



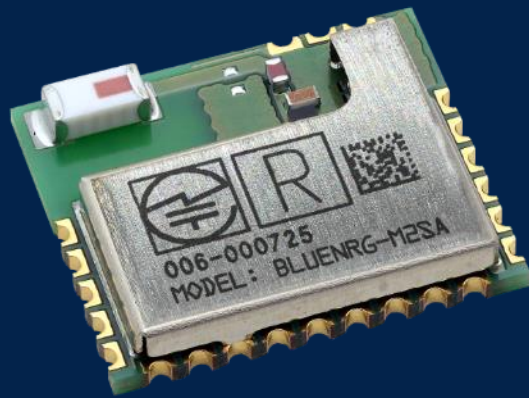
life.augmented

# Low power RF modules products family



# BlueNRG-based module portfolio

wireless connectivity made easy



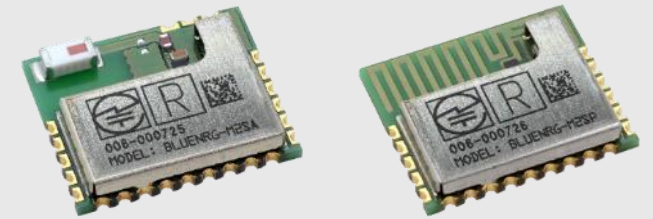


# BlueNRG modules Why using them?

## Bluetooth® Low Energy modules allow fast time to market and huge cost savings

### Modules are designed for time to market

- No RF expertise required: HW/SW Connectivity is a Black-Box in your Design!
- Fast Prototyping and HW Design
- Cost efficiency for volumes up to 150kpcs per year



### Modules are pre-certified

- Multi-Regional Certifications and SIG End-Product Certification allowing ~15K\$ cost saving
- Including HW Design and Certification, total cost saving up to 50~100K\$!



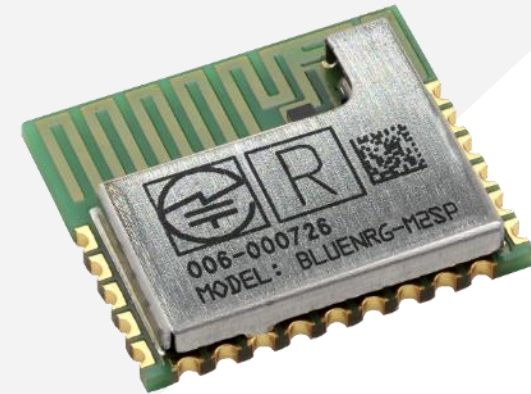
### Modules come with scalable offer

- Cost vs. features and antenna type
- Easy migration from legacy generation SPBTLE to new generation BlueNRG-M
  - Hardware pin-to-pin compatibility and same SW resources (BlueNRG-Navigator and SDK available as well)
  - Improved performance (immunity, output power)
  - 10 years longevity (do not take care of inner components availability)





# BlueNRG product family



## Network Processor

## Wireless SoC

Features / Antenna

### BlueNRG-M0

BT4.2 Certification  
Basic features

Full / SMD

BlueNRG-M0A

Light / SMD

BlueNRG-M0L

Light / PCB

### BlueNRG-M2

BT5.0 Certification  
LE Privacy 1.2  
LE Secure Connection  
LE Data Len ext

MEMORY: 256KB/24KB

BlueNRG-M2SA

BlueNRG-M2SP

Value



life.augmented

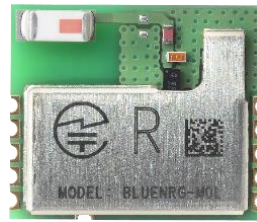


# BlueNRG modules portfolio

Suitable for motion algorithms, audio, Mesh over Bluetooth® LE

Network Processor

BlueNRG-M0L  
BlueNRG-M0A



based on

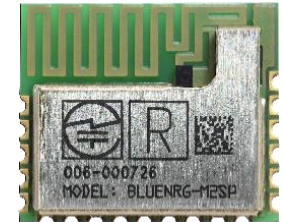
BlueNRG-MS



- Including high efficient chip antenna, filter and balun **BALF-NRG-01D3**
- Bluetooth® LE 4.2 certification
- Up to **+6 dBm** output power
- 5-wires **SPI interface** to external host

Wireless SoC

BlueNRG-M2SA  
BlueNRG-M2SP



based on

BlueNRG-2



- Including high efficient chip antenna [-M2SA] or PCB antenna [-M2SP], filter and balun **BALF-NRG-02D3**
- Bluetooth® LE 5.0 certification
- Up to **+5 dBm** [-M2SA] or **+7 dBm** [-M2SP] output power
- Extensive **peripheral set**

