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3GPP

The **3rd Generation Partnership Project (3GPP)** is an umbrella term for a number of standards organizations which develop protocols for mobile telecommunications. Its best known work is the development and maintenance of:^[1]

- GSM and related 2G and 2.5G standards, including GPRS and EDGE
- UMTS and related 3G standards, including HSPA and HSPA+
- LTE and related 4G standards, including LTE Advanced and LTE Advanced Pro
- 5G NR and related 5G standards, including 5G-Advanced
- An evolved IP Multimedia Subsystem (IMS) developed in an access independent manner

3GPP is a consortium with seven national or regional telecommunication standards organizations as primary members ("organizational partners") and a variety of other organizations as associate members ("market representation partners"). The 3GPP organizes its work into three different streams: Radio Access Networks, Services and Systems Aspects, and Core Network and Terminals.^[2]

The project was established in December 1998 with the goal of developing a specification for a 3G mobile phone system based on the 2G GSM system, within the scope of the International Telecommunication Union's International Mobile Telecommunications-2000, hence the name 3GPP.^[3] It should not be confused with 3rd Generation Partnership Project 2 (3GPP2), which developed a competing 3G system, CDMA2000.^[4]

The 3GPP administrative support team (known as the "Mobile Competence Centre") is located at the European Telecommunications Standards Institute headquarters in the Sophia Antipolis technology park in France.^[5]

Organizational Partners

The seven 3GPP Organizational Partners are from Asia, Europe and North America. Their aim is to determine the general policy and strategy of 3GPP and perform the following tasks:

- The approval and maintenance of the 3GPP scope;
- The maintenance of the Partnership Project Description;

3rd Generation Partnership Project



A GLOBAL INITIATIVE

Abbreviation	3GPP
Formation	1998
Type	<u>Standards organization</u>
Region served	Worldwide
Website	<u>www.3gpp.org</u> (<u>https://www.3gpp.org/</u>)

- Take the decision to create or cease a Technical Specification Groups, and approve their scope and terms of reference;
- The approval of Organizational Partner funding requirements;
- The allocation of human and financial resources provided by the Organizational Partners to the Project Co-ordination Group;
- Act as a body of appeal on procedural matters referred to them.

Together with the Market Representation Partners (MRPs) perform the following tasks:

- The maintenance of the Partnership Project Agreement;
- The approval of applications for 3GPP partnership;
- Take the decision against a possible dissolution of 3GPP.

The Organizational Partners are:^[6]

Organizational Partners		
Organization	Country/region	Website
<u>Association of Radio Industries and Businesses (ARIB)</u>	Japan	<u>ARIB</u> (http://www.arib.or.jp)
<u>Alliance for Telecommunications Industry Solutions (ATIS)</u>	USA	<u>ATIS</u> (http://www.atis.org)
<u>China Communications Standards Association (CCSA)</u>	China	<u>CCSA</u> (http://www.ccsa.org.cn)
<u>European Telecommunications Standards Institute (ETSI)</u>	Europe	<u>ETSI</u> (http://www.etsi.org)
<u>Telecommunications Standards Development Society (TSDSI)</u>	India	<u>TSDSI</u> (https://tsd.si.in/)
<u>Telecommunications Technology Association (TTA)</u>	South Korea	<u>TTA</u> (http://www.tta.or.kr)
<u>Telecommunication Technology Committee (TTC)</u>	Japan	<u>TTC</u> (http://www.ttc.or.jp)

Market Representation Partners

The 3GPP Organizational Partners can invite a Market Representation Partner to take part in 3GPP, which:

- Has the ability to offer market advice to 3GPP and to bring into 3GPP a consensus view of market requirements (e.g., services, features and functionality) falling within the 3GPP scope;
- Does not have the capability and authority to define, publish and set standards within the 3GPP scope, nationally or regionally;
- Has committed itself to all or part of the 3GPP scope;
- Has signed the Partnership Project Agreement.

