

## 2G/3G Operation Description

Model: QS08XXX

Band: GSM850MHz, PCS1900MHz, WCDMA850MHz

### 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.

Volgo8 product is new Pad designed by NTD. The baseband circuit is based on Qualcomm MSM8225Q and RF circuit is included Transceiver named Qualcomm QTR6285a, Triquint PA. It works with the bands of GSM850,PCS1900.

### 2、 Platform

MSM8225Q is based on RF band support WCDMA+GSM+GNSS. The package support BGA package. General features include:

- High-performance ARM CORTEX A5™ application processor at up to 800MHz
- High-performance ARM926EJ-S™ modem processor at up to 400MHz
- Baseband functions, including multiple hardware cores
- Integrated wideband stereo codec for digital audio applications
- High-quality digital still image camera performance with up to 8-megapixel resolution
- Integrated high-speed USB PHY, USB 2.0 compliant high-speed USB core with limited OTG capabilities
- Mobile Industry Processor Interface that optimizes the interconnection cost between the MSM device and the LCD panel/camera devices
- Vocoder support(EVRC,AMR etc.)

### 3、 Transceiver RTR6285a

- radioOne RF transceiver functions(Rx and Tx, both eliminating their intermediate frequency components)
- WCDMA(Release'99, HSDPA, HSUPA) and GSM(Release'99, GPRS and EDGE)
- Gen7(GPS) is supported
- RF transmitters: a single analog baseband Tx input from the MSM device is shared by all the QTR transmit paths and MB/LB quadrature upconverters respectively translate the PCS1900/GSM850 Tx waveform directly to the desired RF band.
- RF receivers: supports GSM850/PCS1900, operation with primary receiver path, using a differential configuration to maximize common-mode rejection, Tx isolation, out-of-band suppression, and second-order intermodulation performance. There are two quadrature downconverters and separate baseband interfaces(I/Q) to the MSM device.

### 4、 PA

GSM

Triquint7M5022 (U79) is a Multi-State polar GSM/EDGE PAM designed for use with the Qualcomm RTR6285a EDGE solutions with compact form for quad-band cellular handsets comprising GSM850/900, DCS1800, and PCS1900 operation.

### Operating Parameters

DC Supply	Condition	Min	Typ	Max	Unit
Battery voltage ( $V_{BATT}$ )		3.0	3.5	4.8	V
$V_{MODE0}, V_{MODE1}$ (digital control) LB_EN, HB_EN	Low High Current	0 1.35		0.5 2.6 0.1	V mA
Rise Time	From $P_{out} = -30$ dBm to $P_{out} = P_{max}$		0.5		$\mu$ s
Fall Time	From $P_{out} = -30$ dBm to $P_{out} = P_{max}$		0.5		$\mu$ s
Operating Case Temperature		-25		+90	$^{\circ}$ C
LB TX Frequency Range GSM850	Freq	824		849	(MHz)
LB TX Frequency Range GSM900	Freq	880		915	(MHz)
HB TX Frequency Range GSM1800	Freq	1710		1785	(MHz)
HB TX Frequency Range GSM1900	Freq	1880		1910	(MHz)

### Modes of Operation

Mode of Operation	LB_EN	HB_EN	VMode0	Vmode1
Powerdown	Low	Low	X	X
Low band – High-power mode	High	Low	Low	Low
Low band – Medium Power mode	High	Low	Low	High
Low band – Low-power mode	High	Low	High	Low
Low band – Ultra-Low-power mode	High	Low	High	High
High band – High-power mode	Low	High	Low	Low
High band – Low-power mode	Low	High	High	Low
High band – Ultra-Low-power mode	Low	High	High	High

### WCDMA

Avago ACPM-5005 supports multimode application UMTS Band5 and meets stringent linearity requirements up to 28.25dBm output power for UMTS Rel' 99. The PA contains internal DC blocking capacitors for RF input and output ports. The ACPM-5005-TR1 features 5th generation of CoolPAM circuit technology which supports 3 power modes-active, bypass, mid power and high power modes. A directional coupler is integrated into the module and both coupling and isolation ports are available externally, supporting daisy chain. The ACPM-5005 has integrated on-chip Vre on-module bias switch as one of the key features of the CoolPAM-5, so an external constant voltage source is not required. All of the digital control inputs pins such as the Ven, Vmode and Vbp are fully CMOS compatible. The power amplifier is manufactured on an advanced InGap HBT (hetero-junction Bipolar Transistor) MMIC(microwave monolithic integrated circuit) technology.

