ST25 Ecosystem introductions

吴刚

Nov, 2022

Agenda

- ST25 design resources
- Customer oriented solutions

ST25 design resources

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ST25 Ecosystem in China

Easy-to-use and customer-oriented

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ST25 Hardware Ecosystem

Fast evaluation and easy prototyping

Discovery kit

- **ST25 NFC IC**
- Onboard STM32 MCU
- Micro-USB connector
- PC GUI available
- MCU source code available for full function evaluation and demo with PC GUI

Example: ST25R3911B-DISCO

Nucleo shield board

- **ST25 NFC IC**
- Compatible with STM32 Nucleo boards
- Equipped with Arduino™ UNO R3 connector
- MCU source code available for prototype development &

Example: X-NUCLEO-NFC05A1

Application oriented demo kit

- **ST25 NFC IC**
- Onboard STM32 MCU
- Micro-USB connector
- Comprehensive Device Test Environment (DTE) for EMVCo Level 1 FW control

Example: ST25R3911B-EMVCO

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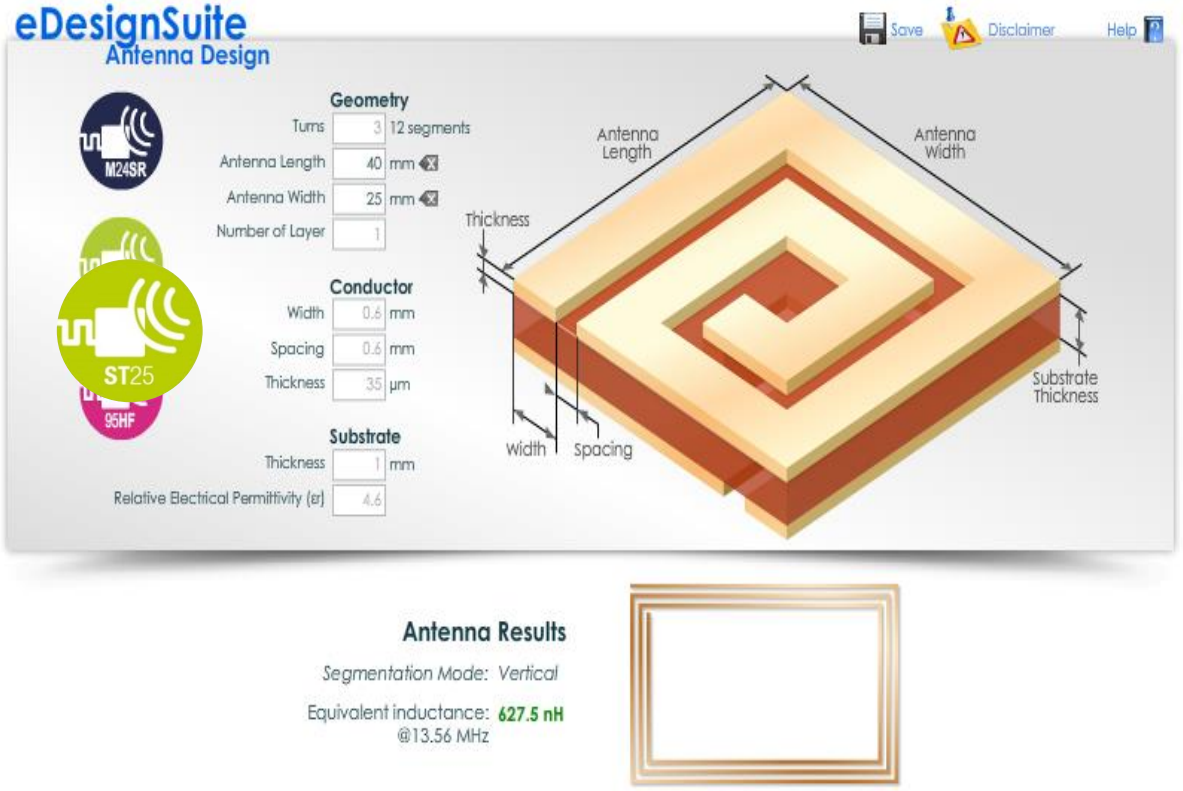
Design tools and training

