

# ST25系列NFC芯片 扩展您的无线生活

意法半导体市场部经理

祝林 13602661606

Q2 2015



ST Confidential

## From RFID driven (2010)...



## ... to NFC driven (2015)



- Limited RFID adoption, no NFC
- High cost of infrastructure (reader)
- ROI [investment] driven

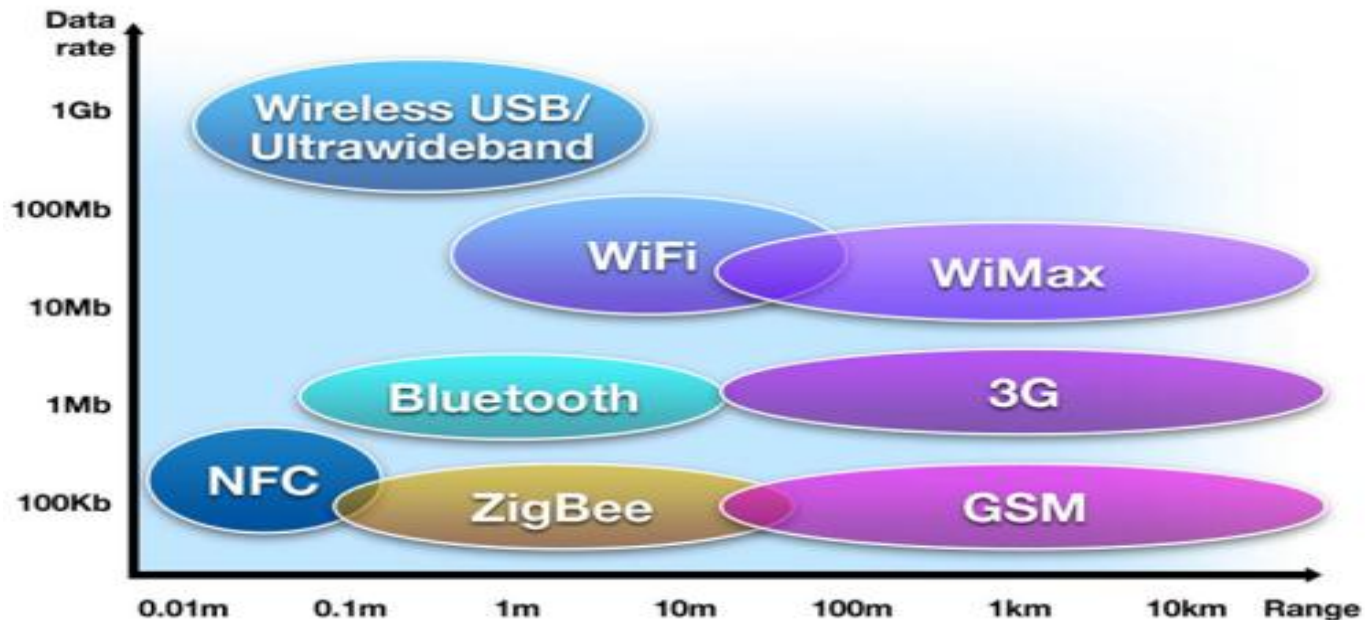
- NFC adoption confirmed, ramping
- “Free” infrastructure
- User experience [value] driven
- Multi-market

- Near Field Communication, a short range wireless technology operating at 13.56MHz
- Interactive and zero power, enabling convenient connection to the Internet of Things
- Enables contactless transactions, data exchange, and simplifies setup of more complex communications such as Bluetooth and Wi-Fi
- Fast growing deployment in Mobile
  - The number of NFC-enabled devices in use : 320 million in 2014 (source ABI research)
  - By 2015, 50% of smartphones compatible with NFC (source Gartner)



## NFC : Near Field Communication

- is a subset of 13.56 MHz RFID
- is short distance and low data rate
- is zero power consumption for a NFC tag as energy provided by the RF field
- is complementary to Wi-Fi and Bluetooth technology



# Wide range of use cases

5



- Convenient wireless pairing

- **Tap & Pair!** Bluetooth or Wifi connection pairing / unpairing made convenient by just taping the phone by the dynamic NFC tag.



- Remote programming

- **Tap & Set!** Take advantage of smartphones user interface to set appliances, home automation, healthcare and industrial equipments. Change default settings, cooking profile, activate warranty card ...



- Data download

- **Tap & Download!** Download your running data, your device user manual, the customer service contact information.



