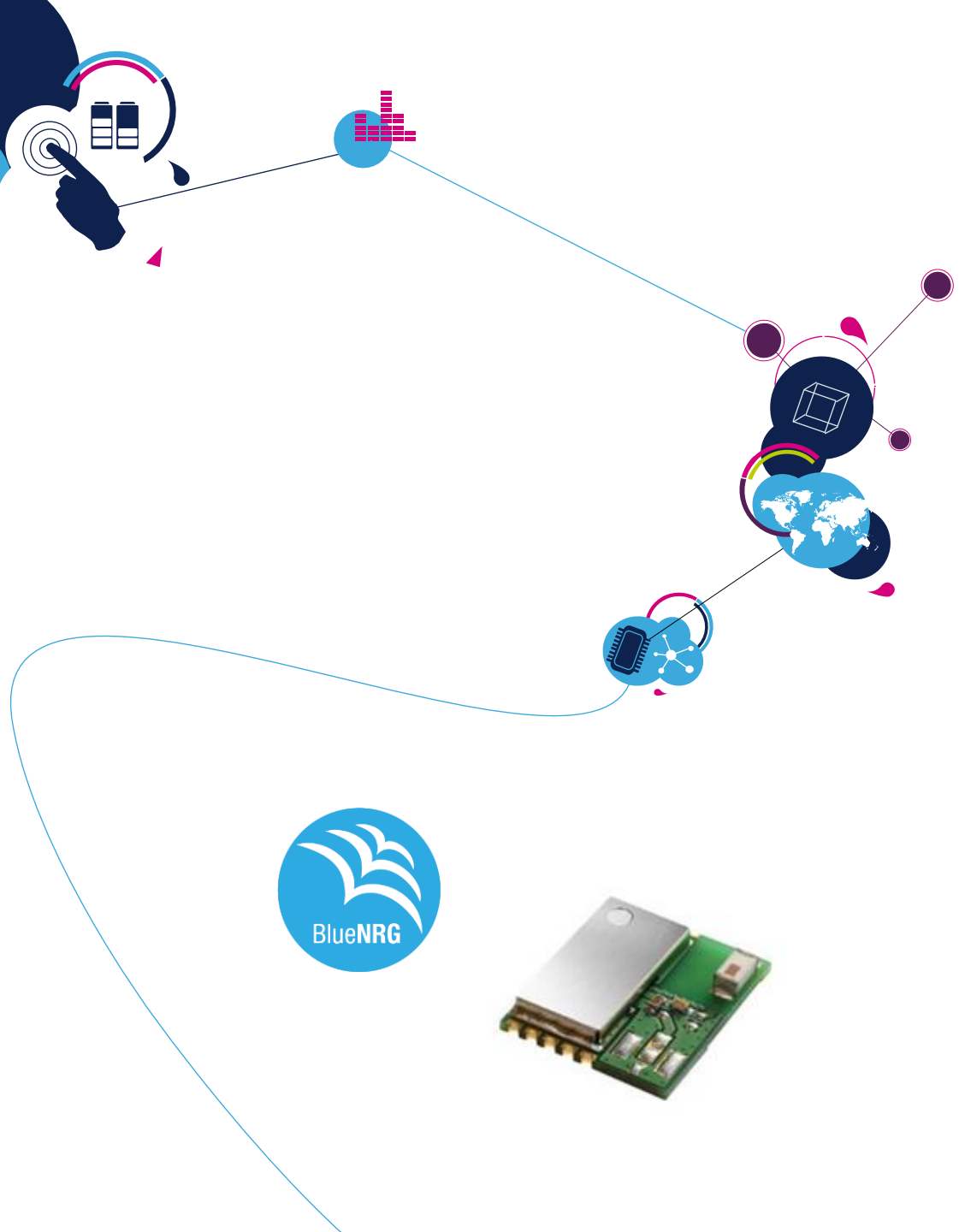


# SPBTLE-1S ArTM

October 2017

STMicroelectronics



# BlueNRG Product Family

for smart innovators

2

Wearable



Beacon / Retail



PC accessories



Medical



Toys / Gaming



Automotive



ePayment



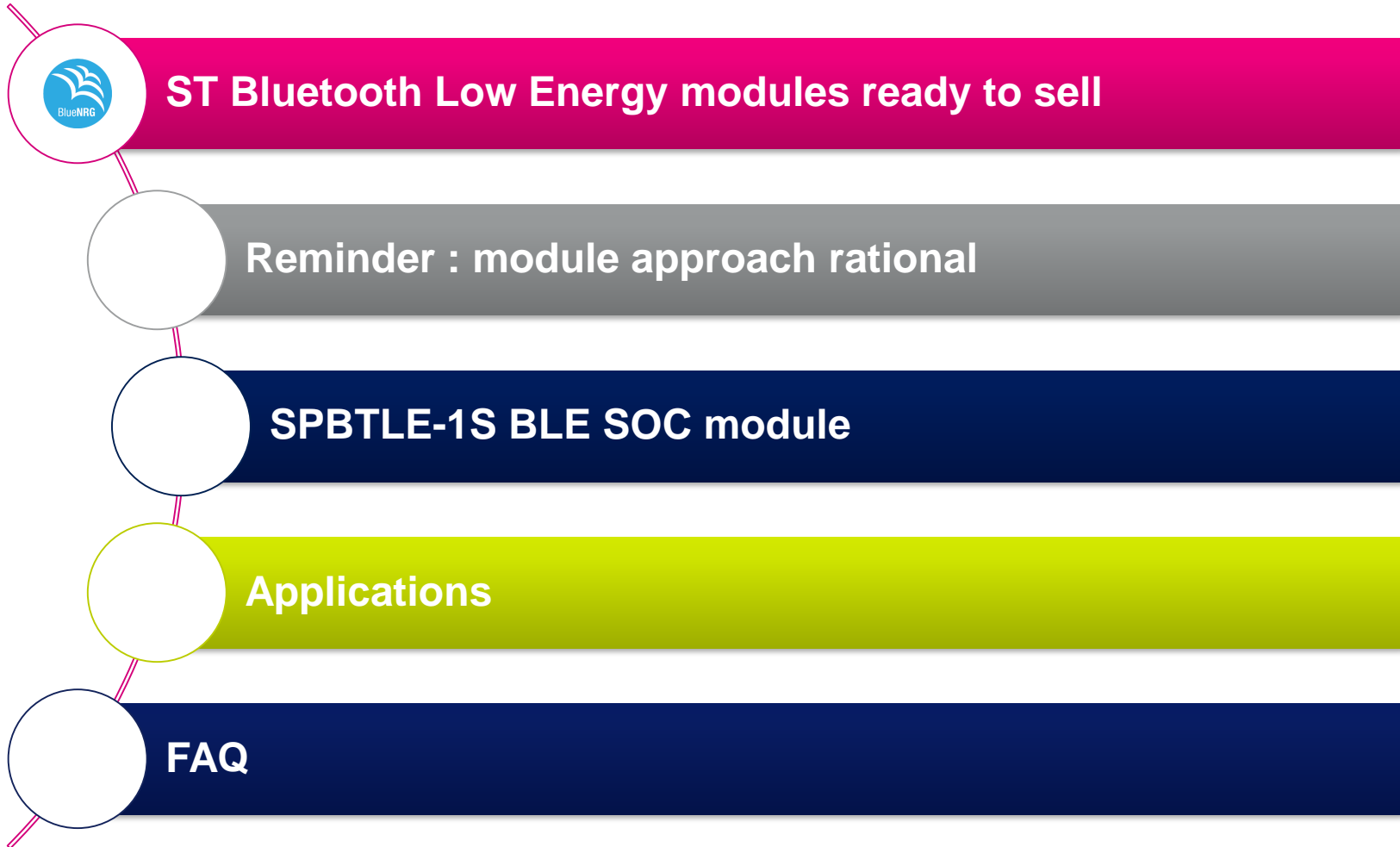
