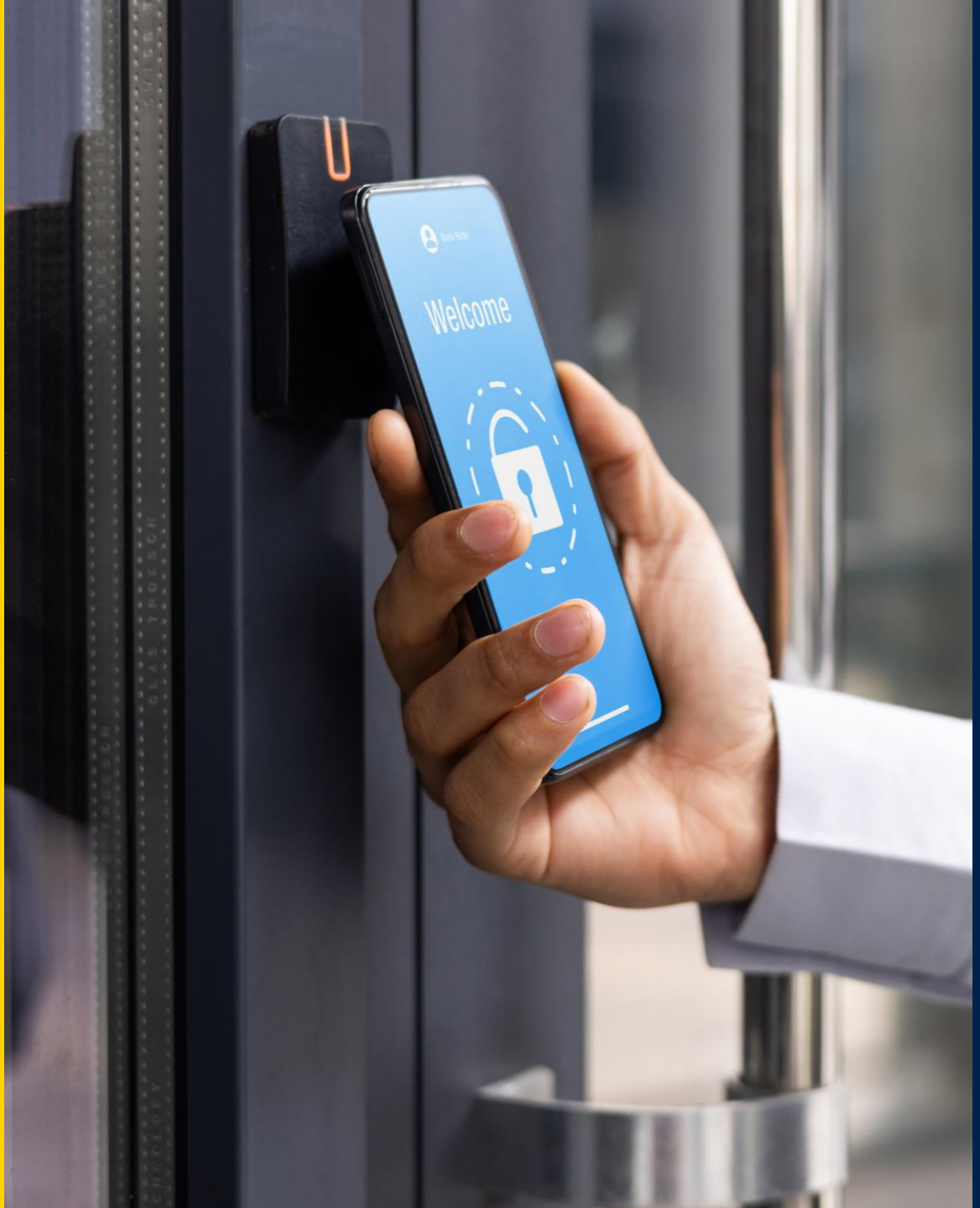
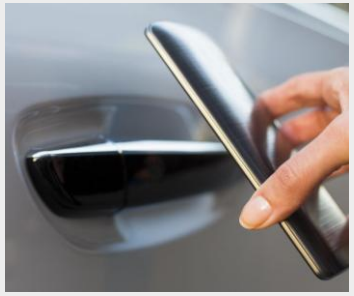


ST25R210 NFC reader product presentation

ST25

ST25R210 overview

High-performance NFC reader for access control, Reader+Tag, industrial, and consumer




- **Cost-optimized**
- **ST25R210 offers extended range & outstanding robustness**

Why choose the ST25R210?

