Operational Description

1. Overview:

The equipment works with LTE can support LTE data rates.

2. System Overview:

Baseband

The MT8788 device, withintegrated Bluetooth, FM, WLAN and GPS modules, is a highly integrated basebandplatform incorporating both modem and application processing subsystems to enableLTE/LTE-A and C2K smart device applications. The chip integrates ARM® Cortex-A73 operating up to 2.0GHz, ARM® Cortex-A53 operating up to 2.0GHz and powerful multi-standard video codec. Inaddition, an extensive set of interfaces and connectivity peripherals are included to interface to cameras, touch-screen displays and UFS/MMC/SD cards.

PMU

MT6358 is a power management system chip optimized for 2G/3G handsets and 4G smart phones.MT6358 contains 9 buck converters and 33 LDOs, which are optimized for specific 2G/3G/4G smart phone subsystems.

MT6370 provides flexibility for various applications of indicator LED drivers. It supports up to 2 channel LEDs with independent controlled. Flexible control includes: register mode, PWM mode and breath mode. Sophisticated controls are available for power up, battery charging and the RTC alarm.MT6370 is optimized for maximum battery life, allowing the RTC circuit to stay alive without a battery for several hours. MT6370adopts SPI interface and 2 SRCLKEN control pins to control buck converters, LDOs, and various drivers; it provides enhanced safety control and protocol for handshaking with BB.

Radio transceiver

MT6177 is a RF transceiver targeted at high speed 2G/3G/4G multi-mode smart phone and tablet computers implanted in 40nm CMOS. The RF transceiver function is fully integrated. The description briefly introduces the RF macros in MT6177.The key features are listed as below:

1).Full multi-mode RF solution(GGE/WCDMA/LTE,etc.).

2).Direct Conversion(3G/LTE),Two Point Modulation(TPM) for GMSK and Small Signal Polar for 8-PSK

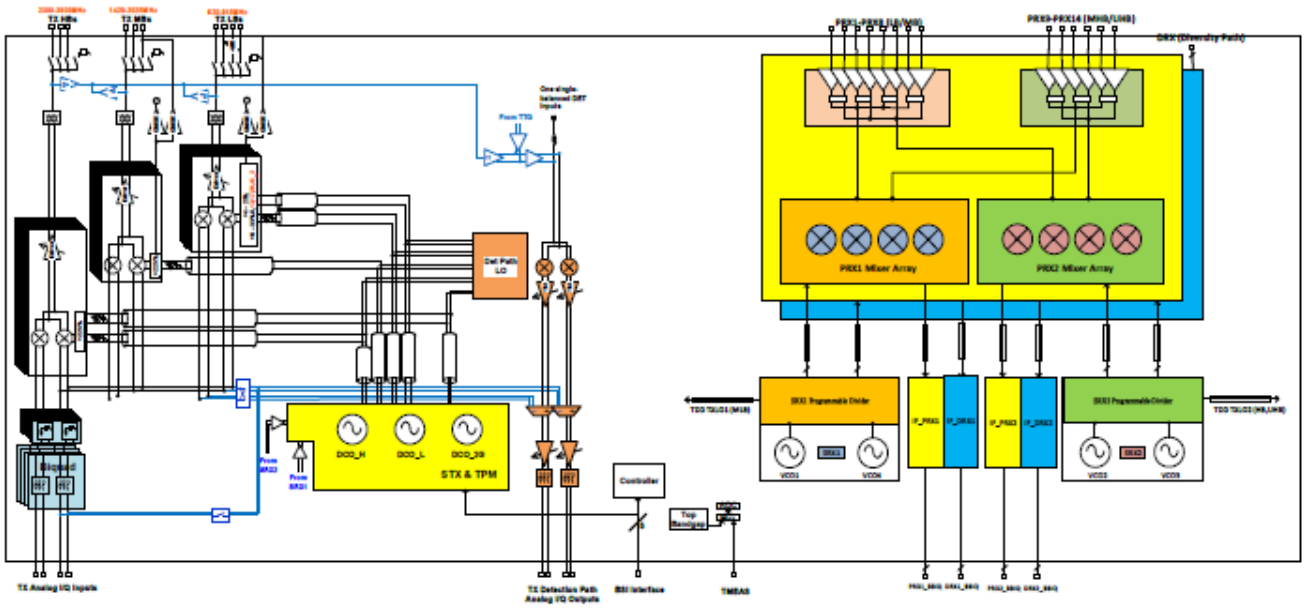
3).Hybrid Direct-Conversion(4G/3G)/low-IF(GGE,DC-HSDPA) receiver

