

Performance Features

- Variable frequency gain: 10dB
- Mirror rejection: 24dBc
- LO to RF isolation: 45dB
- Input P1dB: 15dBm
- Input IP3: 19dBm
- Package size: 4*4mm 24-pin QFN

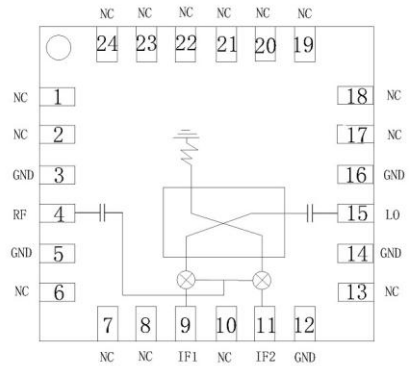
Overview

The CWM211SP4 is a passive IQ mixer manufactured in a GaAs process. The device consists of two standard double balanced mixers, a 90° coupler and a power divider. It can be used as an upconverter or downconverter from 8 GHz to 14.5 GHz.

Typical Applications

- Point-to-Point Communication
- Radar, satellite communications
- Point-to-Multipoint Communication

Functional Block Diagram



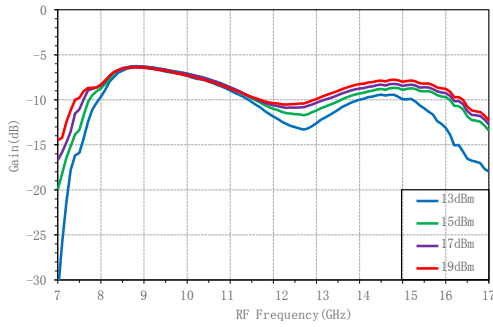
Electrical performance table (TA=+25°C, IF=1GHz, LO=+17dBm USB,down conversion)

Parameter Name	Description	Minimum value	Typical values	Maximum value	Unit
Frequency range	RF Port	8~14.5			GHz
	LO Port	8~14.5			GHz
	IF Port	DC~3.5			GHz
Variable frequency gain			10		dB
Mirror Suppression			24		dBc
Isolation degree	RF to IF port		22		dB
	LO to RF port		45		dB
	LO to IF port		42		dB
Enter IP3	Pin=10dBm/ tone, Δ f=1MHz		19		dBm
Input P1dB			15		dBm
Return loss*	RF Port		-10		dB
Phase balance degree			±3		Deg
Range balance			±1		dB

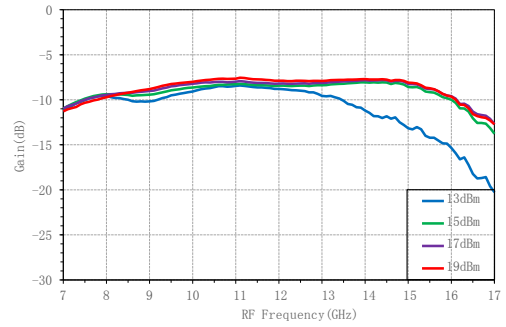
*Note: LO port is an external source, so it is not possible to accurately test the LO port standing wave

Down conversion test curve (room temperature 25°C)

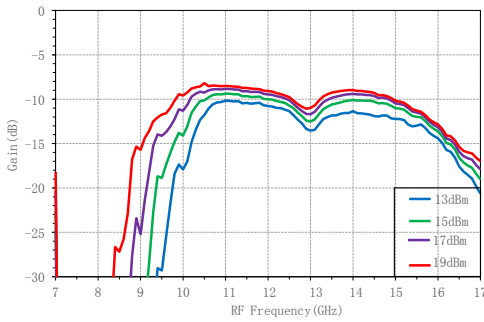
Variable Frequency Gain VS RF
Frequency (USB IF=1GHz)



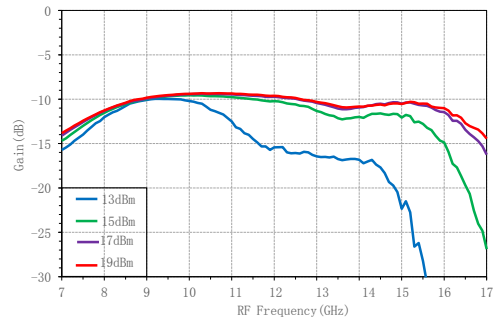
Variable Frequency Gain VS RF
Frequency (LSB IF=1GHz)



