

Frequency Mixer

TUF-ED12914/2

Typical Performance Data

RF (IN) (MHz)	LO (MHz)	CONVERSION LOSS IF FIXED @IF(OUT)=30MHz (dB)		
		@LO (dBm)		
		+10	+13	+16
10.1	40.1	6.48	5.99	5.73
50.1	80.1	6.69	6.12	5.84
90.1	120.1	6.56	6.04	5.77
130.1	160.1	6.55	6.01	5.75
170.1	200.1	6.46	5.94	5.73
210.1	240.1	6.39	5.92	5.72
250.1	280.1	6.38	5.93	5.74
290.1	320.1	6.27	5.89	5.74
330.1	360.1	6.29	5.93	5.77
370.1	400.1	6.24	5.93	5.77
410.1	440.1	6.28	5.97	5.82
450.1	480.1	6.31	5.97	5.81
490.1	520.1	6.33	6.02	5.85
530.1	560.1	6.42	6.09	5.88
570.1	600.1	6.44	6.14	5.96
610.1	640.1	6.50	6.18	6.00
650.1	680.1	6.53	6.23	6.08
690.1	720.1	6.58	6.28	6.14
730.1	760.1	6.67	6.42	6.26
770.1	800.1	6.78	6.55	6.38
810.1	840.1	6.86	6.63	6.44
850.1	880.1	7.05	6.72	6.50
890.1	920.1	7.26	6.90	6.67
930.1	960.1	7.38	6.95	6.70
970.1	1000.1	7.47	6.95	6.69
990.1	1020.1	7.53	6.94	6.66
1030.1	1060.1	7.74	6.98	6.69
1050.1	1080.1	7.86	7.05	6.70
1090.1	1120.1	8.23	7.20	6.79
1110.1	1140.1	8.34	7.30	6.87
1150.1	1180.1	8.65	7.54	7.02
1170.1	1200.1	8.92	7.71	7.13
1210.1	1240.1	9.24	8.03	7.38
1230.1	1260.1	9.48	8.24	7.52
1270.1	1300.1	9.99	8.73	7.90
1290.1	1320.1	10.28	9.03	8.12
1330.1	1360.1	10.74	9.56	8.62
1350.1	1380.1	11.08	9.94	8.96
1390.1	1420.1	11.74	10.84	9.93
1410.1	1440.1	12.00	11.30	10.51

RF (IN) (MHz)	LO (MHz)	IP3 INPUT (dBm)		
		@LO (dBm)		
		+10	+13	+16
10.1	40.1	18.46	21.97	25.02
50.1	80.1	17.95	21.29	23.03
90.1	120.1	18.41	20.08	20.57
130.1	160.1	18.35	19.32	31.95
170.1	200.1	17.78	21.61	21.86
210.1	240.1	17.64	25.57	20.15
250.1	280.1	19.65	20.32	19.81
290.1	320.1	26.68	17.63	20.25
330.1	360.1	21.16	18.83	23.93
370.1	400.1	17.60	18.85	21.81
410.1	440.1	15.61	17.34	22.85
450.1	480.1	15.14	16.42	19.14
490.1	520.1	15.92	20.04	23.93
530.1	560.1	16.07	21.70	26.87
570.1	600.1	16.05	19.42	29.39
610.1	640.1	18.03	19.17	21.26
650.1	680.1	18.07	21.34	22.74
690.1	720.1	16.57	25.59	31.01
730.1	760.1	14.29	19.85	30.83
770.1	800.1	12.75	16.28	23.73
810.1	840.1	11.26	13.74	18.39
850.1	880.1	11.10	12.60	14.74
890.1	920.1	12.58	14.31	16.12
930.1	960.1	14.16	17.41	20.32
970.1	1000.1	16.29	24.10	27.42
990.1	1020.1	17.74	26.99	22.22
1030.1	1060.1	16.95	20.91	18.87
1050.1	1080.1	16.30	20.62	18.36
1090.1	1120.1	14.30	21.92	19.04
1110.1	1140.1	14.59	21.85	19.06
1150.1	1180.1	14.32	24.00	19.64
1170.1	1200.1	13.94	23.55	20.06
1210.1	1240.1	14.31	21.93	21.62
1230.1	1260.1	14.18	20.74	21.71
1270.1	1300.1	14.18	19.20	22.06
1290.1	1320.1	14.19	18.58	22.49
1330.1	1360.1	14.90	18.54	22.89
1350.1	1380.1	15.30	18.73	22.95
1390.1	1420.1	16.78	20.77	22.72
1410.1	1440.1	18.29	23.90	20.52