Easy to use and user friendly - Antenna eDesign suite



Antenna design tools: single layer antenna design

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Available in www.st.com

参考网盘4号目录下文档 如何设计单面FR-4 PCB天线.pdf

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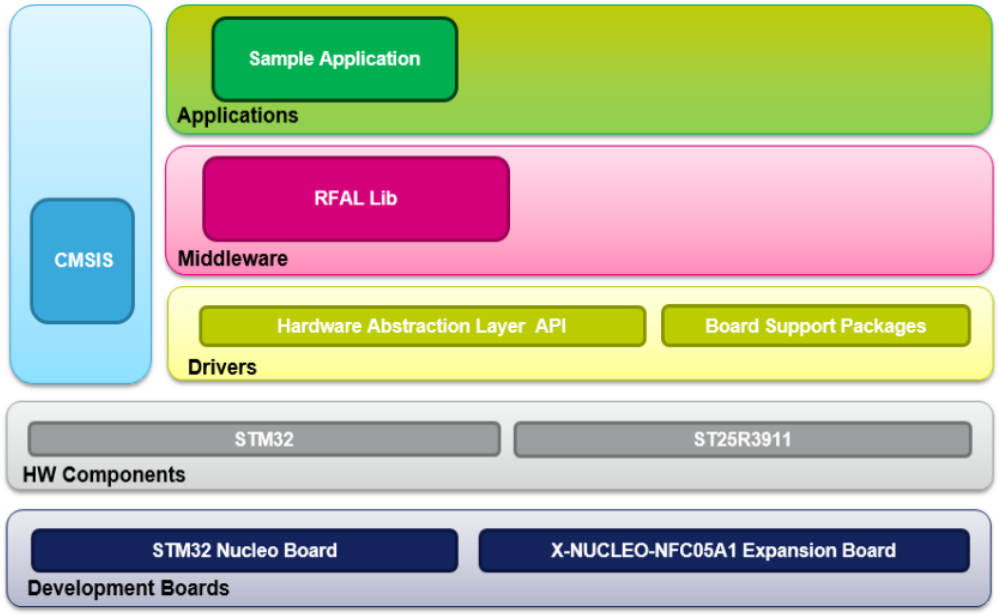
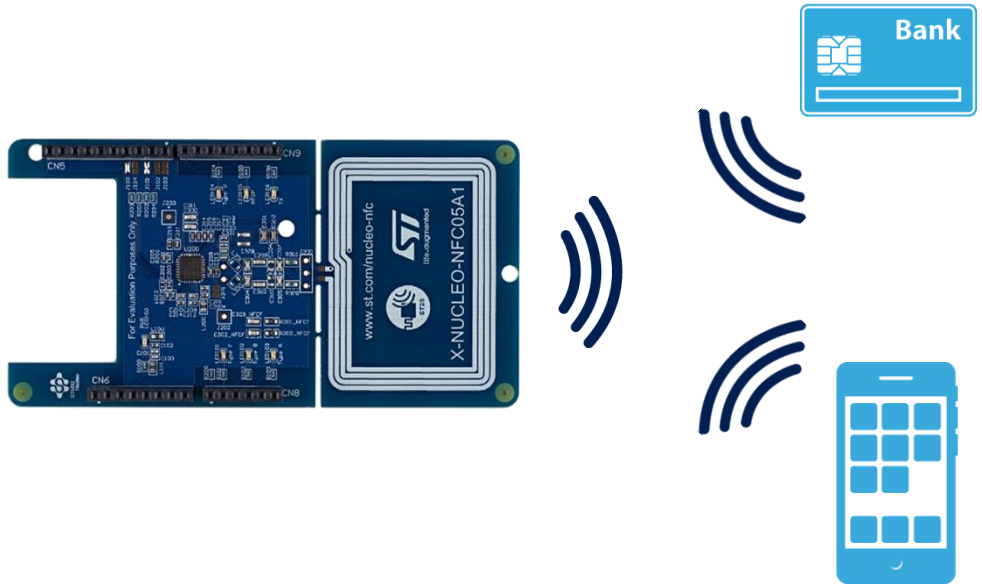
ST25 Software Ecosystem

STM32Cube expansion, easy-to-use and porting

- Example : Demo of the ST25R3911B wakeup and reader mode
  - Low power Wakeup mode detection of approaching tag
  - Identification and activation of nearby tag/P2P device
  - Displays tag‘s technology (LED) and UID





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STM32 open development environment

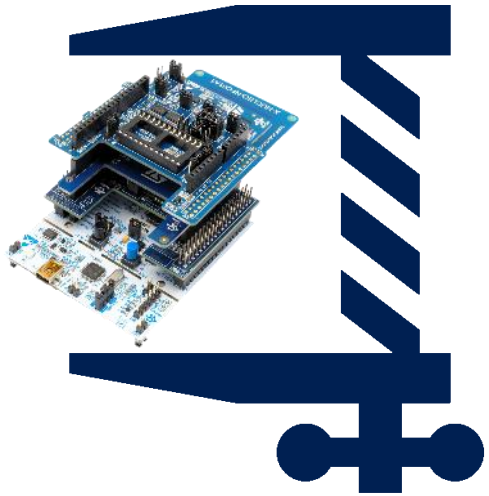
A fast track from idea to production with Nucelo boards

NUCLEO-F401RE

+

X-NUCLEO-IKS01A2

X-NUCLEO-NFC01A1



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Idea → Prototype → Engineering sample → **Product**

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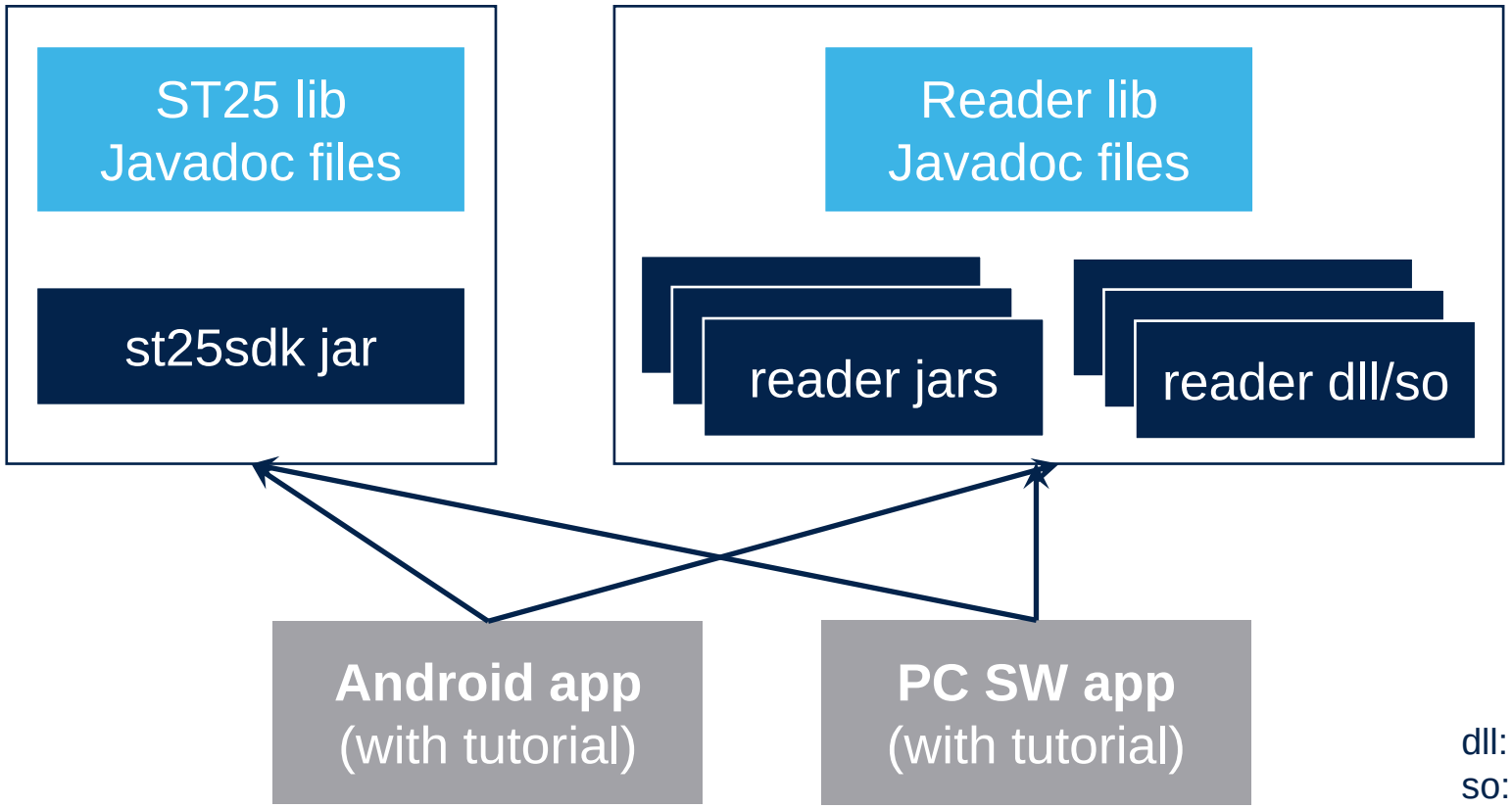
ST25 SDK content

