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Self and Mutual Acoustic Radiation Impedances for Pistons in a Plane Infinite Rigid Baffle

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ABSTRACT

Formulas to calculate the self-impedance and mutual-impedance coefficients of acoustic radiation from disks in an infinite rigid baffle are discussed. A Fortran IV computer program which evaluates these expressions is listed, and two tables of numerical values are printed. The first table lists both the self-impedance and the mutual-impedance coefficients as a function of ka and kd, where $kd = nka$, $n = 2, 3, 4, \ldots, 151$, and where $ka = 0.02\ (0.02)\ 0.10,\ 0.15\ (0.05)\ 1.00,\ 1.20\ (0.20)\ 3.00$. The second table lists only the self impedance for $ka = 2.50\ (0.50)\ 77.0$.

PROBLEM STATUS

This is an interim report on a continuing NRL Problem.

AUTHORIZATION

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SELF AND MUTUAL ACOUSTIC RADIATION IMPEDANCES FOR PISTONS IN A PLANE INFINITE RIGID BAFFLE

INTRODUCTION

We consider in this report the acoustic radiation impedance coefficients, Z_{ij}, for identical circular disks radiating in a plane infinite rigid baffle. The coefficients are listed as a function of kd for a given ka, where k is the wavenumber $2\pi/\lambda$, λ the wavelength, a the radius of the piston, and d the distance between the centers of the radiating pistons. The range of ka considered is 0.02 to 3.0 for tabulation of both self-impedance and mutual-impedance coefficients. An additional table lists the self impedances for ka between 2.5 and 77.0 in steps of 0.5. The computation was accomplished using NRL's Fortran IV computer program MUTIMP (see Appendix A for program listing). It should be noted that the values listed are applicable to radiation from all planar array configurations of circular pistons having any transduction mechanism.

The following tables were published for two purposes. First, they will serve as ready reference for scientists working in sonar, where the value of a self-impedance or mutual-radiation-impedance coefficient is often required. Second, these values can be used to check the various approximations and asymptotic forms that are continually being developed.

METHOD OF CALCULATION

The total force on the ith piston due to an array of identical circular disks vibrating with reference velocities $V_1, V_2, V_3, \ldots, V_n$ is given by

$$F_i = \sum_{j=1}^{n} Z_{ij} V_j .$$

Z_{ii} is called the self impedance of a single disk, and Z_{ij} is called the mutual impedance coefficient between the ith piston and the jth piston. Pritchard (1) has obtained a series representation in terms of products of Bessel functions for the impedances Z_{ij} when the circular disks radiate in a plane infinite rigid baffle. Pritchard's equation, valid when $d > a$, is

$$\frac{Zij}{\rho c A} = 2 \sum_{m=0}^{\infty} \sum_{n=0}^{\infty} \frac{\Gamma\left(m + n + \frac{1}{2}\right)}{\sqrt{\pi}\, m!\, n!} \left(\frac{a}{d}\right)^{m+n} J_{m+1}(ka)\, J_{n+1}(ka)\, \zeta_{m+n}^{(2)}(kd) ,$$

where

$$\zeta_{m+n}^{(2)}(kd) = \sqrt{\frac{\pi}{2kd}} \left[J_{m+n+(1/2)}(kd) + i\,(-1)^{m+n} J_{-m-n-(1/2)}(kd) \right]$$

$$= j_{m+n}(kd) - i\, y_{m+n}(kd),$$

$i = \sqrt{-1}$,

Γ = the gamma function,

J_n = the Bessel function of order n,

$Z_{ij}/\rho c A'$ = normalized mutual-radiation-impedance coefficient between two circular pistons. Where p and c are the density and the speed of sound in the medium.

The computer program MUTIMP evaluates the real and imaginary parts of Pritchard's equation separately. The functional values for the spherical Bessel functions (j_n) were evaluated in Subroutine SPESF, the values for the Bessel function (J_n) were evaluated in Subroutine JN. The spherical Neumann functions (y_n) were evaluated in Subroutine SPHYN (2).

The equation used to obtain the self impedance is

$$Z_{ii} = R_1(2ka) + i\, X_1(2ka),$$

where

$$R_1(x) = 1 - [2J_1(x)/x] ,$$

$$X_1(x) = 2H_1(x)/x .$$

$H_1(x)$ is the Struve function of order 1. When $0 \leq x < 13$, $H_1(x)$ is calculated using equation 12.1.5 in the Handbook of Mathematical Functions (3):

$$H_1(x) = \frac{2}{\pi}\left[\frac{x^2}{1^2\cdot 3} - \frac{x^4}{1^2\cdot 3^2\cdot 5} + \frac{x^6}{1^2\cdot 3^2\cdot 5^2\cdot 7} - \frac{x^8}{1^2\cdot 3^2\cdot 5^2\cdot 7^2\cdot 9} + \cdots\right].$$

For $x \geq 13$, $H_1(x)$ is calculated using equation 12.1.31 in Ref. 3:

$$H_1(x) \approx Y_1(x) + \frac{2}{\pi}\left[1 + \frac{1}{x^2} - \frac{1^2\cdot 3}{x^4} + \frac{1^2\cdot 3^2\cdot 5}{x^6} - \cdots\right].$$

Here $Y_1(x)$ is the Neumann function and is evaluated from the asymptotic form given by Watson (4):

$$Y_1(x) \approx -\sqrt{\frac{2}{\pi x}}\cos\left(x - \frac{\pi}{4}\right)\left[1 - \frac{(1^2-4)(3^2-4)}{2!\,(8x)^2} + \frac{(1^2-4)(3^2-4)(5^2-4)(7^2-4)}{4!\,(8x)^4} - \cdots\right]$$

$$-\sqrt{\frac{2}{\pi x}}\sin\left(x - \frac{\pi}{4}\right)\left[\frac{(1^2-4)}{1!\,(8x)} - \frac{(1^2-4)(3^2-4)(5^2-4)}{3!\,(8x)^3} + \cdots\right] .$$

The Bessel function of order one, used in the calculation of the real part of the self impedance, is calculated in double precision to minimize possible subtraction errors. When the argument is less than 19, a series expansion

$$J_1(x) = -\sum_{k=1}^{\infty} (-1)^k \left(\frac{x}{2}\right)^{2k-1} \Big/ (k!\,(k-1)!)$$

is used; otherwise the following asymptotic expansion, as found on page 195 of Watson is used:

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$$J_1(x) \approx \sqrt{\frac{2}{\pi x}}\left[P^{(1)}(x)\cos\left(x - \frac{3\pi}{4}\right) - Q^{(1)}(x)\sin\left(x - \frac{3\pi}{4}\right)\right],$$

where

$$P^{(1)}(x) = 1 + \sum_{k=1}^{\infty} \frac{(-1)^k (4-1^2)(4-3^2)(4-5^2)\ldots[4-(4k-1)^2]}{(2k)!\ 2^{6k}\ x^{2k}}$$

$$Q^{(1)}(x) = \sum_{k=1}^{\infty} \frac{(-1)^{k+1}(4-1^2)(4-3^2)\ldots[4-(4k-3)^2]}{(2k-1)!\ 2^{6k-3}\ x^{2k-1}}.$$

The values of $P^{(1)}$ and $Q^{(1)}$ are calculated in subroutines DPSUBV and DQSUBV (5).

USE OF COMPUTER PROGRAM MUTIMP

MUTIMP calculates in single precision the self-impedance and the mutual impedance coefficients for a $n \times m$ array of identical circular pistons in a plane infinite rigid baffle. The spacing between rows is fixed and the spacing between columns is fixed. For a given velocity distribution the total impedance on each element and the average of these total impedances are calculated. The program was written in Fortran IV for use on the NRL CDC 3800 computer.

INPUT/OUTPUT

The input for MUTIMP is provided by reading a single card. The statement READ A, DH, DV, F, NHOR, NVER, NOUNFV reads in the following variables:

A, the radius of the piston, is a floating point variable punched in columns 1 through 15.

DH and DV are the horizontal and vertical spacing between pistons. They are floating point variables punched in columns 16 through 30 and 31 through 45.

F is the frequency at which the pistons are driven. It is a floating point number punched in columns 46 through 60.

NHOR and NVER are integer variables punched in columns 61, 62, 63 and 64, 65, 66 respectively. NHOR is the number of pistons per row, NVER is the number of pistons per column.

NOUNFV is an integer variable punched in column 67. It is an identifier equal to 1 when the velocity distribution is nonuniform and equal to 0 when the velocity distribution is uniform. When NOUNFV equals 1, the velocities must be stored in the array VELC. When NOUNFV equals 0, the velocities are taken to be equal to unity.

The output is printed in the form of tables. The print statement is located at the end of the program. Warning messages are printed if convergence is not obtained. These messages are suppressed during calculation of the reactive part of the mutual impedance coefficient when $kd = 2ka$.

USE OF TABLES

There are two distinct tables. Table 1 lists the mutual acoustic radiation impedance coefficients normalized by ρcA as a function of kd for the fixed ka stated on each page, where $k = 2\pi/\lambda$, a is the radius of each element, $A = \pi a^2$, and d is the distance from the center of one element to the center of the next element. The self impedance for that value of ka is also listed, and a variable called AVE, defined in the next paragraph, is printed. Table 2 lists only the self impedances for circular disks radiating in a plane infinite rigid baffle as a function of ka. The complex mutual-impedance coefficients are calculated for $kd = nka$, where $n = 2, 3, 4, \ldots, 151$.

If Z_i represents the total impedance on the ith element, then we define

$$AVE = \sum_{i=1}^{151} Z_i/151.$$

AVE, unlike the other variables listed, is associated with a specific array. This array is a line array, one by 151, of identical circular elements (the ka of each element being the ka listed on that page) with each piston tangent to its neighbors. The array is located in a plane infinite rigid baffle, and all elements are assumed to vibrate with unit velocity. The mass density ρ and the velocity of sound c were chosen to be 1 g/cm^3 and 1.55×10^5 cm/sec respectively.

ACCURACY AND CHECKING PROCEDURES

The results printed are good to seven decimal digits, with the exception of the impedance coefficients associated with $kd = 2ka$. For this case the value of the resistance is accurate to seven decimal digits but the value of the reactance is generally accurate to four decimal digits. For the reactance, the ratio of the last term in the summation to the total summation is of order 10^{-8} and of order 10^{-9} when the pistons are touching. Since the accuracy of AVE is no greater than that of each mutual impedance, only five significant figures are printed.

Unfortunately there are few values with which to compare results. The self impedances were checked against those tabulated in Kinsler and Frey (6), and self and mutual impedances were compared to those obtained by Hanish (7). A hand calculation was performed on the mutual impedance coefficients for $ka = 0.02$, $kd = 2.00$. This check agreed to the number of digits printed in the table. Another hand calculation was made on the real part of the mutual impedance coefficient when $ka = 2.00$, $kd = 100.0$. The agreement was three significant figures after summing 15 terms of the series.

When the radii of the pistons are much smaller than the wavelength, and when the separation between the pistons is large with respect to the radius, Pritchard points out that one may neglect the terms that contain a/d to powers higher than zero. For this limiting case $J_1(ka)$ can be replaced by $(1/2)ka$ and $\zeta^{(2)}_0(ka)$ can be replaced by

$$(\sin kd)/kd + i\,(\cos kd)/kd,$$

where $i = \sqrt{-1}$. Hence when $(ka)^2 << 1$ and $a/d << 1$, we see that

$$\frac{Z_{ij}}{\rho cA} \approx \frac{(ka)^2}{2}\left[\frac{\sin(kd)}{kd} + \frac{i\cos(kd)}{kd}\right].$$

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Using the above approximation for $ka = 0.02$, $kd = 3.00$ we get $9.4079 \times 10^{-6} + i\, 6.599 \times 10^{-5}$, which agrees with the tabulated values to three and four significant figures for the resistance and reactance respectively.

A number of functional values delivered by the subroutines of MUTIMP were checked either with a hand calculation or else compared to previously published values.

As a final check an integral formulation due to Pritchard (8) was programmed using Simpson's 1/3 rule. Comparison of answers indicated that the values listed in the tables are accurate.

REFERENCES

1. Pritchard, R.L., "Directivity of Acoustic Linear Point Arrays," Appendix C, Technical Memorandum 21, Harvard University Acoustics Research Laboratory, Jan. 15, 1951

2. Mason, J.P., and Baier, R.V., "Fortran Subroutines to Evaluate, in Single Precision, Bessel Functions of the First and Second Kinds for Integer or Fractional Orders and Positive Real Arguments," NRL Memorandum Report 1977, NRL Computer Bulletin 8, Dec. 1968

3. Abramowitz, M. and Stegun, I.A., eds., "Handbook of Mathematical Functions with Formulas, Graphs, and Mathematical Tables," National Bureau of Standards, June 1964

4. Watson, G.N., "A Treatise on the Theory of Bessel Functions," Cambridge:University Press, Chap. VII, 1944

5. Mason, J.P., "A Fortran Subroutine to Evaluate, in Double Precision, Bessel Functions of the First and Second Kinds for Orders Zero and One, Using Positive Real Arguments," NRL Memorandum Report 1976, NRL Computer Bulletin 7, Dec. 1968

6. Kinsler, L.E., and Frey, A.R., "Fundamentals of Acoustics," New York:Wiley, 1950, 2nd ed., 1962

7. Hanish, S., "The Mechanical Self Resistance and the Mechanical Mutual Resistance of an Unbaffled Rigid Disk ($ka < 1$) Radiating Sound from a Single Face into an Acoustic Medium," NRL Report 5538, Oct. 24, 1960

8. Pritchard, R.L., "Mutual Acoustic Impedance between Radiators in an Infinite Rigid Plane," J. Acoust. Soc. Am. 32:730-737 (1960)

MUTUAL RADIATION IMPEDANCE
KA = 0.02

SELF IMPEDANCE = 1.999867-004+J1.697472-002 AVE = 2.3637-002+J7.8561-002

KD	RE	IM	KD	RE	IM	KD	RE	IM
0.04	1.999333-004	5.439770-003	1.04	1.658364-004	9.736527-005	2.04	8.743952-005	-4.432334-005
0.06	1.998667-004	3.431389-003	1.06	1.645849-004	9.225453-005	2.06	8.569541-005	-4.561596-005
0.08	1.997734-004	2.533467-003	1.08	1.633151-004	8.729691-005	2.08	8.395089-005	-4.686564-005
0.10	1.996535-004	2.010706-003	1.10	1.620274-004	8.248533-005	2.10	8.220635-005	-4.807295-005
0.12	1.995071-004	1.666487-003	1.12	1.607220-004	7.781321-005	2.12	8.046215-005	-4.923843-005
0.14	1.993340-004	1.421956-003	1.14	1.593993-004	7.327449-005	2.14	7.871867-005	-5.036261-005
0.16	1.991345-004	1.238929-003	1.16	1.580595-004	6.886350-005	2.16	7.697628-005	-5.144602-005
0.18	1.989085-004	1.096575-003	1.18	1.567030-004	6.457499-005	2.18	7.523536-005	-5.248915-005
0.20	1.986561-004	9.825418-004	1.20	1.553301-004	6.040406-005	2.20	7.349627-005	-5.349252-005
0.22	1.983774-004	8.890287-004	1.22	1.539410-004	5.634614-005	2.22	7.175939-005	-5.445659-005
0.24	1.980723-004	8.108647-004	1.24	1.525362-004	5.239697-005	2.24	7.002507-005	-5.538187-005
0.26	1.977411-004	7.444846-004	1.26	1.511160-004	4.855257-005	2.26	6.829369-005	-5.626881-005
0.28	1.973838-004	6.873500-004	1.28	1.496806-004	4.480920-005	2.28	6.656561-005	-5.711788-005
0.30	1.970004-004	6.376037-004	1.30	1.482305-004	4.116339-005	2.30	6.484119-005	-5.792953-005
0.32	1.965910-004	5.938559-004	1.32	1.467659-004	3.761186-005	2.32	6.312079-005	-5.870421-005
0.34	1.961559-004	5.550452-004	1.34	1.452872-004	3.415154-005	2.34	6.140477-005	-5.944237-005
0.36	1.956949-004	5.203475-004	1.36	1.437948-004	3.077955-005	2.36	5.969348-005	-6.014445-005
0.38	1.952083-004	4.891128-004	1.38	1.422889-004	2.749319-005	2.38	5.798727-005	-6.081086-005
0.40	1.946963-004	4.608217-004	1.40	1.407699-004	2.428989-005	2.40	5.628651-005	-6.144205-005
0.42	1.941588-004	4.350541-004	1.42	1.392382-004	2.116726-005	2.42	5.459152-005	-6.203843-005
0.44	1.935960-004	4.114665-004	1.44	1.376942-004	1.812303-005	2.44	5.290267-005	-6.260043-005
0.46	1.930081-004	3.897755-004	1.46	1.361381-004	1.515507-005	2.46	5.122029-005	-6.312844-005
0.48	1.923953-004	3.697450-004	1.48	1.345704-004	1.226135-005	2.48	4.954473-005	-6.362290-005
0.50	1.917575-004	3.511769-004	1.50	1.329913-004	9.439970-006	2.50	4.787631-005	-6.408419-005
0.52	1.910951-004	3.339036-004	1.52	1.314013-004	6.689120-006	2.52	4.621538-005	-6.451273-005
0.54	1.904082-004	3.177825-004	1.54	1.298008-004	4.007089-006	2.54	4.456227-005	-6.490892-005
0.56	1.896968-004	3.026914-004	1.56	1.281900-004	1.392254-006	2.56	4.291731-005	-6.527316-005
0.58	1.889613-004	2.885250-004	1.58	1.265694-004	-1.156924-006	2.58	4.128081-005	-6.560585-005
0.60	1.882018-004	2.751922-004	1.60	1.249393-004	-3.641908-006	2.60	3.965311-005	-6.590738-005
0.62	1.874184-004	2.626138-004	1.62	1.233001-004	-6.064089-006	2.62	3.803452-005	-6.617814-005
0.64	1.866113-004	2.507203-004	1.64	1.216522-004	-8.424789-006	2.64	3.642535-005	-6.641853-005
0.66	1.857808-004	2.394508-004	1.66	1.199959-004	-1.072527-005	2.66	3.482593-005	-6.662893-005
0.68	1.849270-004	2.287517-004	1.68	1.183316-004	-1.296673-005	2.68	3.323655-005	-6.680975-005
0.70	1.840501-004	2.185754-004	1.70	1.166597-004	-1.515032-005	2.70	3.165752-005	-6.696136-005
0.72	1.831504-004	2.088798-004	1.72	1.149806-004	-1.727714-005	2.72	3.008914-005	-6.708415-005
0.74	1.822281-004	1.996272-004	1.74	1.132946-004	-1.934822-005	2.74	2.853171-005	-6.717851-005
0.76	1.812833-004	1.907842-004	1.76	1.116021-004	-2.136458-005	2.76	2.698553-005	-6.724483-005
0.78	1.803163-004	1.823204-004	1.78	1.099035-004	-2.332717-005	2.78	2.545088-005	-6.728348-005
0.80	1.793273-004	1.742089-004	1.80	1.081992-004	-2.523692-005	2.80	2.392804-005	-6.729487-005
0.82	1.783166-004	1.664253-004	1.82	1.064896-004	-2.709471-005	2.82	2.241730-005	-6.727937-005
0.84	1.772845-004	1.589475-004	1.84	1.047749-004	-2.890139-005	2.84	2.091894-005	-6.723736-005
0.86	1.762310-004	1.517555-004	1.86	1.030558-004	-3.065777-005	2.86	1.943323-005	-6.716923-005
0.88	1.751566-004	1.448312-004	1.88	1.013323-004	-3.236465-005	2.88	1.796043-005	-6.707537-005
0.90	1.740614-004	1.381581-004	1.90	9.960513-005	-3.402278-005	2.90	1.650081-005	-6.695616-005
0.92	1.729457-004	1.317212-004	1.92	9.787446-005	-3.563289-005	2.92	1.505463-005	-6.681199-005
0.94	1.718098-004	1.255068-004	1.94	9.614074-005	-3.719570-005	2.94	1.362215-005	-6.664323-005
0.96	1.706539-004	1.195021-004	1.96	9.440433-005	-3.871189-005	2.96	1.220361-005	-6.645028-005
0.98	1.694784-004	1.136958-004	1.98	9.266563-005	-4.018211-005	2.98	1.079927-005	-6.623351-005
1.00	1.682834-004	1.080773-004	2.00	9.092500-005	-4.160702-005	3.00	9.409364-006	-6.599332-005
1.02	1.670693-004	1.026368-004	2.02	8.918284-005	-4.298722-005	3.02	8.034127-006	-6.573009-005

MUTUAL RADIATION IMPEDANCE
KA = 0.04

SELF IMPEDANCE = 7.997867-004+J3.393857-002 AVE = 5.5484-002+J1.2539-001

KD	RE	IM	KD	RE	IM	KD	RE	IM
0.08	7.989339-004	1.085402-002	2.08	3.357532-004	-1.873709-004	4.08	-1.580895-004	-1.158687-004
0.12	7.978687-004	6.825833-003	2.12	3.218014-004	-1.968622-004	4.12	-1.610180-004	-1.083912-004
0.16	7.963788-004	5.018324-003	2.16	3.078612-004	-2.056928-004	4.16	-1.636350-004	-1.008859-004
0.20	7.944657-004	3.961081-003	2.20	2.939443-004	-2.138790-004	4.20	-1.659429-004	-9.336359-005
0.24	7.921312-004	3.260930-003	2.24	2.800627-004	-2.214367-004	4.24	-1.679443-004	-8.583529-005
0.28	7.893776-004	2.760198-003	2.28	2.662280-004	-2.283811-004	4.28	-1.696420-004	-7.831168-005
0.32	7.862074-004	2.382538-003	2.32	2.524519-004	-2.347268-004	4.32	-1.710394-004	-7.080328-005
0.36	7.826238-004	2.086308-003	2.36	2.387457-004	-2.404882-004	4.36	-1.721401-004	-6.332042-005
0.40	7.786391-004	1.846816-003	2.40	2.251209-004	-2.456791-004	4.40	-1.729479-004	-5.587323-005
0.44	7.742303-004	1.648477-003	2.44	2.115887-004	-2.503132-004	4.44	-1.734669-004	-4.847166-005
0.48	7.694284-004	1.480960-003	2.48	1.981599-004	-2.544037-004	4.48	-1.737015-004	-4.112541-005
0.52	7.642290-004	1.337148-003	2.52	1.848455-004	-2.579637-004	4.52	-1.736566-004	-3.384397-005
0.56	7.586373-004	1.211975-003	2.56	1.716562-004	-2.610062-004	4.56	-1.733371-004	-2.663662-005
0.60	7.526584-004	1.101738-003	2.60	1.586023-004	-2.635438-004	4.60	-1.727483-004	-1.951238-005
0.64	7.462981-004	1.003669-003	2.64	1.456942-004	-2.655893-004	4.64	-1.718956-004	-1.248003-005
0.68	7.395624-004	9.156553-004	2.68	1.329418-004	-2.671551-004	4.68	-1.707848-004	-5.548096-006
0.72	7.324578-004	8.360596-004	2.72	1.203549-004	-2.682537-004	4.72	-1.694220-004	1.275139-006
0.76	7.249911-004	7.635920-004	2.76	1.079432-004	-2.688975-004	4.76	-1.678133-004	7.981668-006
0.80	7.171692-004	6.972236-004	2.80	9.571595-005	-2.690988-004	4.80	-1.659651-004	1.456375-005
0.84	7.089996-004	6.361238-004	2.84	8.368218-005	-2.688699-004	4.84	-1.638842-004	2.101393-005
0.88	7.004901-004	5.796152-004	2.88	7.185070-005	-2.682232-004	4.88	-1.615774-004	2.732502-005
0.92	6.916487-004	5.271399-004	2.92	6.023004-005	-2.671710-004	4.92	-1.590517-004	3.349012-005
0.96	6.824838-004	4.782346-004	2.96	4.882843-005	-2.657255-004	4.96	-1.563143-004	3.950264-005
1.00	6.730039-004	4.325116-004	3.00	3.765382-005	-2.638991-004	5.00	-1.533726-004	4.535625-005
1.04	6.632181-004	3.896440-004	3.04	2.671387-005	-2.617041-004	5.04	-1.502342-004	5.104496-005
1.08	6.531355-004	3.493545-004	3.08	1.601592-005	-2.591529-004	5.08	-1.469068-004	5.656307-005
1.12	6.427656-004	3.114064-004	3.12	5.567021-006	-2.562578-004	5.12	-1.433982-004	6.190516-005
1.16	6.321181-004	2.755965-004	3.16	-4.626112-006	-2.530312-004	5.16	-1.397163-004	6.706615-005
1.20	6.212029-004	2.417496-004	3.20	-1.455708-005	-2.494854-004	5.20	-1.358693-004	7.204127-005
1.24	6.100303-004	2.097137-004	3.24	-2.421980-005	-2.456331-004	5.24	-1.318653-004	7.682606-005
1.28	5.986106-004	1.793563-004	3.28	-3.360855-005	-2.414865-004	5.28	-1.277126-004	8.141637-005
1.32	5.869544-004	1.505617-004	3.32	-4.271791-005	-2.370581-004	5.32	-1.234196-004	8.580838-005
1.36	5.750726-004	1.232282-004	3.36	-5.154283-005	-2.323604-004	5.36	-1.189947-004	8.999858-005
1.40	5.629761-004	9.726602-005	3.40	-6.007859-005	-2.274059-004	5.40	-1.144464-004	9.398378-005
1.44	5.506760-004	7.259568-005	3.44	-6.832082-005	-2.222070-004	5.44	-1.097832-004	9.776112-005
1.48	5.381837-004	4.914658-005	3.48	-7.626551-005	-2.167762-004	5.48	-1.050137-004	1.013281-004
1.52	5.255107-004	2.685572-005	3.52	-8.390899-005	-2.111260-004	5.52	-1.001466-004	1.046824-004
1.56	5.126684-004	5.666688-006	3.56	-9.124795-005	-2.052688-004	5.56	-9.519048-005	1.078221-004
1.60	4.996686-004	-1.447122-005	3.60	-9.827944-005	-1.992170-004	5.60	-9.015394-005	1.107458-004
1.64	4.865232-004	-3.360376-005	3.64	-1.050009-004	-1.929830-004	5.64	-8.504564-005	1.134520-004
1.68	4.732440-004	-5.177232-005	3.68	-1.114100-004	-1.865792-004	5.68	-7.987418-005	1.159400-004
1.72	4.598430-004	-6.901457-005	3.72	-1.175050-004	-1.800177-004	5.72	-7.464817-005	1.182089-004
1.76	4.463323-004	-8.536484-005	3.76	-1.232843-004	-1.733110-004	5.76	-6.937614-005	1.202585-004
1.80	4.327239-004	-1.008546-004	3.80	-1.287467-004	-1.664711-004	5.80	-6.406661-005	1.220888-004
1.84	4.190301-004	-1.155128-004	3.84	-1.338915-004	-1.595101-004	5.84	-5.872803-005	1.237000-004
1.88	4.052629-004	-1.293660-004	3.88	-1.387182-004	-1.524402-004	5.88	-5.336876-005	1.250928-004
1.92	3.914345-004	-1.424392-004	3.92	-1.432268-004	-1.452731-004	5.92	-4.799712-005	1.262679-004
1.96	3.775572-004	-1.547554-004	3.96	-1.474174-004	-1.380207-004	5.96	-4.262131-005	1.272267-004
2.00	3.636432-004	-1.663361-004	4.00	-1.512907-004	-1.306948-004	6.00	-3.724945-005	1.279704-004
2.04	3.497044-004	-1.772015-004	4.04	-1.548476-004	-1.233070-004	6.04	-3.188954-005	1.285010-004

UNCLASSIFIED

MUTUAL RADIATION IMPEDANCE
KA = 0.06

SELF IMPEDANCE = 1.798920-003+J5.088071-002 AVE = 8.4261-002+J1.6555-001

KD	RE	IM	KD	RE	IM	KD	RE	IM
0.12	1.794607-003	1.621733-002	3.12	1.261259-005	-5.763193-004	6.12	-4.778375-005	2.899491-004
0.18	1.789223-003	1.014666-002	3.18	-2.155703-005	-5.651678-004	6.18	-3.001655-005	2.894548-004
0.24	1.781702-003	7.406546-003	3.24	-5.438461-005	-5.524328-004	6.24	-1.248405-005	2.879382-004
0.30	1.772061-003	5.791881-003	3.30	-8.582596-005	-5.382086-004	6.30	4.758975-006	2.854240-004
0.36	1.760319-003	4.713109-003	3.36	-1.158407-004	-5.225899-004	6.36	2.165967-005	2.819398-004
0.42	1.746503-003	3.933854-003	3.42	-1.443924-004	-5.056713-004	6.42	3.816722-005	2.775154-004
0.48	1.730641-003	3.339695-003	3.48	-1.714486-004	-4.875475-004	6.48	5.423296-005	2.721834-004
0.54	1.712769-003	2.868256-003	3.54	-1.969808-004	-4.683130-004	6.54	6.981050-005	2.659786-004
0.60	1.692924-003	2.482580-003	3.60	-2.209645-004	-4.480622-004	6.60	8.485582-005	2.589381-004
0.66	1.671149-003	2.159360-003	3.66	-2.433793-004	-4.268892-004	6.66	9.932739-005	2.511009-004
0.72	1.647491-003	1.883174-003	3.72	-2.642091-004	-4.048875-004	6.72	1.131862-004	2.425080-004
0.78	1.622000-003	1.643411-003	3.78	-2.834417-004	-3.821503-004	6.78	1.263960-004	2.332021-004
0.84	1.594731-003	1.432537-003	3.84	-3.010688-004	-3.587698-004	6.84	1.389231-004	2.232276-004
0.90	1.565742-003	1.245058-003	3.90	-3.170864-004	-3.348373-004	6.90	1.507367-004	2.126301-004
0.96	1.535094-003	1.076879-003	3.96	-3.314946-004	-3.104432-004	6.96	1.618087-004	2.014566-004
1.02	1.502853-003	9.248862-004	4.02	-3.442973-004	-2.856767-004	7.02	1.721141-004	1.897554-004
1.08	1.469087-003	7.866749-004	4.08	-3.555023-004	-2.606256-004	7.08	1.816306-004	1.775753-004
1.14	1.433866-003	6.603582-004	4.14	-3.651215-004	-2.353763-004	7.14	1.903390-004	1.649661-004
1.20	1.397267-003	5.444377-004	4.20	-3.731704-004	-2.100135-004	7.20	1.982229-004	1.519784-004
1.26	1.359364-003	4.377088-004	4.26	-3.796684-004	-1.846199-004	7.26	2.052690-004	1.386629-004
1.32	1.320238-003	3.391932-004	4.32	-3.846382-004	-1.592765-004	7.32	2.114668-004	1.250708-004
1.38	1.279970-003	2.480880-004	4.38	-3.881064-004	-1.340622-004	7.38	2.168089-004	1.112531-004
1.44	1.238644-003	1.637290-004	4.44	-3.901029-004	-1.090534-004	7.44	2.212909-004	9.726123-005
1.50	1.196345-003	8.556095-005	4.50	-3.906608-004	-8.432436-005	7.50	2.249111-004	8.314595-005
1.56	1.153160-003	1.311652-005	4.56	-3.898164-004	-5.994664-005	7.56	2.276708-004	6.895787-005
1.62	1.109179-003	-5.400139-005	4.62	-3.876091-004	-3.598922-005	7.62	2.295741-004	5.474700-005
1.68	1.064490-003	-1.161329-004	4.68	-3.840812-004	-1.251831-005	7.68	2.306278-004	4.056269-005
1.74	1.019185-003	-1.735716-004	4.74	-3.792777-004	1.040282-005	7.74	2.308416-004	2.645344-005
1.80	9.733554-004	-2.265737-004	4.80	-3.732464-004	3.271388-005	7.80	2.302277-004	1.246680-005
1.86	9.270930-004	-2.753639-004	4.86	-3.660371-004	5.435769-005	7.86	2.288009-004	-1.350821-006
1.92	8.804903-004	-3.201420-004	4.92	-3.577024-004	7.528029-005	7.92	2.265786-004	-1.495425-005
1.98	8.336399-004	-3.610865-004	4.98	-3.482965-004	9.543099-005	7.98	2.235803-004	-2.829970-005
2.04	7.866339-004	-3.983590-004	5.04	-3.378760-004	1.147625-004	8.04	2.198280-004	-4.134485-005
2.10	7.395644-004	-4.321070-004	5.10	-3.264990-004	1.332309-004	8.10	2.153461-004	-5.404904-005
2.16	6.925227-004	-4.624666-004	5.16	-3.142251-004	1.507958-004	8.16	2.101608-004	-6.637331-005
2.22	6.455993-004	-4.895641-004	5.22	-3.011154-004	1.674204-004	8.22	2.043003-004	-7.828051-005
2.28	5.988839-004	-5.135186-004	5.28	-2.872322-004	1.830713-004	8.28	1.977948-004	-8.973545-005
2.34	5.524645-004	-5.344426-004	5.34	-2.726389-004	1.977191-004	8.34	1.906761-004	-1.007049-004
2.40	5.064280-004	-5.524441-004	5.40	-2.573996-004	2.113376-004	8.40	1.829778-004	-1.111578-004
2.46	4.608596-004	-5.676267-004	5.46	-2.415790-004	2.239045-004	8.46	1.747349-004	-1.210653-004
2.52	4.158425-004	-5.800913-004	5.52	-2.252423-004	2.354010-004	8.52	1.659836-004	-1.304005-004
2.58	3.714578-004	-5.899361-004	5.58	-2.084550-004	2.458122-004	8.58	1.567615-004	-1.391391-004
2.64	3.277847-004	-5.972579-004	5.64	-1.912827-004	2.551265-004	8.64	1.471072-004	-1.472591-004
2.70	2.848996-004	-6.021519-004	5.70	-1.737906-004	2.633362-004	8.70	1.370603-004	-1.547487-004
2.76	2.428764-004	-6.047125-004	5.76	-1.560441-004	2.704369-004	8.76	1.266611-004	-1.615668-004
2.82	2.017864-004	-6.050337-004	5.82	-1.381077-004	2.764279-004	8.82	1.159507-004	-1.677224-004
2.88	1.616978-004	-6.032088-004	5.88	-1.200453-004	2.813119-004	8.88	1.049705-004	-1.731953-004
2.94	1.226758-004	-5.993315-004	5.94	-1.019202-004	2.850950-004	8.94	9.376246-005	-1.779756-004
3.00	8.478242-005	-5.934950-004	6.00	-8.379451-005	2.877866-004	9.00	8.236867-005	-1.820559-004
3.06	4.807628-005	-5.857931-004	6.06	-6.572913-005	2.893993-004	9.06	7.083130-005	-1.854313-004

MUTUAL RADIATION IMPEDANCE
KA = 0.08

SELF IMPEDANCE = 3.196588-003+J6.779030-002 AVE = 1.1365-001+J1.9636-001

KD	RE	IM	KD	RE	IM	KD	RE	IM
0.16	3.182970-003	2.150448-002	4.16	-6.536839-004	-4.032760-004	8.16	3.733717-004	-1.178836-004
0.24	3.165996-003	1.335773-002	4.24	-6.709188-004	-3.431422-004	8.24	3.592346-004	-1.459145-004
0.32	3.142324-003	9.651263-003	4.32	-6.833024-004	-2.830815-004	8.32	3.430934-004	-1.724820-004
0.40	3.112043-003	7.446009-003	4.40	-6.909435-004	-2.234273-004	8.40	3.250859-004	-1.974505-004
0.48	3.075272-003	5.956408-003	4.48	-6.939701-004	-1.645001-004	8.48	3.053583-004	-2.206967-004
0.56	3.032149-003	4.867652-003	4.56	-6.925287-004	-1.066072-004	8.56	2.840644-004	-2.421098-004
0.64	2.982839-003	4.027480-003	4.64	-6.867830-004	-5.004073-005	8.64	2.613645-004	-2.615920-004
0.72	2.927531-003	3.352996-003	4.72	-6.769128-004	4.922514-006	8.72	2.374246-004	-2.790586-004
0.80	2.866435-003	2.795166-003	4.80	-6.631133-004	5.802229-005	8.80	2.124150-004	-2.944388-004
0.88	2.799782-003	2.323146-003	4.88	-6.455936-004	1.090156-004	8.88	1.865095-004	-3.076753-004
0.96	2.727825-003	1.916581-003	4.96	-6.245757-004	1.576775-004	8.96	1.598843-004	-3.187249-004
1.04	2.650836-003	1.561519-003	5.04	-6.002929-004	2.038016-004	9.04	1.327166-004	-3.275581-004
1.12	2.569104-003	1.248093-003	5.12	-5.729888-004	2.472006-004	9.12	1.051840-004	-3.341593-004
1.20	2.482935-003	9.691402-004	5.20	-5.429158-004	2.877069-004	9.20	7.746332-005	-3.385268-004
1.28	2.392652-003	7.193430-004	5.28	-5.103336-004	3.251728-004	9.28	4.972935-005	-3.406722-004
1.36	2.298589-003	4.946770-004	5.36	-4.755082-004	3.594710-004	9.36	2.215409-005	-3.406202-004
1.44	2.201095-003	2.920425-004	5.44	-4.387100-004	3.904944-004	9.44	-5.094281-006	-3.384088-004
1.52	2.100528-003	1.090127-004	5.52	-4.002127-004	4.181566-004	9.52	-3.185236-005	-3.340879-004
1.60	1.997257-003	-5.634095-005	5.60	-3.602918-004	4.423915-004	9.60	-5.796238-005	-3.277198-004
1.68	1.891658-003	-2.055747-004	5.68	-3.192233-004	4.631534-004	9.68	-8.327311-005	-3.193779-004
1.76	1.784112-003	-3.399631-004	5.76	-2.772819-004	4.804167-004	9.76	-1.076406-004	-3.091466-004
1.84	1.675005-003	-4.605661-004	5.84	-2.347402-004	4.941758-004	9.84	-1.309288-004	-2.971201-004
1.92	1.564726-003	-5.682793-004	5.92	-1.918671-004	5.044443-004	9.92	-1.530107-004	-2.834023-004
2.00	1.453663-003	-6.638721-004	6.00	-1.489263-004	5.112550-004	10.00	-1.737683-004	-2.681057-004
2.08	1.342206-003	-7.480168-004	6.08	-1.061756-004	5.146589-004	10.08	-1.930936-004	-2.513504-004
2.16	1.230741-003	-8.213111-004	6.16	-6.386502-005	5.147248-004	10.16	-2.108892-004	-2.332639-004
2.24	1.119649-003	-8.842956-004	6.24	-2.223615-005	5.115385-004	10.24	-2.270682-004	-2.139795-004
2.32	1.009307-003	-9.374676-004	6.32	1.847914-005	5.052019-004	10.32	-2.415551-004	-1.936359-004
2.40	9.000824-004	-9.812918-004	6.40	5.805969-005	4.958323-004	10.40	-2.542858-004	-1.723762-004
2.48	7.923358-004	-1.016209-003	6.48	9.629601-005	4.835614-004	10.48	-2.652080-004	-1.503469-004
2.56	6.864161-004	-1.042641-003	6.56	1.329911-004	4.685341-004	10.56	-2.742810-004	-1.276969-004
2.64	5.826607-004	-1.061001-003	6.64	1.679614-004	4.509079-004	10.64	-2.814763-004	-1.045768-004
2.72	4.813936-004	-1.071689-003	6.72	2.010373-004	4.308513-004	10.72	-2.867771-004	-8.113783-005
2.80	3.829244-004	-1.075104-003	6.80	2.320640-004	4.085428-004	10.80	-2.901785-004	-5.753096-005
2.88	2.875466-004	-1.071641-003	6.88	2.609018-004	3.841702-004	10.88	-2.916873-004	-3.390595-005
2.96	1.955370-004	-1.061693-003	6.96	2.874268-004	3.579286-004	10.96	-2.913219-004	-1.041054-005
3.04	1.071543-004	-1.045654-003	7.04	3.115311-004	3.300198-004	11.04	-2.891117-004	1.281046-005
3.12	2.263828-005	-1.023919-003	7.12	3.331232-004	3.006508-004	11.12	-2.850973-004	3.561597-005
3.20	-5.779113-005	-9.968833-004	7.20	3.521281-004	2.700327-004	11.20	-2.793296-004	5.786947-005
3.28	-1.339346-004	-9.649439-004	7.28	3.684875-004	2.383791-004	11.28	-2.718695-004	7.943976-005
3.36	-2.056140-004	-9.284989-004	7.36	3.821597-004	2.059053-004	11.36	-2.627877-004	1.002017-004
3.44	-2.726732-004	-8.879471-004	7.44	3.931194-004	1.728270-004	11.44	-2.521637-004	1.200367-004
3.52	-3.349780-004	-8.436871-004	7.52	4.013579-004	1.393588-004	11.52	-2.400854-004	1.388337-004
3.60	-3.924170-004	-7.961169-004	7.60	4.068825-004	1.057131-004	11.60	-2.266485-004	1.564895-004
3.68	-4.449016-004	-7.456327-004	7.68	4.097163-004	7.209920-005	11.68	-2.119559-004	1.729092-004
3.76	-4.923662-004	-6.926284-004	7.76	4.098978-004	3.872198-005	11.76	-1.961165-004	1.880070-004
3.84	-5.347678-004	-6.374943-004	7.84	4.074802-004	5.780815-006	11.84	-1.792452-004	2.017063-004
3.92	-5.720867-004	-5.806159-004	7.92	4.025312-004	-2.653143-005	11.92	-1.614614-004	2.139401-004
4.00	-6.043253-004	-5.223729-004	8.00	3.951320-004	-5.802935-005	12.00	-1.428889-004	2.246514-004
4.08	-6.315088-004	-4.631380-004	8.08	3.853767-004	-8.853598-005	12.08	-1.236543-004	2.337932-004

