

Question: What is ITU's role in IMT?

Over the last 25 years, ITU has developed the IMT framework of standards — or International Mobile Telecommunication system — for mobile telephony and continues to lead international efforts involving governments and industry players to produce the next generation standards for global mobile communications.

Question: What does IMT stand for?

IMT stands for “International Mobile Telecommunications”.

For the last 25 years or so, the ITU's IMT standards (or '[ITU-R Recommendations on IMT](#)') have helped shape the way mobile communication services have developed worldwide.

Question: What is IMT-2000 versus IMT-Advanced?

The initial set of [IMT standards](#) which the ITU approved were called **IMT-2000**. Recently ITU-R has approved **IMT-Advanced** standard and will keep progressing the upgrade for the next generation of these technologies.

IMT-Advanced systems are broadband mobile systems that include the new capabilities of IMT that go beyond those of IMT-2000. Such systems provide access to a wide range of telecommunication services including advanced mobile services, supported by mobile and fixed networks, which are increasingly packet-based.

IMT-Advanced systems support low to high mobility applications and a wide range of data rates in accordance with user and service demands in multiple user environments. IMT Advanced also has capabilities for high quality multimedia applications within a wide range of services and platforms, providing a significant improvement in performance and quality of service.

Question: What technology is IMT-Advanced?

IMT-Advanced isn't a specific technology but rather, it's a specification and list of requirements for high-speed mobile broadband service.

“IMT-Advanced marks a huge leap forward in state-of-the-art technologies, which will make the present day smart phone feel like an old dial-up Internet connection,” said ITU secretary-general Hamadoun Touré, in a statement. *“Access to the Internet, streaming videos, and data transfers anytime, anywhere will be better than most desktop connections today.”*

Mr François Rancy, Director of ITU's Radiocommunication Bureau, said, *“IMT-Advanced would be like putting a fibre optic broadband connection on your mobile phone, making your phone at least 100 times faster than today's 3G smart phones. But it's not only about speed; it's about efficiency. IMT-Advanced*



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will use radio-frequency spectrum much more efficiently making higher data transfers possible on lesser bandwidth. This will enable mobile networks to face the dramatic increase in data traffic that is expected in the coming years”

*source: [ITU Press Release](#) of 18 January 2012

Question: Which technologies meet the IMT-Advanced criteria and specification?

Right now two technologies have been found to meet the IMT-Advanced criteria:

WirelessMAN-Advanced and **LTE-Advanced**.

ITU has determined that "LTE-Advanced" and "WirelessMAN-Advanced" should be accorded the official designation of IMT-Advanced. These are extensions of the 3G LTE and WiMax technologies.*

*source: [ITU Press Release](#) of 18 January 2012

Question: What are the key features of IMT- Advanced?

Key features of ‘IMT-Advanced’:

- a high degree of commonality of functionality worldwide while retaining the flexibility to support a wide range of services and applications in a cost efficient manner;
- compatibility of services within IMT and with fixed networks;
- capability of interworking with other radio access systems;
- high quality mobile services;
- user equipment suitable for worldwide use;
- user-friendly applications, services and equipment;
- worldwide roaming capability; and,
- enhanced peak data rates to support advanced services and applications:

100 Mbit/s for high and 1 Gbit/s for low mobility were established as targets for research*.

These features enable IMT-Advanced to address evolving user needs and the capabilities of IMT-Advanced systems are being continuously enhanced in line with user trends and technology developments.

* Data rates sourced from [Recommendation ITU-R M.1645](#) - ‘Framework and overall objectives of the future development of IMT-2000 and systems beyond IMT-2000’ and [Recommendation ITU-R M.2012 for IMT-Advanced](#) for detailed specifications of the terrestrial radio interfaces of International Mobile Telecommunications Advanced (IMT-Advanced).



Question: What is the Vocabulary of terms for IMT?

This is available in [Recommendation ITU-R M.1224](#).

IMT-Advanced systems, the next step in global wireless broadband communications, include new capabilities that go beyond IMT-2000, widely deployed since 2000 and referred to as 3G mobile technology.

With the completion of an intensive programme developed by ITU's Radiocommunication Sector (ITU-R) to stimulate global development of the future IMT technologies and following a detailed evaluation against stringent technical and operational criteria, ITU has determined that "LTE-Advanced" and "WirelessMAN-Advanced" should be accorded the official designation of IMT-Advanced.

See also: [ITU Press Release](#) of 18 January 2012

Question: Where can I find the list of ITU-R Reports on IMT?

These are available [here](#)

Question: Where can I find the full list of ITU-R Recommendations (standards or specifications) on IMT?

These are available [here](#).

Specifications for IMT-Advanced – the next step in mobile broadband wireless technology – were announced in January 2012 during the ITU World Radiocommunication Assembly (RA-12).

