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April 1st, 2010 Renesas Electronics Corporation

Issued by: Renesas Electronics Corporation (http://www.renesas.com)

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SILICON TRANSISTOR

2SC5010

NPN SILICON EPITAXIAL TRANSISTOR 3 PINS ULTRA SUPER MINI MOLD

DESCRIPTION

The 2SC5010 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 (NEST3 process) which is an NEC proprietary fabrication technique.

FEATURES

· Low Voltage Use.

• High ft : 12.0 GHz TYP. (@ Vce = 3 V, Ic = 10 mA, f = 2 GHz)

• Low Cre : 0.4 pF TYP. (@ VcE = 3 V, IE = 0, f = 1 MHz)

• Low NF : 1.5 dB TYP. (@ VcE = 3 V, Ic = 3 mA, f = 2 GHz)

• High $|S_{21e}|^2$: 8.5 dB TYP. (@ VCE = 3 V, Ic = 10 mA, f = 2 GHz)

• Ultra Super Mini Mold Package.

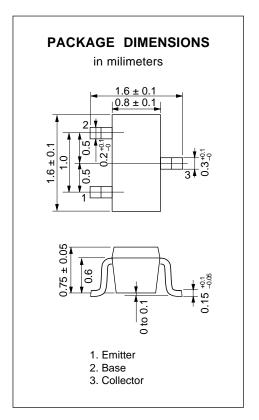
ORDERING INFORMATION

PART NUMBER	QUANTITY	PACKING STYLE
2SC5010	50 pcs/Unit.	Embossed tape 8 mm wide.
2SC5010-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 (TA = 25 °C)

Collector to Base Voltage	Vсво	9	V
Collector to Emitter Voltage	VCEO	6	V
Emitter to Base Voltage	VEBO	2	V
Collector Current	Ic	30	mΑ
Total Power Dissipation	Рт	125	mW
Junction Temperature	T_j	150	°C
Storage Temperature	T_{stg}	-65 to +150	°C



Date Published July 1995 P Printed in Japan



ELECTRICAL CHARACTERISTICS (TA = 25 °C)

CHARACTERISTIC	SYMBOL	MIN.	TYP.	MAX.	UNIT	TEST CONDITIONS
Collector Cutoff Current	Ісво			0.1	μΑ	Vcb = 5 V, IE = 0
Emitter Cutoff Current	ІЕВО			0.1	μΑ	V _{EB} = 1 V, I _C = 0
DC Current Gain	hfe	75		150		VcE = 3 V, Ic = 10 mA*1
Gain Bandwidth Product	f⊤		12.0		GHz	VcE = 3 V, Ic = 10 mA, f = 2 GHz
Feed-Back Capacitance	Cre		0.4	0.7	pF	Vce = 3 V, Ie = 0 , f = 1 MHz*2
Insertion Power Gain	S _{21e} ²	7.0	8.5		dB	VcE = 3 V, Ic = 10 mA, f = 2 GHz
Noise Figure	NF		1.5	2.5	dB	VcE = 3 V, Ic = 3 mA, f = 2 GHz

^{*1} Pulse Measurement PW \leq 350 μ s, Duty Cycle \leq 2 %

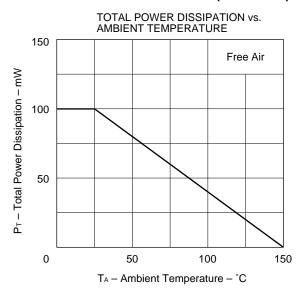
hfe Classification

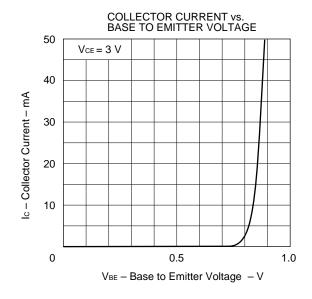
Rank	FB
Marking	83
hfe	75 to 150

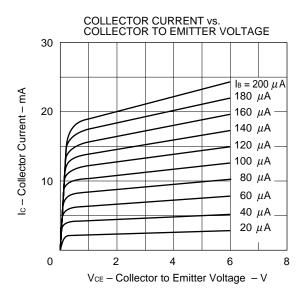
^{*2} The emitter terminal and the case shall be connected to the guard terminal of the three-terminal capacitance bridge.

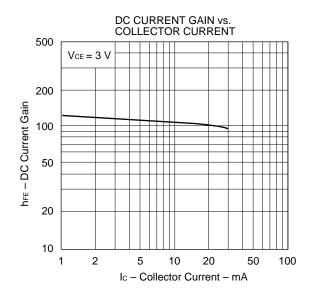


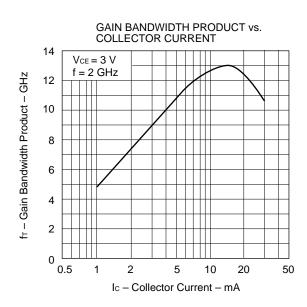
TYPICAL CHARACTERISTICS (TA = 25 °C)

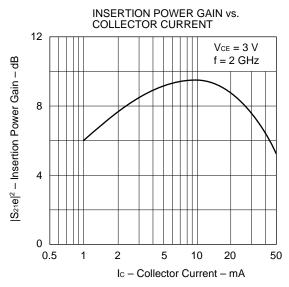




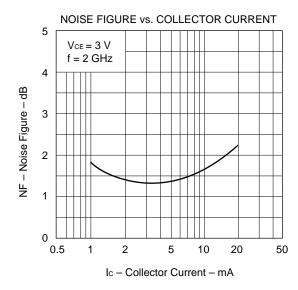


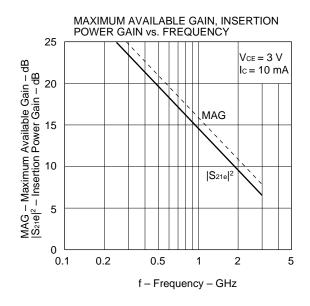


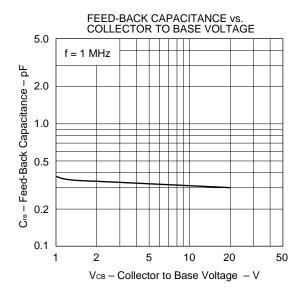












Vce = 3 V, Ic = 10 mA, Zo = 50 Ω

FREQUENCY S ₁₁ S ₂₁ S ₁₂	S ₂₂	
MHz MAG ANG MAG ANG MAG ANG	MAG AN	G
100.00 .735 -18.7 15.465 157.7 .017 78.5 200.00 .640 -37.8 14.330 142.1 .030 69.7	.931 –15 .810 –25	
300.00 .534 -55.7 13.115 129.2 .040 66.3	.700 –32	
400.00 .438 -71.4 11.574 118.3 .048 64.5	.612 –36	
500.00 .364 -84.9 10.235 109.9 .057 63.7	.547 –38	3.2
600.00 .311 –96.6 8.943 103.1 .064 63.3	.499 –39	
700.00 .268 -107.0 7.935 97.7 .072 62.8	.461 –40	
800.00 .241 -116.9 7.105 92.7 .080 62.7 900.00 .218 -126.4 6.425 88.7 .088 62.6	.430 –40 .405 –41	
900.00 .218 -126.4 6.425 88.7 .088 62.6 1000.00 .204 -135.9 5.864 84.8 .095 62.0	.386 –42	2 2
1100.00 .192 -144.5 5.397 81.4 .103 61.0	.370 –42	2.8
1200.00 .186 -153.7 4.992 78.1 .111 60.9	.354 –43	3.6
1300.00 .183 –161.8 4.628 75.1 .119 60.5	.341 –44	1.5
1400.00 .184 -169.5 4.348 72.3 .127 59.4	.328 -45	5.4
1500.00 .185 -176.7 4.072 69.2 .134 58.4	.317 –46 .305 –48	8.6
1600.00 .189 176.4 3.851 66.6 .142 57.7 1700.00 .196 169.9 3.643 63.8 .151 56.9	.305 –48 .294 –49	
1800.00 .201 164.8 3.457 61.3 .158 55.9	.285 –50).6
1900.00 .208 159.7 3.311 59.0 .166 55.1	.271 –52	2.2
2000.00 .219 155.1 3.156 56.6 .176 53.7	.261 –54	1.0
2100.00 .228 150.6 3.024 54.1 .183 52.3	.249 –55	
2200.00 .239 147.1 2.904 51.5 .190 51.4	.239 –57	
2300.00 .248 143.3 2.790 49.3 .199 50.3 2400.00 .259 139.9 2.685 46.8 .207 49.0	.229 –59 .218 –62	9.8 2.0
2500.00 .270 136.9 2.593 44.7 .215 47.9	.206 –64	1.6
2600.00 .281 133.7 2.511 42.2 .223 46.4	.197 –67	
2700.00 .293 131.6 2.425 40.2 .230 45.5	.185 –70).1
2800.00 .305 128.7 2.354 37.9 .237 43.9	.174 –73	
2900.00 .316 126.3 2.283 35.6 .246 43.0	.162 –77	
3000.00 .329 124.5 2.220 33.5 .253 41.5	.151 –81	1.1
VCE = 3 V, IC = 7 mA, $ZO = 50 \Omega$		
FREQUENCY S ₁₁ S ₂₁ S ₁₂	S ₂₂	_
FREQUENCY S ₁₁ S ₂₁ S ₁₂ MHz MAG ANG MAG ANG MAG ANG	MAG S22	G
FREQUENCY MAG ANG MAG MAG MAG MAG MAG MAG MAG MAG MAG MA	MAG AN	
MHz MAG ANG MAG ANG MAG ANG 100.00 .855 -14.2 10.699 164.8 .019 80.2 200.00 .787 -28.4 10.334 151.4 .035 73.3	MAG AN .968 -10 .902 -19).6 9.8
MHz MAG ANG MAG ANG MAG ANG 100.00 .855 -14.2 10.699 164.8 .019 80.2 200.00 .787 -28.4 10.334 151.4 .035 73.3 300.00 .715 -41.9 9.924 140.1 .048 68.5	MAG AN .968 -10 .902 -19 .825 -27	0.6 9.8 7.0
MHz MAG ANG MAG ANG MAG ANG 100.00 .855 -14.2 10.699 164.8 .019 80.2 200.00 .787 -28.4 10.334 151.4 .035 73.3 300.00 .715 -41.9 9.924 140.1 .048 68.5 400.00 .631 -54.9 9.183 130.2 .059 63.4	MAG AN .968 -10 .902 -19 .825 -27 .743 -32	0.6 9.8 7.0 2.5
MHz MAG ANG MAG ANG MAG ANG 100.00 .855 -14.2 10.699 164.8 .019 80.2 200.00 .787 -28.4 10.334 151.4 .035 73.3 300.00 .715 -41.9 9.924 140.1 .048 68.5 400.00 .631 -54.9 9.183 130.2 .059 63.4 500.00 .561 -66.5 8.559 121.7 .068 60.9	MAG AN .968 -10 .902 -19 .825 -27 .743 -32 .678 -36).6).8 7.0 2.5).5
MHz MAG ANG MAG ANG MAG ANG 100.00 .855 -14.2 10.699 164.8 .019 80.2 200.00 .787 -28.4 10.334 151.4 .035 73.3 300.00 .715 -41.9 9.924 140.1 .048 68.5 400.00 .631 -54.9 9.183 130.2 .059 63.4 500.00 .561 -66.5 8.559 121.7 .068 60.9 600.00 .495 -77.0 7.749 113.9 .077 58.8	MAG AN .968 -10 .902 -19 .825 -27 .743 -32 .678 -36 .621 -39	0.6 0.8 7.0 2.5 6.5 0.4
MHz MAG ANG MAG ANG MAG ANG 100.00 .855 -14.2 10.699 164.8 .019 80.2 200.00 .787 -28.4 10.334 151.4 .035 73.3 300.00 .715 -41.9 9.924 140.1 .048 68.5 400.00 .631 -54.9 9.183 130.2 .059 63.4 500.00 .561 -66.5 8.559 121.7 .068 60.9	MAG AN .968 -10 .902 -19 .825 -27 .743 -32 .678 -36	0.6 9.8 7.0 2.5 6.5 9.4
MHz MAG ANG MAG ANG MAG ANG 100.00 .855 -14.2 10.699 164.8 .019 80.2 200.00 .787 -28.4 10.334 151.4 .035 73.3 300.00 .715 -41.9 9.924 140.1 .048 68.5 400.00 .631 -54.9 9.183 130.2 .059 63.4 500.00 .561 -66.5 8.559 121.7 .068 60.9 600.00 .495 -77.0 7.749 113.9 .077 58.8 700.00 .434 -86.4 7.090 107.6 .084 57.5 800.00 .387 -95.8 6.490 101.5 .092 56.4 900.00 .346 -104.1 5.972 96.6 .099 55.5	MAG AN .968 -10 .902 -19 .825 -27 .743 -32 .678 -36 .621 -39 .572 -41 .531 -43 .496 -45	0.6 9.8 7.0 2.5 6.5 9.4 1.9 3.4
MHz MAG ANG MAG ANG MAG ANG 100.00 .855 -14.2 10.699 164.8 .019 80.2 200.00 .787 -28.4 10.334 151.4 .035 73.3 300.00 .715 -41.9 9.924 140.1 .048 68.5 400.00 .631 -54.9 9.183 130.2 .059 63.4 500.00 .561 -66.5 8.559 121.7 .068 60.9 600.00 .495 -77.0 7.749 113.9 .077 58.8 700.00 .434 -86.4 7.090 107.6 .084 57.5 800.00 .387 -95.8 6.490 101.5 .092 56.4 900.00 .346 -104.1 5.972 96.6 .099 55.5 1000.00 .313 -113.2 5.531 91.8 .105 55.0	MAG AN .968 -10 .902 -19 .825 -27 .743 -32 .678 -36 .621 -39 .572 -41 .531 -43 .496 -45 .467 -46	0.6 0.8 7.0 2.5 6.5 0.4 1.9 8.4 5.1
MHz MAG ANG MAG ANG MAG ANG 100.00 .855 -14.2 10.699 164.8 .019 80.2 200.00 .787 -28.4 10.334 151.4 .035 73.3 300.00 .715 -41.9 9.924 140.1 .048 68.5 400.00 .631 -54.9 9.183 130.2 .059 63.4 500.00 .561 -66.5 8.559 121.7 .068 60.9 600.00 .495 -77.0 7.749 113.9 .077 58.8 700.00 .434 -86.4 7.090 107.6 .084 57.5 800.00 .387 -95.8 6.490 101.5 .092 56.4 900.00 .346 -104.1 5.972 96.6 .099 55.5 1000.00 .313 -113.2 5.531 91.8 .105 55.0 1100.00 .287 -121.1 5.1	MAG AN .968 -10 .902 -19 .825 -27 .743 -32 .678 -36 .621 -39 .572 -41 .531 -43 .496 -45 .467 -46	0.6 0.8 7.0 2.5 6.5 0.4 1.9 3.4 5.1 6.4 7.3
MHz MAG ANG MAG ANG MAG ANG 100.00 .855 -14.2 10.699 164.8 .019 80.2 200.00 .787 -28.4 10.334 151.4 .035 73.3 300.00 .715 -41.9 9.924 140.1 .048 68.5 400.00 .631 -54.9 9.183 130.2 .059 63.4 500.00 .561 -66.5 8.559 121.7 .068 60.9 600.00 .495 -77.0 7.749 113.9 .077 58.8 700.00 .434 -86.4 7.090 107.6 .084 57.5 800.00 .387 -95.8 6.490 101.5 .092 56.4 900.00 .346 -104.1 5.972 96.6 .099 55.5 1000.00 .313 -113.2 5.531 91.8 .105 55.0 1100.00 .287 -121.1 5.1	MAG AN .968 -10 .902 -19 .825 -27 .743 -32 .678 -36 .621 -39 .572 -41 .531 -43 .496 -45 .467 -46 .442 -47 .420 -48).6 9.8 7.0 2.5 5.5 9.4 1.9 3.4 5.1 7.3
MHz MAG ANG MAG ANG MAG ANG 100.00 .855 -14.2 10.699 164.8 .019 80.2 200.00 .787 -28.4 10.334 151.4 .035 73.3 300.00 .715 -41.9 9.924 140.1 .048 68.5 400.00 .631 -54.9 9.183 130.2 .059 63.4 500.00 .561 -66.5 8.559 121.7 .068 60.9 600.00 .495 -77.0 7.749 113.9 .077 58.8 700.00 .434 -86.4 7.090 107.6 .084 57.5 800.00 .387 -95.8 6.490 101.5 .092 56.4 900.00 .346 -104.1 5.972 96.6 .099 55.5 1000.00 .313 -113.2 5.531 91.8 .105 55.0 1100.00 .287 -121.1 5.1	MAG AN .968 -10 .902 -19 .825 -27 .743 -32 .678 -36 .621 -39 .572 -41 .531 -43 .496 -45 .467 -46).6).8 7.0 2.5 5.5).4 1.9 3.4 7.3 3.4 7.3
MHz MAG ANG MAG ANG MAG ANG 100.00 .855 -14.2 10.699 164.8 .019 80.2 200.00 .787 -28.4 10.334 151.4 .035 73.3 300.00 .715 -41.9 9.924 140.1 .048 68.5 400.00 .631 -54.9 9.183 130.2 .059 63.4 500.00 .561 -66.5 8.559 121.7 .068 60.9 600.00 .495 -77.0 7.749 113.9 .077 58.8 700.00 .434 -86.4 7.090 107.6 .084 57.5 800.00 .387 -95.8 6.490 101.5 .092 56.4 900.00 .346 -104.1 5.972 96.6 .099 55.5 1000.00 .287 -121.1 5.117 87.8 .113 54.3 1200.00 .266 -129.5 4.7	MAG AN .968 -10 .902 -19 .825 -27 .743 -32 .678 -36 .621 -39 .572 -41 .531 -43 .496 -45 .467 -46 .442 -47 .420 -48 .399 -49 .381 -50 .364 -51).6).8 7.0 2.5 5.5).4 1.9 3.4 5.1 5.4 7.3 3.4 9.7
