ATMOSPHERIC NOISE MEASUREMENTS

Data Summary N.º 5 - Station ARN-2 N.º 10

W.S. TAVEIRA

P. ROZENFELD

F. DE MENDONÇA

Scientific Report LAFE-74

April — 1968

The measurements reported herein were performed in cooperation with the Electromagnetic Interference Environment Section, Tropospheric Telecommunications Laboratory of ESSA — Boulder, Colorado

Comissão Nacional de Atividades Espaciais
São José dos Campos
São Paulo — Brasil

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W. S. Taveira, P. Rozenfeld, and F. de Mendonça

ABSTRACT

Under the designation of Project "OBRA", one of the sixteen Atmospheric Radio Noise Receiving Stations of the world-wide network coordinated by the Environmental Science Services Administration, has been in operation at this Laboratory since August 1963.

This report presents the data collected during the period September 1966 - December 1967. The absence of data from October 1966 to April 1967 and for August 1967, is due to malfunction of the equipment on these periods.

DESCRIPTION OF DATA

The data presented are based on the measurements of three parameters of the noise; these are the mean power, the mean envelope voltage, and the logarithm of the envelope voltage.

The mean power received from sources external to the antenna is the basic parameter. It is expressed in terms of an effective antenna noise factor in decibels, defined by:

$$F_a = 10 \log_{10} p_n/(kT_o b)$$

where

p_n = noise power available from an equivalent lossless antenna (W)

k = Boltzmann's constant = 1.38×10^{-23} J/°K

T_o = Reference temperature taken as 288°K

b = Effective receiver noise bandwidth (Hz)

This noise factor can be related to the r.m.s. noise vertical field strength along the antenna in decibels above 1μV/m by:

$$E_n = F_a - 95.5 + 10 \log_{10} b + 20 \log_{10} f_{MHz}$$

where

f_{MHz} = Frequency in MHz

For a bandwidth of 1 KHz, the value of E_n can be found from the nomogram of figure 9. For any bandwidth b Hz, other than 1 KHz, it is enough to add $(10 \log_{10} b - 30)$ to the value of E_n obtained from figure 9.

The other two measured parameters are given as deviations relative to the mean power. Thus, the mean voltage and mean logarithm, expressed as V_D and L_D respectively, are in db below the mean power. These parameters, together with the mean power, are used in an empirical graphical method (Crichlow,Spaulding,Roubique, and Disney, 1960) to derive the amplitude-probability distribution for atmospheric radio noise.

In the following data tabulations, are reported the values of F_{am}, V_{Dm} and L_{Dm}, respectively the month-hour medians for F_a, V_D and L_D. To give an indication of the variation of the noise power from day-to-day at a given time of day, the upper and lower deciles values of F_a are also reported, as deviations D_u and D_l, above and below F_{am}.

Measurements were made with the Environmental Science Services Administration's Radio Noise Recorder, Model ARN-2. This equipment was designed to measure and record atmospheric noise for eight frequencies, each channel with an effective noise bandwidth of 200 Hz.

The channel designations for the eight frequencies are:

Channel	Recorder Frequencies (MHz)
1	0.05125
2	0.113
3	0.246
4	0.545
5	2.5
6	5.0
7	10.0
8	20.0

The antenna system of the ARN-2 station consists of a vertical omnidirectional whip antenna above a ground plane.

A detailed description of the equipment and measurement technique employed can be found in the reference.

The power measurements (F_a) are obtained by integration on a 15 minutes interval, and this value is taken as representative of the conditions for the whole hour. The time used is GMT minus 3 hours.

The eight channels are scanned two at a time, so that the four lower frequencies are recorded in successive intervals of fifteen minutes during one hour; the same for the four higher ones, through another recorder. L_D and V_D are recorded simultaneously, one week with the high frequency channels and the next with the low frequency ones.

Hence, the measurements related to a given hour, for 51.25 KHz and 2.5 MHz were obtained between this hour and the hour plus fifteen minutes. The next two frequencies (113 MHz and 5.0 MHz) between the hour plus fifteen minutes and the hour plus thirty minutes, and so on for the other pairs of simultaneous frequencies (246 KHz with 10.0 MHz and 545 KHz with 20.0 MHz) until the eight channels were scanned during one hour.This time difference between measurements was considered when the values of F_{am} were plotted (figure 1 to 8).

Although special care is taken to avoid interference of man-made noise in the measurements, it is possible that sometimes the received signal is contaminated with fields other than atmospheric noise. In this case it has been verified (Crichlow, et al., 1960) that the first parameter to reflect this is the log deviation (L_D), whose absolute value will decrease so that, with the corresponding value of V_D they will not provide a solution for the amplitude-probability distribution as concluded from experimental data by Crichlow, et al., (1960). When this occurs, the measured value of L_D can be ignored, and the most probable value of L_D from the curve (fig. 10) of L_D versus V_D can be used. This procedure has been followed throughout this summary; a small circle above an L_{Dm} value indicates a quantity

which is not the actually measured value, but a quantity obtained from the corresponding V_D from the above referred curve.

An asterisk above a median value indicates it was obtained from less than fifteen measurements for F_{am} or less than seven measurements for L_{Dm} and V_{Dm}.

The vertical lines in the figures 1 to 8 indicate the variation during the month of the local sunset and sunrise time.

PREVIOUS DATA PUBLICATIONS

Previous data of atmospheric noise measurements have been taken and published at this Laboratory under the following names:

REPORT Nº LAFE 13 - Data Summary for the period Aug 1963 - Dec 1963

REPORT Nº LAFE 23 - Data Summary for the period Jan 1964 - Jun 1964

REPORT Nº LAFE 24 - Data Summary for the period Jul 1964 - Jun 1965

REPORT Nº LAFE 58 - Data Summary for the period Jul 1965 - Jun 1966

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LIST OF FIGURES

MONTH-HOUR VALUES OF RADIO NOISE

Station São José Lat. 23.3°S Long. 45.8°W Month September 19 66

Frequency (Mc)

Hour (LST)	.051					.113					.246					.545					2.5					6.0					10.0					20.0				
	Fam	Du	Dℓ	Vdm	Ldm	Fam	Du	Dℓ	Vdm	Ldm	Fam	Du	Dℓ	Vdm	Ldm	Fam	Du	Dℓ	Vdm	Ldm	Fam	Du	Dℓ	Vdm	Ldm	Fam	Du	Dℓ	Vdm	Ldm	Fam	Du	Dℓ	Vdm	Ldm	Fam	Du	Dℓ	Vdm	Ldm
00	132	14	8	6.0	12.5	119	10	9	6.0	11.0	109	4	15	6.0	12.0	61	32	11	3.5*	9.0*																				
01																					67	7	17	4.0	10.0	57	11	21	4.0*	8.5*	45	6	4	5.0*	9.0*	24	7	2	2.0	5.0
02	131	12	23	6.0*	11.0*	121	10	13	6.5	12.0	109	6	19	8.0	14.5	59	35	11	5.0*	12.0*																				
03																					63	8	15	5.0	10.0	54	11	21	4.0*	10.0*	39	11	7	3.0*	6.0*	24			1.0*	4.5*
04	129	16	11	6.5*	12.0*	118	12	13	7.0	12.0	104	9	16	6.0	9.0	60	6	11	7.0	13.0																				
05																					63	8	12	5.0*	10.5*	59	10	15	5.0*	9.0*	36	9	6	4.0	7.5	24	2	2	3.0*	6.0*
06	123	12	7	6.5*	12.0*	104	13	8	7.5	12.5	78	15	15	6.0*	12.0*	59	32	6	4.0*	8.0*																				
07																					45	7	10	2.0*	7.0*	47	11	8	5.0*	9.5*	39	10	10	5.0	10.5	26	2	2	3.0*	6.0*
08	124	11	11	9.0*	14.5*	102	10	8	5.5	10.0	75	20	8	8.0*	14.5*	59	18	6	4.0*	9.0*																				
09																					39	12	6	4.0*	7.5*	43	6	8	5.0*	9.0*	37	9	6	3.0*	6.0*	26	4	4	2.5*	5.0*
10	123	9	16	5.5*	10.5*	102	15	8	5.5	10.0	81	11	13	8.5	13.5	61	13	4	4.5*	10.0*																				
11																					41	6	10	4.0	7.5	37	7	8	8.5*	15.0*	35	10	12	7.0	13.5	26	6	3	4.5*	8.0*
12	123	11	14	9.5	14.0	101	19	6	4.0*	7.5*						56	29	5	6.0*	11.0*																				
13																					39	9	4	9.5*	16.0*	36	8	9			37	7	7	6.0*	11.0*	26	7	2	3.0*	6.0*
14	124	6	5	8.0*	13.0*	104	13	12	10.0*	17.5*	80	19	10	5.5*	10.0*	59	37	7	5.0*	10.0*																				
15																					41	15	8	4.5	10.0	42	9	8	5.0*	9.0*	39	8	4	5.0*	9.0*	30	6	4	4.5*	8.5*
16	136	4	16	8.0	13.5	104	14	19	3.5*	7.0*	77	28	10	13.0*	22.5*	59	13	9	4.5*	10.0*																				
17																					47	20	8	5.0*	9.0*	49	7	4	5.0*	10.5*	45	7	12	4.5*	8.0*	30	6	4	5.0*	9.0*
18	127	15	6	7.5*	12.5*	108	17	7	7.0	12.5	93	20	17	7.0	12.5	57	10	8	3.5*	7.5*																				
19																					65	7	8	4.0*	9.0*	59	9	7	4.0*	9.0*	47	8	4	4.0	7.5	28	8	6	3.5	7.0
20	130	14	11	10.0*	17.5*	114	13	6	5.5*	10.0*	100	16	9	5.5	11.0	62	10	6	4.0*	8.0*																				
21																					65	8	9	4.0	8.5	67	4	14	5.0*	10.0*	44	7	7	3.5	7.0	26	6	3	2.5	5.5
22	131	13	8	5.0	11.5	117	13	9	6.0*	11.0*	105	10	12	4.5	10.5	61	9	5	5.0*	9.0*																				
23																					63	10	9	4.0	9.0	61	10	5	4.5*	9.5*	45	5	9	4.5	8.5	24	4	2	1.5*	3.5*

F_{am} = median value of effective antenna noise in db above ktb
D_u = ratio of upper decile to median in db
D_ℓ = ratio of median to lower decile in db
V_{dm} = median deviation of average voltage in db below mean power
L_{dm} = median deviation of average logarithm in db below mean power

