NFC in Consumer Electronics and Home Appliances

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Embedded NFC

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SECURE CONNECTIONS FOR A SMARTER WORLD

IoT at Home

1. Wifi enabled dish washer
2. 3 smart phones
   3 tablets
   2 eBooks
   2 smart watches
   2 BT-headset
3. Tonie box
4. WIFI enabled Light
5. BT Loudspeker
6. BT enabled coffee machine
7. Temperature of rabbit’s house

Do I Need for Every Connectivity WIFI?

- 24 WLAN-clients
- 6 apps on the phone
- Which information lands where?
- Do I need to know at works if my dish washer is ready?
- Do I need an app for my coffee machine if I need to configure only once?

NFC Enabling IoT on Demand

- 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

More intuitive than any technology

It's like shaking hands

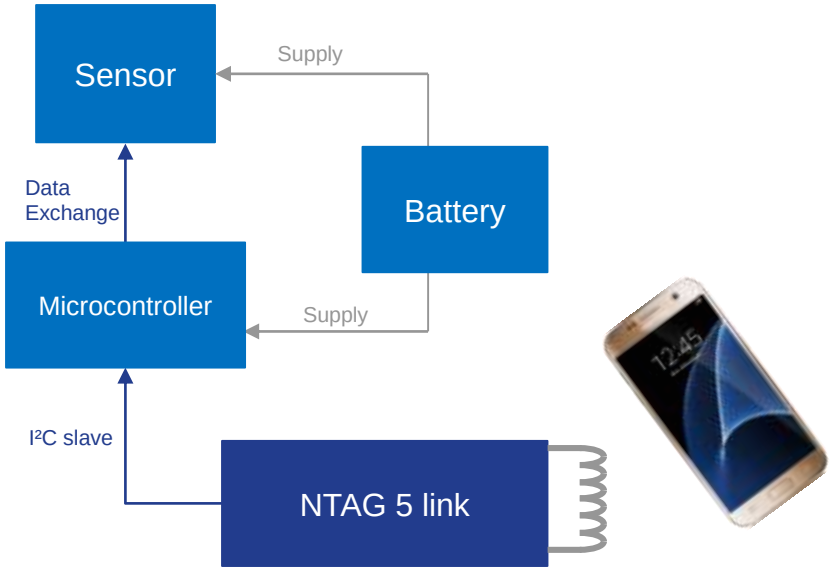
Use Power Very Efficiently

Only one of the two devices needs to be powered

Trusted addition to other technology

