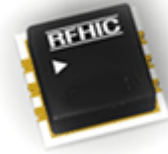


Product Features

- GaAs p-HEMT chip on board
- No matching circuit needed
- High IP3
- Single Supply Voltage (5V)
- Surface Mount Hybrid Type
- Tape & Reel Packaging
- Small Size, High Heatsink
- Alumina Substrate
- High Maximum input power(+25dBm)

Application

- Repeater
- Base Station
- RF Sub-Systems



Description

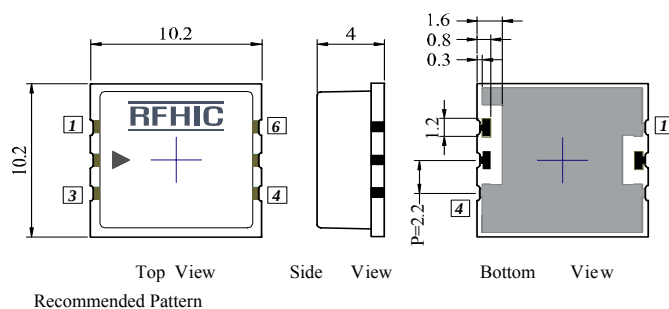
- This LNA family is a high gain, ultra low noise amplifier.
- This family of Low Noise Amplifier has superior performance comes with a modest price tag.

Specifications

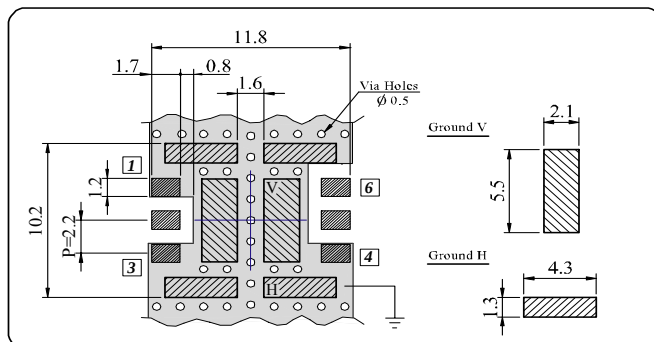
(Operating Temperature:-30°C~+85°C)

PARAMETER	CL0902		CL1502	CL1802	CL2102	CL2702
Frequency Range (MHz)	824~894	890~960	1400~1600	1750~1870	1920~2170	2300~2700
Power Gain (dB)	21	20	17	16	15	12.5
Gain Flatness (dB)	±0.5	±0.5	±0.5	±0.5	±1.0	±1.5
Input Return Loss (dB)(S ₁₁)	-17	-17	-17	-18	-18	-18
Output Return Loss (dB)(S ₂₂)	-8.5	-8.5	-10	-10	-10	-10
1dB Compression Point (dBm)(P _{1dB}) (Typ.)	20	20	21	21	20	20
Output 3 rd Order Intercept Point (dBm)(OIP3)(TYP.)	31	31	33	33	33	33
Noise Figure (dB)(TYP.)	0.9	0.8	0.9	0.8	0.9	0.9
DC Current (V _{dc} =5V, T _c =25°C)(mA)	100	100	90	100	100	100

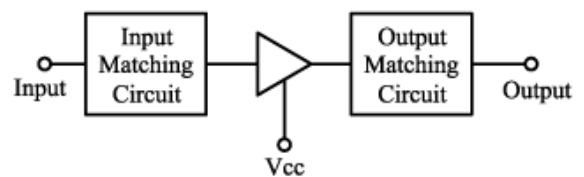
Dimensions in mm



Recommended Pattern



Functional Diagram



Pin No.	Function
1, 3, 4	Ground
2	Input
5	Output
6	Vcc

Noise Figure

CL0902(Cell)

* Agilent 11:15:06 Feb 3, 2004

DUT Amplifier Sys Downconv Off		
Freq	NoiseFig dB	Gain dB
824.00000 MHz	0.720	20.940
829.00000 MHz	0.763	20.807
834.00000 MHz	0.748	20.733
839.00000 MHz	0.792	20.711
844.00000 MHz	0.787	20.745
849.00000 MHz	0.825	20.716
854.00000 MHz	0.794	20.886
859.00000 MHz	0.833	20.877
864.00000 MHz	0.814	20.918
869.00000 MHz	0.849	20.879
874.00000 MHz	0.774	20.780
879.00000 MHz	0.741	20.627
884.00000 MHz	0.766	20.419
889.00000 MHz	0.742	20.322
894.00000 MHz	0.663	20.113
Start 824.00 MHz BW 4 MHz Points 15 Stop 894.00 MHz		
Tcold 296.50 K Avgs Off Att 0 dB Loss Off Corr		

Frequency
Freq Mode, Sweep
Start Freq
824.000000 MHz
Stop Freq
894.000000 MHz
Center Freq
859.000000 MHz
Freq Span
70.000000 MHz
Fixed Freq
1.50500000 GHz
More 1 of 2