MONTH-HOUR VALUES OF RADIO NOISE

Station São José Lat. 23.3°S Long. 45.8°W Month May 19 67

Hour (LST)	Frequency (Mc)																																	
	051					113					246					545					25					50					100					200				
	Fam	Du	Dℓ	Vdm	Ldm	Fam	Du	Dℓ	Vdm	Ldm	Fam	Du	Dℓ	Vdm	Ldm	Fam	Du	Dℓ	Vdm	Ldm	Fam	Du	Dℓ	Vdm	Ldm	Fam	Du	Dℓ	Vdm	Ldm	Fam	Du	Dℓ	Vdm	Ldm
00						112			8.0	16.0	103			4.5	8.5	84			6.0	11.0	63	4	10	7.5	13.5	69	6	13	5.5	10.0	45	2	4	1.0	3.5	27			1.6	4.0
01	128			10.0	17.0	112			9.0	16.5	103			8.0	17.0	82			5.5	9.5	60	5	9	8.5	13.5	53	7	6	6.5	12.0	43	4	6	6.0	11.0	24			1.5	3.5
02	128			9.5	15.5	110			10.5	19.5	101			8.0	14.5	80			5.0	9.5	61	6	12	8.5	14.5	54	6	6	7.0	12.5	44	5	5	2.5	5.0	28			1.0	4.5
03	126			10.0	17.5	107			8.0	14.5	99			13.0	22.5	80			8.5	15.0	60			9.0	15.0	52	7	6			43	7	4	3.5	6.5	27			1.0	2.5
04	124			15.0	26.0	108			8.5	16.0	97			7.5	16.5	78			8.5	14.0	61	4	12	8.0	14.0	54	6	5	9.5	8.5	41	8	2			26				
05	122			12.0	21.0	106			10.5	18.5	95			11.5	19.5	80			11.5	20.0	59	8	12	10.5	19.0	52	22	5	7.0	12.5	37	6	2	6.0	11.0	26			3.0	6.0
06	124			14.0	24.5	102			13.0	22.5	84			5.0	9.0	88			5.0	9.5	59	8	10	10.5	17.5	62	15	11	11.5	18.0	39	8	6	3.0	6.0	25				
07	117					90			8.0	14.5	80			7.5	13.5	88			8.0	14.5	45					58	5	9	8.0	14.0	42	7	4	6.5	12.0	29				
08	117			5.5	9.5	90			5.0	9.8	81			6.0	11.0	89			7.0	13.5	45			5.0	9.5	49	6	5	8.0	13.0	39	6	6			31			4.5	8.5
09	115			6.0	11.0	96			10.0	17.5	81			10.5	18.5	84			3.5	6.5	45					44			10.5	17.5	39			2.5	5.0	31			5.0	9.5
10	118			6.5	13.0	96			7.0	12.0	82			5.5	12.0	90			5.5	10.0	48					42	8	6			39					31			3.0	6.0
11	116			8.5	15.0	98			8.0	16.0	85			12.0	21.0	90			6.0	10.5	47			8.5	15.0	39			13.0	20.0	37	8	6	6.5	12.0	28				
12	120			7.0	12.5	100			7.0	13.0	81			5.0	9.5	82			6.0	11.5	43			8.5	15.0	39	5	8			33	10	4	3.0	6.0	29			1.5	3.5
13	118			10.0	17.5	96			10.0	17.0	79			6.5	12.0	88			7.0	13.0	41			7.5	13.5	38	12	4			35	10	6	6.0	11.0	31	8	8	6.0	11.0
14	118			9.0	16.0	96			10.0	17.5	82			4.5	8.5	90					46			11.0	19.5	41			5.5	11.0	36	10	4	8.0	13.5	31	8	6	10.0	17.5
15	118			9.0	16.0	96			8.5	15.0	83			5.5	10.0	89			8.0	13.0	46			6.0	11.0	44	4	7	5.0	8.5	30	6	5			33				
16	119			9.0	11.5	105			10.5	17.0	88			9.0	15.0	89			11.5	18.5	45					52	6	10	9.5	17.5	41	6	4	8.5	15.0	31	10	6	7.0	12.5
17	119			9.0	15.0	98			9.0	15.0	85			12.0	21.0	90			6.0	11.0	47	20	4	12.0	21.0	57	8	15	7.0	12.5	46	6	6	6.5	12.0	29			4.0	7.5
18	120			6.0	11.0	104			9.0	16.0	93			7.5	12.5	89			6.0	11.0	55			7.0	12.5	57	5	6	8.0	14.5	45	7	4	7.0	12.0	31	8	4	1.5	3.5
19	120			9.0	14.5	107			7.5	14.0	97			8.0	14.0	88			5.0	9.5	61	6	11	2.5	5.0	60	9	12	8.0	14.5	47	4	7	6.5	12.0	31	6	6	3.5	6.5
20	120			9.5	17.0	108			7.5	13.0	95			10.5	18.5	92			5.5	9.5	59	8	8	5.0	8.5	60	8	10	9.0	16.5	45	7	4			29	6	2	6.0	11.0
21	120			9.6	15.0	110			7.5	12.5	99			9.5	17.0	93			5.0	10.0	61	6	9	7.0	12.5	64	7	7			45	8	6			29	5	2	4.5	8.5
22	126			10.0	16.0	112			7.0	12.0	99			7.5	13.0	92	8	6	8.0	13.0	61	5	10	6.0	11.0	64	9	8	8.0	14.0	47	7	7	2.5	5.0	29	3	4	3.0	6.0
23	124			9.0	14.5	108			7.0	12.5	103			8.5	15.0	92	6	10	4.0	8.0	61	6	7	11.5	20.0	66	7	7			45	6	4	4.0	7.5	28			3.0	6.0

F_{am} = median value of effective antenna noise in db above ktb
D_u = ratio of upper decile to median in db
D_ℓ = ratio of median to lower decile in db
V_{dm} = median deviation of average voltage in db below mean power
L_{dm} = median deviation of average logarithm in db below mean power

MONTH-HOUR VALUES OF RADIO NOISE

Station São José Lat. 23.3°S Long. 45.8°W Month June 19 67

Frequency (Mc)

Hour (LST)	.051 Fam	.051 Du	.051 Dℓ	.051 Vdm	.051 Ldm	.113 Fam	.113 Du	.113 Dℓ	.113 Vdm	.113 Ldm	.246 Fam	.246 Du	.246 Dℓ	.246 Vdm	.246 Ldm	.545 Fam	.545 Du	.545 Dℓ	.545 Vdm	.545 Ldm
00	124*			9.0*	16.0*	102*			7.0*	12.0*	90*			7.0*	12.5*	83*			6.5*	11.5*
01	126*			9.5*	16.0*	110*			9.0*	14.5*	94*			8.0*	14.5*	81*			5.5*	10.0*
02	126*			7.0*	12.5*	108*			10.5*	18.5*	93*			7.5*	13.5*	83*			3.5*	6.5*
03	127*			8.5*	14.0*	110*			9.0*	16.0*	94*			4.0*	7.5*	83*			3.5*	6.5*
04	126*			14.0*	24.5*	112*			9.0*	16.0*	93*			9.0*	14.5*	81*			2.0*	4.0*
05	126*			10.0*	17.5*	110*			11.0*	19.5*	92*			11.0*	17.0*	91*				
06	124*			9.5*	16.5*	102*			7.0*	12.5*	74*			10.5*	16.5*	93*			5.0*	9.0*
07	118*					99*			3.5*	6.5*	74*			4.5*	8.5*	91*			1.5*	3.5*
08	116*			9.0*	16.0*	94*			2.5*	5.0*	74*			8.0*	14.5*	93*				
09	116	7	8	6.0*	11.0*	102	9	12	2.0*	4.0*	76	14	4	12.0*	21.0*	92	2	5	7.0*	14.0*
10	117	9	7	12.0*	21.0*	100	9	12	9.0*	16.0*	78*					93*			4.0*	7.5*
11	116*			10.5*	17.0*	96*			7.0*	12.5*	76*			4.0*	7.5*	91*			7.0*	13.0*
12	117*			17.0*	29.5*	98*			14.0*	24.5*	73*			5.0*	9.5*	91*			7.0*	13.0*
13	116*			12.5*	22.0*	100*			15.5*	27.0*	76*			4.5*	8.5*	91*			6.0*	10.5*
14	120	10	10	10.0*	17.5*	102*			14.5*	25.0*	79*			5.0*	9.5*	91*			7.0*	15.0*
15	118*			9.5*	17.0*	99*			9.5*	17.0*	78*			11.0*	18.0*	91*				
16	118*			6.0*	11.0*	100*			9.5*	17.0*	76*			8.0*	14.5*	91*				
17	124	12	11	16.5*	28.5*	104	15	18	15.0*	26.0*	85	12	11	15.5*	27.0*	89	5	2		
18	124	11	10	13.0*	22.5*	108	16	19	12.0*	23.0*	89	13	10	10.5*	17.5*	88*				
19	128	7	11	8.5*	14.0*	110	8	19	8.0*	13.0*	92	11	10	7.5*	13.5*	88	6	5	6.0*	11.0*
20	128	12	10	9.5*	15.0*	111	14	16	8.0*	13.0*	92	21	7	10.5*	19.6*	91	8	3	3.5*	6.5*
21	126	12	10	7.0*	11.5*	110	12	14	11.5*	19.0*	92	22	8	8.0*	13.0*	93	12	4	4.0*	7.5*
22	126	10	8	10.0*	17.5*	110	12	18	9.0*	17.0*	94	18	8	9.5*	16.5*	95*			5.0*	9.0*
23	124	12	6	10.0*	15.5*	107*			8.0*	16.0*	94	22	8	6.5*	13.0*	91*			7.0*	13.5*

Hour (LST)	2.5 Fam	2.5 Du	2.5 Dℓ	2.5 Vdm	2.5 Ldm	5.0 Fam	5.0 Du	5.0 Dℓ	5.0 Vdm	5.0 Ldm	10.0 Fam	10.0 Du	10.0 Dℓ	10.0 Vdm	10.0 Ldm	20.0 Fam	20.0 Du	20.0 Dℓ	20.0 Vdm	20.0 Ldm
00	58*					69*					38*			1.5*	4.0*	24*			5.0*	8.5*
01	56*			8.5*	16.5*	52*			8.0*	17.0*	41*					24*			1.5*	3.0*
02	59*			5.0*	11.0*	51*			3.5*	6.5*	42*			2.0*	4.0*	22*			2.0*	4.0*
03	57*			7.0*	12.5*	51*			7.0*	13.0*	38*			2.5*	5.0*	24*				
04	57*			8.0*	14.0*	51*			4.0*	7.5*	35*			3.5*	6.5*	24*			1.5*	3.5*
05	60*			7.0*	16.0*	51*			5.0*	9.5*	32*			3.5*	6.5*	23*			0.5*	2.5*
06	59*			7.0*	11.0*	54*					38*			3.5*	6.5*	24*			3.0*	6.5*
07	51*			8.0*	14.5*	66*			4.0*	10.0*	40*			6.5*	12.5*	30*			6.0*	10.0*
08	52*			4.5*	8.5*	51*					39*			10.0*	19.5*	28*			4.5*	8.5*
09	48*			9.0*	15.0*	51*			5.0*	10.0*	38*			11.5*	20.0*	28*			5.0*	9.0*
10	44*			4.5*	10.0*	48*			6.0*	10.5*	36*			9.0*	16.0*	28*			8.0*	14.5*
11	46*			10.5*	18.5*	43*					34*					30*			7.0*	12.5*
12						43*			10.0*	16.0*	34*			8.5*	15.0*	32*			5.0*	9.0*
13						47*					35*			7.5*	13.5*	32*			4.0*	8.0*
14	48*			15.5*	10.0*	47*			4.0*	8.0*	36*			0.5*	2.5*	31*			4.0*	7.5*
15	46*					47*					38*			6.5*	11.5*	36*			9.5*	16.5*
16	46*			6.0*	11.0*	53*			7.5*	14.0*	40*			8.0*	14.5*	34*			8.0*	14.0*
17	52*			9.0*	12.0*	61*			7.0*	12.5*	42*					30*			7.5*	13.5*
18	54*			5.5*	10.0*	64*					44*			10.0*	17.5*	30*			4.0*	7.5*
19	67*			7.5*	13.0*	65*			8.0*	14.5*	42*			4.5*	10.5*	30*			4.5*	8.5*
20	58*			5.0*	9.5*	67*					44*			6.0*	11.0*	28*			4.0*	7.5*
21	60*			7.6*	14.0*	69*			7.0*	12.5*	44*			5.0*	11.0*	26*			2.0*	4.0*
22	59*			9.0*	15.0*	70*					42*			3.0*	6.0*	24*			2.0*	4.0*
23	60*			2.5*	5.0*	72*					43*			5.0*	9.0*	24*			3.5*	6.5*

F_{am} = median value of effective antenna noise in db above ktb
D_u = ratio of upper decile to median in db
D_ℓ = ratio of median to lower decile in db
V_{dm} = median deviation of average voltage in db below mean power
L_{dm} = median deviation of average logarithm in db below mean power

