

RF MMIC Innovator

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[CLASSIFICATION] APPLICATION NOTE

[DATE] 2010.05

[REVISION NO.] REV.A

[MEASURING INSTRUMENTS]

- NA_AGILENT 8753ES

- SA_AGILENT E4404B

- SG_AGILENT 4438C

- SG_IFR 3416

Wide Band Drive Amp BT05AG

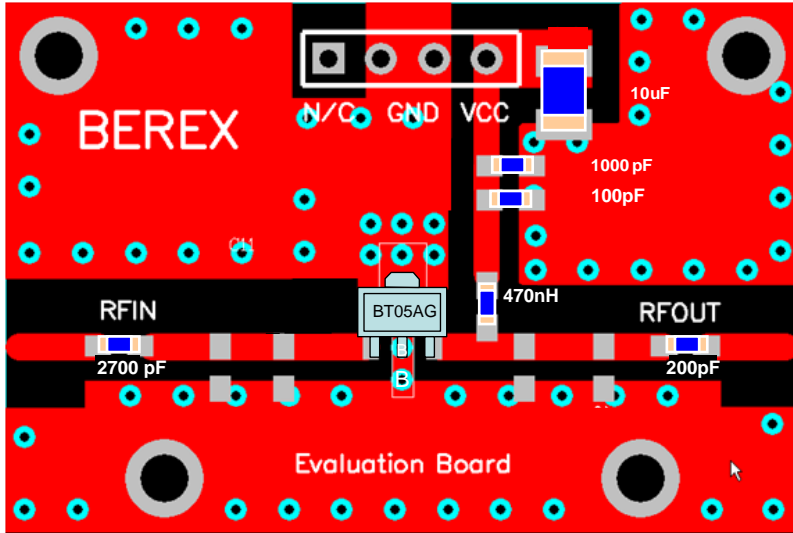
Application Note



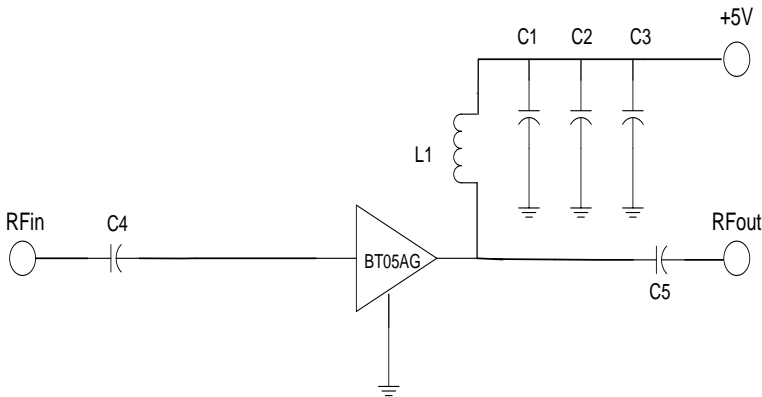
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1. BT05AG 70MHz Application Note



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	200pF	Samsung
C6	0603 CAP	NA	
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	470nH	Ceratech
L2	0603 IND	NA	
L3	0603 IND	NA	
R1	0603 RES	NA	
U1	SOT89 PKG	BT05AG	BEREX



Note:

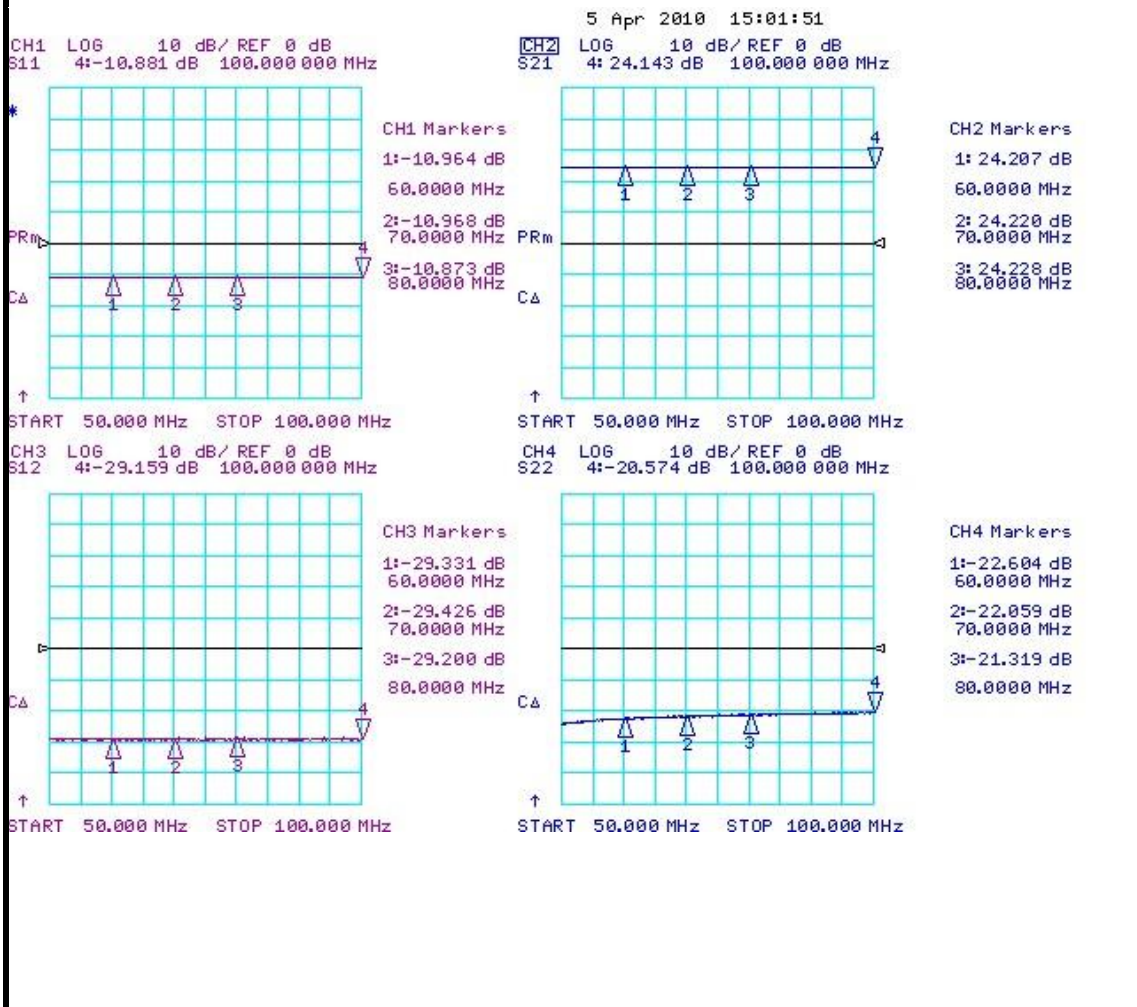
1. PCB: 31mil thick FR4

TITLE	
BT05AG Evaluation Board	
(70 MHz)	
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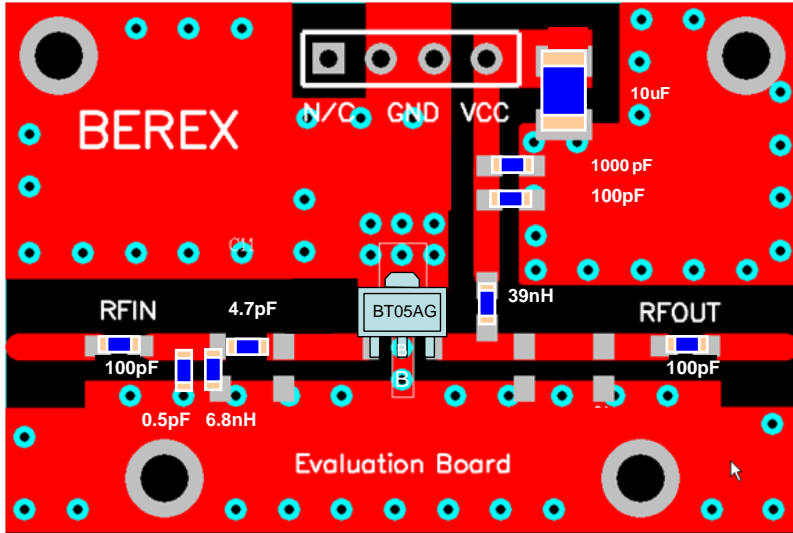
1.1 BT05AG_70MHz Test Result

SN	Freq [MHz]	Vcc [V]	Icc [mA]	Gain [dB]	OIP3 [dBm] ⁽¹⁾	P1dB [dBm]	IRL [dB]	ORL [dB]	NF [dB]
-	70	5	84	24.2	38.5	23.3	-10.9	-22	4.6

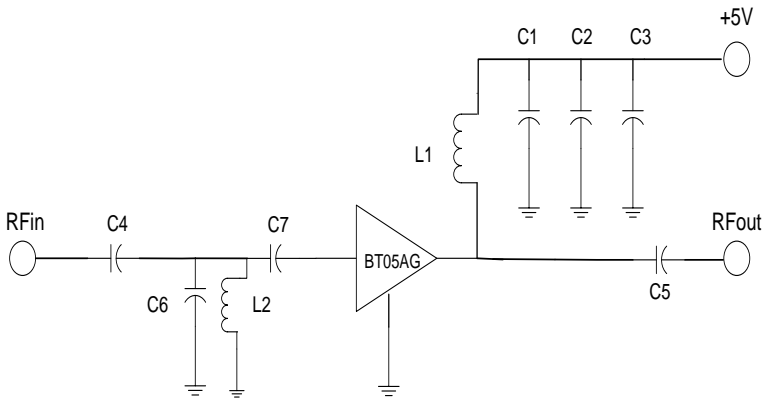
(1) OIP3 was tested @Pout=10dBm/tone 1MHz offset



2. BT05AG_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	0.5pF	Samsung
C7	0603 CAP	4.7pF	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	BT05AG	BEREX



Note:

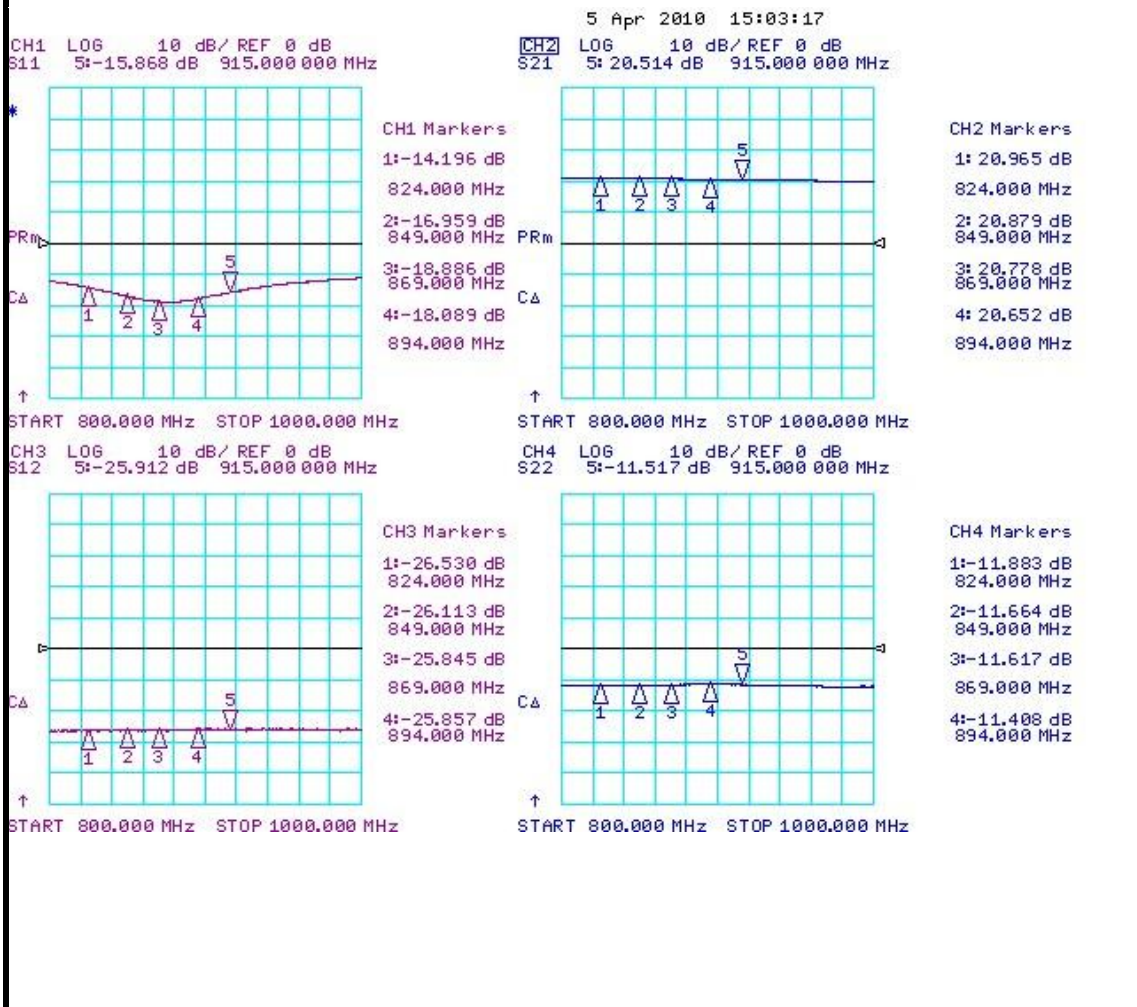
1. PCB: 31mil thick FR4
2. The distance between the center of the series cap(C7) and the Input Pin of BT05AG is 1.7mm
3. The distance between the center of the shunt cap(C6) and the Input Pin of BT05AG is 4.4mm
4. The distance between the center of the shunt cap(L2) and the Input Pin of BT05AG is 5.3mm

TITLE	
BT05AG Evaluation Board	
(824~849 MHz)	
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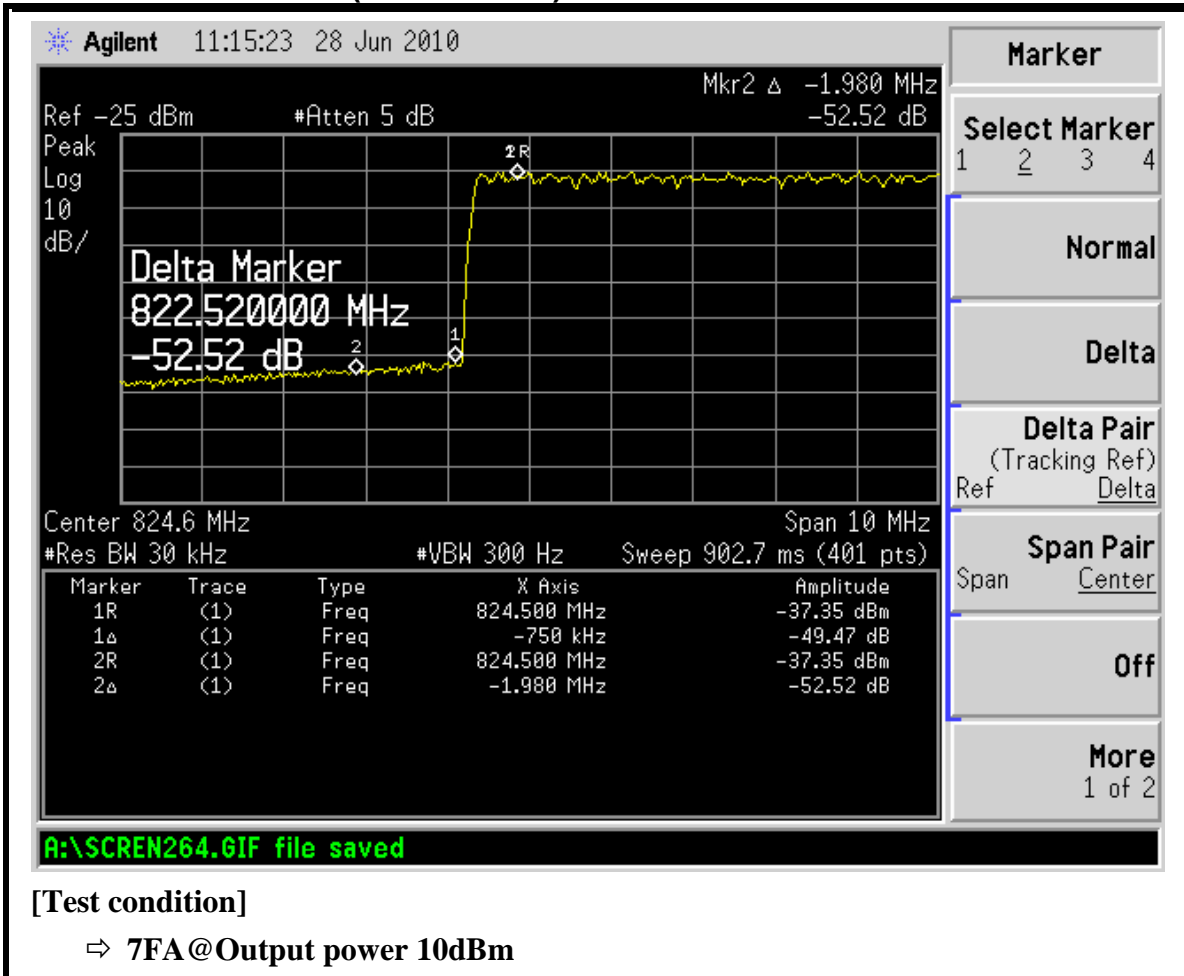
2.1 BT05AG_CDMA(824~849MHz) Test Result

SN	Freq [MHz]	Vcc [V]	Icc [mA]	Gain [dB]	OIP3 [dBm] ⁽¹⁾	P1dB [dBm]	IRL [dB]	ORL [dB]	NF [dB]
-	836	5	81	20.8	37.6	23.2	-16	-11	4.5

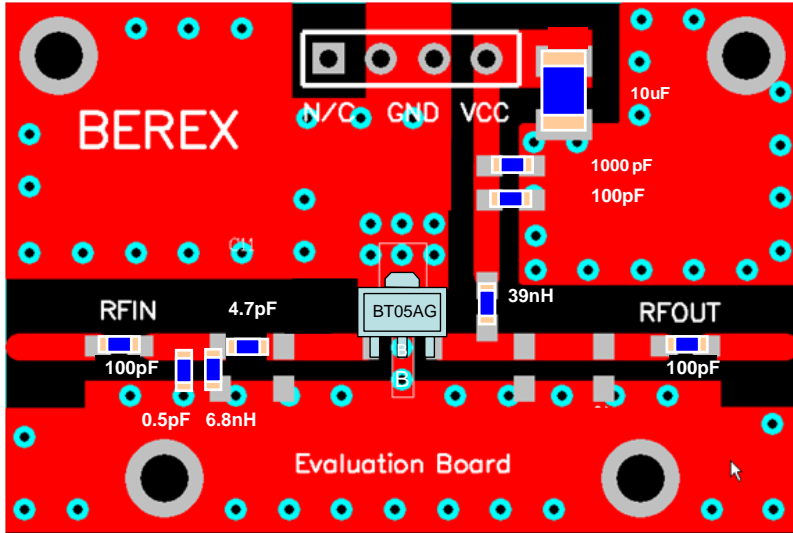
(1) OIP3 was tested @Pout=10dBm/tone 1MHz offset



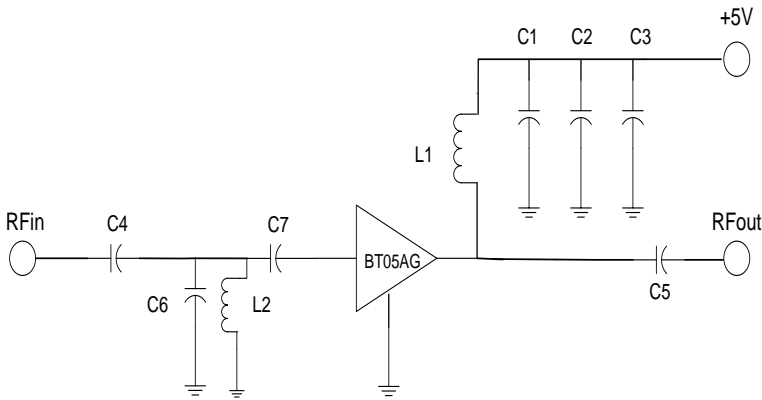
2.2 BT05AG_CDMA(824~849MHz) SPURIOUS



3. BT05AG_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	0.5pF	Samsung
C7	0603 CAP	4.7pF	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	BT05AG	BEREX



Note:

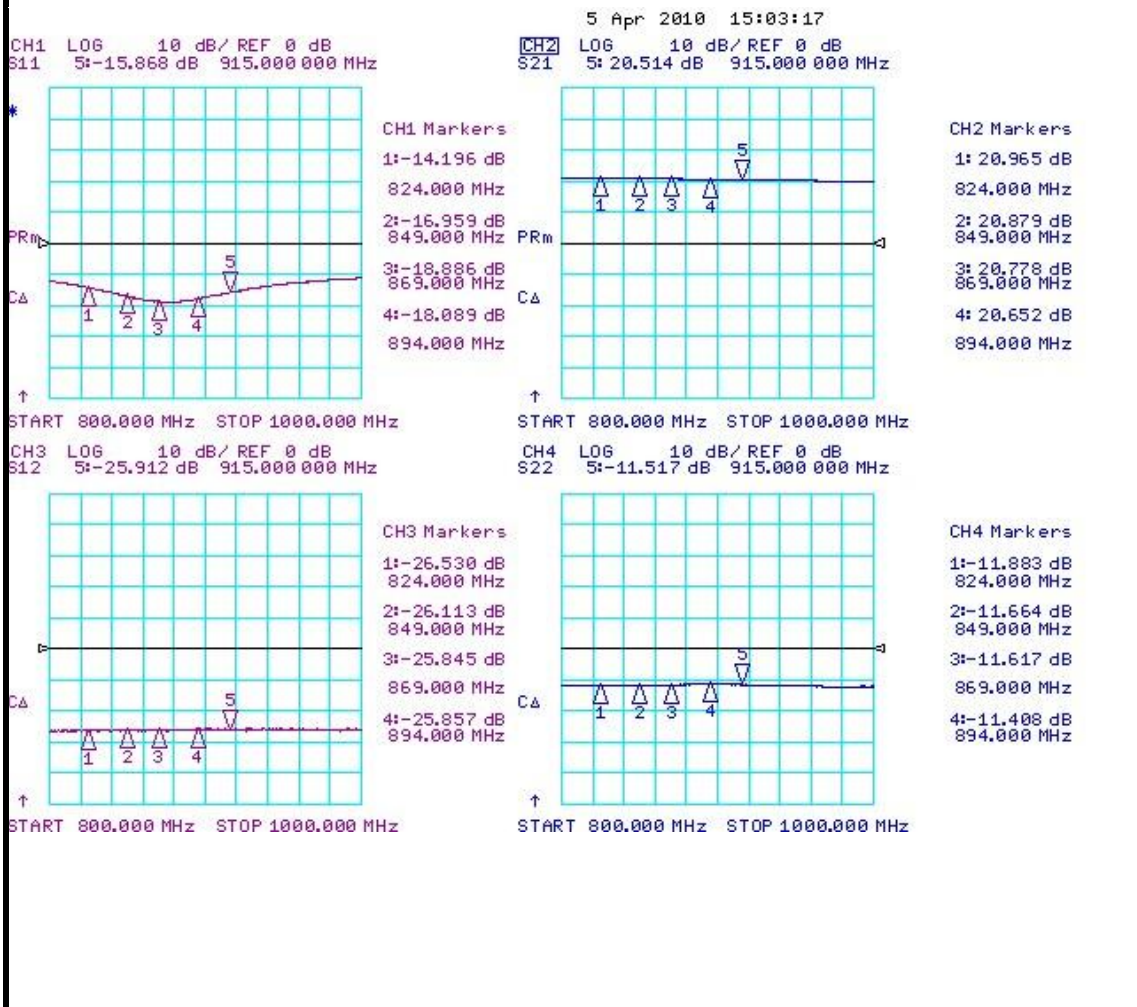
1. PCB: 31mil thick FR4
2. The distance between the center of the series cap(C7) and the Input Pin of BT05AG is 1.7mm
3. The distance between the center of the shunt cap(C6) and the Input Pin of BT05AG is 4.4mm
4. The distance between the center of the shunt cap(L2) and the Input Pin of BT05AG is 5.3mm

TITLE	
BT05AG Evaluation Board	
(869~894 MHz)	
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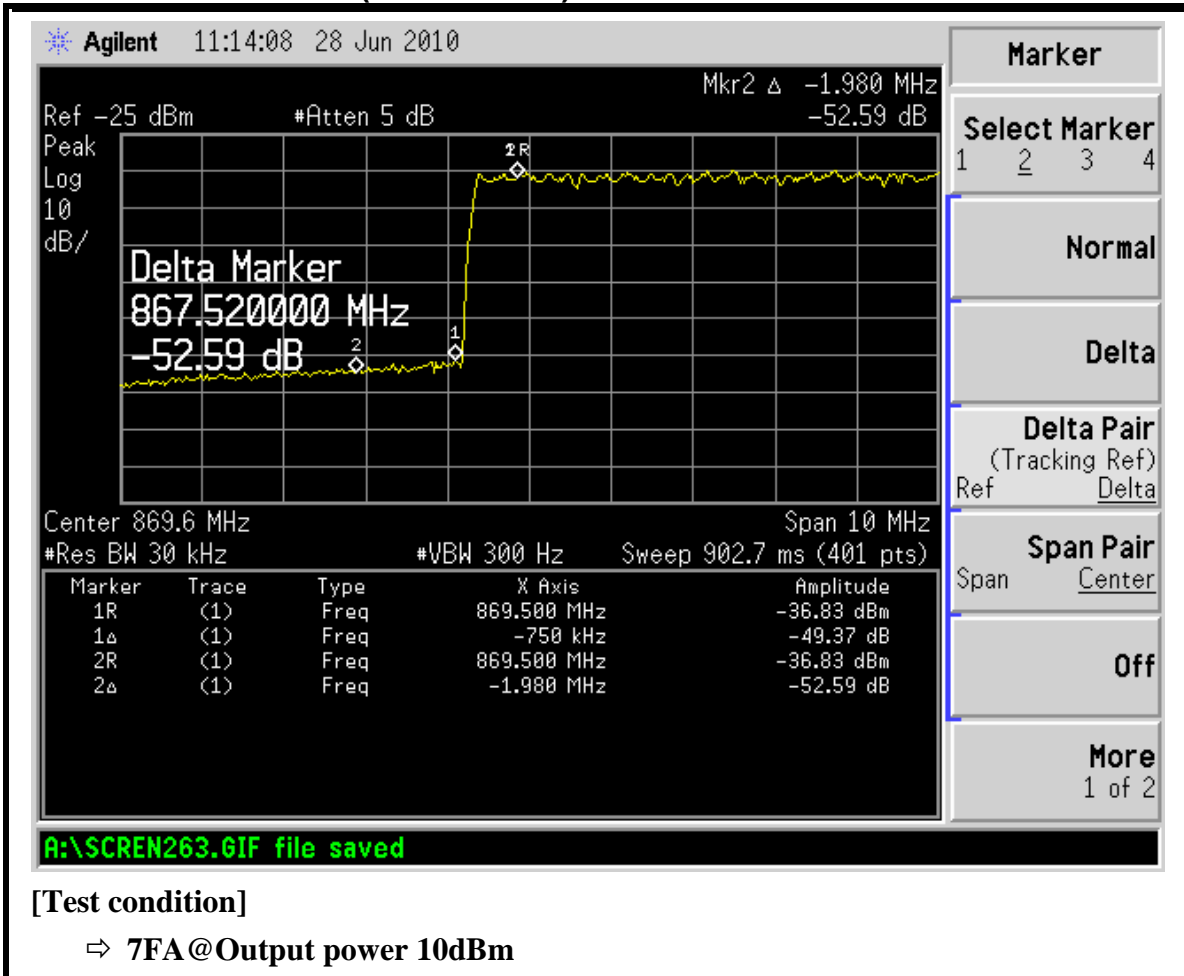
3.1 BT05AG_CDMA(869~894MHz) Test Result

SN	Freq [MHz]	Vcc [V]	Icc [mA]	Gain [dB]	OIP3 [dBm] ⁽¹⁾	P1dB [dBm]	IRL [dB]	ORL [dB]	NF [dB]
	881.5	5	81	20.6	38	23.2	-18	-11	4.5

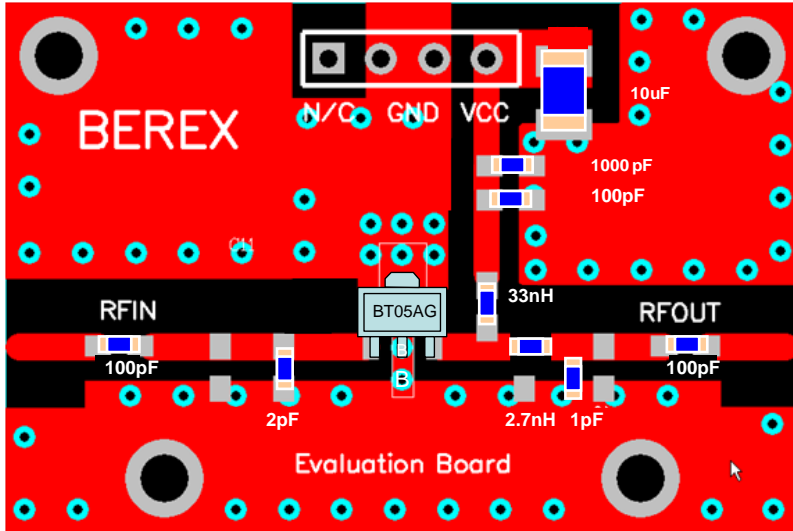
(1) OIP3 was tested @Pout=10dBm/tone 1MHz offset



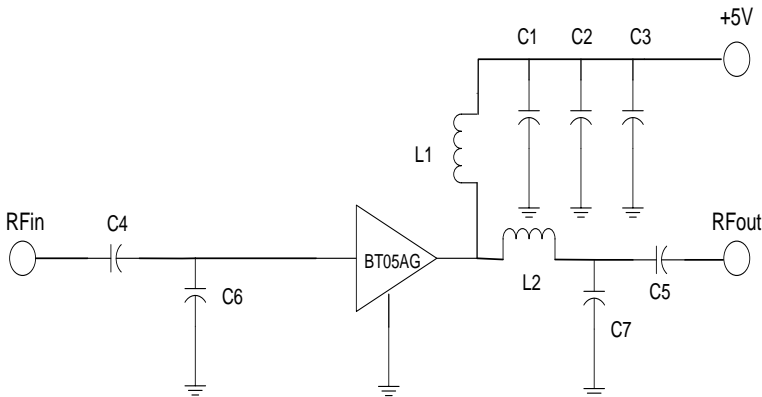
3.2 BT05AG_ CDMA(869~894MHz) SPURIOUS



4. BT05AG_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	2pF	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	33nH	Ceratech
L2	0603 IND	2.7nH	Ceratech
L3	0603 IND	NA	
R1	0603 RES	NA	
U1	SOT89 PKG	BT05AG	BEREX



