

# Frequency Mixer

# ASK-2-KK81

## Typical Performance Data

RF (IN) (MHz)	LO (MHz)	CONVERSION LOSS IF FIXED @IF(OUT)=30MHz (dB)		
		@LO (dBm)		
		+4	+7	+10
10.1	40.1	6.01	5.74	5.57
40.1	70.1	6.47	6.18	5.94
80.1	110.1	6.45	6.14	6.01
110.1	140.1	6.52	6.22	6.07
150.1	180.1	6.66	6.38	6.17
180.1	210.1	6.64	6.34	6.18
220.1	250.1	6.64	6.33	6.16
250.1	280.1	6.80	6.47	6.26
290.1	320.1	6.85	6.51	6.30
320.1	350.1	6.86	6.51	6.35
360.1	390.1	6.87	6.50	6.29
390.1	420.1	7.00	6.60	6.36
430.1	460.1	7.04	6.62	6.37
460.1	490.1	6.98	6.61	6.43
500.1	530.1	7.09	6.68	6.53
530.1	560.1	7.26	6.81	6.63
570.1	600.1	7.37	6.90	6.73
600.1	630.1	7.36	6.86	6.65
640.1	670.1	7.45	6.93	6.75
670.1	700.1	7.51	6.95	6.79
710.1	740.1	7.53	6.95	6.80
740.1	770.1	7.46	6.94	6.91
780.1	810.1	7.56	7.03	7.00
810.1	840.1	7.70	7.19	7.10
850.1	880.1	7.91	7.48	7.43
880.1	910.1	8.04	7.68	7.65
920.1	950.1	8.41	8.10	8.09
950.1	980.1	8.69	8.42	8.38
990.1	1020.1	9.06	8.88	8.86
1020.1	1050.1	9.39	9.28	9.32
1060.1	1090.1	9.74	9.68	9.74
1090.1	1120.1	9.96	9.90	9.97
1130.1	1160.1	10.22	10.14	10.18
1160.1	1190.1	10.45	10.33	10.35
1200.1	1230.1	10.67	10.48	10.44
1230.1	1260.1	10.81	10.54	10.46
1270.1	1300.1	11.24	10.86	10.73
1300.1	1330.1	11.40	10.96	10.81
1340.1	1370.1	11.73	11.18	10.99
1370.1	1400.1	12.16	11.47	11.26

RF (IN) (MHz)	LO (MHz)	IP3 INPUT (dBm)		
		@LO (dBm)		
		+4	+7	+10
10.1	40.1	21.00	21.13	20.92
40.1	70.1	17.03	16.23	17.03
80.1	110.1	14.41	16.49	21.00
110.1	140.1	16.02	20.89	20.97
150.1	180.1	16.78	20.49	20.91
180.1	210.1	17.82	20.83	20.91
220.1	250.1	20.68	19.17	14.58
250.1	280.1	20.36	19.27	13.67
290.1	320.1	16.20	17.72	13.96
320.1	350.1	14.46	15.95	12.69
360.1	390.1	13.38	13.99	11.24
390.1	420.1	11.59	12.09	10.25
430.1	460.1	10.56	10.83	9.30
460.1	490.1	10.31	10.04	8.28
500.1	530.1	8.29	7.74	6.22
530.1	560.1	8.07	7.42	5.61
570.1	600.1	7.10	5.98	4.45
600.1	630.1	7.18	5.72	4.21
640.1	670.1	5.97	4.90	4.30
670.1	700.1	5.07	4.72	4.29
710.1	740.1	4.84	5.09	4.66
740.1	770.1	4.99	5.42	4.92
780.1	810.1	5.57	6.20	5.25
810.1	840.1	6.42	6.89	5.93
850.1	880.1	7.52	8.06	7.46
880.1	910.1	7.49	8.64	8.69
920.1	950.1	7.36	8.99	9.05
950.1	980.1	8.30	10.42	10.09
990.1	1020.1	9.66	11.81	11.51
1020.1	1050.1	11.40	13.34	12.83
1060.1	1090.1	13.05	16.30	15.79
1090.1	1120.1	11.34	14.98	16.06
1130.1	1160.1	9.40	12.26	15.04
1160.1	1190.1	8.64	10.78	13.67
1200.1	1230.1	7.98	9.59	12.59
1230.1	1260.1	8.25	9.15	11.49
1270.1	1300.1	8.28	9.02	10.81
1300.1	1330.1	8.25	9.31	11.08
1340.1	1370.1	8.12	9.99	11.07
1370.1	1400.1	7.39	10.18	11.93

