



NXP Extends its Secure Ultra-Wideband Portfolio with New Sensing Solutions that Enable Emerging IoT Use Cases

Embargo: 20 October 9:30am CET

THE UNIQUE POWER SPECTRUM OF UWB

- Ultra-Wideband (UWB) uses low power to achieve high bandwidth connections
- Sends and receives narrow signal pulses at bandwidth of over 500 MHz at very low power spectral densities
- Signals can only travel up to a limited distance

→ no interference with other waves

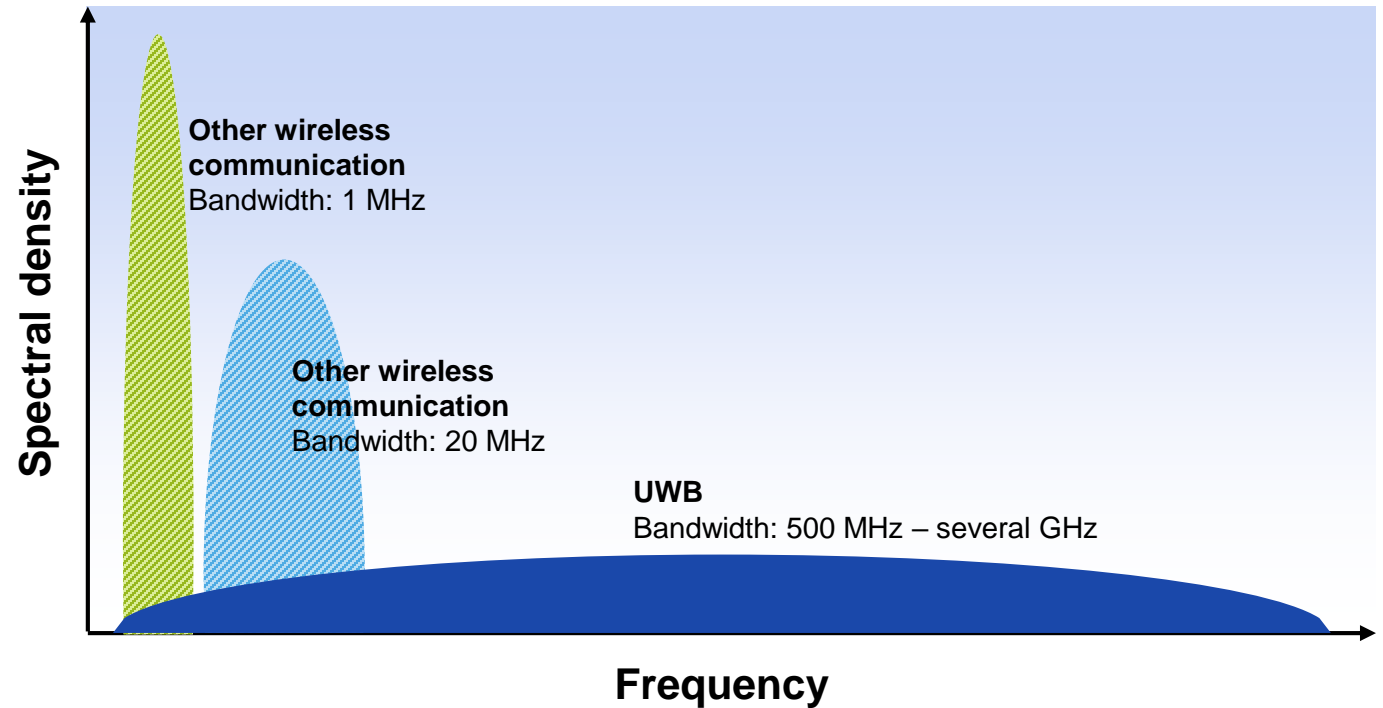
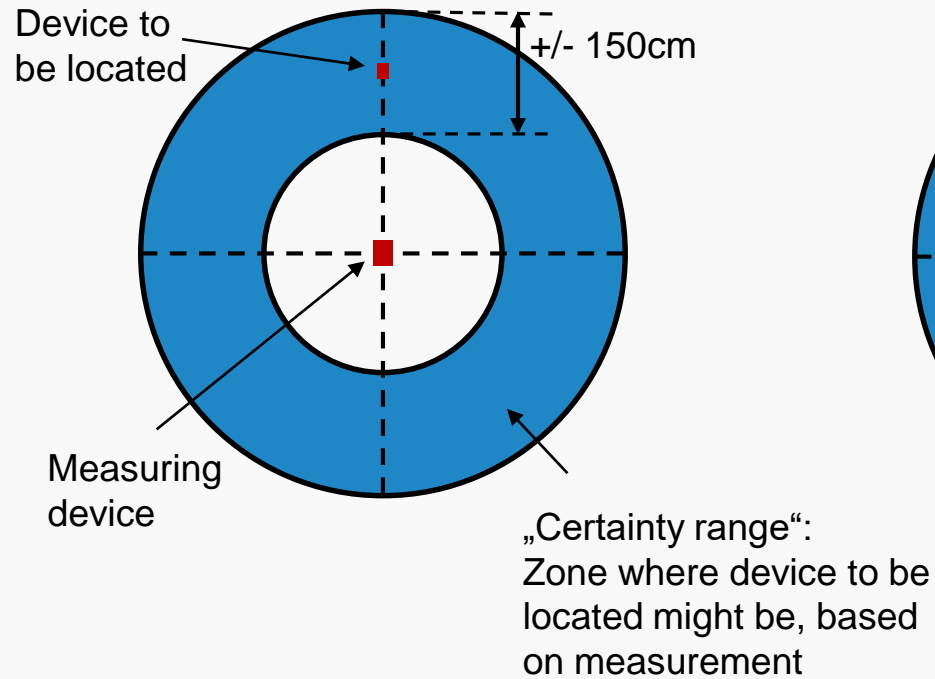