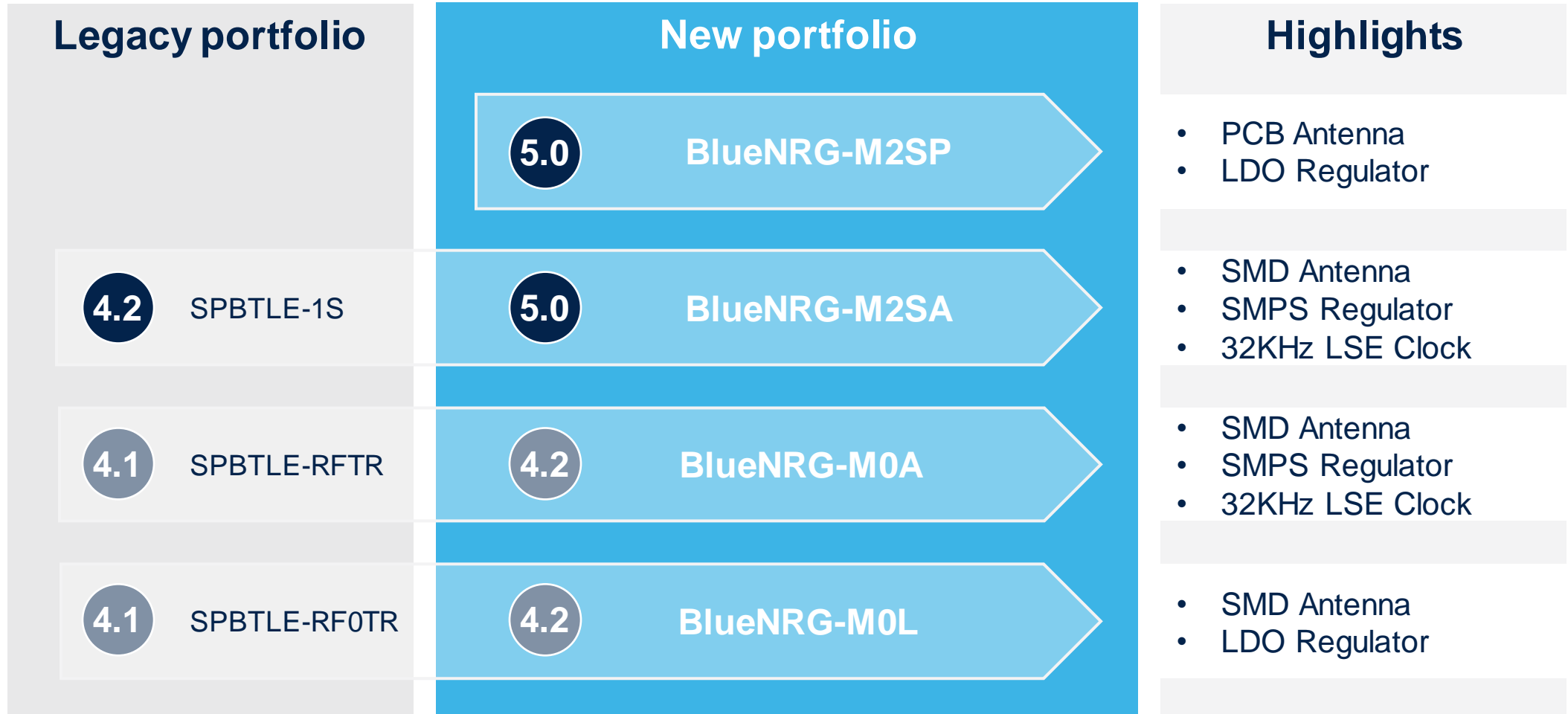
- Bluetooth® SIG End Product certification
- CE/RED qualified, FCC/IC/TELEC modular approval certified

- -85 dBm Rx sensitivity
- Small form factor: 13.5 x 11.5 x 2 mm

- Industrial temperature range: -40 °C to +85 °C
- Power supply voltage from 1.7V to 3.6V





# BlueNRG modules evolution



**COMPATIBILITY:**

same package 13.5 x 11.5 x 2 mm  
same temperature range -40°C / +85°C  
same operating voltage 1.7V / 3.6V

-  Network Processor
-  Programmable Bluetooth® LE SoC



# BlueNRG modules product family

|  | SPBTLE-RF0TR                             | SPBTLE-RFTR                       | BLUENRG-M0L                               | BLUENRG-M0A | SPBTLE-1S                                | BLUENRG-M2SA                                  | BLUENRG-M2SP             |
|--|--|-----------------------------------|---|-------------|--|---|--------------------------|
| BlueNRG device   | BlueNRG-MS                               |                                   |   |             | BlueNRG-1                                | BlueNRG-2                                     |                          |
| Balun  | Companion BALF-NRG-01D3                  |                                   |   |             |  | Companion BALF-NRG-02D3                       |                          |
| Bluetooth® certification / SIG end product certification | Bluetooth® LE 4.1 / D028766 – QDID 71984 |                                   | Bluetooth® LE 4.2 / D043964 – QDID 122868 |             | Bluetooth® LE 4.2 / D034470 – QDID 92838 | Bluetooth® LE 5.0 (*) / D043965 – QDID 121363 |                          |
| Core   | Companion MCU                            |                                   |   |             | Cortex-M0 up to 32MHz                    |   |                          |
| Memory [KB]  | -  |                                   |   |             | 160KB Flash / 24KB RAM                   | 256KB Flash / 24KB RAM                        |                          |
| Antenna  | SMD (connector option by 00hm)           |                                   | SMD                                       |             | SMD (pin option by 00hm)                 | SMD   | PCB                      |
| Sensitivity [dBm]  | -86                                      |                                   | -85                                       |             | -84                                      | -85   |                          |
| Max Power level [dBm]                                    | +4                                       |                                   | +6  |             | +4                                       | +5  | +7                       |
| LSE clock  | N/A                                      | Included                          | N/A                                       | Included    |  |   | N/A                      |
| Voltage regulator  | LDO                                      | SMPS                              | LDO                                       | SMPS        |  |   | LDO                      |
| Modular approval   | RED, FCC, IC                             | RED, FCC, IC, TELEC, WPC for -M0L |   |             | RED, FCC, IC, SRRC                       | RED, FCC, IC, TELEC, SRRC (Q4'20)             | RED, FCC, IC, TELEC, WPC |
| Form factor  | Castellation Holes                       |                                   |   |             |  |   |                          |
| Size [mm]  | 13.5 x 11.5 x 2                          |                                   |   |             |  |   |                          |
| Family Pin2Pin compatibility                             | SPBTLE-RFTR                              | SPBTLE-RF0TR                      | SPBTLE-RFx                                |             | SPBTLE-RFx (partial)                     | SPBTLE-1S                                     | SPBTLE-1S (partial)      |
| Status   | NRND (Legacy)                            |                                   | Active                                    |             | NRND (Legacy)                            | Active  |                          |

(\*) **Supported Bluetooth LE5.0 features:** Enhanced security with LE Secure Connections, power-efficient privacy with LL Privacy 1.2, up to 2.6x higher throughput with LE Data Length Extension



# BlueNRG longevity program New portfolio

Staying in production for 10 years, or offering pin2pin replacements

4.1 SPBTLE-RFTR

4.2 BlueNRG-M0A

14 years  
of commitment  
(since 2015)

4.1 SPBTLE-RF0TR

4.2 BlueNRG-M0L

13 years  
of commitment  
(since 2016)

4.2 SPBTLE-1S

5.0 BlueNRG-M2SA

12 years  
of commitment  
(since 2017)

5.0 BlueNRG-M2SP

10 years  
of commitment  
(since 2019)



