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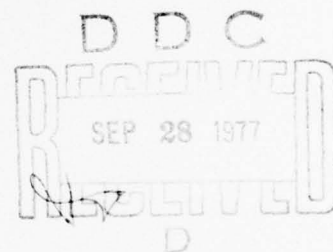
THE BEVERAGE WAVE ANTENNA: CURRENTS, CHARGES AND ADMITTANCES
Vol. II. Experimental Measurements

by

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Cambridge, MA 02138

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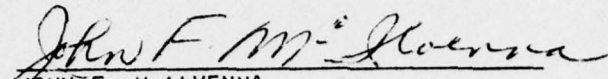


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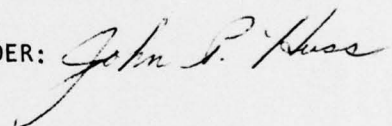
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20. ABSTRACT (Continue on reverse side if necessary and identify by block number) This report presents the results of an experimental and theoretical investigation of the circuit properties of horizontal-wire antennas placed over an imperfectly conducting half-space. Particular emphasis is given to the Beverage wave antenna, a special type of horizontal-wire antenna placed in close proximity to the earth. Earlier work has generally assumed a free-space wave number on the wire, thus neglecting the effect of the half-space. The present study has carefully investigated experimentally the effect of the half-space on the prop-		

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PART III
EXPERIMENTAL MEASUREMENTS

3.1. Introduction

A systematic study of the horizontal-wire antenna over a dissipative half-space and of the special case of the modified Beverage antenna is presented. The study, which is mainly experimental in nature, is concerned with the electrical characteristics of these antennas and how they are affected by the height of the antenna and the electrical properties of the medium over which the wire is placed. Essentially, this involves measuring the distributions of surface current and charge on these antennas and observing the corresponding effects due to changes in the several parameters.

Theoretically, once the current distribution is known, all the electrical properties of the antenna can be evaluated in a straightforward manner. Due to the complexities of the feeding system, in most current measurements only relative distributions are obtained. To normalize these distributions properly, the characteristics of the feeding system must be determined. For the conventional coaxial-line feed the normalization problem resolves itself into determining the antenna input impedance. Since the input impedance is necessary for an overall understanding of the current distribution, impedance measurements were included in the study.

Another important quantity, the distribution of charge per unit length, can be obtained from the current distribution through the use of the continuity equation. The charge distribution is often used to study the near-zone electric field of the antenna and to obtain a better understanding of the overall electromagnetic interaction of the wire especially near the end and at the driving point. Since the use of the continuity equation involves differentiation of the current, small errors in the measured current can cause large inaccuracies in the calculated charge distribution. To avoid this problem, it was decided to include measurements of the surface charge distribution in the analysis.

In presenting the data, comparisons are made whenever possible between the measured quantities and the associated analytic expressions developed in Part I (Volume I). In fact, one of the major purposes of the experimental analysis is to verify the theoretical work of King [1] and the feasibility

of the modified Beverage antenna. The limitations on King's zeroth-order theory and its ranges of applicability are discussed. For certain types of dissipative media the expression for the theoretical wave number given by equation (1.7) can be shown to be in error. This is due primarily to the fact that the basic restrictions given in (1.3a) are violated for these media. Empirical evidence shows that, although the wave numbers are in error, the zeroth-order form for the current and charge distributions are still maintained.

In all cases the measurements are compared either to completely theoretical expressions that are based on the developments in Part I and use (1.7), or to a semi-empirical theory which utilizes the zeroth-order forms for the current, charge and admittance and the measured effective wave numbers. The effective wave number is defined as the wave number observed on the unloaded dipole antenna; corrections for end effects are neglected. If the antenna end effect is small, the effective wave number and the wave number given by (1.7) are identical. For significant end effects the measured wave number will include a contribution due to the end effect. This contribution will primarily affect the observed attenuation on the antenna. Since the end effect is actually a lumped correction occurring at the end of the antenna and the attenuation α_L is a distributed parameter, the use of a measured effective attenuation is clearly only an approximation. For low attenuation and large end corrections this approximation becomes increasingly worse. This approach was taken initially by necessity since the end effects were not well understood and could not be eliminated. It was also believed that the effects would be small.

A second semi-empirical theory was developed subsequently which accounts for both the capacitive end effect and the radiation loss through a complex terminal function θ_s composed of a terminal attenuation function ρ_s and a terminal phase function ϕ_s . This approach is described in Section 1.8 of Volume I. The experimentally determined quantities ρ_s and ϕ_s correspond, respectively, to the increased magnitude and the shift in α_L that are observed to occur in both the measured data and the theoretical values (based on an effective wave number) compared here in Part III. The slight variations that remain are due to junction effects which were not included in the analysis. Comparisons between this theory and the measured data are in Figs. 1.23 through 1.33 (Volume I).

3.2. Measuring Procedure

The three types of media over which the antennas were placed were fresh water, salt water, and moist earth. They were chosen because they represent the three most common media over which these types of antennas can be used and exhibit a wide range of relative dielectric constants and loss tangents at the operating frequency of 300 MHz. The electrical properties of the three media were measured with the techniques discussed in Part II and were remeasured periodically to ensure uniformity throughout the experiments. In the remaining discussions the terms fresh water, salt water, and moist earth will refer to media with the following electrical properties:

Media	ϵ_r	σ (mhos/m)	P_e at 300 MHz	Average Temperature °C
Fresh Water	82	.092	.067	17.5
Salt Water	81	3.9	2.885	21.5
Moist Earth	11.4	.0022	.012	≈ 5

The current and charge distributions on monopole antennas over each of these media were measured for heights of $d/\lambda_0 = .01, .02, .05, .1$ and $.25$. At each height three monopole lengths were investigated, namely, $h/\lambda_0 = .5, 1.0,$ and 1.5 . For the Beverage antenna the same combination of antenna spacings and lengths was used by simply connecting the resistive load and the quarter-wave section to the end of the monopole. Hence the overall lengths of the Beverage antennas were $s = .5\lambda_0 + \lambda_L/4, \lambda_0 + \lambda_L/4,$ and $1.5\lambda_0 + \lambda_L/4$ where for most cases of interest $\lambda_L \neq \lambda_0$.

To ensure that the height of the antennas would remain as uniform as possible for all cases, polyfoam floats were fabricated precisely on a milling machine and were placed under the wire for support. The book value for the relative dielectric constant of the polyfoam was $\epsilon_r \leq 1.04$. The presence of the floats under the wire produced no noticeable effects on the measured currents or input impedances. Since it was still possible that the weight of the antenna could partially submerge the floats, a pulley system was designed to balance the weight of the wire. Nylon string was looped

around the wire at three or four positions along its length, passed through a set of pulleys located about 6 ft. above the tank, and then passed through another set of pulleys and counterweighted appropriately at the end. With this arrangement it was possible to place the wire over the floats so that it would just touch the polyfoam but would not exert any weight on it.

The current and charge distributions were measured by moving the loop and monopole probes along the slot cut in the antenna. Connecting the B channel of the vector voltmeter to the probe output and the A channel to a phase reference permits continuous monitoring of the current or charge. For the Beverage antenna it was possible to probe current and charge only up to the resistive load. With the placement of the solid resistor into the line it was impossible to move the probes beyond this point to measure the current and charge on the quarter-wave section. Altshuler [2] has shown that for a similar situation the measured currents on the quarter-wave section are found to be approximately sinusoidal, as would be expected for a resonant element. Thus, by knowing the current or charge distribution up to the resistive load, the distributions on the quarter-wave section can be predicted quite easily. In presenting the data, the theoretical current and charge distributions on the quarter-wave section are included to show the behavior of this current and charge.

The only other limitations in the current and charge measurements were mechanical in nature. Restrictions due to the construction of the line made it impossible to make measurements directly to the end of the antenna or to the junction at the driving point. The charge probe was allowed to come within 1.3 cm of the end of the line while the current probe could get no closer than 1.9 cm. For measurements near the driving point the current probe could come to within .3 cm of the junction and the charge probe could travel to within .9 cm.

The arrangement of the measuring equipment was shown previously in Fig. 2.2(b). The block diagram for the experiment is presented in Fig. 3.1. All equipment was connected through a 25 Watt voltage regulator which isolates the apparatus from any spurious responses or drift in the line voltage. The 300 MHz source consisted of a Hewlett-Packard 3200 B VHF oscillator and an accompanying Hewlett-Packard 230B power amplifier. The oscillator exhibited remarkable stability after a warm-up period of one hour. Frequent checks

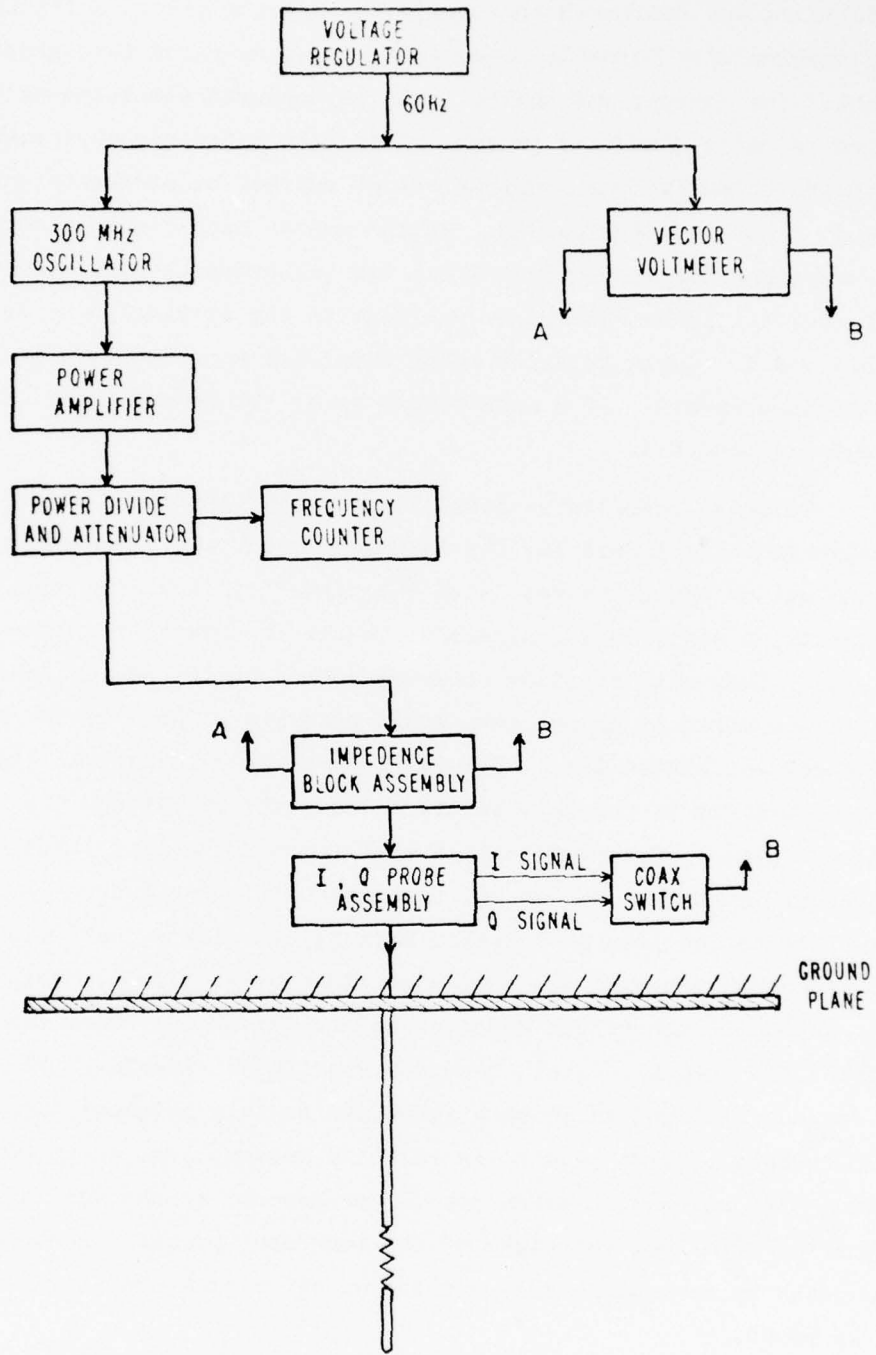


FIG. 3.1. BLOCK DIAGRAM FOR CURRENT, CHARGE AND ADMITTANCE MEASUREMENTS.

were made to detect any power drift in the oscillator and the frequency stability was monitored constantly through the use of a frequency counter. No problem with harmonic generation was encountered throughout the experiment. The current and charge could be measured simultaneously at each position by using a coaxial switch. This eliminated the more time-consuming process of making one complete set of current measurements and then starting again to measure the charge. At the end of each complete current and charge measurement the input-power level was rechecked by measuring the response of the current probe when placed as near to the driving point as possible. This was to ensure that the power level had not changed during the course of the measurements. If a significant power change was recorded, the measurement was repeated.

To be as accurate as possible in making the impedance measurements, the calibration procedure for the impedance block was performed before and after each set of measurements. With the measuring line more than 12 ft. in length, it was a very delicate procedure to connect the line to the ground plane. Even with the line attached to the pulley system, slight variations back and forth or up and down could generate a large amount of torque at the flanged end of the line. Through the use of a level, the line was balanced as accurately as possible before being inserted through the hole in the ground plane. Clamps were then used to hold the line firmly in place and to prevent any sway. Due to the fact that differing amounts of tension were applied to the line while being held by the clamps, variations in the calibration constants of the impedance block were noticed. This was determined to be due to the slight movement off center of the inner conductor of the feed line when the outer conductor was flexed slightly. The impedance probes were found to be very sensitive to this movement and, thus, to alleviate this problem triangular rexolite spacers were inserted into the feed line with care being taken not to include any in the section between the driving point and the plane of the impedance probes. Accuracy was further ensured by rechecking the calibration every time the position of the line was moved.

Impedance measurements were initiated with the longest antenna length and were continued on progressively shorter lengths by withdrawing the antenna into the feed line. With the placement of the polyfoam floats needed for each complete set of impedance measurements, it was much easier to

position the floats first and draw in the antenna than it was to increase the antenna length and periodically add more support floats. Since it was still necessary to support the wire with nylon string, the height of the antenna had to be checked each time the length of the antenna was decreased to ensure that excessive tension from the string had not bent the antenna upward from its level position. Over a period of time contact problems developed due to the constant wear from sliding the antenna in and out at the driving point. When the antenna does not make proper contact at the driving point, meter readings become unsteady and erroneous measurements result. To overcome this problem, a thin layer of silver conducting paint was applied to the antenna to provide a tight electrical contact at the driving point. The antenna was repainted before each set of impedance measurements to guarantee good contact along sections where the paint may have worn off.

3.3. Presentation of Measured Data for a Dipole Antenna Above a Dissipative Half-Space

The measurements for a dipole antenna placed above a variety of dissipative media are presented in this section. The section will be divided into three parts for the three different media treated (fresh water, salt water, and moist earth). The current and charge data are presented in order of increasing d/λ_0 spacings. For each spacing measurements are presented for antenna lengths of $1.5\lambda_0$, λ_0 and $.5\lambda_0$. All measurements are compared either to King's theory [1] when valid or to a semi-empirical theory based on the measured effective wave number. Data points were measured every 2.5 cm and numbered 61, 41 and 21, respectively, for antenna lengths of $1.5\lambda_0$, λ_0 and $.5\lambda_0$. This number of data points for each length was shown to provide sufficient resolution to represent the actual current and charge distributions accurately.

The measured data were normalized to the accompanying theoretical curve at $z/h = .2$ or to a smooth part of the curve in the immediate vicinity of this point. Normalization to the driving point at $z = 0$ by means of the measured input admittance was not attempted owing to the problems involved with the junction effects [3]. In some cases end effects did not permit normalization at $z/h = .2$. In these situations the data were normalized by aligning the peaks of the magnitude curve. Further discussion on this and the end-effect problem is given in Section 3.5.

The admittance data are presented in both the rectangular-plot form with $\beta_L h$ as the independent variable and in the circular-diagram form. For each respective medium the admittances are presented in order of increasing d/λ_0 spacing. All admittance measurements are made for monopole lengths ranging from $.013\lambda_0$ to $1.5\lambda_0$ (1.3 cm to 150 cm) and were recorded at intervals of 2.5 cm. An interval of this size was small enough to provide an accurate representation of the input admittance. The admittance curves display the apparent input admittance uncorrected for junction effects. King has shown [4] that when a monopole is driven by a coaxial line through a ground plane, a negative terminal-zone capacitance with admittance $Y_T = j\omega C_T$ must be added to the measured apparent admittance, Y_{in} , to give the actual admittance of the isolated monopole, $Y_{monopole}$. Hence,

$$Y_{in} = Y_{monopole} + j\omega C_T \quad (3.1)$$

where C_T is determined from curves in [4] for $b/a = 2.3$, $C = 133.2$ pF/m to be:

$$C_T = -.423 \text{ pF} \quad (3.2)$$

Note that C_T includes the effect of the rexolite spacer ($\epsilon_r = 2$) at the driving point. At the operating frequency of 300 MHz, the terminal-zone admittance Y_T is:

$$Y_T = j\omega C_T = -j.814 \text{ millimhos} \quad (3.3)$$

It is apparent that the terminal-zone correction affects only the susceptance and that the measured conductance values are unaltered.

Fresh-Water Measurements

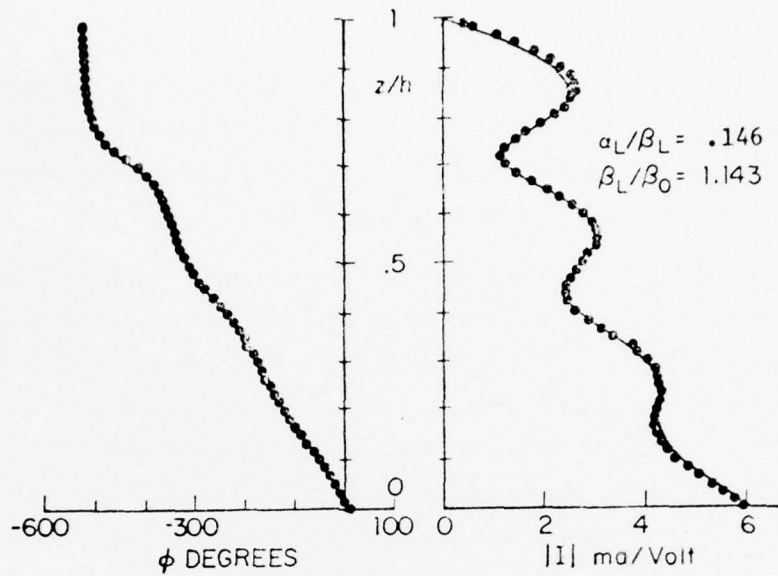
The fresh-water solution used for these measurements corresponds to solution number 2 in Section 2.5. The electrical properties were measured to be $\epsilon_r = 82$ and $\sigma = .092$ mhos/m at 20° C. During the course of these measurements the temperature of the fresh water varied between 15° C and 20° C. For the measurements taken at $d/\lambda_0 = .01$, the water temperature was initially 20° C. The water gradually cooled so that for the final measurements at $d/\lambda_0 = .25$, the temperature was recorded at 15° C. Measurement of the

electrical properties of the water at both these temperatures revealed no noticeable change. This agrees with previous investigations [5] made over a similar temperature range.

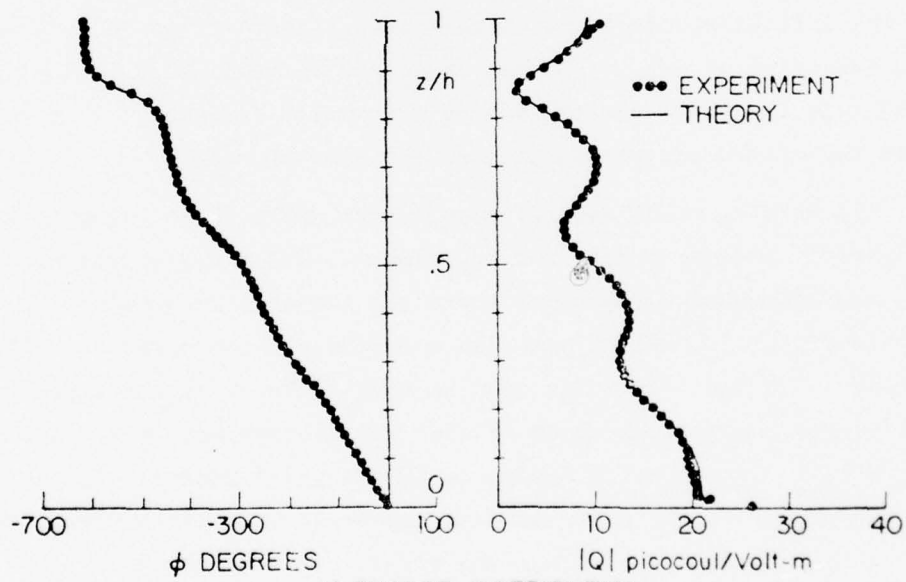
The measured current and charge distributions are presented in Figs. 3.2 through 3.18. The measured data are represented by dots. Tabulation of the normalized data and the raw data is given in Appendix B. An examination of these curves reveals the following important results:

1) For $d/\lambda_0 = .01$ and $.02$ (Figs. 3.2 through 3.7) the measured current and charge are compared with the theoretical expression developed by King [equations (1.6) and (1.18) with (1.7)]. The agreement is seen to be quite good for all antenna lengths. For $d/\lambda_0 = .01$ the measured wave number is within 1% of the theoretically predicted wave number of (1.7); while for $d/\lambda_0 = .02$ the wave numbers are within 3% with still very acceptable results. Departure from the theory is evident at the driving point and at the end of the antenna. These variations are due to the junction effect at the driving point and to the antenna end effect, neither of which can be taken into account in the zeroth-order theory of King. It is interesting to note that one of the initial restrictions on this theory is that $\beta_0 d \ll 1$ [equation (1.5)]. The fact that at $d/\lambda_0 = .02$ the agreement is still good implies that this condition is not as restrictive as originally presumed. This would agree with the subsequent restriction on the size of h/d .

2) At $d/\lambda_0 = .05$ and $.1$, significant differences begin to arise in the comparison between theory and experiment. The disagreement occurs mainly in α_L , the attenuation constant, where the theoretical value for α_L is found to be significantly smaller than the measured effective value. This is observed in Figs. 3.8 and 3.12 which compare King's theory to the experimental data. The deeper theoretical nulls reflect the discrepancy in the attenuation. For $d/\lambda_0 = .1$ noticeable departure in the phase constant β_L is also observed. At these heights the measured data appear to be shifted toward the end of the line. This is due to the end effect of the line which makes the antenna appear to be longer than it is. The shift is not due to any error in the wave number. A further discussion on end effects will be postponed until Section 3.5. For $d/\lambda_0 = .05$ and $.1$, errors in α_L of 20% and 50%, respectively, were considered unacceptable. Without further confirmation, it was believed that the large discrepancies between the theoretical attenuation

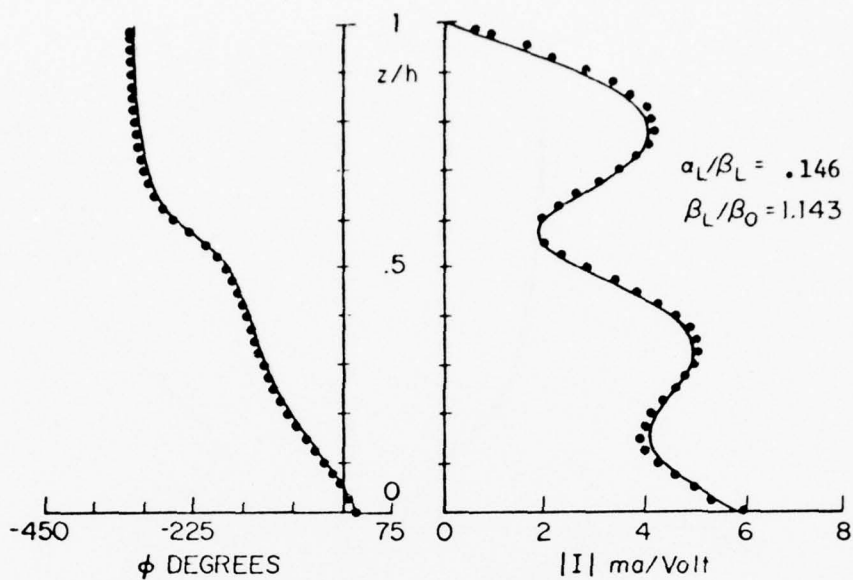


a) CURRENT DISTRIBUTION

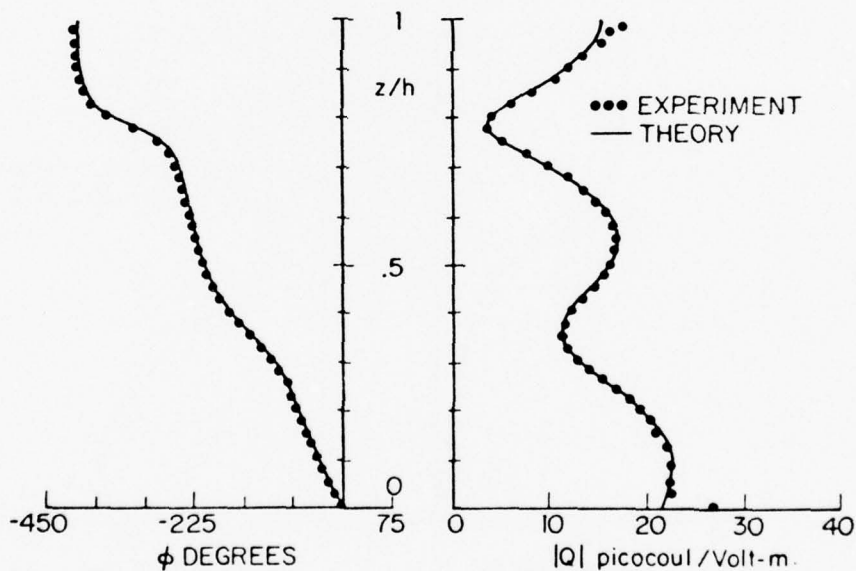


b) CHARGE DISTRIBUTION

FIG. 3.2. CURRENT AND CHARGE DISTRIBUTION ON MONOPOLE OVER FRESH WATER; $h/\lambda_0 = 1.5$ AND $d/\lambda_0 = .01$.



a) CURRENT DISTRIBUTION



b) CHARGE DISTRIBUTION

FIG. 3.3. CURRENT AND CHARGE DISTRIBUTION ON MONOPOLE OVER FRESH WATER; $h/\lambda_0 = 1$ AND $d/\lambda_0 = .01$.

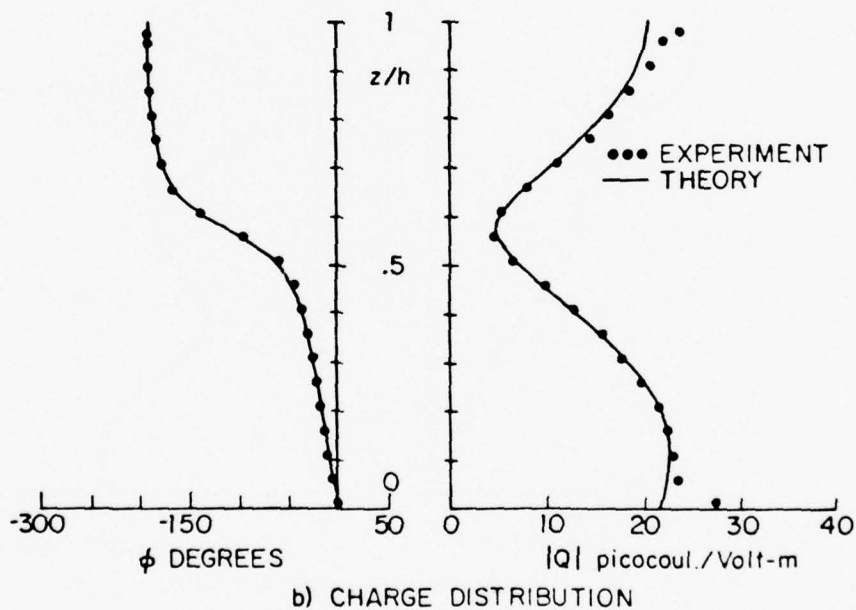
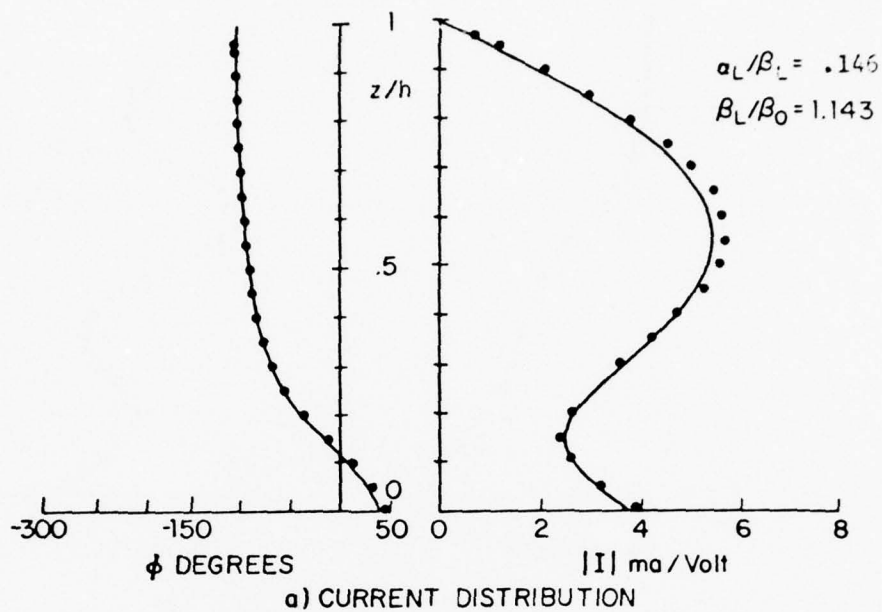


FIG.3.4. CURRENT AND CHARGE DISTRIBUTION ON MONOPOLE OVER FRESH WATER; $h/\lambda_0 = .5$ AND $d/\lambda_0 = .01$.

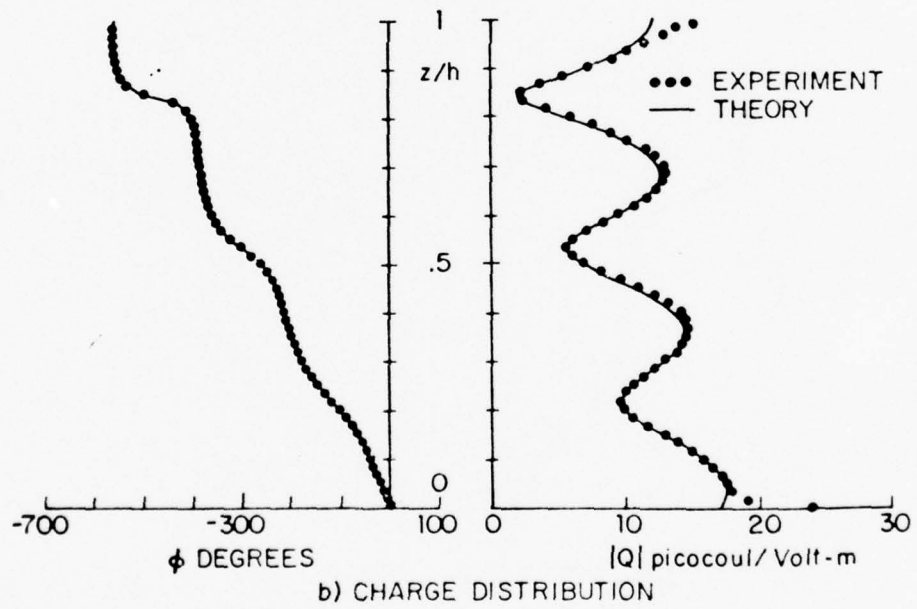
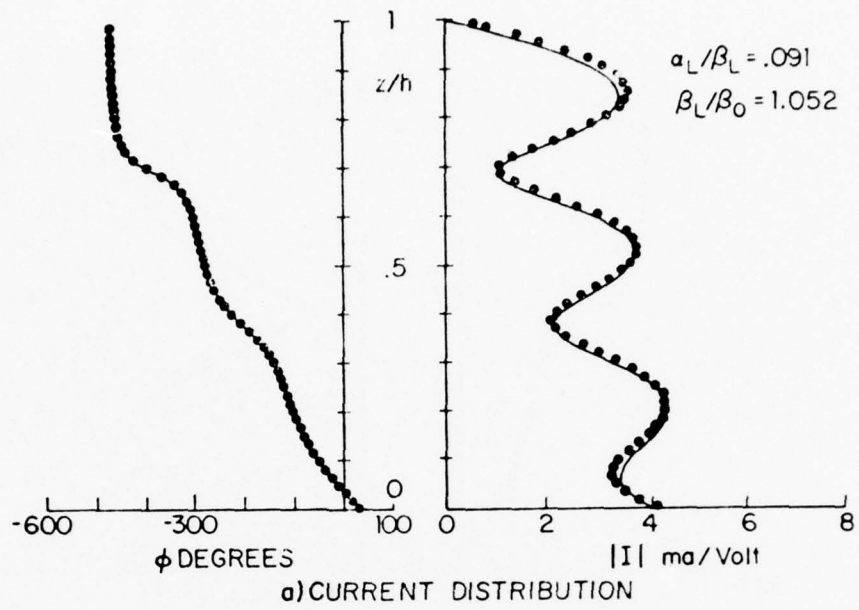
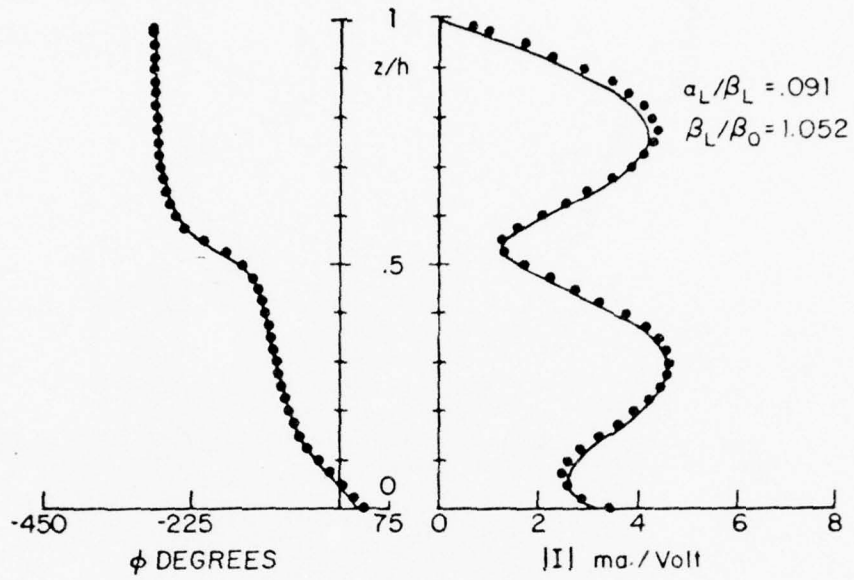
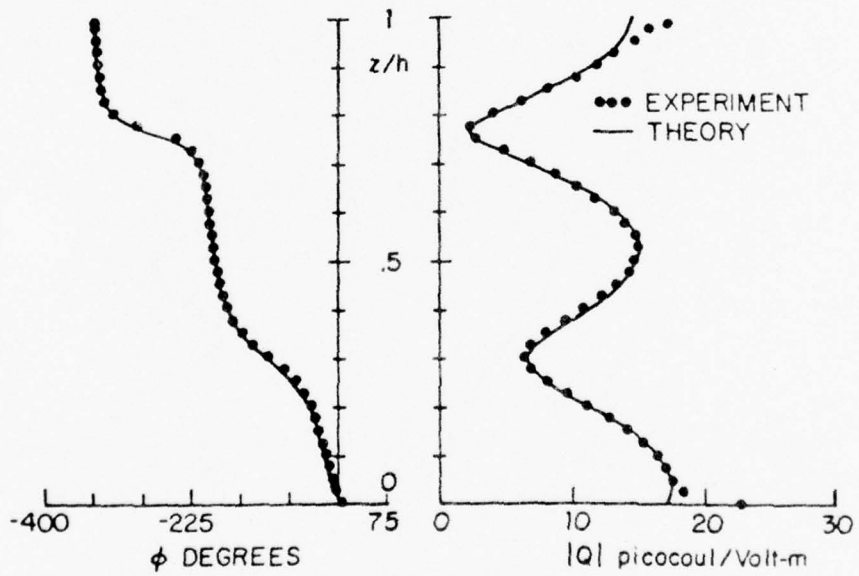


FIG.3.5. CURRENT AND CHARGE DISTRIBUTION ON MONOPOLE OVER FRESH WATER; $t_1/\lambda_0 = 1.5$ AND $d/\lambda_0 = .02$.

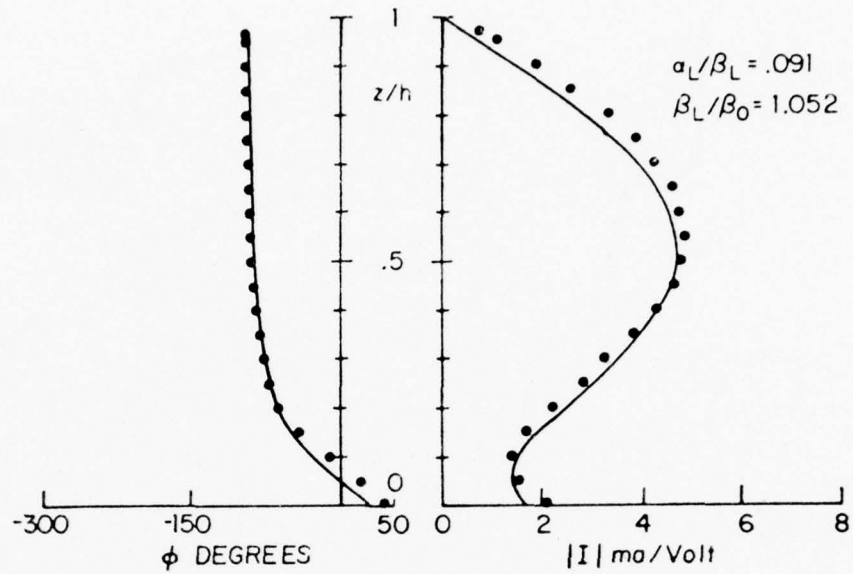


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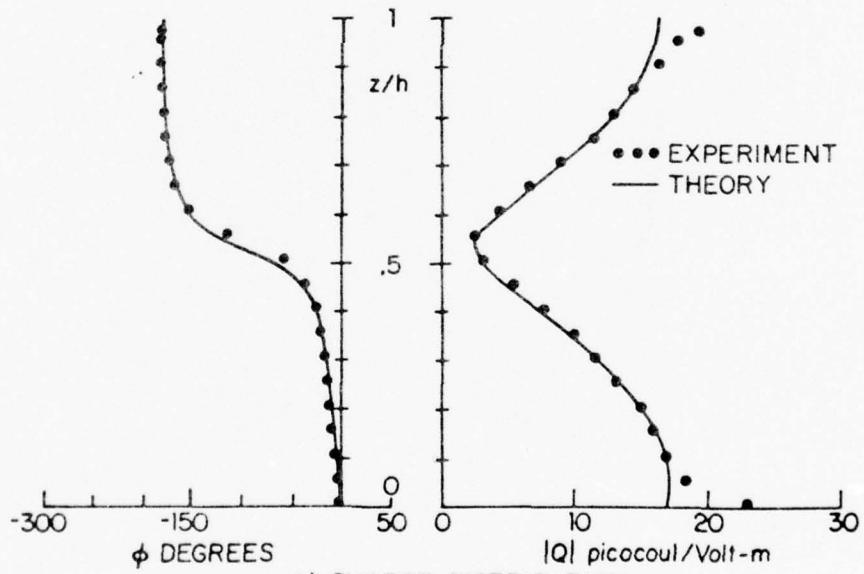


b) CHARGE DISTRIBUTION

FIG. 3.6. CURRENT AND CHARGE DISTRIBUTION ON MONOPOLE OVER FRESH WATER; $h/\lambda_0 = 1$ AND $d/\lambda_0 = .02$.

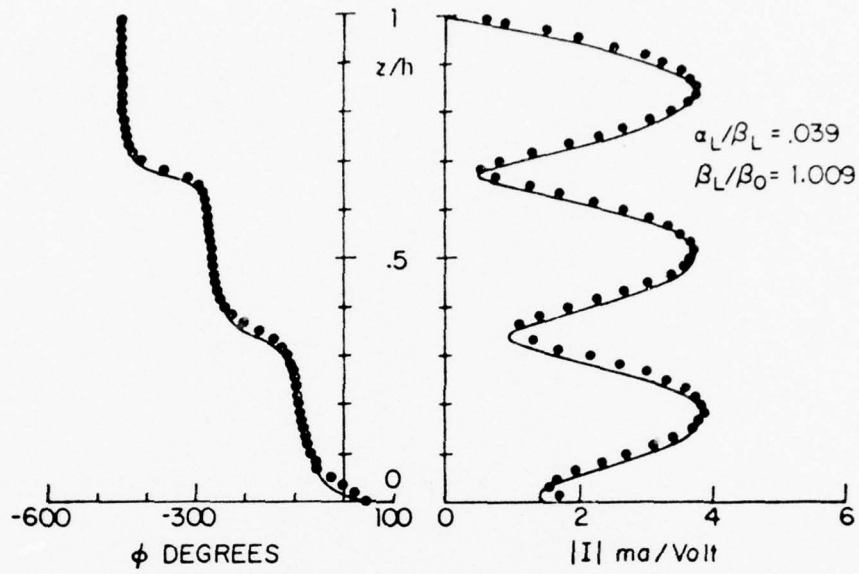


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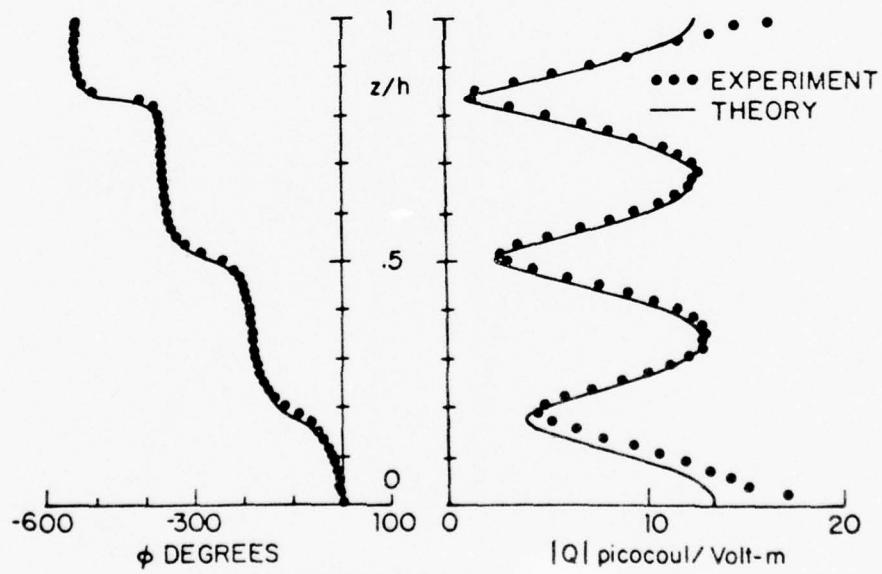


b) CHARGE DISTRIBUTION

Fig. 3.7. CURRENT AND CHARGE DISTRIBUTION ON MONOPOLE OVER FRESH WATER; $h/\lambda_0 = .5$ AND $d/\lambda_0 = .02$.

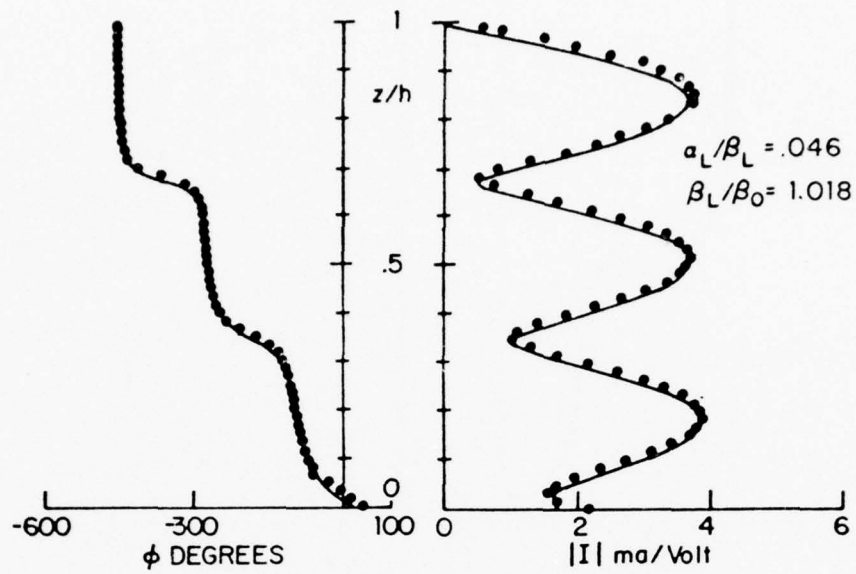


a) CURRENT DISTRIBUTION

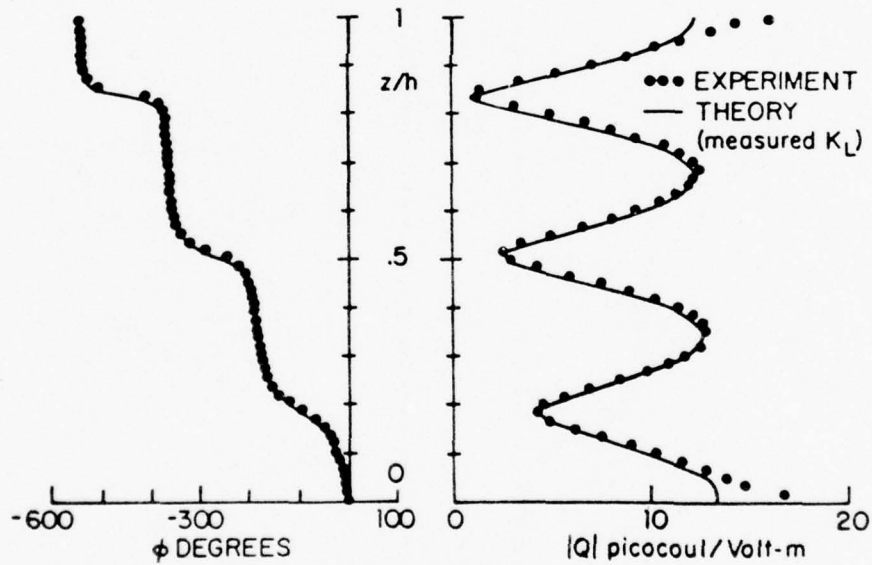


b) CHARGE DISTRIBUTION

FIG. 3.8. CURRENT AND CHARGE DISTRIBUTION ON MONOPOLE OVER FRESH WATER USING THEORETICAL WAVENUMBER; $h/\lambda_0 = 1.5$ AND $d/\lambda_0 = .05$.

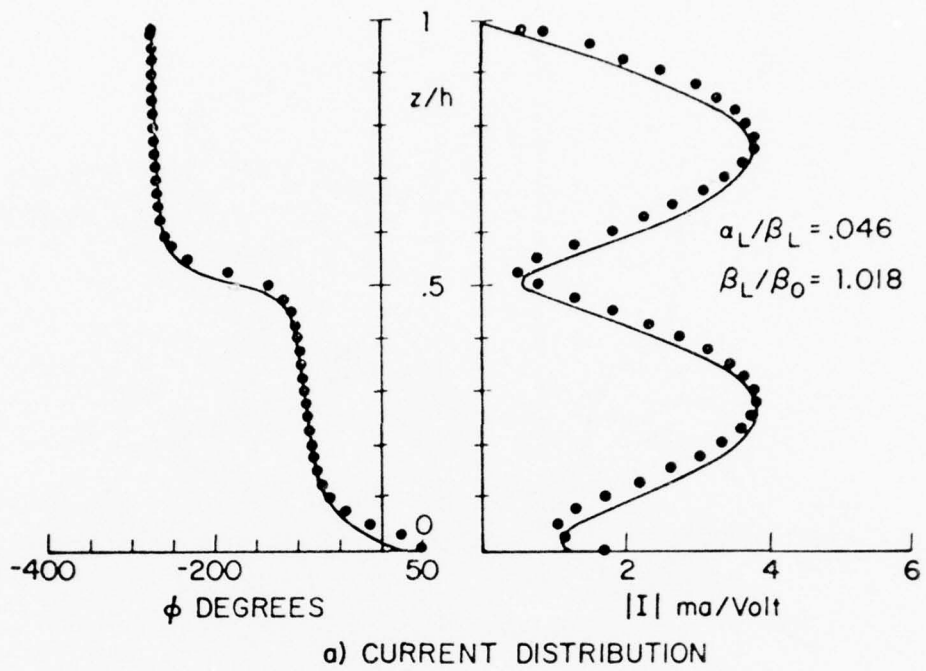


a) CURRENT DISTRIBUTION

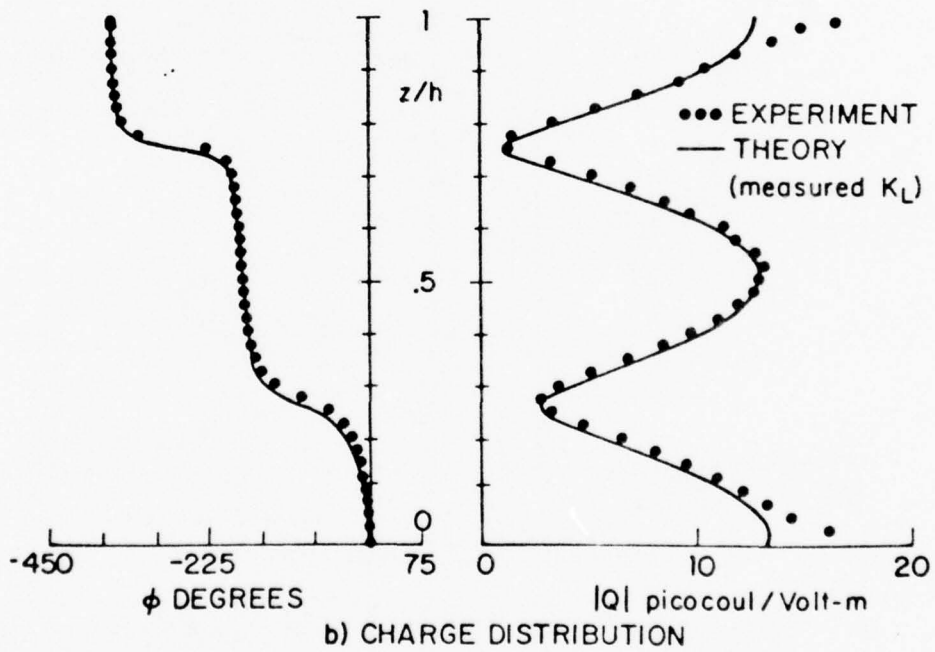


b) CHARGE DISTRIBUTION

FIG. 3.9. CURRENT AND CHARGE DISTRIBUTION ON MONOPOLE OVER FRESH WATER USING MEASURED WAVENUMBER; h/λ_0 AND $d/\lambda_0 = .05$.



a) CURRENT DISTRIBUTION



b) CHARGE DISTRIBUTION

FIG.3.10. CURRENT AND CHARGE DISTRIBUTION ON MONOPOLE OVER FRESH WATER USING MEASURED WAVENUMBER; $h/\lambda_0 = 1$ AND $d/\lambda_0 = .05$.

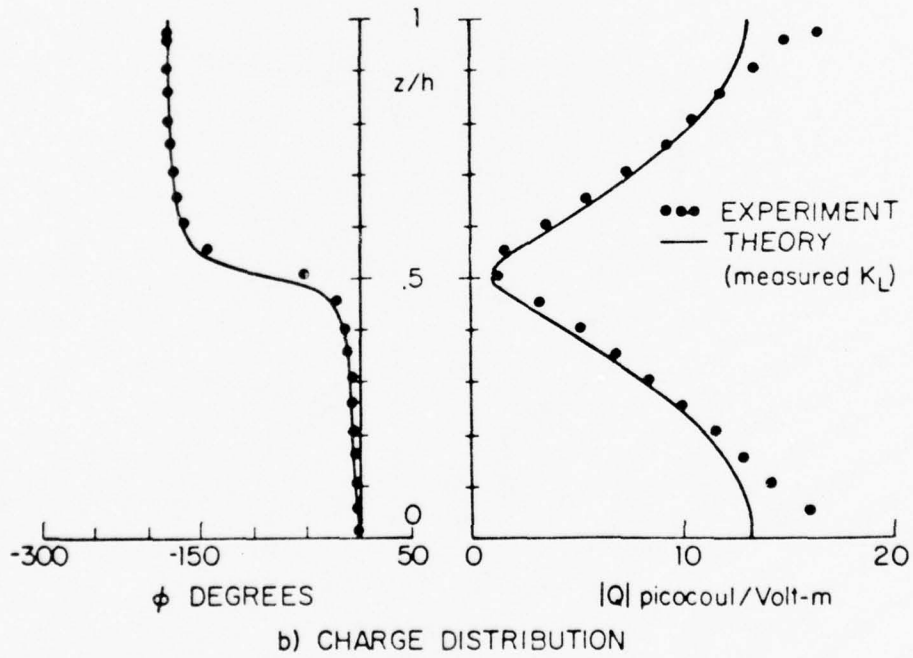
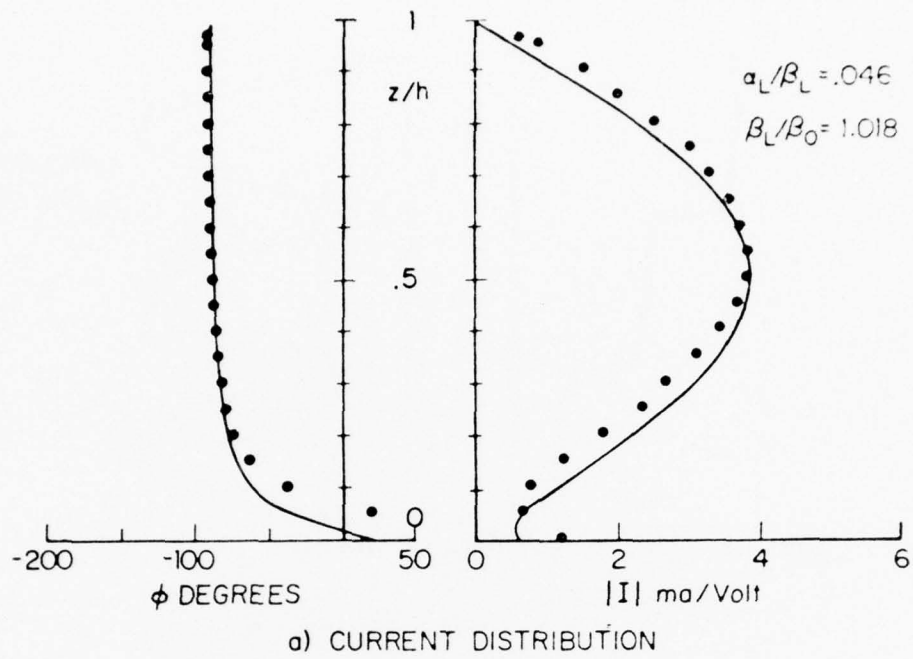


FIG. 3.11. CURRENT AND CHARGE DISTRIBUTION ON MONOPOLE OVER FRESH WATER USING MEASURED WAVENUMBER; $h/\lambda_0 = .5$ AND $d/\lambda_0 = .05$.

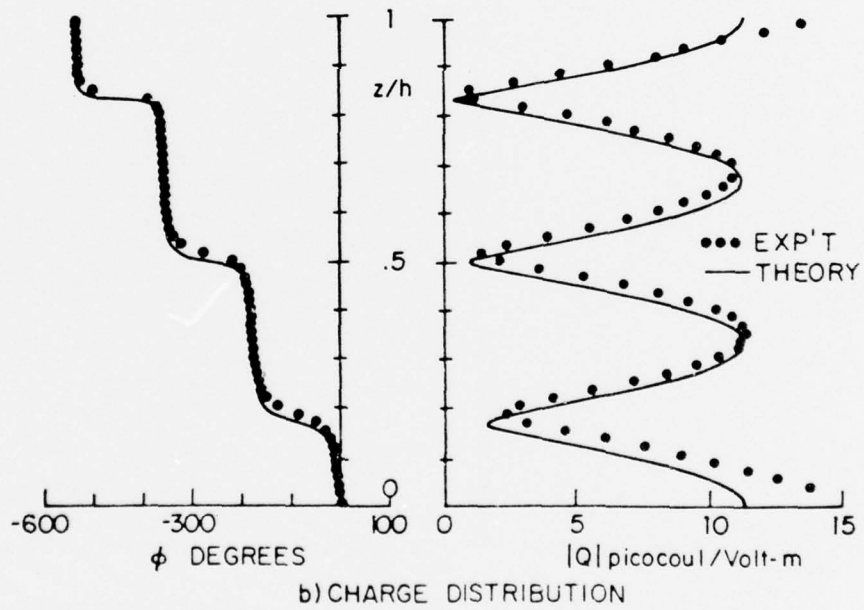
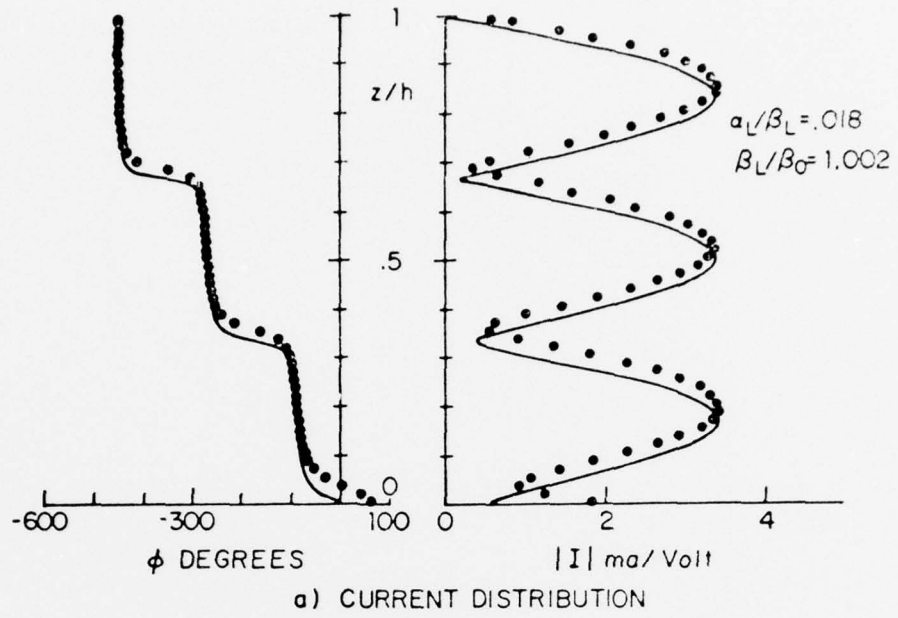


FIG. 3.12 CURRENT AND CHARGE DISTRIBUTION ON MONOPOLE OVER FRESH WATER USING THEORETICAL WAVE NUMBER; $h/\lambda_0 = 1.5$ AND $d/\lambda_0 = 1$.

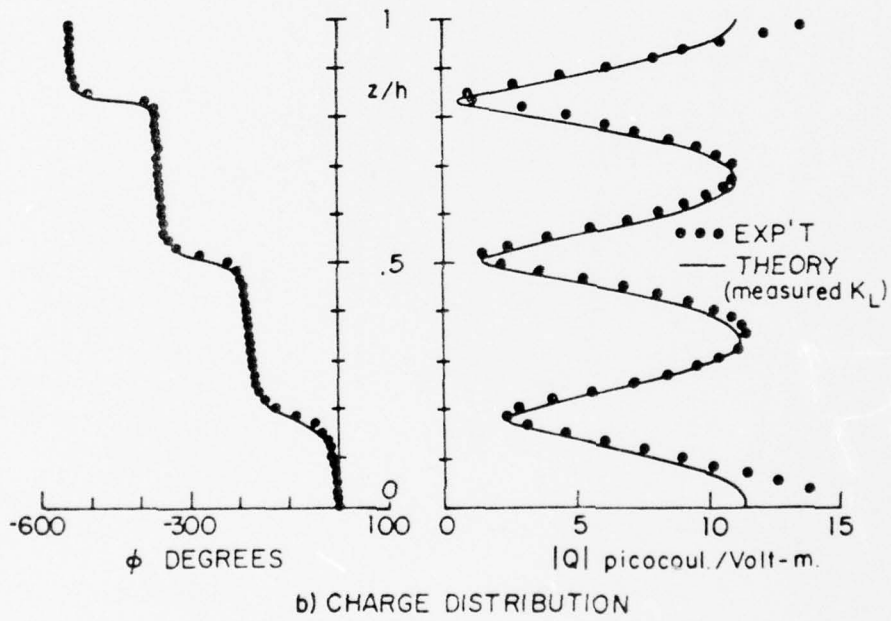
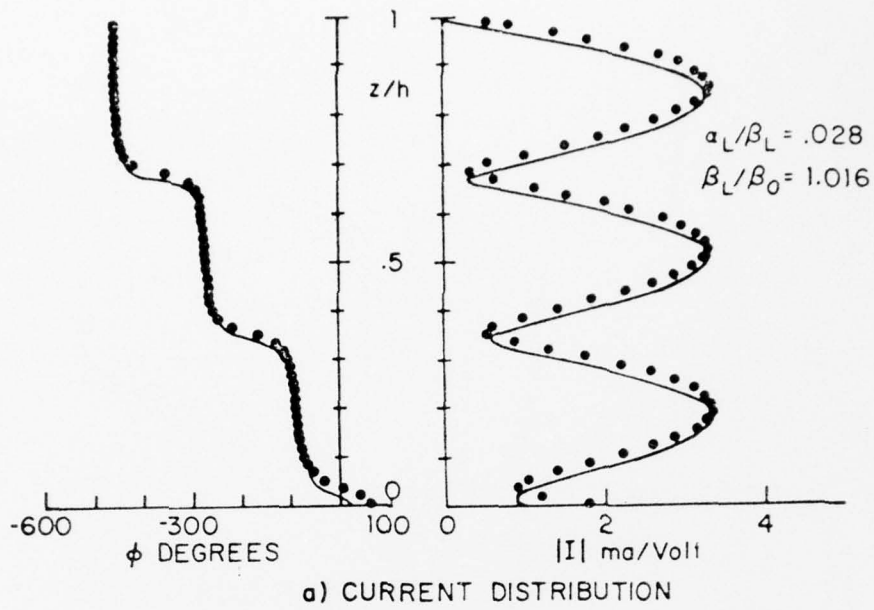
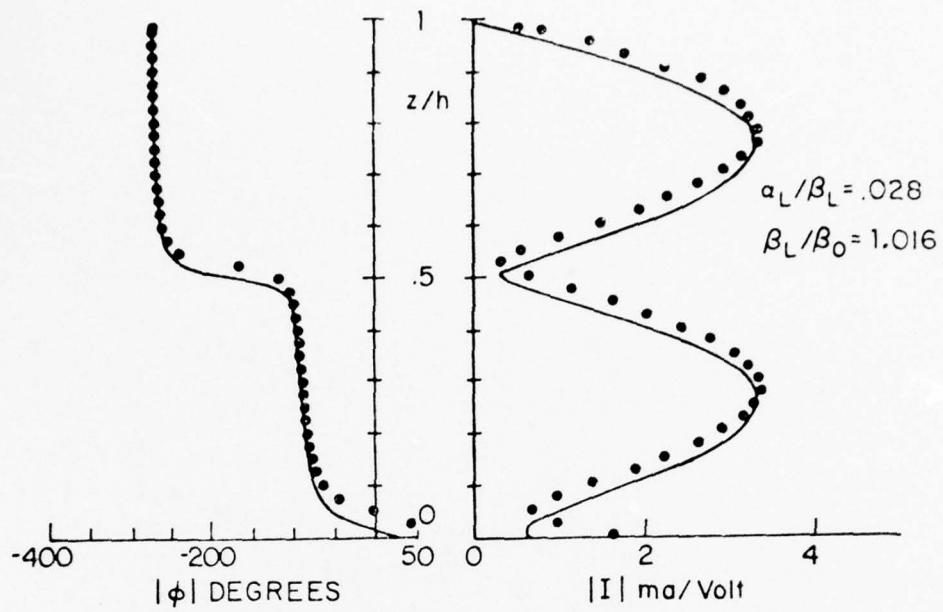
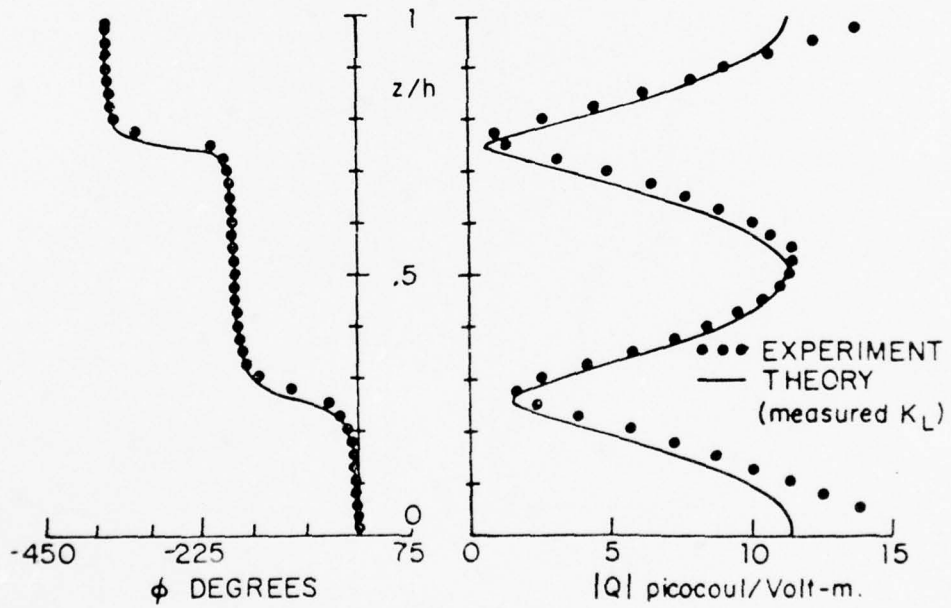


FIG. 3.13 CURRENT AND CHARGE DISTRIBUTION ON MONOPOLE OVER FRESH WATER USING MEASURED WAVENUMBER; $h/\lambda_0 = 1.5$ AND $d/\lambda_0 = 1$.



a) CURRENT DISTRIBUTION



b) CHARGE DISTRIBUTION

FIG.3.14. CURRENT AND CHARGE DISTRIBUTION ON MONOPOLE OVER FRESH WATER USING MEASURED WAVENUMBER; $h/\lambda_0 = 1$ AND $d/\lambda_0 = 1$.

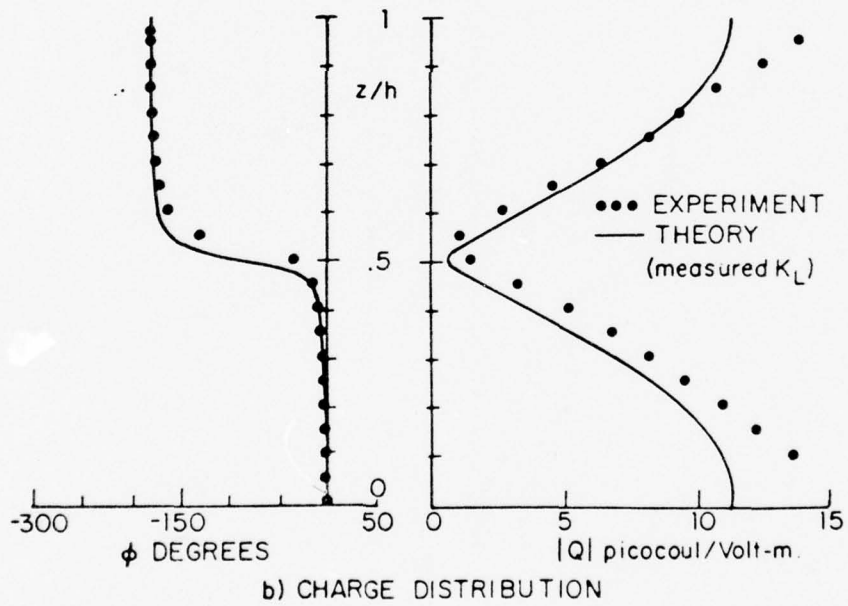
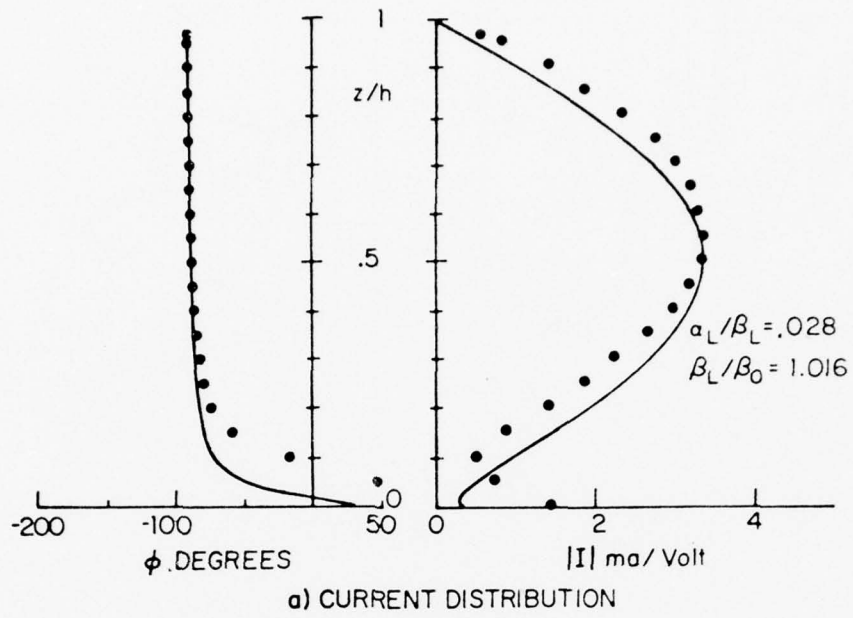
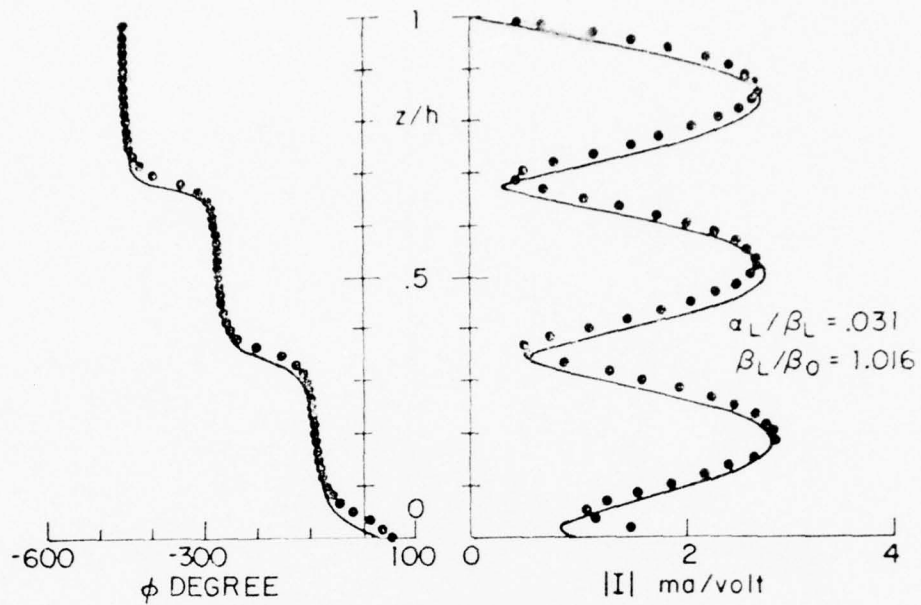
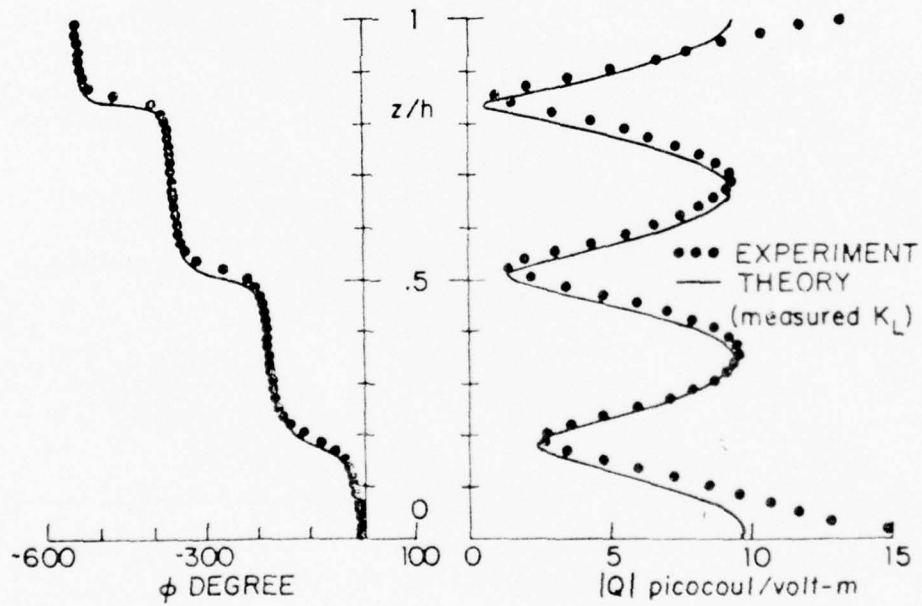


FIG.3.15.CURRENT AND CHARGE DISTRIBUTION ON MONOPOLE OVER FRESH WATER USING MEASURED WAVENUMBER; $h/\lambda_0 = .5$ AND $d/\lambda_0 = .1$.

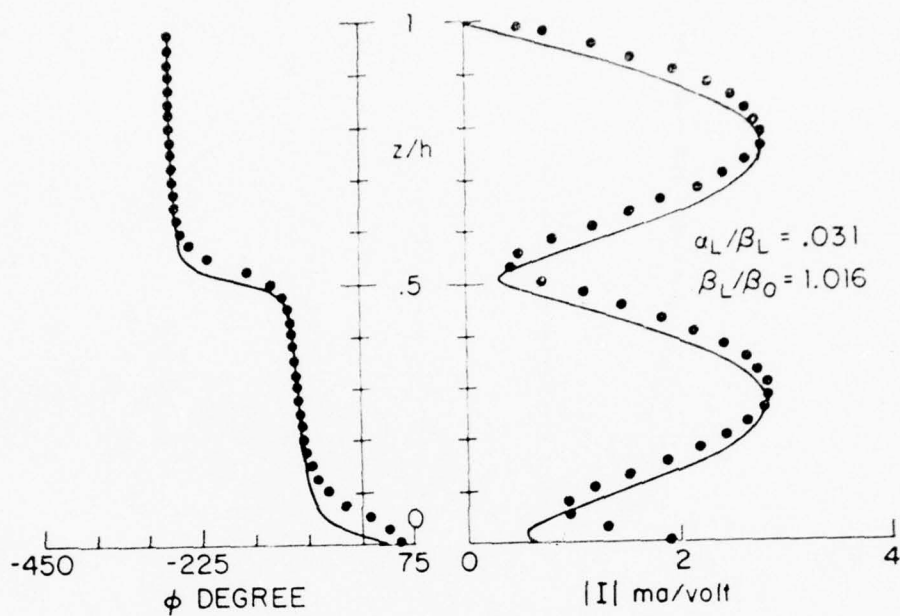


a) CURRENT DISTRIBUTION

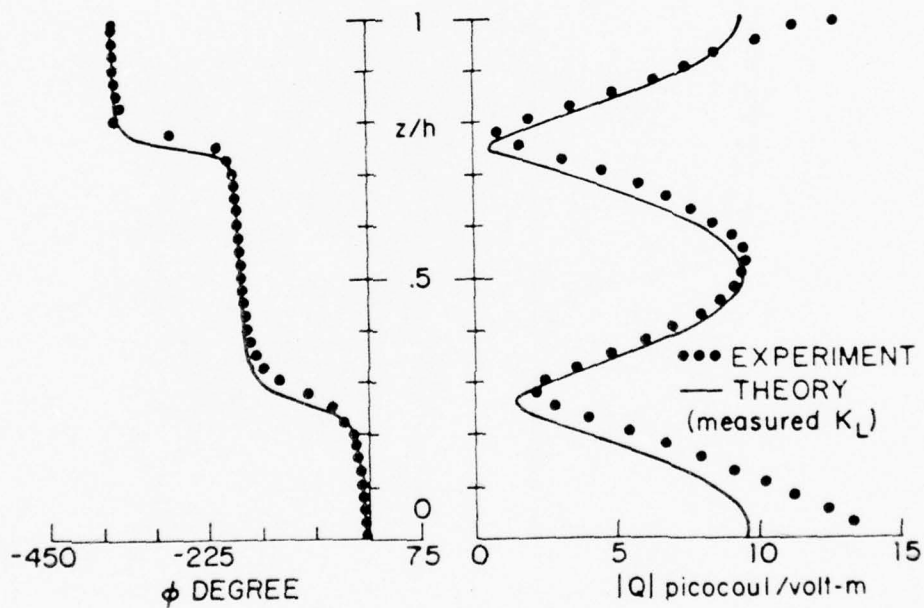


b) CHARGE DISTRIBUTION

FIG. 3.16. CURRENT AND CHARGE DISTRIBUTION ON MONOPOLE OVER FRESH WATER USING MEASURED WAVENUMBER; $h/\lambda_0 = 1.5$ AND $d/\lambda_0 = .25$.

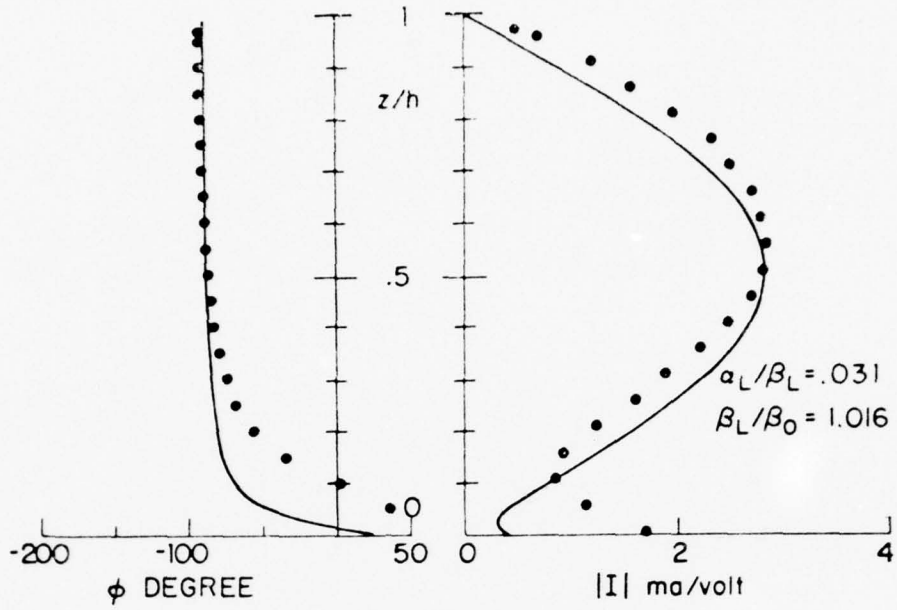


a) CURRENT DISTRIBUTION

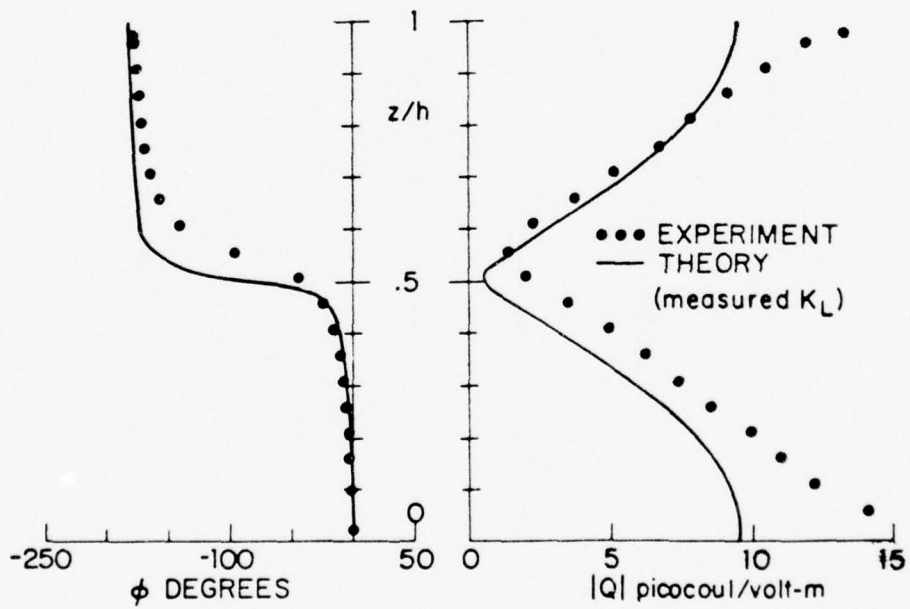


b) CHARGE DISTRIBUTION

FIG.3.17. CURRENT AND CHARGE ON MONOPOLE OVER FRESH WATER USING MEASURED WAVENUMBER; $h/\lambda_0 = 1$ AND $d/\lambda_0 = .25$.



a) CURRENT DISTRIBUTION



b) CHARGE DISTRIBUTION

FIG. 3.18. CURRENT AND CHARGE DISTRIBUTION ON MONOPOLE OVER FRESH WATER USING MEASURED WAVENUMBER; $h/\lambda_0 = .5$ AND $d/\lambda_0 = .25$.

given by (1.7) and the measured attenuation could depend on one or both of the following. The possibility that a fundamental limitation exists in the d/λ_0 quantity is strong. Speculation that the d/λ_0 quantity is unimportant as long as h/λ_0 is large may be plausible, but exactly how large h/λ_0 must be is not specifically known. It is quite possible that for the cases being studied the transmission-line-like behavior may diverge at this height. The second possibility is that a significant end effect is present which would cause the effective attenuation to be higher than the theoretical value. Since the slight shift in the measured data could be caused by the end effect, there is strong evidence in this direction. This problem is discussed in Section 1.8 (Volume I) where it is determined that the discrepancies are due to the end effect. In any case, to overcome this problem a semi-empirical solution was developed which utilizes the zeroth-order form for the current and charge derived by King with the measured effective wave number obtained from the experiment. The comparison between this solution and the measurements is given in Figs. 3.9 through 3.11 and 3.13 through 3.15. The figures show that the zeroth-order form still holds and that by using the measured effective wave number the corresponding results are quite good.

3) At the highest spacing, $d/\lambda_0 = .25$, the semi-empirical solution was also used. The results are presented in Figs. 3.16 through 3.18. It appears that at this height the forms of the current and charge begin to depart somewhat from the sinusoidal. This is especially apparent near the driving point. It would seem that at this height the influence of the medium is diminishing and the form of the current and charge is approaching that of an isolated antenna. Alternatively, it is quite possible that the end correction is sufficiently large to give this appearance. In either case, the semi-empirical solution still provides good approximate representations for the current and charge.

In Fig. 3.19 the theoretically predicted wave numbers from (1.7) for an antenna over fresh water are compared with the measured effective wave numbers obtained from the previous data. Note that for the β_L/β_0 curve all measured values are within 5% of the theoretical curve. For the α_L/β_L curve, however, the agreement is good only for the two cases of $d/\lambda_0 = .01$ and $.02$. At heights of $d/\lambda_0 = .05$ and greater, the error in α_L exceeds 20%, as is easily seen from the comparison in Fig. 3.19.

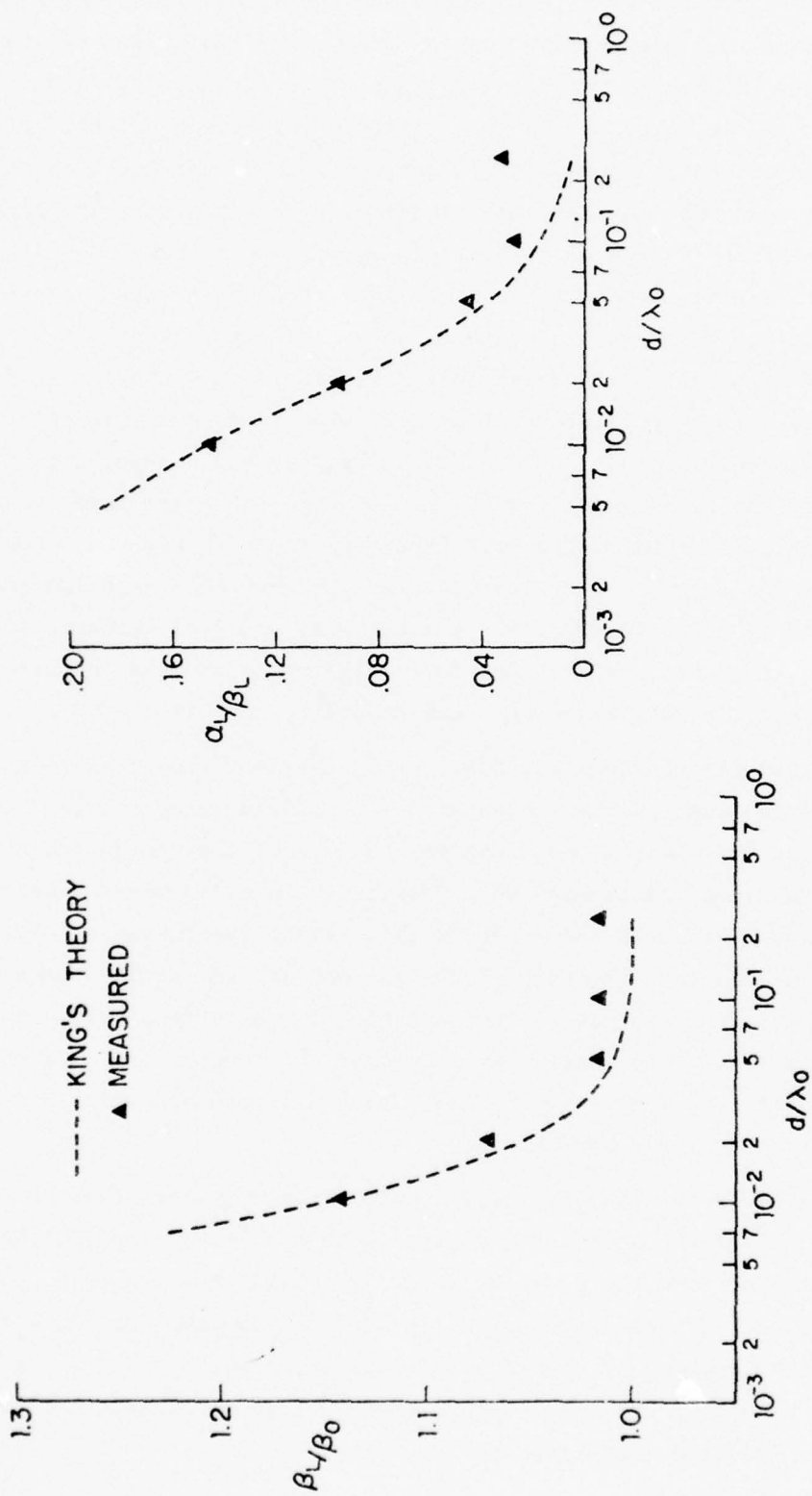


FIG. 3.19. WAVENUMBER ON HORIZONTAL WIRE OVER FRESH WATER;
 $\epsilon_r = 82$ AND $Pe = 0.67$

The measured effective wave numbers were obtained by using standard transmission-line techniques. At each height the difference between charge nulls was measured on an antenna, $1.5\lambda_0$ in length, to determine the phase constant β_L of the line. The measurements were made at the nulls because they tend to be much more sharply defined than the peaks of the curve, resulting in better accuracy. The charge distribution was measured rather than the current since the charge probe has less of an averaging effect than the current probe. The attenuation constant was determined by measuring the position of the peaks and nulls of the current distribution as well as the magnitude of the current at these points and then utilizing the following relationship:

$$ISWR = \frac{|I|_{\max}}{|I|_{\min}} = S_I = \frac{\cosh(\alpha_L w_1 + \rho_s)}{\sinh(\alpha_L w_2 + \rho_s)} \quad (3.4)$$

where ρ_s , the terminal attenuation function, is equal to zero for an open circuit with no appreciable end effect and w_1, w_2 are the distances from the end of the antenna to the current peak and null, respectively.

With S_I, w_1 and w_2 determined experimentally, α_L can be solved for by iteration. Equation (3.4) was programmed on a Hewlett-Packard 9821A calculator to obtain the desired results for α_L . For significant end effects, ρ_s is no longer zero and the α_L solved for is not the true attenuation but an effective value which includes a contribution due to ρ_s . When ρ_s is comparable in magnitude to $\alpha_L h$, the concept of an effective α_L cannot be used. It turns out that this is the situation that exists for $d/\lambda_0 = .25$. This special case is discussed in detail in Section 1.8 in Volume I.

The input admittance measurements for a monopole over fresh water are shown in Figs. 3.20 through 3.24 with the corresponding circle diagrams in Figs. 3.25 through 3.29. At $d/\lambda_0 = .01$ and $.02$, the measured input admittance is compared with the theoretical admittance obtained by King in (1.16). As with the current and charge distributions, the agreement between experimental and predicted results is good considering that the zeroth-order theory contains no corrections for end or junction effects. In the other three cases, $d/\lambda_0 = .05, .1$, and $.25$, the measured data are compared with the transmission-line form for the admittance given by (1.16) with the measured

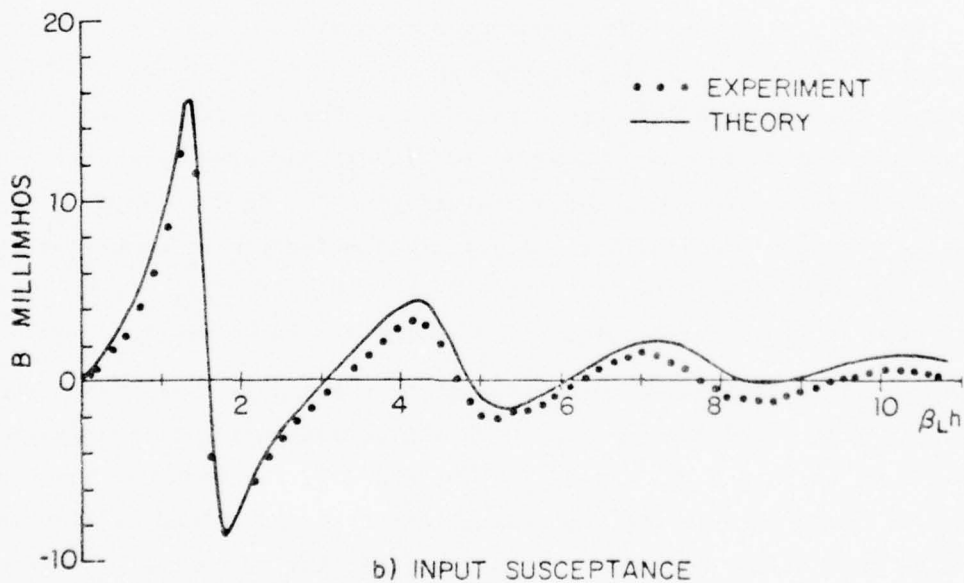
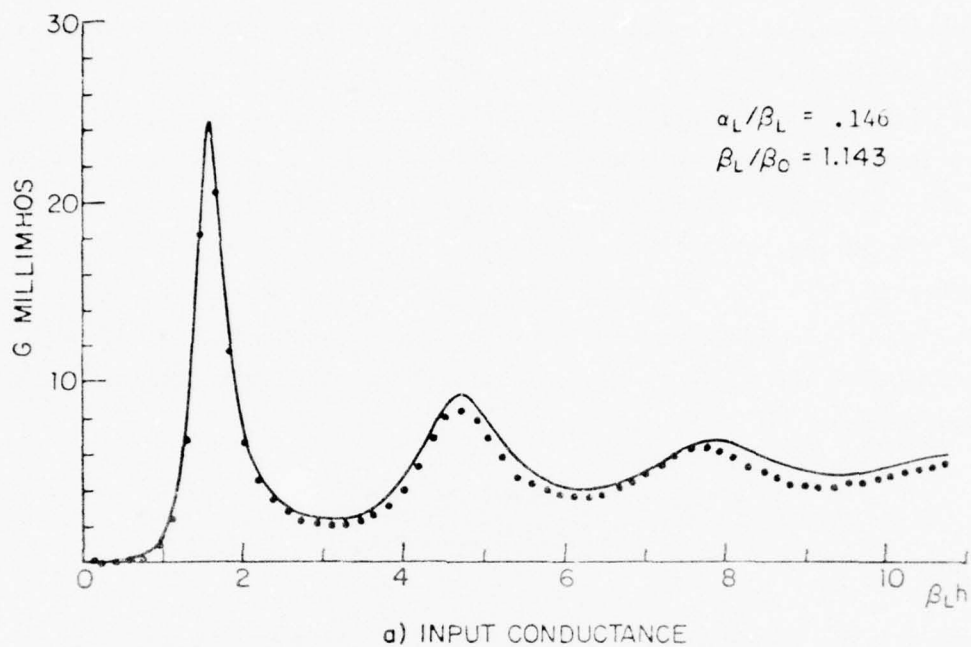
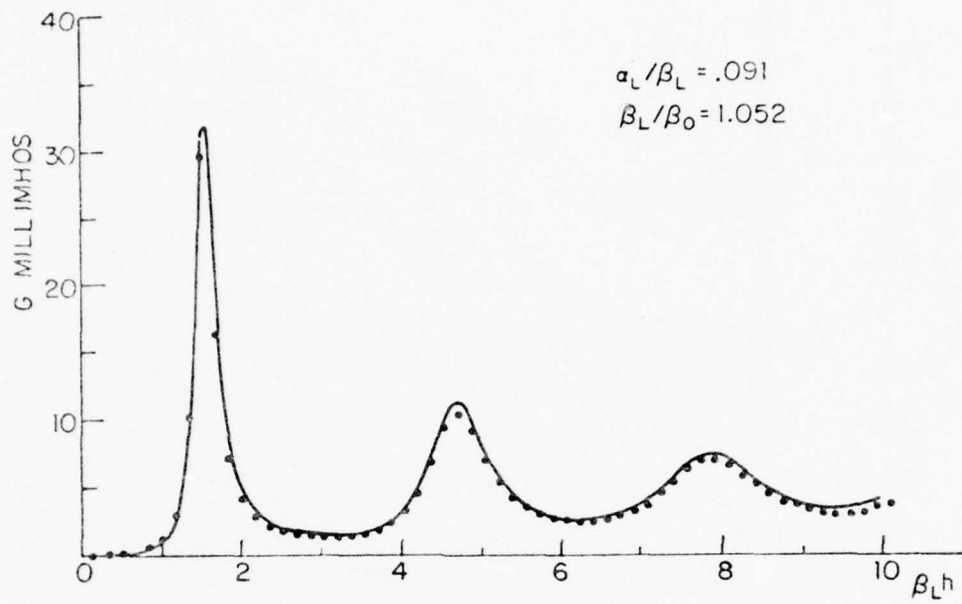
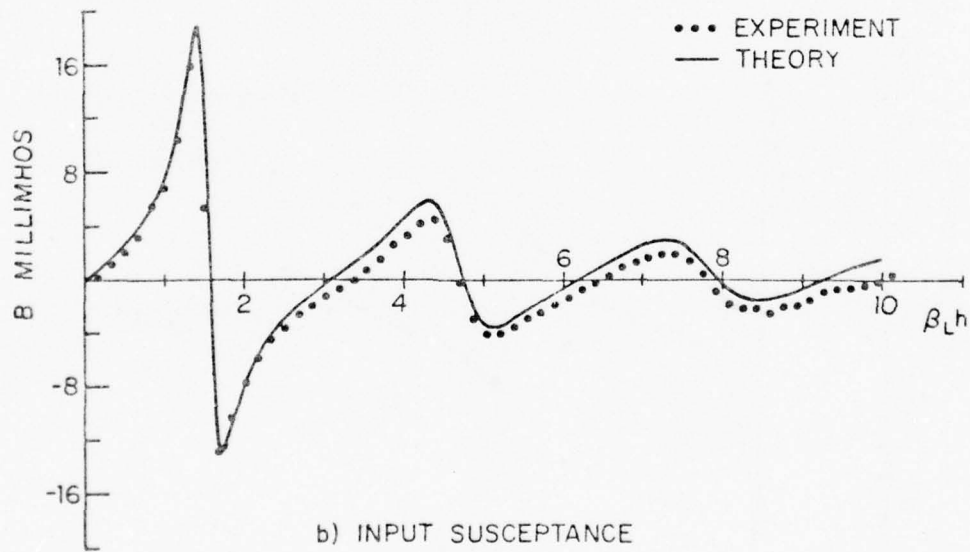


FIG. 3.20. INPUT ADMITTANCE OF MONOPOLE OVER FRESH WATER;
 $d/\lambda_0 = .01$ AND $\sigma/\lambda_0 = .0015$

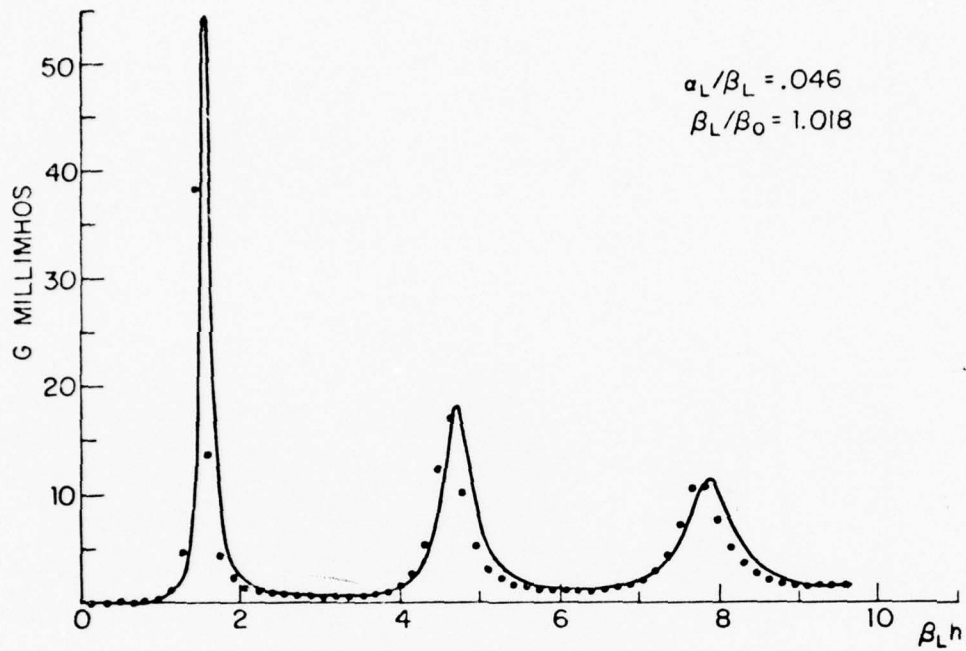


a) INPUT ADMITTANCE

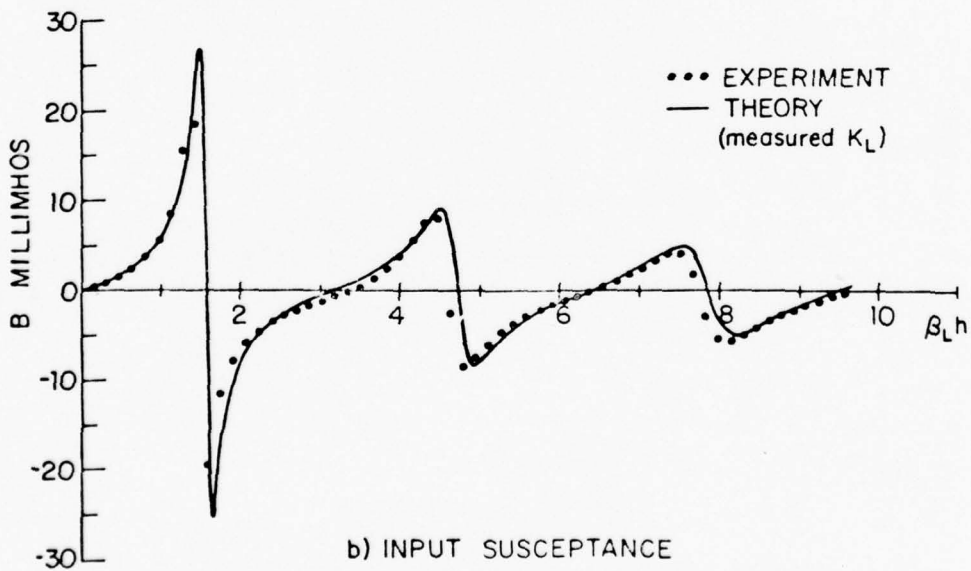


b) INPUT SUSCEPTANCE

FIG. 3.21 INPUT ADMITTANCE OF MONOPOLE OVER FRESH WATER;
 $d/\lambda_0 = .02$ AND $a/\lambda_0 = .0015$



a) INPUT CONDUCTANCE



b) INPUT SUSCEPTANCE

FIG3.22. INPUT ADMITTANCE OF MONOPOLE OVER FRESH WATER USING MEASURED K_L ; $d/\lambda_0 = .05$ AND $a/\lambda_0 = .0015$

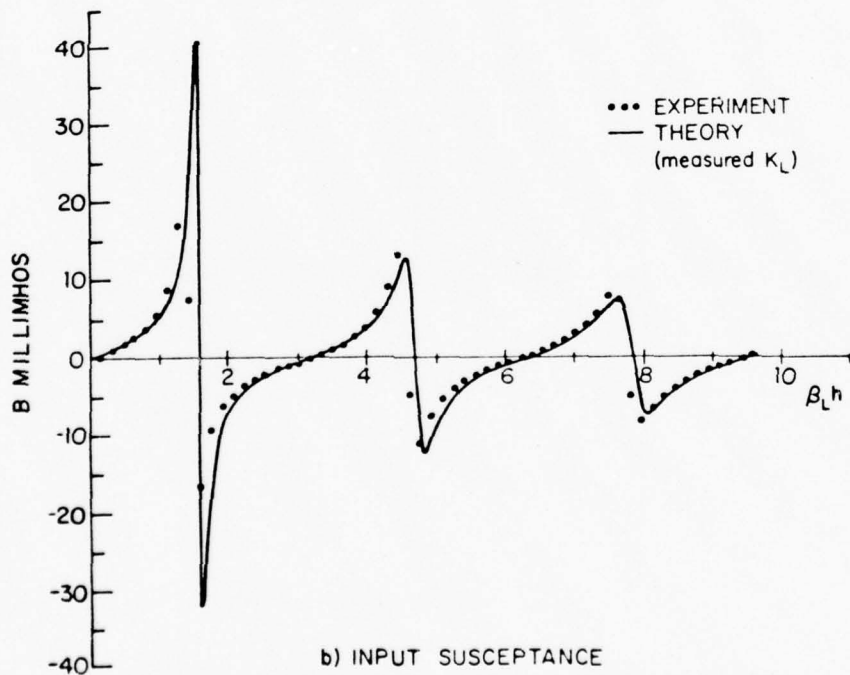
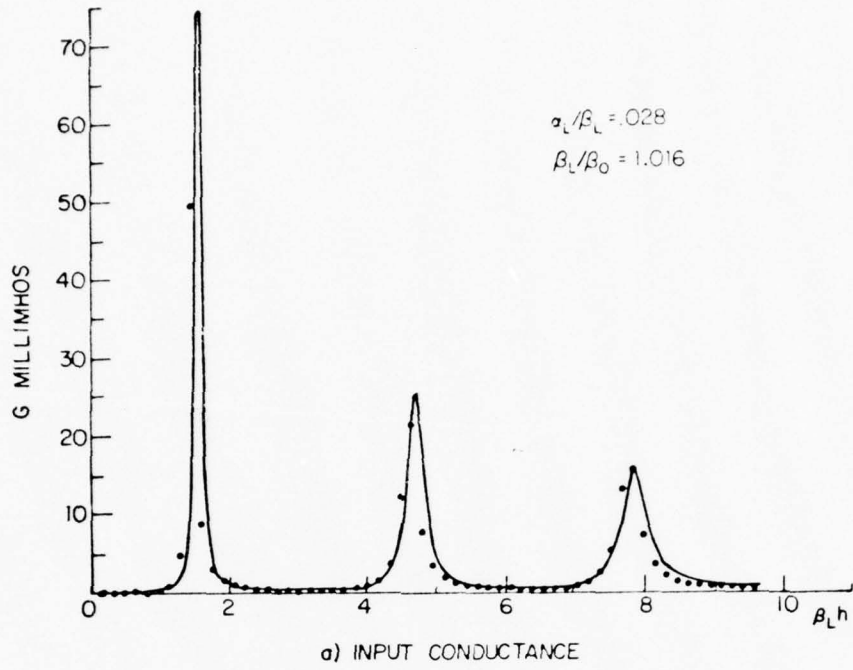


FIG. 3.23. INPUT ADMITTANCE OF MONOPOLE OVER FRESH WATER USING MEASURED K_L ; $d/\lambda_0 = .1$ AND $\alpha/\lambda_0 = .0015$

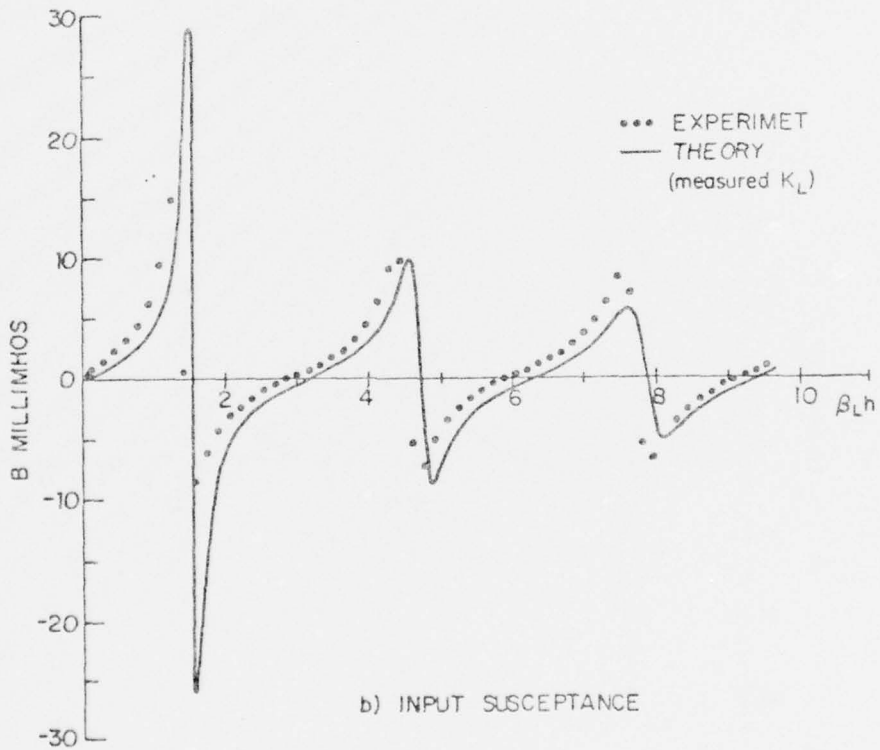
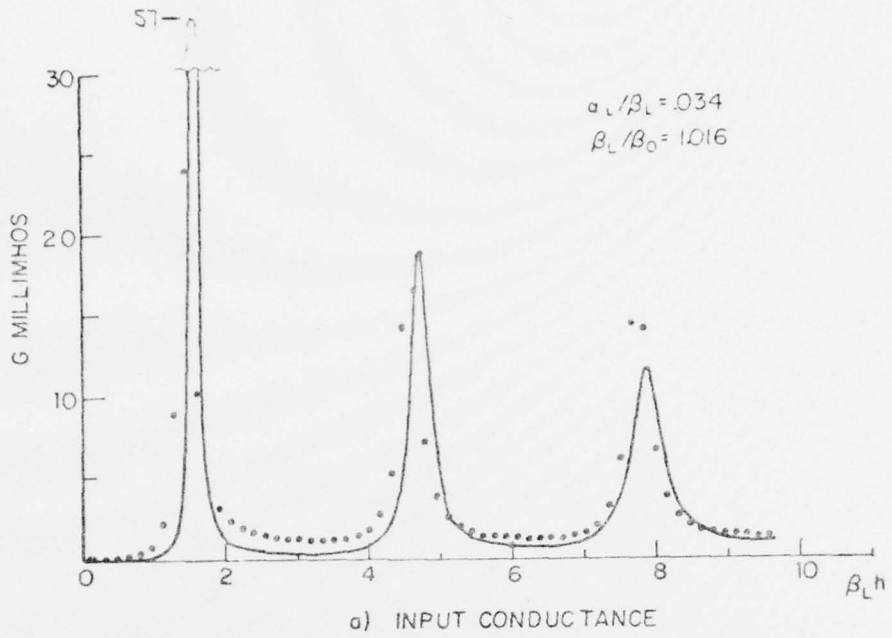


FIG. 3.24, INPUT ADMITTANCE OF MONOPOLE OVER FRESH WATER USING MEASURED K_L , $d/\lambda_0 = .25$ AND $a/\lambda_0 = .0015$

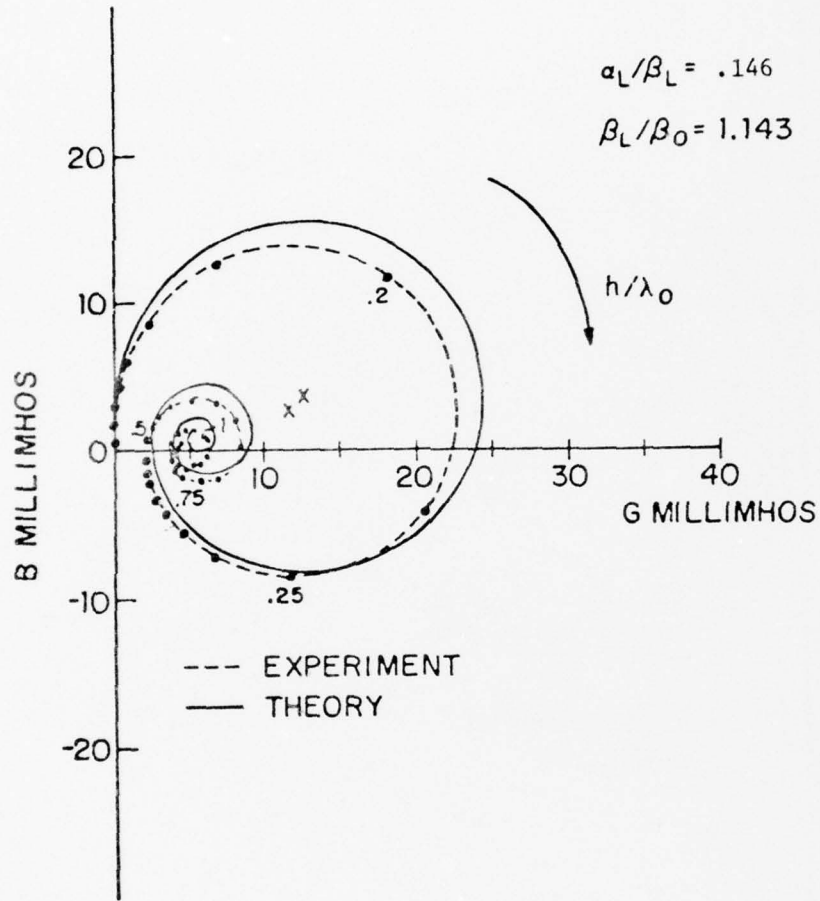


FIG.3.25.INPUT ADMITTANCE CIRCLE DIAGRAM OF MONOPOLE OVER FRESH WATER; $d/\lambda_0 = .01$ AND $a/\lambda_0 = .0015$.

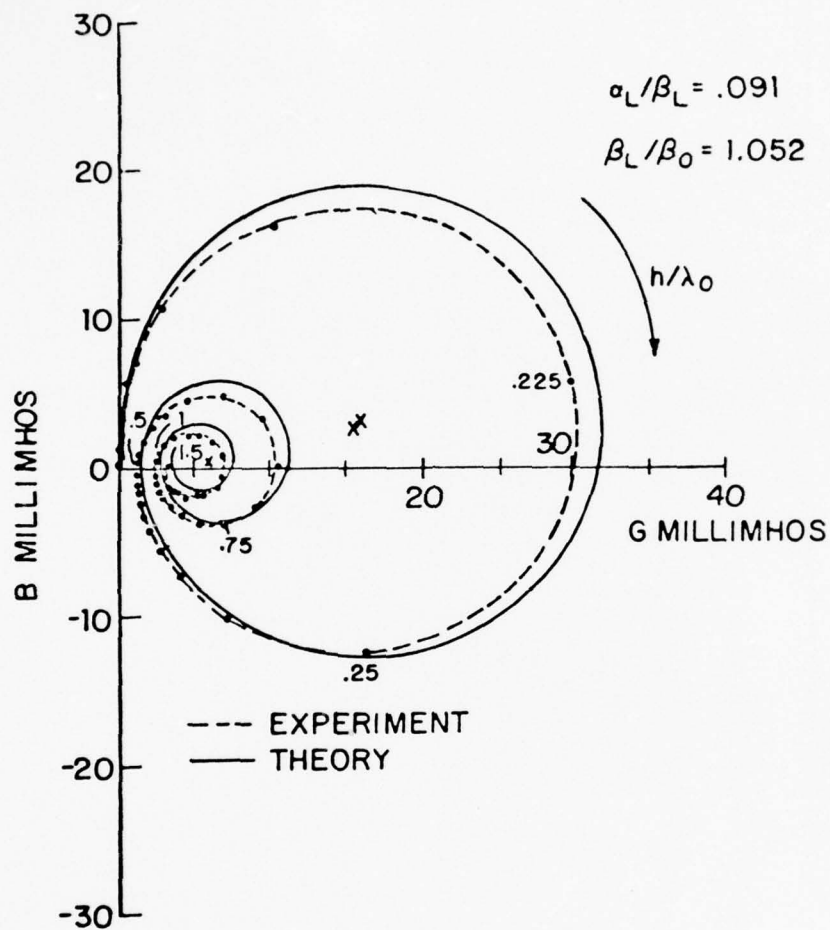


FIG.3.26. INPUT ADMITTANCE CIRCLE DIAGRAM OF MONOPOLE OVER FRESH WATER; $d/\lambda_0 = .02$ AND $a/\lambda_0 = .0015$.

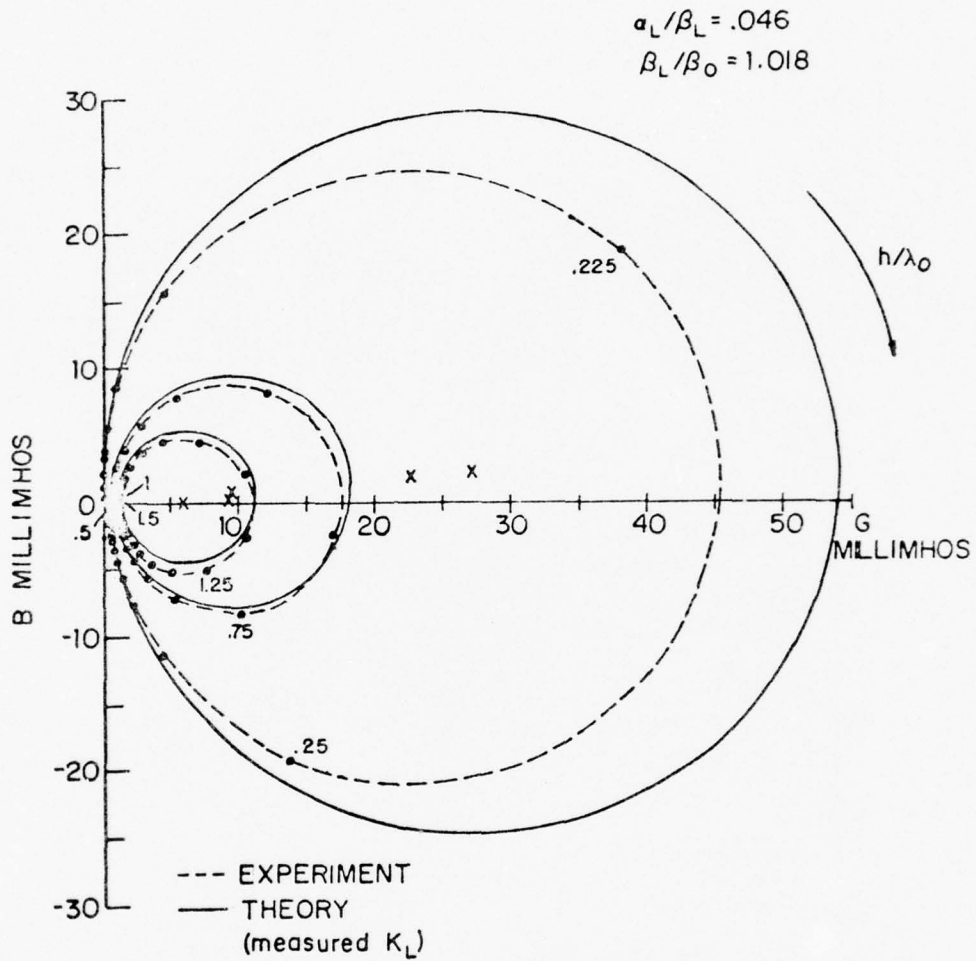


FIG. 3.27. INPUT ADMITTANCE OF MODIFIED BEVERAGE ANTENNA OVER FRESH WATER USING MEASURED K_L ; $d/\lambda_0 = .05$ AND $a/\lambda_0 = .0015$

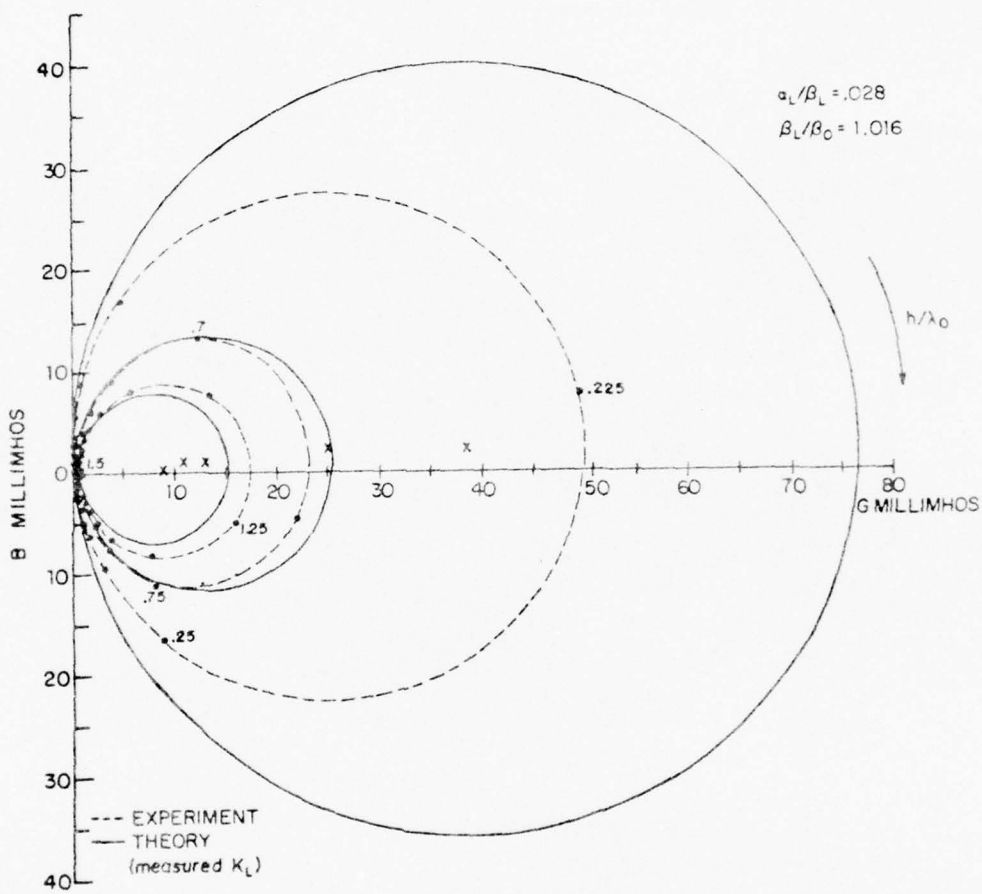


FIG. 3.28 INPUT ADMITTANCE CIRCLE DIAGRAM OF MONOPOLE OVER FRESH WATER USING MEASURED K_L , $d/\lambda_0 = .1$ AND $a/\lambda_0 = .0015$

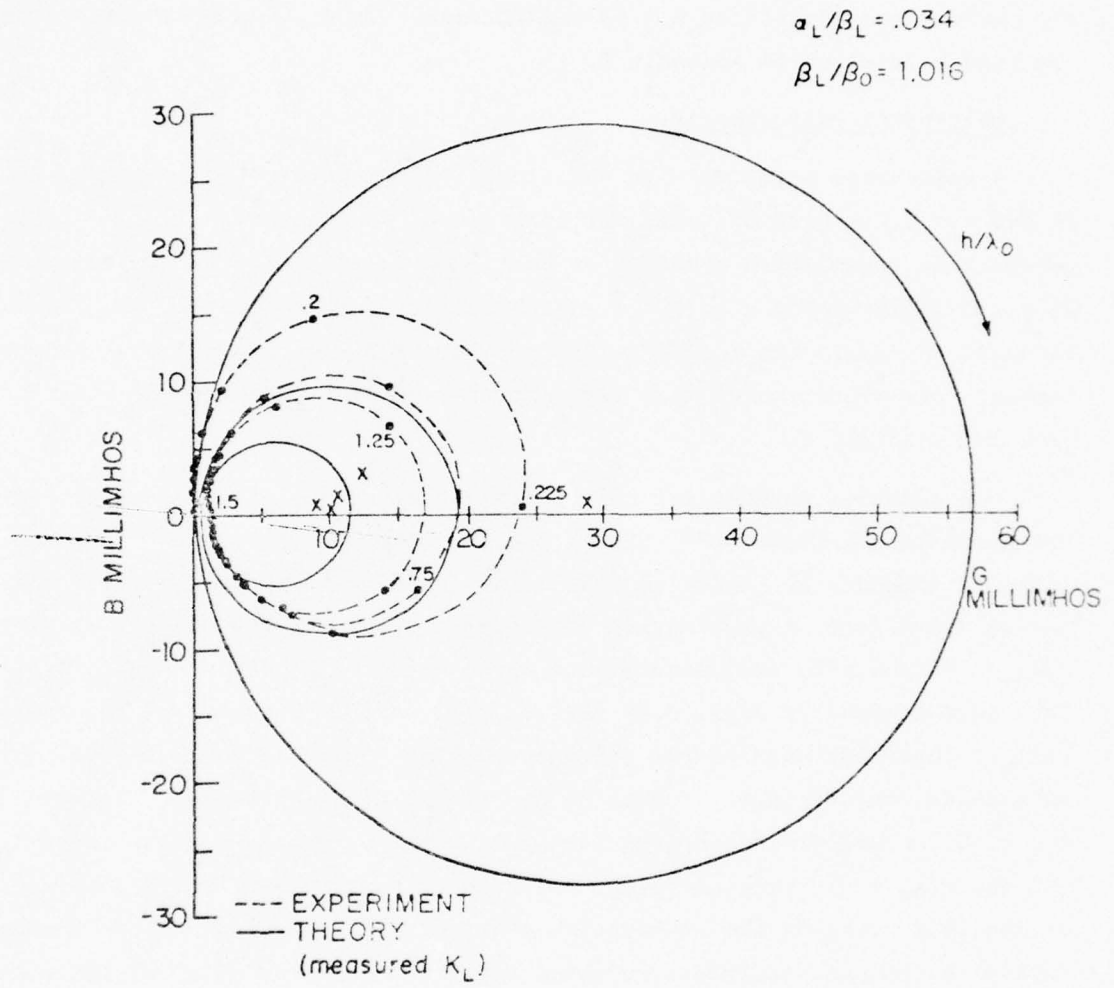


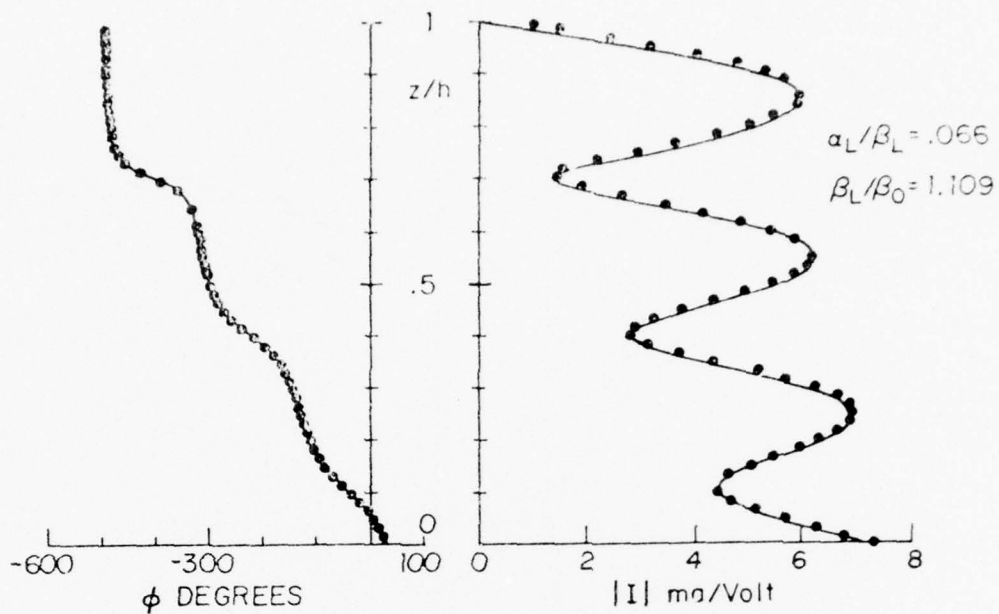
FIG. 3.29 INPUT ADMITTANCE CIRCLE DIAGRAM OF MONOPOLE OVER FRESH WATER USING MEASURED K_L , $d/\lambda_0 = .25$ AND $a/\lambda_0 = .0015$

effective wave numbers. In the $d/\lambda_0 = .05$ and $d/\lambda_0 = .1$ cases, the agreement is good for a zeroth-order theory except in the region of the first resonance. At $d/\lambda_0 = .25$, where the validity of the transmission-line behavior becomes questionable, the agreement is not very good. This suggests that at this height the departure from the simple zeroth-order theory for the current and admittance may be significant. Tabulation of the measured admittance is given in Appendix B.

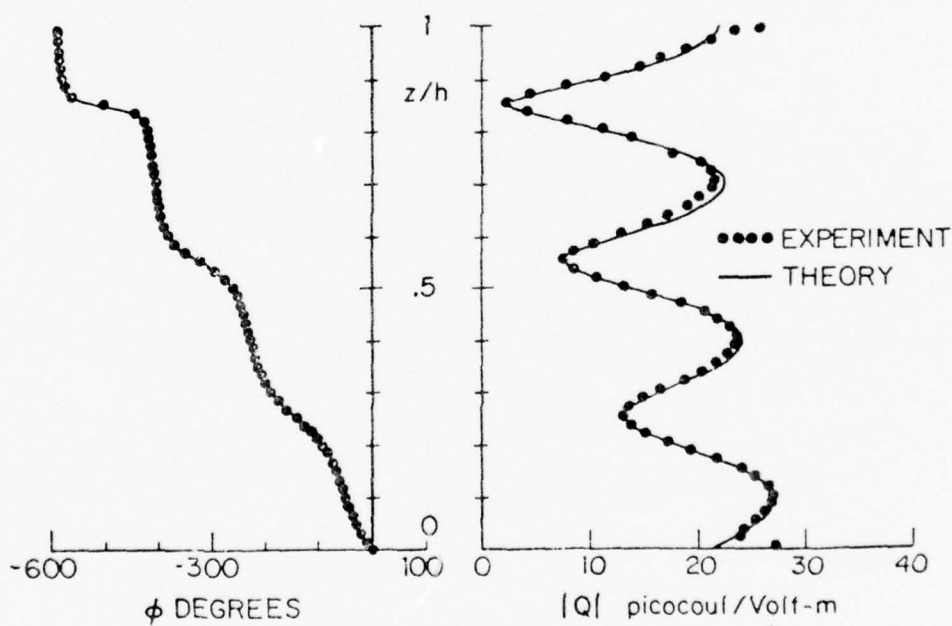
Salt-Water Measurements

A salt-water solution with the electrical properties described by $\epsilon_r = 81$ and $\sigma = 3.9$ mhos/m was used for this set of measurements. This solution corresponds to solution number 3 in Section 2.5. The electrical properties were initially measured at 19° C and then later rechecked at 22° C. No noticeable change in the conductivity or relative dielectric constant was observed. All measurements were made with the water temperature in the range from 19° C to 22° C.

The measured current and charge distributions for the salt-water case are presented in Figs. 3.30 through 3.46. Tables of the measured data are given in Appendix B. A set of conclusions similar to those for fresh water can be drawn from an examination of the data. For the two closest spacings, $d/\lambda_0 = .01$ and $.02$, the measurements agree quite well with King's theory. This is evidenced in Figs. 3.30 through 3.35. It is interesting to observe that at these two heights the line attenuation is significantly higher for an antenna over fresh water than it is for one over salt water. Figs. 3.36 and 3.40 compare King's theory with the experimental measurements for $d/\lambda_0 = .05$ and $d/\lambda_0 = .1$, respectively. For both of these cases, variations greater than 20% arise in the attenuation constant. A comparison of the measured data with the semi-empirical solution using the measured value of the effective wave number k_L is presented in Figs. 3.37 through 3.39 and Figs. 3.41 through 3.43. As in the fresh-water case, it is evident that the sinusoidal form for the current and charge still holds and that the agreement is quite good when the measured effective wave number is used. For $d/\lambda_0 = .25$, shown in Figs. 3.44 through 3.46, the departure from sinusoidal theory becomes more evident with the greatest variation appearing at the driving point. For an approximate representation of the current and charge distributions, the semi-empirical solution may be quite acceptable.

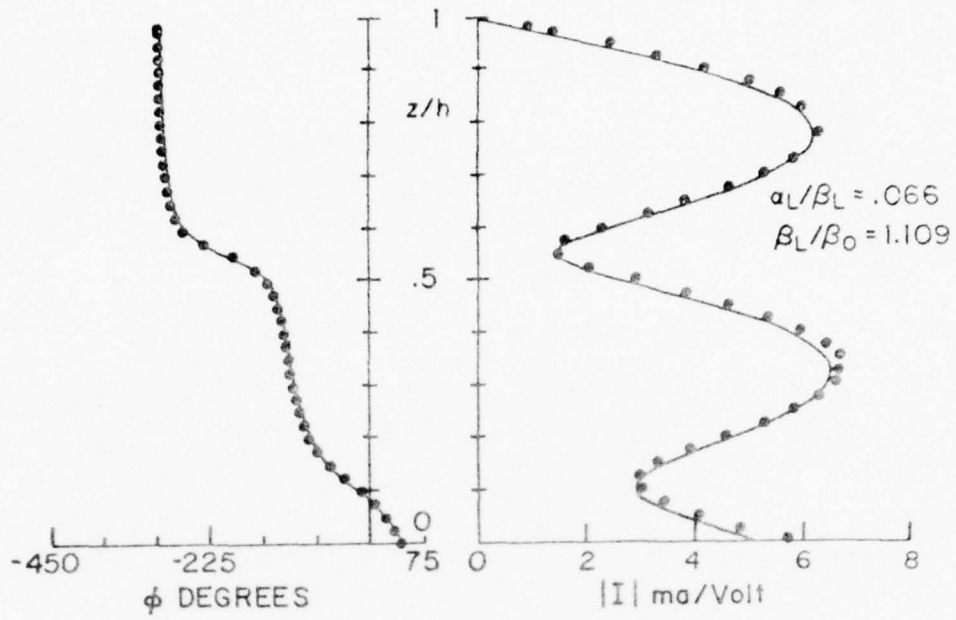


a) CURRENT DISTRIBUTION

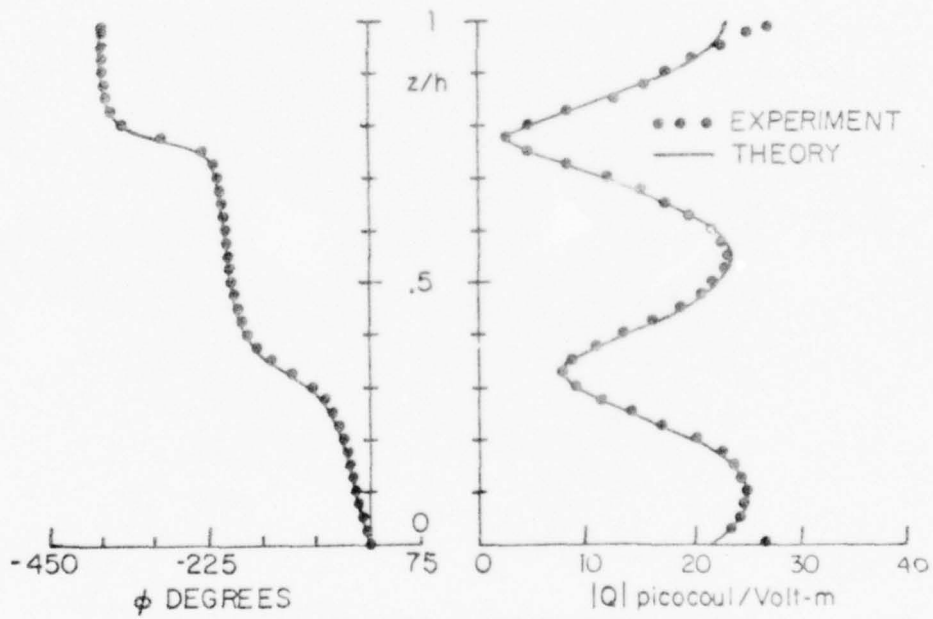


b) CHARGE DISTRIBUTION

FIG.3.30. CURRENT AND CHARGE DISTRIBUTION ON MONOPOLE OVER SALT WATER; $h/\lambda_0 = 1.5$ AND $d/\lambda_0 = .01$.



a) CURRENT DISTRIBUTION



b) CHARGE DISTRIBUTION

FIG.3.31. CURRENT AND CHARGE DISTRIBUTION ON MONOPOLE OVER SALT WATER; $h/\lambda_0 = 1$ AND $d/\lambda_0 = .01$.

