

SAZ-2410-19-S1

Rev. 1.2

WR-19 Standard Gain Horn Antenna, 24 dBi Gain**Simulated Gain vs. Frequency in Tabular Format**

Frequency (GHz)	Gain (dBi)	Frequency (GHz)	Gain (dBi)
40	22.8	51	24.3
41	23.1	52	24.2
42	23.1	53	24.4
43	23.3	54	24.5
44	23.4	55	24.5
45	23.6	56	24.7
46	23.7	57	24.7
47	23.8	58	24.7
48	23.9	59	24.9
49	24.0	60	24.8
50	24.1		

Simulated Half Power Beamwidth (E-Plane) vs. Frequency in Tabular Format

Frequency (GHz)	Beamwidth (Degrees)	Frequency (GHz)	Beamwidth (Degrees)
40	12.4	51	10.9
41	12.3	52	10.7
42	12.1	53	10.6
43	11.9	54	10.5
44	11.8	55	10.4
45	11.6	56	10.2
46	11.4	57	10.2
47	11.3	58	10.1
48	11.1	59	9.9
49	11.1	60	10.1
50	10.9		

Simulated Half Power Beamwidth (H-Plane) vs. Frequency in Tabular Format

Frequency (GHz)	Beamwidth (Degrees)	Frequency (GHz)	Beamwidth (Degrees)
40	11.3	51	9.0
41	11.1	52	8.9
42	11.0	53	8.4
43	10.7	54	8.3
44	10.6	55	8.0
45	10.5	56	7.7
46	10.3	57	7.8
47	10.2	58	7.3
48	9.9	59	7.3
49	9.8	60	7.2
50	9.4		



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 Phone: 424-757-0168 | Fax: 424-757-0188 | Email: sales@sagemillimeter.com



SAZ-2410-15-S1

Rev. 1.2

WR-15 Standard Gain Horn Antenna, 24 dBi Gain

Simulated Gain vs. Frequency in Tabular Format

Frequency (GHz)	Gain (dBi)	Frequency (GHz)	Gain (dBi)
50	22.9	63	23.9
51	22.8	64	24.0
52	23.1	65	23.9
53	23.0	66	24.1
54	23.3	67	24.0
55	23.3	68	24.2
56	23.4	69	24.2
57	23.5	70	24.3
58	23.6	71	24.3
59	23.7	72	24.4
60	23.7	73	24.3
61	23.8	74	24.4
62	23.8	75	24.5

Simulated Half Power Beamwidth (E-Plane) vs. Frequency in Tabular Format

Frequency (GHz)	Beamwidth (Degrees)	Frequency (GHz)	Beamwidth (Degrees)
50	12.5	63	11.1
51	12.4	64	11.1
52	12.1	65	11.0
53	12.2	66	11.0
54	11.9	67	10.9
55	11.9	68	10.9
56	11.7	69	10.7
57	11.7	70	10.9
58	11.5	71	10.7
59	11.5	72	10.7
60	11.3	73	10.8
61	11.3	74	10.5
62	11.2	75	10.9



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WR-10 Standard Gain Horn Antenna, 24 dBi Gain**Simulated Gain vs. Frequency in Tabular Format**

Frequency (GHz)	Gain (dBi)	Frequency (GHz)	Gain (dBi)
75	22.9	93	24.1
76	23.1	94	24.2
77	23.1	95	24.3
78	23.1	96	24.2
79	23.3	97	24.4
80	23.3	98	24.4
81	23.4	99	24.4
82	23.5	100	24.5
83	23.5	101	24.5
84	23.6	102	24.5
85	23.7	103	24.6
86	23.7	104	24.7
87	23.8	105	24.6
88	23.9	106	24.7
89	23.9	107	24.7
90	23.9	108	24.7
91	24.0	109	24.9
92	24.1	110	24.8

Simulated Half Power Beamwidth (E-Plane) vs. Frequency in Tabular Format

Frequency (GHz)	Beamwidth (Degrees)	Frequency (GHz)	Beamwidth (Degrees)
75	12.4	93	10.9
76	12.3	94	10.8
77	12.1	95	10.7
78	12.1	96	10.7
79	12.0	97	10.6
80	11.8	98	10.5
81	11.8	99	10.6
82	11.7	100	10.4
83	11.5	101	10.3
84	11.5	102	10.4
85	11.4	103	10.3
86	11.3	104	10.2
87	11.3	105	10.3
88	11.2	106	10.1
89	11.1	107	10.1
90	11.1	108	10.2
91	11.0	109	9.7
92	10.9	110	10.0



