Theory of Operation

Z-Wave works in the industrial, scientific, and medical (ISM) band on two frequencies using a FSK and GFSK modulation. The throughput is up to 100 kbit/s (9.6 kbit/s and 40kbits/s using older series chips) and suitable for control and sensor applications.

Each Z-Wave network may include up to 232 nodes, and consists of two sets of nodes: controllers and slave devices. Nodes may be configured to retransmit the message to guarantee connectivity in the multipath environment of a residential house.

The uses an internal crystal as its base for clock source and RF Frequency generation (908.40MHz - 916.00MHz). The device must be calibrated using a high precision clock source in the factory to eliminate initial offsets caused by initial tolerance error in each individual crystal. The also used is a narrow band pass filter to filter out irrelevant frequencies from getting back to the receiver.

The WS15Z5-1 uses a PCB antenna tuned for maximum efficiency in the 908.4 – 916.0 MHz band.

The device primarily receives on/off commands wirelessly but given the nature of Z-Wave the device will also repeat any messages received within its mesh network. Additionally, pressing either of the paddle switches will cause a relay to close or open so the Load wire is live (120Vac) or not live (0Vac) like a typical wall switch.