



life.augmented

ST NFC for Automotive

peng.wang@st.com



ST25 NFC in automotive



NFC in automotive

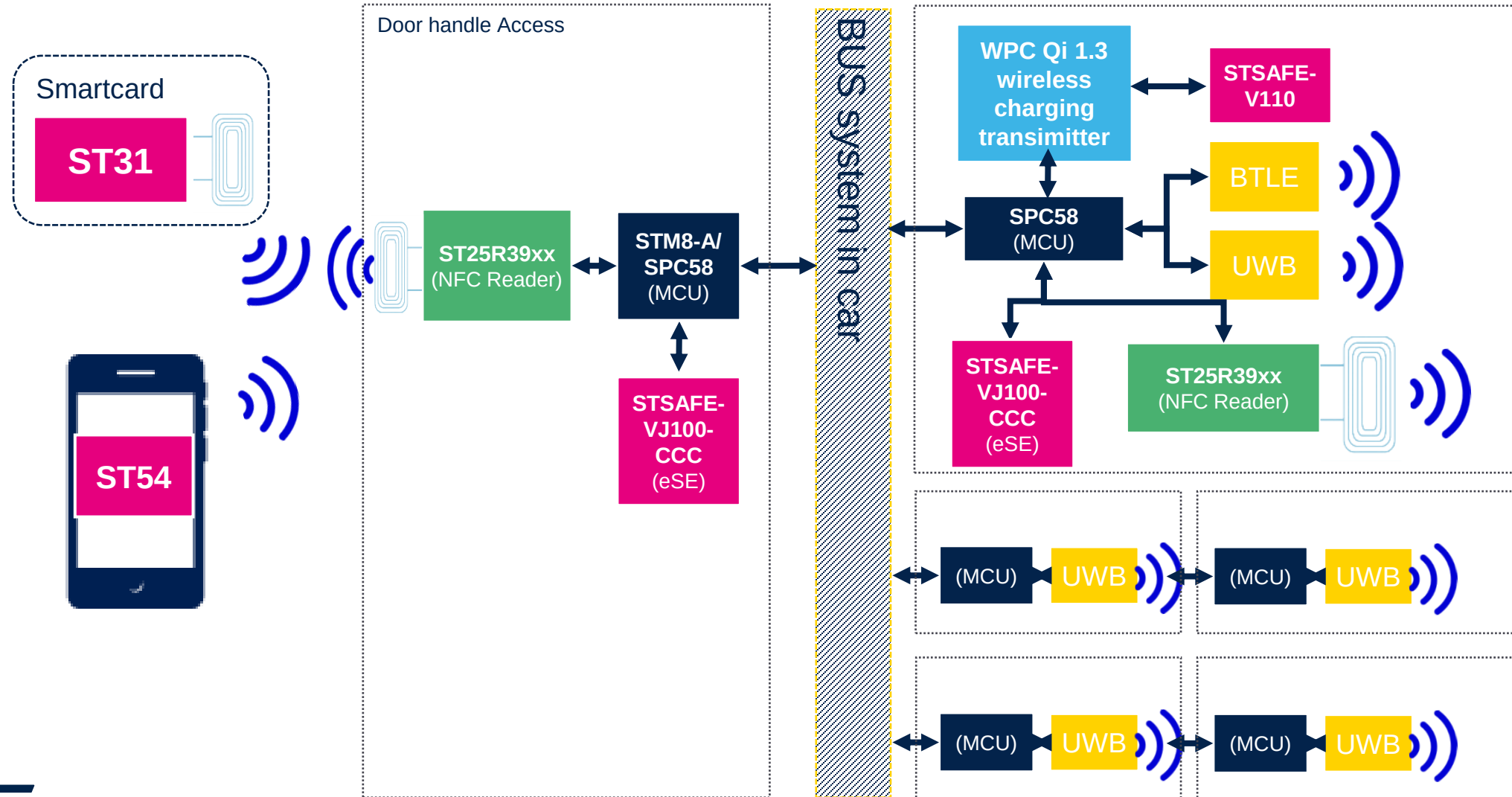


The Digital Key



NFC Doorhandle + Center Console

NFC+MCU+SE+BT+UWB: DK-3.0

