GSM Base Station VCO

Features

- Fully integrated VCO
- Supporting GSM 1800 and GSM 900 standards
- 130nm CMOS technology
- Phase noise of -148 dBc/Hz at 1.8 MHz offset frequency
- LC-tuned Colpitts architecture
- No switching capacitors required
- 3.3 V Design

General Description

IMST's base station VCO has been developed for a GSM base station PLL. The GSM 1800 as well as GSM 900 standards can be covered on one die together with the PLL. The architecture comprises three LC-tuned Colpitts oscillators with buffer stages which are alternating be used to cover the required bandwidth. GSM 900 can be used by a selectable frequency divider.

Therefore coarse tuning is realized by alternating the selectable VCO circuit in combination with the prescaler and varactor diodes are used for fine tuning within the frequency range of each VCO core.

In terms of achieving a low phase noise performance, a switchable LC tank is avoided because of the lossy switches. A 130 nm RF-CMOS process was used for the implementation. The process supports thick oxide devices for higher breakdown voltages.

Trimming of the three oscillators is done in a post-production process by laser trim option.

Parameter	Value	Unit	Note
VDD	3.3	V	
IDD	<100	mA	
Frequency range VCO1	1500-1670	MHz	
Frequency range VCO2	1650-1830	MHz	
Frequency range VCO3	1810-1990	MHz	
Phase noise	- 131	dBc/Hz	At 400 kHz
	- 137	dBc/Hz	At 600 kHz
	- 148	dBc/Hz	At 1800 kHz
	- 156	dBc/Hz	> 6000 kHz

Table 1: Key Parameter of the VCO

Block diagram