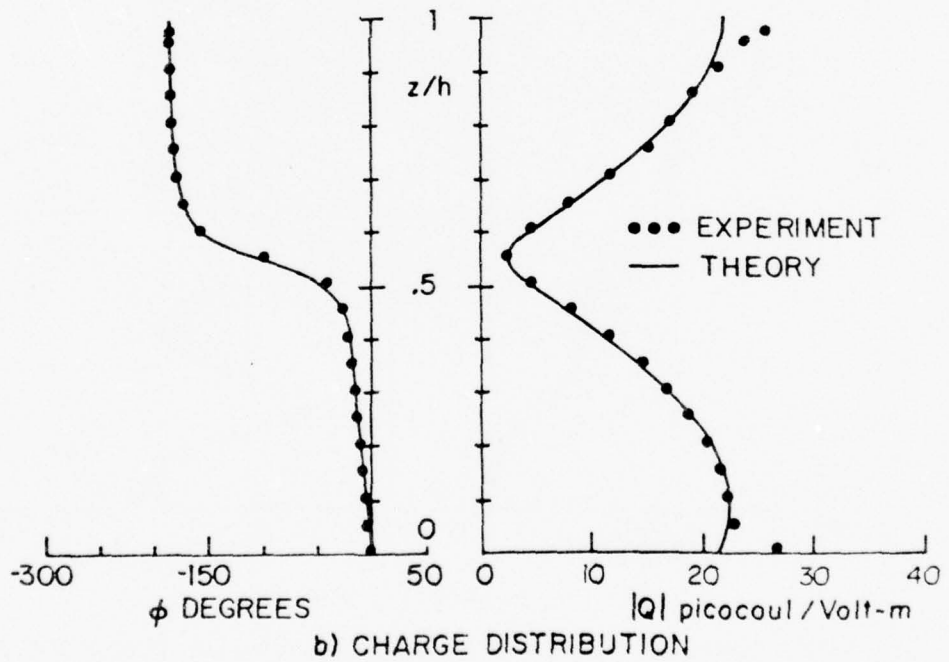
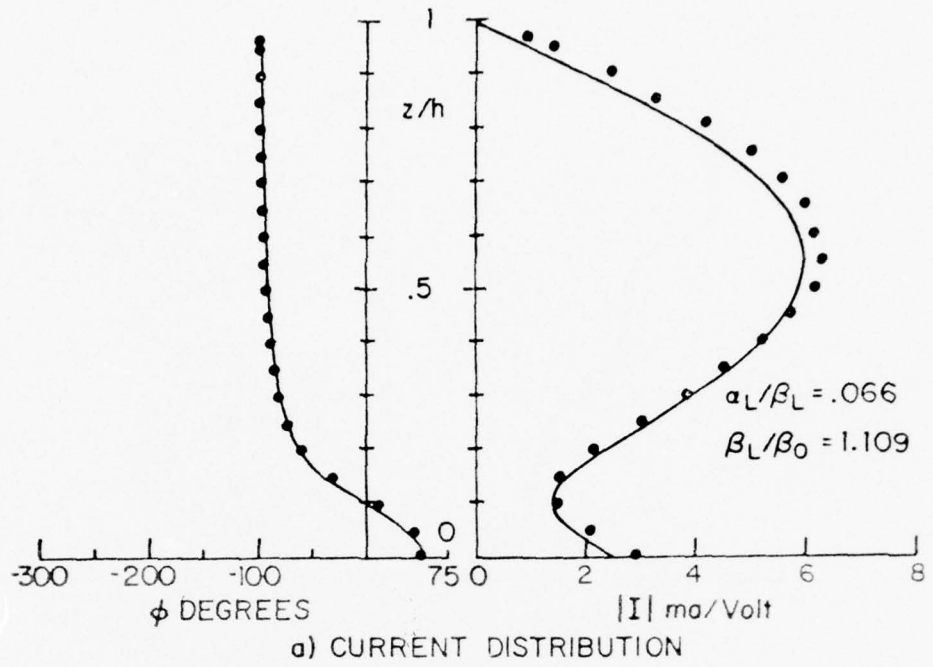
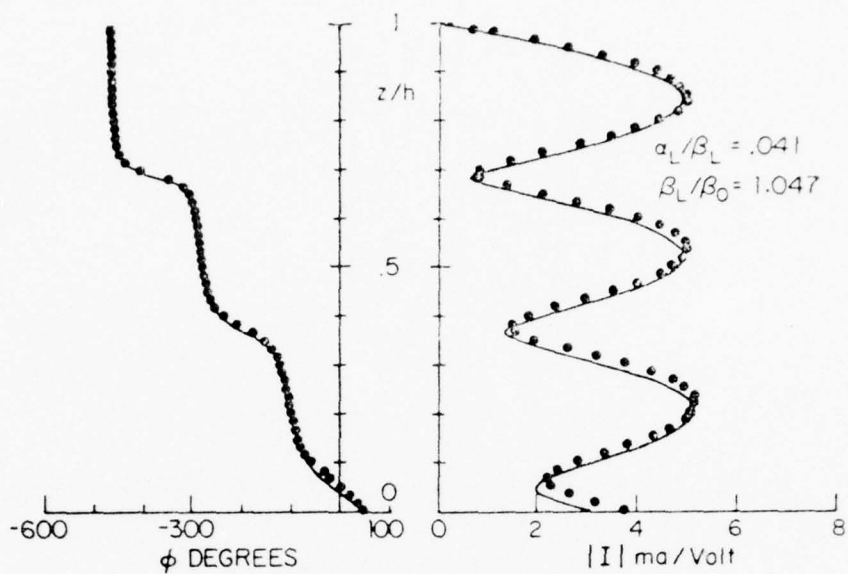
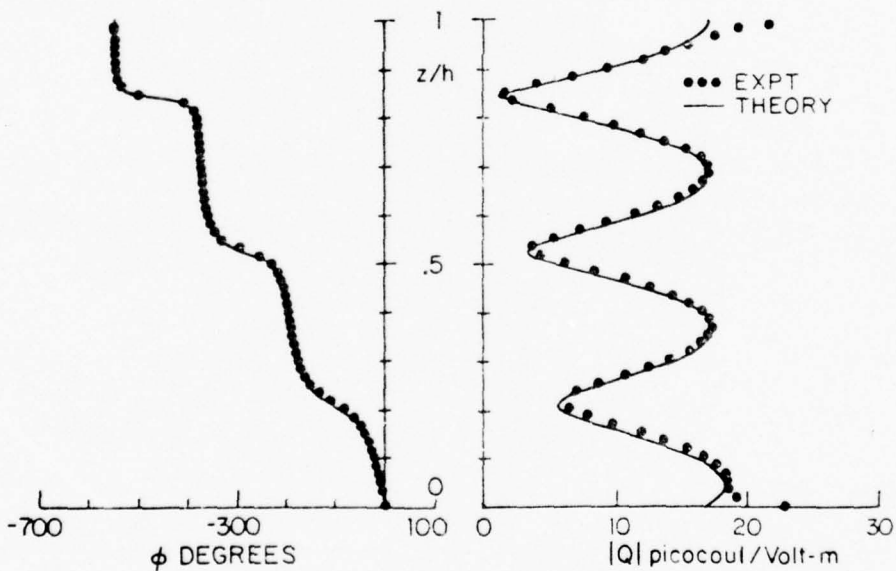


FIG.3.32. CURRENT AND CHARGE DISTRIBUTION ON MONOPOLE OVER SALT WATER; $h/\lambda_0 = .5$ AND $d/\lambda_0 = .01$.

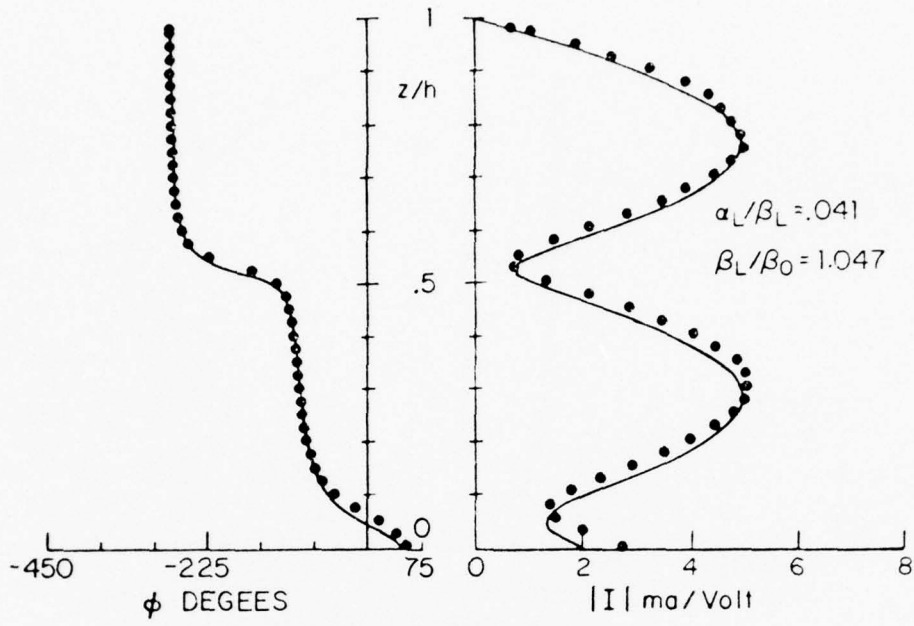


a) CURRENT DISTRIBUTION

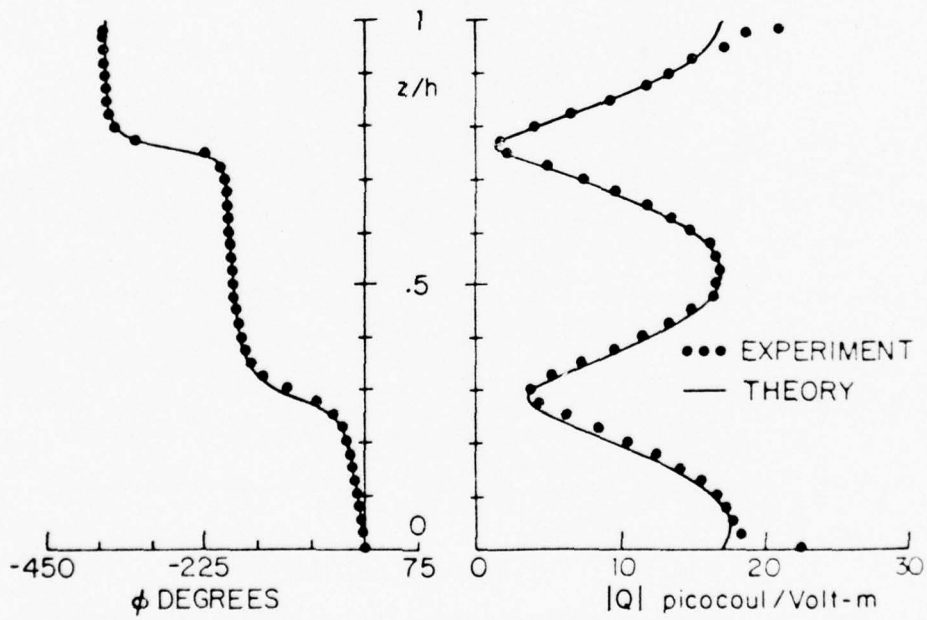


b) CHARGE DISTRIBUTION

FIG. 3.33. CURRENT AND CHARGE DISTRIBUTION ON MONOPOLE OVER SALT WATER; $h/\lambda_0 = 1.5$ AND $d/\lambda_0 = .02$.



a) CURRENT DISTRIBUTION



b) CHARGE DISTRIBUTION

FIG. 3.34. CURRENT AND CHARGE DISTRIBUTION ON MONOPOLE OVER SALT WATER; $h/\lambda_0 = 1$ AND $d/\lambda_0 = .02$.

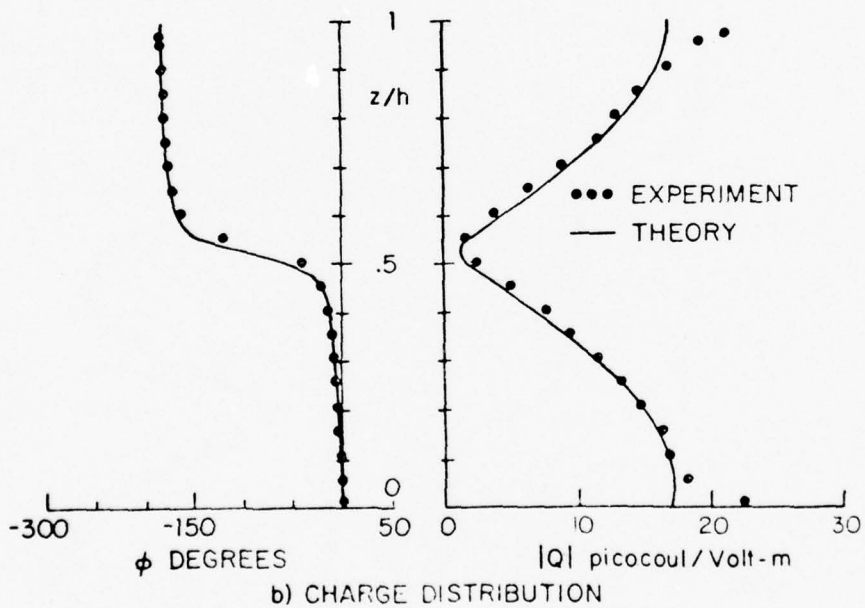
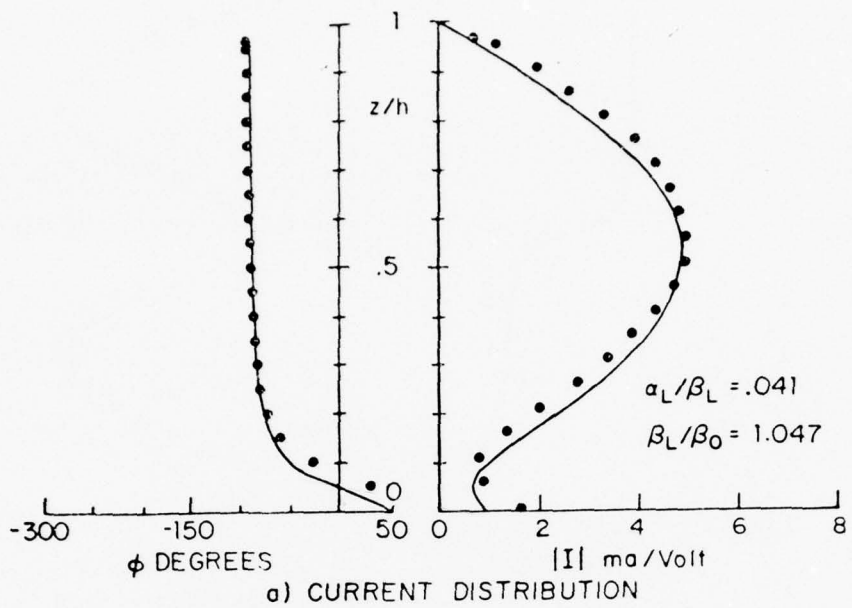
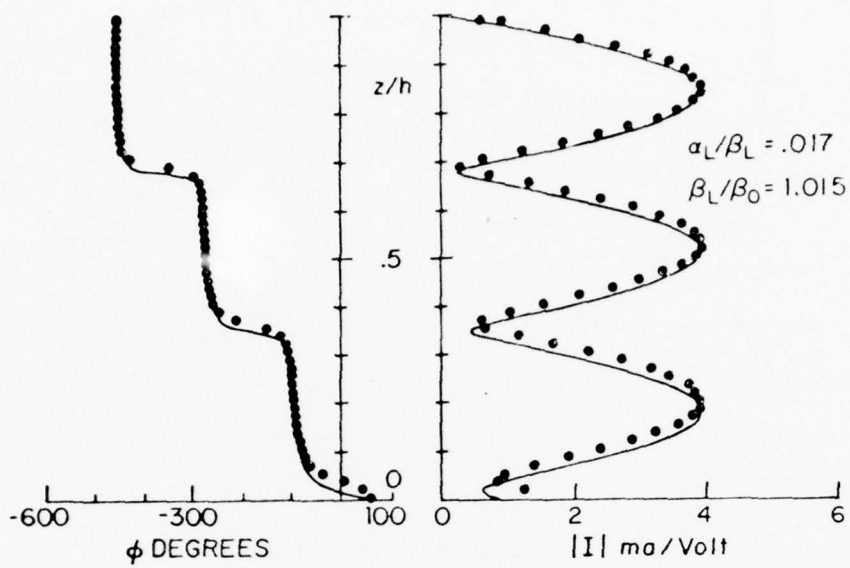
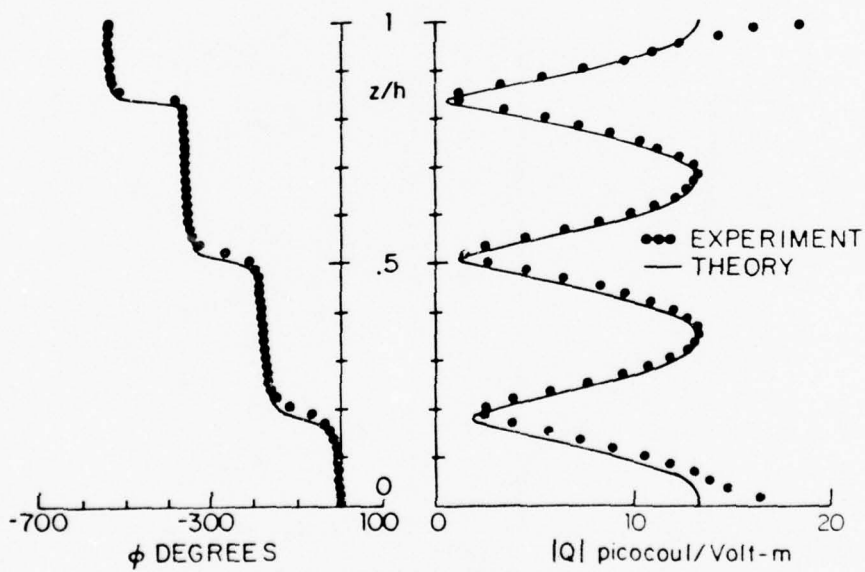


FIG.3.35. CURRENT AND CHARGE DISTRIBUTION ON MONOPOLE OVER SALT WATER; $n/\lambda_0 = .5$ AND $d/\lambda_0 = .02$.



a) CURRENT DISTRIBUTION



b) CHARGE DISTRIBUTION

FIG.3.36 CURRENT AND CHARGE DISTRIBUTION ON MONOPOLE OVER SALT WATER USING THEORETICAL WAVELENGTH; $h/\lambda_0 = 1.5$ AND $d/\lambda_0 = .05$

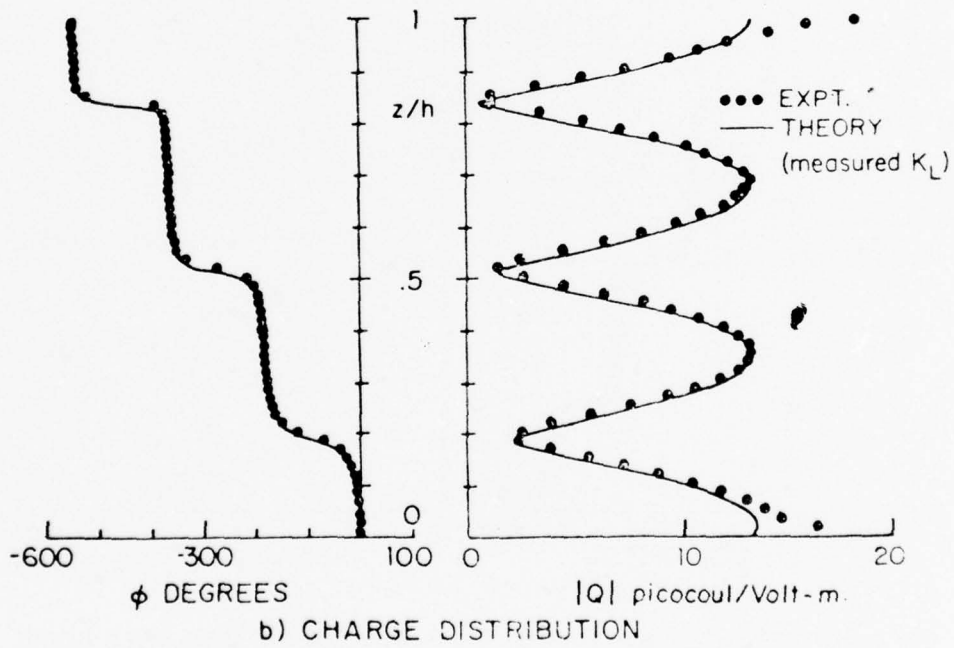
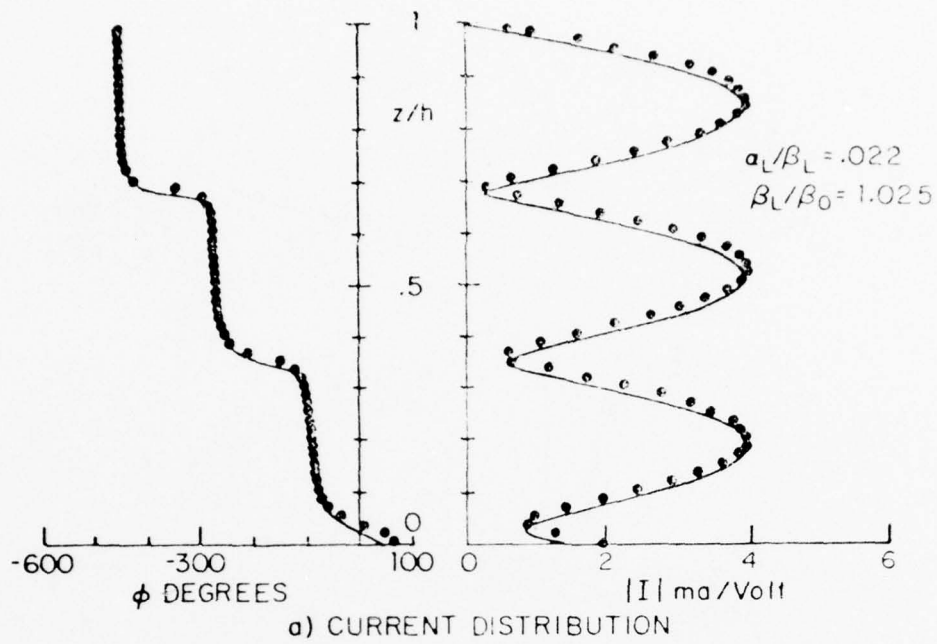


FIG. 3.37. CURRENT AND CHARGE DISTRIBUTION ON MONOPOLE OVER SALT WATER USING MEASURED WAVENUMBER; $h/\lambda_0 = 1.5$ AND $d/\lambda_0 = .05$.

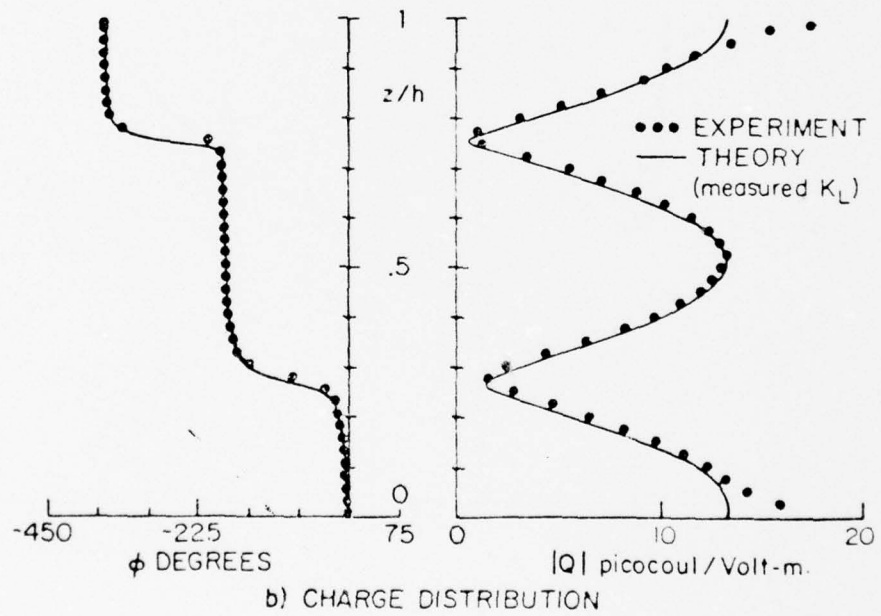
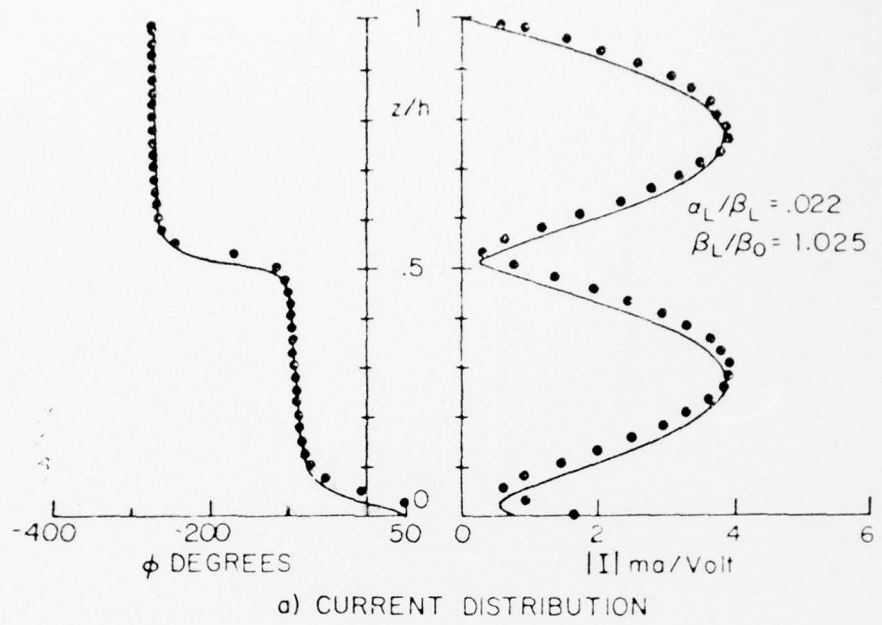
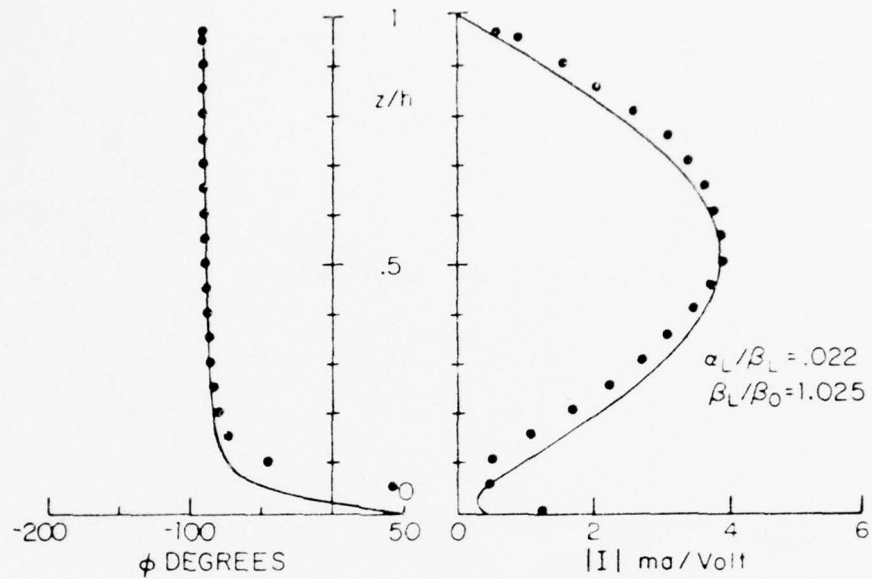
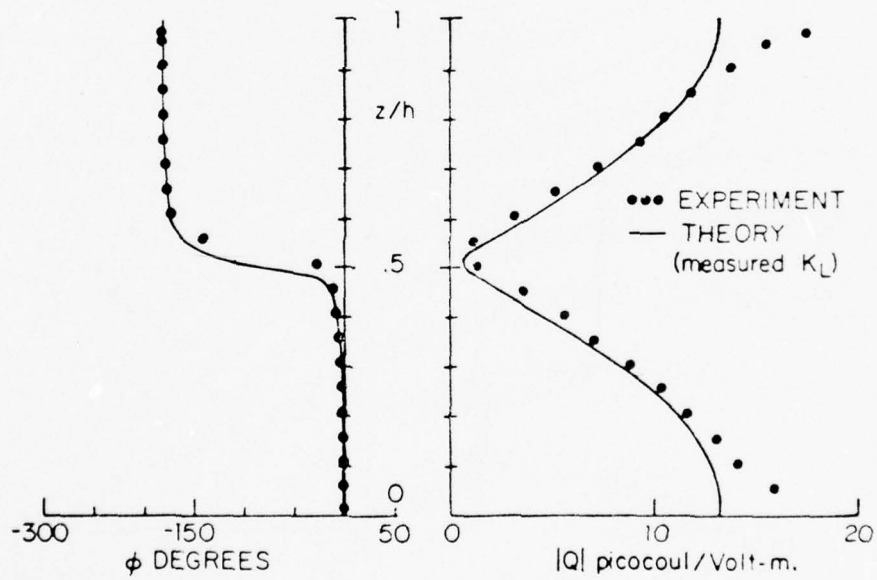


FIG. 3.38 CURRENT AND CHARGE DISTRIBUTION ON MONOPOLE OVER SALT WATER USING MEASURED WAVENUMBER; $h/\lambda_0=1$ AND $d/\lambda_0=.05$

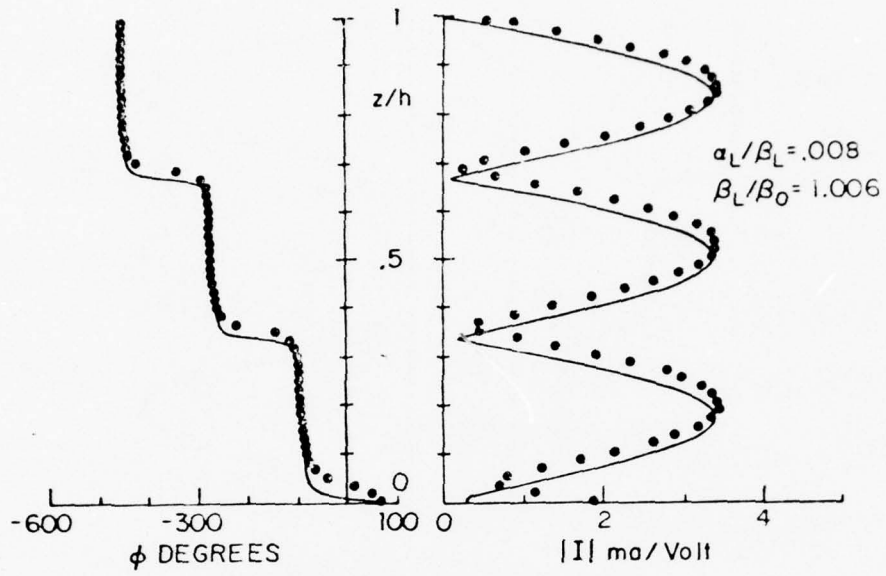


a) CURRENT DISTRIBUTION

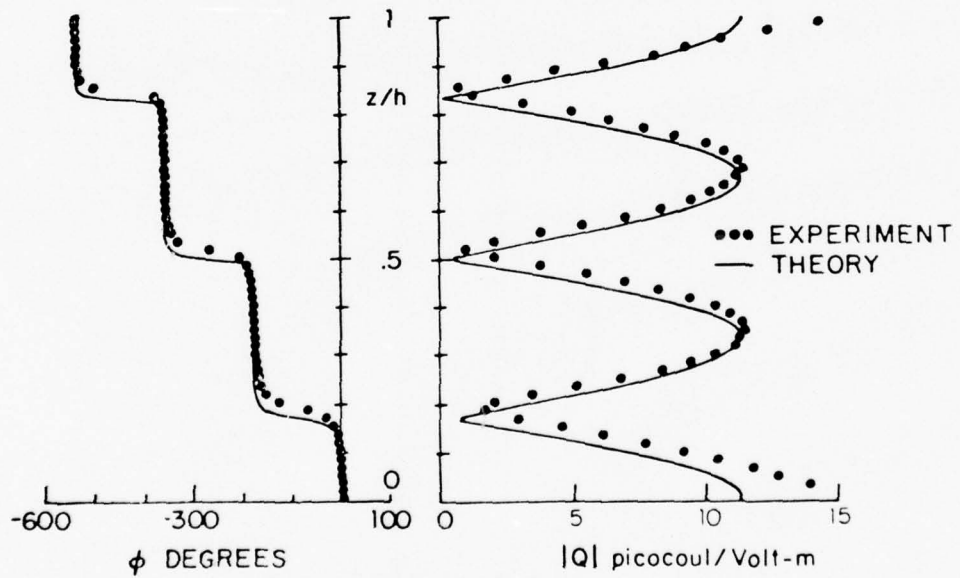


b) CHARGE DISTRIBUTION

FIG.3.39. CURRENT AND CHARGE DISTRIBUTION ON MONOPOLE OVER SALT WATER USING MEASURED WAVENUMBER; $h/\lambda_0 = .5$ AND $d/\lambda_0 = .05$.

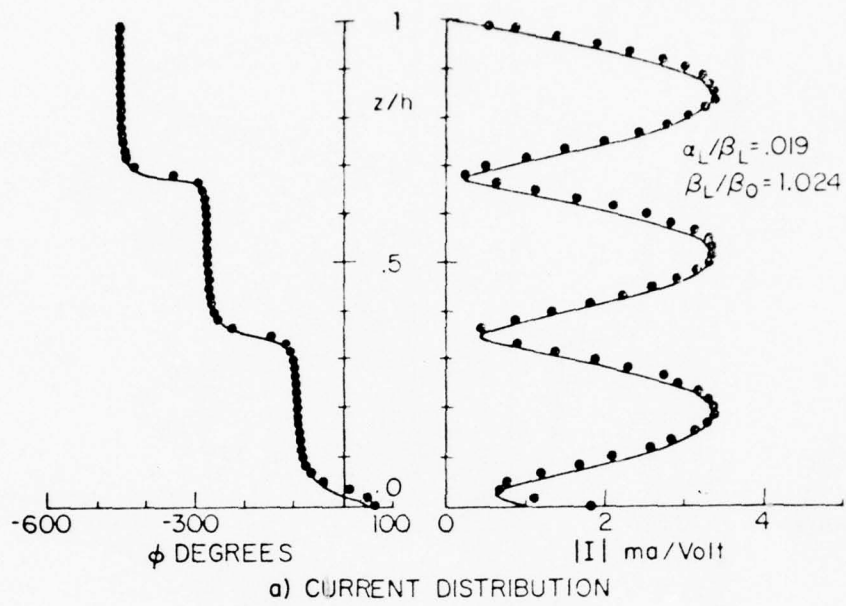


a) CURRENT DISTRIBUTION

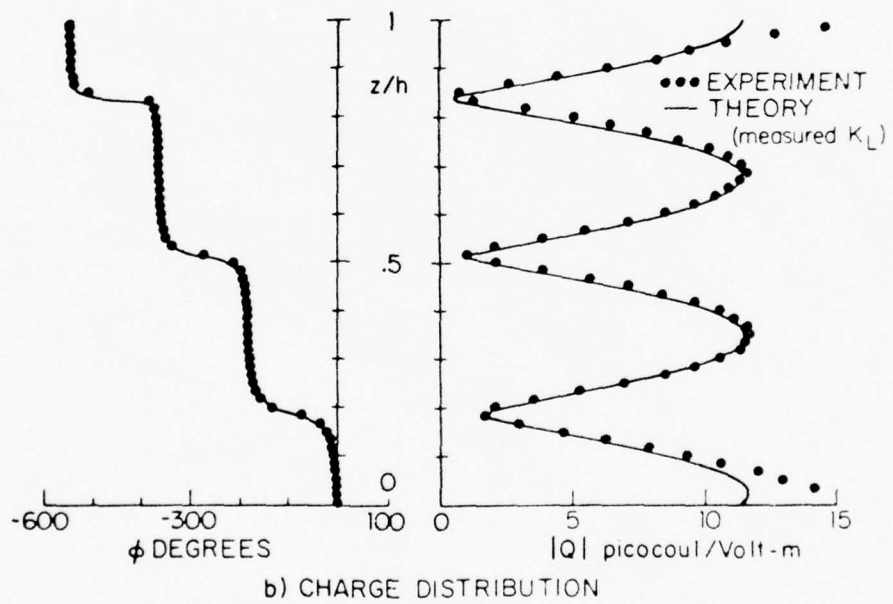


b) CHARGE DISTRIBUTION

FIG. 3.40. CURRENT AND CHARGE DISTRIBUTION ON MONOPOLE OVER SALT WATER USING THEORETICAL WAVENUMBER; $h/\lambda_0 = 1.5$ AND $d/\lambda_0 = .1$.

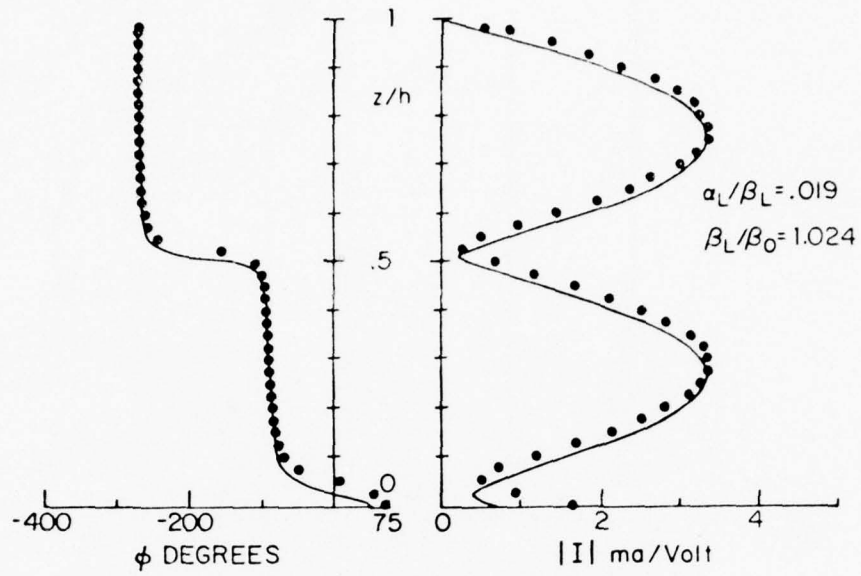


a) CURRENT DISTRIBUTION

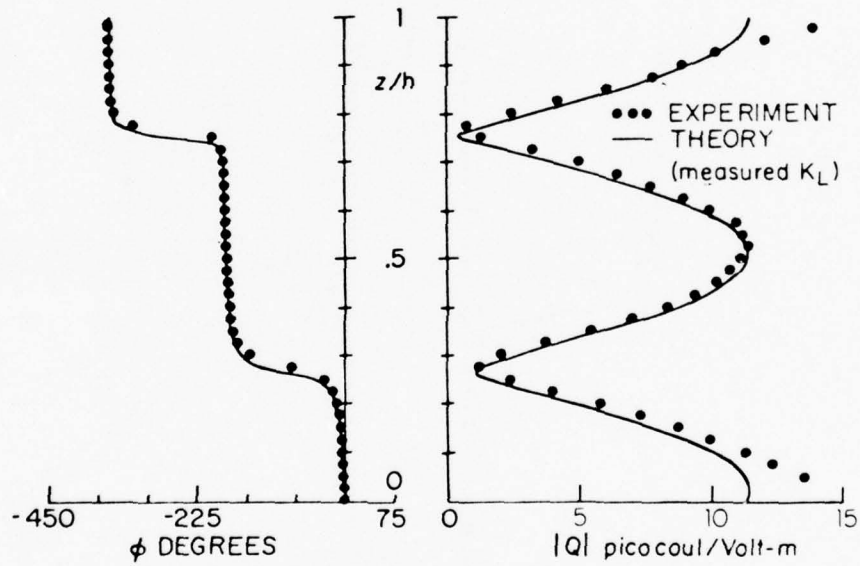


b) CHARGE DISTRIBUTION

FIG.3.41. CURRENT AND CHARGE DISTRIBUTION ON MONOPOLE OVER SALT WATER USING MEASURED WAVENUMBER; $h/\lambda_0 = 1.5$ AND $d/\lambda_0 = .1$.

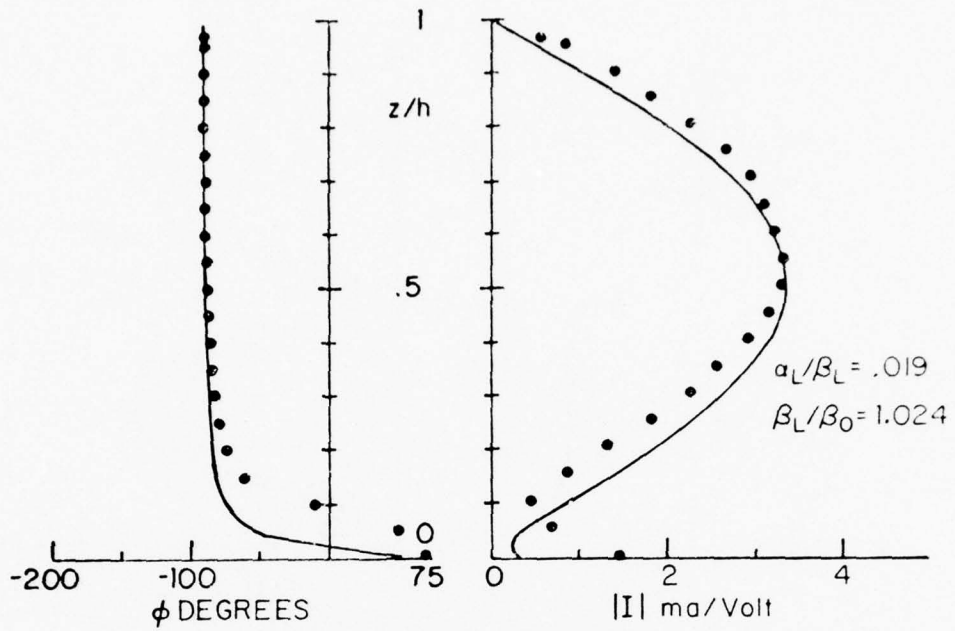


a) CURRENT DISTRIBUTION

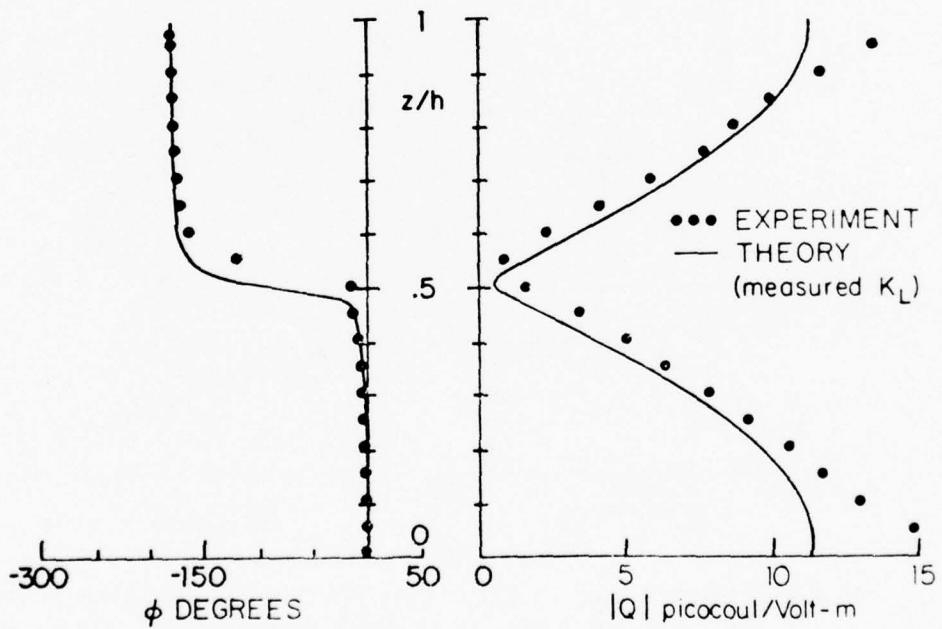


b) CHARGE DISTRIBUTION

FIG. 3.42. CURRENT AND CHARGE DISTRIBUTION ON MONOPOLE OVER SALT WATER USING MEASURED WAVENUMBER; $h/\lambda_0 = 1$ AND $d/\lambda_0 = .1$.

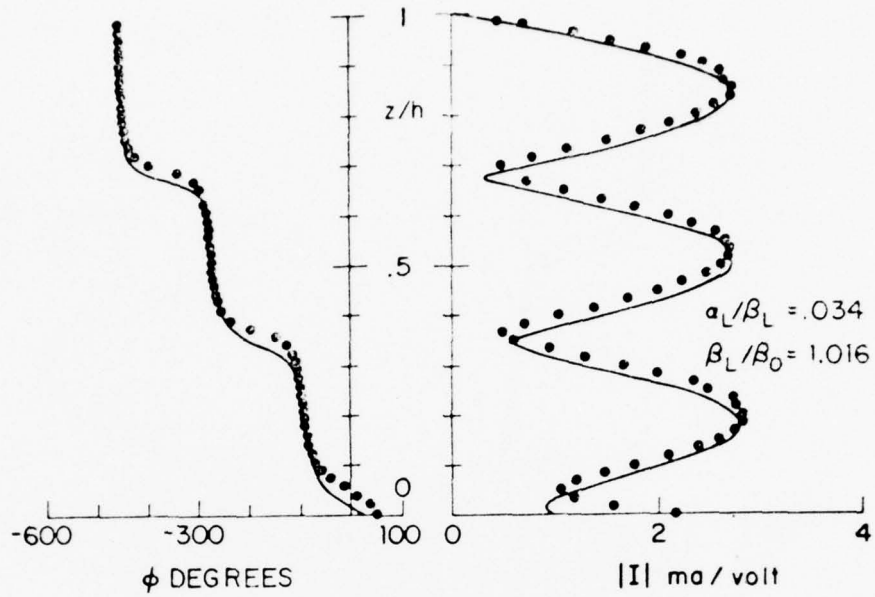


a) CURRENT DISTRIBUTION

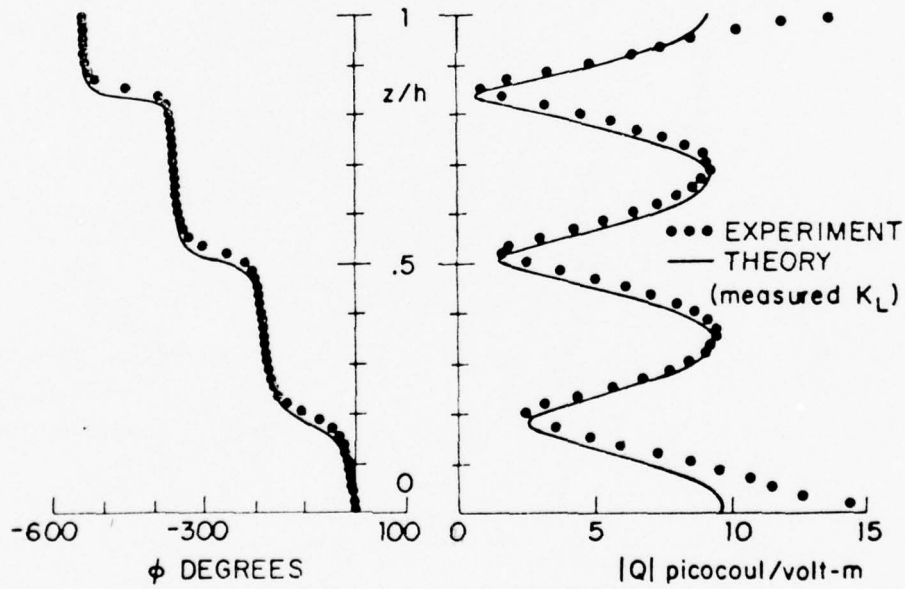


b) CHARGE DISTRIBUTION

FIG.3.43. CURRENT AND CHARGE DISTRIBUTION ON MONOPOLE OVER SALT WATER USING MEASURED WAVENUMBER; $h/\lambda_0 = .5$ AND $d/\lambda_0 = .1$.

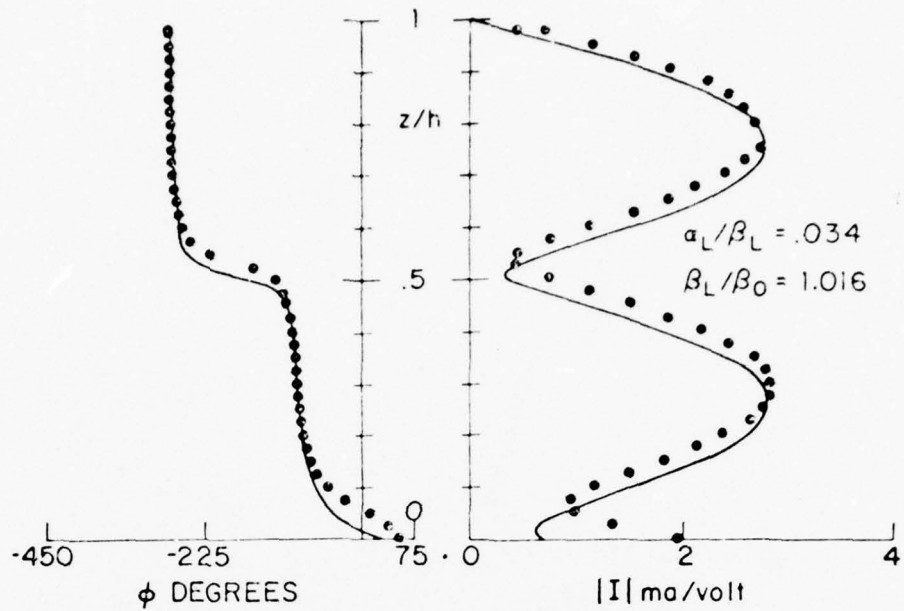


a) CURRENT DISTRIBUTION

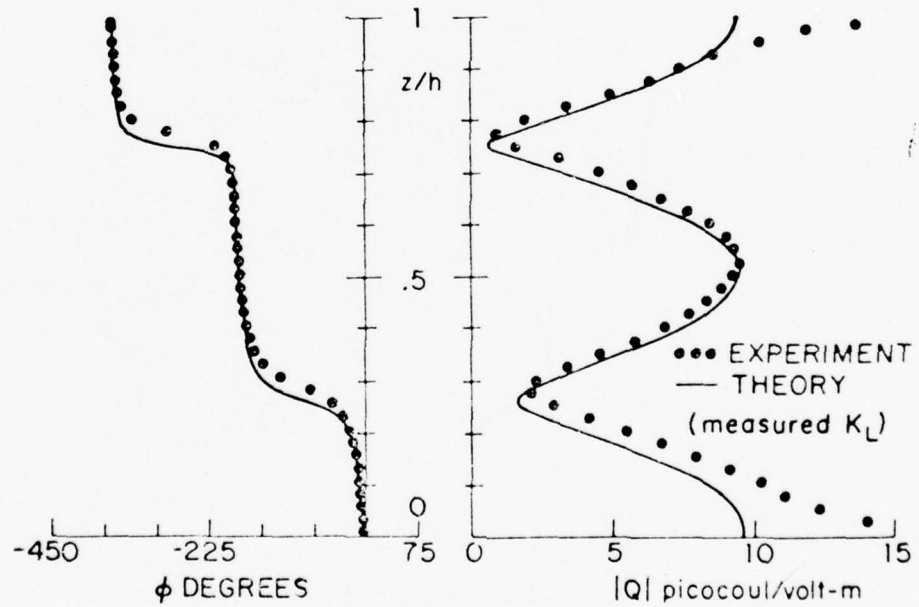


b) CHARGE DISTRIBUTION

FIG.3.44. CURRENT AND CHARGE DISTRIBUTION ON MONOPOLE OVER SALT WATER USING MEASURED WAVE NUMBER; $h/\lambda_0 = 1.5$ AND $d/\lambda_0 = .25$.

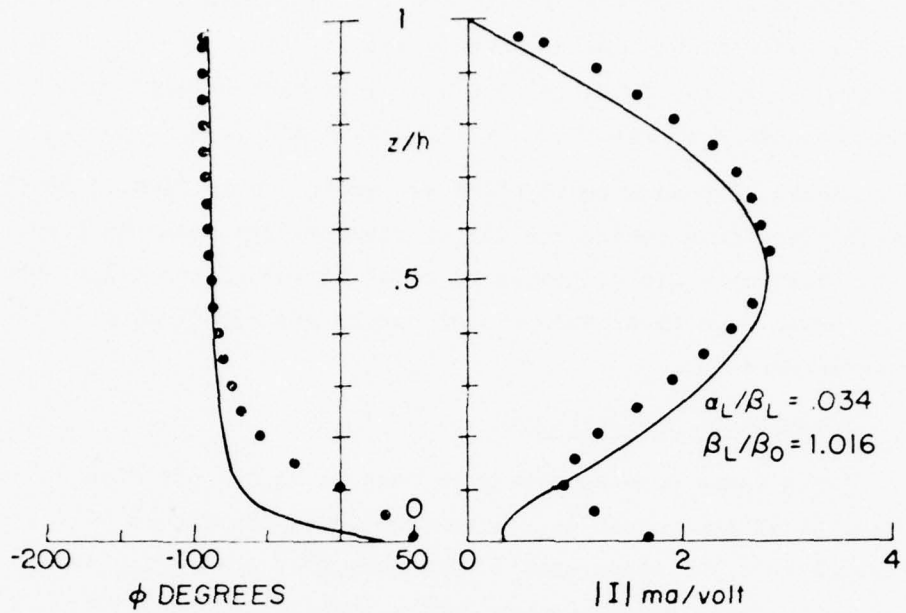


a) CURRENT DISTRIBUTION

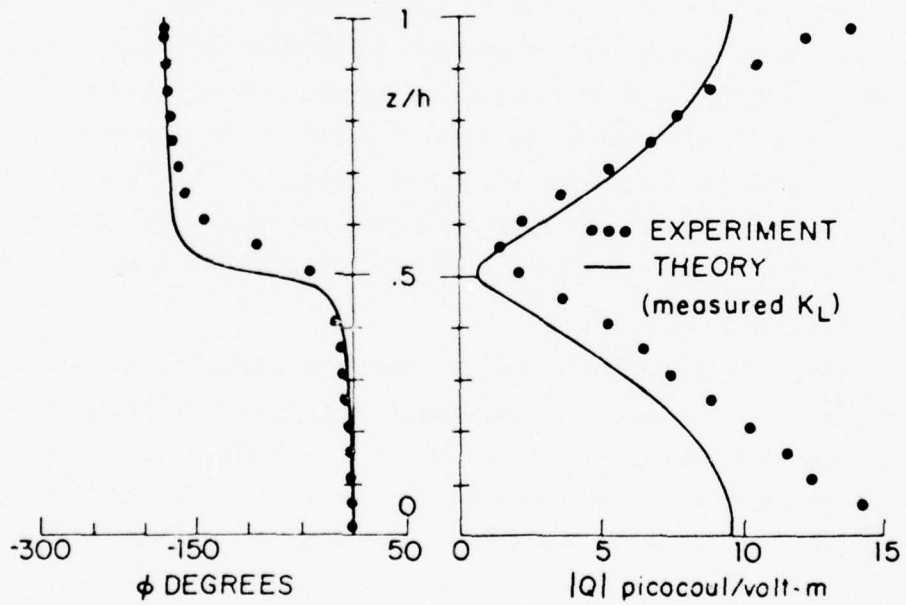


b) CHARGE DISTRIBUTION

FIG. 3.45. CURRENT AND CHARGE DISTRIBUTION ON MONOPOLE OVER SALT WATER USING MEASURED WAVE NUMBER; $h/\lambda_0 = 1$ AND $d/\lambda_0 = .25$.



a) CURRENT DISTRIBUTION



b) CHARGE DISTRIBUTION

FIG. 3.46. CURRENT AND CHARGE DISTRIBUTION ON MONOPOLE OVER SALT WATER USING MEASURED WAVENUMBER; $h/\lambda_0 = .5$ AND $d/\lambda_0 = .25$.

Figure 3.47 compares the theoretical wave numbers on the wire with the measured values obtained from the previous data. At $d/\lambda_0 = .01$ and $.02$, the error in α_L/β_L is within 10% but this variation becomes much larger for greater heights as evidenced by Figs. 3.36 and 3.40.

Rectangular admittance plots are presented in Figs. 3.48 through 3.52; the corresponding admittance circle diagrams are shown in Figs. 3.53 through 3.57. Both sets are displayed in order of increasing d/λ_0 . The conclusions to be drawn from these two sets of curves are identical to those for the fresh-water case.

Moist-Earth Measurements

Since these measurements were made on an outdoor ground plane, the external conditions could not be controlled as completely as in the two previous cases. The measurements were made over a nine-day period in early December. The air temperature during this period ranged from 35° F to 40° F ($\approx 2^\circ - 5^\circ$ C). The earth was a rich moist loamy material which was determined to consist of 20% water by weight. The electrical properties were determined to be $\epsilon_r = 11.5$ and $\sigma = .0022$ mhos/m. Measurements made on earth samples taken three days apart gave comparable results. To prevent the earth's properties from changing drastically over the period during which measurements were taken, the area in front of the ground plane was covered with a large plastic sheet which was covered, in turn, with a pile of leaves. The sheet prevented rain from affecting the electrical properties of the earth, while the leaves were used as insulation to keep the earth from freezing at night.

The measured results for currents and charges are given in Figs. 3.58 through 3.69. Since the theoretical α_L values were found to be much larger than the measured effective α_L values at all heights, all measurements have been compared with the semi-empirical solution which utilizes measured effective wave numbers. The discrepancies in α_L are mainly due to the fact that the restriction, $|k_2| \gg |k_1|$, imposed in King's theory is no longer strictly true for moist earth with $\epsilon_r = 11.5$, although end effects may also play a factor in these discrepancies. Hence, at none of the heights was there acceptable agreement between King's theory and the experimental results. For $d/\lambda_0 = .02, .05, \text{ and } .1$, the sinusoidal nature of the current and charge is obvious and, given the measured wave number, the agreement is

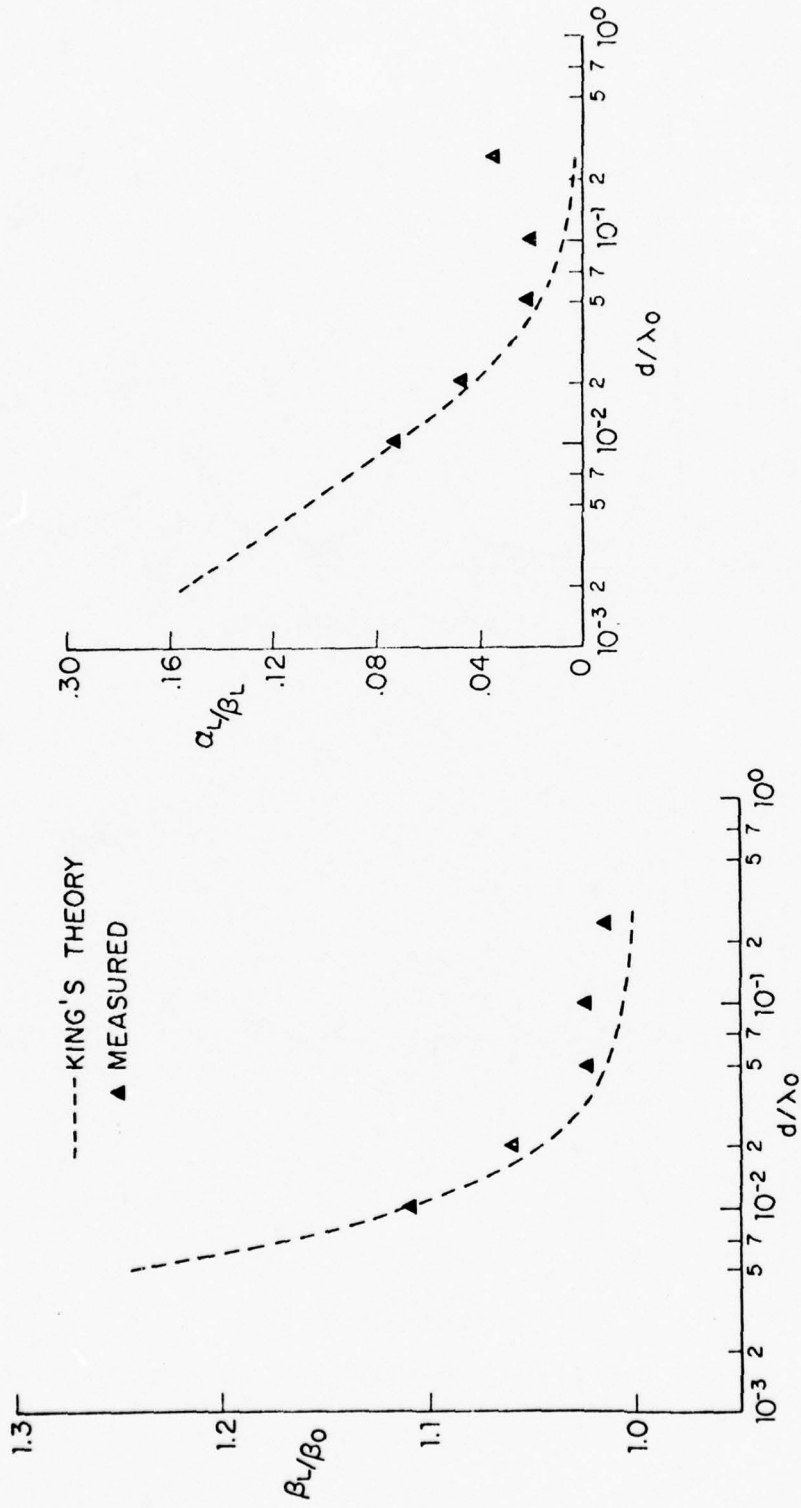


FIG. 3.47. WAVENUMBER ON HORIZONTAL WIRE OVER SALT WATER;
 $\epsilon_r = 81$ AND $Pe = 2.885$

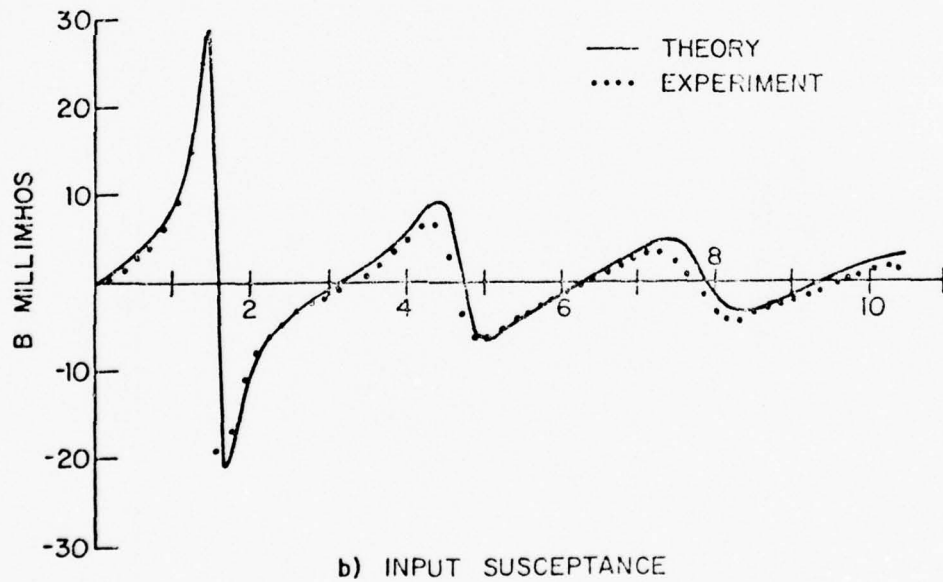
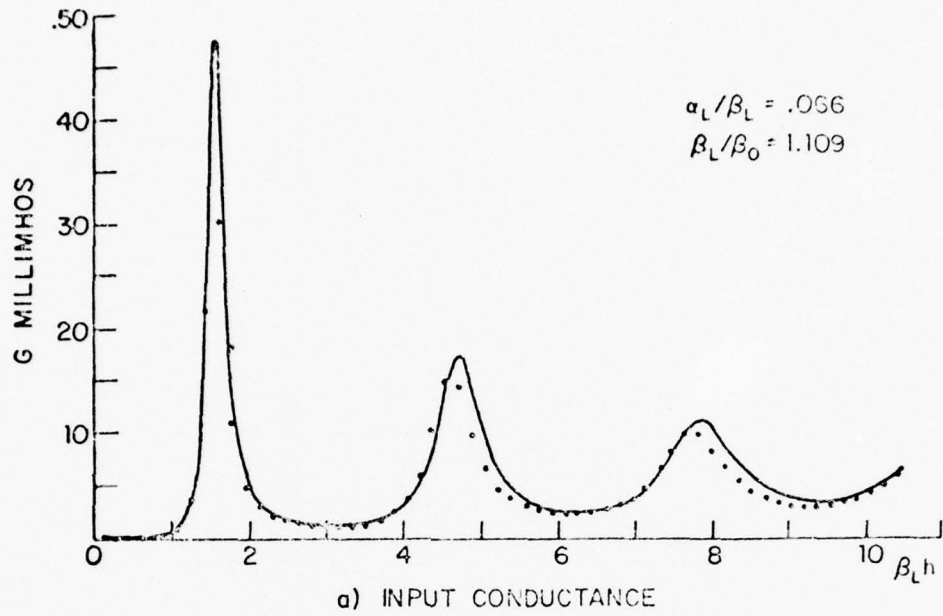
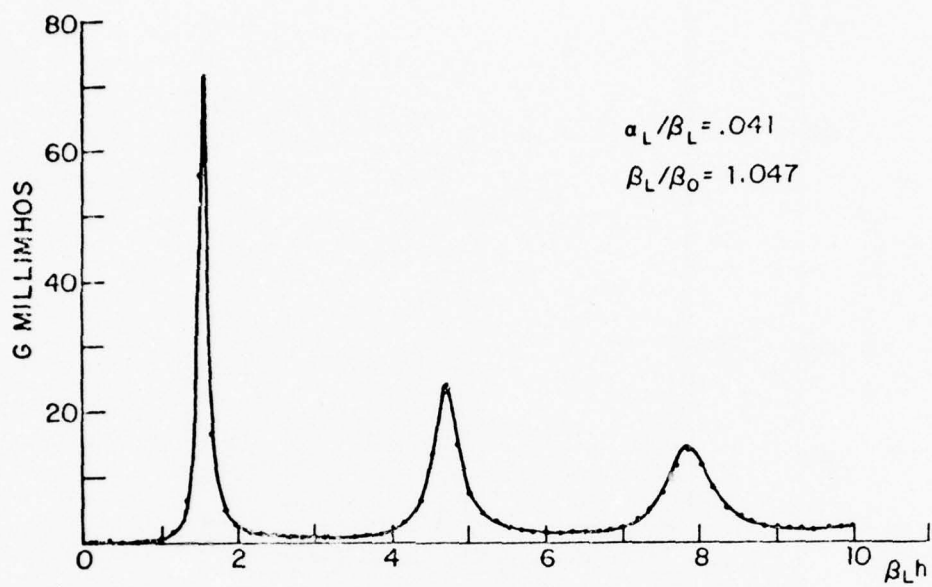
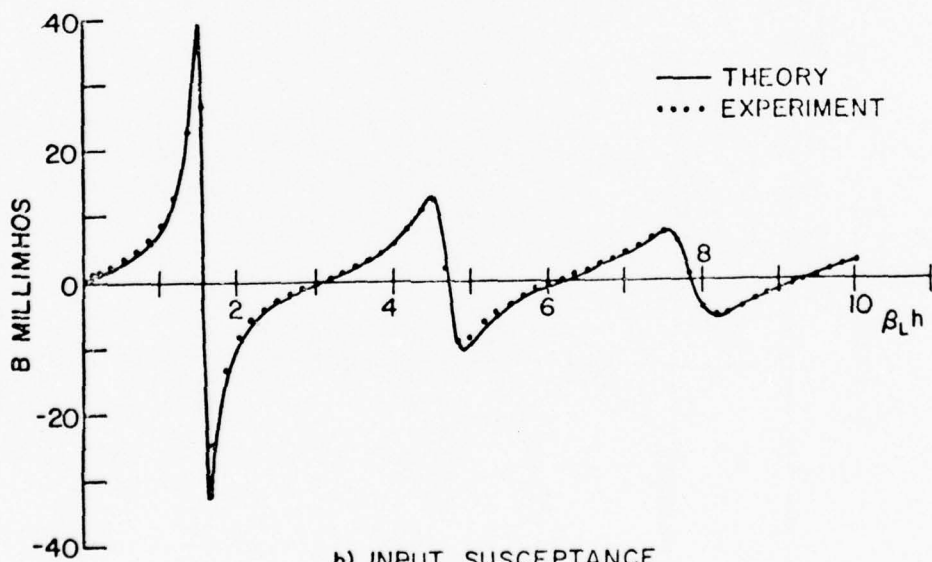


FIG. 3.48. INPUT ADMITTANCE OF MONOPOLE OVER SALT WATER;
 $d/\lambda_0 = .01$ AND $a/\lambda_0 = .0015$.

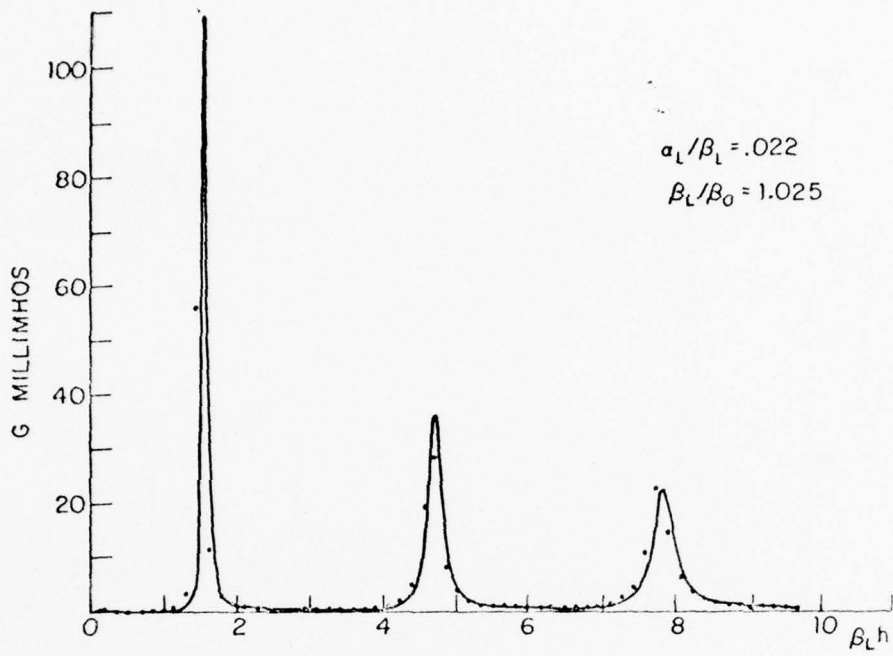


a) INPUT CONDUCTANCE

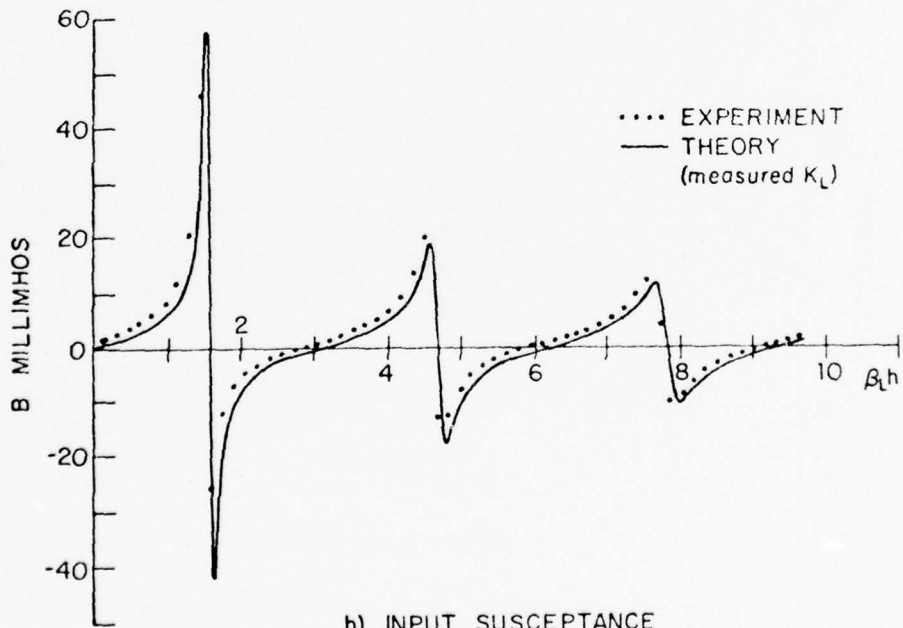


b) INPUT SUSCEPTANCE

FIG. 3.49. INPUT ADMITTANCE OF MONOPOLE OVER SALT WATER;
 $d/\lambda_0 = .02$ AND $a/\lambda_0 = .0015$.



a) INPUT CONDUCTANCE



b) INPUT SUSCEPTANCE

FIG. 3.50. INPUT ADMITTANCE OF MONOPOLE OVER SALT WATER USING MEASURED K_L ; $d/\lambda_0 = .05$ AND $a/\lambda_0 = .0015$.

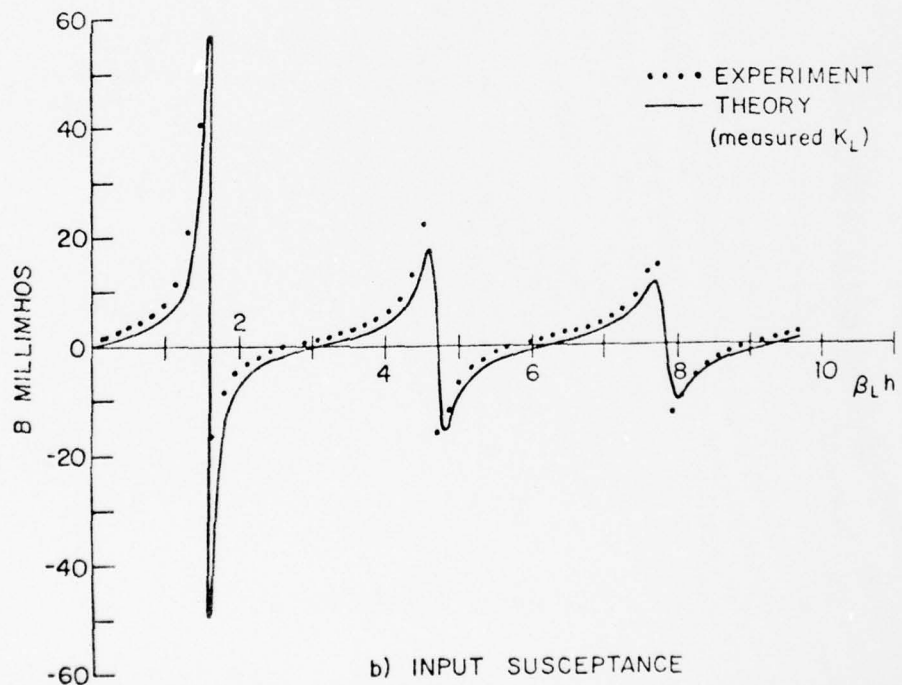
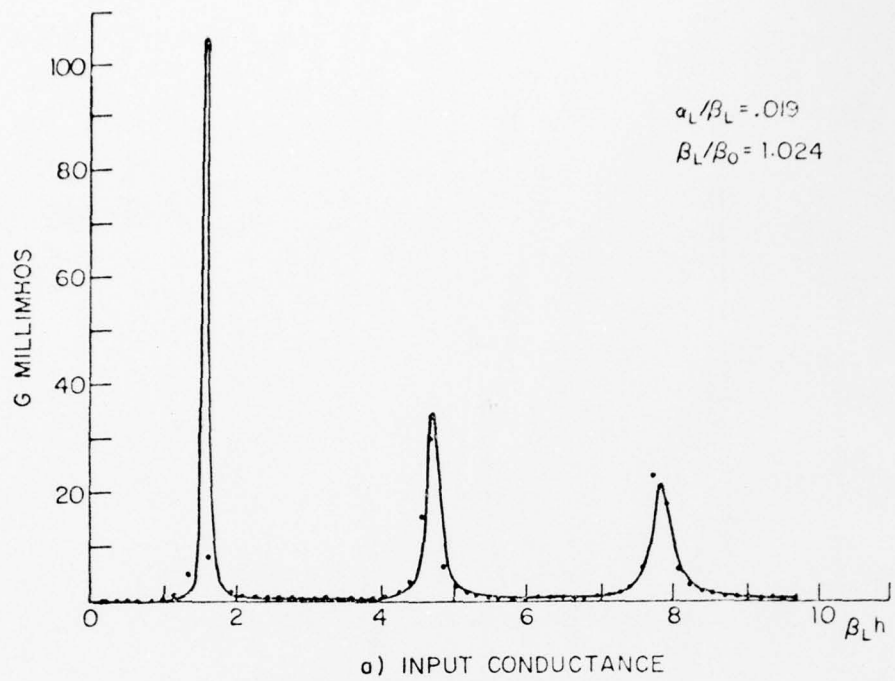


FIG. 3.51. INPUT ADMITTANCE OF MONOPOLE OVER SALT WATER USING MEASURED K_L ; $d/\lambda_0 = .1$ AND $a/\lambda_0 = .0015$.

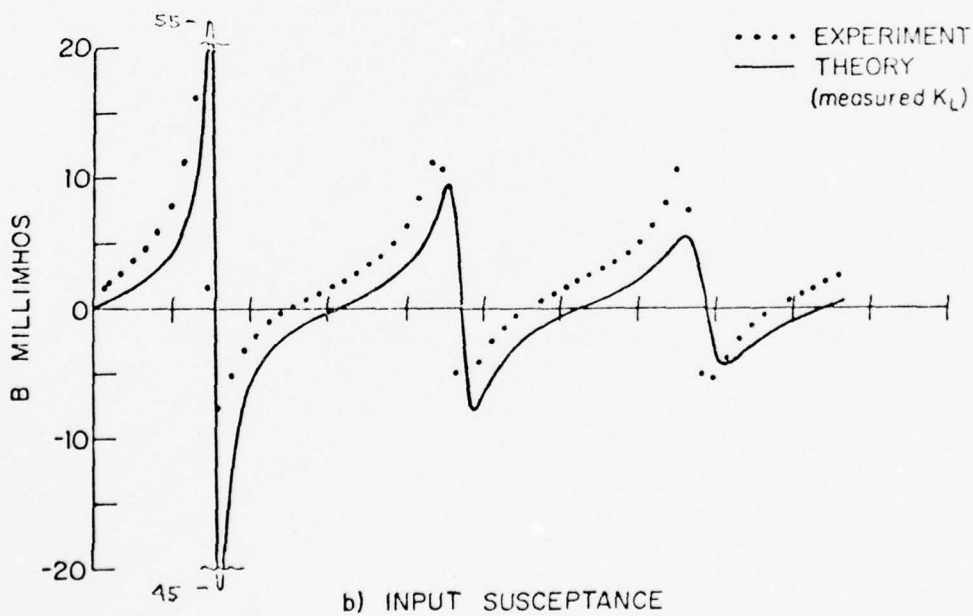
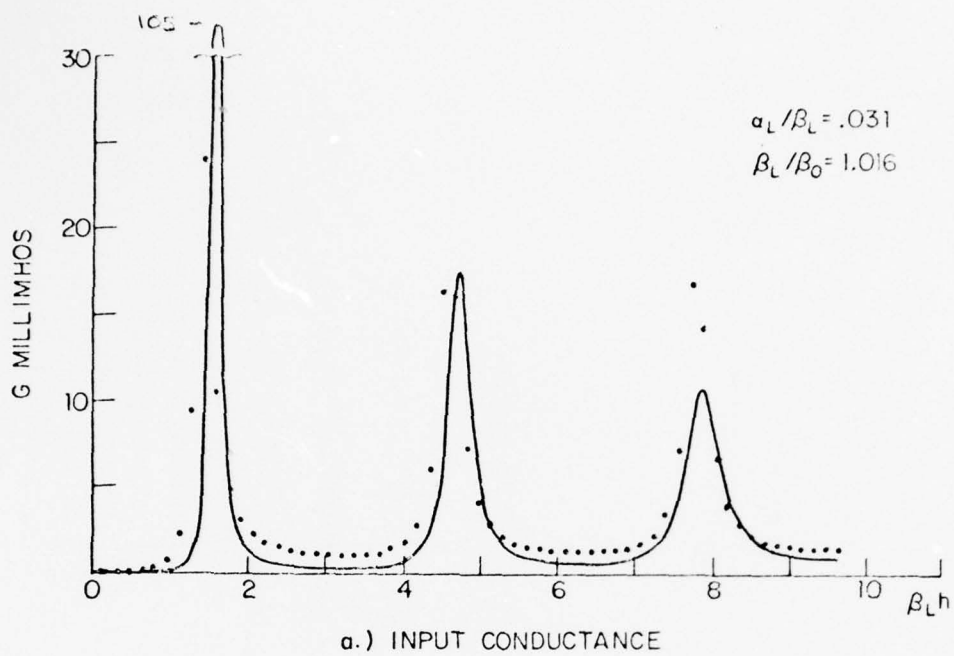


FIG. 3.52. INPUT ADMITTANCE OF MONOPOLE OVER SALT WATER USING MEASURED K_L ; $d/\lambda_0 = .25$ AND $a/\lambda_0 = .0015$.

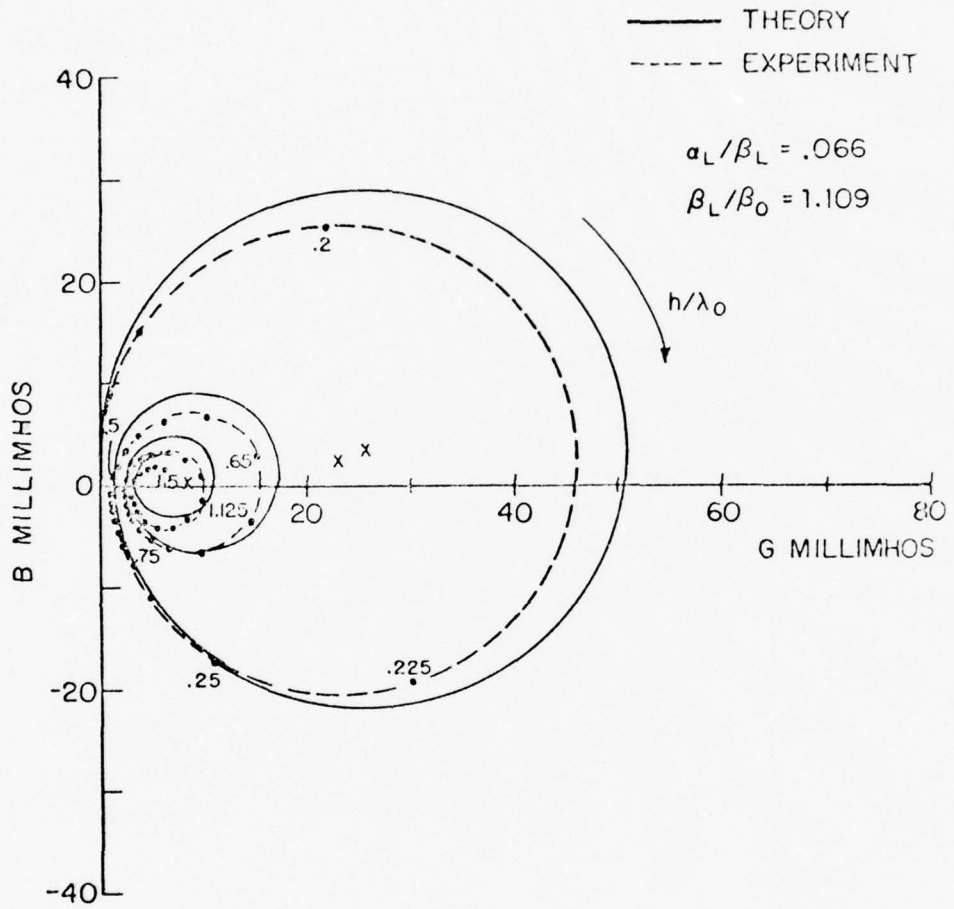


FIG. 3.53. INPUT ADMITTANCE CIRCLE DIAGRAM OF MONOPOLE OVER SALT WATER; $d/\lambda_0 = .01$ AND $\sigma/\lambda_0 = .0015$.

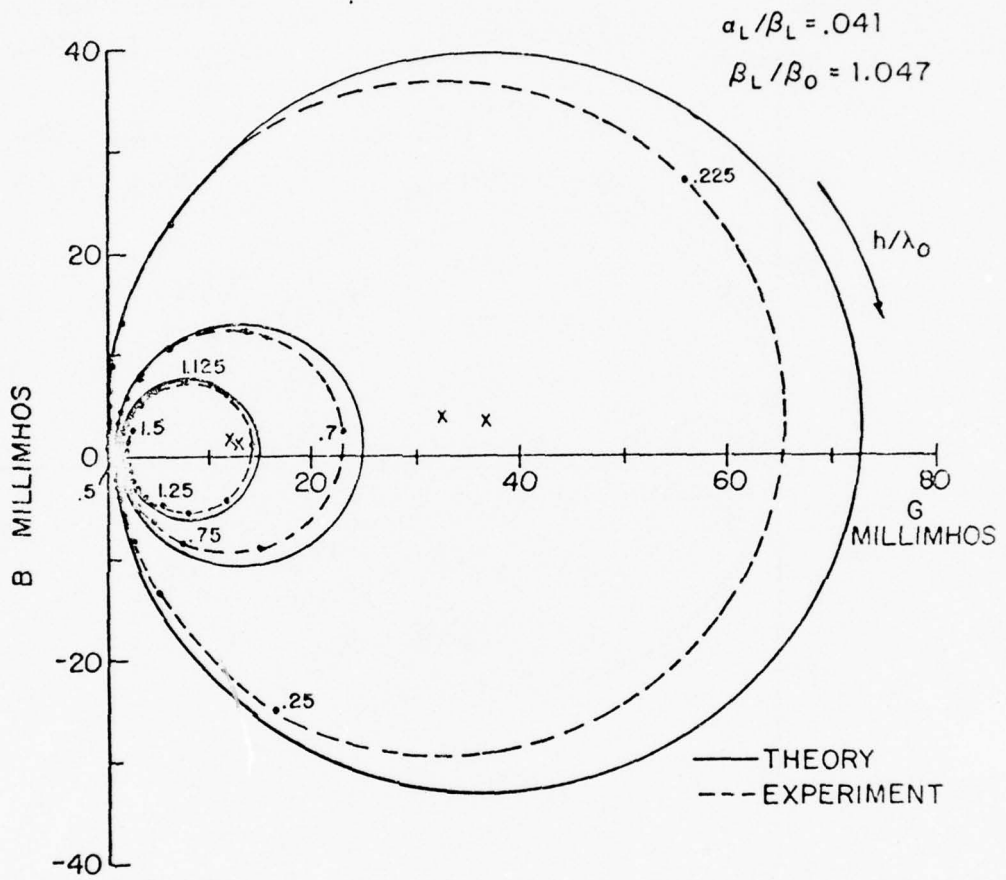


FIG. 3.54. INPUT ADMITTANCE CIRCLE DIAGRAM OF MONOPOLE OVER SALT WATER; $d/\lambda_0 = .02$ AND $a/\lambda_0 = .0015$.

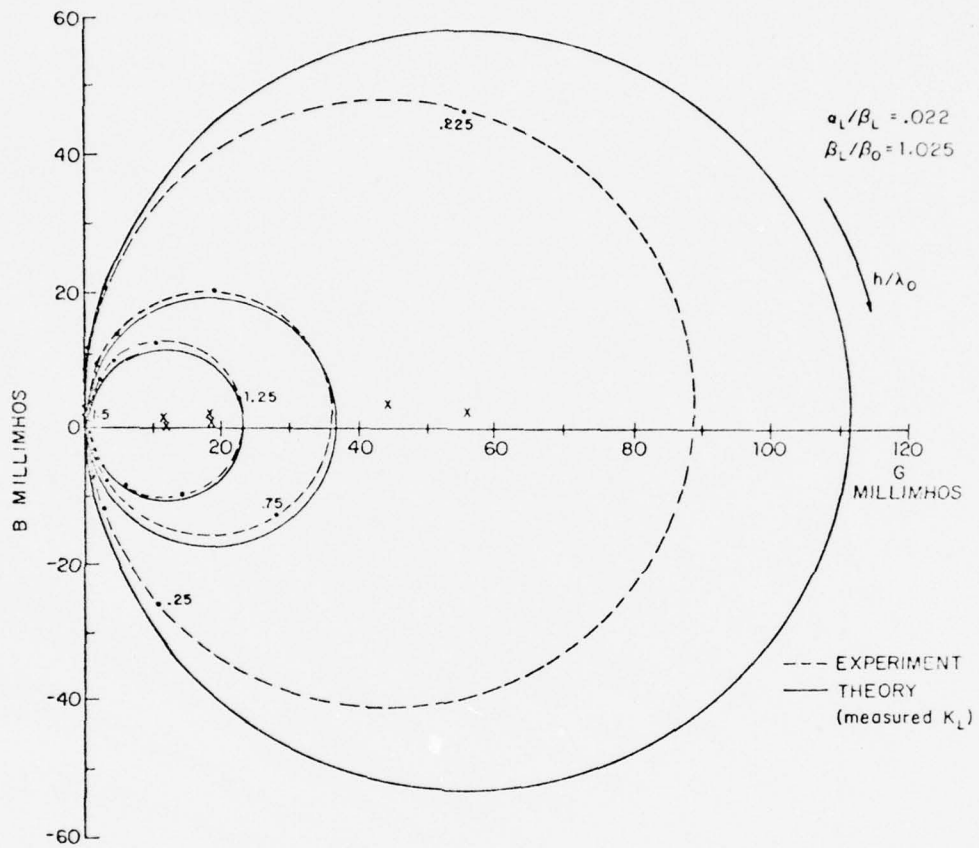


FIG. 3.55. INPUT ADMITTANCE CIRCLE DIAGRAM OF MONOPOLE OVER SALT WATER USING MEASURED K_L ; $d/\lambda_0 = .05$ AND $a/\lambda_0 = .0015$.

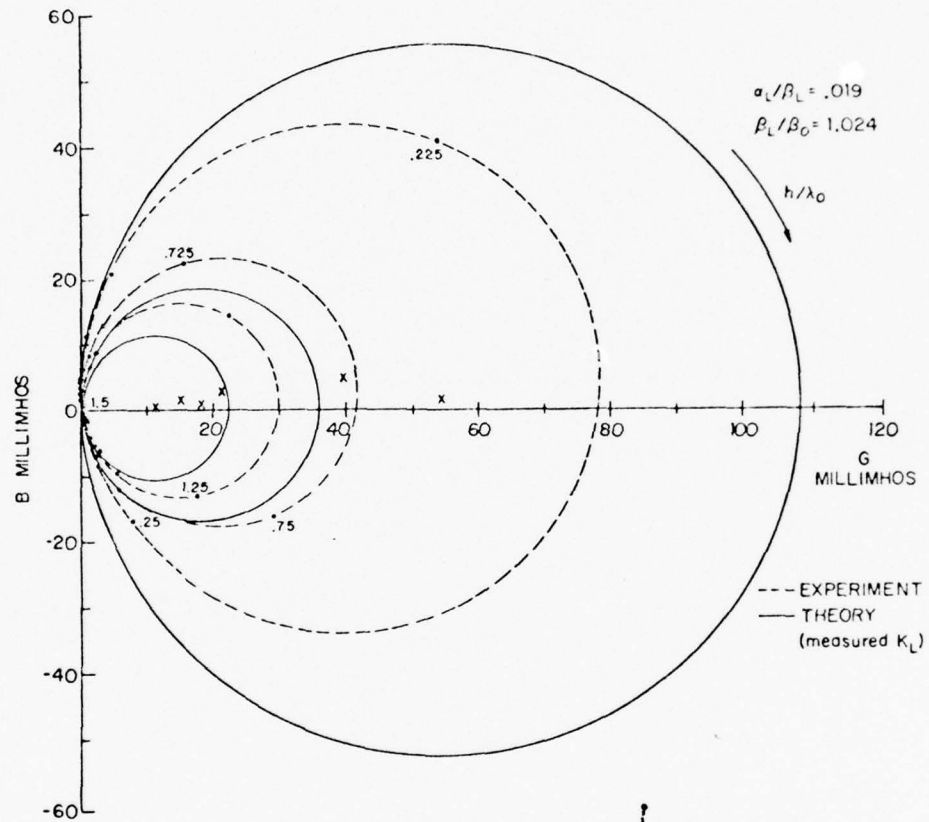


FIG. 3.56.

INPUT ADMITTANCE CIRCLE DIAGRAM OF MONOPOLE OVER SALT WATER
USING MEASURED K_L ; $d/\lambda_0 = .1$ AND $a/\lambda_0 = .0015$.

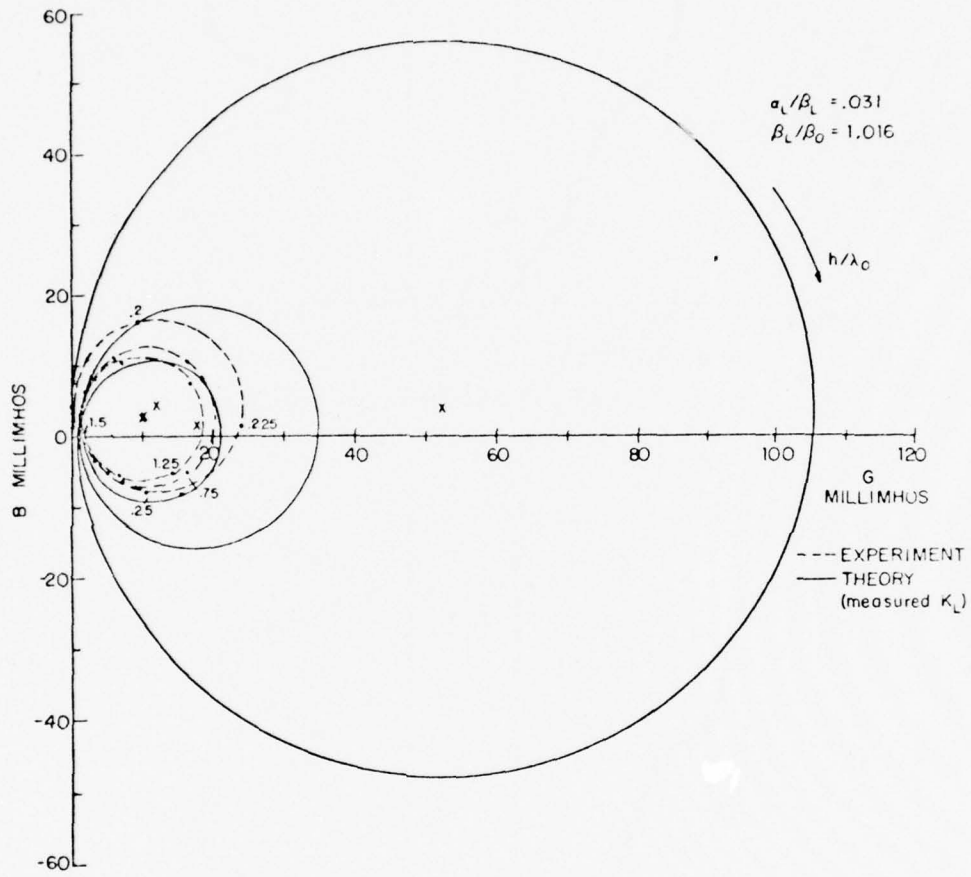


FIG. 3.57. INPUT ADMITTANCE CIRCLE DIAGRAM OF MONOPOLE OVER SALT WATER USING MEASURED K_L ; $d/\lambda_0 = .25$ AND $a/\lambda_0 = .0015$.

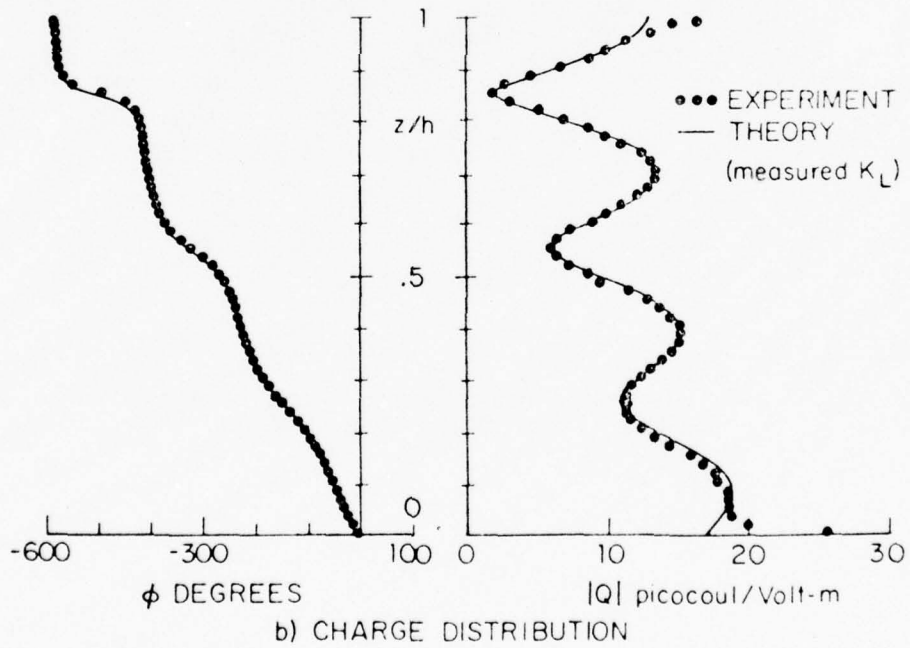
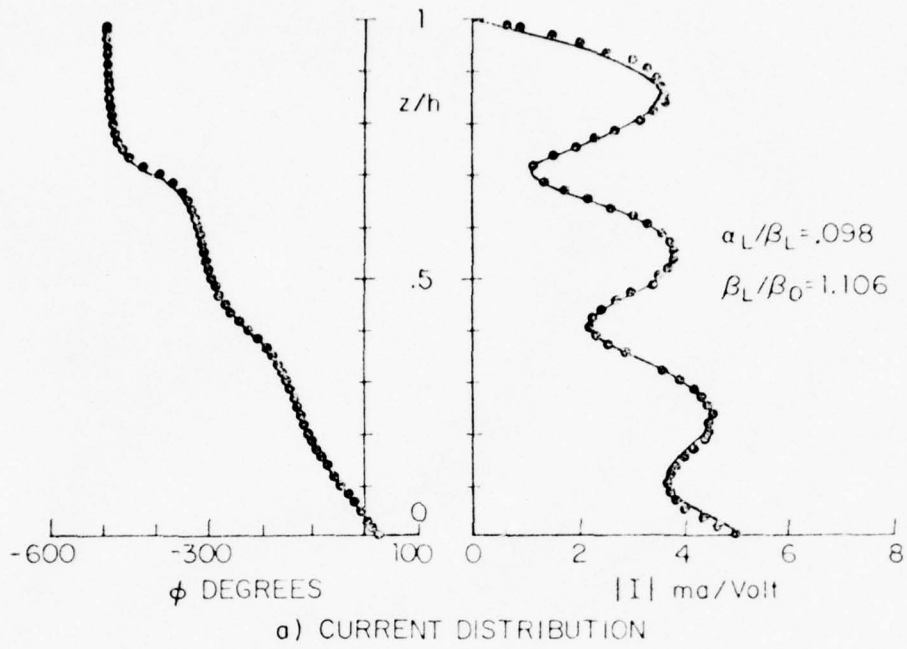
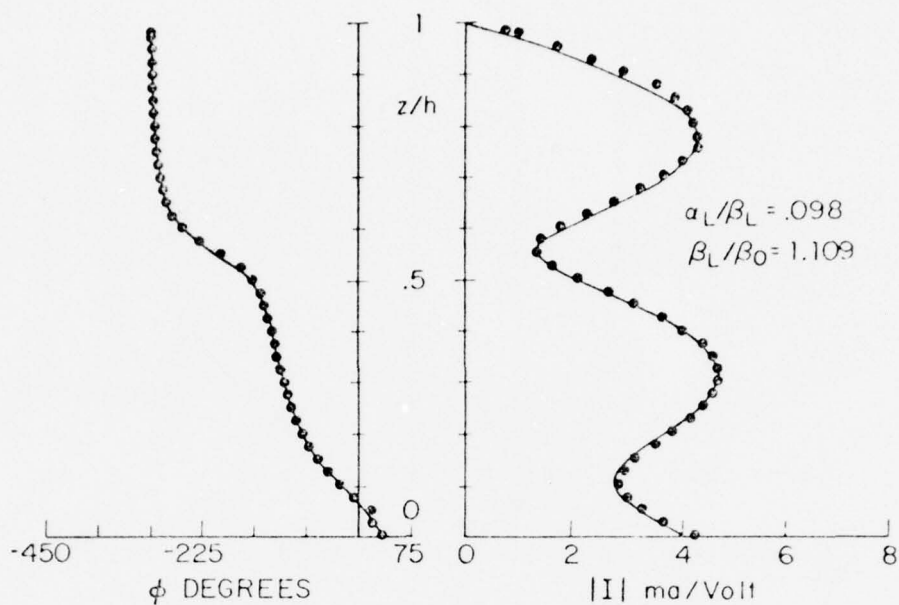
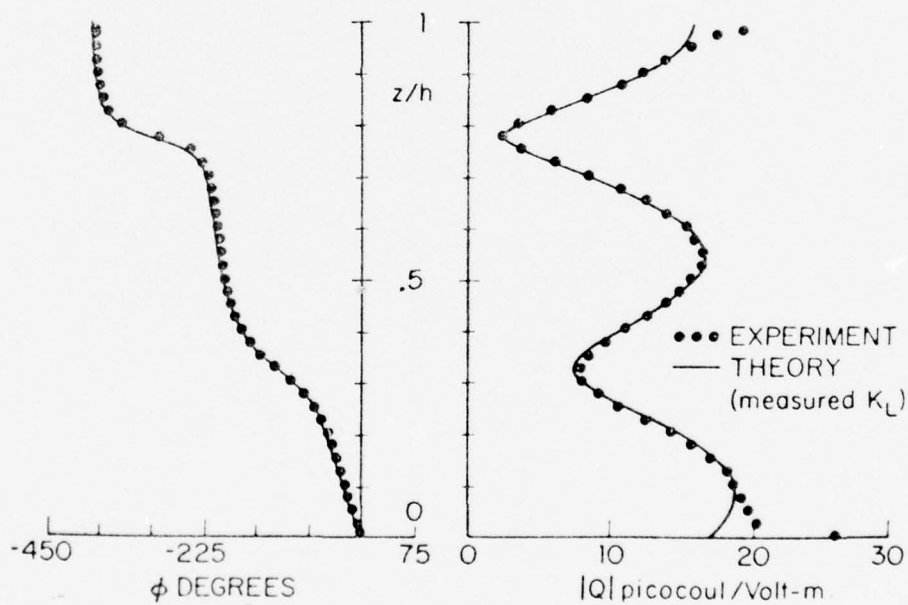


FIG. 3.58. CURRENT AND CHARGE DISTRIBUTION ON MONOPOLE OVER MOIST EARTH USING MEASURED WAVENUMBER; $h/\lambda_0 = 1.5$ AND $d/\lambda_0 = .02$.

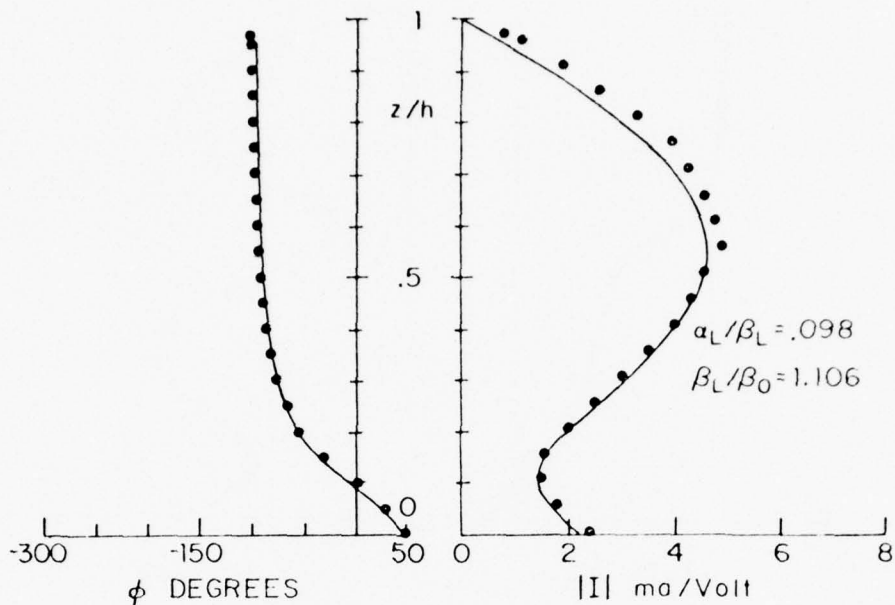


a) CURRENT DISTRIBUTION

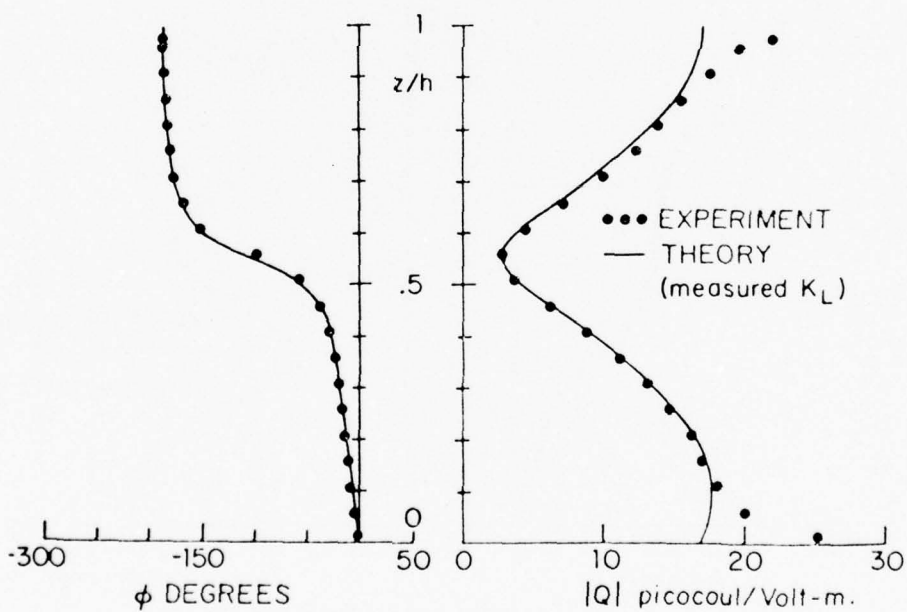


b) CHARGE DISTRIBUTION

FIG. 3.59. CURRENT AND CHARGE DISTRIBUTION ON MONOPOLE OVER MOIST EARTH USING MEASURED WAVENUMBER; $h/\lambda_0 = 1$ AND $d/\lambda_0 = .02$.

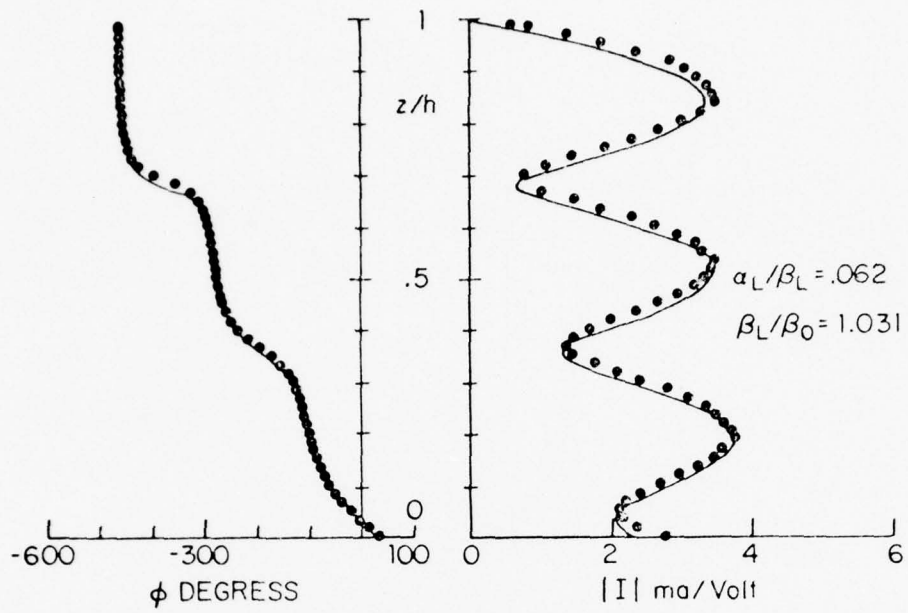


a) CURRENT DISTRIBUTION

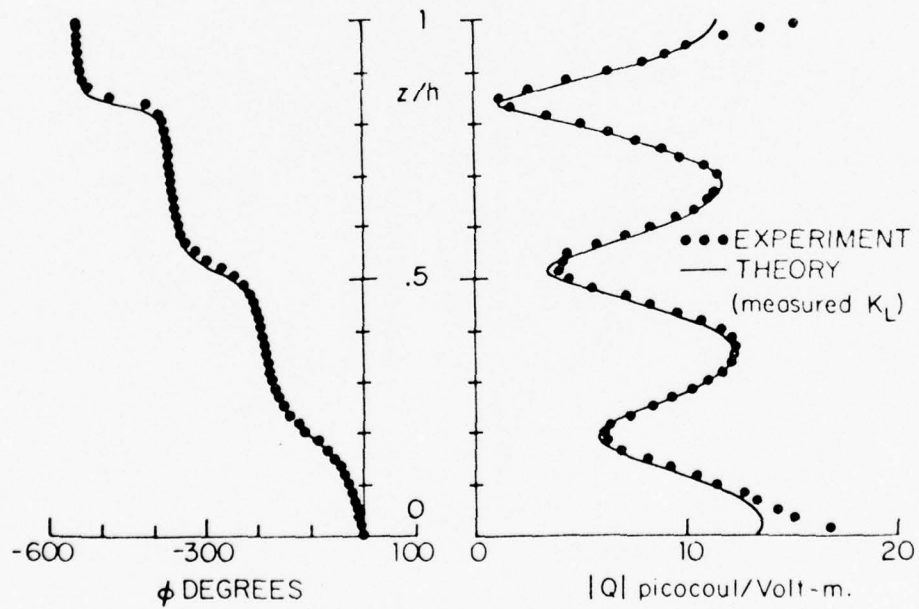


b) CHARGE DISTRIBUTION

FIG. 3.60. CURRENT AND CHARGE DISTRIBUTION ON MONOPOLE OVER MOIST EARTH USING MEASURED WAVENUMBER; $h/\lambda_0 = .5$ AND $d/\lambda_0 = .02$.

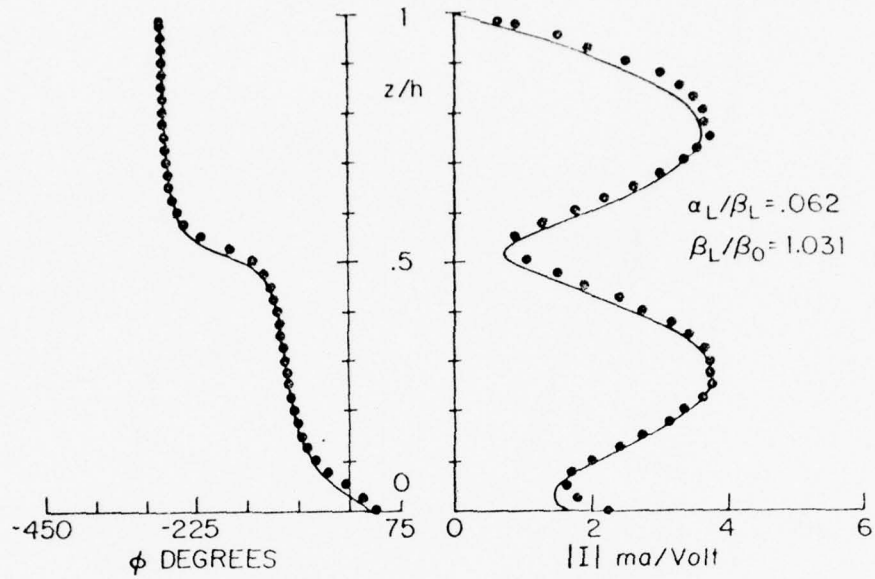


a) CURRENT DISTRIBUTION

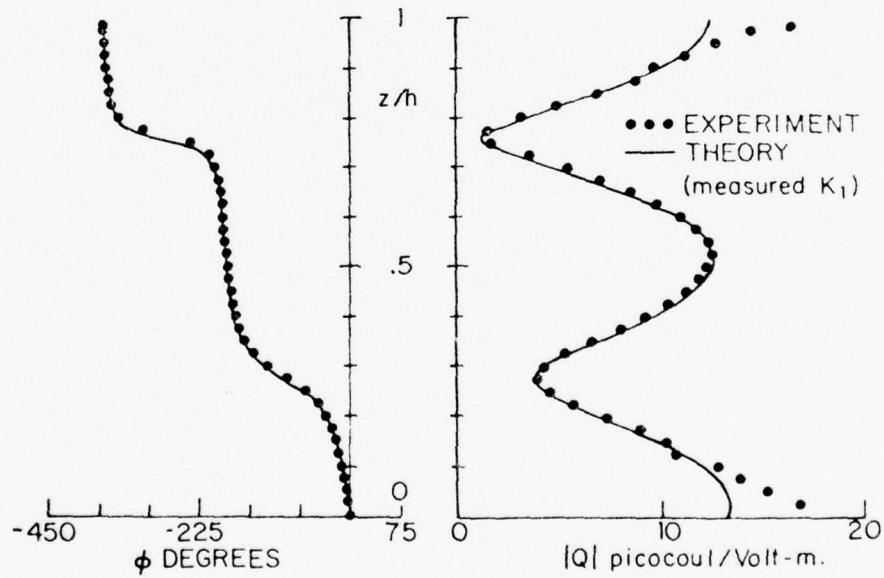


b) CHARGE DISTRIBUTION

FIG. 3.61. CURRENT AND CHARGE DISTRIBUTION ON MONOPOLE OVER MOIST EARTH USING MEASURED WAVENUMBER; $h/\lambda_0=1.5$ AND $d/\lambda_0=.05$



a) CURRENT DISTRIBUTION



b) CHARGE DISTRIBUTION

FIG. 3.62. CURRENT AND CHARGE DISTRIBUTION ON MONOPOLE OVER MOIST EARTH USING MEASURED WAVENUMBER; $h/\lambda_0=1$ AND $d/\lambda_0=.05$

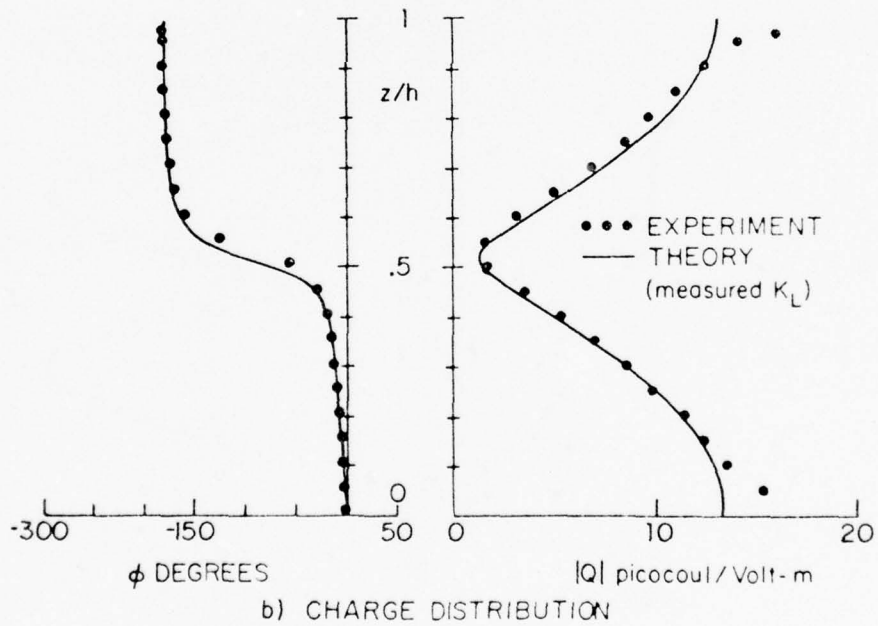
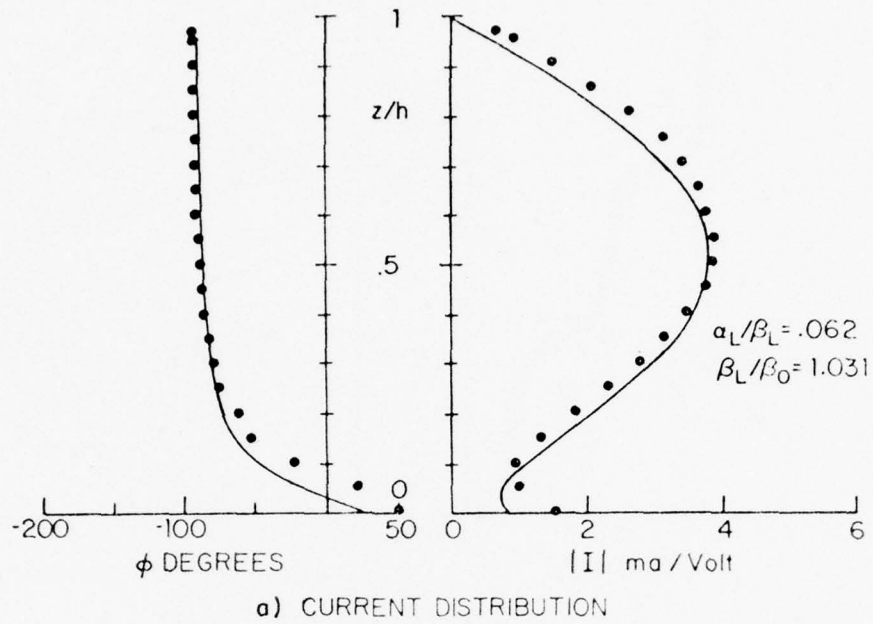
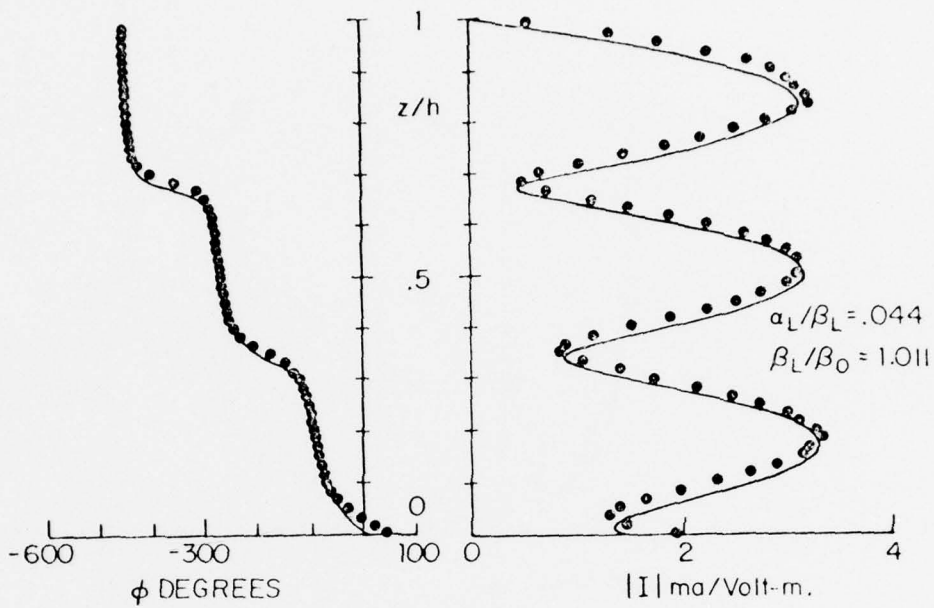
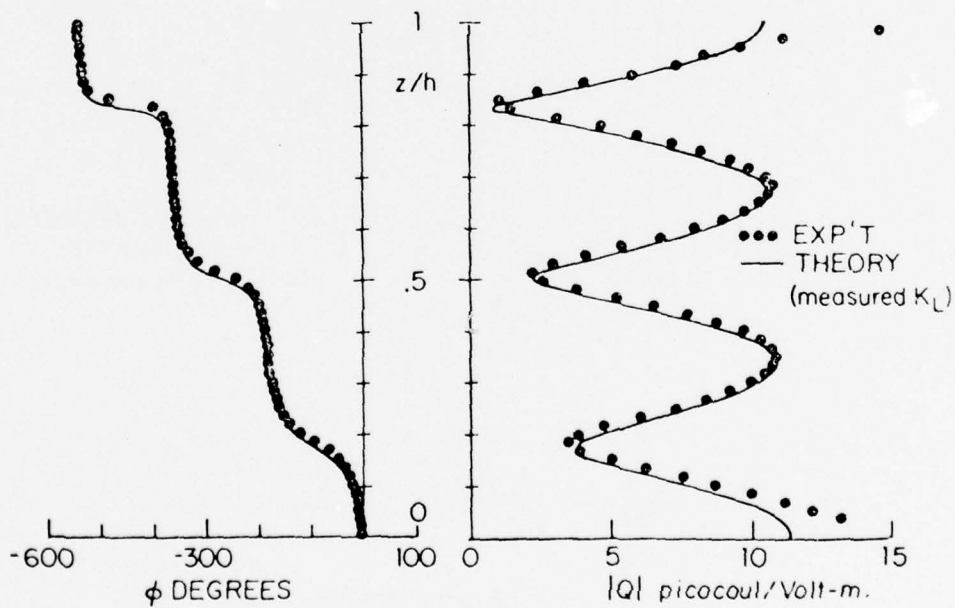


FIG. 3.63. CURRENT AND CHARGE DISTRIBUTION ON MONOPOLE OVER MOIST EARTH USING MEASURED WAVENUMBER; $h/\lambda_0 = .5$ AND $d/\lambda_0 = .05$.

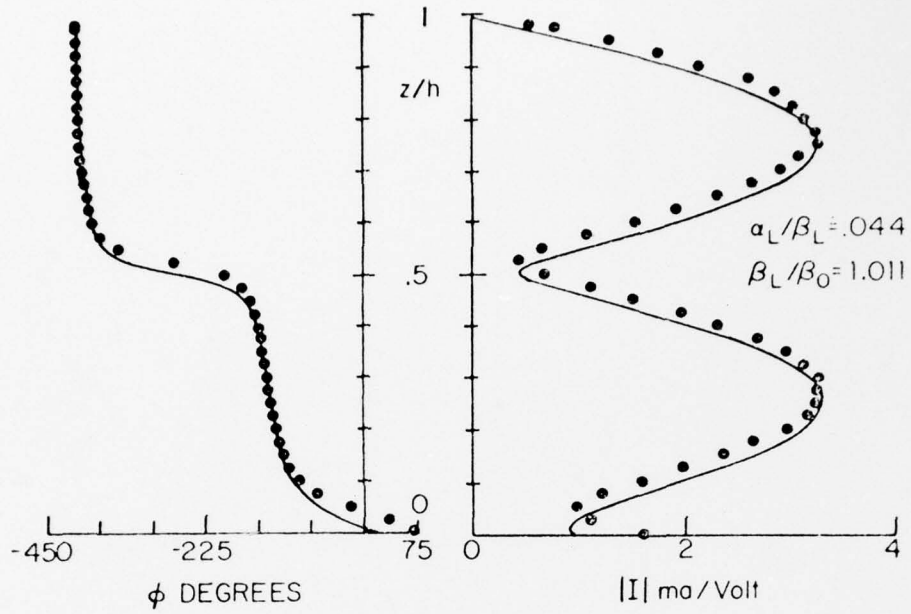


a) CURRENT DISTRIBUTION

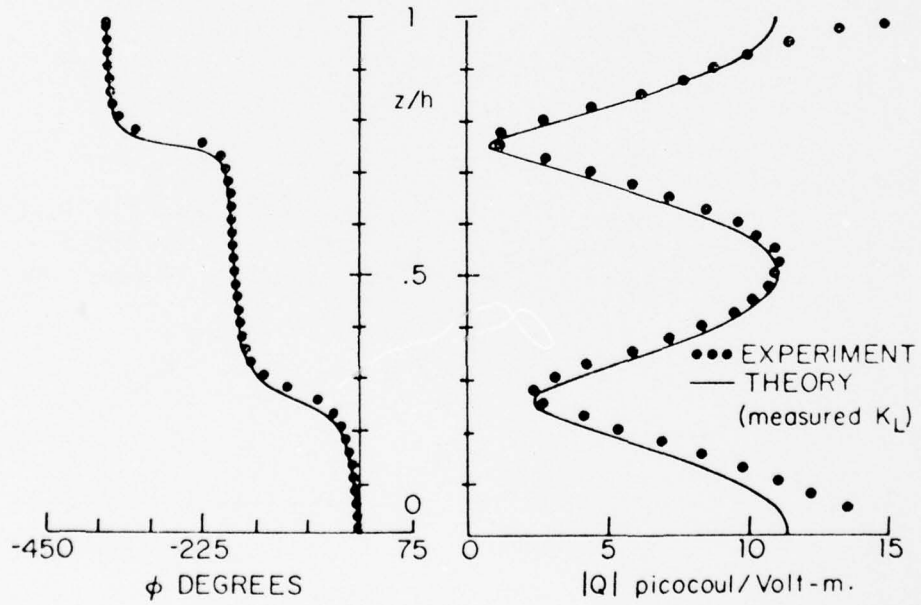


b) CHARGE DISTRIBUTION

FIG. 3.64. CURRENT AND CHARGE DISTRIBUTION ON MONOPOLE OVER MOIST EARTH USING MEASURED WAVENUMBER; $h/\lambda_0 = 1.5$ AND $d/\lambda_0 = .1$.



a) CURRENT DISTRIBUTION



b) CHARGE DISTRIBUTION

FIG. 3.65. CURRENT AND CHARGE DISTRIBUTION ON MONOPOLE OVER MOIST EARTH USING MEASURED WAVENUMBER; $h/\lambda_0 = 1$ AND $d/\lambda_0 = .1$.

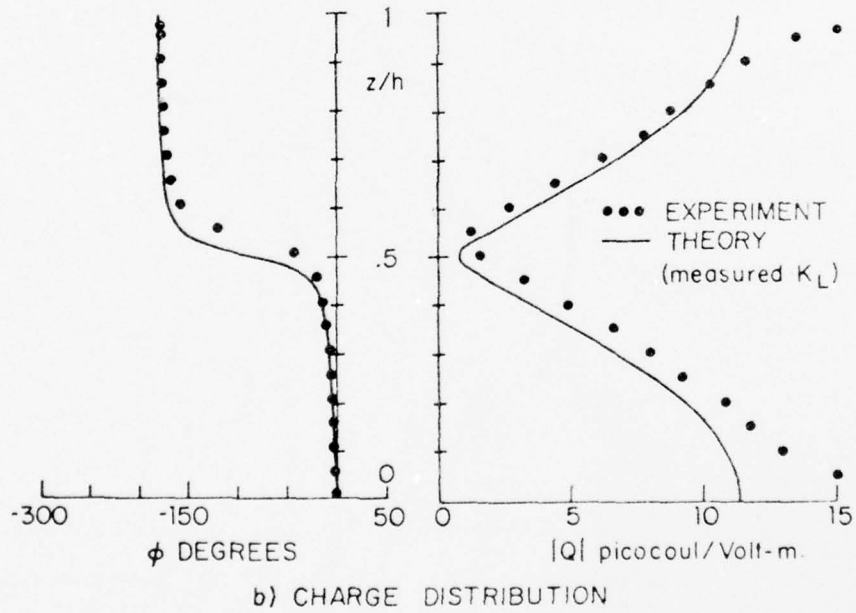
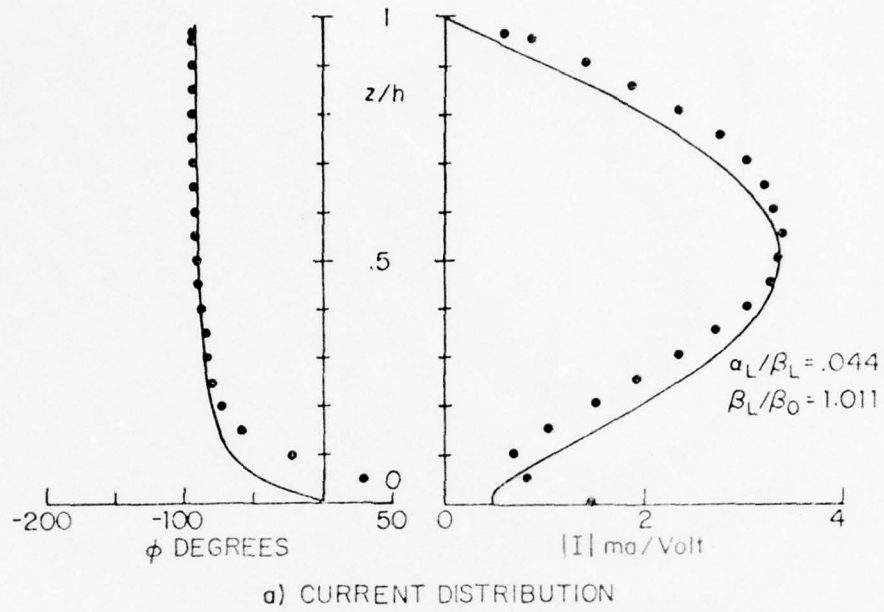
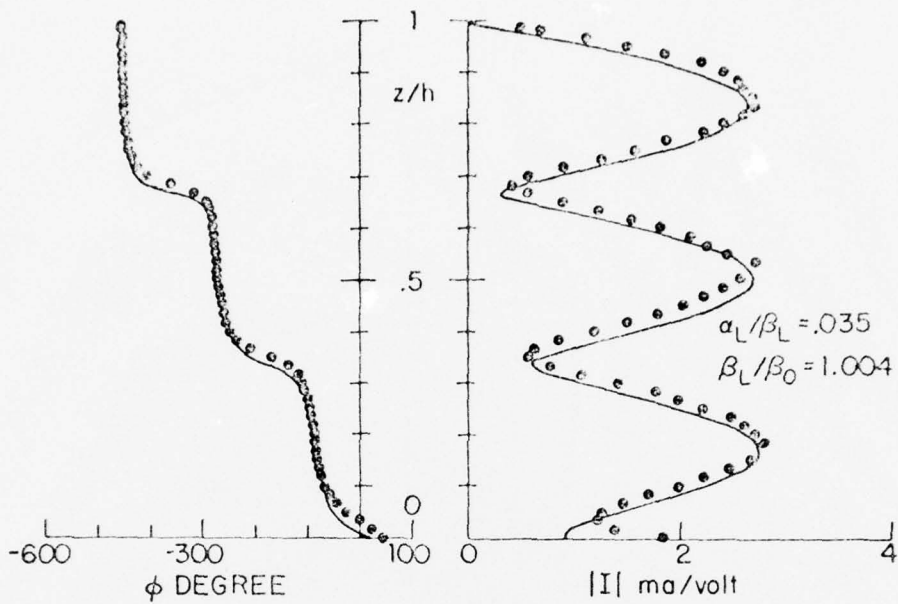
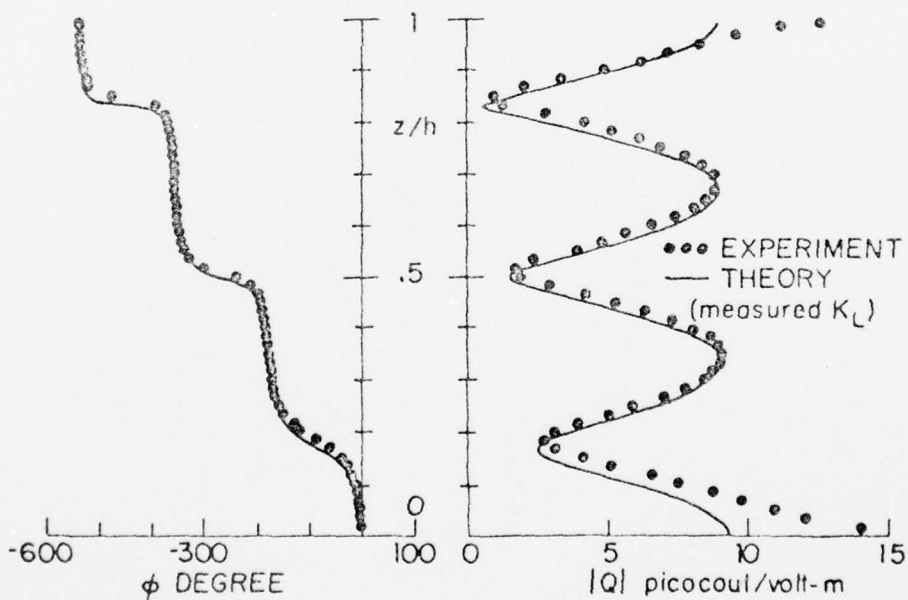


FIG. 3.66. CURRENT AND CHARGE DISTRIBUTION ON MONOPOLE OVER MOIST EARTH USING MEASURED WAVENUMBER; $h/\lambda_0 = .5$ AND $d/\lambda_0 = .1$.



a) CURRENT DISTRIBUTION



b) CHARGE DISTRIBUTION

FIG. 3.67. CURRENT AND CHARGE DISTRIBUTION ON MONOPOLE OVER MOIST EARTH USING MEASURED WAVENUMBER; $h/\lambda_0 = 1.5$ AND $d/\lambda_0 = .29$.

