

Frequency Mixer

HJK-ED9887/1

Typical Performance Data

RF (IN) (MHz)	LO (MHz)	CONVERSION LOSS IF FIXED @IF(OUT)=70MHz (dB)			RF (IN) (MHz)	LO (MHz)	IP3 INPUT (dBm)			RF (IN) (MHz)	LO (MHz)	COMPRESSION @RF IN=+19dBm (dB)		
		@LO (dBm)					@LO (dBm)					@LO (dBm)		
+16	+19	+22	+16	+19	+22	+16	+19	+22						
220.1	290.1	11.19	9.85	9.16	220.1	290.1	26.56	27.10	28.80	220.1	290.1	1.72	1.01	0.38
230.1	300.1	10.77	9.57	8.98	230.1	300.1	35.96	30.94	31.42	230.1	300.1	1.51	0.84	0.26
240.1	310.1	10.42	9.33	8.88	240.1	310.1	28.87	28.89	30.99	240.1	310.1	1.45	0.65	0.21
250.1	320.1	9.97	9.05	8.70	250.1	320.1	29.89	29.44	31.54	250.1	320.1	1.42	0.61	0.26
260.1	330.1	9.79	8.94	8.65	260.1	330.1	30.10	34.77	36.50	260.1	330.1	1.19	0.43	0.20
270.1	340.1	9.68	8.86	8.62	270.1	340.1	29.44	33.72	36.54	270.1	340.1	1.02	0.31	0.15
280.1	350.1	9.47	8.72	8.50	280.1	350.1	26.73	29.65	32.39	280.1	350.1	0.90	0.29	0.14
290.1	360.1	9.43	8.71	8.51	290.1	360.1	25.10	27.26	30.65	290.1	360.1	0.66	0.15	0.08
300.1	370.1	9.22	8.56	8.40	300.1	370.1	25.65	27.62	31.02	300.1	370.1	0.45	0.07	0.06
310.1	380.1	8.95	8.35	8.25	310.1	380.1	24.82	26.69	29.95	310.1	380.1	0.36	0.07	0.07
320.1	390.1	8.84	8.31	8.24	320.1	390.1	24.36	26.07	30.09	320.1	390.1	0.17	-0.01	0.06
330.1	400.1	8.62	8.11	8.11	330.1	400.1	24.54	26.40	31.01	330.1	400.1	0.13	0.02	0.07
340.1	410.1	8.43	7.99	8.06	340.1	410.1	24.01	26.01	30.38	340.1	410.1	0.14	0.08	0.08
350.1	420.1	8.41	7.97	8.12	350.1	420.1	24.24	26.63	30.69	350.1	420.1	0.12	0.13	0.13
360.1	430.1	8.23	7.87	8.04	360.1	430.1	25.37	30.26	31.31	360.1	430.1	0.19	0.23	0.15
370.1	440.1	8.17	7.91	8.02	370.1	440.1	28.23	41.04	33.13	370.1	440.1	0.25	0.19	0.40
380.1	450.1	8.12	7.90	7.99	380.1	450.1	32.16	36.02	35.70	380.1	450.1	0.27	0.24	0.15
390.1	460.1	7.99	7.82	7.92	390.1	460.1	30.89	36.01	32.71	390.1	460.1	0.33	0.21	0.18
