NFC Trends to Look Out for in 2020 and Beyond

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NFC Marketing

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SECURE CONNECTIONS
FOR A SMARTER WORLD

Agenda
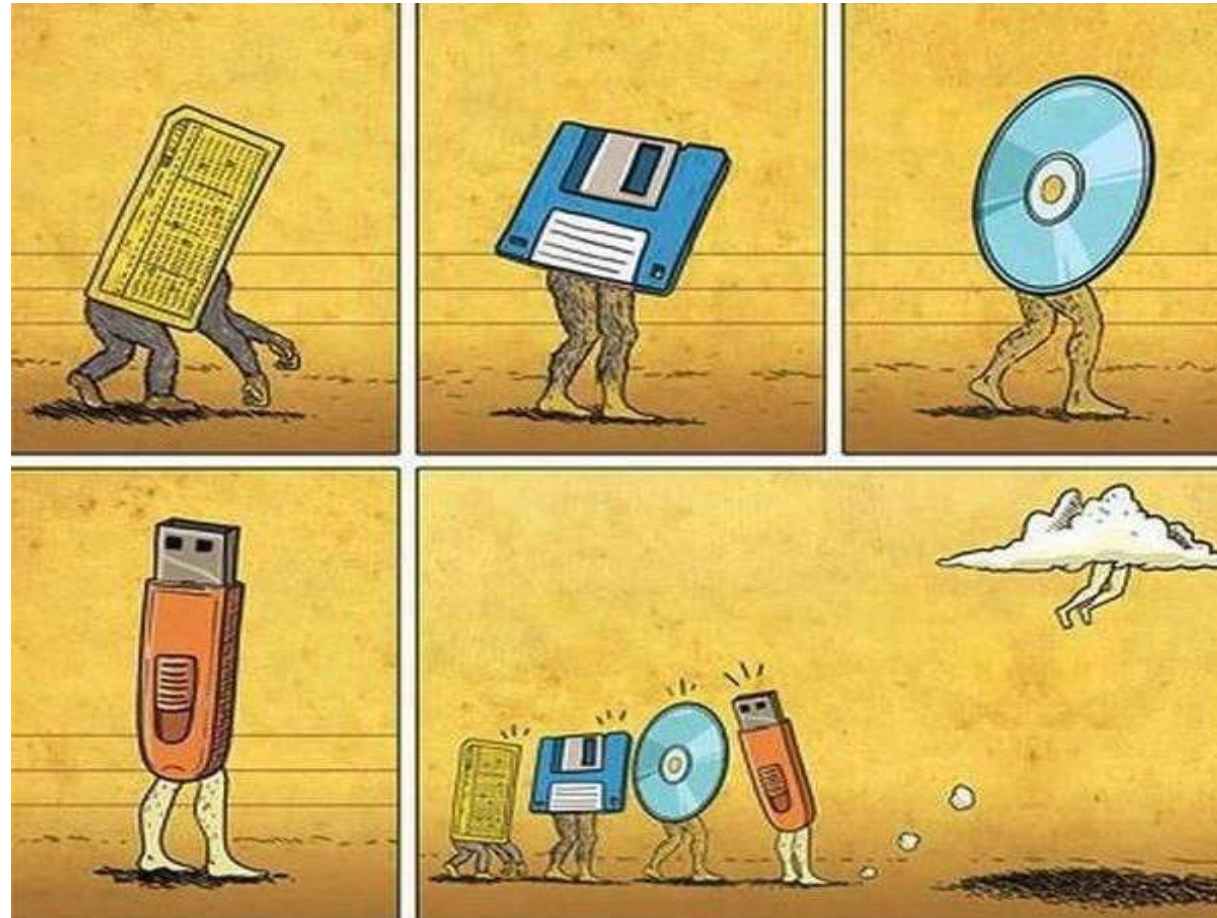
- Technology Evolution

- NFC Introduction

- Key Areas of Innovation

  - Smarter Industries

  - A new shopping experience

  - Powering Lifestyles

Technology Evolution
Same Use Case, Easier & Better Solution

What is NFC?
Short Overview

- NFC is a contactless short range technology, based on inductive coupling (10cm / 4 in)
- Co-invented in 2002 by NXP and Sony
- Operating frequency 13.56MHz, speed < 848 kbits/s

Big reasons to consider NFC

More intuitive than any technology
It's like shaking hands

Use Power Very Efficiently
One powered device & Energy harvesting

Trusted addition to other technology
Especially for pairing devices

Key Areas of Innovation

Smarter industries

A new shopping experience

Powering new lifestyles

Smarter Industries

Enhancing Industry 4.0

- Add RFID tags to give passive objects a voice; end-to-end tracking and traceability
- Product and parts authentication
- Manufacturing process optimization: Use NFC for diagnosis, parametrization and maintenance tasks

Parameterization & Diagnosis

It's as simple as you could think

Industrial Devices Start Using NFC for Parameterization & Diagnosis

Parameterization, Diagnosis and Firmware Update Today

Function	Goal	Current method	Drawbacks
Parameterization / Configuration	Set individual parameters (timing, reset behavior, channels, region setting, program etc.)		• Housing has openings, issues with dirt, water • Settings not self-explanatory • # and accuracy of parameters limited • Cost (switch ~$0.30, display more)
Diagnosis	Read out diagnostic data for maintenance or post-mortem analysis		• Housing has openings, issues with dirt, water • Device needs to be powered • Cost
Firmware update	Flash a new firmware into a device in the field or in the distribution center		• Housing has openings, issues with dirt, water • Device needs to be powered • Cost of connector and interface chip