Smart Home



Tags and Finders



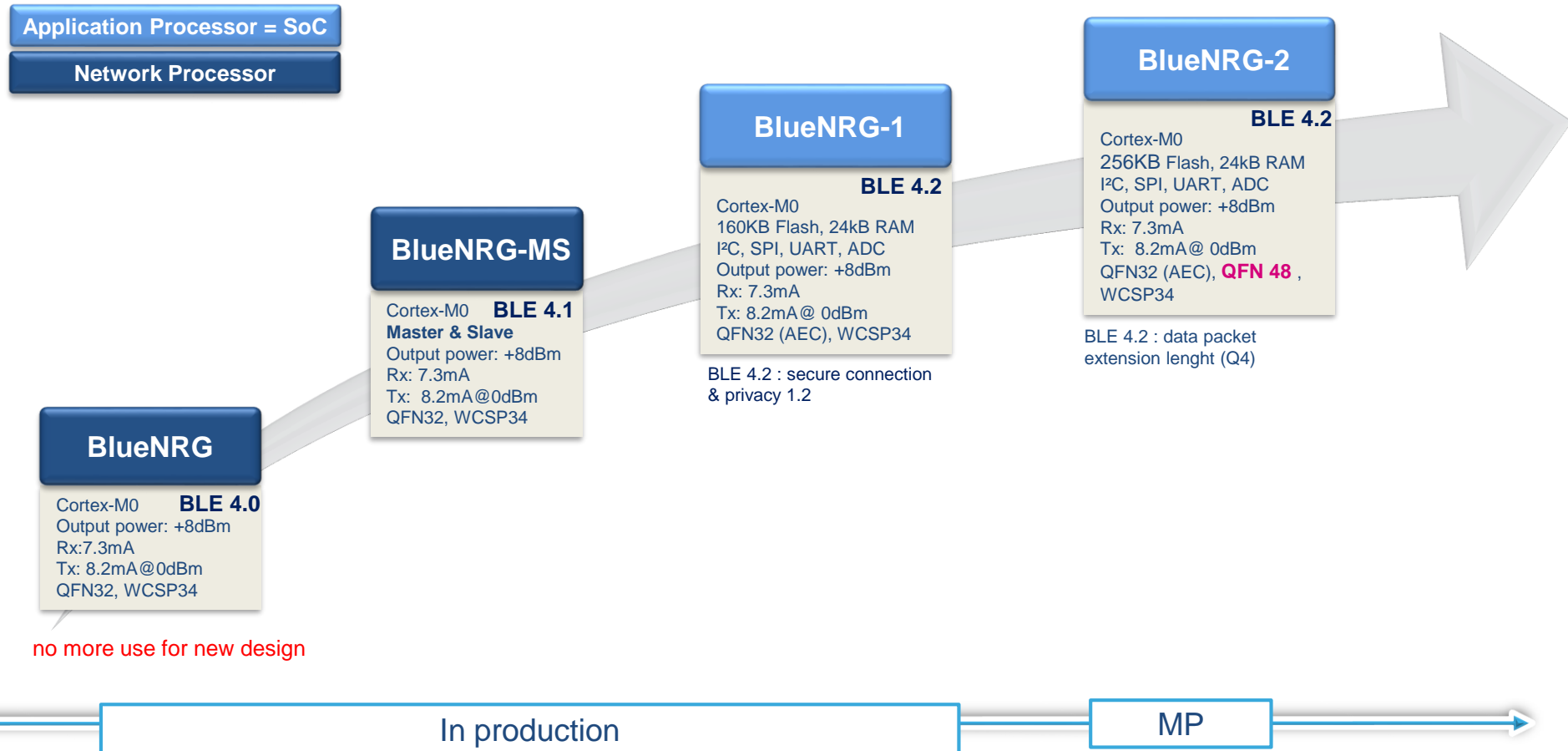
Industrial





# Bluetooth® SMART offering Roadmap

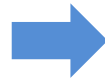
Discrete 4





### SPBTLE-RF

FCC, CE **BLE 4.1**  
Cortex-M0  
**Master & Slave**  
Output power: +4dBm  
11.5x13.5x2



