MK UWB Kit

Mobile Knowledge

Featuring **NXP Trimension™ SR150 / SR040**

Secure UWB
for your IoT solution

fira MEMBER

muRata INNOVATOR IN ELECTRONICS
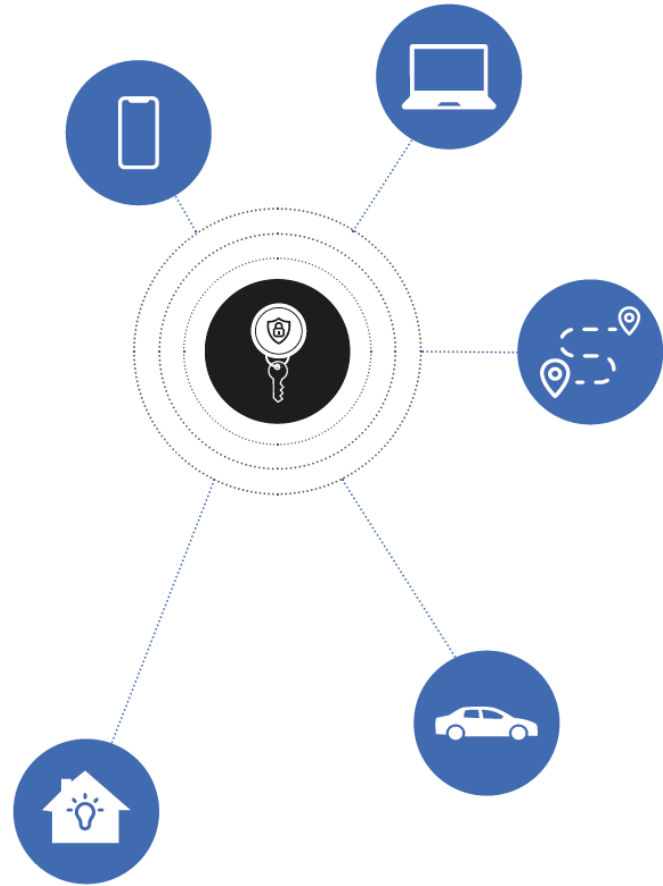
MK UWB Kit SR150/040

What it offers
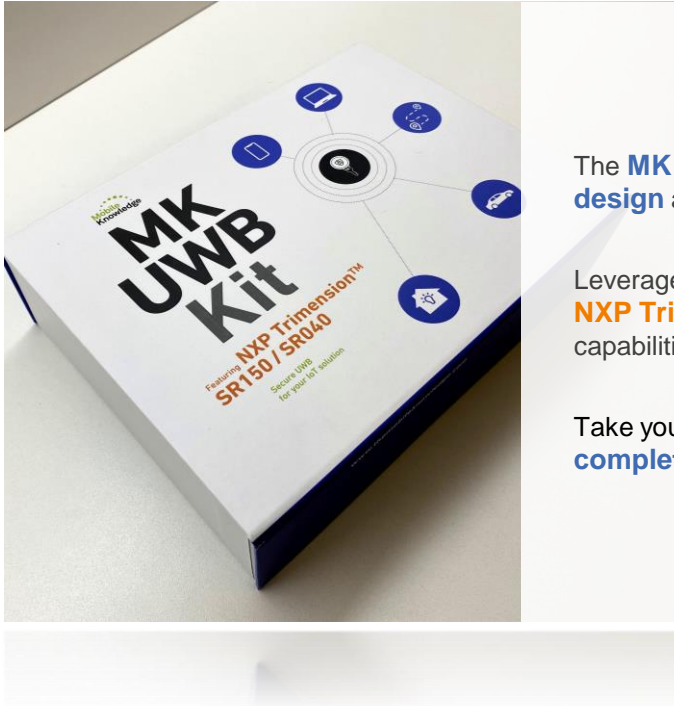
The **MK UWB Kit SR150/SR040** is the most comprehensive **reference design** and **development platform** for UWB-based IoT solutions.

Leverage on UWB technology advanced functionalities and benefit from **NXP Trimension™ SR150 and Trimension™ SR040 UWB IC** capabilities.

