

The BlueNRG-LP device limitations

Silicon identification

This errata sheet applies to the following STMicroelectronics BlueNRG-LP devices:

Table 1. Ordering information

Order code	Package	Identification information of the device ⁽¹⁾	Device cut
BlueNRG-345A	QFN32	0x120	2.0
BlueNRG-345M	QFN48	0x120	2.0
BlueNRG-345V	WLCSP49	0x120	2.0
BlueNRG-355A	QFN32	0x120	2.0
BlueNRG-355M	QFN48	0x120	2.0
BlueNRG-355V	WLCSP49	0x120	2.0

1. Value as read from register system controller (SYSCFG) - DIE_ID register (0x40000000).

Table 2. Bootloader table

Order code	Package	Embedded UART bootloader version ⁽¹⁾
BlueNRG-345A	QFN32	3 or 4
BlueNRG-345M	QFN48	3 or 4
BlueNRG-345V	WLCSP49	3 or 4
BlueNRG-355A	QFN32	3 or 4
BlueNRG-355M	QFN48	3 or 4
BlueNRG-355V	WLCSP49	3 or 4

1. Value as read from the address 0x10000010.

Note: For each device limitation the following information is provided:

- *Description: limitation description*
- *Impact: limitation impact*
- *Workaround: possible workaround if any*

1 Limitations

1.1 Host wake-up source does not wake the BlueNRG-LP from DEEPSTOP

Part numbers affected: The BlueNRG-345A, BlueNRG-345M, BlueNRG-345V, BlueNRG-355A, BlueNRG-355M, BlueNRG-355V.

Description:

The wake-up block of the radio manages a Host wake-up timer in parallel to the Bluetooth® wake-up timer. This timer can be used as an additional slow clock timer available in the SoC to exit the device from a DEEPSTOP without launching any Bluetooth sequence.

Impact: This timer does not raise any wake-up request to the power controller of the device.

Workaround:

1. Use the RTC block to wake up the system
2. A software workaround is provided in the ST BlueNRG-LP SDK (STSW-BNRGLP-DK)

1.2 Unsupported system and Bluetooth LE clock configuration combinations

Part numbers affected: The BlueNRG-345A, BlueNRG-345M, BlueNRG-345V, BlueNRG-355A, BlueNRG-355M, BlueNRG-355V.

Description:

The following system and Bluetooth Low Energy (LE) clock configuration combinations are not supported

1. System_Clock=32 MHz and Ble_Clock=32 MHz
2. System_Clock=16 MHz and Ble_Clock=16 MHz

Impact: A device crash could be observed when using Bluetooth Low Energy applications with host wake-up timer

Workaround: None

1.3 HSE phase noise

Part numbers affected: The BlueNRG-345A, BlueNRG-345M, BlueNRG-345V, BlueNRG-355A, BlueNRG-355M, BlueNRG-355V.

Description

HSE phase noise is observed when the high speed external IO current control register is set to value > 4 (max. 0.61 mA/V).

Impact

HSE phase noise is observed.

Workaround

High speed external IO current control register setting to a value < 5 is highly recommended (RCC_RFSWHSECR register, bits GMC[2:0]).

1.4 RTC key lost

Part numbers affected: The BlueNRG-345A, BlueNRG-345M, BlueNRG-345V, BlueNRG-355A, BlueNRG-355M, BlueNRG-355V.

Description

RTC loses the keys inserted to unlock the calendar register access when the device goes to deepstop mode, due to PRESETn that should come from rcc_v12o instead of rcc_v12i.

Impact

RTC calendar update functionality is affected when system wakes up from DEEPSTOP mode.

Workaround

1. Rewrite the key in the write protect register (WPR) after a DEEPSTOP

1.5 ADC occasional mode does not work

Part numbers affected: The BlueNRG-345A, BlueNRG-345M, BlueNRG-345V, BlueNRG-355A, BlueNRG-355M, BlueNRG-355V.

Description

The occasional mode of the ADC allows catching one sample of the Vbat or the temperature sensor during an analog audio mode or full mode sequence. Since the setup time of the temperature sensor is too high and sampling only the first value provides a wrong value, the measure is good only from the second sample.

Impact

The temperature sensor occasional mode strategy (doing one measure among a continuous flow of measurements on another channel) does not work

Workaround:

Two possible options to insert a temperature measurement among other channel measurements are the following:

1. Sequence mode with a downsampling ratio =1
 - The sequence mode can be composed of up to 16 conversions
 - Use the ADC mode in continuous regular sequence mode, with a downsampling ratio =1
 - Program 14 times the channel that has to be continuously converted
 - Program 2 consecutive times, the thermal sensor
 - Read all data on the « DS_DATAOUT_REG » register
 - Discard the first measure of the thermal sensor
2. Sequence mode with a downsampling ratio different from 1
 - The sequence mode can be composed of up 16 conversions
 - Use the ADC mode in continuous regular sequence mode, with a downsampling ratio from 4 to 128 (downsampling ratio =2 is not recommended)
 - Program 15 times the channel that has to be continuously converted
 - Program 1 time, the thermal sensor
 - Read all data on « DS_DATAOUT_REG »"

1.6 Embedded UART bootloader crash

Part numbers affected: The BlueNRG-345A, BlueNRG-345M, BlueNRG-345V, BlueNRG-355A, BlueNRG-355M, BlueNRG-355V with embedded UART bootloader version 3.

