

ST25R3918 product presentation





ST25R3918 – Key messages

What it does

- ST25R enables wireless communication features for enhancing product interaction and improving customer experience
- Communication with NFC-enabled smart devices (Android, iOS) with a simple tap in CE mode



Healthcare, Beauty, Kitchen, Consumer, IOT & more

www.st.com/st25r

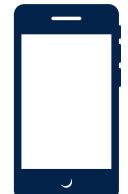
advanced features allow **best customer experience**
by **tapping** to **start phone applications**
automatically and allow **faster** time to market.
~0.5W **power** for excellent range/power consumption ratio
and **improved** electromagnetic immunity.



Readers



13.56MHz



or





ST25R3918 Main Markets

Medical & Healthcare



lab equipment – medical test kits – dispenser
drug & asset management

Beauty & Lifestyle



toothbrush – hair & body care devices
e-cigarette – aroma diffuser

Kitchen & Home Appliances



blender – vacuum cleaner – humidifier
smart fridge – coffee machine

Home Automation



smart devices – metering – smart lock
sensing – smart furniture

Gaming & Education



game consoles – figurines – board games
RC vehicles – dolls

Tools



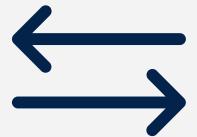
power drill – disk grinder – pressure washer
buzzsaw – buffer machine



ST25R3918 main application parameters

Good interaction range

Dynamic Power Output



Automatically adjusted output power to optimize power transfer and stay within certification limits

Extended user experience

Card emulation mode



Start of temporary smartphone applications like Apple App Clip or Android Instant App with a simple tap of the phone to the ST25R

Low power consumption

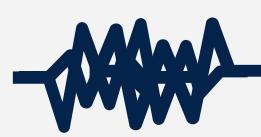
Low Power Tag Detection



Inductive wake-up mode allows low power consumption and increased battery lifetime

Noise immunity

Noise Suppression Receiver



Increased immunity to interference from noise sources and simplified electro-magnetic immunity to ease certification

Fast development

RFAL software library



Single SW library for all ST25 products and full integration into STM32 ecosystem



ST25R3918

Multi-Purpose NFC Transceiver



ST25R3918

Reader Writer	ISO14443 ISO15693	RAM BUFFER	SPI/I ² C
PP2P			
CE	NFC	512-Byte	2.4/5.5V
0.5W	848kb/s		
DPO: Dynamic Power Output LPID: Low power inductive card detection AWS: Active Wave shaping NSR: Noise Suppression Receiver DSO: Driver Slope Adjustment EMD: Automatic EMD Error Handling			



QFN32
Wettable flank

Use cases

- Ideal for Reader+Tag
- Access Control, Gaming, Consumer
- Apple AppClip; Android InstantApp

Key Features

- **0.5W** dynamic output power
- **Active Waveshaping, Noise Suppression Receiver**
- **Low Power Tag Detection**
- -40°C to **85°C** ambient temperature range

Key Benefits

- Low power operation & Standby mode
- Works in challenging environment like noisy LCD displays
- Excellent performance for low power applications
- CE mode allows easy start & interface with application on phones



Product lineup

	ST25R95	ST25R3918	ST25R3911B	ST25R3912	ST25R3916	ST25R3917
Description	Entry-Level NFC Reader	Multi purpose NFC reader	High-Performance NFC Forum Reader	Mid-Range NFC Forum Reader	High-performance NFC Universal Device & EMVCo Reader	High-performance NFC & EMVCo Reader
Reader/Writer mode	ISO14443A/B ISO15693 Felica	ISO14443A/B ISO15693	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
PP2P mode	-	Initiator & Target	Initiator	Initiator	Initiator & Target	Initiator
RF speed	424kbps	848kbps	6.8Mbps (VHBR)	848kbps	848kbps	848kbps
Market	Consumer	Consumer	Payment EMVCo 2.6, Industrial	Access control, Metering, Consumer	Payment EMVCo 3.0, Industrial, Consumer	Payment EMVCo 3.0, Industrial, Consumer
Advanced features	IWU	DPO, NSR, DSA, AWS, IWU, EMD	AAT, DPO, CIWU	DPO, IWU	AAT, DPO, NSR, DSA, AWS, CIWU, EMD	DPO, NSR, DSA, AWS, IWU, EMD
HW interface	SPI 2Mbps	I ² C // SPI 10Mbps	SPI 6Mbps 	SPI 6Mbps	I ² C // SPI 10Mbps	I ² C // SPI 10Mbps
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
Output power	0.23W	0.5W	1.4W	1.0W	1.6W	1.6W
Temperature range	-25°C to +85°C ^(A)	-40°C to +85°C ^(A)	-40°C to +125°C ^(J)	-40°C to +125°C ^(J)	-40°C to +105°C ^(A)	-40°C to +105°C ^(A)
Package	32-pin QFN	WF 32-pin QFN	32-pin QFN / Wafer	32-pin QFN / WF 32-pin QFN / WLCSP-30	WF 32-pin QFN / WLCSP-36	WF 32-pin QFN