Especially for pairing devices

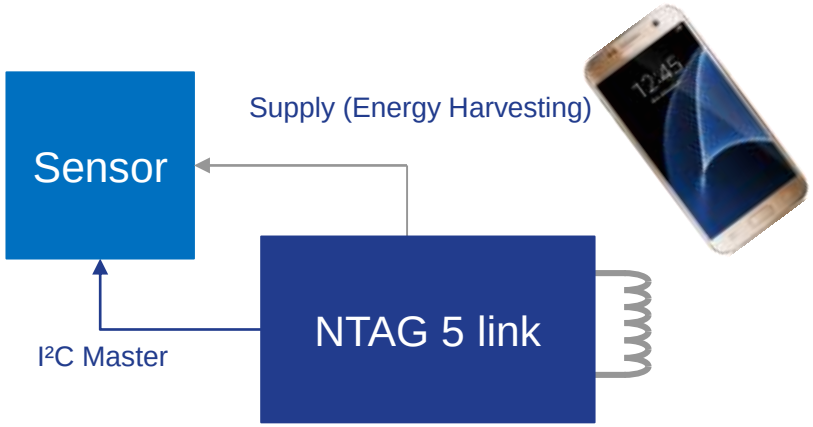
Constant Monitoring of Sensors



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

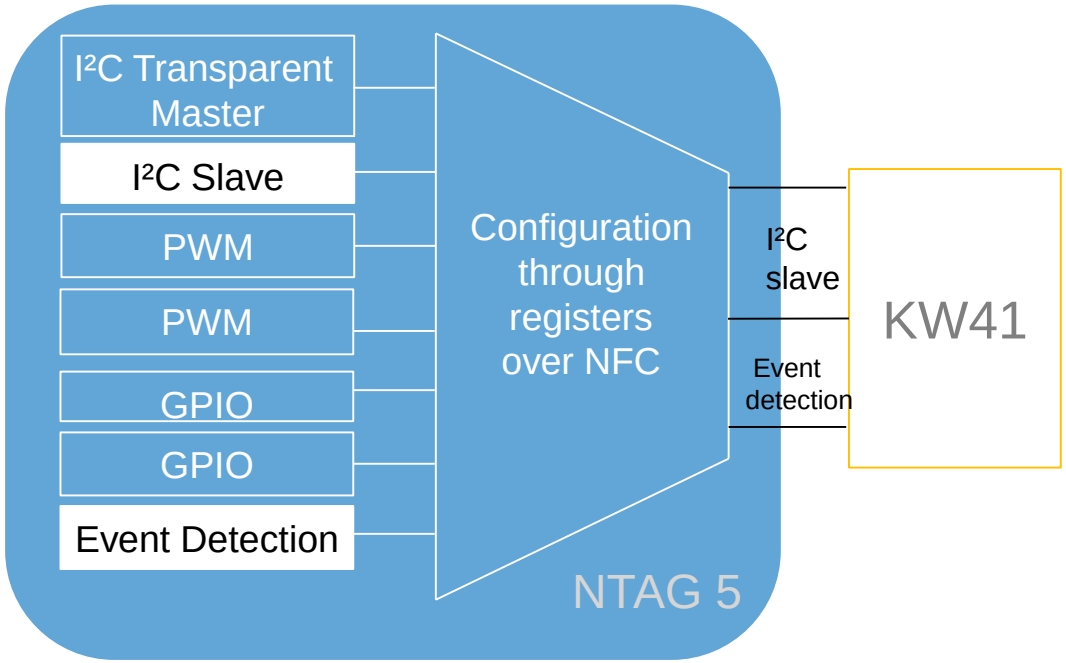


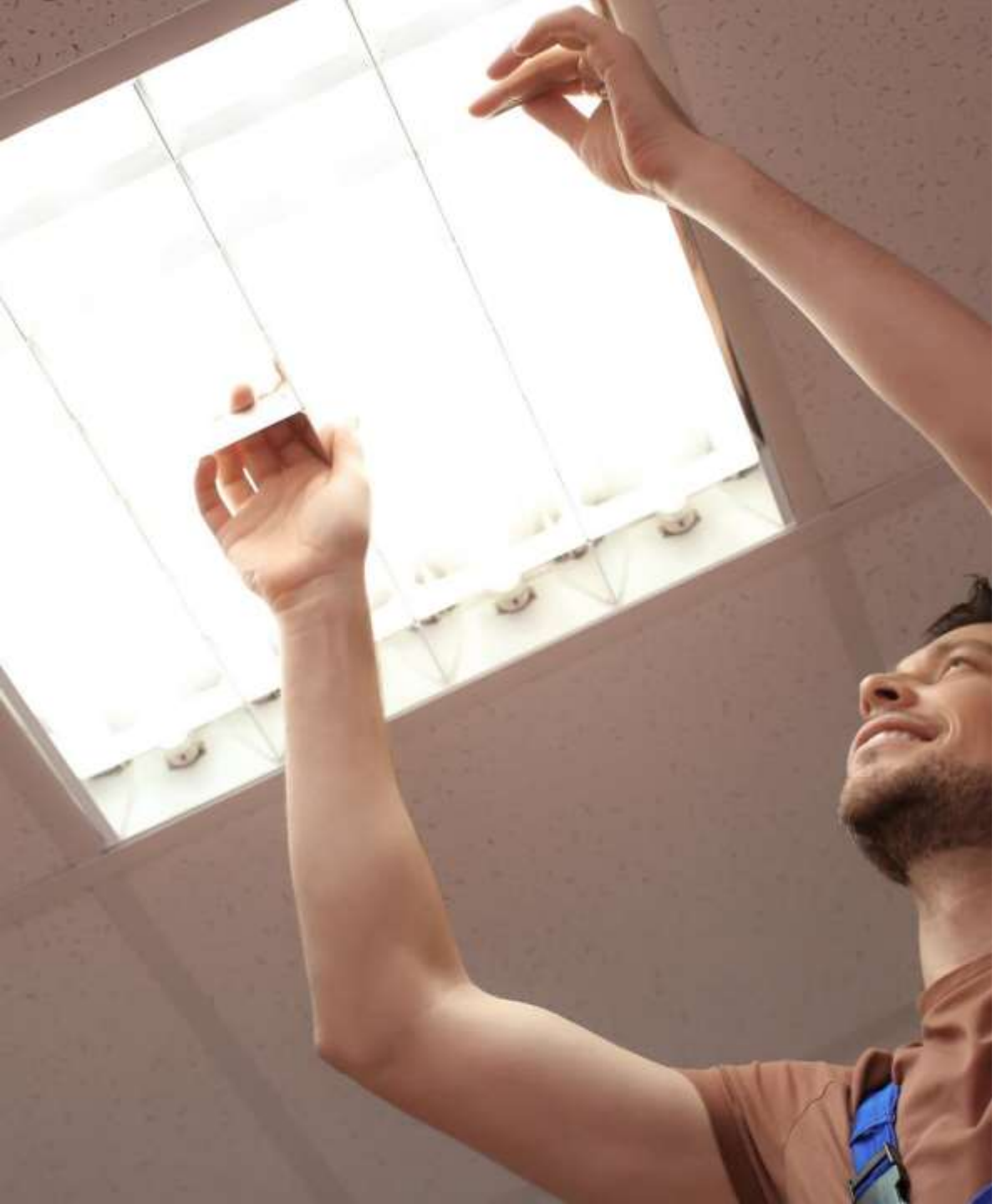
Benefits

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

NFC Commissioning

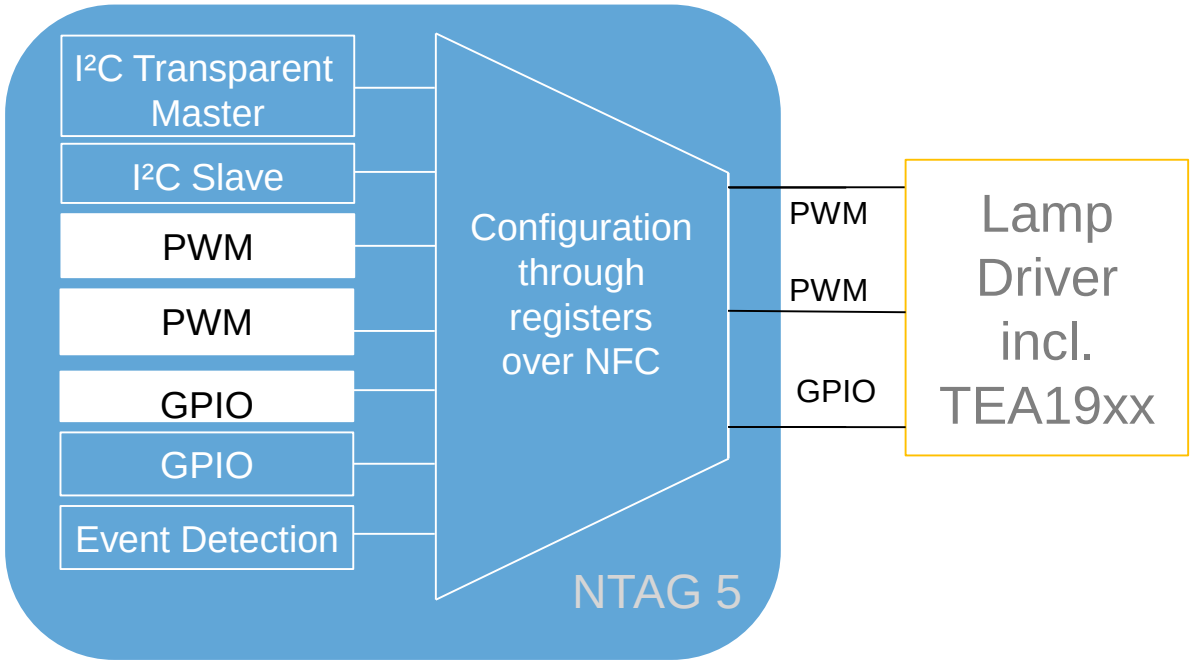
- I²C slave interface to a BT/Zigbee µC for pairing pairing protocol
- Event detection pin to wake up the circuit in the event of NFC field





