Abeeway
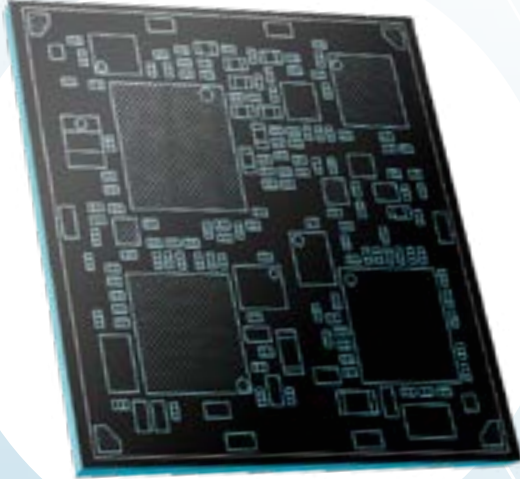## Improve your position

GEOLOCATION MODULE

Compact, comprehensive and cutting-edge

The **Abeeway Geolocation Module** is a **multi-technology fused location LPWAN module** designed as the ideal platform to **develop a wide range of IoT tracking solutions, minimizing the Total Cost of Ownership (TCO) of IoT geolocation use cases.** It allows your engineering to focus on the use case, to **optimize time-to-market and cost** by using less complex PCBs (all high-density devices being encapsulated), to reduce certification risk and budget, as well as testing time and cost for mass production.

This LoRaWAN® fused location module is a **cost effective, ultra-low power and compact form factor SiP (System in Package)** integrating the high performance STM32WB microcontroller (MCU) with integrated Bluetooth 5.x Low Energy transceiver, the latest LoRaWAN® radio transceiver from Semtech, and an optimized arrangement of multi-technology RF engines for indoor and outdoor positioning.

Application Areas

• Indoor & Outdoor Asset location: shared scooters tracking, parking policy enforcement, theft protection, tool monitoring on construction sites, cable drum monitoring, supply chain monitoring, cattle tracking and more.

• Indoor & Outdoor safety & productivity solutions: visitor tracking, guard tour monitoring, monitored evacuation, social distancing policies, and so on.

• Consumer Tracking Applications: pet / child / elderly safety and protection. Keep-together bubble for schools and theme parks.

Product Highlights

The module contains a high-performance multi-constellation GNSS receiver (GPS, GLONASS, Beidou, and Galileo) and supports a patented ultra-Low-Power GPS (LP GPS) mode which can provide a network assisted first fix in 3 to 5 seconds from cold start at -157dBm, while requiring extremely low power (only GNSS correlators are active to collect Pseudo-range information). Indoor positioning can be achieved by combining the Bluetooth Low Energy receiver and the ultra-low power Wi-Fi receiver. The LoRa® radio supports the worldwide unlicensed sub-GHz spectrum also supports device-to-device time-of-flight ranging.

The highly configurable peripherals include multiples digital interfaces: I2C/SPI/UART/ USB/GPIOs, an ADC channel input, and I/Os to support various power management schemes. These I/Os and the power of the STM32WB make it possible to use the module not only as fused location provider, but also as the main MCU for any LoRaWAN® application, and to drive an external LTE-M or NB-IoT modem for cellular LPWAN support.

The module is delivered with an application firmware supporting AT commands to easily deploy your IoT applications. ThingPark Location Engine, a cloud-based fused location solver enabling Network TDoA location, LP-GPS, Wi-Fi and Bluetooth location is available through optional subscription.

