Operation Description

1. Overview:

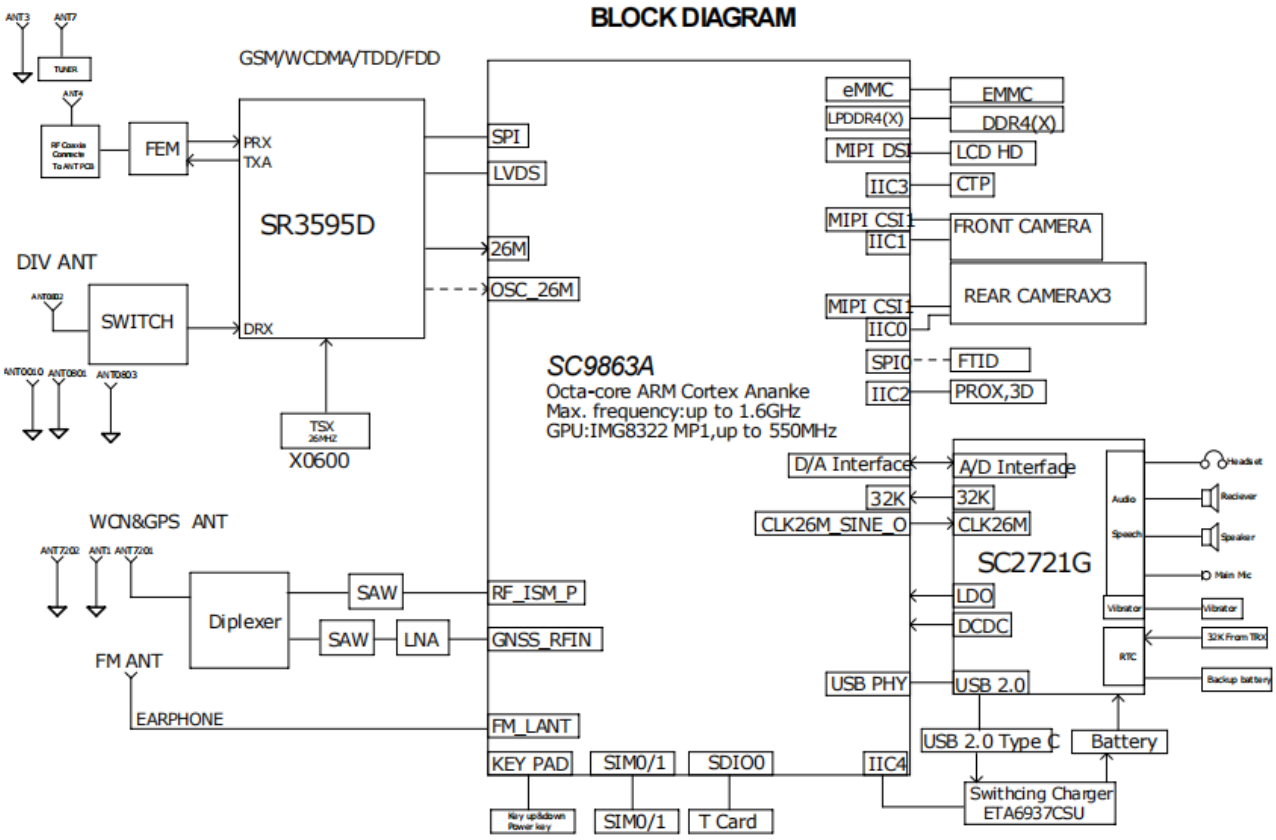
Platform: SC9863A

Band: GSM850/EGSM900/DCS1800/PCS1900+ WCDMA 1/2/4/5/8+FDD
B2/3/4/5/7/12/17/28AB/66
WIFI + BT + GPS + FM;
Speed: Octa -Core 1.6GHz;

– **Base band + EMMCP (eMMC+LPDDR3)+ PMIC + RF PA;**
– Baseband: SC9863A (SPREADTRUM)
–PMIC: SC2721G(SPREADTRUM)
— WCDMA/FDD/TDD PA：RPM6743(SPREADTRUM)
— GSM PA: RTM7916 (SPREADTRUM)

2. System diagram Overview:

2.1. Overview: block diagram



System block diagram

2.2RF

2.2.1 features

LTE

- FDD: Up to 150Mbps downlink, 50Mbps uplink
- TDD: Up to 150Mbps downlink, 50Mbps uplink
- Support different data rate at different BW (scalable), 150Mbps at 20MHz, 100 Mbps at 20 MHz, 50 Mbps at 10 MHz, 25 Mbps at 5 MHz, etc.
- Compatible with 3GPP Release Release 10
- Support PWS (Public Warning System) and CMAS receiving
- Cryptographic Algorithms：UEA1/UIA1:SNOW-3G, UEA2/UIA2:AES, UEA3/UIA3:ZUC

3G UMTS FDD supported features

- Release 99 WCDMA up to UE Class 384kbps for both uplink and downlink\
- Release 7 HSDPA, up to 21Mbps(Category 14)
- Release 7 HSUPA, up to 5.76Mbps(Category 7)
- Diversity Reception and soft combining over two receive antennas.

