



ST25R210 NFC reader product presentation





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





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	ISO14443 ISO15693 FeliCa	RAM BUFFER	SPI
Card Emulation	NFC	256-Byte	Vdd: 2.7-5.5 V Vio: 1.65-5.5 V
Passive P2P	848kb/s		10 Mb/s >2.7 V 5 Mb/s <2.7 V
1.6 W	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

Key features

- CR15 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	I ² C // SPI 10 Mbps	SPI 10 Mbps	SPI 10Mbps	SPI 10Mbps
SW interface		 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

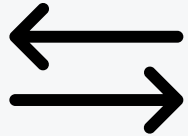
DSA: Drive slope adjustment
AWS: Active wave shaping
IWU: inductive wake up

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 electromagnetic 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

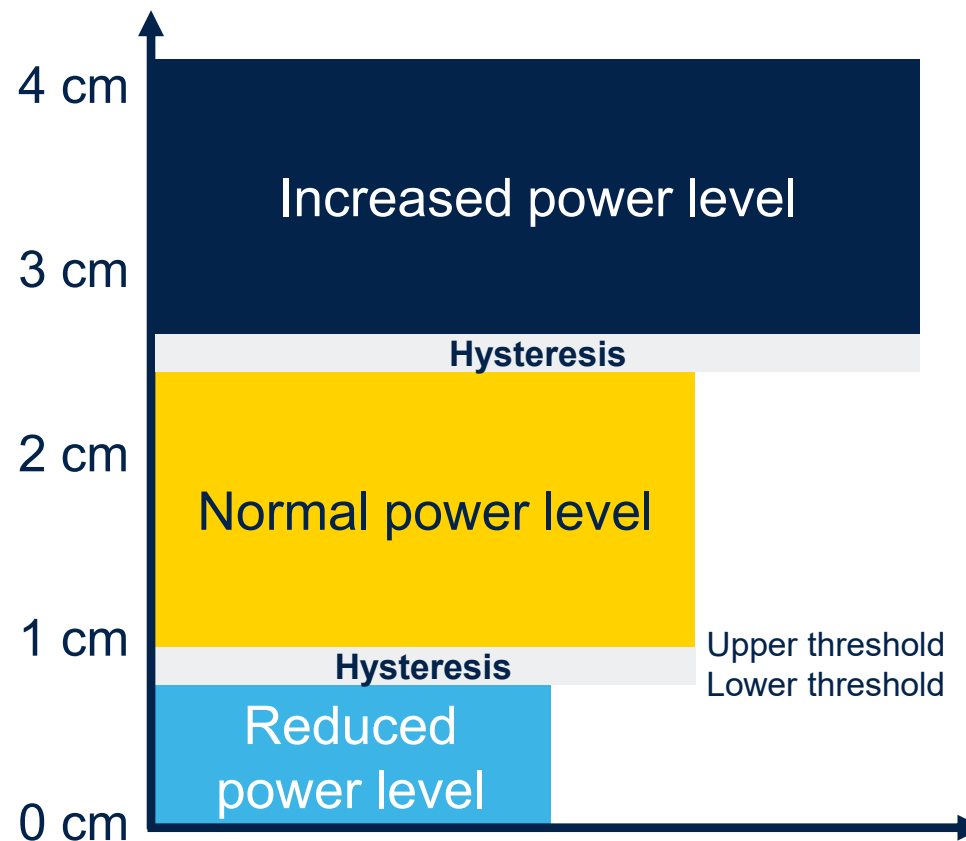
The ST25R series allows for dynamic adjustment of the output power via DPO.