ST25 SDK easy-to-use and customer-oriented



Data Brief

User Manual

dll: dynamic link library (for Windows)
so: shared object (dynamic library for Linux)

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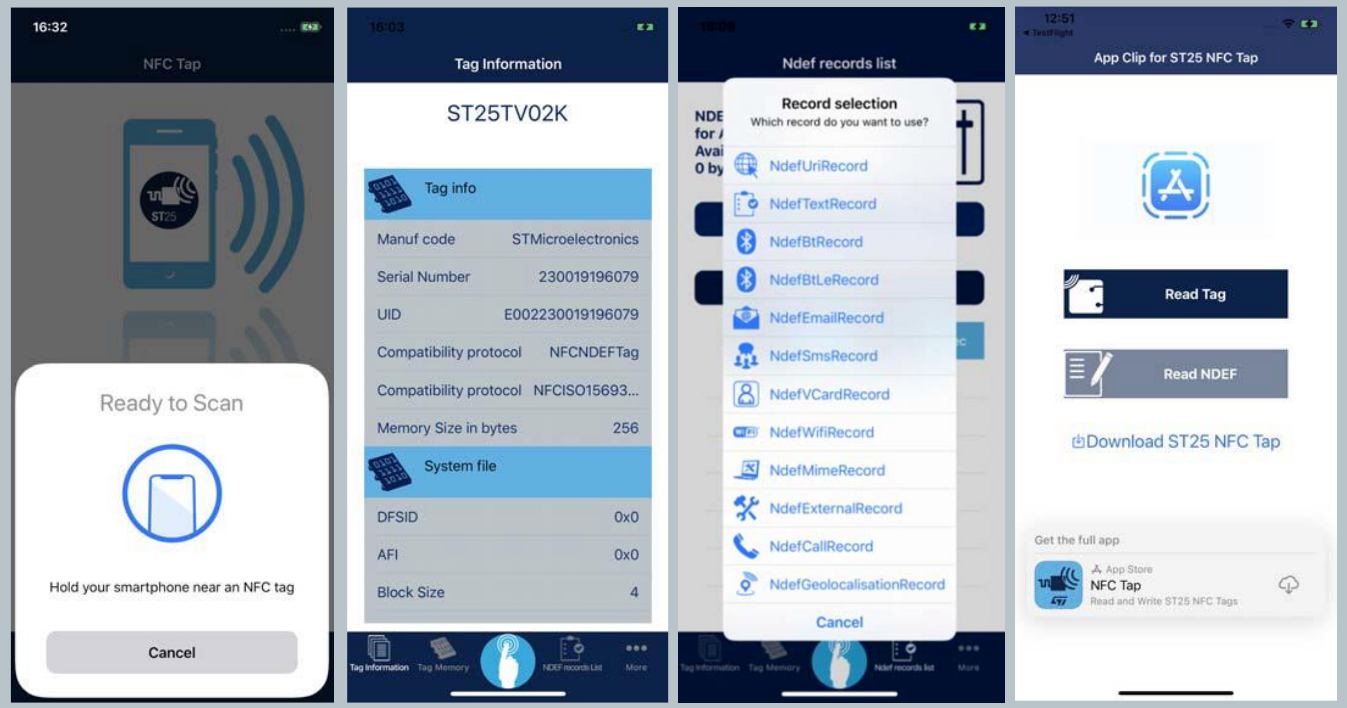
ST25 iOS mobile apps