CL0902(GSM)

* Agilent 11:51:26 Feb 3, 2004

DUT Amplifier Sys Downconv Off		
Freq	NoiseFig dB	Gain dB
890.00000 MHz	0.751	20.550
895.00000 MHz	0.701	20.361
900.00000 MHz	0.693	20.212
905.00000 MHz	0.682	20.118
910.00000 MHz	0.698	20.110
915.00000 MHz	0.759	20.072
920.00000 MHz	0.768	20.091
925.00000 MHz	0.772	20.152
930.00000 MHz	0.766	20.190
935.00000 MHz	0.696	20.233
940.00000 MHz	0.687	20.160
945.00000 MHz	0.691	20.015
950.00000 MHz	0.762	19.878
955.00000 MHz	0.655	19.725
960.00000 MHz	0.596	19.568
Start 890.00 MHz BW 4 MHz Points 15 Stop 960.00 MHz		
Tcold 296.50 K Avgs Off Att 0 dB Loss Off Corr		

Frequency
Freq Mode, Sweep
Start Freq
890.000000 MHz
Stop Freq
960.000000 MHz
Center Freq
925.000000 MHz
Freq Span
70.000000 MHz
Fixed Freq
1.50500000 GHz
More 1 of 2

CL1502

* Agilent 11:24:36 Feb 3, 2004

DUT Amplifier Sys Downconv Off		
Freq	NoiseFig dB	Gain dB
1.4000000 GHz	0.802	17.040
1.414286 GHz	0.778	17.414
1.428571 GHz	0.672	17.866
1.442857 GHz	0.633	17.579
1.457143 GHz	0.717	16.796
1.471429 GHz	0.787	16.146
1.485714 GHz	0.808	16.180
1.5000000 GHz	0.777	16.609
1.514286 GHz	0.630	16.971
1.528571 GHz	0.693	16.679
1.542857 GHz	0.736	16.254
1.557143 GHz	0.752	16.056
1.571429 GHz	0.671	16.333
1.585714 GHz	0.631	16.563
1.6000000 GHz	0.701	16.402
Start 1.40000 GHz BW 4 MHz Points 15 Stop 1.60000 GHz		
Tcold 296.50 K Avgs Off Att 0 dB Loss Off Corr		

Frequency
Freq Mode, Sweep
Start Freq
1.40000000 GHz
Stop Freq
1.60000000 GHz
Center Freq
1.50000000 GHz
Freq Span
200.000000 MHz
Fixed Freq
1.50500000 GHz
More 1 of 2

CL1802

* Agilent 11:30:32 Feb 3, 2004

DUT Amplifier Sys Downconv Off		
Freq	NoiseFig dB	Gain dB
1.7500000 GHz	0.875	16.343
1.758571 GHz	0.943	16.085
1.767143 GHz	0.959	15.742
1.775714 GHz	0.857	15.617
1.784286 GHz	0.863	15.465
1.792857 GHz	0.860	15.484
1.801429 GHz	0.832	15.605
1.8100000 GHz	0.824	15.668
1.818571 GHz	0.905	15.694
1.827143 GHz	0.893	15.600
1.835714 GHz	0.937	15.422
1.844286 GHz	0.853	15.236
1.852857 GHz	0.835	15.044
1.861429 GHz	0.795	15.007
1.8700000 GHz	0.837	15.077
Start 1.75000 GHz BW 4 MHz Points 15 Stop 1.87000 GHz		
Tcold 296.50 K Avgs Off Att 0 dB Loss Off Corr		

Frequency
Freq Mode, Sweep
Start Freq
1.75000000 GHz
Stop Freq
1.87000000 GHz
Center Freq
1.81000000 GHz
Freq Span
120.000000 MHz
Fixed Freq
1.50500000 GHz
More 1 of 2

CL2102

* Agilent 11:38:17 Feb 3, 2004

DUT Amplifier Sys Downconv Off		
Freq	NoiseFig dB	Gain dB
1.9200000 GHz	0.835	15.894
1.937857 GHz	0.855	15.506
1.955714 GHz	0.820	15.410
1.973571 GHz	0.814	15.403
1.991429 GHz	0.834	15.250
2.009286 GHz	0.829	14.970
2.027143 GHz	0.773	14.921
2.0450000 GHz	0.879	14.990
2.062857 GHz	0.866	14.963
2.080714 GHz	0.878	14.724
2.098571 GHz	0.820	14.583
2.116429 GHz	0.877	14.533
2.134286 GHz	0.867	14.682
2.152143 GHz	0.856	14.594
2.1700000 GHz	0.850	14.354
Start 1.92000 GHz BW 4 MHz Points 15 Stop 2.17000 GHz		
Tcold 296.50 K Avgs Off Att 0 dB Loss Off Corr		