RF (IN) (MHz)	LO (MHz)	COMPRESSION @RF IN=+9dBm (dB)		
		@LO (dBm)		
		+10	+13	+16
10.1	40.1	1.36	1.11	0.96
50.1	80.1	-0.11	1.09	0.92
90.1	120.1	1.31	1.14	0.97
130.1	160.1	1.32	1.09	0.96
170.1	200.1	1.40	1.14	0.93
210.1	240.1	1.36	1.06	0.90
250.1	280.1	1.34	1.10	0.91
290.1	320.1	1.39	1.06	0.88
330.1	360.1	1.36	0.98	0.80
370.1	400.1	1.45	1.03	0.86
410.1	440.1	1.39	0.92	0.76
450.1	480.1	1.37	0.96	0.82
490.1	520.1	1.29	0.90	0.77
530.1	560.1	1.30	0.93	0.79
570.1	600.1	1.36	1.01	0.84
610.1	640.1	1.46	1.08	0.94
650.1	680.1	1.56	1.20	1.01
690.1	720.1	1.73	1.33	1.10
730.1	760.1	1.89	1.45	1.20
770.1	800.1	2.01	1.55	1.26
810.1	840.1	2.13	1.66	1.41
850.1	880.1	2.15	1.75	1.50
890.1	920.1	2.14	1.70	1.47
930.1	960.1	2.26	1.81	1.58
970.1	1000.1	2.40	1.86	1.61
990.1	1020.1	2.44	1.92	1.64
1030.1	1060.1	2.36	2.04	1.72
1050.1	1080.1	2.34	2.04	1.74
1090.1	1120.1	2.17	2.07	1.73
1110.1	1140.1	2.06	1.98	1.73
1150.1	1180.1	1.88	1.97	1.76
1170.1	1200.1	1.78	1.95	1.72
1210.1	1240.1	1.60	1.86	1.79
1230.1	1260.1	1.43	1.77	1.80
1270.1	1300.1	1.17	1.63	1.85
1290.1	1320.1	1.00	1.56	1.88
1330.1	1360.1	0.73	1.33	1.85
1350.1	1380.1	0.54	1.13	1.71
1390.1	1420.1	0.15	0.55	1.10
1410.1	1440.1	-0.01	0.22	0.68



