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UNIVERSITY OF TRIESTE

# Argus Security Meets UNITS

## Trieste, 28 April 2025

# STM32WL55 Hands-on

- Hands on 1: SubGHz_Phy_AT_Slave
  - Intro: AT commands (2 minutes)
  - Example selection from Cube MX
  - Code generation
  - AT commands via UART (Teraterm)
  - Waterfall visual on master screen
  - Breakpointing, dynamic registers manipulation, variables inspection

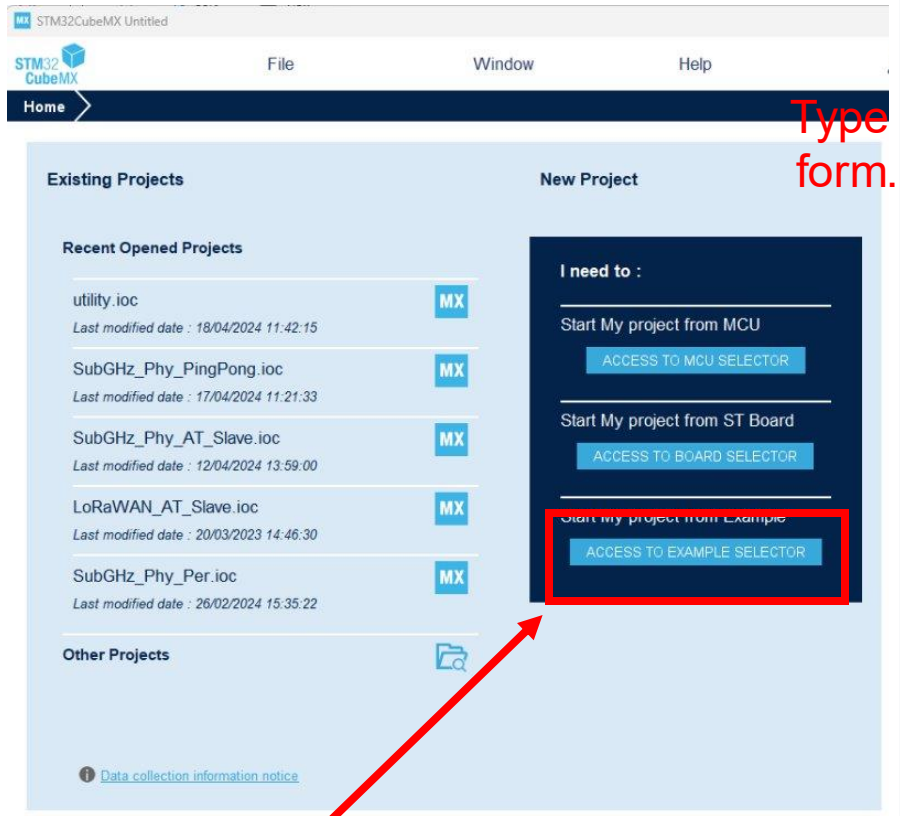
- Hands on 2: LoRa Slave device
  - Example selection from Cube MX
  - Code generation
  - Device comissioning