Note:

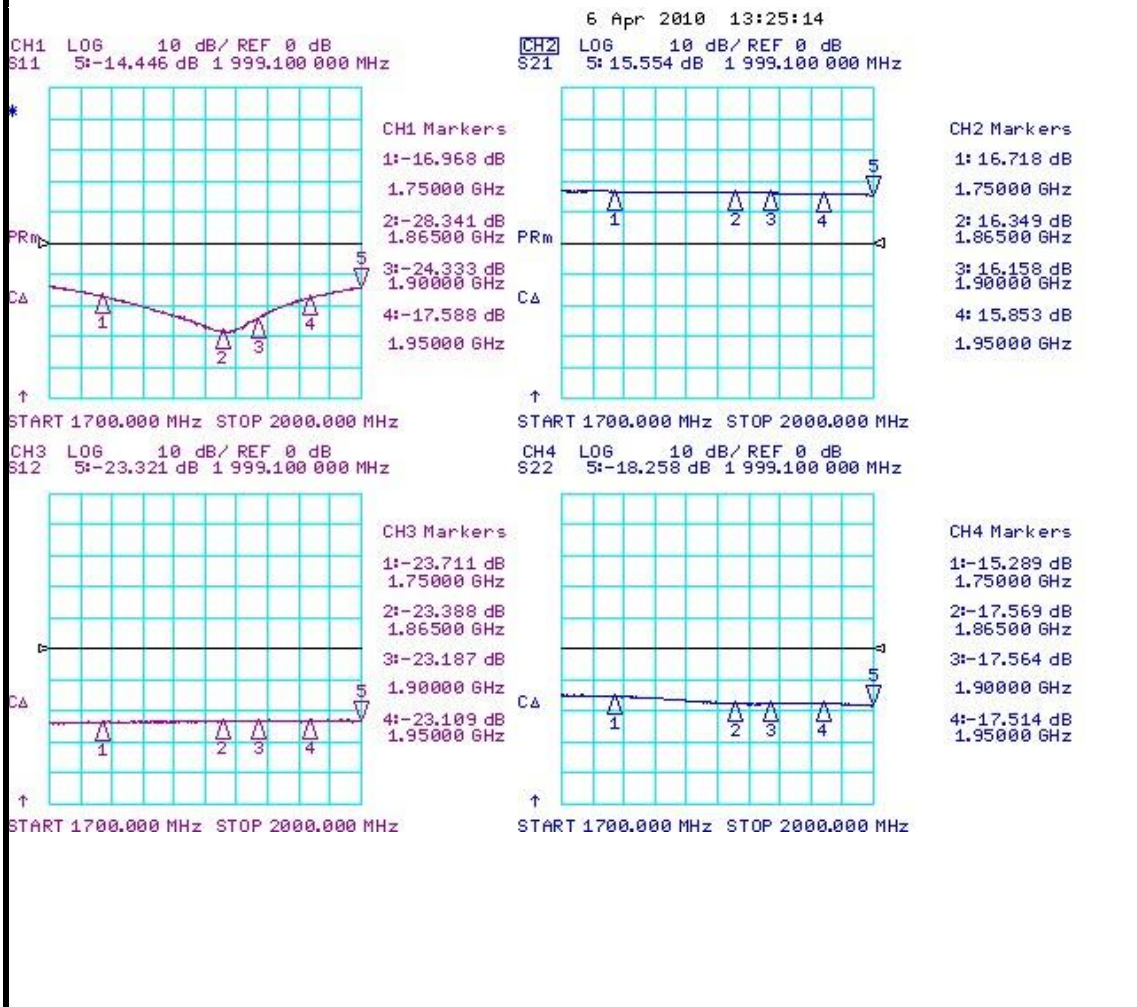
1. PCB: 31mil thick FR4
2. The distance between the center of the shunt cap(C6) and the Input Pin of BT05AG is 1.8mm
3. The distance between the center of the shunt cap(C7) and the Output Pin of BT05AG is 5.9mm
4. The distance between the center of the series Inductor(L2) and the Output Pin of BT05AG is 3.5mm

TITLE	
BT05AG Evaluation Board	
(1750~1780 MHz)	
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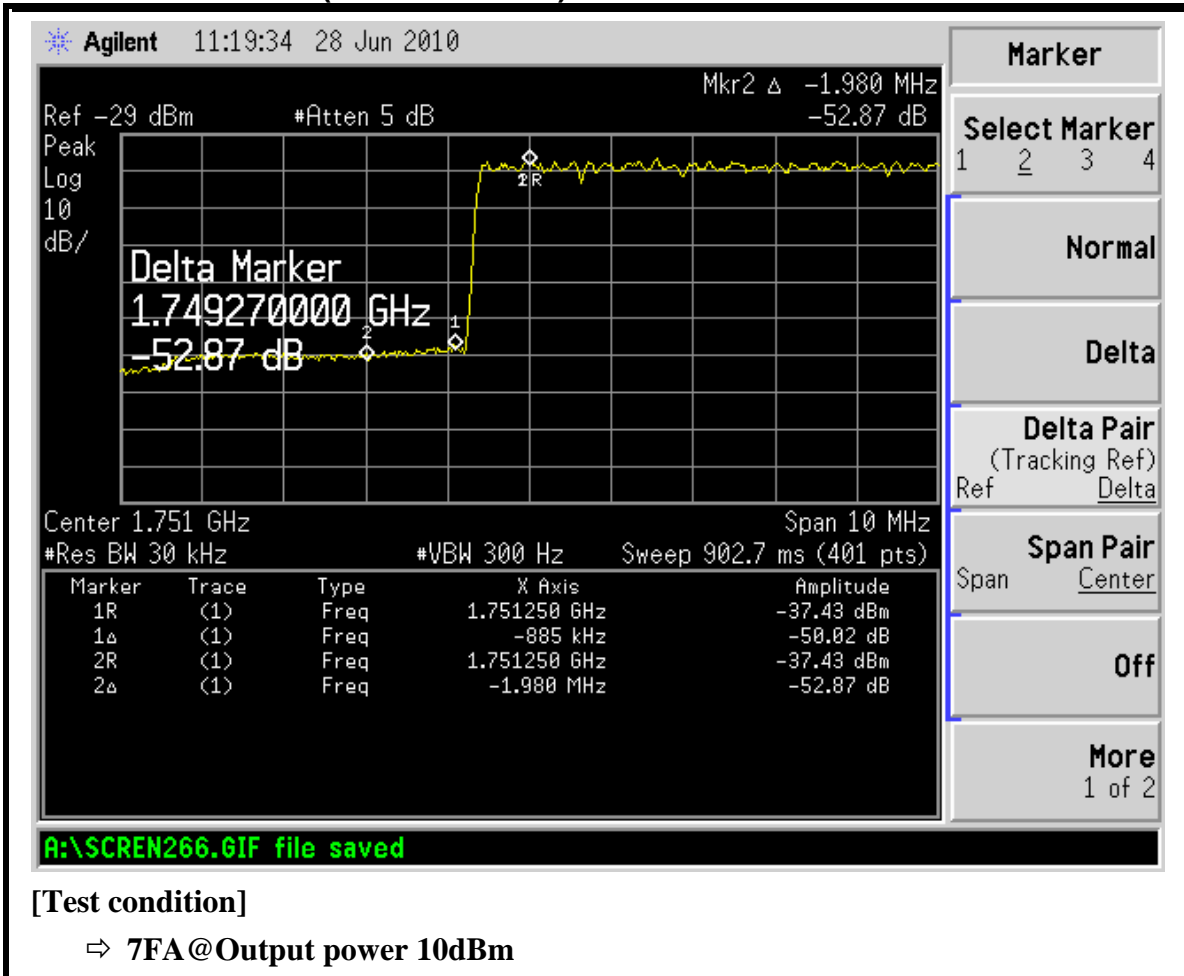
4.1 BT05AG_PCS(1750~1780MHz) Test Result

SN	Freq [MHz]	Vcc [V]	Icc [mA]	Gain [dB]	OIP3 [dBm] ⁽¹⁾	P1dB [dBm]	IRL [dB]	ORL [dB]	NF [dB]
	1765	5	87	16.7	40.4	22.8	-16.9	-15	4.4

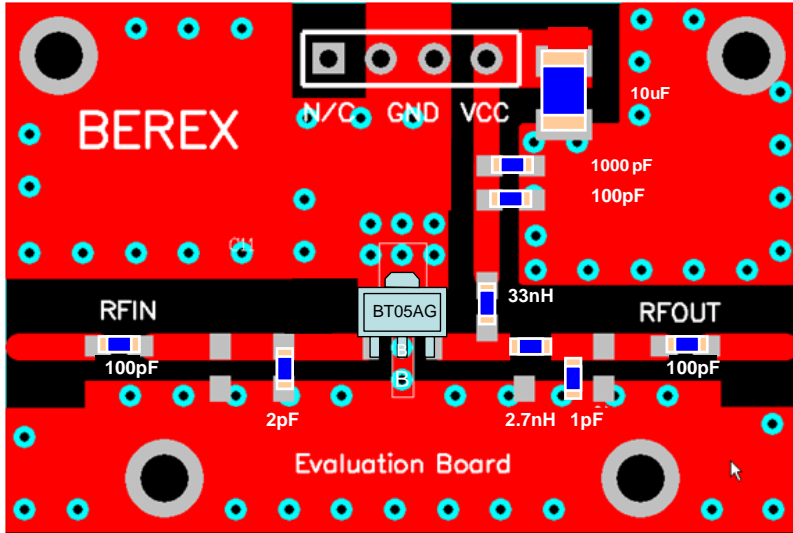
(1) OIP3 was tested @Pout=10dBm/tone 1MHz offset



