# SILICON TRANSISTOR 2SC5008

# NPN SILICON EPITAXIAL TRANSISTOR 3 PINS ULTRA SUPER MINI MOLD

# DESCRIPTION

NEC

The 2SC5008 is an NPN epitaxial silicon transistor designed for use in low noise and small signal amplifiers from VHF band to L band. Low noise figure, high gain, and high current capability achieve a very wide dynamic range and excellent linearity. This is achieved by direct nitride passivated base surface, process (NEST2 process) which is an NEC proprietary fabrication technique.

## FEATURES

- Low Voltage Use.
- High fr: 8.0 GHz TYP. (@ Vce = 3 V, Ic = 5 mA, f = 2 GHz)
- Low Cre: 0.3 pF TYP. (@ Vce = 3 V, Ie = 0, f = 1 MHz)
- Low NF: 1.9 dB TYP. (@ Vce = 3 V, Ic = 5 mA, f = 2 GHz)
- High |S<sub>21e</sub>|<sup>2</sup>: 7.5 dB TYP. (@ VcE = 3 V, lc = 5 mA, f = 2 GHz)
- Ultra Super Mini Mold Package.

## ORDERING INFORMATION

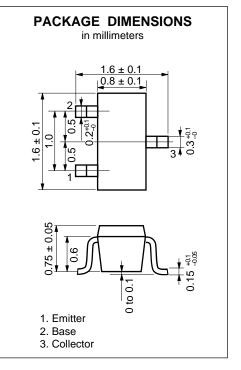
PART NUMBER	QUANTITY	PACKING STYLE
2SC5008	50 pcs./Unit	Embossed tape 8 mm wide.
2SC5008-T1	3 kpcs./Reel	Pin3 (Collector) face to perforation side of the tape.

\* Please contact with responsible NEC person, if you require evaluation sample. Unit sample quantity shall be 50 pcs.

#### ABSOLUTE MAXIMUM RATINGS (T<sub>A</sub> = 25 $^{\circ}$ C)

Collector to Base Voltage	Vсво	20	V
Collector to Emitter Voltage	Vceo	10	V
Emitter to Base Voltage	Vево	1.5	V
Collector Current	Ic	35	mA
Total Power Dissipation	Рт	125 mW	
Junction Temperature	Tj	150	°C
Storage Temperature	Tstg	-65 to + 150	°C





# ELECTRICAL CHARACTERISTICS (TA = 25 °C)

CHARACTERISTIC	SYMBOL	MIN.	TYP.	MAX.	UNIT	TEST CONDITIONS
Collector Cutoff Current	Ісво			1.0	μΑ	Vcb = 10 V, IE = 0
Emitter Cutoff Current	Іево			1.0	μΑ	VEB = 1 V, Ic = 0
DC Current Gain	hfe	80		160		Vce = 3 V, Ic = 5 mA*1
Gain Bandwidth Product	f⊤	5.5	8.0		GHz	Vce = 3 V, Ic = 5 mA
Feed-back Capacitance	Cre		0.3	0.7	pF	Vсв = 3 V, IE = 0, f = 1 MHz*2
Insertion Power Gain	S <sub>21e</sub>   <sup>2</sup>	5.5	7.5		dB	Vce = 3 V, lc = 5 mA, f = 2 GHz
Noise Figure	NF		1.9	3.2	dB	Vce = 3 V, Ic = 5 mA, f = 2 GHz

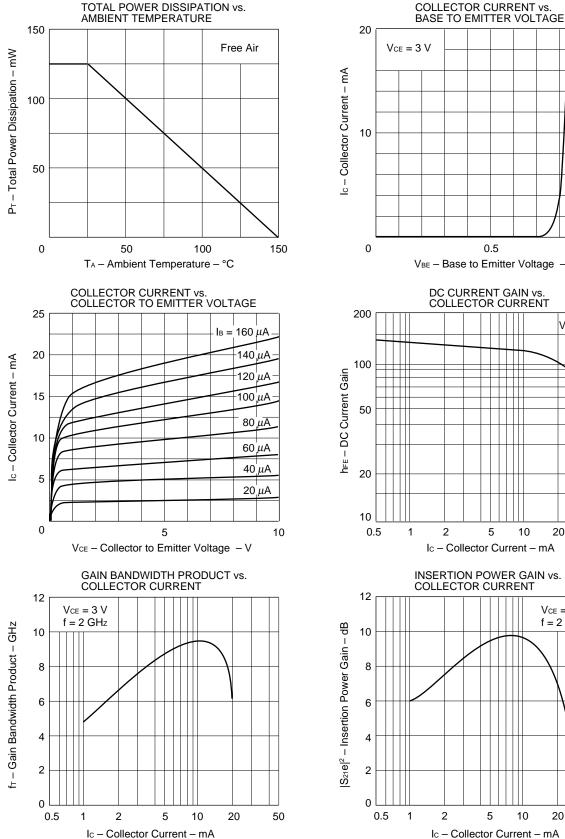
\*1 Pulse Measurement PW  $\leq$  350  $\mu$ s, Duty Cycle  $\leq$  2 %

\*2 The emitter terminal and the case shall be connected to the guard terminal of the three-terminal capacitance bridge.

#### hFE Classification

RANK	FB
Marking	44
hfe	80 to 160



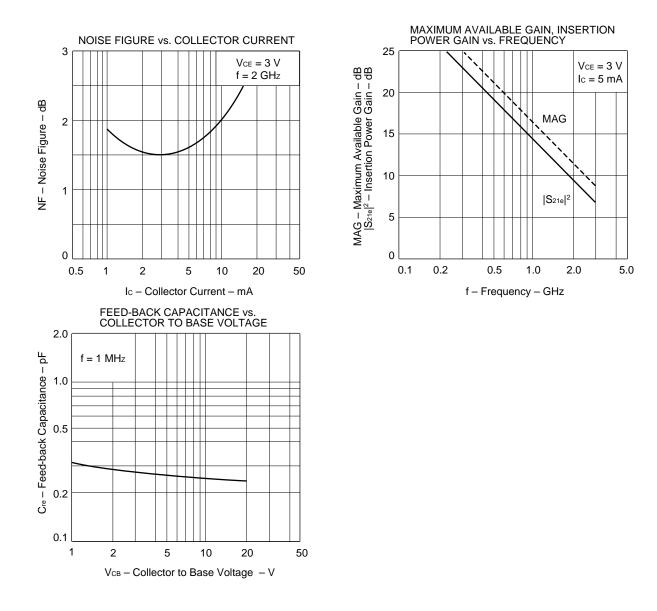


0.5 1.0 VBE - Base to Emitter Voltage - V DC CURRENT GAIN vs. COLLECTOR CURRENT Vce = 3 V 5 10 20 50 Ic - Collector Current - mA INSERTION POWER GAIN vs. COLLECTOR CURRENT  $V_{CE} = 3 V$ f = 2 GHz

50

20

10



# S-PARAMETER

$V_{CE} = 3 V, I_{C} = 10 m/$	A. Zo = 50	Ω						
FREQUENCY		11	S2	21	S	12	S	22
MHz	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG
100.00	.739	-23.1	15.190	151.5	.016	74.9	.922	-13.6
200.00	.617	-45.5	13.966	131.9	.027	63.0	.804	-22.2
300.00	.507	-64.6	12.474	115.9	.035	57.3	.699	-25.8
400.00	.414	-81.0	10.826	102.7	.042	51.8	.632	-27.3
500.00	.344	-94.7	9.421	91.8	.049	49.7	.583	-28.1
600.00	.296	-105.9	8.147	82.9	.055	47.0	.550	-28.1
700.00	.260	-116.6	7.211	74.9	.062	44.4	.525	-28.3
800.00	.236	-126.3	6.434	67.7	.068	41.8	.506	-28.7
900.00	.218	-136.2	5.806	60.9	.075	39.1	.490	-28.9
1000.00	.205	-144.8	5.288	54.6	.083	36.4	.477	-29.6
1100.00	.199	-153.1	4.864	48.6	.089	33.4	.466	-29.9
1200.00	.194	-161.6	4.500	42.7	.096	30.2	.457	-31.0
1300.00	.193	-168.9	4.191	37.0	.102	27.7	.449	-31.7
1400.00	.194	-175.6	3.908	31.4	.111	24.2	.441	-32.8
1500.00	.196	178.7	3.680	26.2	.118	21.0	.435	-33.9
1600.00	.202	173.5	3.489	20.7	.125	17.6	.429	-35.5
1700.00	.214	167.9	3.317	15.0	.133	12.6	.417	-37.2
1800.00	.222	161.7	3.154	9.6	.139	9.4	.406	-38.2
1900.00	.229	156.3	2.994	4.2	.145	6.0	.397	-39.4
2000.00	.237	151.7	2.857	-1.0	.152	2.6	.390	-40.5
2100.00	.246	147.5	2.748	-6.1	.159	9	.381	-42.1
2200.00	.253	144.6	2.626	-11.1	.167	-4.6	.374	-43.6
2300.00	.263	140.9	2.539	-16.2	.174	-8.0	.366	-45.2
2400.00	.271	137.9	2.445	-21.3	.182	-11.6	.357	-46.8
2500.00	.283	134.8	2.363	-26.3	.190	-15.2	.347	-48.4
2600.00	.292	132.0	2.288	-31.4	.197	-19.2	.338	-50.6
2700.00	.303	129.7	2.218	-36.4	.204	-22.9	.328	-52.5
2800.00	.315	127.4	2.147	-41.4	.211	-26.7	.318	-54.8
2900.00	.326	125.0	2.085	-46.3	.220	-30.8	.309	-56.9
3000.00	.339	122.7	2.032	-51.2	.227	-34.2	.299	-59.5
Vce = 3 V, Ic = 7 mA	. Zo = 50 S	2						
FREQUENCY		11	S2	21	S	12	S	22
MHz	MAG	ANG	MAC		MAG	ANG	MAG	ANG
100.00	.815	–17.7	MAG 11.972	ANG 155.6	.016	77.0	.947	–11.5
200.00	.732	-17.7 -34.0	11.228	138.4	.018	63.4	.855	-20.4
300.00	.634	-34.0 -50.1	10.480	123.5	.029	56.1	.855	-20.4 -25.1
400.00	.539		9.549	123.5	.039	50.1	.687	-25.1 -27.9
500.00	.455	-04.9 -78.9	9.549 8.722	99.0	.047	47.4	.630	-27.9
600.00	.392	-89.6	7.703	89.1	.060	47.4	.589	-29.0
700.00	.336	-100.4	6.951	80.3	.066	41.4	.557	-30.9
800.00	.297	-110.0	6.265	72.2	.073	38.5	.532	-31.5

400.00	.539	-64.9	9.549	110.7	.047	51.8	.687	-27.9
500.00	.455	-78.9	8.722	99.0	.054	47.4	.630	-29.6
600.00	.392	-89.6	7.703	89.1	.060	44.0	.589	-30.5
700.00	.336	-100.4	6.951	80.3	.066	41.4	.557	-30.9
800.00	.297	-110.0	6.265	72.2	.073	38.5	.532	-31.5
900.00	.268	-119.5	5.700	64.9	.079	35.8	.511	-31.9
1000.00	.244	-128.0	5.221	58.3	.086	32.7	.494	-32.5
1100.00	.228	-136.6	4.802	51.8	.092	29.7	.480	-32.9
1200.00	.216	-145.2	4.479	45.5	.098	27.4	.468	-33.8
1300.00	.208	-153.4	4.169	39.6	.106	24.0	.459	-34.4
1400.00	.203	-160.8	3.900	33.9	.113	21.1	.449	-35.6
1500.00	.202	-167.7	3.674	28.2	.121	17.5	.440	-36.6
1600.00	.205	-173.8	3.478	22.7	.128	14.3	.433	-37.8
1700.00	.214	179.6	3.316	17.3	.135	10.2	.421	-39.7
1800.00	.219	172.5	3.153	11.6	.141	6.4	.409	-40.7
1900.00	.223	165.7	3.001	6.0	.146	3.5	.399	-41.7
2000.00	.230	160.0	2.874	.7	.153	0.0	.391	-43.0
2100.00	.236	155.4	2.753	-4.6	.160	-3.2	.382	-44.4
2200.00	.244	151.6	2.631	-9.6	.167	-6.9	.374	-45.7
2300.00	.254	147.1	2.548	-14.9	.174	-10.4	.365	-47.2
2400.00	.262	143.5	2.453	-20.0	.181	-13.8	.356	-49.0
2500.00	.273	140.2	2.370	-25.0	.189	-17.4	.346	-50.5
2600.00	.281	137.1	2.295	-30.2	.196	-21.0	.337	-52.7
2700.00	.293	134.1	2.228	-35.2	.203	-24.9	.328	-54.6
2800.00	.303	131.4	2.156	-40.2	.211	-28.3	.317	-56.7
2900.00	.315	128.6	2.092	-45.2	.218	-32.3	.307	-58.8
3000.00	.326	126.2	2.040	-50.1	.227	-36.1	.298	-61.4

