

Test and optimize RF perf
Prepare certification

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Prepare certification

5 Test your RF design

Your device is almost ready,
how to test it and prepare if for
certification

1 Basic
Beacon

2 Create
BLE
Profile

3 PAwR
Advanced
feature

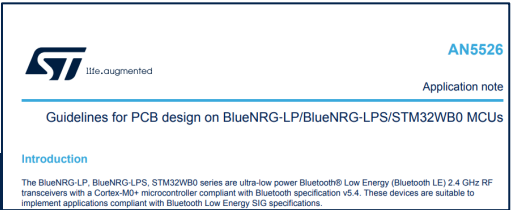
4 BLE Add
On

5 Test
your RF
design



HW design with STM32WB0x

Complete set of documentation
#1 Design schematics and layout



A complete ecosystem
#2 Test & tune your PCB



A complete ecosystem
#3 certify your product



ST MCU STM32WB0x series

Design schematics and layout

Reference schematics & layout

Start from evaluation kits & application examples

Part number	Package	Evaluation kit
STM32WB05N	QFN48	X-NUCLEO-WB05KN1
STM32WB05	QFN32	NUCLEO-WB05KZ
STM32WB06/07	QFN48	NUCLEO-WB07CC
STM32WB09	QFN32	NUCLEO-WB09KE



Application circuits examples for each product and package available in datasheet.

AN5526 : PCB design using STM32WB0x

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AN5526

Application note

Guidelines for PCB design on BlueNRG-LP/BlueNRG-LPS/STM32WB0 MCUs

Introduction

The BlueNRG-LP, BlueNRG-LPS, STM32WB0 series are ultra-low power Bluetooth® Low Energy (Bluetooth LE) 2.4 GHz RF transceivers with a Cortex-M0+ microcontroller compliant with Bluetooth specification v5.4. These devices are suitable to implement applications compliant with Bluetooth Low Energy SIG specifications.

- ➡ PCB structure
- ➡ RF matching network
- ➡ Layout recommendations & examples

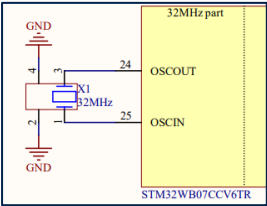
HW design with STM32WB0x : key points

Start from reference design and pay attention to below key points

HSE 32MHz XTAL

STM32WB0x includes internal programmable capacitances to trim the crystal frequency

- No external load capacitances needed.
- Use 8pF load cap crystal.
- No HSE frequency trim needed in production

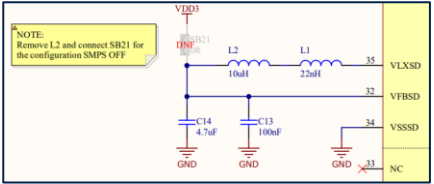


LSE or LSI

LSE 32kHz Xtal is optional.
 Trade off between saving 32kHz Xtal cost and power consumption (around 1uA penalty if using LSI)
 Simply define using LSE or LSI through SW preprocessing option

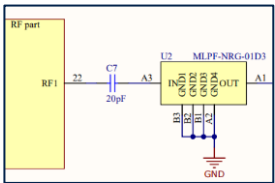
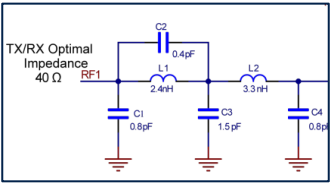
SMPS

Use SMPS or not? Trade off between saving 10uH coil and power consumption
 Simply define using SMPS or not through SW preprocessing option



RF matching & filtering

- Two possibilities : use MLPF-NRG-01D3 IPD filter or use a discrete solution
- MLPF-NRG-01D3 demonstrated with Nucleo evaluation kit.
 - For discretes solution, please refer AN5526



ST MCU STM32WB0x series

Test & tune your PCB

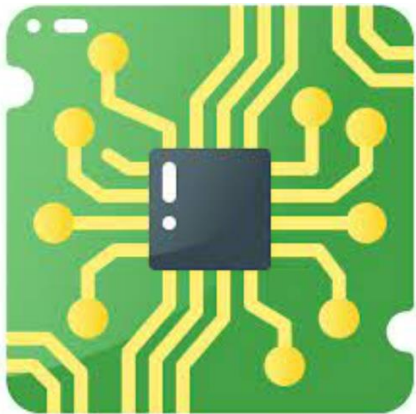
Bring up of your STM32WB0x design

PCB in your hands : Let's test and tune. Refer AN5503

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AN5503
Application note

Guidelines for bringing up on BlueNRG-LP, BlueNRG-LPS devices, and STM32WB0 series MCUs



- HSE 32MHz frequency tuning
- LSE 32kHz frequency tuning.
- Check RF performances & optimize RF matching if needed.



ST support :
Bring-up (HSE/LSE tuning)
RF precertification
Antenna matching

STM32WB0x : a certified solution

STM32WB0x is compliant in regards of regional (CE, FCC etc.) and Bluetooth® Low Energy requirements

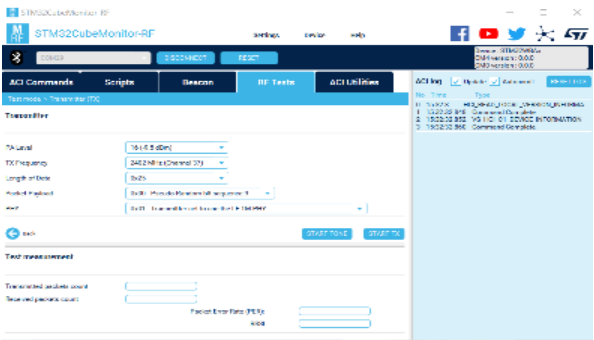
ST is providing complete set of documentation, FW and tools to certify your product.