Take your UWB development experience to the next level with the **most complete and powerful UWB development kit in the market!**

MK UWB Kit SR150/040
What it offers

One kit, all UWB use cases

Support for multiple host platforms

Best-in-class distance & AoA accuracy

Off-the-shelf iOS & Android interoperability

Powered by Murata world's smallest UWB module

MK UWB Kit SR150/040
Contents & features

Leverage on the MK UWB Kit SR150/SR040 **content & features** *and* **accelerate your time to market** *by* **focusing** *on your own* **application development**

One kit, all UWB use cases

UWB
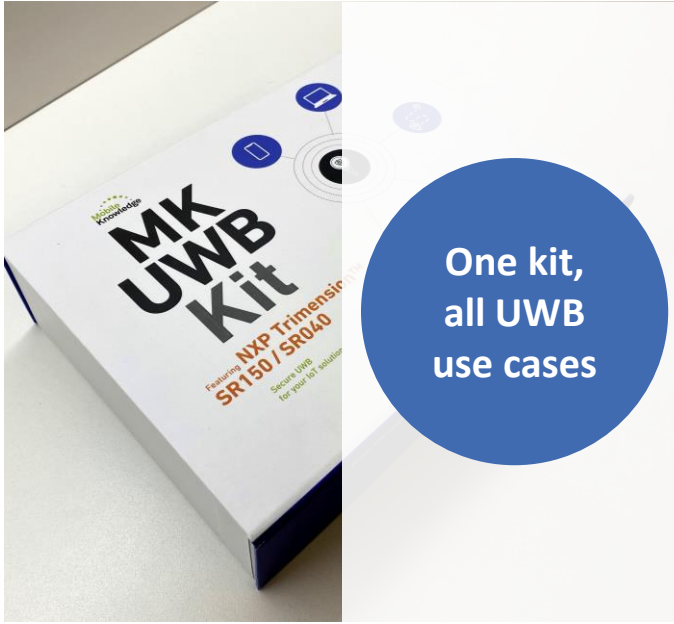
- **Device to Device**
  - Unicast & Multicast DS-TWR
  - Secure ranging
  - Data transfer
  - Tracker and distance alert

- **Mobile to device**
  - Android support (including background operation)
  - iOS support (including background operation)
  - Ranging, Tracker, distance alert, Point & Trigger

- **Indoor positioning**
  - Uplink TDoA
  - Downlink TDoA

Mobile Knowledge

MK UWB Kit SR150/040
Contents & features

*Leverage on the MK UWB Kit SR150/SR040 **content & features** and **accelerate your time to market** by **focusing** on your own **application development***

Support for multiple host platforms

• **Development board integrating NXP QN9090 MCU**

• **Arduino header to connect development board to any host platform, including:**
  • Nordic nRF52840 DK
  • Raspberry Pi

• Software drivers for **NXP QN9090, Nordic nRF52840** and **Linux-based hosts**

MK UWB Kit SR150/040
Contents & features

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Best-in-class distance & AoA accuracy

- **Avg. ranging distance error: ± 7 cm**

- **Avg. AoA error: ± 4°**

- **Calibrations for MK UWB 3D Antenna board applied to all SW components to get highly accurate distance and AoA data:**
  - XTAL calibration
  - AoA calibration
  - Antenna delay calibration

MK UWB Kit SR150/040
Contents & features

*Leverage on the MK UWB Kit SR150/SR040 **content & features** and **accelerate your time to market** by **focusing** on your own **application development***

Off-the-shelf iOS & Android interoperability

- **Includes all MK UWB Kit Mobile Edition 2.0 software material** supporting UWB-enabled Android and iOS devices

- **MK UWB Connect application** available in Appstore and Play Store, delivered as source code as part of the kit

- **Anchor-to-Mobile and Tag-to-Mobile software** to enable ranging against multiple Apple or Android UWB enabled devices simultaneously

MK UWB Kit SR150/040
Contents & features

*Leverage on the MK UWB Kit SR150/SR040 **content & features** and **accelerate your time to market** by **focusing** on your own **application development***