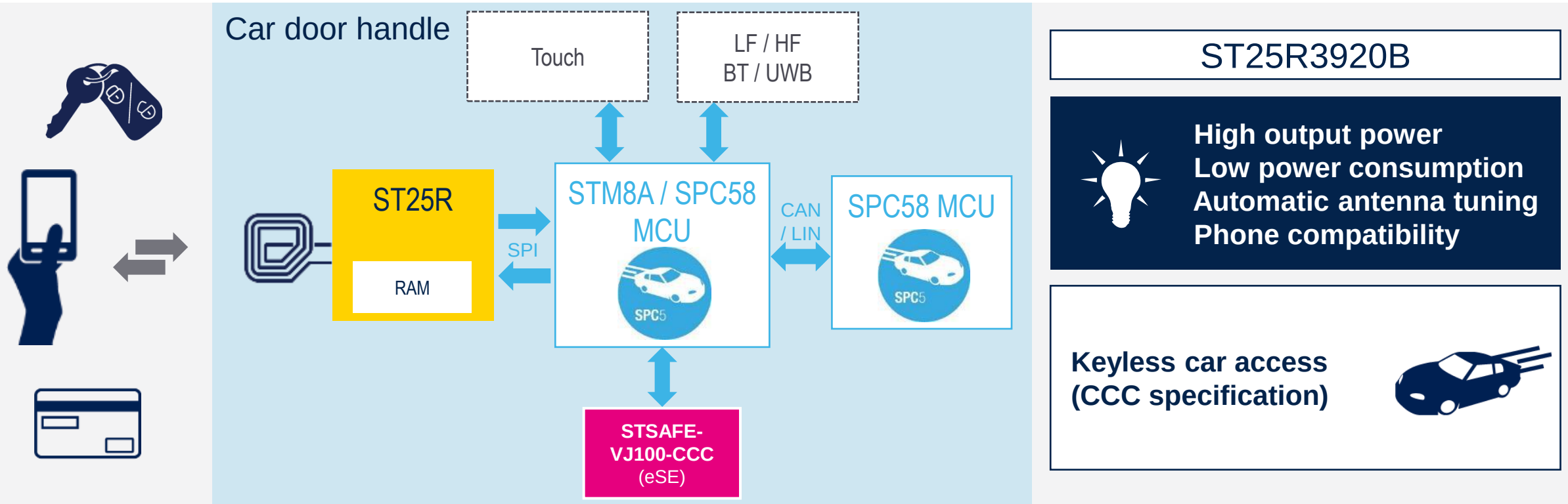


ST DK solution



NFC reader for door handle

Typical NFC Reader Block Diagram & Usage for Car door handle



欢迎联系意法半导体，获取数字钥匙解决方案专业支持：

- 系统原理图、PCB layout
- MCU 底层驱动
- ST25、ST33-A通信协议栈
- CCC 2.0 规范协议栈
- 手机端APP支持
- 后端平台服务支持

