

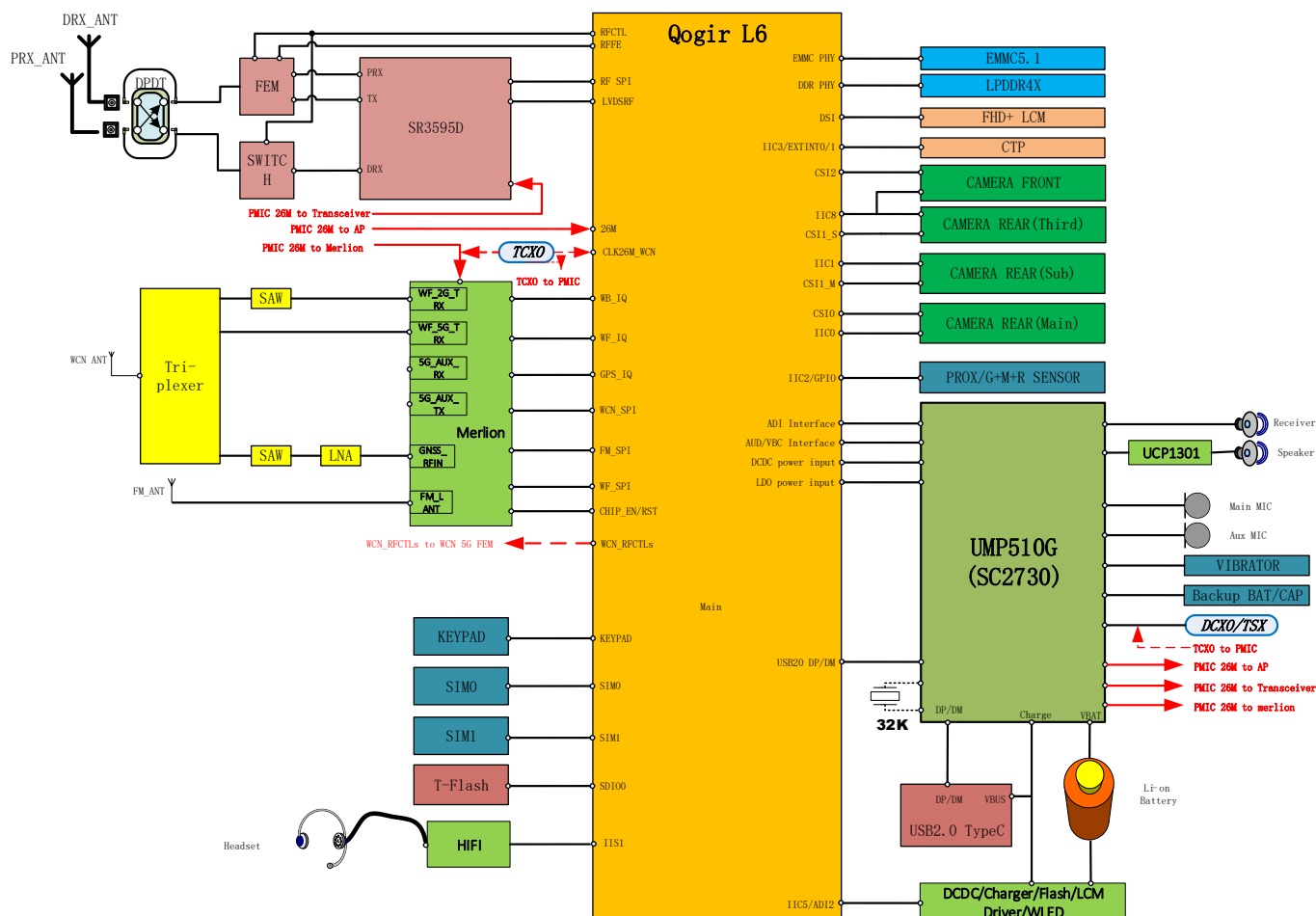
Operational Description

1. Overview:

568581 works with GSM quad band (GSM850/900/1800/1900), UMTS band1/8,LTE B1/3/5/7/8/20/38/41.