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

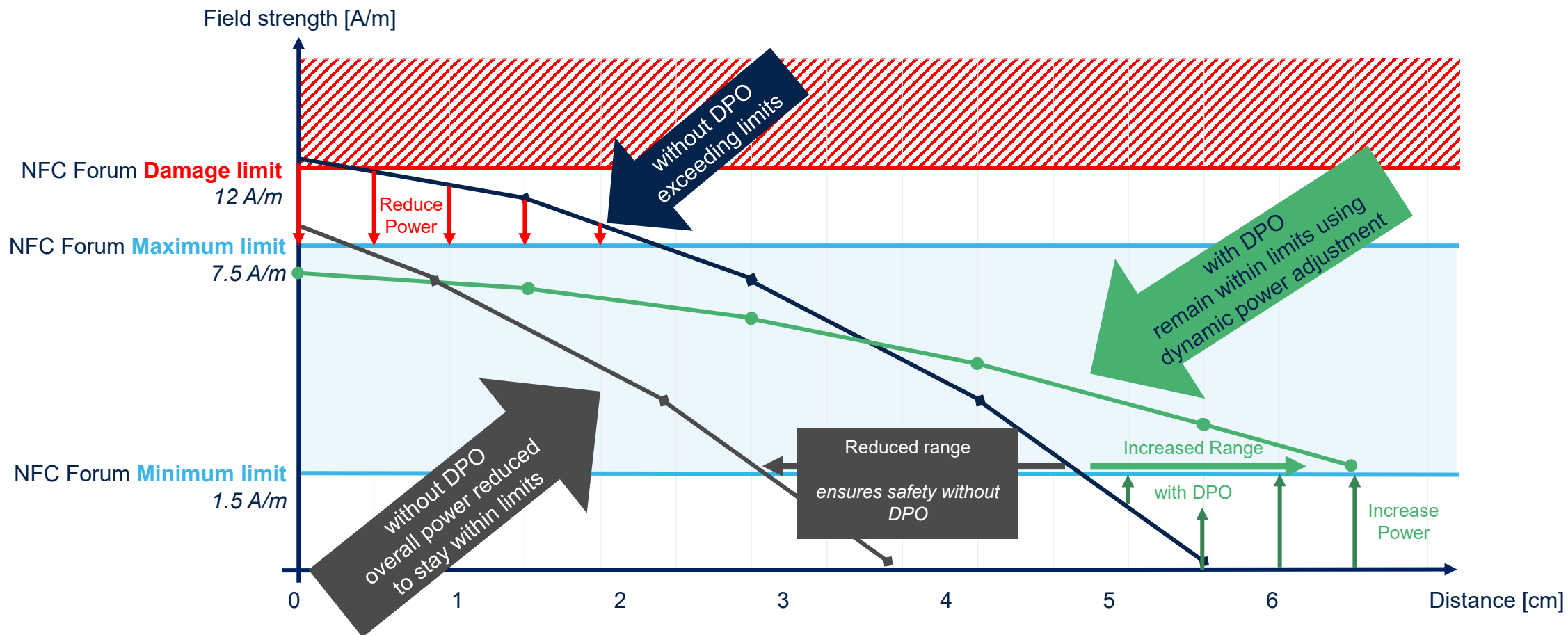
The squelch feature allows scaling of the signal level to improve immunity against noise.





Dynamic power output (DPO)