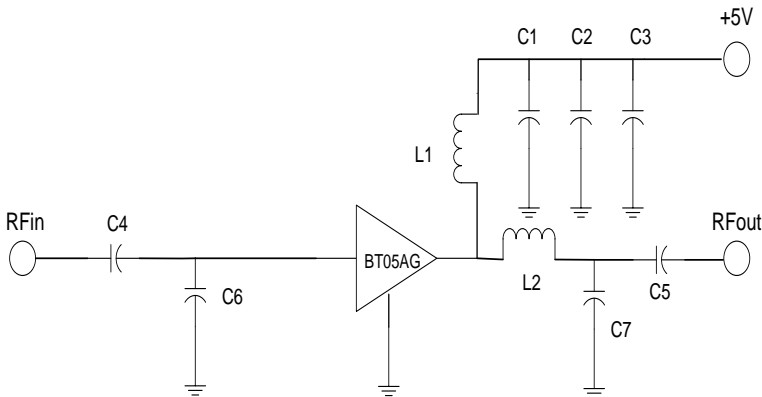
4.2 BT05AG_PCS(1750~1780MHz) SPURIOUS



5. BT05AG_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	2pF	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	33nH	Ceratech
L2	0603 IND	2.7nH	Ceratech
L3	0603 IND	NA	
R1	0603 RES	NA	
U1	SOT89 PKG	BT05AG	BEREX



Note:

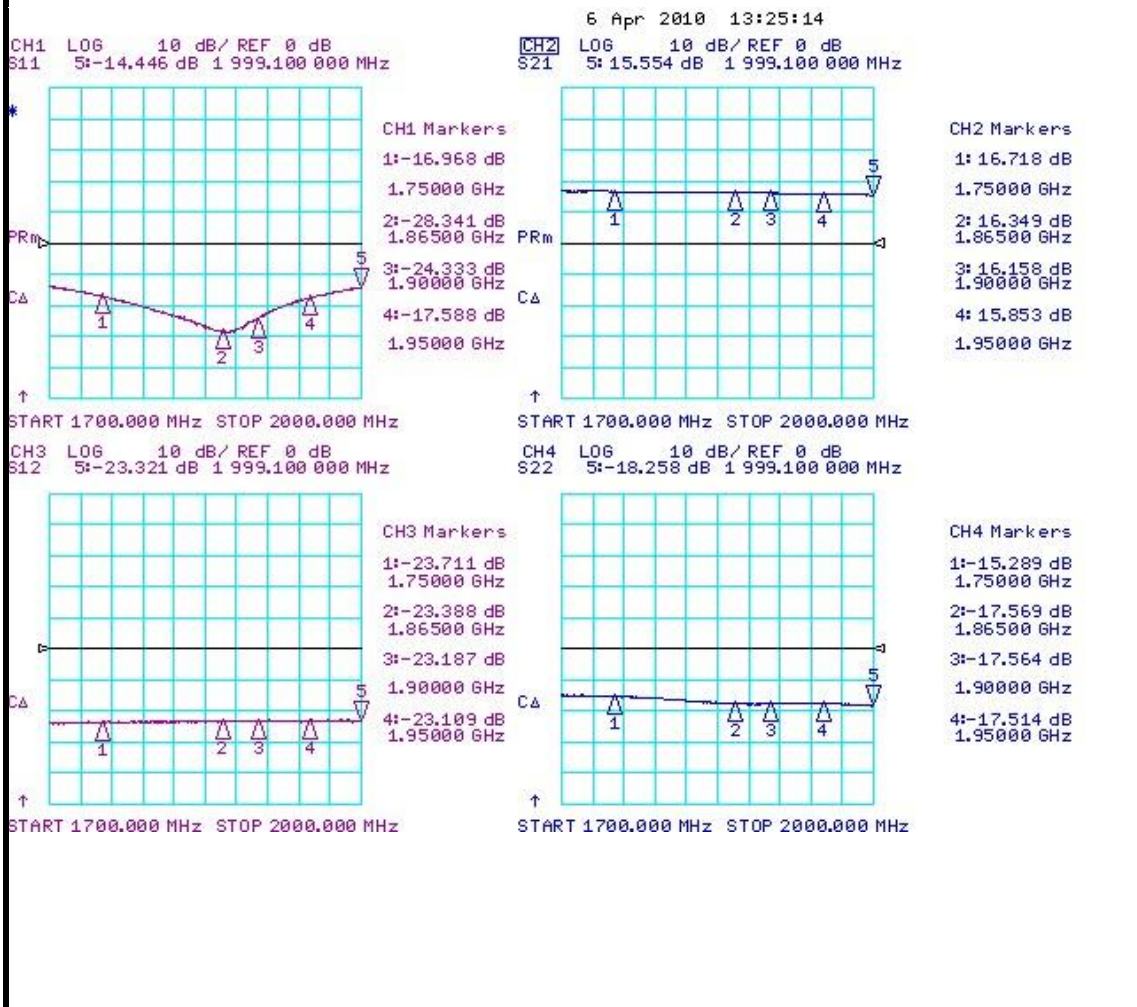
1. PCB: 31mil thick FR4
2. The distance between the center of the shunt cap(C6) and the Input Pin of BT05AG is 1.8mm
3. The distance between the center of the shunt cap(C7) and the Output Pin of BT05AG is 5.9mm
4. The distance between the center of the series Inductor(L2) and the Output Pin of BT05AG is 3.5mm

TITLE	
BT05AG Evaluation Board	
(1840~1870 MHz)	
Drawing Number	Rev.
Date	Drawn By
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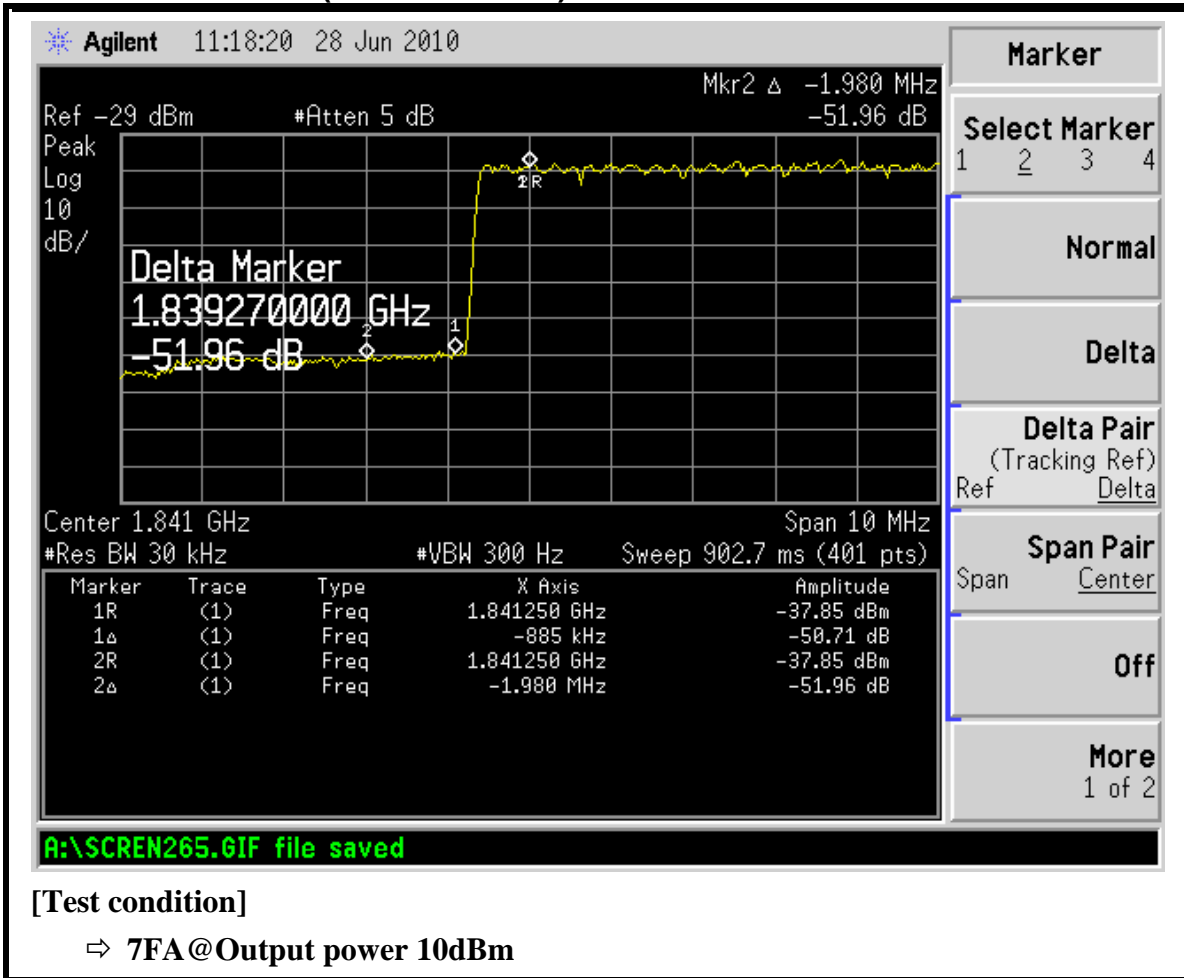
5.1 BT05AG_PCS(1840~1870MHz)Test Result

SN	Freq [MHz]	Vcc [V]	Icc [mA]	Gain [dB]	OIP3 [dBm] ⁽¹⁾	P1dB [dBm]	IRL [dB]	ORL [dB]	NF [dB]
	1855	5	86	16.3	40.2	22.6	-28	-17	4.4

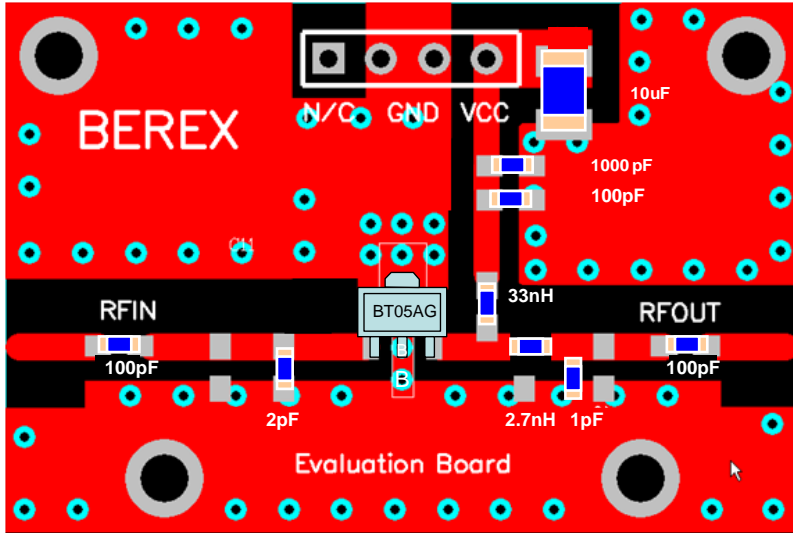
(1) OIP3 was tested @Pout=10dBm/tone 1MHz offset