RF (IN) (MHz)	LO (MHz)	COMPRESSION @RF IN=+1dBm (dB)		
		@LO (dBm)		
		+4	+7	+10
10.1	40.1	0.82	0.31	0.21
40.1	70.1	0.77	0.47	0.40
80.1	110.1	0.96	0.67	0.50
110.1	140.1	0.78	0.54	0.43
150.1	180.1	0.79	0.60	0.48
180.1	210.1	0.97	0.76	0.63
220.1	250.1	0.89	0.73	0.64
250.1	280.1	0.93	0.76	0.69
290.1	320.1	1.03	0.86	0.81
320.1	350.1	1.06	0.91	0.96
360.1	390.1	1.28	1.14	1.11
390.1	420.1	1.28	1.15	1.12
430.1	460.1	1.47	1.34	1.31
460.1	490.1	1.65	1.50	1.47
500.1	530.1	1.81	1.67	1.59
530.1	560.1	1.85	1.73	1.68
570.1	600.1	1.90	1.84	1.81
600.1	630.1	2.02	1.95	1.94
640.1	670.1	2.11	2.06	2.06
670.1	700.1	2.11	2.09	2.09
710.1	740.1	2.18	2.12	2.11
740.1	770.1	2.27	2.16	2.04
780.1	810.1	2.26	2.13	2.01
810.1	840.1	2.17	2.05	1.97
850.1	880.1	2.01	1.87	1.78
880.1	910.1	1.93	1.76	1.65
920.1	950.1	1.73	1.55	1.48
950.1	980.1	1.51	1.35	1.36
990.1	1020.1	1.33	1.12	1.19
1020.1	1050.1	1.19	0.95	1.05
1060.1	1090.1	1.07	0.78	0.87
1090.1	1120.1	1.06	0.73	0.80
1130.1	1160.1	1.05	0.68	0.72
1160.1	1190.1	1.06	0.65	0.64
1200.1	1230.1	1.06	0.64	0.59
1230.1	1260.1	1.14	0.68	0.56
1270.1	1300.1	1.18	0.69	0.50
1300.1	1330.1	1.26	0.72	0.49
1340.1	1370.1	1.43	0.84	0.52
1370.1	1400.1	1.57	0.95	0.57

# Frequency Mixer

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## Typical Performance Data

IF (OUT) (MHz)	LO (MHz)	CONVERSION LOSS VS. IF FREQUENCY @RF(IN)=500.1MHz (dB)
		@LO (dBm)
		+7
490.0	10.1	6.60
479.8	20.3	6.57
469.6	30.5	6.56
459.4	40.7	6.50
449.1	51.0	6.56
438.9	61.2	6.56
428.7	71.4	6.56
418.5	81.6	6.55
408.3	91.8	6.47
398.1	102.0	6.50
387.9	112.2	6.49
377.7	122.4	6.52
367.4	132.7	6.44
357.2	142.9	6.46
347.0	153.1	6.44
336.8	163.3	6.47
326.6	173.5	6.46
316.4	183.7	6.37
306.2	193.9	6.41
296.0	204.1	6.38
285.7	214.4	6.45
275.5	224.6	6.40
265.3	234.8	6.37
255.1	245.0	6.36
234.7	265.4	6.28
224.5	275.6	6.19
204.0	296.1	6.31
193.8	306.3	6.40
173.4	326.7	6.33
163.2	336.9	6.20
142.8	357.3	6.33
132.6	367.5	6.28
112.1	388.0	6.31
101.9	398.2	6.37
81.5	418.6	6.41
71.3	428.8	6.37
50.9	449.2	6.47
40.6	459.5	6.49
20.2	479.9	6.56
10.0	490.1	6.98