Over the last 25 years, ITU has developed the IMT framework of standards — or International Mobile Telecommunication system — for mobile telephony and continues to lead international efforts involving governments and industry players to produce the next generation standards for global mobile communications.

Question: What Specifications for IMT are available in ITU-R Recommendations:

Terrestrial Component:

[Rec. ITU-R M.2012](#) for IMT-Advanced – ‘Detailed specifications of the terrestrial radio interfaces of International Mobile Telecommunications Advanced (IMT-Advanced)’.

[Rec. ITU-R M.1457](#) for IMT-2000 (widely referred to as 3 G mobile technology) - ‘Detailed specifications of the terrestrial radio interfaces of International Mobile Telecommunications-2000 (IMT-2000)’.



Satellite Component:

[Rec. ITU-R M.1850](#) for IMT-2000 (widely referred to as 3 G mobile technology) - 'Detailed specifications of the radio interfaces for the satellite component of International Mobile Telecommunications-2000 (IMT-2000)'.

An ITU-R Recommendation dealing with the satellite component of IMT-Advanced is currently being developed.

Question: Is there a satellite component to IMT

A series of ITU-R Recommendations (standards) for the satellite component to IMT-2000 have been developed including integration of the terrestrial and satellite mobile communication systems, these are:

Rec. ITU-R [M.818](#) - Satellite operation within International Mobile Telecommunications-2000 (IMT-2000)

Rec. ITU-R [M.1167](#) - Framework for the satellite component of International Mobile Telecommunications-2000 (IMT-2000)

Rec. ITU-R [M.1182](#) - Integration of terrestrial and satellite mobile communication systems

Rec. ITU-R [M.1850](#) - 'Detailed specifications of the radio interfaces for the satellite component of International Mobile Telecommunications-2000 (IMT-2000)'

Rec. ITU-R [M.2014](#) - Global circulation of IMT-2000 satellite terminals

Question: Is IMT-2000 - 3G or 4G?

IMT-2000, in use for over a decade since 2000, has been widely deployed and is commonly referred to as 3G.

The term "4G" remains undefined, but it is being applied by some operators to the forerunners of **IMT-Advanced** technologies — LTE, HSPA+, WiMax and to other evolved 3G technologies, which provide a substantial level of improvement in performance and capabilities with respect to the initial third generation systems now deployed.

Specifications for the next phase of development in mobile broadband wireless technology – **IMT-Advanced** – were agreed by the ITU Radiocommunication Assembly in January 2012. See [Press Release](#) of 18 January 2012: 'IMT-Advanced standards announced for next-generation mobile technology'.

Question: Does ITU have a definition for 4G?

The term '4G' remains undefined. ITU has specified that **IMT-Advanced** is the next step in mobile broadband wireless technology building on IMT-2000, widely referred to as 3G.

ITU does not have a definition for 4G and ITU cannot hold a position on whether or not a given technology is labelled with that term for marketing purposes.



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ITU has determined that "LTE-Advanced" and "WirelessMAN-Advanced" should be accorded the official designation of IMT-Advanced. These are extensions of the 3G LTE and WiMax technologies.*

*source: [ITU Press Release](#) of 18 January 2012

Question: Why is IMT-Advanced the new milestone in global mobile broadband ?

Specifications for the next step in mobile broadband wireless technology – IMT-Advanced – were approved by the ITU Radiocommunication Assembly in January 2012. See [ITU Press Release](#) of 18 January 2012: ‘IMT-Advanced standards announced for next-generation mobile technology’.

With the completion of an intensive programme developed by ITU’s Radiocommunication Sector (ITU-R) to stimulate global development of the future IMT technologies and following a detailed evaluation against stringent technical and operational criteria, ITU has determined that "LTE-Advanced" and "WirelessMAN-Advanced" should be accorded the official designation of IMT-Advanced.

IMT-Advanced systems include new capabilities that go beyond IMT-2000, widely deployed since 2000 and referred to as 3G mobile technology. ITU has now specified the standards for IMT-Advanced, the next step in global wireless broadband communications.

IMT-Advanced provides comprehensive support for broadband wireless data and brings major improvements. These include increased spectrum efficiency to handle more users at higher data rates per radio channel; a fully packet-based architecture for reduced costs; lower latency leading to more responsive Internet and multimedia applications; improved radio resource management and control to enhance quality of service, and new capabilities for the radio interface such as wideband radio channels and multiple-input and multiple-output (MIMO) for the use of multiple antennas at both the transmitter and receiver end to improve communication performance.

Question: IMT bands – how many IMT bands are there around the world?

In terms of spectrum, the [ITU Radio Regulations \(RR\)](#) establish the allocation of specific frequency bands for each radio service (41 services in total), including the mobile terrestrial service (the service involved, in this case). At the national or regional level, such allocated bands are then further allocated or assigned for specific types of system or applications using specific channel arrangements. These channel arrangements may differ from region to region or from country to country, resulting in a large diversity of such “bands”.

