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# S2-LPTX

Sub-1GHz Radio Transmitter





# S2-LPTX overview

## S2-LP based ultra-low power Sub-1 GHz radio transmitter



### S2-LPTXQTR

- Pin-to-pin compatible with S2-LPQTR  
→ No need for a new Sigfox certification!
- Operating temperature range: -40 °C to +105 °C
- QFN24 4x4x1mm

### Radio performance

- Frequency bandwidth
  - 413-479 MHz
  - 826-958 MHz
- 100 bps to 500 kbps
- +16 dBm output power

### Ultra low-power consumption

- Sleep / Shutdown: 700nA / 2.5nA
- Tx peak current: 10 mA @ +10 dBm





# S2-LPTX block diagram

Ultra-low power S2-LPTX offers a cost-efficient solution to enable one-way data connectivity

## Key features → benefits

### S2-LPTX doubles the battery life-time

→ Thanks to the extremely low peak current consumption values, the ultra low power mode, and the ability to quickly switch between power-saving and active modes, S2-LPTX is the best solution for battery operated devices

### Shares the same TX path of S2-LP

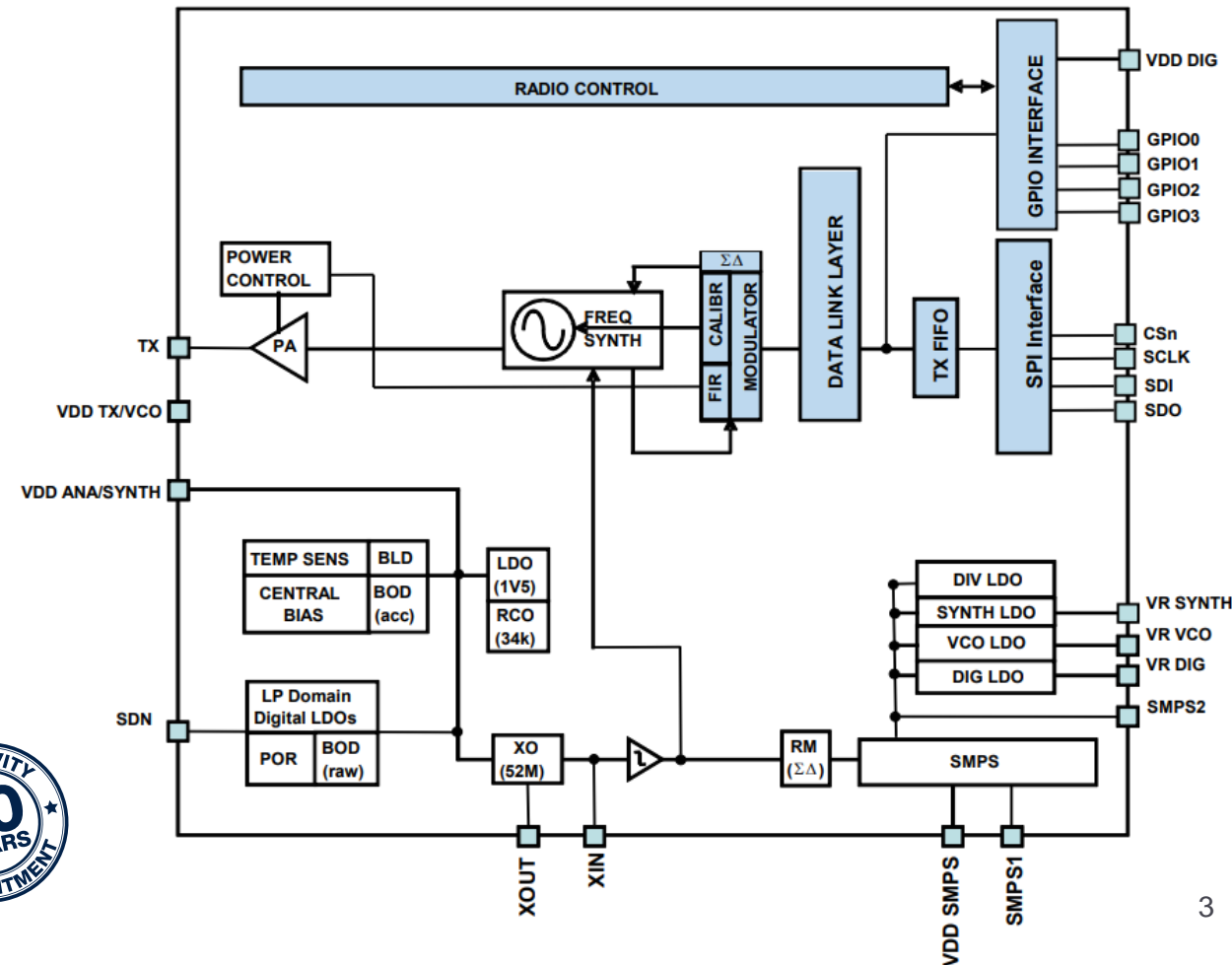
→ no need to re-certify your Sigfox product based on S2-LP