USCOMM-NBS-BL

RN-13

MONTH-HOUR VALUES OF RADIO NOISE

Station São José Lat. 23.3°S Long. 45.8°W Month July 19 67

Hour (LST)	Frequency (Mc)																																					
	0.51					1.13					2.46					3.45					2.5					5.0					10.0					20.0				
	Fam	Du	Dℓ	Vdm	Ldm	Fam	Du	Dℓ	Vdm	Ldm	Fam	Du	Dℓ	Vdm	Ldm	Fam	Du	Dℓ	Vdm	Ldm	Fam	Du	Dℓ	Vdm	Ldm	Fam	Du	Dℓ	Vdm	Ldm	Fam	Du	Dℓ	Vdm	Ldm	Fam	Du	Dℓ	Vdm	Ldm
00	122	14	14	6.5*	11.5*	113	9	13	4.0*	7.5*	92	12	8	2.5*	6.0*	78	9	20	4.0*	9.5*	55	13	7	5.0*	9.0*	73	7	14	8.0*	13.0*	40	4	6	3.0*	6.0*	25	7	4	2.5*	5.0*
01	118	21	9	7.5*	13.5*	114	9	14	3.5*	8.0*	96	9	12	5.0*	10.0*	76	12	14	4.5*	8.0*	57	18	9	5.0	9.5	55	11	9	4.0*	7.5*	40	6	6	2.5*	5.0*	25	9	4	2.0*	6.0*
02	122	17	14	5.5*	9.6*	114	9	11	4.0*	9.5*	96	8	12	2.5*	6.0*	76	12	12	3.5*	6.5*	55	18	8	5.5*	10.5*	55	11	10	7.5*	13.5*	40	6	6	4.0*	7.5*	25	10	4	2.0	5.0
03	132	16	13	6.6*	11.5*	115	7	15	5.0*	9.5*	96	9	14	4.0*	7.5*	74	15	13	4.0*	7.5*	55	19	9	7.0	12.5	57	8	12	5.0	9.0	39	8	6	7.0*	12.5*	25	10	4	3.5*	6.5*
04	123	18	13	6.5*	11.5*	111	2	14	6.0*	10.0*	91	13	11	4.0*	7.5*	74	14	12	2.5*	5.0*	56	17	8	8.0	13.5	53	11	9	6.0*	10.0*	34	10	2	3.5*	6.5*	25	12	4	2.5*	5.0*
05	125	11	16	6.5*	11.5*	113	10	27	6.0*	11.0*	92	13	18	3.5*	7.0*	82	8	22	2.6*	5.0*	55	24	7	6.5	12.0	55	15	9	6.5*	11.0*	34	8	4	3.0*	6.0*	25	12	4	4.5*	8.5*
06	119	20	16	7.5*	13.5*	110	7	23			80	14	16	10.5*	18.5*	82	8	22	3.0*	6.5*	59	18	14	6.0*	11.0*	65	12	17	5.0*	12.0*	38	5	4	5.0	9.5	27	7	6	4.0*	7.5*
07	113	19	17	10.5*	17.5*	95	14	10	7.5*	13.5*	70	18	3	6.5*	11.5*	80	8	22	4.0*	7.5*	47*			6.0	10.5	64	6	14	6.5*	11.0*	40	10	6	5.0	9.0	27	5	4	6.5*	11.5*
08	113	19	12	6.6*	10.5*	95	14	10	7.0*	12.0*	72	17	7	7.0*	12.5*	71	16	8			49*			6.5*	11.5*	56	5	7	8.0*	14.5*	34	14	2	8.0*	13.5*	27	2	5	4.0*	8.5*
09	112	15	12	5.5*	10.0*	97	12	11	9.0*	14.5*	72	14	5	4.0*	7.5*	78	10	19	7.0*	12.5*	46*			4.0*	7.5*	53	4	8	7.5*	13.2*	36	10	4	5.5	9.5	27	4	4	4.5*	8.5*
10	115	14	11	7.5*	12.5*	97	11	11			74	9	4	9.5*	17.0*	80	9	23	3.5*	6.5*	47*			5.0*	9.5*	49	4	8	6.0*	11.0*	34	8	4	6.5	11.5	29	2	5	4.0*	7.5*
11	111	16	9	2.5*	5.0*	96	10	7	5.0*	9.0*	72	8	3	3.5*	6.5*	79	10	19			43*			5.0*	9.0*	45	7	7	5.0*	9.5*	42	8	7	5.5	10.0	27	7	5	4.0*	7.5*
12	109	19	8	5.0*	9.0*	93	13	9	4.0*	7.5*	72	6	4	5.0*	9.0*	81	6	20	4.5*	8.5*	47*			3.0*	6.0*	43	3	5	6.0*	10.0*	30	7	6	6.0*	10.0*	29	6	3	7.0*	12.5*
13	110	16	11			95	11	10	9.0*	12.0*	73	5	4	7.0*	12.5*	82	8	17			43*			2.5*	5.0*	49	5	9	7.0*	12.5*	32	2	6	3.5*	8.0*	29	7	4	6.5*	11.5*
14	115	10	11	6.0*	11.0*	93	10	5	8.5*	15.0*	72	7	3	8.0*	14.5*	82	8	24	4.0*	8.0*	52*			2.0*	4.0*	43	7	7	5.5*	11.0*	34	7	9	4.0*	7.5*	31	8	6	12.5*	20.0*
15	112	16	9	5.0*	9.0*	97	9	10	7.5*	13.5*	72	6	3	10.0*	16.0*	84	6	24			47*			2.0*	4.0*	51	7	12			36	8	6	7.0*	12.5*	31	11	7	4.0*	8.0*
16	109	16	10	5.5*	10.0*	101	2	16			74	5	4	6.5*	12.0*	82	9	26	3.5*	8.0*	49*			6.0*	10.0*	52	12	7			40	7	7	5.0*	9.5*	35	9	8	7.0*	12.5*
17	110	20	12			98	7	8	9.0	16.0	78	6	6	7.0*	12.5*	82	6	26			53	20	6	7.5*	13.5*	39	6	20	5.0*	9.0*	42	8	4	6.0*	10.0*	29	6	5	4.5*	7.5*
18	117	14	13	10.0*	17.5*	99	14	10	7.0*	12.5*	81	10	10	6.5*	12.0*	78	11	22			53	14	9	3.5	6.5	71	6	19	8.0*	14.0*	44	5	7	4.0*	7.5*	31	4	6	3.5*	6.0
19	117	17	10	6.0*	11.0*	103	15	10	5.0*	9.5*	82	11	6	6.0*	11.0*	88	6	27	2.5*	5.0*	54	8	8	5.0*	9.5*	71	8	15	7.5*	13.5*	44	6	7	5.5	10.0	31	4	4	4.0	9.5
20	115	14	11	7.0*	12.5*	101	13	6	8.0*	13.5*	84	16	7	7.5*	13.5*	86	5	17	4.5*	8.5*	54	19	7	5.0*	9.5*	73	7	6	6.5*	11.0*	44	5	5	3.0*	6.5*	29	6	4	4.0	9.5
21	117	18	3	9.0*	16.0*	105	11	10	6.0*	10.0*	86	9	6	6.5*	11.5*	88	4	25			56	11	9	4.5*	8.5*	73	9	15	6.5*	12.0*	44	5	4	5.5*	10.0*	27	4	4	2.5	5.5
22	117	15	14	6.0*	10.0*	105	12	9	6.5*	11.5*	88	11	6	5.0*	9.0*	88	5	18			53	19	6	3.5*	6.5*	75	8	10	5.0*	9.0*	42	4	4	4.0*	7.5*	27	5	6	3.5*	6.5
23	117	18	9	6.0*	10.0*	103	15	6	4.5*	8.5*	90	11	6	6.5*	12.0*	78	10	10	4.0*	7.5*	55	13	9	5.5*	10.0*	73	2	10	4.0*	8.0*	40	6	2	6.5*	11.5*	25	4	4	2.5*	5.0*

F_{am} = median value of effective antenna noise in db above ktb
D_u = ratio of upper decile to median in db
D_ℓ = ratio of median to lower decile in db
V_{dm} = median deviation of average voltage in db below mean power
L_{dm} = median deviation of average logarithm in db below mean power

MONTH-HOUR VALUES OF RADIO NOISE

Station São José Lat. 23, 3°S Long. 45, 8°W Month August 19 67

Hour (LST)	Frequency (Mc)																																					
	051					113					246					545					25					50					100					200				
	Fam	Du	Dℓ	Vdm	Ldm	Fam	Du	Dℓ	Vdm	Ldm	Fam	Du	Dℓ	Vdm	Ldm	Fam	Du	Dℓ	Vdm	Ldm	Fam	Du	Dℓ	Vdm	Ldm	Fam	Du	Dℓ	Vdm	Ldm	Fam	Du	Dℓ	Vdm	Ldm	Fam	Du	Dℓ	Vdm	Ldm
00	131	8	16	8.5	15.0	117	10	15	5.0	9.5	102	12	14	7.0	12.5	87	9	10	5.0	9.5	57	18	11	6.5	11.0	66	20	18			44	7	14	4.5	8.5	25	4	4	4.0	7.5
01	129	9	13	7.0	12.5	117	10	16	6.0	11.0	104	10	18	5.0	8.5	88	9	11	4.5	8.5	58	14	14	4.5	8.5	56	17	12	6.0	11.5	42	12	9	3.5	6.5	25	3	5	3.5	6.5
02	129	11	13	7.0	12.5	118	11	16	6.0	11.0	107	8	18	6.0	11.0	89	8	12	4.0	7.5	60	16	14	3.5	6.5	55	19	11	4.0	7.5	46	8	14	2.5	5.0	25	3	4	2.0	4.0
03	133	7	14	7.0	12.5	117	14	16	5.5	10.0	104	12	19	6.0	11.0	89	8	13	4.0	7.5	60	14	12	4.0	7.5	54	22	5	8.5	14.5	44	6	8	7.0	12.5	23	4	2	2.5	5.0
04	132	9	15	7.5	13.5	119	11	20	5.0	8.5	102	12	19	6.0	11.0	87	10	14	4.5	8.5	65	12	13	3.5	6.5	55	17	9	4.5	8.0	38	10	8	5.0	9.0	25	3	4	2.0	4.0
05	128	14	8	11.0	19.5	115	13	17	5.5	10.0	102	12	20	6.0	11.0	89	7	10	4.0	7.5	65	10	12	7.0	12.5	56	13	10	4.5	8.5	38	9	7	4.0	7.5	23	5	2	2.0	4.0
06	128	12	12	9.0	16.0	107	21	15	5.0	9.5	92	21	21	5.0	9.5	91	6	4	5.0	10.0	63	12	16	3.0	6.0	66	19	14	5.5	10.0	45	7	8	5.5	10.0	25	4	4	3.5	6.5
07	118	14	8	6.0	10.5	98	14	11	3.5	6.5	78	17	7	6.0	11.0	89	2	3	5.5	11.0	56	10	12	8.0	14.5	60	16	9	5.0	9.5	46	6	8	5.0	9.0	27	6	4	3.0	6.0
08	120	14	10	6.0	10.0	102	13	15	6.0	11.0	86	11	14	7.0	12.5	89	8	6			52	10	8	6.0	11.0	52	12	7	4.5	8.5	44	9	6	8.0	14.5	28	7	3	2.5	5.0
09	120	7	13	5.5	10.0	97	15	6	5.0	9.5	84	9	13	7.5	13.5	87	7	5			50	4	5	8.5	15.0	46	17	9	6.0	12.0	40	9	7	6.0	11.0	28	3	5	5.0	9.0
10	118	14	12	5.5	10.0	103	11	12	5.5	10.0	82	9	7	5.0	9.0	91	9	12	3.5	6.5	46	9	2	4.0	7.5	44	13	8	6.5	11.5	42	5	5	3.0	6.0	27	6	2	6.5	11.5
11	119	15	18	5.5	10.0	97	14	6	6.0	11.0	84	8	13	7.5	13.6	89	5	8	5.5	9.5	45	7	4	4.5	8.0	42	13	6	6.0	11.0	38	9	7	5.5	10.0	27	5	3	3.0	6.0
12	116	14	6	7.5	13.5	101	10	12	1.5	3.5	78	14	6	6.5	11.0	87	6	6	5.0	10.0	44	11	2	7.5	13.5	40	10	5	7.0	12.5	38	6	9	6.0	11.0	27	5	3	5.0	9.0
13	118	8	10	4.5	8.5	98	12	9	7.0	12.5	82	8	8	8.0	14.0	89	6	8	5.0	9.5	43	9	3	3.5	6.5	40	11	4	15.5	26.0	38	3	6	3.5	6.6	27	9	4	5.0	9.0
14	122	4	12	3.5	6.5	97	14	8	6.5	12.0	81	7	7	7.5	13.5	91	5	6	5.5	10.0	44	10	3	2.5	5.0	40	12	3	5.0	9.5	39	6	6	6.0	11.0	31	5	9	4.0	7.5
15	117	9	7	6.5	12.0	99	11	9	8.0	14.5	80	7	10	9.0	16.0	89	10	4	2.0	4.6	44	9	6	5.0	9.0	44	9	6	6.0	10.0	40	6	8	2.5	5.0	31	5	6		—
16	116	15	6	3.0	6.0	99	9	10	3.0	6.0	97	10	8	6.5	12.0	89	7	9	6.0	11.0	46	13	5	6.0	10.0	46	11	8	6.0	11.0	42	4	8	9.5	17.0	31	7	9	3.0	6.0
17	121	6	9	7.5	13.5	100	11	7	7.0	12.5	78	18	5	9.5	15.0	87	8	7	5.5	10.0	52	7	7	5.0	9.5	55	14	13	1.0	3.5	45	3	12	4.0	7.5	29	4	4	3.5	6.5
18	120	7	12	13.0	22.5	102	14	15	6.0	10.0	84	16	11	7.0	12.5	86	6	5	4.5	8.5	56	6	6	5.5	10.0	62	6	13	8.5	14.5	48	6	13	7.0	12.5	30	4	7	4.0	7.5
19	123	9	12	7.0	12.5	109	10	14	5.0	9.0	92	11	14	8.0	14.5	85	10	7	4.5	8.0	61	9	10	5.0	9.5	62	20	12	3.0	6.0	48	6	18	5.5	10.0	31	4	5	3.0	6.0
20	122	12	8	7.0	12.5	109	11	11	5.0	9.0	94	12	13	6.0	11.0	89	7	4	5.5	10.0	64	8	16	4.5	8.0	64	23	12	5.5	10.0	49	5	14	7.0	12.5	30	6	5	3.0	6.0
21	124	11	9	8.5	15.0	111	11	12	8.0	14.5	94	13	10	6.0	10.5	93	5	7	3.0	6.0	58	17	9	5.5	10.0	64	25	9	7.0	13.0	48	6	18	5.0	9.5	27	6	2	2.5	5.0
22	126	11	11	7.5	15.0	114	11	13	5.0	9.0	100	11	14	6.0	11.0	93	4	4	5.0	8.5	62	17	9	7.0	12.5	64	22	12	5.0	9.0	44	6	14	4.5	8.5	27	6	5	2.5	5.0
23	126	10	11	8.0	14.5	118	7	17	6.5	11.5	100	14	12	5.0	9.0	90	7	7	5.0	9.0	56	20	13	6.0	11.0	62	11	13			46	7	8	5.5	10.0	27	6	3	3.5	6.5