400.1	470.1	7.96	7.82	7.90	400.1	470.1	30.64	33.16	35.23	400.1	470.1	0.38	0.60	0.21
410.1	480.1	7.99	7.83	7.91	410.1	480.1	30.65	32.80	33.77	410.1	480.1	0.40	0.56	0.22
420.1	490.1	8.04	7.83	7.91	420.1	490.1	29.68	30.64	32.98	420.1	490.1	0.47	0.60	0.23
430.1	500.1	8.13	7.84	7.88	430.1	500.1	29.13	29.48	33.42	430.1	500.1	0.51	0.34	0.04
440.1	510.1	8.19	7.80	7.86	440.1	510.1	28.56	29.99	33.74	440.1	510.1	0.58	0.38	0.18
450.1	520.1	8.24	7.82	7.84	450.1	520.1	27.56	30.93	33.65	450.1	520.1	0.67	0.39	0.22
460.1	530.1	8.39	7.90	7.88	460.1	530.1	26.59	30.74	33.49	460.1	530.1	0.76	0.42	0.24
470.1	540.1	8.49	7.96	7.87	470.1	540.1	25.97	29.96	32.93	470.1	540.1	0.84	0.44	0.26
480.1	550.1	8.68	8.07	7.90	480.1	550.1	24.78	28.58	30.84	480.1	550.1	0.96	0.50	0.33
490.1	560.1	8.85	8.21	8.00	490.1	560.1	24.35	27.65	31.89	490.1	560.1	0.94	0.53	0.35
500.1	570.1	8.98	8.31	8.07	500.1	570.1	23.88	27.07	31.66	500.1	570.1	0.95	0.57	0.37
515.1	585.1	9.25	8.55	8.27	515.1	585.1	23.72	26.33	31.14	515.1	585.1	0.89	0.57	0.37
525.1	595.1	9.32	8.61	8.33	525.1	595.1	23.93	26.57	31.18	525.1	595.1	0.86	0.55	0.36
540.1	610.1	9.54	8.77	8.42	540.1	610.1	23.74	26.08	30.89	540.1	610.1	0.79	0.54	0.36
550.1	620.1	9.77	8.92	8.55	550.1	620.1	23.91	26.22	30.37	550.1	620.1	0.76	0.51	0.35
565.1	635.1	10.03	9.14	8.72	565.1	635.1	23.74	25.74	29.58	565.1	635.1	0.72	0.50	0.36
575.1	645.1	10.28	9.28	8.82	575.1	645.1	23.52	25.63	29.82	575.1	645.1	0.70	0.50	0.38
590.1	660.1	10.54	9.52	9.03	590.1	660.1	23.38	25.28	29.10	590.1	660.1	0.77	0.51	0.38
600.1	670.1	10.70	9.69	9.18	600.1	670.1	23.43	25.17	29.03	600.1	670.1	0.78	0.49	0.39
615.1	685.1	10.78	9.79	9.26	615.1	685.1	22.71	24.86	29.52	615.1	685.1	0.87	0.54	0.44
625.1	695.1	11.00	9.97	9.42	625.1	695.1	22.59	24.68	29.10	625.1	695.1	0.86	0.47	0.39
640.1	710.1	11.17	10.13	9.56	640.1	710.1	21.66	24.12	28.98	640.1	710.1	0.97	0.49	0.41

