

Frequency Mixer

HJK-ED13654A/1

Typical Performance Data

RF (IN) (MHz)	LO (MHz)	CONVERSION LOSS IF FIXED @IF(OUT)=30MHz (dB)		
		@LO (dBm)		
		+15	+17	+19
40.0	10.0	11.42	10.34	11.30
62.5	32.5	8.16	8.08	7.99
77.5	47.5	7.85	7.75	7.58
100.0	70.0	7.63	7.53	7.36
122.5	92.5	7.43	7.34	7.28
137.5	107.5	7.45	7.36	7.30
160.0	130.0	7.28	7.20	7.13
182.5	152.5	7.11	7.03	6.97
205.0	175.0	7.15	7.08	7.02
220.0	190.0	6.93	6.87	6.81
242.5	212.5	6.91	6.86	6.88
265.0	235.0	6.87	6.83	6.85
285.0	255.0	6.78	6.72	6.74
295.0	265.0	6.84	6.78	6.74
310.0	280.0	6.90	6.82	6.76
320.0	290.0	6.90	6.81	6.74
335.0	305.0	6.95	6.84	6.75
410.0	380.0	7.53	7.34	7.18
420.0	390.0	7.69	7.48	7.31
435.0	405.0	7.91	7.67	7.48
450.0	420.0	8.04	7.78	7.58
465.0	435.0	8.22	7.93	7.72
475.0	445.0	8.42	8.11	7.86
490.0	460.0	8.73	8.37	8.07
505.0	475.0	9.02	8.61	8.27
515.0	485.0	9.19	8.73	8.37
530.0	500.0	9.49	9.00	8.62
545.0	515.0	9.74	9.22	8.83
555.0	525.0	9.82	9.29	8.90
570.0	540.0	9.92	9.37	8.95
585.0	555.0	10.13	9.55	9.09
595.0	565.0	10.32	9.72	9.24
610.0	580.0	10.55	9.90	9.39
625.0	595.0	10.63	9.95	9.41
640.0	610.0	10.72	10.01	9.47
650.0	620.0	10.79	10.07	9.55
665.0	635.0	10.86	10.13	9.60
680.0	650.0	10.89	10.13	9.55
690.0	660.0	10.95	10.18	9.57
700.0	670.0	11.08	10.30	9.67

RF (IN) (MHz)	LO (MHz)	IP-3 INPUT (dBm)		
		@LO (dBm)		
		+15	+17	+19
40.00	10.00	12.11	12.76	12.04
62.50	32.50	19.61	22.23	24.58
77.50	47.50	22.53	23.68	31.13
100.00	70.00	28.18	28.66	30.52
122.50	92.50	27.48	27.83	29.68
137.50	107.50	26.54	26.70	27.14
160.00	130.00	25.04	25.83	26.92
182.5	152.5	27.17	29.08	30.84
205.0	175.0	28.56	30.90	32.89
220.0	190.0	30.21	31.88	32.28
242.5	212.5	32.96	35.30	32.41
265.0	235.0	32.67	36.03	34.53
285.0	255.0	33.18	37.65	33.94
295.0	265.0	32.56	35.98	35.31
310.0	280.0	31.03	33.02	36.62
320.0	290.0	30.52	32.98	34.46
335.0	305.0	28.21	30.31	30.61
410.0	380.0	18.73	20.42	22.43
420.0	390.0	18.05	19.69	21.58
435.0	405.0	17.35	19.01	20.81
450.0	420.0	16.72	18.56	20.27
465.0	435.0	16.01	18.23	20.17
475.0	445.0	15.52	17.85	20.14
490.0	460.0	14.92	17.14	19.78
505.0	475.0	14.35	16.22	18.72
515.0	485.0	14.17	15.88	18.24
530.0	500.0	14.21	15.81	18.13
545.0	515.0	14.23	15.77	18.09
555.0	525.0	14.36	15.91	18.15
570.0	540.0	14.45	15.94	17.86
585.0	555.0	14.32	15.71	17.38
595.0	565.0	14.28	15.61	17.13
610.0	580.0	14.05	15.29	16.62
625.0	595.0	13.78	14.93	16.16
640.0	610.0	13.62	14.74	15.96
650.0	620.0	13.57	14.67	15.96
665.0	635.0	13.59	14.64	15.92
680.0	650.0	13.32	14.38	15.56
690.0	660.0	13.13	14.23	15.38
700.0	670.0	13.03	14.16	15.32

