



FTF 2016
TECHNOLOGY FORUM

NFC FOR CONNECTED CARS

FTF-AUT-N1781

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MANAGER SYSTEM APPLICATION SUPPORT
FTF-AUT-N1781
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PUBLIC USE



AGENDA

- Secure Car Access – application areas
- NFC technology
- Automotive use cases
- Portfolio overview
- Support material



Secure Car Access: Applications

Immobilizer	Remote Keyless Entry (RKE)	Passive Keyless Entry (PKE)	Smart Car Management	Advanced Car Access	Connected Keyless Entry
					
<p>• Car theft protection</p> 	<p>Consisting of:</p> <ul style="list-style-type: none">• Car theft protection• Remote car door lock and unlock 	<p>Consisting of:</p> <ul style="list-style-type: none">• Car Theft protection• Remote car door lock and unlock• Passive keyless entry• Passive Start 	<p>Car-key communication:</p> <ul style="list-style-type: none">• Remote start• Car finder• Alarm Systems• Fuel level / Charging state• Door lock status 	<p>Consisting of:</p> <ul style="list-style-type: none">• Car Theft protection• Functional Security• Localization• Range detection• Distance Bonding 	<ul style="list-style-type: none">• Car Access via NFC enabled phones/wearables• NFC key advantage: secure transport of keys 

