

Figure 4. External components for the RF part

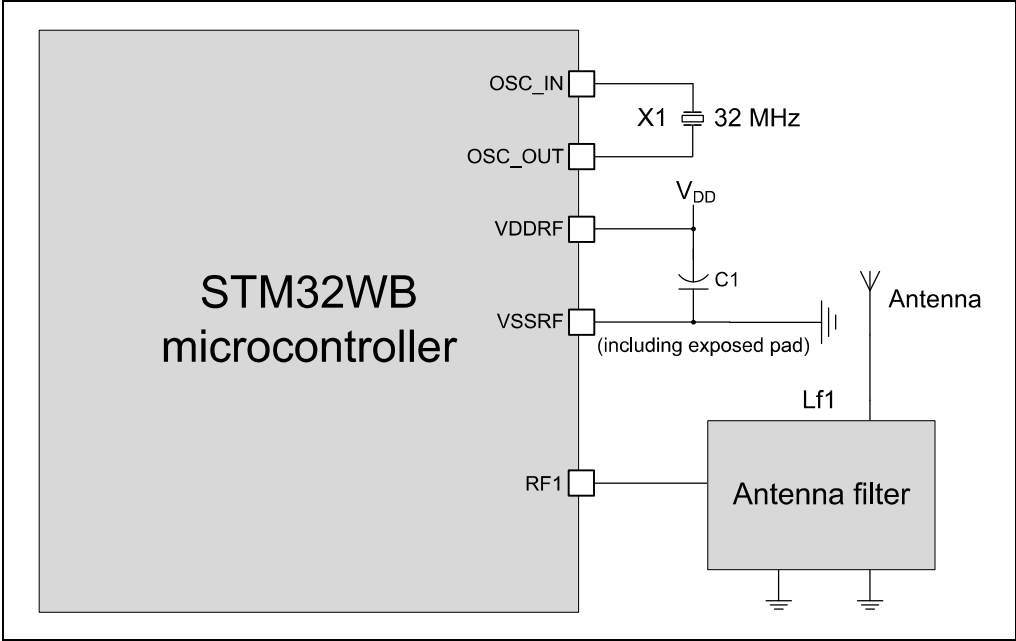


Table 5. Typical external components

Component	Description	Value
C1	Decoupling capacitance for RF	100 nF // 100 pF
X1	32 MHz crystal ⁽¹⁾	32 MHz
Antenna filter	Antenna filter and matching network	Refer to AN5165, on www.st.com
Antenna	2.4 GHz band antenna	-

1. e.g. NDK reference [NX2016SA 32 MHz EXS00A-CS06654](#).

Note: For more details refer to AN5165 “Development of RF hardware using STM32WB microcontrollers” available on www.st.com.

3.7 Power supply management

3.7.1 Power supply distribution

The device integrate an SMPS step-down converter to improve low power performance when the V_{DD} voltage is high enough. This converter has an intelligent mode that automatically enters in bypass mode when the V_{DD} voltage falls below a specific BORx (x = 1, 2, 3 or 4) voltage.

By default, at reset, the SMPS is in bypass mode.

The device can be operated without the SMPS by just wiring its output to V_{DD} . This is the case for applications where the voltage is low, or where the power consumption is not critical.

Figure 5. Power distribution

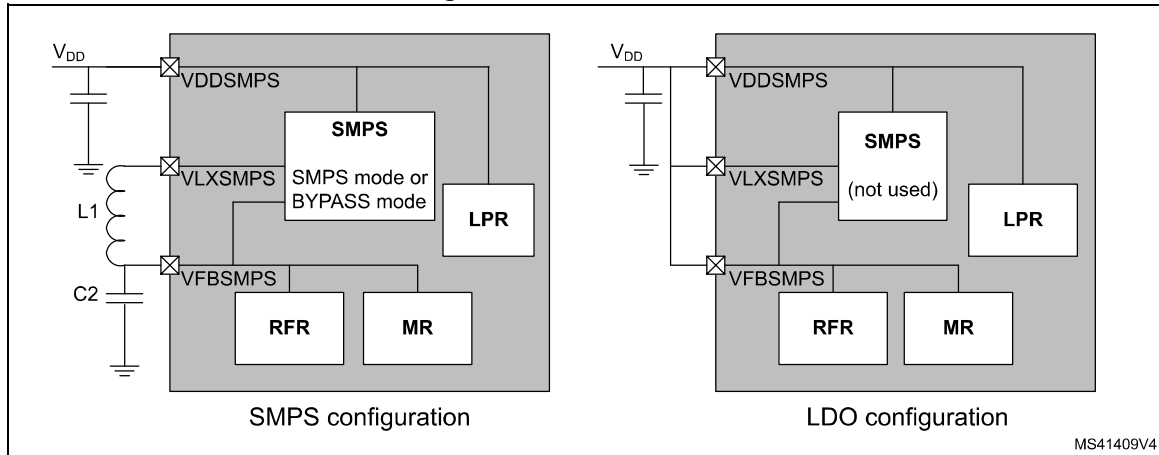


Table 6. Power supply typical components

Component	Description		Value
C2	SMPS output capacitor ⁽¹⁾		4.7 μ F
L1 ⁽²⁾	SMPS inductance	For 8 MHz ⁽³⁾	2.2 μ H
		For 4 MHz ⁽⁴⁾	10 μ H

1. Such as [GRM155R60J475KE19](#).

2. To improve the receiver performance an extra 10 nH inductor (e.g Murata [LQG15WZ10NJ02D](#)) in series with L1 is needed.

3. Such as [Würth 74479774222](#).

4. Such as Murata [LQM21FN100M70L](#).

The SMPS can also be switched on or set in bypass mode at any time by the application software, for example when very accurate ADC measurement are needed.

3.7.2 Power supply schemes

The devices have different voltage supplies (see [Figure 7](#) and [Figure 8](#)) and can operate within the following voltage ranges:

- $V_{DD} = 1.71$ to 3.6 V: external power supply for I/Os (V_{DDIO}), the internal regulator and system functions such as RF, SMPS, reset, power management and internal clocks. It is provided externally through VDD pins. V_{DDRF} and V_{DDSMPS} must be always connected to VDD pins.
- $V_{DDA} = 1.62$ (ADC/COMP) to 3.6 V: external analog power supply for ADC, comparators and voltage reference buffer. The V_{DDA} voltage level can be independent from the V_{DD} voltage. When not used V_{DDA} must be connected to V_{DD} .
- $V_{DDUSB} = 3.0$ to 3.6 V: external independent power supply for USB transceivers. When not used V_{DDUSB} must be connected to V_{DD} or ground.
- $V_{LCD} = 2.5$ to 3.6 V: the LCD controller can be powered either externally through the VLCD pin, or internally from an internal voltage generated by the embedded step-up converter. This converter can generate a V_{LCD} voltage up to 3.6 V if V_{DD} is higher than 2.0 V. Note that the LCD is available only on STM32WB55xx devices.