



ST wireless smart IoT solutions

Watson CHANG
STMicroelectronics



The STM32 portfolio



Five product categories



Wireless
MCU

Short- and long-range connectivity




Ultra-low-power
MCU

32-bit general-purpose microcontrollers: from 75 to 5,072 CoreMark score



Mainstream
MCU

High-performance
MCU



Embedded
MPU

32- and 64-bit microprocessors



Enabling edge AI solutions



Scalable security



[MPU portfolio](#)
[MCU portfolio](#)



STM32 wireless MCUs

STM32WB0

- Arm® Cortex®-M0+ at 64 MHz
- From 192 Kbytes to 512 Kbytes of Flash memory
- Output power: +8 dBm
- Sensitivity: -97 dBm (1Mbps) / -104 dBm (125Kbps)

STM32WL

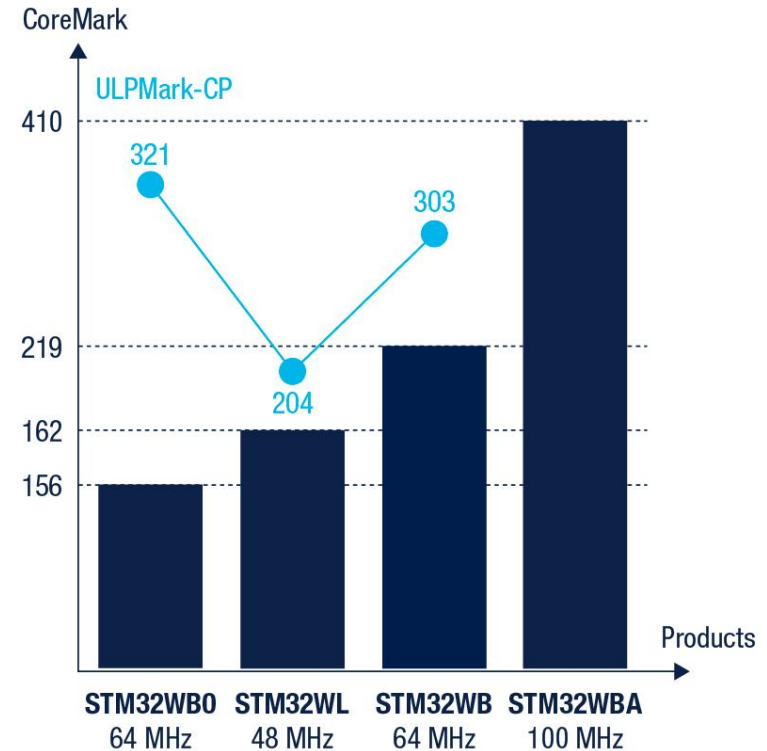
- Arm® Cortex®-M4 and -M0+ at 48 MHz supporting RF
- From 64 Kbytes to 256 Kbytes of Flash memory
- Dual output power: Up to 15 dBm / Up to 22 dBm
- Sensitivity LoRa®: -148 dBm

STM32WB

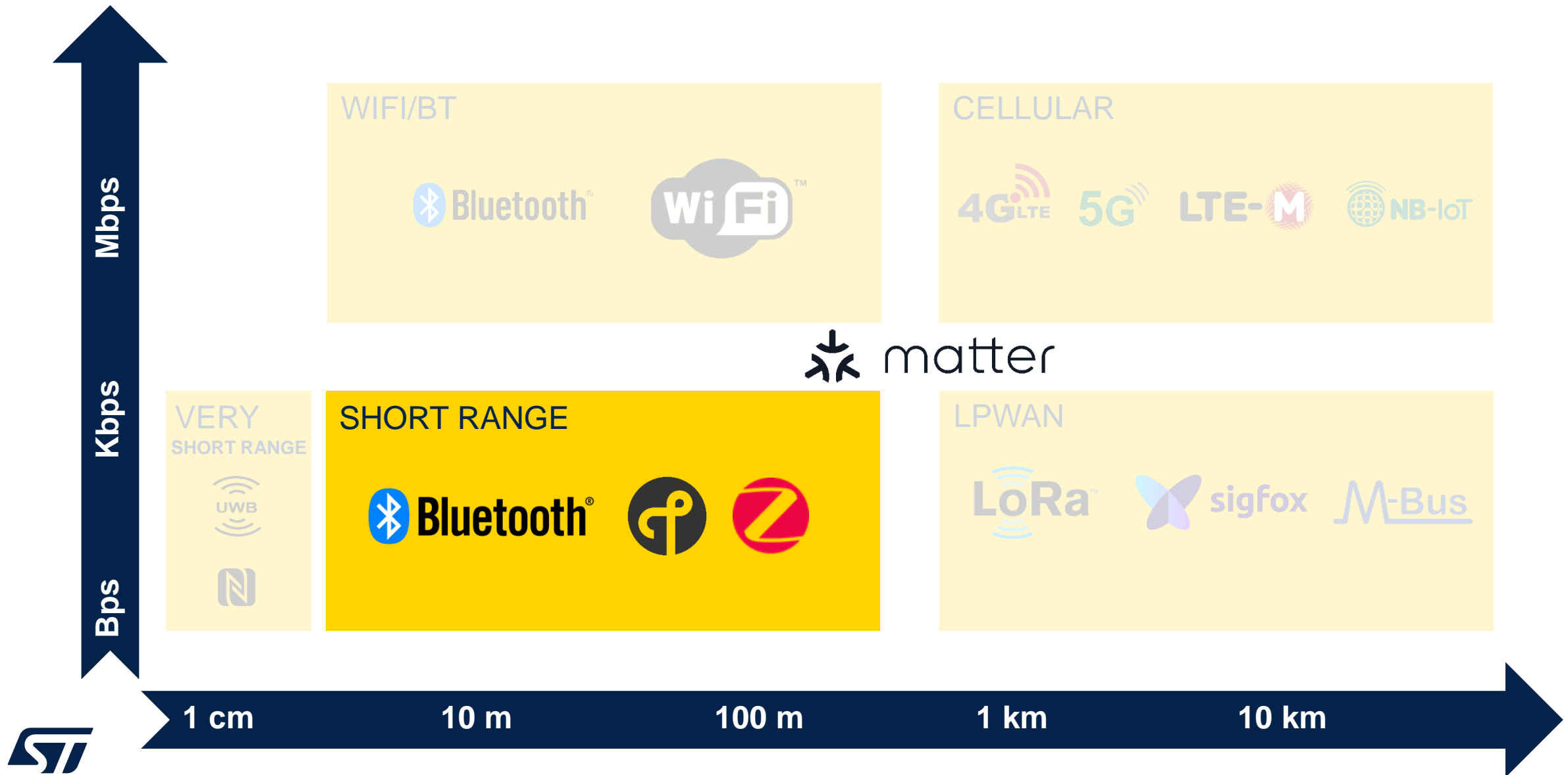
- Arm® Cortex®-M4 at 64 MHz and dedicated M0+ at 32 MHz supporting RF
- From 256 Kbytes to 1 Mbyte of Flash memory
- Output power: +6 dBm
- Sensitivity BLE: -96 dBm, 802.15.4: -100dBm

STM32WBA

- Arm® Cortex®-M33 + FPU at 100 MHz
- From 512 Kbytes to 2 Mbytes of Flash memory
- Output power: +10 dBm
- Sensitivity BLE: -96 dBm, 802.15.4: -97.5 dBm



