Introduction

This release note is updated periodically to keep abreast of STM32CubeMonRF (hereinafter referred to as STM32CubeMonitor-RF) evolution, problems, and limitations.

Check the STMicroelectronics support website at *www.st.com* for the latest version. For the latest release summary, refer to *Table 1*.

Table 1. STM32CubeMonRF 2.9.0 release summary

Type	Summary
Minor release	– Alignment of OpenThread API with version 1.2 – Addition of 802.15.4 Nucleo sniffer firmware – Alignment of Bluetooth® Low Energy commands on firmware release 1.14.0

Customer support

For more information or help concerning STM32CubeMonitor-RF, contact the nearest STMicroelectronics sales office or use the ST community at community.st.com. For a complete list of STMicroelectronics offices and distributors, refer to the *www.st.com* web page.

Software updates

Software updates and all the latest documentation can be downloaded from the STMicroelectronics support web page at www.st.com/stm32cubemonrf.

1   General information

1.1   Overview

STM32CubeMonitor-RF is a tool provided to help designers to:

Perform RF (radio frequency) tests of Bluetooth® Low Energy applications

Perform RF (radio frequency) tests of 802.15.4 applications

Send commands to Bluetooth® Low Energy parts to perform tests

Configure Bluetooth® Low Energy beacon and manage file over-the-air (OTA) transfers

Discover Bluetooth® Low Energy device profiles and interact with services

Send commands to OpenThread parts to perform tests

Visualize Thread® devices connections

Sniff 802.15.4 network

This software applies to microcontrollers of the STM32WB Series, based on Arm®[a] cores.

1.2   Host PC system requirements

Supported operating systems and architectures

Windows® 10, 32-bit (x86) or 64-bit (x64)

Linux®[b] Ubuntu®[c], minimum version 18.04 64-bit

macOS®[d], minimum version macOS Catalina®[d]. Intel®[e] or M1 architecture

Software requirements

For Linux®, the Java®[f] runtime environment (JRE) is required for the installer.

For 802.15.4 sniffer only:

Wireshark v2.4.6 or later available from https://www.wireshark.org

Python™ card v3.8 or later available from https://www.python.org/downloads

pySerial v3.4 or later, available from https://pypi.org/project/pyserial

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e.   Intel is a trademark of Intel Corporation or its subsidiaries.

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1.3   Setup procedure

1.3.1   Windows®

Install

If an older version of STM32CubeMonitor-RF is already installed, the existing version must be uninstalled before installing the new one. The user must have administrator rights on the computer to perform the installation.

1.   Download *STM32CMonRFWin.zip.*
2.   Unzip this file to a temporary location.
3.   Launch *setupSTM32CubeMonitor-RF.exe* to be guided through the setup process.

Uninstall

To uninstall STM32CubeMonitor-RF, follow the steps below:

1.   Open the *Windows Control* panel.
2.   Select *Programs and Features* to display the list of programs installed on the computer.
3.   Left-click on *STM32CubeMonitor-RF* from STMicroelectronics publisher and select the *Uninstall* function.

1.3.2   Linux®

Software requirements

The Java® runtime environment is required for the Linux® installer. It can be installed with the command *apt-get install default-jdk* or with the package manager.

Install

1.   Download *STM32CMonRFLin.tar.gz.*
2.   Unzip this file to a temporary location.
3.   Make sure you have access rights to the target installation directory.
4.   Launch the execution of the *SetupSTM32CubeMonitor-RF.jar* file, or launch manually the installation with *java -jar <install path>/SetupSTM32CubeMonitor-RF.jar.*
5.   An icon appears on the desktop. If the icon is not executable, edit its properties and select the option *Allow executing file as program,* or for Ubuntu® 19.10, select the option *Allow launching*.

Information about COM port on Ubuntu®

The *modemmanager* process is checking the COM port when the board is plugged. Due to this activity, the COM port is busy for a few seconds, and STM32CubeMonitor-RF is unable to connect.

The users need to wait for the end of the modemmanager activity before opening the COM port. If the user does not require *modemmanager*, it is possible to uninstall it with the command *sudo apt-get purge modemmanager*.

For the sniffer mode, the modem manager must be uninstalled or disabled through the command *sudo systemctl stop ModemManger.service* before connecting the sniffer device.