MHz MAG ANG MAG ANG MAG ANG 100.00 .855 -14.2 10.699 164.8 .019 80.2 200.00 .787 -28.4 10.334 151.4 .035 73.3 300.00 .715 -41.9 9.924 140.1 .048 68.5 400.00 .631 -54.9 9.183 130.2 .059 63.4 500.00 .561 -66.5 8.559 121.7 .068 60.9 600.00 .495 -77.0 7.749 113.9 .077 58.8 700.00 .434 -86.4 7.090 107.6 .084 57.5 800.00 .387 -95.8 6.490 101.5 .092 56.4 900.00 .346 -104.1 5.972 96.6 .099 55.5 1000.00 .287 -121.1 5.117 87.8 .113 54.3 1200.00 .266 -129.5 4.7	MAG AN .968 -10 .902 -19 .825 -27 .743 -32 .678 -36 .621 -39 .572 -41 .531 -43 .496 -45 .467 -46 .442 -47 .420 -48 .399 -49 .381 -50 .364 -51 .349 -53	0.6 9.8 7.0 2.5 5.5 9.4 1.9 3.4 7.3 3.4 9.7 9.5 1.9
MHz MAG ANG MAG ANG MAG ANG 100.00 .855 -14.2 10.699 164.8 .019 80.2 200.00 .787 -28.4 10.334 151.4 .035 73.3 300.00 .715 -41.9 9.924 140.1 .048 68.5 400.00 .631 -54.9 9.183 130.2 .059 63.4 500.00 .561 -66.5 8.559 121.7 .068 60.9 600.00 .495 -77.0 7.749 113.9 .077 58.8 700.00 .434 -86.4 7.090 107.6 .084 57.5 800.00 .387 -95.8 6.490 101.5 .092 56.4 900.00 .346 -104.1 5.972 96.6 .099 55.5 1000.00 .287 -121.1 5.117 87.8 .113 54.3 1200.00 .286 -129.5 4.7	MAG AN .968 -10 .902 -19 .825 -27 .743 -32 .678 -36 .621 -39 .572 -41 .531 -43 .496 -45 .467 -46 .442 -47 .420 -48 .399 -49 .381 -50 .364 -51 .349 -53 .336 -54	0.6 0.8 7.0 2.5 0.4 1.9 3.4 5.1 3.4 0.7 0.5 1.9 3.4 1.9 1.9 1.9 1.9 1.9 1.9 1.9 1.9
MHz MAG ANG MAG ANG MAG ANG 100.00 .855 -14.2 10.699 164.8 .019 80.2 200.00 .787 -28.4 10.334 151.4 .035 73.3 300.00 .715 -41.9 9.924 140.1 .048 68.5 400.00 .631 -54.9 9.183 130.2 .059 63.4 500.00 .561 -66.5 8.559 121.7 .068 60.9 600.00 .495 -77.0 7.749 113.9 .077 58.8 700.00 .434 -86.4 7.090 107.6 .084 57.5 800.00 .387 -95.8 6.490 101.5 .092 56.4 900.00 .346 -104.1 5.972 96.6 .099 55.5 1000.00 .287 -121.1 5.117 87.8 .113 54.3 1200.00 .286 -129.5 4.7	MAG AN .968 -10 .902 -19 .825 -27 .743 -32 .678 -36 .621 -39 .572 -41 .531 -43 .496 -45 .467 -46 .442 -47 .420 -48 .399 -49 .381 -50 .364 -51 .349 -53 .336 -54 .321 -55	0.6 0.8 7.0 0.5 0.4 1.9 0.1 0.5 0.4 1.9 0.7 0.5 1.9 0.7 0.5 1.9 0.1 1.9 0.1 1.9 0.1 1.9 0.1 1.0 0.1 0.1 0.1 0.1 0.1 0.1
MHz MAG ANG MAG ANG MAG ANG 100.00 .855 -14.2 10.699 164.8 .019 80.2 200.00 .787 -28.4 10.334 151.4 .035 73.3 300.00 .715 -41.9 9.924 140.1 .048 68.5 400.00 .631 -54.9 9.183 130.2 .059 63.4 500.00 .561 -66.5 8.559 121.7 .068 60.9 600.00 .495 -77.0 7.749 113.9 .077 58.8 700.00 .434 -86.4 7.090 107.6 .084 57.5 800.00 .387 -95.8 6.490 101.5 .092 56.4 900.00 .346 -104.1 5.972 96.6 .099 55.5 100.00 .287 -121.1 5.117 87.8 .113 54.3 1200.00 .266 -129.5 4.76	MAG AN .968 -10 .902 -19 .825 -27 .743 -32 .678 -36 .621 -39 .572 -41 .531 -43 .496 -45 .467 -46 .442 -47 .420 -48 .399 -49 .381 -50 .364 -51 .349 -53 .336 -54 .321 -55 .307 -57).6).8 7.0 2.5 5.5).4 1.9 3.4 7.3 3.4).7).5 1.9
MHz MAG ANG MAG ANG MAG ANG 100.00 .855 -14.2 10.699 164.8 .019 80.2 200.00 .787 -28.4 10.334 151.4 .035 73.3 300.00 .715 -41.9 9.924 140.1 .048 68.5 400.00 .631 -54.9 9.183 130.2 .059 63.4 500.00 .561 -66.5 8.559 121.7 .068 60.9 600.00 .495 -77.0 7.749 113.9 .077 58.8 700.00 .434 -86.4 7.090 107.6 .084 57.5 800.00 .387 -95.8 6.490 101.5 .092 56.4 900.00 .346 -104.1 5.972 96.6 .099 55.5 1000.00 .313 -113.2 5.531 91.8 .105 55.0 1100.00 .287 -121.1 5.1	MAG AN .968 -10 .902 -19 .825 -27 .743 -32 .678 -36 .621 -39 .572 -41 .531 -43 .496 -45 .467 -46 .442 -47 .420 -48 .399 -49 .381 -50 .364 -51 .349 -53 .336 -54 .321 -55 .307 -57 .296 -59 .282 -60	0.6 0.8 7.0 2.5 5.5 0.4 1.9 3.4 5.1 5.4 7.3 3.4 7.3 9.0 0.6
MHz MAG ANG MAG ANG MAG ANG 100.00 .855 -14.2 10.699 164.8 .019 80.2 200.00 .787 -28.4 10.334 151.4 .035 73.3 300.00 .715 -41.9 9.924 140.1 .048 68.5 400.00 .631 -54.9 9.183 130.2 .059 63.4 500.00 .561 -66.5 8.559 121.7 .068 60.9 600.00 .495 -77.0 7.749 113.9 .077 58.8 700.00 .434 -86.4 7.090 107.6 .084 57.5 800.00 .387 -95.8 6.490 101.5 .092 56.4 900.00 .346 -104.1 5.972 96.6 .099 55.5 1000.00 .313 -113.2 5.531 91.8 .105 55.0 1100.00 .287 -121.1 5.1	MAG AN .968 -10 .902 -19 .825 -27 .743 -32 .678 -36 .621 -39 .572 -41 .531 -43 .496 -45 .467 -46 .442 -47 .420 -48 .399 -49 .381 -50 .364 -51 .349 -53 .336 -54 .321 -55 .307 -57 .296 -59 .282 -60 .269 -62	0.6 0.8 7.0 2.5 5.5 0.4 1.9 3.4 5.1 5.4 7.3 3.4 9.7 9.5 9.0 9.6 9.6 9.6
MHz MAG ANG MAG ANG MAG ANG 100.00 .855 -14.2 10.699 164.8 .019 80.2 200.00 .787 -28.4 10.334 151.4 .035 73.3 300.00 .715 -41.9 9.924 140.1 .048 68.5 400.00 .631 -54.9 9.183 130.2 .059 63.4 500.00 .561 -66.5 8.559 121.7 .068 60.9 600.00 .495 -77.0 7.749 113.9 .077 58.8 700.00 .434 -86.4 7.090 107.6 .084 57.5 800.00 .387 -95.8 6.490 101.5 .092 56.4 900.00 .346 -104.1 5.972 96.6 .099 55.5 1000.00 .313 -113.2 5.531 91.8 .105 55.0 1100.00 .287 -121.1 5.1	MAG AN .968 -10 .902 -19 .825 -27 .743 -32 .678 -36 .621 -39 .572 -41 .531 -43 .496 -45 .467 -46 .442 -47 .420 -48 .399 -49 .381 -50 .364 -51 .349 -53 .336 -54 .321 -55 .307 -57 .296 -59 .282 -60 .269 -62).6).8 7.0 2.5 3.5 3.4 5.1 5.1 5.1 5.1 5.1 5.1 6.3 7.3 9.0 9.6 9.6 9.6 9.6 9.6 9.6 9.6 9.6
MHz MAG ANG MAG ANG MAG ANG 100.00 .855 -14.2 10.699 164.8 .019 80.2 200.00 .787 -28.4 10.334 151.4 .035 73.3 300.00 .715 -41.9 9.924 140.1 .048 68.5 400.00 .631 -54.9 9.183 130.2 .059 63.4 500.00 .561 -66.5 8.559 121.7 .068 60.9 600.00 .495 -77.0 7.749 113.9 .077 58.8 700.00 .434 -86.4 7.090 107.6 .084 57.5 800.00 .387 -95.8 6.490 101.5 .092 56.4 900.00 .346 -104.1 5.972 96.6 .099 55.5 1000.00 .287 -121.1 5.117 87.8 .113 54.3 1200.00 .266 -129.5 4.7	MAG AN .968 -10 .902 -19 .825 -27 .743 -32 .678 -36 .621 -39 .572 -41 .531 -43 .496 -45 .467 -46 .442 -47 .420 -48 .399 -49 .381 -50 .364 -51 .349 -53 .336 -54 .321 -55 .307 -57 .296 -59 .282 -60 .269 -62 .259 -64 .247 -66).6).8 7.0 2.5 3.4 3.4 5.1 5.1 5.1 5.1 5.1 5.1 6.3 7.3 9.0 9.6 6.7
MHz MAG ANG MAG ANG MAG ANG 100.00 .855 -14.2 10.699 164.8 .019 80.2 200.00 .787 -28.4 10.334 151.4 .035 73.3 300.00 .715 -41.9 9.924 140.1 .048 68.5 400.00 .631 -54.9 9.183 130.2 .059 63.4 500.00 .561 -66.5 8.559 121.7 .068 60.9 600.00 .495 -77.0 7.749 113.9 .077 58.8 700.00 .434 -86.4 7.090 107.6 .084 57.5 800.00 .387 -95.8 6.490 101.5 .092 56.4 900.00 .346 -104.1 5.972 96.6 .099 55.5 1000.00 .313 -113.2 5.531 91.8 .105 55.0 1100.00 .287 -121.1 5.1	MAG AN .968 -10 .902 -19 .825 -27 .743 -32 .678 -36 .621 -39 .572 -41 .531 -43 .496 -45 .467 -46 .442 -47 .420 -48 .399 -49 .381 -50 .364 -51 .349 -53 .336 -54 .321 -55 .307 -57 .296 -59 .282 -60 .269 -62 .259 -64 .247 -66	0.6 0.8 0.7.0 0.5 0.5 0.5 0.4 1.9 0.5 1.9 0.5 1.9 1.9 1.4 1.9 1.9 1.9 1.9 1.9 1.9 1.9 1.9
MHz MAG ANG MAG ANG MAG ANG 100.00 .855 -14.2 10.699 164.8 .019 80.2 200.00 .787 -28.4 10.334 151.4 .035 73.3 300.00 .715 -41.9 9.924 140.1 .048 68.5 400.00 .631 -54.9 9.183 130.2 .059 63.4 500.00 .561 -66.5 8.559 121.7 .068 60.9 600.00 .495 -77.0 7.749 113.9 .077 58.8 700.00 .434 -86.4 7.090 107.6 .084 57.5 800.00 .387 -95.8 6.490 101.5 .092 56.4 900.00 .346 -104.1 5.972 96.6 .099 55.5 1000.00 .287 -121.1 5.117 87.8 .113 54.3 1200.00 .266 -129.5 4.7	MAG AN .968 -10 .902 -19 .825 -27 .743 -32 .678 -36 .621 -39 .572 -41 .531 -43 .496 -45 .467 -46 .442 -47 .420 -48 .399 -49 .381 -50 .364 -51 .349 -53 .336 -54 .321 -55 .307 -57 .296 -59 .282 -60 .269 -62 .259 -64 .247 -66	0.6 0.8 0.7.0 0.5 0.5 0.5 0.4 1.9 0.5 1.9 0.5 1.9 1.4 1.9 1.4 1.9 1.9 1.9 1.9 1.9 1.9 1.9 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0
MHz MAG ANG MAG ANG MAG ANG 100.00 .855 -14.2 10.699 164.8 .019 80.2 200.00 .787 -28.4 10.334 151.4 .035 73.3 300.00 .715 -41.9 9.924 140.1 .048 68.5 400.00 .631 -54.9 9.183 130.2 .059 63.4 500.00 .561 -66.5 8.559 121.7 .068 60.9 600.00 .495 -77.0 7.749 113.9 .077 58.8 700.00 .434 -86.4 7.090 107.6 .084 57.5 800.00 .387 -95.8 6.490 101.5 .092 56.4 900.00 .346 -104.1 5.972 96.6 .099 55.5 1000.00 .287 -121.1 5.117 87.8 .113 54.3 1200.00 .266 -129.5 4.7	MAG AN .968 -10 .902 -19 .825 -27 .743 -32 .678 -36 .621 -39 .572 -41 .531 -43 .496 -45 .467 -46 .442 -47 .420 -48 .399 -49 .381 -50 .364 -51 .349 -53 .336 -54 .321 -55 .307 -57 .296 -59 .282 -60 .282 -60 .269 -62 .259 -64 .247 -66 .235 -68 .225 -71 .211 -73 .200 -77	0.6 0.8 7.0 2.5 0.5 0.4 1.9 0.5 1.9 1.1 1.0 1.0 1.0 1.0 1.0 1.0 1.0
MHz MAG ANG MAG ANG MAG ANG 100.00 .855 -14.2 10.699 164.8 .019 80.2 200.00 .787 -28.4 10.334 151.4 .035 73.3 300.00 .715 -41.9 9.924 140.1 .048 68.5 400.00 .631 -54.9 9.183 130.2 .059 63.4 500.00 .561 -66.5 8.559 121.7 .068 60.9 600.00 .495 -77.0 7.749 113.9 .077 58.8 700.00 .434 -86.4 7.090 107.6 .084 57.5 800.00 .387 -95.8 6.490 101.5 .092 56.4 900.00 .346 -104.1 5.972 96.6 .099 55.5 1000.00 .313 -113.2 5.531 91.8 .105 55.0 1100.00 .287 -121.1 5.1	MAG AN .968 -10 .902 -19 .825 -27 .743 -32 .678 -36 .621 -39 .572 -41 .531 -43 .496 -45 .467 -46 .442 -47 .420 -48 .399 -49 .381 -50 .364 -51 .349 -53 .336 -54 .321 -55 .307 -57 .296 -59 .282 -60 .269 -62 .259 -64 .247 -66 .235 -68 .225 -71 .211 -73	0.6 0.8 7.0 2.5 0.5 0.4 1.9 1.9 1.4 1.8 1.9 1.9 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0