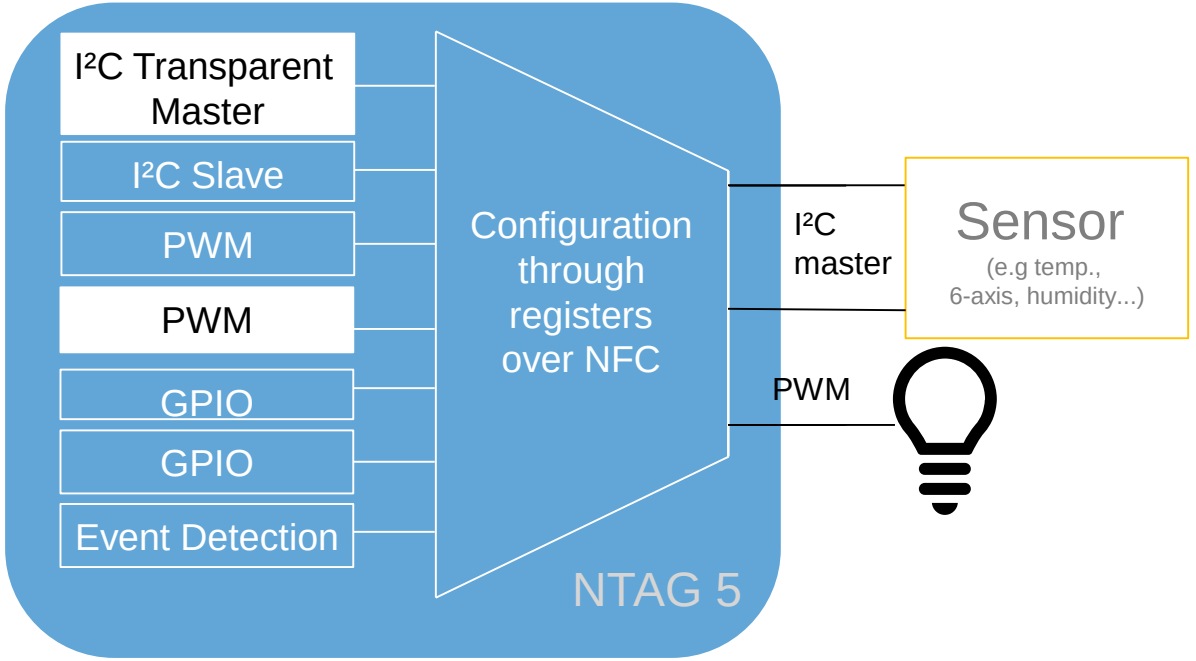
Lighting – LED Converter

- Configure current for LED converter through PWM
- Configure second current for tuneable white LED
- Use GPIO to enable or disable converter