As of January 2025, the Market Representation Partners are:^[6]

Market Representation Partners

Organization	Website
5G-ACIA	http://www.5g-acia.org
5G Automotive Association	http://www.5gaa.org/
5G Americas	http://www.5gamericas.org
Deterministic Networking Alliance (5GDNA)	https://www.5gdna.org/
6G Smart Network and Services Industry Association (6G-IA)	https://6g-ia.eu/
5G Slicing Association (5GSA)	https://www.5g-sa.org/
5G Media Action Group (5G-MAG)	http://www.5g-mag.com/
Automotive Edge Computing Consortium (AECC)	https://aecc.org/
Broadband India Forum	http://www.broadbandindiaforum.com/
Cellular Operators Association of India (COAI)	https://www.coai.com
China Society of Automotive Engineers (CSAE)	http://www.sae-china.org/
CTIA	http://ctia.org/
Global Satellite Operators Association (GSOA)	https://gsoasatellite.com/
Global Certification Forum (GCF)	https://www.globalcertificationforum.org/
Global mobile Suppliers Association (GSA)	https://gsacom.com/
GSMA	https://www.gsma.com/
IPV6 Forum	https://www.ipv6forum.com/
Next Generation Mobile Networks (NGMN)	https://www.ngmn.org/
Public Safety Communication Europe (PSCE) Forum	http://www.psc-europe.eu/
Small Cell Forum	https://www.smallcellforum.org/
TCCA	https://tcca.info/
TD Industry Alliance	http://www.tdia.cn/
Wireless Broadband Alliance	http://www.wballiance.com/

Standards

3GPP standards are structured as *Releases*. Discussion of 3GPP thus frequently refers to the functionality in one release or another.

Version ^[7]	Released ^[8]	Info
Phase 1	1992	GSM Features
Phase 2	1995	GSM Features, <u>EFR</u> Codec,
Release 96	1997 Q1	GSM Features, 14.4 kbit/s User Data Rate,
Release 97	1998 Q1	GSM Features, <u>GPRS</u>
Release 98	1999 Q1	GSM Features, <u>AMR</u> codec, <u>EDGE</u> , GPRS for PCS1900
Release 99	2000 Q1	Specified the first <u>UMTS</u> 3G networks, incorporating a <u>CDMA</u> air interface ^[9]
Release 4	2001 Q2	Originally called the Release 2000 – added features including an <u>all-IP</u> Core Network ^[10]
Release 5	2002 Q1	Introduced <u>IMS</u> and <u>HSDPA</u> ^[11]
Release 6	2004 Q4	Integrated operation with <u>Wireless LAN</u> networks and adds <u>HSUPA</u> , <u>MBMS</u> , enhancements to <u>IMS</u> such as <u>Push to Talk over Cellular</u> (<u>PoC</u>), <u>GAN</u> ^[12]
Release 7	2007 Q4	Focuses on decreasing latency, improvements to <u>QoS</u> and real-time applications such as <u>VoIP</u> . ^[13] This specification also focus on <u>HSPA+</u> (High Speed Packet Access Evolution), <u>SIM</u> high-speed protocol and contactless front-end interface (<u>Near Field Communication</u> enabling operators to deliver contactless services like <u>Mobile Payments</u>), <u>EDGE</u> Evolution.
Release 8	2008 Q4	First LTE release. All-IP Network (SAE). New <u>OFDMA</u> , <u>FDE</u> and <u>MIMO</u> based radio interface, not backwards compatible with previous CDMA interfaces. Dual-Cell HSDPA. <u>UMTS</u> HNB.
Release 9	2009 Q4	SAES Enhancements, <u>WiMAX</u> and <u>LTE/UMTS</u> Interoperability. Dual-Cell HSDPA with <u>MIMO</u> , Dual-Cell HSUPA. <u>LTE</u> HeNB. Evolved multimedia broadcast and multicast service (<u>eMBMS</u>).
Release 10	2011 Q1	LTE Advanced fulfilling <u>IMT Advanced</u> 4G requirements. Backwards compatible with release 8 (LTE). Multi-Cell HSDPA (4 carriers).
Release 11	2012 Q3	Advanced IP Interconnection of Services. Service layer interconnection between national operators/carriers as well as third-party application providers. Heterogeneous networks (<u>HetNet</u>) improvements, Coordinated Multi-Point operation (<u>CoMP</u>). In-device Co-existence (<u>IDC</u>).
Release 12	2015 Q1	Enhanced Small Cells (higher order modulation, dual connectivity, cell discovery, self configuration), <u>Carrier aggregation</u> (2 uplink carriers, 3 downlink carriers, <u>FDD/TDD</u> carrier aggregation), <u>MIMO</u> (3D channel modeling, elevation beamforming, massive <u>MIMO</u>), New and Enhanced Services (cost and range of <u>MTC</u> , <u>D2D</u> communication, <u>eMBMS</u> enhancements) ^[14]
Release 13	2016 Q1	LTE-Advanced Pro . <u>LTE</u> in unlicensed, <u>LTE</u> enhancements for Machine-Type Communication. Elevation Beamforming / Full-Dimension <u>MIMO</u> , <u>Indoor positioning</u> . ^[15]
Release 14	2017 Q2	Energy Efficiency, Location Services (<u>LCS</u>), Mission Critical Data over <u>LTE</u> , Mission Critical Video over <u>LTE</u> , Flexible Mobile Service Steering (<u>FMSS</u>), Multimedia Broadcast Supplement for Public Warning System (<u>MBSP</u>), enhancement for TV services over <u>eMBMS</u> , massive <u>Internet of Things</u> , Cell Broadcast Service (<u>CBS</u>) ^[16]
Release 15	2018 Q2	First 5G NR ("New Radio") release. Support for 5G Vehicle-to-x service, <u>IP</u> Multimedia Core Network Subsystem (<u>IMS</u>), Future Railway