Vce = 3 V, Ic = 5 mA, Zo = 50 Ω

FREQUENCY	S	511	S	21	S	12	S	S 22
MHz	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG
100.00	.900	-11.4	8.160	166.3	.019	80.5	.976	-9.1
200.00	.845	-23.9	8.072	154.4	.036	74.9	.927	-17.4
300.00	.788	-35.4	7.948	144.3	.051	68.4	.864	-24.2
400.00	.723	-46.6	7.529	135.0	.063	63.7	.795	-29.8
500.00	.657	-57.7	7.230	127.4	.074	60.9	.733	-34.2
600.00	.595	-67.8	6.685	119.6	.081	57.5	.678	-37.7
700.00	.528	-77.3	6.274	113.0	.089	56.1	.627	-40.7
800.00	.475	-86.7	5.874	106.5	.097	54.5	.583	-42.7
900.00	.425	-95.3	5.482	101.0	.103	53.4	.545	-44.7
1000.00	.384	-104.3	5.150	95.7	.110	52.3	.514	-46.4
1100.00	.347	-112.0	4.796	91.2	.118	51.5	.486	-47.5
1200.00	.321	-120.5	4.512	87.0	.123	51.3	.460	-48.8
1300.00	.298	-128.4	4.221	83.1	.129	50.4	.438	-50.3
1400.00	.283	-136.2	3.994	79.4	.137	49.6	.418	-51.4
1500.00	.268	-144.2	3.770	75.8	.143	49.4	.400	-52.8
1600.00	.258	-151.8	3.568	72.7	.149	48.6	.382	-54.2
1700.00	.254	-159.7	3.400	69.4	.155	48.3	.368	-55.2
1800.00	.249	-167.2	3.229	66.6	.162	47.3	.353	-56.7
1900.00	.250	-173.7	3.101	63.5	.169	46.8	.337	-58.4
2000.00	.253	179.0	2.957	60.8	.176	46.1	.324	-59.8
2100.00	.257	172.5	2.845	58.0	.183	45.4	.310	-61.7
2200.00	.263	166.7	2.730	55.2	.189	44.6	.296	-63.6
2300.00	.269	161.3	2.640	52.7	.196	43.7	.284	-65.5
2400.00	.277	156.2	2.539	49.9	.203	43.1	.272	-67.6
2500.00	.285	151.5	2.456	47.4	.211	41.9	.261	-69.8
2600.00	.296	147.0	2.380	44.8	.217	41.0	.250	-72.2
2700.00	.305	143.5	2.301	42.4	.223	40.4	.237	-74.4
2800.00	.318	139.6	2.234	39.9	.231	39.3	.225	-77.6
2900.00	.327	136.1	2.164	37.5	.238	38.3	.214	-80.7
3000.00	.341	133.2	2.110	35.2	.244	37.3	.204	-84.1
VcE = 3 V, Ic = 3 m/								
FREQUENCY	S	011	S	21	S	12	5	S ₂₂
			S: MAG	ANG	S MAG	ANG	MAG	S ₂₂ ANG
FREQUENCY MHz	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG
FREQUENCY MHz 100.00	MAG .948	ANG -9.1	MAG 5.295	ANG 168.1	MAG .020	ANG 82.4	MAG .987	ANG -7.0
FREQUENCY MHz 100.00 200.00	MAG .948 .912	ANG -9.1 -18.6	MAG 5.295 5.291	ANG 168.1 158.4	MAG .020 .038	ANG 82.4 76.4	MAG .987 .955	-7.0 -13.8
FREQUENCY MHz 100.00 200.00 300.00	MAG .948 .912 .876	ANG -9.1 -18.6 -27.7	MAG 5.295 5.291 5.354	ANG 168.1 158.4 149.7	MAG .020 .038 .055	ANG 82.4 76.4 70.1	MAG .987 .955 .914	-7.0 -13.8 -19.8
FREQUENCY MHz 100.00 200.00 300.00 400.00	.948 .912 .876 .831	ANG -9.1 -18.6 -27.7 -37.1	5.295 5.291 5.354 5.177	ANG 168.1 158.4 149.7 141.3	.020 .038 .055 .069	82.4 76.4 70.1 66.3	MAG .987 .955 .914 .864	-7.0 -13.8 -19.8 -25.2
FREQUENCY MHz 100.00 200.00 300.00 400.00 500.00	.948 .912 .876 .831	ANG -9.1 -18.6 -27.7 -37.1 -46.0	5.295 5.291 5.354 5.177 5.109	ANG 168.1 158.4 149.7 141.3 135.2	MAG .020 .038 .055 .069 .082	82.4 76.4 70.1 66.3 61.6	.987 .955 .914 .864 .816	-7.0 -13.8 -19.8 -25.2 -29.7
FREQUENCY MHz 100.00 200.00 300.00 400.00 500.00 600.00	.948 .912 .876 .831 .784	ANG -9.1 -18.6 -27.7 -37.1 -46.0 -54.7	5.295 5.291 5.354 5.177 5.109 4.832	ANG 168.1 158.4 149.7 141.3 135.2 127.8	MAG .020 .038 .055 .069 .082 .092	82.4 76.4 70.1 66.3 61.6 57.9	MAG .987 .955 .914 .864 .816 .769	-7.0 -13.8 -19.8 -25.2 -29.7 -33.6
FREQUENCY MHz 100.00 200.00 300.00 400.00 500.00	.948 .912 .876 .831	ANG -9.1 -18.6 -27.7 -37.1 -46.0	5.295 5.291 5.354 5.177 5.109	ANG 168.1 158.4 149.7 141.3 135.2	MAG .020 .038 .055 .069 .082	82.4 76.4 70.1 66.3 61.6	.987 .955 .914 .864 .816	-7.0 -13.8 -19.8 -25.2 -29.7
FREQUENCY MHz 100.00 200.00 300.00 400.00 500.00 600.00 700.00 800.00	.948 .912 .876 .831 .784 .737 .680 .635	ANG -9.1 -18.6 -27.7 -37.1 -46.0 -54.7 -62.9	MAG 5.295 5.291 5.354 5.177 5.109 4.832 4.667 4.504	ANG 168.1 158.4 149.7 141.3 135.2 127.8 121.7 115.1	MAG .020 .038 .055 .069 .082 .092 .101 .108	82.4 76.4 70.1 66.3 61.6 57.9 55.1 52.6	MAG .987 .955 .914 .864 .816 .769 .721	-7.0 -13.8 -19.8 -25.2 -29.7 -33.6 -37.2
FREQUENCY MHz 100.00 200.00 300.00 400.00 500.00 600.00 700.00	.948 .912 .876 .831 .784 .737	ANG -9.1 -18.6 -27.7 -37.1 -46.0 -54.7 -62.9 -71.7	MAG 5.295 5.291 5.354 5.177 5.109 4.832 4.667	ANG 168.1 158.4 149.7 141.3 135.2 127.8 121.7	MAG .020 .038 .055 .069 .082 .092 .101	82.4 76.4 70.1 66.3 61.6 57.9 55.1	MAG .987 .955 .914 .864 .816 .769	-7.0 -13.8 -19.8 -25.2 -29.7 -33.6 -37.2 -39.9
FREQUENCY MHz 100.00 200.00 300.00 400.00 500.00 600.00 700.00 800.00 900.00	.948 .912 .876 .831 .784 .737 .680 .635	ANG -9.1 -18.6 -27.7 -37.1 -46.0 -54.7 -62.9 -71.7 -80.0	MAG 5.295 5.291 5.354 5.177 5.109 4.832 4.667 4.504 4.335	ANG 168.1 158.4 149.7 141.3 135.2 127.8 121.7 115.1 109.5	MAG .020 .038 .055 .069 .082 .092 .101 .108 .115	82.4 76.4 70.1 66.3 61.6 57.9 55.1 52.6 50.8	MAG .987 .955 .914 .864 .816 .769 .721 .678	ANG -7.0 -13.8 -19.8 -25.2 -29.7 -33.6 -37.2 -39.9 -42.7
FREQUENCY MHz 100.00 200.00 300.00 400.00 500.00 600.00 700.00 800.00 900.00 1000.00	.948 .912 .876 .831 .784 .737 .680 .635 .581	ANG -9.1 -18.6 -27.7 -37.1 -46.0 -54.7 -62.9 -71.7 -80.0 -89.2	MAG 5.295 5.291 5.354 5.177 5.109 4.832 4.667 4.504 4.335 4.226	ANG 168.1 158.4 149.7 141.3 135.2 127.8 121.7 115.1 109.5 103.5	MAG .020 .038 .055 .069 .082 .092 .101 .108 .115 .123	82.4 76.4 70.1 66.3 61.6 57.9 55.1 52.6 50.8 48.8	MAG .987 .955 .914 .864 .816 .769 .721 .678 .636	ANG -7.0 -13.8 -19.8 -25.2 -29.7 -33.6 -37.2 -39.9 -42.7 -44.7
FREQUENCY MHz 100.00 200.00 300.00 400.00 500.00 600.00 700.00 800.00 900.00 1000.00 1100.00	.948 .912 .876 .831 .784 .737 .680 .635 .581 .530	ANG -9.1 -18.6 -27.7 -37.1 -46.0 -54.7 -62.9 -71.7 -80.0 -89.2 -97.5	MAG 5.295 5.291 5.354 5.177 5.109 4.832 4.667 4.504 4.335 4.226 4.038	ANG 168.1 158.4 149.7 141.3 135.2 127.8 121.7 115.1 109.5 103.5 98.3	MAG .020 .038 .055 .069 .082 .092 .101 .108 .115 .123 .129	82.4 76.4 70.1 66.3 61.6 57.9 55.1 52.6 50.8 48.8 47.8	MAG .987 .955 .914 .864 .816 .769 .721 .678 .636 .602 .570	ANG -7.0 -13.8 -19.8 -25.2 -29.7 -33.6 -37.2 -39.9 -42.7 -44.7 -46.5
FREQUENCY MHz 100.00 200.00 300.00 400.00 500.00 600.00 700.00 800.00 900.00 1100.00 1100.00 1200.00	.948 .912 .876 .831 .784 .737 .680 .635 .581 .530 .480	ANG -9.1 -18.6 -27.7 -37.1 -46.0 -54.7 -62.9 -71.7 -80.0 -89.2 -97.5 -105.8	5.295 5.291 5.354 5.177 5.109 4.832 4.667 4.504 4.335 4.226 4.038 3.879	ANG 168.1 158.4 149.7 141.3 135.2 127.8 121.7 115.1 109.5 103.5 98.3 93.3	MAG .020 .038 .055 .069 .082 .092 .101 .108 .115 .123 .129 .135	82.4 76.4 70.1 66.3 61.6 57.9 55.1 52.6 50.8 48.8 47.8 46.8	MAG .987 .955 .914 .864 .816 .769 .721 .678 .636 .602 .570	ANG -7.0 -13.8 -19.8 -25.2 -29.7 -33.6 -37.2 -39.9 -42.7 -44.7 -46.5 -48.2
FREQUENCY MHz 100.00 200.00 300.00 400.00 500.00 600.00 700.00 800.00 900.00 1100.00 1200.00 1300.00	.948 .912 .876 .831 .784 .737 .680 .635 .581 .530 .441	ANG -9.1 -18.6 -27.7 -37.1 -46.0 -54.7 -62.9 -71.7 -80.0 -89.2 -97.5 -105.8 -113.4	MAG 5.295 5.291 5.354 5.177 5.109 4.832 4.667 4.504 4.335 4.226 4.038 3.879 3.680	ANG 168.1 158.4 149.7 141.3 135.2 127.8 121.7 115.1 109.5 103.5 98.3 93.3 88.8	MAG .020 .038 .055 .069 .082 .092 .101 .108 .115 .123 .129 .135 .140	82.4 76.4 70.1 66.3 61.6 57.9 55.1 52.6 50.8 48.8 47.8 46.8 45.5	MAG .987 .955 .914 .864 .816 .769 .721 .678 .636 .602 .570 .544	ANG -7.0 -13.8 -19.8 -25.2 -29.7 -33.6 -37.2 -39.9 -42.7 -44.7 -46.5 -48.2 -50.1
FREQUENCY MHz 100.00 200.00 300.00 400.00 500.00 600.00 700.00 800.00 900.00 1100.00 1200.00 1300.00 1400.00	.948 .912 .876 .831 .784 .737 .680 .635 .581 .530 .480 .441 .408 .382	ANG -9.1 -18.6 -27.7 -37.1 -46.0 -54.7 -62.9 -71.7 -80.0 -89.2 -97.5 -105.8 -113.4 -121.2	MAG 5.295 5.291 5.354 5.177 5.109 4.832 4.667 4.504 4.335 4.226 4.038 3.879 3.680 3.528	ANG 168.1 158.4 149.7 141.3 135.2 127.8 121.7 115.1 109.5 103.5 98.3 93.3 88.8 84.7 80.5	MAG .020 .038 .055 .069 .082 .092 .101 .108 .115 .123 .129 .135 .140 .146	82.4 76.4 70.1 66.3 61.6 57.9 55.1 52.6 50.8 48.8 47.8 46.8 45.5 44.3	MAG .987 .955 .914 .864 .816 .769 .721 .678 .636 .602 .570 .544 .517 .493 .471	ANG -7.0 -13.8 -19.8 -25.2 -29.7 -33.6 -37.2 -39.9 -42.7 -44.7 -46.5 -48.2 -50.1 -51.6
FREQUENCY MHz 100.00 200.00 300.00 400.00 500.00 600.00 700.00 800.00 1000.00 1100.00 1200.00 1300.00 1400.00 1500.00	.948 .912 .876 .831 .784 .737 .680 .635 .581 .530 .480 .441 .408	ANG -9.1 -18.6 -27.7 -37.1 -46.0 -54.7 -62.9 -71.7 -80.0 -89.2 -97.5 -105.8 -113.4 -121.2 -128.9	MAG 5.295 5.291 5.354 5.177 5.109 4.832 4.667 4.504 4.335 4.226 4.038 3.879 3.680 3.528 3.359	ANG 168.1 158.4 149.7 141.3 135.2 127.8 121.7 115.1 109.5 103.5 98.3 93.3 88.8 84.7	MAG .020 .038 .055 .069 .082 .092 .101 .108 .115 .123 .129 .135 .140 .146 .151	82.4 76.4 70.1 66.3 61.6 57.9 55.1 52.6 50.8 48.8 47.8 46.8 45.5 44.3 43.8	MAG .987 .955 .914 .864 .816 .769 .721 .678 .636 .602 .570 .544 .517	ANG -7.0 -13.8 -19.8 -25.2 -29.7 -33.6 -37.2 -39.9 -42.7 -44.7 -46.5 -48.2 -50.1 -51.6 -53.2
FREQUENCY MHz 100.00 200.00 300.00 400.00 500.00 600.00 700.00 800.00 1000.00 1100.00 1200.00 1300.00 1400.00 1500.00 1600.00	MAG .948 .912 .876 .831 .784 .737 .680 .635 .581 .530 .480 .441 .408 .382 .358 .339 .324	ANG -9.1 -18.6 -27.7 -37.1 -46.0 -54.7 -62.9 -71.7 -80.0 -89.2 -97.5 -105.8 -113.4 -121.2 -128.9 -136.3	MAG 5.295 5.291 5.354 5.177 5.109 4.832 4.667 4.504 4.335 4.226 4.038 3.879 3.680 3.528 3.359 3.200	ANG 168.1 158.4 149.7 141.3 135.2 127.8 121.7 115.1 109.5 103.5 98.3 93.3 88.8 84.7 80.5 76.9 73.1	MAG .020 .038 .055 .069 .082 .092 .101 .108 .115 .123 .129 .135 .140 .146 .151 .156	82.4 76.4 70.1 66.3 61.6 57.9 55.1 52.6 50.8 48.8 47.8 46.8 45.5 44.3 43.8 43.2	MAG .987 .955 .914 .864 .816 .769 .721 .678 .636 .602 .570 .544 .517 .493 .471 .451	ANG -7.0 -13.8 -19.8 -25.2 -29.7 -33.6 -37.2 -39.9 -42.7 -44.7 -46.5 -48.2 -50.1 -51.6 -53.2 -54.8
FREQUENCY MHz 100.00 200.00 300.00 400.00 500.00 600.00 700.00 800.00 900.00 1100.00 1200.00 1300.00 1400.00 1500.00 1600.00 1700.00	MAG .948 .912 .876 .831 .784 .737 .680 .635 .581 .530 .480 .441 .408 .382 .358 .339 .324 .311	ANG -9.1 -18.6 -27.7 -37.1 -46.0 -54.7 -62.9 -71.7 -80.0 -89.2 -97.5 -105.8 -113.4 -121.2 -128.9 -136.3 -144.4 -151.7	MAG 5.295 5.291 5.354 5.177 5.109 4.832 4.667 4.504 4.335 4.226 4.038 3.879 3.680 3.528 3.359 3.200 3.076 2.932	ANG 168.1 158.4 149.7 141.3 135.2 127.8 121.7 115.1 109.5 103.5 98.3 93.3 88.8 84.7 80.5 76.9 73.1 70.0	MAG .020 .038 .055 .069 .082 .092 .101 .108 .115 .123 .129 .135 .140 .146 .151 .156 .161 .166	82.4 76.4 70.1 66.3 61.6 57.9 55.1 52.6 50.8 48.8 47.8 46.8 45.5 44.3 43.2 42.6 41.9	MAG .987 .955 .914 .864 .816 .769 .721 .678 .636 .602 .570 .544 .517 .493 .471 .451 .432 .416	ANG -7.0 -13.8 -19.8 -25.2 -29.7 -33.6 -37.2 -39.9 -42.7 -46.5 -48.2 -50.1 -51.6 -53.2 -54.8 -56.2 -57.7
FREQUENCY MHz 100.00 200.00 300.00 400.00 500.00 600.00 700.00 800.00 1000.00 1100.00 1200.00 1300.00 1400.00 1500.00 1600.00 1700.00 1800.00	MAG .948 .912 .876 .831 .784 .737 .680 .635 .581 .530 .480 .441 .408 .382 .358 .339 .324	ANG -9.1 -18.6 -27.7 -37.1 -46.0 -54.7 -62.9 -71.7 -80.0 -89.2 -97.5 -105.8 -113.4 -121.2 -128.9 -136.3 -144.4	MAG 5.295 5.291 5.354 5.177 5.109 4.832 4.667 4.504 4.335 4.226 4.038 3.879 3.680 3.528 3.359 3.200 3.076	ANG 168.1 158.4 149.7 141.3 135.2 127.8 121.7 115.1 109.5 103.5 98.3 93.3 88.8 84.7 80.5 76.9 73.1	MAG .020 .038 .055 .069 .082 .092 .101 .108 .115 .123 .129 .135 .140 .146 .151 .156 .161	82.4 76.4 70.1 66.3 61.6 57.9 55.1 52.6 50.8 48.8 47.8 46.8 45.5 44.3 43.8 43.2 42.6	MAG .987 .955 .914 .864 .816 .769 .721 .678 .636 .602 .570 .544 .517 .493 .471 .451	ANG -7.0 -13.8 -19.8 -25.2 -29.7 -33.6 -37.2 -39.9 -42.7 -44.7 -46.5 -48.2 -50.1 -51.6 -53.2 -54.8 -56.2
