Winlink RF Transceiver Description

1. Rx (Receiver) side

The Rx chain consists of a double conversion receiver .
The RF (Radio frequency) signals picked up in the antenna filtered by Ceramic BPF (Band Pass Filter) pass through RF SW (switch) that controlled to Rx state, amplified by LNA (Low Noise Amplifier) to establish the Rx noise figure.

Following the LNA another Ceramic BPF at 5.8GHz reduces more the out of band strong signals as well as Image Noise.

Following the ceramic filter is another LNA which overcome the losses introduced later.
In RF Mixer the high frequency signals are down converted to the IF (Intermediate Frequency) at1GHz.
The RF LO (local oscillator) for the mixer is signal at 4724-4850MHz that derived by a doubler that doubles the signal from synthesizer at 2362-2425MHz that is phase locked to the 10MHz VCTCXO (Voltage Control Temperature Compensated Crystal Oscillator).

The center frequency of the receiver across the band is determined by changing the center frequency of the synthesizer in steps of 1MHz (2MHz after the doubler).

Following RF Mixer SAW (Surface Acoustic Wave) BPF at the IF (1GHz) to filter out RF Mixer unwanted multiplication products existed due to the mixing process and attenuate the adjacent channels by therefore establishing the necessary selectivity.

The IF LO for the 2nd down converter is an oscillator at 1GHz that is phased locked to the VCTCXO.

Following the SAW filter the AGC (Automatic Gain Control) amplifier with gain control necessary for the receiving process.

The AGC is controlled by the digital interface by the help of a serial DAC (Digital to Analog Converter).
In the I/Q demodulator following the AGC amplifier the IF signal is down converted to BB (Base Band)
I/Q signals.
The last component prior to the ADC (Analog to Digital Converter) is anti alaisying passive LPF filters.

2. Tx (Transmitter) side

The digital I/Q BB signals from the digital interface are converted by the DAC to analog I/Q signals which are filtered later by passive LPF (Low Pass Filter) .
The filtered BB I/Q analog signals are I/Q modulated by a an I/Q modulator and up converted at the same time to an IF signal around 1GHz .
The IF LO which is used for the IF CW is an oscillator at 1GHz which is phased locked to the VCTCXO.
The modulated “complex” signal is passed through a SAW BPF centered at 1GHz to filter out undesired I/Q modulated products .
Following the BPF the up converter raise up the IF signal to the RF signal to be transmitted later.
The RF LO for the mixer is signal at 4724-4850MHz that derived by a doubler that doubles the signal from synthesizer at 2362-2425MHz, which is phase, locked to the VCTCXO.

The modulated RF signal at 5.725-5.850GHz is then filtered by a ceramic BPF to reduce harmonic content , amplified by two driver amplifiers and amplified again by the final PA prior going to the antenna through the RF SW (controled to TX state) and ceramic BPF.

In case of service interruption, the system discontinues to transmit the traffic and send only the control signals.
The discontinue transmission is maintained till the traffic is resumed.

Interrupted service identification is based on a CRC that attached to each transmitted frame. The receiver declares on 'Service Interrupted State' if it counts N (software parameter) successive bad frames (CRC).
In this state, the terminal's application sends a message about this interruption to the other terminal and afterward, ceases to transmit its signal.
As a result of that, either by the reception of the message or identifies successive bad frames, the other terminal declares on the 'Service Interrupted State'.

Discontinuation of the transmitted signal is controlled by the application layer and is based on switching off the TX signal and shut-down its power supply.

The 'Traffic Resume State' identifies by successive reception on M (software parameter) good frames".