		Mobile Communication System ^[17]
Release 16	2020 Q3	The <u>5G System</u> – Phase 2: 5G enhancements, NR-based access to unlicensed spectrum (NR-U), Satellite access ^[18]
Release 17	2022 Q1	TSG RAN: Several features that continue to be important for overall efficiency and performance of 5G NR: MIMO, Spectrum Sharing enhancements, UE Power Saving and Coverage Enhancements. RAN1 will also undertake the necessary study and specification work to enhance the physical layer to support frequency bands up to 71 GHz. TSG SA groups focused on further enhancements to the 5G system and enablers for new features and services: Enhanced support of: non-public networks, <u>industrial Internet of Things</u>, low complexity NR devices, <u>edge computing</u> in 5GC, access traffic steering, switch and splitting support, network automation for 5G, <u>network slicing</u>, advanced V2X service, multiple USIM support, proximity-based services in 5GS, 5G multicast broadcast services, <u>Unmanned Aerial Systems</u> (UAS), satellite access in 5G, 5GC location services, Multimedia Priority Service...^[19]
Release 18	2023 Q4	5G-Advanced. Introducing further <u>machine-learning</u> based techniques at different levels of the wireless network. <u>Edge computing</u> , Evolution of IMS Multimedia Telephony Service, Smart Energy and Infrastructure, Vehicle-Mounted Relays, Low Power High Accuracy Positioning for industrial IoT scenarios, Enhanced Access to and Support of <u>Network slicing</u> , Satellite backhaul in 5G... ^{[20][21][19]}
Release 19 ^[22]	2025 Q4	5G-Advanced.

Each release incorporates hundreds of individual Technical Specification and Technical Report documents, each of which may have been through many revisions. Current 3GPP standards incorporate the latest revision of the GSM standards.

The documents are made available without charge on 3GPP's web site. The Technical Specifications cover not only the radio part ("*Air Interface*") and Core Network, but also billing information and speech coding down to source code level. Cryptographic aspects (such as authentication, confidentiality) are also specified.

Specification groups

The 3GPP specification work is done in Technical Specification Groups (TSGs) and Working Groups (WGs).^[23]

There are three Technical Specifications Groups, each of which consists of multiple WGs:

- **RAN** (Radio Access Network): RAN specifies the UTRAN and the E-UTRAN. It is composed of six working groups.