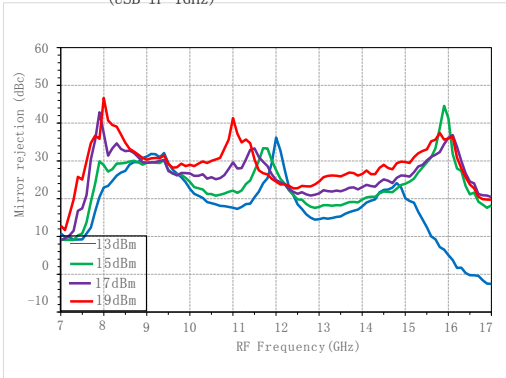
Variable Frequency Gain VS RF
Frequency (USB IF=3.5GHz)



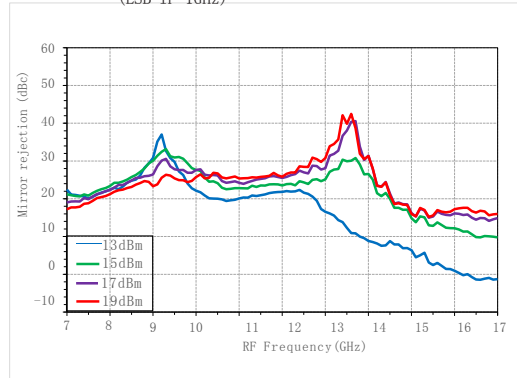
Variable Frequency Gain VS RF
Frequency (LSB IF=3.5GHz)



Mirror rejection VS RF frequency
(USB IF=1GHz)



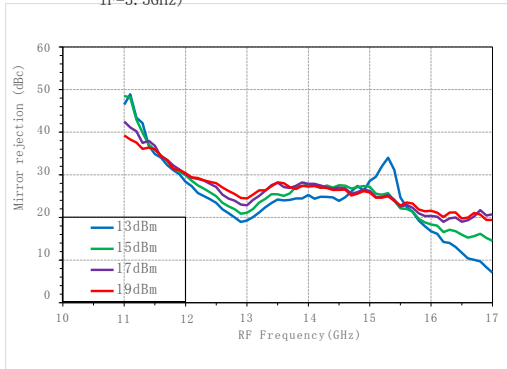
Mirror rejection VS RF frequency
(LSB IF=1GHz)



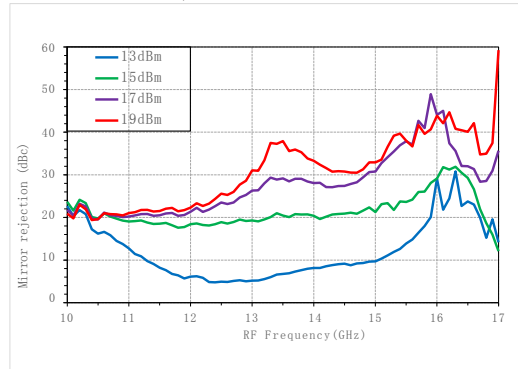
CWM
IQ Mixer Series

Down conversion test curve (room temperature 25°C)

Mirror rejection VS RF frequency (USB
IF=3.5GHz)

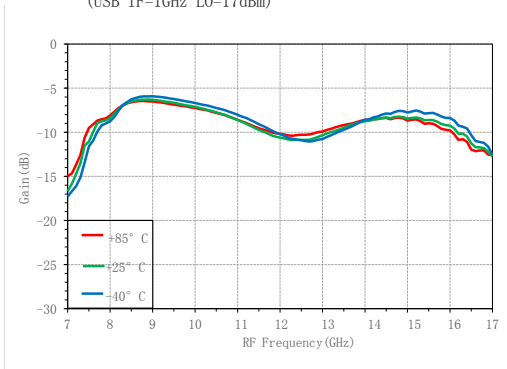


Mirror rejection VS RF frequency (LSB
IF=3.5GHz)