Network Processor  
Programmable Bluetooth® LE SoC

Starting July 1st, 2019







# BlueNRG modules

## Ordering information

BlueNRG-M

2

S

A

### Product Family

Bluetooth® Low Energy Processor Module

### Antenna type (BlueNRG-M2 only)

A – SMD Antenna  
P – PCB Antenna

### Antenna type (BlueNRG-M0 only)

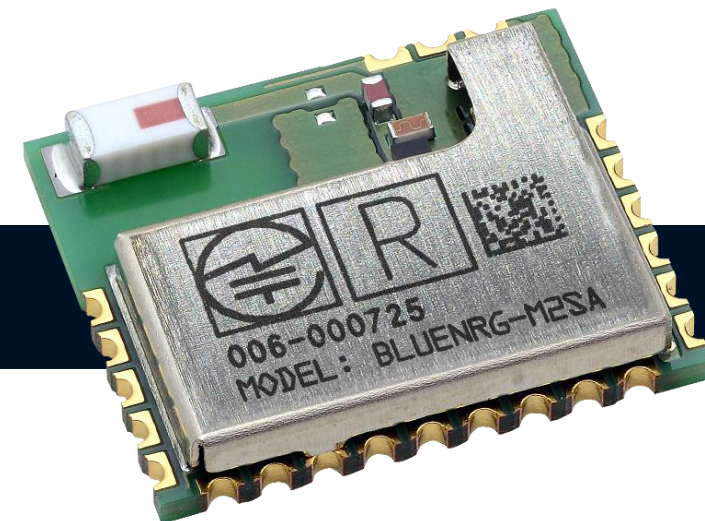
A – SMD Antenna (Full)  
L – SDM Antenna (Light)

### Stack Configuration (BlueNRG-M2 only)

S – Software Programmable

### Device Generation

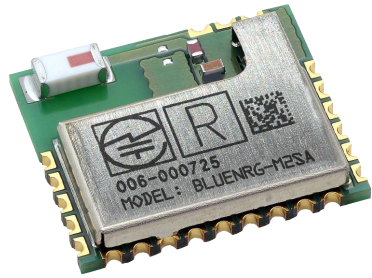
0 – BlueNRG-MS based  
2 – BlueNRG-2 based



life.augmented



# BlueNRG SoC modules simplify IoT



## Smart tools and appliances



- 10 years longevity
- Flexible architecture (SoC or add on)
- Device security

## Personal electronics



- Gaming, PTT (Push-To-Talk), fitness & consumer medical, ...
- Enhanced processing & peripherals
- MEMS sensor libraries
- BLE stack flexibility, RF driver

## Industrial connectivity



- Remote UI, remote control units
- Enhanced processing & peripherals
- Audio PDM IF
- 10 years longevity
- Device security

## Connected toys, robots



- Toys, robot vacuum, lawn mover, pool robot. etc.
- Flexible architecture (SoC or add on)
- Cost optimized with 2-layer PCB

## Lighting and building automation



- Lighting, ventilation, heating, HVAC, smart locks
- Bluetooth® SIG-certified MESH
- -40/+85°C temperature range
- Application security

## People and animal tracking



- Social distancing and tracing, worker tracking, pet & livestock tracking, prisoner tags
- Ultra-low power, application security
- Cost effective in application



# BlueNRG-M2SA/P unveiled

## Full-featured solution for Bluetooth® LE connectivity

High efficiency Chip Antenna (\*)

13.5 mm

Balun  
BALF-NRG-02D3

32KHz XTAL to enable  
ultra-low-power Bluetooth® LE sleep mode (\*)

SMPS Inductor to enable  
low-power Bluetooth® LE active mode (\*)

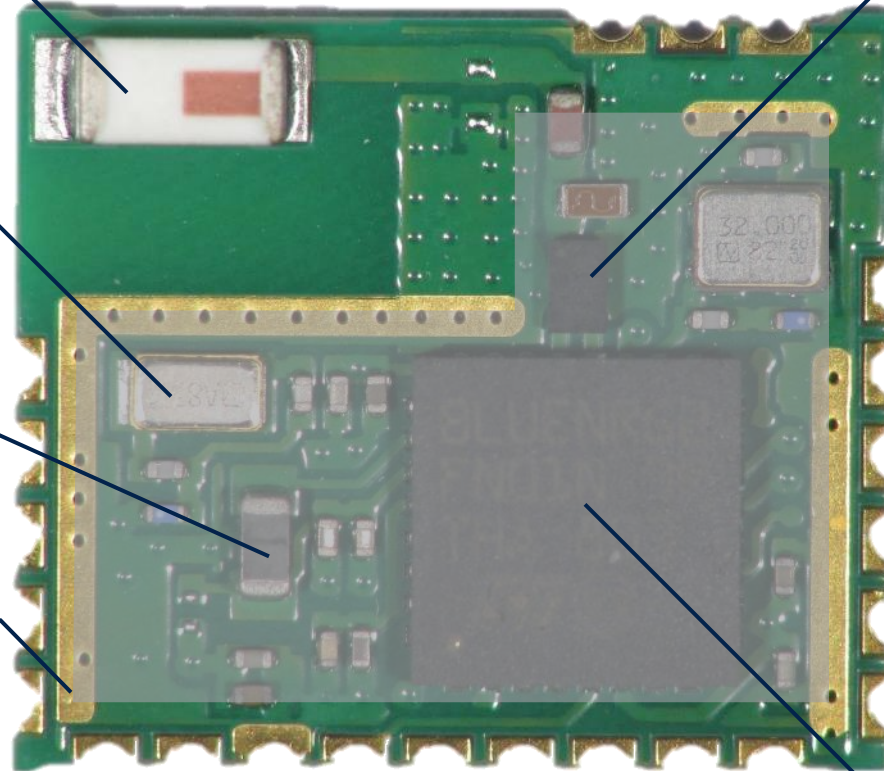
Metallic shield to protect from EMI/RFI

11.5 mm

Suitable for:

- **Motion Algorithms**
- **Voice over Bluetooth® LE**
- **Mesh over Bluetooth® LE**