Customer Benefits

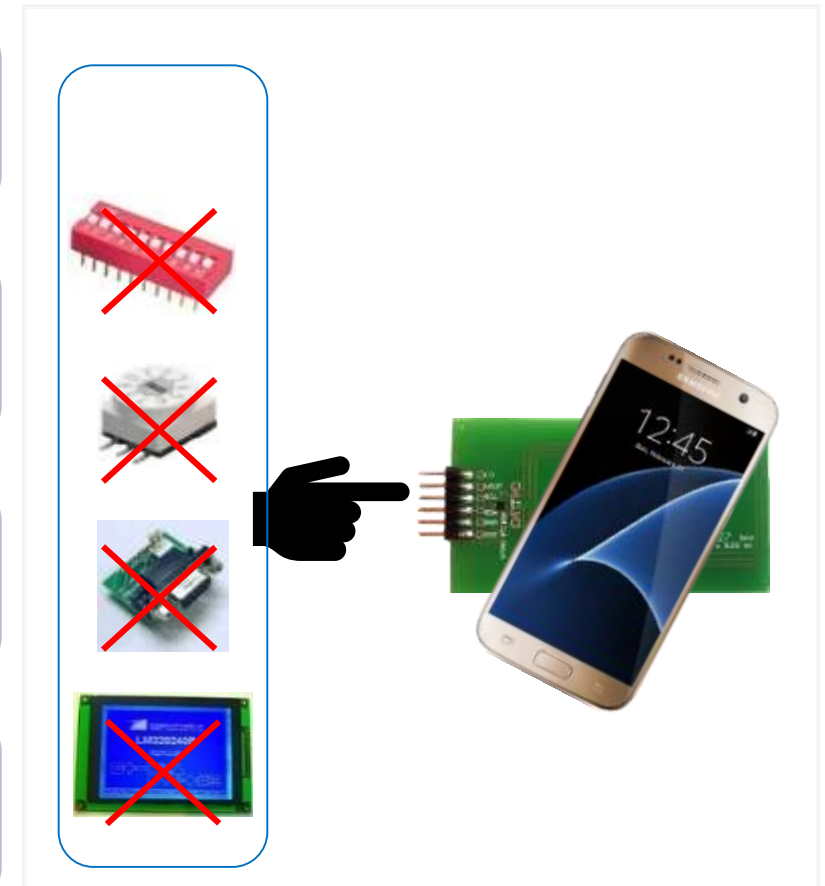|	
Cost reduction	• NTAG I²C *plus* < $0.25
Higher accuracy, more parameters	• Can store 2 kBytes on-chip
Zero-power operation	• Phone powers the NTAG I²C *plus* via the NFC field
Device can be fully sealed	• NFC communication possible through plastic, glass, wood, …

A New Shopping Experience

Adding Smarts to Labels

- Use mobile to access product information, loyalty, in-store navigation, self-checkout
- Improved inventory management
- Increase in customer interaction filling the gap to online stores
- Dynamic pricing

Use of NFC Technology in ESL

Shopper connectivity

- Customers can read product information and access services directly on their NFC-enabled phones.

NTAG I²C *plus*

Contactless cards

- Customers can directly pay for products by tapping their NFC smart cards to the ESL.
- In this case the ESL is a NFC reader.

MFRC630 *plus*

Consistent store map

- An interactive NFC application creates a link between the product, the NFC enabled ESL and the access point of th ESL system.
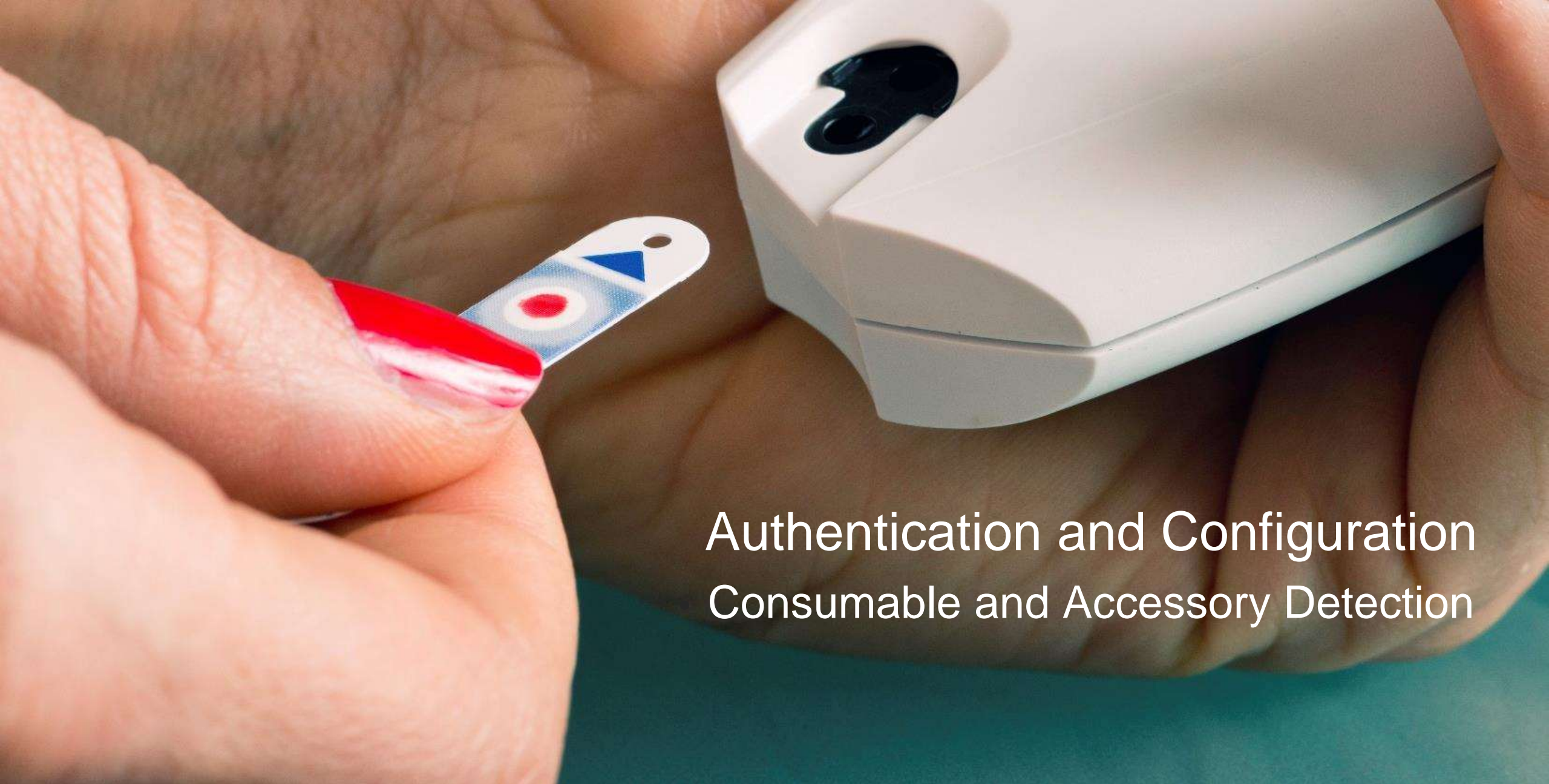
NTAG I²C *plus*

