

RF MMIC Innovator

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[Classification] Application Note

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[Measuring Instruments]

- NA_Agilent 8753ES

- SA_Agilent E4404B

- SG_Agilent 4438C

- SG_IFR 3416

Wide Band Drive Amp BT09VG

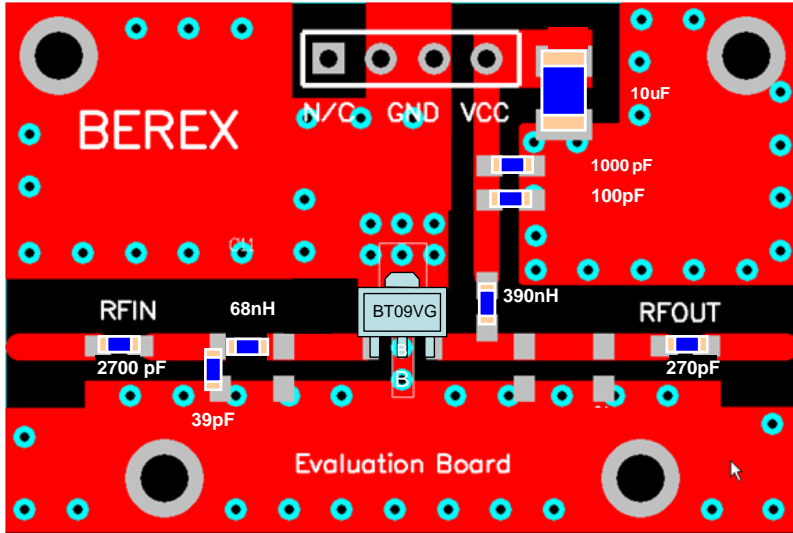
Application Note



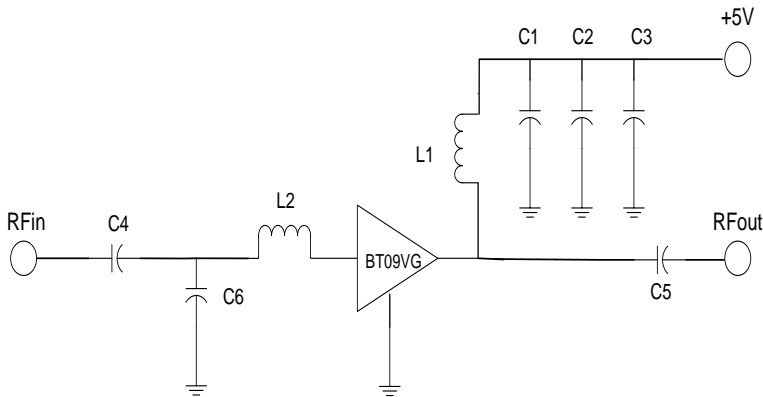
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1. BT09VG 70MHz Application Note



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	2700pF	Samsung
C5	0603 CAP	270pF	Samsung
C6	0603 CAP	39pF	Samsung
C7	0603 CAP	NA	
C8	0603 CAP	NA	
C9	0603 CAP	NA	
C10	0603 CAP	NA	
C11	0603 CAP	NA	
C12	0603 CAP	NA	
L1	0603 IND	390nH	Ceratech
L2	0603 IND	68nH	Ceratech
L3	0603 IND	NA	
R1	0603 RES	NA	
U1	SOT89 PKG	BT09VG	BEREX



Note:

1. PCB: 31mil thick FR4
2. The distance between the center of the shunt cap(C6) and the Input Pin of BT09VG is 5mm

TITLE

BT09VG Evaluation Board

(70 MHz)

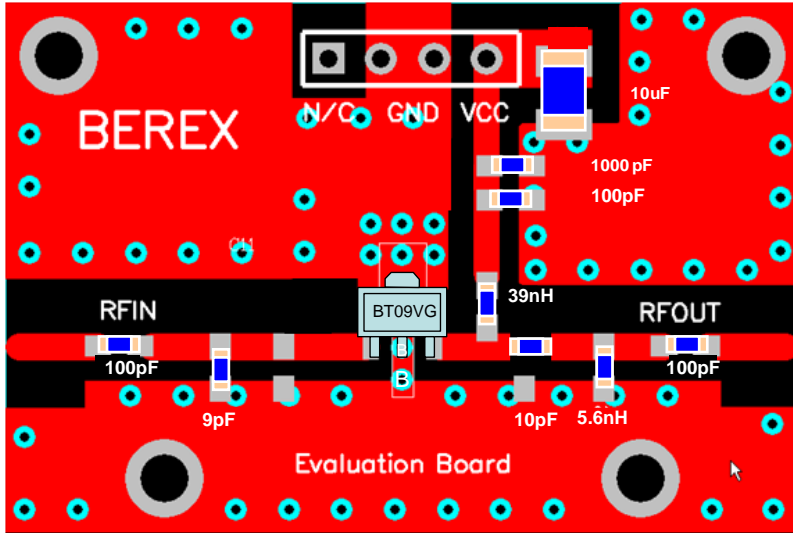
Drawing Number	Rev.
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1.1 BT09VG_70MHz Test Result

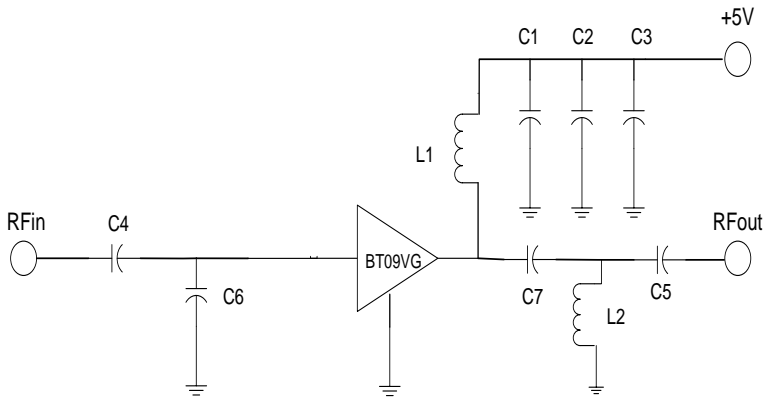
SN	Freq [MHz]	Vcc [V]	Icc [mA]	Gain [dB]	OIP3 [dBm] ⁽¹⁾	P1dB [dBm]	IRL [dB]	ORL [dB]	NF [dB]
-	70	5							3.7

(1) OIP3 was tested @Pout=7dBm/tone 1MHz offset

2. BT09VG_CDMA(824~849MHz) 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	100pF	Samsung
C5	0603 CAP	100pF	Samsung
C6	0603 CAP	9pF	Samsung
C7	0603 CAP	10pF	Samsung
C8	0603 CAP	NA	
C9	0603 CAP	NA	
C10	0603 CAP	NA	
C11	0603 CAP	NA	
C12	0603 CAP	NA	
L1	0603 IND	39nH	Ceratech
L2	0603 IND	5.6nH	Ceratech
L3	0603 IND	NA	
R1	0603 RES	NA	
U1	SOT89 PKG	BT09VG	BEREX



Note:

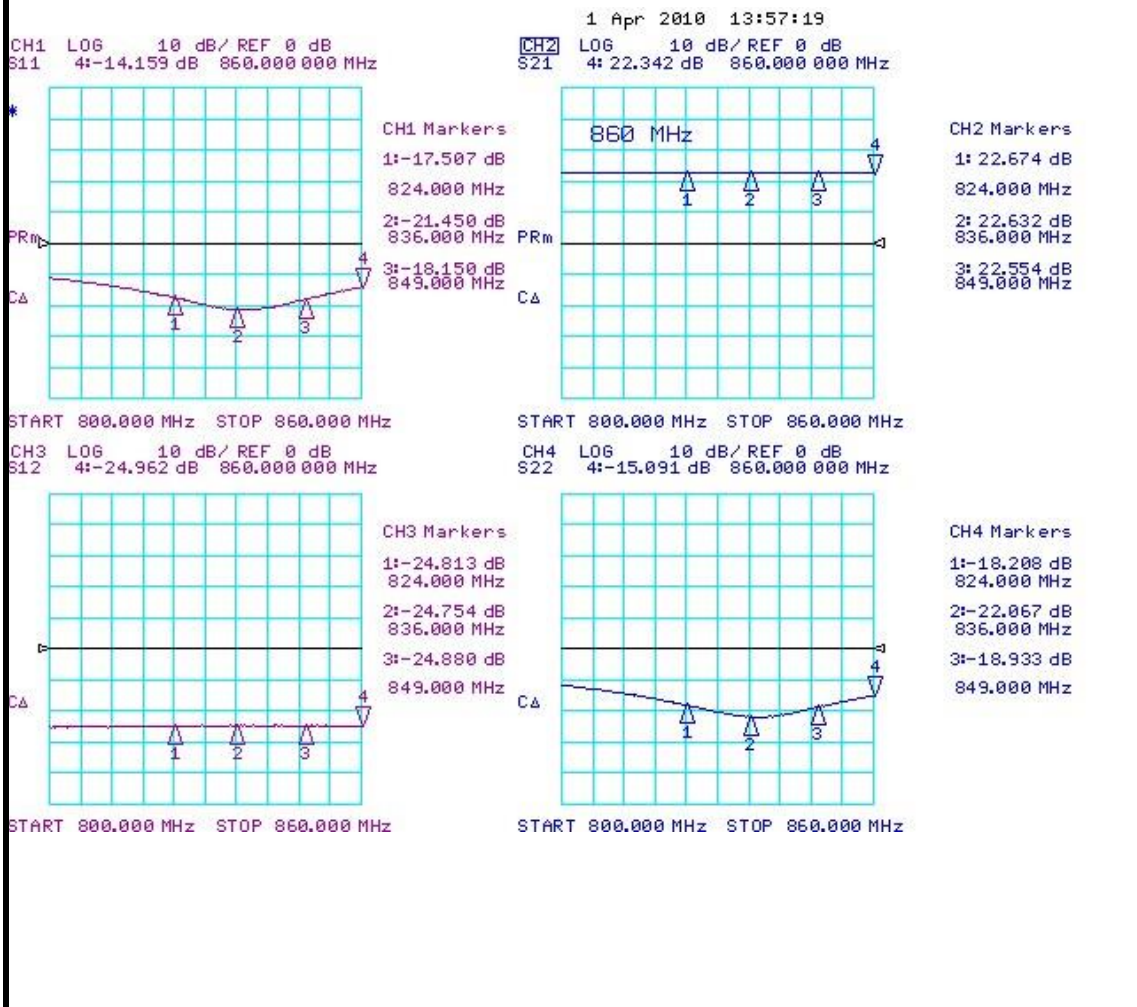
1. PCB: 31mil thick FR4
2. The distance between the center of the shunt cap(C6) and the Input Pin of BT09VG is 8.5mm
3. The distance between the center of the series cap(C7) and the Output Pin of BT09VG is 3.6mm
4. The distance between the center of the shunt Inductor(L2) and the Output Pin of BT09VG is 7.4mm

