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Location Finds Bluetooth, UWB Bluetooth waits for profiles, UWB gears up for smartphones

By [Rick Merritt](#), 01.28.19 2

SAN JOSE, Calif — An update of the Bluetooth specification released today enables location services accurate to within 10 centimeters thanks to a new direction-finding capability. It arrives as a separate draft standard is nearly ready for an even faster and more accurate capability using ultra-wideband (UWB) radio, geared for use in smartphones.

Bluetooth 5.1 describes ways to determine location using multiple antennas at either the transmitter or receiver. It uses measures of signal phase and amplitude to measure location, though profiles for application developers are still being finished.

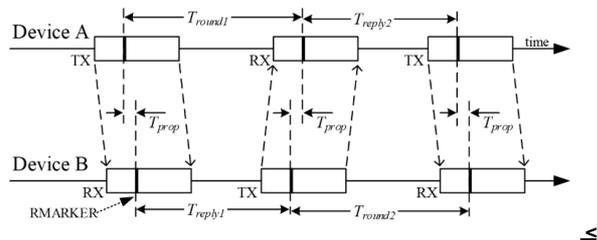
In mid-March, the IEEE 802.15.4z standard for UWB should be in a stable draft form, opening the door for silicon designs. It enables location measures within a single centimeter and resolves in a nanosecond, a rate faster than Bluetooth.

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Smartphone giants Apple and Samsung have been active in the .4z meetings also attended by Huawei, leading some to suggest that the capability could be integrated in handsets within two years. NXP has also been active since the group started a year ago, giving rise to speculation that UWB could come into phones though an integrated NFC chip.

“Consumer electronics applications are always hard to guess before they are available,” but handsets are already home to many different radios with different uses, said Benjamin Rolfe, vice chair of the .4z group and a tech consultant with Blind Creek Associates.

Rolfe is also chief technologist of the UWB Alliance, **launched last year with help from Decawave < https://www.eetimes.com/document.asp?doc_id=1332995>**, which already supplies UWB chips for location services in embedded systems. 3DB Access, a UWB chip provider in Zurich, has also been active in the .4z group.



<https://m.eet.com/media/1309183/UWBlocationtimeofflighttechnique.png>

An example of one of the timing methods the UWB standard uses. Click to enlarge. (Source: IEEE 802.15.4z)

The IEEE **group's website < <http://www.ieee802.org/15/pub/TG4z.html>>** said that the spec targets a range of up to 100 meters. To get there, it defines enhancements to the coding, preamble, and modulation of the existing 15.4 physical layer and related media access controller.

In a **December article < https://www.eetimes.com/author.asp?section_id=36&doc_id=1334096>**, the chair of the .4z group said that the spec will spread use of UWB for secure financial transactions in handsets, asset-sharing apps, and new smart home applications, as well as uses cases outside the phone. Decawave and others already supply similar chips for secure car entry. BMW and Continental are active in the IEEE group, and Hyundai is a member of the UWB Alliance.

Existing Bluetooth location services are accurate down to less than 10 meters based on signal strength and are used in museums, retail stores, and consumer asset trackers. London's Gatwick airport uses more than 2,000 Bluetooth beacons to guide travelers.

Long before UWB shows up in handsets, Bluetooth modules are expected to emerge with antenna arrays using the 5.1 spec's direction-finding techniques. Quupa of Finland is one of the few Bluetooth vendors that already implements a proprietary version of the concepts.

Besides a second antenna, the new spec requires no other hardware. It defines angle of arrival and angle of departure approaches so that only one device needs to have an antenna array, but accuracy is improved when multiple supporting beacons are within range.

— Rick Merritt, Silicon Valley Bureau Chief, [EE Times < <http://www.eetimes.com>>](#) <https://plus.google.com/u/0/104575607046158918027/posts>

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