

Operational Description

Model: MS5314G

Band:

GSM:850/1900

WCDMA: B2/B4/B5

LTE: 2/4/5/12/17/66/71

1. Scope:

This document shows and provides the more detail information about the platform we used. The basic description for the Baseband and RF section are also included

2. RF Module:

3.1 Transceiver (MT6177M)

MT6177M is a highly integrated, single-die radio transceiver chip that supports 4G FDD-LTE, 3G WCDMA, GSM.

operation. Implemented in low cost bulk CMOS, it is optimized to meet the power efficient, high performance cellular handsets

Features

Fully integrated single chip multi-mode, multi-band transceiver in bulk CMOS

FDD-LTE Band: 2,4,5,12,17,66, 71

WCDMA Band: 2,4,5

GSM: GSM850/1900

Completely integrated frequency

synthesizer and VCO

All TX outputs are single-ended and

Analog and Digital IQ interface

C2K/2G/3G/4G CO-banding

Support SRLTE

Support external LNA at RXP and RxD.

Support LTE Power Class 2 high-power UE(HPUE) in band 41.

Built-in DCXO

Three sets of reference outputs

Single SPI operation

Body Size: 5.0 X4.6 X 0.9mm

Ball array: 12 X 11

RoHS Compliance

Halogen Free (HF) Compliance

3.2 RF ASM (HS8916CM-31)

The HS8916CM-31 is a high-power, high-efficiency Front-End CMOS Module for GSM850/1900 operation. A high-power and high-efficiency CMOS-PA & Controller die and a SP16T RF switch are integrated in HS8916CM, supporting quad-band GSM/GPRS of GSM850/1900. The HS8916CM provides complete features including PA over-voltage and over-current protection, 50 ohms matching for inputs/outputs, TRx high linearity/low loss switching and high off-state isolation, integrated directional coupler, esd protection for IEC ruggedness at antenna output. The device is packaged in a small LGA package (5.5mm x 5.3mm x 0.82mm).

Features

- LGA: 5.5 mm x 5.3 mm x 0.82 mm Max
- Fully programmable MIPI RFFE control
- Fourteen low-insertion-loss TRx ports (five ultra-low loss) with enhanced linearity, for state-of-the-art 4G performance and GPS / WiFi compatibility
- High Efficiency (inclusive of coupler)
 - GSM850 42%
 - PCS1900 34%
- Tx harmonics below –40 dBm
- Current limiting and over-voltage protection for ruggedness and extended battery life
- Power control circuitry built-in for improved TRP variation
- Cellular handsets encompassing Quad-Band GSM/GPRS
 - Class 4 GSM850
 - Class 1 PCS1900
 - Class 12 GPRS multi-slot operation

3.3 RF PA (HS8443-19):

HS8443-19 is a hybrid multimode multiband (MMMB) Power Amplifier Module (PAM) that supports 3G / 4G handsets and operates efficiently in CDMA, WCDMA,

TD-SCDMA, and LTE modes. The module is fully programmable through a Mobile Industry Processor Interface (MIPI). The PAM consists of a 3G/4G PA blocks for low, high, and mid-bands, and a Multi-Function Control (MFC) block, RF input/output ports internally matched to 50 ohm to reduce the number of external components. A CMOS integrated circuit uses standard MIPI controls to provide the internal MFC interface and operation. Extremely low leakage current maximizes handset standby time. The devices packaged in a small LGA package. (4.0 mm x 6.8 mm x 0.85 mm)

Feature:

- Two T/R (RX) ports and 14 outputs
- Industry-leading PAE for 3G/4G
- Optimized for APT DCDC operation
- Fully programmable Mobile Industry

Processor Interface (MIPI) control

- MIPI programmable bias modes optim

efficiency / linearity trade-off for 3G an

minimizes DG09 for 3G.

- Small Package:

4.0 mm x 6.8 mm x 0.85 mm, Max

LGA 42 pad configuration

Multiband 3G / LTE handsets

- WCDMA Bands II, IV, V

- FDD LTE Bands

2, 4, 5, 12, 17, 66, 71

3. Baseband(MT6739):

MT6739 device ,with integrated bluetooth ,FM,WLAN and GPS module,is a highly integrated baseband platform incorporating both moden and application processing subsystems to enable LTE smart phone application,The chip integrates Quad-core ARM Cortex-A53 operating up to 1.5GHZ,an Imagination MIPS32 InterAptive processor and powerful multi-standard video codec. In addition,an extensive set of interfaces and connectivity peripherals are included to interface to cameras, touch-screen displayd and MMC/SD cards. the application procesor ,an Quad-core ARM Cortex-A53 MPCore equipped with NEON engine offers processing power necessary to support the latest Open OS along with its demangding applications such as web browsing, email,GPS navigation and games. All are viewed in a high resolution touch screen display with graphics enhanced by the 2D and 3D graphics acceleration.

MT6739 characteristic:

Quad-core ARM Cortex -A53 MPCore operating at 1.5GHZ

LPDDR3 up to 3GB, 667MHZ.

LTE CAT4(150Mbps)

CDMA2000 HRPD/1XEV-DO Revision O and A.