# Hands on 1: SubGHz_Phy_AT_Slave

## Project setup (Cube MX)

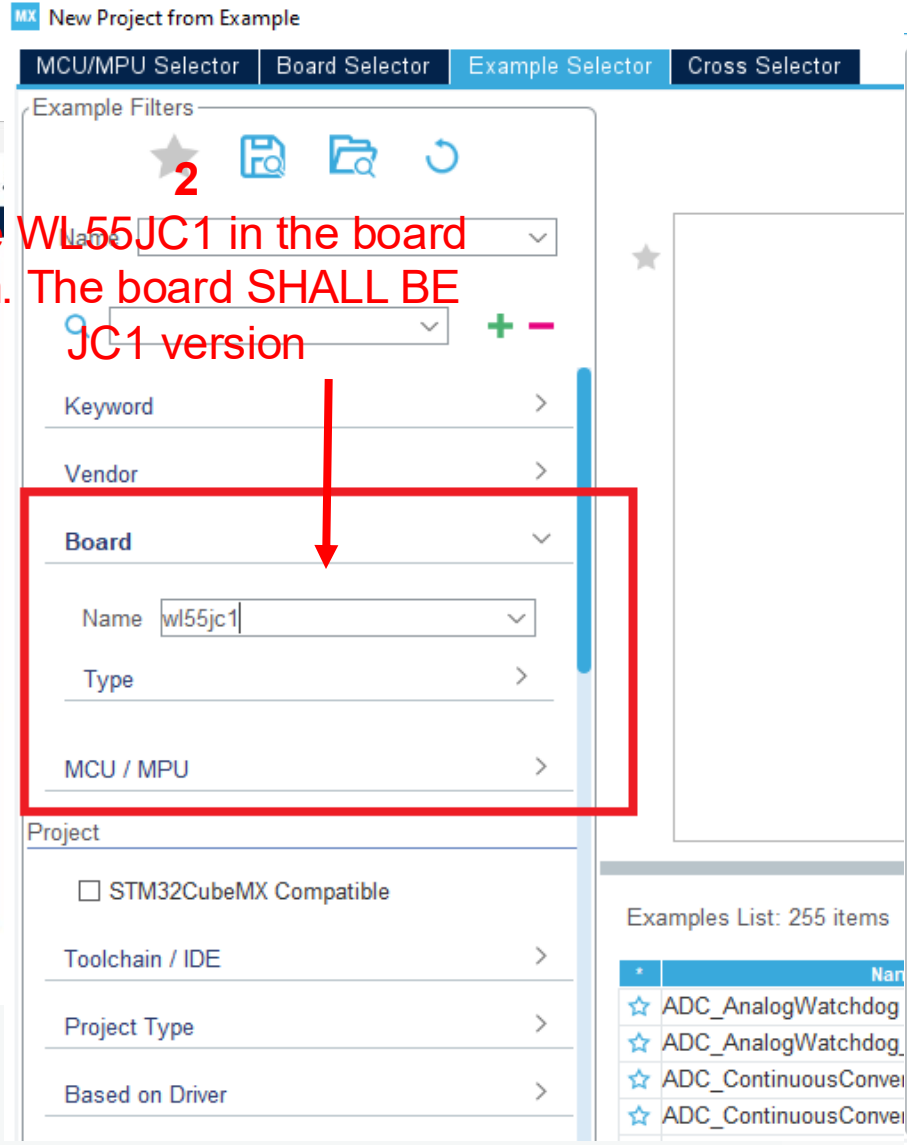
# Project selection

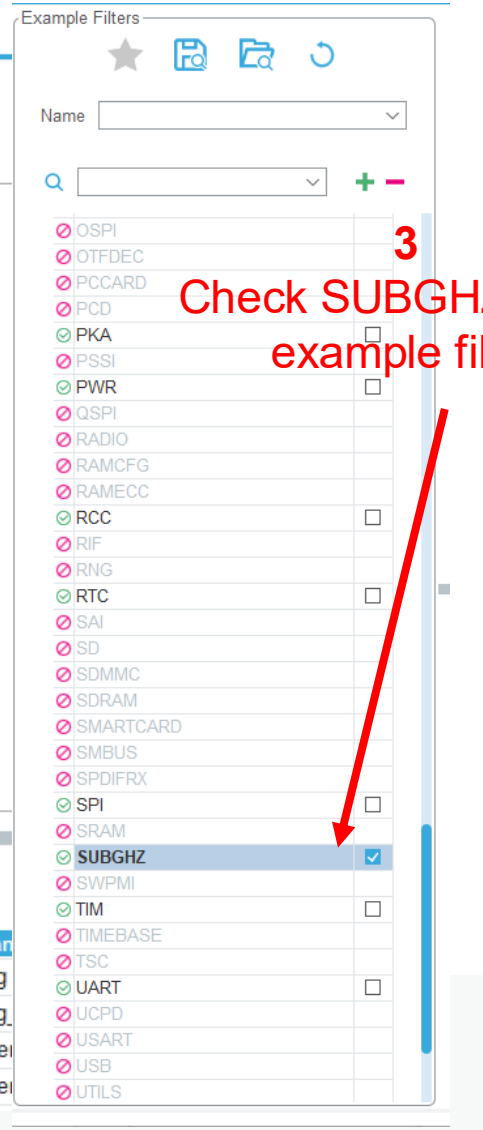
## SUGHz Phy AT Slave




1

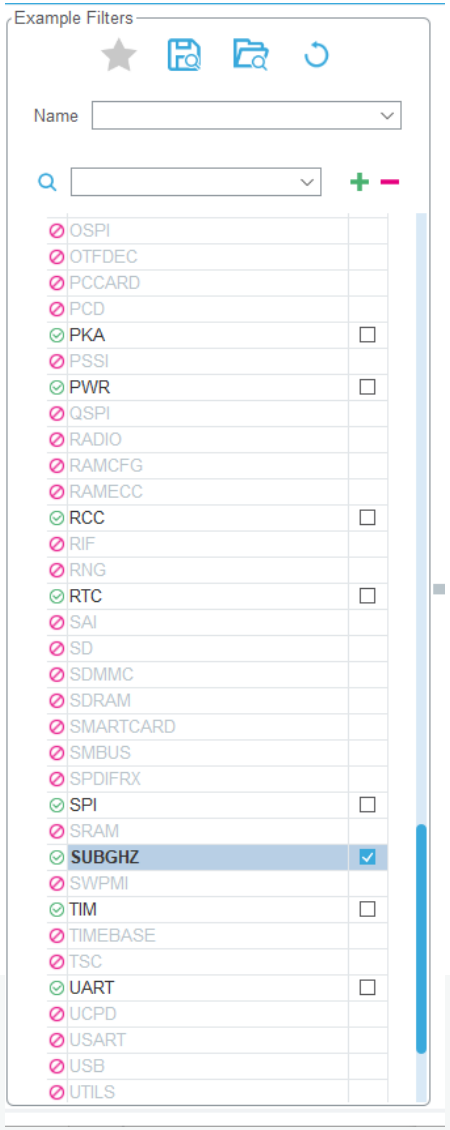
Open Example Selector

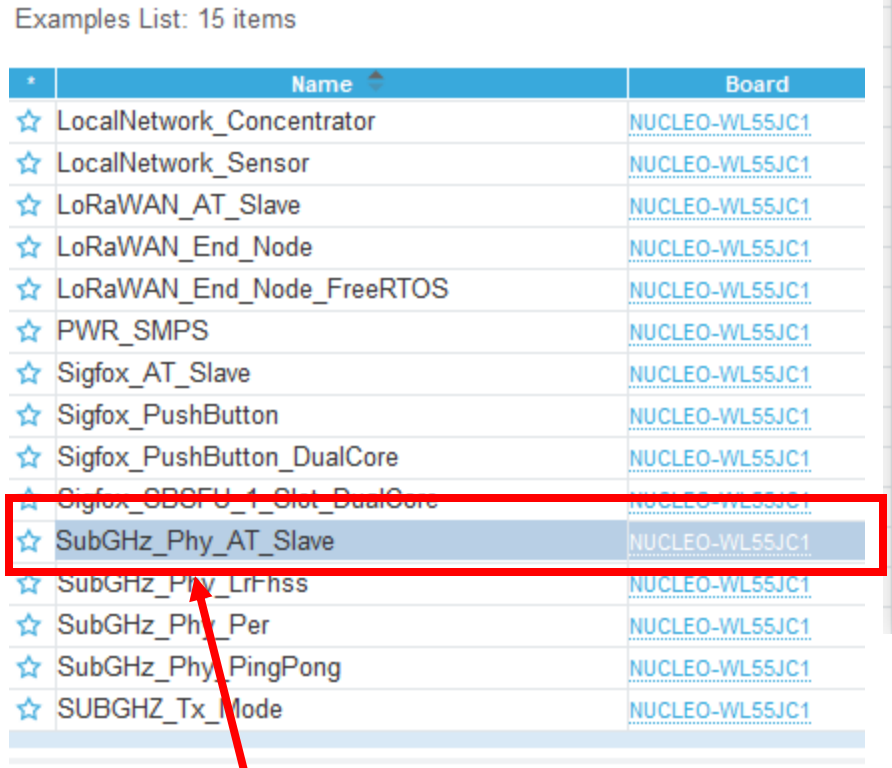


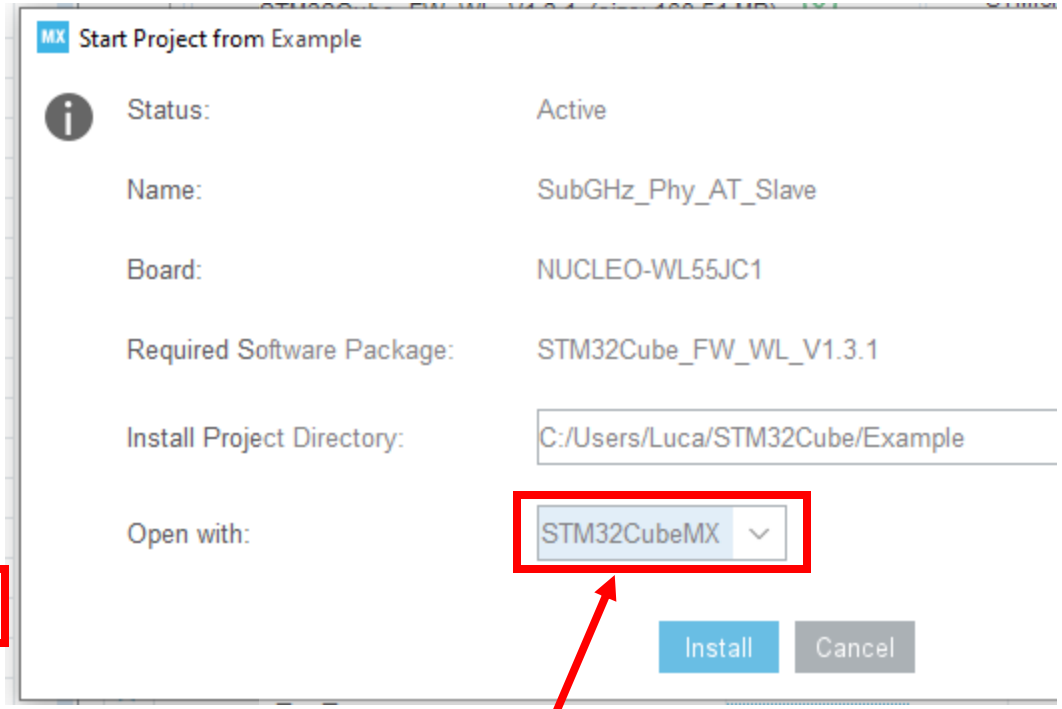



# Project selection

## SUGHz Phy AT Slave




**4**

Double click on SubGHz_Phy_AT_Slave

**5**

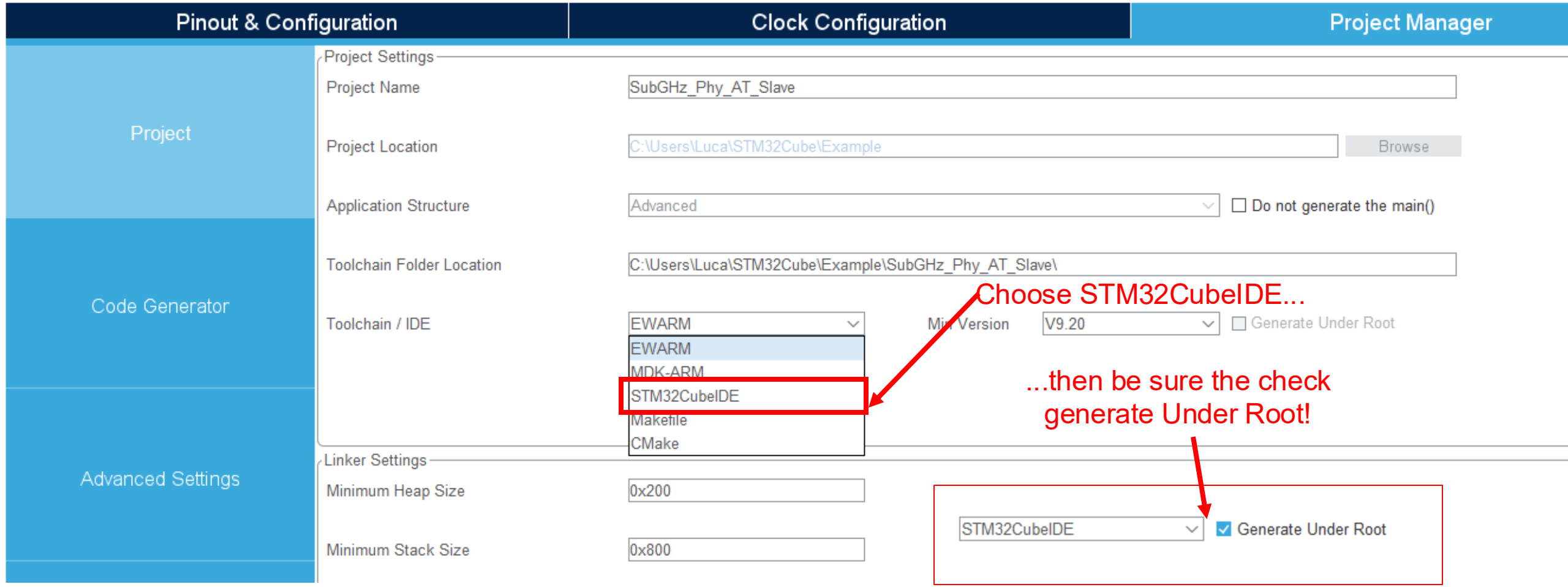
Select STM32CubeMX as "Open with"

# Hands on: SubGHz_Phy_AT_Slave

## Device Configuration (Cube MX)

# Project selection

## SUGHz Phy AT Slave



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# IDE CODE

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translite - SubGHz_Phy_AT_Slave/Core/Inc/sys_conf.h - STM32CubeIDE