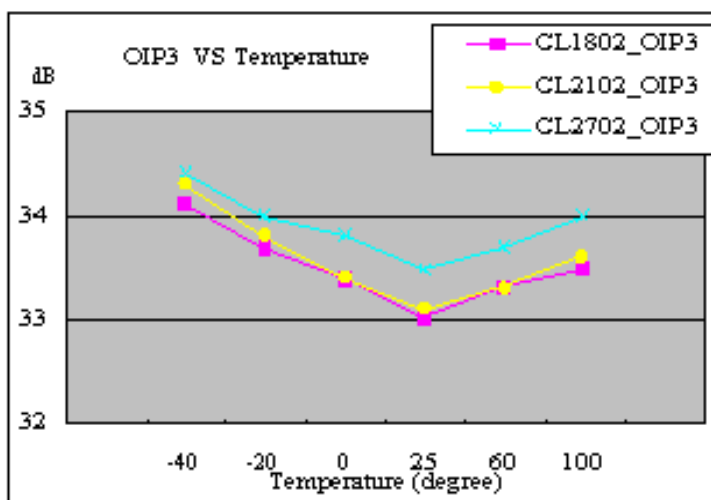
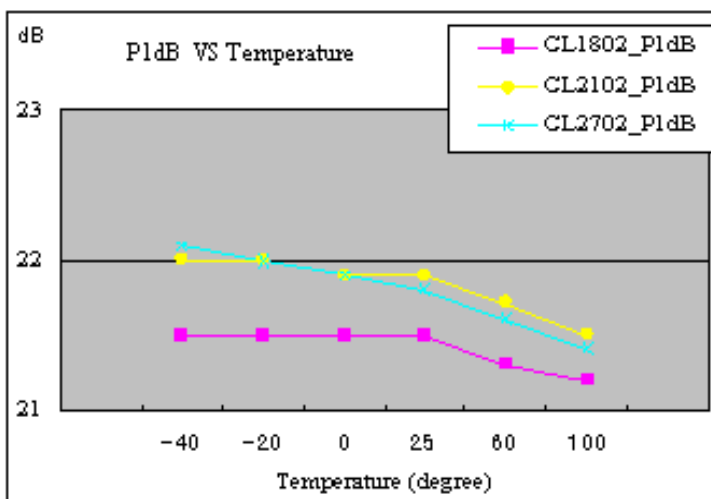
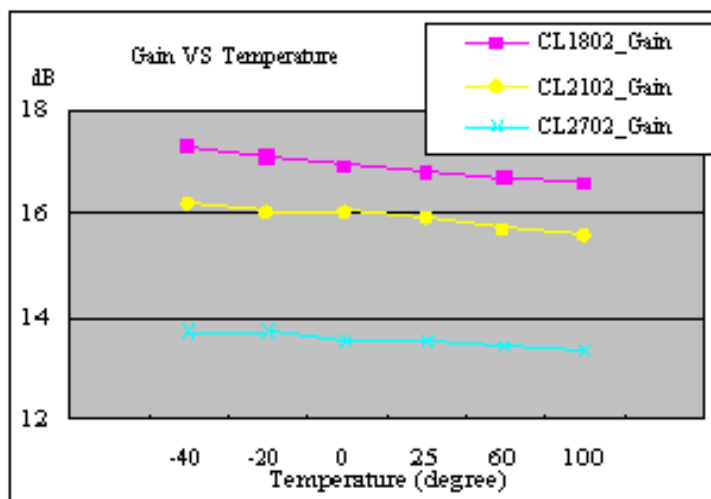
Frequency
Freq Mode, Sweep
Start Freq
1.92000000 GHz
Stop Freq
2.17000000 GHz
Center Freq
2.04500000 GHz
Freq Span
250.000000 MHz
Fixed Freq
1.50500000 GHz
More 1 of 2

CL2702

* Agilent 11:41:54 Feb 3, 2004

DUT Amplifier Sys Downconv Off		
Freq	NoiseFig dB	Gain dB
2.3000000 GHz	0.797	14.188
2.328571 GHz	0.833	13.755
2.357143 GHz	0.863	13.746
2.385714 GHz	0.853	13.769
2.414286 GHz	0.866	13.470
2.442857 GHz	0.891	13.561
2.471429 GHz	0.800	13.498
2.5000000 GHz	0.927	13.160
2.528571 GHz	0.920	13.042
2.557143 GHz	0.882	12.989
2.585714 GHz	0.870	12.927
2.614286 GHz	0.866	12.800
2.642857 GHz	0.918	12.698
2.671429 GHz	0.890	12.565
2.7000000 GHz	0.849	12.525
Start 2.30000 GHz BW 4 MHz Points 15 Stop 2.70000 GHz		
Tcold 296.50 K Avgs Off Att 0 dB Loss Off Corr		