4).Low supply current& operation directly from DC-DC converter

5).26MHz intenal DCXO or external VCTCXO operation(with integrated AFC DAC)

6).Support RF calibration features for key Rx and Tx specifications(Image rejection, LO feed through, DC offset)

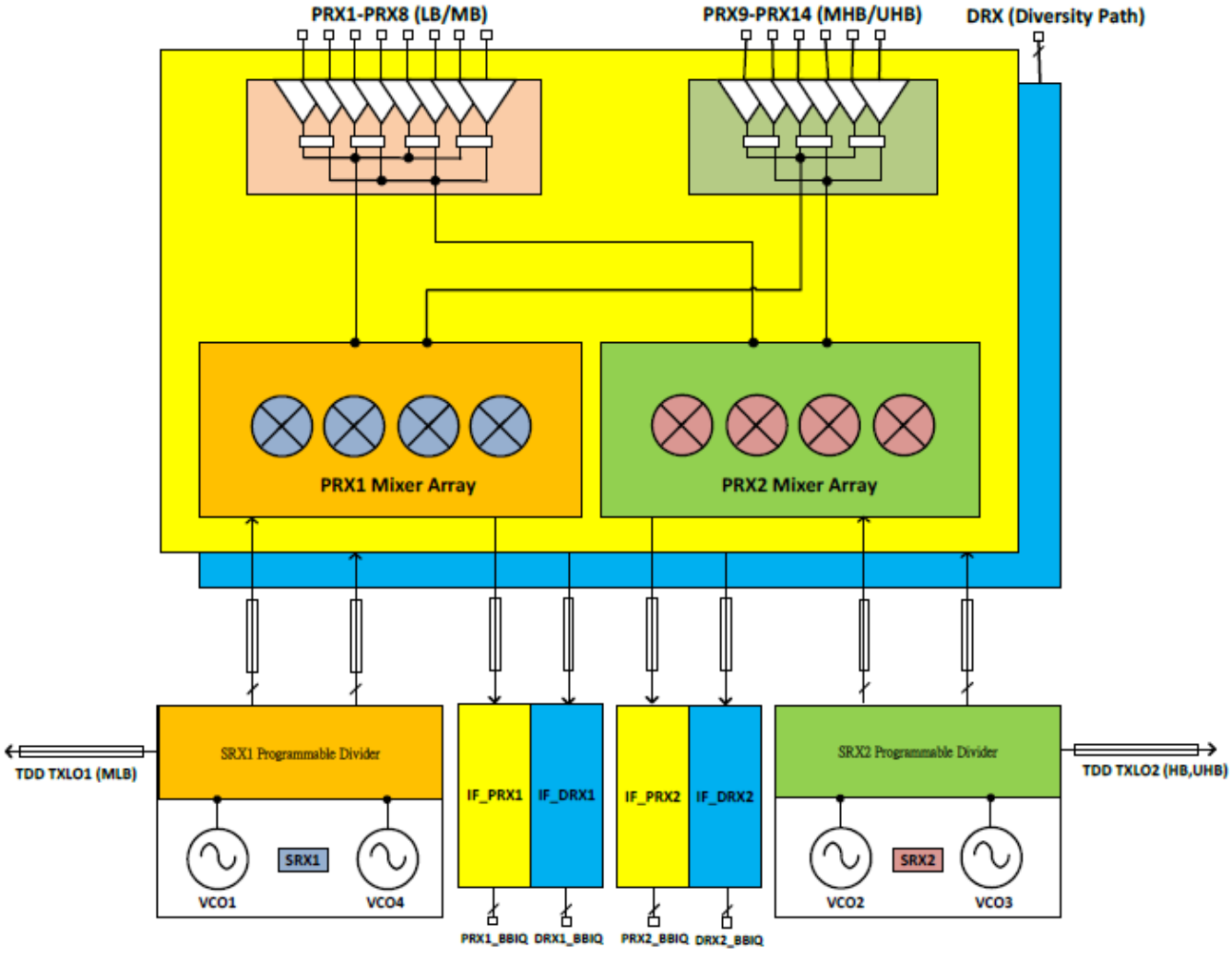
7).Temperature measurement sub-system.



