

RF MMIC Innovator

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[CLASSIFICATION] APPLICATION NOTE

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[REVISION NO.] REV.A

[MEASURING INSTRUMENTS]

- NA\_AGILENT 8753ES

- SA\_AGILENT E4404B

- SG\_AGILENT 4438C

- SG\_IFR 3416

## Wide Band Drive Amp BT013

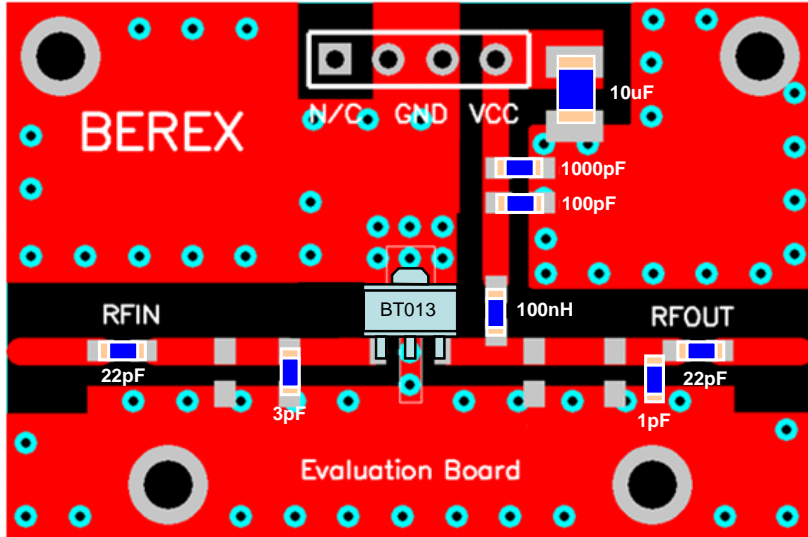
### Application Note



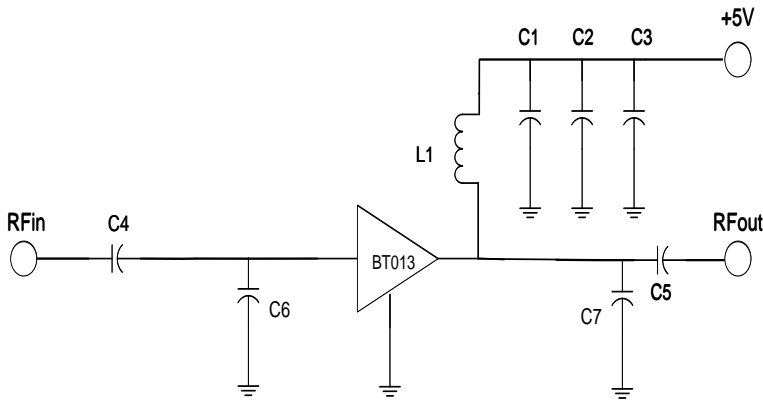
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1. BT013\_PCS(1750~1780MHz) Application Note



Ref. Des.	Description/ Part Number	Values	Vendor
C1	0603 CAP	100pF	Samsung
C2	0604 CAP	1000pF	Samsung
C3	A3216 CAP	10uF	AVX
C4	0603 CAP	22pF	Samsung
C5	0603 CAP	22pF	Samsung
C6	0603 CAP	3pF	Samsung
C7	0603 CAP	1pF	Samsung
C8	0603 CAP	NA	
C9	0603 CAP	NA	
C10	0603 CAP	NA	
C11	0603 CAP	NA	
C12	0603 CAP	NA	
L1	0603 IND	100nH	Ceratech
L2	0603 IND	NA	Ceratech
L3	0603 IND	NA	
R1	0603 RES	NA	
U1	SOT89 PKG	BT013	BEREX



Note:

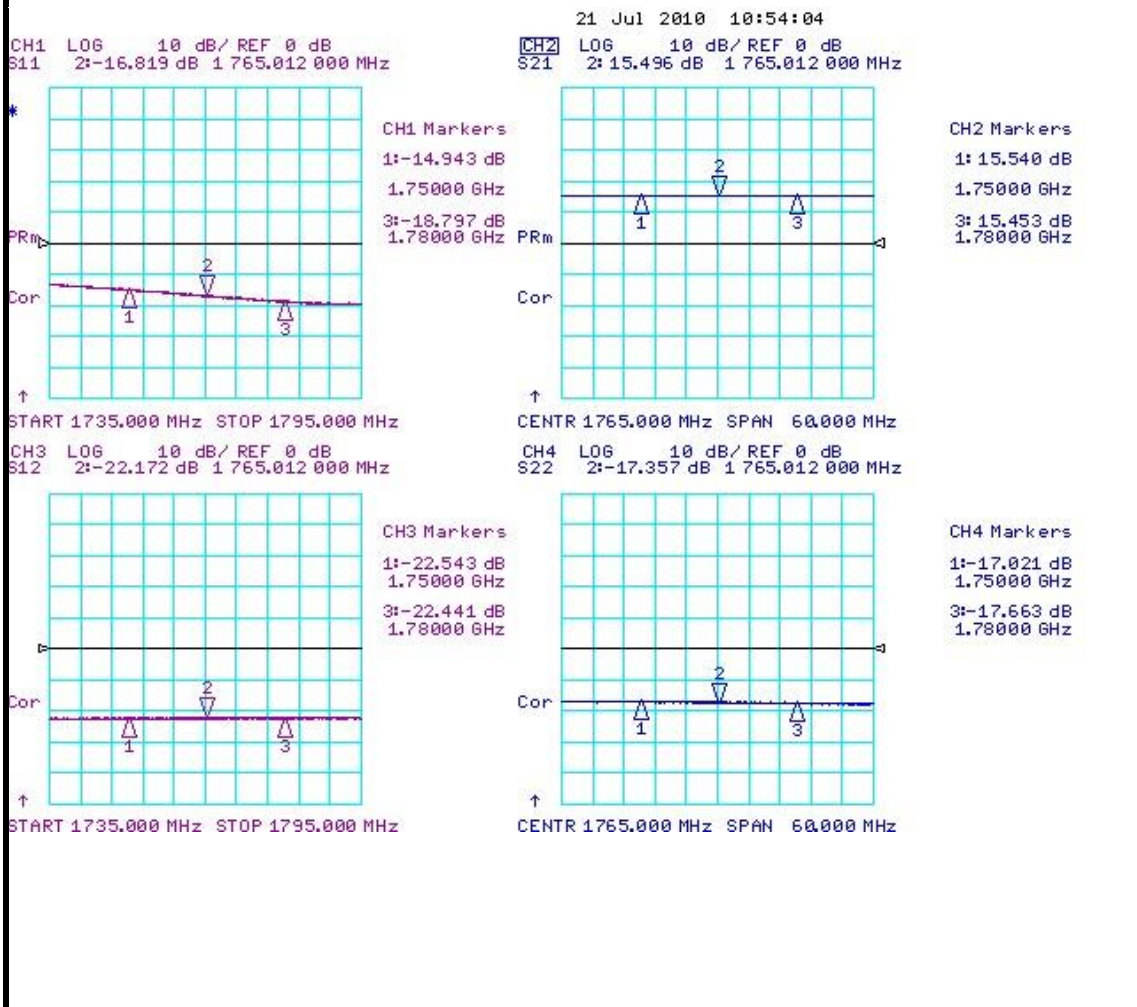
1. PCB: 31mil thick FR4
2. The distance between the center of the shunt cap(C6) and the Input Pin of BT013 is 4.4mm
3. The distance between the center of the shunt cap(C7) and the Output Pin of BT013 is 10.0mm