If the *modemmanager* cannot be disabled, it is also possible to define rules so that the *modemmanager* ignores the sniffer device. The *10-stsniffer.rules* file, available in the

~/STMicroelectronics/STM32CubeMonitor-RF/sniffer directory, can be copied in */etc/udev/rules.d.*

Uninstall

1. Launch the "*uninstaller.jar*" located in the installation directory */STMicroelectronics/STM32CubeMonitor-RF/Uninstaller.* If the icon is not executable, edit its properties and select the option *Allow executing file as program*.
2. Select *Force deletion...* and click on the *Uninstall* button.

1.3.3 macOS®

Install

1. Download "*STM32CMonRFMac.zip*".
2. Unzip this file to a temporary location.
3. Make sure you have access rights to the target installation directory.
4. Double click on the *installerSTM32CubeMonitor-RF.dmg* file.
5. Open the STM32CubeMonitor-RF new disk.
6. Drag and drop the STM32CubeMonitor-RF shortcut to the *Applications* shortcut.
7. Drag and drop the document folder to a location of your choice.

If an error "STM32CubeMonitor-RF cannot be opened because it is from an unidentified developer" occurs, the command *sudo spctl --master-disabl* must be used to disable the verification.

Uninstall

1. In the applications folder, select the STM32CubeMonitor-RF icon and move it to trash.
2. In the user's home directory, remove the folder Library/STM32CubeMonitor-RF. If the *Library* folder is hidden:
   a) Open *Finder.*
   b) Hold down *Alt (Option)* and choose *Go from the drop-down* menu bar at the top of the screen.
   c) The *Library* folder is listed below the *Home* folder.

1.4 Devices supported by STM32CubeMonitor-RF

Supported devices

The tool is tested with the STM32WB55 Nucleo and dongle boards (P-NUCLEO-WB55), the STM32WB15 Nucleo board (NUCLEO-WB15CC), and the STM32WB5MM-DK Discovery kit.

The boards based on STM32WBxx are compatible if they feature:

A connection through a USB "Virtual COM port" or a serial link and

A test firmware:

– *Transparent mode* for Bluetooth® Low Energy

– *Thread_Cli_Cmd* for Thread®

– *Phy_802_15_4_Cli* for 802.15.4 RF test

– *Mac_802_15_4_Sniffer.bin* for sniffer

The device connection details and firmware location are described in Section 2 of the user manual *STM32CubeMonitor-RF software tool for wireless performance measurements* (UM2288).

2 Release information

2.1 New features/enhancements

This release:

Adds compatibility with the OpenThread stack of STM32Cube_FW_V1.14.0. This stack is based on the OpenThread 1.2 stack and supports the O.T. 1.1 commands.

Adds new Bluetooth® Low Energy commands and events. Updates some existing commands to be compatible with the release 1.14.0 of the stack.

Commands added:

– HCI_LE_READ_TRANSMIT_POWER,
– HCI_LE_SET_PRIVACY_MODE,
– ACI_GAP_ADD_DEVICES_TO_LIST,
– HCI_LE_READ_RF_PATH_COMPENSATION,
– HCI_LE_WRITE_RF_PATH_COMPENSATION

Events added:

– HCI_LE_EXTENDED_ADVERTISING_REPORT_EVENT,
– HCI_LE_SCAN_TIMEOUT_EVENT,
– HCI_LE_ADVERTISING_SET_TERMINATED_EVENT,
– HCI_LE_SCAN_REQUEST_RECEIVED_EVENT,
– HCI_LE_CHANNEL_SELECTION_ALGORITHM_EVENT

Command removed:

– ACI_GAP_START_NAME_DISCOVERY_PROC

Command updated (parameters or description):
- ACI_HAL_GET_LINK_STATUS,
- HCI_SET_CONTROLLER_TO_HOST_FLOW_CONTROL,
- HCI_HOST_BUFFER_SIZE,
- ACI_HAL_WRITE_CONFIG_DATA,
- ACI_GAP_SET_LIMITED_DISCOVERABLE,
- ACI_GAP_SET_DISCOVERABLE,
- ACI_GAP_SET_DIRECT_CONNECTABLE,
- ACI_GAP_INIT,
- ACI_GAP_START_GENERAL_CONNECTION_ESTABLISH_PROC,
- ACI_GAP_START_SELECTIVE_CONNECTION_ESTABLISH_PROC,
- ACI_GAP_CREATE_CONNECTION,
- ACI_GAP_SET_BROADCAST_MODE,
- ACI_GAP_START_OBSERVATION_PROC,
- ACI_GAP_GET_OOB_DATA,
- ACI_GAP_SET_OOB_DATA,
- ACI_GAP_ADD_DEVICES_TO_RESOLVING_LIST,
- ACI_HAL_FW_ERROR_EVENT,
- HCI_LE_READ_ADVERTISING_PHYSICAL_CHANNEL_TX_POWER,
- HCI_LE_ENABLE_ENCRYPTION,
- HCI_LE_LONG_TERM_KEY_REQUEST_NEGATIVE_REPLY,
- HCI_LE_RECEIVER_TEST_V2,
- HCI_LE_TRANSMITTER_TEST_V2,
- ACI_HAL_WRITE_CONFIG_DATA,
- ACI_GAP_SET_DIRECT_CONNECTABLE,
- HCI_LE_SET_EVENT_MASK,
- HCI_LE_TRANSMITTER_TEST