NFC TECHNOLOGY



What is NFC?

Near Field Communication is a short-range wireless connectivity technology *standard*, designed for *intuitive* and *simple* communication between *two* electronic devices.



RFID, Proximity & NFC

We Often Hear About Them, But What is Covered With These Names?



RFID: Radio Frequency Identification

- Generic term for contactless technology.
- Always used for applications related to **tagging of goods and items**
- Range from few cm to several m – automatic detection of a Unique Identifier (few bytes)
- Based on various technologies : LF (120-150 KHz), HF (13.56 MHz), UHF (433 to 900 MHz)
- Standardized in ISO18000

Contactless **Proximity** technology

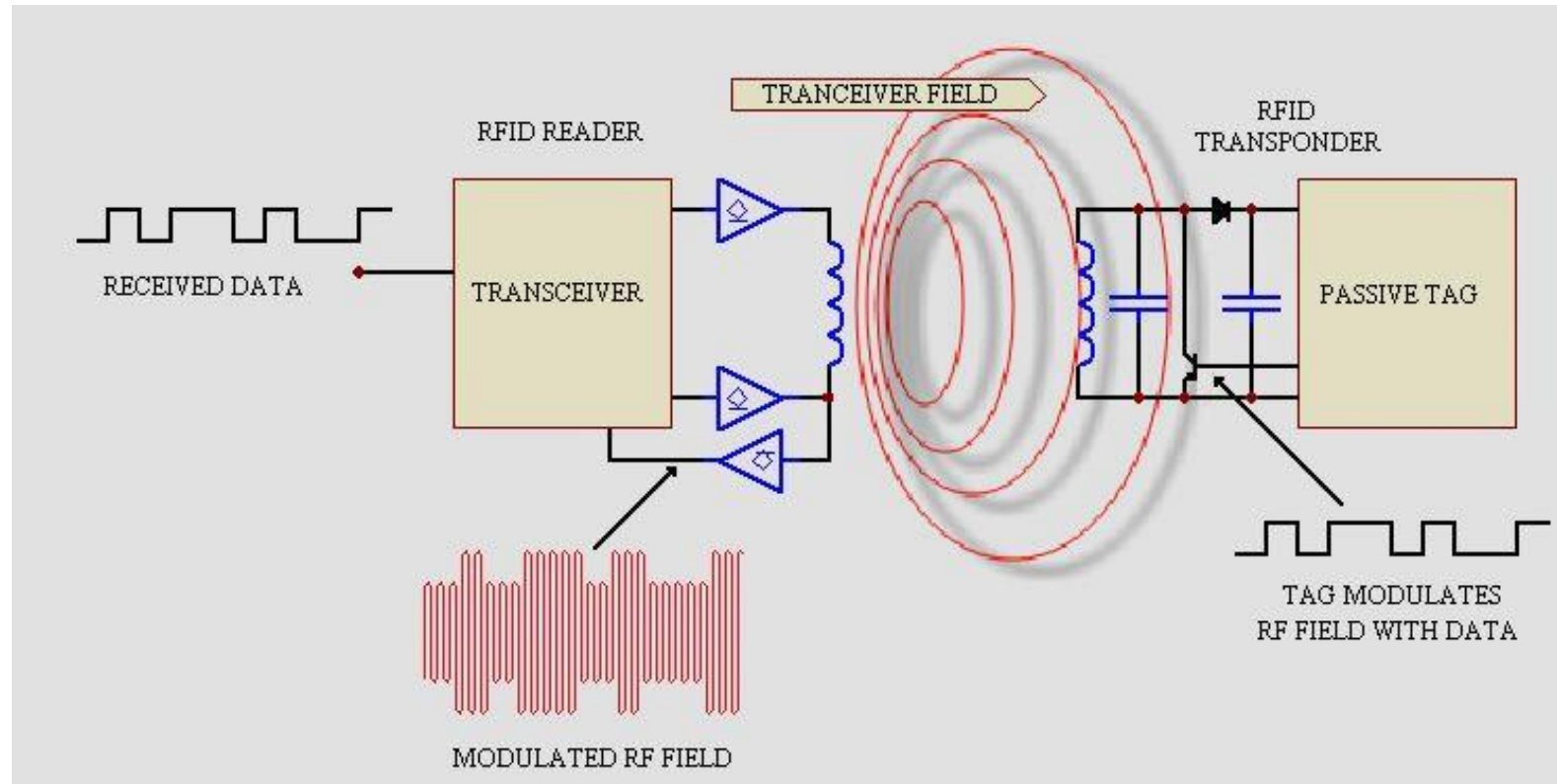
- Subset of RFID, limited to 1 frequency range : 13.56 MHz. Associated to people, active action required (put card in front of reader)
- Use in **Access Control, Passport, Payment, Transport**
- More memory, more security
- short range (several cm)
- Standardized in ISO14443

