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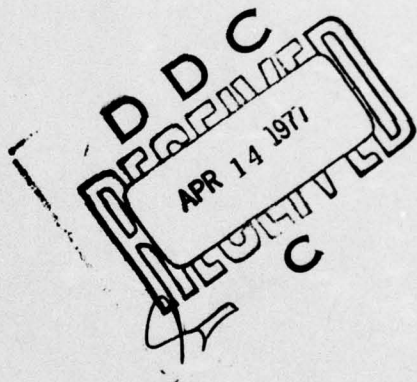
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Satellite Temperature Sounding of the Atmosphere: Ground Truth Analysis

ROBERT A. McCLATCHEY



19 November 1976

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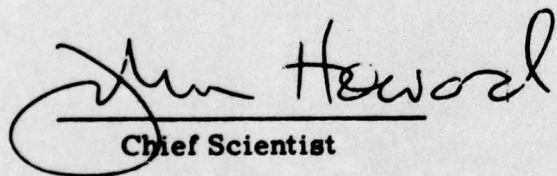


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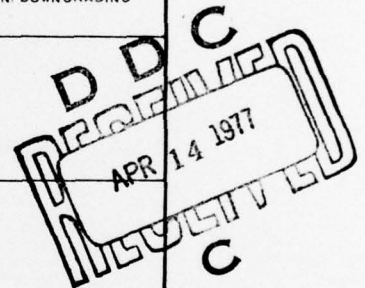
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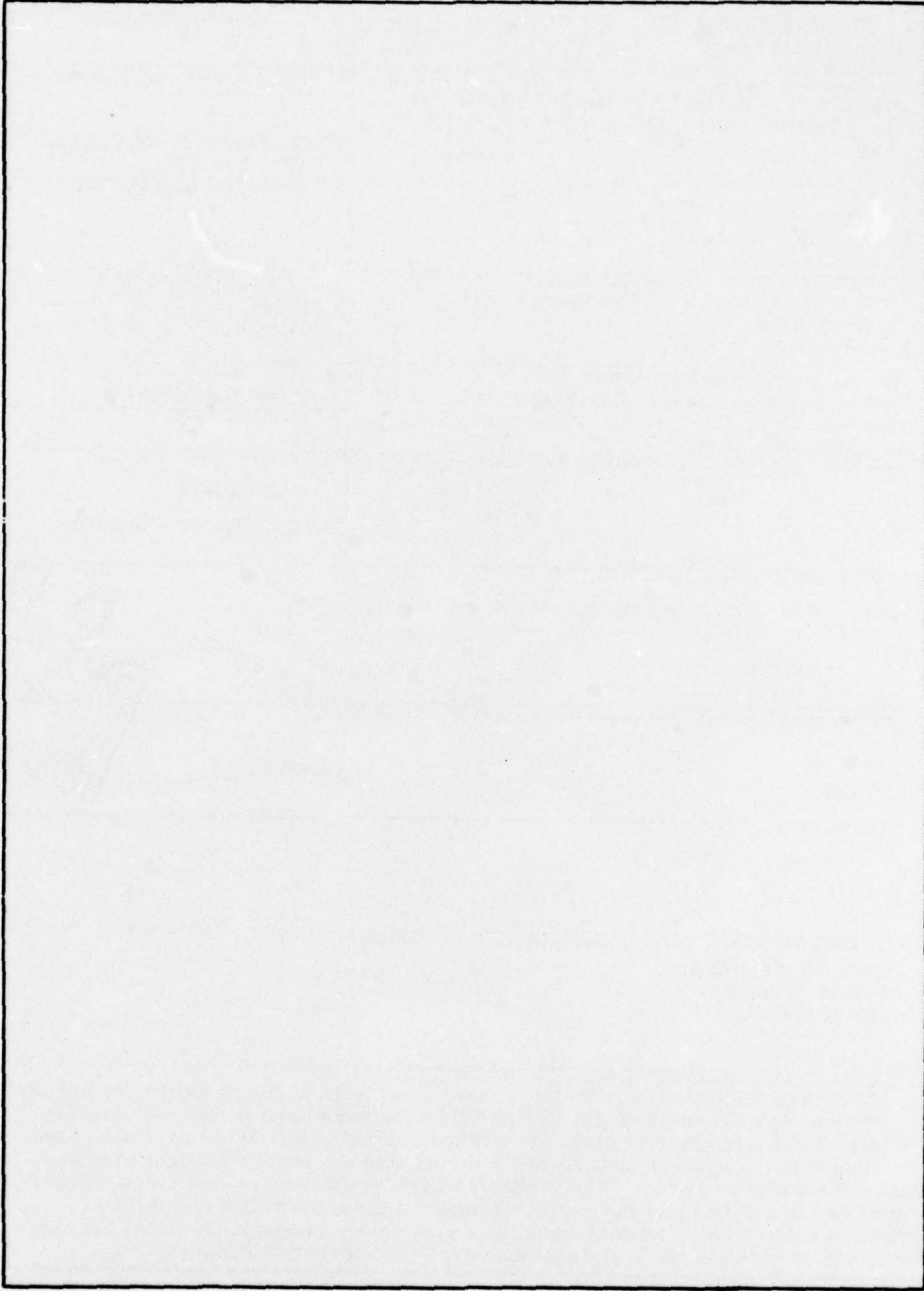
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Satellite Temperature Sounding of the Atmosphere: Ground Truth Analysis

1. INTRODUCTION

Since satellite-borne temperature sounding of the atmosphere was first suggested as a practical measurement, the 15- μm region of carbon dioxide absorption (and emission) has been utilized. The suggestion to use the 15- μm band was first made in 1959 by Kaplan.¹ By the mid 1960's, instruments were built and flown by NOAA, and temperature sounding was a reality. By 1972 the first sounder package was flown on a Defense Meteorological Satellite.

Throughout this period, attempts at ground truth comparisons left unexplained discrepancies. These discrepancies were generally dealt with in the software of data analysis schemes, by adjusting transmittances, by adjusting measurements, or by the development of inversion algorithms equivalent to a giant look-up scheme among a climatological library of measured radiances associated with known temperature profiles. It is hoped that through careful analysis, we might better understand some of the causes for discrepancies between measurement and calculation and then discover methods of correcting the errors. In this way we may eventually obtain temperature soundings without recourse to climatological data and we will be more certain that inferred temperatures are a direct result only of the satellite measurements themselves and not simply the result of the climatological statistics used in the interpretation of measured radiances.

(Received for publication 18 November 1976)

1. Kaplan, L. D. (1959) Inference of atmospheric structure from remote radiation measurements, J. Opt. Soc. Amer., **49**:1004.

This report represents an analysis of a limited number of Defense Meteorological Satellite radiance observations made during the period from February to April 1975. All of the sounding data and corresponding visible and infrared imagery obtained during the time period were scanned and a small number (9) of cases were identified where satellite observations were obtained in the vicinity of a radiosonde and rocketsonde site and conditions were deemed by us to be clear. We also demanded that the satellite track over the "ground truth" site was within 100 nm of the station and within 3 hr of the radiosonde/rocketsonde launch time.

The decision was made at the outset that measured and computed radiances would be compared (as opposed to temperatures). This decision allows the questions associated with temperature inversion to be removed from discussion here. Allowing for on-board calibration issues, radiance is the fundamental quantity being measured. Given a sufficiently detailed description of the atmosphere in terms of temperature and absolute humidity as functions of pressure, and given a detailed description of the filter functions in the 15 μm band channels, and given an appropriate computation scheme for atmospheric transmittance, the calculation of upwelling radiance is a straightforward problem.

The solution to the equation of radiative transfer is presented in Eq. (1).

$$I_{\Delta\nu} = \left[\int_{\Delta\nu} f(\nu) \int_{\tau_g}^{1.0} B(\nu, T) d\tau d\nu + \int_{\Delta\nu} f(\nu) B(\nu, T_s) d\nu \right] / \int_{\Delta\nu} f(\nu) d\nu \quad (1)$$

where

$I_{\Delta\nu}$ is the radiant intensity in $\text{W}/\text{cm}^2/\text{sr}/\text{cm}^{-1}$,

$B(\nu, T)$ is the Planck blackbody function,

T is the atmospheric temperature and T_s is the surface temperature,

τ is the transmittance of the atmosphere from the altitude associated with the pressure level, p , to the top of the atmosphere,

ν is the frequency (given here in cm^{-1}), and

$f(\nu)$ is the instrument filter function.

If we assume that $B(\nu, T)$ is relatively constant over the width of a filter function (10 or 12 cm^{-1} wide), and if we write $t_x(p)$ as independent variable instead of τ , we obtain Eq. (2), where the quantity, $d\bar{\tau}/d(t_x p)$, now becomes a weighting function that can be interpreted as defining the atmospheric layer primarily responsible for the upwelling emission in the spectral interval, $\Delta\nu$.

$$I_{\Delta\nu} = \int_{p_g}^0 B(\bar{\nu}, \tau) \frac{d\bar{\tau}}{d(t_x p)} dt_x p + B(\bar{\nu}, T_s) \quad (2)$$

$$\bar{\tau}_{\Delta} = \frac{\int f(\nu)\tau(\nu)d\nu}{\int f(\nu)d\nu}. \quad (3)$$

2. GROUND TRUTH DATA

A list of all stations used in this study together with the dates of measurement are included in Table 4. Table 1 provides the detailed atmospheric profiles of temperature, water vapor, and ozone as functions of pressure. The pressure levels are those reported in the radiosonde and rocketsonde data. Radiosonde information was generally extended from the surface to about the 10 mb pressure level with data at higher altitudes obtained from rocketsondes. The ozone data were not obtained from the radiosonde site, but were introduced from climatological models of ozone distribution. Since ozone only has a minor effect on the atmospheric transmittance in the 15 μm region, this is not expected to lead to serious error.

3. DMSP FILTER FUNCTIONS

Data from two separate satellites are included in this analysis, the Block 5C noon satellite launched 16 March 1974 designated 8531 and the Block 5C morning satellite launched 8 August 1974 designated 9532. Table 2 provides the digitized filter functions for the six channels in the 15 μm CO_2 band for each of these satellite sensors. The listed frequencies are nominally the central frequency for each filter function. Note that the Q-branch filters (located at 668 cm^{-1}), have widths at half-maximum of about 3.5 cm^{-1} whereas the other channels have widths at half-maximum of about 12 cm^{-1} . Note also that the 668 cm^{-1} filters are digitized non-uniformly with a greater spacing near the edges of the filters.

4. ATMOSPHERIC TRANSMITTANCE

The atmospheric transmittances are computed by averaging over the appropriate filter function by first computing the monochromatic transmittances for the appropriate atmospheric path taking into account the temperature, pressure, water vapor, and ozone distributions. These monochromatic transmittances were then weighted by the appropriate filter functions as indicated in Eq. (3) in order to generate the appropriate averaged transmittances. Prior investigations indicated that a monochromatic step of 0.1 cm^{-1} would obtain a result of high accuracy in the vicinity of transmittance near 0.5, even at high altitudes. Therefore, the step size of 0.1 cm^{-1} was used throughout. The AFCRL Atmospheric Absorption Line

Parameters Compilation,² was used for all absorption lines in the spectral region of interest. The calculations were based on the January 1976 data tape. Some recent comparisons of these calculations with some recent measurements³ are presented in Figures 1 and 2.

The Lorentz line shape was used throughout with a line-wing modification of CO₂ proposed by Burch.⁴ This line-shape factor forces all line contributions to zero 15 cm⁻¹ from the line center. In addition to the contributions from water vapor lines in the vicinity of the filters, a contribution is included for the water vapor continuum based on an extrapolation in the 15 μm region from the laboratory measurements of Burch and others as summarized by Bignell.⁵ The absorption coefficient associated with selfbroadening is given in Figure 3 and has been introduced independent of temperature. The ratio of nitrogen broadening to self-broadening was taken to be 0.005. For a more thorough discussion of this matter, see Burch.⁴

The transmittances for the 9 cases included in this investigation are given in Table 3 together with the computed radiances.

5. WEIGHTING FUNCTIONS

The concept of "weighting function" was introduced in Eq. (2). In general, if we are dealing with atmospheric absorption by CO₂ alone and if the atmospheric model is defined with sufficiently detailed stratification, a uniform series of weighting functions would be produced by a calculation of the logarithmic derivative of the transmittance. An example of such a set of curves is shown in Figure 4 which was computed for an atmospheric model containing only CO₂ in the 15 μm region with filters similarly defined as the DMSP filters used in this investigation. Figure 4 was based on the U.S. Standard Atmosphere containing 44 levels between the surface and space. In addition to the standard weighting function defined in Eq. (2), a set of "Energy Functions" can be defined for a given atmospheric profile. Figure 5 provides the corresponding Energy Functions for the U.S. Standard Atmosphere, 1962 and are defined by Eq. (4). These curves have been normalized to

2. McClatchey, R.A., Benedict, W.S., Clough, S.A., Burch, D.E., Calfee, R.F., Fox, K., Rothman, L.S., and Garing, J.S. (1973) AFCRL Atmospheric Absorption Line Parameters Compilation, AFCRL-TR-73-0096.
3. Burch, D.E. (1976) (private communication).
4. Burch, D.E. (1970) Semi-Annual Technical Report: Investigation of the Absorption of Infrared Radiation by Atmospheric Gases, Aeronutronic Report U-4784.
5. Bignell, K.J. (1970) Quart. J. Roy. Met. Soc., 96:409.

unity at their maximum values. In a sense they are more useful than the standard weighting functions as the area under these curves represents the actual energy arising from the atmosphere bounded by any pair of pressure levels.

Owing to the complexity introduced by using the actual radiosonde/rocketsonde pressure levels in our calculations and also the contributions to the weighting functions by the irregular (but realistic) distributions of water vapor in the lower troposphere, the weighting functions shown in Figures 6 and 7 are seen to be less smooth and less regular than those in Figures 4 and 5.

$$E(l, p) = B(\bar{\nu}, T(l, p)) \frac{d\bar{\tau}}{dl, p} \quad (4)$$

6. RADIANCE CALCULATIONS

The calculation of radiance proceeds in a straightforward manner, once the mean transmittances defined in Eq. (3) have been computed, from each pressure level to space. We need only associate a $B(\bar{\nu}, T)$ value with each τ value and find the area under the resulting curve. Examples of the required numerical quadrature are found in Figures 8 and 9 which represent the $B(\bar{\nu}, T)$ vs τ relationship for the 668 and 727 channels for the Barking Sands comparison of 24 February 1975. These curves are seen to be well defined, thus being amenable to simple quadrature techniques. The results of radiance calculations for the nine cases investigated are presented in Table 4 together with the measured radiances. The calculations have assumed that the surface temperature was equal to the lowest altitude temperature reported as part of the radiosonde measurement. This may help to explain the discrepancy in the 746 cm^{-1} channel. In general the results are good only for the 676 cm^{-1} channel. All the other channels show significant discrepancies and on balance the discrepancies are systematic, the calculations being greater than the measurements. At this time, there is no satisfactory explanation for these discrepancies, but we are embarking on a special study of atmospheric transmittance in the $15 \mu\text{m}$ CO_2 band in order to establish the transmittance validity with respect to satellite temperature sounding.