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Frequency Mixer

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Typical Performance Data

IF (OUT) (MHz)	LO (MHz)	CONVERSION LOSS VS. IF FREQUENCY @RF(IN)=417MHz (dB)	IF (OUT) (MHz)	LO (MHz)	CONVERSION LOSS VS. IF FREQUENCY @RF(IN)=300MHz (dB)	IF (OUT) (MHz)	LO (MHz)	CONVERSION LOSS VS. IF FREQUENCY @RF(IN)=544.1MHz (dB)
		@LO (dBm)			@LO (dBm)			@LO (dBm)
		+19			+19			+19
127.0	290.0	10.24	10.1	310.1	11.14	260.1	284.0	10.30
120.8	296.2	10.16	22.9	322.9	10.15	253.7	290.4	10.23
114.7	302.3	9.97	35.7	335.7	9.47	247.3	296.8	10.01
108.5	308.5	9.70	48.6	348.6	8.99	240.9	303.2	9.85
102.4	314.6	9.60	61.4	361.4	8.64	234.5	309.6	9.75
96.2	320.8	9.41	74.2	374.2	8.42	228.0	316.1	9.62
90.1	326.9	9.43	87.0	387.0	8.16	221.6	322.5	9.62
83.9	333.1	9.29	99.8	399.8	7.96	215.2	328.9	9.34
77.7	339.3	9.34	112.7	412.7	7.95	208.8	335.3	9.37
71.6	345.4	9.23	125.5	425.5	7.88	202.4	341.7	9.17
65.4	351.6	9.23	138.3	438.3	7.83	196.0	348.1	9.25
59.3	357.7	9.24	151.1	451.1	7.87	189.6	354.5	9.06
53.1	363.9	9.11	163.9	463.9	7.89	183.2	360.9	9.09
46.9	370.1	9.12	176.8	476.8	7.80	176.8	367.3	8.94
40.8	376.2	8.98	189.6	489.6	7.70	170.4	373.7	8.86
34.6	382.4	9.19	202.4	502.4	7.60	163.9	380.2	8.78
28.5	388.5	9.24	215.2	515.2	7.53	157.5	386.6	8.63
22.3	394.7	9.56	228.0	528.0	7.57	151.1	393.0	8.55
16.2	400.8	9.89	240.9	540.9	7.64	144.7	399.4	8.38
10.0	407.0	10.76	253.7	553.7	7.72	138.3	405.8	8.38
10.0	427.0	10.27	266.5	566.5	7.82	131.9	412.2	8.23
28.1	445.1	8.24	279.3	579.3	7.88	125.5	418.6	8.25
46.1	463.1	7.96	292.2	592.2	7.93	119.1	425.0	8.12
64.2	481.2	7.91	305.0	605.0	7.96	112.7	431.4	8.10
82.2	499.2	7.78	317.8	617.8	8.07	106.3	437.8	8.04
100.3	517.3	7.66	330.6	630.6	8.18	99.8	444.3	8.02
118.3	535.3	7.88	343.4	643.4	8.26	93.4	450.7	8.00
136.4	553.4	7.96	356.3	656.3	8.38	87.0	457.1	8.03
154.4	571.4	8.13	369.1	669.1	8.45	80.6	463.5	8.09
172.5	589.5	8.27	381.9	681.9	8.44	74.2	469.9	8.04
190.5	607.5	8.34	394.7	694.7	8.53	67.8	476.3	8.14
208.6	625.6	8.53	407.5	707.5	8.59	61.4	482.7	8.07
226.6	643.6	8.72	420.4	720.4	8.72	55.0	489.1	8.17
244.7	661.7	8.89	433.2	733.2	8.92	48.6	495.5	8.15
262.7	679.7	8.94	446.0	746.0	9.14	42.2	501.9	8.16
280.8	697.8	9.03	458.8	758.8	9.44	35.7	508.4	8.24
298.8	715.8	9.14	471.6	771.6	9.68	29.3	514.8	8.41
316.9	733.9	9.44	484.5	784.5	9.93	22.9	521.2	8.73
334.9	751.9	9.68	497.3	797.3	10.24	16.5	527.6	9.25
353.0	770.0	10.07	510.1	810.1	10.51	10.1	534.0	10.53