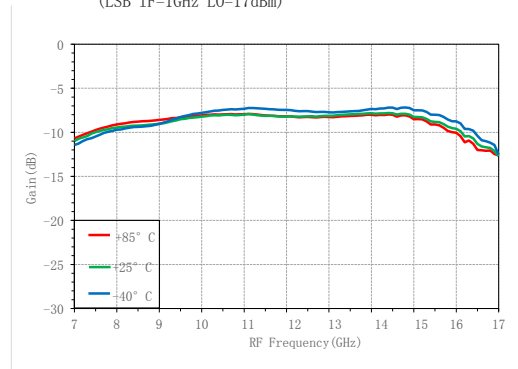


Down conversion test curve (high and low temperature)

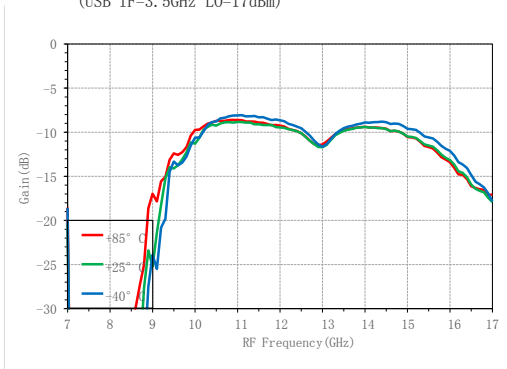
Variable Frequency Gain VS Temperature
(USB IF=1GHz LO=17dBm)



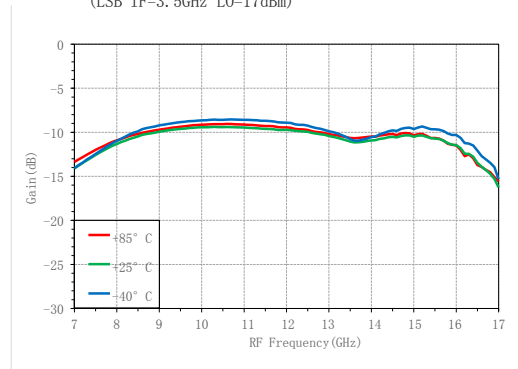
Variable Frequency Gain VS Temperature
(LSB IF=1GHz LO=17dBm)



Variable Frequency Gain VS Temperature
(USB IF=3.5GHz LO=17dBm)

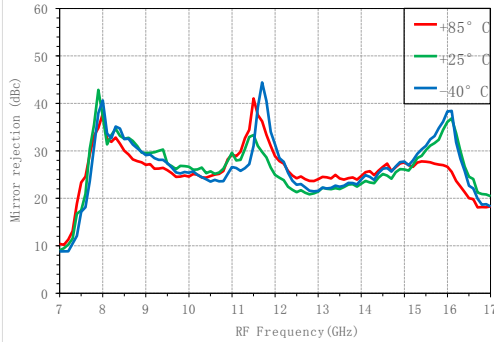


Variable Frequency Gain VS Temperature
(LSB IF=3.5GHz LO=17dBm)

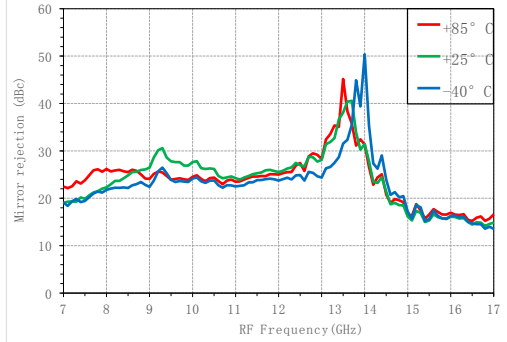


Down conversion test curve (high and low temperature)

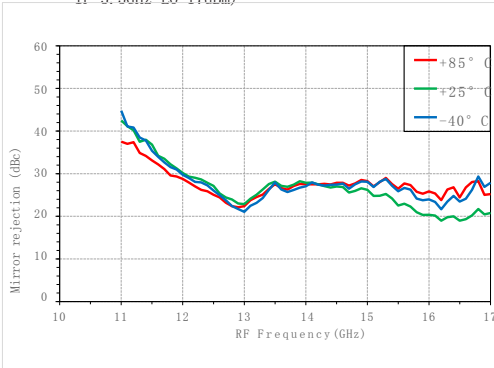
Mirror Rejection VS Temperature (USB
IF=1GHz LO=17dBm)