### Cost efficiency

→ 10% to 20% saving, depending on volumes

### 10-years longevity

→ Granting long-term availability for industrial applications

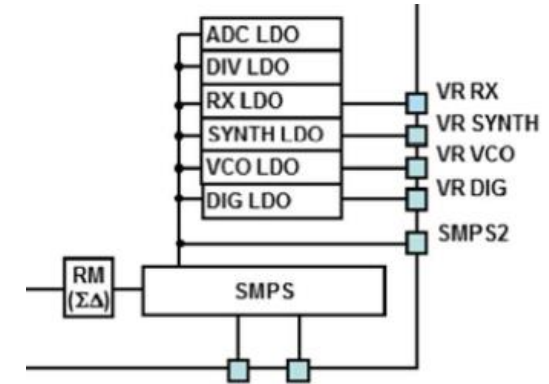




# S2-LPTX power management

## SMPS highlights

- High-efficiency design / one single external coil required
- Used for both internal LDO's and PA bias voltage
- By-passable (external LDO needed)



Programmable  $V_{SMPS}$ : from 1.1 up to 1.8 V (by 0.1 V step)

### Boost Mode

- $V_{SMPS} = 1,8\text{ V}$
- +16dBm output power
- 30mA in TX / 10mA in RX (\*)
- Excellent selectivity (\*)

### High-Performance Mode

- $V_{SMPS} = 1,5\text{ V}$
- +14dBm output power
- 20mA in TX / 8,4mA in RX (\*)
- Excellent selectivity (\*)

### Low-Power Mode

- $V_{SMPS} = 1,2\text{ V}$
- +10dBm output power
- 10mA in TX / 7mA in RX (\*)
- Good selectivity (\*)

One PCB with same BOM → 3 modes possible!

