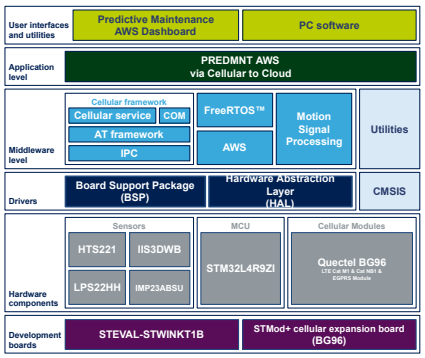
STSW-STWINCELL

Data brief

Cellular to cloud connectivity software package for STEVAL-STWINKT1B evaluation kit for industrial IoT applications



Features

- Environmental, pre-processed time and frequency domain vibration data and algorithms for ultrasound emissions
- Acts as a host for cellular connectivity applications supporting LPWAN technologies (LTE Cat M1 and NB-IoT)
- Connectivity to IoT cloud using MQTT protocol
- Compatible with DSH-PREDMNT AWS cloud dashboard for remote data monitoring
- FreeRTOS™ third party RTOS kernel for embedded devices
- Signal processing (MotionSP) middleware for vibration analysis in:
  - time domain: speed RMS and acceleration peak
  - frequency domain: FFT with programmable size, averaging, overlapping and windowing
- PC terminal boot menu via VCOM for device FW customization (APN, cloud API key)
- Supports IAR™, Keil®, and GCC-based development environments

Description

The STSW-STWINCELL software package enables the connection of industrial nodes to the Internet via cellular networks. It represents a baseline solution that developers can build on to reduce design cycle overheads on their final products and applications.

The software performs time domain and spectral analysis on IIS3DWB accelerometer (up to 6 kHz), environmental (temperature, pressure and relative humidity) and ultrasound data (up to 80 kHz), and transmits results to the DSH-PREDMNT AWS cloud dashboard application using the MQTT protocol.

The firmware runs on the STEVAL-STWINKT1B SensorTile Wireless Industrial Node development kit MCU (STM32L4R9ZIJ6), and requires the additional STMod+ cellular expansion board featuring the BG96 modem by Quectel (LTE Cat M1/NB-IoT/2G fallback).

The cellular expansion board is included in the P-L496GCELL02 discovery pack or available as STEVAL-STMODLTE.

Note: STEVAL-STMODLTE is available for US and Canada markets only.

Product summary	
Software package for STEVAL-STWINKT1B	STSW-STWINCELL
SensorTile wireless development kit	STEVAL-STWINKT1B
LTE Cellular to Cloud Pack	P-L496G-CELL02
LTE expansion board for STMod+	STEVAL-STMODLTE
Ultra-low-power ARM Cortex-M4 MCU	STM32L4R9ZIJ6
IDEs	• Keil • IAR Embedded Workbench • STM32CubeIDE
Applications	Condition Monitoring / Predictive Maintenance Sensing

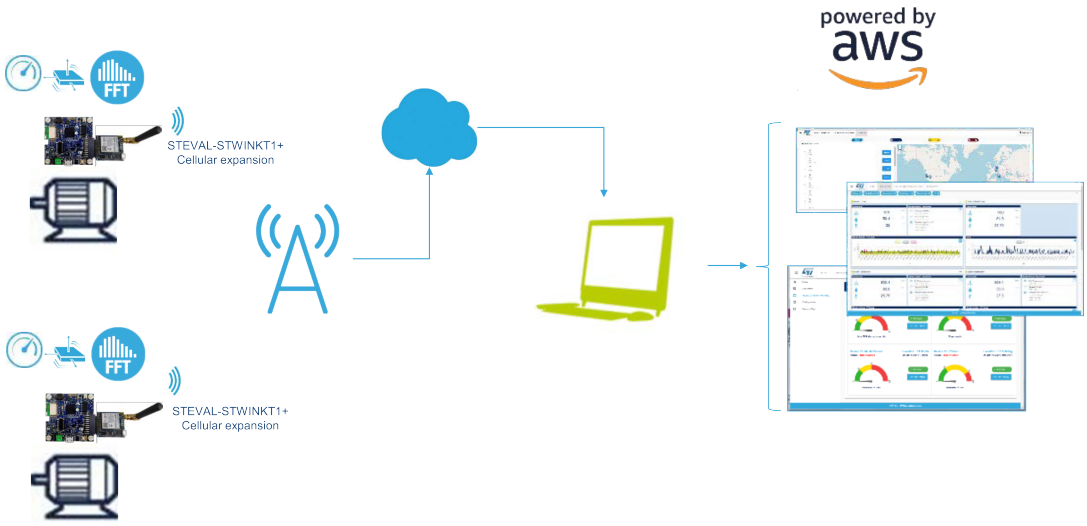
1 Application scenario

The STSW-STWINCELL software package helps you explore and develop cellular network connectivity in condition monitoring and predictive maintenance applications.

This software is compatible with DSH-PREDMNT AWS dashboard, so you can to remotely monitor industrial equipment fitted with intelligent sensor nodes, and come to terms with the fast growing application segments revolving around condition monitoring and predictive maintenance technologies.

In this scenario, the cellular modem will support several network protocols such as 2G, 3G, LTE Cat M1, or NB-IoT (also known as NB1) in order to be able to negotiate an appropriate connection with an available network.

Figure 1. STSW-STWINCELL package - handling of cellular IoT connectivity from an intelligent sensor node



2 STM32Cube development environment

STM32Cube is a combination of a full set of PC software tools and embedded software blocks running on STM32 microcontrollers and microprocessors:

- STM32CubeMX configuration tool for any STM32 device; it generates initialization C code for Cortex-M cores and the Linux device tree source for Cortex-A cores
- STM32CubeIDE integrated development environment based on open-source solutions like Eclipse or the GNU C/C++ toolchain, including compilation reporting features and advanced debug features
- STM32CubeProgrammer programming tool that provides an easy-to-use and efficient environment for reading, writing and verifying devices and external memories via a wide variety of available communication media (JTAG, SWD, UART, USB DFU, I2C, SPI, CAN, etc.)
- STM32CubeMonitor family of tools (STM32CubeMonRF, STM32CubeMonUCPD, STM32CubeMonPwr) to help developers customize their applications in real-time
- STM32Cube MCU and MPU packages specific to each STM32 series with drivers (HAL, low-layer, etc.), middleware, and lots of example code used in a wide variety of real-world use cases
- STM32Cube expansion packages for application-oriented solutions

Revision history

Table 1. **Document revision history**

Date	Version	Changes
17-Mar-2020	1	Initial release.
03-Apr-2020	2	Updated cover page image.
01-Mar-2021	3	Added STEVAL-STMODLTE and STEVAL-STWINKT1B compatibility information.