



Single-Chip 65-nm HSUPA + RF + BT + FM + Multimedia SoC

FEATURES

- **General Characteristics**
 - Single-chip, single-die, HSPA System On a Chip (SoC) with integrated RF, Bluetooth®, FM, multimedia acceleration, high-speed USB, full mixed-signal audio and dual high-performance applications and communications CPUs
 - Advanced, release 6-compliant, 7.2 Mbps HSDPA, 5.8 Mbps HSUPA modem with Class 33 EDGE
 - Utilizes the low-cost, low-power, 65-nm digital CMOS process
 - Compact, 14 mm x 14 mm, 621-pin FBGA package for small, low-cost PCB design
- **Multimedia Capabilities**
 - Supports 5.0-Mpixel camera sensors with MIPI serial interface
 - 30 fps, H.264, MPEG4, H.263 and WMV9 video @ high-quality HVGA resolution
 - H.264 encode and decode for high-quality, efficient memory usage
 - Dual LCD support; up to 24M colors with MIPI serial interface
 - 64-tone polyphonic ringer
 - Digital audio mixing with 5-band equalizer
 - Advanced audio codec support: MP3, AAC, AAC+, eAAC, WMA, AMR-NB, AMR-WB, WB-AMR+
- **Extensive Mixed-Signal and Advanced Audio Integration**
 - USBOTG HS (480 Mbps) and FS transceivers
 - Stereo headset and earpiece amplifiers with stereo line drivers for external Class D loudspeaker amplifiers.
 - stereo DACs with greater than 95 dB SNR
 - analog TV-out support (Composite)
 - 2G and 3G RF transceiver
 - Bluetooth 2.1 EDR, FM Rx (RDS) and FM Tx
- **Advanced Technology**
 - Self-calibrating 2G and 3G transceivers automatically adjusts to changing conditions and compensates for manufacturing deviations
 - Broadcom® M-Stream technology delivering up to 3 dB better signal quality

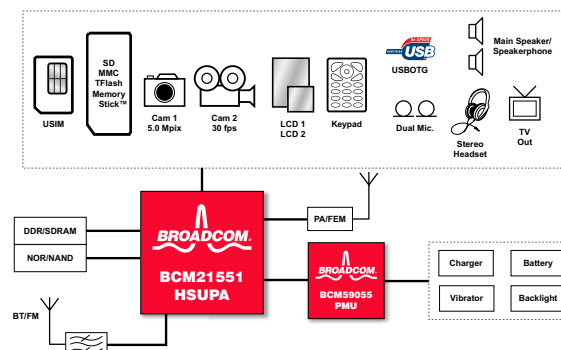
SUMMARY OF BENEFITS

- Enables high-performance, low-cost HSUPA/HSDPA/WCDMA/EDGE/GPRS handset design.
- Enables small, thin design via through integrated multimedia, RF, Bluetooth, FM and mixed-signal audio.
- Low power consumption through utilization of advanced 65-nm process and on-chip hardware acceleration architecture.
- High-performance, 468-MHz ARM11™ processor for superfast applications computing speed.
- Quad-band 2G and multiband 3G for world-wide coverage and roaming ability.
- Advanced echo cancellation with narrowband, and wideband AMR codecs.
- Extended coverage, fewer dropped calls and improved audio quality, using M-Stream, SAIC, and unique RF design.
- Advanced HSDPA DMI equalizer, offering high data throughput in during mobile and fading conditions.
- High-quality audio, video capture, and playback with H.264 HVGA hardware support.
- Fast multimedia and data download using 480-Mbps USBOTG.
- SD/MMC, version 4.2, for supporting external T-Flash/SD memory cards up to 32 GB.