It can support DC-HSDPA downlink ,HSUPA uplink data rates, as well as Class 12 GPRS (in both uplink and downlink mode) and EDGE.

2. System diagram Overview:



2.1. RF:

RF (Radio Frequency) section is in charge of the signal transmit and receiving, signal modulation and demodulation.

2.2. Product technical parameters:

GSM

Items	GSM850	GSM900	DCS	PCS
Frequency allocation	TX (Uplink): 824M - 849MHZ	TX (Uplink): 880M - 915MHZ	TX (Uplink): 1710M - 1785MHZ	TX (Uplink): 1850M - 1910MHZ
	RX (Downlink): 869M - 894MHZ	RX (Downlink): 925M - 960MHZ	RX (Downlink): 1805M - 1880MHZ	RX (Downlink): 1930M - 1990MHZ
Channelwidth	200KHz	200KHz	200KHz	200KHz
Channel	128 - 251	975 - 1023, 0 - 124	512 - 885	512 - 810
Modulation	GMSK, BT=0.3 8PSK (downlink)	GMSK, BT=0.3 8PSK (downlink)	GMSK, BT=0.3 8PSK (downlink)	GMSK, BT=0.3 8PSK (downlink)
power class	4	4	1	1

GPRS	Class12 capability class B	Class12 capability class B	Class12 capability class B	Class12 capability class B
EGPRS	Class 12	Class 12	Class 12	Class 12
TX/RX space	45MHz	45MHz	95MHz	80MHz
(Fn)Freq. calculating formula	$F_n = 824.2 + (N - 128) \times 0.2$ N: Channel No. Unit: MHz	$F_n = 880.2 + (N - 975) \times 0.2$ N: Channel No. Unit: MHz	$F_n = 1710.2 + (N - 512) \times 0.2$ N: Channel No. Unit: MHz	$F_n = 1850.2 + (N - 512) \times 0.2$ N: Channel No. Unit: MHz

WCDMA

Items	Band1	Band8
Frequency allocation	TX(Uplink):1920-1980MHz	TX(Uplink): 880-915MHz
	RX(Downlink):2110-2170MHz	RX(Downlink):925-960MHz
Channel band width	5MHz	5MHz
Channel	9612 - 9888	2712-2863
Modulation	Uplink: QPSK Downlink: 16QAM	Uplink: QPSK Downlink: 16QAM
power class	Power Class 3	Power Class 3
HSDPA	Power Class 3 Category 14	Power Class 3 Category 14
HSUPA	Power Class 3 Category 6	Power Class 3 Category 6
TX/RX channel space	190MHz	45MHz
(Fn)Freq. calculating formula	$F_n = 1922.4 + (N - 9612) \times 0.2$ N: Channel No. //Unit: MHz	$F_n = 882.4 + (N - 2712) \times 0.2$ N: Channel No. //Unit: MHz
Power Class	3	3
Cell Radius	800m	800m

LTE

Items	band1	band3	band5	band7	band8
Frequency allocation	TX(Uplink) :1920-1980MHz	TX(Uplink) :1710-1785MHz	TX(Uplink) :824-849MHz	TX(Uplink) :2500-2570MHz	TX(Uplink) :880-895MHz
	RX(Downlink) :2110-2170MHz	RX(Downlink) :1805-1880MHz	RX(Downlink) :869-894MHz	RX(Downlink) :2620-2690MHz	RX(Downlink) :925-960MHz
Channel band width	1.4M/3M/5M/10M/15M/20M	1.4M/3M/5M/10M/15M/20M	1.4M/3M/5M/10M/15M	5M/10M/15M/20M	1.4M/3M/5M/10M
Channel	18000-18599	19200-19949	20400-20649	20750-21449	21450-21799
Modulation	QPSK, 16QAM	QPSK, 16QAM	QPSK, 16QAM	QPSK, 16QAM	QPSK, 16QAM
power class	3	3	3	3	3
TX/RX channel space	190MHz	95MHz	45MHz	120MHz	45MHz
(Fn)Freq. calculating formula	$F_n = 1920 + (N - 18000) \times 0.2$ N: Channel No. //Unit: MHz	$F_n = 1710 + (N - 19200) \times 0.2$ N: Channel No. //Unit: MHz	$F_n = 824 + (N - 20400) \times 0.2$ N: Channel No. //Unit: MHz	$F_n = 2500 + (N - 20750) \times 0.2$ N: Channel No. //Unit: MHz	$F_n = 880 + (N - 21450) \times 0.2$ N: Channel No. //Unit: MHz