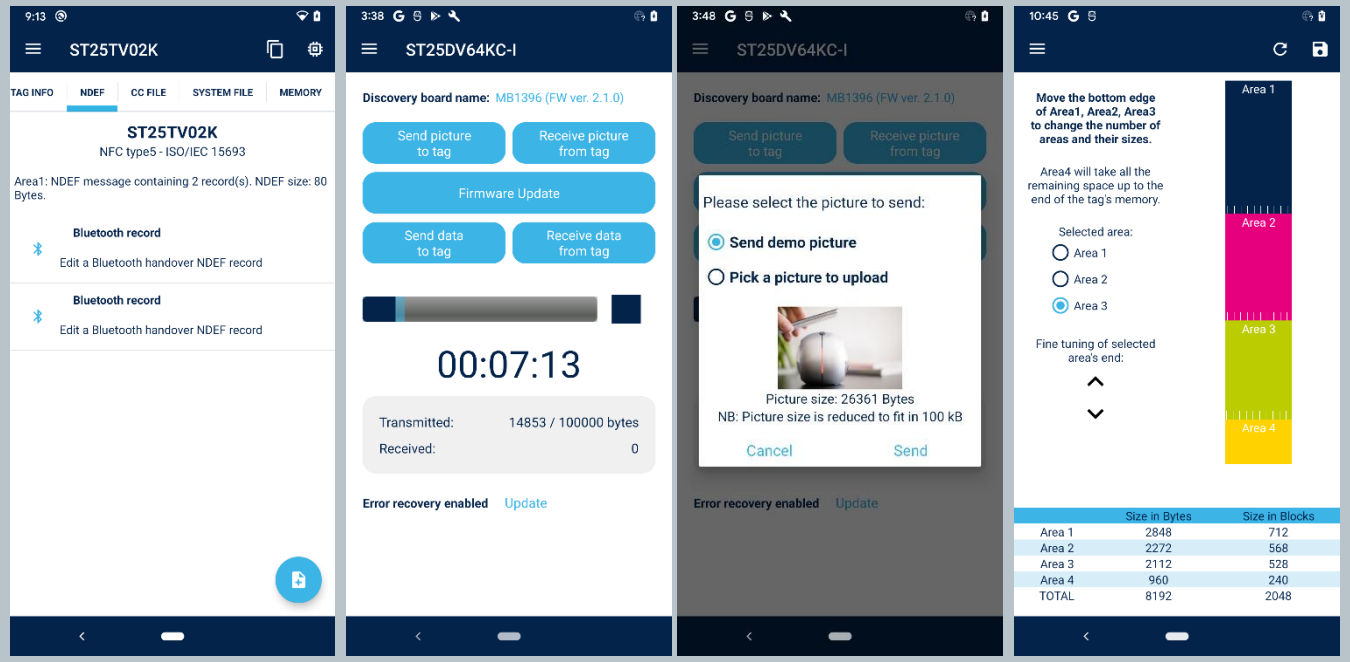
ST25 NFC Tap for iOS



- App Clip for User Experience
- Read/Write NDEF and User memory of ST25 tags
- Support of specific functionalities of ST25 tags (PWM output, TruST25 digital signature…)
- Includes demos for Fast Transfer Mode, Bluetooth pairing and PWM
- Support of NFC background tag reading
- Automatic launch of iOS app
- ST25 NFC tap open-source code (*STSW-ST25IOS002*)
- Support iOS14 & iOS15 beta