SAZ-2410-06-S1

Rev. 1.1

WR-06 Standard Gain Horn Antenna, 24 dBi Gain

Simulated Gain vs. Frequency in Tabular Format

Frequency (GHz)	Gain (dBi)	Frequency (GHz)	Gain (dBi)
110	22.8	141	24.1
111	22.8	142	24.2
112	22.8	143	24.2
113	22.8	144	24.2
114	23.0	145	24.2
115	23.1	146	24.3
116	23.1	147	24.3
117	23.0	148	24.4
118	23.1	149	24.4
119	23.2	150	24.4
120	23.3	151	24.4
121	23.3	152	24.5
122	23.3	153	24.5
123	23.4	154	24.5
124	23.5	155	24.5
125	23.5	156	24.6
126	23.5	157	24.6
127	23.6	158	24.7
128	23.7	159	24.6
129	23.7	160	24.6
130	23.7	161	24.7
131	23.7	162	24.7
132	23.8	163	24.7
133	23.9	164	24.7
134	23.9	165	24.8
135	23.8	166	24.8
136	23.9	167	24.8
137	24.0	168	24.8
138	24.0	169	24.8
139	24.1	170	24.9
140	24.1		



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WR-05 Standard Gain Horn Antenna, 24 dBi Gain**Gain vs. Frequency in Tabular Format**

Frequency (GHz)	Gain (dBi)	Frequency (GHz)	Gain (dBi)
140	22.6	181	24.1
141	22.7	182	24.1
142	22.8	183	24.2
143	22.9	184	24.2
144	22.9	185	24.2
145	22.9	186	24.3
146	22.9	187	24.3
147	23.0	188	24.2
148	23.1	189	24.3
149	23.2	190	24.3
150	23.1	191	24.4
151	23.1	192	24.4
152	23.1	193	24.4
153	23.2	194	24.4
154	23.4	195	24.4
155	23.4	196	24.5
156	23.3	197	24.6
157	23.3	198	24.5
158	23.4	199	24.5
159	23.5	200	24.5
160	23.6	201	24.6
161	23.6	202	24.7
162	23.5	203	24.7
163	23.5	204	24.6
164	23.6	205	24.5
165	23.7	206	24.6
166	23.8	207	24.7
167	23.7	208	24.7
168	23.7	209	24.7
169	23.7	210	24.6
170	23.9	211	24.6
171	24.0	212	24.8
172	24.0	213	24.9
173	23.8	214	24.9
174	23.8	215	24.8
175	23.9	216	24.7
176	24.0	217	24.8
177	24.0	218	24.9
178	24.0	219	25.0
179	24.0	220	24.9
180	24.1		



U Band Harmonic Mixer, Final Test Report

Customer: Suzhou Rebes Elec, Tech. Co. Ltd.
 P.O. Number: 2020RB2-1130-3
 M/N: STH-19SF-S1
 SO/N: 22166
 WO/N: 06937-01

Date: 10/01/2020
 Tested by: JN
 Q.A. By: _____

SPECIFICATIONS:

RF Frequency: 40 to 60 GHz
 Input Power: -20 dBm (Typ)
 IF: DC to 4.0 GHz
 LO Power: +13 dBm (Typ)
 Input Power: +16 dBm (Max)
 Sensitivity: -90 dBm @ 1 kHz RBW (Typ)
 RF Connector: WR-19 WG w/ UG-383/U-M Flange
 LO & IF Connector: SMA (F)
 Outline: FD-U1



TEST RESULTS:

Description	Parameter	Measured
Sensitivity	-90 dBm @ 1 kHz RBW (Typ)	Compliant

Test Condition: LO Frequency: RF/5; LO Power: +13 dBm; IF: 200 MHz

RF Frequency (GHz)	Conversion Loss (dB)	RF Frequency (GHz)	Conversion Loss (dB)
40	28	52	32
42	28	54	29
44	31	56	27
46	29	58	27
48	29	60	31
50	30	End	N/A

Note:

- The harmonic mixer offered is for signal detection only. Due to the customer application specific, the conversion loss was measured by using an external diplexer. The model number of the diplexer used is Tektronix 015-0385-00.
- The data given above was tested under case temperature +25 °C.

