

Synopsys and Sequans Communications

Sequans Utilizes DesignWare USB 2.0 PHY IP to Deliver Low Power and High Performance SoC for WiMAX Mobile Stations



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– Laurent Sibony, Director of ASIC Designs, Sequans Communications

Business

Sequans Communications is an industry leader in fixed and mobile WiMAX semiconductor solutions based on IEEE 802.16 standards.

Challenges

- Meeting critical time to market windows
- Maintaining low power budget for complex wireless application
- Obtaining high quality, reliable IP

Solution

- DesignWare® USB 2.0 nanoPHY IP

Benefits

- Achieved first pass silicon success with proven IP
- Lowered area by 30% and reduced power consumption by up to 15% compared to other IP offerings
- Met aggressive project schedule with easy IP integration, excellent technical support and well-written documentation

Overview

Sequans has developed base station and subscriber station system-on-chips (SoCs) for both fixed and mobile WiMAX, plus two RF chips for mobile WiMAX subscriber stations. As a result the company can offer equipment manufacturers a complete chipset solution for virtually every WiMAX application for building a wide range of WiMAX network components including femto, micro and macro base stations, outdoor and indoor subscriber terminals, home gateways, and a variety of mobile devices.

The SQN1130 delivers wireless broadband connectivity for fully mobile WiMAX applications in addition to portable, nomadic, and fixed applications. Its low power consumption enables it to fit into the most advanced mobile devices such as mobile handsets, smartphones, and PDAs. It is also suitable for fixed devices such as desktop modems and residential gateways, and portable devices such as PC cards, ExpressCards, PCI Express MiniCards, USB dongles and SDIO Modules.

“As an established IP provider, we knew Synopsys had a broad customer base, which gave us assurance that the IP was validated in production and of high quality. The integration process was straightforward and the documentation was well written and concise.”

– Laurent Sibony, Director of ASIC Designs, Sequans Communications

Leading IP Features

Sequans was developing the SQN1130, an advanced baseband chip based on the IEEE 802.16e standard. The SQN1130 would implement a unique, patent-pending, low complexity MIMO algorithm that delivers high data throughput, with very low power consumption. The chip would also include all the MAC and PHY features required for WiMAX Forum™ Wave 2 certification.

Faced with a critical time to market window, Sequans had to get the chip out in approximately seven months. Furthermore, with a lead mobile phone provider as a key customer, low power consumption for maximum battery life was critical. Sequans set out to acquire a USB 2.0 PHY IP solution that would meet both their power budget and project schedule requirements.

After evaluating leading IP providers, Sequans selected Synopsys' DesignWare USB 2.0 nanoPHY IP because it was 30% lower in area and up to 15% lower in power compared to the other offerings. According to Sequans, it was one of the smallest PHYs they found and cost effective. In production volume, they were able to achieve very high yield with greater than 99.7%, measured over 250,000 chips. Lastly, the unique tunability feature in the PHY allowed Sequans to maximize the performance in the USB system and gave them assurance they could fix any minor issues that might arise.

“Compared to other IP vendors we evaluated, Synopsys' DesignWare USB 2.0 nanoPHY was 30% lower in area and up to 15% lower in power. It was one of the smallest PHYs we found.”

– Laurent Sibony, Director of ASIC Designs, Sequans Communications

High Quality and Excellent Support

“Developing the IP internally was never an option for us because it is not our core competency,” said Laurent Sibony, Director of ASIC Designs at Sequans Communications. “Instead, we relied on Synopsys' expertise in developing standards-based IP to help us achieve our goals.” As an established IP vendor, Sequans knew that Synopsys' DesignWare IP had a broad customer base with products shipping in volume. This gave them confidence the IP was of high quality and would function according to the specifications.

The straightforward integration process took about one week and Sequans was able to achieve first pass silicon success and meet their time to market window. Sequans also benefited from having a comprehensive set of well-written documentation and an expert technical support team that was there to help them whenever they needed it.

With the successful entry of the SQN1130 chip into the WiMAX mobile stations market, Sequans is already working on their next design, which not surprisingly, includes Synopsys' DesignWare IP.



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