

RF MMIC Innovator

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[CLASSIFICATION] APPLICATION NOTE

[DATE] 2011.04

[REVISION NO.] REV.A

[MEASURING INSTRUMENTS]

- NA\_AGILENT 8753ES

- SA\_AGILENT E4404B

- SG\_AGILENT 4438C

- SG\_IFR 3416

## Wide Band Low Noise Amp BL081

### Application Note



## Contents

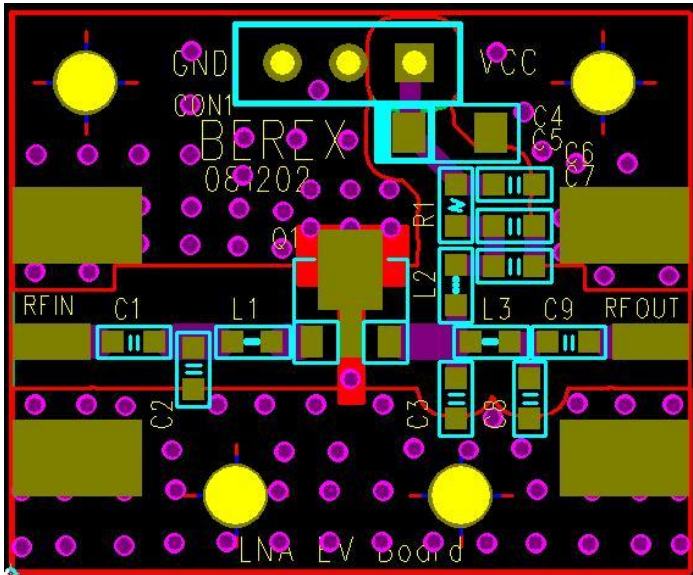
RF MMIC INNOVATOR	<a href="http://WWW.BEREX.COM">WWW.BEREX.COM</a>	1
1. 70MHZ APPLICATION		4
1.1 70MHZ TEST RESULT(S-PARAMETER, OIP3, P1, NF)		5
2. CDMA(824~849MHZ) APPLICATION		6
2.1 CDMA(824~849MHZ) TEST RESULT(S-PARAMETER, OIP3, P1, NF)		7
2.2 CDMA(824~849MHZ) TEST RESULT(SPURIOUS)		8
3. CDMA(869~894MHZ) APPLICATION		9
3.1 CDMA(869~894MHZ) TEST RESULT(S-PARAMETER, OIP3, P1, NF)		10
3.2 CDMA(869~894MHZ) TEST RESULT(SPURIOUS)		11
4. PCS(1750~1780MHZ) APPLICATION		12
4.1 PCS(1750~1780MHZ) TEST RESULT(S-PARAMETER, OIP3, P1, NF)		13
4.2 PCS(1750~1780MHZ) TEST RESULT(SPURIOUS)		14
5. PCS(1840~1870MHZ) APPLICATION		15
5.1 PCS(1840~1870MHZ) TEST RESULT(S-PARAMETER, OIP3, P1, NF)		16
5.2 PCS(1840~1870MHZ) TEST RESULT(SPURIOUS)		17
6. WCDMA(1940~1980MHZ) APPLICATION		18
6.1 WCDMA(1940~1980MHZ) TEST RESULT(S-PARAMETER, OIP3, P1, NF)		19
6.2 WCDMA(1940~1980MHZ) TEST RESULT(ACLR)		20
7. WCDMA(2130~2170MHZ) APPLICATION		21
7.1 WCDMA(2130~2170MHZ) TEST RESULT(S-PARAMETER, OIP3, P1, NF)		22
7.2 WCDMA(2130~2170MHZ) TEST RESULT(ACLR)		23
8. WIBRO(2300~2360MHZ)APPLICATION		24
8.1 WIBRO(2300~2360MHZ) TEST RESULT(S-PARAMETER, OIP3, P1, NF)		25
9. 3500MHZ APPLICATION		26
9.1 3500MHZ TEST RESULT(S-PARAMETER, OIP3, P1, NF)		27
10. 900MHZ(WITH HPF) APPLICATION		28
10.1 900MHZ TEST RESULT(S-PARAMETER, OIP3, P1, NF)		29
11. 1900MHZ(WITH HPF) APPLICATION		30
11.1 1900MHZ TEST RESULT(S-PARAMETER, OIP3, P1, NF)		31

**12. 2140MHZ(WITH HPF) APPLICATION.....32**  
    **12.1 2140MHZ TEST RESULT(S-PARAMETER, OIP3, P1, NF) .....33**

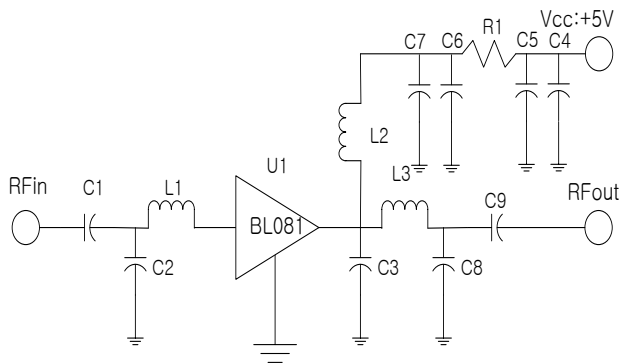
**13. 2450MHZ(WITH HPF) APPLICATION .....34**  
    **13.1 2450MHZ TEST RESULT(S-PARAMETER, OIP3, P1, NF) .....35**

**14. 3500MHZ(WITH HPF) APPLICATION .....36**  
    **14.1 3500MHZ TEST RESULT(S-PARAMETER, OIP3, P1, NF) .....37**

1. BL081\_70MHz Application Note



Ref. Des.	Description/ Part Number	Values	Vendor
C1	0603 CAP	100pF	Samsung
C2	0603 CAP	0.75pF	Samsung
C3	0603 CAP	DNP	
C4	3216 CAP	10uF	AVX
C5	0603 CAP	100nF	Samsung
C6	0603 CAP	1000pF	Samsung
C7	0603 CAP	100pF	Samsung
C8	0603 CAP	DNP	
C9	0603 CAP	100pF	Samsung
C10	0603 CAP	DNP	
C11	0603 CAP	DNP	
C12	0603 CAP	DNP	
L1	0603 IND	2.7nH	Ceratech
L2	0603 IND	18nH	Ceratech
L3	0603 RES	2.7nH	Ceratech
R1	0603 RES	0ohm	
U1	SOT89 PKG	BL081	BEREX



Note:

1. PCB: 31mil thick FR4
2. The distance between the center of the shunt cap(C6) and the Input Pin of BL081 is 5mm

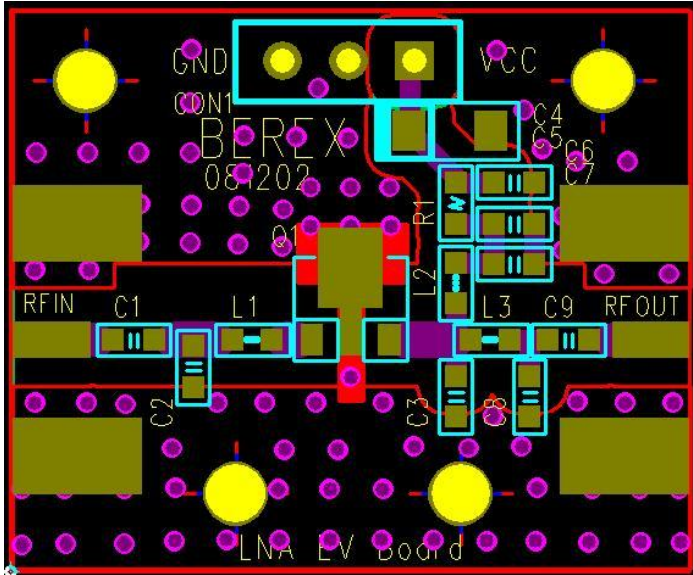
TITLE	
BL081 Evaluation Board	
(70 MHz)	
Drawing Number	Rev.
Date	Drawn By
FILE NAME	SHEET

## 1.1 BL081\_70MHz Test Result

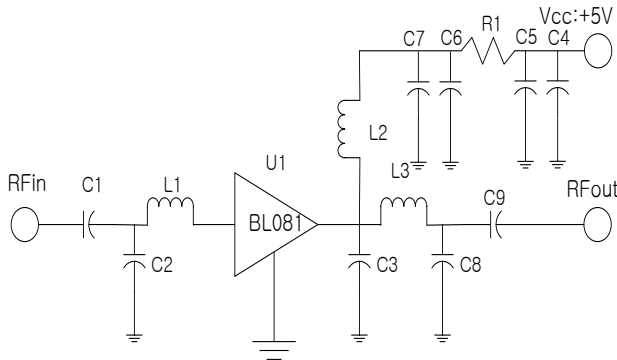
SN	Freq [MHz]	Vcc [V]	Icc [mA]	Gain [dB]	OIP3 [dBm] <sup>(1)</sup>	P1dB [dBm]	IRL [dB]	ORL [dB]	NF [dB]
-	70								

(1) OIP3 was tested @Pout=5/tone 1MHz offset

2.BL081\_CDMA(824~849MHz) Application Note



Ref. Des.	Description/ Part Number	Values	Vendor
C1	0603 CAP	100pF	Samsung
C2	0603 CAP	DNP	
C3	0603 CAP	0.5pF	Samsung
C4	3216 CAP	10uF	AVX
C5	0603 CAP	100nF	Samsung
C6	0603 CAP	1000pF	Samsung
C7	0603 CAP	100pF	Samsung
C8	0603 CAP	DNP	
C9	0603 CAP	100pF	Samsung
C10	0603 CAP	DNP	
C11	0603 CAP	DNP	
C12	0603 CAP	DNP	
L1	0603 IND	8.2nH	Ceratech
L2	0603 IND	100nH	Ceratech
L3	0603 RES	10nH	Ceratech
R1	0603 RES	DNP	
U1	SOT89 PKG	BL081	BEREX



Note:

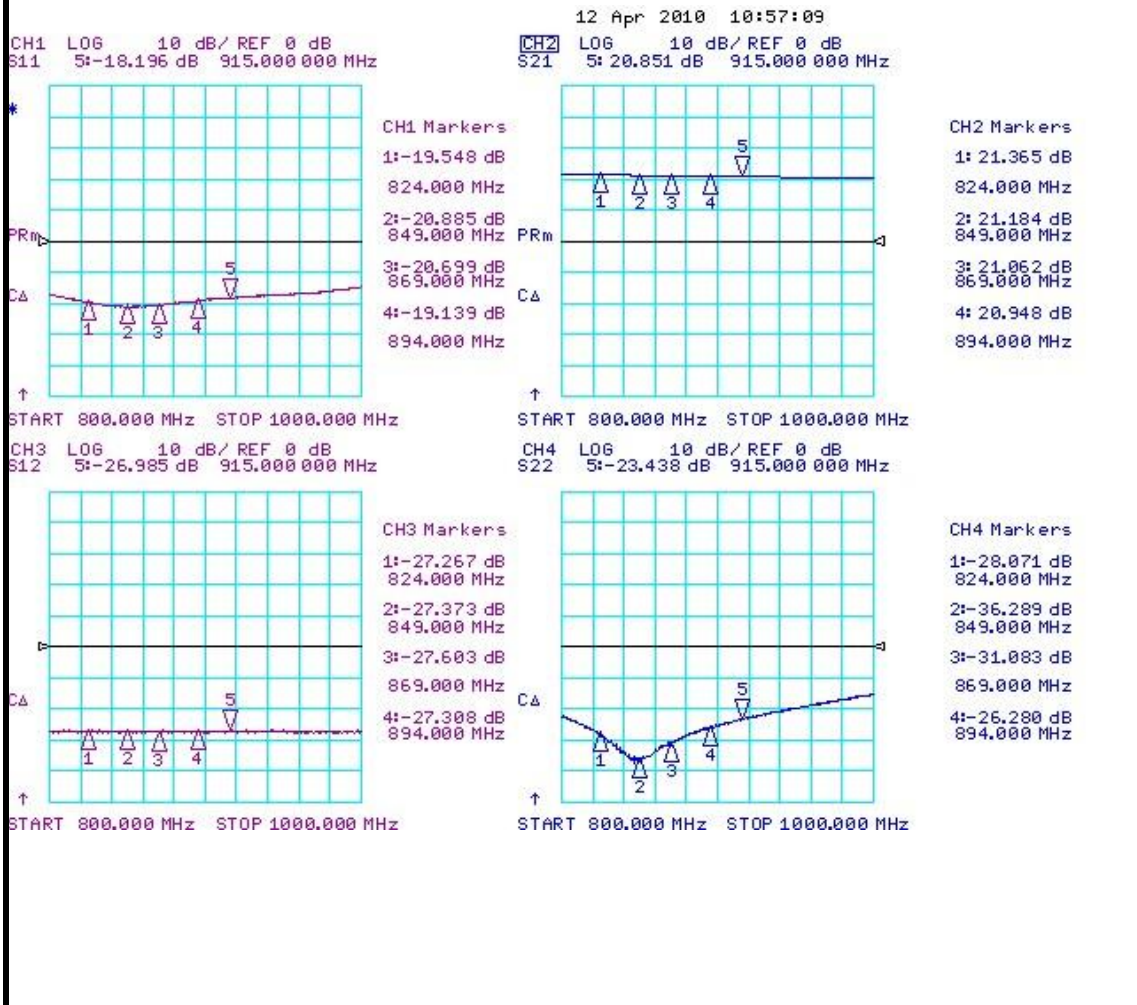
1. PCB: 31mil thick FR4

TITLE	
BL081 Evaluation Board	
(824~849 MHz)	
Drawing Number	Rev.
Date	Drawn By
FILE NAME	SHEET