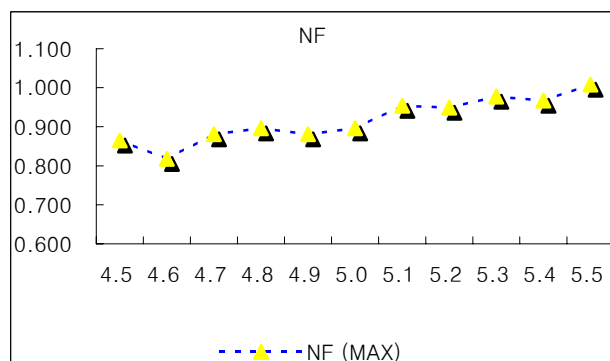
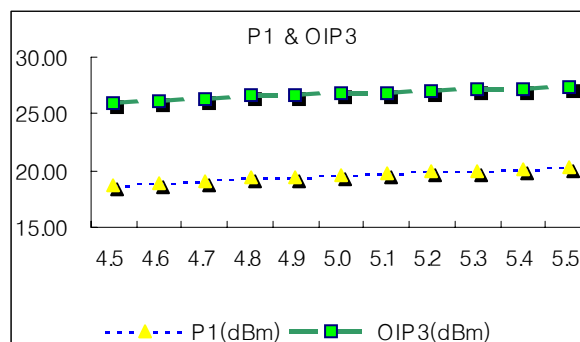
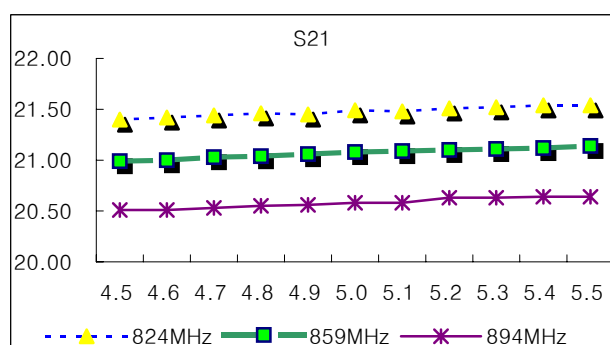
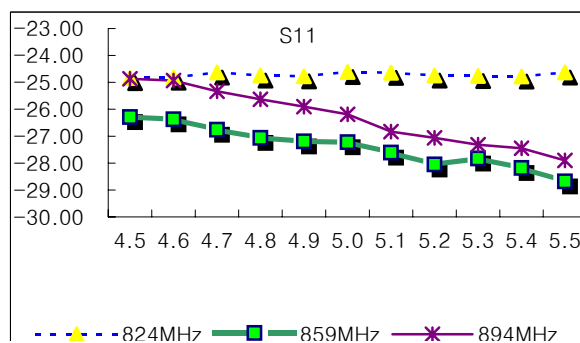
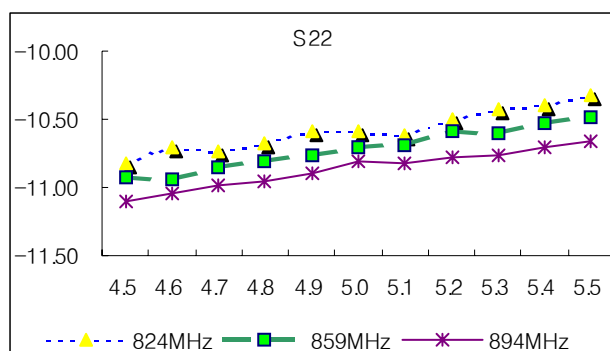
Frequency
Freq Mode, Sweep
Start Freq
2.30000000 GHz
Stop Freq
2.70000000 GHz
Center Freq
2.50000000 GHz
Freq Span
400.000000 MHz
Fixed Freq
1.50500000 GHz
More 1 of 2



Specification based on Voltage Change (from 4.5V to 5.5V)