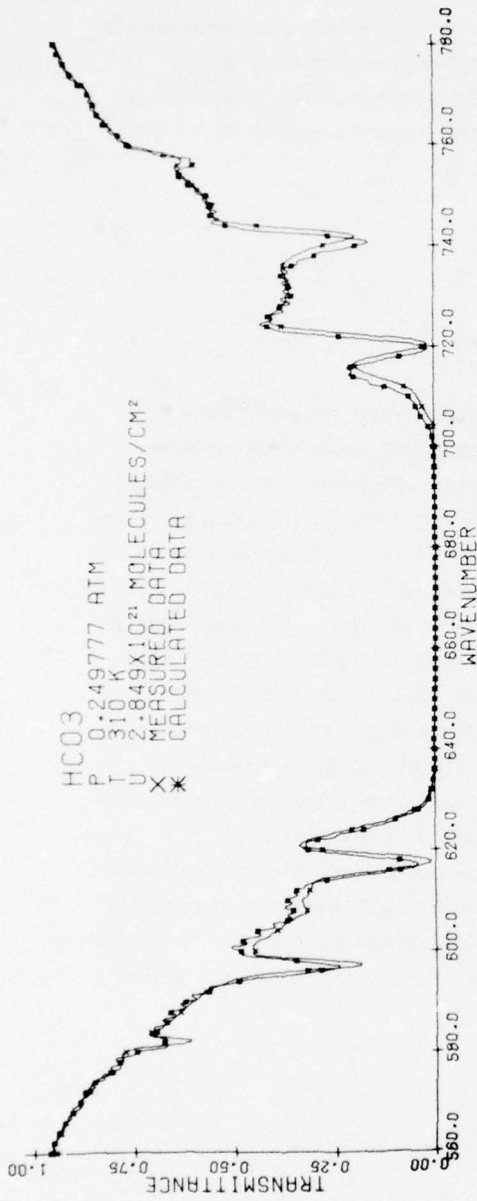


Figure 1. Comparisons of Measured Laboratory Transmittance Spectra With Computations For the 15 μm CO₂ Band For Two Sets of Conditions Corresponding Approximately to an Atmospheric Path From 500 mb to Space

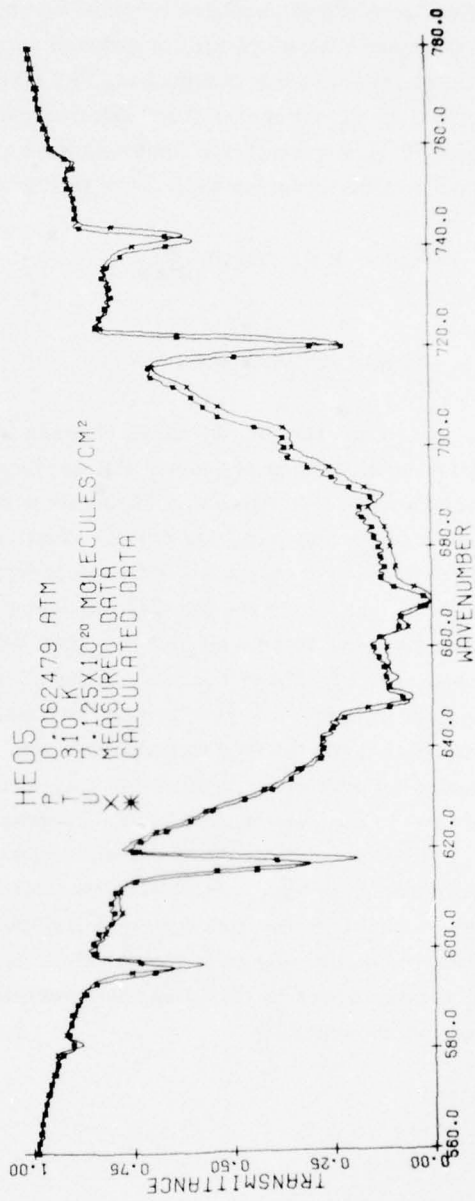


Figure 2. Comparisons of Measured Laboratory Transmittance Spectra With Computations For the 15 μm CO₂ Band For Two Sets of Conditions Corresponding Approximately to an Atmospheric Path From 125 mb to Space

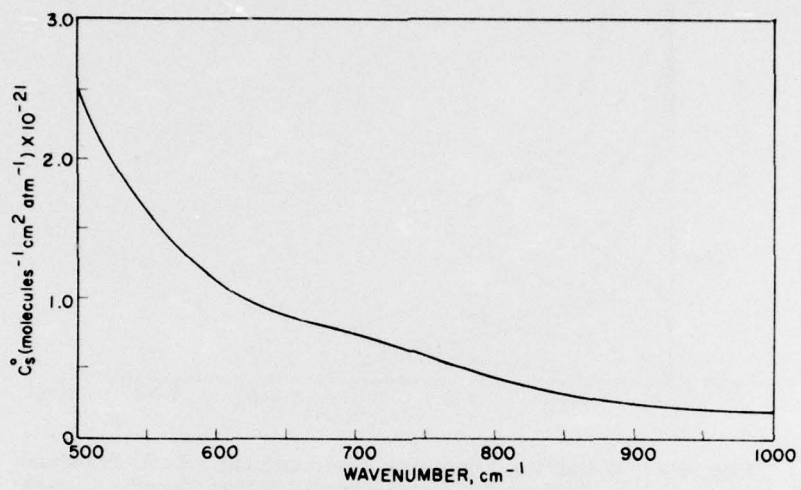


Figure 3. Self-Broadening Absorption Coefficient Used in the Calculation of the Water Vapor Continuum in the $15 \mu\text{m}$ Region

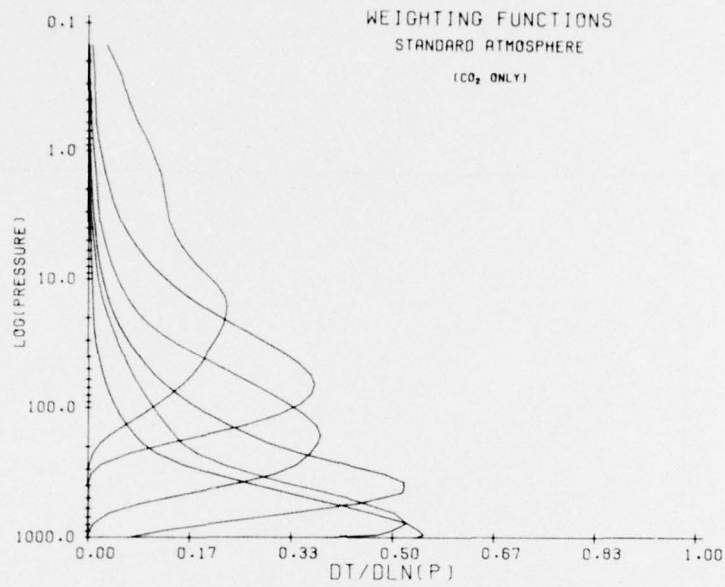


Figure 4. Weighting Functions Computed for a U.S. Standard Atmosphere, 1962 Model Containing No Water Vapor. Central frequencies are the same as the DMSP central frequencies, but filter functions were idealized triangular functions

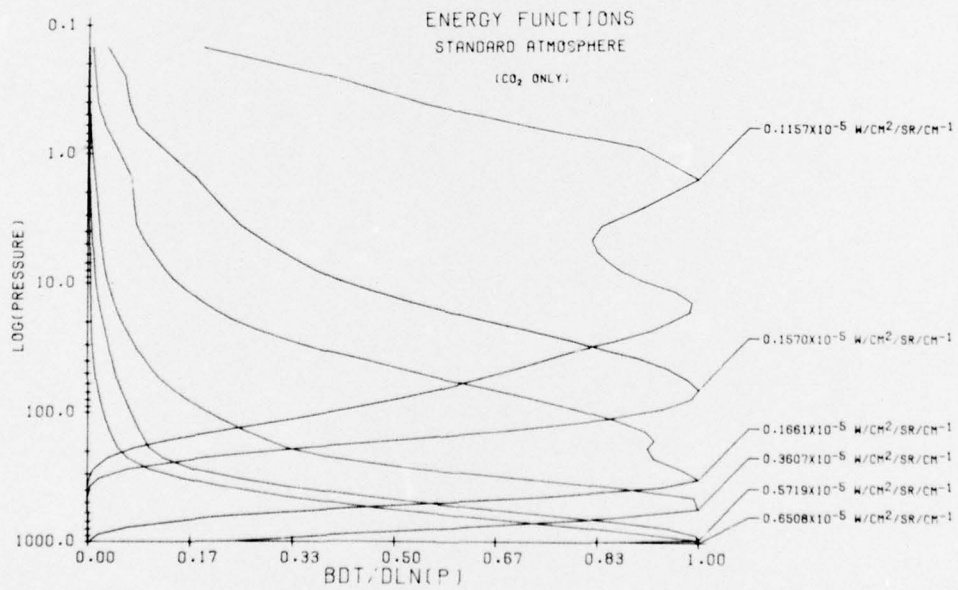


Figure 5. Energy Functions Corresponding to the Weighting Functions of Figure 4

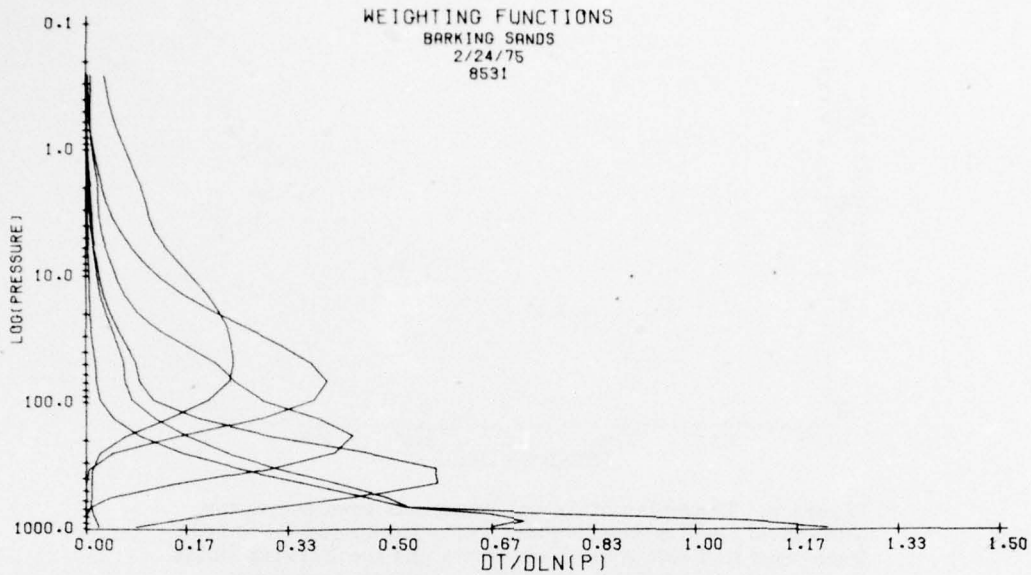


Figure 6. Computed Weighting Functions Corresponding to One of the Actual Atmospheric Soundings Studied

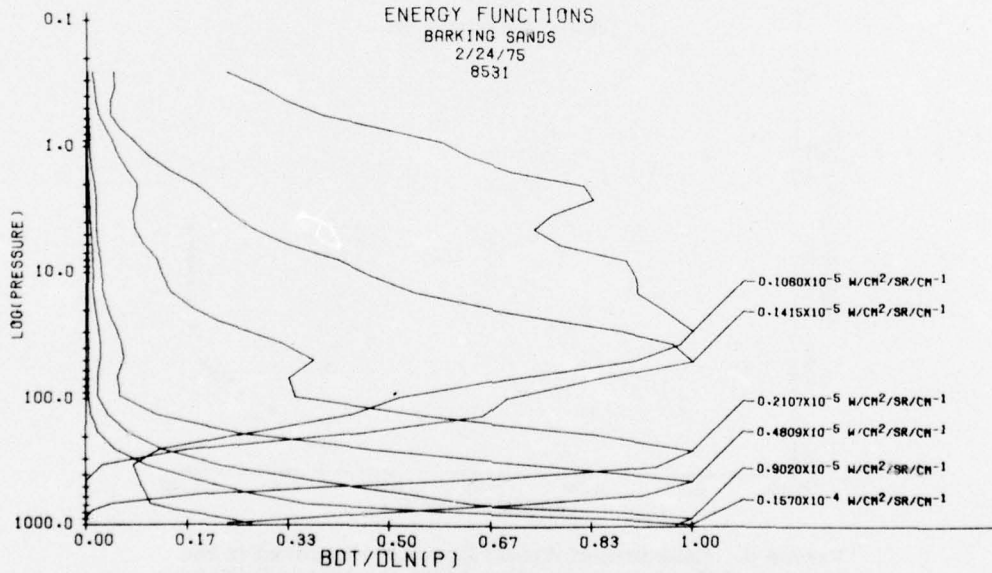


Figure 7. Computed Energy Functions Corresponding to One of the Actual Atmospheric Soundings Studied

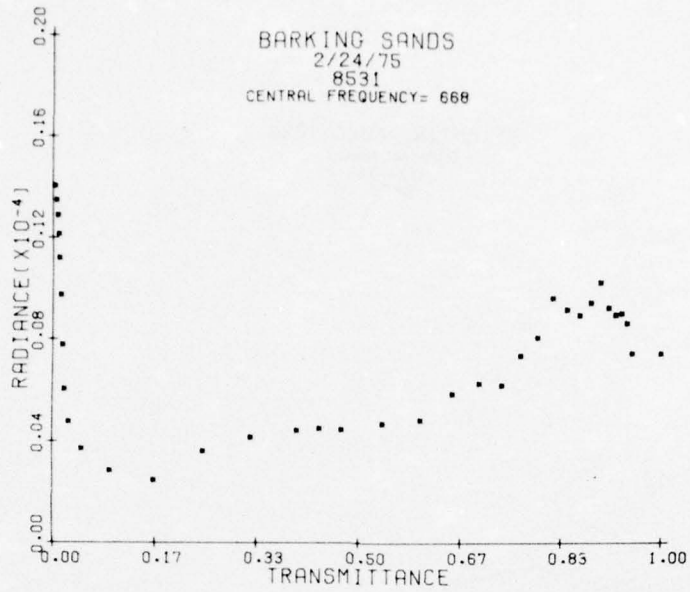


Figure 8. Examples of Actual Functions Involved in the Numerical Quadrature Leading to the Computed Radiances Presented in Table 4 for 2 Channels and the Barking Sands Comparison of 24 February 1975. Central Frequency Equals 668

