5G Rationale
This presentation contains statements and forecasts related to future developments; they express the current assessments of the 1&1 Drillisch AG management.

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In the event of changes in these general conditions, 1&1 Drillisch AG does not assume any obligation to publish the information on which these assessments and statements are based or to publish any revisions of this information.
● German mobile market
● Spectrum auction 2019
● Evolution of the business model of 1&1 Drillisch
● Our assets for a 5G network build
● Our roadmap
German Mobile Market

Total subscribers in million

- MNO: T
- MBA MVNO: 1&1 Drillisch
- MSP: Freenet

<table>
<thead>
<tr>
<th></th>
<th>1&amp;1 DRI</th>
<th>DTE</th>
<th>VOD</th>
<th>TEF D</th>
<th>FNT</th>
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<tbody>
<tr>
<td>8,9</td>
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<td>11,6</td>
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<td>29,7</td>
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<td>43,0*</td>
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<td>43,6</td>
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Postpaid subscribers in million

- 22,0*
- 25,2

Allocation of current frequencies

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<thead>
<tr>
<th></th>
<th>700 MHz FDD</th>
<th>800 MHz FDD</th>
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<th>1.5 GHz SDL</th>
<th>1.8 GHz FDD</th>
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<td>2x40</td>
<td>2x20</td>
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<tr>
<td>Duration</td>
<td>2033</td>
<td>2025</td>
<td>2033</td>
<td>2033</td>
<td>2025</td>
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<td>2025</td>
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<td>2x15</td>
<td>1x20</td>
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<td>2x15</td>
<td>2x10</td>
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<td>1x5</td>
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<tr>
<td>Vodafone</td>
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<td>2x10</td>
<td>2x10</td>
<td>1x20</td>
<td>2x25</td>
<td>2x10</td>
<td>2x5</td>
<td>1x5</td>
<td>2x20</td>
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<tr>
<td>Telefónica</td>
<td>2x10</td>
<td>2x10</td>
<td>2x10</td>
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<td>2x10</td>
<td>2x10</td>
<td>2x20</td>
<td>2x15</td>
<td>1x24</td>
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</tbody>
</table>

* incl. customers at partners (Freenet, 1&1 Drillisch etc.), as of 30.09.2018
We are already excellently positioned today

Approx. 4.5 million DSL customers
  - Increasingly on Layer-2, based on the 1&1 Versatel fiber network

Approx. 9 million Mobile customers
  - Vodafone MVNO
  - TEF D MBA MVNO – remedy taker
  - TEF D MVNO – former 1&1/E-Plus contract

We have now the opportunity to expand our proven business model

5G investment, however, must be appropriate for our business case to be positive
## Available spectrum in the upcoming auction (usage right until 2040)

<table>
<thead>
<tr>
<th>Frequency</th>
<th>MHz</th>
<th>2 GHz</th>
<th>3.6 GHz</th>
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</thead>
<tbody>
<tr>
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<td>5</td>
<td>5  5  5  5  5</td>
<td>10 10 10 10 10</td>
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<tr>
<td>1980 MHz</td>
<td>5</td>
<td>5  5  5  5  5</td>
<td>10 10 10 10 10</td>
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<tr>
<td>2110 MHz</td>
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<td>5  5  5  5  5</td>
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<tr>
<td>2170 MHz</td>
<td>5</td>
<td>5  5  5  5  5</td>
<td>10 10 10 10 10</td>
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<tr>
<td>3400 MHz</td>
<td>10</td>
<td>10 10 10 10 10</td>
<td>10 10 10 10 10</td>
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<td>3600 MHz</td>
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<td>3600 MHz</td>
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<td>3700 MHz</td>
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<tr>
<td>3800 MHz</td>
<td>10</td>
<td>10 10 10 10 10</td>
<td>10 10 10 10 10</td>
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</table>