Bluetooth® Low Energy SoC  
**BlueNRG-232**  
Powered by Cortex-M0

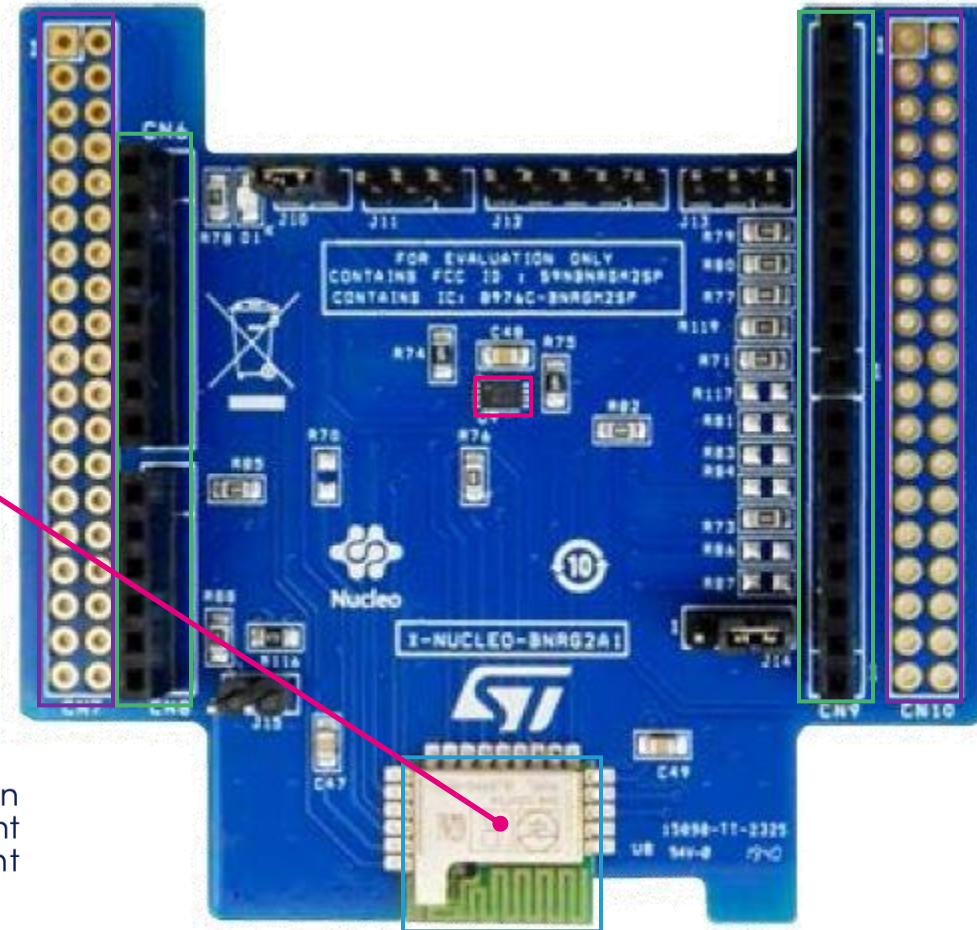
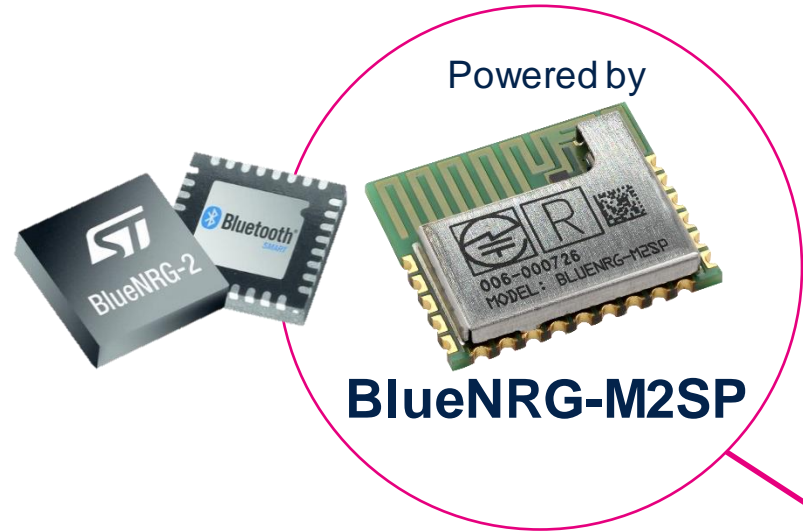


(\*) Not available on BlueNRG-M2SP, based on PCB antenna



# X-NUCLEO-BNRG2A1

## Bluetooth® LE 5.0 network processor solution



**BlueNRG**  
Module Family  
Suitable for



### EXPANSION FW PACKAGES

- X-CUBE-BLE2
- X-CUBE-BLEMESH1
- FP-SNS-BLEMESH1

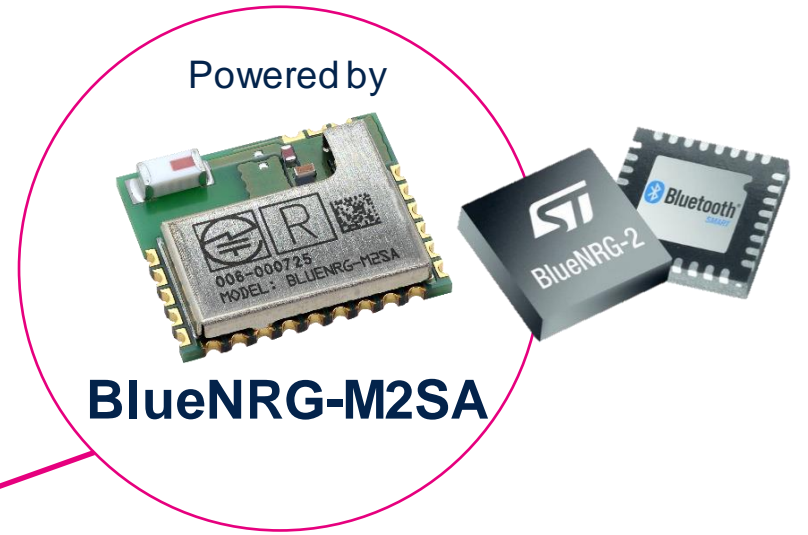


|  |  |  |                           |
|--|--|--|---------------------------|
|  | BlueNRG-232, BALF-NRG-02D2, 32MHz Oscillator |  | Arduino UNO R3 connector  |
|  | M95640                                       |  | ST Morpho connector (opt) |



