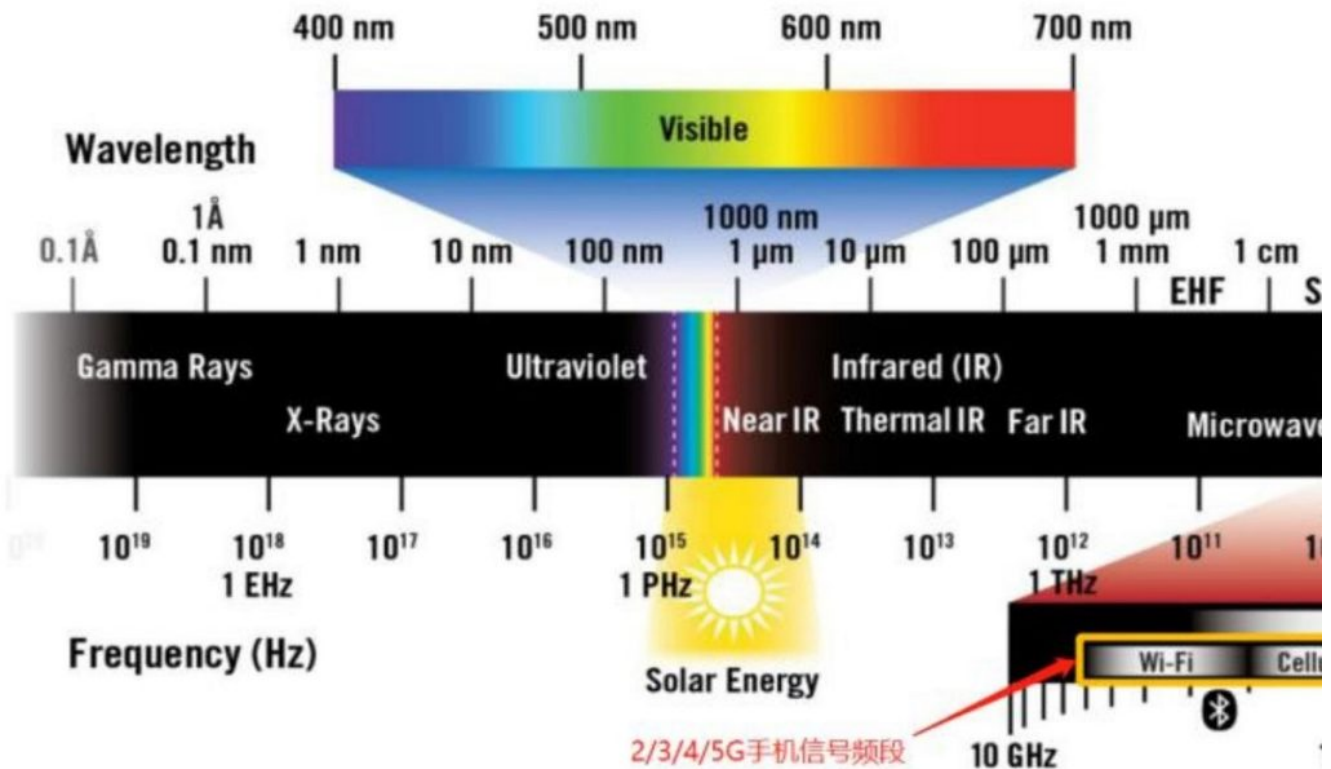


Will Low-E glass influence the mobile phone signal?






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To answer this question, first of all, we must understand that mobile phone signals are electromagnetic waves. What we can encounter in our lives, such as visible light, ultraviolet rays, radio waves of radio and television stations, wifi signals, 2/3/4/5G mobile phone signals, microwaves in microwave ovens, X-rays, etc., all belong to the category of electromagnetic waves. From the figure below, you can see where the 2/3/4/5G mobile phone signal is located in the electromagnetic spectrum.



