



life.augmented

NFC Contactless Connectivity

ST25 NFC Solutions Are Everywhere

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NFC/RFID/Memory Marketing

July 2020



NFC technology at a glance

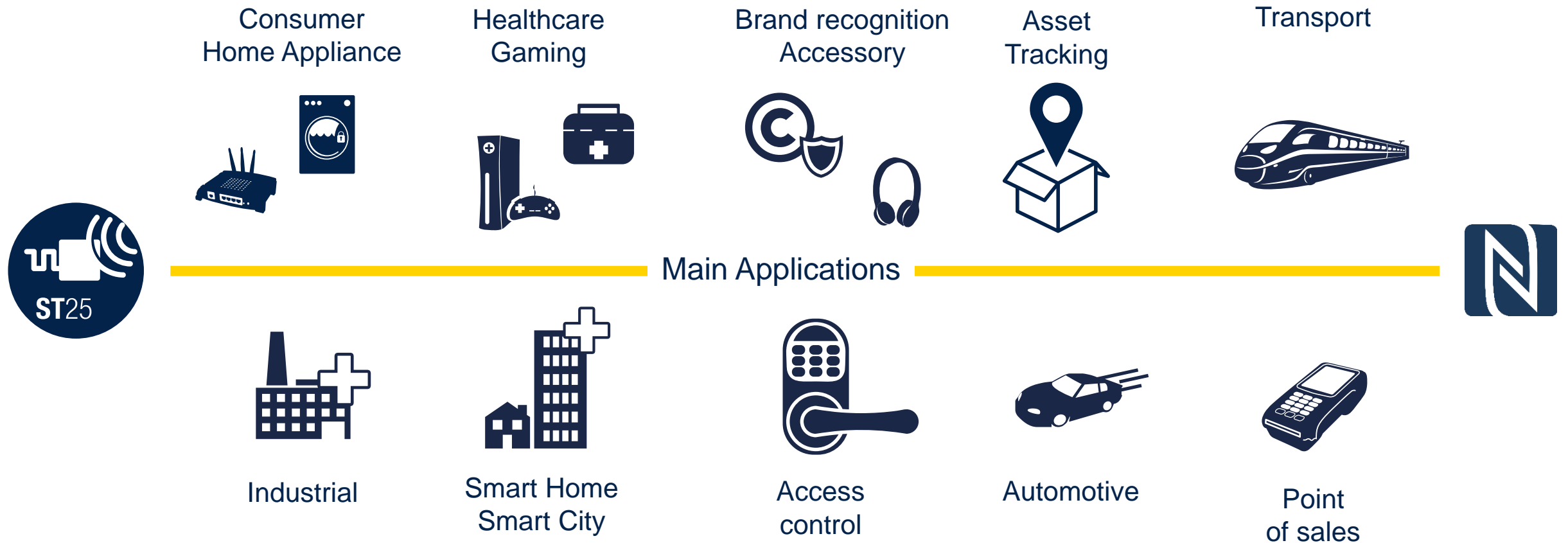
An interactive technology enabling engagement with IoT devices