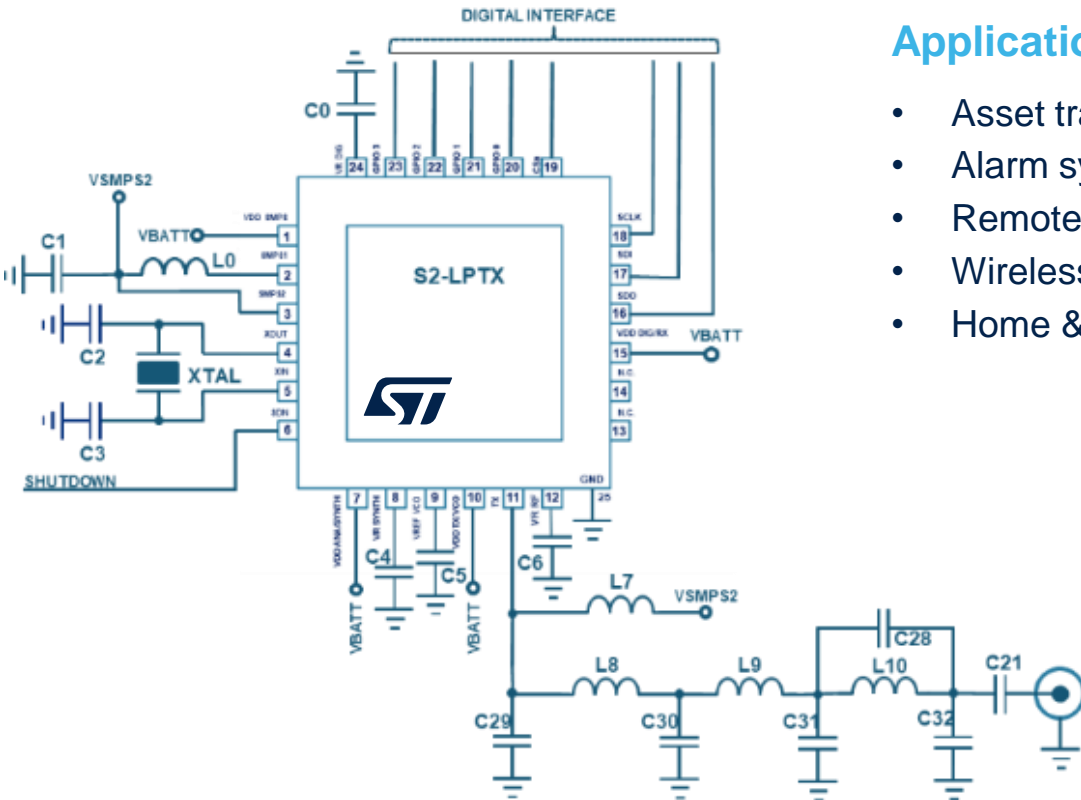


# S2-LPTX typical application

Suitable for applications sub-1GHz one-way connectivity in a cost-efficient flavor is needed

## Easy integration

### 4-wire SPI interface



### Applications

- Asset tracking
- Alarm system
- Remote key entry
- Wireless sensor networks
- Home & building automation

## Pin-out - top view



Pin (main ones)	Name	Description
2, 3	SMPS	1.1V to 1.8V out/in
4, 5	Xtal	Crystal oscillator out/in
6	SDN	Shutdown
16 to 19	SPI	4-wire interface to external MCU
20 to 23	GPIO	4x general purpose I/Os

# S2-LPTX competition benchmark

## Performance key points



	S2-LPTX	Silicon Labs Si403x	Texas Instruments CC1175	ON Semiconductor AX5031	Semtech SX1230
Operating supply voltage range [V]	1.8-3.6	1.8-3.6	2.0-3.6	2.2-3.6	1.8-3.7
Operating temperature range [°C]	-40 +105	-40 +85	-40 +85	-40 +85	-40 +85
Frequency bands [MHz]	430-470 860-940	240-930	164-192 410-480 820-960	400-470 800-940	290-340 431-510 862-1020
Output power level [dBm]	+16	+13 Si4031 +20 Si4032	+16	+15	+17
Data Rate [kbps]	0.1-500	0.123-256	0-200	1-350	1.2-600
Modulation scheme	2(G)FSK - 4(G)FSK, OOK/ASK	2(G)FSK, OOK/ASK	2(G)FSK - 4(G)FSK, MSK, OOK/ASK	2(G)FSK - 4(G)FSK, MSK, OOK/ASK, PSK, OQPSK,	2(G)FSK, OOK/ASK
TX Current consumption [mA]	11mA @ +10dBm 20ma @ +14dBm	30mA @ +13dBm	34mA @ +10dBm	22mA @ +10dBm 37ma @ +14dBm	33mA @ +10dBm 45ma @ +13dBm