File Edit Source Refactor Navigate Search Project Run Window Help

Project Explorer

- SubGHz_Phy_AT_Slave
  - Binaries
  - Includes
  - Core
    - Inc
      - dma.h
      - gpio.h
      - main.h
      - platform.h
      - rtc.h
      - stm32_lpm_if.h
      - stm32wlxx_hal_conf.h
      - stm32wlxx_it.h
      - stm32wlxx_nucleo_conf.h
      - subghz.h
      - sys_app.h
      - sys_conf.h
      - sys_debug.h
      - timer_if.h
      - usart_if.h
      - usart.h
      - utilities_conf.h
      - utilities_def.h
    - Src
    - Startup
  - Drivers
  - Middlewares
  - SubGHz_Phy

sys_conf.h

```
46 /**
47   * @brief Enable trace logs
48   */
49 #define APP_LOG_ENABLED                    1
50
51 /**
52   * @brief Activate monitoring (probes) of some int
53   */
54 #define DEBUG_SUBGHZSPI_MONITORING_ENABLED   0
55
56 #define DEBUG_RF_NRESET_ENABLED              0
57
58 #define DEBUG_RF_HSE32RDY_ENABLED            0
59
60 #define DEBUG_RF_SMPSRDY_ENABLED             0
61
62 #define DEBUG_RF_LDORDY_ENABLED              0
63
64 #define DEBUG_RF_DTB1_ENABLED                0
65
66 #define DEBUG_RF_BUSY_ENABLED                0
67
68 /**
69   * @brief Enable/Disable MCU Debugger pins (dbg se
70   * @note  by HW serial wires are ON by default, ne
71   */
72 #define DEBUGGER_ENABLED                     1
73
74 /**
75   * @brief Disable Low Power mode
76   * @note  0: LowPowerMode enabled. MCU enters stop
77   */
78 #define LOW_POWER_DISABLE                    1
79
```

Activate debug and disable low power in sys_conf.h

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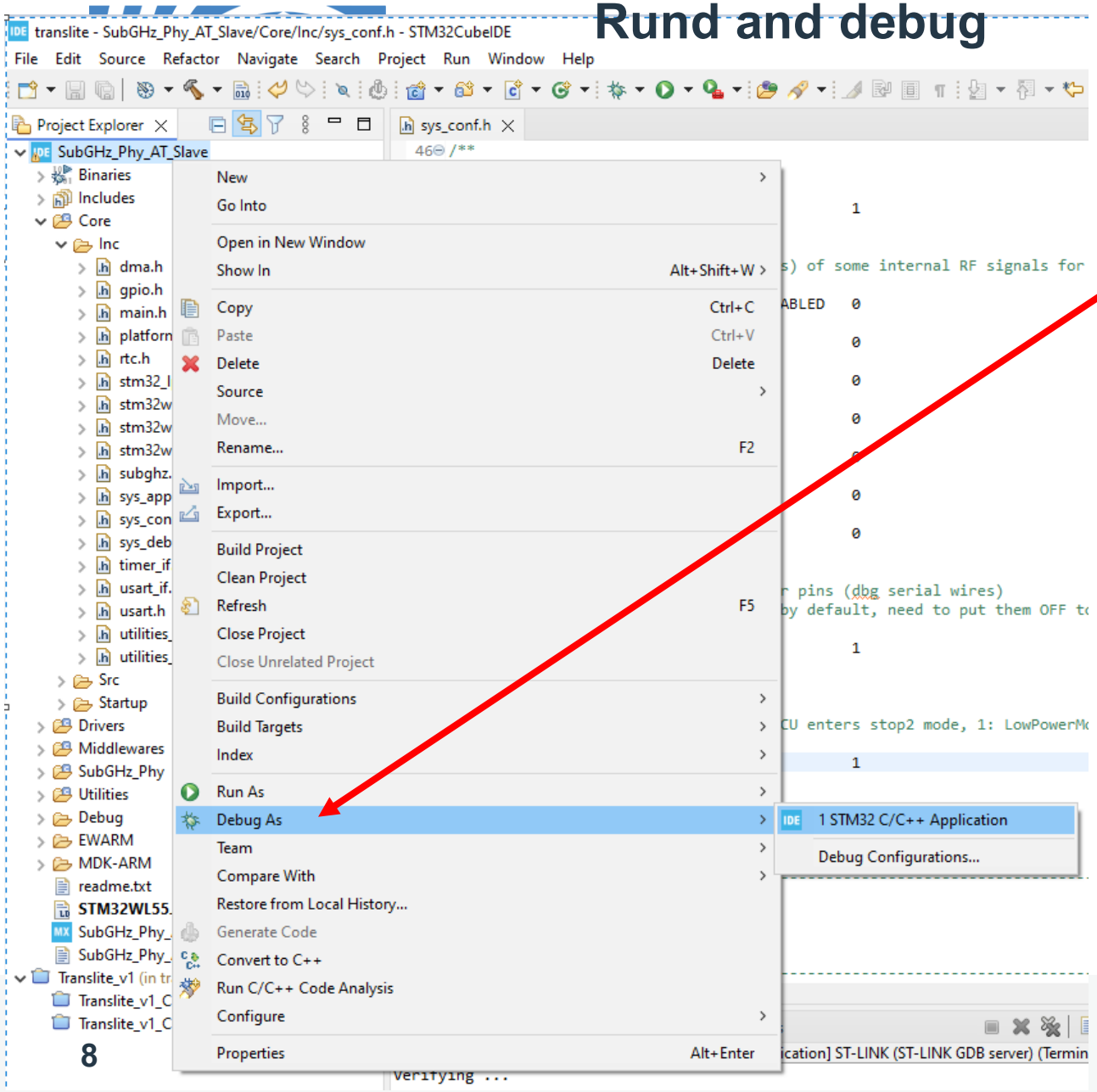
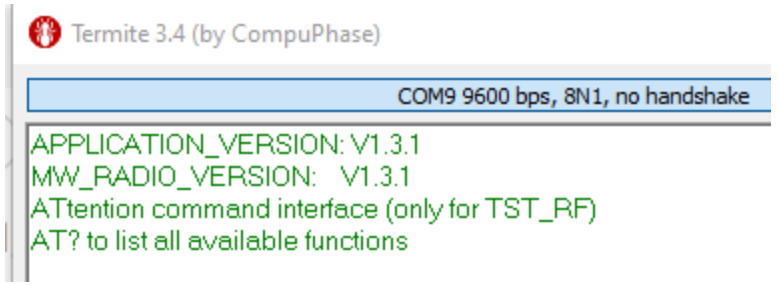
# Rund and debug




Right click on the project, select debug as STM32 c/c++ application.

On the serial console the mcu will signal that is ready to receive AT commands.

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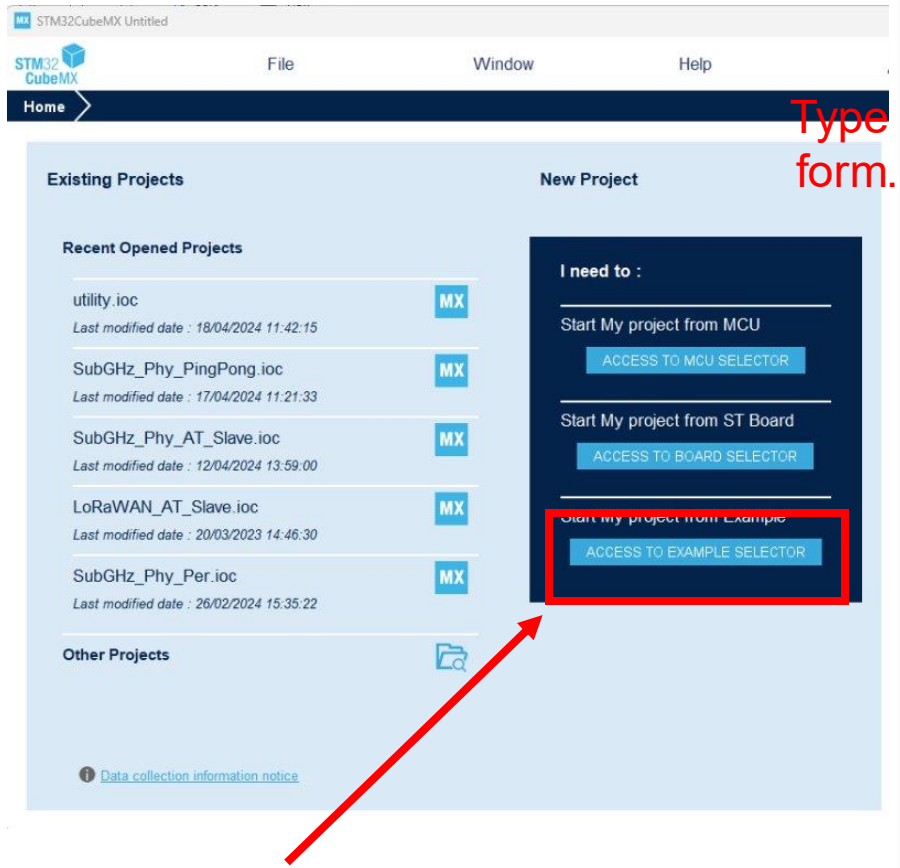
# Hands on 2: Lora Slave (single core)