Description: When readout protection is enabled and/or SWD access is disabled, the embedded UART bootloader is no longer able to boot the chip properly.

Impact: In the BlueNRG-LP cut 2.0 embedded UART bootloader version 3, users are not able to use readout protection and/or disable SWD access.

Workaround: None

1.7 RTC alarm is not able to internally wake up the device from DEEPSTOP

Part numbers affected: The BlueNRG-345A, BlueNRG-345M, BlueNRG-345V, BlueNRG-355A, BlueNRG-355M, BlueNRG-355V.

Description: The RTC is able to run in DEEPSTOP mode but it cannot generate an internal RTC alarm wake-up event.

Impact: RTC alarm cannot be used as an internal wake-up source when the device is in DEEPSTOP.

Workaround: A software workaround consists of outputting the RTC alarm on PA8 and using this pin as wake-up pin from DEEPSTOP.

1.8 RTC interrupt not triggered in RUN mode

Part numbers affected: The BlueNRG-345A, BlueNRG-345M, BlueNRG-345V, BlueNRG-355A, BlueNRG-355M, BlueNRG-355V.

Description: The RTC interrupts could get lost in RUN mode when the selected RTC clock source is LSI or LSE. The problem does not occur when the RTC clock source is CLK_16MHz/512.

Impact: RTC interrupts cannot be reliably used for real-time control functions, since some occurrences of RTC interrupts could be missed.

Workaround: While in RUN mode, do not use RTC interrupts and use polling on RTC_ISR register. Other possible options consist of outputting the RTC alarm or wakeup on PA8 or PA9 and using one of these pins as I/O interrupt pin.

Note: Wakeup from DEEPSTOP mode is not affected and RTC interrupt is always reliable in DEEPSTOP mode.

1.9

Activity on some GPIOs may affect the RF performance

Part numbers affected: The BlueNRG-345A, BlueNRG-345V, BlueNRG-355A, BlueNRG-355V.

Description: RF performance can be degraded, if one of the following conditions happen:

- QFN32 package only: toggling activity on PB14 and PB15 during RF communication
- QFN32 and WLCSP49 packages: GPIOs tracks are routed close to OSCIN/OSCOUT pins and toggling activity on those GPIOs during RF communications.

Impact: The users can experience high packet error rate during RF communications.

Workaround:

- QFN32 package only: avoid toggling PB14/15 (input or output) during RF communications
- QFN32 and WLCSP49 packages: avoid routing GPIO tracks close to OSCIN/OSCOUT tracks, if they are toggling during RF communications.

Revision history

Table 3. Document revision history

Date	Version	Changes
24-Jul-2020	1	Initial release.
10-May-2021	2	Updated cover page. Added Section 1.6 Embedded UART bootloader crash.
11-Jan-2022	3	Added Section 1.7 RTC alarm is not able to internally wake up the device from DEEPSTOP.
15-Apr-2022	4	Added the Section 1.8 RTC interrupt not triggered in RUN mode.
23-08-2022	5	Updated Table 1. Ordering information and Table 2. Bootloader table. Added Section 1.9 Activity on some GPIOs may affect the RF performance and the affected part numbers on the limitation description.

Contents

1	Limitations	2
1.1	Host wake-up source does not wake the BlueNRG-LP from DEEPSTOP	2
1.2	Unsupported system and Bluetooth LE clock configuration combinations	2
1.3	HSE phase noise	2
1.4	RTC key lost	2
1.5	ADC occasional mode does not work	3
1.6	Embedded UART bootloader crash	3
1.7	RTC alarm is not able to internally wake up the device from DEEPSTOP	3
1.8	RTC interrupt not triggered in RUN mode	3
1.9	Activity on some GPIOs may affect the RF performance	4
	Revision history	5

IMPORTANT NOTICE – PLEASE READ CAREFULLY

STMicroelectronics NV and its subsidiaries (“ST”) reserve the right to make changes, corrections, enhancements, modifications, and improvements to ST products and/or to this document at any time without notice. Purchasers should obtain the latest relevant information on ST products before placing orders. ST products are sold pursuant to ST’s terms and conditions of sale in place at the time of order acknowledgement.

Purchasers are solely responsible for the choice, selection, and use of ST products and ST assumes no liability for application assistance or the design of Purchasers’ products.

No license, express or implied, to any intellectual property right is granted by ST herein.

Resale of ST products with provisions different from the information set forth herein shall void any warranty granted by ST for such product.

ST and the ST logo are trademarks of ST. For additional information about ST trademarks, please refer to www.st.com/trademarks. All other product or service names are the property of their respective owners.

Information in this document supersedes and replaces information previously supplied in any prior versions of this document.

© 2020 STMicroelectronics – All rights reserved