Powered by Murata world's smallest UWB module

muRata

- Thanks to the powerful partnership between MobileKnowledge and Murata, **MK UWB 3D Antenna board now includes Murata Type 2BP,** the world's smallest UWB module **:**
  - Includes NXP Trimension SR150 UWB chipset
  - Includes clock, filters and peripheral components
  - 3 Antenna support (3D AoA or 2D AoA support)
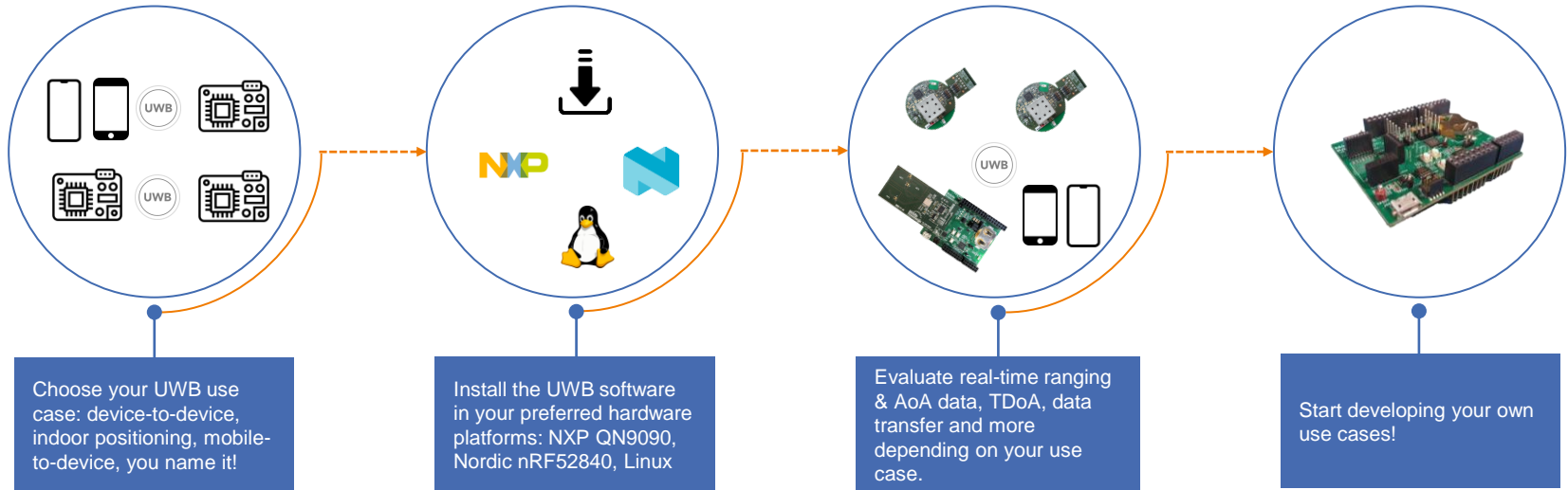 - Power calibration, XTAL calibration applied
  - FCC/IC/MIC Certified

Mobile
Knowledge

MK UWB Kit SR150/040
Box content

(1)
(1)
(2)
(4)
(5)
(3)