## Project setup (Cube MX)

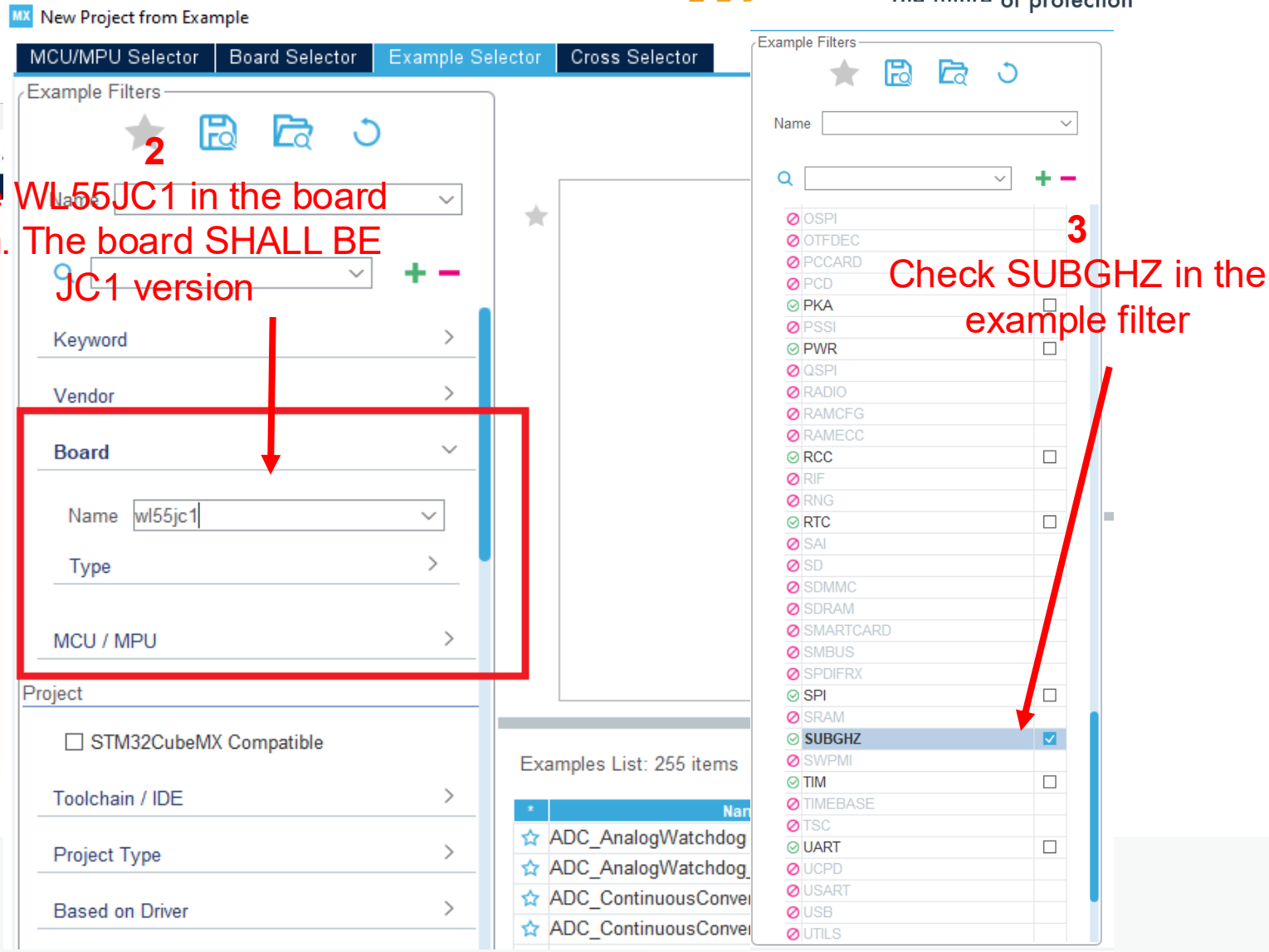
# Project selection

## LoRa WAN End Node



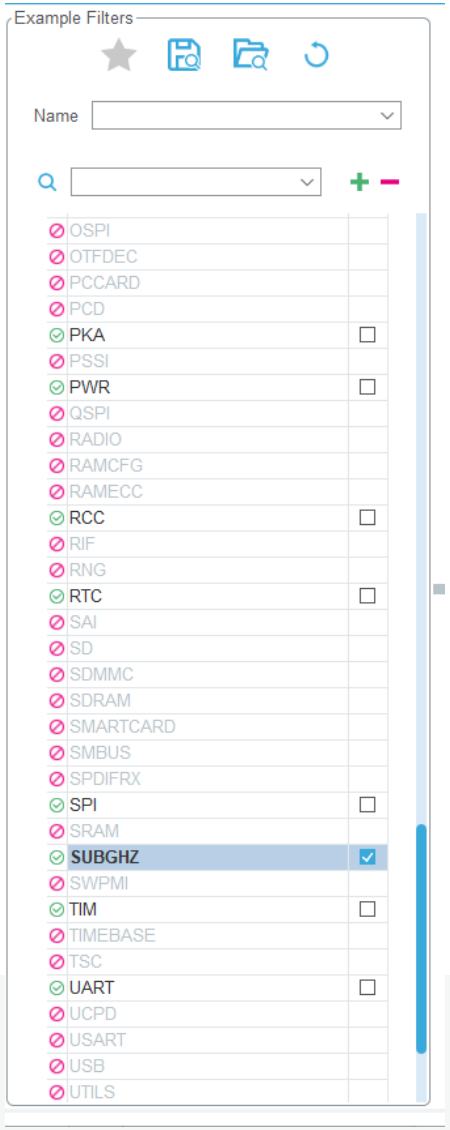

1

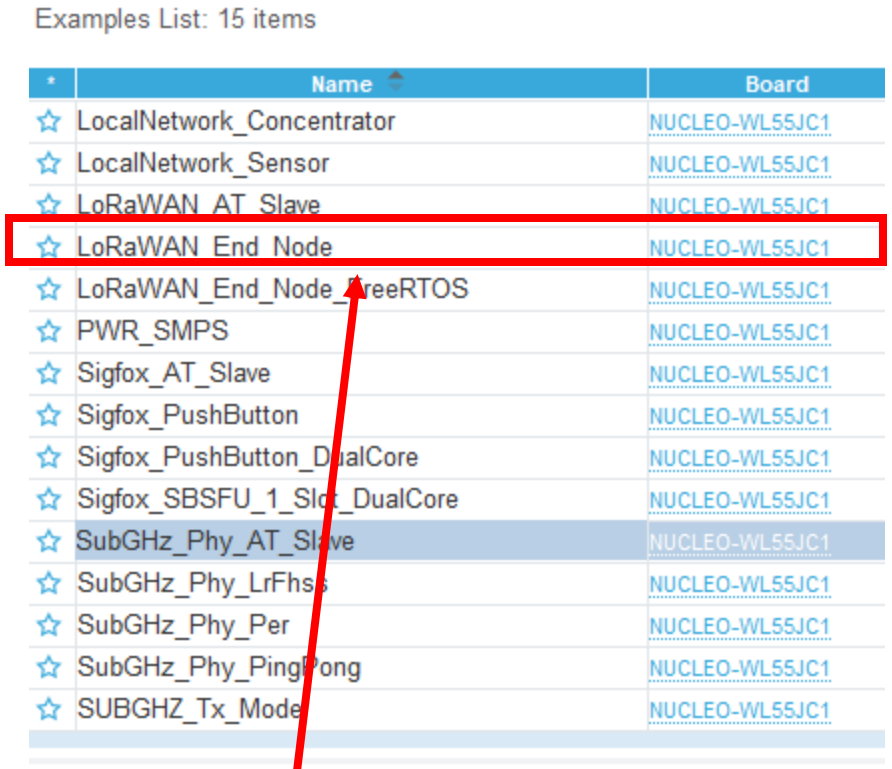
Open Example Selector



# Project selection

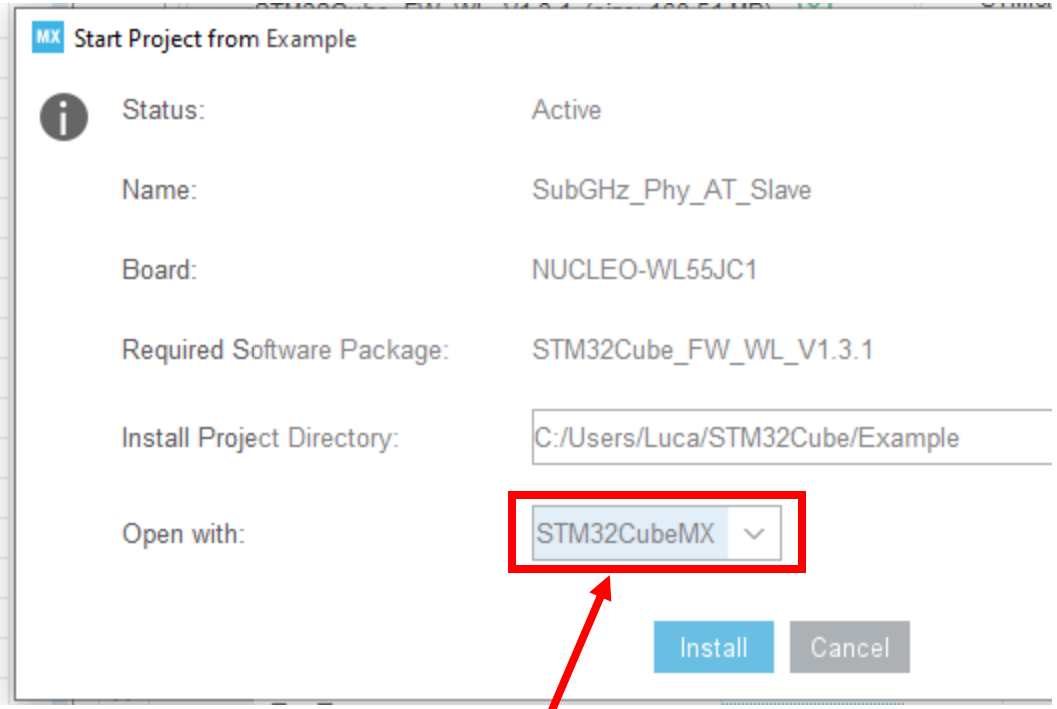
## LoRa WAN End Node




**4**

Double click on LoRaWAN_End_Node




**5**

Select STM32CubeMX as "Open with"