Items	band20	band38	band41
Frequency allocation	TX(Uplink) :832-862MHz	2570-2620MHz	2496-2689MHz
	RX(Downlink) :791-821MHz		
Channel band width	5M/10M/15M/20M	5M/10M/15M/20M	5M/10M/15M/20M
Channel	24150-24449	37750-38249	39650-41589

Modulation	QPSK, 16QAM	QPSK, 16QAM	QPSK, 16QAM
power class	3	3	3
TX/RX channel space	41MHz		
(Fn)Freq. calculating formula	$F_n = 832 + (N - 24150) \times 0.2$ N: Channel No. //Unit: MHz	$F_n = 2570 + (N - 37750) \times 0.2$ N: Channel No. //Unit: MHz	$F_n = 2496 + (N - 38650) \times 0.2$ N: Channel No. //Unit: MHz

BR/EDR Specs:

BR/EDR Specs:	
Items	Values
FrequencyRange	2402MHz - 2480MHz
Power	6.5dBm ± 1dB
Modulation	GFSK/8 - DPSK/π/4 - DQPSK
Numberorchannels	79
Channelspacing	1MHz

BLE Specs:

Items	Values
FrequencyRange	2402MHz - 2480MHz
RFPowerOutput	0.0dBm ± 1dB
Modulation	GFSK
Numberorchannels	40

WIFI:

Frequencyrange	2412MHz - 2472MHz forb/g/n (HT20) 2422MHz - 2462MHz forn (HT40) 5150MHz-5820MHz
IEEE	802.11a, b, g, n HT20/HT40
RFpower802.11baveragepower	15.5dBm ± 1dB
RFpower802.11gaveragepower	13.5dBm ± 1dB
RFpower802.11nHT20averagepower	12.5dBm ± 1dB
RFpower802.11nHT40averagepower	10.0dBm ± 1dB
RFpower802.11bpeakpower	20.0dBm ± 1dB
RFpower802.11gpeakpower	22.0dBm ± 1dB
RFpower802.11nHT20peakpower	22.0dBm ± 1dB

RFpower802.11nHT40peakpower	20.0dBm±1dB
RFpower802.11aHT20peakpower	18.0dBm±1dB
RFpower802.11aHT20peakpower	18.0dBm±1dB
Modulation	DSSS/OFDM
Channelspacing	5MHz/10MHz/20MHz

RECOMMENDABLE OPERATION CONDITION:

NormalSupplyVoltage (Vd. c.)	3.7V
MaximumExtremeSupplyVoltage (Vd. c.)	4.2V
MinimumExtremeSupplyVoltage (Vd. c.)	3.4V
MinimumExtremeTemperature	-20°C
SIM/USIMVoltage	1.8/3v

2G PA

PA parameter GSM	Specification		
	Min.	Typ.	Max.
Powersupplyvoltage	3.1V	3.5V	4.8V
Powersupplycurrent	0	0.23	1.8A

3G PA

PA parameter UMTS	Specification		
	Min.	Typ.	Max.
Powersupplyvoltage	3.1V	3.2V	4.2V
Powersupplycurrent	0	0.51	0.8A