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Typical Performance Data

IF (OUT) (MHz)	LO (MHz)	CONVERSION LOSS VS. IF FREQUENCY @RF(IN)=510.1MHz (dB)	IF (OUT) (MHz)	LO (MHz)	CONVERSION LOSS VS. IF FREQUENCY @RF(IN)=39.9MHz (dB)	IF (OUT) (MHz)	LO (MHz)	CONVERSION LOSS VS. IF FREQUENCY @RF(IN)=1010.1MHz (dB)
		@LO (dBm)			@LO (dBm)			@LO (dBm)
		+13			+13			+13
490.1	20.0	6.08	10.1	50.0	6.07	990.1	20.0	7.55
478.1	32.0	6.02	70.1	110.0	5.92	970.1	40.0	7.48
466.1	44.0	5.99	130.1	170.0	6.00	950.1	60.0	7.44
454.1	56.0	6.02	190.1	230.0	5.98	930.1	80.0	7.56
442.1	68.0	5.93	250.1	290.0	5.97	910.1	100.0	7.42
430.1	80.0	5.95	310.1	350.0	5.96	890.1	120.0	7.46
418.1	92.0	5.94	350.1	390.0	5.96	870.1	140.0	7.27
406.1	104.0	5.94	410.1	450.0	5.95	850.1	160.0	7.27
394.1	116.0	5.83	450.1	490.0	5.93	830.1	180.0	7.27
382.1	128.0	5.72	510.1	550.0	5.94	810.1	200.0	7.24
370.1	140.0	5.72	550.1	590.0	5.98	790.1	220.0	7.25
358.1	152.0	5.74	610.1	650.0	6.14	770.1	240.0	7.18
346.1	164.0	5.72	650.1	690.0	6.19	750.1	260.0	7.21
334.1	176.0	5.74	710.1	750.0	6.15	730.1	280.0	7.23
322.1	188.0	5.73	750.1	790.0	6.05	710.1	300.0	7.26
310.1	200.0	5.71	810.1	850.0	5.97	690.1	320.0	7.29
298.1	212.0	5.70	850.1	890.0	5.88	670.1	340.0	7.33
286.1	224.0	5.70	910.1	950.0	5.84	650.1	360.0	7.31
274.1	236.0	5.71	950.1	990.0	5.76	630.1	380.0	7.35
262.1	248.0	5.72	1010.1	1050.0	5.65	610.1	400.0	7.36
250.1	260.0	5.72	1050.1	1090.0	5.69	570.1	440.0	7.33
238.1	272.0	5.73	1110.1	1150.0	5.69	550.1	460.0	7.28
226.1	284.0	5.74	1150.1	1190.0	5.63	510.1	500.0	7.23
214.1	296.0	5.77	1210.1	1250.0	5.54	490.1	520.0	7.26
202.1	308.0	5.80	1250.1	1290.0	5.57	450.1	560.0	7.27
190.1	320.0	5.81	1310.1	1350.0	5.64	430.1	580.0	7.22
178.1	332.0	5.80	1350.1	1390.0	5.59	390.1	620.0	7.22
166.1	344.0	5.81	1410.1	1450.0	5.74	370.1	640.0	7.23
154.1	356.0	5.82	1450.1	1490.0	5.90	330.1	680.0	7.13
142.1	368.0	5.84	1510.1	1550.0	5.97	310.1	700.0	7.13
130.1	380.0	5.83	1550.1	1590.0	6.04	270.1	740.0	7.11
118.1	392.0	5.83	1610.1	1650.0	6.31	250.1	760.0	7.10
106.1	404.0	5.85	1650.1	1690.0	6.51	210.1	800.0	7.13
94.1	416.0	5.85	1710.1	1750.0	6.89	190.1	820.0	7.17
82.1	428.0	5.88	1750.1	1790.0	7.22	150.1	860.0	7.47
70.1	440.0	5.93	1810.1	1850.0	7.86	130.1	880.0	7.47
58.1	452.0	5.95	1850.1	1890.0	8.24	90.1	920.0	7.28
46.1	464.0	5.96	1910.1	1950.0	9.05	70.1	940.0	7.21
22.1	488.0	5.94	1950.1	1990.0	9.56	30.1	980.0	7.03
10.1	500.0	6.15	2010.1	2050.0	10.37	10.1	1000.0	7.21