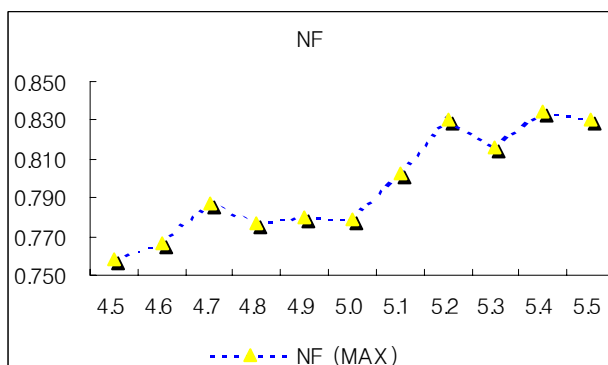
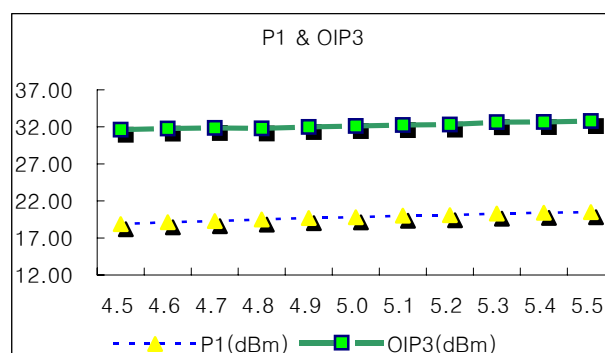
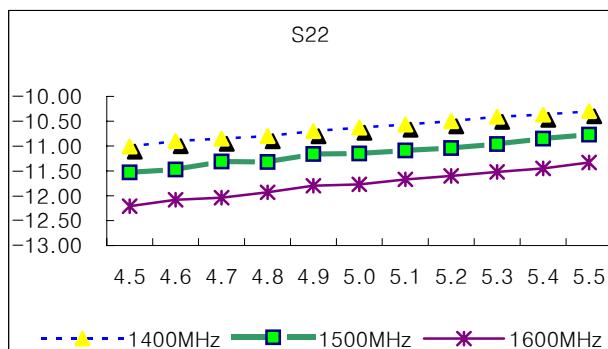
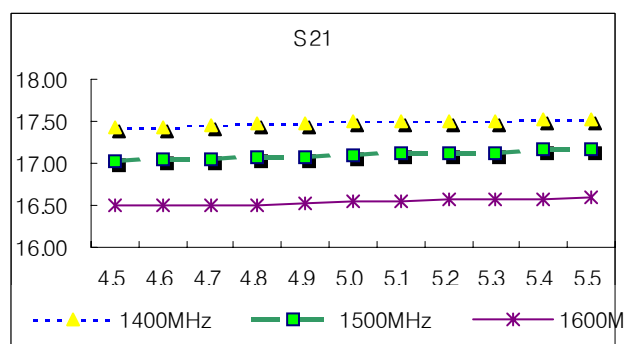
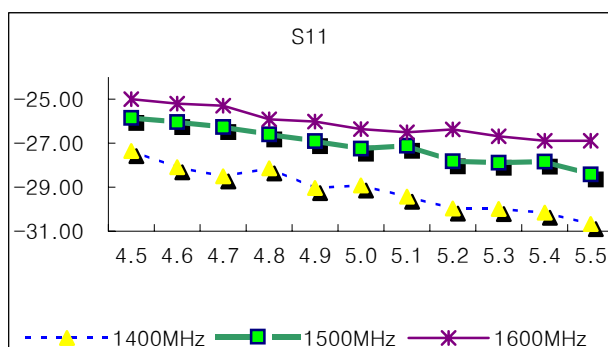
CL0902

	Voltage (V)	Current (mA)	S11(dB)			S21(dB)			S22(dB)			P1 (dBm)	OIP3 (dBm)	NF (MAX)
			824MHz	859MHz	894MHz	824MHz	859MHz	894MHz	824MHz	859MHz	894MHz			
	4.5	95	-24.84	-26.29	-24.87	21.40	20.99	20.51	-10.82	-10.93	-11.10	18.74	25.88	0.865
	4.6	96	-24.82	-26.37	-24.93	21.42	21.00	20.51	-10.71	-10.94	-11.05	18.89	26.04	0.818
	4.7	96	-24.63	-26.76	-25.33	21.44	21.03	20.53	-10.74	-10.85	-10.98	19.10	26.28	0.881
	4.8	97	-24.74	-27.06	-25.63	21.46	21.04	20.55	-10.68	-10.81	-10.95	19.38	26.62	0.896
	4.9	97	-24.77	-27.19	-25.90	21.45	21.06	20.56	-10.59	-10.76	-10.89	19.47	26.67	0.881
	5.0	97	-24.61	-27.22	-26.19	21.49	21.08	20.58	-10.59	-10.71	-10.81	19.62	26.77	0.896
	5.1	98	-24.64	-27.61	-26.83	21.48	21.09	20.58	-10.62	-10.69	-10.82	19.78	26.86	0.954
	5.2	98	-24.74	-28.05	-27.06	21.51	21.10	20.63	-10.50	-10.59	-10.78	19.87	26.99	0.949
	5.3	98	-24.76	-27.83	-27.32	21.52	21.11	20.63	-10.43	-10.61	-10.77	19.94	27.11	0.977
	5.4	99	-24.78	-28.18	-27.45	21.54	21.12	20.64	-10.40	-10.53	-10.71	20.07	27.26	0.967
	5.5	99	-24.63	-28.68	-27.90	21.54	21.14	20.64	-10.32	-10.49	-10.66	20.24	27.33	1.008
Δ	1.0	4	0.23	2.39	3.03	0.14	0.15	0.13	0.50	0.45	0.44	1.50	1.45	0.190