Conversion Loss Data

Model : M1970V-001

Serial Number : MY51390966

Date : 21-FEB-2017

Frequency (GHz)	Conv.Loss	Frequency (GHz)	Conv.Loss
50.00	14.8	56.75	17.6
50.15	15.0	56.90	17.4
50.30	14.7	57.05	17.8
50.45	15.0	57.20	17.6
50.60	15.1	57.35	17.3
50.75	15.1	57.50	17.4
50.90	15.3	57.65	17.4
51.05	15.1	57.80	17.5
51.20	15.5	57.95	17.5
51.35	14.9	58.10	17.5
51.50	15.3	58.25	17.5
51.65	15.1	58.40	17.5
51.80	15.2	58.55	17.6
51.95	15.5	58.70	17.7
52.10	15.2	58.85	17.7
52.25	15.4	59.00	17.7
52.40	15.4	59.15	17.4
52.55	15.3	59.30	17.6
52.70	15.2	59.45	17.4
52.85	15.2	59.60	16.6
53.00	15.0	59.75	17.0
53.15	15.8	59.90	17.2
53.30	15.9	60.05	16.5
53.45	15.4	60.20	17.0
53.60	15.5	60.35	16.9
53.75	15.5	60.50	15.9
53.90	15.4	60.65	16.7
54.05	15.5	60.80	16.2
54.20	15.4	60.95	15.9
54.35	15.5	61.10	15.9
54.50	15.6	61.25	15.8
54.65	15.6	61.40	15.4
54.80	15.9	61.55	15.7
54.95	15.7	61.70	15.3
55.10	16.0	61.85	15.6
55.25	16.1	62.00	15.8
55.40	15.6	62.15	15.2
55.55	16.5	62.30	15.9
55.70	16.3	62.45	15.7
55.85	16.2	62.60	15.5
56.00	17.0	62.75	15.4
56.15	17.3	62.90	15.3
56.30	17.3	63.05	15.1
56.45	17.1	63.20	14.9
56.60	17.0	63.35	14.9

Conversion Loss Data

Model : MI970V-001

Serial Number : MY51390966

Date : 21-FEB-2017

Frequency (GHz)	Conv.Loss	Frequency (GHz)	Conv.Loss
63.50	14.8	70.25	14.7
63.65	14.7	70.40	14.6
63.80	14.7	70.55	14.6
63.95	14.5	70.70	14.6
64.10	14.3	70.85	14.4
64.25	14.3	71.00	14.2
64.40	14.2	71.15	14.1
64.55	14.1	71.30	14.2
64.70	13.9	71.45	14.2
64.85	14.6	71.60	14.5
65.00	13.8	71.75	13.7
65.15	14.0	71.90	13.8
65.30	13.9	72.05	13.6
65.45	14.1	72.20	13.4
65.60	13.9	72.35	13.7
65.75	14.2	72.50	13.4
65.90	14.0	72.65	13.1
66.05	14.2	72.80	13.2
66.20	14.3	72.95	13.5
66.35	14.2	73.10	13.1
66.50	14.5	73.25	13.1
66.65	14.5	73.40	12.9
66.80	14.5	73.55	13.1
66.95	14.6	73.70	12.9
67.10	14.8	73.85	12.9
67.25	14.6	74.00	12.6
67.40	14.8	74.15	12.7
67.55	15.0	74.30	12.9
67.70	14.7	74.45	12.5
67.85	14.5	74.60	12.4
68.00	15.5	74.75	12.7
68.15	14.9	74.90	12.6
68.30	14.9		
68.45	14.7		
68.60	14.6		
68.75	14.8		
68.90	14.6		
69.05	15.4		
69.20	14.6		
69.35	14.9		
69.50	14.8		
69.65	14.3		
69.80	14.3		
69.95	14.7		
70.10	14.6		