演示板



Door handle board



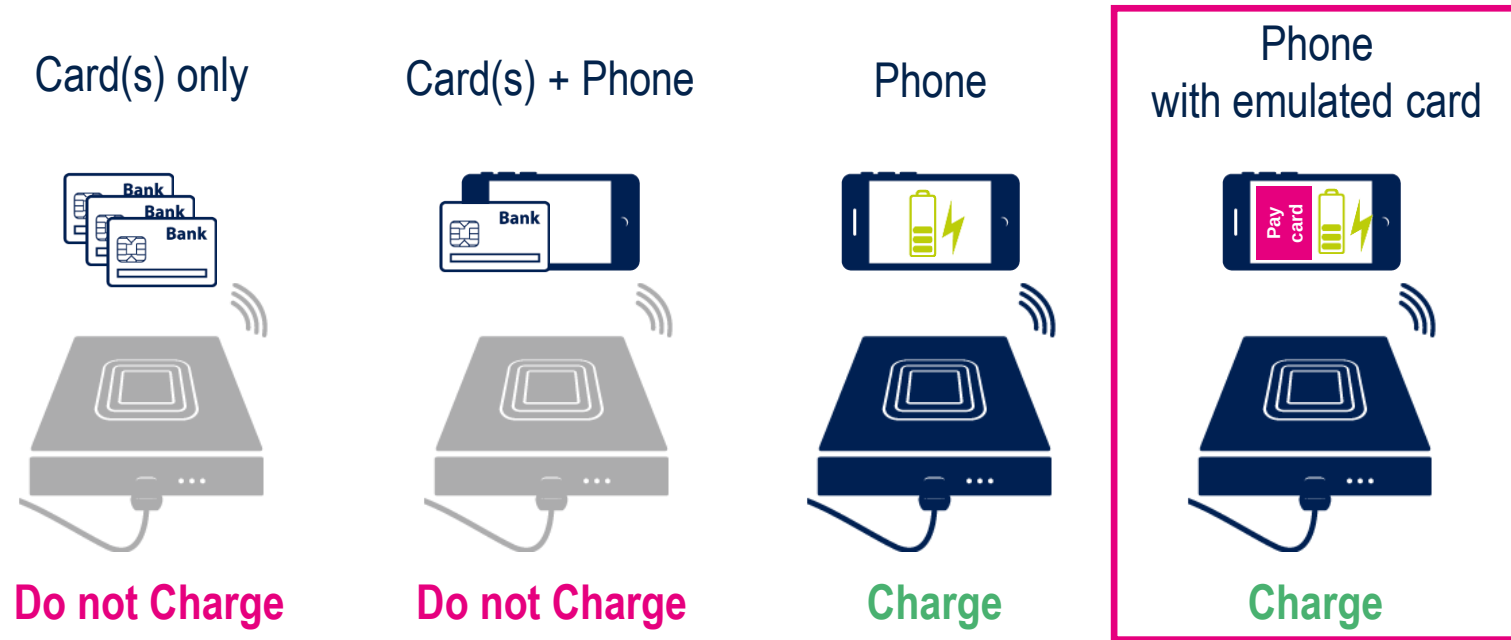
Vehicle Console

Wireless Charging & NFC Card Detection



NFC on Qi Charger for Card Protection

Capable to distinguish real NFC card from cellphone



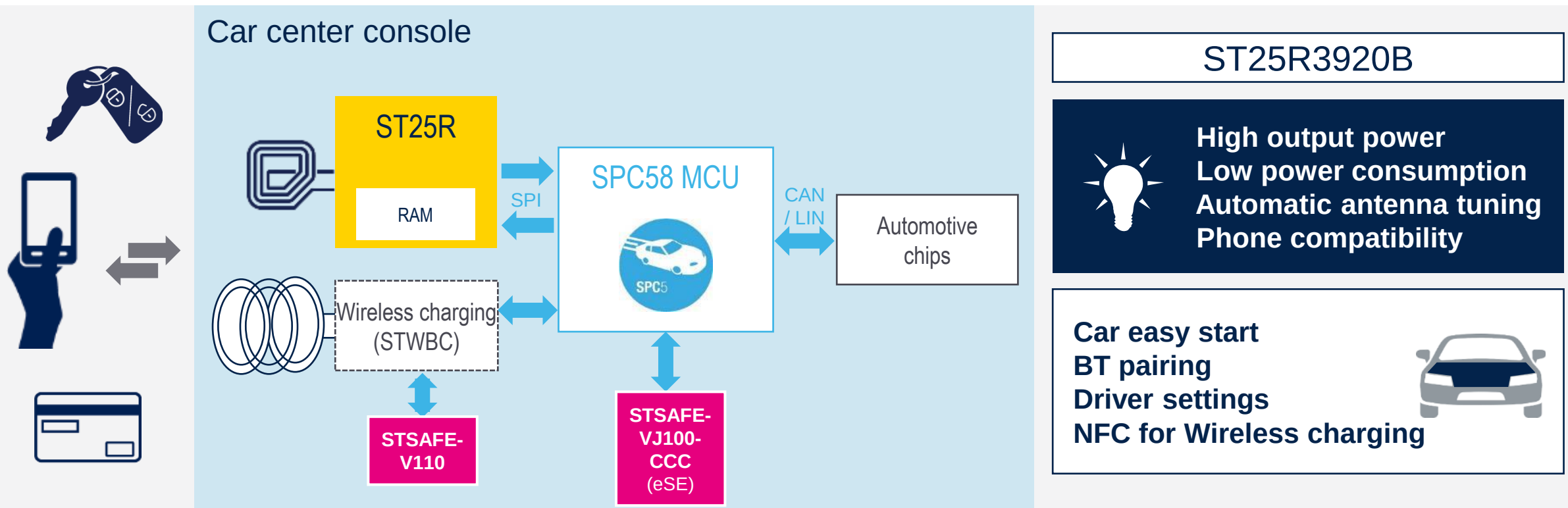
The key issue is

- How to distinguish real NFC card from a cellphone?



