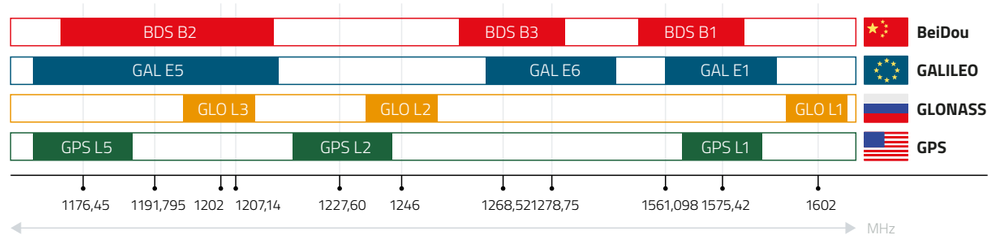
POSITIONING & TIMING GNSS

INTRODUCTION

GNSS

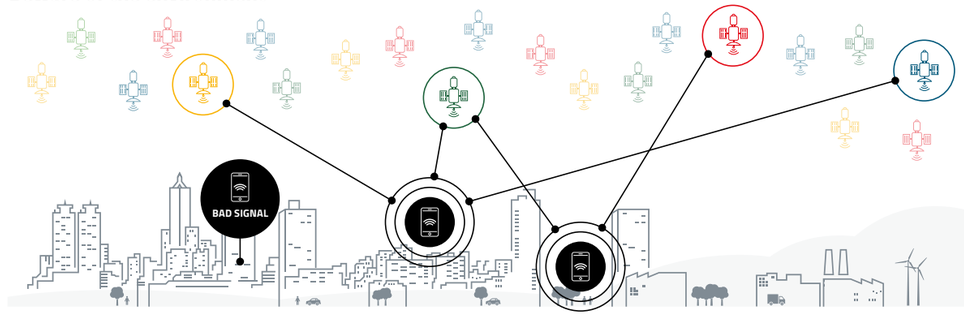
GNSS (Global Navigation Satellite System) is a system, which provides positioning and time synchronization capabilities to an unlimited number of users worldwide. The system is based on signals from the following four satellite constellations.

GNSS Frequency Bands



Signals from the different constellations can coexist on the same frequency bands. Each GNSS provides different signals and services over these frequency bands with different access policies. For example, open signals on the L1 frequency band are mostly used for civil commercial applications.

Beware of the environment



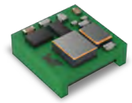
The application environment of the receiver plays an important role in the navigation, with best performance obtained in open-sky conditions. Presence of obstacles and multipath effects define a GNSS challenging environment (e.g. urban canyons), where the receiver has to work with fewer and weaker signals. This makes multi-GNSS even more decisive to the receiver's performance, since more satellites are available for tracking in a given area.

Areas of Application

- Tracking and navigation devices
- Container localization
- Fleet management
- Location support for rescue
- Cartography
- Autonomous agricultural machines
- Geotagging for digital cameras
- Animal tracking
- Time reference for worldwide events/ machine synchronization

PRODUCT OVERVIEW

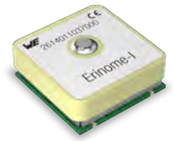
Elara-I



Elara-II

Real size

One of the smallest GNSS modules on the market.



Erinome-I

Erinome-II

Characteristics

Smallest GNSS module (Elara Series)

001101
010100
101101
NMEA + OSP protocol

High update rate

Multi constellation

- Integrated / external antenna variants
- Multi-GNSS (+SBAS and QZSS) supported
- Unbeaten accuracy and time to first fix performances
- High update rate (up to 10 Hz)
- Low power modes
- UART, I²C and SPI interface
- EDA libraries
- Wireless Evaluation Board

we-online.com/GNSS

Differences

	Base Line		Advanced Line	
	Elara-I	**Elara-II**	**Erinome-I**	**Erinome-II**
Order Code	2613011037000	2613021137000	2614011037000	2614021137000
Onboard antenna	✔	-	✔	-
Dimensions [mm]	10 x 10 x 5.9	4.1 x 4.1 x 2.2	18 x 18 x 6.4	7 x 7 x 1.6
GNSS constellations supported	GPS, GLONASS +QZSS, SBAS	GPS, GLONASS, +QZSS, SBAS	GPS, GLONASS, Galileo, Beidou, +QZSS, SBAS	GPS, GLONASS, Galileo, Beidou, +QZSS, SBAS
Accuracy [m]	1.5	1.5	1.5	1.5
Time To First Fix (cold start) [sec]	28	28	28	28
Max update rate [Hz]	5	5	10	10
Number of concurrent GNSS [max]	2	2	3	3
Supply voltage [V]	1.8	1.8	3.3	1.8
Interfaces	UART, I²C, SPI	UART, I²C, SPI	UART, I²C, SPI	UART, I²C, SPI
GNSS chipset	SiRFstar V B01	SiRFstar V B01	SiRFstar V B02	SiRFstar V B02
High sensitivity	✔	✔	✔	✔
Integrated LNS, SAW filter, TCXO, RTC	✔	✔	✔	✔

External Antenna Halimede-I

- Active GNSS antenna
- Power supply: 3 - 5 V
- SMA connector and 3 meters cable
- GPS, GLONASS, Galileo, Beidou
- IP66 - water resistant against powerful jets
- CE declaration
- Suitable for challenging GNSS environment

External Antenna WE-MCA

- SMT multilayer chip antenna
- Extremely low profile
- Omni-directional radiation pattern
- Excellent size to performance ratio
- Smallest form factor in the industry
- Less ground clearance
- Operating temperature: -40 °C to +85°C

OUR FLEXIBLE LOCATOR: GNSS EVALUATION

Evaluation Kit

For a better evaluation of our GNSS modules in the outdoor environment we have developed a special Evaluation Kit with our 2.4 GHz module Thyone-I.

