



Wireless MCU



Entry level MCU



MPU



Ultra Low Power MCU



High- Performance MCU



Analog rich MCU



STM32

# The “Cloudification” of STM32 Applications

**Connecting 100,000+ STM32 customers**

Seamless Software migration

Built-in Security

Cloud Native

Supply Chain & Capacity



**Wireless  
Connectivity**

# STM32 Wireless MCUs





# STM32 sub-GHz Product Families

sub-GHz SoC dual Core

sub-GHz SoC single Core

sub-GHz transceiver

MODULE

STM32WL5x

NEW

STM32WL3x

STM32WLEx

1st generation  
**SPIRIT1**

General purpose sub-GHz radio

2<sup>nd</sup> generation  
**S2-LP**

Ultralow power sub-GHz radio

2 (G)FSK  
(G)MSK

-

OOK  
ASK

-

2/4 (G)FSK  
(G)MSK

BPSK (Sigfox)

OOK  
ASK

-

2 (G)FSK  
(G)MSK

BPSK (Sigfox)

-

-

LoRa (WLx5 P/N)



life.augmented

\*OEM Launch Q4'23

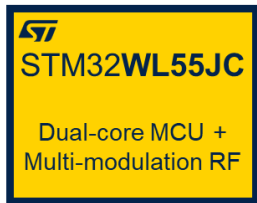
+ DSSS and IQ I/F on WL3

ST Confidential

# STM32WL5M – LoRaWAN® all-in-one solution

## System-in-Package: Plug-in ready-to-go LoRaWAN® solution

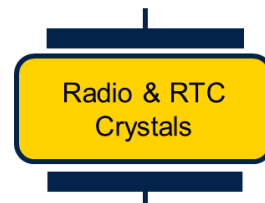