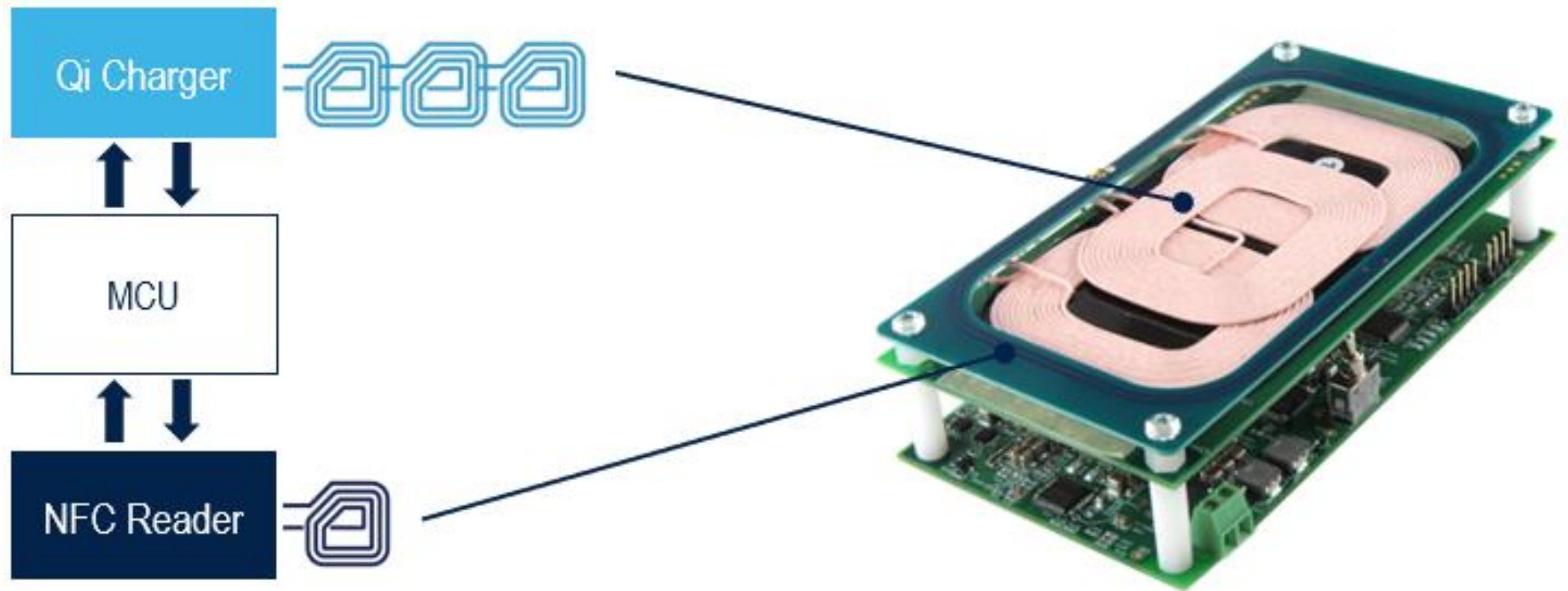
NFC reader for center console

Typical NFC Reader Block Diagram & Usage for Car center console



Combine NFC + Qi for Protection

The NFC reader can protect customer cards



Consumable





NFC tag

Typical NFC Tag (+ Reader) Block Diagram & Usage in Automotive

Consumable (e.g. filter...)



ST25TV02K / ST25TA02KB



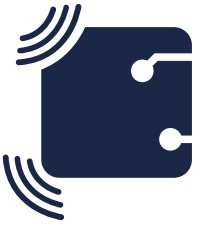
TruST25 digital signature
