gpsOne® Position-Location Technology

Build new revenue streams with the world’s most widely deployed precise positioning technology

QUALCOMM's gpsOne® solution is the most widely adopted Assisted-GPS (A-GPS) position-location technology for 3G networks, enabling precise positioning for wireless location services worldwide. The first A-GPS technology to be commercially deployed for wireless 3G applications, the gpsOne solution has enabled operators to create competitive differentiation, build new revenue streams, drive data usage and reduce churn by featuring location services that leverage this accurate, widely available position-location technology.

A-GPS is generally more accurate than other location technologies and operates in many environments where conventional GPS systems cannot produce a position fix. In addition, the cold-start delay associated with conventional GPS is eliminated with gpsOne, dramatically improving the user experience and opening new possibilities for a broad range of location services and applications for enterprise and consumer markets.

In addition to the large variety of location service opportunities made possible through gpsOne technology performance, gpsOne offers the added advantage that its low-cost implementation eliminates handset cost as a barrier to mass deployments. Most Mobile Station Modem™ (MSM™) chipset solutions are integrated with gpsOne, eliminating the need for most discrete components in order to provide cost-effective, space-efficient A-GPS on mobile handsets across all handset tiers.

gpsOne Position-Location Technology Features

- Designed for use on all air interfaces, including CDMA2000/1xEV-DO/1xEV-DO Rev. A and WCDMA (UMTS)/GPRS/GSM/EDGE/HSDPA
- Industry-leading sensitivity ranging from -155 dBm to -160 dBm
- Enhanced filtering software optimizes GPS accuracy and availability for tracking and satellite navigation applications
- 3GPP and 3GPP2 standards-compatible for both control plane and user plane implementations
- Unique hybrid solution is available for maximum system availability
- Advanced positioning algorithms include multipath mitigation and signal enhancement
- User-controlled privacy
- Four mode operation available in all major air interfaces (Standalone, MS-Based, MS-Assisted, and MS-Assisted/Hybrid)
- Verified operation with key server technologies, such as QUALCOMM’s QPoint™ location server technology
gpsOne Position-Location Technology Benefits

- The most widely deployed integrated GPS-based positioning solution available for wireless
- Offers high accuracy, availability and coverage in many areas where conventional GPS will not work
- Eliminates the time-to-first-fix delay found in conventional GPS solutions
- Enables position-location application development and revenue-generating opportunities
- Provides a reliable, optimized and commercially proven system that speeds deployment, reduces operator risk and minimizes location service costs
- Provides a fully-integrated solution that minimizes material cost, board size, parts count and power consumption in the wireless device
- Requires no wireless infrastructure hardware modifications (such as location measurement units or LMUs), resulting in shorter development times and quick time-to-market
- Position-location capability is fully integrated into most QUALCOMM MSM chipset solutions

gpsOne Software Integration

Since gpsOne is integrated directly into select MSM solutions, it is uniquely capable of seamlessly combining with BREW®/Java® development platforms, standards-compatible location protocol stacks, and multimedia functionality and other capabilities from the Launchpad™ suite. This enables new location services that use multiple technologies from the Launchpad platform, including:

- Advanced location-based gaming with QUALCOMM’s Q3Dimension™ graphics solution
- Location-stamped photos with digital still camera quality or high-quality video clips, enabled by Qcamera™ and Qcamcorder™
- Video triggered by location for point-of-interest applications with Qtv™
- Friend-finding applications that can provide location information during other operations

gpsOne Chipset Architecture

gpsOne Hardware Integration

QUALCOMM’s gpsOne position-location solution is integrated directly into the MSM wireless modem and radioOne® RF chipsets. The tight integration of gpsOne with QUALCOMM chipsets ensures cost-efficient, low-power position-location capabilities that offer a dramatic contrast to expensive, discrete GPS solutions. No additional ASICs are required to implement gpsOne location capabilities in wireless handsets because the GPS baseband processing circuitry is integrated into QUALCOMM’s wireless modem and the GPS RF down conversion circuitry is integrated into QUALCOMM’s RF chipset solutions. QUALCOMM’s integrated gpsOne solution therefore requires less printed circuit board area than discrete GPS chipset solutions, reduces time-to-market and bill-of-materials (BOM) costs and eliminates almost all other discrete devices previously required to implement GPS in mobile handsets.
How gpsOne Works