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Typical Performance Data

LO (MHz)	LO-RF ISOLATION (dB)			LO-IF ISOLATION (dB)		
	@LO (dBm)			@LO (dBm)		
	+10	+13	+16	+10	+13	+16
40.1	63.35	62.16	61.36	57.79	55.53	54.03
80.1	59.33	59.14	58.61	53.92	51.59	50.18
120.1	56.62	56.82	56.74	50.56	48.32	46.76
160.1	54.63	55.25	55.40	48.45	46.07	44.84
200.1	53.10	53.71	53.94	46.91	44.75	43.91
240.1	51.94	52.62	52.77	45.54	43.85	42.82
280.1	51.18	52.04	52.27	44.45	43.21	41.91
320.1	50.05	50.68	50.98	43.43	41.85	40.44
360.1	49.44	49.85	49.99	42.74	41.03	39.47
400.1	49.18	50.04	50.24	42.02	40.31	38.92
440.1	47.88	48.97	49.03	40.77	39.17	37.70
480.1	46.70	47.51	47.76	38.82	37.58	36.54
520.1	45.02	45.84	46.41	37.06	36.19	35.55
560.1	44.13	44.76	45.44	36.07	34.80	34.01
600.1	43.84	44.42	45.24	35.27	34.15	33.24
640.1	44.06	44.77	45.32	34.69	33.66	32.79
680.1	44.91	45.44	45.49	34.05	33.34	32.48
720.1	45.39	45.00	44.54	32.93	32.35	32.08
760.1	46.03	45.66	44.80	32.29	31.27	30.60
800.1	45.46	44.65	43.86	31.51	30.54	29.71
840.1	44.36	43.56	42.93	30.77	30.09	29.32
880.1	44.24	43.70	43.10	29.95	29.60	28.90
920.1	43.17	42.70	42.01	29.23	29.01	28.36
960.1	42.55	42.15	41.61	28.63	28.45	27.95
1000.1	41.68	41.63	41.34	27.94	28.03	27.50
1020.1	41.27	41.43	41.35	27.75	27.96	27.42
1060.1	40.72	41.63	42.18	27.33	28.11	28.12
1080.1	40.33	41.53	42.38	26.67	27.61	28.13
1120.1	39.43	40.87	42.14	25.40	26.02	26.79
1140.1	39.46	41.07	42.63	25.13	25.57	26.27
1180.1	39.05	40.91	43.06	24.63	24.80	25.35
1200.1	38.91	40.91	43.41	24.33	24.49	25.00
1240.1	38.70	41.11	44.38	23.90	24.13	24.55
1260.1	38.51	41.14	44.68	23.67	24.04	24.52
1300.1	37.08	39.73	43.24	23.35	23.83	24.16
1320.1	35.81	38.40	41.76	23.64	24.07	24.37
1360.1	35.71	38.50	41.99	23.89	24.46	24.73
1380.1	35.74	38.60	42.02	23.67	24.34	24.73
1420.1	35.36	38.47	41.88	23.23	24.14	24.67
1440.1	35.32	38.68	42.01	23.27	24.27	24.86

RF (IN) (MHz)	LO (MHz)	RF-IF ISOLATION (dB)		
		@LO (dBm)		
		+10	+13	+16
10.1	40.1	51.18	49.72	49.23
50.1	80.1	35.89	36.83	37.31
90.1	120.1	32.52	32.74	32.80
130.1	160.1	30.00	30.13	30.22
170.1	200.1	28.21	28.51	28.67
210.1	240.1	27.25	27.54	27.64
250.1	280.1	26.61	26.91	27.21
290.1	320.1	26.63	26.86	26.92
330.1	360.1	26.91	27.49	27.66
370.1	400.1	26.87	27.98	28.61
410.1	440.1	27.44	28.49	29.37
450.1	480.1	28.56	29.07	29.41
490.1	520.1	29.82	29.68	29.65
530.1	560.1	29.92	30.07	30.50
570.1	600.1	27.68	28.65	29.93
610.1	640.1	24.42	25.32	26.37
650.1	680.1	21.83	22.00	22.47
690.1	720.1	20.00	19.71	19.66
730.1	760.1	18.75	18.39	18.21
770.1	800.1	17.84	17.39	17.12
810.1	840.1	17.06	16.65	16.39
850.1	880.1	16.42	15.98	15.67
890.1	920.1	15.74	15.21	14.86
930.1	960.1	15.34	14.79	14.49
970.1	1000.1	15.05	14.60	14.33
990.1	1020.1	14.97	14.60	14.40
1030.1	1060.1	14.92	14.83	14.82
1050.1	1080.1	14.85	14.93	15.01
1090.1	1120.1	14.63	14.79	15.02
1110.1	1140.1	14.44	14.65	15.01
1150.1	1180.1	14.32	14.53	14.70
1170.1	1200.1	14.24	14.53	14.69
1210.1	1240.1	14.14	14.46	14.58
1230.1	1260.1	14.13	14.42	14.55
1270.1	1300.1	13.97	14.26	14.34
1290.1	1320.1	13.87	14.16	14.21
1330.1	1360.1	13.69	13.92	13.87
1350.1	1380.1	13.48	13.66	13.60
1390.1	1420.1	13.22	13.31	13.17
1410.1	1440.1	13.11	13.09	12.94