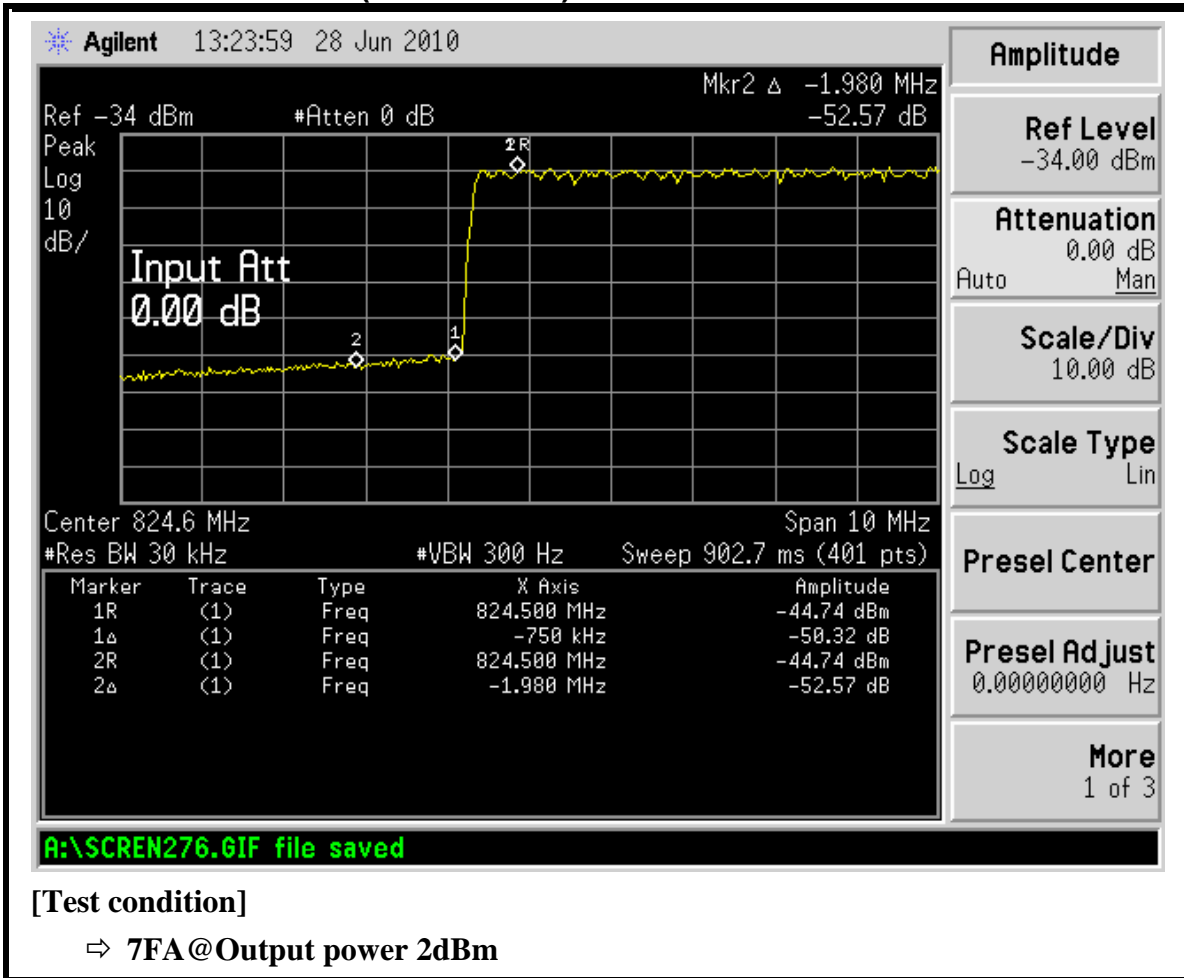
2.1BL081\_CDMA(824~849MHz) Test Result

SN	Freq [MHz]	Vcc [V]	Icc [mA]	Gain [dB]	OIP3 [dBm] <sup>(1)</sup>	P1dB [dBm]	IRL [dB]	ORL [dB]	NF [dB]
-	836	5	24	21.1	28.7	17.3	-20.8	-36	1.0

(1) OIP3 was tested @Pout=5dBm/tone 1MHz offset

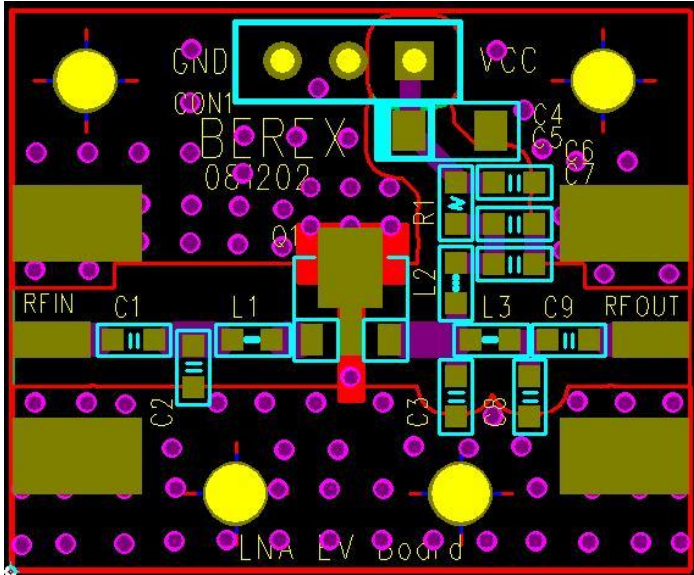


2.2BL081\_CDMA(824~849MHz) SPURIOUS

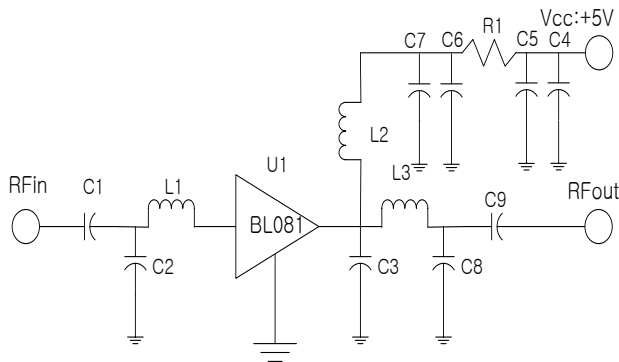




3.BL081\_CDMA(869~894MHz) Application Note



Ref. Des.	Description/ Part Number	Values	Vendor
C1	0603 CAP	100pF	Samsung
C2	0603 CAP	DNP	
C3	0603 CAP	0.5pF	Samsung
C4	3216 CAP	10uF	AVX
C5	0603 CAP	100nF	Samsung
C6	0603 CAP	1000pF	Samsung
C7	0603 CAP	100pF	Samsung
C8	0603 CAP	DNP	
C9	0603 CAP	100pF	Samsung
C10	0603 CAP	DNP	
C11	0603 CAP	DNP	
C12	0603 CAP	DNP	
L1	0603 IND	8.2nH	Ceratech
L2	0603 IND	100nH	Ceratech
L3	0603 RES	10nH	Ceratech
R1	0603 RES	DNP	
U1	SOT89 PKG	BL081	BEREX



Note:

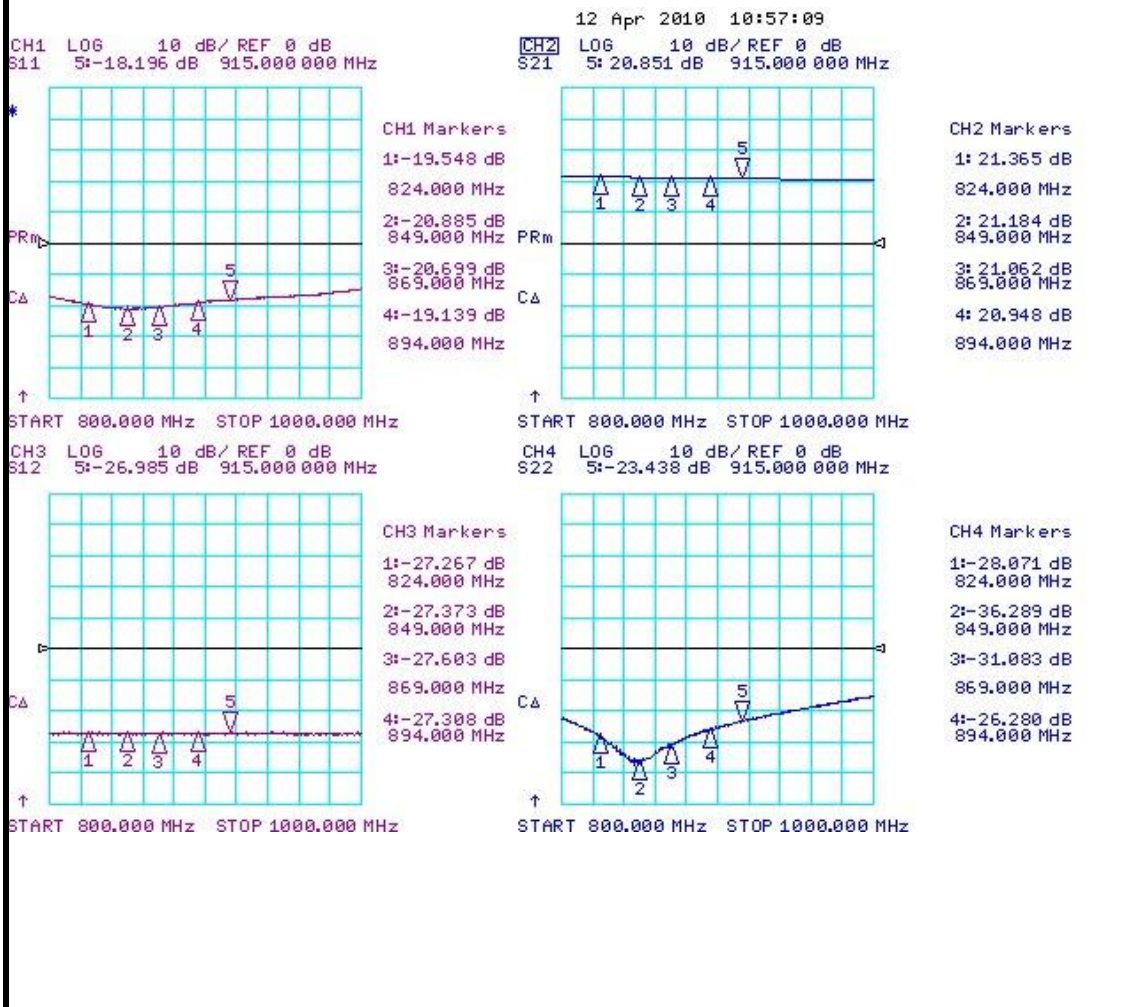
1. PCB: 31mil thick FR4

TITLE	
BL081 Evaluation Board	
(869~894 MHz)	
Drawing Number	Rev.
Date	Drawn By
FILE N ME	SH ET

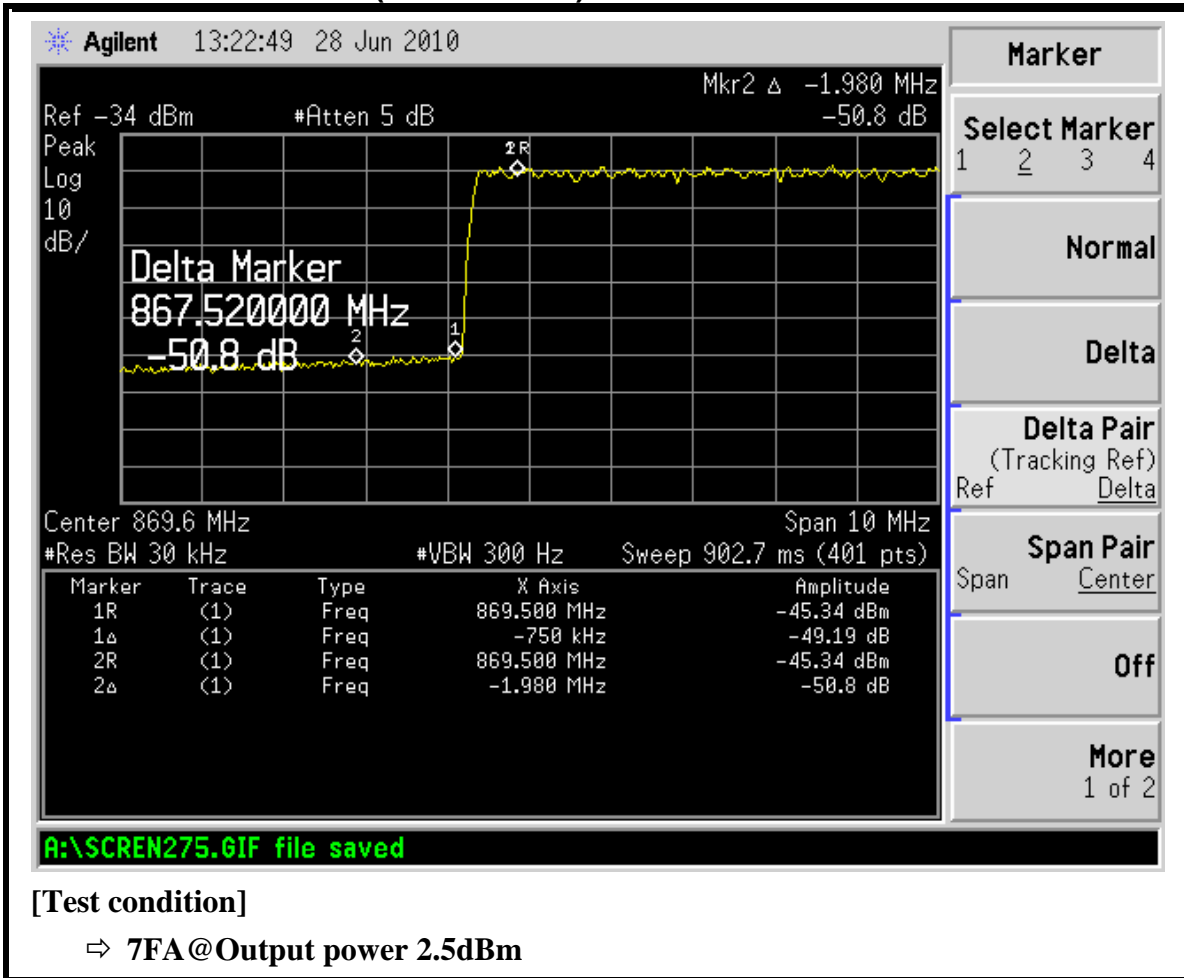
3.1BL081\_CDMA(869~894MHz) Test Result

SN	Freq [MHz]	Vcc [V]	Icc [mA]	Gain [dB]	OIP3 [dBm] <sup>(1)</sup>	P1dB [dBm]	IRL [dB]	ORL [dB]	NF [dB]
	881.5	5	24	20.9	29.3	17.2	-19.1	-26.2	1.0