Communication technologies



Fully embrace 2.4 GHz technologies



Wearable, healthcare,
smart appliances

- Security
- Interoperability
- Bluetooth® SIG Standard



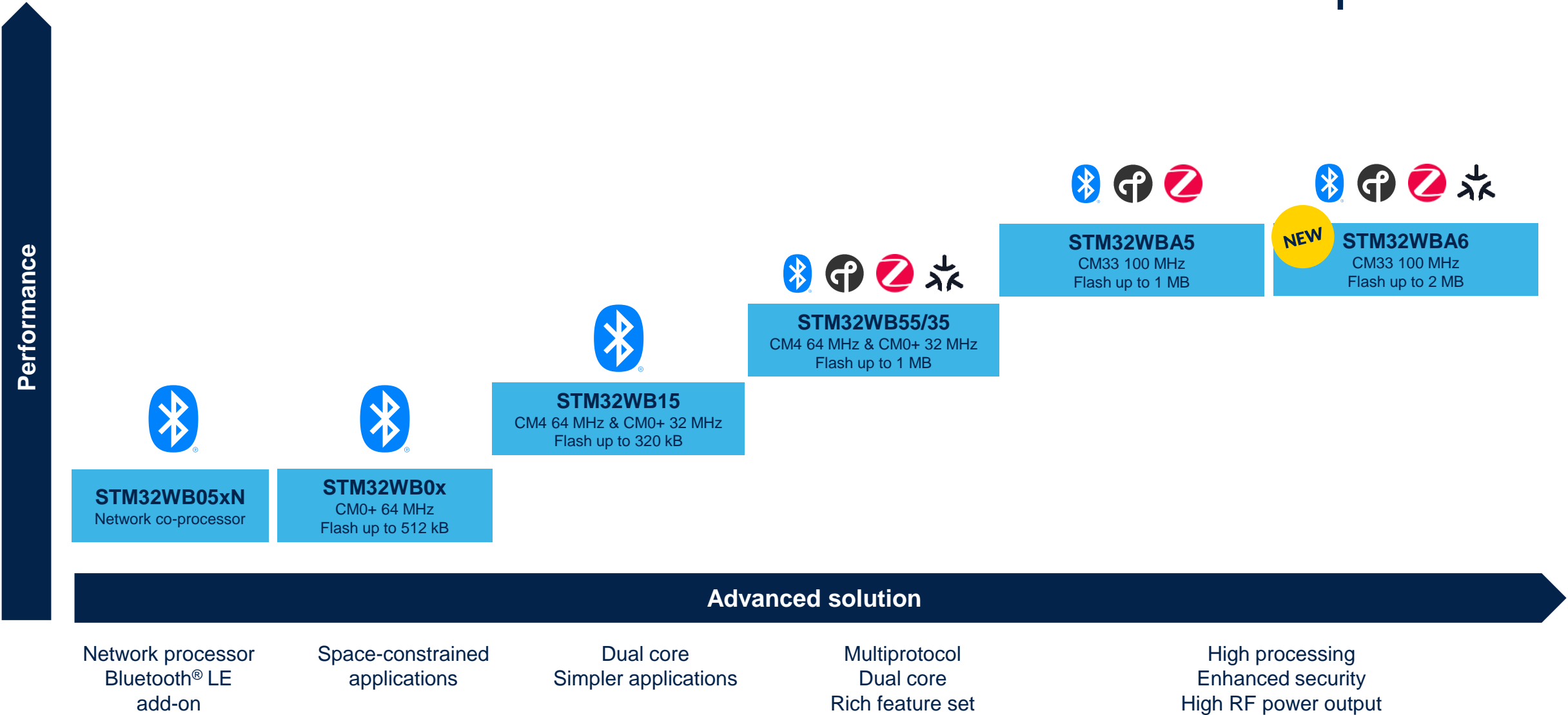
Sensor networks, home
appliances, industrial

- Mesh topology
- Large scale
- Open Standard

Sensor networks, industrial
& home automation

- Mesh topology
- Large scale
- Zigbee compliant

Product portfolio





What the STM32WBA series offers



Enhanced wireless performance for a greater user experience



Secure: reliable and compliant with the latest regulations



Simpler and faster development thanks to proven STM32 ecosystem



What the STM32WBA series offers

Enhanced wireless performance for a greater user experience

- Arm® Cortex® -M33 at 100 MHz. CoreMark score at 407.
- Multiprotocol support: Bluetooth® LE, Zigbee, OpenThread, Matter
- +10 dBm output power with low power consumption

Secure: reliable and compliant with the latest regulations

- SESIP Level 3: compliance with the US Cyber Trust Mark and EU Radio Equipment Directive (RED) regulations
- PSA Certified Level 3
- 10-year rolling longevity commitment for continuous supply

Simpler and faster development thanks to proven STM32 ecosystem

- Rich ecosystem offering hardware, embedded software & tools, documentation
- Design flexibility with a wide range of package options



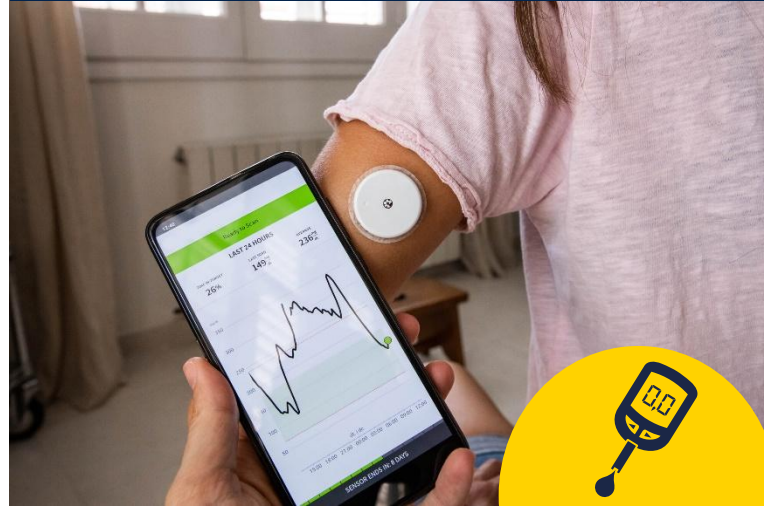
High performance and scalable integration

Industrial



- Extended range capability
- Data privacy
- Cost optimized

Consumer



- Anticlone
- Brand protection
- High interoperability

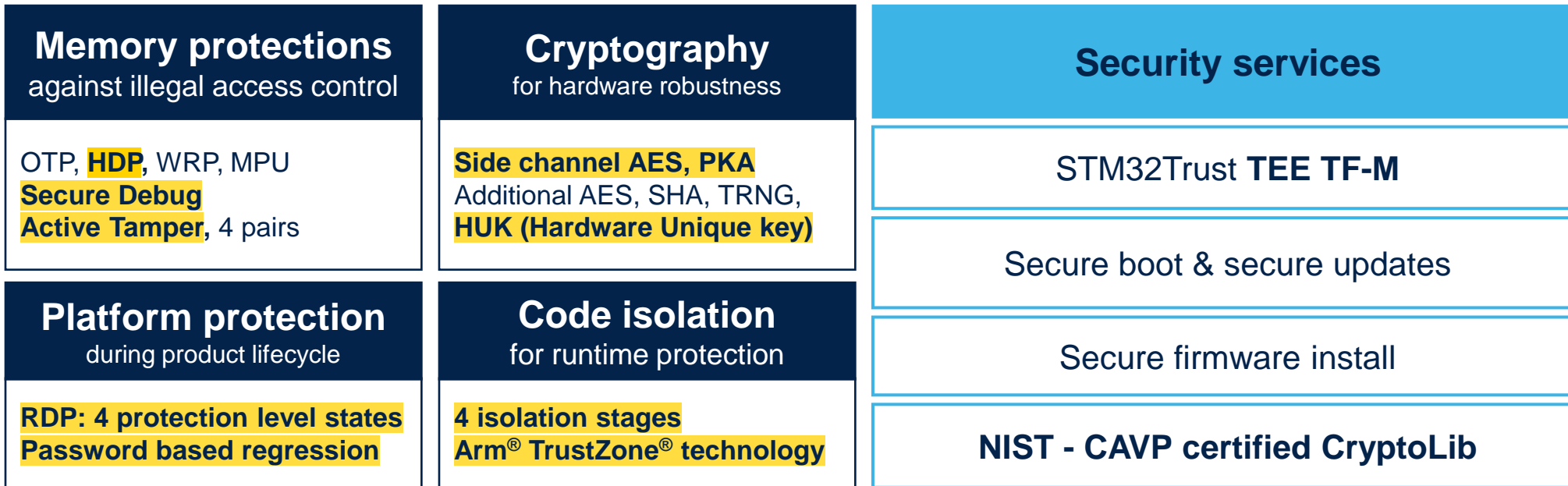
Smart home control



- Fingerprint accessible with high processing capability
- Market-proven security grade