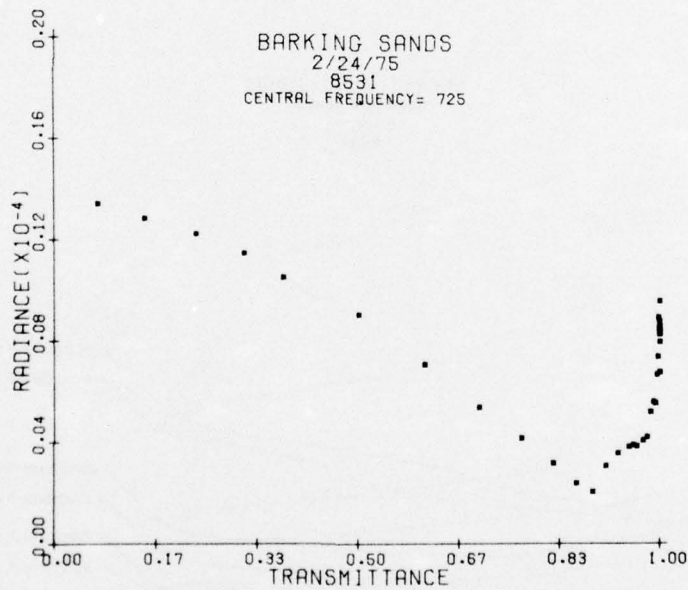


Figure 9. Examples of Actual Functions Involved in the Numerical Quadrature Leading to the Computed Radiances Presented in Table 4 for 2 Channels and the Barking Sands Comparison of 24 February 1975. Central Frequency Equals 725

Table 1. Atmospheric Definitions Based on Radiosonde and Rocketsonde Observations

PT. MUGU
2/17/75
8531

PARKING SANDS
2/18/75
9532

PT. MUGU 2/17/75 8531	PARKING SANDS 2/18/75 9532	TEMPERATURE (K)	MOLECULES/CM SQ	H2O MOLECULES/CM SQ	TEMPERATURE (K)	MOLECULES/CM SQ	H2O MOLECULES/CM SQ	TEMPERATURE (K)	MOLECULES/CM SQ	H2O MOLECULES/CM SQ
0.000	0.000	251.46	0.	0.	0.000	0.	0.	257.77	0.	0.
.331	.331	251.86	0.	0.	.2512	0.	0.	257.77	0.	0.
.4707	.4707	257.49	0.	0.	.7771	0.	0.	262.80	0.	0.
.5577	.5577	262.88	0.	0.	.9515	0.	0.	263.18	0.	0.
.7189	.7189	262.80	0.	0.	1.7530	0.	0.	261.94	0.	0.
.9765	.9765	262.83	0.	0.	2.7365	0.	0.	272.77	0.	0.
1.1958	1.1958	265.75	0.	0.	3.2736	0.	0.	243.14	0.	0.
1.5388	1.5388	267.18	0.	0.	4.3449	0.	0.	250.76	0.	0.
1.9739	1.9739	271.84	0.	0.	6.9797	0.	0.	239.70	0.	0.
2.5361	2.5361	265.74	0.	0.	7.5177	0.	0.	240.21	0.	0.
3.2765	3.2765	262.77	0.	0.	9.1728	0.	0.	276.93	0.	0.
4.2525	4.2525	268.45	0.	0.	13.108	0.	0.	228.44	0.	0.
5.5698	5.5698	239.92	0.	0.	15.8736	0.	0.	226.25	0.	0.
7.8762	7.8762	232.77	0.	0.	27.5349	0.	0.	220.24	0.	0.
9.9749	9.9749	227.89	0.	0.	35.0400	0.	0.	216.55	0.	0.
13.8219	13.8219	220.39	0.	0.	50.0000	0.	0.	209.75	0.	0.
18.2290	18.2290	216.74	0.	0.	70.0000	0.	0.	211.75	0.	0.
24.8911	24.8911	214.40	0.	0.	100.0000	0.	0.	199.75	0.	0.
34.0044	34.0044	213.93	0.	0.	150.0000	0.	0.	211.00	0.	0.
46.0054	46.0054	211.09	0.	0.	250.0000	0.	0.	210.15	0.	0.
65.8800	65.8800	211.75	0.	0.	400.0000	0.	0.	240.15	0.	0.
75.8900	75.8900	210.00	0.	0.	600.0000	0.	0.	260.85	0.	0.
104.8900	104.8900	210.00	0.	0.	900.0000	0.	0.	278.75	0.	0.
143.8200	143.8200	215.75	0.	0.	1200.0000	0.	0.	281.95	0.	0.
196.8100	196.8100	215.45	0.	0.	1600.0000	0.	0.	287.15	0.	0.
269.8700	269.8700	218.85	0.	0.	2000.0000	0.	0.	290.75	0.	0.
313.8000	313.8000	228.05	0.	0.	2500.0000	0.	0.	295.35	0.	0.
362.8500	362.8500	246.05	0.	0.	3000.0000	0.	0.	297.65	0.	0.
418.8700	418.8700	244.75	0.	0.	4000.0000	0.	0.			
470.8500	470.8500	250.45	0.	0.	5000.0000	0.	0.			
548.8400	548.8400	258.25	0.	0.	6000.0000	0.	0.			
624.8600	624.8600	265.45	0.	0.	8000.0000	0.	0.			
708.8500	708.8500	272.25	0.	0.	10000.0000	0.	0.			
802.8800	802.8800	276.15	0.	0.						
907.8600	907.8600	281.55	0.	0.						
1022.8700	1022.8700	286.35	0.	0.						
			0.	0.						
			1.2+9E+16	0.						
			1.672E+16	0.						
			2.211E+16	0.						
			3.035E+16	0.						
			4.777E+16	0.						
			6.879E+16	0.						
			1.058E+17	0.						
			1.600E+17	0.						
			2.239E+17	0.						
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			4.843E+17	0.						
			6.733E+17	0.						
			9.432E+17	0.						
			1.372E+18	0.						
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			6.371E+19	0.						
			8.743E+19	0.						
			1.153E+20	0.						
			1.535E+20	0.						
			2.085E+20	0.						
			2.836E+20	0.						
			3.809E+20	0.						
			5.036E+20	0.						
			6.711E+20	0.						
			8.938E+20	0.						
			1.193E+21	0.						
			1.602E+21	0.						
			2.143E+21	0.						
			2.865E+21	0.						
			3.865E+21	0.						
			5.135E+21	0.						
			6.844E+21	0.						
			9.135E+21	0.						
			1.221E+22	0.						
			1.621E+22	0.						
			2.159E+22	0.						
			2.871E+22	0.						
			3.844E+22	0.						
			5.135E+22	0.						
			6.844E+22	0.						
			9.135E+22	0.						
			1.221E+23	0.						
			1.621E+23	0.						
			2.159E+23	0.						
			2.871E+23	0.						
			3.844E+23	0.						
			5.135E+23	0.						
			6.844E+23	0.						
			9.135E+23	0.						
			1.221E+24	0.						
			1.621E+24	0.						
			2.159E+24	0.						
			2.871E+24	0.						
			3.844E+24	0.						
			5.135E+24	0.						
			6.844E+24	0.						
			9.135E+24	0.						
			1.221E+25	0.						
			1.621E+25	0.						
			2.159E+25	0.						
			2.871E+25	0.						
			3.844E+25	0.						
			5.135E+25	0.						
			6.844E+25	0.						
			9.135E+25	0.						
			1.221E+26	0.						
			1.621E+26	0.						
			2.159E+26	0.						
			2.871E+26	0.						
			3.844E+26	0.						
			5.135E+26	0.						
			6.844E+26	0.						
			9.135E+26	0.						
			1.221E+27	0.						
			1.621E+27	0.						
			2.159E+27	0.						
			2.871E+27	0.						
			3.844E+27	0.						
			5.135E+27	0.						
			6.844E+27	0.						
			9.135E+27	0.						
			1.221E+28	0.						
			1.621E+28	0.						
			2.159E+28	0.						
			2.871E+28	0.						
			3.844E+28	0.						
			5.135E+28	0.						
			6.844E+28	0.						
			9.135E+28	0.						
			1.221E+29	0.						
			1.621E+29	0.						
			2.159E+29	0.						
			2.871E+29	0.						
			3.844E+29	0.						
			5.135E+29	0.						
			6.844E+29	0.						
			9.135E+29	0.						
			1.221E+30	0.						
			1.621E+30	0.						
			2.159E+30	0.						
			2.871E+30	0.						
			3.844E+30	0.						
			5.135E+30	0.						
			6.844E+30	0.						
			9.135E+30	0.						
			1.221E+31	0.						
			1.621E+31	0.						
			2.159E+31	0.						
			2.871E+31	0.						
			3.844E+31	0.						
			5.135E+31	0.						
			6.844E+31	0.						
			9.135E+31	0.						
			1.221E+32	0.						
			1.621E+32	0.						
			2.159E+32	0.						
			2.871E+32	0.						
			3.844E+32	0.						
			5.135E+32	0.						
			6.844E+32	0.						
			9.135E+32	0.						
			1.221E+33	0.						
			1.621E+33	0.						
			2.159E+33	0.						
			2.871E+33	0.						
			3.844E+33	0.						
			5.135E+33	0.						
			6.844E+33	0.						
			9.135E+33	0.						

Table 1. (Cont)

BARKING SANDS 2/26/75 8531		KWAJALEIN 2/27/75 9532	
TEMPERATURE (K)	H2O MOLECULES/ CM SQ	TEMPERATURE (K)	H2O MOLECULES/ CM SQ
259.51	0.	249.45	0.
259.51	0.913E+15	249.62	1.877E+15
259.54	1.539E+16	253.56	8.118E+15
264.58	2.217E+16	269.73	1.569E+16
264.66	3.703E+16	269.77	2.244E+16
261.72	1.189E+17	270.57	3.713E+16
228.59	4.893E+17	270.41	7.039E+16
221.89	1.242E+18	262.81	1.213E+17
216.92	3.818E+18	237.72	3.715E+17
215.97	4.328E+18	232.48	8.396E+17
210.35	4.544E+18	230.02	1.257E+18
198.15	4.946E+18	226.07	1.531E+18
196.75	5.436E+18	218.49	2.677E+18
208.15	5.637E+18	209.77	3.898E+18
219.35	5.813E+18	190.23	4.976E+18
233.15	5.915E+18	207.73	5.650E+18
245.15	6.057E+18	220.29	2.818E+18
262.95	6.142E+18	231.16	5.995E+18
260.35	6.233E+18	237.77	6.032E+18
266.35	6.277E+18	241.53	6.079E+18
273.75	6.327E+18	248.08	6.147E+19
276.95	6.376E+18	252.97	3.117E+20
282.35	6.433E+18	257.83	7.056E+20
289.25	6.476E+18	267.83	1.262E+21
292.35	6.514E+18	267.23	2.142E+21
297.35	6.551E+18	266.53	2.908E+21
298.35	6.585E+18	268.41	3.857E+21
294.35	6.616E+18	274.20	5.911E+21
292.35	6.646E+18	274.81	9.174E+21
		285.04	1.899E+22
		285.85	2.380E+22
		286.69	3.259E+22
		289.58	4.918E+22
		291.18	7.039E+22
		293.29	1.002E+23
		295.52	1.466E+23
		297.84	2.002E+23
		301.87	2.818E+23
			1011.6000

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Table 1. (Cont)