TITLE	
BT013 Evaluation Board	
(1740~1790 MHz)	
Drawing Number	Rev.
Date	Drawn By
FILE NAME	SHEET

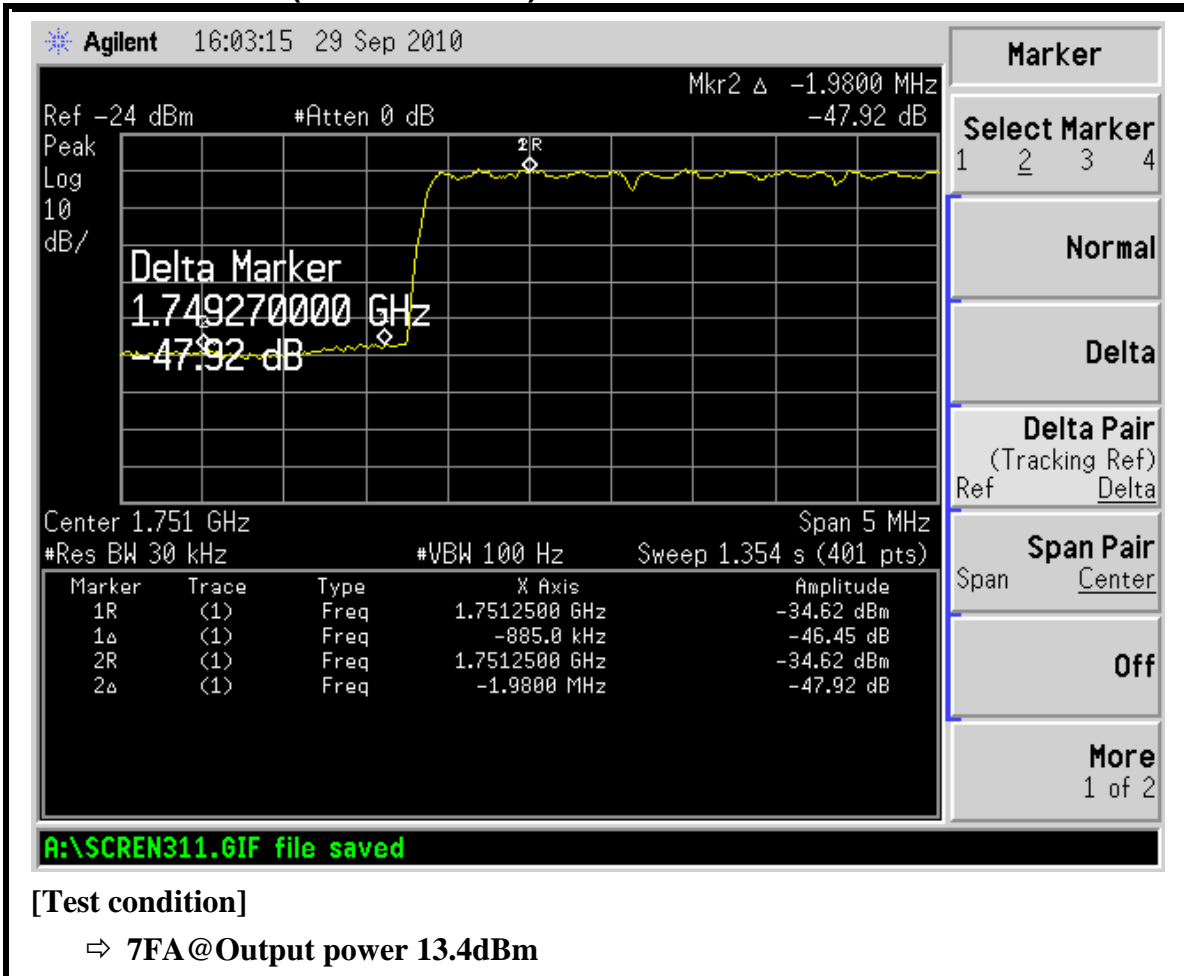
1.1 BT013\_PCS(1750~1780MHz) Test Result

SN	Freq [MHz]	Vcc [V]	Icc [mA]	Gain [dB]	OIP3 [dBm] <sup>(1)</sup>	P1dB [dBm]	IRL [dB]	ORL [dB]	NF [dB]
	1765	5	141	15.4	45.4	27.1	16.8	17.3	7

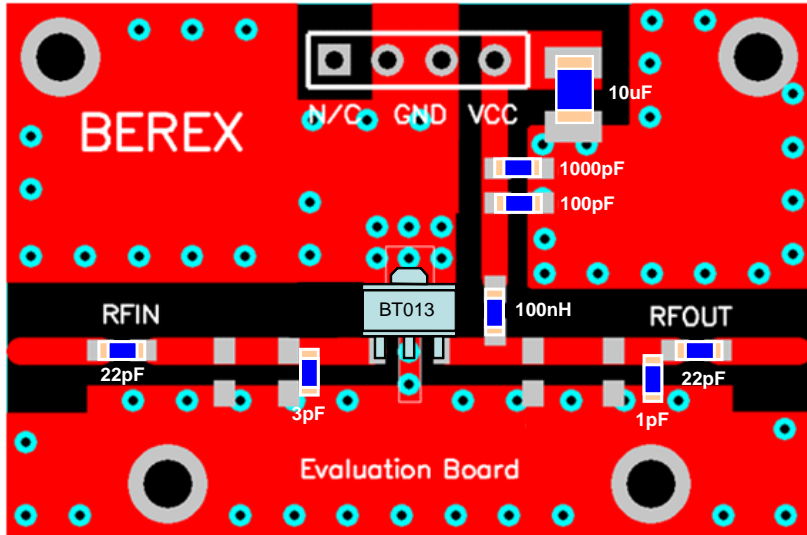
(1) OIP3 was tested @Pout=13dBm/tone 1MHz offset



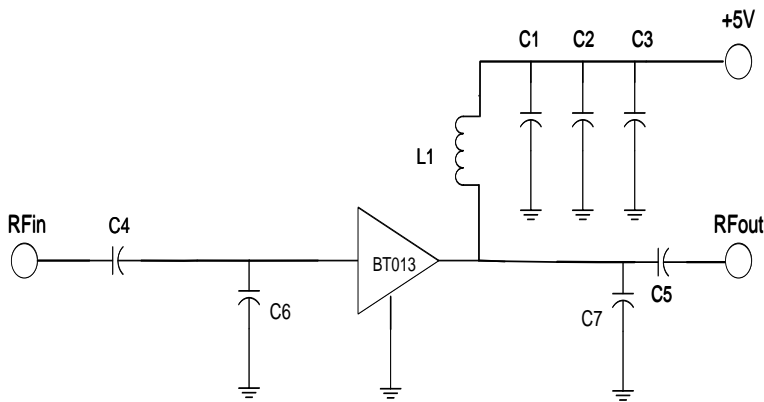
1.2 BT013\_PCS(1750~1780MHz) SPURIOUS



2. BT013\_PCS(1840~1870MHz) Application Note



Ref. Des.	Description/Part Number	Values	Vendor
C1	0603 CAP	100pF	Samsung
C2	0604 CAP	1000pF	Samsung
C3	A3216 CAP	10uF	AVX
C4	0603 CAP	22pF	Samsung
C5	0603 CAP	22pF	Samsung
C6	0603 CAP	3pF	Samsung
C7	0603 CAP	1pF	Samsung
C8	0603 CAP	NA	
C9	0603 CAP	NA	
C10	0603 CAP	NA	
C11	0603 CAP	NA	
C12	0603 CAP	NA	
L1	0603 IND	100nH	Ceratech
L2	0603 IND	NA	Ceratech
L3	0603 IND	NA	
R1	0603 RES	NA	
U1	SOT89 PKG	BT013	BEREX