Extensive functionalities to protect your assets



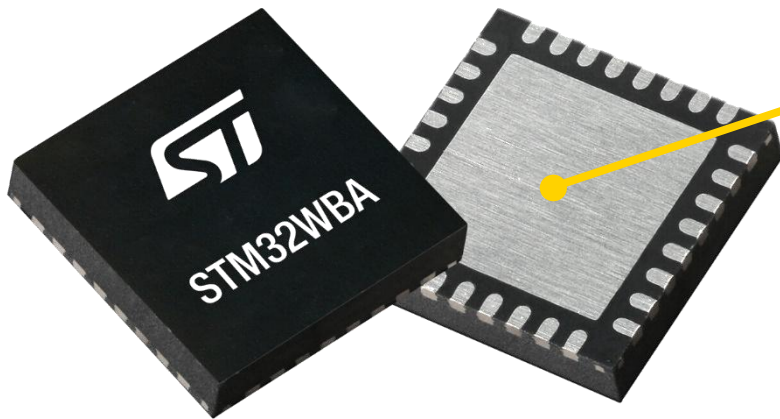
State-of-the-art security assurance level*




target certifications

STM32WBA6

STM32WBA6 DNA within portfolio



High-end MCU offering the most advanced features in the series, such as:

- Up to 2 Mbytes of flash memory and 512 Kbytes of RAM
- Up to 86 GPIOs and USB high-speed support for advanced connectivity
- Design flexibility with a wide range of package options
- QFN48 pin-to-pin compatibility for upgrades from STM32WBA55

What makes STM32WBA6 ideal for smart wireless devices

Smart lock



Enhanced user experience

- Easily store keys & data with 2 Mbytes flash for flexible use
- Seamless firmware updates with dual banking

Cost-efficiency: simplification of design thanks to MCU with integrated radio

Smart home – Matter Thread end devices



High performance

- Reliable data transmission with +10 dBm output power
- X-CUBE-MATTER package certifications
- Extensive 2 Mbytes of flash memory and 512 Kbytes of RAM, sufficient for OTA updates

Medical – continuous glucose monitoring devices (CGM)



Better design efficiency

- Tiny packages for flexible integration
- 2 Mbytes flash for data logging
- Lower device cost

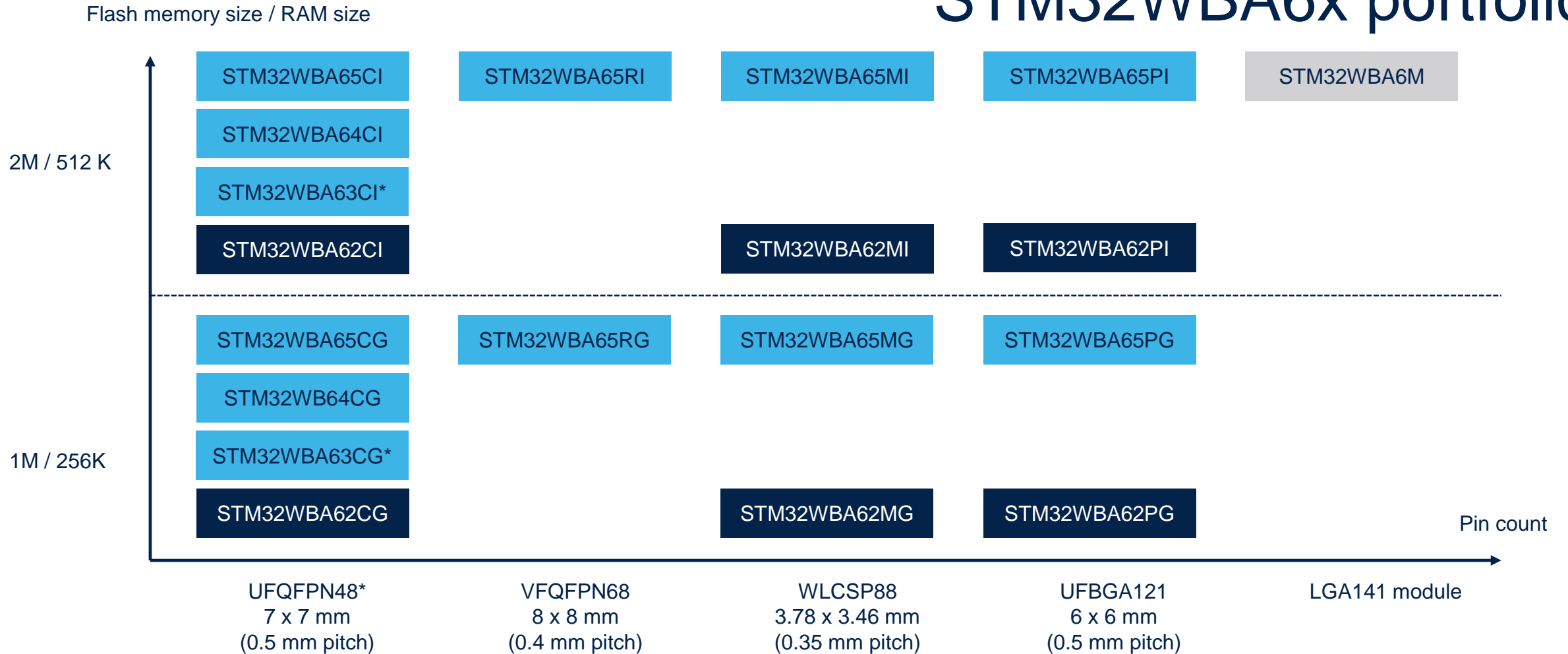
Robust connectivity: reliable data transmission with +10 dBm output power

Ultra-low-power for battery-based devices

Robust security (SESIP L3, RED compliance)

Multiprotocol support (Bluetooth® LE, Thread, Matter) & flexible packages

STM32WBA6x portfolio



Legend: ■ Multiprotocol (Bluetooth® LE (qualified against Bluetooth Core 5.4), IEEE 802.15.4 communication protocols, Zigbee®, Thread, and Matter + Bluetooth® LE audio)

■ Bluetooth® LE (qualified against Bluetooth Core 5.4)

■ Available Q1 2026

* STM32WBA63 is pin-to-pin compatible with the STM32WBA55 QFN48 package.