- **1.6 W** output power with dynamic power output & active wave shaping
- Enables fast **NFC Forum** certification cycles
- **Tiny** footprint 4x4 mm QFN-28
- Best **sensitivity** and LPCD
- -40°C to +105°C extended ambient temperature range
- **10-year** longevity commitment

CERTIFIED

ST25R210 main markets

Access control, eGovernment

Authentication

Beauty & lifestyle

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

Consumer, gaming

Pairing
Power & data transfer

Qi wireless charging protection

Card or phone identification
Authentication

Industrial

Tracking & inventory
Data transfer & programming

Ki kitchen

Power & data transfer

ST25R210
High-perf. NFC universal device reader

ST25R210

Reader Writer

Card Emulation

Passive P2P

1.6 W

ISO14443 ISO15693 FeliCa

NFC

848kb/s

RAM BUFFER

256-Byte

SPI

Vdd: 2.7-5.5 V

Vio: 1.65-5.5 V

10 Mb/s >2.7 V
5 Mb/s <2.7 V

DPO: Dynamic power output
LRCD: Long range card detection
AWS: Active wave shaping
NSR: Noise suppression receiver
AAT: Automatic antenna tuning
EMD: Automatic EMD error handling

4x4 mm QFN28

Use cases

- Access control, Reader+Tag, industrial & consumer applications

LONGEVITY 10 YEARS COMMITMENT

Key features

- CR13 NFC Forum universal device
- **1.6 W** output power with DPO, **active wave shaping**
- **Noise suppression** for antenna behind or close to displays
- **Long range LPCD**
- Vdd 2.7-5.5 V with reduced capacitor BOM
- SPI interface: Vio 1.65-5.5 V
- QFN-28 4x4 mm package
- -40°C to +**105°C** ambient temperature range

Key benefits

- Smallest footprint, high perf, yet cost-efficient NFC reader

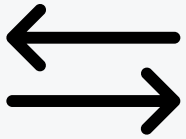
NFC reader product lineup

	ST25R3916B	ST25R200	ST25R210	ST25R300
Description	NFC universal device reader	Powerful multi-purpose NFC reader	High performance NFC universal device reader	High performance NFC universal device & EMVCo reader
Reader/Writer mode	ISO14443A/B ISO15693 FeliCa	ISO14443A/B ISO15693	ISO14443A/B ISO15693 FeliCa	ISO14443A/B ISO15693 FeliCa
Card emulation mode	Yes	No	Yes	Yes
P2P mode	Passive - Initiator & target	No P2P	Passive - Initiator & target	Passive - Initiator & target
LPCD range	Standard range (Wakeup<<Read)	Extended range (Wakeup≥Read)	Extended range (Wakeup≥Read)	Extended range (Wakeup≥Read)
Mfi timing compliance	Via external MCU	Via external MCU	**Internal timer**	Internal timer
Automatic antenna tuning	Voltage-controlled capacitors	No AAT	**Capacitor bank**	Capacitor bank
Reset pin	No	Yes	Yes	Yes
Advanced features	AAT, DPO, NSR, DSA, AWS, IWU, EMD	DPO, IWU, NSR, EMD, OSP	**AAT**, DPO, NSR, **AWS**, IWU, EMD	AAT, DPO, NSR, AWS, IWU, EMD
HW interface	I²C // SPI 10 Mbps	SPI 10 Mbps	SPI 10Mbps	SPI 10Mbps
SW interface	RFAL Unified software library for frontends			
Power supply	2.4 V – 5.5 V	2.7 V - 5.5 V	2.7 V – **5.5 V**	2.7 V – 6.0 V
Output power	1.6 W	1.2 W	**1.6 W**	2.2W
Temperature range	-40°C to +105°C (A)	-40°C to +85°C (A)	-40°C to +105°C (A)	-40°C to +105°C (A)
Package	5x5 QFN 32-pin / WLCSP-36	4x4 QFN 24-pin	**4x4 QFN 28-pin**	5x5 QFN 32-pin

AAT: Automatic antenna tuning
DPO: Dynamic power output
NSR: Noise suppression receiver
DSA: Drive slope adjustment
AWS: Active wave shaping
IWU: inductive wake up
EMD: Electromagnetic disturbance suppression
P2P: Peer to peer mode
LPCD: Low power card detection

ST25R210 key benefits

Outstanding range Consistent experience
DPO: Dynamic power output



- Largest wakeup range on the market (surpassing ST25R3916B by double digit %)
- The output power is adjusted automatically to reduce power and stay within certification limits.