RF (IN) (MHz)	LO (MHz)	COMPRESSION @RF IN=+14dBm (dB)		
		@LO (dBm)		
		+15	+17	+19
40.00	10.00	0.14	1.33	0.31
62.50	32.50	0.54	0.28	0.14
77.50	47.50	0.41	0.21	0.15
100.00	70.00	0.31	0.19	0.17
122.50	92.50	0.43	0.28	0.20
137.50	107.50	0.39	0.28	0.21
160.00	130.00	0.37	0.30	0.24
182.5	152.5	0.30	0.22	0.15
205.0	175.0	0.25	0.16	0.11
220.0	190.0	0.19	0.13	0.08
242.5	212.5	0.10	0.07	0.08
265.0	235.0	0.06	0.05	0.06
285.0	255.0	0.07	0.05	0.06
295.0	265.0	0.10	0.06	0.06
310.0	280.0	0.16	0.10	0.07
320.0	290.0	0.22	0.13	0.09
335.0	305.0	0.32	0.20	0.13
410.0	380.0	1.70	0.96	0.51
420.0	390.0	2.07	1.20	0.64
435.0	405.0	2.49	1.54	0.85
450.0	420.0	2.85	1.87	1.10
465.0	435.0	3.20	2.20	1.36
475.0	445.0	3.41	2.40	1.52
490.0	460.0	3.72	2.68	1.76
505.0	475.0	4.10	3.05	2.07
515.0	485.0	4.37	3.31	2.29
530.0	500.0	4.61	3.57	2.53
545.0	515.0	4.68	3.68	2.63
555.0	525.0	4.77	3.77	2.71
570.0	540.0	4.97	3.94	2.91
585.0	555.0	5.14	4.14	3.08
595.0	565.0	5.26	4.26	3.22
610.0	580.0	5.51	4.53	3.48
625.0	595.0	5.78	4.82	3.78
640.0	610.0	5.90	4.97	3.91
650.0	620.0	5.93	5.00	3.93
665.0	635.0	5.96	5.04	3.99
680.0	650.0	6.04	5.16	4.15
690.0	660.0	6.12	5.26	4.28
700.0	670.0	6.14	5.31	

