

Description for SLIM 11B

1. Circuit Overview

SLIM 11B is Tri-band (GSM850/DCS1800/PCS1900)GSM Phone and supports GPRS Class12. There is seamless roaming and handover between the bands. The RF design is based on a Media Tek Inc MT6120 Quadruple band GSM chip transceiver. Also RF parts includes Front End Module and PAM and TCXO. This RF solution works together with the baseband chipset MTK6219 from Media Tek Inc.

The entire RF parts will be supplied by 2.8V from MT6120 voltage regulation part, except for the PA, which will be supplied directly from the battery.

The Baseband part is composed of MT6219 digital baseband chipset, MT6305 power management IC and memory.

2. RF PARTS

2.1. Transmitted Parts

The main parts of the transmitter is the modulation loop section(MT6120) and the power amplifier and Front End Module.

2.1.1. MT6120

The MT6120 transmitter section consists of two on-chip TX VCOs, buffer amplifiers, a down-converting mixer, a quadrature modulator, an analog phase detector(PD) and a digital phase frequency detector(PFD), each with a charge pump output and on chip loop filter. The dividers and loop filters are used to achieve the desired IF frequency from the down-conversion mixer and quadrature modulator. For given transmission channel, the transmitter will select one of the two different TX reference dividing numbers. These built-in components, along with an internal voltage controlled oscillator(TX VCO) and a loop filter, implement a translation loop modulator. The TX VCO output is fed to the power amplifier(PA). A control loop, implemented externally, is used to control the PA's output power level.

2.1.2. Power Amplifier (AWT6171)

The AWT6171 is a quad-band GSM850, GSM900, DCS1800, and PCS1900 power amplifier module. The AWT6171 integrated CMOS power control scheme simplifies the design of the transmitter by eliminating the need for external power control circuit.

The AWT6171 have 34.5dBm max power, 55% efficiency in GSM550~GSM900 mode(in power class 5), and 32.5dBm max power, 53% efficiency in DCS mode(in power class 0), and 32.5dBm max power, 52% efficiency in PCS mode.

2.1.3. Front End Module (ESHS-M080SF)

ESHS-M080SF is antenna switch module with SAW filter for Tri Band (GSM850/ DCS / PCS). This module has max 1.4dB insertion loss in GSM850 TX mode and max 1.4dB in DCS/PCS TX mode.

And in Rx mode, typical 2.5dB insertion loss in GSM850, typical 2.4dB in DCS, typical 2.6dB in PCS1900.

2.2 Received Parts

The Receiver is very low IF architecture. The GSM and DCS/PCS RX signals flows from the Front End Module to MT6120. The MT6120 incorporates four low noise amplifiers (LNAs), two RF quadrature mixers, an integrated channel filter, programmable gain amplifiers(PGA), an IQ demodulator.

2.2.1 MT6120

The receiver section of MT6120 includes Quad-band LNAs, RF quadrature mixers, an on-chip channel filter, PGAs, quadrature second mixers, and a final low-pass filter.

The very low-IF MT6120 uses image-rejection mixers and filters to eliminate interference. With accurate RF quadrature signal generation and mixer matching techniques, the image rejection of the MT6120 can reach 35dB for all bands. The fully integrated channel filters rejects interference, blocking signals, and images without any external components.

3. BASEBAND PARTS

The main parts of the BaseBand includes MT6219 digital baseband chipset, MT6305 power management IC, Memory, Nand Flash Memory.

3.1 MT6219

The MT6219 is a leading edge single-chip solution for GSM/GPRS mobile targeting the emerging applications in digital audio and video. Based on 32-bit ARM7ESJ-S RISC processor, MT6129 not only features high performance GPRS class 12, but also provides comprehensive and advanced solutions for handheld multi-media.

Mobile phone with FCC ID : UTA8SLIM11B is support GPRS Class 12.

Specially, MT6129 consists if the following subsystems.

- Microcontroller Unit Subsystem - includes an ARM7EJ-S RISC processor and its accompanying memory management and interrupt handling logics.
- Digital Signal Processor subsystem - includes a DSP and its accompanying memory management and interrupt handling logics.
- MCU/DSP interface - where the MCU and DSP exchange H/W and S/W information.
- Microcontroller Coprocessors - runs computing intensive processes in place of MCU
- DSP Peripherals - hardware acceleratos for GSM/GPRS channel codec.
- Multi-media Subsystem – integrates several advanced accelerators to support multi-media applications.
- Voice Front End – the data path for converting analog speech from and audio source.
- Audio Front End – the data path for converting stereo audio from stereo audio source.
- Baseband Front End – the data path for converting digital signal from and to analog signal of RF modules.
- Timing Generator – generates the control signals related to the TDMA frame timing.
- Power,Reset and Clock subsystem – manages the power,reset,and clock distribution inside MT6219.

3.2 Power Management IC (MT6305)

The MT6305 is a power management system chip optimized for GSM handsets.

It contains seven LDOs, one to power each of the critical GSM sub-blocks.

Sophisticated controls are available for power up during battery charging, keypad interface, and RTC alarm. The MT6305 battery charger can be used with lithium ion and nickel metal hydride batteries.

The SIM interface provides the level shift between SIM card and microprocessor.

3.3 Memory (M6MGD13TW66CWG)

The M6MGD13TW66CWG is a combination memory organized as 64M(4,194,304 X 16bit) flash memory , 64M flash memory and 32M(2,097,152 X 16bit) Smartcombo RAM in one package. The Supply voltage in F-Vcc/S-Vcc will be supplied by 2.8V from MT6305 power management IC.

3.4 Nand Flash Memory (K9F1208U0B)

K9F1208U0B is 512M bit with spare 16M bit capacity. Its NAND cell provides the most cost-effective solution for the solid state mass storage market. A program operation can be performed in typical 200us on the 528-byte page and an erase operation can be performed in typical 2ms on a 16K-byte block.

The K9F1208U0B is an optimum solution for large nonvolatile storage applications such as solid state file storage and other portable applications requiring non-volatility.