

Digital Key Certification Test Introduction

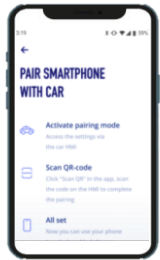
Ching-I Chang , April 2024



What is DCK (Digital Car Key) ?



1 Pairing the owner phone to Vehicle.



Pairing



2 Find the DCK in Cell Phone Wallet.



3 ACCESS to Vehicle via Cell Phone.



Why it is necessary to replace traditional key fob by DCK

Digital car keys offer several **benefits** compared to **traditional key fobs**



1. Enhanced security

Digital car keys can offer enhanced security features such as biometric authentication (e.g., fingerprint or facial recognition) or secure communication protocols **include certification authorize.**



2. Convenience

Digital car keys are typically stored on a smartphone, eliminating the need to carry a physical key fob.



3. Remote access

Digital keys often enable remote access features, allowing users to **lock, unlock,** and start their vehicles **from a distance** using their **smartphones.**



More beneficial using DCK



4. Integration with other devices

- Integrate with other smart devices and platforms,
- Allowing for seamless connectivity and automation.



5. Personalization

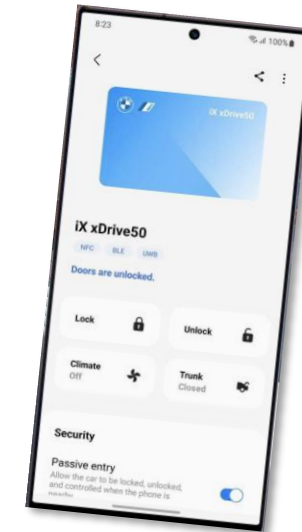
- privileges to different users
- setting up preferences for seat positions,
- climate control settings, and
- entertainment preferences

6. Keyless Ignition

7. Remote Start

8. Shared Access

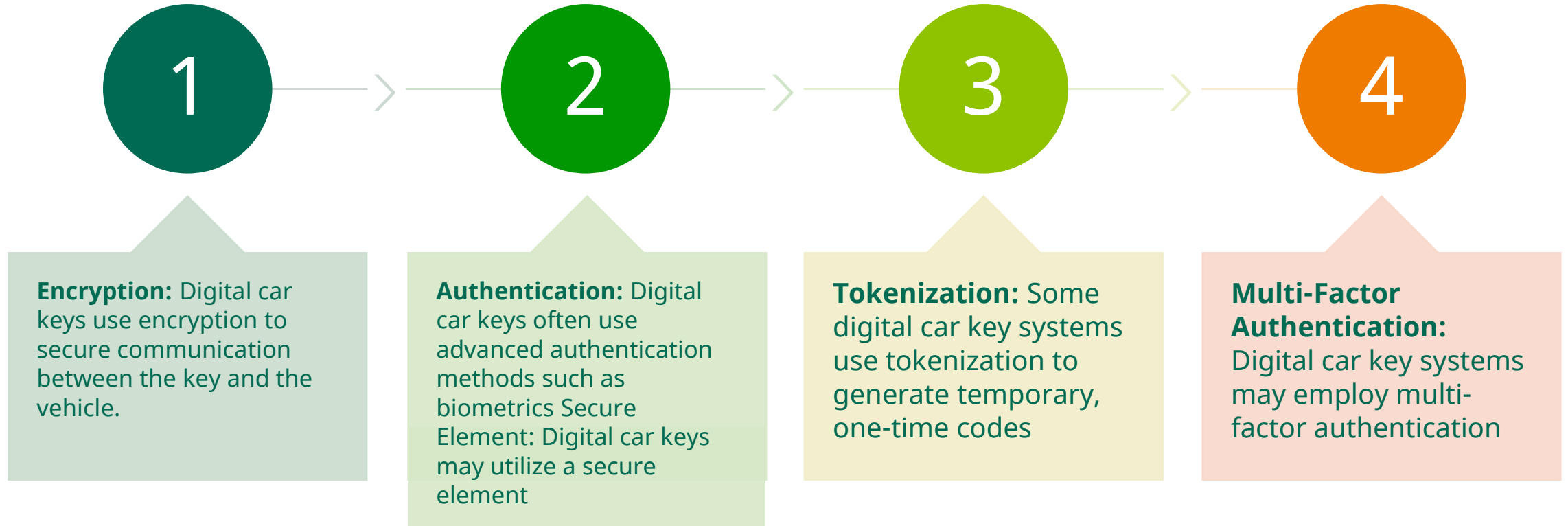
9. Vehicle Tracking and Monitoring





Overall, digital car keys offer a **more streamlined, high security** and **feature-rich** experience compared to traditional key fobs, providing added convenience, security, and customization options for users.