PARKING SANDS 2/28/75 9532				KWAJALEIN 2/28/75 8531			
TEMPERATURE (K)	H2O MOLECULES/ CM SQ	O3 MOLECULES/ CM SQ	TEMPERATURE (K)	H2O MOLECULES/ CM SQ	O3 MOLECULES/ CM SQ	TEMPERATURE (K)	H2O MOLECULES/ CM SQ
0.0000	0.	0.	251.42	0.0000	0.	251.42	0.
.3987	0.	8.917E+15	251.42	.0030	0.	251.42	1.958E+15
.4000	0.	1.21E+16	247.04	2.2E1	0.	247.04	5.449E+15
.5454	0.	1.829E+16	255.80	.7059	0.	255.80	8.422E+15
.6645	0.	2.036E+16	257.04	.5257	0.	257.04	1.531E+16
.8574	0.	2.751E+16	267.05	.783F	0.	267.05	2.338E+16
1.1142	0.	4.459E+16	275.99	1.0934	0.	275.99	4.331E+16
1.6574	0.	8.335E+16	282.73	2.8754	0.	282.73	1.226E+17
2.8417	0.	2.094E+17	286.79	7.0412	0.	286.79	2.229E+17
4.2686	0.	3.953E+17	288.22	4.4790	0.	288.22	4.195E+17
7.6233	0.	8.746E+17	237.06	5.9727	0.	237.06	6.143E+17
11.8875	0.	1.533E+18	230.18	9.9767	0.	230.18	9.231E+17
16.0428	0.	2.634E+18	232.13	10.639E	0.	232.13	1.337E+18
21.7975	0.	2.859E+18	231.44	12.2740	0.	231.44	1.593E+18
30.7100	0.	3.819E+18	227.05	14.2242	0.	227.05	1.852E+18
40.0000	0.	4.545E+18	224.60	16.5175	0.	224.60	2.157E+18
50.0000	0.	4.936E+18	227.23	19.3700	0.	227.23	2.536E+18
76.0000	0.	5.436E+18	224.55	22.6500	0.	224.55	2.952E+18
100.0000	0.	5.653E+18	225.11	26.1500	0.	225.11	3.422E+18
150.0000	0.	5.813E+18	223.92	30.3900	0.	223.92	3.843E+18
176.0000	0.	5.863E+18	218.41	35.2000	0.	218.41	4.253E+18
200.0000	0.	5.913E+18	214.59	41.4500	0.	214.59	4.623E+18
250.0000	0.	5.945E+18	210.87	49.5500	0.	210.87	4.949E+18
300.0000	0.	6.057E+18	207.74	57.0700	0.	207.74	5.200E+18
400.0000	0.	6.150E+18	198.60	67.4500	0.	198.60	5.406E+18
500.0000	0.	6.247E+18	191.57	80.1800	0.	191.57	5.563E+18
600.0000	2.462E+20	6.327E+18	189.42	95.3400	0.	189.42	5.647E+18
700.0000	2.443E+21	6.366E+18	195.68	114.2800	0.	195.68	5.719E+18
800.0000	3.182E+21	6.403E+18	202.51	135.6300	0.	202.51	5.777E+18
900.0000	3.761E+21	6.440E+18	209.75	159.7400	0.	209.75	5.835E+18
1000.0000	5.427E+21	6.476E+18	217.73	187.3100	0.	217.73	5.892E+18
1100.0000	8.169E+21	6.511E+18	226.53	218.2200	0.	226.53	5.949E+18
1200.0000	1.348E+22	6.546E+18	234.65	252.7400	0.	234.65	5.996E+18
1300.0000	2.446E+22	6.579E+18	240.71	291.6700	0.	240.71	6.047E+18
1400.0000	3.926E+22	6.611E+18	249.21	334.9200	0.	249.21	6.095E+18
1500.0000	5.557E+22	6.641E+18	258.16	382.8000	0.	258.16	6.143E+18
1600.0000	8.392E+22	6.671E+18	263.96	446.0700	0.	263.96	6.191E+18
			269.78	495.3500	0.	269.78	6.239E+18
			276.03	561.0000	0.	276.03	6.297E+18
			285.15	633.8100	0.	285.15	6.355E+18
			287.47	714.6700	0.	287.47	6.413E+18
			291.82	804.4800	0.	291.82	6.471E+18
			293.82	903.8000	0.	293.82	6.529E+18
			302.64	1011.9000	0.	302.64	6.587E+18
							6.645E+18
							6.703E+18
							6.761E+18
							6.819E+18
							6.877E+18
							6.935E+18
							6.993E+18
							7.051E+18
							7.109E+18
							7.167E+18
							7.225E+18
							7.283E+18
							7.341E+18
							7.399E+18
							7.457E+18
							7.515E+18
							7.573E+18
							7.631E+18
							7.689E+18
							7.747E+18
							7.805E+18
							7.863E+18
							7.921E+18
							7.979E+18
							8.037E+18
							8.095E+18
							8.153E+18
							8.211E+18
							8.269E+18
							8.327E+18
							8.385E+18
							8.443E+18
							8.501E+18
							8.559E+18
							8.617E+18
							8.675E+18
							8.733E+18
							8.791E+18
							8.849E+18
							8.907E+18
							8.965E+18
							9.023E+18
							9.081E+18
							9.139E+18
							9.197E+18
							9.255E+18
							9.313E+18
							9.371E+18
							9.429E+18
							9.487E+18
							9.545E+18
							9.603E+18
							9.661E+18
							9.719E+18
							9.777E+18
							9.835E+18
							9.893E+18
							9.951E+18
							10.009E+18
							10.067E+18
							10.125E+18
							10.183E+18
							10.241E+18
							10.299E+18
							10.357E+18
							10.415E+18
							10.473E+18
							10.531E+18
							10.589E+18
							10.647E+18
							10.705E+18
							10.763E+18
							10.821E+18
							10.879E+18
							10.937E+18
							10.995E+18
							11.053E+18
							11.111E+18
							11.169E+18
							11.227E+18
							11.285E+18
							11.343E+18
							11.401E+18
							11.459E+18
							11.517E+18
							11.575E+18
							11.633E+18
							11.691E+18
							11.749E+18
							11.807E+18
							11.865E+18
							11.923E+18
							11.981E+18
							12.039E+18
							12.097E+18
							12.155E+18
							12.213E+18
							12.271E+18
							12.329E+18
							12.387E+18
							12.445E+18
							12.503E+18
							12.561E+18
							12.619E+18
							12.677E+18
							12.735E+18
							12.793E+18
							12.851E+18
							12.909E+18
							12.967E+18
							13.025E+18
							13.083E+18
							13.141E+18
							13.199E+18
							13.257E+18
							13.315E+18
							13.373E+18
							13.431E+18
							13.489E+18
							13.547E+18
							13.605E+18
							13.663E+18
							13.721E+18
							13.779E+18
							13.837E+18
							13.895E+18
							13.953E+18
							14.011E+18
							14.069E+18
							14.127E+18
							14.185E+18
							14.243E+18
							14.301E+18
							14.359E+18
							14.417E+18
							14.475E+18
							14.533E+18
							14.591E+18
							14.649E+18
							14.707E+18
							14.765E+18
							14.823E+18
							14.881E+18
							14.939E+18
							15.0000

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Table 1. (Cont)

KWAJALEIN
4/01/75
8531

PRESSURE (MB)	TEMPERATURE (K)	H ₂ O MOLECULES/ CM SQ	O ₂ MOLECULES/ CM SQ
0.0000	249.94	0.	0.913E+15
.1124	242.67	0.	2.270E+15
.2176	254.37	0.	5.832E+15
.6664	267.78	0.	2.133E+16
.8625	262.07	0.	2.735E+16
1.9453	271.75	0.	1.133E+17
3.3752	257.59	0.	2.716E+17
6.1261	238.71	0.	6.281E+17
15.1150	270.44	0.	1.975E+18
28.2657	218.70	0.	3.634E+18
51.7900	209.18	0.	5.039E+18
75.7300	190.71	0.	5.532E+18
103.3500	191.17	0.	5.678E+18
128.4800	197.02	0.	5.791E+18
200.3000	221.18	0.	5.916E+18
240.5100	235.12	0.	5.931E+18
300.1100	244.21	2.117E+20	6.072E+18
380.6400	255.16	1.035E+21	6.135E+18
463.0700	265.51	2.687E+21	6.214E+18
542.2700	273.13	5.959E+21	6.261E+18
613.1300	280.12	8.909E+21	6.337E+18
691.7700	282.02	1.345E+22	6.707E+18
756.7500	287.22	1.837E+22	6.473E+18
802.4900	295.75	2.672E+22	6.478E+18
851.0600	290.61	4.226E+22	6.512E+18
876.1800	290.77	5.154E+22	6.530E+18
901.9900	291.68	6.157E+22	6.533E+18
928.4300	293.14	7.329E+22	6.595E+18
955.4200	295.69	8.644E+22	6.582E+18
1010.6000	302.29	1.151E+23	6.617E+18

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Table 2a. Filter Functions for the Block 5C 8531 Satellite

OMSP FILTER NO. 4531
668 MAIN CHANNEL
FREQUENCY STEP IS VARIABLE

FREQUENCY	FILTER TRANSMISSION	FREQUENCY	FILTER TRANSMISSION	FREQUENCY	FILTER TRANSMISSION	FREQUENCY	FILTER TRANSMISSION
569.00	.0745	663.60	.0907	671.80	.1133	679.60	.0938
569.50	.0750	664.10	.0912	672.30	.1138	680.10	.0943
570.00	.0755	664.60	.0917	672.80	.1143	680.60	.0948
570.50	.0760	665.10	.0922	673.30	.1148	681.10	.0953
571.00	.0765	665.60	.0927	673.80	.1153	681.60	.0958
571.50	.0770	666.10	.0932	674.30	.1158	682.10	.0963
572.00	.0775	666.60	.0937	674.80	.1163	682.60	.0968
572.50	.0780	667.10	.0942	675.30	.1168	683.10	.0973
573.00	.0785	667.60	.0947	675.80	.1173	683.60	.0978
573.50	.0790	668.10	.0952	676.30	.1178	684.10	.0983
574.00	.0795	668.60	.0957	676.80	.1183	684.60	.0988
574.50	.0800	669.10	.0962	677.30	.1188	685.10	.0993
575.00	.0805	669.60	.0967	677.80	.1193	685.60	.0998
575.50	.0810	670.10	.0972	678.30	.1198	686.10	.1003
576.00	.0815	670.60	.0977	678.80	.1203	686.60	.1008
576.50	.0820	671.10	.0982	679.30	.1208	687.10	.1013
577.00	.0825	671.60	.0987	679.80	.1213	687.60	.1018
577.50	.0830	672.10	.0992	680.30	.1218	688.10	.1023
578.00	.0835	672.60	.0997	680.80	.1223	688.60	.1028
578.50	.0840	673.10	.1002	681.30	.1228	689.10	.1033
579.00	.0845	673.60	.1007	681.80	.1233	689.60	.1038
579.50	.0850	674.10	.1012	682.30	.1238	690.10	.1043
580.00	.0855	674.60	.1017	682.80	.1243	690.60	.1048
580.50	.0860	675.10	.1022	683.30	.1248	691.10	.1053
581.00	.0865	675.60	.1027	683.80	.1253	691.60	.1058
581.50	.0870	676.10	.1032	684.30	.1258	692.10	.1063
582.00	.0875	676.60	.1037	684.80	.1263	692.60	.1068
582.50	.0880	677.10	.1042	685.30	.1268	693.10	.1073
583.00	.0885	677.60	.1047	685.80	.1273	693.60	.1078
583.50	.0890	678.10	.1052	686.30	.1278	694.10	.1083
584.00	.0895	678.60	.1057	686.80	.1283	694.60	.1088
584.50	.0900	679.10	.1062	687.30	.1288	695.10	.1093
585.00	.0905	679.60	.1067	687.80	.1293	695.60	.1098
585.50	.0910	680.10	.1072	688.30	.1298	696.10	.1103
586.00	.0915	680.60	.1077	688.80	.1303	696.60	.1108
586.50	.0920	681.10	.1082	689.30	.1308	697.10	.1113
587.00	.0925	681.60	.1087	689.80	.1313	697.60	.1118
587.50	.0930	682.10	.1092	690.30	.1318	698.10	.1123
588.00	.0935	682.60	.1097	690.80	.1323	698.60	.1128
588.50	.0940	683.10	.1102	691.30	.1328	699.10	.1133
589.00	.0945	683.60	.1107	691.80	.1333	699.60	.1138
589.50	.0950	684.10	.1112	692.30	.1338	700.10	.1143
590.00	.0955	684.60	.1117	692.80	.1343	700.60	.1148
590.50	.0960	685.10	.1122	693.30	.1348	701.10	.1153
591.00	.0965	685.60	.1127	693.80	.1353	701.60	.1158
591.50	.0970	686.10	.1132	694.30	.1358	702.10	.1163
592.00	.0975	686.60	.1137	694.80	.1363	702.60	.1168
592.50	.0980	687.10	.1142	695.30	.1368	703.10	.1173
593.00	.0985	687.60	.1147	695.80	.1373	703.60	.1178
593.50	.0990	688.10	.1152	696.30	.1378	704.10	.1183
594.00	.0995	688.60	.1157	696.80	.1383	704.60	.1188
594.50	.1000	689.10	.1162	697.30	.1388	705.10	.1193
595.00	.1005	689.60	.1167	697.80	.1393	705.60	.1198
595.50	.1010	690.10	.1172	698.30	.1398	706.10	.1203
596.00	.1015	690.60	.1177	698.80	.1403	706.60	.1208
596.50	.1020	691.10	.1182	699.30	.1408	707.10	.1213
597.00	.1025	691.60	.1187	699.80	.1413	707.60	.1218
597.50	.1030	692.10	.1192	700.30	.1418	708.10	.1223
598.00	.1035	692.60	.1197	700.80	.1423	708.60	.1228
598.50	.1040	693.10	.1202	701.30	.1428	709.10	.1233
599.00	.1045	693.60	.1207	701.80	.1433	709.60	.1238
599.50	.1050	694.10	.1212	702.30	.1438	710.10	.1243
600.00	.1055	694.60	.1217	702.80	.1443	710.60	.1248
600.50	.1060	695.10	.1222	703.30	.1448	711.10	.1253
601.00	.1065	695.60	.1227	703.80	.1453	711.60	.1258
601.50	.1070	696.10	.1232	704.30	.1458	712.10	.1263
602.00	.1075	696.60	.1237	704.80	.1463	712.60	.1268
602.50	.1080	697.10	.1242	705.30	.1468	713.10	.1273
603.00	.1085	697.60	.1247	705.80	.1473	713.60	.1278
603.50	.1090	698.10	.1252	706.30	.1478	714.10	.1283
604.00	.1095	698.60	.1257	706.80	.1483	714.60	.1288
604.50	.1100	699.10	.1262	707.30	.1488	715.10	.1293
605.00	.1105	699.60	.1267	707.80	.1493	715.60	.1298
605.50	.1110	700.10	.1272	708.30	.1498	716.10	.1303
606.00	.1115	700.60	.1277	708.80	.1503	716.60	.1308
606.50	.1120	701.10	.1282	709.30	.1508	717.10	.1313
607.00	.1125	701.60	.1287	709.80	.1513	717.60	.1318
607.50	.1130	702.10	.1292	710.30	.1518	718.10	.1323
608.00	.1135	702.60	.1297	710.80	.1523	718.60	.1328
608.50	.1140	703.10	.1302	711.30	.1528	719.10	.1333
609.00	.1145	703.60	.1307	711.80	.1533	719.60	.1338
609.50	.1150	704.10	.1312	712.30	.1538	720.10	.1343
610.00	.1155	704.60	.1317	712.80	.1543	720.60	.1348
610.50	.1160	705.10	.1322	713.30	.1548	721.10	.1353
611.00	.1165	705.60	.1327	713.80	.1553	721.60	.1358
611.50	.1170	706.10	.1332	714.30	.1558	722.10	.1363
612.00	.1175	706.60	.1337	714.80	.1563	722.60	.1368
612.50	.1180	707.10	.1342	715.30	.1568	723.10	.1373
613.00	.1185	707.60	.1347	715.80	.1573	723.60	.1378
613.50	.1190	708.10	.1352	716.30	.1578	724.10	.1383
614.00	.1195	708.60	.1357	716.80	.1583	724.60	.1388
614.50	.1200	709.10	.1362	717.30	.1588	725.10	.1393
615.00	.1205	709.60	.1367	717.80	.1593	725.60	.1398
615.50	.1210	710.10	.1372	718.30	.1598	726.10	.1403
616.00	.1215	710.60	.1377	718.80	.1603	726.60	.1408
616.50	.1220	711.10	.1382	719.30	.1608	727.10	.1413
617.00	.1225	711.60	.1387	719.80	.1613	727.60	.1418
617.50	.1230	712.10	.1392	720.30	.1618	728.10	.1423
618.00	.1235	712.60	.1397	720.80	.1623	728.60	.1428
618.50	.1240	713.10	.1402	721.30	.1628	729.10	.1433
619.00	.1245	713.60	.1407	721.80	.1633	729.60	.1438
619.50	.1250	714.10	.1412	722.30	.1638	730.10	.1443
620.00	.1255	714.60	.1417	722.80	.1643	730.60	.1448
620.50	.1260	715.10	.1422	723.30	.1648	731.10	.1453
621.00	.1265	715.60	.1427	723.80	.1653	731.60	.1458
621.50	.1270	716.10	.1432	724.30	.1658	732.10	.1463
622.00	.1275	716.60	.1437	724.80	.1663	732.60	.1468
622.50	.1280	717.10	.1442	725.30	.1668	733.10	.1473
623.00	.1285	717.60	.1447	725.80	.1673	733.60	.1478
623.50	.1290	718.10	.1452	726.30	.1678	734.10	.1483
624.00	.1295	718.60	.1457	726.80	.1683	734.60	.1488
624.50	.1300	719.10	.1462	727.30	.1688	735.10	.1493
625.00	.1305	719.60	.1467	727.80	.1693	735.60	.1498
625.50	.1310	720.10	.1472	728.30	.1698	736.10	.1503
626.00	.1315	720.60	.1477	728.80	.1703	736.60	.1508
626.50	.1320	721.10	.1482	729.30	.1708	737.10	.1513
627.00	.1325	721.60	.1487	729.80	.1713	737.60	.1518
627.50	.1330	722.10	.1492	730.30	.1718	738.10	.1523
628.00	.1335	722.60	.1497	730.80	.1723	738.60	.1528
628.50	.1340	723.10	.1502	731.30	.1728	739.10	.1533
629.00	.1345	723.60	.1507	731.80	.1733	739.60	.1538
629.50	.1350	724.10	.1512	732.30	.1738	740.10	.1543
630.00	.1355	724.60	.1517	732.80	.1743	740.60	.1548
630.50	.1360	725.10	.1522	733.30	.1748	741.10	.1553
631.00	.1365	725.60	.1527	733.80	.1753	741.60	.1558
631.50	.1370	726.10	.1532	734.30	.1758	742.10	.1563
632.00	.1375	726.60	.1537	734.80	.1763	742.60	.1568
632.50	.1380	727.10	.1542	735.30	.1768	743.10	.1573
633.00	.1385	727.60	.1547	735.80	.1773	743.60	.1578
633.50	.1390	728.10	.1552	736.30	.1778	744.10	.1583
634.00	.1395	728.60	.1557	736.80	.1783	744.60	.1588
634.50	.1400	729.10	.1562	737.30	.1788	745.10	.1593
635.00	.1405	729.60	.1567	737.80	.1793	745.60	.1598
635.50	.1410	730.10	.1572	738.30	.1798	746.10	.1603
636.00	.1415	730.60	.1577	738.80	.1803	746.60	.1608
636.50	.1420	731.10	.1582	739.30	.1808	747.10	.1613
637.00	.1425	731.60	.1587	739.80	.1813	747.60	.1618
637.50	.1430	732.10	.1592	740.30	.1818	748.10	.1623
638.00	.1435	732.60	.1597	740.80	.1823	748.60	.1628
638.50	.1440	733.10	.1602	741.30	.1828	749.10	.1633
639.00	.1445	733.60	.1607	741.80	.1833	749.60	.1638
639.50	.1450	734.10	.1612	742.30	.1838	750.10	.1643
640.00	.1455	734					