DPO of reader keeps power levels within requirements & limits





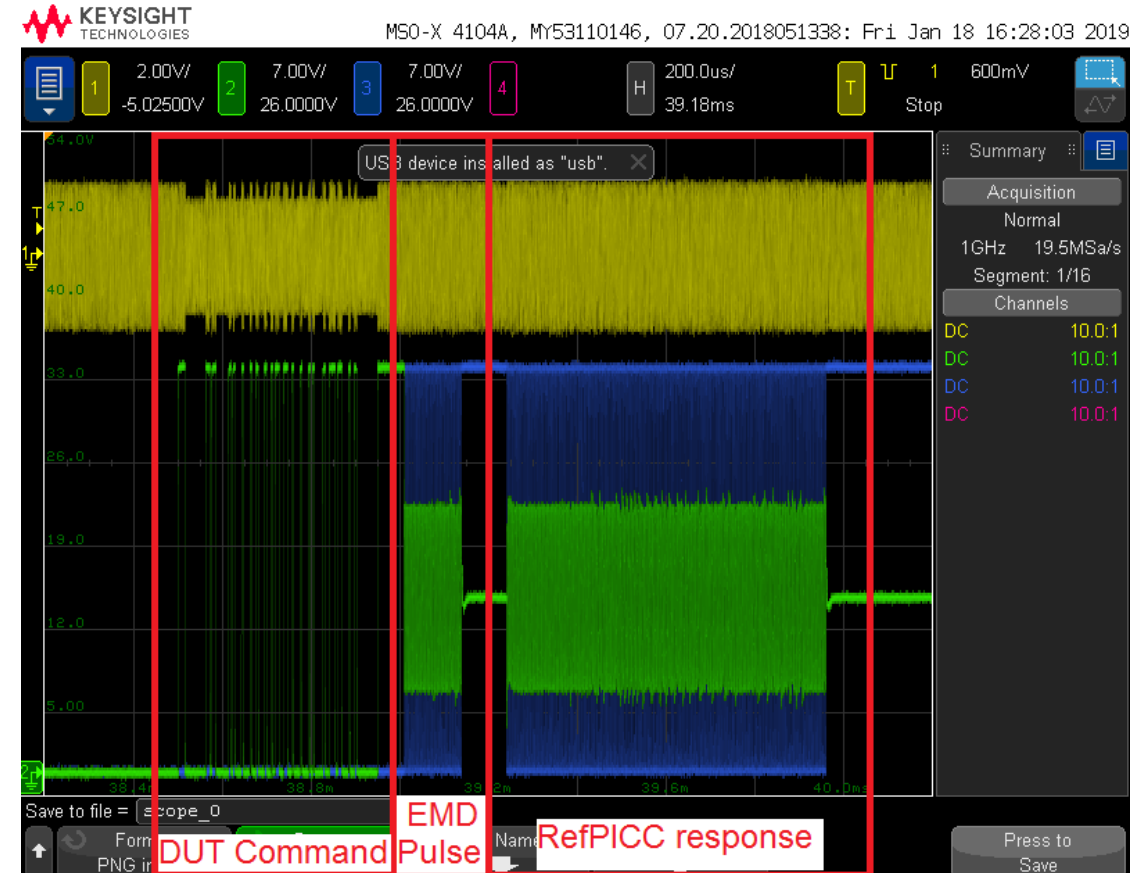
Automatic EMD suppression

- 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)