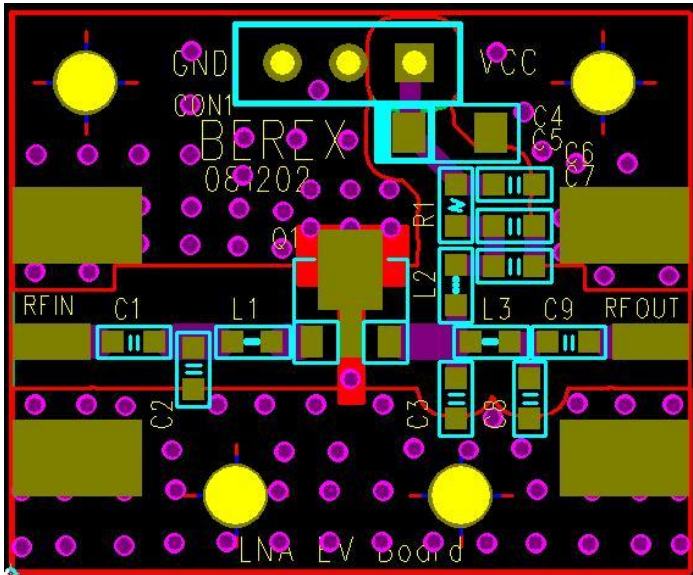
(1) OIP3 was tested @Pout=5dBm/tone 1MHz offset



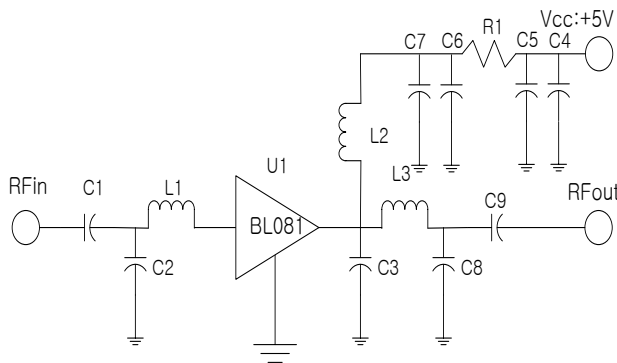
3.2BL081\_CDMA(869~894MHz) SPURIOUS



4.BL081\_PCS(1750~1780MHz) Application Note



Ref. Des.	Description/ Part Number	Values	Vendor
C1	0603 CAP	100pF	Samsung
C2	0603 CAP	0.75pF	Samsung
C3	0603 CAP	DNP	
C4	3216 CAP	10uF	AVX
C5	0603 CAP	100nF	Samsung
C6	0603 CAP	1000pF	Samsung
C7	0603 CAP	100pF	Samsung
C8	0603 CAP	DNP	
C9	0603 CAP	100pF	Samsung
C10	0603 CAP	DNP	
C11	0603 CAP	DNP	
C12	0603 CAP	DNP	
L1	0603 IND	2.7nH	Ceratech
L2	0603 IND	18nH	Ceratech
L3	0603 RES	2.7nH	Ceratech
R1	0603 RES	0ohm	
U1	SOT89 PKG	BL081	BEREX



Note:

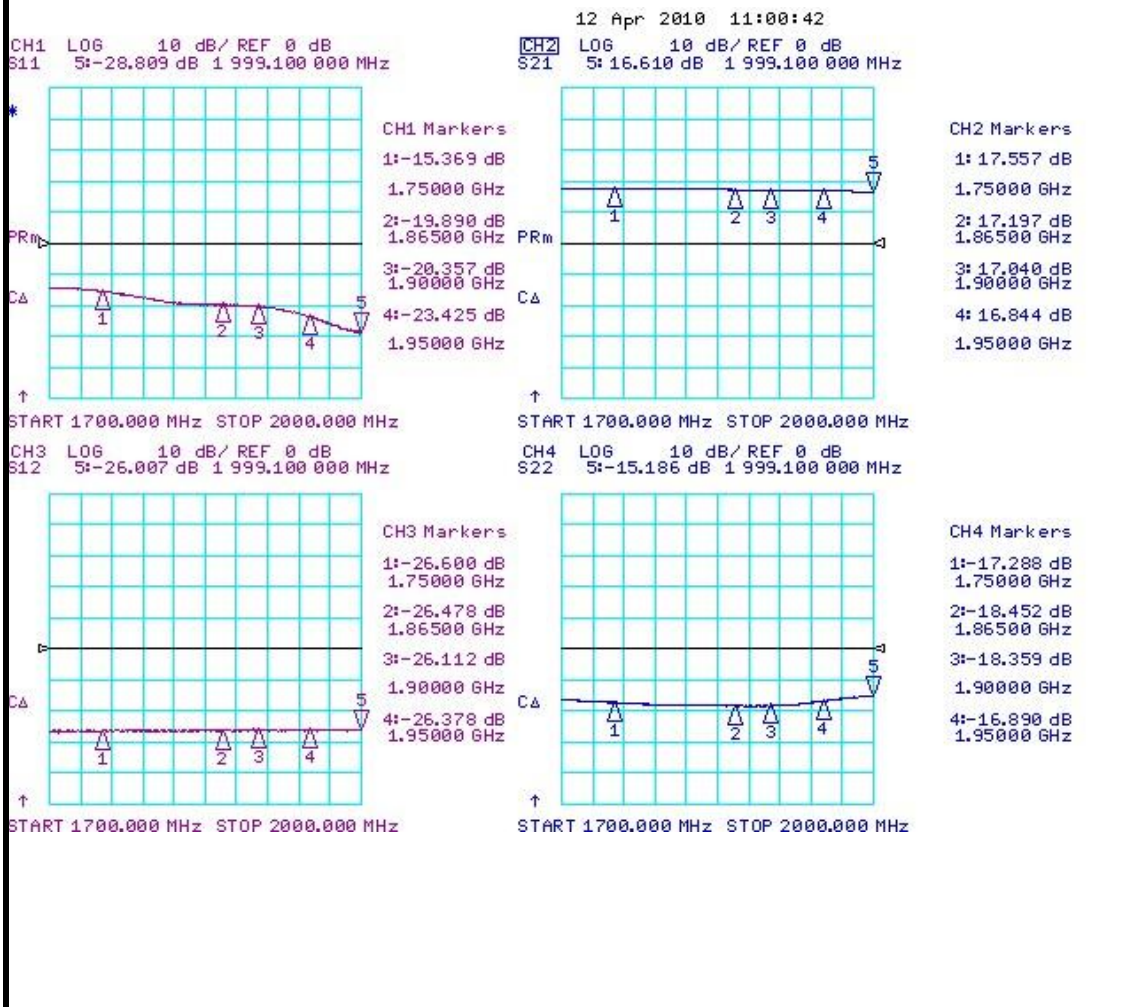
1. PCB: 31mil thick FR4

TITLE	
BL081 Evaluation Board	
(1750~1780 MHz)	
Drawing Number	Rev.
Date	Drawn By
FILE NAME	SHEET

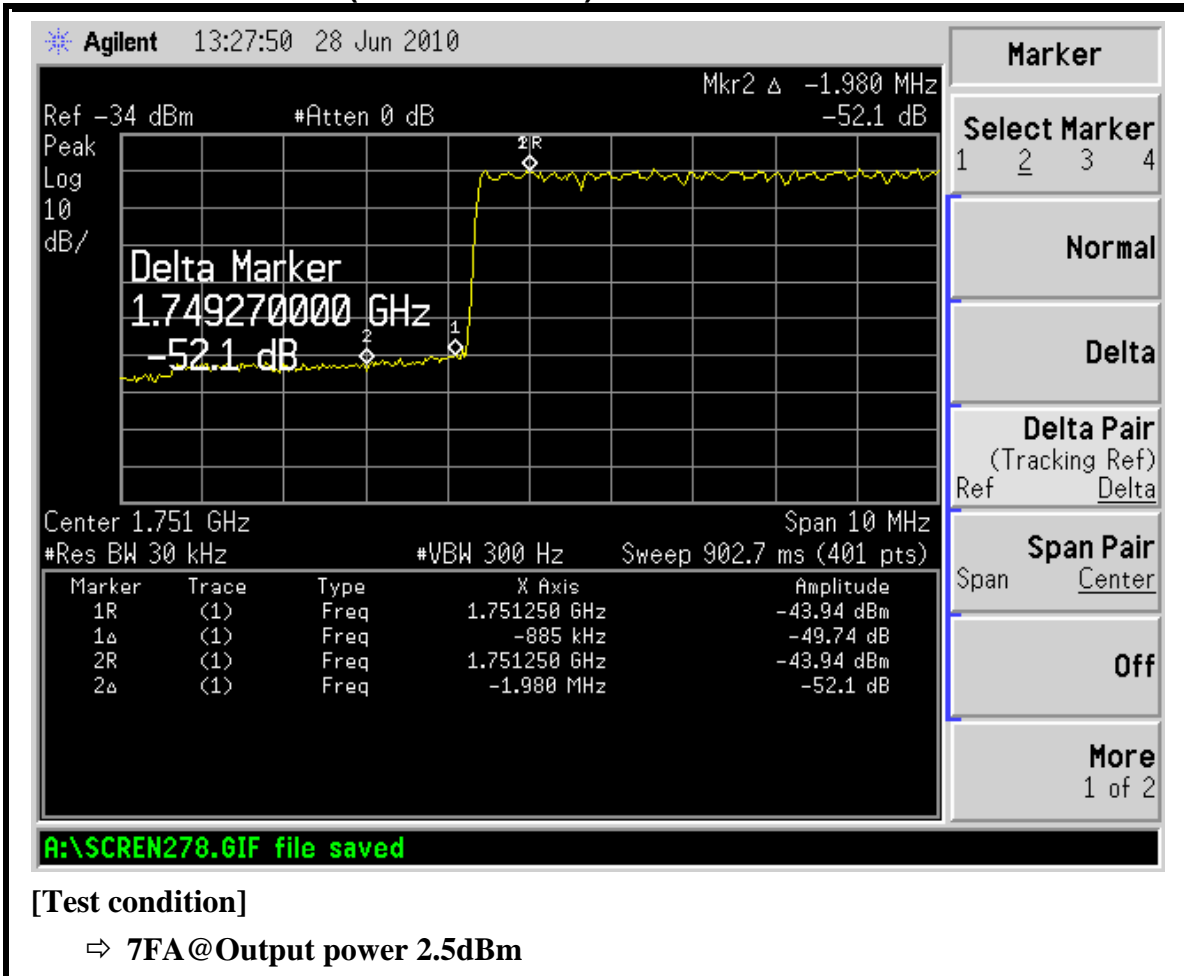
4.1BL081\_PCS(1750~1780MHz) Test Result

SN	Freq [MHz]	Vcc [V]	Icc [mA]	Gain [dB]	OIP3 [dBm] <sup>(1)</sup>	P1dB [dBm]	IRL [dB]	ORL [dB]	NF [dB]
	1765	5	25	17.5	29	17.8	-15.3	-17.2	1.1

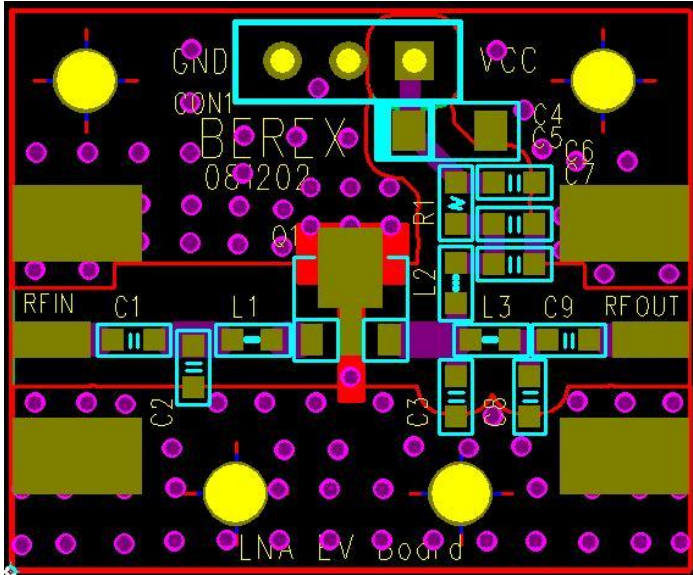
(1) OIP3 was tested @Pout=5dBm/tone 1MHz offset



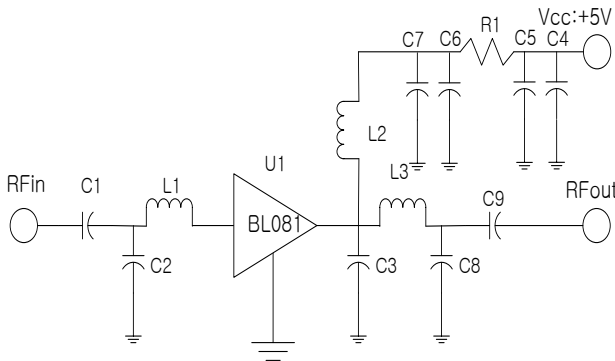
4.2 BL081\_PCS(1750~1780MHz) SPURIOUS



5. BL081\_PCS(1840~1870MHz) Application Note



Ref. Des.	Description/ Part Number	Values	Vendor
C1	0603 CAP	100pF	Samsung
C2	0603 CAP	0.75pF	Samsung
C3	0603 CAP	DNP	
C4	3216 CAP	10uF	AVX
C5	0603 CAP	100nF	Samsung
C6	0603 CAP	1000pF	Samsung
C7	0603 CAP	100pF	Samsung
C8	0603 CAP	DNP	
C9	0603 CAP	100pF	Samsung
C10	0603 CAP	DNP	
C11	0603 CAP	DNP	
C12	0603 CAP	DNP	
L1	0603 IND	2.7nH	Ceratech
L2	0603 IND	18nH	Ceratech
L3	0603 RES	2.7nH	Ceratech
R1	0603 RES	0ohm	
U1	SOT89 PKG	BL081	BEREX



Note:

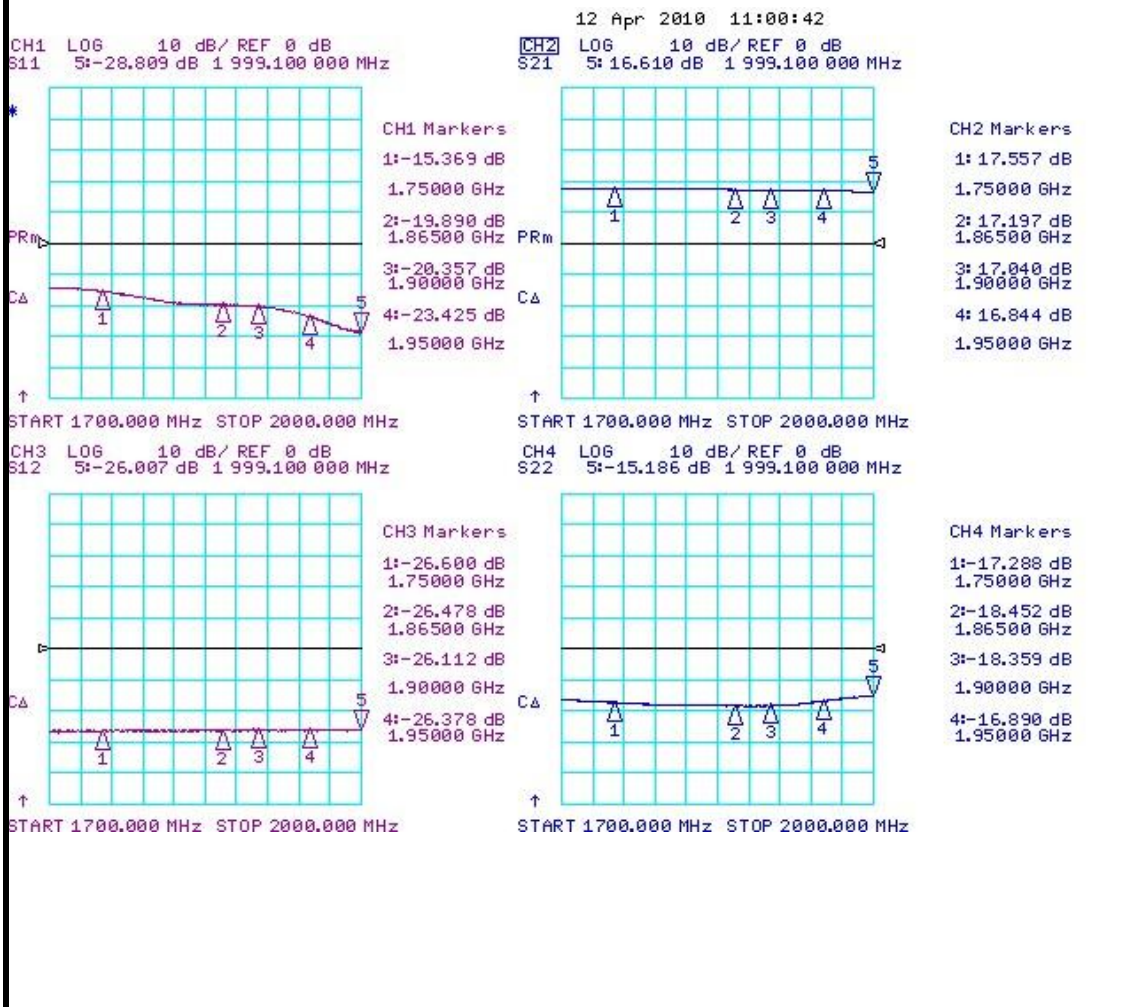
1. PCB: 31mil thick FR4

TITLE	
BL081 Evaluation Board	
(1840~1870 MHz)	
Drawing Number	Rev.
Date	Drawn By
FILE NAME	SHEET

5.1 BL081\_PCS(1840~1870MHz)Test Result

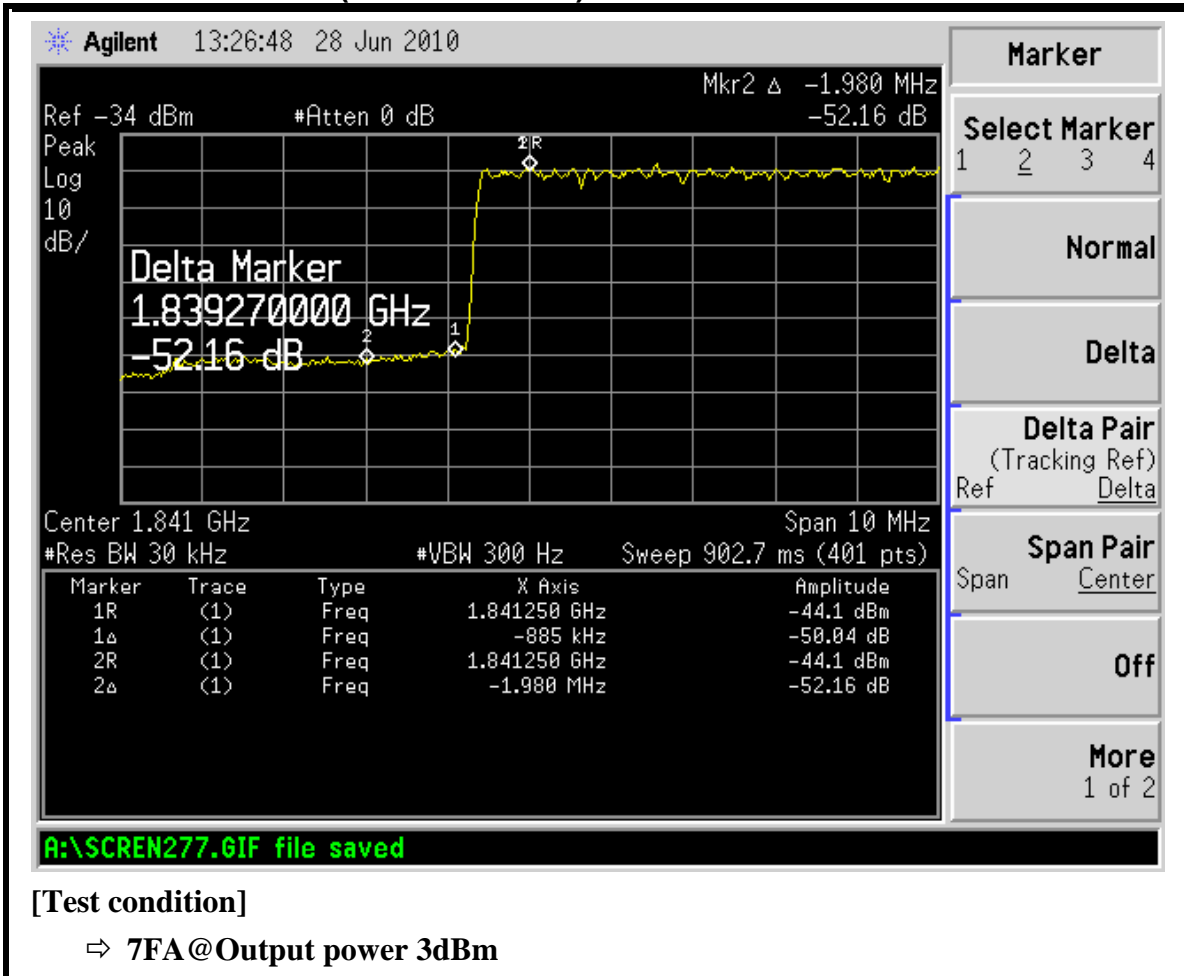
SN	Freq [MHz]	Vcc [V]	Icc [mA]	Gain [dB]	OIP3 [dBm] <sup>(1)</sup>	P1dB [dBm]	IRL [dB]	ORL [dB]	NF [dB]
	1855	5	25	17.2	29.3	17.9	-19.8	-18.4	1.1

(1) OIP3 was tested @Pout=5dBm/tone 1MHz offset

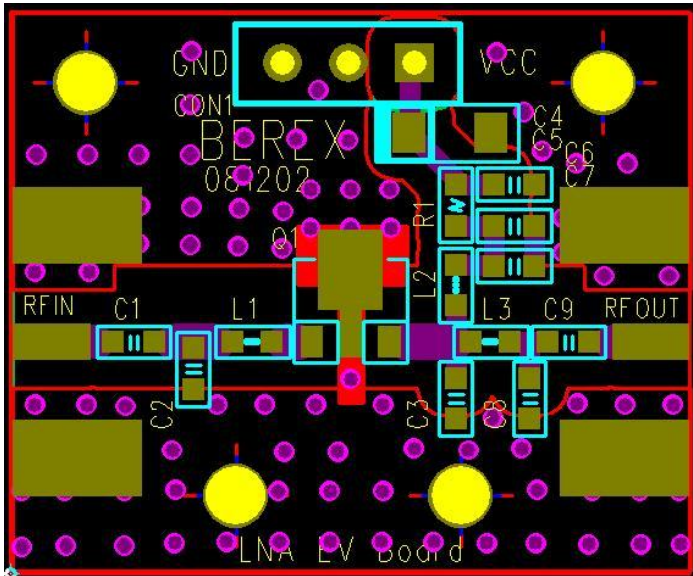




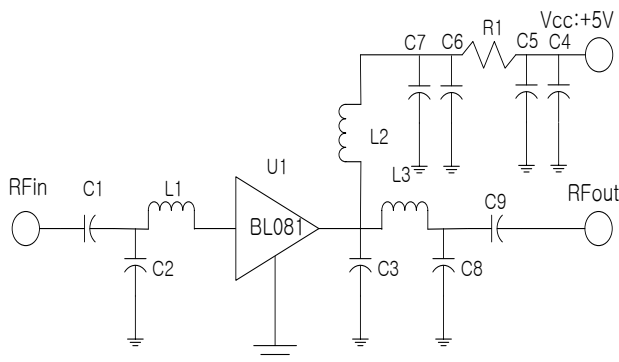
5.2 BL081\_PCS(1840~1870MHz)SPURIOUS



6. BL081\_WCDMA(1940~1980MHz) Application Note



Ref. Des.	Description/ Part Number	Values	Vendor
C1	0603 CAP	100pF	Samsung
C2	0603 CAP	0.75pF	Samsung
C3	0603 CAP	DNP	
C4	3216 CAP	10uF	AVX
C5	0603 CAP	1nF	Samsung
C6	0603 CAP	100pF	Samsung
C7	0603 CAP	100pF	Samsung
C8	0603 CAP	DNP	
C9	0603 CAP	100pF	Samsung
C10	0603 CAP	DNP	
C11	0603 CAP	DNP	
C12	0603 CAP	DNP	
L1	0603 IND	2.7nH	Ceratech
L2	0603 IND	18nH	Ceratech
L3	0603 RES	2.7nH	Ceratech
R1	0603 RES	0ohm	
U1	SOT89 PKG	BL081	BEREX



Note:

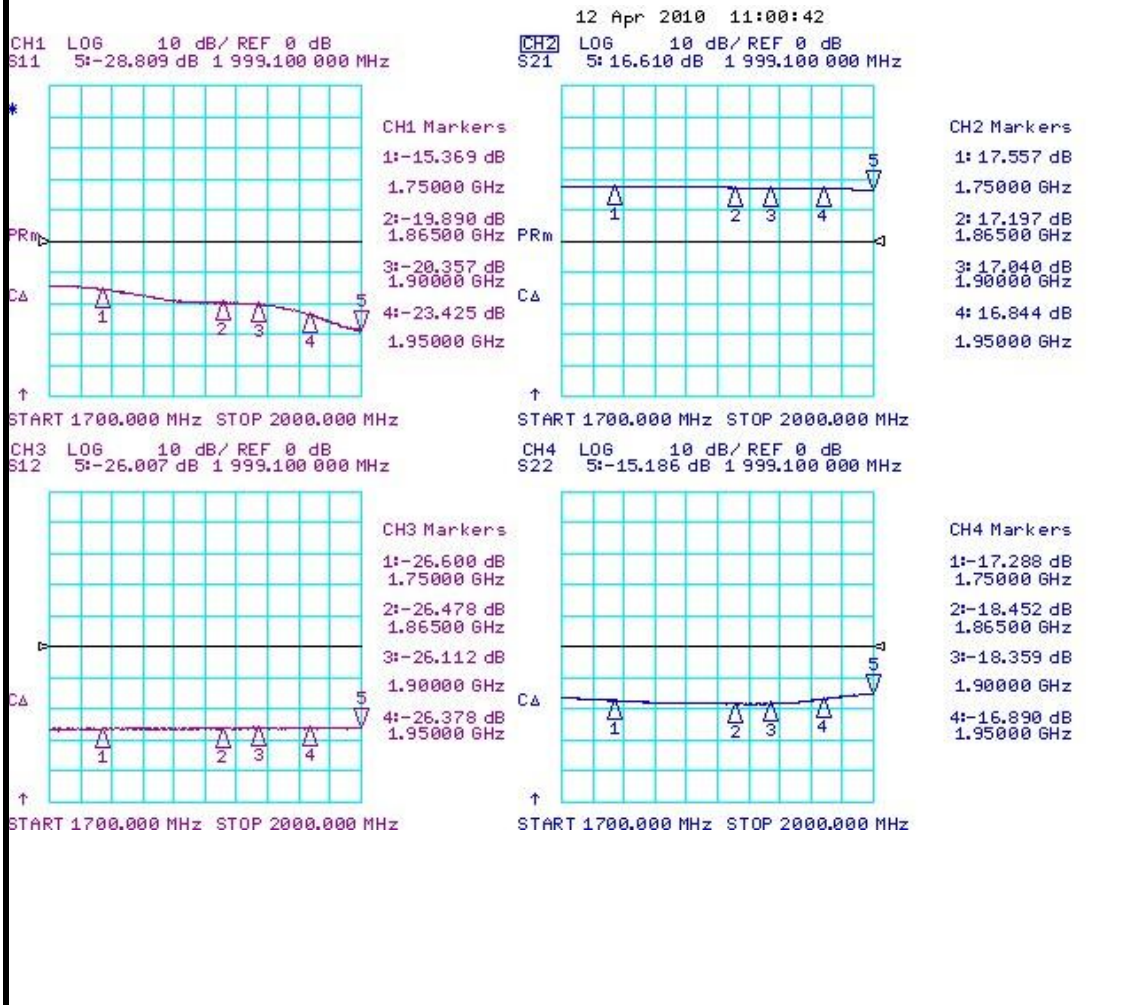
1. PCB: 31mil thick FR4

TITLE	
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(1940~1980 MHz)	
Drawing Number	Rev.
Date	Drawn By
FILE NAME	SHEET