TITLE	
BT09VG Evaluation Board	
(824~849 MHz)	
Drawing Number	Rev.
Date	Drawn By
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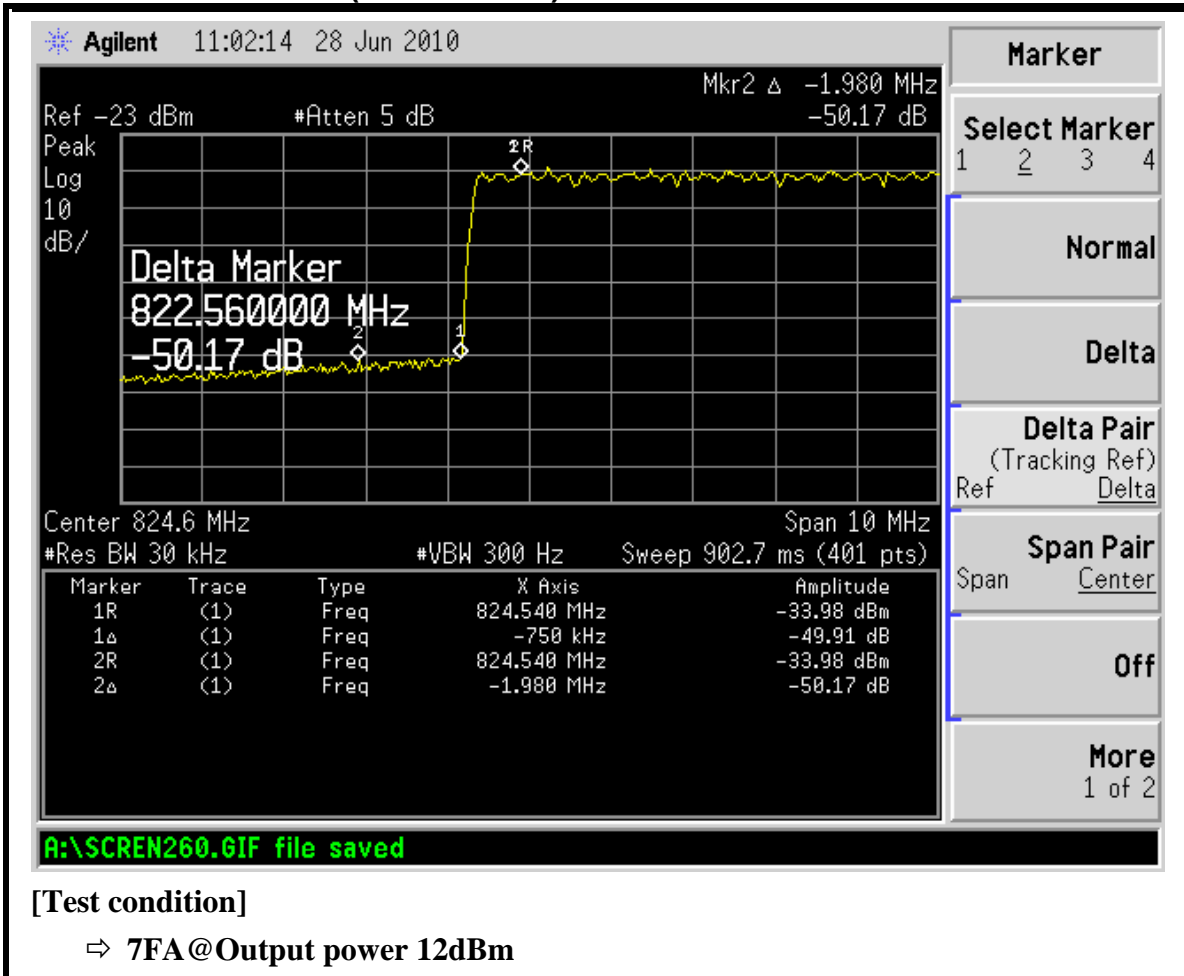
2.1 BT09VG_CDMA(824~849MHz) Test Result

SN	Freq [MHz]	Vcc [V]	Icc [mA]	Gain [dB]	OIP3 [dBm] ⁽¹⁾	P1dB [dBm]	IRL [dB]	ORL [dB]	NF [dB]
-	836	5	162	22.6	42	24.9	-21	-22	4.0

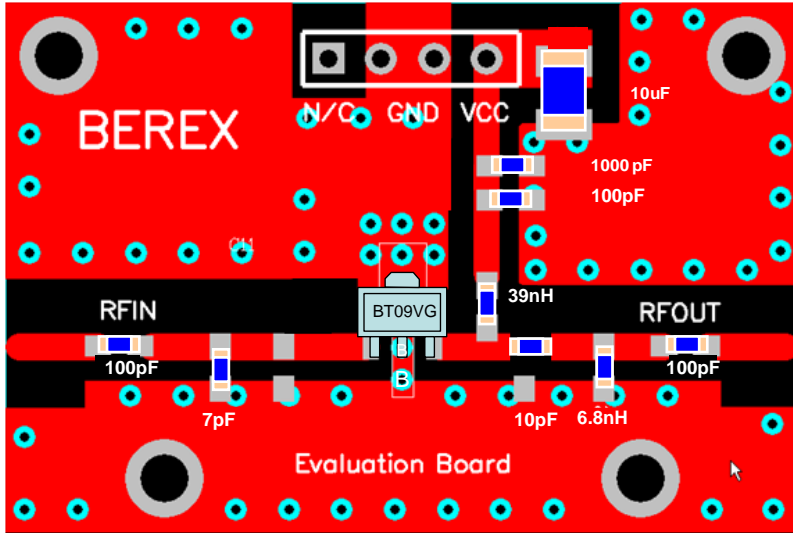
(1) OIP3 was tested @Pout=13dBm/tone 1MHz offset



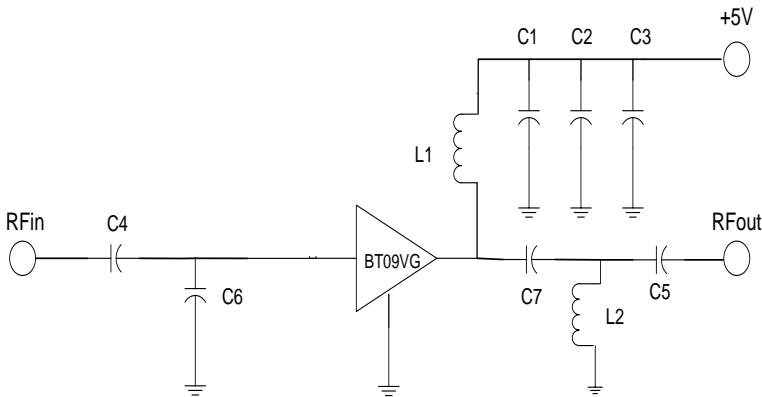
2.2 BT09VG_CDMA(824~849MHz) SPURIOUS



3. BT09VG_CDMA(869~894MHz) 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	100pF	Samsung
C5	0603 CAP	100pF	Samsung
C6	0603 CAP	7pF	Samsung
C7	0603 CAP	10pF	Samsung
C8	0603 CAP	NA	
C9	0603 CAP	NA	
C10	0603 CAP	NA	
C11	0603 CAP	NA	
C12	0603 CAP	NA	
L1	0603 IND	39nH	Ceratech
L2	0603 IND	6.8nH	Ceratech
L3	0603 IND	NA	
R1	0603 RES	NA	
U1	SOT89 PKG	BT09VG	BEREX



Note:

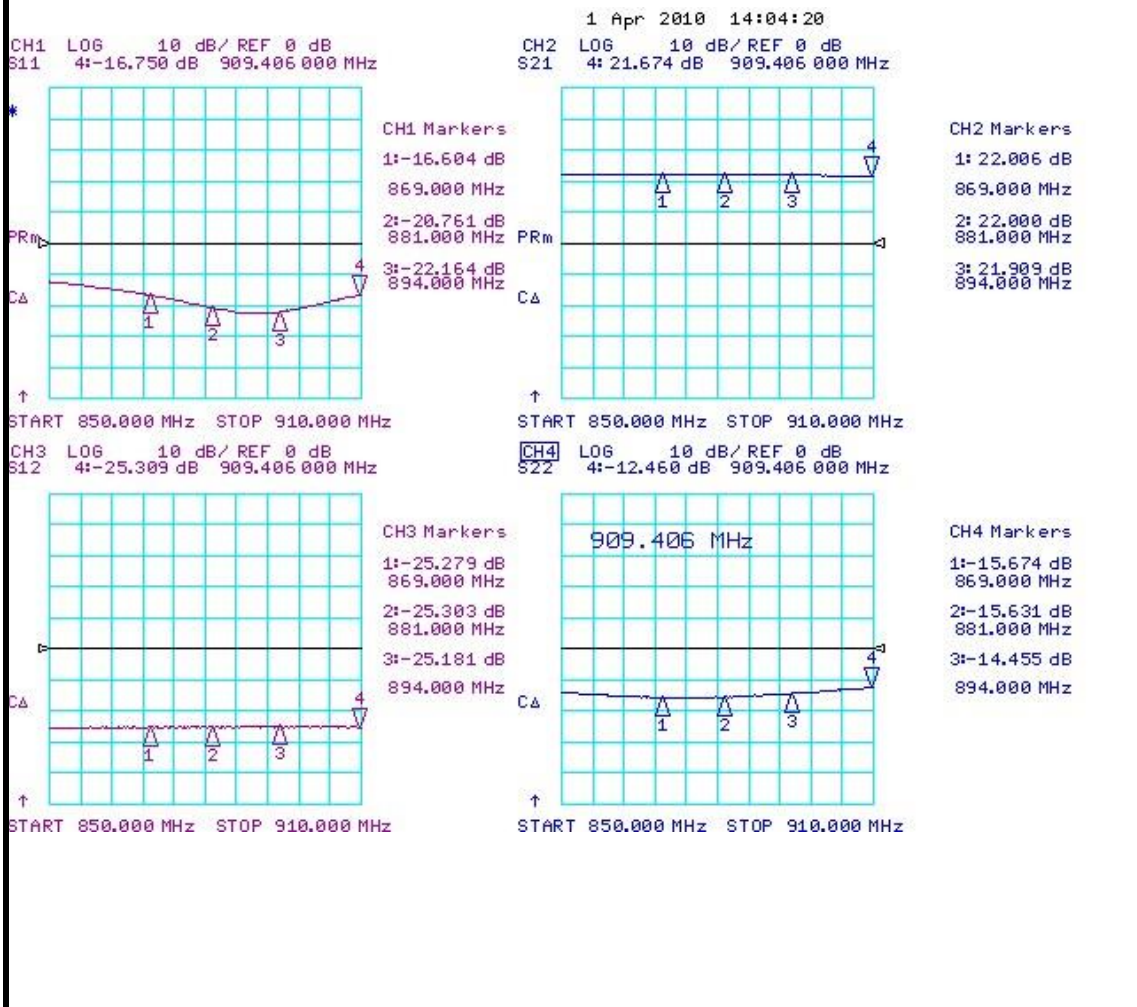
1. PCB: 31mil thick FR4
2. The distance between the center of the shunt cap(C6) and the Input Pin of BT09VG is 5.7mm
3. The distance between the center of the series cap(C7) and the Output Pin of BT09VG is 3.8mm
4. The distance between the center of the shunt Inductor(L2) and the Output Pin of BT09VG is 5.5mm