### SPBTLE-RF0

FCC, CE **BLE 4.1**  
Cortex-M0  
**Master & Slave**  
Output power: +4dBm  
11.5x13.5x2

<3\$



### BlueNRG-MS

Cortex-M0  
**Master & Slave**  
Output power: +8dBm  
Rx: 7.3mA  
Tx: 8.2mA@0dBm  
QFN32, WCSP34



### BlueNRG-1

Cortex-M0  
160KB Flash, 24kB RAM  
I<sup>2</sup>C, SPI, UART, ADC  
Output power: +8dBm  
Rx: 7.3mA  
Tx: 8.2mA@ 0dBm  
QFN32 (AEC), WCSP34



11.5 mm x 13.5 mm

### SPBTLE-1S

FCC, CE **BLE 4.2**  
Cortex-M0  
160KB Flash, 24kB RAM  
I<sup>2</sup>C, SPI, UART, ADC  
Output power: +4dBm  
11.5x13.5x2

BLE 4.2 : secure connection  
& privacy 1.2

In production



**ST Bluetooth Low Energy modules ready to sell**



**Reminder : module approach rational**



**SPBTLE-1S BLE SOC module**



**Applications**



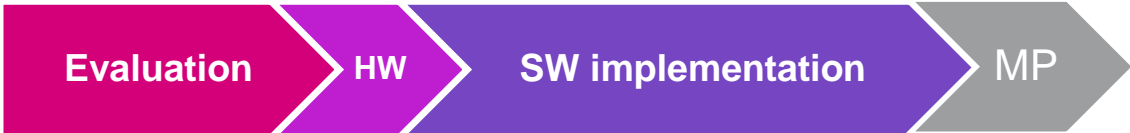
**FAQ**



BlueNRG-1



SPBTLE-1S



Modules designed for time to market

Regional and BLE  
RF certifications



Modules designed for time to market



SPBTLE-1S



&



EU



US



Can



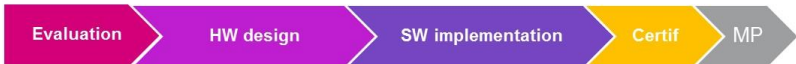
China



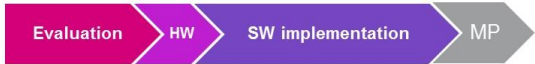
Japan (coming soon)



BlueNRG-1



SPBTLE-1S











For which volume should I consider SPBTLE-1S vs. BlueNRG-1 ?

Depends of course of BOM, application complexity, RF knowledge & certification required

	BOM \$	Dev \$	Certification\$
		HW design more complex & RF knowledge required SW effort is identical	Regional RF certification = region × 8000\$  BT RF certification = 15000\$
		Easy HW design SW effort is identical	No certification needed



**ST Bluetooth Low Energy modules ready to sell**

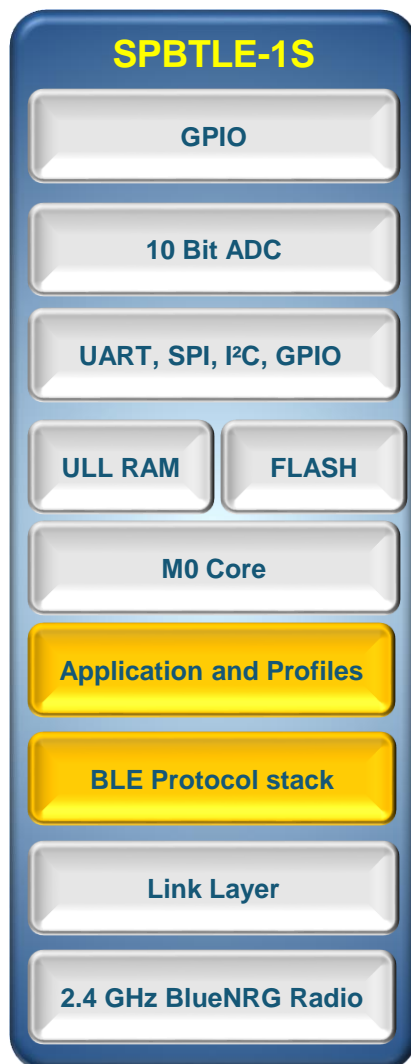
**Reminder : module approach rational**



**SPBTLE-1S BLE SOC module**

**Applications**

**FAQ**



### SPBTLE-1S Module

- Bluetooth v4.2 security compliant

### Core & Memories

- Cortex-M0 @ 32MHz
- RAM: 2x12KB Ultra Low Leakage
- Flash: 160KB (60KB Minimum stack)

### Peripherals

- Up to 14xGPIO
- 1xSPI, 2xI<sup>2</sup>C, 1xUART, 1x10-bit ADC
- Timer, ADC, WDG & RTC, PDM.