Characteristics

Standalone - Adapted Thyone-I

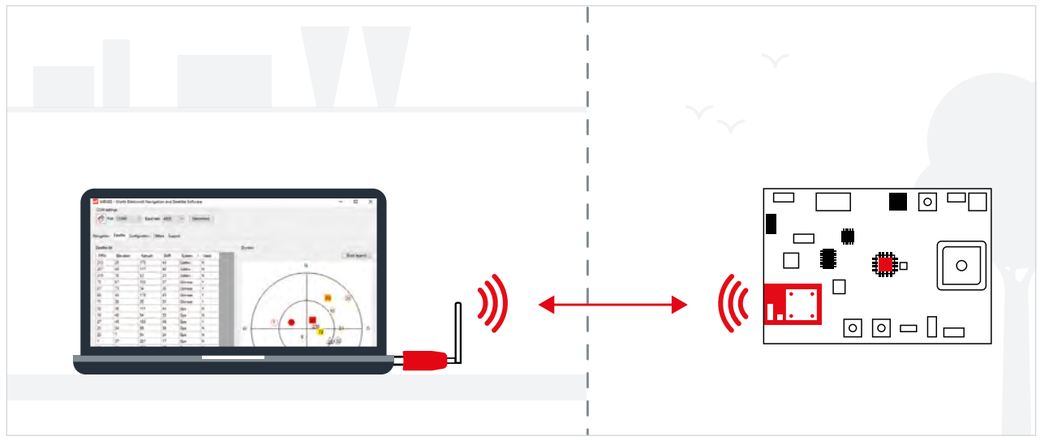
Wireless host connection

Flexible placement

Navigation Satellite Software - WENSS

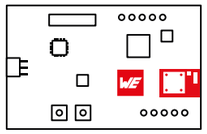
Wireless Operation of the GNSS Evaluation Board:

- ✔ The board provides several power options (USB, battery, external supply).
- ✔ Allows testing the GNSS module without cable connection between its evaluation board and the host PC.
- ✔ An adapted version of Thyone-I RF module is implemented. GNSS module is talking directly (without further µC) to Thyone-I.
- ✔ Messages coming from the GNSS module are delivered via UART to the Thyone-I module on the evaluation board.
- ✔ The Thyone-I module on the evaluation board broadcasts all arriving messages.
- ✔ Other Thyone-I units (e.g. our USB stick) in the area receive the messages.
- ✔ If these Thyone-I units are connected to a host PC, WENSS allows communicating with the GNSS module.
- ✔ Eval Board can be placed outside for evaluating in real conditions and the host is located indoor.



ADDED VALUES

Development Tools



Eval Boards

- Easy testing
- Rapid prototyping
- FTDI integrated (UART to USB)
- Pins available on header
- Current measurement
- Evaluating different antenna variants (Elara-II, Erinome-II)
- Putting into operation

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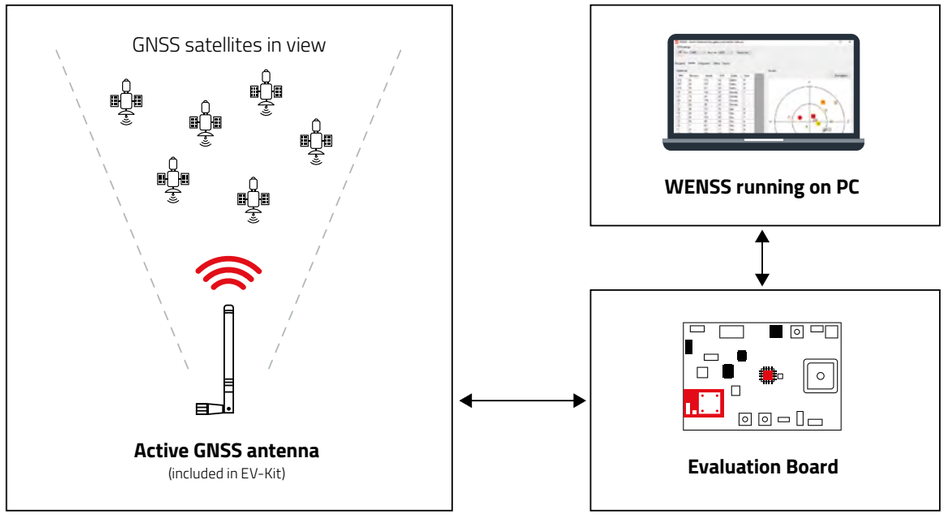
More information on page 150



WENSS: Navigation and Satellite Software

- Proprietary, free-of-charge and user friendly PC tool
- Quick start
- Communication with the GNSS module from a host PC
- Testing module functionalities and features
- Understanding software protocols

Download: WENSS

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AppNotes

ANR017 GNSS Antenna Selection

we-online.com/ANR017

ANR018 GNSS I²C Communication

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Webinar:
Basics of GNSS positioning and receivers' technology