HPUE

Embedded connectivity system including WLAN/BT/FM/GPS

Resolution up to HD+(1440 x720 60 fps)

OpenGL ES 3.0 3D graphic accelerator

ISP supports 13MP@30fps

H.264 1.80p@30fps encoder

Speech codec(FR,HR,EFR,AMR,FR,AMR,HR and Wide-band AMR ,EVS-WB)

Package: VFBGA 11.8X11.0 mm

Modem Features:

. LTE FDD baseband

FDD UP TO 150Mbps downlink, 50Mbps uplink

1.4 to 20MHz RF bandwidth

2*2 downlink SU-MIMO, 4*2 downlink SU-MIMO

IPv6,QoS

Inter-RAT capabilities with HSPA+, EDGE and applicable backward-compatible modes.

.WCDMA baseband:

3G modem supports most main features in 3GPP Release 7 and Release 8

CPC (DTX in CELL_DCH,UL DRX DL DRX),HS-SCCH-LESS,HS-DSCH

DUAL CELL operation

2drx schemes in URA_PCH and CELL_PCH

Uplink cat 7(16qam) ,throughput up to 11.5Mbps

Downlink Cat.24(64QAM),throughput up to 42.2Mbps

GSM/GPRS baseband:

- Compatible with GSM/GPRS Release GSM850 and PCS1900 recommendations

- Complete in-phase and quadrature (I/Q) component interface between the Digital Signal Processor (DSP) and RF module
- Cryptographic Algorithms: A5/1 A5/2 A5/3, GEA1 GEA2 GEA3

Connectivity Features

WLAN

Bluetooth

GPS

FM Receiver

The RF parts of those four blocks are placed on chip MT6625L, With four advanced radio technologies integrated on one chip, It supports single antenna sharing among 2.4GHz Bluetooth, 2.4GHz WLAN and 1.575GHz for GPS.

-Single antenna for Bluetooth and WLAN/GPS

-WiFi Features

- Single-band 2.4 GHz single stream IEEE 802.11b/g/n

- Support WIFI and Bluetooth TDD operation and single-antenna topology with integrated TR-switch

Wifi: 2412-2462 MHz (TX/RX)

.Bluetooth Features

- Bluetooth v4.1 Low Energy (LE)

- Bluetooth v2.1 and BLE dual mode concurrent

- Integrated on-chip PA for TX, maximum power >8dBm (class 1)

BT: 2402-2480MHz (TX/RX)

. GPS Features

- Support GPS , BEIDOU ,GALILEO,GLONASS and BEIDOU.

Built-in calibration for PVT variation.

Typical Rx tracking sensitivity of -163dbm.

Supports external LNA

Multi-mode filters for different GNSS receiver modes.

. FM Features

87.5-108MHZ with 50KHZ step

Supports RDS/RBDS

Digital stereo modulator/demodulator

Digital audio interface(FM 2-wire bus)

Fast seek time 30ms/channel

Stereo noise reduction

Audio sensitivity 3dbu Vemf (SINAD=26dbm)

Audio SIND>60dB

Anti-jamming

Supports short antenna

Operation Frequency:

BT/BLE: 2402MHz~2480MHz

Wifi: 2412MHz~2462MHz

Tx:

GSM/GPRS 850: 824.2MHz ~ 848.8MHz

GSM/GPRS 1900: 1850.2MHz ~ 1909.8MHz

WCDMA Band V: 826.4MHz ~ 846.6MHz

WCDMA Band IV: 1712.4MHz ~ 1752.6MHz

WCDMA Band II: 1852.4MHz ~ 1907.6MHz LTE

Band 2: 1850 MHz ~ 1910 MHz

LTE Band 4: 1710 MHz ~ 1755 MHz

LTE Band 5: 824 MHz ~ 849 MHz

LTE Band 12: 699 MHz ~ 716 MHz

LTE Band 17: 704 MHz ~ 716 MHz

LTE Band 66: 1710 MHz ~ 1780 MHz

LTE Band 71:

Rx:

GSM/GPRS 850: 869.2MHz ~ 893.8MHz

GSM/GPRS 1900: 1930.2MHz ~ 1989.8MHz

WCDMA Band V: 871.4MHz ~ 891.6MHz

WCDMA Band IV: 2112.4MHz ~ 2152.6MHz

WCDMA Band II: 1932.4MHz ~ 1987.6MHz

LTE Band 2: 1930 MHz ~ 1990 MHz

LTE Band 4: 2110 MHz ~ 2155 MHz

LTE Band 5: 869 MHz ~ 894 MHz

LTE Band 12: 729 MHz ~ 746 MHz

LTE Band 17: 734 MHz ~ 746 MHz

LTE Band 66: 2110 MHz ~ 2180 MHz

LTE Band 71:

Modulation Type:

BT: GFSK, $\pi/4$ -DQPSK, 8DPSK

BLE: GFSK

Wifi: DSSS, OFDM

GSM/GPRS: GMSK

WCDMA/HSDPA/HSUPA: QPSK

LTE: PSK/16QAM

Antenna Type:

BT/BLE/Wifi/2G/3G/4G: Internal Antenna

Antenna Gain:

BT/BLE/Wifi: 1.2dBi

LTE Band 2: 0.9dBi

LTE Band 4: 0.7dBi

LTE Band 5: 0.5dBi

LTE Band 12: 0.3dBi

LTE Band 17: 0.3dBi

LTE Band 66: 0.7dBi

LTE Band 71:

GSM/GPRS 850: 0.6dBi

GSM/GPRS 1900: 0.8dBi

WCDMA Band V: 0.6dBi

WCDMA Band IV: 0.8dBi

WCDMA Band II: 0.8dBi

Crystal: 26MHz