TITLE	
BT09VG Evaluation Board	
(869~894 MHz)	
Drawing Number	Rev.
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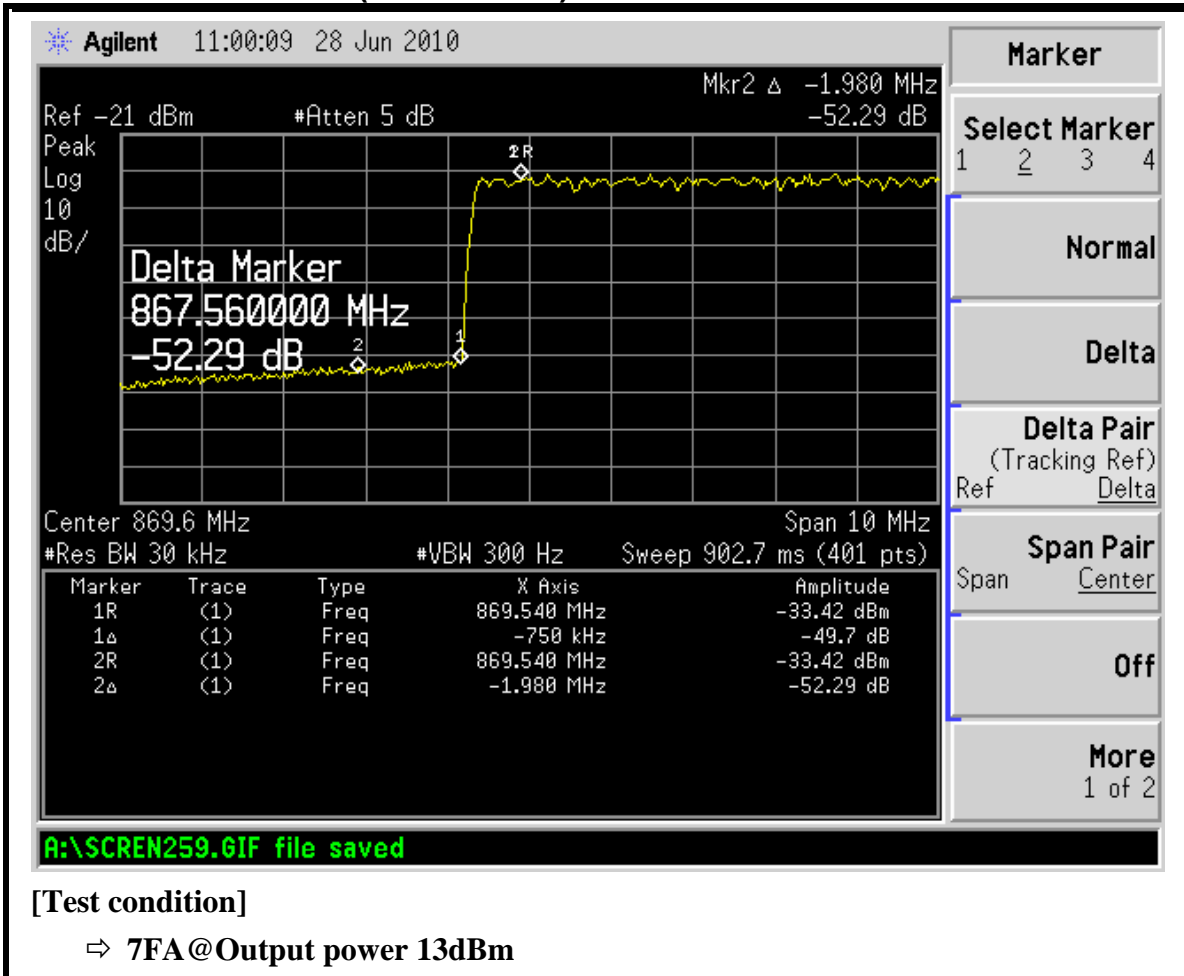
3.1 BT09VG_CDMA(869~894MHz) Test Result

SN	Freq [MHz]	Vcc [V]	Icc [mA]	Gain [dB]	OIP3 [dBm] ⁽¹⁾	P1dB [dBm]	IRL [dB]	ORL [dB]	NF [dB]
	881.5	5	163	22	42	25.5	-20	-15	4.0

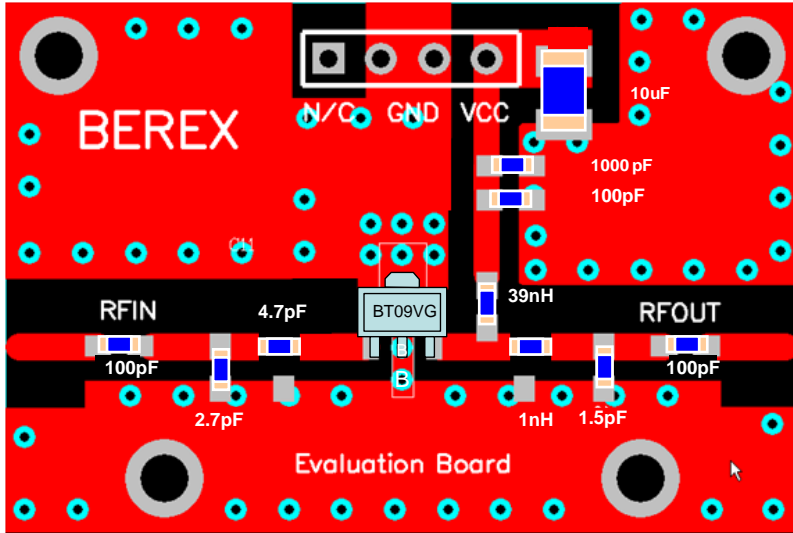
(1) OIP3 was tested @Pout=13dBm/tone 1MHz offset



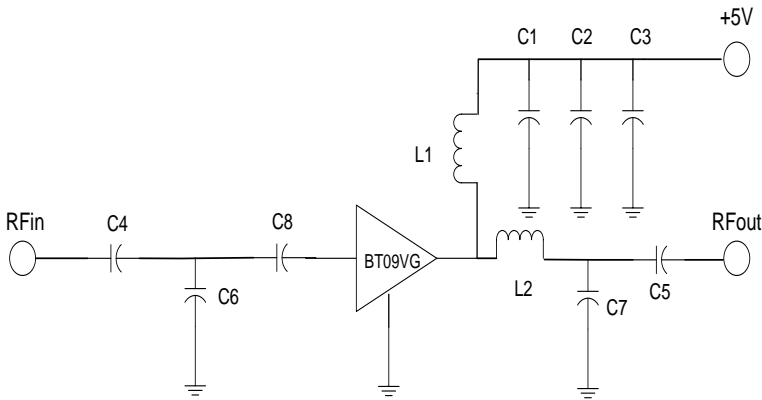
3.2 BT09VG_ CDMA(869~894MHz) SPURIOUS



4. BT09VG_PCS(1750~1780MHz) 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	100pF	Samsung
C5	0603 CAP	100pF	Samsung
C6	0603 CAP	2.7pF	Samsung
C7	0603 CAP	1.5pF	Samsung
C8	0603 CAP	4.7pF	Samsung
C9	0603 CAP	NA	
C10	0603 CAP	NA	
C11	0603 CAP	NA	
C12	0603 CAP	NA	
L1	0603 IND	39nH	Ceratech
L2	0603 IND	1nH	Ceratech
L3	0603 IND	NA	
R1	0603 RES	NA	
U1	SOT89 PKG	BT09VG	BEREX



Note:

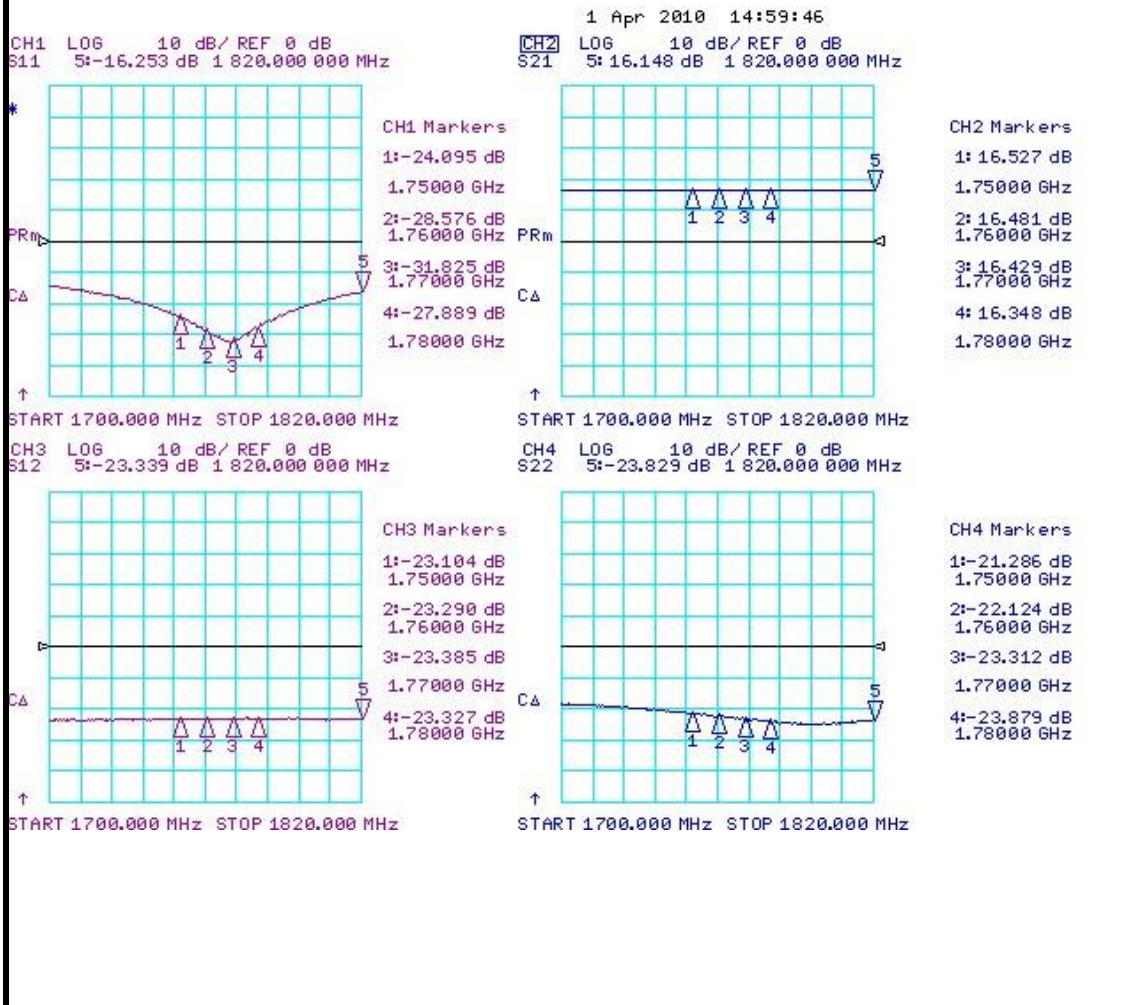
1. PCB: 31mil thick FR4
2. The distance between the center of the shunt cap(C6) and the Input Pin of BT09VG is 5.0mm
3. The distance between the center of the series cap(C8) and the Input Pin of BT09VG is 2.6mm
4. The distance between the center of the series Inductor(L2) and the Output Pin of BT09VG is 3.5mm
5. The distance between the center of the shunt Cap(C7) and the Output Pin of BT09VG is 7.9mm

TITLE	
BT09VG Evaluation Board	
(1750~1780 MHz)	
Drawing Number	Rev.
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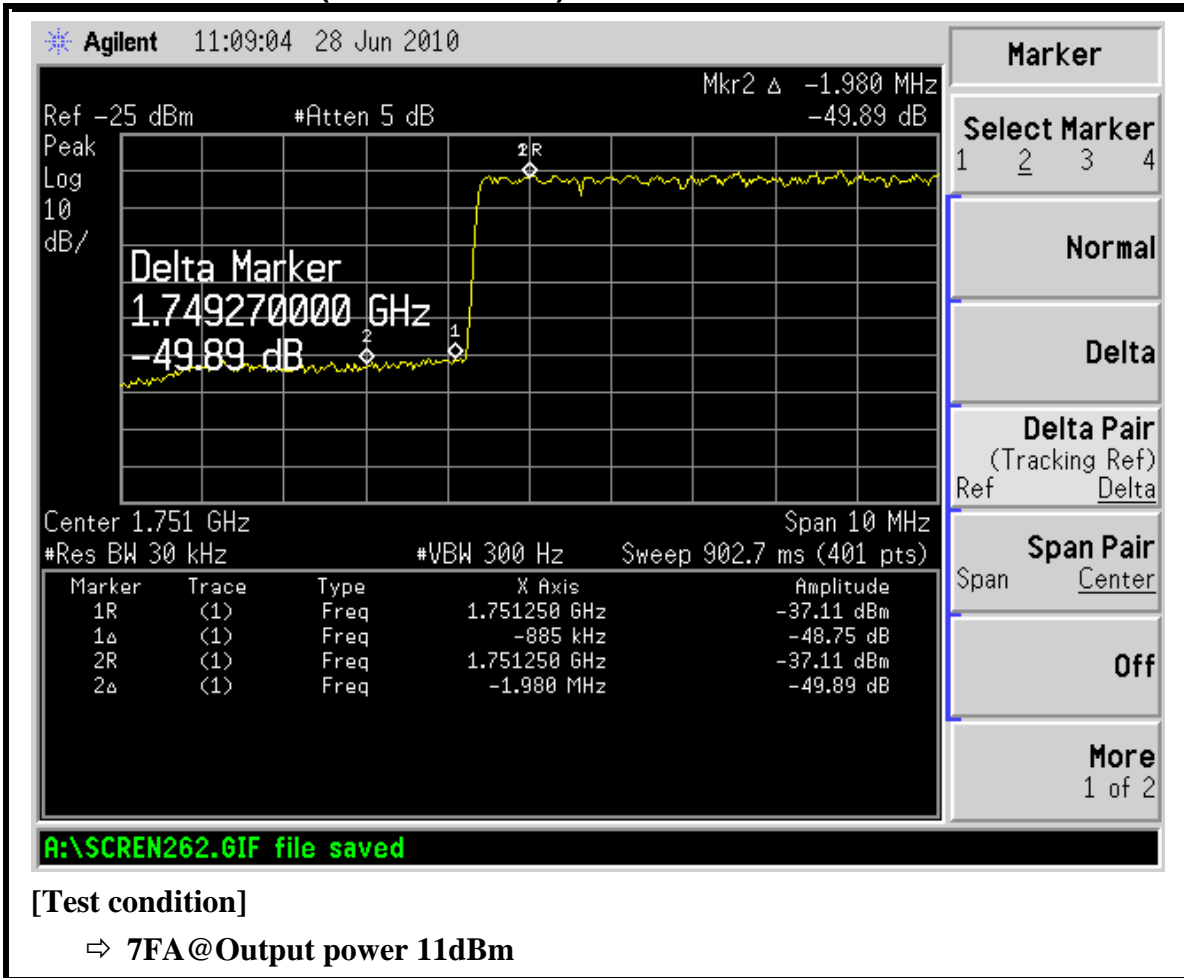
4.1 BT09VG_PCS(1750~1780MHz) Test Result

SN	Freq [MHz]	Vcc [V]	Icc [mA]	Gain [dB]	OIP3 [dBm] ⁽¹⁾	P1dB [dBm]	IRL [dB]	ORL [dB]	NF [dB]
	1765	5	160	16.4	41	25.9	-28	-22	4.0

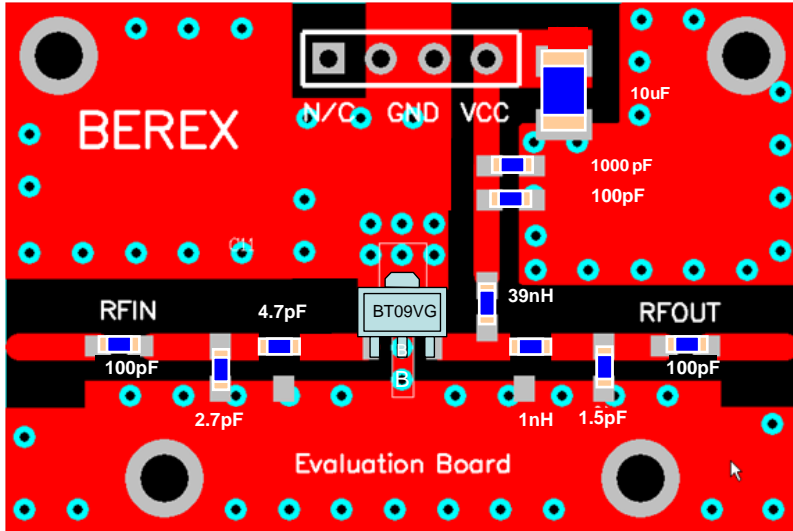
(1) OIP3 was tested @Pout=13dBm/tone 1MHz offset



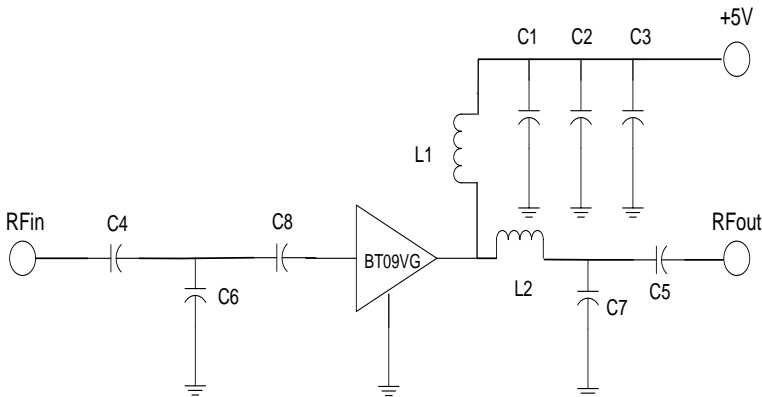
4.2 BT09VG_PCS(1750~1780MHz) SPURIOUS



5. BT09VG_PCS(1840~1870MHz) 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	100pF	Samsung
C5	0603 CAP	100pF	Samsung
C6	0603 CAP	2.7pF	Samsung
C7	0603 CAP	1.5pF	Samsung
C8	0603 CAP	4.7pF	Samsung
C9	0603 CAP	NA	
C10	0603 CAP	NA	
C11	0603 CAP	NA	
C12	0603 CAP	NA	
L1	0603 IND	39nH	Ceratech
L2	0603 IND	1nH	Ceratech
L3	0603 IND	NA	
R1	0603 RES	NA	
U1	SOT89 PKG	BT09VG	BEREX



Note:

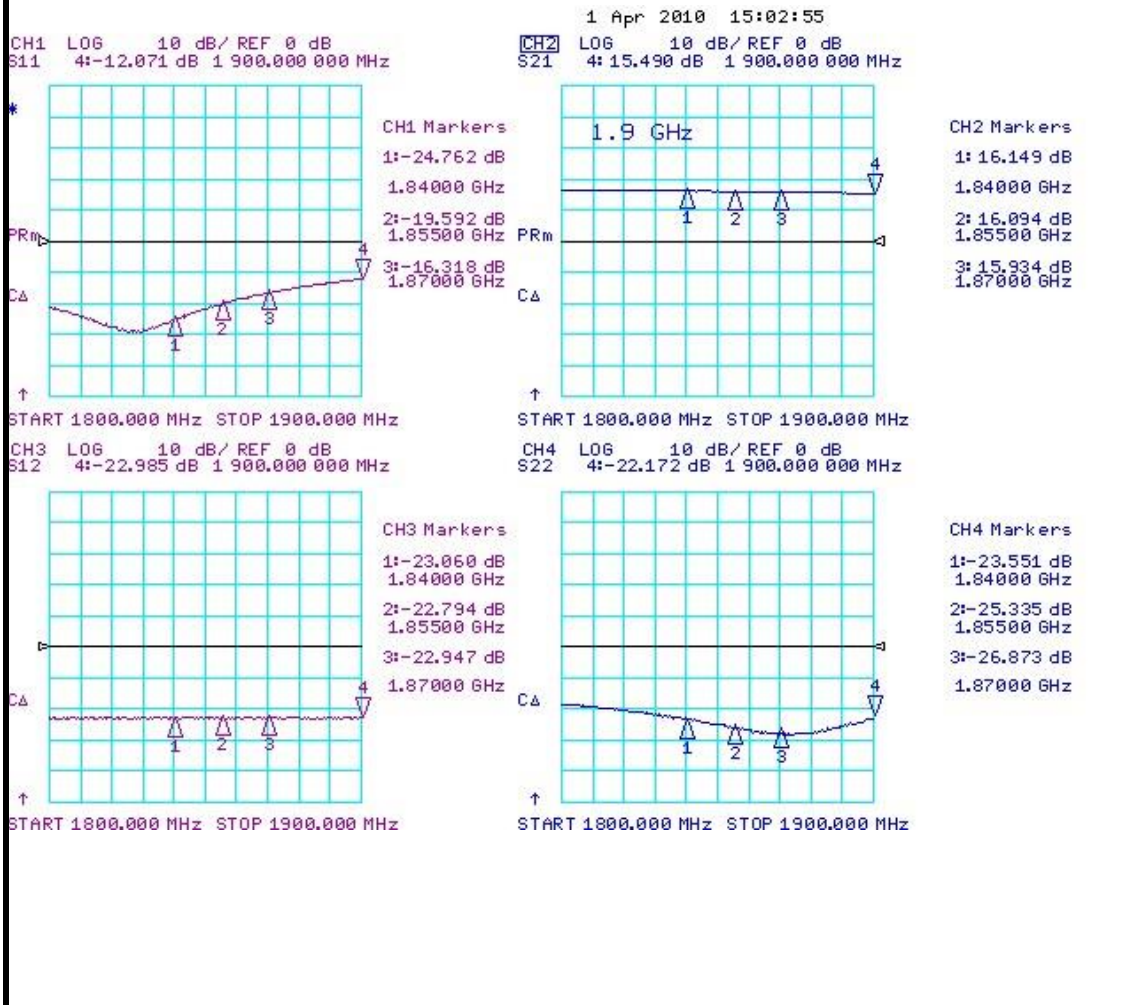
1. PCB: 31mil thick FR4
2. The distance between the center of the shunt cap(C6) and the Input Pin of BT09VG is 4.0mm
3. The distance between the center of the series cap(C8) and the Input Pin of BT09VG is 2.3mm
4. The distance between the center of the series Inductor(L2) and the Output Pin of BT09VG is 4.0mm
5. The distance between the center of the shunt Cap(C7) and the Output Pin of BT09VG is 7.8mm

TITLE	
BT09VG Evaluation Board	
(1840~1870 MHz)	
Drawing Number	Rev.
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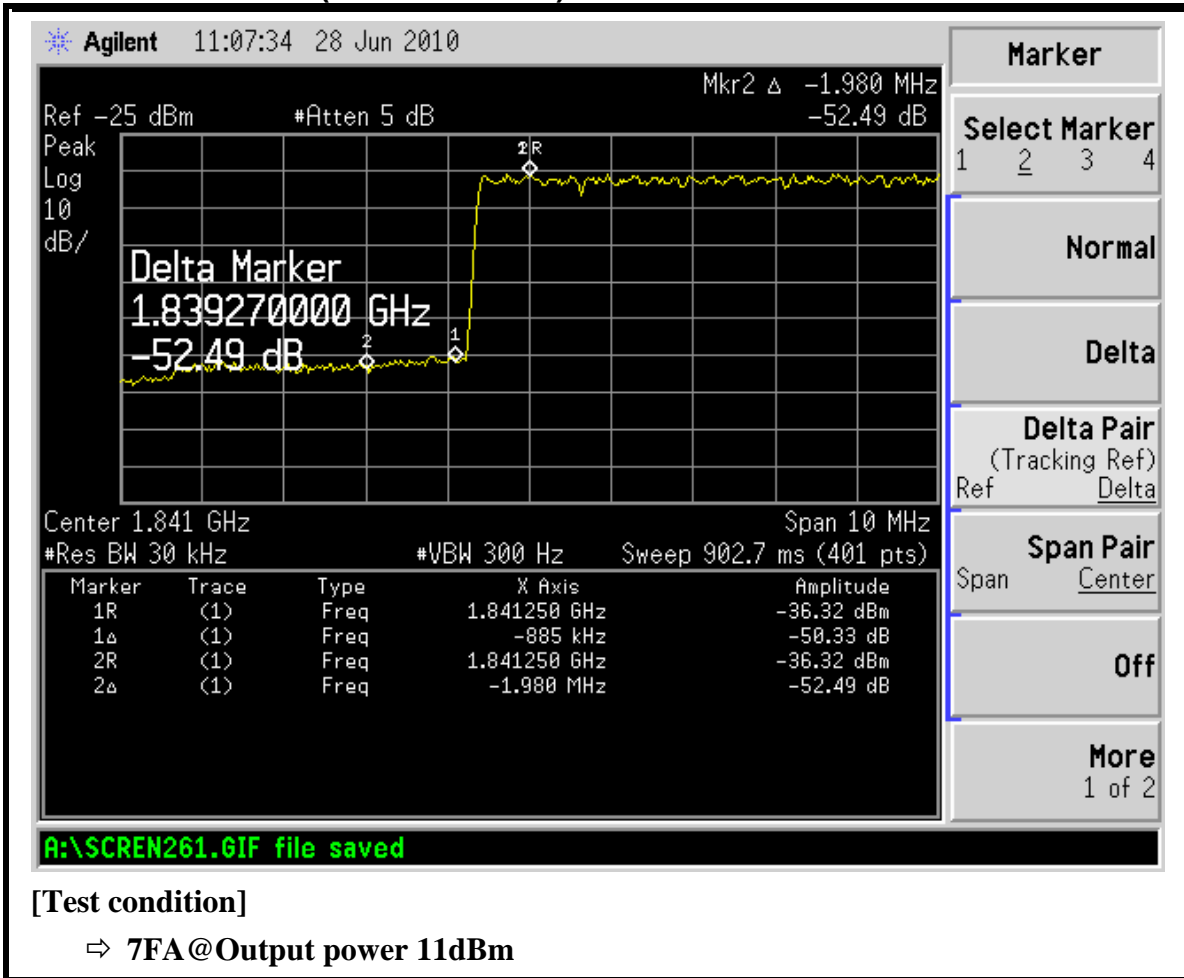
5.1 BT09VG_PCS(1840~1870MHz)Test Result

SN	Freq [MHz]	Vcc [V]	Icc [mA]	Gain [dB]	OIP3 [dBm] ⁽¹⁾	P1dB [dBm]	IRL [dB]	ORL [dB]	NF [dB]
	1855	5	164	16.1	42	25.8	-19	-25	4.0

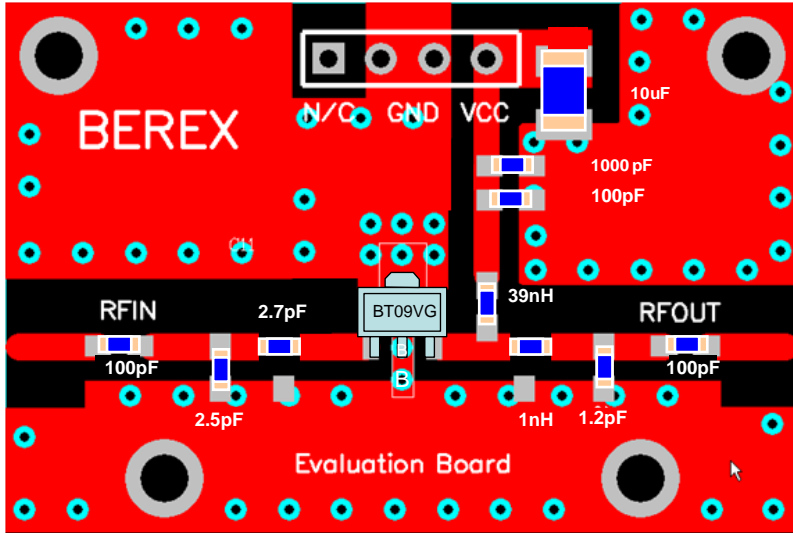
(1) OIP3 was tested @Pout=13dBm/tone 1MHz offset



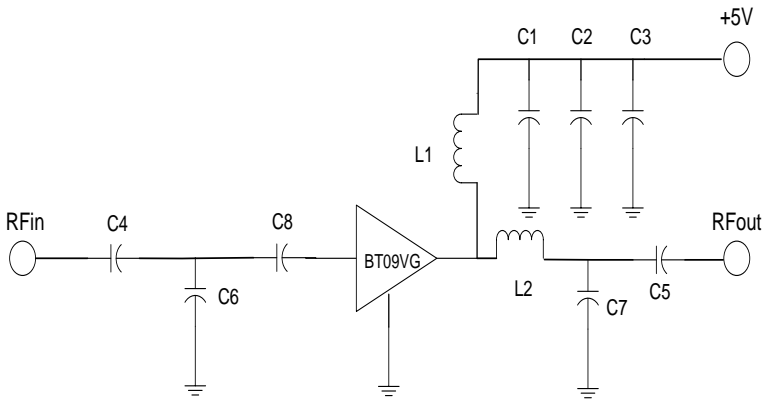
5.2 BT09VG_PCS(1840~1870MHz)SPURIOUS



6. BT09VG_WCDMA(1940~1980MHz) 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	100pF	Samsung
C5	0603 CAP	100pF	Samsung
C6	0603 CAP	2.5pF	Samsung
C7	0603 CAP	1.2pF	Samsung
C8	0603 CAP	2.7pF	Samsung
C9	0603 CAP	NA	
C10	0603 CAP	NA	
C11	0603 CAP	NA	
C12	0603 CAP	NA	
L1	0603 IND	39nH	Ceratech
L2	0603 IND	1nH	Ceratech
L3	0603 IND	NA	
R1	0603 RES	NA	
U1	SOT89 PKG	BT09VG	BEREX



