ARE AUCTIONS STILL THE RIGHT WAY TO ALLOCATE SPECTRUM?
AN EUROPEAN OPERATOR’S PERSPECTIVE
SPECTRUM POLICY AND AUCTIONS: BEST PRACTICES FROM AROUND THE WORLD
OTTAWA, NOVEMBER 21, 2019
JAN-HENDRIK JOCHUM, DEUTSCHE TELEKOM AG
# CONTRADICTORY GOALS FOR NRAS

## Targets of rule makers for auctions

- **Efficient Spectrum Allocation**
  - Highest priority for regulatory authorities
  - Original idea of spectrum auctions
  - Good reason for efficient design
  - Introduce NE by set asides or restrictive caps
  - Impose access obligations
  - Most favorable conditions for NE

- **Introduce Competition**
  - Prohibitive roll-out obligations de-value spectrum
  - Asymmetric obligations

- **Improve Infrastructure**
  - Clear interest of many states
  - Direct political intervention into auction processes
  - Undermines efficient outcomes

## Comments
GERMANY’S 5G AUCTION: AN UNUSUALLY HEATED DEBATE

**Government**
- 5G ‘leadership’
- Improve mobile coverage
- Increase competition

**Incumbent MNOs**
- Fair licensing terms, low spectrum prices
- Insure legal certainty

**MVNOs, Altnets**
- Privileges for newcomers
- Wholesale Access Obligations

**Regulator**
- Ensure smooth auction process
- Avoid legal risks

**Academia**
- Social welfare
- 5G ecosystem

**Verticals**
- Spectrum reservation for local use
- Mandatory national roaming

**Consumers**
- 4G coverage
- Affordable prices

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**Some Tabloid Headlines**

Deutsche Telekom verklagt Bundesnetzagentur

Trotz 5G! Funklöcher wird es erst mal weiter geben

Unions-Abgeordnete fordern Änderungen bei 5G-Vergabe

„5G ist nicht an jeder Milchkanne notwendig“
GERMANY: SPECTRUM RESERVATION FOR LOCAL USE

- Every MHz matters: more adjacent spectrum means lower operating costs
- Artificial scarcity has driven spectrum costs by more than €3bn
- Distortion of competition due to huge price disparity between local spectrum and auctioned spectrum
- Substantial risk of inefficient spectrum usage: reserved spectrum likely to go unused in many areas

Sharing approaches such as leasing better option to award spectrum to verticals – e.g. Sweden:

#Sweden: @3Sverige agrees to lease spectrum to Finnish @Ukkoverket for deployment of local private LTE networks for the Swedish industrial actors. The lease will require an explicit approval from @PTSse.
Source: tre.se/privat/varfor- ...
AWARDING CONDITIONS ENDANGER EUROPE’S 5G POSITION

- Awarded only parts of the 3.4-3.8 GHz band, scarcity led to very high prices for small spectrum holdings
  - No MNO with 100 MHz adjacent spectrum
  - Remaining 120 MHz to be auctioned 2020
- Severe technical restrictions on the 3.5 GHz band caused by Military Services Satellite Earth Station
  - Analysis started, discussion of government (Min. of Defense/Interior Affairs - mobile operators) initiated
- 700 MHz served to fix state budget
  - 3.4-3.8 GHz: 50 MHz for FWA
  - Two nationwide and some regional licenses (lifetime: 2018/2026)
  - PC requests feedback on the quantity of spectrum needed to efficiently provide 5G services
- Assigned in total 360 of 400 MHz in 3.4-3.8 GHz
  - No access and coverage obligation
  - 700 MHz planned in time
- Reserves 90 MHz in 3410-3500 MHz for wireless cameras, distracting this portion from 5G usage
  - Rest of conditions very positive
- Reservation of 100 MHz in 3.7-3.8 GHz for local campus solutions caused scarcity by regulation
  - Unreasonable rollout obligations
  - Soft MVNO-access obligations
  - Preferential treatment for new entrant
- Exceeding starting prices
  - Asymmetric lot design
  - 700 MHz not available by mid-2020
  - NR obligations
- Role model to support early 5G implementation
  - Assignment of 3 block with 130 MHz each in 3.4-3.8 GHz
  - No limiting obligations
  - 700 MHz assigned close to start price
- Late availability of 3.4-3.8 GHz due to existing holdings (2025 3.4-3.6 GHz/2023 3.6-3.8 GHz)
- Due to difficult cross border coordination in 700 MHz with Russia, the implementation of 5G will be delayed after 2020
- Officials favor competition over 5G
  - 3.6-3.8 GHz: NE reservation, spectrum cap of 40 MHz for MNO and FWA obligations
  - 700 MHz & 3.4-3.6 GHz to be awarded 2020
  - 700 MHz: NE reservation, combined with high rollout and access obligations and PPDR obligation
- 3.4-3.8 GHz fully assigned with regional approach and FWA obligations
  - No 5G enabling holdings mean no introduction of eMBB before 2025
  - NE Reservation in 700 MHz
- Regional awarding of 390 MHz in 3.4-3.8 GHz
  - Predatory bidding by regional players
  - Non-contiguous assignments and unsold spectrum
  - 700 MHz auction in 2020 – fair design, but excessive obligations