### All in One SubGhz SoC



256KB FLASH  
37 GPIOs

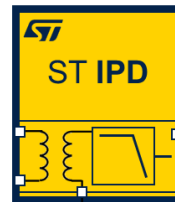


### Integrated Crystals



32Mhz TCXO  
32Khz XO

### Integrated Passive device



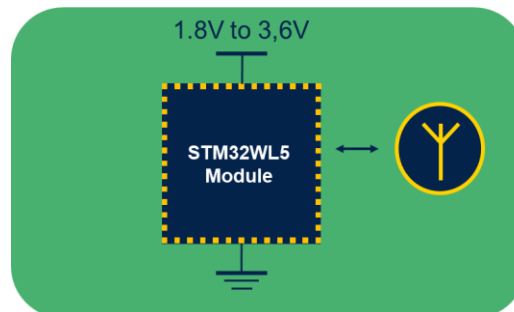
Matching network  
Antenna filter

### Integrated RF Switch



RX/TX  
Switch

+ Optional STSAFE

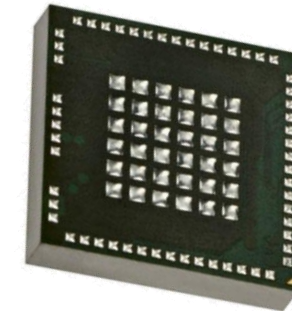


**Simple PCB:** No External components

**Easy to layout:** 2 Layer PCB capable

**Internal antenna matching**

**Direct connection to VDD:** Internal SMPS components



STM32WL5M MM : Q1 '24  
Sampling NOW



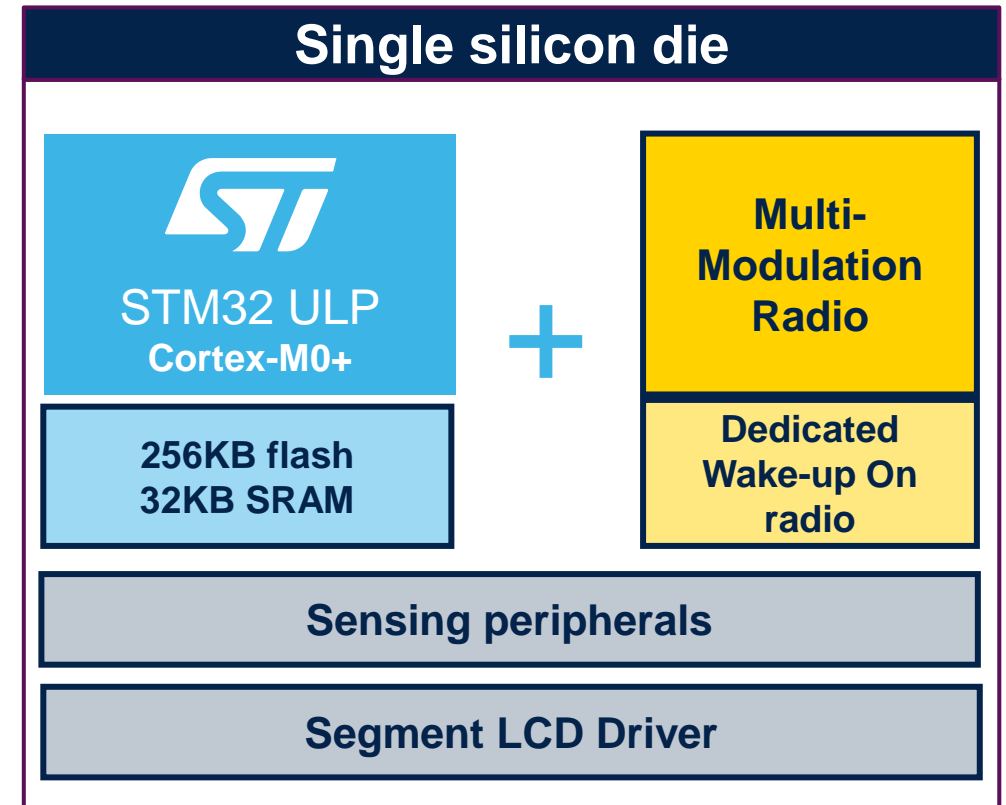
# STM32WL3 new sub-1GHz SoC

**Unique wireless SoC combining multiprotocol sub-GHz radio and application features**

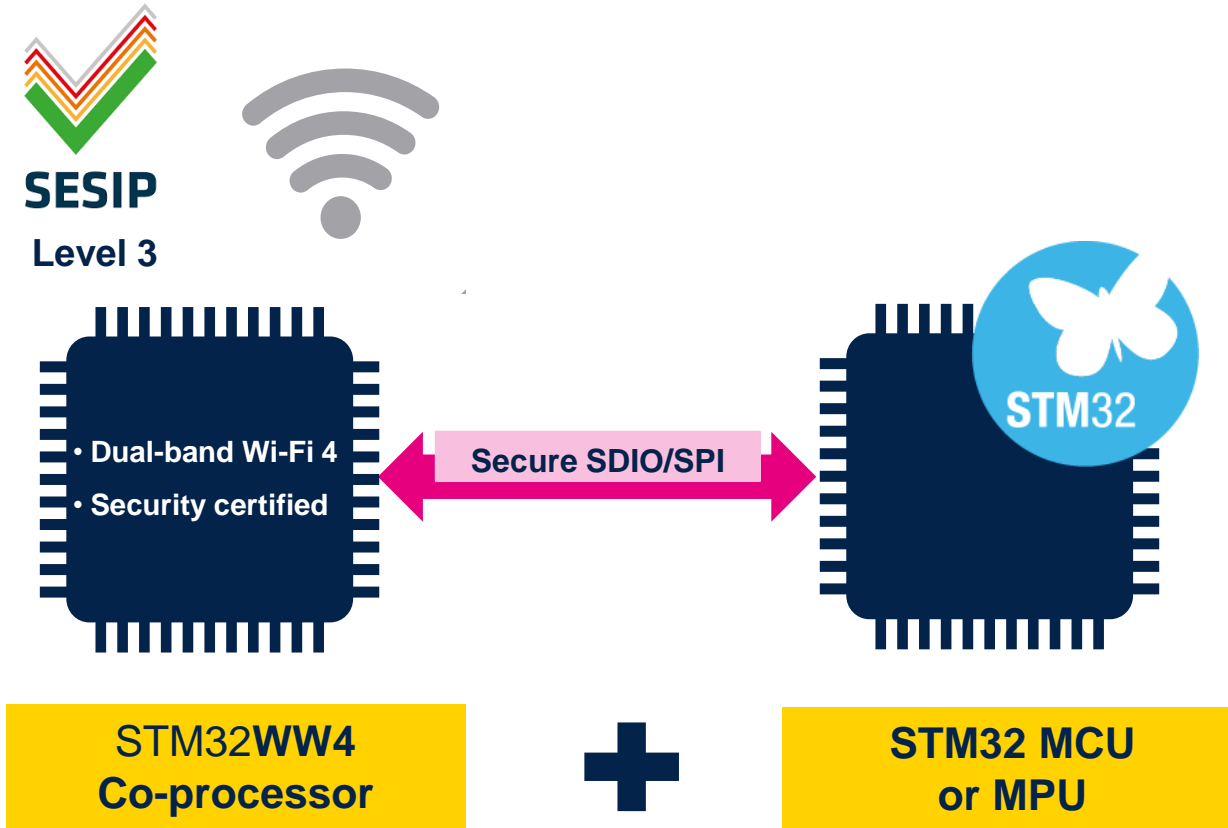


STM32WL3 MM : Q1 '24  
Sampling NOW

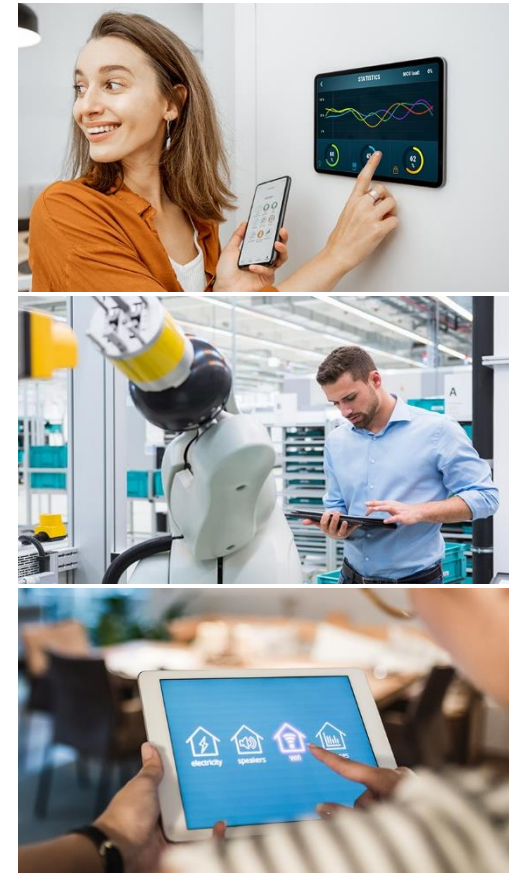
PACKAGE  
QFN48 6x6mm  
QFN32 5x5mm



# STM32WW4: Wi-Fi 4 coprocessor



STM32WW4 MM : Q2 '24  
Sampling Q3'24



Flexible  
to address  
many  
applications

Graphics

Artificial Intelligence

Smart home

and many more!