NFC: Near Field Communication

- NFC builds on Proximity technology by **extending the technology to Peer-to-Peer** and Card Emulation
- Short range
- Standardized at the NFC Forum

RFID: Radio Frequency Identification

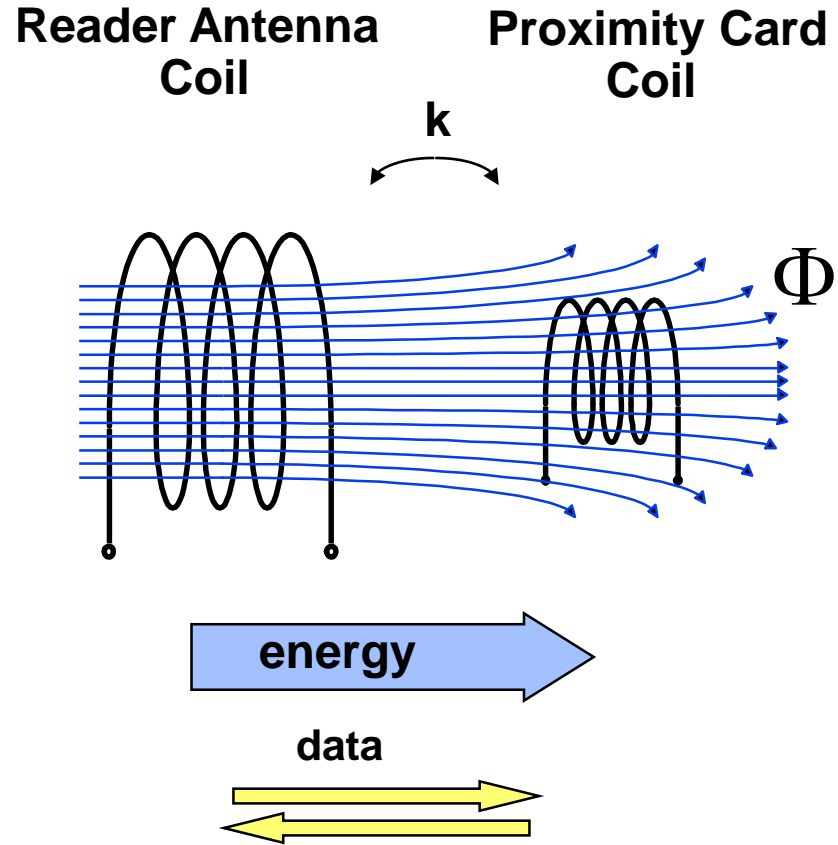
Contactless Communication Principle /1



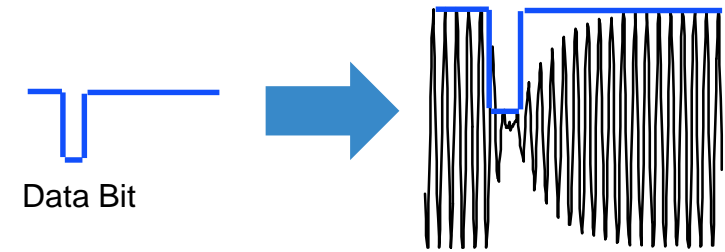
** ISO/IEC 14443-compliant smartcard*

RFID: Radio Frequency Identification

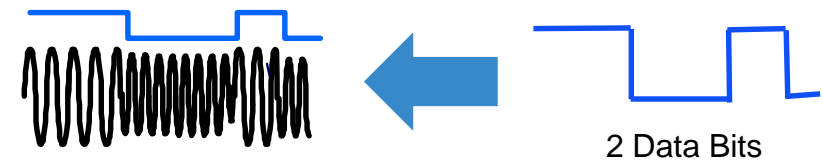
Contactless Communication Principle /2



Modulation Reader - > Card



Modulation Card - > Reader

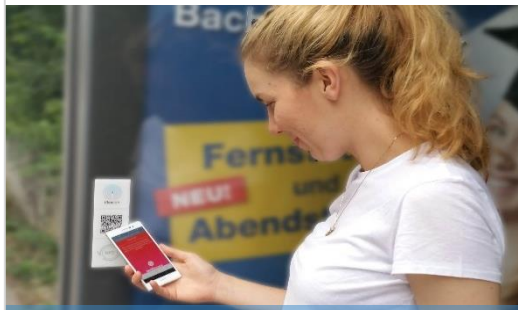


* ISO/IEC 14443-compliant smartcard

The 3 Modes of NFC: A Tap is All It Takes

Read/Write Mode

- Interacts with an NFC-enabled device
- Reads data in from device or writes data out



Get information or initiate an action

Peer-to-Peer Mode

- Establishes two-way communication between NFC-enabled devices
- Each device serves as an endpoint



Passive and active communication, e.g. pairing

Card Emulation Mode

- System behaves as contactless smartcard*
- Makes NFC-enabled systems compatible with contactless cards