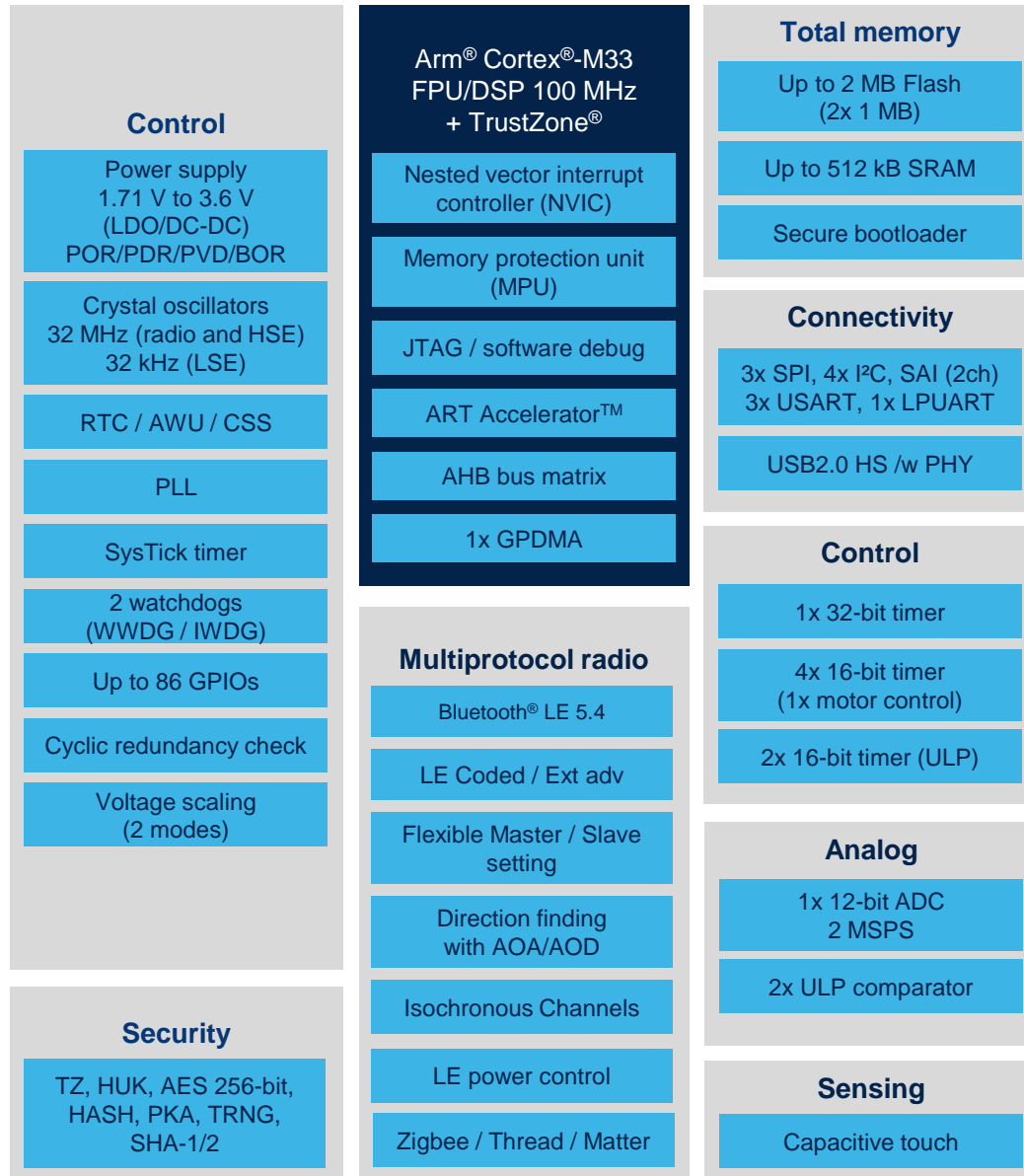


STM32WBA6 product lines

<ul style="list-style-type: none"> • Arm® Cortex®-M33 (DSP + MPU + TZ) at 100 MHz • ART Accelerator • Integrated balun + antenna matching • Max output power: +10 dBm • 16-bit motor control timer • 32-bit timer • 1x ADC 12-bit • 2x comparators • Temperature sensor • Low voltage 1.7 to 3.6V • Temperature range -40° to 105°C 	Product line	Flash (MB)	RAM (KB)	Multi protocols	Other	USB	LDO/SMPS	
	STM32WBA6							
	STM32WBA65	Up to 2 MB	Up to 512 KB	Yes	3x USART 3x SPI 4x I2C	USB HS	SMPS + LDO	
	STM32WBA64			Yes	3x USART 3x SPI 4x I2C	USB HS	LDO	
	STM32WBA63			Yes	2x USART 2x SPI 2x I2C	-	SMPS + LDO	
STM32WBA62	-			3x USART 3x SPI 4x I2C	USB HS	LDO		



STM32WBA6x block diagram



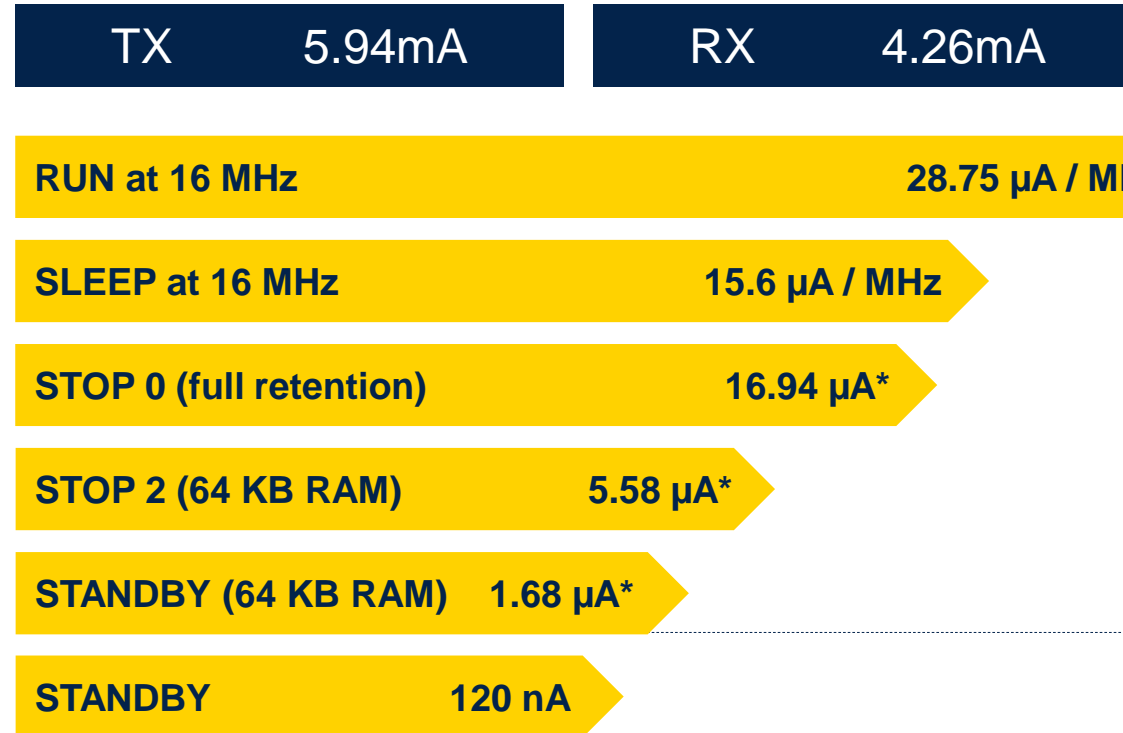
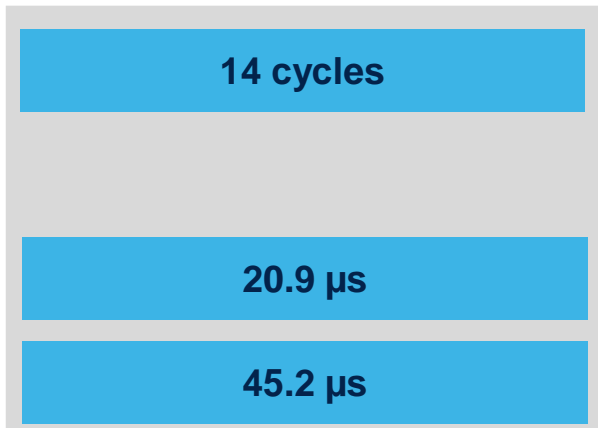
Strong radio performance

- Multiprotocol: BLE 5.4, Zigbee R22/23, OpenThread 1.4, Matter 1.4
- +10 dBm max output power + external PA support
- Tx = 5.94 mA (0 dBm) / Rx = 4.3 mA (3.3 V SMPS)
- Rx sensitivity:
 - -96 dBm Bluetooth® LE @ 1 Mbps
 - -100 dBm 802.15.4 @ 250 kbps
- Packet Traffic Arbitration



STM32WBA65 power consumption

Wake-up times



RF operation available

Typ @ SMPS ON 3.3 V @ 25°C

* with RTC

Maximize integration efficiency

USB high speed
(480 Mbps)