Sensor Communication

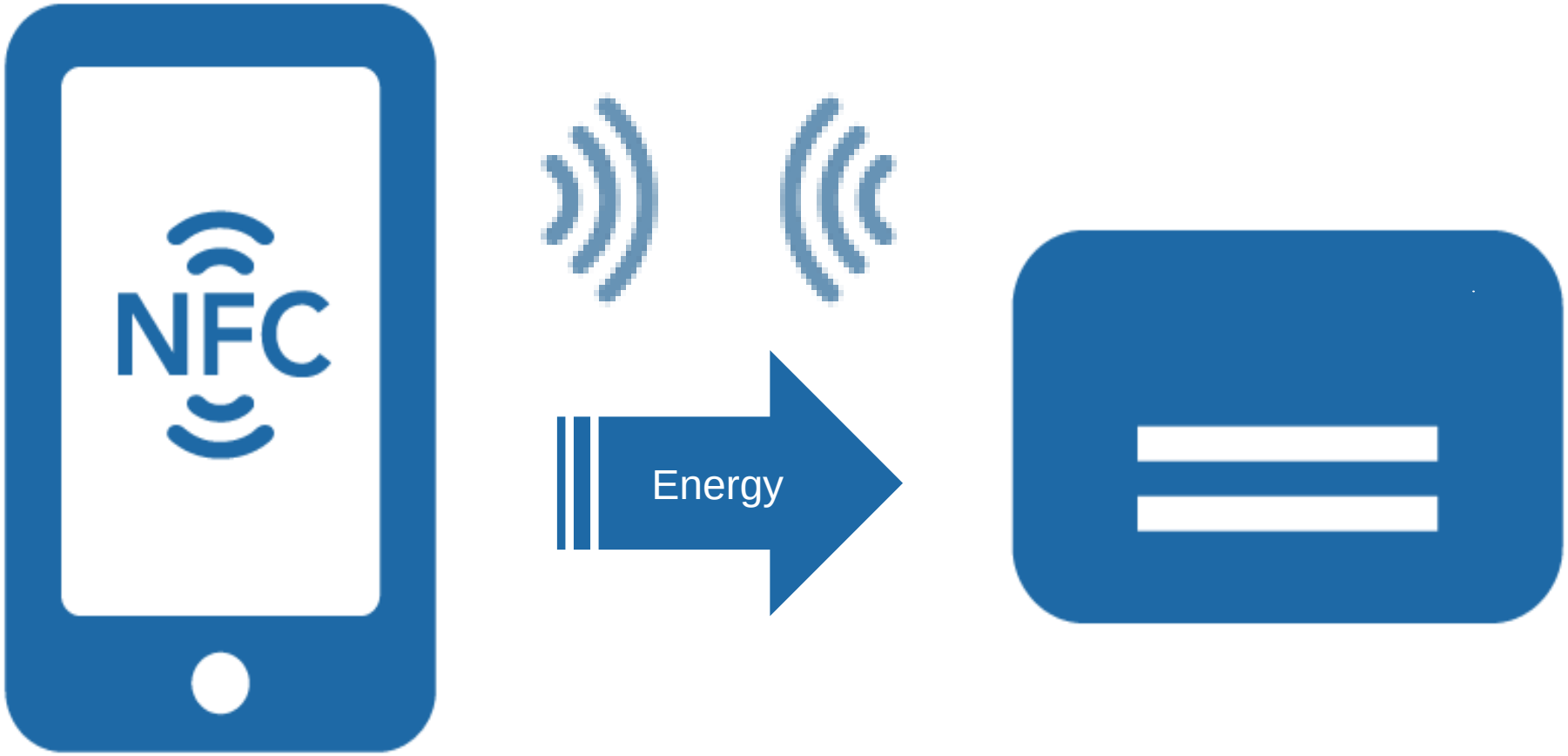
- Read/write to sensor through NFC and I²C master
- No MCU needed for communication to the sensor
- LED brightness changed through PWM indicating the communication