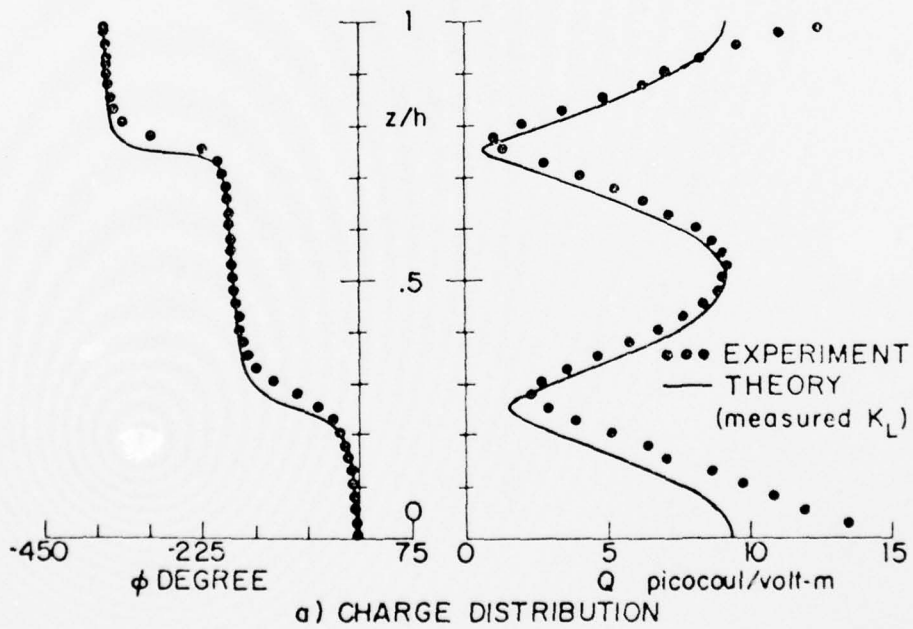
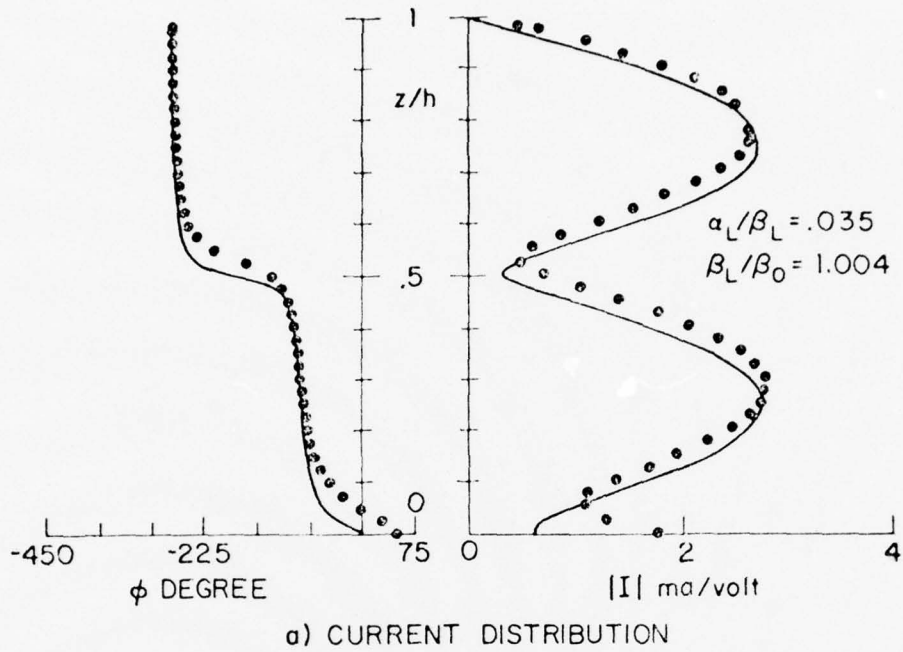
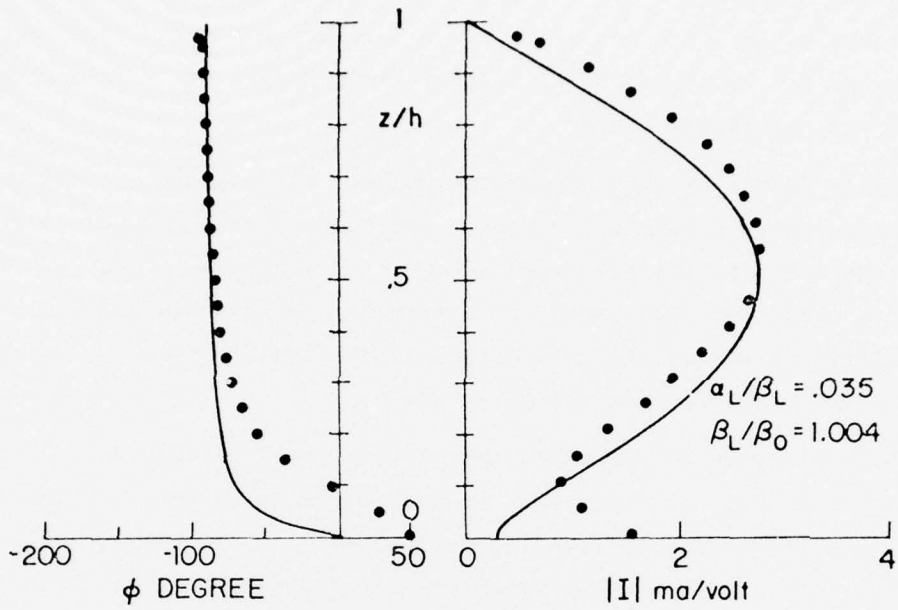
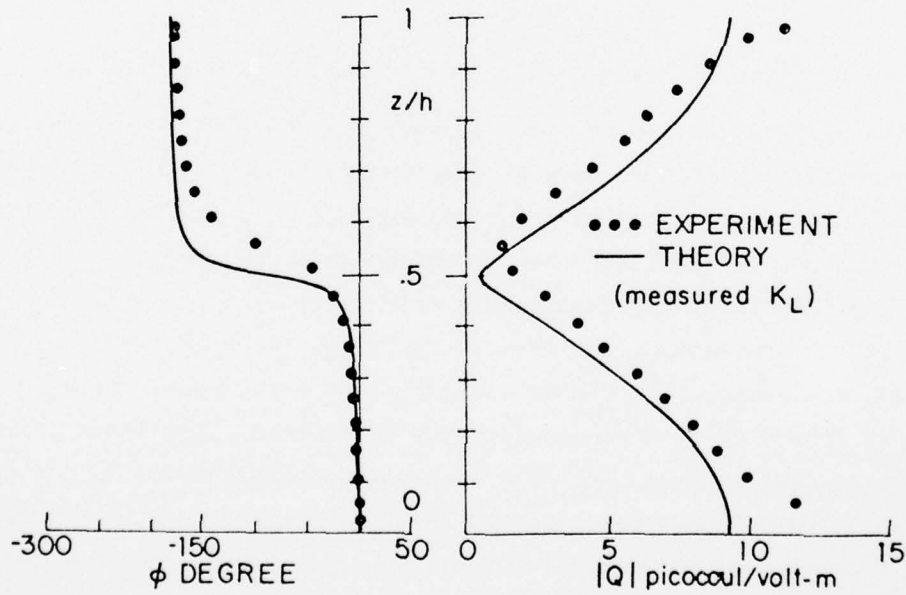


FIG. 3.68. CURRENT AND CHARGE DISTRIBUTION ON MONOPOLE OVER MOIST EARTH USING MEASURED WAVENUMBER; $h/\lambda_0 = 1$ AND $d/\lambda_0 = .29$



a) CURRENT DISTRIBUTION



b) CHARGE DISTRIBUTION

FIG. 3.69. CURRENT AND CHARGE DISTRIBUTION ON MONOPOLE OVER MOIST EARTH USING MEASURED WAVENUMBER; $h/\lambda_0 = .5$ AND $d/\lambda_0 = .29$.

quite good. The $d/\lambda_0 = .25$ measurements have characteristics similar to those taken at the same height over the previous two media. The currents and charges are not strictly sinusoidal in form with the greatest departure observed at the driving point.

Figure 3.70 shows the comparison between the measured effective wave numbers and those predicted by King. For the smallest height measured, $d/\lambda_0 = .02$, the error in the predicted attenuation constant is 35%. It is interesting to note that when comparing antennas at comparable heights above the three different media, the attenuation (radiation loss) is consistently greatest for the wire over the moist earth.

The admittance measurements appear in Figs. 3.71 through 3.78. The agreement for $d/\lambda_0 = .02$ and $.05$ is seen to be quite good considering the limitations of the zeroth-order approximation. At $d/\lambda_0 = .1$, the agreement is not as good as for the two water cases, especially in the second and third resonance. As before, the zeroth-order admittance for $d/\lambda_0 = .25$ clearly cannot give an accurate approximation. The data for the measured admittances as well as for the currents and charges appear in Appendix B.

3.4. Presentation of Measured Data for the Modified Beverage Wave Antenna

The measurements in Section 3.3 were repeated for an antenna terminated in a resistor and quarter-wave section to form the modified Beverage antenna. The data are presented in an identical manner. All the measured data, both normalized and unnormalized, are contained in Appendix B. For the current and charge distributions data points were taken every 5 cm ($.05\lambda_0$) to obtain accurate representations for these quantities. When the antenna is properly matched, the current and charge distributions are smoothly varying and measurements spaced every 5 cm provide good resolution. The input admittance at each height was measured for only four antenna lengths ($l_1/\lambda_0 = 1.5, 1.0, .5$ and $.25$). With proper matching the input admittance remains practically constant for increasing antenna lengths. The four admittances were measured essentially to demonstrate the traveling-wave nature of the modified Beverage antenna.

For all cases the best match condition was obtained basically by trial and error. The appropriate quarter-wave section could be ascertained from the measured wave number. Once this was determined, different resistors

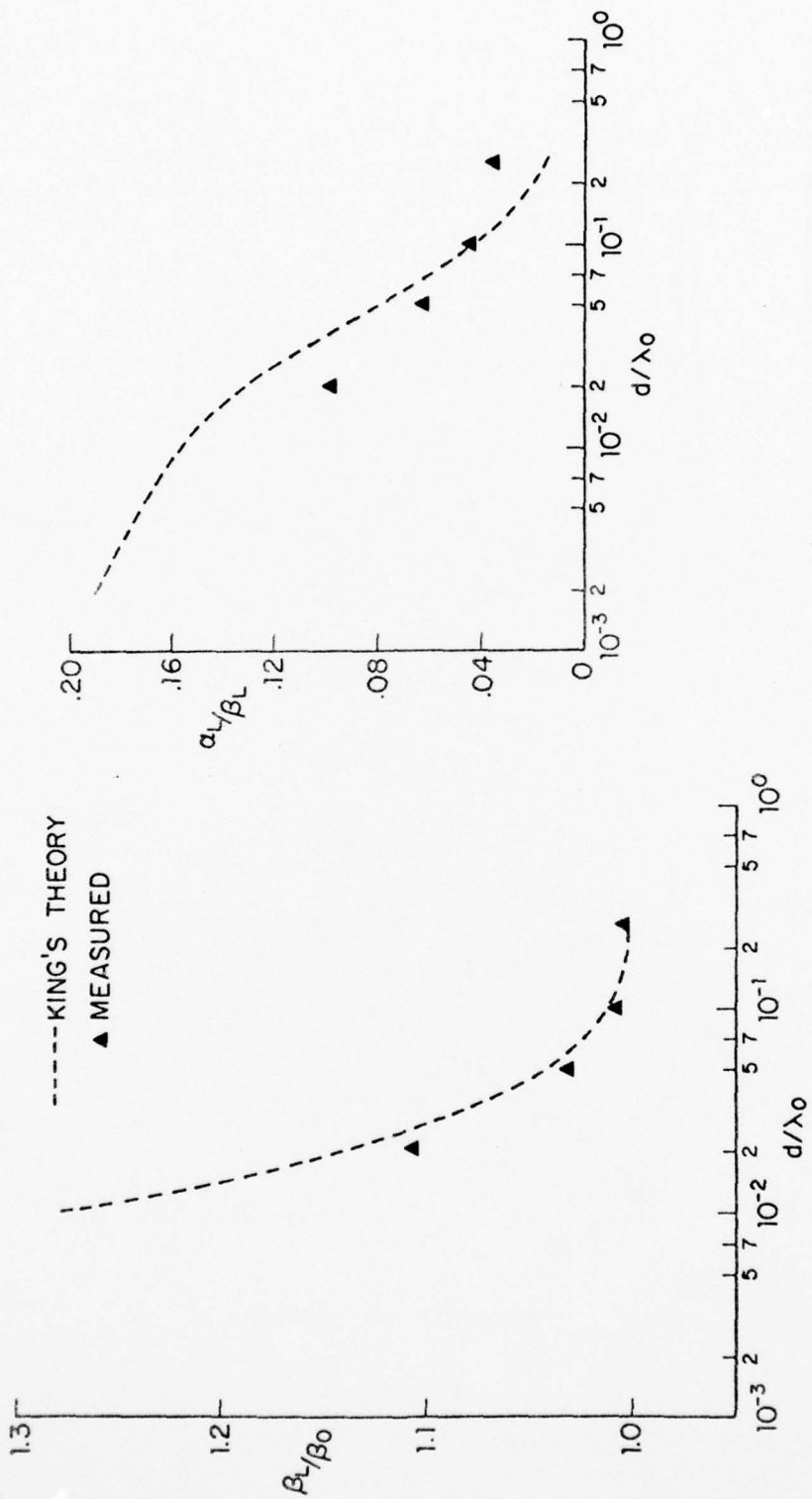


FIG. 3.70. WAVENUMBER ON HORIZONTAL WIRE OVER MOIST EARTH;
 $\epsilon_r = 11.5$ AND $Pe = .012$.

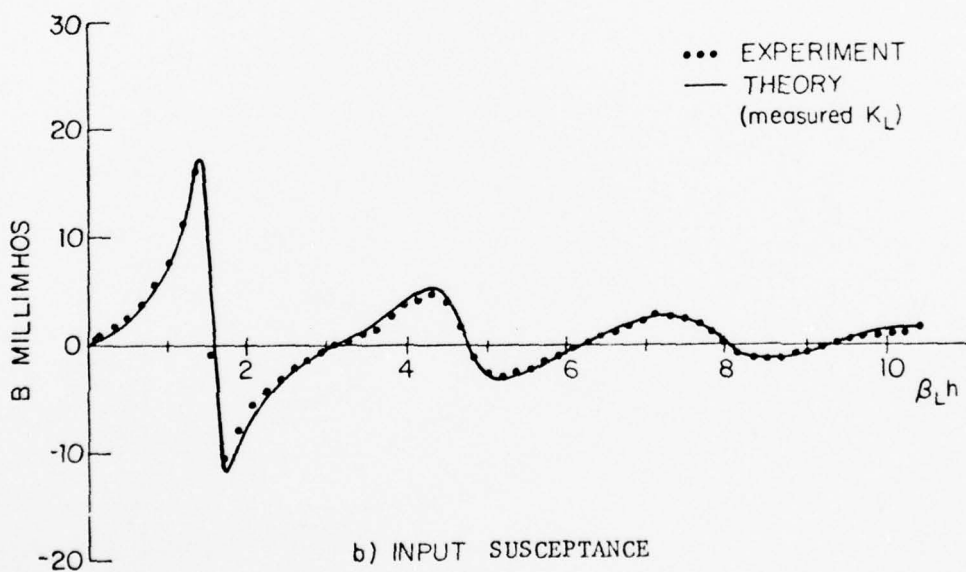
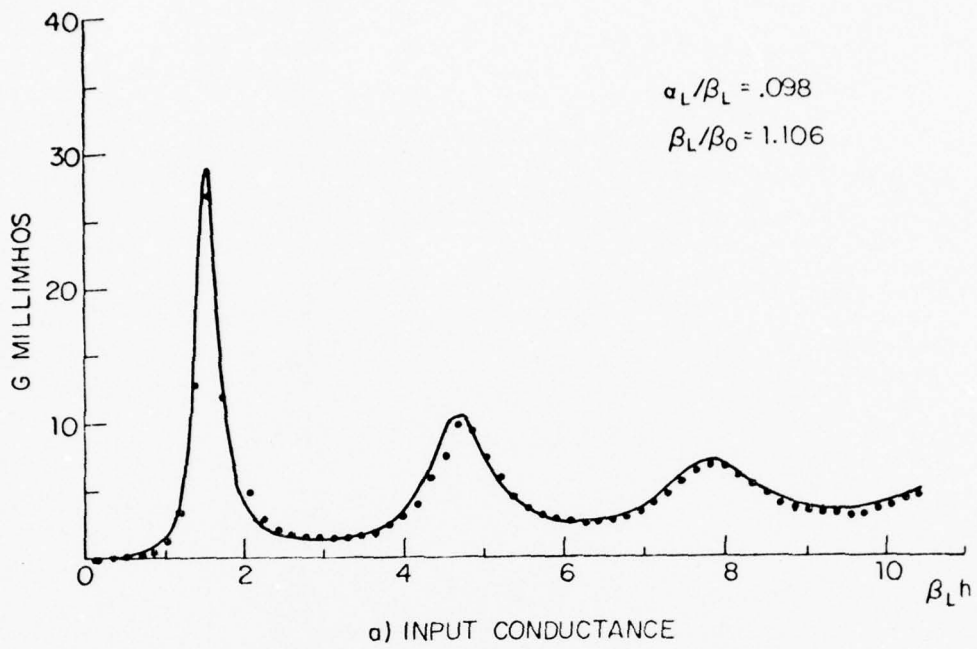


FIG. 3.71. INPUT ADMITTANCE OF MONOPOLE OVER MOIST EARTH USING MEASURED K_L ; $d/\lambda_0 = .02$ AND $a/\lambda_0 = .0015$

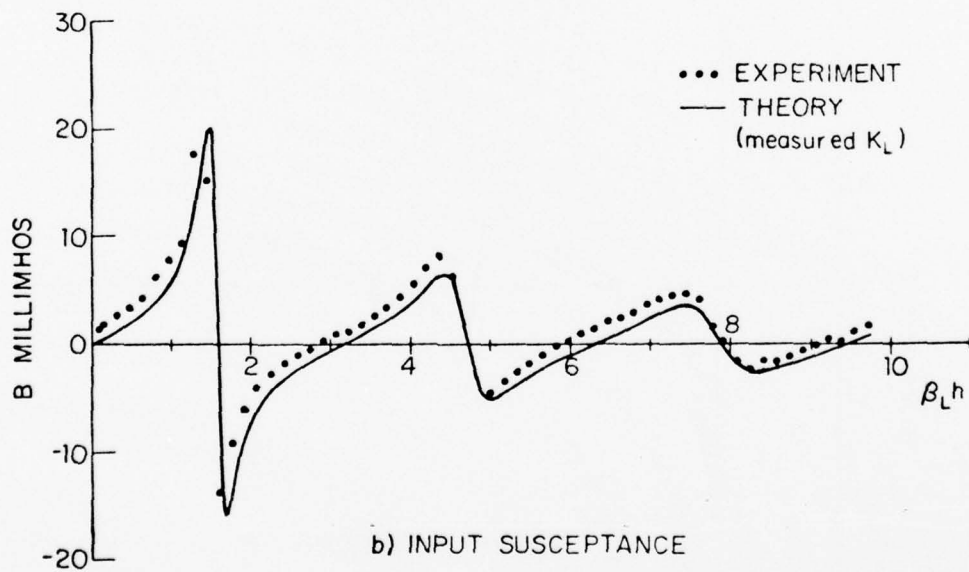
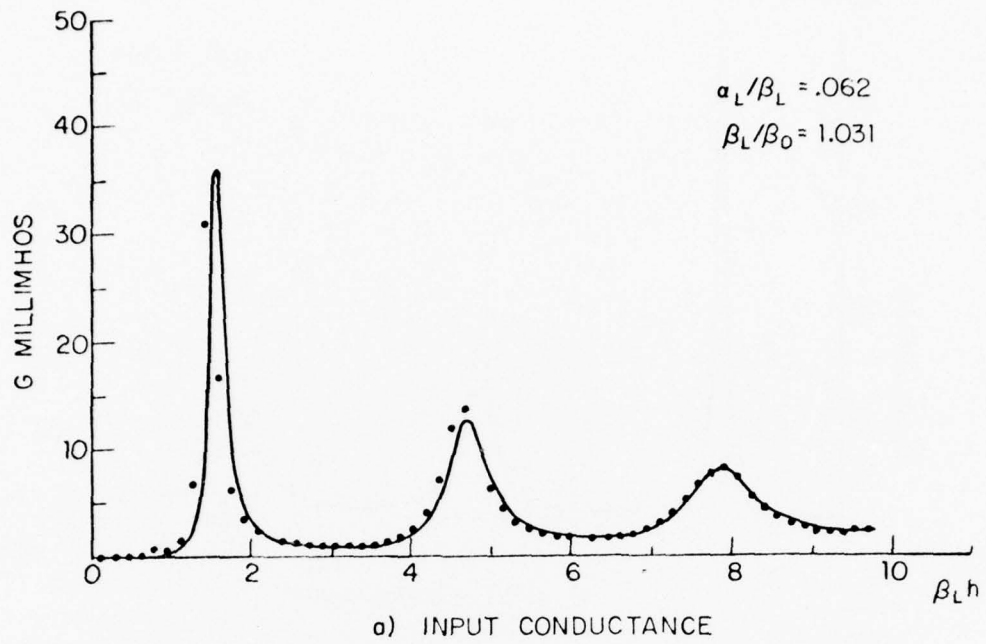
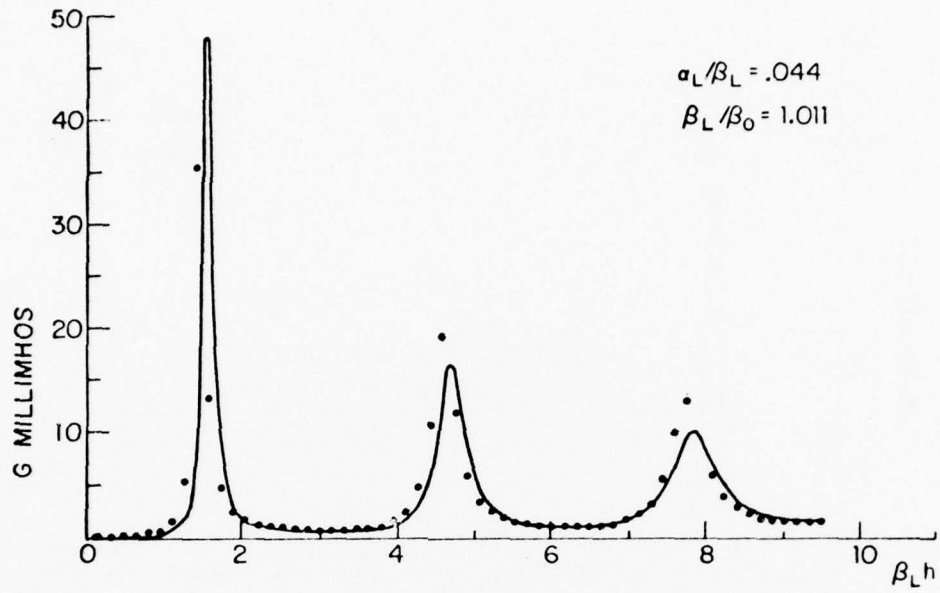
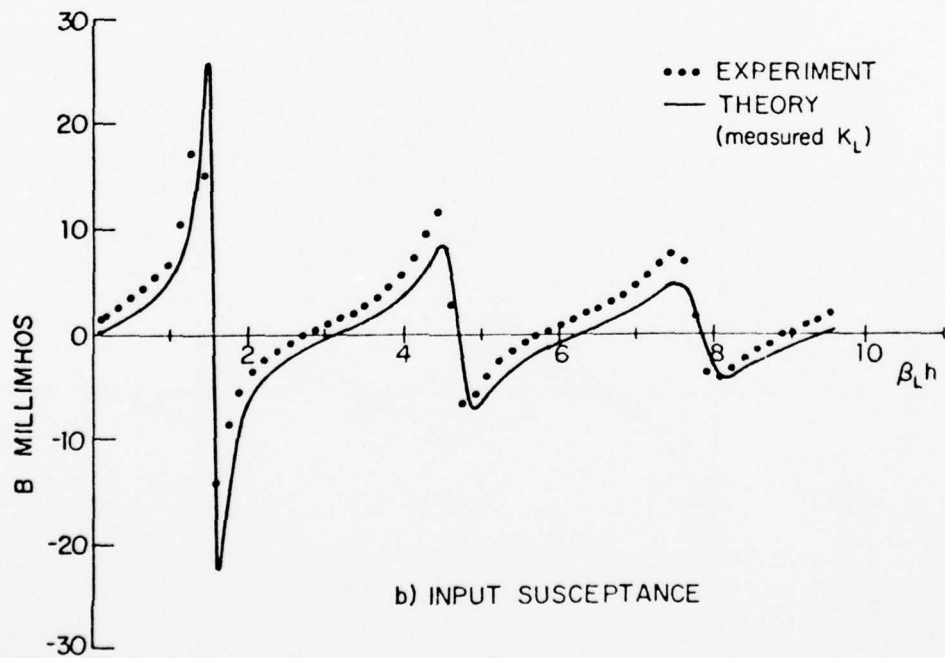


FIG. 3.72. INPUT ADMITTANCE OF MONOPOLE OVER MOIST EARTH USING MEASURED K_L ; $d/\lambda_0 = .05$ AND $a/\lambda_0 = .0015$



a) INPUT CONDUCTANCE



b) INPUT SUSCEPTANCE

FIG. 3.73. INPUT ADMITTANCE OF MONOPOLE OVER MOIST EARTH USING MEASURED K_L ; $d/\lambda_0 = .1$ AND $\sigma/\lambda_0 = .0015$

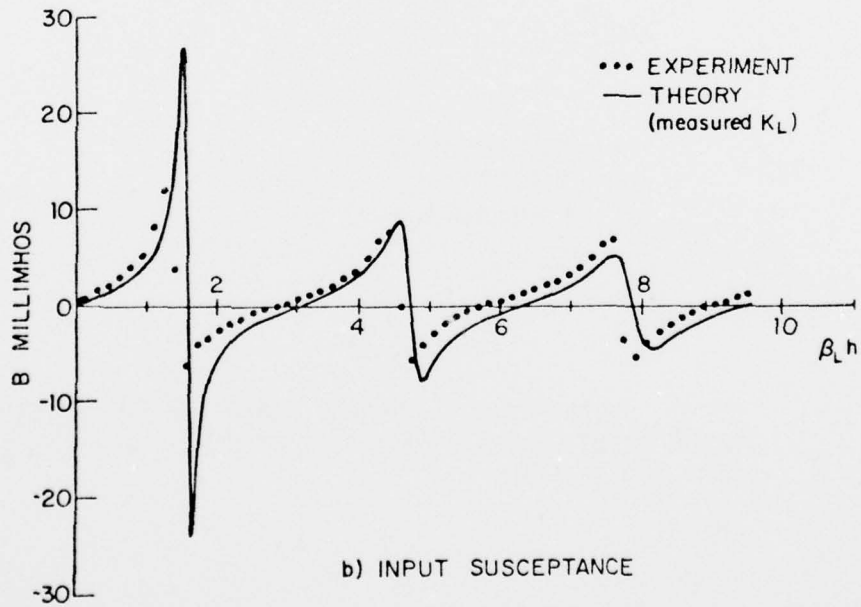
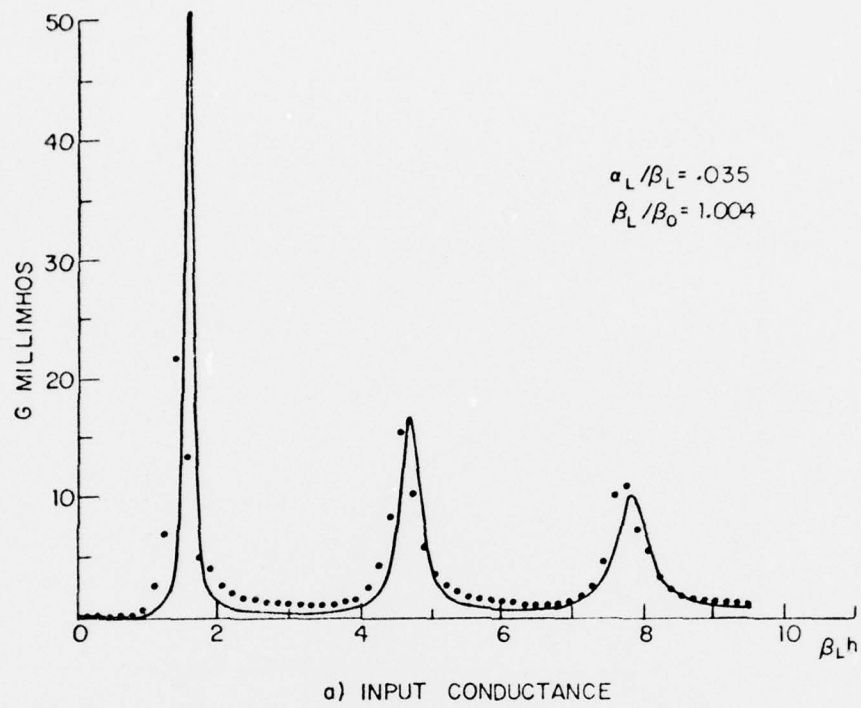


FIG. 3.74. INPUT ADMITTANCE OF MONOPOLE OVER MOIST EARTH USING MEASURED K_L ; $d/\lambda_0 = .29$ AND $a/\lambda_0 = .0015$.

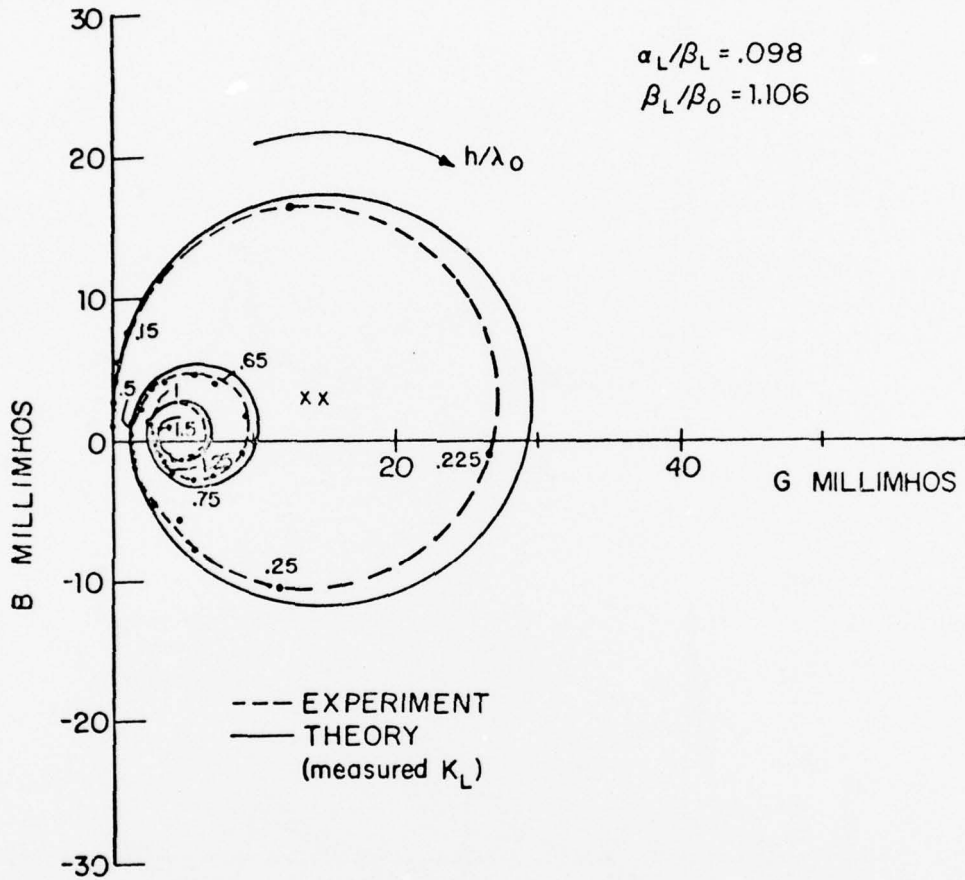


FIG. 3.75. INPUT ADMITTANCE CIRCLE DIAGRAM OF MONOPOLE OVER MOIST EARTH USING MEASURE K_L ; $d/\lambda_0 = .02$ AND $a/\lambda_0 = .0015$

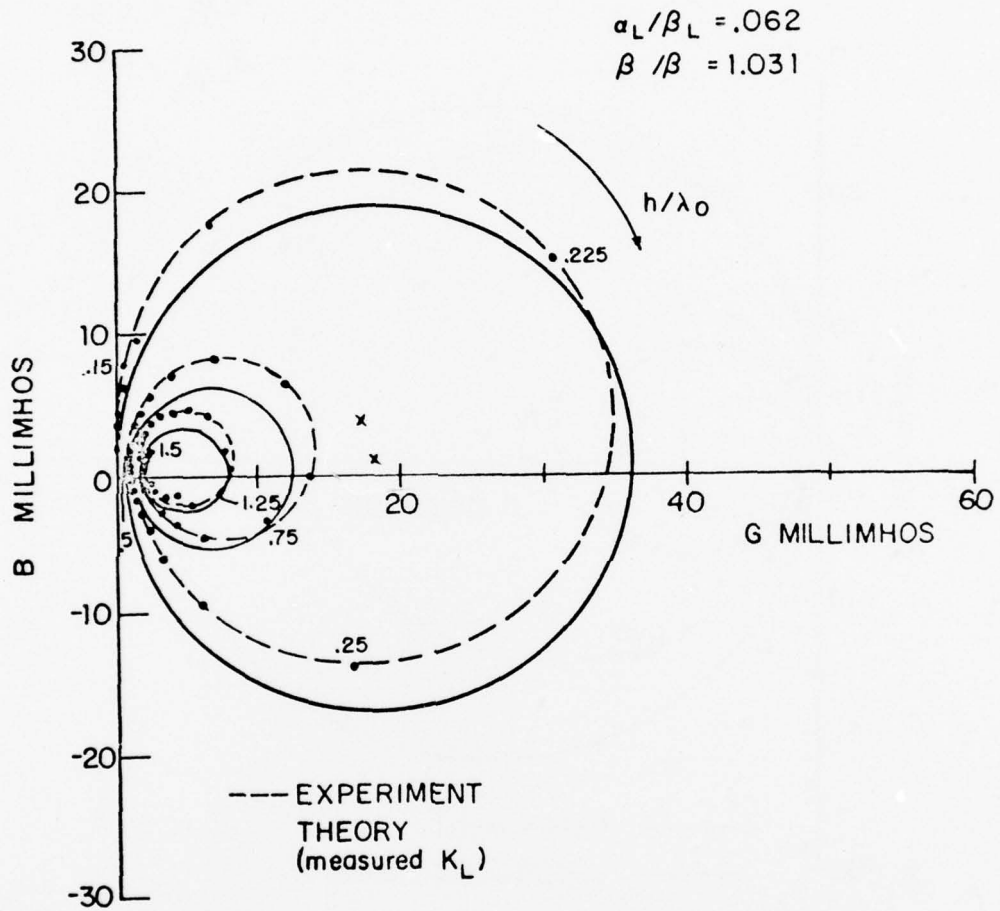


FIG. 3.76. INPUT ADMITTANCE CIRCLE DIAGRAM OF MONOPOLE OVER MOIST EARTH USING MEASURE K_L ; $d/\lambda_0 = .05$ AND $\sigma/\lambda_0 = .0015$

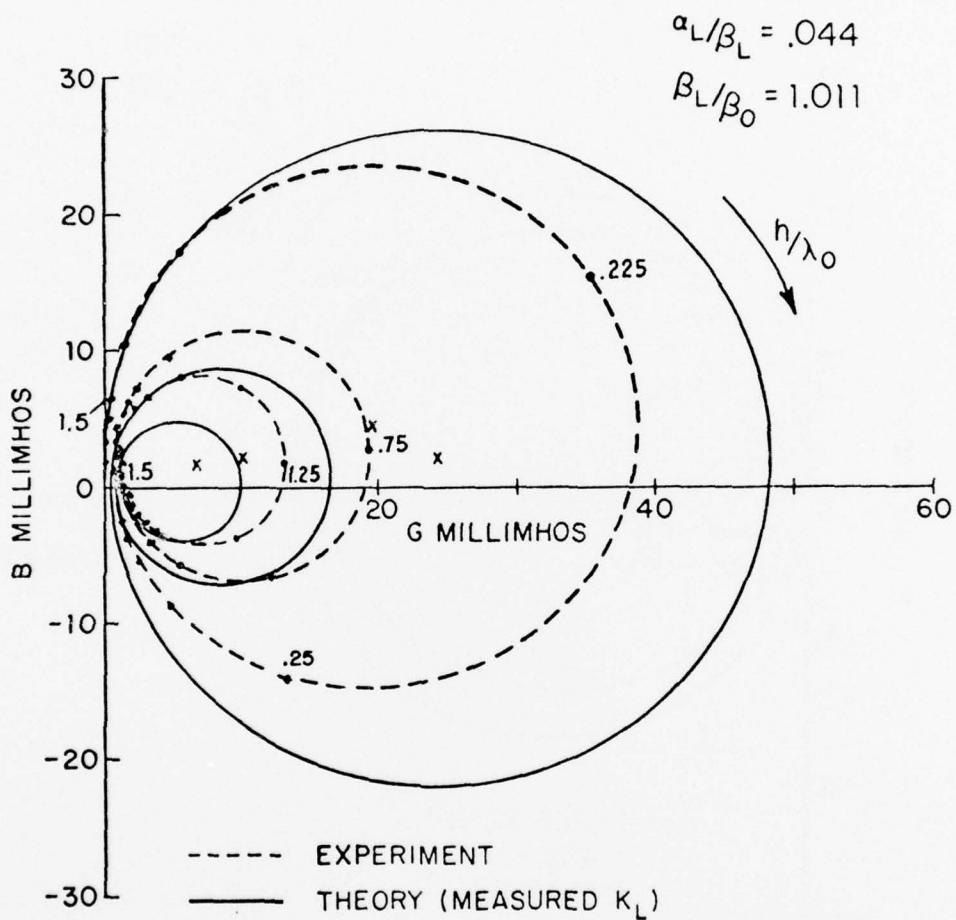


FIG. 3.77. INPUT ADMITTANCE CIRCLE DIAGRAM OF MONOPOLE OVER MOIST EARTH USING MEASURED K_L ; $d/\lambda_0 = .1$ AND $a/\lambda_0 = .0015$.

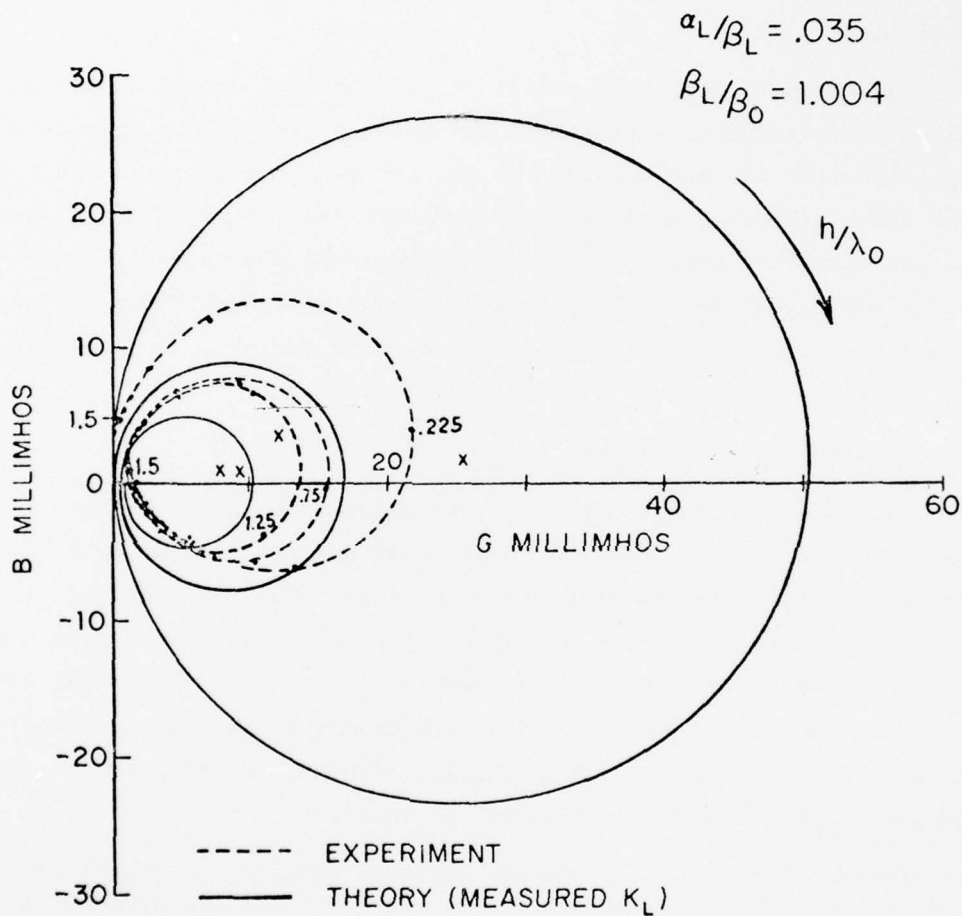


FIG. 3.78.

INPUT ADMITTANCE CIRCLE DIAGRAM OF MONOPOLE OVER MOIST EARTH USING MEASURED K_L ; $d/\lambda_0 = .29$ AND $a/\lambda_0 = .0015$.

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HARVARD UNIV CAMBRIDGE MASS GORDON MCKAY LAB
THE BEVERAGE WAVE ANTENNA: CURRENTS, CHARGES AND ADMITTANCES VO--ETC(U)
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were connected along with the quarter-wave section to the end of the line and the VSWR on the antenna was measured with the charge probe. The resistor that gave the lowest VSWR was the one used. The amount of guess work involved in choosing the correct resistor was minimized by knowing the theoretical value for the characteristic impedance, Eq. (1.8). In most cases the resistor used was the one whose value came closest to the theoretical prediction.

The measured data were normalized in the same manner as in Section 3.3. All data are compared with either theoretical predictions, given by (1.54) and (1.56) for the current and charge, or for those cases in which the measured effective and theoretical wave numbers are in error with a semi-empirical solution that uses the form for the current and charge distributions in (1.54) and (1.56) and the measured effective wave number for k_L . Although no measurements were made on the quarter-wave section, the analytic form for the current and charge is presented in the figures.

Fresh-Water Measurements

With the critical quantity in all these measurements being the wave number, it is evident that the theoretical and measured effective wave numbers will agree over the same range of heights for the modified Beverage antenna case as for the unloaded cases. Figures 3.79 through 3.84 compare the measured results for the modified Beverage antenna at $d/\lambda_0 = .01$ and $.02$ with the theoretical current and charge expressions given in (1.54) and (1.56) with (1.7) for k_L . In all these figures the agreement is very good and the traveling-wave distribution is apparent.

Figures 3.85 and 3.89 compare measured results for $d/\lambda_0 = .05$ and $.1$ with the current and charge distributions in (1.54) and (1.56) using the theoretical wave number. The agreement in these two sets of curves is satisfactory even though the theoretical α_L is much smaller than the measured value. To improve the agreement, the same semi-empirical approach was used as in the monopole case. Figures 3.86 through 3.88 and 3.90 through 3.92 compare measured current and charge distributions for $d/\lambda_0 = .05$ and $.1$ with analytic expressions in (1.54) and (1.56) with the measured effective wave number for k_L . The agreement is seen to be quite good except for variations at the driving point and at the resistive load which cannot be properly taken care of by the zeroth-order expressions.

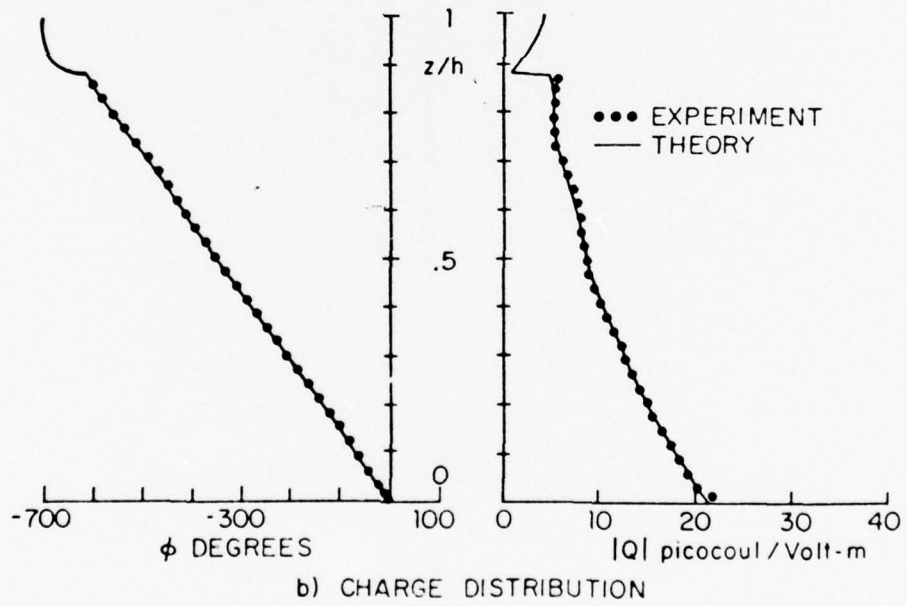
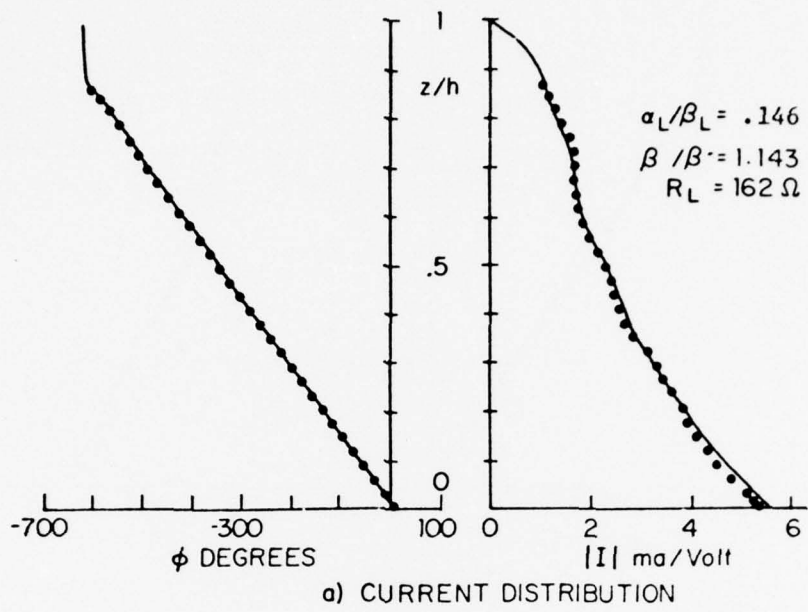
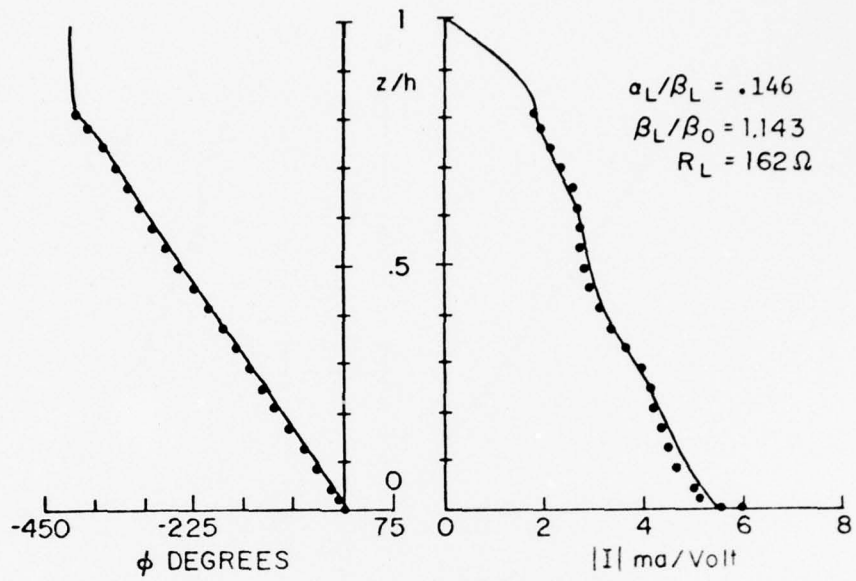
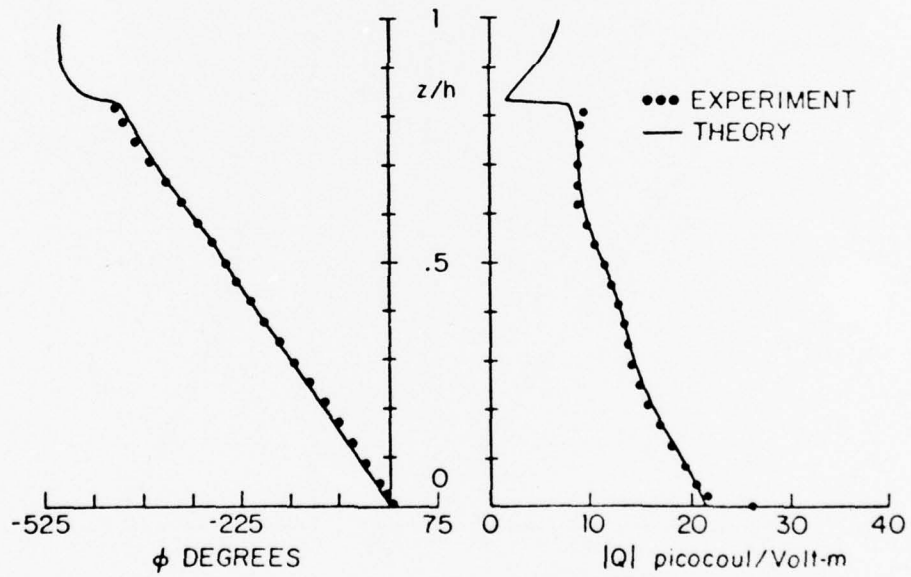


FIG. 3.79. CURRENT AND CHARGE DISTRIBUTION ON MODIFIED BEVERAGE ANTENNA OVER FRESH WATER; $\epsilon_1/\lambda_0 = 1.5$ AND $d/\lambda_0 = .01$.

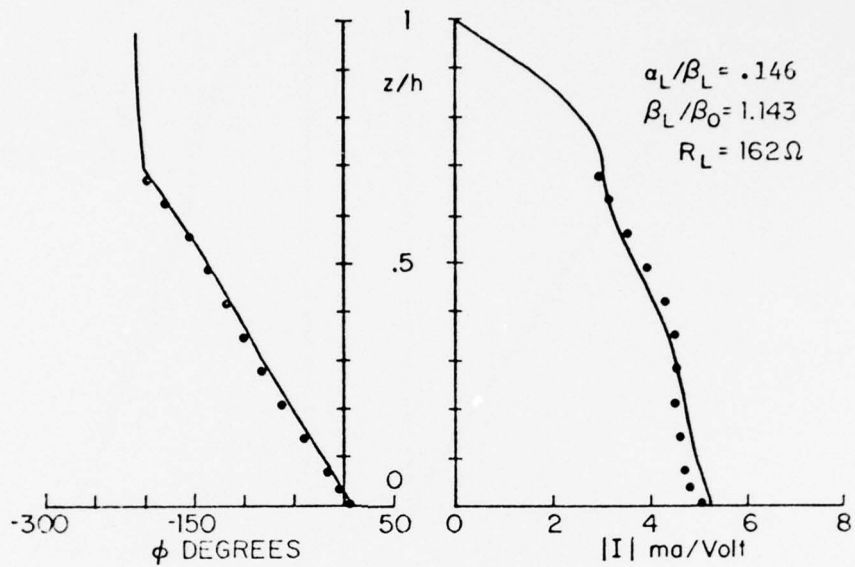


a) CURRENT DISTRIBUTION

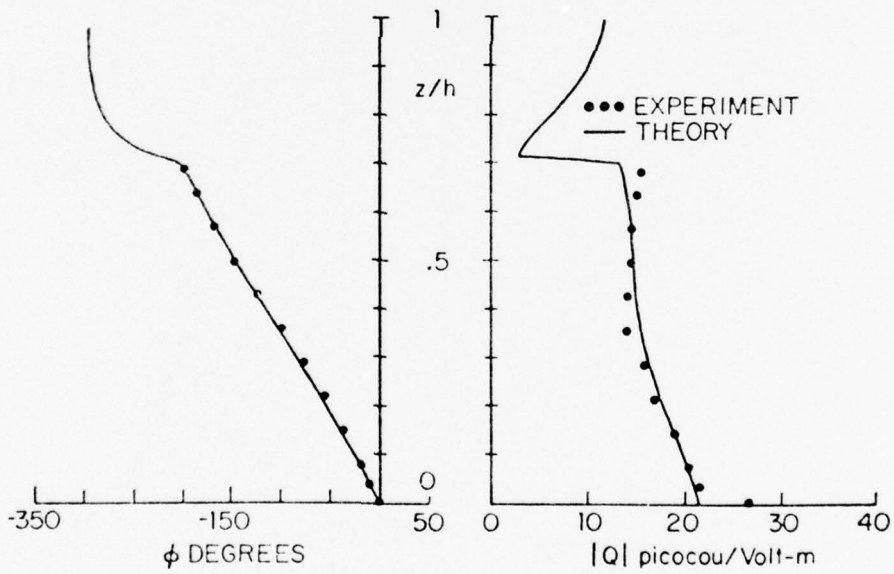


b) CHARGE DISTRIBUTION

FIG. 3.80. CURRENT AND CHARGE DISTRIBUTION ON MODIFIED BEVERAGE ANTENNA OVER FRESH WATER; $t_1/\lambda_0 = 1$ AND $d/\lambda_0 = .01$.

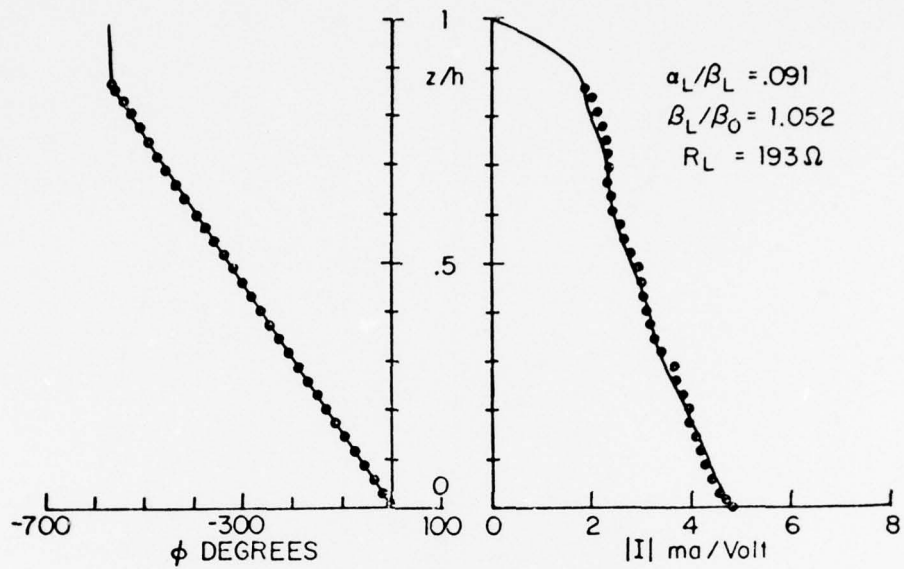


a) CURRENT DISTRIBUTION

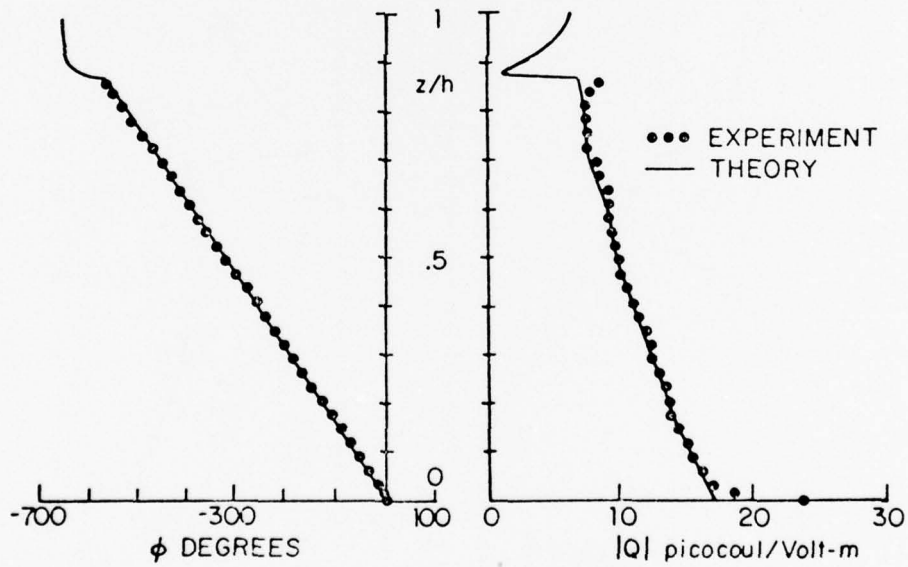


b) CHARGE DISTRIBUTION

FIG. 3.81. CURRENT AND CHARGE DISTRIBUTION ON MODIFIED BEVERAGE ANTENNA OVER FRESH WATER; $t_1/\lambda_0 = .5$ AND $d/\lambda_0 = .01$.



a) CURRENT DISTRIBUTION



b) CHARGE DISTRIBUTION

FIG. 3.82. CURRENT AND CHARGE DISTRIBUTION ON MODIFIED BEVERAGE ANTENNA OVER FRESH WATER; $l_1/\lambda_0 = 1.5$ AND $d/\lambda_0 = .02$.

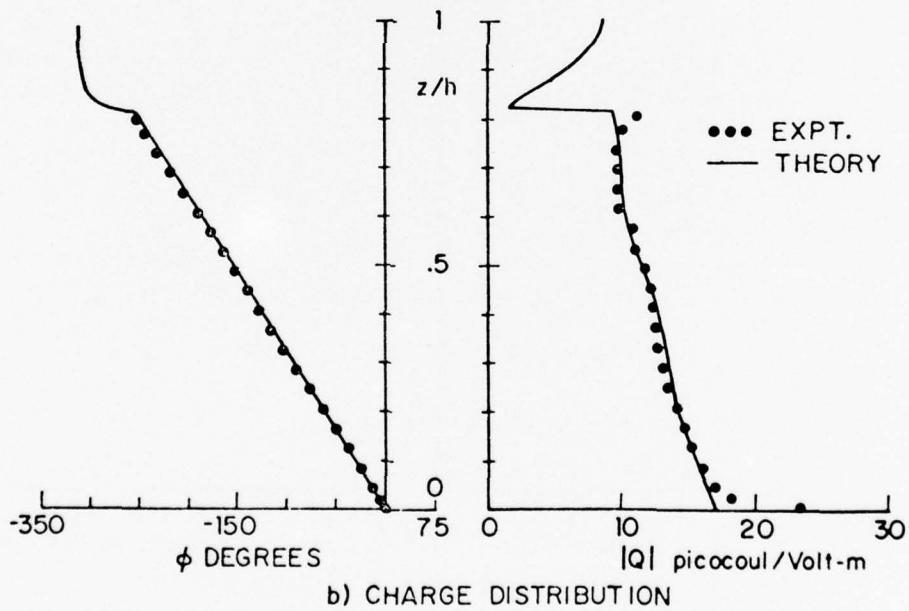
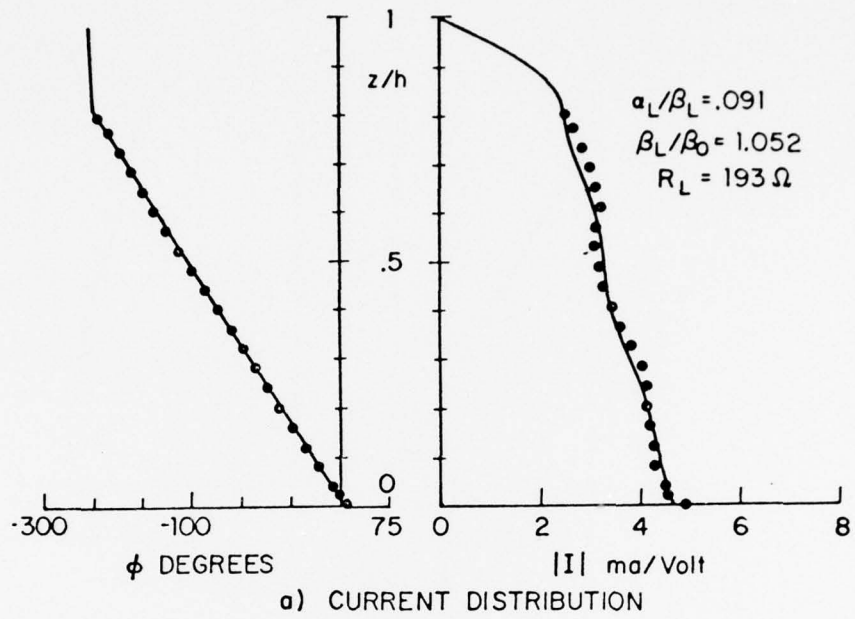


FIG. 3.83. CURRENT AND CHARGE DISTRIBUTION ON MODIFIED BEVERAGE ANTENNA OVER FRESH WATER; $t_1/\lambda_0 = 1$ AND $d/\lambda_0 = .02$.

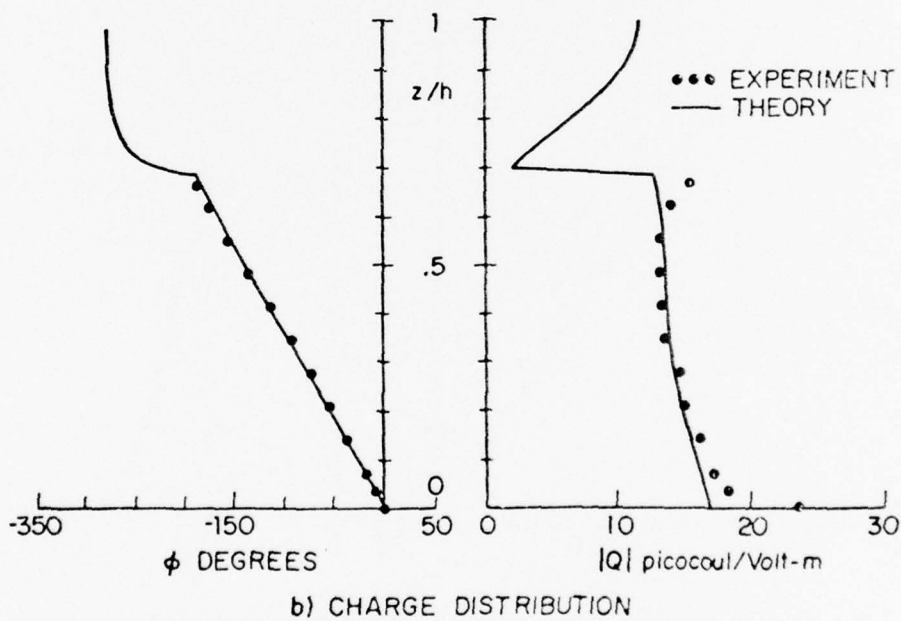
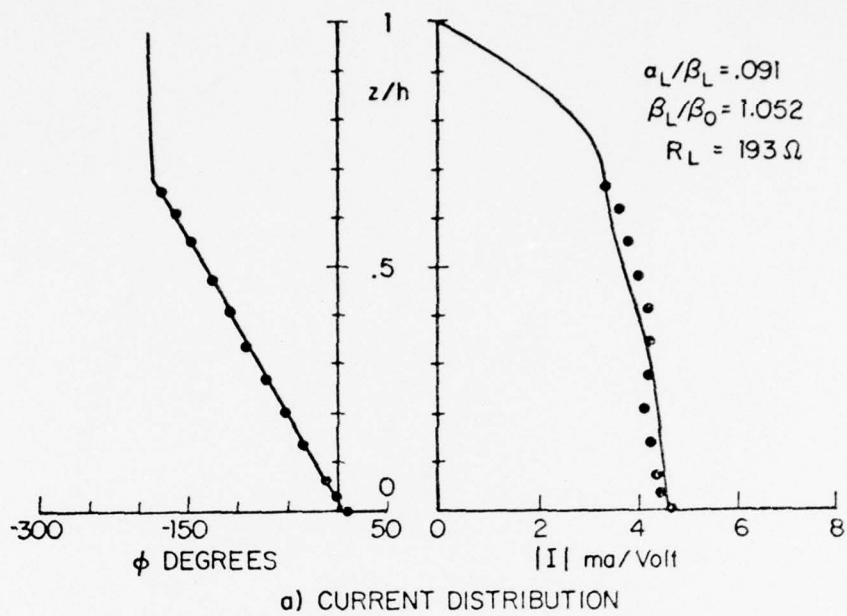
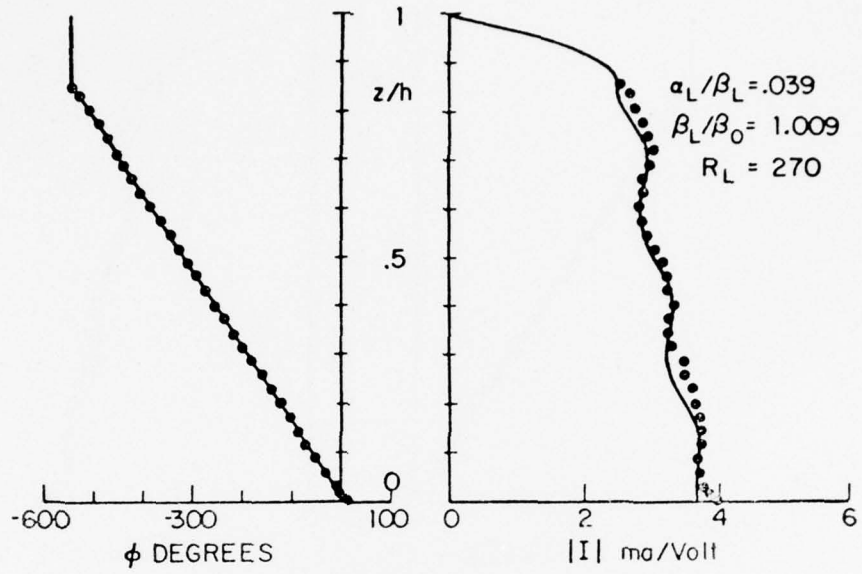
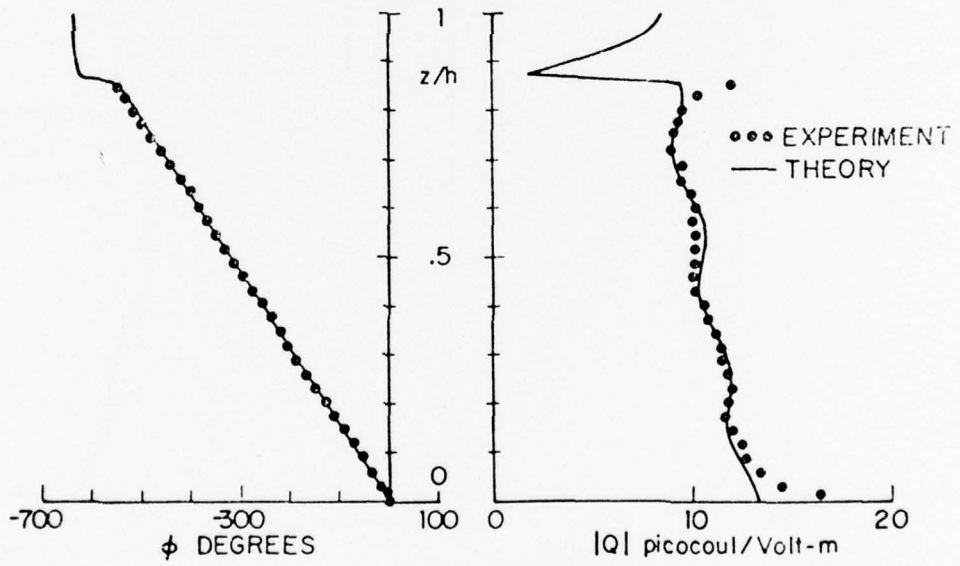


FIG. 3.84. CURRENT AND CHARGE DISTRIBUTION ON MODIFIED BEVERAGE ANTENNA OVER FRESH WATER; $t_1/\lambda_0 = .5$ AND $d/\lambda_0 = .02$.

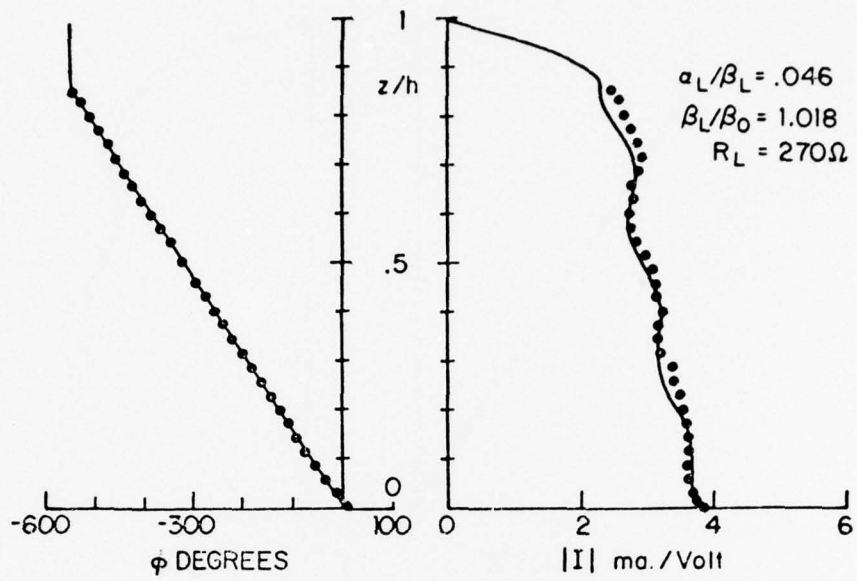


a) CURRENT DISTRIBUTION

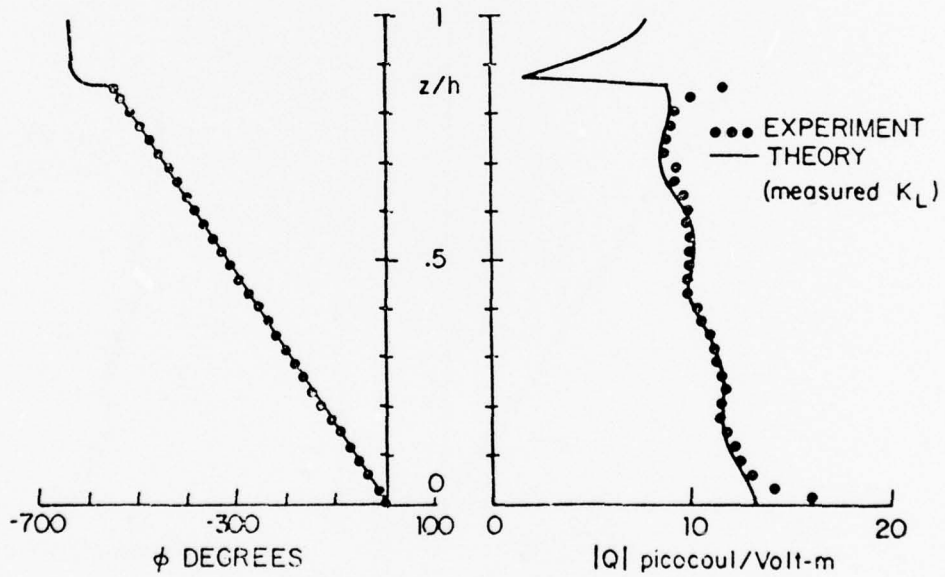


b) CHARGE DISTRIBUTION

FIG. 3.85. CURRENT AND CHARGE DISTRIBUTION ON MODIFIED BEVERAGE ANTENNA OVER FRESH WATER USING THEORETICAL WAVENUMBER; $l_1/\lambda_0 = 1.5$ AND $d/\lambda_0 = .05$.



a) CURRENT DISTRIBUTION



b) CHARGE DISTRIBUTION

FIG. 3.86. CURRENT AND CHARGE DISTRIBUTION ON MODIFIED BEVERAGE ANTENNA OVER FRESH WATER USING MEASURED WAVENUMBER; $f_1/\lambda_0 = 1.5$ AND $d/\lambda_0 = .05$.

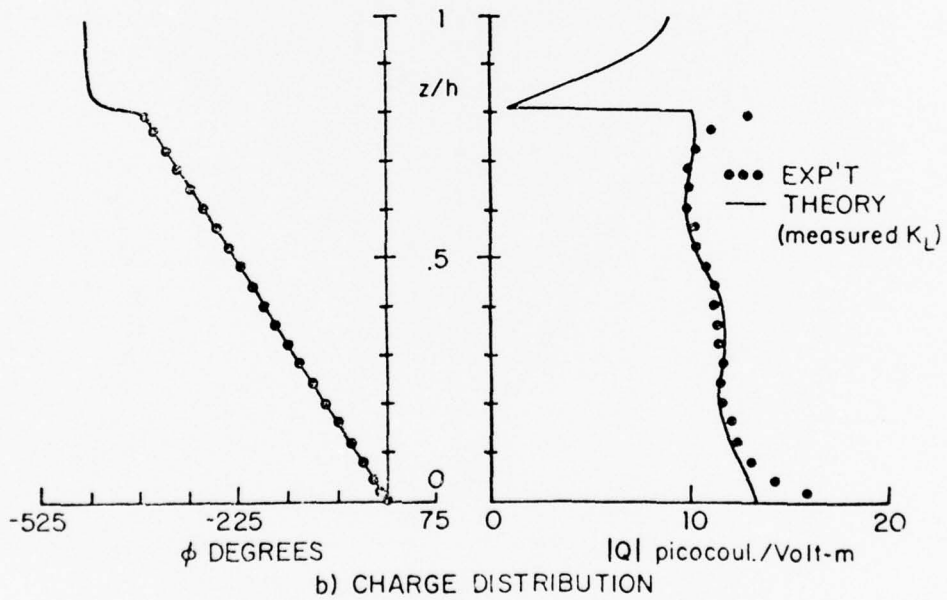
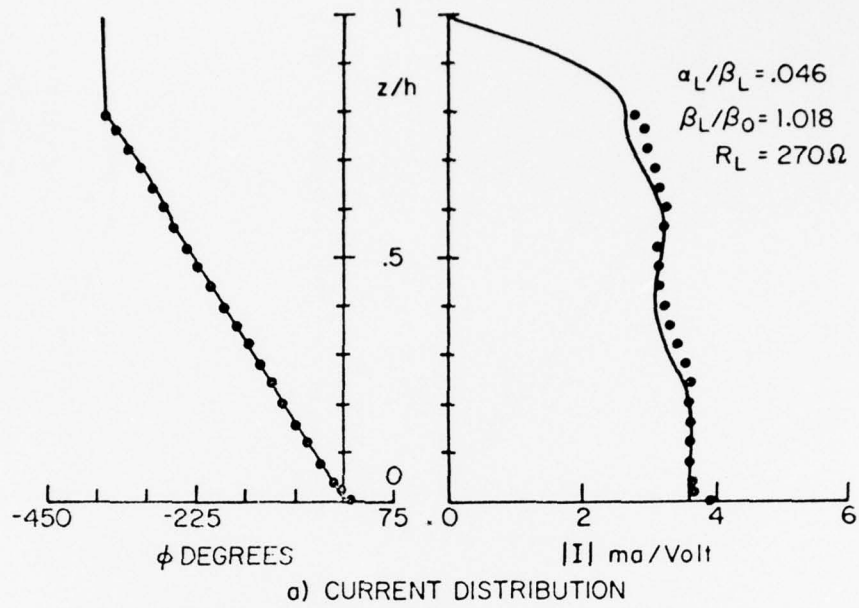
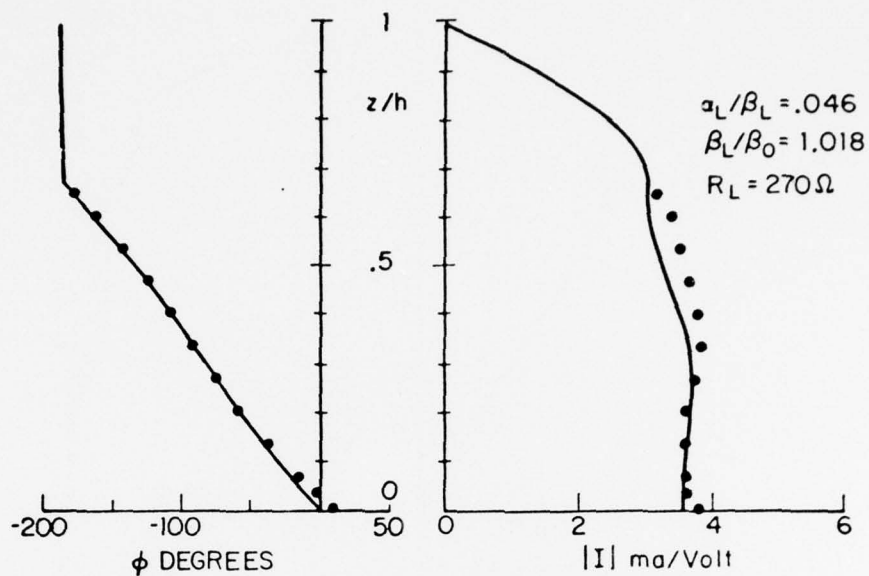
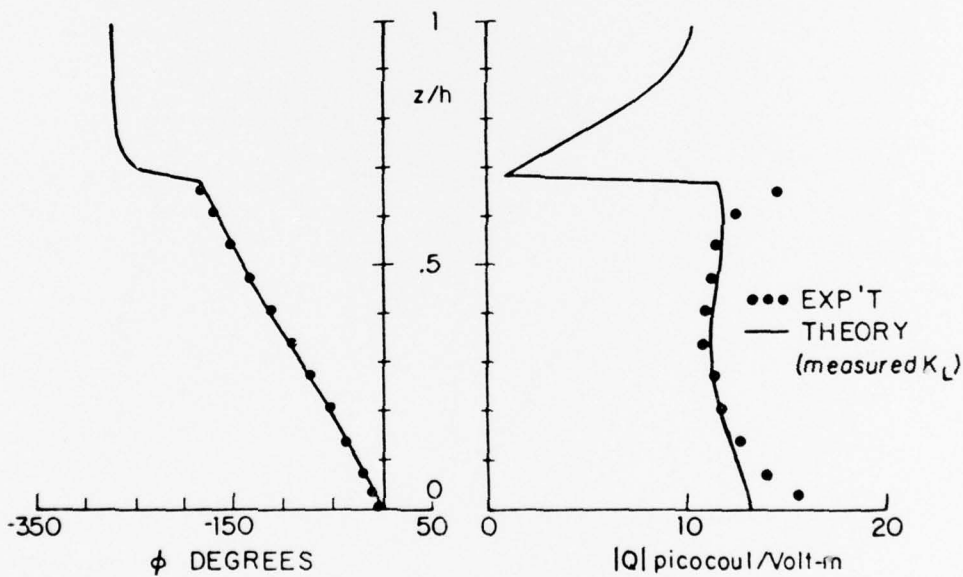


FIG. 3.87. CURRENT AND CHARGE DISTRIBUTION ON MODIFIED BEVERAGE ANTENNA OVER FRESH WATER USING MEASURED WAVENUMBER; $l_1/\lambda_0 = 1$ AND $d/\lambda_0 = .05$.

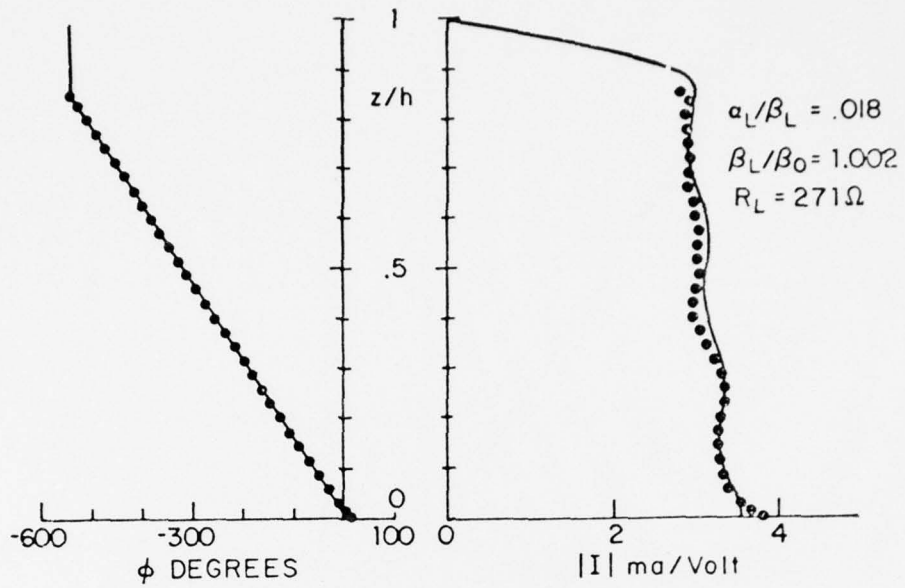


a) CURRENT DISTRIBUTION

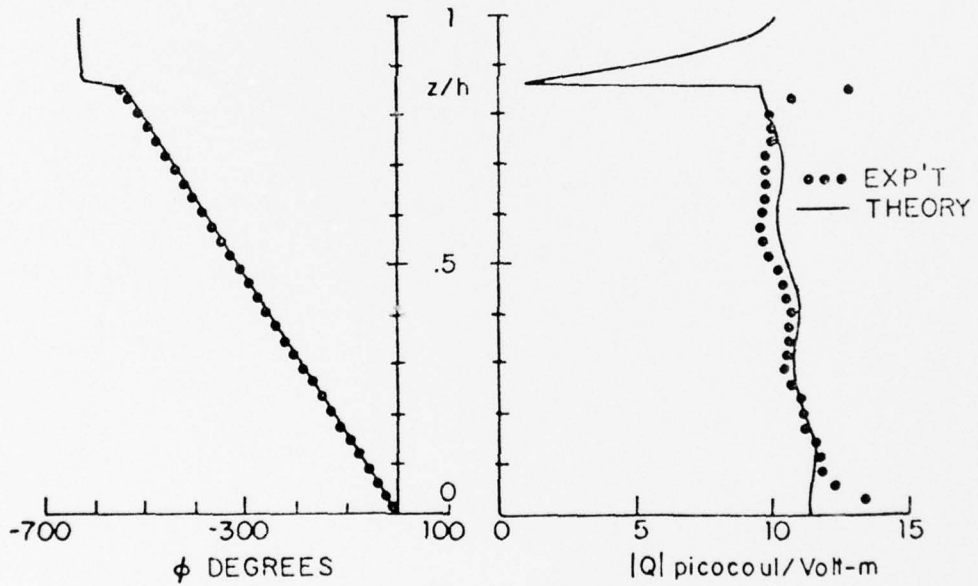


b) CHARGE DISTRIBUTION

FIG. 3.88 CURRENT AND CHARGE DISTRIBUTION ON MODIFIED BEVERAGE ANTENNA OVER FRESH WATER USING MEASURED WAVENUMBER; $f_1/\lambda_0 = .5$ AND $d/\lambda = .05$

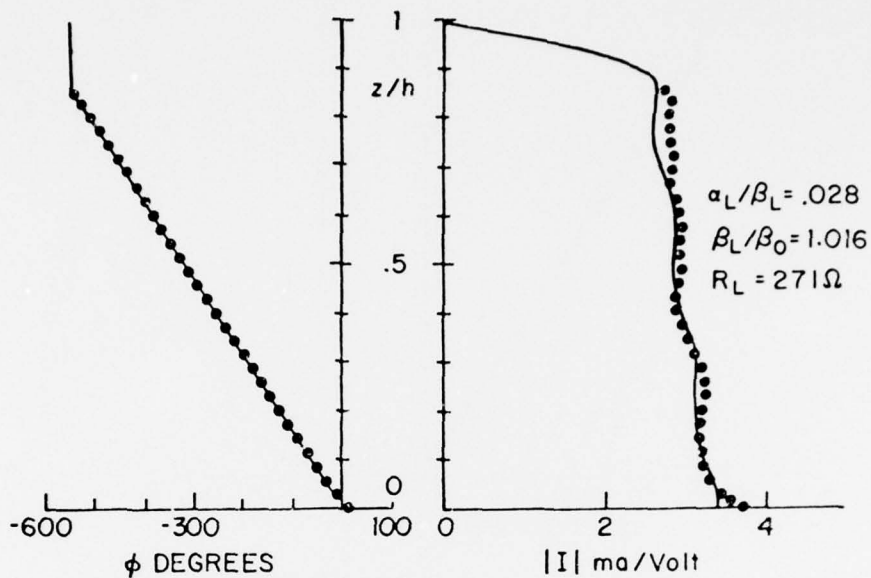


a) CURRENT DISTRIBUTION

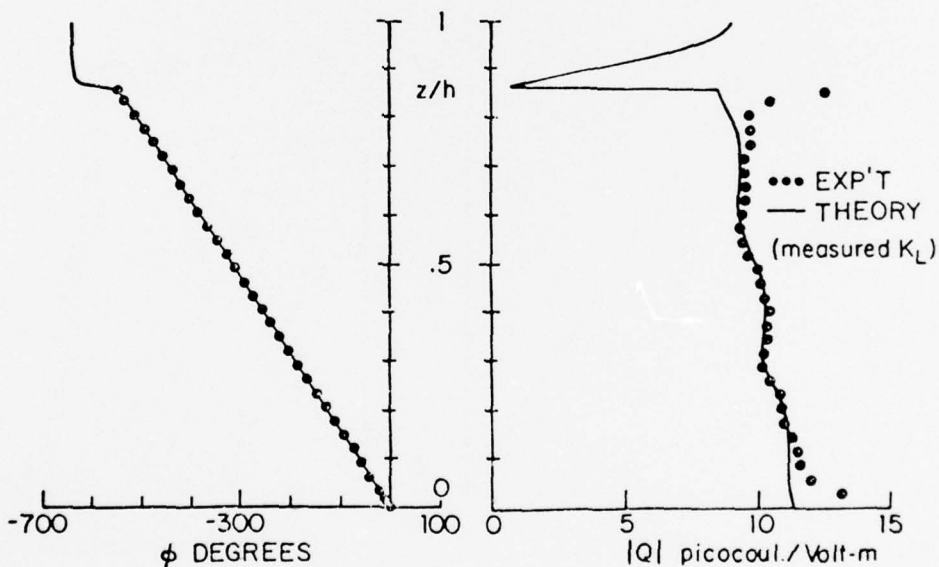


b) CHARGE DISTRIBUTION

FIG. 3.89. CURRENT AND CHARGE DISTRIBUTION ON MODIFIED BEVERAGE ANTENNA OVER FRESH WATER USING THEORETICAL WAVENUMBER $t_1/\lambda_0 = 1.5$ AND $d/\lambda_0 = .1$.



a) CURRENT DISTRIBUTION



b) CHARGE DISTRIBUTION

FIG. 3.90. CURRENT AND CHARGE DISTRIBUTION ON MODIFIED BEVERAGE ANTENNA OVER FRESH WATER USING MEASURED WAVENUMBER; $l_1/\lambda_0 = 1.5$ AND $d/\lambda_0 = .1$.

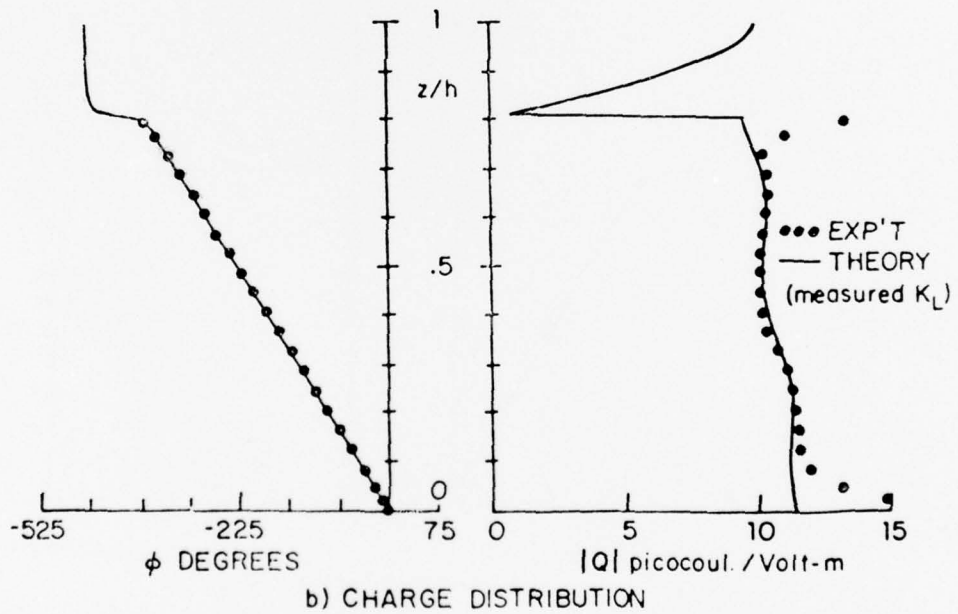
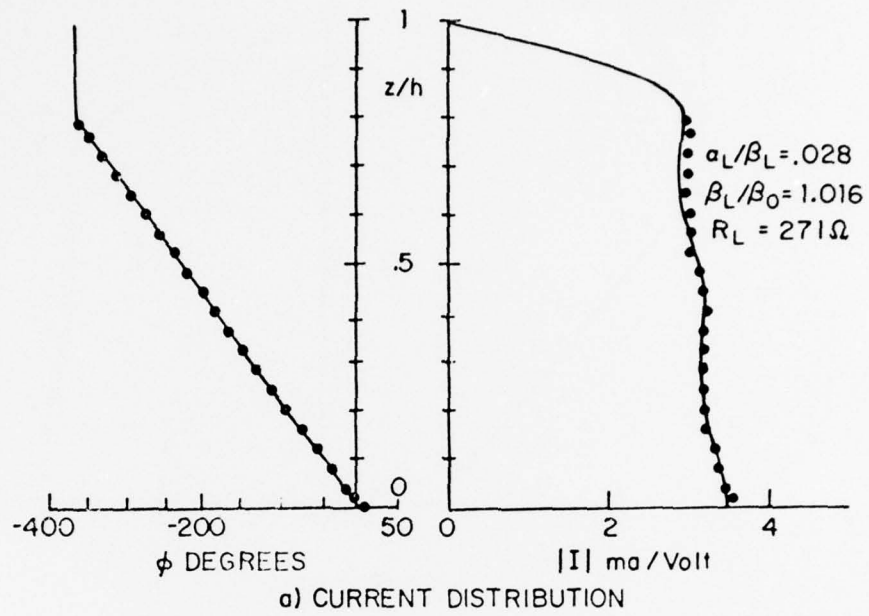


FIG. 3.91. CURRENT AND CHARGE DISTRIBUTION ON MODIFIED BEVERAGE ANTENNA OVER FRESH WATER USING MEASURED WAVENUMBER; $t_1/\lambda_0 = 1$ AND $d/\lambda_0 = .1$.

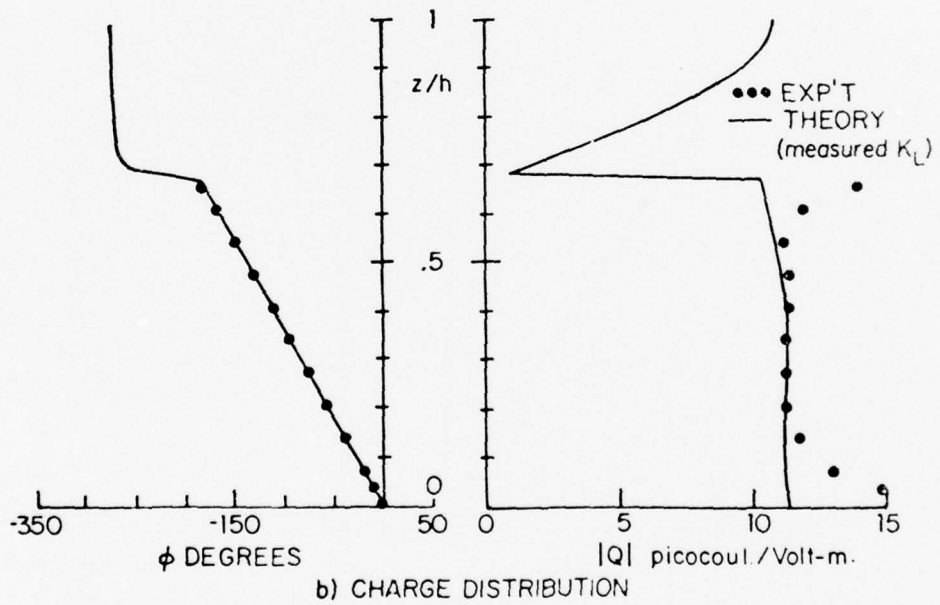
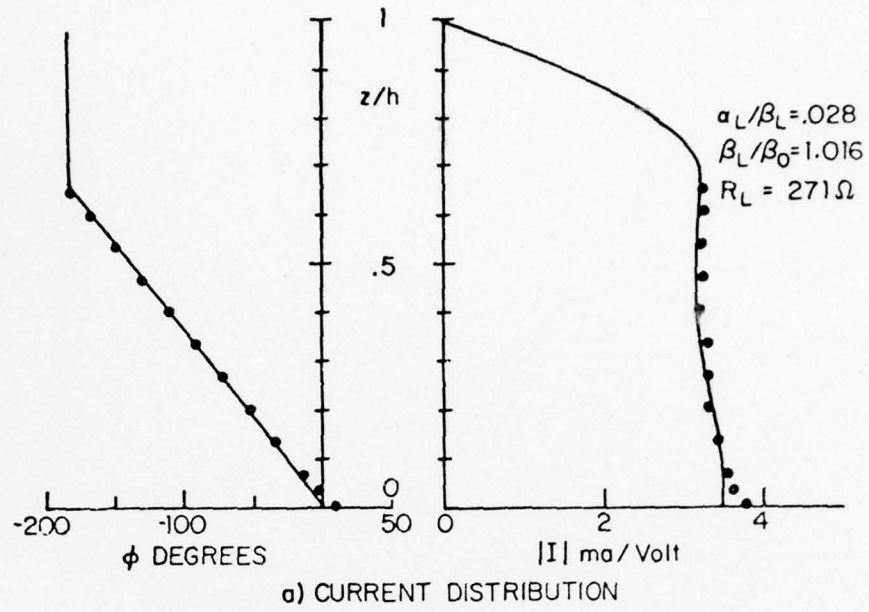


FIG. 3.92. CURRENT AND CHARGE DISTRIBUTION ON MODIFIED BEVERAGE ANTENNA OVER FRESH WATER USING MEASURED WAVENUMBER; $f_1/\lambda_0 = .5$ AND $d/\lambda_0 = .1$.

The measurements for $d/\lambda_0 = .25$ are presented in Figs. 3.93 through 3.95. The agreement with the semi-empirical solution is fairly good considering the apparent departure from the transmission-line-like distribution at this height.

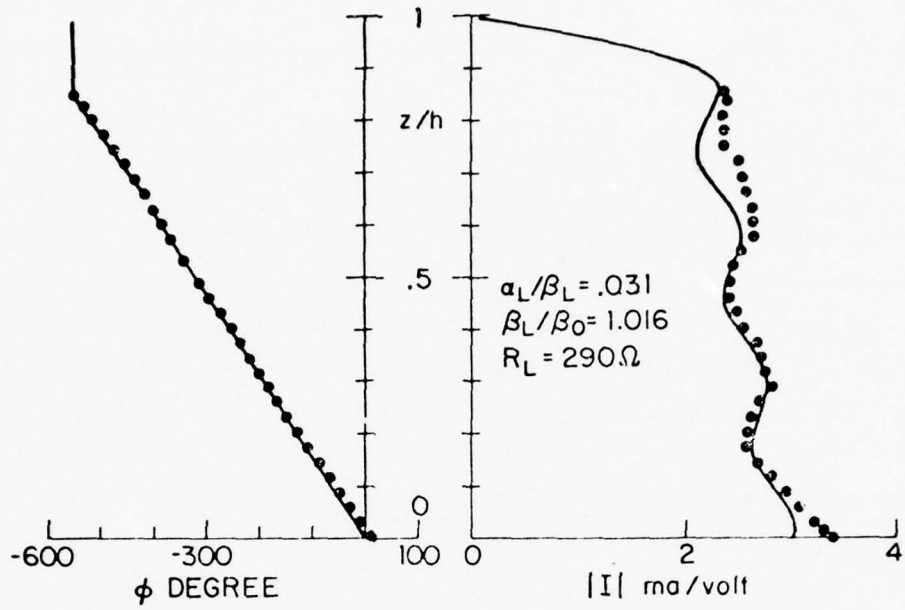
The measured input admittance for modified Beverage antennas over fresh water is presented in Figs. 3.96 through 3.100. Figures 3.96 and 3.97 compare the measured admittance with the expression in (1.55) using the theoretical wave number in (1.7) for k_L . The theoretical curves in Figs. 3.98, 3.99 and 3.100 consist of (1.55) with the measured effective wave number used for k_L . The agreement is good for a zeroth-order theory in all cases except for some noticeable departure for $d/\lambda_0 = .25$. The chart below lists the load resistor used for each height and compares each with half the value of the corresponding characteristic impedance predicted by King and calculated from the measured wave number using (1.8).

d/λ_0	R_L used	$(1/2)Z_c$ King	from $(1/2)Z_c$ measured k_L
.01	162 Ω	177 - j26 Ω	---
.02	193 Ω	207 - j20 Ω	---
.05	270 Ω	254 - j10 Ω	256 - j12 Ω
.1	271 Ω	294 - j5 Ω	298 - j8 Ω
.25	290 Ω	348 - j2 Ω	354 - j11 Ω

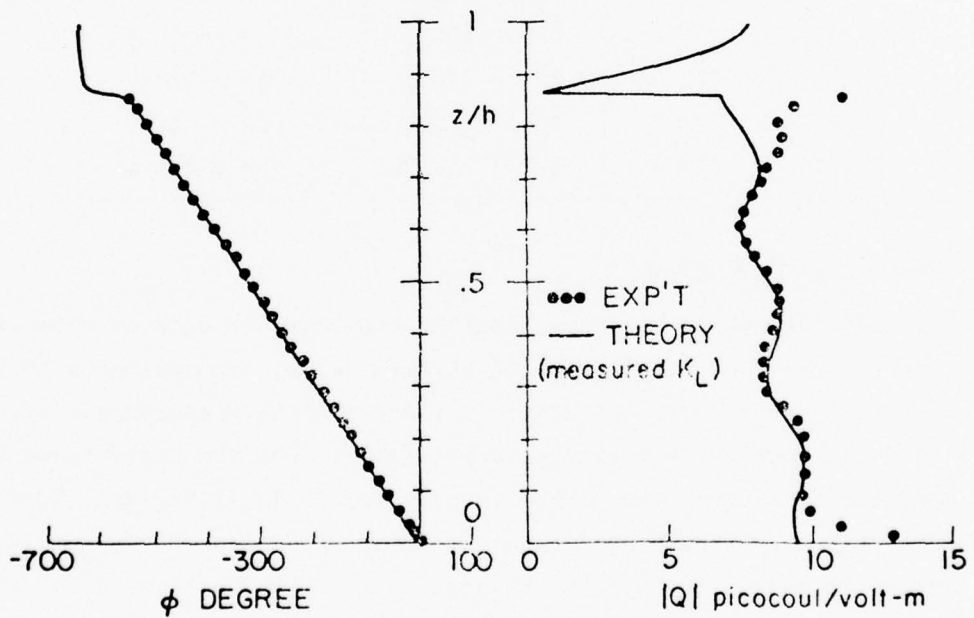
Salt-Water Measurements

The conclusions to be drawn from the measurements made on antennas over salt water, presented in Figs. 3.101 through 3.122, are analogous to those for the fresh-water case. At $d/\lambda_0 = .01$ and $.02$ the measurements agree very well with the complete theoretical expressions. For the other three heights the measured effective wave number is used for k_L in (1.54) and (1.56) and compared with the experimental results. Comparisons using the complete theoretical expressions for $d/\lambda_0 = .05$ and $.1$ are shown in Figs. 3.107 and 3.111. A good match can be obtained at $d/\lambda_0 = .25$ but the overall agreement with the semi-empirical solution is not as good as for the closer spacings.

The admittances are given in Figs. 3.118 through 3.122. Figures 3.118 and 3.119 compare the measured admittances with (1.55) using the theoretical

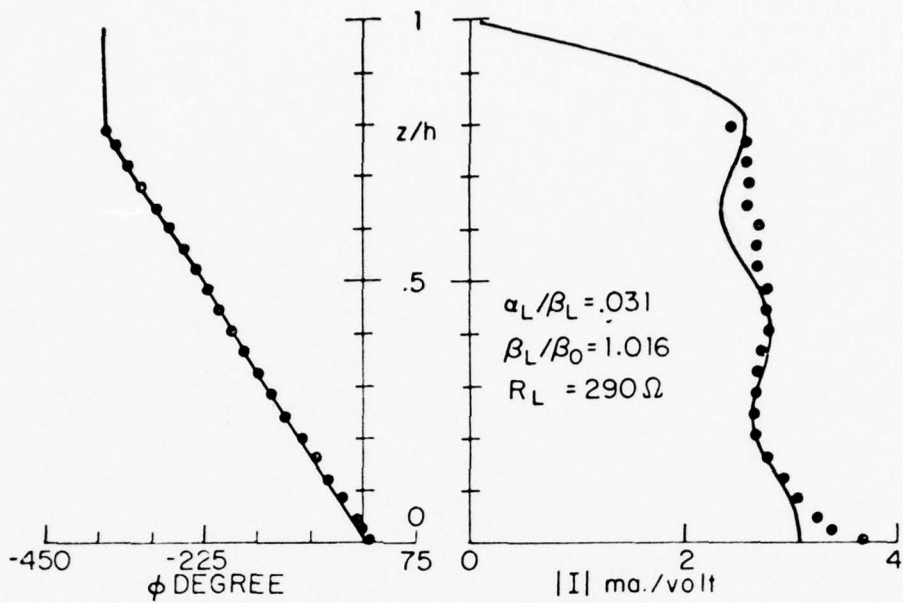


a) CURRENT DISTRIBUTION

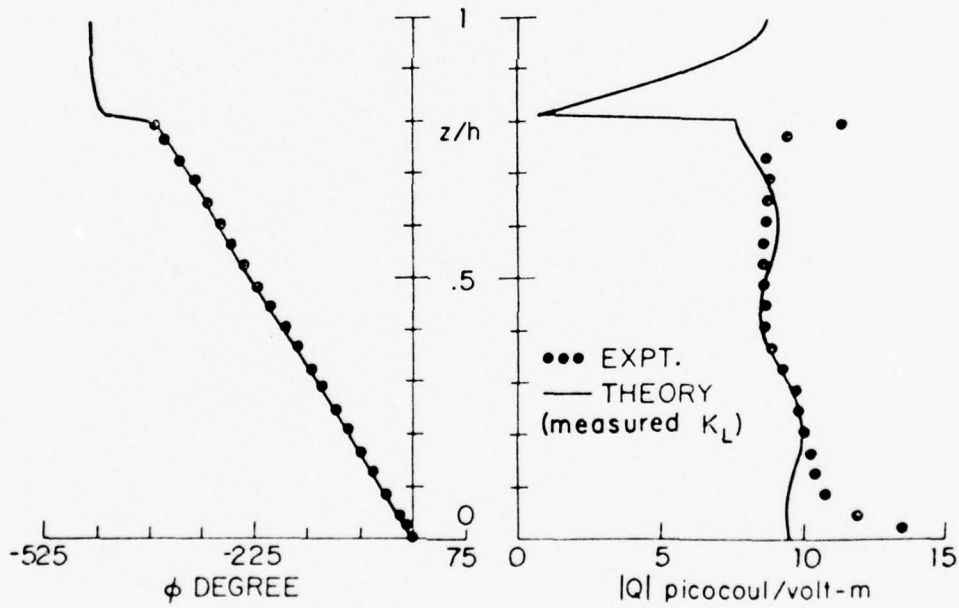


b) CHARGE DISTRIBUTION

FIG. 3.93. CURRENT AND CHARGE ON MODIFIED BEVERAGE ANTENNA OVER FRESH WATER USING MEASURED WAVENUMBER; $t_1/\lambda_0 = 1.5$ AND $d/\lambda_0 = .25$.

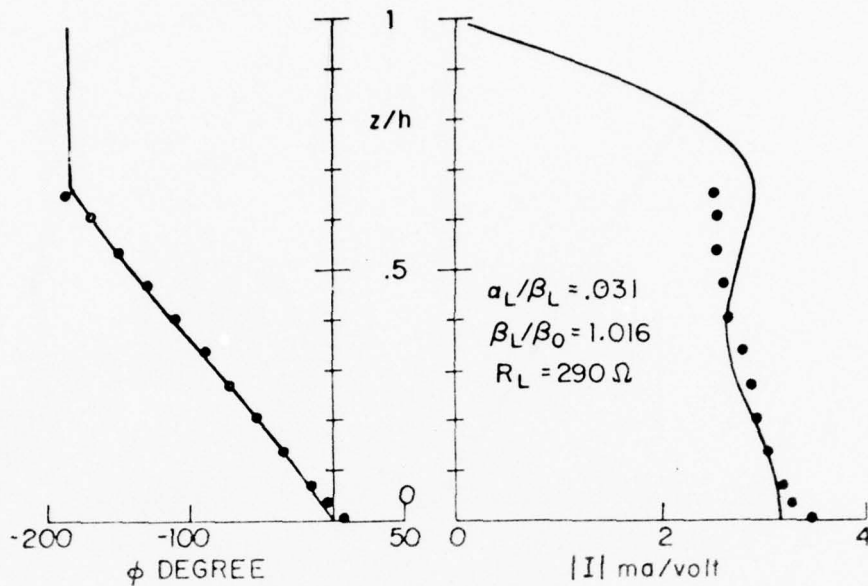


a) CURRENT DISTRIBUTION

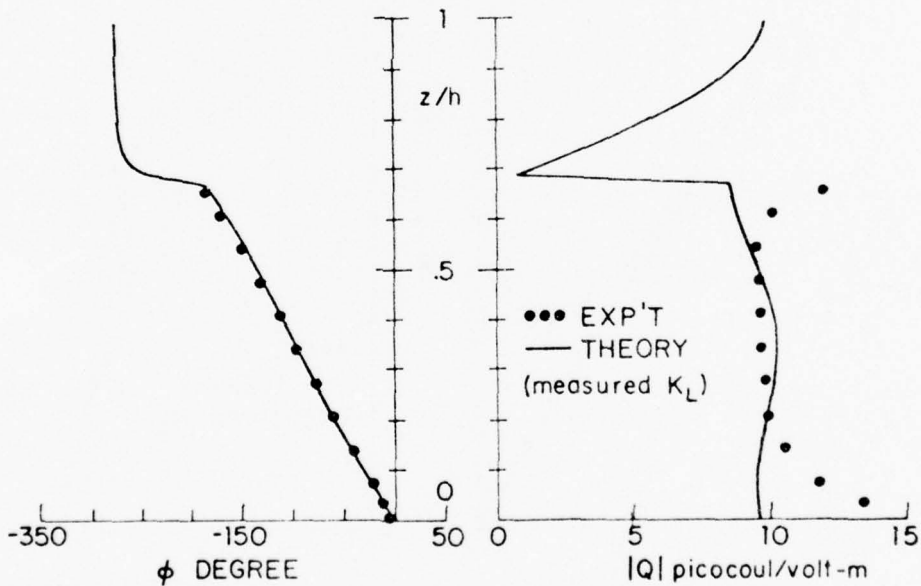


b) CHARGE DISTRIBUTION

FIG. 3.94. CURRENT AND CHARGE DISTRIBUTION ON MODIFIED BEVERAGE ANTENNA OVER FRESH WATER USING MEASURED WAVENUMBER; $l/\lambda_0 = 1$ AND $d/\lambda_0 = .25$.



a) CURRENT DISTRIBUTION



b) CHARGE DISTRIBUTION

FIG. 3.95. CURRENT AND CHARGE DISTRIBUTION ON MODIFIED BEVERAGE ANTENNA OVER FRESH WATER USING MEASURED WAVENUMBER; $t_1/\lambda_0 = .5$ AND $d/\lambda_0 = .25$.

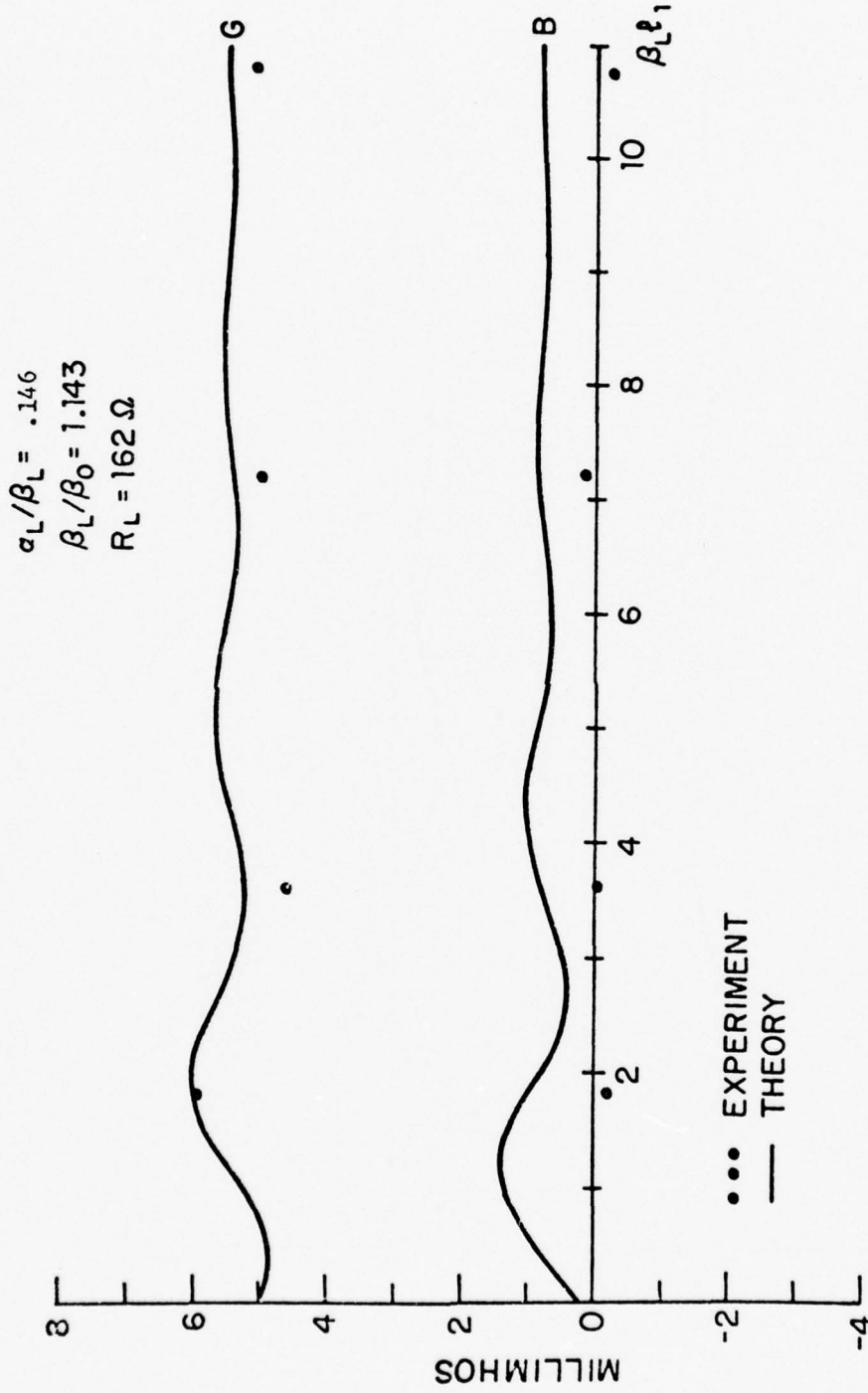


FIG. 3.96. INPUT ADMITTANCE OF MODIFIED BEVERAGE ANTENNA OVER FRESH WATER; $d/\lambda_0 = .01$ AND $\alpha/\lambda_0 = .0015$.

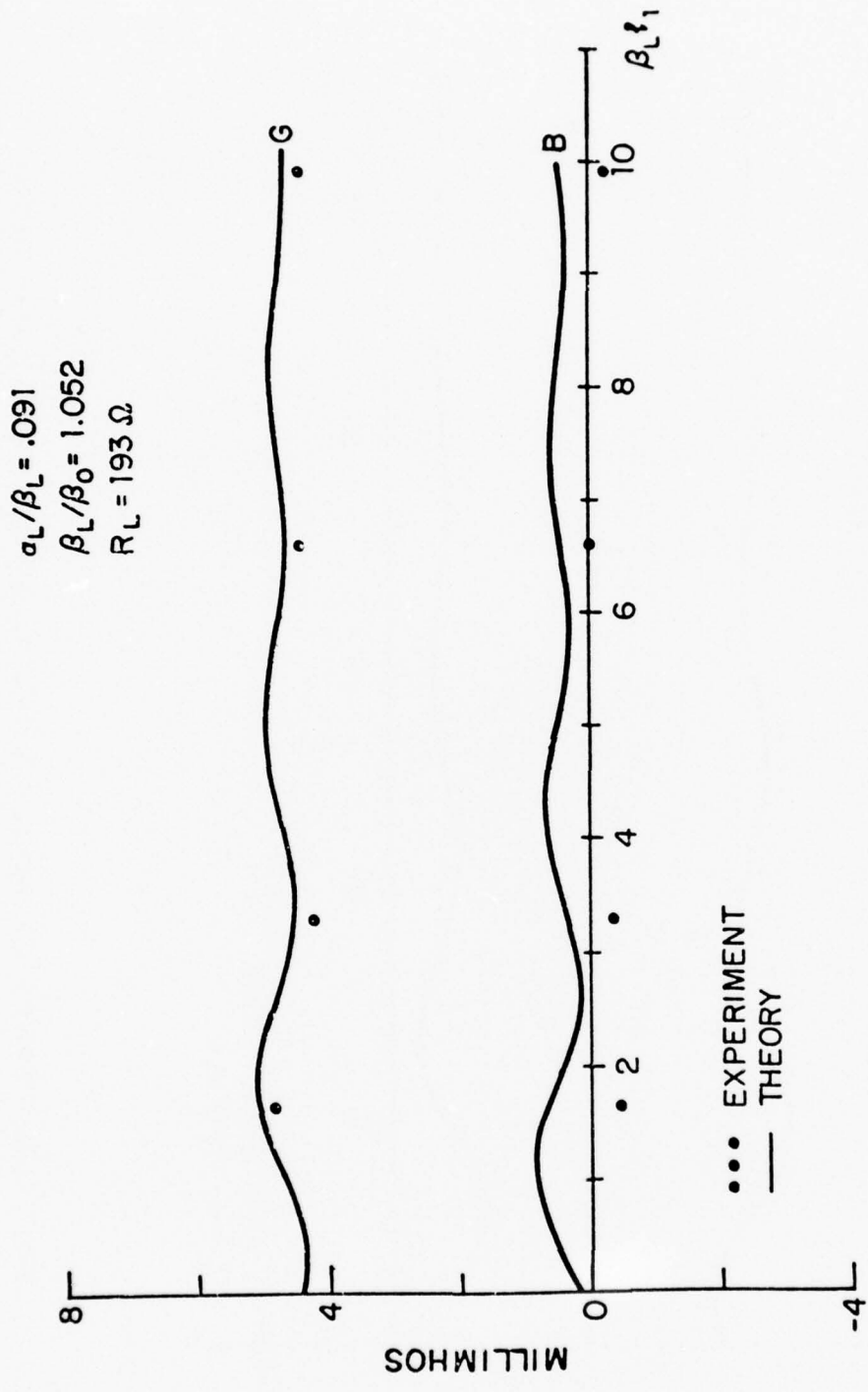


FIG. 3.97. INPUT ADMITTANCE OF MODIFIED BEVERAGE ANTENNA OVER FRESH WATER; $d/\lambda_0 = .02$ AND $\sigma/\lambda_0 = .0015$.

$\alpha_L / \beta_L = .046$
 $\beta_L / \beta_0 = 1.018$
 $R_L = 270 \Omega$

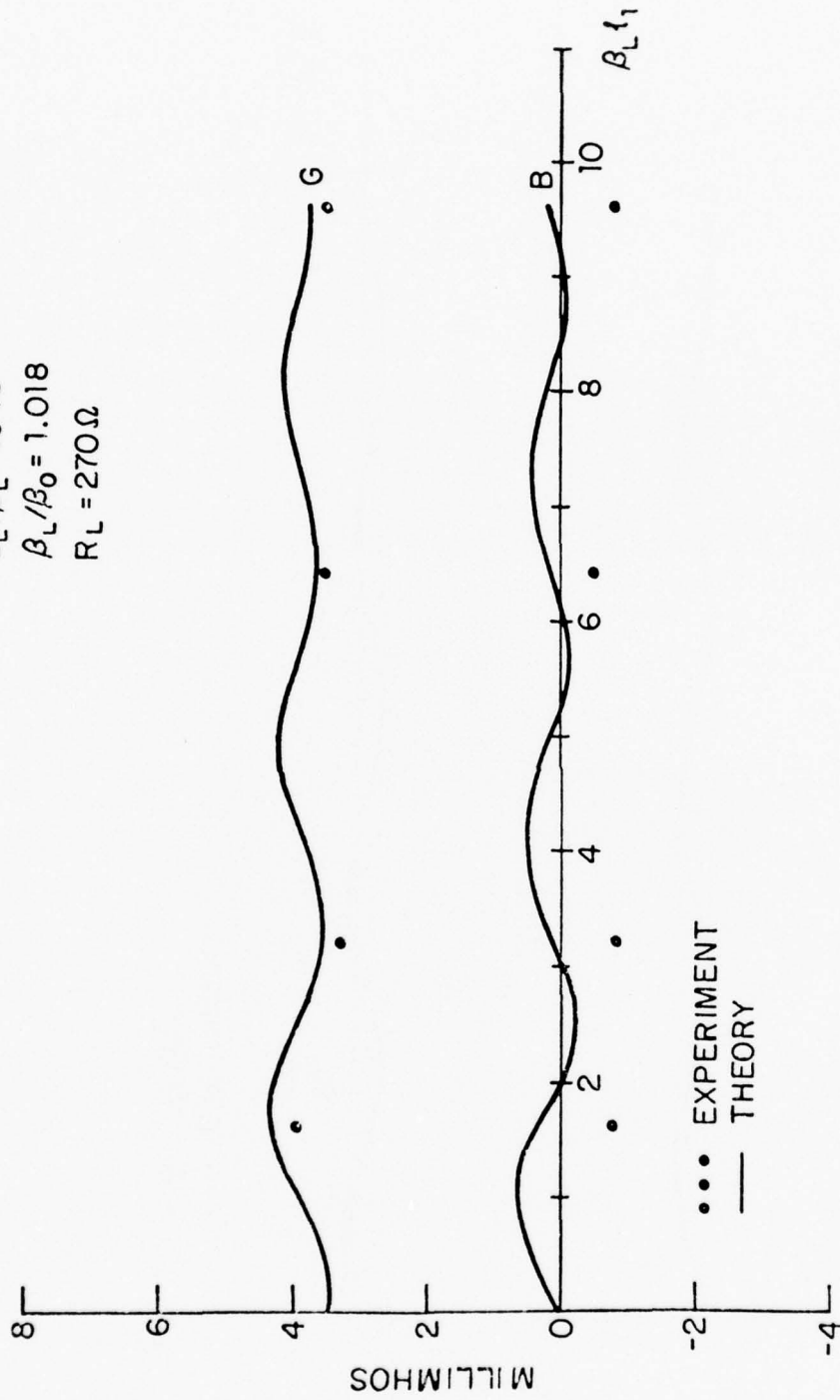


FIG. 3.98. INPUT ADMITTANCE OF MODIFIED BEVERAGE ANTENNA OVER FRESH WATER USING MEASURED K_L ; $d/\lambda_0 = .05$ AND $\sigma/\lambda_0 = .0015$

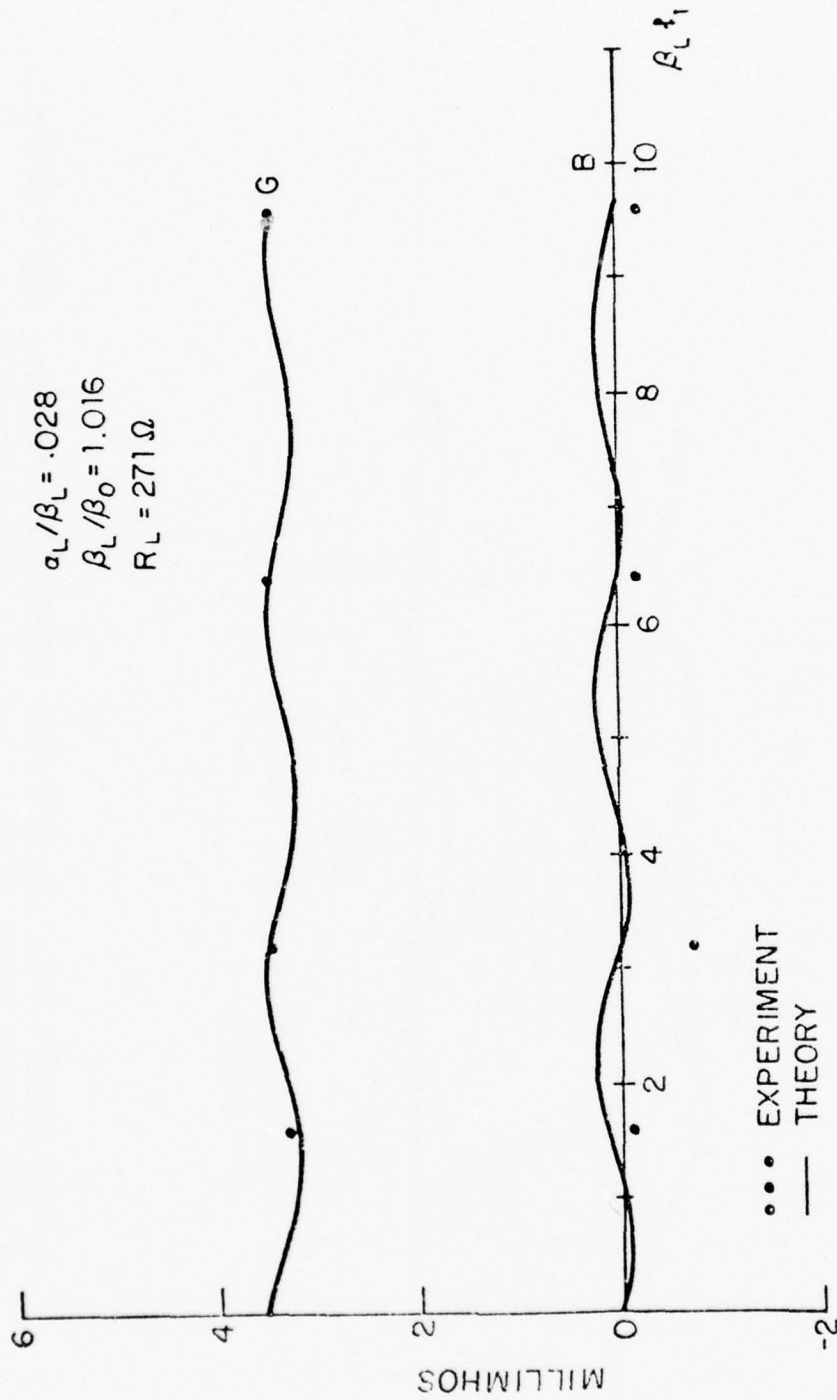


FIG. 3.99. INPUT ADMITTANCE OF MODIFIED BEVERAGE ANTENNA OVER FRESH WATER USING MEASURED K_L ; $d/\lambda_c = .1$ AND $\alpha/\lambda_0 = .0015$

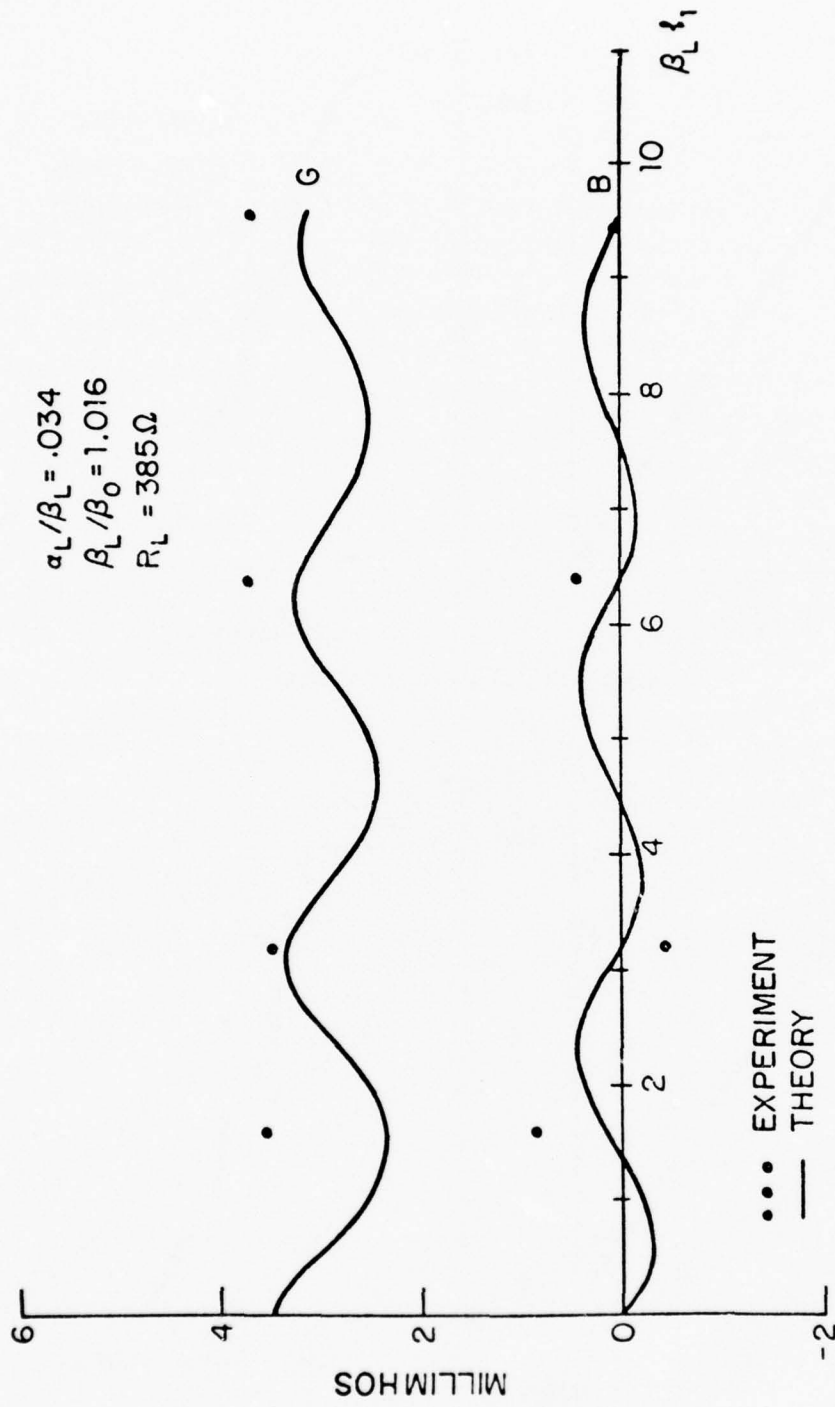


FIG. 3.100. INPUT ADMITTANCE OF MODIFIED BEVERAGE ANTENNA OVER FRESH WATER USING MEASURED K_L ; $d/\lambda_0 = .25$ AND $\alpha/\lambda_0 = .0015$

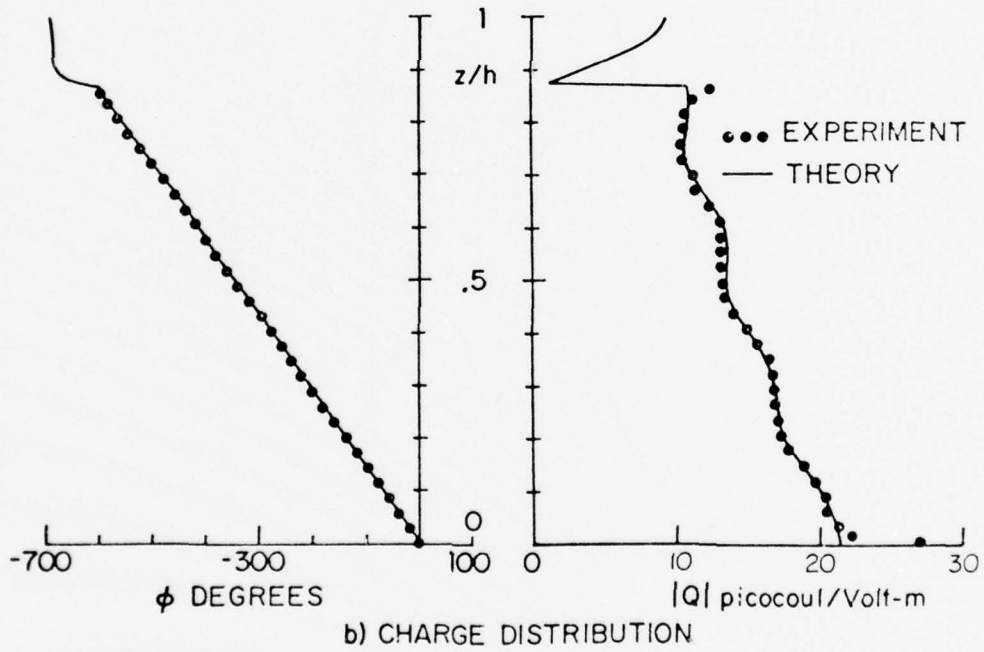
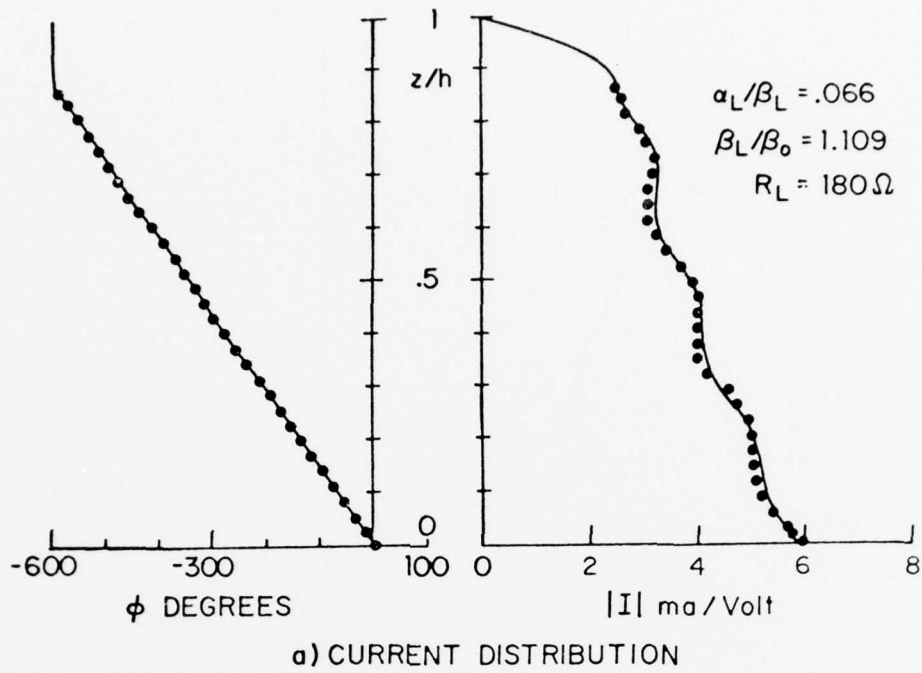
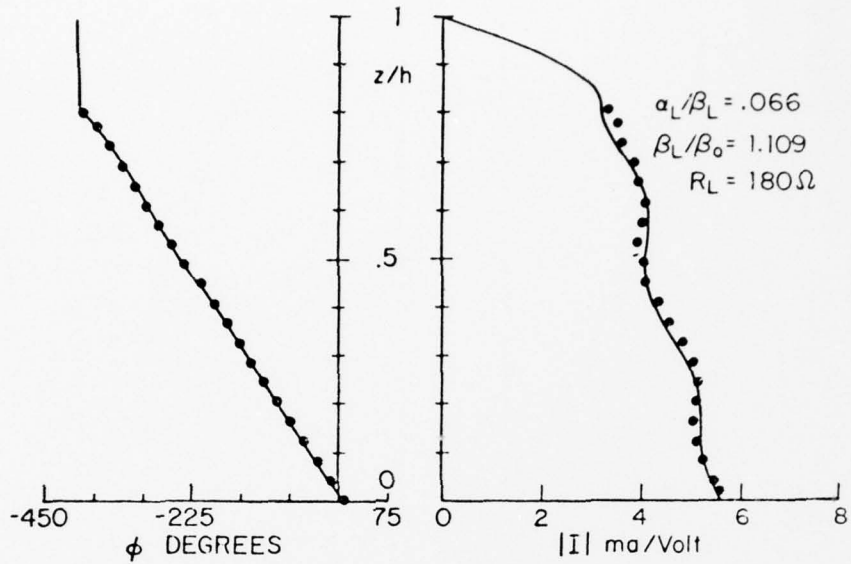
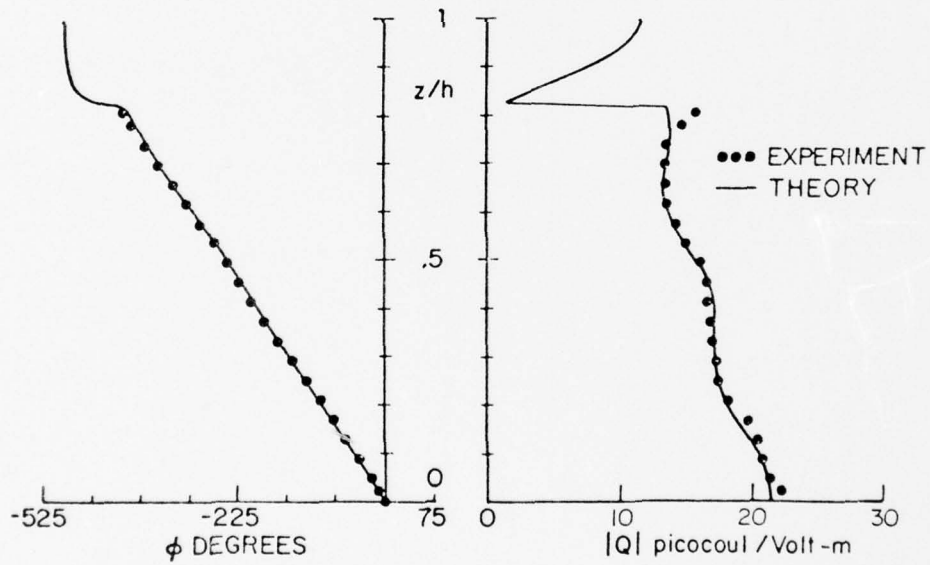


FIG. 3.101. CURRENT AND CHARGE DISTRIBUTION ON MODIFIED BEVERAGE ANTENNA OVER SALT WATER; $l_1/\lambda_0 = 1.5$ AND $d/\lambda_0 = .01$.