Frequency Mixer

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Typical Performance Data

IF (OUT) (MHz)	LO (MHz)	CONVERSION LOSS VS. IF FREQUENCY @RF(IN)=310MHz (dB)	IF (OUT) (MHz)	LO (MHz)	CONVERSION LOSS VS. IF FREQUENCY @RF(IN)=285MHz (dB)	IF (OUT) (MHz)	LO (MHz)	CONVERSION LOSS VS. IF FREQUENCY @RF(IN)=335MHz (dB)
		@LO (dBm)			@LO (dBm)			@LO (dBm)
		+17			+17			+17
10.0	320.0	7.05	250.00	35.00	8.42	325.00	10.00	11.69
15.0	325.0	7.05	241.00	44.00	8.16	315.40	19.60	9.47
21.0	331.0	7.08	235.00	50.00	8.02	309.00	26.00	8.89
26.0	336.0	7.12	226.00	59.00	7.81	299.40	35.60	8.45
32.0	342.0	7.14	217.00	68.00	7.76	289.80	45.20	8.17
37.0	347.0	7.14	211.00	74.00	7.72	283.40	51.60	8.04
48.0	358.0	7.21	202.00	83.00	7.67	273.80	61.20	7.92
58.0	368.0	7.27	193.0	92.0	7.62	264.2	70.8	7.86
68.0	378.0	7.30	184.0	101.0	7.54	254.6	80.4	7.77
112.0	422.0	7.41	178.0	107.0	7.51	248.2	86.8	7.72
154.0	464.0	7.61	169.0	116.0	7.44	238.6	96.4	7.61
189.0	499.0	7.93	160.0	125.0	7.37	229.0	106.0	7.49
231.0	541.0	8.33	154.0	131.0	7.28	222.6	112.4	7.43
266.0	576.0	8.86	145.0	140.0	7.17	213.0	122.0	7.35
301.0	611.0	9.34	136.0	149.0	7.04	203.4	131.6	7.26
343.0	653.0	9.72	130.0	155.0	6.98	197.0	138.0	7.20
378.0	688.0	10.28	121.0	164.0	6.98	187.4	147.6	7.11
420.0	730.0	10.44	112.0	173.0	6.95	177.8	157.2	7.08
455.0	765.0	10.72	106.0	179.0	6.92	171.4	163.6	7.04
490.0	800.0	11.06	97.0	188.0	6.84	161.8	173.2	6.97
250.0	60.0	8.05	88.0	197.0	6.83	152.2	182.8	6.85
235.0	75.0	7.81	79.0	206.0	6.80	142.6	192.4	6.77
217.0	93.0	7.66	73.0	212.0	6.69	68.0	267.0	6.57
202.0	108.0	7.54	68.0	217.0	6.70	66.0	269.0	6.60
184.0	126.0	7.40	60.0	225.0	6.63	60.0	275.0	6.69
169.0	141.0	7.30	56.0	229.0	6.55	56.0	279.0	6.72
154.0	156.0	7.21	48.0	237.0	6.75	50.0	285.0	6.76
136.0	174.0	6.99	41.0	244.0	6.72	41.0	294.0	6.79
121.0	189.0	6.89	39.0	246.0	6.73	39.0	296.0	6.80
106.0	204.0	6.84	36.0	249.0	6.73	36.0	299.0	6.81
88.0	222.0	6.79	33.0	252.0	6.73	33.0	302.0	6.82
73.0	237.0	6.75	31.0	254.0	6.73	31.0	304.0	6.83
60.0	250.0	6.70	28.0	257.0	6.73	28.0	307.0	6.85
50.0	260.0	6.82	25.0	260.0	6.74	25.0	310.0	6.86
39.0	271.0	6.81	22.0	263.0	6.74	22.0	313.0	6.87
33.0	277.0	6.82	20.0	265.0	6.75	20.0	315.0	6.88
28.0	282.0	6.82	17.0	268.0	6.76	17.0	318.0	6.89
22.0	288.0	6.83	14.0	271.0	6.78	14.0	321.0	6.91
17.0	293.0	6.85	12.0	273.0	6.80	12.0	323.0	6.94
12.0	298.0	6.88	10.0	275.0	6.83	10.0	325.0	6.96

Frequency Mixer

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Typical Performance Data

LO (MHz)	LO-RF ISOLATION (dB)			LO-IF ISOLATION (dB)		
	@LO (dBm)			@LO (dBm)		
	+15	+17	+19	+15	+17	+19
10.0	74.99	74.68	74.72	60.55	60.78	61.03
32.5	75.02	74.58	74.25	58.77	58.88	58.97
47.5	75.16	74.95	74.60	57.71	57.88	57.97
70.0	76.17	76.13	75.28	55.89	56.05	56.12
92.5	76.59	75.31	75.51	53.93	53.99	54.07
107.5	73.79	72.18	71.95	52.34	52.40	52.51
130.0	71.16	70.32	69.80	50.39	50.47	50.54
152.5	70.69	69.93	70.43	48.66	48.72	48.82
175.0	71.17	70.50	72.08	47.00	47.05	47.14
190.0	71.57	70.51	71.53	45.59	45.62	45.68
212.5	70.76	69.30	69.89	43.35	43.37	43.41
235.0	68.73	67.46	70.17	40.83	40.84	41.89
255.0	67.16	65.77	70.33	39.05	39.08	41.23
265.0	65.67	64.52	66.64	38.42	38.48	40.68
280.0	62.92	62.04	63.21	38.53	38.59	39.98
290.0	62.02	61.16	62.15	38.93	38.99	39.66
305.0	61.77	61.22	60.70	40.06	40.11	40.19
380.0	60.57	60.59	60.22	45.68	45.75	45.82
390.0	60.32	60.38	60.20	46.51	46.57	46.61
405.0	59.81	59.93	60.01	47.59	47.68	47.76
420.0	59.15	59.25	59.29	48.66	48.74	48.83
435.0	58.65	58.69	58.71	49.35	49.43	49.49
445.0	58.31	58.35	58.37	49.77	49.83	49.89
460.0	57.94	57.97	57.96	50.30	50.36	50.39
475.0	57.54	57.58	57.48	51.09	51.13	51.14
485.0	57.40	57.50	57.33	51.66	51.67	51.66
500.0	57.25	57.36	57.22	52.55	52.56	52.51
515.0	57.18	57.26	57.30	53.27	53.25	53.22
525.0	57.00	57.06	57.12	53.77	53.72	53.69
540.0	56.70	56.75	56.88	54.17	54.10	54.05
555.0	56.43	56.47	56.68	54.56	54.45	54.39
565.0	56.32	56.37	56.49	54.85	54.71	54.60
580.0	56.40	56.50	56.62	55.68	55.53	55.41
595.0	56.51	56.62	56.90	56.66	56.54	56.45
610.0	56.37	56.58	56.99	57.71	57.66	57.64
620.0	56.28	56.51	56.91	58.31	58.29	58.25
635.0	56.02	56.24	56.67	59.17	59.15	59.21
650.0	55.69	55.93	56.52	60.06	60.22	60.38
660.0	55.43	55.70	56.22	61.06	61.26	61.57
670.0	55.20	55.53	55.86	62.01	62.47	62.77