IF (OUT) (MHz)	LO (MHz)	CONVERSION LOSS VS. IF FREQUENCY @RF(IN)=10.1MHz (dB)
		@LO (dBm)
		+7
10.0	20.1	6.24
30.0	40.1	5.88
50.0	60.1	5.52
70.0	80.1	5.70
90.0	100.1	5.53
110.0	120.1	5.46
130.0	140.1	5.85
150.0	160.1	5.74
170.0	180.1	5.81
190.0	200.1	5.92
210.0	220.1	5.84
230.0	240.1	5.72
250.0	260.1	5.96
270.0	280.1	6.02
310.0	320.1	6.18
330.0	340.1	6.04
370.0	380.1	6.08
390.0	400.1	6.29
430.0	440.1	6.29
450.0	460.1	6.17
490.0	500.1	6.39
510.0	520.1	6.23
550.0	560.1	6.35
570.0	580.1	6.50
610.0	620.1	6.40
630.0	640.1	6.73
670.0	680.1	6.73
690.0	700.1	6.91
730.0	740.1	7.14
750.0	760.1	7.08
790.0	800.1	7.40
810.0	820.1	7.67
850.0	860.1	7.82
870.0	880.1	7.95
910.0	920.1	8.32
930.0	940.1	9.11
970.0	980.1	9.25
990.0	1000.1	9.15
1030.0	1040.1	10.15
1050.0	1060.1	9.71

IF (OUT) (MHz)	LO (MHz)	CONVERSION LOSS VS. IF FREQUENCY @RF(IN)=1000.1MHz (dB)
		@LO (dBm)
		+7
990.0	10.1	8.45
970.0	30.1	8.55
950.0	50.1	8.43
930.0	70.1	8.58
910.0	90.1	8.37
890.0	110.1	8.30
870.0	130.1	8.26
850.0	150.1	8.08
830.0	170.1	8.19
810.0	190.1	8.03
790.0	210.1	8.09
770.0	230.1	7.99
750.0	250.1	7.78
730.0	270.1	7.92
710.0	290.1	7.74
690.0	310.1	7.82
670.0	330.1	7.68
650.0	350.1	7.70
630.0	370.1	7.66
610.0	390.1	7.50
570.0	430.1	7.36
550.0	450.1	7.35
510.0	490.1	7.30
490.0	510.1	7.21
450.0	550.1	7.30
430.0	570.1	7.33
390.0	610.1	7.45
370.0	630.1	7.43
330.0	670.1	7.35
310.0	690.1	7.35
270.0	730.1	7.49
250.0	750.1	7.58
210.0	790.1	7.72
190.0	810.1	7.75
150.0	850.1	7.93
130.0	870.1	8.05
90.0	910.1	8.27
70.0	930.1	8.38
30.0	970.1	8.65
10.0	990.1	9.13