UNCLASSIFIED

MUTUAL RADIATION IMPEDANCE
KA = 0.10

SELF IMPEDANCE = 4,991674-003+J8,465654-002 AVE = 1,4105-001+J2,2399-001

KD	RE	IM	KD	RE	IM	KD	RE	IM
0,20	4,958473-003	2.669055-002	5,20	-8,476485-004	4.490055-004	10,20	-3.421416-004	-3.493481-004
0,30	4,917160-003	1.642371-002	5,30	-7,835129-004	5.213651-004	10,30	-3.716657-004	-3.104015-004
0,40	4,859667-003	1.170733-002	5,40	-7,140684-004	5.859304-004	10,40	-3.969440-004	-2.691321-004
0,50	4,786340-003	8,869557-003	5,50	-6,401435-004	6.423983-004	10,50	-4.178122-004	-2.259853-004
0,60	4,697616-003	6.929517-003	5,60	-5,625766-004	6.905439-004	10,60	-4.341512-004	-1.814158-004
0,70	4,594023-003	5.494512-003	5,70	-4,822087-004	7.302202-004	10,70	-4.458873-004	-1.358837-004
0,80	4,476179-003	4.374907-003	5,80	-3,998769-004	7.613566-004	10,80	-4.529919-004	-8.984970-005
0,90	4,344781-003	3.467697-003	5,90	-3,164084-004	7,839579-004	10,90	-4.554813-004	-4,377082-005
1,00	4,200607-003	2.712143-003	6,00	-2,326136-004	7.981021-004	11,00	-4.534156-004	1.903601-006
1,10	4.044504-003	2.070182-003	6,10	-1,492803-004	8.039377-004	11,10	-4.468974-004	4.673616-005
1,20	3,877389-003	1.516805-003	6,20	-6,716804-005	8.016810-004	11,20	-4.360701-004	9.030526-005
1,30	3,700236-003	1.034947-003	6,30	1.299756-005	7.916118-004	11,30	-4.211157-004	1.322088-004
1,40	3,514074-003	6.125853-004	6,40	9,052966-005	7.740705-004	11,40	-4.022528-004	1.720678-004
1,50	3,319976-003	2.410168-004	6,50	1,647850-004	7.494529-004	11,50	-3.797335-004	2.095291-004
1,60	3.119055-003	-8.622110-005	6,60	2.351681-004	7.182057-004	11,60	-3.538410-004	2.442689-004
1,70	2,912453-003	-3.740409-004	6,70	3,011349-004	6.808217-004	11,70	-3.248857-004	2.759950-004
1,80	2.701336-003	-6.262664-004	6,80	3,621963-004	6.378341-004	11,80	-2.932025-004	3.044489-004
1,90	2,486884-003	-8.459466-004	6,90	4,179206-004	5.898114-004	11,90	-2.591467-004	3.294081-004
2,00	2,270284-003	-1.035575-003	7,00	4,679360-004	5.373514-004	12,00	-2.230907-004	3.506873-004
2,10	2,052720-003	-1.197245-003	7,10	5,119323-004	4.810754-004	12,10	-1.854200-004	3.681396-004
2,20	1,835369-003	-1.332763-003	7,20	5.496618-004	4.216224-004	12,20	-1.465293-004	3.816575-004
2,30	1,619367-003	-1.443729-003	7,30	5,809401-004	3.596431-004	12,30	-1.068189-004	3.911731-004
2,40	1.405909-003	-1.531600-003	7,40	6.056464-004	2.957940-004	12,40	-6.669020-005	3.966581-004
2,50	1.196033-003	-1.597728-003	7,50	6.237224-004	2.307314-004	12,50	-2.654259-005	3.981236-004
2,60	9.988216-004	-1.643402-003	7,60	6.351721-004	1.651059-004	12,60	1.323084-005	3.956194-004
2,70	7.912870-004	-1.669866-003	7,70	6.400598-004	9.955680-005	12,70	5.224672-005	3.892328-004
2,80	5.983901-004	-1.678339-003	7,80	6.385084-004	3.470661-005	12,80	9.013498-005	3.790871-004
2,90	4.130326-004	-1.670025-003	7,90	6,306968-004	-2.884403-005	12,90	1.265422-004	3.653402-004
3,00	2.360512-004	-1.646127-003	8,00	6.168570-004	-9.052109-005	13,00	1.611345-004	3.481825-004
3,10	6.821363-005	-1.607847-003	8,10	5.972712-004	-1.497817-004	13,10	1.936010-004	3.278343-004
3,20	-8.978679-005	-1.556390-003	8,20	5.722678-004	-2.061184-004	13,20	2.236557-004	3.045435-004
3,30	-2.373343-004	-1.492968-003	8,30	5.422175-004	-2.590626-004	13,30	2.510405-004	2.785828-004
3,40	-3.738941-004	-1.418793-003	8,40	5.075292-004	-3.081882-004	13,40	2.755269-004	2.502468-004
3,50	-4.990149-004	-1.335084-003	8,50	4.686454-004	-3.531146-004	13,50	2.969178-004	2.198487-004
3,60	-6.123311-004	-1.243053-003	8,60	4.260376-004	-3.935086-004	13,60	3.150492-004	1.877171-004
3,70	-7.135635-004	-1.143910-003	8,70	3.802012-004	-4.290870-004	13,70	3.297909-004	1.541926-004
3,80	-8.025206-004	-1.038856-003	8,80	3.316507-004	-4.596180-004	13,80	3.410476-004	1.196245-004
3,90	-8.790980-004	-9.290748-004	8,90	2.809146-004	-4.849217-004	13,90	3.487591-004	8.436710-005
4,00	-9.432778-004	-8.157315-004	9,00	2.285303-004	-5.048714-004	14,00	3.529006-004	4.877643-005
4,10	-9.951277-004	-6.999654-004	9,10	1.750389-004	-5.193933-004	14,10	3.534821-004	1.320669-005
4,20	-1.034798-003	-5.828852-004	9,20	1.209805-004	-5.284659-004	14,20	3.505484-004	-2.199308-005
4,30	-1.062522-003	-4.655628-004	9,30	6.688892-005	-5.321196-004	14,30	3.441776-004	-5.648230-005
4,40	-1.078606-003	-3.490280-004	9,40	1.328702-005	-5.304351-004	14,40	3.344801-004	-8.993205-005
4,50	-1.083436-003	-2.342638-004	9,50	-3.931769-005	-5.235416-004	14,50	3.215974-004	-1.220280-004
4,60	-1.077462-003	-1.222009-004	9,60	-9.043760-005	-5.116149-004	14,60	3.056997-004	-1.524733-004
4,70	-1.061204-003	-1.371289-005	9,70	-1.396091-004	-4.948746-004	14,70	2.869847-004	-1.809913-004
4,80	-1.035239-003	9.038744-005	9,80	-1.863962-004	-4.735816-004	14,80	2.656744-004	-2.073276-004
4,90	-1.000200-003	1.893525-004	9,90	-2.303943-004	-4.480345-004	14,90	2.420134-004	-2.312528-004
5,00	-9.567665-004	2.825034-004	10,00	-2.712333-004	-4.185663-004	15,00	2.162658-004	-2.525636-004
5,10	-9.056628-004	3.692322-004	10,10	-3.085802-004	-3.855407-004	15,10	1.887127-004	-2.710854-004

MUTUAL RADIATION IMPEDANCE
KA = 0.15

SELF IMPEDANCE = 1.120789-002+J1.265620-001 AVE = 2.0769-001+J2.7502-001

KD	RE	IM	KD	RE	IM	KD	RE	IM
0.30	1.104065-002	3.905384-002	7.80	1.432200-003	7.842483-005	15.30	2.903379-004	-6.710707-004
0.45	1.083372-002	2.323225-002	7.95	1.400891-003	-1.339247-004	15.45	1.849780-004	-7.000598-004
0.60	1.054791-002	1.574770-002	8.10	1.339858-003	-3.354548-004	15.60	7.752999-005	-7.129201-004
0.75	1.018707-002	1.110588-002	8.25	1.251496-003	-5.222569-004	15.75	-2.959591-005	-7.096765-004
0.90	9.756008-003	7.843851-003	8.40	1.138683-003	-6.908647-004	15.90	-1.340420-004	-6.907059-004
1.05	9.260462-003	5.379142-003	8.55	1.004701-003	-8.383096-004	16.05	-2.335534-004	-6.567225-004
1.20	8.706981-003	3.432728-003	8.70	8.531630-004	-9.621642-004	16.20	-3.260251-004	-6.087558-004
1.35	8.102833-003	1.854564-003	8.85	6.879245-004	-1.060574-003	16.35	-4.095451-004	-5.481228-004
1.50	7.455890-003	5.570636-004	9.00	5.130012-004	-1.132279-003	16.50	-4.824321-004	-4.763940-004
1.65	6.774496-003	-5.143003-004	9.15	3.324807-004	-1.176617-003	16.65	-5.432686-004	-3.953549-004
1.80	6.067349-003	-1.395441-003	9.30	1.504373-004	-1.193523-003	16.80	-5.909264-004	-3.069631-004
1.95	5.343352-003	-2.111340-003	9.45	-2.915120-005	-1.183511-003	16.95	-6.245867-004	-2.133029-004
2.10	4.611487-003	-2.680393-003	9.60	-2.024820-004	-1.147644-003	17.10	-6.437520-004	-1.165374-004
2.25	3.880672-003	-3.116985-003	9.75	-3.660006-004	-1.087501-003	17.25	-6.482519-004	-1.886038-005
2.40	3.159625-003	-3.433071-003	9.90	-5.164674-004	-1.005125-003	17.40	-6.382409-004	7.755238-005
2.55	2.456739-003	-3.639172-003	10.05	-6.510149-004	-9.029705-004	17.55	-6.141894-004	1.705901-004
2.70	1.779952-003	-3.745005-003	10.20	-7.671975-004	-7.838379-004	17.70	-5.768687-004	2.582521-004
2.85	1.136639-003	-3.759882-003	10.35	-8.630303-004	-6.508090-004	17.85	-5.273284-004	3.386895-004
3.00	5.335025-004	-3.692947-003	10.50	-9.370177-004	-5.071730-004	18.00	-4.668694-004	4.102430-004
3.15	-2.351323-005	-3.553319-003	10.65	-9.881715-004	-3.563529-004	18.15	-3.970113-004	4.714765-004
3.30	-5.293042-004	-3.350153-003	10.80	-1.016018-003	-2.018304-004	18.30	-3.194552-004	5.212041-004
3.45	-9.796667-004	-3.092643-003	10.95	-1.020595-003	-4.707104-005	18.45	-2.360440-004	5.585128-004
3.60	-1.371345-003	-2.790002-003	11.10	-1.002435-003	1.045480-004	18.60	-1.487198-004	5.827775-004
3.75	-1.702060-003	-2.451402-003	11.25	-9.625446-004	2.498065-004	18.75	-5.947949-005	5.936702-004
3.90	-1.970523-003	-2.085903-003	11.40	-9.023704-004	3.857052-004	18.90	2.966943-005	5.911629-004
4.05	-2.176435-003	-1.702365-003	11.55	-8.237556-004	5.095232-004	19.05	1.167533-004	5.755230-004
4.20	-2.320461-003	-1.309359-003	11.70	-7.288926-004	6.188690-004	19.20	1.998748-004	5.473031-004
4.35	-2.404199-003	-9.150742-004	11.85	-6.202681-004	7.117226-004	19.35	2.772534-004	5.073243-004
4.50	-2.430126-003	-5.272206-004	12.00	-5.006027-004	7.864693-004	19.50	3.472627-004	4.566545-004
4.65	-2.401537-003	-1.529456-004	12.15	-3.727878-004	8.419246-004	19.65	4.084637-004	3.965809-004
4.80	-2.322462-003	2.012487-004	12.30	-2.398202-004	8.773485-004	19.80	4.596333-004	3.285783-004
4.95	-2.197582-003	5.295767-004	12.45	-1.047356-004	8.924513-004	19.95	4.997885-004	2.542746-004
5.10	-2.032130-003	8.270300-004	12.60	2.945660-005	8.873892-004	20.10	5.282035-004	1.754118-004
5.25	-1.831788-003	1.089425-003	12.75	1.598372-004	8.627504-004	20.25	5.444228-004	9.380719-005
5.40	-1.602570-003	1.313438-003	12.90	2.836374-004	8.195332-004	20.40	5.482665-004	1.131139-005
5.55	-1.350720-003	1.496625-003	13.05	3.982941-004	7.591149-004	20.55	5.398309-004	-7.023222-005
5.70	-1.082585-003	1.637428-003	13.20	5.015011-004	6.832145-004	20.70	5.194815-004	-1.490281-004
5.85	-8.045111-004	1.735164-003	13.35	5.912517-004	5.938478-004	20.85	4.878422-004	-2.233674-004
6.00	-5.227258-004	1.790005-003	13.50	6.658762-004	4.932780-004	21.00	4.457770-004	-2.916639-004
6.15	-2.432360-004	1.802939-003	13.65	7.240698-004	3.839619-004	21.15	3.943680-004	-3.524879-004
6.30	2.827299-005	1.775719-003	13.80	7.649129-004	2.684926-004	21.30	3.348886-004	-4.045945-004
6.45	2.865281-004	1.710804-003	13.95	7.878830-004	1.495416-004	21.45	2.687727-004	-4.469494-004
6.60	5.267495-004	1.611283-003	14.10	7.928574-004	2.979873-005	21.60	1.975808-004	-4.787479-004
6.75	7.447207-004	1.480796-003	14.25	7.801077-004	-8.808520-005	21.75	1.229642-004	-4.994301-004
6.90	9.368463-004	1.323444-003	14.40	7.502856-004	-2.015553-004	21.90	4.662702-005	-5.086893-004
7.05	1.100197-003	1.143694-003	14.55	7.044015-004	-3.082056-004	22.05	-2.971152-005	-5.064760-004
7.20	1.232540-003	9.462813-004	14.70	6.437951-004	-4.058277-004	22.20	-1.043557-004	-4.929948-004
7.35	1.332359-003	7.361065-004	14.85	5.701003-004	-4.924552-004	22.35	-1.756699-004	-4.686971-004
7.50	1.398855-003	5.181372-004	15.00	4.852036-004	-5.664005-004	22.50	-2.421143-004	-4.342673-004
7.65	1.431937-003	2.973080-004	15.15	3.911990-004	-6.262867-004	22.65	-3.022771-004	-3.906053-004

UNCLASSIFIED

MUTUAL RADIATION IMPEDANCE
KA = 0.20

SELF IMPEDANCE = 1.986711-002+J1.679627-001 AVE = 2.6865-001+J3.0957-001

KD	RE	IM	KD	RE	IM	KD	RE	IM
0.40	1.934224-002	5.026589-002	10.40	-1.575236-003	-1.069689-003	20.40	9.704413-004	2.023012-005
0.60	1.869791-002	2.842858-002	10.60	-1.723219-003	-7.215057-004	20.60	9.458420-004	-1.712952-004
0.80	1.761744-002	1.776442-002	10.80	-1.798281-003	-3.579852-004	20.80	8.843689-004	-3.523734-004
1.00	1.672171-002	1.098196-002	11.00	-1.800212-003	6.327582-006	21.00	7.891439-004	-5.160874-004
1.20	1.543651-002	6.153180-003	11.20	-1.731577-003	3.573783-004	21.20	6.645505-004	-6.563307-004
1.40	1.399183-002	2.517973-003	11.40	-1.597518-003	6.821088-004	21.40	5.160391-004	-7.680300-004
1.60	1.242104-002	-2.841750-004	11.60	-1.405483-003	9.689105-004	21.60	3.498947-004	-8.473239-004
1.80	1.075993-002	-2.446731-003	11.80	-1.164870-003	1.208010-003	21.80	1.729773-004	-8.916912-004
2.00	9.045724-003	-4.084796-003	12.00	-8.866059-004	1.391774-003	22.00	-7.556871-006	-9.000246-004
2.20	7.316065-003	-5.274251-003	12.20	-5.826960-004	1.514928-003	22.20	-1.845394-004	-8.726484-004
2.40	5.607995-003	-6.070858-003	12.40	-2.657330-004	1.574680-003	22.40	-3.510698-004	-8.112807-004
2.60	3.956964-003	-6.520204-003	12.60	5.159284-005	1.570746-003	22.60	-5.007798-004	-7.189409-004
2.80	2.395899-003	-6.663069-003	12.80	3.569755-004	1.505285-003	22.80	-6.280730-004	-5.998096-004
3.00	9.543675-004	-6.538313-003	13.00	6.389458-004	1.382743-003	23.00	-7.283298-004	-4.590449-004
3.20	-3.421483-004	-6.184332-003	13.20	8.872804-004	1.209619-003	23.20	-7.980710-004	-3.025636-004
3.40	-1.472849-003	-5.639646-003	13.40	1.093352-003	9.941549-004	23.40	-8.350741-004	-1.367978-004
3.60	-2.422064-003	-4.942946-003	13.60	1.250409-003	7.459734-004	23.60	-8.384393-004	3.156591-005
3.80	-3.179533-003	-4.132788-003	13.80	1.353781-003	4.756751-004	23.80	-8.086016-004	1.958519-004
4.00	-3.740529-003	-3.247080-003	14.00	1.400993-003	1.944060-004	24.00	-7.472924-004	3.496565-004
4.20	-4.105815-003	-2.322446-003	14.20	1.391803-003	-8.658075-005	24.20	-6.574497-004	4.870938-004
4.40	-4.281427-003	-1.393532-003	14.40	1.328147-003	-3.563571-004	24.40	-5.430833-004	6.030175-004
4.60	-4.278321-003	-4.923205-004	14.60	1.214007-003	-6.047277-004	24.60	-4.091010-004	6.932105-004
4.80	-4.111873-003	3.525143-004	14.80	1.055203-003	-8.225997-004	24.80	-2.611012-004	7.545345-004
5.00	-3.801258-003	1.116175-003	15.00	8.591235-004	-1.002301-003	25.00	-1.051432-004	7.850360-004
5.20	-3.368738-003	1.778207-003	15.20	6.344022-004	-1.137836-003	25.20	5.249775-005	7.840039-004
5.40	-2.838874-003	2.322832-003	15.40	3.905533-004	-1.225074-003	25.40	2.055796-004	7.519774-004
5.60	-2.237688-003	2.739163-003	15.60	1.375859-004	-1.261857-003	25.60	3.481373-004	6.907057-004
5.80	-1.591816-003	3.021255-003	15.80	-1.143925-004	-1.248036-003	25.80	4.747128-004	6.030604-004
6.00	-9.276590-004	3.168026-003	16.00	-3.555670-004	-1.185422-003	26.00	5.805607-004	4.929056-004
6.20	-2.705764-004	3.183030-003	16.20	-5.767845-004	-1.077676-003	26.20	6.618233-004	3.649315-004
6.40	3.558627-004	3.074102-003	16.40	-7.698899-004	-9.301152-004	26.40	7.156690-004	2.244576-004
6.60	9.305454-004	2.852885-003	16.60	-9.280162-004	-7.494738-004	26.60	7.403871-004	7.721481-005
6.80	1.435378-003	2.534250-003	16.80	-1.045818-003	-5.436083-004	26.80	7.354389-004	-7.088565-005
7.00	1.855733-003	2.135648-003	17.00	-1.119642-003	-3.211687-004	27.00	7.014608-004	-2.139868-004
7.20	2.180766-003	1.676395-003	17.20	-1.147628-003	-9.124668-005	27.20	6.402222-004	-3.465150-004
7.40	2.403598-003	1.176929-003	17.40	-1.129741-003	1.369854-004	27.40	5.545396-004	-4.633944-004
7.60	2.521360-003	6.580635-004	17.60	-1.067731-003	3.546304-004	27.60	4.481507-004	-5.602391-004
7.80	2.535107-003	1.402491-004	17.80	-9.650230-004	5.534040-004	27.80	3.255544-004	-6.335155-004
8.00	2.449594-003	-3.571155-004	18.00	-8.265501-004	7.259413-004	28.00	1.918231-004	-6.806685-004
8.20	2.272951-003	-8.163134-004	18.20	-6.585291-004	8.660615-004	28.20	5.239539-005	-7.002083-004
8.40	2.016239-003	-1.221857-003	18.40	-4.681914-004	9.689815-004	28.40	-8.714265-005	-6.917537-004
8.60	1.692940-003	-1.560939-003	18.60	-2.634816-004	1.031471-003	28.60	-2.212791-004	-6.560315-004
8.80	1.318366-003	-1.823770-003	18.80	-5.273471-005	1.051944-003	28.80	-3.447919-004	-5.948326-004
9.00	9.090416-004	-2.003806-003	19.00	1.556554-004	1.030488-003	29.00	-4.529497-004	-5.109267-004
9.20	4.820595-004	-2.097844-003	19.20	3.535625-004	9.688224-004	29.20	-5.416914-004	-4.079402-004
9.40	5.443951-005	-2.106005-003	19.40	5.334379-004	8.702004-004	29.40	-6.077766-004	-2.902020-004
9.60	-3.574827-004	-2.031597-003	19.60	6.885915-004	7.392514-004	29.60	-6.489017-004	-1.625633-004
9.80	-7.386226-004	-1.880871-003	19.80	8.134343-004	5.817726-004	29.80	-6.637782-004	-3.020038-005
10.00	-1.075649-003	-1.662675-003	20.00	9.036737-004	4.044809-004	30.00	-6.521694-004	1.015936-004
10.20	-1.357404-003	-1.388040-003	20.20	9.564544-004	2.147337-004	30.20	-6.148861-004	2.276184-004

MUTUAL RADIATION IMPEDANCE
KA = 0.25

SELF IMPEDANCE = 3.092617-002+J2.084950-001 AVE = 3.2418-001+J3.3281-001

KD	RE	IM	KD	RE	IM	KD	RE	IM
0.50	2.965624-002	5.998735-002	13.00	9.918394-004	2.148894-003	25.50	4.325101-004	1.126306-003
0.75	2.811312-002	3.159149-002	13.25	1.464523-003	1.802010-003	25.75	6.909485-004	9.747262-004
1.00	2.603350-002	1.732554-002	13.50	1.830309-003	1.357994-003	26.00	9.018678-004	7.660380-004
1.25	2.349380-002	8.144302-003	13.75	2.071042-003	8.472148-004	26.25	1.053227-003	5.141480-004
1.50	2.058637-002	1.680428-003	14.00	2.176686-003	3.029391-004	26.50	1.136861-003	2.353439-004
1.75	1.741545-002	-2.991679-003	14.25	2.145641-003	-2.407425-004	26.75	1.148904-003	-5.274501-005
2.00	1.409261-002	-6.315101-003	14.50	1.984541-003	-7.509600-004	27.00	1.089949-003	-3.322494-004
2.25	1.073197-002	-8.540614-003	14.75	1.707588-003	-1.197972-003	27.25	9.649276-004	-5.861559-004
2.50	7.445403-003	-9.836704-003	15.00	1.335454-003	-1.556827-003	27.50	7.827275-004	-7.993312-004
2.75	4.337834-003	-1.033703-002	15.25	8.938420-004	-1.808692-003	27.75	5.555808-004	-9.594124-004
3.00	1.503028-003	-1.016217-002	15.50	4.117927-004	-1.941775-003	28.00	2.982543-004	-1.057513-003
3.25	-9.800714-004	-9.429274-003	15.75	-8.015072-005	-1.951803-003	28.25	2.710182-005	-1.088706-003
3.50	-3.050237-003	-8.255661-003	16.00	-5.518119-004	-1.842045-003	28.50	-2.409636-004	-1.052253-003
3.75	-4.665974-003	-6.758898-003	16.25	-9.751727-004	-1.622885-003	28.75	-4.895146-004	-9.515755-004
4.00	-5.806582-003	-5.055042-003	16.50	-1.325982-003	-1.310981-003	29.00	-7.036055-004	-7.939778-004
4.25	-6.472231-003	-3.255850-003	16.75	-1.585097-003	-9.280858-004	29.25	-8.706622-004	-5.901286-004
4.50	-6.663075-003	-1.465564-003	17.00	-1.739474-003	-4.995930-004	29.50	-9.812104-004	-3.533529-004
4.75	-6.477460-003	2.223072-004	17.25	-1.782780-003	-5.290683-005	29.75	-1.029404-003	-9.877098-005
5.00	-5.909354-003	1.727912-003	17.50	-1.715576-003	3.842577-004	30.00	-1.013323-003	1.576578-004
5.25	-5.045122-003	2.987434-003	17.75	-1.545091-003	7.855488-004	30.25	-9.350218-004	4.001262-004
5.50	-3.959842-003	3.954780-003	18.00	-1.284601-003	1.127523-003	30.50	-8.003442-004	6.139447-004
5.75	-2.733346-003	4.602459-003	18.25	-9.524653-004	1.390977-003	30.75	-6.184979-004	7.864233-004
6.00	-1.446185-003	4.921612-003	18.50	-5.708827-004	1.561986-003	31.00	-4.014385-004	9.076165-004
6.25	-1.757349-004	4.921199-003	18.75	-1.644525-004	1.632604-003	31.25	-1.630916-004	9.708891-004
6.50	1.007391-003	4.626387-003	19.00	2.413720-004	1.601183-003	31.50	8.153198-005	9.732692-004
6.75	2.042427-003	4.076250-003	19.25	6.218406-004	1.472309-003	31.75	3.172735-004	9.155734-004
7.00	2.880927-003	3.320898-003	19.50	9.543818-004	1.256365-003	32.00	5.297584-004	8.022962-004
7.25	3.488497-003	2.418208-003	19.75	1.219911-003	9.687561-004	32.25	7.062653-004	6.412776-004
7.50	3.845740-003	1.430327-003	20.00	1.403895-003	6.288542-004	32.50	8.364810-004	4.431703-004
7.75	3.948399-003	4.201228-004	20.25	1.497119-003	2.587265-004	32.75	9.130957-004	2.207430-004
8.00	3.806697-003	-5.522136-004	20.50	1.496114-003	-1.182641-004	33.00	9.322061-004	-1.193512-005
8.25	3.443973-003	-1.432270-003	20.75	1.403227-003	-4.789046-004	33.25	8.935033-004	-2.403777-004
8.50	2.894677-003	-2.174054-003	21.00	1.226337-003	-8.015339-004	33.50	8.002374-004	-4.505761-004
8.75	2.201881-003	-2.742059-003	21.25	9.782547-004	-1.067318-003	33.75	6.589657-004	-6.298525-004
9.00	1.414446-003	-3.112672-003	21.50	6.758219-004	-1.261328-003	34.00	4.791004-004	-7.676181-004
9.25	5.839996-004	-3.274872-003	21.75	3.388033-004	-1.373350-003	34.25	2.722895-004	-8.559927-004
9.50	-2.380829-004	-3.230203-003	22.00	-1.138224-005	-1.398402-003	34.50	5.166858-005	-8.902493-004
9.75	-1.003558-003	-2.992072-003	22.25	-3.529979-004	-1.336917-003	34.75	-1.689673-004	-8.690584-004
10.00	-1.669886-003	-2.584414-003	22.50	-6.653162-004	-1.194594-003	35.00	-3.760203-004	-7.945209-004
10.25	-2.202371-003	-2.039837-003	22.75	-9.298557-004	-9.819370-004	35.25	-5.569224-004	-6.719905-004
10.50	-2.575778-003	-1.397360-003	23.00	-1.131455-003	-7.135112-004	35.50	-7.008928-004	-5.096979-004
10.75	-2.775343-003	-6.998941-004	23.25	-1.259122-003	-4.069703-004	35.75	-7.995750-004	-3.182056-004
11.00	-2.797153-003	8.394391-006	23.50	-1.306616-003	-8.191634-005	36.00	-8.475170-004	-1.097254-004
11.25	-2.647903-003	6.846811-004	23.75	-1.272720-003	2.413336-004	36.25	-8.424653-004	1.026544-004
11.50	-2.344050-003	1.289899-003	24.00	-1.161220-003	5.429991-004	36.50	-7.854600-004	3.057858-004
11.75	-1.910459-003	1.790843-003	24.25	-9.805600-004	8.050295-004	36.75	-6.807253-004	4.872701-004
12.00	-1.378606-003	2.161857-003	24.50	-7.432399-004	1.012167-003	37.00	-5.353668-004	6.362097-004
12.25	-7.844847-004	2.386024-003	24.75	-4.649679-004	1.152821-003	37.25	-3.588956-004	7.438581-004
12.50	-1.663258-004	2.455809-003	25.00	-1.636399-004	1.219698-003	37.50	-1.626113-004	8.041291-004
12.75	4.377250-004	2.373130-003	25.25	1.417949-004	1.210162-003	37.75	4.111678-005	8.139349-004

UNCLASSIFIED

MUTUAL RADIATION IMPEDANCE
KA = 0.30

SELF IMPEDANCE = 4.433004-002+J2.485989-001 AVE = 3.7471-001+J3.4766-001

KD	RE	IM	KD	RE	IM	KD	RE	IM
0.60	4.172552-002	6.791551-002	15.60	3.079876-004	-2.803709-003	30.60	-1.047995-003	9.844277-004
0.90	3.860025-002	3.239271-002	15.90	-5.243118-004	-2.717223-003	30.90	-7.033647-004	1.238030-003
1.20	3.446000-002	1.418526-002	16.20	-1.279801-003	-2.395674-003	31.20	-3.031340-004	1.377224-003
1.50	2.952185-002	2.553817-003	16.50	-1.895551-003	-1.875678-003	31.50	1.162941-004	1.391910-003
1.80	2.404059-002	-5.285333-003	16.80	-2.322977-003	-1.209675-003	31.80	5.175173-004	1.283150-003
2.10	1.829276-002	-1.043233-002	17.10	-2.531507-003	-4.608680-004	32.10	8.654423-004	1.062870-003
2.40	1.255961-002	-1.345195-002	17.40	-2.510578-003	3.025765-004	32.40	1.130329-003	7.526017-004
2.70	7.110107-003	-1.471793-002	17.70	-2.269865-003	1.013562-003	32.70	1.290308-003	3.814128-004
3.00	2.185046-003	-1.453889-002	18.00	-1.837769-003	1.611801-003	33.00	1.333162-003	-1.678900-005
3.30	-2.016595-003	-1.320673-002	18.30	-1.258350-003	2.048785-003	33.30	1.257225-003	-4.063293-004
3.60	-5.348220-003	-1.101245-002	18.60	-5.870191-004	2.291587-003	33.60	1.071337-003	-7.529395-004
3.90	-7.722442-003	-8.246500-003	18.90	1.146064-004	2.325203-003	33.90	7.938842-004	-1.026749-003
4.20	-9.113824-003	-5.191460-003	19.20	7.842233-004	2.153284-003	34.20	4.510029-004	-1.204840-003
4.50	-9.557422-003	-2.111381-003	19.50	1.364250-003	1.797247-003	34.50	7.414715-005	-1.273140-003
4.80	-9.143391-003	7.596653-004	19.80	1.806666-003	1.293872-003	34.80	-3.027772-004	-1.227513-003
5.10	-8.008113-003	3.228034-003	20.10	2.076879-003	6.916597-004	35.10	-6.464421-004	-1.073949-003
5.40	-6.322605-003	5.148706-003	20.40	2.156331-003	4.628093-005	35.40	-9.270243-004	-8.278650-004
5.70	-4.279084-003	6.430427-003	20.70	2.043633-003	-5.844630-004	35.70	-1.120775-003	-5.125850-004
6.00	-2.076721-003	7.037331-003	21.00	1.754193-003	-1.145715-003	36.00	-1.212012-003	-1.571523-004
6.30	9.240215-005	6.986946-003	21.30	1.318402-003	-1.590243-003	36.30	-1.194367-003	2.063276-004
6.60	2.056128-003	6.344762-003	21.60	7.785732-004	-1.882329-003	36.60	-1.071192-003	5.455683-004
6.90	3.672993-003	5.215860-003	21.90	1.849353-004	-2.000556-003	36.90	-8.551091-004	8.309533-004
7.20	4.840232-003	3.734258-003	22.20	-4.089541-004	-1.939283-003	37.20	-5.667405-004	1.038105-003
7.50	5.498568-003	2.050842-003	22.50	-9.509575-004	-1.708707-003	37.50	-2.327641-004	1.149950-003
7.80	5.633569-003	3.207839-004	22.80	-1.394860-003	-1.333562-003	37.80	1.165385-004	1.158110-003
8.10	5.273629-003	-1.308599-003	23.10	-1.704240-003	-8.505765-004	38.10	4.500117-004	1.063502-003
8.40	4.484875-003	-2.708692-003	23.40	-1.855391-003	-3.049648-004	38.40	7.383888-004	8.761125-004
8.70	3.363527-003	-3.778382-003	23.70	-1.839064-003	2.537312-004	38.70	9.568459-004	6.139723-004
9.00	2.026397-003	-4.450252-003	24.00	-1.660907-003	7.760747-004	39.00	1.087125-003	3.014411-004
9.30	6.003358-004	-4.693834-003	24.30	-1.340606-003	1.217045-003	39.30	1.119044-003	-3.304053-005
9.60	-7.885061-004	-4.515796-003	24.60	-9.098174-004	1.539862-003	39.60	1.051272-003	-3.595249-004
9.90	-2.024785-003	-3.957214-003	24.90	-4.091125-004	1.718996-003	39.90	8.913164-004	-6.492247-004
10.20	-3.012668-003	-3.088272-003	25.20	1.157819-004	1.742128-003	40.20	6.547215-004	-8.770384-004
10.50	-3.682533-003	-2.000919-003	25.50	6.181031-004	1.610917-003	40.50	3.635791-004	-1.023712-003
10.80	-3.995225-003	-8.001712-004	25.80	1.054166-003	1.340523-003	40.80	4.447889-005	-1.077453-003
11.10	-3.943641-003	4.052065-004	26.10	1.387115-003	9.579693-004	41.10	-2.739070-004	-1.034864-003
11.40	-3.591649-003	1.511854-003	26.40	1.589989-003	4.995050-004	41.40	-5.633878-004	-9.011184-004
11.70	-2.870544-003	2.430092-003	26.70	1.647861-003	7.223459-006	41.70	-7.987382-004	-6.893801-004
12.00	-1.973424-003	3.090683-003	27.00	1.558875-003	-4.747556-004	42.00	-9.598853-004	-4.195246-004
12.30	-9.480532-004	3.449607-003	27.30	1.334118-003	-9.041957-004	42.30	-1.033609-003	-1.162871-004
12.60	1.111632-004	3.490540-003	27.60	9.963624-004	-1.244403-003	42.60	-1.014613-003	1.929941-004
12.90	1.111392-003	3.224936-003	27.90	5.778209-004	-1.467324-003	42.90	-9.058815-004	4.808300-004
13.20	1.969092-003	2.689810-003	28.20	1.171165-004	-1.555817-003	43.20	-7.183008-004	7.220142-004
13.50	2.616630-003	1.943484-003	28.50	-3.442402-004	-1.504925-003	43.50	-4.695848-004	8.958195-004
13.80	3.007296-003	1.059746-003	28.80	-7.655532-004	-1.322057-003	43.80	-1.826158-004	9.877691-004
14.10	3.118354-003	1.209567-004	29.10	-1.110495-003	-1.026075-003	44.10	1.166507-004	9.908315-004
14.40	2.951974-003	-7.892860-004	29.40	-1.350207-003	-6.454078-004	44.40	4.015231-004	9.059404-004
14.70	2.534023-003	-1.593284-003	29.70	-1.465678-003	-2.153589-004	44.70	6.469445-004	7.418052-004
15.00	1.910921-003	-2.225608-003	30.00	-1.449218-003	2.251343-004	45.00	8.316880-004	5.140356-004
15.30	1.144879-003	-2.638180-003	30.30	-1.304905-003	6.369918-004	45.30	9.401826-004	2.436687-004