### Extended Operating range

- 1.7 up to 3.6V
- 40 up to +85°C

### Radio Performance

- Up to +5dBm
- Rx 7.3 mA and Tx 8.2 mA @ 0dBm
- Sleep current < 1µA

### Packages

- 11.5x13x2
- Compatible with SPBTLE-RF



EU



US



Can



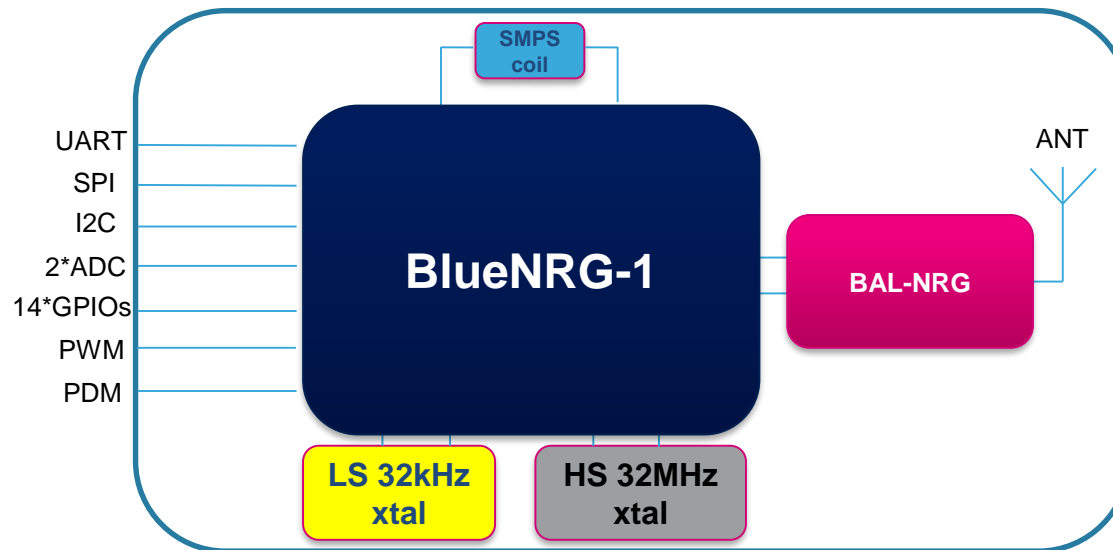
China



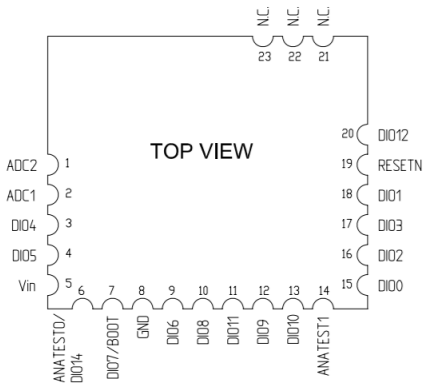
Japan (coming soon)

- SPBTLE-1S is a 11.5\*13.5\*2 mm module integrating:
  - BlueNRG-1 SOC (CSP package)
  - BAL-NRG-01D3 balun
  - 32kHz & 32MHz Xtal
  - 10uH SMPS coil
  - 2.4Ghz ceramic antenna

(<http://www.johansontechnology.com/datasheets/antennas/2450AT18A100.pdf>)



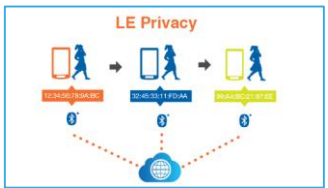
### SPBTLE-1S pinning



- ### SPBTLE-1S IOs
- Below table summarizing IOs and possible functions
  - SPBTLE-1S is base don BlueNRG-1 **CSP** so DIO13 not available
  - If using SPI interface, pay attention to **wake up** capabilities of IO selected


	Special feature	GPIO mode "000"				Mode serial 1 "001"		Mode serial 0 "100"		Microphone / ADC mode "101"	
		Type	Reset	Pup/down	Signal	Type	Signal	Type	Signal	Type	Customer
DIO0		I/O	I PD	PD	GPIO 0	I	UART_CTS	I/O	SPI_CLK		
DIO1		I/O	I PD	PD	GPIO 1	O	UART_RTS	I/O	SPI-CS1	I	PDM_DATA
DIO2		I/O	I PD	PD	GPIO 2	O	PWM0	O	SPI_OUT	O	PDM_CLK
DIO3		I/O	I PD	PD	GPIO 3	O	PWM1	I	SPI-IN	O	ADC_CLK
DIO4		I/O	I PD	PD	GPIO 4	I	UART_RXD	I/O	I2C2_CLK	O	PWM0
DIO5		I/O	I PD	PD	GPIO 5	O	UART_TXD	I/O	I2C2_DAT	O	PWM1
DIO6		I/O	I PD	PD	GPIO 6	O	UART_RTS	I/O	I2C2_CLK	I	PDM_DATA
DIO7	Boot mode (IO7 high)	I/O	I PD	PD	GPIO 7	I	UART_CTS	I/O	I2C2_DAT	O	PDM_CLK
DIO8		I/O	I PD	PD	GPIO 8	O	UART_TXD (bootloader)	I/O	SPI_CLK	I	PDM_DATA
DIO9	wake up capable	I/O	I PU	PU	GPIO 9	I	SWCLK	I	SPI-IN		
DIO10	wake up capable	I/O	I PU	PU	GPIO 10	I	SWDIO	O	SPI_OUT		
DIO11	wake up capable	I/O	I PU	PU	GPIO 11	I	UART_RXD (bootloader)	I/O	SPI-CS1		
DIO12	wake up capable	OD	I	No Pull	GPIO 12	I		I/O	I2C1_CLK		
DIO14		I/O	I PD	PD	GPIO 14	I/O	I2C1_CLK	I/O	SPI_CLK	O	ADC_DATA

### BLE 4.2 secure features



	BlueNRG-1 SPBTLE-1S	BlueNRG-2
privacy 1.2	✓ @st. com DK 2.5.0	✓ @st. com DK 2.5.0
secure connection 4.2	✓ @st. com DK 2.5.0	✓ @st. com DK 2.5.0
data packet extended length		✓ end Q4

### BLE 4.2 End Product certified

**Bluetooth**

You are not logged in  
[Home](#) | [Register](#) | [Login](#)

Events

Resources

- Knowledge Base
- Qualified Listings
- List of BQTFs
- Member Directory

Report Issues

Select Language ▾

Search site  [Search](#) ▸

#### Listings Search

Information Test Plan Generator will be replaced with the new qualification and declaration tool, Launch Studio, later this fall. All projects, including all listings, will automatically be migrated to the new tool when it is live, and you will be automatically redirected to the new tool. We will continue to communicate with more detail as we approach the release of Launch Studio.