WLCSP88

Size: 3.78 x 3.46 mm p0.35 mm - 54 GPIOs

QFN48

Size: 7 x 7 mm p0.5 mm - 34 GPIOs

QFN68

Size: 8 x 8 mm p0.4 mm - 46 GPIOs

BGA121

Size: 6 x 6 mm p0.5 mm - 86 GPIOs

QFN48 no
USB

Size: 7 x 7 mm p0.5 mm - 31 GPIOs, pin-to-pin compatible with STM32WBA5x, no USB high speed

STM32WBA ecosystem



RF IPD companion chip to STM32WBA series

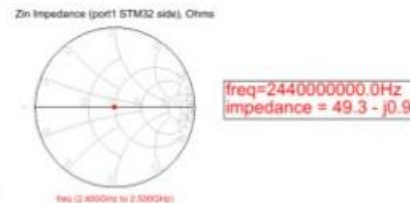
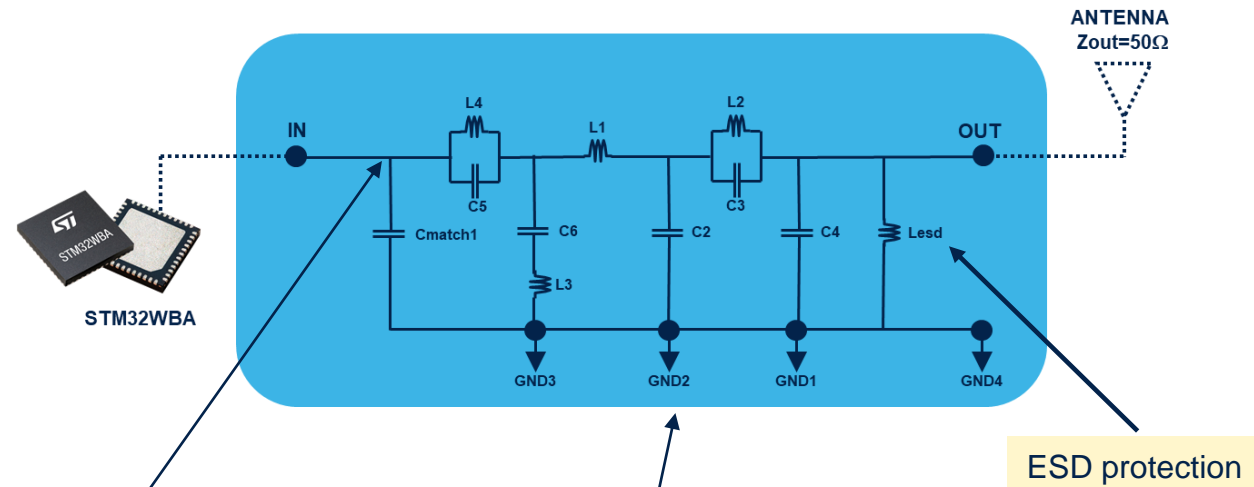
Designed to ensure harmonics filtering, impedance matching and ESD protection in one die

- All-in-one: matching, filtering and antenna protection in one die
- Designed to simplify the RF path between STM32WBA and antenna
- Optimized to answer optimized performances
- BOM reduction, reliability improvement
- System integration: small die size 1.6 x 1 mm²

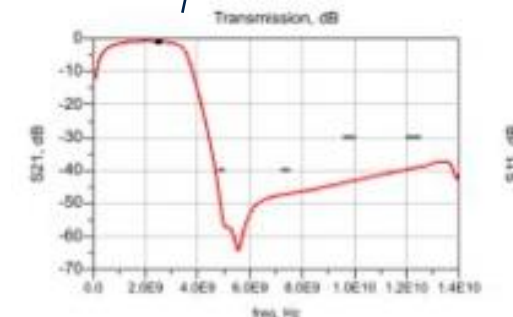


Chip scale package on glass 8 bumps

[MLPF-WB-04D3](#)
1.6 x 1 mm²



Direct match of STM32WBA impedance



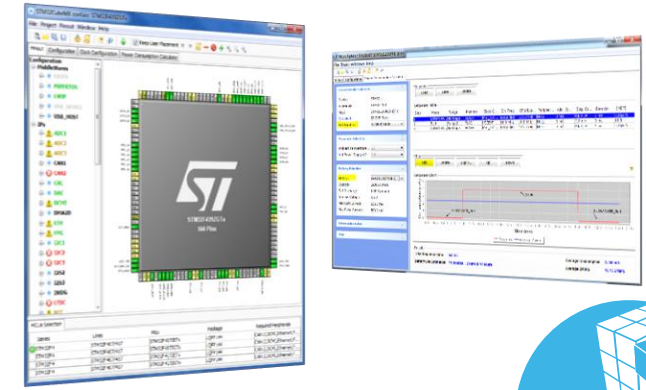
Deep attenuation to answer system requirements

STM32WBA ecosystem simplifies your design journey



Hardware

**Nucleo board &
discovery kit**

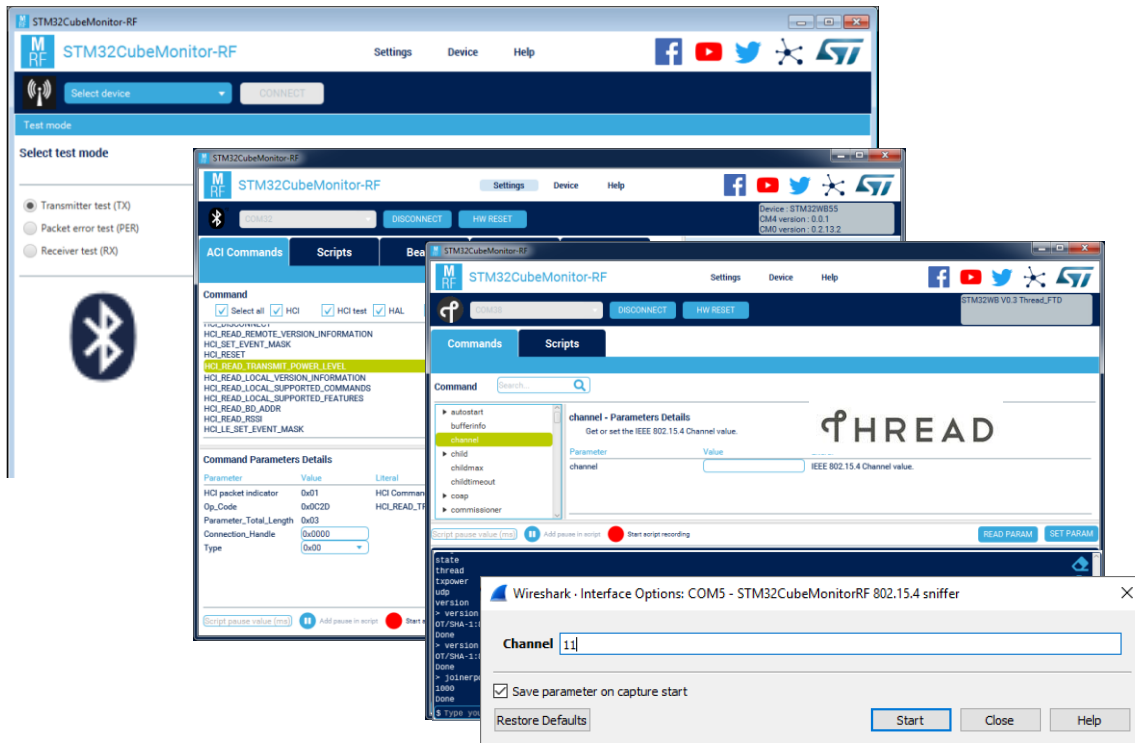


Software

STM32CubeWBA
(connectivity + examples + peripherals)
STM32CubeMX
(code generation + power calculation)
STM32CubeMonRF
STM32CubeProg

STM32 CubeMonitor-RF

STM32CubeMonitor-RF



- Performance monitoring
- Radio testing
- Advanced scripting capabilities
- Data logging and report generation

ST Bluetooth® LE smartphone apps



ST Bluetooth® LE Sensor

ST BLE Sensor – Used with our OOB demo

Read the data exported by a Bluetooth® LE device using the BlueST protocol.