ST25 Android mobile apps

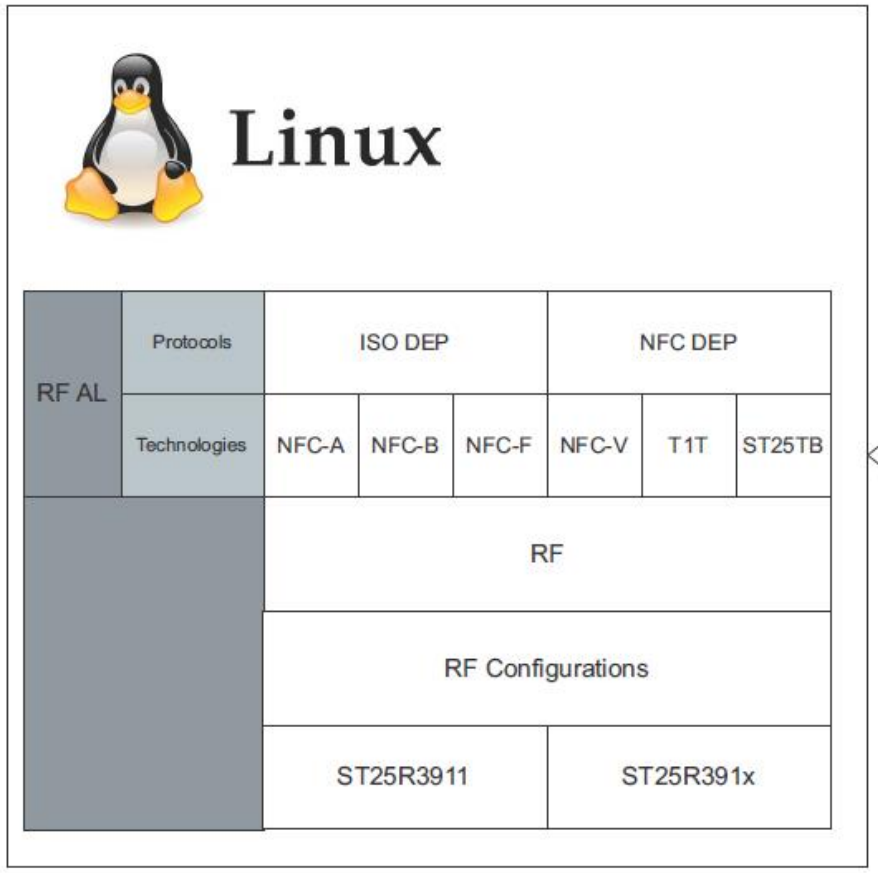
ST25 NFC Tap for Android

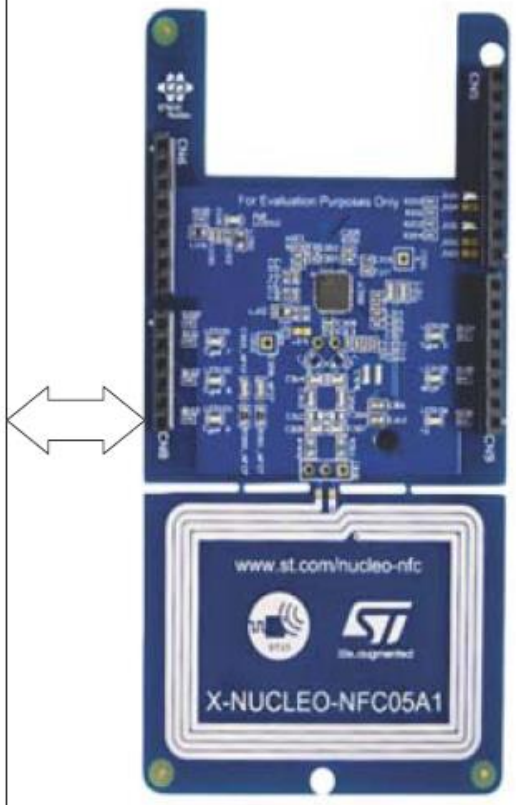


- Read/Write NDEF and User memory of ST25 tags
- Support of specific functionalities of ST25 tags (Tamper detect, Augmented NDEF, PWM output, TruST25 digital signature…)
- Includes demos for Fast Transfer Mode, PWM and Wifi or Bluetooth pairing
- Automatic launch of Android app
- ST25 NFC tap apk file (*STSW-ST25001*)
- ST25 NFC tap open-source code (*STSW-ST25002*)

Linux® driver for the ST25R391x

Simple implementation with the Raspberry Pi 3 to operate with the reader





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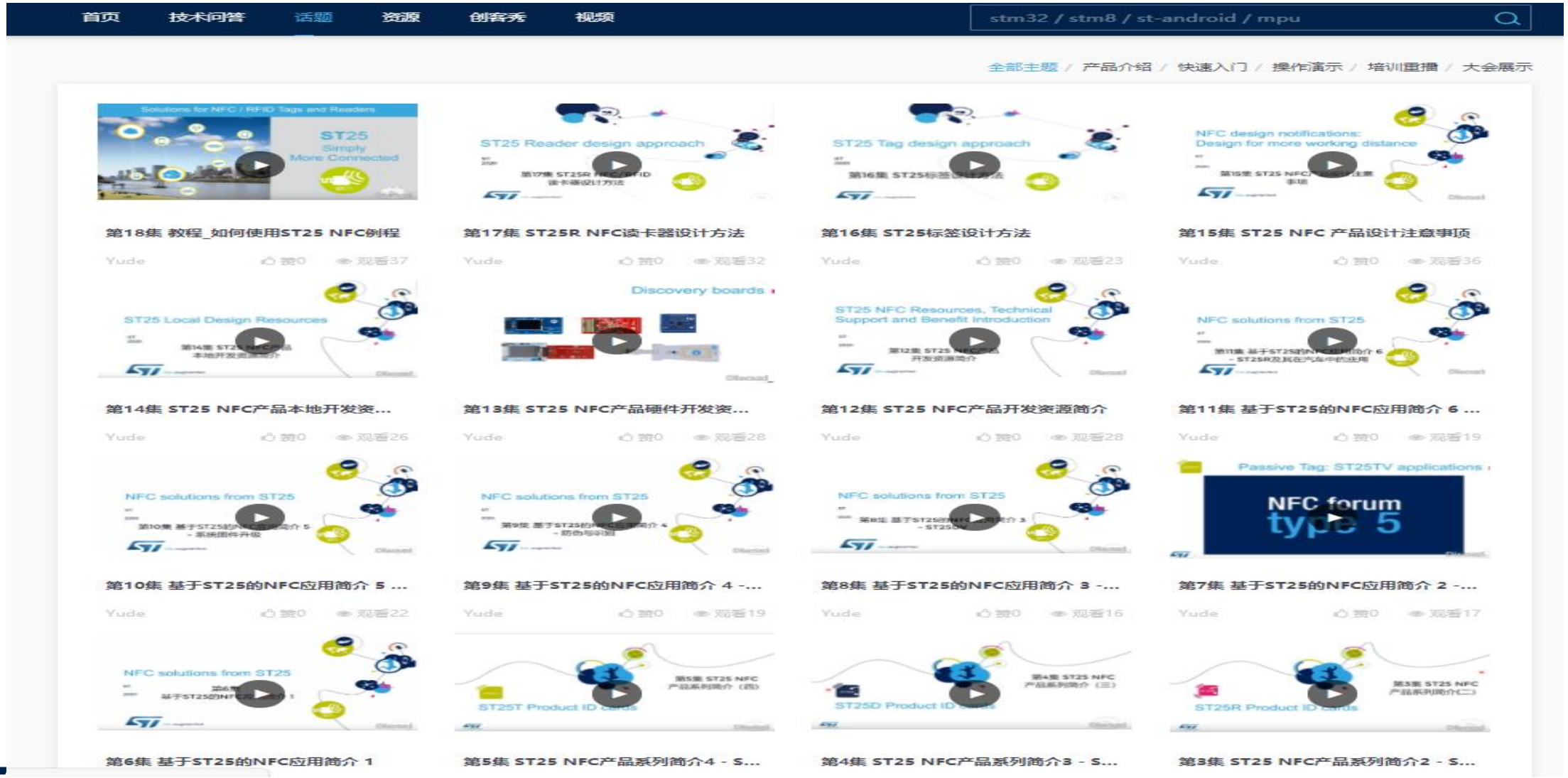
ST China Community

