

GLOSSARY OF TECHNICAL TERMS

In this document, unless the context otherwise requires, explanations and definitions of certain terms used in this document in connection with our Company and our business shall have the meanings set out below. The terms and their meanings may not correspond to standard industry meaning or usage of these terms.

“A-GNSS”	Assisted GNSS, a technology designed to enhance the performance of global navigation satellite systems by integrating satellite signals with internet-based data, thereby improving time-to-first-fix, positioning speed and accuracy, especially under poor signal conditions;
“ADC”	analogue-to-digital converter, an important component when it comes to dealing with digital systems communicating with real-time signals, used to convert conditioned analog signals into a stream of digital data so that the data acquisition system can process them for display, storage, and analysis;
“AEC”	Automotive Electronics Council, an organization originally established in the 1990s by Chrysler, Ford, and GM for the purpose of establishing common part-qualification and quality-system standards;
“AEC-Q”	Automotive Electronic Council qualification standard, which is derived by AEC component technical committee to electrical components and their qualification requirement;
“AEC-Q100”	AEC-Q100 standard, a set of rigorous requirements and tests that electronic components must pass to ensure their suitability for use in automotive applications. The AEC-Q100 standard is widely recognized and adopted in the automotive industry and is an important consideration in the design and manufacturing of electronic components for automotive applications;
“AI”	artificial intelligence, simulation of human intelligence processes by machines, especially computer systems;
“advanced encryption standard” or “AES”	a highly trusted encryption algorithm used to secure data by converting it into an unreadable format without the proper key;
“anti-interference”	ability of the carrier to adapt to various intentional or unintentional electromagnetic interferences and function properly;
“automotive-grade”	meet the automotive grade standard AEC-Q certification applied to automotive components. In order to improve the stability and standardization of automotive electronics, AEC established the AEC-Q series of automotive on-board electronic components test standards, of which AEC-Q100, AEC-Q101, AEC-Q200 is the most common, and has now become a recognized automotive components downstream original equipment manufacturers usually require suppliers to have their products tested by their own or third-party testing organizations to confirm their compliance with the AEC-Q reliability test standards;

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“baseband”	the core device of the board or module, its main function is to complete the capture, tracking, data demodulation of the specified satellite signals, and give the pseudo-range of satellite signals, carrier phase and other measurement information, and its function and performance usually determines the performance index of the downstream machine;
“BDS-1 BeiDou-1”	the first-generation experimental system (20002012), providing regional services to China and surrounding areas; now retired;
“BDS-2 BeiDou-2”	the second-generation regional system (20122020), offering navigation and positioning services mainly in the Asia-Pacific region;
“BDS-3 BeiDou-3”	the third-generation global system (completed in 2020), supporting triple-frequency signals and advanced services such as PPP-B2b for global high-precision positioning;
“Beidou” or “BeiDou satellite navigation system” or “BeiDou system” or “BDS”	China’s self-developed, independently operated global satellite navigation system, which is also the third mature global satellite navigation system after GPS and GLONASS;
“CPU”	central processing unit, the central unit in a computer containing the logic circuitry that performs the instructions of a computer program;
“chip”	Is the use of a certain process, a circuit required transistors, resistors, capacitors and inductors and wiring interconnections together, made in a small piece or several small pieces of semiconductor wafers or dielectric substrate, and then encapsulated in a shell, become a micro-structure with the required circuit function (i.e., integrated circuits), a large number of micro-structures will be placed in the aforementioned on a piece of plastic substrate to form a chip in order to achieve specific functions;
“chip design”	Design and development process targeting integrated circuits and very large-scale integrated circuits, mainly including requirements analysis, architectural design, logic design, physical realization and verification;
“chip probing”	a test of the electrical parameters of the chip, each chip in the wafer being tested in order to remove defective parts to reduce the cost of subsequent packaging;
“cloud”	the computers and connections that support cloud computing;
“DAG”	Directed Acyclic Graph, a data structure used in computing and network systems to represent processes, data flow, or dependencies without cycles;
“DC”	direct current, a one-directional flow of electric charge;
“DES”	data encryption standard, a symmetric-key algorithm for the encryption of digital data;