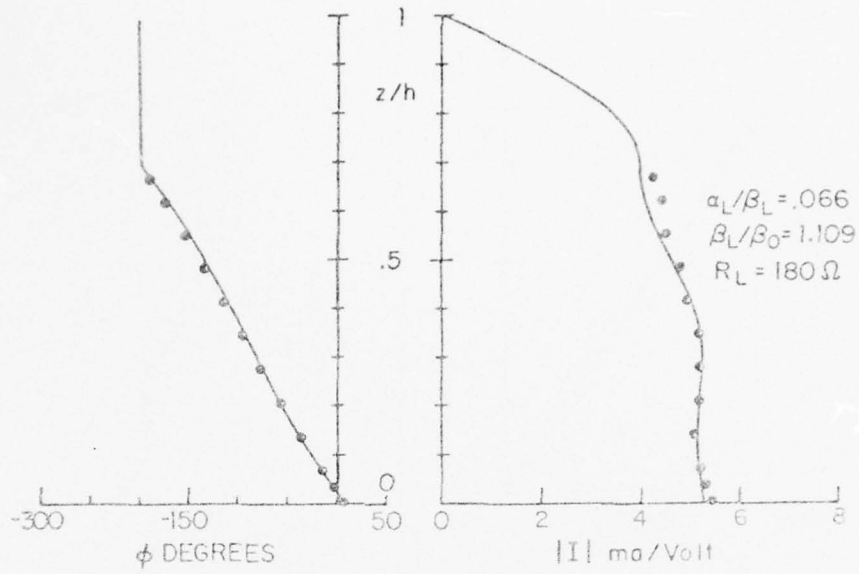


a) CURRENT DISTRIBUTION

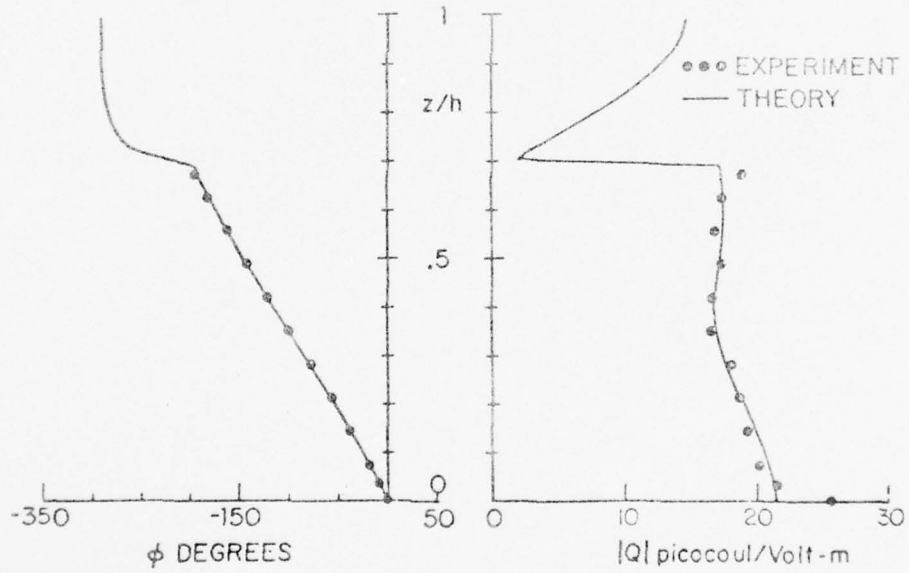


b) CHARGE DISTRIBUTION

FIG. 3.102. CURRENT AND CHARGE DISTRIBUTION ON MODIFIED BEVERAGE ANTENNA OVER SALT WATER; $l_1/\lambda_0 = 1$ AND $d/\lambda_0 = .01$.



a) CURRENT DISTRIBUTION



b) CHARGE DISTRIBUTION

FIG. 3.103. CURRENT AND CHARGE DISTRIBUTION ON MODIFIED BEVERAGE ANTENNA OVER SALT WATER; $\epsilon_r/\lambda_0 = .5$ AND $d/\lambda_0 = .01$.

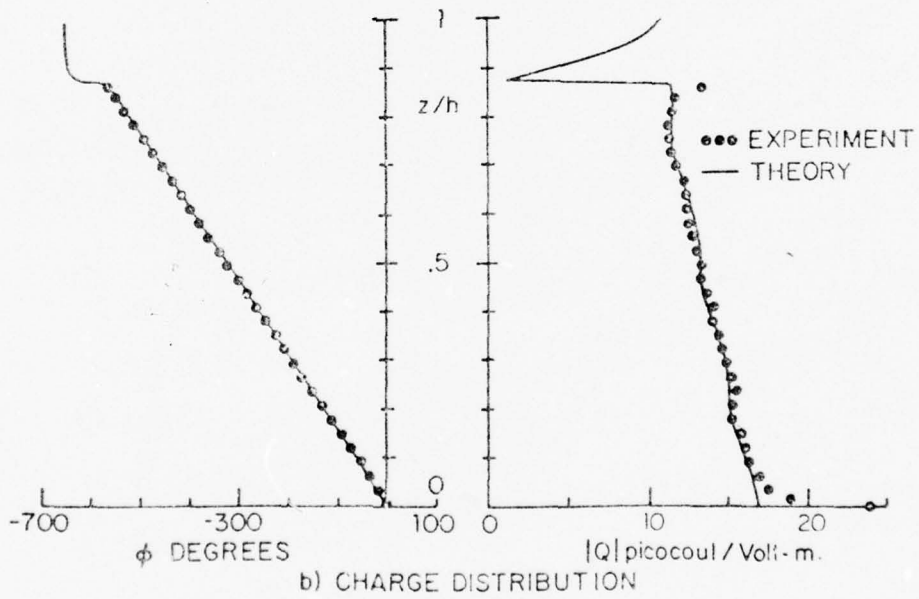
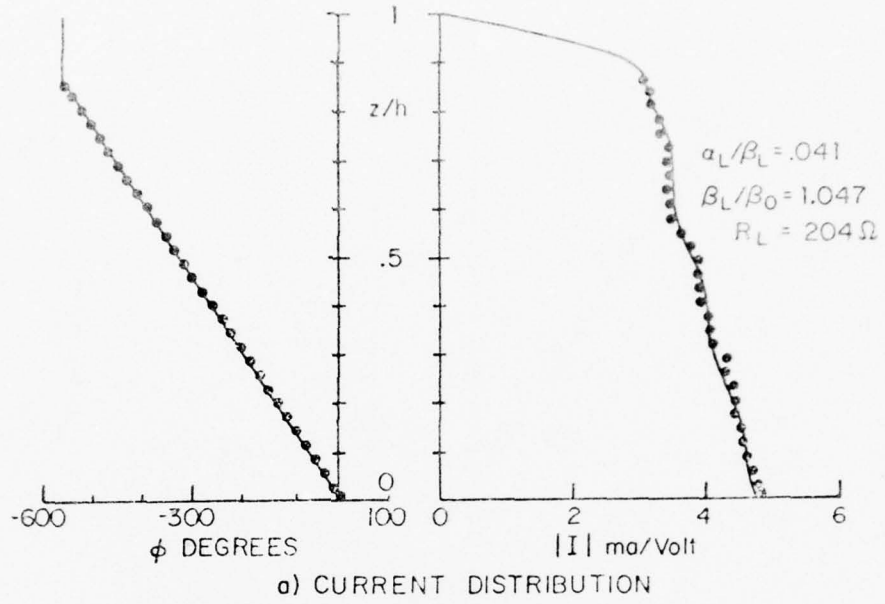
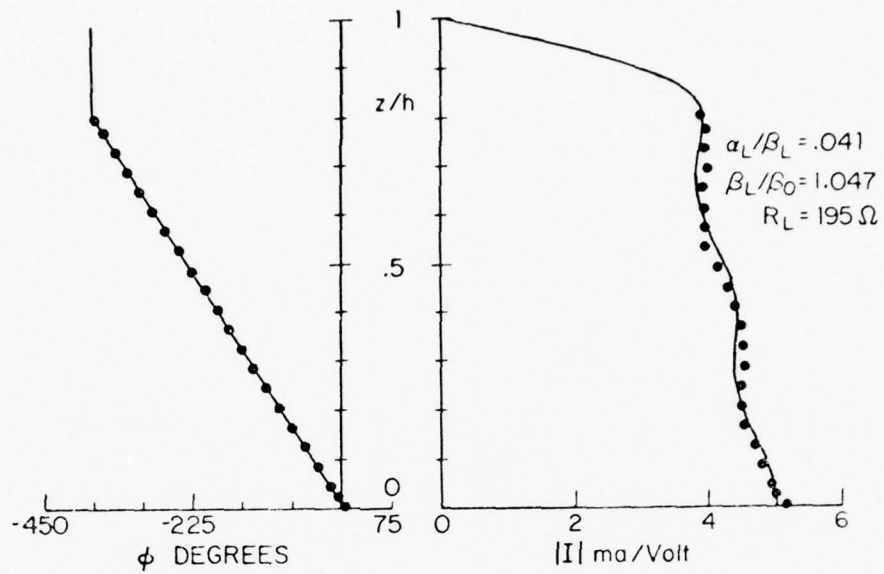
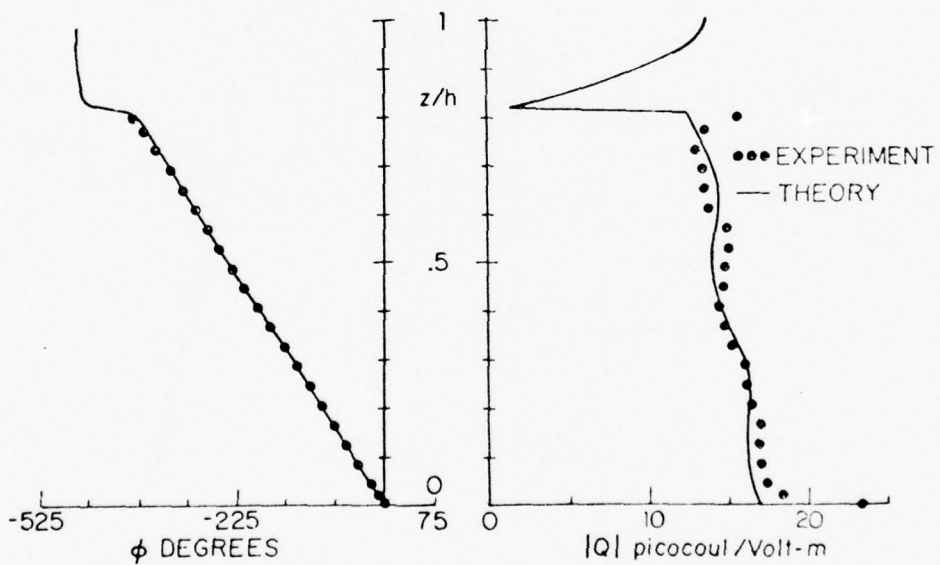


FIG. 3.104. CURRENT AND CHARGE DISTRIBUTION ON MODIFIED BEVERAGE ANTENNA OVER SALT WATER; $t_1/\lambda_0 = 1.5$ AND $d/\lambda_0 = .02$.

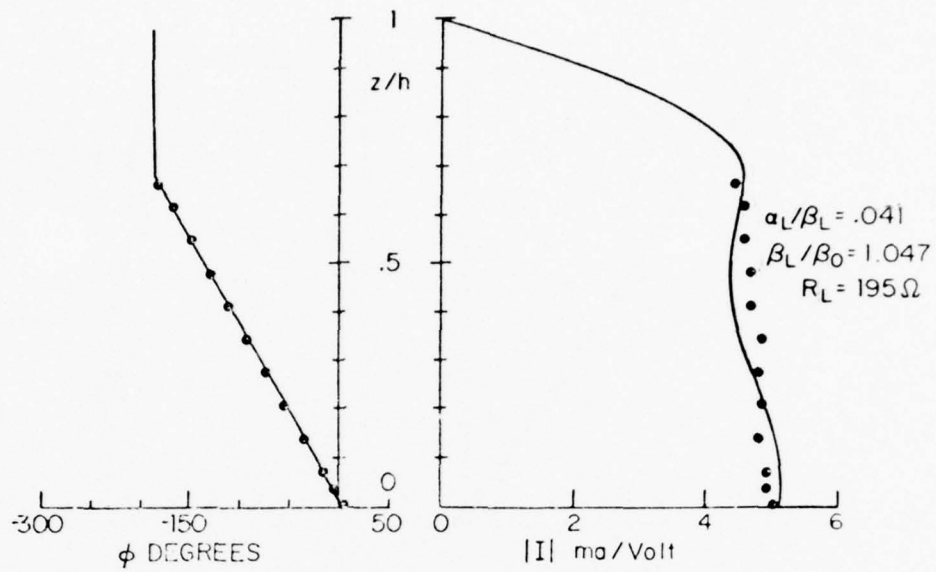


a) CURRENT DISTRIBUTION

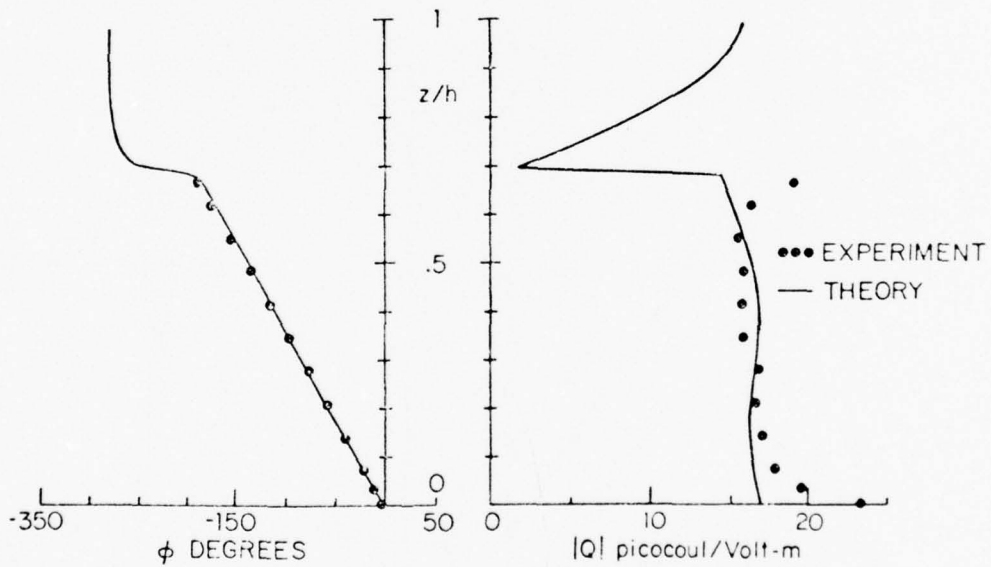


b) CHARGE DISTRIBUTION

FIG. 3.105. CURRENT AND CHARGE DISTRIBUTION ON MODIFIED BEVERAGE ANTENNA OVER SALT WATER; $l_1/\lambda_0 = 1$ AND $d/\lambda_0 = .02$.

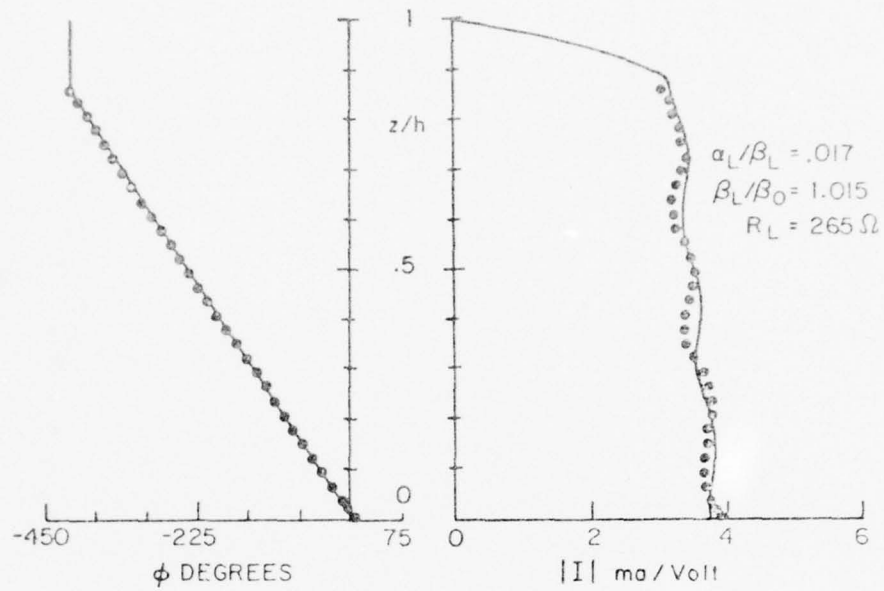


a) CURRENT DISTRIBUTION

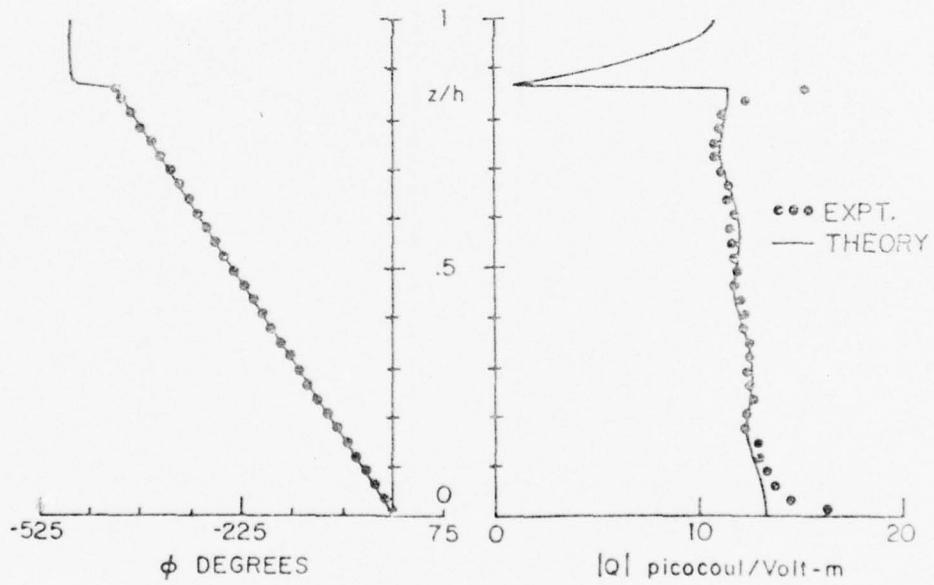


b) CHARGE DISTRIBUTION

FIG. 3.106. CURRENT AND CHARGE DISTRIBUTION ON MODIFIED BEVERAGE ANTENNA OVER SALT WATER; $t_1/\lambda_0 = .5$ AND $d/\lambda_0 = .02$.

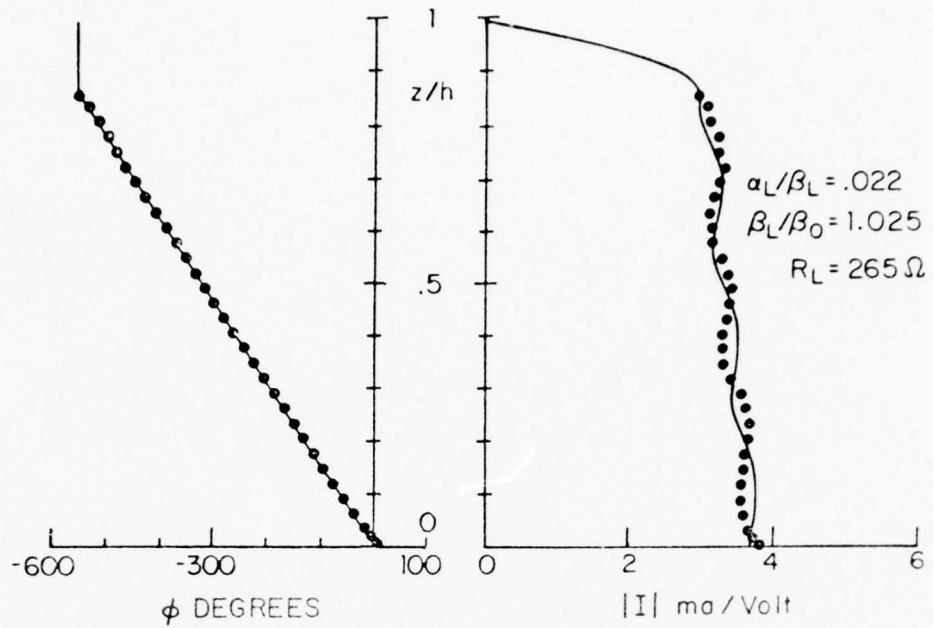


a) CURRENT DISTRIBUTION

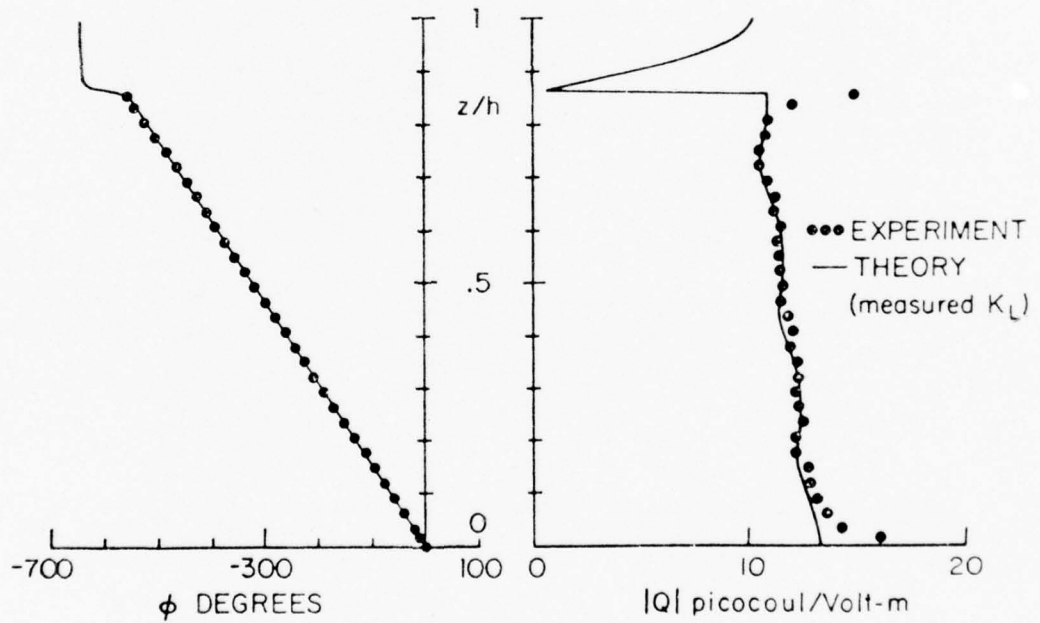


b) CHARGE DISTRIBUTION

FIG. 3.107. CURRENT AND CHARGE DISTRIBUTION ON MODIFIED BEVERAGE ANTENNA OVER SALT WATER USING THEORETICAL WAVENUMBER; $\xi_1/\lambda_0 = 1.5$ AND $d/\lambda_0 = .05$.



a) CURRENT DISTRIBUTION



b) CHARGE DISTRIBUTION

FIG. 3.108. CURRENT AND CHARGE DISTRIBUTION ON MODIFIED BEVERAGE ANTENNA OVER SALT WATER USING MEASURED WAVENUMBER; $t_1/\lambda_0 = 1.5$ AND $d/\lambda_0 = .05$.

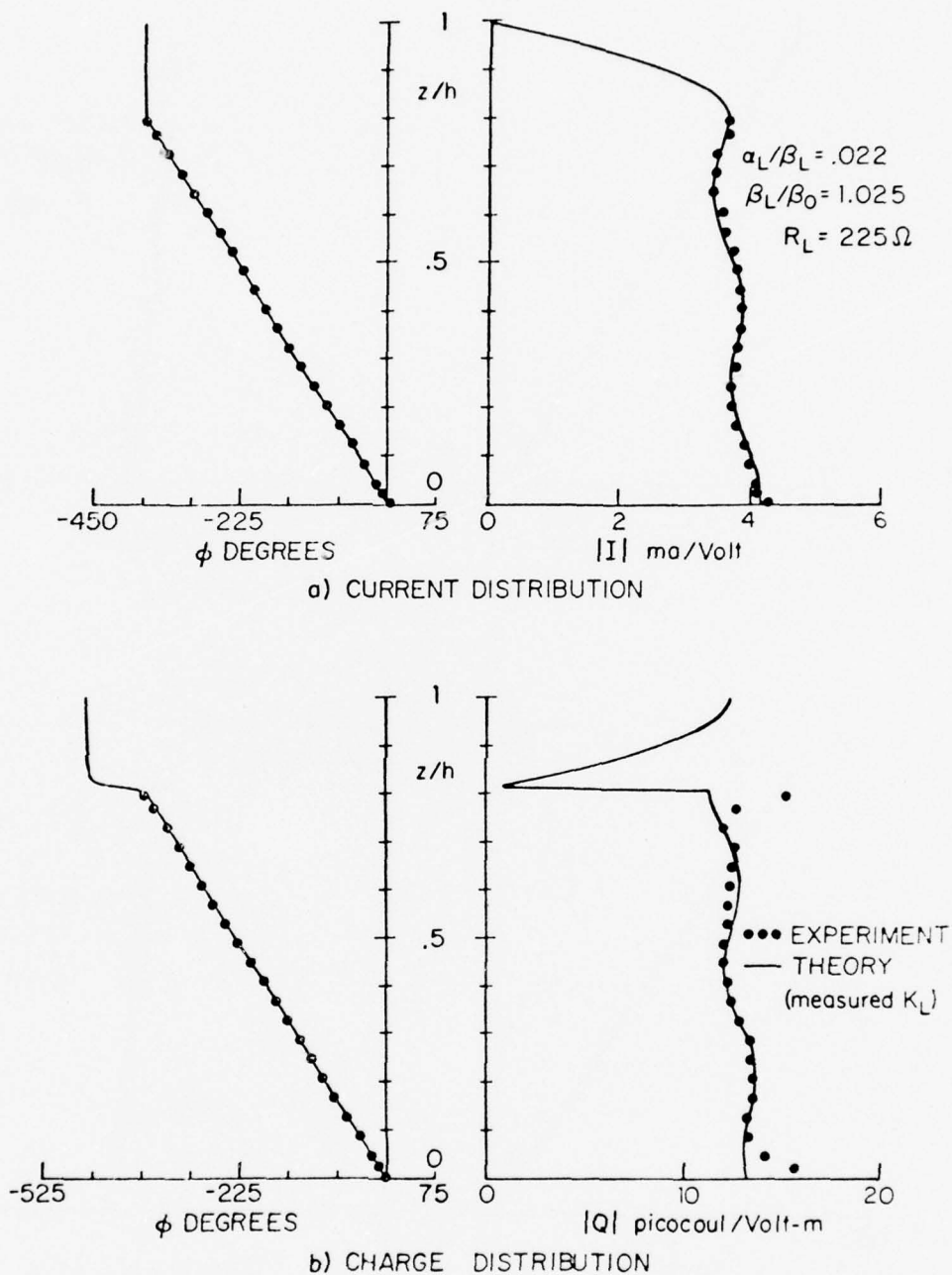
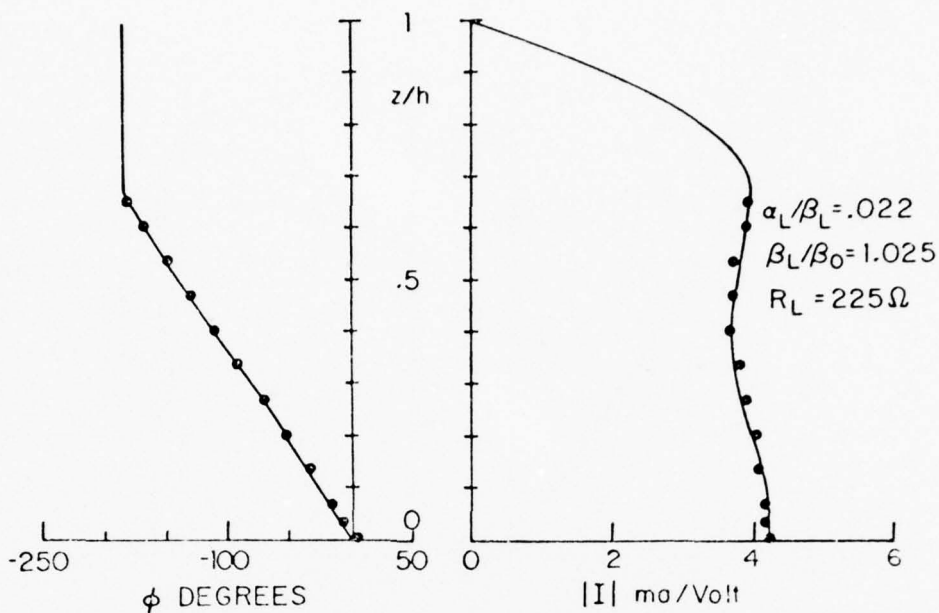
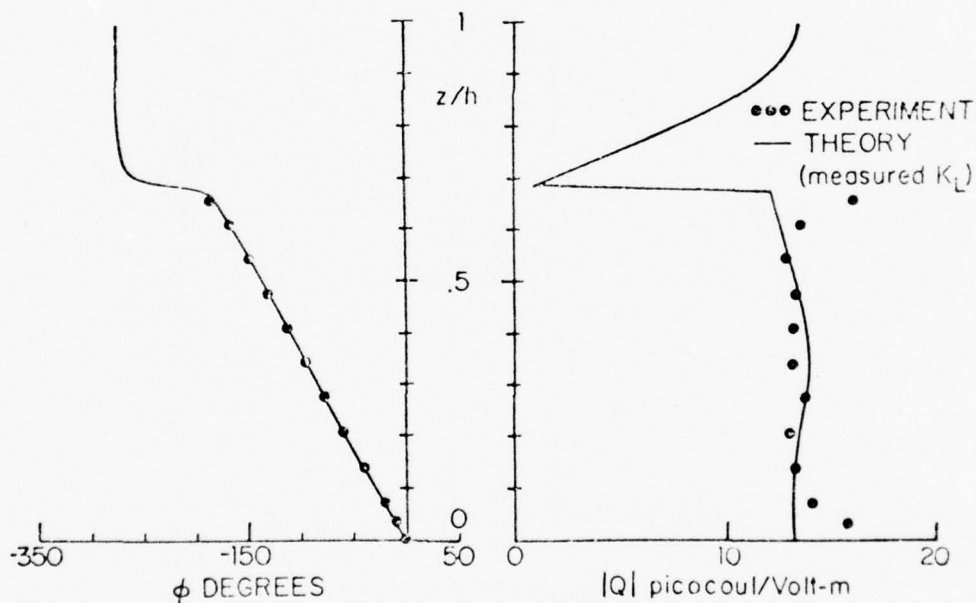


FIG. 3.109. CURRENT AND CHARGE DISTRIBUTION ON MODIFIED BEVERAGE ANTENNA OVER SALT WATER USING MEASURED WAVENUMBER; $l_1/\lambda_0 = 1$ AND $d/\lambda_0 = .05$.

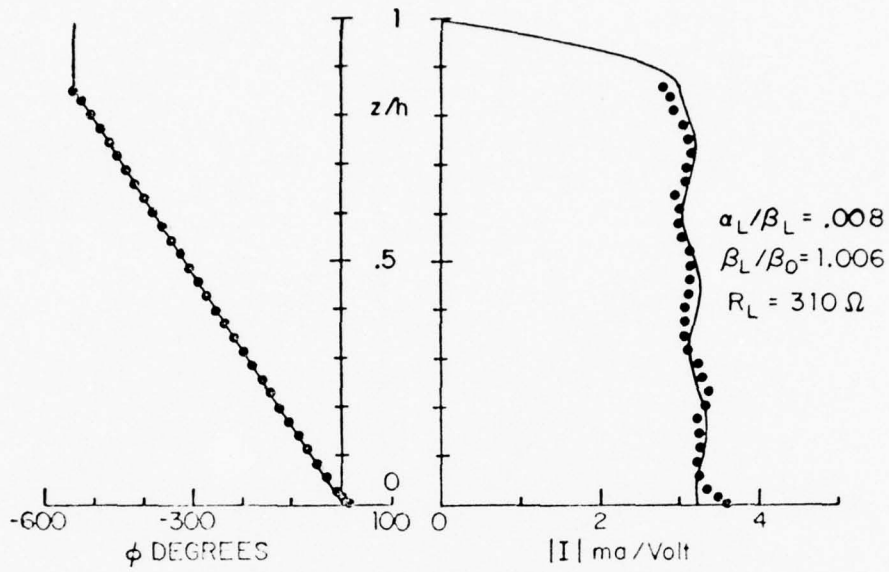


a) CURRENT DISTRIBUTION

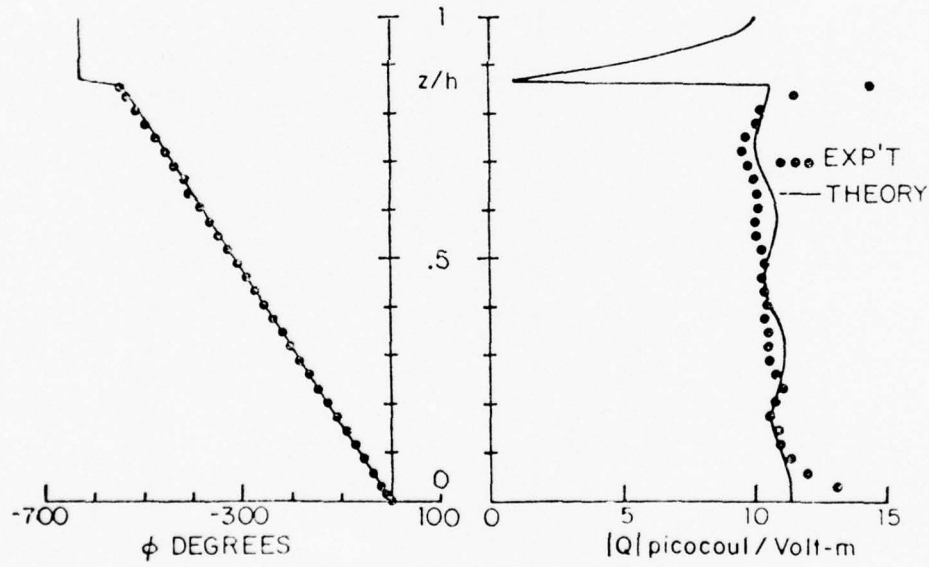


b) CHARGE DISTRIBUTION

FIG. 3.110. CURRENT AND CHARGE DISTRIBUTION ON MODIFIED BEVERAGE ANTENNA OVER SALT WATER USING MEASURED WAVENUMBER; $l_1/\lambda_0 = .5$ AND $d/\lambda_0 = .05$.



a) CURRENT DISTRIBUTION



b) CHARGE DISTRIBUTION

FIG. 3.111. CURRENT AND CHARGE DISTRIBUTION ON MODIFIED BEVERAGE ANTENNA OVER SALT WATER USING THEORETICAL WAVENUMBER; $l_1/\lambda_0 = 1.5$ AND $d/\lambda_0 = .1$.

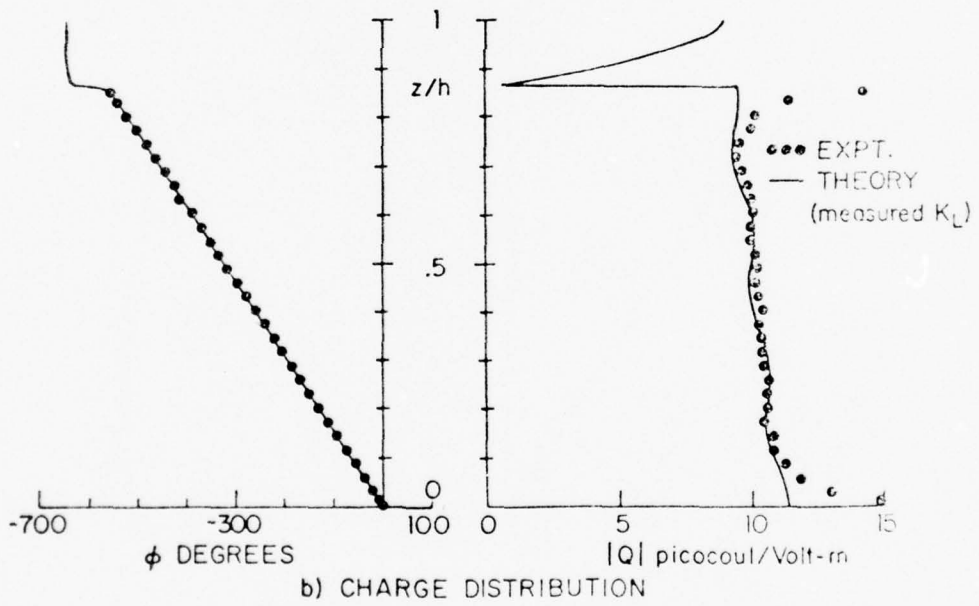
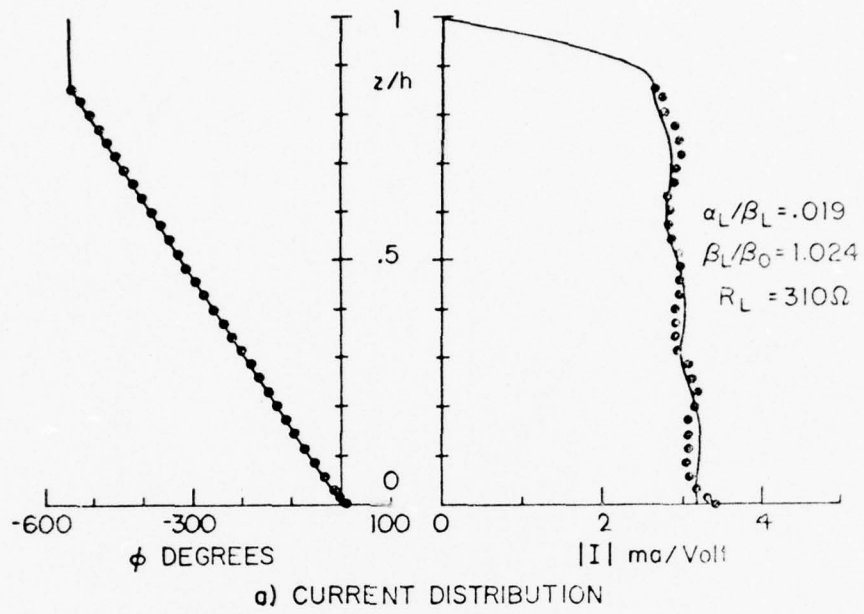
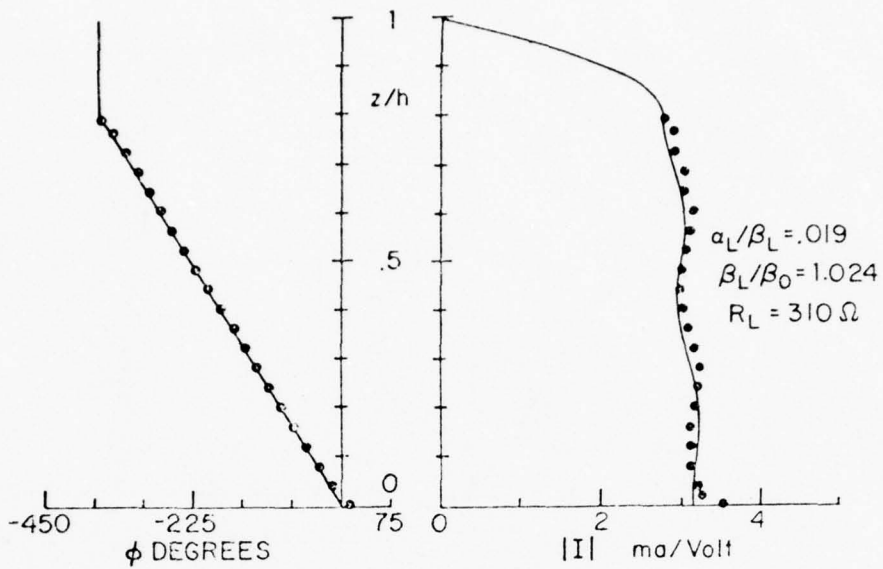
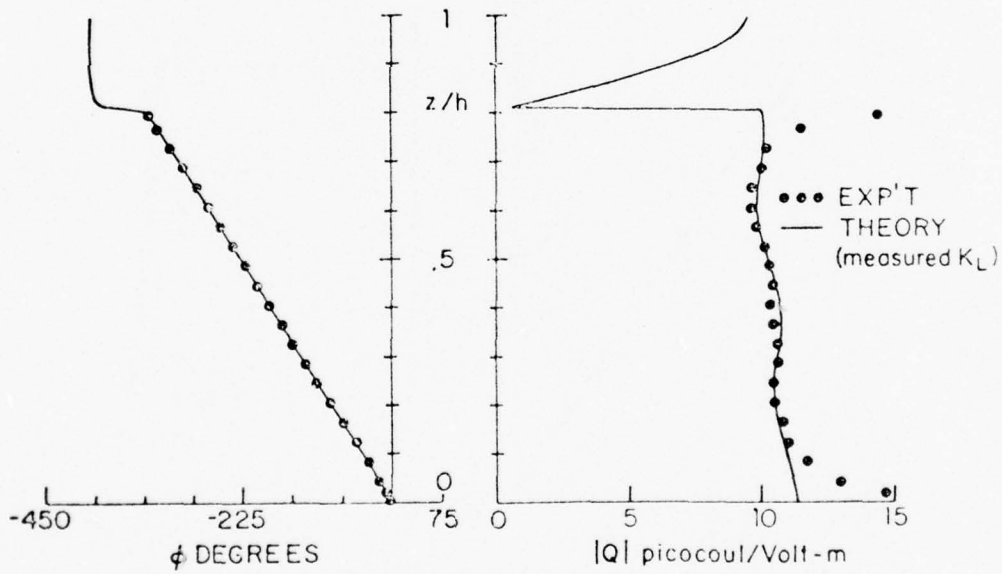


FIG. 3.112. CURRENT AND CHARGE DISTRIBUTION ON MODIFIED BEVERAGE ANTENNA OVER SALT WATER USING MEASURED WAVENUMBER; $f_1/\lambda_0 = 1.5$ AND $d/\lambda_0 = .1$.



a) CURRENT DISTRIBUTION



b) CHARGE DISTRIBUTION

FIG. 3.113. CURRENT AND CHARGE DISTRIBUTION ON MODIFIED BEVERAGE ANTENNA OVER SALT WATER USING MEASURED WAVENUMBER; $z_1/\lambda_0 = 1$ AND $d/\lambda_0 = .1$.

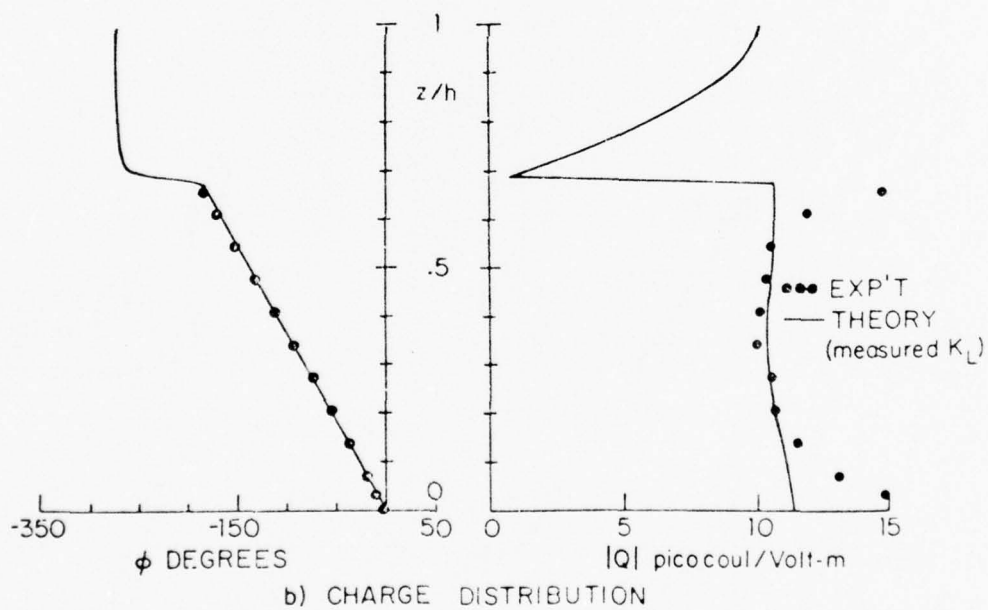
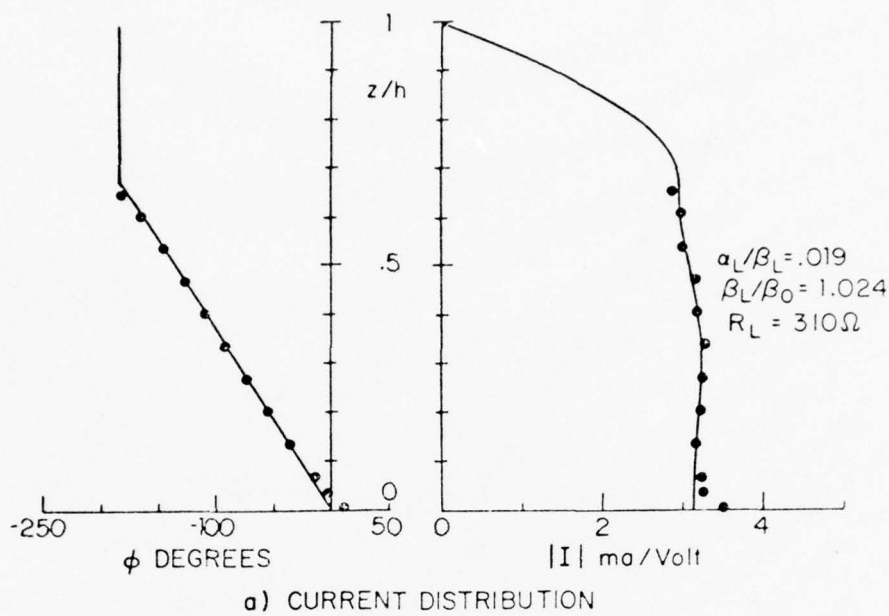
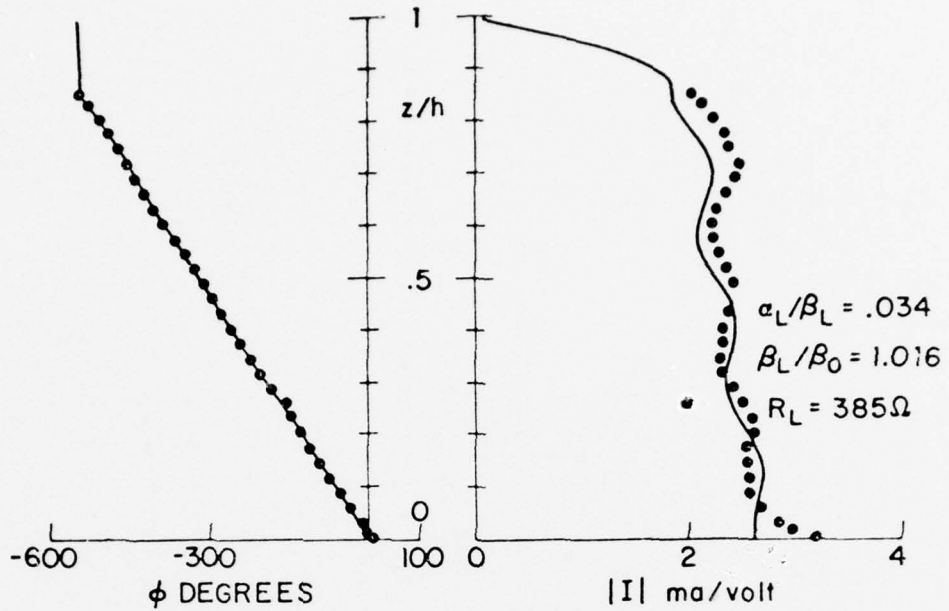
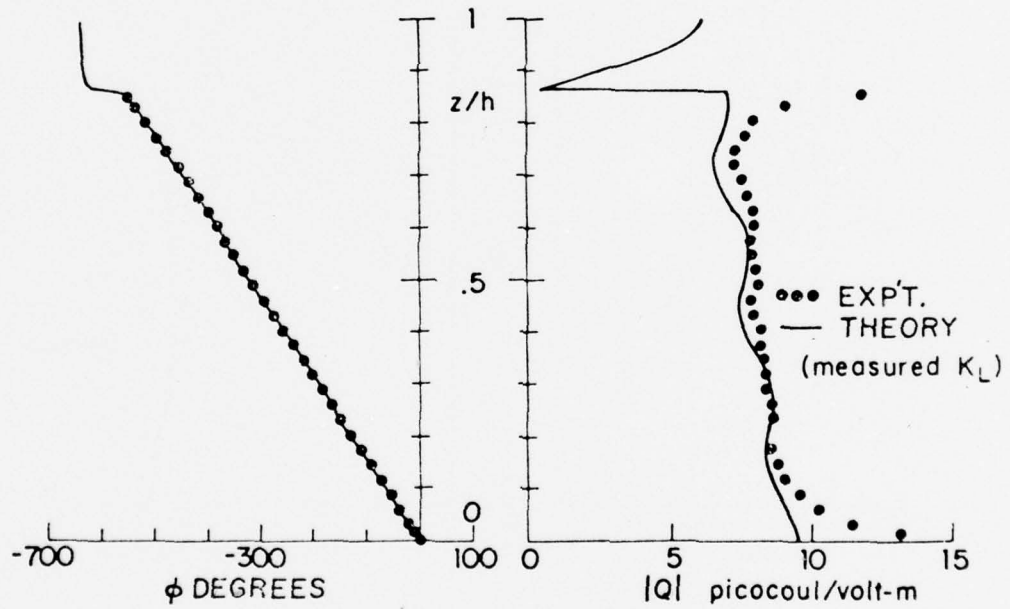


FIG. 3.114. CURRENT AND CHARGE DISTRIBUTION ON MODIFIED BEVERAGE ANTENNA OVER SALT WATER USING MEASURED WAVENUMBER; $\xi_1/\lambda_0 = .5$ AND $d/\lambda_0 = .1$.

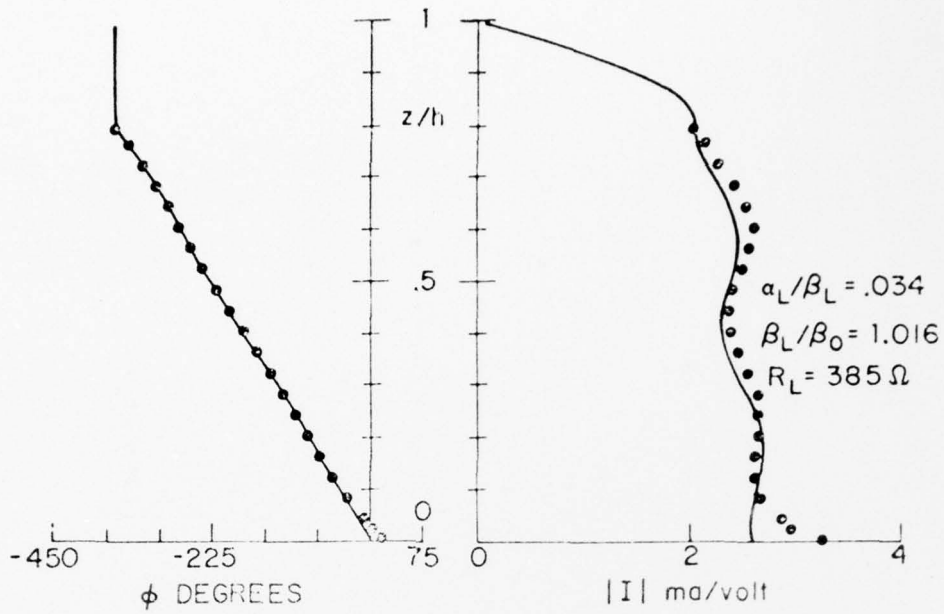


a) CURRENT DISTRIBUTION

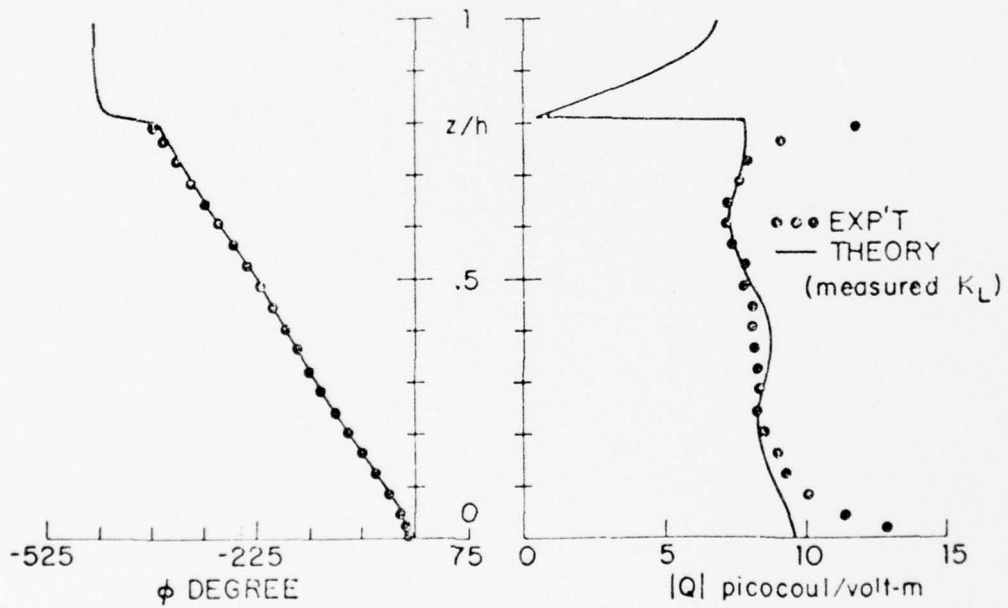


b) CHARGE DISTRIBUTION

FIG. 3.115. CURRENT AND CHARGE DISTRIBUTION ON MODIFIED BEVERAGE ANTENNA OVER SALT WATER USING MEASURED WAVENUMBER; $f_1/\lambda_0 = 1.5$ AND $d/\lambda_0 = .25$.



a) CURRENT DISTRIBUTION



b) CHARGE DISTRIBUTION

FIG. 3.116. CURRENT AND CHARGE DISTRIBUTION ON MODIFIED BEVERAGE ANTENNA OVER SALT WATER USING MEASURED WAVENUMBER; $\xi_1/\lambda_0 = 1$ AND $d/\lambda_0 = .25$.

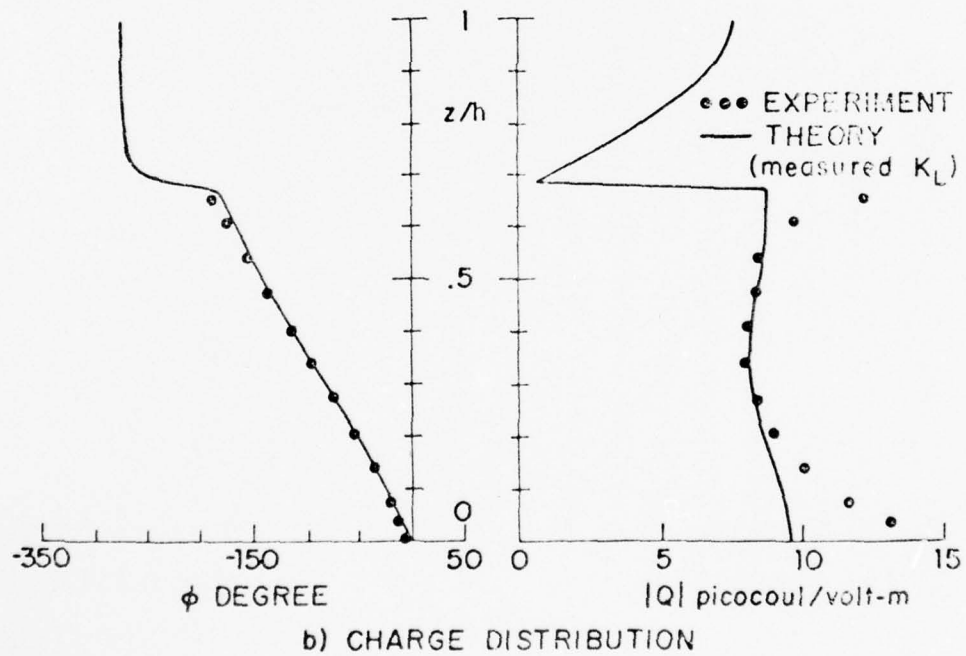
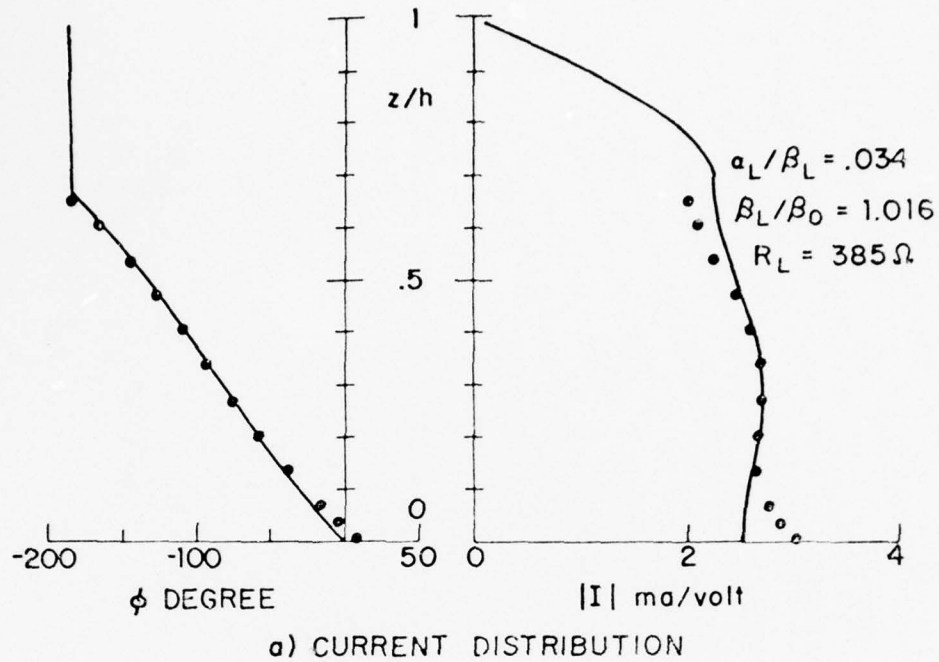


FIG. 3.117. CURRENT AND CHARGE DISTRIBUTION ON MODIFIED BEVERAGE ANTENNA OVER SALT WATER USING MEASURED WAVENUMBER; $l_1/\lambda_0 = .5$ AND $d/\lambda_0 = .25$

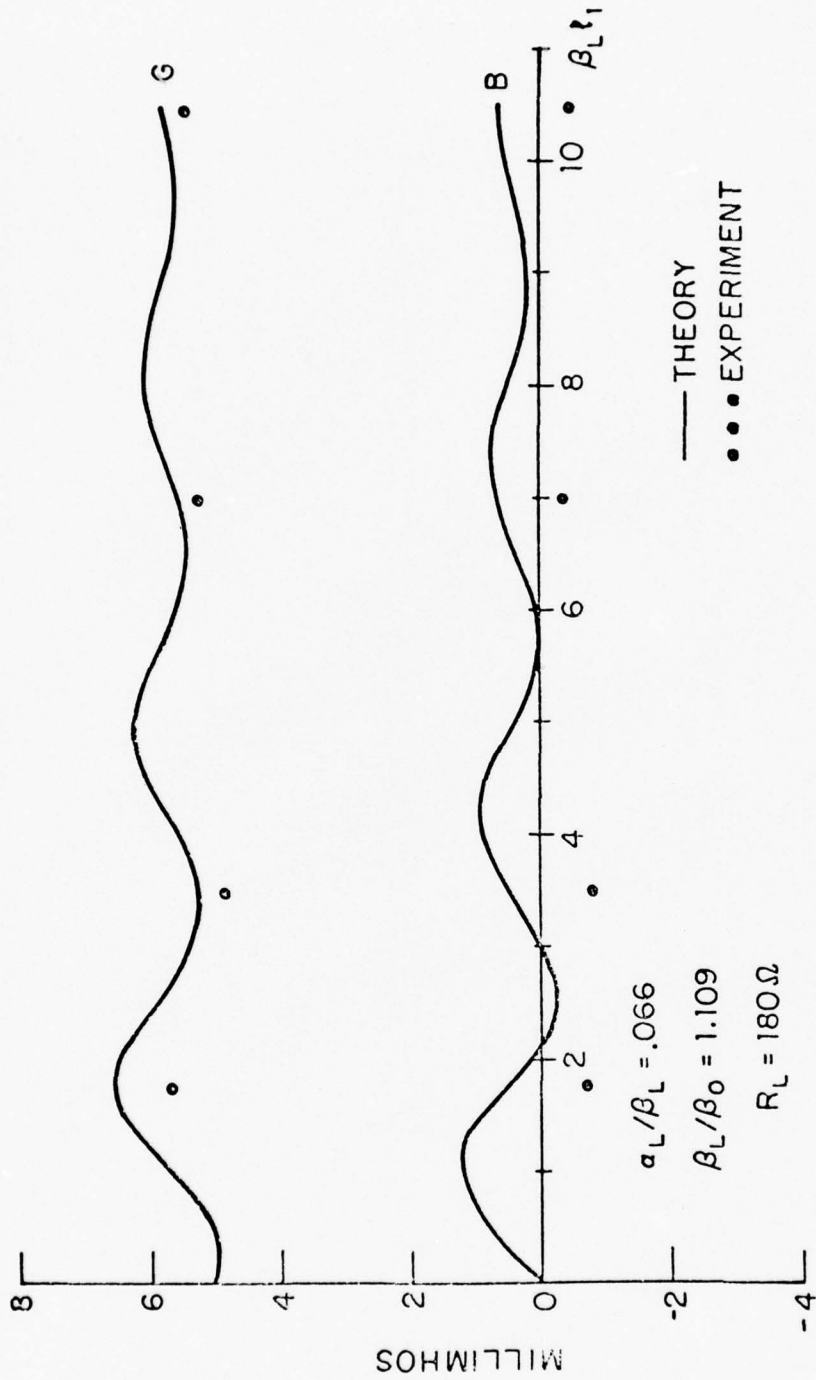


FIG. 3.118. INPUT ADMITTANCE OF MODIFIED BEVERAGE ANTENNA OVER SALT WATER; $d/\lambda_0 = .01$ AND $a/\lambda_0 = .0015$.

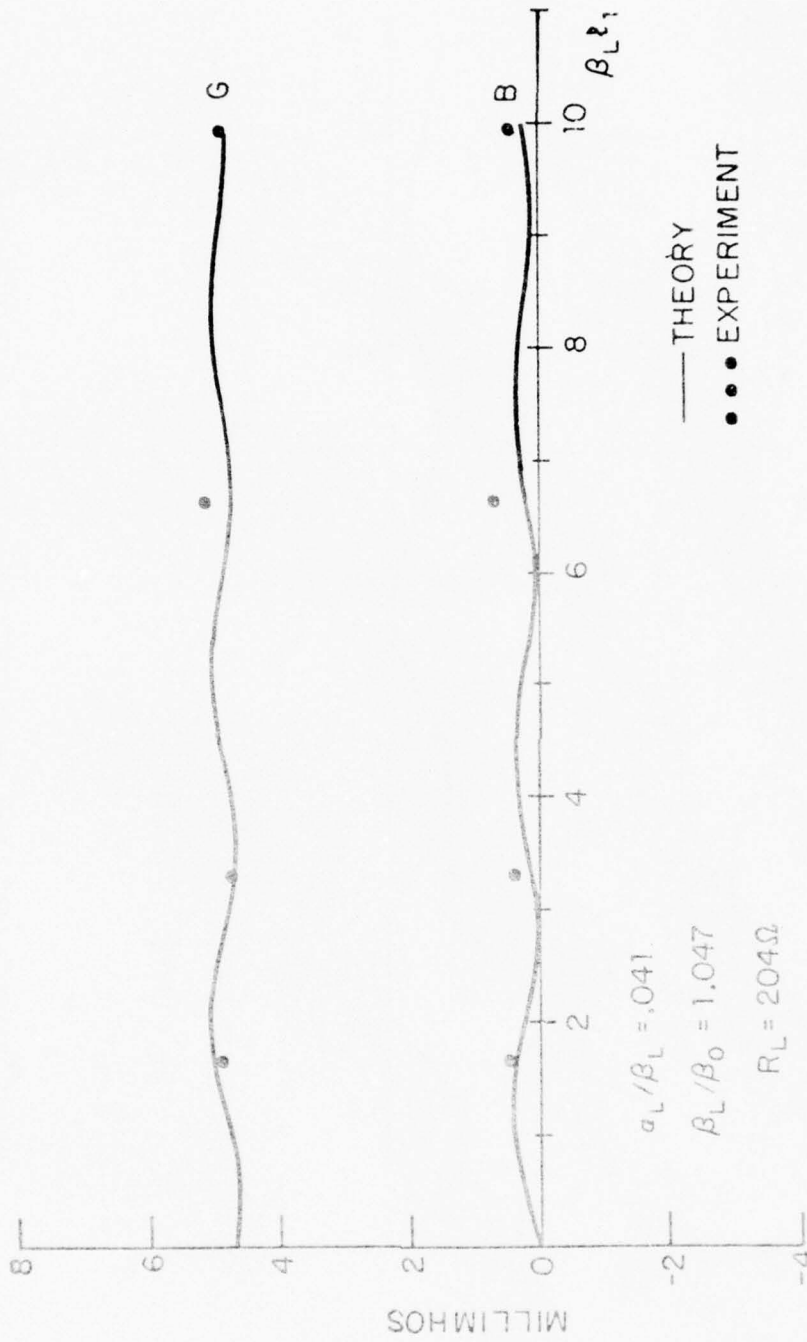


FIG. 3.119. INPUT ADMITTANCE OF MODIFIED BEVERAGE ANTENNA OVER SALT WATER; $d/\lambda_0 = .02$ AND $a/\lambda_0 = .0015$.

FIG. 3.119.

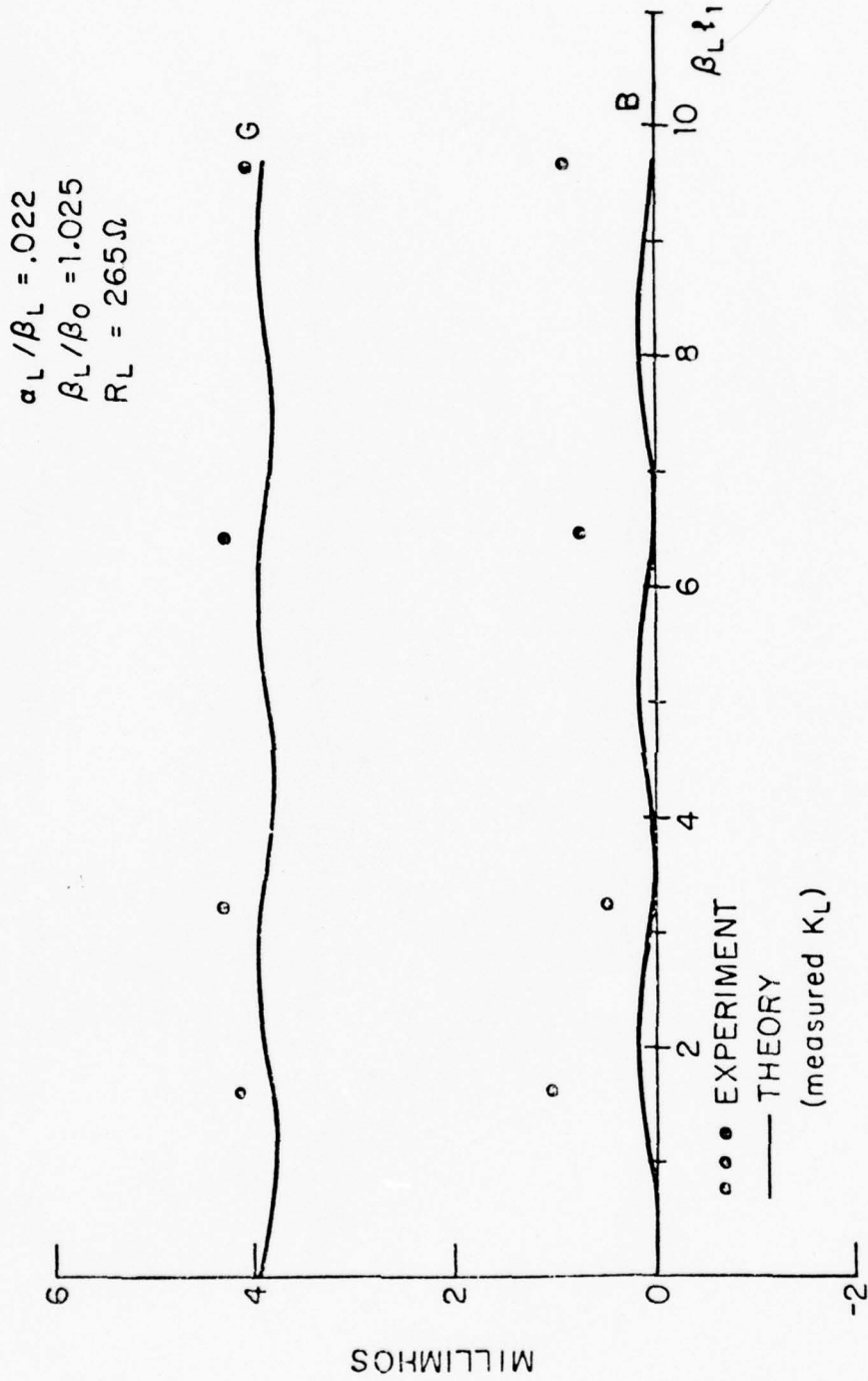


FIG. 3.120. INPUT ADMITTANCE OF MODIFIED BEVERAGE ANTENNA OVER SALT WATER USING MEASURED K_L ; $d/\lambda_0 = .05$ AND $\sigma/\lambda_0 = .0015$.

$$\begin{aligned} \alpha_L / \beta_L &= .019 \\ \beta_L / \beta_0 &= 1.024 \\ R_L &= 310 \Omega \end{aligned}$$

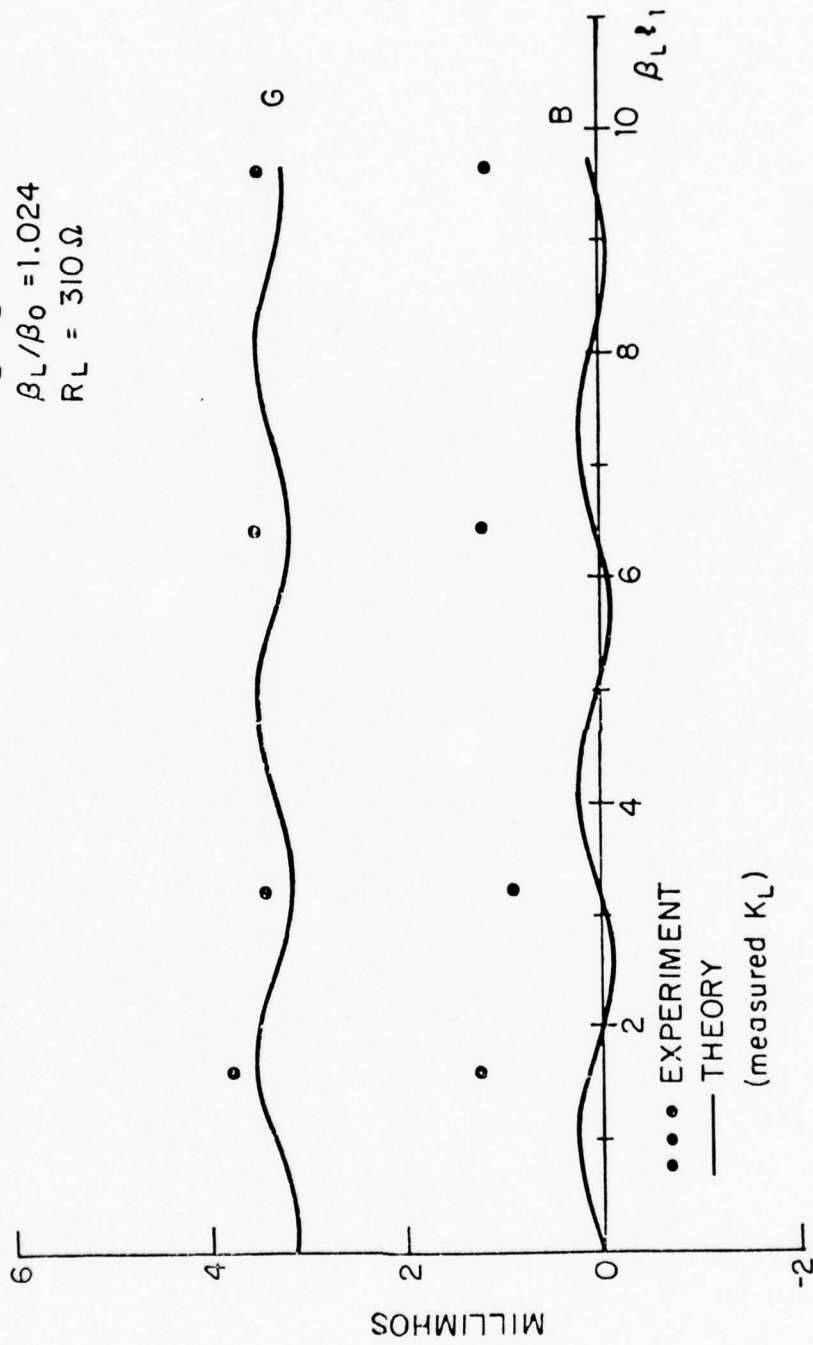


FIG. 3.121. INPUT ADMITTANCE OF MODIFIED BEVERAGE ANTENNA OVER SALT WATER USING MEASURED K_L ; $d/\lambda_0 = .1$ AND $\sigma/\lambda_0 = .0015$.

$$\alpha_L / \beta_L = .031$$
$$\beta_L / \beta_0 = 1.016$$
$$R_L = 385 \Omega$$

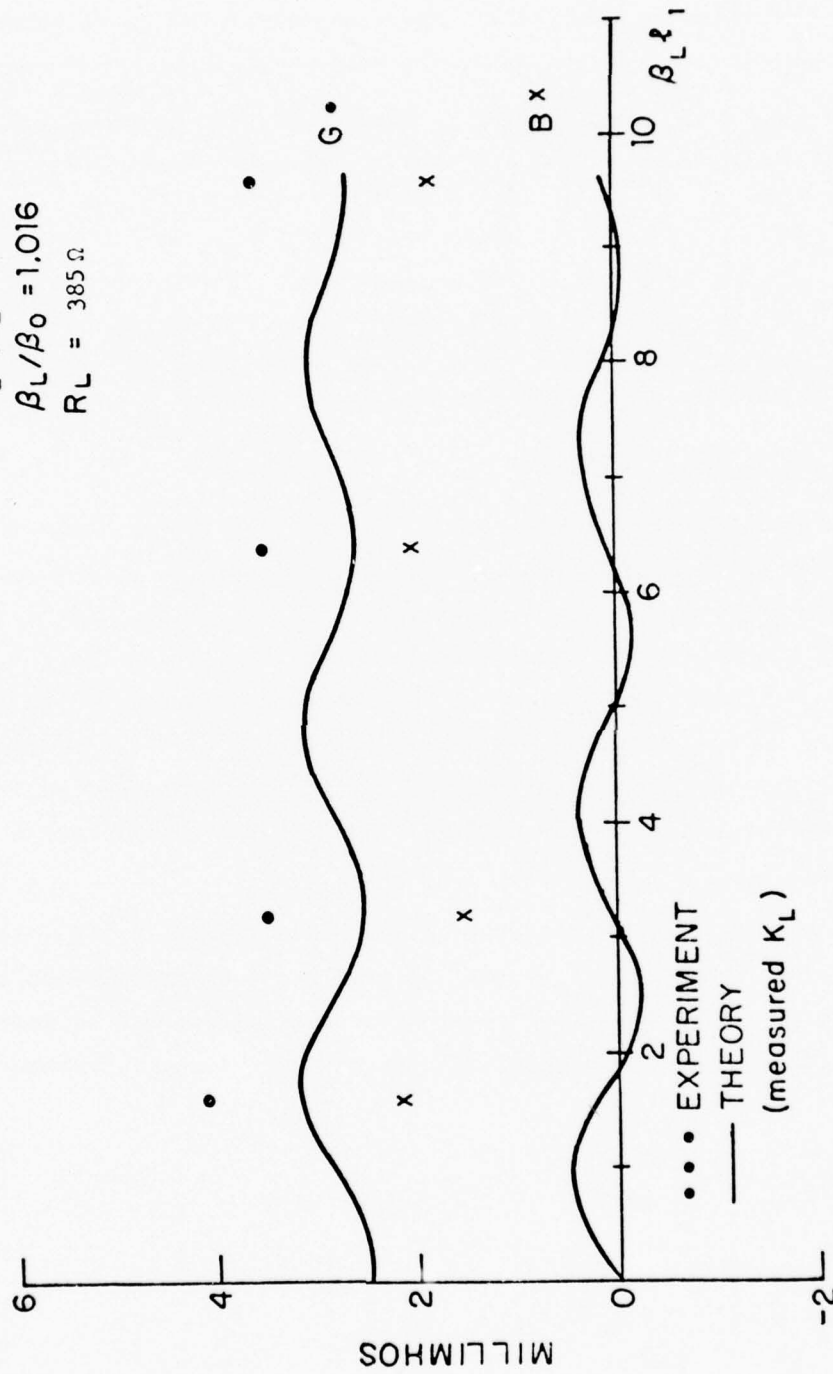


FIG. 3.122. INPUT ADMITTANCE OF MODIFIED BEVERAGE ANTENNA OVER SALT WATER USING MEASURED K_L ; $d/\lambda_0 = .25$ AND $\alpha/\lambda_0 = .0015$.

FIG. 3.122.

wave number. All other theoretical curves utilize the same expression but employ the measured effective wave number for k_L . Comparisons of the load resistors used with the calculated values appear in the chart below.

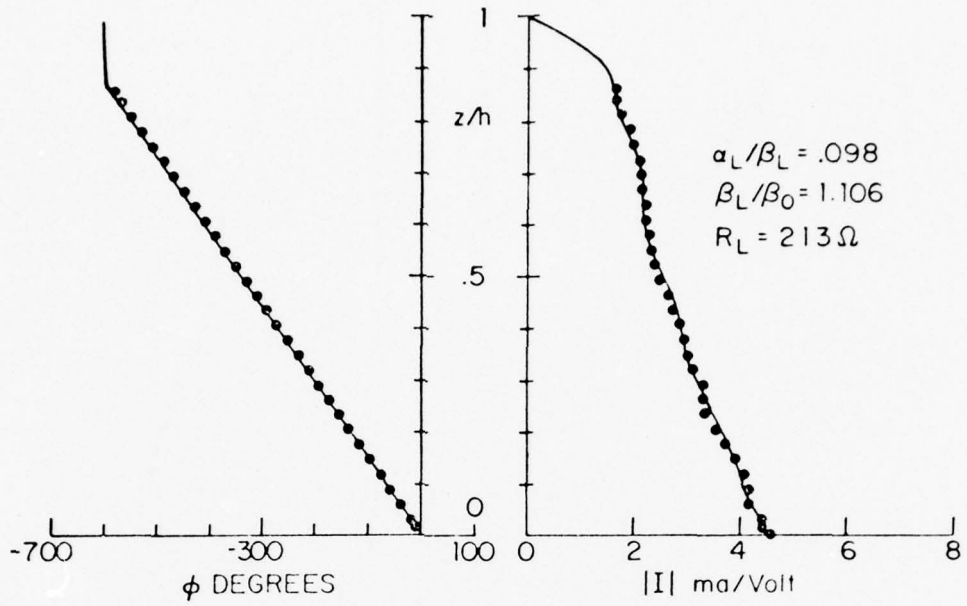
d/λ_0	R_L used	$(1/2)Z_c$ King	$(1/2)Z_c$ from measured k_L
.01	180 Ω	172 - j12 Ω	---
.02	204 Ω	206 - j8 Ω	---
.05	225 Ω	255 - j4 Ω	258 - j5 Ω
.1	310 Ω	295 - j2 Ω	300 - j6 Ω
.25	385 Ω	348 - j1 Ω	354 - j12 Ω

Moist-Earth Measurements

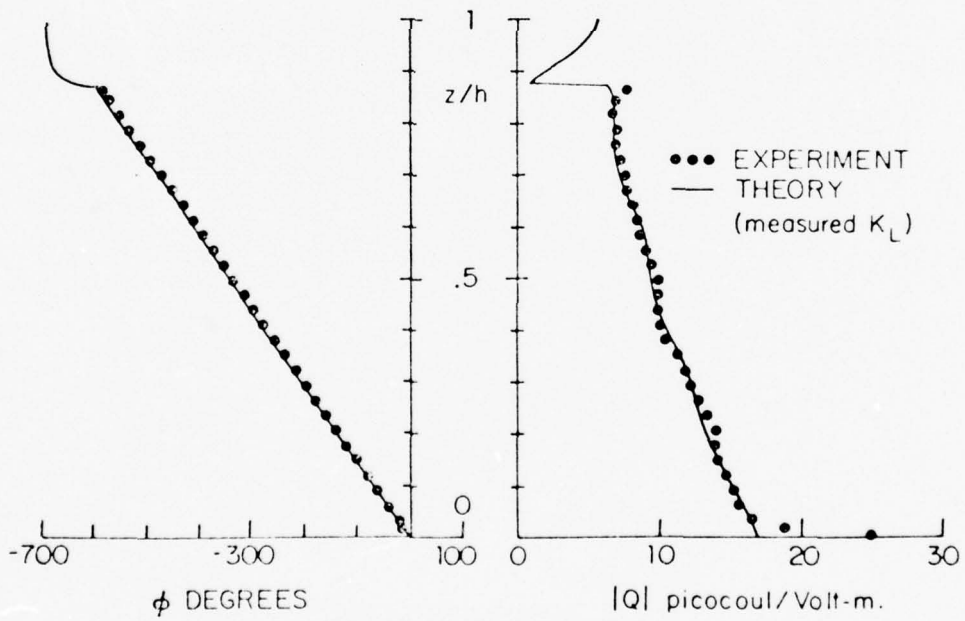
Due to the fact that condition (1.3b) is not strictly valid for the case of moist earth with $\epsilon_r = 11.5$ and $\sigma = .0022$ mhos/m, only measured effective wave numbers were used throughout for k_L in (1.54) and (1.56). The current and charge distributions, displayed graphically in Figs. 3.123 through 3.134, reveal good agreement between the measured results and the curves based on the measured wave number. Even for the highest spacing, $d/\lambda_0 = .25$, the agreement is quite good except for variations at the driving point and at the load resistor which are basically a manifestation of junction effects.

The admittance curves appear in Figs. 3.135 through 3.138. Agreement for the closest spacing, $d/\lambda_0 = .02$, is good for both conductance and susceptance curves. For the other three cases the conductance agreement is good with larger variations appearing in the susceptance. Resistor comparisons appear below.

d/λ_0	R_L used	$(1/2)Z_c$ King	$(1/2)Z_c$ from measured k_L
.01	---	---	---
.02	213 Ω	224 - j29 Ω	218 - j21 Ω
.05	242 Ω	262 - j21 Ω	259 - j16 Ω
.1	242 Ω	296 - j13 Ω	295 - j13 Ω
.25	380 Ω	348 - j6 Ω	358 - j12 Ω

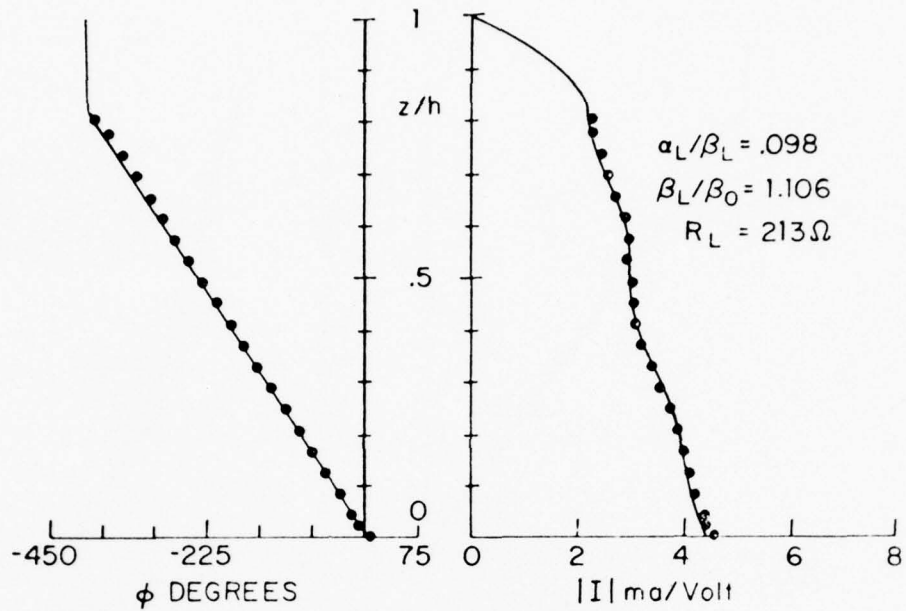


a) CURRENT DISTRIBUTION

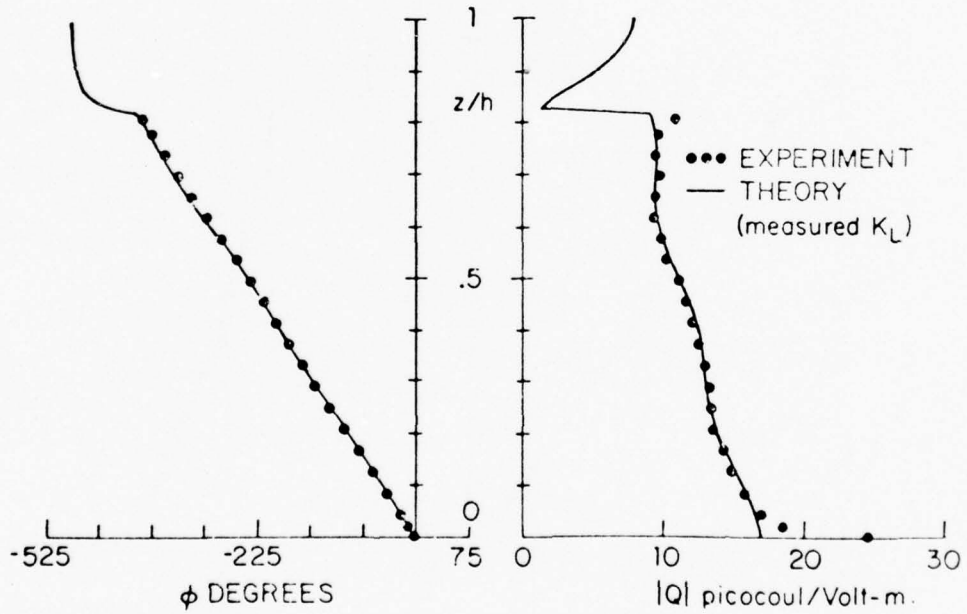


b) CHARGE DISTRIBUTION

FIG. 3.123. CURRENT AND CHARGE DISTRIBUTION ON MODIFIED BEVERAGE ANTENNA OVER MOIST EARTH USING MEASURED WAVENUMBER; $l_1/\lambda_0 = 1.5$ AND $d/\lambda_0 = .02$.

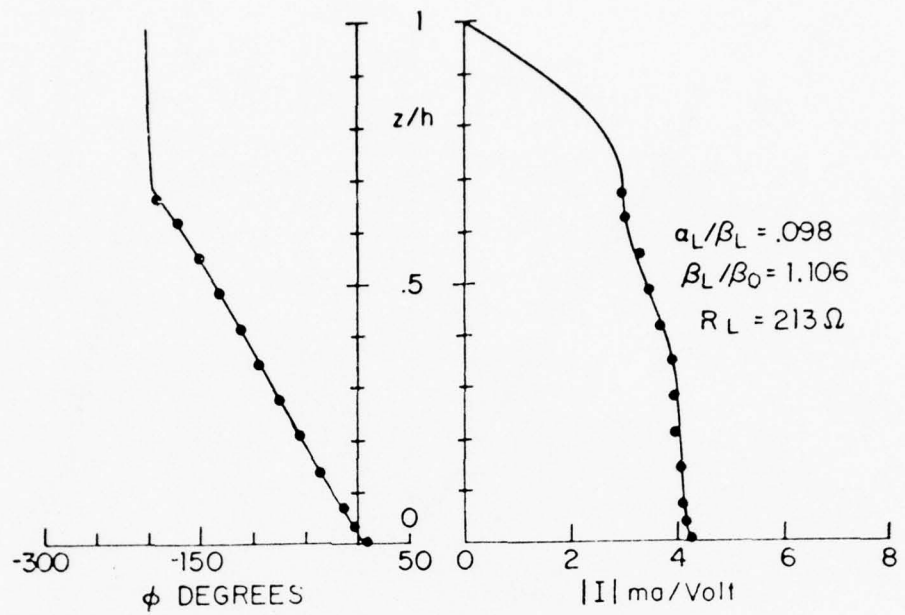


a) CURRENT DISTRIBUTION

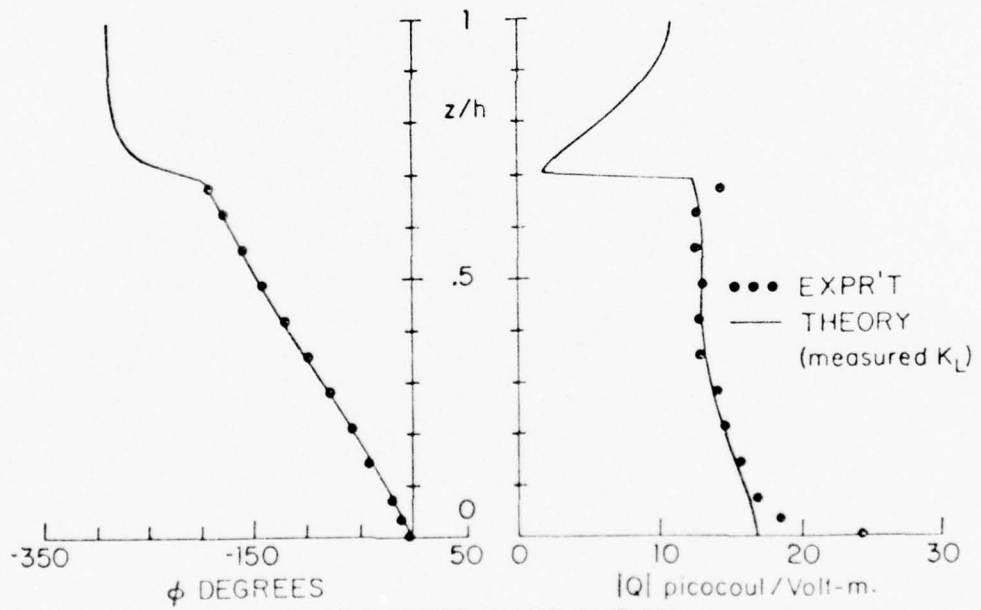


b) CHARGE DISTRIBUTION

FIG. 3.124. CURRENT AND CHARGE DISTRIBUTION ON MODIFIED BEVERAGE ANTENNA OVER MOIST EARTH USING MEASURED WAVENUMBER, $f_1/\lambda_0 = 1$ AND $d/\lambda_0 = .02$.

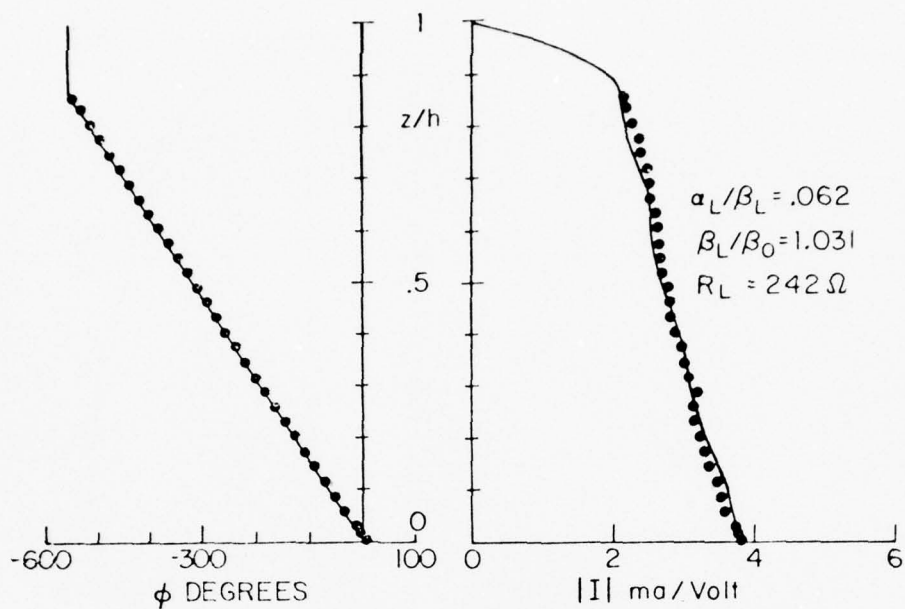


a) CURRENT DISTRIBUTION

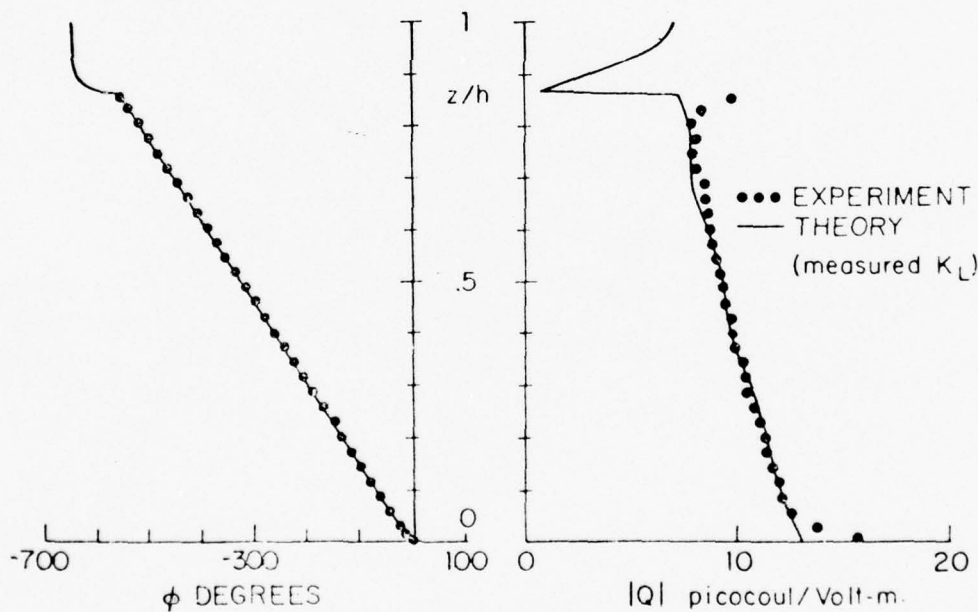


b) CHARGE DISTRIBUTION

FIG. 3.125. CURRENT AND CHARGE DISTRIBUTION ON MODIFIED BEVERAGE ANTENNA OVER MOIST EARTH USING MEASURED WAVENUMBER; $t_1/\lambda_0 = .5$ AND $d/\lambda_0 = .02$.

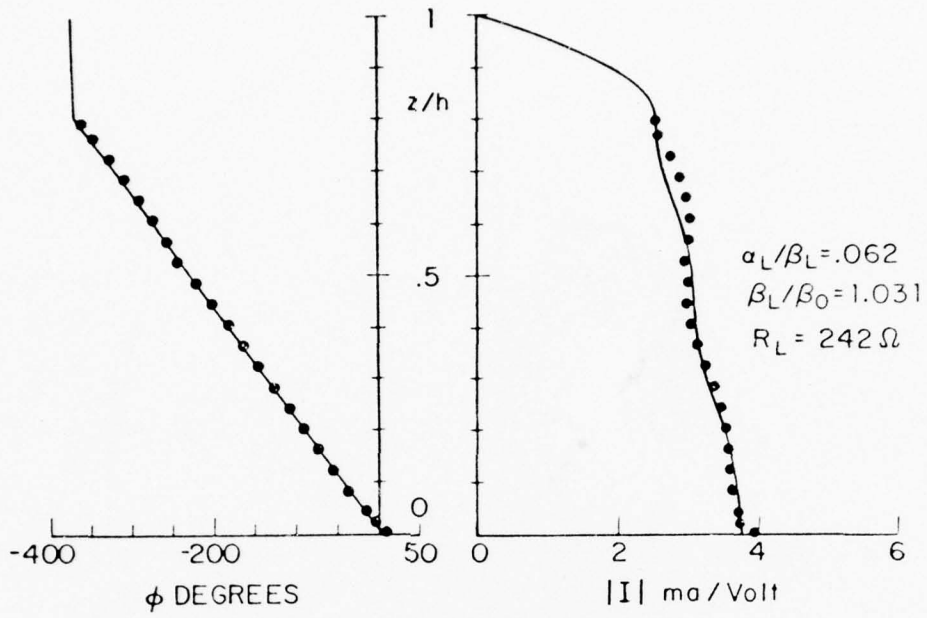


a) CURRENT DISTRIBUTION

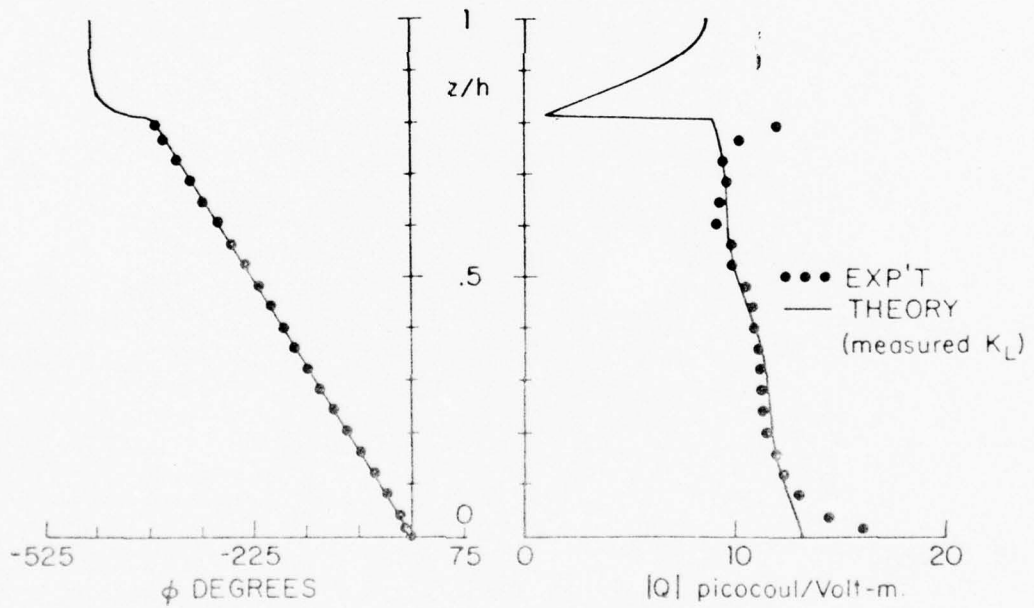


b) CHARGE DISTRIBUTION

FIG. 3.126. CURRENT AND CHARGE DISTRIBUTION ON MODIFIED BEVERAGE ANTENNA OVER MOIST EARTH USING MEASURED WAVENUMBER; $l_1/\lambda_0 = 1.5$ AND $d/\lambda_0 = .05$

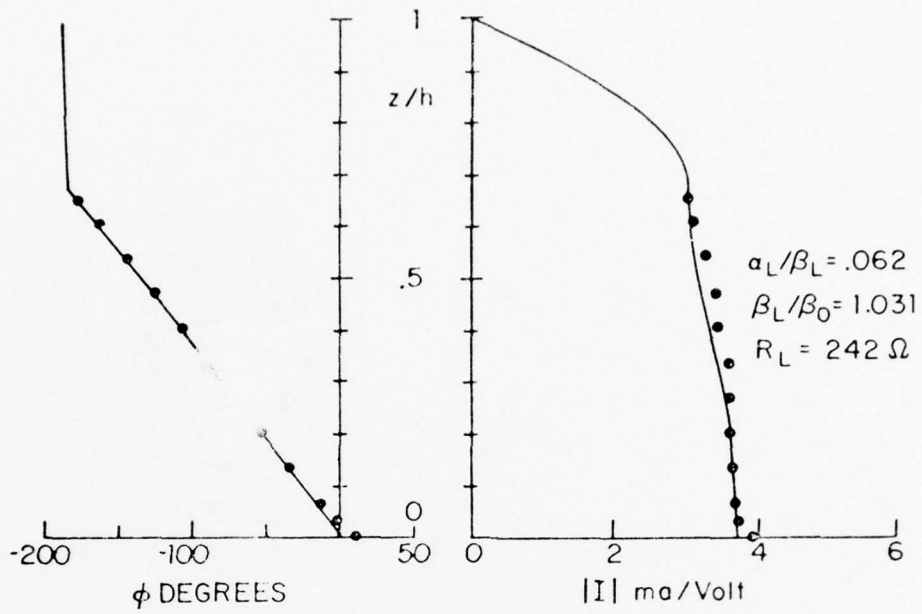


a) CURRENT DISTRIBUTION

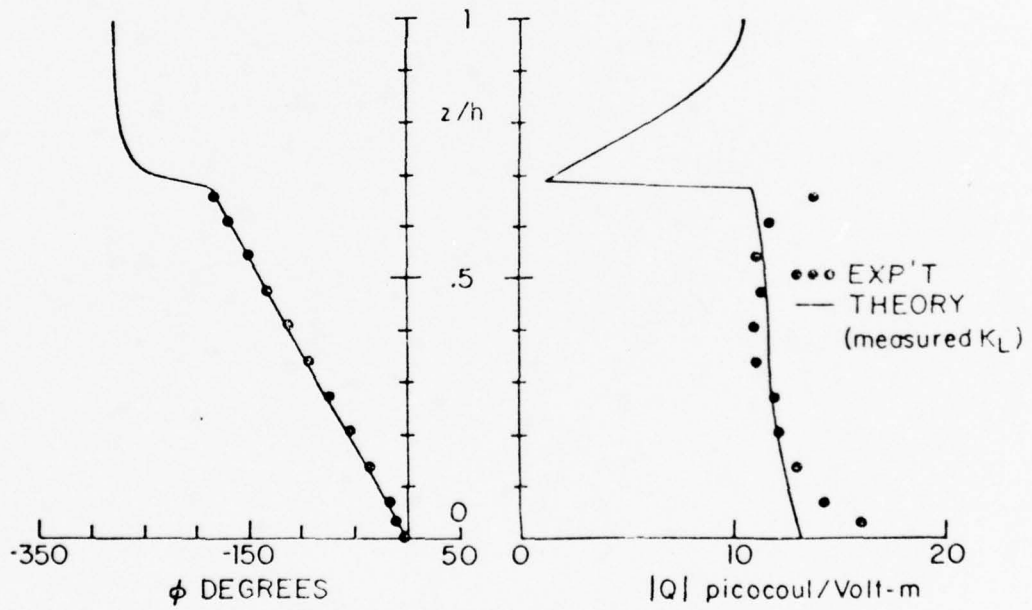


b) CHARGE DISTRIBUTION

FIG. 3.127. CURRENT AND CHARGE DISTRIBUTION ON MODIFIED BEVERAGE ANTENNA OVER MOIST EARTH USING MEASURED WAVENUMBER; $\epsilon_1/\lambda_0 = 1$ AND $d/\lambda_0 = .05$.

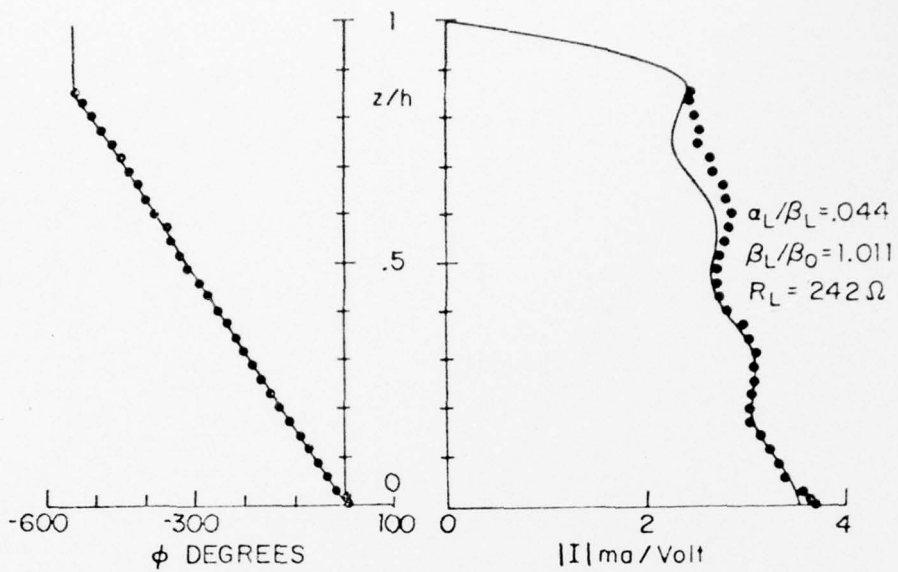


a) CURRENT DISTRIBUTION

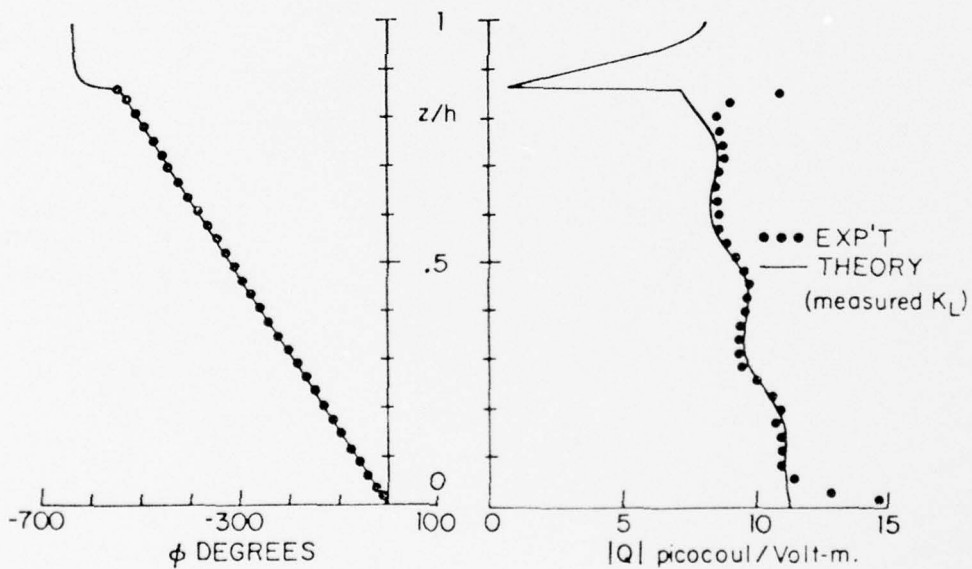


b) CHARGE DISTRIBUTION

FIG. 3.128. CURRENT AND CHARGE DISTRIBUTION ON MODIFIED BEVERAGE ANTENNA OVER MOIST EARTH USING MEASURED WAVENUMBER; $k_1/\lambda_0 = .5$ AND $d/\lambda_0 = .05$.

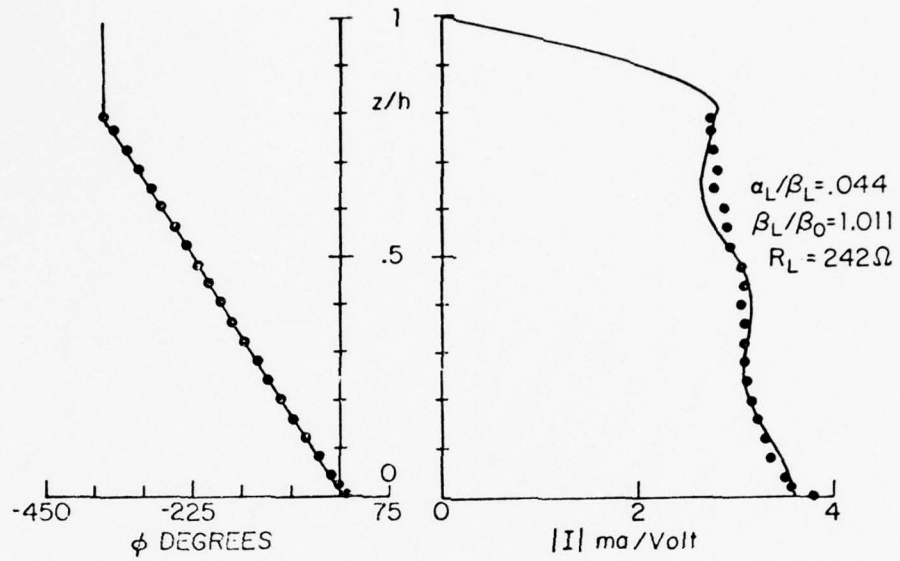


a) CURRENT DISTRIBUTION

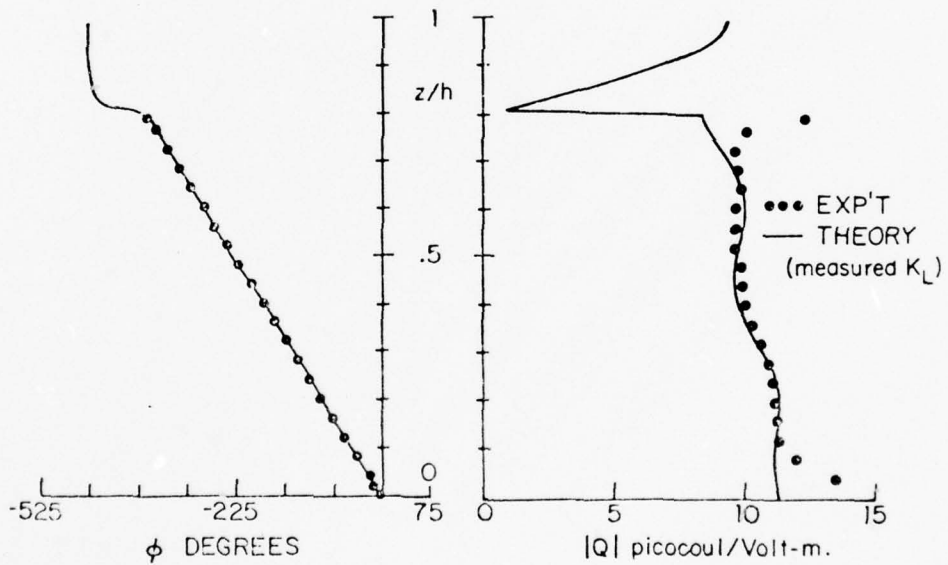


b) CHARGE DISTRIBUTION

FIG. 3.129. CURRENT AND CHARGE DISTRIBUTION ON MODIFIED BEVERAGE ANTENNA OVER MOIST EARTH USING MEASURED WAVENUMBER; $l_1/\lambda_0 = 1.5$ AND $d/\lambda_0 = .1$.



a) CURRENT DISTRIBUTION



b) CHARGE DISTRIBUTION

FIG. 3.130. CURRENT AND CHARGE DISTRIBUTION ON MODIFIED BEVERAGE WAVE ANTENNA OVER MOIST EARTH USING MEASURED WAVE-NUMBER; $\epsilon_1/\lambda_0 = 1$ AND $d/\lambda_0 = .1$.

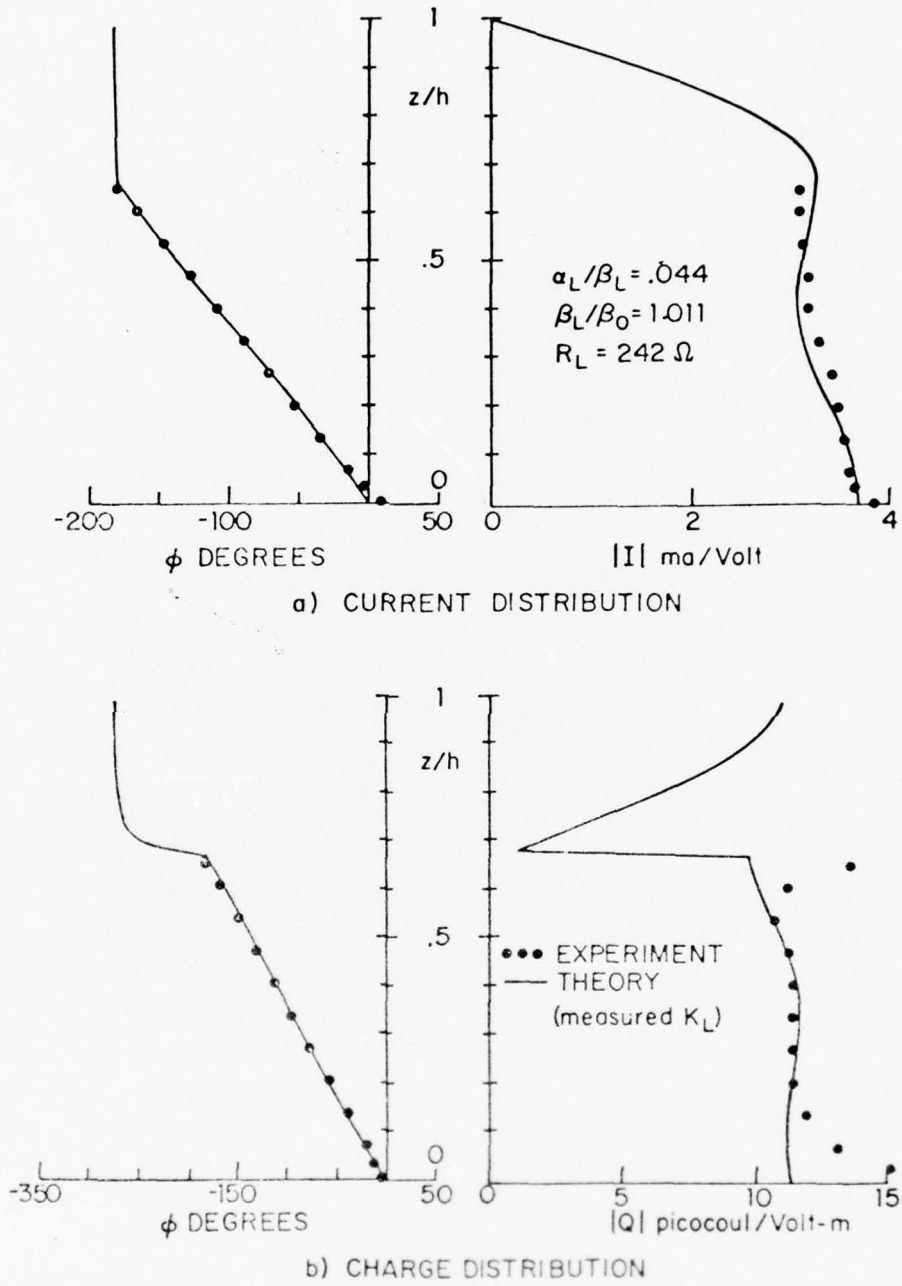
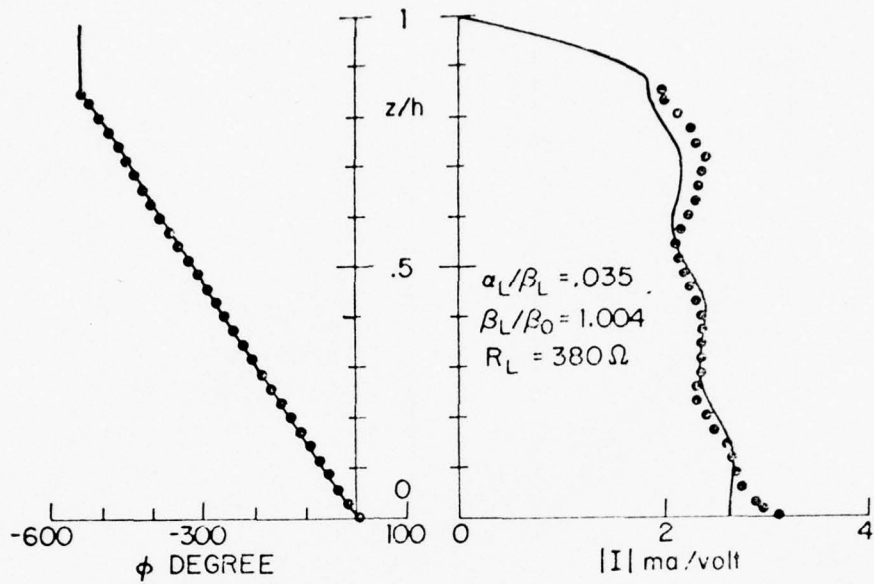
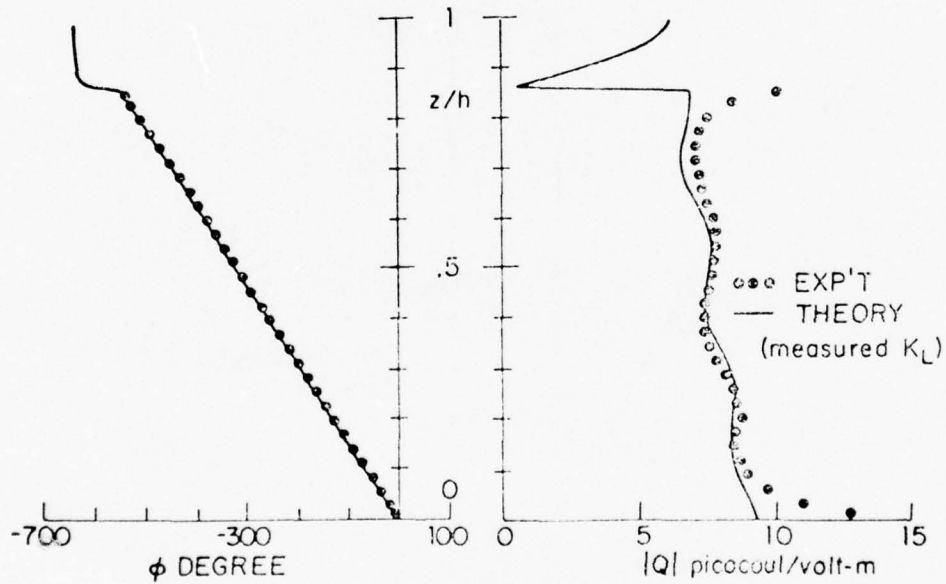


FIG. 3.131. CURRENT AND CHARGE DISTRIBUTION ON MODIFIED BEVERAGE ANTENNA OVER MOIST EARTH USING MEASURED WAVENUMBER; $t_1/\lambda_0 = .5$ AND $d/\lambda_0 = .1$.

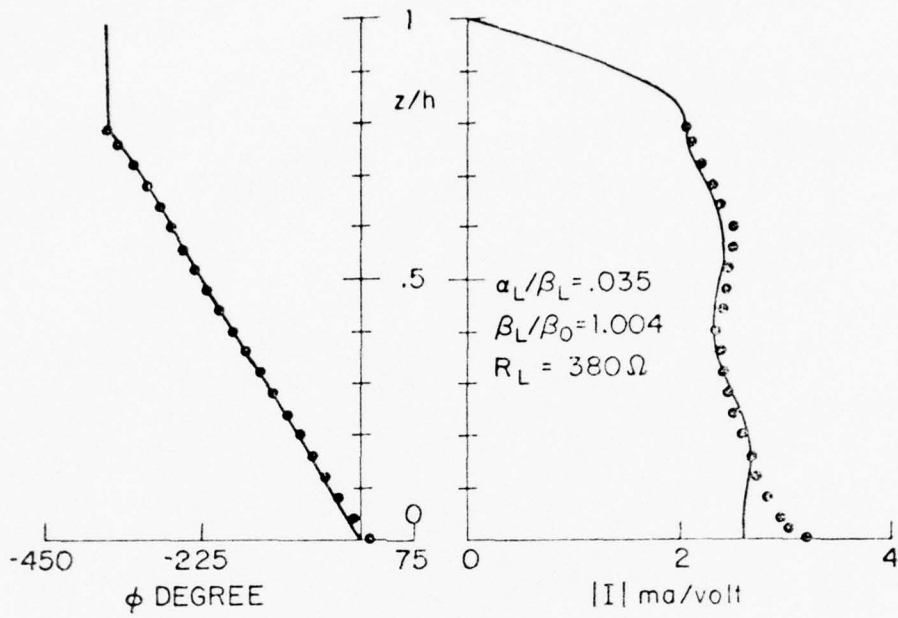


a) CURRENT DISTRIBUTION

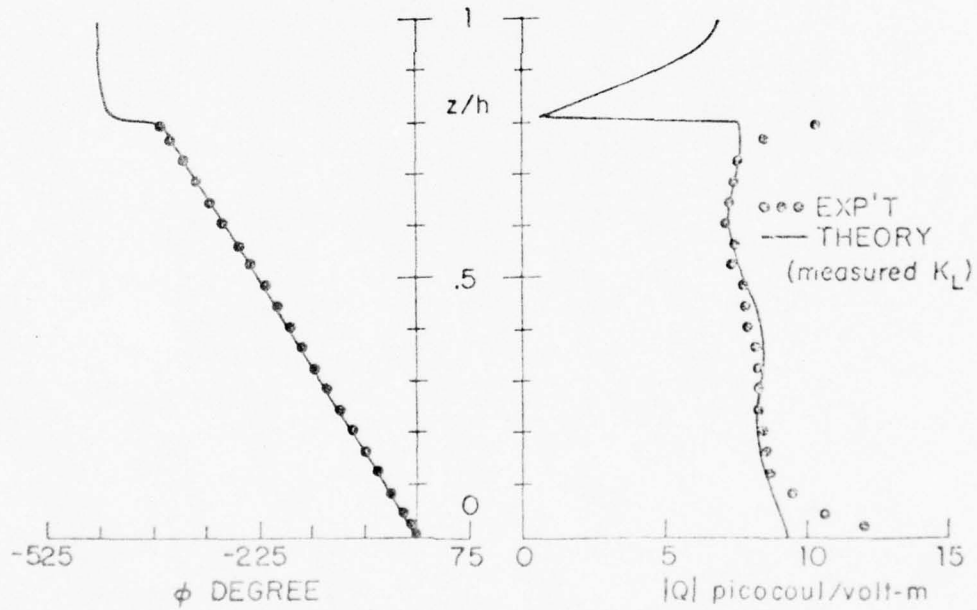


b) CHARGE DISTRIBUTION

FIG. 3.132. CURRENT AND CHARGE DISTRIBUTION ON MODIFIED BEVERAGE ANTENNA OVER MOIST EARTH USING MEASURED WAVENUMBER; $l_1/\lambda_0 = 1.5$ AND $d/\lambda_0 = .29$.

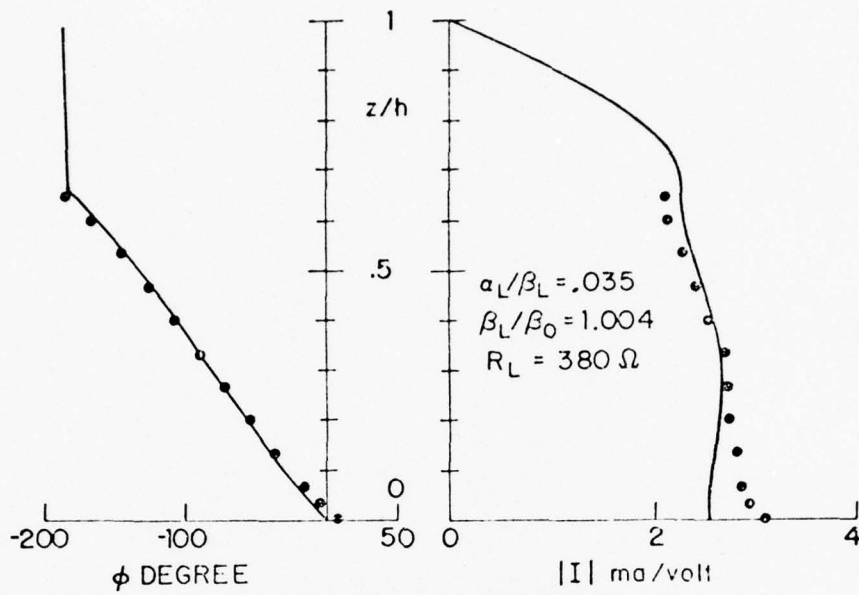


a) CURRENT DISTRIBUTION

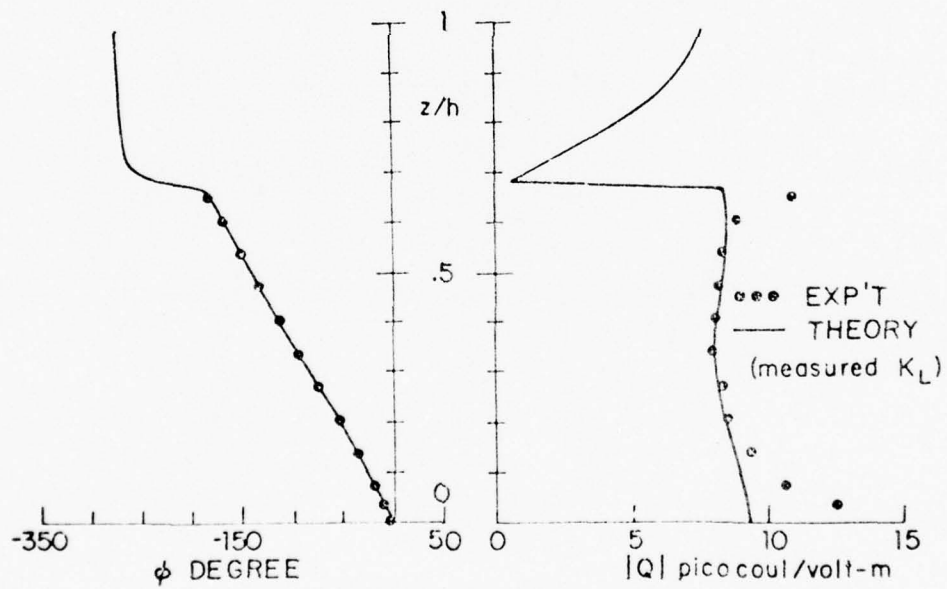


b) CHARGE DISTRIBUTION

FIG. 3.133. CURRENT AND CHARGE DISTRIBUTION ON MODIFIED BEVERAGE ANTENNA OVER MOIST EARTH USING MEASURED WAVENUMBER; $\epsilon_1/\lambda_0 = 1$ AND $d/\lambda_0 = .29$.



a) CURRENT DISTRIBUTION



b) CHARGE DISTRIBUTION

FIG. 3.134. CURRENT AND CHARGE DISTRIBUTION ON MODIFIED BEVERAGE ANTENNA OVER MOIST EARTH USING MEASURED WAVENUMBER; $\epsilon_1/\lambda_0 = .5$ AND $d/\lambda_0 = .29$.

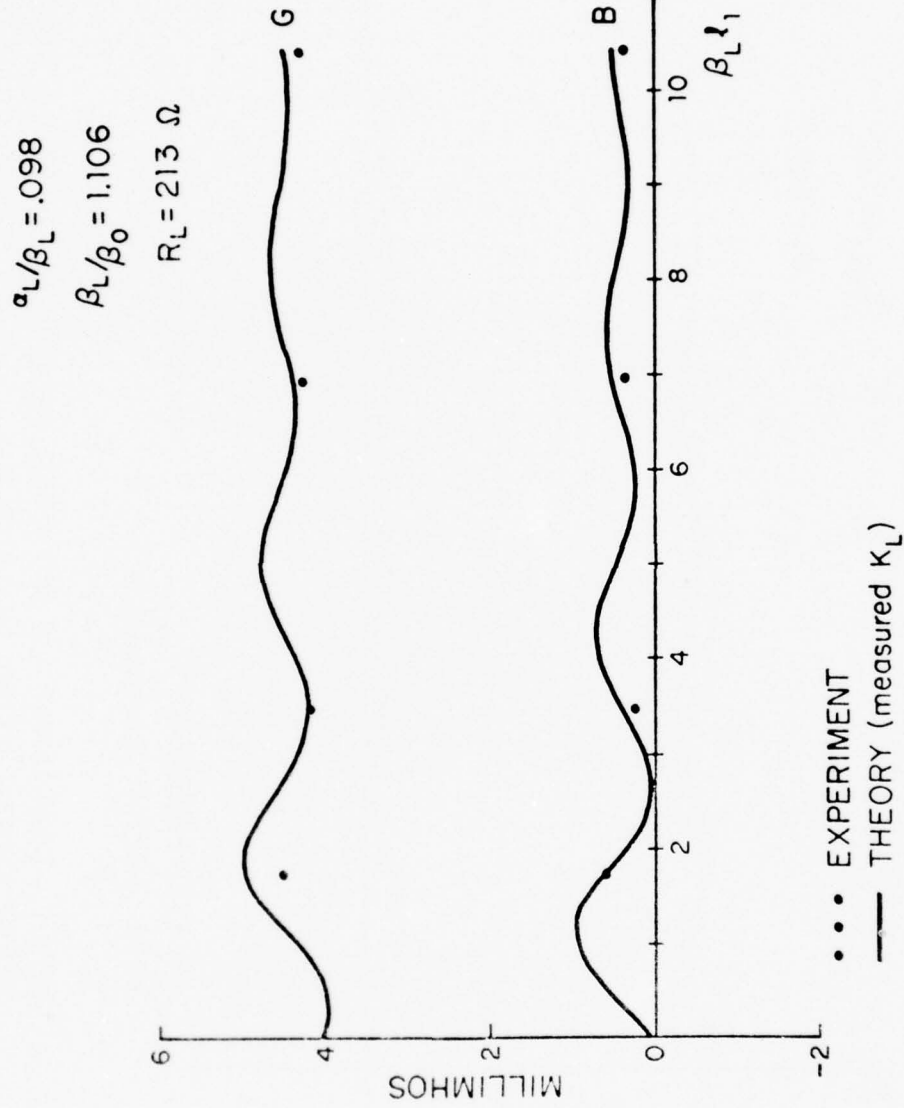


FIG. 3.135. INPUT ADMITTANCE OF MODIFIED BEVERAGE ANTENNA OVER MOIST EARTH USING MEASURED K_L , $d/\lambda_0 = .02$ AND $\sigma/\lambda_0 = .0015$.

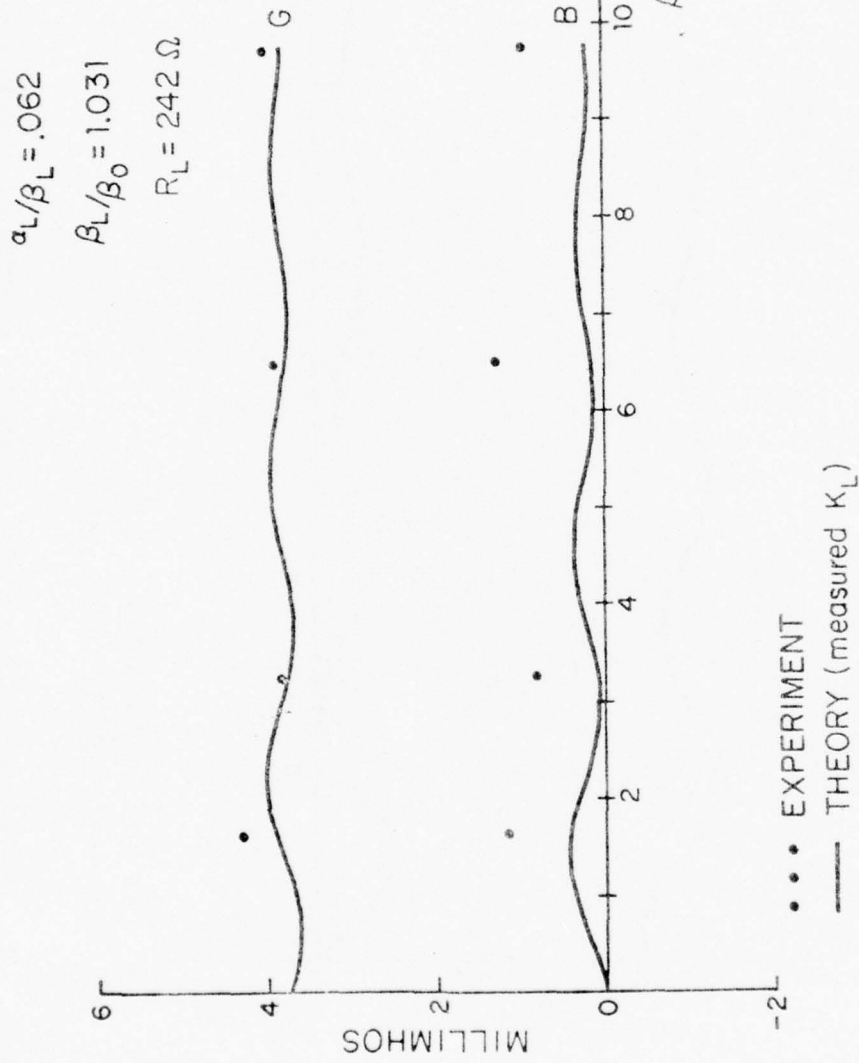


FIG. 3.136. INPUT ADMITTANCE OF MODIFIED BEVERAGE ANTENNA OVER MOIST EARTH USING MEASURED K_L , $d/\lambda_0 = .05$ AND $\sigma/\lambda_0 = .0015$

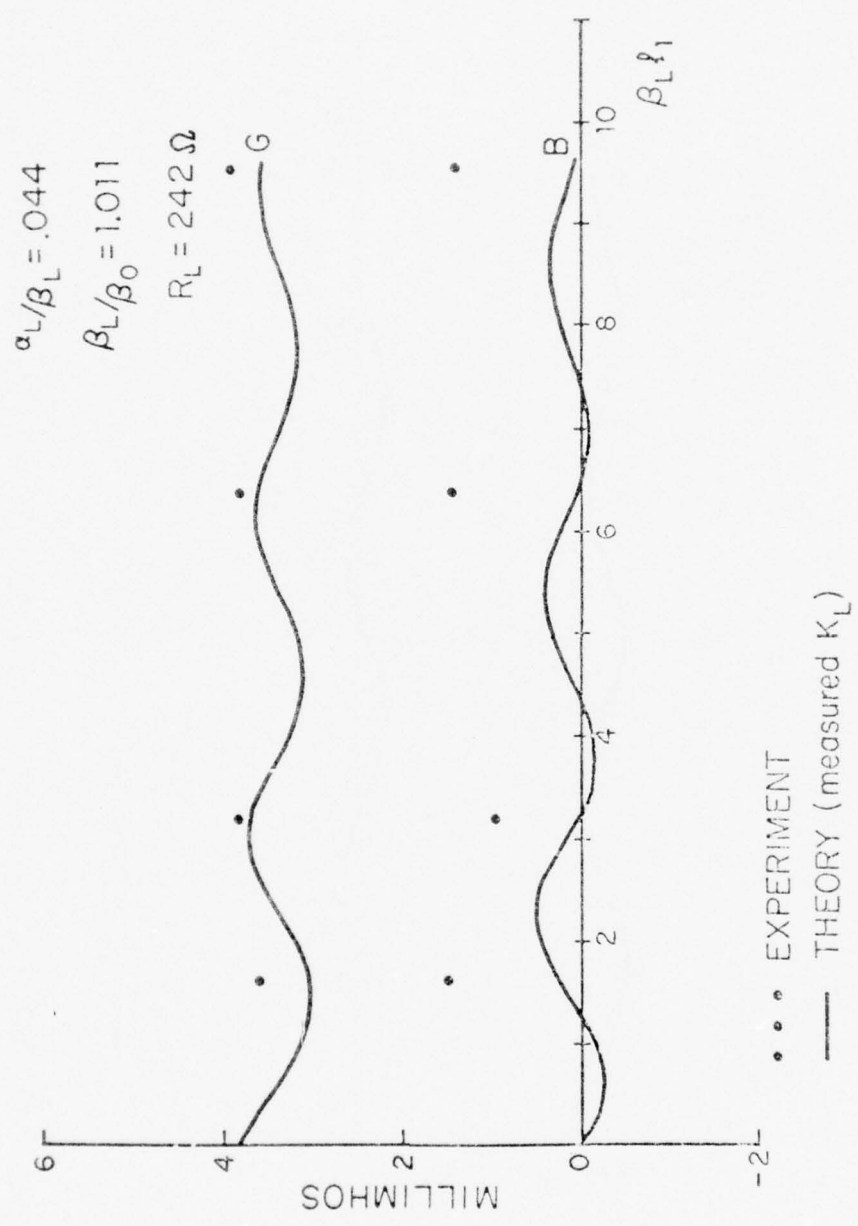


FIG. 3.137. INPUT ADMITTANCE OF MODIFIED BEVERAGE ANTENNA OVER MOIST EARTH USING MEASURED K_L , $d/\lambda_0 = .1$ AND $\alpha/\lambda_0 = .0015$.

