DATASHEET

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# SPIRIT Super-Sensitive Software GNSS[1]-Receiver for Portable Consumer Electronics

## Application areas:

- PND, in-car navitainment
- Mobile applications
- Geo-located Web services
- Information security
- Assets visibility
- Offline navigation

"More than 960 million mobile handsets sold in 2014 will have integrated GPS-receivers".

*Berg Insight forecast 2009*

"In 2009 GPS will help to drive shipment growth of over 25% YoY. OEMs in these markets can use GPS to differentiate their product, while also drive new service revenue streams".

*IMS Research report 2009*

Built-in navigation feature is already a major selling point and a strong competitive advantage for mobile phones, netbooks, laptops, PDAs, MIDs and UMPCs. Commonly an OEM utilizes chip- and chipset-based GPS-receivers but with such an approach there is no much room to differentiate the navigation feature. With SPIRIT's Super-Sensitive Software GNSS-Receiver an OEM has all advantages and flexibility of a software solution and is able to implement the navigation feature with the sensitivity **10-15 dB** higher than in any dedicated commercial GPS chip. SPIRIT's Super-Sensitive Software GNSS-Receiver relies on Global Navigation Satellite System providing more reliable positioning than any GPS-only system.

## Value for End Users – Reliable Navigation Everywhere

Laptops, netbooks and mobile handsets are commonly used **indoors**: at home or at workplace, in a café or in a hotel lobby. 70% of navigation tasks are initiated indoors. Restricted sky visibility in **urban landscapes** and **natural environments** such as forestlands and highlands is another obstacle for navigation applications.

SPIRIT's Super-Sensitive Software GNSS-Receiver is specifically designed to provide reliable and accurate navigation **in nearly all conditions** thanks to:

## Technical characteristics:

- Cold-start sensitivity: –157 dBm
- Hot-start sensitivity: –164 dBm
- Tracking sensitivity: –170 dBm
- Navigation sensitivity: –166 dBm
- GLONASS support
- EMI suppression

- Increased sensitivity: SPIRIT's Super-Sensitive Software GNSS-Receiver outperforms all commercial GPS receivers in sensitivity by 10-15dB. Complex signal processing and electromagnetic interference (EMI) suppression algorithms account for these high results.

- Number of tracked satellites doubled: SPIRIT's Super-Sensitive Software GNSS-Receiver tracks satellites of both GPS and GLONASS navigation systems what roughly doubles the total number of tracked satellites. SPIRIT's Super-Sensitive Software GNSS-Receiver is ready to support Galileo.

SPIRIT's Super-Sensitive Software GNSS-Receiver is a software based navigation engine that interoperates with a tiny hardware module with an antenna, an RF front-end and a USB controller implemented on it. SPIRIT's Software GNSS-Receiver API is compatible with the industry-standard protocol NMEA 0183 which is implemented in modern mapping software and geographic information systems.

[1] As of today Global Navigation Satellite System is the combination of the two existing worldwide satellite navigation systems GPS and GLONASS

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## Technical advantages

| Criteria[2] | Advantage |
|---|---|
| Cold start sensitivity[3] | 10–15dB higher than in most chip-based GPS-receivers |
| Hot start and A-GPS[4] sensitivity | 7–9dB higher than in most chip-based GPS-receivers |
| Number of tracked satellites | At least 50% more than in most commercial chip-based GPS-receivers |

## Reference design of a navigation receiver

Reference design of a navigation receiver based on SPIRIT Super-Sensitive Software GNSS-Receiver with a RF front-end and an antenna implemented on a USB dongle available upon request.

- 32 channels to support all-in-view satellites
- SBAS (WAAS, EGNOS) support
- Long term ephemeris support (similar to A-GPS mode)
- Positioning accuracy (open sky): 3 m (CEP) autonomous
- Cold-start TTFF: < 30 seconds in the open sky, up to several minutes for certain indoors conditions (-157dBm)
- Hot-start TTFF: < 6 sec in the open sky
- Navigation sensitivity -166dBm
- Tracking sensitivity -170 dBm
- Double GPS+GLONASS and single GPS/GLONASS-only modes
- EMI protection support
- USB version 2.0 interface
- USB-dongle mini size: 18x42 mm

[2] All characteristics in the table are based on official information that is obtained in ideal laboratory conditions. Similar comparative test in real life conditions may sufficiently increase the difference revealing even more advantages of SPIRIT's Super-Sensitive Software GNSS-Receiver over commercial GPS receivers.
3 Cold start sensitivity combines search and navigation sensitivity after cold start
4 Assisted GPS with coarse time aiding (typical mode of most A-GPS positioning)

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