# STM32 MCU 2.4GHz portfolio

## STM32WB MCU

STM32WB55

STM32WB35

STM32WB15

STM32WB50

STM32WB30

STM32WB10

- **Dual core & security** (Arm® Cortex® -M4 / -M0+)
- Up to **1MB** flash / **256KB** RAM
- Bluetooth® Low Energy 5.4, Zigbee R22 & Thread, proprietary, Matter
- **Dual core & security** (Arm® Cortex® -M4 / -M0+)
- **320 KB** flash/ **48KB** RAM
- Bluetooth® Low Energy 5.3, 2Mbps (**excluding 802.15.4**)

## STM32WBA MCU

STM32WBA52

- Arm® Cortex® -M33 / **TrustZone®** 100MHZ
- **1MB** flash memory / **128KB** RAM
- Bluetooth® Low Energy 5.4 (long range, 2Mbps, advertising extension)
- Up to **+10dBm** output power
- Enhanced security

Module Available

## BlueNRG System-on-Chip

BlueNRG-1

BlueNRG-2

BlueNRG-LP

- Arm® Cortex® -M0+
- **256KB** flash / **64KB** RAM
- Bluetooth® Low Energy 5.3, (long-range, 2Mbps, Advertising ext)

BlueNRG-LPS

- Arm® Cortex® -M0+
- **192KB** flash / **24KB** RAM
- Bluetooth® Low Energy 5.3 (long-range, 2Mbps, Advertising ext, **AoA/AoD**)

EVOLUTION

## STM32WB0 MCU

STM32WB09

- Arm® Cortex® -M0+ @64MHz
- **512KB** flash / **64KB** RAM
- Bluetooth® Low Energy 5.3 (long-range, 2Mbps, Advertising ext, **AoA/AoD, Isochronous channel**)
- Up to **+8dBm** output power



matter







# STM32WB09 – New 2.4 GHz MCU

## 1 Bluetooth LE 5.3 certified core

- Arm Cortex-M0+ @ 64MHz 512KB/64KB
- BLE 5.3 READY radio: **2Mbps / Long-Range / Direction Finding / Isochronous channel**

## 2 Long range communication

- RX Sensitivity level: **-97 dBm** @ 1Mbps / **-104 dBm** @ 125kbps
- Up to **+8 dBm** programmable output power 1dB granularity

## 3 Ultra-low power consumption

- **4.3 mA TX current** (@ 0dBm, 3.3 V)
- **3.4 mA RX current** (@ 3.3V)
- **Cortex M0+ 14 µA/MHz** dynamic consumption

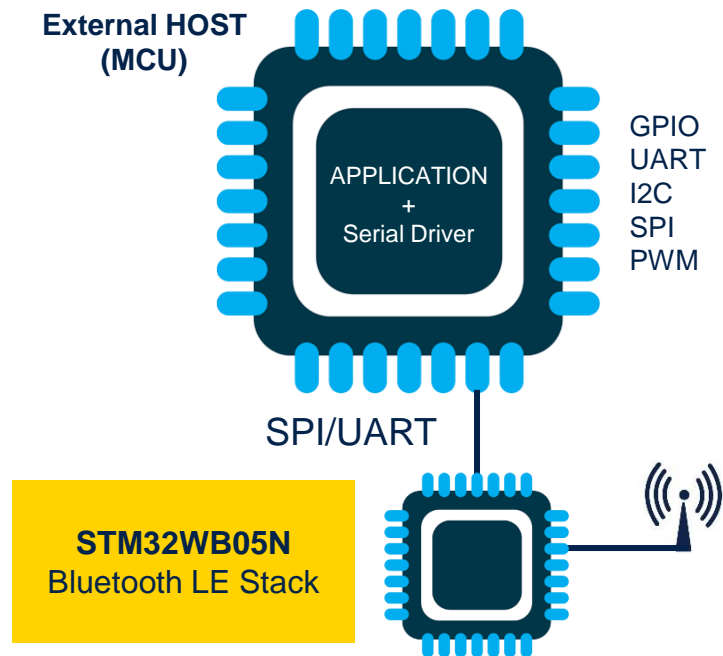
## 4 Reduced BOM for cost optimized design

- **Suitable for 2-layer PCB design**
- Integrated RF BALUN / Tunable **capacitor-less** 32MHz crystal
- Embedded 32KHz low-power ring-oscillator
- Integrated DC/DC step-down converter and LDO regulators
- **ST's IPD available**