Powering New Lifestyles

NFC in Consumer Medical

- Each accessory becomes easier to authenticate and trace to their devices
- This allows safety and security for patients and revenue protection for our customers.

Authentication and Configuration
Consumable and Accessory Detection

Customer Benefits – Why Identify Accessories?

Enforce expiration dates	• Safe device usage for end customer
Calibration data increases measurement accuracy	• Ensuring accurate device results
Revenue Protection	• Prevents re-use of disposables • Revenue Protection • Counterfeit protection
Future Proof	• New accessories can configure the main device with new functions

The Right NFC Tag and NFC Reader for Each Application

| Tag	Reader	RF standard	Benefits
NTAG DNA	MFRC 630	Proximity < 10 cm ISO/IEC 14443	• Enable secure originality check with **any NFC enabled mobile phone**
ICODE DNA	SLRC 610	Vicinity < 1 m ISO/IEC 15693	• **Securely** check if consumables are genuine • **Longer read range**
ICODE SLIX2	SLRC 610	Vicinity < 1 m ISO/IEC 15693	• Reliable **counting & inventory** • Check **conditions** of consumables (usage, best before dates, …)

And what's beyond?

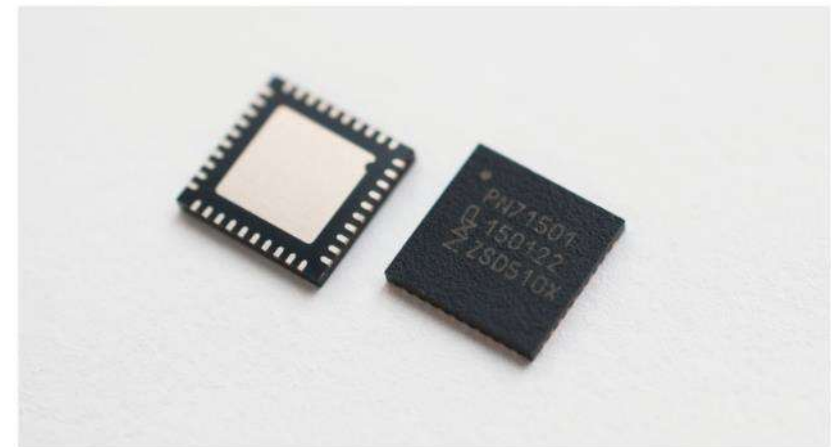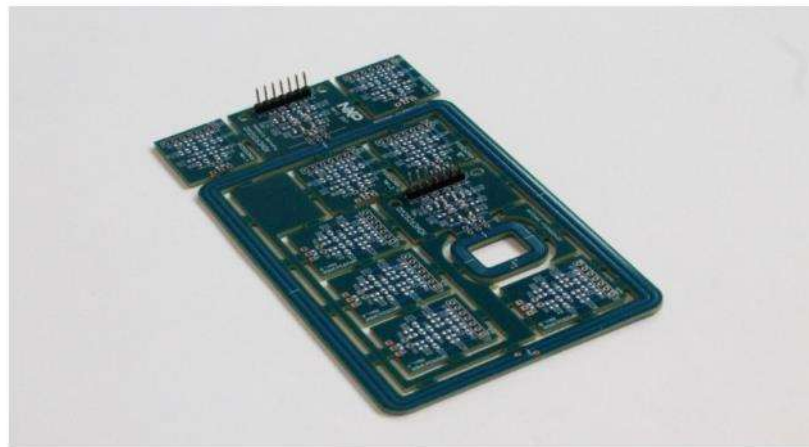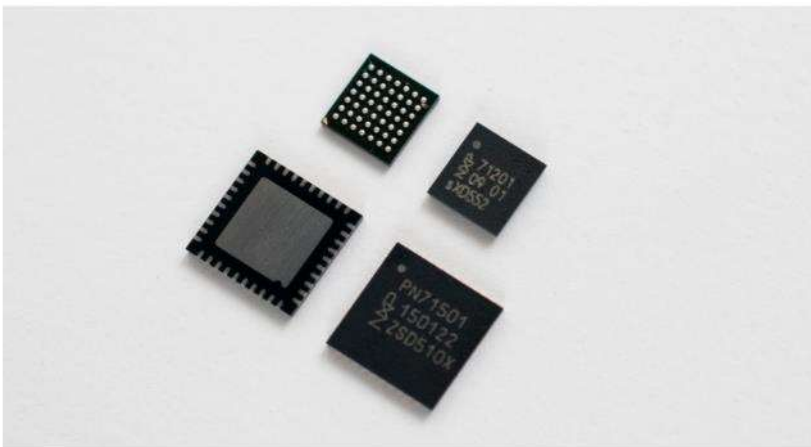# NFC Charging – Big News for Small Devices