## S-PARAMETER

$V_{CE} = 3 V, I_C = 5 m/$					-			
FREQUENCY	S	511	S2	21	S	12	S	22
N411-								
MHz 100.00	MAG .870	ANG -13.9	MAG 9.067	ANG 158.8	MAG .017	ANG 76.2	MAG .964	ANG -9.7
200.00	.870	-27.3	8.687	143.1	.017	65.8	.897	
300.00	.733	-40.3	8.368	129.3	.042	58.0	.814	-23.3
400.00	.661	-53.0	7.864	117.5	.052	51.2	.748	-27.0
500.00	.575	-66.1	7.479	106.3	.059	45.9	.687	-29.5
600.00	.510	-76.2	6.765	96.3	.066	41.4	.643	-31.2
700.00	.440	-87.2	6.297	86.6	.072	38.2	.604	-32.3
800.00	.387	-96.8	5.812	77.7	.078	34.7	.574	-33.3
900.00	.345	-106.1	5.365	69.7	.083	32.7	.547	-33.9
1000.00	.309	-114.9	4.964	62.4	.090	29.2	.527	-34.7
1100.00	.283	-123.3	4.616	55.4	.096	25.9	.509	-35.2
1200.00	.261	-131.9	4.298	49.0	.101	23.0	.493	-36.1
1300.00	.246	-139.7	4.032	42.4	.107	20.4	.481	-36.7
1400.00	.234	-147.4	3.784	36.7	.115	17.1	.471	-37.8
1500.00	.227	-154.7	3.568	30.8	.122	14.2	.460	-38.9
1600.00	.227	-161.3	3.385	25.0	.129	11.2	.450	-40.2
1700.00	.231	-168.9	3.230	19.1	.137	7.1	.438	-41.9
1800.00	.231	-176.7	3.069	13.5	.141	3.4	.425	-42.8
1900.00 2000.00	.233 .237	176.3 169.5	2.929 2.802	7.8 2.3	.148 .153	.7 –2.4	.413 .405	-44.0 -45.2
2100.00	.237	163.9	2.690	-3.0	.155	-2.4 -6.1	.405	-45.2 -46.5
2100.00	.242	159.4	2.583	-3.0 -8.3	.166	-9.3	.390	-40.3 -48.0
2300.00	.256	154.3	2.495	-13.6	.173	-12.8	.377	-40.0 -49.5
2400.00	.264	150.1	2.404	-18.8	.179	-16.2	.367	-51.1
2500.00	.274	146.2	2.324	-23.9	.187	-19.3	.358	-52.7
2600.00	.282	142.3	2.251	-29.2	.194	-23.3	.348	-54.8
2700.00	.292	139.2	2.188	-34.3	.200	-26.9	.339	-56.8
2800.00	.303	135.9	2.117	-39.4	.207	-30.2	.328	-59.0
2900.00	.313	132.9	2.056	-44.5	.215	-34.1	.319	-60.9
3000.00	.325	130.0	2.003	-49.5	.223	-37.5	.309	-63.5
Vce = 3 V, Ic = 3 m/ FREQUENCY		2 511	S2	21	S	12	S	22
FREQUENCY	S	511						
FREQUENCY MHz	S MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG
FREQUENCY MHz 100.00	S MAG .936	ANG –10.5	MAG 5.612	ANG 163.6	MAG .017	ANG 79.6	MAG .981	ANG -7.1
FREQUENCY MHz	MAG .936 .892	ANG	MAG	ANG	MAG	ANG	MAG	ANG -7.1 -14.0
FREQUENCY MHz 100.00 200.00	S MAG .936	ANG –10.5 –20.4	MAG 5.612 5.628	ANG 163.6 148.9	MAG .017 .034	ANG 79.6 69.7	MAG .981 .944	ANG -7.1
FREQUENCY MHz 100.00 200.00 300.00	MAG .936 .892 .842	ANG -10.5 -20.4 -30.5	MAG 5.612 5.628 5.602 5.393 5.328	ANG 163.6 148.9 136.8	MAG .017 .034 .048	ANG 79.6 69.7 60.6	MAG .981 .944 .887	ANG -7.1 -14.0 -19.3 -23.7 -27.2
FREQUENCY MHz 100.00 200.00 300.00 400.00 500.00 600.00	MAG .936 .892 .842 .785 .732 .681	ANG -10.5 -20.4 -30.5 -41.2 -50.8 -59.2	MAG 5.612 5.628 5.602 5.393 5.328 4.924	ANG 163.6 148.9 136.8 126.0 116.2 106.6	MAG .017 .034 .048 .060 .069 .077	ANG 79.6 69.7 60.6 53.2 46.4 40.6	MAG .981 .944 .887 .837 .782 .740	ANG -7.1 -14.0 -19.3 -23.7 -27.2 -29.9
FREQUENCY MHz 100.00 200.00 300.00 400.00 500.00 600.00 700.00	MAG .936 .892 .842 .785 .732 .681 .618	ANG -10.5 -20.4 -30.5 -41.2 -50.8 -59.2 -68.7	MAG 5.612 5.628 5.602 5.393 5.328 4.924 4.767	ANG 163.6 148.9 136.8 126.0 116.2 106.6 97.2	MAG .017 .034 .048 .060 .069 .077 .084	ANG 79.6 69.7 60.6 53.2 46.4 40.6 35.8	MAG .981 .944 .887 .837 .782 .740 .698	ANG -7.1 -14.0 -19.3 -23.7 -27.2 -29.9 -32.0
FREQUENCY MHz 100.00 200.00 300.00 400.00 500.00 600.00 700.00 800.00	MAG .936 .892 .842 .785 .732 .681 .618 .564	ANG -10.5 -20.4 -30.5 -41.2 -50.8 -59.2 -68.7 -77.9	MAG 5.612 5.628 5.602 5.393 5.328 4.924 4.767 4.575	ANG 163.6 148.9 136.8 126.0 116.2 106.6 97.2 88.0	MAG .017 .034 .048 .060 .069 .077 .084 .090	ANG 79.6 69.7 60.6 53.2 46.4 40.6 35.8 31.0	MAG .981 .944 .887 .837 .782 .740 .698 .663	ANG -7.1 -14.0 -19.3 -23.7 -27.2 -29.9 -32.0 -33.9
FREQUENCY MHz 100.00 200.00 300.00 400.00 500.00 600.00 700.00 800.00 900.00	MAG .936 .892 .842 .785 .732 .681 .618 .564 .510	ANG -10.5 -20.4 -30.5 -41.2 -50.8 -59.2 -68.7 -77.9 -86.9	MAG 5.612 5.628 5.602 5.393 5.328 4.924 4.767 4.575 4.365	ANG 163.6 148.9 136.8 126.0 116.2 106.6 97.2 88.0 79.4	MAG .017 .034 .048 .060 .069 .077 .084 .090 .094	ANG 79.6 69.7 60.6 53.2 46.4 40.6 35.8 31.0 27.0	MAG .981 .944 .887 .837 .782 .740 .698 .663 .627	ANG -7.1 -14.0 -19.3 -23.7 -27.2 -29.9 -32.0 -33.9 -35.2
FREQUENCY MHz 100.00 200.00 300.00 400.00 500.00 600.00 700.00 800.00 900.00 1000.00	MAG .936 .892 .842 .785 .732 .681 .618 .564 .510 .459	ANG -10.5 -20.4 -30.5 -41.2 -50.8 -59.2 -68.7 -77.9 -86.9 -96.0	MAG 5.612 5.628 5.602 5.393 5.328 4.924 4.767 4.575 4.365 4.191	ANG 163.6 148.9 136.8 126.0 116.2 106.6 97.2 88.0 79.4 70.9	MAG .017 .034 .048 .060 .069 .077 .084 .090 .094 .100	ANG 79.6 69.7 60.6 53.2 46.4 40.6 35.8 31.0 27.0 23.5	MAG .981 .944 .887 .837 .782 .740 .698 .663 .627 .599	ANG -7.1 -14.0 -19.3 -23.7 -27.2 -29.9 -32.0 -33.9 -35.2 -36.5
FREQUENCY MHz 100.00 200.00 300.00 400.00 500.00 600.00 700.00 800.00 900.00 1000.00 1100.00	MAG .936 .892 .842 .785 .732 .681 .618 .564 .564 .510 .459 .413	ANG -10.5 -20.4 -30.5 -41.2 -50.8 -59.2 -68.7 -77.9 -86.9 -96.0 -104.8	MAG 5.612 5.628 5.602 5.393 5.328 4.924 4.767 4.575 4.365 4.191 3.991	ANG 163.6 148.9 136.8 126.0 116.2 106.6 97.2 88.0 79.4 70.9 62.9	MAG .017 .034 .048 .060 .069 .077 .084 .090 .094 .100 .106	ANG 79.6 69.7 60.6 53.2 46.4 40.6 35.8 31.0 27.0 23.5 19.8	MAG .981 .944 .887 .837 .782 .740 .698 .663 .627 .599 .577	ANG -7.1 -14.0 -19.3 -23.7 -27.2 -29.9 -32.0 -33.9 -35.2 -36.5 -37.5
FREQUENCY MHz 100.00 200.00 300.00 400.00 500.00 600.00 700.00 800.00 900.00 1000.00 1100.00 1200.00	MAG .936 .892 .842 .785 .732 .681 .618 .564 .564 .510 .459 .413 .375	ANG -10.5 -20.4 -30.5 -41.2 -50.8 -59.2 -68.7 -77.9 -86.9 -96.0 -104.8 -113.0	MAG 5.612 5.628 5.602 5.393 5.328 4.924 4.767 4.575 4.365 4.191 3.991 3.790	ANG 163.6 148.9 136.8 126.0 116.2 106.6 97.2 88.0 79.4 70.9 62.9 55.7	MAG .017 .034 .048 .060 .069 .077 .084 .090 .094 .100 .106 .110	ANG 79.6 69.7 60.6 53.2 46.4 40.6 35.8 31.0 27.0 23.5 19.8 17.1	MAG .981 .944 .887 .837 .782 .740 .698 .663 .663 .627 .599 .577 .558	ANG -7.1 -14.0 -19.3 -23.7 -27.2 -29.9 -32.0 -33.9 -35.2 -36.5 -37.5 -38.5
FREQUENCY MHz 100.00 200.00 300.00 400.00 500.00 600.00 700.00 800.00 900.00 1000.00 1100.00 1200.00 1300.00	MAG .936 .892 .842 .785 .732 .681 .618 .564 .564 .510 .459 .413 .375 .350	ANG -10.5 -20.4 -30.5 -41.2 -50.8 -59.2 -68.7 -77.9 -86.9 -96.0 -104.8 -113.0 -120.8	MAG 5.612 5.628 5.602 5.393 5.328 4.924 4.767 4.575 4.365 4.191 3.991 3.790 3.588	ANG 163.6 148.9 136.8 126.0 116.2 106.6 97.2 88.0 79.4 70.9 62.9 55.7 48.7	MAG .017 .034 .048 .060 .069 .077 .084 .090 .094 .100 .106 .110 .116	ANG 79.6 69.7 60.6 53.2 46.4 40.6 35.8 31.0 27.0 23.5 19.8 17.1 14.2	MAG .981 .944 .887 .837 .782 .740 .698 .663 .627 .599 .577 .558 .542	ANG -7.1 -14.0 -19.3 -23.7 -27.2 -29.9 -32.0 -33.9 -35.2 -36.5 -37.5 -38.5 -39.6
FREQUENCY MHz 100.00 200.00 300.00 400.00 500.00 600.00 700.00 800.00 900.00 1000.00 1100.00 1200.00 1300.00 1400.00	MAG .936 .892 .842 .785 .732 .681 .618 .564 .510 .413 .375 .350 .325	ANG -10.5 -20.4 -30.5 -41.2 -50.8 -59.2 -68.7 -77.9 -86.9 -96.0 -104.8 -113.0 -120.8 -128.3	MAG 5.612 5.628 5.602 5.393 5.328 4.924 4.767 4.575 4.365 4.191 3.991 3.790 3.588 3.410	ANG 163.6 148.9 136.8 126.0 116.2 106.6 97.2 88.0 79.4 70.9 62.9 55.7 48.7 42.0	MAG .017 .034 .048 .060 .069 .077 .084 .090 .094 .100 .106 .110 .116 .121	ANG 79.6 69.7 60.6 53.2 46.4 40.6 35.8 31.0 27.0 23.5 19.8 17.1 14.2 11.1	MAG .981 .944 .887 .837 .782 .740 .698 .663 .627 .599 .577 .558 .542 .542 .525	ANG -7.1 -14.0 -19.3 -23.7 -27.2 -29.9 -32.0 -33.9 -35.2 -36.5 -37.5 -38.5 -39.6 -40.8
FREQUENCY MHz 100.00 200.00 300.00 400.00 500.00 600.00 700.00 800.00 900.00 1000.00 1100.00 1200.00 1300.00 1400.00	MAG .936 .892 .842 .785 .732 .681 .618 .564 .510 .459 .413 .375 .350 .325 .307	ANG -10.5 -20.4 -30.5 -41.2 -50.8 -59.2 -68.7 -77.9 -86.9 -96.0 -104.8 -113.0 -120.8 -128.3 -135.8	MAG 5.612 5.628 5.602 5.393 5.328 4.924 4.767 4.575 4.365 4.191 3.991 3.790 3.588 3.410 3.234	ANG 163.6 148.9 136.8 126.0 116.2 106.6 97.2 88.0 79.4 70.9 62.9 55.7 48.7 42.0 35.7	MAG .017 .034 .048 .060 .069 .077 .084 .090 .094 .100 .106 .110 .116 .121 .126	ANG 79.6 69.7 60.6 53.2 46.4 40.6 35.8 31.0 27.0 23.5 19.8 17.1 14.2 11.1 7.8	MAG .981 .944 .887 .837 .782 .740 .698 .663 .627 .599 .577 .558 .542 .525 .513	ANG -7.1 -14.0 -19.3 -23.7 -27.2 -29.9 -32.0 -33.9 -35.2 -36.5 -37.5 -38.5 -39.6 -40.8 -41.8