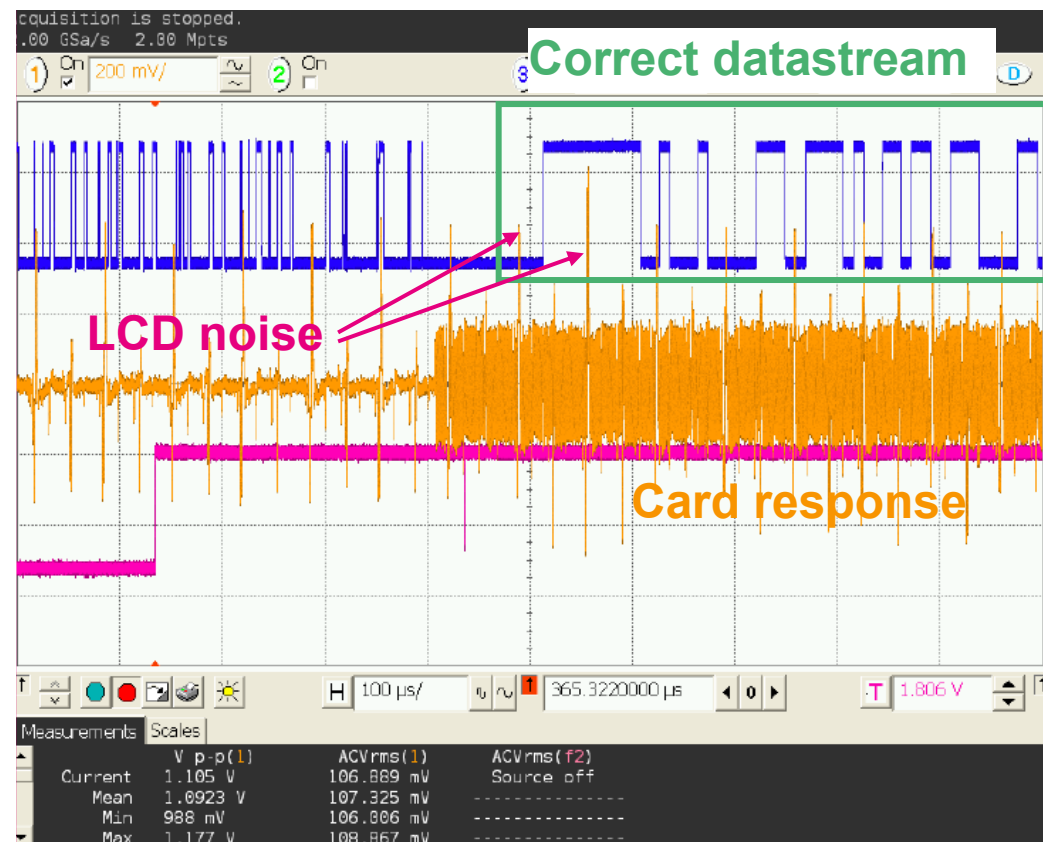


Noise suppression receiver (NSR)

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

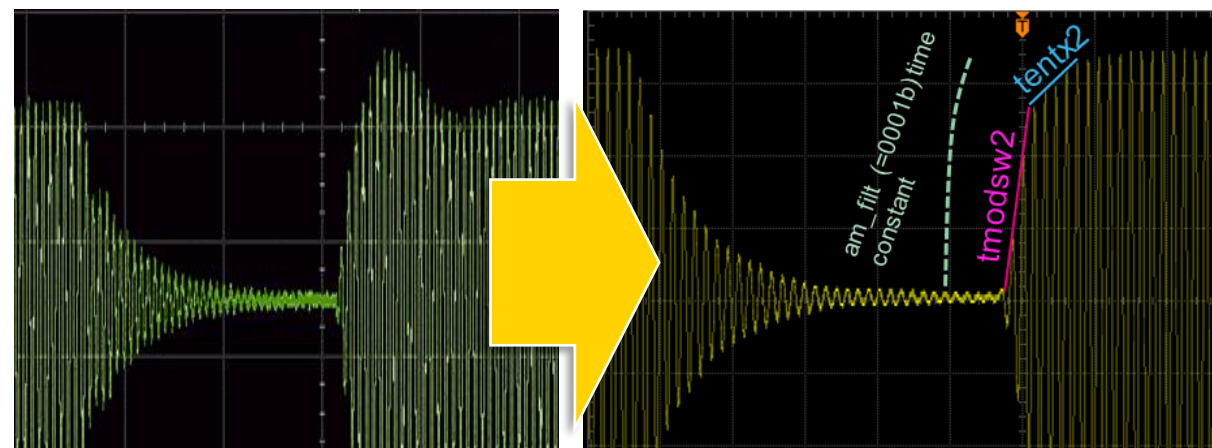
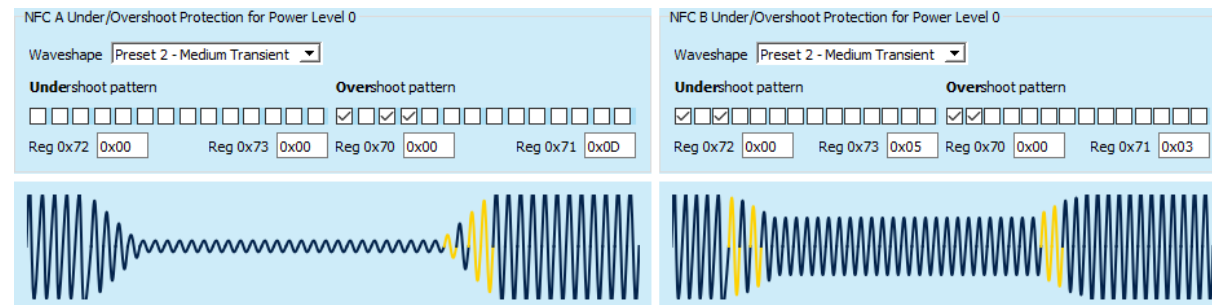




Active wave shaping (AWS)