# STM32WB05N : Network Processor

## NETWORK PROCESSOR

Radio link added through a simple and standard **serial interface**



Radio as a simple plug-in  
on a standard serial interface

Bluetooth LE **Network Processor** architecture

HW **scalability** and SW design **flexibility**

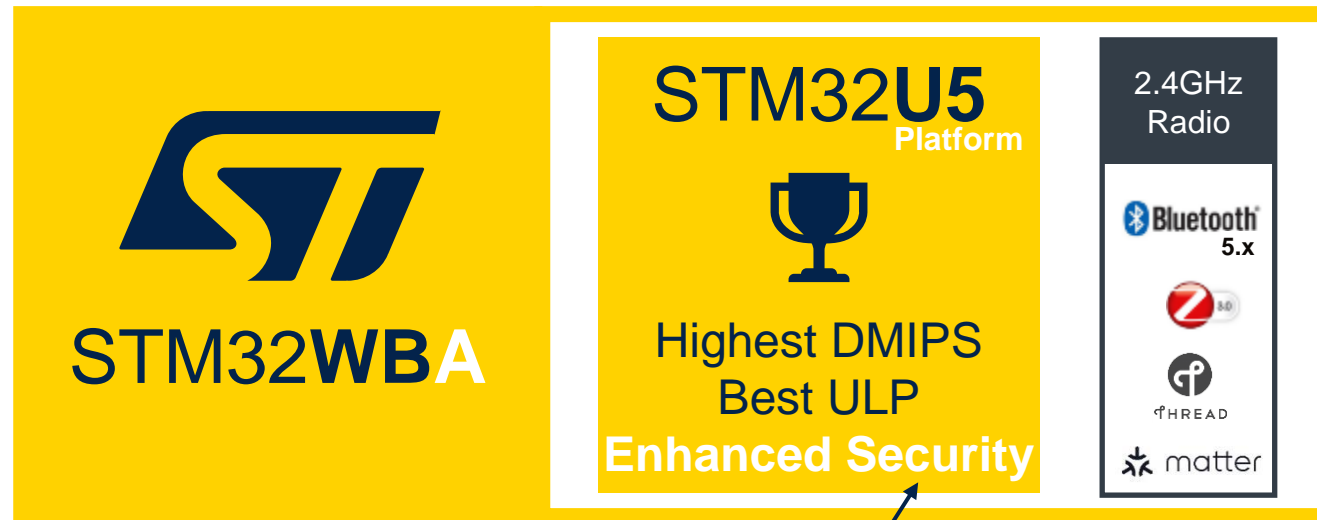
Adding Bluetooth LE functionality **easily and seamlessly** to an external Host MCU

**Minimizes** software **development efforts** and **deployment risks**

**Target: 1Q2024**

# STM32WBA platform in a nutshell

Capitalize on STM32U5 new ultra-low-power platform



Best in class MCU Security Level



STM32WBA

# Enabling key new features for embedded developers



## STM32WBA5

### **Powerful Core & Radio**

Cortex M33 100MHz with TZ, +10dBm

### **Support latest protocol**

BLE 5.3 full (Long Range, Direction finding, Audio, Power LE...)  
MATTER, OpenThread, Zigbee 3.0

### **Enhanced security**

AES and PKA, side attack resistant  
Active RTC tamper

### **Low-power consumption**

Ultra-low power radio  
LP DMA and IP autonomous in LP mode

### **Improved data storage**

100 kcycles for 256 KB of Flash

### **BOM cutter**

Integrated Matching and accurate 32KHz clock

# A versatile product

- Robust RF link **106dBm** with **Bluetooth® Low Energy** and **+10 dBm** output power
- Update securely** radio and stack firmware with SBSFU
- Bluetooth 5.3 **Mesh capable** to extend network range



## Lighting



## Fleet maintenance

- Retrofit legacy product to **Bluetooth 5.3**
- Remotely upgrade device with **OTA capability**
- Brand protection** with authenticated **FW upgrade** system
- IoT protection ready**

- Down to **2.4µA mode** with **RTC** and 64KB of RAM
- Security:** AES, PKA side attack resistant
- Security:** RTC active tamperers enabled
- Robustness:** 100KB cycle flash memory cycle capable



## Industrial devices



## Fitness/healthcare

- Multipoint** Bluetooth® Low Energy connections, up to 20 links
- Battery lifetime care with **< 140 nA** standby mode
- Dynamic efficient **45µA/MHz**
- Battery care thanks top **LPBAM acquisition** mode
- Handle advanced algorithm with **1 Mbyte** of flash



## Beaconing and sensors



## Home automation

- Beacon** profile available among a huge list
- Bluetooth® Low Energy, long-range** capable
- Embedded balun + matching** to minimize design cost
- Advertising extension** for increased beacon lifetime
- Up to +10 dBm** output power to get best beacon range
- 2.2µA** ULP-mode with full RAM for **battery life** optimization
- Down to 1.71V power supply full feature capable

- 10 years lifetime**
- High output power **+10dBm**
- Capacitive Touch**
- Fast** wake-up
- High MCU efficiency for advanced features **407 CoreMark**

## STM32WBA5x ID card

STM32WBA55 / STM32WBA54 / STM32WBA52 / STM32WBA5M

### ARCHITECTURE

- Up to 1MB Flash / 128KB RAM
- Single Core M33 TZ 100MHz
- 28µA/MHz (active mode @ 3.0V SMPS)
- 1.25µA ULP mode w/ 64KB RAM, RTC Radio operation