- NFC charging technology standardized in NFC forum
- Target: < 2W devices
- Integrated high-speed communication link (mutual authentication, FW update, late device configuration, Bluetooth/Wi-Fi paring)
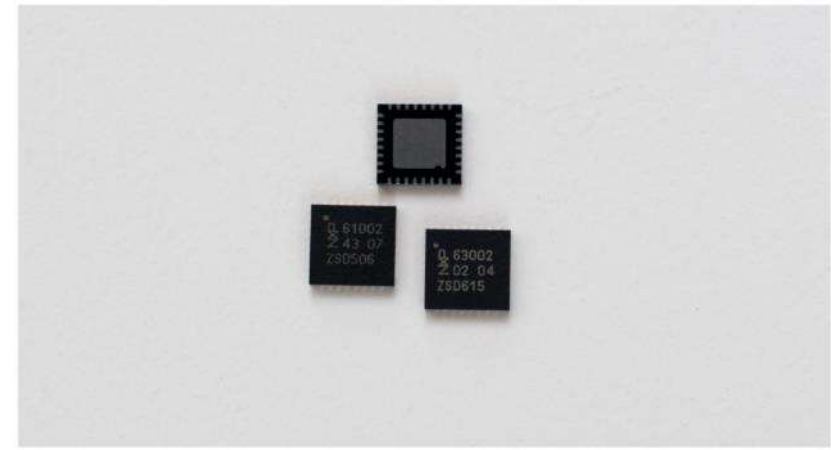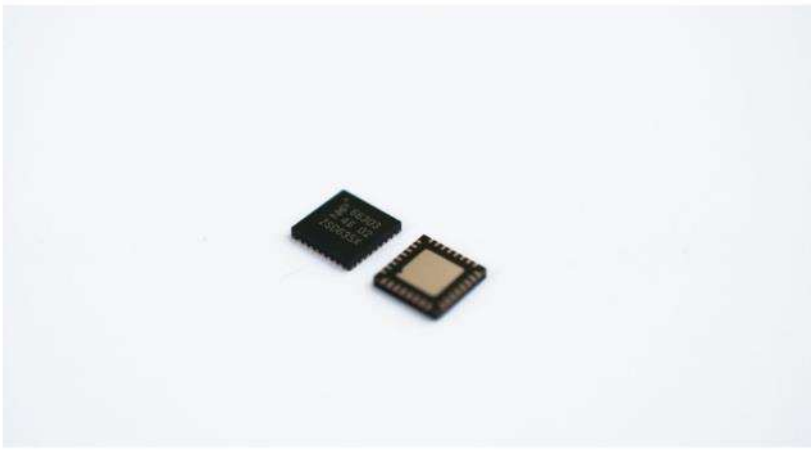
Products

NFC Focus Products for Each Application Need

Readers/connected Tags: for Embedded Electronics

Features and price →

Specialist

One chip system, programmable NFC controller with DPC
PN7462 family

High-perf full NFC with DPC
PN5180

All round

Single-chip MCU with integrated NFC tag
LPC8N04

High-perf multi-protocol reader
CLRC663 *plus*

Plug&Play NFC for Linux, Android, WinIoT
PN7150

Entry level

NTAG I²C *plus*

Proximity&vicinity readers
MFRC630
(ISO14443A – Reader for NTAG® and MIFARE® product families)
SLRC610
(ISO15693 / ISO18000-3M3 - Reader for ICODE® family)

Connected tag solutions
NFC tags with non-volatile memory and host connection or integrated MCU

NFC Frontend solutions
NFC reader with NFC Reader SW Library

NFC controller solutions
NFC reader with integrated 32-bit Cortex MCU and either integrated firmware or freely programmable memory

* Single chip: Cortex M0 MCU + last generation NFC reader + ISO 7816 Contact reader