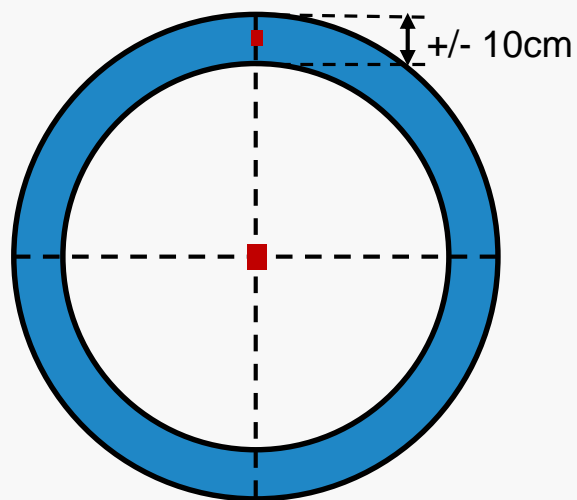
Image 1: Spectral density for UWB and narrowband

UWB DELIVERS ADVANCED LOCALIZATION USER EXPERIENCE

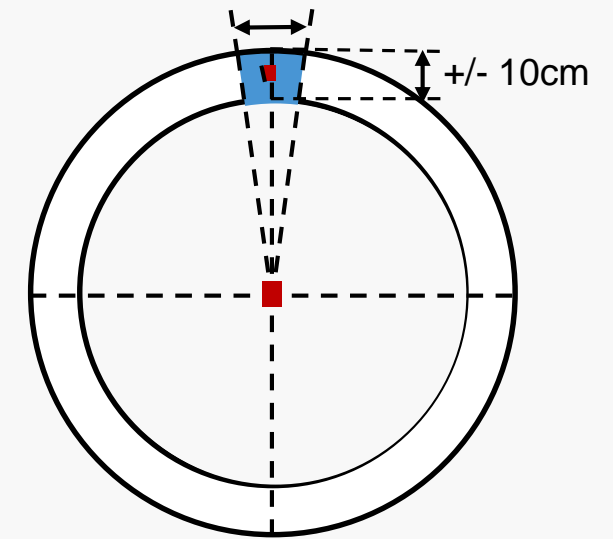
Ranging with other technologies



Ranging with UWB



Ranging and localization with NXP UWB



UWB KEY DIFFERENTIATORS

Secure

Integrity of distance result due to PHY layer encryption

Real Time

Refresh rate of 200~1000 times/second

Co-existent

Support band different from Bluetooth/Wi-Fi



Reliable

Immune to narrowband fading or jamming

Accurate

Centimeter resolution in dense multipath environments

Low Energy

Ultra short airtime

Source: FiRa Consortium

BUILDING UP A HOLISTIC, INTEROPERABLE UWB ECOSYSTEM

WHERE WE STAND TODAY



Jul 2019

FiRa Consortium co-founded by NXP, Samsung & HID



Oct 2019

CCC Announces Digital Key Release 3.0 with UWB Keyless Access



Jan 2020

NXP and HID Global demo UWB hands-free access control and indoor tracking at CES 2020



Jul 2020

Apple shares plans for CarKey with UWB, first implementation in 2021 [BMW 5 Series](#)

Oct 2020

NXP expands UWB portfolio to IoT anchor and tag solutions

NXP and [VW](#) present first UWB-enabled concept car

Aug 2019



NXP Introduces First Secure UWB Chipset for [Mobile Devices](#)

Apple integrates UWB into [iPhone 11](#) for file sharing

Sep 2019



NXP Announces [Automotive UWB Chip](#) Capable of Turning Smartphones into Car Keys

BMW first to announcement investments into mobile car key

Nov 2019

NXP and Samsung bring first UWB-enabled Android device to market: [Samsung Galaxy Note20 Ultra](#), followed by Samsung Galaxy Z Fold2

Find item and access control announced

Aug 2020



The FiRa Consortium counts more than 45 members and published PHY and MAC layer specifications as first steps towards a full certification program

