

## Single-Chip 65 nm EDGE Baseband + RF + Multimedia

### FEATURES

- **General Characteristics**
  - Single-chip, single-die, Class 33, 4-band, EDGE/GPRS baseband processor
  - Complete System On a Chip (SoC), integrating RF transceiver, high-end multimedia, high-speed 480-Mbps USB 2.0 OTG, full mixed-signal support for speakers, stereo DAC and audio amplifiers, USB transceiver, full security and DRM, and high-performance 208 MHz ARM9<sup>™</sup> processor
  - Utilizes low-cost, low-power 65 nm digital CMOS process
  - Compact, 12 mm x 12 mm, 407-pin FBGA package for low-cost PCB design
- **Multimedia Capabilities**
  - 2.0 Mpixel camera support with ISP
  - 30 fps, full-rate H.264, H.263, WMV9, and MPEG4 at high-quality QVGA resolution
  - H.264 encode and decode for high-quality, efficient memory usage
  - Dual LCD support, up to 262k colors
  - 64-tone polyphonic ringer
  - Digital audio mixer and 5-band equalizer
  - Advanced audio codec support: MP3, AAC, AAC+, eAAC, WMA, AMR-NB, and AMR-WB
  - Downloadable codec capability with on-chip SRAM
- **Extensive Mixed-Signal and Advanced Audio Integration**
  - USB 2.0 HS (480 Mbps) transceivers
  - 400 mW stereo amplifiers; 100 mW stereo amplifiers for speakerphone, music player, and ringer
  - Stereo DACs with greater than 95 dB SNR
- **Signal Quality**
  - Self-calibrating, on-chip, Class 33 EDGE transceiver automatically adjusts to changing conditions and compensates for manufacturing deviations
  - Broadcom<sup>®</sup> M-Stream technology delivering up to 3 dB better signal quality
  - SAIC support for voice, data, echo cancelling, and noise suppression

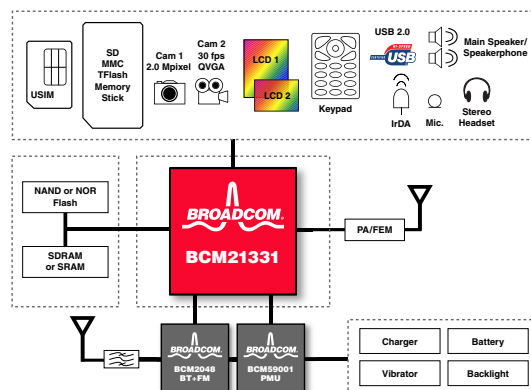
### SUMMARY OF BENEFITS

- Enables high-performance, low-cost EDGE/GPRS handset design
- Enables small, thin design through integrated multimedia, RF, and mixed-signal audio.
- Lowest power consumption due to advanced 65 nm process and on-chip hardware acceleration architecture.
- Quad-band support for worldwide GSM coverage and roaming ability.
- Extended coverage and fewer dropped calls using M-Stream, SAIC, and unique RF design.
- High-performance, 208 MHz ARM9 processor for superfast applications computing speed.
- High-quality audio, video capture, and playback with H.264 QVGA hardware support.
- Fast multimedia and data download using 480 Mbps USB 2.0 OTG.
- Flexibility design provides support for optional GPS, Bluetooth<sup>®</sup>/FM, Wi-Fi<sup>®</sup> external multimedia processor.
- **Enhanced interfaces:**
  - Flexible memory: NOR/NAND/SDRAM/DDR at 104 MHz
  - High-speed USB 2.0 OTG (480 Mbps)
  - Two high-speed UARTs @ 3.6 Mbps
  - 8-bit and 4-bit SDIO ports
  - Hard disk (CE-ATA)/SD/MMC, T-Flash, and memory stick PRO<sup>™</sup>
  - BSC (I<sup>2</sup>C compatible), I<sup>2</sup>S, SPI and PCM interfaces
  - USIM controller
  - ETM and JTAG for software debug
  - Bluetooth/FM, Wi-Fi, and GPS support
  - TV-Out support via ITU-601