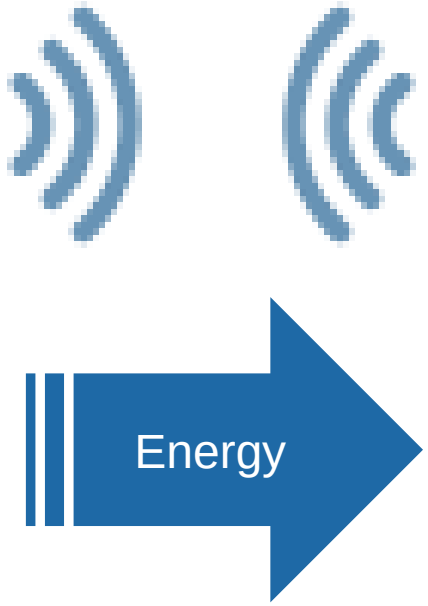
NTAG 5 Brings NFC to Tiny Devices

Active Load Modulation enables same read range with an antenna 40 times smaller

NFC Read Range vs. Antenna Sizes



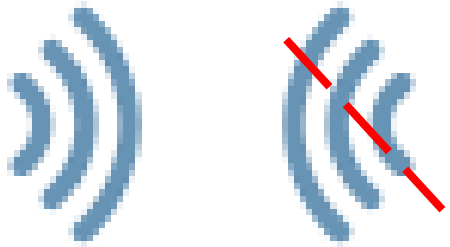
NFC Read Range vs. Antenna Sizes

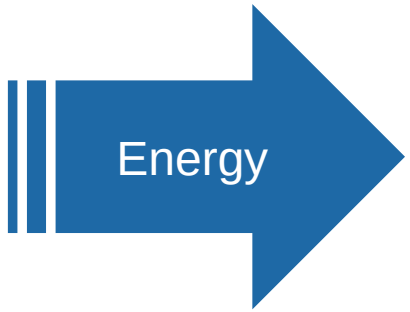


Read range is roughly the diameter of the card‘s antenna

Rule of thumb

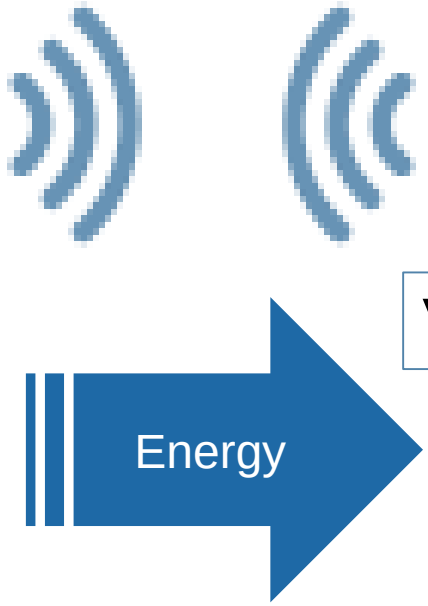
NFC Read Range vs. Antenna Sizes



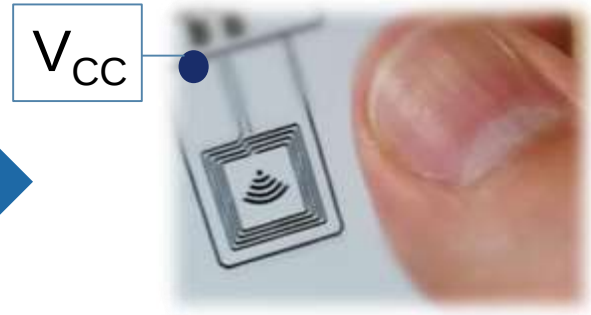


The small antenna cannot drive enough energy to sufficiently back-modulate to the reader.

