

TH05 Z-Wave Antenna Specification

Only radiated measurements are used to show compliance of the TH05 with FCC/ISED limits for fundamental and spurious emissions. Although not required, antenna description and worst-case gain calculation is included below.

Antenna Description

The TH05 uses a trace antenna exhibiting a monopole type structure and characteristics. All antenna tuning is performed during manufacturing. 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.

Antenna Gain Calculation

Peak antenna gain is estimated by extracting the Gain (GT) from the Friis transmission equation.

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

Where P_R =available power at receive antenna, P_T is power delivered to the transmit antenna, G_T is the gain of the transmit antenna, G_R is the gain of the receive antenna, R is the distance, and λ is the wavelength of the frequency.

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)	G_T (dBi)
908.42	5.9	3	-1.7	-35.45	1.5
916	5.9	3	-1.7	-35.45	1.9