MUTUAL RADIATION IMPEDANCE
KA = 0.35

SELF IMPEDANCE = 6.001217-002+J2.875191-001 AVE = 4.2044-001+J3.5592-001

KD	RE	IM	KD	RE	IM	KD	RE	IM
0.70	5.524929-002	7.379158-002	18.20	-1.978522-003	2.595889-003	35.70	-1.512951-003	-6.923661-004
1.05	4.961893-002	3.061222-002	18.55	-9.500712-004	3.058148-003	36.05	-1.642533-003	-1.303108-004
1.40	4.231197-002	8.305142-003	18.90	1.533653-004	3.139271-003	36.40	-1.572364-003	4.365846-004
1.75	3.364404-002	-5.500007-003	19.25	1.198406-003	2.843652-003	36.75	-1.314682-003	9.402452-004
2.10	2.479880-002	-1.401028-002	19.60	2.063374-003	2.219890-003	37.10	-9.039487-004	1.321464-003
2.45	1.577893-002	-1.856932-002	19.95	2.652144-003	1.353529-003	37.45	-3.923045-004	1.536813-003
2.80	7.356522-003	-1.998517-002	20.30	2.904519-003	3.557336-004	37.80	1.569944-004	1.563546-003
3.15	2.740855-005	-1.891429-002	20.65	2.802071-003	-6.506407-004	38.15	6.773514-004	1.401933-003
3.50	-5.826514-003	-1.598407-002	21.00	2.368890-003	-1.545873-003	38.50	1.106858-003	1.074806-003
3.85	-9.963669-003	-1.182050-002	21.35	1.667347-003	-2.227351-003	38.85	1.395618-003	6.244175-004
4.20	-1.229582-002	-7.036092-003	21.70	7.895001-004	-2.621087-003	39.20	1.511500-003	1.070315-004
4.55	-1.268692-002	-2.201277-003	22.05	-1.546963-004	-2.689508-003	39.55	1.443669-003	-4.140604-004
4.90	-1.193835-002	2.188536-003	22.40	-1.050914-003	-2.434730-003	39.90	1.203506-003	-8.762416-004
5.25	-9.762491-003	5.742716-003	22.75	-1.794069-003	-1.897079-003	40.25	8.228527-004	-1.225056-003
5.60	-6.747435-003	8.197111-003	23.10	-2.300432-003	-1.149153-003	40.60	3.498447-004	-1.420588-003
5.95	-3.316643-003	9.424818-003	23.45	-2.516873-003	-2.862805-004	40.95	-1.571366-004	-1.441990-003
6.30	1.124504-004	9.434746-003	23.80	-2.426219-003	5.854150-004	41.30	-6.366317-004	-1.289657-003
6.65	3.166871-003	8.358281-003	24.15	-2.048236-003	1.361877-003	41.65	-1.031519-003	-9.848161-004
7.00	5.549989-003	6.425628-003	24.50	-1.436219-003	1.953360-003	42.00	-1.295786-003	-5.666339-004
7.35	7.064083-003	3.934460-003	24.85	-6.697325-004	2.294638-003	42.35	-1.399859-003	-8.722263-005
7.70	7.621627-003	1.214254-003	25.20	1.555478-004	2.352037-003	42.70	-1.333871-003	3.948188-004
8.05	7.246146-003	-1.410037-003	25.55	9.396103-004	2.126548-003	43.05	-1.108528-003	8.215359-004
8.40	6.059047-003	-3.651350-003	25.90	1.590076-003	1.652762-003	43.40	-7.534854-004	1.142555-003
8.75	4.261157-003	-5.287758-003	26.25	2.032944-003	9.938613-004	43.75	-3.134882-004	1.321002-003
9.10	2.104535-003	-6.181176-003	26.60	2.220874-003	2.333676-004	44.10	1.572360-004	1.337705-003
9.45	-1.380748-004	-6.286104-003	26.95	2.138107-003	-5.353024-004	44.45	6.016309-004	1.193214-003
9.80	-2.204188-003	-5.648057-003	27.30	1.801509-003	-1.220179-003	44.80	9.666989-004	9.074240-004
10.15	-3.869473-003	-4.392415-003	27.65	1.257740-003	-1.741625-003	45.15	1.209795-003	5.168856-004
10.50	-4.969838-003	-2.705416-003	28.00	5.769548-004	-2.041476-003	45.50	1.303582-003	7.016132-005
10.85	-5.415672-003	-8.097121-004	28.35	-1.561190-004	-2.089421-003	45.85	1.239074-003	-3.781852-004
11.20	-5.197151-003	1.062583-003	28.70	-8.526103-004	-1.885916-003	46.20	1.026434-003	-7.742277-004
11.55	-4.380516-003	2.696330-003	29.05	-1.430172-003	-1.461378-003	46.55	6.934642-004	-1.071139-003
11.90	-3.096189-003	3.916446-003	29.40	-1.822618-003	-8.718478-004	46.90	2.820037-004	-1.234704-003
12.25	-1.520446-003	4.605288-003	29.75	-1.987414-003	-1.917110-004	47.25	-1.573028-004	-1.247237-003
12.60	1.470142-004	4.712727-003	30.10	-1.910179-003	4.955842-004	47.60	-5.712147-004	-1.109460-003
12.95	1.706941-003	4.258154-003	30.45	-1.605750-003	1.107673-003	47.95	-9.103252-004	-8.401462-004
13.30	2.963126-003	3.324609-003	30.80	-1.115735-003	1.573056-003	48.30	-1.134937-003	-4.735996-004
13.65	3.841273-003	2.046044-003	31.15	-5.029568-004	1.839372-003	48.65	-1.219687-003	-5.531273-005
14.00	4.202222-003	5.894709-004	31.50	1.565148-004	1.879201-003	49.00	-1.156386-003	3.636575-004
14.35	4.048295-003	-8.657717-004	31.85	7.827205-004	1.692783-003	49.35	-9.547567-004	7.329013-004
14.70	3.422377-003	-2.149179-003	32.20	1.301430-003	1.307380-003	49.70	-6.410114-004	1.008700-003
15.05	2.420145-003	-3.118262-003	32.55	1.652866-003	7.734348-004	50.05	-2.544704-004	1.159184-003
15.40	1.176628-003	-3.673672-003	32.90	1.798528-003	1.580614-004	50.40	1.573440-004	1.167995-003
15.75	-1.511377-004	-3.768729-003	33.25	1.725327-003	-4.633206-004	50.75	5.445304-004	1.036032-003
16.10	-1.403222-003	-3.412503-003	33.60	1.446615-003	-1.016159-003	51.10	8.608366-004	7.811117-004
16.45	-2.435442-003	-2.666372-003	33.95	1.000041-003	-1.435647-003	51.45	1.069166-003	4.355881-004
16.80	-3.135421-003	-1.634696-003	34.30	4.425525-004	-1.674262-003	51.80	1.145913-003	4.227248-005
17.15	-3.434316-003	-4.509320-004	34.65	-1.567946-004	-1.707085-003	52.15	1.083611-003	-3.508550-004
17.50	-3.313072-003	7.390617-004	35.00	-7.253311-004	-1.534319-003	52.50	8.916202-004	-6.964805-004
17.85	-2.802659-003	1.794501-003	35.35	-1.195525-003	-1.180764-003	52.85	5.947731-004	-9.536340-004

UNCLASSIFIED

MUTUAL RADIATION IMPEDANCE
KA = 0.40

SELF IMPEDANCE = 7.789468-002+J3.253061-001 AVE = 4.6134-001+J3.5900-001

KD	RE	IM	KD	RE	IM	KD	RE	IM
0.80	6.989061-002	7.740692-002	20.80	3.434713-003	-1.362761-003	40.80	7.851131-005	-1.882055-003
1.20	6.059145-002	2.614873-002	21.20	2.583117-003	-2.543892-003	41.20	-6.541961-004	-1.746928-003
1.60	4.881176-002	-1.391545-004	21.60	1.362735-003	-3.287012-003	41.60	-1.270517-003	-1.341237-003
2.00	3.562256-002	-1.541850-002	22.00	-2.452685-005	-3.493507-003	42.00	-1.676413-003	-7.335289-004
2.40	2.218389-002	-2.340103-002	22.40	-1.358429-003	-3.150839-003	42.40	-1.812466-003	-2.256750-005
2.80	9.619467-003	-2.585532-002	22.80	-2.434780-003	-2.331401-003	42.80	-1.662489-003	6.786338-004
3.20	-1.101066-003	-2.408430-002	23.20	-3.096181-003	-1.178441-003	43.20	-1.255239-003	1.260695-003
3.60	-9.258483-003	-1.930805-002	23.60	-3.254553-003	1.183500-004	43.60	-6.590964-004	1.634858-003
4.00	-1.444806-002	-1.273665-002	24.00	-2.902317-003	1.353530-003	44.00	2.932135-005	1.746445-003
4.40	-1.660478-002	-5.532030-003	24.40	-2.110870-003	2.337986-003	44.40	7.007468-004	1.582768-003
4.80	-1.598807-002	1.268608-003	24.80	-1.017031-003	2.927470-003	44.80	1.250533-003	1.174352-003
5.20	-1.312941-002	6.832564-003	25.20	2.001143-004	3.043331-003	45.20	1.594895-003	5.893942-004
5.60	-8.750845-003	1.059410-002	25.60	1.348113-003	2.682546-003	45.60	1.683616-003	-7.754047-005
6.00	-3.665682-003	1.228763-002	26.00	2.251195-003	1.915815-003	46.00	1.507290-003	-7.207397-004
6.40	1.325549-003	1.194643-002	26.40	2.776837-003	8.744055-004	46.40	1.098078-003	-1.240037-003
6.80	5.530671-003	9.867163-003	26.80	2.854879-003	-2.719160-004	46.80	5.239752-004	-1.556348-003
7.20	8.441460-003	6.545867-003	27.20	2.486483-003	-1.342214-003	47.20	-1.224228-004	-1.623658-003
7.60	9.760812-003	2.594476-003	27.60	1.741854-003	-2.172627-003	47.60	-7.387903-004	-1.435642-003
8.00	9.517118-003	-1.350645-003	28.00	7.474040-004	-2.641166-003	48.00	-1.229214-003	-1.025985-003
8.40	7.845923-003	-4.716066-003	28.40	-3.353775-004	-2.685355-003	48.40	-1.519062-003	-4.624516-004
8.80	5.143248-003	-7.063584-003	28.80	-1.335859-003	-2.310206-003	48.80	-1.566290-003	1.642577-004
9.20	1.898476-003	-8.138946-003	29.20	-2.100893-003	-1.585568-003	49.20	-1.367469-003	7.550534-004
9.60	-1.363034-003	-7.892063-003	29.60	-2.518015-003	-6.335510-004	49.60	-9.576964-004	1.218071-003
10.00	-4.156552-003	-6.467834-003	30.00	-2.531739-003	3.917741-004	50.00	-4.044858-004	1.482905-003
10.40	-6.103478-003	-4.170690-003	30.40	-2.150621-003	1.329070-003	50.40	2.032978-004	1.511269-003
10.80	-6.977475-003	-1.409367-003	30.80	-1.444249-003	2.034893-003	50.80	7.696650-004	1.302461-003
11.20	-6.726046-003	1.369230-003	31.20	-5.308804-004	2.405445-003	51.20	1.206615-003	8.928856-004
11.60	-5.466077-003	3.747184-003	31.60	4.421221-004	2.391624-003	51.60	1.447763-003	3.497825-004
12.00	-3.455498-003	5.394274-003	32.00	1.321862-003	2.005255-003	52.00	1.458383-003	-2.397646-004
12.40	-1.046508-003	6.110417-003	32.40	1.973746-003	1.315726-003	52.40	1.240345-003	-7.827449-004
12.80	1.371947-003	5.846753-003	32.80	2.301895-003	4.378102-004	52.80	8.312652-004	-1.194852-003
13.20	3.433592-003	4.703561-003	33.20	2.263069-003	-4.872415-004	53.20	2.980821-004	-1.413535-003
13.60	4.847511-003	2.906596-003	33.60	1.872107-003	-1.314252-003	53.60	-2.738535-004	-1.407446-003
14.00	5.436829-003	7.664174-004	34.00	1.198238-003	-1.916736-003	54.00	-7.943992-004	-1.180883-003
14.40	5.158550-003	-1.372479-003	34.40	3.530538-004	-2.206096-003	54.40	-1.182790-003	-7.725820-004
14.80	4.102619-003	-3.184791-003	34.80	-5.278017-004	-2.144490-003	54.80	-1.380133-003	-2.491554-004
15.20	2.471403-003	-4.411921-003	35.20	-1.306249-003	-1.749542-003	55.20	-1.358296-003	3.057372-004
15.60	5.435787-004	-4.897179-003	35.60	-1.863278-003	-1.090342-003	55.60	-1.123865-003	8.047223-004
16.00	-1.371509-003	-4.604098-003	36.00	-2.117007-003	-2.755537-004	56.00	-7.166128-004	1.170435-003
16.40	-2.981824-003	-3.615950-003	36.40	-2.034584-003	5.643541-004	56.40	-2.027997-004	1.347480-003
16.80	-4.055737-003	-2.117431-003	36.80	-1.636209-003	1.297866-003	56.80	3.355693-004	1.310787-003
17.20	-4.454090-003	-3.620284-004	37.20	-9.908432-004	1.812888-003	57.20	8.137985-004	1.069105-003
17.60	-4.146929-003	1.369425-003	37.60	-2.044330-004	2.033766-003	57.60	1.157794-003	6.631594-004
18.00	-3.213106-003	2.812446-003	38.00	5.973573-004	1.932269-003	58.00	1.315510-003	1.588347-004
18.40	-1.823529-003	3.758231-003	38.40	1.289110-003	1.530984-003	58.40	1.264794-003	-3.634865-004
18.80	-2.112687-004	4.082906-003	38.80	1.765164-003	8.987452-004	58.80	1.016438-003	-8.217036-004
19.20	1.366459-003	3.762740-003	39.20	1.955651-003	1.389583-004	59.20	6.120457-004	-1.144873-003
19.60	2.668394-003	2.873593-003	39.60	1.836638-003	-6.271962-004	59.60	1.170997-004	-1.284163-003
20.00	3.505299-003	1.575329-003	40.00	1.432926-003	-1.279991-003	60.00	-3.896114-004	-1.220202-003
20.40	3.766711-003	8.411242-005	40.40	8.132102-004	-1.719767-003	60.40	-8.285059-004	-9.657170-004

MUTUAL RADIATION IMPEDANCE
KA = 0.45

SELF IMPEDANCE = 9.788990-002+J3.618167-001 AVE = 4.9743-001+J3.5826-001

KD	RE	IM	KD	RE	IM	KD	RE	IM
0.90	8.528474-002	7.860795-002	23.40	-4.057537-003	-6.719980-004	45.90	1.972482-003	-7.106251-004
1.35	7.092831-002	1.902499-002	23.85	-3.871383-003	1.138063-003	46.35	1.452759-003	-1.483315-003
1.80	5.324515-002	-1.076587-002	24.30	-2.935454-003	2.658631-003	46.80	6.565463-004	-1.948634-003
2.25	3.423742-002	-2.634502-002	24.75	-1.459634-003	3.604082-003	47.25	-2.539824-004	-2.020783-003
2.70	1.596041-002	-3.214313-002	25.20	2.489445-004	3.810866-003	47.70	-1.097236-003	-1.692999-003
3.15	2.466904-004	-3.070264-002	25.65	1.848855-003	3.264825-003	48.15	-1.708293-003	-1.037392-003
3.60	-1.152820-002	-2.423104-002	26.10	3.031759-003	2.098684-003	48.60	-1.971037-003	-1.892793-004
4.05	-1.860481-002	-1.489494-002	26.55	3.581061-003	5.612441-004	49.05	-1.840099-003	6.806128-004
4.50	-2.090234-002	-4.757947-003	27.00	3.410826-003	-1.034837-003	49.50	-1.348484-003	1.400400-003
4.95	-1.897910-002	4.388558-003	27.45	2.578101-003	-2.375885-003	49.95	-5.996436-004	1.830891-003
5.40	-1.390146-002	1.119819-002	27.90	1.267142-003	-3.208183-003	50.40	2.541547-004	1.892393-003
5.85	-7.045741-003	1.489071-002	28.35	-2.505137-004	-3.385345-003	50.85	1.042683-003	1.579340-003
6.30	1.327755-004	1.529318-002	28.80	-1.671629-003	-2.893379-003	51.30	1.611585-003	9.600702-004
6.75	6.326094-003	1.279325-002	29.25	-2.721260-003	-1.849261-003	51.75	1.852496-003	1.620705-004
7.20	1.055966-002	8.213895-003	29.70	-3.205409-003	-4.741260-004	52.20	1.723576-003	-6.541621-004
7.65	1.231146-002	2.632742-003	30.15	-3.046343-003	9.529560-004	52.65	1.256606-003	-1.327302-003
8.10	1.154937-002	-2.822671-003	30.60	-2.294267-003	2.151089-003	53.10	5.494660-004	-1.726989-003
8.55	8.686041-003	-7.169419-003	31.05	-1.113764-003	2.892357-003	53.55	-2.542753-004	-1.778983-003
9.00	4.464514-003	-9.722822-003	31.50	2.516154-004	3.044727-003	54.00	-9.944128-004	-1.478843-003
9.45	-2.018339-004	-1.018679-002	31.95	1.529131-003	2.595060-003	54.45	-1.525952-003	-8.916421-004
9.90	-4.404903-003	-8.670418-003	32.40	2.470896-003	1.648322-003	54.90	-1.747432-003	-1.379859-004
10.35	-7.402245-003	-5.633222-003	32.85	2.901579-003	4.037995-004	55.35	-1.620203-003	6.306664-004
10.80	-8.735810-003	-1.773633-003	33.30	2.750655-003	-8.864018-004	55.80	-1.175027-003	1.262360-003
11.25	-8.291424-003	2.116108-003	33.75	2.063339-003	-1.968043-003	56.25	-5.048824-004	1.634605-003
11.70	-6.292689-003	5.300876-003	34.20	9.886601-004	-2.634491-003	56.70	2.543543-004	1.678055-003
12.15	-3.234814-003	7.232439-003	34.65	-2.524094-004	-2.765852-003	57.15	9.513878-004	1.389331-003
12.60	2.259024-004	7.636411-003	35.10	-1.412037-003	-2.350163-003	57.60	1.449577-003	8.306473-004
13.05	3.404283-003	6.543589-003	35.55	-2.264695-003	-1.482954-003	58.05	1.653652-003	1.165162-004
13.50	5.715008-003	4.263535-003	36.00	-2.650722-003	-3.458310-004	58.50	1.527858-003	-6.096492-004
13.95	6.774773-003	1.308752-003	36.45	-2.505919-003	8.312236-004	58.95	1.102093-003	-1.204266-003
14.40	6.460865-003	-1.713784-003	36.90	-1.871752-003	1.816071-003	59.40	4.650023-004	-1.551906-003
14.85	4.918002-003	-4.221973-003	37.35	-8.846555-004	2.419925-003	59.85	-2.543989-004	-1.587640-003
15.30	2.515136-003	-5.766275-003	37.80	2.529921-004	2.533282-003	60.30	-9.127866-004	-1.309082-003
15.75	-2.370102-004	-6.106522-003	38.25	1.314086-003	2.145479-003	60.75	-1.381020-003	-7.759292-004
16.20	-2.790275-003	-5.245325-003	38.70	2.091883-003	1.344457-003	61.20	-1.569413-003	-9.725681-005
16.65	-4.664707-003	-3.414182-003	39.15	2.440053-003	2.972218-004	61.65	-1.444849-003	5.907312-004
17.10	-5.535789-003	-1.017339-003	39.60	2.299970-003	-7.847205-004	62.10	-1.036490-003	1.151979-003
17.55	-5.287878-003	1.453959-003	40.05	1.710215-003	-1.687851-003	62.55	-4.291145-004	1.477430-003
18.00	-4.025518-003	3.519292-003	40.50	7.968153-004	-2.238562-003	63.00	2.544146-004	1.506160-003
18.45	-2.042575-003	4.800007-003	40.95	-2.534241-004	-2.336330-003	63.45	8.779505-004	1.236717-003
18.90	2.430216-004	5.086489-003	41.40	-1.230917-003	-1.971824-003	63.90	1.319126-003	7.265593-004
19.35	2.374994-003	4.370175-003	41.85	-1.944926-003	-1.226755-003	64.35	1.493315-003	7.988307-005
19.80	3.947774-003	2.835861-003	42.30	-2.260594-003	-2.558713-004	64.80	1.369815-003	-5.736064-004
20.25	4.681879-003	8.175378-004	42.75	-2.124232-003	7.449834-004	65.25	9.771550-004	-1.104658-003
20.70	4.471914-003	-1.272278-003	43.20	-1.572146-003	1.578192-003	65.70	3.966449-004	-1.409993-003
21.15	3.399249-003	-3.025151-003	43.65	-7.216325-004	2.083216-003	66.15	-2.544057-004	-1.432339-003
21.60	1.708439-003	-4.115059-003	44.10	2.537452-004	2.167362-003	66.60	-8.463455-004	-1.171116-003
22.05	-2.466257-004	-4.357689-003	44.55	1.159402-003	1.822612-003	67.05	-1.262954-003	-6.817838-004
22.50	-2.075332-003	-3.740151-003	45.00	1.818398-003	1.125476-003	67.50	-1.424218-003	-6.413091-005
22.95	-3.427118-003	-2.416613-003	45.45	2.105858-003	2.202640-004	67.95	-1.301647-003	5.580255-004

UNCLASSIFIED

MUTUAL RADIATION IMPEDANCE
KA = 0.50

SELF IMPEDANCE = 1.198988-001+J3.969147-001 AVE = 5.2903-001+J3.5489-001

KD	RE	IM	KD	RE	IM	KD	RE	IM
1.00	1.010482-001	7.729966-002	26.00	3.436092-003	2.929409-003	51.00	1.540602-003	1.710184-003
1.50	8.005431-002	9.387658-003	26.50	4.336521-003	9.058230-004	51.50	2.150834-003	7.547973-004
2.00	5.501372-002	-2.300949-002	27.00	4.161344-003	-1.260504-003	52.00	2.227769-003	-3.652478-004
2.50	2.936036-002	-3.724331-002	27.50	2.992055-003	-3.044983-003	52.50	1.762974-003	-1.375380-003
3.00	6.395888-003	-3.887518-002	28.00	1.144944-003	-4.033394-003	53.00	8.793642-004	-2.032872-003
3.50	-1.124419-002	-3.177659-002	28.50	-9.127888-004	-4.016775-003	53.50	-2.010242-004	-2.184987-003
4.00	-2.198442-002	-1.960909-002	29.00	-2.679888-003	-3.034096-003	54.00	-1.212640-003	-1.804254-003
4.50	-2.549607-002	-5.876906-003	29.50	-3.741971-003	-1.354368-003	54.50	-1.911508-003	-9.927974-004
5.00	-2.265102-002	6.388291-003	30.00	-3.867623-003	5.954730-004	55.00	-2.133900-003	4.477603-005
5.50	-1.526276-002	1.498038-002	30.50	-3.057625-003	2.337950-003	55.50	-1.834518-003	1.052789-003
6.00	-5.674593-003	1.875804-002	31.00	-1.537125-003	3.460956-003	56.00	-1.095320-003	1.787332-003
6.50	3.718056-003	1.769925-002	31.50	3.055102-004	3.714286-003	56.50	-1.033972-004	2.075129-003
7.00	1.091600-002	1.275769-002	32.00	2.016913-003	3.064412-003	57.00	8.962170-004	1.854249-003
7.50	1.465069-002	5.555227-003	32.50	3.189378-003	1.695718-003	57.50	1.660920-003	1.187157-003
8.00	1.454751-002	-2.021910-003	33.00	3.557179-003	-4.042145-005	58.00	2.009278-003	2.434051-004
8.50	1.109828-002	-8.238509-003	33.50	3.055982-003	-1.714977-003	58.50	1.863926-003	-7.433007-004
9.00	5.462819-003	-1.185470-002	34.00	1.832240-003	-2.926517-003	59.00	1.268535-003	-1.532832-003
9.50	-8.470832-004	-1.233584-002	34.50	2.018338-004	-3.396732-003	59.50	3.751685-004	-1.936942-003
10.00	-6.327524-003	-9.895867-003	35.00	-1.430698-003	-3.033668-003	60.00	-5.943998-004	-1.864022-003
10.50	-9.807985-003	-5.378508-003	35.50	-2.671851-003	-1.948474-003	60.50	-1.403609-003	-1.339686-003
11.00	-1.067695-002	-1.414026-005	36.00	-3.233384-003	-4.229549-004	61.00	-1.858706-003	-4.986221-004
11.50	-8.967393-003	4.886415-003	36.50	-2.998656-003	1.162909-003	61.50	-1.855011-003	4.498572-004
12.00	-5.294579-003	8.230530-003	37.00	-2.045953-003	2.425007-003	62.00	-1.400852-003	1.273782-003
12.50	-6.704816-004	9.370707-003	37.50	-6.243736-004	3.067584-003	62.50	-6.137156-004	1.775142-003
13.00	3.755486-003	8.215389-003	38.00	9.106616-004	2.952014-003	63.00	3.099969-004	1.837362-003
13.50	6.967234-003	5.207473-003	38.50	2.185736-003	2.126018-003	63.50	1.143859-003	1.452281-003
14.00	8.303392-003	1.184380-003	39.00	2.899786-003	8.073112-004	64.00	1.686815-003	7.204154-004
14.50	7.583280-003	-2.841160-003	39.50	2.894719-003	-6.731781-004	64.50	1.811550-003	-1.751240-004
15.00	5.115443-003	-5.925305-003	40.00	2.189854-003	-1.953881-003	65.00	1.494235-003	-1.014337-003
15.50	1.594269-003	-7.405657-003	40.50	9.728224-004	-2.730450-003	65.50	8.187055-004	-1.594281-003
16.00	-2.084994-003	-7.036053-003	41.00	-4.498164-004	-2.827671-003	66.00	-4.552308-005	-1.778048-003
16.50	-5.045881-003	-5.017621-003	41.50	-1.729359-003	-2.238527-003	66.50	-8.856930-004	-1.526984-003
17.00	-6.632893-003	-1.925119-003	42.00	-2.560037-003	-1.121830-003	67.00	-1.498086-003	-9.085886-004
17.50	-6.550949-003	1.448620-003	42.50	-2.751713-003	2.400406-004	67.50	-1.737330-003	-7.854222-005
18.00	-4.913607-003	4.289869-003	43.00	-2.273004-003	1.512146-003	68.00	-1.550813-003	7.583861-004
18.50	-2.193879-003	5.955155-003	43.50	-1.255151-003	2.389009-003	68.50	-9.900867-004	1.398767-003
19.00	9.058187-004	6.112595-003	44.00	4.339895-005	2.667639-003	69.00	-1.968301-004	1.689873-003
19.50	3.630320-003	4.803273-003	44.50	1.302259-003	2.294174-003	69.50	6.328578-004	1.566016-003
20.00	5.351653-003	2.412478-003	45.00	2.217826-003	1.373522-003	70.00	1.296850-003	1.063242-003
20.50	5.710286-003	-4.380670-004	45.50	2.576203-003	1.404951-004	70.50	1.636153-003	3.091211-004
21.00	4.686657-003	-3.048085-003	46.00	2.302863-003	-1.099751-003	71.00	1.572901-003	-5.095304-004
21.50	2.589580-003	-4.807539-003	46.50	1.477612-003	-2.046945-003	71.50	1.128116-003	-1.192850-003
22.00	-3.190897-005	-5.336387-003	47.00	3.119776-004	-2.478125-003	72.00	4.152189-004	-1.576649-003
22.50	-2.529205-003	-4.563906-003	47.50	-9.046981-004	-2.299848-003	72.50	-3.888066-004	-1.571789-003
23.00	-4.311966-003	-2.731652-003	48.00	-1.876818-003	-1.568039-003	73.00	-1.087274-003	-1.184793-003
23.50	-4.985348-003	-3.226697-004	48.50	-2.374096-003	-4.713460-004	73.50	-1.511840-003	-5.149506-004
24.00	-4.435245-003	2.063279-003	49.00	-2.285864-003	7.171936-004	74.00	-1.563011-003	2.710684-004
24.50	-2.843639-003	3.856855-003	49.50	-1.645380-003	1.707891-003	74.50	-1.233374-003	9.806134-004
25.00	-6.332812-004	4.653076-003	50.00	-6.188697-004	2.264783-003	75.00	-6.081668-004	1.442204-003
25.50	1.642410-003	4.300951-003	50.50	5.373406-004	2.261612-003	75.50	1.566772-004	1.546910-003

MUTUAL RADIATION IMPEDANCE
KA = 0.55

SELF IMPEDANCE = 1.438138-001+J4.304721-001 AVE = 5.5657-001+J3.4969-001

KD	RE	IM	KD	RE	IM	KD	RE	IM
1.10	1.167882-001	7.344761-002	28.60	-1.555688-003	-4.647895-003	56.10	-1.086861-003	2.249783-003
1.65	8.743400-002	-2.498263-003	29.15	-3.684941-003	-3.089690-003	56.65	2.469685-004	2.461942-003
2.20	5.367969-002	-3.615600-002	29.70	-4.668381-003	-6.946249-004	57.20	1.482999-003	1.950819-003
2.75	2.100119-002	-4.699553-002	30.25	-4.263919-003	1.814514-003	57.75	2.262220-003	8.794897-004
3.30	-5.744426-003	-4.237586-002	30.80	-2.638521-003	3.708302-003	58.30	2.365758-003	-4.285946-004
3.85	-2.323917-002	-2.825916-002	31.35	-3.054681-004	4.460882-003	58.85	1.776070-003	-1.586989-003
4.40	-3.025116-002	-1.036135-002	31.90	2.035675-003	3.894258-003	59.40	6.782778-004	-2.260160-003
4.95	-2.770372-002	6.253413-003	32.45	3.707109-003	2.217537-003	59.95	-5.976020-004	-2.260431-003
5.50	-1.827589-002	1.784922-002	33.00	4.247477-003	-4.653545-005	60.50	-1.675615-003	-1.600015-003
6.05	-5.651370-003	2.251555-002	33.55	3.537699-003	-2.222859-003	61.05	-2.244411-003	-4.838055-004
6.60	6.391155-003	2.028990-002	34.10	1.824071-003	-3.683822-003	61.60	-2.146943-003	7.539010-004
7.15	1.482695-002	1.286684-002	34.65	-3.646849-004	-4.028963-003	62.15	-1.423537-003	1.749295-003
7.70	1.798119-002	2.974979-003	35.20	-2.379134-003	-3.193395-003	62.70	-2.966169-004	2.215776-003
8.25	1.575198-002	-6.414347-003	35.75	-3.640576-003	-1.456028-003	63.25	8.974338-004	2.026257-003
8.80	9.437743-003	-1.284925-002	36.30	-3.806143-003	6.516815-004	63.80	1.808470-003	1.247489-003
9.35	1.243699-003	-1.495179-002	36.85	-2.860775-003	2.507098-003	64.35	2.175061-003	1.172181-004
9.90	-6.384780-003	-1.264850-002	37.40	-1.111746-003	3.579260-003	64.90	1.899317-003	-1.028177-003
10.45	-1.142197-002	-7.048811-003	37.95	9.097699-004	3.579825-003	65.45	1.072690-003	-1.853596-003
11.00	-1.274993-002	-3.250670-005	38.50	2.608989-003	2.539480-003	66.00	-5.392423-005	-2.123076-003
11.55	-1.036553-002	6.323591-003	39.05	3.501576-003	7.898984-004	66.55	-1.146142-003	-1.767051-003
12.10	-5.276789-003	1.031873-002	39.60	3.350819-003	-1.140844-003	67.10	-1.885157-003	-8.999255-004
12.65	8.589867-004	1.105198-002	40.15	2.229313-003	-2.686768-003	67.65	-2.060630-003	2.163848-004
13.20	6.239775-003	8.597328-003	40.70	4.894104-004	-3.409078-003	68.20	-1.630369-003	1.251379-003
13.75	9.421346-003	3.902942-003	41.25	-1.346528-003	-3.119932-003	68.75	-7.299454-004	1.903658-003
14.30	9.683954-003	-1.537675-003	41.80	-2.742179-003	-1.930199-003	69.30	3.697809-004	1.988536-003
14.85	7.174676-003	-6.137833-003	42.35	-3.303204-003	-2.094047-004	69.85	1.343976-003	1.490157-003
15.40	2.802884-003	-8.662270-003	42.90	-2.887970-003	1.528239-003	70.40	1.909627-003	5.634633-004
15.95	-2.065829-003	-8.544131-003	43.45	-1.642156-003	2.776801-003	70.95	1.907611-003	-5.137736-004
16.50	-6.020358-003	-5.996411-003	44.00	5.084753-005	3.185301-003	71.50	1.347286-003	-1.424060-003
17.05	-8.000232-003	-1.900693-003	44.55	1.687231-003	2.655734-003	72.05	4.011546-004	-1.903615-003
17.60	-7.569213-003	2.482220-003	45.10	2.792080-003	1.365269-003	72.60	-6.480686-004	-1.818668-003
18.15	-4.998440-003	5.889048-003	45.65	3.056640-003	-2.919622-004	73.15	-1.491797-003	-1.202599-003
18.70	-1.147427-003	7.408722-003	46.20	2.424012-003	-1.824636-003	73.70	-1.886196-003	-2.436553-004
19.25	2.812297-003	6.717859-003	46.75	1.099669-003	-2.789360-003	74.25	-1.722523-003	7.724175-004
19.80	5.745152-003	4.138252-003	47.30	-5.144714-004	-2.918434-003	74.80	-1.056919-003	1.547391-003
20.35	6.870045-003	5.101291-004	47.85	-1.941492-003	-2.193584-003	75.35	-9.156076-005	1.857966-003
20.90	5.962016-003	-3.073499-003	48.40	-2.769903-003	-8.455206-004	75.90	8.866176-004	1.619988-003
21.45	3.386596-003	-5.589685-003	48.95	-2.771840-003	7.188466-004	76.45	1.591087-003	9.110420-004
22.00	-3.420715-005	-6.372035-003	49.50	-1.965211-003	2.038765-003	77.00	1.819540-003	-5.457561-005
22.55	-3.278224-003	-5.282060-003	50.05	-6.030068-004	2.734909-003	77.55	1.511870-003	-9.905127-004
23.10	-5.423539-003	-2.722723-003	50.60	9.055167-004	2.617975-003	78.10	7.657355-004	-1.623165-003
23.65	-5.906133-003	5.021342-004	51.15	2.117370-003	1.739641-003	78.65	-1.942434-004	-1.771551-003
24.20	-4.663914-003	3.435576-003	51.70	2.685526-003	3.723175-004	79.20	-1.083993-003	-1.398971-003
24.75	-2.131536-003	5.247543-003	52.25	2.457916-003	-1.074883-003	79.75	-1.643943-003	-6.217390-004
25.30	9.058783-004	5.466224-003	52.80	1.517596-003	-2.178180-003	80.30	-1.714649-003	3.269764-004
25.85	3.552435-003	4.097274-003	53.35	1.536414-004	-2.622859-003	80.85	-1.282085-003	1.166996-003
26.40	5.062496-003	1.601806-003	53.90	-1.227332-003	-2.292703-003	81.40	-4.797605-004	1.653774-003
26.95	5.047884-003	-1.254683-003	54.45	-2.222041-003	-1.299778-003	81.95	4.523531-004	1.649499-003
27.50	3.574464-003	-3.634140-003	55.00	-2.547983-003	5.284201-005	82.50	1.239503-003	1.161993-003
28.05	1.125024-003	-4.869180-003	55.55	-2.123345-003	1.363244-003	83.05	1.653047-003	3.404752-004