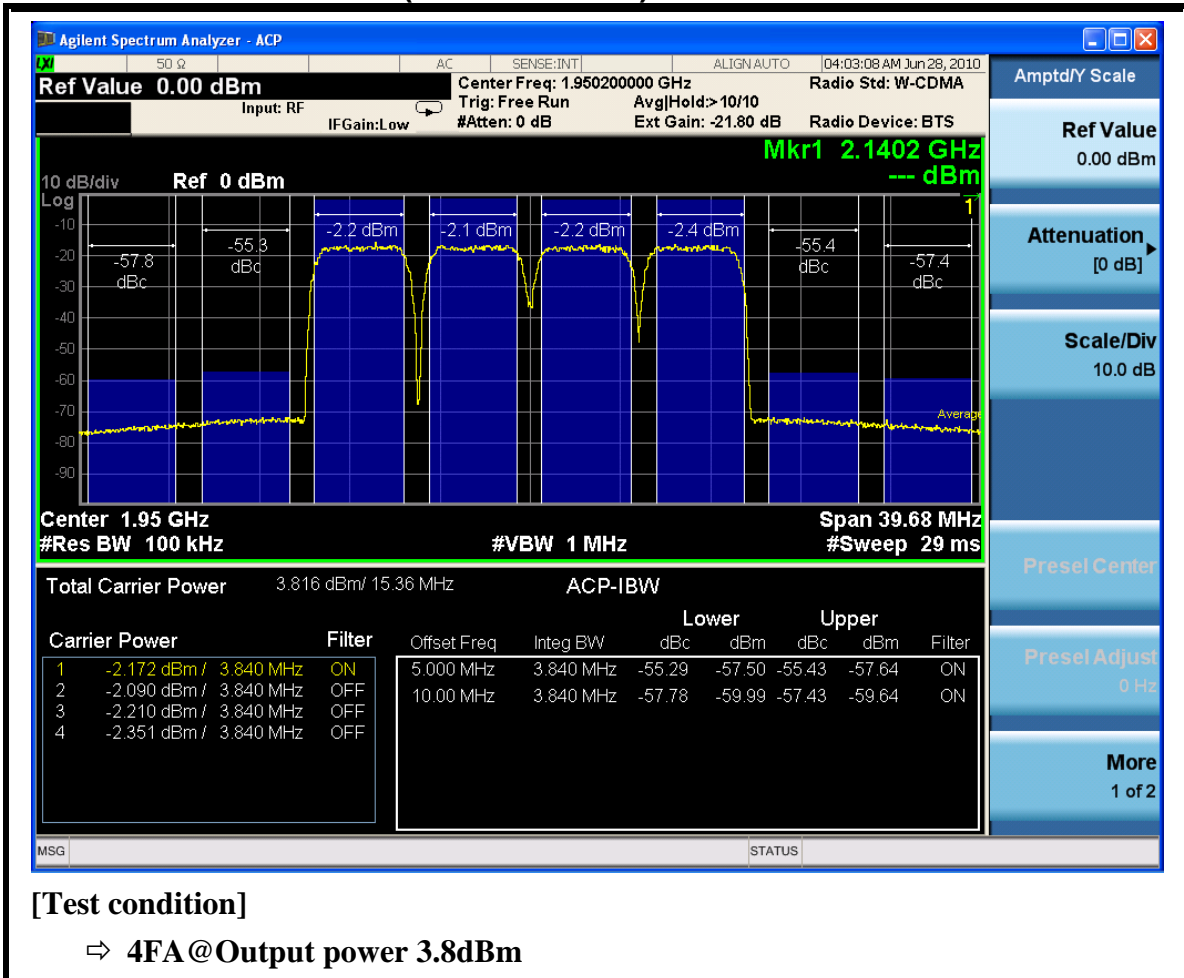
6.1 BL081\_WCDMA(1940~1980MHz)TestResult

SN	Freq [MHz]	Vcc [V]	Icc [mA]	Gain [dB]	OIP3 [dBm] <sup>(1)</sup>	P1dB [dBm]	IRL [dB]	ORL [dB]	NF [dB]
	1960	5	25	16.8	29.8	17.8	-23.4	-16.9	1.2

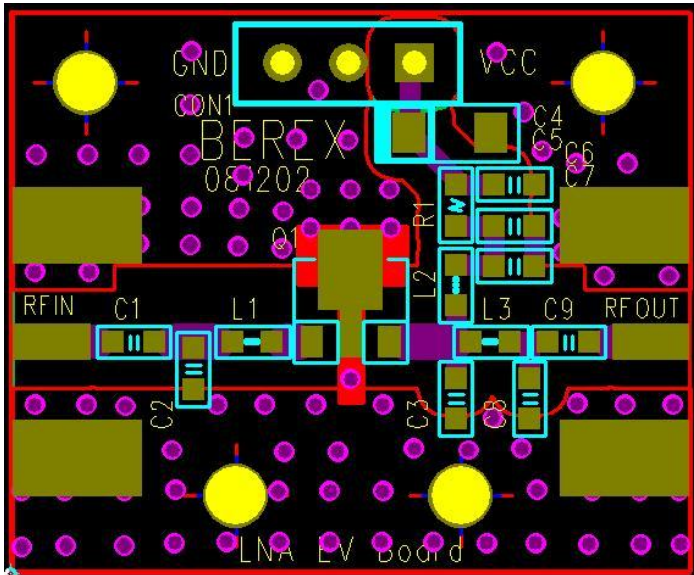
(1) OIP3 was tested @Pout=5dBm/tone 1MHz offset



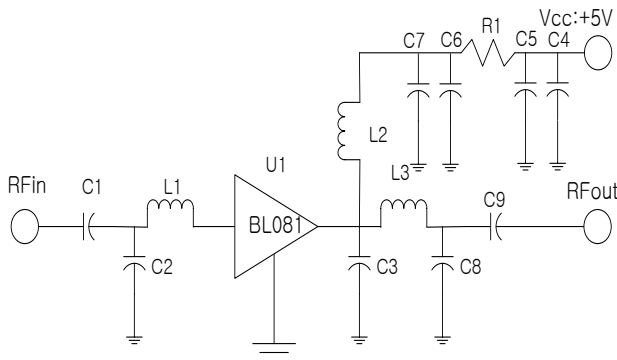
6.2BL081\_ WCDMA(1940~1980MHz) ACLR



7. BL081\_WCDMA(2130~2170MHz) Application Note



Ref. Des.	Description/ Part Number	Values	Vendor
C1	0603 CAP	18pF	Samsung
C2	0603 CAP	0.75pF	Samsung
C3	0603 CAP	DNP	
C4	3216 CAP	10uF	AVX
C5	0603 CAP	100nF	Samsung
C6	0603 CAP	1000pF	Samsung
C7	0603 CAP	100pF	Samsung
C8	0603 CAP	0.5pF	Samsung
C9	0603 CAP	18pF	Samsung
C10	0603 CAP	DNP	
C11	0603 CAP	DNP	
C12	0603 CAP	DNP	
L1	0603 IND	1.5nH	Ceratech
L2	0603 IND	33nH	Ceratech
L3	0603 RES	4.7nH	Ceratech
R1	0603 RES	0ohm	
U1	SOT89 PKG	BL081	BEREX



Note:

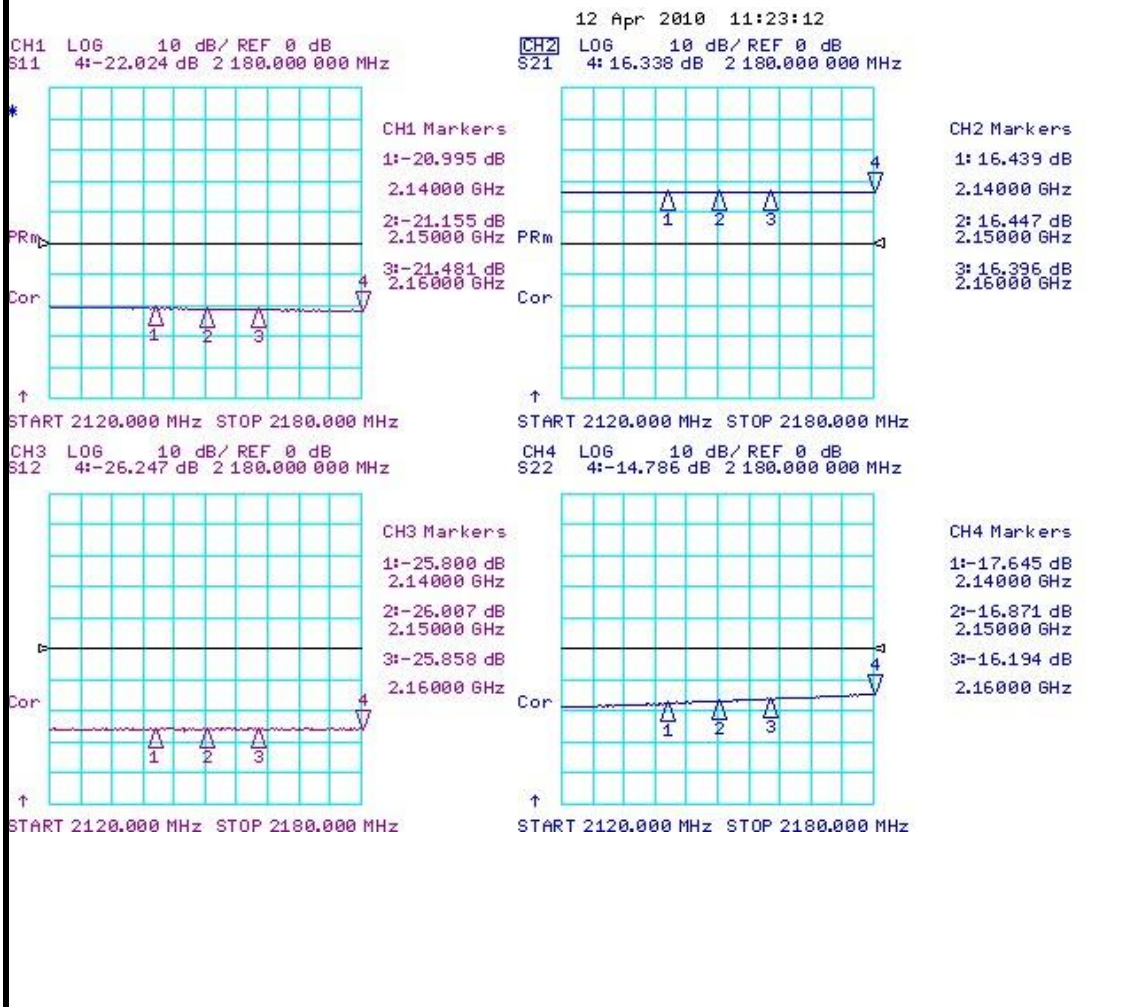
1. PCB: 31mil thick FR4

TITLE	
BL081 Evaluation Board	
(2130~2170 MHz)	
Drawing Number	Rev.
Date	Drawn By
FILE NAME	SHEET

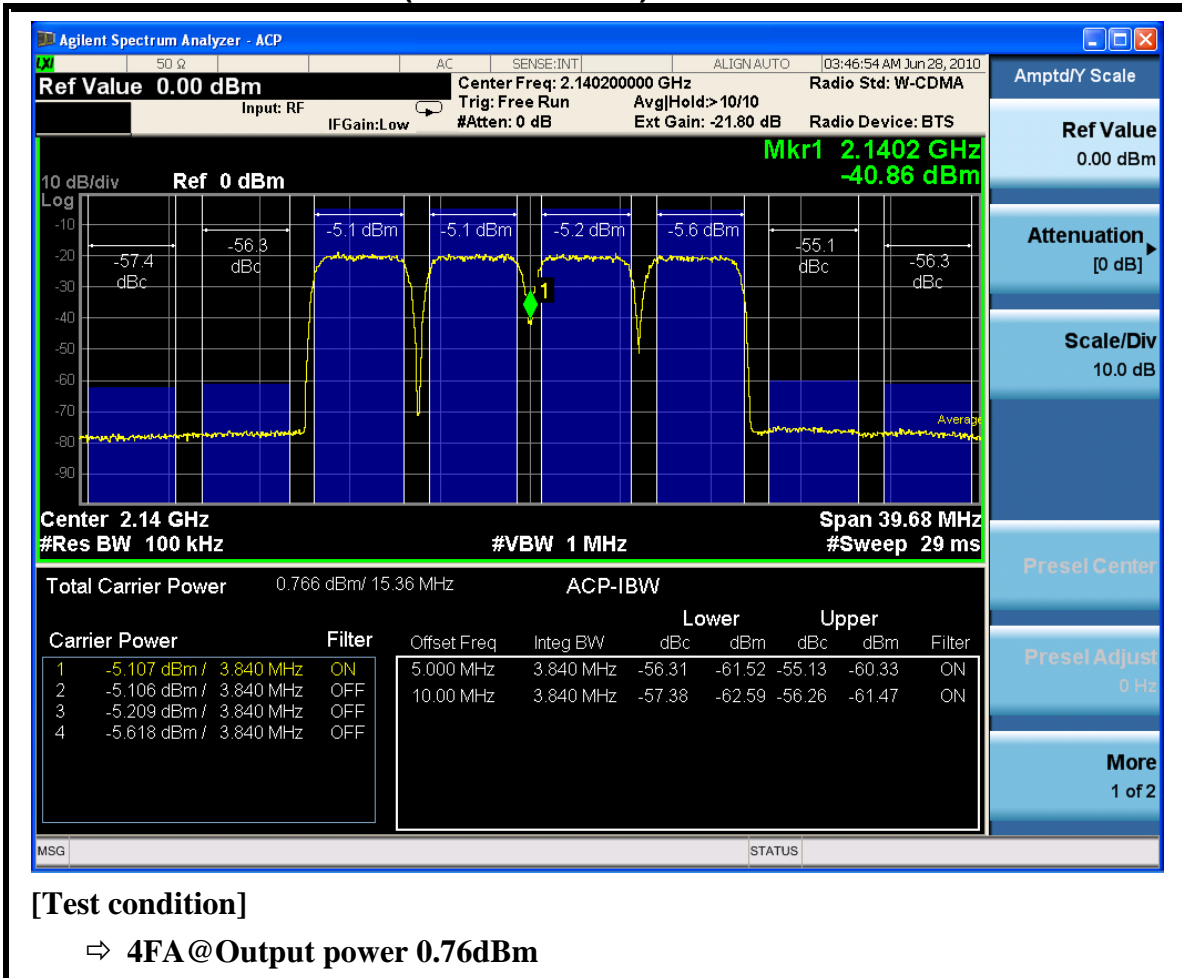
7.1 BL081\_WCDMA(2130~2170MHz) Test Result

SN	Freq [MHz]	Vcc [V]	Icc [mA]	Gain [dB]	OIP3 [dBm] <sup>(1)</sup>	P1dB [dBm]	IRL [dB]	ORL [dB]	NF [dB]
	2150	5	26	16.4	30.2	17.7	-20.9	-17.6	1.2