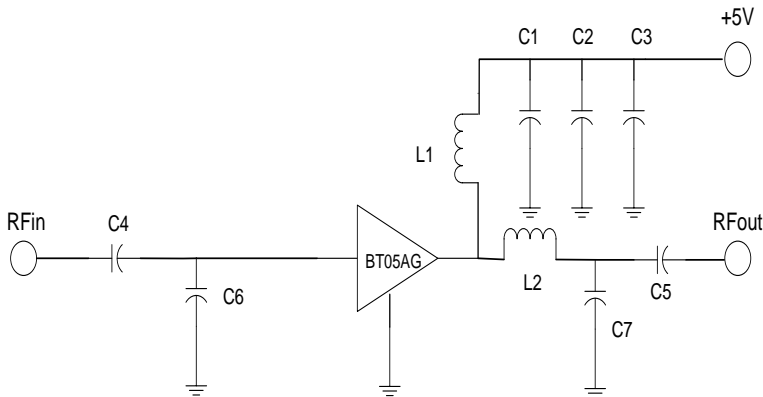
5.2 BT05AG_PCS(1840~1870MHz)SPURIOUS



6. BT05AG_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	2pF	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	33nH	Ceratech
L2	0603 IND	2.7nH	Ceratech
L3	0603 IND	NA	
R1	0603 RES	NA	
U1	SOT89 PKG	BT05AG	BEREX



Note:

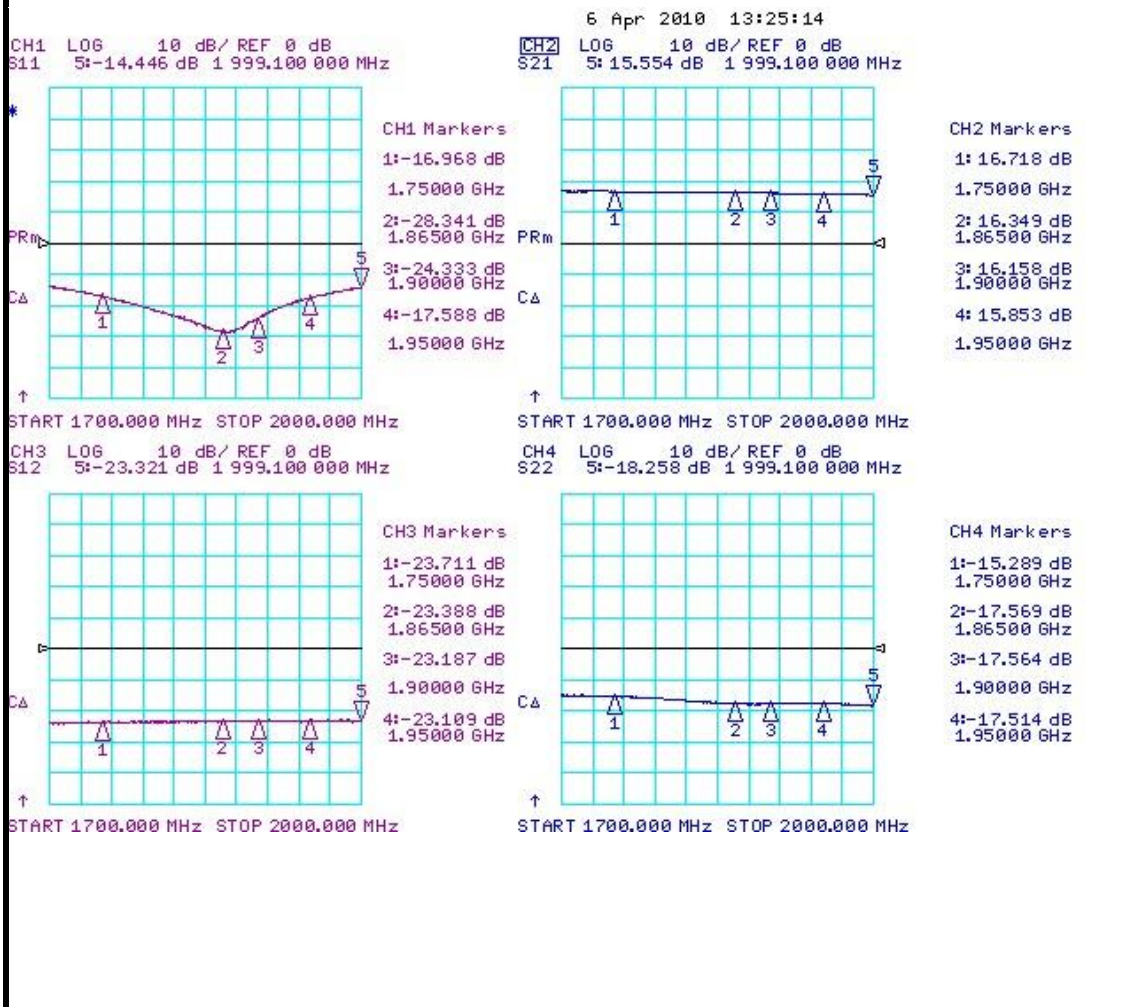
1. PCB: 31mil thick FR4
2. The distance between the center of the shunt cap(C6) and the Input Pin of BT05AG is 1.8mm
3. The distance between the center of the shunt cap(C7) and the Output Pin of BT05AG is 5.9mm
4. The distance between the center of the series Inductor(L2) and the Output Pin of BT05AG is 3.5mm

TITLE	
BT05AG Evaluation Board	
(1940~1980 MHz)	
Drawing Number	Rev.
Date	Drawn By
FILE NAME	SHEET

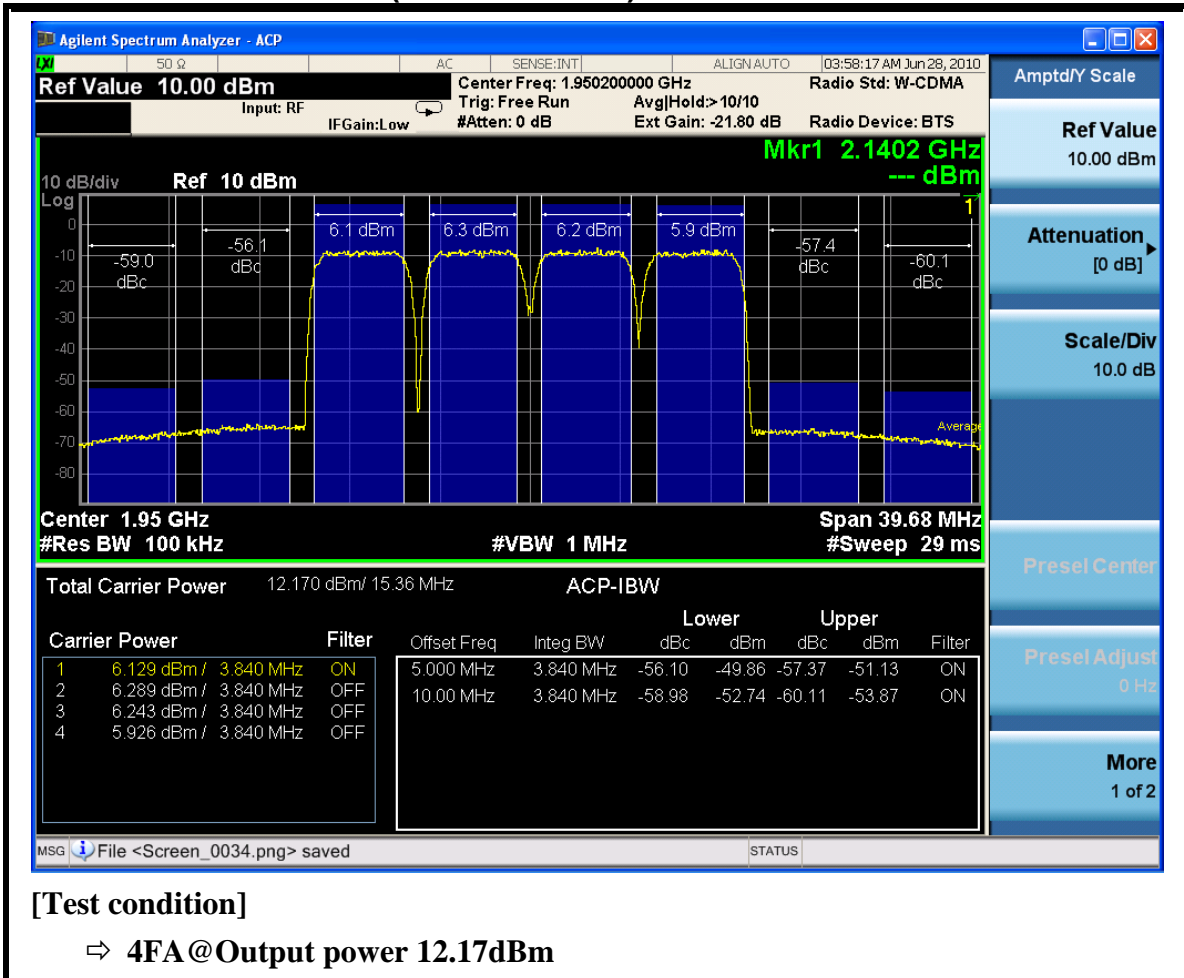
6.1 BT05AG_WCDMA(1940~1980MHz)TestResult

SN	Freq [MHz]	Vcc [V]	Icc [mA]	Gain [dB]	OIP3 [dBm] ⁽¹⁾	P1dB [dBm]	IRL [dB]	ORL [dB]	NF [dB]
	1960	5	87	15.8	40.5	22.5	-17.5	-17.5	4.4