UNCLASSIFIED

MUTUAL RADIATION IMPEDANCE
KA = 0.60

SELF IMPEDANCE = 1,695182-001+J4,623697-001 AVE = 5,8036-001+J3.4323-001

KD	RE	IM	KD	RE	IM	KD	RE	IM
1,20	1,321123-001	6,707845-002	31,20	-1,144084-003	5,143832-003	61,20	-2,680999-003	-1,679156-004
1,80	9,259534-002	-1,626014-002	31,80	1,923447-003	4,798974-003	61,80	-2,285112-003	1,361900-003
2,40	4,900028-002	-4,938850-002	32,40	4,217753-003	2,821235-003	62,40	-1,106223-003	2,391097-003
3,00	9,521926-003	-5,451080-002	33,00	4,981779-003	-5,234742-005	63,00	4,329821-004	2,573327-003
3,60	-1,927014-002	-4,173936-002	33,60	4,009038-003	-2,805316-003	63,60	1,793311-003	1,861623-003
4,20	-3,384874-002	-2,003581-002	34,20	1,694322-003	-4,498736-003	64,20	2,507585-003	5,189542-004
4,80	-3,429700-002	2,348396-003	34,80	-1,122316-003	-4,589079-003	64,80	2,340732-003	-9,784636-004
5,40	-2,392242-002	1,897381-002	35,40	-3,457988-003	-3,100207-003	65,40	1,366725-003	-2,109720-003
6,00	-8,077511-003	2,624985-002	36,00	-4,527783-003	-5,958851-004	66,00	-6,268789-005	-2,490092-003
6,60	7,444282-003	2,382127-002	36,60	-4,006532-003	2,031087-003	66,60	-1,444642-003	-2,001550-003
7,20	1,797257-002	1,414356-002	37,20	-2,124898-003	3,875139-003	67,20	-2,301748-003	-8,287498-004
7,80	2,106033-002	1,386607-003	37,80	4,275879-004	4,328262-003	67,80	-2,346701-003	6,102474-004
8,40	1,685556-002	-9,991815-003	38,40	2,753242-003	3,278680-003	68,40	-1,578255-003	1,812683-003
9,00	7,705026-003	-1,658275-002	39,00	4,060225-003	1,133549-003	69,00	-2,766182-004	2,366465-003
9,60	-2,826799-003	-1,690564-002	39,60	3,930573-003	-1,336594-003	69,60	1,098377-003	2,091122-003
10,20	-1,118533-002	-1,162229-002	40,20	2,452073-003	-3,272996-003	70,20	2,069437-003	1,096213-003
10,80	-1,491686-002	-3,086798-003	40,80	1,729916-004	-4,025778-003	70,80	2,307225-003	-2,615386-004
11,40	-1,331116-002	5,571381-003	41,40	-2,099581-003	-3,370654-003	71,40	1,741782-003	-1,505872-003
12,00	-7,443200-003	1,151085-002	42,00	-3,584174-003	-1,573487-003	72,00	5,823577-004	-2,207786-003
12,60	3,441433-004	1,304969-002	42,60	-3,792399-003	7,150243-004	72,60	-7,596611-004	-2,133203-003
13,20	7,307598-003	1,009242-002	43,20	-2,688321-003	2,693624-003	73,20	-1,816473-003	-1,320737-003
13,80	1,122059-002	4,017140-003	43,80	-6,881650-004	3,689852-003	73,80	-2,226693-003	-6,384713-005
14,40	1,104742-002	-2,897246-003	44,40	1,495094-003	3,387482-003	74,40	-1,858696-003	1,194894-003
15,00	7,180299-003	-8,285441-003	45,00	3,104765-003	1,925507-003	75,00	-8,524652-004	2,019410-003
15,60	1,197355-003	-1,047361-002	45,60	3,601665-003	-1,618319-004	75,60	4,332294-004	2,130976-003
16,20	-4,745026-003	-8,973861-003	46,20	2,843729-003	-2,139145-003	76,20	1,548524-003	1,502213-003
16,80	-8,663154-003	-4,556521-003	46,80	1,124488-003	-3,328007-003	76,80	2,109656-003	3,625929-004
17,40	-9,387148-003	1,093671-003	47,40	-9,390971-004	-3,338824-003	77,40	1,930817-003	-8,850442-004
18,00	-6,891168-003	5,997359-003	48,00	-2,627109-003	-2,197514-003	78,00	1,085408-003	-1,806684-003
18,60	-2,225490-003	8,555913-003	48,60	-3,366973-003	-3,261516-004	78,60	-1,233747-004	-2,087925-003
19,20	2,901881-003	8,057596-003	49,20	-2,926868-003	1,612116-003	79,20	-1,271068-003	-1,641038-003
19,80	6,734851-003	4,858786-003	49,80	-1,487175-003	2,947259-003	79,80	-1,960808-003	-6,319034-004
20,40	8,057739-003	2,001500-004	50,40	4,316003-004	3,233233-003	80,40	-1,960379-003	5,812695-004
21,00	6,569491-003	-4,260071-003	51,00	2,156217-003	2,396228-003	81,00	-1,280194-003	1,574913-003
21,60	2,931942-003	-7,024977-003	51,60	3,096202-003	7,512960-004	81,60	-1,660798-004	2,007812-003
22,20	-1,505776-003	-7,251775-003	52,20	2,945346-003	-1,115268-003	82,20	9,893639-004	1,738106-003
22,80	-5,197467-003	-4,999185-003	52,80	1,780652-003	-2,554213-003	82,80	1,784944-003	8,695224-004
23,40	-6,930099-003	-1,160025-003	53,40	2,705027-005	-3,078530-003	83,40	1,950014-003	-2,881348-004
24,00	-6,214962-003	2,882313-003	54,00	-1,696924-003	-2,527659-003	84,00	1,436378-003	-1,329316-003
24,60	-3,415981-003	5,744771-003	54,60	-2,796700-003	-1,115563-003	84,60	4,318066-004	-1,894642-003
25,20	4,148801-004	6,511279-003	55,20	-2,906161-003	6,513174-004	85,20	-7,083995-004	-1,794797-003
25,80	3,925895-003	5,019840-003	55,80	-2,008920-003	2,155107-003	85,80	-1,586918-003	-1,073744-003
26,40	5,936655-003	1,882056-003	56,40	-4,364249-004	2,882025-003	86,40	-1,902715-003	9,788241-006
27,00	5,829757-003	-1,759226-003	57,00	1,253822-003	2,597407-003	87,00	-1,554052-003	1,074979-003
27,60	3,734807-003	-4,640809-003	57,60	2,475396-003	1,420773-003	87,60	-6,709953-004	1,752619-003
28,20	4,518287-004	-5,812697-003	58,20	2,815924-003	-2,228246-004	88,20	4,328551-004	1,812951-003
28,80	-2,848899-003	-4,947072-003	58,80	2,175805-003	-1,755828-003	88,80	1,371598-003	1,243416-003
29,40	-5,039769-003	-2,423551-003	59,40	7,961876-004	-2,650663-003	89,40	1,821806-003	2,500708-004
30,00	-5,417309-003	8,288498-004	60,00	-8,311993-004	-2,610862-003	90,00	1,633831-003	-8,168058-004
30,60	-3,924368-003	3,669752-003	60,60	-2,138858-003	-1,668785-003	90,60	8,813688-004	-1,586101-003

MUTUAL RADIATION IMPEDANCE
KA = 0.65

SELF IMPEDANCE = 1,968873-001+J4,924971-001 AVE = 6,0060-001+J3,3605-001

KD	RE	IM	KD	RE	IM	KD	RE	IM
1,30	1,466379-001	5.827886-002	33,80	3,873685-003	-4.069905-003	66,30	-9.143934-004	-2.714362-003
1,95	9,515065-002	-3.143304-002	34,45	6,086837-004	-5.478941-003	66,95	-2.347637-003	-1,591837-003
2,60	4,094926-002	-6.184037-002	35,10	-2,779048-003	-4.642295-003	67,60	-2.805037-003	1,520895-004
3,25	-4,383129-003	-5.883359-002	35,75	-4,930599-003	-1.976918-003	68,25	-2.120583-003	1,801357-003
3,90	-3,269767-002	-3.651570-002	36,40	-5,030029-003	1.385224-003	68,90	-5.923233-004	2,691752-003
4,55	-4,121205-002	-7.770512-003	37,05	-3,110243-003	4.074259-003	69,55	1.146691-003	2,477931-003
5,20	-3,273378-002	1.649222-002	37,70	-9,897422-006	5.037341-003	70,20	2.390152-003	1,266805-003
5,85	-1,421107-002	2.929006-002	38,35	2,989299-003	3.947912-003	70,85	2.644917-003	-4,340230-004
6,50	5,822244-003	2.869897-002	39,00	4,689523-003	1.311334-003	71,50	1.826130-003	-1,928518-003
7,15	2,002158-002	1.752868-002	39,65	4.452555-003	-1.764890-003	72,15	2.840213-004	-2,616627-003
7,80	2,432924-002	1.652888-003	40,30	2,436394-003	-4.033602-003	72,80	-1.345351-003	-2,234788-003
8,45	1,878375-002	-1.239370-002	40,95	-4,937414-004	-4.611154-003	73,45	-2.402041-003	-9,563195-004
9,10	6,901125-003	-1,971993-002	41,60	-3,134053-003	-3.319236-003	74,10	-2.469117-003	6,863300-004
9,75	-6,024824-003	-1,854251-002	42,25	-4,434458-003	-7,340537-004	74,75	-1,536760-003	2,022926-003
10,40	-1,502215-002	-1,040878-002	42,90	-3,914135-003	2,067646-003	75,40	8,816660-007	2,518544-003
11,05	-1,718187-002	7,680415-004	43,55	-1,836686-003	3,954940-003	76,05	1,511881-003	1,987287-003
11,70	-1,247256-002	1,040389-002	44,20	9,177750-004	4,197315-003	76,70	2,385878-003	6,613955-004
12,35	-3,434153-003	1,499796-002	44,85	3,223473-003	2,745495-003	77,35	2,280291-003	-9,096925-004
13,00	6,030998-003	1,331355-002	45,50	4,167298-003	2,313439-004	78,00	1,254205-003	-2,086671-003
13,65	1,224801-002	6,612721-003	46,15	3,408745-003	-2,305006-003	78,65	-2,622155-004	-2,400188-003
14,30	1,312590-002	-2,055034-003	46,80	1,300247-003	-3.843804-003	79,30	-1.647708-003	-1,737681-003
14,95	8,802022-003	-9,165604-003	47,45	-1,273543-003	-3,794140-003	79,95	-2,344124-003	-3,830037-004
15,60	1,395715-003	-1,209746-002	48,10	-3,265344-003	-2,219218-003	80,60	-2,080977-003	1,104770-003
16,25	-5,964299-003	-1,005428-002	48,75	-3,889950-003	2,067810-004	81,25	-9,801132-004	2,121767-003
16,90	-1,041693-002	-4,222735-003	49,40	-2,932410-003	2,485701-003	81,90	4,998377-004	2,264137-003
17,55	-1,044557-002	2,835949-003	50,05	-8,192453-004	3,704754-003	82,55	1,754230-003	1,488119-003
18,20	-6,361624-003	8,273980-003	50,70	1,569588-003	3,400876-003	83,20	2,279158-003	1,220465-004
18,85	-5,305746-005	1.007667-002	51,35	3,265861-003	1.735153-003	83,85	1.873611-003	-1,272236-003
19,50	5,855534-003	7,784258-003	52,00	3,604347-003	-5.877824-004	84,50	7,160395-004	-2,130183-003
20,15	9,070394-003	2,565984-003	52,65	2,482542-003	-2.616580-003	85,15	-7.136614-004	-2.112882-003
20,80	8,498829-003	-3.340206-003	53,30	3,879143-004	-3.541700-003	85,80	-1.832842-003	-1,240644-003
21,45	4,599314-003	-7.566640-003	53,95	-1,812545-003	-3.017406-003	86,45	-2.193299-003	1.206611-004
22,10	-6,920461-004	-8.547851-003	54,60	-3,230142-003	-1.289565-003	87,10	-1.660529-003	1,412804-003
22,75	-5,715878-003	-6.085087-003	55,25	-3,312433-003	9.173919-004	87,75	-4.634324-004	2,113868-003
23,40	-8,004331-003	-1.345527-003	55,90	-2,057511-003	2.703203-003	88,40	9.036771-004	1,948835-003
24,05	-6,991661-003	3.671822-003	56,55	-1,912496-006	3.358104-003	89,05	1.884960-003	9,971935-004
24,70	-3,254966-003	6,966386-003	57,20	2,007735-003	2.644052-003	89,70	2.088824-003	-3,444068-004
25,35	1,583882-003	7.322741-003	57,85	3,162548-003	8.797675-004	90,35	1.443971-003	-1,527250-003
26,00	5,550675-003	4.748572-003	58,50	3,016160-003	-1.200140-003	91,00	2.236248-004	-2,074766-003
26,65	7,114697-003	4.100768-004	59,15	1,656347-003	-2.750225-003	91,65	-1.069968-003	-1,774339-003
27,30	5,770893-003	-3.885048-003	59,80	-3,421116-004	-3.157106-003	92,30	-1.912035-003	-7,595890-004
27,95	2,190172-003	-6.432305-003	60,45	-2,159557-003	-2.281438-003	92,95	-1.967970-003	5,485940-004
28,60	-2,100878-003	-6.299394-003	61,10	-3,066914-003	-5.038050-004	93,60	-1.226080-003	1,616421-003
29,25	-5,363176-003	-3.659767-003	61,75	-2,717479-003	1.439718-003	94,25	2.174865-006	2,014821-003
29,90	-6,343356-003	3.255228-004	62,40	-1,278534-003	2.761669-003	94,90	1.212723-003	1,591664-003
30,55	-4,749260-003	4.011209-003	63,05	6,468192-004	2.941616-003	95,55	1.915566-003	5,295325-004
31,20	-1,324645-003	5.941112-003	63,70	2,271761-003	1.930385-003	96,20	1.832942-003	-7,327512-004
31,85	2,489467-003	5.418199-003	64,35	2,946688-003	1.602234-004	96,85	1.008894-003	-1,681250-003
32,50	5,155794-003	2.750255-003	65,00	2,418319-003	-1.639226-003	97,50	-2.128909-004	-1,935990-003
33,15	5,655666-003	-9.128964-004	65,65	9,238628-004	-2.741098-003	98,15	-1.332243-003	-1,403008-003

UNCLASSIFIED

MUTUAL RADIATION IMPEDANCE
KA = 0.70

SELF IMPEDANCE = 2.257890-001+J5.207543-001 AVE = 6.1755-001+J3.2874-001

KD	RE	IM	KD	RE	IM	KD	RE	IM
1.40	1.600013-001	4.719298-002	36.40	-5.734956-003	1.576380-003	71.40	2.294539-003	-1.981871-003
2.10	9.481385-002	-4.747909-002	37.10	-3.306882-003	4.807984-003	72.10	4.735106-004	-2.964940-003
2.80	2.972418-002	-7.265227-002	37.80	5.579785-004	5.700099-003	72.80	-1.533064-003	-2.547990-003
3.50	-1.973989-002	-5.924182-002	38.50	4.024570-003	3.927232-003	73.50	-2.787226-003	-9.519834-004
4.20	-4.442568-002	-2.679679-002	39.20	5.508016-003	4.033529-004	74.20	-2.719158-003	1.057436-003
4.90	-4.381213-002	7.147683-003	39.90	4.393953-003	-3.183258-003	74.90	-1.385397-003	2.536592-003
5.60	-2.516515-002	2.952997-002	40.60	1.287101-003	-5.174628-003	75.60	5.692315-004	2.806353-003
6.30	-1.105897-004	3.446042-002	41.30	-2.309582-003	-4.705681-003	76.30	2.222720-003	1.763346-003
7.00	1.994116-002	2.373162-002	42.00	-4.718077-003	-2.075800-003	77.00	2.810224-003	-8.251917-005
7.70	2.776042-002	4.774364-003	42.70	-4.864692-003	1.428244-003	77.70	2.077305-003	-1.856662-003
8.40	2.225756-002	-1.307270-002	43.40	-2.755248-003	4.158257-003	78.40	3.891705-004	-2.733667-003
9.10	7.912196-003	-2.246897-002	44.10	5.626440-004	4.876698-003	79.10	-1.450504-003	-2.320791-003
9.80	-7.840711-003	-2.067908-002	44.80	3.516317-003	3.314661-003	79.80	-2.581666-003	-8.331890-004
10.50	-1.803668-002	-1.003040-002	45.50	4.750567-003	2.655617-004	80.50	-2.489470-003	1.017010-003
11.20	-1.898575-002	3.714928-003	46.20	3.746746-003	-2.814146-003	81.20	-1.238078-003	2.361097-003
11.90	-1.140390-002	1.419176-002	46.90	1.036851-003	-4.497982-003	81.90	5.692531-004	2.581198-003
12.60	4.071161-004	1.718815-002	47.60	-2.073857-003	-4.047701-003	82.60	2.080481-003	1.593836-003
13.30	1.079074-002	1.219928-002	48.30	-4.133055-003	-1.734173-003	83.30	2.596015-003	-1.202633-004
14.00	1.530670-002	2.252616-003	49.00	-4.217146-003	1.317284-003	84.00	1.892143-003	-1.749701-003
14.70	1.252781-002	-7.755369-003	49.70	-2.343222-003	3.671899-003	84.70	3.173263-004	-2.536066-003
15.40	4.371812-003	-1.336687-002	50.40	5.654933-004	4.257971-003	85.40	-1.379697-003	-2.126526-003
16.10	-5.042628-003	-1.247070-002	51.10	3.132166-003	2.852644-003	86.10	-2.405487-003	-7.316053-004
16.80	-1.139676-002	-6.023582-003	51.80	4.176129-003	1.616708-004	86.80	-2.292481-003	9.821368-004
17.50	-1.209217-002	2.629042-003	52.50	3.254170-003	-2.532563-003	87.50	-1.111685-003	2.210225-003
18.20	-7.261549-003	9.425577-003	53.20	8.459967-004	-3.980356-003	88.20	5.690766-004	2.387533-003
18.90	5.019021-004	1.144642-002	53.90	-1.892370-003	-3.542674-003	88.90	1.957822-003	1.447963-003
19.60	7.482556-003	8.128296-003	54.60	-3.681842-003	-1.471268-003	89.60	2.411240-003	-1.526258-004
20.30	1.058154-002	1.345954-003	55.30	-3.716162-003	1.230946-003	90.30	1.732341-003	-1.657170-003
21.00	8.660312-003	-5.596144-003	56.00	-2.023569-003	3.293858-003	91.00	2.553844-004	-2.365146-003
21.70	2.919377-003	-9.541658-003	56.70	5.672642-004	3.775685-003	91.70	-1.318220-003	-1.958408-003
22.40	-3.793277-003	-8.890929-003	57.40	2.831341-003	2.491523-003	92.40	-2.252682-003	-6.437144-004
23.10	-8.368072-003	-4.222972-003	58.10	3.725182-003	8.054033-005	93.10	-2.121556-003	9.516892-004
23.80	-8.852066-003	2.098782-003	58.80	2.866464-003	-2.310463-003	93.80	-1.002005-003	2.079014-003
24.50	-5.262423-003	7.099809-003	59.50	6.955796-004	-3.571266-003	94.50	5.687393-004	2.219061-003
25.20	5.348643-004	8.575204-003	60.20	-1.748174-003	-3.142543-003	95.20	1.850856-003	1.321035-003
25.90	5.773780-003	6.045327-003	60.90	-3.322948-003	-1.262583-003	95.90	2.250100-003	-1.806641-004
26.60	8.091880-003	8.793184-004	61.60	-3.316756-003	1.161750-003	96.60	1.592942-003	-1.576244-003
27.30	6.561678-003	-4.424731-003	62.30	-1.768211-003	2.991315-003	97.30	2.014249-004	-2.215725-003
28.00	2.128000-003	-7.433836-003	63.00	5.683452-004	3.388904-003	98.00	-1.264272-003	-1.811397-003
28.70	-3.085046-003	-6.884110-003	63.70	2.589165-003	2.201321-003	98.70	-2.118773-003	-5.668983-004
29.40	-6.632956-003	-3.199064-003	64.40	3.361491-003	1.543535-005	99.40	-1.971741-003	9.248220-004
30.10	-6.967931-003	1.784496-003	65.10	2.553156-003	-2.130620-003	100.10	-9.058866-004	1.963752-003
30.80	-4.084205-003	5.721037-003	65.80	5.739394-004	-3.239552-003	100.80	5.682673-004	2.071060-003
31.50	5.499521-004	6.851015-003	66.50	-1.630712-003	-2.817481-003	101.50	1.756659-003	1.209531-003
32.20	4.729470-003	4.779014-003	67.20	-3.030429-003	-1.092830-003	102.20	2.108227-003	-2.051734-004
32.90	6.553574-003	5.948939-004	67.90	-2.990645-003	1.104961-003	102.90	1.470202-003	-1.504788-003
33.60	5.282966-003	-3.688854-003	68.60	-1.559407-003	2.743492-003	103.60	1.539968-004	-2.083880-003
34.30	1.629777-003	-6.097834-003	69.30	5.689567-004	3.071581-003	104.30	-1.216483-003	-1.681674-003
35.00	-2.628573-003	-5.599322-003	70.00	2.389824-003	1.962871-003	105.00	-2.000360-003	-4.991690-004
35.70	-5.507635-003	-2.538060-003	70.70	3.061735-003	-3.795525-005	105.70	-1.839264-003	9.008907-004

MUTUAL RADIATION IMPEDANCE
KA = 0.75

SELF IMPEDANCE = 2.560847-001+J5.470513-001 AVE = 6.3163-001+J3.2180-001

KD	RE	IM	KD	RE	IM	KD	RE	IM
1.50	1.718665-001	3.401850-002	39.00	6.022777-003	1.690235-003	76.50	2.841778-003	1.446756-003
2.25	9.141329-002	-6.380984-002	39.75	5.453830-003	-2.814879-003	77.25	3.035684-003	-8.700169-004
3.00	1.573874-002	-8.102920-002	40.50	2.033023-003	-5.670292-003	78.00	1.612435-003	-2.679832-003
3.75	-3.537488-002	-5.532492-002	41.25	-2.334668-003	-5.433880-003	78.75	-6.407688-004	-3.030747-003
4.50	-5.293237-002	-1.323583-002	42.00	-5.315679-003	-2.341591-003	79.50	-2.510835-003	-1.763947-003
5.25	-4.074978-002	2.278211-002	42.75	-5.389178-003	1.876867-003	80.25	-3.011110-003	4.169400-004
6.00	-1.234867-002	3.889083-002	43.50	-2.617634-003	4.959883-003	81.00	-1.901185-003	2.335761-003
6.75	1.561053-002	3.270846-002	44.25	1.441011-003	5.321526-003	81.75	1.992731-004	2.977399-003
7.50	3.035516-002	1.188972-002	45.00	4.603847-003	2.862673-003	82.50	2.155572-003	2.024092-003
8.25	2.752860-002	-1.094613-002	45.75	5.232616-003	-1.026739-003	83.25	2.930268-003	1.153254-005
9.00	1.158449-002	-2.455224-002	46.50	3.078095-003	-4.248510-003	84.00	2.132661-003	-1.971220-003
9.75	-7.652129-003	-2.385654-002	47.25	-6.337741-004	-5.124049-003	84.75	2.148223-004	-2.870398-003
10.50	-2.030735-002	-1.134152-002	48.00	-3.894805-003	-3.265182-003	85.50	-1.783640-003	-2.226935-003
11.25	-2.107554-002	5.192913-003	48.75	-4.997355-003	2.618944-004	86.25	-2.798491-003	-4.099872-004
12.00	-1.112336-002	1.703703-002	49.50	-3.425131-003	3.543649-003	87.00	-2.307003-003	1.593751-003
12.75	3.282984-003	1.886436-002	50.25	-8.907793-005	4.854001-003	87.75	-5.964651-004	2.715273-003
13.50	1.441864-002	1.091249-002	51.00	3.195945-003	3.559075-003	88.50	1.402455-003	2.373007-003
14.25	1.703935-002	-1.756219-003	51.75	4.695401-003	4.192938-004	89.25	2.621488-003	7.737414-004
15.00	1.069998-002	-1.225938-002	52.50	3.668099-003	-2.852577-003	90.00	2.425129-003	-1.210629-003
15.75	-5.093862-004	-1.548806-002	53.25	7.288887-004	-4.522926-003	90.75	9.413501-004	-2.517895-003
16.50	-1.043705-002	-1.048106-002	54.00	-2.514408-003	-3.753250-003	91.50	-1.019129-003	-2.463602-003
17.25	-1.413795-002	-5.250501-004	54.75	-4.337909-003	-1.017993-003	92.25	-2.405270-003	-1.098874-003
18.00	-1.025308-002	8.870537-003	55.50	-3.815552-003	2.182274-003	93.00	-2.488700-003	8.287850-004
18.75	-1.393141-003	1.294024-002	56.25	-1.286740-003	4.141646-003	93.75	-1.245946-003	2.284400-003
19.50	7.503937-003	1.001466-002	57.00	1.856983-003	3.856007-003	94.50	6.403984-004	2.500740-003
20.25	1.186104-002	2.127385-003	57.75	3.935403-003	1.535272-003	95.25	2.156078-003	1.382247-003
21.00	9.765139-003	-6.297553-003	58.50	3.875605-003	-1.539315-003	96.00	2.500080-003	-4.547410-004
21.75	2.751396-003	-1.087616-002	59.25	1.763749-003	-3.720417-003	96.75	1.507510-003	-2.021108-003
22.50	-5.222445-003	-9.504321-003	60.00	-1.230013-003	-3.875331-003	97.50	-2.725527-004	-2.487116-003
23.25	-9.967988-003	-3.282773-003	60.75	-3.497895-003	-1.972351-003	98.25	-1.880292-003	-1.621517-003
24.00	-9.232322-003	4.257059-003	61.50	-3.856164-003	9.297868-004	99.00	-2.462281-003	9.453986-005
24.75	-3.734929-003	9.123420-003	62.25	-2.161282-003	3.269019-003	99.75	-1.724100-003	1.734439-003
25.50	3.385033-003	8.949471-003	63.00	6.393077-004	3.819084-003	100.50	-7.862696-005	2.426043-003
26.25	8.332610-003	4.118298-003	63.75	3.034941-003	2.330773-003	101.25	1.584350-003	1.815140-003
27.00	8.656250-003	-2.593743-003	64.50	3.765070-003	-3.592069-004	102.00	2.378902-003	2.463141-004
27.75	4.441152-003	-7.588055-003	65.25	2.481086-003	-2.796787-003	102.75	1.894567-003	-1.430825-003
28.50	-1.873298-003	-8.353255-003	66.00	-9.007361-005	-3.695105-003	103.50	4.079267-004	-2.321389-003
29.25	-6.883987-003	-4.710164-003	66.75	-2.555654-003	-2.612517-003	104.25	-1.274656-003	-1.962360-003
30.00	-8.041168-003	1.215850-003	67.50	-3.610175-003	-1.675462-004	105.00	-2.254061-003	-5.629096-004
30.75	-4.930811-003	6.215946-003	68.25	-2.725392-003	2.312611-003	105.75	-2.018543-003	1.116624-003
31.50	6.150870-004	7.720738-003	69.00	-4.131520-004	3.511266-003	106.50	-7.107490-004	2.177502-003
32.25	5.580461-003	5.107661-003	69.75	2.068694-003	2.820073-003	107.25	9.574991-004	2.063189-003
33.00	7.392767-003	-6.587659-005	70.50	3.399371-003	6.462893-004	108.00	2.092317-003	8.509733-004
33.75	5.244585-003	-4.974828-003	71.25	2.896958-003	-1.824909-003	108.75	2.096415-003	-7.980342-004
34.50	4.360072-004	-7.058098-003	72.00	8.665518-004	-3.275482-003	109.50	9.831540-004	-1.999132-003
35.25	-4.396931-003	-5.344913-003	72.75	-1.582229-003	-2.956478-003	110.25	-6.389657-004	-2.118383-003
36.00	-6.717607-003	-8.940832-004	73.50	-3.140592-003	-1.073581-003	111.00	-1.898590-003	-1.106907-003
36.75	-5.411556-003	3.845119-003	74.25	-2.999100-003	1.341592-003	111.75	-2.129296-003	4.810100-004
37.50	-1.311316-003	6.372193-003	75.00	-1.267069-003	2.995694-003	112.50	-1.221891-003	1.791348-003
38.25	3.318103-003	5.447090-003	75.75	1.103900-003	3.025323-003	113.25	3.248608-004	2.129399-003

MUTUAL RADIATION IMPEDANCE
KA = 0.80

SELF IMPEDANCE = 2,876301-001+J5,713090-001 AVE = 6,4330-001+J3,1552-001

KD	RE	IM	KD	RE	IM	KD	RE	IM
1,60	1,819330-001	1,900141-002	41,60	-4,484199-003	-4,762198-003	81,60	-2,778556-004	3,322899-003
2,40	8,489968-002	-7,981082-002	42,40	-6,416948-003	-9,870163-005	82,40	2,168902-003	2,489952-003
3,20	-3,990789-004	-8,629393-002	43,20	-4,457099-003	4,450806-003	83,20	3,265568-003	1,771082-004
4,00	-5,001628-002	-4,703446-002	44,00	8,635859-005	6,183697-003	84,00	2,379273-003	-2,198092-003
4,80	-5,696977-002	3,003907-003	44,80	4,416059-003	4,170141-003	84,80	8,001879-005	-3,207662-003
5,60	-3,192897-002	3,692470-002	45,60	5,961683-003	-2,582994-004	85,60	-2,224343-003	-2,270738-003
6,40	3,870488-003	4,248980-002	46,40	3,899552-003	-4,380003-003	86,40	-3,149209-003	1,353735-005
7,20	2,953823-002	2,374099-002	47,20	-4,183158-004	-5,749772-003	87,20	-2,164284-003	2,247761-003
8,00	3,382114-002	-4,260835-003	48,00	-4,342679-003	-3,643800-003	88,00	1,036759-004	3,090238-003
8,80	1,858807-002	-2,478049-002	48,80	-5,546982-003	5,674457-004	88,80	2,268445-003	2,059852-003
9,60	-4,466850-003	-2,803361-002	49,60	-3,401551-003	4,304124-003	89,60	3,030780-003	-1,905044-004
10,40	-2,145093-002	-1,503881-002	50,40	7,065948-004	5,352458-003	90,40	1,957390-003	-2,286490-003
11,20	-2,388545-002	4,586016-003	51,20	4,264376-003	3,171643-003	91,20	-2,741226-004	-2,970863-003
12,00	-1,244064-002	1,898366-002	52,00	5,165456-003	-8,365577-004	92,00	-2,301985-003	-1,856851-003
12,80	4,658522-003	2,075946-002	52,80	2,953056-003	-4,223467-003	92,80	-2,910517-003	3,546239-004
13,60	1,707687-002	1,045317-002	53,60	-9,580341-004	-4,985322-003	93,60	-1,758193-003	2,315015-003
14,40	1,831392-002	-4,703423-003	54,40	-4,181430-003	-2,744892-003	94,40	4,320953-004	2,849772-003
15,20	8,881394-003	-1,555485-002	55,20	-4,811483-003	1,071643-003	95,20	2,325660-003	1,661375-003
16,00	-4,730707-003	-1,634430-002	56,00	-2,546357-003	4,138297-003	96,00	2,788659-003	-5,066184-004
16,80	-1,430832-002	-7,605502-003	56,80	1,177934-003	4,643434-003	96,80	1,566365-003	-2,333997-003
17,60	-1,472065-002	4,746024-003	57,60	4,094098-003	2,356750-003	97,60	-5,782696-004	-2,727205-003
18,40	-6,547830-003	1,326579-002	58,40	4,480726-003	-1,277397-003	98,40	-2,340100-003	-1,473129-003
19,20	4,752771-003	1,335644-002	59,20	2,175444-003	-4,048862-003	99,20	-2,665442-003	6,471209-004
20,00	1,237847-002	5,655816-003	60,00	-1,370471-003	-4,322963-003	100,00	-1,381641-003	2,344039-003
20,80	1,219181-002	-4,753088-003	60,80	-4,002621-003	-2,001881-003	100,80	7,132400-004	2,603399-003
21,60	4,892617-003	-1,161196-002	61,60	-4,169793-003	1,457549-003	101,60	2,345882-003	1,291875-003
22,40	-4,748383-003	-1,118406-002	62,40	-1,835564-003	3,955401-003	102,40	2,541107-003	-7,766910-004
23,20	-1,094132-002	-4,231639-003	63,20	1,538985-003	4,020901-003	103,20	1,203808-003	-2,345693-003
24,00	-1,030189-002	4,739611-003	64,00	3,907233-003	1,676042-003	104,00	-8,375343-004	-2,478594-003
24,80	-3,653207-003	1,034798-002	64,80	3,876009-003	-1,615101-003	104,80	-2,343536-003	-1,117419-003
25,60	4,727444-003	9,521845-003	65,60	1,522915-003	-3,858144-003	105,60	-2,415891-003	8,958274-004
26,40	9,817885-003	3,142454-003	66,40	-1,686187-003	-3,734865-003	106,40	-1,032689-003	2,339472-003
27,20	8,825990-003	-4,712363-003	67,20	-3,808163-003	-1,375818-003	107,20	9,516249-004	2,353028-003
28,00	2,687933-003	-9,340175-003	68,00	-3,597246-003	1,752508-003	108,00	2,333558-003	9,496031-004
28,80	-4,694725-003	-8,200396-003	68,80	-1,234423-003	3,757319-003	108,80	2,290034-003	-1,004979-003
29,60	-8,906330-003	-2,280693-003	69,60	1,814303-003	3,462950-003	109,60	8,681452-004	-2,325853-003
30,40	-7,634072-003	4,674797-003	70,40	3,705639-003	1,098432-003	110,40	-1,055939-003	-2,226940-003
31,20	-1,913628-003	8,509578-003	71,20	3,331798-003	-1,871795-003	111,20	-2,316411-003	-7,883021-004
32,00	4,652786-003	7,118231-003	72,00	9,675753-004	-3,653153-003	112,00	-2,163773-003	1,104552-003
32,80	8,144469-003	1,581030-003	72,80	-1,925185-003	-3,203626-003	112,80	-7,100619-004	2,305286-003
33,60	6,645766-003	-4,628855-003	73,60	-3,599889-003	-8,416062-004	113,60	1,150865-003	2,100565-003
34,40	1,278260-003	-7,806567-003	74,40	-3,078289-003	1,974660-003	114,40	2,292531-003	6,334137-004
35,20	-4,603132-003	-6,210869-003	75,20	-7,203005-004	3,545875-003	115,20	2,037345-003	-1,194921-003
36,00	-7,492227-003	-1,001506-003	76,00	2,020391-003	2,955655-003	116,00	5,583477-004	-2,278196-003
36,80	-5,808745-003	4,575723-003	76,80	3,491141-003	6,034530-004	116,80	-1,236763-003	-1,974141-003
37,60	-7,476125-004	7,198428-003	77,60	2,835607-003	-2,062539-003	117,60	-2,262332-003	-4,848554-004
38,40	4,546717-003	5,435404-003	78,40	4,908756-004	-3,435714-003	118,40	-1,910984-003	1,276431-003
39,20	6,922645-003	5,139394-004	79,20	-2,101250-003	-2,718036-003	119,20	-4,129287-004	2,244988-003
40,00	5,087498-003	-4,516188-003	80,00	-3,379623-003	-3,823961-004	120,00	1,313964-003	1,847901-003
40,80	2,982643-004	-6,662752-003	80,80	-2,602847-003	2,136661-003	120,80	2,226212-003	3,425606-004

MUTUAL RADIATION IMPEDANCE
KA = 0.85

SELF IMPEDANCE = 3.202762-001+J5.934597-001 AVE = 6.5290-001+J3.1009-001

KD	RE	IM	KD	RE	IM	KD	RE	IM
1.70	1.899427-001	2.429562-003	44.20	1.441536-003	6.649459-003	86.70	-3.309359-003	1.038419-003
2.55	7.534873-002	-9.486702-002	45.05	5.835030-003	3.242690-003	87.55	-1.390281-003	3.140832-003
3.40	-1.792190-002	-8.793307-002	45.90	6.170575-003	-2.202541-003	88.40	1.428280-003	3.087381-003
4.25	-6.240628-002	-3.470203-002	46.75	2.373343-003	-5.978913-003	89.25	3.231080-003	9.553291-004
5.10	-5.573036-002	2.036602-002	47.60	-2.873627-003	-5.626504-003	90.10	2.823254-003	-1.780048-003
5.95	-1.812060-002	4.742869-002	48.45	-6.016286-003	-1.526809-003	90.95	5.210053-004	-3.265063-003
6.80	2.085061-002	3.917405-002	49.30	-5.029232-003	3.452019-003	91.80	-2.089642-003	-2.522690-003
7.65	3.839230-002	8.930386-003	50.15	-7.130899-004	5.954015-003	92.65	-3.244337-003	-9.409408-005
8.50	2.877593-002	-2.071537-002	51.00	3.936063-003	4.390606-003	93.50	-2.191747-003	2.353752-003
9.35	3.050545-003	-3.207608-002	51.85	5.799635-003	-5.873550-005	94.35	3.189693-004	3.171217-003
10.20	-2.027465-002	-2.146582-002	52.70	3.722252-003	-4.325223-003	95.20	2.569867-003	1.836721-003
11.05	-2.723025-002	1.021502-003	53.55	-7.805575-004	-5.561276-003	96.05	3.048727-003	-7.121804-004
11.90	-1.594838-002	1.963818-002	54.40	-4.620058-003	-3.035488-003	96.90	1.464058-003	-2.736285-003
12.75	3.970190-003	2.327214-002	55.25	-5.247583-003	1.445284-003	97.75	-1.080038-003	-2.880533-003
13.60	1.885606-002	1.158420-002	56.10	-2.341230-003	4.822196-003	98.60	-2.852111-003	-1.080251-003
14.45	1.989671-002	-6.152780-003	56.95	2.046878-003	4.867626-003	99.45	-2.670868-003	1.417611-003
15.30	8.022690-003	-1.795699-002	57.80	4.934284-003	1.649903-003	100.30	-6.917455-004	2.917246-003
16.15	-7.774904-003	-1.693142-002	58.65	4.430797-003	-2.580382-003	101.15	1.720586-003	2.424454-003
17.00	-1.696089-002	-5.056511-003	59.50	9.713532-004	-4.959935-003	102.00	2.932365-003	3.048491-004
17.85	-1.427338-002	8.964326-003	60.35	-3.041941-003	-3.946709-003	102.85	2.146421-003	-1.985321-003
18.70	-2.555714-003	1.588377-002	61.20	-4.903657-003	-3.147636-004	103.70	-7.435987-005	-2.898883-003
19.55	9.805717-003	1.185909-002	62.05	-3.425087-003	3.428802-003	104.55	-2.208871-003	-1.842216-003
20.40	1.473990-002	4.348998-004	62.90	3.114216-004	4.770781-003	105.40	-2.818913-003	4.401130-004
21.25	9.648533-003	-1.035852-002	63.75	3.739307-003	2.875657-003	106.25	-1.517515-003	2.389016-003
22.10	-1.364434-003	-1.354264-002	64.60	4.567366-003	-8.995659-004	107.10	7.870285-004	2.695216-003
22.95	-1.066678-002	-7.616250-003	65.45	2.308036-003	-3.972880-003	107.95	2.524270-003	1.178133-003
23.80	-1.230495-002	2.883974-003	66.30	-1.442900-003	-4.300113-003	108.80	2.531138-003	-1.110180-003
24.65	-5.746039-003	1.076478-002	67.15	-4.129991-003	-1.731629-003	109.65	8.299331-004	-2.613884-003
25.50	4.154628-003	1.103951-002	68.00	-3.976259-003	1.935572-003	110.50	-1.405156-003	-2.330547-003
26.35	1.068054-002	4.027669-003	68.85	-1.155517-003	4.212115-003	111.35	-2.657834-003	-4.787384-004
27.20	9.758755-003	-5.200290-003	69.70	2.372684-003	3.603473-003	112.20	-2.097757-003	1.668112-003
28.05	2.454755-003	-1.043787-002	70.55	4.221682-003	5.883670-004	113.05	-1.302444-004	2.656804-003
28.90	-6.040267-003	-8.474891-003	71.40	3.189747-003	-2.750317-003	113.90	1.895813-003	1.837456-003
29.75	-1.005776-002	-1.023332-003	72.25	3.833368-005	-4.162008-003	114.75	2.612153-003	-2.100616-004
30.60	-7.199780-003	6.690871-003	73.10	-3.065551-003	-2.743285-003	115.60	1.554621-003	-2.085666-003
31.45	2.691274-004	9.559246-003	73.95	-4.037227-003	4.870226-004	116.45	-5.369776-004	-2.525881-003
32.30	7.166496-003	5.944878-003	74.80	-2.272394-003	3.316459-003	117.30	-2.235736-003	-1.254435-003
33.15	8.959960-003	-1.424395-003	75.65	9.808121-004	3.852207-003	118.15	-2.400575-003	8.456580-004
34.00	4.721133-003	-7.480341-003	76.50	3.502105-003	1.785368-003	119.00	-9.422075-004	2.344766-003
34.85	-2.443984-003	-8.276490-003	77.35	3.612463-003	-1.436881-003	119.85	1.131677-003	2.239360-003
35.70	-7.644905-003	-3.538891-003	78.20	1.290387-003	-3.622514-003	120.70	2.412174-003	6.232856-004
36.55	-7.524593-003	3.329502-003	79.05	-1.849868-003	-3.324060-003	121.55	2.045834-003	-1.391087-003
37.40	-2.407796-003	7.672312-003	79.90	-3.678646-003	-7.954076-004	122.40	3.029746-004	-2.438042-003
38.25	4.062900-003	6.719317-003	80.75	-2.993516-003	2.215245-003	123.25	-1.620461-003	-1.824002-003
39.10	7.574522-003	1.336702-003	81.60	-3.080673-004	3.672344-003	124.10	-2.423102-003	1.354219-005
39.95	5.875061-003	-4.706659-003	82.45	2.529354-003	2.627697-003	124.95	-1.578204-003	1.816938-003
40.80	3.335906-004	-7.363466-003	83.30	3.606284-003	-1.644080-003	125.80	3.212802-004	2.368705-003
41.65	-5.203905-003	-5.005585-003	84.15	2.233713-003	-2.789424-003	126.65	1.978248-003	1.313042-003
42.50	-7.051107-003	5.944993-004	85.00	-6.152891-004	-3.483911-003	127.50	2.276786-003	-6.155244-004
43.35	-4.123992-003	5.578490-003	85.85	-2.993577-003	-1.818813-003	128.35	1.033300-003	-2.102732-003

