

Including roll-out obligations into auction design: the Danish 800MHz auction

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Award of digital dividend spectrum in Europe often linked to improving broadband coverage

Stronger roll-out/coverage obligations on 800MHz spectrum compared with other bands

- Population coverage
- Identification of specific un-served/under-served areas

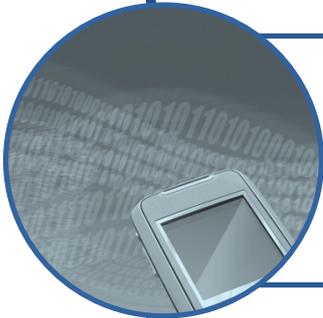
Various models for assigning obligations

- Obligation on all licensees, but with sharing (e.g. Germany, Romania, Portugal, France ...)
- Attached to specific 800MHz blocks offered in auction (e.g. Sweden, UK, Austria, Slovenia, Lithuania ...) to support market-based determination of who should provide coverage



Starting point: very good availability of basic services

- 2Mbps service available to 99.9% of the population
- 96% of the population have access to 10Mbps
- 100Mbps available for almost 40%



Objective: improve availability of 10Mbps services

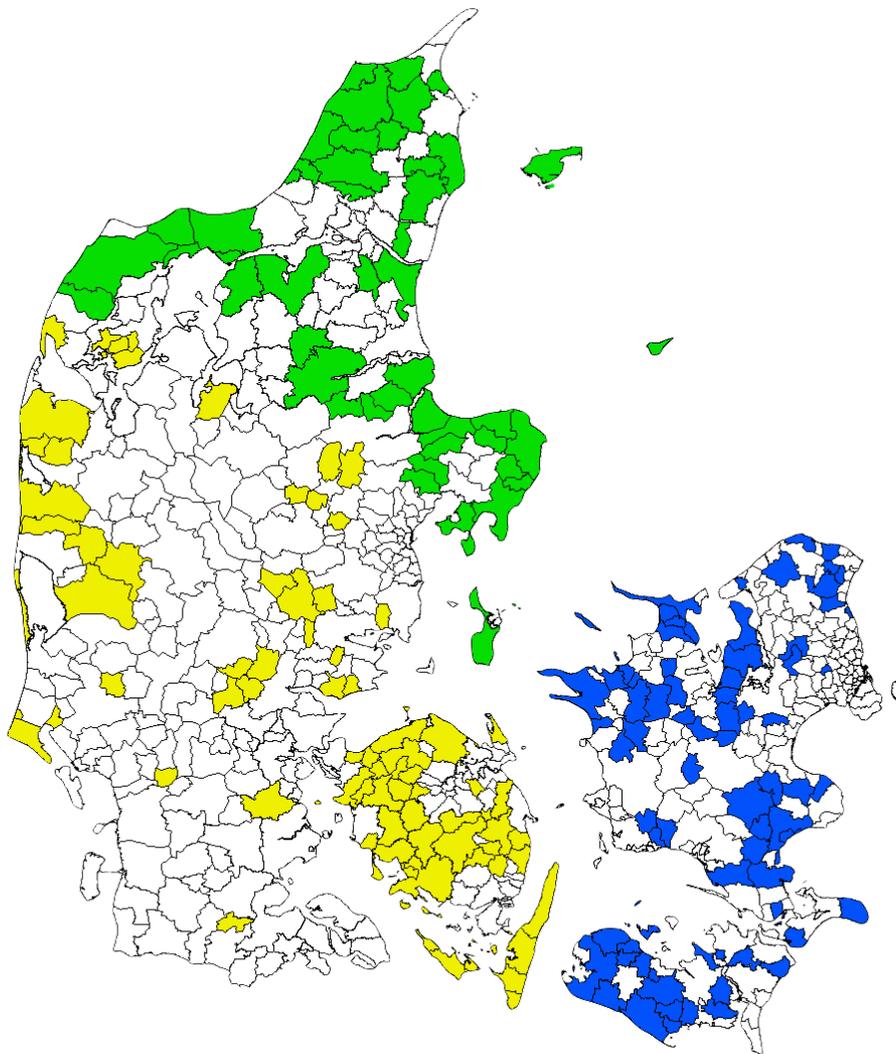
- Onerous obligations
- Download speeds of at least 10Mbps (outdoors) in regions where the availability of such services was poor (207 postcodes)



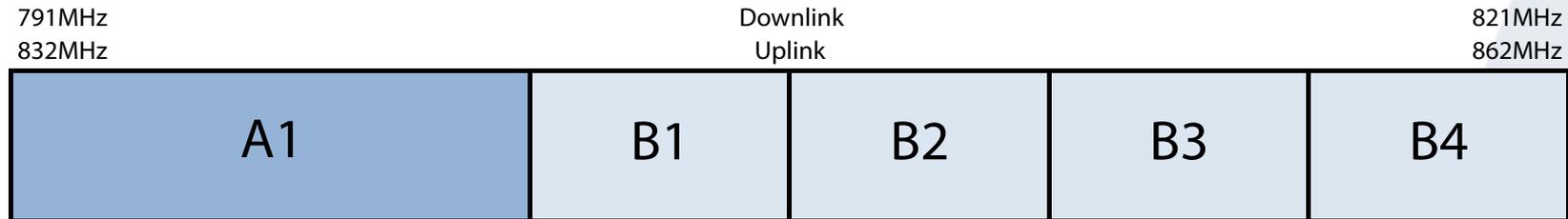
Challenges:

- Ensure that spectrum with coverage obligation will be sold
- Allow maximum flexibility to operators in terms of who will end up providing coverage, and providing an opportunity to share the cost

Regionalised obligations with options for exemption



- Split the coverage obligation regionally, allowing different operators to meet it in different regions
- Attach coverage obligation to all spectrum blocks, but allow operators to bid for 'exemptions' from the obligation in each of the three regions
- Limit supply of exemptions in each region to one less than the number of winners of spectrum so that there is at least one operator who is subject to the obligation
- Require operators to make non-exempt bids for any package that includes exemptions for the same spectrum without exemptions at reserve prices to ensure that there was a winning outcome in which coverage obligation would be served



Single frequency-specific block
Obligation to cover the northern region only (owing to issues with DTT interference in the rest of the country)

RP: DKK 50m

Four frequency-generic blocks
Obligation to cover all three regions

RP: DKK 50m per block

- Combinatorial clock auction with a second price rule, generous spectrum caps (2x20MHz) and low reserve prices to reflect restrictions put in place to mitigate DTT interference and coverage requirements
- Bids made on packages of blocks and regional exemptions (subject to having placed a corresponding non-exempt bid)
- Supply of exemptions endogenously adjusted to be one less than the number of relevant spectrum winners

Supply of exemptions is endogenous

Adjustment requires running a provisional winner determination at the end of each clock round (using all bids submitted in the auction up to that point)

Excess demand in a lot category if there is a bidder in the provisional winning outcome who wins fewer lots in this category than included in its last clock bid

Demand for exemptions may depend on spectrum package

For any particular spectrum package, demand can only decrease as price of exemption goes up

Bidder can bid for exemption at higher price if changing to a different spectrum combination

Required non-exempt bids were not removed when calculating opportunity costs

Three
bidders

Hi3G

TDC

TT-Network, a joint venture of Telia and Telenor

Two
winners

TT-Network wins A1 and exemptions in all
regions

TDC wins the remaining 2x20MHz

Some of
the lowest
prices in
Europe

TT-Network pays DKK 111m (RP: DKK 60m)

TDC pays DKK 628m (RP: DKK 200m)

Thank you

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