RF (IN) (MHz)	LO (MHz)	RF-IF ISOLATION (dB)		
		@LO (dBm)		
		+15	+17	+19
40.00	10.00	35.39	34.52	42.83
62.50	32.50	33.03	31.63	36.34
77.50	47.50	32.82	31.26	32.44
100.00	70.00	29.91	28.68	30.62
122.50	92.50	25.00	24.94	26.66
137.50	107.50	24.42	25.03	26.09
160.00	130.00	28.01	29.03	30.51
182.5	152.5	31.88	33.19	34.84
205.0	175.0	34.00	35.00	36.06
220.0	190.0	35.37	36.14	36.96
242.5	212.5	38.26	38.71	39.36
265.0	235.0	40.37	40.36	48.50
285.0	255.0	42.35	42.33	45.40
295.0	265.0	43.09	43.35	46.55
310.0	280.0	42.64	43.21	45.36
320.0	290.0	41.31	41.81	42.27
335.0	305.0	39.09	39.35	39.59
410.0	380.0	36.12	35.50	37.03
420.0	390.0	36.39	35.77	36.29
435.0	405.0	36.01	35.77	35.65
450.0	420.0	35.71	35.60	35.64
465.0	435.0	34.72	34.68	34.82
475.0	445.0	33.52	33.47	33.47
490.0	460.0	32.70	32.72	32.76
505.0	475.0	31.97	32.08	32.46
515.0	485.0	31.62	31.81	32.39
530.0	500.0	30.79	30.95	31.40
545.0	515.0	31.28	31.44	31.79
555.0	525.0	31.00	31.11	31.39
570.0	540.0	31.19	31.29	31.44
585.0	555.0	31.44	31.58	31.73
595.0	565.0	32.09	32.27	32.52
610.0	580.0	32.01	32.10	32.29
625.0	595.0	32.19	32.21	32.30
640.0	610.0	32.42	32.34	32.26
650.0	620.0	32.84	32.70	32.55
665.0	635.0	32.84	32.61	32.28
680.0	650.0	33.21	32.98	32.19
690.0	660.0	33.45	33.27	32.72
700.0	670.0	33.60	33.48	33.31