F_{am} = median value of effective antenna noise in db above ktb
D_u = ratio of upper decile to median in db
D_ℓ = ratio of median to lower decile in db
V_{dm} = median deviation of average voltage in db below mean power
L_{dm} = median deviation of average logarithm in db below mean power

RN-13

MONTH-HOUR VALUES OF RADIO NOISE

Station São José Lat. 23.3°S Long. 45.8°W Month October 19 67

Frequency (Mc)

Hour (LST)	.051 F_{am}	.051 D_u	.051 D_ℓ	.051 V_{dm}	.051 L_{dm}	.113 F_{am}	.113 D_u	.113 D_ℓ	.113 V_{dm}	.113 L_{dm}
00	139	8	14	8.0*	°14.5*	124	5	13	6.0*	°11.0*
01	139	8	14	6.5	11.0	123	9	13	6.5	11.0
02	138	12	14	6.0*	°11.0*	124	7	12	7.0	°12.5
03	137	12	21	7.0*	°12.5*	123	9	13	3.0*	°6.0*
04	137	11	21	7.0	°12.5	120	11	10	7.0*	°12.5*
05	137	11	23	6.5	°12.0	119	9	12	8.0*	13.0*
06	131	10	16	7.5*	12.5*	106	9	5	4.0*	8.0*
07	127	12	19	6.0*	10.0*	103	13	10	4.0*	°7.5*
08	130	4	24	5.0*	°9.5*	105	13	9	5.0	°9.5
09	125	10	16	7.5*	°13.5*	102	13	9	4.0*	7.5*
10	127	9	18	6.0*	°11.0*	102	13	12	5.0*	°9.5*
11	126	10	20	8.0*	°14.5*	104	14	12	7.0*	12.5*
12	129	8	15	7.0*	12.0*	106	13	10	10.0*	16.5*
13	129	12	14	6.5*	°12.0*	113	11	16	6.0*	°11.0*
14	127	22	9	6.0*	°11.0*	118	15	16	8.0*	°14.5*
15	136	16	12	9.0*	°16.0*	121	17	20	8.5*	°15.5*
16	138	14	18	6.0*	10.0*	120	18	16	2.5*	°5.0*
17	139	13	23	7.0*	11.5*	116	17	15	12.0*	18.5*
18	139	16	16	6.5*	°11.5*	120	20	18	8.0	°14.5
19	139	12	17	7.0	°12.5	122	14	13	6.5*	°11.5*
20	138	10	13	6.0*	°11.5*	121	9	8	7.5*	°13.5*
21	136	10	11	6.0	10.0	122	8	10	5.0*	9.0*
22	141	6	18	5.5*	°10.0*	123	6	10	7.0	°12.5
23	141	5	15	7.0*	°12.5*	122	6	11	6.0	10.0

Hour (LST)	.246 F_{am}	.246 D_u	.246 D_ℓ	.246 V_{dm}	.246 L_{dm}	.545 F_{am}	.545 D_u	.545 D_ℓ	.545 V_{dm}	.545 L_{dm}
00	114	12	10	6.5	11.5	100	13	10	5.0*	°9.5*
01	114	9	8	5.0*	°9.5*	99	10	10	6.5*	°11.5*
02	112	12	12	4.5*	°8.5*	98	12	8	5.0	10.0
03	110	14	7	4.5*	°8.5*	97	12	10	5.0*	°9.5*
04	112	10	12	4.0*	7.5*	97	10	11	4.5*	10.0*
05	102	18	6	3.5*	6.5*	88	12	12	2.5*	6.0*
06	89	10	7	4.5*	9.5*	92	11	7	5.0*	°9.5*
07	86	15	4	4.5*	°8.5*	96	7	12		
08	88	11	5	4.0*	°7.5*	96	7	8	6.0*	°11.0*
09	89	9	7	8.0*	13.0*	95	9	13		
10	88	12	6	6.5*	°10.0*	93	12	8	6.5*	11.0*
11	89	11	7	14.0*	°24.5*	94	8	6	3.5*	11.5*
12	92	17	9	9.5*	15.0*	92	12	8	12.0*	°23.0*
13	99	18	14	8.5*	°15.0*	98	5	12		
14	102	26	20	13.0*	°23.0*	100	12	8	7.0*	14.0*
15	102	25	15			100	15	10	6.5*	13.0*
16	106	25	21	8.0*	°14.5*	100	18	11	4.5*	12.0*
17	106	28	20	10.5*	°18.5*	101	19	12	8.0*	13.5*
18	108	22	16	5.0*	°9.5*	97	17	11	5.5*	10.0*
19	110	14	10	6.0	10.0	98	11	9	3.5*	7.0*
20	112	6	8	5.0	°9.5	101	6	7	4.5*	°8.5*
21	110	19	7	6.0	10.0	102	7	8	4.0*	8.0*
22	112	7	7	7.5*	°13.5*	104	6	8	4.0*	°9.5*
23	113	8	8	6.0*	10.0*	102	6	6	3.0*	°6.5*

Hour (LST)	2.5 F_{am}	2.5 D_u	2.5 D_ℓ	2.5 V_{dm}	2.5 L_{dm}	5.0 F_{am}	5.0 D_u	5.0 D_ℓ	5.0 V_{dm}	5.0 L_{dm}
00	68	10	4	4.5*	8.0*	76	11	8	4.5*	°8.5*
01	69	9	9	6.5*	11.0*	70	14	10	7.0*	10.5*
02	68	6	8	8.0*	°14.5*	65	9	13	7.5*	13.0*
03	68	8	8	7.0*	14.0*	63	9	10	7.5*	13.5*
04	68	6	7	9.5*	17.0*	64	7	7	8.5*	°15.0*
05	66	10	7	4.0*	°7.5*	66	20	8	6.0*	10.5*
06	66	5	11	5.0*	°9.5*	68	10	7	5.0*	11.5*
07	56	9	9	5.0*	°9.5*	60	10	8	4.0*	8.0*
08	48*			5.0*	9.0*	54	6	9	4.0*	°7.5*
09	46	8	2	7.5*	15.5*	50	5	12	3.5*	°6.5*
10	46	12	3	3.5*	6.5*	46	7	9	4.0*	8.5*
11	46	10	4	3.0*	6.0*	41	9	5	5.0*	°9.5*
12	46	9	3	3.5*	°6.5*	42	7	6	7.5*	12.5*
13	48	18	6	2.0*	5.0*	46	9	9	6.0	°11.0
14	51	23	7	11.5*	20.0*	48	11	11	5.0*	10.5*
15	59	19	15	6.5*	13.0*	50	15	10	8.5*	16.5*
16	56	24	10	5.0*	9.0*	57	6	11	9.5*	16.5*
17	58	24	7	6.0*	10.0*	64	8	12	2.0*	6.0*
18	66	20	12	5.5	°10.5	70	10	11	4.5*	8.5*
19	68	14	6	5.0	°9.5	74	6	10	4.0*	8.0*
20	70	10	4	3.5*	6.5*	72	12	6	3.0	7.0
21	70	9	2	7.0*	12.0*	76	6	6	2.5*	6.0*
22	70	8	4	4.0*	7.5*	74	9	5	5.0*	10.0*
23	68	10	8	6.0*	°11.0*	72	16	5	4.5*	°8.5*

Hour (LST)	10.0 F_{am}	10.0 D_u	10.0 D_ℓ	10.0 V_{dm}	10.0 L_{dm}	20.0 F_{am}	20.0 D_u	20.0 D_ℓ	20.0 V_{dm}	20.0 L_{dm}
00	58	4	22	5.5*	°10.0*	32	11	6	6.0*	°11.0*
01	58	4	22	3.0*	6.0*	30	22	2	4.0*	°7.5*
02	58	5	24	4.0*	°7.5*	32	22	6	4.5	°8.5
03	58	5	6	5.0*	°9.5*	30	30	8	5.5*	°10.0*
04	52	11	15	4.5*	8.0*	28	27	6	4.0*	°7.5*
05	54	5	14	4.0*	°7.5*	26	23	4	5.0	9.0
06	56	8	22	3.5*	8.5*	28	21	5	4.5*	9.0*
07	52	8	13	4.0*	7.5*	32	13	4	4.0*	8.0*
08	46	14	15	7.0*	11.5*	32	12	6	8.5*	°15.0*
09	46	7	9	5.0*	°9.5*	28	13	4	5.0*	°9.5*
10	44	6	6	3.5*	7.0*	29	7	5	3.0*	°6.0*
11	42	6	7	4.0*	8.5*	28	6	4	3.0*	6.0*
12	44	6	9	6.5*	12.0*	30	10	6	6.0*	°11.0*
13	46	5	6	3.0*	7.0*	32	4	6	6.5*	11.0*
14	48	10	6	4.5*	8.0*	32	11	3	5.5	10.0
15	52	6	8	5.0*	10.0*	34	9	3	5.0*	9.0*
16	52	8	4	9.0*	15.0*	36	12	5	5.0*	°9.5*
17	58	10	4	3.5*	°6.5*	34	16	2	3.0*	°6.0*
18	59	6	3	4.0	7.5	34	16	5	4.5	10.0
19	58	14	4	5.0*	°9.5*	32	11	6	5.0*	°9.5*
20	58	2	6	3.5*	7.0*	31	9	4	2.0*	4.5*
21	57	4	22	2.5*	6.0*	30	5	3	3.0	°6.0
22	58	4	4	2.0*	5.0*	30	6	2	6.0*	°11.0*
23	58	5	5	3.5	°6.5	32	4	6	3.5*	7.5*

F_{am} = median value of effective antenna noise in db above ktb
D_u = ratio of upper decile to median in db
D_ℓ = ratio of median to lower decile in db
V_{dm} = median deviation of average voltage in db below mean power
L_{dm} = median deviation of average logarithm in db below mean power