Note: Please click on the label for help on individual search criteria or open this [help file](#) for help on all search criteria. Please provide [feedback](#) on this new search.

Simple Search

Search:

Search In:

- ☒ Qualifications & Declarations
- ☒ End Product List (EPL)
- ☒ Qualified Products List (PRD 1.0)

Rows Per Page:

[Search](#) [Reset](#)

[Advanced Search >>](#)

Note: Search results are limited to 2,500 rows to ensure sufficient search performance. If your results show 2,500 rows, please refine your search criteria.

Number of item(s) found per list:

- Qualifications & Declarations: 1
- End Product List (EPL): 0
- Qualified Products List (PRD 1.0): 0

Total Records Found: 1

QD ID ▾	QDL2 ▾	Declaration ID ▾	Design Name ▾	Product(s) ▾	Company ▾	Product Type(s) ▾	Spec Name ▾	Date ▾	More Info ▾
<a href="#">92838</a>	Yes	<a href="#">D034470</a>	SPBTLE-1S	SPBTLE-1S, SPBTLE-1S	STMicroelectronics	End Product	4,2	15-Mar-2017	

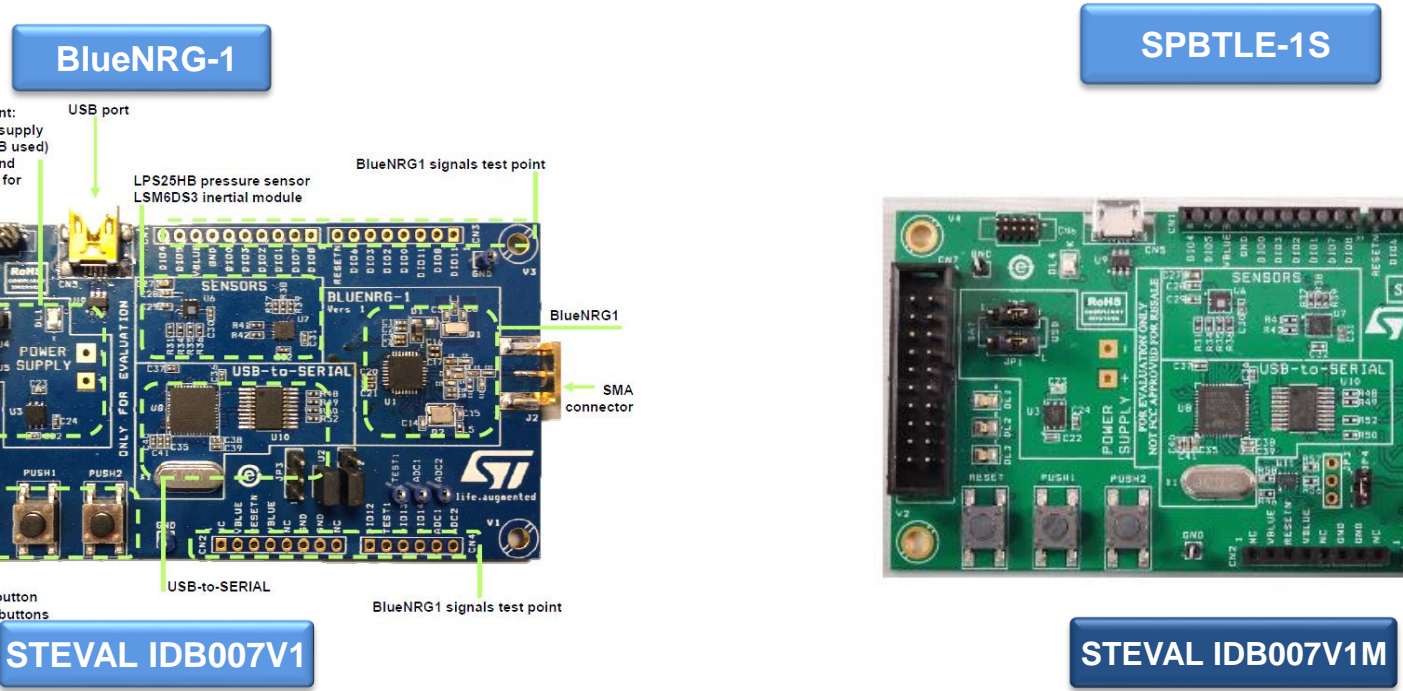


QDID 92838 | SPBTLE-1S | End Product | BLE 4.2



HW & SW certified

### DK HW Resources




**1 SW development kit**  
**@ STSW-BLUENRG1-DK**




### SW DK - BLE examples



- 
- BlueNRG-1 STEVAL-IDB007V1 is based on **16Mhz** , default images and associated code examples are so based on **16Mhz**