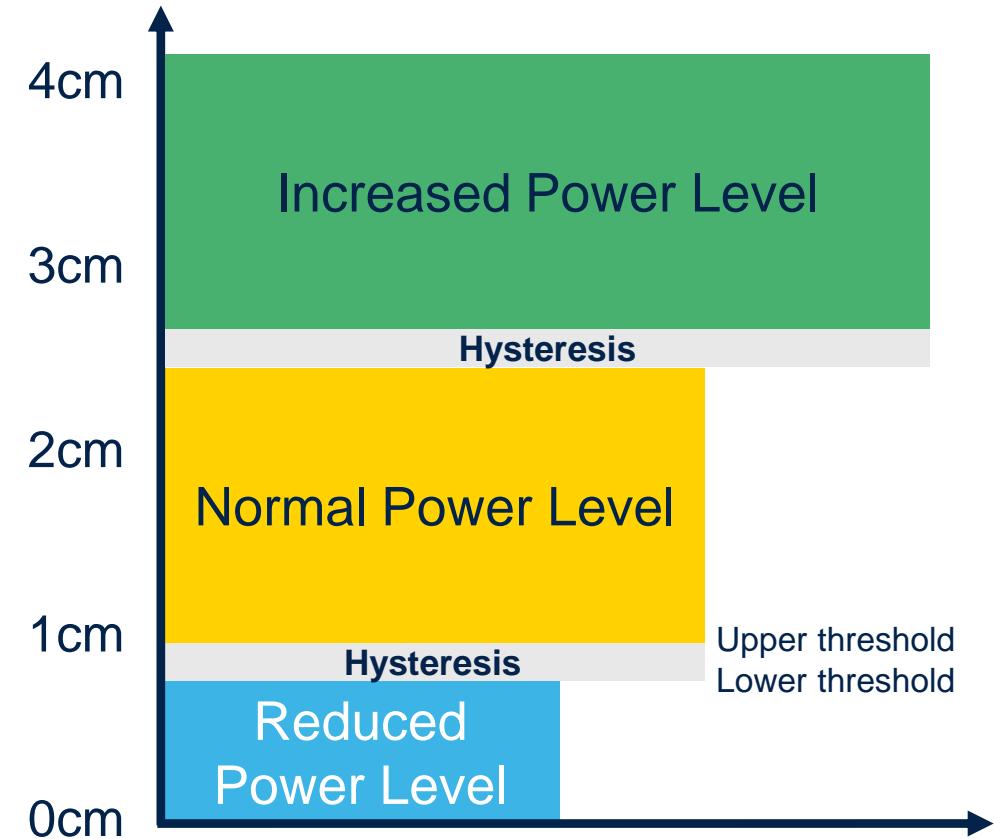
ST25R3916/17/18 Lineup

Features	ST25R3916	ST25R3917	ST25R3918
Power	1.6W		0.5W
ISO/IEC 14443 Type-A		Yes	
ISO/IEC 14443 Type-B		Yes	
ISO/IEC 15693		Yes	
FeliCa™	Yes		No
NFC Tag read support		Yes	
ISO/IEC 18092 Passive Initiator mode		Yes	
ISO/IEC 18092 Passive Target mode	Yes	No	Yes
ISO/IEC 18092 Active Initiator and Target mode	Yes	No	
Card Emulation	Yes	No	Yes
Automatic antenna tuning (AAT)	Yes		No
Capacitive sensor wakeup	Yes		No
Low Power Tag Detection		Yes	



