

GENEVA BROADCASTING, INC.
Radio Station WGVA
Geneva, NY
1240 kHz, 1 kW- U

ENGINEERING STATEMENT

This engineering statement, together with the attached figures, has been prepared on behalf of Geneva Broadcasting, Inc., licensee of AM radio station WGVA, Geneva, NY, in support of a request for direct measurement of power.

An FM translator antenna for W214BR (90.7 MHz, File #BPFT -20040108AMJ) has been mounted 58m AGL on the tower. The associated transmission line is carried across the base insulator by means of a Kintronic Labs FMC-1.5 Isocoupler. New antenna and feed system impedance measurements have been made and are included in this filing.

ANTENNA SYSTEM

The WGVA tower is 61.0 m (200') above base insulator and is 90.8° at 1240 kHz and produces a notified inverse field of 305.78 mV/m with 1 kW input. The overall height of this tower is 62.4 meters (205') and is painted as well as illuminated with a 300mm beacon and dual sidelights. Power for the tower lighting is carried across the base insulator by chokes designed for that purpose.

The ground system beneath this tower consists of 120 equally spaced buried copper radials 61.0 meters (200') in length plus 120 interspersed copper radials 15.2m (50') in length.

The NAD-27 coordinates of this tower are: N 42° 51' 37" and W 77° 00' 59".

EQUIPMENT EMPLOYED FOR IMPEDANCE MEASUREMENTS

The test equipment used to measure the WGVA antenna impedance included:

1. Delta model OIB-1 RF Bridge, Serial #896, with extended range option.
2. Delta model RG-1 Receiver/Generator, Serial #161.

The rated accuracy of the bridge is $\pm 2\% \pm 1$ ohm for both resistance and reactance. Calibration of the bridge was verified the day of measurement and indicated the OIB-1 is well within the manufacturer's tolerance.

The equipment was set up and connected first to the antenna feed, then to the tuning unit input jack. The generator was zero beat to the WGVA 1240 kHz crystal to establish an accurate 1240 kHz reference. The vernier dial on the receiver/generator was then used to determine frequencies within and up to ± 30 kHz from 1240 kHz. At intervals of 10 kHz, the accuracy of the generator was verified by zero beating with other broadcast stations. The bridge was nulled for each of the frequencies listed in this report and indications on the resistance and reactance dials were noted.

Since the resistive values were less than 65 ohms and reactance values were greater than 20 ohms, a correction formula outlined in Appendix I of the Delta OIB-1 manual was applied. The formula is: $C_r = xF (.009 - .00014R)$ where C_r is the correction factor, in this case, to be added to the antenna resistance, xF is the reactance dial reading corrected for frequency, and R is the measured resistance before application of the correction factor. The reactance values were determined by multiplying the reactance dial setting by frequency in MHz.

This data was then tabulated and plotted as shown in Figures 2 and 3.

The antenna resistance at 1240 kHz was found to be 45.3 ohms with a reactive component of $+j 15.5$ ohms.

The antenna tuning unit was set to produce 50 ohms $\pm j 0$ at the input jack while the sideband impedances ± 10 kHz do not vary more than ± 2 ohms $\pm j 3.4$ ohms for a VSWR less than 1.11:1.