# Frequency Mixer

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## Typical Performance Data

LO (MHz)	LO-RF ISOLATION (dB)			LO-IF ISOLATION (dB)			RF (IN) (MHz)	LO (MHz)	RF-IF ISOLATION (dB)		
	@LO (dBm)			@LO (dBm)					@LO (dBm)		
	+4	+7	+10	+4	+7	+10			+4	+7	+10
40.1	48.87	47.37	46.89	50.24	43.99	41.13	10.1	40.1	48.05	47.14	46.42
70.1	44.57	43.71	43.06	46.15	39.99	37.17	40.1	70.1	39.09	38.47	38.01
110.1	41.30	40.39	39.66	42.99	37.07	34.24	80.1	110.1	34.02	33.37	33.11
140.1	39.53	38.54	37.68	40.12	34.44	31.65	110.1	140.1	32.05	31.55	31.27
180.1	38.30	37.23	36.36	40.27	33.80	30.64	150.1	180.1	30.50	29.99	29.72
210.1	37.22	36.23	35.42	39.75	32.86	29.58	180.1	210.1	30.24	29.73	29.37
250.1	35.62	34.62	33.84	38.69	31.51	28.17	220.1	250.1	29.90	29.26	28.85
280.1	34.92	34.00	33.18	37.81	30.62	27.21	250.1	280.1	30.24	29.64	29.27
320.1	33.28	32.51	31.81	36.59	30.14	26.73	290.1	320.1	31.30	30.33	29.50
350.1	32.04	31.38	30.83	33.95	28.38	25.24	320.1	350.1	32.08	30.70	29.62
390.1	30.84	30.32	29.88	32.45	27.58	24.49	360.1	390.1	32.69	31.39	30.12
420.1	30.13	29.65	29.21	31.49	26.88	23.78	390.1	420.1	34.58	33.66	32.19
460.1	29.15	28.73	28.27	29.57	25.84	23.01	430.1	460.1	32.51	31.22	28.48
490.1	28.02	27.57	27.06	27.16	23.72	21.29	460.1	490.1	28.92	27.35	24.49
530.1	26.59	26.10	25.55	25.71	22.58	20.31	500.1	530.1	23.49	22.23	20.15
560.1	25.49	25.02	24.49	24.71	21.77	19.47	530.1	560.1	21.29	20.19	18.66
600.1	24.09	23.76	23.25	22.97	20.55	18.42	570.1	600.1	18.44	17.62	16.80
630.1	23.30	22.94	22.51	21.79	19.67	17.69	600.1	630.1	17.02	16.58	16.43
670.1	22.39	22.11	21.82	20.36	18.58	16.87	640.1	670.1	15.63	15.53	16.26
700.1	21.74	21.53	21.44	18.97	17.35	15.87	670.1	700.1	14.92	15.13	16.32
740.1	21.30	21.21	21.36	17.86	16.24	14.88	710.1	740.1	14.52	15.20	16.81
770.1	21.02	21.06	21.40	16.89	15.34	13.93	740.1	770.1	15.07	16.15	18.35
810.1	21.07	21.16	21.67	15.83	14.13	12.86	780.1	810.1	15.38	16.70	18.82
840.1	21.16	21.41	21.93	15.21	13.57	12.27	810.1	840.1	15.88	17.33	19.27
880.1	21.52	21.99	22.59	14.23	12.69	11.30	850.1	880.1	17.23	18.65	20.48
910.1	21.84	22.44	23.13	13.62	12.21	10.90	880.1	910.1	18.27	19.59	21.17
950.1	22.36	23.04	23.74	12.56	11.30	10.07	920.1	950.1	19.55	20.59	21.57
980.1	22.82	23.54	24.23	11.87	10.77	9.70	950.1	980.1	20.44	21.11	21.61
1020.1	23.28	23.99	24.58	10.94	10.54	9.11	990.1	1020.1	21.43	21.93	21.72
1050.1	23.41	24.08	24.50	10.16	9.38	8.51	1020.1	1050.1	21.70	22.02	21.67
1090.1	23.30	23.83	24.16	9.52	8.85	8.13	1060.1	1090.1	20.49	20.62	20.31
1120.1	22.82	23.22	23.49	8.85	8.29	7.63	1090.1	1120.1	19.37	19.26	18.96
1160.1	22.00	22.32	22.54	8.23	7.76	7.22	1130.1	1160.1	17.84	17.64	17.28
1190.1	21.31	21.58	21.78	7.86	7.46	7.00	1160.1	1190.1	16.52	16.32	16.09
1230.1	20.18	20.42	20.62	7.22	6.91	6.52	1200.1	1230.1	15.05	14.80	14.58
1260.1	19.33	19.57	19.80	6.88	6.63	6.29	1230.1	1260.1	14.22	13.88	13.62
1300.1	18.36	18.56	18.90	6.39	6.19	5.99	1270.1	1300.1	13.10	12.85	12.64
1330.1	17.53	17.78	18.09	6.04	5.86	5.69	1300.1	1330.1	12.15	11.84	11.69
1370.1	16.63	16.93	17.23	5.83	5.70	5.51	1340.1	1370.1	11.21	10.87	10.70
1400.1	15.90	16.20	16.46	5.50	5.34	5.18	1370.1	1400.1	11.05	10.70	10.51