Note:

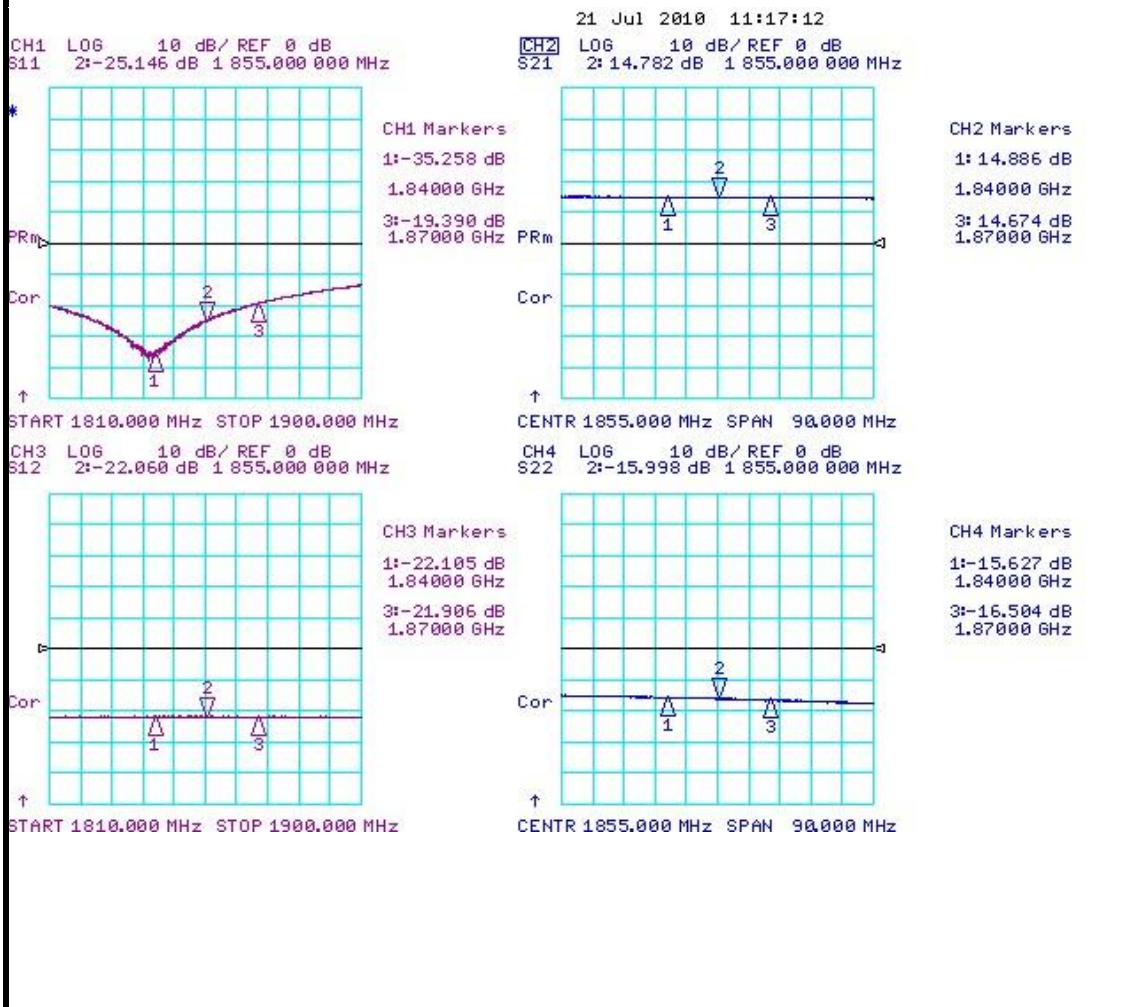
1. PCB: 31mil thick FR4
2. The distance between the center of the shunt cap(C6) and the Input Pin of BT013 is 3.5mm
3. The distance between the center of the shunt cap(C7) and the Output Pin of BT013 is 9.0mm

TITLE	
BT013 Evaluation Board	
(1840~1870 MHz)	
Drawing Number	Rev.
Date	Drawn By
FILE NAME	SHEET