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“design-in”	a process where customers engage suppliers early in the product design phase to propose and refine designs that align with customer needs and market trends;
“design-win”	a confirmation from customers adopting a supplier’s product design, indicating the supplier’s ability to meet the customer’s production, delivery, and cost requirements;
“DR”	dead reckoning, a method of navigation relying on estimating one’s current track, groundspeed and position based on earlier known positions;
“eVTOL”	electric Vertical Take-off and Landing aircraft, a new type of aircraft powered by electricity and capable of vertical take-off and landing, relying on high-precision GNSS navigation for safe operations;
“fabless”	the development, design and sale of semiconductor chips while outsourcing their wafer fabrication, packaging and testing services to a specialized manufacturer called a semiconductor foundry;
“final test”	Mainly to complete the package after the chip for a variety of performance indicators and functional indicators of the test;
“foundry”	a manufacturer specializing in the production and manufacture of chips in the field of integrated circuits;
“FPGA verification”	field-programmable gate array verification, involving using simulation and timing analysis to ensure the design meets functional and timing requirements;
“GEO”	Geostationary Earth Orbit, an orbit at approximately 36,000 km altitude where satellites appear stationary relative to the Earth’s surface, often used for augmentation services;
“GLONASS”	a Russian satellite navigation system operating as part of a radionavigation-satellite service. It provides an alternative to Global Positioning System (GPS) and is the second navigational system in operation with global coverage and of comparable precision;
“GNSS”	Global Navigation Satellite System, a space-based radio navigation and positioning system that provides all-weather positioning, navigation, and timing (PNT) for any location on the surface of the Earth or in near-Earth space. In 2007, the United Nations recognized the Global Positioning System (GPS) of the United States, the Global Navigation Satellite System (GLONASS) of Russia, the Galileo Navigation Satellite System (Galileo) of the European Union, and the BeiDou Satellite Navigation System (BeiDou Navigation Satellite System) of China. Navigation Satellite System (BeiDou Navigation Satellite System, BDS) are recognized as the four major global satellite navigation and positioning systems;

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“GNSS chip”	the global satellite navigation system positioning chip, which is the core component of all high-precision satellite navigation and positioning terminal products and applications, with the highest technical content, determining the application performance of terminal products;
“GPS”	Global Positioning System, a satellite-based radio navigation system developed by the U.S. Department of Defense and operated by the United States Space Force. It is one of the global navigation satellite systems that provide geolocation and time information to a GPS receiver anywhere on or near the Earth where there is an unobstructed line of sight to four or more GPS satellites;
“Galileo”	Galileo Navigation Satellite System, a global navigation satellite system created by the European Union through the European Space Agency and operated by the European Union Agency for the Space Programme;
“Hz”	Hertz, the unit of frequency in the International System of Units, often described as being equivalent to one event (or cycle) per second;
“high precision”	satellite positioning accuracy better than meter-level, typically reaching sub-meter to centimeter-level in dynamic positioning and millimeter-level in static displacement monitoring applications;
“Hybrid timing approach”	a method that combines GNSS timing with other time sources (e.g., ground networks or atomic clocks) to achieve more reliable and accurate synchronization;
“I ² C”	Inter-Integrated Circuit, a synchronous serial bus connecting low-speed peripherals to processors or controllers in short-distance communication;
“IGSO”	Inclined Geosynchronous Orbit, a geosynchronous orbit with an inclination, where satellites trace a figure-eight ground track, providing enhanced coverage for mid- and low-latitude regions;
“IMU”	Inertial Measurement Unit, a device that measures the attitude angle (or angular rate) and acceleration of an object in three axes;
“inertial navigation system” or “INS”	a navigation device that uses motion sensors, rotation sensors and a computer to continuously calculate by dead reckoning the position, the orientation, and the velocity of a moving object without the need for external references;
“integrated circuit” or “IC”	a small unit or package which is made as a single indivisible structure (such as a chip) and is electrically equivalent to a conventional circuit of many separate components;
“Internet of Things” or “IoT”	the physical objects (or groups of such objects) with sensors, processing ability, software and other technologies that connect and exchange data with other devices and systems over the Internet or other communications networks;