WG	Shorthand	Scope	Specifications
RAN WG1	RAN1 (http://www.3gpp.org/RAN1-Radio-layer-1)	Radio Layer 1 (Physical layer)	List of specs (http://www.3gpp.org/DynaReport/TSG-WG--R1.htm)
RAN WG2	RAN2 (http://www.3gpp.org/RAN2-Radio-layer-2-and-Radio-layer)	Radio Layer 2 and Radio Layer 3 Radio Resource Control	List of specs (http://www.3gpp.org/DynaReport/TSG-WG--R2.htm)
RAN WG3	RAN3 (http://www.3gpp.org/RAN3-lu-lub-lur-S1-X2-and-UTRAN-E)	UTRAN, E-UTRAN, NG-RAN architecture and related network interfaces	List of specs (http://www.3gpp.org/DynaReport/TSG-WG--R3.htm)
RAN WG4	RAN4 (http://www.3gpp.org/RAN4-Radio-performance-and)	Radio performance and protocol aspects	List of specs (http://www.3gpp.org/DynaReport/TSG-WG--R4.htm)
RAN WG5	RAN5 (http://www.3gpp.org/RAN5-Mobile-terminal-conformance)	Mobile terminal conformance testing	List of specs (http://www.3gpp.org/DynaReport/TSG-WG--R5.htm)

- **SA** (Service and System Aspects): SA specifies the service requirements and the overall architecture of the 3GPP system. It is also responsible for the coordination of the project. SA is composed of six working groups.

WG	Shorthand	Scope	Specifications
SA WG1	SA1 (http://www.3gpp.org/SA1-Services)	Services	List of specs (http://www.3gpp.org/ftp/Specs/html-info/TSG-WG--S1.htm)
SA WG2	SA2 (http://www.3gpp.org/SA2-Architecture)	Architecture	List of specs (http://www.3gpp.org/ftp/Specs/html-info/TSG-WG--S2.htm)
SA WG3	SA3 (http://www.3gpp.org/SA3-Security)	Security	List of specs (http://www.3gpp.org/ftp/Specs/html-info/TSG-WG--S3.htm)
SA WG4	SA4 (http://www.3gpp.org/SA4-Codec)	Codec	List of specs (http://www.3gpp.org/ftp/Specs/html-info/TSG-WG--S4.htm)
SA WG5	SA5 (http://www.3gpp.org/SA5-Telecom-Management)	Management, Orchestration and Charging	List of specs (http://www.3gpp.org/ftp/Specs/html-info/TSG-WG--S5.htm)
SA WG6	SA6 (http://www.3gpp.org/specifications-groups/sa-plenary/sa6-mission-critical-applications)	Application Enablement and Critical Communication Applications	List of specs (http://www.3gpp.org/ftp/Specs/html-info/TSG-WG--S6.htm)

- **CT** (Core Network and Terminals): CT specifies the core network and terminal parts of 3GPP. It includes the core network – terminal layer 3 protocols. It is composed of five working groups.

WG	Shorthand	Scope	Specifications
CT WG1	CT1 (http://www.3gpp.org/CT1-M-M-CC-SM-lu)	User Equipment – Core Network protocols	List of specs (http://www.3gpp.org/ftp/Specs/html-info/TSG-WG--C1.htm)
CT WG2	CT2	closed	
CT WG3	CT3 (http://www.3gpp.org/CT3-Interworking-with-External)	Interworking with external networks	List of specs (http://www.3gpp.org/ftp/Specs/html-info/TSG-WG--C3.htm)
CT WG4	CT4 (http://www.3gpp.org/CT4-M-AP-CAMEL-GTP-BCH-SS-TrFO-IMS)	Core Network Protocols	List of specs (http://www.3gpp.org/ftp/Specs/html-info/TSG-WG--C4.htm)
CT WG5	CT5 (http://www.3gpp.org/CT5)	closed	
CT WG6	CT6 (http://www.3gpp.org/CT6-Smart-Card-Application-Aspects)	Smart Card Application Aspects	List of specs (http://www.3gpp.org/ftp/Specs/html-info/TSG-WG--C6.htm)

▪ **GERAN** (GSM/EDGE Radio Access Network):

The closure of GERAN was announced in January 2016.^[24] The specification work on legacy GSM/EDGE system was transferred to RAN WG, RAN6. RAN6 was closed in July 2020 (https://www.3gpp.org/news-events/2128-r6_geran).