FREQUENCY MHz 100.00 200.00 300.00 400.00 500.00 600.00 700.00 800.00 900.00 1000.00 1100.00 1200.00 1300.00 1400.00 1500.00	MAG .936 .892 .842 .785 .732 .681 .618 .564 .510 .459 .413 .375 .350 .325 .307 .295	ANG -10.5 -20.4 -30.5 -41.2 -50.8 -59.2 -68.7 -77.9 -86.9 -96.0 -104.8 -113.0 -120.8 -128.3 -135.8 -142.9	MAG 5.612 5.628 5.602 5.393 5.328 4.924 4.767 4.575 4.365 4.191 3.991 3.588 3.410 3.234 3.086	ANG 163.6 148.9 136.8 126.0 116.2 106.6 97.2 88.0 79.4 70.9 62.9 55.7 48.7 42.0 35.7 29.5	MAG .017 .034 .048 .060 .069 .077 .084 .090 .094 .100 .106 .110 .116 .121 .126 .134	ANG 79.6 69.7 60.6 53.2 46.4 40.6 35.8 31.0 27.0 23.5 19.8 17.1 14.2 11.1 7.8 4.9	MAG .981 .944 .887 .837 .782 .740 .698 .663 .627 .599 .577 .558 .542 .525 .542 .525 .513 .499	ANG -7.1 -14.0 -19.3 -23.7 -27.2 -29.9 -32.0 -33.9 -35.2 -36.5 -37.5 -38.5 -39.6 -40.8 -41.8 -43.2
FREQUENCY MHz 100.00 200.00 300.00 400.00 500.00 600.00 700.00 800.00 900.00 1000.00 1100.00 1200.00 1300.00 1400.00	MAG .936 .892 .842 .785 .732 .681 .618 .564 .510 .459 .413 .375 .350 .325 .350 .325 .307 .295 .289 .283	ANG -10.5 -20.4 -30.5 -41.2 -50.8 -59.2 -68.7 -77.9 -86.9 -96.0 -104.8 -113.0 -120.8 -128.3 -135.8	MAG 5.612 5.628 5.602 5.393 5.328 4.924 4.767 4.575 4.365 4.191 3.790 3.588 3.410 3.234 3.086 2.960 2.830	ANG 163.6 148.9 136.8 126.0 116.2 106.6 97.2 88.0 79.4 70.9 62.9 55.7 48.7 42.0 35.7 29.5 23.3 17.0	MAG .017 .034 .048 .060 .069 .077 .084 .090 .094 .100 .106 .110 .116 .121 .126	ANG 79.6 69.7 60.6 53.2 46.4 40.6 35.8 31.0 27.0 23.5 19.8 17.1 14.2 11.1 7.8 4.9 1.0 -2.7	MAG .981 .944 .887 .837 .782 .740 .698 .663 .627 .599 .577 .558 .542 .525 .513 .499 .486 .471	ANG -7.1 -14.0 -19.3 -23.7 -27.2 -29.9 -32.0 -33.9 -35.2 -36.5 -37.5 -38.5 -38.5 -39.6 -40.8 -41.8 -43.2 -44.8 -46.0
FREQUENCY MHz 100.00 200.00 300.00 400.00 500.00 600.00 700.00 800.00 900.00 1000.00 1100.00 1200.00 1300.00 1400.00 1500.00 1600.00 1700.00 1800.00	MAG .936 .892 .842 .785 .732 .681 .618 .564 .510 .459 .413 .375 .350 .325 .350 .325 .307 .295 .289 .283 .276	ANG -10.5 -20.4 -30.5 -41.2 -50.8 -59.2 -68.7 -77.9 -86.9 -96.0 -104.8 -113.0 -120.8 -120.8 -128.3 -135.8 -142.9 -150.9 -158.6 -166.4	MAG 5.612 5.628 5.602 5.393 5.328 4.924 4.767 4.575 4.365 4.191 3.790 3.588 3.410 3.234 3.086 2.960 2.830 2.707	ANG 163.6 148.9 136.8 126.0 116.2 106.6 97.2 88.0 79.4 70.9 62.9 55.7 48.7 42.0 35.7 29.5 23.3 17.0 11.2	MAG .017 .034 .048 .060 .069 .077 .084 .090 .094 .100 .106 .110 .116 .121 .126 .134 .140	ANG 79.6 69.7 60.6 53.2 46.4 40.6 35.8 31.0 27.0 23.5 19.8 17.1 14.2 11.1 7.8 4.9 1.0 -2.7 -5.6	MAG .981 .944 .887 .837 .782 .740 .698 .663 .627 .599 .577 .558 .542 .525 .513 .499 .486 .471 .457	ANG -7.1 -14.0 -19.3 -23.7 -27.2 -29.9 -32.0 -33.9 -35.2 -36.5 -37.5 -38.5 -37.5 -38.5 -39.6 -40.8 -41.8 -43.2 -44.8 -46.0 -47.1
FREQUENCY MHz 100.00 200.00 300.00 400.00 500.00 600.00 700.00 800.00 900.00 1000.00 1100.00 1200.00 1300.00 1400.00 1500.00 1600.00 1700.00 1800.00 2000.00	MAG .936 .892 .842 .785 .732 .681 .618 .564 .510 .459 .413 .375 .350 .325 .307 .295 .289 .283 .276 .273	ANG -10.5 -20.4 -30.5 -41.2 -50.8 -59.2 -68.7 -77.9 -86.9 -96.0 -104.8 -113.0 -120.8 -128.3 -135.8 -142.9 -150.9 -158.6 -166.4 -174.1	MAG 5.612 5.628 5.602 5.393 5.328 4.924 4.767 4.575 4.365 4.191 3.790 3.588 3.410 3.234 3.086 2.960 2.830 2.707 2.597	ANG 163.6 148.9 136.8 126.0 116.2 106.6 97.2 88.0 79.4 70.9 62.9 55.7 48.7 42.0 35.7 29.5 23.3 17.0 11.2 5.4	MAG .017 .034 .048 .060 .069 .077 .084 .090 .094 .100 .106 .110 .116 .121 .126 .134 .140 .143 .148 .153	ANG 79.6 69.7 60.6 53.2 46.4 40.6 35.8 31.0 27.0 23.5 19.8 17.1 14.2 11.1 7.8 4.9 1.0 -2.7 -5.6 -8.5	MAG .981 .944 .887 .837 .782 .740 .698 .663 .627 .599 .577 .558 .542 .525 .513 .499 .486 .471 .457 .448	ANG -7.1 -14.0 -19.3 -23.7 -27.2 -29.9 -32.0 -33.9 -35.2 -36.5 -37.5 -38.5 -39.6 -40.8 -41.8 -43.2 -44.8 -46.0 -47.1 -48.4
FREQUENCY MHz 100.00 200.00 300.00 400.00 500.00 600.00 700.00 800.00 900.00 1000.00 1100.00 1200.00 1300.00 1400.00 1500.00 1700.00 1700.00 1800.00 2000.00 2100.00	MAG .936 .892 .842 .785 .732 .681 .618 .564 .510 .459 .413 .375 .350 .325 .307 .295 .289 .283 .276 .273 .273	ANG -10.5 -20.4 -30.5 -41.2 -50.8 -59.2 -68.7 -77.9 -86.9 -96.0 -104.8 -113.0 -120.8 -128.3 -135.8 -142.9 -150.9 -158.6 -166.4 -174.1 179.6	MAG 5.612 5.628 5.602 5.393 5.328 4.924 4.767 4.575 4.365 4.191 3.991 3.790 3.588 3.410 3.234 3.086 2.960 2.830 2.707 2.597 2.504	ANG 163.6 148.9 136.8 126.0 116.2 106.6 97.2 88.0 79.4 70.9 62.9 55.7 48.7 42.0 35.7 29.5 23.3 17.0 11.2 5.4 3	MAG .017 .034 .048 .060 .069 .077 .084 .090 .094 .100 .106 .110 .116 .121 .126 .134 .140 .143 .148 .153 .159	ANG 79.6 69.7 60.6 53.2 46.4 40.6 35.8 31.0 27.0 23.5 19.8 17.1 14.2 11.1 7.8 4.9 1.0 -2.7 -5.6 -8.5 -11.6	MAG .981 .944 .887 .837 .782 .740 .698 .663 .627 .599 .577 .558 .542 .525 .513 .499 .486 .471 .457 .448 .435	ANG -7.1 -14.0 -19.3 -23.7 -27.2 -29.9 -32.0 -33.9 -35.2 -36.5 -37.5 -38.5 -39.6 -40.8 -41.8 -43.2 -44.8 -46.0 -47.1 -48.4 -49.8
FREQUENCY   MHz   100.00   200.00   300.00   400.00   500.00   600.00   700.00   800.00   900.00   1000.00   1000.00   1100.00   1200.00   1300.00   1400.00   1500.00   1600.00   1700.00   1800.00   2000.00   2100.00	MAG .936 .892 .842 .785 .732 .681 .618 .564 .510 .459 .413 .375 .350 .325 .307 .295 .289 .283 .276 .273 .273 .275	ANG -10.5 -20.4 -30.5 -41.2 -50.8 -59.2 -68.7 -77.9 -86.9 -96.0 -104.8 -113.0 -120.8 -128.3 -135.8 -142.9 -158.6 -166.4 -174.1 179.6 174.0	MAG 5.612 5.628 5.602 5.393 5.328 4.924 4.767 4.575 4.365 4.191 3.991 3.790 3.588 3.410 3.234 3.086 2.960 2.830 2.830 2.707 2.597 2.504 2.405	ANG 163.6 148.9 136.8 126.0 116.2 106.6 97.2 88.0 79.4 70.9 62.9 55.7 48.7 42.0 35.7 29.5 23.3 17.0 11.2 5.4 3 -5.9	MAG .017 .034 .048 .060 .069 .077 .084 .090 .094 .100 .106 .110 .116 .121 .126 .134 .140 .143 .143 .148 .153 .159 .164	ANG 79.6 69.7 60.6 53.2 46.4 40.6 35.8 31.0 27.0 23.5 19.8 17.1 14.2 11.1 7.8 4.9 1.0 -2.7 -5.6 -8.5 -11.6 -14.4	MAG .981 .944 .887 .837 .782 .740 .698 .663 .627 .599 .577 .558 .542 .525 .513 .499 .486 .471 .457 .448 .435 .428	ANG -7.1 -14.0 -19.3 -23.7 -27.2 -29.9 -32.0 -33.9 -35.2 -36.5 -37.5 -38.5 -39.6 -40.8 -41.8 -43.2 -44.8 -44.8 -44.8 -44.8 -45.1 -48.4 -49.8 -51.3
FREQUENCY   MHz   100.00   200.00   300.00   400.00   500.00   600.00   700.00   800.00   900.00   1000.00   1000.00   1000.00   1200.00   1300.00   1400.00   1500.00   1600.00   1900.00   2000.00   2100.00   2300.00	MAG .936 .892 .842 .785 .732 .681 .618 .564 .510 .459 .413 .375 .350 .325 .307 .295 .289 .283 .276 .273 .275 .280	ANG -10.5 -20.4 -30.5 -41.2 -50.8 -59.2 -68.7 -77.9 -86.9 -96.0 -104.8 -113.0 -120.8 -128.3 -135.8 -142.9 -150.9 -158.6 -166.4 -174.1 179.6 174.0 167.8	MAG 5.612 5.628 5.602 5.393 5.328 4.924 4.767 4.575 4.365 4.191 3.991 3.790 3.588 3.410 3.234 3.086 2.960 2.830 2.707 2.504 2.405 2.332	ANG 163.6 148.9 136.8 126.0 116.2 106.6 97.2 88.0 79.4 70.9 62.9 55.7 48.7 42.0 35.7 48.7 42.0 35.7 29.5 23.3 17.0 11.2 5.4 3 -5.9 -11.5	MAG .017 .034 .048 .060 .069 .077 .084 .090 .094 .100 .106 .110 .116 .121 .126 .134 .140 .143 .148 .153 .159 .164 .170	ANG 79.6 69.7 60.6 53.2 46.4 40.6 35.8 31.0 27.0 23.5 19.8 17.1 14.2 11.1 7.8 4.9 1.0 -2.7 -5.6 -8.5 -11.6 -14.4 -17.9	MAG .981 .944 .887 .837 .782 .740 .698 .663 .627 .599 .577 .558 .542 .525 .513 .499 .486 .471 .457 .448 .435 .428 .428 .417	ANG -7.1 -14.0 -19.3 -23.7 -27.2 -29.9 -32.0 -33.9 -35.2 -36.5 -37.5 -38.5 -39.6 -40.8 -41.8 -43.2 -44.8 -44.8 -45.2 -48.4 -49.8 -51.3 -52.7