Low power consumption
IWU: Inductive wakeup

- Increase battery lifetime during key detection
- Inductive wakeup enables low power consumption while in card detection mode

Noise immunity
NSR: Noise suppression receiver

- Increased immunity to interference from noise sources
- Simplifies electro-magnetic immunity and eases certification

Fast time-to-market

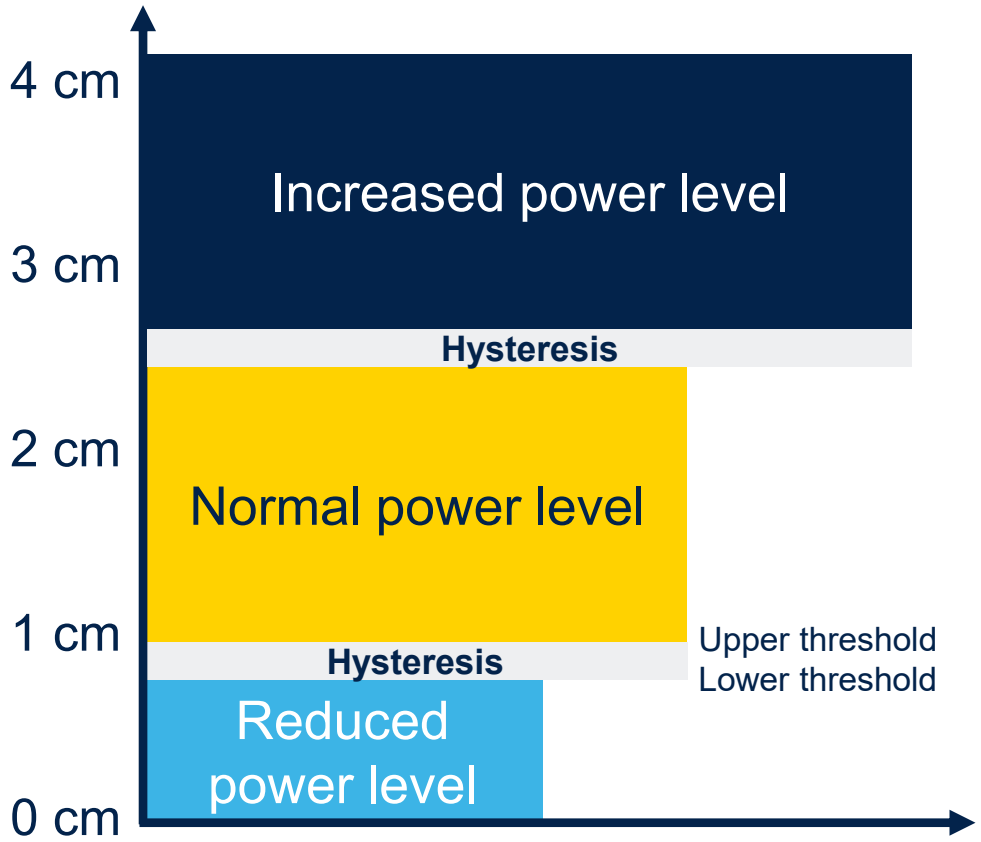
- NFC Forum, and ISO compliant SW library
- Single SW library for all products
- Full integration into STM32 ecosystem

Dynamic power output (DPO)

Achieve min/max power limits easier
The ST25R series allows for dynamic adjustment of the output power via DPO.