The 3GPP structure also includes a Project Coordination Group, which is the highest decision-making body. Its missions include the management of overall timeframe and work progress.

Standardization process

3GPP standardization work is contribution-driven. Companies ("individual members") participate through their membership to a 3GPP Organizational Partner. As of December 2020, 3GPP is composed of 719 individual members.^[25]

Specification work is done at WG and at TSG level:^[26]

- the 3GPP WGs hold several meetings a year. They prepare and discuss change requests against 3GPP specifications. A change request accepted at WG level is called "agreed".
- the 3GPP TSGs hold plenary meetings quarterly. The TSGs can "approve" the change requests that were agreed at WG level. Some specifications are under the direct responsibility of TSGs and therefore, change requests can also be handled at TSG level. The approved change requests are subsequently incorporated in 3GPP specifications.

3GPP follows a three-stage methodology as defined in ITU-T Recommendation I.130:^[27]

- *stage 1 specifications* define the service requirements from the user point of view.
- *stage 2 specifications* define an architecture to support the service requirements.

- *stage 3 specifications* define an implementation of the architecture by specifying protocols in details.

Test specifications are sometimes defined as stage 4, as they follow stage 3.

Specifications are grouped into releases. A release consists of a set of internally consistent set of features and specifications.

Timeframes are defined for each release by specifying freezing dates. Once a release is frozen, only essential corrections are allowed (i.e. addition and modifications of functions are forbidden). Freezing dates are defined for each stage.

The 3GPP specifications are transposed into deliverables by the Organizational Partners.

See also

- [List of mobile phone generations](#)
- [Universal Mobile Telecommunications System \(UMTS\)](#)
- [3GPP Long Term Evolution](#)
- [Evolution to 3G](#)
- [IP Multimedia Subsystem](#)
- [3GP](#)
- 3GPP2 – The 3GPP's counterpart in the [CDMA2000](#) sphere.
- [GSM services](#)
- [LoRaWAN](#)
- [Telecoms & Internet converged Services & Protocols for Advanced Networks \(TISPAN\)](#)
- [Open Mobile Alliance](#)
- [Service data adaptation protocol](#)
- [Service layer](#)
- [European Telecommunications Standards Institute](#)

References

1. 3GPP Scope and Objectives, 31 August 2007 (http://www.3gpp.org/ftp/Inbox/2008_web_files/3GP_P_Scopeand0310807.pdf)
2. "About 3GPP" (<http://www.3gpp.org/about-3gpp/about-3gpp>). 3GPP. Retrieved 10 March 2019.
3. "3GPP Background" (https://web.archive.org/web/20000706195240/http://www.3gpp.org/About_3GPP/3gpp.htm). 7 June 2000. Archived from the original (http://www.3gpp.org/About_3GPP/3gpp.htm) on 6 July 2000.
4. "3rd Generation Partnership Project 2" (<https://web.archive.org/web/20040123013738/http://3gpp2.org/>). Archived from the original (<http://www.3gpp2.org/>) on 23 January 2004. Retrieved 25 November 2012.
5. "Mobile Competence Centre" (<http://3gpp.org/Mobile-Competence-Centre>). 3GPP. Retrieved 10 March 2019.
6. "Partners" (<https://www.3gpp.org/about-3gpp/partners>). 3GPP. Retrieved 1 January 2025.
7. Releases (<http://www.3gpp.org/releases>)