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Typical Performance Data

LO (MHz)	LO-RF ISOLATION (dB)			LO-IF ISOLATION (dB)		
	@LO (dBm)			@LO (dBm)		
	+16	+19	+22	+16	+19	+22
290.1	47.69	49.12	40.20	38.48	39.47	46.59
300.1	47.62	48.85	39.89	37.98	38.92	46.37
310.1	47.34	48.26	39.11	37.51	38.39	45.70
320.1	46.62	47.58	39.19	36.94	38.03	45.12
330.1	45.43	45.90	38.27	36.36	37.38	43.46
340.1	44.66	45.08	38.06	35.84	36.73	43.83
350.1	44.02	44.55	37.90	35.13	36.20	43.02
360.1	43.02	43.37	37.08	34.43	35.52	42.14
370.1	41.96	42.17	36.87	33.68	34.71	40.94
380.1	41.04	41.24	36.96	33.17	34.22	40.54
390.1	39.48	39.59	36.01	32.46	33.51	39.78
400.1	38.33	38.33	35.83	31.59	32.56	38.39
410.1	37.07	37.17	35.40	30.87	31.86	36.75
420.1	35.84	35.98	34.52	30.50	31.36	35.72
430.1	35.44	36.12	34.79	29.87	30.89	34.82
440.1	35.20	36.48	34.77	29.57	30.34	33.86
450.1	35.07	36.62	34.06	29.74	30.48	34.08
460.1	35.93	37.41	34.53	30.03	30.76	34.44
470.1	36.29	37.52	34.04	30.14	30.89	34.50
480.1	36.70	38.01	33.77	30.26	31.20	34.69
490.1	37.77	39.26	34.47	30.73	31.89	35.50
500.1	38.06	39.59	34.20	31.10	32.45	35.96
510.1	38.76	40.27	34.70	31.38	32.89	36.26
520.1	40.17	41.78	35.90	31.62	33.15	36.71
530.1	40.71	42.28	36.04	32.09	33.57	37.71
540.1	41.53	43.01	37.04	32.41	33.83	38.93
550.1	42.36	43.71	37.75	32.72	33.96	39.18
560.1	42.63	44.12	37.53	32.98	34.18	39.14
570.1	43.57	45.20	38.26	33.41	34.49	39.18
585.1	44.03	45.65	38.70	34.06	35.15	39.84
595.1	44.74	46.65	39.68	34.28	35.26	39.34
610.1	45.81	47.79	40.67	34.89	35.79	39.49
620.1	45.80	47.92	41.72	35.36	36.38	40.46
635.1	46.47	48.82	43.34	35.51	36.32	39.53
645.1	45.91	48.05	43.65	35.80	36.48	39.34
660.1	45.67	47.21	46.38	36.20	36.93	39.87
670.1	44.78	46.02	46.69	36.29	36.88	39.18
685.1	44.33	45.13	48.62	36.71	37.24	39.13
695.1	43.12	43.49	47.43	36.98	37.61	39.57
710.1	42.48	42.49	45.03	37.10	37.44	38.33

RF (IN) (MHz)	LO (MHz)	RF-IF ISOLATION (dB)		
		@LO (dBm)		
		+16	+19	+22
220.1	290.1	38.60	38.81	53.97
230.1	300.1	35.90	34.87	37.08
240.1	310.1	36.64	37.34	42.19
250.1	320.1	37.65	40.50	60.51
260.1	330.1	37.74	40.60	35.38
270.1	340.1	36.91	37.94	40.07
280.1	350.1	38.34	40.05	44.26
290.1	360.1	39.47	41.86	48.30
300.1	370.1	39.98	42.12	51.51
310.1	380.1	40.09	41.49	43.57
320.1	390.1	41.57	43.32	46.08
330.1	400.1	43.12	45.84	60.77
340.1	410.1	45.18	49.49	43.56
350.1	420.1	45.91	50.75	54.56
360.1	430.1	52.05	56.06	56.45
370.1	440.1	59.39	46.77	58.47
380.1	450.1	45.14	41.65	48.73
390.1	460.1	43.42	40.50	46.43
400.1	470.1	41.90	38.30	42.52
410.1	480.1	42.38	37.72	40.39
420.1	490.1	41.78	36.53	37.15
430.1	500.1	41.36	36.31	37.27
440.1	510.1	41.70	37.65	36.16
450.1	520.1	42.63	39.45	36.71
460.1	530.1	42.60	39.77	36.88
470.1	540.1	42.30	39.51	38.03
480.1	550.1	43.05	40.28	41.03
490.1	560.1	42.73	40.76	42.82
500.1	570.1	42.25	40.47	42.50
515.1	585.1	40.66	39.15	41.65
525.1	595.1	39.80	38.99	41.76
540.1	610.1	37.40	37.18	40.04
550.1	620.1	35.84	36.00	38.29
565.1	635.1	33.50	34.34	36.87
575.1	645.1	31.89	32.99	35.70
590.1	660.1	29.61	30.69	33.25
600.1	670.1	28.19	29.27	31.86
615.1	685.1	26.28	27.35	30.22
625.1	695.1	25.02	25.89	28.26
640.1	710.1	23.43	24.18	26.49