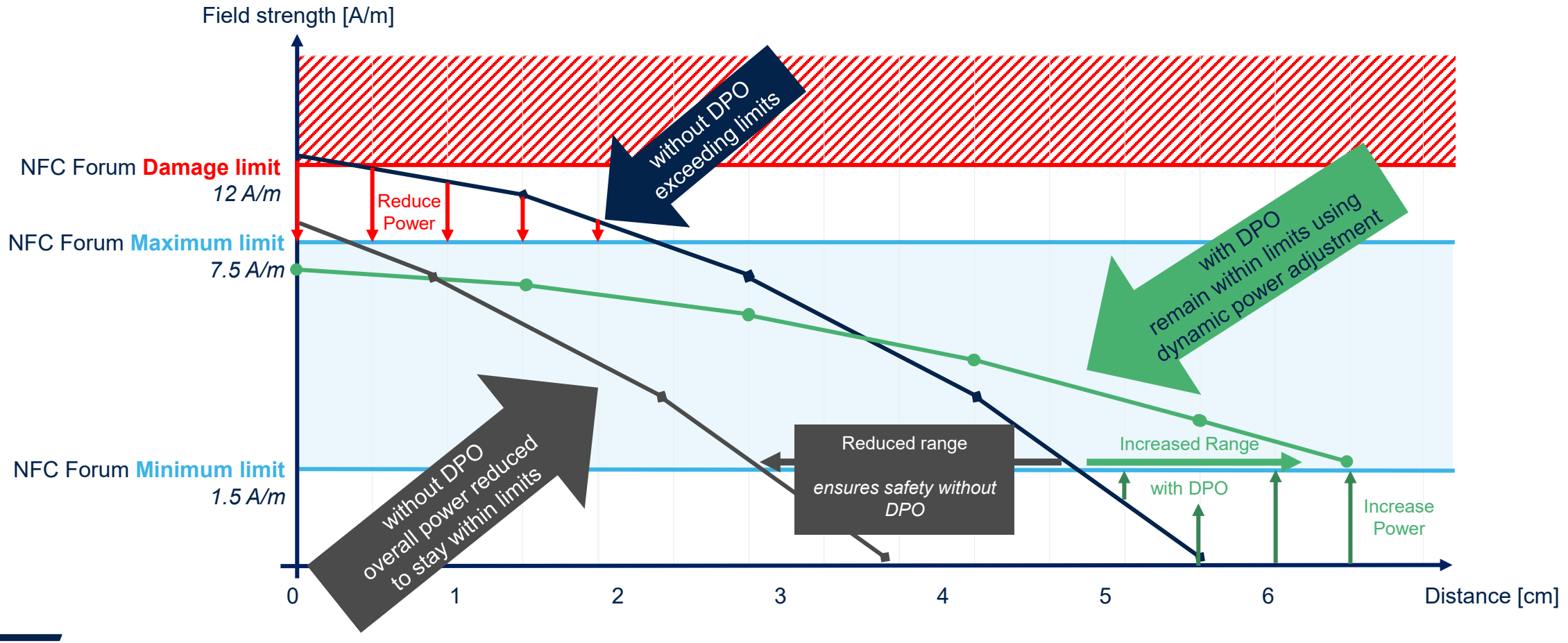
Optimal performance for weak to strong card response
The ST25R series allows adaptation to different power levels of card responses via active gain control.

Improved noise immunity
The squelch feature allows scaling of the signal level to improve immunity against noise.



Dynamic power output (DPO)