- Service maintenance

- **Tap & Diagnose!** Enable / disable a device, repurpose it, download its maintenance records, error codes, activate new functions.

# « Embedded NFC » use cases for IoT

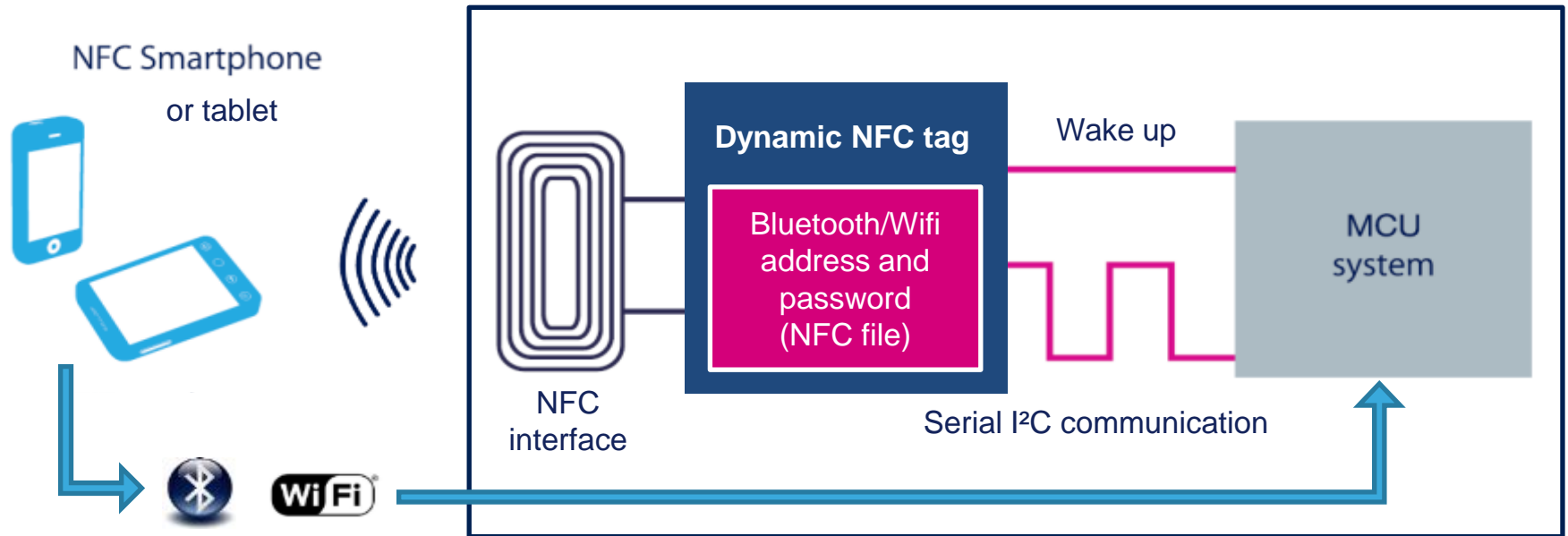
- ST's dynamic NFC tags and transceivers...  
... a wide range of use cases, in an affordable and easy-to-use device



<http://youtu.be/Z-9HtyhoxT8>

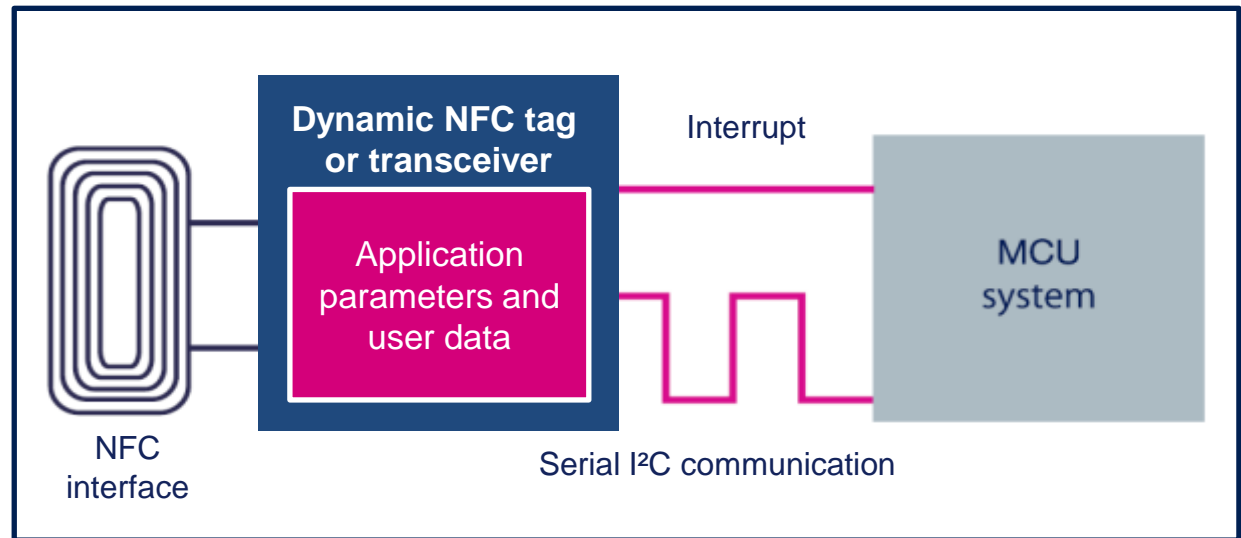
# Wireless pairing "Tap & pair"