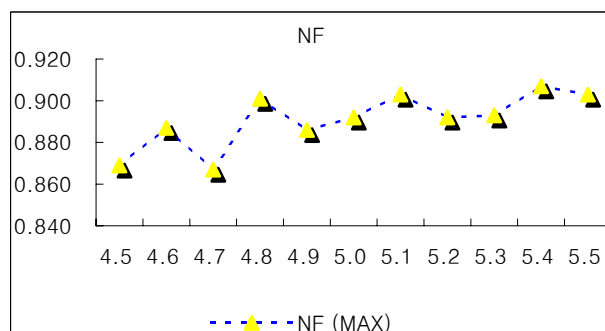
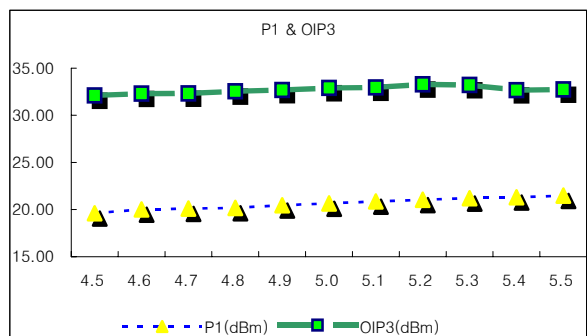
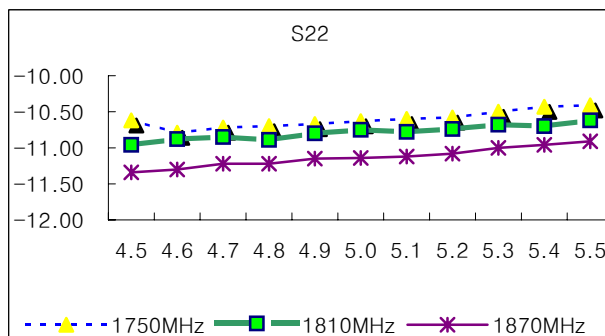
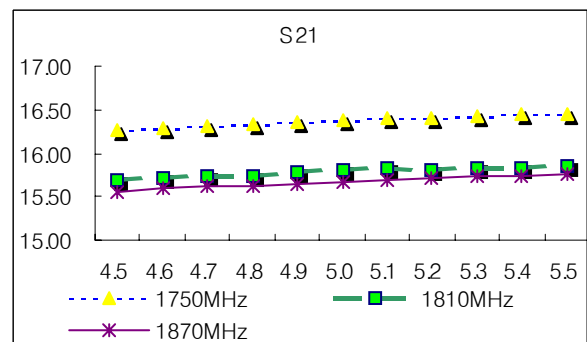
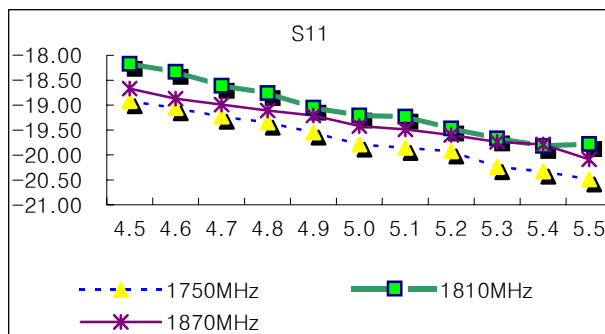
CL1502

	Voltage (V)	Current (mA)	S11(dB)			S21(dB)			S22(dB)			P1 (dBm)	OIP3 (dBm)	NF (MAX)
			1400MHz	1500MHz	1600MHz	1400MHz	1500MHz	1600MHz	1400MHz	1500MHz	1600MHz			
	4.5	89	-27.36	-25.85	-25.00	17.43	17.02	16.49	-11.01	-11.53	-12.21	18.87	31.63	0.758
	4.6	89	-28.09	-26.04	-25.21	17.43	17.04	16.49	-10.90	-11.47	-12.08	19.12	31.77	0.767
	4.7	90	-28.51	-26.27	-25.30	17.46	17.05	16.51	-10.85	-11.31	-12.04	19.29	31.86	0.787
	4.8	90	-28.14	-26.60	-25.92	17.47	17.07	16.51	-10.80	-11.32	-11.93	19.49	31.80	0.777
	4.9	91	-29.04	-26.91	-26.02	17.47	17.07	16.52	-10.70	-11.16	-11.80	19.69	32.00	0.780
	5.0	91	-28.92	-27.25	-26.36	17.49	17.09	16.54	-10.63	-11.15	-11.77	19.81	32.13	0.779
	5.1	91	-29.43	-27.12	-26.51	17.50	17.11	16.55	-10.57	-11.09	-11.67	20.01	32.26	0.803
	5.2	92	-29.97	-27.82	-26.38	17.50	17.13	16.56	-10.50	-11.04	-11.60	20.08	32.31	0.830
	5.3	92	-29.99	-27.89	-26.69	17.51	17.13	16.57	-10.41	-10.96	-11.52	20.29	32.65	0.816
	5.4	93	-30.16	-27.84	-26.89	17.53	17.16	16.58	-10.37	-10.85	-11.45	20.41	32.66	0.835
	5.5	93	-30.67	-28.42	-26.89	17.53	17.16	16.59	-10.30	-10.77	-11.33	20.49	32.80	0.830
Δ	1.0	4	3.31	2.57	1.89	0.10	0.14	0.10	0.71	0.76	0.88	1.62	1.17	0.077