Passwords
Easy & fast data transfer

Product recognition
End user experience



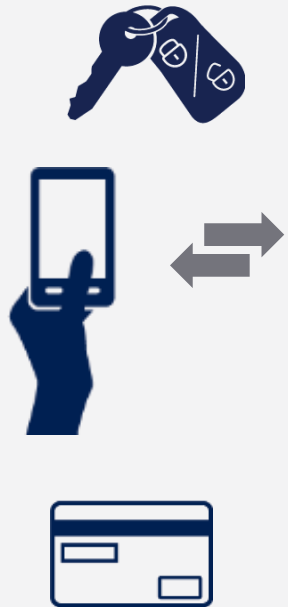
Charging Pile



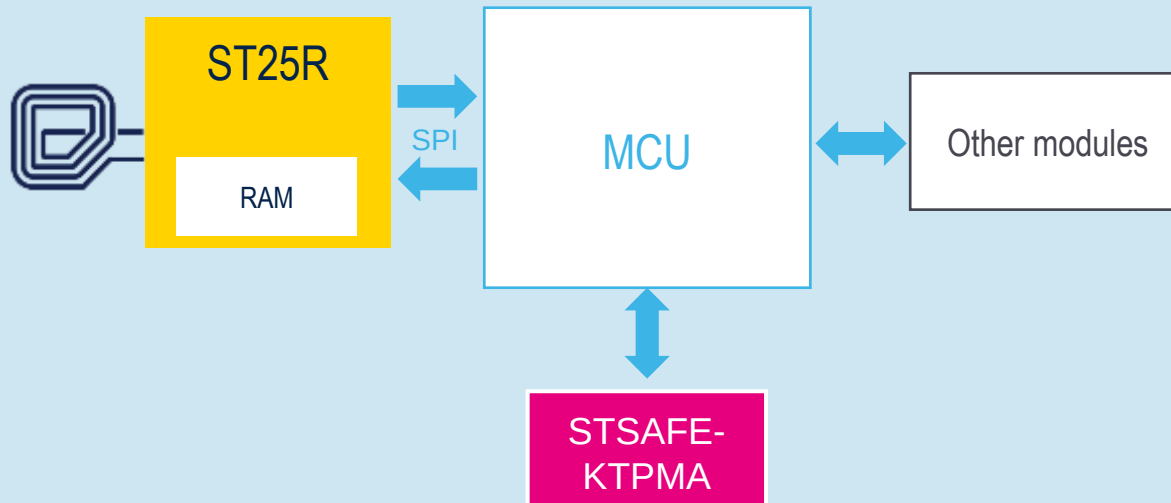


NFC reader for Charging Pile

Typical NFC Reader Block Diagram & Usage for Charging Pile



Charging Pile



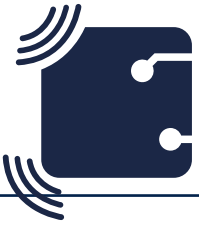
ST25R3920B



High output power
Low power consumption
Automatic antenna tuning
Phone compatibility