GSM modem and voice CODEC

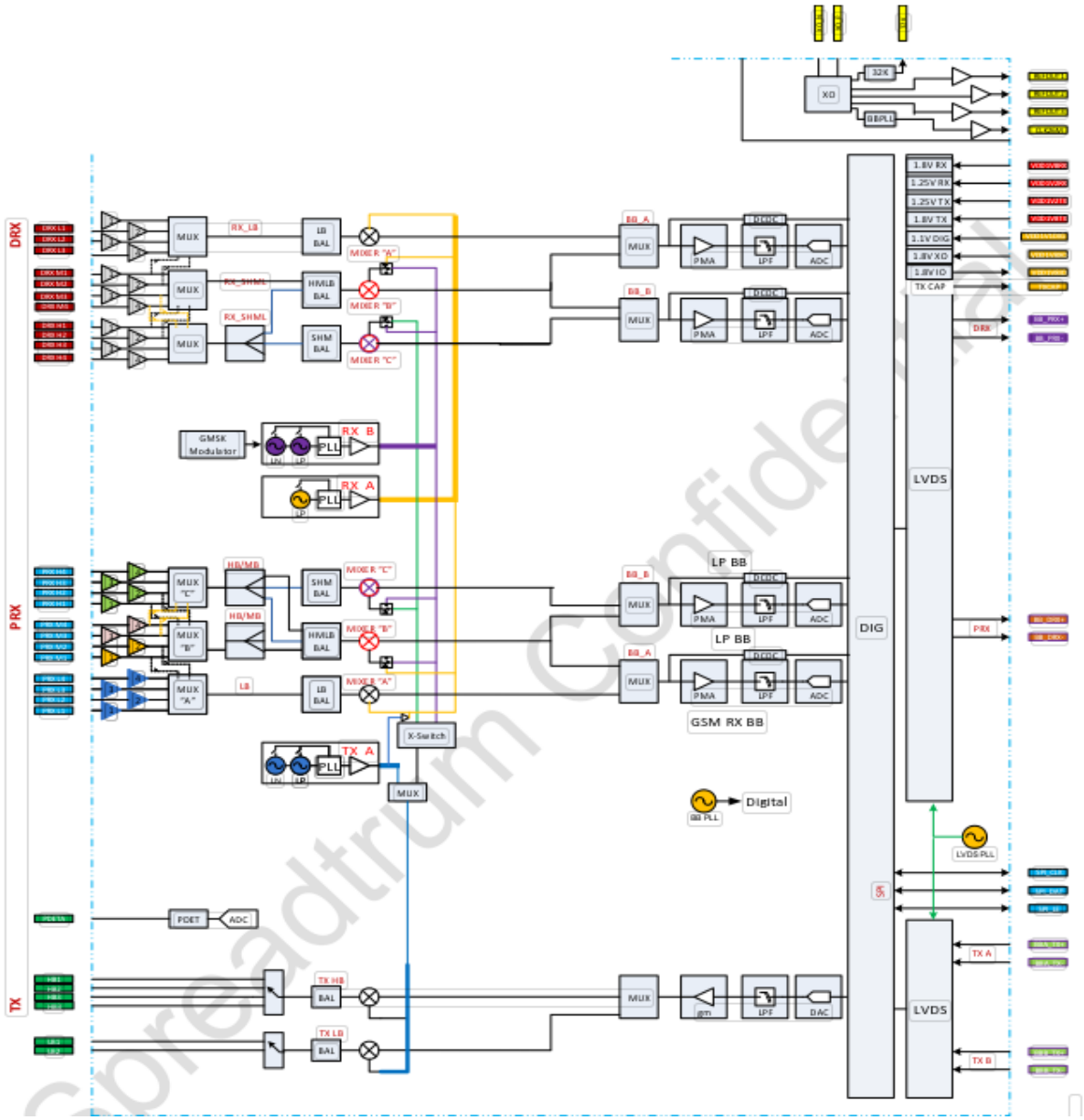
- Dial tone generation
- Noise reduction
- Echo suppression
- Advanced sidetone oscillation reduction
- Digital sidetone generator with programmable gain
- Two programmable acoustic compensation filters
- GSM quad vocoders for adaptive multi-rate (AMR), enhanced full rate (EFR), full rate (FR) and half rate (HR)
- GSM channel coding, equalization and A5/1, A5/2 and A5/3 ciphering
- GPRS GEA1, GEA2 and GEA3 ciphering
- Programmable GSM/GPRS/EDGE modem
- Packet switched data with CS1/CS2/CS3/CS4 coding schemes
- GSM circuit switch data
  GPRS/EDGE Class 12
- Supports SAIC (single antenna interference cancellation) technology
- Supports VAMOS (Voice services over Adaptive Multi-user channels on One Slot) technology in R9 spec