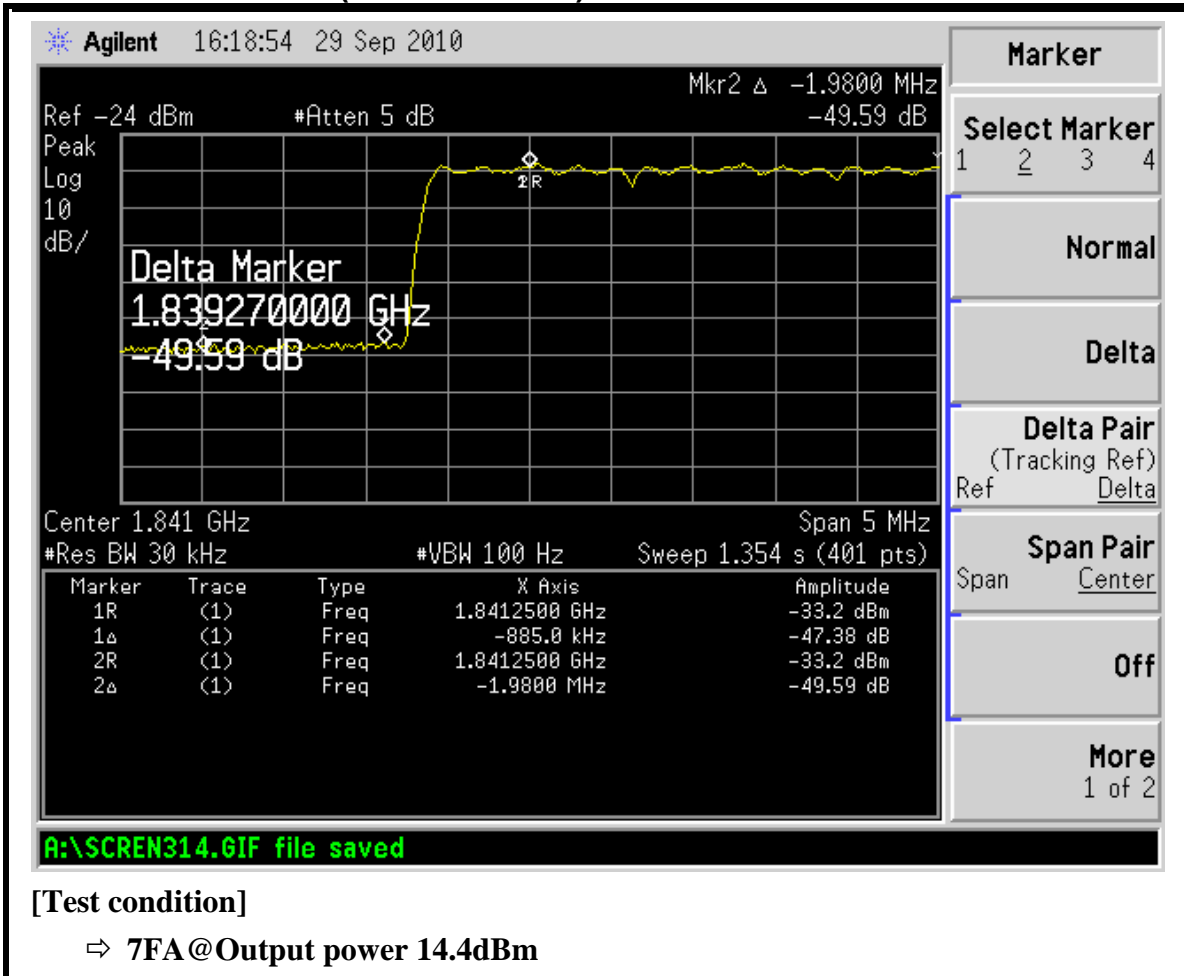
2.1 BT013\_PCS(1840~1870MHz)Test Result

SN	Freq [MHz]	Vcc [V]	Icc [mA]	Gain [dB]	OIP3 [dBm] <sup>(1)</sup>	P1dB [dBm]	IRL [dB]	ORL [dB]	NF [dB]
	1850	5	135	14.7	44.2	27	25.1	15.9	7

(1) OIP3 was tested @Pout=13dBm/tone 1MHz offset

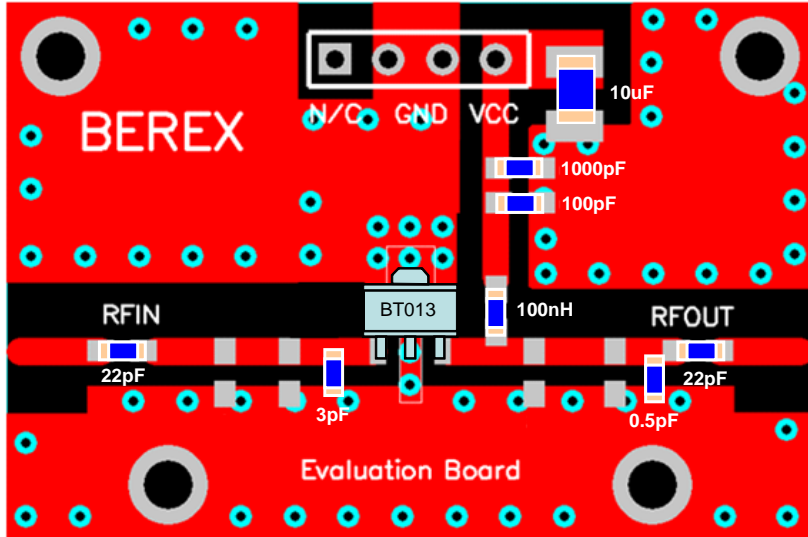


2.2 BT013\_PCS(1840~1870MHz) SPURIOUS

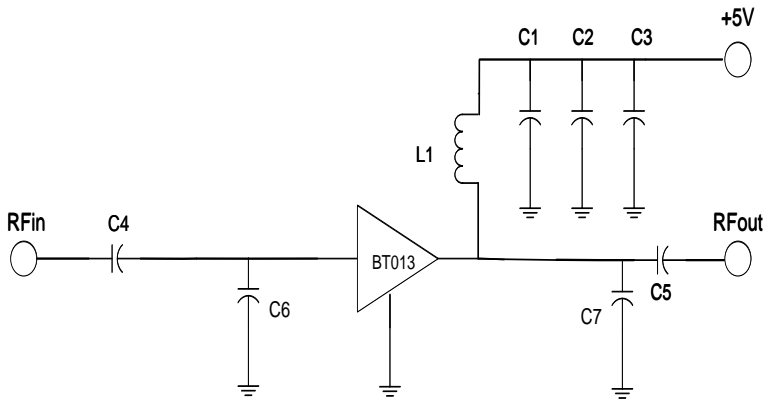




3 BT013\_WCDMA(1940~1980MHz) Application Note



Ref. Des.	Description/Part Number	Values	Vendor
C1	0603 CAP	100pF	Samsung
C2	0604 CAP	1000pF	Samsung
C3	A3216 CAP	10uF	AVX
C4	0603 CAP	22pF	Samsung
C5	0603 CAP	22pF	Samsung
C6	0603 CAP	3pF	Samsung
C7	0603 CAP	0.5pF	Samsung
C8	0603 CAP	NA	
C9	0603 CAP	NA	
C10	0603 CAP	NA	
C11	0603 CAP	NA	
C12	0603 CAP	NA	
L1	0603 IND	100nH	Ceratech
L2	0603 IND	NA	Ceratech
L3	0603 IND	NA	
R1	0603 RES	NA	
U1	SOT89 PKG	BT013	BEREX



Note:

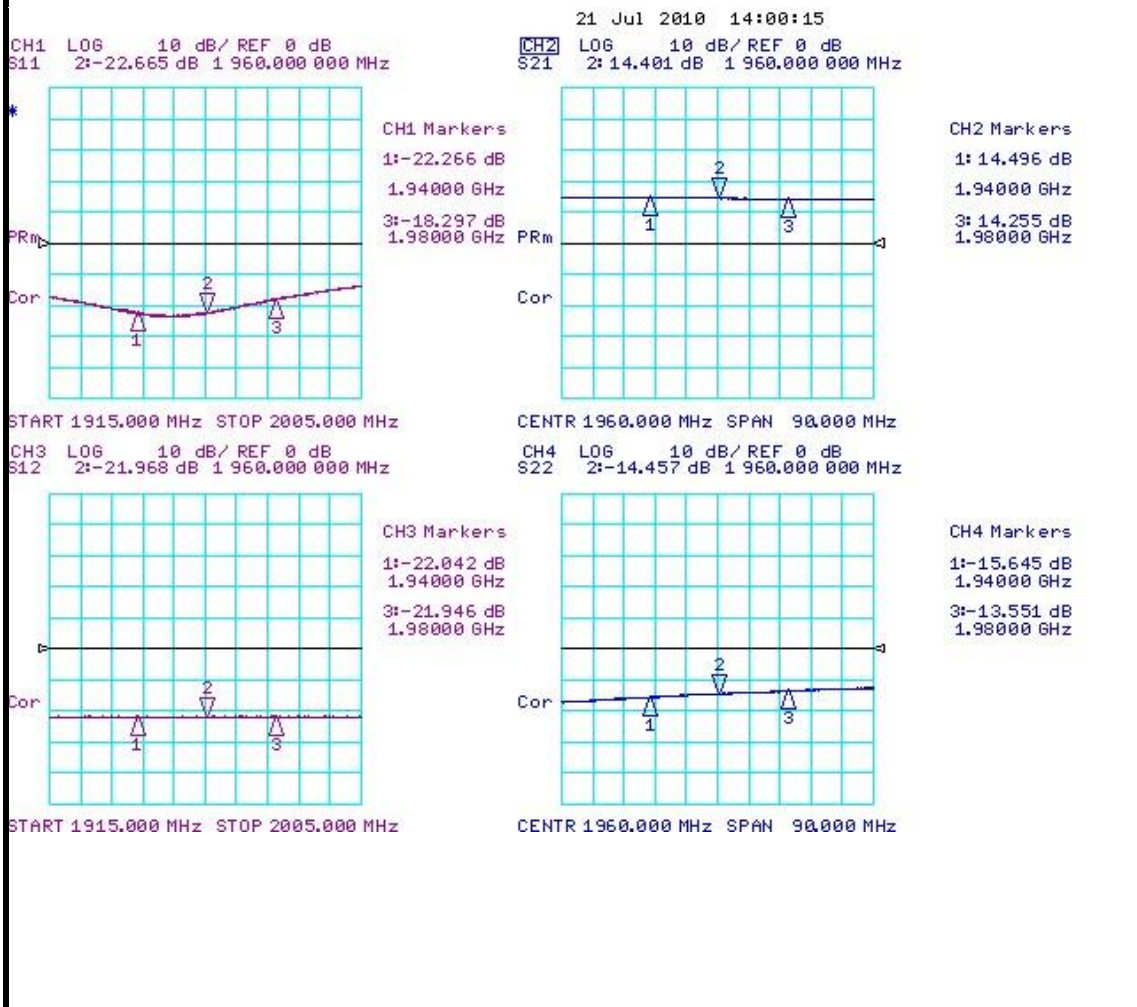
1. PCB: 31mil thick FR4
2. The distance between the center of the shunt cap(C6) and the Input Pin of BT013 is 1.8mm
3. The distance between the center of the shunt cap(C7) and the Output Pin of BT013 is 9.0mm

