ABRACON

Global Navigation Satellite System (GNSS) Market

Forecasted to grow from $ 222Bn in 2022 to $ 331Bn in 2027, a CAGR of 8.3%.

Description

- Global Navigation Satellite System (GNSS) is the general term used for systems consisting of orbital satellites which provide both location and timing services. The most well-known is GPS.
- The satellites transmit both their positional and timing information at specific frequencies as a code which can be decoded by any GNSS device. There are a few GNSS constellations each operating at specific frequencies including: GPS L1 (1575.42MHz), GLONASS G1 (1602MHz), BeiDou B1 (1561MHz), and Galileo E1 (1575.42MHz). Having a system which supports multiple bands can improve accuracy, robustness and Time-To-First-Fix (TTFF).
- The GPS system is being modernized with the introduction of GPS L2 band (1227.60MHz) with the L2C code for civilian use and GPS L5 band signals (1176.45MHz) for aircraft navigation and Safety-of-Life (SoL) uses.
- The L2C and L5 bands are in pre-operational status but can be used in combination with the L1 code as a "dual-frequency GPS". The signals offer ionospheric correction and L5 has a higher signal strength. The result is improved accuracy, reliability, operation under cloud cover/buildings/trees, and faster signal acquisition.
- Typical use-cases for GNSS include:
    - **Industrial** - Equipment tracking, agricultural tracking, marine, and logistics.
    - **Consumer** - Wearables, pet tracker, family tracking, and marine tracking.
    - **Defense** – UAV, drone, surveillance.
    - **Transport** - EV Chargers, vehicles, and e-scooters.

Drivers

- Increasing demand for higher GNSS positional accuracy in applications such as fitness trackers and e-scooters.
- GNSS chipsets support more frequency bands for a robust solution.

Customer Challenges & Opportunities

- Time To First Fix (TTFF) can occasionally take a long time to determine the location. Abracon's multi-GNSS antennas are suitable for GPS L1, GLONASS, and BeiDou.
- GNSS signals are often weakened when penetrating buildings resulting in weaker signals. The ANGH Niche antenna multi-band solutions can support GPS L1, L2 and L5 precision bands.
- Low-Noise Amplifiers (LNAs) together with the multi-GNSS SAW filter with low insertion loss can improve the Signal-To-Ratio (SNR).
- Abracon's optimization service can be used to help optimize the antenna performance in the system.

Abracon Series to Consider for Global Navigation Satellite System (GNSS)

ABRACON
Innovation For Tomorrow's Designs®

Description & Requirements	Frequency Control & Timing	RF & Antenna	Power & Magnetics
External/Industrial	MHz Crystals ABM12W (1.6 x 1.2mm) ABM11W (2.0 x 1.6mm) Crystal Oscillator ATX-12 (2.5 x 2.0mm)	Multi-GNSS AEACBA050018-SG3 (Puck) AEARBA048014-SG3 (Puck) AEACMK0660746-SG4 (Dome) Precision GNSS (L1 + L2 + L5) AEACBA050018-SG4L2L5 (Puck) AEAGMK148060-S1575 (Dome) AECC0502GB (Helical) Combo (GNSS + Cellular + Wi-Fi/BT/BLE/ Zigbee) AEACBA059015-C3GSW (Puck) AEACBK046014-C2WG (Puck) AEACBK189085-MLWFGL5 (Dome) Combo (GPS + Cellular + NB-IoT/CAT-M) AEACBK050048-C2LG (Dome) AEACBK110053-MLWG (Dome) AECR1808A12 (Dome) AECR1808A20 (Dome)	Power Inductor (High Power) AMSLA (Stacked inductor) ASPI-F (Molded Flat Wire) ASPIAIG-F (Molded Flat Wire) Power Inductor (Mid-Power) ASPIAIG-S (Resin Shielded) AMPLA (Molded Round Wire) AMDLA (Molded Round Wire) Power Inductor (Low Power) AOTA (Mini Molded) ASMPH (Metal Alloy Multilayer) ASMPM (Metal Alloy Multilayer) Supercapacitor ADCM (Module) RF Inductor AIMC (Ceramic Multilayer) ATFC (Thin Film Multilayer)
Defense/Transport	MHz Crystal ABM10AIG (2.5 x 2.0mm) ABM11AIG (2.0 x 1.6mm) FC1BA (2.0 x 1.6mm) FC2BA (2.5 x 2.0mm) FC3BA (3.2 x 2.5mm) 32.768kHz Crystal FK13AE (3.2 x 1.5mm)	Combo (GPS + Cellular + NB-IoT/CAT-M + Wi-Fi/BT/BLE/Zigbee) AECS1806C03Z (Shark Fin) AECS1806D07Z (Shark Fin)	Power Inductor ASPIAIG-F (Molded Flat Wire) ASPIAIG-S (Resin Shielded) AMPLA (Molded Round Wire) AMDLA (Molded Round Wire)
Wearable GNSS	MHz Crystal ABM10 (2.5 x 2.0mm) ABM11 (2.0 x 1.6mm) kHz Crystal ABS05 (1.6 x 1.0mm)	Niche PCB Embedded* ANG4 (GNSS, GPS L1) ANGH (GNSS, GPS L1 + L2 + L5 + L6) *Available on license	Power Inductor AOTA (Mini Molded) ASMPH (Metal Alloy Multilayer) ASMPM (Metal Alloy Multilayer) RF Inductor AIMC (Ceramic Multilayer) ATFC (Thin Film Multilayer) AISC (RF Wirewound)