ST25DV Dynamic NFC demo

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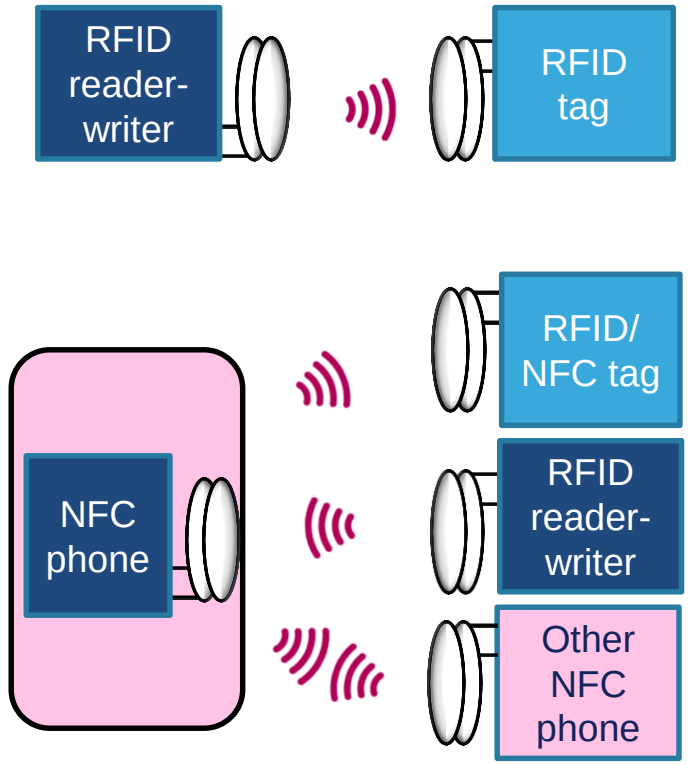
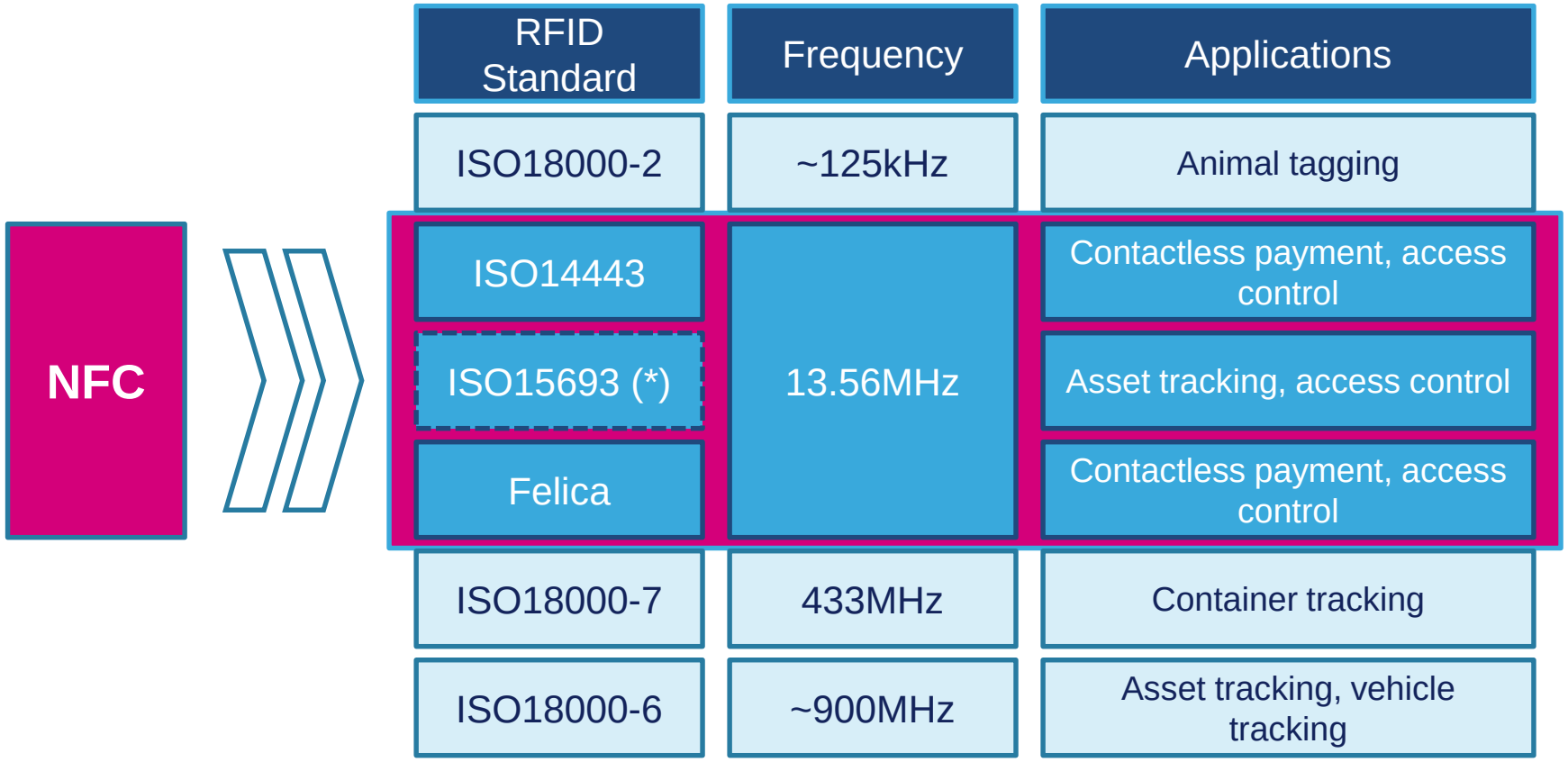
NFC and RFID technology