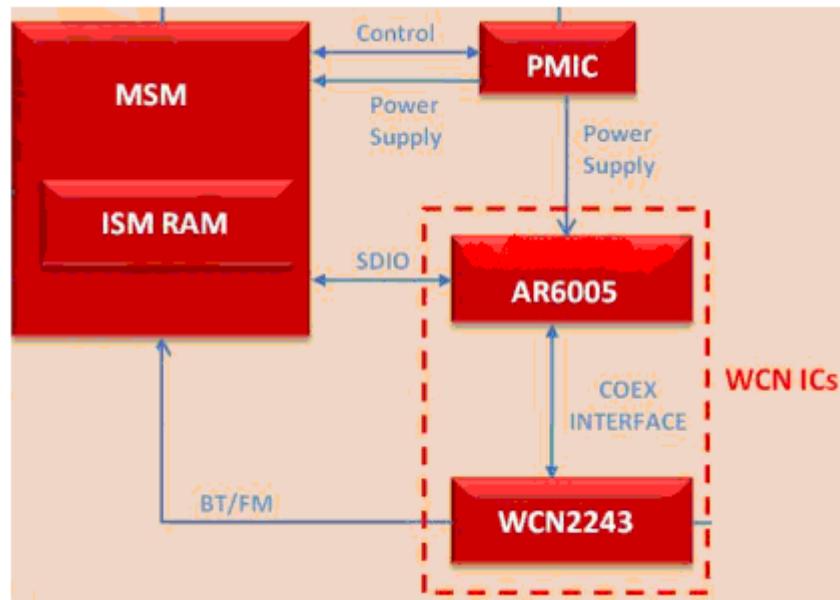
### Recommended Operating Condition

Description	Min.	Typ.	Max.	Unit
DC Supply Voltage ( $V_{cc1}, V_{cc2}$ )	3.2	3.4	4.2	V
Enable Voltage (Ven)				
Low	0	0	0.5	V
High	1.35	2.6	3.1	V
Mode Control Voltage (Vmode)				
Low	0	0	0.5	V
High	1.35	2.6	3.1	V
Bypass Control Voltage (Vbp)				
Low	0	0	0.5	V
High	1.35	2.6	3.1	V
Operating Frequency ( $f_o$ )	815		849	MHz
Ambient Temperature ( $T_a$ )				
UMTS	-20	25	85	$^{\circ}$ C
CDMA	-30	25	85	$^{\circ}$ C

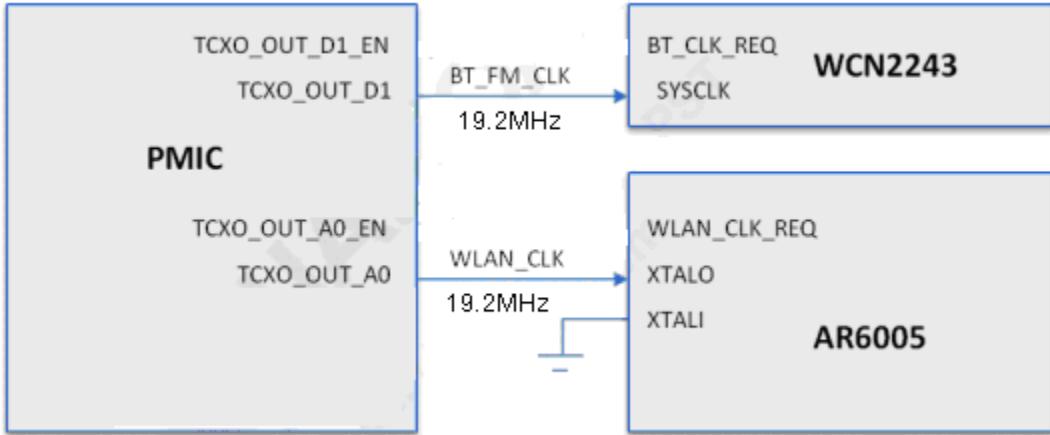
Operating Logic Table

Power Mode	Ven	Vmode	Vbp	Pout (Rel99)	Pout (HSDPA, HSUPA MPR=0dB)
High Power Mode	High	Low	Low	~ 28.25 dBm	~ 27.25 dBm
Mid Power Mode	High	High	Low	~ 17 dBm	~ 16 dBm
Bypass Mode	High	High	High	~ 7 dBm	~ 6 dBm
Shut Down Mode	Low	Low	Low	-	-

## WiFi/BT operation



The WCN2243 includes a fully integrated BT with a dedicated 2.4GHz radio and all the baseband circuits and software for BT3.0. The AR6005 is a single chip, small form factor IEEE 802.11b/g/n. The AR6005 supports 3-wire Bluetooth coexistence protocols with co-located WCN2243. The interface between the WCN2243 and AR6005 and the MSM8225Q is SDIO bus. PMIC 3.3V provides to WCN2243 VDD\_BT\_PA and AR6005 VDD\_PA. PMIC 1.8V provides to WCN2243 VDD\_LDO\_IN and AR6005 VDD18\_BB. Simultaneously PMIC provides 19.2MHz Sys-clock to WCN2243 and AR6005 through the pin of TCXO\_OUT\_D1 and TCXO\_OUT\_A0 with DC block caps. The chart as follows.



WCN2243 and AR6005 have the similar Tx/Rx functional hardware. For example, the receiver is comprised of an LNA, a direct conversion mixer, and a baseband programmable gain filter. This receiver is implemented using the direct conversion topology. The mixer down converts the signal to baseband in-phase(I) and quadrature-phase(Q) signals. The I/Q signals are low-pass filtered and amplified by the baseband programmable gain filter controlled by digital logic. The baseband I/Q signals are sent to the ADC.

The DC offset of the receive chain is reduced using multiple digital to analog converters(DACs) controlled by the baseband block. The transmitter converts baseband I/Q inputs to bands centered around 2.4GHz. The outputs of the DAC are low pass filtered through an on-chip reconstruction filter to remove spectral images and out-of-band quantization noise.

The transmitter is comprised of a programmable reconstruction filter, a direct conversion mixer, a preamplifier and a PA. This transmitter is implemented using the direct conversion topology. The transmit output power is adjusted by a digitally programmable control loop at the start of each packet. The power control can also compensate for temperature variation. The Tx signal is amplified by the PA to the sky. The chart as follows.