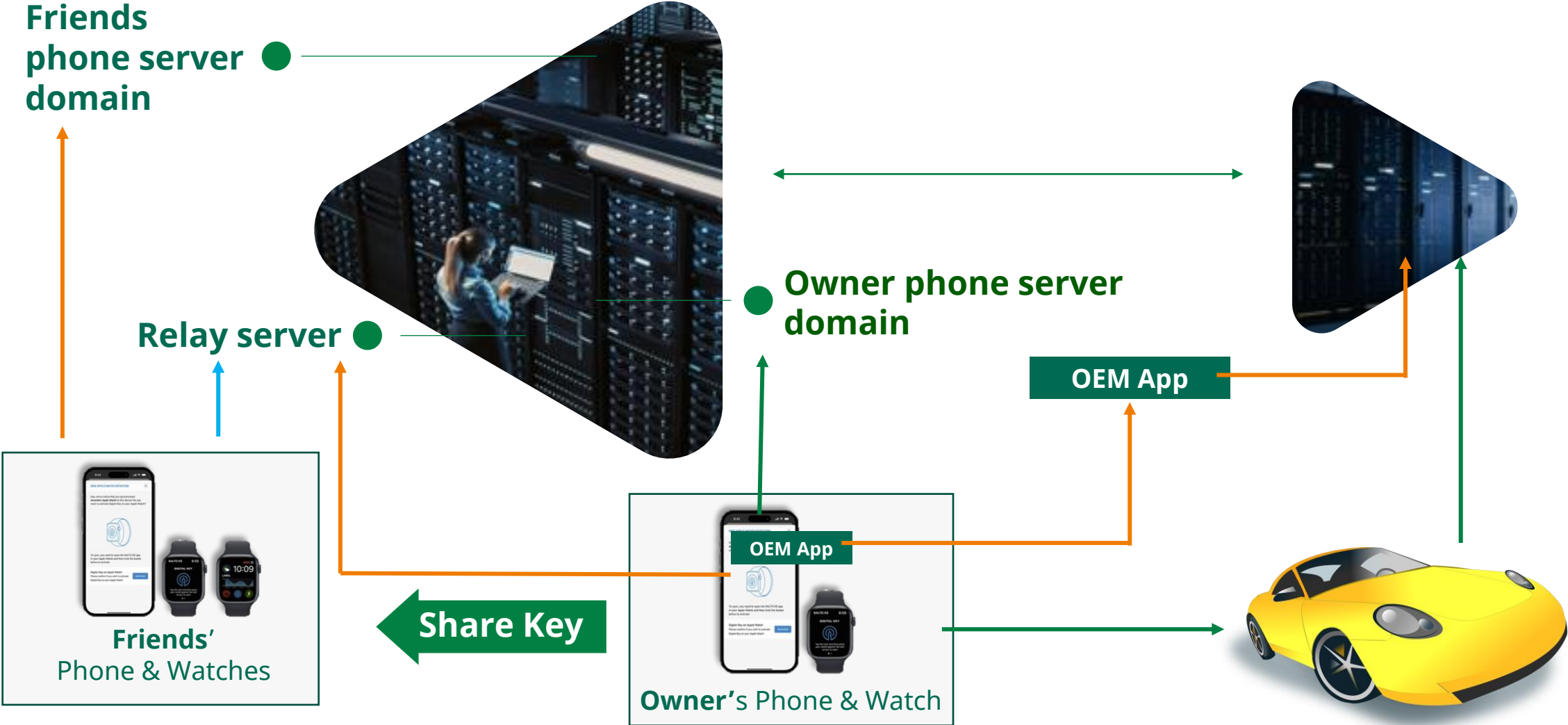
Robust DCK Security control





1. Overall, digital car keys leverage a combination of **encryption, authentication methods, secure hardware components, and remote management capabilities** to **control security** and **prevent unauthorized access to vehicles.**
2. These measures help protect **against theft, hacking, and other security threats** associated with traditional key-based systems

CarKey server chain



Major CarKey Technology Development Organization



Car Connectivity Consortium

An Industry organization dedicated to global technologies for **smartphone-to-car** connectivity solutions.