NEW

NOW WITH MURATA TYPE 2BP UWB MODULE!
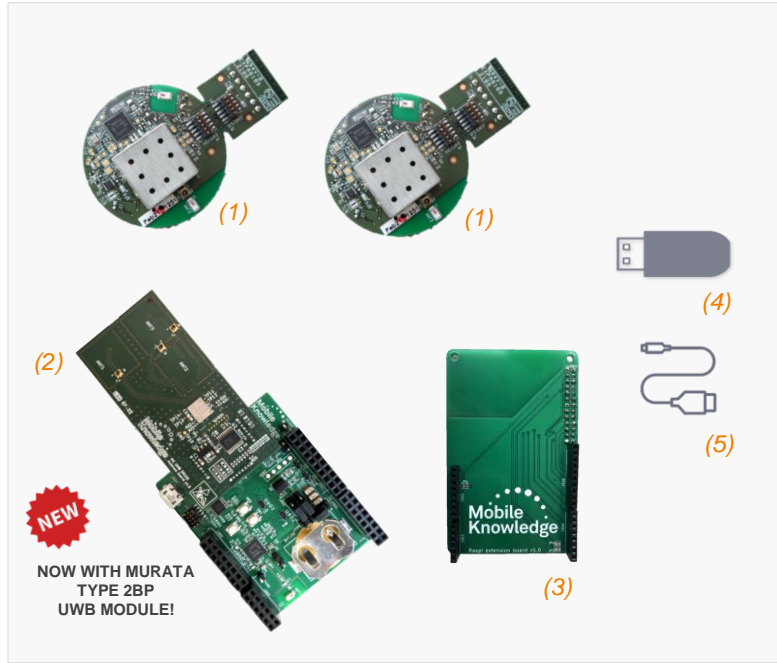
- **2x UWB Tags SR040** *(1)*
- **1x MK UWB SR150 Anchor 3D** *(2),* consisting of:
  - **MK UWB Shield 2 Arduino-compatible** development board
  - **MK UWB 3D Antenna board**, with a soldered **Murata Type 2BP** UWB module featuring **NXP Trimension™ SR150 UWB IC** and supporting **3D position information**
- **MK UWB Shield 2 to Raspberry Pi connector board** *(3)*
- **USB flash drive** *(4)* with software and documentation:
  Full set of documents to help you get started with the UWB technology using the MK UWB Kit SR150/SR040 hardware and software content.
  Documentation provides step-by-step instructions to run off-the-shelf demo applications and use the development platform and software libraries to create your own UWB applications
- **Cables and connectors** *(5):* USB to micro-USB OTG adapter, micro-USB to USB-C adapter, and USB cable

MK UWB Kit SR150/040

Out-of-the-box experience

Choose your UWB use case: device-to-device, indoor positioning, mobile-to-device, you name it!

Install the UWB software in your preferred hardware platforms: NXP QN9090, Nordic nRF52840, Linux

Evaluate real-time ranging & AoA data, TDoA, data transfer and more depending on your use case.

Start developing your own use cases!

MK UWB Kit SR150/040

MK UWB 3D Antenna board: In detail

MK UWB 3D Antenna board

UWB Module-compatible PCB that can be easily connected
to the MK UWB Shield 2 supporting **3D Angle of Arrival** measurements.

MK UWB SR150 Anchor 3D
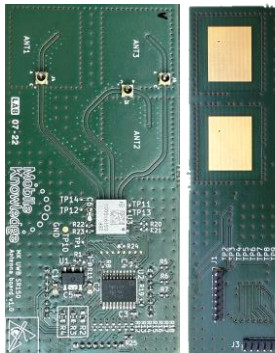
MK UWB 3D Antenna board + UWB SR150 Module: Ready-to-use solution that features three PCB antennas, enabling ranging, 2D, and 3D Angle of Arrival measurements as well as TDoA.

It can be easily connected to MK UWB Shield 2 using the board pin headers. Specific software and documentation is provided.

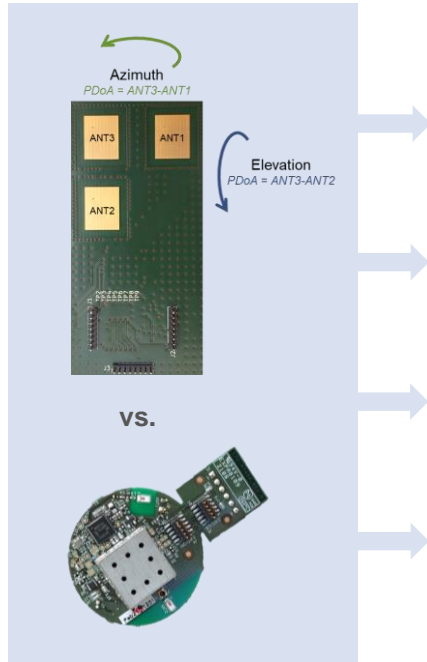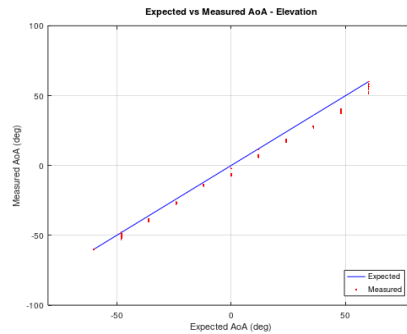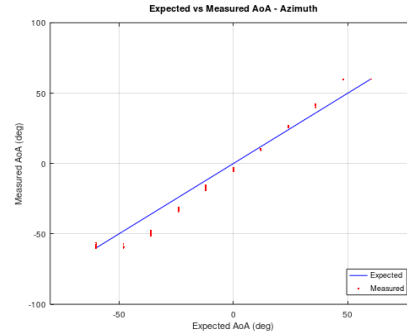**Now integrating Murata Type 2BP UWB Module!**
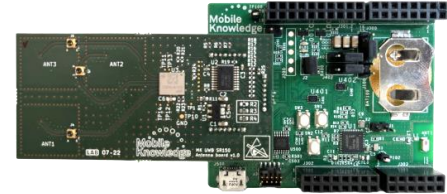
- 70x34,5mm dimensions
- Supporting 3.3 and 1.8v power supply and signal interface
- Accessible RF connectors for calibration/testing purposes