Improved active wave shaping (AWS) function

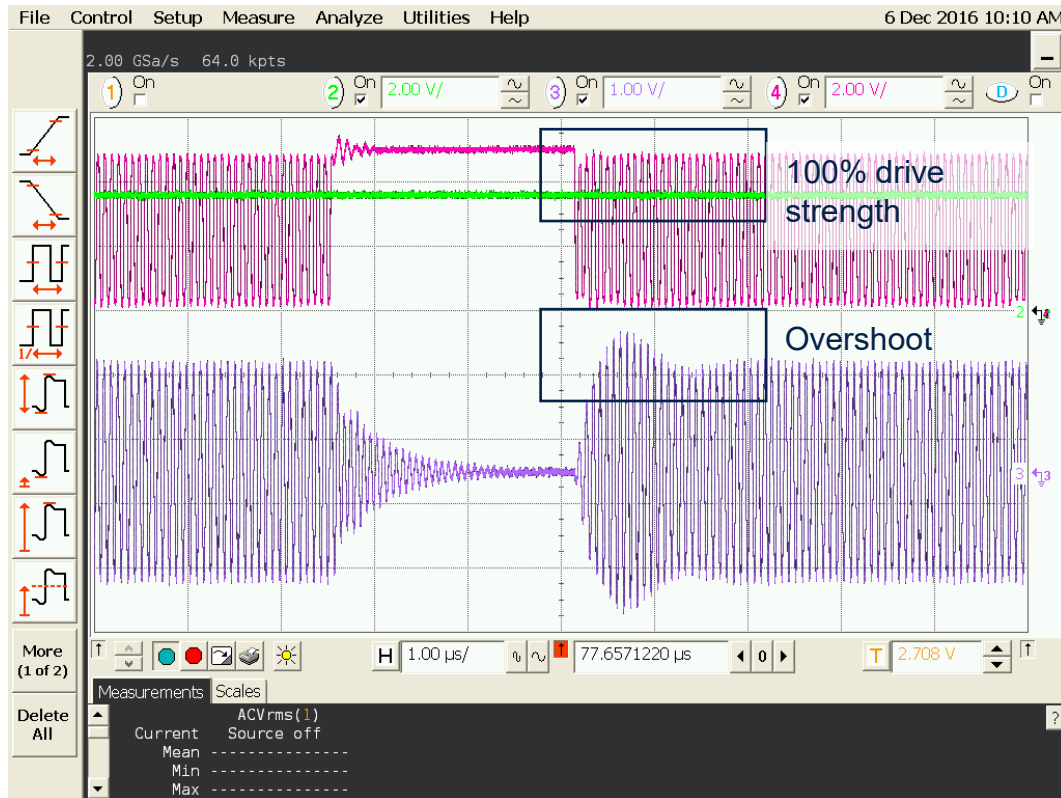
- Reduces over- and undershoots more effectively than before.
- Brings them to an acceptable level even in the most challenging designs.
- The function is easily enabled with 2x registers and 14x bits for each over- and undershoot protection.