8. "3GPP Specifications – Releases (and phases and stages)" (<https://www.3gpp.org/specifications>). Retrieved 16 September 2010.
9. Overview of 3GPP Release 99, Summary of all Release 99 Features. ETSI Mobile Competence Centre, Version xx/07/04
10. Overview of 3GPP Release 4, Summary of all Release 4 Features, v.1.1.0 (draft) ETSI Mobile Competence Centre 2004
11. Summary of all Release 5 Features, ETSI Mobile Competence Centre, Version 9 September 2003
12. Overview of 3GPP Release 6, Summary of all Release 6 Features, Version TSG #33, ETSI Mobile Competence Centre 2006
13. Review of the Work Plan at Plenaries #31, 3GPP, SP-060232 3GPP TSG SA#31 Sanya, 13–16 March 2006
14. "Highlights of 3GPP Release 12" (<http://www.unwiredinsight.com/2014/highlights-of-3gpp-release-12>). Retrieved 20 November 2014.
15. "Release 13 priorities" (<http://www.3gpp.org/news-events/3gpp-news/1628-rel13>). Retrieved 20 November 2014.
16. "3GPP Portal > Specifications" (<https://portal.3gpp.org/Specifications.aspx?q=1&releases=189>). *portal.3gpp.org*. Retrieved 27 October 2016.
17. "3GPP Portal > Specifications" (<https://portal.3gpp.org/Specifications.aspx?q=1&releases=190>). *portal.3gpp.org*. Retrieved 27 October 2016.
18. "3GPP Portal > Specifications" (<https://portal.3gpp.org/Specifications.aspx?q=1&releases=191>). *portal.3gpp.org*. Retrieved 14 July 2020.
19. "5G evolution toward 5G advanced: An overview of 3GPP releases 17 and 18" (<https://www.ericsson.com/en/reports-and-papers/ericsson-technology-review/articles/5g-evolution-toward-5g-advanced>). *Ericsson*. Retrieved 25 August 2022.
20. "Release 18" (<https://www.3gpp.org/release18>). *3gpp.org*. Retrieved 25 November 2021.
21. "5G-Advanced's system architecture begins taking shape at 3GPP" (<https://www.nokia.com/blog/5g-advanceds-system-architecture-begins-taking-shape-at-3gpp/>). *Nokia*. Retrieved 25 November 2021.
22. "Release 19" (<https://www.3gpp.org/specifications-technologies/releases/release-19>). *3GPP*. Retrieved 8 September 2024.
23. "Specification Groups" (<https://web.archive.org/web/20110509054716/http://3gpp.org/Specification-Groups>). Archived from the original (<http://www.3gpp.org/Specification-Groups>) on 9 May 2011. Retrieved 11 April 2011.
24. closure of GERAN (http://www.3gpp.org/news-events/3gpp-news/1762-iot_geran)
25. 3GPP membership (<http://www.3gpp.org/membership>)
26. 3GPP TR 21.900 Technical Specification Group working methods (<http://www.3gpp.org/ftp/Specs/html-info/21900.htm>)
27. ITU-T Recommendation I.130 (<http://www.itu.int/rec/T-REC-I.130-198811-I/>)

External links

- [3GPP website](http://www.3gpp.org/) (<http://www.3gpp.org/>)
- [3GPP Standards List of Acronyms & Terminology](https://sites.google.com/site/lteencyclopedia/lte-acronyms) (<https://sites.google.com/site/lteencyclopedia/lte-acronyms>)
- [3GPP freely published, detailed technical specifications](http://www.3gpp.org/specification-numbering) (<http://www.3gpp.org/specification-numbering>)

- [3GPP releases descriptions \(http://www.3gpp.org/ftp/Information/WORK_PLAN/Description_Releases/\)](http://www.3gpp.org/ftp/Information/WORK_PLAN/Description_Releases/)
 - [ETSI GSM UMTS 3GPP Numbering Cross Reference \(http://webapp.etsi.org/key/queryform.asp\)](http://webapp.etsi.org/key/queryform.asp)
 - [TS/TR \(http://www.3gpp.org/ftp/specs/html-info/status-report.htm\)](http://www.3gpp.org/ftp/specs/html-info/status-report.htm)
 - [specification numbering \(http://www.3gpp.org/Specification-Numbering\)](http://www.3gpp.org/Specification-Numbering)
 - [Tool for visualizing multiple inter-related 3gpp standards \(http://webbrain.com/brainpage/brain/A785310D-5623-E3D7-C68A-1A53BB98BD05/\)](http://webbrain.com/brainpage/brain/A785310D-5623-E3D7-C68A-1A53BB98BD05/)
 - [Tool for visualizing, decoding, encoding network protocol messages defined by 3gpp \(http://www.3gpp-message-analyser.com/\)](http://www.3gpp-message-analyser.com/)
 - [LTE-3GPP.info: online 3GPP messages decoder fully supporting Rel.15 \(http://lte-3gpp.info/\)](http://lte-3gpp.info/)
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