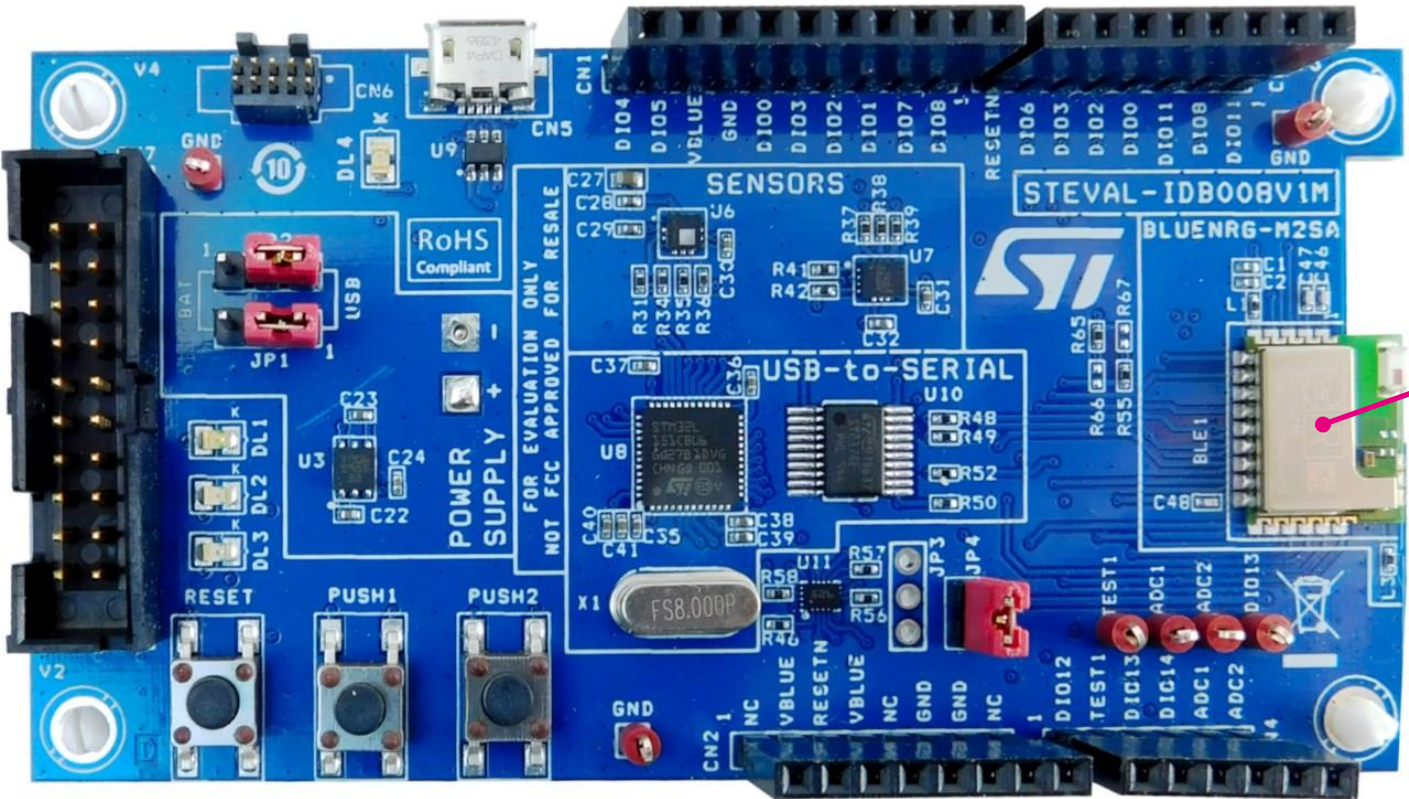
# STEVAL-IDB008V1M BlueNRG-M2SA evaluation board

BlueNRG  
Module Family  
Suitable for



BlueNRG-M2 **Wireless SoC FW Package**  
**STSW-BLUENRG1-DK**  
including interactive, simple and user-friendly  
PC Graphical User Interfaces (GUIs)

- BlueNRG Navigator
- BlueNRG Radio Initialization Wizard



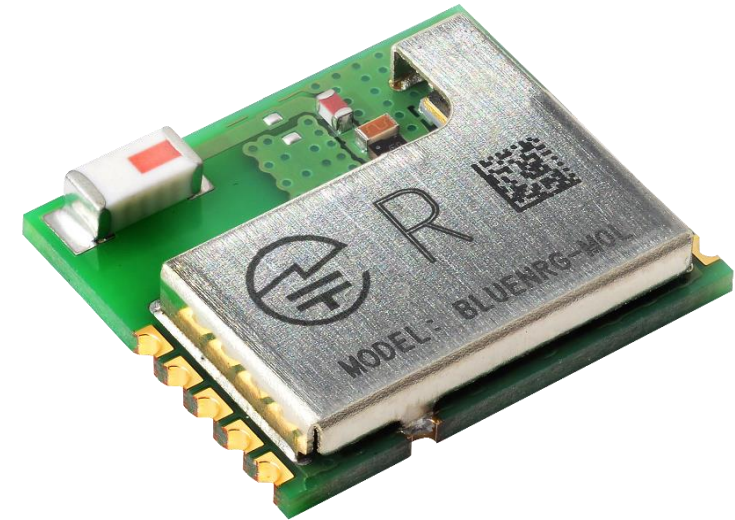


# BlueNRG-M0A/L

## Full-featured solution for Bluetooth® LE connectivity

### Integration

- **BlueNRG-MS** Bluetooth® Low Energy network processor
- **BALF-NRG-01D3** balun
- 4-wires **SPI interface** to external host, plus IRQ and RESET lines
- Included 10uH SMPS regulator (-M0A only)
- **Precise sleep timer** through included 32KHz LSE oscillator (-M0A only)
- Included AES-128 security co-processor
- **Upgradable Bluetooth® LE protocol stack**



### Optimized Bluetooth® LE protocol stack

- Compliant with **Bluetooth® v4.2** standard
- Supports **master and slave** modes, up to 2 masters simultaneously
- Multiple roles supported simultaneously
- Embedded GAP, ATT/GATT, SM and L2CAP layers
- Bluetooth® low energy profiles provided separately

### Operating ranges

- **Small** form factor: 13.5 x 11.5 x 2 mm
- **Industrial** temperature range: -40 °C to +85 °C
- Power supply voltage from **1.7V to 3.6V**

### Certified RF interface

- Included high efficient chip antenna, filter and balun
- Up to **+6 dBm** output power, **-85 dBm** Rx sensitivity
- CE/RED qualified, FCC, IC, TELEC and WPC (-M0L only) modular approval certified
- BT SIG **End Product QDID 122868**

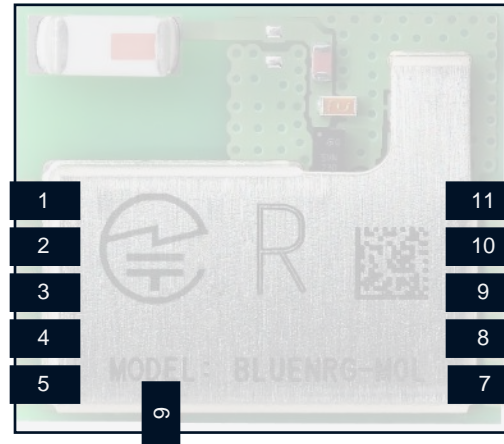
### Applications

- Watches
- Fitness, wellness and sports
- Consumer medical
- Security/proximity
- Remote control
- Home and industrial automation
- Assisted living
- Mobile phone peripherals
- PC peripherals