Sep 2020



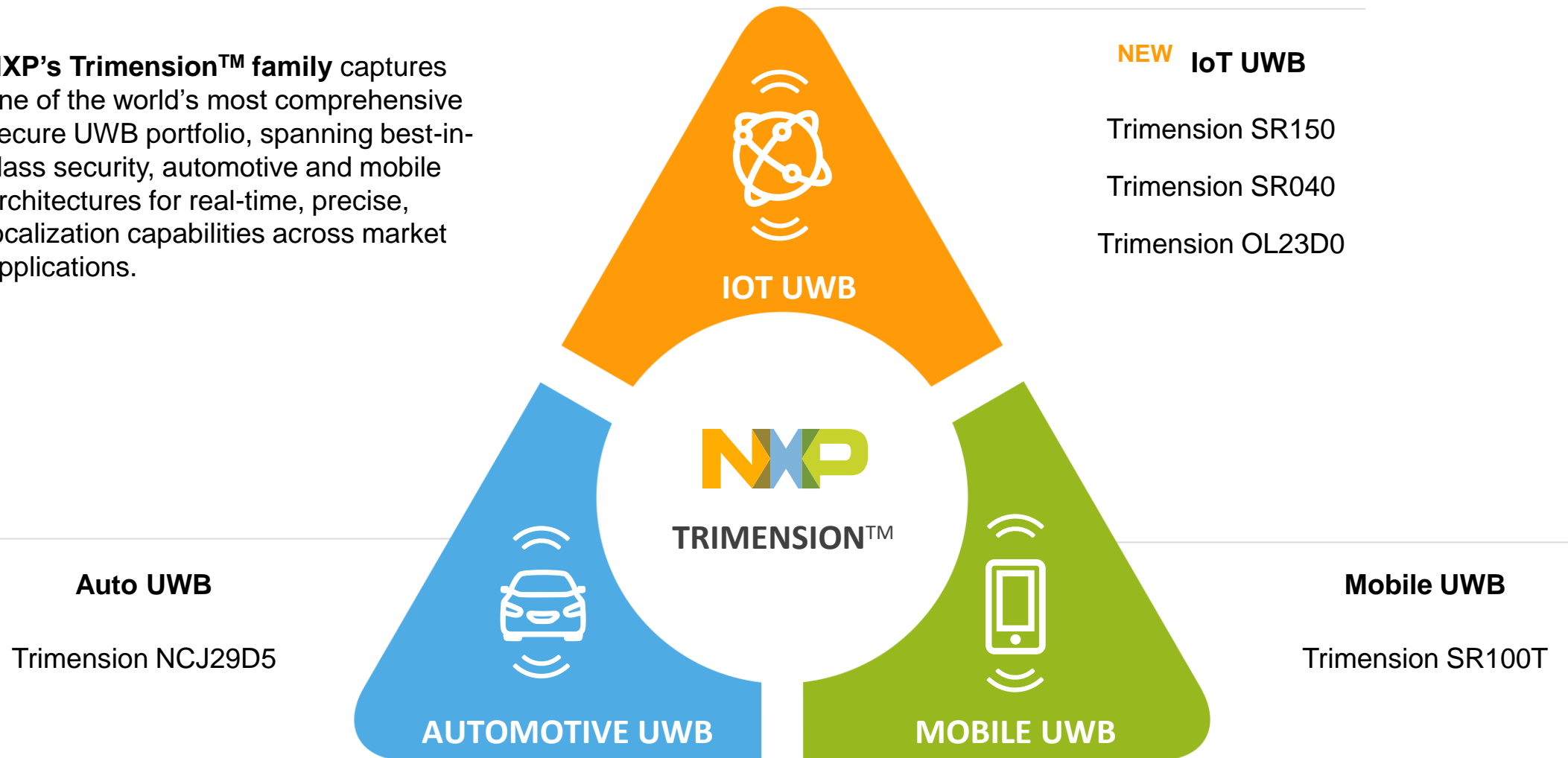
WHAT ARE WE ANNOUNCING

NXP Extends its Secure Ultra-Wideband Portfolio with New Sensing Solutions that Enable Emerging IoT Use Cases

- New IoT ICs deliver highly precise positioning capabilities and fine ranging for IoT applications such as smart locks and IoT sensors
- UWB IoT modules and development kits are available now through NXP's partner network
- Introducing Trimension™ : under the new brand name NXP offers one of the broadest UWB portfolios available with tailored sensing solutions for vehicles, smartphones, and IoT devices

DRIVING INNOVATION AT THE INTERSECTION OF KEY VERTICALS

NXP's Trimension™ family captures one of the world's most comprehensive secure UWB portfolio, spanning best-in-class security, automotive and mobile architectures for real-time, precise, localization capabilities across market applications.

