

# S2-LP: Ultra-low-power, high-performance, sub-1GHz RF transmitter and transceivers



## The S2-LP are ultra-low-power, wireless, sub-1GHz proprietary RF transmitter and transceivers

Designed principally for the ISM frequency bands, it shows top-notch RF performance and unparalleled energy efficiency extending battery life from months to more than 10 years. The embedded radio guarantees an RF link budget in excess of 145 dB in addition to a compelling output power up to +16 dBm, resulting in a reliable long-distance RF link. It is ready for SIGFOX, KNX-RF, Wireless M-Bus, 6LowPAN and WiSUN networking connectivity, simplifying the design of IoT applications and enabling remote sensors to the Cloud.

### KEY FEATURES

- Ultra-low power consumption
  - 600 nA in Sleep mode
  - 7 mA in Receive mode\*
  - 10 mA in Transmit mode @ +10 dBm
  - Sniff mode\*
- RF link budget higher than 145 dB\*
- Up to +16 dBm output power
- Frequency bands:
  - 413-479 MHz (S2-LPQTR and S2-LPTXQTR)
  - 452-527 MHz (S2-LPCBQTR)
  - 826-958 MHz (S2-LPQTR and S2-LPTXQTR)
  - 904-1055 MHz (S2-LPCBQTR)
- Modulation schemes: 2(G)FSK, 4(G)FSK, OOK, ASK
- On-chip DC/DC step-down converter and linear regulator
- Fully integrated ultra-low power RC oscillator
- 128-byte Receive\* and Transmit FIFO
- Robust CSMA/CA engine based on listen-before-talk systems\*
- Embedded flexible packet handler
- Suitable for SIGFOX™ connectivity
- IEEE 802.15.4g packet handler
- Wireless M-BUS, KNX-RF, 6LowPAN and WiSUN ready
- Suitable for building systems targeting world-wide regulatory standards

\*RX Feature only available on transceivers: S2-LP and S2-LPCB

## Sub-1GHz transmitter and transceivers connect smart things to the cloud

### KEY BENEFITS

- Extended battery life up to 10 years
- Long distance and reliable RF connections
- Connects smart things to the Cloud without a local gateway

### KEY APPLICATIONS

Smart metering, Industrial monitoring and control, Home energy management systems, Smart parking, Wireless alarm systems, Asset tracking devices

| Order Code | Description                                        |
|------------|----------------------------------------------------|
| S2-LPQTR   | Transceiver for 413-479 MHz and 826-958 MHz Bands  |
| S2-LPCBQTR | Transceiver for 452-527 MHz and 904-1055 MHz Bands |
| S2-LPTXQTR | Transmitter for 413-479 MHz and 826-958 MHz Bands  |



## Available tools and technical documentation

|                |                  |                                                                                                                      |
|----------------|------------------|----------------------------------------------------------------------------------------------------------------------|
| Evaluation kit | STEVAL-FKI433V2  | Sub-1GHz transceiver development kit tuned for 430-470 MHz based on S2-LPQTR                                         |
|                | STEVAL-FKI868V2  | Sub-1GHz transceiver development kit tuned for 860-940 MHz based on S2-LPQTR                                         |
|                | STEVAL-FKI915V1  | Sub-1GHz transceiver development kit tuned for 860-940 MHz allowing to reach +27 dBm based on S2-LPQTR               |
|                | STEVAL-FKI512V1  | Sub-1GHz transceiver development kit tuned for 452-527 MHz based on S2-LPCBQTR                                       |
|                | X-NUCLEO-S2868A2 | Sub-1 GHz 868 MHz RF expansion board based on S2-LP radio for STM32 Nucleo                                           |
|                | X-NUCLEO-S2915A1 | Sub-1 GHz 915 MHz RF expansion board based on S2-LP radio for STM32 Nucleo allowing to reach +27 dBm                 |
| HW resources   | Schematic pack   | Evaluation kit: schematics                                                                                           |
|                | BOM              | Evaluation kit: bill of material                                                                                     |
|                | Gerber pack      | Evaluation kit: board manufacturing specification                                                                    |
| SW resources   | GUI              | Graphical user interface for driving by PC evaluation kit                                                            |
|                | Library          | Library drivers                                                                                                      |
|                | Examples         | Embedded examples                                                                                                    |
| Documentation  | AN4190           | Antenna selections guidelines                                                                                        |
|                | AN4947           | PCB design guidelines for the S2-LP transceiver                                                                      |
|                | AN4949           | Using the S2-LP transceiver under FCC title 47 part 15 in the 902 – 928 MHz band                                     |
|                | AN4953           | Using the S2-LP transceiver under ARIB STD-T108 in the 920 MHz band                                                  |
|                | AN4962           | S2-LP ETSI compliance test at 868 MHz SRD band                                                                       |
|                | AN4997           | FCC part 15 @433 MHz compliance                                                                                      |
|                | AN5008           | ARIB STD-T67 @ 449 MHz compliance                                                                                    |
|                | AN5009           | FCC part 90 in 450-470 MHz band masks D and E compliance                                                             |
|                | AN5029           | Using the S2-LP transceiver with FEM at 500 mW under FCC title 47 part 15 in the 902 – 928 MHz band                  |
|                | UM1904           | Getting started with X-CUBE-SUBG1, Sub-1 GHz RF software expansion for STM32Cube                                     |
|                | UM2669           | Getting started with X-CUBE-SUBG2, Sub-1 GHz RF software expansion for STM32Cube                                     |
|                | UM2149           | Getting started with the S2-LP development kits                                                                      |
|                | UM2169           | Getting started with the SIGFOX S2-LP kit                                                                            |
|                | UM2173           | SIGFOX firmware library user manual                                                                                  |
|                | UM2211           | BLE-Sub1GHz development kit                                                                                          |
|                | UM2638           | Getting started with the X-NUCLEO-S2868A2 Sub-1 GHz 868 MHz RF expansion board based on S2-LP radio for STM32 Nucleo |
|                | UM2641           | Getting started with the X-NUCLEO-S2915A1 Sub-1 GHz 915 MHz RF expansion board based on S2-LP radio for STM32 Nucleo |