Conversion Loss Data

Model : M1970W

Serial Number : MY51430883

Date : 08-DEC-2016

Frequency (GHz)	Conv.Loss
75.00	18.2
75.15	18.5
75.30	19.0
75.45	19.1
75.60	18.5
75.75	18.2
75.90	18.3
76.05	18.1
76.20	18.4
76.35	18.7
76.50	18.6
76.65	18.4
76.80	18.5
76.95	18.8
77.10	19.3
77.25	18.7
77.40	18.3
77.55	18.4
77.70	18.8
77.85	18.4
78.00	19.3
78.15	19.2
78.30	19.0
78.45	19.4
78.60	19.4
78.75	19.6
78.90	19.6
79.05	19.7
79.20	19.4
79.35	19.9
79.50	19.6
79.65	20.0
79.80	19.0
79.95	19.6
80.10	20.3
80.25	20.1
80.40	20.5
80.55	20.3
80.70	19.8
80.85	20.4
81.00	19.8
81.15	19.4
81.30	19.6
81.45	20.4
81.60	19.9

Frequency (GHz)	Conv.Loss
81.75	20.7
81.90	20.7
82.05	20.9
82.20	20.3
82.35	20.8
82.50	21.0
82.65	20.9
82.80	20.5
82.95	21.2
83.10	21.1
83.25	21.3
83.40	20.9
83.55	21.2
83.70	20.5
83.85	20.6
84.00	20.2
84.15	21.4
84.30	20.8
84.45	20.8
84.60	20.9
84.75	21.0
84.90	20.8
85.05	21.1
85.20	21.3
85.35	20.1
85.50	21.0
85.65	20.7
85.80	20.7
85.95	20.6
86.10	20.5
86.25	20.8
86.40	20.3
86.55	21.0
86.70	20.6
86.85	20.0
87.00	20.0
87.15	20.2
87.30	20.6
87.45	20.7
87.60	20.2
87.75	20.0
87.90	20.2
88.05	20.6
88.20	20.1
88.35	20.1

Conversion Loss Data

Model : M1970W

Serial Number : MY51430883

Date : 08-DEC-2016

Frequency (GHz)	Conv.Loss	Frequency (GHz)	Conv.Loss
88.50	20.1	95.25	21.0
88.65	20.2	95.40	20.2
88.80	20.4	95.55	19.2
88.95	19.7	95.70	19.2
89.10	19.9	95.85	18.8
89.25	20.1	96.00	19.5
89.40	19.5	96.15	18.8
89.55	20.4	96.30	19.6
89.70	19.6	96.45	19.5
89.85	20.2	96.60	19.7
90.00	20.6	96.75	19.5
90.15	20.7	96.90	19.3
90.30	20.2	97.05	19.4
90.45	20.3	97.20	19.7
90.60	20.8	97.35	19.7
90.75	20.6	97.50	18.9
90.90	20.2	97.65	19.1
91.05	20.3	97.80	18.8
91.20	19.9	97.95	19.3
91.35	20.3	98.10	19.7
91.50	20.9	98.25	19.5
91.65	20.3	98.40	19.6
91.80	20.4	98.55	19.5
91.95	20.1	98.70	19.2
92.10	20.8	98.85	19.6
92.25	20.3	99.00	19.7
92.40	20.7	99.15	19.9
92.55	20.2	99.30	19.3
92.70	20.7	99.45	19.6
92.85	19.8	99.60	19.3
93.00	20.4	99.75	19.5
93.15	20.6	99.90	18.9
93.30	20.0	100.05	18.6
93.45	19.9	100.20	19.6
93.60	20.3	100.35	19.9
93.75	20.0	100.50	19.9
93.90	19.6	100.65	19.7
94.05	20.8	100.80	19.9
94.20	20.7	100.95	20.5
94.35	19.8	101.10	20.2
94.50	20.4	101.25	19.9
94.65	21.1	101.40	19.9
94.80	20.5	101.55	20.8
94.95	20.4	101.70	19.9
95.10	20.0	101.85	20.5