**100 MHz local usage**
MNOs
- 98% of households in each German Federal State with minimum 100 Mbit/s
- Freeways and Federal highways with connection function with 100 Mbit/s (at least) and 10 ms latency between base station and devices
- Railroads with >2k passengers/day with 100 Mbit/s
- 500 active base stations with 100 Mbit/s (min.) in white spots areas (allocation per German Federal State according to area segmentation)
- 1,000 active 5G base stations (allocation per German Federal State according to area segmentation)

Newly acquired spectrum:
- 3.6 GHz spectrum
  - 1,000 active 5G base stations (allocation per German Federal state according to area segmentation)

Other Federal highways with 100 Mbit/s (min.) and 10 ms latency (max.) between base station and device
- Highways/ state roads with 50 Mbit/s (min.)
- Seaports/ waterways with 50 Mbit/s (min.)
- Other railroads (<2k passengers/day) with 50 Mbit/s (min.)
1&1 Drillisch has continuously developed its business model over more than two decades.
Successful development of the business model

**Products**

- **MSP Model**
  - 2005–2010: First mover with the first discount rate plans on the German market

- **MVNO Model**
  - Marketing of own products based on standardised and unbundled advance services of the MNOs
  - Combines the advantages of MSP (low CAPEX)
  - MNO (high flexibility)

- **MBA MVNO Model**
  - Long-term guaranteed access to all current and future technologies (incl. 5G)
  - Access to high network capacity secured (independence over MNOs)
  - Competitive advantage over all non-MNOs

- **MNO Model**
  - Increase customer approach
  - Economic independence
  - Flexibility
  - Growth opportunities
  - All market segments
  - Mobile
  - Fixed-line substitute

**Subscribers**

- **(1)**
- **(in mn)**

<table>
<thead>
<tr>
<th>Year</th>
<th>MSP Model</th>
<th>MVNO Model</th>
<th>MBA MVNO Model</th>
<th>MNO Model</th>
</tr>
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<tbody>
<tr>
<td>2005</td>
<td>0,5</td>
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<tr>
<td>2010</td>
<td>1,2</td>
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<tr>
<td>2014</td>
<td>1,9</td>
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<td>2019e</td>
<td>&gt; 14,0</td>
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**1&1 Drillisch has continuously evolved its business model and increased profitability and independence**

Our assets for a 5G network build

- In 2021 1&1 Drillisch expects to own approx. 16 million customer contracts (Mobile + DSL)
- Internalization of wholesale fees currently paid to service providers offers significant cost savings
- With 1&1 we have an excellent and nationwide known brand with a comprehensive product portfolio for high profile customers and SMBs
- Drillisch brands (smartmobil, cheap SIM cards and yourfone, cheap devices) address entry segment and discount segment
- Additionally: cooperation with 1&1 Versatel for B2B customers
- Sales and service „engine“ is already efficiently running on high level
- 1&1 Versatel runs one of the largest fiber networks in Germany, which can be used as 5G backhaul
- We are in discussions with potential partners, which have developed attractive network concepts and are offering network build-out and maintenance as full-service
- Interests rate are at an all-time low
United Internet – Access value chain

~ 9m Mobile customers
~ 4.5m Fixed line customers

Expansion of the value chain
Frequencies via 1&1 DRI

Mobile Core System
Own Base Stations

Fixed line Core System
Mobile Backhaul

3rd Party Base Stations

FTTB, FTTC, KVZ-TAL
Our assets for a 5G network build (cont’d)

- We address the entire German market

<table>
<thead>
<tr>
<th>Segment</th>
<th>Brands</th>
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</thead>
<tbody>
<tr>
<td>B2B/Large corporates</td>
<td>1&amp;1 versatel</td>
</tr>
<tr>
<td>High profile customers</td>
<td>1&amp;1</td>
</tr>
<tr>
<td>Entry segment and discount brands</td>
<td>smartmobil.de, yourfone, SIMPLY</td>
</tr>
</tbody>
</table>
1) Independence from MNO and margin uplift
   - Substitution of variable cost with own fixed-cost will allow better fixed cost leveraging and drive margin upside
   - Business model becomes independent from wholesale access on MNO network

2) Better product differentiation
   - Superior 5G technology - innovation premium drives ARPU uplift
   - Access to higher bandwidths allowing to offer more differentiated products and tap additional customer groups

3) Multiple upsides from additional revenues streams
   - Access to new customer groups (business/premium), fixed wireless access, own wholesale product, IoT (Internet of Things) etc.