# Frequency Mixer

# ASK-2-KK81

## Typical Performance Data

RF (IN) (MHz)	LO (MHz)	RF VSWR (:1)		
		@LO (dBm)		
		+4	+7	+10
10.1	40.1	1.08	1.31	1.28
40.1	70.1	1.10	1.11	1.16
80.1	110.1	1.07	1.11	1.15
110.1	140.1	1.11	1.12	1.15
150.1	180.1	1.08	1.10	1.14
180.1	210.1	1.10	1.11	1.13
220.1	250.1	1.13	1.15	1.18
250.1	280.1	1.11	1.13	1.16
290.1	320.1	1.14	1.14	1.17
320.1	350.1	1.13	1.14	1.18
360.1	390.1	1.09	1.12	1.17
390.1	420.1	1.10	1.13	1.18
430.1	460.1	1.08	1.14	1.21
460.1	490.1	1.09	1.16	1.25
500.1	530.1	1.10	1.19	1.31
530.1	560.1	1.09	1.19	1.31
570.1	600.1	1.09	1.20	1.33
600.1	630.1	1.15	1.25	1.40
640.1	670.1	1.22	1.32	1.49
670.1	700.1	1.30	1.41	1.62
710.1	740.1	1.47	1.60	1.84
740.1	770.1	1.60	1.73	2.01
780.1	810.1	1.81	1.96	2.27
810.1	840.1	1.99	2.14	2.41
850.1	880.1	2.20	2.31	2.53
880.1	910.1	2.41	2.51	2.68
920.1	950.1	2.72	2.80	2.91
950.1	980.1	2.87	2.95	3.03
990.1	1020.1	3.25	3.35	3.42
1020.1	1050.1	3.44	3.58	3.64
1060.1	1090.1	3.60	3.79	3.88
1090.1	1120.1	3.84	4.05	4.18
1130.1	1160.1	3.82	4.03	4.16
1160.1	1190.1	3.98	4.21	4.36
1200.1	1230.1	4.14	4.36	4.51
1230.1	1260.1	4.13	4.33	4.47
1270.1	1300.1	4.27	4.43	4.57
1300.1	1330.1	4.40	4.55	4.69
1340.1	1370.1	4.34	4.44	4.57
1370.1	1400.1	4.57	4.67	4.80

LO (MHz)	LO VSWR (:1)		
	@LO (dBm)		
	+4	+7	+10
40.1	1.79	2.71	3.97
70.1	1.68	2.41	3.36
110.1	1.71	2.44	3.38
140.1	1.81	2.65	3.69
180.1	1.78	2.51	3.44
210.1	1.76	2.47	3.34
250.1	1.89	2.68	3.64
280.1	1.88	2.63	3.55
320.1	1.90	2.60	3.45
350.1	2.01	2.77	3.68
390.1	2.07	2.84	3.76
420.1	2.06	2.78	3.65
460.1	2.12	2.83	3.67
490.1	2.29	3.06	3.95
530.1	2.36	3.15	4.06
560.1	2.40	3.17	4.05
600.1	2.53	3.32	4.21
630.1	2.59	3.37	4.24
670.1	2.67	3.42	4.27
700.1	2.78	3.53	4.35
740.1	2.84	3.56	4.34
770.1	2.92	3.61	4.37
810.1	3.03	3.72	4.42
840.1	3.08	3.73	4.40
880.1	3.16	3.79	4.42
910.1	3.21	3.82	4.42
950.1	3.25	3.82	4.38
980.1	3.29	3.82	4.34
1020.1	3.31	3.80	4.29
1050.1	3.30	3.75	4.18
1090.1	3.32	3.70	4.11
1120.1	3.30	3.67	4.03
1160.1	3.28	3.58	3.90
1190.1	3.29	3.52	3.81
1230.1	3.28	3.47	3.73
1260.1	3.22	3.41	3.67
1300.1	3.23	3.38	3.56
1330.1	3.22	3.31	3.45
1370.1	3.19	3.25	3.42
1400.1	3.27	3.26	3.31