ST25 Reader DPO: Dynamic Power Output

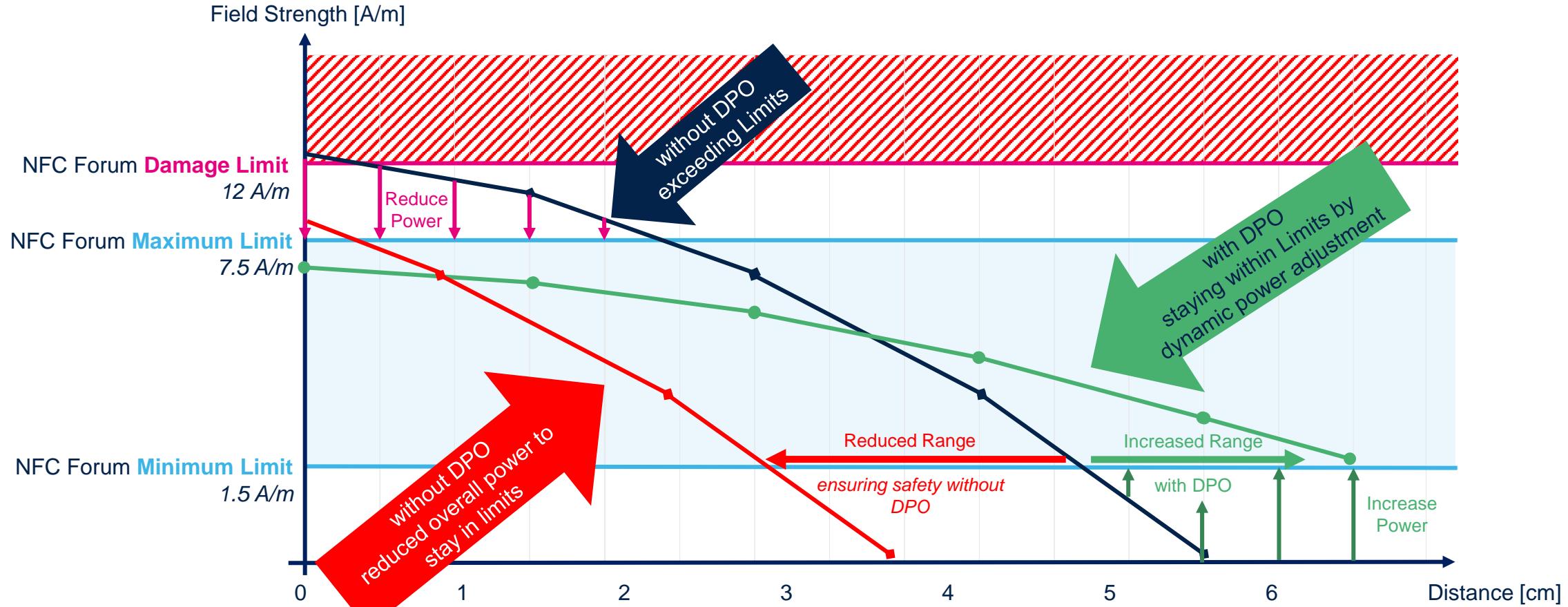
- Achieve min/max power limits easier
The ST25R series allows to adjust the output power dynamically via Dynamic Power Output
- Optimal performance from weak to strong card response
ST25R series allows to adopt to different power levels of card responses via Active Gain Control
- Improved noise immunity
Squelch feature allows to scale the signal level to have improved immunity against noise





