

# What is Bluetooth connection? The latest Bluetooth connection standards today

What is Bluetooth technology that consumer electronics manufacturers like to use so much? Let's learn about this technology and its benefits

Most consumer electronics manufacturers today integrate standard Bluetooth connection technology into their products. To bring convenience in sharing and transmitting information and data or connecting peripheral devices such as headphones, mice, etc. to each other quickly. So what is the Bluetooth connection standard? What is the latest Bluetooth version on the market? Let's find answers with TipsMake through the following article.

## What is Bluetooth connection?

**Bluetooth connection** is a connection standard that uses radio waves to connect and exchange data with personal devices within the 2.4GHz band. This is a technology that allows users to connect or transfer data between mobile electronic devices such as mobile phones, tablets, laptops and fixed electronic devices without using the device. Use cables to transmit over short distances.

Picture 1 of What is Bluetooth connection? The latest Bluetooth connection standards today

The range at which devices can effectively operate and connect to each other is about 10m and has a data transfer rate of 1Mbps. Devices with integrated Bluetooth connection standards support many useful features, meeting many user needs.

In short, Bluetooth is an electronic standard that manufacturers who want to integrate this connection standard into products must meet Bluetooth requirements. These technical standard requirements ensure that devices can recognize and interact with each other when connecting via Bluetooth.

## Advantages and disadvantages of Bluetooth

**The Bluetooth connection standard** gives device users more benefits and convenience in the process of connecting, exchanging and sharing data information with other devices. However, this technology still has some limitations that affect the user experience. Specifically about the advantages and disadvantages:

### Advantage

**Applying Bluetooth technology** to devices gives users the following outstanding advantages:

1. Completely replaces traditional connection cables. Helps save users time in folding and carrying when traveling.
2. Bluetooth technology is safe, does not affect human health at all.
3. Secure user information with encryption technology. Once a device has established a connection, it is difficult for any device to eavesdrop or steal data from that device.
4. Devices can connect and exchange data with each other within a maximum operating range of 20m (On the market there are currently some types of Bluetooth connections with a maximum range of up to 100m).
5. Convenient for users to connect with each other in cases of driving or being busy with work that makes it inconvenient to operate manually for a long time.
6. Low price.
7. Consumes little operating power, consuming 0.3mAh on average and up to 30mAh in data transfer mode.
8. Does not cause interference that affects other wireless devices.
9. High device compatibility, supported by many hardware and software manufacturers.

Picture 2 of What is Bluetooth connection? The latest Bluetooth connection standards today

## Defect

In addition to the above advantages, the Bluetooth connection standard also suffers from some insignificant limitations as follows:

1. Low transmission speed, maximum speed is about 720Kbps.
2. Signal reception ability is low when there are obstacles blocking it.
3. Long setup time.

## Operating principle of Bluetooth

When the device connects to Bluetooth, this connection standard will automatically search for devices with compatible frequencies within the limited operating range to connect to each other. This connection process ensures data stability during transmission between devices. In particular, in terms of Bluetooth coverage, there are currently 3 different layers:

1. **Class 1** : 100mW capacity with coverage range of nearly 100m.
2. **Class 2** : Capacity 2.5mW with coverage range of about 10m.
3. **Class 3** : 1mW with coverage range of about 5m.

Besides, this Bluetooth connection standard is also a collection of many different protocols.

## Bluetooth connection standards from past to present

**Bluetooth connectivity** was first developed in 1994 by an Ericsson electrical engineer. Later, this technology was joined by world-famous electronics manufacturers to form an organization called SIG (Special Interest Group) to jointly research, develop and standardize.

The SIG organization, which includes companies such as Intel, Ericsson, IBM, Nokia, Toshiba, Apple, Lenovo and Microsoft, oversees the development of Bluetooth standards and licenses wireless technology manufacturers. This.

### Picture 3 of What is Bluetooth connection? The latest Bluetooth connection standards today

By 1999, Bluetooth technology was officially standardized and announced on the market. Up to now, this technology has undergone many upgraded versions and is widely used.