- NFC: Near Field Communication
- Sister technology of 13.56MHz RFID: Radio Frequency IDentification
- RFID involves:
  - Emitter (reader/writer): emits radio signal
    - Gives energy to tag, initiates commands
    - Can read and / or write into tags
  - Tag/card : picks up radio signal
    - [IC + inductive antenna] receives and replies data through inductive coupling
- NFC combines:
  - RFID's
    - Reader-writer mode
    - Tag (also called "card emulation") mode
  - And includes a peer-to-peer mode



NFC and RFID protocols / standards

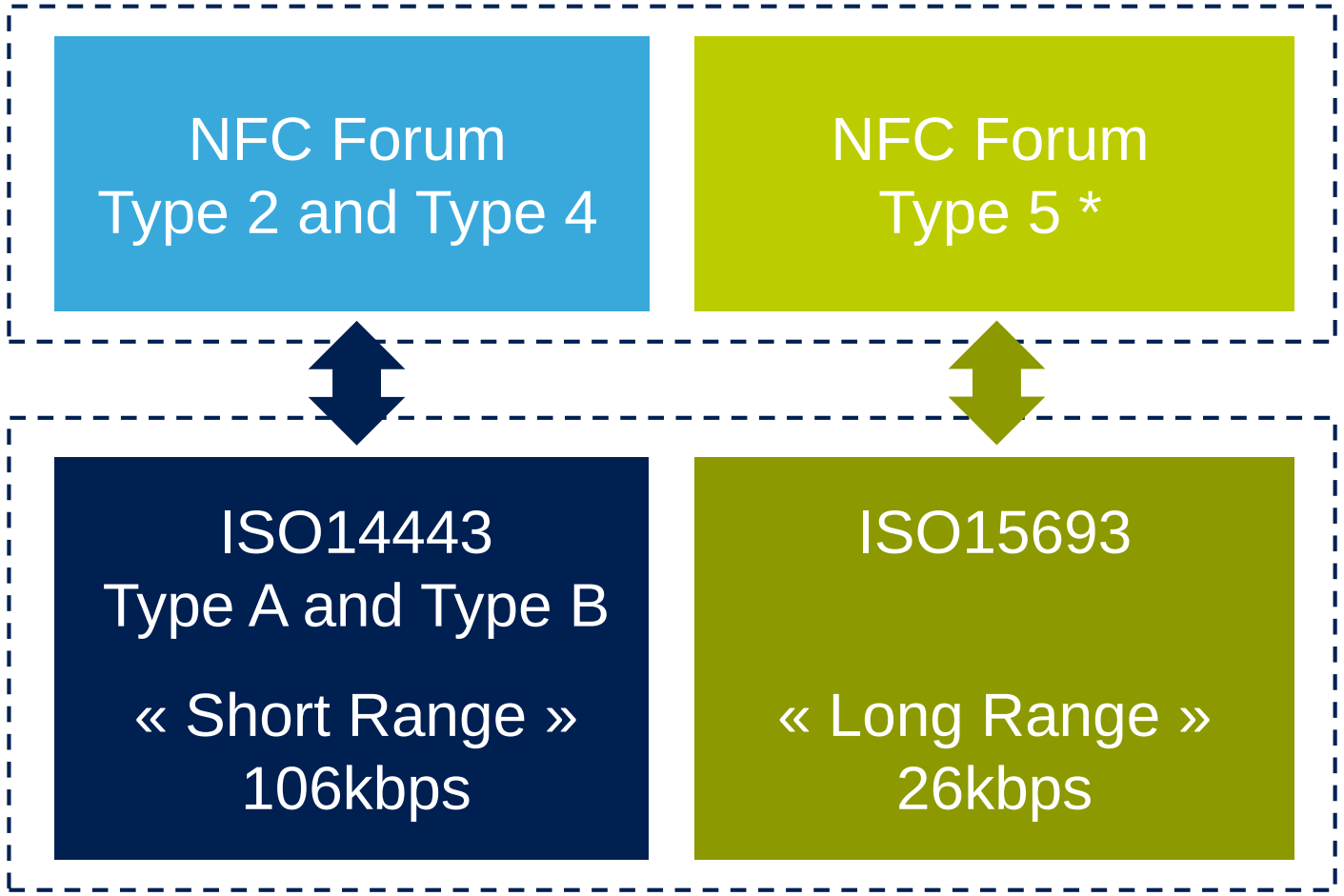


(*) ISO15693 integrated in NFC Forum specifications in October 2015 as NFC Forum type 5 (aka type V)

NFC Forum Standards

NFC specification
→ **Upper layer SW**

RFID HF ISO standards
→ **HW / SW protocol**



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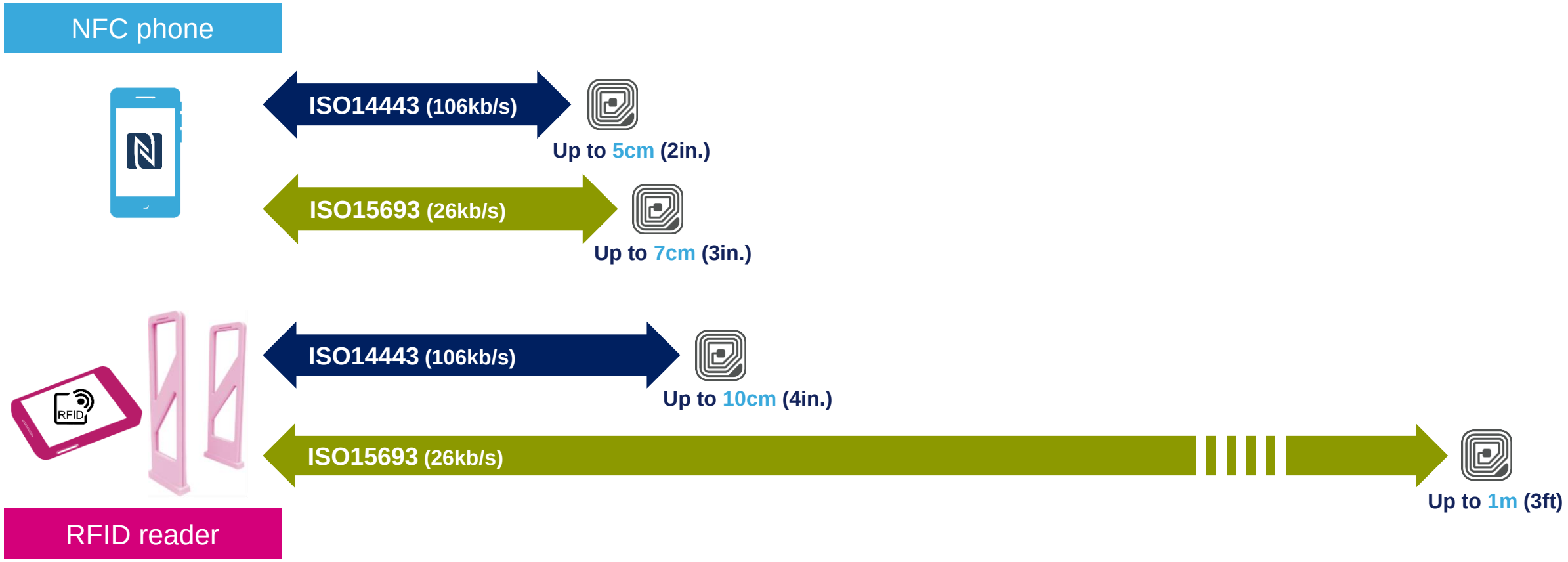
Typical NFC / RFID range