ST25 Reader DPO: Dynamic Power Output

DPO of reader will keep power levels within requirements & limits





NSR: noise suppression receiver

- Proper decoding

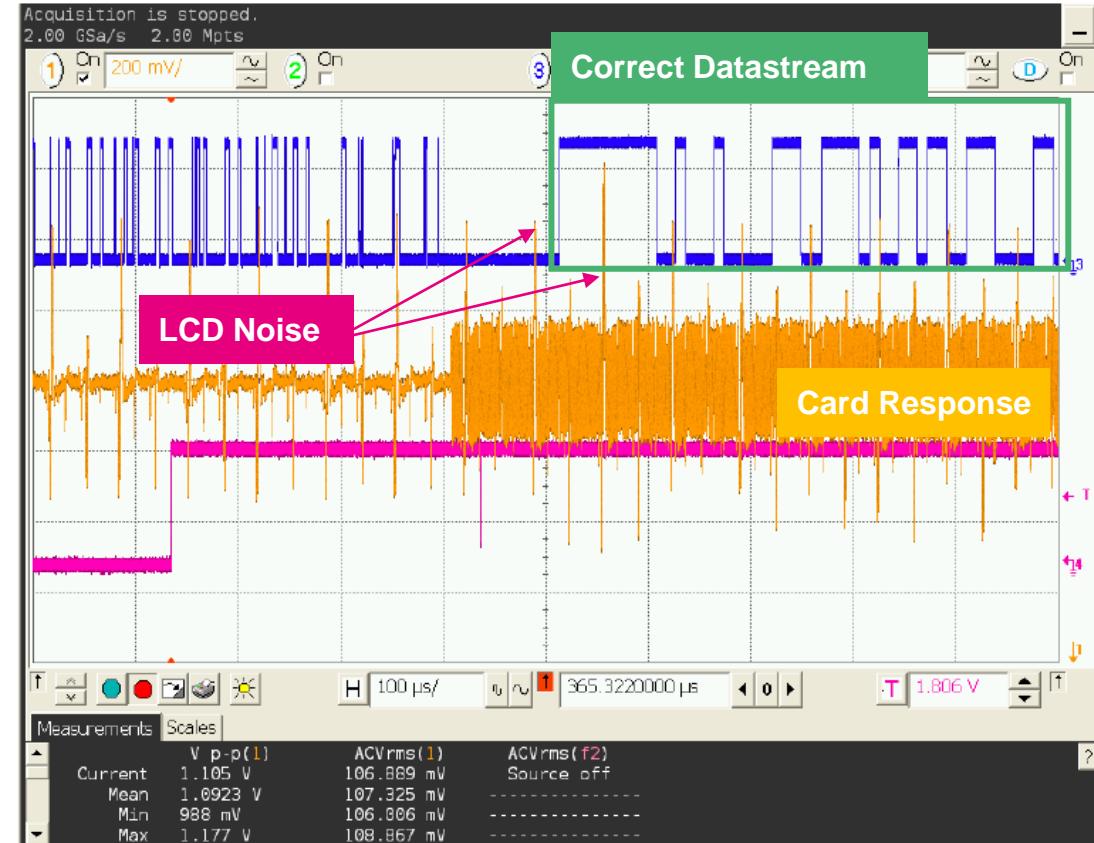
Proper decoding still possible even though LCD noise level exceeds card signal strength

ANS jumps in as soon as the receiver locks on a card response.

