

Challenges and strategies under the current framework

Development of a long term Spectrum Strategy for Sweden

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Lisbon, 20 September 2013

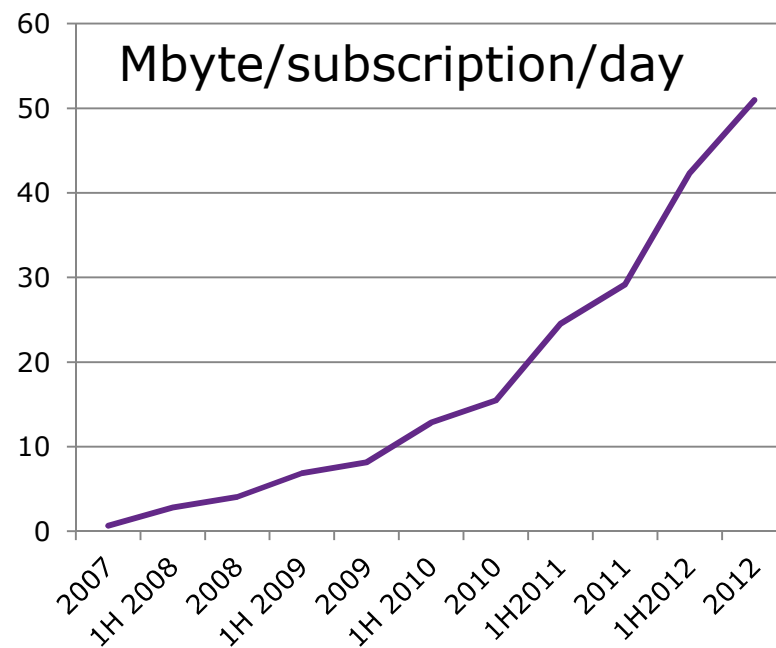


Swedish Post and Telecom Authority



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

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

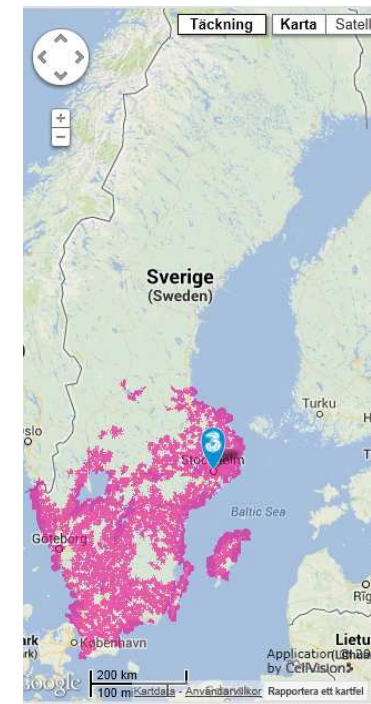
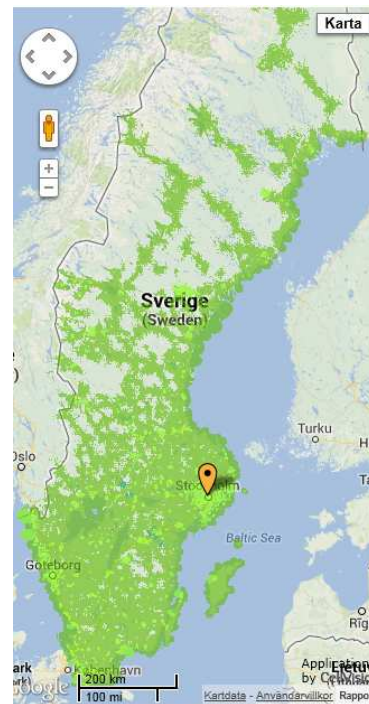
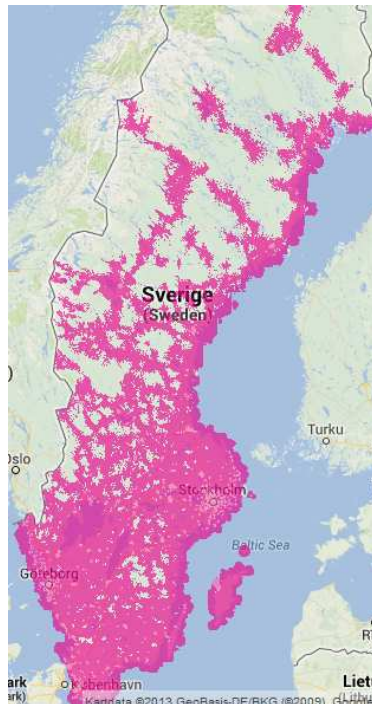
- Refarming 900 MHz & 1800 MHz
 - Service and technology neutral
 - Partial auction of 1800 MHz band autumn 2011
- Auction 800 MHz band in March 2011
- Service and technology neutrality
 - 2.1 GHz-band spring 2011
 - 900 MHz-band summer 2011
 - 1800 MHz-band 1 Jan 2013

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

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

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

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



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.

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

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)

Inventory phase

Supply, demand,
Current use

Analysis phase

Review of
frequency
bands and
evaluation of
current/
potential usage

Implementation phase

Renewal or phase out of
current use
License conditions
Assignment design choices
Assignment

Amount (MHz)	Popular name	Duplex band	Usage today	Planned changes	Licensing method
492,0	12,5 GHz band		EMPTY	Under analysis WAPECS Block licenses Potential award 2012-2013	Block licenses
1 518	28				
1 525	27 L-band		MILITARY		Usage governed by satellite
1 559	34 L-band		Satellite (MSS downlink)		Usage governed by satellite
	35 L-band		Satellite navigation (GPS, Galileo)		Usage governed by satellite
	36 L-band				
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	100 L-band				

PTS

Inriktningsplan

Thank you!



Mobile network antennae in Swedish winter environment