5G Use Cases

In the context of 5G, one is often talking about three distinctive classes of use cases:

enhanced mobile broadband (eMBB), massive machine-type communication (mMTC),

and ultra-reliable and low-latency communication (URLLC) (see also Fig. 1.2).

• eMBB corresponds to a more or less straightforward evolution of the mobile broadband

services of today, enabling even larger data volumes and further enhanced user

experience, for example, by supporting even higher end-user data rates.

mMTC corresponds to services that are characterized by a massive number of devices,

for example, remote sensors, actuators, and monitoring of various equipment. Key

requirements for such services include very low device cost and very low device

energy consumption, allowing for very long device battery life of up to at least several

years. Typically, each device consumes and generates only a relatively small amount of

data, that is, support for high data rates is of less importance.

• URLLC type-of-services are envisioned to require very low latency and extremely

high reliability. Examples hereof are traffic safety, automatic control, and factory

automation.

It is important to understand that the classification of 5G use cases into these three

distinctive classes is somewhat artificial, primarily aiming to simplify the definition of

requirements for the technology specification. There will be many use cases that do

not fit exactly into one of these classes. Just as an example, there may be services that

require very high reliability but for which the latency requirements are not that critical.

Similarly, there may be use cases requiring devices of very low cost but where the

possibility for very long device battery life may be less important

NR—The New 5G Radio-Access Technology

Despite LTE being a very capable technology, there are requirements not possible to

meet with LTE or its evolution. Furthermore, technology development over the more

than 10 years that have passed since the work on LTE was initiated allows for more

advanced technical solutions. To meet these requirements and to exploit the potential

of new technologies, 3GPP initiated the development of a new radio-access technology

known as NR (New Radio). A workshop setting the scope was held in the fall of 2015

and technical work began in the spring of 2016. The first version of theNRspecifications

was available by the end of 2017 to meet commercial requirements on early 5G deployments

already in 2018.

NR reuses many of the structures and features of LTE. However, being a new radioaccess

technology means that NR, unlike the LTE evolution, is not restricted by a need

to retain backwards compatibility. The requirements on NR are also broader than what

was the case for LTE, motivating a partly different set of technical solutions.

5GCN—The New 5G Core Network

In parallel to NR, that is, the new 5G radio-access technology, 3GPP is also developing a

new 5G core network referred to as 5GCN. The new 5G radio-access technology will

connect to the 5GCN. However, 5GCN will also be able to provide connectivity for the

evolution of LTE. At the same time, NR may also connect via the legacy core network

EPC when operating in so-called non-stand-alone mode together will LTE