### Radio key features

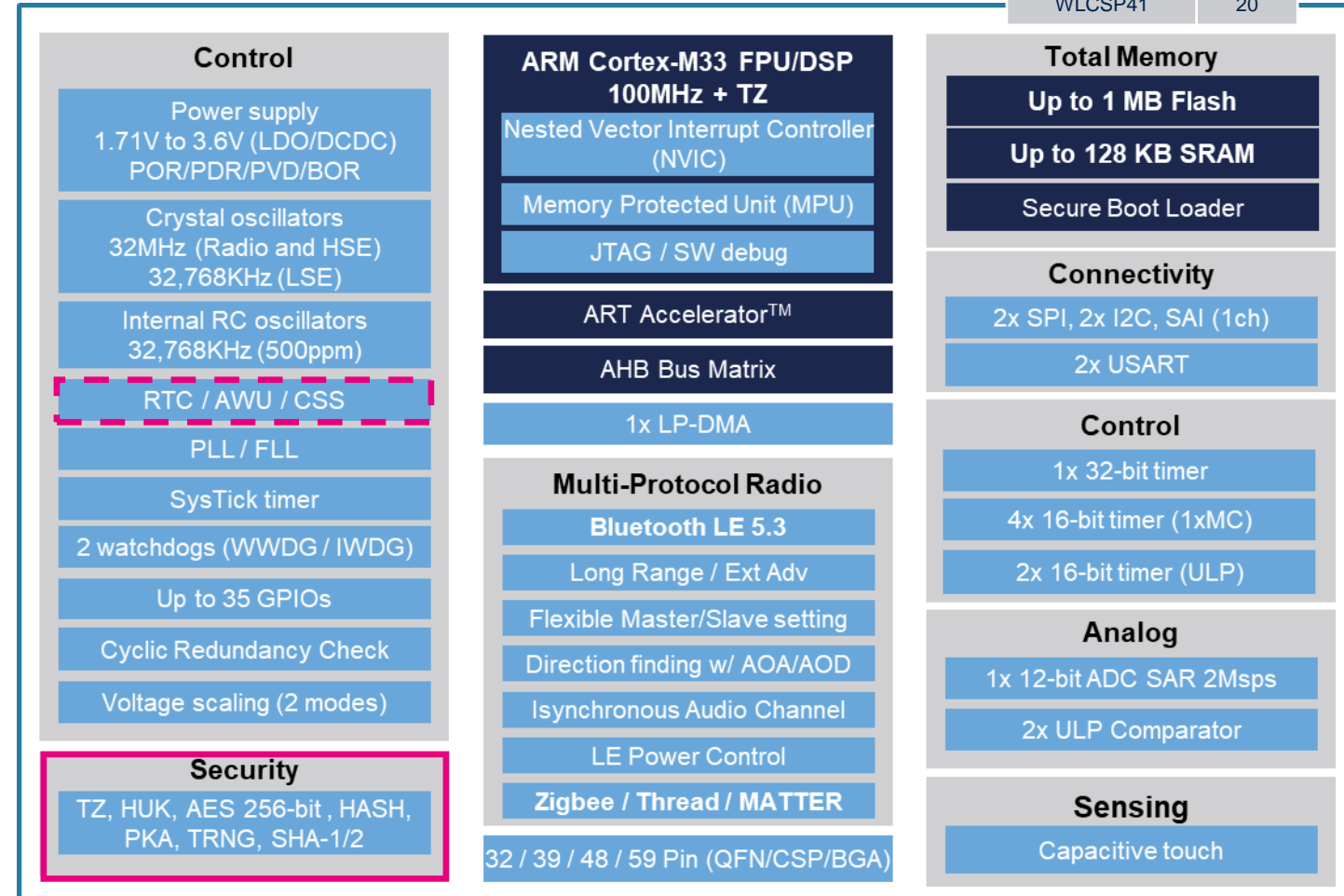
- +10dBm max output power + ext PA support
- Bluetooth LE 5.3, Mesh, up to 20 connections
- Zigbee 3.0, Zigbee Direct, SE, GP
- Thread : OT 1.3
- Concurrent mode BLE/ZB, BLE/OT, BLE/MAC
- MATTER
- Proprietary 2.4GHz
- TX=5.4mA (0dBm) / RX = 3.9mA (3.3V SMPS)
- [-40; +105]°C full spec; [-40; +125]°C reduced spec