NEW POWER DETERMINATION

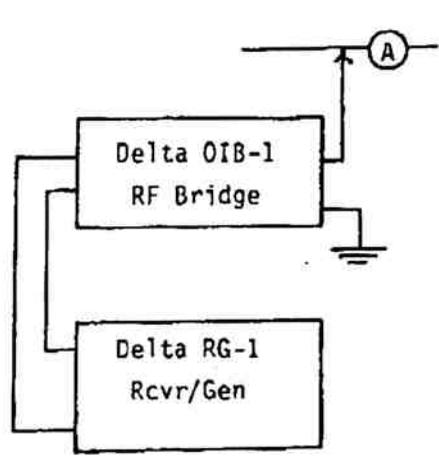
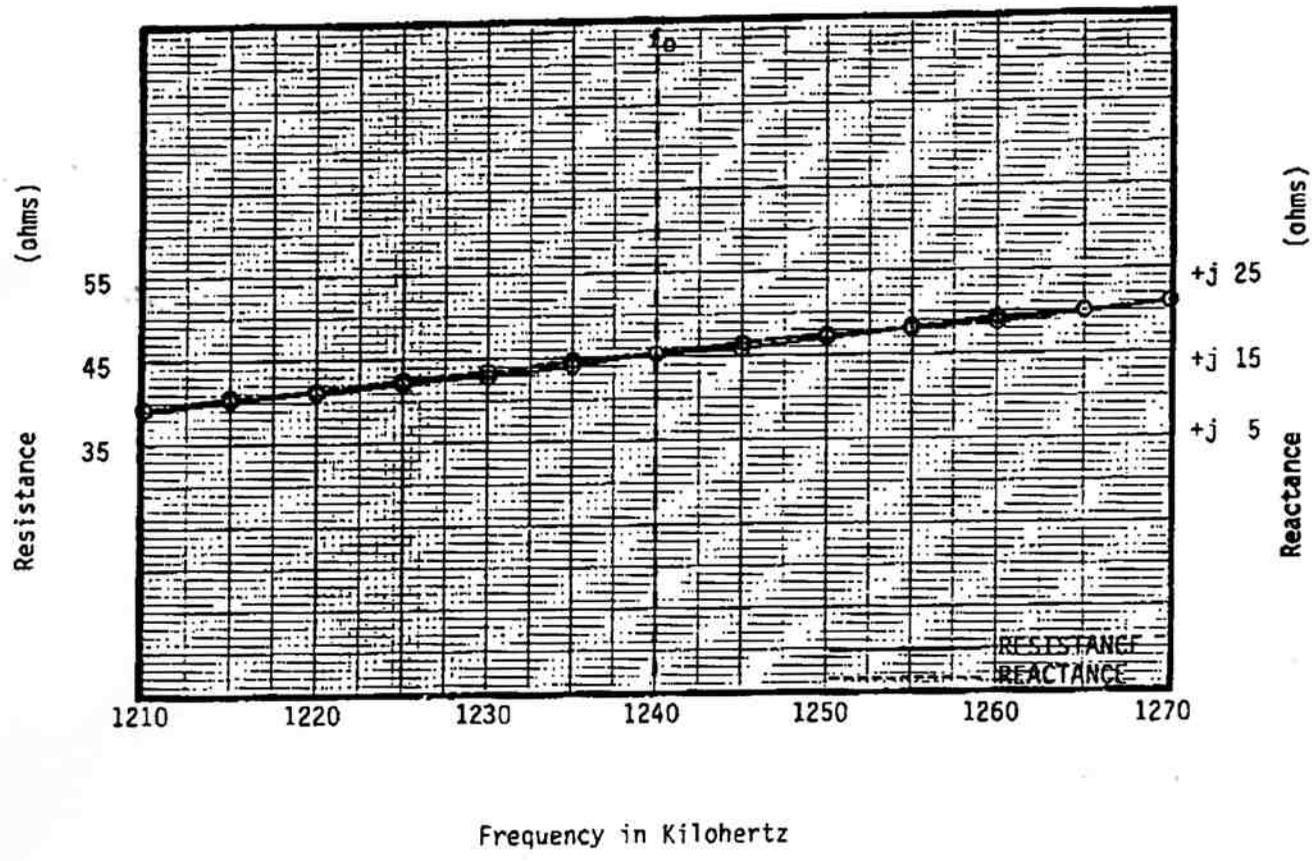
Operating power is determined by the formula: $P = I^2R$, where P is the antenna input power in watts, I is the antenna current in amperes and R is the antenna resistance in ohms. Substituting the new value of antenna resistance in the formula, the antenna current for 1000 watt unlimited time operation is 4.70 amperes.

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 Antenna Impedance Measurements