Source: Cullen International, NRA web sites
# MARKET STRUCTURE AND AUCTION DESIGN CRUCIAL FOR 5G DEPLOYMENT: THE GOOD, THE BAD AND THE UGLY

<table>
<thead>
<tr>
<th>Country</th>
<th>MNOs</th>
<th>MVNOs</th>
<th>ARPU</th>
<th>Auction price of 5G frequencies</th>
<th>Amount of 3.5 GHz spectrum auctioned</th>
</tr>
</thead>
<tbody>
<tr>
<td>Finland</td>
<td>3</td>
<td>0</td>
<td>17.14 €/MONTH</td>
<td>0.08 BN €²</td>
<td>390 MHZ</td>
</tr>
<tr>
<td>Germany</td>
<td>4¹</td>
<td>43</td>
<td>12.57 €/MONTH</td>
<td>4.18 BN €²</td>
<td>300 MHZ</td>
</tr>
<tr>
<td>Italy</td>
<td>4¹</td>
<td>21</td>
<td>12.06 €/MONTH</td>
<td>4.35 BN €²</td>
<td>200 MHZ</td>
</tr>
</tbody>
</table>

¹ Market entry of 4th MNO 1&1 supported by preferential treatment; Market entry of 4th MNO (Iliad Italia) forced by regulatory intervention
² Price for 3.5 GHz only

**THIS IS WHY FINLAND WILL PROBABLY HAVE A FIRST CLASS 5G NETWORK MANY YEARS AHEAD OF ITALY ... GOVERNMENT PRIORITIZING NETWORK BUILDOUT OVER AUCTION PROCEEDS.**

Redburn, 2. October 2018

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Source: Redburn, Morgan Stanley, GSMA Intelligence, NRAs
INCREASING CONCERNS REGARDING PRACTICALITY OF SPECTRUM AUCTIONS

THE STATE DID ALWAYS GET ITS PART IN THE SPECTRUM AUCTIONS. BUT THE HIGH SPENDING IS FOR MNOS COMPARABLE TO A TAXATION LIMITING THE DESIRED DEPLOYMENT OF NEW INFRASTRUCTURE.

ANDREAS MUNDT
PRESIDENT OF GERMAN FEDERAL CARTEL OFFICE
4. APRIL 2017

SPECTRUM AUCTION CRITICS

- Auction put existential pressure on MNOs – bid fights drive up spectrum costs
- High spending is finally paid by consumers
- Companies only have limited investment capabilities – high auction cost at the expense of network deployment
- Disproportionate obligations create additional cost and risks
- As a consequence: slow network rollout

ALTERNATIVE APPROACHES

CHINA
- Spectrum assignment by decree (neither auction nor Beauty Contest)
- Result: 4G roll out in China faster than anywhere else – >1 bn 4G mobile subscriber
- Implication: fast, easy and cost efficient awarding proceedings do foster network deployment

FRANCE
- MNO committed to additional network rollout to improve coverage
- In return, 900 MHz, 1800 MHz and 2 GHz licenses prolonged by 10 years without auction (with remedies to give up some spectrum for new entrant free mobile)
- No increase of annual license fees and reduced administrative lead times for new towers

Source: Cullen International, Kalba, FAZ

Jan-Hendrik Jochum - Are Auctions Still the Right Way to Allocate Spectrum?
21.11.2019
ARE AUCTIONS STILL THE RIGHT WAY TO ALLOCATE SPECTRUM?

- DIFFERENT REGIMES NEED DIFFERENT APPROACHES
- AUCTIONS ARE IN THEORY AN EFFICIENT WAY OF SPECTRUM ALLOCATION
- AUCTIONS ARE OFTEN MISUSED TO INTRODUCE POLITICAL GOALS – ORIGINAL INTENTION THWARTED
- NRA’S OFTEN LACK OF KNOWLEDGE IN GAME THEORY AND AUCTION DESIGN
- RE-AUCTION OF DEFINITE LICENSES NEEDS TO BE REPLACED BY INDEFINITE REGIMES OR TO BE REPLACED BY PROLONGATIONS/EXTENSIONS

**ACCURACY OF SPECTRUM AUCTIONS**

- ✔️ New band – definite lifetime (green check)
- ✔️ Legacy band – indefinite lifetime (green check)
- ✔️ New band – indefinite lifetime (green check)
- ✗ Legacy band – definite lifetime (red cross)
THANK YOU