### Packages

UQFN32, UQFN48, WLCSP41, BGA59, Module

### Stretch / Access / Lines

Package	GPIOs
BGA59-SMPS	35
QFN48-SMPS	31
QFN48	35
QFN32	20
WLCSP41	20

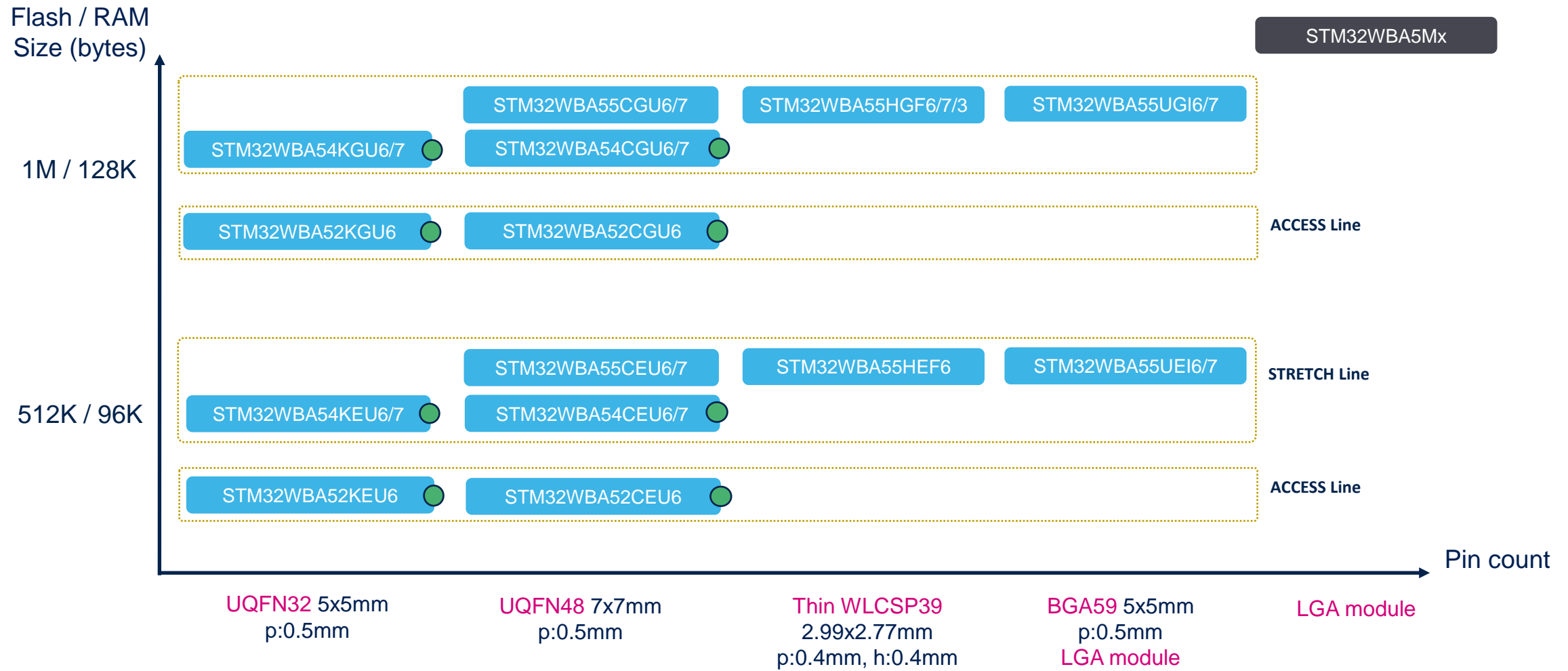




# STM32WBA5x Product lines

ARM Cortex-M33 (DSP + MPU + TZ) - 100 MHz	<div><ul style="list-style-type: none"><li>• ARM Cortex – M33</li><li>• CPU max 100MHz</li><li>• ART Accelerator</li><li>• Integrated Balun</li><li>• Adaptative Antenna Matching</li><li>• Max output power: +10dBm</li><li>• 16-bit Motor Control timer</li><li>• 32-bit timer</li><li>• 1x ADC 12-bit</li><li>• Capacitive touch</li><li>• 2x Comparator 4-in-1</li><li>• Temperature sensor</li><li>• Low voltage 1.7 to 3.6V</li><li>• LDO or DC/DC</li><li>• Internal RC +/- 1%</li></ul></div> <div>Feature support depending on Lines</div>	Product line	Flash (KB)	RAM (KB)	Connectivity					Security	RF perf	PMU	
					BLE	Zigbee	Thread	2.4GHz Proprietary	Other				
		STM32WBAx											
		STM32WBA55 Stretch Line	Up to 1024K	Up to 128K	BLE 5.3	■	■	■	2x USART 2x SPI 2x I2C 1x SAI [-40; 105]°C	Trust Zone AES 256-bit SHA2-256 PKA, SKS, PCK HUK, TRNG, SFI, SBSFU Unique ID	+10dBm	SMPS	
		STM32WBA54 Stretch Line	Up to 1024K	Up to 128K	BLE 5.3	■	■	■	2x USART 2x SPI 2x I2C [-40; -105]°C	Trust Zone AES 256-bit SHA2-256 PKA, SKS, PCK HUK, TRNG, SFI, SBSFU Unique ID	+10dBm	LDO (+3 GPIO)	
		STM32WBA52 Access Line	Up to 1024K	Up to 128K	BLE 5.3			■	2x USART 2x SPI 2x I2C [-40; 85]°C	Trust Zone AES 256-bit SHA2-256 PKA, SKS, PCK HUK, TRNG, SFI, SBSFU Unique ID	+10dBm	LDO	

