

Frequency Mixer

TUF-ED12915/1

Typical Performance Data

RF (IN) (MHz)	LO (MHz)	CONVERSION LOSS IF FIXED @IF(OUT)=30MHz (dB)		
		@LO (dBm)		
		+7	+10	+13
4.00	34.00	6.79	6.40	6.23
6.00	36.00	6.56	6.17	6.02
8.00	38.00	6.46	6.09	5.94
10.00	40.00	6.39	6.03	5.90
16.00	46.00	6.34	5.99	5.85
24.50	54.50	6.33	5.99	5.85
33.00	63.00	6.37	6.00	5.86
41.50	71.50	6.34	5.99	5.84
50.00	80.00	6.33	5.99	5.85
58.50	88.50	6.31	5.98	5.85
67.00	97.00	6.34	6.00	5.86
75.50	105.50	6.36	6.02	5.87
84.00	114.00	6.33	6.00	5.86
92.50	122.50	6.36	6.02	5.88
101.00	131.00	6.39	6.04	5.91
131.00	161.00	6.53	6.19	6.06
151.00	181.00	6.50	6.16	6.05
171.00	201.00	6.49	6.15	6.05
191.00	221.00	6.46	6.17	6.06
211.00	241.00	6.52	6.20	6.08
231.00	261.00	6.47	6.19	6.08
251.00	281.00	6.46	6.18	6.08
271.00	301.00	6.45	6.17	6.08
345.75	375.75	6.49	6.25	6.14
420.50	450.50	6.49	6.26	6.15
495.25	525.25	6.61	6.37	6.24
570.00	600.00	6.75	6.44	6.28
585.00	615.00	6.77	6.45	6.29
600.00	630.00	6.77	6.47	6.32

RF (IN) (MHz)	LO (MHz)	IP3 INPUT (dBm)		
		@LO (dBm)		
		+7	+10	+13
4.00	34.00	18.93	21.93	22.93
6.00	36.00	19.29	22.38	22.55
8.00	38.00	19.14	22.13	23.06
10.00	40.00	19.45	20.79	20.39
16.00	46.00	18.91	20.90	21.74
24.50	54.50	19.21	21.13	22.48
33.00	63.00	19.72	22.07	24.24
41.50	71.50	21.29	26.18	24.14
50.00	80.00	24.59	22.26	19.96
58.50	88.50	20.10	20.21	19.13
67.00	97.00	19.42	19.37	19.23
75.50	105.50	18.87	19.33	20.28
84.00	114.00	21.92	19.92	22.05
92.50	122.50	20.48	18.36	21.19
101.00	131.00	18.60	17.14	19.77
131.00	161.00	17.46	17.70	24.30
151.00	181.00	15.63	18.01	25.87
171.00	201.00	15.98	19.74	19.73
191.00	221.00	16.30	30.00	18.74
211.00	241.00	15.62	21.58	18.09
231.00	261.00	17.24	20.42	17.72
251.00	281.00	17.87	19.02	18.09
271.00	301.00	23.54	16.36	16.15
345.75	375.75	21.86	17.15	17.60
420.50	450.50	12.84	13.43	14.65
495.25	525.25	12.82	12.96	14.81
570.00	600.00	15.52	17.58	19.84
585.00	615.00	15.00	18.60	23.65
600.00	630.00	13.87	16.79	20.23

