

Handset Connectivity Technologies

Handset Connectivity Technologies is the third consecutive report from Berg Insight analysing the latest trends on the worldwide market for GNSS, Bluetooth, WLAN and NFC technologies in mobile handsets.

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- **Identify** the opportunities and challenges with integration of multiple connectivity technologies in mobile handsets.
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- **Comprehend** how NFC technology in handsets can enable new services.
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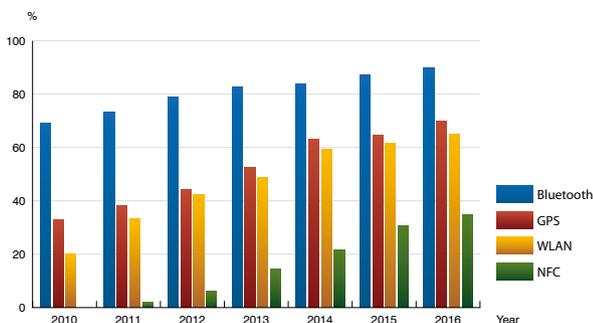


Popularity of smartphones boosts connectivity technology attach rates

Global handset shipments grew 15 percent in 2011 to about 1.5 billion units, although the growth rate slowed down in Q4-2011 in the wake of the deteriorating macroeconomic conditions, especially in Europe. Global sales of featurephones were nearly flat, while smartphone shipments grew almost 60 percent to 470 million units in 2011. Penetration of smartphones is growing worldwide as handset vendors adopt smartphone operating systems in order to reduce development time and cost for new advanced handset models. Mobile operators have put their hopes on smartphones as drivers of data revenues and are willing to subsidise smartphones that drive adoption of postpaid subscriptions and data plans. Mobile subscribers also put more emphasis on the user experience and support of native apps and web services. There were 4.7 billion mobile phones in use at the end of 2011, including 750 million smartphones. About 4.1 billion people, or nearly 60 percent of the world's population, owned a mobile phone.

The popularity of smartphones is driving attach rates of wireless connectivity technologies including Bluetooth, WLAN, NFC and GPS that enable new use cases for handsets. Bluetooth can be used to connect headsets, fitness and medical sensors or perform file transfers. WLAN can be used for Internet access, VoIP services or fast file and media transfer. Near Field Communication (NFC) is a standard for short-range wireless, point-to-point communication. NFC operates in the unlicensed 13.56 MHz band over distances of about 10 centimetres. When deployed in mobile phones, NFC can be used for countless applications, ranging from information exchange and device pairing, to electronic ticketing and secure contactless payments. The most important driver for GPS integration in handsets today is arguably the interest in location-based services (LBS), although emergency call location regulations are being introduced in more countries. In contrast to emergency call services relying on occasional push to fix positioning, consumer-oriented LBS pose new challenges. These services range from advanced turn-by-turn navigation services to local search, people tracking, friendfinders and social networking. Handsets thus need to support services that require both infrequent, fast push to fix updates in addition to continuous position updates – all whilst conserving battery life. The revised emergency call mandates in the US may well require approaches such as using improved hybrid location technologies in all handsets.

GPS technology for handsets has matured, offering much better performance in terms of sensitivity, power consumption, size and price than ▶



Projected attach rate for handset connectivity technologies (World 2010 - 2016)

▶ was possible a few years ago. Support for other satellite systems such as GLONASS, Galileo and Compass will also be added over time. The first handsets with GPS/GLONASS receivers are already available. Using multiple satellite systems concurrently ensures additional visible satellites and incrementally better performance in urban canyons. However, in order to improve indoor performance, hybrid positioning systems are needed. Hybrid positioning systems can fuse data from sensors to provide input to position calculations. Examples include inertial sensors such as accelerometers and gyroscopes, as well as compasses and pressure sensors. In the near future, the main barrier is the low data accuracy and high drift obtained from low cost sensors, making dead reckoning for extended periods of time unfeasible. Periodic calibrations using signal measurements from cellular and WLAN networks can improve the system performance.

Bluetooth is now a standard feature on most featurephone models and virtually all smartphones. In 2011, shipments of Bluetooth-enabled handsets reached 1.1 billion units and the Bluetooth attach rate grew to more than 73 percent across all handset segments. The attach rate for WLAN connectivity in the smartphone segment has grown from less than 6 percent in 2006 to about 95 percent in 2011. However, the attach rate for WLAN is still less than 5 percent in the featurephone segment. The attach rate for GPS in handsets across all air interface standards grew from 33 percent in 2010 to 38 percent in 2011. GPS connectivity has become a standard feature on most smartphone models except a few low cost GSM/WCDMA models. The GPS attach rate in the GSM/WCDMA smartphone segment increased from 90 percent in 2010 to about 95 percent in 2011. NFC may finally have reached a breakthrough as more than 40 NFC-enabled handset models were released by the end of 2011. At the beginning of March 2012, more than 100 models had been announced by nearly all leading vendors. Berg Insight estimates that sales of NFC-handsets reached about 30 million units in 2011, up from roughly 3 million in 2010.

This report answers the following questions:

- When will NFC become a widespread handset connectivity technology?
- What is the roadmap for integration of WLAN in mass-market mobile phones?
- What is driving the adoption of GPS technology in GSM/WCDMA handsets?
- What are the benefits with Assisted-GPS, A-GNSS and hybrid location technologies?
- Which features are supported in the latest Bluetooth standard?
- Who are the leading developers of cellular and connectivity chipsets?
- Which connectivity technologies are being adopted by leading handset manufacturers?
- What impact will new technologies have on the wireless chipset value chain?
- How is the greater diversity of radios affecting wireless chipset and handset design?

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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 wireless M2M markets.

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