FREQUENCY   MHz   100.00   200.00   300.00   400.00   500.00   600.00   700.00   800.00   900.00   1000.00   1000.00   1000.00   1200.00   1300.00   1400.00   1500.00   1600.00   1700.00   2000.00   2100.00   2300.00   2400.00	MAG .936 .892 .842 .785 .732 .681 .618 .564 .510 .459 .413 .375 .350 .325 .307 .295 .289 .283 .276 .273 .275 .280 .284	ANG -10.5 -20.4 -30.5 -41.2 -50.8 -59.2 -68.7 -77.9 -86.9 -96.0 -104.8 -113.0 -120.8 -120.8 -128.3 -135.8 -142.9 -150.9 -158.6 -166.4 -174.1 179.6 174.0 167.8 162.6	MAG 5.612 5.628 5.602 5.393 5.328 4.924 4.767 4.575 4.365 4.191 3.991 3.790 3.588 3.410 3.234 3.086 2.960 2.830 2.707 2.597 2.597 2.504 2.405 2.332 2.248	ANG 163.6 148.9 136.8 126.0 116.2 106.6 97.2 88.0 79.4 70.9 62.9 55.7 48.7 42.0 35.7 29.5 23.3 17.0 11.2 5.4 3 -5.9 -11.5 -16.9	MAG .017 .034 .048 .060 .069 .077 .084 .090 .094 .100 .106 .110 .116 .121 .126 .134 .140 .143 .148 .153 .148 .153 .159 .164 .170 .176	ANG 79.6 69.7 60.6 53.2 46.4 40.6 35.8 31.0 23.5 19.8 17.1 14.2 11.1 7.8 4.9 1.0 -2.7 -5.6 -8.5 -11.6 -14.4 -17.9 -20.9	MAG .981 .944 .887 .837 .782 .740 .698 .663 .627 .599 .577 .558 .542 .525 .513 .499 .486 .471 .457 .448 .435 .428 .417 .406	ANG -7.1 -14.0 -19.3 -23.7 -27.2 -29.9 -32.0 -33.9 -35.2 -36.5 -37.5 -38.5 -39.6 -40.8 -41.8 -43.2 -44.8 -46.0 -47.1 -48.4 -49.8 -51.3 -52.7 -54.2
FREQUENCY   MHz   100.00   200.00   300.00   400.00   500.00   600.00   700.00   800.00   900.00   1000.00   1000.00   1000.00   1200.00   1300.00   1400.00   1500.00   1600.00   1700.00   2000.00   2100.00   2300.00   2400.00   2500.00	MAG .936 .892 .842 .785 .732 .681 .618 .564 .510 .459 .413 .375 .350 .325 .307 .295 .289 .283 .276 .273 .275 .280 .284 .292	ANG -10.5 -20.4 -30.5 -41.2 -50.8 -59.2 -68.7 -77.9 -86.9 -96.0 -104.8 -113.0 -120.8 -120.8 -128.3 -135.8 -142.9 -150.9 -158.6 -166.4 -174.1 179.6 174.0 167.8 162.6 157.7	MAG 5.612 5.628 5.602 5.393 5.328 4.924 4.767 4.575 4.365 4.191 3.991 3.790 3.588 3.410 3.234 3.086 2.960 2.830 2.707 2.597 2.504 2.405 2.332 2.248 2.177	ANG 163.6 148.9 136.8 126.0 116.2 106.6 97.2 88.0 79.4 70.9 62.9 55.7 48.7 42.0 35.7 29.5 23.3 17.0 11.2 5.4 3 -5.9 -11.5 -16.9 -22.2	MAG .017 .034 .048 .060 .069 .077 .084 .090 .094 .100 .106 .110 .116 .121 .126 .134 .140 .143 .148 .153 .148 .153 .159 .164 .170 .176 .182	ANG 79.6 69.7 60.6 53.2 46.4 40.6 35.8 31.0 23.5 19.8 17.1 14.2 11.1 7.8 4.9 1.0 -2.7 -5.6 -8.5 -11.6 -14.4 -17.9 -20.9 -23.8	MAG .981 .944 .887 .837 .782 .740 .698 .663 .627 .599 .577 .558 .542 .525 .513 .499 .486 .471 .457 .448 .435 .428 .417 .406 .396	ANG -7.1 -14.0 -19.3 -23.7 -27.2 -29.9 -32.0 -33.9 -35.2 -36.5 -37.5 -38.5 -39.6 -40.8 -41.8 -43.2 -44.8 -46.0 -47.1 -48.4 -49.8 -51.3 -52.7 -54.2 -55.9
FREQUENCY   MHz   100.00   200.00   300.00   400.00   500.00   600.00   700.00   800.00   900.00   1000.00   1000.00   1000.00   1200.00   1300.00   1400.00   1500.00   1600.00   1700.00   2000.00   2100.00   2300.00   2400.00   2500.00   2600.00	MAG .936 .892 .842 .785 .732 .681 .618 .564 .510 .459 .413 .375 .350 .325 .307 .295 .289 .283 .276 .273 .275 .280 .284 .292 .288	ANG -10.5 -20.4 -30.5 -41.2 -50.8 -59.2 -68.7 -77.9 -86.9 -96.0 -104.8 -113.0 -120.8 -128.3 -135.8 -142.9 -150.9 -158.6 -166.4 -174.1 179.6 174.0 167.8 162.6 157.7 152.8	MAG 5.612 5.628 5.602 5.393 5.328 4.924 4.767 4.575 4.365 4.191 3.991 3.790 3.588 3.410 3.234 3.086 2.960 2.830 2.707 2.597 2.504 2.405 2.332 2.248 2.177 2.109	ANG 163.6 148.9 136.8 126.0 116.2 106.6 97.2 88.0 79.4 70.9 62.9 55.7 48.7 42.0 35.7 29.5 23.3 17.0 11.2 5.4 3 -5.9 -11.5 -16.9 -22.2 -27.6	MAG .017 .034 .048 .060 .069 .077 .084 .090 .094 .100 .106 .110 .116 .121 .126 .134 .140 .143 .148 .153 .159 .164 .170 .176 .182 .187	ANG 79.6 69.7 60.6 53.2 46.4 40.6 35.8 31.0 27.0 23.5 19.8 17.1 14.2 11.1 7.8 4.9 1.0 -2.7 -5.6 -8.5 -11.6 -14.4 -17.9 -20.9 -23.8 -27.3	MAG .981 .944 .887 .837 .782 .740 .698 .663 .627 .599 .577 .558 .542 .525 .513 .499 .486 .471 .457 .448 .435 .428 .417 .406 .396 .386	ANG -7.1 -14.0 -19.3 -23.7 -27.2 -29.9 -32.0 -33.9 -35.2 -36.5 -37.5 -38.5 -39.6 -40.8 -41.8 -40.8 -41.8 -43.2 -44.8 -46.0 -47.1 -48.4 -49.8 -51.3 -52.7 -54.2 -55.9 -57.9
FREQUENCY   MHz   100.00   200.00   300.00   400.00   500.00   600.00   700.00   800.00   900.00   1000.00   1000.00   1000.00   1000.00   1200.00   1300.00   1400.00   1500.00   1600.00   1700.00   2000.00   2100.00   2300.00   2400.00   2500.00   2600.00   2700.00	MAG .936 .892 .842 .785 .732 .681 .618 .564 .510 .459 .413 .375 .350 .325 .307 .295 .289 .283 .276 .273 .275 .280 .284 .292 .284 .292 .288 .307	ANG -10.5 -20.4 -30.5 -41.2 -50.8 -59.2 -68.7 -77.9 -86.9 -96.0 -104.8 -113.0 -120.8 -128.3 -135.8 -142.9 -158.6 -166.4 -174.1 179.6 174.0 167.8 162.6 157.7 152.8 148.7	MAG 5.612 5.628 5.602 5.393 5.328 4.924 4.767 4.575 4.365 4.191 3.991 3.790 3.588 3.410 3.234 3.086 2.960 2.830 2.707 2.597 2.504 2.405 2.332 2.248 2.177 2.109 2.051	ANG 163.6 148.9 136.8 126.0 116.2 106.6 97.2 88.0 79.4 70.9 62.9 55.7 48.7 42.0 35.7 29.5 23.3 17.0 11.2 5.4 3 -5.9 -11.5 -16.9 -22.2 -27.6 -32.9	MAG .017 .034 .048 .060 .069 .077 .084 .090 .094 .100 .106 .110 .116 .121 .126 .134 .140 .143 .148 .153 .159 .164 .170 .176 .182 .187 .194	ANG 79.6 69.7 60.6 53.2 46.4 40.6 35.8 31.0 27.0 23.5 19.8 17.1 14.2 11.1 7.8 4.9 1.0 -2.7 -5.6 -8.5 -11.6 -14.4 -14.4 -17.9 -20.9 -23.8 -27.3 -30.7	MAG .981 .944 .887 .837 .782 .740 .698 .663 .627 .599 .577 .558 .542 .525 .513 .499 .486 .471 .457 .448 .435 .428 .417 .406 .396 .386 .376	ANG -7.1 -14.0 -19.3 -23.7 -27.2 -29.9 -32.0 -33.9 -35.2 -36.5 -37.5 -38.5 -39.6 -40.8 -41.8 -41.8 -43.2 -44.8 -46.0 -47.1 -48.4 -49.8 -51.3 -52.7 -54.2 -55.9 -57.9 -59.9
FREQUENCY   MHz   100.00   200.00   300.00   400.00   500.00   600.00   700.00   800.00   900.00   1000.00   1100.00   1200.00   1300.00   1400.00   1500.00   1600.00   1700.00   2000.00   2100.00   2300.00   2400.00   2500.00   2600.00   2700.00   2800.00	MAG .936 .892 .842 .785 .732 .681 .618 .564 .510 .459 .413 .375 .350 .325 .307 .295 .289 .283 .276 .273 .275 .280 .284 .292 .284 .292 .298 .307 .316	ANG -10.5 -20.4 -30.5 -41.2 -50.8 -59.2 -68.7 -77.9 -86.9 -96.0 -104.8 -113.0 -120.8 -120.8 -128.3 -135.8 -142.9 -158.6 -166.4 -174.1 179.6 174.0 167.8 162.6 157.7 152.8 148.7 144.7	MAG 5.612 5.628 5.602 5.393 5.328 4.924 4.767 4.575 4.365 4.191 3.991 3.790 3.588 3.410 3.234 3.086 2.960 2.830 2.707 2.597 2.504 2.405 2.332 2.248 2.177 2.109 2.051 1.988	ANG 163.6 148.9 136.8 126.0 116.2 106.6 97.2 88.0 79.4 70.9 62.9 55.7 48.7 42.0 35.7 29.5 23.3 17.0 11.2 5.4 3 -5.9 -11.5 -16.9 -22.2 -27.6 -32.9 -38.1	MAG .017 .034 .048 .060 .069 .077 .084 .090 .094 .100 .106 .110 .116 .121 .126 .134 .140 .143 .148 .153 .159 .164 .170 .176 .182 .187 .194 .200	ANG 79.6 69.7 60.6 53.2 46.4 40.6 35.8 31.0 27.0 23.5 19.8 17.1 14.2 11.1 7.8 4.9 1.0 -2.7 -5.6 -8.5 -11.6 -14.4 -17.9 -23.8 -27.3 -23.8	MAG .981 .944 .887 .837 .782 .740 .698 .663 .627 .599 .577 .558 .542 .525 .513 .499 .486 .471 .457 .448 .435 .428 .417 .406 .396 .386 .376 .366	ANG -7.1 -14.0 -19.3 -23.7 -27.2 -29.9 -32.0 -33.9 -35.2 -36.5 -37.5 -38.5 -39.6 -40.8 -41.8 -41.8 -43.2 -44.8 -46.0 -47.1 -48.4 -49.8 -52.7 -54.2 -55.9 -57.9 -57.9 -59.9 -61.8
FREQUENCY   MHz   100.00   200.00   300.00   400.00   500.00   600.00   700.00   800.00   900.00   1000.00   1000.00   1000.00   1000.00   1200.00   1300.00   1400.00   1500.00   1600.00   1700.00   2000.00   2100.00   2300.00   2400.00   2500.00   2600.00   2700.00	MAG .936 .892 .842 .785 .732 .681 .618 .564 .510 .459 .413 .375 .350 .325 .307 .295 .289 .283 .276 .273 .275 .280 .284 .292 .284 .292 .288 .307	ANG -10.5 -20.4 -30.5 -41.2 -50.8 -59.2 -68.7 -77.9 -86.9 -96.0 -104.8 -113.0 -120.8 -128.3 -135.8 -142.9 -158.6 -166.4 -174.1 179.6 174.0 167.8 162.6 157.7 152.8 148.7	MAG 5.612 5.628 5.602 5.393 5.328 4.924 4.767 4.575 4.365 4.191 3.991 3.790 3.588 3.410 3.234 3.086 2.960 2.830 2.707 2.597 2.504 2.405 2.332 2.248 2.177 2.109 2.051	ANG 163.6 148.9 136.8 126.0 116.2 106.6 97.2 88.0 79.4 70.9 62.9 55.7 48.7 42.0 35.7 29.5 23.3 17.0 11.2 5.4 3 -5.9 -11.5 -16.9 -22.2 -27.6 -32.9	MAG .017 .034 .048 .060 .069 .077 .084 .090 .094 .100 .106 .110 .116 .121 .126 .134 .140 .143 .148 .153 .159 .164 .170 .176 .182 .187 .194	ANG 79.6 69.7 60.6 53.2 46.4 40.6 35.8 31.0 27.0 23.5 19.8 17.1 14.2 11.1 7.8 4.9 1.0 -2.7 -5.6 -8.5 -11.6 -14.4 -14.4 -17.9 -20.9 -23.8 -27.3 -30.7	MAG .981 .944 .887 .837 .782 .740 .698 .663 .627 .599 .577 .558 .542 .525 .513 .499 .486 .471 .457 .448 .435 .428 .417 .406 .396 .386 .376	ANG -7.1 -14.0 -19.3 -23.7 -27.2 -29.9 -32.0 -33.9 -35.2 -36.5 -37.5 -38.5 -39.6 -40.8 -41.8 -40.8 -41.8 -43.2 -44.8 -46.0 -47.1 -48.4 -49.8 -52.7 -54.2 -55.9 -57.9 -59.9