TITLE	
BT013 Evaluation Board	
(1940~1980 MHz)	
Drawing Number	Rev.
Date	Drawn By
FILE NAME	SHEET

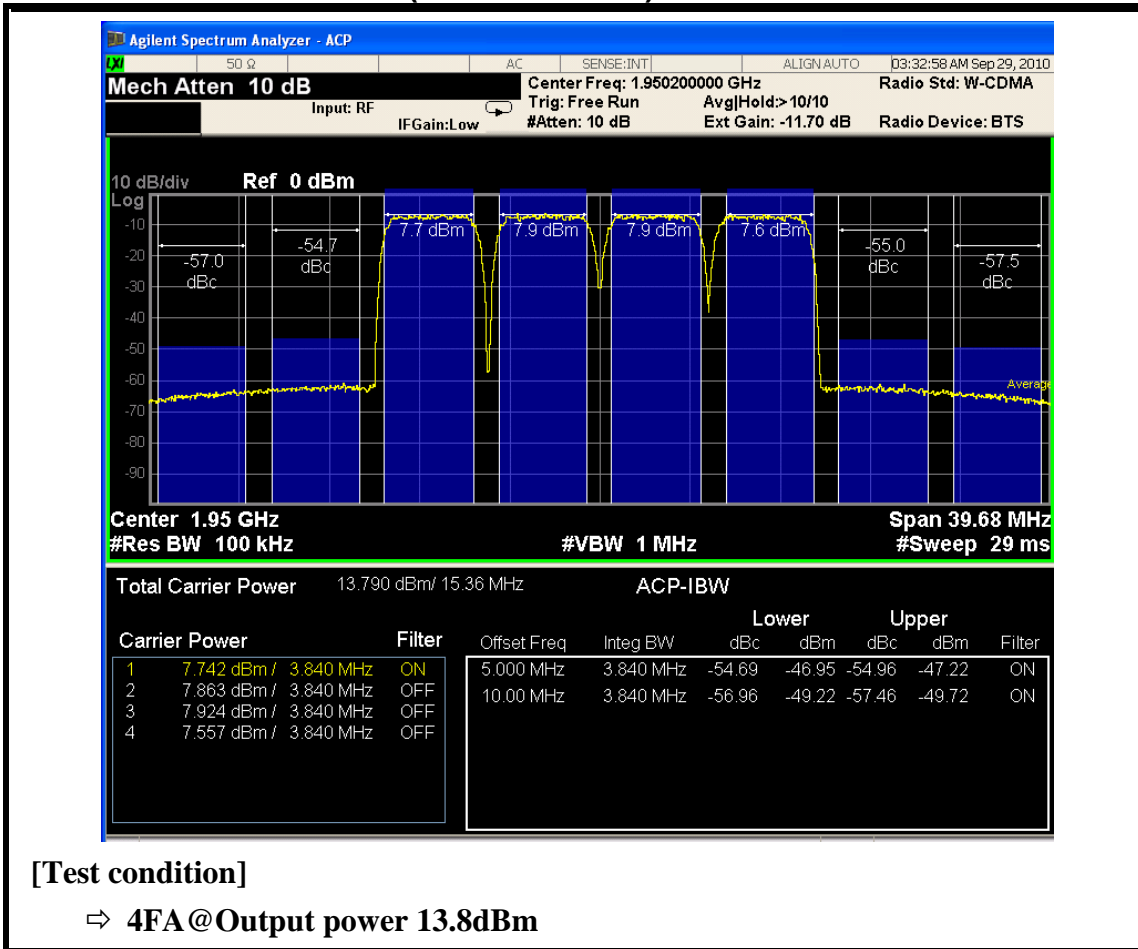
3.1 BT013\_WCDMA(1940~1980MHz)TestResult

SN	Freq [MHz]	Vcc [V]	Icc [mA]	Gain [dB]	OIP3 [dBm] <sup>(1)</sup>	P1dB [dBm]	IRL [dB]	ORL [dB]	NF [dB]
	1960	5	142	14.4	46	26.5	22.6	14.4	6.8

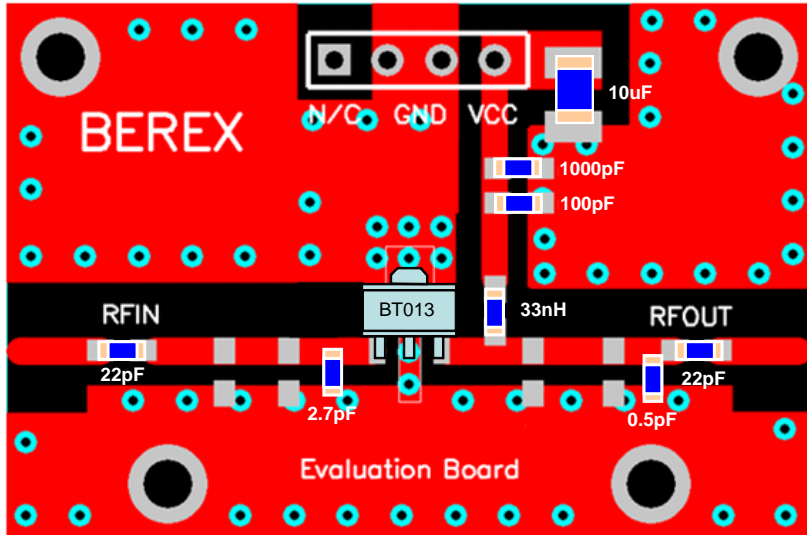
(1) OIP3 was tested @Pout=13dBm/tone 1MHz offset