NFC Focus Products for Each Application Need

ICs for tags, labels and cards

Security, Features and price →

Specialist

NHS3100 / NHS3152
NFC sensor tag with programmable ARM core
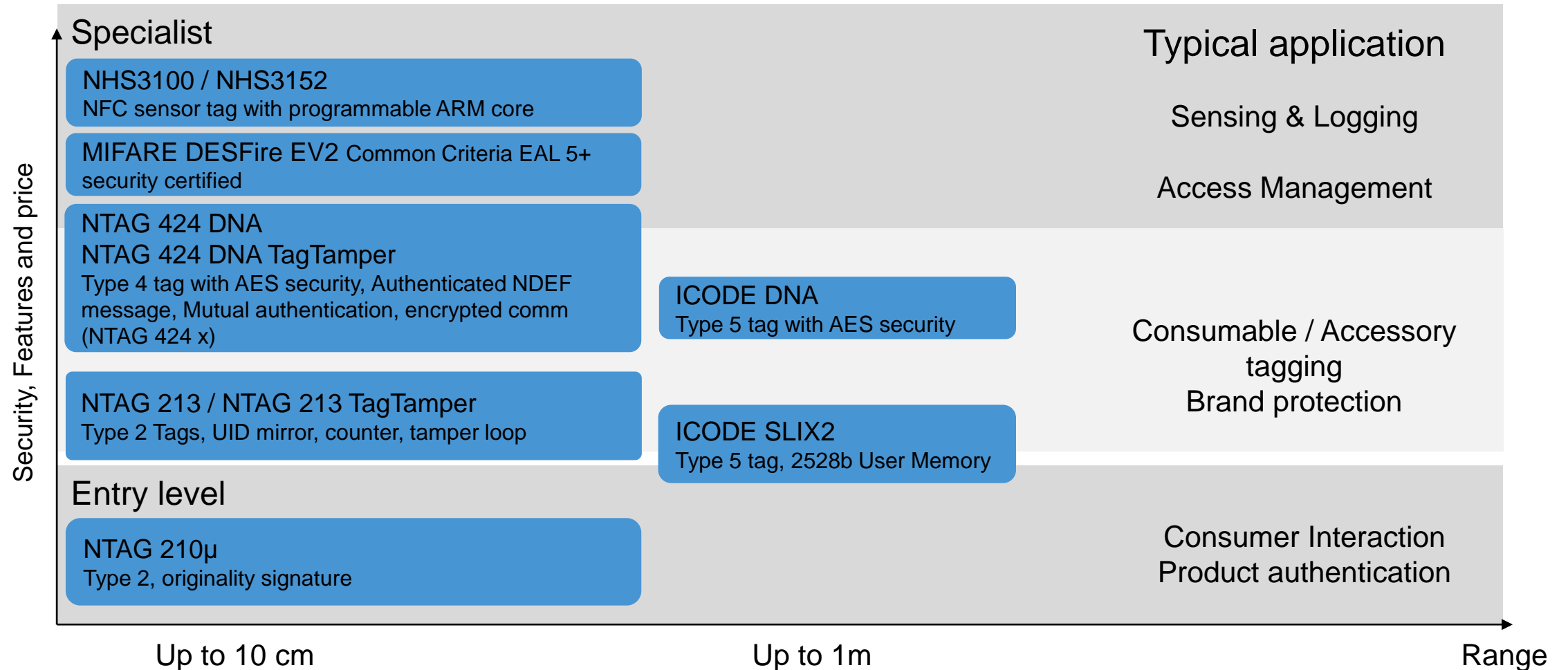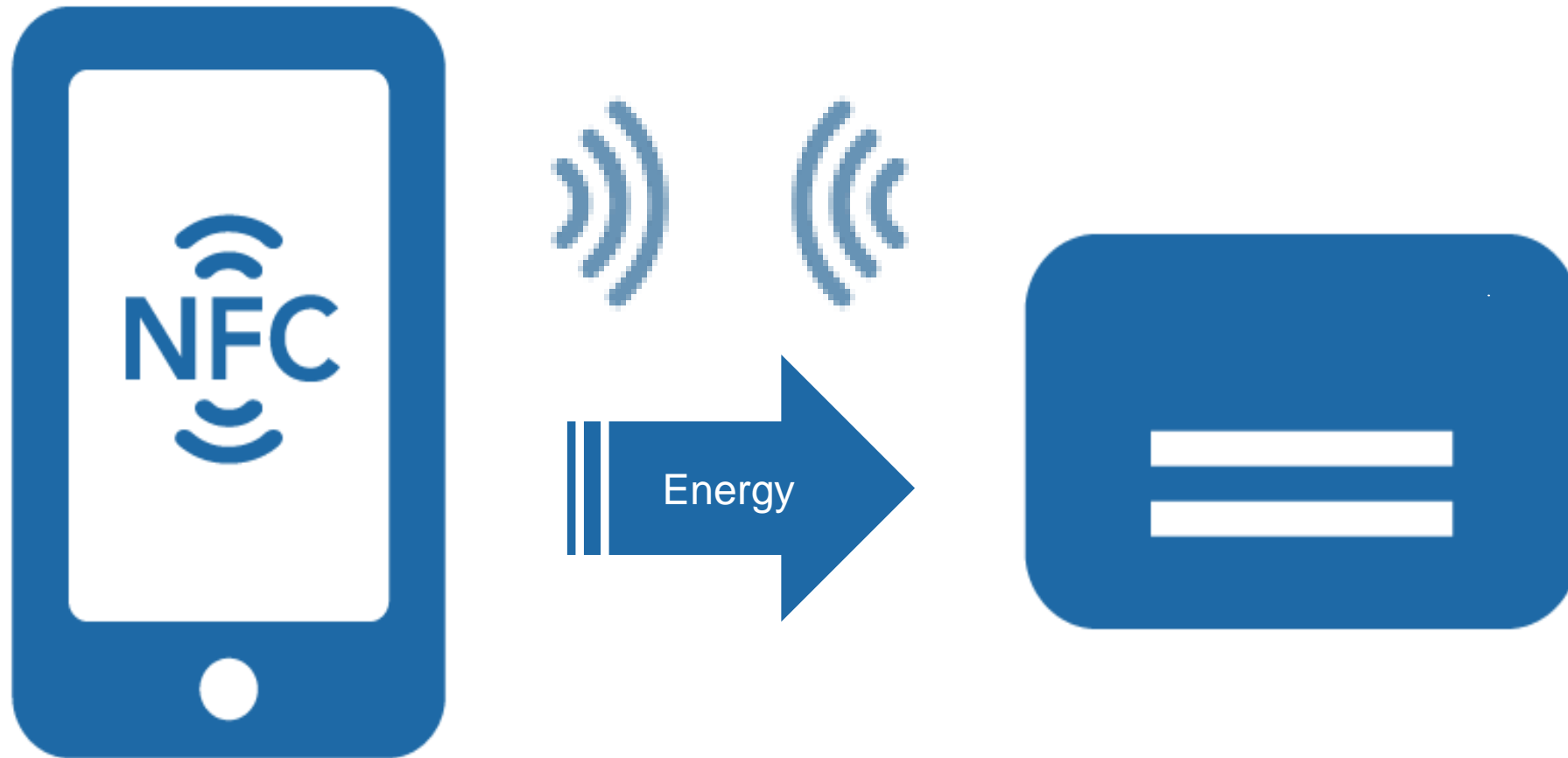
MIFARE DESFire EV2 Common Criteria EAL 5+
security certified

NTAG 424 DNA
NTAG 424 DNA TagTamper
Type 4 tag with AES security, Authenticated NDEF
message, Mutual authentication, encrypted comm
(NTAG 424 x)

ICODE DNA
Type 5 tag with AES security

NTAG 213 / NTAG 213 TagTamper
Type 2 Tags, UID mirror, counter, tamper loop

ICODE SLIX2
Type 5 tag, 2528b User Memory

Entry level

NTAG 210µ
Type 2, originality signature

Typical application

Sensing & Logging

Access Management

Consumable / Accessory
tagging
Brand protection

Consumer Interaction
Product authentication

Up to 10 cm   Up to 1m   Range
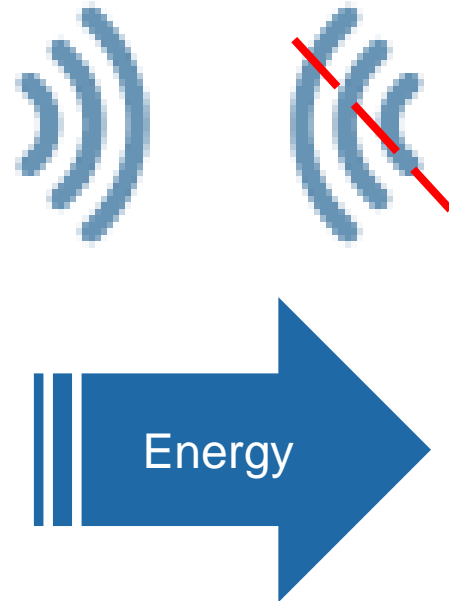
2020 is the Year of NTAG 5