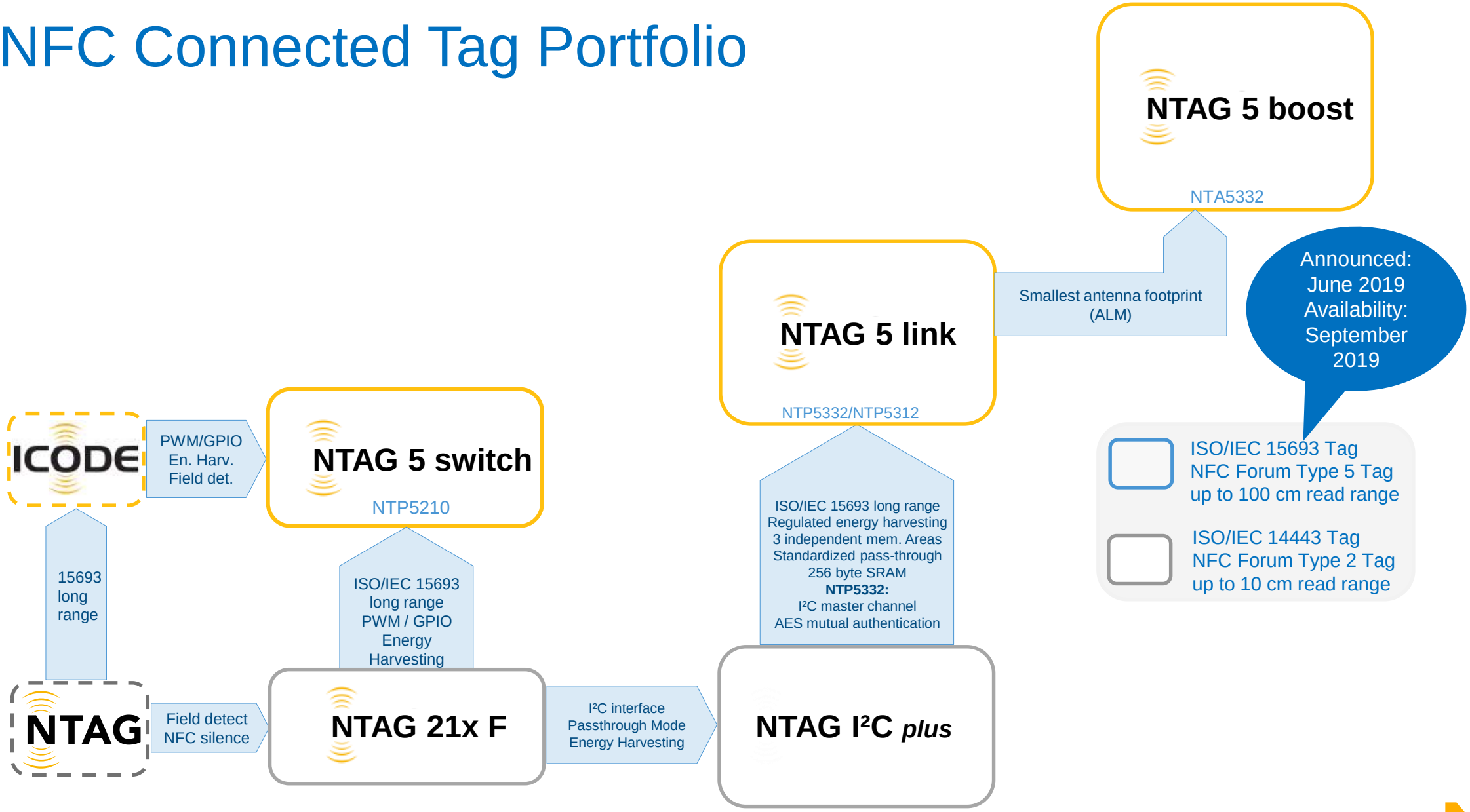
Active Load Modulation Enabling NFC for Tiny Devices



