

FROM FIRST RADIOS TO SMART TELEPHONES

During the first fifty years of its existence, radio underwent several transformations which made it indispensable in our daily lives. During the 1970s, the programming of commercial radio stations was further transformed. We were increasingly abandoning the AM band to focus on FM, which offers better quality. Digital satellite broadcasting was launched. As far as programming is concerned, public affairs programs are less frequent, in favor of music programs.

Even today, radio communications are essential to aviation, shipping and the conquest of space. With the advent of the Internet and smartphones, the use of radio frequencies is in full swing.

Four radios in one phone

Today, in a smartphone, one can count up to four types of radio transmitters:

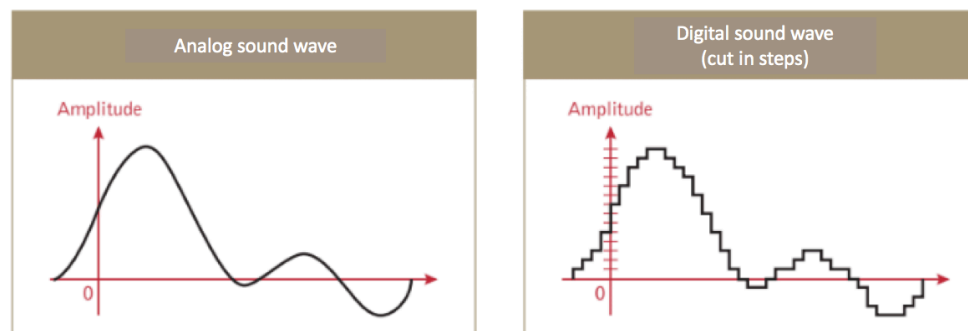
- one for the cellular function of the telephone, which makes it possible to communicate with telephone towers,
- one for the GPS function, which allows to communicate with the satellites:
- one for the Internet function via WiFi;
- one to connect external devices in Bluetooth mode (speaker, headphones, watch ...).

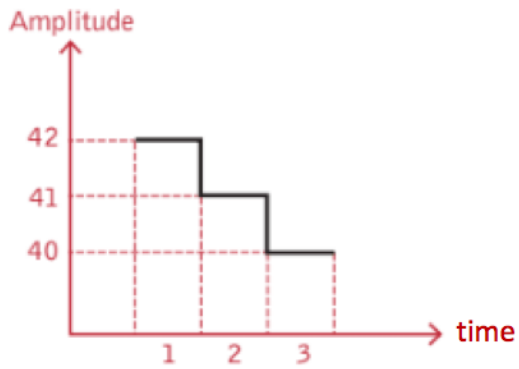
FAREWELL ANALOGUE, HELLO DIGITAL!

With changing data transmission needs, the audio signals as they are used need to be changed to facilitate their transport. They are transformed into a so-called digital signal.

How to transform sound into a digital signal?

The sound wave itself is a so-called analog signal. To transform this wave into a digital signal, that is to say into a signal composed only of a succession of 0 and 1, the sound wave is first "cut" into small pieces.





For each created piece, the amplitude (the equivalent of the decibel for a sound wave) is converted into a binary number, that is to say a number composed only of 0 and 1. For example, if the amplitude was 42, this would be written "101010" in binary.

To transmit the part of the wave indicated opposite and composed of 3 steps whose amplitude is 42, 41 and 40, the signal transmitted would be "101010" for 42, then "101001" for 41, and "101000" for 40.

How to transport the digital signal?

While the analog signal had a lot of information to transmit (to reflect all the variations in the voice), the digital signal simplified things a lot. It is only composed of two possible pieces of information: a 0 or a 1.

To modulate (transport) this new signal, the method is very similar to that used for AM or FM radio: we use a carrier wave.

For example, in one of the possible modulation types, a "1" represents the maximum amplitude of the carrier wave, while a "0" represents its minimum amplitude. The wave thus transmitted carries with it all the necessary information and can be demodulated once received by the receiver in order to be listened to.