RN-13

MONTH-HOUR VALUES OF RADIO NOISE

Station São José Lat. 23.3°S Long. 45.8°W Month November 19 67

Hour (LST)	Frequency (Mc)																																					
	0.51					1.13					2.16					5.45					9.5					60					120					200				
	Fam	Du	Dℓ	Vdm	Ldm	Fam	Du	Dℓ	Vdm	Ldm	Fam	Du	Dℓ	Vdm	Ldm	Fam	Du	Dℓ	Vdm	Ldm	Fam	Du	Dℓ	Vdm	Ldm	Fam	Du	Dℓ	Vdm	Ldm	Fam	Du	Dℓ	Vdm	Ldm	Fam	Du	Dℓ	Vdm	Ldm
00	131	6	6	9.5	16.0	118	9	8	12.0	21.0	104	7	11	10.0	16.0	85	14	9	7.5	13.5	66			5	13.5	62	10	7	9.5	17.0	50			6.0	11.0	33			7.5	13.5
01	130	7	3	12.5	21.5	114	5	10	10.0	17.5	103	7	11	10.0	15.5	86	12	11	9.0	16.0	64	16	5	9.0	14.5	57	4	6	9.5	17.0	50			8.0	15.5	32			5.0	9.5
02	129	7	6	12.0	21.0	112	8	8	9.5	18.0	100	11	12	12.0	21.0	84	14	10	10.0	17.5	63			7.0	11.5	57	4	4	11.0	19.5	50	4	6	4.0	7.5	33			3.0	8.5
03	129	6	8	14.0	24.5	111	8	11	10.5	18.5	98	10	9	11.5	20.0	83	13	8	8.0	14.5	62			11.0	19.5	55	6	4			49			9.0	16.0	33			7.0	12.5
04	127	7	11	13.0	22.5	109	4	12	12.0	21.0	96	10	7	9.5	16.0	79	14	6	10.0	17.5	62			9.0	16.0	57			8.5	15.0	50			7.5	13.5	34			6.0	11.0
05	123	9	8	10.0	16.5	95	16	8			94			6.0	10.0	88	8	8	9.0	16.0	61			10.5	19.0	57	13	8	9.5	17.0	46			5.5	10.5	31			5.0	9.5
06	120	7	13	7.0	12.0	99			10.0	16.5	86			10.5	17.5	84	14	6			51			6.0	13.0	55					44			7.0	12.0	29			6.5	11.0
07	117	4	10			97			8.0	14.5	84			10.0	17.5	90			4.0	8.5	47			3.5	7.0	52			8.0	16.5	40			5.0	10.0	38			7.5	12.0
08	117			5.0	9.5	92			6.0	11.0	87			7.5	12.0	86					52			3.0	6.0	49			7.5	13.5	38			7.0	11.5	33			5.0	9.0
09	115			6.5	11.0	93			4.0	7.5	83			6.5	11.5	88			8.5	15.0	44			4.5	9.0	43			4.5	10.5	37			5.0	9.5	28			6.0	11.0
10	117			6.5	11.0	94			6.0	11.0	87			9.0	16.0	88			7.0	16.0	59			3.0	6.0	37			10.0	17.5	36					27			5.5	10.0
11	119			7.5	13.5	101			6.0	10.0	84			11.0	19.5	86	12	4			51			3.0	6.0	43			6.5	12.0	36					29			6.5	12.0
12	123	14	16	8.5	16.0	102			9.0	16.0	88			5.5	10.0	90			18.0	42.0	52			4.5	9.5	49			5.5	11.5	37					38			9.0	16.0
13	128			9.0	16.0	105	26	16	8.5	16.0	93	29	8	7.5	13.5	91	19	4	6.5	15.5	61					57					45			8.5	15.0	33			6.0	11.0
14	131	18	9	9.0	15.0	111	25	10	9.0	16.0	106			11.5	20.0	90			12.0	21.0	59			7.5	14.0	45					44			9.0	12.5	35			5.0	9.5
15	138			8.5	14.0	115			5.0	9.5	106			9.5	18.0	96	11	9	10.0	17.5	58			11.0	18.0	51			5.5	10.0	44			5.0	9.5	31			6.0	10.0
16	134	13	5	7.0	11.5	119	10	15	8.5	15.0	106	8	19	10.5	17.0	94	10	11	5.5	13.0	68			8.0	16.0	53					30			6.0	11.0	33			5.5	10.0
17	135	7	6	8.5	17.0	113	11	7	8.0	14.0	98	12	12	11.0	19.5	90	7	6	6.0	11.0	60			4.5	8.5	58			6.0	11.0	52			6.0	11.0	33	6	6	8.0	14.5
18	137	2	7	9.5	17.0	113	13	6	9.0	14.5	100	16	11	9.0	15.0	88	13	7	6.5	13.5	64					63			3.5	9.0	51			5.0	9.5	33			5.0	9.5
19	133	9	7	7.5	14.5	114	14	4	8.5	14.0	103	16	7	9.0	14.5	89	15	3	4.5	8.0	68			5.0	9.0	67					51			7.5	12.5	29			6.5	12.0
20	133	9	7	7.5	13.5	117	9	5	7.0	12.0	104	6	6	6.0	12.0	94	11	7	5.5	9.5	68	18	4	4.0	8.0	70	5	14	5.0	9.5	50	5	6	2.0	6.5	33			9.0	15.0
21	133	8	6	6.5	11.0	115	9	6	8.5	15.0	104	8	7	6.0	11.5	98	8	9	10.5	18.5	68			7.0	12.5	73			8.0	14.5	50	6	6	4.5	9.0	35			3.5	7.5
22	133	7	8	10.0	17.5	116	9	7	10.0	17.5	103	11	7	9.0	16.0	92	11	5	6.0	11.0	66			8.0	14.5	76			2.0	6.5	46	6	2	8.0	14.5	35			5.5	10.0
23	130	7	5	10.0	17.5	115	9	10	10.0	17.5	102	12	9	10.5	18.5	88	13	12	10.0	17.5	67			8.5	14.5	73					50			8.0	14.5	31			5.5	10.0

F_{am} = median value of effective antenna noise in db above ktb
D_u = ratio of upper decile to median in db
D_ℓ = ratio of median to lower decile in db
V_{dm} = median deviation of average voltage in db below mean power
L_{dm} = median deviation of average logarithm in db below mean power

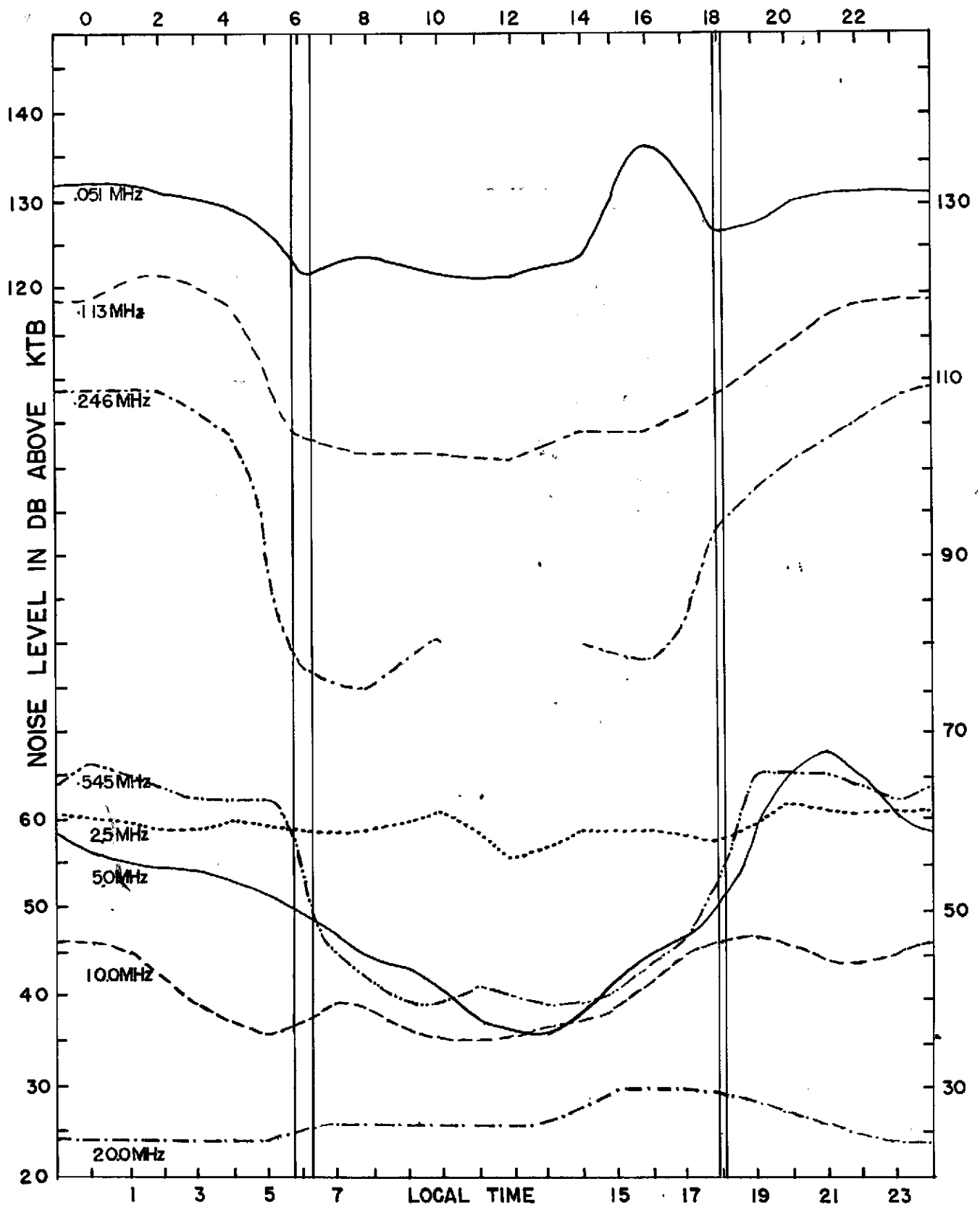
MONTH-HOUR VALUES OF RADIO NOISE

Station São José Lat. 23.3°S Long. 45.8°W Month December 19 67

Frequency (Mc)