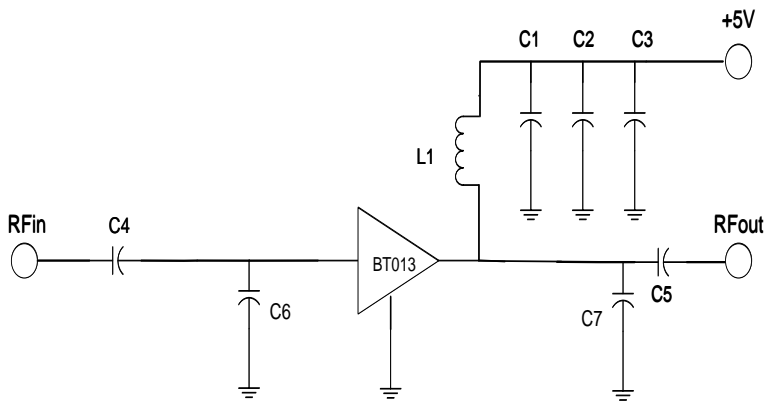
### 3.2 BT013\_WCDMA(1940~1980MHz) ACLR



4 BT013\_WCDMA(2130~2170MHz) Application Note



Ref. Des.	Description/Part Number	Values	Vendor
C1	0603 CAP	100pF	Samsung
C2	0604 CAP	1000pF	Samsung
C3	A3216 CAP	10uF	AVX
C4	0603 CAP	22pF	Samsung
C5	0603 CAP	22pF	Samsung
C6	0603 CAP	2.7pF	Samsung
C7	0603 CAP	0.5pF	Samsung
C8	0603 CAP	NA	
C9	0603 CAP	NA	
C10	0603 CAP	NA	
C11	0603 CAP	NA	
C12	0603 CAP	NA	
L1	0603 IND	33nH	Ceratech
L2	0603 IND	NA	Ceratech
L3	0603 IND	NA	
R1	0603 RES	NA	
U1	SOT89 PKG	BT013	BEREX



Note:

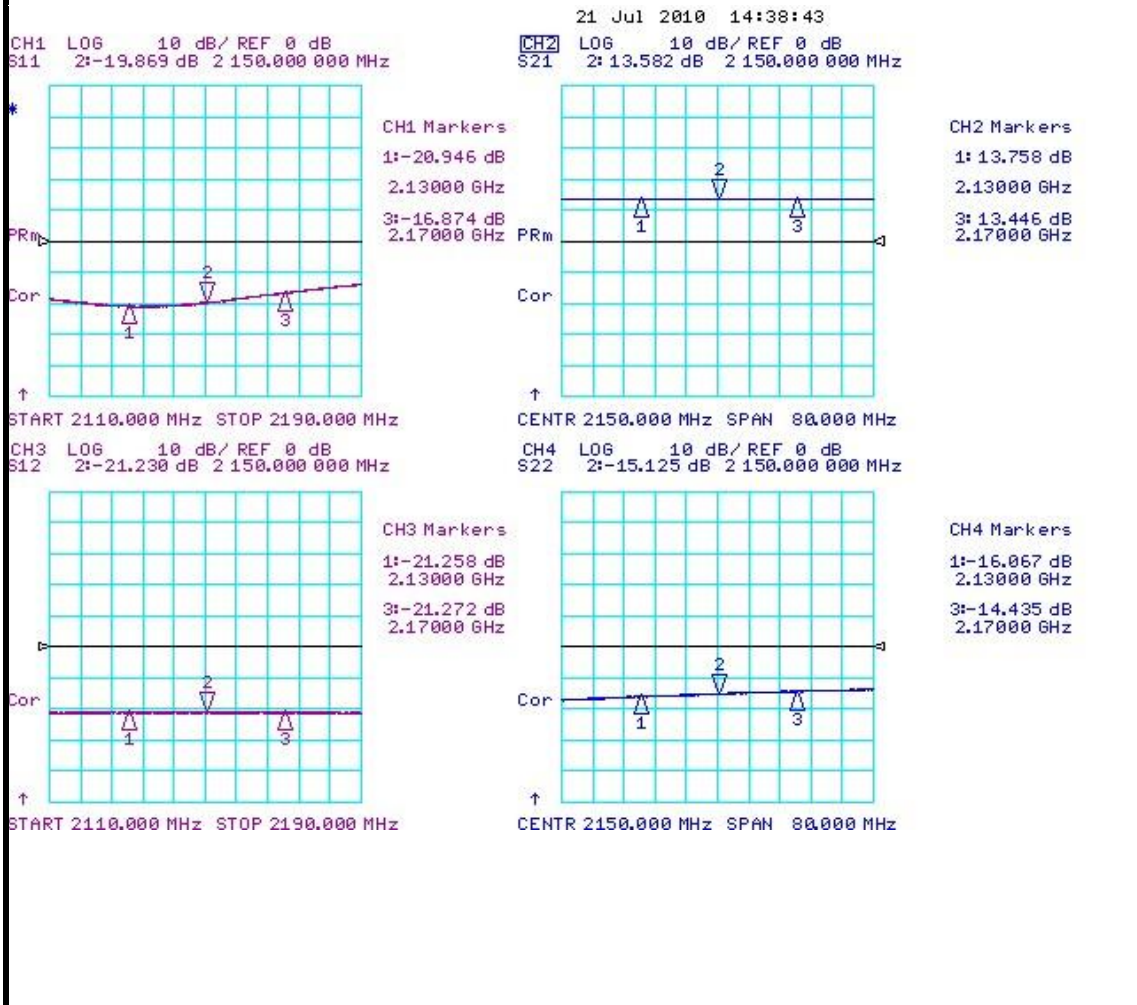
1. PCB: 31mil thick FR4
2. The distance between the center of the shunt cap(C6) and the Input Pin of BT013 is 1.0mm
3. The distance between the center of the shunt cap(C7) and the Output Pin of BT013 is 9.3mm

TITLE	
BT013 Evaluation Board	
(2130~2170 MHz)	
Drawing Number	Rev.
Date	Drawn By
FILE NAME	SHEET