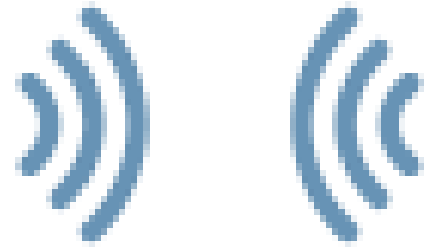# NFC Read Range vs. Antenna Sizes

Energy

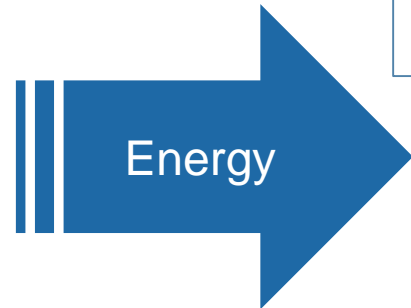# NFC Read Range vs. Antenna Sizes

The small antenna cannot drive enough energy to sufficiently back-modulate to the reader.

Energy

Active Load Modulation Enabling NFC for Tiny Devices

Powered through an external supply, active load modulation of the device is actively driving the modulation back to the reader.

Energy

V_{CC}

NTAG 5 Interfaces

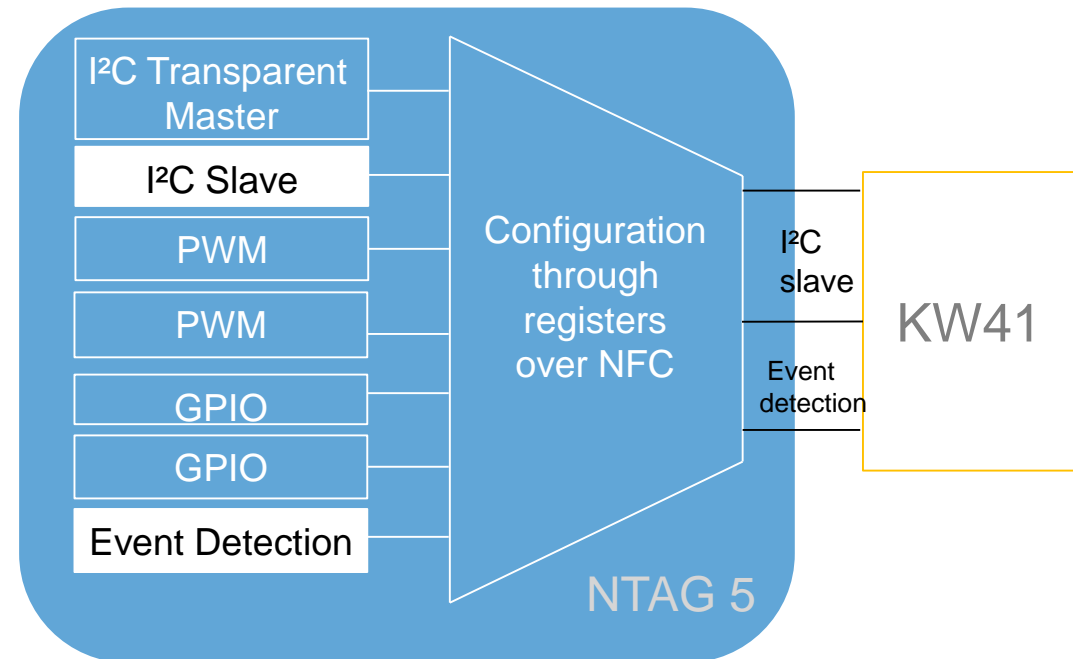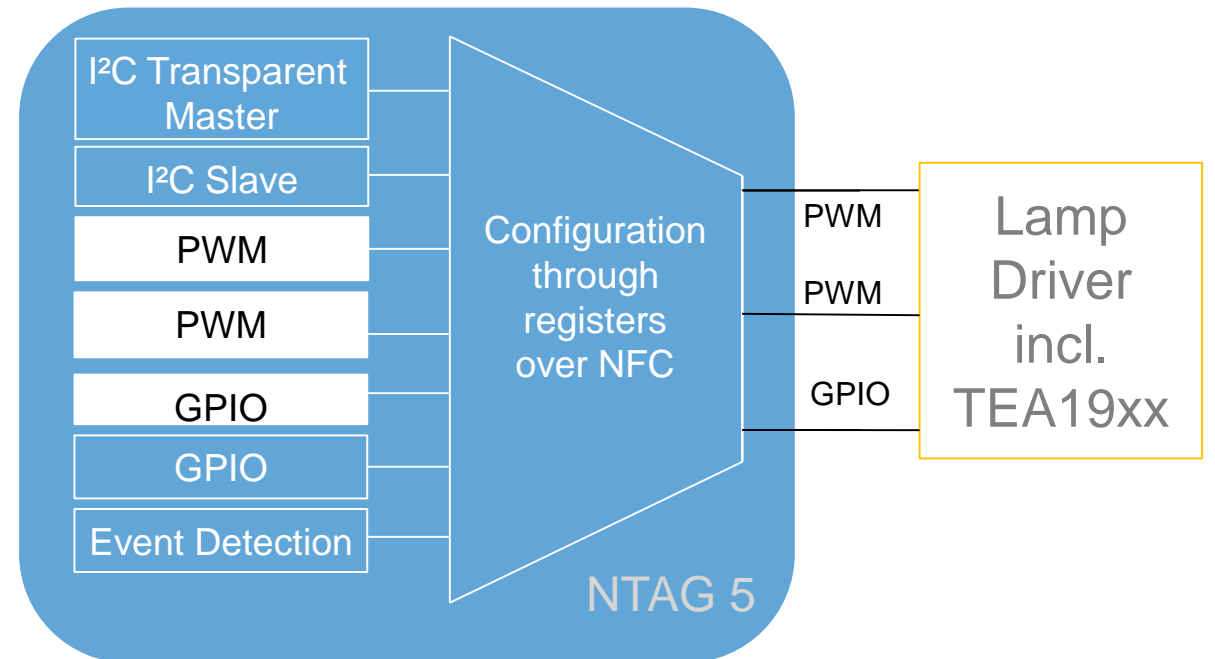Wide variety of interfaces enable completely new applications