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RF (IN) (MHz)	LO (MHz)	RF VSWR (:1)			LO (MHz)	LO VSWR (:1)			IF (OUT) (MHz)	IF VSWR @LO=1020.1MHz (:1)		
		@LO (dBm)				@LO (dBm)				@LO (dBm)		
		+10	+13	+16		+10	+13	+16		+10	+13	+16
10.1	40.1	1.29	1.20	1.13	40.1	1.69	2.61	3.85	10.0	1.89	1.55	1.41
50.1	80.1	1.27	1.08	1.11	80.1	1.55	2.29	3.29	30.0	1.89	1.56	1.41
90.1	120.1	1.15	1.07	1.12	120.1	1.59	2.40	3.48	50.0	1.91	1.58	1.43
130.1	160.1	1.17	1.05	1.08	160.1	1.58	2.36	3.40	70.0	1.93	1.59	1.44
170.1	200.1	1.15	1.11	1.16	200.1	1.55	2.29	3.29	90.0	1.91	1.58	1.43
210.1	240.1	1.19	1.12	1.15	240.1	1.59	2.38	3.44	110.0	1.93	1.60	1.45
250.1	280.1	1.16	1.13	1.19	280.1	1.54	2.26	3.24	130.0	1.94	1.61	1.47
290.1	320.1	1.20	1.18	1.22	320.1	1.56	2.32	3.33	150.0	1.94	1.61	1.47
330.1	360.1	1.18	1.18	1.22	360.1	1.56	2.30	3.26	170.0	1.96	1.63	1.50
370.1	400.1	1.21	1.23	1.27	400.1	1.57	2.31	3.26	190.0	1.96	1.64	1.50
410.1	440.1	1.21	1.21	1.25	440.1	1.60	2.34	3.29	210.0	1.96	1.63	1.51
450.1	480.1	1.23	1.23	1.26	480.1	1.60	2.30	3.21	230.0	1.97	1.65	1.53
490.1	520.1	1.25	1.25	1.27	520.1	1.64	2.35	3.26	250.0	1.99	1.68	1.56
530.1	560.1	1.27	1.28	1.31	560.1	1.66	2.34	3.20	270.0	1.99	1.68	1.56
570.1	600.1	1.30	1.31	1.34	600.1	1.70	2.39	3.26	290.0	1.99	1.69	1.58
610.1	640.1	1.31	1.33	1.36	640.1	1.74	2.39	3.22	310.0	2.02	1.71	1.60
650.1	680.1	1.35	1.38	1.41	680.1	1.75	2.38	3.18	330.0	2.01	1.71	1.61
690.1	720.1	1.33	1.36	1.39	720.1	1.80	2.43	3.22	350.0	2.03	1.74	1.64
730.1	760.1	1.31	1.35	1.38	760.1	1.82	2.43	3.19	390.0	2.05	1.76	1.66
770.1	800.1	1.28	1.29	1.31	800.1	1.86	2.48	3.24	410.0	2.04	1.77	1.68
810.1	840.1	1.25	1.25	1.27	840.1	1.88	2.47	3.21	450.0	2.07	1.80	1.72
850.1	880.1	1.31	1.30	1.30	880.1	1.90	2.47	3.20	470.0	2.06	1.80	1.72
890.1	920.1	1.32	1.29	1.29	920.1	1.94	2.49	3.19	510.0	2.07	1.82	1.74
930.1	960.1	1.40	1.37	1.37	960.1	1.96	2.47	3.14	530.0	2.08	1.82	1.76
970.1	1000.1	1.52	1.48	1.46	1000.1	2.00	2.49	3.14	570.0	2.09	1.85	1.79
990.1	1020.1	1.55	1.51	1.49	1020.1	2.02	2.50	3.15	590.0	2.07	1.82	1.77
1030.1	1060.1	1.70	1.65	1.63	1060.1	2.08	2.55	3.18	630.0	2.09	1.86	1.82
1050.1	1080.1	1.83	1.75	1.72	1080.1	2.10	2.57	3.18	650.0	2.07	1.84	1.80
1090.1	1120.1	1.91	1.80	1.74	1120.1	2.16	2.63	3.23	690.0	2.07	1.85	1.81
1110.1	1140.1	1.96	1.85	1.79	1140.1	2.17	2.65	3.25	710.0	2.05	1.83	1.79
1150.1	1180.1	2.17	2.03	1.95	1180.1	2.22	2.68	3.26	750.0	2.06	1.85	1.82
1170.1	1200.1	2.19	2.05	1.95	1200.1	2.22	2.68	3.26	770.0	2.02	1.81	1.79
1210.1	1240.1	2.26	2.11	2.01	1240.1	2.25	2.73	3.31	810.0	2.02	1.80	1.78
1230.1	1260.1	2.35	2.20	2.09	1260.1	2.28	2.75	3.32	830.0	1.99	1.79	1.76
1270.1	1300.1	2.43	2.29	2.15	1300.1	2.29	2.74	3.29	870.0	1.97	1.75	1.72
1290.1	1320.1	2.43	2.29	2.16	1320.1	2.31	2.76	3.32	890.0	1.93	1.72	1.68
1330.1	1360.1	2.57	2.44	2.30	1360.1	2.35	2.80	3.35	930.0	1.94	1.69	1.65
1350.1	1380.1	2.62	2.50	2.36	1380.1	2.35	2.78	3.32	950.0	1.87	1.67	1.61
1390.1	1420.1	2.59	2.49	2.37	1420.1	2.36	2.77	3.31	990.0	1.93	1.60	1.53
1410.1	1440.1	2.63	2.54	2.44	1440.1	2.37	2.80	3.34	1010.0	1.94	1.65	1.56