UNCLASSIFIED

MUTUAL RADIATION IMPEDANCE
KA = 0,90

SELF IMPEDANCE = 3,538701-001+J6,134468-001 AVE = 6,6071-001+J3,0569-001

KD	RE	IM	KD	RE	IM	KD	RE	IM
1,80	1,956855-001	-1,537460-002	46,80	2,271412-003	-6,666771-003	91,80	-2,289641-003	-2,765570-003
2,70	6,295853-002	-1,083884-001	47,70	-3,738916-003	-5,811294-003	92,70	-3,554756-003	7,378763-005
3,60	-3,594832-002	-8,563294-002	48,60	-6,748987-003	-6,703544-004	93,60	-2,131119-003	2,803233-003
4,50	-7,141443-002	-1,902267-002	49,50	-4,634132-003	4,781770-003	94,50	8,628984-004	3,379367-003
5,40	-4,896465-002	3,707025-002	50,40	8,501078-004	6,484455-003	95,40	3,153530-003	1,411209-003
6,30	-8,904321-004	5,254572-002	51,30	5,509727-003	3,305446-003	96,30	3,037019-003	-1,578197-003
7,20	3,561861-002	2,900552-002	52,20	5,910284-003	-2,222645-003	97,20	6,454963-004	-3,328902-003
8,10	3,981848-002	-8,900395-003	53,10	1,899667-003	-5,909532-003	98,10	-2,186180-003	-2,551246-003
9,00	1,590578-002	-3,307615-002	54,00	-3,391100-003	-5,075226-003	99,00	-3,326885-003	1,255268-004
9,90	-1,462481-002	-2,997505-002	54,90	-5,983793-003	-4,899171-004	99,90	-1,951900-003	2,659923-003
10,80	-2,985996-002	-6,523275-003	55,80	-4,036894-003	4,312280-003	100,80	8,625574-004	3,153979-003
11,70	-2,181827-002	1,787685-002	56,70	8,551066-004	5,749960-003	101,70	2,980185-003	1,273455-003
12,60	4,432931-004	2,618349-002	57,60	4,957116-003	2,858732-003	102,60	2,825015-003	-1,529384-003
13,50	1,941390-002	1,484287-002	58,50	5,238733-003	-2,073916-003	103,50	5,531416-004	-3,136090-003
14,40	2,220565-002	-5,628228-003	59,40	1,606877-003	-5,311177-003	104,40	-2,094573-003	-2,362138-003
15,30	8,824051-003	-1,966955-002	60,30	-3,114582-003	-4,491957-003	105,30	-3,125386-003	1,709870-004
16,20	-9,384397-003	-1,806696-002	61,20	-5,374520-003	-3,470501-004	106,20	-1,793460-003	2,532868-003
17,10	-1,893509-002	-3,662133-003	62,10	-3,560150-003	3,936560-003	107,10	8,619751-004	2,954270-003
18,00	-1,389876-002	1,193601-002	63,00	8,583992-004	5,160922-003	108,00	2,826240-003	1,151472-003
18,90	6,860555-004	1,743380-002	63,90	4,511935-003	2,499745-003	108,90	2,636800-003	-1,485764-003
19,80	1,344708-002	9,824207-003	64,80	4,696537-003	-1,953160-003	109,80	4,712803-004	-2,964549-003
20,70	1,535383-002	-4,241106-003	65,70	1,370202-003	-4,826055-003	110,70	-2,012794-003	-2,193944-003
21,60	5,956522-003	-1,405446-002	66,60	-2,889241-003	-4,018067-003	111,60	-2,945795-003	2,112259-004
22,50	-7,019143-003	-1,286309-002	67,50	-4,877533-003	-2,311195-004	112,50	-1,652314-003	2,419334-003
23,40	-1,388431-002	-2,396424-003	68,40	-3,170538-003	3,628781-003	113,40	8,611863-004	2,775963-003
24,30	-1,011539-002	9,041829-003	69,30	8,605485-004	4,677666-003	114,30	2,688486-003	1,042661-003
25,20	7,705146-004	1,305991-002	70,20	4,145315-003	2,204794-003	115,20	2,468476-003	-1,446481-003
26,10	1,034175-002	7,252371-003	71,10	4,249291-003	-1,853019-003	116,10	3,982111-004	-2,810816-003
27,00	1,170473-002	-3,476148-003	72,00	1,174844-003	-4,424473-003	117,00	-1,939251-003	-2,043294-003
27,90	4,403130-003	-1,096491-002	72,90	-2,701870-003	-3,625167-003	117,90	-2,784601-003	2,470737-004
28,80	-5,671462-003	-9,942732-003	73,80	-4,464089-003	-1,351652-004	118,80	-1,525718-003	2,317168-003
29,70	-1,097123-002	-1,682783-003	74,70	-2,845975-003	3,371798-003	119,70	8,602170-004	2,615683-003
30,60	-7,897029-003	7,327586-003	75,60	8,618933-004	4,273749-003	120,60	2,564385-003	9,449646-004
31,50	8,093178-004	1,043370-002	76,50	3,837877-003	1,958023-003	121,50	2,316954-003	-1,410854-003
32,40	8,436050-003	5,687568-003	77,40	3,873800-003	-1,768503-003	122,40	3,325844-004	-2,672143-003
33,30	9,436409-003	-2,991316-003	78,30	1,010794-003	-4,086285-003	123,30	-1,872678-003	-1,907504-003
34,20	3,428365-003	-9,008266-003	79,20	-2,543443-003	-3,293916-003	124,20	-2,639007-003	2,791907-004
35,10	-4,800255-003	-8,071901-003	80,10	-4,114486-003	-5,444133-005	125,10	-1,411480-003	2,224650-003
36,00	-9,074272-003	-1,224604-003	81,00	-2,571266-003	3,153784-003	126,00	8,590868-004	2,470729-003
36,90	-6,438026-003	6,192968-003	81,90	8,626472-004	3,930862-003	126,90	2,451902-003	8,567351-004
37,80	8,301297-004	8,680794-003	82,80	3,576129-003	1,748413-003	127,80	2,179754-003	-1,378335-003
38,70	7,146336-003	4,634488-003	83,70	3,553859-003	-1,696108-003	128,70	2,733157-004	-2,546318-003
39,60	7,888717-003	-2,656280-003	84,60	8,710384-004	-3,797341-003	129,60	-1,812052-003	-1,784413-003
40,50	-2,759321-003	-7,656888-003	85,50	-2,407579-003	-3,010679-003	130,50	-2,506757-003	3,081089-004
41,40	-4,190268-003	-6,770087-003	86,40	-3,814763-003	1,439997-005	131,40	-1,307831-003	2,140386-003
42,30	-7,739714-003	-9,054628-004	87,30	-2,335610-003	2,966316-003	132,30	8,578111-004	2,338915-003
43,20	-5,404771-003	5,385838-003	88,20	8,629505-004	3,635931-003	133,20	2,349385-003	7,766379-004
44,10	8,424104-004	7,426754-003	89,10	3,350390-003	1,568076-003	134,10	2,054864-003	-1,348481-003
45,00	6,214749-003	3,876923-003	90,00	3,277802-003	-1,633298-003	135,00	2,195234-004	-2,431542-003
45,90	6,764510-003	-2,410656-003	90,90	7,505197-004	-3,547407-003	135,90	-1,756541-003	-1,672263-003

MUTUAL RADIATION IMPEDANCE
KA = 0.95

SELF IMPEDANCE = 3.882557-001+J6.312258-001 AVE = 6.6706-001+J3.0254-001

KD	RE	IM	KD	RE	IM	KD	RE	IM
1.90	1.990037-001	-3.406224-002	49.40	-5.548656-003	4.678914-003	96.90	1.747161-003	-3.261488-003
2.85	4.804176-002	-1.198341-001	50.35	5.680648-004	7.098426-003	97.85	-1.620838-003	-3.286064-003
3.80	-5.353593-002	-7.930284-002	51.30	5.991653-003	3.598528-003	98.80	-3.580995-003	-5.872481-004
4.75	-7.614152-002	-1.004839-003	52.25	6.295510-003	-2.730463-003	99.75	-2.536235-003	2.546813-003
5.70	-3.703396-002	5.131401-002	53.20	1.414726-003	-6.589420-003	100.70	5.907840-004	3.510998-003
6.65	1.760088-002	5.121305-002	54.15	-4.457786-003	-4.895924-003	101.65	3.169680-003	1.547070-003
7.60	4.542229-002	1.331678-002	55.10	-6.461998-003	7.652206-004	102.60	3.073400-003	-1.662887-003
8.55	3.299863-002	-2.605451-002	56.05	-3.082822-003	5.604982-003	103.55	4.310625-004	-3.435423-003
9.50	-1.903703-003	-3.777283-002	57.00	2.720245-003	5.671605-003	104.50	-2.520607-003	-2.327553-003
10.45	-2.896996-002	-1.849342-002	57.95	6.094183-003	1.068164-003	105.45	-3.329182-003	6.901956-004
11.40	-2.920559-002	1.179219-002	58.90	4.342268-003	-4.266114-003	106.40	-1.362774-003	3.081746-003
12.35	-6.780642-003	2.826517-002	59.85	-9.296832-004	-5.918072-003	107.35	1.698925-003	2.875393-003
13.30	1.771147-002	2.036062-002	60.80	-5.271119-003	-2.643924-003	108.30	3.297945-003	2.880230-004
14.25	2.506675-002	-2.421894-003	61.75	-5.136303-003	2.707682-003	109.25	2.133875-003	-2.493231-003
15.20	1.180013-002	-2.044593-002	62.70	-7.730050-004	5.665832-003	110.20	-7.800691-004	-3.158516-003
16.15	-9.210181-003	-2.021689-002	63.65	4.097166-003	3.865684-003	111.15	-2.997123-003	-1.192400-003
17.10	-2.059252-002	-4.013947-003	64.60	5.446305-003	-1.068447-003	112.10	-2.690267-003	1.729572-003
18.05	-1.443014-002	1.366628-002	65.55	2.265349-003	-4.978507-003	113.05	-1.566382-004	3.167526-003
19.00	2.598533-003	1.870000-002	66.50	-2.693088-003	-4.670746-003	114.00	2.464723-003	1.953449-003
19.95	1.593022-002	8.336633-003	67.45	-5.290226-003	-5.186176-004	114.95	2.997658-003	-8.614279-004
20.90	1.531323-002	-7.747921-003	68.40	-3.450293-003	3.946067-003	115.90	1.034390-003	-2.915342-003
21.85	2.483855-003	-1.622594-002	69.35	1.186573-003	5.031932-003	116.85	-1.755351-003	-2.516537-003
22.80	-1.126844-002	-1.097589-002	70.30	4.718706-003	1.935084-003	117.80	-3.043305-003	-3.565791-005
23.75	-1.486178-002	2.676236-003	71.25	4.261111-003	-2.676681-003	118.75	-1.784811-003	2.435120-003
24.70	-6.214022-003	1.312272-002	72.20	2.971822-004	-4.956949-003	119.70	9.351340-004	2.845482-003
25.65	6.802319-003	1.221524-002	73.15	-3.809200-003	-3.084356-003	120.65	2.836016-003	8.874288-004
26.60	1.339691-002	1.511717-003	74.10	-4.663982-003	1.287813-003	121.60	2.352956-003	-1.776703-003
27.55	8.708179-003	-9.674943-003	75.05	-1.644169-003	4.485411-003	122.55	-7.597350-005	-2.924559-003
28.50	-2.714320-003	-1.228644-002	76.00	2.658616-003	3.897043-003	123.50	-2.404459-003	-1.626722-003
29.45	-1.120064-002	-4.776569-003	76.95	4.658160-003	1.028190-004	124.45	-2.701042-003	1.001919-003
30.40	-1.007387-002	6.136866-003	77.90	2.759005-003	-3.683833-003	125.40	-7.504054-004	2.758819-003
31.35	-8.389915-004	1.140752-002	78.85	-1.375010-003	-4.334132-003	126.35	1.794008-003	2.198469-003
32.30	8.533937-003	7.100813-003	79.80	-4.273825-003	-1.385786-003	127.30	2.810677-003	-1.791539-004
33.25	1.043243-002	-2.733034-003	80.75	-3.570629-003	2.639013-003	128.25	1.478133-003	-2.372772-003
34.20	3.736501-003	-9.796416-003	81.70	6.897838-005	4.387847-003	129.20	-1.062409-003	-2.563533-003
35.15	-5.640002-003	-8.500460-003	82.65	3.567860-003	2.467417-003	130.15	-2.683480-003	-6.223717-004
36.10	-9.926787-003	-3.457675-004	83.60	4.035958-003	-1.450358-003	131.10	-2.052178-003	1.807593-003
37.05	-5.898903-003	7.672518-003	84.55	1.154653-003	-4.080228-003	132.05	2.746521-004	2.701142-003
38.00	2.740824-003	9.029205-003	85.50	-2.617964-003	-3.275723-003	133.00	2.340093-003	1.338146-003
38.95	8.721155-003	2.947649-003	86.45	-4.141325-003	2.217221-004	133.95	2.432273-003	-1.117142-003
39.90	7.291942-003	-5.252262-003	87.40	-2.204259-003	3.459636-003	134.90	5.025149-004	-2.609768-003
40.85	-3.116011-005	-8.777488-003	88.35	1.515576-003	3.764426-003	135.85	-1.817744-003	-1.913315-003
41.80	-6.995804-003	-4.963967-003	89.30	3.901699-003	9.466192-004	136.80	-2.595516-003	3.631300-004
42.75	-7.926570-003	2.741726-003	90.25	3.007479-003	-2.595541-003	137.75	-1.205989-003	2.306456-003
43.70	-2.327887-003	7.867818-003	91.20	-3.581902-004	-3.914891-003	138.70	1.166585-003	2.306675-003
44.65	4.939059-003	6.331862-003	92.15	-3.357859-003	-1.965305-003	139.65	2.537492-003	3.901338-004
45.60	7.856181-003	-3.282639-004	93.10	-3.515534-003	1.572035-003	140.60	1.781219-003	-1.824708-003
46.55	4.214287-003	-6.447391-003	94.05	-7.583743-004	3.735913-003	141.55	-4.451613-004	-2.493420-003
47.50	-2.737868-003	-7.034438-003	95.00	2.571806-003	2.762025-003	142.50	-2.271894-003	-1.080999-003
48.45	-7.171224-003	-1.827523-003	95.95	3.705581-003	-4.806090-004	143.45	-2.186235-003	1.211144-003

MUTUAL RADIATION IMPEDANCE
KA = 1.00

SELF IMPEDANCE = 4.232752-001+J6.467637-001 AVE = 6.7234-001+J3.0077-001

KD	RE	IM	KD	RE	IM	KD	RE	IM
2.00	1.997955-001	-5.326669-002	52.00	7.354848-003	-1.177102-003	102.00	3.776386-003	3.953930-004
3.00	3.101312-002	-1.287343-001	53.00	2.926411-003	-6.696369-003	103.00	2.349988-003	-2.935367-003
4.00	-6.973851-002	-6.908413-002	54.00	-3.979120-003	-5.967571-003	104.00	-1.188866-003	-3.529138-003
5.00	-7.600425-002	1.810856-002	55.00	-7.041046-003	1.223855-004	105.00	-3.577634-003	-8.976867-004
6.00	-2.089108-002	6.148194-002	56.00	-3.634707-003	5.884273-003	106.00	-2.662960-003	2.501690-003
7.00	3.489734-002	4.324421-002	57.00	2.935686-003	6.128097-003	107.00	6.601509-004	3.558881-003
8.00	4.826254-002	-5.478348-003	58.00	6.626570-003	8.257098-004	108.00	3.320374-003	1.354638-003
9.00	1.892331-002	-3.877385-002	59.00	4.202307-003	-5.043295-003	109.00	2.906931-003	-2.043231-003
10.00	-2.025074-002	-3.310910-002	60.00	-1.940833-003	-6.156518-003	110.00	-1.474223-004	-3.517783-003
11.00	-3.526313-002	-6.858051-004	61.00	-6.127157-003	-1.665028-003	111.00	-3.012416-003	-1.760544-003
12.00	-1.793498-002	2.688904-002	62.00	-4.635299-003	4.187871-003	112.00	-3.081269-003	1.569560-003
13.00	1.198469-002	2.731526-002	63.00	1.003730-003	6.065280-003	113.00	-3.409625-004	3.410391-003
14.00	2.735758-002	4.299451-003	64.00	5.558001-003	2.394103-003	114.00	2.662007-003	2.110817-003
15.00	1.714595-002	-1.933661-002	65.00	4.940159-003	-3.331610-003	115.00	3.186506-003	-1.090024-003
16.00	-6.594084-003	-2.331084-002	66.00	-1.325969-004	-5.866801-003	116.00	7.974538-004	-3.242117-003
17.00	-2.181911-002	-6.609964-003	67.00	-4.933804-003	-3.012328-003	117.00	-2.277692-003	-2.402006-003
18.00	-1.637377-002	1.398014-002	68.00	-5.123905-003	2.487257-003	118.00	-3.224290-003	6.136194-004
19.00	2.778901-003	2.020536-002	69.00	-6.654019-004	5.573554-003	119.00	-1.215392-003	3.019123-003
20.00	1.758311-002	8.137094-003	70.00	4.268787-003	3.520066-003	120.00	1.868174-003	2.631805-003
21.00	1.556192-002	-9.913221-003	71.00	5.194171-003	-1.666626-003	121.00	3.197318-003	-1.488619-004
22.00	5.343371-005	-1.761164-002	72.00	1.384238-003	-5.198080-003	122.00	1.589073-003	-2.748196-003
23.00	-1.415195-002	-9.137226-003	73.00	-3.576644-003	-3.918719-003	123.00	-1.442175-003	-2.799047-003
24.00	-1.469243-002	6.687865-003	74.00	-5.159235-003	8.805391-004	124.00	-3.109253-003	-2.963200-004
25.00	-2.211519-003	1.533818-002	75.00	-2.019084-003	4.752966-003	125.00	-1.913806-003	2.436626-003
26.00	1.126494-002	9.753080-003	76.00	2.870486-003	4.210758-003	126.00	1.008298-003	2.903680-003
27.00	1.376219-002	-4.058639-003	77.00	5.027992-003	-1.387500-004	127.00	2.964630-003	7.146901-004
28.00	3.872250-003	-1.328254-002	78.00	2.566363-003	-4.250781-003	128.00	2.185941-003	-2.092064-003
29.00	-8.774512-003	-1.007214-002	79.00	-2.162756-003	-4.399723-003	129.00	-5.748974-004	-2.946722-003
30.00	-1.277498-002	1.880595-003	80.00	-4.809916-003	-5.501185-004	130.00	-2.768753-003	-1.099792-003
31.00	-5.144996-003	1.138760-002	81.00	-3.023767-003	3.703995-003	131.00	-2.402896-003	1.722393-003
32.00	6.592494-003	1.015267-002	82.00	1.465145-003	4.490192-003	132.00	1.499533-004	2.930209-003
33.00	1.173814-002	-6.291322-005	83.00	4.514970-003	1.178634-003	133.00	2.527579-003	1.446024-003
34.00	6.101914-003	-9.621099-003	84.00	3.390267-003	-3.124874-003	134.00	2.563152-003	-1.335589-003
35.00	-4.664041-003	-1.003653-002	85.00	-7.885005-004	-4.487731-003	135.00	2.590426-004	-2.857122-003
36.00	-1.066105-002	-1.454265-003	86.00	-4.153519-003	-1.740602-003	136.00	-2.247600-003	-1.748700-003
37.00	-6.793534-003	7.965263-003	87.00	-3.666101-003	2.525377-003	137.00	-2.666245-003	9.395917-004
38.00	2.953977-003	9.755895-003	88.00	1.427399-004	4.398816-003	138.00	-6.451919-004	2.731304-003
39.00	9.554332-003	2.712319-003	89.00	3.736215-003	2.231098-003	139.00	1.935714-003	2.004091-003
40.00	7.257327-003	-6.411038-003	90.00	3.852735-003	-1.917035-003	140.00	2.712731-003	-5.421688-004
41.00	-1.439091-003	-9.337008-003	91.00	4.632288-004	-4.230748-003	141.00	1.002282-003	-2.557366-003
42.00	-8.429304-003	-3.741269-003	92.00	-3.273873-003	-2.646489-003	142.00	-1.599101-003	-2.209451-003
43.00	-7.522655-003	4.954715-003	93.00	-3.952817-003	1.310838-003	143.00	-2.704141-003	1.507990-004
44.00	1.035767-004	8.802373-003	94.00	-1.021578-003	3.991538-003	144.00	-1.324866-003	2.340582-003
45.00	7.297629-003	4.564049-003	95.00	2.777343-003	2.984433-003	145.00	1.245087-003	2.363032-003
46.00	7.613748-003	-3.595836-003	96.00	3.970106-003	-7.171236-004	146.00	2.642922-003	2.274457-004
47.00	1.063794-003	-8.172030-003	97.00	1.525621-003	-3.689798-003	147.00	1.608324-003	-2.086779-003
48.00	-6.171047-003	-5.199147-003	98.00	-2.257378-003	-3.243867-003	148.00	-8.810193-004	-2.464076-003
49.00	-7.551545-003	2.335830-003	99.00	-3.909389-003	1.454718-004	149.00	-2.532362-003	-5.860042-004
50.00	-2.071489-003	7.464327-003	100.00	-1.969854-003	3.334604-003	150.00	-1.848916-003	1.802215-003
51.00	5.061136-003	5.662297-003	101.00	1.724500-003	3.424973-003	151.00	5.141399-004	2.512792-003

MUTUAL RADIATION IMPEDANCE
KA = 1.20

SELF IMPEDANCE = 5.665123-001+J6.862665-001 AVE = 6.8939-001+J3.0691-001

KD	RE	IM	KD	RE	IM	KD	RE	IM
2.40	1.776533-001	-1.277991-001	62.40	-3.375523-003	7.207343-003	122.40	5.068241-004	-4.025352-003
3.60	-4.737824-002	-1.329233-001	63.60	5.391353-003	5.648478-003	123.60	-3.533549-003	-1.912142-003
4.80	-1.047463-001	4.193911-004	64.80	7.084186-003	-2.923815-003	124.80	-3.033073-003	2.575611-003
6.00	-2.852089-002	7.838780-002	66.00	-1.560358-004	-7.522858-003	126.00	1.289226-003	3.724385-003
7.20	5.266394-002	4.511158-002	67.20	-6.942169-003	-2.533726-003	127.20	3.901281-003	1.464432-004
8.40	5.209440-002	-2.843850-002	68.40	-4.790961-003	5.455318-003	128.40	1.535562-003	-3.549637-003
9.60	-6.973877-003	-5.141302-002	69.60	3.291401-003	6.330737-003	129.60	-2.726570-003	-2.692205-003
10.80	-4.486105-002	-1.057043-002	70.80	6.972852-003	-7.612592-004	130.80	-3.465106-003	1.551458-003
12.00	-2.336199-002	3.425338-002	72.00	1.786252-003	-6.662054-003	132.00	1.887804-004	3.757320-003
13.20	2.141211-002	3.100472-002	73.20	-5.471193-003	-4.011552-003	133.20	3.538239-003	1.174770-003
14.40	3.357342-002	-8.075866-003	74.40	-5.628858-003	3.587417-003	134.40	2.355742-003	-2.846506-003
15.60	4.215312-003	-3.158849-002	75.60	1.283780-003	6.442220-003	135.60	-1.783590-003	-3.198493-003
16.80	-2.594164-002	-1.422863-002	76.80	6.368580-003	1.119569-003	136.80	-3.595586-003	4.990503-004
18.00	-2.112101-002	1.778483-002	78.00	3.299206-003	-5.445249-003	138.00	-8.303835-004	3.501367-003
19.20	8.397157-003	2.448315-002	79.20	-3.821275-003	-4.971339-003	139.20	2.937024-003	2.025017-003
20.40	2.433979-002	9.547866-004	80.40	-5.928194-003	1.734329-003	140.40	2.926373-003	-1.986584-003
21.60	9.147331-003	-2.110669-002	81.60	-5.234195-004	6.063289-003	141.60	-7.845538-004	-3.418114-003
22.80	-1.551019-002	-1.530708-002	82.80	5.382579-003	2.645645-003	142.80	-3.440955-003	-5.030034-004
24.00	-1.888453-002	8.479533-003	84.00	4.352904-003	-4.000414-003	144.00	-1.701311-003	2.999668-003
25.20	1.024826-003	1.968763-002	85.20	-2.121282-003	-5.428957-003	145.20	2.161372-003	2.650505-003
26.40	1.787344-002	5.885279-003	86.40	-5.747703-003	1.011531-005	146.40	3.226872-003	-1.045482-003
27.60	1.143260-002	-1.390138-002	87.60	-2.044572-003	5.287433-003	147.60	1.931965-004	-3.358881-003
28.80	-8.455187-003	-1.503368-002	88.80	4.130863-003	3.769672-003	148.80	-3.035948-003	-1.385852-003
30.00	-1.639107-002	2.344380-003	90.00	4.943382-003	-2.451317-003	150.00	-2.372585-003	2.308877-003
31.20	-3.602241-003	1.550779-002	91.20	-4.872614-004	-5.423335-003	151.20	1.282045-003	3.023765-003
32.40	1.266527-002	8.638359-003	92.40	-5.163461-003	-1.491133-003	152.40	3.256974-003	-9.851473-005
33.60	1.218542-002	-8.369563-003	93.60	-3.218782-003	4.217620-003	153.60	1.079807-003	-3.047351-003
34.80	-3.273975-003	-1.389233-002	94.80	2.729870-003	4.470852-003	154.80	-2.430029-003	-2.094245-003
36.00	-1.366390-002	-1.911375-003	96.00	5.091696-003	-9.130011-004	156.00	-2.810641-003	1.494485-003
37.20	-6.511407-003	1.165630-002	97.20	9.815423-004	-5.013865-003	157.20	3.716615-004	3.137027-003
38.40	8.242015-003	9.968206-003	98.40	-4.264924-003	-2.698128-003	158.40	3.035349-003	7.842793-004
39.60	1.190395-002	-3.950063-003	99.60	-4.011130-003	2.961461-003	159.60	1.817049-003	-2.525773-003
40.80	6.098115-004	-1.215791-002	100.80	1.291395-003	4.754294-003	160.80	-1.683089-003	-2.589295-003
42.00	-1.079443-002	-4.828819-003	102.00	4.841518-003	5.128005-004	162.00	-3.000799-003	6.258364-004
43.20	-8.176299-003	8.082215-003	103.20	2.206166-003	-4.276450-003	163.20	-5.003000-004	3.001414-003
44.40	4.449109-003	1.026302-002	104.40	-3.149923-003	-3.564255-003	164.40	2.597078-003	1.542498-003
45.60	1.088338-002	-4.190759-004	105.60	-4.412633-003	1.625814-003	165.60	2.361471-003	-1.848191-003
46.80	3.459786-003	-1.003228-002	106.80	-8.249996-005	4.649043-003	166.80	-8.607002-004	-2.850022-003
48.00	-7.895701-003	-6.686770-003	108.00	4.255449-003	1.741767-003	168.00	-2.947015-003	-2.288264-004
49.20	-8.870617-003	4.817410-003	109.20	3.130475-003	-3.298574-003	169.20	-1.272020-003	2.644944-003
50.40	1.247115-003	9.774690-003	110.40	-1.919115-003	-4.068207-003	170.40	1.990185-003	2.128858-003
51.60	9.340261-003	2.322568-003	111.60	-4.438871-003	3.113271-004	171.60	2.686402-003	-1.075987-003
52.80	5.421803-003	-7.686063-003	112.80	-1.304112-003	4.204846-003	172.80	-2.926356-005	-2.873627-003
54.00	-5.064761-003	-7.663394-003	114.00	3.410342-003	2.710185-003	174.00	-2.670408-003	-1.006972-003
55.20	-8.769425-003	1.920998-003	115.20	3.722500-003	-2.173765-003	175.20	-1.893092-003	2.109520-003
56.40	-1.363508-003	8.699235-003	116.40	-6.703208-004	-4.213282-003	176.40	1.271507-003	2.511615-003
57.60	7.455913-003	4.329857-003	117.60	-4.127319-003	-8.926075-004	177.60	2.782729-003	-2.731742-004
58.80	6.599069-003	-5.271324-003	118.80	-2.303885-003	3.487864-003	178.80	7.486370-004	-2.674538-003
60.00	-2.472444-003	-7.899133-003	120.00	2.391943-003	3.376975-003	180.00	-2.206713-003	-1.655754-003
61.20	-8.096329-003	-5.459412-004	121.20	3.974434-003	-9.958794-004	181.20	-2.327311-003	1.447153-003

UNCLASSIFIED

MUTUAL RADIATION IMPEDANCE
KA = 1.40

SELF IMPEDANCE = 7.073505-001+J6.903570-001 AVE = 7.1189-001+J3.3025-001

KD	RE	IM	KD	RE	IM	KD	RE	IM
2.80	1.212635-001	-1.826198-001	72.80	-4.121105-003	-6.937679-003	142.80	-4.069719-003	-5.993396-004
4.20	-1.134283-001	-8.641589-002	74.20	-7.394566-003	2.828609-003	144.20	-1.269746-003	3.870732-003
5.60	-7.460209-002	7.513680-002	75.60	1.503290-003	7.623678-003	145.60	3.564062-003	1.890683-003
7.00	5.033004-002	6.786020-002	77.00	7.626981-003	-1.832497-004	147.00	2.445321-003	-3.160545-003
8.40	6.228568-002	-3.250832-002	78.40	1.094905-003	-7.412504-003	148.40	-2.673572-003	-2.919036-003
9.80	-1.890885-002	-5.709678-002	79.80	-6.993928-003	-2.296980-003	149.80	-3.299780-003	2.118655-003
11.20	-5.194616-002	8.174986-003	81.20	-3.392028-003	6.390036-003	151.20	1.512953-003	3.578375-003
12.60	-4.314849-004	4.671481-002	82.60	5.624045-003	4.353069-003	152.60	3.748721-003	-8.747567-004
14.00	4.136158-002	7.345850-003	84.00	5.157688-003	-4.722847-003	154.00	-2.229466-004	-3.807912-003
15.40	1.284384-002	-3.597244-002	85.40	-3.716164-003	-5.788492-003	155.40	-3.756264-003	-4.235480-004
16.80	-3.053758-002	-1.711322-002	86.80	-6.233426-003	2.635669-003	156.80	-1.046289-003	3.597245-003
18.20	-2.029220-002	2.513961-002	88.20	1.514065-003	6.485934-003	158.20	3.337320-003	1.627842-003
19.60	1.984676-002	2.249108-002	89.60	6.544969-003	-3.841725-004	159.60	2.152255-003	-2.985723-003
21.00	2.380497-002	-1.472842-002	91.00	7.219659-004	-6.414862-003	161.00	-2.554139-003	-2.605483-003
22.40	-9.852027-003	-2.432133-002	92.40	-6.105043-003	-1.773930-003	162.40	-2.975756-003	2.056334-003
23.80	-2.412436-002	5.280717-003	93.80	-2.743707-003	5.629640-003	163.80	1.507727-003	3.253873-003
25.20	1.071482-003	2.329750-002	95.20	5.006959-003	3.606381-003	165.20	3.433420-003	-9.249284-004
26.60	2.192462-002	2.726264-003	96.60	4.340734-003	-4.258864-003	166.60	-3.252420-004	-3.510907-003
28.00	6.071802-003	-2.009038-002	98.00	-3.410086-003	-4.929718-003	168.00	-3.485817-003	-2.738338-004
29.40	-1.787992-002	-8.933918-003	99.40	-5.360810-003	2.487459-003	169.40	-8.551085-004	3.360572-003
30.80	-1.129144-002	1.537829-002	100.80	1.519134-003	5.626231-003	170.80	3.140417-003	1.402183-003
32.20	1.266951-002	1.313352-002	102.20	5.723040-003	-5.337644-004	172.20	1.899902-003	-2.833223-003
33.60	1.445962-002	-9.835502-003	103.60	4.402930-004	-5.653078-003	173.60	-2.449224-003	-2.334769-003
35.00	-6.954962-003	-1.527931-002	105.00	-5.422800-003	-1.375753-003	175.00	-2.695298-003	2.000686-003
36.40	-1.561179-002	4.102199-003	106.40	-2.247126-003	5.042973-003	176.40	1.501523-003	2.972316-003
37.80	1.346014-003	1.548524-002	107.80	4.528274-003	3.031381-003	177.80	3.159181-003	-9.668820-004
39.20	1.493593-002	1.251327-003	109.20	3.708514-003	-3.896780-003	179.20	-4.126842-004	-3.251936-003
40.60	3.635009-003	-1.400724-002	110.60	-3.169388-003	-4.262035-003	180.60	-3.249379-003	-1.448352-004
42.00	-1.274845-002	-5.758432-003	112.00	-4.679333-003	2.369162-003	182.00	-6.895972-004	3.153056-003
43.40	-7.583801-003	1.121352-002	113.40	1.520645-003	4.951934-003	183.40	2.967171-003	1.206134-003
44.80	9.459734-003	9.082527-003	114.80	5.075638-003	-6.491346-004	184.80	1.680021-003	-2.698433-003
46.20	1.023543-002	-7.546296-003	116.20	2.200312-004	-5.050535-003	186.20	-2.355821-003	-2.098273-003
47.60	-5.532975-003	-1.103275-002	117.60	-4.880901-003	-1.062186-003	187.60	-2.449694-003	1.950294-003
49.00	-1.147393-002	3.478723-003	119.00	-1.854003-003	4.574980-003	189.00	1.494455-003	2.725167-003
50.40	1.440369-003	1.156722-002	120.40	4.144666-003	2.574118-003	190.40	2.917887-003	-1.002159-003
51.80	1.132911-002	5.285989-004	121.80	3.203681-003	-3.605089-003	191.80	-4.881058-004	-3.023523-003
53.20	2.379149-003	-1.078357-002	123.20	-2.974115-003	-3.726824-003	193.20	-3.040300-003	-3.259598-005
54.60	-9.961173-003	-4.067673-003	124.60	-4.131041-003	2.271791-003	194.60	-5.448649-004	2.969019-003
56.00	-5.556805-003	8.898060-003	126.00	1.519731-003	4.407466-003	196.00	2.812993-003	1.034077-003
57.40	7.634838-003	6.816066-003	127.40	4.551036-003	-7.404813-004	197.40	1.486479-003	-2.577919-003
58.80	7.822320-003	-6.215400-003	128.80	4.313473-005	-4.560559-003	198.80	-2.271681-003	-1.889567-003
60.20	-4.685700-003	-8.560051-003	130.20	-4.438658-003	-8.086614-004	200.20	-2.232427-003	1.904097-003
61.60	-9.021436-003	3.092531-003	131.60	-1.534634-003	4.191624-003	201.60	1.486603-003	2.506025-003
63.00	1.482313-003	9.206239-003	133.00	3.829155-003	2.201159-003	203.00	2.703443-003	-1.031914-003
64.40	9.121516-003	1.000639-004	134.40	2.790446-003	-3.364021-003	204.40	-5.536364-004	-2.820039-003
65.80	1.612321-003	-8.781155-003	135.80	-2.811637-003	-3.287257-003	205.80	-2.853561-003	6.586687-005
67.20	-8.205262-003	-3.015772-003	137.20	-3.679291-003	2.189578-003	207.20	-4.172152-004	2.804167-003
68.60	-4.276183-003	7.419409-003	138.60	1.517037-003	3.957468-003	208.60	2.674397-003	8.817562-004
70.00	6.453772-003	5.364496-003	140.00	4.116123-003	-8.142600-004	210.00	1.314620-003	-2.469066-003
71.40	6.257387-003	-5.342181-003	141.40	-1.019461-004	-4.153093-003	211.40	-2.195093-003	-1.703757-003