# BlueNRG-M0A/L pin assignment

| BlueNRG-M0x<br>Module Pin | BlueNRG-MS<br>ICs pin | Function |
|---------------------------|-----------------------|----------|
| 1                         | N/A                   | N/C      |
| 2                         | 14                    | N/C      |
| 3                         | 13                    | N/C      |
| 4                         | 3                     | SPI_IRQ  |
| 5                         | 19, 24                | Vin      |



| BlueNRG-M0x<br>Module Pin | BlueNRG-MS<br>ICs pin | Function |
|---------------------------|-----------------------|----------|
| 11                        | 25                    | BT_RESET |
| 10                        | 31                    | SPI_CS   |
| 9                         | 1                     | SPI_MOSI |
| 8                         | 32                    | SPI_MISO |
| 7                         | 2                     | SPI_CLK  |

| BlueNRG-M0x<br>Module Pin | BlueNRG-MS<br>ICs pin | Function |
|---------------------------|-----------------------|----------|
| 6                         | N/A                   | GND      |

| Typical current consumption<br>Vin = 3.3 V, T = 25 °C | BlueNRG-M0A | BlueNRG-M0L |
|---|-------------|-------------|
| Reset   |             | 5 nA        |
| Standby   | 1.8 uA      | 1.7 uA      |
| Sleep (12 KB retention RAM)                           | 1.7 uA (XO) | 2.8 uA (RO) |
| Sleep (24 KB retention RAM)                           | 2.2 uA (XO) | 3.2 uA (RO) |
| Active  | 2.12 mA     | 2.54 mA     |
| RX  | 9.36 mA     | 16.6 mA     |
| TX +8 dBm   | 16.5 mA     | 27.35 mA    |
| TX +2 dBm   | 10.4 mA     | 18.29 mA    |
| TX -14 dBm  | 7.82 mA     | 13.25 mA    |



# BlueNRG-M2SA/P

## Host-less solution for Bluetooth® LE connectivity

### Integration

- **BlueNRG-2** Bluetooth® Low Energy application processor
- **BALF-NRG-02D3** balun
- 1x UART, 1x SPI, 1x I2C, 14x GPIO, 2x TIM, Watchdog, RTC, 1x ADC, 1x PDM, DMA controller, SWD interface
- **Cortex-M0** @ 32MHz, 2x 12KB RAM and 256 KB Flash memory
- Included 10uH SMPS regulator (**-M2SA only**)
- **Precise sleep timer** through included 32KHz LSE oscillator (**-M2SA only**)
- Included AES-128 security co-processor

### Optimized Bluetooth® LE protocol stack

- Compliant with **Bluetooth® v5.0** standard
- Supports **master and slave** modes, up to 2 masters simultaneously
- Multiple roles supported simultaneously
- Embedded GAP, ATT/GATT, SM and L2CAP layers
- Multiple sample projects are available in SDK and **Mesh-SDK**

### Certified RF interface

- Included high efficient chip antenna (**-M2SA only**), filter and balun
- Up to **+7 dBm** output power (**-M2SP only**), **-85 dBm** Rx sensitivity
- CE/RED qualified, FCC, IC, TELEC, WPC (**-M2SP only**) and SRRC (**-M2SA only**) modular approval certified
- BT SIG **End Product QDID 121363**



### Operating ranges

- **Small** form factor: 13.5 x 11.5 x 2 mm
- **Industrial** temperature range: -40 °C to +85 °C
- Power supply voltage from **1.7V to 3.6V**

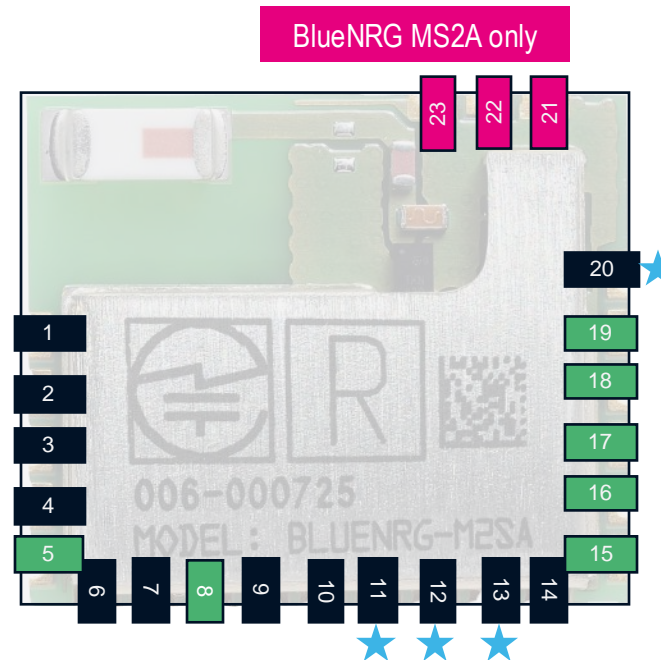




# BlueNRG-M2SA/P Pin assignment

| Module Pin | ICs pin | Main Function             | Alternate Function  |
|------------|---------|---------------------------|---|
| 1          | 16      | ADC2                      | N/A   |
| 2          | 15      | ADC1                      | N/A   |
| 3          | 8       | DIO4 (mode 000)           | UART_RXD (mode 001)<br>I2C2_CLK (mode 100)<br>PWM0 (mode 101)     |
| 4          | 7       | DIO5 (mode 000)           | UART_TXD (mode 001)<br>I2C2_DAT (mode 100)<br>PWM1 (mode 101)     |
| 5          | 19, 24  | Vin                       | N/A   |
| 6          | 13      | ANATEST0/DIO14 (mode 000) | SPI_CLK (mode 100)  |
| 7          | 4       | DIO7/BOOT (mode 000)      | UART_CTS (mode 001)<br>I2C2_DAT (mode 100)<br>PDM_CLK (mode 101)  |
| 8          | N/A     | GND                       | N/A   |
| 9          | 5       | DIO6 (mode 000)           | UART_RTS (mode 001)<br>I2C2_CLK (mode 100)<br>PDM_DATA (mode 101) |
| 10         | 3       | DIO8 (mode 000)           | UART_TXD (mode 001)<br>SPI_CLK (mode 100)<br>PDM_DATA (mode 101)  |

| Module Pin | ICs pin | Main Function |
|------------|---------|---------------|
| 21         | N/A     | GND           |
| 22         | N/A     | N/C           |
| 23         | N/A     | GND           |