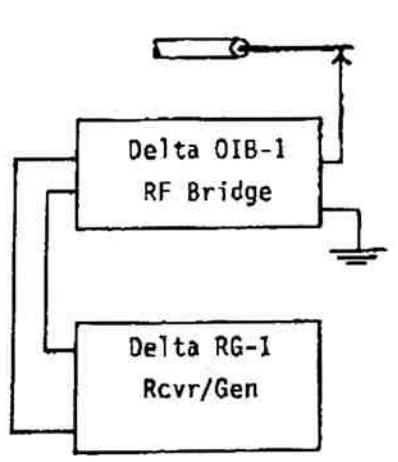
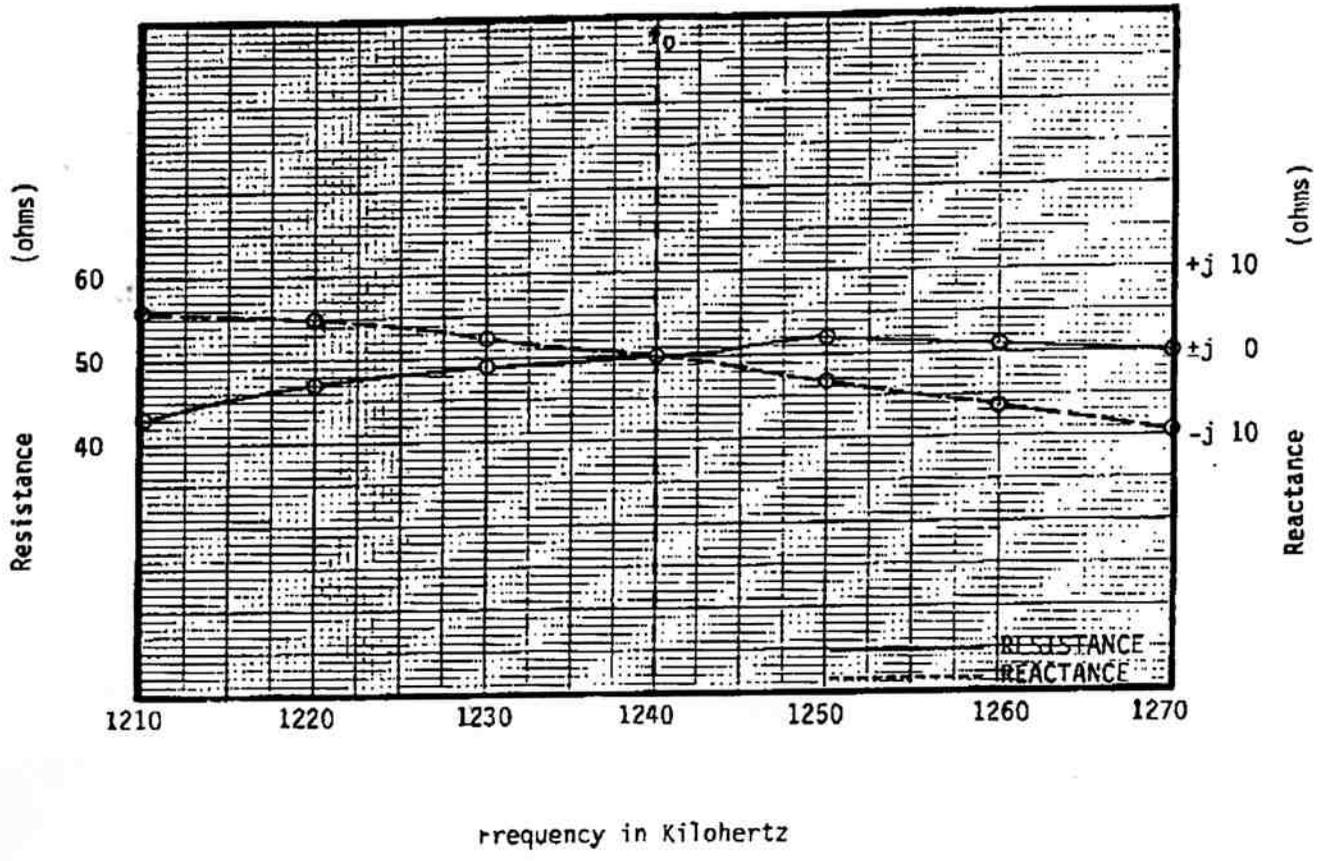


| Frequency (kHz) | Resistance (ohms) | Reactance (ohms) |
|-----------------|-------------------|------------------|
| 1210 | 39.2 | +j 9.3 |
| 1215 | 40.2 | +j 10.7 |
| 1220 | 41.0 | +j 11.2 |
| 1225 | 42.0 | +j 12.6 |
| 1230 | 42.8 | +j 13.5 |
| 1235 | 44.0 | +j 14.8 |
| f_0 1240 | 45.3 | +j 15.5 |
| 1245 | 45.8 | +j 16.3 |
| 1250 | 47.0 | +j 17.3 |
| 1255 | 48.0 | +j 18.2 |
| 1260 | 49.2 | +j 18.9 |
| 1265 | 50.0 | +j 20.0 |
| 1270 | 51.0 | +j 21.0 |

Base Current = $\sqrt{\frac{1000}{45.3}}$ = 4.70 Amperes

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 Transmission Line Impedance Measurements

FIGURE 3



| Frequency (kHz) | Resistance (ohms) | Reactance (ohms) |
|-----------------|-------------------|------------------|
| 1210 | 43.0 | +j 5.8 |
| 1220 | 47.0 | +j 4.9 |
| 1230 | 49.0 | +j 2.5 |
| f_0 1240 | 50.0 | $\pm j$ 0.0 |
| 1250 | 52.0 | -j 3.4 |
| 1260 | 51.0 | -j 6.3 |
| 1270 | 50.0 | -j 9.3 |