IF (OUT) (MHz)	IF VSWR @LO=1000.1MHz (:1)		
	@LO (dBm)		
	+4	+7	+10
10.1	1.42	1.13	1.07
40.1	1.46	1.16	1.05
60.1	1.43	1.14	1.08
90.1	1.44	1.15	1.06
110.1	1.39	1.11	1.10
140.1	1.43	1.14	1.07
160.1	1.38	1.10	1.11
190.1	1.38	1.11	1.11
210.1	1.33	1.07	1.14
240.1	1.34	1.09	1.13
260.1	1.29	1.06	1.18
290.1	1.27	1.07	1.20
310.1	1.25	1.04	1.20
340.1	1.22	1.08	1.24
360.1	1.20	1.07	1.25
390.1	1.15	1.13	1.32
410.1	1.15	1.10	1.30
440.1	1.11	1.18	1.38
460.1	1.10	1.19	1.40
490.1	1.07	1.24	1.46
510.1	1.08	1.24	1.45
540.1	1.10	1.31	1.53
560.1	1.13	1.35	1.58
590.1	1.14	1.38	1.62
610.1	1.18	1.41	1.65
640.1	1.22	1.48	1.73
660.1	1.27	1.54	1.80
690.1	1.28	1.55	1.81
710.1	1.35	1.64	1.91
740.1	1.37	1.66	1.92
760.1	1.45	1.77	2.05
790.1	1.46	1.77	2.04
810.1	1.53	1.86	2.14
840.1	1.55	1.88	2.16
860.1	1.64	1.99	2.28
890.1	1.65	1.99	2.27
910.1	1.71	2.05	2.34
940.1	1.76	2.12	2.42
960.1	1.83	2.19	2.48
990.1	1.86	2.23	2.52

## Harmonics Tables

RF HARMONICS ORDER

	(-dBm)	(-dBc)										
0	-	-	+8	15	10	21	15	27	21	34	34	44
1	-	9	+0	20	18	34	36	36	40	47	50	50
2	>90	41	34	39	33	48	49	46	59	51	50	56
3	>90	>69	61	60	53	55	>69	60	67	62	64	66
4	>90	>69	>69	>69	>69	>69	>69	>69	>69	>69	>69	>69
5	>90	>69	>69	>69	>69	>69	>69	>69	>69	>69	>69	>69
6	>90	>69	>69	>69	>69	>69	>69	>69	>69	>69	>69	>69
7	>90	>69	>69	>69	>69	>69	>69	>69	>69	>69	>69	>69
8	>90	>69	>69	>69	>69	>69	>69	>69	>69	>69	>69	>69
9	>90	>69	>69	>69	>69	>69	>69	>69	>69	>69	>69	>69
10	>90	>69	>69	>69	>69	>69	>69	>69	>69	>69	>69	>69
	RF CAL	0	1	2	3	4	5	6	7	8	9	10

### LO HARMONICS ORDER

Test conditions: RF IN: 550.1 MHz; -14.00 dBm.  
 LO IN: 580.1 MHz; +7.00 dBm  
 IF OUT: 30 MHz; -20.82 dBm

RF HARMONICS ORDER

	(-dBm)	(-dBc)										
0	-	-	+0	24	19	37	25	41	33	48	52	58
1	-	9	+0	22	21	40	38	44	39	55	51	68
2	73	39	20	36	26	46	51	45	48	54	45	61
3	>90	45	38	41	30	39	58	49	55	55	62	65
4	>90	60	58	47	39	45	43	56	62	55	64	63
5	>90	66	57	63	60	54	50	55	61	62	65	71
6	>90	72	71	66	67	78	50	60	65	62	66	68
7	>90	77	>79	>79	67	74	64	76	57	68	72	68
8	>90	>79	>79	>79	>79	77	>79	75	64	66	73	75
9	>90	>79	>79	>79	>79	>79	>79	>79	67	>79	68	73
10	>90	>79	>79	>79	>79	>79	>79	>79	>79	>79	72	>79
	RF CAL	0	1	2	3	4	5	6	7	8	9	10

### LO HARMONICS ORDER

Test conditions: RF IN: 550.1 MHz; -4.00 dBm.  
 LO IN: 580.1 MHz; +7.00 dBm  
 IF OUT: 30 MHz; -11.4 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.