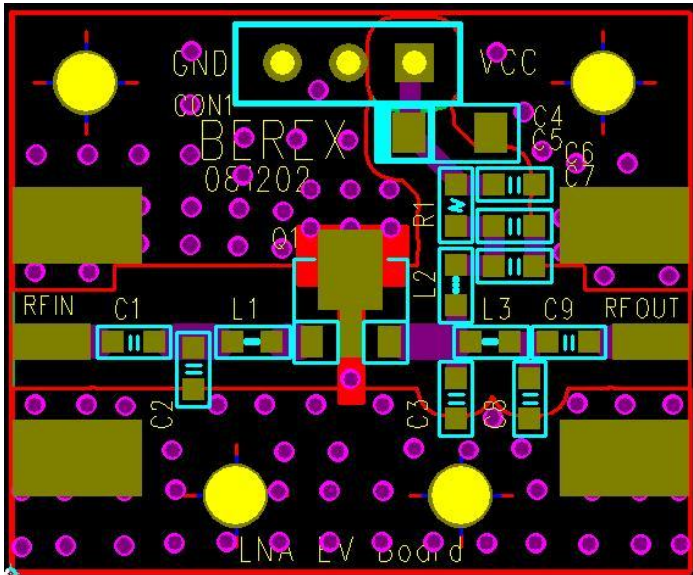
(1) OIP3 was tested @Pout=5dBm/tone 1MHz offset



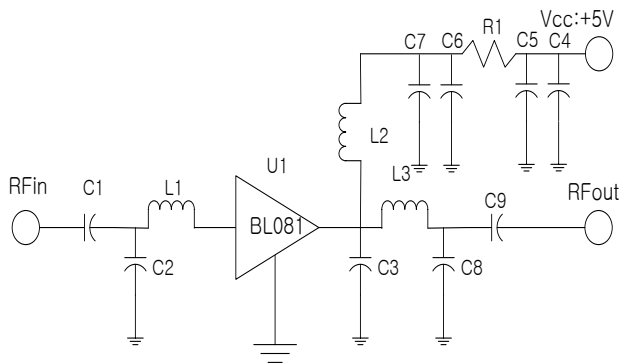
7.2 BL081\_WCDMA(2130~2170MHz) ACLR



8. BL081\_WIBRO(2300~2360MHz) Application Note



Ref. Des.	Description/ Part Number	Values	Vendor
C1	0603 CAP	22pF	Samsung
C2	0603 CAP	0.5pF	Samsung
C3	0603 CAP	DNP	
C4	3216 CAP	10uF	AVX
C5	0603 CAP	100nF	Samsung
C6	0603 CAP	1000pF	Samsung
C7	0603 CAP	100pF	Samsung
C8	0603 CAP	1pF	Samsung
C9	0603 CAP	22pF	Samsung
C10	0603 CAP	DNP	
C11	0603 CAP	DNP	
C12	0603 CAP	DNP	
L1	0603 IND	1.8nH	Ceratech
L2	0603 IND	47nH	Ceratech
L3	0603 RES	3.9nH	Ceratech
R1	0603 RES	0ohm	
U1	SOT89 PKG	BL081	BEREX



Note:

1. PCB: 31mil thick FR4

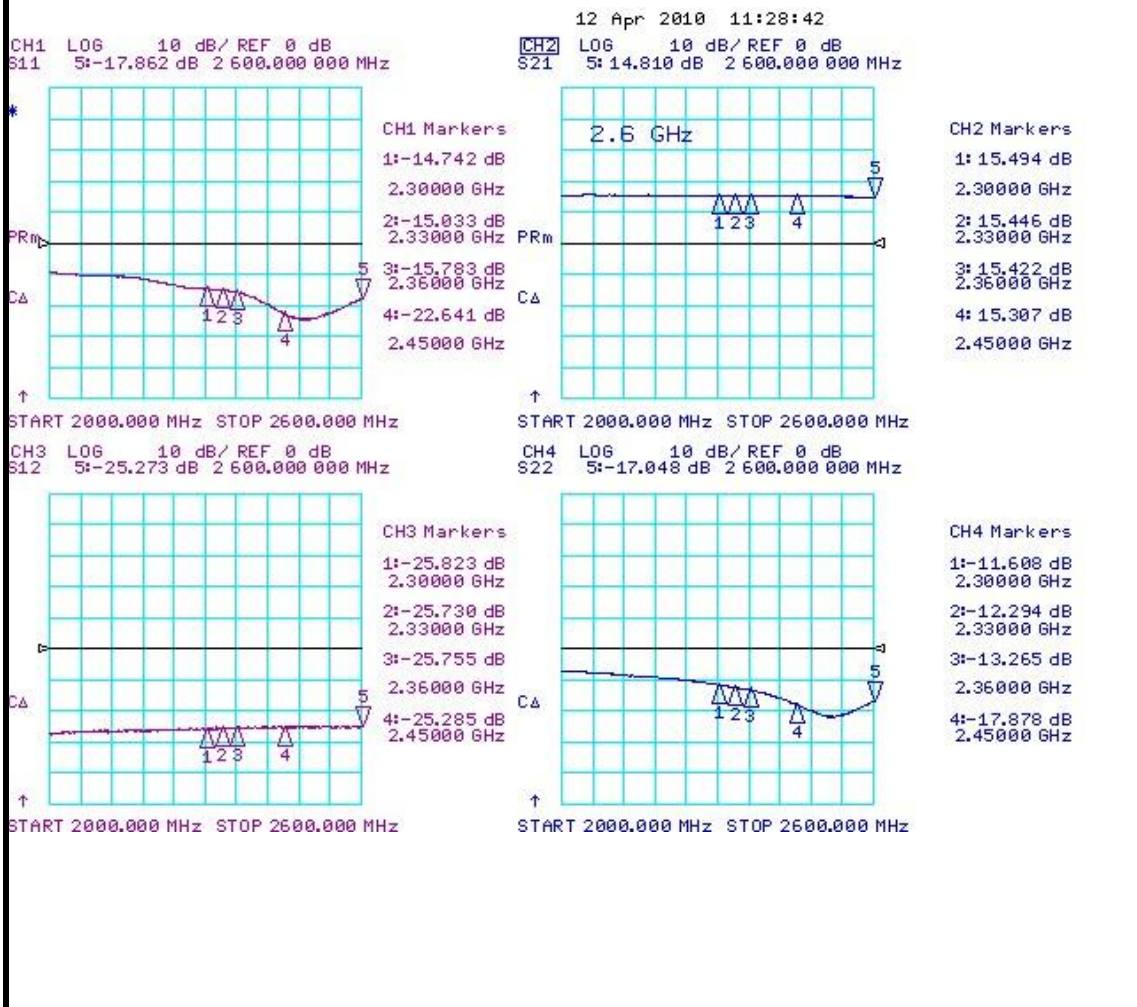
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(2300~2360 MHz)	
Drawing Number	Rev.
Date	Drawn By
FILE NAME	SHEET



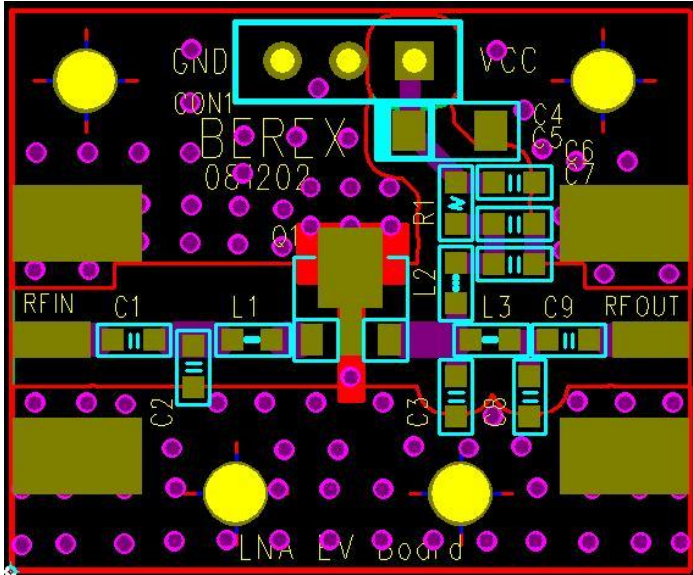
### 8.1 BL081\_WIBRO(2300~2360MHz) Test Result

SN	Freq [MHz]	Vcc [V]	Icc [mA]	Gain [dB]	OIP3 [dBm] <sup>(1)</sup>	P1dB [dBm]	IRL [dB]	ORL [dB]	NF [dB]
	2330	5	24	15.4	30.5	18	-15	-12.2	1.3

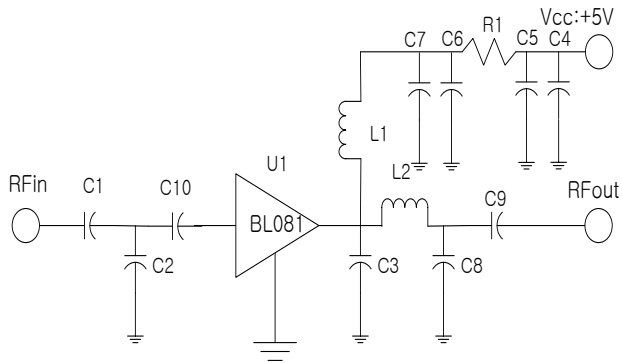
(1) OIP3 was tested @Pout=5dBm/tone 1MHz offset



9. BL081\_3500MHz Application Note



Ref. Des.	Description/ Part Number	Values	Vendor
C1	0603 CAP	18pF	Samsung
C2	0603 CAP	0.5pF	Samsung
C3	0603 CAP	DNP	
C4	3216 CAP	10uF	AVX
C5	0603 CAP	100nF	Samsung
C6	0603 CAP	1000pF	Samsung
C7	0603 CAP	100pF	Samsung
C8	0603 CAP	1pF	Samsung
C9	0603 CAP	18pF	Samsung
C10	0603 CAP	3.3pF	Samsung
C11	0603 CAP	DNP	
C12	0603 CAP	DNP	
L1	0603 IND	33nH	Ceratech
L2	0603 IND	1.5nH	Ceratech
L3	0603 RES	DNP	
R1	0603 RES	0ohm	
U1	SOT89 PKG	BL081	BEREX



Note:

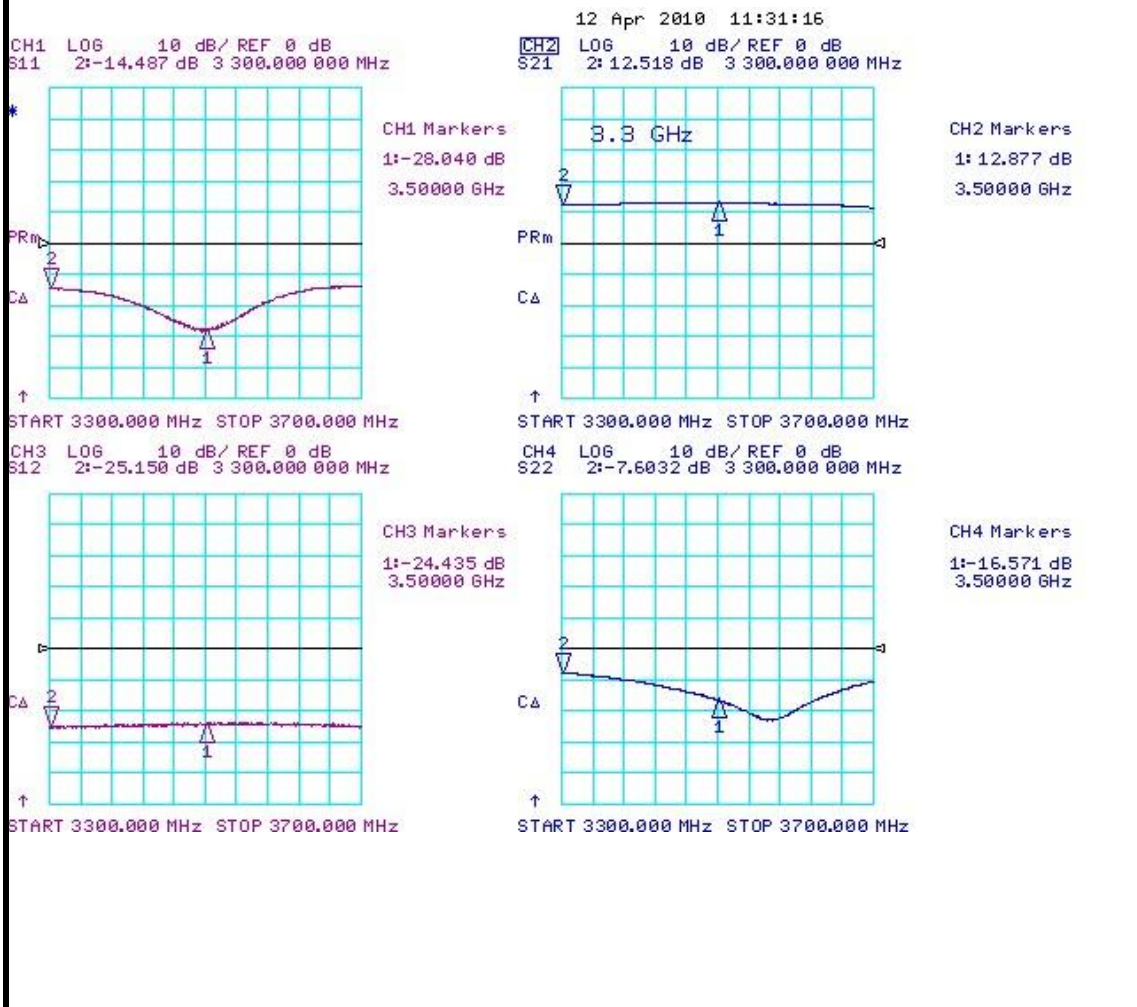
1. PCB: 31mil thick FR4

TITLE	
BL081 Evaluation Board	
(3500 MHz)	
Drawing Number	Rev.
Date	Drawn By
FILE NAME	SHEET