NFC Commissioning

- I²C slave interface to a BT/Zigbee µC for pairing pairing protocol
- Event detection pin to wake up the circuit in the event of NFC field

I²C Transparent Master

I²C Slave

PWM

PWM

GPIO

GPIO

Event Detection

Configuration through registers over NFC

NTAG 5

I²C slave

Event detection

KW41

Lighting – LED Converter

- Configure current for LED converter through PWM

- Configure second current for tuneable white LED

- Use GPIO to enable or disable converter

| I²C Transparent Master		
I²C Slave		
PWM	Configuration through registers over NFC	PWM → Lamp Driver incl. TEA19xx
PWM		PWM
GPIO		GPIO
GPIO		
Event Detection		

NTAG 5

Sensor Communication

- Read/write to sensor through NFC and I²C master
- No MCU needed for communication to the sensor
- LED brightness changed through PWM indicating the communication
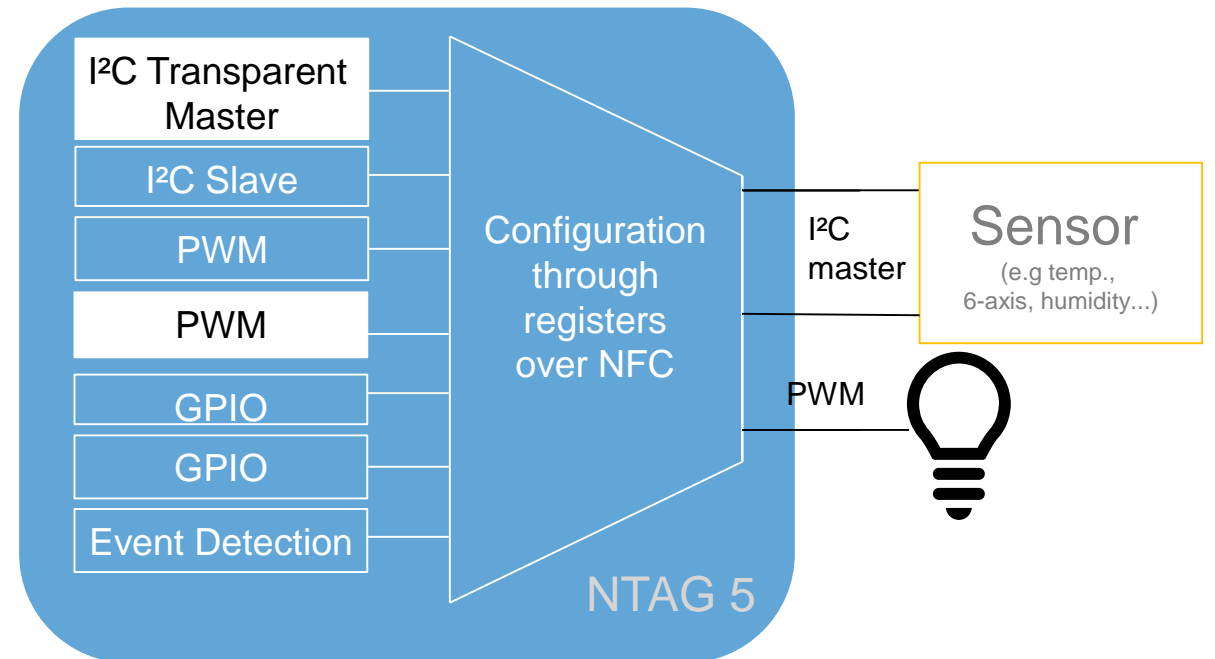
Constant Monitoring of Sensors
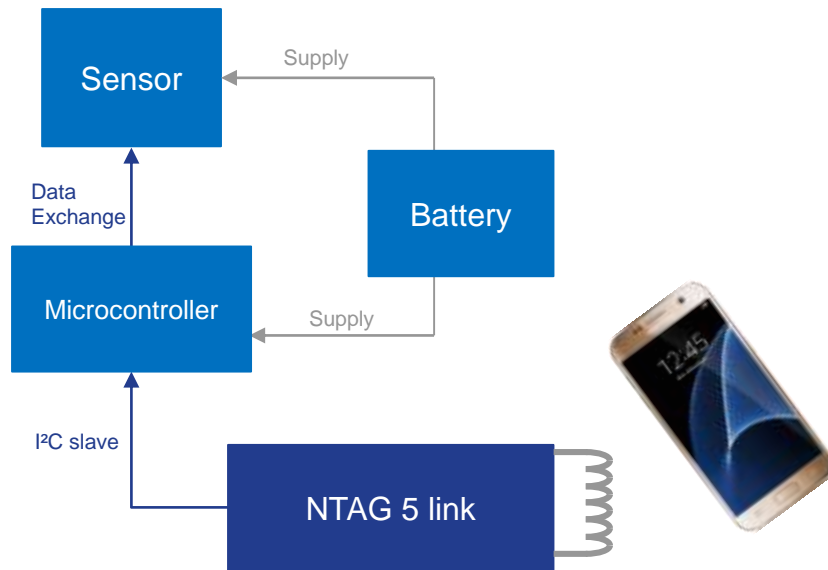
Benefits

- Device can be fully sealed
  NFC communication possible through plastic, glass, wood, …
- Save front-panel space
- Together with consumer mobile phone cost efficient IoT solution