7



Use ST's NFC technology to enable seamless wireless pairing

# Data download, remote programming, servicing “Tap & exchange”



Use ST’s NFC technology to exchange data in an interactive and user-friendly way by leveraging smartphone or tablet display quality



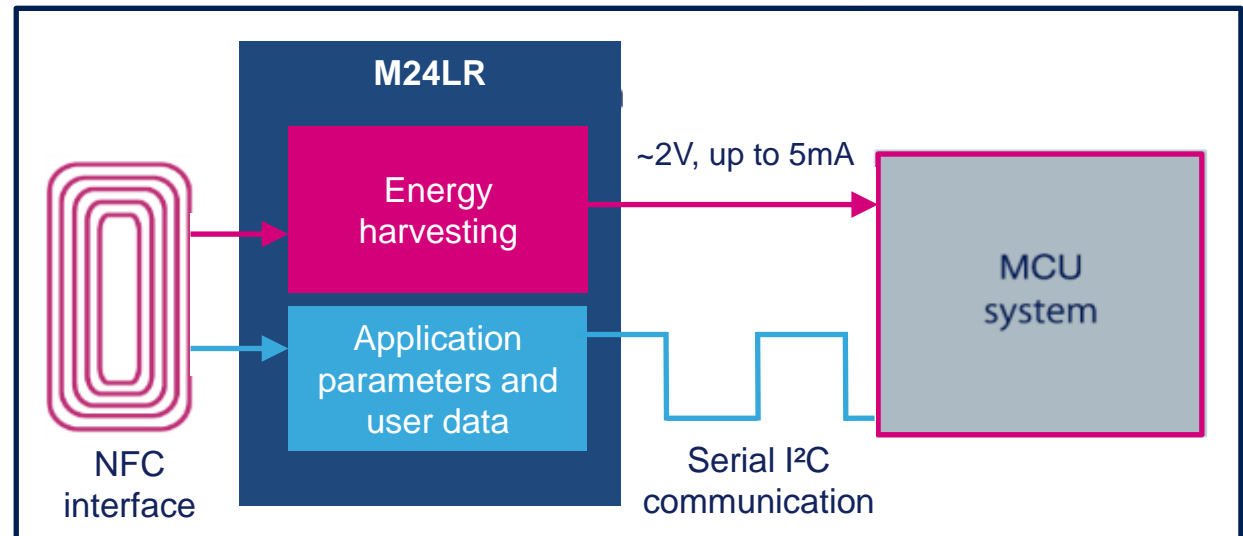
# Energy harvesting with M24LR



NFC Smartphone  
or tablet

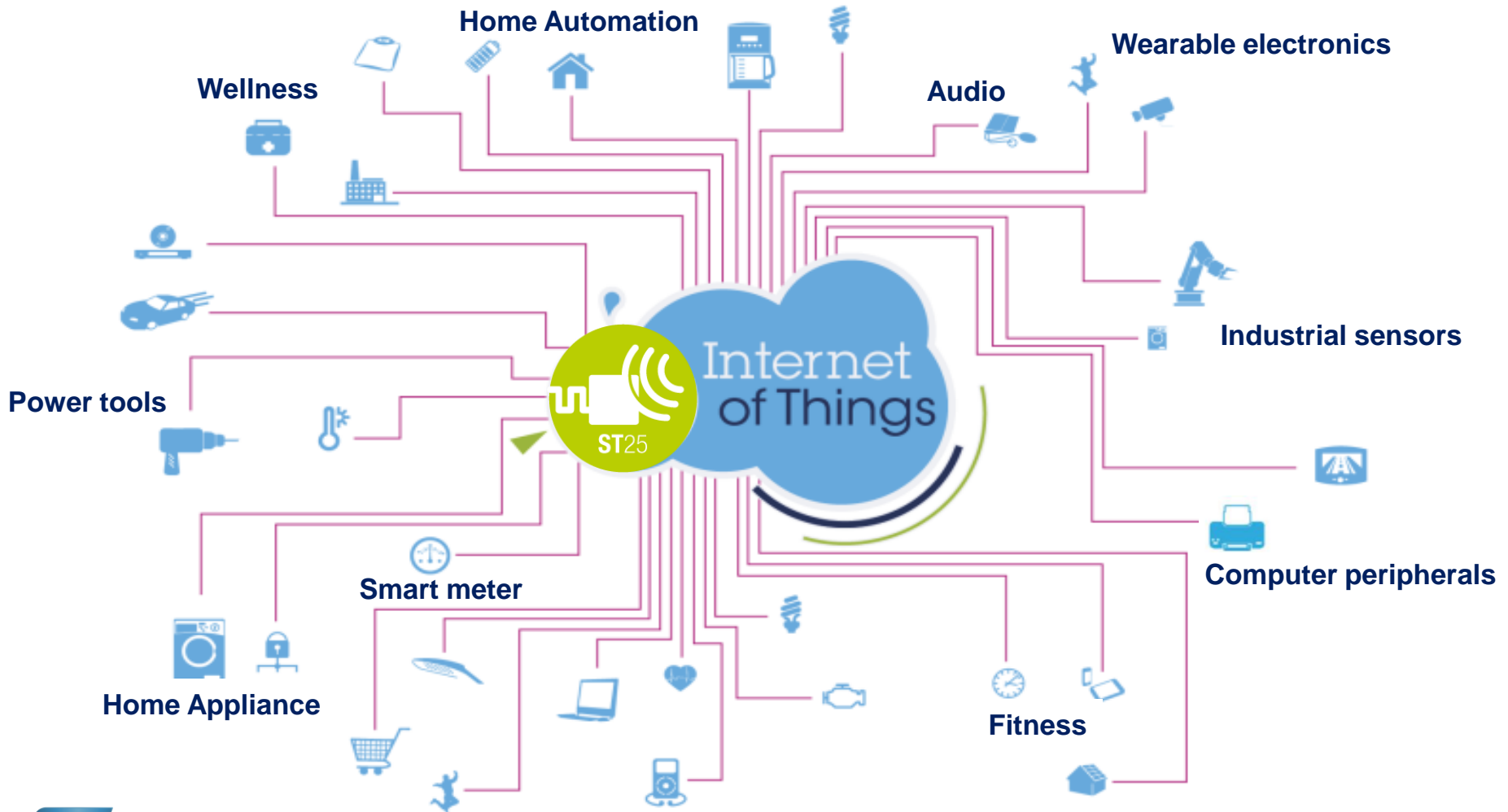


RFID reader



Use M24LR to enable battery-less applications such as e-paper based electronic shelf labels