Conversion Loss Data

Model : M1970W

Serial Number : MY51430883

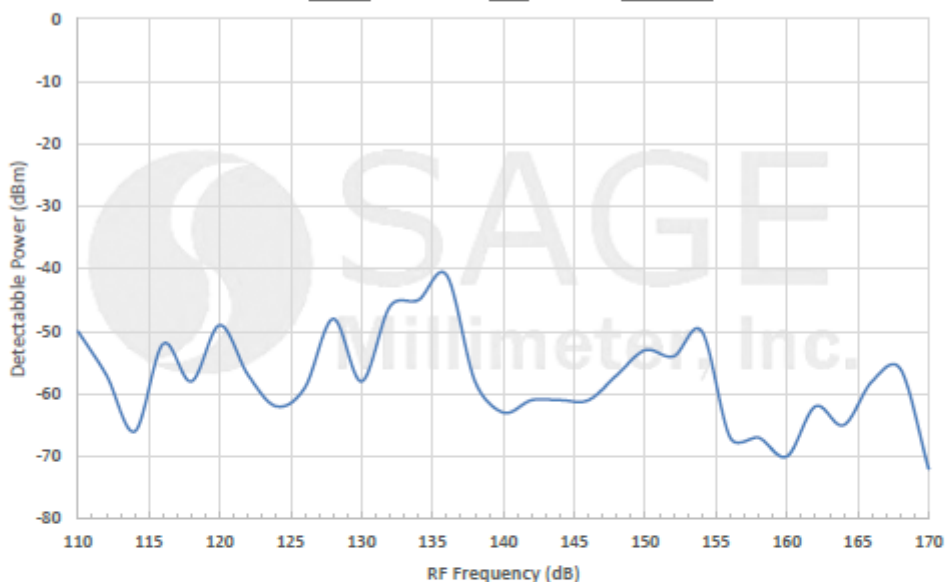
Date : 08-DEC-2016

Frequency (GHz)	Conv.Loss	Frequency (GHz)	Conv.Loss
102.00	20.7	108.75	18.6
102.15	20.3	108.90	19.6
102.30	20.6	109.05	19.3
102.45	19.8	109.20	19.1
102.60	20.4	109.35	19.4
102.75	20.5	109.50	18.6
102.90	20.7	109.65	19.6
103.05	20.0	109.80	19.1
103.20	19.9	109.95	19.4
103.35	20.9		
103.50	19.8		
103.65	19.9		
103.80	20.2		
103.95	19.8		
104.10	19.8		
104.25	19.4		
104.40	20.3		
104.55	20.3		
104.70	19.6		
104.85	19.2		
105.00	20.0		
105.15	19.5		
105.30	19.8		
105.45	19.7		
105.60	19.8		
105.75	19.9		
105.90	19.5		
106.05	19.5		
106.20	19.5		
106.35	19.8		
106.50	18.9		
106.65	19.3		
106.80	19.9		
106.95	19.6		
107.10	18.8		
107.25	19.3		
107.40	19.4		
107.55	20.0		
107.70	19.4		
107.85	19.5		
108.00	18.9		
108.15	19.5		
108.30	19.1		
108.45	19.6		
108.60	19.1		

D-Band Spectrum Analyzer Harmonic Mixer, Common LO/IF Port

Detectable Power versus RF Frequency

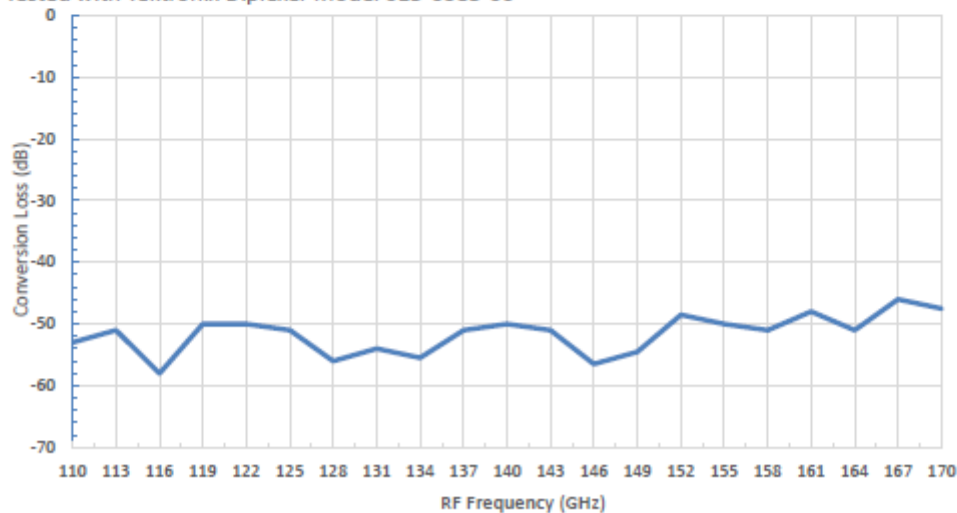
Test Condition: LO Frequency: RF/30; LO Power: +16 dBm; IF: 300 MHz



