



Auction of 5G frequency bands



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On 1 February 2019 and 25 March 2020, the Danish Minister for Climate, Energy and Utilities decided that an auction on radio frequency bands should be held for the 1500 MHz, 2100 MHz, 2300 MHz, 3.5 GHz and 26 GHz frequency bands. This decision has been made in accordance with section 9 of the Danish Radio Frequency Act (consolidated act no. 151 of 27 January 2021 on radio frequencies).

The action will determine which of the prequalified bidders (that is HI3G Denmark ApS, TDC Net A/S and TT-Netværket P/S (a joint venture between Telenor and Telia)) will win and be awarded the right to use the five frequency bands for the next 20 years period (until 31 January 2042 for the 1.5 GHz band, the 2.1 GHz band, the 3.5 GHz band and the 26 GHz band and until 31 December 2041 for the 2.3 GHz band).

This auction is especially important as this will further allow the rollout and application of 5th generation mobile network (5G).

The 3th generation mobile network (3G) and the 4th generation mobile network (4G) have in particular been driven by solutions for consumers. It is expected that 5G will entail a wide range of benefits for businesses across different sectors. Compared to 3G and 4G, 5G enables much higher data rates and ultra-low latency by using a wide spectrum of high-frequency bands and advanced networking technology. As a result, more reliable transmissions and higher user equipment connection density will be possible in the 5G network. 5G will

therefore to a further extend enable automation within agriculture, industry, energy, health and shipping and transport as well as in large parts of the public sector.

In Denmark, communication service providers generally have launched an early version of 5G technology that relies on the existing 4th generation mobile network (4G) service and access to the 4G core network. This network generally uses the 700 MHz band. This 5G network is called non-standalone access (NSA) because, as the name suggests, it is a 5G service which does not "stand alone" but is built over an existing 4G network and also share frequencies with the 4G network. But for most of the planned benefits of 5G, including among others an even greater speed in the transmissions, lower latency and greater number of connected devices, communication service providers need to offer standalone access (SA) where devices connect exclusively to 5G signals and uses a modern 5G core network. Such 5G network is called standalone access (SA). Furthermore, to ensure all the benefits from 5G, 5G network rely on higher operating frequencies, including the 3.5 GHz band and the 26 GHz band.

These bands are comprised by the auction. The 3.5 GHz band (which is comprised by the so called 5G mid-band) ensures high speeds while offering less range per cell tower compared to the low-band (bands with uses a frequency range below 1 GHz). The 26 GHz band is comprised by the so called high-band (bands with uses a frequency range above 24 GHz, also known as "millimetre wave" spectrum) and it ensures very fast gigabit speeds. The trade-off is that millimetre wave transmitters have very limited range and require the deployment of many small transmitters.

The frequency auction for the 5G frequencies will decide which of the prequalified bidders will be awarded the right to use the comprised frequency bands for the next 20 years. The winners of the 5G frequencies have an obligation to lease access to these frequencies to private networks.

In April 2019, Denmark completed a similar auction which comprised the 700, 900 and 2,300 MHz bands. This auction raised a total of DKK 2.21 billion (EUR 296 million).

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