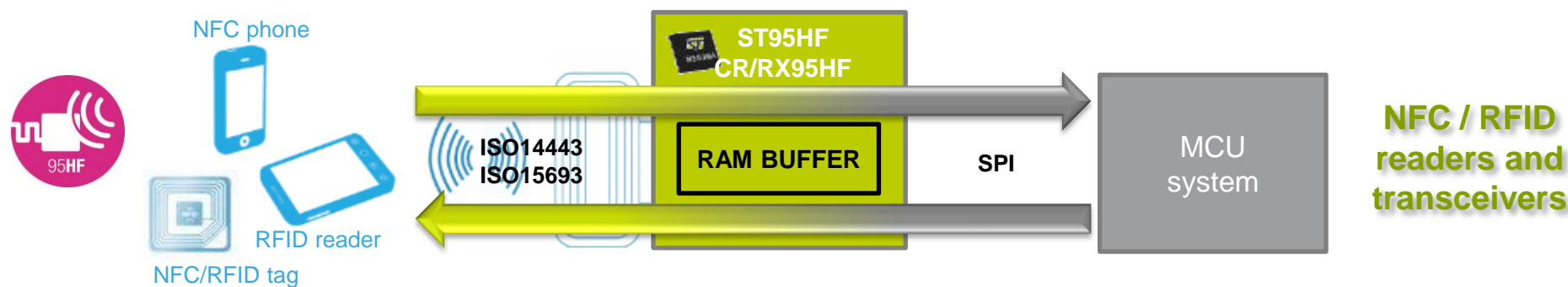
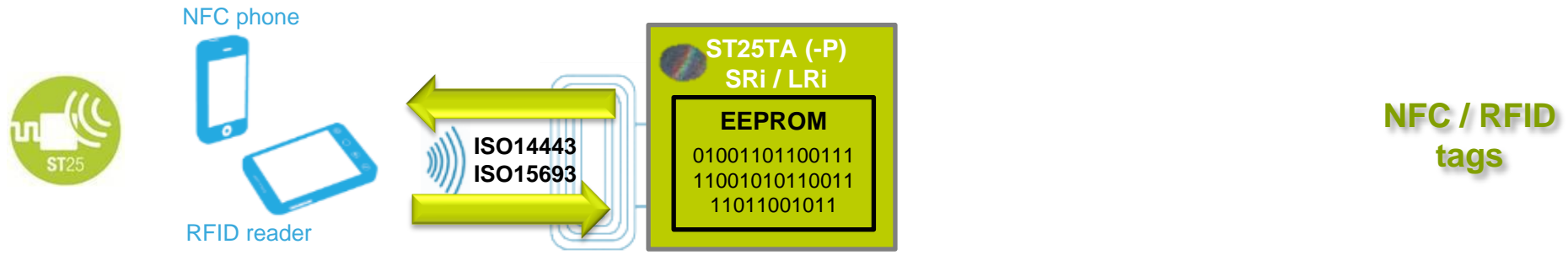
# ST NFC memories and transceivers at the heart of Internet of Things