Note:

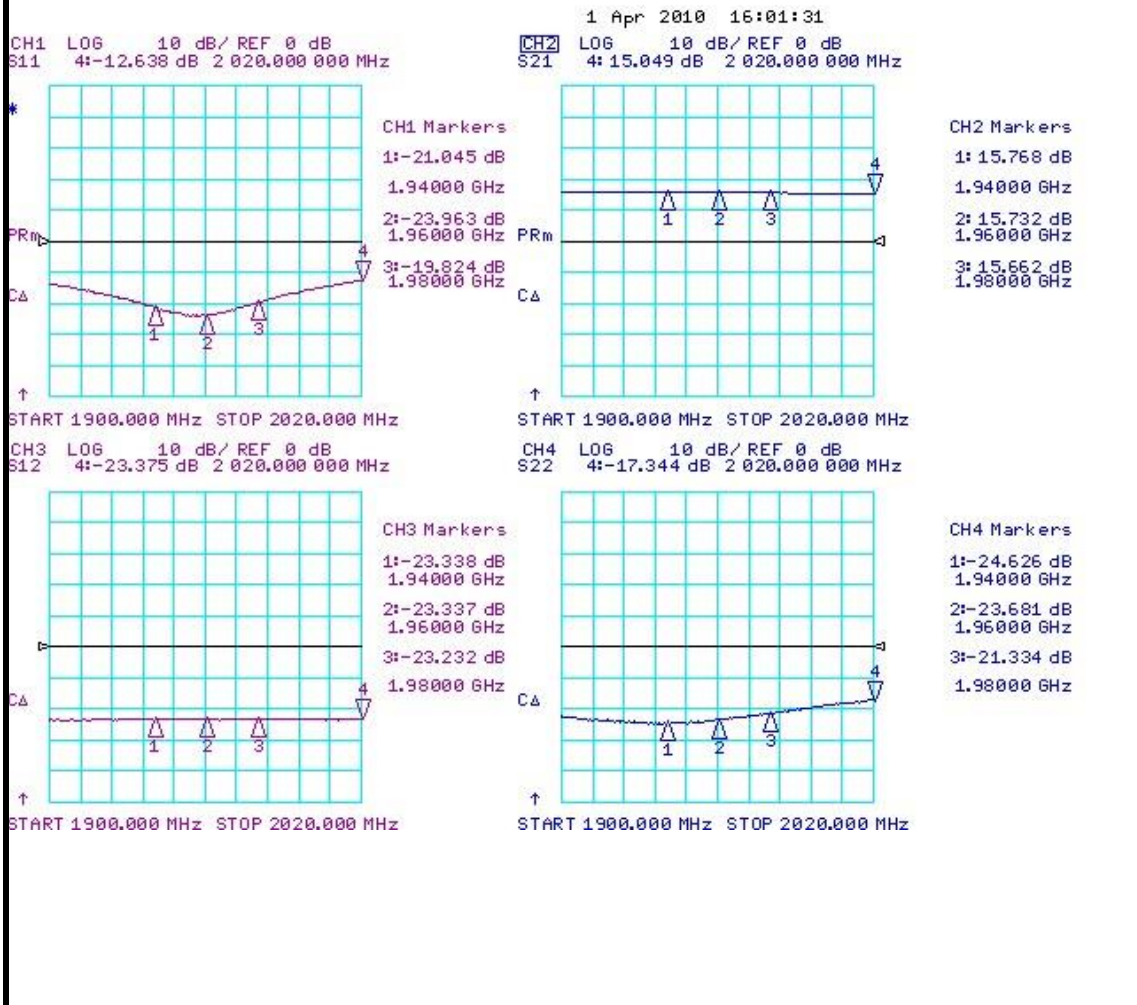
1. PCB: 31mil thick FR4
2. The distance between the center of the shunt cap(C6) and the Input Pin of BT09VG is 6.1mm
3. The distance between the center of the series cap(C8) and the Input Pin of BT09VG is 2.0mm
4. The distance between the center of the series Inductor(L2) and the Output Pin of BT09VG is 3.2mm
5. The distance between the center of the shunt Cap(C7) and the Output Pin of BT09VG is 7.4mm

TITLE	
BT09VG Evaluation Board	
(1940~1980 MHz)	
Drawing Number	Rev.
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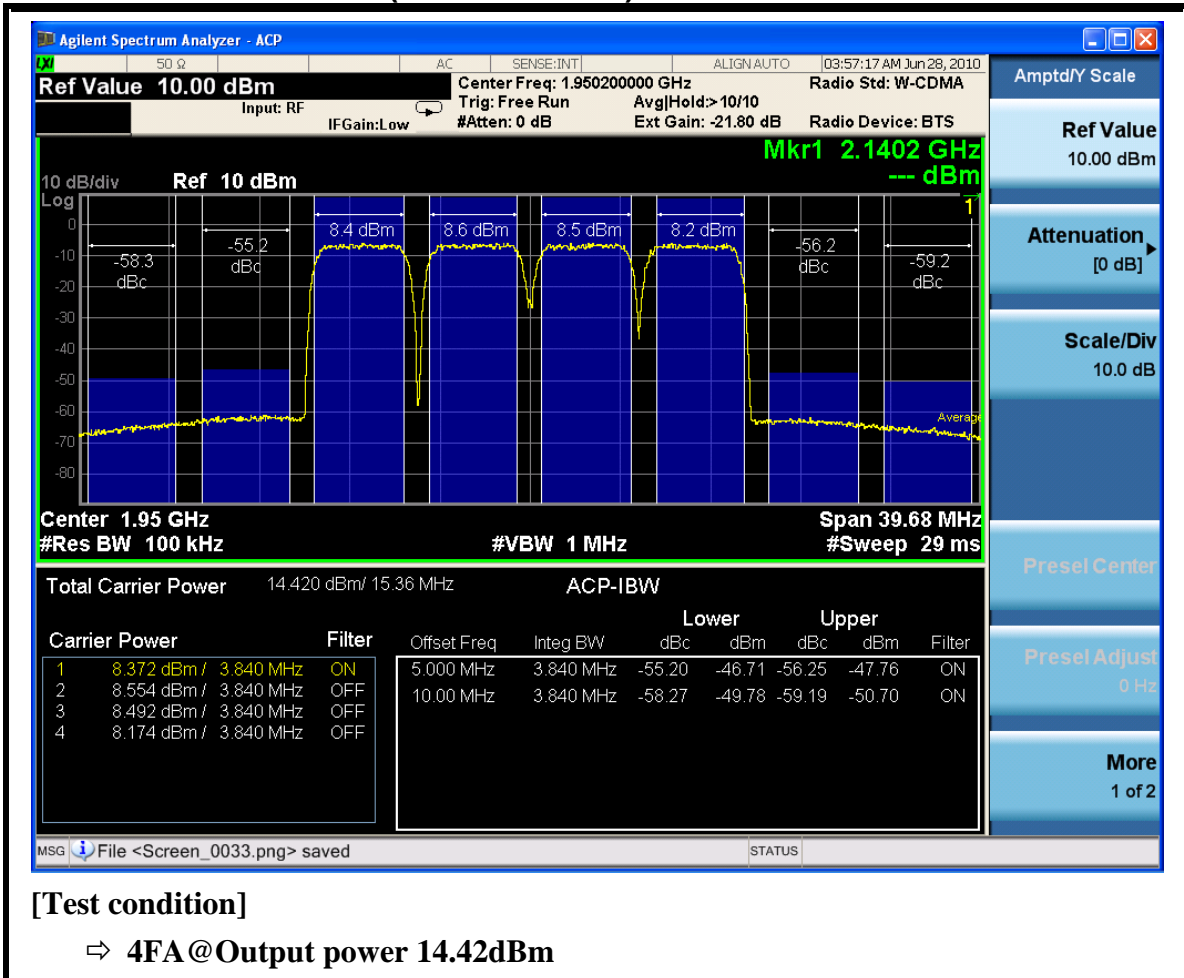
6.1 BT09VG_WCDMA(1940~1980MHz)TestResult

SN	Freq [MHz]	Vcc [V]	Icc [mA]	Gain [dB]	OIP3 [dBm] ⁽¹⁾	P1dB [dBm]	IRL [dB]	ORL [dB]	NF [dB]
	1960	5	165	15.7	41	26.5	-24	-23	4.0

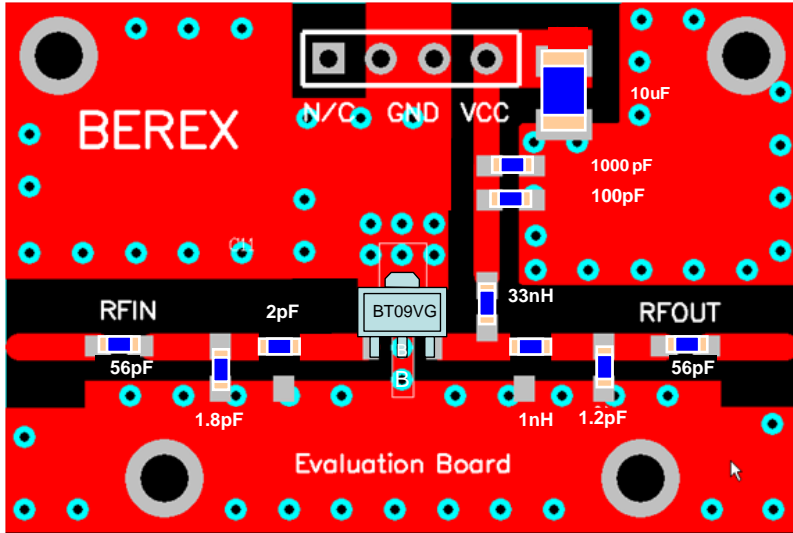
(1) OIP3 was tested @Pout=13dBm/tone 1MHz offset