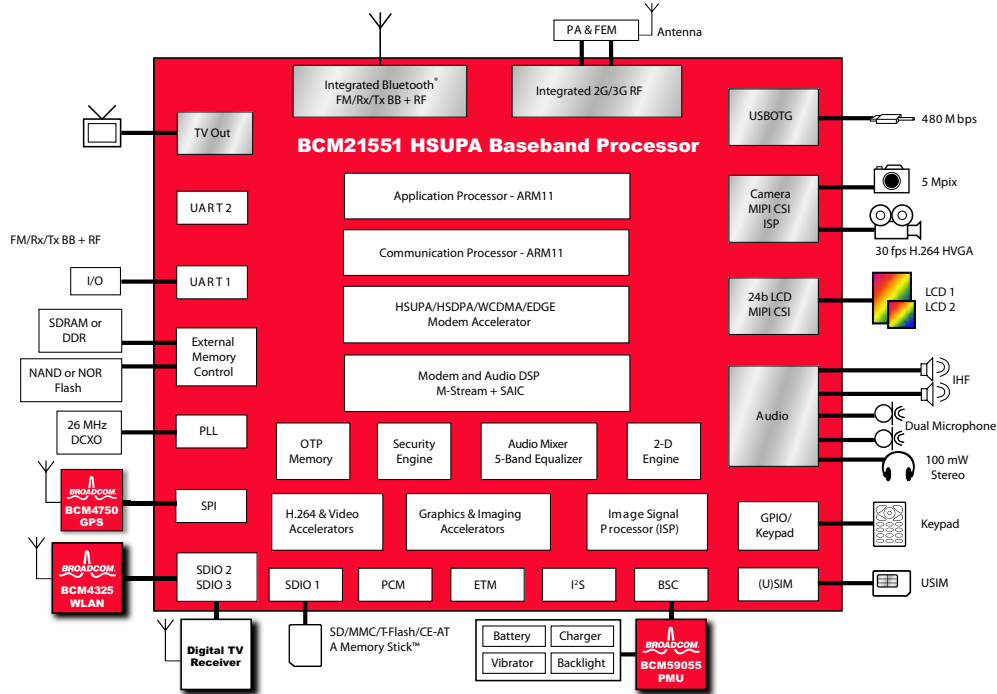
APPLICATIONS

- 3G HSPA feature phones
- 3G OpenOS Smartphones

Typical System Block Diagram



OVERVIEW



Chip Block Diagram

The BCM21551 is an advanced, single-chip, 65-nm HSUPA/WCDMA/EDGE SoC with fully integrated 2G and 3G RF transceivers, Bluetooth, FM and mixed-signal analog. Based on 65-nm technology, the BCM21551 offers the highest integration, lowest power consumption, and lowest cost HSUPA solution.

The modem supports 5.8 Mbps HSUPA, 7.2 Mbps HSDPA, WCDMA 384K with Class 33 EDGE modem and integrates all analog and digital functions on a single, monolithic silicon.

The integrated BCM21551 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 bulk CMOS radio design and directly leverages Broadcom's BCM2085 and BCM21331 CMOS cellular radio products. Critical radio performance, while using digital CMOS for radios, is assured through the use of proprietary, autonomous, real-time calibrations within the radio.

The BCM21551 integrates Bluetooth 2.1 (Lisbon) + EDR-compliant and FM/ RDS/RBDS transceivers. The Bluetooth and FM core feature a high level of integration and eliminates all critical external components, thereby, minimizing the system's footprint, power consumption, and cost.

Robust multimedia capabilities are also provided, including 30 fps HVGA video for H.264 and WMV9, a 5-Mpixel camera with ISP, extensive audio codec support for music playback, and 2D graphics/blending for the LCD.

The BCM21551 cellular processor has fully integrated audio support for driving the ear piece, ringer and stereo headsets. It also has stereo line drivers to support the external Class D amplifiers for driving loudspeakers. 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 and without sacrificing call quality. The BCM21551 utilizes an advanced release 6-compliant direct Matrix Inversion (DMI) equalizer for high HSDPA data throughput in the most challenging radio conditions, thereby offering high performance without costly receiver diversity.

SECURITY

Enhanced security is provided through One-Time Programmable (OTP) bits and dedicated hardware blocks for secure Boot, memory and DRM functions. The embedded OTP bits allow the software to boot securely and verify IMEI security prior to network activation. The OTP bits can also be used by high-level applications to verify the integrity of Digital Rights Management (DRM) functions.

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