

S.O. 22455

VALIDATION OF GAIN CALCULATION

KZSC SANTA CRUZ, CA

MODEL 6810-3-.9SS-DA

Elevation Gain of 6810-3-.9SS-DA equals 1.559

The RMS values are calculated utilizing the data of a planimeter.

Horizontal RMS divided by Vertical RMS equals

$$0.730 \div 0.720 = 1.014$$

Elevation Gain of Horizontal Component equals

$$1.559 \times 1.014 = 1.581$$

Elevation Gain of Vertical Component equals

$$1.559 \times 0.986 = 1.538$$

Horizontal Azimuth Gain equals $1/(\text{RMS})^2$

$$1/(0.730)^2 = 1.876$$

Vertical Azimuth Gain equals $1/(\text{RMS} \div \text{Max Vert})^2$

$$1/(0.720 \div 0.990)^2 = 1.891$$

*** Total Horizontal Gain is Elevation Gain times Azimuth Gain**

$$1.581 \times 1.876 = 2.966$$

*** Total Vertical Gain is Elevation Gain times Azimuth Gain**

$$1.538 \times 1.891 = 2.908$$

ERP divided by Horizontal Gain equals Antenna Input Power

$$10.0 \text{ kW} \div 2.966 = 3.372$$

Antenna Input Power times Vertical Gain equals Vertical ERP

$$3.372 \times 2.908 = 9.804$$

Maximum Value of the Vertical Component squared times the Maximum ERP equals the Vertical ERP

$$(0.990)^2 \times 10.0 \text{ kW} = 9.800$$

NOTE: Calculating the ERP of the Vertical Component by two methods validates the total antenna gain calculations