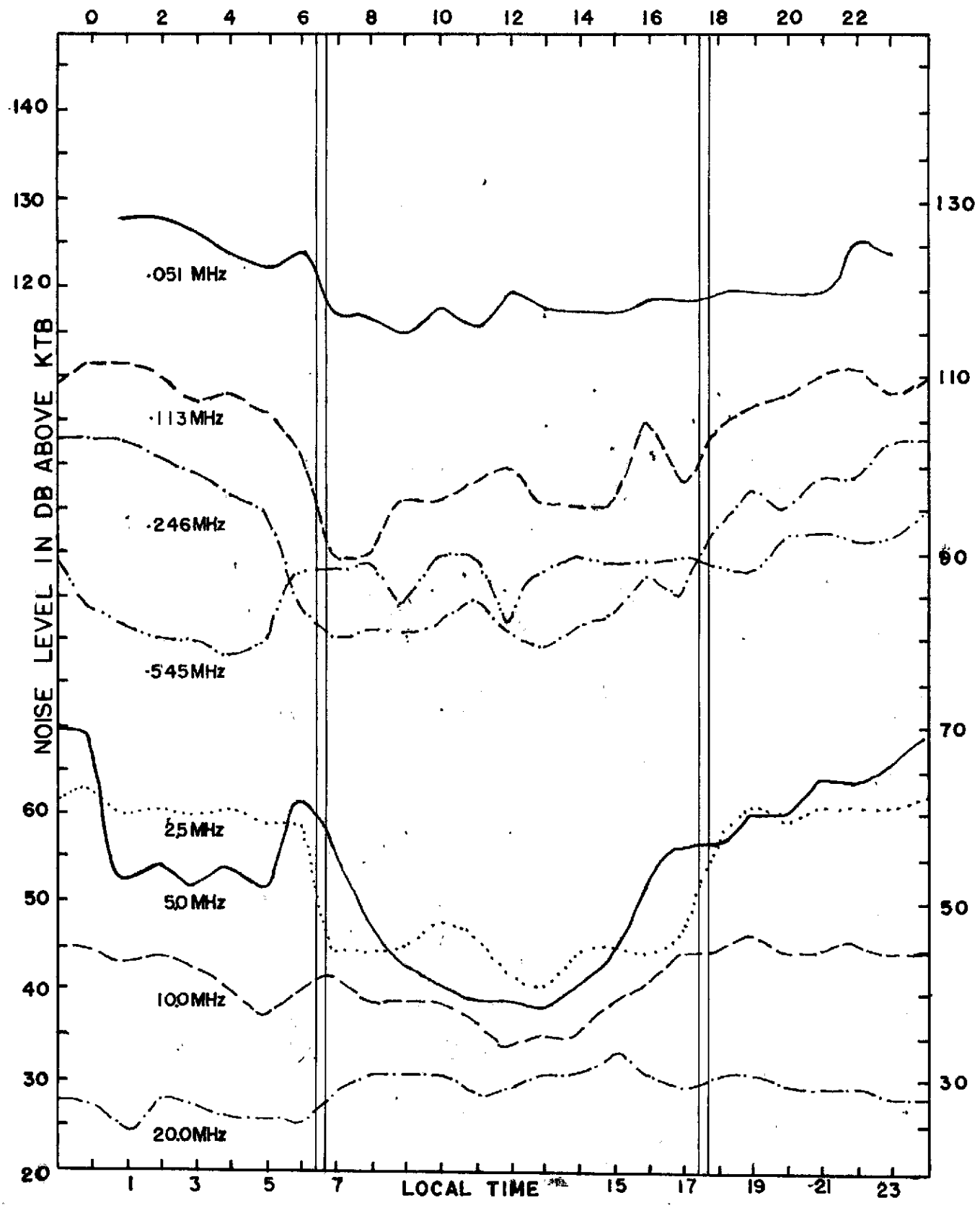
Hour (LST)	0.51					1.13					2.46					5.46					25					50					100					200				
	Fam	Du	Dℓ	Vdm	Ldm	Fam	Du	Dℓ	Vdm	Ldm	Fam	Du	Dℓ	Vdm	Ldm	Fam	Du	Dℓ	Vdm	Ldm	Fam	Du	Dℓ	Vdm	Ldm	Fam	Du	Dℓ	Vdm	Ldm	Fam	Du	Dℓ	Vdm	Ldm	Fam	Du	Dℓ	Vdm	Ldm
00	130					110			140	245	97					91			10.5	18.5	65			11.0	19.5	58			45	8.5	53			5.0	9.0	38			6.0	11.0
01	128			13.0	22.5	116					95			12.0	21.0	93			9.5	17.0	64			9.5	17.0	58			6.0	11.0	55			5.0	9.0	38			10.5	18.5
02	126			16.0	27.5	116			11.5	20.0	94			9.0	16.0	90					63			12.0	21.0	57			15.0	26.0	53					36			7.5	13.5
03	126			15.5	27.0	118			8.0	14.5	91			12.0	21.0	90			15.5	22.0	61	6	6	11.0	19.5	55	5	2	10.5	18.5	51					39			13.0	22.5
04	126			13.0	22.5	116			8.5	15.0	91			11.0	17.0	93			6.5	11.5	57			13.5	23.5	67			10.0	17.5	49			5.0	9.0	34			5.0	7.5
05	120			13.5	23.5	102			7.0	12.5	79			8.5	15.0	94			4.5	8.5	55			6.5	11.5	55	10	10	8.0	14.5	50			5.0	9.5	36			8.0	14.5
06	116			12.0	21.0	109			5.5	10.0	77			8.0	14.5	92			7.0	12.5	51			7.5	12.5	54			9.0	14.5	48			9.0	12.0	37			8.5	6.5
07	114			7.0	12.5	102			4.5	8.5	79			8.0	14.5	94			5.0	9.0	47			4.0	7.5	53			7.0	12.5	45					36			10.0	17.5
08	115			8.0	14.5	108					77					94			2.5	10.0	45			4.0	7.5	48			9.0	15.0	41			5.5	11.5	35			4.0	8.0
09	116			12.5	21.5	104			4.0	7.5	79			13.0	22.5	98	6	4	5.0	9.0	47			6.0	11.0	39			14.0	24.5	45			7.0	11.5	36			9.0	14.5
10	118	6	8	6.0	11.0	107	5	10			81					92	7	4	13.0	22.5	49			2.0	4.0	39			6.5	10.0	41			2.0	6.5	34			4.5	8.5
11	122	5	8	13.5	23.5	106	20	13	6.5	11.5	81					97	5	7	10.0	16.5	43					39			7.0	12.5	41			7.0	12.5	34				
12	126	10	10	9.0	16.0	114	27	12	13.0	22.5	90	29	13	10.0	16.5	100	12	5	9.5	17.0	45			4.5	8.5	45			2.0	5.0	46			9.0	16.0	36			8.0	14.5
13	131	16	16	9.5	17.0	119	23	16			95	30	18	7.5	13.5	102	12	7	3.5	6.5	61			9.0	18.0	47			2.5	9.0	41	19	2			34			6.5	11.0
14	133	19	6	9.0	16.0	122	29	12	6.0	11.0	93	33	14	9.5	16.5	104	10	10	14.0	24.5	51			2.5	5.0	47			7.5	12.5	48	17	7	5.0	9.0	41			2.5	10.5
15	134	20	6	12.0	21.0	125					109			18.0	20.0	102	12	8			51			6.0	13.0	61			4.5	8.5	49			7.0	14.0	40			4.5	9.0
16	136	16	7	12.0	21.0	126	17	13	10.0	16.5	95	22	13	12.5	22.0	98	12	8	6.5	11.5	53			3.6	7.5	55	12	9			65	3	8	2.5	9.5	38	8	4	3.0	6.0
17	133	13	6	9.0	14.5	122	19	16	9.5	15.0	91	23	12	8.5	14.5	96	3	10	3.0	6.0	67	10	10	1.0	6.0	58	10	4	5.0	10.5	56	4	8	10.0	17.5	38	9	4	5.5	10.0
18	130	12	5	9.5	17.0	124	11	19	11.0	20.5	98	19	13	3.5	6.5	96	9	10	3.0	7.5	61			6.0	11.0	68	6	7	5.0	10.0	56	8	10	6.0	11.0	40			6.0	11.0
19	133	8	8	9.5	17.0	124	9	9	8.5	14.0	101	15	11	8.0	13.0	100	7	7	3.0	6.5	65	5	6	3.0	7.0	67	8	6			57	7	9	6.0	11.0	36	10	2	6.0	11.0
20	135	6	9	6.5	11.0	122	11	8	9.0	16.0	99	14	2	9.0	16.0	102	4	6	3.5	6.5	67	9	6	9.0	12.5	72	5	11	9.0	16.0	62	8	9	5.0	9.5	40	5	6	5.0	12.0
21	133	10	9			121	14	9			99	14	9	12.5	22.0	100	6	3			67	8	8	5.0	9.0	69	9	6			54	5	8	8.0	14.5	38	12	4	17.0	29.5
22	133	7	11	12.0	21.0	122	18	6	11.0	19.0	99	10	8	15.0	26.0	96	5	9			67	10	5	7.0	12.5						53	8	10	7.5	13.5	38	9	4	13.5	23.5
23	132	6	15	9.0	16.0	120	13	15	9.5	17.0	99	8	6	11.5	20.0	94	5	9	11.5	20.0	67			11.0	19.5						52	6	5	6.0	11.0	38	7	4	8.5	15.0

F_{am} = median value of effective antenna noise in db above ktb
D_u = ratio of upper decile to median in db
D_ℓ = ratio of median to lower decile in db
V_{dm} = median deviation of average voltage in db below mean power
L_{dm} = median deviation of average logarithm in db below mean power



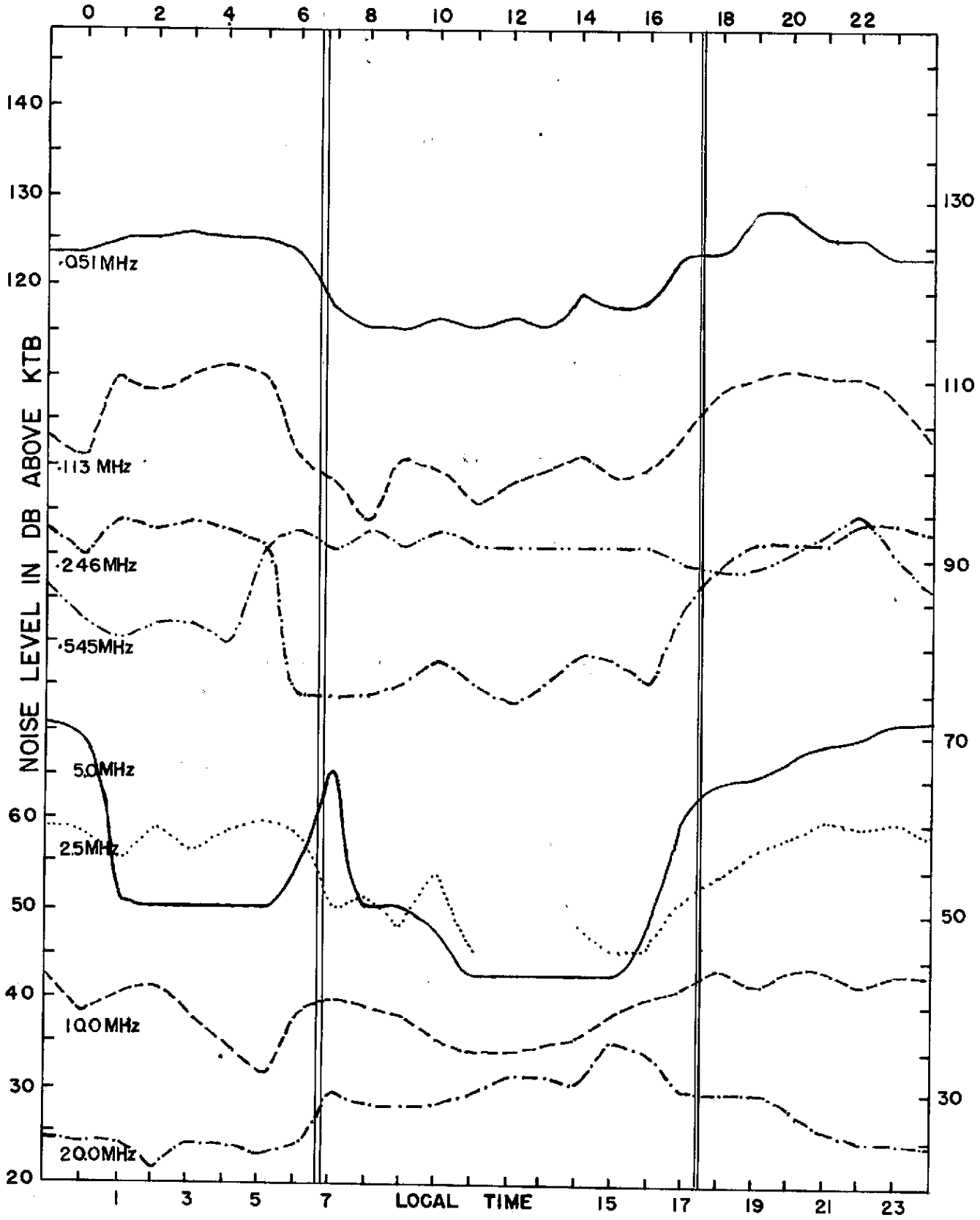
Monthly Median Values for September 1966