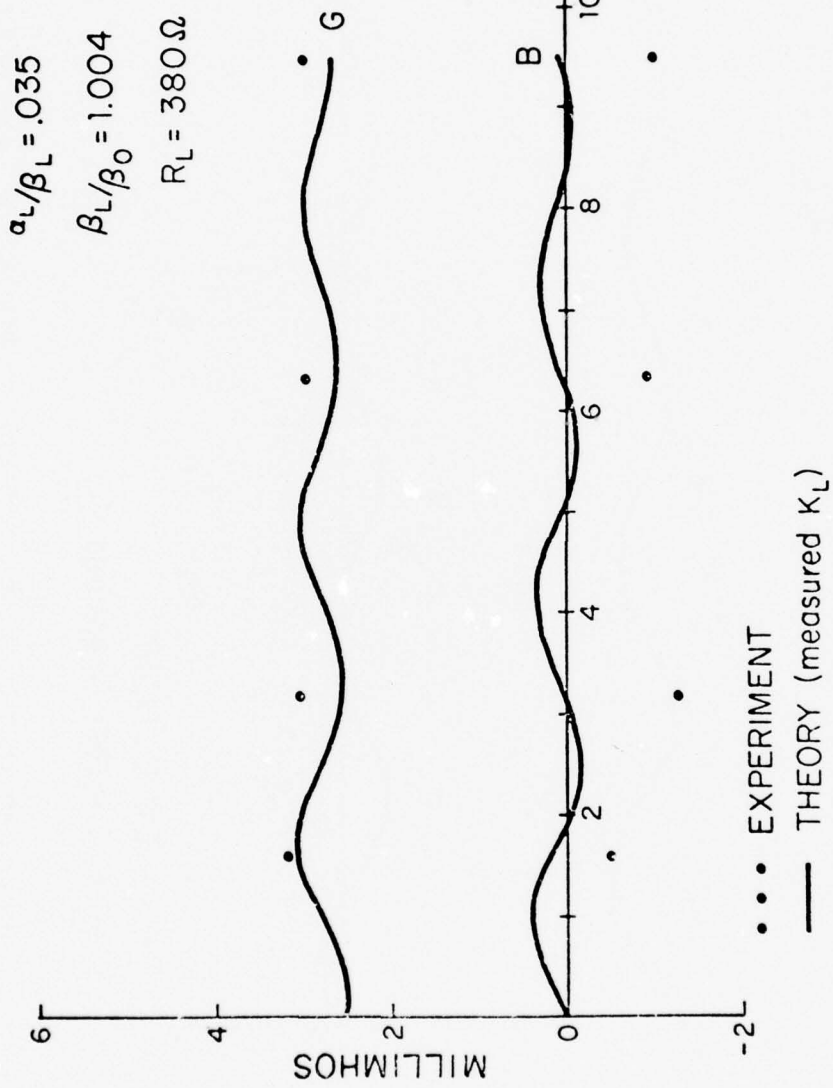


FIG. 3.138. INPUT ADMITTANCE OF MODIFIED BEVERAGE ANTENNA OVER MOIST EARTH USING MEASURED K_L , $d/\lambda_0 = .29$ AND $\sigma/\lambda_0 = .0015$.

3.5. End-Effect Correction

It was pointed out previously that the antenna end effect [6] is responsible for both the shift that appears in the experimental results when compared with the theoretical current and charge distribution curves and the discrepancies which occur between the theoretical and measured α_L . The shift is most noticeable at heights of $d/\lambda_0 = .05, .1, \text{ and } .25$, suggesting the range of heights at which the end effect becomes important. This is further confirmed when it is observed that it is within this range that the measured α_L departs significantly from the theoretical values. Since antennas of the type being discussed behave like transmission lines, the end-effect phenomenon associated with transmission lines is also prevalent for this type of antenna. In transmission-line theory an ideal open circuit possesses an infinite impedance in the plane of the open circuit. In practical situations, however, an open connection such as the condition that would exist at the end of the antenna would not represent an ideal open circuit due to the fact that the capacitance per unit length near the end of the line would no longer be constant. To correct for this, a lumped capacitance C_T is evaluated which represents the effect of the terminal zone where both the wave number and capacitance per unit length become functions of the distance from the end of the line. The effect of the terminal-zone capacitance is to cause a large charge build-up at the end of the antenna, as can be easily seen from the previous curves, causing both the current and charge distributions to deviate from their sinusoidal behavior at the end of the line. It can be shown [4] that the effect of the terminal zone is to cause an increase in the effective length of the transmission line that is equivalent to C_T/C_0 where C_0 is the capacitance per unit length for the infinitely long line. This increase in effective length is the reason for the shift observed in the measured data when compared with the theoretical curves. The zeroth-order transmission-line theory is unable to account accurately for this end effect and the corresponding increase in effective length. The fact that all the energy which arrives at the end of the antenna may not be completely reflected will cause the discrepancies seen in the attenuation. This radiation loss off the end of the antenna introduces a resistance which is included with the end-correction capacitance C_T in the terminal network that models the end effect.

To correct for the shift due to the end effect, it is possible to evaluate the apparent increase in length caused by the open-circuited end and to add this increase to the actual antenna length. Using this new length in either the complete theoretical formulation, Eqs. (1.6), (1.18), (1.54) and (1.56), or in the semi-empirical approach which utilizes the above equations with measured wave numbers, will correct for the deviation that occurs between the measured data and both analytic solutions. This increase in length can be obtained experimentally from the curves in Sections 3.3 and 3.4. Since the end effect should not be dependent on the antenna length, the $h/\lambda_0 = 1$ curve was used for all heights over all three media to determine this increase. This was done by measuring the difference between the null of the data and the null of the theory being compared. The following increases were measured:

d/λ_0	Fresh Water	Salt Water	Moist Earth
.01	0	0	0
.02	0	1.6 cm	0
.05	2 cm	2 cm	2 cm
.1	2.4 cm	2 cm	2.4 cm
.25	3.2 cm	2.8 cm	3.2 cm

For the lowest heights, where the attenuation is highest, no noticeable increase in length was observed from the curves. As the height of the wire is increased, there is a corresponding increase in the apparent length of the wire ranging up to approximately 3 cm. This additional length can be included to obtain a first-order correction for the end effect.

The complex reflection coefficient at the end of a dipole antenna placed above a dissipative half-space is an intricate theoretical problem which has yet to be solved. From this quantity the ρ_s and ϕ_s values which describe the end effect can be obtained. The ρ_s value is associated with the radiation loss from the end of the antenna.

A more complete theory for the current and charge distributions is presented in Section 1.8 of Volume I. It includes contributions due to empirically determined end effects and uses the theoretical k_L determined by King.

3.6. Broadband Characteristics of the Modified Beverage Antenna

One of the more desirable properties of the conventional Beverage antenna is its proposed frequency-independent characteristics. A careful study, however, shows that there has never been a definitive investigation into the frequency response of the conventional Beverage antenna. It has been assumed that when the antenna is in the traveling-wave mode, its frequency-independent nature is evident. It was shown previously that the characteristic impedance of the wire is dependent on the d/λ_0 value which depends in turn on the operating frequency. Changes in the frequency may cause varying degrees of mismatch. The original Beverage antenna work also left unanswered what the frequency response would be of the counterpoise system and the vertical elements at the end of the antenna.

For the modified Beverage antenna the necessity of the quarter-wave terminating section appears to limit seriously its anticipated broadband behavior. It can be shown, however, that despite the use of the quarter-wave section a broadband response can be obtained over a wide range of parameters. Altshuler [2] has shown that for a similar type of traveling-wave antenna in free space, excellent frequency response can be obtained over a 2-to-1 range with additional adequate coverage occurring over a 3-to-1 range. Considering the similarity in configuration, frequency responses at least as good can be anticipated for the modified Beverage antenna. The presence of significant attenuation due to interaction with the half-space will make the Beverage antenna less susceptible at the driving point to changes at the end of the antenna.

Two sets of measurements were made to determine the broadband properties of the modified Beverage antenna. The series of curves presented in the previous sections (Figs. 3.96 - 3.100, 3.118 - 3.122, and 3.135 - 3.138) show that the match for a particular frequency is quite good over all ranges of the length ℓ_1 . A second set of measurements was taken in which the length ℓ_1 was kept constant while the length ℓ_2 of the quarter-wave section was varied. The frequency was kept constant at 300 MHz. The input admittance for this situation is presented as a function of the length of the terminating section in Fig. 3.139. The input admittance remains fairly constant over at least a 3-to-1 range, confirming the broadband nature of this antenna. With the expanded ordinate scale in Fig. 3.139 it can be seen that

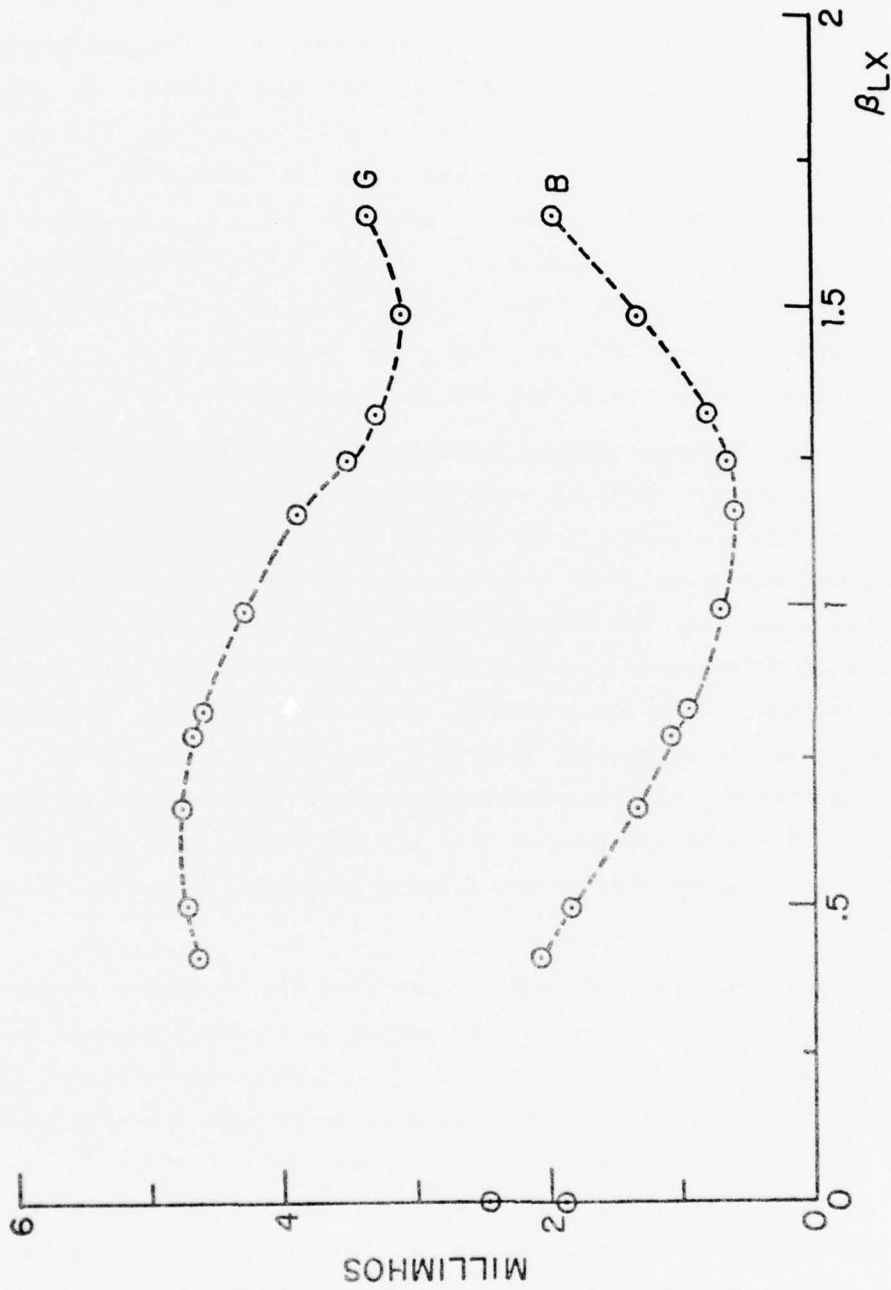


FIG. 3.139. INPUT ADMITTANCE OF BEVERAGE ANTENNA FOR VARIOUS LENGTHS OF TERMINATING SECTION; $h/\lambda_0 = 1$, $d/\lambda_0 = .025$, AND $R_L = 220\Omega$.

the maximum variation in conductance or susceptance is approximately 1.5 millimhos.

3.7. Conclusions

The data presented in Figs. 3.2 through 3.138 lead to numerous conclusions concerning the properties of both dipole antennas in the presence of a dissipative medium and Beverage wave antennas. The conclusions derived from this experimental analysis are as follows:

Dense Media $|k_2| \gg |k_1|$

This case applies to the measurements made over both fresh and salt water at 300 MHz with $\epsilon_r \approx 81$. The dense-medium condition, Eq. (1.3b), was one of the restrictions originally imposed in the development of the expression for the wave number on a horizontal wire above a dissipative half-space. For horizontal wires including Beverage antennas placed above this type of medium, the following can be concluded:

1) For $d/\lambda_0 \leq .02$, the theoretical development of King, described in Section 1.2 of Volume I, correctly represents the current and charge distributions and provides a good zeroth-order approximation for the input admittance on a center-driven dipole antenna. The extension of this theory to loaded antennas, given in Section 1.6, which includes the special case of the Beverage wave antenna, also gives correct results for the current, charge and input admittance. The agreement in this range of heights is mainly a result of the fact that the theoretical wave number given by (1.7) agrees quite favorably with the experimentally determined wave numbers.

2) In the range $.02 < d/\lambda_0 \leq .1$, the comparisons between the measured effective and the theoretically predicted wave numbers begin to show the existence of significant deviations. For these heights, variations of 20% or greater begin to occur, especially for the attenuation constant α_L of the antenna. This departure may be due to one of the following factors. Initially it was thought that the transmission-line behavior may no longer be valid for $d/\lambda_0 \geq .02$. This would probably be due to a significant amount of radiation being neglected by the assumption that the radiation into the air is quite small in comparison with the radiation into the half-space. The second possibility, and the more probable one, is that a more refined theory is needed which accounts for the nonideal end effect of the antenna. This

would assume that the theoretical k_L is the correct one and that the discrepancies observed in the wave numbers were due to the absence of an end-correction factor. End effects are dealt with in more detail in Section 1.8 of Volume I. Despite these facts, the measurements have shown that the expressions for the current, charge and admittance [Eqs. (1.6), (1.16), (1.18), (1.54), (1.55), and (1.56)] still hold if the effective wave number is used. Using these equations with the measured effective wave number substituted for k_L gives good agreement with the measured data. The only noticeable departure from this occurs in the admittance where agreement at the first resonance is somewhat in error. Since the theory consists of only a zeroth-order expression, higher-order correction terms due to junction and end effects would be necessary to improve the agreement. Hence, over this range of heights the approximate solution which utilizes the zeroth-order expressions for the current, charge and admittance along with the measured effective wave number gives good results.

3) At $d/\lambda_0 = .25$ measurements show a perceptible departure from the zeroth-order form for all three quantities along with significant deviations in the wave number. It is important to note that in the range $.1 < d/\lambda_0 < .25$, no measurements were taken and, therefore, it has not been determined exactly where in this range the current, charge and admittance change from a basically transmission-line form to one more characteristic of an antenna in free space. It has been shown that at $d/\lambda_0 = .25$ the transmission-line form with the measured wave number gives adequate agreement for the current and charge distributions, although it is evident that the measurements are not exactly sinusoidal. It may still be possible that with a large enough end correction one may obtain an adequate approximation at this height. Larger discrepancies appear, however, for the input admittance which is quite sensitive to the exact form of the current distribution. For the Beverage antenna the comparisons at this height tend to provide much better results.

Hence, for antennas placed above dense media for which the condition $|k_2| \gg |k_1|$ holds, complete theoretical formulations are available for $d/\lambda_0 \leq .02$. For heights ranging from $d/\lambda_0 > .02$ up to at least $d/\lambda_0 = .1$ and probably higher, the transmission-line characteristics of the wire are still predominant, yet use of measured effective wave numbers for k_L is necessary. If moderate errors can be tolerated, the transmission-line form can be used for the current and charge distributions up to $d/\lambda_0 = .25$.

Discrepancies in the admittance preclude using a simple zeroth-order theory which does not include an end-correction term.

Moderately Dense Media $|k_2| > |k_1|$

This case refers to the measurements that were made over moist earth at 300 MHz where the relative dielectric constant was measured to be $\epsilon_r = 11.4$ and the conductivity was quite small. This is an interesting case since earth is a more common environment for antennas of this type. These measurements also give an indication as to how restrictive condition (1.3b) actually is. The measurements show that for horizontal-wire antennas as well as Beverage antennas placed above moist earth, the following can be concluded:

1) For the closest spacing measured, $d/\lambda_0 = .02$, a large discrepancy was observed between the theoretical wave number given by (1.7) and the measured one. A significant error was observed in the attenuation constant in that the predicted α_L value was 50% greater than the measured effective α_L value. Despite this fact, the transmission-line-like behavior for the current, charge and input admittance is clearly evident and the comparison with the semi-empirical solutions bears this out. Since measurements made at this height agreed quite well with theory for the dense media case, $|k_2| \gg |k_1|$, it would appear that condition (1.3b) must be strictly adhered to for King's theory to be valid.

2) Over the range $.02 < d/\lambda_0 \leq .1$, the zeroth-order transmission-line form is applicable and agreement with the semi-empirical solution is quite good. The error involved in the theoretical wave number remains quite large at these heights. Note that the range over which the transmission-line type behavior predominates most likely extends beyond $d/\lambda_0 = .1$. Since deviations from this behavior occur at the next height measured, $d/\lambda_0 = .29$, it is safe to assume that the semi-empirical solution will be applicable over part of the range $.1 < d/\lambda_0 \leq .29$. This is especially true for the current and charge distributions and less so for the input admittance. Formulas which would correctly predict the wave numbers for heights up to $d/\lambda_0 = .29$ have not been developed. Note that in this range part of the reason for the discrepancies in the wave numbers may be due to end effects. But, since the error for $d/\lambda_0 = .02$ is so large, it is more than likely that the main cause is the violation of condition (1.3b).

3) As for the case when $|k_2| \gg |k_1|$, the currents, charges and admittances begin to depart from the transmission-line behavior at $d/\lambda_0 = .29$ and take on antenna-type characteristics. Current and charge distributions can still be reasonably approximated by semi-empirical procedures but not the admittance which exhibits large errors when using this approximate technique.

Therefore, for antennas above moderately dense media for which $|k_2| > |k_1|$, a completely theoretical formulation does not exist for any range of heights. A transmission-line form, however, can clearly be used with the measured effective wave number to represent the antenna properties accurately for heights at least as great as $d/\lambda_0 = .1$ and up to $d/\lambda_0 = .29$ if large errors can be tolerated.

It is interesting to note that, although $|k_2| > |k_1|$ for moist earth at 300 MHz, at much lower frequencies where $p_e = \sigma/\omega\epsilon$ becomes increasingly larger and the earth acts more like a conductor, the condition $|k_2| \gg |k_1|$ can be obtained for moist earth. Under these conditions, one can expect that King's theory will hold in a manner analogous to the water cases. At these lower frequencies, water will also begin to act like a good conductor, which further reinforces the condition that $|k_2| \gg |k_1|$ and results in a set of conclusions similar to the case of 300 MHz.

APPENDIX A
COMPUTER PROGRAM FOR EVALUATION OF THE COMPLEX WAVE NUMBER
ON A WIRE ABOVE A DISSIPATIVE HALF-SPACE

The program in this appendix evaluates equation (1.7) which gives the complex wave number on a wire over a dissipative half-space. In the main program the operating frequency, wire spacing, radius of the wire, dielectric constant of the half-space, and conductivity of the half-space are read in on data cards. The following function subroutines and subroutines are used:

- FUNCTION XK4 - Evaluates the complex wave number of the dissipative half-space.
- FUNCTION DGAMMA - Evaluates the Gamma Function of the given argument.
- SUBROUTINE BSLM - Evaluates Bessel Functions J_0 and J_1 of complex arguments.
- SUBROUTINE BESH - Evaluates the Hankel Function with complex argument.

TABLE 3.1

```

1. COMPLEX XK4,Z,XK1,X11,XZ,XU,JRES,YRES,XKL,RC,XKLI
2. COMPLEX SUM(60)
3. COMPLEX XYB
4. COMPLEX XZ1
5. COMPLEX XILR,XILR1,XILI
6. COMMON ER
7. DIMENSION BETA(50),ALPHA(50),RATIO1(50),RATIO2(50),RATIO3(50),
8. IRATIO4(50),RHC(50),XIRC(50),DBVLAM(50)
9. PI=3.14159265
10. READ(5,1) ASET,ND
11.
12. 1 FORMAT(2I4)
13. DO 20 J=1,ASET
14. READ(5,100) F,SIGMA,ER,A
15. 100 FORMAT(4E14,6)
16. OMEGA=2.*PI/F*(10.**6)
17. PE=(SIGMA)/(OMEGA*ER)*(8.854E-12)
18. XI=OMEGA/(3.68)
19. XLAMDA=(2.*PI)/XI
20. ZETA=376.7
21. DO 10 I=1,ND
22. READ(5,11) D
23. 11 FORMAT(E14,6)
24. Z=2.*(XK4*(SIGMA,OMEGA)*D)
25. IF(CABS(Z).GT.9.) GOTO 8
26. ZX=CPLX(0.,1.)*Z
27. CALL BSLSP(1,Z,XU,JRES)
28. ZX=CPLX(0.,1.)*Z
29. CALL BESH(ZX,1,1,XYB,IER)
30. ZX=CPLX(0.,1.)*Z
31. XK1=(PI/Z)*XYB
32. X11=CPLX(0.,1.)*JRES
33. XZ=-XK1/Z
34. XZ1=PI*(X11/(2.*Z))
35. DO 30 JU=1,21
36. SUM(1)=XZ1
37. N=JU-1
38. D=(**N)*GAMMA(FLBAT(N)*.5)*DGAMMA(FLBAT(N)*2.5)
39. SUM(N+2)=SUM(N+1)-(PI/8.)*(2.*(2*N+1))/D
40. IF(CABS((SUM(N+2)-SUM(N+1))/SUM(N+1)).LT.1.E-5) GOTO 31
41. 30 CONTINUE
42. 31 XL=(1./(2.*Z))+CPLX(C.*.1.)/SUM(N+2)
43. AR=D/A
44. ACOSH=ALOG(AR+SQRT((AR**2)-1.))
45. XKL=X1*(CSQRT(1.+(2./(ACOSH))*(XU*XZ)))
46. GOTO 9
47. 8 AR=D/A
48. ACOSH=ALOG(AR+SQRT((AR**2)-1.))
49. XILR=(1./Z)*(CSQRT(PI/(2.*Z)))*CEXP(-Z)
50. XILR1=(1./(2.*Z))-XILR*(1.+(3./(8.*Z))-(128.*(Z**3)))**2
51. 1315/(3072.*(Z**5))-10080./(98304.*(Z**7)))**2
52. XIL1=(1./Z)*(1.-(1./(Z**2))-(3./(Z**4))-(45./(Z**6))-(1975./Z
53. 1**8)))
54. XKL=X1*(CSQRT(1.+(2./(ACOSH))*(XILR1*(0.,1.)*XILI)))
55. 9 XKL1=CONJG(XKL)
56. BETA(1)=REAL(XKL1)
57. ALPHA(1)=AIMAG(XKL1)
58. RATIO1(1)=BETA(1)/BETA(1)
59. RATIO2(1)=BETA(1)/X1
60. RC=(XKL1*ZETA)/(2.*PI*X1)*ACOSH
61. RRC(1)=REAL(RC)
62. XIRC(1)=AIMAG(RC)
63. RATIO3(1)=RRC(1)/ZETA
64. RATIO4(1)=XIRC(1)/ZETA
65. DBVLAM(1)=D/XLAMDA
66. 10 CONTINUE
67. WRITE(6,900) J
68. 900 FORMAT(1H1,/,40X,'PROPERTIES OF WAVE ANTENNA NEAR',/,40X,
69. 'DISSIPATIVE HALF SPACE',/,10X,'SET NUMBER =',5X,12//)
70. WRITE(6,901) SIGMA,ER,PE
71. 901 FORMAT(10X,'CONSTITUTIVE PARAMETERS OF DISSIPATIVE MEDIA',/,
72. 2 25X,'SIGMA =',F6.5,10X,'ER =',F7.4,10X,'PE =',F6.4,/)
73. WRITE(6,902) F
74. 902 FORMAT(40X,'FREQUENCY =',F6.2,'MHZ',/,/)
75. WRITE(6,903) (DBVLAM(I),BETA(I),ALPHA(I),RATIO2(I),RATIO1(I),
76. 1RRC(I),XIRC(I),RATIO3(I),RATIO4(I)) ,I=1,ND)
77. 903 FORMAT(8X,'D/LAM',9X,'BETA',8X,'ALPHA',7X,'B1/BC',8X,'AL/BO',10X,
78. 1'RRC',7X,'XIRC',8X,'RC/ZETA',6X,'XC/ZETA',/,/, 5C(5X,F8.4,8X,F7.4,8X,
79. 2F7.4,6X,F5.3,8X,F5.3,8X,F6.2,3X,F6.2,3X,F5.3,8X,F5.3,/)
80. 20 CONTINUE
81. C THIS PART OF THE PROGRAM EVALUATES THE COMPLEX
82. C WAVE NUMBER FOR A HORIZONTAL ANTENNA OVER A DISSIPATIVE
83. C HALF-SPACE GIVEN THE NECESSARY SET OF PARAMETERS. THE
84. C FORMULA FOLLOWS THE DEVELOPMENT IN KING'S PAPER. ALSO
85. C EVALUATED IS THE CHARACTERISTIC IMPEDANCE FOR THE SPECIFIED
86. C WAVE NUMBER. THIS ASSUMES A WT TIME DEPENDENCE
87. STOP
88. END

```

```

1. FUNCTION XK4(SIGMA, OMEGA)
2. COMMON ER
3. COMPLEX XK4
4. H=SIGMA/((OMEGA*ER)*8.854E-12)
5. F=SQRT(.5*(SQRT(1.+(H**2))+1.))
6. G=SQRT(.5*(SQRT(1.+(H**2))-1.))
7. B0=OMEGA/(3.68)
8. XK41=B0*F+SQRT(ER)
9. XK42=B0*G+SQRT(ER)
10. XK4=CPLX(XK41,XK42)
11. RETURN
12. END

```

TABLE 3.1 (CONTINUED)

```

1. FUNCTION DGAMMA(DX)
2. XX=DX
3. IF(XX=57.16+6.4
4. IER=2
5. DGAMMA=1.E75
6. RETURN
7.
8. X=XX
9. ERR=1.0E-6
10. IER=0
11. DGAMMA=1.0
12. IF(X=2.0)50,80,15
13. IF(X=2.0)110,110,15
14. X=X-1.0
15. DGAMMA=DGAMMA*X
16. GO TO 10
17. 50 IF(X=1.0)60,120,110
18. 60 IF(X=ERR)2,82,80
19. 62 Y=FLD(AT(1/X))-X
20. IF(ABS(Y)-ERR)130,130,64
21. 64 IF(1.0-Y-ERR)130,130,70
22. 70 IF(X=1.0)80,80,110
23. 80 DGAMMA=DGAMMA/X
24. X=X+1.0
25. GO TO 70
26. 110 Y=1.0
27. GY=1.0*Y*(-0.5771517+Y*(+0.9858540+Y*(-0.8764218+Y*(+0.8328212+
28. Y*(-0.5684729+Y*(+0.2548205+Y*(-0.05149930))))))
29. DGAMMA=DGAMMA*GY
30. RETURN
31. 120 IER=1
32. RETURN
33. END

```

```

1. SUBROUTINE BSLSMPL(NNRD,DZZ,DCBSLJ)
2. C SUBROUTINE 'BSLSMPL'
3. C 'BSLSMPL' COMPUTES BESSEL J FUNCTION WITH COMPLEX ARGUMENTS
4. C AND ORDER ND AND 1. ACCURACY UP TO 6TH DECIMAL PLACE OR MORE IS
5. C OBTAINED FOR ABS(4) LESS THAN 20.
6. C SUBROUTINE DESTROYS ITS INPUT VALUES
7. C IMPLICIT COMPLEX*(C), REAL*(I)
8. N=NRD
9. TX=REAL(DZZ)
10. TY=IMAG(DZZ)
11. X=TX
12. Y=TY
13. TX=-500*TX
14. TY=-500*TY
15. TR=TX*TX-TY*TY
16. TE=2.00*TX*TY
17. R=N
18. ETC=10.0
19. L=(SQRT(R+10.0*(X**Y**Y)))+R+ETC
20. TFR=1.00
21. TFI=0.00
22. II=(L+1)*(N+1)
23. JU=(2*L*N+2)
24. DB=400*N+1.0
25. TP=II*(JU+K)*K
26. TGR=TR/TP
27. TGI=TE/TP
28. TC=TFR
29. TFR=1.00-TGR+TFR+TGI*TFI
30. 400 TFI=-1.00*(TGR+TFI+TGI*TD)
31. IF (N+GT+0) GO TO 401
32. IF (N+GT+0) GO TO 402
33. 401 CONTINUE
34. DCBSLJ=CMPLX(TFR,TFI)
35. RETURN
36. 402 TGR=1.00
37. TGI=0.00
38. N=N+Y
39. 403 TC=TGR
40. TGR=TGR+TX-TGI*TY
41. TGI=TC+TY+TGI*TX
42. N=N+Y
43. IF (N+GT+0) GO TO 403
44. TX=1.00
45. DB=400*N+1.0
46. WPD=M*W
47. 404 TGR=TGR+WD
48. TGR=TGR+TX
49. TGI=TGI+TY
50. TD=TFR
51. TFR=TFR+TGR+TFI+TGI
52. TFI=TD+TGI+TFI+TGR
53. GO TO 401
54. END

```

TABLE 3.1 (CONTINUED)

```

1. FUNCTION DGAMMA(DX)
2. XX=DX
3. IF (X=57.16/6.4
4. IER=2
5. DGAMMA=1.E75
6. RETURN
7. 6 X=XX
8. ERR=1.0E-6
9. IER=0
10. DGAMMA=1.0
11. IF (X=2.0) GO TO 15
12. 10 IF (X=2.0) GO TO 110,115
13. 15 X=X-1.0
14. DGAMMA=DGAMMA*X
15. GO TO 10
16. 50 IF (X=1.0) GO TO 120,110
17. 60 IF (X=ERR) GO TO 80
18. 62 Y=FLGAT(IN(X))-X
19. IF (ABS(Y)-ERR) GO TO 130,130,64
20. 64 IF (1.0-Y-ERR) GO TO 130,130,70
21. 70 IF (X=1.0) GO TO 80,110
22. 80 DGAMMA=DGAMMA/X
23. X=X+1.0
24. GO TO 70
25. 110 Y=X-1.0
26. 64 Y=1.0*Y*(+0.5771017+Y*(+0.9858540+Y*(-0.8764218+Y*(+0.8328212+
27. 64 Y*(+0.5684729+Y*(-0.2548205+Y*(-0.05149930))))))
28. DGAMMA=DGAMMA*Y
29. RETURN
30. 120 IER=1
31. RETURN
32. END

```

```

1. SUBROUTINE BLSML(NBRD,DZZ,DCBSLJ)
2. C SUBROUTINE 'BLSML'
3. C 'BLSML' COMPUTES BESSEL J FUNCTION WITH COMPLEX ARGUMENTS
4. C AND ORDER AND 1. ACCURACY UPTS 6TH DECIMAL PLACE OR MORE IS
5. C OBTAINED FOR ABS(Z) LESS THAN 20.
6. C SUBROUTINE DESTROYS ITS INPUT VALUES
7. C IMPLICIT COMPLEX*(C), REAL*(I)
8. N=NBRD
9. TX=REAL(DZZ)
10. TY=AIMAG(DZZ)
11. X=TX
12. Y=TY
13. TX=X+.5D0*TX
14. TY=Y+.5D0*TY
15. TR=TX*TX+TY*TY
16. TE=2.0D0*TX*TY
17. R=N
18. ETC=10.0
19. L=(SQRT(R+10.0*(X*X+Y*Y))+R)+ETC
20. TFR=1.0D0
21. TFI=C.0D0
22. II*(L+1)*(N+L+1)
23. JJ=(2*L+1)
24. DB 400 K=1,L
25. TP=II*(JJ+K)*K
26. TGR=TR/TP
27. TGI=TE/TP
28. TD=TFR
29. TFR=TD-TGR*TFR+TGI*TFI
30. 400 TFI=-(TGR*TFI+TGI*TD)
31. IF (N=0) GO TO 401
32. IF (N=GT.0) GO TO 402
33. 401 CONTINUE
34. DCBSLJ=CMPLX(TFR,TFI)
35. RETURN
36. 402 TGR=1.0D0
37. TGI=0.0D0
38. N=N+1
39. 403 TC=TGR
40. TGR=TGR+TX*TGI*TY
41. TGI=TC+TY*TGI*TX
42. N=N+1
43. IF (N=GT.0) GO TO 403
44. TFI=0.0D0
45. DB 400 K=1,N
46. WPD=K*K
47. 404 TW=TW+WPD
48. TGR=TGR/TW
49. TGI=TGI/TW
50. TD=TFR
51. TFR=TFR+TGR*TFI*TCI
52. TFI=TD+TGI*TFI+TGR
53. GO TO 401
54. END

```

TABLE 3.1 (CONTINUED)

```

1. SUBROUTINE BESM(ZX,N,KIND,XYB,IER)
2. SUBROUTINE BESM
3. C 'BESH' COMPUTES HANDEL FUNCTION WITH COMPLEX ARGUMENTS.
4. C SUBROUTINE DESTROYS ITS INPUT VALUES
5. C IMPLICIT COMPLEX*(C)
6. C IMPLICIT REAL*(B)
7. C COMPLEX ZX
8. C COMPLEX XYB
9. C DIMENSION DT(12),DTT(6),DTX(6)
10. C KX=2
11. IF(N+EQ=0.AND.KIND=EQ=1) GO TO 300
12. IF(N+EQ=0.AND.KIND=EQ=2) GO TO 400
13. IF(N+EQ=1.AND.KIND=EQ=1) GO TO 300
14. IF(N+EQ=1.AND.KIND=EQ=2) GO TO 400
15. 300 DX=DX*COMPLX(0.0C,1.0C)
16. GO TO 500
17. 400 DX=DX*COMPLX(0.0C,1.0C)
18. GO TO 500
19. 500 TRX=REAL(DX)
20. TIX=AIMAG(DX)
21. TMAG=SQRT(TRX**2+TIX**2)
22. DBK=COMPLX(0.0C,0C)
23. YP=3.14159265
24. IF(N) 10,20,20
25. 10 IER=1
26. RETURN
27. 20 IF (TMAG=170.0C) 22,22,21
28. 21 IER=3
29. RETURN
30. 22 IER=2
31. IF (TMAG=1.0C) 30,30,25
32. 25 DA=CEAP(-DX)
33. DB=1.0C/DX
34. DC=COMPT(DB)
35. IF(REAL(DC))100,1C1,1C1
36. 100 DC=0C
37. CONTINUE
38. DT(1)=DB
39. DO 26 LL=2,12
40. 26 DT(LL)=DT(LL-1)*DB
41. DTT(1)=(DX/75DC)**2
42. DO 600 LL=2,6
43. 600 DTT(LL)=DTT(LL-1)*DTT(1)
44. DTX(1)=(DX/2.0C)**2
45. DO 605 LLL=2,6
46. 605 DTX(LLL)=DTX(LLL-1)*DTX(1)
47. IF(N=1) 627,270,627
48. 627 IF (TMAG=2.0C) 810,610,27
49. C COMPUTE I1 AND THEN K1
50. 610 D10=1.0C+3.5156229C*DTT(1)+3.0899424C*DTT(2)
51. 1.1206792C*DTT(3)+2659732C*DTT(4)+0360768CC*DTT(5)
52. 2+.0045813C*DTT(6)
53. D00=COLRG(DX/2.0C)*D10=-57721566C+.4278420CC*DTX(1)
54. 1+.2306975C*DTX(2)+.0348859C*DTX(3)+.00262698CC*DTX(4)
55. 2+.0001075C*DTX(5)+.0000074C*DTX(6)
56. IF(N) 20,628,629
57. DBK=D00
58. GO TO 200
59. C
60. C
61. C
62. C
63. C
64. C
65. C
66. C
67. C
68. C
69. C
70. C
71. C
72. C
73. C
74. C
75. C
76. C
77. C
78. C
79. C
80. C
81. C
82. C
83. C
84. C
85. C
86. C
87. C
88. C
89. C
90. C
91. C
92. C
93. C
94. C
95. C
96. C
97. C
98. C
99. C
100. C
101. C
102. C
103. C
104. C
105. C
106. C
107. C
108. C
109. C
110. C
111. C
112. C
113. C
114. C
115. C
116. C
117. C
118. C
119. C

```

BESK 060
 BESK 066
 BESK 069
 BESK 070
 BESK 071
 BESK 076
 BESK 079
 BESK 080
 BESK 081
 BESK 082
 BESK PCB
 BESK PC9
 BESK 091
 BESK 092
 BESK 093
 BESK 094

TABLE 3.1 (CONTINUED)

```
120.      37 D00=-DA
121.      DX2J=DCMPLX(1.00,C.DC)
122.      TFACT=1.00
123.      THJ=C.DC
124.      DF=40 J=1,6                      BESK 099
125.      TRJ=1.00/FLBAT(J)
126.      DX2J=DX2J*DC
127.      TFACT=TFACT*TRJ*TRJ
128.      THJ=THJ*TRJ
129.      40 D00=D00+DX2J*TFACT*(THJ-DA)
130.      IF(N)*3,2,3                      BESK 105
131.      42 DBK=D00
132.      GO TO 200
133.
134.      C      COMPUTE K1 USING SERIES EXPANSION
135.      C
136.      43 DX2J=DB
137.      TFACT=1.00
138.      THJ=1.00
139.      DG1=1.00/DX+DX2J*(.500+CA*THJ)
140.      D0 50 J=2,8                      BESK 115
141.      DX2J=DX2J*DC
142.      TRJ=1.00/FLBAT(J)
143.      TFACT=TFACT*TRJ*TRJ
144.      THJ=THJ*TRJ
145.      50 DG1=DG1+DX2J*TFACT*(.500+(DA-THJ)*FLBAT(J))
146.      IF(N=1)31,52,31                  BESK 121
147.      52 DBK=DG1
148.
149.      C      COMPUTE HANKEL FUNCTION USING K0 AND K1
150.      C
151.      200 IF(N.EQ.0.AND.KIND.EQ.1) GO TO 110
152.      IF(N.EQ.0.AND.KIND.EQ.2) GO TO 115
153.      IF(N.EQ.1.AND.KIND.EQ.1) GO TO 120
154.      IF(N.EQ.1.AND.KIND.EQ.2) GO TO 120
155.      110 DBH=2.00*DCMPLX(C.DC,1.00)*DBK/TP1
156.      GO TO 130
157.      115 DBH=2.00*DCMPLX(C.DC,1.00)*DBK/TP1
158.      GO TO 130
159.      120 DBH=2.00*DBK/TP1
160.      XY0=DBH
161.      130 CRNTINUE,
162.      RETURN
163.      END
```

APPENDIX B

TABLES OF MEASURED CURRENTS, CHARGES AND ADMITTANCES ON UNLOADED MONOPOLES
OVER A DISSIPATIVE HALF-SPACE AND ON MODIFIED BEVERAGE ANTENNAS

This appendix contains all the measured data described in Part III. Table 3.2 lists the measured data for the current and charge distributions on unloaded monopoles. The following terms are defined:

$\left\{ \begin{smallmatrix} I \\ Q \end{smallmatrix} \right\} \text{RMAG}$ = Raw data for current and charge magnitudes.

$\left\{ \begin{smallmatrix} I \\ Q \end{smallmatrix} \right\} \text{RFAZ}$ = Raw data for current and charge phases.

$\left\{ \begin{smallmatrix} I \\ Q \end{smallmatrix} \right\} \text{NMAG}$ = Normalized magnitudes for current and charge.

$\left\{ \begin{smallmatrix} I \\ Q \end{smallmatrix} \right\} \text{NFAZ}$ = Normalized phases for current and charge.

$\left\{ \begin{smallmatrix} I \\ Q \end{smallmatrix} \right\} \text{NREAL}$ = Normalized real part of current and charge.

$\left\{ \begin{smallmatrix} I \\ Q \end{smallmatrix} \right\} \text{NIMAG}$ = Normalized imaginary part of current and charge.

The remaining tables list the following data:

Table 3.3. Measured input admittances and impedances of a monopole over dissipative media.

Table 3.4. Measured current and charge distributions on modified Beverage antennas.

Table 3.5. Measured input admittances and impedances of the modified Beverage antenna.

TABLE 3.2 (CONTINUED)

DISTRIBUTION OF CURRENT AND CHARGE ON MONOPOLE ANTENNA OVER FRESH WATER
 ALPHA/BETA = .1289 BETA/BETA = 1.143 H/LAMDA0 = 1.000
 FREQUENCY = 300.00MHz PE = .067 D/LAMDA0 = .0100

A. MEASURED CURRENT DISTRIBUTION IN MA/VOLTS

Z/H	RAW DATA		NORMALIZED DATA				Z/LAMDA0
	IR*AG	IR*AZ	IN*AG	IN*AZ	IN*REAL	IN*PAG	
.025	9.4990	25.0000	4.0000	20.0000	5.638	2.052	.025
.050	8.4911	14.0000	5.3400	10.8000	5.281	.973	.050
.075	7.4832	130.0000	5.0000	.4000	5.020	.070	.075
.100	7.1559	105.3000	4.3000	4.4000	4.822	-.921	.100
.125	6.4993	91.1000	4.0000	24.7000	3.907	-1.797	.125
.150	6.4760	80.0000	3.9400	20.0000	3.109	-2.524	.150
.175	6.4993	62.1000	4.0000	16.9000	2.529	-3.018	.175
.200	6.4993	49.3000	4.1000	14.0000	1.919	-3.785	.200
.225	7.4326	38.0000	4.4000	12.0000	1.409	-4.086	.225
.250	7.4992	27.5000	4.4000	10.0000	1.000	-4.510	.250
.275	7.4992	17.3000	4.8000	110.7000	1.097	-4.490	.275
.300	6.4325	11.8000	5.0000	118.2000	2.363	-4.407	.300
.325	6.4558	4.0000	5.0000	126.0000	2.986	-4.110	.325
.350	6.4392	-1.5000	5.0000	131.5000	3.940	-3.775	.350
.375	6.4392	-7.6000	4.9000	137.4000	3.633	-3.318	.375
.400	7.4992	-13.5000	4.8000	143.5000	3.714	-2.748	.400
.425	7.1559	-20.0000	4.3000	150.0000	3.724	-2.150	.425
.450	6.3994	-26.6000	3.8000	156.4000	3.924	-1.525	.450
.475	5.4994	-34.4000	3.4000	164.4000	3.294	-.920	.475
.500	4.7600	-43.0000	2.8600	175.0000	2.849	-.249	.500
.525	3.4996	-58.5000	2.2400	184.3000	2.314	.346	.525
.550	3.3600	-74.8000	2.0000	190.4000	1.803	.911	.550
.575	3.604	-100.0000	1.8400	200.0000	1.189	1.410	.575
.600	3.4763	-125.7000	1.9000	205.0000	1.089	1.871	.600
.625	3.763	-141.2000	2.2000	211.2000	.927	2.260	.625
.650	4.362	-153.3000	2.6000	223.3000	.803	2.550	.650
.675	5.161	-165.7000	3.1000	235.7000	1.194	2.840	.675
.700	5.794	-169.5000	3.4800	239.5000	1.714	3.029	.700
.725	6.360	-174.4000	3.8200	244.4000	2.198	3.152	.725
.750	6.4058	-176.7000	4.1000	250.7000	2.583	3.200	.750
.775	6.4993	-181.0000	4.2000	211.0000	2.795	3.170	.775
.800	6.4600	-183.2000	4.1000	219.2000	2.800	3.003	.800
.825	6.7600	-185.5000	4.0800	215.5000	2.894	2.846	.825
.850	6.161	-187.0000	3.7000	217.0000	2.704	2.523	.850
.875	5.4994	-188.5000	3.2400	218.5000	2.814	2.226	.875
.900	4.6994	-189.2000	2.8200	219.2000	2.130	1.843	.900
.925	3.5994	-190.0000	2.1400	220.0000	1.685	1.388	.925
.950	2.731	-190.4000	1.6400	220.4000	1.097	1.001	.950
.975	1.532	-191.3000	.9200	221.3000	.718	.575	.975
.984	.999	-192.0000	.6000	222.0000	.473	.369	.984

B. MEASURED CHARGE DISTRIBUTION IN PICCOUL/VOLTS*CM

Z/H	RAW DATA		NORMALIZED DATA				Z/LAMDA0
	QR*AG	QR*AZ	QN*AG	QN*AZ	QN*REAL	QN*PAG	
.025	9.4994	-3.4000	26.2000	-3.4000	26.154	-1.554	.025
.050	8.4986	-11.5000	22.0000	-11.5000	21.558	-4.386	.050
.075	8.147	-20.0000	22.0000	-20.0000	20.594	-7.955	.075
.100	8.147	-29.4000	22.0000	-29.4000	19.167	-10.800	.100
.125	7.940	-37.0000	22.0000	-37.0000	17.570	-13.000	.125
.150	7.541	-45.0000	21.4000	-45.0000	15.174	-15.175	.150
.175	7.541	-50.3000	20.3800	-50.3000	13.018	-15.880	.175
.200	7.444	-58.4000	20.1200	-58.4000	10.953	-17.173	.200
.225	6.993	-65.6000	18.9000	-65.6000	7.748	-17.239	.225
.250	6.3994	-74.0000	17.2800	-74.0000	4.763	-18.611	.250
.275	5.794	-83.3000	15.6800	-83.3000	1.867	-19.953	.275
.300	5.077	-94.4000	14.1800	-94.4000	-1.088	-21.139	.300
.325	4.647	-107.3000	12.5800	-107.3000	-3.735	-21.992	.325
.350	4.248	-123.0000	11.4800	-123.0000	-6.282	-19.628	.350
.375	4.100	-140.7000	11.0800	-140.7000	-8.574	-7.018	.375
.400	4.194	-158.0000	11.2800	-158.0000	-10.514	-4.248	.400
.425	4.767	-174.0000	11.8800	-174.0000	-11.815	-1.242	.425
.450	5.477	-186.8000	13.1000	-186.8000	-13.008	1.551	.450
.475	5.747	-197.0000	14.1800	-197.0000	-13.860	4.146	.475
.500	5.994	-205.3000	15.1200	-205.3000	-13.670	6.462	.500
.525	5.846	-212.0000	15.8000	-212.0000	-13.399	8.373	.525
.550	5.994	-217.4000	16.2000	-217.4000	-12.895	9.844	.550
.575	6.398	-222.4000	16.4800	-222.4000	-12.131	11.195	.575
.600	5.942	-227.0000	16.0800	-227.0000	-10.953	11.746	.600
.625	5.794	-231.0000	15.6800	-231.0000	-9.895	12.170	.625
.650	5.294	-235.0000	14.3200	-235.0000	-8.219	11.730	.650
.675	4.447	-239.4000	13.1000	-239.4000	-6.668	11.274	.675
.700	4.299	-244.0000	11.6200	-244.0000	-5.094	10.444	.700
.725	3.544	-250.0000	9.8800	-250.0000	-3.277	9.002	.725
.750	2.760	-255.3000	7.4800	-255.3000	-1.385	7.330	.750
.775	1.920	-275.6000	4.9200	-275.6000	.180	4.897	.775
.800	1.302	-308.4000	2.5800	-308.4000	2.194	2.761	.800
.825	1.458	-352.5000	3.9400	-352.5000	3.906	.514	.825
.850	2.176	-378.0000	5.8400	-378.0000	5.992	-1.817	.850
.875	2.975	-390.3000	8.0000	-390.3000	6.942	-4.056	.875
.900	3.448	-396.5000	10.4000	-396.5000	8.360	-6.186	.900
.925	4.344	-400.8000	11.7400	-400.8000	8.887	-7.671	.925
.950	4.899	-403.2000	13.2000	-403.2000	9.482	-9.043	.950
.975	5.543	-404.7000	14.9800	-404.7000	10.468	-10.537	.975
.984	5.846	-405.8000	15.8000	-405.8000	11.015	-11.327	.984
.987	6.297	-406.0000	17.0000	-406.0000	11.883	-12.243	.987

TABLE 3.2 (CONTINUED)

DISTRIBUTION OF CURRENT AND CHARGE ON HORIZONTAL ANTENNA OVER FRESH WATER
ALFA/ETA = .0911 BETA/DZETA = 3.002 K/LAMDA = 1.500
FREQUENCY = 300.00MHZ FE = .067 D/LAMDA = .0200

A. MEASURED CURRENT DISTRIBUTION IN MA/VOLTS

Table A: MEASURED CURRENT DISTRIBUTION IN MA/VOLTS. Columns include Z/LAMDA, I/REAL, I/IMAG, I/FAZ, I/BAZ, I/REAL, I/IMAG, and Z/LAMDA. Rows list data points from 1.00 to 9.89.

B. MEASURED CHARGE DISTRIBUTION IN PICCOL/VOLTS

Table B: MEASURED CHARGE DISTRIBUTION IN PICCOL/VOLTS. Columns include Z/LAMDA, I/REAL, I/IMAG, I/FAZ, I/BAZ, I/REAL, I/IMAG, and Z/LAMDA. Rows list data points from 1.00 to 9.91.

TABLE 3.2 (CONTINUED)

DISTRIBUTION OF CURRENT AND CHARGE ON HORNPOLE ANTENNA OVER FRESH WATER
 ALPHA/METAL = .0911 BETA1/BETA2 = 1.052 H/LAPCAD = 1.000
 FREQUENCY = 300.00MHz PE = .067 D/LAPCAD = .0200

A. MEASURED CURRENT DISTRIBUTION IN MA/VOLT

RA - DATA NORMALIZED DATA

Z/H	IR*AS	IRFAZ	IRNPAZ	IRNFAZ	IRREAL	IRNPAG	Z/LAMDA0
.003	7.400	150.000	3.440	35.000	2.818	1.973	.003
.025	5.261	138.000	2.880	21.000	2.880	1.058	.025
.050	5.091	119.400	2.600	4.400	2.592	.199	.050
.075	5.007	95.800	2.480	-15.200	2.392	-.650	.075
.100	5.025	82.000	2.600	-28.000	2.174	-1.386	.100
.125	4.905	96.200	2.440	-18.800	2.310	-.786	.125
.150	6.512	54.100	2.200	50.000	1.856	2.756	.150
.175	7.025	44.800	3.080	70.000	1.125	-3.375	.175
.200	7.977	37.000	3.920	-78.000	.815	-3.835	.200
.225	8.768	30.800	4.220	-84.200	.526	-4.198	.225
.250	9.435	25.000	4.440	-85.800	.315	-4.440	.250
.275	9.980	21.200	4.580	-93.800	.202	-4.550	.275
.300	9.461	17.000	4.600	-97.800	.148	-4.557	.300
.325	4.282	12.400	4.580	-102.400	-.079	-4.454	.325
.350	8.995	9.300	4.420	-105.700	-1.194	-4.255	.350
.375	8.425	8.400	4.180	-109.800	-1.389	-3.900	.375
.400	7.570	1.400	3.720	-113.400	-1.489	-3.409	.400
.425	6.512	-6.000	3.200	-117.800	-1.492	-2.831	.425
.450	5.454	-9.500	2.680	-124.500	-1.518	-2.209	.450
.475	4.277	-18.200	2.200	-133.200	-1.506	-1.600	.475
.500	3.378	-33.200	1.880	-148.800	-1.511	-.895	.500
.525	2.605	-47.000	1.280	-172.200	-1.248	-.174	.525
.550	2.083	-60.800	1.220	-202.800	-1.098	-.531	.550
.575	3.039	-119.000	1.920	-239.400	-.893	1.230	.575
.600	4.170	-135.200	2.000	-280.200	-.677	1.882	.600
.625	5.128	-144.800	2.020	-329.400	-.456	2.478	.625
.650	5.942	-150.000	2.920	-385.000	-.259	3.040	.650
.675	7.100	-154.600	3.440	-449.800	-.180	3.616	.675
.700	7.774	-157.700	3.820	-522.700	-.092	4.225	.700
.725	8.621	-160.000	4.040	-604.000	.088	4.823	.725
.750	8.669	-161.500	4.280	-694.800	.286	5.423	.750
.775	8.532	-163.300	4.380	-794.200	.419	6.026	.775
.800	8.584	-164.300	4.220	-892.300	.488	6.645	.800
.825	8.282	-165.500	4.080	-989.800	.540	7.282	.825
.850	7.611	-166.300	3.740	-1087.300	.573	7.967	.850
.875	6.940	-167.200	3.420	-1184.200	.588	8.698	.875
.900	6.982	-167.800	3.220	-1280.200	.583	9.472	.900
.925	6.518	-168.100	2.820	-1375.800	.564	10.291	.925
.950	3.378	-168.800	1.680	-1471.000	.528	11.054	.950
.975	1.913	-169.000	.840	-1566.000	.477	11.762	.975
.984	1.282	-169.400	.620	-1661.000	.414	12.414	.984

B. MEASURED CHARGE DISTRIBUTION IN PICCOL/VOLT*P

RA - DATA NORMALIZED DATA

Z/H	QR*AS	QRFAZ	QRNPAZ	QRNFAZ	QRREAL	QRNPAG	Z/LAMDA0
.006	11.796	.300	22.820	.300	22.820	-.119	.006
.025	9.187	44.000	18.520	44.000	18.475	-1.292	.025
.050	8.752	9.100	17.680	-9.100	17.407	2.756	.050
.075	8.448	-14.100	17.040	-14.100	16.546	4.156	.075
.100	8.148	-18.800	16.460	-18.800	15.988	5.304	.100
.125	7.623	-23.900	15.900	-23.900	14.128	6.611	.125
.150	6.999	-29.100	14.140	-29.100	12.385	8.077	.150
.175	6.316	-35.000	12.760	-35.000	10.992	9.719	.175
.200	5.524	-42.400	11.120	-42.400	8.212	11.498	.200
.225	4.782	-52.000	9.660	-52.000	5.997	13.412	.225
.250	4.100	-65.000	8.080	-65.000	3.915	15.483	.250
.275	3.396	-83.300	6.860	-83.300	.800	17.693	.275
.300	3.138	-106.800	6.340	-106.800	-1.801	20.079	.300
.325	3.346	-129.400	6.760	-129.400	-4.291	22.624	.325
.350	3.985	-147.800	7.980	-147.800	-6.730	25.288	.350
.375	4.883	-160.000	9.460	-160.000	-8.889	28.036	.375
.400	5.196	-169.000	10.800	-169.000	-10.608	30.861	.400
.425	6.049	-175.400	12.220	-175.400	-12.181	33.800	.425
.450	6.803	-180.300	13.340	-180.300	-13.340	36.850	.450
.475	7.294	-184.300	14.240	-184.300	-14.300	39.999	.475
.500	7.596	-187.800	14.740	-187.800	-14.611	43.248	.500
.525	7.395	-190.800	14.940	-190.800	-14.688	46.598	.525
.550	7.346	-193.000	14.840	-193.000	-14.640	50.048	.550
.575	6.850	-196.000	14.040	-196.000	-13.896	53.598	.575
.600	6.054	-198.000	13.240	-198.000	-12.992	57.248	.600
.625	5.401	-200.400	11.720	-200.400	-10.985	60.998	.625
.650	5.394	-203.200	10.300	-203.200	9.987	64.848	.650
.675	4.296	-209.700	8.680	-209.700	7.754	68.798	.675
.700	3.346	-212.300	6.760	-212.300	5.714	72.848	.700
.725	2.336	-222.100	4.720	-222.100	3.802	76.998	.725
.750	1.297	-224.700	2.840	-224.700	2.470	81.248	.750
.775	1.059	-207.200	2.140	-207.200	1.294	85.598	.775
.800	1.921	-384.000	3.840	-384.000	3.491	90.048	.800
.825	2.980	-387.200	6.020	-387.200	6.013	94.598	.825
.850	4.100	-368.800	8.080	-368.800	8.070	99.248	.850
.875	5.394	-368.000	10.300	-368.000	10.244	103.998	.875
.900	6.803	-368.500	11.720	-368.500	11.991	108.848	.900
.925	6.054	-370.400	13.140	-370.400	14.240	113.798	.925
.950	7.294	-370.800	14.740	-370.800	16.999	118.848	.950
.975	7.596	-371.400	15.880	-371.400	19.987	123.998	.975
.987	8.554	-371.800	17.280	-371.800	23.247	129.248	.987

TABLE 3.2 (CONTINUED)

DISTRIBUTION OF CURRENT AND CHARGE ON MONOPOLE ANTENNA OVER FRESH WATER
 ALFA/BETA = .1085 BETA/BETAC = 1.193 W/LAMDA0 = .500
 FREQUENCY = 300.00MHZ PE = .067 D/LAMDA0 = .0100

A. MEASURED CURRENT DISTRIBUTION IN MA/VOLTY

Z/H	RAW DATA		NORMALIZED DATA				Z/LAMDA0
	IR*AG	IR*AZ	IN*AG	IN*AZ	IN*REAL	IN*IMAG	
.000	8.498	180.00	3.820	45.00	2.701	2.701	.003
.050	8.423	152.40	3.140	37.00	2.288	1.916	.025
.100	8.348	124.80	2.460	29.00	1.875	1.544	.050
.150	8.273	97.20	1.780	21.00	1.462	1.172	.075
.200	8.198	69.60	1.100	13.00	1.050	.800	.100
.250	8.123	42.00	0.420	5.00	.637	.430	.125
.300	8.048	14.40	-0.260	-1.00	.225	.150	.150
.350	7.973	-13.20	-0.940	-2.00	-.167	-.117	.175
.400	7.898	-40.80	-1.620	-3.00	-.354	-.244	.200
.450	7.823	-68.40	-2.300	-4.00	-.541	-.374	.225
.500	7.748	-96.00	-2.980	-5.00	-.728	-.504	.250
.550	7.673	-123.60	-3.660	-6.00	-.915	-.634	.275
.600	7.598	-151.20	-4.340	-7.00	-1.102	-.764	.300
.650	7.523	-178.80	-5.020	-8.00	-1.289	-.894	.325
.700	7.448	-206.40	-5.700	-9.00	-1.476	-1.024	.350
.750	7.373	-234.00	-6.380	-10.00	-1.663	-1.154	.375
.800	7.298	-261.60	-7.060	-11.00	-1.850	-1.284	.400
.850	7.223	-289.20	-7.740	-12.00	-2.037	-1.414	.425
.900	7.148	-316.80	-8.420	-13.00	-2.224	-1.544	.450
.950	7.073	-344.40	-9.100	-14.00	-2.411	-1.674	.475
.968	7.000	-350.00	-9.380	-14.00	-2.467	-1.674	.487

B. MEASURED CHARGE DISTRIBUTION IN PICCOUL/VOLTY-P

Z/H	RAW DATA		NORMALIZED DATA				Z/LAMDA0
	QR*AG	QR*AZ	QN*AG	QN*AZ	QN*REAL	QN*IMAG	
.012	14.788	2.80	26.460	2.80	26.428	1.293	.006
.050	10.236	-1.60	22.680	-1.60	22.651	-.633	.025
.100	11.768	-6.40	20.900	-6.40	20.878	-2.264	.050
.150	11.049	-10.00	21.580	-10.00	21.222	-2.764	.075
.200	11.168	-14.40	20.720	-14.40	20.069	-5.153	.100
.250	11.092	-17.60	19.080	-17.60	18.148	-5.827	.125
.300	10.917	-21.60	17.120	-21.60	16.918	-6.302	.150
.350	10.742	-26.40	15.160	-26.40	15.597	-6.750	.175
.400	10.567	-30.00	13.400	-30.00	14.518	-6.971	.200
.450	10.392	-33.60	11.840	-33.60	13.239	-7.124	.225
.500	10.217	-37.20	10.480	-37.20	12.151	-7.229	.250
.550	10.042	-40.80	9.320	-40.80	11.263	-7.308	.275
.600	9.867	-44.40	8.360	-44.40	10.518	-7.368	.300
.650	9.692	-48.00	7.600	-48.00	9.903	-7.412	.325
.700	9.517	-51.60	7.040	-51.60	9.411	-7.444	.350
.750	9.342	-55.20	6.580	-55.20	9.031	-7.467	.375
.800	9.167	-58.80	6.320	-58.80	8.751	-7.482	.400
.850	8.992	-62.40	6.160	-62.40	8.571	-7.490	.425
.900	8.817	-66.00	6.100	-66.00	8.491	-7.494	.450
.950	8.642	-69.60	6.140	-69.60	8.511	-7.494	.475
.968	8.567	-70.00	6.140	-70.00	8.511	-7.494	.487

DISTRIBUTION OF CURRENT AND CHARGE ON MONOPOLE ANTENNA OVER FRESH WATER
 ALFA/BETA = .0911 BETA/BETAC = 1.052 W/LAMDA0 = .500
 FREQUENCY = 300.00MHZ PE = .067 D/LAMDA0 = .0200

A. MEASURED CURRENT DISTRIBUTION IN MA/VOLTY

Z/H	RAW DATA		NORMALIZED DATA				Z/LAMDA0
	IR*AG	IR*AZ	IN*AG	IN*AZ	IN*REAL	IN*IMAG	
.000	3.459	169.50	2.100	44.50	1.438	1.438	.003
.050	2.744	144.80	1.860	21.50	1.421	.572	.025
.100	2.484	119.00	1.400	11.00	1.271	-.127	.050
.150	2.292	83.40	1.700	-6.10	1.276	-.124	.075
.200	1.907	63.90	2.220	-6.10	1.073	-.194	.100
.250	1.469	48.00	3.240	-7.00	.898	-.267	.125
.300	1.021	43.00	3.820	-8.00	.752	-.343	.150
.350	7.884	39.40	4.300	-8.00	.627	-.417	.175
.400	8.165	36.80	4.640	-8.00	.532	-.487	.200
.450	8.446	34.20	4.780	-9.00	.463	-.557	.225
.500	8.727	31.60	4.880	-9.00	.419	-.627	.250
.550	8.998	29.00	4.740	-9.00	.398	-.697	.275
.600	9.269	26.40	4.400	-9.00	.381	-.767	.300
.650	9.540	23.80	3.880	-9.00	.368	-.837	.325
.700	9.811	21.20	3.280	-9.00	.359	-.907	.350
.750	10.082	18.60	2.680	-9.00	.352	-.977	.375
.800	10.353	16.00	2.080	-9.00	.348	-1.047	.400
.850	10.624	13.40	1.480	-9.00	.346	-1.117	.425
.900	10.895	10.80	0.880	-9.00	.346	-1.187	.450
.950	11.166	8.20	0.280	-9.00	.346	-1.257	.475
.968	11.267	7.20	.720	-9.00	.346	-1.257	.487

B. MEASURED CHARGE DISTRIBUTION IN PICCOUL/VOLTY-P

Z/H	RAW DATA		NORMALIZED DATA				Z/LAMDA0
	QR*AG	QR*AZ	QN*AG	QN*AZ	QN*REAL	QN*IMAG	
.012	10.105	.00	23.000	.00	23.000	.000	.006
.050	8.004	-4.40	18.400	-4.40	18.369	-.642	.025
.100	7.351	-7.80	16.900	-7.80	18.850	-1.297	.050
.150	6.958	-9.40	16.880	-7.80	19.233	-2.195	.075
.200	6.565	-11.00	16.980	-9.40	19.289	-2.843	.100
.250	6.081	-12.00	13.080	-11.00	18.275	-2.718	.125
.300	5.622	-12.80	11.800	-11.00	17.129	-2.899	.150
.350	4.306	-14.50	9.900	-11.00	15.888	-2.811	.175
.400	3.306	-16.20	7.600	-11.00	14.590	-2.604	.200
.450	2.635	-17.90	5.300	-11.00	13.292	-2.294	.225
.500	1.305	-19.00	3.000	-11.00	11.994	-1.984	.250
.550	1.44	-19.10	2.900	-11.00	10.696	-1.674	.275
.600	1.618	-19.00	4.180	-11.00	9.398	-1.364	.300
.650	2.819	-19.30	6.480	-11.00	8.100	-1.054	.325
.700	3.854	-17.00	8.880	-11.00	6.802	-.744	.350
.750	4.950	-17.20	11.380	-11.00	5.504	-.434	.375
.800	5.993	-17.90	12.880	-11.00	4.206	-.124	.400
.850	6.955	-18.60	14.380	-11.00	2.908	.186	.425
.900	7.108	-181.80	16.340	-11.00	1.610	.500	.450
.950	7.656	-182.40	17.600	-11.00	0.312	.814	.475
.968	8.367	-182.60	19.200	-11.00	0.014	.814	.487

TABLE 3.2 (CONTINUED)

DISTRIBUTION OF CURRENT AND CHARGE ON MONOPOLE ANTENNA OVER FRESH WATER
ALPHA/REAL = 0.0001 BETA/BETA = 1.018 W/LAMDA0 = 1.500
FREQUENCY = 300.000MHZ PE = .067 D/LAMDA0 = .0500

A. MEASURED CURRENT DISTRIBUTION IN MA/VOLTS

Table A: MEASURED CURRENT DISTRIBUTION IN MA/VOLTS. Columns: Z/H, IMAZ, IREAZ, INMAG, INFAZ, INREAL, INIMAG, Z/LAMDA0. Rows: 1002 to 989.

B. MEASURED CHARGE DISTRIBUTION IN PICCOUL/VOLTS.M

Table B: MEASURED CHARGE DISTRIBUTION IN PICCOUL/VOLTS.M. Columns: Z/H, QMAZ, QREAZ, QNIMAG, QNFAZ, QNREAL, QNIMAG, Z/LAMDA0. Rows: 1004 to 991.

TABLE 3.2 (CONTINUED)

DISTRIBUTION OF CURRENT AND CHARGE ON HORIZONTAL ANTENNA OVER FRESH WATER
 ALPHA/BETA = .048; BETA/BETA = 1.018; Z/LAMDA = 1.000
 FREQUENCY = 300.000 MHz; FE = .067; D/LAMDA = .1000

A. MEASURED CURRENT DISTRIBUTION IN MA/VOLT

Z/H	RA-DATA				NORMALIZED DATA			
	IR*AG	IR*AZ	IR*MG	IR*FZ	IR*REAL	IR*IMAG	Z/LAMDA	
.03	163.10	1.700	48.10	1.135	1.265	.003		
.25	131.10	1.080	13.90	1.078	.480	.025		
.50	101.10	1.320	42.80	1.048	.059	.050		
.75	81.10	1.700	80.30	.989	-.897	.075		
1.00	61.10	2.200	124.00	.892	-1.494	.100		
1.25	41.10	2.800	172.00	.782	-2.047	.125		
1.50	21.10	3.400	224.00	.634	-2.542	.150		
1.75	1.10	4.000	280.00	.487	-2.999	.175		
2.00		4.600	340.00	.381	-3.342	.200		
2.25		5.200	400.00	.282	-3.593	.225		
2.50		5.800	460.00	.188	-3.759	.250		
2.75		6.400	520.00	.100	-3.820	.275		
3.00		7.000	580.00	.020	-3.795	.300		
3.25		7.600	640.00	-.059	-3.648	.325		
3.50		8.200	700.00	-.138	-3.440	.350		
3.75		8.800	760.00	-.217	-3.188	.375		
4.00		9.400	820.00	-.296	-2.912	.400		
4.25		10.000	880.00	-.375	-2.619	.425		
4.50		10.600	940.00	-.454	-2.312	.450		
4.75		11.200	1000.00	-.533	-2.000	.475		
5.00		11.800	1060.00	-.612	-1.688	.500		
5.25		12.400	1120.00	-.691	-.132	.525		
5.50		13.000	1180.00	-.770	.178	.550		
5.75		13.600	1240.00	-.849	.489	.575		
6.00		14.200	1300.00	-.928	.800	.600		
6.25		14.800	1360.00	-.997	1.112	.625		
6.50		15.400	1420.00	-.106	1.424	.650		
6.75		16.000	1480.00	.174	1.736	.675		
7.00		16.600	1540.00	.442	2.048	.700		
7.25		17.200	1600.00	.710	2.360	.725		
7.50		17.800	1660.00	.978	2.672	.750		
7.75		18.400	1720.00	1.246	2.984	.775		
8.00		19.000	1780.00	1.514	3.296	.800		
8.25		19.600	1840.00	1.782	3.608	.825		
8.50		20.200	1900.00	2.050	3.920	.850		
8.75		20.800	1960.00	2.318	4.232	.875		
9.00		21.400	2020.00	2.586	4.544	.900		
9.25		22.000	2080.00	2.854	4.856	.925		
9.50		22.600	2140.00	3.122	5.168	.950		
9.75		23.200	2200.00	3.390	5.480	.975		
10.00		23.800	2260.00	3.658	5.792	.999		

B. MEASURED CHARGE DISTRIBUTION IN PICCOUL/VOLT

Z/H	RA-DATA				NORMALIZED DATA			
	QR*AG	QR*AZ	QR*MG	QR*FZ	QR*REAL	QR*IMAG	Z/LAMDA	
.03	21.500	.000	.000	21.500	1.000	.000	.006	
.25	16.120	-1.400	16.120	16.119	-.450	.025		
.50	14.300	-3.900	14.300	14.287	-.973	.050		
.75	13.200	-6.300	13.200	13.140	-1.461	.075		
1.00	12.140	-8.800	12.140	11.997	-1.897	.100		
1.25	11.500	-11.500	10.980	11.800	-2.177	.125		
1.50	11.000	-14.000	9.500	10.701	-2.379	.150		
1.75	10.600	-16.200	8.000	9.612	-2.495	.175		
2.00	10.300	-18.000	6.500	8.647	-2.539	.200		
2.25	10.100	-19.400	5.000	7.801	-2.511	.225		
2.50	10.000	-20.300	3.500	7.072	-2.420	.250		
2.75	10.000	-20.700	2.000	6.458	-2.288	.275		
3.00	10.000	-20.600	0.500	5.955	-2.125	.300		
3.25	10.000	-20.000	0.000	5.568	-1.938	.325		
3.50	10.000	-18.900	0.000	5.299	-1.742	.350		
3.75	10.000	-17.400	0.000	5.141	-1.551	.375		
4.00	10.000	-15.600	0.000	5.081	-1.381	.400		
4.25	10.000	-13.500	0.000	5.110	-1.230	.425		
4.50	10.000	-11.200	0.000	5.230	-1.100	.450		
4.75	10.000	-8.800	0.000	5.440	-1.000	.475		
5.00	10.000	-6.400	0.000	5.730	-.920	.500		
5.25	10.000	-4.000	0.000	6.090	-.860	.525		
5.50	10.000	-1.600	0.000	6.520	-.810	.550		
5.75	10.000	0.800	0.000	7.010	-.770	.575		
6.00	10.000	3.200	0.000	7.560	-.740	.600		
6.25	10.000	5.600	0.000	8.170	-.720	.625		
6.50	10.000	8.000	0.000	8.840	-.710	.650		
6.75	10.000	10.400	0.000	9.570	-.710	.675		
7.00	10.000	12.800	0.000	10.360	-.720	.700		
7.25	10.000	15.200	0.000	11.210	-.740	.725		
7.50	10.000	17.600	0.000	12.120	-.770	.750		
7.75	10.000	20.000	0.000	13.090	-.810	.775		
8.00	10.000	22.400	0.000	14.120	-.860	.800		
8.25	10.000	24.800	0.000	15.210	-.920	.825		
8.50	10.000	27.200	0.000	16.360	-.990	.850		
8.75	10.000	29.600	0.000	17.570	-1.070	.875		
9.00	10.000	32.000	0.000	18.840	-1.160	.900		
9.25	10.000	34.400	0.000	20.170	-1.260	.925		
9.50	10.000	36.800	0.000	21.560	-1.370	.950		
9.75	10.000	39.200	0.000	23.010	-1.490	.975		
10.00	10.000	41.600	0.000	24.520	-1.620	.999		

TABLE 3.2 (CONTINUED)

DISTRIBUTION OF CURRENT AND CHARGE ON HORNPOLE ANTENNA OVER FRESH WATER
ALUMINUM + .028C RETAL/BETAC + 1.016 W/LAMDAO + 1.900

FREQUENCY = 300.000MHZ PE = .067 D/LAMDAO = .1000

A. MEASURED CURRENT DISTRIBUTION IN HORNPOLE

Table with columns: Z/H, REAL DATA (IRFAZ, INPAG, INFAZ, INREAL, INIPAG), NORMALIZED DATA (IRFAZ, INREAL, INIPAG), Z/LAMDAO. Rows 1-99.

B. MEASURED CHARGE DISTRIBUTION IN HORNPOLE

Table with columns: Z/H, REAL DATA (IRFAZ, INPAG, INFAZ, INREAL, INIPAG), NORMALIZED DATA (IRFAZ, INREAL, INIPAG), Z/LAMDAO. Rows 1-99.

TABLE 3.2 (CONTINUED)

DISTRIBUTION OF CURRENT AND CHARGE ON MONOPOLE ANTENNA OVER FRESH WATER
 ALPHA/ETAAL = .028C BETA/ETAETAC = 1.016 H/LAMDAO = 1.000
 FREQUENCY = 300.00MHz PE = .067 D/LAMDAO = 1.000

A. MEASURED CURRENT DISTRIBUTION IN PA/VBLT

Z/H	RAW DATA		NORMALIZED DATA				Z/LAMDAO
	IN*AS	IPFAZ	IN*AG	IN*FAZ	IN*REAL	IN*IMAG	
+0.25	0.754	177.00	1.62C	62.6C	-.761	1.430	+.003
+0.25	1.144	155.80	1.96C	40.8C	-.627	1.430	+.025
+0.50	1.177	111.10	1.88C	23.9C	-.468	1.430	+.050
+0.75	1.144	68.60	1.96C	14.1C	-.468	1.430	+.075
+1.00	0.754	49.70	1.36C	10.3C	-.568	1.430	+.100
+1.25	0.378	34.70	1.08C	7.4C	-.802	1.430	+.125
+1.50	0.199	26.30	0.820C	5.77C	-.938	1.430	+.150
+1.75	0.130	20.90	0.640C	4.41C	-.937	1.430	+.175
+2.00	0.099	16.70	0.480C	3.28C	-.874	1.430	+.200
+2.25	0.076	12.80	0.360C	2.46C	-.704	1.430	+.225
+2.50	0.059	9.50	0.270C	1.82C	-.487	1.430	+.250
+2.75	0.046	7.00	0.200C	1.34C	-.289	1.430	+.275
+3.00	0.036	5.10	0.150C	1.00C	-.181	1.430	+.300
+3.25	0.029	3.80	0.110C	0.740C	-.115	1.430	+.325
+3.50	0.024	2.80	0.080C	0.540C	-.075	1.430	+.350
+3.75	0.020	2.10	0.060C	0.410C	-.050	1.430	+.375
+4.00	0.017	1.60	0.045C	0.300C	-.036	1.430	+.400
+4.25	0.015	1.20	0.035C	0.220C	-.026	1.430	+.425
+4.50	0.013	0.90	0.026C	0.160C	-.018	1.430	+.450
+4.75	0.011	0.70	0.020C	0.120C	-.013	1.430	+.475
+5.00	0.009	0.50	0.015C	0.090C	-.009	1.430	+.500
+5.25	0.008	0.40	0.011C	0.060C	-.006	1.430	+.525
+5.50	0.007	0.30	0.008C	0.045C	-.004	1.430	+.550
+5.75	0.006	0.25	0.006C	0.035C	-.003	1.430	+.575
+6.00	0.005	0.20	0.005C	0.028C	-.002	1.430	+.600
+6.25	0.004	0.18	0.004C	0.022C	-.001	1.430	+.625
+6.50	0.004	0.16	0.003C	0.018C	-.001	1.430	+.650
+6.75	0.003	0.14	0.003C	0.014C	-.001	1.430	+.675
+7.00	0.003	0.13	0.002C	0.011C	-.001	1.430	+.700
+7.25	0.002	0.12	0.002C	0.009C	-.001	1.430	+.725
+7.50	0.002	0.11	0.002C	0.007C	-.001	1.430	+.750
+7.75	0.002	0.10	0.001C	0.006C	-.001	1.430	+.775
+8.00	0.002	0.10	0.001C	0.005C	-.001	1.430	+.800
+8.25	0.001	0.09	0.001C	0.004C	-.001	1.430	+.825
+8.50	0.001	0.09	0.001C	0.003C	-.001	1.430	+.850
+8.75	0.001	0.08	0.001C	0.003C	-.001	1.430	+.875
+9.00	0.001	0.08	0.001C	0.002C	-.001	1.430	+.900
+9.25	0.001	0.08	0.001C	0.002C	-.001	1.430	+.925
+9.50	0.001	0.08	0.001C	0.002C	-.001	1.430	+.950
+9.75	0.001	0.08	0.001C	0.002C	-.001	1.430	+.975
+10.00	0.001	0.08	0.001C	0.002C	-.001	1.430	+.998

B. MEASURED CHARGE DISTRIBUTION IN PICCOUL/VBLT*W

Z/H	RAW DATA		NORMALIZED DATA				Z/LAMDAO
	Q*AS	Q*FAZ	Q*AG	Q*FAZ	Q*REAL	Q*IMAG	
+0.25	0.997	-3.00	21.50C	-3.00	21.471	-1.125	+.006
+0.25	7.300	-8.00	19.70C	-8.00	18.668	-1.085	+.025
+0.50	0.394	-5.00	13.76C	-5.00	13.708	-1.199	+.050
+0.75	0.203	-3.00	12.88C	-3.00	12.800	-1.369	+.075
+1.00	0.078	-1.90	11.26C	-1.90	11.173	-1.550	+.100
+1.25	0.052	-0.970	10.000C	-0.970	9.887	-1.685	+.125
+1.50	0.045	-1.180	8.700C	-1.180	8.528	-1.749	+.150
+1.75	0.048	-1.450	7.520C	-1.450	7.321	-1.803	+.175
+2.00	0.032	-1.190	6.680C	-1.190	6.388	-1.843	+.200
+2.25	0.026	-0.790	5.820C	-0.790	5.374	-1.877	+.225
+2.50	0.021	-0.500	5.260C	-0.500	4.669	-1.869	+.250
+2.75	0.017	-0.370	4.820C	-0.370	4.197	-1.808	+.275
+3.00	0.014	-0.280	4.500C	-0.280	3.829	-1.669	+.300
+3.25	0.011	-0.210	4.200C	-0.210	3.489	-1.459	+.325
+3.50	0.009	-0.160	3.920C	-0.160	3.176	-1.117	+.350
+3.75	0.008	-0.120	3.660C	-0.120	2.890	-0.877	+.375
+4.00	0.007	-0.090	3.420C	-0.090	2.630	-.657	+.400
+4.25	0.006	-0.070	3.200C	-0.070	2.394	-.453	+.425
+4.50	0.005	-0.050	3.000C	-0.050	2.180	-.280	+.450
+4.75	0.004	-0.040	2.820C	-0.040	2.000	-.137	+.475
+5.00	0.004	-0.030	2.660C	-0.030	1.850	-.026	+.500
+5.25	0.003	-0.020	2.520C	-0.020	1.720	+.000	+.525
+5.50	0.003	-0.015	2.400C	-0.015	1.610	+.000	+.550
+5.75	0.002	-0.010	2.300C	-0.010	1.510	+.000	+.575
+6.00	0.002	-0.008	2.220C	-0.008	1.420	+.000	+.600
+6.25	0.002	-0.006	2.160C	-0.006	1.340	+.000	+.625
+6.50	0.001	-0.005	2.100C	-0.005	1.270	+.000	+.650
+6.75	0.001	-0.004	2.050C	-0.004	1.210	+.000	+.675
+7.00	0.001	-0.003	2.000C	-0.003	1.160	+.000	+.700
+7.25	0.001	-0.002	1.960C	-0.002	1.110	+.000	+.725
+7.50	0.001	-0.002	1.920C	-0.002	1.070	+.000	+.750
+7.75	0.001	-0.001	1.880C	-0.001	1.030	+.000	+.775
+8.00	0.001	-0.001	1.840C	-0.001	1.000	+.000	+.800
+8.25	0.001	-0.001	1.800C	-0.001	0.970	+.000	+.825
+8.50	0.001	-0.001	1.760C	-0.001	0.940	+.000	+.850
+8.75	0.001	-0.001	1.720C	-0.001	0.910	+.000	+.875
+9.00	0.001	-0.001	1.680C	-0.001	0.880	+.000	+.900
+9.25	0.001	-0.001	1.640C	-0.001	0.850	+.000	+.925
+9.50	0.001	-0.001	1.600C	-0.001	0.820	+.000	+.950
+9.75	0.001	-0.001	1.560C	-0.001	0.790	+.000	+.975
+10.00	0.001	-0.001	1.520C	-0.001	0.760	+.000	+.998

TABLE 3.2 (CONTINUED)

DISTRIBUTION OF CURRENT AND CHARGE ON MONOPOLE ANTENNA OVER FRESH WATER
 ALFA/BETA = .0460 BETA/BETAC = 1.018 W/LAMDA = .500
 FREQUENCY = 300.00MHZ PE = .067 D/LAMDA = .0500

A. MEASURED CURRENT DISTRIBUTION IN MA/VOLTS

Z/H	RAW DATA		NORMALIZED DATA				Z/LAMDA
	IR*AG	IR*AZ	IN*AG	IN*AZ	IN*REAL	IN*IMAG	
.050	2.420	171.30	1.200	66.300	.666	.998	.003
.100	1.720	133.50	.800	48.000	.480	.720	.005
.150	1.200	99.00	.600	36.000	.360	.540	.007
.200	.800	74.00	.400	27.000	.270	.405	.009
.250	.600	54.00	.300	19.800	.198	.297	.011
.300	.400	39.00	.200	14.400	.144	.216	.013
.350	.300	28.00	.150	10.500	.105	.158	.015
.400	.200	20.00	.100	7.800	.078	.117	.017
.450	.150	15.00	.075	5.850	.0585	.0878	.019
.500	.100	10.00	.050	4.500	.045	.0675	.021
.550	.075	7.500	.0375	3.375	.03375	.0506	.023
.600	.050	5.000	.025	2.500	.025	.0375	.025
.650	.0375	3.750	.01875	1.875	.01875	.0274	.027
.700	.025	2.500	.0125	1.250	.0125	.0188	.029
.750	.01875	1.875	.009375	.9375	.009375	.0137	.031
.800	.0125	1.250	.00625	.625	.00625	.0091	.033
.850	.009375	.9375	.0046875	.46875	.0046875	.0068	.035
.900	.00625	.625	.0035	.35	.0035	.0051	.037
.950	.0046875	.46875	.002578125	.2578125	.002578125	.0038	.039
.998	.0035	.35	.001925	.1925	.001925	.0028	.041

B. MEASURED CHARGE DISTRIBUTION IN PICCOUL/VOLTS

Z/H	RAW DATA		NORMALIZED DATA				Z/LAMDA
	QR*AG	QR*AZ	QN*AG	QN*AZ	QN*REAL	QN*IMAG	
.050	9.997	-2.000	21.500	-2.000	21.487	-.750	.006
.100	7.423	-3.000	15.920	-3.000	15.898	-.933	.008
.150	5.952	-4.000	11.080	-4.000	11.048	-1.162	.010
.200	5.147	-5.000	8.100	-5.000	8.051	-1.433	.012
.250	4.463	-6.000	5.900	-6.000	5.831	-1.746	.014
.300	3.937	-7.000	4.380	-7.000	4.291	-2.100	.016
.350	3.519	-8.000	3.260	-8.000	3.142	-2.495	.018
.400	3.199	-9.000	2.460	-9.000	2.343	-2.930	.020
.450	2.951	-10.000	1.930	-10.000	1.824	-3.395	.022
.500	2.764	-11.000	1.520	-11.000	1.485	-3.888	.024
.550	2.618	-12.000	1.190	-12.000	1.116	-4.400	.026
.600	2.501	-13.000	.920	-13.000	.847	-4.930	.028
.650	2.404	-14.000	.700	-14.000	.630	-5.475	.030
.700	2.322	-15.000	.520	-15.000	.464	-6.030	.032
.750	2.252	-16.000	.380	-16.000	.347	-6.590	.034
.800	2.193	-17.000	.280	-17.000	.260	-7.150	.036
.850	2.144	-18.000	.210	-18.000	.193	-7.710	.038
.900	2.103	-19.000	.160	-19.000	.146	-8.270	.040
.950	2.069	-20.000	.120	-20.000	.110	-8.830	.042
.998	2.041	-21.000	.090	-21.000	.083	-9.390	.044

DISTRIBUTION OF CURRENT AND CHARGE ON MONOPOLE ANTENNA OVER FRESH WATER
 ALFA/BETA = .0280 BETA/BETAC = 1.016 W/LAMDA = .500
 FREQUENCY = 300.00MHZ PE = .067 D/LAMDA = .1000

A. MEASURED CURRENT DISTRIBUTION IN MA/VOLTS

Z/H	RAW DATA		NORMALIZED DATA				Z/LAMDA
	IR*AG	IR*AZ	IN*AG	IN*AZ	IN*REAL	IN*IMAG	
.050	2.902	182.000	1.400	67.000	.668	1.326	.003
.100	1.991	140.500	.900	48.500	.450	.918	.005
.150	1.407	97.600	.600	34.000	.300	.636	.007
.200	1.033	71.000	.400	25.000	.200	.454	.009
.250	.774	51.000	.300	18.000	.150	.340	.011
.300	.573	36.000	.200	13.000	.100	.255	.013
.350	.422	26.000	.150	9.500	.075	.184	.015
.400	.311	19.000	.100	7.000	.050	.135	.017
.450	.228	14.000	.075	5.250	.0375	.101	.019
.500	.165	10.000	.050	3.900	.025	.074	.021
.550	.121	7.500	.0375	2.925	.01875	.055	.023
.600	.087	5.500	.025	2.175	.013125	.040	.025
.650	.063	4.000	.01875	1.6125	.009375	.029	.027
.700	.046	3.000	.013125	1.1875	.00675	.021	.029
.750	.034	2.250	.009375	.88125	.004875	.015	.031
.800	.025	1.650	.00675	.6525	.0035375	.011	.033
.850	.018	1.200	.004875	.4875	.00255	.008	.035
.900	.013	.900	.0035375	.35375	.001875	.006	.037
.950	.009	.675	.00255	.255	.00136875	.004	.039
.998	.007	.500	.001875	.1875	.0010125	.003	.041

B. MEASURED CHARGE DISTRIBUTION IN PICCOUL/VOLTS

Z/H	RAW DATA		NORMALIZED DATA				Z/LAMDA
	QR*AG	QR*AZ	QN*AG	QN*AZ	QN*REAL	QN*IMAG	
.050	9.997	-3.000	21.500	-3.000	21.471	-1.125	.006
.100	7.423	-4.000	15.920	-4.000	15.771	-1.465	.008
.150	5.952	-5.000	11.080	-5.000	11.177	-1.923	.010
.200	5.147	-6.000	8.100	-6.000	8.209	-2.500	.012
.250	4.463	-7.000	5.900	-7.000	5.937	-3.192	.014
.300	3.937	-8.000	4.380	-8.000	4.106	-3.900	.016
.350	3.519	-9.000	3.260	-9.000	3.079	-4.630	.018
.400	3.199	-10.000	2.460	-10.000	2.248	-5.380	.020
.450	2.951	-11.000	1.930	-11.000	1.617	-6.150	.022
.500	2.764	-12.000	1.520	-12.000	1.187	-6.940	.024
.550	2.618	-13.000	1.190	-13.000	.858	-7.750	.026
.600	2.501	-14.000	.920	-14.000	.620	-8.580	.028
.650	2.404	-15.000	.700	-15.000	.443	-9.430	.030
.700	2.322	-16.000	.520	-16.000	.317	-10.300	.032
.750	2.252	-17.000	.380	-17.000	.222	-11.190	.034
.800	2.193	-18.000	.280	-18.000	.157	-12.100	.036
.850	2.144	-19.000	.210	-19.000	.112	-13.030	.038
.900	2.103	-20.000	.160	-20.000	.080	-13.980	.040
.950	2.069	-21.000	.120	-21.000	.058	-14.950	.042
.998	2.041	-22.000	.090	-22.000	.042	-15.940	.044

TABLE 3.2 (CONTINUED)

DISTRIBUTION OF CURRENT AND CHARGE ON HORIZONTAL ANTENNA OVER FRESH WATER
 ALUMINUM/RETAC * 0.0316 BETA/RETAC * 1.016 H/LAMPAD * 1.800
 FREQUENCY * 300.00MHZ PE * .067 D/LAMPAD * .2800

A. MEASURED CURRENT DISTRIBUTION IN MA/VOLTY

Z/H	RAW DATA		NORMALIZED DATA				Z/LAMPAD
	IRFAZ	IRFAZ	INMAG	INFAZ	INREAL	INIMAG	
.002	4.377	170.80	2.04C	80.4C	1.308	1.582	.003
.17	2.144	154.40	1.48C	34.6C	1.218	.840	.028
.33	4.448	131.4C	1.16C	11.4C	1.137	.829	.080
.50	2.295	100.8C	1.06C	19.8C	1.018	.761	.075
.67	2.077	75.6C	1.26C	44.4C	.900	.882	.100
.83	1.316	60.0C	1.58C	84.0C	.740	1.281	.128
1.00	1.995	50.7C	2.18C	69.2C	.665	1.739	.150
1.17	4.431	40.0C	2.18C	75.8C	.595	2.113	.178
1.33	5.149	39.6C	2.42C	80.4C	.524	2.388	.200
1.50	5.052	36.0C	2.66C	84.0C	.478	2.645	.228
1.67	4.951	32.4C	2.80C	87.2C	.437	2.797	.250
1.83	4.778	30.0C	2.80C	89.4C	.402	2.860	.278
2.00	4.438	28.1C	2.84C	91.9C	.374	2.838	.300
2.17	4.048	26.8C	2.78C	94.1C	.349	2.773	.328
2.33	3.695	23.4C	2.48C	96.4C	.329	2.643	.350
2.50	3.227	21.6C	2.48C	98.4C	.309	2.434	.378
2.67	2.802	18.0C	2.28C	101.0C	.291	2.218	.400
2.83	2.405	16.2C	1.98C	103.8C	.268	1.953	.428
3.00	2.030	12.0C	1.40C	108.0C	.254	1.522	.450
3.17	1.762	7.3C	1.30C	112.7C	.242	1.199	.478
3.33	1.427	6.6C	.84C	124.6C	.213	.850	.500
3.50	1.117	3.8C	.50C	129.0C	.188	.623	.528
3.67	1.069	23.3C	.90C	203.3C	.169	.574	.550
3.83	1.572	-117.0C	.12C	227.0C	.143	.621	.578
4.00	4.180	-118.0C	1.28C	266.4C	.122	1.006	.600
4.17	3.102	-139.2C	1.44C	255.2C	.102	1.434	.628
4.33	4.377	-143.2C	1.78C	243.2C	.081	1.767	.650
4.50	4.567	-148.8C	2.30C	228.8C	.068	2.299	.678
4.67	5.312	-150.0C	2.62C	270.0C	.058	2.618	.700
4.83	5.465	-152.8C	2.62C	272.8C	.048	2.873	.728
5.00	5.495	-156.0C	2.66C	276.0C	.038	2.669	.750
5.17	5.482	-156.4C	2.54C	274.8C	.028	2.662	.778
5.33	5.312	-156.0C	2.50C	278.0C	.018	2.473	.800
5.50	4.844	-140.0C	2.28C	280.0C	.008	2.244	.828
5.67	4.293	-142.8C	2.02C	282.8C	.007	1.972	.850
5.83	3.697	-140.0C	1.74C	288.0C	.006	1.681	.878
6.00	2.932	-169.8C	1.28C	295.8C	.005	1.300	.900
6.17	2.252	-175.8C	1.06C	298.8C	.004	.921	.928
6.33	1.445	-224.8C	.44C	310.0C	.003	.637	.950
6.50	1.200	-277.3C	.88C	327.3C	.002	.424	1.000
6.67	1.167	-302.4C	.78C	342.4C	.001	.361	1.050
6.83	2.765	-314.5C	1.16C	443.5C	.010	1.118	1.100
7.00	3.188	-320.0C	1.80C	443.8C	.020	1.481	1.150
7.17	3.740	-323.7C	1.74C	443.7C	.018	1.749	1.180
7.33	4.377	-326.4C	2.08C	444.4C	.019	2.056	1.178
7.50	4.930	-328.0C	2.32C	444.2C	.019	2.319	1.200
7.67	5.355	-329.5C	2.52C	443.5C	.022	2.520	1.228
7.83	5.611	-330.4C	2.64C	443.4C	.021	2.640	1.250
8.00	5.738	-331.0C	2.70C	443.0C	.020	2.699	1.278
8.17	5.652	-332.4C	2.66C	442.4C	.019	2.658	1.300
8.33	5.483	-333.0C	2.58C	442.0C	.018	2.573	1.328
8.50	5.142	-333.8C	2.42C	443.8C	.016	2.215	1.350
8.67	4.675	-334.7C	2.20C	444.7C	.015	1.813	1.378
8.83	4.196	-335.0C	1.84C	445.0C	.014	1.456	1.400
9.00	3.188	-335.2C	1.50C	445.2C	.014	1.149	1.428
9.17	2.445	-335.5C	1.18C	445.5C	.011	.816	1.450
9.33	1.842	-335.8C	.84C	445.8C	.009	.607	1.478
9.50	.935	-335.5C	.44C	445.5C	.008	.448	1.484

B. MEASURED CHARGE DISTRIBUTION IN PICCOUL/VOLTY

Z/H	RAW DATA		NORMALIZED DATA				Z/LAMPAD
	QRHAG	QRFAZ	QNMAG	QNF AZ	QNREAL	QNIMAG	
.004	1.400	-5.00	20.00C	-8.00	19.928	-1.743	.006
.17	7.400	-8.00	14.80C	-4.80	14.711	-1.711	.028
.33	6.380	-8.10	12.76C	-8.10	12.633	-1.794	.050
.50	5.840	-11.00	11.400	-11.00	11.420	-2.004	.078
.67	5.300	-12.70	10.40C	-12.70	10.411	-2.130	.100
.83	4.750	-15.30	9.50C	-15.30	9.163	-2.507	.128
1.00	4.200	-18.00	8.40C	-18.00	8.197	-2.698	.150
1.17	3.600	-22.80	7.20C	-22.80	6.637	-2.790	.178
1.33	2.960	-28.40	5.92C	-28.40	5.208	-2.816	.200
1.50	2.380	-35.00	4.70C	-35.00	3.729	-2.814	.228
1.67	1.700	-53.00	3.40C	-53.00	2.046	-2.715	.250
1.83	1.130	-60.00	2.60C	-60.00	1.800	-2.600	.278
2.00	1.350	-113.7C	2.70C	-113.7C	1.185	-2.472	.300
2.17	1.740	-139.3C	3.52C	-139.3C	1.669	-2.296	.328
2.33	2.380	-151.4C	4.48C	-151.4C	1.885	-2.094	.350
2.50	2.240	-161.7C	5.88C	-161.7C	1.653	-1.846	.378
2.67	3.500	-167.0C	7.00C	-167.0C	1.421	-1.576	.400
2.83	3.920	-174.8C	7.84C	-174.8C	1.238	-1.283	.428
3.00	4.300	-174.0C	8.60C	-174.0C	1.053	-1.099	.450
3.17	4.510	-174.0C	9.28C	-174.0C	1.029	-.929	.478
3.33	4.670	-178.50	9.34C	-178.50	1.027	-.844	.500
3.50	4.780	-180.20	9.56C	-180.20	1.040	-.823	.528
3.67	4.780	-182.00	9.44C	-182.00	1.054	-.829	.550
3.83	4.580	-184.00	9.16C	-184.00	1.038	-.639	.578
4.00	4.300	-185.80	8.60C	-185.80	1.056	-.669	.600
4.17	3.980	-187.70	7.84C	-187.70	1.074	-.688	.628
4.33	3.480	-189.70	6.94C	-189.70	1.060	-.680	.650
4.50	2.980	-193.00	5.90C	-193.00	1.029	-.627	.678
4.67	2.380	-197.00	4.70C	-197.00	1.008	-.574	.700
4.83	1.700	-203.00	3.40C	-203.00	1.081	-.437	.728
5.00	1.070	-221.30	2.14C	-221.30	1.168	-.312	.750
5.17	.690	-264.00	1.28C	-264.00	.996	-.177	.778
5.33	.990	-314.00	1.90C	-314.00	1.380	-.167	.800
5.50	1.500	-335.70	3.00C	-335.70	2.234	-.123	.828
5.67	2.140	-345.50	4.28C	-345.50	3.444	-.107	.850
5.83	2.750	-350.70	5.50C	-350.70	5.488	-.089	.878
6.00	3.280	-354.00	6.30C	-354.00	8.444	-.079	.900
6.17	3.700	-354.50	7.40C	-354.50	7.388	-.058	.928
6.33	4.050	-358.20	8.10C	-358.20	6.096	-.054	.950
6.50	4.300	-359.70	8.40C	-359.70	5.600	-.048	.978
6.67	4.500	-361.20	9.00C	-361.20	5.398	-.048	1.000
6.83	4.400	-364.50	9.20C	-364.50	5.191	-.041	1.028
7.00	4.400	-363.80	9.20C	-363.80	5.180	-.040	1.050
7.17	4.350	-368.00	8.70C	-368.00	5.667	-.038	1.078
7.33	4.050	-368.00	8.10C	-368.00	6.086	-.047	1.100
7.50	3.650	-367.50	7.30C	-367.50	7.238	-.053	1.128
7.67	3.150	-369.60	6.30C	-369.60	8.211	-1.051	1.150
7.83	2.740	-371.70	5.48C	-371.70	9.266	-1.111	1.178
8.00	2.150	-375.00	4.30C	-375.00	4.153	-1.113	1.200
8.17	1.470	-382.00	2.84C	-382.00	8.236	-1.101	1.228
8.33	.750	-399.50	1.50C	-399.50	1.157	-.984	1.250
8.50	.470	-472.00	.94C	-472.00	.129	-.872	1.278
8.67	1.200	-518.0C	2.04C	-518.0C	1.119	-.744	1.300
8.83	1.750	-529.00	3.00C	-529.00	.936	-.648	1.328
9.00	2.500	-535.00	5.00C	-535.00	.800	-.581	1.350
9.17	3.300	-538.00	6.40C	-538.00	.696	-.538	1.378
9.33	3.820	-539.70	7.44C	-539.70	1.040	-.504	1.400
9.50	4.450	-541.50	8.50C	-541.50	1.000	-.487	1.428
9.67	5.150	-544.80	10.30C	-544.80	1.028	-.503	1.450
9.83	5.930	-544.00	11.70C	-544.00	1.167	-.516	1.478
9.91	6.580	-544.20	13.18C	-544.20	1.319	-1.033	1.487

TABLE 3.2 (CONTINUED)

DISTRIBUTION OF CURRENT AND CHARGE ON DIAPHRAGM ANTENNA OVER FRESH WATER
 ALP/LAMDA = 1.0310 BETA1/BETA2 = 1.018 C/LAMDA0 = 1.000
 FREQUENCY = 300.000MHZ RE = 1.6E7 C/LAMDA0 = .2800

A. MEASURED CURRENT DISTRIBUTION IN PAV/BLT

Z/H	IR*AS	IRFAZ	INMAG	INFAZ	INREAL	INIMAG	Z/LAMDA0
.03	1.199	172.3C	1.90C	52.3C	1.16R	1.5C3	.003
.05	2.117	166.9C	1.32C	36.5C	1.02R	.793	.025
.10	4.222	130.0C	.96C	25.2C	.861	.400	.075
.15	6.339	94.8C	.80C	17.0C	.784	.267	.100
.20	8.454	69.7C	1.14C	10.3C	.754	.190	.125
.25	10.569	45.3C	1.50C	6.4C	.741	.136	.150
.30	12.684	21.0C	1.88C	3.7C	.754	.100	.175
.35	14.799	9.2C	2.14C	2.1C	.780	.075	.200
.40	16.914	3.1C	2.40C	1.2C	.820	.050	.225
.45	19.029	1.0C	2.72C	.7C	.870	.030	.250
.50	21.144	.29C	3.00C	.4C	.930	.020	.275
.55	23.259	.08C	3.24C	.2C	1.000	.015	.300
.60	25.374	.02C	3.44C	.1C	1.080	.010	.325
.65	27.489	.00C	3.60C	.05C	1.170	.008	.350
.70	29.604	.00C	3.72C	.02C	1.270	.006	.375
.75	31.719	.00C	3.80C	.01C	1.380	.005	.400
.80	33.834	.00C	3.84C	.00C	1.500	.004	.425
.85	35.949	.00C	3.84C	.00C	1.630	.003	.450
.90	38.064	.00C	3.80C	.00C	1.770	.002	.475
.95	40.179	.00C	3.72C	.00C	1.920	.001	.500
1.00	42.294	.00C	3.60C	.00C	2.080	.000	.525
1.05	44.409	.00C	3.44C	.00C	2.250	.000	.550
1.10	46.524	.00C	3.24C	.00C	2.430	.000	.575
1.15	48.639	.00C	3.00C	.00C	2.620	.000	.600
1.20	50.754	.00C	2.72C	.00C	2.820	.000	.625
1.25	52.869	.00C	2.40C	.00C	3.030	.000	.650
1.30	54.984	.00C	2.04C	.00C	3.250	.000	.675
1.35	57.099	.00C	1.64C	.00C	3.480	.000	.700
1.40	59.214	.00C	1.20C	.00C	3.720	.000	.725
1.45	61.329	.00C	.72C	.00C	3.970	.000	.750
1.50	63.444	.00C	.20C	.00C	4.230	.000	.775
1.55	65.559	.00C	.00C	.00C	4.500	.000	.800
1.60	67.674	.00C	.00C	.00C	4.780	.000	.825
1.65	69.789	.00C	.00C	.00C	5.070	.000	.850
1.70	71.904	.00C	.00C	.00C	5.370	.000	.875
1.75	74.019	.00C	.00C	.00C	5.680	.000	.900
1.80	76.134	.00C	.00C	.00C	6.000	.000	.925
1.85	78.249	.00C	.00C	.00C	6.330	.000	.950
1.90	80.364	.00C	.00C	.00C	6.670	.000	.975
1.95	82.479	.00C	.00C	.00C	7.020	.000	.998
2.00	84.594	.00C	.00C	.00C	7.380	.000	1.000

B. MEASURED CHARGE DISTRIBUTION IN PICCOUL/BLT*P

Z/H	IR*AS	QRFAZ	QNMAG	QNFAZ	QNREAL	QNIMAG	Z/LAMDA0
.03	1.199	19.50C	19.50C	19.50C	19.50C	19.50C	.006
.05	2.117	12.36C	12.36C	12.36C	12.36C	12.36C	.025
.10	4.222	6.18C	6.18C	6.18C	6.18C	6.18C	.100
.15	6.339	4.12C	4.12C	4.12C	4.12C	4.12C	.175
.20	8.454	3.08C	3.08C	3.08C	3.08C	3.08C	.250
.25	10.569	2.50C	2.50C	2.50C	2.50C	2.50C	.325
.30	12.684	2.14C	2.14C	2.14C	2.14C	2.14C	.400
.35	14.799	1.88C	1.88C	1.88C	1.88C	1.88C	.475
.40	16.914	1.64C	1.64C	1.64C	1.64C	1.64C	.550
.45	19.029	1.40C	1.40C	1.40C	1.40C	1.40C	.625
.50	21.144	1.16C	1.16C	1.16C	1.16C	1.16C	.700
.55	23.259	.92C	.92C	.92C	.92C	.92C	.775
.60	25.374	.68C	.68C	.68C	.68C	.68C	.850
.65	27.489	.44C	.44C	.44C	.44C	.44C	.925
.70	29.604	.20C	.20C	.20C	.20C	.20C	.998
.75	31.719	.00C	.00C	.00C	.00C	.00C	1.000

TABLE 3.2 (CONTINUED)

DISTRIBUTION OF CURRENT AND CHARGE ON MONOPOLE ANTENNA OVER FRESH WATER
 K/LAMBDA = .0310 BETA1/BETA2 = 1.018 H/LAMBDA0 = .500
 FREQUENCY = 300.000 MHz FE = .067 D/LAMBDA0 = .2500

A. MEASURED CURRENT DISTRIBUTION IN MA/VOLTS

Z/H	RA- DATA		NORMALIZED DATA				Z/LAMBDA0
	IR*G	IR*FAZ	IR*G	IR*FAZ	IR*REAL	IR*IMAG	
.00	2.759	172.0C	1.70C	82.0C	1.067	1.340	.003
.05	2.754	154.2C	1.14C	39.2C	.943	.841	.028
.10	1.777	121.6C	.88C	1.8C	.880	.022	.050
.15	1.522	85.5C	.88C	24.8C	.709	.487	.076
.20	2.727	63.5C	1.22C	26.0C	.873	.1017	.100
.25	2.776	51.2C	1.40C	18.8C	.879	.1492	.125
.30	2.157	45.3C	1.88C	79.2C	.881	.1784	.150
.35	2.017	40.5C	2.02C	77.8C	.921	.2163	.175
.40	2.438	37.4C	2.48C	82.6C	.917	.2540	.200
.45	6.230	35.0C	2.70C	85.0C	.835	.2690	.225
.50	6.264	33.3C	2.80C	86.7C	.861	.2736	.250
.55	6.303	31.6C	2.82C	88.4C	.879	.2781	.275
.60	6.213	30.5C	2.70C	88.4C	.861	.2700	.300
.65	6.135	29.4C	2.78C	85.8C	.824	.2780	.325
.70	5.967	28.6C	2.70C	80.4C	.828	.2700	.350
.75	5.166	27.7C	2.50C	81.4C	.861	.2649	.375
.80	4.381	27.3C	1.98C	82.3C	.893	.2618	.400
.85	3.487	26.6C	1.58C	82.7C	.882	.2588	.425
.90	2.682	26.4C	1.20C	83.4C	.893	.2557	.450
.95	1.922	26.4C	.88C	83.2C	.888	.2588	.475
.98	1.173	26.4C	.48C	83.2C	.887	.2679	.484

B. MEASURED CHARGE DISTRIBUTION IN PICCOL/VOLTS

Z/H	RA- DATA		NORMALIZED DATA				Z/LAMBDA0
	IR*G	IR*FAZ	QR*G	QR*FAZ	QR*REAL	QR*IMAG	
.12	1.442	.00C	19.50C	.00C	19.50C	.000	.004
.15	7.292	.80C	10.14C	.80C	19.139	.197	.028
.18	6.073	28.10C	10.18C	28.10C	18.172	.444	.050
.20	5.475	44.00C	11.02C	44.00C	10.993	.769	.076
.25	3.119	44.50C	9.94C	44.50C	9.909	.780	.100
.30	2.419	46.60C	8.88C	46.60C	8.923	.798	.125
.35	3.921	88.70C	7.42C	88.70C	7.336	.1182	.150
.40	2.254	-11.85C	6.24C	-11.85C	6.115	.1244	.175
.45	2.585	-14.20C	4.88C	-14.20C	4.782	.1389	.200
.50	1.413	-25.20C	3.52C	-25.20C	3.185	.1499	.225
.55	1.751	88.40C	2.04C	88.40C	1.998	.1427	.250
.60	1.731	96.50C	1.42C	96.50C	1.461	.1411	.275
.65	1.496	-93.20C	2.28C	-93.20C	-1.777	.1429	.300
.70	3.174	-128.2C	3.48C	-128.2C	-3.447	.1367	.325
.75	2.026	-185.10C	5.10C	-185.10C	-4.929	.1311	.350
.80	1.461	-169.6C	6.72C	-169.6C	-6.610	.1213	.375
.85	4.117	-172.30C	7.80C	-172.30C	-7.790	.11048	.400
.90	2.266	-174.30C	9.08C	-174.30C	-9.015	.1000	.425
.95	5.977	-175.80C	10.44C	-175.80C	-10.812	.10765	.450
.98	6.124	-177.30C	11.90C	-177.30C	-11.887	.1061	.475
.99	6.429	-177.80C	13.26C	-177.80C	-13.280	.1059	.487

TABLE 3.2 (CONTINUED)

DISTRIBUTION OF CURRENT AND CHARGE ON PARABOLIC ANTENNA OVER SALT WATER
 ALUMINUM METAL * 1086G METAL/BETAC * 1.105 W/LAMPAD * 1.500
 FREQUENCY * 300.00MHZ PE * 2.885 D/LAMPAD * 1.010

A. MEASURED CURRENT DISTRIBUTION IN PARVOLT

Z/H	IR*AG	IR*FAZ	IR*IMAG	IR*REAL	IR*IMAG	Z/LAMPD
.00	1.00	130.00	7.30C	30.00C	0.322	3.650
.01	7.761	121.00	6.79C	21.80C	0.277	2.810
.02	27.79	113.10	6.24C	13.10C	0.078	1.414
.03	77.70	103.40	5.684C	3.80C	0.051	.716
.04	177.1	92.00	5.120C	-0.00C	0.000	.413
.05	327.0	78.00	4.680C	-12.00C	-0.339	-1.753
.06	477.0	62.00	4.400C	-27.80C	-0.888	-2.715
.07	627.0	44.00	4.200C	-55.40C	-1.751	-3.838
.08	777.0	29.00	4.000C	-71.00C	-2.939	-5.001
.09	927.0	15.00	3.800C	-85.00C	-4.388	-6.225
.10	1077.0	0.00	3.600C	-98.00C	-6.000	-7.510
.11	1227.0	-12.00	3.400C	-104.90C	-7.822	-8.850
.12	1377.0	-29.00	3.200C	-110.20C	-9.800	-10.250
.13	1527.0	-49.00	3.000C	-114.00C	-11.900	-11.710
.14	1677.0	-71.00	2.800C	-116.50C	-14.100	-13.230
.15	1827.0	-94.00	2.600C	-117.80C	-16.400	-14.810
.16	1977.0	-119.00	2.400C	-117.90C	-18.800	-16.450
.17	2127.0	-145.00	2.200C	-116.80C	-21.300	-18.150
.18	2277.0	-172.00	2.000C	-114.50C	-23.900	-19.910
.19	2427.0	-200.00	1.800C	-111.00C	-26.600	-21.730
.20	2577.0	-229.00	1.600C	-106.30C	-29.400	-23.610
.21	2727.0	-259.00	1.400C	-100.50C	-32.300	-25.550
.22	2877.0	-290.00	1.200C	-93.70C	-35.300	-27.550
.23	3027.0	-322.00	1.000C	-86.00C	-38.400	-29.610
.24	3177.0	-355.00	0.800C	-77.50C	-41.600	-31.730
.25	3327.0	-389.00	0.600C	-68.30C	-44.900	-33.910
.26	3477.0	-424.00	0.400C	-58.50C	-48.300	-36.150
.27	3627.0	-460.00	0.200C	-48.20C	-51.800	-38.450
.28	3777.0	-497.00	0.000C	-37.70C	-55.400	-40.810
.29	3927.0	-535.00	-0.200C	-27.00C	-59.100	-43.230
.30	4077.0	-574.00	-0.400C	-16.20C	-62.900	-45.710
.31	4227.0	-614.00	-0.600C	-5.30C	-66.800	-48.250
.32	4377.0	-655.00	-0.800C	5.70C	-70.800	-50.850
.33	4527.0	-697.00	-1.000C	16.20C	-74.900	-53.510
.34	4677.0	-740.00	-1.200C	26.80C	-79.100	-56.230
.35	4827.0	-784.00	-1.400C	37.50C	-83.400	-59.010
.36	4977.0	-829.00	-1.600C	48.40C	-87.800	-61.850
.37	5127.0	-875.00	-1.800C	59.50C	-92.300	-64.750
.38	5277.0	-922.00	-2.000C	70.90C	-96.900	-67.710
.39	5427.0	-970.00	-2.200C	82.60C	-101.600	-70.730
.40	5577.0	-1019.00	-2.400C	94.60C	-106.400	-73.810
.41	5727.0	-1069.00	-2.600C	106.90C	-111.300	-76.950
.42	5877.0	-1120.00	-2.800C	119.50C	-116.300	-80.150
.43	6027.0	-1172.00	-3.000C	132.40C	-121.400	-83.410
.44	6177.0	-1225.00	-3.200C	145.60C	-126.600	-86.730
.45	6327.0	-1279.00	-3.400C	159.10C	-131.900	-90.110
.46	6477.0	-1334.00	-3.600C	172.90C	-137.300	-93.550
.47	6627.0	-1390.00	-3.800C	187.00C	-142.800	-97.050
.48	6777.0	-1447.00	-4.000C	201.40C	-148.400	-100.610
.49	6927.0	-1505.00	-4.200C	216.10C	-154.100	-104.230
.50	7077.0	-1564.00	-4.400C	231.10C	-159.900	-107.910
.51	7227.0	-1624.00	-4.600C	246.40C	-165.800	-111.650
.52	7377.0	-1685.00	-4.800C	262.00C	-171.800	-115.450
.53	7527.0	-1747.00	-5.000C	277.90C	-177.900	-119.310
.54	7677.0	-1810.00	-5.200C	294.10C	-184.100	-123.230
.55	7827.0	-1874.00	-5.400C	310.60C	-190.400	-127.210
.56	7977.0	-1939.00	-5.600C	327.40C	-196.800	-131.250
.57	8127.0	-2005.00	-5.800C	344.50C	-203.300	-135.350
.58	8277.0	-2072.00	-6.000C	361.90C	-209.900	-139.510
.59	8427.0	-2140.00	-6.200C	379.60C	-216.600	-143.730
.60	8577.0	-2209.00	-6.400C	397.60C	-223.400	-148.010
.61	8727.0	-2279.00	-6.600C	415.90C	-230.300	-152.350
.62	8877.0	-2350.00	-6.800C	434.50C	-237.300	-156.750
.63	9027.0	-2422.00	-7.000C	453.40C	-244.400	-161.210
.64	9177.0	-2495.00	-7.200C	472.60C	-251.600	-165.730
.65	9327.0	-2569.00	-7.400C	492.10C	-258.900	-170.310
.66	9477.0	-2644.00	-7.600C	511.90C	-266.300	-174.950
.67	9627.0	-2720.00	-7.800C	532.00C	-273.800	-179.650
.68	9777.0	-2797.00	-8.000C	552.40C	-281.400	-184.410
.69	9927.0	-2875.00	-8.200C	573.10C	-289.100	-189.230
.70	10077.0	-2954.00	-8.400C	594.10C	-296.900	-194.110
.71	10227.0	-3034.00	-8.600C	615.40C	-304.800	-199.050
.72	10377.0	-3115.00	-8.800C	637.00C	-312.800	-204.050
.73	10527.0	-3197.00	-9.000C	658.90C	-320.900	-209.110
.74	10677.0	-3280.00	-9.200C	681.10C	-329.100	-214.230
.75	10827.0	-3364.00	-9.400C	703.60C	-337.400	-219.410
.76	10977.0	-3449.00	-9.600C	726.40C	-345.800	-224.650
.77	11127.0	-3535.00	-9.800C	749.50C	-354.300	-230.050
.78	11277.0	-3622.00	-10.000C	772.90C	-362.900	-235.510
.79	11427.0	-3710.00	-10.200C	796.60C	-371.600	-241.030
.80	11577.0	-3799.00	-10.400C	820.60C	-380.400	-246.610
.81	11727.0	-3889.00	-10.600C	844.90C	-389.300	-252.250
.82	11877.0	-3980.00	-10.800C	869.50C	-398.300	-257.950
.83	12027.0	-4072.00	-11.000C	894.40C	-407.400	-263.710
.84	12177.0	-4165.00	-11.200C	919.60C	-416.600	-269.530
.85	12327.0	-4259.00	-11.400C	945.10C	-425.900	-275.410
.86	12477.0	-4354.00	-11.600C	970.90C	-435.300	-281.350
.87	12627.0	-4450.00	-11.800C	997.00C	-444.800	-287.350
.88	12777.0	-4547.00	-12.000C	1023.40C	-454.400	-293.410
.89	12927.0	-4645.00	-12.200C	1050.10C	-464.100	-299.530
.90	13077.0	-4744.00	-12.400C	1077.10C	-473.900	-305.710
.91	13227.0	-4844.00	-12.600C	1104.40C	-483.800	-311.950
.92	13377.0	-4945.00	-12.800C	1132.00C	-493.800	-318.250
.93	13527.0	-5047.00	-13.000C	1159.90C	-503.900	-324.610
.94	13677.0	-5150.00	-13.200C	1188.10C	-514.100	-331.030
.95	13827.0	-5254.00	-13.400C	1216.60C	-524.400	-337.510
.96	13977.0	-5359.00	-13.600C	1245.40C	-534.800	-344.050
.97	14127.0	-5465.00	-13.800C	1274.50C	-545.300	-350.650
.98	14277.0	-5572.00	-14.000C	1303.90C	-555.900	-357.310
.99	14427.0	-5680.00	-14.200C	1333.60C	-566.600	-364.030
1.00	14577.0	-5789.00	-14.400C	1363.60C	-577.400	-370.810

B. MEASURED CHARGE DISTRIBUTION IN PICCOULOMETER

Z/H	IR*AG	IR*FAZ	IR*IMAG	IR*REAL	IR*IMAG	Z/LAMPD
.004	0.007	-0.00	26.88C	-0.00C	0.000	.004
.017	7.759	-10.00	23.68C	-10.00C	0.232	.017
.033	27.580	-19.70	20.00C	-19.70C	0.232	.033
.050	77.513	-27.30	15.12C	-27.30C	0.232	.050
.067	177.047	-34.10	9.920C	-34.10C	0.232	.067
.083	327.083	-41.00	5.260C	-41.00C	0.232	.083
.100	477.117	-47.60	2.720C	-47.60C	0.232	.100
.117	627.153	-53.70	0.000C	-53.70C	0.232	.117
.133	777.191	-59.70	25.12C	-59.70C	0.232	.133
.150	927.230	-65.40	29.00C	-65.40C	0.232	.150
.167	1077.270	-70.00	29.00C	-70.00C	0.232	.167
.183	1227.310	-73.00	19.20C	-73.00C	0.232	.183
.200	1377.350	-75.00	17.12C	-75.00C	0.232	.200
.217	1527.390	-76.00	15.04C	-76.00C	0.232	.217
.233	1677.430	-76.00	13.88C	-76.00C	0.232	.233
.250	1827.470	-75.00	13.12C	-75.00C	0.232	.250
.267	1977.510	-73.00	12.00C	-73.00C	0.232	.267
.283	2127.550	-70.00	10.72C	-70.00C	0.232	.283
.300	2277.590	-66.00	10.36C	-66.00C	0.232	.300
.317	2427.630	-61.00	10.00C	-61.00C	0.232	.317
.333	2577.670	-55.00	9.64C	-55.00C	0.232	.333
.350	2727.710	-48.00	9.28C	-48.00C	0.232	.350
.367	2877.750	-40.00	8.92C	-40.00C	0.232	.367
.383	3027.790	-31.00	8.56C	-31.00C	0.232	.383
.400	3177.830	-22.00	8.20C	-22.00C	0.232	.400
.417	3327.870	-13.00	7.84C	-13.00C	0.232	.417
.433	3477.910	0.00	7.48C	0.00C	0.232	.433
.450	3627.950	11.00	7.12C	11.00C	0.232	.450
.467	3777.990	22.00	6.76C	22.00C	0.232	.467
.483	3928.030	33.00	6.40C	33.00C	0.232	.483
.500	4078.070	44.00	6.04C	44.00C	0.232	.500
.517	4228.110	55.00	5.68C	55.00C	0.232	.517
.533	4378.150	66.00	5.32C	66.00C	0.232	.533
.550	4528.190	77.00	4.96C	77.00C	0.232	.550
.567	4678.230	88.00	4.60C	88.00C	0.232	.567
.583	4828.270	99.00	4.24C	99.00C	0.232	.583
.600	4978.310	110.00	3.88C	110.00C	0.232	.600
.617	5128.350	121.00	3.52C	121.00C	0.232	.617
.633	5278.390	132.00	3.16C	132.00C	0.232	.633
.650	5428.430	143.00	2.80C	143.00C	0.232	.650
.667	5578.470	154.00	2.44C	154.00C	0.232	.667
.683	5728.510	165.00	2.08C	165.00C	0.232	.683
.700	5878.550	176.00	1.72C	176.00C	0.232	.700
.717	6028.590	187.00	1.36C	187.00C	0.232	.717
.733	6178.630	198.00	1.00C	198.00C	0.232	.733
.750	6328.670	209.00	0.64C	209.00C	0.232	.750
.767	6478.710	220.00	0.28C	220.00C	0.232	.767
.783	6628.750	231.00	0.00C	231.00C	0.232	.783
.800	6778.790	242.00	0.00C	242.00C	0.232	.800
.817	6928.830	253.00	0.00C	253.00C	0.232	.817
.833</						

TABLE 3.2 (CONTINUED)

DISTRIBUTION OF CURRENT AND CHARGE ON HANDPOLE ANTENNA OVER SALT WATER
 ALPHA/BETAL = .0666 BETA/BETAC = 1.109 H/LAMPDAG = 1.000
 FREQUENCY = 300.000-MZ RE = 2.885 D/LAMPDAG = .0100

A. MEASURED CURRENT DISTRIBUTION IN HAV/VOLTS

Z/H	RA-DATA			NORMALIZED DATA			Z/LAMPDAG
	IRFAG	IRFAZ	IRFAG	INFAG	INFZ	INREAL	
.003	9.414	158.50	5.74C	38.6C	4.492	3.573	.003
.004	7.719	150.00	4.82C	30.00	4.174	2.410	.004
.005	6.991	138.40	4.00C	18.40	3.871	1.288	.005
.006	6.493	123.00	3.42C	3.00	3.415	.179	.006
.007	6.147	80.80	2.80C	-14.80	2.891	-.873	.007
.008	5.912	59.20	2.40C	-29.20	2.505	-1.883	.008
.009	5.786	42.40	2.10C	-45.80	2.210	-2.881	.009
.010	5.711	31.30	1.90C	-64.70	1.911	-3.850	.010
.011	5.659	23.10	1.70C	-84.90	1.637	-4.782	.011
.012	5.610	17.30	1.60C	-106.00	1.388	-5.617	.012
.013	5.565	12.30	1.50C	-127.70	1.161	-6.351	.013
.014	5.523	8.470	1.40C	-149.30	9.101	-6.986	.014
.015	5.483	4.70	1.30C	-170.00	115.30	-7.529	.015
.016	5.445	1.70	1.20C	-188.30	138.00	-7.981	.016
.017	5.409	-1.00	1.10C	-203.00	161.00	-8.441	.017
.018	5.375	-2.90	1.00C	-214.00	184.00	-8.909	.018
.019	5.343	-4.90	0.90C	-221.00	207.00	-9.384	.019
.020	5.312	-6.90	0.80C	-225.00	230.00	-9.864	.020
.021	5.282	-8.80	0.70C	-226.00	253.00	-10.348	.021
.022	5.253	-10.60	0.60C	-224.00	276.00	-10.836	.022
.023	5.225	-12.40	0.50C	-219.00	299.00	-11.328	.023
.024	5.198	-14.10	0.40C	-211.00	322.00	-11.824	.024
.025	5.172	-15.70	0.30C	-200.00	345.00	-12.324	.025
.026	5.147	-17.20	0.20C	-186.00	368.00	-12.828	.026
.027	5.123	-18.60	0.10C	-169.00	391.00	-13.336	.027
.028	5.100	-19.90	0.00C	-149.00	414.00	-13.848	.028
.029	5.078	-21.10	0.00C	-126.00	437.00	-14.364	.029
.030	5.057	-22.20	0.00C	-100.00	460.00	-14.884	.030
.031	5.037	-23.20	0.00C	-71.00	483.00	-15.408	.031
.032	5.018	-24.10	0.00C	-39.00	506.00	-15.936	.032
.033	5.000	-24.90	0.00C	0.00	529.00	-16.468	.033
.034	4.983	-25.60	0.00C	28.00	552.00	-17.004	.034
.035	4.967	-26.20	0.00C	56.00	575.00	-17.544	.035
.036	4.952	-26.70	0.00C	84.00	598.00	-18.088	.036
.037	4.938	-27.20	0.00C	112.00	621.00	-18.636	.037
.038	4.925	-27.60	0.00C	140.00	644.00	-19.188	.038
.039	4.913	-28.00	0.00C	168.00	667.00	-19.744	.039
.040	4.902	-28.40	0.00C	196.00	690.00	-20.304	.040
.041	4.892	-28.80	0.00C	224.00	713.00	-20.868	.041
.042	4.883	-29.20	0.00C	252.00	736.00	-21.436	.042
.043	4.875	-29.60	0.00C	280.00	759.00	-22.008	.043
.044	4.868	-30.00	0.00C	308.00	782.00	-22.584	.044
.045	4.862	-30.40	0.00C	336.00	805.00	-23.164	.045
.046	4.857	-30.80	0.00C	364.00	828.00	-23.748	.046
.047	4.853	-31.20	0.00C	392.00	851.00	-24.336	.047
.048	4.850	-31.60	0.00C	420.00	874.00	-24.928	.048
.049	4.848	-32.00	0.00C	448.00	897.00	-25.524	.049
.050	4.847	-32.40	0.00C	476.00	920.00	-26.124	.050
.051	4.847	-32.80	0.00C	504.00	943.00	-26.728	.051
.052	4.848	-33.20	0.00C	532.00	966.00	-27.336	.052
.053	4.850	-33.60	0.00C	560.00	989.00	-27.948	.053
.054	4.853	-34.00	0.00C	588.00	1012.00	-28.564	.054
.055	4.858	-34.40	0.00C	616.00	1035.00	-29.184	.055
.056	4.864	-34.80	0.00C	644.00	1058.00	-29.808	.056
.057	4.871	-35.20	0.00C	672.00	1081.00	-30.436	.057
.058	4.879	-35.60	0.00C	700.00	1104.00	-31.068	.058
.059	4.888	-36.00	0.00C	728.00	1127.00	-31.704	.059
.060	4.898	-36.40	0.00C	756.00	1150.00	-32.344	.060
.061	4.909	-36.80	0.00C	784.00	1173.00	-32.988	.061
.062	4.921	-37.20	0.00C	812.00	1196.00	-33.636	.062
.063	4.934	-37.60	0.00C	840.00	1219.00	-34.288	.063
.064	4.948	-38.00	0.00C	868.00	1242.00	-34.944	.064
.065	4.963	-38.40	0.00C	896.00	1265.00	-35.604	.065
.066	4.979	-38.80	0.00C	924.00	1288.00	-36.268	.066
.067	4.996	-39.20	0.00C	952.00	1311.00	-36.936	.067
.068	5.014	-39.60	0.00C	980.00	1334.00	-37.608	.068
.069	5.033	-40.00	0.00C	1008.00	1357.00	-38.284	.069
.070	5.053	-40.40	0.00C	1036.00	1380.00	-38.964	.070
.071	5.074	-40.80	0.00C	1064.00	1403.00	-39.648	.071
.072	5.096	-41.20	0.00C	1092.00	1426.00	-40.336	.072
.073	5.119	-41.60	0.00C	1120.00	1449.00	-41.028	.073
.074	5.143	-42.00	0.00C	1148.00	1472.00	-41.724	.074
.075	5.168	-42.40	0.00C	1176.00	1495.00	-42.424	.075
.076	5.194	-42.80	0.00C	1204.00	1518.00	-43.128	.076
.077	5.221	-43.20	0.00C	1232.00	1541.00	-43.836	.077
.078	5.249	-43.60	0.00C	1260.00	1564.00	-44.548	.078
.079	5.278	-44.00	0.00C	1288.00	1587.00	-45.264	.079
.080	5.308	-44.40	0.00C	1316.00	1610.00	-45.984	.080
.081	5.339	-44.80	0.00C	1344.00	1633.00	-46.708	.081
.082	5.371	-45.20	0.00C	1372.00	1656.00	-47.436	.082
.083	5.404	-45.60	0.00C	1400.00	1679.00	-48.168	.083
.084	5.438	-46.00	0.00C	1428.00	1702.00	-48.904	.084
.085	5.473	-46.40	0.00C	1456.00	1725.00	-49.644	.085
.086	5.509	-46.80	0.00C	1484.00	1748.00	-50.388	.086
.087	5.546	-47.20	0.00C	1512.00	1771.00	-51.136	.087
.088	5.584	-47.60	0.00C	1540.00	1794.00	-51.888	.088
.089	5.623	-48.00	0.00C	1568.00	1817.00	-52.644	.089
.090	5.663	-48.40	0.00C	1596.00	1840.00	-53.404	.090
.091	5.704	-48.80	0.00C	1624.00	1863.00	-54.168	.091
.092	5.746	-49.20	0.00C	1652.00	1886.00	-54.936	.092
.093	5.789	-49.60	0.00C	1680.00	1909.00	-55.708	.093
.094	5.833	-50.00	0.00C	1708.00	1932.00	-56.484	.094
.095	5.878	-50.40	0.00C	1736.00	1955.00	-57.264	.095
.096	5.924	-50.80	0.00C	1764.00	1978.00	-58.048	.096
.097	5.971	-51.20	0.00C	1792.00	2001.00	-58.836	.097

B. MEASURED CHARGE DISTRIBUTION IN PICCOL/VOLTS-P

Z/H	RA-DATA			NORMALIZED DATA			Z/LAMPDAG
	IRFAG	IRFAZ	IRFAG	INFAG	INFZ	INREAL	
.006	9.934	5.00	26.50C	5.00	26.299	2.310	.006
.005	9.767	-7.00	23.38C	-7.00	23.278	-.286	.005
.004	9.615	-8.90	24.12C	-8.90	23.265	-2.730	.004
.003	9.495	-11.00	24.52C	-11.00	24.019	-4.930	.003
.002	9.399	-16.00	24.74C	-16.00	23.820	-6.830	.002
.001	9.320	-20.70	24.24C	-20.70	22.676	-8.548	.001
.000	9.259	-25.40	23.44C	-25.40	24.70	-10.314	.000
.001	9.215	-29.20	22.52C	-29.20	19.658	-10.787	.001
.002	9.187	-33.40	20.14C	-33.40	19.814	-11.087	.002
.003	9.164	-37.90	16.98C	-37.90	13.011	-10.879	.003
.004	9.145	-42.70	14.18C	-42.70	9.593	-10.488	.004
.005	9.130	-47.70	11.44C	-47.70	5.806	-9.857	.005
.006	9.118	-52.80	8.74C	-52.80	1.840	-8.826	.006
.007	9.109	-58.00	6.04C	-58.00	-2.200	-7.525	.007
.008	9.102	-63.20	3.30C	-63.20	-8.202	-6.158	.008
.009	9.097	-68.40	0.60C	-68.40	-15.921	-4.417	.009
.010	9.094	-73.60	0.00C	-73.60	-23.930	-2.530	.010
.011	9.092	-78.80	0.00C	-78.80	-31.939	-.472	.011
.012	9.091	-84.00	0.00C	-84.00	-39.951	1.043	.012
.013	9.091	-89.20	0.00C	-89.20	-47.968	2.493	.013
.014	9.092	-94.40	0.00C	-94.40	-55.990	3.849	.014
.015	9.093	-99.60	0.00C	-99.60	-63.999	5.115	.015
.016	9.095	-104.80	0.00C	-104.80	-71.986	6.297	.016
.017	9.098	-110.00	0.00C	-110.00	-79.951	7.398	.017
.018	9.102	-115.20	0.00C	-115.20	-87.884	8.421	.018
.019	9.107	-120.40	0.00C	-120.40	-95.786	9.365	.019
.020	9.113	-125.60	0.00C	-125.60	-103.657	10.230	.020
.021	9.120	-130.80	0.00C	-130.80	-111.498	11.024	.021
.022	9.128	-136.00	0.00C	-136.00	-119.309	11.747	.022
.023	9.137	-141.20	0.00C	-141.20	-127.091	12.400	.023
.024	9.147	-146.40	0.00C	-146.40	-134.844	12.983	.024
.025	9.158	-151.60	0.00C	-151.60	-142.568	13.507	.025
.026	9.170	-156.80	0.00C	-156.80	-150.263	13.972	.026
.027	9.183	-162.00	0.00C	-162.00	-157.929	14.378	.027
.028	9.197	-167.20	0.00C	-167.20	-165.566	14.725	.028
.029	9.212	-172.40	0.00C	-172.40	-173.174	15.014	.029
.030	9.228	-177.60	0.00C	-177.60	-180.753	15.246	.030
.031	9.244	-182.80	0.00C	-182.80	-188.303	15.421	.031
.032	9.261	-188.00	0.00C	-188.00	-195.814	15.540	.032
.033	9.279	-193.20	0.00C	-193.20	-203.296	15.604	.033
.034	9.298	-198.40	0.00C	-198.40	-210.749	15.614	.034
.035	9.318	-203.60	0.00C	-203.60	-218.174	15.570	.035
.036	9.339	-208.80	0.00C	-208.80	-225.571	15.483	.036
.037	9.361	-214.00	0.00C	-214.00	-232.940	15.354	.037
.038	9.384	-219.20	0.00C	-219.20	-240.281	15.193	.038

TABLE 3.2 (CONTINUED)

DISTRIBUTION OF CURRENT AND CHARGE ON MONOPOLE ANTENNA OVER SALT WATER
 ALPHA/BETA = 1.0007 BETA/BETAC = 1.047 H/LAMC/D = 1.800
 FREQUENCY = 300.000MHZ PE = 2.885 D/LAMC/D = 1.0000

A. MEASURED CURRENT DISTRIBUTION IN MA/VOLTY

Z/H	RAW DATA		NORMALIZED DATA					Z/LAMDO
	IMPAG	IMFAZ	INMAG	INFAZ	INREAL	INIMAG		
+002	8+110	160+80	3.7+0	+5+60	2+617	2+672	+003	
+17	6+414	149+30	3+1+0	3+3+0	2+594	1+769	+025	
+33	5+888	139+50	2+8+0	19+80	2+670	+070	+050	
+50	+9+44	115+60	2+280	2+800	2+880	+024	+078	
+67	6+774	81+90	2+200	+22+10	2+038	+1828	+100	
+83	5+204	55+10	2+800	+33+80	2+001	+1+225	+125	
+100	6+33	27+90	2+780	+55+90	1+394	+2+005	+150	
+117	7+249	34+90	3+3+0	+72+20	1+021	+3+180	+178	
+133	8+246	27+90	+300	+80+60	+681	+3+749	+200	
+150	10+189	18+40	+46+0	+87+10	+218	+4+294	+225	
+167	10+763	14+60	+49+0	+92+90	+139	+4+636	+250	
+183	10+960	11+10	5+080	+96+00	+2015	+4+927	+275	
+200	11+110	7+90	5+080	+100+90	+913	+4+977	+300	
+217	11+197	4+40	5+180	+103+90	+1+930	+4+970	+325	
+233	11+197	1+00	4+920	+107+10	+1+517	+4+932	+375	
+250	11+476	0+30	+750	+114+00	+1+731	+4+605	+400	
+267	9+758	-3+00	+260	+118+00	+2+009	+3+779	+425	
+283	8+772	-7+80	3+720	+122+00	+2+015	+3+127	+450	
+300	6+457	-14+10	3+180	+125+00	+1+989	+2+984	+475	
+317	5+442	-23+10	2+600	+128+10	+1+935	+1+736	+500	
+333	4+210	-38+10	1+9+0	+131+00	+1+729	+1+581	+525	
+350	3+342	-51+80	1+5+0	+176+80	+1+038	+0+86	+550	
+367	3+212	-59+10	1+8+0	+223+40	+1+289	+727	+575	
+383	3+949	-120+90	1+8+0	+252+50	+1+704	+1+070	+600	
+400	5+178	-137+90	2+2+0	+252+50	+2+002	+2+513	+625	
+417	6+394	-159+80	2+9+0	+268+60	+1+999	+3+995	+650	
+433	7+595	-159+80	3+580	+274+70	+229	+3+973	+700	
+450	8+837	-161+70	+8+0	+274+70	+818	+4+100	+725	
+467	9+635	-161+70	+6+0	+279+80	+749	+4+954	+750	
+500	10+112	-164+50	+6+0	+282+10	1+023	+4+772	+775	
+517	10+590	-167+10	+3+0	+282+10	1+928	+4+604	+800	
+533	10+763	-169+30	+3+0	+286+30	1+386	+4+741	+825	
+550	10+720	-171+30	+3+0	+286+30	1+480	+4+503	+850	
+567	10+286	-173+00	+4+7+0	+288+20	+1+519	+4+151	+875	
+583	9+591	-175+10	+4+20	+290+10	+1+326	+3+672	+900	
+600	8+937	-177+70	3+980	+292+70	1+836	+3+089	+925	
+617	8+421	-180+40	3+420	+295+80	1+467	+2+420	+950	
+633	6+33	-184+90	2+780	+305+00	1+219	+1+710	+975	
+650	6+357	-190+00	1+180	+317+10	1+011	+939	+1000	
+667	2+995	-202+10	+8+0	+347+20	+819	+1+86	+1025	
+683	1+823	-232+20	+8+0	+406+00	+382	+1+605	+1050	
+700	1+423	-291+10	+8+0	+436+60	+074	+1+021	+1075	
+717	3+125	-321+60	1+4+0	+448+00	+207	+2+079	+1100	
+733	4+514	-333+00	2+080	+464+00	+1+923	+2+812	+1125	
+750	6+119	-339+00	2+820	+464+00	+1+923	+3+089	+1150	
+767	7+508	-342+30	3+280	+467+30	+4+40	+3+432	+1175	
+783	8+506	-342+30	3+280	+468+80	+4+800	+3+874	+1190	
+800	9+591	-342+30	+4+20	+468+80	+4+864	+4+334	+1200	
+817	10+373	-347+60	+7+80	+468+80	+1+043	+4+665	+1225	
+833	10+763	-348+00	+3+80	+468+80	+1+149	+4+885	+1250	
+850	10+763	-349+10	+3+80	+468+80	+1+208	+4+811	+1275	
+867	10+503	-349+90	+3+80	+468+90	+1+245	+4+677	+1300	
+883	10+169	-350+00	+4+8+0	+468+00	+1+288	+4+468	+1325	
+900	9+505	-350+80	+3+80	+468+80	+1+193	+4+215	+1350	
+917	8+850	-351+10	2+9+0	+466+10	+1+093	+3+785	+1375	
+933	7+114	-351+60	3+280	+466+60	+1+037	+3+143	+1400	
+950	5+642	-351+60	2+600	+466+60	+7+3	+2+492	+1425	
+967	4+201	-351+90	1+8+0	+466+90	+581	+1+857	+1450	
+983	2+387	-351+90	1+100	+466+90	+803	+1+052	+1475	
+980	1+519	-351+90	+700	+466+90	+803	+6+670	+1484	

B. MEASURED CHARGE DISTRIBUTION IN PICCUL/VOLTY-P

Z/H	RAW DATA		NORMALIZED DATA					Z/LAMDO
	QRMAG	QRFZ	QNMAG	QNFZ	QNREAL	QNIMAG		
+004	10+005	2+50	23+000	2+80	22+978	1+003	+004	
+017	8+404	-2+10	19+320	+2+10	19+307	+708	+025	
+33	6+152	-6+40	16+740	+6+40	16+603	+2+089	+050	
+50	8+108	-10+40	14+840	+10+40	14+364	+4+668	+100	
+67	6+056	-14+60	10+820	+14+80	17+922	+5+606	+125	
+83	7+726	-18+40	17+760	+18+40	18+802	+7+142	+150	
+100	7+308	-22+70	16+800	+22+70	19+499	+7+957	+175	
+117	6+751	-27+40	15+820	+27+40	13+779	+7+142	+190	
+133	6+251	-32+20	13+800	+32+20	11+677	+7+357	+200	
+150	5+255	-39+20	12+080	+39+20	9+361	+7+635	+225	
+167	+3+36	-48+50	9+900	+48+50	6+960	+7+115	+250	
+183	3+485	-62+00	8+000	+62+00	5+731	+7+077	+275	
+200	2+880	-81+80	6+620	+81+80	+944	+6+952	+300	
+217	2+714	-108+50	5+280	+108+50	+1380	+6+918	+325	
+233	3+080	-132+60	7+080	+132+60	+1782	+6+912	+350	
+250	3+402	-150+80	8+740	+150+80	+7+689	+6+264	+375	
+267	+4+707	-168+90	10+820	+168+90	+10+314	+6+272	+400	
+283	5+490	-170+60	12+620	+170+60	+12+081	+6+061	+425	
+300	6+151	-176+30	14+140	+176+30	+14+111	+6+912	+450	
+317	6+823	-180+70	15+640	+180+70	+16+638	+6+911	+475	
+333	7+151	-184+50	16+440	+184+50	+18+389	+6+911	+500	
+350	7+421	-187+70	17+080	+187+70	+19+906	+6+286	+525	
+367	7+586	-190+50	17+440	+190+50	+17+148	+6+198	+550	
+383	7+482	-193+20	17+200	+193+20	+16+744	+6+928	+575	
+400	7+256	-196+00	16+680	+196+00	+16+034	+6+934	+600	
+417	6+821	-199+00	15+680	+199+00	+14+826	+6+108	+625	
+433	6+281	-201+90	14+440	+201+90	+13+396	+6+386	+650	
+450	5+551	-205+90	12+740	+205+90	+11+428	+6+874	+675	
+467	+4+707	-210+60	10+820	+210+60	+9+313	+6+508	+700	
+483	3+708	-217+80	8+580	+217+80	+6+732	+6+222	+725	
+500	2+723	-230+10	6+280	+230+10	+4+018	+6+008	+750	
+517	1+931	-254+00	4+4+0	+254+00	+1+224	+6+268	+775	
+533	1+862	-284+00	3+820	+284+00	+1+384	+6+376	+800	
+550	2+332	-329+10	5+360	+329+10	+4+899	+6+282	+825	
+567	3+202	-388+00	7+360	+388+00	+7+109	+6+908	+850	
+583	+4+80	-383+90	9+380	+383+90	+9+327	+6+997	+875	
+600	5+002	-389+20	11+500	+389+20	+11+499	+6+161	+900	
+617	5+751	-363+20	13+280	+363+20	+13+999	+6+738	+925	
+633	6+455	-385+90	14+880	+385+90	+14+761	+6+138	+950	
+650	6+908	-368+10	15+880	+368+10	+15+722	+6+238	+975	
+667	7+221	-369+80	16+600	+369+80	+16+288	+6+288	+1000	
+683	7+456	-371+40	17+140	+371+40	+16+802	+6+388	+1025	
+700	7+04	-373+10	17+020	+373+10	+16+877	+6+938	+1050	
+717	7+184	-374+80	16+820	+374+80	+16+994	+6+136	+1075	
+733	6+708	-375+90	15+420	+375+90	+14+830	+6+224	+1100	
+750	6+003	-377+10	13+800	+377+10	+13+190	+6+088	+1125	
+767	5+203	-378+50	11+980	+378+50	+11+368	+6+396	+1150	
+783	+3+36	-380+50	9+900	+380+50	+9+873	+6+467	+1175	
+800	3+249	-381+00	7+700	+381+00	+7+094	+6+138	+1200	
+817	2+227	-389+30	5+180	+389+30	+5+668	+6+306	+1225	
+833	+974	-407+90	2+2+0	+407+90	+1+802	+6+168	+1250	
+850	+101+50	-401+50	1+680	+401+50	+81+868	+6+108	+1275	
+867	1+749	-405+70	+0+00	+405+70	+8+009	+6+301	+1300	
+883	2+941	-403+90	6+7+0	+403+90	+6+764	+6+480	+1325	
+900	+1+096	-407+20	4+4+0	+407+20	+4+4+0	+6+364	+1350	
+917	5+255	-409+00	12+080	+409+00	+11+931	+6+930	+1375	
+933	5+951	-405+00	13+080	+405+00	+13+978	+6+974	+1400	
+950	6+708	-400+80	15+080	+400+80	+15+147	+6+888	+1425	
+967	7+804	-401+40	17+480	+401+40	+17+138	+6+988	+1450	
+983	8+287	-401+90	19+280	+401+90	+19+184	+6+978	+1475	
+980	9+405	-402+00	21+620	+402+00	+21+148	+6+496	+1484	

TABLE 3.2 (CONTINUED)

DISTRIBUTION OF CURRENT AND CHARGE ON PENSOLE ANTENNA OVER SALT WATER
 ALPHA/BETA = .0007 BETA/LAMBDA = 1/E-07 W/LAMBDA = 1.000
 FREQUENCY = 300.000 MHz PE = 2.885 D/LAMBDA = .0200

A. MEASURED CURRENT DISTRIBUTION IN PAVVOLT

Z/H	RAW DATA		NORMALIZED DATA					Z/LAMBDA
	IR/PAZ	IR/FAZ	IR/PAG	IR/FAZ	IR/REAL	IR/IMAG		
.03	0.000	183.40	2.76L	53.4C	1.896	2.216	.003	
.25	0.000	153.7C	2.02C	38.7C	1.876	1.723	.025	
.50	0.000	129.9C	1.84C	14.9C	1.488	.396	.050	
.75	0.000	96.2C	1.42C	-18.8C	1.244	-.458	.075	
1.00	0.000	67.4C	1.00C	-47.8C	1.023	-1.281	.100	
1.25	0.000	51.1C	2.34C	-63.9C	1.029	-2.101	.125	
1.50	0.000	41.2C	2.94C	-73.8C	.820	-2.623	.150	
1.75	0.000	36.7C	3.52C	-80.3C	.593	-3.170	.175	
2.00	0.000	30.4C	4.02C	-85.0C	.350	-4.005	.200	
2.25	0.000	28.5C	4.88C	-88.1C	.141	-4.638	.225	
2.50	0.000	23.7C	5.44C	-91.3C	-.110	-4.839	.250	
2.75	0.000	21.4C	5.84C	-93.6C	-.304	-4.830	.275	
3.00	0.000	19.3C	6.08C	-95.0C	-.505	-4.655	.300	
3.25	0.000	17.3C	6.08C	-97.7C	-.678	-4.314	.325	
3.50	0.000	15.4C	5.90C	-99.6C	-.817	-3.831	.350	
3.75	0.000	13.6C	5.40C	-101.8C	-.920	-3.245	.375	
4.00	0.000	12.0C	4.10C	-104.1C	-.999	-2.576	.400	
4.25	0.000	10.7C	3.50C	-106.4C	-1.012	-1.831	.425	
4.50	0.000	9.4C	2.88C	-108.6C	-1.013	-1.069	.450	
4.75	0.000	8.1C	2.14C	-116.4C	-.952	-1.917	.475	
5.00	0.000	7.0C	1.34C	-128.3C	-.831	-1.032	.500	
5.25	0.000	6.7C	.78C	-162.0C	-.742	-.241	.525	
5.50	0.000	6.2C	.84C	-222.1C	-.623	.563	.550	
5.75	0.000	5.5C	1.48C	-250.8C	-.484	1.395	.575	
6.00	0.000	4.9C	2.14C	-260.7C	-.346	2.112	.600	
6.25	0.000	4.7C	2.88C	-268.7C	-.188	2.855	.625	
6.50	0.000	4.5C	3.50C	-268.7C	-.079	3.499	.650	
6.75	0.000	4.3C	3.94C	-271.4C	.096	3.939	.675	
7.00	0.000	4.1C	4.48C	-272.9C	.226	4.484	.700	
7.25	0.000	3.9C	4.78C	-273.6C	.300	4.771	.725	
7.50	0.000	3.7C	5.02C	-274.8C	.420	5.022	.750	
7.75	0.000	3.5C	5.18C	-275.8C	.484	5.184	.775	
8.00	0.000	3.3C	4.78C	-276.2C	.516	4.752	.800	
8.25	0.000	3.1C	4.60C	-277.1C	.569	4.568	.825	
8.50	0.000	2.9C	4.38C	-277.3C	.557	4.344	.850	
8.75	0.000	2.7C	3.94C	-277.5C	.517	3.926	.875	
9.00	0.000	2.5C	3.48C	-278.1C	.459	3.527	.900	
9.25	0.000	2.3C	2.84C	-278.1C	.364	2.554	.925	
9.50	0.000	2.1C	1.90C	-278.1C	.268	1.861	.950	
9.75	0.000	1.9C	1.48C	-278.1C	.182	1.069	.975	
10.00	0.000	1.7C	.70C	-278.1C	.099	.693	.984	

B. MEASURED CHARGE DISTRIBUTION IN PICCOUL/VOLT-F

Z/H	RAW DATA		NORMALIZED DATA					Z/LAMBDA
	QR/PAZ	QR/FAZ	QR/PAG	QR/FAZ	QR/REAL	QR/IMAG		
.06	1.412	.10	22.60C	.40C	22.4	.000	.006	
.25	1.401	-.24C	18.34C	-.25C	18.24	-.800	.025	
.50	7.412	.81C	17.78C	-.51C	17.71C	-1.581	.050	
.75	7.408	1.70C	17.02C	-1.00C	17.03	-2.997	.075	
1.00	7.414	-10.40C	16.68C	-10.86C	16.376	-3.065	.100	
1.25	6.416	-13.44C	15.52C	-13.48C	15.11C	-3.844	.125	
1.50	4.418	-16.44C	14.18C	-16.44C	13.603	-4.004	.150	
1.75	4.414	-20.44C	12.48C	-20.44C	11.727	-4.268	.175	
2.00	4.415	-25.44C	10.48C	-25.44C	9.472	-4.437	.200	
2.25	3.416	-32.20C	8.44C	-32.20C	7.142	-4.497	.225	
2.50	2.417	-43.10C	6.14C	-43.10C	4.493	-4.195	.250	
2.75	1.418	-60.40C	4.32C	-60.40C	1.413	-3.962	.275	
3.00	1.419	-107.40C	3.72C	-107.40C	1.415	-3.546	.300	
3.25	1.419	-142.40C	5.10C	-142.40C	.410	-3.140	.325	
3.50	1.419	-159.20C	7.22C	-159.20C	-.410	-2.587	.350	
3.75	1.419	-168.20C	9.52C	-168.20C	-3.319	-1.947	.375	
4.00	1.419	-173.50C	11.88C	-173.50C	-11.406	-1.300	.400	
4.25	1.419	-177.40C	13.26C	-177.40C	-17.740	-.602	.425	
4.50	1.419	-180.30C	14.68C	-180.30C	-14.880	.078	.450	
4.75	1.419	-183.40C	16.22C	-183.40C	-16.388	1.031	.475	
5.00	1.419	-184.40C	16.84C	-184.40C	-16.500	1.194	.500	
5.25	1.419	-185.10C	16.84C	-185.10C	-16.779	1.497	.525	
5.50	1.419	-186.40C	16.84C	-186.40C	-16.430	1.901	.550	
5.75	1.419	-188.40C	16.10C	-188.40C	-16.003	2.249	.575	
6.00	1.419	-189.20C	13.50C	-189.20C	-13.469	2.376	.600	
6.25	1.419	-190.20C	11.88C	-190.20C	-13.287	2.391	.625	
6.50	1.419	-191.70C	11.88C	-191.70C	-11.974	2.397	.650	
6.75	1.419	-193.40C	9.96C	-193.40C	-.9284	2.280	.675	
7.00	1.419	-196.90C	7.42C	-196.90C	-.7100	2.157	.700	
7.25	1.419	-202.90C	4.86C	-202.90C	-.4497	1.844	.725	
7.50	1.419	-222.70C	2.04C	-222.70C	-1.499	1.383	.750	
7.75	1.419	-320.60C	1.58C	-320.60C	1.221	1.003	.775	
8.00	1.419	-351.30C	3.94C	-351.30C	3.895	.596	.800	
8.25	1.419	-359.00C	4.54C	-359.00C	6.539	.114	.825	
8.50	1.419	-361.80C	9.18C	-361.80C	9.176	-.286	.850	
8.75	1.419	-363.80C	11.70C	-363.80C	11.880	-.653	.875	
9.00	1.419	-364.40C	13.28C	-364.40C	13.241	-1.019	.900	
9.25	1.419	-365.00C	14.96C	-365.00C	14.903	-1.304	.925	
9.50	1.419	-365.80C	17.10C	-365.80C	17.021	-1.639	.950	
9.75	1.419	-365.90C	18.68C	-365.90C	18.581	-1.920	.975	
10.00	1.419	-366.40C	20.920	-366.40C	20.808	-2.187	.987	

TABLE 3.2 (CONTINUED)

DISTRIBUTION OF CURRENT AND CHARGE ON MONOPOLE ANTENNA OVER SALT WATER
ALFA/BETAL * 1.000 BETA/BETAC * 1.109 W/LAMPDAG * .500
FREQUENCY * 300.00MHZ RE * 2.885 D/LAMPDAG * .0200

A. MEASURED CURRENT DISTRIBUTION IN MA/VOLTS

Table with columns: Z/H, IN+0, IREAZ, IN+AG, INFAZ, INREAL, INIAG, Z/LAMPDAG. Rows include data for Z/H values from 1.0P to 1.75A.