Updates 802.15.4 sniffer firmware for STM32WB55 Nucleo and new firmware for STM32WB55 USB dongle

2.2 Fixed issues

This release:

Fixes bug 130999: Some packets are missed in PER test

Fixes problem 110073: Some panId values cannot be set in the network explorer tab

2.3 Restrictions

This version of STM32CubeMonitor-RF does not provide the *Extended advertising* commands. For some operations (FUOTA, ACI scan), the Bluetooth® Low Energy stack with legacy advertising must be used. Please refer to the user manual UM2288 to see which firmware must be used.

When the device under test is disconnected, the software may not immediately detect the disconnection. In this case, an error is reported when a new command is sent. If the board is not detected after the error, it is necessary to unplug and then reconnect it.

For sniffer on macOS®, the sniffer Python™ file must be set with executable right after copy. The command is: *chmod+x stm32cubeMonRf_sniffer.py.*

On some Ubuntu® 18 systems, there may be a conflict in Java FX with the GTK version. If the error *Gdk-CRITICAL **: 12:47:45.162: gdk_x11_display_set_window_scale* is displayed, the tool must be launched from the command line with a specific option: In the tool binary folder, use the command: *jre/bin/java -Djdk.gtk.version=2 -jar STM32CubeMonitor-RF.jar.*

2.4   Licensing

STM32CubeMonRF is delivered under the SLA0048 software license agreement and its Additional License Terms.

3   STM32CubeMonitor-RF release information

3.1   STM32CubeMonitor-RF V1.5.0

Tool first version to support Bluetooth® Low Energy features of STM32WB55xx. Versions 1.x.y have only Bluetooth® Low Energy support.

3.2   STM32CubeMonitor-RF V2.1.0

Addition of OpenThread support in the tool

3.3   STM32CubeMonitor-RF V2.2.0

Improvement of OpenThread command windows: Option to clear windows/history, details about OT commands selected in the tree

Addition of "read param" and "set param" buttons for OT commands used to read or set parameters

Addition of scripts for OpenThread

It is possible to add a loop in the script (refer to the user manual for details)

User interface update: the disabled items are now colored in gray

Implementation of search command for threads

Addition of the selection of Bluetooth® Low Energy PHY and modulation index

In Bluetooth® Low Energy RF tests, the frequency can be changed when the test is running

3.4   STM32CubeMonitor-RF V2.2.1

3.4.1   New features/enhancements

The OTA download procedure is updated: When the target device is configured in OTA loader mode, the target address is incremented by one. STM32CubeMonitor-RF now uses the incremented address for the download.

The list of OpenThread commands is aligned with the Thread® stack.

3.5   STM32CubeMonitor-RF V2.3.0

3.5.1   New features/enhancements

Alignment with STM32WB55 cube firmware 1.0.0

Addition of 802.15.4 RF tests

New features in *ACI Utilities* panel:

-The discovery of remote Bluetooth® Low Energy devices

-Interaction with the services of remote devices

3.6 STM32CubeMonitor-RF V2.4.0

3.6.1 New features/enhancements

Alignment with STM32WB cube firmware 1.1.1

Support firmware update over the air of the wireless stack (FUOTA)

Optimize FUOTA connection parameters to increase performance. Add a warning if the address is below `0x6000`.

Correction of UART detection issue on windows 10

The tool uses properly the *write without response* function to write a characteristic with *write without response* permission.

Update the device name in the device information box.

Fix the value of HCI_LE_SET_EVENT_MASK.

Correction of the text about error reason description

Fix issues with OpenThread scripts.

Set a maximum size for graphs.

Update some control locks to prevent wrong actions from the user.