Certification guideline for STM32WB0, STM32WB and STM32WBA

This page contains information related to Bluetooth® Low Energy and regional (CE, FCC) certification. It is assumed that the reader is familiar with STM32WB, STM32WB and/or STM32WBA development. Otherwise, we recommend reading the [Introduction to Bluetooth® Low Energy with STM32](#) guideline first.

https://wiki.st.com/stm32mcu/wiki/Connectivity:Certification_guideline



<https://www.st.com/en/development-tools/stm32cubemonrf.html>
PC tool

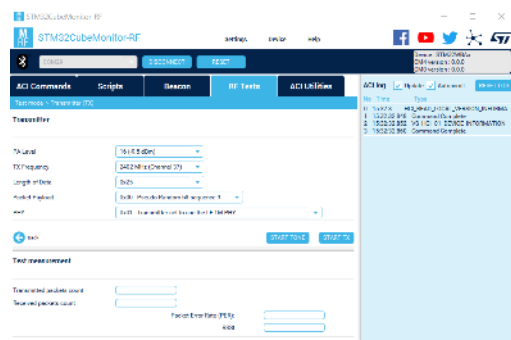


STM32WB0x

BLE_Transparent FW

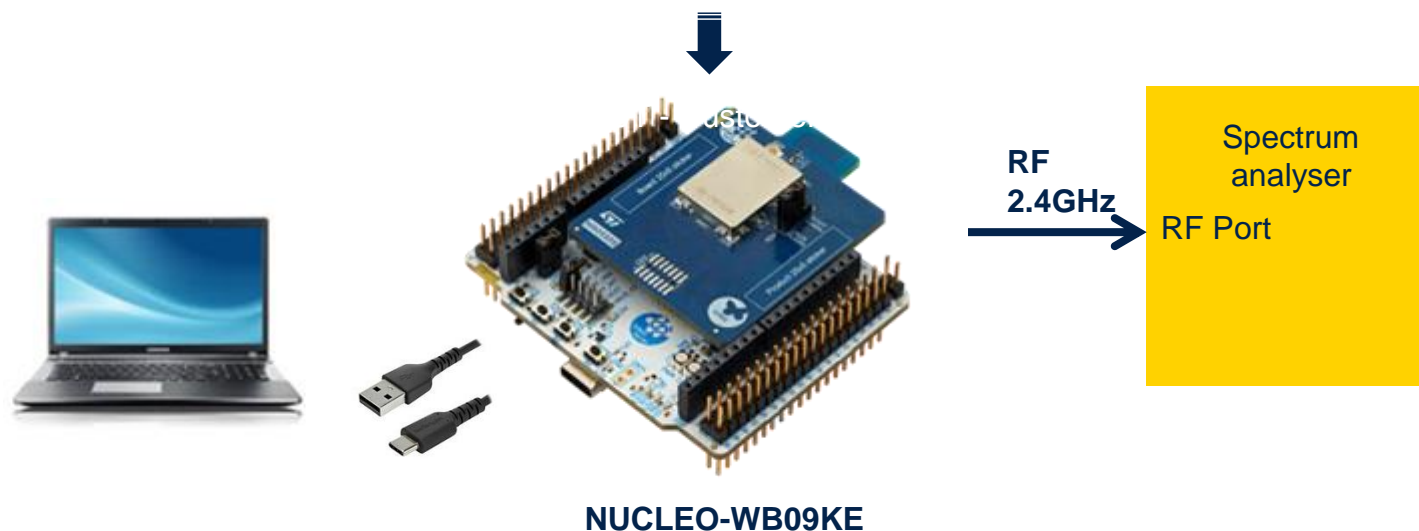
Transparent Mode FW

Use transparent mode and STM32CubeMonitorRF



tool is available at [st.com](https://www.st.com)

Dedicated FW (Transparent Mode FW) must be set in STM32WB0x (*)



ST MCU STM32WB0x series

Certify your product

Bluetooth certification

STM32WB0x is having reference QDIDs at Bluetooth SIG.

Customer must perform PHY testing and declare its product at Bluetooth SIG.

2.2.1. STM32WB0 PHY QDID

Package	Part number	RF PHY QDID
WLCSP36 QFN32	STM32WB05	175191 (TCRL 2021-1) Bluetooth® Low Energy 5.3
WLCSP49 QFN32 QFN48	STM32WB06 STM32WB07	221778 (TCRL 2023-1) Bluetooth® Low Energy 5.4
WLCSP36 QFN32	STM32WB09	175191 (TCRL 2021-1) Bluetooth® Low Energy 5.3

2.2.2. STM32WB0 host stack QDID

Features	Host stack version	QDID
4.0 HCI LL with extended advertising, ATT, GAP, GATT, L2CAP with Enhanced Connected Oriented Channel, SMP	stm32wb0x_ble_stack	234204 (TCRL 2023-1) Bluetooth® Low Energy 5.4
4.0 HCI LL with extended advertising	stm32wb0x_ble_stack_controller_only	234204 (TCRL 2023-1) Bluetooth® Low Energy 5.4

Refer wiki https://wiki.st.com/stm32mcu/wiki/Connectivity:Certification_guideline on st.com describing steps by steps process

Takeaways

STM32WB key Application Notes

AN5503 and AN5526 to secure your hardware & RF design

STM32WB0 is a certified solution

Wiki pages and dedicated support to ease your certification process journey



Thank you

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