# Glossary
## Mobile Communications

This document is a collection of explanations of technical terms and abbreviations on the topic of Mobile Communications.

### 3G
The "third generation" of mobile communications standards, such as UMTS, 3G+ or CDMA2000

### 4G
Next Generation Mobile Networks (NGMN) is a project of mobile communications companies and mobile communications suppliers for the development of the next mobile communications generation. This generation is also referred to as "4G" (fourth generation). The project has achieved its main objective when the standard is approved.

### APN
Access point name (abbreviated to APN, frequently called "access point") is the name of a connection point in a network, which enables access to an external packet data network.

**Mobile Communications Generations**

| Generation | Technology | Transmission | Bandwidth |
|---|---|---|---|
| 1G | AMPS | analog, circuit switched | - |
| 2G | GSM | digital, circuit switched | 9.6 kBit/s |
| 2.5G | HSCSD | digital, circuit switched | 57.6 kBit/s |
| | GPRS | digital, packet switched | 115 kBit/s |
| 2.75G | EDGE | digital, packet switched | 236 kBit/s |
| 3G | UMTS | digital, packet switched | 384 kBit/s |
| 3.5G | HSPA | digital, packet switched | 14.4 MBit/s |
| 3.9G | LTE | digital, packet switched | 150 MBit/s |
| 4G | LTE Advanced | digital, packet switched | 1 GBit/s |

### Bandwidth
Bandwidth describes the frequency range (in MHz) in which radio signals can be sent. The term ("bandwidth") is often falsely used to specify the transfer rate or "speed".

### Carrier
The carrier provides physical network capacities.

### Data rate
Describes the "speed" of the connection in the number of binary data (bits) that can be transferred per second (unit: bit/s).
The data rate is often also referred to as the (bit) transfer rate.
In radio cells / wireless environments the data rate depends on several factors:
- Number of stations (e.g. linking of several access points, switches, etc.)
- Distance to the access point
- Quality of the connection and disturbing influences (e.g. other WLAN networks or devices; signals through walls/floors)
- Quality of the hardware used (e.g. outdated WLAN cards in the client, antenna(s))

### Downlink
In a communications system the downlink refers to the link with the data flow coming from the direction of the telecommunications network from the viewpoint of a terminal. The opposite direction is called uplink.

### EDGE (Enhanced Data Rates for GSM Evolution)
A technology used to increase the data rate.

### Radio cell

A radio cell is the area, in which the signal sent by the transmission device of a mobile communications network can be received and decoded.

### GPS

Global Positioning System; this is a satellite-based navigation system for worldwide positioning

### GPRS (General Packet Radio Service)

A packet-oriented transmission service that is used in the field of mobile communications. In practice GPRS technology enables a data transfer rate of up to 55.6 kbit/s.

### GSM

Global System for Mobile Communication refers to the international standard for digital cellular mobile communications. GSM guarantees compatibility between the various network operators.

### HSDPA

HSDPA stands for High Speed Downlink Packet Access and is the turbo version of UMTS. HSDPA technology increases the maximum bandwidth for data transmission in the UMTS network. In this way, users achieve a comparable speed when surfing the net with mobile communications as with DSL lines in the landline network.

### HSOPA

High Speed OFDM Packet Access (HSOPA, also referred to as Long Term Evolution (LTE) or Super 3G) is a possible successor to UMTS.
This is intended to enable mobile communications providers to support 10 times more users and, in addition to voice, to also offer services such as interactive applications including high speed data transfer and cellular TV/IPTV.

### HSUPA

High Speed Downlink Packet Access (HSDPA) is the high-performance extension to UMTS. The advantages that HSDPA entail for the downlink are to be achieved by HSUPA in the uplink: increase data rates and throughput as well as reduce access times. Data rates of several Mbit/s are also possible with HSUPA.

### IMEI

Abbreviation for "International Mobile Equipment Identity". The IMEI number is a 15-digit serial number that can be used to clearly identify every mobile telephone. The IMEI numbers are saved centrally in the Equipment Identity Register (EIR).

### IMSI

Abbreviation for "International Mobile Subscriber Identity". IMSI is the subscriber identity and is saved on the SIM card.

### Joyn

Joyn, is an industry standard that is intended to make the mobile transmission of texts, voice, images and videos independent of any platform and provider. The successor to the SMS is also intended to enable video telephony and text chats.

### LTE (Long Term Evolution)

In contrast to UMTS, LTE supports various bandwidths and can in this way be used in a flexible manner in various future ranges. Peak data rates of 300 Mbps in the downlink and 75 Mbps in the uplink with latencies under 5 ms should be achieved at 20 MHz.