3.7 STM32CubeMonitor-RF V2.5.0

3.7.1 New features/enhancements

Network Explorer is added to a new tab of Thread® mode.

This feature displays the connected Thread® devices and the connections between them.

3.8 STM32CubeMonitor-RF V2.6.0

3.8.1 New features/enhancements

802.15.4 RF tests are added.

In the transmitter test, the sending of MAC frames is available. The user defines the frame.

In the receiver test, the LQI, ED, and CCA tests are available and the PER test shows the decoded frames.

3.8.2 Fixed issues

This release:

Updates the C1_Read_Device_Information command description,

Disables the navigation link when the 802.15.4 receiver test is in progress,

Updates ST logo and colors,

Fixes the blank popup message displayed when the script detects an error,

Disables the start button as soon as the channel list is inconsistent in 802.15.4 PER multichannel test,

Includes workaround to prevent freeze observed on a serial port with macOS®.

3.9 STM32CubeMonitor-RF V2.7.0

3.9.1 New features/enhancements

Updates OpenThread API with version 1.1.0.

Adds the OpenThread CoAP Secure API.

Adds 802.15.4 sniffer mode.

3.9.2 Fixed issues

This release:

Fixes the address bytes inverted in the OTA updater panel,

Fixes the OpenThread network explore button label management,

Fixes the behavior of the parameter field when the parameter is from the terminal and is wrong,

Fixes the naming of Bluetooth® Low Energy commands according to AN5270 specification,

Fixes the connection fail behavior of the OpenThread COM port,

Fixes Bluetooth® Low Energy tester connection fail behavior on Linux®,

Fixes OpenThread panId hexadecimal value display,

Improve SBSFU OTA and tests,

Fixes ACI client characteristic configuration after reconnection.

3.10 STM32CubeMonitor-RF V2.7.1

3.10.1 New features/enhancements

802.15.4 sniffer fixes.

3.10.2 Fixed issues

This release:

Fixes the error on quick Wireshark sniffer stop then start,

Removes two extra bytes in sniffed data.

3.11 STM32CubeMonitor-RF V2.8.0

3.11.1 New features/enhancements

OTA improvement:

Add an option in the OTA panel to increase the packet length (MTU) to optimize speed.

Add a menu to select the target. It is required to compute the number of sectors to erase for SMT32WB15xx.

Remove the modulations not suitable for the PER test in the PER picklist.

3.11.2 Fixed issues

This release:

Fixes the bug 102779: Displaying offset and attribute data length is reversed for ACI_GATT_ATTRIBUTE_MODIFIED_EVENT.

Aligns the message HCI_ATT_EXCHANGE_MTU_RESP_EVENT with AN5270.

Fixes the attribute name in HCI_LE_DATA_LENGTH_CHANGE_EVENT.

Improves the welcome screen layout for small screens.

3.12 STM32CubeMonitor-RF V2.8.1

3.12.1 Fixed issues

This release:

Fixes bug 64425: Send command button unlocked during OTA transfer.

Fixes bug 115533: During the OTA update, the issue in the ACI_GAP_START_GENERAL_DISCOVERY_PROC command.

Fixes bug 115760: During the OTA update, when *Optimize MTU size* box is checked, the download is stopped after the exchange of MTU size.

Fixes bug 117927: change address type to public device address for OTA.

Fixes bug 118377: wrong sector size erased before OTA transfer.

Set OTA block size according to MTU size exchanged.