MUTUAL RADIATION IMPEDANCE
KA = 1.60

SELF IMPEDANCE = 8.366605-001+J6.623940-001 AVE = 7.4998-001+J3.6020-001

KD	RE	IM	KD	RE	IM	KD	RE	IM
3.20	4.717941-002	-2.034648-001	83.20	7.793172-003	4.750247-004	163.20	-6.625483-004	3.924684-003
4.80	-1.369883-001	-1.037537-002	84.80	2.413459-004	-7.656505-003	164.80	3.904104-003	5.421819-004
6.40	-9.655130-005	1.023613-001	86.40	-7.518420-003	-1.616399-005	166.40	4.236744-004	-3.880612-003
8.00	8.152222-002	-4.352947-003	88.00	2.008001-004	7.378994-003	168.00	-3.854280-003	-3.070683-004
9.60	-6.689572-003	-6.758849-002	89.60	7.238306-003	-4.098055-00[illegible]	169.60	-1.924053-004	3.825179-003
11.20	-5.759572-002	8.065235-003	91.20	-6.110935-004	-7.096433-003	171.20	3.793382-003	7.972546-005
12.80	8.938277-003	5.006320-002	92.80	-6.953451-003	8.048890-004	172.80	-3.093245-005	-3.758960-003
14.40	4.416954-002	-9.521649-003	94.40	9.914020-004	6.809438-003	174.40	-3.721985-003	1.395310-004
16.00	-9.925556-003	-3.942250-002	96.00	6.664468-003	-1.170829-003	176.00	2.460343-004	3.682529-003
17.60	-3.550918-002	1.021179-002	97.60	-1.343355-003	-6.518619-003	177.60	3.640664-003	-3.504075-004
19.20	1.041721-002	3.222116-002	99.20	-6.371965-003	1.509154-003	179.20	-4.526177-004	-3.596462-003
20.80	2.941424-002	-1.056495-002	100.80	1.668388-003	6.224582-003	180.80	-3.549995-003	5.526330-004
22.40	-1.067010-002	-2.698550-002	102.40	6.076545-003	-1.821212-003	182.40	6.504231-004	3.501336-003
24.00	-2.485949-002	1.074290-002	104.00	-1.967772-003	-5.927929-003	184.00	3.450557-003	-7.459592-004
25.60	1.079046-002	2.297967-002	105.60	-5.778808-003	2.108206-003	185.60	8.392139-004	-3.397729-003
27.20	2.130284-002	-1.081786-002	107.20	2.242647-003	5.629256-003	187.20	-3.342925-003	9.301614-004
28.80	-1.082880-002	-1.979540-002	108.80	5.479347-003	-2.371220-003	188.80	1.01[illegible]777-003	3.286218-003
30.40	-1.843085-002	1.082607-002	110.40	-2.494044-003	-5.329154-003	190.40	3.227680-003	-1.105038-003
32.00	1.081176-002	1.718802-002	112.00	-5.178751-003	2.611233-003	192.00	-1.188924-003	-3.167382-003
33.60	1.604976-002	-1.078749-002	113.60	2.722899-003	5.028210-003	193.60	-3.105397-003	1.270413-003
35.20	-1.075452-002	-1.500208-002	115.20	4.877603-003	-2.829147-003	195.20	1.349488-003	3.041796-003
36.80	-1.403341-002	1.071385-002	116.80	-2.930078-003	-4.727003-003	196.80	2.976652-003	-1.426132-003
38.40	1.066631-002	1.313413-002	118.40	-4.576479-003	3.025791-003	198.40	-1.500330-003	-2.910037-003
40.00	1.229617-002	-1.061254-002	120.00	3.116381-003	4.426104-003	200.00	-2.842021-003	1.572067-003
41.60	-1.055308-002	-1.151271-002	121.60	4.275948-003	-3.201940-003	201.60	1.641331-003	2.772676-003
43.20	-1.077794-002	1.048840-002	123.20	-3.282559-003	-4.126080-003	203.20	2.702074-003	-1.708112-003
44.80	1.041887-002	1.008691-002	124.80	-3.976570-003	3.358325-003	204.80	-1.772401-003	-2.630285-003
46.40	9.435326-003	-1.034482-002	126.40	3.429323-003	3.827486-003	206.40	-2.557380-003	1.834188-003
48.00	-1.026653-002	-8.819506-003	128.00	3.678897-003	-3.495637-003	208.00	1.893470-003	2.483429-003
49.60	-8.236233-003	1.018424-002	129.60	-3.557349-003	-3.530869-003	209.60	2.408502-003	-1.950239-003
51.20	1.009816-002	7.682702-003	131.20	-3.383469-003	3.614539-003	211.20	-2.004495-003	-2.332670-003
52.80	7.156452-003	-1.000850-002	132.80	3.667285-003	3.236763-003	212.80	-2.256001-003	2.056233-003
54.40	-9.915418-003	-6.655319-003	134.40	3.090817-003	-3.715667-003	214.40	2.105455-003	2.178563-003
56.00	-6.177390-003	9.819073-003	136.00	-3.759761-003	-2.945694-003	216.00	2.100427-003	-2.152162-003
57.60	9.719609-003	5.720969-003	137.60	-2.801458-003	3.799642-003	217.60	-2.196357-003	-2.021660-003
59.20	5.284548-003	-9.617158-003	139.20	3.835386-003	2.658171-003	219.20	-1.942328-003	2.238042-003
60.80	-9.511842-003	-4.866781-003	140.80	2.515897-003	-3.867067-003	220.80	2.277226-003	1.862501-003
62.40	-4.466464-003	9.403777-003	142.40	-3.894759-003	-2.374694-003	222.40	1.782243-003	-2.313913-003
64.00	9.293073-003	4.082517-003	144.00	-2.234625-003	3.918536-003	224.00	-2.348114-003	-1.701621-003
65.60	3.713968-003	-9.179832-003	145.60	3.938470-003	2.095746-003	225.60	-1.620700-003	2.379837-003
67.20	-9.064154-003	-3.359941-003	147.20	1.958117-003	-3.954633-003	227.20	2.409095-003	1.539545-003
68.80	-3.019643-003	8.946135-003	148.80	-3.967098-003	-1.821795-003	228.80	1.458221-003	-2.435900-003
70.40	8.825868-003	2.692356-003	150.40	-1.686835-003	3.975936-003	230.40	-2.460266-003	-1.376789-003
72.00	2.377428-003	-8.703441-003	152.00	3.981220-003	1.553292-003	232.00	-1.295314-003	2.482209-003
73.60	-8.578944-003	-2.074265-003	153.60	1.421220-003	-3.983021-003	233.60	2.501746-003	1.213858-003
75.20	-1.762326-003	8.452462-003	155.20	-3.981411-003	-1.290672-003	235.20	1.132480-003	-2.518894-003
76.80	8.324078-003	1.501115-003	156.80	-1.161699-003	3.976460-003	236.80	-2.533674-003	-1.051242-003
78.40	1.230179-003	-8.193876-003	158.40	3.968241-003	1.034352-003	238.40	-9.702043-004	2.546106-003
80.00	-8.061937-003	-9.691022-004	160.00	9.086793-004	-3.956824-003	240.00	2.556211-003	8.894242-004
81.60	-7.175017-004	7.928343-003	161.60	-3.942282-003	-7.847292-004	241.60	8.089603-004	-2.564015-003

UNCLASSIFIED

MUTUAL RADIATION IMPEDANCE
KA = 1,80

SELF IMPEDANCE = 9,469636-001+J6,080953-001 AVE = 8,0564-001+J3,8406-001

KD	RE	IM	KD	RE	IM	KD	RE	IM
3,60	-2,398440-002	-1,880234-001	93,60	-4,418383-003	5,717699-003	183,60	3,618580-003	6,896671-004
5,40	-1,111348-001	6,032637-002	95,40	6,448588-003	2,945847-003	185,40	-1,492396-004	-3,644897-003
7,20	6,640158-002	6,720142-002	97,20	1,376422-003	-6,820800-003	187,20	-3,481814-003	9,642755-004
9,00	3,832264-002	-6,496771-002	99,00	-6,828644-003	2,066803-004	189,00	1,713807-003	3,141381-003
10,80	-6,025482-002	-1,764994-002	100,80	1,722565-003	6,484886-003	190,80	2,644547-003	-2,360361-003
12,60	-2,290187-003	5,373150-002	102,60	5,819475-003	-3,096574-003	192,60	-2,872474-003	-2,019916-003
14,40	4,613287-002	-9,176329-003	104,40	-4,263772-003	-4,877468-003	194,40	-1,302140-003	3,226189-003
16,20	-1,754059-002	-3,793881-002	106,20	-3,716286-003	5,171842-003	196,20	3,406151-003	5,300277-004
18,00	-2,951985-002	2,330326-002	108,00	5,783271-003	2,402446-003	198,00	-2,555251-004	-3,406234-003
19,80	2,682715-002	2,118720-002	109,80	1,007955-003	-6,076729-003	199,80	-3,229691-003	1,013671-003
21,60	1,320986-002	-2,841121-002	111,60	-6,047616-003	3,934561-004	201,60	1,705710-003	2,888820-003
23,40	-2,832759-002	-5,818933-003	113,40	1,730074-003	5,707760-003	203,40	2,404167-003	-2,297039-003
25,20	7,928035-004	2,683962-002	115,20	5,084315-003	-2,935717-003	205,20	-2,758857-003	-1,803328-003
27,00	2,420925-002	-6,472960-003	117,00	-3,952884-003	-4,217931-003	207,00	-1,119405-003	3,069546-003
28,80	-1,111155-002	-2,069828-002	118,80	-3,160306-003	4,735368-003	208,80	3,215654-003	3,892097-004
30,60	-1,656598-002	1,464219-002	120,60	5,250241-003	1,971267-003	210,60	-3,486912-004	-3,192451-003
32,40	1,704211-002	1,206464-002	122,40	7,155253-004	-5,479114-003	212,40	-3,004021-003	1,055994-003
34,20	7,433939-003	-1,833075-002	124,20	-5,418640-003	5,407186-004	214,20	1,696619-003	2,662903-003
36,00	-1,856691-002	-2,895075-003	126,00	1,733147-003	5,080256-003	216,00	2,189306-003	-2,238536-003
37,80	1,354900-003	1,784469-002	127,80	4,489185-003	-2,802511-003	217,80	-2,655338-003	-1,609937-003
39,60	1,628806-002	-5,148095-003	129,60	-3,697476-003	-3,682788-003	219,60	-9,565242-004	2,927516-003
41,40	-8,349798-003	-1,404468-002	131,40	-2,708338-003	4,376997-003	221,40	3,043342-003	2,640988-004
43,20	-1,127888-002	1,086128-002	133,20	4,812107-003	1,620372-003	223,20	-4,308631-004	-2,999355-003
45,00	1,262126-002	8,164345-003	135,00	4,777393-004	-4,987062-003	225,00	-2,800400-003	1,092341-003
46,80	4,876635-003	-1,360586-002	136,80	-4,899787-003	6,594908-004	226,80	1,686621-003	2,459250-003
48,60	-1,382730-002	-1,586004-003	138,60	1,733097-003	4,561627-003	228,60	1,995818-003	-2,183991-003
50,40	1,549320-003	1,333104-002	140,40	3,996424-003	-2,689607-003	230,40	-2,560216-003	-1,436025-003
52,20	1,219191-002	-4,389059-003	142,20	-3,482890-003	-3,238996-003	232,20	-8,103619-004	2,797697-003
54,00	-6,815815-003	-1,050912-002	144,00	-2,333091-003	4,076307-003	234,00	2,886277-003	1,522548-004
55,80	-8,400515-003	8,736830-003	145,80	4,444339-003	1,328951-003	235,80	-5,037083-004	-2,823650-003
57,60	1,009644-002	5,996332-003	147,60	2,806013-004	-4,573606-003	237,60	-2,615362-003	1,123578-003
59,40	3,432698-003	-1,085719-002	149,40	-4,463258-003	7,569877-004	239,40	1,675782-003	2,274404-003
61,20	-1,101959-002	-8,451952-004	151,20	1,730715-003	4,124715-003	241,20	1,820430-003	-2,132724-003
63,00	1,637261-003	1,061056-002	153,00	3,580799-003	-2,592006-003	243,00	-2,472143-003	-1,278648-003
64,80	9,682715-003	-3,897966-003	154,80	-3,299177-003	-2,864304-003	244,80	-6,784291-004	2,678183-003
66,60	-5,837172-003	-8,310605-003	156,60	-2,016100-003	3,819403-003	246,60	2,742121-003	5,173932-005
68,40	-6,586176-003	7,375864-003	158,40	4,130179-003	1,082864-003	248,40	-5,685540-004	-2,662711-003
70,20	8,458427-003	4,613606-003	160,20	1,145699-004	-4,220244-003	250,20	-2,446141-003	1,150390-003
72,00	2,503831-003	-9,054122-003	162,00	-4,089894-003	8,381291-004	252,00	1,664158-003	2,105604-003
73,80	-9,157372-003	-3,689917-004	163,80	1,726503-003	3,750721-003	253,80	1,660520-003	-2,084191-003
75,60	1,682936-003	8,786855-003	165,60	3,224769-003	-2,506186-003	255,60	-2,390037-003	-1,135445-003
77,40	7,983526-003	-3,553094-003	167,40	-3,139352-003	-2,543183-003	257,40	-5,587269-004	2,567442-003
79,20	-5,156065-003	-6,807665-003	169,20	-1,744429-003	3,596500-003	259,20	2,608995-003	-3,900760-005
81,00	-5,335146-003	6,423390-003	171,00	3,857792-003	8,721674-004	261,00	-6,264699-004	-2,514424-003
82,80	7,306136-003	3,653122-003	172,80	-2,708348-005	-3,913859-003	262,80	-2,290504-003	1,173334-003
84,60	1,855341-003	-7,776454-003	174,60	-3,766066-003	9,063855-004	264,60	1,651790-003	1,950617-003
86,40	-7,828060-003	-3,733148-005	176,40	1,720791-003	3,426223-003	266,40	1,513964-003	-2,037949-003
88,20	1,708313-003	7,475673-003	178,20	2,915765-003	-2,429601-003	268,20	-2,313023-003	-1,004502-003
90,00	6,753474-003	-3,296330-003	180,00	-2,998363-003	-2,264466-003	270,00	-4,496316-004	2,464229-003
91,80	-4,652670-003	-5,712679-003	181,80	-1,508744-003	3,400514-003	271,80	2,485369-003	-1,212552-004

MUTUAL RADIATION IMPEDANCE
KA = 2.00

SELF IMPEDANCE = 1.033022+000+J5.348633-001 AVE = 8.7367-001+J3.9115-001

KD	RE	IM	KD	RE	IM	KD	RE	IM
4.00	-7.507140-002	-1.453484-001	104.00	-1.985837-003	-6.080413-003	204.00	6.782408-004	-3.189597-003
6.00	-5.367959-002	9.733004-002	106.00	-4.612829-003	4.255270-003	206.00	-3.151601-003	7.039025-004
8.00	8.332382-002	1.129315-003	108.00	5.682224-003	2.377518-003	208.00	1.932966-003	2.547966-003
10.00	-2.895413-002	-6.000440-002	110.00	-2.003275-004	-6.044252-003	210.00	1.497901-003	-2.791215-003
12.00	-3.447231-002	4.349317-002	112.00	-5.315473-003	2.650340-003	212.00	-3.131577-003	-1.984187-004
14.00	4.634989-002	1.064409-002	114.00	4.541578-003	3.664097-003	214.00	1.112438-003	2.902662-003
16.00	-8.867404-003	-4.064803-002	116.00	1.415902-003	-5.557217-003	216.00	2.156177-003	-2.199034-003
18.00	-2.937534-002	2.245761-002	118.00	-5.546570-003	1.008758-003	218.00	-2.870339-003	-1.035744-003
20.00	2.948558-002	1.542277-002	120.00	3.172476-003	4.546078-003	220.00	2.505394-004	3.013355-003
22.00	1.423018-003	-3.021479-002	122.00	2.766611-003	-4.698717-003	222.00	2.611955-003	-1.468594-003
24.00	-2.567719-002	1.046016-002	124.00	-5.336453-003	-5.504149-004	224.00	-2.400803-003	-1.748026-003
26.00	1.871192-002	1.745914-002	126.00	1.693735-003	5.000551-003	226.00	-5.850245-004	2.884751-003
28.00	7.433985-003	-2.257055-002	128.00	3.781570-003	-3.565066-003	228.00	2.841376-003	-6.627896-004
30.00	-2.203456-002	2.522155-003	130.00	-4.741592-003	-1.924206-003	230.00	-1.769687-003	-2.287687-003
32.00	1.079202-002	1.777164-002	132.00	2.208544-004	5.034778-003	232.00	-1.332038-003	2.539167-003
34.00	1.094533-002	-1.622101-002	134.00	4.418930-003	-2.262371-003	234.00	2.838717-003	1.531037-004
36.00	-1.823785-002	-2.987600-003	136.00	-3.839203-003	-3.030882-003	236.00	-1.033391-003	-2.622491-003
38.00	4.646844-003	1.688009-002	138.00	-1.140903-003	4.683543-003	238.00	-1.938069-003	2.014018-003
40.00	1.272703-002	-1.070794-002	140.00	4.665780-003	-8.991895-004	240.00	2.615920-003	9.163403-004
42.00	-1.432692-002	-6.756666-003	142.00	-2.720886-003	-3.813567-003	242.00	-2.533856-004	-2.737161-003
44.00	-1.533527-004	1.511931-002	144.00	-2.302462-003	4.004969-003	244.00	-2.363855-003	1.358336-003
46.00	1.320400-002	-5.900899-003	146.00	4.536907-003	4.205906-004	246.00	2.200867-003	1.571210-003
48.00	-1.041806-002	-9.141136-003	148.00	-1.485712-003	-4.242142-003	248.00	5.085722-004	-2.633705-003
50.00	-3.804443-003	1.274990-002	150.00	-3.195567-003	3.075109-003	250.00	-2.585585-003	6.285981-004
52.00	1.266812-002	-1.787394-003	152.00	4.071895-003	1.604191-003	252.00	1.634570-003	2.072830-003
54.00	-6.650656-003	-1.037033-002	154.00	-2.332080-004	-4.313363-003	254.00	1.195024-003	-2.330463-003
56.00	-6.415995-003	9.998062-003	156.00	-3.775839-003	1.981701-003	256.00	-2.595953-003	-1.158070-004
58.00	1.135682-002	1.607100-003	158.00	3.330814-003	2.575329-003	258.00	9.675249-004	2.389978-003
60.00	-3.163427-003	-1.062674-002	160.00	9.432949-004	-4.049251-003	260.00	1.756881-003	-1.859996-003
62.00	-8.072493-003	7.068636-003	162.00	-4.024143-003	8.175133-004	262.00	-2.403947-003	-8.171231-004
64.00	9.483601-003	4.255376-003	164.00	2.388811-003	3.278241-003	264.00	2.555258-004	2.506801-003
66.00	-8.067926-005	-1.007923-002	166.00	1.962549-003	-3.493938-003	266.00	2.156708-003	-1.266031-003
68.00	-8.860583-003	4.147106-003	168.00	-3.946221-003	-3.262674-004	268.00	-2.033466-003	-1.423461-003
70.00	7.248314-003	6.146467-003	170.00	1.330019-003	3.680137-003	270.00	-4.447280-004	2.423325-003
72.00	2.496812-003	-8.895773-003	172.00	2.760154-003	-2.709220-003	272.00	2.371012-003	-5.997062-004
74.00	-8.880584-003	1.396994-003	174.00	-3.570709-003	-1.366186-003	274.00	-1.520880-003	-1.892424-003
76.00	4.838399-003	7.294415-003	176.00	2.412025-004	3.771994-003	276.00	-1.079914-003	2.154765-003
78.00	4.497863-003	-7.246296-003	178.00	3.291940-003	-1.769184-003	278.00	2.391399-003	8.457442-005
80.00	-8.249688-003	-1.044272-003	180.00	-2.945719-003	-2.231808-003	280.00	-9.117797-004	-2.193876-003
82.00	2.425842-003	7.741514-003	182.00	-7.944292-004	3.567713-003	282.00	-1.603941-003	1.729748-003
84.00	5.884373-003	-5.300281-003	184.00	3.535800-003	-7.542922-004	284.00	2.224576-003	7.333604-004
86.00	-7.100298-003	-3.069400-003	186.00	-2.134296-003	-2.869849-003	286.00	-2.571666-004	-2.311699-003
88.00	1.624932-004	7.557780-003	188.00	-1.702836-003	3.101757-003	288.00	-1.981114-003	1.187602-003
90.00	6.652431-003	-3.221780-003	190.00	3.491918-003	2.546473-004	290.00	1.891222-003	1.298134-003
92.00	-5.575433-003	-4.604297-003	192.00	-1.209093-003	-3.246903-003	292.00	3.906049-004	-2.244430-003
94.00	-1.824827-003	6.837668-003	194.00	-2.423830-003	2.425509-003	294.00	-2.188398-003	5.749612-004
96.00	6.831197-003	-1.163305-003	196.00	3.181456-003	1.182220-003	296.00	1.423869-003	1.738768-003
98.00	-3.822425-003	-5.609597-003	198.00	-2.466598-004	-3.350661-003	298.00	9.818286-004	-2.004784-003
100.00	-3.438475-003	5.694790-003	200.00	-2.914560-003	1.602647-003	300.00	-2.216655-003	-5.803891-005
102.00	6.479750-003	7.403331-004	202.00	2.643850-003	1.963469-003	302.00	8.639745-004	2.026219-003

UNCLASSIFIED

MUTUAL RADIATION IMPEDANCE
KA = 2,20

SELF IMPEDANCE = 1,092171+000+J4,509750-001 AVE = 9,4427-001+J3,7567-001

KD	RE	IM	KD	RE	IM	KD	RE	IM
4,40	-9,770143-002	-9,118538-002	114,40	5,190571-003	1,502693-003	224,40	-2,681776-003	-6,303016-004
6,60	5,642011-003	9,286358-002	116,60	-1,806310-003	-4,984564-003	226,60	1,058427-003	2,514416-003
8,80	5,075111-002	-4,831281-002	118,80	-2,910972-003	4,313174-003	228,80	1,396300-003	-2,313107-003
11,00	-5,556352-002	-7,912817-003	121,00	5,105703-003	-1,826599-004	231,00	-2,666211-003	2,303233-004
13,20	2,296827-002	4,076924-002	123,20	-3,097011-003	-3,947939-003	233,20	1,738852-003	2,000908-003
15,40	1,602201-002	-3,678146-002	125,40	-1,344221-003	4,742901-003	235,40	5,886951-004	-2,559286-003
17,60	-3,417317-002	8,056428-003	127,60	4,545581-003	-1,675996-003	237,60	-2,393192-003	1,020793-003
19,80	2,387360-002	2,010560-002	129,80	-3,962359-003	-2,642366-003	239,80	2,213291-003	1,321775-003
22,00	1,759144-003	-2,803744-002	132,00	1,931910-004	4,679241-003	242,00	-2,318981-004	-2,543951-003
24,20	-2,145901-002	1,384909-002	134,20	3,608746-003	-2,862930-003	244,20	-1,902906-003	1,669541-003
26,40	2,188661-002	3,313591-003	136,40	-4,367061-003	-1,212115-003	246,40	2,447661-003	5,508619-004
28,60	-5,781268-003	-2,082439-002	138,60	1,565551-003	4,176434-003	248,60	-9,864035-004	-2,282671-003
30,80	-1,241271-002	1,576949-002	140,80	2,416293-003	-3,665825-003	250,80	-1,253818-003	2,122148-003
33,00	1,872011-002	6,410139-004	143,00	-4,318290-003	2,013804-004	253,00	2,432274-003	-2,332659-004
35,20	-9,885875-003	-1,451361-002	145,20	2,663713-003	3,321265-003	255,20	-1,606122-003	-1,813353-003
37,40	-5,527432-003	1,557614-002	147,40	1,100301-003	-4,047032-003	257,40	-5,163100-004	2,345511-003
39,60	1,495554-002	-4,471686-003	149,60	-3,861670-003	1,470753-003	259,60	2,181492-003	-9,548534-004
41,80	-1,178197-002	-8,937490-003	151,80	3,411864-003	2,223386-003	261,80	-2,038591-003	-1,191594-003
44,00	-2,512178-004	1,404672-002	154,00	-2,078725-004	-4,008816-003	264,00	2,344603-004	2,329857-003
46,20	1,094372-002	-7,698082-003	156,20	-3,074497-003	2,492101-003	266,20	1,731198-003	-1,547870-003
48,40	-1,209502-002	-4,102718-003	158,40	3,771226-003	1,004437-003	268,40	-2,251674-003	-4,846294-004
50,60	3,652097-003	1,165801-002	160,60	-1,388495-003	-3,590083-003	270,60	9,258029-004	2,088512-003
52,80	6,960890-003	-9,413596-003	162,80	-2,056837-003	3,191911-003	272,80	1,134404-003	-1,961705-003
55,00	-1,123918-002	-7,107239-005	165,00	3,740525-003	-2,131039-004	275,00	-2,235589-003	2,355081-004
57,20	6,314263-003	8,770670-003	167,20	-2,342722-003	-2,860355-003	277,20	1,494176-003	1,655557-003
59,40	3,240072-003	-9,889681-003	169,40	-9,213350-004	3,531057-003	279,40	4,554755-004	-2,165170-003
61,60	-9,546004-003	3,095291-003	171,60	3,353346-003	-1,316441-003	281,60	-2,002770-003	8,989642-004
63,80	7,845289-003	5,686189-003	173,80	-2,999553-003	-1,911584-003	283,80	1,890718-003	1,081659-003
66,00	-2,670805-005	-9,366240-003	176,00	2,173794-004	3,505697-003	286,00	-2,364313-004	-2,148530-003
68,20	-7,308994-003	5,360738-003	178,20	2,672760-003	-2,211510-003	288,20	-1,585681-003	1,444521-003
70,40	8,367555-003	2,662416-003	180,40	-3,320025-003	-8,486048-004	290,40	2,085166-003	4,285570-004
72,60	-2,693218-003	-8,077686-003	182,60	1,252799-003	3,145145-003	292,60	-8,740921-004	-1,923448-003
74,80	-4,796090-003	6,730378-003	184,80	1,783782-003	-2,829894-003	294,80	-1,032857-003	1,824972-003
77,00	8,027836-003	-8,563710-005	187,00	-3,298428-003	2,209169-004	297,00	2,067879-003	-2,372476-004
79,20	-4,664011-003	-6,258561-003	189,20	2,095335-003	2,507057-003	299,20	-1,398464-003	-1,520932-003
81,40	-2,248801-003	7,253756-003	191,40	7,844172-004	-3,133120-003	301,40	-4,036255-004	2,010952-003
83,60	6,997696-003	-2,389748-003	193,60	-2,960505-003	1,196175-003	303,60	1,849847-003	-8,509763-004
85,80	-5,897112-003	-4,139409-003	195,80	2,679131-003	1,670460-003	305,80	-1,763903-003	-9,875719-004
88,00	1,238692-004	7,023694-003	198,00	-2,238753-004	-3,114125-003	308,00	2,379720-004	1,992950-003
90,20	5,467220-003	-4,132716-003	200,20	-2,359616-003	1,991745-003	310,20	1,460763-003	-1,355623-003
92,40	-6,403396-003	-1,936140-003	202,40	2,966420-003	7,273491-004	312,40	-1,941918-003	-3,804684-004
94,60	2,152662-003	6,169953-003	204,60	-1,145466-003	-2,795899-003	314,60	8,294353-004	1,781366-003
96,80	3,634988-003	-5,250735-003	206,80	-1,569283-003	2,544267-003	316,80	9,454335-004	-1,707027-003
99,00	-6,242469-003	1,500711-004	209,00	2,949164-003	-2,263729-004	319,00	-1,923150-003	2,386165-004
101,20	3,714200-003	4,849626-003	211,20	-1,898796-003	-2,227570-003	321,20	1,315671-003	1,404702-003
103,40	1,696292-003	-5,732872-003	213,40	-6,762770-004	2,816808-003	323,40	3,589021-004	-1,877536-003
105,60	-5,515301-003	1,962380-003	215,60	2,647987-003	-1,099789-003	325,60	-1,717485-003	8,093119-004
107,80	4,734699-003	3,235375-003	217,80	-2,422905-003	-1,478396-003	327,80	1,653922-003	9,061234-004
110,00	-1,688055-004	-5,617322-003	220,00	2,284994-004	2,800642-003	330,00	-2,391915-004	-1,857967-003
112,20	-4,354200-003	3,375998-003	222,20	2,108621-003	-1,814922-003	332,20	-1,352340-003	1,278322-003

MUTUAL RADIATION IMPEDANCE
KA = 2,40

SELF IMPEDANCE = 1,124375+000+J3,647303-001 AVE = 1,0063+000+J3,3790-001

KD	RE	IM	KD	RE	IM	KD	RE	IM
4,80	-9,360945-002	-4,153767-002	124,80	-3,341123-003	2,764035-003	244,80	-5,519687-004	2,140684-003
7,20	4,274633-002	6,006932-002	127,20	4,249086-003	2,132205-004	247,20	1,834888-003	-1,194132-003
9,60	2,271463-003	-5,582882-002	129,60	-2,934736-003	-2,970421-003	249,60	-2,138889-003	-3,552380-004
12,00	-3,013324-002	3,323885-002	132,00	1,559229-004	4,096771-003	252,00	1,324646-003	1,690337-003
14,40	3,717328-002	-4,567700-003	134,40	2,604057-003	-3,071133-003	254,40	1,632604-004	-2,121006-003
16,80	-2,654552-002	-1,810896-002	136,80	-3,924447-003	4,978374-004	256,80	-1,538429-003	1,440266-003
19,20	6,847321-003	2,728855-002	139,20	3,175008-003	2,243549-003	259,20	2,087762-003	-2,282888-005
21,60	1,164017-002	-2,214585-002	141,60	-8,127048-004	-3,734398-003	261,60	-1,540755-003	-1,380481-003
24,00	-2,112131-002	7,822055-003	144,00	-1,890353-003	3,248075-003	264,00	2,019681-004	2,039952-003
26,40	1,902464-002	7,582160-003	146,40	3,528826-003	-1,100715-003	266,40	1,217800-003	-1,625972-003
28,80	-8,273682-003	-1,685499-002	148,80	-3,292007-003	-1,545859-003	268,80	-1,978434-003	3,731734-004
31,20	-4,788604-003	1,665937-002	151,20	1,362081-003	3,309861-003	271,20	1,695878-003	1,051682-003
33,60	1,369039-002	-8,467426-003	153,60	1,211381-003	-3,308447-003	273,60	-5,355416-004	-1,904121-003
36,00	-1,477250-002	-2,744718-003	156,00	-3,079560-003	1,597055-003	276,00	-8,833984-004	1,750527-003
38,40	8,513873-003	1,122322-002	158,40	3,299023-003	8,881606-004	278,40	1,817978-003	-6,882537-004
40,80	1,185726-003	-1,320602-002	160,80	-1,805938-003	-2,839922-003	280,80	-1,790068-003	-7,141960-004
43,20	-9,227751-003	8,466146-003	163,20	-5,773557-004	3,265358-003	283,20	8,305770-004	1,721009-003
45,60	1,186432-002	-3,825837-005	165,60	2,592882-003	-1,989087-003	285,60	5,452870-004	-1,814739-003
48,00	-8,352652-003	-7,568365-003	168,00	-3,209072-003	-2,800394-004	288,00	-1,614259-003	9,618675-004
50,40	1,018386-003	1,068664-002	170,40	2,146921-003	2,340315-003	290,40	1,824866-003	3,778440-004
52,80	6,158909-003	-8,189975-003	172,80	-2,804606-006	-3,131791-003	292,80	-1,081571-003	-1,498801-003
55,20	-9,632811-003	1,813288-003	175,20	-2,084033-003	2,279926-083	295,20	-2,129943-004	1,820855-003
57,60	7,968577-003	4,942167-003	177,60	3,035142-003	-2,702853-004	297,60	1,375732-003	-1,189224-003
60,00	-2,462433-003	-8,675431-003	180,00	-2,388661-003	-1,825787-003	300,00	-1,803194-003	-5,181440-005
62,40	-3,878750-003	7,755543-003	182,40	5,216077-004	2,920757-003	302,40	1,284456-003	1,246162-003
64,80	7,795354-003	-2,993424-003	184,80	1,567258-003	-2,473752-003	304,80	-1,046752-004	-1,772442-003
67,20	-7,496003-003	-2,940722-003	187,20	-2,790273-003	7,560752-004	307,20	-1,111213-003	1,366986-003
69,60	3,426220-003	6,978941-003	189,60	2,535899-003	1,310061-003	309,60	1,729227-003	-2,555145-004
72,00	2,107761-003	-7,213907-003	192,00	-9,730919-004	-2,645324-003	312,00	-1,436624-003	-9,720083-004
74,40	-6,216338-003	3,775685-003	194,40	-1,055737-003	2,575872-003	314,40	3,998084-004	1,674241-003
76,80	6,912475-003	1,364756-003	196,80	2,487543-003	-1,172164-003	316,80	8,296668-004	-1,493272-003
79,20	-4,053197-003	-5,500353-003	199,20	-2,594512-003	-8,057519-004	319,20	-1,608232-003	5,367304-004
81,60	-7,002432-004	6,594456-003	201,60	1,352901-003	2,318558-003	321,60	1,536919-003	6,852956-004
84,00	4,825699-003	-4,267691-003	204,00	5,614911-004	-2,592726-003	324,00	-6,655263-004	-1,532001-003
86,40	-6,262291-003	-1,053626-004	206,40	-2,139982-003	1,515016-003	326,40	-5,399844-004	1,567639-003
88,80	4,426354-003	4,188481-003	208,80	2,571482-003	3,242574-004	328,80	1,446393-003	-7,855166-004
91,20	-4,268531-004	-5,918216-003	211,20	-1,658324-003	-1,953413-003	331,20	-1,585593-003	-3,947986-004
93,60	-3,585824-003	4,535113-003	213,60	-9,526726-005	2,531812-003	333,60	8,960996-004	1,352293-003
96,00	5,564321-003	-9,019819-004	216,00	1,760429-003	-1,782747-003	336,00	2,507739-004	-1,591020-003
98,40	-4,598957-003	-3,015614-003	218,40	-2,474799-003	1,243526-004	338,40	-1,250619-003	9,967527-004
100,80	1,324570-003	5,202592-003	220,80	1,888304-003	1,562579-003	340,80	1,584237-003	1,089097-004
103,20	2,476305-003	-4,622184-003	223,20	-3,335678-004	-2,401580-003	343,20	-1,087034-003	-1,142314-003
105,60	-4,834938-003	1,698393-003	225,60	-1,361381-003	1,975116-003	345,60	2,983565-005	1,565637-003
108,00	4,608569-003	1,966770-003	228,00	2,313332-003	-5,314390-004	348,00	1,028342-003	-1,166584-003
110,40	-2,026645-003	-4,463202-003	230,40	-2,043402-003	-1,158311-003	350,40	-1,535680-003	1,645502-004
112,80	-1,486200-003	4,561492-003	232,80	7,171240-004	2,211276-003	352,80	1,235124-003	9,096784-004
115,20	4,089172-003	-2,312089-003	235,20	9,548050-004	-2,093474-003	355,20	-2,943733-004	-1,494892-003
117,60	-4,484025-003	-1,034012-003	237,60	-2,096641-003	8,898797-004	357,60	-7,873067-004	1,292459-003
120,00	2,557155-003	3,714584-003	240,00	2,125738-003	7,522477-004	360,00	1,443858-003	-4,184996-004
122,40	6,097875-004	-4,379005-003	242,40	-1,049063-003	-1,970766-003	362,40	-1,338474-003	-6,622097-004

UNCLASSIFIED

MUTUAL RADIATION IMPEDANCE
KA = 2,60

SELF IMPEDANCE = 1,132009+000+J2,836512-001 AVE = 1,0504+000+J2,8364-001

KD	RE	IM	KD	RE	IM	KD	RE	IM
5,20	-7,205118-002	-7,212920-003	135,20	-3,037252-004	-3,264754-003	265,20	1,609258-003	4,525510-004
7,80	5,033813-002	2,158037-002	137,80	-1,394861-003	2,898867-003	267,80	-1,134654-003	-1,205437-003
10,40	-2,765003-002	-3,145176-002	140,40	2,639221-003	-1,733175-003	270,40	3,476402-004	1,602254-003
13,00	7,807548-003	3,282667-002	143,00	-3,097578-003	1,233679-004	273,00	5,229088-004	-1,537427-003
15,60	7,618323-003	-2,716952-002	145,60	2,669814-003	1,463625-003	275,60	-1,228826-003	1,038067-003
18,20	-1,722642-002	1,704621-002	148,20	-1,507127-003	-2,583855-003	278,20	1,573229-003	-2,537885-004
20,80	2,053701-002	-5,387897-003	150,80	-3,897393-005	2,939452-003	280,80	-1,465267-003	-5,879141-004
23,40	-1,819881-002	-5,058562-003	153,40	1,521742-003	-2,456781-003	283,40	9,438654-004	1,247495-003
26,00	1,183087-002	1,222167-002	156,00	-2,527245-003	1,299415-003	286,00	-1,643214-004	-1,541374-003
28,60	-3,625877-003	-1,503939-002	158,60	2,788992-003	1,854973-004	288,60	-6,477745-004	1,392884-003
31,20	-4,158585-003	1,356250-002	161,20	-2,257637-003	-1,570348-003	291,20	1,261671-003	-8,520423-004
33,80	9,689925-003	-8,812425-003	163,80	1,107789-003	2,469325-003	293,80	-1,506881-003	7,912300-005
36,40	-1,191779-002	2,438536-003	166,40	3,179915-004	-2,645101-003	296,40	1,320386-003	7,026805-004
39,00	1,072399-002	3,734222-003	169,00	-1,610384-003	2,070665-003	299,00	-7,625977-004	-1,271569-003
41,60	-6,844595-003	-8,155658-003	171,60	2,410042-003	-9,304182-004	301,60	-1,909230-006	1,469932-003
44,20	1,598996-003	9,893613-003	174,20	-2,506906-003	-4,379296-004	304,20	7,528080-004	-1,247881-003
46,80	3,494922-003	-8,797274-003	176,80	1,894470-003	1,642644-003	306,80	-1,277392-003	6,755392-004
49,40	-7,118399-003	5,455560-003	179,40	-7,657998-004	-2,349457-003	309,40	1,430705-003	7,886666-005
52,00	8,464484-003	-9,768889-004	182,00	-5,465366-004	2,373708-003	312,00	-1,175477-003	-7,983212-004
54,60	-7,395565-003	-3,341399-003	184,60	1,667803-003	-1,727913-003	314,60	5,908799-004	1,279332-003
57,20	4,418628-003	6,363154-003	187,20	-2,287529-003	6,126882-004	317,20	1,518316-004	-1,389372-003
59,80	-4,983742-004	-7,393585-003	189,80	2,244944-003	6,448412-004	319,80	-8,393739-004	1,103280-003
62,40	-3,232256-003	6,323681-003	192,40	-1,570054-003	-1,686442-003	322,40	1,277573-003	-5,086371-004
65,00	5,782678-003	-3,611908-003	195,00	4,700431-004	2,224318-003	325,00	-1,346100-003	-2,208788-004
67,60	-6,554877-003	1,195019-004	197,60	7,337150-004	-2,120162-003	327,60	1,031398-003	8,761119-004
70,20	5,472622-003	3,147755-003	200,20	-1,699045-003	1,420115-003	330,20	-4,288316-004	-1,272294-003
72,80	-2,964174-003	-5,317629-003	202,80	2,159877-003	-3,369893-004	332,80	-2,860772-004	1,301051-003
75,40	-1,872714-004	5,875187-003	205,40	-1,998997-003	-8,139029-004	335,40	9,086739-004	-9,599374-004
78,00	3,077529-003	-4,776796-003	208,00	1,277448-003	1,706116-003	338,00	-1,263665-003	3,514864-004
80,60	-4,932576-003	2,431074-003	210,60	-2,127850-004	-2,094268-003	340,60	1,254384-003	3,474912-004
83,20	5,309161-003	4,400067-004	213,20	-8,860475-004	1,881155-003	343,20	-8,890021-004	-9,371933-004
85,80	-4,194400-003	-3,015720-003	215,80	1,707989-003	-1,141510-003	345,80	2,766259-004	1,251853-003
88,40	1,983574-003	4,605090-003	218,40	-2,027586-003	9,679711-005	348,40	4,051815-004	-1,206253-003
91,00	6,510118-004	-4,827217-003	221,00	1,766402-003	9,507074-004	351,00	-9,617987-004	8,186957-004
93,60	-2,958830-003	3,697546-003	223,60	-1,011846-003	-1,705039-003	353,60	1,237019-003	-2,042757-004
96,20	4,320308-003	-1,601879-003	226,20	-1,151821-005	1,959850-003	356,20	-1,156811-003	-4,592063-004
98,80	-4,409258-003	-8,289525-004	228,80	1,008372-003	-1,654549-003	358,80	7,491199-004	9,826152-004
101,40	3,266938-003	2,904677-003	231,40	-1,697584-003	8,880700-004	361,40	-1,344610-004	-1,219322-003
104,00	-1,272042-003	-4,068005-003	234,00	1,891208-003	1,126315-004	364,00	-5,096219-004	1,106206-003
106,60	-9,801039-004	4,041166-003	236,60	-1,545450-003	-1,059475-003	366,60	9,997650-004	-6,803745-004
109,20	2,851852-003	-2,888802-003	239,20	7,698545-004	1,685918-003	369,20	-1,198915-003	6,720717-005
111,80	-3,840932-003	9,839523-004	241,80	2,069524-004	-1,821730-003	371,80	1,054583-003	5,564836-004
114,40	3,712745-003	1,109122-003	244,40	-1,104402-003	1,438988-003	374,40	-6,125569-004	-1,013368-003
117,00	-2,553057-003	-2,799425-003	247,00	1,670309-003	-6,569276-004	377,00	2,538241-006	1,175951-003
119,60	7,301086-004	3,633816-003	249,60	-1,751512-003	-2,948403-004	379,60	5,998463-004	-1,002085-003
122,20	1,219534-003	-3,416456-003	252,20	1,335075-003	1,143500-003	382,20	-1,023542-003	5,457625-004
124,80	-2,746769-003	2,252157-003	254,80	-5,490462-004	-1,651009-003	384,80	1,150579-003	5,952286-005
127,40	3,442743-003	-5,048273-004	257,40	-3,766124-004	1,680655-003	387,40	-9,488516-004	-6,397647-004
130,00	-3,146617-003	-1,314067-003	260,00	1,177083-003	-1,233646-003	390,00	4,800840-004	1,030405-003
132,60	1,980349-003	2,693463-003	262,60	-1,628250-003	4,460088-004	392,60	1,189550-004	-1,122945-003