BEST AVAILABLE COPY

Table 2a. (Cont)

DMSP FILTER NO. 8531 695 WAVE NUMBER CHANNEL FREQUENCY STEP = .5 WAVE NUMBERS				DMSP FILTER NO. 8531 676 WAVE NUMBER CHANNEL FREQUENCY STEP = .5 WAVE NUMBERS			
FREQUENCY	FILTER TRANSMISSION	FREQUENCY	FILTER TRANSMISSION	FREQUENCY	FILTER TRANSMISSION	FREQUENCY	FILTER TRANSMISSION
661.0	.0000	676.50	.2983	682.00	.0000	699.50	.6010
661.5	.0000	677.00	.5740	682.50	.0000	700.00	.5050
662.0	.0000	677.50	.5730	683.00	.0000	700.50	.4300
662.5	.0000	678.00	.5990	683.50	.0000	701.00	.3900
663.0	.0000	678.50	.5470	684.00	.0000	701.50	.2250
663.5	.0000	679.00	.5370	684.50	.0000	702.00	.1820
664.0	.0000	679.50	.2320	685.00	.0000	702.50	.1120
664.5	.0000	680.00	.4440	685.50	.0000	703.00	.0910
665.0	.0000	680.50	.4000	686.00	.0000	703.50	.0530
665.5	.0000	681.00	.3130	686.50	.0000	704.00	.0400
666.0	.0000	681.50	.2320	687.00	.0000	704.50	.0210
666.5	.0000	682.00	.2030	687.50	.0000	705.00	.0200
667.0	.0000	682.50	.1370	688.00	.0000	705.50	.0110
667.5	.0000	683.00	.0930	688.50	.0000	706.00	.0090
668.0	.0000	683.50	.0730	689.00	.0000	706.50	.0090
668.5	.0000	684.00	.0530	689.50	.0000	707.00	.0050
669.0	.0000	684.50	.0330	690.00	.0000	707.50	.0050
669.5	.0000	685.00	.0130	690.50	.0000	708.00	.0020
670.0	.0000	685.50	.0030	691.00	.0000	708.50	.0010
670.5	.0000	686.00	.0030	691.50	.0000	709.00	.0000
671.0	.0000	686.50	.0030	692.00	.0000	709.50	.0000
671.5	.0000	687.00	.0030	692.50	.0000	710.00	.0000
672.0	.0000	687.50	.0030	693.00	.0000		
672.5	.0000	688.00	.0030	693.50	.0000		
673.0	.0000	688.50	.0030	694.00	.0000		
673.5	.0000	689.00	.0030	694.50	.0000		
674.0	.0000	689.50	.0030	695.00	.0000		
674.5	.0000	690.00	.0030	695.50	.0000		
675.0	.0000	690.50	.0030	696.00	.0000		
675.5	.0000	691.00	.0030	696.50	.0000		
676.0	.0000	691.50	.0030	697.00	.0000		
676.5	.0000	692.00	.0030	697.50	.0000		
677.0	.0000	692.50	.0030	698.00	.0000		
677.5	.0000	693.00	.0030	698.50	.0000		
678.0	.0000	693.50	.0030	699.00	.0000		
678.5	.0000	694.00	.0030	699.50	.0000		
679.0	.0000	694.50	.0030	700.00	.0000		
679.5	.0000	695.00	.0030				
680.0	.0000	695.50	.0030				
680.5	.0000	696.00	.0030				
681.0	.0000	696.50	.0030				
681.5	.0000	697.00	.0030				
682.0	.0000	697.50	.0030				
682.5	.0000	698.00	.0030				
683.0	.0000	698.50	.0030				
683.5	.0000	699.00	.0030				
684.0	.0000	699.50	.0030				
684.5	.0000	700.00	.0030				
685.0	.0000	700.50	.0030				
685.5	.0000	701.00	.0030				
686.0	.0000	701.50	.0030				
686.5	.0000	702.00	.0030				
687.0	.0000	702.50	.0030				
687.5	.0000	703.00	.0030				
688.0	.0000	703.50	.0030				
688.5	.0000	704.00	.0030				
689.0	.0000	704.50	.0030				
689.5	.0000	705.00	.0030				
690.0	.0000	705.50	.0030				
690.5	.0000	706.00	.0030				
691.0	.0000	706.50	.0030				
691.5	.0000	707.00	.0030				
692.0	.0000	707.50	.0030				
692.5	.0000	708.00	.0030				
693.0	.0000	708.50	.0030				
693.5	.0000	709.00	.0030				
694.0	.0000	709.50	.0030				
694.5	.0000	710.00	.0030				
695.0	.0000						
695.5	.0000						
696.0	.0000						
696.5	.0000						
697.0	.0000						
697.5	.0000						
698.0	.0000						
698.5	.0000						
699.0	.0000						
699.5	.0000						
700.0	.0000						

BEST AVAILABLE COPY

Table 2a. (Cont)

DMSF FILTER NO. 4531 727 WAVELENGTH CHANNEL FREQUENCY STEP = .5 WAVENUMBERS				DMSF FILTER NO. 4531 727 WAVELENGTH CHANNEL FREQUENCY STEP = .5 WAVENUMBERS			
FREQUENCY	FILTER TRANSMISSION	FREQUENCY	FILTER TRANSMISSION	FREQUENCY	FILTER TRANSMISSION	FREQUENCY	FILTER TRANSMISSION
691.50	0.010	708.50	.5720	713.00	.0010	731.50	.3350
691.50	.010	709.00	.5630	713.50	.0020	731.00	.2710
692.00	.020	709.50	.5430	714.00	.0030	731.50	.2050
692.50	.030	710.00	.5230	714.50	.0040	732.00	.1490
693.00	.040	710.50	.5030	715.00	.0050	732.50	.0930
693.50	.050	711.00	.4830	715.50	.0080	733.00	.0370
694.00	.060	711.50	.4630	716.00	.0110	733.50	.0000
694.50	.070	712.00	.4430	716.50	.0140	734.00	.0000
695.00	.080	712.50	.4230	717.00	.0170	734.50	.0290
695.50	.090	713.00	.4030	717.50	.0200	735.00	.0210
696.00	.100	713.50	.3830	718.00	.0230	735.50	.0000
696.50	.110	714.00	.3630	718.50	.0260	736.00	.0160
697.00	.120	714.50	.3430	719.00	.0290	736.50	.0420
697.50	.130	715.00	.3230	719.50	.0320	737.00	.0770
698.00	.140	715.50	.3030	720.00	.0350	737.50	.0000
698.50	.150	716.00	.2830	720.50	.0380	738.00	.0000
699.00	.160	716.50	.2630	721.00	.0410	738.50	.0000
699.50	.170	717.00	.2430	721.50	.0440	739.00	.0000
700.00	.180	717.50	.2230	722.00	.0470	739.50	.0000
700.50	.190	718.00	.2030	722.50	.0500	740.00	.0000
701.00	.200	718.50	.1830	723.00	.0530		
701.50	.210	719.00	.1630	723.50	.0560		
702.00	.220	719.50	.1430	724.00	.0590		
702.50	.230	720.00	.1230	724.50	.0620		
703.00	.240	720.50	.1030	725.00	.0650		
703.50	.250	721.00	.0830	725.50	.0680		
704.00	.260	721.50	.0630	726.00	.0710		
704.50	.270	722.00	.0430	726.50	.0740		
705.00	.280	722.50	.0230	727.00	.0770		
705.50	.290	723.00	.0030	727.50	.0800		
706.00	.300	723.50	.0000	728.00	.0830		
706.50	.310	724.00	.0000	728.50	.0860		
707.00	.320	724.50	.0000	729.00	.0890		
707.50	.330	725.00	.0000	729.50	.0920		
708.00	.340	725.50	.0000	730.00	.0950		
708.50	.350	726.00	.0000				

BEST AVAILABLE COPY

Table 2a. (Cont)

DSP FILTER NO. 4531
 7.6 MAW NUMBER CHANNEL
 FREQUENCY STEP = .5 MAW NUMBERS

FREQUENCY	FILTER TRANSMISSION	FREQUENCY	FILTER TRANSMISSION
732.00	.0010	746.50	.5711
732.50	.0020	750.00	.5833
733.00	.0030	751.50	.6011
733.50	.0040	751.00	.5813
734.00	.0060	751.50	.6033
734.50	.0070	752.00	.5970
735.00	.0080	752.50	.6081
735.50	.0100	753.00	.6350
736.00	.0140	751.50	.6293
736.50	.0240	754.00	.6193
737.00	.0370	754.50	.6371
737.50	.0520	755.00	.6723
738.00	.0683	755.50	.6933
738.50	.0870	756.00	.6830
739.00	.1200	756.50	.6923
739.50	.1720	757.00	.6813
740.00	.2270	757.50	.6913
740.50	.3130	758.00	.6960
741.00	.4390	758.50	.6970
741.50	.6170	759.00	.6933
742.00	.8640	759.50	.6930
742.50	1.120	760.00	.6923
743.00	1.460	760.50	.6931
743.50	1.860	761.00	1.0000
744.00	2.440		
744.50	3.150		
745.00	4.000		
745.50	5.060		
746.00	6.460		
746.50	8.240		
747.00	10.500		
747.50	13.300		
748.00	16.700		
748.50	20.800		
749.00	25.700		