4 Revision history

Table 2. Document revision history

Date	Revision	Changes
02-Mar-2017	1	Initial release.
25-Apr-2017	2	Modified for release 1.2.0: – updated *Section 2: Release information* – updated *Section 2.3: Restrictions* – added *Section 3.2: STM32CubeMonitor-RF V1.2.0 information*
27-Jun-2017	3	Changed document classification to ST Restricted. Modified for release 1.3.0, hence updated document title and added *Section 3.3: STM32CubeMonitor-RF V1.3.0 information*. Updated *Section 1.2: Host PC system requirements*, *Section 1.3: Setup procedure*, *Device configuration*, *Section 2.1: New features/enhancements*, *Section 2.2: Fixed issues*, *Section 2.3: Restrictions* and *Section 3.2: STM32CubeMonitor-RF V1.2.0 information*.
29-Sep-2017	4	Modified for release 1.4.0, hence updated document title and added *Section 3.4: STM32CubeMonitor-RF V1.4.0 information*. Updated *Section 1.1: Overview*, *Section 1.2: Host PC system requirements*, *Section 1.3.1: Windows*, *Section 1.4: Devices supported by STM32CubeMonitor-RF*, *Section 2.1: New features/enhancements*, *Section 2.2: Fixed issues* and *Section 2.3: Restrictions*. Added *Section 1.3.2: Linux®*, *Section 1.3.3: macOS®*, and *Section 2.4: Licensing*. Updated *Table 1: STM32CubeMonitor-RF 1.4.0 release summary*.
29-Jan-2018	5	Modified for release 1.5.0, hence updated document title and added *Section 3.5: STM32CubeMonitor-RF V1.5.0 information*. Updated *Section 1.2: Host PC system requirements*, *Section 1.3.2: Linux®*, *Device configuration*, *Section 2.1: New features/enhancements*, *Section 2.2: Fixed issues* and *Section 2.3: Restrictions*. Updated *Table 1: STM32CubeMonitor-RF 1.5.0 release summary* and *Table 2: List of licenses*.
14-May-2018	6	Modified for release 2.1.0, hence updated document title and added *Section 3.6: STM32CubeMonitor-RF V2.1.0 information*. Updated *Section 1.1: Overview*, *Section 1.2: Host PC system requirements*, *Section 2.1: New features/enhancements*, *Section 2.2: Fixed issues*, *Section 2.3: Restrictions*. Updated *Table 1: STM32CubeMonitor-RF 2.1.0 release summary* and *Table 2: List of licenses*.
24-Aug-2018	7	Modified for release 2.2.0, hence updated document title and added *Section 3.7: STM32CubeMonitor-RF V2.2.0 information*. Updated *Section 2.1: New features/enhancements*, *Section 2.2: Fixed issues*, *Section 2.2: Restrictions*. Updated *Table 1: STM32CubeMonitor-RF 2.3.0 release summary* and *Table 2: List of licenses*.

Table 2. Document revision history (continued)

Date	Revision	Changes
15-Oct-2018	8	Modified for release 2.2.1, hence updated document title and added *Section 3.8: STM32CubeMonitor-RF V2.2.1 information*. Updated *Section 1.1: Overview*, *Section 1.3.2: Linux®*, *Section 1.3.3: macOS®*, *Section 2.1: New features/enhancements,* and *Section 2.2: Restrictions*. Removed former *Section 2.2: Fixed issues*.
15-Feb-2019	9	Updated: – Title, *Table 1,* and *Section 2* switch to the 2.3.0 release – *Section 3* former releases history – *Section 1.1: Overview* to add OpenThread and 802.15.4 RF – *Section 1.3: Setup procedure* with different OS
12-Jul-2019	10	Updated: – Title, *Table 1,* and *Section 2* switch to the 2.4.0 release – *Table 2* jSerialComm version – *Section 3* former releases history
3-Apr-2020	11	Updated: – Title, *Table 1*, and *Section 2* switch to the 2.5.0 release – *Table 2* Inno setup version – *Section 3* former releases history
13-Nov-2020	12	Updated: – Title, *Table 1*, and *Section 2* switch to the 2.6.0 release – *Table 2* and *Table 3* details in an added copyright column – *Section 3* former releases history
8-Feb-2021	13	Updated: – Title, *Table 1*, *Section 1*, and *Section 2* switch to the 2.7.0 release with new802.15.4 sniffer mode and *Host PC system requirements* – *Table 3* Java SE and Java FX version – *Section 3* former releases history
8-Jun-2021	14	Updated: – Title, *Table 1,* and *Section 2* switch to the 2.7.1 release with 802.15.4 sniffer fixes – *Section 3* former releases history
15-Jul-2021	15	Updated: – Title, *Table 1*, and *Section 2* switch to the 2.8.0 release with OTA speed improvement and new OTA option for STM32WB15xx – *Section 1.4* NUCLEO-WB15CC support and test firmware explanation – *Table 2* with SLA0048 in *Licensing* – *Table 3* with Inno setup version – *Section 3* former releases history

Table 2. Document revision history (continued)

Date	Revision	Changes
21-Dec-2021	16	Updated: – Title, *Table 1*, and *Section 2.1* switch to the 2.8.1 release with fixes for Bluetooth® Low Energy OTA – *Section 3* former releases history
7-Jul-2022	17	Updated: – Title, *Table 1*, and *Section 2.1* switch to the 2.9.0 release – Python™ card version in *Software requirements* – *Section 2.4: Licensing* replacing tables with the suitable license agreement statement – *Section 3* former releases history

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