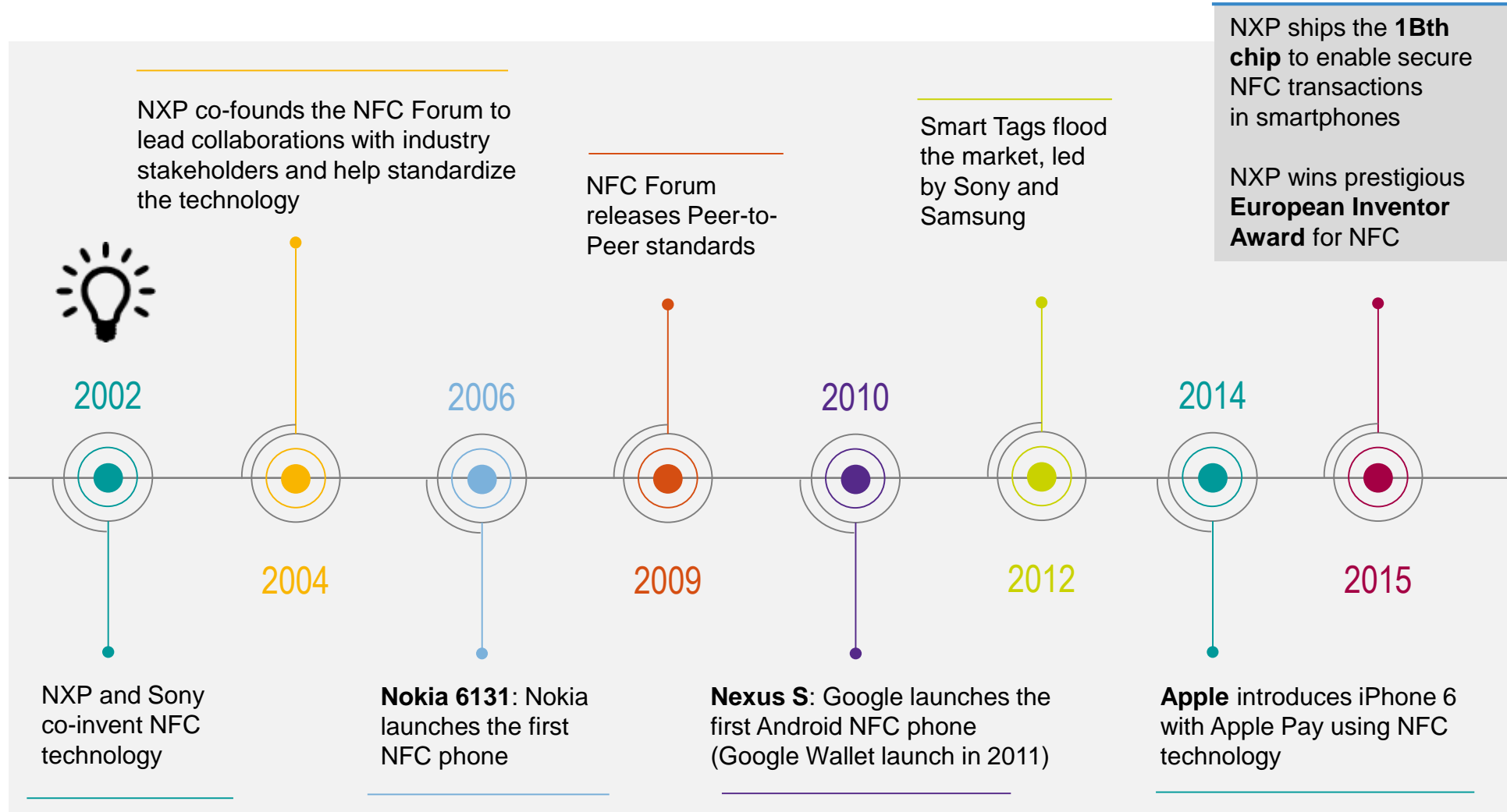


Ticketing, payments, access, control, transit...