★ Wake-up

In green, compatibility between BlueNRG-M0x and BlueNRG-M2Sx

| Module Pin | ICs pin | Main Function    | Alternate Function   |
|------------|---------|------------------|--|
| 20         | 30      | DIO12 (mode 000) | N/A  |
| 19         | 25      | BT_RESET         | N/A  |
| 18         | 11      | DIO1 (mode 000)  | UART_RTS (mode 001)<br>SPI_CS1 (mode 100)<br>PDM_DATA (mode 101) |
| 17         | 9       | DIO2 (mode 000)  | PWM0 (mode 001)<br>SPI_OUT (mode 100)<br>PDM_CLK (mode 101)      |
| 16         | 10      | DIO3 (mode 000)  | PWM1 (mode 001)<br>SPI_IN (mode 100)                             |
| 15         | 12      | DIO0 (mode 000)  | UART_CTS (mode 001)<br>SPI_CLK (mode 100)                        |

| Module Pin | ICs pin | Main Function    | Alternate Function                        |
|------------|---------|------------------|---|
| 11         | 32      | DIO11 (mode 000) | UART_RXD (mode 001)<br>SPI_CS1 (mode 100) |
| 12         | 2       | DIO9 (mode 000)  | SWCLK (mode 001)<br>SPI_IN (mode 100)     |
| 13         | 1       | DIO10 (mode 000) | SWDIO (mode 001)<br>SPI_OUT (mode 100)    |
| 14         | 14      | ANATEST1         | N/A                                       |

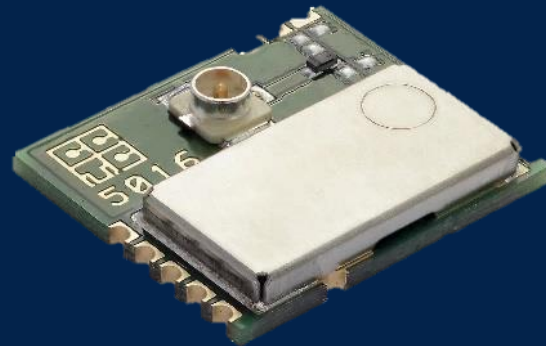


# BlueNRG-M2SA/P Characteristics

| Typical current consumption<br>$V_{in} = 3.3\text{ V}$ , $T = 25\text{ °C}$ , 24 KB RAM | BlueNRG-M2SA           | BlueNRG-M2SP           |
|---|------------------------|------------------------|
| Reset   |                        | 5 nA                   |
| Standby   |                        | 0.5 $\mu\text{A}$      |
| Sleep   | 0.9 $\mu\text{A}$ (XO) | 2.1 $\mu\text{A}$ (RO) |
| Active  | 1.89 mA                | 2.75 mA                |
| RX  | 7.55 mA                | 15 mA                  |
| TX +8 dBm   | 14.78 mA               | 33.9 mA                |
| TX +2 dBm   | 9.27 mA                | 19.1 mA                |
| TX -14 dBm  | 7.01 mA                | 13.7 mA                |

# SPIRIT-based module portfolio

## Wireless connectivity made easy





# SPIRIT modules portfolio

## ANTENNA option

SPSGRF-868  
SPSGRF-915



- Two carrier frequency versions: 868 MHz & 915 MHz
- Including high efficient chip antenna, filter and balun **BALF-SPI-01D3**
- CE/RED qualified [-868], FCC and IC modular approval certified [-915]

## CONNECTOR option

SPSGRFC-433  
SPSGRFC-868  
SPSGRFC-915



- Three carrier frequency versions: 433 MHz, 868 MHz and 915 MHz
- Including U.FI. connector, filter and balun **BALF-SPI-01D3** [-868 & -915] or **BALF-SPI-02D3** [-433]
- CE/RED qualified [-433 & -868], FCC and IC modular approval certified [-915]

- Up to **+11.6 dBm** output power
- **-118 dBm** Rx sensitivity
- 4-wires **SPI interface** to external host
- Shutdown line
- 4 programmable GPIOs
- Included AES-128 security co-processor

- Modulation schemes: 2-FSK, GFSK, MSK, GMSK, OOK,ASK
- Packet format **Basic**, **MBUS** and **STack**
- Forward Error Correction (FEC with interleaving)
- Low Duty Cycle (LDC) mode with automatic acknowledgement
- Embedded CSMA/CA protocol, based on listen-before-talk

- Automatic CRC handling
- Whitening and de-whitening of data
- **Small** form factor: 13.5 x 11.5 x 2 mm
- **Industrial** temperature range: **-40 °C to +85 °C**
- Power supply voltage from **1.8V to 3.6V**



## Complete solution for Sub-1GHz connectivity

### Integration

- **SPIRIT1** Sub-1GHz network processor
- **BALF-SPI-01D3** balun
- Two carrier frequency versions: 868 MHz and 915 MHz
- 4-wires **SPI interface** to external host, plus Shutdown line and 4 programmable GPIOs
- Included AES-128 security co-processor

### Superior radio features

- Modulation schemes: 2-FSK, GFSK, MSK, GMSK, OOK and ASK
- Packet format: **Basic**, **MBUS** and **STack**
- Forward Error Correction (FEC with interleaving)
- Low Duty Cycle (LDC) mode with automatic acknowledgement
- Embedded CSMA/CA protocol, based on listen-before-talk systems
- Automatic CRC handling
- Whitening and de-whitening of data

### Certified RF interface

- Included high efficient chip antenna, filter and balun
- Up to **+11.6 dBm** output power
- **-118 dBm** Rx sensitivity
- CE/RED qualified, FCC and IC modular approval certified



### Operating ranges

- **Small** form factor: 13.5 x 11.5 x 2 mm
- **Industrial** temperature range: -40 °C to +85 °C
- Power supply voltage from **1.8V to 3.6V**

### Applications

- Automatic Meter Reading (AMR)
- Wireless Sensor Network (WSN)
- Industrial monitoring and control
- Wireless fire and security alarm systems
- Point-to-point wireless link
- Home and building automation