MUTUAL RADIATION IMPEDANCE
KA = 2,80

SELF IMPEDANCE = 1,119405+000+J2,138155-001 AVE = 1.0715+000+J2,2231-001

KD	RE	IM	KD	RE	IM	KD	RE	IM
5,60	-4,491750-002	8,670917-003	145,60	2,015996-003	1,118380-003	285,60	3,432836-004	-1,124210-003
8,40	3,720314-002	-4,676247-003	148,40	-1,496828-003	-1,695850-003	288,40	-6,931468-004	9,351702-004
11,20	-2,891435-002	-2,898791-003	151,20	8,275023-004	2,060086-003	291,20	9,570081-004	-6,428071-004
14,00	2,188539-002	8,659339-003	154,00	-8,881404-005	-2,177907-003	294,00	-1,106379-003	2,824841-004
16,80	-1,538487-002	-1,235840-002	156,80	-6,335852-004	2,044899-003	296,80	1,126369-003	1,033577-004
19,60	9,324919-003	1,418334-002	159,60	1,258894-003	-1,684895-003	299,60	-1,017120-003	-4,701653-004
22,40	-3,849545-003	-1,437880-002	162,40	-1,719999-003	1,146343-003	302,40	7,935170-004	7,763871-004
25,20	-8,389243-004	1,322434-002	165,20	1,970495-003	-4,960631-004	305,20	-4,832139-004	-9,881509-004
28,00	4,557576-003	-1,103412-002	168,00	-1,989176-003	-1,888245-004	308,00	1,232517-004	1,082982-003
30,80	-7,182189-003	8,147697-003	170,80	1,781575-003	8,298601-004	310,80	2,443331-004	-1,052157-003
33,60	8,666554-003	-4,912441-003	173,60	-1,378479-003	-1,356062-003	313,60	-5,773895-004	9,014508-004
36,40	-9,048441-003	1,661948-003	176,40	8,316774-004	1,711633-003	316,40	8,384584-004	-6,502213-004
39,20	8,445256-003	1,306654-003	179,20	-2,075025-004	-1,861735-003	319,20	-9,989609-004	3,289596-004
42,00	-7,041512-003	-3,750946-003	182,00	-4,210565-004	1,795746-003	322,00	1,042301-003	2,437958-005
44,80	5,070191-003	5,501246-003	184,80	9,827446-004	-1,527716-003	324,80	-9,655491-004	-3,688371-004
47,60	-2,790260-003	-6,466291-003	187,60	-1,415987-003	1,094046-003	327,60	7,795437-004	6,651727-004
50,40	4,627198-004	6,636317-003	190,40	1,675522-003	-5,487424-004	330,40	-5,074169-004	-8,803116-004
53,20	1,672446-003	-6,077228-003	193,20	-1,737008-003	-4,316970-005	333,20	1,817484-004	9,910148-004
56,00	-3,416277-003	4,918685-003	196,00	1,599164-003	6,132742-004	336,00	1,593109-004	-9,863647-004
58,80	4,626022-003	-3,337134-003	198,80	-1,283261-003	-1,097560-003	338,80	-4,764860-004	8,688065-004
61,60	-5,224278-003	1,535551-003	201,60	8,300921-004	1,443503-003	341,60	7,338788-004	-6,536485-004
64,40	5,201487-003	2,780467-004	204,40	-2,948441-004	-1,615669-003	344,40	-9,030114-004	3,671034-004
67,20	-4,611854-003	-1,911256-003	207,20	-2,595168-004	1,599242-003	347,20	9,659566-004	-4,311877-005
70,00	3,563400-003	3,205159-003	210,00	7,695533-004	-1,401139-003	350,00	-9,172150-004	-2,806240-004
72,80	-2,203384-003	-4,047856-003	212,80	-1,178526-003	1,048657-003	352,80	7,641442-004	5,670730-004
75,60	7,007560-004	4,382532-003	215,60	1,442624-003	-5,858597-004	355,60	-5,259149-004	-7,840274-004
78,40	7,725010-004	-4,209576-003	218,40	-1,535576-003	6,816499-005	358,40	2,311346-004	9,077395-004
81,20	-2,059222-003	3,582830-003	221,20	1,451171-003	4,442008-004	361,20	8,556743-005	-9,254958-004
84,00	3,032379-003	-2,600635-003	224,00	-1,203459-003	-8,931323-004	364,00	-3,875906-004	8,368986-004
86,80	-3,606449-003	1,392863-003	226,80	8,246546-004	1,229161-003	366,80	6,405753-004	-6,537222-004
89,60	3,743878-003	-1,054224-004	229,60	-3,610487-004	-1,416839-003	369,60	-8,162955-004	3,983810-004
92,40	-3,456237-003	-1,116034-003	232,40	-1,325701-004	1,438408-003	372,40	8,957920-004	-1,012074-004
95,20	2,800195-003	2,141505-003	235,20	5,993209-004	-1,295387-003	375,20	-8,714004-004	-2,031351-004
98,00	-1,868997-003	-2,869581-003	238,00	-9,867209-004	1,007942-003	378,00	7,474584-004	4,796792-004
100,80	7,805348-004	3,236717-003	240,80	1,252527-003	-6,121670-004	380,80	-5,396327-004	-6,971558-004
103,60	3,365786-004	-3,222039-003	243,60	-1,369283-003	1,556224-004	383,60	2,729605-004	8,315153-004
106,40	-1,357385-003	2,847377-003	246,40	1,327096-003	3,083146-004	386,40	2,114994-005	-8,685725-004
109,20	2,173866-003	-2,172767-003	249,20	-1,134358-003	-7,266350-004	389,20	-3,086040-004	8,054857-004
112,00	-2,705788-003	1,288078-003	252,00	8,163862-004	1,052701-003	392,00	5,565586-004	-6,509189-004
114,80	2,908062-003	-3,018289-004	254,80	-4,121758-004	-1,251396-003	394,80	-7,371616-004	4,238860-004
117,60	-2,773992-003	-6,714808-004	257,60	-3,032489-005	1,302856-003	397,60	8,306670-004	-1,514293-004
120,40	2,334237-003	1,524123-003	260,40	4,598502-004	-1,204395-003	400,40	-8,275800-004	-1,345880-004
123,20	-1,651779-003	-2,166599-003	263,20	-8,277091-004	9,704411-004	403,20	7,296000-004	4,011943-004
126,00	8,136045-004	2,536629-003	266,00	1,093260-003	-6,305357-004	406,00	-5,492706-004	-6,180985-004
128,80	7,986899-005	-2,604802-003	268,80	-1,228358-003	2,256593-004	408,80	3,083948-004	7,611194-004
131,60	-9,263908-004	2,376418-003	271,60	1,220294-003	1,966613-004	411,60	-3,541256-005	-8,148693-004
134,40	1,633204-003	-1,889461-003	274,40	-1,072922-003	-5,878895-004	414,40	-2,379447-004	7,743959-004
137,20	-2,126883-003	1,209086-003	277,20	8,058821-004	9,040170-004	417,20	4,803305-004	-6,456080-004
140,00	2,360662-003	-4,193395-004	280,00	-4,520515-004	-1,110476-003	420,00	-6,643671-004	4,444533-004
142,80	-2,318568-003	-3,868661-004	282,80	5,353954-005	1,185883-003	422,80	7,697267-004	-1,949590-004

UNCLASSIFIED

MUTUAL RADIATION IMPEDANCE
KA = 3,00

SELF IMPEDANCE = 1,092228+000+J1,593918-001 AVE = 1,0697+000+J1,6431-001

KD	RE	IM	KD	RE	IM	KD	RE	IM
6,00	-2,189817-002	9,754607-003	156,00	-1,317949-003	6,588729-004	306,00	-7,133420-004	-2,358716-004
9,00	1,862479-002	-1,338074-002	159,00	1,371142-003	-4,582108-004	309,00	6,664299-004	3,308430-004
12,00	-1,470845-002	1,068304-002	162,00	-1,395634-003	2,560145-004	312,00	-6,072337-004	-4,174443-004
15,00	1,252407-002	-7,978742-003	165,00	1,392003-003	-5,614625-005	315,00	5,371484-004	4,941377-004
18,00	-1,110644-002	5,743306-003	168,00	-1,361322-003	-1,377069-004	318,00	-4,577540-004	-5,596066-004
21,00	1,004505-002	-3,915625-003	171,00	1,305117-003	3,220924-004	321,00	3,707820-004	6,127770-004
24,00	-9,158605-003	2,404539-003	174,00	-1,225333-003	-4,938461-004	324,00	-2,780795-004	-6,528341-004
27,00	8,360545-003	-1,141540-003	177,00	1,124281-003	6,501391-004	327,00	1,815712-004	6,792327-004
30,00	-7,607408-003	7,940600-005	180,00	-1,004587-003	-7,885181-004	330,00	-8,322088-005	-6,917035-004
33,00	6,877182-003	8,142819-004	183,00	8,491393-004	9,069384-004	333,00	-1,500694-005	6,902529-004
36,00	-6,159332-003	-1,562253-003	186,00	-7,210257-004	-1,003788-003	336,00	1,111851-004	-6,751585-004
39,00	5,449834-003	2,180982-003	189,00	5,634728-004	1,077905-003	339,00	-2,034605-004	6,469589-004
42,00	-4,748509-003	-2,682935-003	192,00	-3,997844-004	-1,128583-003	342,00	2,900882-004	-6,064386-004
45,00	4,057499-003	3,078030-003	195,00	2,332789-004	1,155575-003	345,00	-3,694640-004	5,546087-004
48,00	-3,380348-003	-3,374603-003	198,00	-6,722922-005	-1,159082-003	348,00	4,401526-004	-4,926837-004
51,00	2,721398-003	3,580049-003	201,00	-9,519605-005	1,139738-003	351,00	-5,009126-004	4,220542-004
54,00	-2,085394-003	-3,701242-003	204,00	2,509873-004	-1,098587-003	354,00	5,507174-004	-3,442573-004
57,00	1,477187-003	3,744817-003	207,00	-3,973450-004	1,037051-003	357,00	-5,887718-004	2,609444-004
60,00	-9,015259-004	-3,717349-003	210,00	5,317251-004	-9,568954-004	360,00	6,145230-004	-1,738470-004
63,00	3,628941-004	3,625456-003	213,00	-6,518793-004	8,601882-004	363,00	-6,276680-004	8,474211-005
66,00	1,346206-004	-3,475860-003	216,00	7,558890-004	-7,492519-004	366,00	6,281550-004	4,583060-006
69,00	-5,874233-004	3,275394-003	219,00	-8,421916-004	6,266152-004	369,00	-6,161807-004	-9,236604-005
72,00	9,924896-004	-3,031001-003	222,00	9,096012-004	-4,949606-004	372,00	5,921823-004	1,769029-004
75,00	-1,347424-003	2,749694-003	225,00	-9,573203-004	3,570711-004	375,00	-5,568253-004	-2,565804-004
78,00	1,650498-003	-2,438514-003	228,00	9,849456-004	-2,157755-004	378,00	5,109870-004	3,299059-004
81,00	-1,900682-003	2,104469-003	231,00	-9,924651-004	7,389496-005	381,00	-4,557361-004	-3,955349-004
84,00	2,097648-003	-1,754471-003	234,00	9,802496-004	6,580966-005	384,00	3,923088-004	4,522941-004
87,00	-2,241774-003	1,395265-003	237,00	-9,490358-004	-2,006879-004	387,00	-3,220827-004	-4,992025-004
90,00	2,334126-003	-1,033360-003	240,00	8,999041-004	3,282466-004	390,00	2,465471-004	5,354871-004
93,00	-2,376431-003	6,749592-004	243,00	-8,342503-004	-4,461930-004	393,00	-1,672728-004	-5,605949-004
96,00	2,371043-003	-3,258908-004	246,00	7,537520-004	5,524732-004	396,00	8,588009-005	5,742002-004
99,00	-2,320891-003	-8,452355-006	249,00	-6,603304-004	-6,453051-004	399,00	-4,006576-006	-5,762081-004
102,00	2,229430-003	3,231713-004	252,00	5,561085-004	7,232058-004	402,00	-7,672524-005	5,667524-004
105,00	-2,100572-003	-6,139110-004	255,00	-4,433669-004	-7,850123-004	405,00	1,547392-004	-5,461898-004
108,00	1,938620-003	8,769027-004	258,00	3,244968-004	8,298987-004	408,00	-2,285357-004	5,150898-004
111,00	-1,748193-003	-1,108997-003	261,00	-2,019525-004	-8,573798-004	411,00	2,967198-004	-4,742204-004
114,00	1,534148-003	1,307689-003	264,00	7,820360-005	8,673170-004	414,00	-3,580268-004	4,245304-004
117,00	-1,301501-003	-1,471132-003	267,00	4,431211-005	-8,599117-004	417,00	4,113454-004	-3,671280-004
120,00	1,055345-003	1,598143-003	270,00	-1,632343-004	8,356942-004	420,00	-4,557370-004	3,032572-004
123,00	-8,007669-004	-1,688195-003	273,00	2,763234-004	-7,955069-004	423,00	4,904518-004	-2,342713-004
126,00	5,427752-004	1,741404-003	276,00	-3,815002-004	7,404815-004	426,00	-5,149405-004	1,616054-004
129,00	-2,862182-004	-1,758506-003	279,00	4,768826-004	-6,720113-004	429,00	5,288627-004	-8,674649-005
132,00	3,571486-005	1,740819-003	282,00	-5,608171-004	5,917200-004	432,00	-5,320903-004	1,120423-005
135,00	2,044116-004	-1,690204-003	285,00	6,319056-004	-5,014249-004	435,00	5,247074-004	6,351913-005
138,00	-4,301942-004	1,609017-003	288,00	-6,890270-004	4,030994-004	438,00	-5,070055-004	-1,359580-004
141,00	6,360745-004	-1,500051-003	291,00	7,313534-004	-2,988313-004	441,00	4,794752-004	2,047118-004
144,00	-8,249480-004	1,366475-003	294,00	-7,583595-004	1,907813-004	444,00	-4,427937-004	-2,684711-004
147,00	9,862000-004	-1,211770-003	297,00	7,698269-004	-8,113943-005	447,00	3,978094-004	3,260425-004
150,00	-1,125734-003	1,039686-003	300,00	-7,658427-004	-2,791656-005	450,00	-3,455227-004	-3,763704-004
153,00	1,235989-003	-8,540272-004	303,00	7,467914-004	1,342634-004	453,00	2,870646-004	4,185555-004

SELF IMPEDANCE

KA	RE	IM	KA	RE	IM	KA	RE	IM
2,50	1,131032+000	3,231248-001	27,50	1,002845+000	2,584277-002	52,50	1,000770+000	1,339502-002
3,00	1,092228+000	1,593918-001	28,00	1,003696+000	2,182579-002	53,00	1,001462+000	1,204963-002
3,50	1,001338+000	9,894449-002	28,50	1,001193+000	1,883312-002	53,50	1,000809+000	1,070730-002
4,00	9,413409-001	1,220290-001	29,00	9,977497-001	1,913247-002	54,00	9,994412-001	1,048287-002
4,50	9,454863-001	1,663428-001	29,50	9,964967-001	2,194331-002	54,50	9,986172-001	1,144912-002
5,00	9,913055-001	1,783665-001	30,00	9,984467-001	2,428887-002	55,00	9,990696-001	1,259943-002
5,50	1,032143+000	1,464489-001	30,50	1,001695+000	2,376764-002	55,50	1,000354+000	1,278946-002
6,00	1,037241+000	9,730956-002	31,00	1,003266+000	2,067351-002	56,00	1,001283+000	1,177801-002
6,50	1,010818+000	6,619133-002	31,50	1,001832+000	1,760180-002	56,50	1,001023+000	1,042144-002
7,00	9,809464-001	6,759664-002	32,00	9,988190-001	1,701474-002	57,00	9,998423-001	9,868093-003
7,50	9,726528-001	8,806496-002	32,50	9,970052-001	1,904092-002	57,50	9,988350-001	1,050933-002
8,00	9,887004-001	1,021318-001	33,00	9,979644-001	2,146721-002	58,00	9,989109-001	1,164432-002
8,50	1,011490+000	9,482422-002	33,50	1,000711+000	2,182955-002	58,50	9,999734-001	1,214385-002
9,00	1,020888+000	7,185804-002	34,00	1,002698+000	1,963453-002	59,00	1,001033+000	1,148559-002
9,50	1,011126+000	5,145359-002	34,50	1,002172+000	1,671500-002	59,50	1,001128+000	1,021246-002
10,00	9,933167-001	4,726882-002	35,00	9,997146-001	1,548300-002	60,00	1,000197+000	9,413158-003
10,50	9,837028-001	5,766805-002	35,50	9,976169-001	1,673809-002	60,50	9,991095-001	9,720597-003
11,00	9,893475-001	6,921209-002	36,00	9,977515-001	1,901674-002	61,00	9,988575-001	1,074880-002
11,50	1,003436+000	6,952050-002	36,50	9,999056-001	2,000176-002	61,50	9,996493-001	1,146824-002
12,00	1,012837+000	5,756493-002	37,00	1,002058+000	1,864059-002	62,00	1,000741+000	1,115598-002
12,50	1,010028+000	4,310429-002	37,50	1,002270+000	1,604051-002	62,50	1,001133+000	1,004456-002
13,00	9,988426-001	3,705853-002	38,00	1,000428+000	1,438581-002	63,00	1,000487+000	9,087857-003
13,50	9,898826-001	4,201765-002	38,50	9,982712-001	1,492924-002	63,50	9,994136-001	9,077826-003
14,00	9,906749-001	5,092506-002	39,00	9,977557-001	1,690026-002	64,00	9,988982-001	9,929091-003
14,50	9,995218-001	5,416608-002	39,50	9,992841-001	1,827653-002	64,50	9,993960-001	1,077703-002
15,00	1,007917+000	4,811669-002	40,00	1,001401+000	1,765288-002	65,00	1,000431+000	1,078117-002
15,50	1,008582+000	3,767144-002	40,50	1,002176+000	1,548410-002	65,50	1,001051+000	9,888077-003
16,00	1,001662+000	3,116843-002	41,00	1,000958+000	1,360603-002	66,00	1,000701+000	8,861820-003
16,50	9,939018-001	3,281349-002	41,50	9,989191-001	1,352987-002	66,50	9,997220-001	8,571218-003
17,00	9,921782-001	3,938559-002	42,00	9,979283-001	1,509108-002	67,00	9,990173-001	9,198012-003
17,50	9,974862-001	4,369434-002	42,50	9,988435-001	1,665744-002	67,50	9,992217-001	1,008708-002
18,00	1,004574+000	4,119804-002	43,00	1,000772+000	1,665323-002	68,00	1,000129+000	1,036038-002
18,50	1,007058+000	3,375429-002	43,50	1,001937+000	1,497904-002	68,50	1,000900+000	9,719840-003
19,00	1,003114+000	2,746943-002	44,00	1,001312+000	1,305045-002	69,00	1,000835+000	8,705614-003
19,50	9,967151-001	2,699864-002	44,50	9,995220-001	1,246833-002	69,50	1,000012+000	8,186790-003
20,00	9,936981-001	3,156117-002	45,00	9,982239-001	1,356691-002	70,00	9,991961-001	8,564204-003
20,50	9,964829-001	3,603147-002	45,50	9,985744-001	1,515400-002	70,50	9,991283-001	9,416019-003
21,00	1,002190+000	3,577126-002	46,00	1,000203+000	1,563818-002	71,00	9,998549-001	9,898763-003
21,50	1,005560+000	3,068502-002	46,50	1,001596+000	1,447962-002	71,50	1,000698+000	9,523208-003
22,00	1,003764+000	2,498563-002	47,00	1,001500+000	1,264397-002	72,00	1,000889+000	8,591829-003
22,50	9,987401-001	2,317371-002	47,50	1,000050+000	1,168131-002	72,50	1,000267+000	7,907198-003
23,00	9,951613-001	2,603295-002	48,00	9,985998-001	1,230630-002	73,00	9,994146-001	8,031653-003
23,50	9,961162-001	3,017614-002	48,50	9,984614-001	1,377789-002	73,50	9,991126-001	8,780710-003
24,00	1,000472+000	3,131297-002	49,00	9,997202-001	1,461452-002	74,00	9,996243-001	9,406104-003
24,50	1,004143+000	2,811254-002	49,50	1,001194+000	1,395682-002	74,50	1,000468+000	9,287936-003
25,00	1,003900+000	2,320314-002	50,00	1,001543+000	1,232622-002	75,00	1,000869+000	8,496067-003
25,50	1,000191+000	2,059748-002	50,50	1,000484+000	1,111163-002	75,50	1,000471+000	7,712745-003
26,00	9,965226-001	2,204078-002	51,00	9,990172-001	1,128656-002	76,00	9,996523-001	7,599617-003
26,50	9,961673-001	2,558678-002	51,50	9,984838-001	1,254013-002	76,50	9,991663-001	8,196015-003
27,00	9,992581-001	2,753925-002	52,00	9,993397-001	1,359579-002	77,00	9,994488-001	8,895352-003

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Appendix A

PRINTOUT OF THE PROGRAM MUTIMP

Printed below is MUTIMP, a Fortran IV computer program to calculate the self impedance and mutual radiation impedance coefficients for identical circular pistons radiating in a plane infinite rigid baffle. For purposes of publication, this program had its input modified, the modified program required 4 minutes and 5 seconds to compile, calculate, and print the preceding table on the NRL CDC 3800.

```
      PROGRAM MUTIMP
      TYPE COMPLEX Z
      DIMENSION Z(12,12)
      DIMENSION FACT(180),GAMMA(180),ZRADR(155),BESS(170),ZETAR(215),
     1ZETAI(165),VELC(155),BIGZ(155),DK(155)
      TYPE LOGICAL VALID
      TYPE REAL KA,KA1,KA2,KA3,KD,KD1,KD2,KD3
      TYPE DOUBLE R,CAA,TWOKA,BJ1,T6,EPS,API,SQ,FJ1,AA,AK,FACTJ,CX,SX,BB
     1,CC,FF,GG
      TYPE COMPLEX ZRADR,AVE,BIGZ,VELC
      COMMON/BLK1/FACT/CM/EPS,T6
   10 FORMAT(4F15.8,2I3,I1)
  125 FORMAT(*  WHEN THE ARGUMENT IS*F15.8* THE STRUVE FUNCTION DOES NOT
     1  CONVERGE. *)
  141 FORMAT(1X* THE FIRST SERIES FOR THE STRUVE FUNCTION HAS NOT YET
     1 CONVERGED*)
  151 FORMAT(1X*THE SECOND SERIES FOR THE STRUVE FUNCTION HAS NOT YET
     1 CONVERGED*)
  161 FORMAT(1X* THE THIRD SERIES FOR THE STRUVE FUNCTION HAS NOT YET
     1 CONVERGED*)
  195 FORMAT(1H1 51X*MUTUAL RADIATION IMPEDANCE*/60X*KA =*F5.2//15X*SELF
     1 IMPEDANCE =*E13.6*+J*E12.6,10X*AVE =*E11.4*+J*E10.4//    1X,3(4X*K
     2D*10X*RE*12X*IM*10X)/)
  290 FORMAT(1X,*THE IMPEDANCE HAS NOT CONVERGED FOR KA=*E20.12* KD=*E20
     1.12*JJJJ=*I4*I=*I4 )
  297 FORMAT( 3(2X,F6.2,3X,C(E13.6,E14.6),4X) )
  300 FORMAT (1H1 60X *SELF IMPEDANCE*//1X 3(4X*KA*10X*RE*12X*IM*10X)/)
  866 FORMAT(5H XXX    )
      GAMMA(1)=1.0
      GAMMA(2)=0.5
      DO 50 N=3,165
   50 GAMMA(N)= GAMMA(N-1)*(N+N-3)*0.5
      FACT(1)=1.0
      DO 190 I=1,171
  190 FACT(I+1)=I*FACT(I)
      T6=64.0D
      INIT=0
      C=1.55E+5
      EPS=5.0D-26
      API=3.14159265358979323846264 3D
      PI=3.14159265359
      SQ=1.41421356237309504880168 9D
    5 READ 10, A,DH,DV,F,NHOR,NVER,NOUNFV
      IF(EOF,60) 9999,11
   11 CCC=2.0*PI*F/C
      CAA=KA=CCC*A
      NVER1=NVER-1
      NHOR1=NHOR-1
      NRP=AA=(NHOR*NVER)/3.
      IF(AA.NE.NRP)NRP=NRP+1
      NRP2=NRP+NRP
```

```
C     FROM HERE TO STATEMENT 210 WE CALCULATE THE SELF IMPEDANCE. DOUBLE
C      PRECISION MIXED MODE ARITHMETIC IS USED.
      R=TWOKA=2.0*CAA
   20 IF( R.GE. 19.0) GO TO 100
      IF (R) 14,1,2
    1 RESIST=REACT=  0.0
      GO TO 210
C       SERIES FOR ARGUMENTS LESS THAN  19
   14 R=ABS(R)
    2 FJ1=AK= 0
      AA=1.0
  105 AK=AK+1.0
      FACTJ=-(R*R/4.0)/(AK*AK)
      AA=AA*FACTJ
      BJ1=FJ1-AK*2.0/R*AA
      IF(BJ1.EQ.0.0.OR.ABS((FJ1-BJ1)/BJ1).LT.EPS) 103,4
    4 FJ1=BJ1
      GO TO 105
C  ASYMPTOTIC EXPANSION OF THE BESSEL FUNCTION FOR ARGUMENTS GREATER
C  THAN OR EQUAL TO 19.0
  100 AA=DSQRT(2.0/(API*R))
      CX=DCOS(R)
      SX=DSIN(R)
      BB=(SX+CX)/SQ
      CC=(SX-CX)/SQ
      CALL DPSUBV(1.0D,R,FF)
      CALL DQSUBV(1.0D,R,GG)
      BJ1=AA*(CC*FF+BB*GG)
  103 RESIST=-2.0D*BJ1/R + 1.0D
      IF( TWOKA.LT.13)115,135
  115 H1=2.0/PI
C  REACT ACTUALLY CONTAINS TWICE THE STRUVE FUNCTION DIVIDED BY ITS
C     ARGUMENT TWOKA.
      TERM=FACTOR=TWOKA*TWOKA/3.0
      DO 120  J=1,200
      REALJ=J
      BOTTOM= (REALJ+REALJ+1.0)*(REALJ+REALJ+3.0)
      FACTOR=-FACTOR*R*R/BOTTOM
      TERM=TERM+FACTOR
      IF(TERM.EQ.0) GO TO 120
      IF ( ABSF(FACTOR/TERM).LT. 1.E-8)   GO TO 130
  120 CONTINUE
      PRINT125, TWOKA
      GO TO 210
  130 H1=H1*TERM
      REACT=H1/CAA
      GO TO 210
C  CALCULATE REACTANCE WHEN TWOKA IS GREATER THAN OR EQUAL TO 13.
  135 R=1.0/TWOKA
      RSQ=R*R
```

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      RTERM=-3.0*R*RSQ
      SUM=TWOKA+R
      CONST=3.0
      DO 140 I=1,500
      CONST2= CONST+2.0
      R1TERM =-RTERM*CONST*CONST2*RSQ
      SUM=SUM+RTERM
      IF( ABS(R1TERM/SUM).LT.1.E-08.OR.ABS(RTERM).LT.ABS(R1TERM)) GO TO
     1 145
      RTERM=R1TERM
  140 CONST=CONST2
      PRINT 141
  145 S1=SUM*2.0/PI
      EIGR SQ= 0.015625*RSQ
      RTERM=7.5*EIGRSQ
      SUM=1.0
      F=3.0
      CONST=5.0
      DO 150 I=1,500
      CONST2=CONST+2.0
      FPLUS1=F+1.0
      R1TERM=-RTERM*EIGRSQ*(CONST*CONST-4.0)*(CONST2*CONST2-4.0)/(F*FPLU
     1S1)
      SUM=SUM+RTERM
      IF( ABS(R1TERM/SUM).LT.1.E-08.OR.ABS(RTERM).LT.ABS(R1TERM)) GO TO
     1 155
      RTERM=R1TERM
      CONST=CONST2
  150 F=F+2.0
      PRINT 151
  155 S2= SUM*SQRT(2.0*TWOKA/PI)*COSF(TWOKA-PI/4.0)
      CONST=3.0
      F=2.0
      SUM=0.0
      RTERM=-0.375*R
      DO 160 I=1,500
      SUM=SUM+RTERM
      CONST2=CONST+2.0
      FPLUS1=F+1.0
      R1TERM=-RTERM*EIGRSQ*(CONST*CONST-4.0)*(CONST2*CONST2-4.0)/(F*FPLU
     1S1)
      IF( ABS(R1TERM/SUM).LT.1.E-08.OR.ABS(RTERM).LT.ABS(R1TERM)) GO TO
     1 165
      RTERM=R1TERM
      CONST=CONST2
  160 F=F+2.0
      PRINT 161
  165 S3= SUM*SQRT(2.0*TWOKA/PI)*SINF(TWOKA-PI/4.0)
      H1= (S1-S2-S3)*R
      REACT=2.0*R*H1
```

```
  210 CONTINUE
      K=3*NRP
C     FINDING MUTUAL IMPEDANCE COEFFICIENTS AND STORING IN ZRADR.
      DO 230 J=1, K
      DK(J)=0.
  230 ZRADR (J)=(0.0,0.0)
      IF(KA-0.5) 270,260,260
  260 MXN=100
      GO TO 285
  270 MXN=82
  285 CALL JN(KA,MXN,BESS)
      DVSQ=DV*DV
      DHSQ=DH*DH
      DO 294 IL=INIT,NVER1
      DO 294 J=INIT    ,NHOR1
      IF(IL+J.EQ.0) GO TO 294
      I=NHOR*IL+J
      KD=DK(I)=CCC*SQRT(IL*IL*DVSQ+J*J*DHSQ)
      RATKAD=KA/KD
      CALL SBESF(KD,ZETAR)
      CALL SPHYN(KD,163,ZETAI)
      DO 291 L=1,163
  291 ZETAI(L)= -ZETAI(L)
      ERTERM=0.0
      K=-10
C     FINDING REAL PART OF IMPEDANCE COEFFICIENT.
      DO 293 MM=1,25
      PRTERM=ERTERM
      DO 292 NN= 1,MM
      ERTERM=GAMMA(MM+NN-1)* RATKAD**(MM+NN-2)/(FACT(NN)*FACT(MM))*BESS(
     1MM+1)*BESS(NN+1)*ZETAR(MM+NN-1)
      IF( NN.NE.MM) ERTERM= 2.0* ERTERM
  292 ZRADR(I)=ZRADR(I)+ERTERM
      ZRAD=REAL(ZRADR(I))
      VALID=ABSF(ERTERM/ZRAD).LT.1.E-10.AND.ABSF(PRTERM).GT.ABSF(ERTERM)
      IF( VALID .AND.  K.EQ.MM)    GO TO 250
      IF(VALID) K=MM+1
  293 CONTINUE
      JJJJ=1
      PRINT 290, KA,KD,JJJJ,I
  250 EITERM=0.0
      K=-10
C     FINDING IMAGINARY PART OF IMPEDANCE COEFFICIENTS
      DO 255 MM=1,80
      PITERM=EITERM
      DO 254 NN=1,MM
      EITERM=GAMMA(MM+NN-1)*RATKAD **(MM+NN-2)/(FACT(NN)*FACT(MM))*ZETAI
     1(MM+NN-1)*BESS(MM+1)*BESS(NN+1)*1.E260
      IF ( NN .NE. MM ) EITERM=2.0*EITERM
  254 ZRADR(I)=ZRADR(I)+EITERM*(0.0,1.0)
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      ZRAD=AIMAG( ZRADR(I) )
      VALID=ABSF(EITERM/ZRAD).LT.1.E-10.AND.ABSF(PITERM).GT.ABSF(EITERM)
      IF( VALID.AND. K.EQ.MM)  GO TO 294
      IF(VALID) K=MM+1
  255 CONTINUE
      IF(I.EQ.1) GO TO 294
      JJJJ=2
      PRINT 290, KA,KD,JJJJ,I
  294 CONTINUE
      NUMBB=NHOR*NVER
      DO 296 I=1,NUMBB
  296 ZRADR(I)= 2.0*ZRADR(I)
      DO 350 I=INIT,NVER1
      DO 350 J=INIT,NHOR1
  350 Z(I+1,J+1)=ZRADR(NHOR*I+J)
      Z(1,1)=CMPLX(RESIST,REACT)
      DO 362 I=1,NUMBB
  362 BIGZ(I)=(0.0,0.0)
      IF(NOUNFV) 360,295
  295 AVE=(0.,0.)
      DO 320 IL=INIT,NVER1
      DO 320 J=INIT,NHOR1
      I=NHOR*IL+J
      II1=I+1
      DO 320 K=INIT,NVER1
      DO 320 L=INIT,NHOR1
      BIGZ(II1)=Z(IABS(IL-K)+1,IABS(L-J)+1) + BIGZ(II1)
  320 CONTINUE
  375 DO 325 I=1,NUMBB
  325 AVE=AVE+BIGZ(I)
      AVE=AVE/NUMBB
      GO TO 400
  360 AVE=(0.,0.)
      DO 365 IL=INIT,NVER1
      DO 365 J=INIT,NHOR1
      I=NHOR*IL+J
      II1=I+1
      DO 365 K=INIT,NVER1
      DO 365 L=INIT,NHOR1
      BIGZ(II1)=Z(IABS(IL-K)+1,IABS(L-J)+1)*VELC( NHOR*K+L+1)+BIGZ(II1)
  365 CONTINUE
      DO 370 I=1,NUMBB
  370 BIGZ(I)=BIGZ(I)/VELC(I)
      GO TO 375
  400 RE=REAL(AVE)
      ER=AIMAG(AVE)
  316 PRINT 195, KA,RESIST,REACT,RE,ER
      DO 317 I=1,NRP
      KD1=DK(I)
      KD2=DK(I+NRP)
      KD3=DK(I+NRP2)
  317 PRINT 297, KD1,ZRADR(I),KD2,ZRADR(I+NRP),KD3,ZRADR(I+2*NRP)
      GO TO 5
 9999 END
```

```
      SUBROUTINE JN(X,N,ARR)
      DIMENSION ARR(170)
      NN=N+1
      NOTE=0
      IF(X.EQ.0.0) GO TO 4
      IF(X.LE.0.5) GO TO 6
      ALPHA=1.0E-200
      M=-1
      ARR(N+1)=ALPHA
      SUM=ARR(N+2)=0
      I=-N
      DO 2 LL=I,M
      L=-LL
      TN=L+L
      ARR(L)=TN*ARR(L+1)/X-ARR(L+2)
      IF(L/2*2.EQ.L) SUM=SUM+ARR(L+1)
    2 CONTINUE
      C=1.0/(ARR(1)+SUM+SUM)
      DO 3 I=1,NN
      ARR(I)=ARR(I)*C
    3 CONTINUE
      RETURN
    4 ARR(1)=1.0
      DO 5 I=2,NN
      ARR(I)=0
    5 CONTINUE
      RETURN
C     SERIES FOR ARGUMENT ' 0.5
    6 EPS=5.0E-11
      RX=1.0E+307
      CH=CH3=CS=DFAC=1.0
      DO 12 L=1,NN
      NO=L-1
      IF(NOTE.EQ.1) PRINT 13,X,NO
      IF(L.EQ.1) GO TO 7
      CS=CS*0.5*X
   14 CH3=CS
      DFAC=DFAC*NO
C     CHECK FOR OVERFLOW
      IF EXPONENT FAULT 9,7
    9 DFAC=CH/RX*NO
      PRINT 13,X,NO
   13 FORMAT(3X,*FOR ARGUMENT OF *,E17.10,* AND ORDER OF *,I5,* EXPONENT
     1 WAS INCREASED BY 307*)
    7 CH=DFAC
      XKK=0
      A=CH2=FORTT=1.0/DFAC
      VK=NO
      FN=-.25*X*X
   10 VK=VK+1.0
```

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```
      XKK=XKK+1.0
      A=A*FN/(XKK*VK)
      IF(A.NE.0.0) GO TO 8
      A=CH2*RX*FN/(XKK*VK)
      PRINT 13,X,NO
      CH2=A
    8 TT=A+FORTT
      IF(TT.EQ.0.0.OR.ABS(A/TT).LT.EPS) GO TO 11
      FORTT=TT
      GO TO 10
   11 ARR(L)=CS*TT
   12 CONTINUE
      END
```

```
      SUBROUTINE SBESF(XH,RAY)
      COMMON/BLK1/FACT
      DIMENSION RAY(1),FACT(1)
      L = 0
    1 IF (XH.GE.0.4) GO TO 4
      Z2H=XH*XH/2.
      DO 3N=L,50
      TM=FACT(N+1)*(XH +XH)**N/FACT(N+N+2)
      IF (TM.EQ.0.) GO TO 8
      SUM=TERM=1.0
      DO 2 I=1,50
      XI=I*(N+N+I+I+1)
      TERM=-TERM*Z2H/XI
      SUM = SUM + TERM
    2 IF (ABSF(TERM/SUM).LT.1.E-26) GO TO 3
    3 RAY(N+1) =TM*SUM
      RETURN
    4 N=65
      IF(XH.LT.100.) GO TO 20
C      FORWARD RECURSION
      RAY(1)=SINF(XH)/XH
      RAY(2)=(RAY(1)-COSF(XH))/XH
      DO 11 K=1,50
   11 RAY(K+2)=(K+K+1)*RAY(K+1)/XH-RAY(K)
      RETURN
C     BACKWARD RECURSION
   20 IF(XH.GT.10. ) N=N+XH+10.0
      RAY(N+1)=1.E-30
      RAY(N+2)=0.0
      I = -N
      M = -1
      DO 5 KK=I,M
      K = -KK
      TK=K+K+1
    5 RAY(K)=TK*RAY(K+1)/XH-RAY(K+2)
      CP=DSIN(XH)/(XH*RAY(1))
      IF(CP.EQ.0) CP=-COSF(XH)/(XH*RAY(2) )
      DO 6 L=1,51
    6 RAY(L)=CP*RAY(L)
    8 DO 9 J=N,51
    9 RAY(J+1)=0.D
      END
```

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```
      SUBROUTINE SPHYN(X,N,ARR)
      DIMENSION ARR(165)
      ARR(1)=-DCOS(X)/X *1.E-260
      ARR(2)=ARR(1)/X-DSIN(X)/X*1.E-260
      NM1=N-1
      DO 2 K=1,NM1
      TKP1=K+K+1
      ARR(K+2)=TKP1*ARR(K+1)/X-ARR(K)
    2 CONTINUE
      END
```

```
      SUBROUTINE DPSUBV(V,X,DF)
      TYPE DOUBLE V,X,DF,HOLD1,XS,AK,FORPV,FVS,A,FACN,FACD,T6,EPS,HOLD2
      COMMON/CM/EPS,T6
      HOLD1=.99999999999D307
      XS=X*X
      AK=0.0D
      FORPV=1.0D
      FVS=4.0D*V*V
      A=1.0D
C     BEGIN ITERATION WITH AK=1
    3 AK=AK+1.0D
      FACN=(FVS-(4.0D*AK-1.0D)**2)*(FVS-(4.0D*AK-3.0D)**2)
      FACD=-2.0D*AK*(2.0D*AK-1.0D)*T6*XS
      A=A*FACN/FACD
      DF=A+FORPV
      IF(DF.EQ.0.0D.OR.DABS(A/DF).LT.EPS) GO TO 2
    4 HOLD2=DABS(A)
      IF(HOLD2.GT.HOLD1)5,6
    5 DF=FORPV
      RETURN
    6 FORPV=DF
      HOLD1=HOLD2
      GO TO 3
    2 END
```

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```
      SUBROUTINE DQSUBV(V,X,EG)
      TYPE DOUBLE V,X,EG,HOLD1,XS,AK,FVS,A,FORQV,FACN,FACD,T6,EPS,HOLD2
      COMMON/CM/EPS,T6
      HOLD1=.99999999999D307
      XS=X*X
      AK=1.0D
      FVS=4.0D*V*V
      A=FORQV=(FVS-1.0D)/(8.0D*X)
C     BEGIN ITERATION WITH AK=2 BECAUSE FIRST TERM IS NOT SAME AS FACTOR
    3 AK=AK+1.0D
      FACN=(FVS-(4.0D*AK-3.0D)**2)*(FVS-(4.0D*AK-5.0D)**2)
      FACD=-(2.0D*AK-1.0D)*(2.0D*AK-2.0D)*T6*XS
      A=A*FACN/FACD
      EG=A+FORQV
      IF(EG.EQ.0.0D.OR.DABS(A/EG).LT.EPS) GO TO 2
    4 HOLD2=DABS(A)
      IF(HOLD2.GT.HOLD1)5,6
    5 EG=FORQV
      RETURN
    6 FORQV=EG
      HOLD1=HOLD2
      GO TO 3
    2 END
```

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Appendix B

PLOTS OF RESISTANCE AND REACTANCE FOR VARYING ka

The following curves are plots of the resistance and reactance for the cases $kd = 2ka$, $kd = 5ka$, and $kd = 10ka$. The data points were computed using NRL's program "MUTIMP" (see Appendix A). The lower curves on the following pages are continuations of the upper curves but with their vertical scales expanded.