- Noise immunity compared to non NSR

Type A 106 display noise immunity improved by a factor of 3.3 vs ST25R3912

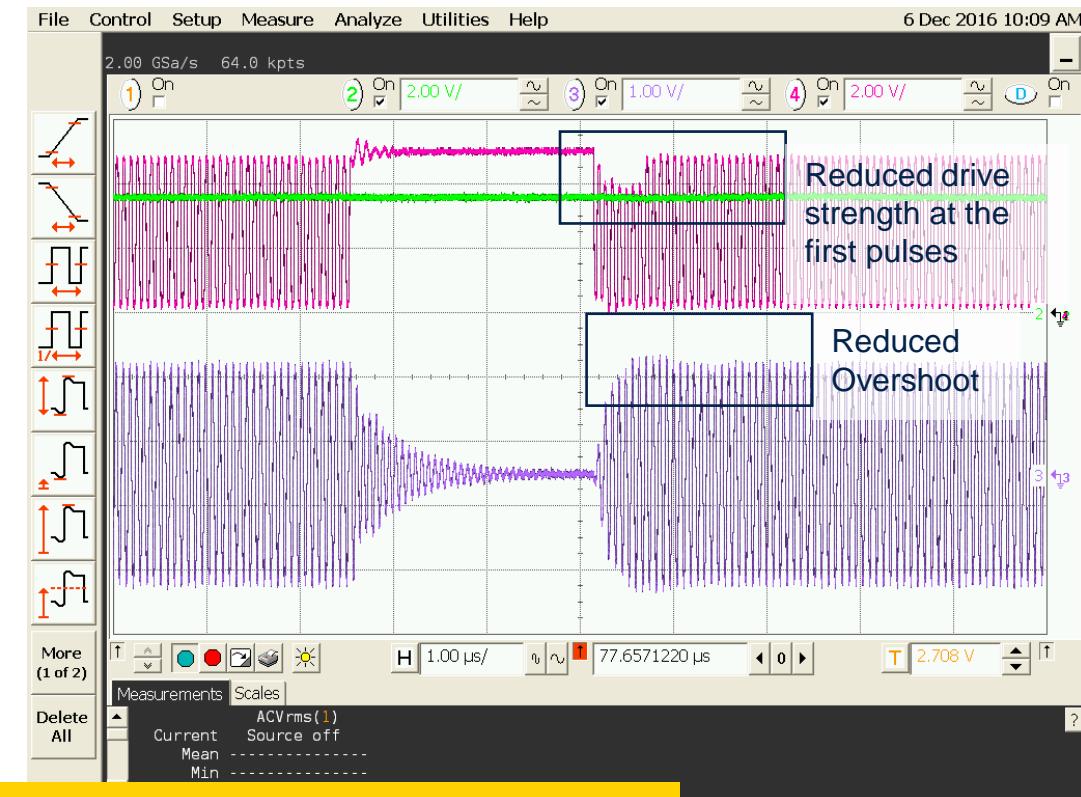
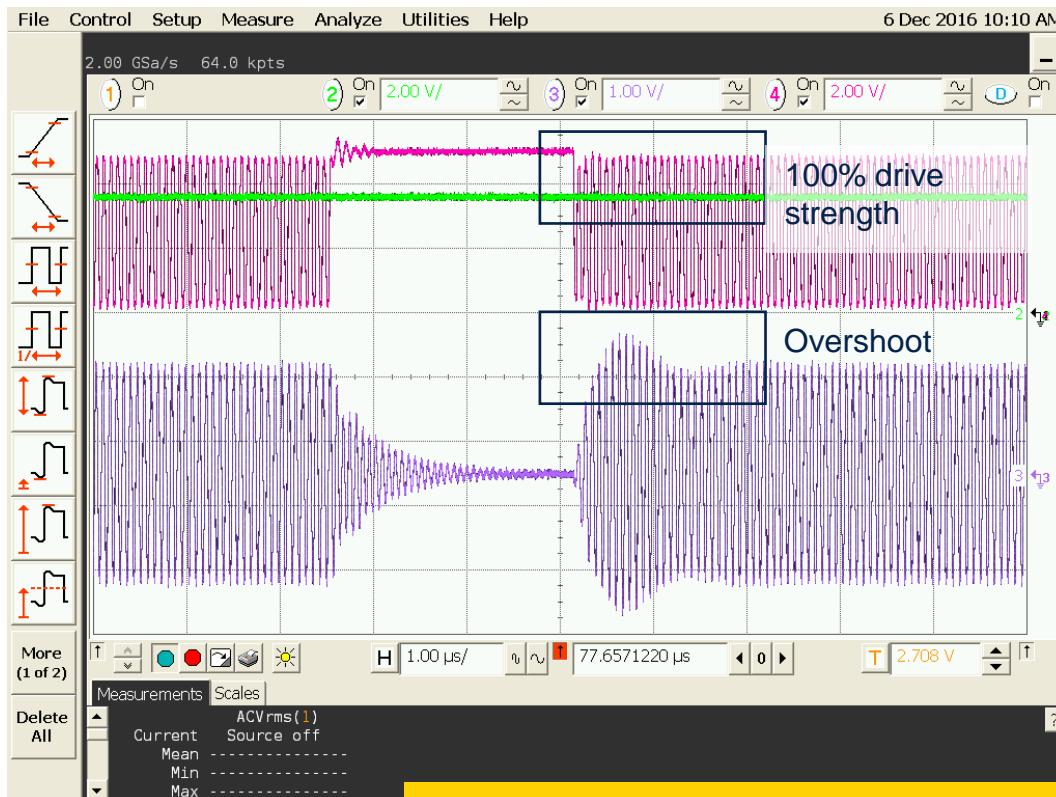
Type B 106 display noise immunity improved by a factor of 9.2 vs ST25R3912





AWS: active waveshaping

- Traditional A106 modulation pulse
- Improved A106 modulation pulse with Over/Ubershoot Protection



Over/Ubershoots can be solved with register settings
No rematching of antenna required