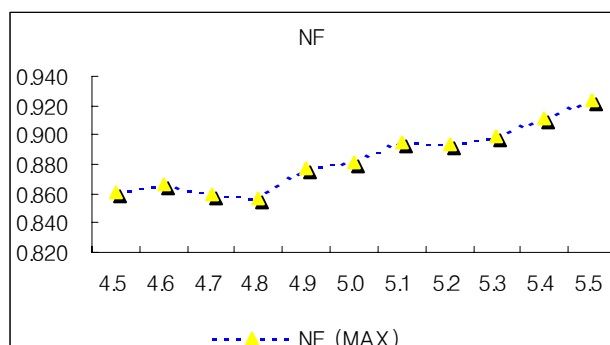
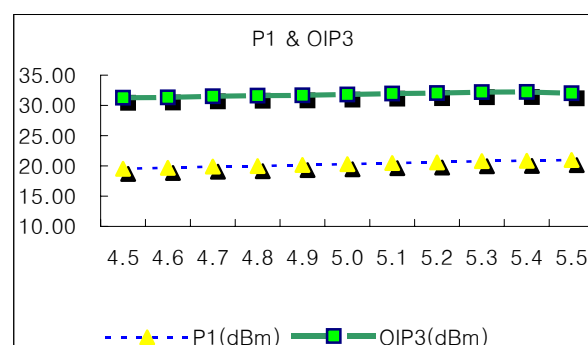
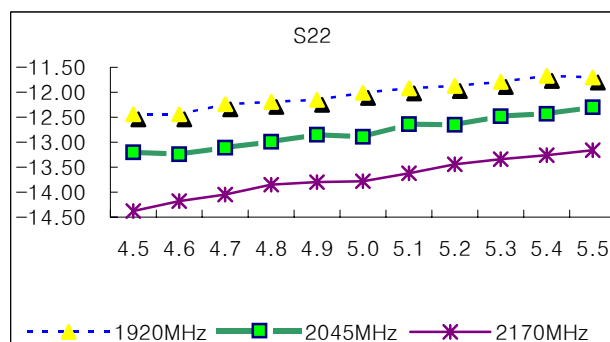
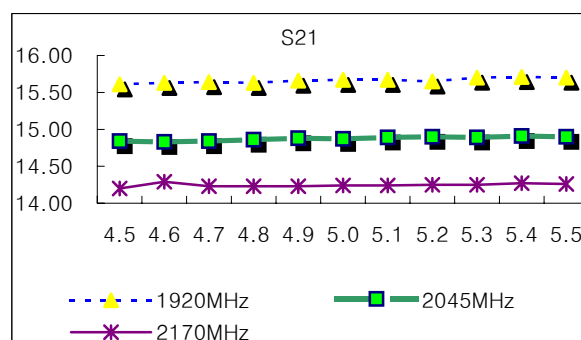
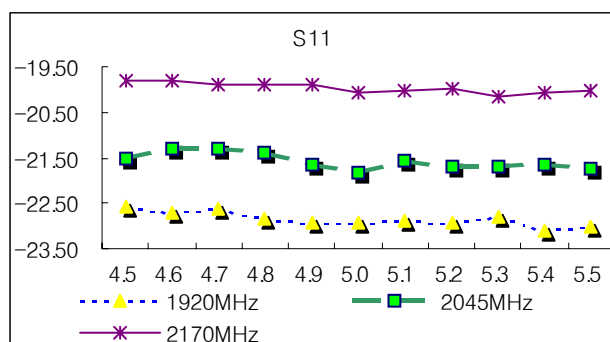
CL1802

	Voltage (V)	Current (mA)	S11(dB)			S21(dB)			S22(dB)			P1 (dBm)	OIP3 (dBm)	NF (MAX)
			1750MHz	1810MHz	1870MHz	1750MHz	1810MHz	1870MHz	1750MHz	1810MHz	1870MHz			
	4.5	99	-18.92	-18.17	-18.67	16.26	15.69	15.56	-10.62	-10.96	-11.34	19.61	32.10	0.869
	4.6	99	-19.06	-18.33	-18.87	16.28	15.71	15.60	-10.79	-10.88	-11.30	20.02	32.31	0.887
	4.7	100	-19.23	-18.61	-18.99	16.32	15.74	15.61	-10.72	-10.85	-11.22	20.11	32.32	0.867
	4.8	100	-19.35	-18.76	-19.11	16.34	15.74	15.63	-10.70	-10.89	-11.22	20.17	32.55	0.901
	4.9	100	-19.55	-19.05	-19.21	16.36	15.78	15.64	-10.67	-10.80	-11.15	20.46	32.69	0.886
	5.0	100	-19.79	-19.21	-19.42	16.37	15.80	15.66	-10.63	-10.75	-11.14	20.66	32.90	0.892
	5.1	101	-19.86	-19.23	-19.49	16.40	15.83	15.68	-10.60	-10.78	-11.12	20.87	32.96	0.903
	5.2	101	-19.93	-19.47	-19.60	16.41	15.81	15.71	-10.58	-10.74	-11.08	21.05	33.29	0.892
	5.3	102	-20.24	-19.67	-19.74	16.42	15.83	15.73	-10.50	-10.68	-11.00	21.21	33.22	0.893
	5.4	102	-20.33	-19.82	-19.79	16.44	15.83	15.74	-10.43	-10.70	-10.96	21.30	32.67	0.907
	5.5	102	-20.49	-19.78	-20.09	16.45	15.85	15.75	-10.41	-10.62	-10.91	21.48	32.74	0.903
Δ	1.0	3	1.57	1.65	1.42	0.19	0.16	0.19	0.38	0.34	0.43	1.87	1.19	0.040