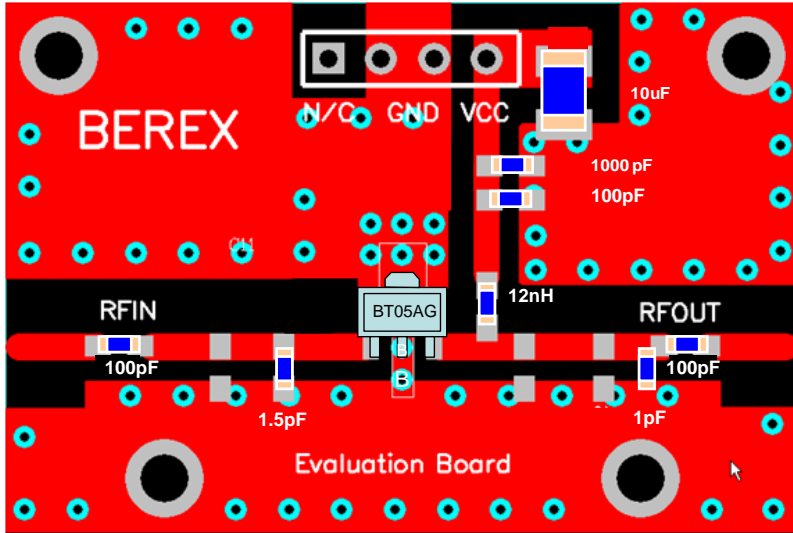
(1) OIP3 was tested @Pout=10dBm/tone 1MHz offset



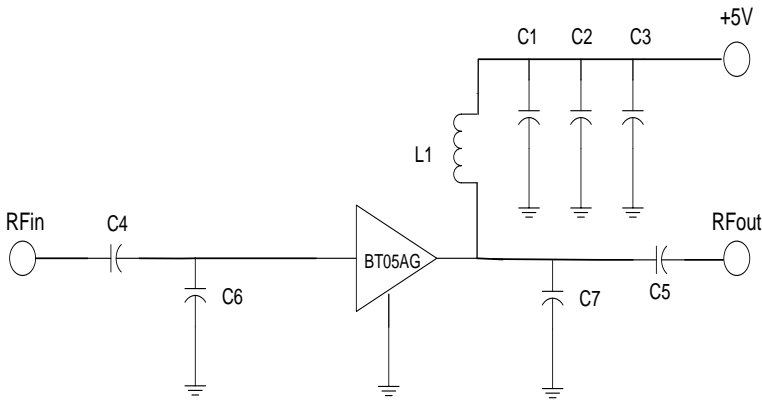
6.2 BT05AG_ WCDMA(1940~1980MHz) ACLR



7. BT05AG_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	1.5pF	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	12nH	Ceratech
L2	0603 IND	NA	
L3	0603 IND	NA	
R1	0603 RES	NA	
U1	SOT89 PKG	BT05AG	BEREX



Note:

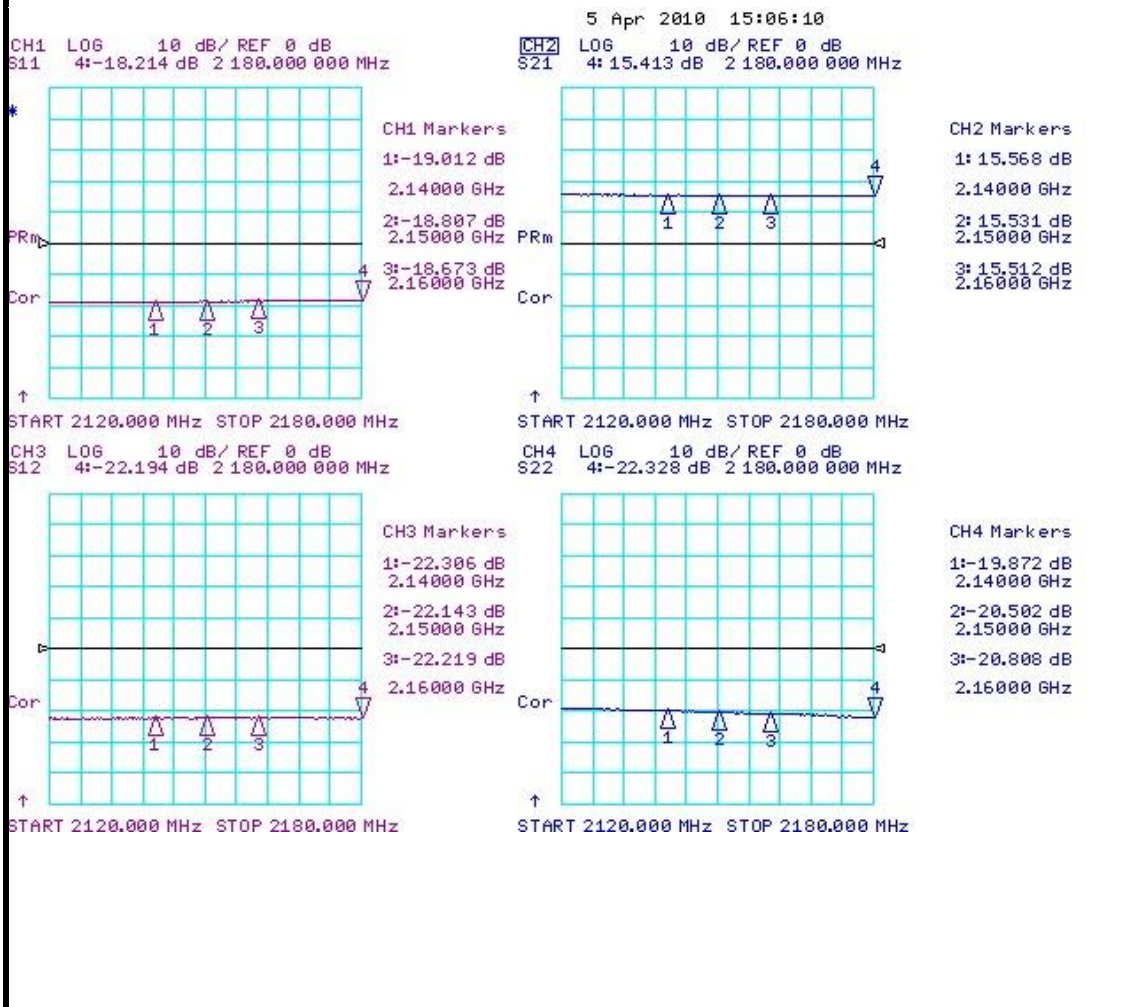
1. PCB: 31mil thick FR4
2. The distance between the center of the shunt cap(C6) and the Input Pin of BT05AG is 1.8mm
3. The distance between the center of the shunt cap(C7) and the Output Pin of BT05AG is 10.2mm

TITLE	
BT05AG Evaluation Board	
(2130~2170 MHz)	
Drawing Number	Rev.
Date	Drawn By
FILE NAME	SHEET

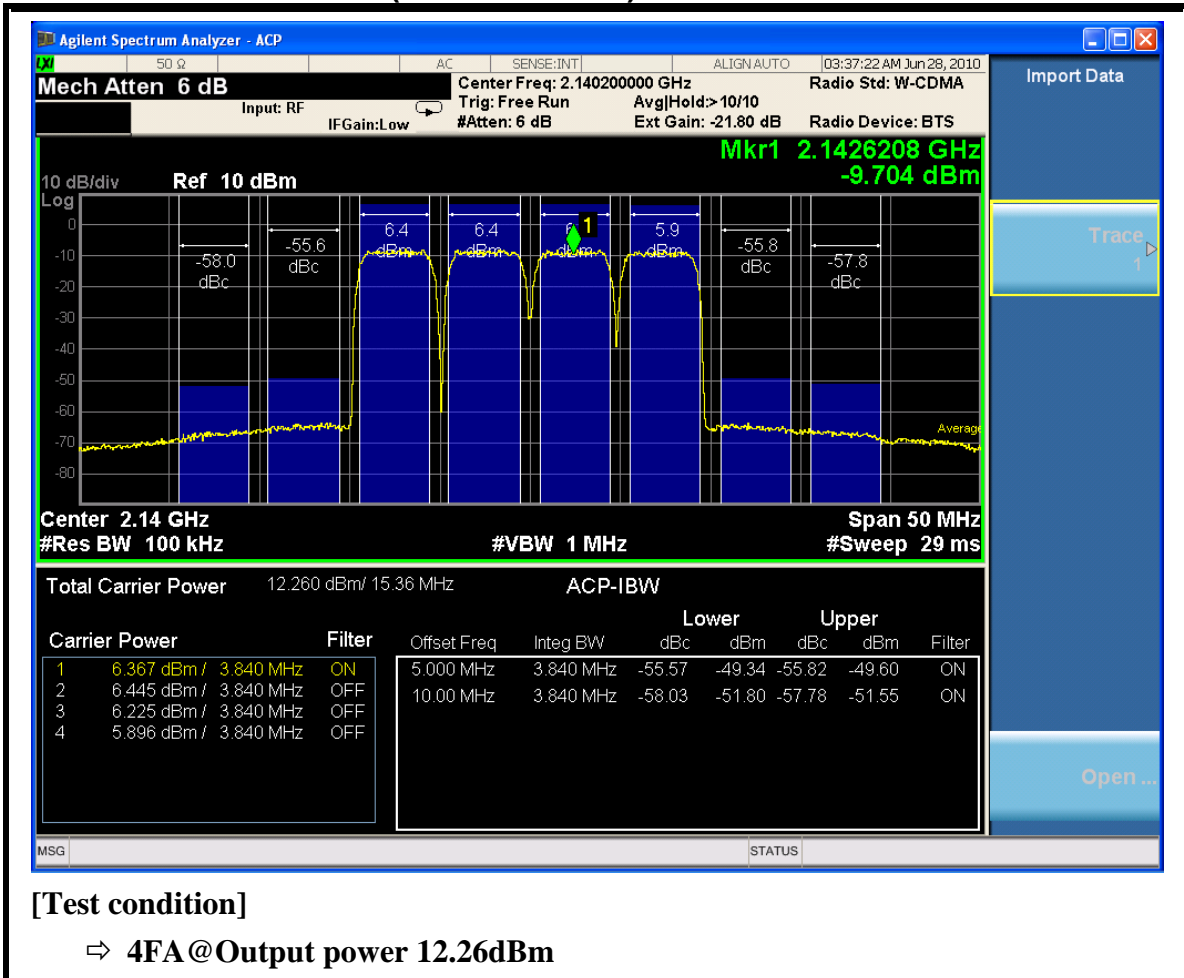
7.1 BT05AG_ WCDMA(2130~2170MHz) Test Result

SN	Freq [MHz]	Vcc [V]	Icc [mA]	Gain [dB]	OIP3 [dBm] ⁽¹⁾	P1dB [dBm]	IRL [dB]	ORL [dB]	NF [dB]
	2150	5	85	15.3	40.4	22.9	-18	-20	4.4