Table 2b. Filter Functions for the Block 5C 9532 Satellite

OMSP FILTER NO. 9532
 568 MAV NUMBER CHANNEL
 FREQUENCY STEP IS VARIABLE

FREQUENCY	FILTER TRANSMISSION	FREQUENCY	FILTER TRANSMISSION	FREQUENCY	FILTER TRANSMISSION	FREQUENCY	FILTER TRANSMISSION
650.00	.0726	666.00	.2607	674.00	.1500	750.00	.0006
655.00	.0750	666.20	.2607	674.20	.1477	755.00	.0006
660.00	.0758	666.40	.2613	674.40	.1454	760.00	.0005
665.00	.0768	666.60	.2620	674.60	.1431	765.00	.0004
668.00	.0782	666.80	.2624	674.80	.1407	770.00	.0003
669.00	.0788	667.00	.2627	675.00	.1384	775.00	.0002
669.20	.0790	667.20	.2629	675.20	.1361	780.00	.0002
669.40	.0792	667.40	.2631	675.40	.1338	785.00	.0002
669.60	.0794	667.60	.2633	675.60	.1315	790.00	.0003
669.80	.0796	667.80	.2635	675.80	.1292	795.00	.0003
670.00	.0798	668.00	.2637	676.00	.1269	800.00	.0002
670.20	.0799	668.20	.2639	676.20	.1246		
670.40	.0800	668.40	.2641	676.40	.1223		
670.60	.0801	668.60	.2643	676.60	.1200		
670.80	.0802	668.80	.2645	676.80	.1177		
671.00	.0803	669.00	.2647	677.00	.1154		
671.20	.0804	669.20	.2649	677.20	.1131		
671.40	.0805	669.40	.2651	677.40	.1108		
671.60	.0806	669.60	.2653	677.60	.1085		
671.80	.0807	669.80	.2655	677.80	.1062		
672.00	.0808	670.00	.2657	678.00	.1039		
672.20	.0809	670.20	.2659	678.20	.1016		
672.40	.0810	670.40	.2661	678.40	.0993		
672.60	.0811	670.60	.2663	678.60	.0970		
672.80	.0812	670.80	.2665	678.80	.0947		
673.00	.0813	671.00	.2667	679.00	.0924		
673.20	.0814	671.20	.2669	679.20	.0901		
673.40	.0815	671.40	.2671	679.40	.0878		
673.60	.0816	671.60	.2673	679.60	.0855		
673.80	.0817	671.80	.2675	679.80	.0832		
674.00	.0818	672.00	.2677	680.00	.0809		
674.20	.0819	672.20	.2679	680.20	.0786		
674.40	.0820	672.40	.2681	680.40	.0763		
674.60	.0821	672.60	.2683	680.60	.0740		
674.80	.0822	672.80	.2685	680.80	.0717		
675.00	.0823	673.00	.2687	681.00	.0694		
675.20	.0824	673.20	.2689	681.20	.0671		
675.40	.0825	673.40	.2691	681.40	.0648		
675.60	.0826	673.60	.2693	681.60	.0625		
675.80	.0827	673.80	.2695	681.80	.0602		
676.00	.0828	674.00	.2697	682.00	.0579		
676.20	.0829	674.20	.2699	682.20	.0556		
676.40	.0830	674.40	.2701	682.40	.0533		
676.60	.0831	674.60	.2703	682.60	.0510		
676.80	.0832	674.80	.2705	682.80	.0487		
677.00	.0833	675.00	.2707	683.00	.0464		
677.20	.0834	675.20	.2709	683.20	.0441		
677.40	.0835	675.40	.2711	683.40	.0418		
677.60	.0836	675.60	.2713	683.60	.0395		
677.80	.0837	675.80	.2715	683.80	.0372		
678.00	.0838	676.00	.2717	684.00	.0349		
678.20	.0839	676.20	.2719	684.20	.0326		
678.40	.0840	676.40	.2721	684.40	.0303		
678.60	.0841	676.60	.2723	684.60	.0280		
678.80	.0842	676.80	.2725	684.80	.0257		
679.00	.0843	677.00	.2727	685.00	.0234		
679.20	.0844	677.20	.2729	685.20	.0211		
679.40	.0845	677.40	.2731	685.40	.0188		
679.60	.0846	677.60	.2733	685.60	.0165		
679.80	.0847	677.80	.2735	685.80	.0142		
680.00	.0848	678.00	.2737	686.00	.0119		
680.20	.0849	678.20	.2739	686.20	.0096		
680.40	.0850	678.40	.2741	686.40	.0073		
680.60	.0851	678.60	.2743	686.60	.0050		
680.80	.0852	678.80	.2745	686.80	.0027		
681.00	.0853	679.00	.2747	687.00	.0004		
681.20	.0854	679.20	.2749				
681.40	.0855	679.40	.2751				
681.60	.0856	679.60	.2753				
681.80	.0857	679.80	.2755				
682.00	.0858	680.00	.2757				
682.20	.0859	680.20	.2759				
682.40	.0860	680.40	.2761				
682.60	.0861	680.60	.2763				
682.80	.0862	680.80	.2765				
683.00	.0863	681.00	.2767				
683.20	.0864	681.20	.2769				
683.40	.0865	681.40	.2771				
683.60	.0866	681.60	.2773				
683.80	.0867	681.80	.2775				
684.00	.0868	682.00	.2777				
684.20	.0869	682.20	.2779				
684.40	.0870	682.40	.2781				
684.60	.0871	682.60	.2783				
684.80	.0872	682.80	.2785				
685.00	.0873	683.00	.2787				
685.20	.0874	683.20	.2789				
685.40	.0875	683.40	.2791				
685.60	.0876	683.60	.2793				
685.80	.0877	683.80	.2795				
686.00	.0878	684.00	.2797				
686.20	.0879	684.20	.2799				
686.40	.0880	684.40	.2801				
686.60	.0881	684.60	.2803				
686.80	.0882	684.80	.2805				
687.00	.0883	685.00	.2807				
687.20	.0884	685.20	.2809				
687.40	.0885	685.40	.2811				
687.60	.0886	685.60	.2813				
687.80	.0887	685.80	.2815				
688.00	.0888	686.00	.2817				
688.20	.0889	686.20	.2819				
688.40	.0890	686.40	.2821				
688.60	.0891	686.60	.2823				
688.80	.0892	686.80	.2825				
689.00	.0893	687.00	.2827				
689.20	.0894	687.20	.2829				
689.40	.0895	687.40	.2831				
689.60	.0896	687.60	.2833				
689.80	.0897	687.80	.2835				
690.00	.0898	688.00	.2837				
690.20	.0899	688.20	.2839				
690.40	.0900	688.40	.2841				
690.60	.0901	688.60	.2843				
690.80	.0902	688.80	.2845				
691.00	.0903	689.00	.2847				
691.20	.0904	689.20	.2849				
691.40	.0905	689.40	.2851				
691.60	.0906	689.60	.2853				
691.80	.0907	689.80	.2855				
692.00	.0908	690.00	.2857				
692.20	.0909	690.20	.2859				
692.40	.0910	690.40	.2861				
692.60	.0911	690.60	.2863				
692.80	.0912	690.80	.2865				
693.00	.0913	691.00	.2867				
693.20	.0914	691.20	.2869				
693.40	.0915	691.40	.2871				
693.60	.0916	691.60	.2873				
693.80	.0917	691.80	.2875				
694.00	.0918	692.00	.2877				
694.20	.0919	692.20	.2879				
694.40	.0920	692.40	.2881				
694.60	.0921	692.60	.2883				
694.80	.0922	692.80	.2885				
695.00	.0923	693.00	.2887				
695.20	.0924	693.20	.2889				
695.40	.0925	693.40	.2891				
695.60	.0926	693.60	.2893				
695.80	.0927	693.80	.2895				
696.00	.0928	694.00	.2897				
696.20	.0929	694.20	.2899				
696.40	.0930	694.40	.2901				
696.60	.0931	694.60	.2903				
696.80	.0932	694.80	.2905				
697.00	.0933	695.00	.2907				
697.20	.0934	695.20	.2909				
697.40	.0935	695.40	.2911				
697.60	.0936	695.60	.2913				
697.80	.0937	695.80	.2915				
698.00	.0938	696.00	.2917				
698.20	.0939	696.20	.2919				
698.40	.0940	696.40	.2921				
698.60	.0941	696.60	.2923				
698.80	.0942	696.80	.2925				
699.00	.0943	697.00	.2927				
699.20	.0944	697.20	.2929				
699.40	.0945	697.40	.2931				
699.60	.0946	697.60	.2933				
699.80	.0947	697.80	.2935				
700.00	.0948	698.00	.2937				
700.20	.0949	698.20	.2939				
700.40	.0950	698.40	.2941				
700.60	.0951	698.60	.2943				
700.80	.0952	698.80	.2945				
701.00	.0953	699.00	.2947				
701.20	.0954	699.20	.2949				
701.40	.0955	699.40	.2951				
701.60	.0956	699.60	.2953				
701.80	.0957	699.80	.2955				
702.00	.0958	700.00	.2957				
702.20	.0959	700.20	.2959				
702.40	.0960	700.40	.2961				
702.60	.0961	700.60	.2963				
702.80	.0962	700.80	.2965				
703.00	.0963	701.00	.2967				
703.20	.0964	701.20	.2969				
703.40	.0965	701.40	.2971				
703.60	.0966	701.60	.2973				
703.80	.0967	701.80	.2975				
704.00	.0968	702.00	.2977				
704.20	.0969	702.20	.2979				
704.40	.0970	702.40	.2981				
704.60	.0971	702.60	.2983	</			

BEST AVAILABLE COPY

Table 2b. (Cont)

DMSP FILTER NO. 9532 676 WAVELENGTH CHANNEL FREQUENCY STEP= .5 WAVENUMBERS				DMSP FILTER NO. 9532 695 WAVELENGTH CHANNEL FREQUENCY STEP= .5 WAVENUMBERS			
FREQUENCY	FILTER TRANSMISSION	FREQUENCY	FILTER TRANSMISSION	FREQUENCY	FILTER TRANSMISSION	FREQUENCY	FILTER TRANSMISSION
654.0	0.0000	681.50	.5020	682.00	0.0000	699.50	.4620
655.0	.0010	682.00	.7750	682.50	.0010	700.00	.4330
656.0	.0010	682.50	.4350	683.00	.0020	700.50	.3050
657.0	.0020	683.00	.3740	683.50	.0050	711.00	.2330
658.0	.0030	683.50	.3350	684.00	.0050	731.50	.1400
659.0	.0040	684.00	.2270	684.50	.0040	732.00	.0930
660.0	.0060	684.50	.1630	685.00	.0040	742.50	.0630
661.0	.0090	685.00	.1230	685.50	.0120	743.00	.0420
662.0	.0150	685.50	.0930	686.00	.0150	753.50	.0290
663.0	.0270	686.00	.0590	686.50	.0120	754.00	.0170
664.0	.0380	686.50	.0430	687.00	.0330	754.50	.0120
665.0	.0520	687.00	.0320	687.50	.0340	755.00	.0380
666.0	.0700	687.50	.0230	688.00	.0780	755.50	.0050
667.0	.1000	688.00	.0190	688.50	.1760	756.00	.0350
668.0	.1310	688.50	.0130	689.00	.1190	756.50	.0340
669.0	.1750	689.00	.0070	689.50	.2220	757.00	.0030
670.0	.2240	689.50	.0030	690.00	.3170	757.50	.0020
671.0	.2620	690.00	.0030	690.50	.3760	758.00	.0010
672.0	.3530	690.50	.0030	691.00	.4420	758.50	.0010
673.0	.3970	691.00	.0020	691.50	.4970	759.00	.0000
674.0	.4320	691.50	.0010	692.00	.5330		
675.0	.4660	692.00	.0000	692.50	.5570		
676.0	.4900			693.00	.5750		
677.0	.5050			693.50	.5880		
678.0	.5150			694.00	.5960		
679.0	.5240			694.50	.6030		
680.0	.5300			695.00	.6000		
681.0	.5350			695.50	.5920		
682.0	.5400			696.00	.5810		
683.0	.5470			696.50	.5720		
684.0	.5540			697.00	.5620		
685.0	.5610			697.50	.5570		
686.0	.5680			698.00	.5560		
687.0	.5740			698.50	.5560		
688.0	.5800			699.00	.5560		

BEST AVAILABLE COPY

Table 2b. (Cont)

DMSF FILTER NO. 9532
727 WAVELENGTH CHANNEL
FREQUENCY STEP= .5 WAVENUMBERS

DMSF FILTER NO. 9532
707 WAVELENGTH CHANNEL
FREQUENCY STEP= .5 WAVENUMBERS

FREQUENCY	FILTER TRANSMISSION	FREQUENCY	FILTER TRANSMISSION	FREQUENCY	FILTER TRANSMISSION	FREQUENCY	FILTER TRANSMISSION	FREQUENCY	FILTER TRANSMISSION
693.00	0.0000	710.50	.5330	710.00	0.0000	727.50	.5680		
693.50	.0010	711.00	.5320	710.50	0.0000	728.00	.5650		
694.00	.0010	711.50	.5310	711.00	.0010	728.50	.5600		
694.50	.0020	712.00	.5290	711.50	.0010	729.00	.4910		
695.00	.0030	712.50	.5280	712.00	.0020	729.50	.3710		
695.50	.0040	713.00	.4890	712.50	.0030	730.00	.2750		
696.00	.0050	713.50	.4270	713.00	.0040	730.50	.1920		
696.50	.0060	714.00	.3100	713.50	.0060	731.00	.1330		
697.00	.0070	714.50	.2350	714.00	.0060	731.50	.0890		
697.50	.0100	715.00	.1930	714.50	.0110	732.00	.0620		
698.00	.0120	715.50	.1550	715.00	.0110	732.50	.0420		
698.50	.0170	716.00	.0710	715.50	.0200	733.00	.0310		
699.00	.0240	716.50	.0230	716.00	.0250	733.50	.0210		
699.50	.0330	717.00	.0110	716.50	.0380	734.00	.0150		
700.00	.0450	717.50	.0030	717.00	.0570	734.50	.0120		
700.50	.0640	718.00	.0170	717.50	.0790	735.00	.0100		
701.00	.0920	718.50	.0420	718.00	.1100	735.50	.0090		
701.50	.1240	719.00	.0930	718.50	.1560	736.00	.0050		
702.00	.1730	719.50	.0970	719.00	.2150	736.50	.0040		
702.50	.2340	720.00	.0340	719.50	.2950	737.00	.0030		
703.00	.3070	720.50	.0030	720.00	.3640	737.50	.0020		
703.50	.3920	721.00	.0020	720.50	.4370	738.00	.0010		
704.00	.4860	721.50	.0010	721.00	.5170	738.50	0.0000		
704.50	.5950	722.00	.0010	721.50	.5940	739.00	0.0000		
705.00	.7200	722.50	.0000	722.00	.6700	739.50	0.0000		
705.50	.8600	723.00	0.0000	722.50	.7500	740.00	0.0000		
706.00	.9750			723.00	.8200				
706.50	1.0000			723.50	.8800				
707.00	1.0000			724.00	.9300				
707.50	1.0000			724.50	.9600				
708.00	1.0000			725.00	.9700				
708.50	1.0000			725.50	.9600				
709.00	1.0000			726.00	.9400				
709.50	1.0000			726.50	.9100				
710.00	1.0000			727.00	.8700				

BEST AVAILABLE COPY

Table 2b. (Cont)

DMSP FILTER NO. 9512
746 MAV NUMBER CHANNEL
FREQUENCY STEP .5 MAV NUMBERS

FREQUENCY	FILTER TRANSMISSION	FREQUENCY	FILTER TRANSMISSION
743.00	.0000	750.50	.6120
743.50	.0010	751.00	.6340
744.00	.0020	751.50	.6580
744.50	.0040	752.00	.6750
745.00	.0070	752.50	.6210
745.50	.0060	753.00	.1390
746.00	.0040	753.50	.1150
746.50	.0110	754.00	.0690
747.00	.0110	754.50	.0470
747.50	.0190	755.00	.0310
748.00	.1260	755.50	.0200
748.50	.0360	756.00	.0150
749.00	.0520	756.50	.0120
749.50	.0790	757.00	.0100
750.00	.1030	757.50	.0050
750.50	.1720	758.00	.0040
751.00	.2650	758.50	.0030
751.50	.3600	759.00	.0020
752.00	.4470	759.50	.0010
752.50	.5760	760.00	1.0000
753.00	.6570		
753.50	.6930		
754.00	.7190		
754.50	.7240		
755.00	.7190		
755.50	.7010		
756.00	.6760		
756.50	.6460		
757.00	.6080		
757.50	.5700		
758.00	.5390		
758.50	.5260		
759.00	.5240		
759.50	.5380		
760.00	.5730		

Table 3. Computed Transmittances for the Atmospheres Described by Table 1 and the Filter Functions Defined in Table 2. Transmittances are for the total path from the indicated pressure level to space