Certification Programs are:

- **WCC1 NFC**



- **WCC2 NFC+ BLE**



- **WCC3 NFC+ BLE+UWB**


















Supported by major industrial supplier



Major Cell Phone OS providers are Charter members of CCC

Charter Members

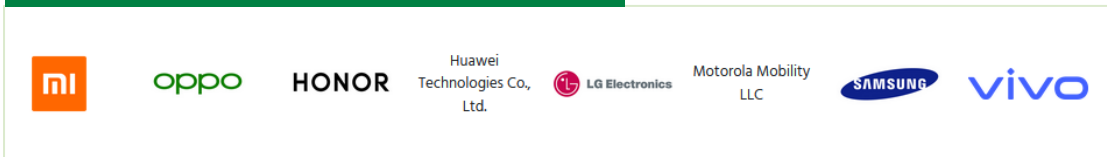
Other MEMBERS are...

Total 327 members (until 2024 04 06)

Car Manufactures



Phone Manufactures



Infotainment System Manufactures



Ecosystem Technology Partners





Major Technologies

Near Field NFC for contact application

Major Technology 1



Near Field Communication (NFC) DCK

- NFC technology enables smartphones to communicate with compatible devices over short distances, typically a few centimeters.
- Digital car keys can utilize NFC for secure communication between the smartphone and the vehicle, allowing for contactless unlocking and starting.



Short Range BLE for 5 to 30 Meters Application

Major Technology 2



Bluetooth Low Energy (BLE) DCK:

- BLE is another wireless technology commonly used for digital car keys.
- It offers low power consumption and can maintain a constant connection between the smartphone and the vehicle.
- Enabling features like **proximity-based unlocking**.