2.2.2 transceiver principle

SR3595D is a highly integrated, single-die radio transceiver chip that supports 4G LTE with LTE for FDD-LTE, TDD-LTE, 3G WCDMA, HSDPA, HSUPA, GSM/EDGE as well as TD-SCDMA operation. Implemented in low cost bulk CMOS, it is optimized to meet the challenges of today's small form factor, power efficient, high performance cellular handsets. The SR3595D has total of 6 single-ended transmit ports, 12 primary and 11 diversity single-ended receive ports. The SR3595D provides connectivity multiple bands of operation. The SR3595D offers a cost competitive and small footprint radio solution

for multi-mode, multi-band applications with the highest performance at the lowest power.

The linear transceiver architecture of SR3595D is utilized for 2.5G, 3G and 4G systems, offering excellent performance and design margins over 3GPP requirements. For 2.5G, a direct modulation scheme is used in the transmitter and performance of 2.5G receive and transmit chains is such that no additional RF filters are required to meet out-of-band noise specifications. The output driver stage for each transmitter chain is single-ended and matched to 50Ω.

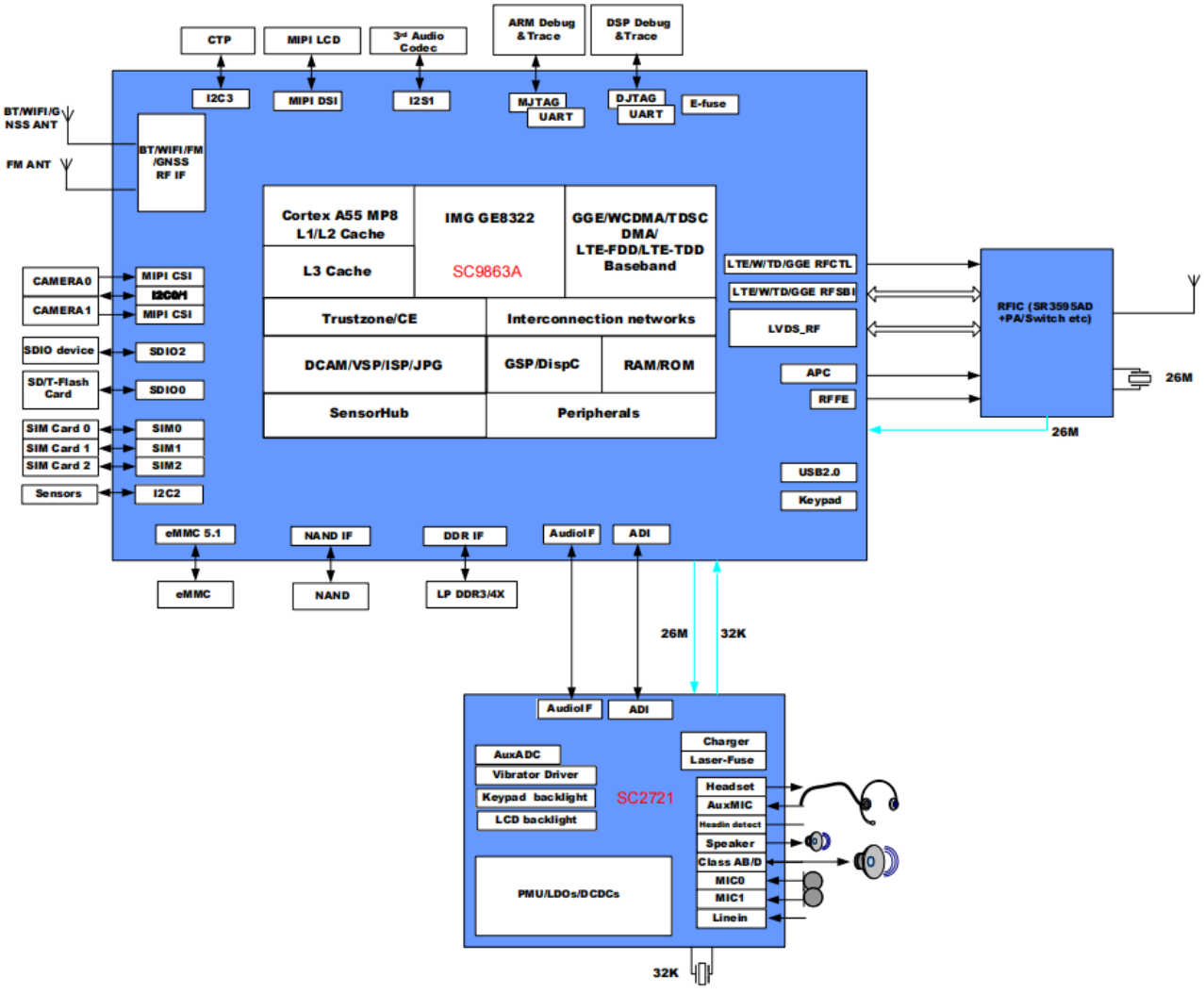


2.3. BB:

SC9863A is a highly integrated application processor with embedded TD-LTE, LTE FDD, TDSCDMA/HSPA(+), WCDMA/HSPA(+) and GSM/GPRS/EDGE to supportDual SIM Dual Standbyup to LTE+LTE. It consists of 8-cores ARM® Cortex-A55 core as application

processor, which includes a NEON/Dot Product multimedia processing engine, Imagination PowerVR Fentale GE8322 as 3D graphics accelerator, multi-standard multi-media accelerators and advanced audio subsystem, and also integrated Wifi/BT/FM/GNSS. The specially optimized architecture of SC9863A can achieve high performance and low power for a lot of applications. Proprietary architectures and algorithms were developed for low power ASIC design and power management. Unique techniques are used for noise/offset calibration and cancellation. Overall, SC9863A chip set presents a high cost-effective platform for Android mobile devices.