ST BLE StarNet (Star topology)

View the data exported by a Bluetooth® LE gateway connected to a network of devices.

ST BLE ToolBox

Discover peripherals, services, and characteristics, and perform R&W. Users can collect cloud-based analytics on the Azure App Center, bond devices, test throughput, log messages.



ST Bluetooth® LE StarNet



ST BLE Toolbox

STM32WBA takeaways



Wireless

Multiple protocols supported
+10 dBm output power

Performance

Arm® Cortex®-M33 at 100 MHz
Efficiency

Power efficiency

Extended battery lifetime
Autonomous low-power mode

Security

TrustZone®. DPA resistant
Target SESIP Level 3

Integration

Up to 2 Mbytes of flash memory, up to 512
Kbytes RAM. Reduced BOM

Free ecosystem

Faster time to market
Enhanced design journey

ST67W coprocessor module series – Faster wireless innovation



Wi-Fi® enables secure direct cloud connectivity everywhere



Fast

Simple to deploy

Scalable & cost-effective

Convenient

Driving the need for embedding Wi-Fi® technology in a fast and cost-effective way.



ST67W611M

The first ST Wi-Fi® coprocessor module enables **faster wireless innovation** and **design scalability**.



Integration with most STM32 microcontrollers & microprocessors

- Compatible with the majority of the STM32 portfolio.
- Plug-in solution using an MCU as a host for greater design flexibility of next-gen IoT solutions augmented by edge AI.
- Easily add wireless connectivity to existing applications thanks to self-contained module form factor.



Certified, high-performance wireless connectivity

- Pre-loaded with Wi-Fi® 6, Bluetooth® LE. Supports the Matter protocol over Wi-Fi®, providing future-proof connectivity.
- Powered by Qualcomm multiprotocol connectivity technology.
- Three variants for flexible configuration options.



Seamless integration with the STM32Cube ecosystem

- Integrated in the extensive STM32 ecosystem for smoother design journeys.
- STM32Cube software expansion package provides user-friendly APIs for application development and ready-to-use demo applications.

Accelerating the deployment of IoT solutions augmented by Edge AI



Smart homes

Door locks & doorbells, cameras, smart hubs

Industrial IoT

Industrial control IoT hub/gateways, smart utility metering, EV chargers



Smart appliances

White goods, kitchen appliances

Healthcare

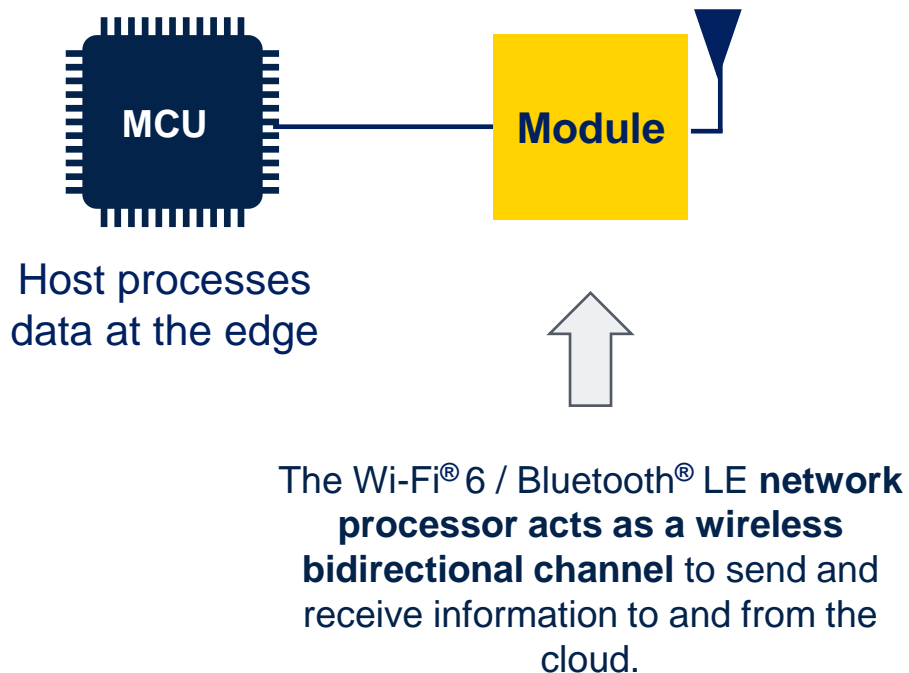
Medical devices, portable patient monitors, handheld devices



Wireless connectivity networks boost the deployment of devices enhanced with edge AI thanks to the flexibility, real-time processing, and scalability they provide.

A flexible solution to enable edge computing

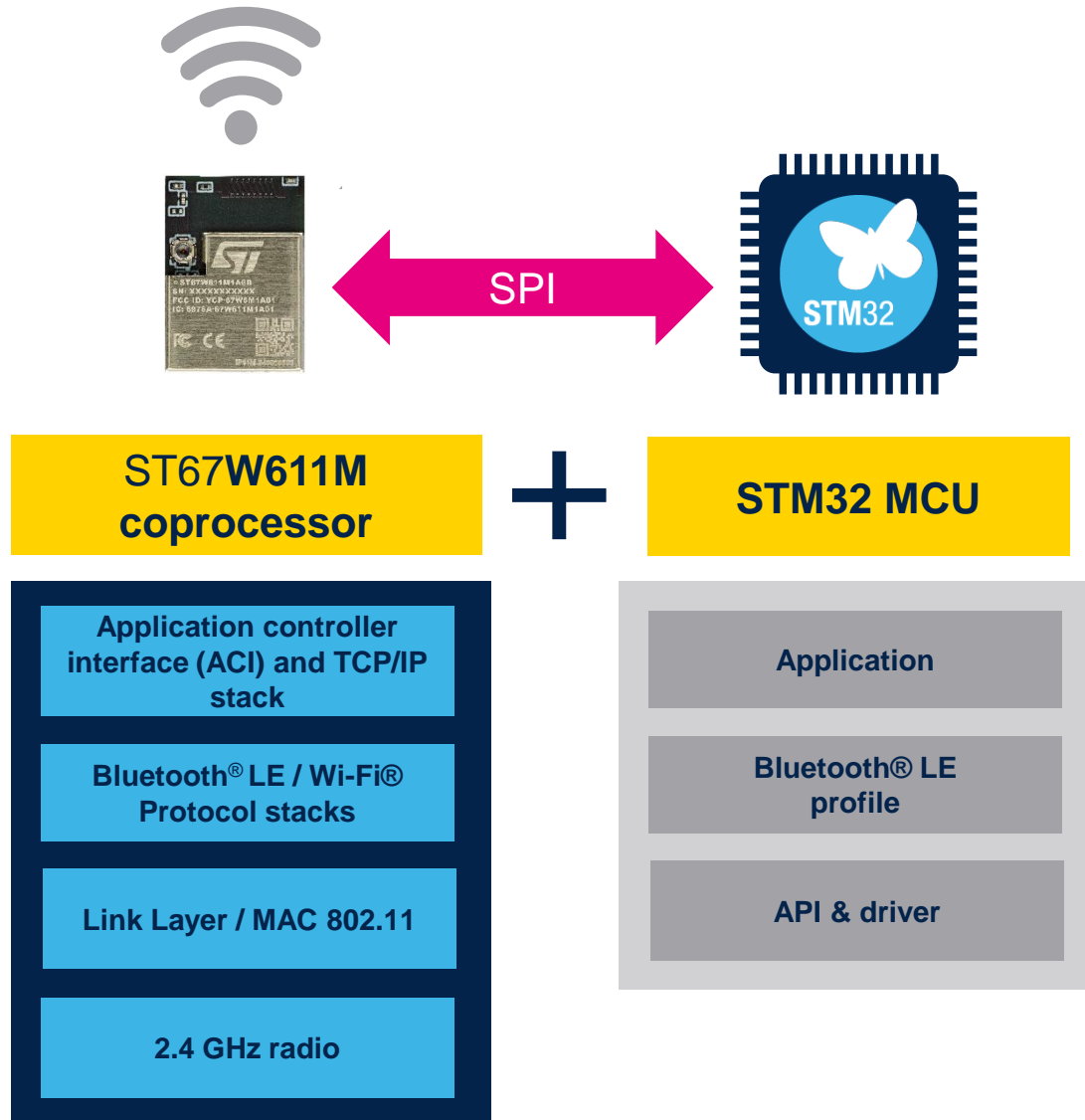
Many IoT devices require edge computing, relying on real-time processing and analysis of data at the source to offload cloud infrastructures and enable ultralow latency.