4) Improved network quality
   - Currently customer perception dependent on network quality of counter party under MBA MVNO
   - Own network will allow “custom-made” network with superior quality at par supporting and matching 1&1 Drillisch brand proposition
   - Ability to capture and accelerate own organic growth potential from strength of brand and customer service perception

5) Supporting terminal value upside
   - Higher profits mid- to long-term
Our roadmap for a potential network build-out

1\textsuperscript{st} step: Participation in the spectrum auction
2\textsuperscript{nd} step: Negotiate and agree National roaming
3\textsuperscript{rd} step: Network build-out phase 1
4\textsuperscript{th} step: Potential further participation in the next spectrum bid, expected for 2024/2025
5\textsuperscript{th} step: Network build-out phase 2
Our roadmap – Network infrastructure & design

- 1&1 Drillisch will close a service contract with an infrastructure provider to plan, develop, build and run an up-to-date, powerful and innovative mobile network for the exclusive use of 1&1 Drillisch (no joint venture)

- Superior 5G performance with network start – less complexity and tailored network grid, as there is no legacy network which needs to be serviced

- Existing mobile backhaul connections via 1&1 Versatel and other partners (e.g. city carriers etc.)
Our roadmap – National roaming

- National Roaming is an essential prerequisite for the business case during the build-out phase
- MNOs have to negotiate National Roaming, based on the current spectrum auction framework
- BNetzA (Federal Network Agency) will act as a referee – additional non-discriminatory requirements for all MNOs
- MNO Remedy (incl. National Roaming) committed by TEF D in connection with the TEF/E-Plus merger
Our roadmap – Additional revenue streams and cost savings

- Fixed wireless access
  - Additional FWA contracts from customers with no fixed-line connection or lower bandwidth connection (hybrid products/bonding)
  - Conversion of existing DSL customers from 2021 onwards
- Higher market share with increased distribution power
  - Better product differentiation – being in the driver seat for product innovation
  - Better network quality and higher bandwidth
  - Attraction of additional premium and business customers
- More-for-more from increased product value – moving from 4G to 5G products; impact from additional ARPU will phase-out over time, as 5G will become standard
- Push of 5G devices
- Additional wholesale revenues: potential to offer wholesale access to service providers and city carriers
Our roadmap – External view on IoT potential

- IoT will deliver additional upside potential via increasing penetration of non-communication devices (i.e. smart metering, smart household appliances)
- 1.8 billion IoT devices with cellular connections by 2023 – Wide-area IoT growing by 26% CAGR
- Assuming higher customer participation in increasing use cases with incremental revenues
- IoT revenues in Germany are expected to already double between 2018 and 2020

![Connected devices chart](chart)

**Connected devices (in billion)**

- **2017**:
  - Wide-area IoT: 5
  - Short-range IoT: 10
  - Mobile Phones: 15
  - PC/laptop/tablet: 5
  - Fixed phones: 5

- **2023**:
  - Wide-area IoT: 25
  - Short-range IoT: 20
  - Mobile Phones: 20
  - PC/laptop/tablet: 10
  - Fixed phones: 5

1) Source: Ericsson Mobility Report November 2017
2) TechNavio/Deloitte, „Prognose zum Umsatz mit dem Internet der Dinge (IoT) in Deutschland“, 2016
It’s already good today – and it can just get better