RF:

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

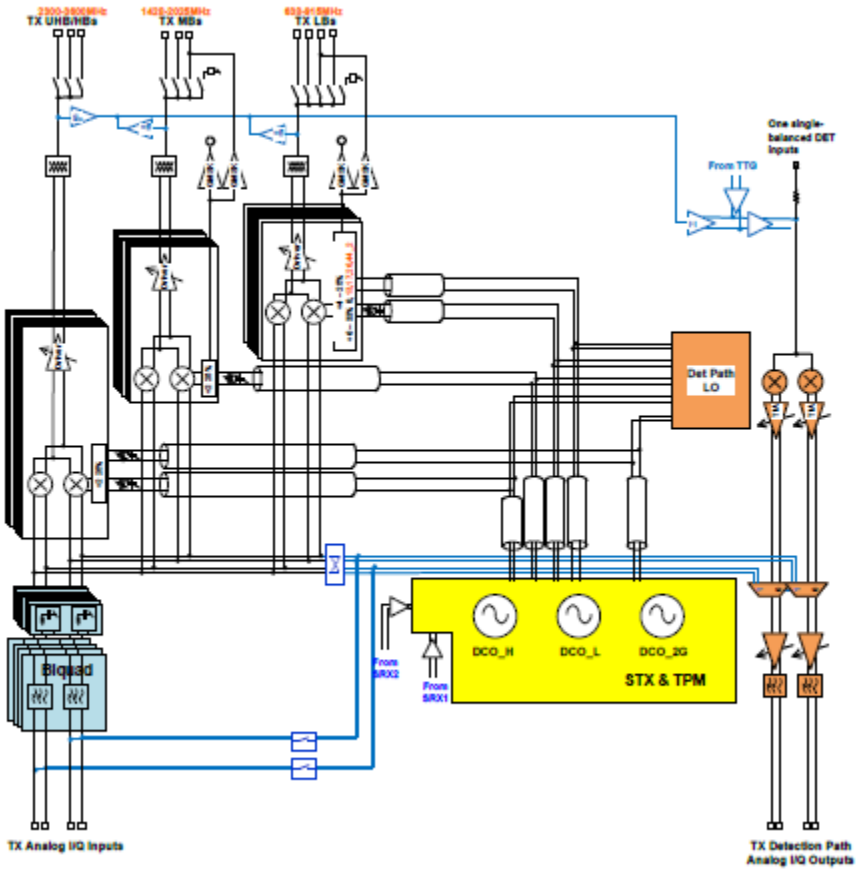
Receiver principle



The direct conversion/LIF receiver (RX) contains all active circuits for the complete receiver chain supporting LTE

(TDD/FDD) with/without CA, single-cell (SC)/dual-cell (DC) 3G WCDMA, 3G TDSCDMA, C2K and 2G GSM/GPRS/EDGE (GGE) mode reception. The path contains a total of 14+14 single-ended input ports and 2+2 sets of I/Q single-ended outputs. 14 input ports are divided into seven groups, G1 to G7, with shared LNA output. Each of these four group outputs could be down converted by two Rx synthesizers with maximum flexibility. Inter-band CA ports need to be assigned to different LNA groups, and intra-band non-contiguous CA signal can be down-converted by single path or two paths with different LO depending on the total bandwidth and power level difference.

Transmitter principle



The transmitter is designed for high performance and low power consumption. It consists of three signal paths: low-band, mid-band and high-band/ultrahigh-band (LB, MB, HB, UHB). The three paths share a common analog base-band active low-pass filter and a common passive RC low-pass filter. After that, the I/Q baseband signals are up-converted by one of three fully-differential passive mixers and amplified by the RF driver (PGA). The differential output is converted to single-ended using a balun. Finally the single-ended RF signal is routed to the desired output pin by the output switch. Note that only one TX-path and one output pin switch are active at a time. Singled-ended Tx signals at the output of the three signal paths (LB, MB, HB/UHB) are connected together to a common detector path used for calibration.

Each signal path (LB, MB, HB/UHB) has its corresponding LO distribution circuitry. The LO distribution design is optimized for low power consumption. The Detector path has a single-ended RF input for high accuracy power control and Digital Predistortion (DPD).

WIFI/BT/FM/GPS

MT6631 is 4-in-1 connectivity chip which contains a 2.4GHz Wi-Fi and Bluetooth transceiver front-end, a 5GHz Wi-Fi transceiver ,a GPS receiver front-end and a complete FM receiver.

MT6631 supports integrated passive device to save footprint on PCB and cost due to WiFi/Bluetooth / GPS external BoM (bill of materials) in a 40-pin QFN package.

Supports WiFi external LNA and GPS external LNA.