https://shequ.stmicroelectronics.cn/

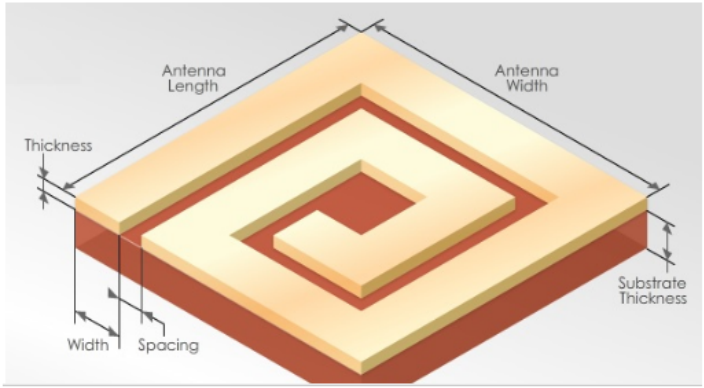
On-line training videos



Reference designs

23 dynamitic tag antenna designs have been validated for customers

Antenna parameters



Title	Antenna length (mm)	Antenna Width (mm)	Antenna turns	Width (mm)	Spacing (mm)	Thickness (mm)	Substrate thickness	Number of PCB layer	Antenna inductance
ANT14x14_Dual layers NEW	14	13.5	11	0.2	0.2	35	1.6	2	ANT7
ANT15x15_Dual layers NEW	15	15	7	0.2	0.2	35	0.8	2	4.48
ANT_D15_cirular_Dual layers NEW	15/Diameter	-	10	0.254	0.2	35	0.8	2	4.67
ANT17x17_Dual layers NEW	17	17	7	0.3	0.25	35	0.8	2	4.53
ANT20x15_Dual layers NEW	20	15	6	0.2	0.2	35	0.8	2	4.62
ANT20x20_Single layer NEW	20	20	15	0.2	0.2	35	0.8	1	4.5
ANT_D20_cirular_Dual layers NEW	20/Diameter	-	8	0.3	0.3	35	1.6	2	ANT13
ANT25x20_Single layer NEW	25	20	11	0.2	0.2	35	0.8	1	4.2
ANT25x25_Single layer NEW	25	25	10	0.2	0.2	35	0.8	1	4.45
ANT_D25_cirular_Single layer NEW	25/Diameter	-	13	0.2	0.254	35	0.8	1	4.62
ANT30x20_Single layer NEW	30	20	13	0.254	0.3	35	0.8	1	4.37
ANT30x25_Single layer NEW	30	25	9	0.2	0.2	35	0.8	1	4.47
ANT_D30_cirular_Single layer NEW	30/Diameter	-	10	0.2	0.2	35	0.8	1	4.93
ANT31*30_Single layer NEW	31	30	5	0.6	0.6	35	1.6	2	ANT14
ANT40x25_Single layer NEW	40	25	8	0.3	0.2	35	0.8	1	4.32
ANT40x30_Single layer NEW	40	30	7	0.2	0.2	35	0.8	1	4.47
ANT40x40_Single layer NEW	40	40	7	0.4	0.25	35	0.8	1	4.44
ANT40x20_Single layer NEW	40	20	9	0.3	0.15	35	0.8	1	ANT2
ANT50x50_Single layer NEW	50	50	7	0.7	0.4	35	0.8	1	4.8
ANT60x60_Single layer NEW	60	60	6	0.8	0.5	35	0.8	1	4.8
ANT70x70_Single layer NEW	70	70	6	1.4	0.6	35	0.8	1	4.7
ANT75x40_Single layer NEW	75	40	6	0.6	0.6	35	0.8	1	ANT1
ANT80x80_Single layer NEW	80	80	5	1.4	0.5	35	0.8	1	4.8
Antenna parameters description: Antenna length/Antenna width/Width/Spacing/Thickness/Susbrate Thickness NEW	-	-	-	-	-	-	-	-	-

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Local application tips

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How To Design Single Side N（NFC

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前言

介绍 NFC 单面天线的工作原理和设计过程。

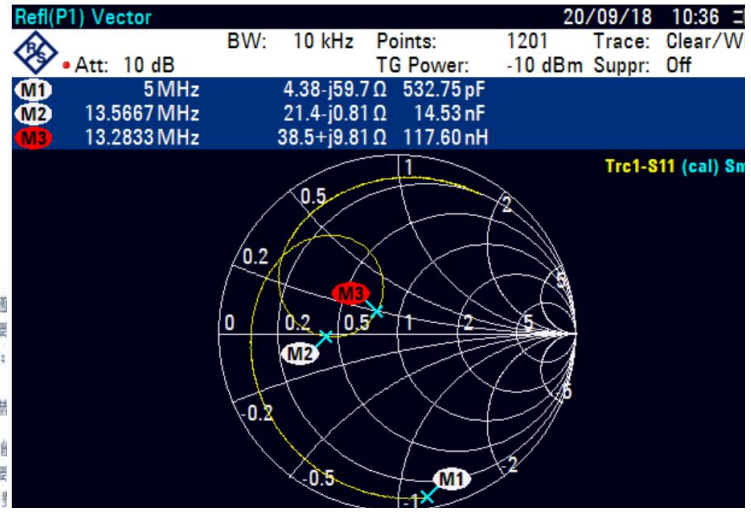
问题

客户希望了解 NFC 天线的工作原理和如何设计 NFC 单面天线。

原理简介

- 在 NFC 通信系统中，读卡器（Reader）和标签（Tag）通
  天线性能的好坏直接决定 NFC 的工作距离，在设计中需要
- Tag 天线表现为电感特性，可以看作一个电感和电阻串联；
  以看作为一个电容和芯片内阻串联。
- 图 1 是 NFC Tag 等效电路图，芯片和天线组成一个并联谐
  $f_0 = \frac{1}{2\pi\sqrt{LC}}$ ；而电阻则是耗能器件，会消耗 Tag 捕获的
- 等效电容由芯片本身决定，设计 NFC Tag 天线时，我们要
- 为了方便客户和提高工作效率，ST 官方网站提供了免