- ISO14443 is called « **short range** » standard while with higher RF speed
- ISO15693 is called « **long range** » standard

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ST25 Products Families

Ticketing, Gaming, Medical, Brand protection, Access control, …

www.st.com/st25t

Tags

ST25**T**

13.56MHz

NFC phone / RFID Reader

Industrial, Consumer, Metering, Appliance, … (Fast Transfer Mode and SW upgrade)

www.st.com/st25d

Dynamic tags

STM32 microcontroller

I2C

ST25**D**

13.56MHz

NFC phone / RFID Reader

POS & mPOS Terminals, Automotive, Access control, …

www.st.com/st25r

Readers

STM32 microcontroller

SPI

ST25**R**

13.56MHz

NFC phone

or

or

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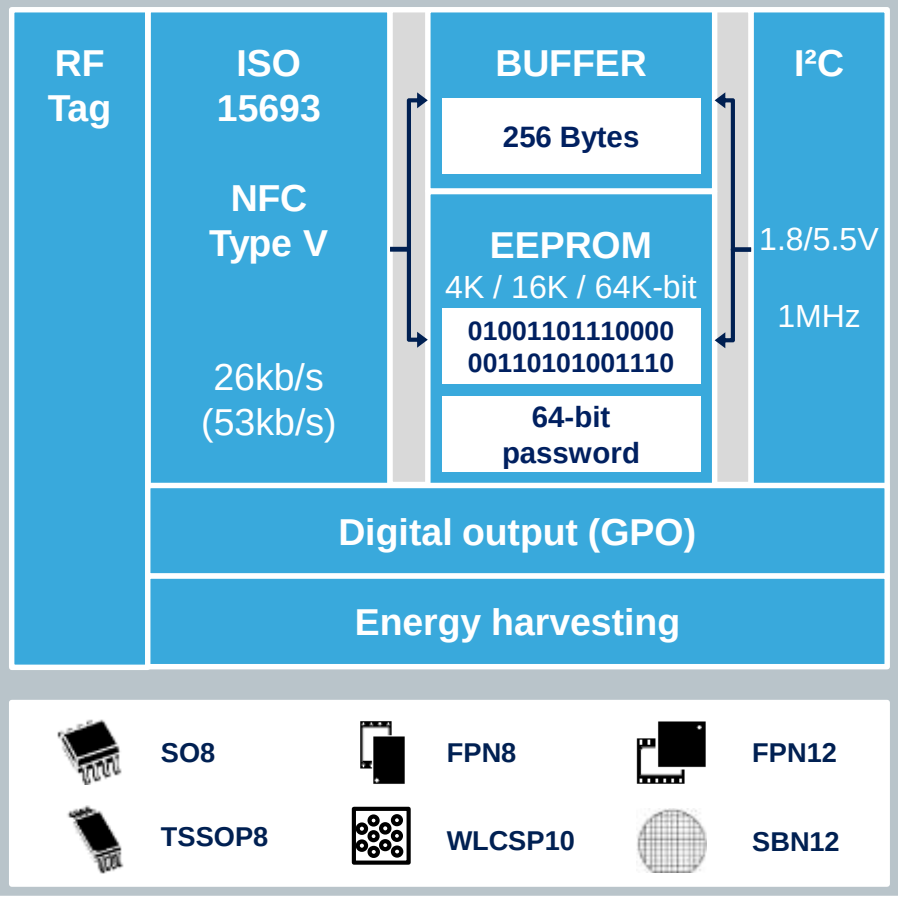
ST25DV Dynamic NFC Tag

ST25DV04K / 16K / 64K



Use cases

- Fast data exchange with NFC phones / HF readers. Long range
  - Fast data transfer for MCU FW upgrade, Fast data exchange
  - Parameters settings and update, with in the box programming
  - Datalog download
- Battery less applications

Key Features

- **ISO15693** and **NFC Type V**
- **Fast data transfer** thanks to 256 Bytes buffer
- Low Power mode, < 1µA power consumption in Standby
- -40 to **+125°C** (I2C) industrial Grade 8 temperature range
- **Energy harvesting** function through RF