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# Project selection

## LoRa WAN End Node

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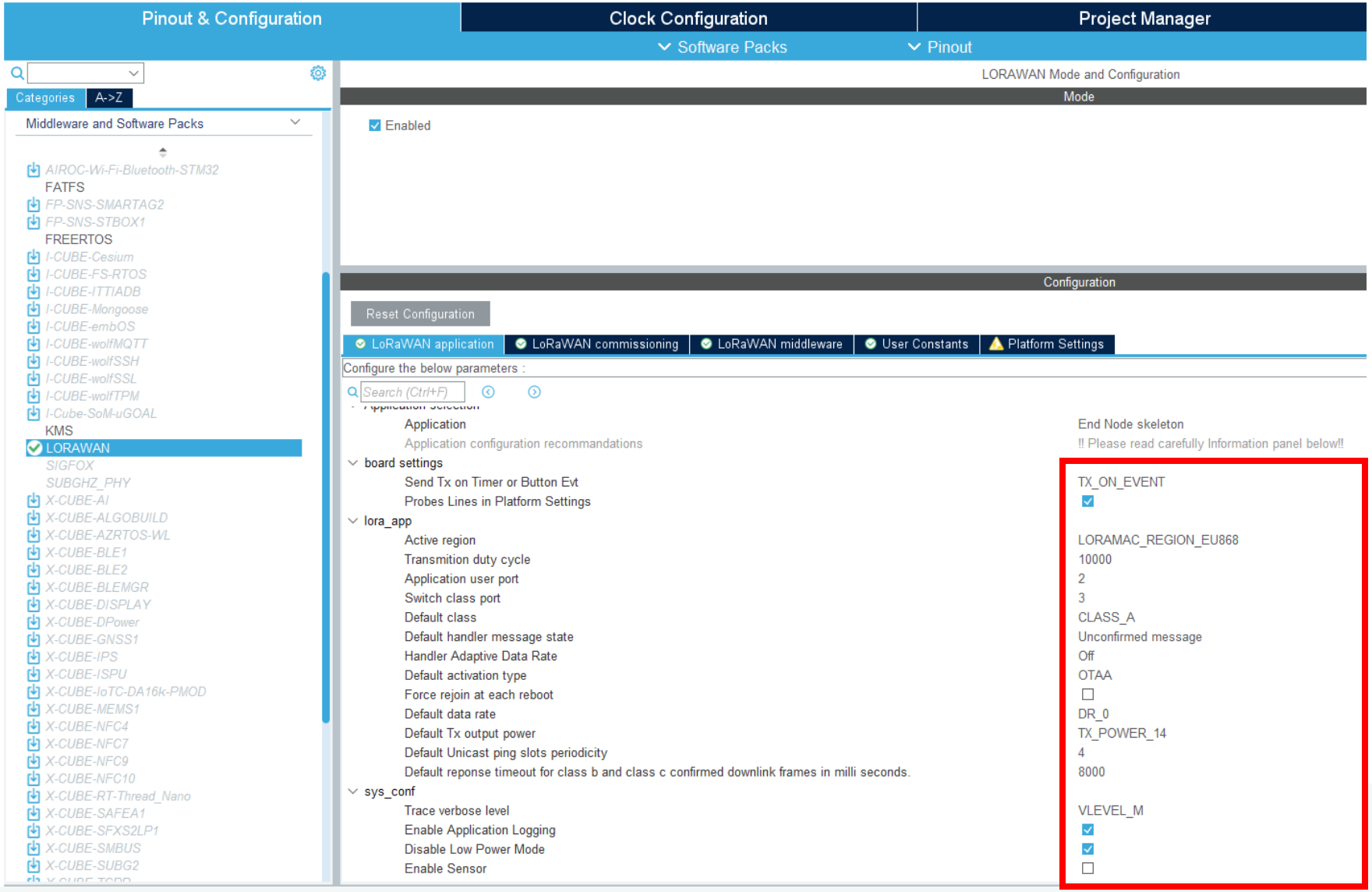
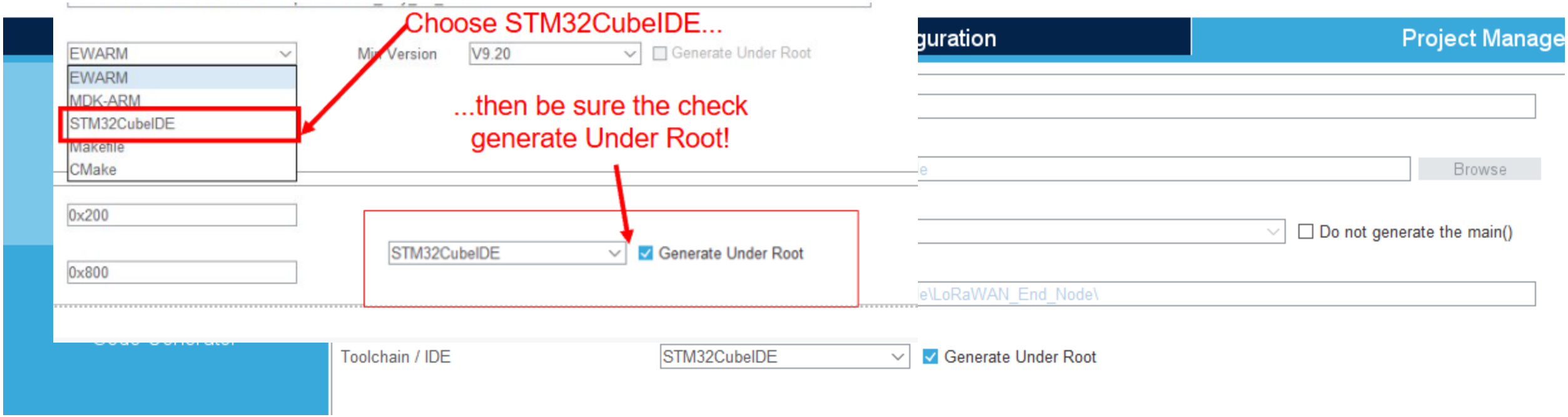



**6**

Edits to the configuration:
TX_ON_EVENT
Adaptive Data Rate OFF,
Disable LOW POWER MODE, enable app logging