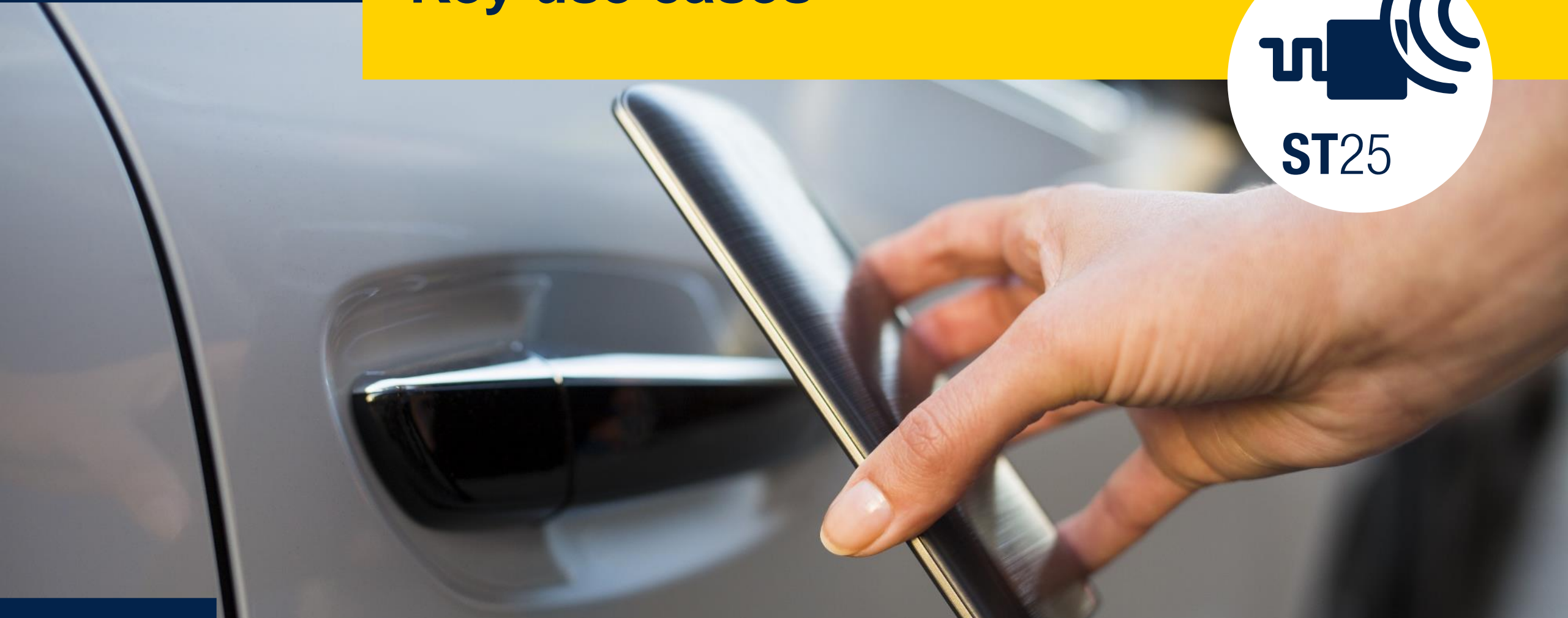
- Near Field Communication, a **short-range** wireless technology
 - Operating at **13.56MHz**
 - Based on the RFID HF standard (ISO14443 & ISO15693)
- **Interactive** and **zero power**, enabling convenient connection to the Internet of Things
- ➔ **NFC-enabled mobile phone can engage with items by a simple tap**
- NFC is developed by the NFC Forum
 - **Interoperability** between devices
 - **Standardized** use cases (web link, Bluetooth handover,...)
- Fast-growing deployment in Mobile phones
 - In 2020, more than two in three phones to come with NFC
 - NFC is used for Mobile payment (EMVCo) like Apple Pay
 - Apple added support of NFC reader mode from iOS11 (2017) onward and support of NFC writer mode from iOS13 in September 2019



ST25 series enriching our lives!



Key use cases

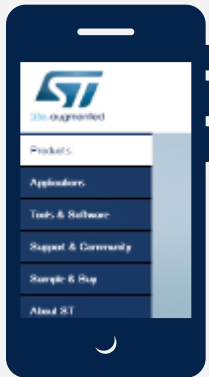


URL link “tap & get web page”

Direct access to a Web page



Native support with NFC phone (NDEF)

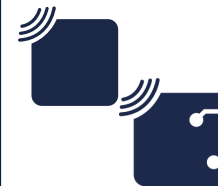


Open a web page

thanks to URL information stored inside the ST25 tags

iOS and Android compatibility

ST solutions



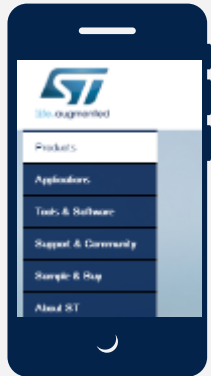
- Tag
- Dynamic Tag

“Tap & get app”

Direct access to download an app



Native support with NFC phone (NDEF)



Direct link to Google Play and Apple store
to download an app

iOS and Android compatibility

ST solutions



- Tag
- Dynamic Tag

Smart access control

Access control made smart

Smart locks

NFC assisted lock configuration to grant temporary access rights (maintenance, friends...)