Photos - ST25R3911B阻抗匹配目标.png



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ST25R3911B 低功耗模式电流计算

前言

本篇文章主要介绍 ST25R3911B 低功耗模式电流的计算。低功耗模式主要分为电容式唤醒和电感式唤醒。电感式唤醒又可以通过幅值和相位检测两种模式来检测。

低功耗模式

电容式唤醒

在 *Tcwur* 栏输入唤醒时间间隔，可以在 10ms-800ms 之间的 16 个设定点选择，单位为秒。右侧 C 这一栏可以得到使用电容式

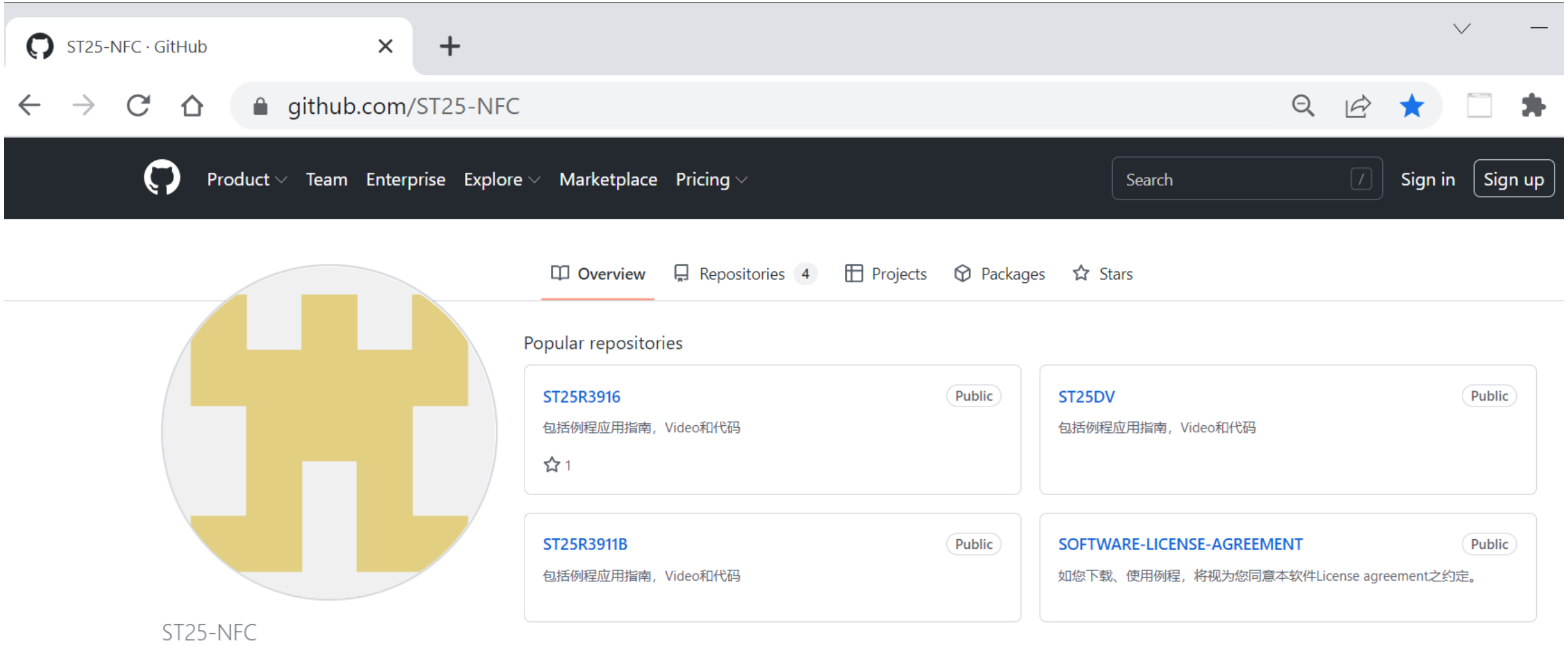
电感参考选择

Brand	type	Series	Part #	L [nH]	Q@fwork	DRC [mOhm]	IRMS [mA]	SFR [MHz]	Footprint
TDK	*MultiLayer*	*MLJ1608*	*MLJ1608WR22J*	*220*	*28*	*290*	*550*	*350*	*0603*
Vishay	*shielded*	*IHHP0806*	*IHHP0806AZERR24M01*	*240*	*20*	*20.5*	*4200*		*0806*
Taiyo Yuden	MultiLayer	MCFK1608	MCFK1608TR24M	240		50	2100		0603
muRata	wire wound	LQW15	LQW15CAR27J00D	270		380	480	1200	0402
muRata	wire wound	LQW18	LQW18CNR27J00D	270		160	750		0603
Taiyo Yuden	MultiLayer	MCKK2012	MCKK2012TR24M	240		25	4000		0805
Taiyo Yuden	MultiLayer	MC	MCFK1608TR24M	240		50	2100		0603

0)	10 ms range (wur=1)
	10 ms
	20 ms
	30 ms
	40 ms
	50 ms
	60 ms
	70 ms
	80 ms

ST FAE on-site: ST25-NFC GitHub

https://github.com/ST25-NFC



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SW example code introductions

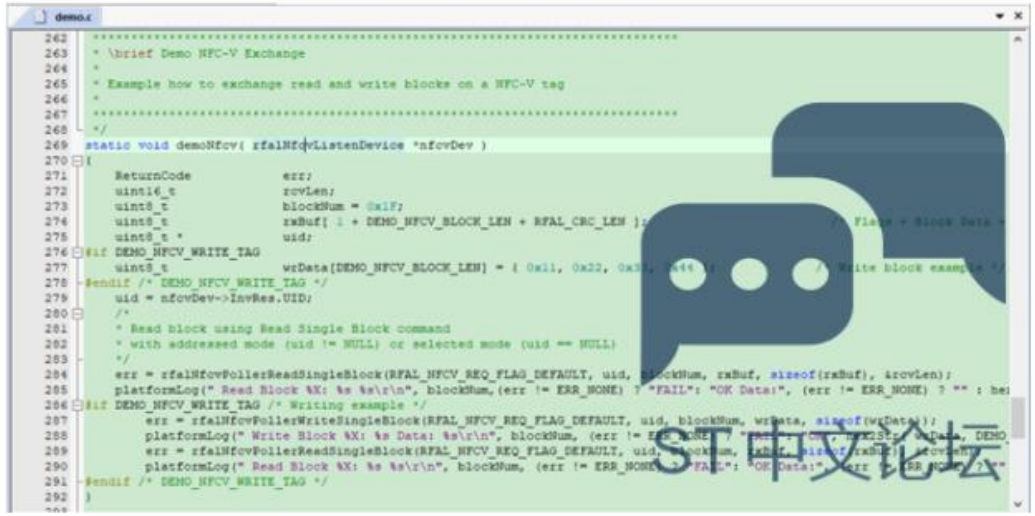
README.md

例程解析

• 代码实现

o 代码实现在应用层，体现在"demo.c"这个文件上

o 而实现tagV的相关内容都放在demoNfcv(rfalNfcvListenDevice *nfcvDev)这个函数内。



• 相关API函数

o ReturnCode rfalNfcvPollerReadSingleBlock(uint8_t flags, const uint8_t* uid, uint8_t blockNum, uint8_t* rxBuf, uint16_t rxBufLen, uint16_t *rcvLen)： 读取单一block