DPO of reader keeps power levels within requirements & limits



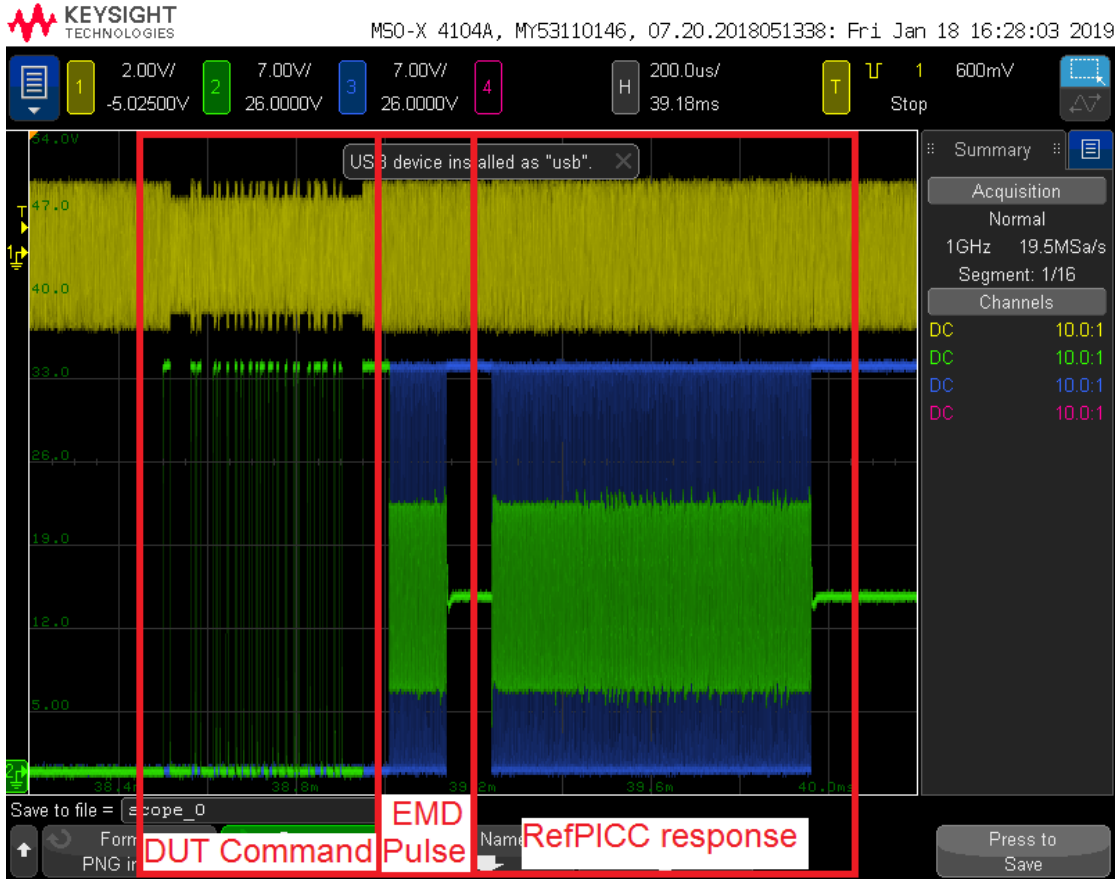
Automatic EMD suppression

- ## Automatic PCD EMD handling

  When the ST25R210 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 ST25R210 and the PICC against PICC generated Electro Magnetic Disturbance (EMD)

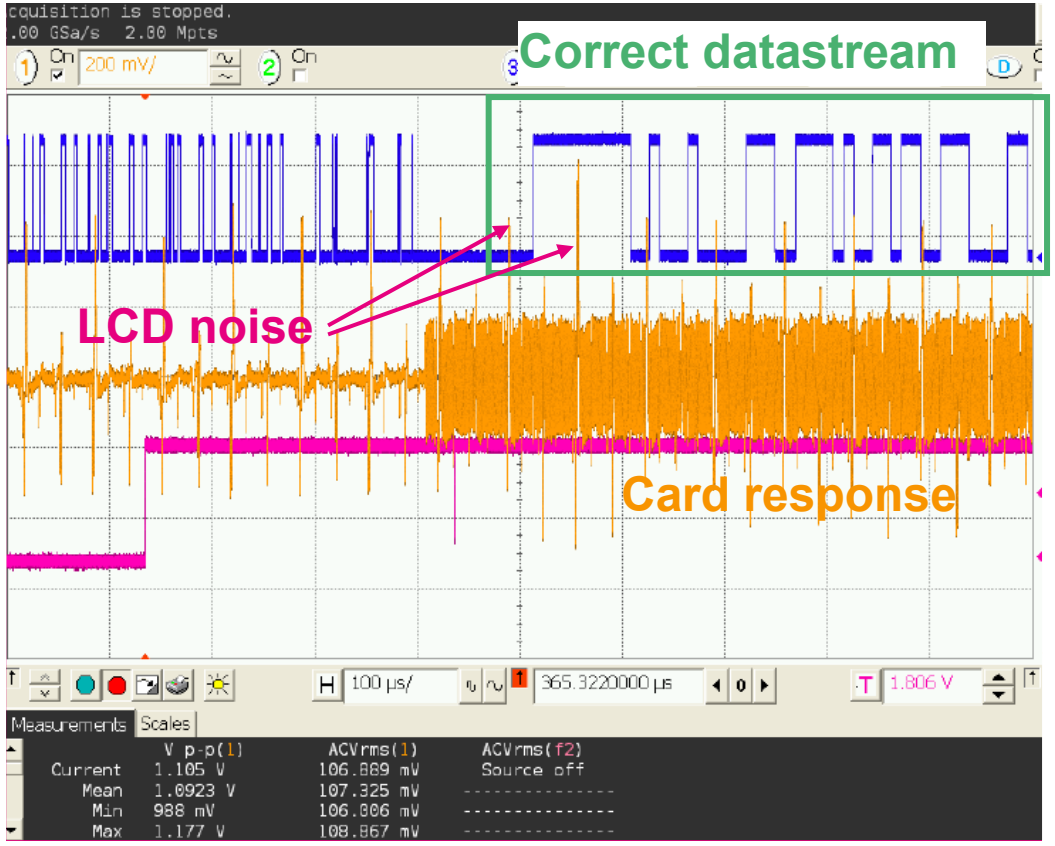


Noise suppression receiver (NSR)

Proper decoding

- Proper decoding is still possible even when the noise level (e.g., from LCD displays) exceeds card signal strength.
- Active noise suppression jumps in as soon as the receiver locks onto a card response.