PT. MUGU
2/17/75
8531

PRESSURE (MB)	TEMPERATURE (K)	FREQUENCY					
		668	676	695	717	727	747
TRANSMITTANCE							
.3311	251.86	9.3387E-01	9.8641E-01	9.8233E-01	9.9833E-01	9.9996E-01	9.9618E-01
.4307	257.63	9.3127E-01	9.8665E-01	9.8210E-01	9.9863E-01	9.9993E-01	9.9611E-01
.5577	262.83	9.1949E-01	9.8516E-01	9.8113E-01	9.9843E-01	9.9967E-01	9.9733E-01
.7189	266.87	9.0698E-01	9.8740E-01	9.7961E-01	9.9613E-01	9.9976E-01	9.9763E-01
.9265	262.83	8.9221E-01	9.8189E-01	9.7754E-01	9.9773E-01	9.9963E-01	9.9743E-01
1.1958	265.75	8.7478E-01	9.7729E-01	9.7464E-01	9.9697E-01	9.9937E-01	9.9721E-01
1.5388	267.18	8.5498E-01	9.7243E-01	9.7178E-01	9.9584E-01	9.9895E-01	9.9593E-01
1.9779	271.84	8.3283E-01	9.6626E-01	9.6607E-01	9.9416E-01	9.9526E-01	9.9558E-01
2.5361	265.34	8.0826E-01	9.5863E-01	9.6186E-01	9.9132E-01	9.9710E-01	9.9610E-01
3.2765	262.77	7.8149E-01	9.4882E-01	9.5933E-01	9.8922E-01	9.9548E-01	9.9547E-01
4.2525	258.46	7.5202E-01	9.3574E-01	9.4881E-01	9.8663E-01	9.9294E-01	9.9356E-01
5.5698	270.92	7.1909E-01	9.1606E-01	9.4101E-01	9.8243E-01	9.8970E-01	9.9351E-01
7.4765	272.77	6.8032E-01	8.9409E-01	9.3111E-01	9.7736E-01	9.8553E-01	9.9226E-01
9.9749	227.89	6.3330E-01	8.6231E-01	9.1312E-01	9.7175E-01	9.8431E-01	9.9171E-01
13.4219	220.39	5.7702E-01	8.2712E-01	9.0127E-01	9.6356E-01	9.7375E-01	9.8691E-01
18.2290	218.34	5.1310E-01	7.6432E-01	8.7425E-01	9.5274E-01	9.6916E-01	9.8691E-01
24.8911	214.80	4.4270E-01	6.9091E-01	8.4413E-01	9.3693E-01	9.5351E-01	9.8693E-01
34.0944	213.93	3.6762E-01	5.9849E-01	8.0630E-01	9.1873E-01	9.3854E-01	9.8693E-01
46.9254	211.09	2.8923E-01	4.8744E-01	7.4573E-01	8.9334E-01	9.1977E-01	9.7736E-01
65.0800	211.75	2.4960E-01	4.2664E-01	7.0353E-01	8.7819E-01	9.0394E-01	9.7449E-01
75.8900	210.95	1.7246E-01	3.0789E-01	6.2144E-01	8.4417E-01	8.8369E-01	9.6677E-01
104.3900	215.25	1.0489E-01	1.8131E-01	5.1561E-01	7.9202E-01	8.5227E-01	9.5516E-01
143.0200	215.05	5.5741E-02	8.3723E-02	3.9301E-01	7.2736E-01	8.1429E-01	9.3813E-01
196.0100	215.65	2.9417E-02	2.3294E-02	2.6400E-01	6.4420E-01	7.6696E-01	9.1420E-01
269.1700	214.85	2.0148E-02	2.6427E-03	1.5503E-01	5.3635E-01	7.1182E-01	8.7921E-01
313.4000	224.05	1.8279E-02	5.9981E-04	1.0711E-01	4.7461E-01	6.7423E-01	8.5433E-01
362.8500	236.05	1.6776E-02	1.0746E-05	6.6795E-02	3.9669E-01	6.3601E-01	8.2171E-01
418.0700	244.05	1.5711E-02	1.6719E-05	3.5947E-02	3.1614E-01	5.8404E-01	7.7619E-01
479.6500	250.45	1.3837E-02	2.5904E-06	1.6732E-02	2.3787E-01	5.2424E-01	7.2335E-01
548.4400	258.25	1.2449E-02	3.8452E-07	6.5890E-03	1.6913E-01	4.6237E-01	6.6461E-01
624.5600	265.45	1.1158E-02	4.3761E-08	2.1132E-03	1.1322E-01	3.9691E-01	6.1350E-01
709.8600	272.25	9.9151E-03	3.1166E-09	5.2769E-04	7.0749E-02	3.3364E-01	5.3739E-01
802.9800	276.15	8.6874E-03	1.1409E-10	1.0490E-04	4.1217E-02	2.6548E-01	4.6513E-01
907.1600	281.55	7.4789E-03	1.8423E-12	1.5320E-05	2.2537E-02	2.0461E-01	3.8376E-01
1022.7000	286.95	6.0204E-03	9.7624E-15	1.6365E-06	1.0402E-02	1.3547E-01	2.9337E-01
TOTAL RADIANCE		5.7811E-06	4.5007E-06	4.4889E-06	5.8337E-06	7.6561E-06	9.6577E-06

Table 3. (Cont)

KHAJALEIN
2/20/75
9532

PRESSURE (MM)	TEMPERATURE (K)	FREQUENCY					
		668	676	693	707	727	747
TRANSMITTANCE							
.1126	248.30	9.6294E-01	9.9488E-01	9.8323E-01	9.9974E-01	1.0000E+00	9.9698E-01
.7414	263.57	9.3295E-01	9.8784E-01	9.8143E-01	9.9957E-01	9.9995E-01	9.9862E-01
.6116	269.17	9.0673E-01	9.8450E-01	9.7923E-01	9.9915E-01	9.9984E-01	9.9637E-01
1.1136	272.02	8.6764E-01	9.7935E-01	9.7369E-01	9.9775E-01	9.9944E-01	9.9804E-01
1.5098	272.57	8.4253E-01	9.7285E-01	9.6880E-01	9.9625E-01	9.9895E-01	9.9773E-01
2.2655	260.17	8.0508E-01	9.6263E-01	9.6197E-01	9.9327E-01	9.9775E-01	9.9734E-01
3.5299	253.71	7.6022E-01	9.4572E-01	9.5155E-01	9.8893E-01	9.9532E-01	9.9653E-01
5.1478	241.11	7.1690E-01	9.2336E-01	9.4127E-01	9.8462E-01	9.9185E-01	9.9556E-01
6.7861	242.22	6.7376E-01	9.0195E-01	9.3148E-01	9.8053E-01	9.8832E-01	9.9494E-01
10.8153	234.50	6.0209E-01	8.4796E-01	9.0499E-01	9.6995E-01	9.7985E-01	9.9136E-01
16.2479	229.96	5.1925E-01	7.8050E-01	8.6092E-01	9.5635E-01	9.6911E-01	9.8923E-01
26.8219	227.07	4.0575E-01	6.5947E-01	8.2505E-01	9.3111E-01	9.4651E-01	9.6471E-01
37.7195	215.59	3.2427E-01	5.5172E-01	7.6976E-01	9.0881E-01	9.3044E-01	9.6021E-01
50.0000	203.25	2.5415E-01	4.4856E-01	7.1361E-01	8.8945E-01	9.1464E-01	9.7673E-01
70.0000	202.35	1.7097E-01	3.1565E-01	6.3281E-01	8.2222E-01	8.9333E-01	9.7122E-01
100.0000	192.15	9.4079E-02	1.7833E-01	5.3100E-01	8.2593E-01	9.6604E-01	9.6294E-01
179.0000	215.14	2.4942E-02	2.7514E-02	3.1122E-01	7.1598E-01	7.9543E-01	9.3416E-01
361.3900	243.92	1.2685E-02	5.1133E-04	9.3610E-02	4.6993E-01	6.6452E-01	8.4550E-01
408.1900	260.78	1.0057E-02	6.5820E-06	2.2430E-02	2.6967E-01	9.4283E-01	7.3690E-01
510.3700	268.70	8.7111E-03	9.8632E-08	4.3602E-03	1.4967E-01	4.3688E-01	6.3300E-01
614.9800	279.46	6.8941E-03	1.9587E-09	6.1713E-04	7.2315E-02	3.3821E-01	5.2336E-01
758.0000	288.44	5.2230E-03	4.6986E-12	2.8003E-05	2.5147E-02	2.1971E-01	3.7917E-01
803.8500	290.11	4.7470E-03	5.1171E-13	9.9914E-06	1.7750E-02	1.8883E-01	3.3552E-01
852.1600	290.74	3.9753E-03	3.8788E-14	2.8257E-06	1.2985E-02	1.4712E-01	2.6813E-01
903.0000	292.00	3.0143E-03	1.8568E-15	6.2667E-07	5.7595E-03	1.0129E-01	1.6914E-01
956.6200	295.59	2.0234E-03	5.2571E-17	9.9442E-08	2.4555E-03	5.9442E-02	1.1479E-01
984.2300	298.00	1.5400E-03	6.9588E-18	3.2912E-08	1.4305E-03	4.1444E-02	8.1055E-02
1011.9900	302.21	1.1535E-03	8.3078E-19	1.0303E-08	8.0594E-04	2.8164E-02	5.6732E-02
TOTAL RADIANCE		5.9488E-06	4.4523E-06	4.6624E-06	5.6935E-06	3.5973E-06	1.0116E-05

Table 3. (Cont)

BARKING SANDS
2/24/75
8531

PRESSURE (MB)	TEMPERATURE (K)	FREQUENCY					
		668	676	695	717	727	747
		TRANSMITTANCE					
.2276	247.77	9.5253E-01	9.9152E-01	9.8373E-01	9.9892E-01	9.9998E-01	9.9832E-01
.2898	257.47	9.4452E-01	9.8946E-01	9.8318E-01	9.9884E-01	9.9997E-01	9.9816E-01
.3751	260.35	9.3564E-01	9.8756E-01	9.8245E-01	9.9873E-01	9.9995E-01	9.9798E-01
.4453	259.87	9.2572E-01	9.8598E-01	9.8158E-01	9.9855E-01	9.9991E-01	9.9731E-01
.6267	262.05	9.1426E-01	9.8445E-01	9.8143E-01	9.9835E-01	9.9984E-01	9.9764E-01
.8069	263.33	9.0785E-01	9.8242E-01	9.7873E-01	9.9799E-01	9.9973E-01	9.9745E-01
1.0376	263.47	8.8507E-01	9.7949E-01	9.7534E-01	9.9741E-01	9.9954E-01	9.9725E-01
1.7473	259.75	8.6663E-01	9.7539E-01	9.7313E-01	9.9657E-01	9.9925E-01	9.9715E-01
1.7749	261.46	8.4571E-01	9.6986E-01	9.6999E-01	9.9532E-01	9.9876E-01	9.9697E-01
2.2426	264.74	8.2217E-01	9.6285E-01	9.6436E-01	9.9347E-01	9.9796E-01	9.9643E-01
2.9086	252.74	7.9630E-01	9.5403E-01	9.5477E-01	9.9113E-01	9.9673E-01	9.9535E-01
3.4084	246.84	7.6801E-01	9.4223E-01	9.5233E-01	9.8841E-01	9.9499E-01	9.9334E-01
5.0254	276.65	7.3618E-01	9.2613E-01	9.4390E-01	9.8523E-01	9.9243E-01	9.9452E-01
6.6715	237.27	6.9483E-01	9.0663E-01	9.3667E-01	9.8123E-01	9.8897E-01	9.9340E-01
8.8921	237.28	6.5426E-01	8.7640E-01	9.2457E-01	9.7574E-01	9.8432E-01	9.9182E-01
11.9675	227.02	6.0115E-01	8.3885E-01	9.0324E-01	9.6862E-01	9.7766E-01	9.9300E-01
16.2179	221.47	5.3959E-01	7.8891E-01	8.8343E-01	9.5946E-01	9.7144E-01	9.8303E-01
22.0085	218.82	4.7199E-01	7.2783E-01	8.6327E-01	9.4723E-01	9.6152E-01	9.8579E-01
25.6804	212.34	4.3616E-01	6.8449E-01	8.4453E-01	9.3952E-01	9.5523E-01	9.8440E-01
30.0200	218.57	3.9963E-01	6.4016E-01	8.2522E-01	9.3445E-01	9.4802E-01	9.8249E-01
40.9800	215.45	3.2363E-01	5.3699E-01	7.7338E-01	9.1855E-01	9.3101E-01	9.7391E-01
56.3200	209.05	2.4543E-01	4.2884E-01	7.0499E-01	8.8155E-01	9.1184E-01	9.7356E-01
78.7900	193.35	1.6491E-01	2.8763E-01	6.2185E-01	8.5109E-01	8.8994E-01	9.6747E-01
111.4400	199.07	9.3712E-02	1.5757E-01	5.2521E-01	8.1175E-01	8.6225E-01	9.5422E-01
155.3000	217.45	4.7545E-02	6.2757E-02	3.9746E-01	7.4487E-01	8.2399E-01	9.4376E-01
212.5800	222.45	2.6471E-02	1.4848E-02	2.5578E-01	6.5122E-01	7.7772E-01	9.1507E-01
286.1400	237.15	1.9351E-02	1.5991E-03	1.3426E-01	5.1520E-01	7.0069E-01	8.6077E-01
378.6600	257.15	1.5991E-02	6.5603E-03	5.0592E-02	3.5660E-01	6.1105E-01	7.3419E-01
493.2200	265.35	1.3215E-02	1.6010E-03	1.1347E-02	2.0135E-01	5.0217E-01	6.9791E-01
633.4700	275.65	1.0727E-02	2.5947E-04	1.2444E-03	9.1721E-02	3.7431E-01	6.8234E-01
715.0400	281.95	9.5639E-03	1.7463E-03	2.9343E-04	5.6489E-02	3.1372E-01	5.1649E-01
806.9000	286.75	8.0623E-03	6.2923E-04	4.9584E-05	3.1308E-02	2.3484E-01	4.2621E-01
907.4700	290.55	6.0277E-03	8.1790E-05	5.2430E-06	1.4220E-02	1.5667E-01	2.9612E-01
1019.0000	294.05	3.6041E-03	2.7325E-05	2.7689E-07	4.5343E-03	7.2886E-02	1.5559E-01
TOTAL RADIANCE		5.5052E-06	4.1942E-06	4.5131E-06	6.5110E-06	8.4929E-06	1.0135E-05

Table 3. (Cont)