RF (IN) (MHz)	LO (MHz)	COMPRESSION @RF IN=5dBm (dB)		
		@LO (dBm)		
		+7	+10	+13
4.00	34.00	0.69	0.46	0.28
6.00	36.00	0.86	0.58	0.38
8.00	38.00	0.91	0.63	0.42
10.00	40.00	0.96	0.67	0.41
16.00	46.00	0.97	0.66	0.47
24.50	54.50	1.01	0.68	0.48
33.00	63.00	0.95	0.66	0.44
41.50	71.50	0.99	0.67	0.46
50.00	80.00	0.94	0.61	0.42
58.50	88.50	0.94	0.60	0.39
67.00	97.00	0.91	0.60	0.40
75.50	105.50	0.88	0.56	0.37
84.00	114.00	0.89	0.57	0.37
92.50	122.50	0.84	0.53	0.34
101.00	131.00	0.84	0.55	0.33
131.00	161.00	0.69	0.39	0.19
151.00	181.00	0.72	0.42	0.21
171.00	201.00	0.65	0.35	0.13
191.00	221.00	0.68	0.35	0.15
211.00	241.00	0.69	0.39	0.19
231.00	261.00	0.69	0.35	0.16
251.00	281.00	0.66	0.34	0.13
271.00	301.00	0.67	0.34	0.14
345.75	375.75	0.63	0.30	0.12
420.50	450.50	0.61	0.31	0.16
495.25	525.25	0.51	0.27	0.15
570.00	600.00	0.58	0.33	0.21
585.00	615.00	0.58	0.38	0.24
600.00	630.00	0.62	0.38	0.23



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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)=2MHz (dB)	IF (OUT) (MHz)	LO (MHz)	CONVERSION LOSS VS. IF FREQUENCY @RF(IN)=600MHz (dB)
		@LO (dBm)			@LO (dBm)			@LO (dBm)
		+10			+10			+10
299.75	0.25	8.71	0.25	2.25	7.30	597.75	2.25	6.49
299.50	0.50	6.94	0.75	2.75	7.25	597.25	2.75	6.47
299.25	0.75	6.51	1.25	3.25	7.26	596.75	3.25	6.46
299.00	1.00	6.35	2.00	4.00	6.99	596.00	4.00	6.44
298.00	2.00	6.19	6.00	8.00	7.25	592.00	8.00	6.43
296.00	4.00	6.15	10.00	12.00	7.23	588.00	12.00	6.42
294.00	6.00	6.12	14.00	16.00	7.19	584.00	16.00	6.41
292.00	8.00	6.11	18.00	20.00	7.21	580.00	20.00	6.41
290.00	10.00	6.07	22.00	24.00	7.19	576.00	24.00	6.38
288.00	12.00	6.07	26.00	28.00	7.20	572.00	28.00	6.38
284.00	16.00	6.07	30.00	32.00	7.20	568.00	32.00	6.37
280.00	20.00	6.00	40.00	42.00	7.23	559.00	41.00	6.18
276.00	24.00	6.06	50.00	52.00	7.24	550.00	50.00	6.16
272.00	28.00	6.08	60.00	62.00	7.21	510.00	90.00	6.05
268.00	32.00	6.05	70.00	72.00	7.20	470.00	130.00	5.93
265.00	35.00	6.07	80.00	82.00	7.22	430.00	170.00	5.79
250.00	50.00	6.39	90.00	92.00	7.21	390.00	210.00	5.88
235.00	65.00	5.99	100.00	102.00	7.22	350.00	250.00	6.05
220.00	80.00	5.99	110.00	112.00	7.10	310.00	290.00	6.12
205.00	95.00	5.94	120.00	122.00	7.09	270.00	330.00	6.15
190.00	110.00	5.96	130.00	132.00	7.11	230.00	370.00	6.18
175.00	125.00	5.92	138.00	140.00	7.23	190.00	410.00	6.23
160.00	140.00	5.89	175.50	177.50	7.16	150.00	450.00	6.35
145.00	155.00	5.89	213.00	215.00	7.23	140.00	460.00	6.34
130.00	170.00	5.90	250.50	252.50	7.19	130.00	470.00	6.36
115.00	185.00	5.91	288.00	290.00	7.22	120.00	480.00	6.37
110.00	190.00	5.94	325.50	327.50	7.30	110.00	490.00	6.40
85.00	215.00	5.92	363.00	365.00	7.23	100.00	500.00	6.37
60.00	240.00	5.94	400.50	402.50	7.27	90.00	510.00	6.40
35.00	265.00	5.99	438.00	440.00	7.30	80.00	520.00	6.39
10.00	290.00	6.07	458.00	460.00	7.26	70.00	530.00	6.40
8.00	292.00	6.07	472.00	474.00	7.29	60.00	540.00	6.37
7.00	293.00	6.06	486.00	488.00	7.25	50.00	550.00	6.40
6.00	294.00	6.08	500.00	502.00	7.27	40.00	560.00	6.39
5.00	295.00	6.07	514.00	516.00	7.26	30.00	570.00	6.39
4.00	296.00	6.08	528.00	530.00	7.26	20.00	580.00	6.39
3.00	297.00	6.08	542.00	544.00	7.23	10.00	590.00	6.41
2.00	298.00	6.09	556.00	558.00	7.25	7.00	593.00	6.43
1.00	299.00	6.11	570.00	572.00	7.26	4.00	596.00	6.43
0.65	299.35	6.06	584.00	586.00	7.27	1.00	599.00	6.46
0.30	299.70	6.08	598.00	600.00	7.35	0.50	599.50	6.45