Typical Performance Data

RF (IN) (MHz)	LO (MHz)	RF VSWR (:1)			LO (MHz)	LO VSWR (:1)			IF (OUT) (MHz)	IF VSWR @LO=534MHz (:1)		
		@LO (dBm)				@LO (dBm)				@LO (dBm)		
		+16	+19	+22		+16	+19	+22		+16	+19	+22
220.1	290.1	1.52	1.29	1.29	290.1	59.91	59.91	44.55	10.0	1.91	2.07	2.11
230.1	300.1	1.46	1.28	1.33	300.1	48.26	48.26	36.97	20.0	2.41	2.39	2.29
240.1	310.1	1.41	1.27	1.36	310.1	45.72	45.72	34.75	30.0	2.60	2.46	2.31
250.1	320.1	1.36	1.28	1.39	320.1	35.46	35.46	27.59	40.0	2.83	2.63	2.44
260.1	330.1	1.35	1.30	1.41	330.1	26.33	26.33	21.20	50.0	2.84	2.60	2.40
270.1	340.1	1.33	1.30	1.41	340.1	22.58	22.58	18.30	60.0	2.89	2.63	2.42
280.1	350.1	1.32	1.31	1.41	350.1	19.54	19.54	15.96	70.0	3.08	2.80	2.55
290.1	360.1	1.32	1.32	1.42	360.1	15.81	15.67	13.09	80.0	3.01	2.71	2.46
300.1	370.1	1.30	1.32	1.42	370.1	12.35	12.26	10.50	90.0	3.09	2.79	2.54
310.1	380.1	1.30	1.33	1.43	380.1	10.02	9.90	8.64	100.0	3.16	2.84	2.58
320.1	390.1	1.29	1.33	1.44	390.1	8.05	7.94	7.14	110.0	3.02	2.72	2.46
330.1	400.1	1.30	1.35	1.46	400.1	6.35	6.26	5.79	120.0	3.13	2.81	2.55
340.1	410.1	1.31	1.38	1.49	410.1	4.99	4.92	4.69	130.0	3.14	2.82	2.56
350.1	420.1	1.32	1.40	1.50	420.1	4.00	3.92	3.90	140.0	3.08	2.77	2.50
360.1	430.1	1.34	1.44	1.52	430.1	3.20	3.14	3.31	150.0	3.25	2.93	2.64
370.1	440.1	1.37	1.50	1.54	440.1	2.58	2.55	3.37	160.0	3.24	2.92	2.62
380.1	450.1	1.42	1.55	1.57	450.1	2.14	2.16	2.97	170.0	3.19	2.86	2.58
390.1	460.1	1.47	1.60	1.60	460.1	1.91	1.99	2.89	180.0	3.29	2.95	2.66
400.1	470.1	1.49	1.62	1.63	470.1	1.92	2.01	2.79	200.0	3.21	2.88	2.59
410.1	480.1	1.48	1.63	1.64	480.1	2.15	2.22	2.83	210.0	3.31	2.98	2.68
420.1	490.1	1.47	1.64	1.66	490.1	2.55	2.61	3.04	230.0	3.25	2.93	2.63
430.1	500.1	1.45	1.62	1.66	500.1	3.11	3.18	3.40	240.0	3.33	3.00	2.68
440.1	510.1	1.41	1.60	1.66	510.1	3.80	3.90	3.87	260.0	3.30	2.97	2.67
450.1	520.1	1.38	1.56	1.64	520.1	4.57	4.70	4.42	270.0	3.33	2.99	2.68
460.1	530.1	1.35	1.51	1.62	530.1	5.42	5.61	5.07	290.0	3.26	2.93	2.63
470.1	540.1	1.31	1.47	1.59	540.1	6.44	6.66	5.89	300.0	3.21	2.89	2.63
480.1	550.1	1.27	1.43	1.55	550.1	7.53	7.76	6.71	320.0	3.21	2.90	2.62
490.1	560.1	1.25	1.40	1.53	560.1	8.51	8.77	7.47	330.0	3.15	2.83	2.57
500.1	570.1	1.22	1.37	1.50	570.1	9.53	9.79	8.23	350.0	3.18	2.88	2.60
515.1	585.1	1.19	1.33	1.47	585.1	11.46	11.77	9.69	360.0	3.06	2.76	2.51
525.1	595.1	1.18	1.32	1.47	595.1	12.61	12.89	10.56	380.0	3.05	2.76	2.51
540.1	610.1	1.16	1.31	1.48	610.1	14.15	14.50	11.85	390.0	2.92	2.63	2.40
550.1	620.1	1.14	1.28	1.44	620.1	15.53	15.96	13.09	410.0	2.93	2.66	2.42
565.1	635.1	1.12	1.26	1.43	635.1	17.39	17.75	14.62	420.0	2.82	2.55	2.33
575.1	645.1	1.11	1.26	1.44	645.1	17.93	18.30	15.13	440.0	2.84	2.57	2.35
590.1	660.1	1.10	1.24	1.44	660.1	19.54	19.98	16.56	450.0	2.71	2.46	2.25
600.1	670.1	1.08	1.24	1.44	670.1	20.70	20.70	17.22	470.0	2.66	2.42	2.21
615.1	685.1	1.07	1.26	1.49	685.1	20.95	21.20	17.75	480.0	2.55	2.32	2.13
625.1	695.1	1.06	1.27	1.50	695.1	22.00	22.00	18.70	500.0	2.50	2.27	2.09
640.1	710.1	1.05	1.30	1.54	710.1	23.49	23.49	19.98	510.0	2.45	2.23	2.06