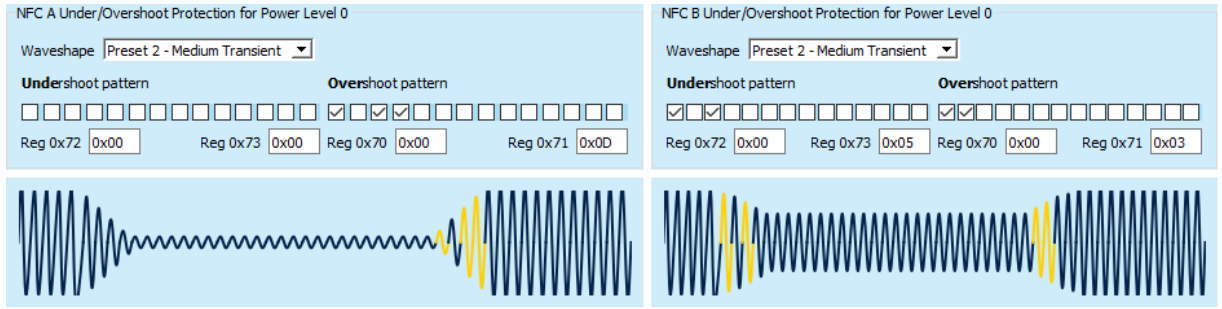
Higher noise immunity

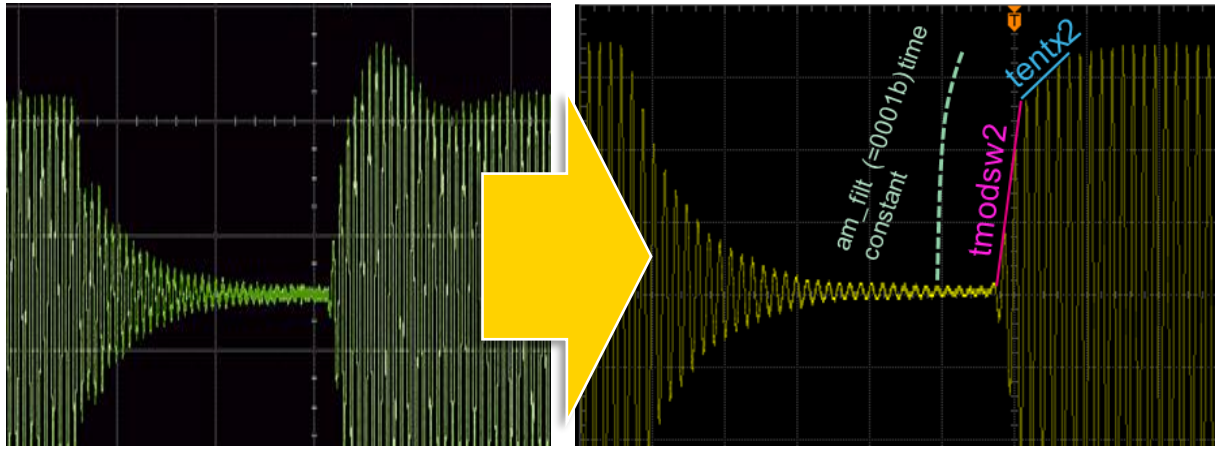


Active wave shaping (AWS)