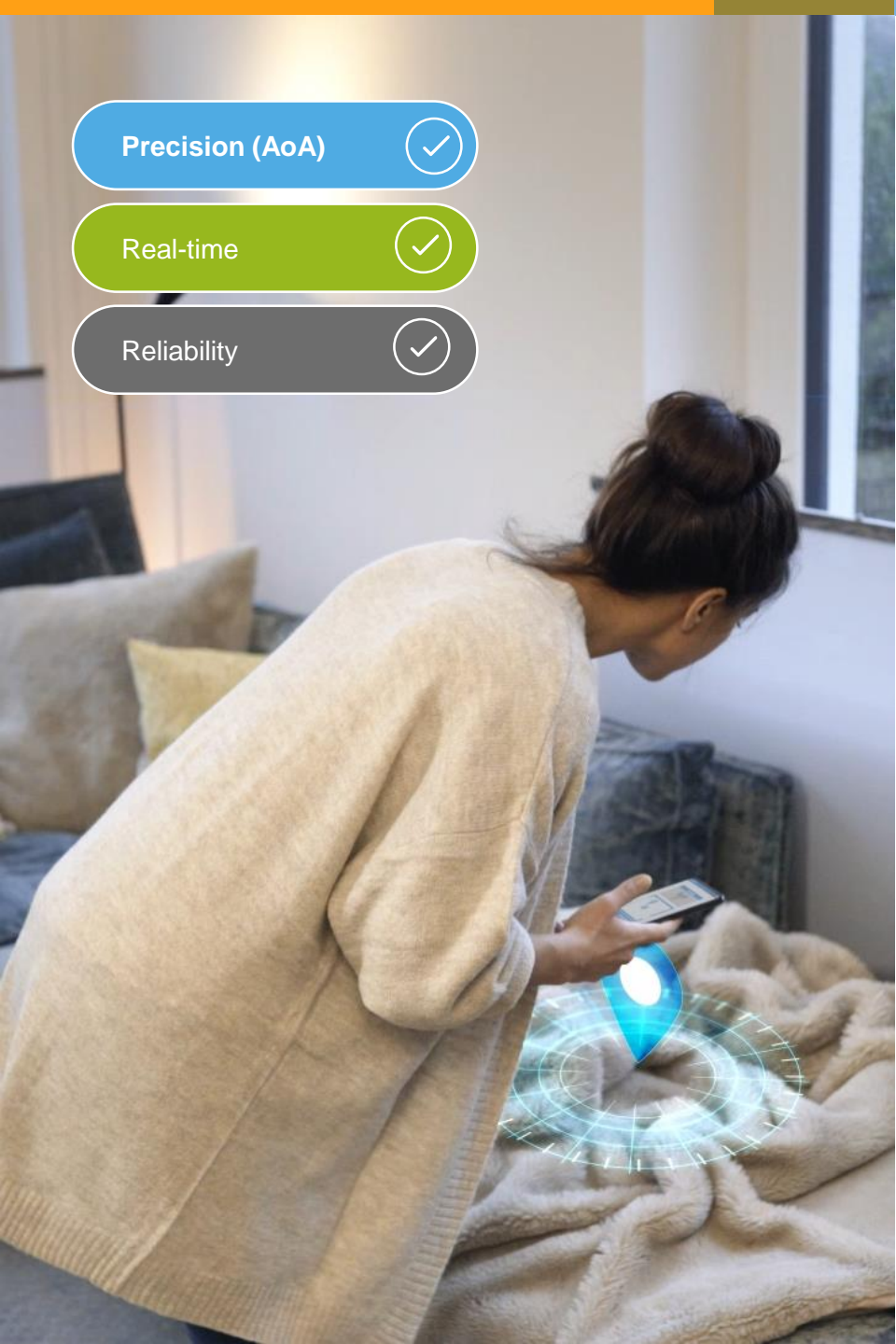


TRIMENSION SR040: SECURE UWB SOLUTION FOR IOT TAGS

Optimized for low-power operation and reducing the need for external components, Trimension SR040 is designed for use in battery-operated IoT devices, including UWB trackers and tags. The pre-developed FiRa MAC by NXP ensure interoperability and fast time-to-market. Trimension SR040 can be integrated with Bluetooth Low Energy or other connectivity controllers in one device. Being used as a Time Difference of Arrival (TDoA) RTLS tag, they can send blink packets only.

- Specialized part for battery-operated use cases
- On-chip flash for firmware, for download-free booting
- Optimized low-power modes
- Integrated Tx/Rx switch
- In accordance with FiRa certification development
- IEEE 802.15.4z compatible
- Arm® Cortex®-based





UNMATCHED PRECISION SENSING FOR ITEM TRACKING

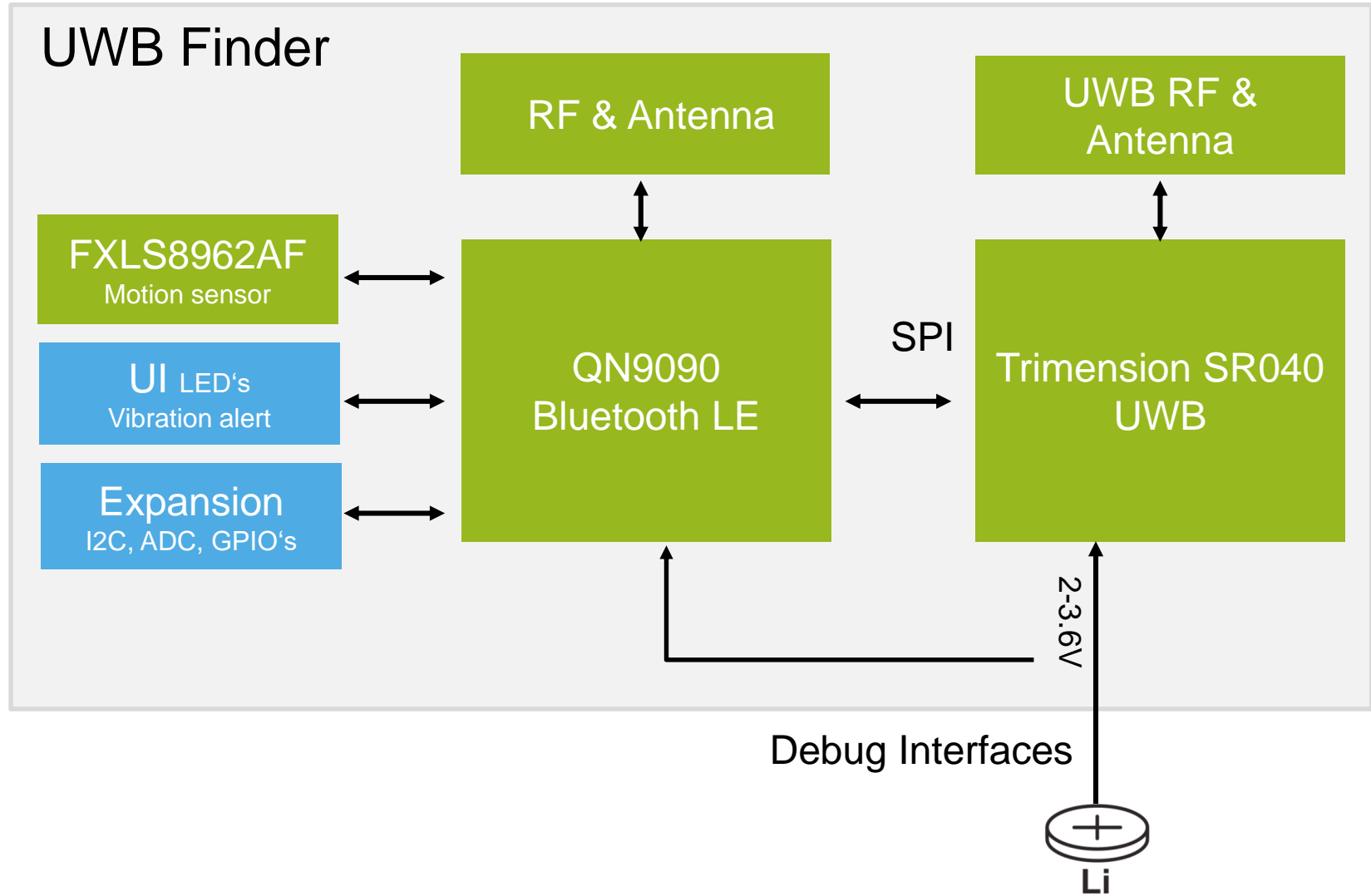
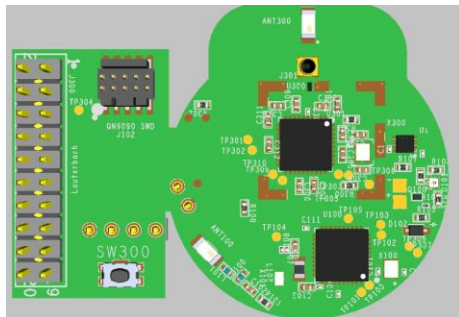
- Searching for lost earbuds charging cradle, keychain or remote by attaching UWB tag
- Searched Item can also be factory fitted with UWB finder