Plug-in Wi-Fi® and Bluetooth® LE unconstrained design upgradability

- Host upscaling will **not affect the wireless subsystem** and will **not require a new certification**
- **Powerful computing and scalable** resources
- **Reusable** Wi-Fi®6 / Bluetooth® LE component
- **Highly flexible** partitioning thanks to the embedded flash of the module maximizing host offloading
- **Independent** host/wireless subsystems

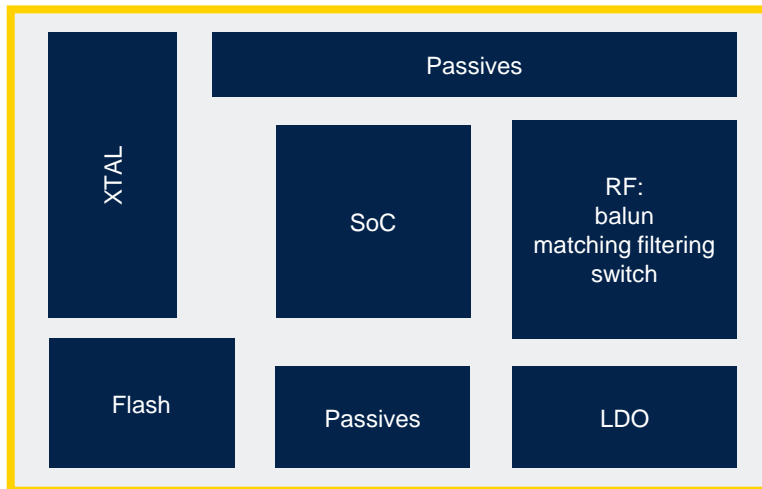
Network coprocessor (NCP) software stack



- All stacks are contained in the module
- High-level APIs for simple integration with applications

Simplifying your Wi-Fi® design journey and costs

PCB implementation with Wi-Fi® chipset



4-layer PCB

Many discrete components
Sensitive design

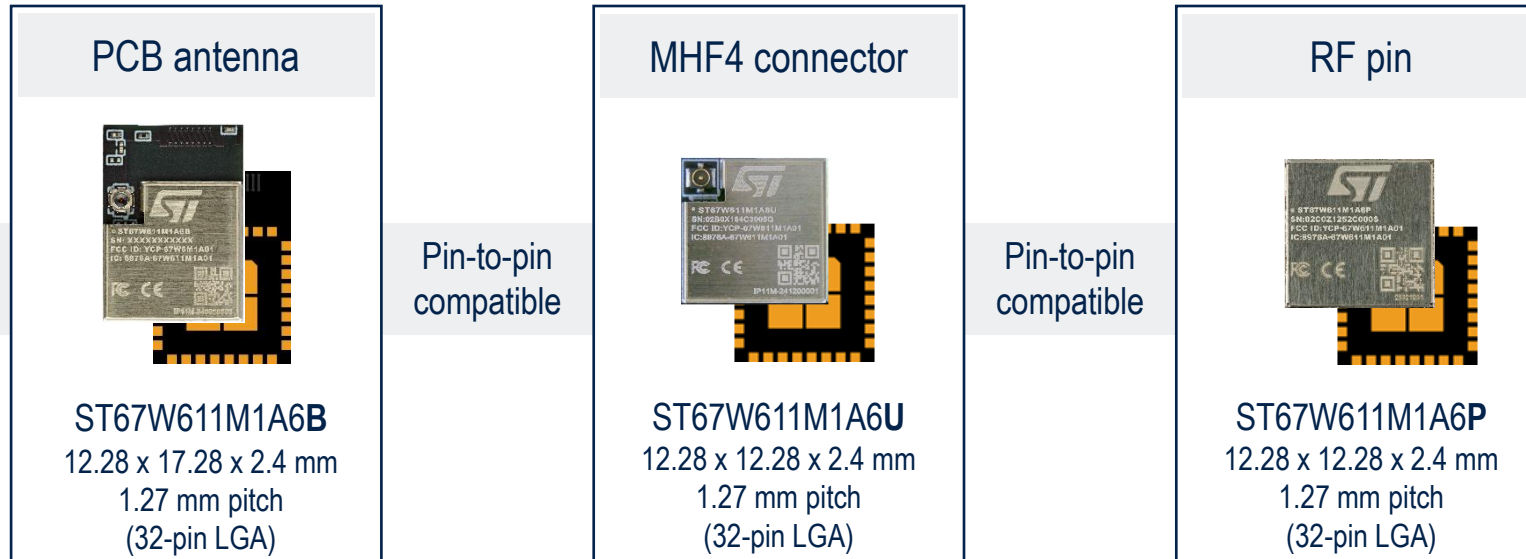
PCB implementation with ST67W611M



Module enabling 2-layer PCB

Single crystal Wi-Fi® operation
SoC with integrated balun, power amplifier,
low noise amplifier and switch
Integrated flash memory & PCB antenna

ST67W611M module in LGA32 package



Pin count (main ones)	Name	Description
4x	SPI	Communication interface
2x	UART	Optional for debugging
1	DEVICE_READY	SPI clock request to host
1	CHIP_EN	Enable for the module
1	RF_ANT	RF in/out pin (ST67W611M1A6P only)

The module addresses worldwide certifications



Key enabling features

Integration



- Embedded 4 Mbytes of flash w/ OTA capability
- Embedded 40 MHz crystal
- Integrated balun, PA, LNA, and switch
- Built on a 40 nm process node

Wireless connectivity



- Wi-Fi®6 1x1 2.4 GHz, 802.11b/g/n/ax
- MCS9, high efficiency 20/40MHz bandwidth
- Station / Soft access point
- Target wake up time (TWT)
- Bluetooth® LE
- Matter (*)
- Thread (**)



Wireless performance



- TCP throughput of up to 18 Mbps
- Tx output power:
 - Up to +21 dBm (Wi-Fi®)
 - +10 dBm (Bluetooth® LE)
- Rx sensitivity:
 - -70/-67 dBm (MCS9, HE20/HE40)
 - -99/-97 dBm (Bluetooth® LE 1M/2M)

Security



- Integrated hardware crypto acceleration
- Security services (secure boot, secure debug,...)
- PSA Certified Level One

Notes:

(*) delivery planned in Q3 2025

(**) delivery planned Q4 2025

ST67W611M1 TWT feature and power consumption

Target wake up time (TWT) feature significantly reduces power consumption and congestion