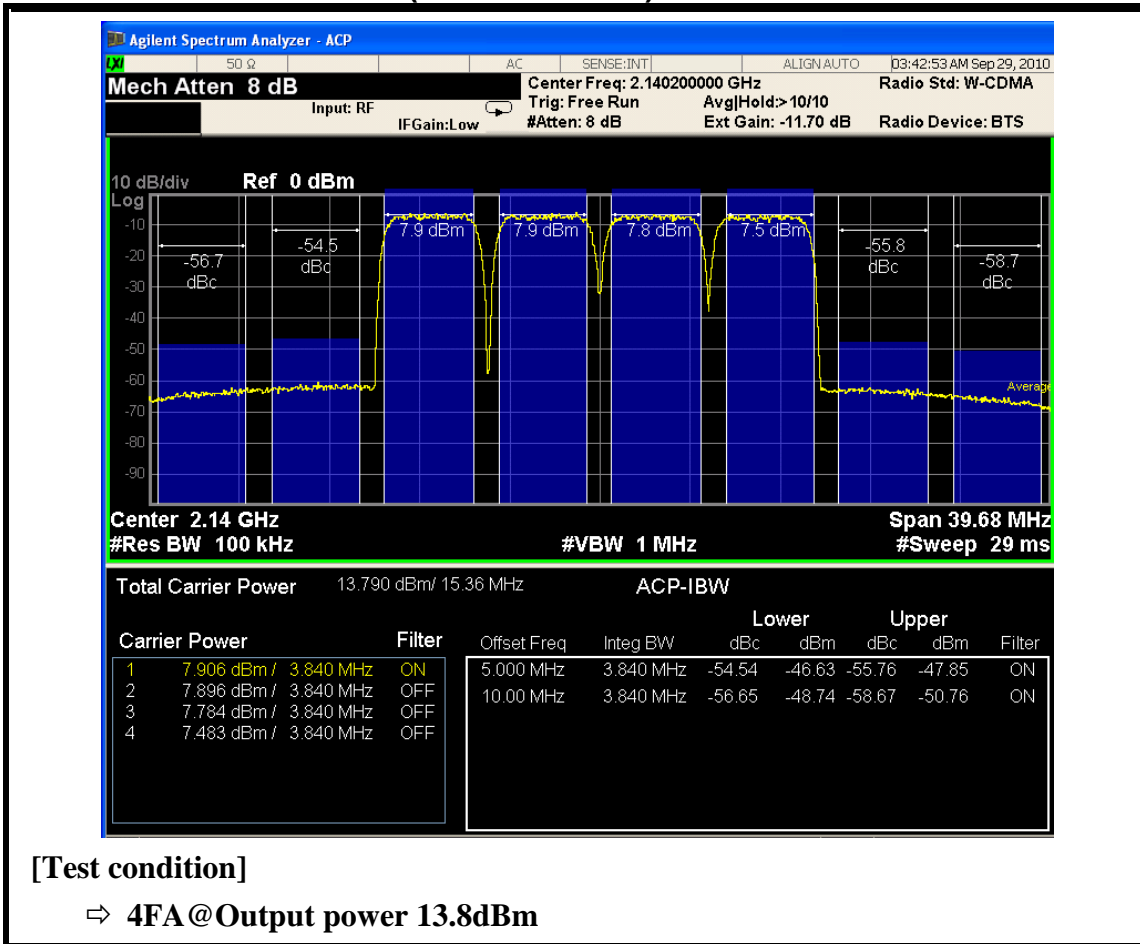
4.1 BT013\_ WCDMA(2130~2170MHz) Test Result

SN	Freq [MHz]	Vcc [V]	Icc [mA]	Gain [dB]	OIP3 [dBm] <sup>(1)</sup>	P1dB [dBm]	IRL [dB]	ORL [dB]	NF [dB]
	2150	5	130	13.5	45	26.5	19.8	15.1	6.7

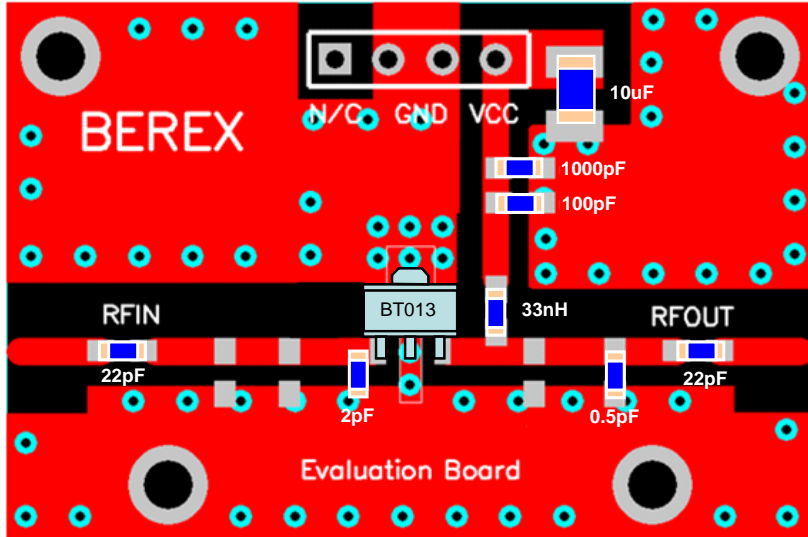
(1) OIP3 was tested @Pout=13dBm/tone 1MHz offset



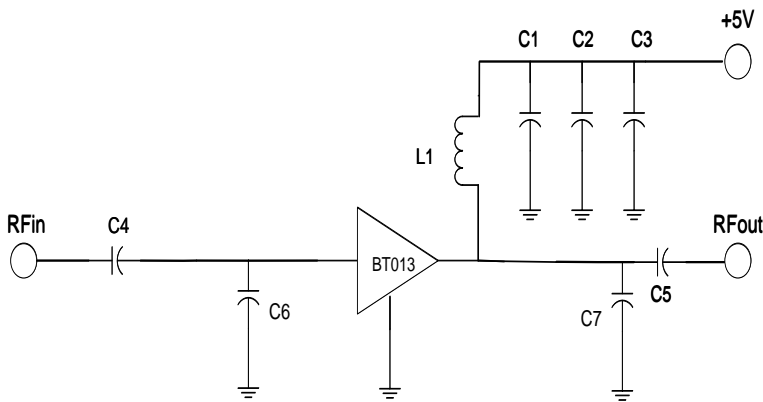
### 4.2 BT013\_ WCDMA(2130~2170MHz) ACLR



5 BT013\_WIBRO(2300~2360MHz) Application Note



Ref. Des.	Description/ Part Number	Values	Vendor
C1	0603 CAP	100pF	Samsung
C2	0604 CAP	1000pF	Samsung
C3	A3216 CAP	10uF	AVX
C4	0603 CAP	22pF	Samsung
C5	0603 CAP	22pF	Samsung
C6	0603 CAP	2pF	Samsung
C7	0603 CAP	0.5pF	Samsung
C8	0603 CAP	NA	
C9	0603 CAP	NA	
C10	0603 CAP	NA	
C11	0603 CAP	NA	
C12	0603 CAP	NA	
L1	0603 IND	33nH	Ceratech
L2	0603 IND	NA	Ceratech
L3	0603 IND	NA	
R1	0603 RES	NA	
U1	SOT89 PKG	BT013	BEREX



Note:

1. PCB: 31mil thick FR4
2. The distance between the center of the shunt cap(C6) and the Input Pin of BT013 is 1.0mm
3. The distance between the center of the shunt cap(C7) and the Output Pin of BT013 is 7.3mm