Fig. 1



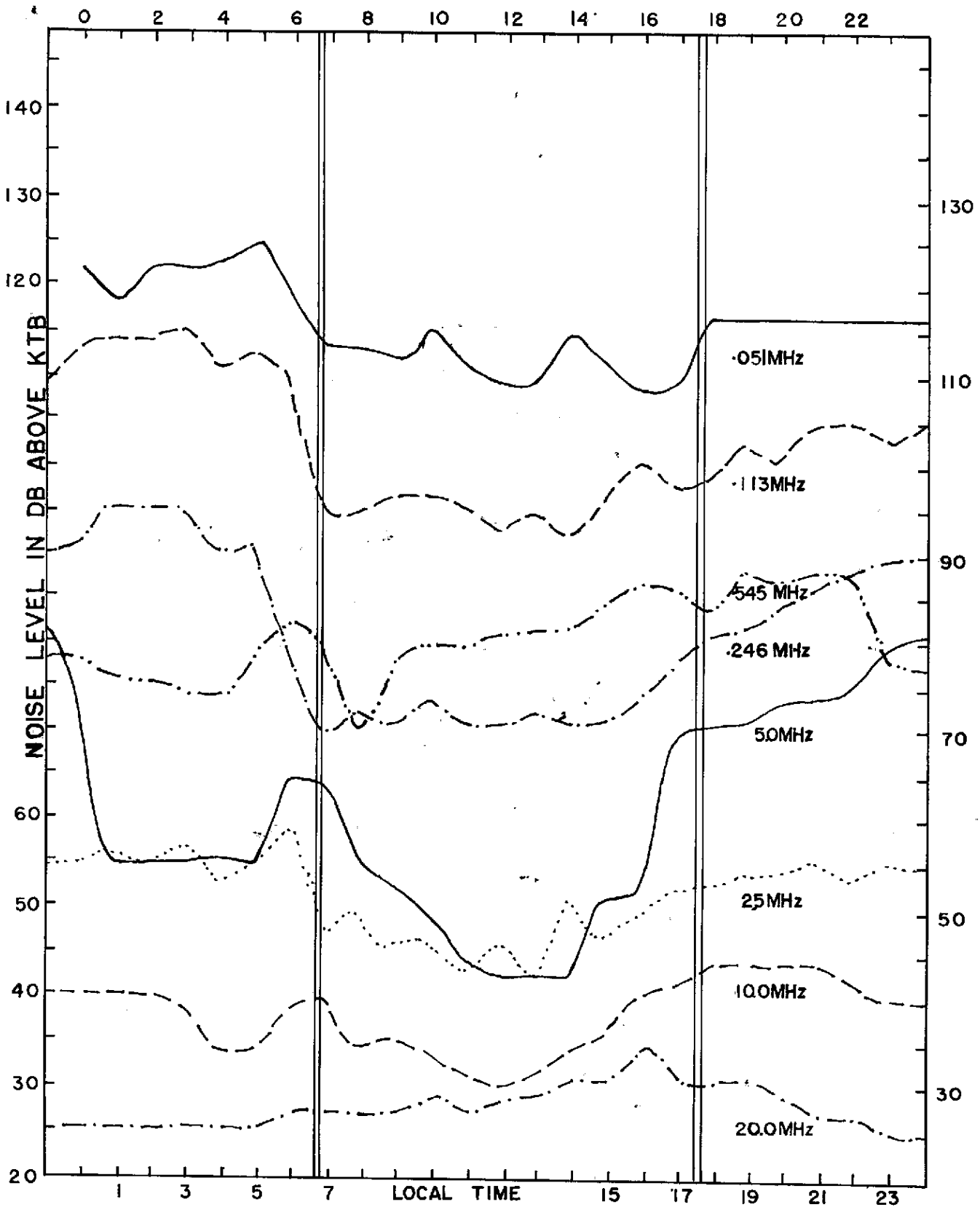
Monthly Median Values for May 1967

Fig. 2



Monthly Median Values for June 1967

Fig. 3



Monthly Median Values for July 1967

Fig. 4

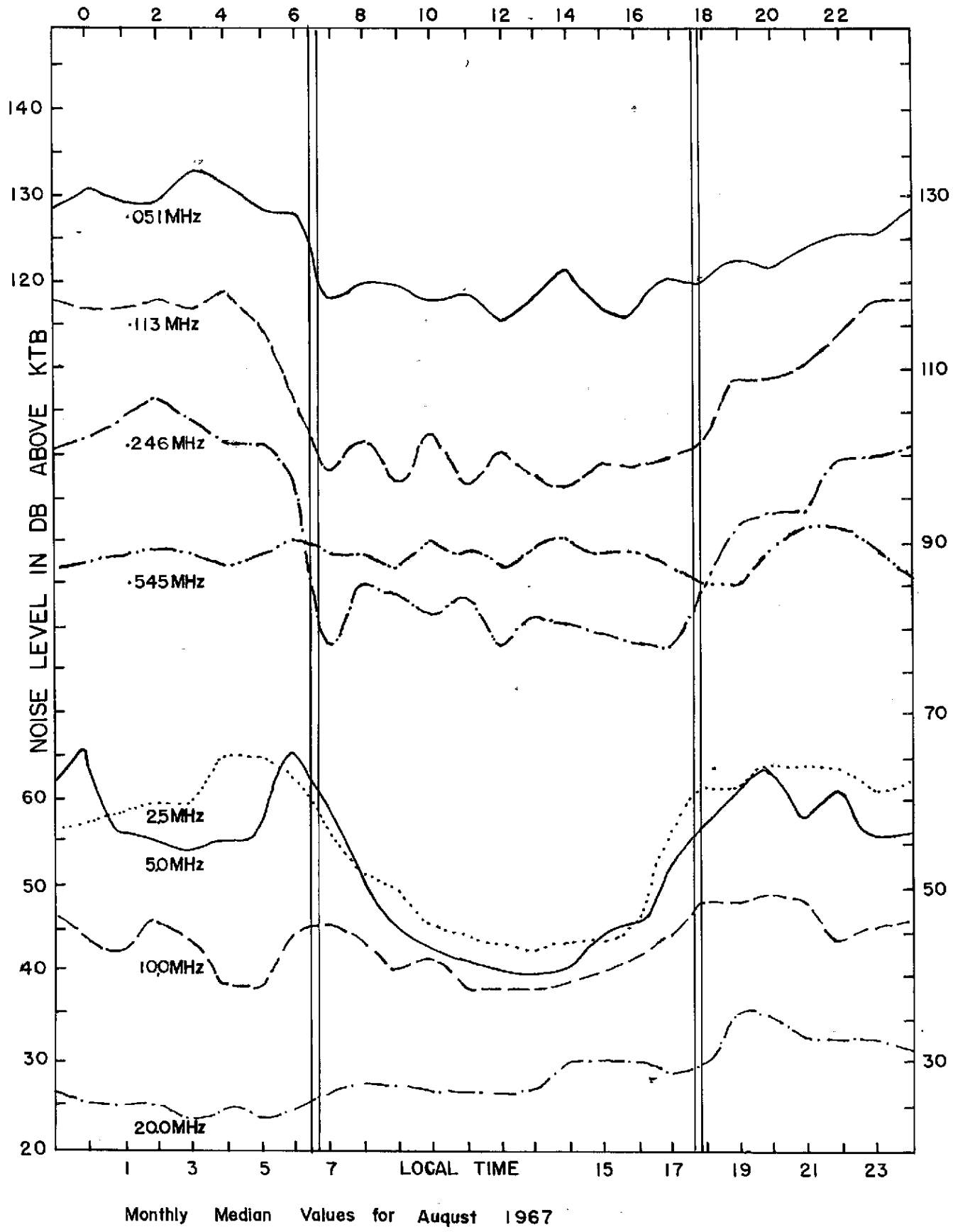
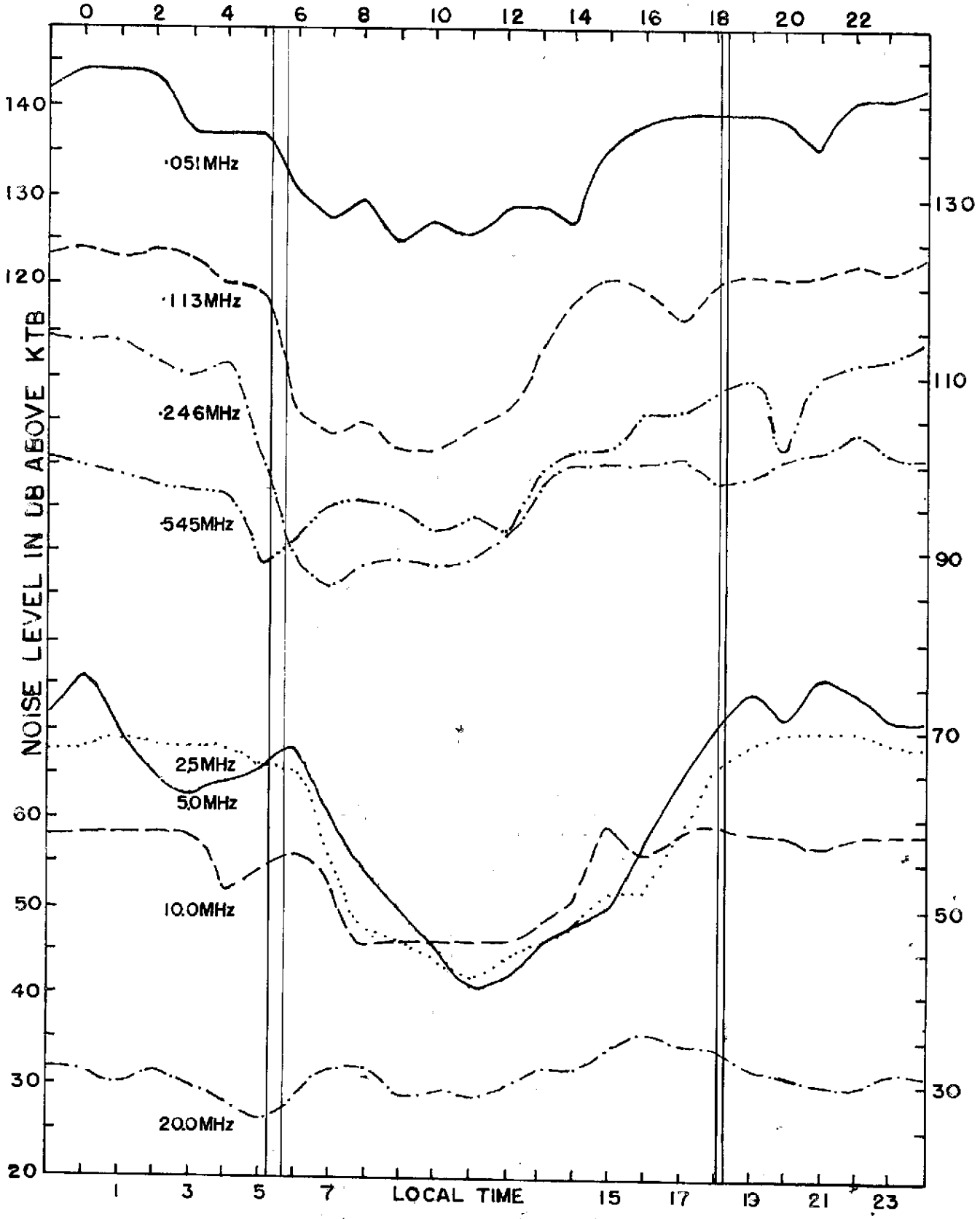
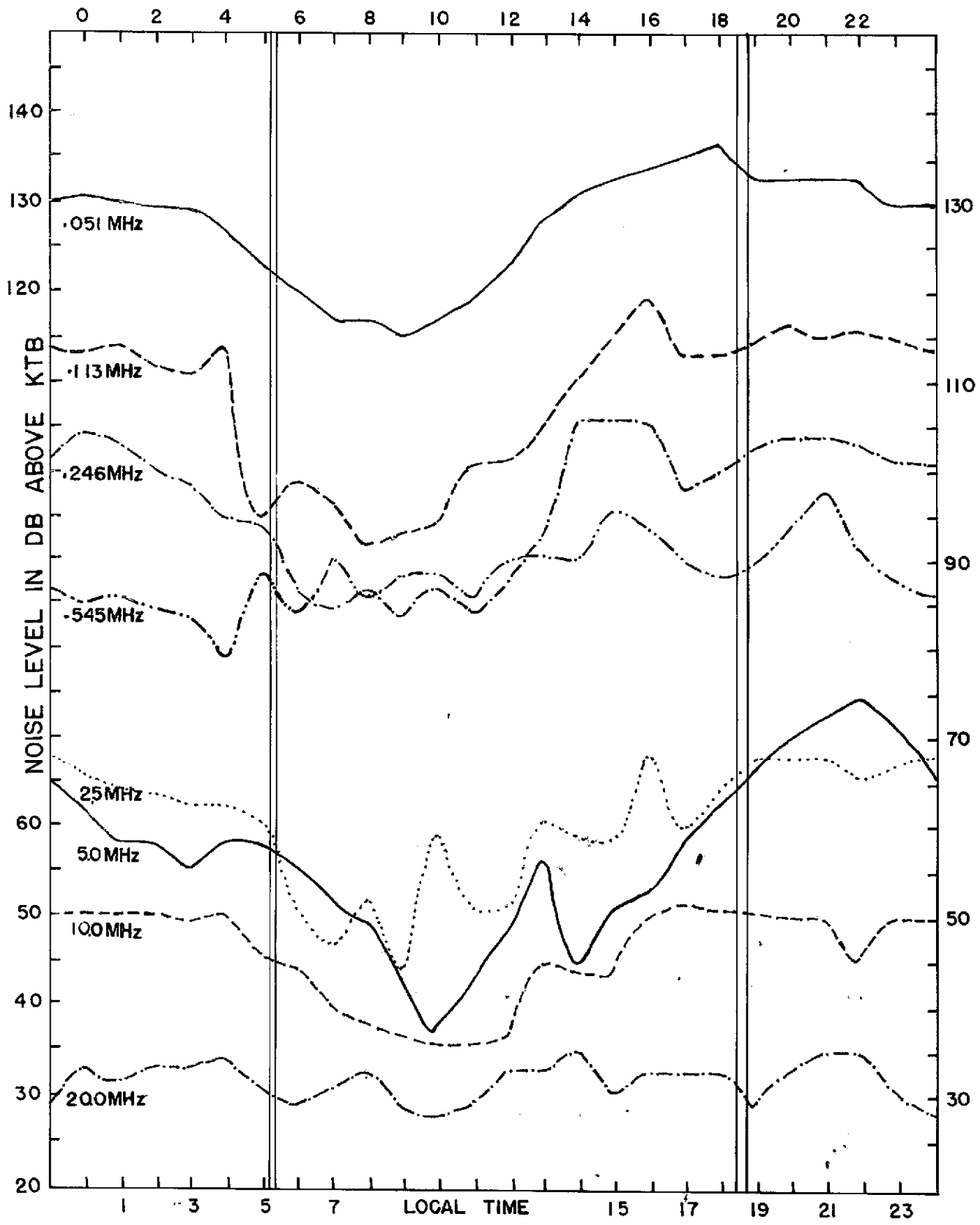