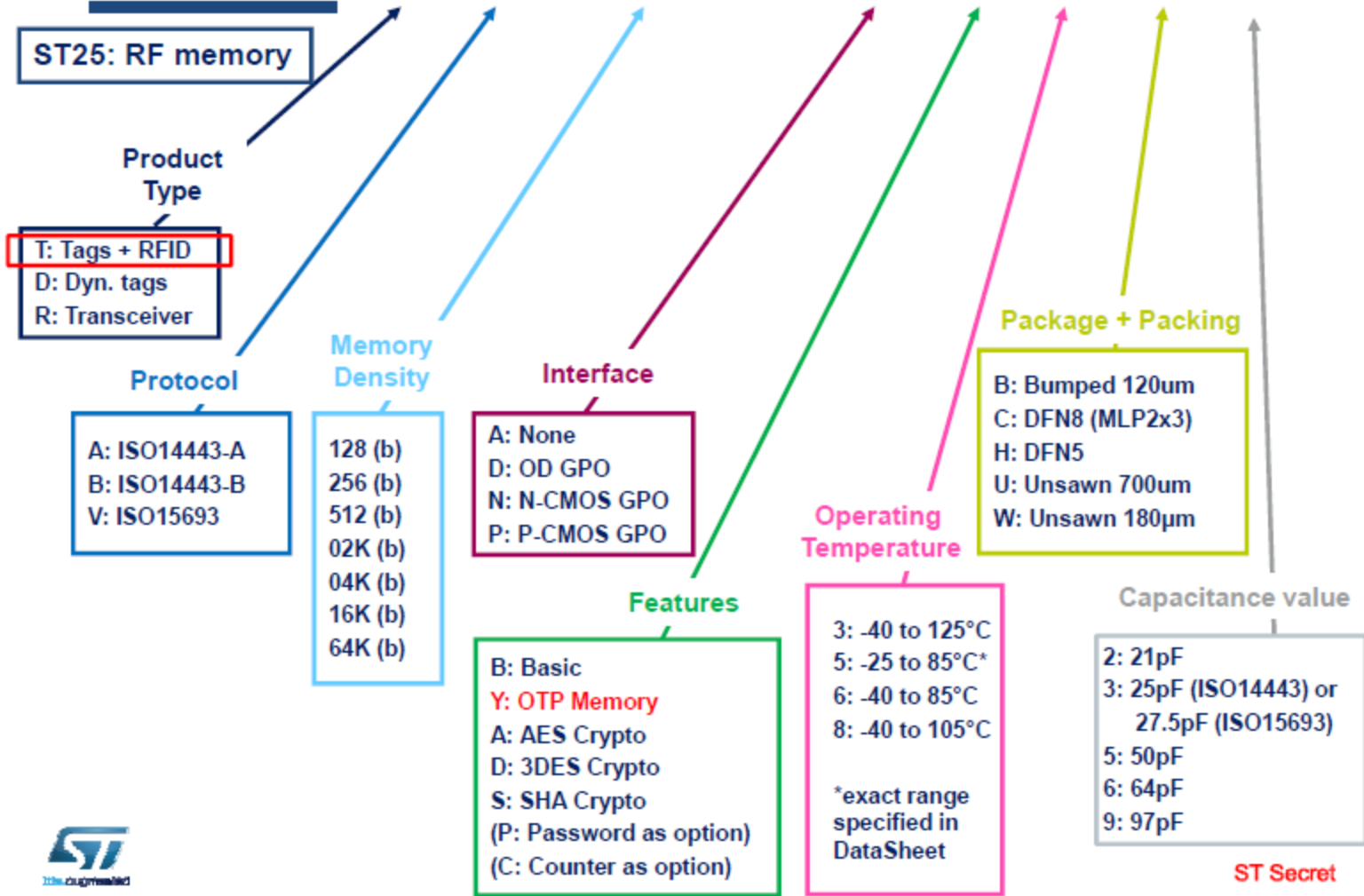


# NFC / RFID Portfolio

# ST solutions for NFC / RFID



# ST25 TA 512 - DC6C5



ST Secret



# Dynamic NFC / RFID tags

## M24LR series

## M24SR series

Contactless Interface

ISO15693  
NFC Compatible

ISO14443A  
NFC Type 4

RF range

Long range, up to 100cm

Short range, up to 10cm

RF speed

26kbps

106kbps

Serial Interface

I2C @400kHz

I2C @1MHz

Extra features

MCU wake-up &  
Energy Harvesting

MCU wake-up &  
RF Disable

Memory format

EEPROM data

EEPROM  
preformatted NDEF file

Memory size

4 / 16 / 64-kbit

2 / 4 / 16 / 64-kbit

Data protection

Password 32-bit

Password 128-bit

Temperature range

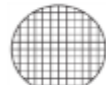
-40°C to +85°C

-40°C to +85°C