The network signal transmission frequencies of various generations and standards of different mobile network operators in China are shown in the following table (1GHz=1024MHz). We can see that with the upgrading of mobile networks, the frequency of electromagnetic waves used for signal transmission is getting higher and higher, and the data transmission rate of the network is also getting higher and higher. The higher the frequency, the greater the attenuation of the electromagnetic wave in the propagation medium, that is, the greater the attenuation of the signal when passing through the obstacle. Therefore, as the frequency increases, the transmission distance will be reduced, and the coverage capability will be weakened. As the operator's network covers the same area, the number of base stations required will increase.

| 运营商 | 制式 | | 上行频率 MHz | 下行频率MHz |
|--|----------|----------------|-----------|-----------|
|  中国移动 China Mobile | 2G | GSM900 (FDD) | 885-909 | 930-954 |
| | | GSM1800 (FDD) | 1710-1725 | 1805-1820 |
| | 3G | TD-SCDMA(TDD) | 2010-2025 | |
| | 4G | TD-LTE | 1880-1900 | |
| | | | 2320-2370 | |
| | | | 2575-2635 | |
| 5G | IMT-2020 | 2515-2675 | | |
| | | 4800-4900 | | |
|  China Unicom 中国联通 | 2G | GSM900 (FDD) | 909-915 | 954-960 |
| | | GSM1800 (FDD) | 1745-1755 | 1840-1850 |
| | 3G | WCDMA (FDD) | 1940-1955 | 2130-2145 |
| | 4G | FDD-LTE | 1755-1765 | 1850-1860 |
| | | TD-LTE | 2300-2320 | |
| | 5G | IMT-2020 | 3500-3600 | |
|  中国电信 CHINA TELECOM | 2G | CDMA800 (FDD) | 825-840 | 870-885 |
| | 3G | CDMA2000 (FDD) | 1920-1935 | 2110-2125 |
| | 4G | FDD-LTE | 1765-1780 | 1860-1875 |
| | | TD-LTE | 2370-2390 | |
| | 5G | IMT-2020 | 3400-3500 | |

As we all know, the use of Low-E glass in doors and windows has an impact on the transmission of ultraviolet, visible light, and infrared light, thereby improving the thermal insulation performance of glass. In addition, there is a phenomenon that some people are concerned about, that is, LowE glass will also affect the transmission of electromagnetic waves in the UHF band, which will cause mobile phones, cordless phones, broadcast TV, GPS, Wifi, Bluetooth, satellite radio and public two-way radios (police, fire, ambulance) communication signal attenuation. The amount of attenuation or shielding by LowE glass of the above communication signal strength is usually expressed in decibels (dB). The higher the decibel number, the greater the signal attenuation.

The calculation formula is as follows:

$$SE = \log(E_0/E_I)$$

SE = shielding effect (dB)

E₀ = electric field strength before passing through the shielding material

E_I = electric field strength

after passing through the shielding material Normally, the more silver layers of Low-E glass, the more obvious the shielding effect on mobile phone signals. Therefore, the configuration and combination of different insulating glass from a single piece of single silver double glass to multiple pieces of multiple silver triple glasses will also form different degrees of shielding effect on mobile phone signals. We often do not have an intuitive understanding of the decibel value of signal attenuation, so please refer to the following table, so that you can compare the shielding effect of LowE glass on mobile phone signals with other materials commonly used in buildings. The following table lists the shielding effect of different materials on 3G and 4G LTE network signals.

| Building Material | Signal shielding effect□dB□ |
|--------------------------|------------------------------------|
| plasterboard | 2 |
| clear glass | 4 |
| plywood | 4~6 |
| solid wood | 5~12 |
| brick wall | 8~28 |
| concrete(15cm) | 10~20 |
| Low e glass | 24~40 |
| metal | 32~50 |

In fact, it is difficult for us to quantitatively assess how much mobile phone signal attenuation will be caused to the entire building by the use of [Low-E glass](#) for external windows (or curtain walls). The design of the building, the use of building materials, and the original coverage strength of the cell phone signal will all have an impact on the final result. In many cases, we do not feel the impact of the use of Low-E glass on the mobile phone signal because the signal can penetrate the outer wall, roof, window frame (usually non-metal window frame) and doors, etc. For large-scale high-rise office buildings that all use LowE glass as the curtain wall,

the attenuation of mobile phone signals will be more obvious. However, mobile network providers can install signal transmitters inside buildings to ensure cell phone signal strength within the building. To sum up: 1. Low-E glass does have an impact on mobile phone signals. The more silver layers are, the more obvious it is, but it is difficult to quantitatively evaluate; 2. Generally speaking, the impact is not large, because the signal can still penetrate from other places such as the outer wall. , unless you are a full Low-E curtain wall building, but even so, don't worry, you can add a signal transmitter inside.

The conclusion is: Low-E glass has an influence on the mobile signal, but you don't need to worry about it. Compared with its advantages in energy-saving and other aspects, the influence is too small to notice.

Do you have any different ideas? Come to [share with us](#) below!