Antenna Spec
Z-wave garage door controller

Rev1, 11/30/2022

Z-wave :

The device uses a short wire antenna exhibiting a monopole type structure and characteristics. The antenna is not accessible or changeable by the user. No modifications can be made to the radiating mechanism (antenna or tuning elements) by the user.
Peak antenna gain is estimated by extracting the Gain (G_T) from the Friis transmission equation.

$$\frac{P_R}{P_T} = \frac{\lambda^2 G_T G_R}{(4\pi R)^2}$$

Assuming polarization match (linearly polarized) and no mismatch loss (tuned) in the direction of peak antenna gain at 3m separation. At each Z-wave frequency, the peak antenna gain is estimated as in the table here. Parametric values for each component of the formula above are listed.

Freq (MHz)	G_R (dBi)	R (m)	P_T (dBm)	P_R (dBm)	$\boldsymbol{G_T}$ **(dBi)**
908.42	5.9	3	-1.7	-35.45	**1.5**
912	5.9	3	13.5	-20.65	**1.1**
916	5.9	3	-1.7	-35.15	**1.9**
920	5.9	3	13.5	-20.65	**1.2**

Sub GHz freq:

Wire antenna that exhibits a monopole design. The antenna is not accessible or changeable by the user. No modifications can be made to the radiating mechanism (antenna or tuning elements) by the user.
Peak antenna gain is estimated by extracting the Gain (G_T) from the Friis transmission equation.

$$\frac{P_R}{P_T} = \frac{\lambda^2 G_T G_R}{(4\pi R)^2}$$

Assuming polarization match (linearly polarized) and no mismatch loss (tuned) in the direction of peak antenna gain at 3m separation. At each sub GHz frequency, the peak antenna gain is estimated as in the table here. Parametric values for each component of the formula above are listed.

Freq (MHz)	G_R (dBi)	R (m)	P_T (dBm)	P_R (dBm)	$\boldsymbol{G_T}$ **(dBi)**
310	13.87	3	-2.6	-47.7	**-27.2**
315	14.25	3	-2.4	-45.4	**-25.3**
345	14.70	3	-0.8	-31.4	**-12.6**
390	15.87	3	0.7	-47.7	**-30.3**