

# A BRIEF HISTORY OF ULTRA-WIDEBAND (UWB)

- 1887**

The first UWB signals are generated in experiments by Heinrich Hertz.
- 1897**

G. Marconi first uses UWB on spark-gap transmitters with Morse code in transatlantic radio communications.
- 1954**

Giuseppe De Rosa files a patent for an early impulse (UWB) system. He files for the patent in 1942.
- 1962**

Gerald Ross uses transient impulses to characterize wideband radar components.
- 1968**

Tektronix Inc.'s time domain receiver plug-in uses a technique that enables UWB signal averaging.
- 1969**

Henning Harmuth publishes papers that put the basic design for UWB transmitters and receivers into the public domain.
- 1972**

Gerald Ross and Kenneth Robbins get patents that pioneer using UWB signals in communications and radar.
- 1973**

Ross gets a patent that shows UWB can coexist with common standards without interference.
- 1974**

Rexford Morey designs a UWB radar system for penetrating the ground.
- 1975**

A UWB system for communications or radar can now be made from Tektronix components.
- 1977**
  - Paul Van Etten's testing of UWB radar systems leads to the development of system design and antenna concepts.
  - Col. J.D. Taylor heads a U.S. Air Force program in UWB system development.
- 1978**

C.L. Bennett and Gerald Ross publish the schematics for a UWB radar system.
- 1989**

The term ultra-wideband/UWB now signifies terms such as impulse, carrier-free, baseband, time domain, non-sinusoidal, orthogonal function, and large-relative-bandwidth radio/radar signals, according to the U.S. Department of Defense.
- 1990**

The U.S. government agency DARPA spends 25M USD to explore UWB for military radar.
- 1994**

T.E. McEwan invents the micropower impulse radar (MIR), which is the first time a UWB operates at ultra-low power, is extremely compact, and inexpensive.
- 2002**
  - The FCC amends its rules to include the operation of UWB devices without a license. It also opens up 7.5 GHz for UWB applications and UWB becomes commercially viable.
  - WiMedia Alliance is formed to standardize personal area networks using UWB.
- 2003**

The IEEE 802.15.4 standard is published and defines the physical layer (PHY) and media access control (MAC) layer for low-rate wireless personal area networks.
- 2004**

UWB Forum forms to promote interoperable UWB wireless computer networking products from multiple vendors. It disbands in 2006.
- 2009**

WiMedia Alliance disbands and sells its IP to Bluetooth® and USB groups.
- 2018**

UWB Alliance forms to build a global ecosystem across the complete UWB value chain.
- 2019**
  - Apple releases iPhone 11 with its U1 UWB chip.
  - FiRa® Consortium forms to promote and standardize UWB for fine ranging.
- 2020**
  - FiRa Consortium and UWB Alliance announce a formal liaison.
    - FiRa publishes UWB MAC and PHY technical requirements specifications.
  - Samsung launches Galaxy Note 20 with UWB.
    - IEEE 802.15.4z defines a two-way ranging method, and enhances PHY and MAC standards for UWB technology.
- 2021**
  - Google and Xiaomi release smartphones with UWB chips.
  - FiRa launches its Certification Program to drive interoperability between UWB devices.
- 2023**
  - FiRa publishes 2.0 technical specifications and launches its Certification Program 2.0.
  - FiRa partners with the Car Connectivity Consortium (CCC) on the UWB technology standards used in the CCC Digital Key.