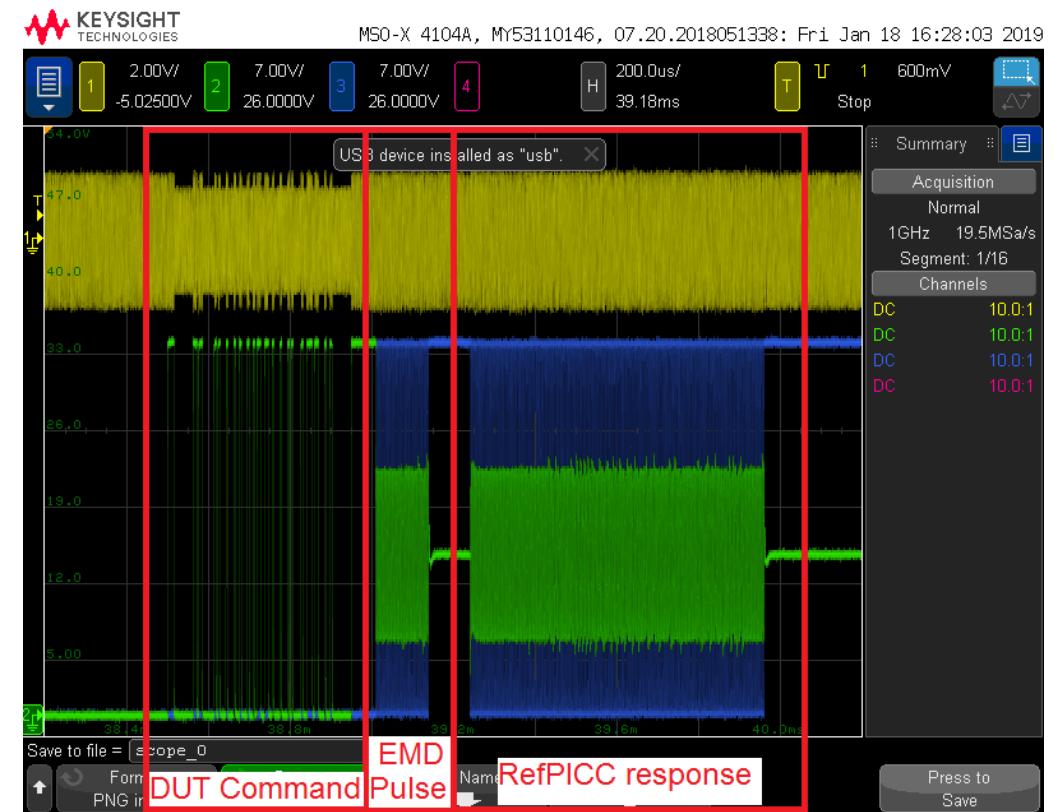
Automatic EMD suppression

- Automatic PCD EMD handling

When the ST25R3918 receives a PICC frame it is checked for transmission errors. Transmission errors are detected in real time and if the number of received bytes when a transmission error is detected is less than 4, then the PCD shall ignore the transmission and be ready to receive a new PICC frame.

- Increased Robustness

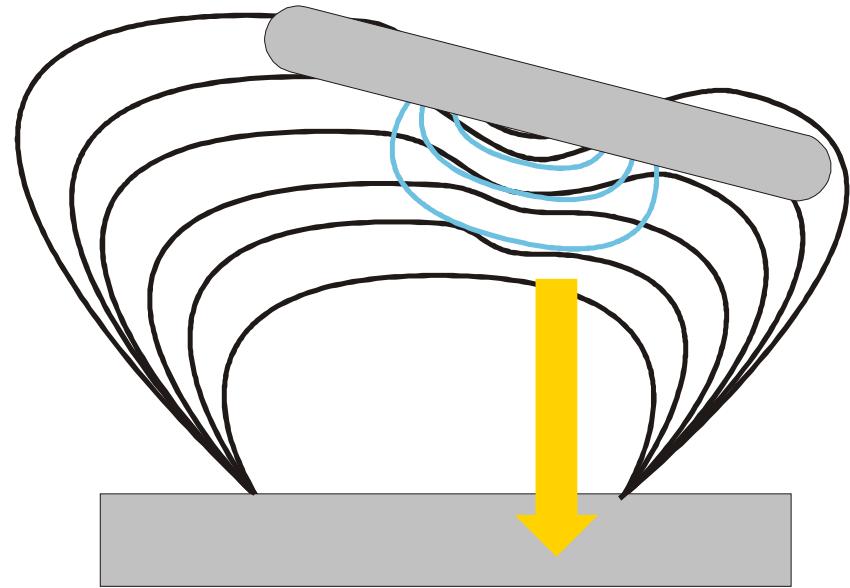
EMD handling enhances the robustness of the contactless communication between ST25R3918 and the PICC against PICC generated electromagnetic disturbance (EMD)





