

DSP-based femto base station solution

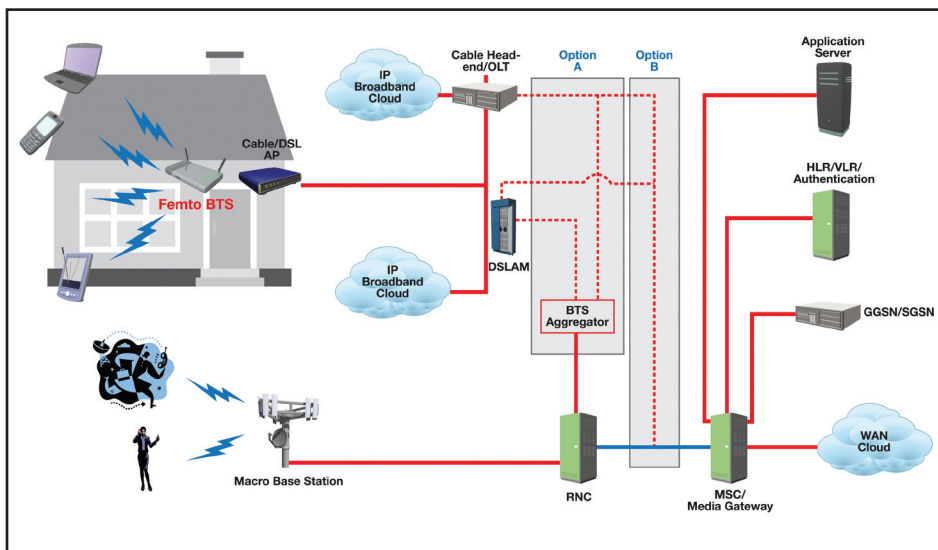
Enabling efficient, flexible products



Product Bulletin

The new femtocell baseband solution from Texas Instruments (TI) offers substantial development benefits for base station and networking original equipment manufacturers (OEMs). The baseband solution includes the TMS320TCI6484 high-performance, low-power DSP specifically designed for wireless baseband applications, optimized wireless standard software toolkits, Code Composer Studio™ suite of development tools and hardware development boards.

- With TI's femtocell basestation solution, OEMs can develop a software programmable physical layer solution targeted for this market without incurring excessive research and development expenditures. Femto base stations are consumer devices that enhance the wireless experience in the home, bringing higher data rates, better coverage and lower cost plans to the user.
- A typical femto network architecture is shown below. Users in the home connect to the network via their mobile device and then to the network through an existing landline connection (typically DSL, cable or fiber). These femto base stations must co-exist within the macro base station area and must cope with the challenges of interference, power control and hand off with the macro network.



Key features

- TMS320TCI6484 high-performance DSP
 - The 1 GHz, TMS320C64x+™ core provides flexible processing for supporting different standards
 - Optimized for wireless baseband applications with turbo and viterbi decode coprocessors
 - Enhanced memory and cache support enables L2/L3 functionality
 - Includes 2 MB of internal memory with 1-MB cache
 - Increased DDR2 speed to 667 MHz (32 b)
 - Industry-leading, 65-nm process technology allows for greater integration
 - Wide variety of peripherals
 - RapidIO®, sGMII, Ethernet, Utopia
- Ease of programming enables customization combined with fast time to market
 - The femtocell market is still in the early stages of development and TI solutions enable system developers to make modifications if deployments encounter unexpected issues
 - At the same time the equipment manufacturers need to get to market quickly to be involved in the early trials and obtain critical feedback on their solutions
 - TI solutions leverage the market's most comprehensive set of DSP development tools including Code Composer Studio™ and the DSP/BIOS operating system
- Optimized software toolkits for multiple standards
 - Optimized libraries for WCDMA, WiMAX, LTE and more
 - Carrier class code development provides ease of use and integrates smoothly into customer applications
- ATCA-compliant AMC development hardware board

- Making use of the TCI6484 DSP allows OEMs to respond quickly to these challenges and to provide all the features and updates required by operators.
- Building a software programmable, DSP-based baseband solution provides OEMs with the most flexible approach for the emerging femto station market.
- OEMs can future-proof their femto base station products, thereby appealing to the upgrade-conscious wireless service providers who can easily support new features via field software upgrades.
- The TCI6484 DSP allows OEMs to address any wireless standard from GSM to LTE. Using TI's optimized libraries for these standards reduces time to market and development costs.
- This product enables small form-factor base stations with a single DSP solution for femto base station applications. Enterprise-femto base stations targeting small businesses can be enabled by adding optional components such as a micro-controller and additional memory.

processing, the basic physical layer data rate support is almost equivalent to a single sector macro. The powerful, yet inexpensive TCI6484 processor is ideally suited in this regard to meet the needs of a femtocell. With a 1 GHz processing speed and dedicated accelerators this device is capable of handling these high data rates without assistance. In addition, the TCI6484 high-speed interfaces such as the Gigabit Ethernet and the four serial RapidIO® links simplify board-level design and further reduce system cost.