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



NFC Connected Tag Portfolio



Available NFC Use Cases

In Home Appliances and Consumer Electronics

Pair Your Phone With a Tap

BT speakers or headphone

WiFi printers for quick printing

Wearable device

WiFi camera for transferring quickly pictures

NFC Gateway to allow friends to use your WiFi network

TV to view images and videos on the big screen

NFC Benefits

- Simple secure pairing with a single tap
- Pair devices 20x faster than with BLE or Wi-Fi
- Identify a device instantly (no device conflicts or codes)
- Make devices easier to use
- Reduce tech-support costs
- Ensure that accessories are paired to the correct device

Authenticate and configure through NFC

Authentication of accessories or consumable

➔ Check that the right and genuine filter is used

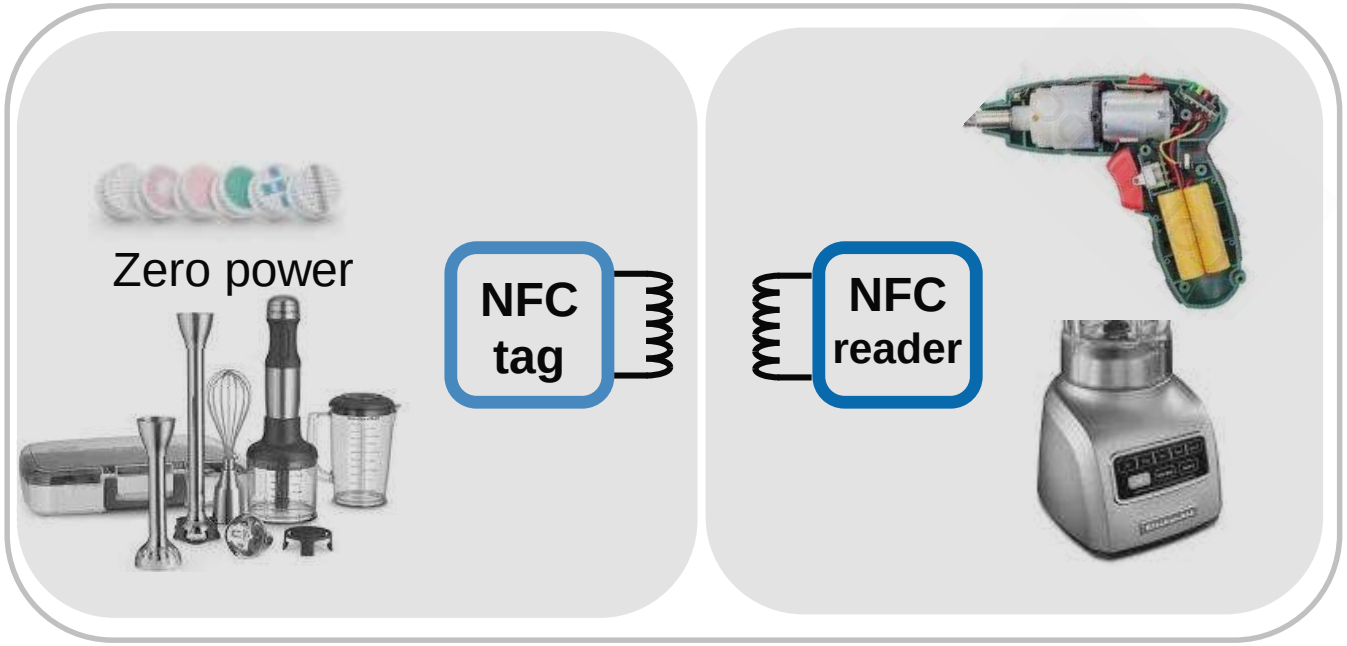
Wireless Configuration of the device

➔ Configure automatically the brush speed, spinning parameters, …

Safe NFC latch mechanism

➔ No power until NFC connectivity is on

How It Works



NFC Tag in the replacing part, e.g. brush head, water or air filter, …

Data read by NFC reader inside the base unit and sent to the MCU.

Benefits

- No mechanical constraint thanks to wireless connectivity
- Possibly additional interaction with NFC phone, e.g. download online manuals or ordering

Checkout our demo!

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