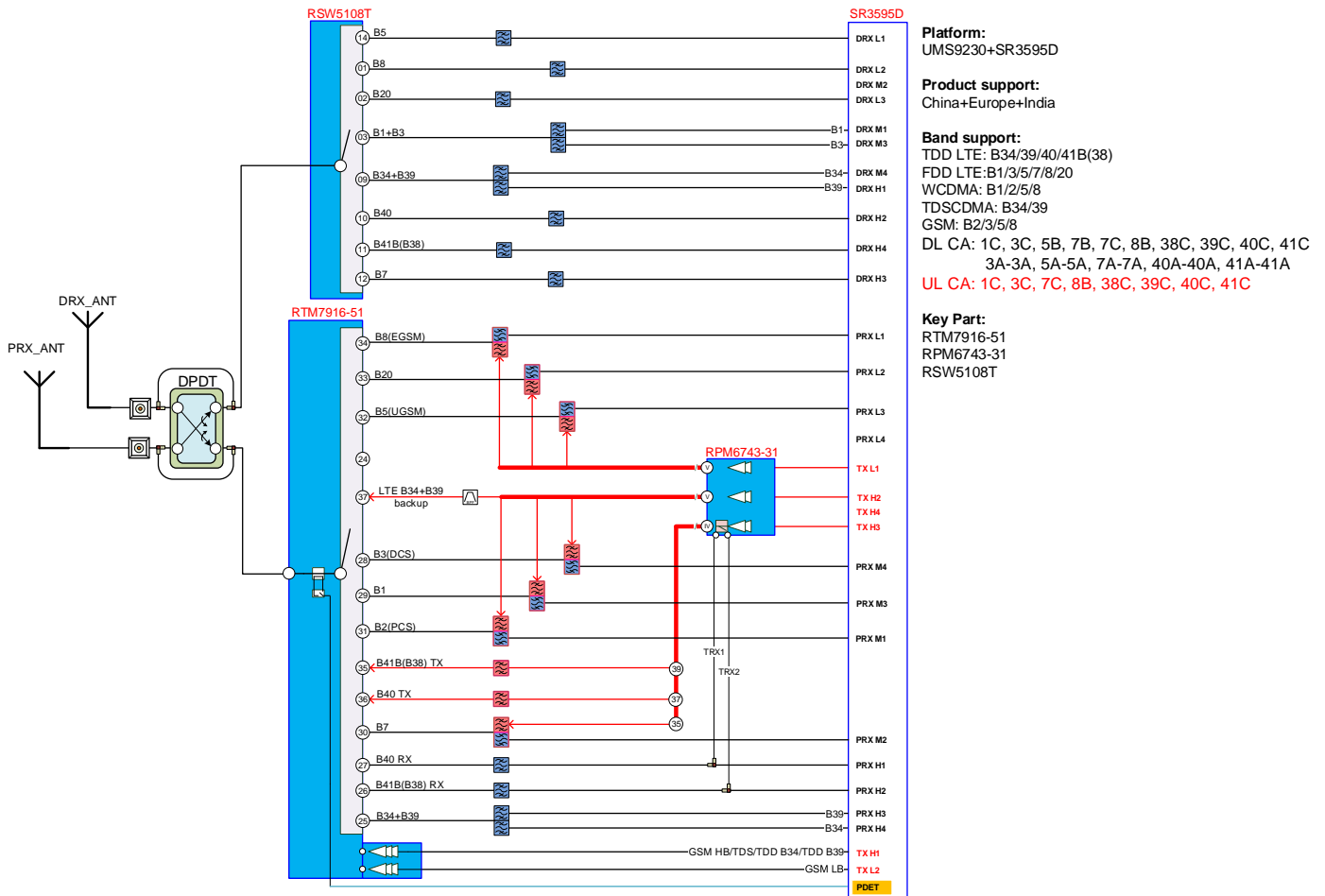
2.3. BB:

BB (Base-Band) section is the control & management center of the mobile where OS (Operate System) running and provides the MMI for the Tablet PC.