The gpsOne technology functions in four different modes of operation. Chosen automatically or specified by software, the four modes are Standalone GPS, Mobile Station (MS)-based, MS-assisted and MS-assisted/Hybrid. In the A-GPS modes, gpsOne technology utilizes assistance data from a location server in the wireless network in combination with A-GPS cirquitry and software in the wireless device.

Note: The common term used by standards bodies for the handset/terminal device in CDMA2000 is "Mobile Station" (MS) and in WCDMA (UMTS)/GPRS/GSM/HSDPA/EDGE is "User Equipment" (UE). For simplicity in this document, references to the handset/terminal will be "MS," but this use implies both MS and UE.

**Standalone GPS:** The GPS receiver calculates a position without using any assistance data and without a connection to the wireless network.

**MS-Based:** The GPS receiver calculates the position using assistance data from a location server to increase cold-start sensitivity and reduce the start time for an initial position calculation.

**MS-Assisted:** The GPS receiver uses assistance data from a location server to make measurements related to its distance from the GPS satellites, then sends this information to the location server where the position is calculated. This mode also increases cold start sensitivity and reduces the start time for an initial position calculation.

**MS-Assisted/Hybrid:** Wireless network information is added to GPS measurements as part of the position calculation by the location server, integrating the relative strengths of GPS information and available wireless network location information for increased positioning reliability in difficult GPS environments.

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**gpsOne Applications**

Numerous applications exist for gpsOne position-location technology. Offering guidance and convenience, providing entertainment and security, enabling commerce and building community, gpsOne brings value, excitement and usability to the wireless subscriber. Applications range from guided tours and finding local points of interest to location-specific weather forecasts and traffic conditions, from mobile matchmaking and location-based group games to geofencing, geocaching, location-triggered marketing, fleet management and sales force automation.

gpsOne technology can also be used to support the United States Government’s E911 mandate (and similar mandates in other countries) by allowing emergency calls placed from mobile phones to be located.

**QUALCOMM’s Position-Location Products**

In addition to the gpsOne solution that provides industry-leading performance and integration with key multimedia, security and communications technologies, QUALCOMM’s overall A-GPS solution includes: compatible location server technology known as QPoint through system integration partners; BREW and Java development platforms; GPS reference network solutions; system architecture design and consultation; location standards body participation; tools for development, deployment and maintenance; and direct or third party support for various stages throughout the location service lifecycle.

QUALCOMM’s gpsOne and QPoint location products can be purchased individually or as a complete end-to-end system which provides an optimized solution that simplifies A-GPS location service deployments. QUALCOMM provided the industry’s first commercially available, integrated position location technology and has proven this commercially tested end-to-end offering speeds time-to-market, reduces operator risk and provides for effective ongoing system maintenance – all critical to helping operators quickly launch low-cost, revenue-generating location services. QUALCOMM’s gpsOne technology has been successfully deployed as part of a complete solution with QPoint at multiple locations worldwide including the United States, Canada, Central America, South America, Japan, South Korea, China, the Middle East and Thailand.
About QUALCOMM

QUALCOMM CDMA Technologies is shaping and creating new ways to communicate. Working with manufacturers and operator partners worldwide, we develop systems that provide the foundation for tomorrow’s wireless services while delivering what the market needs today.

Our industry-leading CDMA engineers create detailed reference designs to accelerate testing and deployment for our partners. Our chipsets and systems bring advanced features and functionality to legacy and next-generation networks and devices. With QUALCOMM CDMA Technologies, manufacturers and wireless operators can deliver the products and services the world wants now and be first to market with future developments.