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LO (MHz)	LO-RF ISOLATION (dB)			LO-IF ISOLATION (dB)		
	@LO (dBm)			@LO (dBm)		
	+7	+10	+13	+7	+10	+13
34.00	66.48	54.24	53.44	52.50	51.36	50.60
36.00	65.89	53.84	53.04	52.35	51.17	50.39
38.00	65.48	53.45	52.64	52.20	50.99	50.16
40.00	65.04	53.07	52.28	52.00	50.79	49.96
46.00	63.78	51.95	51.23	51.48	50.17	49.32
54.50	62.28	50.54	49.82	50.63	49.19	48.25
63.00	61.05	49.26	48.48	49.78	48.20	47.14
71.50	59.92	48.09	47.34	48.96	47.25	46.14
80.00	58.92	47.13	46.42	48.39	46.51	45.34
88.50	58.15	46.41	45.70	47.81	45.90	44.69
97.00	57.40	45.86	45.18	47.30	45.45	44.27
105.50	56.75	45.31	44.65	46.92	44.99	43.87
114.00	56.23	44.84	44.18	46.55	44.60	43.51
122.50	55.68	44.44	43.73	46.21	44.22	43.18
131.00	55.21	44.01	43.27	45.86	43.85	42.85
161.00	53.67	42.42	41.43	44.52	42.54	41.53
181.00	52.82	41.50	40.47	43.84	41.97	40.88
201.00	52.21	40.99	40.01	43.53	41.84	40.73
221.00	51.60	40.42	39.51	43.20	41.63	40.48
241.00	51.01	39.51	38.58	42.76	41.02	39.73
261.00	50.39	38.69	37.73	42.47	40.55	39.08
281.00	50.03	38.42	37.52	42.25	40.51	39.04
301.00	49.39	37.98	37.08	41.87	40.20	38.73
375.75	47.99	36.02	35.24	39.87	38.44	37.12
450.50	46.66	34.34	33.62	36.74	36.08	35.21
525.25	44.31	32.88	32.36	33.92	33.82	33.47
600.00	44.09	31.59	31.22	31.72	32.00	31.96
615.00	44.28	31.47	31.02	31.40	31.69	31.68
630.00	44.54	31.28	30.80	31.21	31.39	31.38