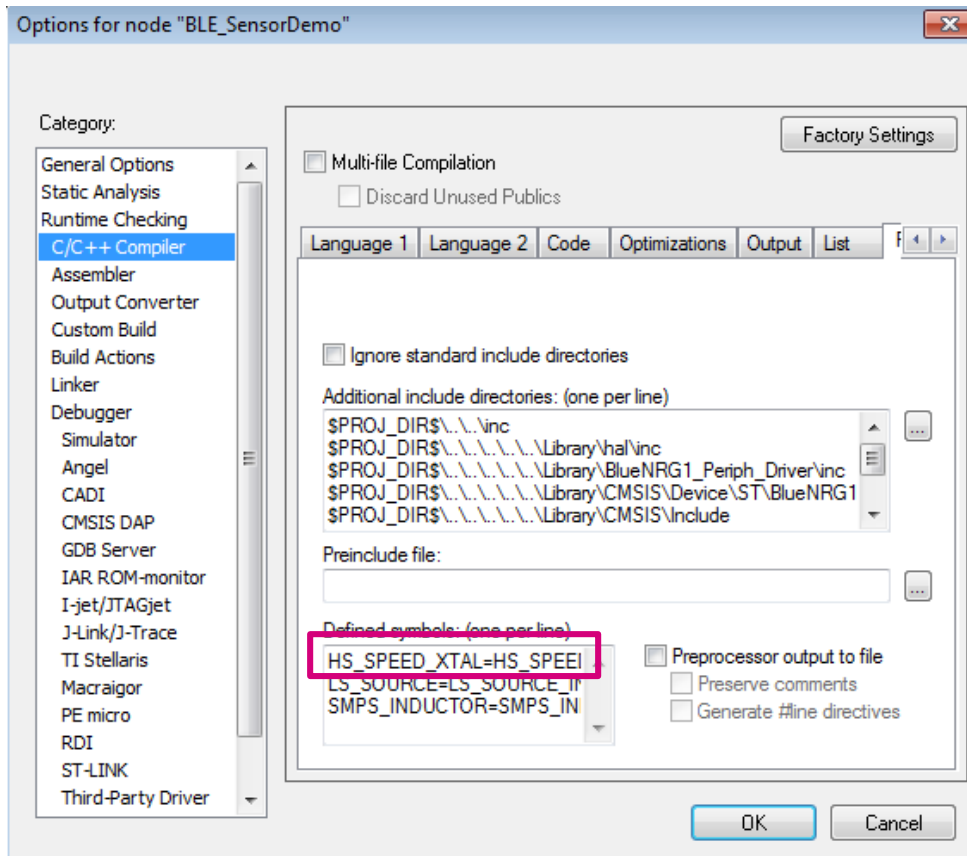


- 
- Compilation option need to be modified in IDE **build options** to be compliant to SPBTLE-1S integrating a **32Mhz**



**HS\_SPEED\_XTAL=HS\_SPEED\_XTAL\_32MHZ**

### SW DK - BLE examples



STEVAL IDB007V1

HS\_SPEED\_XTAL=HS\_SPEED\_XTAL\_16MHZ

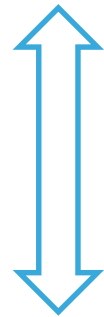
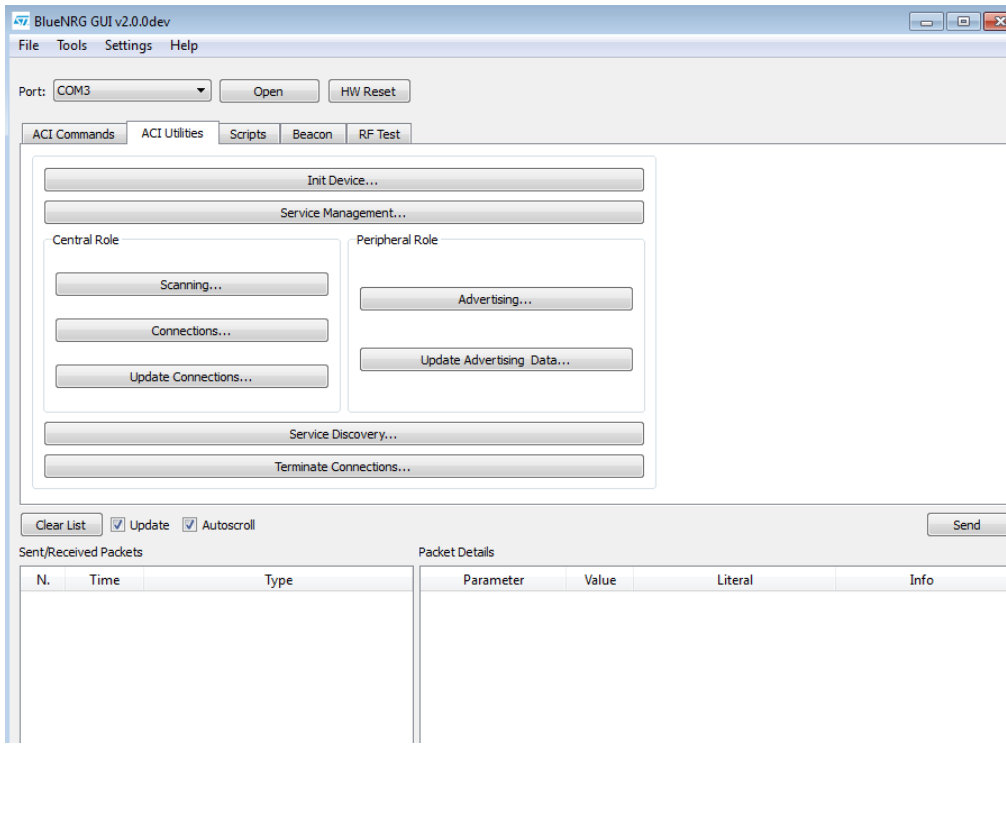
STEVAL IDB007V1M