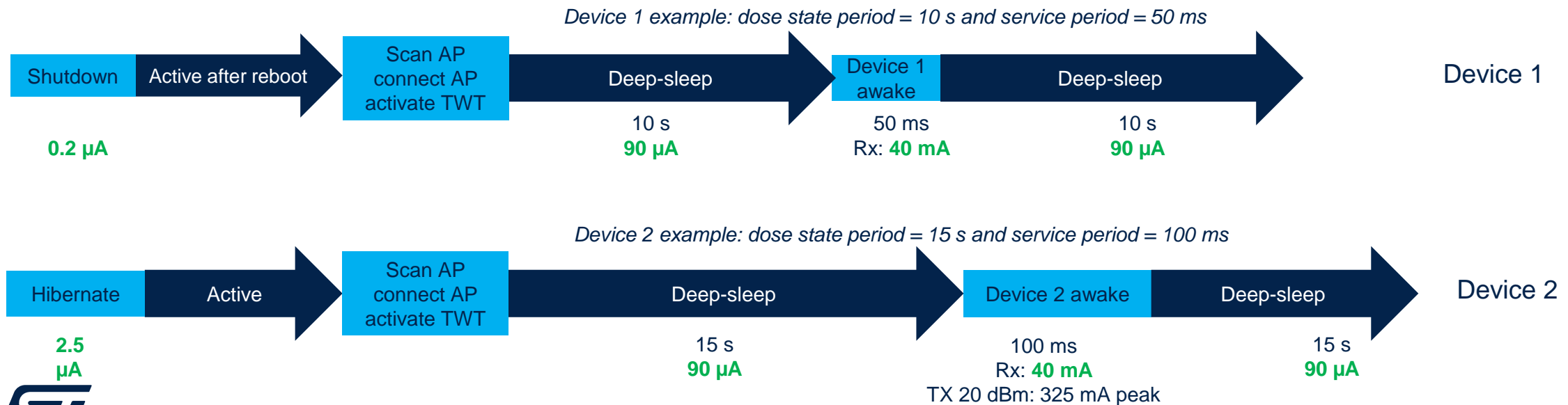
Wi-Fi® 6 AP



ST67W611M1



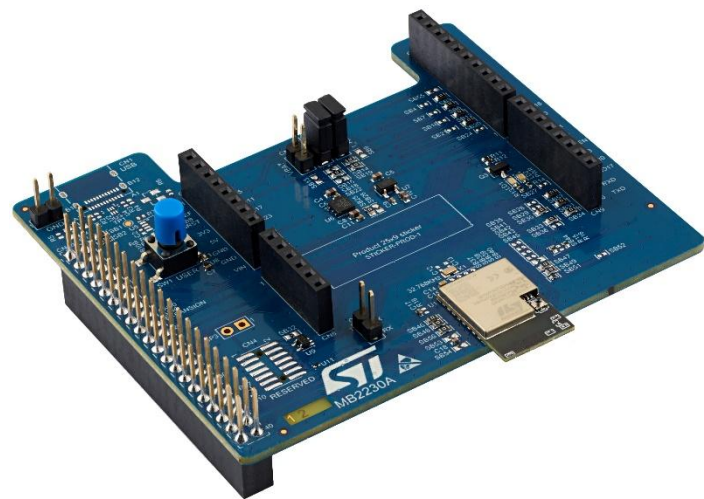
Access point and ST67W611M1 negotiate scheduled wake up time



Seamless integration within STM32 ecosystem



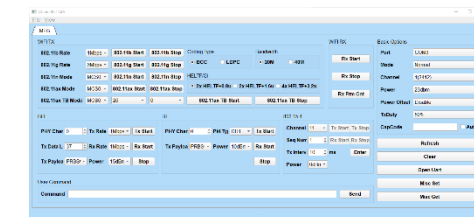
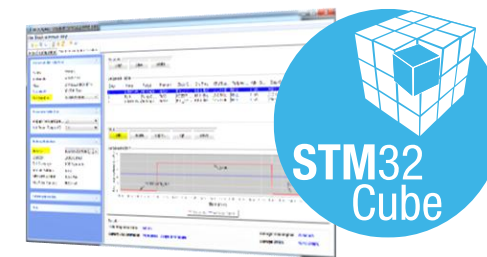
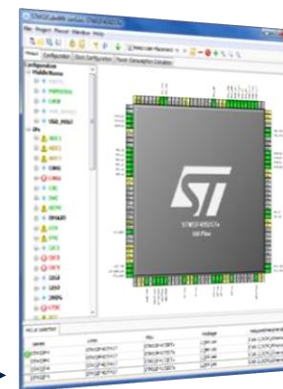
ST67W611M ecosystem simplifies your design journey



Hardware

**X-NUCLEO-67W61M1
expansion**

**STDES-67W61BU-U5
reference design**



Software

STM32CubeMX (code generation for host MCU/MPU)

X-CUBE-ST67W61 (Wi-Fi® & Bluetooth® LE dedicated drivers + examples)

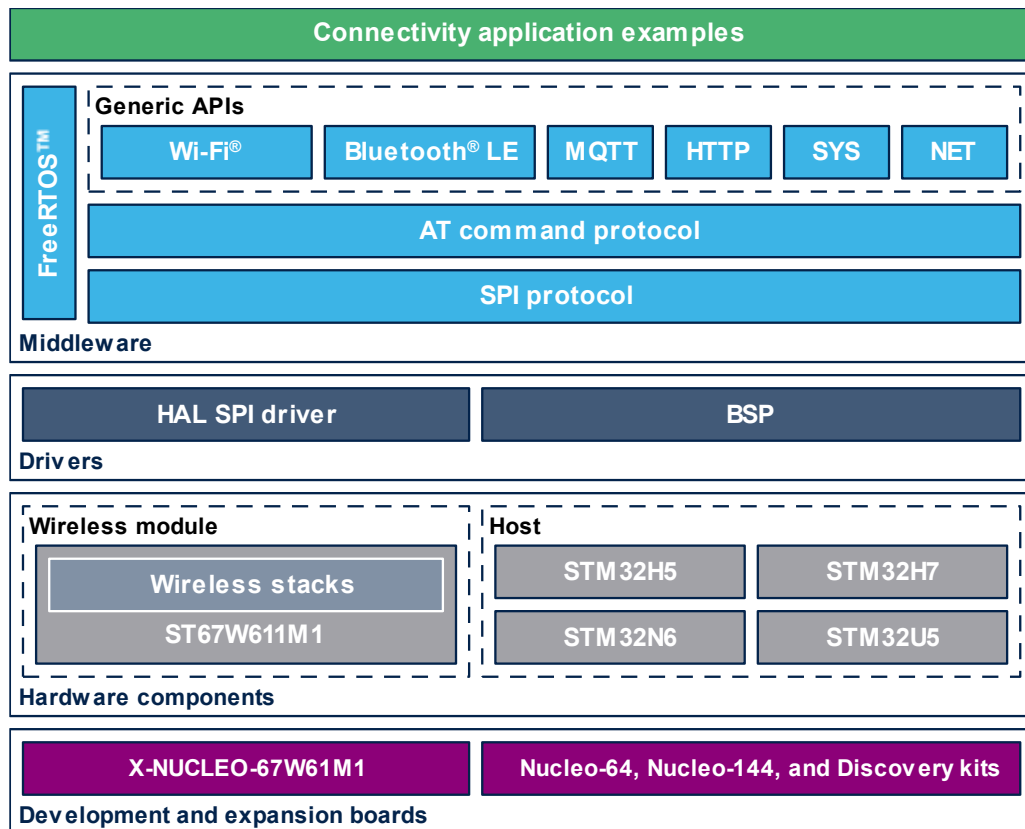
STM32CubeIDE (for host MCU/MPU)
Supported in **X-CUBE-MATTER**

Qconn RF Monitoring Tool

Qconn Programming tool (OTP)

Expansion package X-CUBE-ST67W61M

STM32Cube expansion package: drivers for the ST67W611M



- Complete middleware to build Wi-Fi® and Bluetooth® LE applications using ST67W611M.
- Native support of the X-CUBE-ST67W61M in STM32CubeMX
- Easy portability across different MCU families, thanks to STM32Cube technology.
- Numerous examples to get started with Wi-Fi® and Bluetooth® LE applications.
- Expansion package compatible with STM32CubeMX including configurability in a GUI. Can be downloaded and installed directly from the tool.
- Free of charge, user-friendly license terms.



ST67W611M takeaways



Wireless

Wi-Fi® 6 / Bluetooth® LE stacks inside the module
up to +21 dBm output power (Wi-Fi®)

Integration

Certified module, regulatory, and Wi-Fi®/Bluetooth® LE
Reduced BOM and engineering efforts

Power efficiency

Wi-Fi® 6 TWT support
Low-power modes down to 0.2 μ A

Wireless design expertise

ST & Qualcomm partnership provides a trusted
solution for IoT devices

Full ecosystem support

Expansion board. Middleware, STM32Cube expansion
pack, support in STM32CubeMX & X-CUBE-MATTER

Our technology starts with You



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