Precise location using UWB

Major Technology 3-1

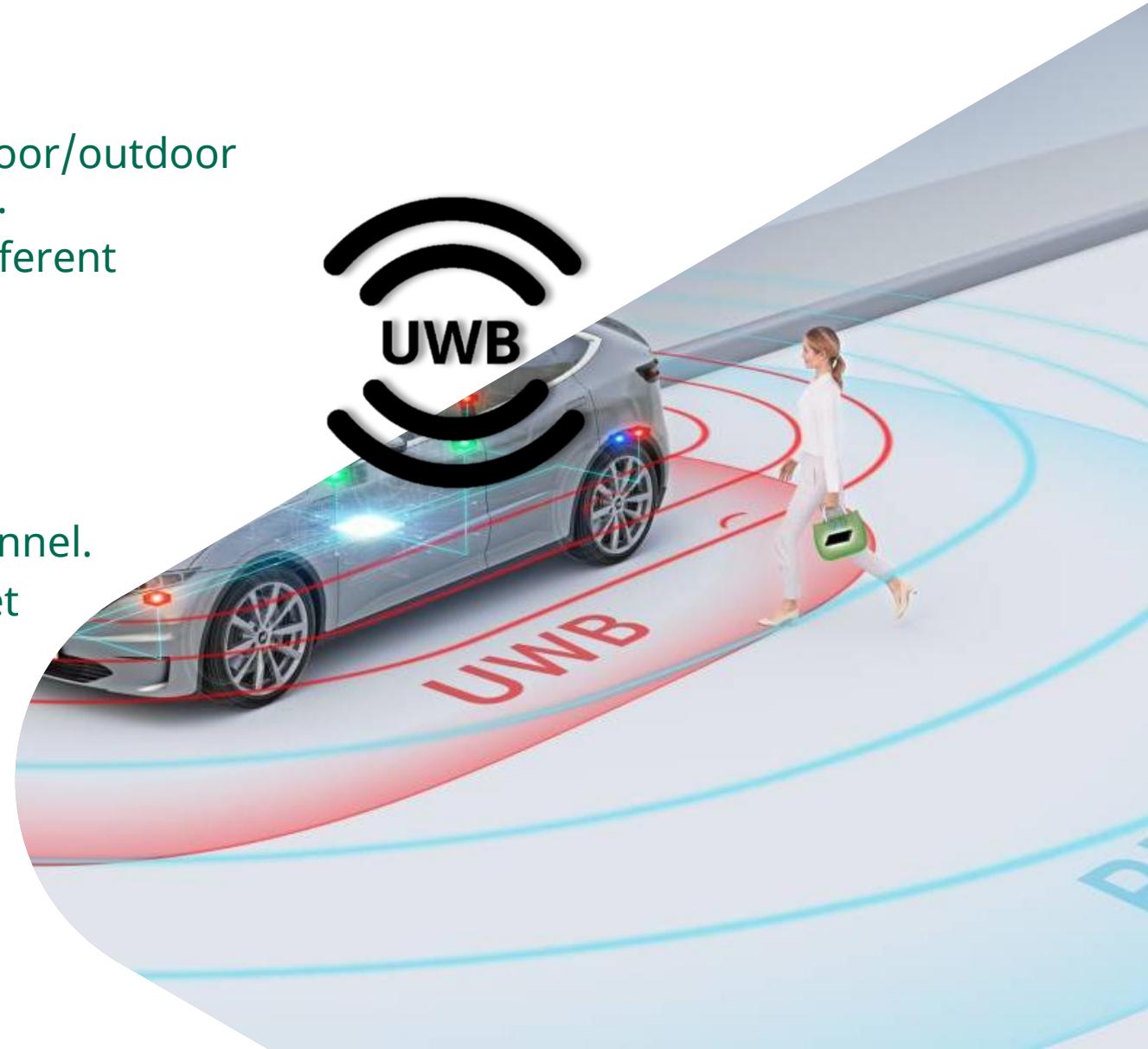


High Accuracy:

- UWB technology provides highly accurate indoor/outdoor positioning, typically within a few centimeters.
- Define the user application approach from different trajectory.

Low Latency:

- Updates with minimal latency,
- Ensuring real-time tracking of assets or personnel.
- Quick response times are critical, such as asset management or emergency response.