B. MEASURED CHARGE DISTRIBUTION IN PICCOLL/VOLTS*

Table with columns: Z/H, IREAZ, IREAZ, IN+AG, INFAZ, INREAL, INIAG, Z/LAMPDAG. Rows include data for Z/H values from 1.1P to 1.75A.

DISTRIBUTION OF CURRENT AND CHARGE ON MONOPOLE ANTENNA OVER SALT WATER
ALFA/BETAL * 1.007 BETA/BETAC * 1.007 W/LAMPDAG * .500
FREQUENCY * 300.00MHZ RE * 2.885 D/LAMPDAG * .0200

A. MEASURED CURRENT DISTRIBUTION IN MA/VOLTS

Table with columns: Z/H, IN+0, IREAZ, IN+AG, INFAZ, INREAL, INIAG, Z/LAMPDAG. Rows include data for Z/H values from 1.0P to 1.75A.

B. MEASURED CHARGE DISTRIBUTION IN PICCOLL/VOLTS*

Table with columns: Z/H, IREAZ, IREAZ, IN+AG, INFAZ, INREAL, INIAG, Z/LAMPDAG. Rows include data for Z/H values from 1.1P to 1.75A.

AD-A044 651

HARVARD UNIV CAMBRIDGE MASS GORDON MCKAY LAB
THE BEVERAGE WAVE ANTENNA: CURRENTS, CHARGES AND ADMITTANCES V0--ETC(U)
FEB 77 R M SORBELLO F19628-76-C-0057

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TABLE 3.2 (CONTINUED)

DISTRIBUTION OF CURRENT AND CHARGE ON WINDPOLE ANTENNA OVER SALT WATER
ALFA/LAMBDA = .0020 BETA/LAMBDA = 1.005 M/LAMBDA = 1.500
FREQUENCY = 300.000MHZ RE = 2.885 D/LAMBDA = .0050

Table with columns: Z/H, DATA, NORMALIZED DATA (INRAG, INFAZ, INREAL, INMAG), and Z/LAMBDA. Rows include data for Z/H values from .000 to .989.

B. MEASURED CHARGE DISTRIBUTION IN PICCOLL/VOLTS

Table with columns: Z/H, DATA, NORMALIZED DATA (QNRAG, QNFAZ, QNREAL, QNMAG), and Z/LAMBDA. Rows include data for Z/H values from .000 to .991.

TABLE 3.2 (CONTINUED)

DISTRIBUTION OF CURRENT AND CHARGE ON HORNPOLE ANTENNA OVER SALT WATER
 ALPHA/BETA1 = .0020 BETA1/BETA2 = 1.025 H/LAMDA0 = 1.000
 FREQUENCY = 300.00MHZ RE = 2.025 D/LAMDA0 = .0800

A. MEASURED CURRENT DISTRIBUTION IN PAVBLT

Z/P	RA DATA		NORMALIZED DATA				Z/LAMDA0
	IRFAZ	IRFAG	IRFZ	IRFAG	IRREAL	IRIMAG	
.003	3.1147	179.70	1.02C	64.70	.692	1.445	.003
.025	2.2268	161.50	.92C	46.50	.633	.667	.025
.50	1.4025	117.70	.80C	-7.20	.595	-.076	.050
.75	1.1137	82.10	.50C	-52.50	.563	-.718	.075
.100	1.0220	64.20	1.44C	-70.80	.474	-1.260	.100
.125	1.0120	57.10	1.98C	-71.90	.415	-1.934	.125
.150	1.0050	52.70	2.48C	-62.30	.332	-2.458	.150
.175	1.0010	49.80	2.94C	-55.10	.251	-2.929	.175
.200	1.0000	48.00	3.42C	-49.10	.172	-3.274	.200
.225	1.0000	46.50	3.92C	-44.50	.095	-3.619	.225
.250	1.0000	45.20	4.44C	-40.00	.020	-3.880	.250
.275	1.0000	44.00	4.98C	-35.50	-.075	-3.859	.275
.300	1.0000	42.80	5.54C	-31.00	-.150	-3.917	.300
.325	1.0000	41.70	6.12C	-26.50	-.219	-3.794	.325
.350	1.0000	40.60	6.72C	-22.00	-.288	-3.650	.350
.375	1.0000	39.50	7.34C	-17.50	-.355	-3.284	.375
.400	1.0000	38.40	7.98C	-13.00	-.422	-2.921	.400
.425	1.0000	37.30	8.64C	-8.50	-.489	-2.416	.425
.450	1.0000	36.20	9.32C	-4.00	-.557	-1.909	.450
.475	1.0000	35.10	1.00C	-104.40	-.624	-1.298	.475
.500	1.0000	34.00	.70C	-113.90	-.690	-.695	.500
.525	1.0000	32.90	.40C	-148.20	-.754	-.081	.525
.550	1.0000	31.80	.10C	-243.50	-.817	.555	.550
.575	1.0000	30.70	1.16C	-255.20	-.875	1.140	.575
.600	1.0000	29.60	1.75C	-264.50	-.925	1.712	.600
.625	1.0000	28.50	2.32C	-267.00	-.968	2.317	.625
.650	1.0000	27.40	2.75C	-264.40	-.994	2.719	.650
.675	1.0000	26.30	3.18C	-265.50	-.998	3.180	.675
.700	1.0000	25.20	3.60C	-270.20	-.988	3.680	.700
.725	1.0000	24.10	4.02C	-271.80	-.963	3.780	.725
.750	1.0000	23.00	4.44C	-271.50	-.925	3.859	.750
.775	1.0000	21.90	4.86C	-271.50	-.875	3.858	.775
.800	1.0000	20.80	5.28C	-272.00	-.811	3.738	.800
.825	1.0000	19.70	5.70C	-272.50	-.739	3.637	.825
.850	1.0000	18.60	6.12C	-273.20	-.667	3.356	.850
.875	1.0000	17.50	6.54C	-273.20	-.595	3.055	.875
.900	1.0000	16.40	6.96C	-273.20	-.523	2.554	.900
.925	1.0000	15.30	7.38C	-273.20	-.451	2.017	.925
.950	1.0000	14.20	7.80C	-273.20	-.379	1.518	.950
.975	1.0000	13.10	8.22C	-273.20	-.307	1.050	.975
.984	1.0000	12.00	8.64C	-273.20	-.235	.559	.984

B. MEASURED CHARGE DISTRIBUTION IN PICCOL/VOLT-P

Z/P	RA DATA		NORMALIZED DATA				Z/LAMDA0
	QRFAZ	QRFAG	QRFZ	QRFAG	QRREAL	QRIMAG	
.003	3.1147	-5.00	21.00C	-45.00	20.920	-1.830	.004
.025	2.2268	-5.00	15.80C	-36.80	15.779	-1.403	.025
.50	1.4025	-6.90	14.28C	-36.90	14.177	-1.714	.050
.75	1.1137	-8.20	13.24C	-36.20	13.108	-1.888	.075
.100	1.0220	-9.40	12.28C	-34.40	12.115	-2.004	.100
.125	1.0120	-11.20	11.14C	-31.80	10.928	-2.164	.125
.150	1.0050	-12.50	9.70C	-28.90	9.514	-2.179	.150
.175	1.0010	-15.10	8.20C	-25.10	7.917	-2.136	.175
.200	1.0000	-16.50	6.50C	-24.00	6.162	-2.069	.200
.225	1.0000	-18.40	4.70C	-24.40	4.260	-1.942	.225
.250	1.0000	-20.30	2.80C	-28.30	2.197	-1.735	.250
.275	1.0000	-22.20	1.50C	-46.00	1.106	-1.516	.275
.300	1.0000	-24.00	2.40C	-145.20	-2.042	-1.229	.300
.325	1.0000	-25.80	4.30C	-147.10	-4.208	-.887	.325
.350	1.0000	-27.70	6.20C	-174.70	-6.273	-.582	.350
.375	1.0000	-29.60	8.10C	-176.50	-8.197	-.215	.375
.400	1.0000	-31.50	9.90C	-180.50	-9.860	.084	.400
.425	1.0000	-33.40	11.80C	-184.20	-10.912	.419	.425
.450	1.0000	-35.30	11.90C	-183.40	-11.899	.707	.450
.475	1.0000	-37.20	10.50C	-184.40	-12.643	.959	.475
.500	1.0000	-39.10	10.90C	-185.20	-12.667	1.171	.500
.525	1.0000	-41.00	13.24C	-185.80	-13.172	1.338	.525
.550	1.0000	-42.90	12.90C	-186.40	-12.688	1.440	.550
.575	1.0000	-44.80	12.24C	-187.20	-12.243	1.574	.575
.600	1.0000	-46.70	11.50C	-187.60	-11.399	1.521	.600
.625	1.0000	-48.60	10.18C	-188.20	-10.073	1.470	.625
.650	1.0000	-50.50	8.82C	-189.00	-8.711	1.380	.650
.675	1.0000	-52.40	7.46C	-190.20	-7.027	1.264	.675
.700	1.0000	-54.30	6.10C	-192.30	-6.393	1.174	.700
.725	1.0000	-56.20	4.74C	-195.70	-5.292	.925	.725
.750	1.0000	-58.10	3.38C	-211.80	-4.057	.648	.750
.775	1.0000	-60.00	2.02C	-327.80	-.942	.390	.775
.800	1.0000	-61.90	2.00C	-357.50	3.037	.133	.800
.825	1.0000	-63.80	5.00C	-361.70	7.017	-.151	.825
.850	1.0000	-65.70	7.04C	-343.80	7.027	-.430	.850
.875	1.0000	-67.60	9.15C	-344.80	9.112	-.717	.875
.900	1.0000	-69.50	11.60C	-345.70	11.402	-1.158	.900
.925	1.0000	-71.40	13.24C	-346.00	13.244	-1.405	.925
.950	1.0000	-73.30	15.24C	-346.20	15.191	-1.650	.950
.975	1.0000	-75.20	17.32C	-346.40	17.212	-1.931	.975

TABLE 3.2 (CONTINUED)

DISTRIBUTION OF CURRENT AND CHARGE ON MONOPOLE ANTENNA OVER SALT WATER
 ALPHA/BETA * 1000 METAL/BETA * 1.023 NYLAP/CAO * 1.500
 FE HEAD * 3.000CM FE * 2.800 D/LAMP/CAO * 1000

A. MEASURED CURRENT DISTRIBUTION IN MA/VOLTS

Z/H	DATA	REAL	IMAG	REAL	IMAG	REAL	IMAG	Z/LAMP/CAO
.02	1.11	1.11	0.00	1.11	0.00	1.11	0.00	.003
.04	1.11	1.11	0.00	1.11	0.00	1.11	0.00	.005
.06	1.11	1.11	0.00	1.11	0.00	1.11	0.00	.007
.08	1.11	1.11	0.00	1.11	0.00	1.11	0.00	.009
.10	1.11	1.11	0.00	1.11	0.00	1.11	0.00	.011
.12	1.11	1.11	0.00	1.11	0.00	1.11	0.00	.013
.14	1.11	1.11	0.00	1.11	0.00	1.11	0.00	.015
.16	1.11	1.11	0.00	1.11	0.00	1.11	0.00	.017
.18	1.11	1.11	0.00	1.11	0.00	1.11	0.00	.019
.20	1.11	1.11	0.00	1.11	0.00	1.11	0.00	.021
.22	1.11	1.11	0.00	1.11	0.00	1.11	0.00	.023
.24	1.11	1.11	0.00	1.11	0.00	1.11	0.00	.025
.26	1.11	1.11	0.00	1.11	0.00	1.11	0.00	.027
.28	1.11	1.11	0.00	1.11	0.00	1.11	0.00	.029
.30	1.11	1.11	0.00	1.11	0.00	1.11	0.00	.031
.32	1.11	1.11	0.00	1.11	0.00	1.11	0.00	.033
.34	1.11	1.11	0.00	1.11	0.00	1.11	0.00	.035
.36	1.11	1.11	0.00	1.11	0.00	1.11	0.00	.037
.38	1.11	1.11	0.00	1.11	0.00	1.11	0.00	.039
.40	1.11	1.11	0.00	1.11	0.00	1.11	0.00	.041
.42	1.11	1.11	0.00	1.11	0.00	1.11	0.00	.043
.44	1.11	1.11	0.00	1.11	0.00	1.11	0.00	.045
.46	1.11	1.11	0.00	1.11	0.00	1.11	0.00	.047
.48	1.11	1.11	0.00	1.11	0.00	1.11	0.00	.049
.50	1.11	1.11	0.00	1.11	0.00	1.11	0.00	.051
.52	1.11	1.11	0.00	1.11	0.00	1.11	0.00	.053
.54	1.11	1.11	0.00	1.11	0.00	1.11	0.00	.055
.56	1.11	1.11	0.00	1.11	0.00	1.11	0.00	.057
.58	1.11	1.11	0.00	1.11	0.00	1.11	0.00	.059
.60	1.11	1.11	0.00	1.11	0.00	1.11	0.00	.061
.62	1.11	1.11	0.00	1.11	0.00	1.11	0.00	.063
.64	1.11	1.11	0.00	1.11	0.00	1.11	0.00	.065
.66	1.11	1.11	0.00	1.11	0.00	1.11	0.00	.067
.68	1.11	1.11	0.00	1.11	0.00	1.11	0.00	.069
.70	1.11	1.11	0.00	1.11	0.00	1.11	0.00	.071
.72	1.11	1.11	0.00	1.11	0.00	1.11	0.00	.073
.74	1.11	1.11	0.00	1.11	0.00	1.11	0.00	.075
.76	1.11	1.11	0.00	1.11	0.00	1.11	0.00	.077
.78	1.11	1.11	0.00	1.11	0.00	1.11	0.00	.079
.80	1.11	1.11	0.00	1.11	0.00	1.11	0.00	.081
.82	1.11	1.11	0.00	1.11	0.00	1.11	0.00	.083
.84	1.11	1.11	0.00	1.11	0.00	1.11	0.00	.085
.86	1.11	1.11	0.00	1.11	0.00	1.11	0.00	.087
.88	1.11	1.11	0.00	1.11	0.00	1.11	0.00	.089
.90	1.11	1.11	0.00	1.11	0.00	1.11	0.00	.091
.92	1.11	1.11	0.00	1.11	0.00	1.11	0.00	.093
.94	1.11	1.11	0.00	1.11	0.00	1.11	0.00	.095
.96	1.11	1.11	0.00	1.11	0.00	1.11	0.00	.097
.98	1.11	1.11	0.00	1.11	0.00	1.11	0.00	.099
1.00	1.11	1.11	0.00	1.11	0.00	1.11	0.00	1.000

B. MEASURED CHARGE DISTRIBUTION IN PICCOLL/VOLT*H

Z/H	DATA	REAL	IMAG	REAL	IMAG	REAL	IMAG	Z/LAMP/CAO
.02	12.540	-5.00	21.620	-5.00	21.620	-5.00	21.620	.004
.04	9.384	-6.00	16.180	-6.00	16.180	-6.00	16.180	.005
.06	6.728	-6.00	11.180	-6.00	11.180	-6.00	11.180	.007
.08	4.972	-9.00	10.020	-9.00	10.020	-9.00	10.020	.009
.10	3.617	-11.00	10.600	-11.00	10.600	-11.00	10.600	.011
.12	2.417	-13.00	9.300	-13.00	9.300	-13.00	9.300	.013
.14	1.740	-15.70	7.880	-15.70	7.880	-15.70	7.880	.015
.16	.986	-17.60	6.280	-17.60	6.280	-17.60	6.280	.017
.18	.524	-19.10	4.800	-19.10	4.800	-19.10	4.800	.019
.20	.230	-20.30	3.500	-20.30	3.500	-20.30	3.500	.021
.22	.118	-21.10	2.400	-21.10	2.400	-21.10	2.400	.023
.24	.067	-21.70	1.600	-21.70	1.600	-21.70	1.600	.025
.26	.041	-22.10	1.000	-22.10	1.000	-22.10	1.000	.027
.28	.028	-22.40	.600	-22.40	.600	-22.40	.600	.029
.30	.020	-22.60	.400	-22.60	.400	-22.60	.400	.031
.32	.015	-22.70	.300	-22.70	.300	-22.70	.300	.033
.34	.011	-22.80	.200	-22.80	.200	-22.80	.200	.035
.36	.008	-22.80	.150	-22.80	.150	-22.80	.150	.037
.38	.006	-22.80	.100	-22.80	.100	-22.80	.100	.039
.40	.005	-22.80	.070	-22.80	.070	-22.80	.070	.041
.42	.004	-22.80	.050	-22.80	.050	-22.80	.050	.043
.44	.003	-22.80	.040	-22.80	.040	-22.80	.040	.045
.46	.003	-22.80	.030	-22.80	.030	-22.80	.030	.047
.48	.002	-22.80	.020	-22.80	.020	-22.80	.020	.049
.50	.002	-22.80	.015	-22.80	.015	-22.80	.015	.051
.52	.001	-22.80	.010	-22.80	.010	-22.80	.010	.053
.54	.001	-22.80	.008	-22.80	.008	-22.80	.008	.055
.56	.001	-22.80	.006	-22.80	.006	-22.80	.006	.057
.58	.001	-22.80	.005	-22.80	.005	-22.80	.005	.059
.60	.001	-22.80	.004	-22.80	.004	-22.80	.004	.061
.62	.001	-22.80	.003	-22.80	.003	-22.80	.003	.063
.64	.001	-22.80	.002	-22.80	.002	-22.80	.002	.065
.66	.001	-22.80	.002	-22.80	.002	-22.80	.002	.067
.68	.001	-22.80	.001	-22.80	.001	-22.80	.001	.069
.70	.001	-22.80	.001	-22.80	.001	-22.80	.001	.071
.72	.001	-22.80	.001	-22.80	.001	-22.80	.001	.073
.74	.001	-22.80	.001	-22.80	.001	-22.80	.001	.075
.76	.001	-22.80	.001	-22.80	.001	-22.80	.001	.077
.78	.001	-22.80	.001	-22.80	.001	-22.80	.001	.079
.80	.001	-22.80	.001	-22.80	.001	-22.80	.001	.081
.82	.001	-22.80	.001	-22.80	.001	-22.80	.001	.083
.84	.001	-22.80	.001	-22.80	.001	-22.80	.001	.085
.86	.001	-22.80	.001	-22.80	.001	-22.80	.001	.087
.88	.001	-22.80	.001	-22.80	.001	-22.80	.001	.089
.90	.001	-22.80	.001	-22.80	.001	-22.80	.001	.091
.92	.001	-22.80	.001	-22.80	.001	-22.80	.001	.093
.94	.001	-22.80	.001	-22.80	.001	-22.80	.001	.095
.96	.001	-22.80	.001	-22.80	.001	-22.80	.001	.097
.98	.001	-22.80	.001	-22.80	.001	-22.80	.001	.099
1.00	.001	-22.80	.001	-22.80	.001	-22.80	.001	1.000

TABLE 3.2 (CONTINUED)

DISTRIBUTION OF CURRENT AND CHARGE ON DIPOLE ANTENNA OVER SALT WATER
 H/LAMDA = .0190 BETA/LBETAC = 1.023 H/LAMDAO = 1.000
 FREQUENCY = 300.000MHZ FE = 2.885 D/LAMDAO = 1.000

A. MEASURED CURRENT DISTRIBUTION IN PA/VOLTY

Z/H	IN/AS	IRFAZ	INMAG	INFAZ	INREAL	INIMAG	Z/LAMDO
.003	1.950	195.000	1.660	68.000	.622	1.539	.003
.005	2.475	180.000	.940	53.000	.566	.751	.005
.010	3.950	133.000	.520	41.000	.517	.504	.010
.015	5.325	77.000	.280	30.000	.463	.452	.015
.020	6.700	49.000	1.200	23.000	.412	-.127	.020
.025	8.075	49.000	1.750	17.000	.363	-.166	.025
.030	9.450	44.000	2.140	12.000	.294	-.210	.030
.035	10.825	42.000	2.350	8.000	.224	-.230	.035
.040	12.200	40.000	2.820	5.000	.153	-.214	.040
.045	13.575	38.000	3.120	3.000	.083	-.311	.045
.050	14.950	37.000	3.280	2.000	.034	-.340	.050
.055	16.325	36.000	3.380	1.500	-.023	-.340	.055
.060	17.700	35.000	3.380	1.000	-.094	-.335	.060
.065	19.075	34.000	3.300	.500	-.164	-.327	.065
.070	20.450	33.000	3.140	.000	-.234	-.314	.070
.075	21.825	32.000	2.840		-.304	-.282	.075
.080	23.200	31.000	2.540		-.374	-.229	.080
.085	24.575	30.200	2.100		-.444	-.205	.085
.090	25.950	29.400	1.660		-.514	-.166	.090
.095	27.325	28.600	1.140		-.584	-.112	.095
.100	28.700	28.000	.680		-.654	-.038	.100
.105	30.075	27.200	.200		-.724	.034	.105
.110	31.450	26.400	-.320		-.794	.112	.110
.115	32.825	25.600	-.840		-.864	.182	.115
.120	34.200	24.800	-1.360		-.934	.252	.120
.125	35.575	24.000	-1.880		-.994	.322	.125
.130	36.950	23.200	-2.400		-.994	.392	.130
.135	38.325	22.400	-2.920		-.934	.462	.135
.140	39.700	21.600	-3.440		-.814	.532	.140
.145	41.075	20.800	-3.960		-.634	.602	.145
.150	42.450	20.000	-4.480		-.414	.672	.150
.155	43.825	19.200	-5.000		-.154	.742	.155
.160	45.200	18.400	-5.520		.146	.812	.160
.165	46.575	17.600	-6.040		.406	.882	.165
.170	47.950	16.800	-6.560		.626	.952	.170
.175	49.325	16.000	-7.080		.806	1.022	.175
.180	50.700	15.200	-7.600		.946	1.092	.180
.185	52.075	14.400	-8.120		1.046	1.162	.185
.190	53.450	13.600	-8.640		1.106	1.232	.190
.195	54.825	12.800	-9.160		1.126	1.302	.195
.200	56.200	12.000	-9.680		1.106	1.372	.200
.205	57.575	11.200	-10.200		1.046	1.442	.205
.210	58.950	10.400	-10.720		.946	1.512	.210
.215	60.325	9.600	-11.240		.806	1.582	.215
.220	61.700	8.800	-11.760		.626	1.652	.220
.225	63.075	8.000	-12.280		.406	1.722	.225
.230	64.450	7.200	-12.800		.146	1.792	.230
.235	65.825	6.400	-13.320		-.154	1.862	.235
.240	67.200	5.600	-13.840		-.414	1.932	.240
.245	68.575	4.800	-14.360		-.634	2.002	.245
.250	69.950	4.000	-14.880		-.814	2.072	.250
.255	71.325	3.200	-15.400		-.944	2.142	.255
.260	72.700	2.400	-15.920		-.994	2.212	.260
.265	74.075	1.600	-16.440		-.954	2.282	.265
.270	75.450	.800	-16.960		-.814	2.352	.270
.275	76.825	.000	-17.480		-.554	2.422	.275
.280	78.200		-18.000		-.254	2.492	.280
.285	79.575		-18.520		.106	2.562	.285
.290	80.950		-19.040		.366	2.632	.290
.295	82.325		-19.560		.586	2.702	.295
.300	83.700		-20.080		.766	2.772	.300
.305	85.075		-20.600		.906	2.842	.305
.310	86.450		-21.120		.996	2.912	.310
.315	87.825		-21.640		1.046	2.982	.315
.320	89.200		-22.160		1.056	3.052	.320
.325	90.575		-22.680		1.026	3.122	.325
.330	91.950		-23.200		.956	3.192	.330
.335	93.325		-23.720		.846	3.262	.335
.340	94.700		-24.240		.696	3.332	.340
.345	96.075		-24.760		.506	3.402	.345
.350	97.450		-25.280		.286	3.472	.350
.355	98.825		-25.800		.026	3.542	.355
.360	100.200		-26.320		-.274	3.612	.360
.365	101.575		-26.840		-.534	3.682	.365
.370	102.950		-27.360		-.754	3.752	.370
.375	104.325		-27.880		-.934	3.822	.375
.380	105.700		-28.400		-.994	3.892	.380
.385	107.075		-28.920		-.914	3.962	.385
.390	108.450		-29.440		-.794	4.032	.390
.395	109.825		-29.960		-.634	4.102	.395
.400	111.200		-30.480		-.434	4.172	.400
.405	112.575		-31.000		-.214	4.242	.405
.410	113.950		-31.520		.026	4.312	.410
.415	115.325		-32.040		.286	4.382	.415
.420	116.700		-32.560		.546	4.452	.420
.425	118.075		-33.080		.766	4.522	.425
.430	119.450		-33.600		.946	4.592	.430
.435	120.825		-34.120		1.086	4.662	.435
.440	122.200		-34.640		1.186	4.732	.440
.445	123.575		-35.160		1.246	4.802	.445
.450	124.950		-35.680		1.266	4.872	.450
.455	126.325		-36.200		1.246	4.942	.455
.460	127.700		-36.720		1.186	5.012	.460
.465	129.075		-37.240		1.086	5.082	.465
.470	130.450		-37.760		.946	5.152	.470
.475	131.825		-38.280		.766	5.222	.475
.480	133.200		-38.800		.546	5.292	.480
.485	134.575		-39.320		.286	5.362	.485
.490	135.950		-39.840		.026	5.432	.490
.495	137.325		-40.360		-.274	5.502	.495
.500	138.700		-40.880		-.534	5.572	.500
.505	140.075		-41.400		-.754	5.642	.505
.510	141.450		-41.920		-.934	5.712	.510
.515	142.825		-42.440		-.994	5.782	.515
.520	144.200		-42.960		-.914	5.852	.520
.525	145.575		-43.480		-.794	5.922	.525
.530	146.950		-44.000		-.634	5.992	.530
.535	148.325		-44.520		-.434	6.062	.535
.540	149.700		-45.040		-.214	6.132	.540
.545	151.075		-45.560		.026	6.202	.545
.550	152.450		-46.080		.286	6.272	.550
.555	153.825		-46.600		.546	6.342	.555
.560	155.200		-47.120		.766	6.412	.560
.565	156.575		-47.640		.946	6.482	.565
.570	157.950		-48.160		1.086	6.552	.570
.575	159.325		-48.680		1.186	6.622	.575
.580	160.700		-49.200		1.246	6.692	.580
.585	162.075		-49.720		1.266	6.762	.585
.590	163.450		-50.240		1.246	6.832	.590
.595	164.825		-50.760		1.186	6.902	.595
.600	166.200		-51.280		1.086	6.972	.600
.605	167.575		-51.800		.946	7.042	.605
.610	168.950		-52.320		.766	7.112	.610
.615	170.325		-52.840		.546	7.182	.615
.620	171.700		-53.360		.286	7.252	.620
.625	173.075		-53.880		.026	7.322	.625
.630	174.450		-54.400		-.274	7.392	.630
.635	175.825		-54.920		-.534	7.462	.635
.640	177.200		-55.440		-.754	7.532	.640
.645	178.575		-55.960		-.934	7.602	.645
.650	180.000		-56.480		-.994	7.672	.650
.655	181.425		-57.000		-.914	7.742	.655
.660	182.850		-57.520		-.794	7.812	.660
.665	184.275		-58.040		-.634	7.882	.665
.670	185.700		-58.560		-.434	7.952	.670
.675	187.125		-59.080		-.214	8.022	.675
.680	188.550		-59.600		.026	8.092	.680
.685	190.000		-60.120		.286	8.162	.685
.690	191.450		-60.640		.546	8.232	.690
.695	192.900		-61.160		.766	8.302	.695
.700	194.350		-61.680		.946	8.372	.700
.705	195.800		-62.200		1.086	8.442	.705
.710	197.250		-62.720		1.186	8.512	.710
.715	198.700		-63.240		1.246	8.582	.715
.720	200.150		-63.760		1.266	8.652	.720
.725	201.600		-64.280		1.246	8.722	.725
.730	203.050		-64.800		1.186	8.792	.730
.735	204.500		-65.320		1.086	8.862	.735
.740	205.950		-65.840		.946	8.932	.740
.745	207.400		-66.360		.766	9.002	.745
.750	208.850		-66.880		.546	9.072	.750
.755	210.300		-67.400		.286	9.142	.755
.760	211.750		-67.920		.026	9.212	.760
.765	213.200		-68.440		-.274	9.282	.765
.770	214.650		-68.960		-.534	9.352	.770
.775	216.100		-69.480		-.754	9.422	.775
.780	217.550		-70.000		-.934	9.492	.780
.785	219.000		-70.520		-.994	9.562	.785
.790	220.450		-71.040		-.914	9.632	.790
.795	221.900		-71.560		-.794	9.702	.795
.800	223.350		-72.080		-.634	9.772	.800
.805	224.800		-72.600		-.434	9.842	.805
.810	226.250		-73.120		-.214	9.912	.810
.815	227.700		-73.640		.026	9.982	.815
.820	229.150		-74.160		.286	10.052	.820
.825	230.600						

TABLE 3.2 (CONTINUED)

DISTRIBUTION OF CURRENT AND CHARGE ON MONOPOLE ANTENNA OVER SALT WATER
 ALFA/BETAL = .0220 BETA/BETAC = 1.025 W/LAMDAO = .500
 FREQUENCY = 300.00MHZ PE = 2.885 D/LAMDAO = .0500

A. MEASURED CURRENT DISTRIBUTION IN MA/VOLTY

Z/H	RAW DATA		NORMALIZED DATA					Z/LAMDAO
	IR*AG	IR*AZ	IN*AG	IN*AZ	IN*REAL	IN*IMAG		
.12	2.18	184.70	1.280	65.70	.437	1.182	.003	
.50	1.135	157.20	.440	42.20	.351	.322	.025	
.100	1.030	69.70	.820	45.30	.361	-.370	.050	
.150	2.504	42.80	1.080	72.80	.281	-1.000	.075	
.200	0.125	34.50	1.700	80.50	.281	-1.877	.100	
.250	0.798	30.90	2.240	89.10	.230	-2.028	.125	
.300	0.433	29.20	2.720	85.80	.199	-2.713	.150	
.350	7.084	27.85	3.080	87.20	.150	-3.076	.175	
.400	5.023	26.90	3.480	88.10	.115	-3.478	.200	
.450	0.794	25.40	3.720	89.20	.082	-3.720	.225	
.500	0.271	25.00	3.920	89.80	.057	-3.820	.250	
.550	9.174	24.80	3.880	90.20	.014	-3.840	.275	
.600	0.440	24.70	3.780	90.30	.020	-3.780	.300	
.650	0.600	24.80	3.640	90.80	.031	-3.640	.325	
.700	0.467	23.80	3.540	91.20	.075	-3.579	.350	
.750	0.722	23.40	3.100	91.40	.067	-3.089	.375	
.800	0.149	23.40	2.800	91.40	.073	-2.899	.400	
.850	0.772	23.40	2.600	91.40	.058	-2.609	.425	
.900	0.489	23.40	1.580	91.40	.044	-1.559	.450	
.950	2.124	23.40	.950	91.40	.025	-.800	.475	
.984	1.372	23.40	.580	91.40	.016	-.580	.484	

B. MEASURED CHARGE DISTRIBUTION IN PICCOL/VOLTY*P

Z/H	RAW DATA		NORMALIZED DATA					Z/LAMDAO
	QR*AG	QR*AZ	QN*AG	QN*AZ	QN*REAL	QN*IMAG		
.12	3.975	-2.00	21.000	-2.000	20.887	-.732	.004	
.50	7.533	-2.30	15.840	-2.300	15.647	-.636	.025	
.100	4.688	-2.40	14.080	-2.400	14.063	-.688	.050	
.150	0.184	-1.50	13.020	-1.500	12.996	-.795	.075	
.200	5.491	-4.20	11.560	-4.200	11.529	-.847	.100	
.250	0.184	-3.80	10.240	-3.800	10.204	-.897	.125	
.300	4.142	-5.80	8.720	-5.800	8.680	-.934	.150	
.350	3.315	-7.20	6.980	-7.200	6.925	-.951	.175	
.400	2.641	-8.40	5.560	-8.400	5.499	-.958	.200	
.450	1.059	-12.80	3.480	-12.800	3.278	-.793	.225	
.500	0.808	-20.50	1.280	-20.500	1.125	-.611	.250	
.550	0.513	-19.00	1.080	-19.000	.821	-.490	.275	
.600	1.444	-172.30	3.040	-172.300	-3.013	-.407	.300	
.650	2.403	-173.00	5.080	-173.000	-5.053	-.274	.325	
.700	3.391	-179.00	7.140	-179.000	-7.139	-.150	.350	
.750	4.389	-180.10	9.240	-180.100	-9.240	.016	.375	
.800	5.387	-180.00	10.400	-180.000	-10.399	.127	.400	
.850	5.585	-181.40	11.700	-181.400	-11.706	.267	.425	
.900	6.488	-181.70	13.000	-181.700	-13.009	.405	.450	
.950	7.134	-182.00	14.400	-182.000	-14.431	.539	.475	
.974	8.264	-182.10	17.440	-182.100	-17.428	.639	.487	

DISTRIBUTION OF CURRENT AND CHARGE ON MONOPOLE ANTENNA OVER SALT WATER
 ALFA/BETAL = .0190 BETA/BETAC = 1.023 W/LAMDAO = .500
 FREQUENCY = 300.00MHZ PE = 2.885 D/LAMDAO = .1000

A. MEASURED CURRENT DISTRIBUTION IN MA/VOLTY

Z/H	RAW DATA		NORMALIZED DATA					Z/LAMDAO
	IR*AG	IR*AZ	IN*AG	IN*AZ	IN*REAL	IN*IMAG		
.084	3.000	195.80	1.440	68.80	.821	1.343	.003	
.50	1.700	174.80	.840	47.80	.486	-.505	.025	
.100	1.100	119.30	.440	41.70	.431	-.089	.050	
.150	2.100	85.20	.840	41.80	.397	-.740	.075	
.200	3.250	52.10	1.300	37.90	.329	-1.255	.100	
.250	4.500	46.50	1.800	40.50	.287	-1.775	.125	
.300	5.800	43.30	2.240	43.70	.246	-2.228	.150	
.350	6.350	41.00	2.540	45.80	.199	-2.532	.175	
.400	7.250	40.20	2.900	48.80	.162	-2.895	.200	
.450	7.680	39.40	3.140	48.80	.110	-3.138	.225	
.500	8.200	38.40	3.280	48.80	.086	-3.279	.250	
.550	8.200	37.60	3.300	48.80	.082	-3.300	.275	
.600	7.800	37.10	3.280	48.80	.084	-3.280	.300	
.650	7.200	36.90	3.200	48.80	.088	-3.200	.325	
.700	6.700	36.20	2.920	48.80	.095	-2.980	.350	
.750	6.000	36.00	2.640	48.80	.097	-2.640	.375	
.800	5.600	35.80	2.400	48.80	.091	-2.400	.400	
.850	4.500	35.90	1.800	48.80	.088	-1.800	.425	
.900	3.450	36.00	1.380	48.80	.084	-1.380	.450	
.950	2.750	36.00	.820	48.80	.081	-.820	.475	
.984	1.900	36.00	.580	48.80	.079	-.580	.484	

B. MEASURED CHARGE DISTRIBUTION IN PICCOL/VOLTY*P

Z/H	RAW DATA		NORMALIZED DATA					Z/LAMDAO
	QR*AG	QR*AZ	QN*AG	QN*AZ	QN*REAL	QN*IMAG		
.12	1.144	-2.00	20.300	-2.000	20.288	-.708	.004	
.50	7.334	-2.20	14.880	-2.200	14.809	-.569	.025	
.100	6.435	-2.80	13.000	-2.800	12.984	-.635	.050	
.150	5.782	-3.30	11.680	-3.300	11.641	-.672	.075	
.200	5.027	-4.00	10.680	-4.000	10.634	-.737	.100	
.250	4.024	-4.70	9.140	-4.700	9.109	-.749	.125	
.300	3.371	-5.70	7.800	-5.700	7.781	-.777	.150	
.350	3.018	-7.10	6.000	-7.100	6.046	-.822	.175	
.400	2.485	-9.70	5.020	-9.700	4.948	-.846	.200	
.450	1.959	-13.60	3.240	-13.600	3.244	-.797	.225	
.500	1.762	-18.40	1.840	-18.400	1.877	-.635	.250	
.550	1.794	-121.00	.800	-121.000	-.418	-.686	.275	
.600	1.409	-169.80	2.240	-169.800	-2.191	-.625	.300	
.650	1.890	-172.50	4.000	-172.500	-3.986	-.569	.325	
.700	2.861	-175.30	5.780	-175.300	-5.781	-.474	.350	
.750	3.772	-175.40	7.620	-175.400	-7.612	-.344	.375	
.800	4.267	-178.40	8.620	-178.400	-8.617	-.261	.400	
.850	4.371	-179.40	9.840	-179.400	-9.839	-.193	.425	
.900	5.732	-180.00	11.880	-180.000	-11.880	.000	.450	
.950	6.933	-180.00	13.400	-180.000	-13.399	.140	.475	
.974	7.484	-180.00	15.120	-180.000	-15.119	.211	.487	

TABLE 3.2 (CONTINUED)

DISTRIBUTION OF CURRENT AND CHARGE ON PARABOLIC ANTENNA OVER SALT WATER
 ALPHA/DLTA = .0340 BETA/DLTA = 1.018 H/LAMDA = 1.500
 FREQUENCY = 300.000MHZ PE = 2.888 D/LAMDA = .2500

A. MEASURED CURRENT DISTRIBUTION IN PARABOLIC

Z/H	RAW DATA			NORMALIZED DATA			Z/LAMDA
	IRFAZ	IRFAG	IRFIZ	INFAZ	INFAZ	INREAL	
.02	171.70	2.16C	49.7C	1.297	1.647	.002	
.17	187.8C	1.58C	35.8C	1.265	.913	.025	
.33	135.4C	1.16C	13.8C	1.146	.281	.090	
.50	108.8C	1.08C	15.2C	1.023	-.278	.075	
.67	81.6C	1.20C	4.4C	.914	-.778	.100	
.83	63.7C	1.48C	-.83C	.778	1.259	.125	
1.00	52.6C	1.74C	-.694C	.626	1.644	.150	
1.17	45.4C	2.10C	-.746C	.487	2.043	.175	
1.33	40.2C	2.40C	-.818C	.342	2.375	.200	
1.50	33.4C	2.80C	-.855C	.204	2.592	.225	
1.67	33.4C	3.14C	-.866C	.067	2.739	.250	
1.83	29.0C	2.90C	-.912C	-.061	2.859	.275	
2.00	28.4C	2.74C	-.934C	-.168	2.835	.300	
2.17	24.5C	2.78C	-.965C	-.272	2.715	.325	
2.33	24.2C	2.74C	-.978C	-.342	2.500	.350	
2.50	21.8C	2.50C	-.100C	-.443	2.160	.375	
2.67	19.4C	2.36C	-.105C	-.515	1.830	.400	
2.83	18.2C	2.00C	-.105C	-.534	1.497	.425	
3.00	18.2C	1.64C	-.105C	-.534	1.164	.450	
3.17	18.2C	1.28C	-.115C	-.547	0.831	.475	
3.33	18.2C	0.92C	-.128C	-.567	0.498	.500	
3.50	18.2C	0.56C	-.144C	-.589	0.165	.525	
3.67	18.2C	0.20C	-.162C	-.612	0.000	.550	
3.83	18.2C	0.00C	-.181C	-.636	0.000	.575	
4.00	18.2C	0.00C	-.200C	-.660	0.000	.600	
4.17	18.2C	0.00C	-.219C	-.684	0.000	.625	
4.33	18.2C	0.00C	-.238C	-.708	0.000	.650	
4.50	18.2C	0.00C	-.257C	-.732	0.000	.675	
4.67	18.2C	0.00C	-.276C	-.756	0.000	.700	
4.83	18.2C	0.00C	-.295C	-.780	0.000	.725	
5.00	18.2C	0.00C	-.314C	-.804	0.000	.750	
5.17	18.2C	0.00C	-.333C	-.828	0.000	.775	
5.33	18.2C	0.00C	-.352C	-.852	0.000	.800	
5.50	18.2C	0.00C	-.371C	-.876	0.000	.825	
5.67	18.2C	0.00C	-.390C	-.900	0.000	.850	
5.83	18.2C	0.00C	-.409C	-.924	0.000	.875	
6.00	18.2C	0.00C	-.428C	-.948	0.000	.900	
6.17	18.2C	0.00C	-.447C	-.972	0.000	.925	
6.33	18.2C	0.00C	-.466C	-.996	0.000	.950	
6.50	18.2C	0.00C	-.485C	-.1020	0.000	.975	
6.67	18.2C	0.00C	-.504C	-.1044	0.000	1.000	
6.83	18.2C	0.00C	-.523C	-.1068	0.000	1.025	
7.00	18.2C	0.00C	-.542C	-.1092	0.000	1.050	
7.17	18.2C	0.00C	-.561C	-.1116	0.000	1.075	
7.33	18.2C	0.00C	-.580C	-.1140	0.000	1.100	
7.50	18.2C	0.00C	-.599C	-.1164	0.000	1.125	
7.67	18.2C	0.00C	-.618C	-.1188	0.000	1.150	
7.83	18.2C	0.00C	-.637C	-.1212	0.000	1.175	
8.00	18.2C	0.00C	-.656C	-.1236	0.000	1.200	
8.17	18.2C	0.00C	-.675C	-.1260	0.000	1.225	
8.33	18.2C	0.00C	-.694C	-.1284	0.000	1.250	
8.50	18.2C	0.00C	-.713C	-.1308	0.000	1.275	
8.67	18.2C	0.00C	-.732C	-.1332	0.000	1.300	
8.83	18.2C	0.00C	-.751C	-.1356	0.000	1.325	
9.00	18.2C	0.00C	-.770C	-.1380	0.000	1.350	
9.17	18.2C	0.00C	-.789C	-.1404	0.000	1.375	
9.33	18.2C	0.00C	-.808C	-.1428	0.000	1.400	
9.50	18.2C	0.00C	-.827C	-.1452	0.000	1.425	
9.67	18.2C	0.00C	-.846C	-.1476	0.000	1.450	
9.83	18.2C	0.00C	-.865C	-.1500	0.000	1.475	
10.00	18.2C	0.00C	-.884C	-.1524	0.000	1.500	

B. MEASURED CHARGE DISTRIBUTION IN PARABOLIC

Z/H	RAW DATA			NORMALIZED DATA			Z/LAMDA
	QRFAZ	QRFAG	QRFIZ	QNFZA	QNFZB	QNFZC	
.004	12.700	-5.00	19.20C	-5.00	19.127	-1.673	.004
.17	9.700	4.30	14.40C	-6.30	14.313	-1.580	.025
.33	7.200	8.80	12.64C	-8.00	12.517	-1.759	.050
.50	7.200	10.20	11.92C	-10.20	11.398	-2.040	.075
.67	6.700	12.2C	10.72C	-12.2C	10.478	-2.265	.100
.83	6.200	9.40C	9.40C	-14.50C	9.294	-2.404	.125
1.00	5.30C	17.20	8.48C	-17.20	8.101	-2.508	.150
1.17	4.59C	21.40	7.28C	-21.40	6.778	-2.656	.175
1.33	3.90C	23.70	5.92C	-23.70	5.455	-2.760	.200
1.50	3.20C	34.50	4.80C	-34.50	3.956	-2.719	.225
1.67	2.713	44.80C	3.94C	-44.80C	2.419	-2.580	.250
1.83	1.80C	72.50	2.56C	-72.50C	1.770	-2.442	.275
2.00	1.512	108.90	2.420	-108.90C	1.784	-2.290	.300
2.17	1.490	137.70	3.12C	-137.70C	1.608	-2.100	.325
2.33	2.700	154.00	4.32C	-154.00C	1.882	-1.894	.350
2.50	3.500	163.00	5.60C	-163.00C	2.385	-1.637	.375
2.67	4.200	168.40	6.72C	-168.40C	3.057	-1.328	.400
2.83	4.800	172.40	7.68C	-172.40C	3.614	-.989	.425
3.00	5.490	175.50	8.400	-175.50C	4.074	-.659	.450
3.17	6.180	177.80	9.04C	-177.80C	4.433	-.347	.475
3.33	6.750	179.80	9.620	-179.80C	4.700	-.032	.500
3.50	6.900	181.80	9.44C	-181.80C	4.830	.286	.525
3.67	6.475	183.60	9.40C	-183.60C	4.913	.590	.550
3.83	5.700	185.30	9.12C	-185.30C	4.951	.842	.575
4.00	5.400	186.90	8.64C	-186.90C	4.977	1.028	.600
4.17	5.000	189.00	8.000	-189.00C	4.992	1.251	.625
4.33	4.400	191.40	7.04C	-191.40C	4.991	1.391	.650
4.50	3.925	194.20	6.12C	-194.20C	4.973	1.501	.675
4.67	3.125	198.80	5.00C	-198.80C	4.733	1.611	.700
4.83	2.725	204.00	3.72C	-204.00C	4.244	1.631	.725
5.00	1.551	220.00	2.48C	-220.00C	3.600	1.594	.750
5.17	1.000	254.70	1.60C	-254.70C	2.822	1.543	.775
5.33	1.1125	300.30	1.80C	-300.30C	1.946	1.461	.800
5.50	1.825	332.80	2.92C	-332.80C	1.290	1.348	.825
5.67	2.625	343.50	4.20C	-343.50C	0.827	1.193	.850
5.83	3.300	349.40	5.28C	-349.40C	0.500	0.971	.875
6.00	4.000	353.20	6.40C	-353.20C	0.395	0.758	.900
6.17	4.550	356.00	7.28C	-356.00C	0.262	0.508	.925
6.33	5.000	357.90	8.000	-357.90C	0.195	0.293	.950
6.50	5.350	359.70	8.56C	-359.70C	0.148	0.048	.975
6.67	5.650	361.00	8.88C	-361.00C	0.119	0.000	1.000
6.83	5.775	362.50	9.24C	-362.50C	0.102	0.000	1.025
7.00	5.675	363.40	9.08C	-363.40C	0.084	0.000	1.050
7.17	5.400	364.70	8.56C	-364.70C	0.030	0.000	1.075
7.33	5.000	366.00	8.32C	-366.00C	0.074	0.000	1.100
7.50	4.675	367.00	7.48C	-367.00C	0.024	0.000	1.125
7.67	4.100	368.50	6.56C	-368.50C	0.000	0.000	1.150
7.83	3.475	371.50	5.56C	-371.50C	0.000	0.000	1.175
8.00	2.900	374.50	4.48C	-374.50C	0.000	0.000	1.200
8.17	1.975	378.60	3.16C	-378.60C	0.000	0.000	1.225
8.33	1.000	393.00	1.60C	-393.00C	0.000	0.000	1.250
8.50	.512	457.50	.82C	-457.50C	0.000	0.000	1.275
8.67	1.100	517.70	1.76C	-517.70C	0.000	0.000	1.300
8.83	2.25	531.40	3.24C	-531.40C	0.000	0.000	1.325
9.00	3.000	536.50	4.80C	-536.50C	0.000	0.000	1.350
9.17	3.975	539.40	6.36C	-539.40C	0.000	0.000	1.375
9.33	4.600	541.30	7.28C	-541.30C	0.000	0.000	1.400
9.50	4.300	542.40	8.48C	-542.40C	0.000	0.000	1.425
9.67	3.800	544.00	10.16C	-544.00C	0.000	0.000	1.450
9.83	3.400	545.00	11.84C	-545.00C	0.000	0.000	1.475
10.00	3.000	545.40	13.60C	-545.40C	0.000	0.000	1.500

TABLE 3.2 (CONTINUED)

DISTRIBUTION OF CURRENT AND CHARGE ON PARABOLIC ANTENNA OVER SALT WATER
 ALPHA/BETA = .0340 BETA/BETA = 1.016 H/LAMDA = 1.000
 FREQUENCY = 300.00MHZ PE = 2.885 D/LAMDA = .2900

A. MEASURED CURRENT DISTRIBUTION IN MA/VOLT

Z/H	IR*AG	IRFAZ	INMAG	INFAZ	INREAL	INIMAG	Z/LAMDA
.003	5.744	173.40	1.940	51.40	1.210	1.814	.003
.025	3.625	158.00	1.340	36.00	1.084	.788	.025
.050	2.951	132.00	.980	10.00	.965	.470	.050
.075	2.543	96.40	.940	.25.40	.843	.403	.075
.100	3.184	72.00	1.140	.20.00	.733	.473	.100
.125	4.003	54.70	1.440	.48.30	.618	.545	.125
.150	4.923	48.00	1.820	.74.00	.502	.619	.150
.175	5.735	42.30	2.120	.79.70	.379	.684	.175
.200	6.364	38.00	2.340	.83.60	.255	.744	.200
.225	7.087	35.00	2.420	.87.00	.137	.794	.225
.250	7.410	32.40	2.740	.89.40	.029	.834	.250
.275	7.424	30.00	2.820	.91.40	.078	.861	.275
.300	7.624	28.70	2.820	.93.30	.162	.875	.300
.325	7.520	28.40	2.780	.95.10	.247	.875	.325
.350	7.195	28.00	2.660	.94.00	.334	.854	.350
.375	6.644	23.10	2.420	.94.90	.424	.804	.375
.400	5.843	20.80	2.160	.94.20	.510	.734	.400
.425	5.231	18.40	1.880	.93.60	.597	.648	.425
.450	4.757	14.70	1.530	.93.20	.684	.548	.450
.475	4.330	8.50	1.120	.93.50	.774	.437	.475
.500	2.102	-2.90	.740	.94.20	.867	.327	.500
.525	1.134	-9.40	.440	.95.00	.964	.224	.525
.550	1.190	-9.40	.440	.95.60	.974	.134	.550
.575	2.102	-122.70	.740	.94.70	.974	.044	.575
.600	3.100	-134.00	1.120	.95.20	.964	.054	.600
.625	4.112	-140.20	1.520	.96.20	.944	.064	.625
.650	5.131	-143.50	1.880	.97.60	.914	.074	.650
.675	6.161	-145.70	2.100	.98.70	.874	.084	.675
.700	6.436	-147.40	2.340	.99.40	.824	.094	.700
.725	6.759	-149.20	2.580	.99.70	.774	.104	.725
.750	7.354	-149.80	2.720	.99.80	.724	.114	.750
.775	7.712	-150.80	2.740	.99.80	.674	.124	.775
.800	7.141	-151.30	2.640	.99.30	.624	.134	.800
.825	6.974	-152.30	2.580	.99.30	.574	.144	.825
.850	6.546	-153.00	2.460	.99.00	.524	.154	.850
.875	6.005	-153.50	2.220	.98.50	.474	.164	.875
.900	5.231	-153.80	1.860	.97.80	.424	.174	.900
.925	4.184	-154.00	1.540	.97.00	.374	.184	.925
.950	3.184	-154.30	1.140	.96.30	.324	.194	.950
.975	1.693	-154.30	.700	.96.30	.274	.204	.975
.984	1.190	-154.30	.440	.96.30	.224	.214	.984

B. MEASURED CHARGE DISTRIBUTION IN PICCOL/VOLT-F

Z/H	QR*AG	QRFAZ	QNMAG	QNFZ	QREAL	QIMAG	Z/LAMDA
.006	9.784	-5.00	19.200	-5.00	19.127	-1.473	.006
.025	7.342	-5.70	14.120	-5.70	14.050	-1.402	.025
.050	6.438	-6.90	12.380	-6.90	12.290	-1.487	.050
.075	5.793	-9.00	11.140	-9.00	11.003	-1.743	.075
.100	5.344	-10.80	10.280	-10.80	10.058	-1.924	.100
.125	4.742	-12.90	9.120	-12.90	8.890	-2.034	.125
.150	4.139	-15.80	7.980	-15.80	7.667	-2.141	.150
.175	3.494	-19.00	6.840	-19.00	6.384	-2.188	.175
.200	2.973	-24.30	5.520	-24.30	5.031	-2.272	.200
.225	2.149	-32.40	4.120	-32.40	3.443	-2.282	.225
.250	1.404	-44.10	2.900	-44.10	1.937	-2.159	.250
.275	1.123	-59.30	2.160	-59.30	.801	-2.122	.275
.300	1.194	-81.40	1.200	-81.40	.1212	-1.955	.300
.325	1.747	-106.80	3.360	-106.80	-2.812	-1.840	.325
.350	3.371	-159.30	5.960	-159.30	-4.266	-1.612	.350
.375	2.985	-186.20	7.480	-186.20	-5.594	-1.274	.375
.400	3.946	-170.50	6.620	-170.50	-6.726	-1.226	.400
.425	3.794	-173.80	7.680	-173.80	-7.438	-1.029	.425
.450	4.216	-176.20	8.300	-176.20	-8.288	-1.050	.450
.475	4.614	-177.90	8.880	-177.90	-8.874	-1.225	.475
.500	4.794	-179.50	9.220	-179.50	-9.220	-1.285	.500
.525	4.940	-180.70	9.500	-180.70	-9.499	-1.114	.525
.550	4.946	-182.10	9.320	-182.10	-9.214	-1.042	.550
.575	4.690	-183.80	9.020	-183.80	-9.000	-1.058	.575
.600	4.359	-184.80	8.440	-184.80	-8.410	-1.064	.600
.625	3.794	-186.40	7.680	-186.40	-7.622	-1.064	.625
.650	3.494	-188.00	6.720	-188.00	-6.685	-1.061	.650
.675	2.943	-190.70	5.660	-190.70	-5.662	-1.098	.675
.700	2.361	-194.00	4.600	-194.00	-4.602	-1.098	.700
.725	1.602	-200.00	3.120	-200.00	-3.122	-1.067	.725
.750	.832	-218.00	1.600	-218.00	-1.604	-1.067	.750
.775	.468	-284.00	.900	-284.00	-0.904	-1.067	.775
.800	.988	-333.50	1.900	-333.50	-1.700	-1.068	.800
.825	2.554	-354.40	4.920	-354.40	-4.897	-1.068	.825
.850	3.297	-357.40	6.340	-357.40	-6.333	-1.068	.850
.875	3.844	-359.20	7.400	-359.20	-7.399	-1.068	.875
.900	4.441	-361.00	8.540	-361.00	-8.539	-1.149	.900
.925	5.094	-364.30	10.180	-364.30	-10.172	-1.149	.925
.950	6.134	-368.20	11.800	-368.20	-11.782	-1.149	.950
.975	7.193	-363.60	13.640	-363.60	-13.613	-1.149	.975

TABLE 3.2 (CONTINUED)

DISTRIBUTION OF CURRENT AND CHARGE ON MONOPOLE ANTENNA OVER SALT WATER
 ALPHA/BETA = .0341 BETA/BETA = 1.016 H/LAMDA = .500
 FREQUENCY = 300.00MHZ PE = 2.885 D/LAMDA = .2500

A. MEASURED CURRENT DISTRIBUTION IN MA/VOLT

Z/H	RAW DATA		NORMALIZED DATA					Z/LAMDA
	IRFAZ	IRFAG	IRFAZ	IRFAG	IRREAL	IRIMAG		
.125	1.125	1.125	1.700	49.80	1.097	1.238	.003	
.250	2.250	2.250	1.180	30.50	1.017	.899	.025	
.375	3.375	3.375	.900	.000	.900	.000	.080	
.500	4.500	4.500	.980	-31.70	.838	-.515	.075	
.625	5.625	5.625	1.220	-85.00	.700	-.999	.100	
.750	6.750	6.750	1.580	-67.30	.610	-1.458	.125	
.875	7.875	7.875	1.920	-74.80	.510	-1.851	.150	
1.000	9.000	9.000	2.200	-79.60	.397	-2.184	.175	
1.125	10.125	10.125	2.480	-83.00	.302	-2.462	.200	
1.250	11.250	11.250	2.680	-86.00	.187	-2.673	.225	
1.375	12.375	12.375	2.820	-87.50	.123	-2.817	.250	
1.500	13.500	13.500	2.880	-89.30	.038	-2.840	.275	
1.625	14.625	14.625	2.760	-90.40	-.019	-2.760	.300	
1.750	15.750	15.750	2.680	-91.50	-.070	-2.659	.325	
1.875	16.875	16.875	2.520	-92.60	-.114	-2.517	.350	
2.000	18.000	18.000	2.300	-93.20	-.128	-2.294	.375	
2.125	19.125	19.125	1.940	-93.70	-.128	-1.934	.400	
2.250	20.250	20.250	1.580	-94.30	-.118	-1.576	.425	
2.375	21.375	21.375	1.200	-94.30	-.090	-1.197	.450	
2.500	22.500	22.500	.720	-94.30	-.054	-.718	.475	
2.625	23.625	23.625	.180	-94.30	-.036	-.239	.500	

B. MEASURED CHARGE DISTRIBUTION IN PICCOL/VOLT-M

Z/H	RAW DATA		NORMALIZED DATA					Z/LAMDA
	IRFAZ	IRFAG	IRFAZ	IRFAG	IRREAL	IRIMAG		
.125	9.984	-2.50	19.200	-2.50	19.182	-.837	.006	
.250	7.384	-3.20	14.200	-3.20	14.178	-.793	.025	
.375	6.438	-4.40	12.380	-4.40	12.344	-.950	.080	
.500	5.970	-5.50	11.480	-5.50	11.467	-1.100	.075	
.625	5.234	-6.70	10.180	-6.70	10.110	-1.188	.100	
.750	4.597	-8.10	8.840	-8.10	8.792	-1.246	.125	
.875	3.444	-10.50	7.400	-10.50	7.276	-1.269	.150	
1.000	2.694	-12.80	5.180	-12.80	4.932	-1.240	.200	
1.125	1.975	-14.90	3.800	-14.90	3.268	-1.216	.225	
1.250	1.292	-16.20	2.100	-16.20	1.880	-1.283	.250	
1.375	.707	-16.90	1.360	-16.90	-.059	-1.359	.275	
1.500	1.113	-16.80	2.140	-16.80	-.107	-1.391	.300	
1.625	1.441	-16.180	3.540	-16.180	-.339	-1.117	.325	
1.750	2.094	-16.840	5.180	-16.840	-.8074	-1.042	.350	
1.875	3.194	-17.250	6.720	-17.250	-1.443	-.877	.375	
2.000	4.594	-17.520	7.680	-17.520	-2.653	-.643	.400	
2.125	6.197	-17.730	8.840	-17.730	-4.820	-.416	.425	
2.250	8.439	-17.910	10.400	-17.910	-10.489	-.164	.450	
2.375	11.244	-18.040	12.200	-18.040	-18.200	.085	.475	
2.500	15.184	-18.080	13.820	-18.080	-18.819	-.193	.500	

TABLE 3.2 (CONTINUED)

DISTRIBUTION OF CURRENT AND CHARGE ON HORNPOLE ANTENNA OVER HOIST YARTH
 ALPHA/BETA * 1098C BETA/BETA * 1.10A M/LAMPDAG * 1.000
 FREQUENCY * 300.00MHZ PE * 1012 D/LAMPDAG * 10200

A. MEASURED CURRENT DISTRIBUTION IN HAV/VLT

RAW DATA NORMALIZED DATA

Z/H	IRHAG	IRFAZ	INMAG	INFAZ	INREAL	INIMAG	Z/LAMPDAG
+003	0.4443	120.00	4.320C	30.00C	3.741	2.160	+003
+025	7.432	109.00	3.760C	19.00C	3.955	1.924	+025
+050	14.72	108.00	3.360C	18.00C	3.938	1.938	+050
+075	22.08	80.00	3.000C	10.00C	3.033	1.535	+075
+100	29.44	66.00	2.900C	28.00C	2.56	1.361	+100
+125	36.8	48.00	3.600C	45.00C	2.121	1.21	+125
+150	44.16	29.00	3.200C	66.00C	1.976	2.785	+150
+175	51.52	17.00	3.000C	73.00C	1.083	2.443	+175
+200	58.88	7.00	3.900C	82.00C	1.09	3.867	+200
+225	66.24	1.00	4.290C	91.00C	1.074	4.259	+225
+250	73.6	0.00	4.500C	97.00C	1.055	4.600	+250
+275	80.96	0.00	4.640C	103.00C	1.033	4.951	+275
+300	88.32	0.00	4.800C	108.00C	1.008	5.300	+300
+325	95.68	0.00	4.740C	112.00C	1.0791	4.432	+325
+350	103.04	0.00	4.700C	116.00C	2.119	4.195	+350
+375	110.4	0.00	4.500C	120.00C	2.250	3.897	+375
+400	117.76	0.00	4.100C	124.00C	2.328	3.375	+400
+425	125.12	0.00	3.720C	130.00C	2.391	2.850	+425
+450	132.48	0.00	3.200C	135.00C	2.478	2.447	+450
+475	139.84	0.00	2.720C	142.00C	2.143	1.675	+475
+500	147.2	0.00	2.160C	152.00C	1.911	1.007	+500
+525	154.56	0.00	1.600C	165.00C	1.630	0.317	+525
+550	161.92	0.00	1.040C	196.00C	1.323	1.92	+550
+575	169.28	0.00	1.400C	228.00C	1.080	1.058	+575
+600	176.64	0.00	1.800C	260.00C	1.056	1.012	+600
+625	184.0	0.00	2.300C	288.00C	1.140	2.396	+625
+650	191.36	0.00	2.800C	312.00C	1.244	2.409	+650
+675	198.72	0.00	3.300C	330.00C	1.373	3.250	+675
+700	206.08	0.00	3.760C	348.00C	1.510	3.648	+700
+725	213.44	0.00	4.200C	360.00C	1.657	3.917	+725
+750	220.8	0.00	4.600C	365.00C	1.819	4.148	+750
+775	228.16	0.00	4.900C	360.00C	1.993	4.304	+775
+800	235.52	0.00	5.200C	348.00C	2.180	3.968	+800
+825	242.88	0.00	5.400C	329.00C	2.380	3.637	+825
+850	250.24	0.00	5.500C	306.00C	2.592	3.468	+850
+875	257.6	0.00	5.600C	280.00C	2.817	3.254	+875
+900	264.96	0.00	5.600C	256.00C	3.053	2.990	+900
+925	272.32	0.00	5.400C	234.00C	3.299	2.678	+925
+950	279.68	0.00	5.000C	216.00C	3.556	2.318	+950
+975	287.04	0.00	4.500C	204.00C	3.823	1.918	+975
+1000	294.4	0.00	4.000C	198.00C	4.099	1.588	+1000
+984	1.920	0.00	0.800C	0.760C	1.363	1.68	+984

B. MEASURED CHARGE DISTRIBUTION IN PICCOLL/VOLT-P

RAW DATA NORMALIZED DATA

Z/H	IRHAG	IRFAZ	QNMAG	QNFZ	QNRAL	QNIMAG	Z/LAMPDAG
+006	17.356	-1.20	26.100	-1.20	26.094	-0.847	+006
+025	18.472	0.00	20.500	0.00	20.484	-2.363	+025
+050	14.273	-13.00	19.900	-13.00	19.448	-4.490	+050
+075	12.467	-18.00	19.500	-18.00	18.460	-6.684	+075
+100	10.768	-24.00	18.900	-24.00	17.266	-9.487	+100
+125	10.076	-29.00	18.400	-29.00	16.087	-10.990	+125
+150	11.478	-36.00	17.200	-36.00	14.139	-9.900	+150
+175	11.773	-40.00	15.900	-40.00	12.090	-10.326	+175
+200	14.76	-47.00	14.400	-47.00	9.710	-10.834	+200
+225	14.976	-56.00	12.600	-56.00	7.046	-10.446	+225
+250	7.89	-67.00	10.600	-67.00	4.105	-9.813	+250
+275	6.184	-81.00	9.300	-81.00	1.423	-9.191	+275
+300	3.566	-100.00	8.100	-100.00	1.407	-7.977	+300
+325	4.93	-122.00	7.900	-122.00	4.289	-6.706	+325
+350	3.990	-142.00	8.500	-142.00	1.408	-6.018	+350
+375	6.490	-158.00	9.700	-158.00	9.075	-3.593	+375
+400	7.435	-170.00	11.180	-170.00	-11.017	-1.903	+400
+425	6.428	-178.00	12.400	-178.00	-18.679	-1.177	+425
+450	3.323	-185.00	14.000	-185.00	-13.948	1.417	+450
+475	3.775	-180.00	15.000	-180.00	-14.744	2.759	+475
+500	1.4460	-180.00	15.700	-180.00	-15.223	4.079	+500
+525	1.1779	-198.00	16.500	-198.00	-18.692	5.099	+525
+550	11.739	-201.00	16.600	-201.00	-18.003	6.970	+550
+575	10.480	-203.00	16.000	-203.00	-14.783	8.275	+575
+600	10.781	-205.00	15.400	-205.00	-13.919	6.729	+600
+625	4.376	-208.00	14.100	-208.00	-12.391	6.728	+625
+650	4.379	-211.00	12.600	-211.00	-10.800	6.489	+650
+675	7.169	-214.00	10.800	-214.00	-8.201	6.117	+675
+700	2.4922	-210.00	8.800	-210.00	-6.652	5.287	+700
+725	4.196	-227.00	8.100	-227.00	-4.185	4.320	+725
+750	2.500	-244.00	3.760	-244.00	-1.648	3.379	+750
+775	1.194	-290.00	2.400	-290.00	0.821	2.295	+775
+800	2.441	-342.00	3.520	-342.00	3.348	1.088	+800
+825	3.497	-386.00	5.800	-386.00	5.806	0.424	+825
+850	5.666	-370.00	8.400	-370.00	8.272	-1.459	+850
+875	7.169	-375.00	10.800	-375.00	10.432	-2.790	+875
+900	4.179	-377.00	12.300	-377.00	11.763	-3.596	+900
+925	1.764	-378.00	13.900	-378.00	13.215	-4.499	+925
+950	1.448	-379.00	15.700	-379.00	14.828	-5.338	+950
+975	1.1177	-380.00	17.500	-380.00	16.416	-6.236	+975
+987	10.767	-381.00	19.500	-381.00	18.205	-6.988	+987

TABLE 3.2 (CONTINUED)

DISTRIBUTION OF CURRENT AND CHARGE ON HORNPOLE ANTENNA OVER HOIST EARTH
 ALPHA/BETA L = 0.021 BETA1/BETA C = 1.031 W/LAMPAD = 1.900
 FREQUENCY = 300.000MHZ PE = 402 D/LAMPAD = 0.0500

A. MEASURED CURRENT DISTRIBUTION IN PA/VECT

Z/H	RAW DATA		NORMALIZED DATA					Z/LAMPAD
	IRFAZ	IRFAG	INPAG	INFAZ	INREAL	INIMAG		
0.02	0.157	130.00	2.780	30.00	2.408	1.390	0.03	
0.17	0.115	112.00	2.280	12.80	2.323	0.519	0.05	
0.33	0.077	98.00	2.180	6.40	2.175	0.192	0.05	
0.50	0.057	78.00	2.140	2.00	2.100	0.167	0.05	
0.67	0.044	61.00	2.220	28.80	1.737	1.382	0.10	
0.83	0.026	49.00	2.440	81.00	1.936	1.896	0.12	
1.00	0.018	37.00	2.700	163.00	1.824	2.408	0.15	
1.17	0.012	28.00	2.960	271.80	1.931	2.831	0.15	
1.33	0.007	20.00	3.240	378.40	1.985	3.187	0.15	
1.50	0.004	14.00	3.440	486.00	1.991	3.482	0.22	
1.67	0.002	8.80	3.560	591.20	1.975	3.559	0.25	
1.83	0.001	6.40	3.780	686.40	1.949	3.737	0.25	
2.00	0.000	4.00	3.700	1000.00	1.993	3.634	0.30	
2.17	0.000	2.50	3.800	1050.50	1.982	3.669	0.32	
2.33	0.000	1.00	3.440	1100.00	1.929	3.240	0.35	
2.50	0.000	0.50	3.340	1150.00	1.912	3.027	0.35	
2.67	0.000	0.20	3.100	1200.00	1.990	2.885	0.40	
2.83	0.000	0.10	2.800	1250.50	1.984	2.880	0.42	
3.00	0.000	0.05	2.440	1300.20	1.939	1.808	0.50	
3.17	0.000	0.02	2.100	1410.00	1.948	1.204	0.75	
3.33	0.000	0.01	1.800	1540.00	1.926	0.772	0.90	
3.50	0.000	0.00	1.500	1720.00	1.985	0.209	0.92	
3.67	0.000	0.00	1.400	1890.00	1.987	0.187	0.95	
3.83	0.000	0.00	1.480	2100.00	1.917	0.870	0.95	
4.00	0.000	0.00	1.720	2350.00	1.972	1.419	0.80	
4.17	0.000	0.00	1.970	2600.00	1.973	2.068	0.85	
4.33	0.000	0.00	2.380	2860.00	1.952	2.315	0.85	
4.50	0.000	0.00	2.700	3030.00	1.910	2.480	0.75	
4.67	0.000	0.00	2.980	3260.00	1.978	2.979	0.70	
4.83	0.000	0.00	3.140	3720.00	1.955	3.174	0.72	
5.00	0.000	0.00	3.320	4740.00	1.987	3.302	0.70	
5.17	0.000	0.00	3.420	5790.00	1.935	3.378	0.75	
5.33	0.000	0.00	3.440	6810.00	1.912	3.404	0.80	
5.50	0.000	0.00	3.360	7820.00	1.902	3.245	0.85	
5.67	0.000	0.00	3.220	8870.00	1.941	3.079	0.85	
5.83	0.000	0.00	2.980	9990.00	1.985	2.809	0.75	
6.00	0.000	0.00	2.640	10320.00	1.932	2.430	0.90	
6.17	0.000	0.00	2.320	10930.00	1.983	2.067	0.92	
6.33	0.000	0.00	1.900	11030.00	1.903	1.693	0.90	
6.50	0.000	0.00	1.520	11000.00	1.914	1.164	0.97	
6.67	0.000	0.00	1.060	1020.00	1.877	0.596	1.000	
6.83	0.000	0.00	0.780	1300.00	1.777	0.071	1.049	
7.00	0.000	0.00	0.740	1390.00	1.831	0.458	1.050	
7.17	0.000	0.00	1.100	1420.00	1.888	0.989	1.078	
7.33	0.000	0.00	1.440	1438.00	1.908	1.448	1.100	
7.50	0.000	0.00	1.940	1444.00	1.916	1.930	1.028	
7.67	0.000	0.00	2.320	1450.00	1.880	2.380	1.150	
7.83	0.000	0.00	2.700	1454.00	1.848	2.693	1.175	
8.00	0.000	0.00	3.020	1455.00	1.863	3.009	1.200	
8.17	0.000	0.00	3.320	1457.00	1.805	3.295	1.225	
8.33	0.000	0.00	3.520	1458.50	1.820	3.481	1.250	
8.50	0.000	0.00	3.440	1460.00	1.801	3.407	1.275	
8.67	0.000	0.00	3.380	1460.00	1.807	3.329	1.300	
8.83	0.000	0.00	3.240	1461.00	1.818	3.180	1.325	
9.00	0.000	0.00	3.000	1461.50	1.814	3.018	1.350	
9.17	0.000	0.00	2.880	1462.00	1.895	2.798	1.375	
9.33	0.000	0.00	2.380	1462.50	1.915	2.234	1.400	
9.50	0.000	0.00	1.900	1463.00	1.927	1.851	1.425	
9.67	0.000	0.00	1.400	1463.00	1.915	1.364	1.450	
9.83	0.000	0.00	0.880	1463.00	1.913	0.838	1.475	
9.99	0.000	0.00	0.620	1463.00	1.939	0.604	1.484	

B. MEASURED CHARGE DISTRIBUTION IN PICCOLL/VOLTP

Z/H	RAW DATA		NORMALIZED DATA					Z/LAMPAD
	IRFAZ	IRFAG	INPAG	INFAZ	INREAL	INIMAG		
0.04	13.900	3.00	22.240	-3.00	22.210	-1.164	0.04	
0.17	11.400	16.40	16.880	16.40	16.880	11.902	0.25	
0.33	9.400	11.00	15.040	11.00	14.764	-2.870	0.50	
0.50	8.900	15.40	14.240	15.40	13.729	-3.782	0.75	
0.67	8.300	20.00	13.280	20.00	12.479	-4.542	1.00	
0.83	7.950	24.40	12.720	24.40	11.565	-5.295	1.25	
1.00	7.190	30.00	11.440	30.00	9.847	-6.150	1.50	
1.17	6.590	37.20	10.480	37.20	8.348	-6.334	1.75	
1.33	5.750	45.80	9.200	45.80	6.437	-6.573	2.00	
1.50	5.100	55.00	8.000	55.00	4.583	-6.765	2.25	
1.67	4.300	69.20	6.880	69.20	2.443	-6.432	2.50	
1.83	3.900	86.00	6.240	86.00	1.625	-6.125	2.75	
2.00	3.400	114.80	6.080	114.80	1.001	-5.533	3.00	
2.17	4.000	124.00	6.400	124.00	3.979	-5.304	3.25	
2.33	4.550	140.40	7.280	140.40	5.626	-4.821	3.50	
2.50	5.200	152.80	8.280	152.80	7.400	-3.803	3.75	
2.67	5.900	162.00	9.280	162.00	8.826	-2.868	4.00	
2.83	6.400	169.80	10.240	169.80	10.068	-1.866	4.25	
3.00	6.900	174.80	11.040	174.80	10.989	-1.058	4.50	
3.17	7.300	179.80	11.680	179.80	11.480	-1.102	4.75	
3.33	7.600	183.00	12.180	183.00	12.193	0.346	5.00	
3.50	7.700	187.00	12.320	187.00	12.228	1.801	5.25	
3.67	7.750	190.50	12.400	190.50	12.192	2.860	5.50	
3.83	7.800	193.80	12.440	193.80	11.824	2.839	5.75	
4.00	7.830	197.40	11.680	197.00	11.170	3.115	6.00	
4.17	8.700	200.80	10.780	200.80	10.041	3.764	6.25	
4.33	8.400	205.00	9.600	205.00	8.701	4.057	6.50	
4.50	8.200	210.00	8.320	210.00	7.805	4.232	6.75	
4.67	8.000	216.00	7.200	216.00	6.825	4.182	7.00	
4.83	7.850	228.00	5.600	228.00	5.747	4.119	7.25	
5.00	7.820	243.80	4.500	243.80	4.874	4.000	7.50	
5.17	7.800	257.00	3.600	257.00	4.038	4.000	7.75	
5.33	7.800	298.50	4.160	298.50	1.985	3.856	8.00	
5.50	8.750	319.40	4.400	319.40	3.321	2.887	8.25	
5.67	8.600	337.80	5.760	337.80	5.322	2.204	8.50	
5.83	8.450	346.80	7.120	346.80	6.922	1.824	8.75	
6.00	8.200	352.20	8.320	352.20	8.243	1.129	9.00	
6.17	8.950	356.80	9.520	356.80	9.505	0.931	9.25	
6.33	8.900	360.00	10.400	360.00	10.400	0.000	9.50	
6.50	8.900	368.00	11.040	368.00	11.028	-0.578	9.75	
6.67	7.100	365.00	11.360	365.00	11.317	-0.990	1.000	
6.83	7.300	368.80	11.680	368.80	11.898	-1.383	1.025	
7.00	7.200	370.00	11.680	370.00	11.348	-2.000	1.050	
7.17	8.200	371.00	10.880	371.00	10.680	-2.074	1.075	
7.33	8.100	371.80	9.760	371.80	9.584	-1.946	1.100	
7.50	8.600	373.00	8.960	373.00	8.730	-2.014	1.125	
7.67	8.800	374.00	7.680	374.00	7.852	-1.868	1.150	
7.83	8.400	380.00	6.400	380.00	6.914	-1.919	1.175	
8.00	8.200	382.00	5.120	382.00	4.747	-1.918	1.200	
8.17	8.200	390.00	3.920	390.00	3.098	-1.760	1.225	
8.33	8.400	411.80	1.820	411.80	1.121	-1.434	1.250	
8.50	8.800	481.00	1.280	481.00	0.899	-1.097	1.275	
8.67	8.850	523.00	2.640	523.00	2.928	-0.772	1.300	
8.83	8.750	553.00	4.400	553.00	4.376	-0.460	1.325	
9.00	8.400	540.00	6.400	540.00	6.400	0.000	1.350	
9.17	8.200	543.00	7.380	543.00	7.383	0.119	1.375	
9.33	8.300	544.00	9.120	544.00	9.098	0.336	1.400	
9.50	8.900	545.80	10.080	545.80	10.034	1.425	1.425	
9.67	7.400	547.00	11.840	547.00	11.782	1.443	1.450	
9.83	8.500	548.00	13.600	548.00	13.468	1.893	1.475	
9.99	9.500	548.00	19.200	548.00	19.092	2.115	1.487	

TABLE 3.2 (CONTINUED)

DISTRIBUTION OF CURRENT AND CHARGE ON HORNPELE ANTENNA OVER MOIST EARTH
 ALFALP/RETAI * 10001 METAL/BETAC * 1001 W/LAMPAD * 1000
 FREQUENCY * 300.00MHZ PE * 1012 D/LAMPAD * 10000

A. MEASURED CURRENT DISTRIBUTION IN MAJVBVT

Z/H	RAW DATA				NORMALIZED DATA			
	IMAG	IRFAZ	INMAG	INFAZ	INREAL	INMAG	Z/LAMPD	
.03	1.998	170.00	2.240	35.00	1.835	1.285	.003	
.25	3.013	151.00	1.800	18.00	1.729	.852	.025	
.50	4.761	125.10	1.680	9.90	1.635	+.685	.050	
.75	6.34	100.80	1.700	3.80	1.406	+.956	.075	
1.00	8.175	86.40	2.000	1.227	1.227	1.000	.100	
1.25	10.284	70.80	2.400	+.800	1.040	+.2161	.125	
1.50	12.791	62.80	2.800	+.700	+.815	+.616	.150	
1.75	15.805	56.20	3.100	-.780	+.610	-.3080	.175	
2.00	19.394	51.10	3.200	-.830	+.377	-.3037	.200	
2.25	23.597	47.80	3.600	-.870	+.140	-.3037	.225	
2.50	28.412	43.80	3.700	-.910	-.092	-.3037	.250	
2.75	33.840	42.80	3.700	-.940	-.295	-.3037	.275	
3.00	39.883	38.80	3.600	-.940	-.458	-.3037	.300	
3.25	46.530	32.80	3.400	-.900	-.688	-.3037	.325	
3.50	53.775	28.80	3.100	-.800	-.982	-.3037	.350	
3.75	61.610	26.00	2.700	-.650	-.130	-.2409	.375	
4.00	70.025	22.00	2.400	-.450	-.288	-.2409	.400	
4.25	79.030	18.00	1.900	-.250	-.450	-.2409	.425	
4.50	88.625	15.00	1.500	-.100	-.610	-.2409	.450	
4.75	98.810	12.00	1.200	+.000	-.770	-.2409	.475	
5.00	109.585	9.80	1.000	+.140	-.930	-.2409	.500	
5.25	120.950	8.20	.800	+.290	-.100	-.100	.525	
5.50	132.905	7.00	.700	+.440	+.000	+.000	.550	
5.75	145.440	6.10	.610	+.590	+.000	+.000	.575	
6.00	158.555	5.40	.540	+.740	+.000	+.000	.600	
6.25	172.250	4.80	.480	+.890	+.000	+.000	.625	
6.50	186.525	4.30	.430	1.040	+.000	+.000	.650	
6.75	201.380	3.90	.390	1.190	+.000	+.000	.675	
7.00	216.815	3.60	.360	1.340	+.000	+.000	.700	
7.25	232.830	3.30	.330	1.490	+.000	+.000	.725	
7.50	249.425	3.10	.310	1.640	+.000	+.000	.750	
7.75	266.600	2.90	.290	1.790	+.000	+.000	.775	
8.00	284.355	2.70	.270	1.940	+.000	+.000	.800	
8.25	302.690	2.50	.250	2.090	+.000	+.000	.825	
8.50	321.605	2.30	.230	2.240	+.000	+.000	.850	
8.75	341.100	2.10	.210	2.390	+.000	+.000	.875	
9.00	361.175	1.90	.190	2.540	+.000	+.000	.900	
9.25	381.830	1.70	.170	2.690	+.000	+.000	.925	
9.50	403.065	1.50	.150	2.840	+.000	+.000	.950	
9.75	424.890	1.30	.130	2.990	+.000	+.000	.975	
10.00	447.305	1.10	.110	3.140	+.000	+.000	1.000	

B. MEASURED CHARGE DISTRIBUTION IN PICCOUL/VOLT-F

Z/H	RAW DATA				NORMALIZED DATA			
	IRAG	IRFAZ	INMAG	INFAZ	INREAL	INMAG	Z/LAMPD	
.03	1.100	2.00	22.500	2.00	22.500	-.787	.030	
.25	1.250	4.50	16.800	4.50	16.748	-.717	.025	
.50	1.500	7.00	15.000	7.00	15.000	-.622	.050	
.75	1.800	10.00	13.800	10.00	13.800	-.522	.075	
1.00	2.100	14.00	12.800	14.00	12.800	-.410	.100	
1.25	2.400	18.00	10.700	18.00	10.188	-.308	.125	
1.50	2.700	22.70	10.200	22.70	9.447	-.216	.150	
1.75	3.000	28.00	8.900	28.00	7.874	-.130	.175	
2.00	3.300	34.00	7.300	34.00	5.916	-.040	.200	
2.25	3.600	40.00	5.600	40.00	3.801	+.000	.225	
2.50	3.900	46.00	4.900	46.00	1.855	+.000	.250	
2.75	4.200	53.00	3.900	53.00	+.000	+.000	.275	
3.00	4.500	60.00	2.900	60.00	+.000	+.000	.300	
3.25	4.800	67.00	1.900	67.00	+.000	+.000	.325	
3.50	5.100	75.00	0.900	75.00	+.000	+.000	.350	
3.75	5.400	83.00	0.000	83.00	+.000	+.000	.375	
4.00	5.700	92.00	-.900	92.00	-.900	-.1598	.400	
4.25	6.000	102.00	-1.700	102.00	-1.700	-.1017	.425	
4.50	6.300	113.00	-2.400	113.00	-2.400	-.041	.450	
4.75	6.600	125.00	-3.000	125.00	-3.000	+.000	.475	
5.00	6.900	138.00	-3.500	138.00	-3.500	+.000	.500	
5.25	7.200	152.00	-3.900	152.00	-3.900	+.000	.525	
5.50	7.500	167.00	-4.200	167.00	-4.200	+.000	.550	
5.75	7.800	183.00	-4.400	183.00	-4.400	+.000	.575	
6.00	8.100	199.00	-4.500	199.00	-4.500	+.000	.600	
6.25	8.400	216.00	-4.500	216.00	-4.500	+.000	.625	
6.50	8.700	234.00	-4.400	234.00	-4.400	+.000	.650	
6.75	9.000	253.00	-4.200	253.00	-4.200	+.000	.675	
7.00	9.300	273.00	-3.900	273.00	-3.900	+.000	.700	
7.25	9.600	294.00	-3.500	294.00	-3.500	+.000	.725	
7.50	9.900	316.00	-3.000	316.00	-3.000	+.000	.750	
7.75	10.200	339.00	-2.400	339.00	-2.400	+.000	.775	
8.00	10.500	363.00	-1.700	363.00	-1.700	+.000	.800	
8.25	10.800	388.00	-1.000	388.00	-1.000	+.000	.825	
8.50	11.100	414.00	-.300	414.00	-.300	+.000	.850	
8.75	11.400	441.00	+.400	441.00	+.400	+.000	.875	
9.00	11.700	469.00	1.100	469.00	1.100	+.000	.900	
9.25	12.000	498.00	1.800	498.00	1.800	+.000	.925	
9.50	12.300	528.00	2.400	528.00	2.400	+.000	.950	
9.75	12.600	559.00	2.900	559.00	2.900	+.000	.975	
10.00	12.900	591.00	3.300	591.00	3.300	+.000	1.000	

TABLE 3.2 (CONTINUED)

DISTRIBUTION OF CURRENT AND CHARGE ON MONOPOLE ANTENNA OVER HOIST EARTH
ALFA/BETA = .0980 BETA/BETAC = 1.106 H/LAMDA = .900

FREQUENCY = 300.00MHZ RE = .012 D/LAMDA = .0200

A. MEASURED CURRENT DISTRIBUTION IN PA/WBLT

Z/H	RAW DATA		NORMALIZED DATA				Z/LAMDA
	IR/AG	IR/FAZ	IN/AG	IN/FAZ	IN/REAL	IN/IMAG	
.006	44.000	130.400	2.4000	45.0000	1.6997	1.6997	.003
.050	34.000	111.400	1.8000	28.8000	1.6007	.8112	.025
.100	24.000	88.400	1.5000	21.6000	1.5000	1.0000	.050
.150	24.000	82.400	1.5000	21.6000	1.3998	1.0228	.075
.200	24.000	81.000	1.5000	21.6000	1.2998	1.0458	.100
.250	24.000	80.000	1.5000	21.6000	1.2000	1.0688	.125
.300	24.000	80.000	1.5000	21.6000	1.1000	1.0918	.150
.350	24.000	80.000	1.5000	21.6000	1.0000	1.1148	.175
.400	24.000	80.000	1.5000	21.6000	.9000	1.1378	.200
.450	24.000	80.000	1.5000	21.6000	.8000	1.1608	.225
.500	24.000	80.000	1.5000	21.6000	.7000	1.1838	.250
.550	24.000	80.000	1.5000	21.6000	.6000	1.2068	.275
.600	24.000	80.000	1.5000	21.6000	.5000	1.2298	.300
.650	24.000	80.000	1.5000	21.6000	.4000	1.2528	.325
.700	24.000	80.000	1.5000	21.6000	.3000	1.2758	.350
.750	24.000	80.000	1.5000	21.6000	.2000	1.2988	.375
.800	24.000	80.000	1.5000	21.6000	.1000	1.3218	.400
.850	24.000	80.000	1.5000	21.6000	.0000	1.3448	.425
.900	24.000	80.000	1.5000	21.6000	-.1000	1.3678	.450
.950	24.000	80.000	1.5000	21.6000	-.2000	1.3908	.475
.998	24.000	80.000	1.5000	21.6000	-.3000	1.4138	.500

B. MEASURED CHARGE DISTRIBUTION IN PICCOL/VBLT*

Z/H	RAW DATA		NORMALIZED DATA				Z/LAMDA
	QR/AG	QR/FAZ	QN/AG	QN/FAZ	QN/REAL	QN/IMAG	
.12	16.399	.80	25.2600	.80	25.2599	-.220	.006
.50	13.439	-1.80	20.1600	-1.80	20.1600	-.633	.025
.100	11.700	-3.80	16.8000	-3.80	16.8000	-1.032	.050
.150	11.104	-7.80	17.0400	-7.80	16.9114	-2.227	.075
.200	10.701	-11.80	16.2900	-11.80	16.0330	-3.827	.100
.250	10.499	-15.80	14.7700	-15.80	14.3041	-5.261	.125
.300	10.311	-19.80	13.1600	-19.80	12.6699	-6.633	.150
.350	10.134	-23.80	11.1600	-23.80	10.8200	-7.820	.175
.400	10.000	-27.80	8.8800	-27.80	8.0120	-8.736	.200
.450	9.999	-31.80	6.2000	-31.80	5.1100	-9.467	.225
.500	9.999	-35.80	3.7200	-35.80	2.1400	-10.020	.250
.550	10.000	-39.80	2.7600	-39.80	1.2170	-10.475	.275
.600	10.000	-43.80	1.8800	-43.80	0.3700	-10.833	.300
.650	10.000	-47.80	1.1400	-47.80	-1.4800	-11.088	.325
.700	10.000	-51.80	0.6200	-51.80	-2.7600	-11.278	.350
.750	10.000	-55.80	0.2400	-55.80	-4.2000	-11.422	.375
.800	10.000	-59.80	0.0000	-59.80	-5.8000	-11.529	.400
.850	10.000	-63.80	0.0000	-63.80	-7.5000	-11.600	.425
.900	10.000	-67.80	0.0000	-67.80	-9.3000	-11.645	.450
.950	10.000	-71.80	0.0000	-71.80	-11.2000	-11.665	.475
.998	10.000	-75.80	0.0000	-75.80	-13.2000	-11.660	.500

DISTRIBUTION OF CURRENT AND CHARGE ON MONOPOLE ANTENNA OVER HOIST EARTH
ALFA/BETA = .0921 BETA/BETAC = 1.031 H/LAMDA = .900

FREQUENCY = 300.00MHZ RE = .012 D/LAMDA = .0200

A. MEASURED CURRENT DISTRIBUTION IN PA/WBLT

Z/H	RAW DATA		NORMALIZED DATA				Z/LAMDA
	IR/AG	IR/FAZ	IN/AG	IN/FAZ	IN/REAL	IN/IMAG	
.006	37.23	150.000	1.5400	50.0000	.9990	1.1800	.003
.050	28.00	120.800	1.0000	20.0000	.9350	.9550	.025
.100	19.97	96.800	.9600	23.4000	.8810	1.0810	.050
.150	24.74	86.800	1.3200	33.7000	.7810	1.1040	.075
.200	37.86	37.200	1.8200	62.8000	.6320	1.1619	.100
.250	47.84	28.400	2.3000	75.8000	.5720	1.2028	.125
.300	57.80	20.000	2.7600	87.8000	.5290	1.2336	.150
.350	67.90	16.000	3.1200	93.5000	.5030	1.2560	.175
.400	77.97	14.000	3.4600	98.0000	.4910	1.2700	.200
.450	87.99	12.000	3.7400	101.8000	.4840	1.2767	.225
.500	97.99	11.000	3.9800	105.0000	.4820	1.2760	.250
.550	107.99	9.800	4.1800	107.8000	.4840	1.2680	.275
.600	117.99	8.400	4.3400	110.2000	.4890	1.2520	.300
.650	127.99	7.000	4.4600	112.2000	.4950	1.2280	.325
.700	137.99	5.600	4.5400	113.8000	.5020	1.1970	.350
.750	147.99	4.200	4.5800	115.0000	.5100	1.1610	.375
.800	157.99	2.800	4.5800	115.8000	.5190	1.1120	.400
.850	167.99	1.400	4.5400	116.2000	.5290	1.0520	.425
.900	177.99	0.000	4.4600	116.2000	.5400	1.0810	.450
.950	187.99	-1.400	4.3400	115.8000	.5520	1.1070	.475
.998	197.99	-2.800	4.1800	115.0000	.5660	1.1300	.500

B. MEASURED CHARGE DISTRIBUTION IN PICCOL/VBLT*

Z/H	RAW DATA		NORMALIZED DATA				Z/LAMDA
	QR/AG	QR/FAZ	QN/AG	QN/FAZ	QN/REAL	QN/IMAG	
.12	16.718	-.80	20.5400	-.80	20.5377	-.717	.006
.50	11.419	-3.80	15.3600	-3.80	15.3116	-.856	.025
.100	10.410	-7.80	13.5200	-7.80	13.4773	-1.131	.050
.150	9.769	-11.80	12.4400	-11.80	12.3477	-1.341	.075
.200	9.409	-15.80	11.1400	-15.80	11.3223	-1.632	.100
.250	9.281	-19.80	9.8200	-19.80	9.6771	-1.705	.125
.300	9.409	-23.80	8.5900	-23.80	8.3777	-1.657	.150
.350	9.769	-27.80	7.0200	-27.80	6.7881	-1.617	.175
.400	10.410	-31.80	5.3400	-31.80	5.0334	-1.783	.200
.450	11.419	-35.80	3.8000	-35.80	3.1377	-1.720	.225
.500	12.719	-39.80	2.4600	-39.80	1.9710	-1.660	.250
.550	14.289	-43.80	1.4000	-43.80	1.1999	-1.327	.275
.600	16.119	-47.80	0.7200	-47.80	0.6903	-1.143	.300
.650	18.209	-51.80	0.3400	-51.80	0.4059	-.896	.325
.700	20.549	-55.80	0.1600	-55.80	0.2400	-.678	.350
.750	23.209	-59.80	0.0800	-59.80	0.1412	-.512	.375
.800	26.209	-63.80	0.0400	-63.80	0.0819	-.389	.400
.850	29.549	-67.80	0.0200	-67.80	0.0499	-.293	.425
.900	33.209	-71.80	0.0100	-71.80	0.0306	-.224	.450
.950	37.209	-75.80	0.0050	-75.80	0.0190	-.170	.475
.998	41.549	-79.80	0.0020	-79.80	0.0120	-.126	.500

TABLE 3.2 (CONTINUED)

DISTRIBUTION OF CURRENT AND CHARGE ON HORIZONTAL ANTENNA OVER HORIZONTAL EARTH
ALPHA/METAL = 0.033 BETA/BETAC = 1.011 H/LAMDA = 1.500
FREQUENCY = 300.00MHz FE = .012 D/LAMDA = .1000

A. MEASURED CURRENT DISTRIBUTION IN PA/DBLT. Table with columns: Z/H, I/FAZ, I/PAZ, I/PAZ, I/PAZ, I/PAZ, I/PAZ, Z/LAMDA. Rows 100-989.

B. MEASURED CHARGE DISTRIBUTION IN PICCOUL/VBLT.P. Table with columns: Z/H, I/PAZ, I/PAZ, I/PAZ, I/PAZ, I/PAZ, I/PAZ, Z/LAMDA. Rows 100-989.

TABLE 3.2 (CONTINUED)

DISTRIBUTION OF CURRENT AND CHARGE ON HORIZONTAL ANTENNA OVER MOIST EARTH
 ALPHA/BETA1 = .0938 BETA1/BETA2 = 1.011 W/LAMPAD = 1.000
 FREQUENCY = 300.000MHZ FE = .012 D/LAMPAD = 1.000

A. MEASURED CURRENT DISTRIBUTION IN MAX/VOLT

Z/H	RAW DATA		NORMALIZED DATA					Z/LAMPAD
	IR/FAZ	IR/FAZ	IR/FAZ	IR/FAZ	IR/REAL	IR/IMAG		
.003	2.944	150.00	1.620	88.000	1.088	1.204	.003	
.025	2.938	127.00	1.180	25.000	1.018	.473	.025	
.050	1.101	91.00	1.000	-11.000	.982	-.191	.050	
.075	2.922	59.00	1.220	-43.000	.892	-.832	.075	
.100	2.917	42.00	1.860	-69.000	.824	-1.377	.100	
.125	1.054	33.00	1.980	-65.000	.710	-1.848	.125	
.150	4.735	27.00	2.360	-75.000	.611	-2.480	.150	
.175	4.415	20.00	2.840	-75.000	.495	-3.593	.175	
.200	6.424	19.50	2.980	-82.500	.389	-5.955	.200	
.225	4.751	17.00	3.180	-87.000	.286	-8.147	.225	
.250	6.497	15.00	3.240	-87.000	.170	-12.236	.250	
.275	6.497	12.80	3.240	-85.200	.048	-18.240	.275	
.300	6.475	11.00	3.280	-81.000	-.087	-23.280	.300	
.325	6.475	9.00	3.180	-69.000	-.164	-28.136	.325	
.350	6.424	7.50	2.980	-59.500	-.234	-32.971	.350	
.375	4.424	6.50	2.700	-58.500	-.304	-37.683	.375	
.400	4.022	5.00	2.320	-55.000	-.363	-42.291	.400	
.425	3.414	4.00	1.980	-45.000	-.412	-46.937	.425	
.450	2.766	3.00	1.520	-37.000	-.444	-51.624	.450	
.475	2.134	1.60.00	1.120	-11.000	-.456	-56.355	.475	
.500	1.034	-.29.00	.680	-121.000	-.446	-61.133	.500	
.525	-.011	-.76.00	.440	-178.000	-.444	-65.955	.525	
.550	1.401	-130.000	.680	-232.000	-.408	-70.820	.550	
.575	1.866	-173.000	1.040	-245.000	-.378	-75.728	.575	
.600	2.403	-185.000	1.540	-257.000	-.346	-80.670	.600	
.625	3.034	-168.000	1.920	-260.000	-.317	-85.640	.625	
.650	4.022	-161.000	2.300	-263.000	-.283	-90.635	.650	
.675	5.403	-163.000	2.680	-265.000	-.230	-95.650	.675	
.700	6.411	-164.000	2.920	-266.000	-.178	-100.680	.700	
.725	6.406	-166.000	3.050	-268.000	-.107	-105.728	.725	
.750	6.377	-167.000	3.280	-269.000	-.027	-110.790	.750	
.775	6.197	-168.000	3.240	-270.000	.000	-115.860	.775	
.800	6.715	-168.000	3.140	-270.000	.027	-120.930	.800	
.825	6.433	-169.000	2.820	-271.000	.069	-126.000	.825	
.850	6.475	-170.000	2.860	-272.000	.100	-131.070	.850	
.875	6.468	-170.000	2.620	-272.000	.091	-136.140	.875	
.900	6.195	-170.000	2.140	-272.000	.075	-141.210	.900	
.925	5.403	-170.000	1.760	-272.000	.077	-146.280	.925	
.950	2.766	-171.000	1.300	-273.000	.068	-151.350	.950	
.975	1.034	-171.000	.880	-273.000	.049	-156.420	.975	
.984	1.119	-171.000	.560	-273.000	.029	-156.490	.984	

B. MEASURED CHARGE DISTRIBUTION IN PICCOL/VOLT-P

Z/H	RAW DATA		NORMALIZED DATA					Z/LAMPAD
	QR/FAZ	QR/FAZ	QR/FAZ	QR/FAZ	QR/REAL	QR/IMAG		
.006	17.797	-2.00	20.880	-2.000	20.787	-.726	.006	
.025	14.496	-3.30	15.440	-3.300	15.414	-.889	.025	
.050	6.797	-4.40	13.440	-4.400	13.438	-1.056	.050	
.075	7.491	-6.80	12.180	-6.800	12.102	-1.379	.075	
.100	6.473	-9.00	11.080	-9.000	10.924	-1.731	.100	
.125	6.402	-11.60	9.760	-11.600	9.566	-2.143	.125	
.150	6.195	-15.00	8.280	-15.000	7.998	-2.600	.150	
.175	6.473	-19.00	6.900	-19.000	6.594	-3.126	.175	
.200	7.479	-25.00	5.360	-25.000	4.858	-3.725	.200	
.225	6.434	-36.00	4.120	-36.000	3.333	-4.422	.225	
.250	6.444	-49.00	2.680	-49.000	1.380	-5.197	.250	
.275	1.427	-61.00	2.320	-61.000	-.463	-6.043	.275	
.300	1.494	-75.00	3.080	-75.000	-2.197	-6.959	.300	
.325	3.463	-88.00	4.200	-88.000	-3.725	-7.925	.325	
.350	3.414	-104.00	5.480	-104.000	-5.573	-8.941	.350	
.375	4.403	-127.000	7.160	-127.000	-6.988	-10.000	.375	
.400	5.403	-151.000	8.680	-151.000	-8.178	-11.195	.400	
.425	6.197	-173.000	9.800	-173.000	-9.359	-12.466	.425	
.450	6.197	-175.000	10.080	-175.000	-10.050	-13.773	.450	
.475	6.144	-177.000	10.680	-177.000	-10.627	-15.112	.475	
.500	6.191	-178.000	10.880	-178.000	-10.877	-16.486	.500	
.525	6.195	-180.000	11.080	-180.000	-11.080	-17.880	.525	
.550	6.191	-181.000	10.880	-181.000	-10.878	-19.290	.550	
.575	6.194	-182.000	10.240	-182.000	-10.234	-20.717	.575	
.600	6.192	-183.000	9.580	-183.000	-9.567	-22.160	.600	
.625	6.103	-184.000	8.840	-184.000	-8.439	-23.610	.625	
.650	6.173	-184.000	7.180	-184.000	-7.143	-25.070	.650	
.675	3.404	-187.000	5.880	-187.000	-5.816	-26.540	.675	
.700	2.494	-191.000	4.380	-191.000	-4.292	-28.020	.700	
.725	1.729	-198.000	2.800	-198.000	-2.860	-29.510	.725	
.750	1.726	-203.000	1.180	-203.000	-.863	-31.010	.750	
.775	1.724	-220.000	1.140	-220.000	.904	-32.520	.775	
.800	1.780	-244.000	2.710	-244.000	2.598	-34.040	.800	
.825	2.494	-253.000	4.380	-253.000	4.352	-35.570	.825	
.850	3.403	-267.000	6.140	-267.000	6.172	-37.110	.850	
.875	4.409	-285.000	7.880	-285.000	7.639	-38.660	.875	
.900	5.405	-306.000	8.700	-306.000	8.700	-40.220	.900	
.925	6.101	-314.000	9.990	-314.000	9.918	-41.790	.925	
.950	6.198	-361.000	11.380	-361.000	11.377	-43.370	.950	
.975	6.193	-382.000	13.180	-382.000	13.152	-44.950	.975	
.987	6.190	-382.000	14.740	-382.000	14.766	-46.530	.987	

TABLE 3.2 (CONTINUED)

DISTRIBUTION OF CURRENT AND CHARGE ON HORIZONTAL ANTENNA OVER CRIST EARTH
 METAL/FEETAC = 1.000 METAL/FEETAC = 1.000 METAL/FEETAC = 1.000
 FREQUENCY = 300.000 MHz FE = 4.012 D/LAMBDA = .2900
 A. MEASURED CURRENT DISTRIBUTION IN HORIZONTAL

Z/H	DATA			NORMALIZED DATA				Z/LAMBDA
	IRMS	IRFAS	INPAG	IRFAS	IRREAL	INMAG		
.00	1.000	1.000	1.000	1.000	1.000	1.000	1.000	.000
.17	1.000	1.000	1.000	1.000	1.000	1.000	1.000	.000
.33	1.000	1.000	1.000	1.000	1.000	1.000	1.000	.000
.50	1.000	1.000	1.000	1.000	1.000	1.000	1.000	.000
.67	1.000	1.000	1.000	1.000	1.000	1.000	1.000	.000
.83	1.000	1.000	1.000	1.000	1.000	1.000	1.000	.000
1.00	1.000	1.000	1.000	1.000	1.000	1.000	1.000	.000
1.17	1.000	1.000	1.000	1.000	1.000	1.000	1.000	.000
1.33	1.000	1.000	1.000	1.000	1.000	1.000	1.000	.000
1.50	1.000	1.000	1.000	1.000	1.000	1.000	1.000	.000
1.67	1.000	1.000	1.000	1.000	1.000	1.000	1.000	.000
1.83	1.000	1.000	1.000	1.000	1.000	1.000	1.000	.000
2.00	1.000	1.000	1.000	1.000	1.000	1.000	1.000	.000
2.17	1.000	1.000	1.000	1.000	1.000	1.000	1.000	.000
2.33	1.000	1.000	1.000	1.000	1.000	1.000	1.000	.000
2.50	1.000	1.000	1.000	1.000	1.000	1.000	1.000	.000
2.67	1.000	1.000	1.000	1.000	1.000	1.000	1.000	.000
2.83	1.000	1.000	1.000	1.000	1.000	1.000	1.000	.000
3.00	1.000	1.000	1.000	1.000	1.000	1.000	1.000	.000
3.17	1.000	1.000	1.000	1.000	1.000	1.000	1.000	.000
3.33	1.000	1.000	1.000	1.000	1.000	1.000	1.000	.000
3.50	1.000	1.000	1.000	1.000	1.000	1.000	1.000	.000
3.67	1.000	1.000	1.000	1.000	1.000	1.000	1.000	.000
3.83	1.000	1.000	1.000	1.000	1.000	1.000	1.000	.000
4.00	1.000	1.000	1.000	1.000	1.000	1.000	1.000	.000
4.17	1.000	1.000	1.000	1.000	1.000	1.000	1.000	.000
4.33	1.000	1.000	1.000	1.000	1.000	1.000	1.000	.000
4.50	1.000	1.000	1.000	1.000	1.000	1.000	1.000	.000
4.67	1.000	1.000	1.000	1.000	1.000	1.000	1.000	.000
4.83	1.000	1.000	1.000	1.000	1.000	1.000	1.000	.000
5.00	1.000	1.000	1.000	1.000	1.000	1.000	1.000	.000
5.17	1.000	1.000	1.000	1.000	1.000	1.000	1.000	.000
5.33	1.000	1.000	1.000	1.000	1.000	1.000	1.000	.000
5.50	1.000	1.000	1.000	1.000	1.000	1.000	1.000	.000
5.67	1.000	1.000	1.000	1.000	1.000	1.000	1.000	.000
5.83	1.000	1.000	1.000	1.000	1.000	1.000	1.000	.000
6.00	1.000	1.000	1.000	1.000	1.000	1.000	1.000	.000
6.17	1.000	1.000	1.000	1.000	1.000	1.000	1.000	.000
6.33	1.000	1.000	1.000	1.000	1.000	1.000	1.000	.000
6.50	1.000	1.000	1.000	1.000	1.000	1.000	1.000	.000
6.67	1.000	1.000	1.000	1.000	1.000	1.000	1.000	.000
6.83	1.000	1.000	1.000	1.000	1.000	1.000	1.000	.000
7.00	1.000	1.000	1.000	1.000	1.000	1.000	1.000	.000
7.17	1.000	1.000	1.000	1.000	1.000	1.000	1.000	.000
7.33	1.000	1.000	1.000	1.000	1.000	1.000	1.000	.000
7.50	1.000	1.000	1.000	1.000	1.000	1.000	1.000	.000
7.67	1.000	1.000	1.000	1.000	1.000	1.000	1.000	.000
7.83	1.000	1.000	1.000	1.000	1.000	1.000	1.000	.000
8.00	1.000	1.000	1.000	1.000	1.000	1.000	1.000	.000
8.17	1.000	1.000	1.000	1.000	1.000	1.000	1.000	.000
8.33	1.000	1.000	1.000	1.000	1.000	1.000	1.000	.000
8.50	1.000	1.000	1.000	1.000	1.000	1.000	1.000	.000
8.67	1.000	1.000	1.000	1.000	1.000	1.000	1.000	.000
8.83	1.000	1.000	1.000	1.000	1.000	1.000	1.000	.000
9.00	1.000	1.000	1.000	1.000	1.000	1.000	1.000	.000
9.17	1.000	1.000	1.000	1.000	1.000	1.000	1.000	.000
9.33	1.000	1.000	1.000	1.000	1.000	1.000	1.000	.000
9.50	1.000	1.000	1.000	1.000	1.000	1.000	1.000	.000
9.67	1.000	1.000	1.000	1.000	1.000	1.000	1.000	.000
9.83	1.000	1.000	1.000	1.000	1.000	1.000	1.000	.000
10.00	1.000	1.000	1.000	1.000	1.000	1.000	1.000	.000

B. MEASURED CHARGE DISTRIBUTION IN PICCOL/VOLTM

Z/H	DATA			NORMALIZED DATA				Z/LAMBDA
	IRMS	IRFAS	INPAG	IRFAS	IRREAL	INMAG		
.00	13.13	3.40	18.880	3.40	18.827	-1.119	.008	.000
.17	3.886	8.880	14.000	8.880	14.000	-1.171	.028	.000
.33	8.259	7.40	11.980	7.40	11.871	-1.458	.050	.000
.50	7.507	9.50	10.880	9.50	10.731	-1.794	.078	.000
.67	8.707	12.00	9.700	12.00	9.808	-2.086	.108	.000
.83	8.003	15.00	8.700	15.00	8.404	-2.252	.125	.000
1.00	5.147	18.00	7.400	18.00	7.074	-2.367	.130	.000
1.17	4.499	23.00	6.500	23.00	6.237	-2.400	.128	.000
1.33	4.505	31.00	5.080	31.00	4.358	-2.618	.100	.000
1.50	2.915	42.00	4.080	42.00	3.032	-2.730	.088	.000
1.67	2.125	46.180	3.000	46.180	2.452	-2.714	.080	.000
1.83	1.835	50.50	2.680	50.50	2.083	-2.660	.075	.000
2.00	2.956	120.00	2.980	120.00	2.586	-2.586	.060	.000
2.17	2.850	131.00	3.880	131.00	3.369	-2.586	.060	.000
2.33	3.409	153.00	4.940	153.00	4.417	-2.512	.050	.000
2.50	4.002	158.00	6.800	158.00	6.415	-2.079	.035	.000
2.67	4.747	168.00	6.880	168.00	6.730	-1.430	.000	.000
2.83	5.299	169.00	7.680	169.00	7.551	-1.400	.000	.000
3.00	5.765	172.00	8.340	172.00	8.274	-1.045	.000	.000
3.17	5.948	177.00	8.620	177.00	8.408	-1.051	.000	.000
3.33	6.155	177.00	8.920	177.00	8.513	-1.042	.000	.000
3.50	6.211	179.00	9.000	179.00	8.599	-1.124	.000	.000
3.67	6.100	181.50	8.840	181.50	8.827	-1.231	.000	.000
3.83	5.906	183.20	8.580	183.20	8.847	-1.378	.000	.000
4.00	5.506	185.80	7.980	185.80	7.929	-1.406	.000	.000
4.17	5.009	188.20	7.280	188.20	7.186	-1.035	.000	.000
4.33	4.706	191.20	6.240	191.20	6.151	-1.212	.000	.000
4.50	3.862	194.00	5.220	194.00	5.051	-1.314	.000	.000
4.67	2.857	199.00	4.140	199.00	3.914	-1.348	.000	.000
4.83	2.001	214.00	3.800	214.00	3.404	-1.422	.000	.000
5.00	1.297	239.00	1.880	239.00	1.968	-1.611	.000	.000
5.17	1.145	320.00	1.860	320.00	1.880	-1.938	.000	.000
5.33	1.587	327.00	2.900	327.00	1.929	-1.253	.000	.000
5.50	2.850	339.00	3.840	339.00	3.585	-1.376	.000	.000
5.67	3.257	343.00	4.720	343.00	4.514	-1.380	.000	.000
5.83	3.450	347.00	5.580	347.00	5.444	-1.217	.000	.000
6.00	4.499	350.00	6.520	350.00	6.421	-1.132	.000	.000
6.17	5.51	352.00	7.320	352.00	7.257	-1.005	.000	.000
6.33	5.504	354.50	7.980	354.50	7.943	-1.045	.000	.000
6.50	5.510	358.20	8.400	358.20	8.401	-1.058	.000	.000
6.67	6.003	358.20	8.700	358.00	8.695	-1.304	.000	.000
6.83	6.054	359.00	8.740	359.00	8.779	-1.153	.000	.000
7.00	6.003	360.00	8.700	360.00	8.700	-1.000	.000	.000
7.17	6.499	361.00	8.280	361.00	8.889	-1.144	.000	.000
7.33	5.299	363.00	7.680	363.00	7.889	-1.402	.000	.000
7.50	4.706	364.00	6.880	364.00	6.843	-1.718	.000	.000
7.67	4.209	366.50	6.100	366.50	6.041	-1.691	.000	.000
7.83	4.002	370.00	5.800	370.00	5.712	-1.007	.000	.000
8.00	2.857	372.00	6.140	372.00	6.100	-1.861	.000	.000
8.17	1.904	376.50	2.780	376.50	2.644	-1.784	.000	.000
8.33	1.56	397.00	1.280	397.00	1.280	-1.990	.000	.000
8.50	1.435	476.780	1.920	476.780	1.920	-1.812	.000	.000
8.67	1.359	1.920	1.920	1.920	1.920	-1.840	.000	.000
8.83	2.263	2.263	2.263	2.263	2.263	-1.712	.000	.000
9.00	1.353	5.340	4.880	5.340	4.880	-1.353	.000	.000
9.17	2.263	5.340	6.180	5.340	6.180	-1.353	.000	.000
9.33	4.499	5.340	7.100	5.340	7.100	-1.073	.000	.000
9.50	5.499	5.340	8.280	5.340	8.280	-1.073	.000	.000
9.67	5.555	5.400	8.500	5.400	8.500	-1.083	.000	.000
9.83	7.459	8.410	11.100	8.410	11.100	-1.478	.000	.000
10.00	8.611	12.480	12.480	12.480	12.480	-1.478	.000	.000

TABLE 3.2 (CONTINUED)

DISTRIBUTION OF CURRENT AND CHARGE ON MONOPOLE ANTENNA OVER POIST EARTH
 ALPHA/METAL = .0380 BETA/RETAC = 1.000 H/LAMDAO = 1.000
 FREQUENCY = 300.00MHZ RE = .012 D/LAMDAO = .2900

A. MEASURED CURRENT DISTRIBUTION IN MA/VOLTS

Z/H	NORMALIZED DATA				Z/LAMDAO
	IRFAZ	INMAG	INFZA	INREAL	
.003	1.0000	1.7600	.8000	1.1778	.003
.006	1.0000	1.7600	.8000	1.1778	.006
.010	1.0000	1.7600	.8000	1.1778	.010
.015	1.0000	1.7600	.8000	1.1778	.015
.020	1.0000	1.7600	.8000	1.1778	.020
.025	1.0000	1.7600	.8000	1.1778	.025
.030	1.0000	1.7600	.8000	1.1778	.030
.035	1.0000	1.7600	.8000	1.1778	.035
.040	1.0000	1.7600	.8000	1.1778	.040
.045	1.0000	1.7600	.8000	1.1778	.045
.050	1.0000	1.7600	.8000	1.1778	.050
.055	1.0000	1.7600	.8000	1.1778	.055
.060	1.0000	1.7600	.8000	1.1778	.060
.065	1.0000	1.7600	.8000	1.1778	.065
.070	1.0000	1.7600	.8000	1.1778	.070
.075	1.0000	1.7600	.8000	1.1778	.075
.080	1.0000	1.7600	.8000	1.1778	.080
.085	1.0000	1.7600	.8000	1.1778	.085
.090	1.0000	1.7600	.8000	1.1778	.090
.095	1.0000	1.7600	.8000	1.1778	.095
.100	1.0000	1.7600	.8000	1.1778	.100
.105	1.0000	1.7600	.8000	1.1778	.105
.110	1.0000	1.7600	.8000	1.1778	.110
.115	1.0000	1.7600	.8000	1.1778	.115
.120	1.0000	1.7600	.8000	1.1778	.120
.125	1.0000	1.7600	.8000	1.1778	.125
.130	1.0000	1.7600	.8000	1.1778	.130
.135	1.0000	1.7600	.8000	1.1778	.135
.140	1.0000	1.7600	.8000	1.1778	.140
.145	1.0000	1.7600	.8000	1.1778	.145
.150	1.0000	1.7600	.8000	1.1778	.150
.155	1.0000	1.7600	.8000	1.1778	.155
.160	1.0000	1.7600	.8000	1.1778	.160
.165	1.0000	1.7600	.8000	1.1778	.165
.170	1.0000	1.7600	.8000	1.1778	.170
.175	1.0000	1.7600	.8000	1.1778	.175
.180	1.0000	1.7600	.8000	1.1778	.180
.185	1.0000	1.7600	.8000	1.1778	.185
.190	1.0000	1.7600	.8000	1.1778	.190
.195	1.0000	1.7600	.8000	1.1778	.195
.200	1.0000	1.7600	.8000	1.1778	.200
.205	1.0000	1.7600	.8000	1.1778	.205
.210	1.0000	1.7600	.8000	1.1778	.210
.215	1.0000	1.7600	.8000	1.1778	.215
.220	1.0000	1.7600	.8000	1.1778	.220
.225	1.0000	1.7600	.8000	1.1778	.225
.230	1.0000	1.7600	.8000	1.1778	.230
.235	1.0000	1.7600	.8000	1.1778	.235
.240	1.0000	1.7600	.8000	1.1778	.240
.245	1.0000	1.7600	.8000	1.1778	.245
.250	1.0000	1.7600	.8000	1.1778	.250
.255	1.0000	1.7600	.8000	1.1778	.255
.260	1.0000	1.7600	.8000	1.1778	.260
.265	1.0000	1.7600	.8000	1.1778	.265
.270	1.0000	1.7600	.8000	1.1778	.270
.275	1.0000	1.7600	.8000	1.1778	.275
.280	1.0000	1.7600	.8000	1.1778	.280
.285	1.0000	1.7600	.8000	1.1778	.285
.290	1.0000	1.7600	.8000	1.1778	.290
.295	1.0000	1.7600	.8000	1.1778	.295
.300	1.0000	1.7600	.8000	1.1778	.300

B. MEASURED CHARGE DISTRIBUTION IN PICCOLL/VOLTS

Z/H	NORMALIZED DATA				Z/LAMDAO
	IRFAZ	INMAG	INFZA	INREAL	
.006	1.0000	1.7600	.8000	1.1778	.006
.010	1.0000	1.7600	.8000	1.1778	.010
.015	1.0000	1.7600	.8000	1.1778	.015
.020	1.0000	1.7600	.8000	1.1778	.020
.025	1.0000	1.7600	.8000	1.1778	.025
.030	1.0000	1.7600	.8000	1.1778	.030
.035	1.0000	1.7600	.8000	1.1778	.035
.040	1.0000	1.7600	.8000	1.1778	.040
.045	1.0000	1.7600	.8000	1.1778	.045
.050	1.0000	1.7600	.8000	1.1778	.050
.055	1.0000	1.7600	.8000	1.1778	.055
.060	1.0000	1.7600	.8000	1.1778	.060
.065	1.0000	1.7600	.8000	1.1778	.065
.070	1.0000	1.7600	.8000	1.1778	.070
.075	1.0000	1.7600	.8000	1.1778	.075
.080	1.0000	1.7600	.8000	1.1778	.080
.085	1.0000	1.7600	.8000	1.1778	.085
.090	1.0000	1.7600	.8000	1.1778	.090
.095	1.0000	1.7600	.8000	1.1778	.095
.100	1.0000	1.7600	.8000	1.1778	.100
.105	1.0000	1.7600	.8000	1.1778	.105
.110	1.0000	1.7600	.8000	1.1778	.110
.115	1.0000	1.7600	.8000	1.1778	.115
.120	1.0000	1.7600	.8000	1.1778	.120
.125	1.0000	1.7600	.8000	1.1778	.125
.130	1.0000	1.7600	.8000	1.1778	.130
.135	1.0000	1.7600	.8000	1.1778	.135
.140	1.0000	1.7600	.8000	1.1778	.140
.145	1.0000	1.7600	.8000	1.1778	.145
.150	1.0000	1.7600	.8000	1.1778	.150
.155	1.0000	1.7600	.8000	1.1778	.155
.160	1.0000	1.7600	.8000	1.1778	.160
.165	1.0000	1.7600	.8000	1.1778	.165
.170	1.0000	1.7600	.8000	1.1778	.170
.175	1.0000	1.7600	.8000	1.1778	.175
.180	1.0000	1.7600	.8000	1.1778	.180
.185	1.0000	1.7600	.8000	1.1778	.185
.190	1.0000	1.7600	.8000	1.1778	.190
.195	1.0000	1.7600	.8000	1.1778	.195
.200	1.0000	1.7600	.8000	1.1778	.200
.205	1.0000	1.7600	.8000	1.1778	.205
.210	1.0000	1.7600	.8000	1.1778	.210
.215	1.0000	1.7600	.8000	1.1778	.215
.220	1.0000	1.7600	.8000	1.1778	.220
.225	1.0000	1.7600	.8000	1.1778	.225
.230	1.0000	1.7600	.8000	1.1778	.230
.235	1.0000	1.7600	.8000	1.1778	.235
.240	1.0000	1.7600	.8000	1.1778	.240
.245	1.0000	1.7600	.8000	1.1778	.245
.250	1.0000	1.7600	.8000	1.1778	.250
.255	1.0000	1.7600	.8000	1.1778	.255
.260	1.0000	1.7600	.8000	1.1778	.260
.265	1.0000	1.7600	.8000	1.1778	.265
.270	1.0000	1.7600	.8000	1.1778	.270
.275	1.0000	1.7600	.8000	1.1778	.275
.280	1.0000	1.7600	.8000	1.1778	.280
.285	1.0000	1.7600	.8000	1.1778	.285
.290	1.0000	1.7600	.8000	1.1778	.290
.295	1.0000	1.7600	.8000	1.1778	.295
.300	1.0000	1.7600	.8000	1.1778	.300