Package

SO8 / TSSOP8 /  
DFN8

SO8 / TSSOP8 /  
DFN8 / SBN12 \*



\* SBN12: Die form, sawn and Bumped wafer, 120µm thickness, inkless wafer

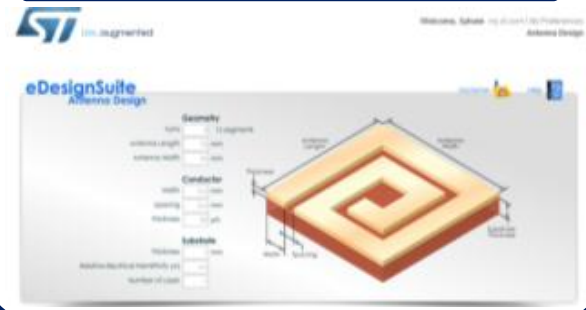
### NFC Android App



### Evaluation board



### Antenna Design Suite



### e2e community



# M24SR support eco-system

### Nucleo shield



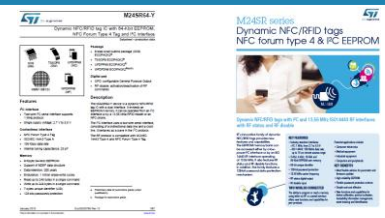
### MCU drivers (FW)

```

/*****/
int main(void)
{
  /* Wait till HSE is ready */
  HSEStartUpStatus = RCC_WaitForHSEStartUp();
  if(HSEStartUpStatus == SUCCESS)
  {
    /* Enable Prefetch Buffer */
    FLASH_PrefetchBufferCmd(FLASH_PrefetchBuffer_Enable);
  }
}

```

### Technical documentation



### IBIS model








[www.st.com/nfc-rfid](http://www.st.com/nfc-rfid)