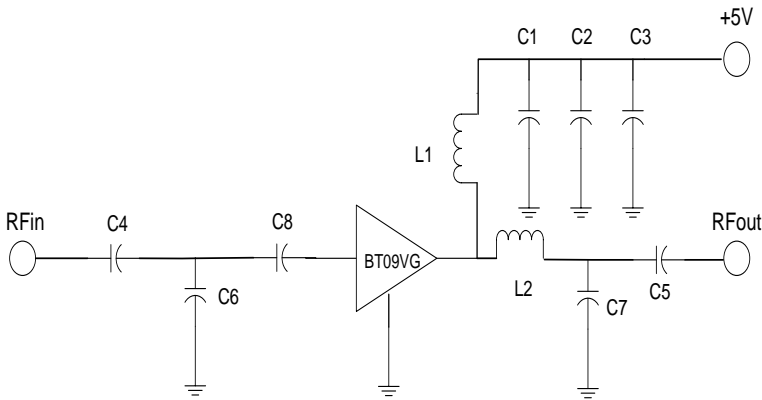
6.2 BT09VG_ WCDMA(1940~1980MHz) ACLR



7. BT09VG_WCDMA(2130~2170MHz) 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	100pF	Samsung
C5	0603 CAP	100pF	Samsung
C6	0603 CAP	1.8pF	Samsung
C7	0603 CAP	1.2pF	Samsung
C8	0603 CAP	2pF	Samsung
C9	0603 CAP	NA	
C10	0603 CAP	NA	
C11	0603 CAP	NA	
C12	0603 CAP	NA	
L1	0603 IND	33nH	Ceratech
L2	0603 IND	1nH	Ceratech
L3	0603 IND	NA	
R1	0603 RES	NA	
U1	SOT89 PKG	BT09VG	BEREX



Note:

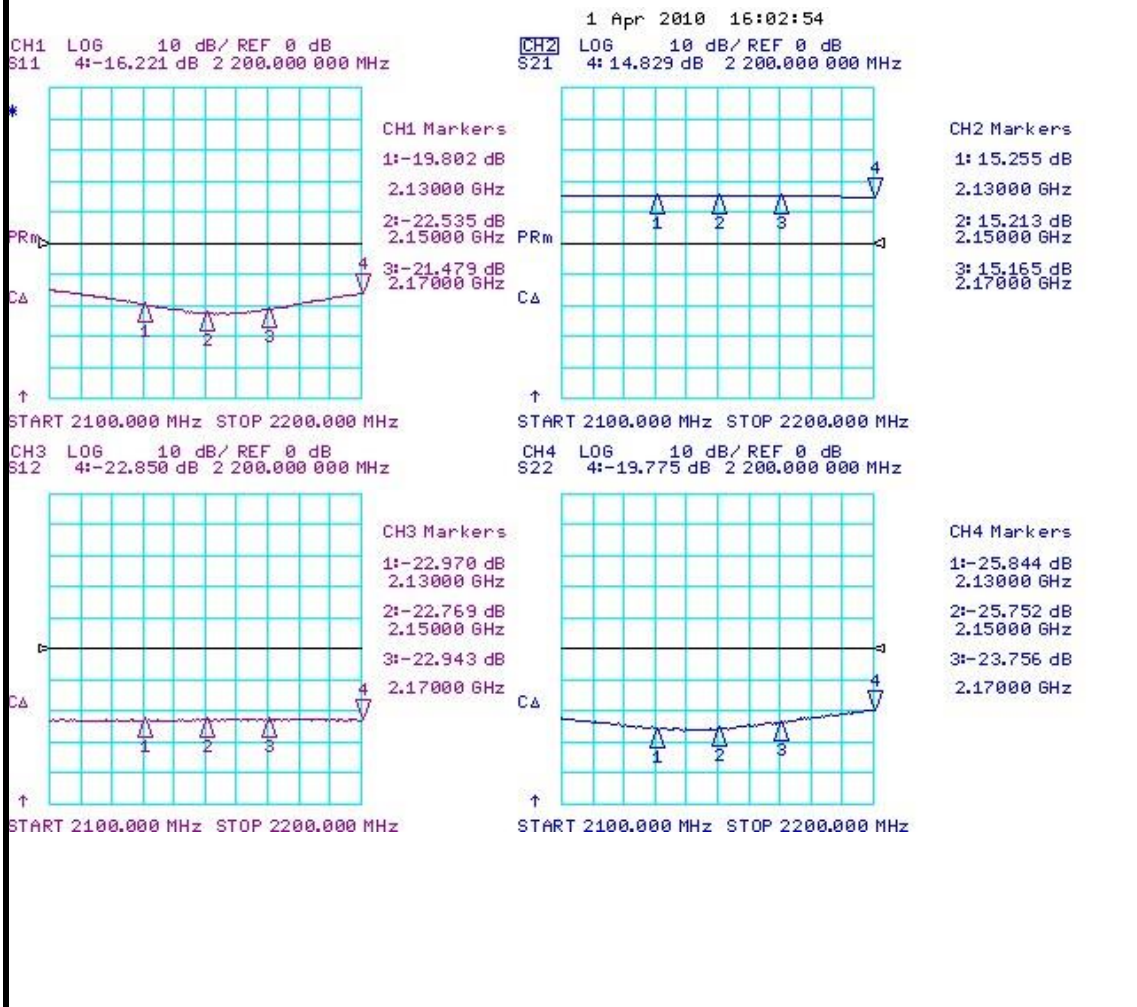
1. PCB: 31mil thick FR4
2. The distance between the center of the shunt cap(C6) and the Input Pin of BT09VG is 6.8mm
3. The distance between the center of the series cap(C8) and the Input Pin of BT09VG is 2.0mm
4. The distance between the center of the series Inductor(L2) and the Output Pin of BT09VG is 3.7mm
5. The distance between the center of the shunt Cap(C7) and the Output Pin of BT09VG is 6.7mm

TITLE	
BT09VG Evaluation Board	
(2130~2170 MHz)	
Drawing Number	Rev.
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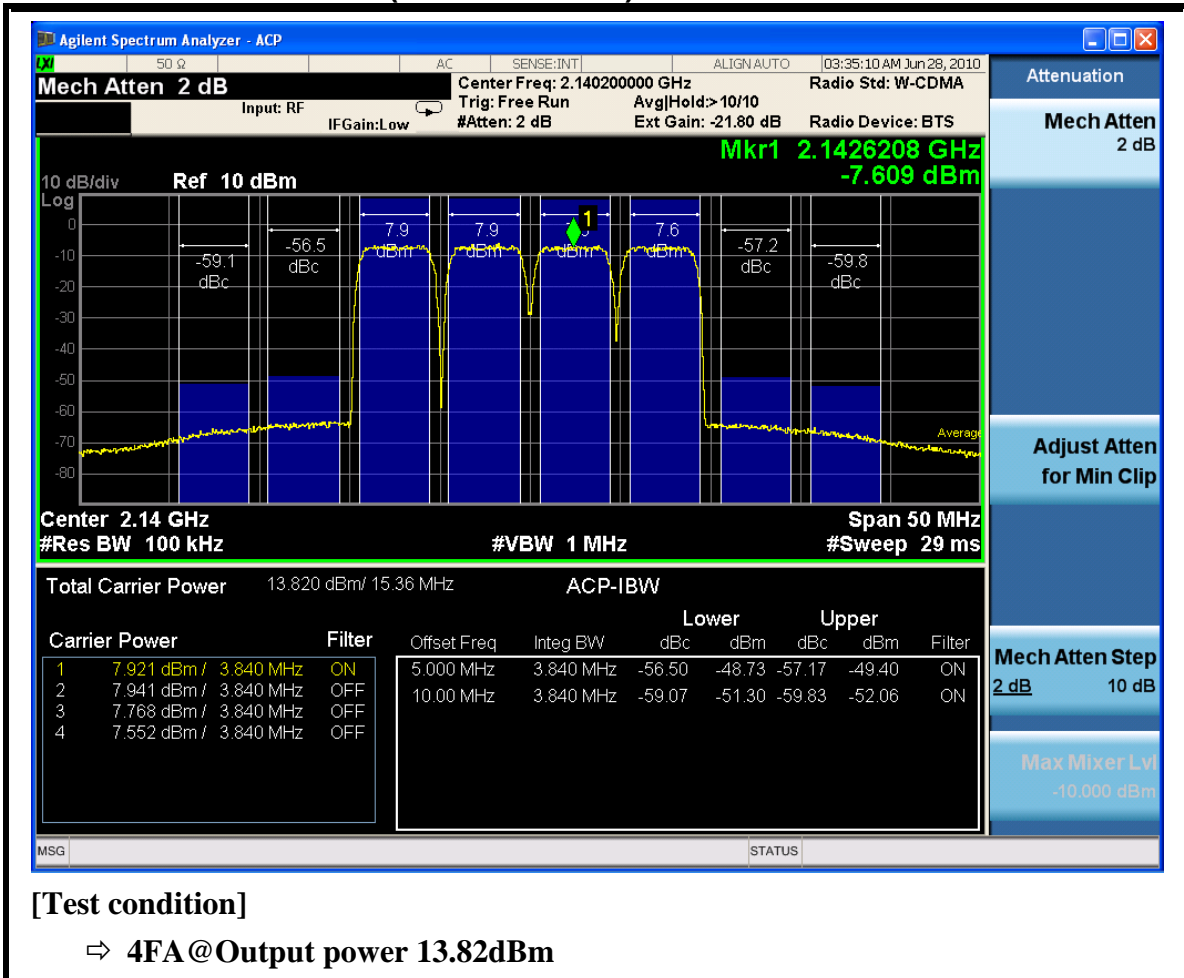
7.1 BT09VG_ WCDMA(2130~2170MHz) Test Result

SN	Freq [MHz]	Vcc [V]	Icc [mA]	Gain [dB]	OIP3 [dBm] ⁽¹⁾	P1dB [dBm]	IRL [dB]	ORL [dB]	NF [dB]
	2150	5	161	15.2	41.3	25.9	-22	-25	4.0

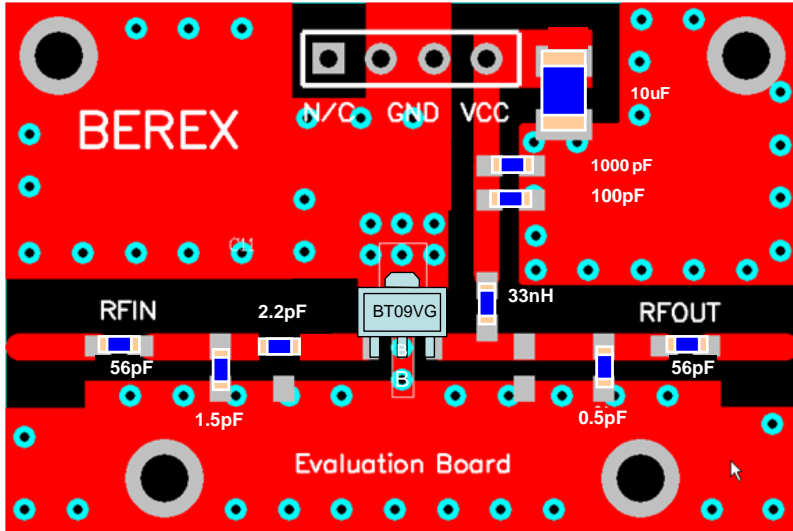
(1) OIP3 was tested @Pout=13dBm/tone 1MHz offset