FREQUENCY MHz 100.00 200.00 300.00 400.00 500.00 600.00 700.00 800.00 1000.00 1100.00 1200.00 1300.00 1400.00 1500.00 1600.00 1700.00 1800.00	MAG .948 .912 .876 .831 .784 .737 .680 .635 .581 .530 .480 .441 .408 .382 .358 .339 .324 .311 .305	ANG -9.1 -18.6 -27.7 -37.1 -46.0 -54.7 -62.9 -71.7 -80.0 -89.2 -97.5 -105.8 -113.4 -121.2 -128.9 -136.3 -144.4 -151.7 -158.8	MAG 5.295 5.291 5.354 5.177 5.109 4.832 4.667 4.504 4.335 4.226 4.038 3.879 3.680 3.528 3.359 3.200 3.076 2.932 2.825	ANG 168.1 158.4 149.7 141.3 135.2 127.8 121.7 115.1 109.5 103.5 98.3 93.3 88.8 84.7 80.5 76.9 73.1 70.0 66.6	MAG .020 .038 .055 .069 .082 .092 .101 .108 .115 .123 .129 .135 .140 .146 .151 .156 .161 .166 .172	82.4 76.4 70.1 66.3 61.6 57.9 55.1 52.6 50.8 48.8 47.8 46.8 45.5 44.3 43.2 42.6 41.9 41.2	MAG .987 .955 .914 .864 .816 .769 .721 .678 .636 .602 .570 .544 .517 .493 .471 .451 .432 .416 .398	ANG -7.0 -13.8 -19.8 -25.2 -29.7 -33.6 -37.2 -39.9 -42.7 -44.7 -46.5 -48.2 -50.1 -51.6 -53.2 -54.8 -56.2 -57.7 -59.3
FREQUENCY MHz 100.00 200.00 300.00 400.00 500.00 600.00 700.00 800.00 1000.00 1100.00 1200.00 1300.00 1400.00 1500.00 1600.00 1700.00 1800.00 1900.00	MAG .948 .912 .876 .831 .784 .737 .680 .635 .581 .530 .480 .441 .408 .382 .358 .339 .324 .311 .305 .301	ANG -9.1 -18.6 -27.7 -37.1 -46.0 -54.7 -62.9 -71.7 -80.0 -89.2 -97.5 -105.8 -113.4 -121.2 -128.9 -136.3 -144.4 -151.7 -158.8 -166.7	MAG 5.295 5.291 5.354 5.177 5.109 4.832 4.667 4.504 4.335 4.226 4.038 3.879 3.680 3.528 3.359 3.200 3.076 2.932 2.825 2.712	ANG 168.1 158.4 149.7 141.3 135.2 127.8 121.7 115.1 109.5 103.5 98.3 93.3 88.8 84.7 80.5 76.9 73.1 70.0 66.6 63.4 60.4	MAG .020 .038 .055 .069 .082 .092 .101 .108 .115 .123 .129 .135 .140 .146 .151 .156 .161 .166 .172 .178	ANG 82.4 76.4 70.1 66.3 61.6 57.9 55.1 52.6 50.8 48.8 47.8 46.8 45.5 44.3 43.8 43.2 42.6 41.9 41.2 40.5	MAG .987 .955 .914 .864 .816 .769 .721 .678 .636 .602 .570 .544 .517 .493 .471 .451 .432 .416 .398 .384	ANG -7.0 -13.8 -19.8 -25.2 -29.7 -33.6 -37.2 -39.9 -42.7 -44.7 -46.5 -48.2 -50.1 -51.6 -53.2 -54.8 -56.2 -57.7 -59.3 -60.9
FREQUENCY MHz 100.00 200.00 300.00 400.00 500.00 600.00 700.00 800.00 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 .948 .912 .876 .831 .784 .737 .680 .635 .581 .530 .480 .441 .408 .382 .358 .339 .324 .311 .305 .301 .299 .300	ANG -9.1 -18.6 -27.7 -37.1 -46.0 -54.7 -62.9 -71.7 -80.0 -89.2 -97.5 -105.8 -113.4 -121.2 -128.9 -136.3 -144.4 -151.7 -158.8 -166.7 -173.5	MAG 5.295 5.291 5.354 5.177 5.109 4.832 4.667 4.504 4.335 4.226 4.038 3.879 3.680 3.528 3.359 3.200 3.076 2.932 2.825 2.712 2.614 2.508	ANG 168.1 158.4 149.7 141.3 135.2 127.8 121.7 115.1 109.5 103.5 98.3 93.3 88.8 84.7 80.5 76.9 73.1 70.0 66.6 63.4 60.4 57.2	MAG .020 .038 .055 .069 .082 .092 .101 .108 .115 .123 .129 .135 .140 .146 .151 .156 .161 .166 .172 .178 .183	82.4 76.4 70.1 66.3 61.6 57.9 55.1 52.6 50.8 48.8 47.8 46.8 45.5 44.3 43.2 42.6 41.9 41.2 40.5 40.2	MAG .987 .955 .914 .864 .816 .769 .721 .678 .636 .602 .570 .544 .517 .493 .471 .451 .432 .416 .398 .384 .367	ANG -7.0 -13.8 -19.8 -25.2 -29.7 -33.6 -37.2 -39.9 -42.7 -44.7 -46.5 -48.2 -50.1 -51.6 -53.2 -54.8 -56.2 -57.7 -59.3 -60.9 -62.6 -64.4
FREQUENCY MHz 100.00 200.00 300.00 400.00 500.00 600.00 700.00 800.00 1000.00 1100.00 1200.00 1300.00 1400.00 1500.00 1600.00 1700.00 1800.00 1900.00 2000.00 2100.00 2200.00	MAG .948 .912 .876 .831 .784 .737 .680 .635 .581 .530 .480 .441 .408 .382 .358 .339 .324 .311 .305 .301 .299	ANG -9.1 -18.6 -27.7 -37.1 -46.0 -54.7 -62.9 -71.7 -80.0 -89.2 -97.5 -105.8 -113.4 -121.2 -128.9 -136.3 -144.4 -151.7 -158.8 -166.7 -173.5 180.0	MAG 5.295 5.291 5.354 5.177 5.109 4.832 4.667 4.504 4.335 4.226 4.038 3.879 3.680 3.528 3.359 3.200 3.076 2.932 2.825 2.712 2.614	ANG 168.1 158.4 149.7 141.3 135.2 127.8 121.7 115.1 109.5 103.5 98.3 93.3 88.8 84.7 80.5 76.9 73.1 70.0 66.6 63.4 60.4 57.2 54.5	MAG .020 .038 .055 .069 .082 .092 .101 .108 .115 .123 .129 .135 .140 .146 .151 .156 .161 .166 .172 .178 .183 .189	82.4 76.4 70.1 66.3 61.6 57.9 55.1 52.6 50.8 48.8 47.8 46.8 45.5 44.3 43.2 42.6 41.9 41.2 40.5 40.2 39.5	MAG .987 .955 .914 .864 .816 .769 .721 .678 .636 .602 .570 .544 .517 .493 .471 .451 .432 .416 .398 .384 .367 .354 .340	ANG -7.0 -13.8 -19.8 -25.2 -29.7 -33.6 -37.2 -39.9 -42.7 -44.7 -46.5 -48.2 -50.1 -51.6 -53.2 -54.8 -56.2 -57.7 -59.3 -60.9 -62.6
FREQUENCY MHz 100.00 200.00 300.00 400.00 500.00 600.00 700.00 800.00 1000.00 1100.00 1200.00 1300.00 1400.00 1500.00 1600.00 1700.00 1800.00 1900.00 2000.00 2100.00 2300.00	MAG .948 .912 .876 .831 .784 .737 .680 .635 .581 .530 .480 .441 .408 .382 .358 .339 .324 .311 .305 .301 .299 .300 .303	ANG -9.1 -18.6 -27.7 -37.1 -46.0 -54.7 -62.9 -71.7 -80.0 -89.2 -97.5 -105.8 -113.4 -121.2 -128.9 -136.3 -144.4 -151.7 -158.8 -166.7 -173.5 180.0 173.7 167.8	MAG 5.295 5.291 5.354 5.177 5.109 4.832 4.667 4.504 4.335 4.226 4.038 3.879 3.680 3.528 3.359 3.200 3.076 2.932 2.825 2.712 2.614 2.508 2.434	ANG 168.1 158.4 149.7 141.3 135.2 127.8 121.7 115.1 109.5 103.5 98.3 93.3 88.8 84.7 80.5 76.9 73.1 70.0 66.6 63.4 60.4 57.2	MAG .020 .038 .055 .069 .082 .092 .101 .108 .115 .123 .129 .135 .140 .146 .151 .156 .161 .166 .172 .178 .183 .189 .195	82.4 76.4 70.1 66.3 61.6 57.9 55.1 52.6 50.8 48.8 47.8 46.8 45.5 44.3 43.2 42.6 41.9 41.2 40.5 40.2 39.5 38.9	MAG .987 .955 .914 .864 .816 .769 .721 .678 .636 .602 .570 .544 .517 .493 .471 .451 .432 .416 .398 .384 .367 .354 .340 .329	ANG -7.0 -13.8 -19.8 -25.2 -29.7 -33.6 -37.2 -39.9 -42.7 -44.7 -46.5 -48.2 -50.1 -51.6 -53.2 -54.8 -56.2 -57.7 -59.3 -60.9 -62.6 -64.4 -66.4
FREQUENCY MHz 100.00 200.00 300.00 400.00 500.00 600.00 700.00 800.00 1000.00 1100.00 1200.00 1300.00 1400.00 1500.00 1600.00 1700.00 1800.00 1900.00 2100.00 2200.00 2300.00 2400.00	MAG .948 .912 .876 .831 .784 .737 .680 .635 .581 .530 .480 .441 .408 .382 .358 .339 .324 .311 .305 .301 .299 .300 .303 .307	ANG -9.1 -18.6 -27.7 -37.1 -46.0 -54.7 -62.9 -71.7 -80.0 -89.2 -97.5 -105.8 -113.4 -121.2 -128.9 -136.3 -144.4 -151.7 -158.8 -166.7 -173.5 180.0 173.7	MAG 5.295 5.291 5.354 5.177 5.109 4.832 4.667 4.504 4.335 4.226 4.038 3.879 3.680 3.528 3.359 3.200 3.076 2.932 2.825 2.7112 2.614 2.508 2.434 2.348	ANG 168.1 158.4 149.7 141.3 135.2 127.8 121.7 115.1 109.5 103.5 98.3 93.3 88.8 84.7 80.5 76.9 73.1 70.0 66.6 63.4 60.4 57.2 54.5 51.5	MAG .020 .038 .055 .069 .082 .092 .101 .108 .115 .123 .129 .135 .140 .146 .151 .156 .161 .166 .172 .178 .183 .189 .195 .201	82.4 76.4 70.1 66.3 61.6 57.9 55.1 52.6 50.8 48.8 47.8 46.8 45.5 44.3 43.2 42.6 41.9 41.2 40.5 40.2 39.5 38.9 38.2	MAG .987 .955 .914 .864 .816 .769 .721 .678 .636 .602 .570 .544 .517 .493 .471 .451 .432 .416 .398 .384 .367 .354 .340	ANG -7.0 -13.8 -19.8 -25.2 -29.7 -33.6 -37.2 -39.9 -42.7 -44.7 -46.5 -48.2 -50.1 -51.6 -53.2 -54.8 -56.2 -57.7 -59.3 -60.9 -62.6 -64.4 -66.4
FREQUENCY MHz 100.00 200.00 300.00 400.00 500.00 600.00 700.00 800.00 1000.00 1100.00 1200.00 1300.00 1500.00 1600.00 1700.00 1800.00 1900.00 2100.00 2200.00 2300.00 2400.00 2500.00	MAG .948 .912 .876 .831 .784 .737 .680 .635 .581 .530 .480 .441 .408 .382 .358 .339 .324 .311 .305 .301 .299 .300 .303 .307 .311	ANG -9.1 -18.6 -27.7 -37.1 -46.0 -54.7 -62.9 -71.7 -80.0 -89.2 -97.5 -105.8 -113.4 -121.2 -128.9 -136.3 -144.4 -151.7 -158.8 -166.7 -173.5 180.0 173.7 167.8 162.3	MAG 5.295 5.291 5.354 5.177 5.109 4.832 4.667 4.504 4.335 4.226 4.038 3.879 3.680 3.528 3.359 3.200 3.076 2.932 2.825 2.712 2.614 2.508 2.434 2.348 2.276	ANG 168.1 158.4 149.7 141.3 135.2 127.8 121.7 115.1 109.5 103.5 98.3 93.3 88.8 84.7 80.5 76.9 73.1 70.0 66.6 63.4 60.4 57.2 54.5 51.5 49.0	MAG .020 .038 .055 .069 .082 .092 .101 .108 .115 .123 .129 .135 .140 .146 .151 .156 .161 .166 .172 .178 .183 .189 .195 .201 .206	82.4 76.4 70.1 66.3 61.6 57.9 55.1 52.6 50.8 48.8 47.8 46.8 45.5 44.3 43.2 42.6 41.9 41.2 40.5 40.2 39.5 38.9 38.2 37.9	MAG .987 .955 .914 .864 .816 .769 .721 .678 .636 .602 .570 .544 .517 .493 .471 .451 .432 .416 .398 .384 .367 .354 .340 .329 .313	ANG -7.0 -13.8 -19.8 -25.2 -29.7 -33.6 -37.2 -39.9 -42.7 -44.7 -46.5 -48.2 -50.1 -51.6 -53.2 -54.8 -56.2 -57.7 -59.3 -60.9 -62.6 -64.4 -68.3 -70.6
FREQUENCY MHz 100.00 200.00 300.00 400.00 500.00 600.00 700.00 800.00 1000.00 1100.00 1200.00 1300.00 1500.00 1600.00 1700.00 1800.00 1900.00 2000.00 2200.00 2300.00 2400.00 2500.00	MAG .948 .912 .876 .831 .784 .737 .680 .635 .581 .530 .480 .441 .408 .382 .358 .339 .324 .311 .305 .301 .299 .300 .303 .307 .311 .320 .327	ANG -9.1 -18.6 -27.7 -37.1 -46.0 -54.7 -62.9 -71.7 -80.0 -89.2 -97.5 -105.8 -113.4 -121.2 -128.9 -136.3 -144.4 -151.7 -158.8 -166.7 -173.5 180.0 173.7 167.8 162.3 156.7	MAG 5.295 5.291 5.354 5.177 5.109 4.832 4.667 4.504 4.335 4.226 4.038 3.879 3.680 3.528 3.359 3.200 3.076 2.932 2.825 2.712 2.614 2.508 2.434 2.348 2.276 2.209	ANG 168.1 158.4 149.7 141.3 135.2 127.8 121.7 115.1 109.5 103.5 98.3 93.3 88.8 84.7 80.5 76.9 73.1 70.0 66.6 63.4 60.4 57.2 54.5 51.5 49.0 45.9	MAG .020 .038 .055 .069 .082 .092 .101 .108 .115 .123 .129 .135 .140 .146 .151 .156 .161 .166 .172 .178 .183 .189 .195 .201 .206 .212	82.4 76.4 70.1 66.3 61.6 57.9 55.1 52.6 50.8 48.8 47.8 46.8 45.5 44.3 43.2 42.6 41.9 41.2 40.5 39.5 38.9 38.9 37.9 37.0	MAG .987 .955 .914 .864 .816 .769 .721 .678 .636 .602 .570 .544 .517 .493 .471 .451 .432 .416 .398 .384 .367 .354 .340 .329 .313 .303	ANG -7.0 -13.8 -19.8 -25.2 -29.7 -33.6 -37.2 -39.9 -42.7 -44.7 -46.5 -48.2 -50.1 -51.6 -53.2 -54.8 -56.2 -57.7 -59.3 -60.9 -62.6 -64.4 -66.4 -66.4 -72.5
FREQUENCY MHz 100.00 200.00 300.00 400.00 500.00 600.00 700.00 800.00 1000.00 1100.00 1200.00 1300.00 1400.00 1500.00 1600.00 1700.00 1800.00 1900.00 2100.00 2200.00 2300.00 2400.00 2500.00 2600.00 2700.00	MAG .948 .912 .876 .831 .784 .737 .680 .635 .581 .530 .480 .441 .408 .382 .358 .339 .324 .311 .305 .301 .299 .300 .303 .307 .311 .320	ANG -9.1 -18.6 -27.7 -37.1 -46.0 -54.7 -62.9 -71.7 -80.0 -89.2 -97.5 -105.8 -113.4 -121.2 -128.9 -136.3 -144.4 -151.7 -158.8 -166.7 -173.5 180.0 173.7 167.8 162.3 156.7 152.5	MAG 5.295 5.291 5.354 5.177 5.109 4.832 4.667 4.504 4.335 4.226 4.038 3.879 3.680 3.528 3.359 3.200 3.076 2.932 2.825 2.712 2.614 2.508 2.434 2.348 2.276 2.209 2.140	ANG 168.1 158.4 149.7 141.3 135.2 127.8 121.7 115.1 109.5 103.5 98.3 93.3 88.8 84.7 80.5 76.9 73.1 70.0 66.6 63.4 60.4 57.2 54.5 51.5 49.0 43.5	MAG .020 .038 .055 .069 .082 .092 .101 .108 .115 .123 .129 .135 .140 .146 .151 .156 .161 .166 .172 .178 .183 .189 .195 .201 .206 .212 .218	ANG 82.4 76.4 70.1 66.3 61.6 57.9 55.1 52.6 50.8 48.8 47.8 46.8 45.5 44.3 43.8 43.2 42.6 41.9 41.2 40.5 40.2 39.5 38.9 38.2 37.9 37.0 36.5	MAG .987 .955 .914 .864 .816 .769 .721 .678 .636 .602 .570 .544 .517 .493 .471 .451 .432 .416 .398 .384 .367 .354 .340 .329 .313 .303 .290	ANG -7.0 -13.8 -19.8 -25.2 -29.7 -33.6 -37.2 -39.9 -42.7 -44.7 -46.5 -48.2 -50.1 -51.6 -53.2 -54.8 -56.2 -57.7 -69.3 -60.9 -62.6 -64.4 -66.4 -68.3 -70.6 -72.5 -75.1
FREQUENCY MHz 100.00 200.00 300.00 400.00 500.00 600.00 700.00 800.00 1000.00 1100.00 1200.00 1300.00 1400.00 1500.00 1600.00 1700.00 1800.00 1900.00 2100.00 2200.00 2300.00 2400.00 2500.00 2500.00 2600.00 2700.00 2800.00	MAG .948 .912 .876 .831 .784 .737 .680 .635 .581 .530 .480 .441 .408 .382 .358 .339 .324 .311 .305 .301 .299 .300 .303 .307 .311 .320 .327 .337	ANG -9.1 -18.6 -27.7 -37.1 -46.0 -54.7 -62.9 -71.7 -80.0 -89.2 -97.5 -105.8 -113.4 -121.2 -128.9 -136.3 -144.4 -151.7 -158.8 -166.7 -173.5 180.0 173.7 167.8 162.3 156.7 152.5 148.0	MAG 5.295 5.291 5.354 5.177 5.109 4.832 4.667 4.504 4.335 4.226 4.038 3.879 3.680 3.528 3.359 3.200 3.076 2.932 2.825 2.712 2.614 2.508 2.434 2.348 2.276 2.209 2.140 2.080	ANG 168.1 158.4 149.7 141.3 135.2 127.8 121.7 115.1 109.5 103.5 98.3 93.3 88.8 84.7 80.5 76.9 73.1 70.0 66.6 63.4 60.4 57.2 54.5 51.5 49.0 45.9 43.5 40.8	MAG .020 .038 .055 .069 .082 .092 .101 .108 .115 .123 .129 .135 .140 .146 .151 .156 .161 .166 .172 .178 .183 .189 .195 .201 .206 .212 .218 .223	ANG 82.4 76.4 70.1 66.3 61.6 57.9 55.1 52.6 50.8 48.8 47.8 46.8 45.5 44.3 43.8 43.2 42.6 41.9 41.2 40.5 40.2 39.5 38.9 38.2 37.9 37.0 36.5 35.7	MAG .987 .955 .914 .864 .816 .769 .721 .678 .636 .602 .570 .544 .517 .493 .471 .451 .432 .416 .398 .384 .367 .354 .340 .329 .313 .303 .290 .278	ANG -7.0 -13.8 -19.8 -25.2 -29.7 -33.6 -37.2 -39.9 -42.7 -44.7 -46.5 -48.2 -50.1 -51.6 -53.2 -54.8 -56.2 -57.7 -59.3 -60.9 -62.6 -64.4 -68.3 -70.6 -72.5 -75.1 -77.8