Hotel Access

with cards or NFC smartphones

ST solutions



- Tag
- HF Reader

Wireless pairing “tap & connect”

Easily pair your connected devices



Native support with NFC phone (NDEF)



Ease Bluetooth / Wi-Fi pairing by simple tap

Just wave your phone to pair

Plug & play technology

Built-in handover in Android & Windows

Multi-user management

Tap your phone to give or take control

Zero impact on power budget

zero power interface and “field detect”

ST solutions



- Tag
- Dynamic Tag

Consumer engagement & brand recognition with Cloud management



Branding and Consumer Engagement

Product identification with enriched information

Identity check using TruST25 digital signature

Tamper detect for open-close detection

ST solutions



• Tag

Contactless electronic ticketing



Fast data transfer
based on ISO14443

Large and unique counting capability
with anti-tearing feature

Anti-collision mechanism

**Compatible with most popular contactless
ticketing systems**

ST solutions



- Tag
- HF Reader

Parameter setting

Save time on your production lines

From DIP switch / resistor to contactless setting

Get rid of manual operation

In the Box “programming”

Simple & flexible

Upload new settings to powered-off devices

Personalize your boxed devices on the production belt

ST solutions



- Dynamic Tag

Maintenance & service

Real-time communication and in-application programming

Fast Transfer Mode with 256 byte buffer
for data synchronization and Firmware update

Manage your stock efficiently
With easy reconfiguration of boxed products

Convenient access to the embedded device
For diagnostics and re-programming

ST solutions



• Dynamic Tag

Payment & home banking

Payment made easy and secure

Payment & Home Banking

Full EMVCo POS and mobile POS (mPOS)
for cashless transactions with minimal investment

Enhanced user experience

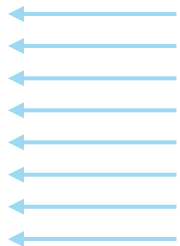
Quicker payment processing
Add new services like loyalty cards

ST solutions



• HF Reader

Energy harvesting to energize low-power devices



STEVAL-SMARTAG1

Energy harvesting from NFC RF Field

NFC connectivity
Enhanced with a suitable App

Up to 5mA with NFC reader

ST one-stop-shop with low power MCU and sensors
with **SmarTAG** solution

ST solutions



- Dynamic Tag

Accessory recognition

Brand recognition and parameter setting



NFC for accessory identification

Convenient and reliable brand identification

Automatic System configuration

Upon accessory type recognition

Brand Recognition

Ensure only branded accessory are used

ST solutions



- Tag
- Dynamic Tag
- HF Reader

Car access and console personalization

NFC for car access and ignition

Convenient and secure access to the car
Distribution of keys online to your NFC smartphone

In-car personalization with secure pairing

Just sit inside and the entire cockpit will fit the driver wish

NFC for car diagnostic

No physical connection required

ST solutions



• HF Reader

ST25 series overview



ST25 product family

Consumer engagement, Asset tracking, Ticketing, Gaming, Brand protection, Access control, ...

www.st.com/st25t

Tags



13.56MHz

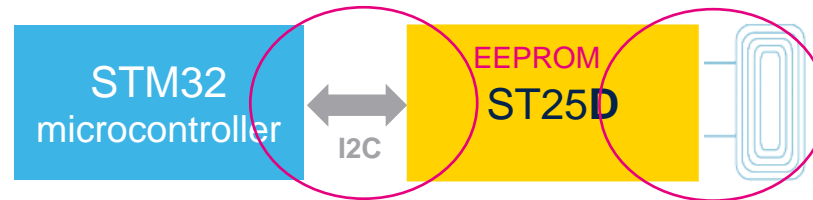


NFC phone / RFID Reader

Industrial, Lighting, Consumer, Metering, Appliance, Healthcare, ... (Fast Transfer Mode and SW upgrade)

www.st.com/st25d

Dynamic tags



13.56MHz



NFC phone / RFID Reader

POS & mPOS Terminals, Automotive, Access control, Gaming, ...