Specifically, the upgraded versions that this technology has undergone during each period of development are as follows:

1. **Bluetooth 1.0:** This is the first version launched on the market, with a connection speed of nearly 1Mbps. However, this version has limited compatibility.
2. **Bluetooth 1.1:** This is an improved version of version 1.0, but the connection speed remains the same.
3. **Bluetooth 1.2:** This is a version that operates based on the 2.4GHz band, with improvements in detection time and connection to devices. Besides, the transmission speed is also considered faster than the connection standard version 1.1.
4. **Bluetooth 1.2 + ERD:** This version has a maximum connection speed of up to 2.1Mbps and integrates the ERD - Enhanced Data Rate transmission connection improvement mode.
5. **Bluetooth 2.0 + ERD:** This version was launched in July 2007, this is an improved connection standard with faster data transmission and sharing speeds. Besides, it also helps the device save more energy during use.
6. **Bluetooth 2.1 + ERD:** This is an upgraded version of Bluetooth 2.0 with the advantage of improving connection speed and data transmission. In addition, this version also integrates a small-range connection mechanism.
7. **Bluetooth 3.0 + HS (High Speed):** This version was introduced in 2009 with the advantage of announced connection speed of up to 24Mbps. Devices that support this 3.0 connection standard but do not have the High Speed feature will not achieve the above transmission speed. Although it has high speed, Bluetooth waves only support the need to quickly share low-capacity files or connect to speakers, headphones, etc.
8. **Bluetooth 4.0:** This version launched in 2020, this is a combination of Bluetooth 2.1 and 3.0 (Classic Bluetooth) for fast information transmission speed along with the ability to save energy when in use.
9. **Bluetooth 4.1:** This is an upgraded version announced in 2014 with many improvements such as reducing Bluetooth data overlap with the 4G network. Or the ability to maximize performance thanks to the self-adjusting bandwidth feature. At the same time, further optimization of connection waiting time helps the device save energy consumption.
10. **Bluetooth 4.2:** Is the next upgrade in 2014. This version has a significant improvement with a maximum transmission speed of 2.5 times compared to version 4.1. Along with that is less energy consumption and limited connection errors as well as better data security. In particular, the most important feature is support for sharing internet connection according to IPv6 protocol.
11. **Bluetooth 5.0:** This is the generation of Bluetooth connection standard announced by SIG on June 16, 2016. This version has many new outstanding improvements such as expanding coverage by 4 times, providing twice the connection speed and increasing the ability to save power consumption by 2.5 times compared to version 4.0. .
12. **Bluetooth 5.1:** This is a new Bluetooth connection standard system upgraded with the ability to 'Find direction AoA - Angle of Arrival' and 'AoD - Angle of Departure', which is responsible for helping users determine the exact location of the device. . At the same time, this upgrade also integrates the ability 'Connect without data packet' to help users connect and sync simply with less power consumption.
13. **Bluetooth 5.2:** This is the latest version of Bluetooth today, released in 2020. This version features advanced attribute protocol – EATT, which can reduce latency and increase encryption in the connection. Besides, the LEPC control feature with the ability to control the source and stabilize the quality of the

transmitted signal helps reduce the rate of receiving error signals. At the same time, with the ISOC feature, it is possible to transmit 2-way data to multiple devices at the same time.

## **Benefits of Bluetooth**

Using current Bluetooth technology brings users and devices many significant benefits. Not only does it significantly save connection and transmission time compared to traditional wired connections. Besides, it can also connect to many devices.

Picture 4 of What is Bluetooth connection? The latest Bluetooth connection standards today

Specifically, the benefits of connecting to the Bluetooth standard are shown through some features that TipsMake shares below:

1. Transfer data via wireless connection between mobile device and computer.
2. Transfer files back and forth between computers.
3. Allows users to share network connection via Bluetooth.
4. Connect to many peripheral devices such as headphones, mice, printers, smartwatches, etc.
5. Applications in remote control devices such as TV controls, air conditioners or toy controllers,.
6. Connect your computer to the internet by turning your smart mobile device into a modem.
7. Bluetooth connection application for businesses operating in fields such as positioning, barcode scanning, medical equipment or traffic safety control equipment.

Through some of the above features, this Bluetooth connection standard supports devices and a number of specific fields. It can be seen that this is an effective wireless connection technology for users today.

## **Several safety solutions help ensure security in Bluetooth**

Although this connection technology has the ability to secure data information. However, intrusion and theft of data in the device can still occur. Below are some notes that users need to take to ensure better data security, specifically:

1. Disable Bluetooth connection when there is no need to use it.
2. Use Bluetooth in hidden mode.
3. Be careful of your surroundings when using a Bluetooth connection. Information may be transmitted to the wrong device and spread outside.
4. Review the user's security settings.
5. Fully exploit security options to ensure maximum safety.
6. Periodically check the list of 'Paired' devices.
7. Periodically scan for viruses with anti-virus software to remove harmful elements from entering the device.

## **Epilogue**

Through the above article, surely you have a better understanding of what the Bluetooth connection standard is. The birth of this wireless connection technology has shown its importance, helping users save time in the process of exchanging data and connecting between devices. If you have any questions about this technology, please

leave a comment below for TipsMake to answer. Thank you for following the article.

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