TABLE 3.2 (CONTINUED)

DISTRIBUTION OF CURRENT AND CHARGE ON MONOPOLE ANTENNA OVER HOMOGENEOUS EARTH
 ALPHA/BETAL = .0336 BETAL/BETAC = 1.0111 W/LAMPDAG = .500
 FREQUENCY = 300.00MHZ FE = .012 D/LAMPDAG = .1000

A. MEASURED CURRENT DISTRIBUTION IN MA/VOLTS

Z/H	IR*AS	IRFAZ	IN*AG	INFAZ	INREAL	INIMAG	Z/LAMPD
.00R	2.414	16.00C	1.440C	55.0C	.837	1.196	.003
.10R	1.4021	135.0C	.84C	30.0C	.787	.420	.025
.150	1.1951	84.40C	.70C	-21.0C	.481	-.257	.050
.150	1.1969	47.40C	1.02C	-57.6C	.947	-.861	.075
.200	2.4995	33.00C	1.50C	-72.0C	.944	-1.427	.100
.250	3.726	26.30C	1.90C	-74.7C	.376	-1.883	.125
.300	4.916	22.00C	2.34C	-83.0C	.285	-2.323	.150
.350	6.0711	21.00C	2.70C	-84.0C	.244	-2.685	.175
.400	5.429	17.00C	3.02C	-88.0C	.105	-3.018	.200
.450	6.029	15.50C	3.28C	-89.5C	.028	-3.260	.225
.500	6.424	14.40C	3.38C	-90.0C	-.029	-3.325	.250
.550	6.723	13.20C	3.38C	-91.8C	-.106	-3.378	.275
.600	6.933	12.40C	3.28C	-93.4C	-.137	-3.277	.300
.650	6.174	12.00C	3.00C	-93.0C	-.167	-3.196	.325
.700	5.429	11.40C	3.02C	-93.4C	-.179	-3.015	.350
.750	5.0327	11.00C	2.74C	-94.0C	-.193	-2.753	.375
.800	4.916	10.80C	2.74C	-94.1C	-.187	-2.338	.400
.850	3.624	10.50C	1.84C	-94.5C	-.148	-1.874	.425
.900	2.702	10.40C	1.440C	-94.8C	-.110	-1.394	.450
.950	1.860	10.40C	.88C	-94.4C	-.080	-.857	.475
.988	1.154	11.20C	.60C	-93.8C	-.040	-.599	.484

B. MEASURED CHARGE DISTRIBUTION IN PICCOL/VOLTS*

Z/H	IR*AS	IRFAZ	Q*AG	Q*FAZ	Q*REAL	Q*IMAG	Z/LAMPD
.10P	13.473	-.50	20.26C	-.50	20.259	-.177	.004
.150	9.776	-1.30	15.00C	-1.30	14.996	-.134	.025
.150	8.432	-2.10	12.98C	-2.10	12.971	-.097	.050
.150	7.780	-3.00	11.70C	-3.00	11.684	-.061	.075
.200	7.189	-4.30	10.80C	-4.30	10.770	-.040	.100
.250	6.791	-5.20	9.16C	-5.20	9.122	-.030	.125
.300	5.293	-7.00	7.96C	-7.00	7.901	-.020	.150
.350	4.348	-9.50	6.80C	-9.50	6.809	-.010	.175
.400	3.245	-13.10	4.88C	-13.10	4.753	-.008	.200
.450	2.141	-17.00	3.22C	-17.00	3.022	-.009	.225
.500	1.51	-22.10	1.58C	-22.10	1.172	-.009	.250
.550	.828	-28.50	1.20C	-28.50	.411	-.009	.275
.600	.1763	-36.00	2.66C	-36.00	-.249	-.009	.300
.650	2.702	-42.10	4.40C	-42.10	-.4278	-.007	.325
.700	4.916	-49.00	6.16C	-49.00	-.6084	-.004	.350
.750	5.134	-57.00	7.720	-57.00	-.7678	-.007	.375
.800	5.745	-67.00	8.770	-67.00	-.9150	-.003	.400
.850	6.743	-78.00	10.20C	-78.00	-1.0141	-.003	.425
.900	7.4687	-91.00	11.58C	-91.00	-1.1193	-.004	.450
.950	8.724	-106.00	13.42C	-106.00	-13.415	-.001	.475
.984	10.481	-124.00	15.16C	-124.00	-15.155	-.007	.487

DISTRIBUTION OF CURRENT AND CHARGE ON MONOPOLE ANTENNA OVER HOMOGENEOUS EARTH
 ALPHA/BETAL = .0336 BETAL/BETAC = 1.0004 W/LAMPDAG = .500
 FREQUENCY = 300.00MHZ FE = .012 D/LAMPDAG = .2500

A. MEASURED CURRENT DISTRIBUTION IN MA/VOLTS

Z/H	IR*AS	IRFAZ	IN*AG	INFAZ	INREAL	INIMAG	Z/LAMPD
.00R	3.444	15.00C	1.560C	48.0C	1.004	1.199	.003
.10R	2.431	129.0C	1.110C	27.0C	.880	.489	.025
.150	1.989	86.40C	.90C	-5.6C	.896	-.088	.050
.150	2.294	65.00C	1.00C	-37.0C	.931	-.026	.075
.200	2.917	46.50C	1.38C	-55.5C	.748	-1.088	.100
.250	3.713	36.00C	1.68C	-65.0C	.683	-1.535	.125
.300	4.287	30.00C	1.98C	-72.0C	.595	-1.845	.150
.350	4.452	25.50C	2.20C	-76.5C	.514	-2.139	.175
.400	5.441	22.00C	2.48C	-80.0C	.431	-2.442	.200
.450	5.779	19.50C	2.66C	-82.5C	.347	-2.637	.225
.500	6.100	17.80C	2.76C	-84.2C	.279	-2.746	.250
.550	6.100	16.20C	2.76C	-85.8C	.202	-2.753	.275
.600	6.100	15.20C	2.70C	-86.4C	.125	-2.718	.300
.650	5.790	13.80C	2.62C	-88.2C	.082	-2.619	.325
.700	5.441	12.60C	2.48C	-89.4C	.064	-2.480	.350
.750	5.139	11.80C	2.28C	-90.2C	.008	-2.280	.375
.800	4.287	11.20C	1.94C	-90.8C	-.027	-1.940	.400
.850	3.444	10.00C	1.560C	-92.0C	-.054	-1.559	.425
.900	2.564	9.40C	1.18C	-92.4C	-.083	-1.159	.450
.950	1.847	8.50C	.70C	-93.5C	-.093	-.859	.475
.988	1.061	6.00C	.44C	-94.0C	-.050	-.477	.484

B. MEASURED CHARGE DISTRIBUTION IN PICCOL/VOLTS*

Z/H	IR*AS	IRFAZ	Q*AG	Q*FAZ	Q*REAL	Q*IMAG	Z/LAMPD
.10P	13.355	-.10	15.62C	-.10	15.620	.027	.004
.150	9.714	-.50	11.460C	-.50	11.460	-.001	.025
.150	8.404	-1.70	9.90C	-1.70	9.896	-.294	.050
.150	7.575	-3.00	8.86C	-3.00	8.848	-.464	.075
.200	6.723	-4.50	7.95C	-4.50	7.955	-.626	.100
.250	5.965	-6.30	7.00C	-6.30	6.958	-.768	.125
.300	5.130	-8.60	6.00C	-8.60	6.924	-.887	.150
.350	4.218	-11.60	4.88C	-11.60	6.743	-.965	.175
.400	3.374	-16.50	3.90C	-16.50	3.739	-1.108	.200
.450	2.760	-22.00	2.76C	-22.00	2.501	-1.184	.225
.500	1.848	-28.50	1.60C	-28.50	1.101	-1.161	.250
.550	1.43	-36.00	1.22C	-36.00	-.222	-1.200	.275
.600	1.924	-42.10	1.90C	-42.10	-.1487	-1.183	.300
.650	2.764	-49.00	3.12C	-49.00	-.2893	-1.149	.325
.700	3.774	-57.00	4.44C	-57.00	-.4479	-1.107	.350
.750	4.743	-67.00	5.60C	-67.00	-.6106	-.1021	.375
.800	5.434	-78.00	6.36C	-78.00	-.6306	-.830	.400
.850	6.729	-91.00	7.40C	-91.00	-.7399	-.774	.425
.900	7.417	-106.00	8.56C	-106.00	-.8124	-.674	.450
.950	8.404	-124.00	9.90C	-124.00	-.9086	-.535	.475
.984	9.657	-144.00	11.46C	-144.00	-1.0168	-.327	.487

TABLE 3.3

ADMITTANCE AND IMPEDANCE OF HORNPOLE ANTENNA OVER FRESH WATER (MEASURED)					ADMITTANCE AND IMPEDANCE OF HORNPOLE ANTENNA OVER FRESH WATER (MEASURED)				
ALPHA/BETA * 1028		ETA/LAMBDA * 1-143		A/LAMBDA * 10017	ALPHA/BETA * 10911		ETA/LAMBDA * 1-152		A/LAMBDA * 10016
FREQUENCY * 300-100MHZ		RE * 1067		D/LAMBDA * 10100	FREQUENCY * 300-100MHZ		RE * 1067		D/LAMBDA * 10100
ADMITTANCE (MILLI-MHS)					ADMITTANCE (MILLI-MHS)				
DETALPH	G	B	R	X	DETALPH	G	B	R	X
.093	.00	.35			.086	.10	.10		
.180	.01	.54			.165	.17	.28		
.259	.02	1.56			.330	.19	1.18		
.339	.11	2.42	18.74	112.37	.496	.25	2.14		
.718	.32	4.11	18.83	241.84	.871	.32	3.24	20.84	207.23
.888	.73	8.96	25.56	162.80	.991	.45	5.00	21.19	179.31
1.077	2.42	8.48	31.32	109.37	1.157	1.05	8.84	25.85	143.47
1.257	6.78	12.51	33.49	81.79	1.322	1.74	15.96	28.44	144.26
1.436	18.81	11.47	39.32	28.74	1.487	4.94	15.82	32.44	144.01
1.616	20.50	44.30	46.72	9.80	1.652	10.43	12.40	28.32	29.28
1.795	11.75	44.48	55.96	40.39	1.818	7.25	10.24	46.12	64.87
1.975	6.76	7.16	69.92	73.86	1.983	4.92	7.40	55.84	100.87
2.155	4.63	5.57	88.25	106.17	2.148	2.92	5.80	69.25	137.58
2.334	2.49	4.00	113.79	140.30	2.313	2.12	4.29	89.20	184.71
2.514	2.82	3.32	148.62	174.97	2.478	1.76	3.80	114.68	228.05
2.693	2.37	2.39	203.20	210.96	2.644	1.54	2.59	169.61	285.25
2.873	2.17	1.85	305.14	247.58	2.809	1.44	1.88	255.32	340.43
3.052	2.11	.79	415.67	155.83	2.974	1.33	1.05	399.23	376.22
3.232	2.13	.06	449.11	13.21	3.139	1.25	.61	615.15	277.95
3.411	2.10	.64	403.54	112.29	3.305	1.42	.43	703.91	144.87
3.591	2.03	1.36	300.01	155.14	3.470	1.84	.77	519.46	259.74
3.771	3.12	2.17	216.00	150.24	3.635	1.72	1.85	318.47	271.22
3.950	3.98	2.87	165.30	119.20	3.801	2.23	2.56	194.45	213.64
4.130	5.25	3.22	128.41	84.89	3.966	3.15	3.28	152.31	158.00
4.309	6.82	3.03	122.46	58.41	4.131	4.57	.25	117.34	109.12
4.489	8.11	1.97	116.43	28.28	4.296	6.73	.53	111.00	76.05
4.668	8.53	.22	117.16	3.02	4.462	9.00	2.16	94.78	31.53
4.848	7.92	1.19	123.48	18.58	4.627	11.41	1.12	95.14	1.08
5.027	6.93	1.92	124.01	37.13	4.792	9.18	2.41	99.60	30.49
5.207	6.67	2.15	150.21	55.02	4.957	7.10	2.92	127.94	59.60
5.386	6.74	1.88	182.29	72.30	5.123	5.44	3.90	121.42	87.05
5.566	6.48	1.73	194.25	75.01	5.288	4.77	3.40	143.30	114.12
5.746	6.05	1.39	220.89	75.81	5.453	3.97	2.48	169.68	136.88
5.925	3.43	.89	247.72	57.56	5.618	3.11	1.58	244.42	161.64
6.105	3.70	.37	267.50	26.76	5.784	2.70	1.82	254.66	171.66
6.284	3.72	.14	268.12	13.49	5.949	2.43	1.24	218.70	156.20
6.464	3.66	.55	253.91	36.18	6.114	2.44	.71	377.84	109.95
6.643	4.11	.90	230.18	80.84	6.279	2.85	.22	424.90	36.36
6.823	4.47	1.18	209.14	95.21	6.445	2.40	.35	384.91	32.83
7.002	4.42	1.38	192.58	93.94	6.610	2.78	1.03	316.29	117.19
7.182	3.90	1.32	174.17	82.92	6.775	3.14	1.33	270.03	114.37
7.362	5.91	1.00	164.50	27.83	6.940	3.64	1.78	201.71	108.42
7.541	6.23	.55	159.27	14.06	7.106	4.43	1.94	183.73	76.96
7.721	6.33	.05	157.97	1.28	7.271	5.18	2.05	162.31	61.86
7.900	6.15	.05	161.31	14.43	7.436	6.92	1.47	150.11	34.81
8.080	5.76	1.00	168.83	29.26	7.601	6.79	.52	142.27	10.59
8.259	5.43	1.04	180.74	35.27	7.767	6.43	.76	142.59	15.84
8.439	4.95	1.17	191.33	46.22	7.932	5.29	1.68	124.49	36.32
8.618	4.42	1.12	204.44	49.56	8.097	4.72	2.03	155.27	55.10
8.798	4.36	.81	221.71	41.19	8.262	4.07	1.96	166.70	62.00
8.977	4.26	.68	228.91	36.54	8.428	4.51	2.29	176.26	89.51
9.157	4.17	.47	236.80	26.69	8.593	3.75	1.27	208.81	97.91
9.337	4.06	.19	234.28	10.45	8.758	3.69	1.69	225.61	104.44
9.516	4.05	.05	229.86	2.84	8.923	3.13	1.41	254.65	107.82
9.696	4.09	.54	222.08	11.87	9.089	3.45	.81	306.27	81.34
9.875	4.73	.34	210.33	15.12	9.254	2.94	.63	370.84	91.99
10.055	4.91	.48	211.74	19.79	9.419	4.70	.65	327.60	61.09
10.234	4.93	.47	201.01	19.14	9.584	3.11	.32	318.17	32.74
10.414	4.90	.35	203.05	14.50	9.750	3.74	1.02	282.48	1.60
10.593	4.92	.34	202.29	13.78	9.915	3.07	.50	267.51	36.44
10.773	4.92	.28	202.60	11.53					

TABLE 3.3 (CONTINUED)

ADMITTANCE AND IMPEDANCE OF MONOPOLE ANTENNA OVER FRESH WATER (MEASURED)					ADMITTANCE AND IMPEDANCE OF MONOPOLE ANTENNA OVER FRESH WATER (MEASURED)				
ALFA/BETA * 10^6	BETA/LPHETA * 10^18	AL/LPHAL * 10^15	D/LPHAD * 10^15	IMPEDANCE (OHMS)	ALFA/BETA * 10^6	BETA/LPHETA * 10^18	AL/LPHAL * 10^15	D/LPHAD * 10^15	IMPEDANCE (OHMS)
FREQUENCY * 300/100MHZ	RE * 10^67				FREQUENCY * 300/100MHZ	RE * 10^67			
ADMITTANCE (MILLIEMHS)					ADMITTANCE (MILLIEMHS)				
BETA/H	G	B	R	X	BETA/H	G	B	R	X
0.03	+1	+20			0.03	+1	+25		
0.100	+1	+25			0.100	+1	+42		
0.350	+3	+82			0.350	+3	+84		
0.600	+7	1.39			0.600	+7	1.71		
0.759	+10	3.51	12.96	+28.43j	0.759	+10	2.70	9.60	-270.12
0.959	+19	5.38	13.40	+18.49c	0.959	+19	5.62	10.11	-177.36
1.119	+32	8.49	15.27	+15.77c	1.119	+32	8.89	11.76	-111.24
1.279	+59	13.44	17.69	+9.91c	1.279	+59	14.94	15.89	-54.58
1.439	+91	19.51	21.16	+10.22c	1.439	+91	24.35	19.69	-2.99
1.599	+137	27.39	24.81	18.24	1.599	+137	32.58	24.35	66.91
1.759	+205	37.39	29.31	75.00	1.759	+205	41.55	149.76	46.99
1.919	+308	50.00	34.81	180.01	1.919	+308	49.87	191.83	191.83
2.079	+447	66.48	41.04	208.26	2.079	+447	55.94	244.58	244.58
2.239	+619	86.48	48.00	240.16	2.239	+619	60.94	302.10	302.10
2.399	+824	110.00	55.11	283.44	2.399	+824	65.94	364.52	364.52
2.558	+1061	137.79	62.14	328.67	2.558	+1061	70.94	431.94	431.94
2.718	+1330	169.00	69.21	375.84	2.718	+1330	75.94	504.36	504.36
2.878	+1631	203.00	76.28	424.97	2.878	+1631	80.94	581.78	581.78
3.038	+1964	239.00	83.35	476.00	3.038	+1964	85.94	664.20	664.20
3.198	+2339	277.00	90.42	528.03	3.198	+2339	90.94	751.62	751.62
3.358	+2756	317.00	97.49	581.06	3.358	+2756	95.94	844.04	844.04
3.518	+3215	359.00	104.56	635.09	3.518	+3215	100.94	941.46	941.46
3.678	+3716	403.00	111.63	690.12	3.678	+3716	105.94	1043.88	1043.88
3.838	+4259	449.00	118.70	746.15	3.838	+4259	110.94	1151.30	1151.30
3.997	+4844	497.00	125.77	803.18	3.997	+4844	115.94	1263.72	1263.72
4.157	+5471	547.00	132.84	861.21	4.157	+5471	120.94	1381.14	1381.14
4.317	+6140	600.00	140.00	920.24	4.317	+6140	125.94	1503.56	1503.56
4.477	+6861	655.00	147.07	980.27	4.477	+6861	130.94	1630.98	1630.98
4.637	+7634	713.00	154.14	1041.30	4.637	+7634	135.94	1763.40	1763.40
4.797	+8469	773.00	161.21	1103.33	4.797	+8469	140.94	1900.82	1900.82
4.957	+9366	835.00	168.28	1166.36	4.957	+9366	145.94	2043.24	2043.24
5.117	+10325	900.00	175.35	1230.39	5.117	+10325	150.94	2190.66	2190.66
5.277	+11346	967.00	182.42	1295.42	5.277	+11346	155.94	2343.08	2343.08
5.437	+12429	1037.00	189.49	1361.45	5.437	+12429	160.94	2500.50	2500.50
5.596	+13574	1110.00	196.56	1428.48	5.596	+13574	165.94	2662.92	2662.92
5.756	+14781	1185.00	203.63	1496.51	5.756	+14781	170.94	2830.34	2830.34
5.916	+16050	1262.00	210.70	1565.54	5.916	+16050	175.94	3002.76	3002.76
6.076	+17391	1342.00	217.77	1635.57	6.076	+17391	180.94	3180.18	3180.18
6.236	+18804	1425.00	224.84	1706.60	6.236	+18804	185.94	3362.60	3362.60
6.395	+20289	1511.00	231.91	1778.63	6.395	+20289	190.94	3550.02	3550.02
6.555	+21846	1600.00	239.00	1851.66	6.555	+21846	195.94	3742.44	3742.44
6.715	+23475	1692.00	246.07	1925.69	6.715	+23475	200.94	3939.86	3939.86
6.875	+25176	1788.00	253.14	2000.72	6.875	+25176	205.94	4142.28	4142.28
7.035	+26949	1888.00	260.21	2076.75	7.035	+26949	210.94	4349.70	4349.70
7.195	+28794	1992.00	267.28	2153.78	7.195	+28794	215.94	4562.12	4562.12
7.355	+30711	2100.00	274.35	2231.81	7.355	+30711	220.94	4779.54	4779.54
7.515	+32700	2213.00	281.42	2310.84	7.515	+32700	225.94	5001.96	5001.96
7.675	+34761	2331.00	288.49	2390.87	7.675	+34761	230.94	5229.38	5229.38
7.835	+36894	2455.00	295.56	2471.90	7.835	+36894	235.94	5461.80	5461.80
7.995	+39109	2585.00	302.63	2553.93	7.995	+39109	240.94	5699.22	5699.22
8.155	+41406	2721.00	309.70	2636.96	8.155	+41406	245.94	5941.64	5941.64
8.315	+43785	2863.00	316.77	2720.99	8.315	+43785	250.94	6189.06	6189.06
8.475	+46246	3011.00	323.84	2805.02	8.475	+46246	255.94	6441.48	6441.48
8.635	+48789	3165.00	330.91	2890.05	8.635	+48789	260.94	6698.90	6698.90
8.795	+51414	3325.00	338.00	2976.08	8.795	+51414	265.94	6961.32	6961.32
8.954	+54121	3491.00	345.07	3063.11	8.954	+54121	270.94	7228.74	7228.74
9.114	+56910	3663.00	352.14	3151.14	9.114	+56910	275.94	7501.16	7501.16
9.274	+59781	3841.00	359.21	3240.17	9.274	+59781	280.94	7778.58	7778.58
9.434	+62734	4025.00	366.28	3330.20	9.434	+62734	285.94	8060.00	8060.00
9.594	+65769	4215.00	373.35	3421.23	9.594	+65769	290.94	8346.42	8346.42

TABLE 3.3 (CONTINUED)

ADMITTANCE AND IMPEDANCE OF HORNBOBLE ANTENNA OVER FRESH WATER (MEASURED)					ADMITTANCE AND IMPEDANCE OF HORNBOBLE ANTENNA OVER SALT WATER (MEASURED)						
ALPHA/BETA * 10310		BETA/LAMBDA * 10310		ALPHA/DL * 10310		ALPHA/BETA * 10661		BETA/LAMBDA * 10661		ALPHA/DL * 10661	
FREQUENCY * 300/GHZ		RE * 107		D/LAMBDA * 10310		FREQUENCY * 300/GHZ		RE * 2088		D/LAMBDA * 10661	
ADMITTANCE (MILLI-MHS)					ADMITTANCE (MILLI-MHS)						
METAL*	G	B	R	X	METAL*	G	B	R	X		
1083	+.1	+.38			1001	+.0	+.16				
1160	+.1	+.63			1174	+.1	+.38				
1319	+.3	1.36			1348	+.3	1.48				
1479	+.5	2.23			1523	+.7	2.70	9.60	-370.12		
1638	+.8	3.11	8.27	-321.33	1697	+.16	+.33	9.84	-247.78		
1798	+.21	+.28	11.44	-233.08	1772	+.12	0.97	11.73	-186.68		
1958	+.61	6.19	14.27	-159.89	1845	1.17	3.18	13.72	-127.62		
1117	0.13	9.33	22.27	-102.34	1919	3.76	10.94	16.21	-82.78		
1277	0.77	14.60	30.17	-70.30	1994	6.72	20.12	19.50	-52.78		
1436	2.92	+.53	41.82	-.93	2068	15.58	49.48	29.04	-15.02		
1596	10.13	+.71	56.76	+.80	2142	11.11	10.89	27.18	+.133		
1756	+.80	+.60	77.72	98.28	2216	1.91	+.12	10.93	34.11		
1915	3.74	+.44	104.99	153.34	2290	3.77	+.74	17.44	+.31		
2075	7.02	+.20	142.71	219.57	2365	9.12	+.50	25.98	148.94		
2234	1.75	+.40	198.36	272.03	2439	1.84	+.80	37.49	186.17		
2394	1.70	+.72	288.00	320.24	2513	1.36	1.34	14.48	256.89		
2554	1.93	+.15	430.23	372.00	2587	1.01	+.43	16.42	329.74		
2713	1.02	+.67	629.74	345.84	2661	1.14	1.57	32.83	417.05		
2873	1.14	+.20	851.00	149.30	2736	1.15	+.73	619.81	393.44		
3032	1.49	+.15	900.88	-123.91	2810	1.19	+.15	838.86	-.25.28		
3192	1.12	+.44	826.58	-356.56	2884	1.19	+.61	603.25	-264.73		
3352	1.44	+.96	519.17	-.99.23	2958	1.70	2.06	236.31	-288.79		
3511	1.16	1.53	305.96	+.41.62	3032	2.02	2.80	137.31	-186.64		
3671	1.13	2.11	197.24	-368.30	3107	3.75	+.89	98.75	-128.77		
3830	1.78	3.13	111.93	-273.71	3181	6.11	6.33	78.84	+.7.78		
3990	1.44	+.23	79.68	-205.51	3255	4.35	6.43	68.56	+.44.00		
4150	2.03	0.29	59.77	-138.39	3329	10.11	2.85	64.34	-12.23		
4310	3.16	0.83	49.33	+.84.42	3403	14.77	2.89	65.11	16.15		
4469	4.18	3.47	48.77	-32.57	3477	9.74	6.43	71.22	46.54		
4628	10.16	+.05	54.82	18.40	3552	6.97	6.18	80.67	74.74		
4788	7.13	+.41	67.43	70.07	3626	4.00	6.08	94.27	103.70		
4948	3.82	+.23	88.83	123.98	3700	3.74	+.35	113.64	132.18		
5107	2.45	3.76	121.65	186.49	3774	4.33	3.42	143.45	181.98		
5267	1.92	2.62	181.98	248.32	3848	5.74	2.67	187.65	187.26		
5426	1.59	1.80	276.65	312.04	3922	5.93	1.89	256.41	199.43		
5586	1.39	1.19	415.15	365.41	3996	6.07	1.74	352.80	164.17		
5746	1.29	+.84	625.00	312.50	4070	6.21	+.42	422.75	74.83		
5905	1.19	+.24	807.49	162.86	4144	6.46	+.36	397.99	+.58.24		
6065	1.14	+.12	867.58	+.91.32	4218	1.05	3.02	307.28	-128.38		
6224	1.10	+.00	753.43	-342.47	4292	6.74	3.02	1.95	227.88		
6384	1.10	+.96	512.46	+.27.78	4366	6.98	3.44	2.81	178.13		
6544	1.10	1.41	347.96	+.42.98	4440	7.14	3.10	1.40	147.00		
6703	1.10	1.93	232.34	-373.88	4514	7.36	3.27	119.97	+.61.07		
6863	1.10	2.57	148.14	-307.88	4588	7.45	6.71	2.86	111.01		
7022	1.10	3.46	106.43	-242.26	4662	7.66	9.76	+.98	111.44		
7182	1.07	+.83	80.73	-185.84	4736	7.80	14.00	98.44	14.28		
7342	1.01	0.06	65.74	-132.34	4810	4.03	+.11	134.88	42.01		
7501	5.74	8.22	59.75	+.80.14	4884	6.03	+.17	14.51	64.84		
7661	14.92	0.70	57.29	+.26.81	4958	6.40	+.11	116.06	85.18		
7820	13.88	5.71	61.30	28.04	5032	6.43	+.12	137.59	128.84		
7980	8.46	8.84	71.86	77.20	5106	3.44	+.12	156.86	127.44		
8140	3.82	10.00	90.17	129.33	5180	4.44	+.17	168.16	137.15		
8299	2.47	3.80	120.25	185.00	5254	3.16	1.94	224.83	141.10		
8459	1.44	6.85	163.22	239.78	5328	3.44	1.40	271.33	124.99		
8618	1.02	10.09	231.68	294.89	5402	9.44	+.75	3.82	76.54		
8778	1.45	1.44	347.21	344.82	5476	9.51	1.42	1.16	3.63		
8938	1.16	+.85	494.17	345.19	5550	9.76	+.43	287.49	+.86.61		
9097	1.09	+.81	670.41	265.08	5624	9.09	1.75	92	281.53		
9257	1.06	+.12	786.52	74.91	5698	10.14	1.41	2.84	67.71		
9416	1.03	+.30	767.86	-187.16	5772	10.28	1.73	174.39	+.80.07		
9576	1.03	+.74	596.94	-359.14	5846	10.42	1.89	153.95	+.40.24		

TABLE 3.3 (CONTINUED)

ADMITTANCE AND IMPEDANCE OF HORNPILE ANTENNA OVER SALT WATER (MEASURED)					ADMITTANCE AND IMPEDANCE OF HORNPILE ANTENNA OVER SALT WATER (MEASURED)				
ALPHA/BETA * 10007		BETA/LAMBDA * 10047		AL/LAMBDA * 10016	ALPHA/BETA * 10022		BETA/LAMBDA * 10025		AL/LAMBDA * 10015
FREQUENCY * 3000(MHZ)		FE * 20005		D/LAMBDA * 10000	FREQUENCY * 3000(MHZ)		FE * 20005		D/LAMBDA * 10000
ADMITTANCE(ILLIHMBS)					ADMITTANCE(ILLIHMBS)				
IMPEDANCE(OHMS)					IMPEDANCE(OHMS)				
BETA/H	I	B	R	X	BETA/H	I	B	R	X
+066	+03	1+21			+064	+02	1+45		
+104	+05	1+50			+101	+03	1+71		
+129	+05	2+42			+132	+05	2+42		
+192	+07	3+51			+193	+07	3+51		
+258	+13	4+78	5+69	-284.79	+244	+10	4+60	4+60	-214.49
+322	+15	4+42	6+05	-195.53	+316	+12	5+11	4+86	-193+11
+367	+17	5+40	7+33	-113+16	+396	+16	5+11	5+99	-84+76
1+151	1+43	13+01	8+92	-75+22	1+177	1+23	11+74	5+99	-84+76
1+316	1+34	24+00	11+30	-40+71	1+204	1+34	20+42	7+81	-47+72
1+490	20+16	26+76	14+51	-6+91	1+249	20+02	40+01	10+67	-8+83
1+644	10+47	24+48	18+59	27+74	1+300	11+04	20+49	14+47	32+66
1+819	5+11	13+48	24+59	64+86	1+371	3+02	11+87	22+60	76+07
1+973	1+58	6+42	33+27	108+57	1+432	1+58	7+16	23+39	133+18
2+138	1+46	+043	45+64	158+39	2+053	1+11	+073	43+14	228+20
2+312	1+26	+118	66+11	219+31	2+254	1+76	3+26	67+83	290+94
2+467	1+03	+2+96	104+86	301+36	2+435	+01	+2+12	120+30	435+63
2+621	+30	+1+53	158+46	425+56	2+636	+04	+1+05	251+25	674+18
2+796	+42	+1+03	473+09	594+24	2+737	+17	+0+52	954+05	1084+17
2+960	+79	+2+24	1158+87	892+06	2+878	+44	+0+26	2231+24	1504+24
3+125	+11	+05	844+90	1273+76	3+059	+43	+00	783+14	1101+12
3+289	+45	1+34	337+56	1532+15	3+200	+47	1+20	290+96	1722+50
3+453	+34	2+26	156+90	1977+22	3+311	+51	2+05	114+28	1459+37
3+614	1+19	3+22	94+30	278+43	3+542	+06	2+97	61+31	1305+14
3+742	1+18	+137	65+71	208+08	3+713	+72	3+89	46+00	1244+56
3+847	1+51	5+79	51+34	145+74	3+844	+00	3+01	34+74	1193+34
+111	+12	7+80	+421	-110+82	+105	1+30	6+42	78+56	-145+48
+276	+17	10+82	40+87	-70+88	+116	2+19	9+13	24+84	-102+87
+440	10+41	14+05	40+59	-36+54	+137	+19	13+03	23+59	-60+56
+615	23+12	2+00	42+93	-3+71	+158	19+12	19+75	25+30	-26+14
+769	44+45	+011	48+93	30+09	+169	23+02	+12+89	79+37	13+36
+933	7+40	+0+50	58+26	60+39	+180	+70	-12+62	35+64	56+93
1+028	+16	+0+30	75+39	104+16	+191	3+43	-7+51	44+33	104+22
1+202	2+19	+0+74	95+74	149+77	2+102	1+76	+0+23	63+31	167+24
1+407	7+19	+0+36	138+51	203+22	2+313	1+19	+0+50	58+01	246+78
1+591	1+45	+0+28	214+59	264+47	2+474	1+15	-2+27	171+50	367+56
1+796	+102	+1+36	302+09	303+08	2+645	+05	+1+25	345+40	507+10
1+992	1+49	+1+47	610+41	192+24	2+776	+13	+0+54	84+51	550+74
2+205	1+44	+2+20	678+61	-103+68	2+897	+57	+11	127+73	-181+82
2+449	1+43	+0	500+89	-315+26	3+118	+76	+71	7+2+67	-654+38
2+614	1+03	1+70	292+49	-324+99	3+279	+70	1+25	352+94	-588+24
2+798	1+48	2+43	190+50	-278+44	3+440	+01	1+92	144+51	-443+25
2+942	1+45	3+16	141+43	-229+18	3+611	+06	2+04	118+59	-353+01
3+097	2+46	+0+08	104+38	-179+76	3+792	+07	+0+13	66+77	-284+72
3+271	1+10	5+07	90+70	-137+30	3+903	1+13	3+02	86+77	-293+57
3+436	+144	6+30	76+66	-99+82	4+014	1+49	+0+88	47+99	-165+28
3+610	7+40	7+22	49+16	-65+70	4+245	7+48	+3+23	43+23	-126+47
3+805	11+11	5+89	48+50	-34+76	4+416	+402	9+45	33+81	-84+99
4+029	14+15	+85	70+40	-44+23	4+597	1+10	12+39	40+29	-44+32
4+284	11+11	+117	76+28	26+88	4+778	2+74	+4+12	40+88	-37+71
4+508	+11	+0+51	44+74	98+29	4+959	1+01	+3+88	47+44	32+59
4+722	+10	+0+01	99+45	91+42	5+140	6+32	+6+03	56+05	75+68
4+987	+10	+1+12	151+31	124+82	5+321	3+45	+6+06	7+42	124+31
5+251	3+10	+3+18	107+31	161+24	5+502	+03	+4+34	91+66	182+25
5+516	2+49	+0+31	215+84	200+24	5+683	1+13	+3+19	133+55	253+17
5+800	0+72	-1+49	310+55	208+44	5+864	1+71	+2+15	204+67	339+16
6+045	2+10	+0+77	435+45	167+68	6+045	1+14	+1+26	394+85	436+41
6+300	1+32	+1+0	619+42	27+05	6+216	1+14	+0+8	793+43	1054+23
6+574	1+92	+07	478+65	-142+10	6+377	+04	+07	1010+23	-72+52
6+858	2+13	1+92	365+25	-215+79	6+538	+06	+09	660+84	-463+67
7+173	2+21	1+48	264+87	-652+52	6+719	+0	1+04	357+31	-404+40
7+467	2+49	2+62	190+83	-193+04	6+900	1+14	1+51	219+89	-403+83

TABLE 3.3 (CONTINUED)

ADMITTANCE AND IMPEDANCE OF HORNPILE ANTENNA OVER SALT WATER (MEASURED)					ADMITTANCE AND IMPEDANCE OF HORNPILE ANTENNA OVER SALT WATER (MEASURED)						
ALPHA/BETA * 10190	BETA/BETA0 * 10223	AL/LANDL * 10015	FREQUENCY * 300/CMHZ	RE * 24885	DL/LANDC * 10000	ALPHA/BETA * 10340	BETA/BETA0 * 10116	AL/LANDL * 10015	FREQUENCY * 300/CMHZ	RE * 24885	DL/LANDC * 10000
ADMITTANCE (MILLIEMHS)					ADMITTANCE (MILLIEMHS)						
BETA/R	G	B	R	X	BETA/R	G	B	R	X		
0.044	+0	1.33	+0	-751.88	0.083	+0	1.42	+0	-617.28		
0.101	+0	1.56	+0	-641.53	0.160	+0	1.85	+0	-540.54		
0.201	+0	2.42	+0	-413.82	0.318	+0	2.86	+0	-380.89		
0.402	+2	3.33	1.80	-300.29	0.79	+2	3.59	1.50	-278.54		
0.803	+5	4.29	2.72	-233.67	1.58	+7	4.54	3.40	-220.21		
1.604	+9	5.60	2.85	-177.88	3.16	+12	5.80	4.70	-170.00		
1.785	+9	7.00	4.67	-133.17	3.98	+14	7.70	11.39	-128.87		
1.825	+9	11.18	7.39	-88.83	4.11	+17	8.97	11.89	-87.27		
1.846	+9	21.35	10.55	-45.78	4.27	+16	10.93	17.42	-46.04		
1.847	5.4	40.50	11.85	-8.89	4.38	23.93	1.50	41.63	-2.81		
1.847	7.92	16.87	22.80	48.57	4.06	11.46	17.83	42.44	48.82		
1.768	2.48	2.84	33.32	102.27	4.76	4.14	25.33	83.54	100.92		
1.929	1.83	5.30	50.28	174.17	4.95	3.16	33.41	135.77	162.45		
2.050	1.13	14.88	78.12	264.21	4.97	2.19	43.45	228.02	288.02		
2.250	0.40	2.28	137.02	390.59	4.21	1.72	112.3	386.11	279.34		
2.411	0.64	1.39	273.31	593.59	2.94	1.67	144	588.84	190.94		
2.572	0.86	0.72	673.08	865.38	2.05	1.26	111	793.88	45.86		
2.733	0.49	0.19	1774.08	887.91	2.713	1.14	62	876.96	-368.17		
2.893	0.45	0.35	1384.62	1078.92	2.873	1.16	158	518.29	-469.36		
3.054	0.3	0.87	458.57	923.76	3.032	1.14	1.50	312.10	-450.23		
3.215	0.0	1.32	210.26	693.86	3.192	0.99	1.91	213.91	-412.65		
3.376	0.19	2.05	89.56	470.77	3.352	0.76	2.84	130.02	-344.48		
3.536	0.42	2.83	51.31	348.74	3.511	1.1	3.22	88.69	-282.74		
3.697	0.85	3.84	33.45	270.59	3.671	1.5	3.86	64.99	-240.15		
3.858	1.68	4.85	24.11	211.74	3.830	2.01	4.87	54.85	-189.46		
4.019	3.02	6.07	21.86	161.79	3.990	3.05	6.15	40.70	-151.08		
4.179	5.46	8.39	20.13	115.49	4.150	4.73	8.33	35.03	-108.40		
4.340	9.84	12.77	19.67	73.01	4.309	5.74	11.07	37.44	-70.14		
4.501	15.40	21.87	21.52	30.57	4.469	10.16	10.48	33.45	-28.01		
4.662	29.41	18.07	28.03	14.40	4.628	19.06	8.14	26.44	18.05		
4.822	6.13	12.06	33.49	65.89	4.788	7.01	10.23	29.41	68.81		
4.983	2.87	17.01	46.11	125.75	4.948	4.4	14.19	119.25	123.68		
5.144	1.43	24.41	66.53	205.18	5.107	2.72	20.02	187.03	184.78		
5.305	1.1	2.81	113.28	315.16	5.267	2.12	11.68	314.07	228.77		
5.465	0.79	1.84	238.40	484.92	5.426	1.75	17.73	468.73	203.44		
5.626	0.62	1.85	500.12	747.91	5.586	1.46	11.5	648.67	21.06		
5.787	0.4	0.90	1028.47	803.14	5.746	1.43	8.4	812.01	-631.11		
5.948	0.48	1.1	1244.52	1028.86	5.905	1.41	10.7	404.13	-368.70		
6.108	0.8	1.58	400.32	854.02	6.065	1.92	1.49	308.97	-401.78		
6.269	0.93	1.36	214.21	672.51	6.224	1.90	1.90	237.69	-376.24		
6.430	1.80	1.95	111.65	518.40	6.384	1.92	2.87	163.11	-320.31		
6.591	3.68	2.42	78.86	397.58	6.544	1.76	2.94	123.15	-287.34		
6.751	7.02	2.87	57.80	328.69	6.703	1.71	3.87	95.02	-250.24		
6.912	13.61	3.82	40.76	255.27	6.863	1.64	12	74.77	-216.58		
7.073	2.02	4.84	34.03	200.88	7.022	1.64	16.05	58.17	-179.12		
7.234	1.00	8.40	29.40	150.81	7.182	2.02	18.94	49.36	-143.28		
7.394	2.07	8.75	27.74	107.09	7.342	3.41	8.08	44.33	-105.09		
7.555	5.21	12.93	28.91	64.38	7.501	7.13	10.54	44.03	-65.09		
7.715	20.40	14.23	31.75	30.08	7.661	12.74	7.17	45.62	-32.01		
7.877	17.43	13.01	36.84	27.50	7.820	14.02	10.31	61.78	23.12		
8.037	5.07	19.80	44.23	74.45	7.980	16.02	15.48	69.64	74.20		
8.198	2.49	40.20	58.89	138.74	8.140	14.4	13.92	129.55	124.90		
8.359	1.59	44.14	84.38	214.33	8.300	16.02	21.67	185.02	185.02		
8.520	1.13	62.71	131.08	314.38	8.459	21.44	11.45	321.06	217.00		
8.680	0.89	1.72	237.30	458.61	8.618	1.71	16.7	445.91	179.87		
8.841	0.72	1.56	500.00	666.67	8.778	1.61	22.9	620.90	11.57		
9.002	0.8	0.30	1000.00	616.14	8.938	1.63	32.02	845.82	-189.13		
9.163	0.8	0.31	1341.04	716.78	9.097	1.45	47.38	1121.16	-321.16		
9.323	0.8	0.78	4.3881	850.30	9.257	1.41	1.45	34.82	-376.92		
9.484	0.5	1.29	279.67	655.96	9.416	1.10	1.80	252.53	-343.37		
9.645	0.6	1.85	149.89	495.17	9.576	1.19	1.84	164.13	-313.94		

TABLE 3.3 (CONTINUED)

ADMITTANCE AND IMPEDANCE OF HORIZONTAL ANTENNA OVER LOSSY EARTH (MEASURED)					ADMITTANCE AND IMPEDANCE OF HORIZONTAL ANTENNA OVER LOSSY EARTH (MEASURED)				
ALPHA/BETA * 10000	BETA/ALPHA * 10000	RE * 1000	DL/LAMBDA * 10000	AL/LAMBDA * 10000	FREQUENCY * 300000000	RE * 1000	DL/LAMBDA * 10000	AL/LAMBDA * 10000	FREQUENCY * 300000000
ADMITTANCE (MILLIHMS)					ADMITTANCE (MILLIHMS)				
REAL * H	G	B	R	X	REAL * H	G	B	R	X
1020	1.4	88			1020	1.4	88		
1174	1.6	92			1174	1.6	92		
1347	1.1	1.71			1347	1.1	1.71		
1501	1.8	2.05			1501	1.8	2.05		
1675	1.2	2.37	14.73	-264.83	1675	1.2	2.37	14.73	-264.83
1849	1.47	5.38	16.12	-184.87	1849	1.47	5.38	16.12	-184.87
2002	1.13	7.58	21.21	-128.78	2002	1.13	7.58	21.21	-128.78
2168	1.42	11.20	24.94	-81.67	2168	1.42	11.20	24.94	-81.67
2320	1.27	16.20	27.36	-37.93	2320	1.27	16.20	27.36	-37.93
2484	1.14	21.24	27.22	1.44	2484	1.14	21.24	27.22	1.44
2637	1.19	10.83	47.09	-41.38	2637	1.19	10.83	47.09	-41.38
2791	1.24	18.13	59.84	80.88	2791	1.24	18.13	59.84	80.88
2945	1.28	10.67	67.21	101.32	2945	1.28	10.67	67.21	101.32
3098	1.32	11.35	106.38	156.88	3098	1.32	11.35	106.38	156.88
3252	1.36	11.28	138.80	216.61	3252	1.36	11.28	138.80	216.61
3406	1.40	10.30	210.44	271.92	3406	1.40	10.30	210.44	271.92
3560	1.44	11.56	302.41	314.90	3560	1.44	11.56	302.41	314.90
3714	1.48	11.66	501.74	287.66	3714	1.48	11.66	501.74	287.66
3868	1.52	11.20	687.91	90.87	3868	1.52	11.20	687.91	90.87
4022	1.56	11.2	681.34	-85.92	4022	1.56	11.2	681.34	-85.92
4176	1.60	11.2	470.46	-270.64	4176	1.60	11.2	470.46	-270.64
4330	1.64	11.2	363.05	-270.78	4330	1.64	11.2	363.05	-270.78
4484	1.68	11.2	190.96	-219.82	4484	1.68	11.2	190.96	-219.82
4638	1.72	11.2	137.00	-166.82	4638	1.72	11.2	137.00	-166.82
4792	1.76	11.2	105.85	-120.12	4792	1.76	11.2	105.85	-120.12
4946	1.80	11.2	107.03	-80.64	4946	1.80	11.2	107.03	-80.64
5100	1.84	11.2	105.81	-56.32	5100	1.84	11.2	105.81	-56.32
5254	1.88	11.2	100.17	-16.86	5254	1.88	11.2	100.17	-16.86
5408	1.92	11.2	105.74	13.76	5408	1.92	11.2	105.74	13.76
5562	1.96	11.2	101.41	41.90	5562	1.96	11.2	101.41	41.90
5716	2.00	11.2	105.36	67.11	5716	2.00	11.2	105.36	67.11
5870	2.04	11.2	106.17	96.18	5870	2.04	11.2	106.17	96.18
6024	2.08	11.2	151.72	129.60	6024	2.08	11.2	151.72	129.60
6178	2.12	11.2	240.67	126.18	6178	2.12	11.2	240.67	126.18
6332	2.16	11.2	316.73	125.30	6332	2.16	11.2	316.73	125.30
6486	2.20	11.2	381.20	54.88	6486	2.20	11.2	381.20	54.88
6640	2.24	11.2	406.44	3.30	6640	2.24	11.2	406.44	3.30
6794	2.28	11.2	374.88	-90.74	6794	2.28	11.2	374.88	-90.74
6948	2.32	11.2	327.06	-130.78	6948	2.32	11.2	327.06	-130.78
7102	2.36	11.2	276.91	-144.31	7102	2.36	11.2	276.91	-144.31
7256	2.40	11.2	212.87	-138.73	7256	2.40	11.2	212.87	-138.73
7410	2.44	11.2	144.80	-119.80	7410	2.44	11.2	144.80	-119.80
7564	2.48	11.2	170.57	-93.42	7564	2.48	11.2	170.57	-93.42
7718	2.52	11.2	187.78	-65.76	7718	2.52	11.2	187.78	-65.76
7872	2.56	11.2	148.44	-46.99	7872	2.56	11.2	148.44	-46.99
8026	2.60	11.2	148.48	-20.78	8026	2.60	11.2	148.48	-20.78
8180	2.64	11.2	173.88	8.88	8180	2.64	11.2	173.88	8.88
8334	2.68	11.2	161.96	30.71	8334	2.68	11.2	161.96	30.71
8488	2.72	11.2	173.83	52.62	8488	2.72	11.2	173.83	52.62
8642	2.76	11.2	159.31	70.62	8642	2.76	11.2	159.31	70.62
8796	2.80	11.2	206.47	92.87	8796	2.80	11.2	206.47	92.87
8950	2.84	11.2	280.64	82.16	8950	2.84	11.2	280.64	82.16
9104	2.88	11.2	278.83	74.28	9104	2.88	11.2	278.83	74.28
9258	2.92	11.2	310.80	48.00	9258	2.92	11.2	310.80	48.00
9412	2.96	11.2	330.00	3.07	9412	2.96	11.2	330.00	3.07
9566	3.00	11.2	337.88	-44.12	9566	3.00	11.2	337.88	-44.12
9720	3.04	11.2	330.00	-81.88	9720	3.04	11.2	330.00	-81.88
9874	3.08	11.2	276.38	-85.64	9874	3.08	11.2	276.38	-85.64
10028	3.12	11.2	266.71	-66.45	10028	3.12	11.2	266.71	-66.45
10182	3.16	11.2	232.18	-50.84	10182	3.16	11.2	232.18	-50.84
10336	3.20	11.2	216.70	-70.01	10336	3.20	11.2	216.70	-70.01

TABLE 3.3 (CONTINUED)

ADMITTANCE AND IMPEDANCE OF HORIZONTAL ANTENNA OVER POIST (EARTH) (MEASURED)

ALFALBETA * 1000 BETA/ALPHETA * 1000 A/LAMDA * 10000

FREQUENCY * 300000000 PE * 1000 D/LAMDA * 10000

ADMITTANCE (ILLI/PHS) IMPEDANCE (OHMS)

BETA/H	G	B	R	X
0000	1.02	1.442		
0050	1.03	1.471		
0100	1.04	1.500		
0150	1.05	1.529		
0200	1.06	1.558		
0250	1.07	1.587		
0300	1.08	1.616		
0350	1.09	1.645		
0400	1.10	1.674		
0450	1.11	1.703		
0500	1.12	1.732		
0550	1.13	1.761		
0600	1.14	1.790		
0650	1.15	1.819		
0700	1.16	1.848		
0750	1.17	1.877		
0800	1.18	1.906		
0850	1.19	1.935		
0900	1.20	1.964		
0950	1.21	1.993		
1000	1.22	2.022		
1050	1.23	2.051		
1100	1.24	2.080		
1150	1.25	2.109		
1200	1.26	2.138		
1250	1.27	2.167		
1300	1.28	2.196		
1350	1.29	2.225		
1400	1.30	2.254		
1450	1.31	2.283		
1500	1.32	2.312		
1550	1.33	2.341		
1600	1.34	2.370		
1650	1.35	2.399		
1700	1.36	2.428		
1750	1.37	2.457		
1800	1.38	2.486		
1850	1.39	2.515		
1900	1.40	2.544		
1950	1.41	2.573		
2000	1.42	2.602		
2050	1.43	2.631		
2100	1.44	2.660		
2150	1.45	2.689		
2200	1.46	2.718		
2250	1.47	2.747		
2300	1.48	2.776		
2350	1.49	2.805		
2400	1.50	2.834		
2450	1.51	2.863		
2500	1.52	2.892		
2550	1.53	2.921		
2600	1.54	2.950		
2650	1.55	2.979		
2700	1.56	3.008		
2750	1.57	3.037		
2800	1.58	3.066		
2850	1.59	3.095		
2900	1.60	3.124		
2950	1.61	3.153		
3000	1.62	3.182		
3050	1.63	3.211		
3100	1.64	3.240		
3150	1.65	3.269		
3200	1.66	3.298		
3250	1.67	3.327		
3300	1.68	3.356		
3350	1.69	3.385		
3400	1.70	3.414		
3450	1.71	3.443		
3500	1.72	3.472		
3550	1.73	3.501		
3600	1.74	3.530		
3650	1.75	3.559		
3700	1.76	3.588		
3750	1.77	3.617		
3800	1.78	3.646		
3850	1.79	3.675		
3900	1.80	3.704		
3950	1.81	3.733		
4000	1.82	3.762		
4050	1.83	3.791		
4100	1.84	3.820		
4150	1.85	3.849		
4200	1.86	3.878		
4250	1.87	3.907		
4300	1.88	3.936		
4350	1.89	3.965		
4400	1.90	3.994		
4450	1.91	4.023		
4500	1.92	4.052		
4550	1.93	4.081		
4600	1.94	4.110		
4650	1.95	4.139		
4700	1.96	4.168		
4750	1.97	4.197		
4800	1.98	4.226		
4850	1.99	4.255		
4900	2.00	4.284		
4950	2.01	4.313		
5000	2.02	4.342		

ADMITTANCE AND IMPEDANCE OF HORIZONTAL ANTENNA OVER POIST (EARTH) (MEASURED)

ALFALBETA * 1000 BETA/ALPHETA * 1000 A/LAMDA * 10000

FREQUENCY * 300000000 PE * 1000 D/LAMDA * 10000

ADMITTANCE (ILLI/PHS) IMPEDANCE (OHMS)

BETA/H	G	B	R	X
0000	1.00	1.400		
0050	1.01	1.429		
0100	1.02	1.458		
0150	1.03	1.487		
0200	1.04	1.516		
0250	1.05	1.545		
0300	1.06	1.574		
0350	1.07	1.603		
0400	1.08	1.632		
0450	1.09	1.661		
0500	1.10	1.690		
0550	1.11	1.719		
0600	1.12	1.748		
0650	1.13	1.777		
0700	1.14	1.806		
0750	1.15	1.835		
0800	1.16	1.864		
0850	1.17	1.893		
0900	1.18	1.922		
0950	1.19	1.951		
1000	1.20	1.980		
1050	1.21	2.009		
1100	1.22	2.038		
1150	1.23	2.067		
1200	1.24	2.096		
1250	1.25	2.125		
1300	1.26	2.154		
1350	1.27	2.183		
1400	1.28	2.212		
1450	1.29	2.241		
1500	1.30	2.270		
1550	1.31	2.299		
1600	1.32	2.328		
1650	1.33	2.357		
1700	1.34	2.386		
1750	1.35	2.415		
1800	1.36	2.444		
1850	1.37	2.473		
1900	1.38	2.502		
1950	1.39	2.531		
2000	1.40	2.560		
2050	1.41	2.589		
2100	1.42	2.618		
2150	1.43	2.647		
2200	1.44	2.676		
2250	1.45	2.705		
2300	1.46	2.734		
2350	1.47	2.763		
2400	1.48	2.792		
2450	1.49	2.821		
2500	1.50	2.850		
2550	1.51	2.879		
2600	1.52	2.908		
2650	1.53	2.937		
2700	1.54	2.966		
2750	1.55	2.995		
2800	1.56	3.024		
2850	1.57	3.053		
2900	1.58	3.082		
2950	1.59	3.111		
3000	1.60	3.140		
3050	1.61	3.169		
3100	1.62	3.198		
3150	1.63	3.227		
3200	1.64	3.256		
3250	1.65	3.285		
3300	1.66	3.314		
3350	1.67	3.343		
3400	1.68	3.372		
3450	1.69	3.401		
3500	1.70	3.430		
3550	1.71	3.459		
3600	1.72	3.488		
3650	1.73	3.517		
3700	1.74	3.546		
3750	1.75	3.575		
3800	1.76	3.604		
3850	1.77	3.633		
3900	1.78	3.662		
3950	1.79	3.691		
4000	1.80	3.720		
4050	1.81	3.749		
4100	1.82	3.778		
4150	1.83	3.807		
4200	1.84	3.836		
4250	1.85	3.865		
4300	1.86	3.894		
4350	1.87	3.923		
4400	1.88	3.952		
4450	1.89	3.981		
4500	1.90	4.010		
4550	1.91	4.039		
4600	1.92	4.068		
4650	1.93	4.097		
4700	1.94	4.126		
4750	1.95	4.155		
4800	1.96	4.184		
4850	1.97	4.213		
4900	1.98	4.242		
4950	1.99	4.271		
5000	2.00	4.300		

TABLE 3.4

DISTRIBUTION OF CURRENT AND CHARGE ON BEVERAGE ANTENNA OVER FRESH WATER
 ALPHA/BETA1 * 1.289 BETA1/BETA2 * 1.143 L1/L2/DAC * 1.900
 FREQUENCY * 300.00MHZ PE * .067 D1/D2/DAC * .010 RL * 162.00OHMS

A. MEASURED CURRENT DISTRIBUTION IN HAVV BLT

Z/H	RAW DATA		NORMALIZED DATA					Z/L2/DAC
	IR/A5	IR/FAZ	IR/PAZ	IR/PAZ	IR/REAL	IR/PAZ		
.007	9.40E3	1.44E0	5.38E0	9.000	5.31E	.86E	.003	
.15	9.36E9	1.33E0	5.26E0	+1.6E0	5.25E	-1.1E7	.025	
.29	9.33E9	1.23E0	5.15E0	-1.1E0	5.15	-1.03E	.050	
.43	9.30E4	1.12E0	5.04E0	+3.2E0	4.97E	-2.58E	.100	
.57	9.27E4	1.02E0	4.93E0	+5.3E0	4.93E	-3.62E	.150	
.71	7.24E7	9.0E0	4.82E0	-7.8E0	4.74E	-4.17E	.200	
.85	7.19E0	8.0E0	4.71E0	-9.9E0	4.66E	-4.24E	.250	
.99	7.14E3	7.0E0	4.60E0	-1.1E0	4.60E	-3.65E	.300	
1.13	7.09E0	6.0E0	4.49E0	-1.3E0	4.52E	-2.67E	.350	
1.27	7.04E0	5.0E0	4.38E0	-1.5E0	4.52E	-1.51E	.400	
1.41	7.00E0	4.0E0	4.27E0	-1.7E0	4.52E	-1.24E	.450	
1.55	6.95E0	3.0E0	4.16E0	-1.9E0	4.52E	-9.71E	.500	
1.69	6.91E0	2.0E0	4.05E0	-2.1E0	4.52E	-1.90E	.550	
1.83	6.87E0	1.0E0	3.94E0	-2.3E0	4.52E	-2.44E	.600	
1.97	6.83E0	0.0E0	3.83E0	-2.5E0	4.52E	-2.97E	.650	
2.11	6.79E0	-0.0E0	3.72E0	-2.7E0	4.52E	-3.49E	.700	
2.25	6.75E0	-1.0E0	3.61E0	-2.9E0	4.52E	-4.01E	.750	
2.39	6.71E0	-2.0E0	3.50E0	-3.1E0	4.52E	-4.53E	.800	
2.53	6.67E0	-3.0E0	3.39E0	-3.3E0	4.52E	-5.05E	.850	
2.67	6.63E0	-4.0E0	3.28E0	-3.5E0	4.52E	-5.57E	.900	
2.81	6.59E0	-5.0E0	3.17E0	-3.7E0	4.52E	-6.09E	.950	
2.95	6.55E0	-6.0E0	3.06E0	-3.9E0	4.52E	-6.61E	1.000	
3.09	6.51E0	-7.0E0	2.95E0	-4.1E0	4.52E	-7.13E	1.050	
3.23	6.47E0	-8.0E0	2.84E0	-4.3E0	4.52E	-7.65E	1.100	
3.37	6.43E0	-9.0E0	2.73E0	-4.5E0	4.52E	-8.17E	1.150	
3.51	6.39E0	-10.0E0	2.62E0	-4.7E0	4.52E	-8.69E	1.200	
3.65	6.35E0	-11.0E0	2.51E0	-4.9E0	4.52E	-9.21E	1.250	
3.79	6.31E0	-12.0E0	2.40E0	-5.1E0	4.52E	-9.73E	1.300	
3.93	6.27E0	-13.0E0	2.29E0	-5.3E0	4.52E	-10.25E	1.350	
4.07	6.23E0	-14.0E0	2.18E0	-5.5E0	4.52E	-10.77E	1.400	
4.21	6.19E0	-15.0E0	2.07E0	-5.7E0	4.52E	-11.29E	1.450	
4.35	6.15E0	-16.0E0	1.96E0	-5.9E0	4.52E	-11.81E	1.500	
4.49	6.11E0	-17.0E0	1.85E0	-6.1E0	4.52E	-12.33E	1.550	
4.63	6.07E0	-18.0E0	1.74E0	-6.3E0	4.52E	-12.85E	1.600	
4.77	6.03E0	-19.0E0	1.63E0	-6.5E0	4.52E	-13.37E	1.650	
4.91	5.99E0	-20.0E0	1.52E0	-6.7E0	4.52E	-13.89E	1.700	
5.05	5.95E0	-21.0E0	1.41E0	-6.9E0	4.52E	-14.41E	1.750	
5.19	5.91E0	-22.0E0	1.30E0	-7.1E0	4.52E	-14.93E	1.800	
5.33	5.87E0	-23.0E0	1.19E0	-7.3E0	4.52E	-15.45E	1.850	
5.47	5.83E0	-24.0E0	1.08E0	-7.5E0	4.52E	-15.97E	1.900	
5.61	5.79E0	-25.0E0	0.97E0	-7.7E0	4.52E	-16.49E	1.950	
5.75	5.75E0	-26.0E0	0.86E0	-7.9E0	4.52E	-17.01E	2.000	
5.89	5.71E0	-27.0E0	0.75E0	-8.1E0	4.52E	-17.53E	2.050	
6.03	5.67E0	-28.0E0	0.64E0	-8.3E0	4.52E	-18.05E	2.100	
6.17	5.63E0	-29.0E0	0.53E0	-8.5E0	4.52E	-18.57E	2.150	
6.31	5.59E0	-30.0E0	0.42E0	-8.7E0	4.52E	-19.09E	2.200	
6.45	5.55E0	-31.0E0	0.31E0	-8.9E0	4.52E	-19.61E	2.250	
6.59	5.51E0	-32.0E0	0.20E0	-9.1E0	4.52E	-20.13E	2.300	
6.73	5.47E0	-33.0E0	0.09E0	-9.3E0	4.52E	-20.65E	2.350	
6.87	5.43E0	-34.0E0	-0.02E0	-9.5E0	4.52E	-21.17E	2.400	
7.01	5.39E0	-35.0E0	-0.13E0	-9.7E0	4.52E	-21.69E	2.450	
7.15	5.35E0	-36.0E0	-0.24E0	-9.9E0	4.52E	-22.21E	2.500	
7.29	5.31E0	-37.0E0	-0.35E0	-10.1E0	4.52E	-22.73E	2.550	
7.43	5.27E0	-38.0E0	-0.46E0	-10.3E0	4.52E	-23.25E	2.600	
7.57	5.23E0	-39.0E0	-0.57E0	-10.5E0	4.52E	-23.77E	2.650	
7.71	5.19E0	-40.0E0	-0.68E0	-10.7E0	4.52E	-24.29E	2.700	
7.85	5.15E0	-41.0E0	-0.79E0	-10.9E0	4.52E	-24.81E	2.750	
7.99	5.11E0	-42.0E0	-0.90E0	-11.1E0	4.52E	-25.33E	2.800	
8.13	5.07E0	-43.0E0	-1.01E0	-11.3E0	4.52E	-25.85E	2.850	
8.27	5.03E0	-44.0E0	-1.12E0	-11.5E0	4.52E	-26.37E	2.900	
8.41	5.00E0	-45.0E0	-1.23E0	-11.7E0	4.52E	-26.89E	2.950	
8.55	4.96E0	-46.0E0	-1.34E0	-11.9E0	4.52E	-27.41E	3.000	
8.69	4.92E0	-47.0E0	-1.45E0	-12.1E0	4.52E	-27.93E	3.050	
8.83	4.88E0	-48.0E0	-1.56E0	-12.3E0	4.52E	-28.45E	3.100	
8.97	4.84E0	-49.0E0	-1.67E0	-12.5E0	4.52E	-28.97E	3.150	
9.11	4.80E0	-50.0E0	-1.78E0	-12.7E0	4.52E	-29.49E	3.200	
9.25	4.76E0	-51.0E0	-1.89E0	-12.9E0	4.52E	-30.01E	3.250	
9.39	4.72E0	-52.0E0	-2.00E0	-13.1E0	4.52E	-30.53E	3.300	
9.53	4.68E0	-53.0E0	-2.11E0	-13.3E0	4.52E	-31.05E	3.350	
9.67	4.64E0	-54.0E0	-2.22E0	-13.5E0	4.52E	-31.57E	3.400	
9.81	4.60E0	-55.0E0	-2.33E0	-13.7E0	4.52E	-32.09E	3.450	
9.95	4.56E0	-56.0E0	-2.44E0	-13.9E0	4.52E	-32.61E	3.500	
10.09	4.52E0	-57.0E0	-2.55E0	-14.1E0	4.52E	-33.13E	3.550	
10.23	4.48E0	-58.0E0	-2.66E0	-14.3E0	4.52E	-33.65E	3.600	
10.37	4.44E0	-59.0E0	-2.77E0	-14.5E0	4.52E	-34.17E	3.650	
10.51	4.40E0	-60.0E0	-2.88E0	-14.7E0	4.52E	-34.69E	3.700	
10.65	4.36E0	-61.0E0	-2.99E0	-14.9E0	4.52E	-35.21E	3.750	
10.79	4.32E0	-62.0E0	-3.10E0	-15.1E0	4.52E	-35.73E	3.800	
10.93	4.28E0	-63.0E0	-3.21E0	-15.3E0	4.52E	-36.25E	3.850	
11.07	4.24E0	-64.0E0	-3.32E0	-15.5E0	4.52E	-36.77E	3.900	
11.21	4.20E0	-65.0E0	-3.43E0	-15.7E0	4.52E	-37.29E	3.950	
11.35	4.16E0	-66.0E0	-3.54E0	-15.9E0	4.52E	-37.81E	4.000	
11.49	4.12E0	-67.0E0	-3.65E0	-16.1E0	4.52E	-38.33E	4.050	
11.63	4.08E0	-68.0E0	-3.76E0	-16.3E0	4.52E	-38.85E	4.100	
11.77	4.04E0	-69.0E0	-3.87E0	-16.5E0	4.52E	-39.37E	4.150	
11.91	4.00E0	-70.0E0	-3.98E0	-16.7E0	4.52E	-39.89E	4.200	
12.05	3.96E0	-71.0E0	-4.09E0	-16.9E0	4.52E	-40.41E	4.250	
12.19	3.92E0	-72.0E0	-4.20E0	-17.1E0	4.52E	-40.93E	4.300	
12.33	3.88E0	-73.0E0	-4.31E0	-17.3E0	4.52E	-41.45E	4.350	
12.47	3.84E0	-74.0E0	-4.42E0	-17.5E0	4.52E	-41.97E	4.400	
12.61	3.80E0	-75.0E0	-4.53E0	-17.7E0	4.52E	-42.49E	4.450	
12.75	3.76E0	-76.0E0	-4.64E0	-17.9E0	4.52E	-43.01E	4.500	
12.89	3.72E0	-77.0E0	-4.75E0	-18.1E0	4.52E	-43.53E	4.550	
13.03	3.68E0	-78.0E0	-4.86E0	-18.3E0	4.52E	-44.05E	4.600	
13.17	3.64E0	-79.0E0	-4.97E0	-18.5E0	4.52E	-44.57E	4.650	
13.31	3.60E0	-80.0E0	-5.08E0	-18.7E0	4.52E	-45.09E	4.700	
13.45	3.56E0	-81.0E0	-5.19E0	-18.9E0	4.52E	-45.61E	4.750	
13.59	3.52E0	-82.0E0	-5.30E0	-19.1E0	4.52E	-46.13E	4.800	
13.73	3.48E0	-83.0E0	-5.41E0	-19.3E0	4.52E	-46.65E	4.850	
13.87	3.44E0	-84.0E0	-5.52E0	-19.5E0	4.52E	-47.17E	4.900	
14.01	3.40E0	-85.0E0	-5.63E0	-19.7E0	4.52E	-47.69E	4.950	
14.15	3.36E0	-86.0E0	-5.74E0	-19.9E0	4.52E	-48.21E	5.000	
14.29	3.32E0	-87.0E0	-5.85E0	-20.1E0	4.52E	-48.73E	5.050	
14.43	3.28E0	-88.0E0	-5.96E0	-20.3E0	4.52E	-49.25E	5.100	
14.57	3.24E0	-89.0E0	-6.07E0	-20.5E0	4.52E	-49.77E	5.150	
14.71	3.20E0	-90.0E0	-6.18E0	-20.7E0	4.52E	-50.29E	5.200	
14.85	3.16E0	-91.0E0	-6.29E0	-20.9E0	4.52E	-50.81E	5.250	
14.99	3.12E0	-92.0E0	-6.40E0	-21.1E0	4.52E	-51.33E	5.300	
15.13	3.08E0	-93.0E0	-6.51E0	-21.3E0	4.52E	-51.85E	5.350	
15.27	3.04E0	-94.0E0	-6.62E0	-21.5E0	4.52E	-52.37E	5.400	
15.41	3.00E0	-95.0E0	-6.73E0	-21.7E0	4.52E	-52.89E	5.450	
15.55	2.96E0	-96.0E0	-6.84E0	-21.9E0	4.52E	-53.41E	5.500	
15.69	2.92E0	-97.0E0	-6.95E0	-22.1E0	4.52E	-53.93E	5.550	
15.83	2.88E0	-98.0E0	-7.06E0	-22.3E0	4.52E	-54.45E	5.600	
15.97	2.84E0	-99.0E0	-7.17E0	-22.5E0	4.52E	-54.97E	5.650	
16.11	2.80E0	-100.0E0	-7.28E0	-22.7E0	4.52E	-55.49E	5.700	
16.25	2.76E0	-101.0E0	-7.39E0	-22.9E0	4.52E	-56.01E	5.750	
16.39	2.72E0	-102.0E0	-7.50E0	-23.1E0	4.52E	-56.53E	5.800	
16.53	2.68E0	-103.0E0	-7.61E0	-23.3E0	4.52E	-57.05E	5.850	
16.67	2.64E0	-104.0E0	-7.72E0	-23.5E0	4.52E	-57.57E	5.900	
16.81	2.60E0	-105.0E0	-7.83E0	-23.7E0	4.52E	-58.09E	5.950	
16.95	2.56E0	-106.0E0	-7.94E0	-23.9E0	4.52E	-58.61E	6.000	
17.09	2.52E0	-107.0E0	-8.05E0	-24.1E0	4.52E	-59.13E	6.050	
17.23	2.48E0	-108.0E0	-8.16E0	-24.3E0	4.52E	-59.65E	6.100	
17.37	2.44E0	-109.0E0	-8.27E0	-24.5E0	4.52E	-60.17E	6.150	
17.51	2.40E0	-110.0E0	-8.38E0	-24.7E0	4.52E	-60.69E	6.200	
17.65	2.36E0	-111.0E0	-8.49E0	-24.9E0	4.52E	-61.21E	6.250	
17.79	2.32E0	-112.0E0	-8.60E0	-25.1E0	4.52E	-61.73E	6.300	
17.93	2.28E0	-113.0E0	-8.71E0	-25.3E0	4.52E	-62.25E	6.350	
18.07	2.24E0	-114.0E0	-8.82E0	-25.5E0	4.52E	-62.77E	6.400	
18.21	2.20E0	-115.0E0	-8.93E0	-25.7E0	4.52E	-63.29E	6.450	
18.35	2.16E0	-116.0E0	-9.04E0	-25.9E0	4.52E	-63.81E	6.500	
18.49	2.12E0	-117.0E0	-9.15E0	-26.1E0	4.52E	-64.33E	6.550	
18.63	2.08E0	-118.0E0	-9.26E0	-26.3E0	4.52E	-64.85E	6.600	
18.77	2.04E0	-119.0E0	-9.37E0	-26.5E0	4.52E	-65.37E	6.650	
18.91	2.00E0	-120.0E0	-9.48E0					

TABLE 3.4 (CONTINUED)

DISTRIBUTION OF CURRENT AND CHARGE ON BEVERAGE ANTENNA OVER FRESH WATER
 ALFA/BETAL = .1289 BETAL/BETAC = 1.143 L1/LAMPDAD = 1.000
 FREQUENCY = 300.00MHz PE = .067 D/LAMPDAD = .010 RL = 162.00Ohms

A. MEASURED CURRENT DISTRIBUTION IN PAVV BLT

Z/H	RAW DATA			NORMALIZED DATA				Z/LAMPDAD
	IRPAZ	IRFAZ	INPAG	INFAZ	INREAL	INIPAG		
.002	4.794	140.00	5.60C	10.00C	5.815	.972	.003	
.021	4.794	129.00	5.14C	9.40C	5.180	-.030	.025	
.041	4.794	119.00	5.00C	-11.00C	4.887	-.962	.050	
.082	4.794	96.00	4.64C	-33.50C	3.903	-2.583	.100	
.123	4.794	76.00	4.50C	-54.00C	2.885	-3.641	.150	
.164	4.794	54.00	4.38C	-78.00C	1.970	-4.227	.200	
.205	4.794	33.00	4.22C	-98.80C	1.100	-4.190	.250	
.246	4.794	14.10	4.14C	-115.90C	0.628	-3.724	.300	
.287	4.794	-5.00	3.98C	-135.00C	-2.814	-2.814	.350	
.328	4.794	-24.00	3.66C	-154.00C	-3.301	-1.581	.400	
.369	4.794	-44.00	3.28C	-174.80C	-3.346	1.325	.450	
.410	4.794	-66.00	2.80C	-196.80C	-2.968	.876	.500	
.451	4.794	-89.00	2.22C	-219.00C	-2.269	1.838	.550	
.492	4.794	-111.00	2.60C	-243.00C	-1.336	2.461	.600	
.533	4.794	-136.00	2.72C	-268.00C	1.380	2.696	.650	
.574	4.794	-158.00	2.72C	-288.00C	1.889	2.656	.700	
.615	4.794	-171.00	2.68C	-301.50C	1.400	2.285	.750	
.656	4.794	-189.00	2.58C	-315.00C	1.299	1.879	.800	
.697	4.794	-207.00	2.38C	-327.00C	2.185	1.692	.850	
.738	4.794	-227.00	2.10C	-337.00C	2.998	1.095	.900	
.780	4.794	-250.00	1.90C	-344.00C	1.781	-.662	.950	
.821	4.794	-268.00	1.78C	-358.00C	1.387	-1.084	.984	

B. MEASURED CHARGE DISTRIBUTION IN PICCOL/VOLT*P

Z/H	RAW DATA			NORMALIZED DATA				Z/LAMPDAD
	QRPAZ	QRFAPZ	QNPAG	QNFAZ	QNREAL	QNIAPG		
.005	10.010	4.00C	26.18C	4.00C	26.116	1.826	.004	
.021	8.445	4.40C	21.68C	4.40C	21.619	1.826	.025	
.041	6.403	-14.10C	20.82C	-14.10C	19.902	1.999	.050	
.082	7.997	-34.00C	19.48C	-34.00C	16.150	-10.893	.100	
.123	7.443	-52.00C	18.00C	-52.00C	10.994	-14.308	.150	
.164	6.434	-72.50C	17.02C	-72.50C	5.118	-18.032	.200	
.205	6.149	-93.50C	14.79C	-93.50C	1.981	-15.711	.250	
.246	5.788	-115.00C	14.48C	-115.00C	-6.872	-13.450	.300	
.287	5.524	-137.80C	14.20C	-137.80C	-10.819	-9.536	.350	
.328	5.382	-159.00C	13.80C	-159.00C	-12.926	1.833	.400	
.369	5.234	-180.00C	13.42C	-180.00C	-13.420	1.67	.450	
.410	5.086	-200.00C	12.79C	-200.00C	-12.009	1.371	.500	
.451	4.927	-216.00C	12.10C	-216.00C	-9.486	7.345	.550	
.492	4.730	-237.50C	11.38C	-237.50C	-6.104	9.581	.600	
.533	4.472	-257.00C	10.44C	-257.00C	-2.349	10.172	.650	
.574	4.202	-274.00C	9.48C	-274.00C	1.449	9.682	.700	
.615	3.924	-301.50C	8.76C	-301.50C	4.588	7.486	.750	
.656	3.604	-325.00C	8.27C	-325.00C	7.227	4.986	.800	
.697	3.245	-344.00C	8.27C	-344.00C	8.407	1.705	.850	
.738	3.471	-365.00C	8.90C	-365.00C	8.795	-1.362	.900	
.780	3.426	-387.00C	9.00C	-387.00C	8.055	1.104	.950	
.821	3.474	-398.00C	9.42C	-398.00C	7.341	-5.903	.987	

DISTRIBUTION OF CURRENT AND CHARGE ON BEVERAGE ANTENNA OVER FRESH WATER
 ALFA/BETAL = .1289 BETAL/BETAC = 1.143 L1/LAMPDAD = .900
 FREQUENCY = 300.00MHz PE = .067 D/LAMPDAD = .010 RL = 162.00Ohms

A. MEASURED CURRENT DISTRIBUTION IN PAVV BLT

Z/H	RAW DATA			NORMALIZED DATA				Z/LAMPDAD
	IRPAZ	IRFAZ	INPAG	INFAZ	INREAL	INIPAG		
.004	7.956	127.00	5.14C	7.00C	5.102	.626	.003	
.025	7.923	115.00	4.90C	4.40C	4.886	-.376	.025	
.040	7.506	104.00	4.80C	-15.80C	4.619	-1.307	.050	
.099	6.479	80.00	4.70C	-35.00C	3.440	-2.971	.100	
.209	6.763	59.00	4.60C	-61.00C	2.230	-4.023	.150	
.376	6.791	39.00	4.60C	-80.00C	1.239	-4.561	.200	
.446	6.762	20.70	4.60C	-97.00C	1.743	-4.500	.250	
.517	6.433	3.30	4.38C	-116.70C	-1.988	-3.913	.300	
.587	6.400	-14.00	4.00C	-134.00C	-2.818	-2.867	.350	
.657	6.400	-32.00	3.60C	-152.00C	-3.190	-1.668	.400	
.726	4.763	-57.50	3.20C	-177.50C	-3.237	1.141	.450	
.795	4.423	-75.00	3.00C	-192.00C	-2.892	1.797	.484	

B. MEASURED CHARGE DISTRIBUTION IN PICCOL/VOLT*P

Z/H	RAW DATA			NORMALIZED DATA				Z/LAMPDAD
	QRPAZ	QRFAPZ	QNPAG	QNFAZ	QNREAL	QNIAPG		
.004	10.009	4.00C	25.66C	4.00C	25.660	1.000	.004	
.026	8.412	4.70C	20.80C	4.70C	20.612	1.000	.025	
.040	7.443	-14.70C	19.68C	-14.70C	18.831	1.000	.050	
.109	7.114	-35.00C	18.24C	-35.00C	14.941	-10.462	.100	
.219	6.134	-54.00C	16.24C	-54.00C	9.591	-13.105	.150	
.374	5.744	-75.00C	15.24C	-75.00C	3.944	-18.721	.200	
.444	5.711	-98.00C	13.84C	-98.00C	-1.084	-13.408	.250	
.514	5.681	-120.00C	13.50C	-120.00C	-7.228	-11.445	.300	
.584	5.490	-140.00C	13.82C	-140.00C	-11.430	-7.748	.350	
.654	5.444	-166.00C	13.96C	-166.00C	-13.545	-3.377	.400	
.724	5.014	-184.00C	14.40C	-184.00C	-14.268	1.004	.450	
.794	5.740	-196.00C	14.82C	-196.00C	-14.246	1.085	.487	

TABLE 3.4 (CONTINUED)

DISTRIBUTION OF CURRENT AND CHARGE ON BEVERAGE ANTENNA OVER FRESH WATER
 ALPHA/BETAL * .0911 BETAL/BETAC * 1.052 L3/LAMPAD * 1.500
 FREQUENCY * 300.000MHZ PE * .067 D/LAMPAD * .020 RL * 193.000OHMS

A. MEASURED CURRENT DISTRIBUTION IN PAVV BLT

Z/H	RAW DATA		NORMALIZED DATA					Z/LAMPAD
	IRFAZ	IRFAG	IRFAZ	IRFAG	IRFAZ	IRREAL	IRIPAG	
.000	4.800A	12.45C	4.80C	4.5C	4.80C5	.378	.003	
.014	4.190A	113.7C	4.70C	4.30C	4.472C	-.514	.025	
.029	4.140A	103.4C	4.58C	4.16C	4.370C	-1.303	.080	
.058	3.700A	83.8C	4.40C	3.81C	3.955C	-2.459	.100	
.116	3.400A	63.8C	4.28C	3.54C	3.737C	-3.540	.150	
.174	3.480A	44.4C	4.18C	3.25C	3.497C	-4.047	.200	
.232	3.263A	25.1C	4.08C	2.94C	3.348	-4.085	.250	
.290	3.114A	6.5C	3.98C	1.11C	3.1587	-3.650	.300	
.348	3.133A	-12.0C	3.88C	0.00C	2.9436	-2.188	.350	
.406	3.075A	-31.8C	3.80C	-1.00C	2.702	-1.673	.400	
.464	3.025A	-49.0C	3.70C	-1.69C	2.432	-1.107	.450	
.522	3.037A	-68.3C	3.60C	-2.18C	2.162	-.525	.500	
.580	3.137A	-87.4C	3.50C	-2.70C	1.910	1.534	.550	
.638	3.283A	-106.9C	3.40C	-3.24C	1.675	2.368	.600	
.696	3.461A	-126.4C	3.30C	-3.80C	1.455	2.900	.650	
.754	3.694A	-145.8C	3.20C	-4.38C	1.248	3.276	.700	
.812	3.981A	-165.4C	3.00C	-5.00C	1.05	2.400	.750	
.870	4.325A	-184.5C	3.00C	-5.65C	1.656	2.502	.800	
.928	4.619A	-201.5C	2.90C	-6.35C	2.285	1.618	.850	
.986	4.876A	-219.7C	2.78C	-7.10C	2.907	.944	.900	
1.044	5.072A	-238.4C	2.66C	-7.85C	3.439	.065	.950	
1.102	5.234A	-258.0C	2.54C	-8.60C	3.780	-1.785	1.000	
1.160	5.364A	-277.3C	2.42C	-9.35C	3.909	-1.454	1.050	
1.218	5.464A	-297.0C	2.30C	-10.10C	3.819	-2.044	1.100	
1.276	5.538A	-316.4C	2.20C	-10.85C	3.478	-2.650	1.150	
1.334	5.583A	-337.5C	2.10C	-11.60C	2.908	-2.340	1.200	
1.392	5.617A	-358.0C	2.00C	-12.35C	2.1026	-2.103	1.250	
1.450	5.640A	-379.0C	1.90C	-13.10C	1.1689	-1.682	1.300	
1.508	5.653A	-399.0C	1.80C	-13.85C	1.1923	-1.110	1.350	
1.566	5.656A	-417.5C	1.70C	-14.60C	1.2100	-1.455	1.400	
1.624	5.649A	-436.5C	1.60C	-15.35C	1.1967	-.224	1.450	
1.682	5.632A	-456.0C	1.50C	-16.10C	1.1720	.653	1.484	

B. MEASURED CHARGE DISTRIBUTION IN PICCOL/VOLT-P

Z/H	RAW DATA		NORMALIZED DATA					Z/LAMPAD
	IRFAZ	IRFAG	IRFAZ	IRFAG	IRFAZ	IRREAL	IRIPAG	
.000	9.468	-2.0C	23.50C	2.0C	23.486	-.820	.004	
.014	7.743	-9.8C	18.22C	-9.8C	17.954	-3.101	.025	
.029	7.187	-19.2C	16.68C	-19.2C	16.750	-5.485	.050	
.058	6.740	-27.7C	15.68C	-27.7C	15.949	-8.699	.100	
.116	6.443	-36.5C	15.18C	-36.5C	14.279	-12.700	.150	
.174	6.273A	-45.4C	14.80C	-45.4C	12.731	-16.322	.200	
.232	6.193A	-54.2C	14.10C	-54.2C	11.033	-19.066	.250	
.290	6.146A	-63.0C	13.52C	-63.0C	9.196	-21.482	.300	
.348	6.089A	-71.8C	13.00C	-71.8C	7.695	-23.514	.350	
.406	6.076A	-80.6C	12.42C	-80.6C	6.428	-25.159	.400	
.464	6.099A	-89.4C	11.70C	-89.4C	5.387	-26.478	.450	
.522	6.147A	-98.2C	10.80C	-98.2C	4.543	-27.461	.500	
.580	6.210A	-107.0C	9.70C	-107.0C	3.867	-28.139	.550	
.638	6.290A	-115.8C	8.40C	-115.8C	3.312	-28.591	.600	
.696	6.384A	-124.6C	6.90C	-124.6C	2.878	-28.867	.650	
.754	6.492A	-133.4C	5.20C	-133.4C	2.556	-28.962	.700	
.812	6.614A	-142.2C	3.40C	-142.2C	2.318	-28.902	.750	
.870	6.750A	-151.0C	1.50C	-151.0C	2.156	-28.792	.800	
.928	6.899A	-159.8C	0.00C	-159.8C	2.056	-28.636	.850	
.986	7.061A	-168.6C	0.00C	-168.6C	1.992	-28.438	.900	
1.044	7.236A	-177.4C	0.00C	-177.4C	1.952	-28.192	.950	
1.102	7.424A	-186.2C	0.00C	-186.2C	1.932	-27.902	1.000	
1.160	7.624A	-195.0C	0.00C	-195.0C	1.928	-27.572	1.050	
1.218	7.836A	-203.8C	0.00C	-203.8C	1.936	-27.202	1.100	
1.276	8.060A	-212.6C	0.00C	-212.6C	1.952	-26.792	1.150	
1.334	8.296A	-221.4C	0.00C	-221.4C	1.972	-26.342	1.200	
1.392	8.544A	-230.2C	0.00C	-230.2C	1.992	-25.852	1.250	
1.450	8.804A	-239.0C	0.00C	-239.0C	2.012	-25.322	1.300	
1.508	9.076A	-247.8C	0.00C	-247.8C	2.028	-24.752	1.350	
1.566	9.360A	-256.6C	0.00C	-256.6C	2.036	-24.142	1.400	
1.624	9.656A	-265.4C	0.00C	-265.4C	2.036	-23.492	1.450	
1.682	9.964A	-274.2C	0.00C	-274.2C	2.028	-22.802	1.487	

TABLE 3.4 (CONTINUED)

DISTRIBUTION OF CURRENT AND CHARGE ON BEVERAGE ANTENNA OVER FRESH WATER

ALPHA/BETA1 = .0911 BETA1/BETA2 = 1.0528 L1/L2/DAC = 1.000

FREQUENCY = 310.000MHZ PE = .067 D/LAMPAC = .020 RL = 193.000HMS

A. MEASURED CURRENT DISTRIBUTION IN PAUV BLT

Z/H	RAW DATA		NORMALIZED DATA				Z/LAMPAC
	IRH AG	IRFAZ	INPAG	INFAZ	INREAL	INIPAG	
.000	5.4931	140.00	4.4800	10.0000	4.1806	1.847	.003
.020	7.7900	129.00	4.5800	9.7000	4.2900	1.755	.025
.040	7.4030	119.00	4.5000	11.0000	4.417	1.859	.050
.060	7.4447	98.500	4.2800	13.1800	3.649	2.236	.100
.080	7.0374	79.000	4.2000	15.0000	3.000	2.668	.150
.100	7.0138	59.000	4.1600	17.0000	2.354	3.193	.200
.120	7.169	39.000	4.1200	19.0000	1.708	3.820	.250
.140	7.1609	19.180	4.1000	21.0000	1.071	4.543	.300
.160	6.9995	0.000	4.0800	22.7000	0.449	5.361	.350
.180	6.6112	-14.500	4.0600	24.0000	-0.140	6.277	.400
.200	6.0064	-33.000	4.0400	24.0000	-0.743	7.303	.450
.220	5.2986	-53.000	4.0200	23.0000	-1.280	8.440	.500
.240	4.4834	-75.800	4.0000	21.0000	-1.768	9.688	.550
.260	3.5794	-99.000	3.9800	18.0000	-2.207	11.044	.600
.280	2.6059	-123.500	3.9600	14.0000	-2.593	12.508	.650
.300	1.6013	-150.000	3.9400	10.0000	-2.920	14.080	.700
.320	5.0094	-180.000	3.9200	6.0000	-3.190	15.751	.750
.340	5.0220	-185.800	3.9000	2.0000	-3.400	17.521	.800
.360	4.4942	-203.400	3.8800	0.0000	-3.559	19.390	.850
.380	4.4009	-225.000	3.8600	0.0000	-3.670	21.359	.900
.400	4.3050	-257.100	3.8400	0.0000	-3.741	23.428	.950

B. MEASURED CHARGE DISTRIBUTION IN PICCOL/VOLTS*

Z/H	RAW DATA		NORMALIZED DATA				Z/LAMPAC
	QHPAG	QHPAZ	QNPAG	QNPFAZ	QNPREAL	QNPIMPAG	
.000	9.736	44.600	23.180	44.600	23.105	-1.859	.004
.020	7.477	18.000	18.000	18.000	17.846	-3.761	.025
.040	7.773	21.000	16.840	21.000	15.721	-6.035	.050
.060	6.053	39.500	15.000	39.500	12.223	-10.075	.100
.080	6.324	57.400	13.000	57.400	8.114	-12.687	.150
.100	5.124	76.600	11.500	76.600	3.379	-14.183	.200
.120	3.473	100.000	10.000	100.000	0.000	-13.903	.250
.140	5.769	116.000	13.200	116.000	-5.813	-11.918	.300
.160	4.424	138.600	16.900	138.600	-9.373	-8.869	.350
.180	3.067	168.700	20.800	168.700	-11.817	-5.960	.400
.200	3.716	175.800	18.400	175.800	-12.387	-3.910	.450
.220	5.006	159.000	14.100	141.100	-11.753	3.040	.500
.240	5.665	122.500	10.000	122.500	-10.171	6.480	.550
.260	4.489	83.000	11.800	83.000	-7.490	8.969	.600
.280	4.770	44.600	15.000	44.600	-4.076	10.088	.650
.300	4.119	167.000	10.700	167.000	-2.563	10.745	.700
.320	4.166	187.200	9.600	187.200	2.862	9.247	.750
.340	4.135	200.000	8.500	200.000	5.886	7.533	.800
.360	4.115	209.400	7.500	209.400	8.237	4.852	.850
.380	4.105	249.700	6.500	249.700	9.806	1.709	.900
.400	4.097	289.600	5.500	289.600	11.592	0.000	.950
.420	4.090	381.400	4.500	381.400	13.583	-1.057	.987

DISTRIBUTION OF CURRENT AND CHARGE ON BEVERAGE ANTENNA OVER FRESH WATER

ALPHA/BETA1 = .0911 BETA1/BETA2 = 1.0528 L1/L2/DAC = .900

FREQUENCY = 310.000MHZ PE = .067 D/LAMPAC = .020 RL = 193.000HMS

A. MEASURED CURRENT DISTRIBUTION IN PAUV BLT

Z/H	RAW DATA		NORMALIZED DATA				Z/LAMPAC
	IRH AG	IRFAZ	INPAG	INFAZ	INREAL	INIPAG	
.000	6.305	136.00	4.6400	11.0000	4.5945	1.933	.003
.020	7.783	124.500	4.6600	10.0000	4.480	1.808	.025
.040	7.404	114.000	4.6800	10.0000	4.384	1.680	.050
.060	7.030	93.000	4.7000	10.0000	4.280	1.550	.100
.080	7.018	73.000	4.7200	10.0000	4.180	1.420	.150
.100	7.014	53.000	4.7400	10.0000	4.080	1.300	.200
.120	7.005	34.000	4.7600	10.0000	3.980	1.180	.250
.140	7.000	17.000	4.7800	10.0000	3.880	1.060	.300
.160	7.000	0.000	4.8000	10.0000	3.780	0.940	.350
.180	6.997	-17.000	4.8200	10.0000	3.680	0.820	.400
.200	6.993	-37.000	4.8400	10.0000	3.580	0.700	.450
.220	6.988	-57.000	4.8600	10.0000	3.480	0.580	.500
.240	6.983	-77.000	4.8800	10.0000	3.380	0.460	.550

B. MEASURED CHARGE DISTRIBUTION IN PICCOL/VOLTS*

Z/H	RAW DATA		NORMALIZED DATA				Z/LAMPAC
	QHPAG	QHPAZ	QNPAG	QNPFAZ	QNPREAL	QNPIMPAG	
.000	9.746	44.600	23.180	44.600	23.368	-1.825	.004
.020	7.479	18.000	18.000	18.000	17.842	-3.775	.025
.040	7.782	21.000	17.000	21.000	16.092	-6.004	.050
.060	6.054	39.500	15.000	39.500	12.260	-9.888	.100
.080	6.316	57.400	13.000	57.400	8.734	-12.022	.150
.100	5.120	76.600	11.500	76.600	4.191	-13.881	.200
.120	3.476	100.000	10.000	100.000	0.000	-13.918	.250
.140	5.768	116.000	13.200	116.000	-5.768	-11.918	.300
.160	4.424	138.600	16.900	138.600	-9.337	-8.869	.350
.180	3.067	168.700	20.800	168.700	-11.821	-5.960	.400
.200	3.716	175.800	18.400	175.800	-12.376	-3.910	.450
.220	5.006	159.000	14.100	141.100	-11.753	3.040	.500
.240	5.665	122.500	10.000	122.500	-10.171	6.480	.550
.260	4.489	83.000	11.800	83.000	-7.490	8.969	.600
.280	4.770	44.600	15.000	44.600	-4.076	10.088	.650
.300	4.119	167.000	10.700	167.000	-2.563	10.745	.700
.320	4.166	187.200	9.600	187.200	2.862	9.247	.750
.340	4.135	200.000	8.500	200.000	5.886	7.533	.800
.360	4.115	209.400	7.500	209.400	8.237	4.852	.850
.380	4.105	249.700	6.500	249.700	9.806	1.709	.900
.400	4.097	289.600	5.500	289.600	11.592	0.000	.950
.420	4.090	381.400	4.500	381.400	13.583	-1.057	.987

TABLE 3.4 (CONTINUED)

DISTRIBUTION OF CURRENT AND CHARGE ON BEVERAGE ANTENNA OVER FRESH WATER

ALFA/BETAL * .0860 BETAL/BETAC * 1.0318 LI/LAMPDAG * 1.500

FREQUENCY * 300.000MHZ PE * .067 D/LAMPDAG * .080 RL * 270.000HMS

A. MEASURED CURRENT DISTRIBUTION IN MAXV BLT

Z/H	RAW DATA			NORMALIZED DATA			Z/LAMPDAG
	IRH AG	IRFAZ	IRNAG	IRFAZ	IRREAL	IRIMAG	
.003	7.332	128.10	3.84C	10.10	3.28C	.473	.003
.014	7.420	115.50	3.74C	+2.80	3.736	-.143	.025
.029	7.484	104.80	3.68C	+13.80	3.978	-.859	.050
.057	8.169	84.50	3.62C	-33.80	3.019	-1.998	.100
.086	8.493	64.00	3.58C	+54.00	2.104	-2.886	.150
.115	8.769	45.30	3.54C	+70.70	1.074	-3.458	.200
.143	8.969	27.30	3.48C	-90.70	-.044	-3.820	.250
.172	9.139	9.40	3.48C	-108.80	-1.118	-3.881	.300
.201	9.285	+8.00	3.48C	-126.00	-2.081	-2.884	.350
.229	9.409	-25.00	3.48C	-143.00	-2.779	-2.094	.400
.258	9.514	+43.40	3.38C	-161.40	-3.203	-1.078	.450
.286	9.604	+64.20	3.38C	-180.80	-3.360	-.089	.500
.315	9.680	+81.40	3.20C	-199.80	-3.011	1.084	.550
.344	9.744	+103.00	3.14C	-219.00	-2.440	1.974	.600
.372	9.803	+120.00	3.14C	-238.00	-1.675	2.880	.650
.401	9.854	-138.00	3.02C	-256.00	-.775	3.124	.700
.430	9.906	-155.80	3.12C	-273.80	-.607	3.113	.750
.458	9.956	-172.50	3.12C	-290.80	1.093	2.982	.800
.487	9.999	-189.70	2.98C	-307.70	1.871	2.844	.850
.516	9.999	-207.40	2.98C	-324.50	2.439	1.677	.900
.544	9.967	-226.20	2.84C	-341.20	2.733	-.773	.950
.573	9.913	-245.40	2.74C	-357.80	2.755	-1.688	1.000
.602	9.846	-265.00	2.72C	-383.00	2.509	-1.083	1.050
.630	9.752	-285.50	2.78C	-403.80	2.017	-1.914	1.100
.659	9.633	-305.30	2.78C	-421.30	1.355	-2.421	1.150
.687	9.506	-321.00	2.80C	-439.00	.944	-2.807	1.200
.716	9.362	-337.00	2.92C	-455.00	-.254	-2.909	1.250
.745	9.197	-354.90	2.84C	-472.90	-1.405	-2.616	1.300
.773	9.074	-371.30	2.74C	-489.30	-1.735	-2.180	1.350
.802	8.902	-388.20	2.84C	-507.20	-2.213	-1.430	1.400
.831	8.667	-408.30	2.88C	-526.30	-2.807	-.611	1.450
.850	8.457	-423.60	2.44C	-541.60	-2.439	-.068	1.484

B. MEASURED CHARGE DISTRIBUTION IN PICCOUL/VBLT**

Z/H	RAW DATA			NORMALIZED DATA			Z/LAMPDAG
	CRH AG	CRFAZ	CNAG	CRFAZ	CNREAL	CNIMAG	
.003	9.482	+2.00	21.70C	+2.00	21.687	-.4757	.006
.014	7.332	+8.70	15.94C	+8.70	15.757	-2.411	.025
.029	8.488	-12.40	14.10C	+17.40	13.485	-4.218	.050
.057	8.769	-36.00	13.02C	-36.20	10.439	-7.505	.100
.086	8.986	-53.40	12.34C	-53.50	7.352	-9.936	.150
.115	9.194	-72.00	12.14C	-72.00	3.758	-11.565	.200
.143	9.391	-90.40	11.72C	-90.80	-.102	-11.720	.250
.172	9.574	-109.80	11.40C	-109.80	-3.805	-10.746	.300
.201	9.740	-128.40	11.50C	-128.40	-7.176	-8.987	.350
.229	9.873	-147.20	11.80C	-147.20	-9.818	-6.327	.400
.258	9.970	-165.20	11.50C	-165.20	-11.118	-2.938	.450
.286	9.170	-183.20	11.84C	-183.20	-11.822	-.827	.500
.315	9.143	-200.60	11.14C	-200.60	-10.465	3.934	.550
.344	9.102	-218.40	10.88C	-218.40	-8.637	6.748	.600
.372	9.039	-236.00	10.52C	-236.00	-6.883	8.721	.650
.401	8.978	-254.40	10.30C	-254.40	-2.701	9.940	.700
.430	8.906	-272.00	9.88C	-272.00	-.794	9.853	.750
.458	8.823	-293.60	9.76C	-293.60	3.307	8.944	.800
.487	8.744	-313.00	9.88C	-313.00	6.738	7.226	.850
.516	8.664	-331.40	9.82C	-331.40	9.474	4.729	.900
.544	8.572	-349.40	9.94C	-349.40	9.770	1.829	.950
.573	8.479	-368.40	9.76C	-368.40	9.699	-1.088	1.000
.602	8.385	-388.00	9.88C	-388.00	9.095	-3.860	1.050
.630	8.284	-408.00	9.68C	-408.00	7.400	-6.209	1.100
.659	8.182	-428.00	9.14C	-428.00	4.865	-7.785	1.150
.687	8.071	-447.00	9.22C	-447.00	2.074	-8.984	1.200
.716	7.973	-466.70	8.68C	-466.70	-1.013	-8.601	1.250
.745	7.878	-486.80	8.78C	-486.80	-3.932	-7.830	1.300
.773	7.774	-506.80	9.00C	-506.80	-6.828	-6.195	1.350
.802	7.671	-525.80	9.22C	-525.80	-8.800	-3.823	1.400
.831	7.561	-533.40	9.56C	-533.40	-9.818	-1.112	1.450
.850	7.436	-546.70	11.60C	-546.70	-11.521	1.353	1.487

TABLE 3.4 (CONTINUED)

DISTRIBUTION OF CURRENT AND CHARGE ON BEVERAGE ANTENNA OVER FRESH WATER
 ALFA/BETA = .0460 BETA/BETA = 1.018 L1/LAMDAC = 1.000
 FREQUENCY = 300.000MHZ PE = .067 C/LAMDAC = .080 RL = 270.000HPS

A. MEASURED CURRENT DISTRIBUTION IN PA/V BLT

RAW DATA		NORMALIZED DATA					
Z/H	IRM AG	IRFAZ	INMAG	INFAZ	INREAL	INMAG	Z/LAMDAC
+002	7.588	127.80	3.94C	9.40C	3.885	+.657	+.003
+020	7.181	115.10	3.79C	-3.10C	3.715	-.195	+.025
+400	7.123	103.10	3.71C	+1.90C	3.676	-.951	+.050
+800	7.107	83.10	3.64C	-35.00C	2.982	+2.088	+.100
+1200	7.107	63.70	3.64C	+54.30C	2.126	+2.956	+.150
+1601	7.107	44.40	3.64C	-73.20C	1.052	+3.185	+.200
+2011	7.107	26.80	3.64C	-91.80C	+.098	-3.439	+.250
+2411	7.107	9.40	3.64C	-118.20C	-1.137	-3.458	+.300
+2811	6.999	-7.40	3.58C	-145.80C	-2.054	-2.874	+.350
+3211	6.922	-25.30	3.44C	-173.20C	-2.758	-2.056	+.400
+3611	6.991	-43.70	3.22C	-181.70C	-3.152	-1.042	+.450
+4011	6.976	-62.70	3.19C	-180.70C	-3.086	+.040	+.500
+4412	6.912	-82.40	3.18C	-200.40C	-2.977	1.119	+.550
+4812	6.912	-102.40	3.18C	-220.40C	-2.814	2.069	+.600
+5212	6.944	-120.40	3.14C	-238.50C	-1.941	2.677	+.650
+5612	6.976	-138.50	3.29C	-256.80C	-.761	3.170	+.700
+6012	6.914	-155.40	3.24C	-273.40C	-.204	3.274	+.750
+6412	6.912	-172.80	3.14C	-290.40C	1.129	2.973	+.800
+6812	6.912	-190.40	3.12C	-308.40C	1.981	2.459	+.850
+7213	6.976	-208.50	3.00C	-326.40C	2.802	1.456	+.900
+7613	6.960	-226.10	2.94C	-344.10C	2.854	.726	+.950
+790	6.990	-244.40	2.80C	-362.40C	2.800	-.039	+.984

B. MEASURED CHARGE DISTRIBUTION IN PICCOL/VOLT.F

RAW DATA		NORMALIZED DATA					
Z/H	IRM AG	IRFAZ	QNMAG	QNF AZ	QNREAL	QNMAG	Z/LAMDAC
+005	9.997	-2.00	21.80C	-2.40C	21.487	-.780	+.006
+020	7.147	-8.40	15.80C	-8.80C	15.614	-2.417	+.085
+400	6.903	-17.50	14.20C	+17.50C	13.543	-.9270	+.050
+800	6.945	-35.20	13.00C	-35.20C	10.423	-7.494	+.100
+1200	6.929	-52.80	12.30C	-52.80C	7.497	-5.813	+.150
+1601	6.999	-70.40	12.04C	-70.40C	3.721	-11.451	+.200
+2011	6.943	-91.10	11.60C	-91.10C	-.223	-11.618	+.250
+2411	6.987	-110.80	11.50C	-110.80C	-3.971	-10.793	+.300
+2811	6.975	-129.40	11.560	-129.40C	-7.337	-8.933	+.350
+3211	6.982	-148.40	11.44C	-148.40C	-9.702	-6.052	+.400
+3611	6.911	-165.80	11.40C	-165.80C	-11.052	-2.937	+.450
+4011	6.999	-183.30	11.14C	-183.30C	-11.161	-.644	+.500
+4412	6.999	-201.40	11.14C	-201.40C	-10.437	4.007	+.550
+4812	6.912	-218.50	10.80C	-218.50C	-8.402	6.713	+.600
+5212	6.927	-236.40	10.34C	-236.40C	-6.729	8.656	+.650
+5612	6.950	-255.40	10.22C	-255.40C	-5.807	9.908	+.700
+6012	6.944	-275.40	9.74C	-275.40C	-.937	9.735	+.750
+6412	6.922	-295.40	9.940	-295.40C	4.201	9.009	+.800
+6812	6.922	-314.70	9.940	-314.70C	6.992	7.065	+.850
+7213	6.976	-333.50	10.24C	-333.50C	9.200	4.587	+.900
+7613	6.992	-351.70	11.08C	-351.70C	10.966	1.599	+.950
+790	6.998	-369.40	12.90C	-369.40C	12.868	-.990	+.987

DISTRIBUTION OF CURRENT AND CHARGE ON BEVERAGE ANTENNA OVER FRESH WATER
 ALFA/BETA = .0460 BETA/BETA = 1.018 L1/LAMDAC = .800
 FREQUENCY = 300.000MHZ PE = .067 C/LAMDAC = .080 RL = 270.000HPS

A. MEASURED CURRENT DISTRIBUTION IN PA/V BLT

RAW DATA		NORMALIZED DATA					
Z/H	IRM AG	IRFAZ	INMAG	INFAZ	INREAL	INMAG	Z/LAMDAC
+004	7.144	128.40	3.78C	8.40C	3.737	+.565	+.003
+024	6.980	116.40	3.64C	-3.40C	3.634	-.214	+.025
+044	6.966	104.10	3.58C	+15.90C	3.443	-.981	+.050
+064	6.966	82.40	3.54C	-37.40C	2.836	-2.184	+.100
+084	6.944	61.10	3.46C	+58.40C	1.866	+3.083	+.150
+104	7.031	40.20	3.72C	-74.80C	+.975	-3.590	+.200
+124	7.020	28.50	3.68C	-91.80C	-.110	-3.819	+.250
+144	7.116	11.70	3.78C	-108.20C	-1.181	-3.670	+.300
+164	6.980	-9.90	3.64C	-124.80C	-2.083	-2.985	+.350
+184	6.915	-28.30	3.50C	-142.20C	-2.949	-2.140	+.400
+204	6.926	-41.60	3.40C	-161.40C	-3.826	-1.073	+.450
+224	6.972	-57.50	3.14C	-177.80C	-3.187	-.138	+.484

B. MEASURED CHARGE DISTRIBUTION IN PICCOL/VOLT.F

RAW DATA		NORMALIZED DATA					
Z/H	IRM AG	IRFAZ	QNMAG	QNF AZ	QNREAL	QNMAG	Z/LAMDAC
+008	9.964	-5.00	21.20C	-5.00C	21.119	-1.848	+.006
+024	7.323	-11.50	15.54C	-11.50C	15.267	-3.106	+.025
+044	6.980	-19.40	14.00C	+19.40C	13.188	-4.496	+.050
+064	6.974	-36.50	12.72C	-36.50C	10.225	-7.566	+.100
+084	6.977	-53.40	11.74C	-53.40C	6.995	-8.453	+.150
+104	6.977	-72.40	11.44C	-72.40C	3.421	-10.917	+.200
+124	6.945	-92.40	10.82C	-92.40C	-.453	-10.811	+.250
+144	6.929	-112.40	10.94C	-112.40C	-4.249	-10.059	+.300
+164	6.964	-133.20	11.44C	-133.20C	-7.667	-8.144	+.350
+184	6.977	-152.40	11.44C	-152.40C	-10.147	-6.280	+.400
+204	6.954	-171.00	12.44C	-171.00C	-12.207	-1.949	+.450
+224	6.924	-184.20	14.50C	-184.20C	-14.081	-1.043	+.487

TABLE 3.4 (CONTINUED)

DISTRIBUTION OF CURRENT AND CHARGE ON BEVERAGE ANTENNA OVER FRESH WATER
 ALFA/LBETA = .0280 BETA/LBETA = 1.016 L1/LAMDAC = 1.500
 FREQUENCY = 300.000MHZ PE = .067 C/LAMDAC = .100 RL = 271.000HPS

A. MEASURED CURRENT DISTRIBUTION IN PAW BLY

Z/H	IRH AS	IRFAZ	INPAG	INFAZ	INREAL	INIPAG	Z/LAMDAC
.028	7.444	136.60	3.70C	10.6C	3.637	.681	.003
.14	7.333	118.6C	3.48C	-1.2C	3.579	-.075	.025
.29	7.154	107.5C	3.46C	-12.4C	3.378	-.749	.050
.57	6.739	87.60	3.30C	-32.4C	2.786	-1.768	.100
.86	6.450	68.0C	3.20C	-52.0C	1.995	-2.553	.150
.115	6.228	48.80	3.00C	-71.2C	1.031	-3.029	.200
.143	6.167	28.60	3.18C	-91.8C	-.047	-3.179	.250
.172	6.147	9.70	3.18C	-110.3C	-1.103	-2.982	.300
.200	6.154	-8.60	3.20C	-128.6C	-1.996	-2.501	.350
.229	6.150	-26.3C	3.28C	-146.3C	-2.712	-1.803	.400
.258	6.124	-43.5C	3.28C	-163.5C	-3.126	-.926	.450
.286	6.112	-61.2C	3.20C	-181.2C	-3.129	-.087	.500
.315	6.106	-78.7C	3.20C	-198.7C	-2.955	1.000	.550
.344	6.102	-97.0C	3.0C	-217.0C	-2.428	1.830	.600
.372	6.108	-115.4C	2.98C	-235.4C	-1.681	2.438	.650
.401	6.116	-134.5C	2.90C	-254.5C	-.775	2.795	.700
.430	6.115	-153.4C	2.90C	-273.4C	.182	2.896	.750
.458	6.107	-172.4C	2.92C	-292.4C	1.117	2.658	.800
.487	6.108	-191.0C	2.96C	-311.0C	1.947	2.234	.850
.515	6.109	-209.0C	2.94C	-329.0C	2.562	1.514	.900
.544	6.109	-228.4C	2.94C	-348.4C	2.958	.631	.950
.573	6.108	-248.4C	2.94C	-368.4C	2.951	-.227	1.000
.601	6.107	-268.0C	2.92C	-388.0C	2.726	-1.048	1.050
.630	6.105	-279.3C	2.88C	-399.3C	2.229	-1.824	1.100
.659	6.103	-296.4C	2.82C	-418.9C	1.540	-2.362	1.150
.687	6.104	-315.8C	2.84C	-435.8C	.697	-2.673	1.200
.716	6.104	-333.8C	2.86C	-453.8C	-.190	-2.854	1.250
.745	6.103	-353.0C	2.86C	-473.0C	-1.102	-2.936	1.300
.773	6.103	-371.4C	2.82C	-491.4C	-1.865	-2.115	1.350
.802	6.102	-389.0C	2.80C	-509.0C	-2.600	-1.442	1.400
.830	6.104	-407.0C	2.84C	-527.0C	-2.775	-.605	1.450
.859	6.100	-422.7C	2.74C	-542.7C	-2.737	.129	1.484

B. MEASURED CHARGE DISTRIBUTION IN PICCOLL/VBLT-F

Z/H	QW AS	QWFAZ	QWIPAG	QWFAZ	QWREAL	QWIPAG	Z/LAMDAC
.028	1.139	-7.0C	20.70C	-7.0C	20.546	-2.523	.006
.14	7.280	-13.4C	15.22C	-13.4C	14.808	-3.527	.025
.29	6.373	-22.20	13.14C	-22.2C	12.166	-.4965	.050
.57	6.262	-46.60	12.00C	-46.6C	9.111	-7.809	.100
.86	6.150	-68.60	11.80C	-68.6C	6.044	-9.901	.150
.115	6.108	-76.60	11.48C	-76.6C	2.660	-11.167	.200
.143	6.107	-94.20	11.28C	-94.2C	-.826	-11.250	.250
.172	6.105	-111.4C	10.98C	-111.4C	-4.042	-10.209	.300
.200	6.107	-129.50	10.88C	-129.5C	-8.908	-8.380	.350
.229	6.103	-148.1C	10.47C	-148.1C	-9.169	-5.707	.400
.258	6.103	-167.0C	10.48C	-167.0C	-10.192	-2.353	.450
.286	6.103	-186.2C	10.18C	-186.2C	-10.120	1.099	.500
.315	6.104	-205.4C	10.24C	-205.4C	-9.281	4.328	.550
.344	6.105	-223.7C	10.36C	-223.7C	-7.490	7.158	.600
.372	6.105	-241.4C	10.36C	-241.4C	-4.959	9.056	.650
.401	6.103	-259.0C	10.48C	-259.0C	-1.996	10.268	.700
.430	6.106	-276.3C	10.24C	-276.3C	1.124	10.178	.750
.458	6.108	-294.0C	10.14C	-294.0C	4.124	9.263	.800
.487	6.105	-311.5C	10.00C	-311.5C	6.626	7.490	.850
.515	6.106	-328.4C	9.82C	-328.4C	8.331	4.810	.900
.544	6.103	-349.0C	9.42C	-349.0C	9.267	1.797	.950
.573	6.102	-368.0C	9.37C	-368.0C	9.229	-1.297	1.000
.601	6.103	-387.0C	9.42C	-387.0C	8.293	-.277	1.050
.630	6.107	-404.9C	9.52C	-404.9C	6.743	-6.720	1.100
.659	6.107	-422.8C	9.52C	-422.8C	4.352	-8.467	1.150
.687	6.107	-440.5C	9.52C	-440.5C	1.971	-9.389	1.200
.716	6.107	-458.4C	9.52C	-458.4C	-1.391	-9.418	1.250
.745	6.104	-477.2C	9.72C	-477.2C	-4.413	-8.681	1.300
.773	6.104	-494.7C	9.72C	-494.7C	-6.837	-6.909	1.350
.802	6.106	-514.0C	9.62C	-514.0C	-8.646	-.217	1.400
.830	6.107	-533.4C	10.48C	-533.4C	-10.410	-1.021	1.450
.859	6.102	-549.3C	12.92C	-549.3C	-12.355	2.023	1.487

TABLE 3.4 (CONTINUED)

DISTRIBUTION OF CURRENT AND CHARGE ON BEVERAGE ANTENNA OVER FRESH WATER
ALFA/ETALE * .0280 BETA/BETAC * 1.016 LI/LAMDAC * 1.000
FREQUENCY * 300.000MHZ PE * .067 D/LAMDAC * .100 RL * 271.000HPS

A. MEASURED CURRENT DISTRIBUTION IN MAVV BLT

Z/H	RAW DATA		NORMALIZED DATA				Z/LAMDAC
	IRH AG	IRFAZ	INPAG	INFAZ	INREAL	INIPAG	
.000	7.793	128.80	3.820	8.80	3.775	.588	.003
.020	7.802	117.00	3.880	8.80	3.855	-.188	.025
.040	7.838	106.40	3.980	+13.61	3.963	-.814	.050
.060	6.450	86.30	3.380	-23.70	2.795	-1.884	.100
.080	6.739	67.10	3.400	+52.90	1.991	+0.632	.150
.101	6.528	47.90	3.200	-72.10	.988	-3.145	.200
.121	6.467	28.60	3.180	+82.00	-.111	+3.111	.250
.141	6.467	9.30	3.180	-110.70	-1.124	-2.975	.300
.161	6.467	-9.70	3.180	-109.70	-2.031	-2.447	.350
.181	6.467	+28.40	3.180	-148.00	-2.697	-1.685	.400
.201	6.467	+46.90	3.180	-145.90	-3.084	-.775	.450
.221	6.469	+63.40	3.220	-143.60	-3.214	-.002	.500
.241	6.469	+80.00	3.180	-200.00	-2.969	1.181	.550
.262	6.364	+99.00	3.190	-215.00	-2.428	1.983	.600
.282	6.101	-110.00	3.000	-238.00	-1.689	2.504	.650
.302	6.101	+130.00	3.000	-245.00	-.782	2.517	.700
.322	6.102	+153.60	3.000	-273.60	-.188	2.594	.750
.342	6.398	+173.00	2.980	-293.00	1.148	2.708	.800
.362	6.475	+191.60	2.980	-311.60	1.979	2.828	.850
.382	6.478	+210.00	2.980	-330.00	2.563	1.480	.900
.402	6.478	+228.40	2.980	-348.40	2.919	-.599	.950
.422	6.594	+243.00	2.980	-363.00	2.936	-.158	.984

B. MEASURED CHARGE DISTRIBUTION IN PICCOLL/VOLT-P

Z/H	RAW DATA		NORMALIZED DATA				Z/LAMDAC
	IRH AG	IRFAZ	QNPAG	QNFAZ	QNREAL	QNIPAG	
.000	1.445	+4.00	20.500	+6.00	20.388	-2.143	.006
.020	7.030	+10.90	14.700	-10.90	14.387	-3.295	.025
.040	6.409	+21.80	13.000	+21.80	12.101	-.4815	.050
.060	6.409	+40.50	11.800	+40.50	9.103	-7.065	.100
.080	6.420	+59.40	11.400	+55.00	5.913	-9.840	.150
.101	6.420	+77.00	11.400	-77.00	2.582	-11.186	.200
.121	6.477	+94.00	11.300	+94.00	-.947	-11.081	.250
.141	6.474	+110.00	11.100	-110.00	4.188	-10.360	.300
.161	6.460	+129.00	10.900	+129.00	10.900	-8.503	.350
.181	6.460	+147.60	10.800	+147.60	9.001	-5.712	.400
.201	6.467	+166.40	10.200	-166.40	-9.972	-2.413	.450
.221	6.469	+185.40	10.000	-185.40	-10.000	-.066	.500
.241	6.421	+204.50	10.000	-204.50	-9.130	4.163	.550
.262	6.422	+223.60	10.000	-223.60	-9.271	6.924	.600
.282	6.468	+243.00	10.000	-243.00	-8.444	8.848	.650
.302	6.468	+260.00	10.100	-260.00	-1.726	9.992	.700
.322	6.477	+276.00	10.200	-276.00	1.428	10.160	.750
.342	6.476	+293.00	10.300	-293.00	4.627	9.360	.800
.362	6.474	+310.00	10.300	-310.00	7.131	7.515	.850
.382	6.468	+328.40	10.100	-328.40	8.978	4.713	.900
.402	6.470	+350.00	10.900	-350.00	10.874	1.374	.950
.422	6.474	+369.00	13.200	-369.00	13.039	-2.182	.987

DISTRIBUTION OF CURRENT AND CHARGE ON BEVERAGE ANTENNA OVER FRESH WATER
ALFA/ETALE * .0280 BETA/BETAC * 1.016 LI/LAMDAC * .500
FREQUENCY * 300.000MHZ PE * .067 D/LAMDAC * .100 RL * 271.000HPS

A. MEASURED CURRENT DISTRIBUTION IN MAVV BLT

Z/H	RAW DATA		NORMALIZED DATA				Z/LAMDAC
	IRH AG	IRFAZ	INPAG	INFAZ	INREAL	INIPAG	
.004	7.035	128.40	3.780	8.80	3.720	.549	.003
.024	7.079	116.40	3.880	8.80	3.893	-.226	.025
.044	7.151	106.40	3.980	+14.00	3.835	-.856	.050
.064	6.464	85.90	3.400	-34.30	2.809	-1.916	.100
.084	6.464	67.90	3.400	+50.10	2.018	-2.588	.150
.104	6.426	48.40	3.200	-71.80	1.035	-3.112	.200
.124	6.426	29.10	3.200	+80.90	-.050	-3.280	.250
.144	6.464	9.00	3.180	-110.80	-1.129	-2.973	.300
.164	6.464	-10.00	3.220	-130.00	-2.070	-2.467	.350
.184	6.464	+29.00	3.220	-149.20	-2.786	-1.649	.400
.204	6.464	+47.40	3.200	-167.60	-3.164	-.686	.450
.224	6.464	+62.40	3.220	-182.40	-3.217	-.135	.484

B. MEASURED CHARGE DISTRIBUTION IN PICCOLL/VOLT-P

Z/H	RAW DATA		NORMALIZED DATA				Z/LAMDAC
	IRH AG	IRFAZ	QNPAG	QNFAZ	QNREAL	QNIPAG	
.004	1.445	+4.00	20.500	+6.00	20.480	-1.430	.006
.024	7.081	+10.70	14.800	-10.70	14.602	-2.759	.025
.044	6.472	+21.80	13.000	+21.80	12.266	-.4360	.050
.064	6.472	+39.00	11.700	+39.00	9.135	-7.413	.100
.084	6.467	+57.40	11.200	+57.40	6.077	-9.503	.150
.104	6.467	+75.00	11.200	-75.00	2.767	-10.935	.200
.124	6.467	+93.70	11.200	+93.70	-.728	-11.200	.250
.144	6.476	+111.00	11.300	-111.00	4.078	-10.624	.300
.164	6.474	+129.00	11.300	+129.00	7.223	-8.794	.350
.184	6.474	+148.00	11.100	-148.00	9.481	-5.924	.400
.204	6.471	+168.00	11.900	-168.00	-11.649	-2.834	.450
.224	6.471	+188.00	13.800	-188.00	-13.914	-.851	.487

TABLE 3.4 (CONTINUED)

DISTRIBUTION OF CURRENT AND CHARGE ON BEVERAGE ANTENNA OVER FRESH WATER
ALFA/BETAL = .0310 BETAL/BETAC = 1.016 LI/LAPDAC = 1.500
FREQUENCY = 300.00MHz PE = .067 D/LAPDAC = .250 RL = 29C.000HMS

A. MEASURED CURRENT DISTRIBUTION IN PA/V BLT

Z/H	RAW DATA			NORMALIZED DATA			Z/LAPDAC
	IMH AG	IRFAZ	INMAG	INFAX	INREAL	INMAG	
.002	7.714	130.70	3.400	10.70	3.341	.631	.003
.14	7.491	118.40	3.300	-1.20	3.899	-.689	.028
.29	7.263	108.40	3.220	-11.40	3.119	-.647	.050
.57	6.992	89.50	3.080	-30.40	2.454	-1.569	.100
.86	6.74	71.30	2.940	-48.70	1.990	-2.205	.150
1.15	6.491	52.80	2.800	-67.40	1.024	-2.603	.200
1.43	6.244	33.00	2.660	-87.00	.140	-2.674	.250
1.72	5.995	14.40	2.540	-107.20	-.763	-2.445	.300
2.00	5.747	-8.40	2.440	-128.20	-1.595	-2.028	.350
2.29	5.499	-28.30	2.360	-148.30	-2.229	-1.377	.400
2.58	5.244	-47.00	2.300	-167.00	-2.611	-.603	.450
2.87	4.991	-64.80	2.260	-184.80	-2.810	.236	.500
3.15	4.744	-81.90	2.240	-201.90	-2.968	1.110	.550
3.44	4.491	-97.80	2.220	-217.80	-2.989	1.867	.600
3.72	4.244	-111.50	2.200	-234.50	-2.955	2.466	.650
4.01	3.995	-122.50	2.180	-250.50	-2.885	2.940	.700
4.30	3.747	-131.00	2.160	-267.00	-2.780	3.279	.750
4.58	3.499	-137.50	2.140	-283.50	-.887	3.485	.800
4.87	3.244	-142.00	2.120	-300.00	1.149	3.559	.850
5.15	2.995	-144.50	2.100	-316.50	2.144	3.434	.900
5.44	2.747	-145.00	2.080	-333.00	2.942	3.210	.950
5.73	2.499	-143.50	2.060	-349.50	3.416	2.888	1.000
6.01	2.244	-140.00	2.040	-366.00	3.582	2.460	1.050
6.30	1.995	-134.50	2.020	-382.50	3.400	2.032	1.100
6.58	1.747	-127.00	2.000	-400.00	2.880	1.604	1.150
6.87	1.499	-117.50	1.980	-418.50	2.721	1.176	1.200
7.16	1.244	-106.00	1.960	-438.00	2.634	.748	1.250
7.45	9.991	-92.50	1.940	-458.50	2.610	.320	1.300
7.73	8.744	-77.00	1.920	-480.00	2.640	-.108	1.350
8.02	7.499	-59.50	1.900	-502.50	2.720	-.536	1.400
8.30	6.244	-40.00	1.880	-527.00	2.850	-.964	1.450
8.59	4.995	-19.50	1.860	-553.50	3.030	-1.392	1.488

B. MEASURED CHARGE DISTRIBUTION IN PICCOL/VOLT-P

Z/H	RAW DATA			NORMALIZED DATA			Z/LAPDAC
	QM AG	QRF AZ	QNMAG	QNFAX	QNREAL	QNMAG	
.003	9.991	-8.00	18.000	-8.00	17.825	-2.505	.006
.14	7.171	-14.70	16.920	-14.70	16.497	-3.279	.028
.29	4.149	-23.40	11.080	-23.40	10.184	-4.365	.050
.57	1.451	-42.40	10.000	-42.40	7.385	-6.743	.100
.86	3.472	-61.90	9.680	-61.90	4.959	-8.539	.150
1.15	3.096	-80.40	9.720	-80.40	3.604	-9.787	.200
1.43	5.450	-96.10	9.820	-96.10	2.384	-9.722	.250
1.72	5.394	-114.70	9.720	-114.70	1.402	-8.831	.300
2.00	5.199	-130.40	9.720	-130.40	0.806	-7.380	.350
2.29	5.096	-147.40	9.540	-147.40	0.437	-6.140	.400
2.58	4.995	-164.40	9.000	-164.40	0.244	-5.140	.450
2.87	4.891	-183.40	8.480	-183.40	0.140	-4.360	.500
3.15	4.795	-204.40	8.240	-204.40	0.080	-3.740	.550
3.44	4.695	-224.40	8.240	-224.40	0.050	-3.260	.600
3.72	4.614	-243.40	8.320	-243.40	0.030	-2.880	.650
4.01	4.535	-262.50	8.640	-262.50	0.020	-2.560	.700
4.30	4.451	-279.40	8.740	-279.40	0.010	-2.280	.750
4.58	4.351	-296.50	8.920	-296.50	0.000	-2.040	.800
4.87	4.244	-312.40	8.820	-312.40	0.000	-1.840	.850
5.15	4.138	-328.50	8.480	-328.50	0.000	-1.680	.900
5.44	4.031	-347.50	8.000	-347.50	0.000	-1.560	.950
5.73	3.924	-366.00	7.740	-366.00	0.000	-1.480	1.000
6.01	3.816	-387.00	7.580	-387.00	0.000	-1.432	1.050
6.30	3.709	-407.00	7.680	-407.00	0.000	-1.400	1.100
6.58	3.604	-426.40	7.920	-426.40	0.000	-1.380	1.150
6.87	3.499	-445.40	8.280	-445.40	0.000	-1.370	1.200
7.16	3.395	-464.40	8.480	-464.40	0.000	-1.370	1.250
7.45	3.291	-483.90	8.480	-483.90	0.000	-1.370	1.300
7.73	3.188	-503.10	8.000	-503.10	0.000	-1.370	1.350
8.02	3.084	-522.40	8.480	-522.40	0.000	-1.370	1.400
8.30	2.980	-541.70	9.480	-541.70	0.000	-1.370	1.450
8.59	2.876	-560.00	11.140	-560.00	0.000	-1.370	1.488

TABLE 3.4 (CONTINUED)

DISTRIBUTION OF CURRENT AND CHARGE ON BEVERAGE ANTENNA OVER FRESH WATER
 ALFA/BETAL * 0.010 BETAL/BETAC * 1.016 L1/L2/CPDAO * 1.000
 FREQUENCY * 300+00MHz PE * 0.067 D/L/CPDAO * 0.250 RL * 290+00Ohms

A. MEASURED CURRENT DISTRIBUTION IN PA/V BLT

Z/H	RAW DATA			NORMALIZED DATA				Z/L/CPDAO
	IMP AG	IRFAZ	INPAG	INFAZ	INREAL	INIMAG		
+00P	0.143	133.00	3.660	8.00	3.424	-5.09	+003	
+01	7.020	126.00	3.880	-3.00	3.375	-1.77	+025	
+10	7.020	111.50	3.640	-13.50	3.150	-4.750	+050	
+18	6.724	96.00	3.400	-33.00	2.900	-11.667	+100	
+120	6.437	76.50	2.900	-52.10	1.794	-23.04	+150	
+101	6.141	52.20	2.760	-71.80	1.802	-20.622	+200	
+211	5.763	33.00	2.460	-91.40	1.180	-24.779	+250	
+241	5.918	24.00	2.660	-112.40	-1.014	-24.559	+300	
+281	5.914	7.60	2.660	-132.60	-1.800	-14.958	+350	
+321	5.763	-27.00	2.660	-152.00	-2.304	-11.258	+400	
+361	6.141	-45.00	2.700	-170.00	-2.659	-11.669	+450	
+421	6.230	-60.80	2.660	-187.80	-2.774	-11.280	+500	
+441	6.141	-80.00	2.660	-205.30	-2.498	-11.180	+550	
+482	6.141	-97.60	2.760	-222.60	-2.039	-11.888	+600	
+522	5.763	-114.00	2.660	-239.00	-1.380	-12.097	+650	
+56P	5.763	-131.80	2.660	-256.80	-1.612	-12.609	+700	
+56P	6.141	-150.70	2.700	-275.70	-1.668	-12.637	+750	
+602	5.763	-169.30	2.660	-294.30	-1.060	-12.351	+800	
+682	5.930	-188.60	2.660	-313.60	-1.807	-11.897	+850	
+722	5.742	-207.30	2.660	-332.30	-2.284	-11.599	+900	
+762	5.426	-226.60	2.660	-350.60	-2.526	-11.8	+950	
+790	5.429	-241.30	2.660	-368.30	-2.425	-12.268	+984	

B. MEASURED CHARGE DISTRIBUTION IN PICCOL/VBLT*

Z/H	RAW DATA			NORMALIZED DATA				Z/L/CPDAO
	QRTAG	QRFAZ	QNPAG	QNFZA	QNREAL	QNIMAG		
+00S	1.104	-8.00	18.700	-8.00	18.518	-2.603	+006	
+20	7.021	-14.50	13.400	-14.50	13.031	-3.370	+025	
+10	6.356	-22.70	11.860	-22.70	10.960	-4.585	+050	
+18	5.757	-31.00	10.760	-31.00	8.121	-7.059	+100	
+120	5.453	-58.90	10.380	-58.90	5.362	-8.888	+150	
+101	5.600	-76.40	10.260	-76.40	2.347	-10.008	+200	
+211	5.254	-111.60	9.820	-111.60	-3.615	-9.130	+250	
+281	5.250	-128.30	9.700	-128.30	-4.024	-7.608	+300	
+321	4.954	-146.30	9.260	-146.30	-7.704	-5.138	+400	
+361	4.751	-165.00	8.860	-165.00	-8.577	-2.296	+450	
+421	4.461	-184.40	8.400	-184.40	-8.678	-1.66	+500	
+441	4.461	-204.40	8.400	-204.40	-7.832	-3.553	+550	
+482	4.461	-224.40	8.400	-224.40	-6.144	-4.017	+600	
+522	4.461	-244.40	8.400	-244.40	-4.169	-7.522	+650	
+56P	4.461	-264.60	8.400	-264.60	-1.552	-8.459	+700	
+602	4.461	-277.00	8.700	-277.00	-1.080	-8.635	+750	
+642	4.461	-294.60	8.760	-294.60	-3.683	-7.970	+800	
+682	4.461	-313.10	8.780	-313.10	5.999	6.411	+850	
+722	4.461	-332.30	8.700	-332.30	2.745	9.923	+900	
+762	5.100	-354.60	9.440	-354.60	9.401	1.856	+950	
+790	6.139	-369.00	11.400	-369.00	12.244	-7.882	+987	

DISTRIBUTION OF CURRENT AND CHARGE ON BEVERAGE ANTENNA OVER FRESH WATER
 ALFA/BETAL * 0.010 BETAL/BETAC * 1.016 L1/L2/CPDAO * 1.000
 FREQUENCY * 300+00MHz PE * 0.067 D/L/CPDAO * 0.250 RL * 290+00Ohms

A. MEASURED CURRENT DISTRIBUTION IN PA/V BLT

Z/H	RAW DATA			NORMALIZED DATA				Z/L/CPDAO
	IMP AG	IRFAZ	INPAG	INFAZ	INREAL	INIMAG		
+004	0.194	130.30	3.660	7.30	3.452	-4.42	+003	
+134	0.438	120.40	3.200	-4.42	3.271	-1.240	+025	
+167	0.438	109.70	3.200	-15.30	3.087	-4.844	+050	
+194	0.467	90.20	3.200	-34.30	2.513	-11.746	+100	
+201	0.433	71.70	2.900	-53.30	1.797	-2.357	+150	
+268	0.426	53.80	2.660	-71.70	1.804	-2.734	+200	
+335	0.464	34.80	2.660	-90.20	1.010	-2.600	+250	
+402	0.435	16.40	2.660	-110.20	-1.918	-2.496	+300	
+469	0.438	-2.00	2.660	-130.00	-1.661	-1.992	+350	
+536	0.421	-25.10	2.660	-150.10	-2.000	-1.766	+400	
+603	0.421	-49.20	2.660	-170.20	-2.503	-1.32	+450	
+670	0.464	-61.00	2.660	-186.20	-2.600	-1.72	+500	

B. MEASURED CHARGE DISTRIBUTION IN PICCOL/VBLT*

Z/H	RAW DATA			NORMALIZED DATA				Z/L/CPDAO
	QRTAG	QRFAZ	QNPAG	QNFZA	QNREAL	QNIMAG		
+08	7.922	-8.00	18.640	-8.00	18.459	-2.594	+006	
+34	5.495	-14.10	13.400	-14.10	12.898	-3.284	+025	
+67	4.994	-22.80	11.760	-22.80	10.865	-4.500	+050	
+134	4.454	-41.00	10.440	-41.00	7.909	-6.875	+100	
+201	4.457	-59.40	9.800	-59.40	6.240	-8.021	+150	
+268	4.156	-77.60	9.740	-77.60	2.100	-9.552	+200	
+335	4.104	-95.90	9.660	-95.90	-1.920	-9.416	+250	
+402	4.105	-114.40	9.660	-114.40	-3.136	-8.666	+300	
+469	4.125	-133.40	9.660	-133.40	-6.388	-7.246	+350	
+536	4.181	-150.40	9.560	-150.40	-8.321	-6.708	+400	
+603	4.409	-171.00	10.140	-171.00	-10.015	-1.586	+450	
+670	5.100	-186.70	12.000	-186.70	-11.918	-1.400	+487	

TABLE 3.4 (CONTINUED)

DISTRIBUTION OF CURRENT AND CHARGE ON BEVERAGE ANTENNA OVER SALT WATER
ALFA/BETA1 = .066C BETA1/BETA2 = 1.109 L1/LAPDAG = 1.500

FREQUENCY * 300-COMPHZ PE = 2.888 Q/LAPDAC = .010 RL = 180-COUBHPS

A. MEASURED CURRENT DISTRIBUTION IN PAVY BLT

Z/H	RAW DATA		NORMALIZED DATA				
	IRFAZ	IRFAG	IRFAZ	IRFAG	INREAL	INIMAG	Z/LAPDAG
.002	9.490	122.70	5.99C	10.70	5.837	1.103	.003
.14	9.490	122.40	5.76C	10.40	5.780	1.040	.028
.29	9.490	121.80	5.66C	10.20	5.690	1.000	.050
.58	9.491	82.20	5.40C	29.80	4.686	-2.684	.100
.87	9.484	61.00	5.20C	51.00	4.100	-3.272	.150
1.16	9.458	39.30	5.04C	72.70	1.511	4.480	.200
1.45	9.453	18.50	5.04C	93.80	1.306	5.011	.250
1.74	9.438	11.30	5.04C	113.30	1.188	4.411	.300
2.03	9.454	20.00	5.04C	132.00	3.389	-3.731	.350
2.32	9.451	38.50	4.96C	150.50	4.317	-2.442	.400
2.61	7.459	57.30	4.74C	169.30	4.468	1.880	.450
2.90	7.459	77.80	4.67C	189.80	4.533	1.783	.500
3.19	6.493	98.80	4.20C	210.60	3.615	2.138	.550
3.48	6.493	120.30	4.02C	232.30	2.458	3.181	.600
3.77	6.493	141.60	4.02C	253.60	1.135	3.856	.650
4.06	6.493	162.80	4.02C	274.80	3.15	4.08	.700
4.35	6.493	182.10	4.02C	294.10	1.641	3.670	.750
4.64	6.493	200.40	4.02C	312.60	2.791	2.959	.800
4.93	6.493	218.70	3.94C	330.70	3.436	1.928	.850
5.22	6.481	237.20	3.70C	349.20	3.634	1.693	.900
5.51	6.494	256.80	3.42C	368.80	3.380	1.523	.950
5.80	6.490	278.50	3.24C	388.50	2.792	1.644	1.000
6.09	5.161	300.60	3.10C	412.60	1.883	2.463	1.050
6.38	5.161	324.40	3.10C	436.40	1.718	3.116	1.100
6.67	5.161	344.4C	3.10C	456.4C	1.346	3.481	1.150
6.96	5.190	364.40	3.18C	476.40	1.194	2.858	1.200
7.24	5.190	381.4C	3.24C	493.80	2.023	2.139	1.250
7.53	5.190	400.00	3.06C	512.00	2.702	1.437	1.300
7.82	4.496	417.80	2.94C	529.80	2.894	1.821	1.350
8.11	4.496	437.70	2.70C	549.70	2.661	1.455	1.400
8.40	4.462	458.60	2.62C	570.60	2.855	1.334	1.450
8.69	4.496	479.4C	2.50C	587.50	1.702	1.488	1.500