www.st.com/st25r

Readers



13.56MHz



NFC phone

or



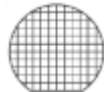
or





NFC / RFID tag product families

	ST25TB	ST25TA Low Density	ST25TA High Density	ST25TV Low Density	ST25TV Energy Harvesting	ST25TV High Density
Contactless Interface	ISO14443B	ISO14443A NFC Forum Type 4		ISO15693 NFC Forum Type 5		
RF range	Short range (up to 10cm)			Long range (up to 100cm)		
RF speed	106kbps			26kbps (53kbps)		
Memory format	EEPROM data	EEPROM (preformatted NDEF)		EEPROM (preformatted NDEF)	EEPROM data	
Memory size	512-bit & 2k / 4k-bit	512-bit / 2k-bit	16k / 64k-bit	512-bit / 2k-bit	4k-bit	16k / 64k-bit
Data protection	OTP bits	Password 128-bit	Password 128-bit	Password 64-bit	Password 64-bit	Password 64-bit
Digital signature	No	Yes, TruST25	No	Yes, TruST25	No	No
Digital output	No	GPO Field detect CMOS_P / Open-drain	No	Tamper Detect	GPO Field detect CMOS_P	No
Counter	32-bit (x2)	20-bit	No	16-bit	No	No
Extra features	No	No	No	Untraceable & Kill modes	Energy Harvesting	No
RF tuning capacitor	64pF	50pF	25pF	23.5pF & 99.7pF	28.5pF	28.5pF
Temperature range	-40°C to +85°C			-40°C to +85°C		
Package	SBN12* / SBN075 ²	SBN12* / SBN075 ² FPN5	SBN12*	SBN12* / SBN075 ² FPN5	SBN12*	SBN12*



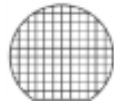
* SBN12: Die form, sawn and Bumped wafer, 120µm thickness, inkless 8" wafer

² SBN075: Die form, sawn and Bumped wafer, 75µm thickness, inkless 8" wafer

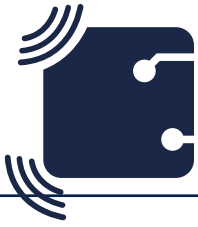


Dynamic NFC / RFID tag product families


	M24SR	M24LR	ST25DV-I2C	ST25DV-PWM
Contactless Interface	ISO14443A NFC Type 4	ISO15693 NFC compatible	ISO15693 NFC Type 5	ISO15693 NFC Type 5
RF range	Short range (up to 10cm)	Long range (up to 1m)	Long range (up to 1m)	Long range (up to 1m)
RF speed	106kbps	26kbps	26kbps	26kbps
Serial Interface	I2C @1MHz	I2C @400kHz	I2C @1MHz	No
Fast Transfer mode	No	No	Yes (256B buffer)	No
Energy Harvesting	No	Yes	Yes	No
Digital output	Open-Drain GPO	Open-Drain GPO	OD or CMOS GPO	2x PWM
Extra features	RF Disable	-	Low Power mode	-
Memory format	EEPROM (preformatted NDEF)	EEPROM data	EEPROM data	EEPROM data
Memory size	2k / 4k / 16k / 64k-bit	4k / 16k / 64k-bit	4k / 16k / 64k-bit	2k-bit
Data protection	Password 128-bit	Password 32-bit	Password 64-bit	Password 64-bit Digital signature
Temperature range	-40°C to +85°C -40°C to +105°C (85°C RF)	-40°C to +85°C	-40°C to +85°C -40°C to +125°C (105°C RF)	-40°C to +85°C (105°C RF)
Package	SO8 / TSSOP8 / FPN8 / SBN12*	SO8 / TSSOP8 / FPN8	SO8 / TSSOP8 / FPN8 / FPN12 / WLCSP10 / SBN12*	SO8 / TSSOP8



* SBN12: Die form, sawn and Bumped wafer, 120µm thickness, inkless 8" wafer



ST25R NFC / HF reader product families

	ST25R95	ST25R3911B	ST25R3912	ST25R3914/15	ST25R3916	ST25R3917	ST25R3920
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