0 2 4 6 8 10 12 14 16 18 20 22
140
130
120
60
50
40
30
20
·051MHz
·113MHz
·246MHz
·545MHz
2.5MHz
5.0MHz
10.0MHz
20.0MHz
NOISE LEVEL IN DB ABOVE KTB
130
110
90
70
50
30
1 3 5 7 LOCAL TIME 15 17 19 21 23
Monthly Median Values for August 1967

Fig. 5



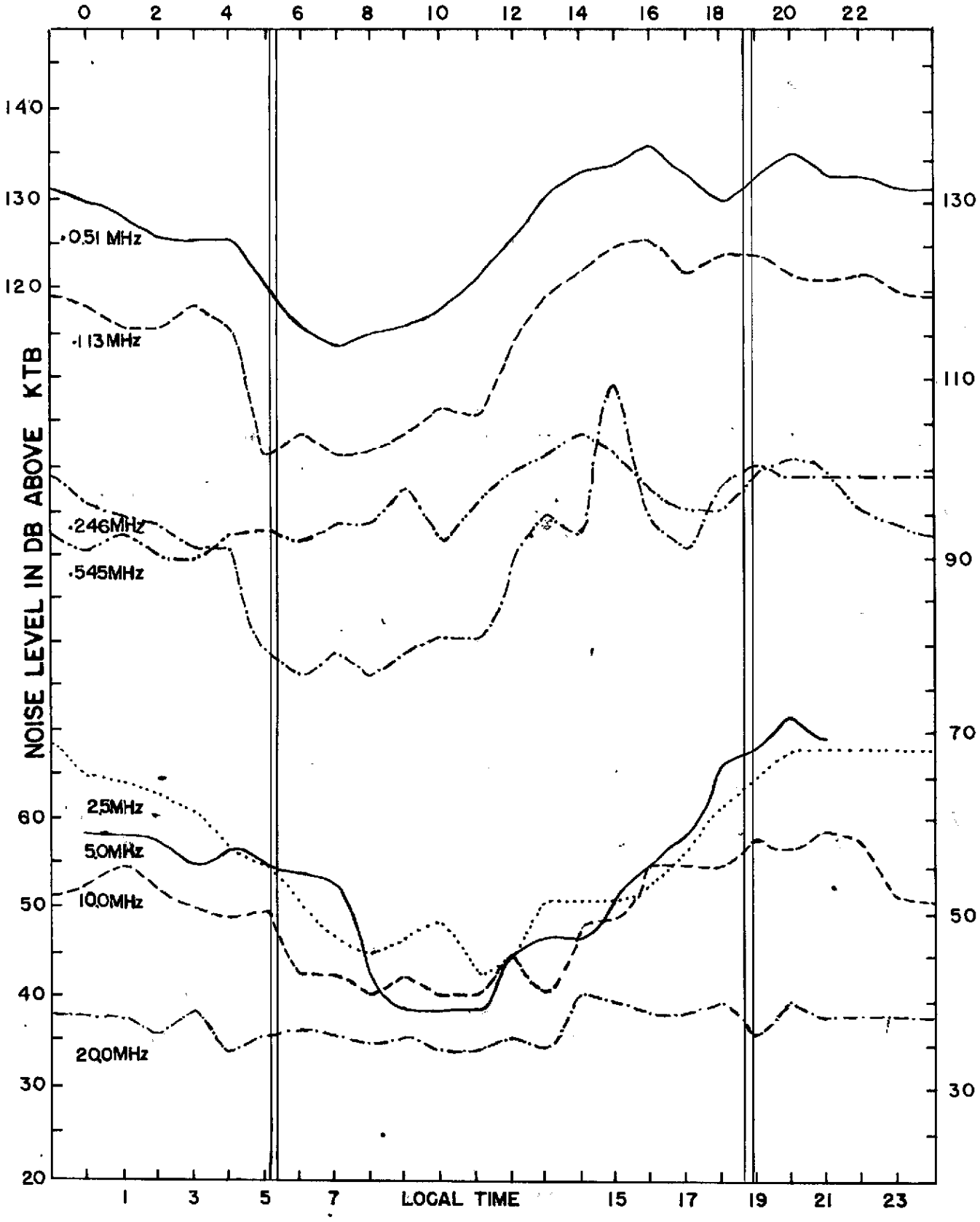
Monthly Median Values for October 1967

Fig. 6



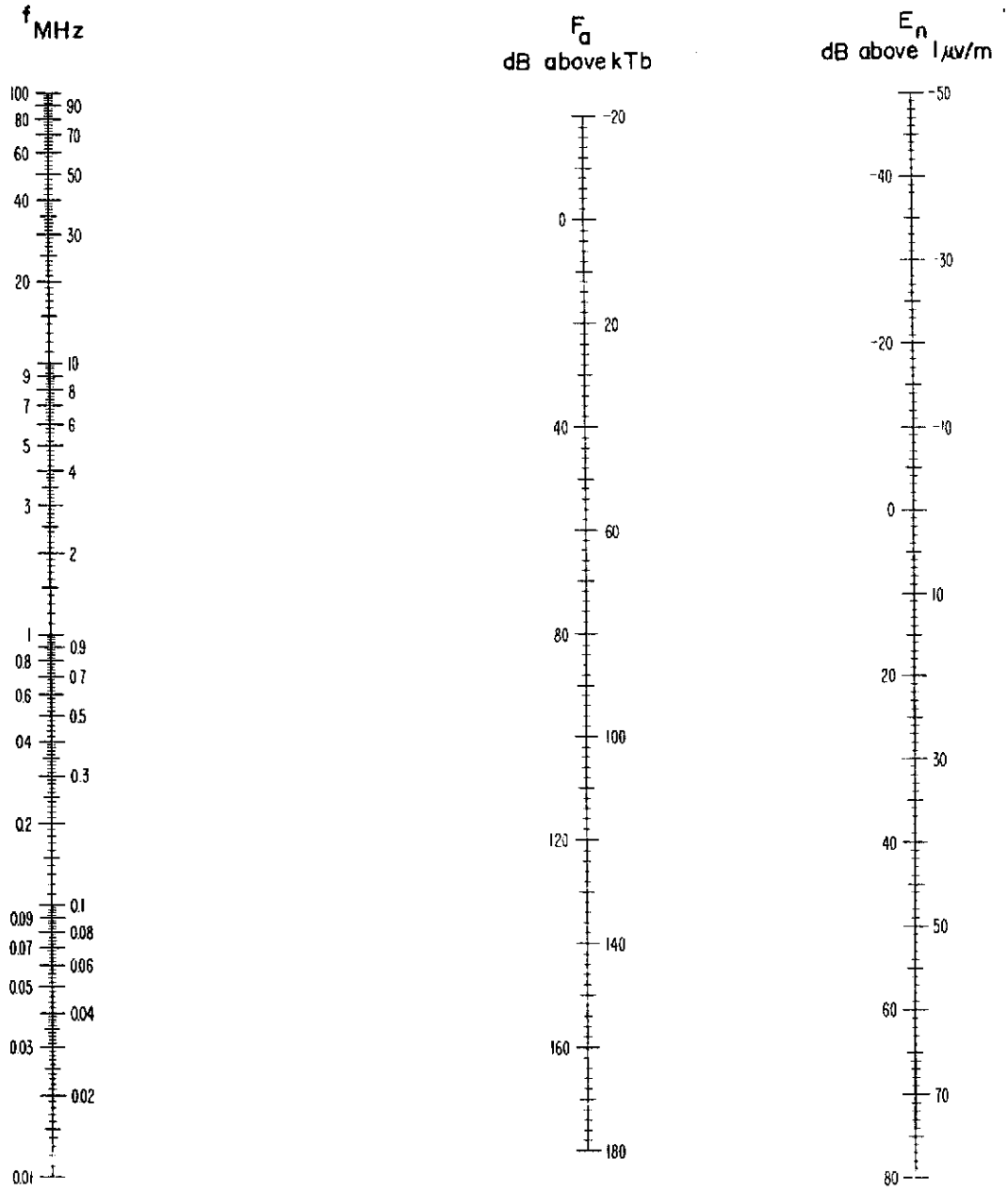
Monthly Median Values for November 1967

Fig. 7



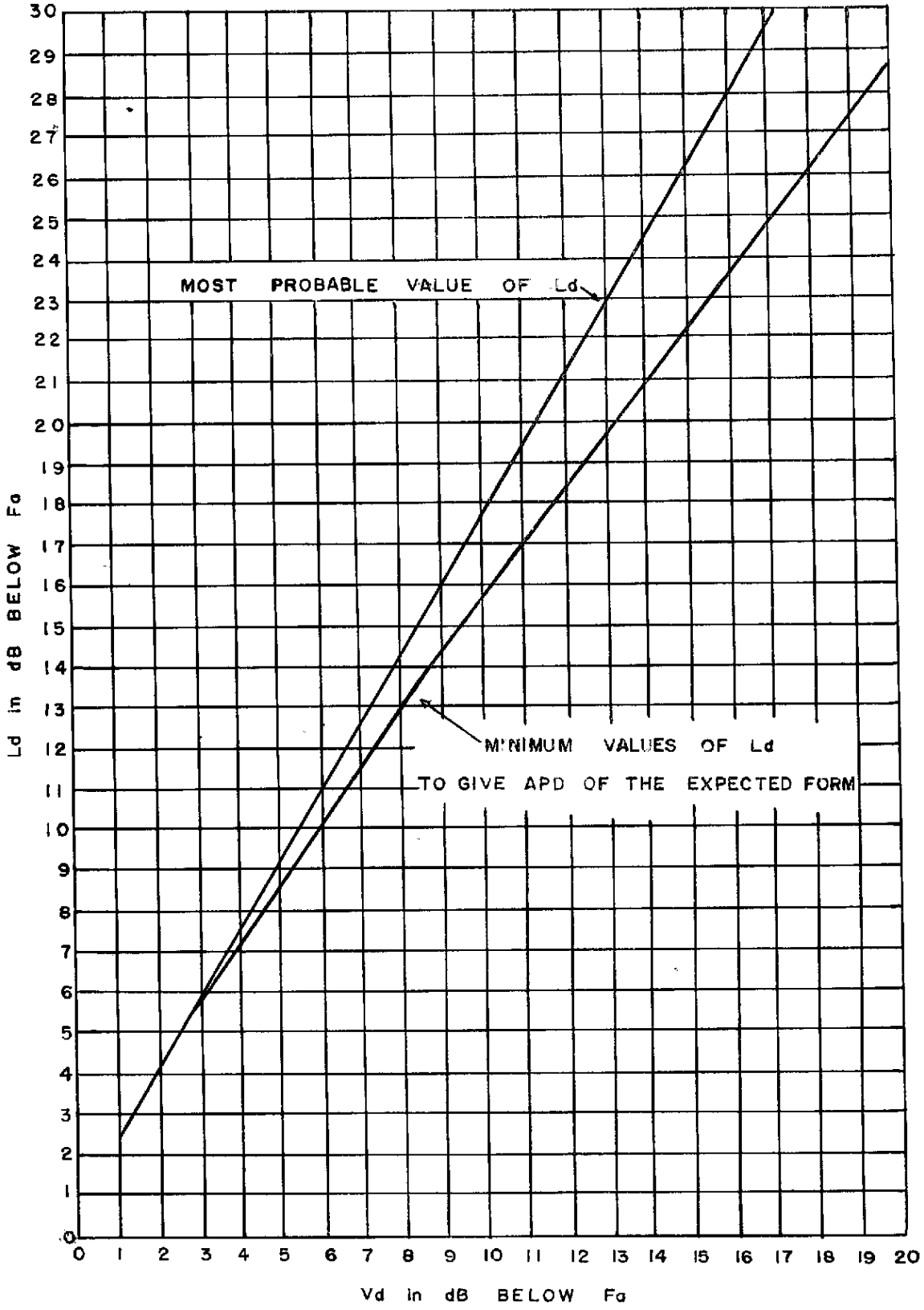
Monthly Median Values for December 1967

Fig. 8



$$E_n = F_a + 20 \log_{10} f_{MHz} - 65.5$$

Fig.: 9 Nomogram for Transforming Effective Antenna Noise Figure to Noise Field Strength as a Function of Frequency.



MOST PROBABLE AND MINIMUM VALUES OF Ld VERSUS Vd

FOR ATMOSPHERIC RADIO NOISE

Fig. 10