Vce = 3 V, Ic = 1 mA, Zo = 50 Ω

VCE - 5 V, IC - I IIIA								
FREQUENCY	S	11	Sz	1	S	12	S	22
MHz	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG
IVII IZ	MAG	ANG	IVIAG	ANG	IVIAG	ANG	MAG	ANG
100.00	1.007	-5.9	1.878	172.3	.020	83.6	.998	-4.2
200.00	.988	-12.5	1.925	164.3	.040	80.5	.986	-8.2
300.00	.978	-18.3	2.006	157.9	.059	75.4	.975	-12.3
400.00	.953	-25.2	2.012	150.9	.077	71.4	.955	-16.2
500.00	.939	-30.9	2.031	145.7	.095	66.7	.937	-19.8
600.00	.921	-30.5 -37.5	1.974	139.1	.110	62.8	.916	-23.3
700.00	.889	-37.3 -43.2	1.942	133.9	.110	58.6	.893	-25.5 -26.9
		-43.2 -49.3	1.942					
800.00	.871			127.9	.139	54.9	.865	-30.0
900.00	.838	-55.6	1.875	122.8	.149	50.9	.836	-33.6
1000.00	.811	-62.4	1.917	117.8	.160	47.9	.807	-36.5
1100.00	.770	-69.7	1.925	112.5	.169	44.6	.781	-38.9
1200.00	.739	-76.5	1.961	107.7	.175	42.1	.755	-41.4
1300.00	.706	-83.5	1.927	102.7	.182	39.6	.729	-44.0
1400.00	.677	-90.1	1.923	98.4	.188	36.8	.704	-46.3
1500.00	.646	-97.2	1.886	93.2	.192	34.9	.679	-48.6
1600.00	.616	-103.7	1.849	89.2	.196	32.6	.656	-50.8
1700.00	.589	-111.3	1.843	84.4	.200	30.8	.635	-53.0
1800.00	.562	-118.1	1.786	80.4	.201	29.0	.616	-55.1
1900.00	.538	-125.1	1.786	76.1	.203	27.7	.593	-57.1
2000.00	.512	-133.6	1.762	71.8	.206	26.1	.575	-59.1
2100.00	.495	-140.2	1.729	68.0	.207	25.2	.557	-61.2
2200.00	.480	-147.6	1.689	63.9	.207	23.9	.540	-63.2
2300.00	.468	-154.5	1.676	60.4	.209	23.0	.522	-65.2
2400.00	.459	-161.6	1.630	56.7	.210	22.3	.511	-67.3
2500.00	.451	-168.1	1.600	53.4	.210	21.7	.494	-69.5
2600.00	.447	-175.0	1.576	49.7	.212	21.5	.481	-71.7
2700.00	.443	179.1	1.538	46.5	.213	21.1	.467	-74.0
2800.00	.445	173.0	1.509	43.4	.214	21.0	.457	-76.5
2900.00	.443	166.8	1.482	40.1	.216	20.6	.441	-79.1
3000.00	.449	161.9	1.453	37.3	.217	20.5	.432	-81.9
Vce = 1 V, Ic = 5 mA	, Zo = 50 Ω	!						
	_		_					
FREQUENCY		11	Sa		S	12		22
FREQUENCY MHz	MAG S	ANG	S ₂ MAG	ANG	S MAG	12 ANG	S MAG	22 ANG
MHz	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG
MHz 100.00	MAG .862	ANG -14.2	MAG 8.672	ANG 160.8	MAG .023	ANG 80.2	MAG .956	ANG -13.0
MHz 100.00 200.00	MAG .862 .795	ANG -14.2 -28.9	MAG 8.672 8.389	ANG 160.8 148.6	MAG .023 .042	ANG 80.2 70.5	MAG .956 .875	ANG -13.0 -24.2
MHz 100.00 200.00 300.00	.862 .795 .718	ANG -14.2 -28.9 -43.2	MAG 8.672 8.389 8.162	ANG 160.8 148.6 137.5	MAG .023 .042 .057	80.2 70.5 64.0	MAG .956 .875 .778	-13.0 -24.2 -32.6
MHz 100.00 200.00 300.00 400.00	MAG .862 .795 .718 .638	ANG -14.2 -28.9 -43.2 -57.7	MAG 8.672 8.389 8.162 7.624	ANG 160.8 148.6 137.5 128.2	.023 .042 .057 .070	80.2 70.5 64.0 59.5	.956 .875 .778 .691	-13.0 -24.2 -32.6 -39.0
MHz 100.00 200.00 300.00 400.00 500.00	MAG .862 .795 .718 .638 .573	ANG -14.2 -28.9 -43.2 -57.7 -71.2	MAG 8.672 8.389 8.162 7.624 7.259	ANG 160.8 148.6 137.5 128.2 119.8	MAG .023 .042 .057 .070 .079	80.2 70.5 64.0 59.5 57.7	MAG .956 .875 .778 .691 .618	-13.0 -24.2 -32.6 -39.0 -43.6
MHz 100.00 200.00 300.00 400.00 500.00 600.00	MAG .862 .795 .718 .638 .573	ANG -14.2 -28.9 -43.2 -57.7 -71.2 -83.2	MAG 8.672 8.389 8.162 7.624 7.259 6.617	ANG 160.8 148.6 137.5 128.2 119.8 112.0	MAG .023 .042 .057 .070 .079 .088	80.2 70.5 64.0 59.5 57.7 55.2	MAG .956 .875 .778 .691 .618	-13.0 -24.2 -32.6 -39.0 -43.6 -47.2
MHz 100.00 200.00 300.00 400.00 500.00 600.00 700.00	MAG .862 .795 .718 .638 .573 .510	ANG -14.2 -28.9 -43.2 -57.7 -71.2 -83.2 -95.3	MAG 8.672 8.389 8.162 7.624 7.259 6.617 6.154	ANG 160.8 148.6 137.5 128.2 119.8 112.0 105.2	MAG .023 .042 .057 .070 .079 .088 .096	80.2 70.5 64.0 59.5 57.7 55.2 53.5	MAG .956 .875 .778 .691 .618 .556	ANG -13.0 -24.2 -32.6 -39.0 -43.6 -47.2 -50.1
MHz 100.00 200.00 300.00 400.00 500.00 600.00 700.00 800.00	MAG .862 .795 .718 .638 .573 .510 .447 .402	ANG -14.2 -28.9 -43.2 -57.7 -71.2 -83.2 -95.3 -106.5	MAG 8.672 8.389 8.162 7.624 7.259 6.617 6.154 5.675	ANG 160.8 148.6 137.5 128.2 119.8 112.0 105.2 98.7	MAG .023 .042 .057 .070 .079 .088 .096 .103	80.2 70.5 64.0 59.5 57.7 55.2 53.5 52.8	MAG .956 .875 .778 .691 .618 .556 .504	ANG -13.0 -24.2 -32.6 -39.0 -43.6 -47.2 -50.1 -52.2
MHz 100.00 200.00 300.00 400.00 500.00 600.00 700.00 800.00 900.00	MAG .862 .795 .718 .638 .573 .510 .447 .402 .364	ANG -14.2 -28.9 -43.2 -57.7 -71.2 -83.2 -95.3 -106.5 -117.0	MAG 8.672 8.389 8.162 7.624 7.259 6.617 6.154 5.675 5.254	ANG 160.8 148.6 137.5 128.2 119.8 112.0 105.2 98.7 93.5	MAG .023 .042 .057 .070 .079 .088 .096 .103 .111	80.2 70.5 64.0 59.5 57.7 55.2 53.5 52.8 52.4	MAG .956 .875 .778 .691 .618 .556 .504 .459	ANG -13.0 -24.2 -32.6 -39.0 -43.6 -47.2 -50.1 -52.2 -54.2
MHz 100.00 200.00 300.00 400.00 500.00 600.00 700.00 800.00 900.00 1000.00	MAG .862 .795 .718 .638 .573 .510 .447 .402 .364 .336	ANG -14.2 -28.9 -43.2 -57.7 -71.2 -83.2 -95.3 -106.5 -117.0 -127.2	MAG 8.672 8.389 8.162 7.624 7.259 6.617 6.154 5.675 5.254 4.875	ANG 160.8 148.6 137.5 128.2 119.8 112.0 105.2 98.7 93.5 88.6	MAG .023 .042 .057 .070 .079 .088 .096 .103 .111 .118	80.2 70.5 64.0 59.5 57.7 55.2 53.5 52.8 52.4 51.3	MAG .956 .875 .778 .691 .618 .556 .504 .459 .423 .393	ANG -13.0 -24.2 -32.6 -39.0 -43.6 -47.2 -50.1 -52.2 -54.2 -55.8
MHz 100.00 200.00 300.00 400.00 500.00 600.00 700.00 800.00 900.00 1000.00	MAG .862 .795 .718 .638 .573 .510 .447 .402 .364 .336 .314	ANG -14.2 -28.9 -43.2 -57.7 -71.2 -83.2 -95.3 -106.5 -117.0 -127.2 -136.0	MAG 8.672 8.389 8.162 7.624 7.259 6.617 6.154 5.675 5.254 4.875 4.517	ANG 160.8 148.6 137.5 128.2 119.8 112.0 105.2 98.7 93.5 88.6 84.4	MAG .023 .042 .057 .070 .079 .088 .096 .103 .111 .118 .126	80.2 70.5 64.0 59.5 57.7 55.2 53.5 52.8 52.4 51.3 50.7	MAG .956 .875 .778 .691 .618 .556 .504 .459 .423 .393 .366	ANG -13.0 -24.2 -32.6 -39.0 -43.6 -47.2 -50.1 -52.2 -54.2 -55.8 -57.1
MHz 100.00 200.00 300.00 400.00 500.00 600.00 700.00 800.00 900.00 1000.00 1100.00	MAG .862 .795 .718 .638 .573 .510 .447 .402 .364 .336 .314 .300	ANG -14.2 -28.9 -43.2 -57.7 -71.2 -83.2 -95.3 -106.5 -117.0 -127.2 -136.0 -144.9	MAG 8.672 8.389 8.162 7.624 7.259 6.617 6.154 5.675 5.254 4.875 4.517 4.206	ANG 160.8 148.6 137.5 128.2 119.8 112.0 105.2 98.7 93.5 88.6 84.4 80.3	MAG .023 .042 .057 .070 .079 .088 .096 .103 .111 .118 .126 .133	80.2 70.5 64.0 59.5 57.7 55.2 53.5 52.8 52.4 51.3 50.7 50.3	MAG .956 .875 .778 .691 .618 .556 .504 .459 .423 .393 .366 .343	ANG -13.0 -24.2 -32.6 -39.0 -43.6 -47.2 -50.1 -52.2 -54.2 -55.8 -57.1 -58.7
MHz 100.00 200.00 300.00 400.00 500.00 600.00 700.00 800.00 900.00 1100.00 1200.00 1300.00	MAG .862 .795 .718 .638 .573 .510 .447 .402 .364 .336 .314 .300 .289	ANG -14.2 -28.9 -43.2 -57.7 -71.2 -83.2 -95.3 -106.5 -117.0 -127.2 -136.0 -144.9 -153.1	MAG 8.672 8.389 8.162 7.624 7.259 6.617 6.154 5.675 5.254 4.875 4.517 4.206 3.922	ANG 160.8 148.6 137.5 128.2 119.8 112.0 105.2 98.7 93.5 88.6 84.4 80.3 76.7	MAG .023 .042 .057 .070 .079 .088 .096 .103 .111 .118 .126 .133 .139	80.2 70.5 64.0 59.5 57.7 55.2 53.5 52.8 52.4 51.3 50.7 50.3 49.5	MAG .956 .875 .778 .691 .618 .556 .504 .459 .423 .393 .366 .343 .323	ANG -13.0 -24.2 -32.6 -39.0 -43.6 -47.2 -50.1 -52.2 -54.2 -55.8 -57.1 -58.7 -60.4
MHz 100.00 200.00 300.00 400.00 500.00 600.00 700.00 800.00 1000.00 1100.00 1200.00 1300.00 1400.00	MAG .862 .795 .718 .638 .573 .510 .447 .402 .364 .336 .314 .300 .289 .286	ANG -14.2 -28.9 -43.2 -57.7 -71.2 -83.2 -95.3 -106.5 -117.0 -127.2 -136.0 -144.9 -153.1 -160.7	MAG 8.672 8.389 8.162 7.624 7.259 6.617 6.154 5.675 5.254 4.875 4.517 4.206 3.922 3.699	ANG 160.8 148.6 137.5 128.2 119.8 112.0 105.2 98.7 93.5 88.6 84.4 80.3 76.7 73.4	MAG .023 .042 .057 .070 .079 .088 .096 .103 .111 .118 .126 .133 .139 .147	80.2 70.5 64.0 59.5 57.7 55.2 53.5 52.8 52.4 51.3 50.7 50.3 49.5 48.9	MAG .956 .875 .778 .691 .618 .556 .504 .459 .423 .393 .366 .343 .323	ANG -13.0 -24.2 -32.6 -39.0 -43.6 -47.2 -50.1 -52.2 -54.2 -55.8 -57.1 -58.7 -60.4 -61.7
MHz 100.00 200.00 300.00 400.00 500.00 600.00 700.00 800.00 1000.00 1100.00 1200.00 1300.00 1400.00 1500.00	MAG .862 .795 .718 .638 .573 .510 .447 .402 .364 .336 .314 .300 .289 .286 .282	ANG -14.2 -28.9 -43.2 -57.7 -71.2 -83.2 -95.3 -106.5 -117.0 -127.2 -136.0 -144.9 -153.1 -160.7 -167.9	MAG 8.672 8.389 8.162 7.624 7.259 6.617 6.154 5.675 5.254 4.875 4.517 4.206 3.922 3.699 3.473	ANG 160.8 148.6 137.5 128.2 119.8 112.0 105.2 98.7 93.5 88.6 84.4 80.3 76.7 73.4 69.9	MAG .023 .042 .057 .070 .079 .088 .096 .103 .111 .118 .126 .133 .139 .147	80.2 70.5 64.0 59.5 57.7 55.2 53.5 52.8 52.4 51.3 50.7 50.3 49.5 48.9 48.3	MAG .956 .875 .778 .691 .618 .556 .504 .459 .423 .393 .366 .343 .323 .303 .286	ANG -13.0 -24.2 -32.6 -39.0 -43.6 -47.2 -50.1 -52.2 -54.2 -55.8 -57.1 -58.7 -60.4 -61.7 -63.7
MHz 100.00 200.00 300.00 400.00 500.00 600.00 700.00 800.00 1000.00 1100.00 1200.00 1300.00 1400.00 1500.00 1600.00	MAG .862 .795 .718 .638 .573 .510 .447 .402 .364 .336 .314 .300 .289 .286 .282	ANG -14.2 -28.9 -43.2 -57.7 -71.2 -83.2 -95.3 -106.5 -117.0 -127.2 -136.0 -144.9 -153.1 -160.7 -167.9 -174.7	MAG 8.672 8.389 8.162 7.624 7.259 6.617 6.154 5.675 5.254 4.875 4.517 4.206 3.922 3.699 3.473 3.293	ANG 160.8 148.6 137.5 128.2 119.8 112.0 105.2 98.7 93.5 88.6 84.4 80.3 76.7 73.4 69.9 66.9	MAG .023 .042 .057 .070 .079 .088 .096 .103 .111 .118 .126 .133 .139 .147 .155	80.2 70.5 64.0 59.5 57.7 55.2 53.5 52.8 52.4 51.3 50.7 50.3 49.5 48.9 48.3 47.5	MAG .956 .875 .778 .691 .618 .556 .504 .459 .423 .393 .366 .343 .323 .303 .286	ANG -13.0 -24.2 -32.6 -39.0 -43.6 -47.2 -50.1 -52.2 -54.2 -55.8 -57.1 -58.7 -60.4 -61.7 -63.7 -65.3
MHz 100.00 200.00 300.00 400.00 500.00 600.00 700.00 800.00 1000.00 1100.00 1200.00 1300.00 1400.00 1500.00 1600.00 1700.00	MAG .862 .795 .718 .638 .573 .510 .447 .402 .364 .336 .314 .300 .289 .286 .282 .282	ANG -14.2 -28.9 -43.2 -57.7 -71.2 -83.2 -95.3 -106.5 -117.0 -127.2 -136.0 -144.9 -153.1 -160.7 -167.9 -174.7 178.6	MAG 8.672 8.389 8.162 7.624 7.259 6.617 6.154 5.675 5.254 4.875 4.517 4.206 3.922 3.699 3.473 3.293 3.128	ANG 160.8 148.6 137.5 128.2 119.8 112.0 105.2 98.7 93.5 88.6 84.4 80.3 76.7 73.4 69.9 66.9 63.6	MAG .023 .042 .057 .070 .079 .088 .096 .103 .111 .118 .126 .133 .139 .147 .155 .162 .170	80.2 70.5 64.0 59.5 57.7 55.2 53.5 52.8 52.4 51.3 50.7 50.3 49.5 48.9 48.3 47.5 46.8	MAG .956 .875 .778 .691 .618 .556 .504 .459 .423 .393 .366 .343 .323 .303 .286 .271	ANG -13.0 -24.2 -32.6 -39.0 -43.6 -47.2 -50.1 -52.2 -54.2 -55.8 -57.1 -58.7 -60.4 -61.7 -63.7 -65.3 -67.1
MHz 100.00 200.00 300.00 400.00 500.00 600.00 700.00 800.00 1000.00 1100.00 1200.00 1300.00 1400.00 1500.00 1600.00 1700.00	MAG .862 .795 .718 .638 .573 .510 .447 .402 .364 .336 .314 .300 .289 .286 .282 .282 .286 .288	ANG -14.2 -28.9 -43.2 -57.7 -71.2 -83.2 -95.3 -106.5 -117.0 -127.2 -136.0 -144.9 -153.1 -160.7 -167.9 -174.7 178.6 172.9	MAG 8.672 8.389 8.162 7.624 7.259 6.617 6.154 5.675 5.254 4.875 4.517 4.206 3.922 3.699 3.473 3.293 3.128 2.962	ANG 160.8 148.6 137.5 128.2 119.8 112.0 105.2 98.7 93.5 88.6 84.4 80.3 76.7 73.4 69.9 66.9 63.6 60.9	MAG .023 .042 .057 .070 .079 .088 .096 .103 .111 .118 .126 .133 .139 .147 .155 .162 .170 .177	80.2 70.5 64.0 59.5 57.7 55.2 53.5 52.8 52.4 51.3 50.7 50.3 49.5 48.9 48.3 47.5 46.8 46.2	MAG .956 .875 .778 .691 .618 .556 .504 .459 .423 .393 .366 .343 .323 .303 .286 .271 .255	ANG -13.0 -24.2 -32.6 -39.0 -43.6 -47.2 -50.1 -52.2 -54.2 -55.8 -57.1 -58.7 -60.4 -61.7 -63.7 -65.3 -67.1 -69.0
MHz 100.00 200.00 300.00 400.00 500.00 600.00 700.00 800.00 1000.00 1100.00 1200.00 1300.00 1400.00 1500.00 1600.00 1700.00 1800.00 1900.00	MAG .862 .795 .718 .638 .573 .510 .447 .402 .364 .336 .314 .300 .289 .286 .282 .286 .282	ANG -14.2 -28.9 -43.2 -57.7 -71.2 -83.2 -95.3 -106.5 -117.0 -127.2 -136.0 -144.9 -153.1 -160.7 -167.9 -174.7 178.6 172.9 167.6	MAG 8.672 8.389 8.162 7.624 7.259 6.617 6.154 5.675 5.254 4.875 4.517 4.206 3.922 3.699 3.473 3.293 3.128 2.962 2.838	ANG 160.8 148.6 137.5 128.2 119.8 112.0 105.2 98.7 93.5 88.6 84.4 80.3 76.7 73.4 69.9 66.9 63.6 60.9 58.1	MAG .023 .042 .057 .070 .079 .088 .096 .103 .111 .118 .126 .133 .139 .147 .155 .162 .170 .177 .186	80.2 70.5 64.0 59.5 57.7 55.2 53.5 52.8 52.4 51.3 50.7 50.3 49.5 48.9 48.3 47.5 46.8 46.2 45.3	MAG .956 .875 .778 .691 .618 .556 .504 .459 .423 .393 .366 .343 .323 .303 .286 .271 .255 .242	ANG -13.0 -24.2 -32.6 -39.0 -43.6 -47.2 -50.1 -52.2 -54.2 -55.8 -57.1 -58.7 -60.4 -61.7 -63.7 -65.3 -67.1 -69.0 -71.6
MHz 100.00 200.00 300.00 400.00 500.00 600.00 700.00 800.00 1000.00 1100.00 1200.00 1300.00 1400.00 1500.00 1700.00 1800.00 1700.00 1800.00 1900.00	MAG .862 .795 .718 .638 .573 .510 .447 .402 .364 .336 .314 .300 .289 .286 .282 .282 .288 .294 .303	ANG -14.2 -28.9 -43.2 -57.7 -71.2 -83.2 -95.3 -106.5 -117.0 -127.2 -136.0 -144.9 -153.1 -160.7 -167.9 -174.7 178.6 172.9 167.6 162.2	MAG 8.672 8.389 8.162 7.624 7.259 6.617 6.154 5.675 5.254 4.875 4.517 4.206 3.922 3.699 3.473 3.293 3.128 2.962 2.838 2.707	ANG 160.8 148.6 137.5 128.2 119.8 112.0 105.2 98.7 93.5 88.6 84.4 80.3 76.7 73.4 69.9 66.9 63.6 60.9 58.1 55.2	MAG .023 .042 .057 .070 .079 .088 .096 .103 .111 .118 .126 .133 .139 .147 .155 .162 .170 .177 .186 .193	ANG 80.2 70.5 64.0 59.5 57.7 55.2 53.5 52.8 52.4 51.3 50.7 50.3 49.5 48.9 48.3 47.5 46.8 46.2 45.3 44.4	MAG .956 .875 .778 .691 .618 .556 .504 .459 .423 .393 .366 .343 .323 .303 .286 .271 .255 .242 .227	ANG -13.0 -24.2 -32.6 -39.0 -43.6 -47.2 -50.1 -52.2 -54.2 -55.8 -57.1 -60.4 -61.7 -63.7 -65.3 -67.1 -69.0 -71.6 -74.0