As expected, all six curves are oscillatory. The oscillations, however, are more complex than graphs of periodic or damped periodic motion. In spite of this complexity, as the value of ka approaches infinity, both the resistance and reactance go to zero.

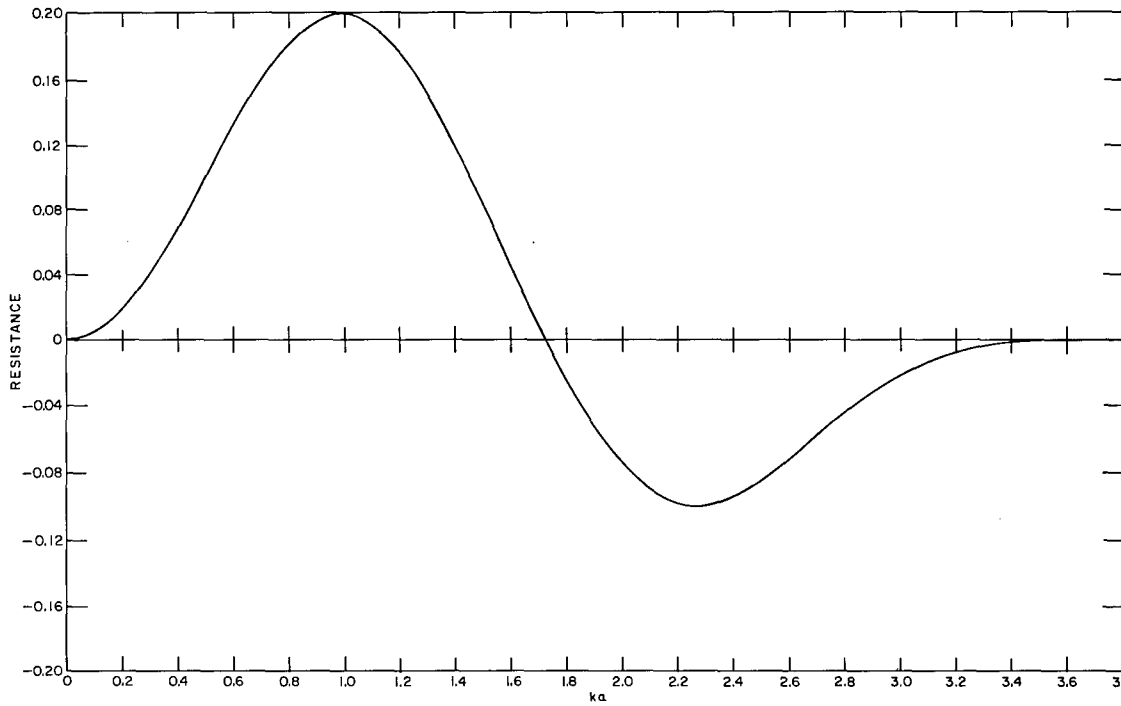

Fig. B1a - Resistance values for $kd = 2ka$

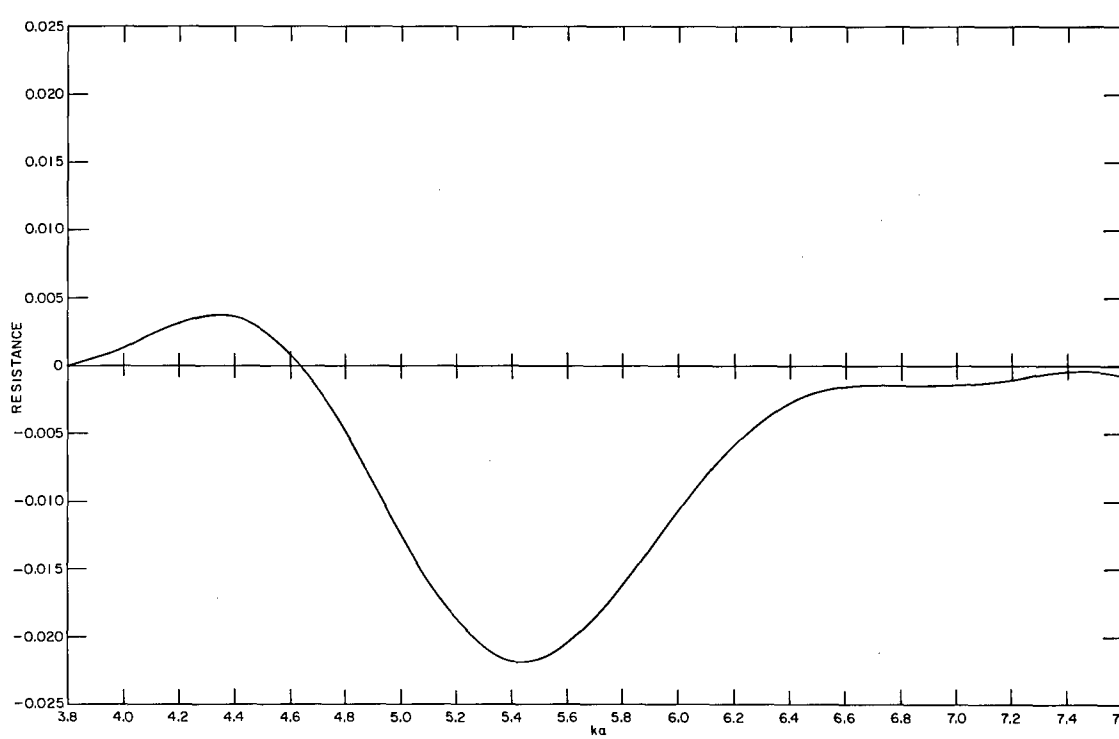

Fig. B1b - Continuation of Fig. B1a

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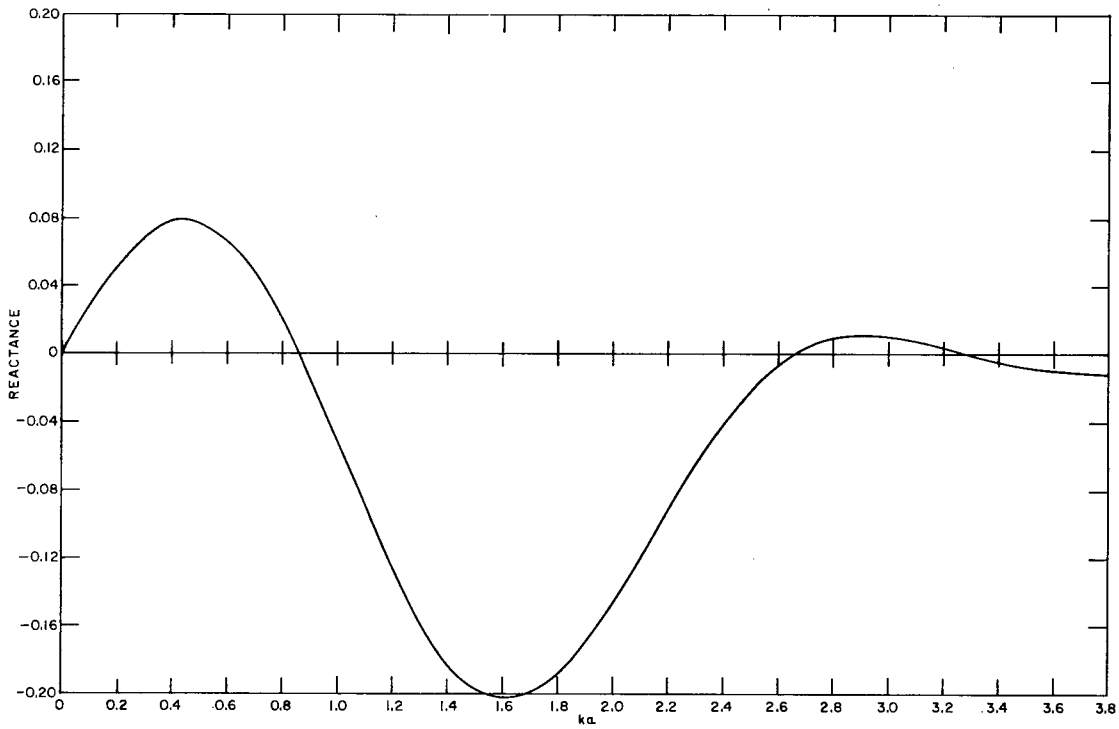

Fig. B2a - Reactance values for $kd = 2ka$

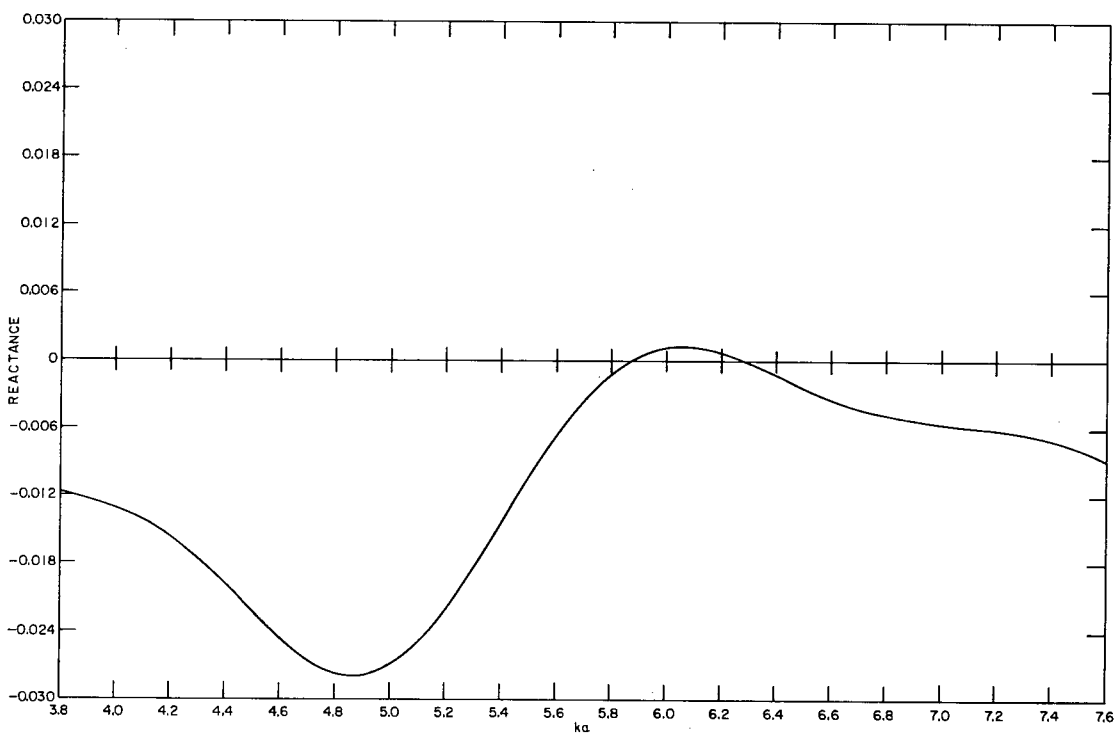

Fig. B2b - Continuation of Fig. B2a

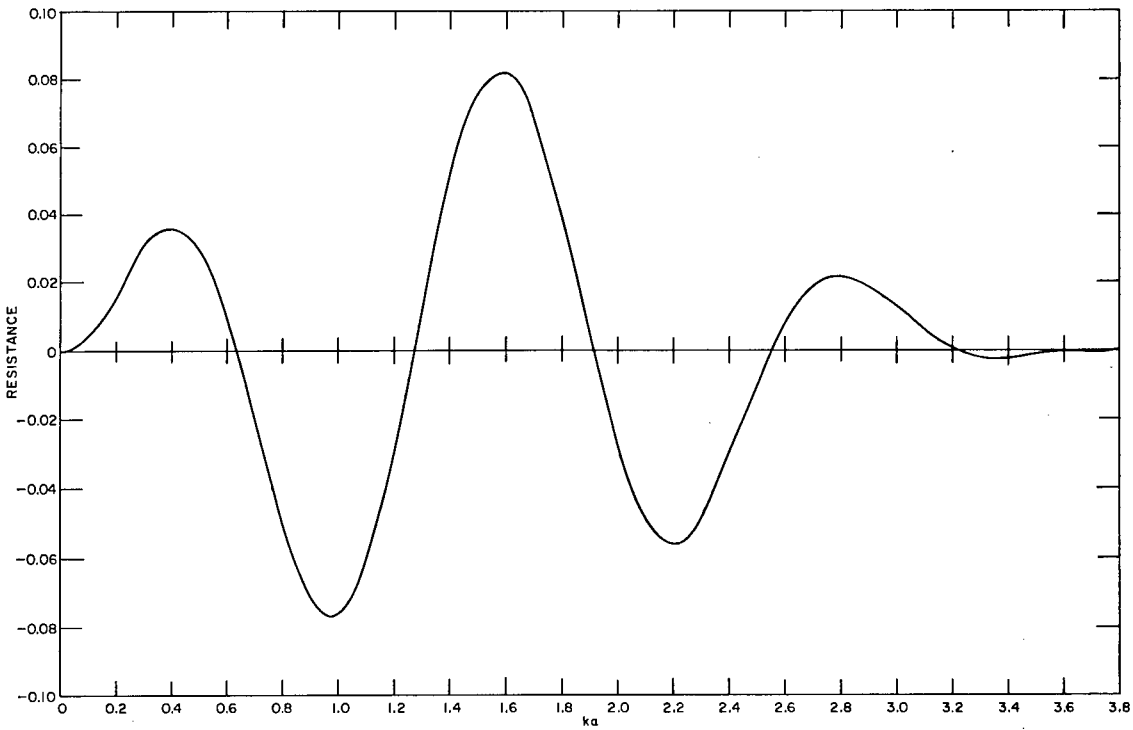

Fig. B3a - Resistance values for $kd = 5ka$

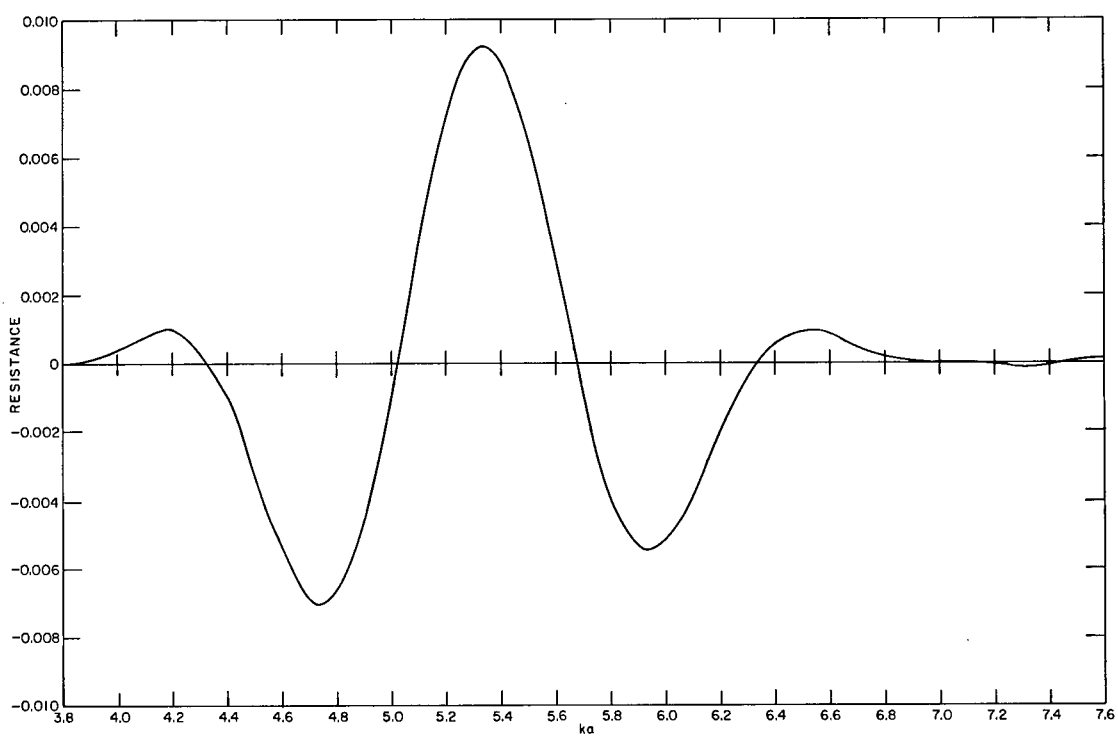

Fig. B3b - Continuation of Fig. B3a

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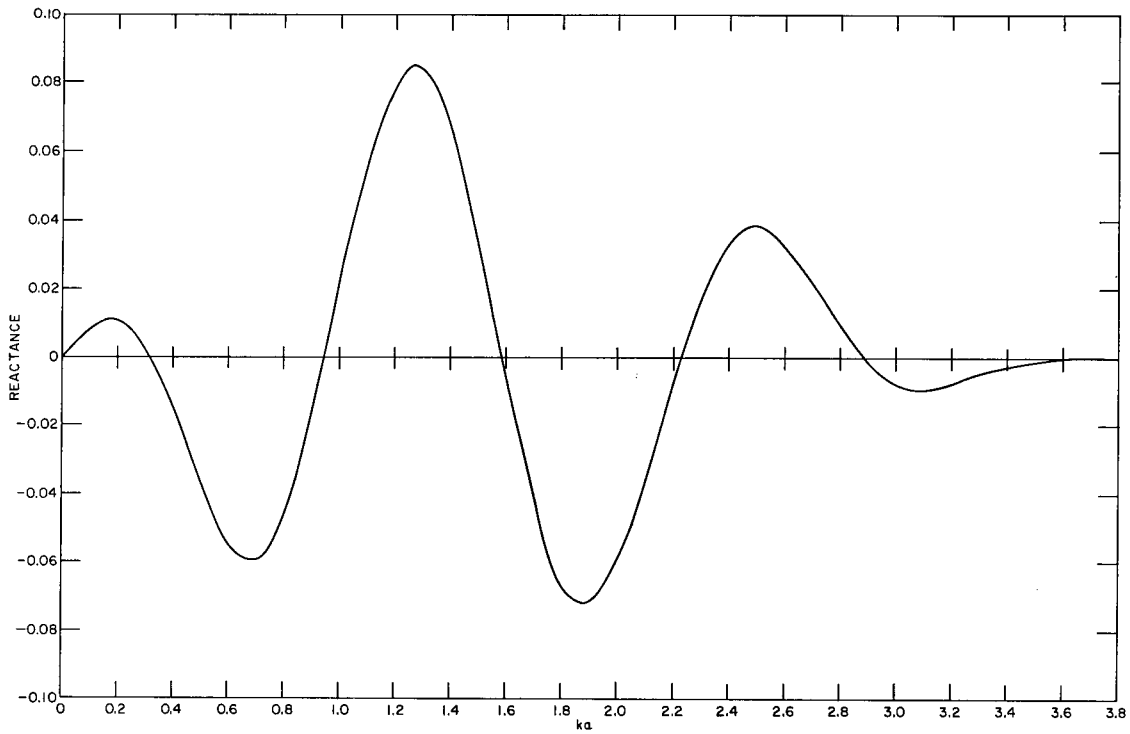

Fig. B4a - Reactance values for $kd = 5ka$

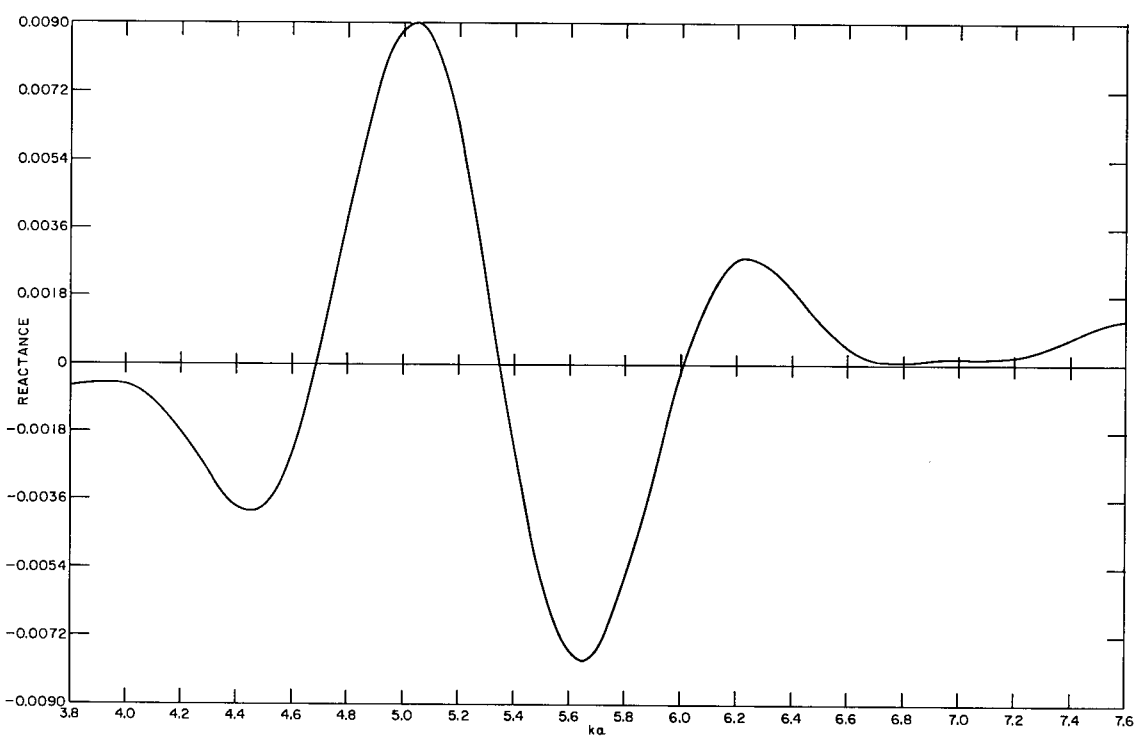

Fig. B4b - Continuation of Fig. B4a

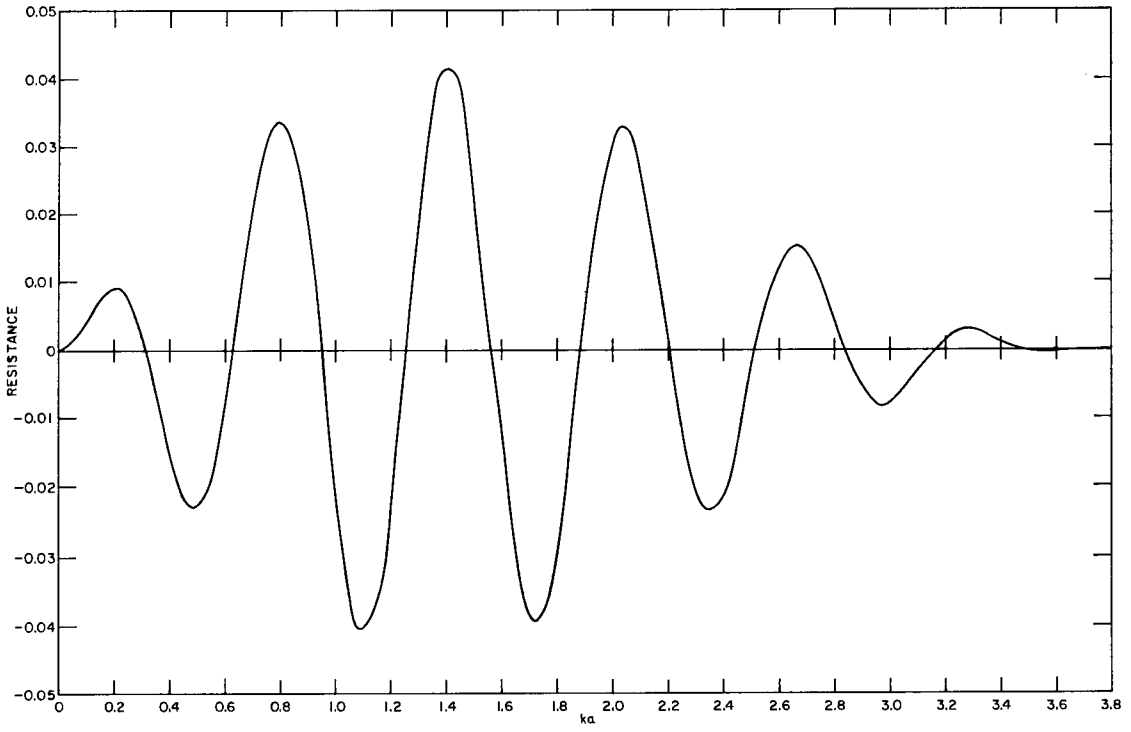

Fig. B5a - Resistance values for $kd = 10ka$

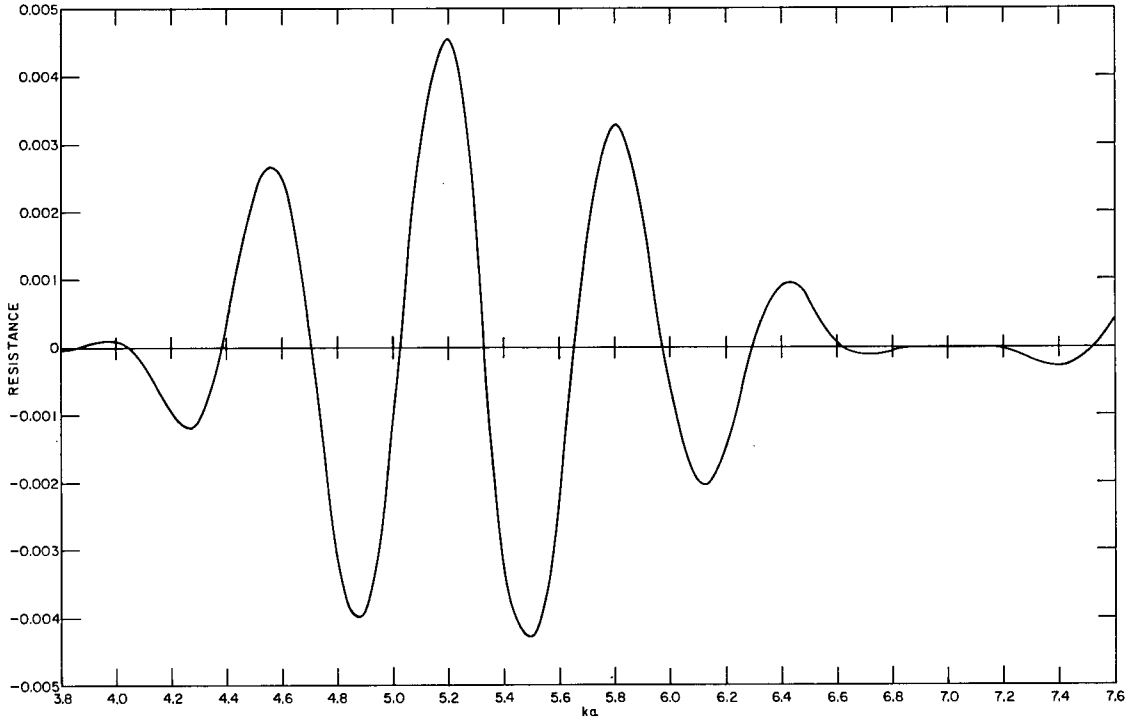

Fig. B5b - Continuation of Fig. B5a

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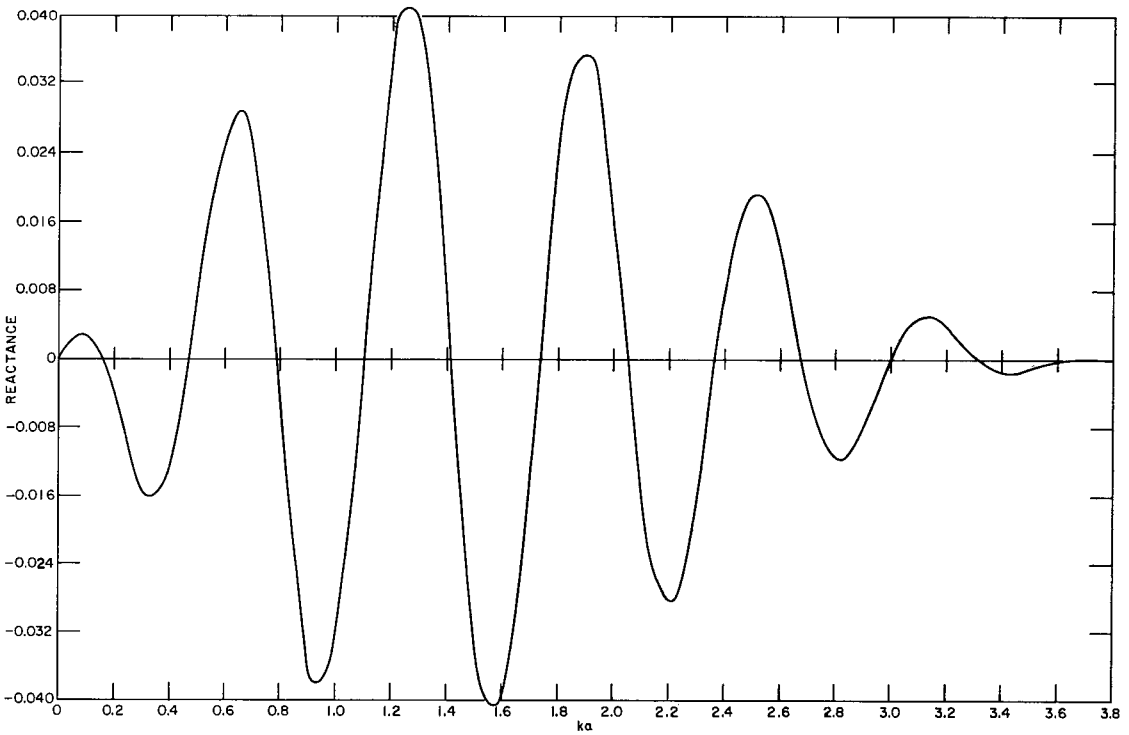

Fig. B6a - Reactance values for $kd = 10ka$

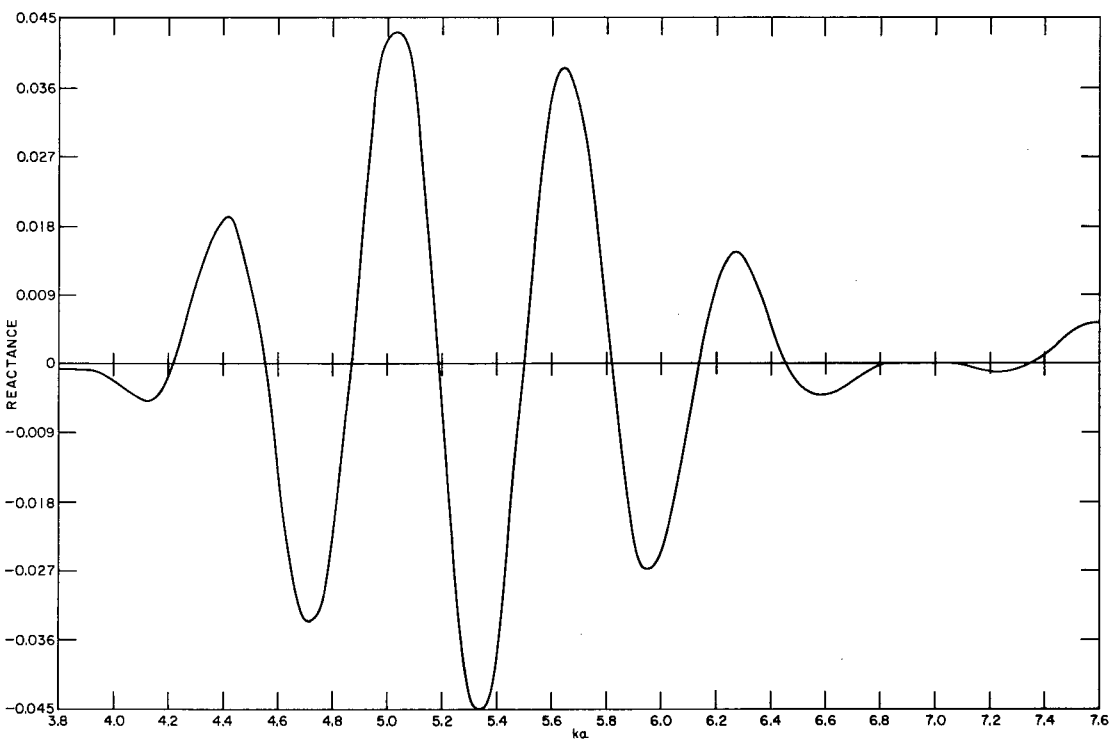

Fig. B6b - Continuation of Fig. B6a

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13. ABSTRACT

Formulas to calculate the self-impedance and mutual-impedance coefficients of acoustic radiation from disks in an infinite rigid baffle are discussed. A Fortran IV computer program which evaluates these expressions is listed, and two tables of numerical values are printed. The first table lists both the self-impedance and the mutual-impedance coefficients as a function of ka and kd, where $kd = nka$, for $n = 2, 3, 4, \ldots, 151$, and where $ka = 0.02\ (0.02)\ 0.10$, $0.15\ (0.05)\ 1.00$, $1.20\ (0.20)\ 3.00$. The second table lists only the self impedance for $ka = 2.50\ (0.50)\ 77.0$.

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Sound transducers						
Sonar transducers						
Sonar arrays						
Computer programming						
Acoustic self impedance						
Acoustic mutual impedance						
Acoustic resistance						
Acoustic reactance						

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