrum usage today and in 2022
- Principles and tools to optimize the socio-economic benefits of spectrum
- Review the instruments for spectrum management and
- Review the technical rules for licensees so that they become as effective as possible

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# Vision – Maximize the socio-economic efficiency of radio spectrum over time

- Socio-economic efficiency implicates the aggregated welfare changes for citizens in the society
- The benefits and costs are valued in monetary terms, even regarding aspects that isn’t a part of a market

Costs

Benefits

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# Future-proofing the spectrum strategy

- Spectrum sharing as the main rule – to avoid spectrum scarcity
- Least restrictive conditions – allowing technical development
- Market mechanisms as a tool to assess socio-economic efficiency where applicable (but doesn’t work adequately for all uses e.g. collective goods)
- A diverse availability of spectrum (block/individual transmitter licenses/unlicensed, high/low effects etc) allowing a diversity of network logics and business models
- Analyzing needs in terms of capacity, coverage, sensitivity to interference etc. – not MHz.

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# Spectrum sharing as the main rule

- Unused spectrum in all bands
- Less exclusive licenses
  - "The license holder has priority regarding the assigned frequencies, but there may be cases where radio equipment with dynamic spectrum access is used by another party."
- Time, geography, sub bands
- LSA

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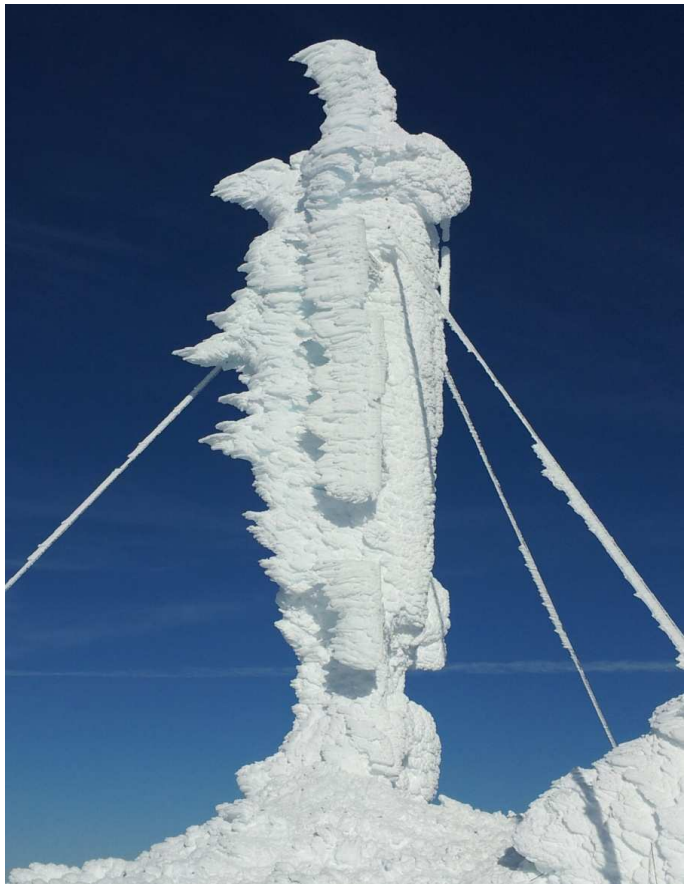
# A continuous process

**Spectrum strategy:**

- Inventory of spectrum usage today and in 2022
- Principles and tools to optimize the public welfare
- Efficient instruments for spectrum management
- Efficient technical rules for licenses (sharing)

# Thank you!



Mobile network antennae in Swedish winter environment