MK UWB 3D Antenna board
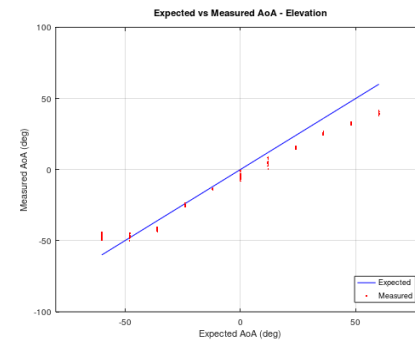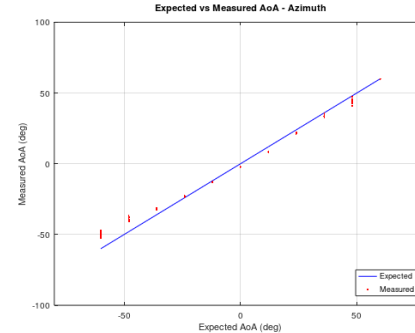Reference AoA data

CHANNEL 5 - RESULTS

CHANNEL 9 - RESULTS

Short summary of results available:

- Improved measurement accuracy and stability
- Angle of Arrival calibration applied
- Effective both in Channel 5 and 9

MK UWB Kit SR150/040

UWB Module: In detail

UWB Module: Murata Type 2BP

Murata Type2BP is the world's smallest UWB module and includes NXP's SR150 UWB chipset. It is **FiRa certified** and is ideally suited for deployment in both larger infrastructures (indoor positioning anchors) and in consumer products and general IoT devices with battery operation.
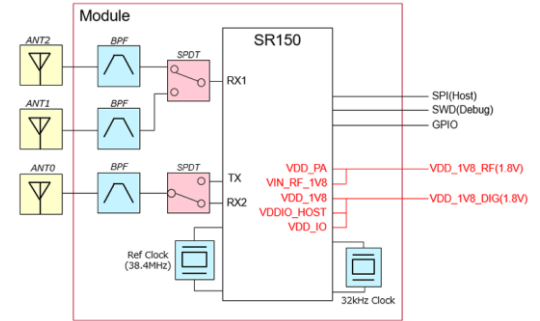

NEW

Murata Type 2BP UWB SR150 Module:

This UWB Module regroups the core functionality of the UWB solution (clocks, filters, switches and passive components).

Compatible with secure UWB ranging, 2D & 3D Angle of Arrival, and TDoA. Suitable for Anchor devices.

Powered by **muRata** fira CERTIFIED

UWB SR150 Module architecture

- P/N: LBUA0VG2BP-006
- UWB functionality in a small form factor (6.6mm x 5.8mm x 1.2mm)
- Worldwide RF bands capability with support of CH5 and CH9
- Interface: SPI
- 3 Antenna support (3D AoA or 2D AoA support)
- Tx Power & XTAL calibration support
- Embedded PHY & MAC FW compatible with FiRa
- **FCC/IC/MIC Certified**

MK UWB Kit SR150/040

MK UWB Shield 2: In detail

MK UWB Shield 2

Flexible platform to develop customized UWB systems. As the central part of the MK UWB Kit SR150/SR040, it is used as the **interface between the UWB module and external devices**.