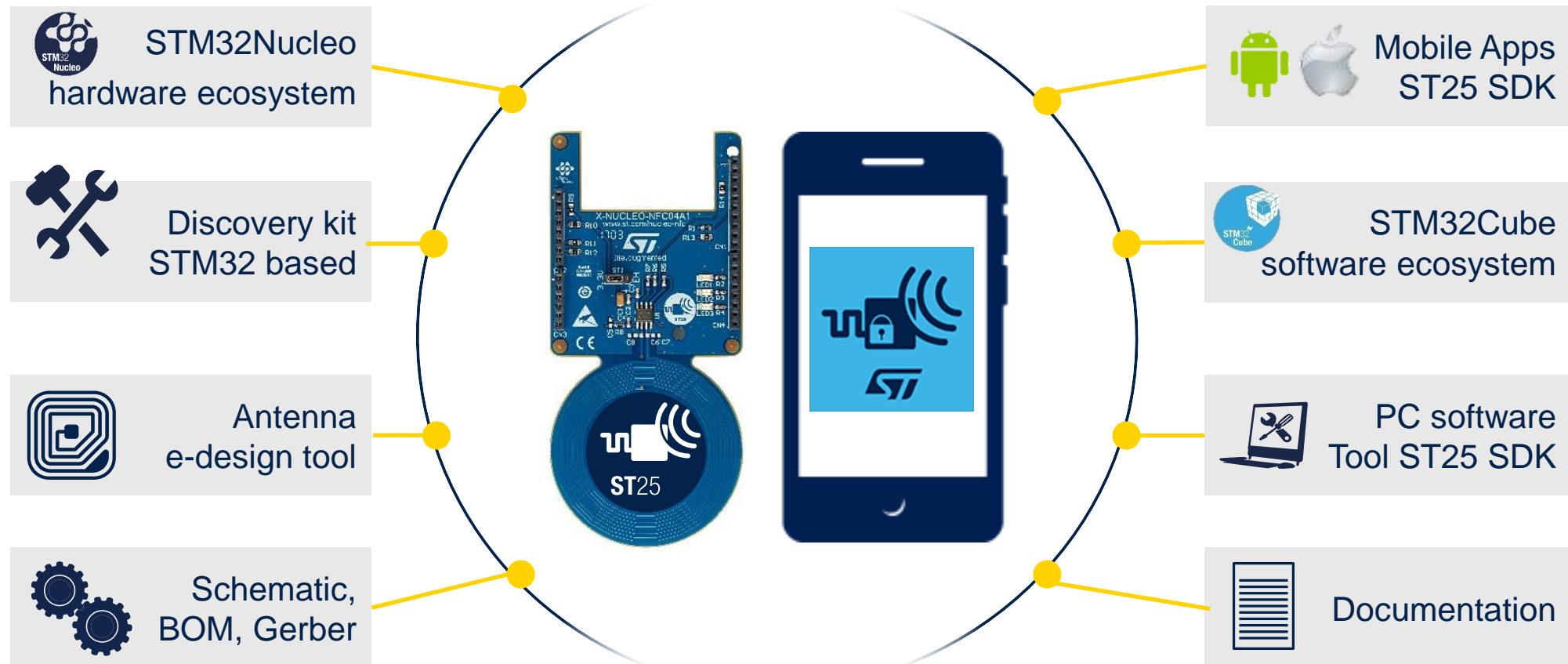
VHBR: Very High Baud Rate
 P2P: Peer to Peer mode
 AAT: Automatic Antenna Tuning
 AWS: Active Wave Shaping