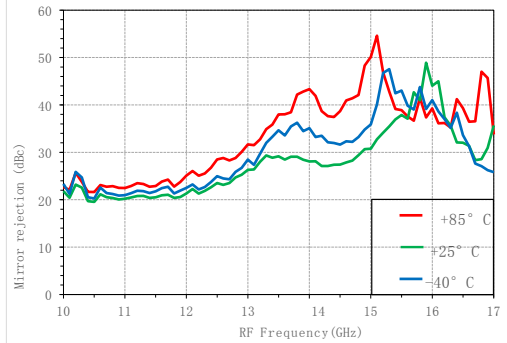
Mirror Rejection VS Temperature (LSB
IF=1GHz LO=17dBm)



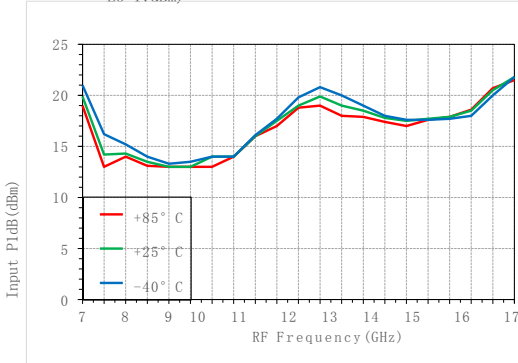
Mirror Rejection VS Temperature (USB
IF=3.5GHz LO=17dBm)



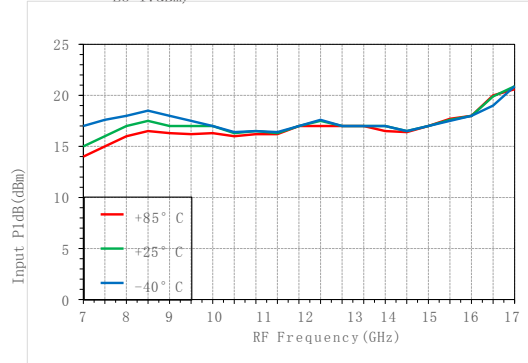
Mirror Rejection VS Temperature (LSB
IF=3.5GHz LO=17dBm)



Input P1dB VS Temperature (USB IF=1GHz
LO=17dBm)



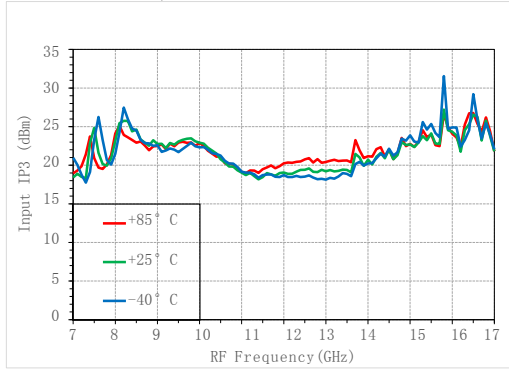
Input P1dB VS Temperature (LSB IF=1GHz
LO=17dBm)



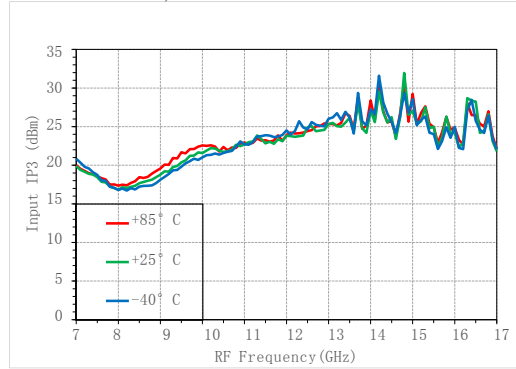
CWM
IQ Mixer Series

Down conversion test curve (high and low temperature)

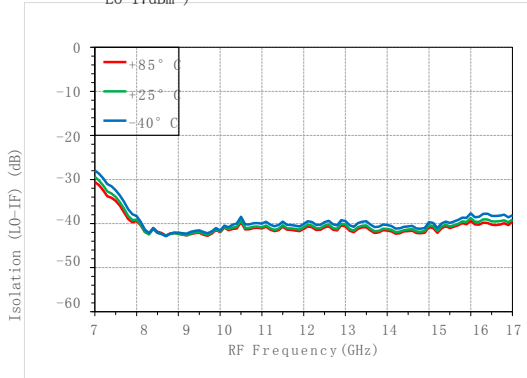
Input IP3 VS Temperature (USB IF=1GHz
LO=17dBm)