# STM32WBA5x Portfolio

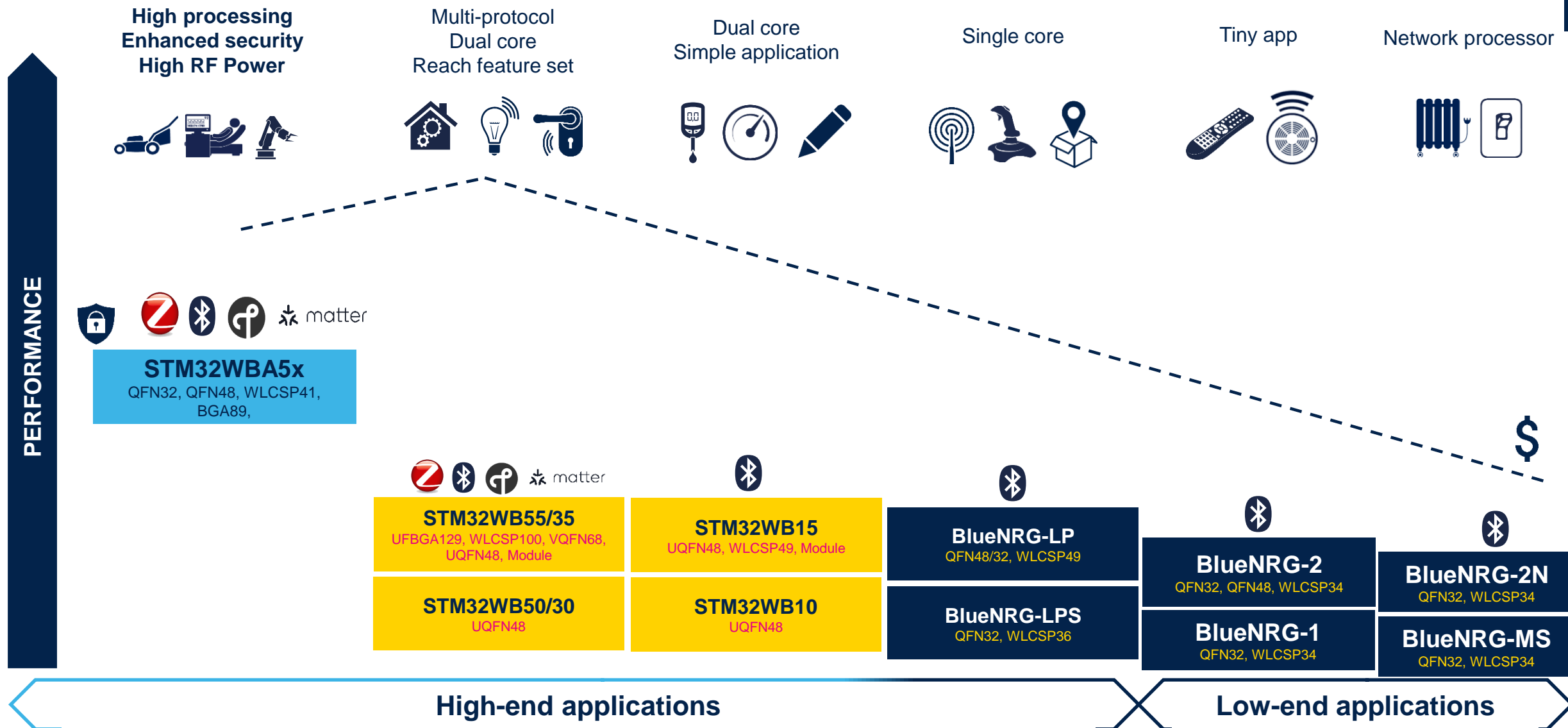


● LDO only

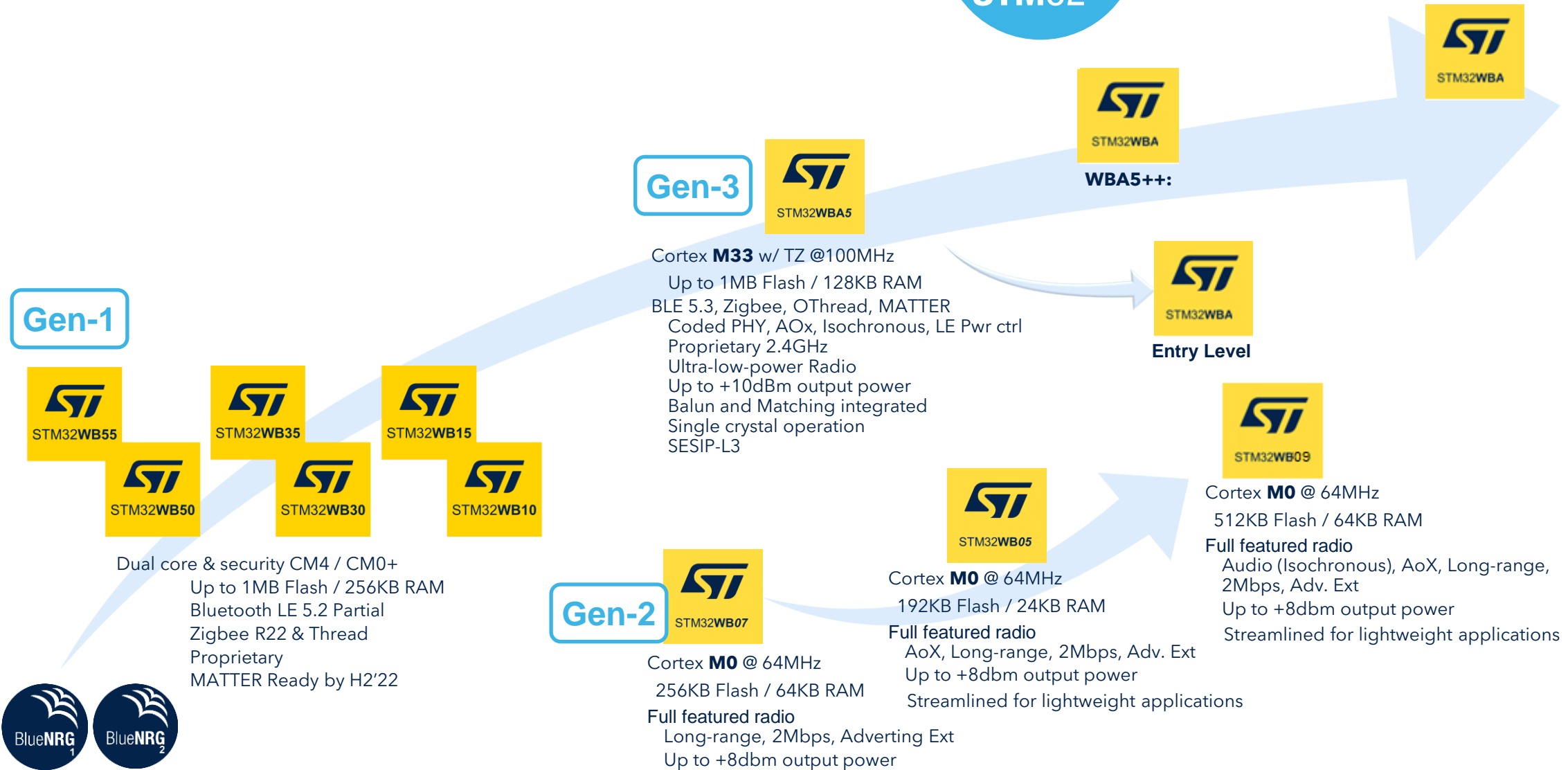
Line are p2p compatible on same package and PMU mode !