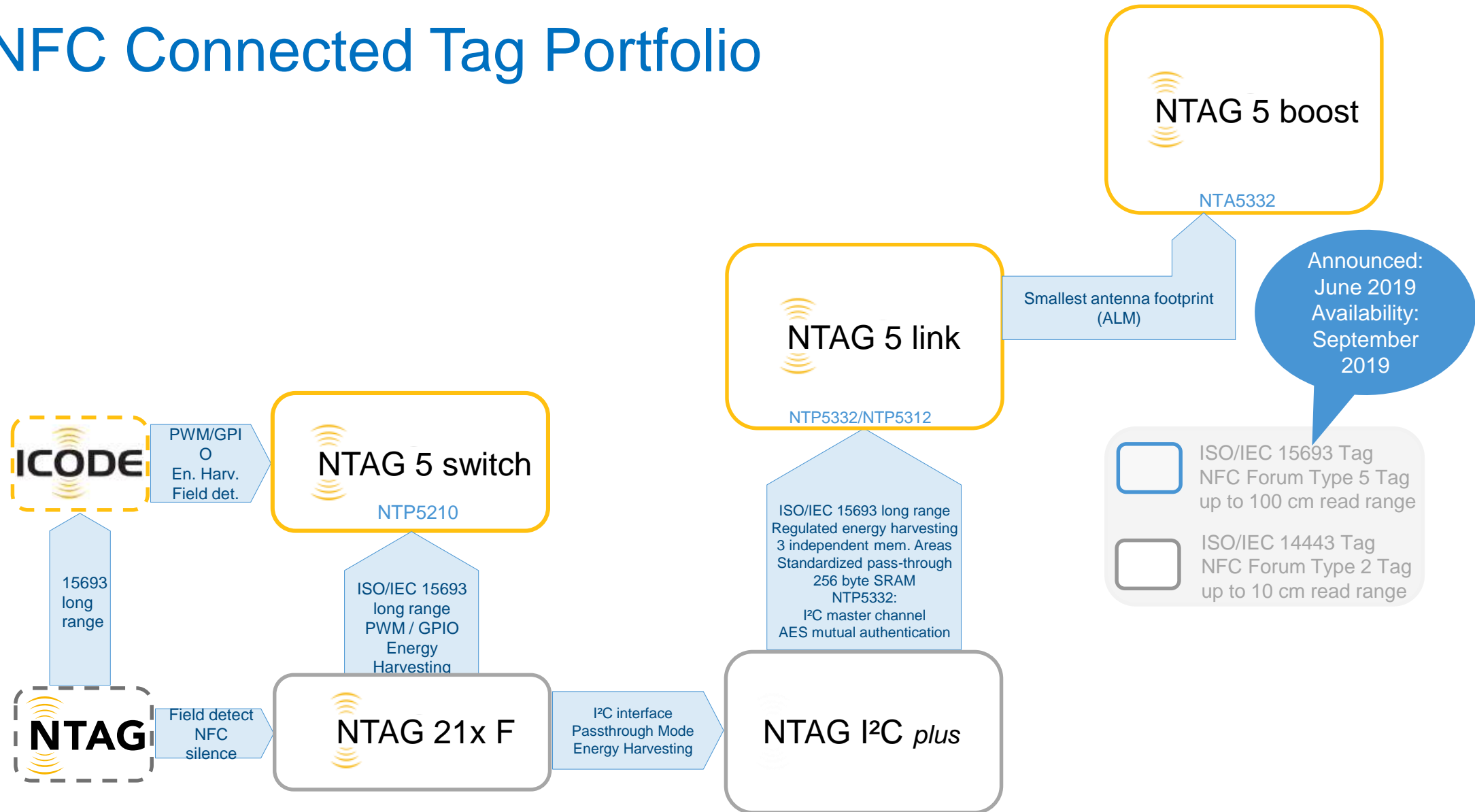# IoT On Demand

Supply (Energy Harvesting)

Sensor

I²C Master

NTAG 5 link
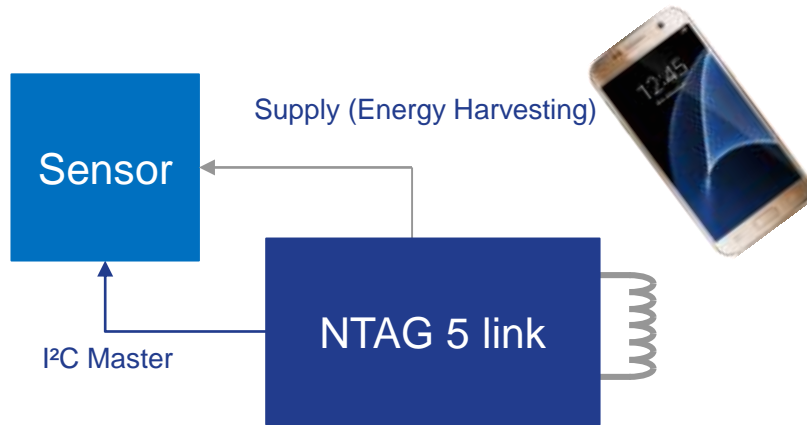
Benefits

- Overall BOM reduction:
  - No Battery needed
  - No MCU needed
    data preparation in app or cloud
- Especially for devices where power is an issue

NFC Connected Tag Portfolio

NTAG 5 boost
NTA5332

Announced:
June 2019
Availability:
September
2019

Smallest antenna footprint
(ALM)

NTAG 5 link
NTP5332/NTP5312

ISO/IEC 15693 Tag
NFC Forum Type 5 Tag
up to 100 cm read range

ISO/IEC 14443 Tag
NFC Forum Type 2 Tag
up to 10 cm read range

PWM/GPIO
En. Harv.
Field det.

ICODE

NTAG 5 switch
NTP5210

ISO/IEC 15693 long range
Regulated energy harvesting
3 independent mem. Areas
Standardized pass-through
256 byte SRAM
NTP5332:
I²C master channel
AES mutual authentication

15693
long
range

ISO/IEC 15693
long range
PWM / GPIO
Energy
Harvesting

NTAG

Field detect
NFC
silence

NTAG 21x F

I²C interface
Passthrough Mode
Energy Harvesting

NTAG I²C *plus*

Check Out Our Demo!

SECURE CONNECTIONS
FOR A SMARTER WORLD