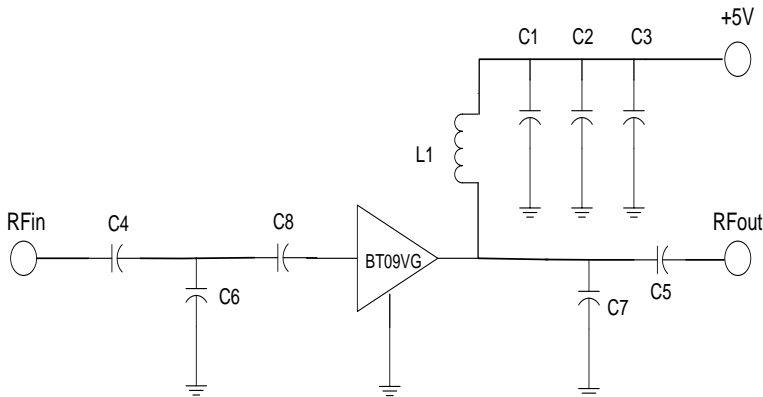
7.2 BT09VG_ WCDMA(2130~2170MHz) ACLR



8. BT09VG_WIBRO(2300~2360MHz) 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	100pF	Samsung
C5	0603 CAP	100pF	Samsung
C6	0603 CAP	1.5pF	Samsung
C7	0603 CAP	0.5pF	Samsung
C8	0603 CAP	2.2pF	Samsung
C9	0603 CAP	NA	
C10	0603 CAP	NA	
C11	0603 CAP	NA	
C12	0603 CAP	NA	
L1	0603 IND	33nH	Ceratech
L2	0603 IND	1nH	Ceratech
L3	0603 IND	NA	
R1	0603 RES	NA	
U1	SOT89 PKG	BT09VG	BEREX



Note:

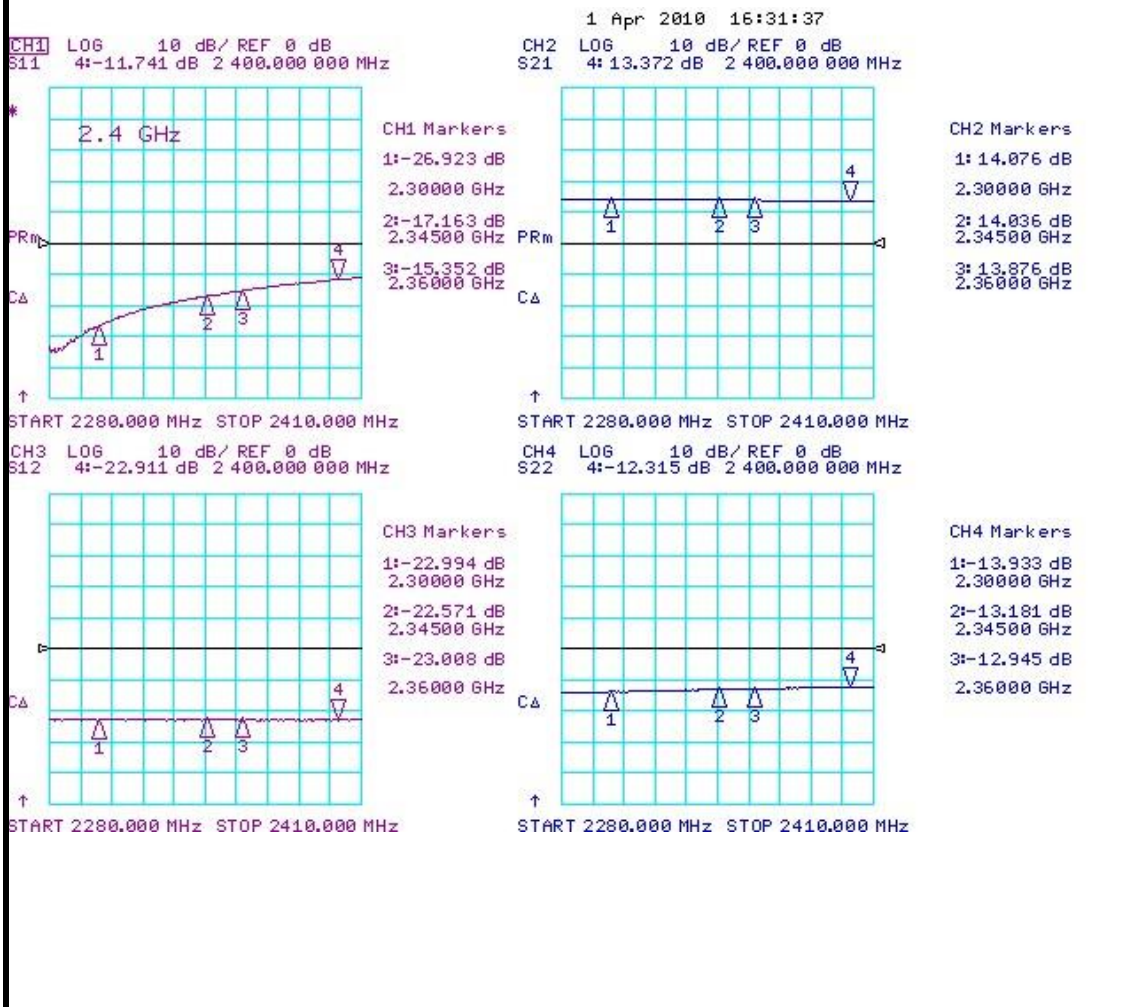
1. PCB: 31mil thick FR4
2. The distance between the center of the shunt cap(C6) and the Input Pin of BT09VG is 4.3mm
3. The distance between the center of the series cap(C8) and the Input Pin of BT09VG is 2.7mm
4. The distance between the center of the shunt cap(C7) and the Output Pin of BT09VG is 6.0mm

TITLE	
BT09VG Evaluation Board	
(2300~2360 MHz)	
Drawing Number	Rev.
Date	Drawn By
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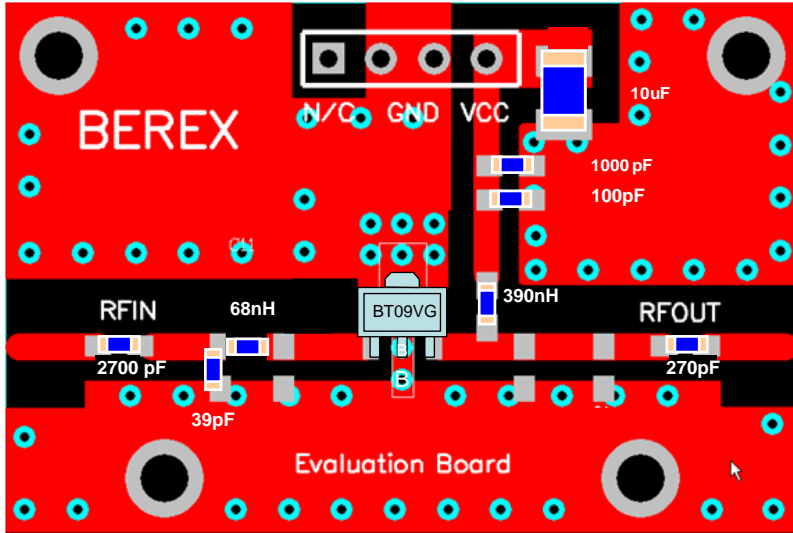
8.1 BT09VG_WIBRO(2300~2360MHz) Test Result

SN	Freq [MHz]	Vcc [V]	Icc [mA]	Gain [dB]	OIP3 [dBm] ⁽¹⁾	P1dB [dBm]	IRL [dB]	ORL [dB]	NF [dB]
	2330	5	165	14	41.2	27	-17	-13	4.0

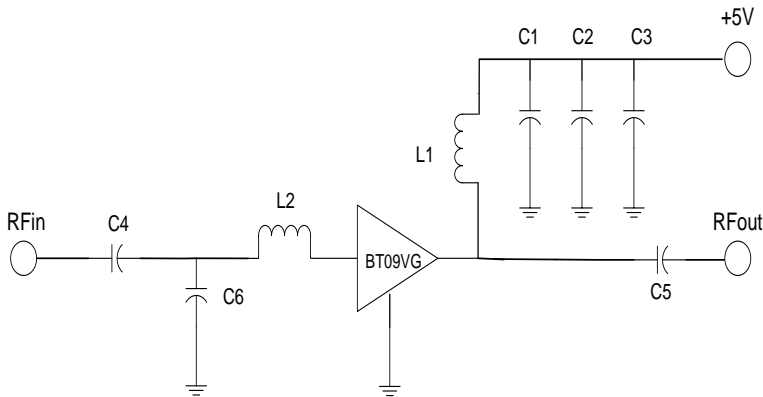
(1) OIP3 was tested @Pout=13dBm/tone 1MHz offset



9. BT09VG_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	56pF	Samsung
C5	0603 CAP	56pF	Samsung
C6	0603 CAP	0.5pF	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	6.8nH	Ceratech
L2	0603 IND	NA	
L3	0603 IND	NA	
R1	0603 RES	NA	
U1	SOT89 PKG	BT09VG	BEREX



Note:

1. PCB: 31mil thick FR4
2. The distance between the center of the series cap(C6) and the Input Pin of BT09VG is 3.3mm
3. The distance between the center of the shunt cap(C7) and the Input Pin of BT09VG is 2.3mm

TITLE

BT09VG Evaluation Board

(3500 MHz)

Drawing Number	Rev.
Date	Drawn By
FILE NAME	SHEET

9.1 BT09VG_3500MHz Test Result

SN	Freq [MHz]	Vcc [V]	Icc [mA]	Gain [dB]	OIP3 [dBm] ⁽¹⁾	P1dB [dBm]	IRL [dB]	ORL [dB]	NF [dB]
	3500	5	88	12.6	39.7	23.1	-16.3	-21.5	4.0

(1) OIP3 was tested @Pout=9dBm/tone 1MHz offset