MHz 100.00 200.00 300.00 400.00 500.00 600.00 700.00 800.00 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 .862 .795 .718 .638 .573 .510 .447 .402 .364 .336 .314 .300 .289 .286 .282 .286 .282 .286 .288 .294 .303 .310	ANG -14.2 -28.9 -43.2 -57.7 -71.2 -83.2 -95.3 -106.5 -117.0 -127.2 -136.0 -144.9 -153.1 -160.7 -167.9 -174.7 178.6 172.9 167.6 162.2 157.3	MAG 8.672 8.389 8.162 7.624 7.259 6.617 6.154 5.675 5.254 4.875 4.517 4.206 3.922 3.699 3.473 3.293 3.128 2.962 2.838 2.707 2.599	ANG 160.8 148.6 137.5 128.2 119.8 112.0 105.2 98.7 93.5 88.6 84.4 80.3 76.7 73.4 69.9 66.9 63.6 60.9 58.1 55.2 52.5	MAG .023 .042 .057 .070 .079 .088 .096 .103 .111 .118 .126 .133 .139 .147 .155 .162 .170 .177 .186 .193 .201	80.2 70.5 64.0 59.5 57.7 55.2 53.5 52.8 52.4 51.3 50.7 50.3 49.5 48.9 48.3 47.5 46.8 46.2 45.3 44.4	MAG .956 .875 .778 .691 .618 .556 .504 .459 .423 .393 .366 .343 .323 .303 .286 .271 .255 .242 .227 .214	ANG -13.0 -24.2 -32.6 -39.0 -43.6 -47.2 -50.1 -52.2 -54.2 -55.8 -57.1 -68.7 -60.4 -61.7 -63.7 -65.3 -67.1 -69.0 -71.6 -74.0 -76.5
MHz 100.00 200.00 300.00 400.00 500.00 600.00 700.00 800.00 1100.00 11200.00 1200.00 1400.00 1500.00 1600.00 1700.00 1800.00 1900.00 2000.00 2200.00	MAG .862 .795 .718 .638 .573 .510 .447 .402 .364 .336 .314 .300 .289 .286 .282 .286 .282 .286 .288 .294 .303 .310 .318	ANG -14.2 -28.9 -43.2 -57.7 -71.2 -83.2 -95.3 -106.5 -117.0 -127.2 -136.0 -144.9 -153.1 -160.7 -167.9 -174.7 178.6 172.9 167.6 162.2 157.3 152.9	MAG 8.672 8.389 8.162 7.624 7.259 6.617 6.154 5.675 5.254 4.875 4.517 4.206 3.922 3.699 3.473 3.293 3.128 2.962 2.838 2.707 2.599 2.487	ANG 160.8 148.6 137.5 128.2 119.8 112.0 105.2 98.7 93.5 88.6 84.4 80.3 76.7 73.4 69.9 66.9 63.6 60.9 58.1 55.2 52.5 49.6	MAG .023 .042 .057 .070 .079 .088 .096 .103 .111 .118 .126 .133 .139 .147 .155 .162 .170 .177 .186 .193 .201 .208	80.2 70.5 64.0 59.5 57.7 55.2 53.5 52.8 52.4 51.3 50.7 50.3 48.9 48.3 47.5 46.8 46.2 45.3 44.4 43.5 42.5	MAG .956 .875 .778 .691 .618 .556 .504 .459 .423 .393 .366 .343 .323 .303 .286 .271 .255 .242 .227 .214 .200 .189	ANG -13.0 -24.2 -32.6 -39.0 -43.6 -47.2 -50.1 -52.2 -54.2 -55.8 -57.1 -58.7 -60.4 -61.7 -63.7 -65.3 -67.1 -69.0 -71.6 -74.0 -76.5 -79.5
MHz 100.00 200.00 300.00 400.00 500.00 600.00 700.00 800.00 1100.00 1200.00 1300.00 1400.00 1500.00 1600.00 1700.00 1800.00 1900.00 2000.00 2100.00 2200.00 2300.00	MAG .862 .795 .718 .638 .573 .510 .447 .402 .364 .336 .314 .300 .289 .286 .282 .286 .288 .294 .303 .310 .318 .327	ANG -14.2 -28.9 -43.2 -57.7 -71.2 -83.2 -95.3 -106.5 -117.0 -127.2 -136.0 -144.9 -153.1 -160.7 -167.9 -174.7 178.6 172.9 167.6 162.2 157.3 152.9 148.8	MAG 8.672 8.389 8.162 7.624 7.259 6.617 6.154 5.675 5.254 4.875 4.517 4.206 3.922 3.699 3.473 3.293 3.128 2.962 2.838 2.707 2.599 2.487 2.404	ANG 160.8 148.6 137.5 128.2 119.8 112.0 105.2 98.7 93.5 88.6 84.4 80.3 76.7 73.4 69.9 66.9 63.6 60.9 58.1 555.2 52.5 49.6 47.4	MAG .023 .042 .057 .070 .079 .088 .096 .103 .111 .118 .126 .133 .139 .147 .155 .162 .170 .177 .186 .193 .201 .208 .215	80.2 70.5 64.0 59.5 57.7 55.2 53.5 52.8 52.4 51.3 50.7 50.3 49.5 48.9 48.3 47.5 46.8 46.2 45.3 44.4 43.5 42.5 41.5	MAG .956 .875 .778 .691 .618 .556 .504 .459 .423 .393 .366 .343 .323 .303 .286 .271 .255 .242 .227 .214 .200 .189 .176	ANG -13.0 -24.2 -32.6 -39.0 -43.6 -47.2 -50.1 -52.2 -54.2 -55.8 -57.1 -58.7 -60.4 -61.7 -63.7 -65.3 -67.1 -69.0 -71.6 -74.0 -76.5 -79.5 -83.1
MHz 100.00 200.00 300.00 400.00 500.00 600.00 700.00 800.00 1100.00 1200.00 1300.00 1400.00 1500.00 1600.00 1700.00 1800.00 1900.00 2000.00 2100.00 2200.00 2300.00 2400.00	MAG .862 .795 .718 .638 .573 .510 .447 .402 .364 .336 .314 .300 .289 .286 .282 .286 .288 .294 .303 .310 .318 .327 .336	ANG -14.2 -28.9 -43.2 -57.7 -71.2 -83.2 -95.3 -106.5 -117.0 -127.2 -136.0 -144.9 -153.1 -160.7 -167.9 -174.7 178.6 172.9 167.6 162.2 157.3 152.9 148.8 144.9	MAG 8.672 8.389 8.162 7.624 7.259 6.617 6.154 5.675 5.254 4.875 4.517 4.206 3.922 3.699 3.473 3.293 3.128 2.962 2.838 2.707 2.599 2.487 2.404 2.312	ANG 160.8 148.6 137.5 128.2 119.8 112.0 105.2 98.7 93.5 88.6 84.4 80.3 76.7 73.4 69.9 66.9 63.6 60.9 58.1 555.2 52.5 49.6 47.4 44.6	MAG .023 .042 .057 .070 .079 .088 .096 .103 .111 .118 .126 .133 .139 .147 .155 .162 .170 .177 .186 .193 .201 .208 .215 .223	80.2 70.5 64.0 59.5 57.7 55.2 53.5 52.8 52.4 51.3 50.7 50.3 49.5 48.9 48.3 47.5 46.8 46.2 45.3 44.4 43.5 42.5 41.5	MAG .956 .875 .778 .691 .618 .556 .504 .459 .423 .393 .366 .343 .323 .303 .286 .271 .255 .242 .227 .214 .200 .189 .176 .166	ANG -13.0 -24.2 -32.6 -39.0 -43.6 -47.2 -50.1 -52.2 -54.2 -55.8 -57.1 -58.7 -60.4 -61.7 -63.7 -65.3 -67.1 -69.0 -71.6 -74.0 -76.5 -79.5 -83.1 -86.5
MHz 100.00 200.00 300.00 400.00 500.00 600.00 700.00 800.00 1000.00 1100.00 1200.00 1400.00 1500.00 1600.00 1700.00 1800.00 1900.00 2100.00 2200.00 2200.00 2300.00 2400.00	MAG .862 .795 .718 .638 .573 .510 .447 .402 .364 .336 .314 .300 .289 .286 .282 .286 .288 .294 .303 .310 .318 .327 .336 .347	ANG -14.2 -28.9 -43.2 -57.7 -71.2 -83.2 -95.3 -106.5 -117.0 -127.2 -136.0 -144.9 -153.1 -160.7 -167.9 -174.7 178.6 172.9 167.6 162.2 157.3 152.9 148.8 144.9 141.4	MAG 8.672 8.389 8.162 7.624 7.259 6.617 6.154 5.675 5.254 4.875 4.517 4.206 3.922 3.699 3.473 3.293 3.128 2.962 2.838 2.707 2.599 2.487 2.404 2.312 2.234	ANG 160.8 148.6 137.5 128.2 119.8 112.0 105.2 98.7 93.5 88.6 84.4 80.3 76.7 73.4 69.9 66.9 63.6 60.9 58.1 55.2 52.5 49.6 47.4 44.6 42.3	MAG .023 .042 .057 .070 .079 .088 .096 .103 .111 .118 .126 .133 .139 .147 .155 .162 .170 .177 .186 .193 .201 .208 .215 .223 .231	80.2 70.5 64.0 59.5 57.7 55.2 53.5 52.8 52.4 51.3 50.7 50.3 49.5 48.9 48.3 47.5 46.8 46.2 45.3 44.4 43.5 42.5 41.5 39.5	MAG .956 .875 .778 .691 .618 .556 .504 .459 .423 .393 .366 .343 .323 .303 .286 .271 .255 .242 .227 .214 .200 .189 .176 .166 .154	ANG -13.0 -24.2 -32.6 -39.0 -43.6 -47.2 -50.1 -52.2 -54.2 -55.8 -57.1 -58.7 -60.4 -61.7 -63.7 -65.3 -67.1 -69.0 -71.6 -74.0 -76.5 -79.5 -83.1 -86.5 -90.9
MHz 100.00 200.00 300.00 400.00 500.00 600.00 700.00 800.00 1000.00 1100.00 1200.00 1300.00 1400.00 1500.00 1600.00 1700.00 1800.00 1900.00 2100.00 2200.00 2300.00 2400.00 2500.00 2600.00	MAG .862 .795 .718 .638 .573 .510 .447 .402 .364 .336 .314 .300 .289 .286 .282 .286 .288 .294 .303 .310 .318 .327 .336 .347 .359	ANG -14.2 -28.9 -43.2 -57.7 -71.2 -83.2 -95.3 -106.5 -117.0 -127.2 -136.0 -144.9 -153.1 -160.7 -167.9 -174.7 178.6 172.9 167.6 162.2 157.3 152.9 148.8 144.9 141.4 137.6	MAG 8.672 8.389 8.162 7.624 7.259 6.617 6.154 5.675 5.254 4.875 4.517 4.206 3.922 3.699 3.473 3.293 3.128 2.962 2.838 2.707 2.599 2.487 2.404 2.312 2.234 2.165	ANG 160.8 148.6 137.5 128.2 119.8 112.0 105.2 98.7 93.5 88.6 84.4 80.3 76.7 73.4 69.9 63.6 60.9 58.1 55.2 52.5 49.6 47.4 44.6 42.3 39.6	MAG .023 .042 .057 .070 .079 .088 .096 .103 .111 .118 .126 .133 .139 .147 .155 .162 .170 .177 .186 .193 .201 .208 .215 .223 .231 .237	80.2 70.5 64.0 59.5 57.7 55.2 53.5 52.8 52.4 51.3 50.7 50.3 49.5 48.9 48.3 47.5 46.8 46.2 45.3 44.4 43.5 42.5 41.5 40.5 39.5 38.2	MAG .956 .875 .778 .691 .618 .556 .504 .459 .423 .393 .366 .343 .323 .303 .286 .271 .255 .242 .227 .214 .200 .189 .176 .166 .154 .146	ANG -13.0 -24.2 -32.6 -39.0 -43.6 -47.2 -50.1 -52.2 -54.2 -55.8 -57.1 -58.7 -60.4 -61.7 -63.7 -65.3 -67.1 -69.0 -71.6 -74.0 -76.5 -79.5 -83.1 -86.5 -90.9 -94.9
MHz 100.00 200.00 300.00 400.00 500.00 600.00 700.00 800.00 1000.00 1100.00 1200.00 1300.00 1400.00 1500.00 1600.00 1700.00 1800.00 1900.00 2200.00 2300.00 2400.00 2500.00 2600.00 2700.00	MAG .862 .795 .718 .638 .573 .510 .447 .402 .364 .336 .314 .300 .289 .286 .282 .282 .286 .288 .294 .303 .310 .318 .327 .336 .347 .359 .368	ANG -14.2 -28.9 -43.2 -57.7 -71.2 -83.2 -95.3 -106.5 -117.0 -127.2 -136.0 -144.9 -153.1 -160.7 -167.9 -174.7 178.6 172.9 167.6 162.2 157.3 152.9 148.8 144.9 141.4 137.6 134.9	MAG 8.672 8.389 8.162 7.624 7.259 6.617 6.154 5.675 5.254 4.875 4.517 4.206 3.922 3.699 3.473 3.293 3.128 2.962 2.838 2.707 2.599 2.487 2.404 2.312 2.234 2.165 2.089	ANG 160.8 148.6 137.5 128.2 119.8 112.0 105.2 98.7 93.5 88.6 84.4 80.3 76.7 73.4 69.9 66.9 63.6 60.9 58.1 55.2 52.5 49.6 47.4 44.6 42.3 39.6 37.3	MAG .023 .042 .057 .070 .079 .088 .096 .103 .111 .118 .126 .133 .139 .147 .155 .162 .170 .177 .186 .193 .201 .208 .215 .223 .231 .237 .245	ANG 80.2 70.5 64.0 59.5 57.7 55.2 53.5 52.8 52.4 51.3 50.7 50.3 49.5 48.9 48.3 47.5 46.8 46.2 45.3 44.4 43.5 42.5 41.5 40.5 39.5 38.2 37.3	MAG .956 .875 .778 .691 .618 .556 .504 .459 .423 .393 .366 .343 .323 .303 .286 .271 .255 .242 .227 .214 .200 .189 .176 .166 .154 .146 .135	ANG -13.0 -24.2 -32.6 -39.0 -43.6 -47.2 -50.1 -52.2 -54.2 -55.8 -57.1 -58.7 -60.4 -61.7 -63.7 -65.3 -67.1 -69.0 -71.6 -74.0 -76.5 -83.1 -86.5 -90.9 -94.9 -100.8
MHz 100.00 200.00 300.00 400.00 500.00 600.00 700.00 800.00 1100.00 1100.00 1200.00 1300.00 1400.00 1500.00 1600.00 1700.00 1800.00 1900.00 2000.00 2100.00 2300.00 2400.00 2500.00 2600.00 2700.00 2800.00	MAG .862 .795 .718 .638 .573 .510 .447 .402 .364 .336 .314 .300 .289 .286 .282 .286 .282 .286 .288 .294 .303 .310 .318 .327 .336 .347 .359 .368 .381	ANG -14.2 -28.9 -43.2 -57.7 -71.2 -83.2 -95.3 -106.5 -117.0 -127.2 -136.0 -144.9 -153.1 -160.7 -167.9 -174.7 178.6 172.9 167.6 162.2 157.3 152.9 148.8 144.9 141.4 137.6 134.9 131.9	MAG 8.672 8.389 8.162 7.624 7.259 6.617 6.154 5.675 5.254 4.875 4.517 4.206 3.922 3.699 3.473 3.293 3.128 2.962 2.838 2.707 2.599 2.487 2.404 2.312 2.234 2.165 2.089 2.028	ANG 160.8 148.6 137.5 128.2 119.8 112.0 105.2 98.7 93.5 88.6 84.4 80.3 76.7 73.4 69.9 66.9 63.6 60.9 58.1 55.2 52.5 49.6 47.4 44.6 42.3 39.6 37.3 34.8	MAG .023 .042 .057 .070 .079 .088 .096 .103 .111 .118 .126 .133 .139 .147 .155 .162 .170 .177 .186 .193 .201 .208 .215 .223 .231 .237 .245 .252	ANG 80.2 70.5 64.0 59.5 57.7 55.2 53.5 52.8 52.4 51.3 50.7 50.3 49.5 48.9 48.3 47.5 46.8 46.2 45.3 44.4 43.5 42.5 41.5 40.5 39.5 38.2 37.3 36.4	MAG .956 .875 .778 .691 .618 .556 .504 .459 .423 .393 .366 .343 .323 .303 .286 .271 .255 .242 .227 .214 .200 .189 .176 .166 .154 .146 .135 .126	ANG -13.0 -24.2 -32.6 -39.0 -43.6 -47.2 -50.1 -52.2 -54.2 -55.8 -57.1 -68.7 -60.4 -61.7 -63.7 -65.3 -67.1 -69.0 -71.6 -74.0 -76.5 -79.5 -83.1 -86.5 -90.9 -94.9 -100.8 -106.2
MHz 100.00 200.00 300.00 400.00 500.00 600.00 700.00 800.00 1100.00 1100.00 1200.00 1300.00 1400.00 1500.00 1600.00 1700.00 1800.00 1900.00 2000.00 2100.00 2200.00 2300.00 2400.00 2500.00 2600.00 2700.00 2800.00 2900.00	MAG .862 .795 .718 .638 .573 .510 .447 .402 .364 .336 .314 .300 .289 .286 .282 .286 .282 .286 .288 .294 .303 .310 .318 .327 .336 .347 .359 .368 .381 .390	ANG -14.2 -28.9 -43.2 -57.7 -71.2 -83.2 -95.3 -106.5 -117.0 -127.2 -136.0 -144.9 -153.1 -160.7 -167.9 -174.7 178.6 172.9 167.6 162.2 157.3 152.9 148.8 144.9 141.4 137.6 134.9 131.9 128.8	MAG 8.672 8.389 8.162 7.624 7.259 6.617 6.154 5.675 5.254 4.875 4.517 4.206 3.922 3.699 3.473 3.293 3.128 2.962 2.838 2.707 2.599 2.487 2.404 2.312 2.234 2.165 2.089 2.028 1.962	ANG 160.8 148.6 137.5 128.2 119.8 112.0 105.2 98.7 93.5 88.6 84.4 80.3 76.7 73.4 69.9 66.9 63.6 60.9 58.1 55.2 52.5 49.6 47.4 44.6 42.3 39.6 37.3 34.8 32.5	MAG .023 .042 .057 .070 .079 .088 .096 .103 .111 .118 .126 .133 .139 .147 .155 .162 .170 .177 .186 .193 .201 .208 .215 .223 .231 .237 .245 .252	ANG 80.2 70.5 64.0 59.5 57.7 55.2 53.5 52.8 52.4 51.3 50.7 50.3 49.5 48.9 48.3 47.5 46.8 46.2 45.3 44.4 43.5 42.5 41.5 40.5 39.5 38.2 37.3 36.4 35.1	MAG .956 .875 .778 .691 .618 .556 .504 .459 .423 .393 .366 .343 .323 .303 .286 .271 .255 .242 .227 .214 .200 .189 .176 .166 .154 .146 .135 .126 .118	ANG -13.0 -24.2 -32.6 -39.0 -43.6 -47.2 -50.1 -52.2 -54.2 -55.8 -57.1 -58.7 -60.4 -61.7 -63.7 -65.3 -67.1 -69.0 -71.6 -74.0 -76.5 -79.5 -83.1 -86.5 -90.9 -94.9 -100.8 -106.2 -113.3
MHz 100.00 200.00 300.00 400.00 500.00 600.00 700.00 800.00 1100.00 1100.00 1200.00 1300.00 1400.00 1500.00 1600.00 1700.00 1800.00 1900.00 2000.00 2100.00 2300.00 2400.00 2500.00 2600.00 2700.00 2800.00	MAG .862 .795 .718 .638 .573 .510 .447 .402 .364 .336 .314 .300 .289 .286 .282 .286 .282 .286 .288 .294 .303 .310 .318 .327 .336 .347 .359 .368 .381	ANG -14.2 -28.9 -43.2 -57.7 -71.2 -83.2 -95.3 -106.5 -117.0 -127.2 -136.0 -144.9 -153.1 -160.7 -167.9 -174.7 178.6 172.9 167.6 162.2 157.3 152.9 148.8 144.9 141.4 137.6 134.9 131.9	MAG 8.672 8.389 8.162 7.624 7.259 6.617 6.154 5.675 5.254 4.875 4.517 4.206 3.922 3.699 3.473 3.293 3.128 2.962 2.838 2.707 2.599 2.487 2.404 2.312 2.234 2.165 2.089 2.028	ANG 160.8 148.6 137.5 128.2 119.8 112.0 105.2 98.7 93.5 88.6 84.4 80.3 76.7 73.4 69.9 66.9 63.6 60.9 58.1 55.2 52.5 49.6 47.4 44.6 42.3 39.6 37.3 34.8	MAG .023 .042 .057 .070 .079 .088 .096 .103 .111 .118 .126 .133 .139 .147 .155 .162 .170 .177 .186 .193 .201 .208 .215 .223 .231 .237 .245 .252	ANG 80.2 70.5 64.0 59.5 57.7 55.2 53.5 52.8 52.4 51.3 50.7 50.3 49.5 48.9 48.3 47.5 46.8 46.2 45.3 44.4 43.5 42.5 41.5 40.5 39.5 38.2 37.3 36.4	MAG .956 .875 .778 .691 .618 .556 .504 .459 .423 .393 .366 .343 .323 .303 .286 .271 .255 .242 .227 .214 .200 .189 .176 .166 .154 .146 .135 .126	ANG -13.0 -24.2 -32.6 -39.0 -43.6 -47.2 -50.1 -52.2 -54.2 -55.8 -57.1 -68.7 -60.4 -61.7 -63.7 -65.3 -67.1 -69.0 -71.6 -74.0 -76.5 -79.5 -83.1 -86.5 -90.9 -94.9 -100.8 -106.2