MK UWB Shield 2 supports Trimension SR150 UWB module thanks to **MK UWB 3D Antenna board.**

It is equipped with an embedded wireless microcontroller, QN9090, Arm® Cortex® M4, supporting Bluetooth Low Energy 5.0, open for customer applications (>100KB of memory available). It **includes SE051W for secure ranging use case compliant with FiRa specifications**.

A simple switch allows you to control the UWB module with an external MCU thanks to an **Arduino compatible** interface.

EASY CONNECTION TO ANY EXTERNAL HOST THROUGH ARDUINO HEADER
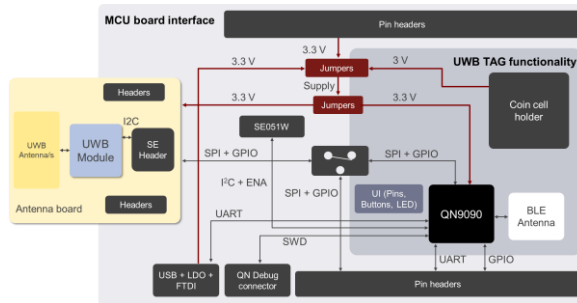
MK UWB Shield 2 architecture

- Easy connection to UWB Module through MK UWB 3D antenna board
- **Easy connection to other host platforms, such as Nordic nRF52840 DK (through Arduino header) and Raspberry Pi (through Shield to Pi board connector board)**
- Can be used as a standalone development platform by using its integrated MCU.
- Controllable by other MCUs through Arduino-compatible expansion headers.
- Support for secure ranging through SE051W.
- Support for multiple interfaces (BLE, USB, UART).
- Power supply available through USB, external board and standard 3V coin cell.

MK UWB Kit SR150/040

UWB Tag SR040

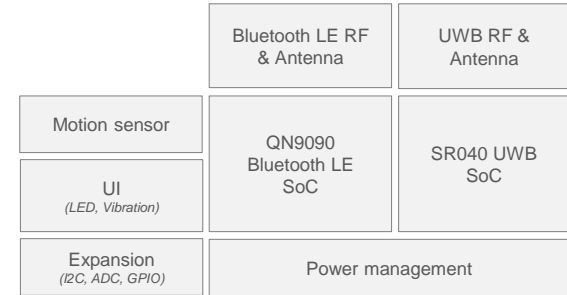Autonomous, battery-powered UWB device that features **NXP's UWB chipset Trimension SR040** and a BLE-enabled microcontroller, enabling all kinds of tracking and localization use cases.
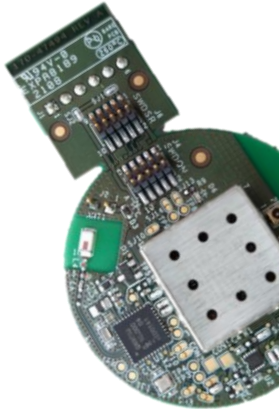
Tag form factor reference design for item tracking from NXP Semiconductors. Based on Trimension SR040, it can be used as a solid basis for your own UWB Tag product.

The **UWB Tag SR040** is equipped with a QN9090 Arm ® Cortex ® M4-based wireless microcontroller integrating Bluetooth Low Energy 5.0. The tag is open for customer applications (>100 KB of memory available).

It includes a ranging application software to experience off-the-shelf UWB experience.

	Bluetooth LE RF & Antenna	UWB RF & Antenna
Motion sensor	QN9090 Bluetooth LE SoC	SR040 UWB SoC
UI *(LED, Vibration)*		
Expansion *(I2C, ADC, GPIO)*	Power management	

MK UWB Tag SR040 architecture

- FIRA compliant-based solution
- Worldwide RF bands capability with support of CH5 and CH9
- Power optimized design for coin cell battery supply with more than 1-year battery lifetime
- Accelerometer / motion detector
- >50m ranging distance with high accuracy (10cm)
- Undergoing FCC/CE certifications

Mobile Knowledge

Demo and use cases
In detail

1

2

3

Device to Device
Use cases

Enable **all UWB device-to-device use cases in all your preferred platforms!**

- **DS-TWR (Unicast and Multicast), Data Transfer, Secure Ranging** through NXP UWB IoT Middleware for **NXP QN9090, Nordic nRF52840 and Linux**

- **Tracker and distance alert use cases** thanks to MK UWB SDK & MK UWB Library

Mobile to Device
Use cases

Enable **UWB interoperability against Apple® and Android mobile devices** thanks to **MK UWB Kit Mobile 2.0 Software**!