CL2102

	Voltage (V)	Current (mA)	S11(dB)			S21(dB)			S22(dB)			P1 (dBm)	OIP3 (dBm)	NF (MAX)
			1920MHz	2045MHz	2170MHz	1920MHz	2045MHz	2170MHz	1920MHz	2045MHz	2170MHz			
	4.5	84	-22.59	-21.51	-19.80	15.61	14.84	14.20	-12.44	-13.20	-14.38	19.51	31.28	0.861
	4.6	84	-22.73	-21.29	-19.79	15.63	14.83	14.29	-12.44	-13.24	-14.18	19.67	31.34	0.867
	4.7	85	-22.64	-21.32	-19.91	15.64	14.84	14.23	-12.24	-13.11	-14.05	19.88	31.52	0.859
	4.8	85	-22.83	-21.40	-19.88	15.63	14.86	14.23	-12.19	-12.99	-13.85	19.96	31.63	0.857
	4.9	86	-22.94	-21.67	-19.91	15.66	14.88	14.23	-12.15	-12.85	-13.80	20.14	31.67	0.877
	5.0	86	-22.93	-21.83	-20.09	15.67	14.87	14.24	-12.01	-12.89	-13.78	20.27	31.81	0.882
	5.1	87	-22.89	-21.58	-20.02	15.67	14.89	14.24	-11.92	-12.64	-13.62	20.46	31.97	0.895
	5.2	87	-22.95	-21.70	-19.99	15.65	14.90	14.25	-11.87	-12.65	-13.44	20.57	32.03	0.893
	5.3	88	-22.81	-21.70	-20.14	15.70	14.89	14.25	-11.79	-12.48	-13.34	20.78	32.21	0.899
	5.4	88	-23.10	-21.65	-20.08	15.71	14.91	14.27	-11.67	-12.43	-13.26	20.84	32.23	0.911
	5.5	89	-23.02	-21.73	-20.02	15.70	14.90	14.26	-11.70	-12.30	-13.16	20.98	32.01	0.923
Δ	1.0	5	0.51	0.54	0.35	0.10	0.08	0.09	0.77	0.94	1.22	1.47	0.95	0.066



CL2702

	Voltage (V)	Current (mA)	S11(dB)			S21(dB)			S22(dB)			P1 (dBm)	OIP3 (dBm)	NF (MAX)
			2300MHz	2500MHz	2700MHz	2300MHz	2500MHz	2700MHz	2300MHz	2500MHz	2700MHz			
	4.5	88	-36.03	-27.44	-20.91	13.74	13.09	12.55	-12.57	-13.76	-14.69	20.71	31.96	0.909
	4.6	88	-36.87	-27.56	-21.11	13.75	13.08	12.57	-12.47	-13.60	-14.51	20.84	32.30	0.928
	4.7	89	-37.63	-27.87	-21.20	13.74	13.08	12.60	-12.30	-13.45	-14.36	21.06	32.40	0.941
	4.8	89	-37.33	-28.10	-21.61	13.79	13.14	12.61	-12.17	-13.32	-14.07	21.22	32.62	0.947
	4.9	89	-38.15	-28.15	-21.41	13.74	13.10	12.60	-12.19	-13.20	-13.97	21.34	32.75	0.955
	5.0	90	-40.16	-28.49	-21.52	13.76	13.10	12.63	-12.05	-13.01	-13.88	21.54	32.88	0.969
	5.1	90	-39.59	-28.43	-21.58	13.75	13.11	12.62	-11.98	-12.92	-13.67	21.73	33.02	0.987
	5.2	91	-40.53	-28.90	-21.75	13.75	13.09	12.63	-11.85	-12.79	-13.51	21.81	33.06	1.003
	5.3	91	-41.87	-28.85	-21.62	13.75	13.11	12.62	-11.73	-12.66	-13.41	21.92	33.12	0.995
	5.4	91	-42.78	-29.30	-21.77	13.74	13.11	12.61	-11.67	-12.57	-13.19	22.13	32.61	0.998
	5.5	92	-41.11	-29.24	-22.10	13.77	13.09	12.65	-11.58	-12.38	-13.03	22.25	32.41	1.031
Δ	1.0	4	6.75	1.86	1.19	0.05	0.06	0.10	0.99	1.38	1.66	1.54	1.16	0.122