3D graphics accelerator,multi-standard multi-media accelerators and advanced audio Subsystem..The chip interfaces to LPPDDR2/3 optimal performance and also supports booting form eMMC tominimize the overall BOM cost.,and supports various booting interfaces,, In addition, an extensive set of interfaces and connectivity peripherals are included to interface to cameras, touch-screen displays, MMC/SD cards.



2.4. Bluetooth & WLAN &FM &GPS

WLAN

- single-band (2.4GHz) single stream 802.11 b/g/n
- Security: WEP/ WPA-TKIP/AES/WPA2/WAPI /WPS2.0/EAP-SIM,HOTSPOT2.0
- Support wifi P2P mode
- Supports 802.11n optional feature: STBC,A-MPDU,Blk-Ack,RIFS,MCS feedback, 20MHz
- sopport STA&P2P concurrency in same channel

- low power mode:ARP offload auto response in sleep mode;DTIM lower power mode.
- WIFI/BT/LTE co-existence

Bluetooth

- Bluetooth specification v2.1+EDR
- Bluetooth specification 3.0+HS compliance
- Bluetooth v4.2Low Energy (LE)
- Rx sensitivity: GFSK -92.5 dBm, DQPSK -91.5 dBm, 8-DPSK -86dBm
- 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 mudes

FM

- 65 -108MHz worldwide FM bands with 50kHz tuning step
- Supports RDS/RBDS radio data system
- Digital stereo demodulator
- signal detection and demodulation
- Superior stereo noise reduction
- Audio sensitivity 2dBu Vemf

GPS

- Supports GPS (L1/BDS B1/GLONASS G1/SBAS)
- Support GPS only,BDS only,GPS+GLONASS position mode
- Support QZSS/SBAS(WAAS/MSAS/EGNOS/GAGAN)
- Support max 64 channels
- support Anti-inerference function for max 12 CW remove
- -165dbm Tracking sensitivity,-147dbm Acquisition sensitivity with cold start
- TTFF:cold start<30s,hos start<1s
- Accuracy:static Horizontal Position<2m ,Velocity Accuracy(98%)speed 0.1m/s
- Support A-GNSS

Antenna

- BT/WIFI Antenna Type: FPCB Antenna & Antenna Gain: 1.2 dBi
- 2/3/4G Antenna Type: FPCB Antenna

  Antenna Gain:

  GSM 850: -0.98 dBi

  PCS 1900: 0.78 dBi

  WCDMA Band II: 0.78 dBi

  WCDMA Band IV: 0.61 dBi

  WCDMA Band V: -0.98 dBi

  LTE Band 2: 0.78 dBi

  LTE Band 4: 0.61 dBi

  LTE Band 5: -0.98 dBi

  LTE Band 7: 0.67 dBi

LTE Band 12: -1.07 dBi
LTE Band 17: -1.07 dBi
LTE Band 66: 0.61 dBi