# Project selection

## LoRa WAN End Node




**Then Open Project (STM32 Cube IDE shall start or already be opened)**

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# Project selection

LoRa WAN End Node

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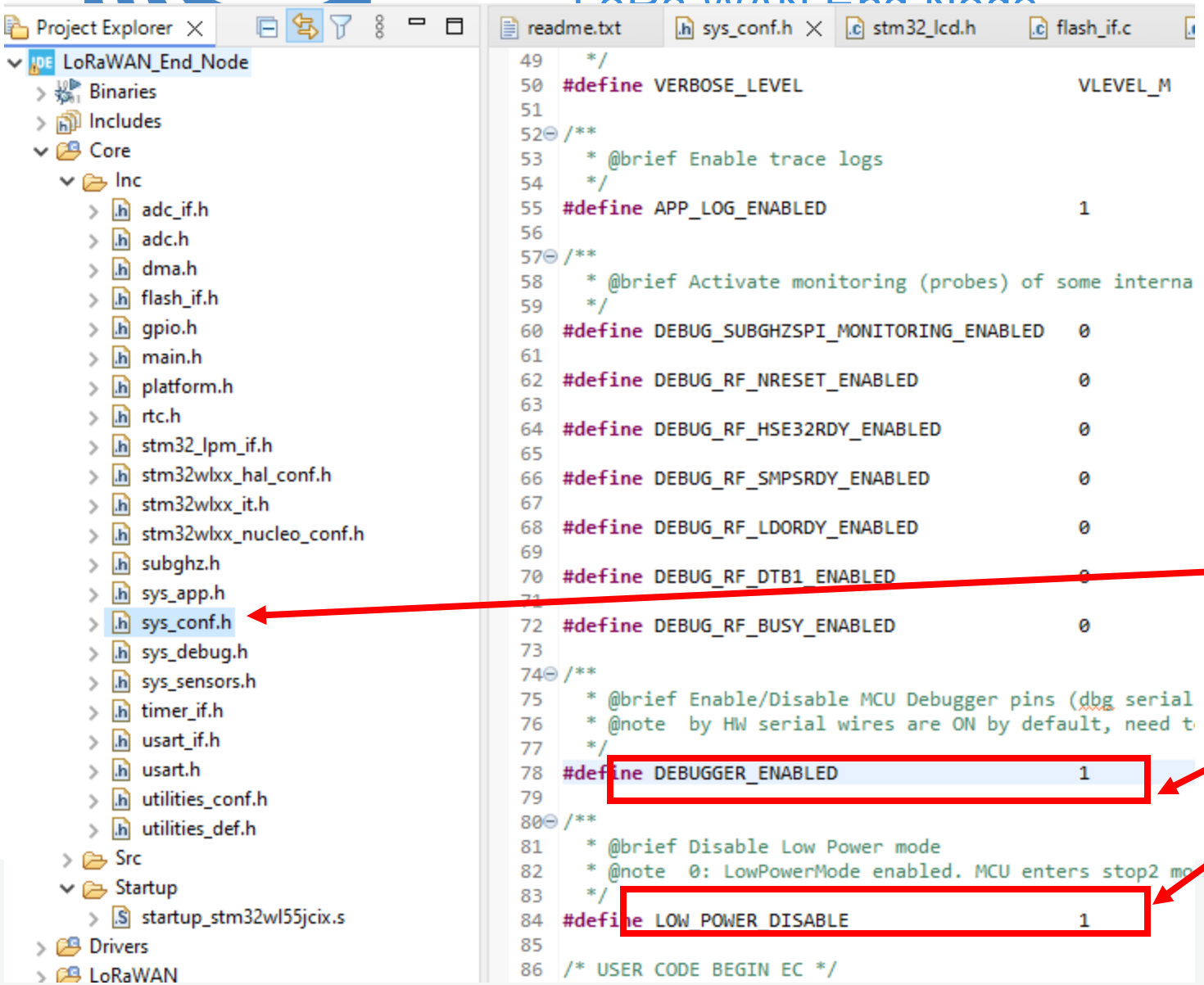
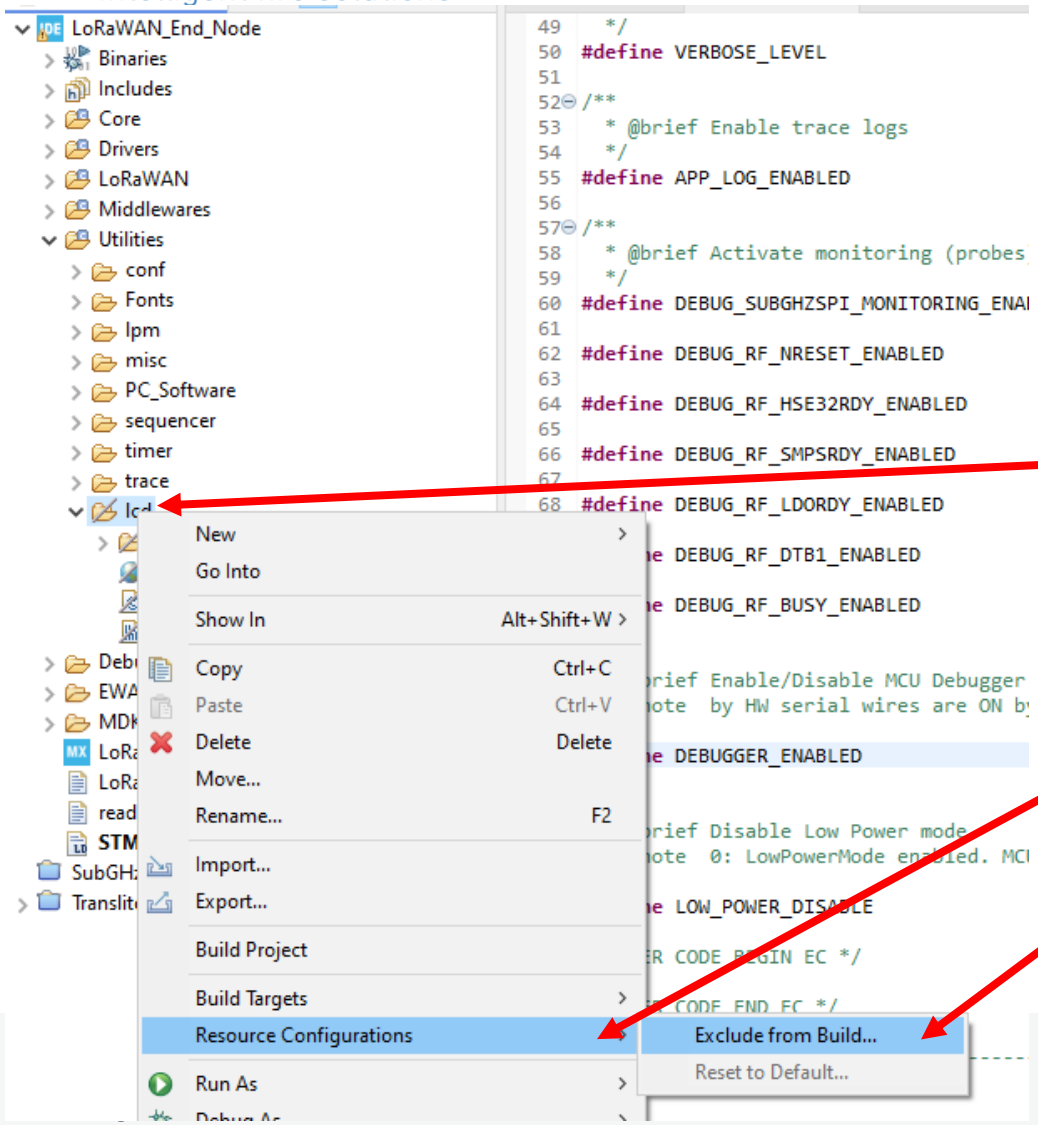


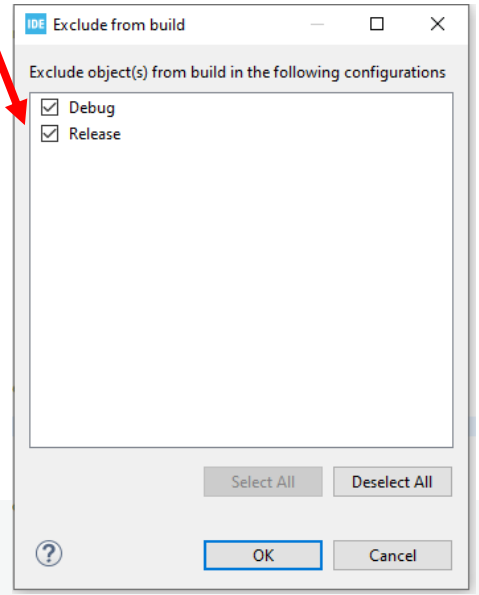

Activate debug and disable low power in sys_conf.h

# Project selection

## LoRa WAN End Node

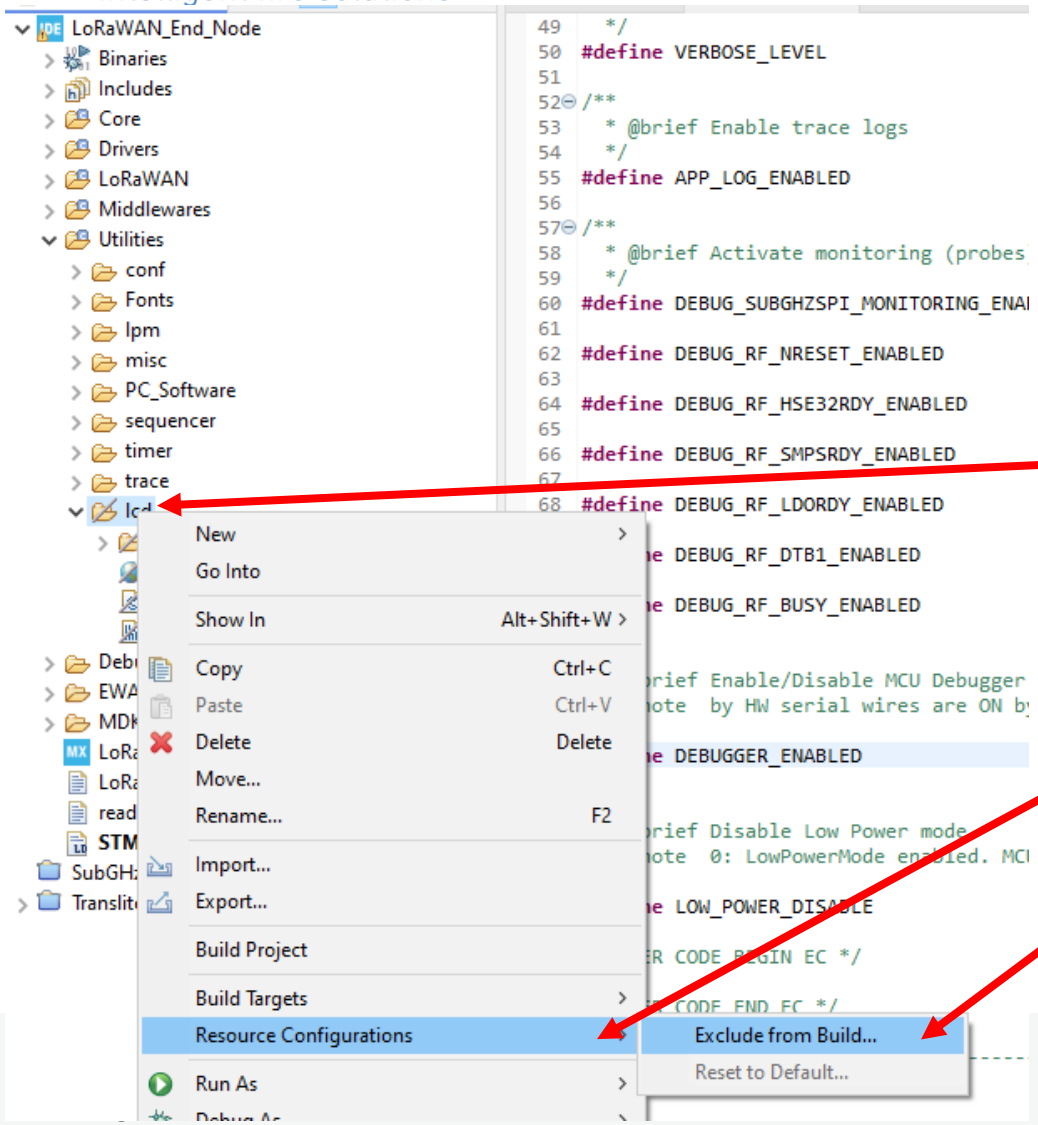



Exclude from build Utilities/lcd
(right click on the folder, check Debug and Release)