# S-PARAMETER

$V_{CE} = 3 V, I_{C} = 1 mA$	A. Zo = 50 Ω	2						
FREQUENCY		511	S2	01	S	12	S2	<b>2</b> 2
FREQUENCI	5			21	5	12	52	~~
MHz	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG
100.00	.986	-6.4	1.963	167.5	.019	82.2	.996	-4.0
200.00	.980	-13.0	2.022	157.2	.019	73.4	.990	-4.0 -8.1
300.00	.958	-19.5	2.075	147.4	.053	66.7	.966	-11.8
400.00	.936	-26.5	2.082	137.6	.070	58.7	.953	-15.4
500.00	.914	-32.8	2.114	129.5	.084	52.1	.929	-18.7
600.00	.890	-39.0	2.011	120.8	.098	45.0	.909	-22.0
700.00	.859	-45.3	1.993	112.4	.109	38.5	.883	-24.9
800.00	.833	-51.7	1.967	103.7	.120	32.1	.859	-27.7
900.00	.801	-58.0	1.916	95.7	.127	25.8	.830	-30.5
1000.00	.769	-65.2	1.952	88.0	.137	20.2	.803	-33.0
1100.00	.732	-72.5	1.972	79.8	.143	14.4	.776	-35.0
1200.00	.693	-80.0	1.987	72.4	.148	9.7	.754	-37.1
1300.00	.663	-86.7	1.945	64.6	.154	4.5	.734	-39.0
1400.00	.626	-93.9	1.936	57.2	.157	1	.712	-41.1
1500.00	.596	-100.5	1.893	49.6	.162	-4.4	.693	-42.9
1600.00	.570	-107.2	1.852	42.8	.165	-8.3	.676	-44.6
1700.00	.542	-114.9	1.845	35.3	.170	-12.9	.660	-46.5
1800.00	.523	-121.5	1.786	28.6	.172	-17.5	.640	-48.3
1900.00	.497	-129.1	1.766	21.5	.174	-21.5	.622	-49.9
2000.00	.471	-137.3	1.746	14.6	.174	-25.3	.610	-51.7
2100.00	.456	-144.2	1.707	8.2	.174	-28.5	.595	-53.3
2200.00	.443	-151.0	1.661	1.6	.176	-31.9	.583	-55.0
2300.00	.430	-158.3	1.648	-4.8	.177	-35.1	.567	-56.8
2400.00	.424	-164.8	1.598	-10.9	.178	-38.1	.557	-58.6
2500.00	.419	-171.3	1.565	-17.0	.180	-40.5	.545	-60.5
2600.00	.414	-177.8	1.534	-23.1	.182	-43.6	.534	-62.6
2700.00	.412	176.4	1.504	-29.1	.183	-46.5	.523	-64.6
2800.00	.413	170.5	1.466	-34.9	.186	-48.7	.525	-66.9
2900.00	.414	164.7	1.442	-40.6	.189	-40.7	.504	-69.2
3000.00	.414	159.5	1.442	-40.0 -46.3	.109	-53.5	.304 .495	-09.2
3000.00	.419	159.5	1.415	-40.5	.191	-00.0	.495	-/1./
$V_{CE} = 1 V$ , $I_C = 5 mA$	$7_0 - 50$	)						
FREQUENCY		- 11	S2	24	0	12	S2	20
FREQUENCY	3		52	21	3	12	54	22
MHz	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG
100.00	.849	–19.1	8.397	156.6	.021	75.5	.949	–11.9
200.00	.764	-34.1	8.259	139.2	.037	63.8	.866	-21.8
300.00	.681	-49.1	7.901	125.1	.051	54.8	.767	-28.2
400.00	.612	-63.6	7.397	113.1	.060	48.4	.689	-32.3
500.00	.534	-78.0	7.006	101.8	.068	42.2	.623	-35.2
600.00	.473	-89.5	6.297	91.7	.076	38.7	.573	-37.0

REQUENCY	ENCY S11		S2	S21		12	S	S22	
MHz	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG	
100.00	.849	-19.1	8.397	156.6	.021	75.5	.949	-11.9	
200.00	.764	-34.1	8.259	139.2	.037	63.8	.866	-21.8	
300.00	.681	-49.1	7.901	125.1	.051	54.8	.767	-28.2	
400.00	.612	-63.6	7.397	113.1	.060	48.4	.689	-32.3	
500.00	.534	-78.0	7.006	101.8	.068	42.2	.623	-35.2	
600.00	.473	-89.5	6.297	91.7	.076	38.7	.573	-37.0	
700.00	.414	-101.5	5.833	82.2	.082	35.3	.531	-38.1	
800.00	.371	-112.1	5.352	73.6	.089	31.9	.499	-39.2	
900.00	.339	-122.2	4.924	65.7	.095	28.7	.472	-39.9	
1000.00	.314	-131.4	4.557	58.5	.103	25.6	.448	-40.9	
1100.00	.295	-140.2	4.219	51.6	.109	22.8	.429	-41.2	
1200.00	.283	-148.3	3.935	45.2	.115	20.1	.414	-42.2	
1300.00	.275	-156.2	3.672	38.8	.122	16.9	.398	-42.8	
1400.00	.270	-163.3	3.448	32.9	.129	13.8	.385	-44.0	
1500.00	.267	-170.3	3.242	26.9	.136	10.7	.374	-45.0	
1600.00	.268	-176.4	3.081	21.1	.143	7.5	.362	-46.4	
1700.00	.273	177.8	2.927	15.4	.153	3.9	.353	-47.9	
1800.00	.280	172.2	2.783	9.6	.160	1	.340	-49.5	
1900.00	.288	165.8	2.663	3.9	.165	-3.8	.326	-51.1	
2000.00	.294	160.1	2.540	-1.7	.171	-6.8	.316	-52.2	
2100.00	.301	155.4	2.445	-7.0	.177	-10.1	.304	-53.7	
2200.00	.307	151.6	2.347	-12.4	.186	-13.8	.293	-55.4	
2300.00	.317	147.3	2.260	-17.8	.192	-17.2	.284	-57.0	
2400.00	324	143.6	2.177	-23.0	.199	-20.8	.272	-58.9	
2500.00	.334	140.2	2.105	-28.2	.207	-23.9	.261	-60.8	
2600.00	.345	137.0	2.037	-33.5	.214	-27.8	.251	-63.7	
2700.00	.354	134.0	1.977	-38.6	.221	-31.4	.241	-65.9	
2800.00	.365	131.0	1.913	-43.8	.228	-35.3	.230	-68.6	
2900.00	.377	128.2	1.856	-48.9	.235	-39.0	.220	-71.2	
3000.00	.387	125.5	1.808	-53.8	.244	-42.9	.210	-74.5	