### LTE Advanced

LTE Advanced (Long Term Evolution Advanced) is an extension to the mobile communications standard LTE that enables higher data transfer rates. The improvements include higher bandwidths with up to 1000 megabits per second.

### Micro SIM

The micro SIM is the functional equivalent to the SIM card, but is smaller in size. Its outer lengths are only 15 mm × 12 mm.

### MMS

The Multimedia Messaging Service (MMS) is regarded as a further development of SMS (Short Message Service) and EMS (Enhanced Message Service) and provides the possibility of sending multimedia messages to other mobile terminals or to e-mail addresses with a mobile telephone.

### Nano SIM

At present the nano SIM card is not yet standardized, but its dimensions will be smaller than the micro SIM.

### PIN

A personal identification number (PIN) or secret number is a number that is known to only one person or to a few persons, and which the person can use to authenticate him/herself to a machine. It is needed in order to obtain access to the SIM card.

### Provider

A provider sells network capacities purchased from a network operator under its own name and freely available on the retail market.

### PTT

Push-to-talk is a mobile communications service that enables voice messages to be sent to individual users or groups. Special mobile telephones which support this function are required for this purpose. The GPRS or UMTS data network is used for transmission. The push-to-talk service mixes the positive features of mobile communications (virtually unlimited reach, good availability) and conventional voice radio (several receivers, lower costs).

### PUK

The Personal Unblocking Key number (PUK) is used to unblock e.g. a SIM card if the PIN code has been repeatedly entered incorrectly (usually three times). The number is not saved in the mobile telephone, but is linked to the SIM card and can be subsequently ascertained from the manufacturer.

### Roaming

Roaming is the crossing of a mobile communications device from one radio cell to the next. Due to roaming it is possible to maintain the radio link and thus continue a conversation, e.g. in a car, over great distances and thus different radio cells.

### Signal Strength

Strength of a signal (expressed in dbm).

### SIM Card

The SIM card is a small processor with a memory. It can be protected against unauthorized use by means of a changeable PIN. The mobile device (usually a mobile telephone) can be allocated to a network and authenticated with the help of the SIM. Secret numbers and algorithms are saved on the SIM card for these purposes.

### SIP

The Session Initiation Protocol (SIP) is a network protocol which is used to set up, manage and clear a communications session between two and more subscribers.

### SMS

Abbreviation for "Short Messages Service" refers to a network service, with which text messages with a maximum length of 160 characters can be sent between mobile telephones.

### UMTS

The Universal Mobile Telecommunications System (UMTS) is a mobile communications standard of the third generation (3G), with which substantially higher data transfer rates (up to 21 Mbit/s with HSPA+, otherwise max. 384 kbit/s) are possible than with the mobile communications standard of the second generation (2G), the GSM standard (up to 220 kbit/s with EDGE; otherwise max. 55 kbit/s with GPRS).

### Uplink

In a communications network the uplink refers to the link with the data flow going in the direction of the telecommunications network from the viewpoint of a terminal. The opposite direction is called downlink.

### VoIP

Voice over IP (VoIP) or IP telephony refers to telephony over a network based on the Internet protocol (IP). In this case, the voice is digitalized and split into individual IP packets. The classic telephone network can be connected with the IP network by means of "Internet telephone gateways" in such a way that it is possible to call from telephone to telephone via the Internet. The individual voice packets are forwarded to the receiver via router systems and are made audible there by means of the appropriate hardware.

## VPN

VPN (Virtual Private Network) is used to connect the subscribers of a network to another network, without the networks having to be compatible to each other. Put in very simple terms - the original network is reduced from the viewpoint of the VPN link to the function of an extension cable that solely connects the VPN subscriber with the connection point of the other network, the VPN gateway. This VPN subscriber (VPN partner) now becomes a subscriber of the other network - with direct access, as if his/her network connection were not connected with the original network, but directly to the other network. The resulting benefits of a VPN can - depending on the VPN protocol used - be supplemented through additional encryption, which enables interception and manipulation-proof communication between the VPN partners.

## WiMAX

WiMAX is being discussed as the mobile alternative to DSL lines and UMTS links. The supply radius of a base station in an urban environment is usually between 2 and 3 kilometers. As with UMTS, all the users involved have to share the available bandwidth.

## WAP

Abbreviation for "Wireless Application Protocol", refers to a service that uses the mobile telephone to call up Internet services.

## WWAN

Wireless Wide Area Network refers to a radio network. It is the radio equivalent to WAN (Wide Area Network). In contrast to Wireless Local Area Network larger ranges (outdoors) are covered with the WWAN.
This includes e. g. the radio networks LTE, WiMAX, GSM and UMTS. GSM and UMTS are at present predominantly used for mobile telephones and notebooks.
In a LIFEBOOK the UMTS/LTE card in the BIOS is known by the name WWAN.