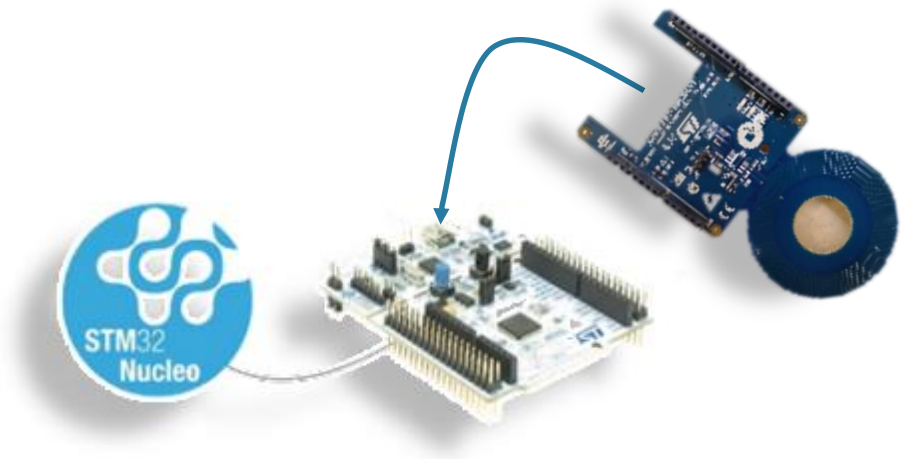
Key Benefits

- Smart applications using a **flexible interrupt GPO**
- Enhanced protection with multiple **64-bit passwords**
- Same 28.5pF internal RF tuning capacitor, as in M24LR

ST25DV Nucleo shield

- ST25DV Nucleo board for fast prototyping
  - ST25DV04K Dynamic NFC tag IC
  - NFC antenna: Ø 54mm, 8 turns single layer 13.56 MHz inductive antenna etched on the PCB
  - Energy harvesting, Low power mode
  - Open drain output GPO : set & reset, pulse sending, Field Detect, RF_Busy / RF_Write (EEPROM), RF put and get message (memory Buffer)
  - Compatible with STM32 Nucleo boards
  - Equipped with Arduino UNO R3 connector
  - 3 general purpose LEDs

Reference
X-NUCLEO-NFC04A1



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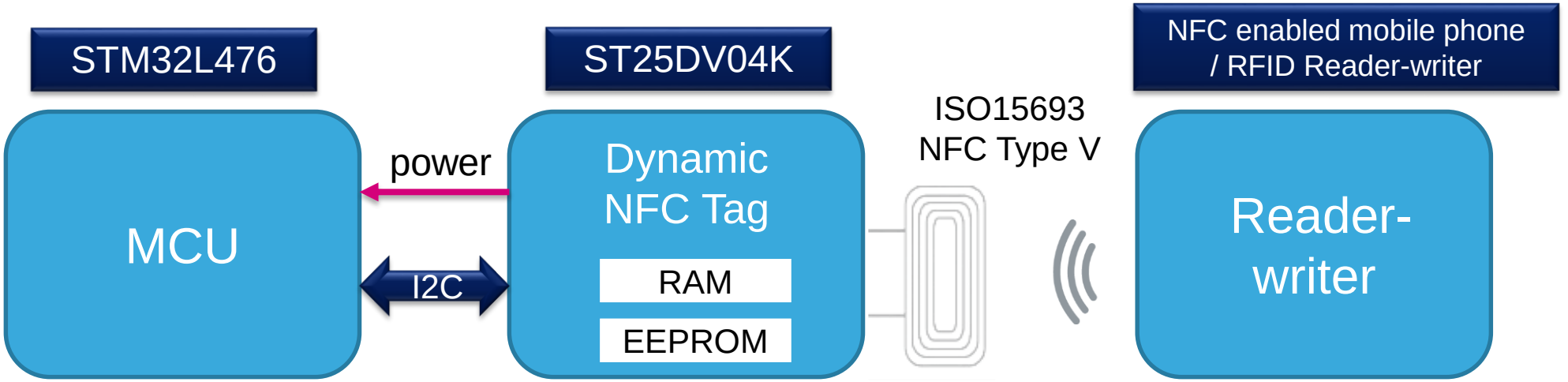
Battery-less Firmware upgrade demo



NUCLEO-L476RG

X-NUCLEO-NFC04A1

Android phone

or DEMO-CR95HF-A

Dynamic Tag enabling multiple Benefits

During the Entire Product Lifecycle







- Parameter setting in production
- Logistics / Asset tracking
- Commissioning / Pairing
- Remote firmware upgrading / programming
- Data download / data-log
- Enable battery-less design

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