Operation Description

Model: TB-650

Band: GSM850,GSM900,DCS1800,PCS1900

1. Scope

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

M6502 product is new Pad designe by HXMID .The baseband circuit is base on MTK MT8312 and RF circuit is included Transceiver named MTK MT6166 , AP PA and skyworks PA,It works at five bands,GSM850,GSM900,DCS1800,PCS1900

2. Platform

MT8312 is based on RF band support GSM+GNSS+wifi+Bluetooth+FM.

The package supports dual-channel DDR3 using BGA package and EMMC flash device through SDIO interface.

The GNSS+WIFI+Bluetooth +FM is MT6627 core.

-Baseband functions,including mulitipe hareware cores

-Single platform that provides dedicated support for all mardet leading codecs and other multimedia formats to support carrier deploymetnts around the word.

-High-quality digital still image camera performance with up to 5-megarpixel resolution

-HS-USB and OTG-USB core with built-in PHY eliminates additional USB components.

-DC power reduction using innovative technique

-integarates multiple processors

-Supported two high speed DDR3 IC.

3.Tansceiver MT6166

The MT6166 is a RF transceiver targeted at high speed 2G multi-mod smart phone and tablet computers implanted in 40nm CMOS,The RF transceiver function is fully integrated. The document briefly introruces the RF mocros in MT6166

3. PA

GSM

AP6690 U616 is a transmit and receive Front End Module(FEM) designed is very low profile(0.9mm) and compact for factor for quad-band cellular handsets GSM850/GSM900/DCS1800/PC1900 operation –a complete transmit vco-to –Antenna and Antenna-to-receiver SAW filter solution.The FEM also supports Class 12 General Packet Radio Service(GPRS) multi-slot operation.

Modes of operation:

Mode	Input Control Bits			
	TxEN	MODE	BS1	BS2
Standby	0	0	0	0
LB_GMSK_Tx	1	0	0	1
HB_GMSK_Tx	1	0	1	1
LB_EDGE_Tx	1	1	0	1
HB_EDGE_Tx	1	1	1	1
TRx1	0	1	0	0
TRx2	0	1	1	0
TRx3	0	1	0	1
TRx4	0	1	1	1
TRx5	0	0	1	0
TRx6	0	0	0	1

Operating Parameters

GSM850/900 ***GMSK Mode***						
Parameter	**Symbol**	**Conditions**	**Minimum**	**Typical**	**Maximum**	**Unit**
Stability	Stab	All combinations of the following parameters: 5 dBm ≤ P_{OUT} ≤ 33 dBm −1 dBm ≤ P_{IN} ≤ 6 dBm Load VSWR = 15:1, all phase angles	No parasitic oscillation > −36 dBm			
Load Mismatch	Load	All combinations of the following parameters: 5 dBm ≤ P_{OUT} ≤ 33 dBm −1 dBm ≤ P_{IN} ≤ 6 dBm Load VSWR = 20:1, all phase angles.	No module damage or permanent degradation			
Noise Power	P_{NOISE_850}	f_0 + 20 MHz (869 MHz to 894 MHz) P_{OUT} ≤ 33 dBm V_{BATT} ≤ 3.5 V T_{CASE} = +25 °C RBW = 100 kHz	—	—	−83	dBm
	P_{NOISE_900}	f_0 + 20 MHz P_{OUT} ≤ 33 dBm V_{BATT} ≤ 3.5 V T_{CASE} = +25 °C RBW = 100 kHz	—	—	−83	
		f_0 + 10 MHz P_{OUT} ≤ 33 dBm V_{BATT} ≤ 3.5 V T_{CASE} = +25 °C RBW = 100 kHz	—	—	−79	
		f_0 – 1805 MHz to 1880 MHz P_{OUT} ≤ 33 dBm V_{BATT} ≤ 3.5 V T_{CASE} = +25 °C RBW = 100 kHz	—	—	−86	

Table 2. Recommended Operating Conditions

Unless otherwise specified: –20 °C ≤ T_{CASE} ≤ +85 °C; 3.0 V ≤ V_{BATT} ≤ 4.6 V.