**S2-LPTX is the best transmitter solution for battery operated devices**







# STEVAL-FKI868V2 / 915V1 S2-LPTX evaluation board

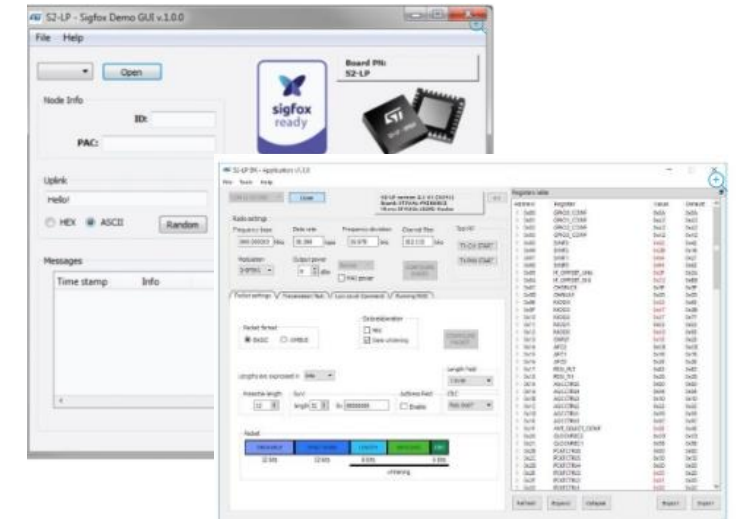
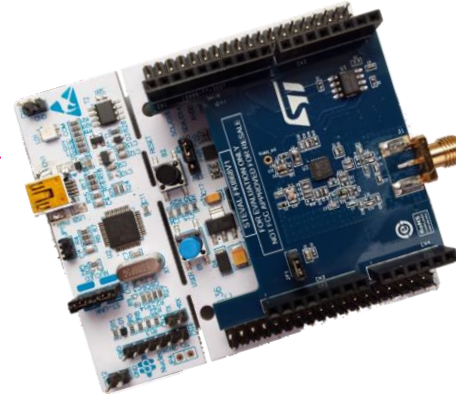
Sub-1GHz RF kits : Wireless M-BUS, Sigfox, 6LowPAN, LPWAN

Development kits based on the ultra-low-power Sub-1GHz S2-LP IC available

**STEVAL-FKI868V2, STEVAL-FKI433V2, STEVAL-FKI512V1, STEVAL-FKI915V1**

The kits come with a **full-featured SDK** and supports SIGFOX connectivity out-of-the-box. The bundle includes an STM32 Nucleo board to start prototyping Sensor-To-Cloud solutions with no need for a local gateway or access point.

Development Kit for Out-of-the-box  
Sensor-to-Cloud Connectivity



Available SIGFOX software libraries for STM32 Cortex M0, M0+, M3 and M4



SOFTWARE PACKAGES:

- [STSW-S2LP-DK](#)
- [STSW-S2LP-SFX-DK](#)