Improved active wave shaping (AWS) function

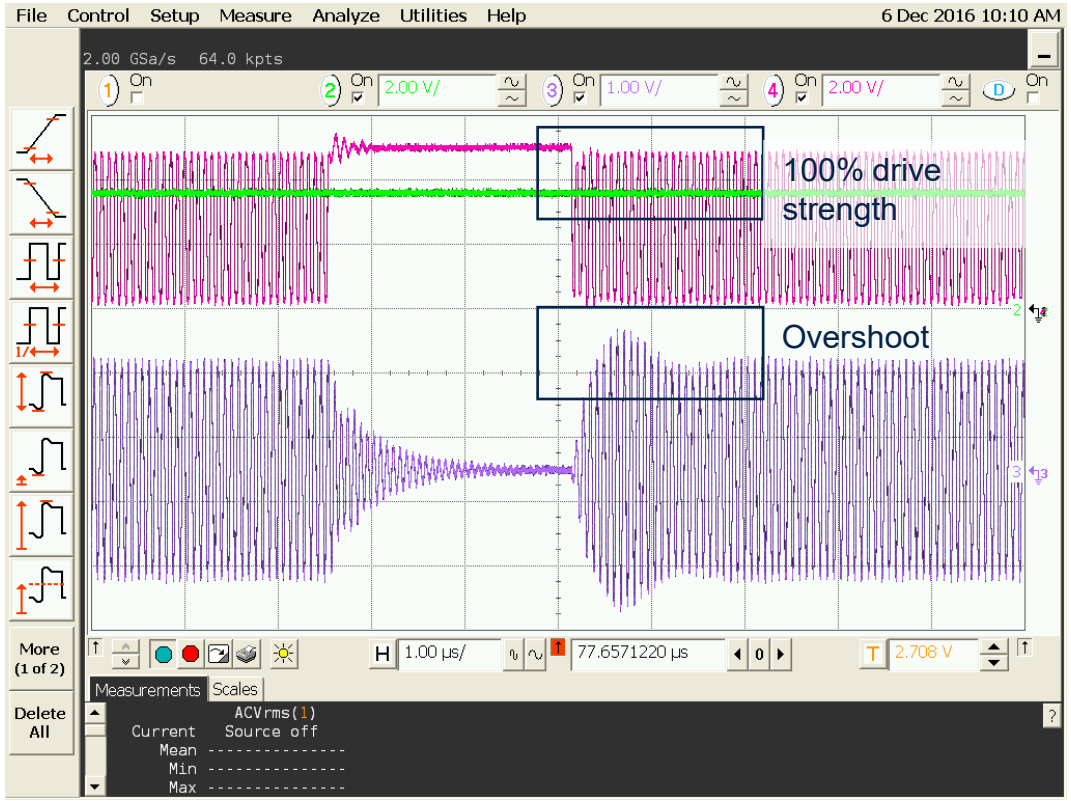
- Reduces over- and undershoots more effectively than before.
- Brings them to an acceptable level even in the most challenging designs.
- The function is easily enabled with 2x registers and 14x bits for each over- and undershoot protection.