Authentication





ST25R NFC / HF readers product family

	ST25R95	ST25R3911B	ST25R3912	ST25R3914/15	ST25R3916	ST25R3917	ST25R3920/B
Description	Entry-Level NFC Reader	High-Performance NFC Forum Reader	Mid-Range NFC Forum Reader	Automotive Grade NFC Forum Reader	High-performance NFC Universal Device & EMVCo Reader	High-performance NFC & EMVCo Reader	Automotive Grade NFC Forum Reader
Reader/Writer mode	ISO14443A/B ISO15693 FeliCa	ISO14443A/B ISO15693 FeliCa	ISO14443A/B ISO15693 FeliCa	ISO14443A/B ISO15693 FeliCa	ISO14443A/B ISO15693 FeliCa	ISO14443A/B ISO15693 FeliCa	ISO14443A/B ISO15693 FeliCa
Card emulation mode	Yes	-	-	-	Yes	-	Yes
AP2P mode	-	Initiator & Target	Initiator & Target	Initiator & Target	Initiator & Target	Initiator & Target	Initiator & Target
PP2P mode	-	Initiator	Initiator	Initiator	Initiator & Target	Initiator	Initiator & Target
RF speed	424kbps	6.8Mbps (VHBR)	848kbps	848kbps	848kbps	848kbps	848kbps
Market	Consumer	Payment EMVCo 2.6, Industrial	Access control, Metering, Consumer	Automotive AEC-Q100 grade 1	Payment EMVCo 3.0, Industrial, Consumer	Payment EMVCo 3.0, Industrial, Consumer	Automotive AEC-Q100 grade 1
Advanced features	IWU	AAT, DPO, CIWU	DPO, IWU	AAT (3914), DPO, CIWU	AAT, DPO, NSR, DSA, AWS, CIWU, EMD	DPO, NSR, DSA, AWS, IWU, EMD	AAT, DPO, NSR, DSA, AWS, CIWU, EMD
HW interface	SPI 2Mbps	SPI 6Mbps	SPI 6Mbps	SPI 6Mbps	SPI 10Mbps	SPI 10Mbps	SPI 5Mbps
SW interface	 Unified Software Library for Frontends						
Power supply	2.7V - 5.5V	2.4V – 5.5V	2.4V – 5.5V	2.4V – 5.5V	2.4V – 5.5V	2.4V – 5.5V	2.4V – 5.5V
Output power	0.23W	1.4W	1.0W	1.0W	1.6W	1.6W	1.6W
Temperature range	-25°C to +85°C	-40°C to +125°C	-40°C to +125°C	-40°C to +125°C	-40°C to +125°C	-40°C to +125°C	-40°C to +125°C
Package	32-pin QFN	32-pin QFN / Wafer	32-pin QFN / WF 32-pin QFN / WLCSP-30	32-pin QFN / WF 32-pin QFN	WF 32-pin QFN / WLCSP-36	WF 32-pin QFN	WF 32-pin QFN

VHBR: Very High Baud Rate
 P2P: Peer to Peer mode
 AAT: Automatic Antenna Tuning
 AWS: Active Wave Shaping

EMD: Automatic EMD suppression
 VHBR: Very High Baud Rate
 DPO: Dynamic Power Output
 CIWU: Capacitive & Inductive Wakeup

DSA: Drive Slope Adjustment
 * Peak output power
 NSR: Noise Suppression Receiver
 IWU: Inductive Wakeup