** ISO/IEC 14443-compliant smartcard*

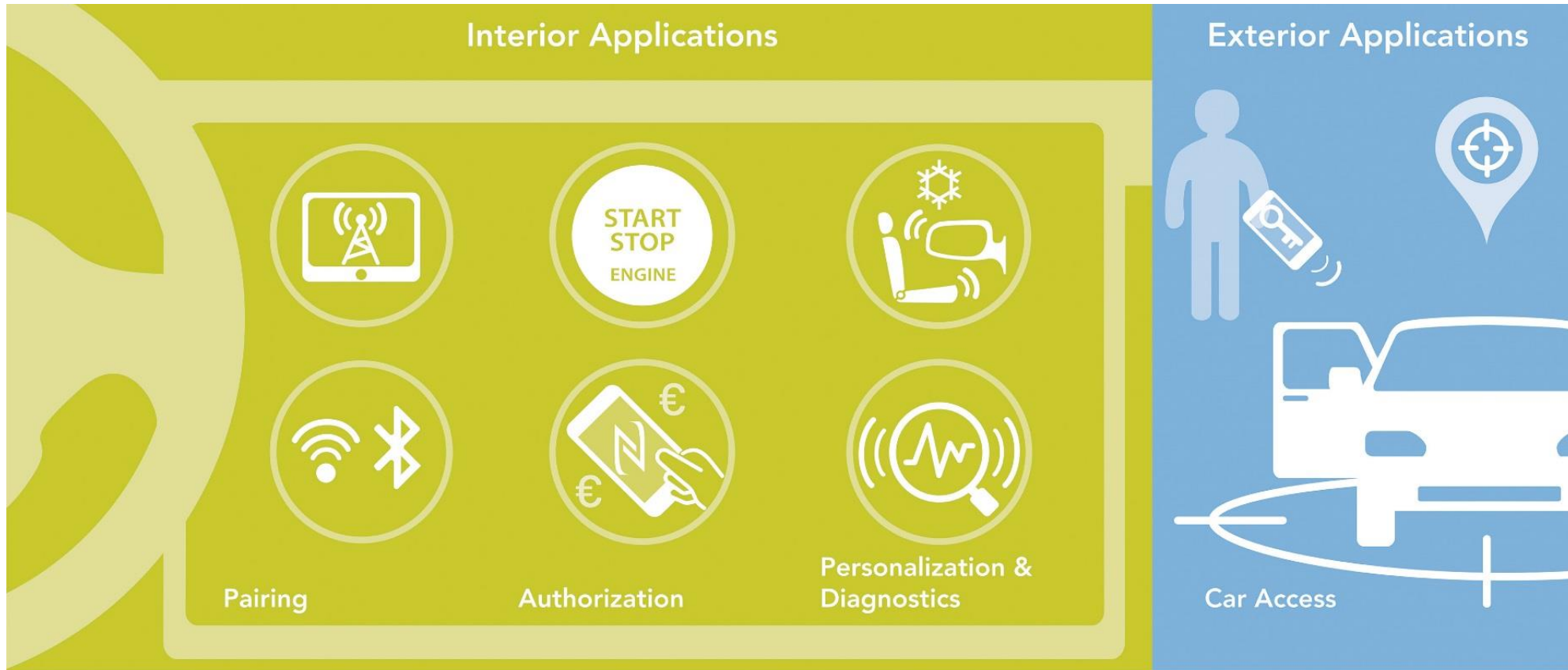
The Evolution of NFC

NXP Builds Track Record of Success Since 2002



AUTOMOTIVE USE CASES

Automotive NFC Use Cases



- Multimedia Streaming
- Wi-Fi Pairing
- BT Pairing

- Driver Authorization (Engine Start)
- Payment Services

- Air Condition, Seat, Mirror Settings
- Transmit Vehicle Diagnostics Data

- Smartphone Car Access
- Car Sharing
- Fleet Management

Automotive NFC Use Cases



BT/Wi-Fi Pairing

- Simple and secure Bluetooth and Wi-Fi pairing



Personalization

- Customize various vehicle settings using NFC as a secure service interface to find the comfort that is all your own



Diagnostics

- Get diagnostic information using NFC as secure service interface e.g. vehicle diagnostics, fuel management



In-car payment

- Use NFC inside of the car as the payment terminal to pay for extra updates/services



Car access

- Use NFC enabled phone or smartcard to authenticate and gain access to shared/rental cars on the go

PORTFOLIO OVERVIEW

NCF/J 3340 – Flagship NFC Controller

Full NFC Functionality Without Compromise

Features:

- NFC controller combines NFC frontend with an advanced 32-bit microcontroller → system solution with fewer components
- Integrated firmware with easy and standardized NCI interface → convenient software integration
- RF driver supply voltage 2,3 V - 5,5 V → High TX output power
- IRQ pin → Improved host communication / host task scheduling
- Temperature range: NCF: - 40 .. +85° , NCJ: ..+105°
- Low Power Card Detection
- Multiple GPIO's
- NCI compliant uC
- SMD package HVQFN40

Supported host interfaces:

- SPI 7 Mbit/s
- I²C

Supported protocols:

Reader/Writer mode

- ISO/IEC 14443 A&B R/W support
- FeliCa R/W support
- R/W support for MIFARE 1 K, 4 K
- R/W support for ISO15693 / 18000-3