Harmonics Tables

RF HARMONICS ORDER

	(-dBm)	(-dBc)										
0	-	-	6	10	12	43	25	30	28	36	36	50
1	-	33	+0	32	10	30	18	36	22	42	31	53
2	63	64	56	58	63	62	53	60	68	69	68	67
3	>90	>82	69	78	73	79	68	76	69	78	75	78
4	>90	>82	>82	>82	>82	>82	>82	>82	>82	>82	>82	>82
5	>90	>82	>82	>82	>82	>82	>82	>82	>82	>82	>82	>82
6	>90	>82	>82	>82	>82	>82	>82	>82	>82	>82	>82	>82
7	>90	>82	>82	>82	>82	>82	81	81	>82	>82	>82	>82
8	>90	>82	>82	>82	>82	>82	>82	>82	>82	>82	>82	>82
9	>90	>82	>82	>82	>82	>82	>82	>82	>82	>82	>82	>82
10	>90	>82	>82	>82	>82	>82	>82	>82	>82	>82	>82	>82
	RF CAL	0	1	2	3	4	5	6	7	8	9	10

LO HARMONICS ORDER

Test conditions:

RF IN: 417 MHz; 0.00 dBm.
LO IN: 487 MHz; +19.00 dBm
IF OUT: 70 MHz; -7.94 dBm

RF HARMONICS ORDER

	(-dBm)	(-dBc)										
0	-	-	16	21	22	53	38	40	39	41	49	53
1	-	34	+0	32	10	31	18	37	23	44	32	61
2	43	57	47	47	55	54	43	51	56	60	57	57
3	70	68	49	59	52	59	47	57	48	58	55	59
4	>90	79	70	76	70	71	72	80	72	81	69	79
5	>90	90	75	>92	73	79	76	80	78	77	76	79
6	>90	>92	86	89	91	>92	90	>92	87	88	91	>92
7	>90	>92	>92	>92	>92	>92	>92	90	91	>92	>92	>92
8	>90	>92	>92	>92	>92	>92	>92	>92	>92	>92	>92	>92
9	>90	>92	>92	>92	>92	>92	>92	>92	>92	>92	>92	>92
10	>90	>92	>92	>92	>92	>92	>92	>92	>92	>92	>92	>92
	RF CAL	0	1	2	3	4	5	6	7	8	9	10

LO HARMONICS ORDER

Test conditions:

RF IN: 417 MHz; 10.00 dBm.
LO IN: 487 MHz; +19.00 dBm
IF OUT: 70 MHz; 2.03 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 represent the Harmonics level of the RF input signal to the mixer.

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