BARKING SANDS
2/26/75
8531

PRESSURE (MB)	TEMPERATURE (K)	FREQUENCY					
		668	676	695	707	727	747
		TRANSMITTANCE					
.3383	259.51	9.3613E-01	9.8768E-01	9.8169E-01	9.9865E-01	9.9994E-01	9.9743E-01
.5000	259.94	9.1624E-01	9.8470E-01	9.8119E-01	9.9835E-01	9.9985E-01	9.9711E-01
.7000	264.68	8.9839E-01	9.8201E-01	9.7416E-01	9.9789E-01	9.9937E-01	9.9687E-01
1.0000	264.66	8.7473E-01	9.7728E-01	9.7446E-01	9.9695E-01	9.9933E-01	9.9655E-01
2.0000	261.77	8.1506E-01	9.6060E-01	9.6247E-01	9.9277E-01	9.9759E-01	9.9573E-01
5.0000	276.56	7.1124E-01	9.1272E-01	9.3330E-01	9.8194E-01	9.8922E-01	9.9239E-01
10.0000	228.69	5.9879E-01	8.3737E-01	9.0768E-01	9.6661E-01	9.7585E-01	9.8833E-01
20.0000	221.83	4.4420E-01	7.0059E-01	8.4388E-01	9.3735E-01	9.5167E-01	9.8322E-01
30.0000	216.92	3.5142E-01	5.8105E-01	7.9165E-01	9.1035E-01	9.3366E-01	9.7882E-01
36.6224	216.97	3.0502E-01	5.1213E-01	7.5725E-01	8.9335E-01	9.1853E-01	9.7555E-01
40.8900	215.75	2.8346E-01	4.7981E-01	7.3410E-01	8.8594E-01	9.1268E-01	9.7396E-01
50.0000	213.95	2.2881E-01	3.9443E-01	6.8055E-01	8.6447E-01	8.9723E-01	9.6944E-01
70.0000	198.15	1.4993E-01	2.6182E-01	5.9137E-01	8.2364E-01	8.7322E-01	9.6201E-01
100.0000	196.62	8.0364E-02	1.3259E-01	4.8787E-01	7.8627E-01	8.4440E-01	9.5239E-01
150.0000	208.17	3.4279E-02	3.3916E-02	3.3195E-01	7.0638E-01	7.9691E-01	9.3212E-01
200.0000	213.85	2.2769E-02	6.4268E-03	2.1204E-01	6.0953E-01	7.4557E-01	9.0264E-01
300.0000	238.05	1.6390E-02	1.1993E-03	7.0473E-02	4.6610E-01	6.3826E-01	8.2277E-01
350.0000	245.15	1.5113E-02	1.6184E-03	3.6583E-02	3.1773E-01	5.8356E-01	7.7734E-01
400.0000	252.45	1.3278E-02	2.7109E-03	1.7577E-02	2.4292E-01	5.3210E-01	7.3042E-01
450.0000	260.85	1.2807E-02	5.1337E-03	7.7035E-03	1.8117E-01	4.8142E-01	6.8335E-01
500.0000	266.95	1.1764E-02	9.4920E-04	3.1541E-03	1.3234E-01	4.3175E-01	6.3834E-01
550.0000	271.05	1.0441E-02	1.5674E-04	1.2165E-03	9.4951E-02	3.8431E-01	5.9890E-01
600.0000	273.75	1.0120E-02	2.2762E-04	4.4191E-04	6.7325E-02	3.3947E-01	5.4816E-01
650.0000	276.95	9.2768E-03	2.8607E-04	1.5660E-04	4.8614E-02	2.9724E-01	5.0339E-01
700.0000	280.45	8.5984E-03	3.0762E-04	5.4501E-04	3.4784E-02	2.5809E-01	4.6159E-01
750.0000	282.45	7.9856E-03	2.7924E-04	1.9143E-04	2.5053E-02	2.2271E-01	4.2256E-01
800.0000	287.25	7.4205E-03	2.1348E-04	6.727E-05	1.872E-02	1.9446E-01	3.8527E-01
840.0000	289.25	6.9333E-03	2.4212E-04	2.9164E-05	1.3922E-02	1.6509E-01	3.5179E-01
850.0000	287.95	6.7458E-03	1.3435E-04	2.3806E-05	1.3030E-02	1.5873E-01	3.4187E-01
860.0000	285.35	6.2995E-03	4.5108E-04	1.4538E-05	1.1073E-02	1.4162E-01	3.1875E-01
890.0000	286.95	5.2751E-03	7.0141E-05	5.9155E-07	7.8739E-03	1.1078E-01	2.4935E-01
950.0000	293.95	3.4804E-03	1.6472E-07	8.4517E-08	3.5431E-03	6.3338E-02	1.4891E-01
1000.0000	294.65	2.0364E-03	1.6136E-07	7.1252E-09	1.2781E-03	3.0831E-02	7.6894E-02
1020.6000	292.15	1.8795E-03	5.9751E-08	4.3026E-09	1.0565E-03	2.6940E-02	6.7519E-02
TOTAL RADIANCE		5.7314E-06	4.3436E-06	4.3728E-06	5.9458E-06	7.9376E-06	9.5074E-06

Table 3. (Cont)

BARKING SANDS
2/28/75
9632

PRESSURE (MB)	TEMPERATURE (K)	FREQUENCY					
		668	676	695	737	727	747
		TRANSMITTANCE					
.3347	253.99	9.3478E-01	9.8817E-01	9.8183E-01	9.9962E-01	9.9996E-01	9.9873E-01
.4000	262.61	9.2445E-01	9.8657E-01	9.8109E-01	9.9943E-01	9.9993E-01	9.9807E-01
.5854	266.29	9.0629E-01	9.8448E-01	9.7937E-01	9.9915E-01	9.9984E-01	9.9848E-01
.6645	262.64	8.9920E-01	9.8359E-01	9.7857E-01	9.9893E-01	9.9973E-01	9.9810E-01
.8574	264.26	8.8317E-01	9.8122E-01	9.7643E-01	9.9851E-01	9.9962E-01	9.9820E-01
1.1142	249.16	8.6437E-01	9.7775E-01	9.7343E-01	9.9781E-01	9.9942E-01	9.9810E-01
1.6574	261.19	8.3188E-01	9.6990E-01	9.6723E-01	9.9599E-01	9.9877E-01	9.9730E-01
2.8617	239.64	7.8045E-01	9.5305E-01	9.5667E-01	9.9181E-01	9.9871E-01	9.9730E-01
4.2946	245.52	7.3534E-01	9.3212E-01	9.4654E-01	9.8717E-01	9.9354E-01	9.9640E-01
7.6233	228.57	6.5617E-01	8.8458E-01	9.2647E-01	9.7624E-01	9.8563E-01	9.9434E-01
11.8875	225.37	5.7661E-01	8.2669E-01	9.0225E-01	9.6752E-01	9.7673E-01	9.9237E-01
16.0428	222.37	5.1191E-01	7.7332E-01	8.8177E-01	9.5735E-01	9.6845E-01	9.9014E-01
21.7975	218.62	4.4493E-01	7.0278E-01	8.5138E-01	9.4389E-01	9.5740E-01	9.8736E-01
30.0000	217.65	3.6886E-01	6.1077E-01	8.0787E-01	9.2547E-01	9.4264E-01	9.8486E-01
40.0000	215.15	2.9787E-01	5.1275E-01	7.5396E-01	9.0471E-01	9.2625E-01	9.8195E-01
50.0000	211.15	2.4195E-01	4.2871E-01	7.0303E-01	8.8607E-01	9.1177E-01	9.7735E-01
70.0000	201.15	1.5784E-01	2.9547E-01	6.1543E-01	8.5473E-01	8.8797E-01	9.7005E-01
100.0000	200.45	8.5752E-02	1.6091E-01	5.0708E-01	8.1353E-01	8.5820E-01	9.6038E-01
150.0000	209.75	3.3799E-02	4.8491E-02	3.5388E-01	7.3861E-01	8.1164E-01	9.4051E-01
175.0000	215.25	2.3593E-02	2.4184E-02	2.8465E-01	6.9575E-01	7.8654E-01	9.2779E-01
200.0000	219.75	1.8497E-02	1.1302E-02	2.3205E-01	6.5001E-01	7.6236E-01	9.1325E-01
250.0000	224.15	1.4284E-02	2.0318E-03	1.4574E-01	5.9755E-01	7.1512E-01	8.8195E-01
300.0000	234.15	1.2594E-02	2.9696E-04	8.6803E-02	4.6621E-01	6.6783E-01	8.4594E-01
400.0000	251.35	1.0432E-02	4.4920E-06	2.4173E-02	2.9277E-01	5.6533E-01	7.6097E-01
500.0000	262.35	8.7660E-03	7.6061E-08	4.9738E-03	1.6404E-01	4.6214E-01	6.6694E-01
600.0000	271.85	7.4441E-03	1.5895E-09	7.8385E-04	8.5692E-02	3.6723E-01	5.7213E-01
650.0000	275.75	6.9004E-03	2.0192E-10	2.9157E-04	6.1383E-02	3.2606E-01	5.2789E-01
700.0000	277.35	6.4346E-03	2.2324E-11	1.0452E-04	4.4272E-02	2.8893E-01	4.8774E-01
750.0000	279.95	5.9491E-03	2.0967E-12	3.6496E-05	3.1635E-02	2.5261E-01	4.4411E-01
800.0000	283.25	5.4543E-03	1.6356E-13	1.2423E-05	2.2320E-02	2.1765E-01	3.9875E-01
850.0000	285.55	4.8671E-03	1.0246E-14	3.9737E-06	1.5123E-02	1.8137E-01	3.4457E-01
900.0000	287.25	3.9776E-03	4.7218E-16	1.0457E-06	9.1333E-03	1.3661E-01	2.6664E-01
950.0000	290.85	3.0056E-03	1.5812E-17	2.2489E-07	4.7105E-03	9.3130E-02	1.8643E-01
1000.0000	294.35	2.1809E-03	3.9941E-19	4.1389E-08	2.2449E-03	5.9573E-02	1.2326E-01
1027.0000	297.85	1.8397E-03	7.0943E-20	1.8132E-08	1.5583E-03	4.7395E-02	9.9111E-02
TOTAL RADIANCE		5.4738E-06	4.2326E-06	4.3107E-06	6.0555E-06	8.0157E-06	9.5811E-06

Table 3. (Cont)

KWAJALEIN
4/01/75
8531

PRESSURE (HR)	TEMPERATURE (K)	FREQUENCY					
		668	676	695	707	727	747
		TRANSMITTANCE					
.1124	242.67	9.6516E-01	9.9516E-01	9.6195E-01	9.9895E-01	1.0000E+00	9.9825E-01
.2176	254.37	9.5207E-01	9.9140E-01	9.8304E-01	9.9884E-01	9.9990E-01	9.9793E-01
.6664	267.78	9.0921E-01	9.8773E-01	9.7462E-01	9.9821E-01	9.9960E-01	9.9731E-01
.8625	262.07	8.9457E-01	9.8132E-01	9.7770E-01	9.9777E-01	9.9960E-01	9.9713E-01
1.9453	271.75	8.3109E-01	9.6574E-01	9.6569E-01	9.9405E-01	9.9820E-01	9.9631E-01
7.3752	257.59	7.7461E-01	9.4600E-01	9.5386E-01	9.8854E-01	9.9520E-01	9.9500E-01
6.1261	238.71	7.0228E-01	9.0807E-01	9.4687E-01	9.8042E-01	9.8869E-01	9.9292E-01
15.1570	230.44	5.4165E-01	7.9817E-01	8.8819E-01	9.5699E-01	9.5965E-01	9.8671E-01
24.2657	218.20	4.0157E-01	6.4524E-01	8.2346E-01	9.2625E-01	9.4534E-01	9.8119E-01
51.7000	208.18	2.5512E-01	4.3817E-01	7.1304E-01	8.8245E-01	9.1200E-01	9.7310E-01
75.7300	190.71	1.6446E-01	2.8719E-01	6.2212E-01	8.5014E-01	9.4838E-01	9.6667E-01
103.3500	191.17	9.9614E-02	1.6492E-01	5.7697E-01	8.1957E-01	8.6699E-01	9.6982E-01
124.4400	197.92	6.4999E-02	9.9394E-02	4.6384E-01	7.8879E-01	8.4687E-01	9.5385E-01
200.8000	221.18	2.7299E-02	1.6747E-02	2.7391E-01	6.7133E-01	7.7932E-01	9.2192E-01
240.5100	235.12	2.1773E-02	4.9093E-03	1.9220E-01	5.8754E-01	7.3751E-01	8.9344E-01
300.1100	244.21	1.8016E-02	6.6333E-04	1.0105E-01	4.5964E-01	6.7137E-01	8.4132E-01
380.6400	255.16	1.5147E-02	3.4776E-05	3.7722E-02	3.1177E-01	5.7893E-01	7.6478E-01
467.0700	265.51	1.2940E-02	2.0813E-06	1.1719E-02	1.9830E-01	4.8839E-01	6.8031E-01
542.2700	273.13	1.1187E-02	1.8725E-07	3.2294E-03	1.2282E-01	4.0802E-01	5.9645E-01
617.1700	280.32	9.8136E-03	2.0112E-08	6.9559E-04	7.7943E-02	3.3312E-01	5.2542E-01
691.7700	282.92	8.5217E-03	1.3144E-09	1.9437E-04	4.6477E-02	2.7110E-01	4.5133E-01
756.3500	287.22	7.5578E-03	1.1769E-10	5.2202E-05	3.6294E-02	2.2245E-01	3.9544E-01
802.4400	285.75	6.5887E-03	1.5701E-11	1.8193E-06	2.1556E-02	1.8220E-01	3.3399E-01
951.0600	290.61	5.0677E-03	1.4825E-12	4.7611E-06	1.2254E-02	1.2397E-01	2.4300E-01
876.1800	290.77	4.3081E-03	3.9903E-13	2.2319E-06	8.9707E-03	1.0491E-01	1.9999E-01
551.9900	291.64	3.6006E-03	9.7912E-14	9.9207E-07	6.4053E-03	8.3382E-02	1.6141E-01
928.4100	293.14	2.8750E-03	2.0898E-14	3.9593E-07	4.2720E-03	5.2710E-02	1.2375E-01
955.4200	295.69	2.1956E-03	3.8647E-15	1.4143E-07	2.4735E-03	4.4510E-02	8.9911E-02
1010.6000	302.29	1.1707E-03	8.6902E-17	1.3444E-08	9.6129E-04	1.3570E-02	4.2539E-02
TOTAL RADIANCE		5.7700E-06	4.2667E-06	4.5907E-06	6.6595E-06	3.5459E-06	1.0020E-06

Table 4. Comparison of Measured With Computed Radiances for the 9 Cases Studied

	Location	Date	θ	668	676	695	707	727	746
Calc	Barking Sands	2/25/75	4.5°	55.1	41.9	45.1	65.0	84.9	100.3
Meas	22.0N 159.8W	8531		54.1	42.5	41.5	57.4	79.9	95.0
Calc	Pt. Mugu	2/18/75	9.4°	57.8	45.0	44.9	58.3	76.6	90.6
Meas	34.1N 119.1W	8531		57.6	46.1	43.1	52.4	71.3	86.0
Calc	Kwajalein	2/28/75	0.5°	57.0	42.6	46.5	68.0	87.5	101.8
Meas	8.7N 167.7E	8531		55.1	42.2	41.7	59.5	83.0	98.4
Calc	Kwajalein	2/27/75	37.1°	58.7	43.7	44.6	64.3	83.9	98.1
Meas	8.7N 167.7E	9532		56.0	43.7	39.9	56.6	77.0	95.0
Calc	Barking Sands	2/28/75	37.0°	54.7	42.3	43.1	60.6	80.2	95.8
Meas	22.0N 159.8W	9532		53.1	42.6	39.0	53.6	71.8	88.6
Calc	Barking Sands	2/18/75	37.0°	58.6	44.5	45.1	61.4	79.6	94.5
Meas	22.0N 159.8W	9532		54.8	43.6	40.3	53.3	71.0	86.2
Calc	Barking Sands	2/26/75	46.4°	57.3	43.4	43.3	59.5	79.4	95.1
Meas	22.0N 159.8W	8531		54.9	44.2	40.0	52.7	73.8	89.7
Calc	Kwajalein	2/20/75	27.5°	59.5	44.5	46.6	66.9	85.9	101.1
Meas	8.7N 167.7E	9532		54.4	42.4	40.8	60.9	80.7	97.5
Calc	Kwajalein	4/1/75	22.6°	57.7	42.7	45.9	66.6	85.5	100.2
Meas	8.7N 167.7E	8531		57.0	43.0	41.2	58.2	80.1	94.8

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