Basic steps for item tracking

1. Initial pairing of UWB Tag) with user's mobile device
2. Initiating search through APK
3. Performing presence check
4. Complete search with UWB fine ranging (facilitated by AR on-screen instructions)

UWB FINDER – FORM FACTOR REFERENCE DESIGN FOR ITEM TRACKING

- Fully integrated UWB with single Tx/Rx fine ranging
- Bluetooth LE presence functionality
- Power optimized design for coin cell battery supply
- Motion sensor for event wake-up



TRIMENSION SR150: SECURE UWB SOLUTION FOR IOT DEVICES

Designed with the specific needs of IoT devices in mind, this solution adds Angle-of-Arrival (AoA) technology for an added level of precision. The pre-developed FiRa MAC by NXP ensure interoperability with the growing set of UWB devices to market.

Trimension SR150 is ideally suited for the UWB enablement of all kinds of larger infrastructures, such as access control installations, indoor localization set ups, and payment schemes, as well as consumer products, including TVs and gaming consoles. Several SR150 IC devices can be placed in a room as UWB anchors to help localize people and objects as they move within the room.

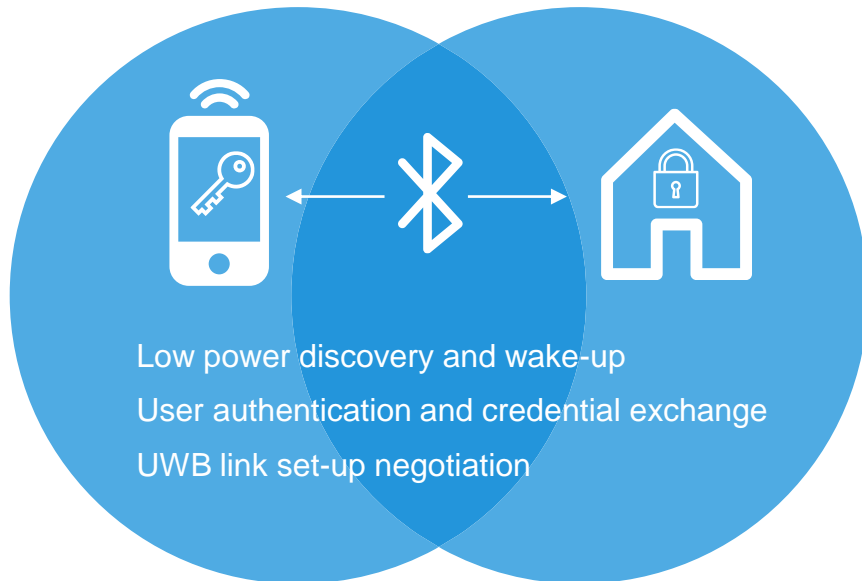
- Dual-RX for AoA functionality
- 3D AoA possible
- Connected to EdgeLock SE for Secure Ranging Use Cases
- RTOS and Linux SW Solution for IoT integration
- In accordance with FiRa™ certification development
- IEEE 802.15.4z compatible
- Arm® Cortex®-based



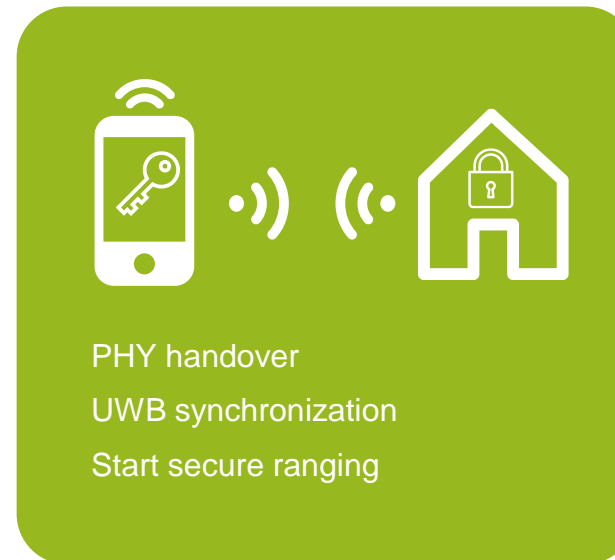
PHYSICAL ACCESS: STEPS IN UWB-BASED HANDSFREE MOBILE ACCESS

- Applicable for residential and corporate access
- Reliable inside/outside detection
- Multisession support – Tailgating prevention

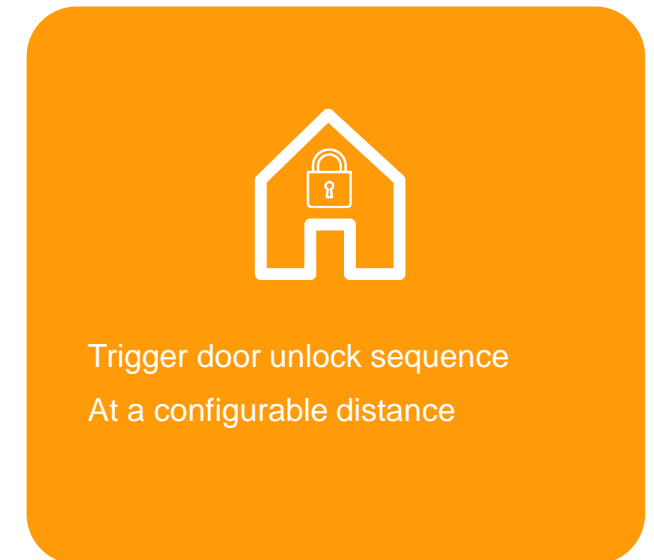
STEP 1: Bluetooth LE RANGE WAKE-UP & INITIALIZATION