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Harmonics Tables

RF HARMONICS ORDER

(-dBm)												
0	-	-	12	27	19	42	42	41	45	32	35	64
1	-	24	+0	29	10	26	20	37	43	32	44	44
2	77	> 78	58	77	58	76	56	69	68	> 78	72	59
3	> 90	70	> 78	73	65	69	59	66	68	> 78	73	72
4	> 90	> 78	> 78	> 78	> 78	> 78	> 78	> 78	> 78	> 78	> 78	> 78
5	> 90	> 78	> 78	> 78	> 78	> 78	> 78	> 78	> 78	> 78	> 78	> 78
6	> 90	> 78	> 78	> 78	> 78	> 78	> 78	> 78	> 78	> 78	> 78	> 78
7	> 90	> 78	> 78	> 78	> 78	> 78	> 78	> 78	> 78	> 78	> 78	> 78
8	> 90	> 78	> 78	> 78	> 78	> 78	> 78	> 78	> 78	> 78	> 78	> 78
9	> 90	> 78	> 78	> 78	> 78	> 78	> 78	> 78	> 78	> 78	> 78	> 78
10	> 90	> 78	> 78	> 78	> 78	> 78	> 78	> 78	> 78	> 78	> 78	> 78
RF CAL	0	1	2	3	4	5	6	7	8	9	10	

LO HARMONICS ORDER

Test conditions: RF IN: 525.00 MHz; -6.00 dBm.
LO IN: 555.00 MHz; +13.00 dBm
IF OUT: 30 MHz; -12.50 dBm

RF HARMONICS ORDER

(-dBm)												
0	-	-	21	37	32	55	51	52	68	48	57	73
1	-	26	+0	27	10	31	22	41	42	39	69	53
2	77	72	45	63	45	67	47	62	61	67	65	54
3	85	50	42	56	43	50	37	45	47	53	59	45
4	> 90	75	67	70	67	78	66	76	59	69	75	75
5	> 90	61	60	63	50	58	49	55	47	54	56	67
6	> 90	> 88	84	80	71	74	66	74	64	78	69	84
7	> 90	> 88	> 88	87	70	70	65	72	67	68	64	66
8	> 90	> 88	> 88	> 88	> 88	84	80	78	78	81	75	82
9	> 90	83	84	87	> 88	> 88	74	76	68	78	70	74
10	> 90	> 88	> 78	> 88	> 88	> 88	> 88	> 88	> 88	82	81	85
RF CAL	0	1	2	3	4	5	6	7	8	9	10	

LO HARMONICS ORDER

Test conditions: RF IN: 525 MHz; +4.00 dBm.
LO IN: 555 MHz; +13.00 dBm
IF OUT: 30.00MHz; -2.44 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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