Inductive low power card detection

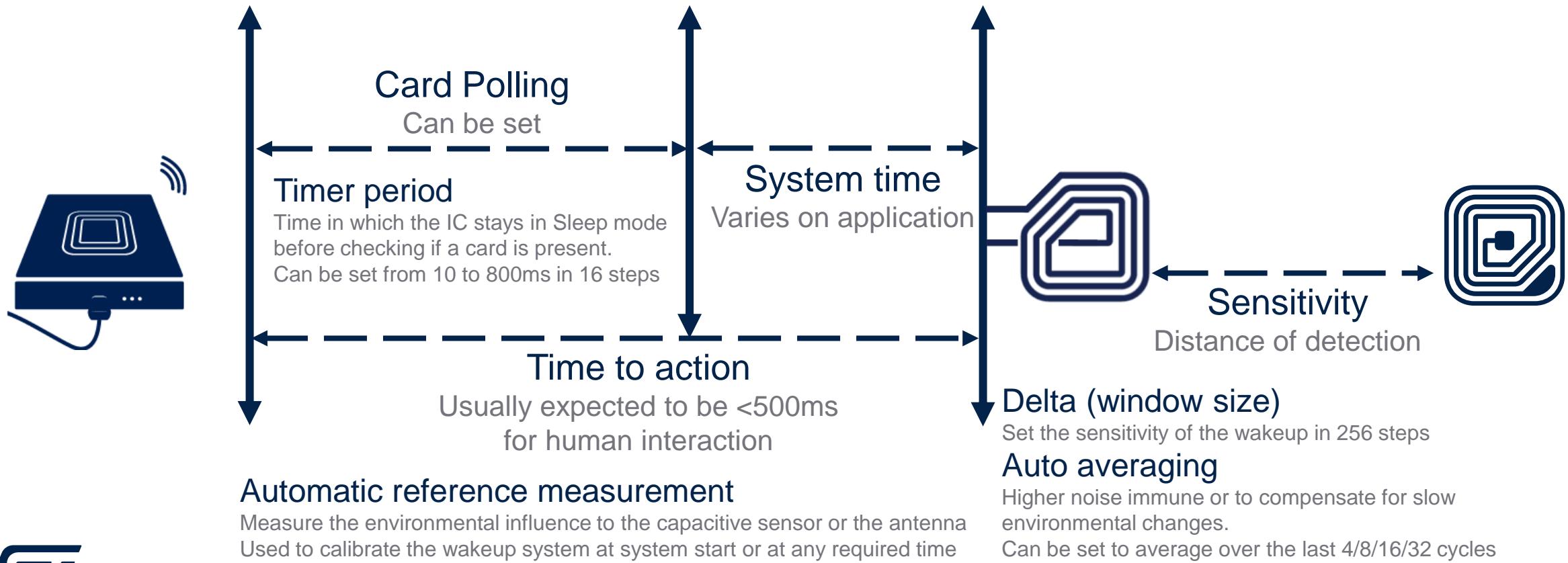
- Internal wakeup circuitry
 - The ST25R3918 includes a fully programmable wakeup scheme. All relevant parameters like cycle time & sensitivity can be programmed.
 - Inductive ping every 10 to 800ms in 16 steps
 - Sensitivity of the wakeup adjusted in 256 steps
 - Automatic average over the last 4/8/16/32 cycles
 - No MCU required to run the wakeup
 - The inductive wakeup is dedicated to detect approaching cards only





Inductive low power card detection

Consider reaction time/sensitivity of the system





Use CE mode to open temporary phone applications

- ST25R3918 features a CE (card emulation) mode beside standard NFC reader functionality
- Enables new way of customer interaction: Temporary phone apps
 - Accessible via simple tap on NFC device e.g. ST25R3918
 - Small and lightweight for opening quickly within seconds
 - No installation process required
- Use cases
 - (Re-) ordering processes
 - Access to product information
 - Device setup and parameter setting
 - Pairing
 - ...



