

# GPS and Mobile Handsets

**GPS and Mobile Handsets** is the third consecutive report from Berg Insight analysing the latest trends on the worldwide market for GNSS technology in mobile handsets.

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## ***This report will allow you to:***

- **Identify** the opportunities and challenges with integration of GPS in mobile handsets.
- **Learn** about the GPS strategies of the leading chipset and handset vendors in the mobile industry.
- **Understand** the reshaping of the GPS value chain and consolidation trends.
- **Anticipate** future design trends and technology developments.
- **Realize** the importance of Assisted-GPS and hybrid location technologies.
- **Predict** when GPS technology will become a standard feature in GSM/WCDMA handsets.



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## When will GPS become mainstream in mass-market handsets?

Technology development enabling GPS integration in mass-market handsets was driven by the Federal Communications Commission (FCC) E911 emergency call mandates requiring all US mobile operators to provide high-accuracy location of emergency callers. While the GSM operators opted for network-based location technologies such as U-TDOA or RF fingerprinting, the CDMA and iDEN operators chose to use the handset-based GPS location technology for locating emergency callers. This has led to rapidly increasing penetration of GPS in iDEN and CDMA handsets in North America. Emergency call location regulation is being introduced in other regions as well. Canada has also chosen to stipulate location accuracy requirements as in the US, while no such rules are yet in place in Japan or in Europe where Cell-ID-type location accuracy is enough for compliance.

Although the first GSM handsets with integrated GPS were launched already in the late 1990's, broader availability of consumer-oriented handsets with GPS did not appear until late 2006, primarily in Japan. In other parts of the world, the major handset and smartphone vendors commenced rollout of a growing number of models, mainly to address the growing interest in commercial location-based services. The number of GPS-enabled handset models available on worldwide markets outside Japan has increased from about 40 at the end of 2007, to more than 130 at the end of Q1-2009.

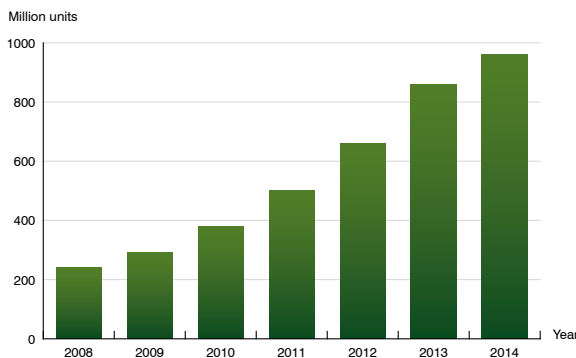
Sales of GPS-enabled GSM/WCDMA handsets grew to about 78 million units in 2008, up from 28 million devices the previous year. Berg Insight estimates that shipments of GPS-enabled GSM/WCDMA handsets will grow to 770 million units in 2014, representing an attach rate of 55 percent. Including handsets based on other air interface standards such as CDMA and iDEN, GPS-enabled handsets sales are estimated to reach about 960 million, or 60 percent of total handset shipments in 2014.

The cellular and connectivity chipset industry is going through a phase of consolidation and strategic change of focus following increasing competition, technology developments and changing customer demands. In 2008, NXP Semiconductors and STMicroelectronics (ST) formed a joint venture for wireless semiconductors that barely commenced operations before a ►

► new deal between ST and Ericsson to merge with Ericsson Mobile Platforms was announced. The new 50/50 joint venture – ST-Ericsson – started operations in February 2009. Moreover, in early 2009, the GPS specialist NemerIX filed for bankruptcy and the connectivity chipset vendor CSR announced its plans to merge with the GPS developer SiRF.

Handset software and applications are becoming more important as handset performance improves and new functionality is being added. Especially smartphone operating systems are receiving more attention from handset manufacturers, mobile network operators, application developers and last but not least users. Smartphones are devices that support installation of native third party applications. Most smartphones also allow full multitasking, enabling users to run multiple applications at once, including background applications. Spurred by Apples success, most major handset vendors have now announced or launched on-device application stores that allow users to download applications and content directly to their handsets. More and more of these applications have some kind of support for GPS location.

Chipset vendors are developing a variety of solutions targeting various segments. Products include GPS modules, standalone GPS chipsets, host-based GPS chipsets, multi-mode chipsets, integrated GPS cores and software-based GPS receivers. GPS technology for handsets has matured greatly, offering much better performance in terms of sensitivity, power consumption, size and price than was possible a few years ago. Furthermore, the OMA SUPL A-GPS standard has enabled lower cost deployment of A-GPS services that ensure a better and more consistent user experience necessary for the consumer market. The SUPL standard allows cost efficient deployment of A-GPS services that reduce the time-to-first-fix, lowers power consumption and enhances the sensitivity of GPS receivers. New business models have also become possible, ranging from hosted services for operators, to services deployed by handset vendors for end-users that cannot get similar services from their network operator yet. Handset vendors are also starting to adopt hybrid location technologies that combine GPS with other wireless and sensor-based technologies, including Wi-Fi positioning, accelerometers, gyroscopes or electronic compasses.



Annual shipments of GPS-enabled handsets, million units (Worldwide 2008–2014)

### This report answers the following questions:

- What is driving the adoption of GPS technology in GSM/WCDMA handsets?
- Who are the leading developers of cellular, connectivity and GPS chipsets?
- What is the technology development roadmap for handset GPS in the coming years?
- How can Assisted-GPS, A-GNSS and hybrid location technologies benefit handset manufacturers, network operators and end-users?
- How is GPS supported in Android, BREW, Java ME, OS X, Palm webOS, Symbian OS and Windows Mobile?
- Which handset vendors have adopted GPS in their products?
- When will satellite positioning technologies become a standard feature in handsets?

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## **Glossary**



## About the Author



**André Malm** is a Senior Analyst with a Masters degree from Chalmers University of Technology.

He joined Berg Insight in 2006 and his areas of expertise include location-based services, handset technologies and personal navigation services.

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