Vce = 1 V, Ic = 3 mA, Zo = 50 Ω

FREQUENCY	S	511	Sa	21	S	12	ç	S ₂₂
MHz	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG
100.00	022	10.0	F F20	165.7	004	04.0	077	-9.5
100.00	.932	-10.9	5.529	165.7	.024	81.3 73.7	.977	
200.00	.886	-21.6	5.442	154.3	.045		.930	-18.3
300.00	.838	-32.2	5.475	144.7	.063	67.9	.869	-25.8
400.00	.788	-42.9	5.242	136.1	.079	61.7	.800	-32.3
500.00	.733	-53.6	5.156	129.6	.092	57.3	.739	-37.5
600.00	.682	-63.5	4.819	122.0	.102	53.8	.682	-41.9
700.00	.620	-73.4	4.644	115.5	.112	50.8	.628	-45.8
800.00	.573	-83.7	4.447	108.7	.119	49.1	.579	-48.8
900.00	.520	-93.9	4.276	103.0	.126	47.2	.535	-51.8
1000.00	.473	-104.2	4.118	96.8	.133	45.6	.498	-54.0
1100.00	.431	-113.9	3.894	91.7	.140	44.6	.467	-55.9
1200.00	.400	-123.4	3.708	86.7	.145	43.7	.439	-57.8
1300.00	.376	-131.6	3.495	82.4	.151	42.9	.412	-59.8
1400.00	.361	-139.7	3.333	78.7	.157	42.1	.389	-61.6
1500.00	.345	-147.7	3.151	74.5	.163	41.4	.368	-63.5
1600.00	.335	-155.3	3.003	71.0	.168	40.5	.347	-65.5
1700.00	.330	-163.1	2.872	67.3	.174	40.3	.329	-67.2
1800.00	.326	-169.9	2.735	64.3	.180	39.5	.313	-69.2
1900.00	.326	-176.4	2.628	61.1	.186	39.0	.297	-71.3
2000.00	.329	177.0	2.509	57.8	.194	38.1	.281	-73.7
2100.00	.333	171.0	2.419	54.9	.199	37.4	.266	-76.1
2200.00	.337	165.6	2.323	51.8	.205	36.7	.253	-78.5
2300.00	.344	160.5	2.251	49.2	.211	36.1	.239	-81.6
2400.00	.351	155.7	2.166	46.2	.218	35.5	.228	-84.2
2500.00	.359	151.3	2.097	43.7	.223	34.5	.214	-87.5
2600.00	.369	146.8	2.035	40.8	.230	33.8	.204	-91.0
2700.00	.378	143.2	1.966	38.4	.237	33.1	.193	-95.1
2800.00	.389	139.6	1.912	35.7	.242	32.0	.181	-99.7
2900.00	.399	135.9	1.853	33.2	.250	31.3	.172	-104.3
3000.00	.411	133.1	1.805	30.8	.256	30.2	.164	-109.4
VcE = 1 V, Ic = 1 mA	$Z_0 = 50 \Omega$)						
			S	21	S	12	5	S ₂₂
FREQUENCY MHz		S ₁₁ ANG	S: MAG	ANG	S MAG	ANG	MAG	S ₂₂ ANG
FREQUENCY MHz	MAG S	ANG	MAG	ANG	MAG	ANG	MAG	ANG
FREQUENCY MHz 100.00	MAG 1.006	ANG -6.7	MAG 1.908	ANG 171.3	MAG .025	ANG 84.6	MAG .994	ANG -5.1
FREQUENCY MHz 100.00 200.00	MAG 1.006 .982	ANG -6.7 -13.7	MAG 1.908 1.949	ANG 171.3 162.2	MAG .025 .049	ANG 84.6 78.6	MAG .994 .982	ANG -5.1 -10.0
FREQUENCY MHz 100.00 200.00 300.00	MAG 1.006 .982 .970	ANG -6.7 -13.7 -20.1	MAG 1.908 1.949 2.027	ANG 171.3 162.2 155.2	MAG .025 .049 .072	ANG 84.6 78.6 73.9	MAG .994 .982 .965	-5.1 -10.0 -14.8
FREQUENCY MHz 100.00 200.00 300.00 400.00	MAG 1.006 .982 .970 .946	ANG -6.7 -13.7 -20.1 -27.6	MAG 1.908 1.949 2.027 2.024	ANG 171.3 162.2 155.2 147.2	.025 .049 .072 .094	84.6 78.6 73.9 68.1	MAG .994 .982 .965 .938	-5.1 -10.0 -14.8 -19.6
FREQUENCY MHz 100.00 200.00 300.00 400.00 500.00	MAG 1.006 .982 .970 .946 .924	ANG -6.7 -13.7 -20.1 -27.6 -34.0	MAG 1.908 1.949 2.027 2.024 2.051	ANG 171.3 162.2 155.2 147.2 142.2	MAG .025 .049 .072 .094 .114	ANG 84.6 78.6 73.9 68.1 63.6	MAG .994 .982 .965 .938 .914	-5.1 -10.0 -14.8 -19.6 -23.9
FREQUENCY MHz 100.00 200.00 300.00 400.00 500.00 600.00	MAG 1.006 .982 .970 .946 .924 .903	ANG -6.7 -13.7 -20.1 -27.6 -34.0 -41.0	MAG 1.908 1.949 2.027 2.024 2.051 1.977	ANG 171.3 162.2 155.2 147.2 142.2 135.3	MAG .025 .049 .072 .094 .114 .132	84.6 78.6 73.9 68.1 63.6 59.0	MAG .994 .982 .965 .938 .914 .887	-5.1 -10.0 -14.8 -19.6 -23.9 -28.0
FREQUENCY MHz 100.00 200.00 300.00 400.00 500.00 600.00 700.00	MAG 1.006 .982 .970 .946 .924 .903 .867	ANG -6.7 -13.7 -20.1 -27.6 -34.0 -41.0 -47.2	MAG 1.908 1.949 2.027 2.024 2.051 1.977 1.946	ANG 171.3 162.2 155.2 147.2 142.2 135.3 129.7	MAG .025 .049 .072 .094 .114 .132 .148	ANG 84.6 78.6 73.9 68.1 63.6 59.0 54.6	MAG .994 .982 .965 .938 .914 .887	-5.1 -10.0 -14.8 -19.6 -23.9 -28.0 -32.2
FREQUENCY MHz 100.00 200.00 300.00 400.00 500.00 600.00 700.00 800.00	MAG 1.006 .982 .970 .946 .924 .903 .867 .848	ANG -6.7 -13.7 -20.1 -27.6 -34.0 -41.0 -47.2 -54.0	MAG 1.908 1.949 2.027 2.024 2.051 1.977 1.946 1.915	ANG 171.3 162.2 155.2 147.2 142.2 135.3 129.7 123.4	MAG .025 .049 .072 .094 .114 .132 .148 .162	84.6 78.6 73.9 68.1 63.6 59.0 54.6 50.6	MAG .994 .982 .965 .938 .914 .887 .857	-5.1 -10.0 -14.8 -19.6 -23.9 -28.0 -32.2 -35.9
FREQUENCY MHz 100.00 200.00 300.00 400.00 500.00 600.00 700.00 800.00 900.00	MAG 1.006 .982 .970 .946 .924 .903 .867 .848 .811	ANG -6.7 -13.7 -20.1 -27.6 -34.0 -41.0 -47.2 -54.0 -60.7	MAG 1.908 1.949 2.027 2.024 2.051 1.977 1.946 1.915 1.874	ANG 171.3 162.2 155.2 147.2 142.2 135.3 129.7 123.4 118.2	MAG .025 .049 .072 .094 .114 .132 .148 .162 .173	84.6 78.6 73.9 68.1 63.6 59.0 54.6 50.6 46.2	MAG .994 .982 .965 .938 .914 .887 .857 .822 .789	-5.1 -10.0 -14.8 -19.6 -23.9 -28.0 -32.2 -35.9 -39.8
FREQUENCY MHz 100.00 200.00 300.00 400.00 500.00 600.00 700.00 800.00 900.00 1000.00	MAG 1.006 .982 .970 .946 .924 .903 .867 .848 .811 .783	ANG -6.7 -13.7 -20.1 -27.6 -34.0 -41.0 -47.2 -54.0 -60.7 -68.4	MAG 1.908 1.949 2.027 2.024 2.051 1.977 1.946 1.915 1.874 1.908	ANG 171.3 162.2 155.2 147.2 142.2 135.3 129.7 123.4 118.2 112.8	MAG .025 .049 .072 .094 .114 .132 .148 .162 .173 .184	84.6 78.6 73.9 68.1 63.6 59.0 54.6 50.6 46.2 43.0	MAG .994 .982 .965 .938 .914 .887 .857 .822 .789	-5.1 -10.0 -14.8 -19.6 -23.9 -28.0 -32.2 -35.9 -39.8 -43.2
FREQUENCY MHz 100.00 200.00 300.00 400.00 500.00 600.00 700.00 800.00 900.00 1000.00	MAG 1.006 .982 .970 .946 .924 .903 .867 .848 .811 .783 .741	ANG -6.7 -13.7 -20.1 -27.6 -34.0 -41.0 -47.2 -54.0 -60.7 -68.4 -76.2	MAG 1.908 1.949 2.027 2.024 2.051 1.977 1.946 1.915 1.874 1.908 1.919	ANG 171.3 162.2 155.2 147.2 142.2 135.3 129.7 123.4 118.2 112.8 107.3	MAG .025 .049 .072 .094 .114 .132 .148 .162 .173 .184 .193	84.6 78.6 73.9 68.1 63.6 59.0 54.6 50.6 46.2 43.0 39.9	MAG .994 .982 .965 .938 .914 .887 .857 .822 .789 .754	-5.1 -10.0 -14.8 -19.6 -23.9 -28.0 -32.2 -35.9 -43.2 -46.0
FREQUENCY MHz 100.00 200.00 300.00 400.00 500.00 600.00 700.00 800.00 900.00 1100.00 1100.00 1200.00	MAG 1.006 .982 .970 .946 .924 .903 .867 .848 .811 .783 .741 .707	ANG -6.7 -13.7 -20.1 -27.6 -34.0 -41.0 -47.2 -54.0 -60.7 -68.4 -76.2 -84.1	MAG 1.908 1.949 2.027 2.024 2.051 1.977 1.946 1.915 1.874 1.908 1.919 1.946	ANG 171.3 162.2 155.2 147.2 142.2 135.3 129.7 123.4 118.2 112.8 107.3 102.3	MAG .025 .049 .072 .094 .114 .132 .148 .162 .173 .184 .193 .201	84.6 78.6 73.9 68.1 63.6 59.0 54.6 50.6 46.2 43.0 39.9 37.1	MAG .994 .982 .965 .938 .914 .887 .857 .822 .789 .754 .723 .692	-5.1 -10.0 -14.8 -19.6 -23.9 -28.0 -32.2 -35.9 -39.8 -43.2 -46.0 -48.6
FREQUENCY MHz 100.00 200.00 300.00 400.00 500.00 600.00 700.00 800.00 900.00 1100.00 1200.00 1300.00	MAG 1.006 .982 .970 .946 .924 .903 .867 .848 .811 .783 .741 .707 .675	ANG -6.7 -13.7 -20.1 -27.6 -34.0 -41.0 -47.2 -54.0 -60.7 -68.4 -76.2 -84.1 -91.2	MAG 1.908 1.949 2.027 2.024 2.051 1.977 1.946 1.915 1.874 1.908 1.919 1.946 1.902	ANG 171.3 162.2 155.2 147.2 142.2 135.3 129.7 123.4 118.2 112.8 107.3 102.3 97.1	MAG .025 .049 .072 .094 .114 .132 .148 .162 .173 .184 .193 .201 .207	ANG 84.6 78.6 73.9 68.1 63.6 59.0 54.6 50.6 46.2 43.0 39.9 37.1 34.5	MAG .994 .982 .965 .938 .914 .887 .857 .822 .789 .754 .723 .692 .663	-5.1 -10.0 -14.8 -19.6 -23.9 -28.0 -32.2 -35.9 -39.8 -43.2 -46.0 -48.6 -51.5
FREQUENCY MHz 100.00 200.00 300.00 400.00 500.00 600.00 700.00 800.00 900.00 1100.00 1200.00 1300.00 1400.00	MAG 1.006 .982 .970 .946 .924 .903 .867 .848 .811 .783 .741 .707 .675 .647	ANG -6.7 -13.7 -20.1 -27.6 -34.0 -41.0 -47.2 -54.0 -60.7 -68.4 -76.2 -84.1 -91.2 -98.6	MAG 1.908 1.949 2.027 2.024 2.051 1.977 1.946 1.915 1.874 1.908 1.919 1.946 1.902 1.888	ANG 171.3 162.2 155.2 147.2 142.2 135.3 129.7 123.4 118.2 112.8 107.3 102.3 97.1 92.7	MAG .025 .049 .072 .094 .114 .132 .148 .162 .173 .184 .193 .201 .207 .212	ANG 84.6 78.6 73.9 68.1 63.6 59.0 54.6 50.6 46.2 43.0 39.9 37.1 34.5 31.8	MAG .994 .982 .965 .938 .914 .887 .857 .822 .789 .754 .723 .692 .663 .634	-5.1 -10.0 -14.8 -19.6 -23.9 -28.0 -32.2 -35.9 -39.8 -43.2 -46.0 -48.6 -51.5 -54.1
FREQUENCY MHz 100.00 200.00 300.00 400.00 500.00 600.00 700.00 800.00 1000.00 1100.00 1200.00 1300.00 1400.00 1500.00	MAG 1.006 .982 .970 .946 .924 .903 .867 .848 .811 .783 .741 .707 .675 .647 .617	ANG -6.7 -13.7 -20.1 -27.6 -34.0 -41.0 -47.2 -54.0 -60.7 -68.4 -76.2 -84.1 -91.2 -98.6 -106.1	MAG 1.908 1.949 2.027 2.024 2.051 1.977 1.946 1.915 1.874 1.908 1.919 1.946 1.902 1.888 1.846	ANG 171.3 162.2 155.2 147.2 142.2 135.3 129.7 123.4 118.2 112.8 107.3 102.3 97.1 92.7 87.4	MAG .025 .049 .072 .094 .114 .132 .148 .162 .173 .184 .193 .201 .207 .212	84.6 78.6 73.9 68.1 63.6 59.0 54.6 50.6 46.2 43.0 39.9 37.1 34.5 31.8 29.5	MAG .994 .982 .965 .938 .914 .887 .857 .822 .789 .754 .723 .692 .663 .634 .609	-5.1 -10.0 -14.8 -19.6 -23.9 -28.0 -32.2 -35.9 -39.8 -43.2 -46.0 -48.6 -51.5 -54.1 -56.8
FREQUENCY MHz 100.00 200.00 300.00 400.00 500.00 600.00 700.00 800.00 1000.00 1100.00 1200.00 1300.00 1400.00 1500.00	MAG 1.006 .982 .970 .946 .924 .903 .867 .848 .811 .783 .741 .707 .675 .647 .617	ANG -6.7 -13.7 -20.1 -27.6 -34.0 -41.0 -47.2 -54.0 -60.7 -68.4 -76.2 -84.1 -91.2 -98.6 -106.1 -112.9	MAG 1.908 1.949 2.027 2.024 2.051 1.977 1.946 1.915 1.874 1.908 1.919 1.946 1.902 1.888 1.846 1.808	ANG 171.3 162.2 155.2 147.2 142.2 135.3 129.7 123.4 118.2 112.8 107.3 102.3 97.1 92.7 87.4 83.0	MAG .025 .049 .072 .094 .114 .132 .148 .162 .173 .184 .193 .201 .207 .212 .216 .220	84.6 78.6 73.9 68.1 63.6 59.0 54.6 50.6 46.2 43.0 39.9 37.1 34.5 31.8 29.5 27.1	MAG .994 .982 .965 .938 .914 .887 .822 .789 .754 .723 .692 .663 .634 .609 .582	-5.1 -10.0 -14.8 -19.6 -23.9 -28.0 -32.2 -35.9 -39.8 -43.2 -46.0 -48.6 -51.5 -54.1 -56.8 -59.4
FREQUENCY MHz 100.00 200.00 300.00 400.00 500.00 600.00 700.00 800.00 1000.00 1100.00 1200.00 1300.00 1400.00 1500.00 1600.00 1700.00	MAG 1.006 .982 .970 .946 .924 .903 .867 .848 .811 .783 .741 .707 .675 .647 .617 .589	ANG -6.7 -13.7 -20.1 -27.6 -34.0 -41.0 -47.2 -54.0 -60.7 -68.4 -76.2 -84.1 -91.2 -98.6 -106.1 -112.9 -121.2	MAG 1.908 1.949 2.027 2.024 2.051 1.977 1.946 1.915 1.874 1.908 1.919 1.946 1.902 1.888 1.846 1.808 1.799	ANG 171.3 162.2 155.2 147.2 147.2 135.3 129.7 123.4 118.2 112.8 107.3 102.3 97.1 92.7 87.4 83.0 78.3	MAG .025 .049 .072 .094 .114 .132 .148 .162 .173 .184 .193 .201 .207 .212 .216 .220 .223	84.6 78.6 73.9 68.1 63.6 59.0 54.6 50.6 46.2 43.0 39.9 37.1 34.5 31.8 29.5 27.1 25.4	MAG .994 .982 .965 .938 .914 .887 .857 .822 .789 .754 .723 .692 .663 .634 .609 .582	-5.1 -10.0 -14.8 -19.6 -23.9 -28.0 -32.2 -35.9 -39.8 -43.2 -46.0 -51.5 -54.1 -56.8 -59.4 -61.8
FREQUENCY MHz 100.00 200.00 300.00 400.00 500.00 600.00 700.00 800.00 1000.00 1100.00 1200.00 1300.00 1400.00 1500.00 1600.00 1700.00	MAG 1.006 .982 .970 .946 .924 .903 .867 .848 .811 .783 .741 .707 .675 .647 .617 .589 .565 .542	ANG -6.7 -13.7 -20.1 -27.6 -34.0 -41.0 -47.2 -54.0 -60.7 -68.4 -76.2 -84.1 -91.2 -98.6 -106.1 -112.9 -121.2 -128.2	MAG 1.908 1.949 2.027 2.024 2.051 1.977 1.946 1.915 1.874 1.908 1.919 1.946 1.902 1.888 1.846 1.808 1.799 1.741	ANG 171.3 162.2 155.2 147.2 142.2 135.3 129.7 123.4 118.2 112.8 107.3 102.3 97.1 92.7 87.4 83.0 78.3 74.4	MAG .025 .049 .072 .094 .114 .132 .148 .162 .173 .184 .193 .201 .207 .212 .216 .220 .223 .224	ANG 84.6 78.6 73.9 68.1 63.6 59.0 54.6 50.6 46.2 43.0 39.9 37.1 34.5 31.8 29.5 27.1 25.4 23.6	MAG .994 .982 .965 .938 .914 .887 .857 .822 .789 .754 .723 .692 .663 .634 .609 .582 .560 .538	-5.1 -10.0 -14.8 -19.6 -23.9 -28.0 -32.2 -35.9 -39.8 -43.2 -46.0 -48.6 -51.5 -54.1 -56.8 -69.4 -61.8
FREQUENCY MHz 100.00 200.00 300.00 400.00 500.00 600.00 700.00 800.00 1000.00 1100.00 1200.00 1300.00 1400.00 1500.00 1600.00 1700.00 1800.00	MAG 1.006 .982 .970 .946 .924 .903 .867 .848 .811 .783 .741 .707 .675 .647 .617 .589 .565 .542 .523	ANG -6.7 -13.7 -20.1 -27.6 -34.0 -41.0 -47.2 -54.0 -60.7 -68.4 -76.2 -84.1 -91.2 -98.6 -106.1 -112.9 -121.2 -128.2 -135.5	MAG 1.908 1.949 2.027 2.024 2.051 1.977 1.946 1.915 1.874 1.908 1.919 1.946 1.902 1.888 1.846 1.808 1.799 1.741 1.729	ANG 171.3 162.2 155.2 147.2 142.2 135.3 129.7 123.4 118.2 112.8 107.3 102.3 97.1 92.7 87.4 83.0 78.3 74.4 70.2	MAG .025 .049 .072 .094 .114 .132 .148 .162 .173 .184 .193 .201 .207 .212 .216 .220 .223 .224 .226	ANG 84.6 78.6 73.9 68.1 63.6 59.0 54.6 50.6 46.2 43.0 39.9 37.1 34.5 31.8 29.5 27.1 25.4 23.6 22.4	MAG .994 .982 .965 .938 .914 .887 .857 .822 .789 .754 .723 .692 .663 .634 .609 .582 .560 .538 .515	-5.1 -10.0 -14.8 -19.6 -23.9 -28.0 -32.2 -35.9 -39.8 -43.2 -46.0 -48.6 -51.5 -54.1 -56.8 -59.4 -61.8 -64.1
FREQUENCY MHz 100.00 200.00 300.00 400.00 500.00 600.00 700.00 800.00 900.00 1100.00 1100.00 1200.00 1400.00 1500.00 1600.00 1700.00 1800.00 1700.00 1800.00 1900.00	MAG 1.006 .982 .970 .946 .924 .903 .867 .848 .811 .783 .741 .707 .675 .647 .617 .589 .565 .542 .523 .502	ANG -6.7 -13.7 -20.1 -27.6 -34.0 -41.0 -47.2 -54.0 -60.7 -68.4 -76.2 -84.1 -91.2 -98.6 -106.1 -112.9 -121.2 -128.2 -135.5 -144.0	MAG 1.908 1.949 2.027 2.024 2.051 1.977 1.946 1.915 1.874 1.908 1.919 1.946 1.902 1.888 1.846 1.808 1.799 1.741 1.729 1.703	ANG 171.3 162.2 155.2 147.2 142.2 135.3 129.7 123.4 118.2 112.8 107.3 102.3 97.1 92.7 87.4 83.0 78.3 74.4 70.2 65.7	MAG .025 .049 .072 .094 .114 .132 .148 .162 .173 .184 .193 .201 .207 .212 .216 .220 .223 .224 .226 .228	ANG 84.6 78.6 73.9 68.1 63.6 59.0 54.6 50.6 46.2 43.0 39.9 37.1 34.5 31.8 29.5 27.1 25.4 23.6 22.4 20.7	MAG .994 .982 .965 .938 .914 .887 .857 .822 .789 .754 .723 .692 .663 .634 .609 .582 .560 .538 .515	-5.1 -10.0 -14.8 -19.6 -23.9 -28.0 -32.2 -35.9 -39.8 -43.2 -46.0 -48.6 -51.5 -54.1 -56.8 -69.4 -61.8 -64.1 -66.4 -68.6
