

## 7.2-MBPS HEDGE 65-nm MULTIMEDIA BASEBAND PROCESSOR

### FEATURES

- **General characteristics**
  - Single-chip, single-die, 7.2-Mbps HSDPA/EDGE baseband processor
  - Complete system-on-a-chip, high-end multimedia with advanced audio, high-speed 480-Mbps USB 2.0 OTG, full mixed-signal support for speakers, Hi-Fi stereo audio amplifiers and USB transceivers, full security and DRM, and high performance 312-MHz ARM11™ applications processor
  - Advanced release 6 compliant equalizer and 208-MHz ARM9™ for communications
  - Utilizes the lowest cost, lowest power 65-nm digital CMOS process
  - Compact 13 mm x 13 mm 517-pin FBGA package for low-cost PCB design
- **Multimedia capabilities**
  - Supports up to 3.2-Mpixel camera
  - 30-fps full-rate H.264, H.263, WMV9, and MPEG4 at high quality QVGA resolution
  - Supports both encode and decode at H.264, for best quality and memory usage
  - Up to 262K colors, dual-panel display support
  - Extensive graphics, video, and imaging hardware acceleration blocks
  - Digital TV out (CCIR6601)
- **Extensive mixed-signal integration and advanced audio**
  - On-chip mixed-signal transceivers for 480-Mbps USB2.0 OTG
  - On-chip 400-mW stereo amplifiers for speaker phone or ringer
  - On-chip Hi-Fi stereo audio DACs and 100-mW amplifiers for MP3/ audio
  - On-chip digital audio mixing and 5-band equalizer
  - Integrated 64-tone polyphonic ringer
  - Integrated MP3, AAC, AAC+, eAAC, WMA and W-AMR codecs
  - Downloadable codec capability with on-chip SRAM
- **Signal and voice quality**
  - Broadcom M-Stream technology delivers up to 3dB better signal quality
  - SAIC support for voice, data, echo cancelling, and noise suppression
  - >95-dB SNR for Hi-Fi stereo audio

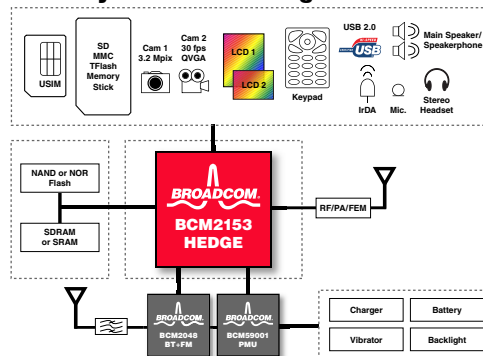
### SUMMARY OF BENEFITS

- Enables the highest performance yet lowest cost HSDPA/EDGE handset design
- Extended coverage and fewer dropped calls using M-Stream, SAIC, and unique WCDMA equalizer
- Lowest power consumption due to advanced 65-nm process and on-chip hardware acceleration architecture
- Fastest video, audio, and data download using 480-Mbps USB 2.0 OTG
- Highest quality audio and video capture and playback with H.264 QVGA hardware support
- Enables smallest and thinnest design via integrated multimedia, audio, and mixed signal
- Extreme flexibility to support optional GPS, Bluetooth®/FM, Wi-Fi®, Mobile TV, or external multimedia processor
- High performance 312-MHz ARM11 processor for super fast applications computing speed
- Quad-band support for worldwide GSM coverage and roaming ability
- **Enhanced interfaces**
  - Flexible memory: NOR/NAND/pSRAM/SDRAM at 104 MHz
  - USB 2.0 OTG high-speed (480 Mbps)
  - Two high-speed UARTs at 3.6 Mbps
  - One 8-bit SDIOs at 416 Mbps, one 4-bit at 208 Mbps
  - BSC, I<sup>2</sup>S, SPI, and PCM interfaces
  - Hard disk (CE-ATA)/SD/MMC and T-Flash, memory stick PRO™
  - USIM controller
  - ETM and JTAG for software debug
  - Bluetooth/FM, Wi-Fi, and GPS support
  - TV out