Wlan features

- 2.4GHzsingle stream 802.11 a/b/g/n RF
- Integrated 2.4GHz PA with max. 20dBm CCK output power and 5GHz PA with max. 17 Dbm OFDM

54Mbps output power

- Supports WiFi Direct (WFA P-2-P standard) and WiFiMiracast (WiFi Display)

Bluetoothfeatures

- Supported Bluetooth V4.0, BT low Energy (LE)
- Bluetooth specification 3.0+HS compliance
- Integrated PA with 8dBm (Class1) transmit power

GPS features

- Support GPS,GALILEO,GLONASS and BEIDOU
- Built-in calibrations for PVT variation
- Multi-mode filters for different GNSS receiver modes

Crystal principle

X200=26MHZ

X600=26MHZ

The modulator-demodulator basic frequency, As Reference frequency source keep synchronization。

X700=27.12MHZ

NFC crystal basic frequency, to supply NFCReference frequency source

EDR:

Operating Frequency	2402MHz~2480MHz
Modulation	GFSK, π/4-DQPSK, 8-DPSK
Number of Channels	79 Channels
Antenna Type	FPC Antenna
Antenna Gain	1.1 dBi

BLE:

Operating Frequency	2402MHz~2480MHz
Modulation	GFSK
Number of Channels	40 Channels
Antenna Type	FPC Antenna
Antenna Gain	1.1 dBi

WIFI 2.4G

Operating Frequency	2412-2462MHz for 802.11b/g/11n(HT20); 2422-2452MHz for 802.11n(HT40);
Modulation	DSSS with DBPSK/DQPSK/CCK for 802.11b; OFDM with BPSK/QPSK/16QAM/64QAM for 802.11g/n;
Number of Channels	11 channels for 802.11b/g/11n(HT20); 7 channels for 802.11n(HT40);

Antenna Type	FPC Antenna
Antenna Gain	1.1 dBi

WIFI 5G

Modulation	OFDM with BPSK/QPSK/16QAM/64QAM
Operating Frequency Range	☒ U-NII-1: 5150 MHz ~5250MHz ☒ U-NII-2A: 5250MHz~5350MHz ☒ U-NII-2C: 5470MHz~5725MHz ☒ U-NII-3: 5725 MHz ~5850 MHz
Antenna Type	FPC antenna
Antenna Gain	0.79dBi

2G&3G

Operating Frequency	☒GSM850: TX824.2MHz~848.8MHz /RX869.2MHz~893.8MHz; ☒UMTS FDD Band V: TX826.4MHz~846.6MHz /RX871.4MHz~891.6MHz; ☒PCS1900: TX1850.2MHz~1909.8MHz /RX1930.2MHz~1989.8MHz; ☒UMTS FDD Band II: TX1852.4MHz~1907.6MHz /RX1932.4MHz~1987.6MHz; ☐UMTS-FDD Band Ⅳ:TX1710MHz~1755MHz /RX2110MHz~2155MHz
Modulation	☒GMSK for GSM/GPRS; ☒8PSK for EGPRS; ☒QPSK for UMTS bands;
Antenna Type	FPC Antenna
Antenna Gain	GSM850/ Band 5:-2.28dBi ; GSM1900/ Band 2:0.67dBi

4G

Frequency Range:	LTE FDD Band 2 Uplink: 1850MHz-1910MHz, Downlink: 1930MHz-1990MHz; LTE FDD Band 4 Uplink: 1710MHz-1755MHz, Downlink: 2110MHz-2155MHz; LTE FDD Band 5 Uplink: 824MHz-849MHz, Downlink: 869MHz-894MHz; LTE-FDD Band 7 Uplink: 2500MHz-2570MHz, Downlink: 2620MHz-2690MHz; LTE FDD Band 12 Uplink: 699MHz-716MHz, Downlink: 729MHz-746MHz; LTE FDD Band 17 Uplink: 704MHz-716MHz, Downlink: 734MHz-746MHz; LTE FDD Band 19 Uplink: 830MHz-845MHz, Downlink: 875MHz-890MHz; LTE TDD Band 41 Uplink&Downlink: 2496MHz-2690MHz,(Note2)
Type of Modulation:	QPSK/16QAM
Antenna:	FPC Antenna
Antenna gain:	B2: 0.67dBi ; B4 -1.22dBi; B5 -2.28dBi; B7:1.83dBi; B12 -3.58dBi; B17 -3.58dBi; B19:-2.28dBi; B41:3.08dBi

NFC

Operation Frequency:	13.56MHz
Modulation Type:	ASK
Number Of Channel	1CH.
Antenna Designation:	Induction coil