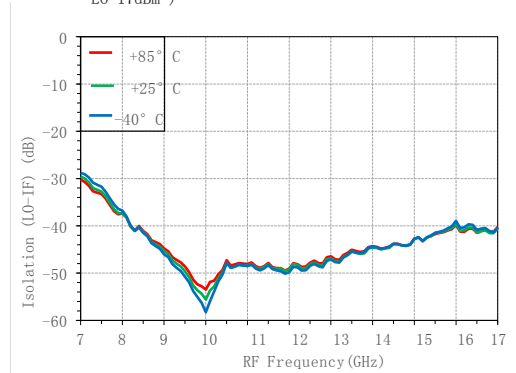
Input IP3 VS Temperature (LSB IF=1GHz
LO=17dBm)



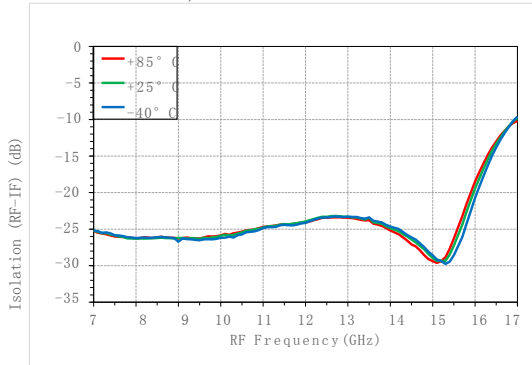
LO/IF1 Isolation VS Temperature (IF=1GHz
LO=17dBm)



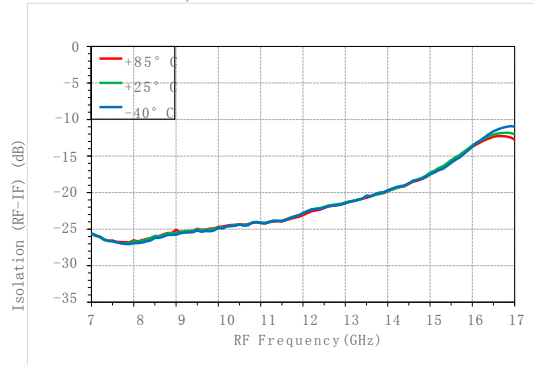
LO/IF2 Isolation VS Temperature (IF=1GHz
LO=17dBm)



RF/IF1 Isolation VS Temperature (IF=1GHz
LO=17dBm)

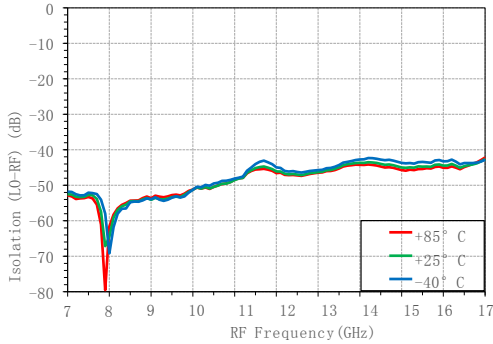


RF/IF2 Isolation VS Temperature (IF=1GHz
LO=17dBm)

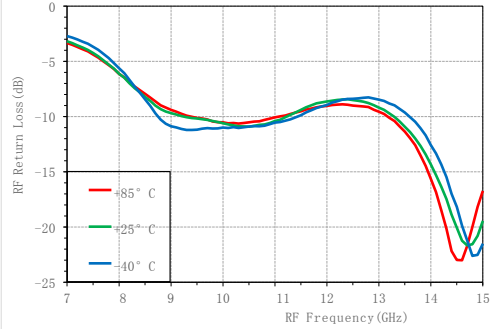


Down conversion test curve (high and low temperature)

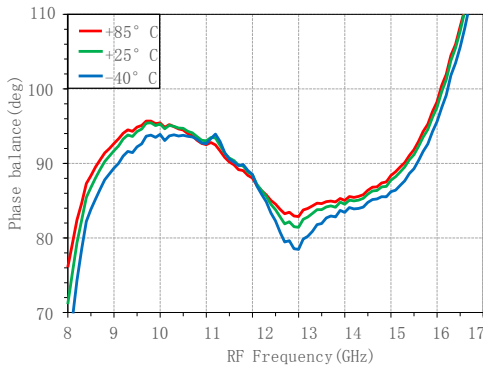
LO/RF Isolation VS Temperature (IF=1GHz
LO=17dBm)