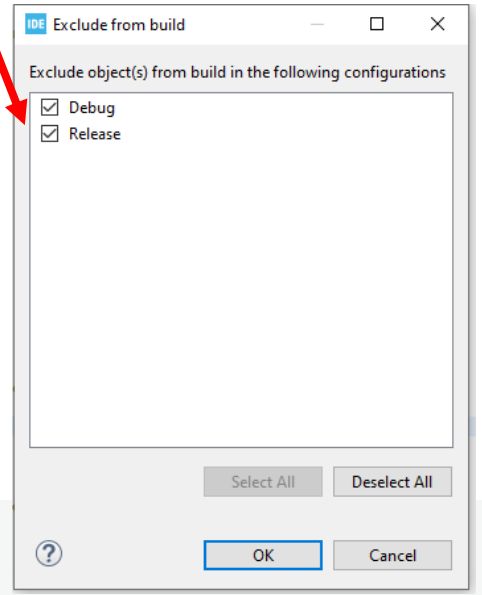


# Project selection

## LoRa WAN End Node

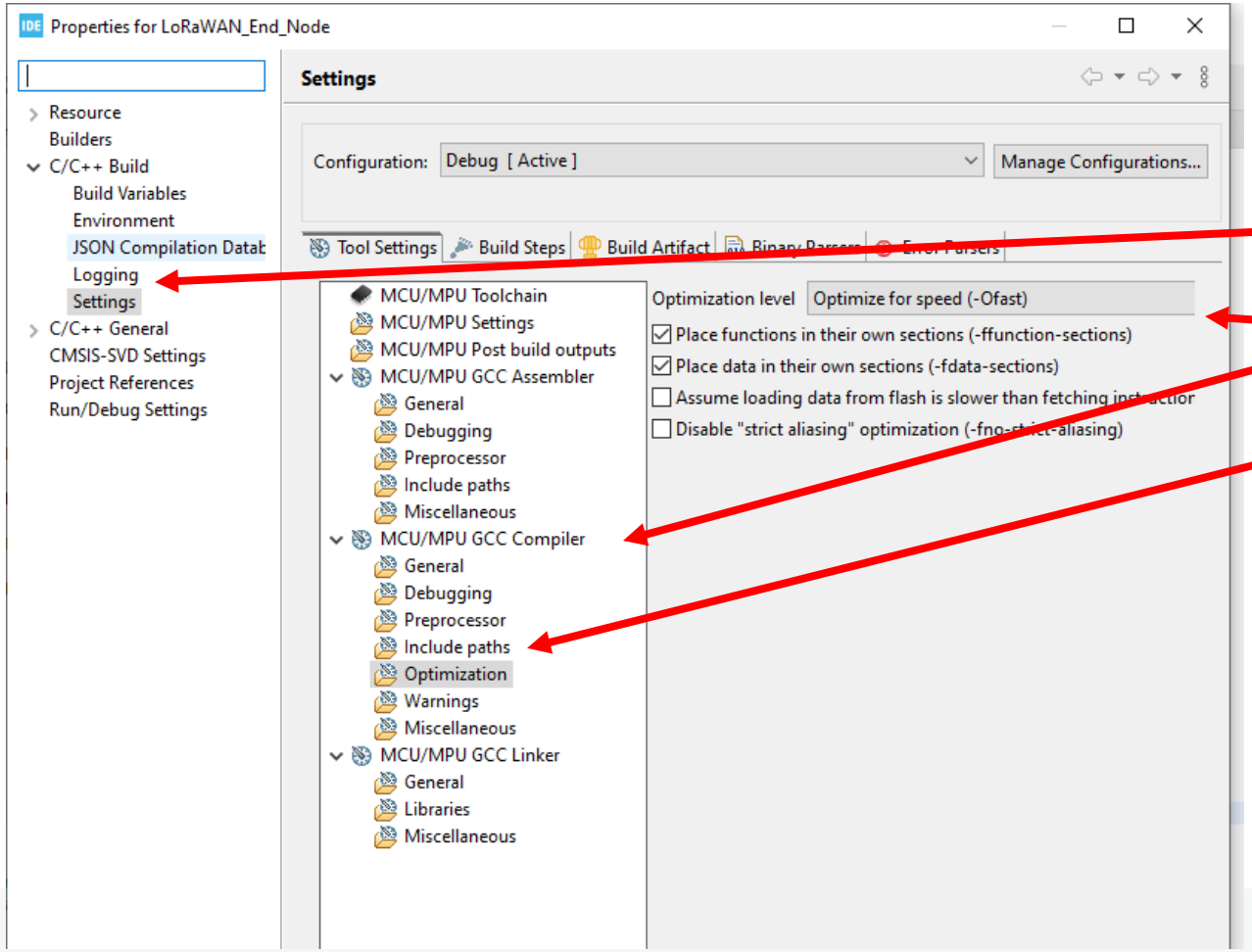



Exclude from build Utilities/lcd
(right click on the folder, check Debug and Release)



# Project selection

## LoRa WAN End Node




Right click on the project folder, select Settings and in MCU/MPU GCC Compiler select (-Ofast)

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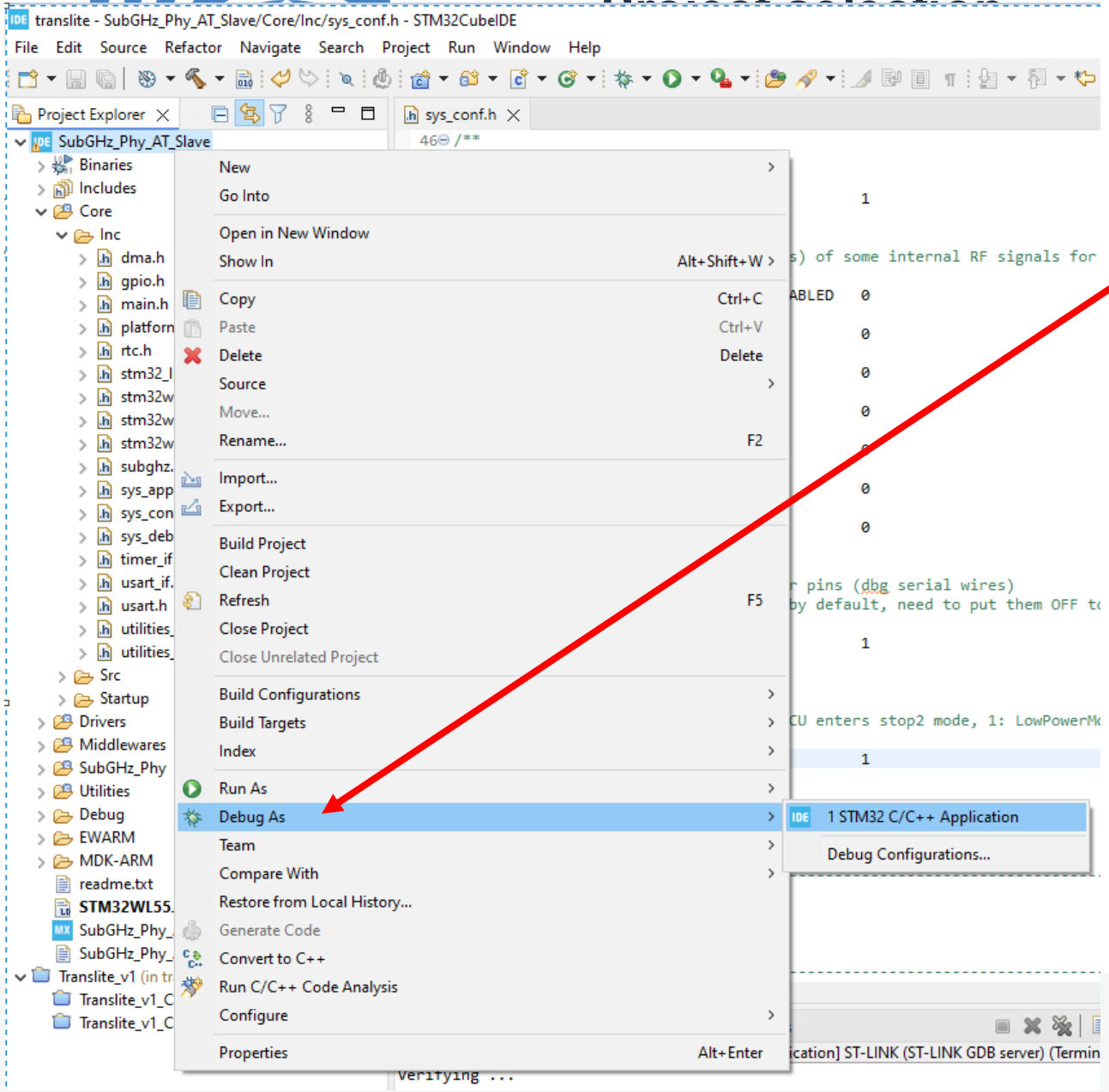
# Project selection