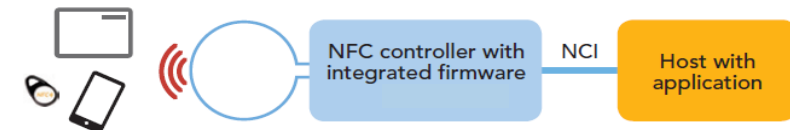
Peer to Peer mode

- Full NFCIP-1 & NFCIP-2 compliance

Card emulation

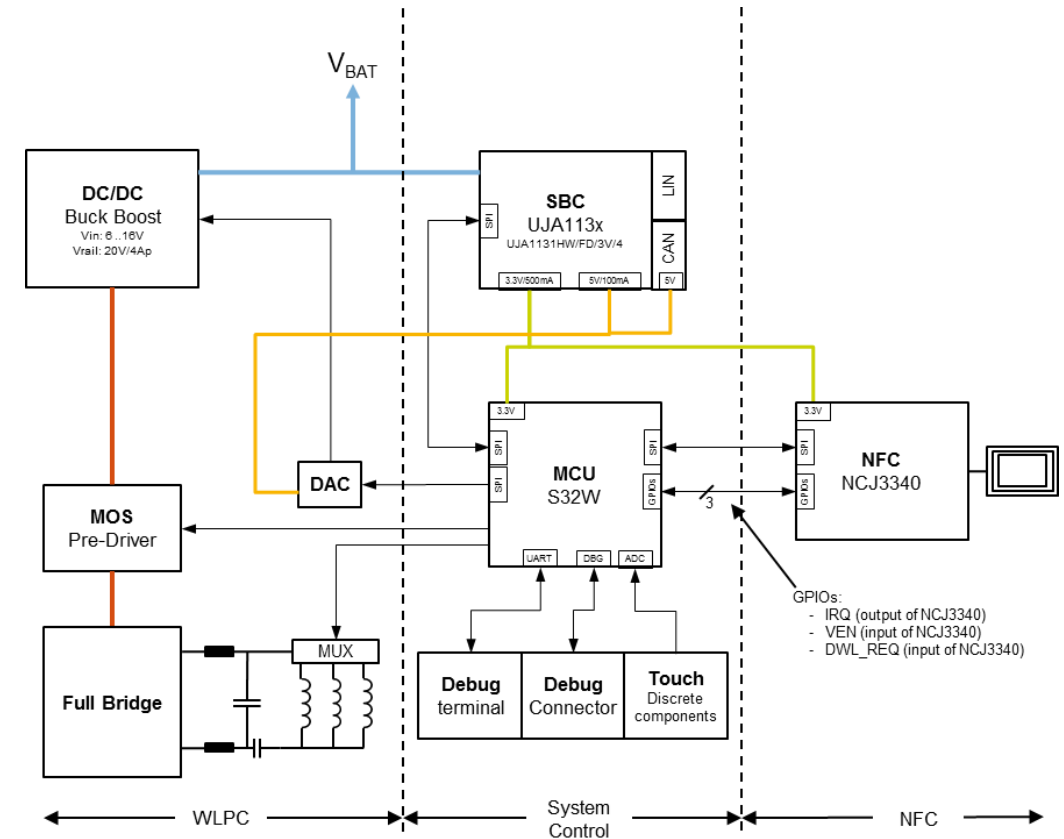
- ISO/IEC 14443 A
- FeliCa

Application diagram



Combining NFC and WLPC

- Combining NFC & WLPC:
 - Wireless Charging and NFC both provide the convenience of a battery re-charge without the hassle of cords and the secure personal connection of NFC.
 - NXP has all required components & is building reference solutions, providing secure connections for a smarter world.
- Project Basis:
 - Build automotive reference design for Wireless Charging and NFC for stack module
 - Wireless Power Charging with mid power Qi 1.2. (15 Watt)
 - NERD demo kits, including demo board, SW tools and documentation.
 - Build up a basis for the next generation adding multi-standard WLPC, Security, EMVco payment and BLE



NCF/J 3320 – Standalone NFC Frontend

Most Flexible Way to Add Pure Reader/Writer Functionality to a System

Features:

- Standalone NFC frontend performing contactless communication → Most flexible way to add NFC R/W functionality to a system
- Dedicated SW reader library → Easy software design-in
- RF driver supply voltage 2,3 V - 5,5 V → High TX output power
- IRQ pin → Improved host communication / host task scheduling
- Temperature range: NCF: - 40 .. +85° , NCJ: ..+105°
- SMD package HVQFN32

Supported host interfaces:

- SPI 7 Mbit/s,
- UART
- I²C

Supported protocols:

Reader/Writer mode

- ISO/IEC 14443 A&B R/W support
- FeliCa R/W support
- R/W support for MIFARE 1K, 4K
- R/W support for ISO15693 / 18000-3