STEP 2: UWB SECURE RANGING



STEP 3: ACCESS





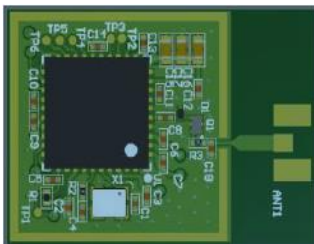
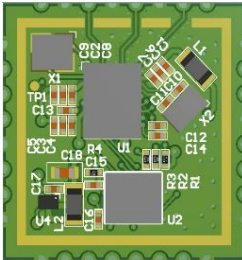
Advanced Capabilities

- Access credentials can be shared most flexibly with no dependence in physical keys
- Set restrictions for temporary access to facilities, meeting rooms, house or vehicle
- A large UWB infrastructure will allow for seamless access experiences from home to car to the workplace

ENABLEMENT: GROWING SET OF MODULE PARTNERS

- A UWB Module is a miniature PCB that regroups the core functionality of the UWB solution. It must be used as a component and be integrated in the system PCB to enable UWB capability.
- Adding power, Interface with system host and antenna configuration allow enabling UWB connectivity in the final system.
- Made available along with UWB dev kits by NXP UWB module partners

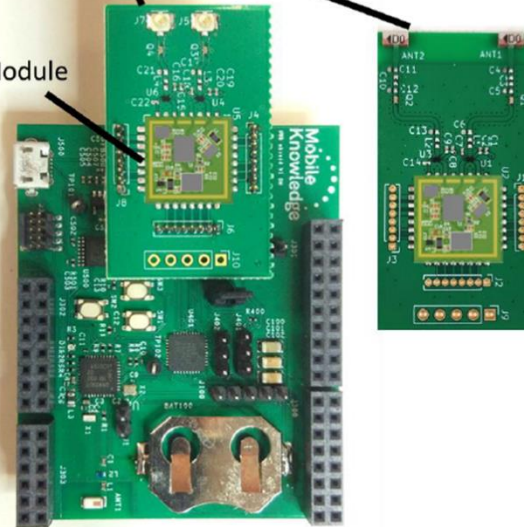
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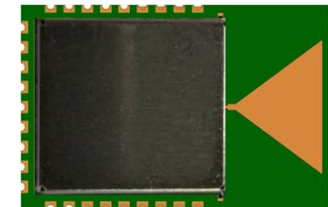
Mobile Knowledge