-80.5

.421

## S-PARAMETER

$V_{CE} = 1 V$ , $I_C = 3 mA$	, Zo = 50 S	2						
FREQUENCY	S	511	S2	21	S	12	S	22
MHz	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG
100.00	.928	-11.2	5.570	160.2	.022	78.7	.974	-8.7
200.00	.876	-22.9	5.562	146.9	.040	67.5	.928	-16.9
300.00	.821	-34.2	5.509	134.3	.057	57.4	.859	-23.0
400.00	.758	-45.7	5.289	123.2	.070	49.7	.798	-28.0
500.00	.705	-56.7	5.198	113.1	.081	43.3	.738	-32.0
600.00	.652	-66.1	4.787	103.2	.089	37.0	.689	-35.2
700.00	.588	-76.8	4.617	93.6	.097	31.9	.640	-37.5
800.00	.535	-87.1	4.406	84.1	.103	27.6	.601	-39.4
900.00	.484	-97.1	4.187	75.5	.108	23.9	.565	-41.0
1000.00	.438	-107.0	3.986	67.1	.115	20.3	.533	-42.6
1100.00	.401	-116.3	3.771	59.1	.120	16.5	.508	-43.6
1200.00	.371	-125.4	3.566	51.8	.125	13.4	.486	-44.7
1300.00	.350	-133.4	3.362	44.8	.131	10.3	.468	-45.7
1400.00	.333	-141.3	3.177	38.3	.137	7.0	.449	-47.2
1500.00	.320	-148.7	3.015	31.8	.143	4.1	.436	-48.3
1600.00	.312	-156.1	2.872	25.8	.149	1.1	.421	-49.7
1700.00	.310	-162.9	2.745	19.5	.157	-2.5	.408	-51.4
1800.00	.310	-170.2	2.623	13.4	.162	-6.5	.391	-52.9
1900.00	.309	-177.5	2.514	7.3	.165	-9.7	.377	-54.2
2000.00	.310	175.4	2.407	1.4	.171	-12.7	.366	-55.5
2100.00	.313	169.8	2.318	-4.2	.177	-16.1	.351	-57.2
2200.00	.317	164.9	2.227	-9.8	.182	-19.1	.343	-58.5
2300.00	.324	159.5	2.157	-15.4	.188	-22.3	.330	-60.4
2400.00	.331	155.0	2.076	-20.8	.194	-25.6	.319	-62.2
2500.00	.338	150.6	2.012	-26.2	.200	-28.8	.307	-64.1
2600.00	.346	146.5	1.947	-31.7	.207	-32.4	.296	-66.8
2700.00	.356	142.6	1.894	-36.9	.213	-35.6	.285	-69.0
2800.00	.365	139.0	1.833	-42.3	.220	-39.1	.274	-71.8
2900.00	.375	135.7	1.782	-47.5	.226	-42.7	.265	-74.3
3000.00	.386	132.4	1.737	-52.7	.234	-46.1	.254	-77.2
Vce = 1 V, Ic = 1 mA FREQUENCY		2 511	S2	21	S	12	S	22
			S2 MAG		S MAG	12 ANG	S: MAG	
FREQUENCY	S MAG	511	MAG	ANG		ANG	MAG	22 ANG -4.6
FREQUENCY MHz	S MAG .983	611 ANG -6.8		ANG 166.5	MAG		MAG .993	ANG -4.6
FREQUENCY MHz 100.00	S MAG .983 .968	ANG	MAG 1.986	ANG 166.5 156.0	MAG .022	ANG 83.1	MAG .993 .983	ANG
FREQUENCY MHz 100.00 200.00	MAG .983 .968 .952	ANG -6.8 -14.0	MAG 1.986 2.016 2.067	ANG 166.5 156.0 145.7	MAG .022 .044	ANG 83.1 73.1	MAG .993 .983 .959	ANG -4.6 -9.3
FREQUENCY MHz 100.00 200.00 300.00	S MAG .983 .968	ANG -6.8 -14.0 -21.0	MAG 1.986 2.016	ANG 166.5 156.0	MAG .022 .044 .064	ANG 83.1 73.1 65.2	MAG .993 .983	ANG -4.6 -9.3 -13.6 -17.7
FREQUENCY MHz 100.00 200.00 300.00 400.00	MAG .983 .968 .952 .925	ANG -6.8 -14.0 -21.0 -28.5	MAG 1.986 2.016 2.067 2.064	ANG 166.5 156.0 145.7 135.9	MAG .022 .044 .064 .083	ANG 83.1 73.1 65.2 56.7	MAG .993 .983 .959 .942	ANG -4.6 -9.3 -13.6
FREQUENCY MHz 100.00 200.00 300.00 400.00 500.00	MAG .983 .968 .952 .925 .904	ANG -6.8 -14.0 -21.0 -28.5 -35.3	MAG 1.986 2.016 2.067 2.064 2.096	ANG 166.5 156.0 145.7 135.9 127.1	MAG .022 .044 .064 .083 .100	ANG 83.1 73.1 65.2 56.7 49.8	MAG .993 .983 .959 .942 .913	ANG -4.6 -9.3 -13.6 -17.7 -21.6
FREQUENCY MHz 100.00 200.00 300.00 400.00 500.00 600.00	MAG .983 .968 .952 .925 .904 .878	ANG -6.8 -14.0 -21.0 -28.5 -35.3 -41.8	MAG 1.986 2.016 2.067 2.064 2.096 1.992	ANG 166.5 156.0 145.7 135.9 127.1 118.1	MAG .022 .044 .064 .083 .100 .116	ANG 83.1 73.1 65.2 56.7 49.8 42.7	MAG .993 .983 .959 .942 .913 .889	ANG -4.6 -9.3 -13.6 -17.7 -21.6 -25.2
FREQUENCY MHz 100.00 200.00 300.00 400.00 500.00 600.00 700.00	MAG .983 .968 .952 .925 .904 .878 .844	ANG -6.8 -14.0 -21.0 -28.5 -35.3 -41.8 -48.6	MAG 1.986 2.016 2.067 2.064 2.096 1.992 1.971	ANG 166.5 156.0 145.7 135.9 127.1 118.1 109.4	MAG .022 .044 .064 .083 .100 .116 .129	ANG 83.1 73.1 65.2 56.7 49.8 42.7 35.5	MAG .993 .983 .959 .942 .913 .889 .859	ANG -4.6 -9.3 -13.6 -17.7 -21.6 -25.2 -28.5
FREQUENCY MHz 100.00 200.00 300.00 400.00 500.00 600.00 700.00 800.00	MAG .983 .968 .952 .925 .904 .878 .844 .816	ANG -6.8 -14.0 -21.0 -28.5 -35.3 -41.8 -48.6 -55.6	MAG 1.986 2.016 2.067 2.064 2.096 1.992 1.971 1.945	ANG 166.5 156.0 145.7 135.9 127.1 118.1 109.4 100.6	MAG .022 .044 .064 .083 .100 .116 .129 .141	ANG 83.1 73.1 65.2 56.7 49.8 42.7 35.5 28.7	MAG .993 .983 .959 .942 .913 .889 .859 .829	ANG -4.6 -9.3 -13.6 -17.7 -21.6 -25.2 -28.5 -31.7
FREQUENCY MHz 100.00 200.00 300.00 400.00 500.00 600.00 700.00 800.00 900.00	MAG .983 .968 .952 .925 .904 .878 .844 .816 .782	ANG -6.8 -14.0 -21.0 -28.5 -35.3 -41.8 -48.6 -55.6 -62.3	MAG 1.986 2.016 2.067 2.064 2.096 1.992 1.971 1.945 1.900	ANG 166.5 156.0 145.7 135.9 127.1 118.1 109.4 100.6 92.3	MAG .022 .044 .064 .083 .100 .116 .129 .141 .151	ANG 83.1 73.1 65.2 56.7 49.8 42.7 35.5 28.7 22.5	MAG .993 .983 .959 .942 .913 .889 .859 .829 .795	ANG -4.6 -9.3 -13.6 -17.7 -21.6 -25.2 -28.5 -31.7 -34.8
FREQUENCY MHz 100.00 200.00 300.00 400.00 500.00 600.00 700.00 800.00 900.00 1000.00	MAG .983 .968 .952 .925 .904 .878 .844 .844 .846 .782 .749	ANG -6.8 -14.0 -21.0 -28.5 -35.3 -41.8 -48.6 -55.6 -62.3 -69.9	MAG 1.986 2.016 2.067 2.064 2.096 1.992 1.971 1.945 1.900 1.926	ANG 166.5 156.0 145.7 135.9 127.1 118.1 109.4 100.6 92.3 84.3	MAG .022 .044 .064 .083 .100 .116 .129 .141 .151 .159	ANG 83.1 73.1 65.2 56.7 49.8 42.7 35.5 28.7 22.5 16.3	MAG .993 .983 .959 .942 .913 .889 .859 .829 .795 .765	ANG -4.6 -9.3 -13.6 -17.7 -21.6 -25.2 -28.5 -31.7 -34.8 -37.4
FREQUENCY MHz 100.00 200.00 300.00 400.00 500.00 600.00 700.00 800.00 900.00 1000.00 1100.00	MAG .983 .968 .952 .925 .904 .878 .844 .816 .782 .749 .709 .673 .639	ANG -6.8 -14.0 -21.0 -28.5 -35.3 -41.8 -48.6 -55.6 -62.3 -69.9 -77.8	MAG 1.986 2.016 2.067 2.064 2.096 1.992 1.971 1.945 1.900 1.926 1.940	ANG 166.5 156.0 145.7 135.9 127.1 118.1 109.4 100.6 92.3 84.3 76.0 68.2 60.4	MAG .022 .044 .064 .083 .100 .116 .129 .141 .151 .159 .166	ANG 83.1 73.1 65.2 56.7 49.8 42.7 35.5 28.7 22.5 16.3 11.1	MAG .993 .983 .959 .942 .913 .889 .859 .829 .795 .765 .736 .709 .686	ANG -4.6 -9.3 -13.6 -17.7 -21.6 -25.2 -28.5 -31.7 -34.8 -37.4 -39.7 -42.0 -44.2
FREQUENCY MHz 100.00 200.00 300.00 400.00 500.00 600.00 700.00 800.00 900.00 1000.00 1100.00 1200.00	MAG .983 .968 .952 .925 .904 .878 .844 .816 .782 .749 .709 .709 .673	ANG -6.8 -14.0 -21.0 -28.5 -35.3 -41.8 -48.6 -55.6 -62.3 -69.9 -77.8 -85.8	MAG 1.986 2.016 2.067 2.064 2.096 1.992 1.971 1.945 1.900 1.926 1.940 1.952	ANG 166.5 156.0 145.7 135.9 127.1 118.1 109.4 100.6 92.3 84.3 76.0 68.2	MAG .022 .044 .064 .083 .100 .116 .129 .141 .151 .151 .159 .166 .172	ANG 83.1 73.1 65.2 56.7 49.8 42.7 35.5 28.7 22.5 16.3 11.1 5.8	MAG .993 .983 .959 .942 .913 .889 .859 .829 .795 .765 .736 .709	ANG -4.6 -9.3 -13.6 -17.7 -21.6 -25.2 -28.5 -31.7 -34.8 -37.4 -39.7 -42.0
FREQUENCY MHz 100.00 200.00 300.00 400.00 500.00 600.00 700.00 800.00 900.00 1000.00 1100.00 1200.00 1300.00	MAG .983 .968 .952 .925 .904 .878 .844 .816 .782 .749 .709 .673 .639	ANG -6.8 -14.0 -21.0 -28.5 -35.3 -41.8 -48.6 -55.6 -62.3 -69.9 -77.8 -85.8 -92.8 -100.6 -107.5	MAG 1.986 2.016 2.067 2.064 2.096 1.992 1.971 1.945 1.900 1.926 1.940 1.952 1.904	ANG 166.5 156.0 145.7 135.9 127.1 118.1 109.4 100.6 92.3 84.3 76.0 68.2 60.4	MAG .022 .044 .063 .100 .116 .129 .141 .151 .151 .159 .166 .172 .178	ANG 83.1 73.1 65.2 56.7 49.8 42.7 35.5 28.7 22.5 16.3 11.1 5.8 .8	MAG .993 .983 .959 .942 .913 .889 .859 .829 .795 .765 .736 .709 .686	ANG -4.6 -9.3 -13.6 -17.7 -21.6 -25.2 -28.5 -31.7 -34.8 -37.4 -39.7 -42.0 -44.2
FREQUENCY MHz 100.00 200.00 300.00 400.00 500.00 600.00 700.00 800.00 900.00 1000.00 1100.00 1200.00 1300.00 1400.00	MAG .983 .968 .952 .925 .904 .878 .844 .816 .782 .749 .709 .673 .639 .606	ANG -6.8 -14.0 -21.0 -28.5 -35.3 -41.8 -48.6 -55.6 -62.3 -69.9 -77.8 -85.8 -92.8 -100.6	MAG 1.986 2.016 2.067 2.064 2.096 1.992 1.971 1.945 1.900 1.926 1.940 1.952 1.904 1.889	ANG 166.5 156.0 145.7 135.9 127.1 118.1 109.4 100.6 92.3 84.3 76.0 68.2 60.4 52.8	MAG .022 .044 .063 .100 .116 .129 .141 .151 .159 .166 .172 .178 .182	ANG 83.1 73.1 65.2 56.7 49.8 42.7 35.5 28.7 22.5 16.3 11.1 5.8 .8 -3.9	MAG .993 .983 .959 .942 .913 .889 .859 .829 .795 .765 .736 .709 .686 .661	ANG -4.6 -9.3 -13.6 -17.7 -21.6 -25.2 -28.5 -31.7 -34.8 -37.4 -39.7 -42.0 -44.2 -46.3