Precise location using UWB

Major Technology 3-2

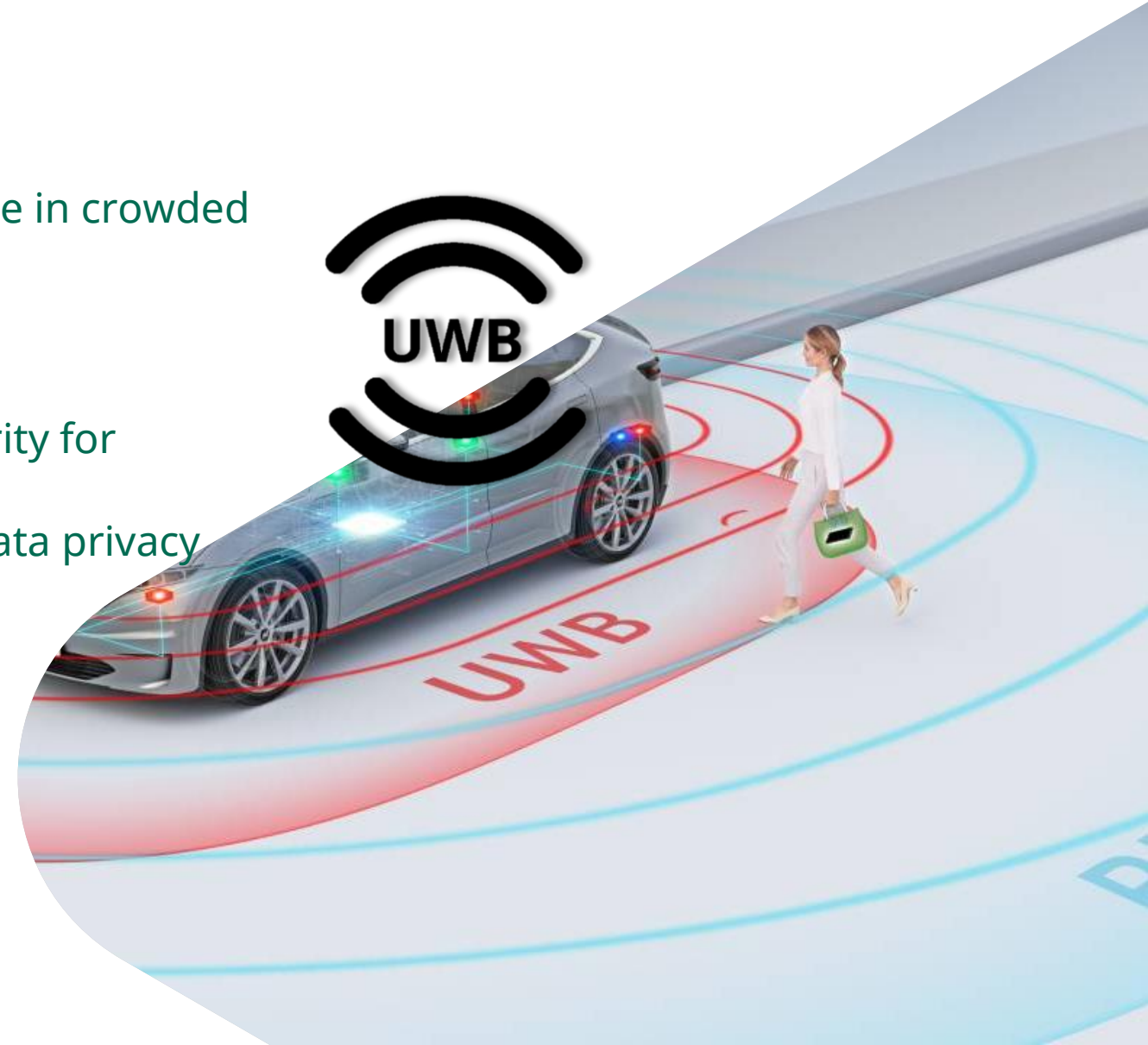


Reduced Interference:.

- This reduces the likelihood of interference.
- Ensuring reliable and consistent performance in crowded environments.

Improved Security:

- Difficult to intercept or jam, enhancing security for location-based applications.
- Suitable for sensitive environments where data privacy and security are paramount concerns.



Combination of CCC Digital Key Program Summary



WCC (Wireless Capability Combinations)

WCC1: NFC Functions

WCC2: Adds RKE Functions (NFC + Bluetooth LE)

WCC3: Adds Passive/Location-based Functions
(NFC + BLE + UWB)

Testing and Devices

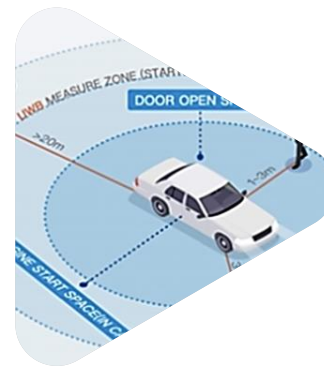
- Interoperability vehicle with 3 smartphones.
- Interoperability smartphone with 3 vehicles (from a list of vehicles Interop Devices List 'IDL').



Use Cases under CCC Digital Key | Functions to verify



1. **Unlock the Vehicle** – Smart device in vehicle's proximity
2. **Lock the Vehicle**
3. **Start the Engine** – Smart device within a vehicle
4. **User Authentication**
5. **Digital Key Provisioning**
6. **Digital Key Revocation**
7. **Selling and rental the Vehicle**
8. **Digital Key Sharing** – Remote & Peer-to-Peer
9. **Digital Key Properties** – Restricting (shared) key usage