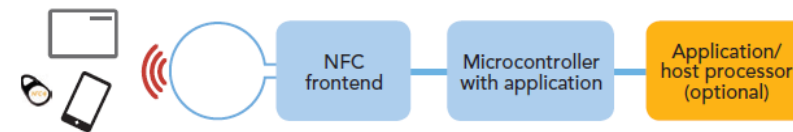
Peer to Peer mode

- ISO/NFC 18092 NFC-IP1 support
- Passive initiator mode



Visit
our
Demo

Application diagram



NFC Door Handle Reference Design

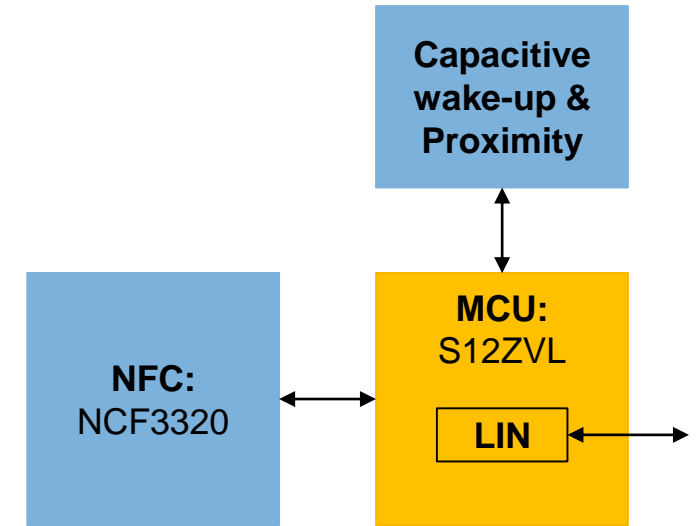
Accelerate Design In – Provide References

- **Project Idea:**

- Build up a NFC door handle reference design to demonstrate benefits of **NCF3320** in real door handle application.

- **Project Goals:**

- **Combining** automotive NFC frontend **NCF3320**, automotive MCU **S12ZVL** and **Capacitive Sensors**
- Benchmark RF performance given the physical constraints of a door handle
- Achieving robustness against influences of chrome attachments
- Provide customer development platform for design-in activities
- Creation of DHRD demo kits, including real door handle, demo board, SW tools and documentation

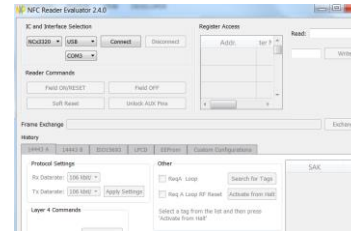


SUPPORT MATERIAL

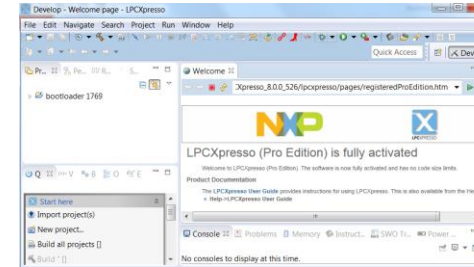


Automotive NFC Support Package

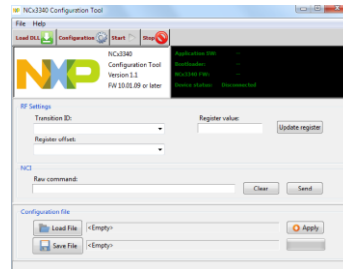
Evaluation Tools



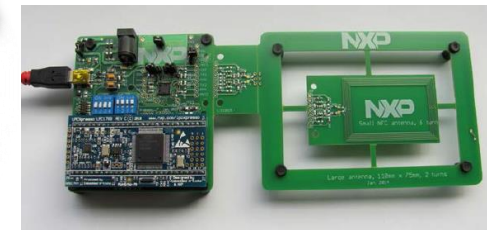
Target Development Environment



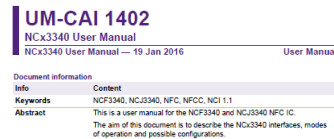
Configuration Tools



Demo Boards



Documentation



Application Boards



KEY TAKEAWAY

NXP is ...



...your partner of choice for NFC products

Provide Secure NFC Solution



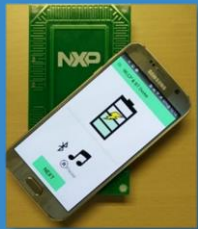
...bridging the gap between automotive and consumer electronics

Innovation and true economy of scale



...provides the broadest NFC solution portfolio

strong NFC innovation pipeline



... a one stop shop for Automotive NFC Applications

Auto qualified MCU, Security and NFC Chipsets



SECURE CONNECTIONS
FOR A SMARTER WORLD

ATTRIBUTION STATEMENT

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