HS\_SPEED\_XTAL=HS\_SPEED\_XTAL\_32MHZ



### ST BLE GUI

@ STSW-BNRGUI



Comprehensive GUI to understand BLE  
concept and associated ST APIs

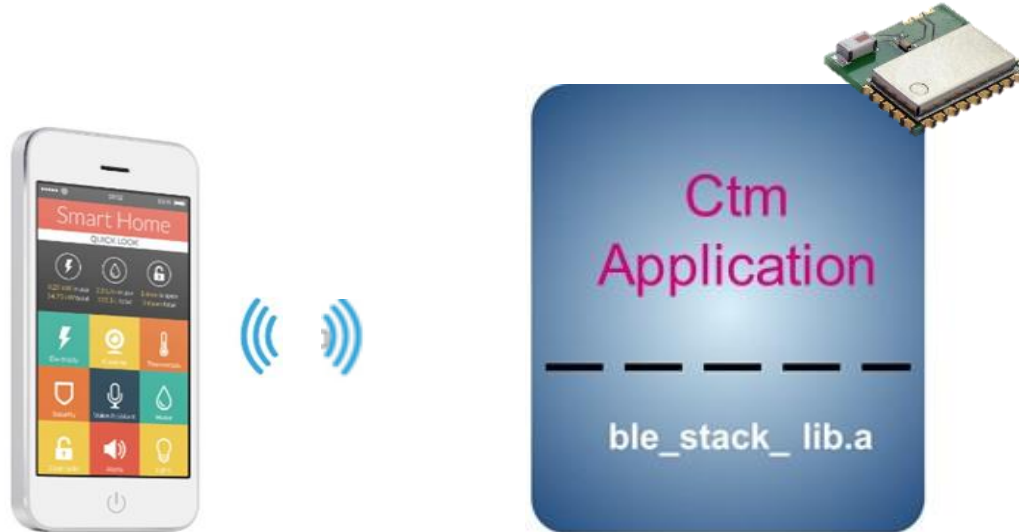
# SPBTLE-1S Development Tools

## Navigator promotion tool not compatible

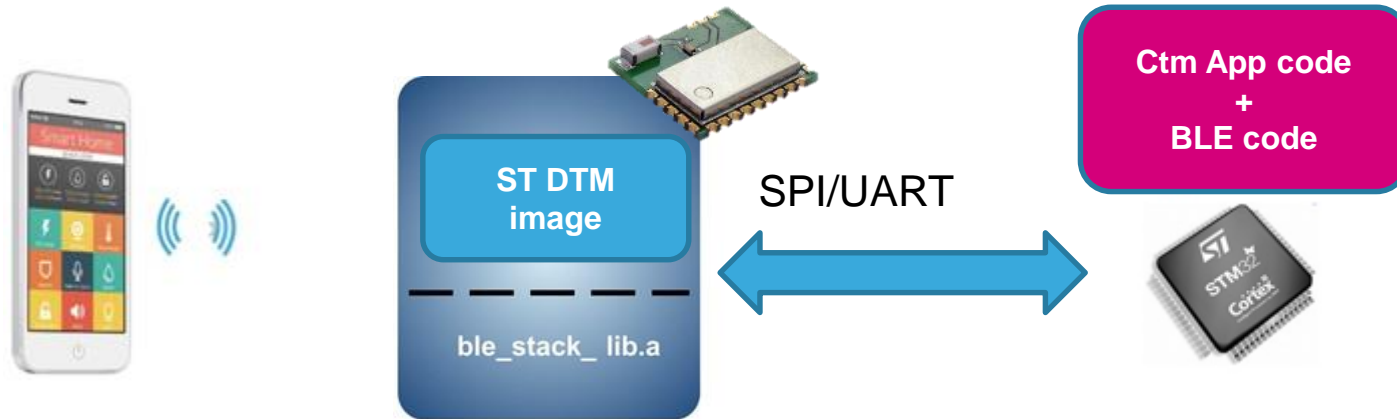
21



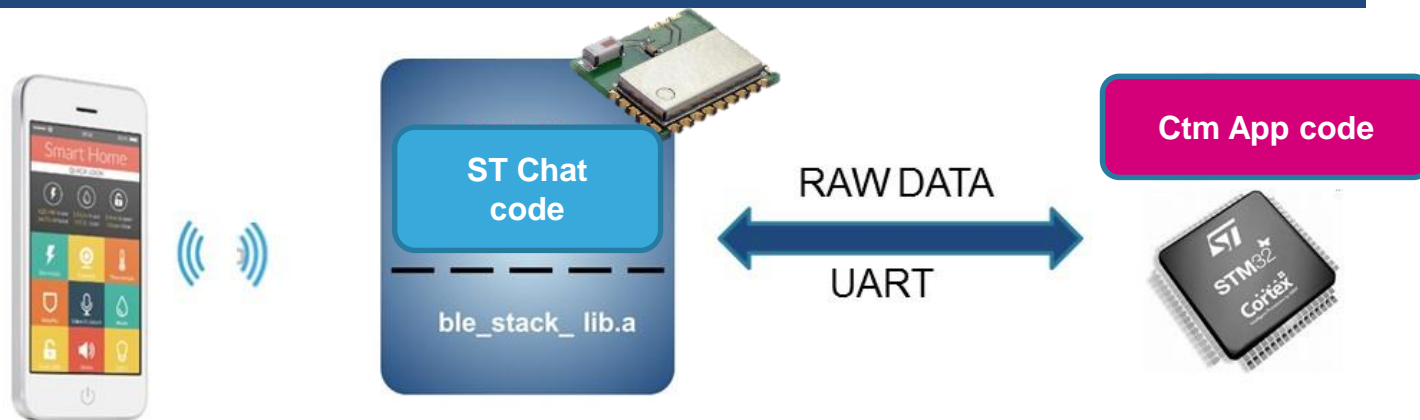
### SPBTLE-1S as unique SOC



### SPBTLE-1S as true network processor



### SPBTLE-1S as data pump : UART serial port emulation over BLE



# SPBTLE-1S Modules on the web

## support tools

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### Module



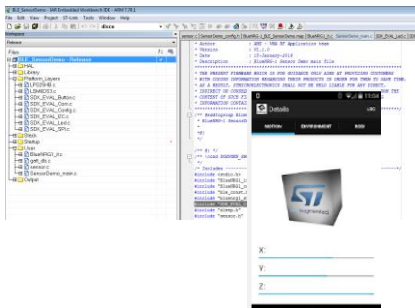
Order code	Description
SPBTLE-1S (Tray)	Bluetooth Low Energy Application Processor Module – 4.2
SPBTLE-1STR (Tape & Reel)	Bluetooth Low Energy Application Processor Module – 4.2

