

# **OPERATIONAL DESCRIPTION**

## **RADIO MODULE RFM 900-LC**

### **for FCC Application**

## **LEVELTRONIC NT and MINILEVEL NT**

**with**

### **Radio transmission**

**and**

### **LEVELMETER 2000**

**Radio Module USA with 902MHz**



**FCC ID:**  
**Applicant:**  
**Correspondence Reference Number:**  
**731 Confirmation Number:**

**O3T065-005-0351**  
**Wyler AG Switzerland**  
**16011**  
**EA98309**

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## **1. Local Oscillator (LO)**

Realized with a VCO, a frequency synthesizer, a loop filter and a 100 MHz quartz (frequency stability between 0...50 °C, +/- 20ppm) as reference.

Aim is that the VCO is subject to the quartz oscillator.

To do this, the 10 MHz reference frequency and the VCO frequency are divided down to 100 KHz.

These two frequencies supply a phase comparator which delivers cyclic pulses proportional to the phase difference of the two input signals.

These pulses passing through a low pass filter are integrated and produce a DC voltage to control VCO.

The quotient from the frequency divider connected to the VCO is programmable by I2C bus.  
The output frequency may be adjusted by steps of 100 KHz.

The VCO consists of an integrated oscillator (SA621) with the load of an adapted circuit, a /4 line coupled with a varicap.

The applied voltage over the varicap fixed the output frequency of the VCO.

## **2. Transmission**

The LO is hooked up on the transmission frequency (906.7...910.3 MHz).

The micro-controller delivers two square wave signals (Output Txdata). 9600 Hz when a Low is to be transmitted or 15000 Hz when a High is to be transmitted.

To reduce the spectrum of the harmonics, the square wave signal has first to pass through a low pass filter.

This attenuated signal (rounded edges) is injected on the varicap from the VCO and modulates so the frequency from the LO.

The HF signal is strongly amplified (+25dB) by an integrated amplifier with filter in SWA technique (high attenuation of the harmonics)

## **3. Receiver**

An integrated Low Noise Amplifier (LNA) SA621 permits to extract the signal from the noise. This HF signal is mixed up with a signal generated by the LO to receive a signal of 10.7 MHz (FO) which can easily be filtered and amplified.

The intermediate Frequency (FI) is filtered by two ceramic filters. The selectivity of the receiver depends on these filters (BP: -20 dB / 400 KHz).

This filtered signal is strongly amplified and demodulated by an integrated circuit (SA626).

The disadvantage of this technology is a generated second signal (mirror frequency) with a frequency value within the band of the FI-filters. The filters cannot reject this signal.

The second function of the SAW filter behind the antenna is, to suppress the mirror frequency (rejection -30 dB).

#### **4. Annex**

The antenna switch permits to branch the antenna to the transmitter or to the receiver.

The micro-controller permits the interface with the serial In- and Outputs, to program the LO and to manage the power modes.