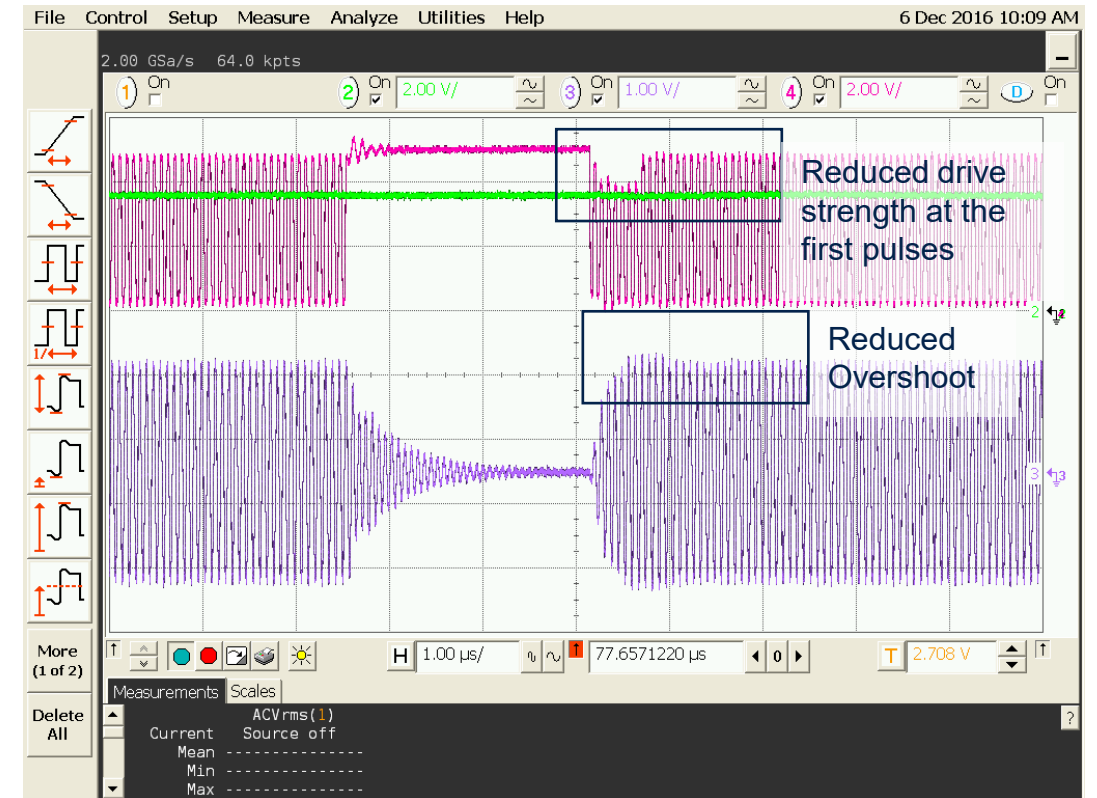


Overshoot protection (OSP)

Traditional A106 modulation pulse



Improved A106 modulation pulse with OSP



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

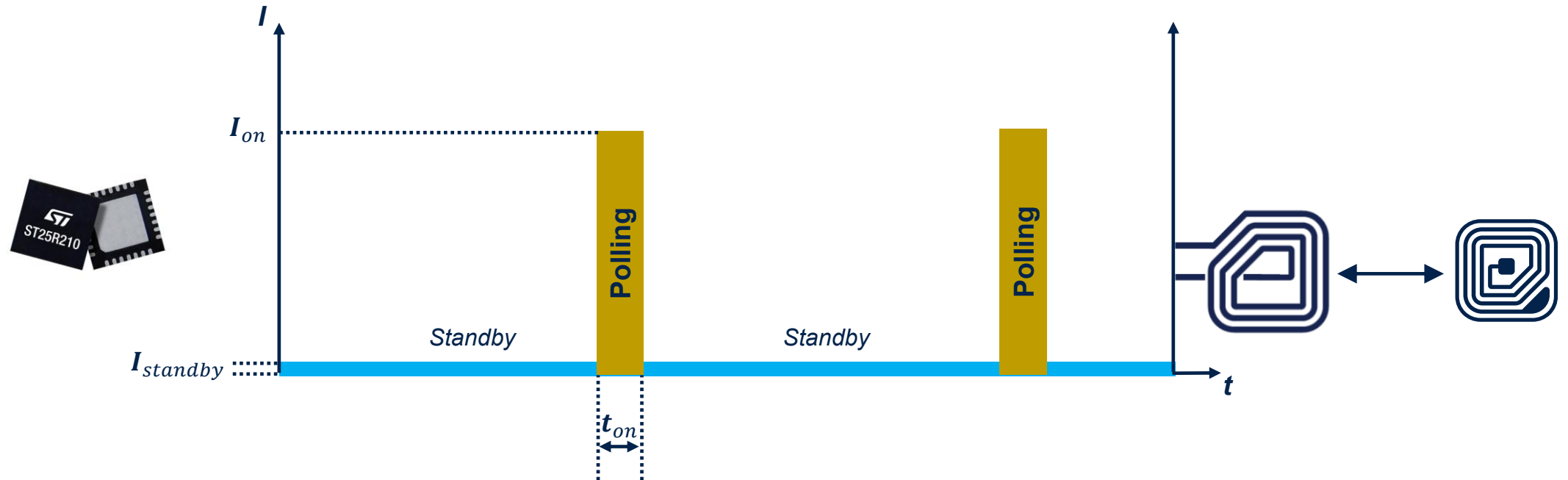




Ideal for NFC use cases where every μA counts

Extend your range, not your power budget

With **ultralow power standby mode** and **optimized polling peaks**, the ST25R210 detects NFC cards and phones using **minimal energy** while maintaining **excellent read range**.



Our technology starts with You

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