### Evaluation boards



Order code	Description
STEVAL-IDB007V1M	Evaluation platform based on SPBTLE-1S Module
STEVAL-BLUEMIC1	Ultra low power Bluetooth low energy microphone based on SPBTLE-1S

### Other tools



Order code	Description
STSW-BLUENRG1-DK	Software Design Kit
STSW-BNRGUI	Graphical User Interface
STSW-BNRG1STLINK	ST-LINK utility
STSW-BNRG001	Power consumption estimation tool
STSW-BLEPROFILES	Bluetooth low energy profiles





**ST Bluetooth Low Energy modules ready to sell**

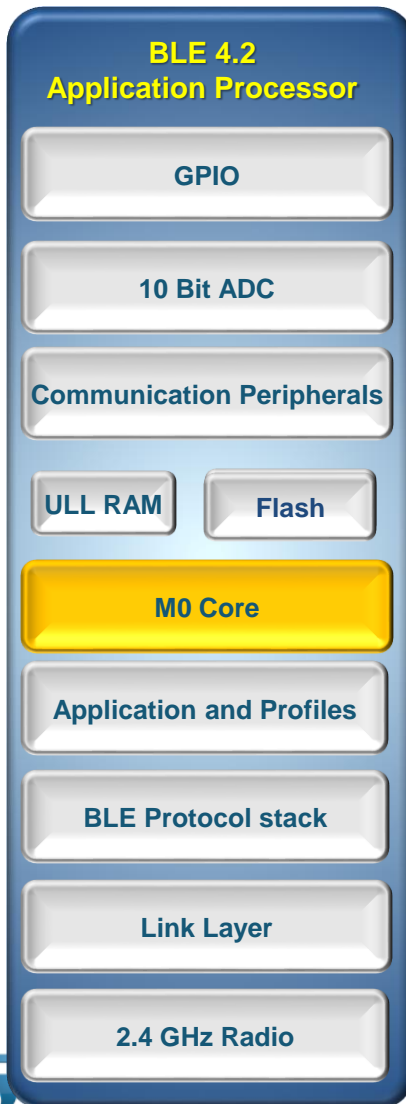
**Reminder : module approach rational**

**SPBTLE-1S BLE SOC module**



**Applications**

**FAQ**



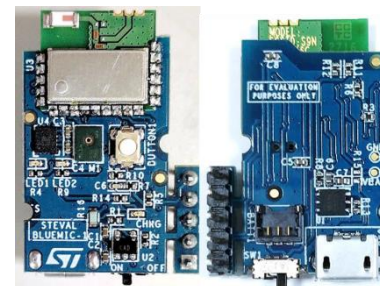
enable low to mid end smart connected applications



Beacon  
Sensor tags  
Remote Control

## Remote Controller – Turn Key solution

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### STEVAL-BLUEMIC1

Based on **SPBTLE-1S**: BlueNRG-1 Module

- Single chip RCU turn-key solution
  - Control + Voice wireless connectivity
  - Leverage on BlueVoice for Voice-over-BLE
  - Low cost PCB with QFN package
  - Software upgrade via BLE





**ST Bluetooth Low Energy modules ready to sell**

**Reminder : module approach rational**

**SPBTLE-1S BLE SOC module**

**Applications**

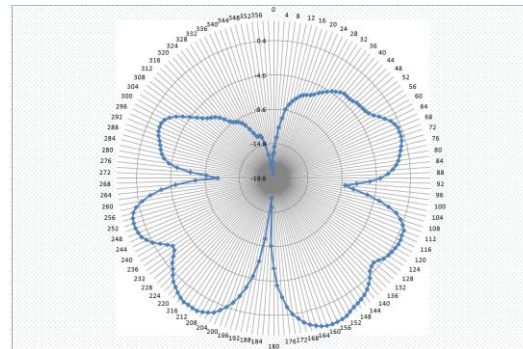
 **FAQ**



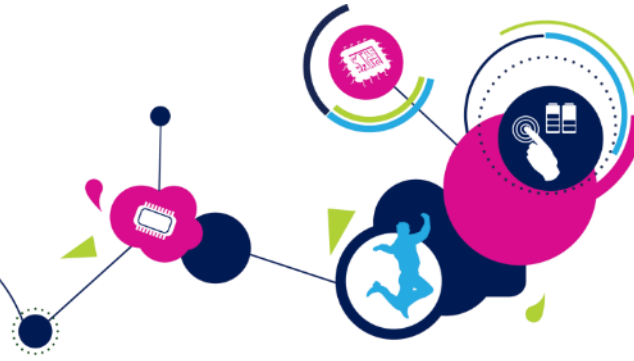
- What is maximum output power ?
  - The output power is limited to +5dbm
  - Nothing prevent user to set higher power but certification is then no more valid
- Can I access to all BlueNRG-1 I/Os?
  - SPBTLE-1S IOs are exactly the one from BlueNRG-1 in CSP package
  - It means DIO13 is not available with SPBTLE-1S
- Can I host application inside SPBTLE-1S?
  - Of course , and hope documentation was clear enough
  - Specific documentation available from [rf-support-emea@st.com](mailto:rf-support-emea@st.com)
- Can I order STEVAL-IDB007V1M ?
  - Eval kit is available and orderable



- Where can I found certification evidence?
  - Full certification package available from [rf-support-emea@st.com](mailto:rf-support-emea@st.com)
- What is antenna used and what are module radiated performances?
  - Antenna used is a ceramic antenna from Johanson  
<http://www.johansontechnology.com/datasheets/antennas/2450AT18A100.pdf>
  - Radiation pattern is also available



ANY QUESTIONS ?  
[rf-support-emea.com](http://rf-support-emea.com)



ST stands for  
**life.augmented**