FREQUENCY MHz 100.00 200.00 300.00 400.00 500.00 600.00 700.00 800.00 900.00 1000.00 1100.00 1200.00 1300.00 1400.00	MAG .983 .968 .952 .925 .904 .878 .844 .816 .782 .749 .709 .673 .639 .606 .578 .551 .526	ANG -6.8 -14.0 -21.0 -28.5 -35.3 -41.8 -48.6 -55.6 -62.3 -69.9 -77.8 -85.8 -92.8 -100.6 -107.5	MAG 1.986 2.016 2.067 2.064 2.096 1.992 1.971 1.945 1.900 1.926 1.940 1.952 1.904 1.889 1.837 1.801 1.782	ANG 166.5 156.0 145.7 135.9 127.1 118.1 109.4 100.6 92.3 84.3 76.0 68.2 60.4 52.8 45.2 38.0 30.7	MAG .022 .044 .083 .100 .116 .129 .141 .151 .159 .166 .172 .178 .182 .185	ANG 83.1 73.1 65.2 56.7 49.8 42.7 35.5 28.7 22.5 16.3 11.1 5.8 .8 -3.9 -8.9 -12.8 -17.6	MAG .993 .983 .959 .942 .913 .889 .859 .829 .795 .765 .736 .709 .686 .661 .641 .641 .621 .603	ANG -4.6 -9.3 -13.6 -17.7 -21.6 -25.2 -28.5 -31.7 -34.8 -37.4 -39.7 -42.0 -44.2 -46.3 -48.2 -50.2 -52.2
FREQUENCY MHz 100.00 200.00 300.00 400.00 500.00 600.00 700.00 800.00 900.00 1000.00 1100.00 1200.00 1300.00 1400.00 1500.00	MAG .983 .968 .952 .925 .904 .878 .844 .816 .782 .749 .709 .673 .639 .606 .578 .551 .526 .509	ANG -6.8 -14.0 -21.0 -28.5 -35.3 -41.8 -48.6 -55.6 -62.3 -69.9 -77.8 -85.8 -92.8 -100.6 -107.5 -114.6	MAG 1.986 2.016 2.067 2.064 2.096 1.992 1.971 1.945 1.900 1.926 1.940 1.952 1.904 1.889 1.837 1.801	ANG 166.5 156.0 145.7 135.9 127.1 118.1 109.4 100.6 92.3 84.3 76.0 68.2 60.4 52.8 45.2 38.0	MAG .022 .044 .063 .100 .116 .129 .141 .151 .159 .166 .172 .178 .182 .185 .189	ANG 83.1 73.1 65.2 56.7 49.8 42.7 35.5 28.7 22.5 16.3 11.1 5.8 .8 -3.9 -8.9 -8.9 -12.8	MAG .993 .983 .959 .942 .913 .889 .859 .829 .795 .765 .736 .709 .686 .661 .641 .621 .603 .582	ANG -4.6 -9.3 -13.6 -17.7 -21.6 -25.2 -28.5 -31.7 -34.8 -37.4 -39.7 -42.0 -44.2 -46.3 -48.2 -50.2
FREQUENCY   MHz   100.00   200.00   300.00   400.00   500.00   600.00   700.00   800.00   900.00   1000.00   1100.00   1300.00   1400.00   1500.00   1600.00   1700.00	MAG .983 .968 .952 .925 .904 .878 .844 .816 .782 .749 .709 .673 .639 .606 .578 .551 .526	ANG -6.8 -14.0 -21.0 -28.5 -35.3 -41.8 -48.6 -55.6 -62.3 -69.9 -77.8 -85.8 -92.8 -100.6 -107.5 -114.6 -122.6	MAG 1.986 2.016 2.067 2.064 2.096 1.992 1.971 1.945 1.900 1.926 1.940 1.952 1.904 1.889 1.837 1.801 1.782	ANG 166.5 156.0 145.7 135.9 127.1 118.1 109.4 100.6 92.3 84.3 76.0 68.2 60.4 52.8 45.2 38.0 30.7	MAG .022 .044 .063 .100 .116 .129 .141 .151 .159 .166 .172 .178 .182 .185 .189 .195	ANG 83.1 73.1 65.2 56.7 49.8 42.7 35.5 28.7 22.5 16.3 11.1 5.8 .8 -3.9 -8.9 -12.8 -17.6	MAG .993 .983 .959 .942 .913 .889 .859 .829 .795 .765 .736 .709 .686 .661 .641 .641 .621 .603	ANG -4.6 -9.3 -13.6 -17.7 -21.6 -25.2 -28.5 -31.7 -34.8 -37.4 -39.7 -42.0 -44.2 -46.3 -48.2 -50.2 -52.2
FREQUENCY MHz 100.00 200.00 300.00 400.00 500.00 600.00 700.00 800.00 900.00 1000.00 1100.00 1100.00 1300.00 1400.00 1500.00 1600.00 1700.00 1800.00	MAG .983 .968 .952 .925 .904 .878 .844 .816 .782 .749 .709 .673 .639 .606 .578 .551 .526 .509 .487 .466	ANG -6.8 -14.0 -21.0 -28.5 -35.3 -41.8 -48.6 -55.6 -62.3 -69.9 -77.8 -85.8 -92.8 -100.6 -107.5 -114.6 -122.6 -129.5 -137.3 -145.4	MAG 1.986 2.016 2.067 2.064 2.096 1.992 1.971 1.945 1.900 1.926 1.940 1.952 1.904 1.889 1.837 1.801 1.782 1.727 1.702 1.674	ANG 166.5 156.0 145.7 135.9 127.1 118.1 109.4 100.6 92.3 84.3 76.0 68.2 60.4 52.8 45.2 38.0 30.7 23.8 16.9 9.8	MAG .022 .044 .063 .100 .116 .129 .141 .151 .159 .166 .172 .178 .182 .185 .185 .189 .195 .196 .196 .198	ANG 83.1 73.1 65.2 56.7 49.8 42.7 35.5 28.7 22.5 16.3 11.1 5.8 .8 -3.9 -8.9 -12.8 -17.6 -22.3 -26.3 -30.1	MAG .993 .983 .959 .942 .913 .889 .859 .829 .795 .765 .736 .709 .686 .661 .641 .621 .621 .603 .582 .562 .548	ANG -4.6 -9.3 -13.6 -17.7 -21.6 -25.2 -28.5 -31.7 -34.8 -37.4 -39.7 -42.0 -44.2 -46.3 -48.2 -50.2 -52.2 -54.4 -56.1 -57.9
FREQUENCY   MHz   100.00   200.00   300.00   400.00   500.00   600.00   700.00   800.00   900.00   1000.00   1100.00   1300.00   1400.00   1500.00   1600.00   1700.00   1800.00   1900.00	MAG .983 .968 .952 .925 .904 .878 .844 .816 .782 .749 .709 .673 .639 .606 .578 .551 .526 .509 .487 .466 .454	ANG -6.8 -14.0 -21.0 -28.5 -35.3 -41.8 -48.6 -55.6 -62.3 -69.9 -77.8 -85.8 -92.8 -100.6 -107.5 -114.6 -122.6 -129.5 -137.3 -145.4 -152.5	MAG 1.986 2.016 2.067 2.064 2.096 1.992 1.971 1.945 1.900 1.926 1.940 1.922 1.904 1.889 1.837 1.801 1.782 1.727 1.702 1.674 1.637	ANG 166.5 156.0 145.7 135.9 127.1 118.1 109.4 100.6 92.3 84.3 76.0 68.2 60.4 52.8 45.2 38.0 30.7 23.8 16.9 9.8 3.4	MAG .022 .044 .083 .100 .116 .129 .141 .151 .159 .166 .172 .178 .182 .185 .189 .195 .196 .196 .198 .198	ANG 83.1 73.1 65.2 56.7 49.8 42.7 35.5 28.7 22.5 16.3 11.1 5.8 .8 -3.9 -12.8 -17.6 -22.3 -26.3 -30.1 -33.7	MAG .993 .983 .959 .942 .913 .889 .859 .795 .765 .736 .709 .686 .661 .641 .621 .603 .582 .562 .548 .530	ANG -4.6 -9.3 -13.6 -17.7 -21.6 -25.2 -28.5 -31.7 -34.8 -37.4 -39.7 -42.0 -44.2 -46.3 -48.2 -50.2 -52.2 -54.4 -56.1 -57.9 -59.6
FREQUENCY   MHz   100.00   200.00   300.00   400.00   500.00   600.00   700.00   800.00   900.00   1000.00   1000.00   1100.00   1200.00   1300.00   1600.00   1700.00   1800.00   1900.00   2000.00   2100.00	MAG .983 .968 .952 .925 .904 .878 .844 .816 .782 .749 .709 .673 .639 .606 .578 .551 .526 .509 .487 .466 .454 .446	ANG -6.8 -14.0 -21.0 -28.5 -35.3 -41.8 -48.6 -55.6 -62.3 -69.9 -77.8 -85.8 -92.8 -100.6 -107.5 -114.6 -122.6 -129.5 -137.3 -445.4 -152.5 -159.2	MAG 1.986 2.016 2.067 2.064 2.096 1.992 1.971 1.945 1.900 1.926 1.940 1.952 1.904 1.889 1.837 1.801 1.782 1.727 1.702 1.674 1.637 1.590	ANG 166.5 156.0 145.7 135.9 127.1 118.1 109.4 109.4 109.4 109.4 109.4 109.4 109.4 109.4 109.4 109.4 109.4 109.4 109.4 109.4 109.4 109.4 52.8 45.2 38.0 30.7 23.8 16.9 9.8 3.4 -3.1	MAG .022 .044 .083 .100 .116 .129 .141 .151 .159 .166 .172 .178 .182 .185 .189 .195 .196 .196 .198 .198 .198 .199	ANG 83.1 73.1 65.2 56.7 49.8 42.7 35.5 28.7 22.5 16.3 11.1 5.8 .8 -3.9 -8.9 -12.8 -17.6 -22.3 -26.3 -30.1 -33.7 -36.9	MAG .993 .983 .959 .942 .913 .889 .859 .829 .795 .765 .736 .709 .686 .661 .641 .641 .621 .603 .582 .562 .548 .530 .519	ANG -4.6 -9.3 -13.6 -17.7 -21.6 -25.2 -28.5 -31.7 -34.8 -37.4 -39.7 -42.0 -44.2 -46.3 -48.2 -50.2 -52.2 -54.4 -56.1 -57.9 -59.6 -61.7
FREQUENCY   MHz   100.00   200.00   300.00   400.00   500.00   600.00   700.00   800.00   900.00   1000.00   1100.00   1200.00   1300.00   1400.00   1500.00   1600.00   1700.00   1800.00   1900.00   2000.00   2100.00	MAG .983 .968 .952 .925 .904 .878 .844 .816 .782 .749 .709 .673 .639 .606 .578 .551 .526 .509 .487 .466 .454 .454 .446 .437	ANG -6.8 -14.0 -21.0 -28.5 -35.3 -41.8 -48.6 -55.6 -62.3 -69.9 -77.8 -85.8 -92.8 -100.6 -107.5 -114.6 -122.6 -129.5 -137.3 -145.4 -152.5 -159.2 -166.3	MAG 1.986 2.016 2.067 2.064 2.096 1.992 1.971 1.945 1.900 1.926 1.940 1.925 1.904 1.889 1.837 1.801 1.782 1.727 1.702 1.674 1.637 1.590 1.571	ANG 166.5 156.0 145.7 135.9 127.1 118.1 109.4 100.6 92.3 84.3 76.0 68.2 60.4 52.8 45.2 38.0 30.7 23.8 16.9 9.8 3.4 -3.1 -9.5	MAG .022 .044 .083 .100 .116 .129 .141 .151 .159 .166 .172 .178 .182 .185 .189 .195 .196 .196 .198 .198 .198 .199 .200	ANG 83.1 73.1 65.2 56.7 49.8 42.7 35.5 28.7 22.5 16.3 11.1 5.8 .8 -3.9 -8.9 -12.8 -17.6 -22.3 -26.3 -30.1 -33.7 -36.9 -40.5	MAG .993 .983 .959 .942 .913 .889 .859 .829 .795 .765 .736 .709 .686 .661 .641 .641 .621 .603 .582 .562 .548 .530 .519 .502	ANG -4.6 -9.3 -13.6 -17.7 -21.6 -25.2 -28.5 -31.7 -34.8 -37.4 -39.7 -42.0 -44.2 -46.3 -48.2 -50.2 -52.2 -54.4 -56.1 -57.9 -59.6 -61.7 -63.5
FREQUENCY   MHz   100.00   200.00   300.00   400.00   500.00   600.00   700.00   800.00   900.00   1000.00   1000.00   1000.00   1200.00   1300.00   1400.00   1500.00   1600.00   1700.00   2000.00   2100.00   2300.00   2400.00	MAG .983 .968 .952 .925 .904 .878 .844 .816 .782 .749 .709 .673 .639 .606 .578 .551 .526 .509 .487 .466 .454 .446 .437 .433	ANG -6.8 -14.0 -21.0 -28.5 -35.3 -41.8 -48.6 -55.6 -62.3 -69.9 -77.8 -85.8 -92.8 -100.6 -107.5 -114.6 -122.6 -129.5 -137.3 -145.4 -152.5 -159.2 -166.3 -172.8	MAG 1.986 2.016 2.067 2.064 2.096 1.992 1.971 1.945 1.900 1.926 1.940 1.925 1.904 1.889 1.837 1.801 1.782 1.727 1.702 1.674 1.637 1.590 1.571 1.520	ANG 166.5 156.0 145.7 135.9 127.1 118.1 109.4 100.6 92.3 84.3 76.0 68.2 60.4 52.8 45.2 38.0 30.7 23.8 16.9 9.8 3.4 -3.1 -9.5 -15.7	MAG .022 .044 .083 .100 .116 .129 .141 .151 .159 .166 .172 .178 .182 .185 .189 .195 .196 .196 .198 .198 .198 .199 .200 .201	ANG 83.1 73.1 65.2 56.7 49.8 42.7 35.5 28.7 22.5 16.3 11.1 5.8 .8 -3.9 -8.9 -12.8 -17.6 -22.3 -26.3 -30.1 -33.7 -36.9 -40.5 -43.8	MAG .993 .983 .959 .942 .913 .889 .859 .829 .765 .736 .709 .686 .661 .641 .641 .621 .603 .582 .562 .548 .530 .519 .502 .490	ANG -4.6 -9.3 -13.6 -17.7 -21.6 -25.2 -28.5 -31.7 -34.8 -37.4 -39.7 -42.0 -44.2 -46.3 -48.2 -50.2 -52.2 -54.4 -56.1 -57.9 -59.6 -61.7 -63.5 -65.7