# S2-LPTX collaterals

## Tools for mass market effectiveness



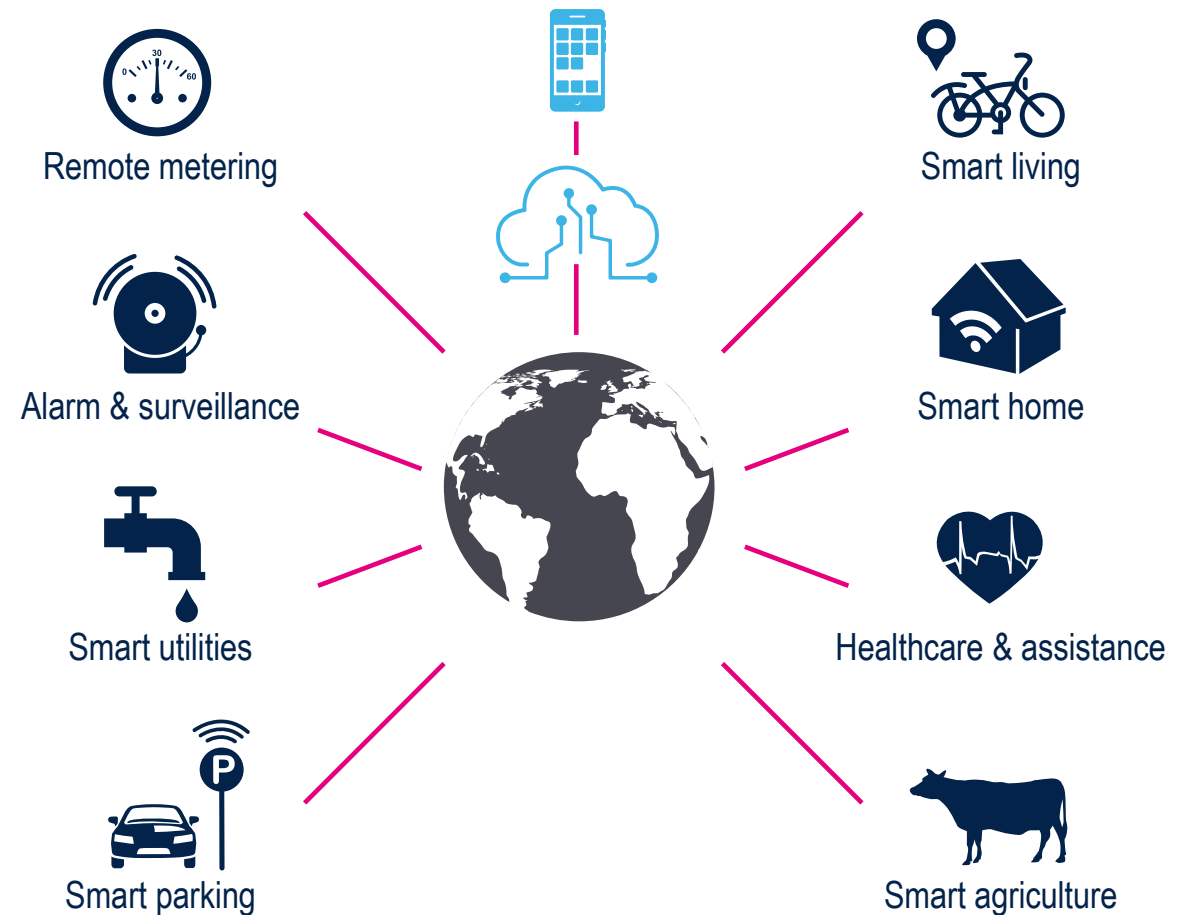
- X-NUCLEO-S2868A2 and X-NUCLEO-S2915A1
- X-CUBE-SUBG1 / 2
- X-CUBE-SFXS2LP1
- FP-ATR-SIGFOX1
- STEVAL-FKI868V2 and STEVAL-FKI915V1
- STSW-S2LP-DK and STSW-S2LP-SFX-DK



- 10 years longevity program
- Product labeled Sustainable Technology
- Sub-1GHz quick reference guide [link](#)
- Sub-1GHz flyer [link](#)



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# S2-LPTX key benefits

## Maximum performance for wide variety of applications

Best transmitter solution for sub-1GHz

Thanks to ultra low power mode, and ability to quickly switch between power-saving and active modes

No recertification needed for Sigfox

Since S2-LPTX has the same transmission path of the S2-LP, there is no need to redo the Sigfox testing

Market enabler for cost sensitive applications

One-way data connectivity, remote monitoring, and Cloud access in a cost-efficient flavor

Ready-to-go software, libraries, and hardware development kits

User friendly development tools that will help you to cut the wires: from setup to Cloud connection

10-years longevity

Part of ST longevity program: long-term availability for industrial applications.

# Our technology starts with You



Find out more at [www.st.com/s2lp](http://www.st.com/s2lp)

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