Frequency Mixer

HJK-ED13654A/1

Typical Performance Data

RF (IN) (MHz)	LO (MHz)	RF VSWR (:1)			LO (MHz)	LO VSWR (:1)			IF (OUT) (MHz)	IF VSWR @LO=277MHz (:1)		
		@LO (dBm)				@LO (dBm)				@LO (dBm)		
		+15	+17	+19		+15	+17	+19		+15	+17	+19
40.0	10.0	1.84	1.91	2.06	10.00	3.94	3.92	3.90	10.00	1.26	1.28	1.30
62.5	32.5	1.87	1.92	2.00	32.50	3.90	3.89	3.88	13.00	1.23	1.25	1.27
77.5	47.5	1.87	1.92	1.98	47.50	3.88	3.88	3.87	15.00	1.21	1.24	1.26
100.0	70.0	1.91	1.97	2.04	70.00	3.85	3.84	3.84	18.00	1.20	1.22	1.24
122.5	92.5	1.94	2.01	2.06	92.50	3.80	3.79	3.78	21.00	1.19	1.21	1.23
137.5	107.5	1.95	2.02	2.08	107.50	3.74	3.74	3.72	23.00	1.18	1.21	1.23
160.0	130.0	1.99	2.05	2.11	130.00	3.67	3.66	3.64	26.00	1.18	1.20	1.23
182.5	152.5	2.04	2.10	2.16	152.5	3.58	3.57	3.55	29.0	1.18	1.21	1.23
205.0	175.0	2.01	2.07	2.12	175.0	3.44	3.43	3.42	32.0	1.19	1.21	1.23
220.0	190.0	2.00	2.05	2.10	190.0	3.30	3.29	3.28	34.0	1.19	1.21	1.24
242.5	212.5	2.02	2.07	2.12	212.5	2.97	2.96	2.95	37.0	1.20	1.22	1.24
265.0	235.0	2.02	2.07	2.13	235.0	2.46	2.44	2.27	40.0	1.20	1.23	1.25
285.0	255.0	1.97	2.01	2.06	255.0	1.84	1.79	1.83	48.0	1.22	1.24	1.26
295.0	265.0	1.94	1.98	2.02	265.0	1.50	1.48	1.68	52.0	1.22	1.25	1.27
310.0	280.0	1.89	1.92	1.96	280.0	1.46	1.47	1.67	58.0	1.23	1.25	1.27
320.0	290.0	1.82	1.84	1.88	290.0	1.70	1.71	1.78	62.0	1.23	1.25	1.27
335.0	305.0	1.75	1.77	1.79	305.0	2.10	2.11	2.12	68.0	1.22	1.25	1.27
410.0	380.0	1.77	1.73	1.71	380.0	3.04	3.03	3.03	78.0	1.22	1.24	1.26
420.0	390.0	1.77	1.73	1.69	390.0	3.08	3.08	3.07	84.0	1.23	1.25	1.27
435.0	405.0	1.84	1.78	1.73	405.0	3.13	3.13	3.12	93.0	1.26	1.28	1.30
450.0	420.0	1.92	1.85	1.80	420.0	3.17	3.16	3.16	102.0	1.28	1.31	1.33
465.0	435.0	1.99	1.93	1.87	435.0	3.19	3.19	3.18	111.0	1.29	1.31	1.33
475.0	445.0	2.08	2.01	1.95	445.0	3.20	3.20	3.19	117.0	1.28	1.30	1.32
490.0	460.0	2.24	2.17	2.11	460.0	3.21	3.21	3.21	126.0	1.28	1.30	1.32
505.0	475.0	2.40	2.32	2.26	475.0	3.23	3.23	3.22	135.0	1.28	1.30	1.32
515.0	485.0	2.53	2.45	2.39	485.0	3.25	3.25	3.24	141.0	1.30	1.32	1.34
530.0	500.0	2.77	2.69	2.61	500.0	3.23	3.23	3.22	150.0	1.32	1.34	1.36
545.0	515.0	2.97	2.89	2.81	515.0	3.23	3.23	3.22	159.0	1.33	1.35	1.37
555.0	525.0	3.09	3.00	2.93	525.0	3.23	3.23	3.22	165.0	1.33	1.35	1.38
570.0	540.0	3.26	3.17	3.10	540.0	3.22	3.22	3.22	174.0	1.33	1.35	1.37
585.0	555.0	3.39	3.30	3.22	555.0	3.22	3.22	3.22	183.0	1.32	1.34	1.36
595.0	565.0	3.45	3.36	3.28	565.0	3.21	3.22	3.22	189.0	1.32	1.34	1.36
610.0	580.0	3.53	3.43	3.34	580.0	3.22	3.22	3.22	198.0	1.35	1.37	1.39
625.0	595.0	3.61	3.50	3.40	595.0	3.21	3.22	3.22	207.0	1.38	1.39	1.41
640.0	610.0	3.65	3.54	3.43	610.0	3.21	3.21	3.21	216.0	1.37	1.39	1.41
650.0	620.0	3.66	3.55	3.43	620.0	3.20	3.20	3.21	222.0	1.36	1.38	1.40
665.0	635.0	3.65	3.54	3.43	635.0	3.19	3.19	3.20	231.0	1.35	1.37	1.38
680.0	650.0	3.59	3.48	3.39	650.0	3.17	3.18	3.19	240.0	1.35	1.36	1.38
690.0	660.0	3.53	3.43	3.34	660.0	3.17	3.18	3.19	246.0	1.35	1.36	1.38
700.0	670.0	3.49	3.40	3.30	670.0	3.17	3.18	3.20	252.0	1.36	1.37	1.39