# Comprehensive NFC / RFID portfolio



## NFC / RFID tags

- |  |  |
|--|--|
| <p><i>ISO14443A (NFC)</i><br/>  ST25TA512<br/>                 ST25TA02K<br/>                 ST25TA16K<br/>                 ST25TA64K<br/> </p> | <p><i>ISO14443B (RFID)</i><br/>  SRI512 / SRT512<br/>                 SRI2K / SRI4K<br/> <br/> <i>ISO15693 (RFID)</i><br/>  LRI2K<br/>                 LRIS64K</p> |
| <p> <i>ISO14443A &amp; INT</i><br/>                 ST25TA02K-P</p>   |  |

## Dynamic NFC / RFID tags

- |  |   |
|--|---|
| <p><i>ISO14443A &amp; I2C</i><br/>  M24SR02<br/>                 M24SR04<br/>                 M24SR16<br/>                 M24SR64<br/> </p> | <p><i>ISO15693 &amp; I2C</i><br/>  M24LR04E<br/>                 M24LR16E<br/>                 M24LR64E<br/> </p> |
|--|---|

## NFC transceivers

- |  |  |   |
|--|--|---|
| <p> <b>RX95HF</b><br/>                 Card emulation</p> | <p><b>CR95HF</b><br/>                 Reader</p> | <p><b>ST95HF</b><br/>                 Transceiver</p>  |
|--|--|---|



Gaming, Consumer, Peripherals, Wellness, Smart poster



# Product part numbers

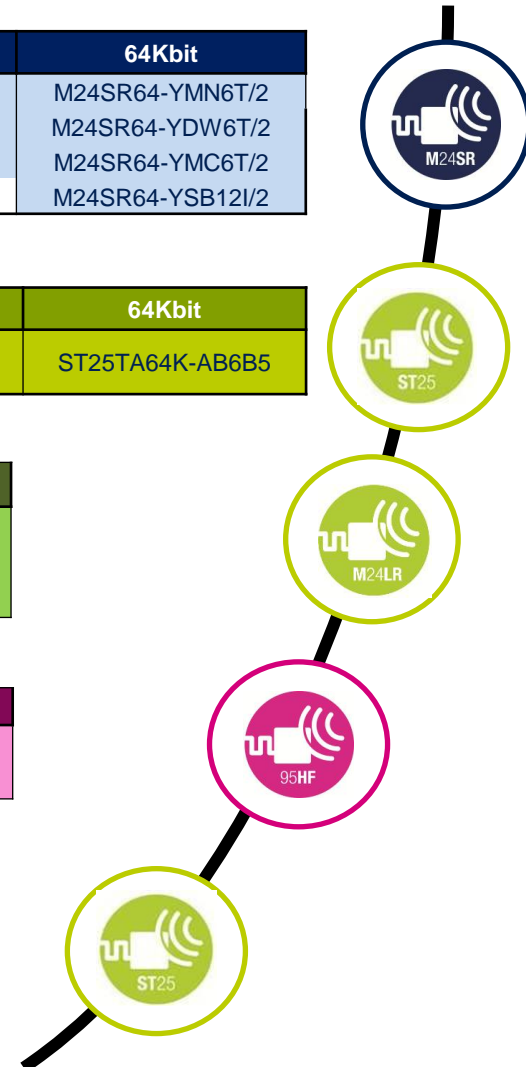
M24SR	Package	2Kbit	4Kbit	16Kbit	64Kbit
Dynamic NFC/RFID tag RF ISO14443A + I2C IF + GPO + RF disable	SO8	M24SR02-YMN6T/2	M24SR04-YMN6T/2	M24SR16-YMN6T/2	M24SR64-YMN6T/2
	TSSOP8	M24SR02-YDW6T/2	M24SR04-YDW6T/2	M24SR16-YDW6T/2	M24SR64-YDW6T/2
	MLP 2x3	M24SR02-YMC6T/2	M24SR04-YMC6T/2	M24SR16-YMC6T/2	M24SR64-YMC6T/2
	SBN12	M24SR02-YSB12I/2			M24SR64-YSB12I/2

ST25TA	Package	512bit	2Kbit	16Kbit	64Kbit
NFC/RFID tag RF ISO14443A	SBN12	ST25TA512-AC6B5	ST25TA02K-AC6B5	ST25TA16K-AB6B5	ST25TA64K-AB6B5

M24LR	Package	4Kbit	16Kbit	64Kbit
Dynamic NFC/RFID tag RF ISO15693 + I2C IF + GPO + Energy harvesting	SO8	M24LR04E-RMN6T/2	M24LR16E-RMN6T/2	M24LR64E-RMN6T/2
	TSSOP8	M24LR04E-RDW6T/2	M24LR16E-RDW6T/2	M24LR64E-RDW6T/2
	MLP 2x3	M24LR04E-RMC6T/2	M24LR16E-RMC6T/2	M24LR64E-RMC6T/2