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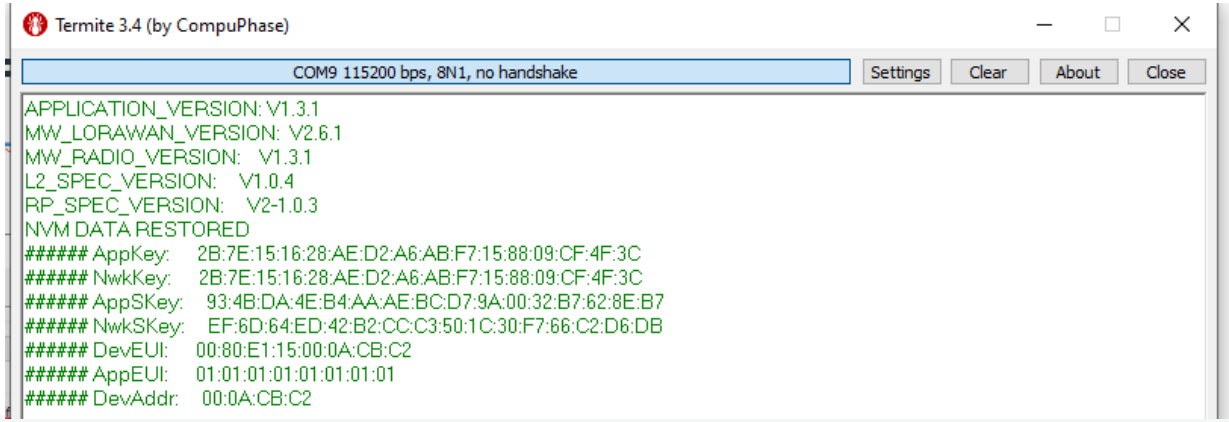
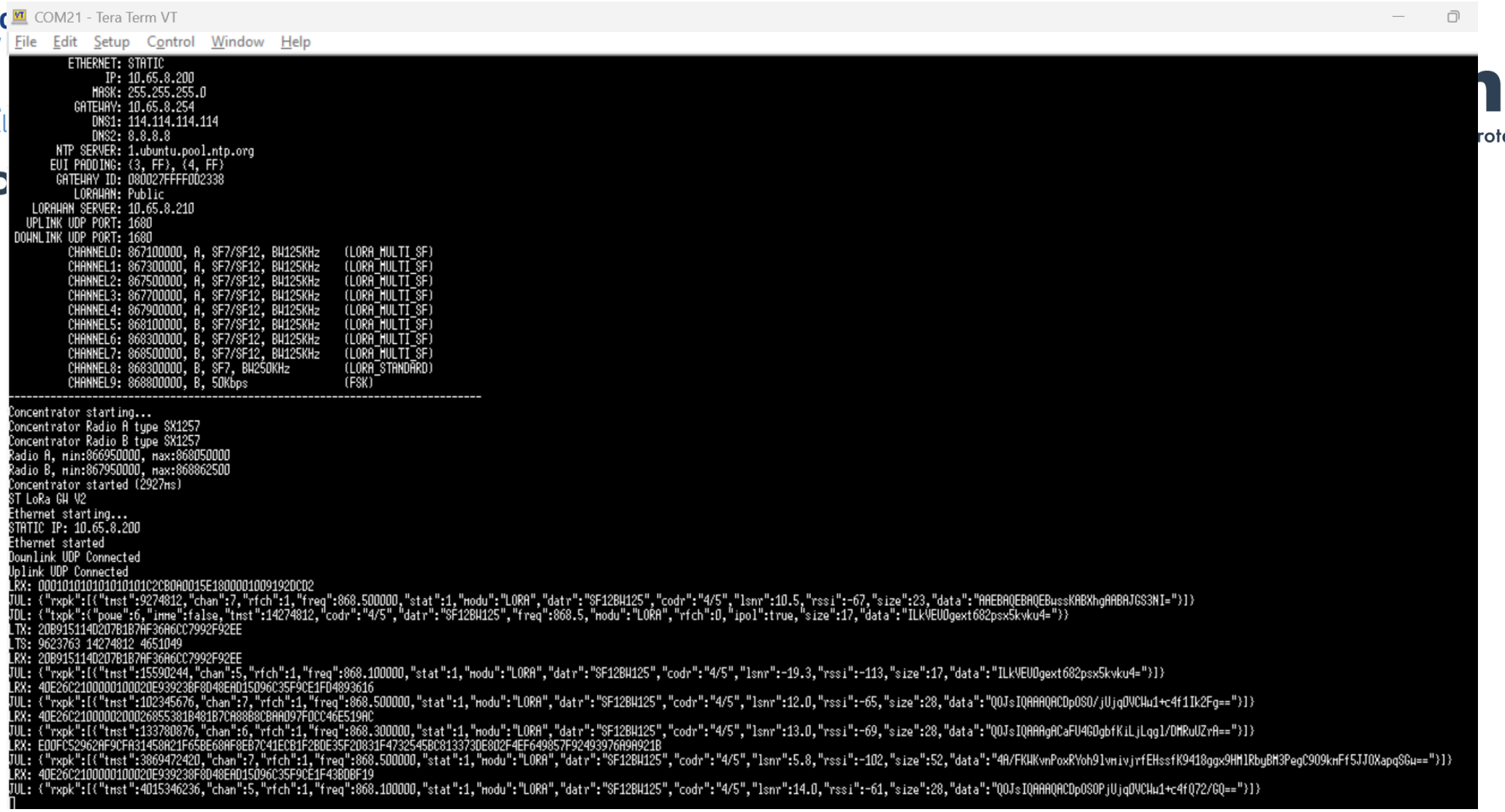
Right click on the project, select debug as STM32 c/c++ application.

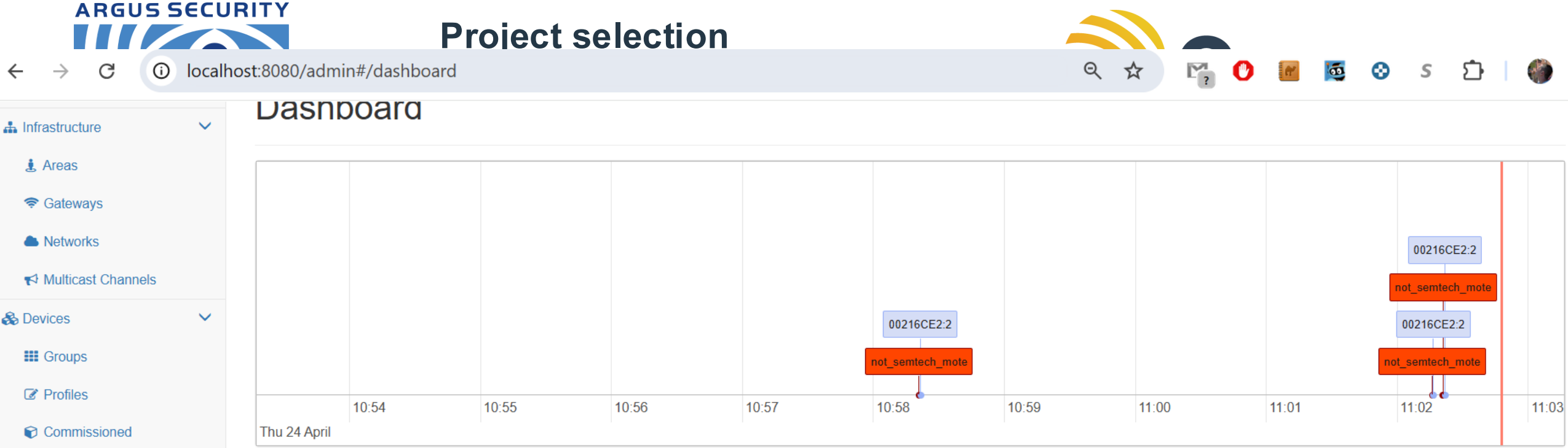
! The serial console shall be configured as 115200, 81N).
Data for LoRa WAN comissioning will appear






We'll see frame and payloads received by the concentrator node and after performing the join OTA, frames will appear on the server:

# Project selection




Servers

| Name | Version | Memory | Disk | Status |
|---|---|---|---|---|
| lorawan@NB004-24 | 0.6.7 | 6 GB (38%) | | ⚠ |

Events

| Last Occurred | Entity | Eid | Text | Args |
|---|---|---|---|---|
| 2025-04-24 09:51:35 | device | 0080E115000ACBC2 | join | <<"00216CE2">> |

Gateways

| MAC | IP Address | Dwell [%] | Last Alive | Status |
|---|---|---|---|---|
| 0080E1FFFF015F17 | 10.65.8.234 | 0.000 | 2025-02-12 16:34:54 | ● |
| 080027FFFF0D2338 | 10.65.8.200 | 0.038 | 2025-04-24 09:52:58 | ✔ |

Nodes

| DevAddr | Profile | Battery | D/L SNR | Last RX | Status |
|---|---|---|---|---|---|
| 00216CE2 | TestProfile | | | | |
| 00F1EE6B | TestProfile | | | 2025-02-12 16:33:01 | |

# Q&A

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# THANK YOU!