- Small size: 17 x 17.5 mm
- Operating range: -25°c to +85°

Location technologies

Outdoor geolocation:
- High performance GNSS chipset: Mediatek MT3333
- Supports GPS, GLONASS, GALILEO, BEIDOU constellations including QZSS, SBAS ranging
- Low power consumption: Acquisition 37mW, Tracking 27 mW
- Superior Sensitivity: Acquisition -148 dBm (cold)/ -163 dBm (hot), Tracking -165 dBm
- Includes RF Front-end Module (FEM) with external LNA, SAW filter and matching
- Separate correlator-only system for patented ultra-low power GPS mode (LPGPS) providing first fix in 3 to 5 seconds from cold start at -157dBm

Short range geolocation :
- Wifi passive sniffing with 802.11 b/g. -90dBm sensitivity at 802.11 b. DQBSK (2Mb/s)
- BLE scan. -94dBm in BLE mode
- Ranging feature: LoRa® time-of-flight distance measurement between supporting devices

LPWAN and unlicensed RF:
- 850-960MHz LoRa®/FSK transceiver and 2.4GHz sniffer/correlator: Semtech LR1011
- High Efficiency 15dBm Tx path, +22dBm PA enabled output power
- High performance LoRa® Rx: Down to -140dBm sensitivity, 4.6mA Rx current
- LoRaWAN® Class A/B/C, all LoRaWAN regions in 850-960MHz spectrum.
- Firmware update over the air, support for compressed delta firmware upgrade
- Optional Secure Element

MCU platform:
- Ultra-Low Power MCU: STM32WB55
- 32 bits ARM -based Cortex- M4
- 1MB of Flash Memory and 256KB of SRAM memory

I/Os:
- Digital: USB 2.0, UART Host, SPI, I2C, serial wire debug bus
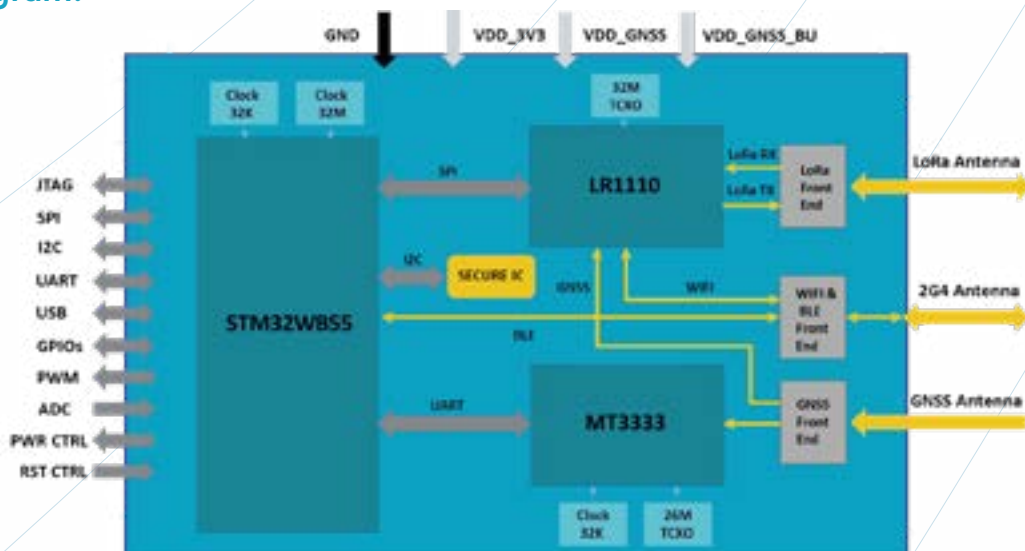- 4xGPIOs, 1xAIO, Application cross trigger inputs & outputs

Additional features:
- Low-Power 32KHz clock, independent TCXOs for MCU and LR1011
- Power supply & battery monitoring with energy usage monitor
- Device management: RTC, BOR, timeouts, on chip temperature sensor

Product references:

Product	SKU
Abeeway Geolocation Module	DEABEE-geoloc-module

Block Diagram:

Pin Connection:

Pin Nº	Pin Name	Pin Nº	Pin Name
1	GND	34	GND
2	I2C_INT1	35	VDD_GNSS_EN
3	nReset_ST	36	VDD_GNSS_BU_EN
4	BOOT0	37	nReset_GNSS
5	I2C_INT2	38	GND
6	GPIO3	39	UART_RX_GNSS
7	GPIO2	40	UART_TX_GNSS
8	VBAT_GND_CTRL	41	GND
9	GND	42	Output1
10	2G4_ANT	43	GND
11	GND	44	GNSS_ANT
12	GND	45	GND
13	SWCLK	46	USER_ADC
14	SWDIO	47	VBAT_MEAS
15	SWO	48	GPIO4
16	GND	49	GND