Parameter			Symbol	Minimum	Typical	Maximum	Unit
Supply Voltage[1]		GMSK	V_{BATT}	3.0	3.5	4.6	V
		EDGE		3.0	3.6	4.6	
			V_{CC}	2.5	—	4.6	
Supply Current			I_{BATT}	0	—	2.3	A
Operating Case Temperature[2]	1-Slot (12.5% duty cycle)		T_{CASE}	–20	—	+85	°C
	2-Slot (25% duty cycle)			–20	—	+85	
	3-Slot (37.5% duty cycle)			–20	—	+85	
	4-Slot (50% duty cycle)			–20	—	+85	

[1] V_{BATT} and V_{CC} should be commoned unless DC/DC is used and V_{CC} can be separately supplied.

[2] Case Operating Temperature refers to the temperature at the GROUND PAD on the underside of the package.

GSM1800/1900

GMSK Mode

Parameter		Symbol	Conditions	Minimum	Typical	Maximum	Unit
Frequency Range	DCS1800	f	—	1710	—	1785	MHz
	PCS1900		—	1850	—	1910	
Input Power		P_{IN}	—	–1	—	6	dBm
Supply Voltage		V_{BATT}	—	3.0	3.5	4.6	V
		V_{CC}	—	2.5	—	4.6	
Power Added Efficiency		$PAE_{GSM1800}$	V_{BATT} = 3.5 V P_{IN} = 3 dBm V_{RAMP} = MAX V_{RAMP}[1] Duty cycle = 1:8 T_{CASE} = +25 °C	—	35	—	%
		$PAE_{GSM1900}$		—	35	—	
Harmonics		2f_0 to 7f_0	BW = 3 MHz 0 dBm ≤ P_{OUT} ≤ 31 dBm 50 Ω		–40	–34	dBm
Output Power		P_{OUT_GMSK}	P_{IN} = –1 dBm V_{BATT} = 3.5 V V_{RAMP} = 1.6 V T_{CASE} =+25 °C	31.0	31.4	—	dBm
		$P_{OUT\_GMSK\_EX}$	P_{IN} = –1 dBm V_{BATT} = 3.0 V V_{RAMP} = 1.6 V	28.5	—	—	
Input VSWR		Γ_{IN}	P_{OUT} ≤ 31 dBm	—	—	2.5:1	
Isolation		ISO_{PDSD}	P_{IN} ≤ 6 dBm TxEN < 0.4 V BS2 = Logic High V_{RAMP} ≤ 0.1 V	—	–52	–46	dBm
		ISO_{PESE}	P_{IN} ≤ 6 dBm TxEN ≥ 1.2 V BS2 = Logic High V_{RAMP} ≤ 0.1 V	—	—	–10	
Low Power Current		I_{LOW_GMSK}	P_{IN} ≤ 6 dBm P_{OUT} = 0 dBm	—	—	100	mA

WIFI/BT/FM/GPS operation block: MT6627

MT6627 is a 4-in-1 connectivity chip which contains a Wi-Fi/Bluetooth transceiver front-end, a GPS receiver front-end and a complete FM receiver, along with Integrated Passive Device (IPD) in a QFN40 pacakge. Simplified block diagram and how MT6627 is used in two different scenarios are shown in Figure 1-1. An always-on low-dropout regulator (ALDO) provides supply voltage to top control logics in MT6627. The top control logics controls each subsystem independently. Each subsystem also has dedicated LDOs. A thermal sensor and a low-speed ADC (Analog-to-Digital Converter) is provided to monitor MT6627's temperature variation. MT6627 does not have its dedicated crystal oscillator. It uses either an external (maybe temperature compensated) oscillator or clock source from companion chips in the platform such as MT6166.

For Wi-Fi and Bluetooth, MT6627 provides an advanced switching mechanism which allows fast switching between Wi-Fi and BT modes. Hardware sharing and reuse is maximized. The transceiver front-ends are on MT6627 while the ADC/DAC (Analog-to-Digital Converter/Digital-to-Analog Converter) are in the companion modem chip. The interface driver/receiver buffer is designed to drive PCB trace loading. The GPS IP in MT6627 is similar to Wi-Fi/Bluetooth such that the ADC/DAC is in the companion modem chip. In contrast, the FM system integrates the modem and ADC in MT6627, and no interface drivers/buffers are required.