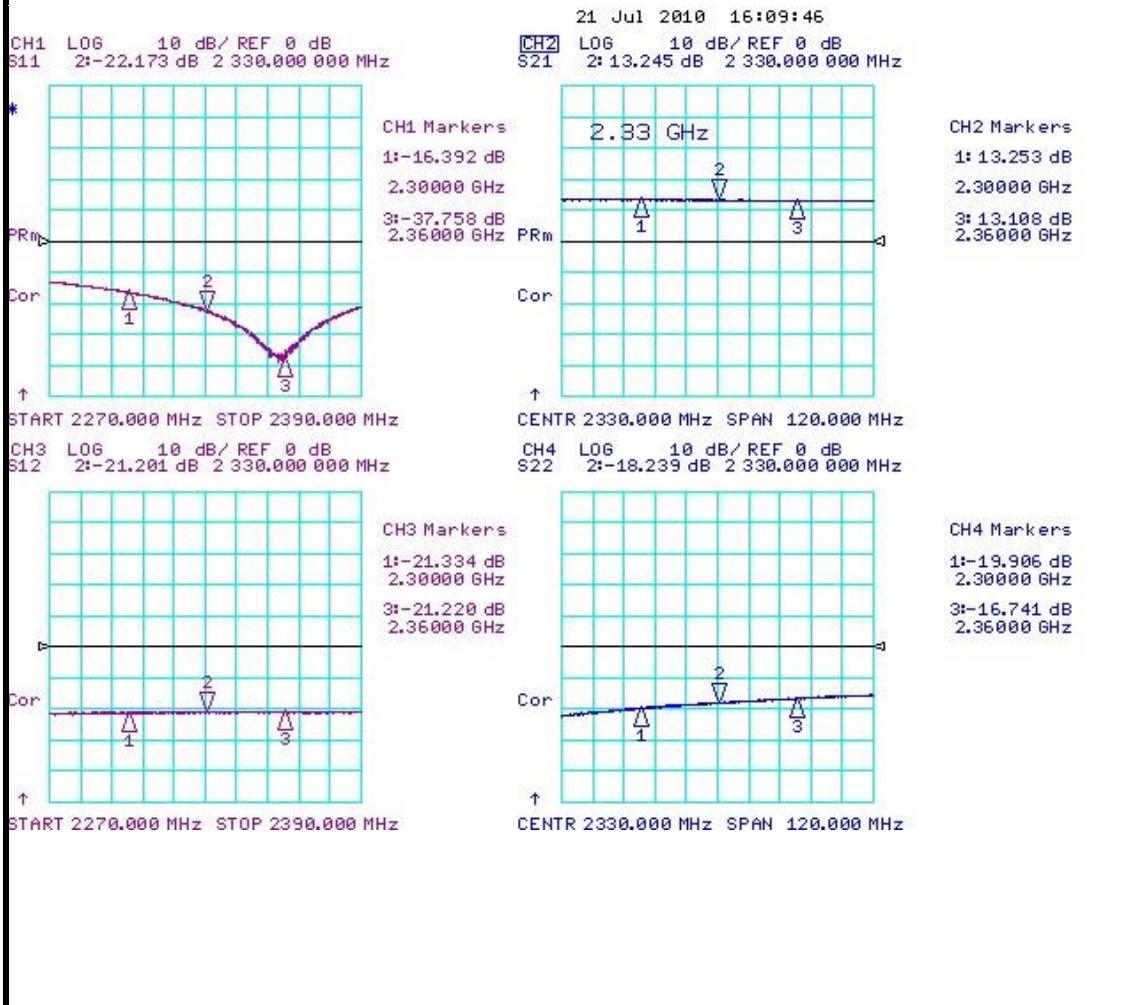
TITLE	
BT013 Evaluation Board	
(2300~2360 MHz)	
Drawing Number	Rev.
Date	Drawn By
FILE NAME	SHEET



5.1 BT013\_WIBRO(2300~2360MHz) Test Result

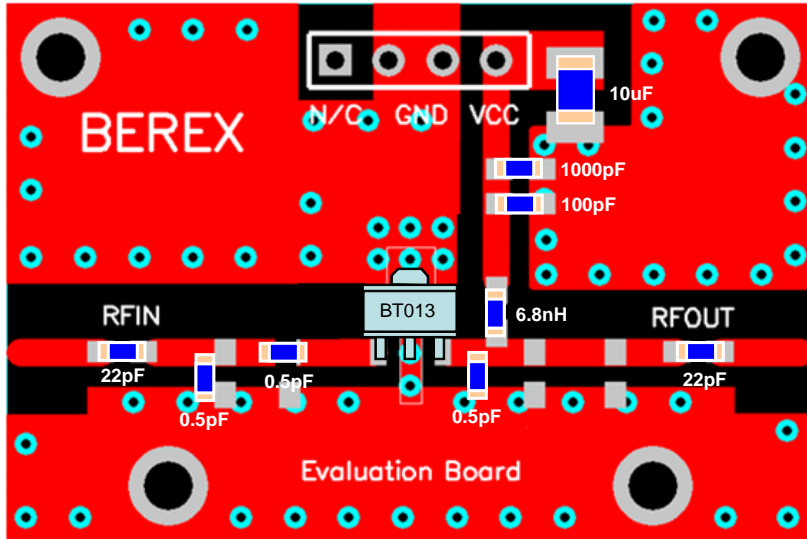
SN	Freq [MHz]	Vcc [V]	Icc [mA]	Gain [dB]	OIP3 [dBm] <sup>(1)</sup>	P1dB [dBm]	IRL [dB]	ORL [dB]	NF [dB]
	2330	5	146	13.2	42	26.8	22.2	18.2	6.8

(1) OIP3 was tested @Pout=13dBm/tone 1MHz offset

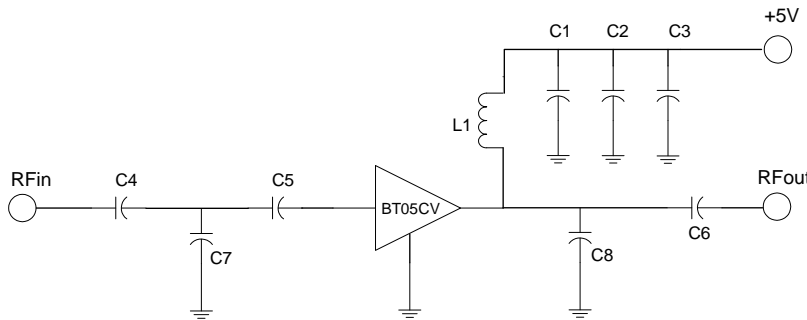




6 BT013\_3500MHz Application Note



Ref. Des.	Description/ Part Number	Values	Vendor
C1	0603 CAP	100pF	Samsung
C2	604 CAP	1000pF	Samsung
C3	A3216 CAP	10uF	AVX
C4	0603 CAP	22pF	Samsung
C5	0603 CAP	0.5pF	Samsung
C6	0603 CAP	22pF	Samsung
C7	0603 CAP	0.5pF	Samsung
C8	0603 CAP	0.5pF	Samsung
C9	0603 CAP	NA	
C10	0603 CAP	NA	
C11	0603 CAP	NA	
C12	0603 CAP	NA	
L1	0603 IND	6.8nH	Ceratech
L2	0603 IND	NA	
L3	0603 IND	NA	
R1	0603 RES	NA	
U1	SOT89 PKG	BT013	BEREX



Note:

1. PCB: 31mil thick FR4
2. The distance between the center of the series cap(C7) and the Input Pin of BT013 is 9.5mm
3. The distance between the center of the shunt cap(C5) and the Input Pin of BT013 is 4.2mm
4. The distance between the center of the shunt cap(C8) and the Output Pin of BT013 is 1.5mm

TITLE	
BT013 Evaluation Board	
(3500 MHz)	
Drawing Number	Rev.
Date	Drawn By
FILE NAME	SHEET

6.1 BT013\_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	129	10.3	40	27.7	16.9	16.3	7.2

(1) OIP3 was tested @Pout=13dBm/tone 1MHz offset