Conversion Loss vs. RF Frequency

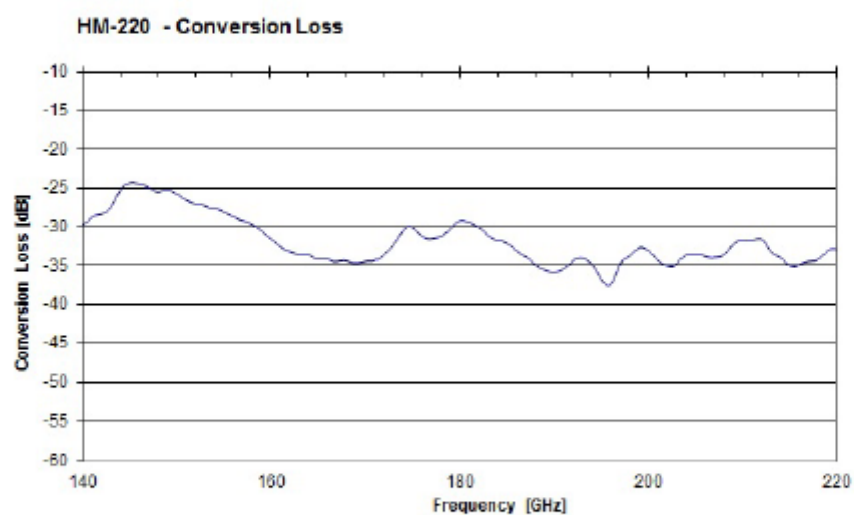
LO Frequency: RF/14; LO Power: +16 dBm; IF: 300 MHz

Tested with Tektronix Diplexer Model 015-0385-00





Typical Performance



Details for test laboratory accreditation scope showing that the laboratory is accredited to make the measurements(Copied from A2LA accreditation)

Testing Activities Performed in Support of FCC Certification in Accordance with 47 Code of Federal Regulations and FCC KDB 974614, Appendix A, Table A.1²:

Rule Subpart/Technology	Test Method	Maximum Frequency (MHz)
<u>Unintentional Radiators</u> Part 15B	ANSI C63.4:2014	40000
<u>Industrial, Scientific, and Medical Equipment</u> Part 18	FCC MP-5 (February 1986)	40000
<u>Intentional Radiators</u> Part 15C	ANSI C63.10:2013; ANSI C63.10:2020	325000
<u>U-NII without DFS Intentional Radiators</u> Part 15E	ANSI C63.10:2013; ANSI C63.10:2020	40000
<u>U-NII with DFS Intentional Radiators</u> Part 15E	FCC KDB 905462 D02 (v02)	40000
<u>UWB Intentional Radiators</u> Part 15F	ANSI C63.10:2013; ANSI C63.10:2020	200000
<u>Commercial Mobile Services (FCC Licensed Radio Service Equipment)</u> Parts 22 (cellular), 24, 25 (non-microwave), and 27	ANSI/TIA-603-E	40000
<u>General Mobile Radio Services (FCC Licensed Radio Service Equipment)</u> Parts 22 (non-cellular), 90 (below 3 GHz), 95 (below 3 GHz), 97 (below 3 GHz), and 101 (below 3 GHz)	ANSI/TIA-603-E	40000
<u>Citizens Broadband Radio Services (FCC Licensed Radio Service Equipment)</u> Parts 96	ANSI/TIA-603-E	325000
<u>Maritime and Aviation Radio Services</u> Parts 80 and 87	ANSI/TIA-603-E	325000
<u>Microwave and Millimeter Bands Radio Services</u> Parts 25, 30, 74, 90 (above 3 GHz), 95 (above 3 GHz), 97 (above 3 GHz), and 101	ANSI/TIA-603-E	325000