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 1500.00 1600.00 1700.00 1800.00 1900.00 2000.00 2100.00	MAG 1.006 .982 .970 .946 .924 .903 .867 .848 .811 .783 .741 .707 .675 .647 .617 .589 .565 .542 .523 .502 .489	ANG -6.7 -13.7 -20.1 -27.6 -34.0 -41.0 -47.2 -54.0 -60.7 -68.4 -76.2 -84.1 -91.2 -98.6 -106.1 -112.9 -121.2 -128.2 -135.5 -144.0 -150.9	MAG 1.908 1.949 2.027 2.024 2.051 1.977 1.946 1.915 1.874 1.908 1.919 1.946 1.902 1.888 1.846 1.808 1.799 1.741 1.729 1.703 1.667	ANG 171.3 162.2 155.2 147.2 142.2 135.3 129.7 123.4 118.2 112.8 107.3 102.3 97.1 92.7 87.4 83.0 78.3 74.4 70.2 65.7 62.1	MAG .025 .049 .072 .094 .114 .132 .148 .162 .173 .184 .193 .201 .207 .212 .216 .220 .223 .224 .226 .228	ANG 84.6 78.6 73.9 68.1 63.6 59.0 54.6 50.6 46.2 43.0 39.9 37.1 34.5 31.8 29.5 27.1 25.4 23.6 22.4 20.7 19.7	MAG .994 .982 .965 .938 .914 .887 .857 .822 .789 .754 .723 .692 .663 .634 .609 .582 .560 .538 .515 .497	-5.1 -10.0 -14.8 -19.6 -23.9 -28.0 -32.2 -35.9 -39.8 -43.2 -46.0 -48.6 -51.5 -54.1 -56.8 -69.4 -61.8 -64.1 -66.4 -68.6 -71.1
FREQUENCY MHz 100.00 200.00 300.00 400.00 500.00 600.00 700.00 800.00 900.00 1100.00 1100.00 1200.00 1300.00 1400.00 1500.00 1600.00 1700.00 1800.00 1900.00 2000.00 2200.00	MAG 1.006 .982 .970 .946 .924 .903 .867 .848 .811 .783 .741 .707 .675 .647 .617 .589 .565 .542 .523 .502 .489 .479	ANG -6.7 -13.7 -20.1 -27.6 -34.0 -41.0 -47.2 -54.0 -60.7 -68.4 -76.2 -84.1 -91.2 -98.6 -106.1 -112.9 -121.2 -128.2 -135.5 -144.0 -150.9 -158.0	MAG 1.908 1.949 2.027 2.024 2.051 1.977 1.946 1.915 1.874 1.908 1.919 1.946 1.902 1.888 1.846 1.808 1.799 1.741 1.729 1.703 1.667 1.625	ANG 171.3 162.2 155.2 147.2 142.2 135.3 129.7 123.4 118.2 112.8 107.3 102.3 97.1 92.7 87.4 83.0 78.3 74.4 70.2 65.7 62.1 58.0	MAG .025 .049 .072 .094 .114 .132 .148 .162 .173 .184 .193 .201 .207 .212 .216 .220 .223 .224 .226 .228 .228	ANG 84.6 78.6 73.9 68.1 63.6 59.0 54.6 50.6 46.2 43.0 39.9 37.1 34.5 31.8 29.5 27.1 25.4 23.6 22.4 20.7 19.7 18.6	MAG .994 .982 .965 .938 .914 .887 .857 .822 .789 .754 .723 .692 .663 .634 .609 .582 .560 .538 .515 .497 .476 .459	-5.1 -10.0 -14.8 -19.6 -23.9 -28.0 -32.2 -35.9 -39.8 -43.2 -46.0 -48.6 -51.5 -54.1 -56.8 -69.4 -61.8 -64.1 -66.4 -68.6 -71.1
FREQUENCY MHz 100.00 200.00 300.00 400.00 500.00 600.00 700.00 800.00 1000.00 1100.00 1200.00 1300.00 1400.00 1500.00 1600.00 1700.00 1800.00 1900.00 2000.00 2200.00 2300.00	MAG 1.006 .982 .970 .946 .924 .903 .867 .848 .811 .783 .741 .707 .675 .647 .617 .589 .565 .542 .523 .502 .489 .479 .470	ANG -6.7 -13.7 -20.1 -27.6 -34.0 -41.0 -47.2 -54.0 -60.7 -68.4 -76.2 -84.1 -91.2 -98.6 -106.1 -112.9 -121.2 -128.2 -135.5 -144.0 -150.9 -158.0 -164.8	MAG 1.908 1.949 2.027 2.024 2.051 1.977 1.946 1.915 1.874 1.908 1.919 1.946 1.902 1.888 1.846 1.808 1.799 1.741 1.729 1.703 1.667 1.625 1.605	ANG 171.3 162.2 155.2 147.2 142.2 135.3 129.7 123.4 118.2 112.8 107.3 102.3 97.1 92.7 87.4 83.0 78.3 74.4 70.2 65.7 62.1 58.0 54.7	MAG .025 .049 .072 .094 .114 .132 .148 .162 .173 .184 .193 .201 .207 .212 .216 .220 .223 .224 .226 .228 .228 .229 .230	ANG 84.6 78.6 73.9 68.1 63.6 59.0 54.6 50.6 46.2 43.0 39.9 37.1 34.5 31.8 29.5 27.1 25.4 23.6 22.4 20.7 19.7 18.6 17.6	MAG .994 .982 .965 .938 .914 .887 .857 .822 .789 .754 .723 .692 .663 .634 .609 .582 .560 .538 .515 .497 .476 .459 .440	-5.1 -10.0 -14.8 -19.6 -23.9 -28.0 -32.2 -35.9 -39.8 -43.2 -46.0 -48.6 -51.5 -54.1 -56.8 -59.4 -61.8 -64.1 -66.4 -71.1 -73.4 -76.0
FREQUENCY MHz 100.00 200.00 300.00 400.00 500.00 600.00 700.00 800.00 1000.00 1100.00 1200.00 1300.00 1400.00 1500.00 1600.00 1700.00 1800.00 1900.00 2000.00 2200.00 2200.00 2300.00 2400.00	MAG 1.006 .982 .970 .946 .924 .903 .867 .848 .811 .783 .741 .707 .675 .647 .617 .589 .565 .542 .523 .502 .489 .479 .470 .466	ANG -6.7 -13.7 -20.1 -27.6 -34.0 -41.0 -47.2 -54.0 -60.7 -68.4 -76.2 -84.1 -91.2 -98.6 -106.1 -112.9 -121.2 -128.2 -135.5 -144.0 -150.9 -158.0 -164.8 -171.5	MAG 1.908 1.949 2.027 2.024 2.051 1.977 1.946 1.915 1.874 1.908 1.919 1.946 1.808 1.799 1.741 1.729 1.703 1.667 1.625 1.605 1.557	ANG 171.3 162.2 155.2 147.2 142.2 135.3 129.7 123.4 118.2 112.8 107.3 102.3 97.1 92.7 87.4 83.0 78.3 74.4 70.2 65.7 62.1 58.0 54.7 50.8	MAG .025 .049 .072 .094 .114 .132 .148 .162 .173 .184 .193 .201 .207 .212 .216 .220 .223 .224 .226 .228 .228 .228 .229 .230 .230	84.6 78.6 73.9 68.1 63.6 59.0 54.6 50.6 46.2 43.0 39.9 37.1 34.5 31.8 29.5 27.1 25.4 23.6 22.4 20.7 19.7 18.6 17.6 16.7	MAG .994 .982 .965 .938 .914 .887 .857 .822 .789 .754 .723 .692 .663 .634 .609 .582 .560 .538 .515 .497 .476 .459 .440 .428	-5.1 -10.0 -14.8 -19.6 -23.9 -28.0 -32.2 -35.9 -39.8 -43.2 -46.0 -51.5 -54.1 -56.8 -59.4 -61.8 -64.1 -66.6 -71.1 -73.4 -76.0 -78.3
FREQUENCY MHz 100.00 200.00 300.00 400.00 500.00 600.00 700.00 800.00 1000.00 1100.00 1200.00 1300.00 1500.00 1600.00 1700.00 1800.00 1900.00 2000.00 2200.00 2300.00 2400.00	MAG 1.006 .982 .970 .946 .924 .903 .867 .848 .811 .783 .741 .707 .675 .647 .617 .589 .565 .542 .523 .502 .489 .479 .470 .466 .461	ANG -6.7 -13.7 -20.1 -27.6 -34.0 -41.0 -47.2 -54.0 -60.7 -68.4 -76.2 -84.1 -91.2 -98.6 -106.1 -112.9 -121.2 -128.2 -135.5 -144.0 -150.9 -158.0 -164.8 -171.5 -177.8	MAG 1.908 1.949 2.027 2.024 2.051 1.977 1.946 1.915 1.874 1.908 1.919 1.946 1.902 1.888 1.846 1.808 1.799 1.741 1.729 1.703 1.667 1.625 1.605 1.557	ANG 171.3 162.2 155.2 147.2 142.2 135.3 129.7 123.4 118.2 112.8 107.3 102.3 97.1 92.7 87.4 83.0 78.3 74.4 70.2 65.7 62.1 58.0 54.7 50.8 47.6	MAG .025 .049 .072 .094 .114 .132 .148 .162 .173 .184 .193 .201 .207 .212 .216 .220 .223 .224 .226 .228 .228 .228 .229 .230 .230	84.6 78.6 73.9 68.1 63.6 59.0 54.6 50.6 46.2 43.0 39.9 37.1 34.5 31.8 29.5 27.1 25.4 20.7 19.7 18.6 16.7 16.0	MAG .994 .982 .965 .938 .914 .887 .857 .822 .789 .754 .723 .692 .663 .634 .609 .582 .560 .538 .515 .497 .476 .459 .440 .428 .413	-5.1 -10.0 -14.8 -19.6 -23.9 -28.0 -32.2 -35.9 -39.8 -43.2 -46.0 -51.5 -54.1 -56.8 -61.8 -61.8 -64.1 -66.4 -71.1 -73.4 -76.0 -78.3 -81.1
FREQUENCY MHz 100.00 200.00 300.00 400.00 500.00 600.00 700.00 800.00 1000.00 1100.00 1200.00 1300.00 1400.00 1500.00 1600.00 1700.00 1800.00 1900.00 2000.00 2200.00 2300.00 2400.00 2500.00 2600.00	MAG 1.006 .982 .970 .946 .924 .903 .867 .848 .811 .783 .741 .707 .675 .647 .617 .589 .565 .542 .523 .502 .489 .479 .470 .466 .461 .462	ANG -6.7 -13.7 -20.1 -27.6 -34.0 -41.0 -47.2 -54.0 -60.7 -68.4 -76.2 -84.1 -91.2 -98.6 -106.1 -112.9 -121.2 -128.2 -135.5 -144.0 -150.9 -158.0 -164.8 -171.5 -177.8	MAG 1.908 1.949 2.027 2.024 2.051 1.977 1.946 1.915 1.874 1.908 1.919 1.946 1.902 1.888 1.846 1.808 1.799 1.741 1.729 1.703 1.667 1.625 1.605 1.557 1.524 1.497	ANG 171.3 162.2 155.2 147.2 142.2 135.3 129.7 123.4 118.2 112.8 107.3 102.3 97.1 92.7 87.4 83.0 78.3 74.4 70.2 65.7 62.1 58.0 54.7 50.8 47.6 44.0	MAG .025 .049 .072 .094 .114 .132 .148 .162 .173 .184 .193 .201 .207 .212 .216 .220 .223 .224 .226 .228 .228 .228 .229 .230 .230 .230 .231	84.6 78.6 73.9 68.1 63.6 59.0 54.6 50.6 46.2 43.0 39.9 37.1 34.5 31.8 29.5 27.1 25.4 23.6 22.4 20.7 19.7 18.6 17.6 16.0 15.7	MAG .994 .982 .965 .938 .914 .887 .857 .822 .789 .754 .723 .692 .663 .634 .609 .582 .560 .538 .515 .497 .476 .459 .440 .428 .413 .399	ANG -5.1 -10.0 -14.8 -19.6 -23.9 -28.0 -32.2 -35.9 -39.8 -43.2 -46.0 -48.6 -51.5 -54.1 -56.8 -61.8 -64.1 -66.4 -68.6 -71.1 -73.4 -76.0 -78.3 -81.1 -83.7
FREQUENCY MHz 100.00 200.00 300.00 400.00 500.00 600.00 700.00 800.00 900.00 1100.00 1200.00 1300.00 1400.00 1500.00 1600.00 1700.00 1800.00 1700.00 2000.00 2100.00 2200.00 2300.00 2400.00 2500.00 2600.00 2700.00	MAG 1.006 .982 .970 .946 .924 .903 .867 .848 .811 .783 .741 .707 .675 .647 .617 .589 .565 .542 .523 .502 .489 .479 .470 .466 .461 .462 .462	ANG -6.7 -13.7 -20.1 -27.6 -34.0 -41.0 -47.2 -54.0 -60.7 -68.4 -76.2 -84.1 -91.2 -98.6 -106.1 -112.9 -121.2 -128.2 -135.5 -144.0 -150.9 -158.0 -164.8 -171.5 -177.8 175.8	MAG 1.908 1.949 2.027 2.024 2.051 1.977 1.946 1.915 1.874 1.908 1.919 1.946 1.902 1.888 1.846 1.808 1.799 1.741 1.729 1.703 1.667 1.625 1.605 1.557 1.524 1.497 1.460	ANG 171.3 162.2 155.2 147.2 142.2 135.3 129.7 123.4 118.2 112.8 107.3 102.3 97.1 92.7 87.4 83.0 78.3 74.4 70.2 65.7 62.1 58.0 54.7 50.8 47.6 44.0 40.9	MAG .025 .049 .072 .094 .114 .132 .148 .162 .173 .184 .193 .201 .207 .212 .216 .220 .223 .224 .226 .228 .228 .228 .229 .230 .230 .231 .231	ANG 84.6 78.6 73.9 68.1 63.6 59.0 54.6 50.6 46.2 43.0 39.9 37.1 34.5 31.8 29.5 27.1 25.4 23.6 22.4 20.7 19.7 18.6 16.7 16.0 15.7	MAG .994 .982 .965 .938 .914 .887 .857 .822 .789 .754 .723 .692 .663 .634 .609 .582 .560 .538 .515 .497 .476 .459 .440 .428 .413 .399 .384	ANG -5.1 -10.0 -14.8 -19.6 -23.9 -28.0 -32.2 -35.9 -39.8 -43.2 -46.0 -48.6 -51.5 -54.1 -56.8 -59.4 -61.8 -64.1 -66.4 -68.6 -71.1 -73.4 -76.0 -78.3 -81.1 -83.7 -86.7
FREQUENCY MHz 100.00 200.00 300.00 400.00 500.00 600.00 700.00 800.00 900.00 1100.00 1100.00 1200.00 1300.00 1500.00 1600.00 1700.00 1800.00 1700.00 2000.00 2100.00 2200.00 2300.00 2400.00 2500.00 2600.00 2700.00 2800.00	MAG 1.006 .982 .970 .946 .924 .903 .867 .848 .811 .783 .741 .707 .675 .647 .617 .589 .565 .542 .523 .502 .489 .479 .470 .466 .461 .462 .462 .465	ANG -6.7 -13.7 -20.1 -27.6 -34.0 -41.0 -47.2 -54.0 -60.7 -68.4 -76.2 -84.1 -91.2 -98.6 -106.1 -112.9 -121.2 -128.2 -135.5 -144.0 -150.9 -158.0 -164.8 -171.5 -177.8 175.8 170.4 164.8	MAG 1.908 1.949 2.027 2.024 2.051 1.977 1.946 1.915 1.874 1.908 1.919 1.946 1.902 1.888 1.846 1.808 1.799 1.741 1.729 1.703 1.667 1.625 1.605 1.557 1.524 1.497 1.460 1.433	ANG 171.3 162.2 155.2 147.2 142.2 135.3 129.7 123.4 118.2 112.8 107.3 102.3 97.1 92.7 87.4 83.0 78.3 74.4 70.2 65.7 62.1 58.0 54.7 50.8 47.6 44.0 40.9 37.8	MAG .025 .049 .072 .094 .114 .132 .148 .162 .173 .184 .193 .201 .207 .212 .216 .220 .223 .224 .226 .228 .228 .229 .230 .230 .231 .231 .231	ANG 84.6 78.6 73.9 68.1 63.6 59.0 54.6 50.6 46.2 43.0 39.9 37.1 34.5 31.8 29.5 27.1 25.4 23.6 22.4 20.7 19.7 18.6 17.6 16.7 16.0 15.7 15.5 14.8	MAG .994 .982 .965 .938 .914 .887 .857 .822 .789 .754 .723 .692 .663 .634 .609 .582 .560 .538 .515 .497 .476 .459 .440 .428 .413 .399 .384 .372	-5.1 -10.0 -14.8 -19.6 -23.9 -28.0 -32.2 -35.9 -39.8 -43.2 -46.0 -48.6 -51.5 -54.1 -56.8 -69.4 -61.8 -64.1 -66.4 -71.1 -73.4 -76.0 -78.3 -81.1 -83.7 -89.8
FREQUENCY MHz 100.00 200.00 300.00 400.00 500.00 600.00 700.00 800.00 900.00 1100.00 1100.00 1200.00 1300.00 1400.00 1500.00 1600.00 1700.00 1800.00 2000.00 2100.00 2200.00 2300.00 2400.00 2500.00 2600.00 2700.00 2800.00 2900.00	MAG 1.006 .982 .970 .946 .924 .903 .867 .848 .811 .783 .741 .707 .675 .647 .617 .589 .565 .542 .523 .502 .489 .479 .470 .466 .461 .462 .462 .465 .466	ANG -6.7 -13.7 -20.1 -27.6 -34.0 -41.0 -47.2 -54.0 -60.7 -68.4 -76.2 -84.1 -91.2 -98.6 -106.1 -112.9 -121.2 -128.2 -135.5 -144.0 -150.9 -158.0 -164.8 -171.5 -177.8 175.8 170.4 164.8 159.2	MAG 1.908 1.949 2.027 2.024 2.051 1.977 1.946 1.915 1.874 1.908 1.919 1.946 1.902 1.888 1.846 1.808 1.799 1.741 1.729 1.703 1.667 1.625 1.605 1.557 1.524 1.497 1.460 1.433 1.399	ANG 171.3 162.2 155.2 147.2 142.2 135.3 129.7 123.4 118.2 112.8 107.3 102.3 97.1 92.7 87.4 83.0 78.3 74.4 70.2 65.7 62.1 58.0 54.7 50.8 47.6 44.0 40.9 37.8 34.6	MAG .025 .049 .072 .094 .114 .132 .148 .162 .173 .184 .193 .201 .207 .212 .216 .220 .223 .224 .226 .228 .228 .229 .230 .230 .231 .231 .232 .233	ANG 84.6 78.6 73.9 68.1 63.6 59.0 54.6 50.6 46.2 43.0 39.9 37.1 34.5 31.8 29.5 27.1 25.4 23.6 22.4 20.7 19.7 18.6 17.6 16.7 16.0 15.7 15.5 14.8 14.7	MAG .994 .982 .965 .938 .914 .887 .857 .822 .789 .754 .723 .692 .663 .634 .609 .582 .560 .538 .515 .497 .476 .459 .440 .428 .413 .399 .384 .372 .360	ANG -5.1 -10.0 -14.8 -19.6 -23.9 -28.0 -32.2 -35.9 -39.8 -43.2 -46.0 -48.6 -51.5 -54.1 -56.8 -69.4 -61.8 -64.1 -66.4 -68.6 -71.1 -73.4 -76.0 -78.3 -81.1 -83.7 -86.7 -89.8 -92.9
FREQUENCY MHz 100.00 200.00 300.00 400.00 500.00 600.00 700.00 800.00 900.00 1100.00 1100.00 1200.00 1300.00 1500.00 1600.00 1700.00 1800.00 1700.00 2000.00 2100.00 2200.00 2300.00 2400.00 2500.00 2600.00 2700.00 2800.00	MAG 1.006 .982 .970 .946 .924 .903 .867 .848 .811 .783 .741 .707 .675 .647 .617 .589 .565 .542 .523 .502 .489 .479 .470 .466 .461 .462 .462 .465	ANG -6.7 -13.7 -20.1 -27.6 -34.0 -41.0 -47.2 -54.0 -60.7 -68.4 -76.2 -84.1 -91.2 -98.6 -106.1 -112.9 -121.2 -128.2 -135.5 -144.0 -150.9 -158.0 -164.8 -171.5 -177.8 175.8 170.4 164.8	MAG 1.908 1.949 2.027 2.024 2.051 1.977 1.946 1.915 1.874 1.908 1.919 1.946 1.902 1.888 1.846 1.808 1.799 1.741 1.729 1.703 1.667 1.625 1.605 1.557 1.524 1.497 1.460 1.433	ANG 171.3 162.2 155.2 147.2 142.2 135.3 129.7 123.4 118.2 112.8 107.3 102.3 97.1 92.7 87.4 83.0 78.3 74.4 70.2 65.7 62.1 58.0 54.7 50.8 47.6 44.0 40.9 37.8	MAG .025 .049 .072 .094 .114 .132 .148 .162 .173 .184 .193 .201 .207 .212 .216 .220 .223 .224 .226 .228 .228 .229 .230 .230 .231 .231 .231	ANG 84.6 78.6 73.9 68.1 63.6 59.0 54.6 50.6 46.2 43.0 39.9 37.1 34.5 31.8 29.5 27.1 25.4 23.6 22.4 20.7 19.7 18.6 17.6 16.7 16.0 15.7 15.5 14.8	MAG .994 .982 .965 .938 .914 .887 .857 .822 .789 .754 .723 .692 .663 .634 .609 .582 .560 .538 .515 .497 .476 .459 .440 .428 .413 .399 .384 .372	-5.1 -10.0 -14.8 -19.6 -23.9 -28.0 -32.2 -35.9 -39.8 -43.2 -46.0 -48.6 -51.5 -54.1 -56.8 -69.4 -61.8 -64.1 -66.4 -71.1 -73.4 -76.0 -78.3 -81.1 -83.7 -89.8

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