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“Ionospheric/multipath error”	refers to delays in signal propagation caused by the ionosphere. Multipath error arises when GNSS signals are reflected by surfaces such as buildings or terrain, causing interference with the direct signal;
“IP” or “IP module”	intellectual property, which, in the context of IC design, refers to a reusable and verified IC layout design with a defined function;
“ISO”	the International Organization for Standardization, a worldwide federation of national standards bodies;
“ISO9001”	the International Quality Management System published by the ISO;
“LNA”	Low-Noise Amplifier, constitutes a kind of RF front-end amplifier chip with very low noise coefficient, the main function is to amplify the weak RF signals received by the antenna, and at the same time reduce the amplifier’s own noise impact on the signals to a minimum in order to facilitate the processing of the back-end electronic equipment;
“machine learning”	the scientific study of algorithms and statistical models that computer systems use to effectively perform specific tasks without being explicitly programmed to do so;
“MCU”	Microcontroller Unit, a compact integrated circuit that contains a processor, memory, and input/output peripherals, commonly used in embedded systems;
“MDCU”	Multichannel Data Collector Unit, a data acquisition device capable of synchronously collecting multi-channel sensor data, supporting real-time data monitoring, analysis, and remote transmission;
“MEO”	Medium Earth Orbit, an orbital regime with an altitude between 2,000 km and 36,000 km, commonly used by GPS, Galileo, and part of the BeiDou constellation;
“modules”	packaged components that include integrated circuits or other electronic components, which are used to build larger systems or devices. They are essential for enhancing performance, efficiency, and scalability in electronic products;
“multi-frequency”	refers to the capability of a GNSS chip, module or terminal to simultaneously receive and process satellite signals transmitted over more than one frequency band (such as L1, L2 or L5). Receiving multiple frequencies improves positioning accuracy, continuity and anti-interference performance, particularly in complex environments such as urban canyons or areas with signal obstruction;

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“multi-system”	refers to the capability of a GNSS chip, module or terminal to simultaneously receive and process positioning, navigation and timing signals from more than one GNSS, such as BeiDou, GPS, GLONASS, Galileo, QZSS or NavIC. Multi-system compatibility enhances signal availability, stability and reliability by allowing devices to make use of satellites from multiple constellations;
“NB-IoT”	Narrowband Internet of things, a low-power wide-area network radio technology standard developed by 3GPP for cellular network devices and services;
“NavIC”	an autonomous regional satellite navigation system that provides accurate real-time positioning and timing services. It covers India and a region extending 1,500 km around it, with plans for further extension up to 3,000 km;
“NMEA”	National Marine Electronics Association standards for communication protocols, used by GNSS receivers to output standardized position, velocity, and time data;
“OA”	office automation, the varied computer machinery and software used to digitally create, collect, store, manipulate, and relay office information needed for accomplishing basic tasks;
“PMU”	power management unit, an integrated circuit module, is used to centrally manage the power supply of a system. Its main functions include voltage regulation, power consumption optimization, power distribution, and control of low-power modes, etc. PMUs are widely used in SoC designs to help improve energy efficiency and extend the battery life of devices;
“PNT”	positioning, navigation and timing, which is the basic element of time and space that needs to be determined in people’s daily life, and Beidou builds the PNT system of positioning navigation and timing, provides time and space benchmarking information, and is the infrastructure of the national information indexing;
“PPP”	Precise Point Positioning, Using data products such as precision satellite orbits and clock differentials broadcast by geosynchronous orbit satellites, single-point positioning is carried out through the non-differential observation data of a single receiver to obtain high-precision positioning results after various error terms are corrected;
“PPP-B2b”	a high-precision positioning service provided by BeiDou-3 through satellite broadcast, delivering real-time corrections for orbit, clock, and biases, enabling decimeter- to centimeter-level accuracy;
“PVT”	position, velocity, time;