Harmonics Tables

RF HARMONICS ORDER

	(-dBm)	(-dBc)										
0	--	--	16.65	38.53	39.40	42.52	36.27	43.08	59.60	68.22	62.74	62.78
1	--	33.84	--	29.04	11.01	39.91	19.62	33.16	45.57	47.68	53.39	52.31
2	104.82	72.44	64.76	70.14	73.46	63.58	70.75	67.09	77.52	77.34	91.75	95.76
3	106.18	86.04	69.89	83.25	72.49	83.58	63.81	81.85	67.30	80.28	75.62	89.97
4	121.66	110.00	108.07	112.36	115.29	108.69	102.59	105.82	101.34	111.14	103.77	108.04
5	119.87	120.16	102.54	115.43	93.48	115.01	98.68	107.42	95.95	102.48	99.56	106.75
6	120.75	121.65	117.75	119.34	109.13	114.90	106.50	114.54	110.79	113.74	104.66	118.98
7	116.37	120.89	120.17	121.81	110.54	120.39	101.45	113.93	102.47	104.74	103.47	109.98
8	118.25	120.82	119.40	121.41	122.47	122.50	119.28	121.80	110.28	113.84	112.03	113.06
9	119.31	118.64	119.75	120.46	119.43	120.59	120.09	120.05	115.85	113.75	109.89	110.30
10	119.85	119.46	121.40	119.84	119.60	120.09	120.41	120.78	118.81	119.56	111.92	111.76
	RF CAL	0	1	2	3	4	5	6	7	8	9	10

LO HARMONICS ORDER

Test conditions: RF IN: 310 MHz; 0.00 dBm.
 LO IN: 280 MHz; +17.00 dBm
 IF OUT: 30 MHz; -6.62 dBm

RF HARMONICS ORDER

	(-dBm)	(-dBc)										
0	--	--	27.14	54.32	48.69	56.77	46.34	52.17	75.97	77.05	72.78	76.46
1	--	33.93	--	29.30	11.31	40.55	20.22	33.47	52.07	48.19	54.88	54.81
2	84.18	60.33	52.83	57.31	60.99	53.39	64.37	58.14	63.44	72.45	81.00	87.24
3	75.66	63.13	51.21	63.47	51.67	64.04	43.45	66.92	47.15	58.89	57.93	69.29
4	119.42	78.83	78.81	81.60	78.12	74.52	76.22	76.33	78.74	76.19	79.51	80.54
5	117.97	109.20	76.16	87.35	69.88	81.37	72.03	76.62	80.17	76.83	80.31	77.40
6	120.81	115.91	103.47	112.80	93.76	97.41	92.42	95.02	89.60	92.64	91.25	92.91
7	117.98	119.17	105.34	108.41	93.42	103.99	88.53	102.04	86.65	104.40	93.52	97.36
8	119.28	122.19	121.98	122.10	118.37	104.46	111.72	104.37	112.06	102.54	108.94	99.68
9	118.71	122.45	121.84	122.57	118.59	115.45	108.34	105.49	114.57	103.32	107.51	105.98
10	121.61	122.54	122.72	122.33	122.45	123.85	122.75	114.26	115.97	112.90	109.45	114.31
	RF CAL	0	1	2	3	4	5	6	7	8	9	10

LO HARMONICS ORDER

Test conditions: RF IN: 310 MHz; 10.00 dBm.
 LO IN: 280 MHz; +17.00 dBm
 IF OUT: 30 MHz; 3.52 dBm

- Notes: 1. All Harmonics are in (dBc) relative to IF OUTPUT
 2. + entry denotes harmonics are in (dBc) above IF OUTPUT
 3. RF Cal represents the Harmonics level of the RF Input Signal to the mixer