95HF	Package	Card emulation	Reader	Transceiver
NFC transceivers NFC + SPI IF	QFN32	RX95HF-VMD5T	CR95HF-VMD5T	ST95HF-VMD5T

ST25TA-P	Package	2Kbit
NFC/RFID tag RF ISO14443A + GPO	DFN5	ST25TA02K-PC6H5
	SBN12	ST25TA02K-PC6B5



# NFC Pedometer Wristband

18

## NFC connectivity with no active RF radio

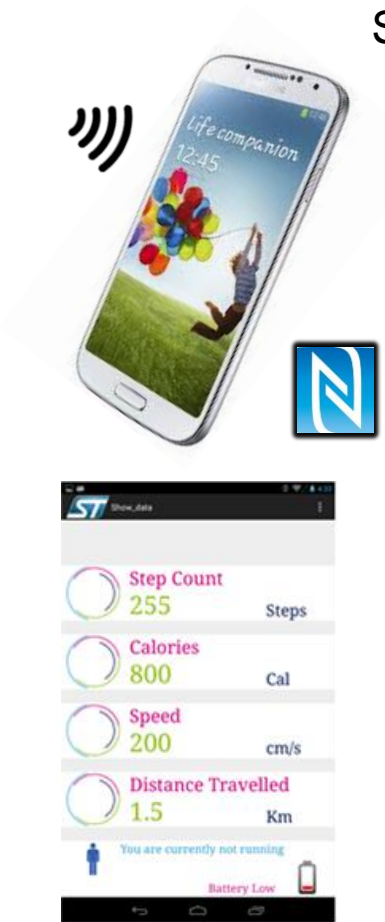
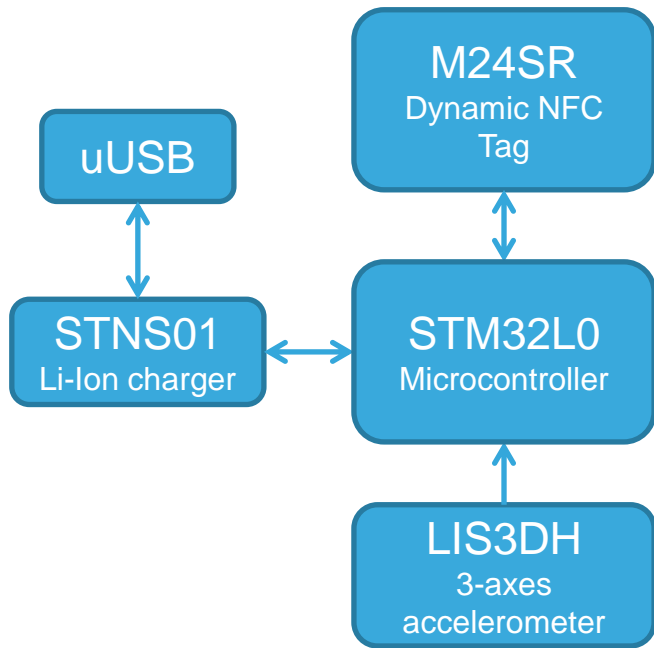


- Wearable reference design utilizing M24SR Dynamic NFC / RFID Tag
- Demo highlights using NFC connectivity as the main communication link to NFC enabled wearable devices
- NFC communication link consumes zero power on wristband side (power from NFC smartphone)

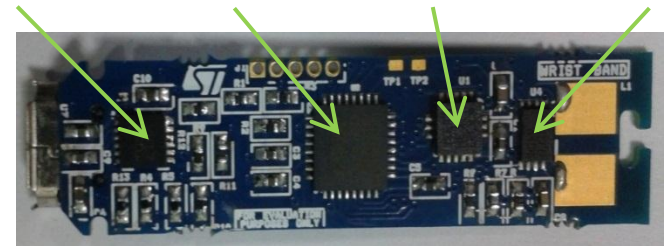
### Pedometer wristband based on ST chips

- M24SR Dynamic NFC / RFID Tag
- STM32L0 ultra low-power microcontroller
- LIS3DH ultra low-power 3-axes accelerometer
- STNS01 Li-Ion battery charger with LD

# Pedometer wristband in details



STNS01 STM32L0 LIS3DH M24SR64





Thank You !