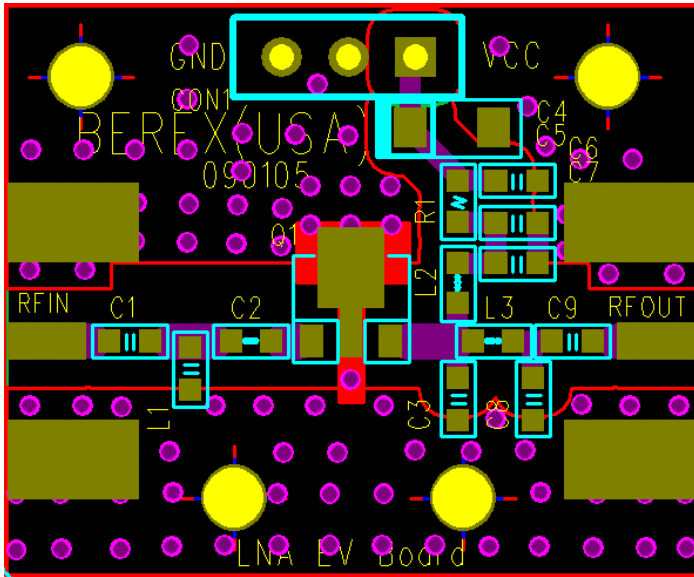
9.1 BL081\_3500MHz Test Result

SN	Freq [MHz]	Vcc [V]	Icc [mA]	Gain [dB]	OIP3 [dBm] <sup>(1)</sup>	P1dB [dBm]	IRL [dB]	ORL [dB]	NF [dB]
	3500	5	26	12.8	31.8	18	-28	-16.5	1.3

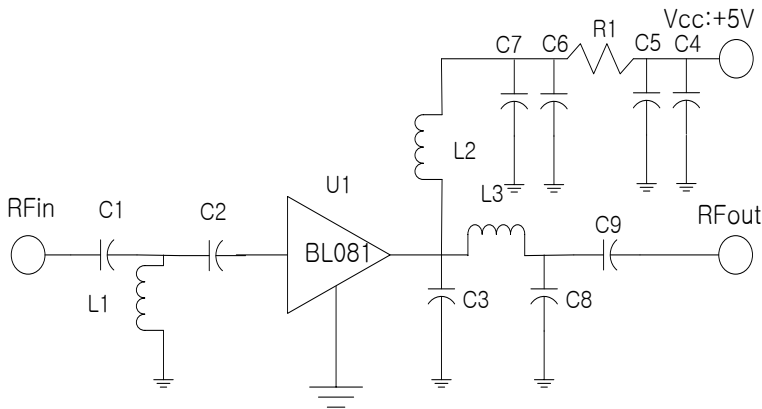
(1) OIP3 was tested @Pout=5dBm/tone 1MHz offset



10. BL081\_900MHz(with HPF) Application Note



Ref. Des.	Description/Part Number	Values	Vendor
C1	0603 CAP	100pF	Samsung
C2	0603 CAP	10pF	Samsung
C3	0603 CAP	1pF	Samsung
C4	3216 CAP	10uF	AVX
C5	0603 CAP	100nF	Samsung
C6	0603 CAP	1000pF	Samsung
C7	0603 CAP	DNP	
C8	0603 CAP	DNP	
C9	0603 CAP	100pF	Samsung
L1	0603 IND	15nH	Ceratech
L2	0603 IND	100nH	Ceratech
L3	0603 RES	12nH	Ceratech
R1	0603 RES	0ohm	
U1	SOT89 PKG	BL081	BEREX



Note:

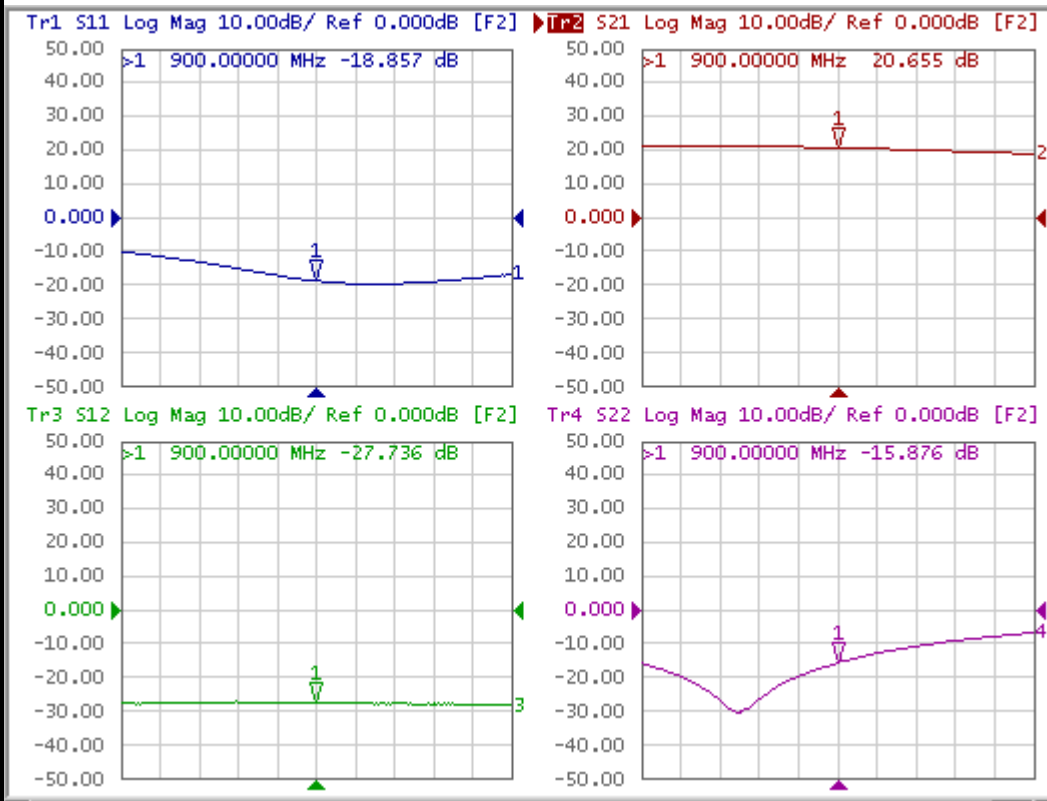
1. PCB: 31mil thick FR4

TITLE	
BL081 Evaluation Board	
(900 MHz)	
Drawing Number	Rev.
Date	Drawn By
FILE NAME	SHEET

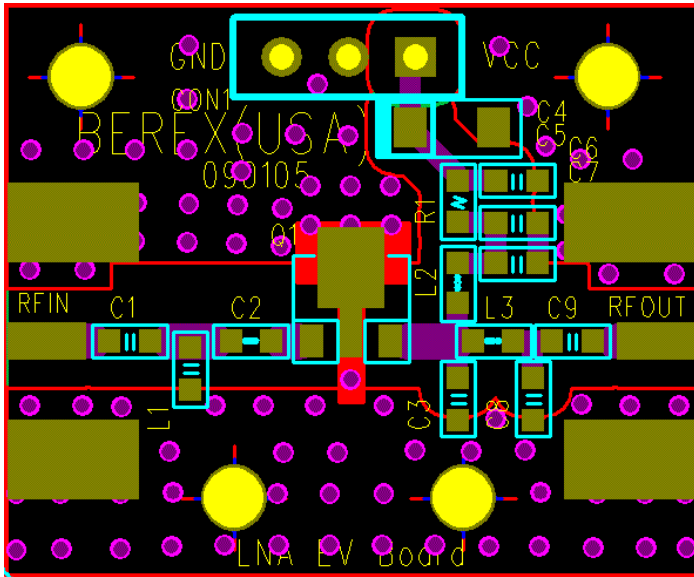
10.1 BL081\_900MHz(with HPF) Test Result

SN	Freq [MHz]	Vcc [V]	Icc [mA]	Gain [dB]	OIP3 [dBm] <sup>(1)</sup>	P1dB [dBm]	IRL [dB]	ORL [dB]	NF [dB]
	900	5	26	20.6	29.5	17.3	-18.8	-15.8	1.13

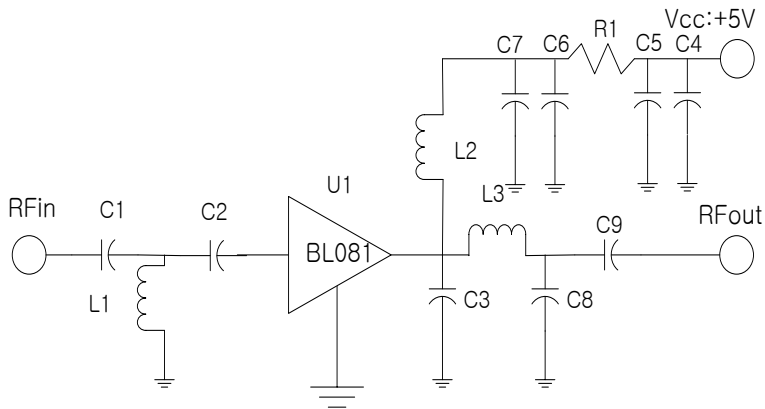
(1) OIP3 was tested @Pout=5dBm/tone 1MHz offset



11. BL081\_ 1900MHz(with HPF) Application Note



Ref. Des.	Description/Part Number	Values	Vendor
C1	0603 CAP	100pF	Samsung
C2	0603 CAP	2pF	Samsung
C3	0603 CAP	DNP	
C4	3216 CAP	10uF	AVX
C5	0603 CAP	100nF	Samsung
C6	0603 CAP	1000pF	Samsung
C7	0603 CAP	DNP	
C8	0603 CAP	DNP	
C9	0603 CAP	100pF	Samsung
L1	0603 IND	4.7nH	Ceratech
L2	0603 IND	18nH	Ceratech
L3	0603 RES	4.7nH	Ceratech
R1	0603 RES	0ohm	
U1	SOT89 PKG	BL081	BEREX



Note:

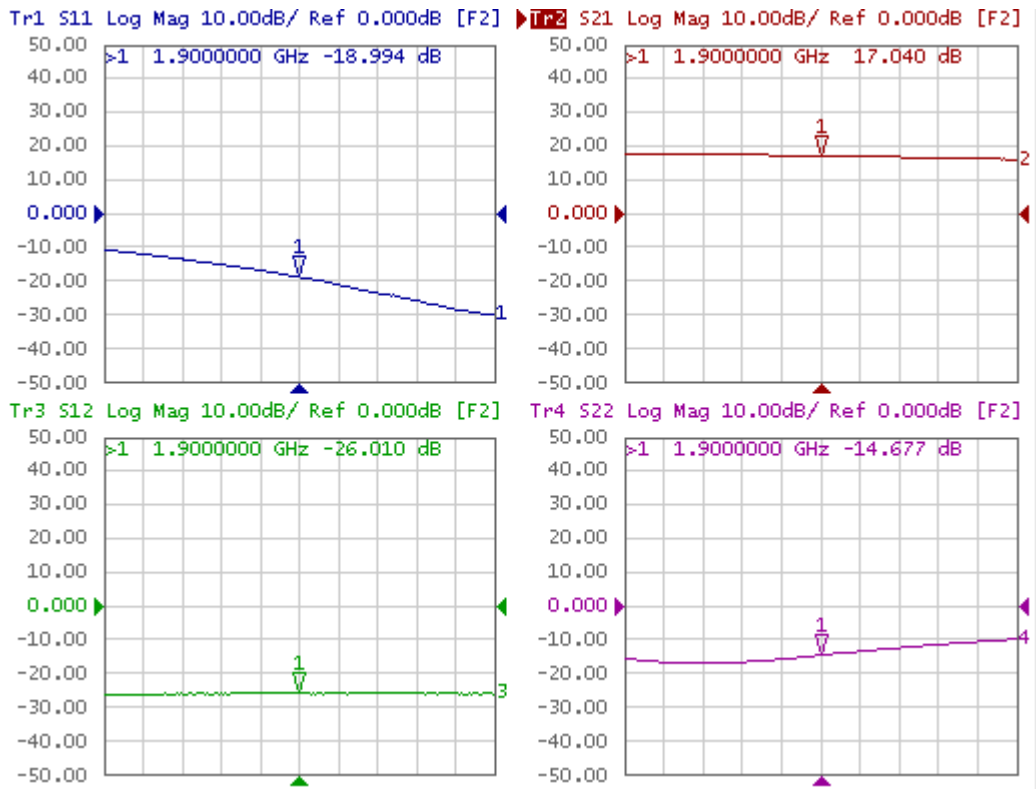
1. PCB: 31mil thick FR4

TITLE	
BL081 Evaluation Board	
(1900 MHz)	
Drawing Number	Rev.
Date	Drawn By
FILE NAME	SHEET

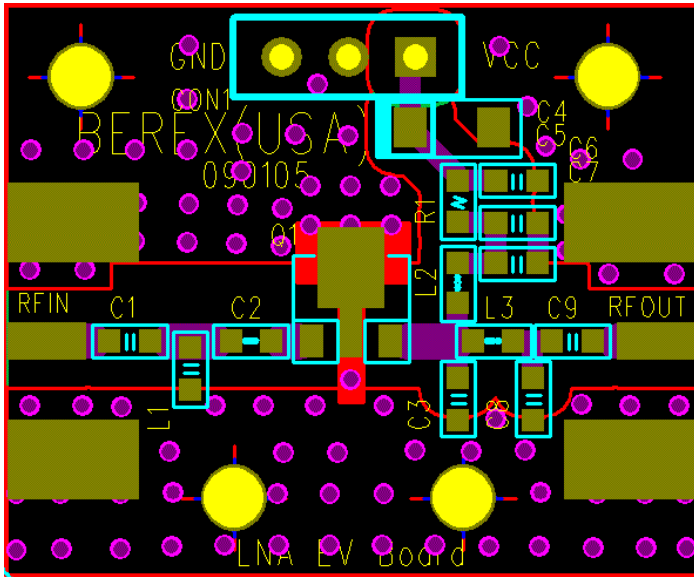
11.1 BL081\_1900MHz (with HPF) Test Result

SN	Freq [MHz]	Vcc [V]	Icc [mA]	Gain [dB]	OIP3 [dBm] <sup>(1)</sup>	P1dB [dBm]	IRL [dB]	ORL [dB]	NF [dB]
	1900	5	26	17.0	30	18	-18.9	-14.6	1.18

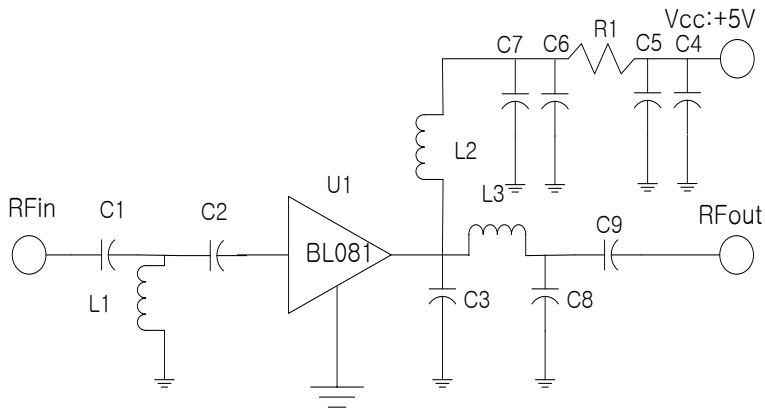
(1) OIP3 was tested @Pout=5dBm/tone 1MHz offset



