Informationsmemorandum
Bilag W

Tyskland 3400-3800 MHz synkronisering

2021
Cross-border synchronisation of TDD mobile networks in the 3400-3800 MHz band

Dear Sir/Madam

Germany’s auction for the award of spectrum in the 3400-3700 MHz band to operators of national mobile networks ended on 12 June 2019.

Frequency blocks were allocated to network operators as follows:

<table>
<thead>
<tr>
<th>Frequency (MHz)</th>
<th>Operator</th>
</tr>
</thead>
<tbody>
<tr>
<td>3400</td>
<td>Vodafone</td>
</tr>
<tr>
<td>3490</td>
<td>1&amp;1 Drillisch</td>
</tr>
<tr>
<td>3540</td>
<td>Telefónica</td>
</tr>
<tr>
<td>3610</td>
<td>Telekom</td>
</tr>
<tr>
<td>3700</td>
<td></td>
</tr>
</tbody>
</table>

In accordance with the President’s Chamber Decision (BK1-17/001) of 26 November 2018, synchronisation of the national mobile networks operated in TDD mode is to be agreed under operator arrangements between the mobile network operators.

Spectrum in the 3700-3800 MHz sub-band is assigned upon application for local broadband wireless networks.

The German mobile network operators have informed the Bundesnetzagentur that it is expedient in the interests of efficient spectrum use to synchronise network operation between adjacent assignment holders and have therefore agreed on the following synchronisation parameters:
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- DL/UL pattern: DDDSU (4:1)
  (D = downlink, S = special subframe, U = uplink)

- Special subframe slot configuration: 10:2:2
  (10 x downlink : 2 x gap : 2 x uplink)

- Cyclic prefix: normal

- Subcarrier spacing: 30 kHz

- Time base: UTC in accordance with Recommendation ITU-R TF.460

- The radio frames are to be synchronised to the UTC second, which corresponds to
  phase synchronisation according to ITU-T. The typical measuring signal is 1pps (pulse
  per second). The rising edge represents the beginning of the UTC second. The DL/UL
  pattern given above starts with the beginning of a radio frame.

- The minimum standards to ensure synchronisation performance according to
  Recommendation ITU-T G.8271.1 apply, in other words a maximum deviation from UTC
  of +/-1500 ns at the radiation points of the 3.4-3.7 GHz transmitting antennas of each
  mobile network operator applies.

In addition, the mobile network operators have asked the Bundesnetzagentur to inform the
frequency administrations in Germany's neighbouring countries of the synchronisation
parameters agreed in Germany in order to support the synchronised network operation in cross-
border mobile network coordination with operators in the neighbouring countries.

We would therefore be very grateful if you could provide us with information about the rights of
use awarded in your country for spectrum in the 3.4-3.8 GHz band and about the
synchronisation parameters agreed by the operators or specified by your administration.

Once we have received this information, we can consider how the best possible coverage can
still be achieved in border regions in cases where different synchronisation parameters are used
in neighbouring countries.

Solutions could be agreed on and documented under bilateral and multilateral arrangements
between the mobile network operators involved.

Please do not hesitate to contact Mr Tobias Schnetzer by telephone on the number above or by
email at tobias.schnetzer@bnetza.de if you have any questions or need any further information.

Yours faithfully

Franke