RF (IN) (MHz)	LO (MHz)	RF-IF ISOLATION (dB)		
		@LO (dBm)		
		+7	+10	+13
4.00	34.00	57.51	54.11	50.11
6.00	36.00	58.53	57.39	52.54
8.00	38.00	53.41	51.51	48.38
10.00	40.00	50.02	57.55	44.30
16.00	46.00	48.30	47.42	45.53
24.50	54.50	45.07	44.54	43.38
33.00	63.00	42.72	42.46	41.70
41.50	71.50	40.87	40.71	40.27
50.00	80.00	39.35	39.33	39.06
58.50	88.50	38.09	38.10	37.94
67.00	97.00	37.05	37.11	37.00
75.50	105.50	36.08	36.18	36.12
84.00	114.00	35.28	35.38	35.32
92.50	122.50	34.56	34.70	34.65
101.00	131.00	33.91	34.08	34.04
131.00	161.00	32.09	32.31	32.30
151.00	181.00	31.23	31.48	31.55
171.00	201.00	30.53	30.86	30.96
191.00	221.00	29.99	30.27	30.37
211.00	241.00	29.52	29.80	29.86
231.00	261.00	29.21	29.59	29.69
251.00	281.00	28.83	29.30	29.55
271.00	301.00	28.70	29.10	29.39
345.75	375.75	29.13	29.74	30.05
420.50	450.50	29.14	30.46	31.47
495.25	525.25	29.30	29.59	29.86
570.00	600.00	27.96	29.15	30.36
585.00	615.00	27.50	28.84	30.23
600.00	630.00	26.77	28.08	29.29



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RF (IN) (MHz)	LO (MHz)	RF VSWR (:1)			LO (MHz)	LO VSWR (:1)			IF (OUT) (MHz)	IF VSWR @LO=600MHz (:1)		
		@LO (dBm)				@LO (dBm)				@LO (dBm)		
		+7	+10	+13		+7	+10	+13		+7	+10	+13
4.00	34.00	1.42	1.43	1.44	34.00	1.52	2.35	3.30	0.25	1.58	1.39	1.23
6.00	36.00	1.30	1.30	1.31	36.00	1.54	2.34	3.29	1.00	1.66	1.45	1.28
8.00	38.00	1.23	1.22	1.24	38.00	1.53	2.34	3.29	2.00	1.67	1.46	1.28
10.00	40.00	1.19	1.18	1.20	40.00	1.53	2.33	3.30	6.00	1.67	1.46	1.29
16.00	46.00	1.12	1.11	1.14	46.00	1.55	2.33	3.30	10.00	1.68	1.46	1.29
24.50	54.50	1.09	1.08	1.12	54.50	1.53	2.34	3.28	33.00	1.69	1.47	1.30
33.00	63.00	1.08	1.06	1.10	63.00	1.50	2.32	3.25	50.00	1.69	1.47	1.30
41.50	71.50	1.07	1.05	1.10	71.50	1.49	2.30	3.19	84.00	1.70	1.48	1.30
50.00	80.00	1.06	1.05	1.10	80.00	1.49	2.27	3.19	101.00	1.71	1.48	1.31
58.50	88.50	1.06	1.05	1.10	88.50	1.49	2.28	3.16	126.00	1.72	1.49	1.31
67.00	97.00	1.06	1.05	1.10	97.00	1.49	2.24	3.16	151.00	1.73	1.50	1.32
75.50	105.50	1.07	1.04	1.09	105.50	1.48	2.26	3.14	176.00	1.74	1.50	1.32
84.00	114.00	1.06	1.04	1.10	114.00	1.47	2.25	3.16	201.00	1.76	1.51	1.33
92.50	122.50	1.06	1.04	1.09	122.50	1.47	2.25	3.17	226.00	1.76	1.52	1.34
101.00	131.00	1.06	1.03	1.09	131.00	1.47	2.26	3.19	251.00	1.78	1.53	1.35
131.00	161.00	1.06	1.03	1.09	161.00	1.47	2.20	3.08	301.00	1.79	1.55	1.37
151.00	181.00	1.06	1.04	1.10	181.00	1.45	2.20	3.04	360.00	1.82	1.58	1.40
171.00	201.00	1.06	1.04	1.11	201.00	1.44	2.19	3.12	410.00	1.86	1.61	1.43
191.00	221.00	1.04	1.06	1.12	221.00	1.43	2.20	3.12	460.00	1.90	1.64	1.46
211.00	241.00	1.05	1.05	1.11	241.00	1.40	2.14	2.98	510.00	1.93	1.68	1.50
231.00	261.00	1.04	1.06	1.12	261.00	1.40	2.13	2.99	520.00	1.95	1.69	1.50
251.00	281.00	1.04	1.07	1.13	281.00	1.42	2.17	3.08	530.00	1.95	1.69	1.51
271.00	301.00	1.03	1.08	1.14	301.00	1.41	2.16	3.02	540.00	1.96	1.70	1.52
345.75	375.75	1.03	1.09	1.15	375.75	1.43	2.14	3.00	550.00	1.97	1.71	1.53
420.50	450.50	1.04	1.13	1.18	450.50	1.43	2.11	2.93	560.00	1.98	1.72	1.54
495.25	525.25	1.05	1.11	1.16	525.25	1.45	2.09	2.89	570.00	1.98	1.72	1.54
570.00	600.00	1.09	1.17	1.22	600.00	1.50	2.14	2.88	580.00	1.99	1.73	1.55
585.00	615.00	1.10	1.18	1.23	615.00	1.52	2.15	2.87	590.00	2.02	1.75	1.57
600.00	630.00	1.12	1.19	1.25	630.00	1.53	2.17	2.93	599.8	1.76	1.60	1.48



