

S.O. 21965

VALIDATION OF GAIN CALCULATION

WAQB TUPELO, MS

MODEL 6810-8-DA

Elevation Gain of 6810-8-DA equals 4.463

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

Horizontal RMS divided by Vertical RMS equals

$$0.815 \div 0.805 = 1.0124$$

Elevation Gain of Horizontal Component equals

$$4.463 \times 1.0124 = 4.518$$

Elevation Gain of Vertical Component equals

$$4.463 \times 0.9877 = 4.408$$

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

$$1/(0.815)^2 = 1.506$$

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

$$1/(0.805 \div 0.990)^2 = 1.512$$

* Total Horizontal Gain is Elevation Gain times Azimuth Gain

$$4.518 \times 1.506 = 6.804$$

* Total Vertical Gain is Elevation Gain times Azimuth Gain

$$4.408 \times 1.512 = 6.665$$

ERP divided by Horizontal Gain equals Antenna Input Power

$$23.0 \text{ kW} \div 6.804 = 3.38$$

Antenna Input Power times Vertical Gain equals Vertical ERP

$$3.38 \times 6.665 = 22.53$$

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

$$(0.990)^2 \times 23.0 \text{ kW} = 22.54$$

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

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