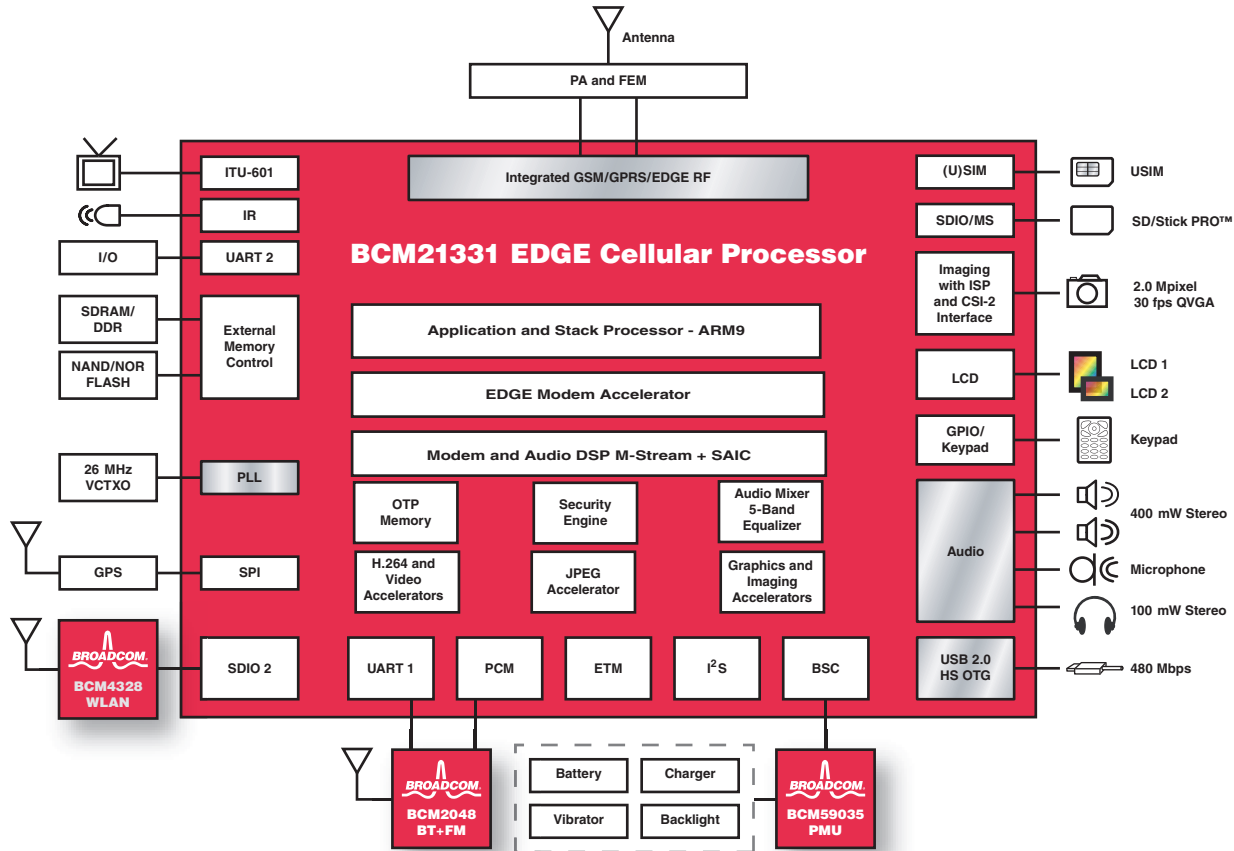
### APPLICATIONS

- Entry to high tier EDGE feature phones

### System Block Diagram



# OVERVIEW



**Functional Block Diagram**

## Overview

The BCM21331 is a single-chip EDGE/GPRS/GSM multimedia baseband processor with a fully integrated RF transceiver and mixed-signal analog. Based on 65 nm technology, the BCM21331 offers the lowest power consumption, highest integration, and lowest cost EDGE solution.

The modem supports Class 33 EDGE/GPRS and integrates all analog and digital baseband functions on a single, monolithic silicon.

The integrated BCM21331 RF transceiver design delivers high RF performance while achieving low-power consumption through innovative architecture and circuit design. The RF transceiver draws on Broadcom's extensive experience in digital CMOS radio design and directly leverages Broadcom's BCM2085 CMOS EDGE radio product. Critical radio performance, while using digital CMOS for radios, is assured through the use of proprietary, autonomous, real-time calibrations within the radio.

The BCM21331 cellular processor has fully integrated audio support for driving the earpiece, ringer, and 100 mW stereo headset. It also has 400 mW drivers for stereo speakers. External audio/video coprocessors are not required for the handset design. Broadcom's proprietary M-Stream high-performance modem and SAIC advanced signal processing technologies improve cellular handset reception and voice quality while increasing network capacity, without sacrificing call quality.

## Connectivity

Supports USB 2.0 HS (480 Mbps) with integrated analog PHY.

## Security

The embedded One-Time-Programmable (OTP) bits allow the software to boot securely and verify IMEI security prior to network activation. OTP bits can also be used by high-level applications to verify the integrity of the DRM function.

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