o ReturnCode rfalNfcvPollerWriteSingleBlock(uint8_t flags, const uint8_t* uid, uint8_t blockNum, const uint8_t* wrData, uint8_blockLen) : 写入单一block

Application oriented solutions

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NFC application block diagram

Consumer engagement, Asset tracking, Ticketing, Gaming, Brand protection, Access control, …

www.st.com/st25t

Tags

ST25**T**

13.56MHz

NFC phone / RFID Reader

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

www.st.com/st25d

Dynamic tags

STM32 microcontroller

I^2C

ST25**D**

13.56MHz

NFC phone / RFID Reader

POS & mPOS Terminals, Automotive, Access control, Gaming, …

www.st.com/st25r

Readers

STM32 microcontroller

SPI / I^2C

ST25**R**

13.56MHz

NFC phone

or

Bank

or

* ST25R3916/ST25R3917 supports SPI and I^2C both

* ST25R3911B/3912/3913/3914/3915 and ST25R95 support SPI only

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ST25 for brand protection

- Anti fake (Accessory)
- Categorizing (Temperature, volume)
- FW/Parameter setting

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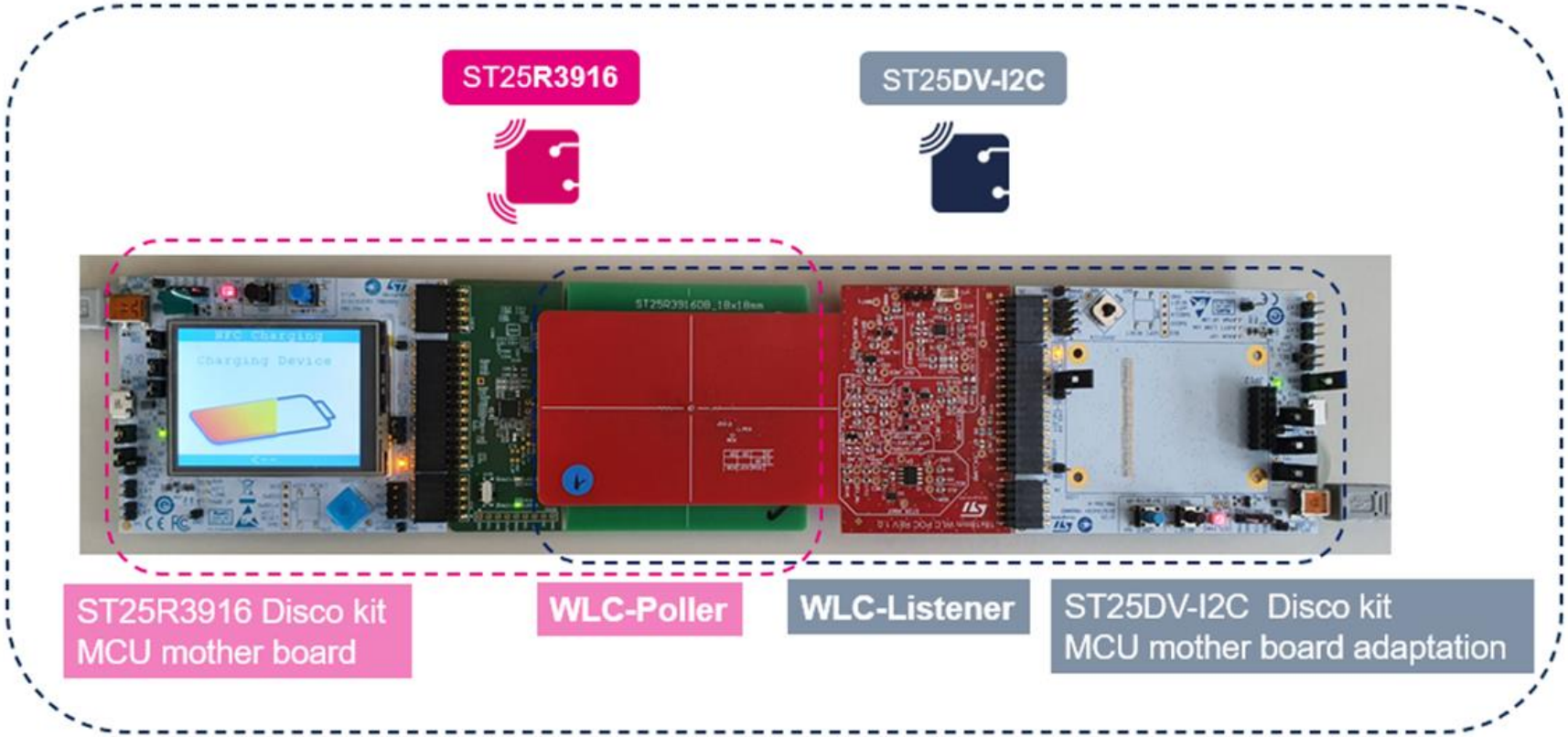
ST25 for NFC charger



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Solutions for NFC / RFID Tags & Readers

ST25

ST25 SIMPLY MORE CONNECTED

Thank you

Find out more at www.st.com/st25

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