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

ST25 ecosystem DNA

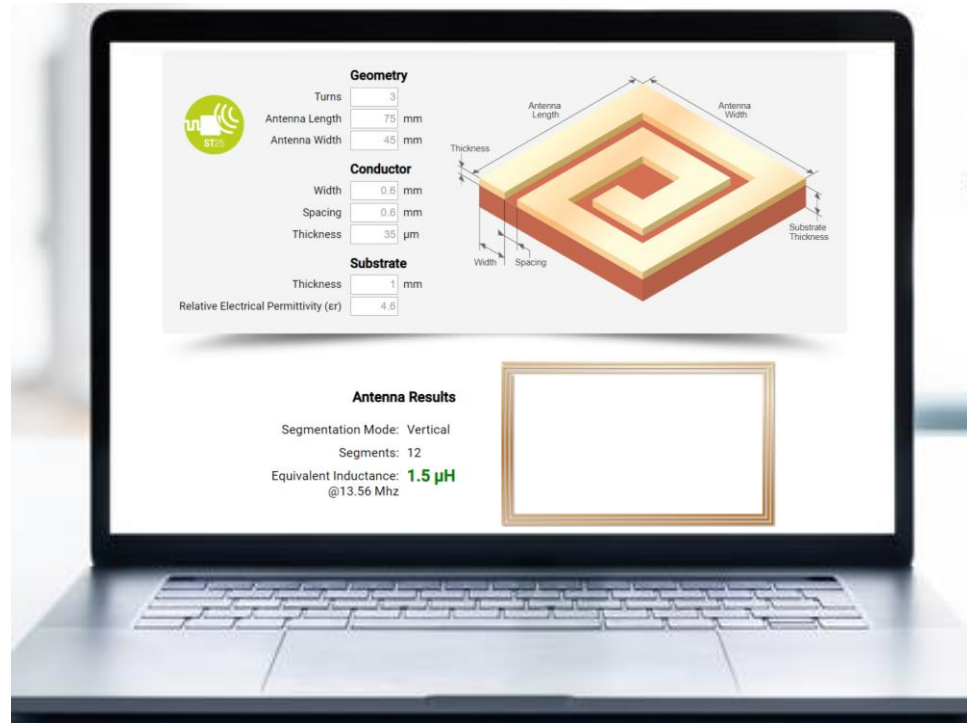
Easy-to-use and customer-oriented



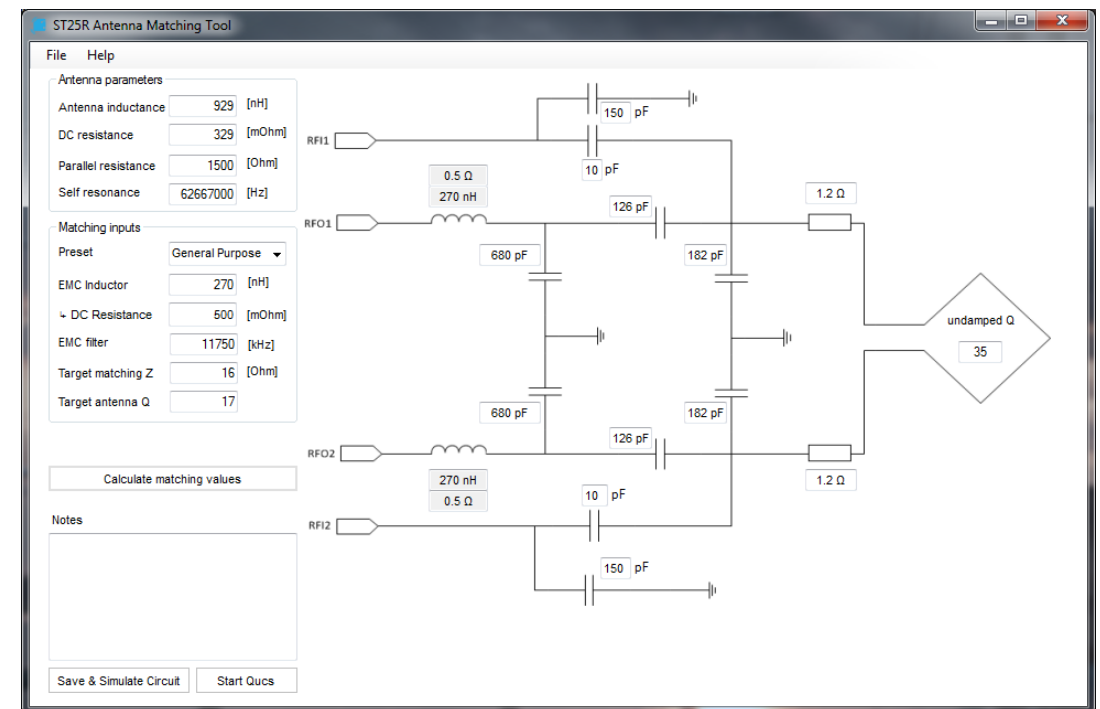
Antenna e-design and matching tools

Fast and easy prototyping

Antenna eDesign suite



ST25R antenna matching tool



Certification & interoperability status



Tags

ST25TV

ST25TA

Dynamic Tags

ST25DV-I2C

ST25DV-PWM

Readers

ST25R3911B

ST25R3916

NFC Forum



NFC Forum



iOS app



RFAL SW



Android app



Linux SW



Questions?



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