12. BL081\_2140MHz (with HPF) Application Note



Ref. Des.	Description/Part Number	Values	Vendor
C1	0603 CAP	100pF	Samsung
C2	0603 CAP	2pF	Samsung
C3	0603 CAP	DNP	
C4	3216 CAP	10uF	AVX
C5	0603 CAP	100nF	Samsung
C6	0603 CAP	1000pF	Samsung
C7	0603 CAP	DNP	
C8	0603 CAP	1pF	Samsung
C9	0603 CAP	100pF	Samsung
L1	0603 IND	33nH	Ceratech
L2	0603 IND	100nH	Ceratech
L3	0603 RES	4.7nH	Ceratech
R1	0603 RES	0ohm	
U1	SOT89 PKG	BL081	BEREX



Note:

- 1. PCB: 31mil thick FR4

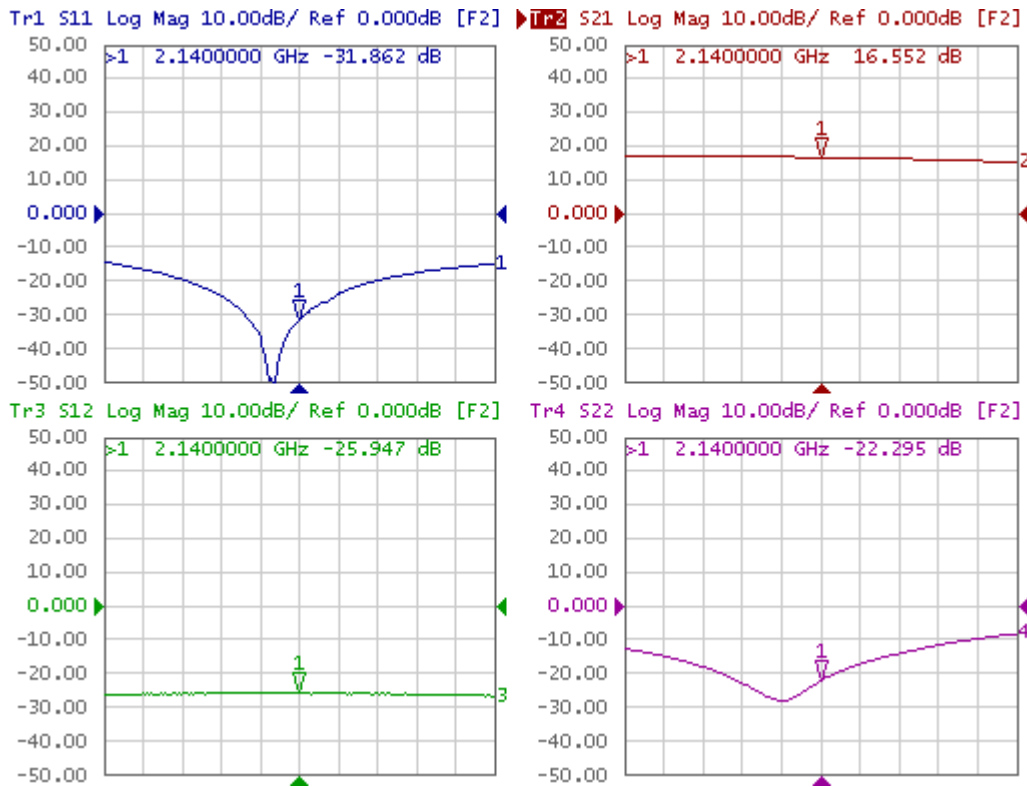
TITLE	
BL081 Evaluation Board	
(2140 MHz)	
Drawing Number	Rev.
Date	Drawn By
FILE NAME	SHEET



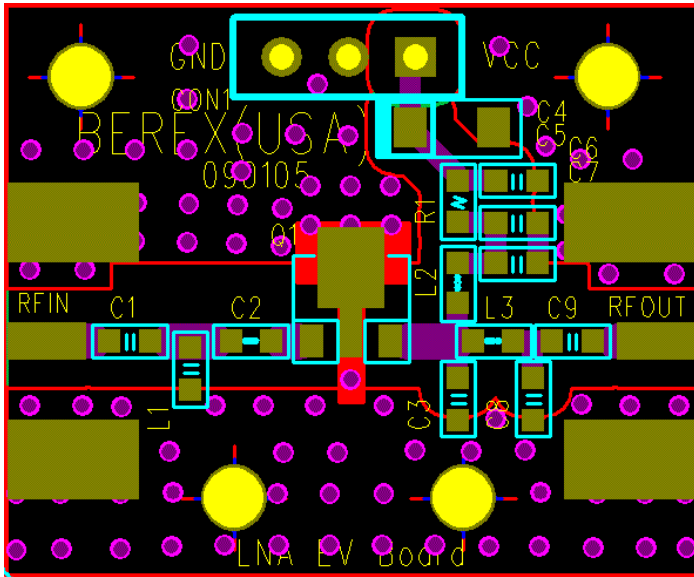
12.1 BL081\_2140MHz (with HPF) Test Result

SN	Freq [MHz]	Vcc [V]	Icc [mA]	Gain [dB]	OIP3 [dBm] <sup>(1)</sup>	P1dB [dBm]	IRL [dB]	ORL [dB]	NF [dB]
	2140	5	26	16.5	30.5	18.3	-31.8	-22.2	1.2

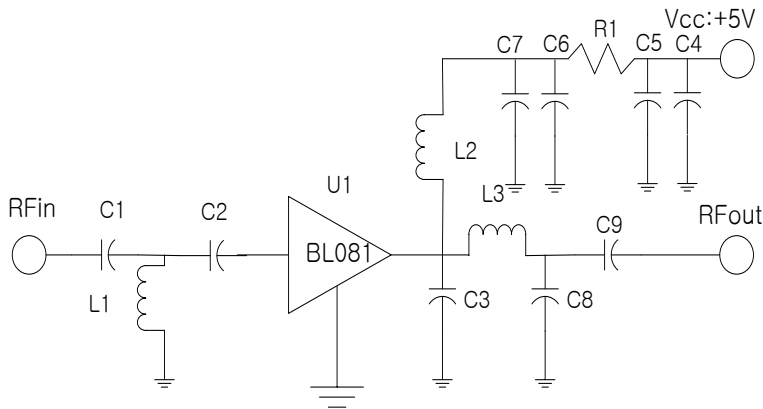
(1) OIP3 was tested @Pout=5dBm/tone 1MHz offset



13. BL081\_2450MHz(with HPF) Application Note



Ref. Des.	Description/Part Number	Values	Vendor
C1	0603 CAP	100pF	Samsung
C2	0603 CAP	1.5pF	Samsung
C3	0603 CAP	DNP	
C4	3216 CAP	10uF	AVX
C5	0603 CAP	100nF	Samsung
C6	0603 CAP	1000pF	Samsung
C7	0603 CAP	DNP	
C8	0603 CAP	1pF	Samsung
C9	0603 CAP	100pF	Samsung
L1	0603 IND	3.3nH	Ceratech
L2	0603 IND	47nH	Ceratech
L3	0603 RES	3.3nH	Ceratech
R1	0603 RES	0ohm	
U1	SOT89 PKG	BL081	BEREX



Note:

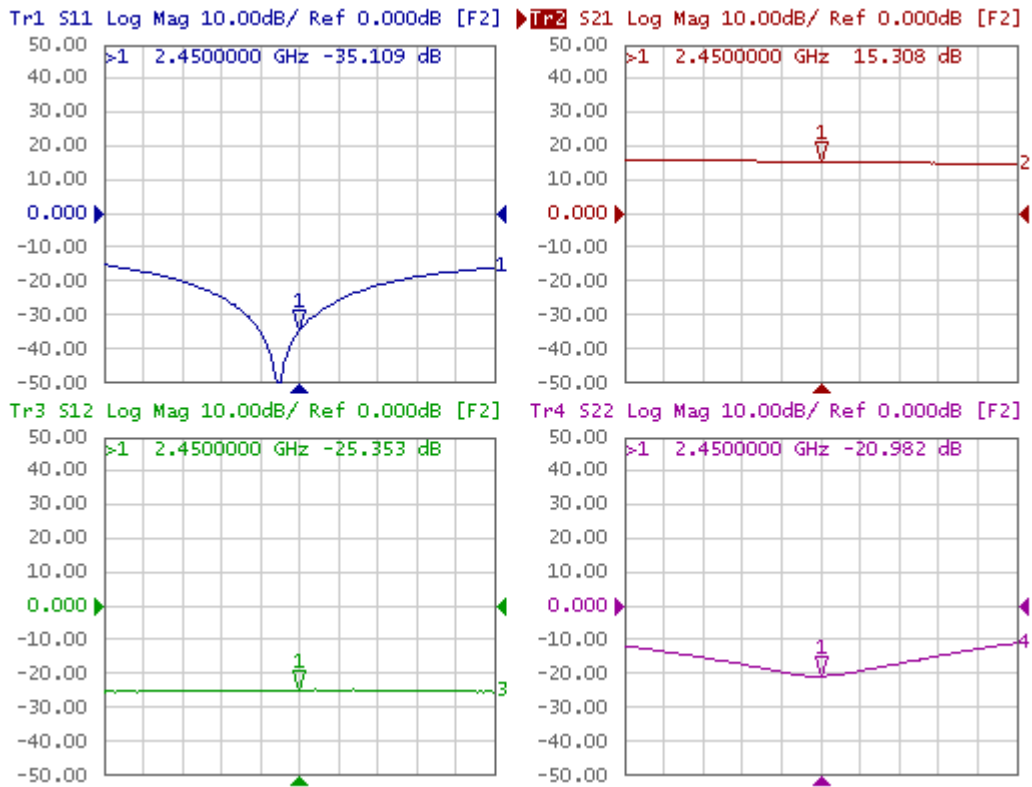
1. PCB: 31mil thick FR4

TITLE	
BL081 Evaluation Board	
(2450 MHz)	
Drawing Number	Rev.
Date	Drawn By
FILE NAME	SHEET

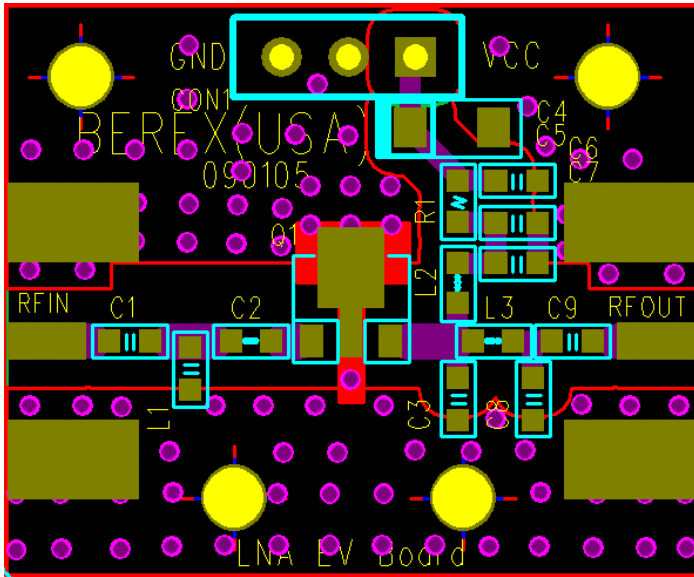
13.1 BL081\_2450MHz (with HPF) Test Result

SN	Freq [MHz]	Vcc [V]	Icc [mA]	Gain [dB]	OIP3 [dBm] <sup>(1)</sup>	P1dB [dBm]	IRL [dB]	ORL [dB]	NF [dB]
	2450	5	26	15.3	31.5	19	-35.1	-20.9	1.26

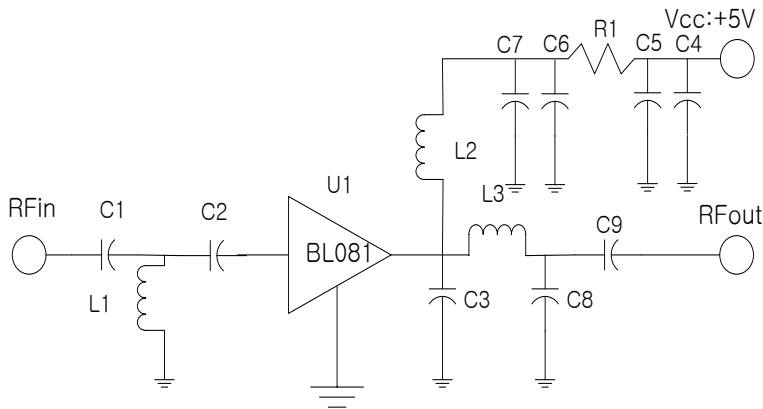
(1) OIP3 was tested @Pout=5dBm/tone 1MHz offset



14. BL081\_3500MHz(with HPF) Application Note



Ref. Des.	Description/Part Number	Values	Vendor
C1	0603 CAP	100pF	Samsung
C2	0603 CAP	1pF	Samsung
C3	0603 CAP	DNP	
C4	3216 CAP	10uF	AVX
C5	0603 CAP	100nF	Samsung
C6	0603 CAP	1000pF	Samsung
C7	0603 CAP	DNP	
C8	0603 CAP	1pF	Samsung
C9	0603 CAP	100pF	Samsung
L1	0603 IND	5.6nH	Ceratech
L2	0603 IND	33nH	Ceratech
L3	0603 RES	1.8nH	Ceratech
R1	0603 RES	0ohm	
U1	SOT89 PKG	BL081	BEREX



Note:

1. PCB: 31mil thick FR4

TITLE	
BL081 Evaluation Board	
(3500 MHz)	
Drawing Number	Rev.
Date	Drawn By
FILE NAME	SHEET

14.1 BL081\_3500MHz(with HPF) Test Result

SN	Freq [MHz]	Vcc [V]	Icc [mA]	Gain [dB]	OIP3 [dBm] <sup>(1)</sup>	P1dB [dBm]	IRL [dB]	ORL [dB]	NF [dB]
	3500	5	26	12.9	32	17.6	-17.4	-19.6	1.37

(1) OIP3 was tested @Pout=5dBm/tone 1MHz offset