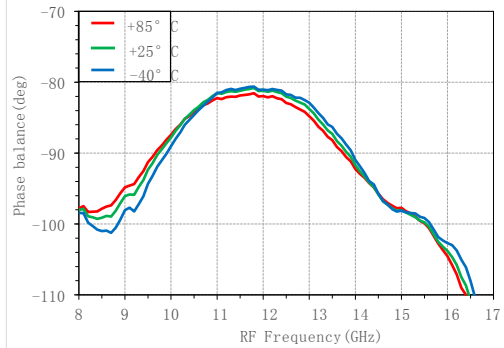
RF Return Loss VS Temperature (LO=17dBm)



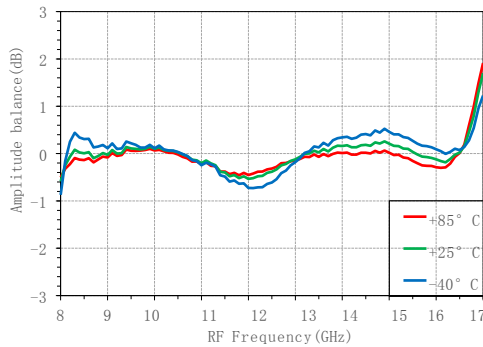
Phase balance VS RF frequency (USB
IF=1GHz)



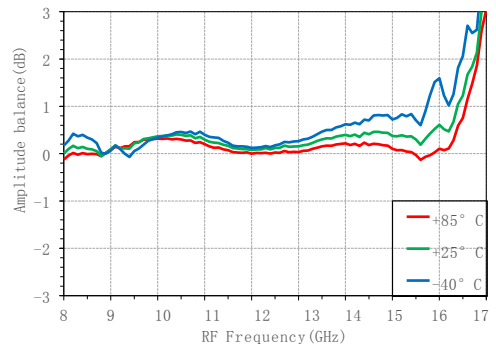
Phase balance VS RF frequency (LSB
IF=1GHz)



Amplitude balance VS RF frequency (USB
IF=1GHz)



Amplitude balance VS RF frequency (LSB
IF=1GHz)



Stray (down conversion)

		M*LO					
		0	1	2	3	4	5
M*RF	0	/	-6.37	30.71	27.27	39.32	40.88
	1	19.92	0.00	23.85	44.67	51.47	55.08
	2	57.89	62.90	56.86	56.00	69.45	70.51
	3	86.51	72.27	71.33	60.81	97.80	98.62
	4	64.56	82.12	88.41	100.41	97.25	103.37
	5	68.97	63.72	88.25	79.77	74.05	77.46
	RF=8GHz~-10dBm ; LO=7.3GHz~+15dBm						

		M*LO					
		0	1	2	3	4	5
M*R F	0	/	5.38	19.79	22.22	46.17	20.65
	1	17.73	0.00	25.55	49.35	51.16	64.86
	2	57.66	51.87	63.69	73.57	62.88	84.94
	3	84.85	95.78	99.08	69.75	87.28	70.56
	4	71.32	76.53	77.21	70.19	75.42	91.73
	5	83.33	71.34	74.11	75.42	71.47	74.08
	RF=8GHz~-10dBm ; LO=8.7GHz~+15dBm						

		M*LO					
		0	1	2	3	4	5
M*RF	0	/	4.99	17.12	43.23	43.81	21.07
	1	15.23	0.00	26.89	52.11	62.21	68.84
	2	68.22	63.97	64.63	55.51	64.24	90.23
	3	87.97	69.71	71.34	66.70	75.31	93.32
	4	90.43	76.63	102.73	78.59	79.44	90.49
	5	/	69.86	73.97	75.58	75.23	116.7
	RF=10GHz & -10dBm ; LO=9.3GHz & +15dBm						