B. MEASURED CHARGE DISTRIBUTION IN PICCOLL/VBLT*

Z/H	RAW DATA		NORMALIZED DATA				
	QRFAZ	QRFAG	QRFAZ	QRFAG	QREAL	QIMAG	Z/LAPDAG
.003	9.490	.000	27.00C	.000	27.000	.000	.006
.14	9.490	4.900	22.24C	5.000	22.028	-3.485	.025
.29	7.498	20.000	21.84C	20.000	20.053	-7.099	.050
.58	7.490	38.400	20.52C	38.800	16.059	-10.774	.100
.87	7.441	58.800	20.39C	58.200	10.739	-17.321	.150
1.16	7.394	77.000	19.76C	77.000	6.436	-19.015	.200
1.45	6.493	96.000	18.90C	96.000	1.976	14.796	.250
1.74	6.493	115.800	17.82C	115.800	1.784	14.030	.300
2.03	6.428	136.700	17.36C	136.700	-12.634	11.906	.350
2.32	6.447	158.400	17.14C	158.400	-15.936	8.310	.400
2.61	6.444	179.700	16.88C	179.700	-16.880	4.088	.450
2.90	6.444	200.700	16.66C	200.700	-15.842	5.829	.500
3.19	6.434	219.000	16.74C	219.000	-13.009	10.530	.550
3.48	6.434	237.500	16.66C	237.500	8.850	13.889	.600
3.77	6.494	256.000	15.66C	256.000	3.788	15.195	.650
4.06	6.443	275.000	14.96C	275.000	1.384	14.916	.700
4.35	6.490	296.000	14.04C	296.000	6.044	12.672	.750
4.64	6.443	317.800	13.36C	317.800	9.897	8.974	.800
4.93	6.493	340.300	13.24C	340.300	12.465	4.463	.850
5.22	6.447	362.000	13.100	362.000	13.092	1.487	.900
5.51	6.447	382.000	13.100	382.000	12.138	4.499	.950
5.80	6.447	400.700	13.100	400.700	9.332	8.546	1.000
6.09	6.447	418.800	13.100	418.800	6.786	11.205	1.050
6.38	6.444	436.900	14.28C	436.900	2.783	11.981	1.100
6.67	6.496	456.800	11.94C	456.800	1.784	11.667	1.150
6.96	6.444	477.000	11.27C	477.000	5.241	9.898	1.200
7.24	6.448	490.000	10.40C	490.000	7.979	8.667	1.250
7.53	6.418	502.000	10.32C	502.000	9.842	3.103	1.300
7.82	6.400	514.200	10.54C	514.200	-10.512	1.772	1.350
8.11	6.444	526.300	10.66C	526.300	8.783	4.234	1.400
8.40	6.444	541.800	11.4200	541.800	8.388	7.421	1.450
8.69	6.496	554.200	12.4200	554.200	-7.265	10.073	1.487

TABLE 3.4 (CONTINUED)

DISTRIBUTION OF CURRENT AND CHARGE ON BEVERAGE ANTENNA OVER SALT WATER
 ALPHA/BETA = 0.660 BETA/BETAC = 1.109 L1/LAPDAO = 1.000
 FREQUENCY = 300.00MHZ PE = 2.888 D/LAPDAO = 0.010 RL = 180.00OHMS

A. MEASURED CURRENT DISTRIBUTION IN PA/V BLY

Z/H	RAW DATA		NORMALIZED DATA					Z/LAPDAO
	IRH AG	IRFAZ	INMAG	INFZ	INREAL	INIMAG		
+02	9.491	130.00	8.000	8.000	8.000	8.000	+002	
+04	9.491	119.70	8.000	8.000	8.000	8.000	+004	
+06	9.491	109.10	8.000	8.000	8.000	8.000	+006	
+08	9.491	98.50	8.000	8.000	8.000	8.000	+008	
+10	9.491	88.30	8.000	8.000	8.000	8.000	+010	
+12	9.491	78.10	8.000	8.000	8.000	8.000	+012	
+14	9.491	68.00	8.000	8.000	8.000	8.000	+014	
+16	9.491	58.00	8.000	8.000	8.000	8.000	+016	
+18	9.491	48.00	8.000	8.000	8.000	8.000	+018	
+20	9.491	38.00	8.000	8.000	8.000	8.000	+020	
+22	9.491	28.00	8.000	8.000	8.000	8.000	+022	
+24	9.491	18.00	8.000	8.000	8.000	8.000	+024	
+26	9.491	8.00	8.000	8.000	8.000	8.000	+026	
+28	9.491	0.00	8.000	8.000	8.000	8.000	+028	
+30	9.491	-8.00	8.000	8.000	8.000	8.000	+030	
+32	9.491	-18.00	8.000	8.000	8.000	8.000	+032	
+34	9.491	-28.00	8.000	8.000	8.000	8.000	+034	
+36	9.491	-38.00	8.000	8.000	8.000	8.000	+036	
+38	9.491	-48.00	8.000	8.000	8.000	8.000	+038	
+40	9.491	-58.00	8.000	8.000	8.000	8.000	+040	
+42	9.491	-68.00	8.000	8.000	8.000	8.000	+042	
+44	9.491	-78.10	8.000	8.000	8.000	8.000	+044	
+46	9.491	-88.30	8.000	8.000	8.000	8.000	+046	
+48	9.491	-98.50	8.000	8.000	8.000	8.000	+048	
+50	9.491	-109.10	8.000	8.000	8.000	8.000	+050	
+52	9.491	-119.70	8.000	8.000	8.000	8.000	+052	
+54	9.491	-130.00	8.000	8.000	8.000	8.000	+054	

B. MEASURED CHARGE DISTRIBUTION IN PICCOL/VOLTP

Z/H	RAW DATA		NORMALIZED DATA					Z/LAPDAO
	IRH AG	IRFAZ	QNMAG	QNFZ	QNREAL	QNIMAG		
+02	9.462	+3.00	27.020	-3.00	26.983	-1.414	+006	
+04	9.462	+11.50	22.940	-11.50	21.794	-4.434	+008	
+06	9.462	+21.30	21.340	-21.30	19.862	-7.750	+010	
+08	9.462	+32.40	20.740	-32.40	18.676	-13.579	+012	
+10	9.462	+44.90	20.480	-44.90	17.646	-21.646	+014	
+12	9.462	+58.80	19.800	-58.80	16.800	-31.600	+016	
+14	9.462	+74.10	18.300	-74.10	15.100	-43.100	+018	
+16	9.462	+90.80	17.480	-90.80	13.680	-56.480	+020	
+18	9.462	+109.00	16.300	-109.00	12.400	-71.600	+022	
+20	9.462	+128.70	14.800	-128.70	11.200	-89.200	+024	
+22	9.462	+150.00	13.000	-150.00	10.000	-109.000	+026	
+24	9.462	+172.90	10.800	-172.90	8.800	-131.600	+028	
+26	9.462	+207.40	8.200	-207.40	7.600	-157.400	+030	
+28	9.462	+253.50	5.200	-253.50	6.400	-187.500	+032	
+30	9.462	+311.20	1.800	-311.20	5.200	-221.200	+034	
+32	9.462	+380.50	-1.800	+380.50	4.000	-258.500	+036	
+34	9.462	+461.40	-5.200	+461.40	2.800	-300.400	+038	
+36	9.462	+553.80	-9.200	+553.80	1.600	-347.800	+040	
+38	9.462	+657.80	-13.800	+657.80	0.400	-400.800	+042	
+40	9.462	+773.30	-19.000	+773.30	-0.800	-460.300	+044	
+42	9.462	+900.40	-24.800	+900.40	-1.600	-526.400	+046	
+44	9.462	+1049.10	-31.200	+1049.10	-2.400	-600.100	+048	
+46	9.462	+1220.40	-38.200	+1220.40	-3.200	-681.400	+050	
+48	9.462	+1414.30	-45.800	+1414.30	-4.000	-770.300	+052	
+50	9.462	+1631.80	-54.000	+1631.80	-4.800	-867.800	+054	
+52	9.462	+1872.90	-62.800	+1872.90	-5.600	-974.900	+056	
+54	9.462	+2137.60	-72.200	+2137.60	-6.400	-1091.600	+058	
+56	9.462	+2425.90	-82.200	+2425.90	-7.200	-1218.900	+060	
+58	9.462	+2737.80	-92.800	+2737.80	-8.000	-1357.800	+062	
+60	9.462	+3073.30	-104.000	+3073.30	-8.800	-1508.300	+064	

DISTRIBUTION OF CURRENT AND CHARGE ON BEVERAGE ANTENNA OVER SALT WATER
 ALPHA/BETA = 0.660 BETA/BETAC = 1.109 L1/LAPDAO = 0.500
 FREQUENCY = 300.00MHZ PE = 2.888 D/LAPDAO = 0.010 RL = 180.00OHMS

A. MEASURED CURRENT DISTRIBUTION IN PA/V BLY

Z/H	RAW DATA		NORMALIZED DATA					Z/LAPDAO
	IRH AG	IRFAZ	INMAG	INFZ	INREAL	INIMAG		
+02	9.499	130.00	8.000	8.000	8.007	0.780	+002	
+04	9.499	119.20	8.000	8.000	8.007	0.780	+004	
+06	9.499	108.10	8.000	8.000	8.007	0.780	+006	
+08	9.499	97.00	8.000	8.000	8.007	0.780	+008	
+10	9.499	86.00	8.000	8.000	8.007	0.780	+010	
+12	9.499	75.00	8.000	8.000	8.007	0.780	+012	
+14	9.499	64.00	8.000	8.000	8.007	0.780	+014	
+16	9.499	53.00	8.000	8.000	8.007	0.780	+016	
+18	9.499	42.00	8.000	8.000	8.007	0.780	+018	
+20	9.499	31.00	8.000	8.000	8.007	0.780	+020	
+22	9.499	20.00	8.000	8.000	8.007	0.780	+022	
+24	9.499	9.00	8.000	8.000	8.007	0.780	+024	
+26	9.499	0.00	8.000	8.000	8.007	0.780	+026	
+28	9.499	-9.00	8.000	8.000	8.007	0.780	+028	
+30	9.499	-18.00	8.000	8.000	8.007	0.780	+030	
+32	9.499	-27.00	8.000	8.000	8.007	0.780	+032	
+34	9.499	-36.00	8.000	8.000	8.007	0.780	+034	
+36	9.499	-45.00	8.000	8.000	8.007	0.780	+036	
+38	9.499	-54.00	8.000	8.000	8.007	0.780	+038	
+40	9.499	-63.00	8.000	8.000	8.007	0.780	+040	
+42	9.499	-72.00	8.000	8.000	8.007	0.780	+042	
+44	9.499	-81.00	8.000	8.000	8.007	0.780	+044	
+46	9.499	-90.00	8.000	8.000	8.007	0.780	+046	
+48	9.499	-99.00	8.000	8.000	8.007	0.780	+048	
+50	9.499	-108.00	8.000	8.000	8.007	0.780	+050	
+52	9.499	-117.00	8.000	8.000	8.007	0.780	+052	
+54	9.499	-126.00	8.000	8.000	8.007	0.780	+054	
+56	9.499	-135.00	8.000	8.000	8.007	0.780	+056	
+58	9.499	-144.00	8.000	8.000	8.007	0.780	+058	
+60	9.499	-153.00	8.000	8.000	8.007	0.780	+060	

B. MEASURED CHARGE DISTRIBUTION IN PICCOL/VOLTP

Z/H	RAW DATA		NORMALIZED DATA					Z/LAPDAO
	IRH AG	IRFAZ	QNMAG	QNFZ	QNREAL	QNIMAG		
+02	9.481	+1.90	28.000	-1.90	28.000	-0.851	+006	
+04	9.481	+6.00	21.000	-6.00	21.000	-2.737	+008	
+06	9.481	+11.00	18.000	-11.00	18.000	-4.786	+010	
+08	9.481	+16.00	15.000	-16.00	15.000	-7.000	+012	
+10	9.481	+21.00	12.000	-21.00	12.000	-9.379	+014	
+12	9.481	+26.00	9.000	-26.00	9.000	-11.900	+016	
+14	9.481	+31.00	6.000	-31.00	6.000	-14.579	+018	
+16	9.481	+36.00	3.000	-36.00	3.000	-17.400	+020	
+18	9.481	+41.00	0.000	-41.00	0.000	-20.379	+022	
+20	9.481	+46.00	-3.000	+46.00	-3.000	-23.500	+024	
+22	9.481	+51.00	-6.000	+51.00	-6.000	-26.779	+026	
+24	9.481	+56.00	-9.000	+56.00	-9.000	-30.200	+028	
+26	9.481	+61.00	-12.000	+61.00	-12.000	-33.779	+030	
+28	9.481	+66.00	-15.000	+66.00	-15.000	-37.500	+032	
+30	9.481	+71.00	-18.000	+71.00	-18.000	-41.379	+034	
+32	9.481	+76.00	-21.000	+76.00	-21.000	-45.400	+036	
+34	9.481	+81.00	-24.000	+81.00	-24.000	-49.579	+038	
+36	9.481	+86.00	-27.000	+86.00	-27.000	-53.900	+040	
+38	9.481	+91.00	-30.000	+91.00	-30.000	-58.379	+042	
+40	9.481	+96.00	-33.000	+96.00	-33.000	-62.900	+044	
+42	9.481	+101.00	-36.000	+101.00	-36.000	-67.579	+046	
+44	9.481	+106.00	-39.000	+106.00	-39.000	-72.400	+048	
+46	9.481	+111.00	-42.000	+111.00	-42.000	-77.379	+050	
+48	9.481	+116.00	-45.000	+116.00	-45.000	-82.500	+052	
+50	9.481	+121.00	-48.000	+121.00	-48.000	-87.779	+054	
+52	9.481	+126.00	-51.000	+126.00	-51.000	-93.200	+056	
+54	9.481	+131.00	-54.000	+131.00	-54.000	-98.779	+058	
+56	9.481	+136.00	-57.000	+136.00	-57.000	-104.500	+060	
+58	9.481	+141.00	-60.000	+141.00	-60.000	-110.379	+062	
+60	9.481	+146.00	-63.000	+146.00	-63.000	-116.400	+064	

TABLE 3.4 (CONTINUED)

DISTRIBUTION OF CURRENT AND CHARGE ON BEVERAGE ANTENNA OVER SALT WATER
 ALPHA/BETAL = 1.0407 BETA/BETAC = 1.047 LI/LAMDAD = 1.500
 FREQUENCY = 300.000MHZ PE = 2.885 D/LAMDAC = .020 RL = 204.000HMS

A. MEASURED CURRENT DISTRIBUTION IN MAV BLT

Z/H	RAW DATA		NORMALIZED DATA					Z/LAMDAD
	IRFAZ	IRFAG	INFAZ	INFAZ	INREAL	INIPAG		
.002	1.1724	126.70	4.970	10.00	4.865	.858	.003	
.14	7.716	129.60	4.880	10.00	4.880	-.140	.025	
.29	9.433	119.10	4.880	-10.90	4.733	-.911	.050	
.44	9.433	100.10	4.740	-29.90	4.109	-2.363	.100	
.58	9.433	80.40	4.680	-49.40	3.007	-3.536	.150	
.73	9.433	60.90	4.600	-69.10	1.641	-4.297	.200	
.88	9.433	41.80	4.500	-88.40	-.127	-4.558	.250	
1.03	9.433	22.60	4.480	-107.20	-1.325	-4.280	.300	
1.18	9.433	3.20	4.440	-125.70	-2.614	-3.638	.350	
1.33	9.433	-14.70	4.440	-144.70	-3.684	-2.566	.400	
1.48	9.433	-32.80	4.320	-162.80	-4.127	-1.277	.450	
1.63	9.433	-52.00	4.240	-182.00	-4.337	-.151	.500	
1.78	9.433	-71.80	4.140	-201.80	-4.302	1.517	.550	
1.93	9.433	-90.40	4.080	-220.40	-3.889	2.866	.600	
2.08	9.433	-110.30	4.040	-238.30	-2.701	3.827	.650	
2.23	9.433	-129.70	3.960	-259.70	-2.059	4.696	.700	
2.38	9.433	-149.30	3.920	-279.30	-.633	5.468	.750	
2.53	9.433	-168.80	3.900	-298.80	1.831	6.144	.800	
2.68	9.433	-188.20	3.920	-316.20	2.829	2.713	.850	
2.83	9.433	-204.70	3.870	-334.70	3.436	1.424	.900	
2.98	9.433	-223.20	3.860	-353.20	3.634	-.333	.950	
3.13	9.433	-243.10	3.800	-373.10	3.409	-.793	1.000	
3.28	9.433	-261.30	3.680	-391.30	2.974	-1.408	1.050	
3.43	9.433	-281.20	3.440	-411.80	2.127	-2.703	1.100	
3.58	9.433	-301.60	3.480	-431.80	1.087	-3.306	1.150	
3.73	9.433	-320.70	3.440	-450.70	-.042	-4.440	1.200	
3.88	9.433	-340.00	3.480	-470.00	-1.190	-3.270	1.250	
4.03	9.433	-358.80	3.340	-488.80	-2.079	-2.614	1.300	
4.18	9.433	-376.40	3.320	-506.40	-2.745	-1.837	1.350	
4.33	9.433	-395.20	3.220	-525.20	-3.113	-.823	1.400	
4.48	9.433	-414.40	3.180	-544.40	-3.170	-.255	1.450	
4.63	9.433	-429.80	3.120	-555.80	-2.939	1.027	1.484	

B. MEASURED CHARGE DISTRIBUTION IN PICCOL/VBLT*

Z/H	RAW DATA		NORMALIZED DATA					Z/LAMDAD
	IRFAG	IRFAL	QNFAG	QNFAL	QNFREAL	QNFIPAG		
.003	3.704	3.00	23.960	3.00	23.927	1.254	.006	
.14	7.454	4.440	18.920	4.440	18.234	-1.582	.025	
.29	7.104	-14.40	17.540	-14.40	16.989	-4.362	.050	
.44	6.753	-33.40	16.920	-33.40	16.126	-9.314	.100	
.58	6.401	-52.10	16.370	-52.10	15.013	-12.860	.150	
.73	6.050	-71.30	16.060	-71.30	13.149	-15.212	.200	
.88	5.699	-90.30	15.800	-90.30	10.883	-15.800	.250	
1.03	5.348	-109.40	15.200	-109.40	8.245	-14.337	.300	
1.18	4.997	-128.30	15.320	-128.30	5.495	-12.023	.350	
1.33	4.646	-147.80	15.960	-147.80	1.974	-8.337	.400	
1.48	4.295	-166.40	15.200	-166.40	-14.774	-3.574	.450	
1.63	3.944	-185.20	14.820	-185.20	-14.759	1.343	.500	
1.78	3.593	-204.70	14.580	-204.70	-13.319	5.930	.550	
1.93	3.242	-222.60	14.320	-222.60	-10.541	9.693	.600	
2.08	2.891	-242.10	13.960	-242.10	-6.532	12.337	.650	
2.23	2.540	-262.20	14.080	-262.20	-1.838	13.940	.700	
2.38	2.189	-280.60	13.580	-280.60	2.545	13.339	.750	
2.53	1.838	-300.00	13.220	-300.00	6.610	11.449	.800	
2.68	1.487	-321.00	13.340	-321.00	10.387	8.395	.850	
2.83	1.136	-338.80	12.960	-338.80	12.046	4.729	.900	
2.98	8.785	-358.80	12.720	-358.80	12.716	-.333	.950	
3.13	8.434	-377.20	12.480	-377.20	11.935	-3.649	1.000	
3.28	8.083	-395.60	12.260	-395.60	10.080	-7.195	1.050	
3.43	7.732	-414.40	12.360	-414.40	7.265	-9.999	1.100	
3.58	7.381	-433.00	12.100	-433.00	3.528	-11.571	1.150	
3.73	7.030	-452.00	11.740	-452.00	-.410	-11.793	1.200	
3.88	6.679	-470.90	11.360	-470.90	-4.053	-10.413	1.250	
4.03	6.328	-490.30	11.240	-490.30	-7.270	-8.572	1.300	
4.18	5.977	-509.40	11.240	-509.40	-9.773	-6.552	1.350	
4.33	5.626	-528.80	11.480	-528.80	-11.232	-4.835	1.400	
4.48	5.275	-549.60	11.600	-549.60	-11.428	1.995	1.450	
4.63	4.924	-569.30	13.340	-569.30	-12.158	5.440	1.487	

TABLE 3.4 (CONTINUED)

DISTRIBUTION OF CURRENT AND CHARGE ON BEVERAGE ANTENNA OVER SALT WATER
ALFA/BETAL = .0007 BETAL/BETAC = 1.007 LI/LAPDAG = 1.000

FREQUENCY = 300.000MHZ PE = 2.885 D/LAPDAG = .020 RL = 195.000HPS

A. MEASURED CURRENT DISTRIBUTION IN PAVV BLT

RAW DATA		NORMALIZED DATA					
Z/H	IRH AG	IRFAZ	INPAG	IKFAZ	IKREAL	INIPAG	Z/LAPDAG
.00P	1.0110	130.00	5.000	5.000	5.180	.+53	.003
.10P	9.752	119.00	5.000	-5.80	5.014	-.009	.028
.40	9.025	109.90	5.000	-15.10	4.827	-1.303	.050
.81	9.317	91.10	4.800	-33.90	4.017	-2.699	.100
.121	9.125	71.80	4.700	-51.50	2.819	-3.810	.150
.161	6.317	51.80	4.580	-73.40	1.908	-4.389	.200
.202	6.701	31.80	4.500	-93.60	1.284	-4.511	.250
.242	6.701	11.80	4.020	-113.20	-1.781	-4.154	.300
.283	6.417	-7.50	4.880	-132.50	-3.094	-3.377	.350
.323	6.774	-26.00	4.800	-151.00	-3.808	-2.011	.400
.363	6.701	-43.80	4.520	-168.80	-4.434	-.878	.450
.404	6.509	-62.20	4.120	-187.20	-4.885	-.554	.500
.444	6.316	-80.80	4.200	-205.80	-5.189	1.880	.550
.484	6.008	-99.70	4.160	-224.70	-5.297	2.926	.600
.525	7.481	-119.50	3.980	-244.50	-5.173	3.552	.650
.565	7.481	-140.50	3.980	-264.50	-.312	3.968	.700
.605	7.423	-160.60	3.900	-284.60	1.065	3.814	.750
.646	7.446	-178.60	3.820	-304.60	2.224	3.227	.800
.686	7.700	-197.50	4.000	-322.50	3.190	2.413	.850
.727	7.423	-216.30	3.900	-341.30	3.751	1.270	.900
.767	7.481	-234.30	3.980	-359.30	3.880	-.049	.950
.794	7.507	-247.60	3.900	-372.60	3.808	-.851	.984

B. MEASURED CHARGE DISTRIBUTION IN PICCOL/VOLT*H

RAW DATA		NORMALIZED DATA					
Z/H	QHPAG	QRFAG	QNPAG	QKFAZ	QKREAL	QNPAG	Z/LAPDAG
.00P	9.009	-1.80	23.400	-1.80	23.388	-.735	.006
.10P	7.401	-10.40	18.340	-10.40	18.039	-3.311	.025
.40	6.707	-20.30	17.420	-20.30	16.338	-6.044	.050
.81	6.460	-38.50	17.000	-38.50	13.072	-10.930	.100
.121	6.506	-58.30	16.900	-58.30	8.880	-14.379	.150
.161	6.560	-78.90	17.000	-78.90	3.862	-16.599	.200
.202	6.460	-95.20	16.820	-95.20	-1.058	-18.449	.250
.242	6.206	-113.20	16.120	-113.20	-6.350	-18.816	.300
.283	6.146	-132.20	16.000	-132.20	-10.748	-11.853	.350
.323	5.440	-151.40	15.220	-151.40	-13.413	-7.192	.400
.363	5.705	-171.70	14.820	-171.70	-14.665	-2.139	.450
.404	5.459	-191.70	14.440	-191.70	-14.140	2.924	.500
.444	5.680	-211.70	14.700	-211.70	-12.507	7.724	.550
.484	5.706	-230.70	14.820	-230.70	-9.387	11.468	.600
.525	5.459	-250.70	15.000	-250.70	-4.384	14.529	.650
.565	4.760	-267.20	14.980	-267.20	-.731	14.942	.700
.605	5.305	-285.20	13.780	-285.20	3.613	13.298	.750
.646	5.005	-303.80	13.820	-303.80	7.021	11.025	.800
.686	5.159	-323.50	13.400	-323.50	10.772	7.971	.850
.727	5.005	-344.00	13.000	-344.00	12.509	3.500	.900
.767	5.205	-364.50	13.520	-364.50	13.471	-1.155	.950
.797	6.006	-379.50	15.600	-379.50	14.705	-5.207	.987

DISTRIBUTION OF CURRENT AND CHARGE ON BEVERAGE ANTENNA OVER SALT WATER
ALFA/BETAL = .0007 BETAL/BETAC = 1.007 LI/LAPDAG = .500

FREQUENCY = 300.000MHZ PE = 2.885 D/LAPDAG = .020 RL = 195.000HPS

A. MEASURED CURRENT DISTRIBUTION IN PAVV BLT

RAW DATA		NORMALIZED DATA					
Z/H	IRH AG	IRFAZ	INPAG	IKFAZ	IKREAL	INIPAG	Z/LAPDAG
.00P	10.000	130.00	5.000	5.000	4.981	+.336	.003
.10P	9.800	119.80	4.900	-5.20	4.880	-.444	.025
.40	9.400	109.80	4.900	-15.40	4.724	-1.321	.050
.81	9.200	90.10	4.780	-34.80	3.920	-2.735	.100
.121	9.400	70.60	4.620	-54.80	2.778	-3.939	.150
.161	9.560	51.30	4.780	-73.70	1.942	-4.588	.200
.202	9.380	31.70	4.620	-93.30	1.279	-4.812	.250
.242	9.320	13.00	4.620	-112.00	-1.746	-4.381	.300
.283	9.320	-7.60	4.680	-130.60	-3.039	-3.538	.350
.323	9.410	-26.10	4.580	-149.10	-3.813	-2.342	.400
.363	9.120	-43.20	4.580	-168.20	-4.404	-.933	.450
.404	8.700	-62.40	4.400	-183.40	-4.392	-.261	.500

B. MEASURED CHARGE DISTRIBUTION IN PICCOL/VOLT*H

RAW DATA		NORMALIZED DATA					
Z/H	QHPAG	QRFAG	QNPAG	QKFAZ	QKREAL	QNPAG	Z/LAPDAG
.00P	9.304	-5.20	23.280	-5.20	23.144	-2.108	.006
.10P	7.500	-14.30	19.500	-14.30	19.082	-4.154	.025
.40	7.128	-23.90	17.820	-23.90	16.034	-6.647	.050
.81	6.824	-41.00	17.000	-41.00	12.878	-11.192	.100
.121	6.844	-59.30	16.620	-59.30	8.485	-14.291	.150
.161	6.759	-78.30	16.880	-78.30	3.423	-16.529	.200
.202	6.759	-97.70	16.880	-97.70	-2.128	-15.737	.250
.242	6.104	-114.80	15.780	-114.80	-7.106	-14.067	.300
.283	6.159	-136.30	15.880	-136.30	-11.481	-10.971	.350
.323	6.220	-156.00	15.500	-156.00	-14.140	-6.204	.400
.363	6.458	-174.70	14.880	-174.70	-15.640	-1.086	.450
.404	7.400	-190.50	19.000	-190.50	-18.607	3.593	.500

TABLE 3.4 (CONTINUED)

DISTRIBUTION OF CURRENT AND CHARGE ON BEVERAGE ANTENNA OVER SALT WATER
ALPHA/BETA1 = .022C BETA1/BETA2 = 1.025 L1/L2/DAG = 1.500
FREQUENCY = 300.000MHz PE = 2.885 D/LAM/DAG = .050 RL = 265.000ohms

A. MEASURED CURRENT DISTRIBUTION IN MAX VOLT

Z/H	RAW DATA		NORMALIZED DATA					Z/LAM/DAG
	IRH AG	IRFAZ	INRAG	INFAZ	INREAL	INIMG		
.022	3.321	126.7C	3.82C	6.77C	3.79A	-.446	.003	
.114	3.124	114.7C	3.74C	6.33C	3.72A	-.345	.025	
.229	4.530	103.3C	3.66C	-16.77C	3.506	-1.052	.050	
.557	6.735	83.80	3.58C	-26.22C	2.889	-2.114	.100	
.86	6.484	64.10	3.50C	-35.9C	1.996	-2.548	.150	
.115	6.486	44.5C	3.56C	-75.5C	.891	-3.447	.200	
.143	6.794	25.8C	3.60C	-94.4C	-.276	-3.689	.250	
.172	6.794	7.4C	3.61C	-112.4C	-1.383	-3.324	.300	
.201	6.790	-10.0C	3.66C	-130.0C	-2.393	-2.804	.350	
.229	6.798	29.5C	3.68C	-147.8C	-3.104	-1.977	.400	
.258	6.731	45.4C	3.62C	-165.4C	-3.503	-.912	.450	
.287	6.486	63.3C	3.56C	-183.4C	-3.584	-.211	.500	
.315	6.485	86.0C	3.42C	-200.2C	-3.164	1.092	.550	
.344	6.101	-101.7C	3.32C	-221.7C	-2.679	2.609	.600	
.373	6.32	-121.4C	3.30C	-241.4C	-1.870	2.608	.650	
.401	6.32	-140.9C	3.30C	-260.9C	-.529	3.258	.700	
.430	6.194	-159.4C	3.26C	-279.4C	.549	3.315	.750	
.459	6.194	-177.3C	3.40C	-297.3C	1.659	3.221	.800	
.487	6.394	-194.8C	3.44C	-314.8C	2.415	2.449	.850	
.516	6.747	-212.0C	3.38C	-332.0C	2.984	1.687	.900	
.545	6.32	-229.8C	3.30C	-349.8C	3.248	.584	.950	
.573	7.710	-248.2C	3.16C	-368.2C	3.188	-.451	1.000	
.602	7.462	-264.7C	3.14C	-386.7C	2.805	-1.411	1.050	
.631	7.413	-287.8C	3.12C	-407.8C	2.096	-2.311	1.100	
.659	7.759	-307.4C	3.18C	-427.4C	1.222	-2.936	1.150	
.688	7.709	-325.5C	3.24C	-445.5C	.284	-3.230	1.200	
.717	6.101	-343.5C	3.32C	-463.5C	-.775	-3.228	1.250	
.745	7.306	-361.6C	3.24C	-481.6C	-1.649	-2.789	1.300	
.774	7.306	-377.2C	3.24C	-497.2C	-2.377	-2.021	1.350	
.803	7.413	-394.7C	3.12C	-514.7C	-2.881	-1.323	1.400	
.831	7.710	-413.2C	3.08C	-533.2C	-3.058	-.265	1.450	
.851	7.722	-429.2C	2.96C	-545.2C	-2.922	.473	1.484	

B. MEASURED CHARGE DISTRIBUTION IN PICCOL/VOLT

Z/H	RAW DATA		NORMALIZED DATA					Z/LAM/DAG
	IRH AG	IRFAZ	QNRAG	QNRFAZ	QNRREAL	QNRIMG		
.022	1.411	45.0C	21.30C	-5.40C	21.219	-1.856	.008	
.114	7.458	-18.0C	18.00C	-12.0C	18.070	-3.331	.025	
.229	6.712	21.2C	14.26C	-21.20C	13.314	-5.164	.050	
.557	6.434	-39.3C	13.52C	-29.3C	10.462	-6.563	.100	
.86	6.137	-57.4C	13.10C	-37.4C	7.135	-10.987	.150	
.115	6.427	-75.5C	12.78C	-75.5C	3.200	-12.373	.200	
.143	6.746	-93.8C	12.68C	-93.8C	-.84C	-12.662	.250	
.172	6.487	-112.4C	12.10C	-112.4C	4.63C	-11.179	.300	
.201	6.704	-131.4C	12.14C	-131.4C	8.092	-9.050	.350	
.229	6.456	-151.0C	12.46C	-151.0C	10.919	-6.003	.400	
.258	6.753	-169.9C	12.24C	-169.9C	12.050	-2.146	.450	
.287	6.74	-188.3C	12.14C	-188.3C	12.013	1.752	.500	
.315	6.703	-208.4C	12.24C	-208.4C	10.964	5.442	.550	
.344	6.753	-229.2C	12.24C	-229.2C	8.775	8.533	.600	
.373	6.425	-242.0C	11.92C	-242.0C	-5.596	10.525	.650	
.401	6.459	-260.3C	12.04C	-260.3C	-2.229	11.868	.700	
.430	6.55	-278.5C	11.82C	-278.5C	1.747	11.690	.750	
.459	6.405	-297.2C	11.50C	-297.2C	5.257	10.028	.800	
.487	6.452	-316.6C	11.60C	-316.6C	8.428	7.970	.850	
.516	6.425	-335.4C	11.50C	-335.4C	10.489	4.714	.900	
.545	6.164	-354.7C	11.40C	-354.7C	11.351	1.053	.950	
.573	6.732	-372.4C	11.34C	-372.4C	11.075	-2.435	1.000	
.602	6.445	-390.2C	11.52C	-390.2C	9.939	-5.780	1.050	
.631	6.255	-407.4C	11.14C	-407.4C	7.625	-6.177	1.100	
.659	6.183	-424.4C	11.24C	-424.4C	4.786	-10.170	1.150	
.688	6.44	-443.0C	10.84C	-443.0C	1.305	-10.781	1.200	
.717	6.454	-462.4C	10.54C	-462.4C	-2.263	-10.294	1.250	
.745	6.476	-481.9C	10.54C	-481.9C	-5.070	-8.948	1.300	
.774	6.457	-502.3C	10.76C	-502.3C	-8.514	-6.580	1.350	
.803	6.129	-522.0C	10.90C	-522.0C	-10.367	-3.368	1.400	
.831	6.409	-541.7C	12.44C	-541.7C	-12.036	.315	1.450	
.851	7.12	-565.0C	14.92C	-565.0C	-14.412	3.862	1.487	

TABLE 3.4 (CONTINUED)

DISTRIBUTION OF CURRENT AND CHARGE ON BEVERAGE ANTENNA OVER SALT WATER

ALFA/BETAL = .0220 BETAL/BETAC = 1.025 LI/LAPDAG = 1.000

FREQUENCY = 330.000MHz PE = 2.845 D/LAMPDAG = .080 RL = 225.000Ohms

A. MEASURED CURRENT DISTRIBUTION IN PA/W BLT

RAW DATA		NORMALIZED DATA					
Z/H	IRPAZ	IRFAZ	IRNAG	IRFAZ	IRREAL	IRIMAG	Z/LAMPDAG
.02	9.791	122.40	4.260	4.500	4.967	.334	.003
.02	7.968	121.10	4.000	4.450	4.800	.310	.005
.03	7.921	100.40	4.000	4.374	4.874	.314	.005
.03	7.334	82.70	3.900	4.230	4.808	.300	.010
.04	8.145	83.70	3.900	4.330	4.876	.316	.010
.04	8.794	45.10	3.700	4.250	4.811	.301	.020
.04	8.777	29.40	3.700	4.250	4.811	.301	.020
.04	8.777	5.80	3.700	4.250	4.811	.301	.020
.04	8.794	14.00	3.700	4.250	4.811	.301	.020
.04	8.711	33.00	3.800	4.350	4.930	.310	.020
.04	8.733	51.10	3.800	4.350	4.930	.310	.020
.04	8.755	68.40	3.800	4.350	4.930	.310	.020
.04	8.777	86.40	3.800	4.350	4.930	.310	.020
.04	8.794	103.30	3.700	4.250	4.811	.301	.020
.04	8.723	122.20	3.700	4.250	4.811	.301	.020
.04	8.744	139.80	3.600	4.150	4.711	.291	.020
.04	8.766	159.80	3.500	4.050	4.611	.281	.020
.04	8.788	179.80	3.400	3.950	4.511	.271	.020
.04	8.810	198.70	3.400	3.950	4.511	.271	.020
.04	8.832	218.30	3.400	3.950	4.511	.271	.020
.04	8.854	237.00	3.400	3.950	4.511	.271	.020
.04	8.876	256.80	3.400	3.950	4.511	.271	.020

B. MEASURED CHARGE DISTRIBUTION IN PICCOL/VOLTY

RAW DATA		NORMALIZED DATA					
Z/H	IRPAZ	IRFAZ	IRNAG	IRFAZ	IRREAL	IRIMAG	Z/LAMPDAG
.05	1.111	-3.00	21.300	-3.00	21.271	-1.115	.004
.05	7.407	-10.70	15.760	-10.70	15.486	-2.926	.025
.05	8.833	20.40	14.220	20.40	13.328	-4.957	.050
.05	8.855	40.00	13.420	40.00	10.250	-8.466	.100
.05	8.877	60.00	13.320	60.00	6.660	-11.535	.150
.05	8.899	80.00	13.420	80.00	2.763	-13.363	.200
.05	8.921	100.00	13.420	100.00	-1.126	-13.665	.250
.05	8.943	119.70	13.500	119.70	-5.326	-13.427	.300
.05	8.965	139.70	13.500	139.70	-8.816	-10.250	.350
.05	8.987	159.00	13.000	159.00	-11.513	-6.495	.400
.05	9.009	178.50	12.500	178.50	-12.262	-2.718	.450
.05	9.031	198.00	12.300	198.00	-12.073	-1.463	.500
.05	9.053	208.90	12.100	208.90	-10.806	-0.493	.550
.05	9.075	228.50	12.100	228.50	-8.257	0.800	.600
.05	9.097	248.00	12.000	248.00	-5.124	1.847	.650
.05	9.119	267.80	12.000	267.80	-1.339	12.327	.700
.05	9.141	287.00	12.000	287.00	2.377	12.031	.750
.05	9.163	296.40	12.000	296.40	5.497	11.020	.800
.05	9.185	315.50	12.000	315.50	9.044	8.888	.850
.05	9.207	334.70	12.100	334.70	12.883	5.379	.900
.05	9.229	353.80	12.700	353.80	12.700	1.380	.950
.05	9.251	369.00	15.300	369.00	15.151	-2.400	.987

DISTRIBUTION OF CURRENT AND CHARGE ON BEVERAGE ANTENNA OVER SALT WATER

ALFA/BETAL = .0220 BETAL/BETAC = 1.025 LI/LAPDAG = .500

FREQUENCY = 330.000MHz PE = 2.845 D/LAMPDAG = .080 RL = 225.000Ohms

A. MEASURED CURRENT DISTRIBUTION IN PA/W BLT

RAW DATA		NORMALIZED DATA					
Z/H	IRPAZ	IRFAZ	IRNAG	IRFAZ	IRREAL	IRIMAG	Z/LAMPDAG
.02	9.110	130.00	4.200	4.400	4.820	.296	.003
.02	8.940	118.70	4.100	4.300	4.726	.289	.005
.02	8.770	108.60	4.100	4.200	4.630	.284	.010
.02	8.600	98.70	4.000	4.100	4.534	.279	.010
.02	8.430	78.30	4.000	4.000	4.438	.274	.020
.02	8.260	58.40	3.800	3.800	4.342	.269	.020
.02	8.090	38.00	3.800	3.800	4.246	.264	.020
.02	7.920	17.70	3.600	3.600	4.150	.259	.020
.02	7.750	7.00	3.600	3.600	4.054	.254	.020
.02	7.580	-28.40	3.700	3.700	3.958	.249	.020
.02	7.410	-48.00	3.800	3.800	3.862	.244	.020
.02	7.240	-68.40	3.800	3.800	3.766	.239	.020

B. MEASURED CHARGE DISTRIBUTION IN PICCOL/VOLTY

RAW DATA		NORMALIZED DATA					
Z/H	IRPAZ	IRFAZ	IRNAG	IRFAZ	IRREAL	IRIMAG	Z/LAMPDAG
.02	8.993	-3.00	21.160	-3.00	21.131	-1.107	.004
.02	8.823	-10.70	15.740	-10.70	15.460	-2.922	.025
.02	8.653	20.40	14.100	20.40	13.210	-4.915	.050
.02	8.483	40.00	13.280	40.00	10.143	-8.572	.100
.02	8.313	60.00	13.000	60.00	6.600	-11.500	.150
.02	8.143	80.00	13.740	80.00	2.763	-13.459	.200
.02	7.973	100.00	13.160	100.00	-1.126	-13.086	.250
.02	7.803	119.70	13.160	119.70	-5.326	-13.086	.300
.02	7.633	139.70	12.800	139.70	-8.840	-10.068	.350
.02	7.463	159.00	12.800	159.00	-11.578	-6.592	.400
.02	7.293	178.50	12.800	178.50	-12.200	-2.936	.450
.02	7.123	198.00	12.900	198.00	-12.000	-1.492	.500

TABLE 3.4 (CONTINUED)

DISTRIBUTION OF CURRENT AND CHARGE ON BEVERAGE ANTENNA OVER SALT WATER

ALFA/BETAL * .0193 BETAL/BETAC * 1.023 LI/LAPDAC * 1.500

FREQUENCY * 300.000MHZ PE = 2.885 D/LAPDAC * .100 RL * 310.000OHMS

A. MEASURED CURRENT DISTRIBUTION IN MA/V BLT

Z/H	RAW DATA		NORMALIZED DATA						Z/LAPDAC
	IRM AG	IRFAZ	INPAG	INFAG	INREAL	INIPAG			
.002	6.755	131.30	3.42C	11.3C	3.354	.670	.003		
.014	6.499	118.30	2.32C	-1.7C	3.319	-.098	.025		
.029	6.141	106.9C	3.18C	-13.1C	3.097	-.721	.050		
.057	7.936	86.50	3.10C	-33.8C	2.585	-1.711	.100		
.086	7.782	67.30	3.04C	-52.7C	1.842	-2.418	.150		
.115	7.685	47.30	3.08C	-72.7C	.914	-2.941	.200		
.143	7.585	27.90	3.08C	-92.1C	-.113	-3.078	.250		
.172	7.434	9.90	3.06C	-110.1C	-1.055	-2.874	.300		
.201	6.134	-8.60	3.14C	-128.8C	-1.955	-2.457	.350		
.229	5.192	-26.30	3.20C	-146.3C	-2.662	-1.776	.400		
.258	7.987	-43.90	3.12C	-162.9C	-2.998	-.865	.450		
.287	7.485	-62.2C	3.08C	-182.2C	-3.078	-1.18	.500		
.315	7.526	-80.70	2.94C	-200.7C	-2.750	-1.039	.550		
.344	7.424	-99.60	2.80C	-218.8C	-2.438	-1.845	.600		
.373	7.424	-118.4C	2.90C	-238.4C	-1.820	-2.470	.650		
.401	7.424	-137.3C	2.90C	-257.3C	-1.238	-2.829	.700		
.430	7.478	-156.30	2.90C	-276.30	.773	-2.947	.750		
.459	7.573	-173.0C	2.96C	-293.0C	1.197	-2.725	.800		
.487	7.628	-191.0C	2.98C	-311.0C	1.895	-2.429	.850		
.516	7.574	-208.6C	2.98C	-328.6C	2.827	-1.542	.900		
.545	7.322	-226.7C	2.86C	-346.7C	2.783	-.658	.950		
.573	7.219	-245.6C	2.82C	-364.6C	2.407	-.275	1.000		
.602	7.277	-264.1C	2.84C	-384.1C	2.592	-1.160	1.050		
.631	7.164	-282.7C	2.80C	-402.7C	2.058	-1.899	1.100		
.659	7.424	-301.5C	2.80C	-421.5C	1.346	-2.058	1.150		
.688	7.475	-319.9C	2.92C	-439.9C	.512	-2.875	1.200		
.717	7.629	-337.7C	2.98C	-457.7C	-.399	-2.993	1.250		
.745	7.526	-354.9C	2.94C	-474.9C	-1.238	-2.667	1.300		
.774	7.373	-372.0C	2.88C	-492.0C	-1.927	-2.140	1.350		
.803	7.164	-390.0C	2.74C	-510.0C	-2.395	-1.372	1.400		
.831	7.014	-409.6C	2.74C	-529.6C	-2.695	-.495	1.450		
.851	6.910	-426.30	2.66C	-546.30	-2.644	.292	1.484		

B. MEASURED CHARGE DISTRIBUTION IN PICCOL/VBLT*

Z/H	RAW DATA		NORMALIZED DATA						Z/LAPDAC
	QRM AG	QRFAG	QNPAZ	GNFAZ	QNREAL	QNIPAG			
.003	10.144	.560C	20.20C	.560C	20.223	-1.769	.006		
.014	7.356	-11.50	14.80C	-11.50	14.562	-2.963	.025		
.029	6.435	-25.10	13.00C	-25.10	12.208	-.448	.050		
.057	5.781	-37.50	11.84C	-37.50	9.425	-7.232	.100		
.086	5.574	-55.50	11.20C	-55.50	6.378	-9.280	.150		
.115	5.376	-74.4C	10.80C	-74.4C	2.920	-10.460	.200		
.143	5.186	-92.50	10.40C	-92.50	-.471	-10.790	.250		
.172	5.178	-111.10	10.40C	-111.10	-3.766	-9.759	.300		
.201	5.247	-130.4C	10.40C	-130.4C	-6.870	-8.072	.350		
.229	5.247	-148.6C	10.40C	-148.6C	-9.048	-5.523	.400		
.258	5.277	-166.6C	10.40C	-166.6C	-10.370	-2.470	.450		
.287	5.178	-185.0C	10.40C	-185.0C	-10.415	.966	.500		
.315	5.148	-203.1C	10.40C	-203.1C	-9.566	4.080	.550		
.344	5.148	-221.0C	10.40C	-221.0C	-7.849	6.823	.600		
.373	5.179	-238.8C	10.26C	-238.8C	-6.315	6.776	.650		
.401	5.148	-257.5C	10.40C	-257.5C	-2.251	10.153	.700		
.430	5.178	-275.7C	10.28C	-275.7C	1.018	10.209	.750		
.459	5.129	-294.10	10.16C	-294.10	4.149	9.274	.800		
.487	5.178	-312.0C	10.26C	-312.0C	6.997	7.504	.850		
.516	5.129	-331.5C	10.18C	-331.5C	6.929	4.848	.900		
.545	4.920	-349.9C	9.94C	-349.9C	9.786	-1.743	.950		
.573	4.920	-367.5C	9.94C	-367.5C	9.455	-1.297	1.000		
.602	4.970	-385.10	10.04C	-385.10	9.092	-1.259	1.050		
.631	4.940	-403.3C	9.98C	-403.3C	6.375	-7.679	1.100		
.659	4.671	-420.6C	9.84C	-420.6C	4.830	-8.573	1.150		
.688	4.772	-439.50	9.64C	-439.50	1.787	-9.479	1.200		
.717	4.673	-457.9C	9.44C	-457.9C	-1.297	-9.350	1.250		
.745	4.722	-477.6C	9.54C	-477.6C	-4.405	-8.462	1.300		
.774	4.920	-497.4C	9.94C	-497.4C	-7.317	-6.728	1.350		
.803	4.999	-516.8C	10.10C	-516.8C	-9.283	-3.779	1.400		
.831	5.023	-536.0C	11.36C	-536.0C	-11.332	-.792	1.450		
.852	7.039	-549.7C	14.22C	-549.7C	-14.017	2.396	1.487		

TABLE 3.4 (CONTINUED)

DISTRIBUTION OF CURRENT AND CHARGE ON BEVERAGE ANTENNA OVER SALT WATER
ALFA/BETAL = .0190 BETAL/BETAC = 1.023 L1/LAPDAC = 1.000
FREQUENCY = 300.00MHz PE = 2.885 C/LAPDAC = .100 RL = 310.00Ohms

A. MEASURED CURRENT DISTRIBUTION IN PA/V BLT

Z/H	RAW DATA			NORMALIZED DATA				Z/LAPDAC
	IRH AG	IRFAZ	INPAG	INFAZ	INREAL	INIMAG		
+008	9.446	132.30	3.520	12.30	3.439	.750	+003	
+020	6.430	119.40	3.280	+.60	3.280	-.034	+025	
+040	6.076	107.80	3.220	-12.20	3.147	-.080	+050	
+080	4.154	86.30	3.120	-33.70	2.896	-1.731	+100	
+121	4.114	66.10	3.120	-53.90	1.838	-2.621	+150	
+161	4.114	46.80	3.120	-73.20	+.922	-2.987	+200	
+201	4.173	28.10	3.180	-91.90	+.105	-3.178	+250	
+241	4.024	10.10	3.220	-109.90	-1.089	-3.029	+300	
+281	3.187	+.70	3.240	-127.90	-1.990	-2.857	+350	
+321	4.121	-25.80	3.160	-145.80	-2.604	-1.790	+400	
+362	7.716	-42.80	3.080	-162.80	-2.942	-.911	+450	
+402	7.761	-68.90	3.000	-182.80	-3.017	-.135	+500	
+442	7.710	-81.40	3.030	-201.40	-2.793	1.095	+550	
+482	7.710	-100.40	3.000	-220.40	-2.285	1.844	+600	
+522	7.764	-119.80	3.040	-239.80	-1.553	2.637	+650	
+563	4.118	-137.70	3.120	-257.70	-.665	3.448	+700	
+603	4.121	-159.80	3.180	-275.80	-.363	3.145	+750	
+643	7.713	-172.70	3.040	-292.70	1.173	2.805	+800	
+683	7.713	-190.00	3.040	-310.00	1.986	2.289	+850	
+723	7.716	-208.40	2.920	-328.40	2.487	1.830	+900	
+763	7.753	-228.20	2.800	-348.20	2.839	+.593	+950	
+791	7.756	-244.50	2.800	-364.50	2.791	-.220	+984	

B. MEASURED CHARGE DISTRIBUTION IN PICCOLL/VBLT-P

Z/H	RAW DATA			NORMALIZED DATA				Z/LAPDAC
	IRH AG	IRFAZ	QNPAG	QNF AZ	QNREAL	QNIMAG		
+005	1.400	+.500	20.000	+.500	19.924	-1.743	+006	
+020	7.750	-11.40	14.700	-11.40	14.410	-2.906	+025	
+040	6.070	-19.70	13.000	-19.70	12.239	-4.380	+050	
+080	5.490	-37.10	11.700	-37.10	9.332	-7.058	+100	
+121	5.030	-54.60	11.000	-54.60	6.372	-8.966	+150	
+161	5.020	-72.80	10.800	-72.80	3.445	-10.361	+200	
+201	5.025	-92.80	10.500	-92.80	-.813	-11.487	+250	
+241	5.020	-112.00	10.440	-112.00	-3.911	-9.680	+300	
+281	5.020	-131.00	10.440	-131.00	-6.880	-8.030	+350	
+321	5.030	-149.80	10.600	-149.80	-9.161	-6.332	+400	
+362	5.000	-167.70	10.600	-167.70	-10.161	-4.616	+450	
+402	5.150	-185.80	10.300	-185.80	-10.453	-.987	+500	
+442	5.000	-203.90	10.400	-203.90	-9.537	+.147	+550	
+482	5.000	-221.30	10.300	-221.30	-7.738	+.798	+600	
+522	5.050	-239.30	10.100	-239.30	-5.156	1.684	+650	
+563	4.900	-258.30	9.800	-258.30	-1.987	2.596	+700	
+603	4.900	-277.10	9.600	-277.10	1.187	3.626	+750	
+643	4.900	-296.40	9.600	-296.40	4.268	4.599	+800	
+683	5.000	-315.40	10.000	-315.40	7.254	6.884	+850	
+723	5.100	-335.80	10.000	-335.80	9.282	8.230	+900	
+763	5.750	-355.80	11.500	-355.80	11.456	1.002	+950	
+791	7.700	-384.80	14.400	-384.80	14.242	-.212	+987	

DISTRIBUTION OF CURRENT AND CHARGE ON BEVERAGE ANTENNA OVER SALT WATER
ALFA/BETAL = .0190 BETAL/BETAC = 1.023 L1/LAPDAC = .500
FREQUENCY = 300.00MHz PE = 2.885 C/LAPDAC = .100 RL = 310.00Ohms

A. MEASURED CURRENT DISTRIBUTION IN PA/V BLT

Z/H	RAW DATA			NORMALIZED DATA				Z/LAPDAC
	IRH AG	IRFAZ	INPAG	INF AZ	INREAL	INIMAG		
+004	6.449	131.70	3.520	5.70	3.470	.593	+003	
+024	6.403	118.30	3.260	-3.70	3.263	-.210	+025	
+044	6.003	106.90	3.260	-15.10	3.147	-.449	+050	
+064	5.007	85.90	3.180	-36.10	2.569	-1.874	+100	
+084	4.007	66.90	3.220	-55.80	1.810	-2.463	+150	
+104	4.003	47.80	3.260	-74.20	+.888	-3.137	+200	
+124	4.007	28.30	3.260	-92.70	-.185	-3.276	+250	
+144	4.007	12.10	3.180	-109.90	-1.080	-3.090	+300	
+164	7.754	+.50	3.160	-127.40	-1.919	-2.510	+350	
+184	7.716	-24.40	3.030	-146.20	-2.493	-1.689	+400	
+204	7.766	-44.00	2.940	-166.00	-2.891	-.721	+450	
+224	7.770	-61.00	2.880	-183.00	-2.876	+.151	+500	

B. MEASURED CHARGE DISTRIBUTION IN PICCOLL/VBLT-P

Z/H	RAW DATA			NORMALIZED DATA				Z/LAPDAC
	IRH AG	IRFAZ	QNPAG	QNF AZ	QNREAL	QNIMAG		
+008	1.400	+.500	20.500	+.500	20.422	-1.787	+006	
+024	7.781	-10.80	14.800	-10.80	14.408	-2.734	+025	
+044	6.023	-19.40	13.120	-19.40	12.405	-4.271	+050	
+064	5.474	-36.40	11.580	-36.40	9.321	-6.872	+100	
+084	5.079	-54.30	10.760	-54.30	6.279	-8.738	+150	
+104	5.074	-73.80	10.560	-73.80	2.999	-10.120	+200	
+124	4.920	-93.20	10.540	-93.20	-.860	-10.024	+250	
+144	4.909	-112.00	10.140	-112.00	-3.880	-9.368	+300	
+164	5.000	-130.40	10.340	-130.40	-6.886	-7.680	+350	
+184	5.174	-151.90	10.540	-151.90	-9.315	-4.974	+400	
+204	5.381	-171.40	11.900	-171.40	-11.740	-1.821	+450	
+224	7.732	-188.10	14.760	-188.10	-14.722	1.312	+500	

TABLE 3.4 (CONTINUED)

DISTRIBUTION OF CURRENT AND CHARGE ON BEVERAGE ANTENNA OVER SALT WATER
ALPHA/BETA * 1000 BETA/BETA * 1000 Z/LAMDAO * 1000

FREQUENCY * 1000000 PE * 2.000 D/LAMDAO * 1000 RL * 305.000000

A. MEASURED CURRENT DISTRIBUTION IN MA/V BLT

Z/M	RAW DATA			NORMALIZED DATA			Z/LAMDAO
	IRH AG	IRFAZ	IRHAG	IRFAZ	IRREAL	IRHAG	
.000	9.754	137.40	3.140	10.20	3.130	.563	.000
.14	4.814	125.50	2.960	11.70	2.959	1.088	.025
.29	4.254	113.90	2.840	13.30	2.764	1.653	.050
.43	3.741	99.30	2.660	14.90	2.608	2.184	.075
.58	3.250	82.80	2.500	16.40	2.480	2.682	.100
.72	2.786	68.10	2.360	17.90	2.380	3.144	.125
.87	2.333	54.20	2.230	19.40	2.300	3.567	.150
1.00	1.886	41.00	2.110	20.90	2.230	3.950	.175
1.14	1.444	28.50	2.000	22.40	2.170	4.293	.200
1.29	1.000	16.70	1.900	23.90	2.120	4.596	.225
1.43	.754	6.10	1.810	25.40	2.080	4.859	.250
1.58	.579	2.80	1.730	26.90	2.050	5.092	.275
1.72	.425	1.20	1.660	28.40	2.030	5.295	.300
1.87	.286	.50	1.600	29.90	2.020	5.468	.325
2.00	.155	.10	1.550	31.40	2.010	5.611	.350
2.14	.033	.00	1.510	32.90	2.010	5.724	.375
2.29	.000	.00	1.480	34.40	2.010	5.807	.400
2.43	.000	.00	1.450	35.90	2.010	5.860	.425
2.58	.000	.00	1.420	37.40	2.010	5.893	.450
2.72	.000	.00	1.390	38.90	2.010	5.906	.475
2.87	.000	.00	1.360	40.40	2.010	5.900	.500
3.00	.000	.00	1.330	41.90	2.010	5.875	.525
3.14	.000	.00	1.300	43.40	2.010	5.831	.550
3.29	.000	.00	1.270	44.90	2.010	5.769	.575
3.43	.000	.00	1.240	46.40	2.010	5.690	.600
3.58	.000	.00	1.210	47.90	2.010	5.595	.625
3.72	.000	.00	1.180	49.40	2.010	5.485	.650
3.87	.000	.00	1.150	50.90	2.010	5.360	.675
4.00	.000	.00	1.120	52.40	2.010	5.221	.700
4.14	.000	.00	1.090	53.90	2.010	5.069	.725
4.29	.000	.00	1.060	55.40	2.010	4.906	.750
4.43	.000	.00	1.030	56.90	2.010	4.733	.775
4.58	.000	.00	1.000	58.40	2.010	4.551	.800
4.72	.000	.00	.970	59.90	2.010	4.361	.825
4.87	.000	.00	.940	61.40	2.010	4.163	.850
5.00	.000	.00	.910	62.90	2.010	3.958	.875
5.14	.000	.00	.880	64.40	2.010	3.747	.900
5.29	.000	.00	.850	65.90	2.010	3.531	.925
5.43	.000	.00	.820	67.40	2.010	3.311	.950
5.58	.000	.00	.790	68.90	2.010	3.087	.975
5.72	.000	.00	.760	70.40	2.010	2.861	1.000
5.87	.000	.00	.730	71.90	2.010	2.633	1.025
6.00	.000	.00	.700	73.40	2.010	2.404	1.050
6.14	.000	.00	.670	74.90	2.010	2.174	1.075
6.29	.000	.00	.640	76.40	2.010	1.943	1.100
6.43	.000	.00	.610	77.90	2.010	1.712	1.125
6.58	.000	.00	.580	79.40	2.010	1.481	1.150
6.72	.000	.00	.550	80.90	2.010	1.250	1.175
6.87	.000	.00	.520	82.40	2.010	1.019	1.200
7.00	.000	.00	.490	83.90	2.010	.788	1.225
7.14	.000	.00	.460	85.40	2.010	.557	1.250
7.29	.000	.00	.430	86.90	2.010	.326	1.275
7.43	.000	.00	.400	88.40	2.010	.095	1.300
7.58	.000	.00	.370	89.90	2.010	-.136	1.325
7.72	.000	.00	.340	91.40	2.010	-.367	1.350
7.87	.000	.00	.310	92.90	2.010	-.598	1.375
8.00	.000	.00	.280	94.40	2.010	-.829	1.400
8.14	.000	.00	.250	95.90	2.010	-1.060	1.425
8.29	.000	.00	.220	97.40	2.010	-1.291	1.450
8.43	.000	.00	.190	98.90	2.010	-1.522	1.475
8.58	.000	.00	.160	100.40	2.010	-1.753	1.500
8.72	.000	.00	.130	101.90	2.010	-1.984	1.525
8.87	.000	.00	.100	103.40	2.010	-2.215	1.550
9.00	.000	.00	.070	104.90	2.010	-2.446	1.575
9.14	.000	.00	.040	106.40	2.010	-2.677	1.600
9.29	.000	.00	.010	107.90	2.010	-2.908	1.625
9.43	.000	.00	.000	109.40	2.010	-3.139	1.650
9.58	.000	.00	.000	110.90	2.010	-3.370	1.675
9.72	.000	.00	.000	112.40	2.010	-3.601	1.700
9.87	.000	.00	.000	113.90	2.010	-3.832	1.725
10.00	.000	.00	.000	115.40	2.010	-4.063	1.750
10.14	.000	.00	.000	116.90	2.010	-4.294	1.775
10.29	.000	.00	.000	118.40	2.010	-4.525	1.800
10.43	.000	.00	.000	119.90	2.010	-4.756	1.825
10.58	.000	.00	.000	121.40	2.010	-4.987	1.850
10.72	.000	.00	.000	122.90	2.010	-5.218	1.875
10.87	.000	.00	.000	124.40	2.010	-5.449	1.900
11.00	.000	.00	.000	125.90	2.010	-5.680	1.925
11.14	.000	.00	.000	127.40	2.010	-5.911	1.950
11.29	.000	.00	.000	128.90	2.010	-6.142	1.975
11.43	.000	.00	.000	130.40	2.010	-6.373	2.000
11.58	.000	.00	.000	131.90	2.010	-6.604	2.025
11.72	.000	.00	.000	133.40	2.010	-6.835	2.050
11.87	.000	.00	.000	134.90	2.010	-7.066	2.075
12.00	.000	.00	.000	136.40	2.010	-7.297	2.100
12.14	.000	.00	.000	137.90	2.010	-7.528	2.125
12.29	.000	.00	.000	139.40	2.010	-7.759	2.150
12.43	.000	.00	.000	140.90	2.010	-7.990	2.175
12.58	.000	.00	.000	142.40	2.010	-8.221	2.200
12.72	.000	.00	.000	143.90	2.010	-8.452	2.225
12.87	.000	.00	.000	145.40	2.010	-8.683	2.250
13.00	.000	.00	.000	146.90	2.010	-8.914	2.275
13.14	.000	.00	.000	148.40	2.010	-9.145	2.300
13.29	.000	.00	.000	149.90	2.010	-9.376	2.325
13.43	.000	.00	.000	151.40	2.010	-9.607	2.350
13.58	.000	.00	.000	152.90	2.010	-9.838	2.375
13.72	.000	.00	.000	154.40	2.010	-10.069	2.400
13.87	.000	.00	.000	155.90	2.010	-10.300	2.425
14.00	.000	.00	.000	157.40	2.010	-10.531	2.450
14.14	.000	.00	.000	158.90	2.010	-10.762	2.475
14.29	.000	.00	.000	160.40	2.010	-10.993	2.500
14.43	.000	.00	.000	161.90	2.010	-11.224	2.525
14.58	.000	.00	.000	163.40	2.010	-11.455	2.550
14.72	.000	.00	.000	164.90	2.010	-11.686	2.575
14.87	.000	.00	.000	166.40	2.010	-11.917	2.600
15.00	.000	.00	.000	167.90	2.010	-12.148	2.625
15.14	.000	.00	.000	169.40	2.010	-12.379	2.650
15.29	.000	.00	.000	170.90	2.010	-12.610	2.675
15.43	.000	.00	.000	172.40	2.010	-12.841	2.700
15.58	.000	.00	.000	173.90	2.010	-13.072	2.725
15.72	.000	.00	.000	175.40	2.010	-13.303	2.750
15.87	.000	.00	.000	176.90	2.010	-13.534	2.775
16.00	.000	.00	.000	178.40	2.010	-13.765	2.800
16.14	.000	.00	.000	179.90	2.010	-13.996	2.825
16.29	.000	.00	.000	181.40	2.010	-14.227	2.850
16.43	.000	.00	.000	182.90	2.010	-14.458	2.875
16.58	.000	.00	.000	184.40	2.010	-14.689	2.900
16.72	.000	.00	.000	185.90	2.010	-14.920	2.925
16.87	.000	.00	.000	187.40	2.010	-15.151	2.950
17.00	.000	.00	.000	188.90	2.010	-15.382	2.975
17.14	.000	.00	.000	190.40	2.010	-15.613	3.000
17.29	.000	.00	.000	191.90	2.010	-15.844	3.025
17.43	.000	.00	.000	193.40	2.010	-16.075	3.050
17.58	.000	.00	.000	194.90	2.010	-16.306	3.075
17.72	.000	.00	.000	196.40	2.010	-16.537	3.100
17.87	.000	.00	.000	197.90	2.010	-16.768	3.125
18.00	.000	.00	.000	199.40	2.010	-16.999	3.150
18.14	.000	.00	.000	200.90	2.010	-17.230	3.175
18.29	.000	.00	.000	202.40	2.010	-17.461	3.200
18.43	.000	.00	.000	203.90	2.010	-17.692	3.225
18.58	.000	.00	.000	205.40	2.010	-17.923	3.250
18.72	.000	.00	.000	206.90	2.010	-18.154	3.275
18.87	.000	.00	.000	208.40	2.010	-18.385	3.300
19.00	.000	.00	.000	209.90	2.010	-18.616	3.325
19.14	.000	.00	.000	211.40	2.010	-18.847	3.350
19.29	.000	.00	.000	212.90	2.010	-19.078	3.375
19.43	.000	.00	.000	214.40	2.010	-19.309	3.400
19.58	.000	.00	.000	215.90	2.010	-19.540	3.425
19.72	.000	.00	.000	217.40	2.010	-19.771	3.450
19.87	.000	.00	.000	218.90	2.010	-20.002	3.475
20.00	.000	.00	.000	220.40	2.010	-20.233	3.500
20.14	.000	.00	.000	221.90	2.010	-20.464	3.525
20.29	.000	.00	.000	223.40	2.010	-20.695	3.550
20.43	.000	.00	.000	224.90	2.010	-20.926	3.575
20.58	.000	.00	.000	226.40	2.010	-21.157	3.600
20.72	.000	.00	.000	227.90	2.010	-21.388	3.625
20.87	.000	.00	.000	229.40	2.010	-21.619	3.650
21.00	.000	.00	.000	230.90	2.010	-21.850	3.675
21.14	.000	.00	.000	232.40	2.010	-22.081	3.700
21.29	.000	.00	.000	233.90	2.010	-22.312	3.725
21.43	.000	.00	.000	235.40	2.010	-22.543	3.750
21.58	.000	.00	.000	236.90	2.010	-22.774	3.775
21.72	.000	.00	.000	238.40	2.010</		

TABLE 3.4 (CONTINUED)

DISTRIBUTION OF CURRENT AND CHARGE ON BEVERAGE ANTENNA OVER SALT WATER
 ALFA/BETAL = .034C BETAL/BETAC = 1.016 LI/LAMDAO = 1.000
 FREQUENCY = 300.000MHZ PE = 2.885 D/LAMPAC = .260 RL = 385.000HMS

A. MEASURED CURRENT DISTRIBUTION IN MA/V BLT

Z/H	RAW DATA			NORMALIZED DATA			Z/LAMDAO
	IR/AG	IR/FAZ	IR/MAG	IN/FAZ	IN/REAL	IN/IMAG	
.002	2.07	138.2C	3.24C	13.2C	3.18A	.74C	.003
.020	2.229	126.1C	2.98C	1.1C	2.959	.057	.028
.040	7.701	114.0C	2.88C	-11.0C	2.807	-.544	.050
.060	7.395	92.0C	2.46C	-32.8C	2.236	-1.441	.100
.080	7.084	70.7C	2.62C	-54.3C	1.929	-2.128	.150
.100	7.028	51.0C	2.80C	-74.0C	.717	-2.499	.200
.120	7.084	32.7C	2.46C	-92.3C	-.105	-2.618	.250
.140	7.084	15.4C	2.62C	-109.4C	-.879	-2.468	.300
.160	7.084	2.4C	2.80C	-127.4C	-1.691	-2.281	.350
.180	7.084	2.4C	2.46C	-142.0C	-2.421	-2.129	.400
.200	7.084	2.4C	2.46C	-163.6C	-2.931	-.889	.450
.220	7.084	2.4C	2.38C	-183.0C	-3.376	-.145	.500
.240	7.084	2.4C	2.36C	-203.3C	-2.168	.933	.550
.260	7.084	2.4C	2.38C	-223.0C	-1.791	1.822	.600
.280	7.084	2.4C	2.46C	-241.7C	-1.176	2.684	.650
.300	7.084	2.4C	2.54C	-258.0C	-.485	3.523	.700
.320	7.084	2.4C	2.62C	-275.8C	-.263	4.348	.750
.340	7.084	2.4C	2.70C	-294.0C	.228	5.168	.800
.360	7.084	2.4C	2.78C	-312.6C	.897	5.982	.850
.380	7.084	2.4C	2.86C	-331.6C	1.697	6.792	.900
.400	7.084	2.4C	2.94C	-351.0C	2.624	7.602	.950
.420	7.084	2.4C	3.02C	-370.8C	3.683	8.422	.980
.440	7.084	2.4C	3.10C	-391.0C	4.877	9.257	.980
.460	7.084	2.4C	3.18C	-411.6C	6.211	10.111	.980
.480	7.084	2.4C	3.26C	-432.6C	7.691	11.000	.980
.500	7.084	2.4C	3.34C	-454.0C	9.324	11.933	.980

B. MEASURED CHANGE DISTRIBUTION IN PICCOL/VBLT-P

Z/H	RAW DATA			NORMALIZED DATA			Z/LAMDAO
	IR/AG	IR/FAZ	IR/MAG	IN/FAZ	IN/REAL	IN/IMAG	
.005	9.975	-10.0C	17.50C	-10.0C	17.23A	-3.039	.006
.020	7.785	-15.1C	12.78C	-15.1C	12.339	-3.329	.028
.040	6.430	-22.8C	11.28C	-22.8C	10.399	-4.371	.050
.060	5.069	-33.3C	9.98C	-33.3C	7.723	-6.321	.100
.080	3.733	-46.8C	9.18C	-46.8C	5.067	-7.655	.150
.100	2.424	-63.8C	7.90C	-63.8C	2.339	-8.400	.200
.120	1.134	-84.2C	6.46C	-84.2C	-.473	-8.467	.250
.140	0.785	-108.0C	4.82C	-108.0C	-3.132	-7.600	.300
.160	0.472	-134.6C	3.32C	-134.6C	-5.324	-6.222	.350
.180	0.285	-163.0C	2.22C	-163.0C	-7.147	-4.602	.400
.200	0.164	-193.0C	1.40C	-193.0C	-8.609	-3.165	.450
.220	0.094	-224.0C	0.80C	-224.0C	-9.814	-1.856	.500
.240	0.059	-256.0C	0.40C	-256.0C	-10.819	-.319	.550
.260	0.035	-289.0C	0.20C	-289.0C	-11.668	0.607	.600
.280	0.022	-324.0C	0.10C	-324.0C	-12.377	1.199	.650
.300	0.013	-361.0C	0.05C	-361.0C	-12.977	1.999	.700
.320	0.008	-399.0C	0.02C	-399.0C	-13.477	2.999	.750
.340	0.005	-438.0C	0.01C	-438.0C	-13.887	4.199	.800
.360	0.003	-478.0C	0.005C	-478.0C	-14.211	5.399	.850
.380	0.002	-519.0C	0.002C	-519.0C	-14.451	6.599	.900
.400	0.001	-561.0C	0.001C	-561.0C	-14.607	7.799	.950
.420	0.000	-604.0C	0.000C	-604.0C	-14.677	8.999	.980
.440	0.000	-648.0C	0.000C	-648.0C	-14.651	10.199	.980
.460	0.000	-693.0C	0.000C	-693.0C	-14.533	11.399	.980
.480	0.000	-739.0C	0.000C	-739.0C	-14.333	12.599	.980
.500	0.000	-786.0C	0.000C	-786.0C	-14.053	13.799	.980

DISTRIBUTION OF CURRENT AND CHARGE ON BEVERAGE ANTENNA OVER SALT WATER
 ALFA/BETAL = .034C BETAL/BETAC = 1.016 LI/LAMDAO = .500
 FREQUENCY = 300.000MHZ PE = 2.885 D/LAMPAC = .260 RL = 385.000HMS

A. MEASURED CURRENT DISTRIBUTION IN MA/V BLT

Z/H	RAW DATA			NORMALIZED DATA			Z/LAMDAO
	IR/AG	IR/FAZ	IR/MAG	IN/FAZ	IN/REAL	IN/IMAG	
.004	4.773	135.4C	3.02C	8.2C	2.989	.431	.003
.020	2.364	122.3C	2.82C	1.3C	2.869	-.246	.028
.040	5.218	111.0C	2.74C	-16.2C	2.650	-.770	.050
.060	7.069	89.0C	2.44C	-37.3C	2.100	-1.600	.100
.080	7.069	70.2C	2.44C	-57.0C	1.428	-2.614	.150
.100	7.069	51.9C	2.68C	-75.3C	.680	-2.592	.200
.120	7.069	34.3C	2.44C	-92.9C	-.138	-2.477	.250
.140	7.069	17.8C	2.50C	-109.4C	-.850	-2.415	.300
.160	7.069	2.4C	2.68C	-127.0C	-1.668	-1.969	.350
.180	7.069	2.4C	2.76C	-145.0C	-1.835	-1.265	.400
.200	7.069	2.4C	2.84C	-163.6C	-2.036	-.515	.450
.220	7.069	2.4C	2.92C	-182.6C	-1.999	-.167	.500

B. MEASURED CHANGE DISTRIBUTION IN PICCOL/VBLT-P

Z/H	RAW DATA			NORMALIZED DATA			Z/LAMDAO
	IR/AG	IR/FAZ	IR/MAG	IN/FAZ	IN/REAL	IN/IMAG	
.004	9.975	-8.0C	17.50C	-8.0C	17.330	-2.436	.006
.020	7.787	-12.8C	12.94C	-12.8C	12.597	-3.047	.028
.040	6.432	-20.4C	11.40C	-20.4C	10.734	-4.013	.050
.060	5.072	-30.6C	9.88C	-30.6C	7.932	-5.891	.100
.080	3.716	-43.8C	8.82C	-43.8C	5.221	-7.134	.150
.100	2.364	-59.4C	7.82C	-59.4C	2.568	-7.873	.200
.120	1.013	-77.4C	6.52C	-77.4C	-.811	-7.866	.250
.140	0.665	-98.0C	4.82C	-98.0C	-3.218	-7.193	.300
.160	0.399	-121.0C	3.32C	-121.0C	-5.853	-6.752	.350
.180	0.234	-146.0C	2.22C	-146.0C	-7.534	-3.529	.400
.200	0.141	-174.0C	1.40C	-174.0C	-8.988	-2.898	.450
.220	0.086	-204.0C	0.80C	-204.0C	-10.231	-1.890	.500
.240	0.051	-236.0C	0.40C	-236.0C	-11.261	-.887	.550
.260	0.031	-269.0C	0.20C	-269.0C	-12.087	0.600	.600
.280	0.018	-304.0C	0.10C	-304.0C	-12.717	1.999	.650
.300	0.010	-340.0C	0.05C	-340.0C	-13.151	3.199	.700
.320	0.006	-378.0C	0.02C	-378.0C	-13.407	4.399	.750
.340	0.003	-417.0C	0.01C	-417.0C	-13.491	5.599	.800
.360	0.002	-457.0C	0.005C	-457.0C	-13.433	6.799	.850
.380	0.001	-498.0C	0.002C	-498.0C	-13.253	7.999	.900
.400	0.000	-540.0C	0.001C	-540.0C	-12.911	9.199	.950
.420	0.000	-584.0C	0.000C	-584.0C	-12.427	10.399	.980
.440	0.000	-629.0C	0.000C	-629.0C	-11.811	11.599	.980
.460	0.000	-676.0C	0.000C	-676.0C	-11.083	12.799	.980
.480	0.000	-724.0C	0.000C	-724.0C	-10.267	13.999	.980
.500	0.000	-774.0C	0.000C	-774.0C	-9.383	15.199	.980

TABLE 3.4 (CONTINUED)

DISTRIBUTION OF CURRENT AND CHARGE ON BEVERAGE ANTENNA OVER MOIST EARTH
 ALP/METAL * .0980 BETA/BETAC * 1.108 L1/LAMPDAG * 1.500
 FREQUENCY * 300.000MHz PE * .012 D/LAMPDAG * .090 HL * 213.000MPS

A. MEASURED CURRENT DISTRIBUTION IN MAX BLT

RAW DATA		NORMALIZED DATA					
Z/H	IMP AG	IRFAZ	IRPAG	IRFAZ	IRREAL	IRPAG	Z/LAMPDAG
.002	8.428	100.000	4.540	.000	4.580	.000	.003
.014	8.428	89.000	4.440	11.000	4.378	11.000	.028
.029	8.428	82.000	4.420	18.000	4.200	18.000	.050
.058	7.920	62.000	4.180	28.000	3.999	28.000	.100
.087	7.420	42.000	4.190	37.000	3.984	37.000	.150
.116	7.711	23.000	4.080	47.000	3.918	47.000	.200
.145	7.429	3.000	3.920	57.000	3.878	57.000	.250
.174	7.429	17.000	3.720	67.000	3.889	67.000	.300
.203	6.724	36.000	3.580	76.000	3.861	76.000	.350
.232	6.413	54.000	3.390	85.000	3.822	85.000	.400
.261	6.074	73.000	3.320	93.000	3.805	93.000	.450
.290	6.074	93.000	3.320	103.000	3.805	103.000	.500
.319	5.697	111.000	3.160	111.000	3.846	111.000	.550
.348	5.728	130.000	3.020	120.000	3.821	120.000	.600
.377	5.657	151.000	2.940	129.000	3.807	129.000	.650
.406	5.420	172.000	2.880	138.000	3.792	138.000	.700
.435	5.141	191.000	2.720	147.000	3.778	147.000	.750
.464	5.127	210.000	2.680	156.000	3.774	156.000	.800
.492	4.785	230.000	2.500	165.000	3.769	165.000	.850
.521	4.438	249.000	2.380	174.000	3.766	174.000	.900
.550	4.423	268.000	2.340	183.000	3.767	183.000	.950
.579	4.347	287.000	2.300	192.000	3.770	192.000	1.000
.608	4.196	307.000	2.220	201.000	3.774	201.000	1.050
.637	4.196	326.000	2.220	210.000	3.780	210.000	1.100
.666	4.145	347.000	2.140	219.000	3.787	219.000	1.150
.695	4.007	367.000	2.180	228.000	3.794	228.000	1.200
.724	3.969	388.000	2.100	237.000	3.800	237.000	1.250
.753	3.704	408.000	1.960	246.000	3.807	246.000	1.300
.782	3.691	428.000	1.900	255.000	3.814	255.000	1.350
.811	3.629	447.000	1.740	264.000	3.821	264.000	1.400
.840	3.437	466.000	1.660	273.000	3.828	273.000	1.450
.869	3.420	478.000	1.640	282.000	3.834	282.000	1.488

B. MEASURED CHARGE DISTRIBUTION IN PICCOLL/VOLT-CM

RAW DATA		NORMALIZED DATA					
Z/H	DRPAG	DRFAZ	DRPAG	DRFAZ	DRREAL	DRPAG	Z/LAMPDAG
.003	15.077	5.000	24.920	5.000	24.825	5.172	.008
.014	15.386	16.000	18.820	16.000	18.091	16.187	.028
.029	14.783	23.000	16.500	23.000	15.188	16.447	.050
.058	9.466	43.000	15.620	43.000	11.968	15.699	.100
.087	9.022	62.000	15.280	62.000	7.117	13.999	.150
.116	8.481	82.000	14.680	82.000	2.043	14.537	.200
.145	8.421	102.000	14.100	102.000	2.932	13.796	.250
.174	6.834	122.000	13.940	122.000	7.387	11.826	.300
.203	6.434	141.000	13.940	141.000	10.833	8.773	.350
.232	6.083	159.000	13.380	159.000	12.538	8.413	.400
.261	7.464	178.000	12.700	178.000	12.692	8.443	.450
.290	7.433	198.000	12.120	198.000	11.527	8.745	.500
.319	7.439	218.000	11.880	218.000	9.466	9.019	.550
.348	6.788	238.000	11.220	238.000	6.328	9.247	.600
.377	6.792	258.000	10.400	258.000	2.516	10.091	.650
.406	6.426	277.000	10.080	277.000	1.261	9.781	.700
.435	5.989	296.000	9.300	296.000	4.464	8.837	.750
.464	5.989	316.000	9.900	316.000	6.877	7.121	.800
.492	5.481	335.000	9.820	335.000	8.900	6.150	.850
.521	5.067	354.000	9.400	354.000	9.349	4.983	.900
.550	5.493	373.000	9.080	373.000	8.867	2.043	.950
.579	5.191	392.000	8.580	392.000	7.236	1.810	1.000
.608	5.194	412.000	8.420	412.000	5.184	1.603	1.050
.637	4.188	431.000	8.000	431.000	2.491	1.744	1.100
.666	4.095	450.000	7.780	450.000	1.271	1.795	1.150
.695	4.098	470.000	7.600	470.000	2.867	1.707	1.200
.724	4.192	489.000	7.280	489.000	4.951	1.510	1.250
.753	4.199	513.000	6.940	513.000	6.184	1.151	1.300
.782	4.098	533.000	7.100	533.000	7.017	1.168	1.350
.811	4.090	552.000	6.780	552.000	6.412	1.405	1.400
.840	4.199	570.000	6.540	570.000	5.980	3.522	1.450
.869	4.095	588.000	7.780	588.000	5.801	5.371	1.487

TABLE 3.4 (CONTINUED)

DISTRIBUTION OF CURRENT AND CHARGE ON BEVERAGE ANTENNA OVER MOIST EARTH
ALPHA/BETA = .0980 BETA/BETAC = 3.106 LI/LAPDAC = 1.000
FREQUENCY = 300.000MHZ PE = .018 D/LAMPAC = .080 RL = 213.000HMS

Table A: MEASURED CURRENT DISTRIBUTION IN MA/V OLT. Columns include Z/H, IRR AG, IRFAZ, INPAG, IAFAZ, INREAL, INIPAG, Z/LAMPAC. Rows range from +002 to +603.

B. MEASURED CHARGE DISTRIBUTION IN PICCOL/VOLT-P

Table B: MEASURED CHARGE DISTRIBUTION IN PICCOL/VOLT-P. Columns include Z/H, IRR AG, IRFAZ, INPAG, IAFAZ, INREAL, INIPAG, Z/LAMPAC. Rows range from +005 to +605.

DISTRIBUTION OF CURRENT AND CHARGE ON BEVERAGE ANTENNA OVER MOIST EARTH

ALPHA/BETA = .0980 BETA/BETAC = 3.106 LI/LAPDAC = .500
FREQUENCY = 300.000MHZ PE = .012 D/LAMPAC = .080 RL = 213.000HMS

Table A: MEASURED CURRENT DISTRIBUTION IN MA/V OLT. Columns include Z/H, IRR AG, IRFAZ, INPAG, IAFAZ, INREAL, INIPAG, Z/LAMPAC. Rows range from +004 to +067.

B. MEASURED CHARGE DISTRIBUTION IN PICCOL/VOLT-P

Table B: MEASURED CHARGE DISTRIBUTION IN PICCOL/VOLT-P. Columns include Z/H, IRR AG, IRFAZ, INPAG, IAFAZ, INREAL, INIPAG, Z/LAMPAC. Rows range from +006 to +071.

TABLE 3.4 (CONTINUED)

DISTRIBUTION OF CURRENT AND CHARGE ON BEVERAGE ANTENNA OVER W/ST EARTH
 ALFA/METAL * 1.0E2 BETA/BETAC * 1.0E2 LIV/LAPDAG * 1.500
 FREQUENCY * 300.000MHZ PE * .012 D/LAMPDAG * .080 RL * 242.000OHMS

A. MEASURED CURRENT DISTRIBUTION IN MAVV BLY

Z/P	RAW DATA		NORMALIZED DATA					Z/LAMPDAG
	IRFAZ	IRFAG	IRFAZ	IRFAG	IRFAL	IRFAG		
.003	0.303	100.000	3.892	10.000	3.769	.863	.003	
.134	0.134	88.000	3.740	7.400	3.758	-.131	.028	
.29	0.134	78.000	3.720	11.800	3.641	-.761	.050	
.57	0.274	58.000	3.580	21.800	3.026	-1.876	.100	
.86	0.474	38.000	3.580	30.800	2.078	-2.735	.150	
.115	0.476	21.000	3.440	49.000	1.233	-3.612	.200	
.144	0.478	2.000	3.380	69.000	.116	-3.318	.250	
.172	0.479	-17.000	3.280	110.000	-.853	-3.118	.300	
.201	0.480	-35.000	3.200	129.000	-1.872	-2.895	.350	
.230	0.484	-51.000	3.180	141.000	-2.825	-1.963	.400	
.258	0.484	-73.000	3.120	163.000	-2.984	-.912	.450	
.287	0.477	-91.000	3.180	181.000	-3.180	.055	.500	
.316	0.469	-109.000	3.080	199.000	-2.893	.956	.550	
.344	0.450	-128.000	3.000	218.000	-2.364	1.847	.600	
.373	0.431	-148.000	2.940	236.000	-1.644	2.737	.650	
.402	0.406	-166.000	2.840	254.000	-.687	2.756	.700	
.431	0.387	-183.000	2.780	273.000	1.175	2.775	.750	
.459	0.367	-200.000	2.740	292.000	2.974	2.604	.800	
.488	0.354	-219.000	2.780	311.000	1.737	2.145	.850	
.517	0.353	-238.000	2.680	329.000	2.961	1.402	.900	
.546	0.356	-256.000	2.640	348.000	2.564	-.630	.950	
.574	0.356	-273.000	2.640	367.000	2.635	-.161	1.000	
.603	0.359	-292.000	2.600	386.000	2.411	-.974	1.050	
.631	0.357	-310.000	2.580	405.000	1.983	-1.686	1.100	
.660	0.352	-328.000	2.480	424.000	1.285	-2.121	1.150	
.689	0.352	-347.000	2.480	443.000	-.033	-2.422	1.200	
.718	0.359	-365.000	2.440	462.000	1.031	-2.449	1.250	
.746	0.349	-383.000	2.360	481.000	-.985	-2.163	1.300	
.775	0.328	-402.000	2.320	500.000	-1.876	-1.702	1.350	
.804	0.309	-421.000	2.240	519.000	-1.970	-1.065	1.400	
.832	0.321	-440.000	2.180	538.000	-2.111	-.353	1.450	
.861	0.334	-459.000	2.100	557.000	-2.109	.214	1.484	

B. MEASURED CHARGE DISTRIBUTION IN PICCOL/VOLT-P

Z/P	RAW DATA		NORMALIZED DATA					Z/LAMPDAG
	QRFAG	QRFAG	QNFAG	QNFAG	QNFAL	QNFAG		
.003	11.789	15.000	20.520	15.000	20.442	-1.788	.006	
.134	8.991	11.000	15.680	11.000	15.279	-2.388	.028	
.29	7.444	20.000	13.780	20.000	12.332	-4.756	.050	
.57	5.793	39.000	12.800	39.000	9.799	-7.929	.100	
.86	4.742	58.000	12.140	58.000	6.408	-10.335	.150	
.115	4.409	76.000	11.980	76.000	2.736	-11.463	.200	
.144	4.493	95.000	11.700	95.000	1.020	-11.485	.250	
.172	4.794	113.000	11.340	113.000	4.421	-10.439	.300	
.201	4.794	131.000	11.340	131.000	7.440	-8.558	.350	
.230	4.449	149.000	11.040	149.000	8.964	-6.513	.400	
.258	4.794	167.000	10.800	167.000	10.593	-2.425	.450	
.287	4.794	185.000	10.440	185.000	10.392	1.001	.500	
.316	4.790	203.000	10.360	203.000	9.534	4.048	.550	
.344	4.694	222.000	10.260	222.000	7.564	6.792	.600	
.373	4.694	241.000	9.920	241.000	4.800	8.659	.650	
.402	4.385	260.000	9.720	260.000	1.488	9.972	.700	
.431	4.394	278.000	9.720	278.000	1.303	9.425	.750	
.459	4.250	296.000	9.460	296.000	4.147	8.503	.800	
.488	4.196	314.000	9.380	314.000	6.561	6.474	.850	
.517	4.375	333.000	9.140	333.000	8.194	4.139	.900	
.546	4.495	351.000	9.000	351.000	8.899	1.346	.950	
.574	4.495	369.000	8.820	369.000	8.702	-1.441	1.000	
.603	4.431	388.000	8.740	388.000	7.717	-4.103	1.050	
.631	4.495	406.000	8.660	406.000	6.000	-6.815	1.100	
.660	4.495	424.000	8.660	424.000	3.442	-7.436	1.150	
.689	4.495	442.000	8.400	442.000	1.484	-7.929	1.200	
.718	4.495	461.000	7.920	461.000	4.079	-6.789	1.250	
.746	4.394	480.000	7.920	480.000	6.113	-5.214	1.300	
.775	4.495	499.000	8.100	499.000	7.319	-2.810	1.350	
.804	4.431	519.000	7.840	519.000	8.275	-.289	1.400	
.832	4.495	538.000	8.260	538.000	8.275	1.480	1.450	
.861	4.394	557.000	9.720	557.000	9.508	2.021	1.484	

TABLE 3.4 (CONTINUED)

DISTRIBUTION OF CURRENT AND CHARGE ON BEVERAGE ANTENNA OVER MOIST EARTH
 ALPHA/BETAL = .0020 BETA/BETAC = 1.032 LI/LAPDAC = 1.000
 FREQUENCY = 300.000MHZ PE = .012 C/LAPDAC = .060 RL = 242.000MHZ

A. MEASURED CURRENT DISTRIBUTION IN PAVV BLT

RAW DATA		NORMALIZED DATA					
Z/H	IRAFZ	IRFAG	IRFAZ	IRFAG	IRREAL	IRIMAG	Z/LAPDAC
.02	6.799	100.00	3.900	7.50	3.867	.039	.002
.20	6.799	88.00	3.790	7.40	3.759	-.022	.028
.40	6.799	77.00	3.680	7.30	3.656	-.083	.050
.60	6.799	66.00	3.570	7.20	3.548	-.128	.100
.80	6.799	55.00	3.460	7.10	3.440	-.190	.150
1.00	6.799	44.00	3.350	7.00	3.332	-.240	.200
1.20	6.799	33.00	3.240	6.90	3.224	-.280	.250
1.40	6.799	22.00	3.130	6.80	3.116	-.320	.300
1.60	6.799	11.00	3.020	6.70	3.008	-.360	.350
1.80	6.799	0.00	2.910	6.60	2.900	-.400	.400
2.00	6.799	-11.00	2.800	6.50	2.792	-.440	.450
2.20	6.799	-22.00	2.690	6.40	2.684	-.480	.500
2.40	6.799	-33.00	2.580	6.30	2.576	-.520	.550
2.60	6.799	-44.00	2.470	6.20	2.468	-.560	.600
2.80	6.799	-55.00	2.360	6.10	2.360	-.600	.650
3.00	6.799	-66.00	2.250	6.00	2.252	-.640	.700
3.20	6.799	-77.00	2.140	5.90	2.144	-.680	.750
3.40	6.799	-88.00	2.030	5.80	2.036	-.720	.800
3.60	6.799	-99.00	1.920	5.70	1.928	-.760	.850
3.80	6.799	-110.00	1.810	5.60	1.820	-.800	.900
4.00	6.799	-121.00	1.700	5.50	1.712	-.840	.950
4.20	6.799	-132.00	1.590	5.40	1.604	-.880	.984

B. MEASURED CHARGE DISTRIBUTION IN PICCOLL/VBLT-P

RAW DATA		NORMALIZED DATA					
Z/H	IRAFZ	IRFAG	IRFAZ	IRFAG	IRREAL	IRIMAG	Z/LAPDAC
.05	11.499	-2.50	21.420	-2.50	21.400	-.034	.006
.10	11.499	-5.00	16.020	-5.00	16.044	-.026	.025
.15	11.499	-7.50	11.620	-7.50	11.668	-.018	.050
.20	11.499	-10.00	7.220	-10.00	7.292	-.010	.100
.25	11.499	-12.50	2.820	-12.50	2.864	-.002	.150
.30	11.499	-15.00	1.420	-15.00	1.448	.006	.200
.35	11.499	-17.50	0.020	-17.50	0.044	.014	.250
.40	11.499	-20.00	-14.380	-20.00	-14.424	.022	.300
.45	11.499	-22.50	-28.780	-22.50	-28.828	.030	.350
.50	11.499	-25.00	-43.180	-25.00	-43.224	.038	.400
.55	11.499	-27.50	-57.580	-27.50	-57.628	.046	.450
.60	11.499	-30.00	-71.980	-30.00	-72.024	.054	.500
.65	11.499	-32.50	-86.380	-32.50	-86.428	.062	.550
.70	11.499	-35.00	-100.780	-35.00	-100.824	.070	.600
.75	11.499	-37.50	-115.180	-37.50	-115.224	.078	.650
.80	11.499	-40.00	-129.580	-40.00	-129.624	.086	.700
.85	11.499	-42.50	-143.980	-42.50	-144.024	.094	.750
.90	11.499	-45.00	-158.380	-45.00	-158.424	.102	.800
.95	11.499	-47.50	-172.780	-47.50	-172.824	.110	.850
1.00	11.499	-50.00	-187.180	-50.00	-187.624	.118	.900
1.05	11.499	-52.50	-201.580	-52.50	-201.824	.126	.950
1.10	11.499	-55.00	-215.980	-55.00	-216.024	.134	.987

DISTRIBUTION OF CURRENT AND CHARGE ON BEVERAGE ANTENNA OVER MOIST EARTH
 ALPHA/BETAL = .0020 BETA/BETAC = 1.032 LI/LAPDAC = .500
 FREQUENCY = 300.000MHZ PE = .012 C/LAPDAC = .060 RL = 242.000MHZ

A. MEASURED CURRENT DISTRIBUTION IN PAVV BLT

RAW DATA		NORMALIZED DATA					
Z/H	IRAFZ	IRFAG	IRFAZ	IRFAG	IRREAL	IRIMAG	Z/LAPDAC
.04	6.799	110.00	3.900	10.00	3.900	.688	.003
.08	6.799	97.00	3.800	9.00	3.797	-.159	.025
.12	6.799	84.00	3.700	8.00	3.697	-.329	.050
.16	6.799	71.00	3.600	7.00	3.597	-.499	.075
.20	6.799	58.00	3.500	6.00	3.497	-.669	.100
.24	6.799	45.00	3.400	5.00	3.397	-.839	.125
.28	6.799	32.00	3.300	4.00	3.297	-1.009	.150
.32	6.799	19.00	3.200	3.00	3.197	-1.179	.175
.36	6.799	6.00	3.100	2.00	3.097	-1.349	.200
.40	6.799	-7.00	3.000	1.00	2.997	-1.519	.225
.44	6.799	-14.00	2.900	0.00	2.897	-1.689	.250
.48	6.799	-21.00	2.800	-1.00	2.797	-1.859	.275
.52	6.799	-28.00	2.700	-2.00	2.697	-2.029	.300
.56	6.799	-35.00	2.600	-3.00	2.597	-2.199	.325
.60	6.799	-42.00	2.500	-4.00	2.497	-2.369	.350
.64	6.799	-49.00	2.400	-5.00	2.397	-2.539	.375
.68	6.799	-56.00	2.300	-6.00	2.297	-2.709	.400
.72	6.799	-63.00	2.200	-7.00	2.197	-2.879	.425
.76	6.799	-70.00	2.100	-8.00	2.097	-3.049	.450
.80	6.799	-77.00	2.000	-9.00	1.997	-3.219	.475

B. MEASURED CHARGE DISTRIBUTION IN PICCOLL/VBLT-P

RAW DATA		NORMALIZED DATA					
Z/H	IRAFZ	IRFAG	IRFAZ	IRFAG	IRREAL	IRIMAG	Z/LAPDAC
.04	13.499	-2.00	21.600	-2.00	21.587	-.076	.006
.08	13.499	-4.00	16.000	-4.00	16.032	-.020	.025
.12	13.499	-6.00	11.600	-6.00	11.676	-.037	.050
.16	13.499	-8.00	7.200	-8.00	7.244	-.054	.100
.20	13.499	-10.00	2.800	-10.00	2.812	-.071	.150
.24	13.499	-12.00	1.400	-12.00	1.379	-.088	.200
.28	13.499	-14.00	0.000	-14.00	0.000	-.105	.250
.32	13.499	-16.00	-14.380	-16.00	-14.424	-.122	.300
.36	13.499	-18.00	-28.780	-18.00	-28.828	-.139	.350
.40	13.499	-20.00	-43.180	-20.00	-43.224	-.156	.400
.44	13.499	-22.00	-57.580	-22.00	-57.628	-.173	.450
.48	13.499	-24.00	-71.980	-24.00	-72.024	-.190	.500
.52	13.499	-26.00	-86.380	-26.00	-86.428	-.207	.550
.56	13.499	-28.00	-100.780	-28.00	-100.824	-.224	.600
.60	13.499	-30.00	-115.180	-30.00	-115.224	-.241	.650
.64	13.499	-32.00	-129.580	-32.00	-129.624	-.258	.700
.68	13.499	-34.00	-143.980	-34.00	-144.024	-.275	.750
.72	13.499	-36.00	-158.380	-36.00	-158.424	-.292	.800
.76	13.499	-38.00	-172.780	-38.00	-172.824	-.309	.850
.80	13.499	-40.00	-187.180	-40.00	-187.624	-.326	.900
.84	13.499	-42.00	-201.580	-42.00	-201.824	-.343	.950
.88	13.499	-44.00	-215.980	-44.00	-216.024	-.360	.987

TABLE 3.4 (CONTINUED)

DISTRIBUTION OF CURRENT AND CHARGE ON BEVERAGE ANTENNA OVER MOIST EARTH
ALPHA/BETA = .0438 BETA/BETAC = 3.051 L1/LAMDAO = 1.500
FREQUENCY = 300.000MHZ PE = .032 D/LAMDAO = .100 RL = 242.000HPS

A. MEASURED CURRENT DISTRIBUTION IN MAX VOLT

Z/H	RAW DATA		NORMALIZED DATA					Z/LAMDAO
	IRH AG	IRFAZ	INMAG	INFAZ	INREAL	INIPAG		
.00P	2.447	110.00	3.68C	10.00	3.4624	.639	.003	
.14	2.421	107.00	3.64C	9.20	3.6111	.456	.085	
.29	2.387	87.90	3.68C	12.10	3.481	-.746	.050	
.57	2.248	67.90	3.38C	-35.10	2.863	-1.796	.100	
.86	2.204	51.00	3.30C	-49.00	2.178	-2.508	.150	
1.14	2.181	32.80	3.20C	-67.80	1.217	-6.981	.200	
1.43	2.088	13.20	3.14C	-86.80	.175	-3.135	.250	
1.72	2.022	4.60	3.04C	-108.40	-.068	-2.913	.300	
2.00	2.022	-26.40	3.04C	-126.40	-1.804	-2.447	.350	
2.29	2.022	-45.60	3.04C	-145.60	-2.808	-1.717	.400	
2.58	2.048	-63.60	3.04C	-163.60	-2.955	-.870	.450	
2.86	2.044	-81.00	3.08C	-181.00	-3.080	.054	.500	
3.15	2.051	-96.40	3.10C	-196.40	-2.944	-.979	.550	
3.43	2.022	-115.40	3.04C	-215.40	-2.478	1.761	.600	
3.72	1.989	-132.40	2.98C	-232.40	-1.818	2.361	.650	
4.01	1.969	-151.40	2.80C	-251.40	-.935	2.639	.700	
4.29	1.923	-165.40	2.74C	-265.40	-.024	2.740	.750	
4.58	1.796	-188.40	2.70C	-288.40	.870	2.556	.800	
4.86	1.796	-213.40	2.70C	-313.40	1.889	1.989	.850	
5.15	1.622	-228.40	2.74C	-328.40	2.344	1.119	.900	
5.44	1.649	-247.00	2.78C	-347.00	2.709	.625	.950	
5.72	1.676	-253.00	2.82C	-353.00	2.802	-.119	1.000	
6.01	1.302	-280.00	2.86C	-380.00	2.688	-.978	1.050	
6.30	1.469	-297.40	2.80C	-397.40	2.227	-1.687	1.100	
6.58	1.434	-312.40	2.78C	-412.40	1.680	-2.150	1.150	
6.87	1.769	-332.00	2.86C	-432.00	.822	-2.530	1.200	
7.15	1.742	-348.40	2.82C	-448.40	-.069	-2.619	1.250	
7.44	1.689	-367.40	2.80C	-467.40	-.764	-2.380	1.300	
7.73	1.676	-388.00	2.82C	-488.00	-1.891	-1.966	1.350	
8.01	1.649	-407.40	2.86C	-507.40	-2.885	-1.343	1.400	
8.30	1.623	-426.40	2.84C	-526.40	-2.374	-.565	1.450	
8.59	1.623	-439.00	2.84C	-539.00	-2.440	-.043	1.484	

B. MEASURED CHARGE DISTRIBUTION IN PICCOLL/VOLTY

Z/H	RAW DATA		NORMALIZED DATA					Z/LAMDAO
	QHPAG	QRFAC	QNMAG	QNFAC	QNREAL	QNIPAG		
.003	4.651	-.80	20.22C	-.80	20.218	-.282	.006	
.14	3.763	-7.00	14.82C	-7.00	14.511	-1.782	.025	
.29	2.794	-16.40	12.84C	-16.40	12.211	-3.717	.050	
.57	2.022	-36.00	11.40C	-36.00	9.223	-6.701	.100	
.86	2.021	-53.40	10.94C	-53.40	6.473	-8.844	.150	
1.14	2.021	-73.40	10.94C	-73.40	3.804	-10.481	.200	
1.43	2.012	-90.40	10.92C	-90.40	1.095	-10.920	.250	
1.72	2.022	-108.40	10.78C	-108.40	-.3385	-10.233	.300	
2.00	2.022	-126.40	10.80C	-126.40	-.8263	-6.945	.350	
2.29	2.043	-142.00	10.82C	-142.00	-.8369	-6.538	.400	
2.58	2.014	-164.40	10.84C	-164.40	-.9453	-3.441	.450	
2.86	1.734	-179.40	9.48C	-179.40	-.9459	-.165	.500	
3.15	2.044	-196.40	9.34C	-196.40	-.8883	2.886	.550	
3.43	2.022	-217.40	9.34C	-217.40	-.7442	5.714	.600	
3.72	2.027	-236.40	9.42C	-236.40	-.5158	7.882	.650	
4.01	2.023	-253.40	9.58C	-253.40	2.488	9.254	.700	
4.29	2.028	-272.40	9.68C	-272.40	.422	9.671	.750	
4.58	2.045	-289.40	9.76C	-289.40	3.178	9.288	.800	
4.86	2.019	-307.40	9.54C	-307.40	5.741	7.419	.850	
5.15	2.025	-322.40	9.24C	-322.40	7.380	5.587	.900	
5.44	2.027	-341.40	8.90C	-341.40	8.415	2.898	.950	
5.72	1.978	-360.40	8.60C	-360.40	8.600	-.000	1.000	
6.01	1.974	-378.40	8.60C	-378.40	8.141	-2.771	1.050	
6.30	1.969	-400.40	8.58C	-400.40	6.257	-5.502	1.100	
6.58	1.950	-417.40	8.48C	-417.40	4.669	-7.144	1.150	
6.87	1.987	-438.40	8.64C	-438.40	1.723	-8.467	1.200	
7.15	2.029	-453.40	8.82C	-453.40	-.462	-8.604	1.250	
7.44	2.019	-470.40	8.78C	-470.40	3.275	-8.224	1.300	
7.73	1.987	-488.40	8.64C	-488.40	5.319	-6.804	1.350	
8.01	1.960	-507.40	8.52C	-507.40	7.145	-4.684	1.400	
8.30	2.029	-524.40	9.04C	-524.40	8.690	-2.492	1.450	
8.59	2.012	-541.40	10.92C	-541.40	-10.916	.286	1.487	

TABLE 3.4 (CONTINUED)

DISTRIBUTION OF CURRENT AND CHARGE ON BEVERAGE ANTENNA OVER MOIST EARTH
 ALFA/BETA = .0438 BETA/BETAC = 1.011 L1/LAMDAC = 1.000
 FREQUENCY = 300.00MHz PE = .012 C/LAMDAC = .100 RL = 242.00ohms

A. MEASURED CURRENT DISTRIBUTION IN PAW BLT

Z/H	RAW DATA			NORMALIZED DATA				Z/LAMDAC
	IRH AG	IRFAZ	INPAG	INFAZ	INREAL	INIPAG		
.002	5.000	110.00	3.780	10.000	3.723	.656	.003	
.020	5.119	99.000	3.580	-1.000	3.579	-.062	.025	
.040	5.205	88.000	3.500	-12.000	3.424	-.728	.050	
.060	5.255	80.000	3.380	-30.000	3.400	-1.781	.100	
.100	5.319	49.000	2.800	-81.000	2.077	-2.585	.150	
.150	5.405	30.000	2.200	-89.000	1.108	-3.116	.200	
.200	5.519	11.000	1.100	-88.000	.089	-3.158	.250	
.241	5.562	-7.000	3.100	-107.000	-.912	-2.984	.300	
.281	5.584	-25.000	3.080	-120.000	-1.789	-2.907	.350	
.321	5.584	-45.000	3.080	-145.000	-2.823	-1.767	.400	
.361	5.584	-63.000	3.080	-163.000	-2.949	-.830	.450	
.401	5.584	-80.000	3.080	-180.000	-3.000	-.027	.500	
.441	5.584	-108.000	3.080	-208.000	-2.714	1.455	.550	
.481	5.584	-135.000	3.080	-235.000	-2.672	1.370	.600	
.521	5.584	-159.000	2.980	-253.000	-1.761	2.354	.650	
.561	5.584	-181.000	2.900	-251.000	-.944	2.742	.700	
.601	5.584	-170.000	2.880	-270.000	.000	2.480	.750	
.641	5.584	-188.000	2.780	-288.000	.880	2.416	.800	
.681	5.584	-208.000	2.800	-308.000	1.724	2.200	.850	
.722	5.584	-228.000	2.780	-328.000	2.304	1.519	.900	
.762	5.584	-248.000	2.740	-348.000	2.659	.663	.950	
.789	5.584	-260.000	2.740	-360.000	2.740	-.000	.984	

B. MEASURED CHARGE DISTRIBUTION IN PICCOL/VBLT*

Z/H	RAW DATA			NORMALIZED DATA				Z/LAMDAC
	QRH AG	QRFAZ	QNPAG	QNFAZ	QNREAL	QNIPAG		
.005	1.000	-3.000	20.920	-3.000	20.891	-1.095	.006	
.020	7.536	-11.000	15.380	-11.000	15.097	-2.935	.025	
.040	5.435	-17.000	13.580	-17.000	12.934	-4.004	.050	
.060	5.435	-30.000	12.000	-30.000	9.749	-4.960	.100	
.100	5.476	-59.000	11.280	-59.000	6.580	-9.299	.150	
.150	5.529	-73.000	11.280	-73.000	3.204	-10.815	.200	
.200	5.574	-82.000	11.180	-82.000	-.390	-11.173	.250	
.241	5.584	-109.000	11.080	-109.000	-3.699	-10.444	.300	
.281	5.584	-127.000	10.980	-127.000	-6.956	-8.753	.350	
.321	5.584	-144.000	10.880	-144.000	-8.478	-6.190	.400	
.361	5.584	-162.000	10.780	-162.000	-10.000	-3.601	.450	
.401	5.584	-180.000	10.680	-180.000	-10.000	.088	.500	
.441	5.584	-199.000	9.980	-199.000	-9.387	3.269	.550	
.481	5.584	-218.000	9.880	-218.000	-8.180	4.128	.600	
.521	5.584	-236.000	9.880	-236.000	-6.279	4.066	.650	
.561	5.584	-255.000	9.880	-255.000	-2.414	9.393	.700	
.601	5.584	-273.000	9.880	-273.000	.400	6.421	.750	
.641	5.584	-292.000	9.880	-292.000	3.880	9.123	.800	
.681	5.584	-309.000	9.780	-309.000	6.182	7.586	.850	
.722	5.584	-328.000	9.880	-328.000	8.175	5.108	.900	
.762	5.584	-347.000	10.040	-347.000	9.813	2.122	.950	
.789	5.584	-360.000	12.300	-360.000	12.893	-.429	.987	

DISTRIBUTION OF CURRENT AND CHARGE ON BEVERAGE ANTENNA OVER MOIST EARTH
 ALFA/BETA = .0438 BETA/BETAC = 1.011 L1/LAMDAC = .500
 FREQUENCY = 300.00MHz PE = .012 C/LAMDAC = .100 RL = 242.00ohms

A. MEASURED CURRENT DISTRIBUTION IN PAW BLT

Z/H	RAW DATA			NORMALIZED DATA				Z/LAMDAC
	IRH AG	IRFAZ	INPAG	INFAZ	INREAL	INIPAG		
.004	6.094	110.000	3.840	10.000	3.782	.667	.003	
.020	6.194	98.000	3.680	-1.000	3.658	-.115	.025	
.040	6.294	87.000	3.600	-13.000	3.508	-.810	.050	
.060	6.394	67.000	3.580	-32.000	2.988	-1.900	.100	
.080	6.494	49.000	3.480	-50.000	2.199	-2.928	.150	
.100	6.594	30.000	3.480	-69.000	1.219	-3.240	.200	
.120	6.694	18.000	3.300	-87.000	.161	-3.294	.250	
.140	6.794	9.000	3.180	-106.000	-.819	-3.044	.300	
.160	6.894	-27.000	3.180	-127.000	-1.991	-2.540	.350	
.180	6.994	-46.000	3.180	-146.000	-2.999	-1.727	.400	
.200	7.094	-65.000	3.100	-165.000	-2.994	-.802	.450	
.220	7.194	-79.000	3.100	-179.000	-3.100	-.027	.500	

B. MEASURED CHARGE DISTRIBUTION IN PICCOL/VBLT*

Z/H	RAW DATA			NORMALIZED DATA				Z/LAMDAC
	QRH AG	QRFAZ	QNPAG	QNFAZ	QNREAL	QNIPAG		
.008	12.036	-3.000	20.400	-3.000	20.362	-1.240	.006	
.020	8.933	-9.000	18.140	-9.000	14.919	-2.577	.025	
.040	7.729	-18.000	13.100	-18.000	10.437	-4.113	.050	
.060	7.421	-37.000	11.800	-37.000	9.1504	-7.186	.100	
.080	6.726	-56.000	11.400	-56.000	6.375	-9.451	.150	
.100	6.726	-74.000	11.400	-74.000	2.988	-11.001	.200	
.120	6.726	-93.000	11.400	-93.000	-.638	-11.382	.250	
.140	6.726	-111.000	11.400	-111.000	-4.178	-10.907	.300	
.160	6.726	-129.000	11.280	-129.000	-7.061	-8.720	.350	
.180	6.726	-147.000	10.780	-147.000	-9.031	-6.776	.400	
.200	6.726	-166.000	11.280	-166.000	-10.919	-2.581	.450	
.220	6.726	-181.000	12.600	-181.000	-13.894	.336	.500	

TABLE 3.4 (CONTINUED)

DISTRIBUTION OF CURRENT AND CHARGE ON BEVERAGE ANTENNA OVER MOIST EARTH
 ALFA/BETAL = 1.0350 BETAL/BETAC = 1.0000 LI/LAPDAG = 1.5000
 FREQUENCY = 300.000MHz PE = .012 C/LAMPDAG = .2500 RL = 380.000Ohms

A. MEASURED CURRENT DISTRIBUTION IN PAW BLT

Z/H	RAW DATA			NORMALIZED DATA				Z/LAMPDAG
	IMH AG	IRFAZ	INMAG	INFAZ	INREAL	INPAG		
.002	6.1100	110.000	3.1200	10.000	3.073	.642	.003	
.014	5.787	98.200	2.9600	-1.800	2.959	-.093	.025	
.028	5.0020	86.900	2.8800	-13.100	2.805	-.1653	.050	
.057	5.394	66.900	2.7800	-33.100	2.312	-1.507	.100	
.086	5.279	48.800	2.7000	-51.600	1.692	-2.100	.150	
.114	5.2500	31.000	2.6800	-69.000	.953	-2.443	.200	
.143	5.243	12.600	2.6000	-87.400	.118	-2.697	.250	
.172	4.848	-5.200	2.4400	-105.000	-.450	-2.353	.300	
.200	4.692	-24.200	2.4000	-124.200	-1.349	-1.985	.350	
.229	4.496	-44.000	2.3000	-144.000	-1.861	-1.352	.400	
.257	4.456	-64.000	2.3000	-164.000	-2.111	-.634	.450	
.286	4.575	-83.600	2.3400	-183.600	-2.235	-.147	.500	
.314	4.575	-101.600	2.3400	-201.600	-2.176	.881	.550	
.343	4.575	-120.000	2.3400	-220.000	-1.793	1.504	.600	
.372	4.575	-137.000	2.3400	-237.000	-1.274	1.962	.650	
.400	4.575	-154.000	2.3400	-254.000	-.621	2.256	.700	
.429	4.496	-171.400	2.3000	-271.400	.056	2.299	.750	
.457	4.379	-189.000	2.2400	-289.000	.729	2.118	.800	
.486	4.223	-206.000	2.1400	-306.000	1.330	1.700	.850	
.515	4.145	-227.000	2.1000	-327.000	1.790	1.136	.900	
.543	4.106	-247.700	2.1000	-347.700	2.022	.447	.950	
.572	4.184	-264.000	2.1400	-364.000	2.128	-.224	1.000	
.600	4.340	-285.000	2.2000	-385.000	2.012	-.938	1.050	
.629	4.496	-302.400	2.2400	-402.400	1.698	-1.551	1.100	
.658	4.536	-319.000	2.3200	-419.000	1.195	-1.989	1.150	
.686	4.575	-335.400	2.3400	-435.400	.590	-2.264	1.200	
.715	4.692	-351.600	2.4000	-451.600	-.043	-2.359	1.250	
.743	4.896	-367.500	2.4000	-467.500	-.692	-2.194	1.300	
.772	4.379	-385.000	2.2400	-485.000	-1.301	-1.424	1.350	
.800	4.144	-404.000	2.1200	-504.000	-1.724	-1.234	1.400	
.829	3.871	-425.200	1.9800	-525.200	-1.914	-.506	1.450	
.857	3.732	-441.500	1.9600	-541.500	-1.959	-.051	1.484	

B. MEASURED CHARGE DISTRIBUTION IN PICCOL/VBLT-M

Z/H	RAW DATA			NORMALIZED DATA				Z/LAMPDAG
	QWAG	QWFAZ	QWVAG	QWFAZ	QWREAL	QWPAG		
.003	11.474	-.4400	17.2600	-.4400	17.199	-1.444	.006	
.014	6.285	-10.500	10.7900	-10.500	10.546	-2.325	.025	
.028	7.024	-18.400	10.9400	-18.400	10.400	-3.840	.050	
.057	6.437	-35.700	9.6800	-35.700	7.861	-5.649	.100	
.086	5.932	-53.000	8.9200	-53.000	5.306	-7.170	.150	
.114	5.785	-72.600	8.7000	-72.600	2.616	-8.297	.200	
.143	5.539	-91.500	8.4800	-91.500	-.222	-8.477	.250	
.172	5.639	-109.500	8.4800	-109.500	-2.831	-7.994	.300	
.200	5.785	-127.000	8.7000	-127.000	-5.296	-6.902	.350	
.229	5.692	-144.000	8.6600	-144.000	-7.097	-5.787	.400	
.257	5.486	-161.000	8.4000	-161.000	-7.549	-2.735	.450	
.286	5.386	-178.000	8.1000	-178.000	-8.095	-.283	.500	
.314	5.187	-194.000	7.8000	-194.000	-7.698	2.150	.550	
.343	5.141	-214.500	7.5800	-214.500	-6.027	4.593	.600	
.372	4.494	-234.200	7.3600	-234.200	-.305	5.969	.650	
.400	4.694	-254.500	7.3600	-254.500	-1.967	7.092	.700	
.429	4.394	-274.000	7.3600	-274.000	.513	7.342	.750	
.457	4.987	-292.300	7.5000	-292.300	2.846	6.939	.800	
.486	5.034	-310.000	7.4800	-310.000	4.324	5.868	.850	
.515	5.134	-327.500	7.7200	-327.500	6.511	4.148	.900	
.543	5.187	-343.500	7.8000	-343.500	7.479	2.210	.950	
.572	5.187	-360.000	7.8000	-360.000	7.800	-.000	1.000	
.600	5.134	-377.000	7.7200	-377.000	7.383	-2.227	1.050	
.629	4.987	-395.200	7.5000	-395.200	6.129	-4.323	1.100	
.658	4.741	-413.000	7.2800	-413.000	4.381	-5.814	1.150	
.686	4.788	-432.500	7.2000	-432.500	2.145	-6.867	1.200	
.715	4.695	-452.000	7.0800	-452.000	-.246	-7.056	1.250	
.743	4.695	-471.000	7.0000	-471.000	-2.530	-6.591	1.300	
.772	4.788	-490.500	7.2000	-490.500	-4.676	-5.475	1.350	
.800	4.787	-510.000	7.4000	-510.000	-6.495	-3.750	1.400	
.829	5.586	-529.000	8.4000	-529.000	-8.246	-1.603	1.450	
.857	6.690	-542.000	10.0000	-542.000	-10.054	-.351	1.487	

TABLE 3.4 (CONTINUED)

DISTRIBUTION OF CURRENT AND CHARGE ON BEVERAGE ANTENNA OVER MOIST EARTH
 ALFA/BETAL = .0350 BETAL/BETAC = 1.000 L1/LAMDAC = 1.000
 FREQUENCY = 300.000MHZ PE = .012 C/LAMDAC = .280 RL = 380.000OHMS

A. MEASURED CURRENT DISTRIBUTION IN MA/V BLT

Z/H	RAW DATA		NORMALIZED DATA					Z/LAMDAC
	IRM AG	IRFAZ	INMAG	INFAZ	INREAL	INIMAG		
.020	0.503	110.00	3.180	10.00	3.130	-.552	.020	
.120	0.176	98.50	3.020	+1.50	3.019	-.079	.025	
.220	0.130	87.00	2.980	+1.00	2.981	-.031	.030	
.320	0.107	87.00	2.800	+1.00	2.870	-.028	.100	
.420	0.090	87.00	2.720	+1.00	2.700	-.020	.150	
.520	0.076	80.00	2.680	+1.00	2.680	-.020	.200	
.620	0.061	70.00	2.680	+1.00	2.680	-.020	.250	
.720	0.047	60.00	2.580	+1.00	2.580	-.020	.300	
.820	0.031	50.00	2.400	+1.00	2.400	-.020	.350	
.920	0.020	40.00	2.300	+1.00	2.300	-.020	.400	
1.020	0.013	30.00	2.200	+1.00	2.200	-.020	.450	
1.120	0.007	20.00	2.100	+1.00	2.100	-.020	.500	
1.220	0.004	15.00	2.000	+1.00	2.000	-.020	.550	
1.320	0.002	10.00	1.900	+1.00	1.900	-.020	.600	
1.420	0.001	7.00	1.800	+1.00	1.800	-.020	.650	
1.520	0.000	5.00	1.700	+1.00	1.700	-.020	.700	
1.620	0.000	3.00	1.600	+1.00	1.600	-.020	.750	
1.720	0.000	2.00	1.500	+1.00	1.500	-.020	.800	
1.820	0.000	1.50	1.400	+1.00	1.400	-.020	.850	
1.920	0.000	1.00	1.300	+1.00	1.300	-.020	.900	
2.020	0.000	0.50	1.200	+1.00	1.200	-.020	.950	
2.120	0.000	0.00	1.100	+1.00	1.100	-.020	.980	

B. MEASURED CHARGE DISTRIBUTION IN PICCOL/VOLT-F

Z/H	RAW DATA		NORMALIZED DATA					Z/LAMDAC
	QRMAG	QRFZA	QNMAG	QNFZA	QNREAL	QNIMAG		
.005	11.607	+6.50	15.900	+6.50	15.798	-1.800	.006	
.020	8.745	+12.00	11.900	+12.00	11.718	-2.491	.025	
.120	7.793	+20.00	10.400	+20.00	9.980	-3.432	.050	
.220	6.906	+37.00	9.460	+37.00	7.950	-5.493	.100	
.320	6.351	+55.00	8.700	+55.00	6.990	-7.127	.150	
.420	6.147	+73.00	8.060	+73.00	6.431	-8.407	.200	
.520	6.044	+92.00	7.480	+92.00	6.353	-8.413	.250	
.620	6.044	+110.00	6.880	+110.00	6.286	-7.761	.300	
.720	6.025	+128.00	6.280	+128.00	6.228	-6.920	.350	
.820	6.005	+145.00	5.680	+145.00	6.169	-6.766	.400	
.920	5.985	+163.00	5.080	+163.00	6.110	-7.803	.450	
1.020	5.952	+180.00	4.480	+180.00	6.051	-8.840	.500	
1.120	5.890	+197.00	3.880	+197.00	6.000	-9.877	.550	
1.220	5.828	+215.00	3.280	+215.00	5.950	-10.914	.600	
1.320	5.766	+233.00	2.680	+233.00	5.900	-11.951	.650	
1.420	5.704	+251.00	2.080	+251.00	5.850	-12.988	.700	
1.520	5.642	+269.00	1.480	+269.00	5.800	-14.025	.750	
1.620	5.580	+287.00	0.880	+287.00	5.750	-15.062	.800	
1.720	5.518	+305.00	0.280	+305.00	5.700	-16.099	.850	
1.820	5.456	+323.00	-0.320	+323.00	5.650	-17.136	.900	
1.920	5.394	+341.00	-0.920	+341.00	5.600	-18.173	.950	
2.020	5.332	+359.00	-1.520	+359.00	5.550	-19.210	.980	

DISTRIBUTION OF CURRENT AND CHARGE ON BEVERAGE ANTENNA OVER MOIST EARTH
 ALFA/BETAL = .0350 BETAL/BETAC = 1.000 L1/LAMDAC = .500
 FREQUENCY = 300.000MHZ PE = .012 C/LAMDAC = .280 RL = 380.000OHMS

A. MEASURED CURRENT DISTRIBUTION IN MA/V BLT

Z/H	RAW DATA		NORMALIZED DATA					Z/LAMDAC
	IRM AG	IRFAZ	INMAG	INFAZ	INREAL	INIMAG		
.020	0.406	110.00	3.080	7.00	3.057	-.375	.020	
.120	0.115	98.00	2.900	7.00	2.929	-.256	.025	
.220	0.090	87.00	2.880	+1.00	2.768	-.794	.050	
.320	0.076	80.00	2.800	+1.00	2.667	-1.677	.100	
.420	0.061	70.00	2.720	+1.00	2.580	-2.623	.150	
.520	0.047	60.00	2.680	+1.00	2.500	-3.579	.200	
.620	0.031	50.00	2.680	+1.00	2.420	-4.535	.250	
.720	0.020	40.00	2.580	+1.00	2.340	-5.491	.300	
.820	0.013	30.00	2.400	+1.00	2.260	-6.447	.350	
.920	0.007	20.00	2.300	+1.00	2.180	-7.403	.400	
1.020	0.004	15.00	2.200	+1.00	2.100	-8.359	.450	
1.120	0.002	10.00	2.100	+1.00	2.020	-9.315	.500	
1.220	0.001	7.00	2.000	+1.00	1.940	-10.271	.550	
1.320	0.000	5.00	1.900	+1.00	1.860	-11.227	.600	
1.420	0.000	3.00	1.800	+1.00	1.780	-12.183	.650	
1.520	0.000	2.00	1.700	+1.00	1.700	-13.139	.700	
1.620	0.000	1.50	1.600	+1.00	1.620	-14.095	.750	
1.720	0.000	1.00	1.500	+1.00	1.540	-15.051	.800	
1.820	0.000	0.50	1.400	+1.00	1.460	-16.007	.850	
1.920	0.000	0.00	1.300	+1.00	1.380	-16.963	.900	
2.020	0.000	0.00	1.200	+1.00	1.300	-17.919	.950	

B. MEASURED CHARGE DISTRIBUTION IN PICCOL/VOLT-F

Z/H	RAW DATA		NORMALIZED DATA					Z/LAMDAC
	QRMAG	QRFZA	QNMAG	QNFZA	QNREAL	QNIMAG		
.020	12.396	+4.80	16.900	+4.80	16.920	-1.421	.026	
.120	9.154	+10.00	12.500	+10.00	12.324	-2.264	.025	
.220	6.947	+18.00	10.400	+18.00	10.157	-3.300	.050	
.320	6.478	+35.00	9.380	+35.00	7.684	-5.380	.100	
.420	6.123	+52.00	8.580	+52.00	5.992	-8.081	.150	
.520	5.855	+69.00	7.880	+69.00	4.374	-11.016	.200	
.620	5.628	+86.00	7.280	+86.00	2.756	-14.016	.250	
.720	5.434	+103.00	6.680	+103.00	1.138	-17.092	.300	
.820	5.261	+120.00	6.080	+120.00	-0.480	-20.202	.350	
.920	5.107	+137.00	5.480	+137.00	-2.102	-23.342	.400	
1.020	4.972	+154.00	4.880	+154.00	-3.724	-26.512	.450	
1.120	4.855	+171.00	4.280	+171.00	-5.346	-29.712	.500	
1.220	4.756	+188.00	3.680	+188.00	-6.968	-32.942	.550	
1.320	4.674	+205.00	3.080	+205.00	-8.590	-36.212	.600	
1.420	4.607	+222.00	2.480	+222.00	-10.212	-39.522	.650	
1.520	4.554	+239.00	1.880	+239.00	-11.834	-42.872	.700	
1.620	4.514	+256.00	1.280	+256.00	-13.456	-46.262	.750	
1.720	4.485	+273.00	0.680	+273.00	-15.078	-49.692	.800	
1.820	4.466	+290.00	0.080	+290.00	-16.700	-53.162	.850	
1.920	4.456	+307.00	-0.520	+307.00	-18.322	-56.672	.900	
2.020	4.454	+324.00	-1.120	+324.00	-19.944	-60.222	.950	

TABLE 3.5

ADMITTANCE AND IMPEDANCE OF BEVERAGE
ANTENNA OVER FRESH WATER (MEASURED)

ALPHA/BETA * 11280 BETA/BETA0 * 1.143 A/LANDL * 10017
FREQUENCY * 300.000 MHz RE * 1067 D/LANDAC * 10100
RL * 162.000 HMS

METAL#	ADMITTANCE (MILLIHMS)			IMPEDANCE (OHMS)	
	S	B	R	X	
1.795	5.16	-.21	127.58	5.96	
3.591	4.76	-.25	218.31	2.38	
7.182	0.12	.14	189.05	-5.55	
10.773	5.16	-.22	197.26	8.58	

ADMITTANCE AND IMPEDANCE OF BEVERAGE
ANTENNA OVER FRESH WATER (MEASURED)

ALPHA/BETA * 10911 BETA/BETA0 * 1.152 A/LANDL * 10016
FREQUENCY * 300.000 MHz RE * 1067 D/LANDAC * 10200
RL * 193.000 HMS

METAL#	ADMITTANCE (MILLIHMS)			IMPEDANCE (OHMS)	
	S	B	R	X	
1.570	1.77	-.46	217.71	20.03	
3.140	1.16	-.41	236.96	23.24	
4.710	1.43	-.46	225.69	3.08	
6.280	1.43	-.45	224.84	14.21	

ADMITTANCE AND IMPEDANCE OF BEVERAGE
ANTENNA OVER FRESH WATER (MEASURED)

ALPHA/BETA * 10486 BETA/BETA0 * 1.118 A/LANDL * 10015
FREQUENCY * 300.000 MHz RE * 1067 D/LANDAC * 10500
RL * 271.000 HMS

METAL#	ADMITTANCE (MILLIHMS)			IMPEDANCE (OHMS)	
	S	B	R	X	
1.599	1.76	-.75	244.93	46.62	
3.198	1.29	-.81	266.56	70.56	
4.797	1.31	-.49	279.45	39.01	
6.396	1.49	-.82	271.54	63.80	

ADMITTANCE AND IMPEDANCE OF BEVERAGE
ANTENNA OVER FRESH WATER (MEASURED)

ALPHA/BETA * 10281 BETA/BETA0 * 1.116 A/LANDL * 10015
FREQUENCY * 300.000 MHz RE * 1067 D/LANDAC * 11000
RL * 271.000 HMS

METAL#	ADMITTANCE (MILLIHMS)			IMPEDANCE (OHMS)	
	S	B	R	X	
1.576	1.71	-.10	371.84	9.12	
3.152	1.43	-.70	276.18	55.55	
4.728	1.40	-.15	244.96	14.66	
6.304	1.49	-.20	244.05	16.65	

ADMITTANCE AND IMPEDANCE OF BEVERAGE
ANTENNA OVER FRESH WATER (MEASURED)

ALPHA/BETA * 10911 BETA/BETA0 * 1.116 A/LANDL * 10015
FREQUENCY * 300.000 MHz RE * 1067 D/LANDAC * 12500
RL * 291.000 HMS

METAL#	ADMITTANCE (MILLIHMS)			IMPEDANCE (OHMS)	
	S	B	R	X	
1.576	1.43	-.45	217.76	144.48	
3.152	1.46	-.44	244.42	36.17	
4.728	1.48	-.40	268.57	29.15	
6.304	1.49	-.42	273.96	1.50	

TABLE 3.5 (CONTINUED)

ADMITTANCE AND IMPEDANCE OF BEVERAGE
ANTENNA OVER SALT WATER (MEASURED)

ALFAL/BETA = .0660 BETA/BETA0 = 1.109 A/LAMD L = .0017
FREQUENCY = 300.00MHZ PE = 2.885 D/LAMDAC = .0100

RL = 180.00HMS

BETA*H	ADMITTANCE (MILLIHOES)		IMPEDANCE (OHMS)	
	G	B	R	X
1.7+2	5.44	--69	17+69	21.37
3.488	4.41	--79	202+44	33+25
6.968	0.62	--38	190+56	13+87
10.452	5.39	--48	184+07	16+35

ADMITTANCE AND IMPEDANCE OF BEVERAGE
ANTENNA OVER SALT WATER (MEASURED)

ALFAL/BETA = .0407 BETA/BETA0 = 1.047 A/LAMD L = .0016
FREQUENCY = 300.00MHZ PE = 2.885 D/LAMDAC = .0200

RL = 204.00HMS

BETA*H	ADMITTANCE (MILLIHOES)		IMPEDANCE (OHMS)	
	G	B	R	X
1.644	4.48	+49	202+87	*20.37
3.288	4.42	+34	210+77	*15+16
6.576	0.7	+69	193+65	*26+36
9.867	4.42	+44	205+75	*18+78

ADMITTANCE AND IMPEDANCE OF BEVERAGE
ANTENNA OVER SALT WATER (MEASURED)

ALFAL/BETA = .0220 BETA/BETA0 = 1.025 A/LAMD L = .0015
FREQUENCY = 300.00MHZ PE = 2.885 D/LAMDAC = .0500

RL = 265.00HMS

BETA*H	ADMITTANCE (MILLIHOES)		IMPEDANCE (OHMS)	
	G	B	R	X
1.610	4.12	+02	228+70	*56+62
3.220	4.29	+47	230+34	*25+23
6.440	4.28	+73	227+04	*38+72
9.660	4.6	+91	234+52	*52+57

ADMITTANCE AND IMPEDANCE OF BEVERAGE
ANTENNA OVER SALT WATER (MEASURED)

ALFAL/BETA = .0191 BETA/BETA0 = 1.028 A/LAMD L = .0015
FREQUENCY = 300.00MHZ PE = 2.885 D/LAMDAC = .1000

RL = 311.00HMS

BETA*H	ADMITTANCE (MILLIHOES)		IMPEDANCE (OHMS)	
	G	B	R	X
1.67	3.76	1.23	240+25	*78+55
3.215	3.40	.88	275+65	*71+35
6.430	3.7	1.20	257+40	*85+41
9.645	3.44	1.12	262+84	*85+57

ADMITTANCE AND IMPEDANCE OF BEVERAGE
ANTENNA OVER SALT WATER (MEASURED)

ALFAL/BETA = .0340 BETA/BETA0 = 1.016 A/LAMD L = .0015
FREQUENCY = 300.00MHZ PE = 2.885 D/LAMDAC = .2500

RL = 385.00HMS

BETA*H	ADMITTANCE (MILLIHOES)		IMPEDANCE (OHMS)	
	G	B	R	X
1.596	4.13	2.13	192+33	*100+16
3.192	3.47	1.51	242+30	*105+44
6.384	3.46	2.01	215+47	*124+45
9.576	3.58	1.79	223+46	*111+73

TABLE 3.5 (CONTINUED)

ADMITTANCE AND IMPEDANCE OF BEVERAGE
ANTENNA OVER DIST. EARTH (MEASURED)

ALFA/BETA = .098 BETA/BETA0 = 1.106 A/LAMD L = .0017
 FREQUENCY = 300.0 MHz FE = .012 D/LAMD AC = .0210
 RL = 213.0 OHMS

BETA*H	ADMITTANCE (MILLIMHS)		IMPEDANCE (OHMS)	
	G	B	R	X
1.737	4.50	.60	218.34	-29.11
3.474	4.16	.24	238.45	-13.69
6.949	4.27	.37	232.45	-20.14
10.423	4.30	.37	230.85	-19.86

ADMITTANCE AND IMPEDANCE OF BEVERAGE
ANTENNA OVER DIST. EARTH (MEASURED)

ALFA/BETA = .0921 BETA/BETA0 = 1.132 A/LAMD L = .0015
 FREQUENCY = 300.0 MHz FE = .012 D/LAMD AC = .0500
 RL = 242.0 OHMS

BETA*H	ADMITTANCE (MILLIMHS)		IMPEDANCE (OHMS)	
	G	B	R	X
1.602	4.43	.17	216.53	-58.92
3.203	4.13	.81	249.92	-52.86
6.407	3.70	1.26	232.18	-75.01
9.730	3.49	.93	237.71	-55.41

ADMITTANCE AND IMPEDANCE OF BEVERAGE
ANTENNA OVER DIST. EARTH (MEASURED)

ALFA/BETA = .0935 BETA/BETA0 = 1.111 A/LAMD L = .0015
 FREQUENCY = 300.0 MHz FE = .012 D/LAMD AC = .1000
 RL = 242.0 OHMS

BETA*H	ADMITTANCE (MILLIMHS)		IMPEDANCE (OHMS)	
	G	B	R	X
1.577	4.43	1.49	238.07	-99.09
3.155	4.13	.57	245.36	-62.14
6.310	3.42	1.44	219.21	-86.40
9.577	3.42	1.41	225.88	-81.25

ADMITTANCE AND IMPEDANCE OF BEVERAGE
ANTENNA OVER DIST. EARTH (MEASURED)

ALFA/BETA = .0950 BETA/BETA0 = 1.104 A/LAMD L = .0015
 FREQUENCY = 300.0 MHz FE = .012 D/LAMD AC = .2900
 RL = 380.0 OHMS

BETA*H	ADMITTANCE (MILLIMHS)		IMPEDANCE (OHMS)	
	G	B	R	X
1.577	4.15	.80	306.84	48.25
3.155	3.42	-1.26	242.03	117.67
6.310	2.77	-1.40	318.34	93.48
9.577	2.76	-1.57	313.42	98.76

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