Pin Nº	Pin Name	Pin Nº	Pin Name
17	GND	50	GND
18	GND	51	nReset_SX
19	VDD_3V3	52	GND
20	VDD_3V3	53	LORA_ANT
21	GND	54	GND
22	GPIO1	55	ONOFF
23	USB_DP	56	I2C_power1
24	USB_DN	57	I2C_power2
25	SPI_CS1	58	Button_1
26	SPI_SCK	59	PWM_Ctrl
27	SPI_MISO	60	Button_2
28	SPI_MOSI	61	CHG_INT
29	SPI_CS2	62	LPUART_TX
30	VDD_GNSS	63	LPUART_RX
31	GND	64	I2C_SCL
32	VDD_GNSS_BU	65	I2C_SDA
33	GND	66	GND
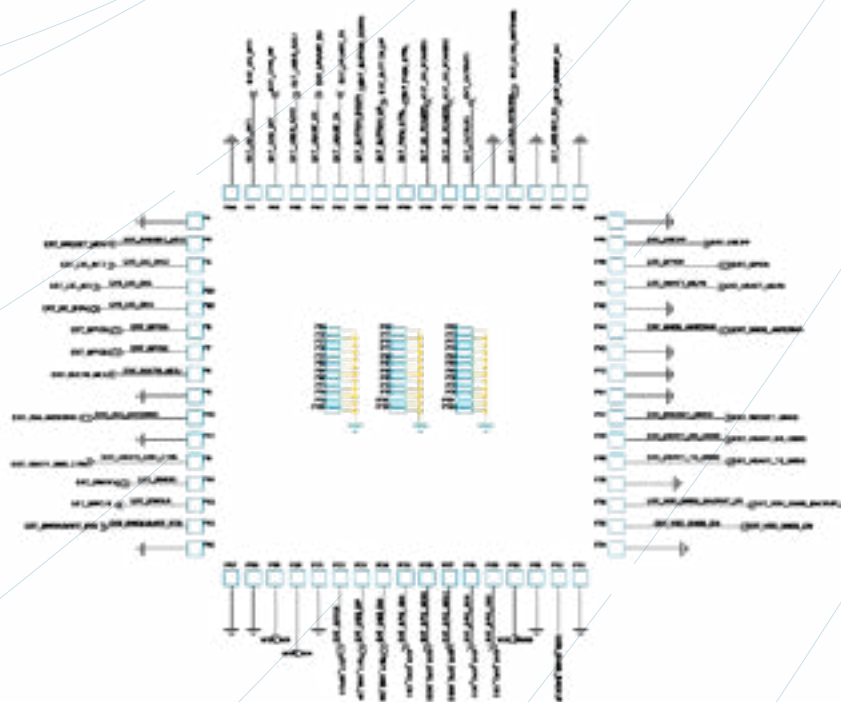
Abeeway is the market leader in low-power geolocation and a provider of disruptive IoT tracking solutions worldwide. Abeeway offers the most energy-efficient, reliable and flexible geolocation solutions using unique tracking devices and a smart multi-technology location system optimized for long-range and low-power-consumption LoRaWAN™ connectivity. The system makes precise geolocation power-efficient for various environments by combining high-precision GPS, our patented cloud computing technology Low Power GPS and ultra-low-consumption Wi-Fi sniffing technique. Offering the fastest time-to-market, Abeeway delivers a complete end-to-end solution for mass-market IoT sectors for asset tracking and management, process and decision optimization and personal safety.

Abeeway is a member of LoRa Alliance™ and is part of the Actility Group. Actility Group is a leading provider of LPWA IoT connectivity solutions, tools, business services and applications.