- **MK UWB Connect application** available in Appstore and Play Store enables:
  - **UWB ranging**
  - **Distance alert**
  - **Tracker** (with iOS ARKit integration!)
  - **Point & trigger** (with iOS ARKit integration!)
- **Anchor-to-Mobile and Tag-to-Mobile software** to enable ranging against multiple Apple or Android UWB enabled devices simultaneously.

Indoor Positioning
Use cases

Use UWB for **accurate, real-time indoor positioning**!

- **Uplink TDoA:** use an infrastructure of UWB anchors to track in real-time the position of all your devices in a RTLS server.

- **Downlink TDoA:** use an infrastructure of UWB anchors so that your devices can compute their own position in real-time without disclosing any information to third parties.

Software and documentation
In detail

Software (device to device)

- NXP UWB IoT middleware for SR150 (QN9090, nRF52840, Linux)
- NXP UWB IoT middleware for SR040 (QN9090)
- NXP SR150 UCI Specification
- MK UWB SDK
- MK UWB Library Lite
- Tracker and distance alert firmware images for UWB Tag and Anchor
- MK UWB PC Shell
- MK UWB Toolbox for Android

Software (mobile to device)

- MK UWB Connect for Android and iOS
- Mobile-to-anchor firmware for MK UWB Anchor
- Tag-to-anchor firmware for UWB Tag SR040

Hardware documentation

- MK UWB Shield 2 User Guide
- MK UWB Tag SR040 User Guide
- MK UWB 3D Antenna board HW design files
- MK UWB Tag SR040 HW design files
- Shield To Raspberry Pi Connector Board HW files

UWB module documentation

- Type2BP Datasheet
- Type2BP Hardware design guide
- Type2BP Footprint
- Type2BP 3D CAD File
- FCC/IC & CE test reports

Multiplatform support documentation

- MK UWB Kit SR150/SR040 Quick Start Guide
- MK UWB SDK porting guidelines
- MK UWB Kit SR150/SR040 Quick Start Guide for Nordic nRF52840
- Run UWB IoT Middleware examples in QN9090, Nordic nRF52840 and Linux

Use cases documentation

- MK UWB Tracker and distance alert User Manual
- TDoA Architecture Configurations
- MK UWB Kit Mobile Edition 2.0 Quick Start guide
- MK UWB Connect for iOS User manual
- MK UWB Connect for Android User manual
- Accessory firmware overview User Manual
- AoA evaluation with MK UWB 3D antenna board
- UWB IoT MW documentation for SR150 UWB IoT MW documentation for SR040

Mobile
Knowledge

Want to do more?

Long-standing expertise in UWB technology to help you reduce your time to market and focus on your own UWB solution development

- **Development of customized UWB use cases:** Embedded software development, mobile application software development, back-end integration, system integration,…

- **UWB technology consulting and support services:** Guidance on use case definition and system integration, system architecture, software requirements, Q&A resolution, FIRA related process and use cases,…

- **Design and development of customized antenna board** based on customer requirements and constraints in order to optimize ranging and AoA measurements

- **Porting of MK UWB SDK** into a customer platform, enabling MK UWB SDK software tools and functionalities on any customer platform that meets the SDK requirements

- **Licensing of MK UWB Library**, for an easy integration of UWB technology while accelerating the time to market

Contact us at:

contact@themobileknowledge.com

Mobile Knowledge

MK UWB Kit SR150/040

Ordering details

Visit **https://www.themobileknowledge.com/product/mk-uwb-kit-sr150-sr040/**

Your entry point to the UWB technology

Evaluate the solution and identify the key technologies involved

1.800 €

Shipping costs not included

Additional Components

Additional UWB Tag SR040
Additional MK UWB SR150 Anchor 3D
Additional UWB Module Type 2BP

MK Services

Contact us for further information
contact@themobileknowledge.com

www.themobileknowledge.com
contact@themobileknowledge.com