Antenna Board

UWB Module



SUNWAY
COMMUNICATION

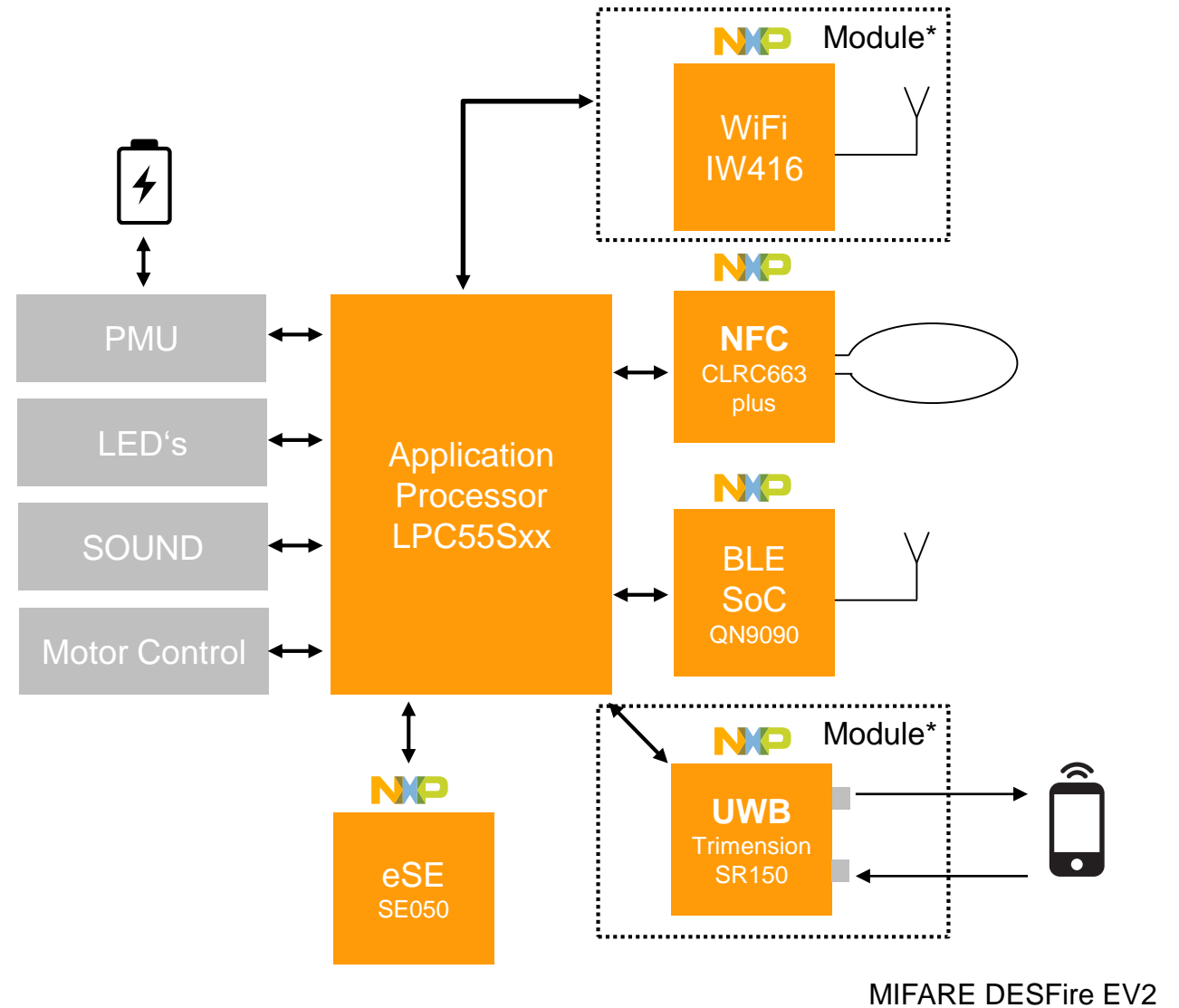




SECURE CONNECTIONS
FOR A SMARTER WORLD

UWB ACCESS CONTROL ARCHITECTURE

- Next evolution towards efficient and optimized smart lock solution
- Trimension SR150: Dedicated UWB IoT solution with RTOS & Linux support
- SE051W eSE as a multi-application credential vault, supporting UWB, NFC & Cloud connectivity



NXP TRIMENSION UWB PORTFOLIO

NXP's Trimension™ family captures one of the world's most comprehensive secure UWB portfolio, spanning best-in-class security, automotive and mobile architectures for real-time, precise, localization capabilities across market applications.

Trimension™				
IoT UWB		Mobile UWB	Auto UWB	
NEW Trimension SR150	NEW Trimension SR040	Trimension SR100T	Trimension NCJ29D5	
<ul style="list-style-type: none">• Dual-RX for AoA functionality• 3D AoA possible• Connected to EdgeLock SE for Secure Ranging Use Cases• RTOS and Linux SW Solution for IoT integration• In accordance with FiRa• Arm® Cortex®-based	<ul style="list-style-type: none">• Specialized part for battery-operated use cases• On-chip program memory, for download-free booting• Optimized low-power modes• Integrated Tx/Rx switch• Arm® Cortex®-based	<ul style="list-style-type: none">• Connected to SE SN100 Family for Secure Ranging Use Cases• Android SW Solution for Mobile Integration	<ul style="list-style-type: none">• Interoperability granted for smart car access• Highest localization resolution• Lowest system cost• Integrated power management• High band operation from 6.0-8.5 GHz• Arm® Cortex®-based• On-chip support for a wide range of cryptographic operations	

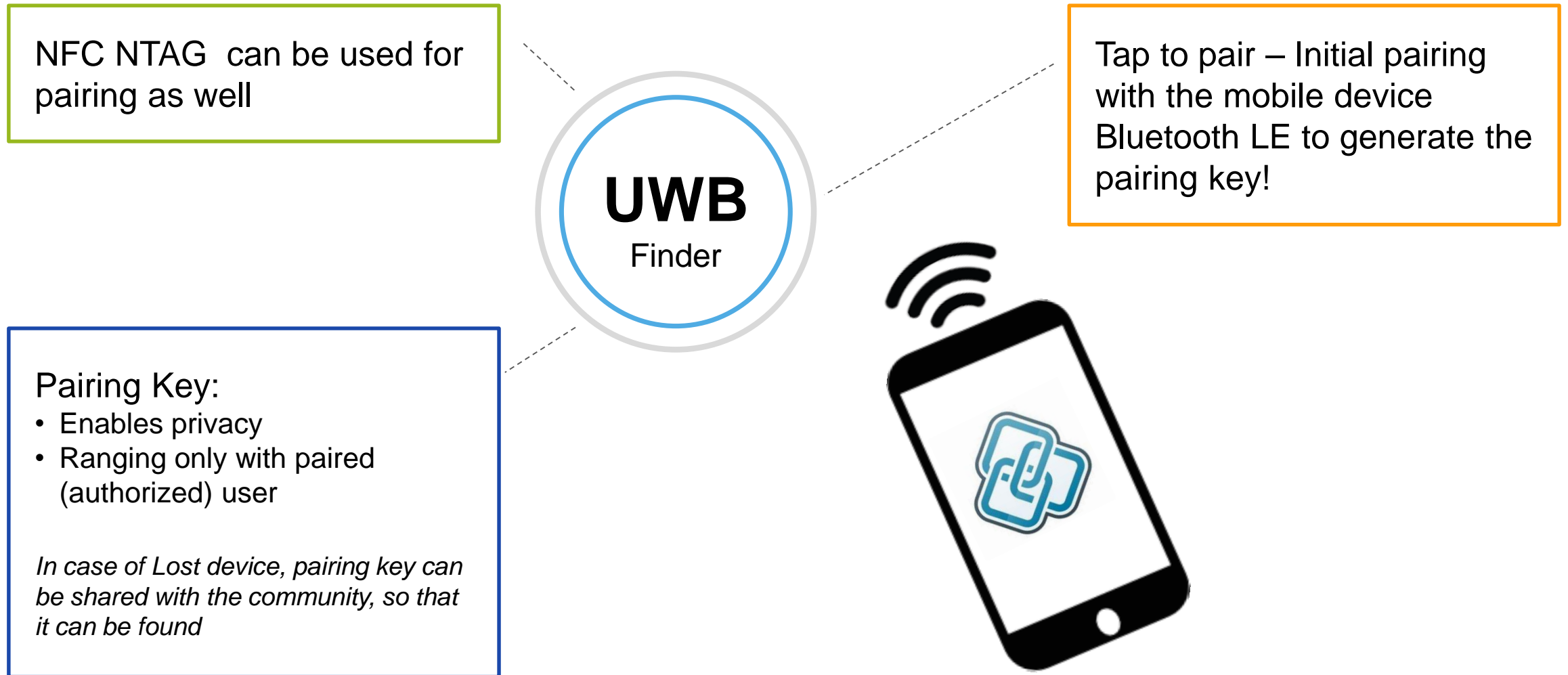
All solutions are IEEE 802.15.4 forward and backward compatible.