FREQUENCY   MHz   100.00   200.00   300.00   400.00   500.00   600.00   700.00   800.00   900.00   1000.00   1000.00   1200.00   1300.00   1400.00   1500.00   1600.00   1700.00   2000.00   2100.00   2300.00   2400.00   2500.00	MAG .983 .968 .952 .925 .904 .878 .844 .816 .782 .749 .709 .673 .639 .606 .578 .551 .526 .509 .487 .466 .454 .454 .446 .437 .433 .430	ANG -6.8 -14.0 -21.0 -28.5 -35.3 -41.8 -48.6 -55.6 -62.3 -69.9 -77.8 -85.8 -92.8 -100.6 -107.5 -114.6 -122.6 -129.5 -137.3 -145.4 -152.5 -159.2 -166.3 -172.8 -179.0	MAG 1.986 2.016 2.067 2.064 2.096 1.992 1.971 1.945 1.900 1.926 1.940 1.925 1.904 1.889 1.837 1.801 1.782 1.727 1.702 1.674 1.637 1.590 1.571 1.520 1.488	ANG 166.5 156.0 145.7 135.9 127.1 118.1 109.4 100.6 92.3 84.3 76.0 68.2 60.4 52.8 45.2 38.0 30.7 23.8 16.9 9.8 3.4 -3.1 -9.5 -15.7 -21.7	MAG .022 .044 .083 .100 .116 .129 .141 .151 .159 .166 .172 .178 .182 .185 .189 .195 .196 .196 .198 .198 .198 .198 .199 .200 .201 .201	ANG 83.1 73.1 65.2 56.7 49.8 42.7 35.5 28.7 22.5 16.3 11.1 5.8 .8 -3.9 -8.9 -12.8 -17.6 -22.3 -30.1 -30.1 -33.7 -36.9 -40.5 -43.8 -46.5	MAG .993 .983 .959 .942 .913 .889 .859 .829 .765 .736 .709 .686 .661 .641 .621 .682 .562 .548 .530 .519 .502 .490 .477	ANG -4.6 -9.3 -13.6 -17.7 -21.6 -25.2 -28.5 -31.7 -34.8 -37.4 -39.7 -42.0 -44.2 -46.3 -48.2 -50.2 -52.2 -54.4 -56.1 -57.9 -59.6 -61.7 -63.5 -65.7 -67.7
FREQUENCY   MHz   100.00   200.00   300.00   400.00   500.00   600.00   700.00   800.00   900.00   1000.00   1000.00   1100.00   1200.00   1300.00   1400.00   1500.00   1600.00   1700.00   2000.00   2100.00   2300.00   2400.00   2500.00   2600.00	MAG .983 .968 .952 .925 .904 .878 .844 .816 .782 .749 .709 .673 .639 .606 .578 .551 .526 .509 .487 .466 .454 .454 .454 .433 .430 .429	ANG -6.8 -14.0 -21.0 -28.5 -35.3 -41.8 -48.6 -55.6 -62.3 -69.9 -77.8 -85.8 -92.8 -100.6 -107.5 -114.6 -122.6 -129.5 -137.3 -145.4 -152.5 -159.2 -166.3 -172.8 -179.0 174.8	MAG 1.986 2.016 2.067 2.064 2.096 1.992 1.971 1.945 1.900 1.926 1.940 1.925 1.904 1.889 1.837 1.801 1.782 1.727 1.702 1.674 1.637 1.590 1.571 1.520 1.488 1.459	ANG 166.5 156.0 145.7 135.9 127.1 118.1 109.4 100.6 92.3 84.3 76.0 68.2 60.4 52.8 45.2 38.0 30.7 23.8 16.9 9.8 3.4 -3.1 -9.5 -15.7 -21.7 -27.8	MAG .022 .044 .083 .100 .116 .129 .141 .151 .159 .166 .172 .178 .182 .185 .189 .195 .196 .196 .198 .198 .198 .198 .199 .200 .201 .201 .201 .203	ANG 83.1 73.1 65.2 56.7 49.8 42.7 35.5 28.7 22.5 16.3 11.1 5.8 .8 -3.9 -8.9 -12.8 -17.6 -22.3 -30.1 -36.3 -30.1 -36.9 -40.5 -43.8 -40.5 -49.3	MAG .993 .983 .959 .942 .913 .889 .859 .829 .795 .765 .736 .709 .686 .661 .641 .621 .603 .582 .562 .548 .530 .519 .502 .490 .477 .466	ANG -4.6 -9.3 -13.6 -17.7 -21.6 -25.2 -28.5 -31.7 -34.8 -37.4 -39.7 -42.0 -44.2 -46.3 -48.2 -50.2 -52.2 -54.4 -56.1 -57.9 -59.6 -61.7 -63.5 -65.7 -67.7 -70.0
FREQUENCY   MHz   100.00   200.00   300.00   400.00   500.00   600.00   700.00   800.00   900.00   1000.00   1100.00   1200.00   1300.00   1400.00   1500.00   1600.00   1700.00   1800.00   2000.00   2100.00   2300.00   2400.00   2500.00   2600.00   2700.00	MAG .983 .968 .952 .925 .904 .878 .844 .816 .782 .749 .709 .673 .639 .606 .578 .551 .526 .509 .487 .466 .454 .454 .446 .437 .433 .430 .429 .429	ANG -6.8 -14.0 -21.0 -28.5 -35.3 -41.8 -48.6 -55.6 -62.3 -69.9 -77.8 -85.8 -92.8 -100.6 -107.5 -114.6 -122.6 -129.5 -137.3 -145.4 -152.5 -137.3 -145.4 -152.5 -159.2 -166.3 -172.8 -179.0 174.8 169.2	MAG 1.986 2.016 2.067 2.064 2.096 1.992 1.971 1.945 1.900 1.926 1.940 1.952 1.904 1.889 1.837 1.801 1.782 1.727 1.702 1.674 1.637 1.590 1.571 1.520 1.488 1.459 1.425	ANG 166.5 156.0 145.7 135.9 127.1 118.1 109.4 100.6 92.3 84.3 76.0 68.2 60.4 52.8 45.2 38.0 30.7 23.8 16.9 9.8 3.4 -3.1 -9.5 -15.7 -21.7 -27.8 -33.7	MAG .022 .044 .083 .100 .116 .129 .141 .151 .159 .166 .172 .178 .182 .185 .189 .195 .196 .196 .198 .198 .198 .199 .200 .201 .201 .201 .203 .204	ANG 83.1 73.1 65.2 56.7 49.8 42.7 35.5 28.7 22.5 16.3 11.1 5.8 .8 -3.9 -8.9 -12.8 -17.6 -22.3 -26.3 -30.1 -33.7 -36.9 -40.5 -43.8 -46.5 -49.3 -52.3	MAG .993 .983 .959 .942 .913 .889 .859 .829 .795 .765 .736 .709 .686 .661 .641 .641 .621 .603 .582 .562 .548 .530 .519 .502 .490 .477 .466 .453	ANG -4.6 -9.3 -13.6 -17.7 -21.6 -25.2 -28.5 -31.7 -34.8 -37.4 -39.7 -42.0 -44.2 -46.3 -48.2 -50.2 -52.2 -54.4 -56.1 -57.9 -59.6 -61.7 -63.5 -65.7 -67.7 -70.0 -72.4
FREQUENCY   MHz   100.00   200.00   300.00   400.00   500.00   600.00   700.00   800.00   900.00   1000.00   1000.00   1100.00   1200.00   1300.00   1400.00   1500.00   1600.00   1700.00   1800.00   2000.00   2100.00   2300.00   2400.00   2500.00   2600.00   2700.00   2800.00	MAG .983 .968 .952 .925 .904 .878 .844 .816 .782 .749 .709 .673 .639 .606 .578 .551 .526 .509 .487 .466 .454 .446 .437 .433 .430 .429 .429 .429 .433	ANG -6.8 -14.0 -21.0 -28.5 -35.3 -41.8 -48.6 -55.6 -62.3 -69.9 -77.8 -85.8 -92.8 -100.6 -107.5 -114.6 -122.6 -129.5 -137.3 -145.4 -152.5 -159.2 -166.3 -172.8 -179.0 174.8 169.2 163.8	MAG 1.986 2.016 2.067 2.064 2.096 1.992 1.971 1.945 1.900 1.926 1.940 1.952 1.904 1.889 1.837 1.801 1.782 1.727 1.702 1.674 1.637 1.590 1.571 1.520 1.488 1.459 1.425 1.390	ANG 166.5 156.0 145.7 135.9 127.1 118.1 109.4 100.6 92.3 84.3 76.0 68.2 60.4 52.8 45.2 38.0 30.7 23.8 16.9 9.8 3.4 -3.1 -9.5 -15.7 -21.7 -27.8 -33.7 -39.5	MAG .022 .044 .083 .100 .116 .129 .141 .151 .159 .166 .172 .178 .182 .185 .189 .195 .196 .196 .198 .198 .198 .199 .200 .201 .201 .201 .203 .204 .206	ANG 83.1 73.1 65.2 56.7 49.8 42.7 35.5 28.7 22.5 16.3 11.1 5.8 .8 -3.9 -8.9 -12.8 -17.6 -22.3 -26.3 -30.1 -33.7 -36.9 -40.5 -43.8 -40.5 -49.3 -55.1	MAG .993 .983 .959 .942 .913 .889 .859 .829 .795 .765 .736 .709 .686 .661 .641 .641 .621 .603 .582 .562 .548 .530 .519 .502 .490 .477 .466 .453 .443	ANG -4.6 -9.3 -13.6 -17.7 -21.6 -25.2 -28.5 -31.7 -34.8 -37.4 -39.7 -42.0 -44.2 -46.3 -48.2 -50.2 -52.2 -54.4 -56.1 -57.9 -59.6 -61.7 -63.5 -65.7 -67.7 -70.0 -72.4 -75.1
FREQUENCY   MHz   100.00   200.00   300.00   400.00   500.00   600.00   700.00   800.00   900.00   1000.00   1100.00   1200.00   1300.00   1400.00   1500.00   1600.00   1700.00   1800.00   2000.00   2100.00   2300.00   2400.00   2500.00   2600.00   2700.00	MAG .983 .968 .952 .925 .904 .878 .844 .816 .782 .749 .709 .673 .639 .606 .578 .551 .526 .509 .487 .466 .454 .454 .446 .437 .433 .430 .429 .429	ANG -6.8 -14.0 -21.0 -28.5 -35.3 -41.8 -48.6 -55.6 -62.3 -69.9 -77.8 -85.8 -92.8 -100.6 -107.5 -114.6 -122.6 -129.5 -137.3 -145.4 -152.5 -137.3 -145.4 -152.5 -159.2 -166.3 -172.8 -179.0 174.8 169.2	MAG 1.986 2.016 2.067 2.064 2.096 1.992 1.971 1.945 1.900 1.926 1.940 1.952 1.904 1.889 1.837 1.801 1.782 1.727 1.702 1.674 1.637 1.590 1.571 1.520 1.488 1.459 1.425	ANG 166.5 156.0 145.7 135.9 127.1 118.1 109.4 100.6 92.3 84.3 76.0 68.2 60.4 52.8 45.2 38.0 30.7 23.8 16.9 9.8 3.4 -3.1 -9.5 -15.7 -21.7 -27.8 -33.7	MAG .022 .044 .083 .100 .116 .129 .141 .151 .159 .166 .172 .178 .182 .185 .189 .195 .196 .196 .198 .198 .198 .199 .200 .201 .201 .201 .203 .204	ANG 83.1 73.1 65.2 56.7 49.8 42.7 35.5 28.7 22.5 16.3 11.1 5.8 .8 -3.9 -8.9 -12.8 -17.6 -22.3 -26.3 -30.1 -33.7 -36.9 -40.5 -43.8 -46.5 -49.3 -52.3	MAG .993 .983 .959 .942 .913 .889 .859 .829 .795 .765 .736 .709 .686 .661 .641 .641 .621 .603 .582 .562 .548 .530 .519 .502 .490 .477 .466 .453	ANG -4.6 -9.3 -13.6 -17.7 -21.6 -25.2 -28.5 -31.7 -34.8 -37.4 -39.7 -42.0 -44.2 -46.3 -48.2 -50.2 -52.2 -54.4 -56.1 -57.9 -59.6 -61.7 -63.5 -65.7 -67.7 -70.0 -72.4

3000.00

.443

153.5

1.336

-50.9

.211

-60.2

[MEMO]

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