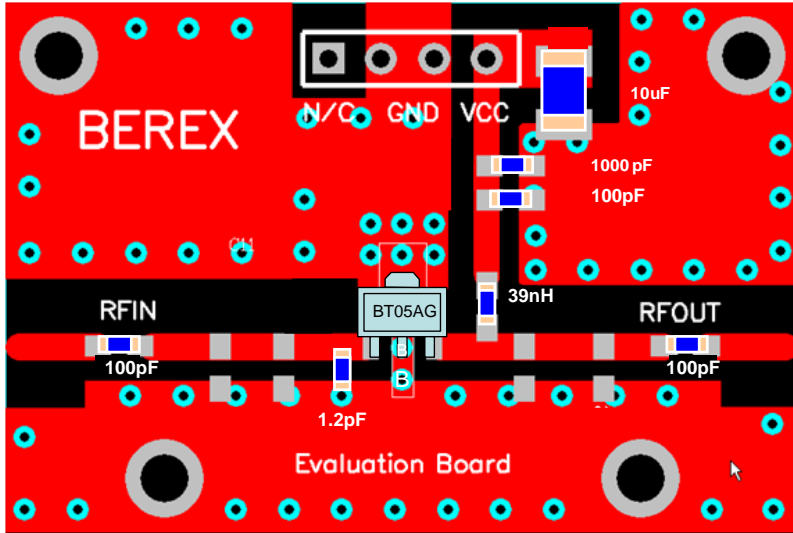
(1) OIP3 was tested @Pout=10dBm/tone 1MHz offset



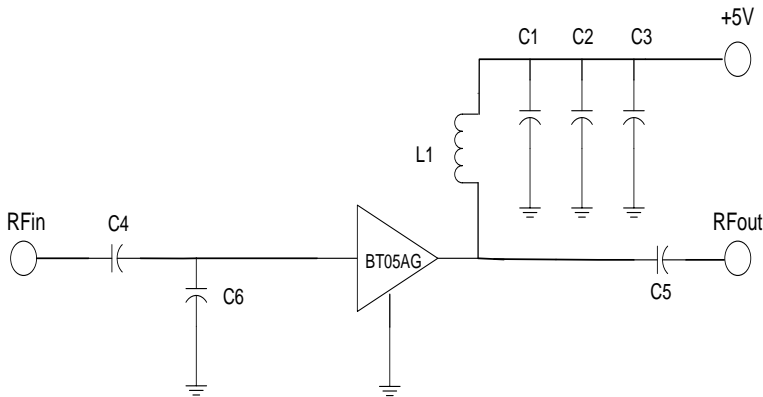
7.2 BT05AG_ WCDMA(2130~2170MHz) ACLR



8. BT05AG_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	1.2pF	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	39nH	Ceratech
L2	0603 IND	NA	
L3	0603 IND	NA	
R1	0603 RES	NA	
U1	SOT89 PKG	BT05AG	BEREX



Note:

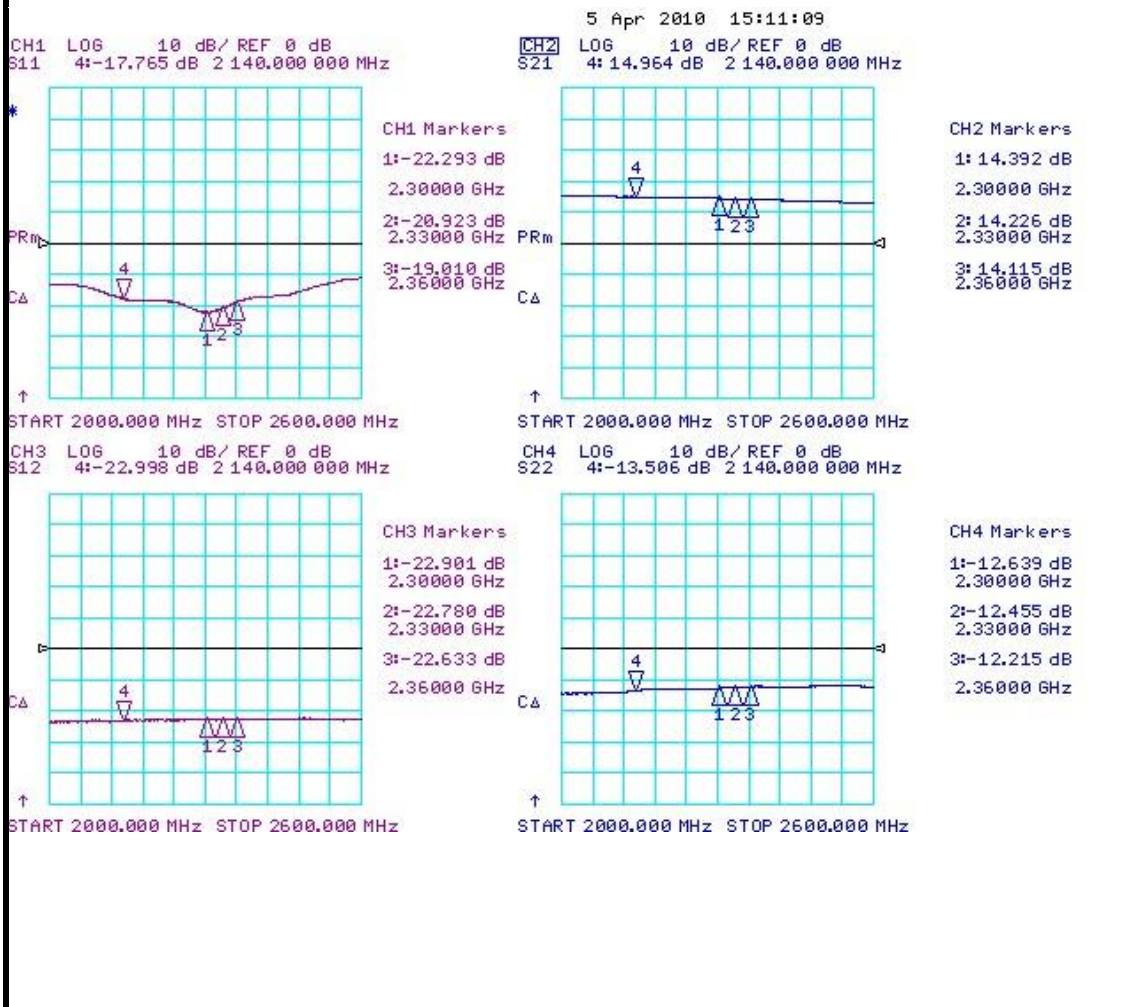
1. PCB: 31mil thick FR4
2. The distance between the center of the shunt cap(C6) and the Input Pin of BT05AG is 0.7mm

TITLE	
BT05AG Evaluation Board	
(2300~2360 MHz)	
Drawing Number	Rev.
Date	Drawn By
FILE NAME	SHEET

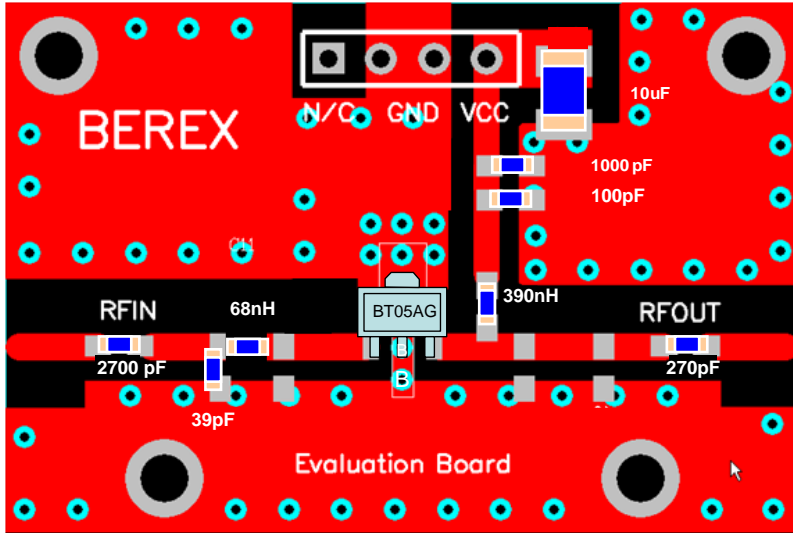
8.1 BT05AG_WIBRO(2300~2360MHz) Test Result

SN	Freq [MHz]	Vcc [V]	Icc [mA]	Gain [dB]	OIP3 [dBm] ⁽¹⁾	P1dB [dBm]	IRL [dB]	ORL [dB]	NF [dB]
	2330	5	82	14.2	38.5	23.4	-20.9	-12.4	4.4

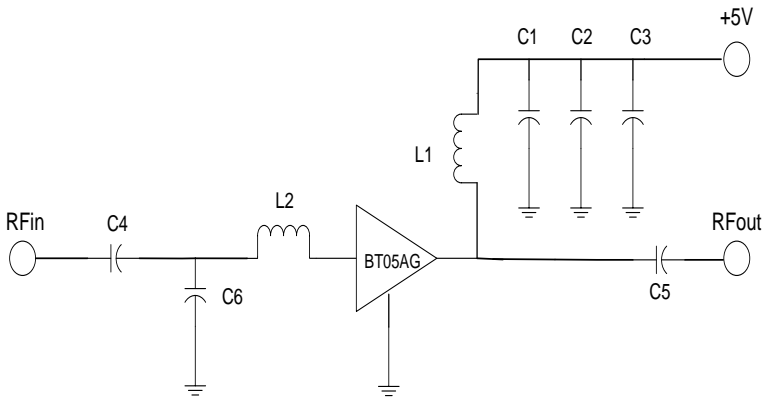
(1) OIP3 was tested @Pout=10dBm/tone 1MHz offset



9. BT05AG_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	BT05AG	BEREX



Note:

1. PCB: 31mil thick FR4
2. The distance between the center of the series cap(C6) and the Input Pin of BT05AG is 3.3mm
3. The distance between the center of the shunt cap(C7) and the Input Pin of BT05AG is 2.3mm

TITLE

BT05AG Evaluation Board

(3500 MHz)

Drawing Number	Rev.
Date	Drawn By
FILE NAME	SHEET

9.1 BT05AG_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							4.4

(1) OIP3 was tested @Pout=10dBm/tone 1MHz offset