

Synopsys and Fujitsu Semiconductor

Fujitsu Semiconductor Selects DesignWare DigRFv4 M-PHY and DigRF 3G PHY IP for Customer's 2G/3G/4G Baseband Design



With our customer's chips designed into leading 4G networks around the world, it is critical that we provide the best ASIC service with proven high-speed interfaces. We selected DesignWare DigRFv4 M-PHY and DigRF 3G PHY IP because of Synopsys' expertise and track record of delivering high-quality solutions."

Daisuke Yamazaki

Manager, Design Department, Wireless Solution Division, [Fujitsu Semiconductor Ltd.](#)

Business

Fujitsu Semiconductor Ltd. designs, manufactures, and sells semiconductors, providing highly reliable, optimal solutions and support to meet the varying needs of its customers. Products and services include microcontrollers, ASICs, ASSPs, and power management ICs, with wide-ranging expertise focusing on mobile, ecological, automotive, imaging, security, and high-performance applications. Through its global sales and development network, with sites in Japan and throughout Asia, Europe, and the Americas, Fujitsu Semiconductor offers semiconductor solutions to the global marketplace.

Fujitsu Semiconductor's Wireless Solution Division supplies RF products supporting multimode (2G/3G/4G/LTE) and multiband (700 – 2700 MHz) technology, as well as ASIC services for their customers' low-power and low-leakage baseband products. Fujitsu Semiconductor's mature RFICs provide platform vendors with the flexibility to integrate multiple 2G, 3G, and 4G bands into a single product configuration, so that all cellular operators worldwide can be serviced with Fujitsu Semiconductor's transceivers.

By focusing on power efficiency, Fujitsu Semiconductor helps their ASIC customers produce low-power, competitive baseband products for their smartphone platforms with longer battery life.

Challenges

- ▶ Ensure low power consumption for power-sensitive smartphones
- ▶ Meet standard specifications while identifying and resolving conflicts between standards
- ▶ Reduce integration risk with proven and reliable IP

Synopsys Solution

MIPI DesignWare® IP including:

- ▶ DigRFv4 M-PHY
- ▶ DigRF 3G PHY

Benefits

- ▶ Achieved low power consumption goals
- ▶ Reduced integration risk with silicon-proven IP
- ▶ Collaborated successfully with experienced technical support team to accelerate and ease the integration process

Overview

Fujitsu Semiconductor's customer needed to launch its own mobile platform quickly with low-power 28nm 2G/3G/4G baseband product supporting multimode, multiband LTE, UMTS, and EDGE mobile handsets with full support for all global FDD and TDD bands. To achieve the shortest time to market after receiving the first engineering samples, interoperability between DigRF interface on baseband side and RFIC was one of the most critical parts.

"Our customer's next-generation mobile devices required low-power, high-bandwidth connectivity, so we needed a reliable IP solution that is compliant to MIPI standard specification, in the required process technology," said Daisuke Yamazaki, Manager, Design Department, Wireless Solution Division at Fujitsu Semiconductor. "We selected Synopsys' DesignWare DigRFv4 M-PHY and DigRF 3G PHY IP, which are designed to provide mobile devices targeting 4G speeds with high data rates and low power consumption."

High-Quality DesignWare IP

Fujitsu Semiconductor knew that reliable IP was imperative to the time to market of their customer's products in such a rapidly changing market. In addition, the DigRFv4 and DigRF 3G standard specifications required fine tuning, so Fujitsu Semiconductor needed a dependable IP provider with whom they could work to identify and address conflicts between the standards. Fujitsu Semiconductor found that Synopsys and its low-power MIPI DigRFv4 M-PHY and DigRF 3G PHY met both of these requirements.

While Fujitsu Semiconductor has the capability to develop complex IP internally, they chose to use Synopsys DesignWare IP so that they could focus on providing custom ASIC services in a timely manner. Using Synopsys IP allowed Fujitsu Semiconductor to focus its resource allocation and shorten their overall product development period. Integrating DesignWare IP allowed Fujitsu Semiconductor deliver an efficient, low-power, and cost-effective solution for this demanding mobile device application.

Expert and Responsive Support

Fujitsu Semiconductor worked closely with Synopsys technical support engineers throughout their development and integration process. As both the specific process technology and the standard specification were being finalized in parallel with the IP integration, clear and consistent communication between Synopsys and Fujitsu Semiconductor was required for successful product development.

"We were pleased with Synopsys' responsive and expert technical support," said Daisuke Yamazaki, Manager, Design Department, Wireless Solution Division at Fujitsu Semiconductor. "We plan to integrate DesignWare IP into future projects as we have every confidence that Synopsys will continue to meet our design and support requirements."

"Using Synopsys DesignWare IP allowed us to focus our resources effectively and shorten our overall product development time."

Daisuke Yamazaki

Manager, Design Department, Wireless Solution Division, Fujitsu Semiconductor Ltd.