As the channeling arrangements do not necessarily use the whole allocated spectrum, and sometimes channeling plans might overlap each other, the sum of bandwidths of the various bands does not match with the total bandwidth of allocated spectrum.

While spectrum allocations are defined on [RR](#), which has the power of international treaty, the various channeling options and their resulting “bands” are considered mainly by the [ITU-R Study Groups](#), (in this case [ITU-R Study Group 5](#)), and the results are issued as “[ITU Recommendations](#)”.



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Such Recommendations or standards are not compulsory, however as they are developed with the participation of all sectors of the industry and approved by [ITU Member States](#), they play a key role in determining which channel arrangements are adopted in a given region or country. [ITU](#) strives to achieve worldwide harmonization of these channel arrangements, to the universal benefit of industry and users, but in some cases this goal is not able to be fully achieved.

There are specific [ITU-R Recommendations](#) which describe the detailed technical specifications for the IMT terrestrial radio interfaces, including IMT-2000 and IMT-Advanced; they specify which technologies fully meet the technical criteria for the respective IMT radio interfaces (see table below).

Question: What are the spectrum bands identified for IMT systems ?

The term [International Mobile Telecommunications \(IMT\)](#) encompasses both IMT-2000 and IMT-Advanced collectively. In successive [World Radiocommunication Conferences \(WRCs\)](#) have identified specific frequency bands for the deployment of IMT systems in general. This identification does not preclude the use of this band by any application of the services to which it is allocated and does not establish priority in the Radio Regulations. In effect, it is up to each country to determine which bands will be made available for IMT in each country/region depending on national/regional requirements.

The [Radio Regulations \(RR\)](#) has identified 7 frequency bands, with a total bandwidth of: 1,177 MHz, that might be used for IMT systems (see table below). For further information, please find below the following items:

- List of bands identified on the [Radio Regulations \(RR\)](#) for deploying IMT systems
- Table with the [Recommendations](#) containing the IMT-Advanced and IMT-2000 technical specifications and the related radio interface standards that have been recognized as meeting such specifications.

All these documents are publically available, free of charge (download version) from our web site:

- <http://www.itu.int/rec/R-REC-M/en> (for ITU-R M-Series Recommendations)
- <http://www.itu.int/pub/R-REG-RR-2012> (for Radio Regulations)



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Band (MHz)	Radio Regulations Footnotes identifying the band for IMT
450-470 (20 MHz)	5.286AA
698-960 (262 MHz)	5.313A, 5.317A
1710-2025 (315 MHz)	5.384A, 5.388
2110-2200 (90 MHz)	5.388
2300-2400 (100 MHz)	5.384A
2500-2690 (190 MHz)	5.384A
3400-3600 (200 MHz)	5.430A, 5.432A, 5.432B, 5.433A

	IMT-2000	IMT-Advanced
ITU-R Recommendation	ITU-R M.1457-10 (06/2011): Detailed specifications of the terrestrial radio interfaces of International Mobile Telecommunications-2000 (IMT-2000)	ITU-R M.2012 (01/2012): Detailed specifications of the terrestrial radio interfaces of International Mobile Telecommunications Advanced (IMT-Advanced)
Main Technical Criteria	<p>1- high degree of commonality of design worldwide;</p> <p>2- compatibility of services within IMT-2000 and with the fixed networks;</p> <p>3- high quality;</p> <p>4- small terminal for worldwide use;</p> <p>5- worldwide roaming capability;</p> <p>6- capability for multimedia applications, and a wide range of services and terminals.</p>	<p>1- a high degree of commonality of functionality worldwide while retaining the flexibility to support a wide range of services and applications in a cost-efficient manner;</p> <p>2- compatibility of services within IMT and with fixed networks;</p> <p>3- capability of interworking with other radio access systems;</p> <p>4- high-quality mobile services;</p> <p>5- user equipment suitable for worldwide use;</p> <p>6- user-friendly applications, services and equipment;</p> <p>7- worldwide roaming capability;</p> <p>8- enhanced peak data rates to support advanced services and applications (100 Mbit/s for high and 1 Gbit/s for low mobility were established as targets for research; (rates surced from ITU-R M.1645)</p>
Recognized Radio Interfaces	<p>1- IMT-2000 CDMA Direct Spread</p> <p>2- IMT-2000 CDMA Multi-Carrier</p> <p>3- IMT-2000 CDMA TDD</p> <p>4- IMT-2000 TDMA Single-Carrier</p> <p>5- IMT-2000 FDMA/TDMA</p> <p>6- IMT-2000 OFDMA TDD WMAN</p>	<p>1- LTE-Advanced</p> <p>2- WirelessMAN-Advanced</p>