Optimized wireless software libraries

The wireless software libraries consist of highly optimized software functions that cover the physical layer functionality as specified in the standards. These libraries are developed using an ISO9001 development process and are well tested for immediate use. OEMs can build their baseband solution by incorporating these software functions into their overall software application. OEMs can easily differentiate their end application by making use of their own algorithms, intellectual property and even

Key benefits

- Low-cost, power-efficient baseband design for femto base stations
 - Single TCI6484 DSP baseband solution for femto base station
- Flexible, software programmable baseband solution
 - Field software upgrades enable emerging applications on existing hardware platforms
 - Single hardware platform supports a varied feature-set depending on operator's unique requirements
- Faster time to market
 - OEMs can reuse their C64x+ DSP-based baseband application software developed for today's macro base stations
 - Software compatibility with legacy C64x+ DSP software shortens development time and allows reuse of existing software
 - User friendly Code Composer Studio suite of development tools and ATCA-compliant hardware development boards reduce development time and cost

- RACH preamble detection (PD) library – Enables WCDMA random access channel detection.
- WiMAX wave 2 library – Optimized WiMAX functions implementing all the necessary elements required for achieving Wave 2 certification.
- LTE library – Optimized LTE functions including symbol and bit rate processing.

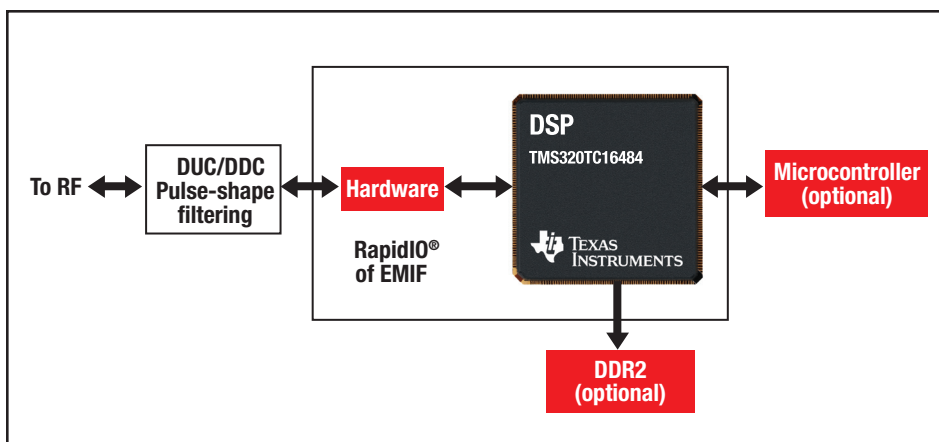
ATCA-compliant AMC evaluation modules (EVM)

Evaluation modules for the TCI6484 are available today. These ATCA-compliant advanced mezzanine cards enable early software development.

Other TI components for femto base station

TI offers the industry's broadest portfolio of products for wireless infrastructure. These include digital up- and-down converters, high-speed data converters and RF products for radio front-end solutions. Other products include power management, timing, backplane interface and standard logic components

For more information
www.ti.com/femtocell



TCI6484 high-performance, powerful DSP

The TCI6484 DSP offers an ideal high-performance baseband platform capable of supporting physical layer functionality including symbol rate, chip rate and higher layers. Although femtocells are small in size, they still need to be powerful in performance. Requirements for HSPA femtocells are the same in terms of raw bandwidth as single sectors of macro basestations. While there are simplifications in the RF and in the layer 2

customizing TI-provided software. The libraries include:

- Release 6 symbol rate library– Downlink and uplink symbol rate functions supporting all channels as defined in Release 6 of the 3GPP specification including HSUPA, HSDPA, dedicated voice and data channels.
- Transmit chip-rate (TX) library – Enables downlink chip rate functions for WCDMA. This toolkit supports downlink spreading and scrambling, closed-loop power control and antenna stream aggregation.

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