		M*LO					
		0	1	2	3	4	5
M*RF	0	/	1.68	16.48	31.89	29.50	/
	1	13.23	0.00	22.68	56.25	44.72	40.22
	2	90.37	54.61	64.42	59.10	86.95	92.31
	3	93.72	67.47	73.51	57.28	90.09	92.87
	4	65.86	80.65	93.05	87.80	95.09	76.67
	5	/	85.50	66.24	94.25	73.25	83.00
	RF=10GHz & -10dBm ; LO=10.7GHz & +15dBm						

		M*LO					
		0	1	2	3	4	5
M*RF	0	/	2.30	25.23	25.67	21.75	/
	1	10.19	0.00	20.41	70.65	44.25	41.81
	2	87.00	87.72	56.58	55.07	69.33	64.26
	3	62.84	89.19	75.98	63.55	68.31	83.84
	4	78.09	79.94	69.84	68.21	80.20	68.34
	5	/	88.84	62.58	87.59	67.08	91.34
	RF=12GHz~-10dBm ; LO=11.3GHz~+15dBm						

		M*LO					
		0	1	2	3	4	5
M*RF	0	/	8.92	28.33	25.09	/	/
	1	13.97	0.00	36.88	53.67	52.41	/
	2	77.37	91.60	63.25	73.11	99.70	66.68
	3	65.29	85.41	70.85	96.11	94.18	88.26
	4	80.58	90.89	99.81	74.56	75.09	97.65
	5	/	65.37	73.15	67.81	97.41	73.95
	RF=12GHz~-10dBm ; LO=12.7GHz~+15dBm						

Stray (upconversion)

		M*LO					
		0	1	2	3	4	5
M*IF	-5	81.19	75.47	78.69	67.03	80.52	78.83
	-4	89.48	77.68	73.12	86.41	83.71	77.06
	-3	59.85	50.05	55.74	55.43	70.49	74.35
	-2	63.08	46.78	46.98	55.05	84.17	64.07
	-1	19.17	0	28.72	26.44	35.1	34.36
	0	/	17.19	22.22	10.48	41.74	68.32
	1	19.18	-1.1	31.62	32.01	37.36	50.86
	2	62.96	49.48	55.21	67.53	79.74	75.78
	3	60.05	42.11	58.45	55.54	69.3	64.7
	4	90.38	71.62	74.54	89.65	77.64	75.68
	5	80.03	64.27	75.1	83.36	77.45	77.88

IF=0.7GHz~-10dBm ; LO=8.7GHz~+15dBm

		M*LO					
		0	1	2	3	4	5
M*IF	-5	80.49	65.78	71.26	73.34	73.84	/
	-4	86.54	62.4	54.99	70.99	66.17	/
	-3	64.84	34.15	59.99	54.06	75.75	/
	-2	59.12	41.08	33.19	59.63	56.47	/
	-1	13.5	0	29.88	43.33	35.74	/
	0	/	9.68	16.24	21.84	16.74	/
	1	13.5	-1.69	30.4	43.13	36.69	/
	2	58.89	44.87	38.68	55.45	60.07	/
	3	64.77	34.57	54.91	69.97	79.96	/
	4	87.86	58.8	65.65	70.72	75.14	/
	5	77.88	62.48	70.94	76.43	/	/

IF=0.7GHz~-10dBm ; LO=10.7GHz~+15dBm

		M*LO				
		0	1	2	3	4
M*IF	-5	91.16	66.95	83.03	77.64	75.87
	-4	84.15	74.28	75.39	78.17	70.57
	-3	66.88	42.18	63.22	68.96	77.99
	-2	57.57	43.81	52.42	59.28	/
	-1	15.41	0	23.78	33.72	/
	0	/	6.31	23.98	/	/
	1	15.41	0.8	25.03	29.04	/
	2	57.6	50.67	55.67	58.31	/
	3	67.56	39.46	57.62	62.64	/
	4	88.75	70.68	81.58	79.45	/