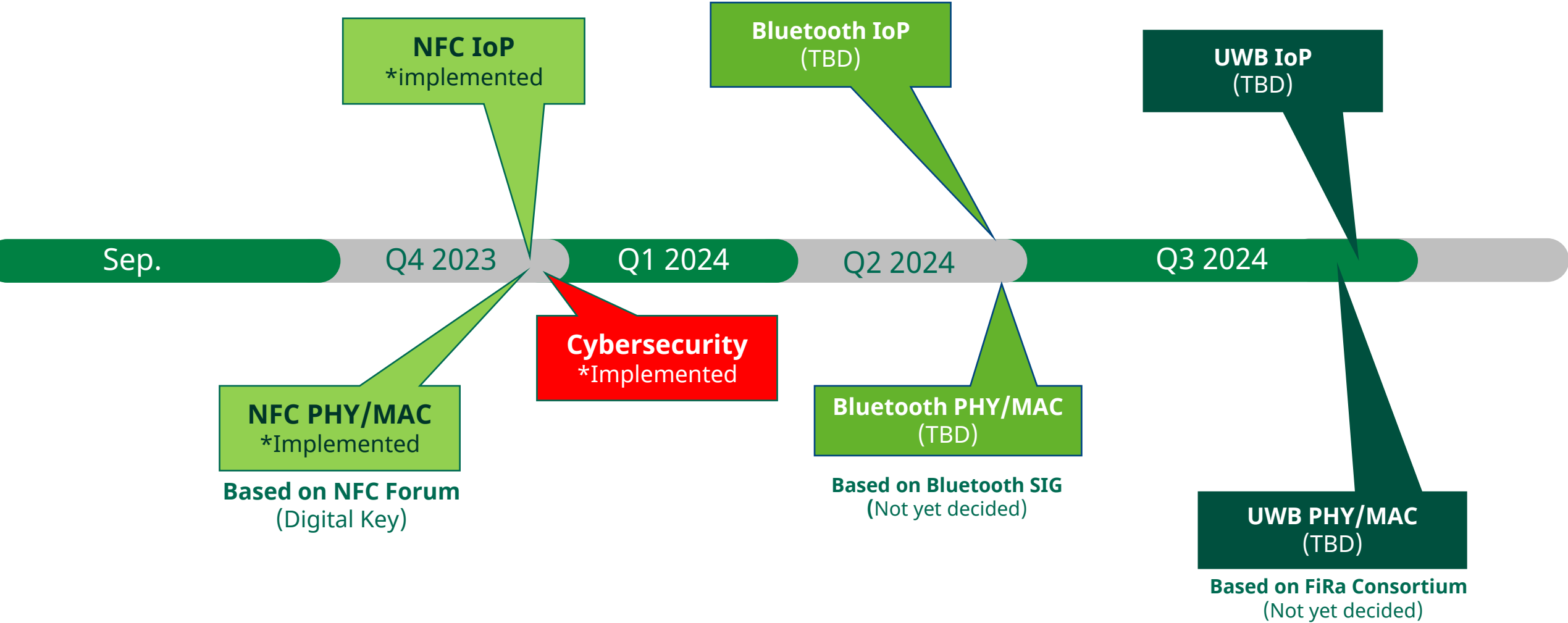


The certification program is for:

- Vehicles
- End-User Devices
- Modules
- Back-end Servers

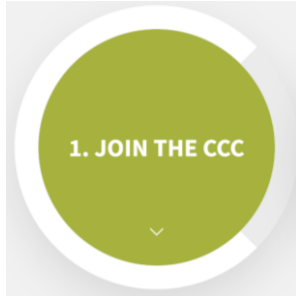
CCC Certification Roadmap

Estimated roadmap based on the test tools validation and program development processes

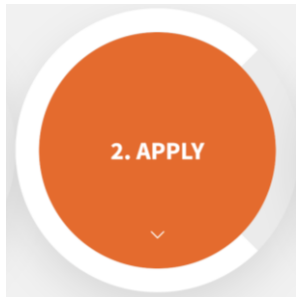


How To Get Certified

Mobility/Automotive Technology | Car Connectivity Consortium



Certification is Free for all CCC Members (*Some restrictions apply*). Core members can attend Plugfests and participate in all Working Groups. Adopter members also have access to the Certification Program.



Apply for Certification:

Complete the Certification Application and Certification Mark License Agreement.
Select your preferred Authorized Test Laboratory.
Schedule your test date.



You've passed the test!
Display your Certification Certificate.
Increase your visibility and strengthen your branding with the CCC Digital Key logo.
See the Brand Usage Guidelines for details.

CARCONNECTIVITY
consortium®

Approved DEKRA CCC Authorized test lab

<https://causeway.carconnectivity.org/wg/Members/wiki/ccc-digital-key-authorized-lab>



Laboratory	Authorized Evaluation Scope
DEKRA Testing and Certification SAU	<ul style="list-style-type: none">• DK Applet Functional Compliance• End-to-End Interoperability (vehicles, EUDs)
DEKRA Testing and Certification (Shanghai) Ltd.	<ul style="list-style-type: none">• DK Applet Functional Compliance
DEKRA Testing and Certification (Suzhou) Co., Ltd.	<ul style="list-style-type: none">• DK Applet Functional Compliance
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Security Evaluation Laboratories

<https://causeway.carconnectivity.org/wg/Members/wiki/ccc-digital-key-authorized-lab>



Laboratory	Authorized Evaluation Scope
LGAI Technological Center S.A. (Applus+ Laboratories)	• DK Applet Security
Riscure B.V.	• DK Applet Security
Serma Safety and Security	• DK Applet Security
SGS Brightsight B.V.	• DK Applet Security
Thales SIX GTS France S.A.S	• DK Applet Security



Thank you

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