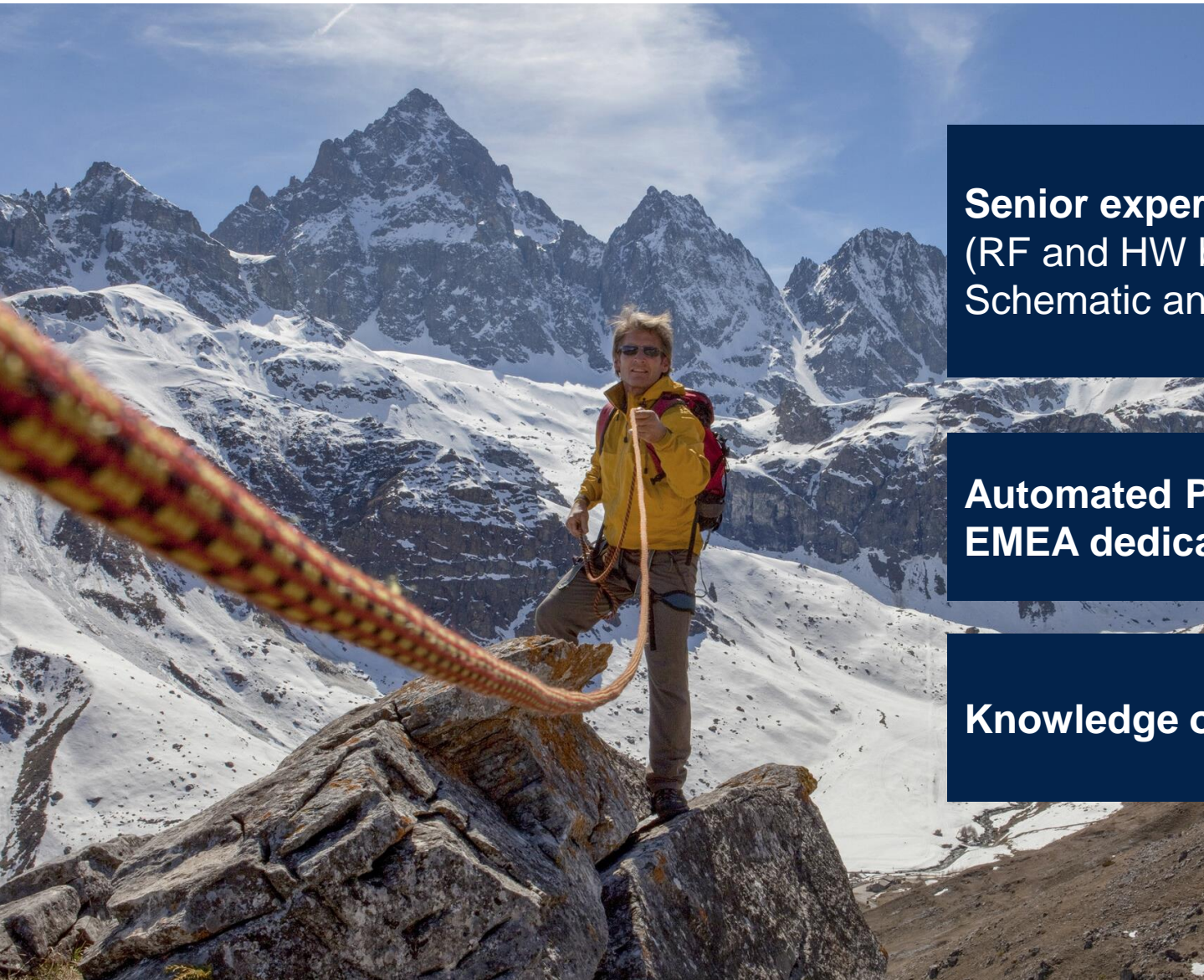
# Product positioning



# STM32 wireless 2.4GHz roadmap



# What you can expect from our wireless support team



**Senior expertise in wireless communication**  
(RF and HW bring-up services, SW and HW debugging, Schematic and layout review)

**Automated Pre-certification capabilities**  
**EMEA dedicated application labs**

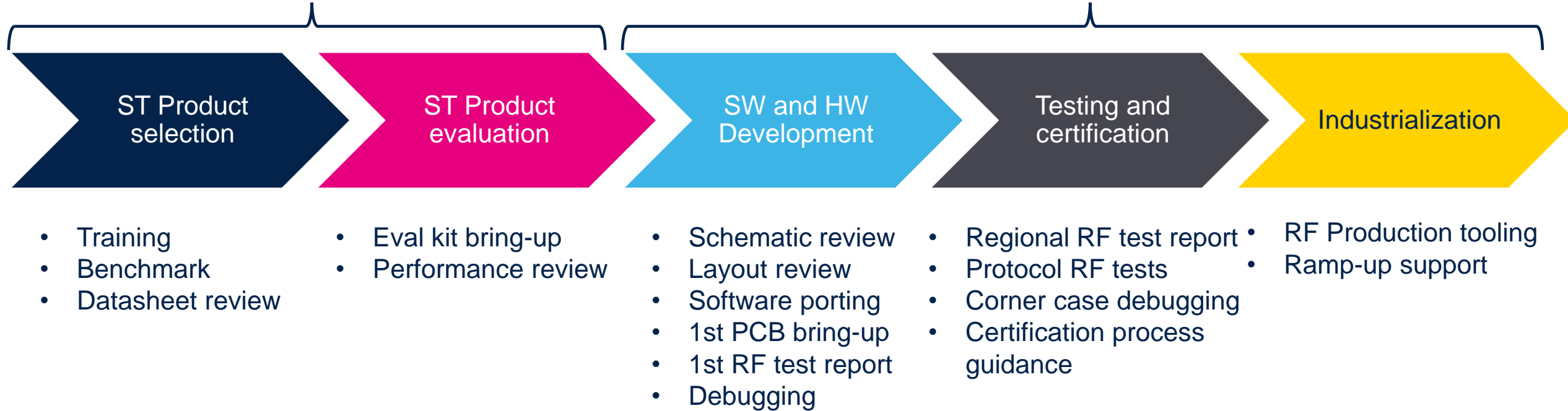
**Knowledge on your application**

**... in a fast and agile way**

# Our customer wireless journey and how we can help

Support them to make the right choice

Make sure their choice was the right one



Don't wait too long to ask for any support.  
The sooner the better!!





life.augmented

# Let's HANDS ON now !

Manuel Marcias FAE