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Harmonics Tables

RF HARMONICS ORDER	(-dBm)												
	0	-	-	16	31	18	40	23	38	36	50	41	56
	1	-	23	+0	32	12	34	19	49	28	36	42	40
	2	84	68	49	71	50	73	51	> 74	51	65	69	73
	3	> 90	72	60	73	62	73	54	72	55	65	56	> 74
	4	> 90	> 74	> 74	> 74	> 74	> 74	> 74	> 74	> 74	> 74	> 74	> 74
	5	> 90	> 74	> 74	> 74	> 74	> 74	> 74	> 74	> 74	> 74	> 74	> 74
	6	> 90	> 74	> 74	> 74	> 74	> 74	> 74	> 74	> 74	> 74	> 74	> 74
	7	> 90	> 74	> 74	> 74	> 74	> 74	> 74	> 74	> 74	> 74	> 74	> 74
	8	> 90	> 74	56	65	55	73	54	72	62	70	60	71
	9	> 90	73	69	65	51	> 74	51	72	50	71	50	68
	10	> 90	40	42	36	28	49	19	34	12	32	+0	23
RF CAL		0	1	2	3	4	5	6	7	8	9	10	

LO HARMONICS ORDER

Test conditions: RF IN: 300.00 MHz; -10.00 dBm.
 LO IN: 330.00 MHz; +10.00 dBm
 IF OUT: 30.00 MHz; -16.12 dBm

RF HARMONICS ORDER	(-dBm)												
	0	-	-	24	41	31	54	38	53	49	61	58	69
	1	-	24	+0	32	12	38	20	46	29	42	50	51
	2	64	65	45	66	45	69	47	69	49	63	70	74
	3	> 90	50	42	57	44	59	44	51	41	65	47	51
	4	> 90	> 84	63	77	63	75	60	73	57	> 84	55	66
	5	> 90	68	69	68	56	68	52	66	49	> 84	49	62
	6	> 90	62	49	> 84	49	66	52	68	56	68	69	68
	7	> 90	66	55	> 84	57	73	60	74	62	76	63	> 84
	8	> 90	51	47	65	40	51	44	59	44	57	42	50
	9	> 90	74	70	63	49	69	47	69	45	67	45	65
	10	> 90	51	50	42	29	46	20	38	12	32	+0	24
RF CAL		0	1	2	3	4	5	6	7	8	9	10	

LO HARMONICS ORDER

Test conditions: RF IN: 300.00 MHz; .00 dBm.
 LO IN: 330.00 MHz; +10.00 dBm
 IF OUT: 30.00 MHz; -6.16 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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RF/IF MICROWAVE COMPONENTS