ST25 Ecosystem





Development & design support

Hardware



Evaluation Boards

Discovery kits
based on STM32 MCU

Nucleo boards ecosystem
based on STM32 MCU

Tag bags

Antenna kits

Software Tools



Antenna design tool

Antenna matching tool

ST25 PC GUI

Software development kit

Documentation



Documentation

Datasheets
Application Notes
Open Source Libraries
Code Examples

Schematics
BOMs
Gerber Files

Support



e2e community

Trainings

Webinar

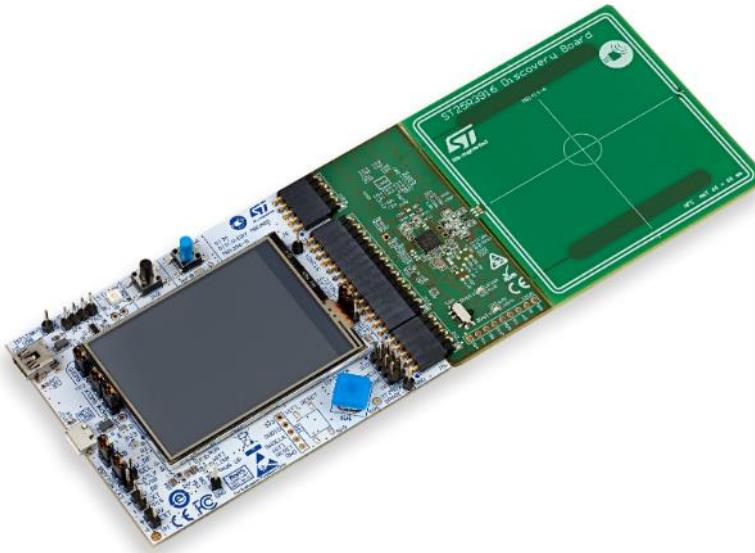
MOOC



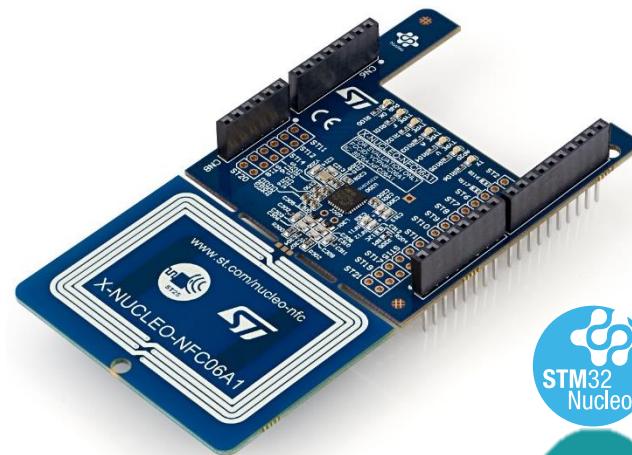
Community



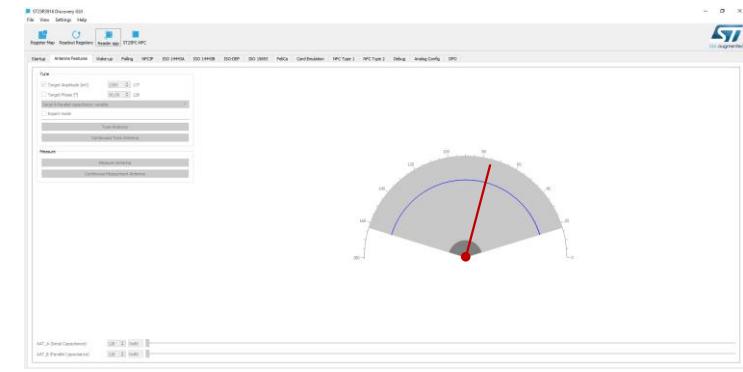
ST25R evaluation boards



ST25R3916-DISCO



X-NUCLEO-NFC06A1



ST25R3916 discovery kit

- ST25R3916 High perf NFC universal device and EMVCo reader
- 66x66mm 2 turns antenna etched on PCB
- STM32L476 ULP 32-bit MCU
- Micro-USB connector
- Additional UART / I²C Host interfaces, as well as NFC SPI and JTAG/SWD points
- Pin compatible with ST25R3918

ST25R3916 Nucleo shield

- ST25R3916 High perf NFC universal device and EMVCo reader
- 47x34mm 4 turns antenna etched on PCB
- Compatible with STM32 Nucleo boards
- Equipped with Arduino™ UNO R3 connector
- Pin compatible with ST25R3918

PC software

- GUI to evaluate the features of the ST25R3916/17/18
- ST25R3916/17/18 register access
- Analog configuration of the ST25R3916/17/18
- Visualizations of DPO, wake up mode and more
- Access all features of ST25 Tags



Thank you