2.4. Receiver principle

The aerial signal mobile received go to RF Connector, and then transmit to transceiver via the selected band in RF switcher & SAW filter. Four IQ signals input to CPU, Go through A/D, DSP, and D/A section in CPU, then output to receiver.

2.5. Transmitter principle



- 1) Audio signal input from Microphone, Microphone convert the voice signal to analog signal and input to CPU (UMS9230).
- 2) After A/D in CPU, then send the digital signal to DSP pass ASI. Then processed logic signal pass D/A converter divided into four signals (IQ), output from CPU (UMS9230) to RF Transceiver I/Q input.
- 3) **After modulated**, Then to PA
- 4). Tx signals output from PA, flow through RF-Connector to antenna.

G - Sensor circuit:

The G sensor cannot use as power reduction instead of proximity sensor, which only used as screen orientation or compass etc

CAMERA Circuit

The camera connects to UMS9230 through Camera interface.

Charger Circuit

The ETA6937CSU integrate the charger control circuit. When inserting the charging adapter, VCDT detect high level, and start the charging program. By setting the max output current of the charging adapter and the duty cycle of the VDRV can set the charging current.

PMU Part Circuit

The circuit is part of the power management chip UMP510G. UMP510G is a power management system chip optimized for 2G/3G/4G handsets and smart phones. UMP510G contains 10 buck converters and 26 LDOs, which are optimized for specific 2G/3G/4G smart phone subsystems.

2.6. WLAN/Bluetooth/GPS and FM function

UMS9230 Supports single antenna for Bluetooth and WLAN, GPS.

- Self calibration
- Supports TCXO & TSX
- Best-in-class current consumption performance
- Intelligent BT/WLAN coexistence scheme that goes beyond PTA signaling (for example, transmit window and duration that take into account protocol exchange sequence, frequency, etc.)

2.6.1 Wi-Fi

- Single-band (2.4GHz) single stream 802.11 b/g/n MAC/BB/RF
- 802.11 d/h/k compliant
- Security: WFA WPA/WPA2 personal, WPS2.0, WAPI (Hardware)
- QoS: WFA WMM, WMM PS
- Supports 802.11n optional features: STBC, A-MPDU, Blk-Ack, RIFS, MCS feedback, 20/40MHz coexistence (PCO), uncheduled PSMP
- Supports 802.11w protected managed frames
- Supports Wi-Fi Direct (WFA P-2-P standard)
- Supports HotSpot 2.0 Passpoint
- Per packet TX power control

2.6.2 BlueTooth

- Bluetooth specification v2.1+EDR
- Bluetooth specification 3.0+HS compliance
- Bluetooth v5.0 Low Energy (LE)
- Rx sensitivity: GFSK -95dBm, DQPSK -94dBm, 8-DPSK -88dBm
- Best-in-class BT/Wi-Fi coexistence performance
- Up to 4 piconets simultaneously with background inquiry/page scan
- Supports Scatternet
- Packet Loss Concealment (PLC) function for better voice quality
- Low-power scan function to reduce power consumption in scan modes

2.6.3 GPS

- Supports GPS (WAAS/MSAS/EGNOS/GAGAN)
- Best-in-class sensitivity performance
- Full A-GPS capability (E911/SUPL/EPO/HotStill)
- Active interference cancellation for up to 8 in-band tones
- Low-power operational modes
- Support co-clock with AP/MD
- 5Hz update rate
- Supports external LNA

2.6.4 FM

- 88-108MHz worldwide FM bands with 50kHz tuning step
- Supports RDS/RBDS radio data system
- Digital stereo demodulator
- Adaptive FM demodulator for both high and low-quality scenarios
- Low sensitivity level with superior interference rejection
- Programmable de-emphasis (b
- Stereophonic multiplex signal (MPX)
- signal detection and demodulation
- Superior stereo noise reduction and soft mute volume control
- Audio dynamic range control
- Mono/stereo blending
- Audio sensitivity $3\text{dB}\mu\text{Vemf}$ (SINAD=26dB)