ST25R3916B/17B/20B

Best choice for **NFC Forum CR13** and **EMVCo 3.1** certification



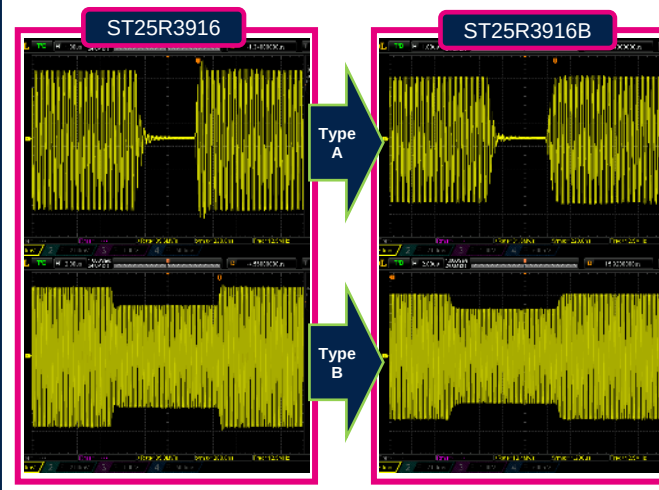
ST25R3916B/17B/20B

Improved DPO

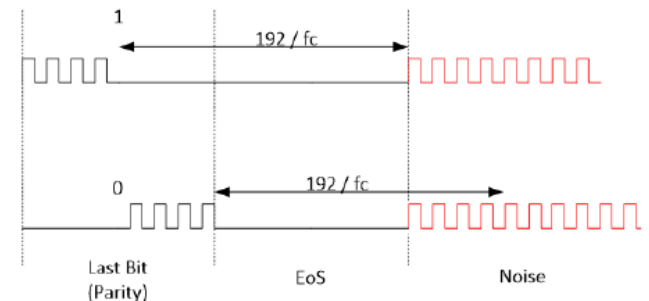
d_res<3:0>	Driver output resistance (normalized)
0	1.00
1	1.19
2	1.40
3	1.61
4	1.79
5	2.02
6	2.49
7	2.94
8	3.41
9	4.06
10	5.95
11	8.26
12	17.1
13	36.6
14	51.2
15	High Z

17 steps

Improved AWS



New EMD test pattern support





Competitor analysis

ST25R39xx vs. Competition

Output Power



Standby Power



Features

	AAT	NSR	AWS	DPO
ST	YES	YES	YES	YES
Competitor	NO	NO	partly	NO
Competitor	NO	NO	NO	NO

Required for CR13

AAT (Automatic Antenna Tuning): Compensates temperature, production drift; Improves communication with metal phones/watch

NSR (Noise Supression Receiver): Improves immunity against external noise sources; Improves communication with phones/watch
Superior performance for **Renault-36-0-808_N** or **VW-TL_81000**

AWS (Active Waveshaping): Improves waveshapes and communication with phones/watch, required to pass CR13 waveshaping

DPO (Dynamic Power Output): Dynamically adjusts output power to requirements



ST25R3920B

This product has also been certified for the following device classes: (list of device classes - delete if not used)

This is to certify that

STMicroelectronics

has successfully achieved certification in the NFC Forum Certification Program indicating that their product has demonstrated its conformance to the Applicable Certification Requirements listed below.

Certification Requirements:

Certification Release 13

Test Release 13.0

Device Class: CCC Digital Key Reader Device

Tag Operation

Platforms: Type 3/4B Tag

NDEF Support:

Avoidance: No

Date certified: 2022-04-13

Certification ID: 59751

The NFC Certification Mark may be used only in relation to products that have been certified under this program.

The register of NFC Forum Certified products may be viewed at <http://nfc-forum.org/our-work/compliance/certification-program/certification-register/>

The NFC Forum Certification Program is operated by the NFC Forum.



Thank you