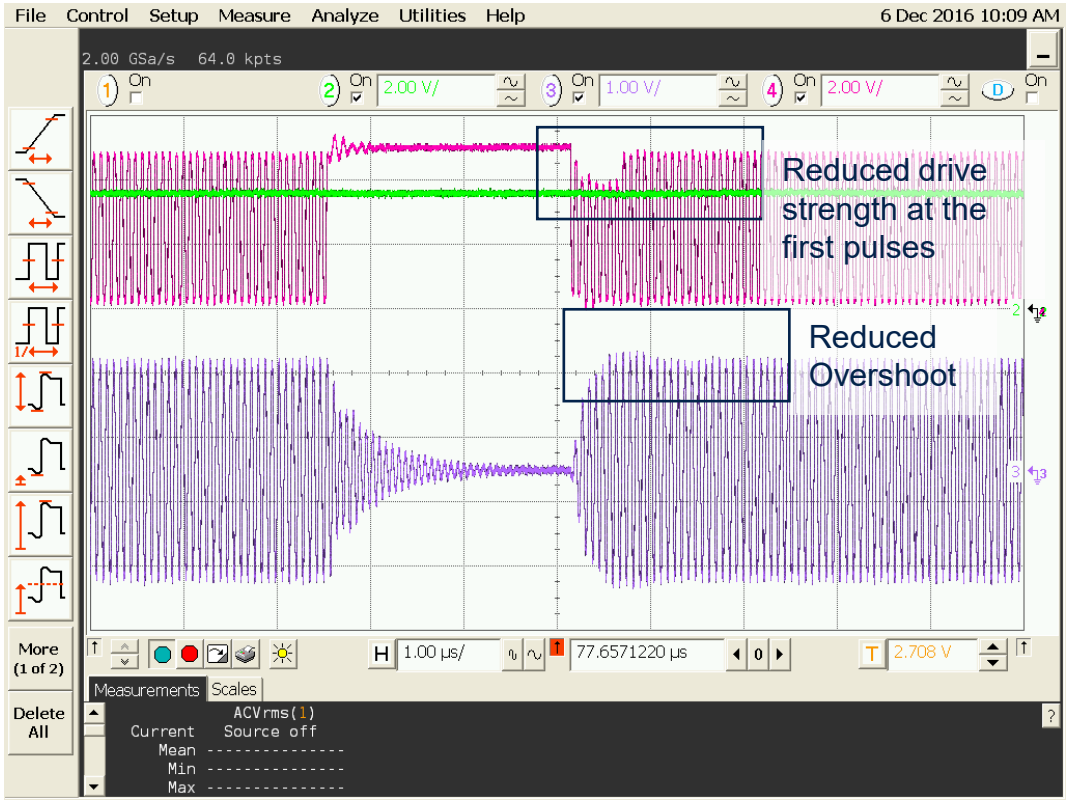


Overshoot protection (OSP)

Traditional A106 modulation pulse



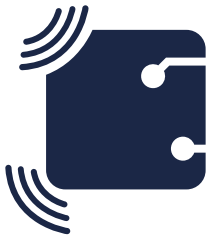
Improved A106 modulation pulse with OSP

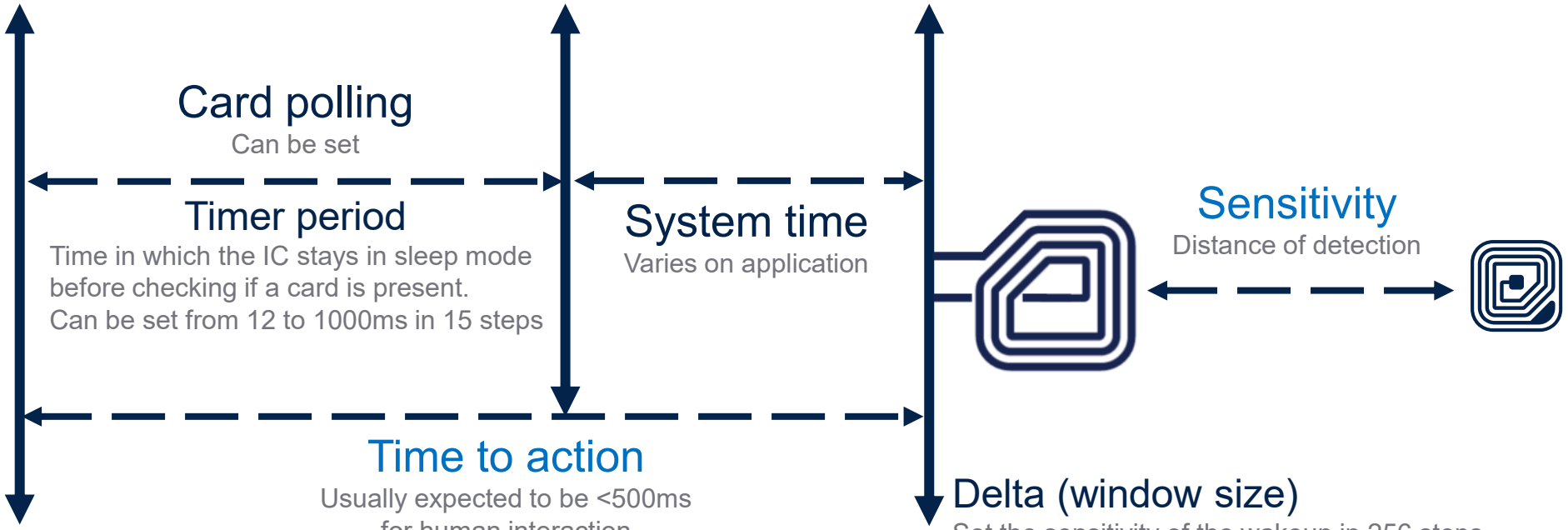


Over/undershoots can be solved with register settings.
No rematching of antenna required.

Reduce power consumption while offering good detection range

Consider reaction time/sensitivity of the system





Automatic reference measurement

Measure the environmental influence to the capacitive sensor or the antenna
Used to calibrate the wakeup system at startup or whenever needed.

Our technology starts with You

www.st.com/st25r