UWB USE CASE EXPANSION

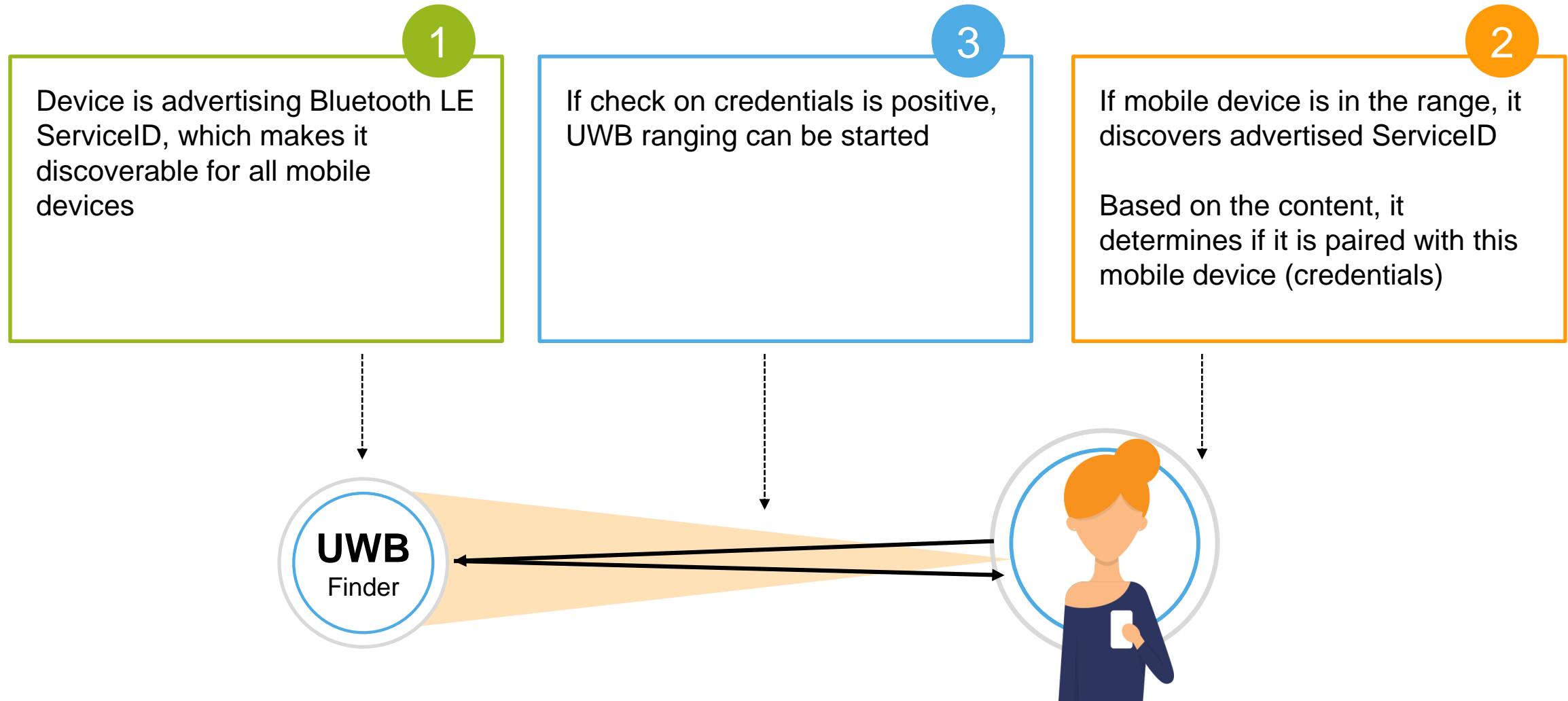
	SMART HOME AND CONSUMER	SMART CITIES AND MOBILITY	SMART RETAIL	SMART BUILDING AND INDUSTRIAL
Hands-Free Access Control	<ul style="list-style-type: none"> • Residential access control • Logical access to personal devices 	<ul style="list-style-type: none"> • Parking garage access control • Vehicle digital key (Standardized by CCC) • Rider identification (Private transport services) 	<ul style="list-style-type: none"> • Unmanned store access 	<ul style="list-style-type: none"> • Physical access control • Logical access control
Location-Based Services	<ul style="list-style-type: none"> • AR gaming 	<ul style="list-style-type: none"> • Indoor navigation • Bike sharing (find a bike nearby) • Ride sharing (precise positioning) • Driverless valet parking and pick-up 	<ul style="list-style-type: none"> • Foot traffic and shopping behavior analytics • Exhibition attendee management • Targeted marketing • Drone-controlled delivery 	<ul style="list-style-type: none"> • Employee indoor navigation • Employee mustering in emergencies • Asset tracking • Find equipment • Patient tracking
Device-to-Device (Peer-to-Peer) Applications	<ul style="list-style-type: none"> • Point and trigger controller app • Gesture-based control • VR gaming and group play • Find someone/something nearby • Presence-based device activation 	<ul style="list-style-type: none"> • V2X* and autonomous driving • Ticket validation (Public transport services) • Reserved seat validation • Transportation fare payment • eID validation in crowded environments 	<ul style="list-style-type: none"> • Tap-free mobile payment • In-vehicle payment 	<ul style="list-style-type: none"> • Teleconference system • Proximity-based patient data sharing • Social distancing

Source: FiRa Consortium

USE CASE EXAMPLE: FIND MY ITEM (PAIRING & CREDENTIALS)



USE CASE EXAMPLE: FIND MY ITEM (DISCOVERY)



USE CASE EXAMPLE: FIND MY ITEM (RANGING FLOW)