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“QZSS”	Quasi-Zenith Satellite System, a four-satellite regional satellite navigation system and a satellite-based augmentation system developed by the Japanese government to enhance the U.S.-operated GPS in the Asia-Oceania regions, with a focus on Japan;
“R&D”	research and development;
“RNSS”	a kind of satellite radio navigation service, which receives satellite radio navigation signals by users, completes the distance measurement to at least 4 satellites independently, and carries out the calculation of user’s position, speed and navigation parameters. GPS and other systems are typical RNSS systems;
“RF”	mainly responsible for receiving the waveform signals emitted by the satellite and amplifying them into digital signals;
“RTCM”	Radio Technical Commission for Maritime Services standards, defining formats for differential GNSS correction data to enhance positioning accuracy;
“RTD”	real-time differential calculates the pseudo-range based on the known coordinates of the reference station and the coordinates of each satellite, and calculates the true distance from each satellite to the reference station at each moment;
“RTK”	real-time kinematic, a real-time difference method based on GNSS carrier phase dynamics, provides three-dimensional positioning results of a survey station in a specified coordinate system in real time with centimeter-level accuracy;
“RTU”	Remote Terminal Unit, a microprocessor-controlled device used in industrial control systems to connect sensors and equipment with a central control or SCADA system;
“SAW component”	a class of electronic devices based on the principle of surface acoustic wave propagation in piezoelectric materials, primarily utilizing metallic electrode structures formed on a piezoelectric substrate to enable the conversion of electrical signals into acoustic signals and vice versa;
“satellite navigation and positioning”	technology for navigation and positioning of terrestrial, oceanic, airborne and space users using space satellites;
“SBAS”	satellite based augmentation system, primarily designed for civil aviation to provide safety-of-life navigation services. There are four various SBAS systems available worldwide, covering different regions, namely (i) Wide Area Augmentation System (WAAS) serving the United States, (ii) European Geostationary Navigation Overlay Service (EGNOS) operating in Europe, (iii) MTSAT satellite augmentation system (MSAS) used over Japan, and (iv) GPS-aided GEO Augmented Navigation (GAGAN) operating in India;
“SoC”	System-on-Chip, an electronic system formed by integrating multiple integrated circuits with specific functions on a single chip;

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“SPI”	Serial Peripheral Interface, a synchronous serial protocol used for high-speed communication between microcontrollers and peripheral devices;
“sq.m.”	square meter;
“standard precision”	satellite positioning accuracy at approximately meter-level (within one to several meters);
“tape-out”	the process of converting an integrated circuit design into a chip for pilot production or manufacturing. Tape-out is a process to check whether the chip has achieved the expected functions and performance of the design. If the tape-out is successful, the chip can be mass-produced; conversely, it is necessary to find out the reasons for the lack of success, optimize the design, and tape-out the chip again;
“Triple-frequency signal system (B1/B2/B3)”	a GNSS configuration where satellites transmit signals on three distinct frequencies (e.g., B1, B2, B3), enabling improved ionospheric error correction, multipath mitigation, and positioning accuracy;
“UART”	Universal Asynchronous Receiver-Transmitter, a hardware interface enabling asynchronous serial data exchange between devices;
“UAV”	Unmanned Aerial Vehicle, an aircraft without a human pilot onboard, typically relying on GNSS for navigation and positioning;
“verification”	a method to verify the correctness of a circuit and evaluate and confirm the initial design plan and to ensure the design satisfies the needs of downstream customers and conforms to the design initiatives;
“VMS”	Video Management System, software and hardware solutions used to collect, store, and manage video data from cameras or sensors for monitoring and analysis;
“wafer”	a thin slice of semiconductor, used for the fabrication of ICs and other microelectronic devices.