# SPSGRFC-433 / 868 / 915

## Complete solution for Sub-1GHz connectivity

### Integration

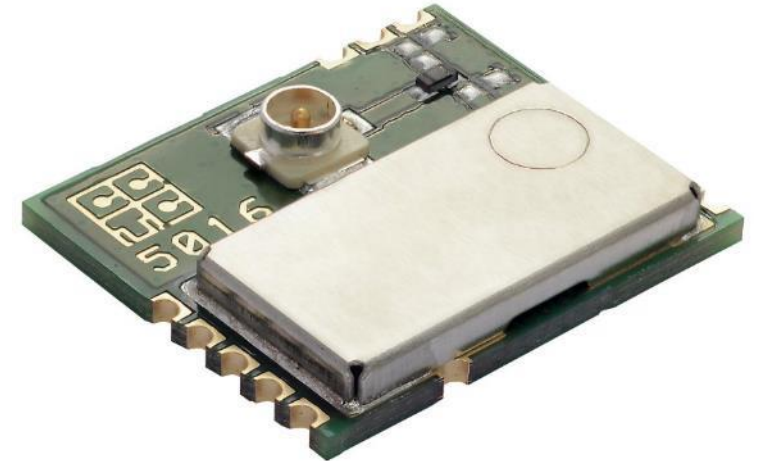
- **SPIRIT1** Sub-1GHz network processor
- **BALF-SPI-01D3** [-868 & -915] or **BALF-SPI-02D3** [-433] balun
- Three carrier frequency versions: 433 MHz, 868 MHz and 915 MHz
- 4-wires **SPI interface** to external host, plus Shutdown line and 4 programmable GPIOs
- Included AES-128 security co-processor

### Superior radio features

- Modulation schemes: 2-FSK, GFSK, MSK, GMSK, OOK and ASK
- Packet format: **Basic**, **MBUS** and **STack**
- Forward Error Correction (FEC with interleaving)
- Low Duty Cycle (LDC) mode with automatic acknowledgement
- Embedded CSMA/CA protocol, based on listen-before-talk systems
- Automatic CRC handling
- Whitening and de-whitening of data

### Certified RF interface

- Included U.FI. connector, filter and balun
- Up to **+11.6 dBm** output power
- **-118 dBm** Rx sensitivity
- CE/RED qualified, FCC and IC modular approval certified



### Operating ranges

- **Small form factor:** 13.5 x 11.5 x 2 mm
- **Industrial temperature range:** -40 °C to +85 °C
- Power supply voltage from **1.8V to 3.6V**

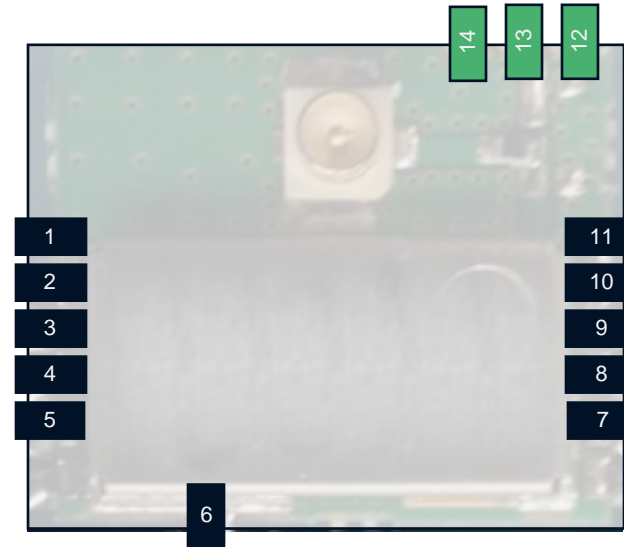
### Applications

- Automatic Meter Reading (AMR)
- Wireless Sensor Network (WSN)
- Industrial monitoring and control
- Wireless fire and security alarm systems
- Point-to-point wireless link
- Home and building automation
- 6LoWPAN MESH network
- Wireless M-Bus protocol stack



# SPSGRF and SPSSGRFC Pin assignment

| Module Pin | ICs pin | Main Function | Alternate Function   |
|------------|---------|---------------|--|
| 1          | 18      | GPIO3         | <ul style="list-style-type: none"> <li>MCU clock output</li> <li>FIFO status flags</li> </ul>                  |
| 2          | 19      | GPIO2         | <ul style="list-style-type: none"> <li>Wake-up input</li> <li>Battery level detector</li> </ul>                |
| 3          | 20      | GPIO1         | <ul style="list-style-type: none"> <li>TX-RX external switch control</li> </ul>                                |
| 4          | 1       | GPIO0         | <ul style="list-style-type: none"> <li>Antenna diversity control</li> <li>Temperature sensor output</li> </ul> |
| 5          | N/A     | Vin           | N/A  |
| 6          | N/A     | GND           | N/A  |



| Module Pin | ICs pin | Function |
|------------|---------|----------|
| 11         | 15      | SDN      |
| 10         | 5       | SPI_CS   |
| 9          | 3       | SPI_MOSI |
| 8          | 2       | SPI_MISO |
| 7          | 4       | SPI_CLK  |

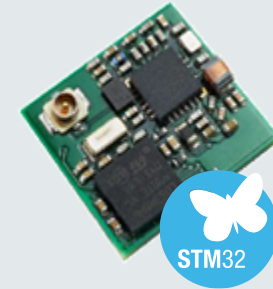
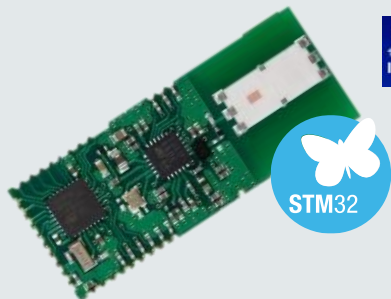
| Module Pin | ICs pin | Function |
|------------|---------|----------|
| 12         | N/A     | N/C      |
| 13         | N/A     | N/C      |
| 14         | N/A     | N/C      |

Pins only available on SPSSGRFC-x modules

| Typical current consumption                  |  | All P/Ns |
|--|--|----------|
| Vin = 3.3 V, TX Power = +11.6 dBm, T = 25 °C |  |          |
| Shutdown                                     |  | 2.5 nA   |
| Standby                                      |  | 0.6 uA   |
| Sleep  |  | 0.85 uA  |
| Active (Ready, default mode)                 |  | 0.4 mA   |
| Lock   |  | 4.4 mA   |
| Rx (SMPS ON, 2-FSK, 868 MHz)                 |  | 9.7 mA   |
| Tx (SMPS ON, 2-FSK, 868 MHz)                 |  | 21 mA    |



# S2-LP 3<sup>rd</sup> part modules



Phoenix



# Thank you

© STMicroelectronics - All rights reserved.

The STMicroelectronics corporate logo is a registered trademark of the STMicroelectronics group of companies. All other names are the property of their respective owners.



life.augmented