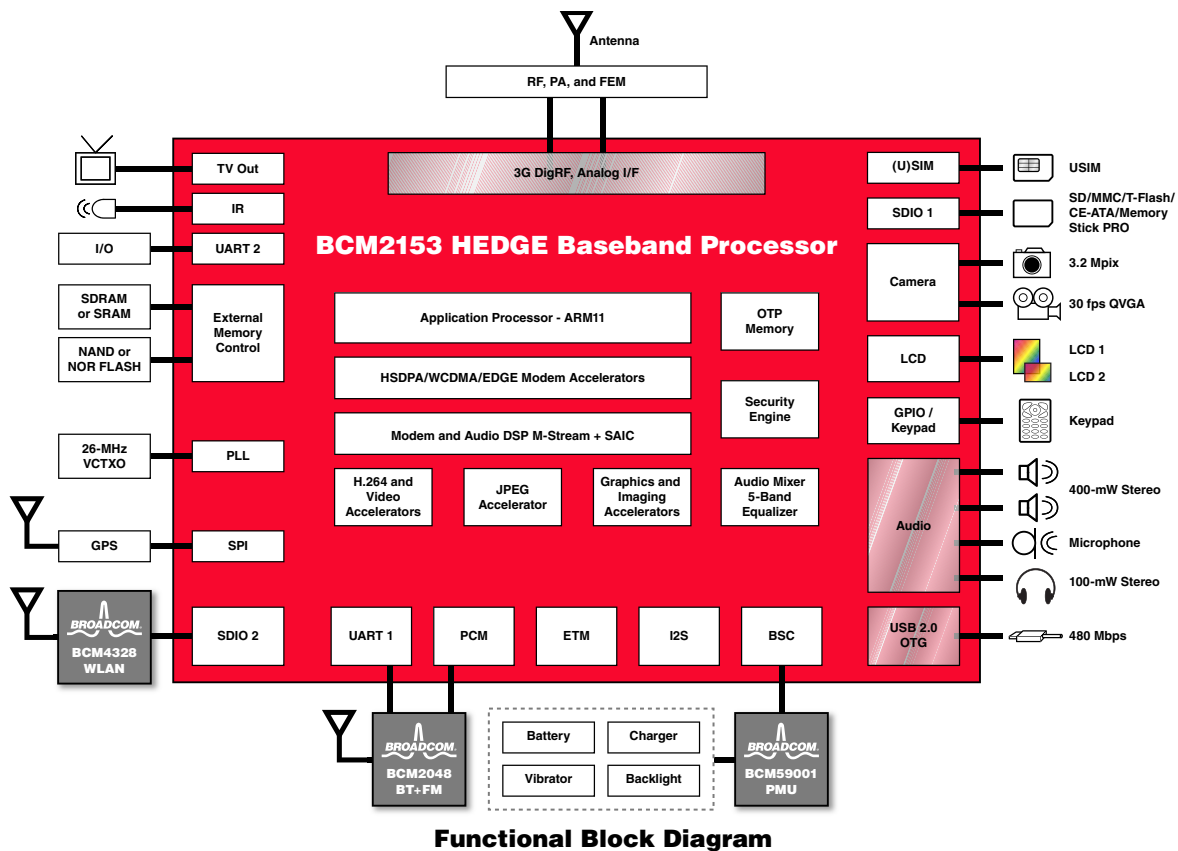
### APPLICATIONS

- Mobile handsets and smartphones

### System Block Diagram



## OVERVIEW



**Functional Block Diagram**

The BCM2153 single chip HEDGE multimedia baseband processor, features WCDMA, 7.2-Mbps HSDPA and EDGE Class 12 capability to provide full support for 2G and 3G voice and high-speed data. Full inter-RAT operation is supported for seamless global roaming on EDGE/GPRS/GSM and HSDPA/WCDMA networks worldwide.

The BCM2153 integrates all multimedia, analog and stereo audio functions on a single, monolithic piece of silicon, which avoids the added cost of die-stacking and provides for lower power operation and lower BOM cost.

Full stereo music capability is integrated, including hi-performance stereo DACs for both headset and stereo speakers, with integrated 5 Band graphic equalizer and digital mixing, thus eliminating the need for an external audio device. On chip stereo output is provided for up to 400 mW into 8Ω.

The BCM2153 also integrates the analog PHY required for USB2.0, providing full USB2.0 480 Mbps, with no external components and supports USB charging and audio functions.

Advanced video acceleration for QVGA 30 fps H.264 and MPEG for both camera and video playback allows for high quality video support and low power, low MIPS.

Broadcom's proprietary M-Stream high-performance modem technology and SAIC advanced signal processing technologies improve cellular handset reception and voice quality while increasing network capacity, without sacrificing call quality.

The BCM2153 utilizes an advanced release 6 compliant DMI (Direct Matrix Inversion) equalizer for highest HSDPA data throughput in the most challenging radio conditions, so offering high performance, without the need for costly receiver diversity.

Separate parallel LCD, camera, and ARM memory busses allow the user interface to be updated without impacting the real-time radio operations.

### Security

Enhanced security is provided with OTP and dedicated HW blocks, to provide secure boot, memory, and DRM functions. The embedded one-time programmable (OTP) bits allow the software to boot securely and check IMEI security prior to network activation. OTP bits can also be used by high-level applications to verify the integrity of the Digital Rights Management (DRM) function.

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