IF=0.7GHz~-10dBm ; LO=12.7GHz~+15dBm

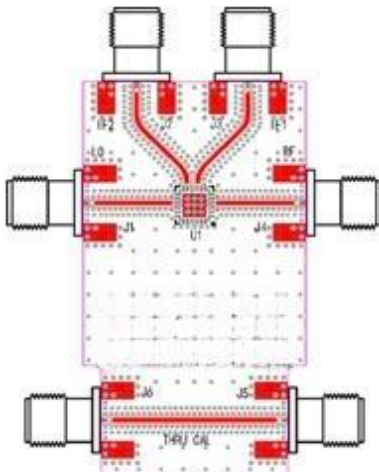
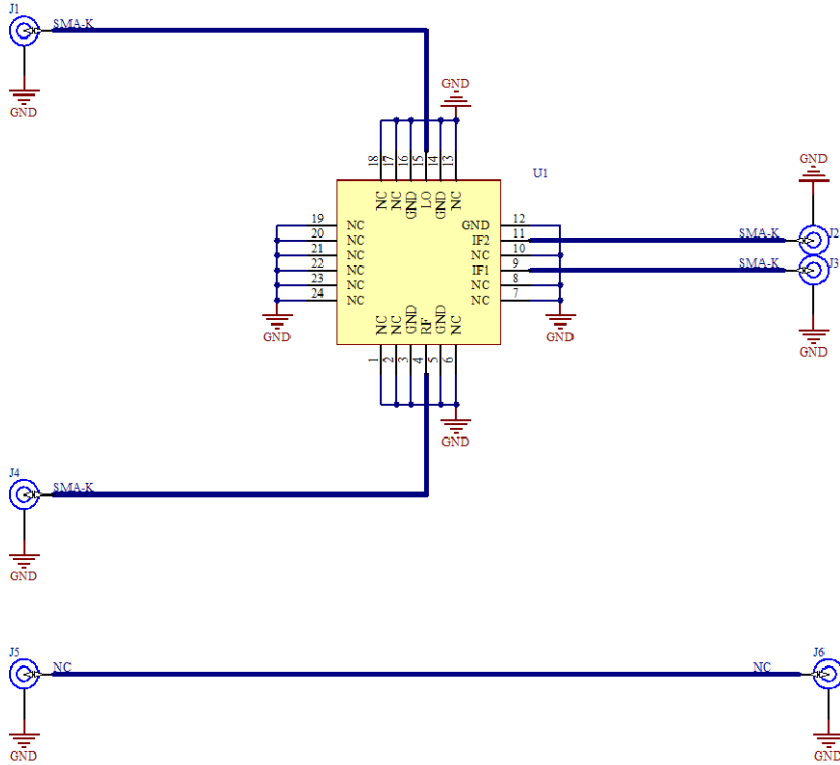
		M*LO					
		0	1	2	3	4	5
M*IF	-5	85.79	84.42	70.81	82.42	76.89	72.01
	-4	82.47	72.33	54.11	74.4	80.24	70.95
	-3	63.38	40.1	62.41	52.68	74.54	/
	-2	61.15	43.86	37.43	56.96	56.1	/
	-1	11.57	0	29	36.5	33.35	/
	0	/	9.05	14.45	20.01	16.82	/
	1	11.57	-2.06	30.58	41.73	69.92	/
	2	61.16	45.51	41.55	55.96	63.35	/
	3	63.71	37.57	54.36	77.23	72.45	/
	4	83.66	63.84	66.38	75.95	73.59	/

IF=1GHz~-10dBm ; LO=10.5GHz~+15dBm

		M*LO					
		0	1	2	3	4	5
M*IF	-5	84.55	87.71	83.35	73.31	77.61	73.69
	-4	61.11	80.68	61.44	79.68	79.54	66.29
	-3	75.9	61.53	58.21	52.89	79.3	71.41
	-2	63.42	53.4	35.76	52.95	60.31	70.53
	-1	9.17	0	29.61	28.32	32.46	/
	0	/	7.31	12.25	18.26	15.17	/
	1	9.18	-2.75	28.68	48.06	53.92	/
	2	63.81	54.04	47.8	56.86	50.3	/
	3	74.59	40.64	59.02	68.11	68.74	/
	4	60.81	65.64	80.09	69.5	/	/

IF=2GHz~-10dBm ; LO=10.5GHz~+15dBm

Evaluation Boards



Designator	Description
J1, J2, J3, J4	SMA-K PCB connectors
U1	CWM211SP4
<p>J1, J2, J3, and J4 are recommended to use the SMA-K connector of Nanjing Aowen D550B12E01- 023.</p> <p>NC indicates that the port is not used or the device is not soldered. The chip NC port is externally connectable to GND.</p>	