

TR0329M-EVB-A

Application Note

3300MHz~4000MHz

5.0V 90mA-HG mode

5.0V 45mA-LG mode

Rev-1.0

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1. GENERAL DESCRIPTION

The TR0329M is a high-linearity, ultra-low noise 2-stage gain block amplifier module with internal 50ohm input output matching with a bypass mode functionality integrated to the second stage in the product. At 3.6 GHz, the amplifier, under high gain mode, typically provides 34dB gain, +35dBm OIP3, and 0.5 dB noise figure while drawing 90 mA current from a +5 V supply. The component also provides high performance in the low gain mode with 15dB gain, 0.5dB noise figure and +22dBm OIP3 while drawing 50 mA current. The TR0329M is packaged in a compact, low-cost Quad Flat No Lead (QFN) 3.5x3.5x0.75mm, 20 pin plastic packages

TR0329M-EVB-A is an evaluation board specially tuned for frequency range of 3300MHz~4000MHz applications. Its application in the areas of Wireless infrastructure, TDD massive multiple input & multiple output, active antenna systems, TDD-based communication systems etc.

TR0329M-EVB-A Board Design

2. TR0329M-EVB-A SCHEMATIC

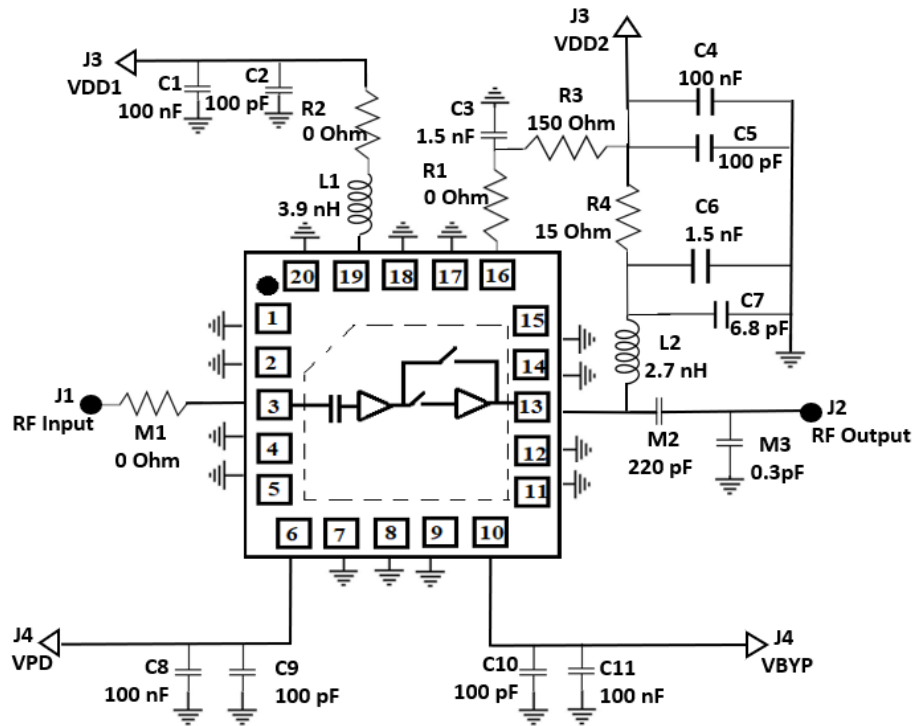


Figure 1 TR0329M-EVB-A 3300MHz ~ 4000MHz schematic

3. TR0329M-EVB-A LAYOUT

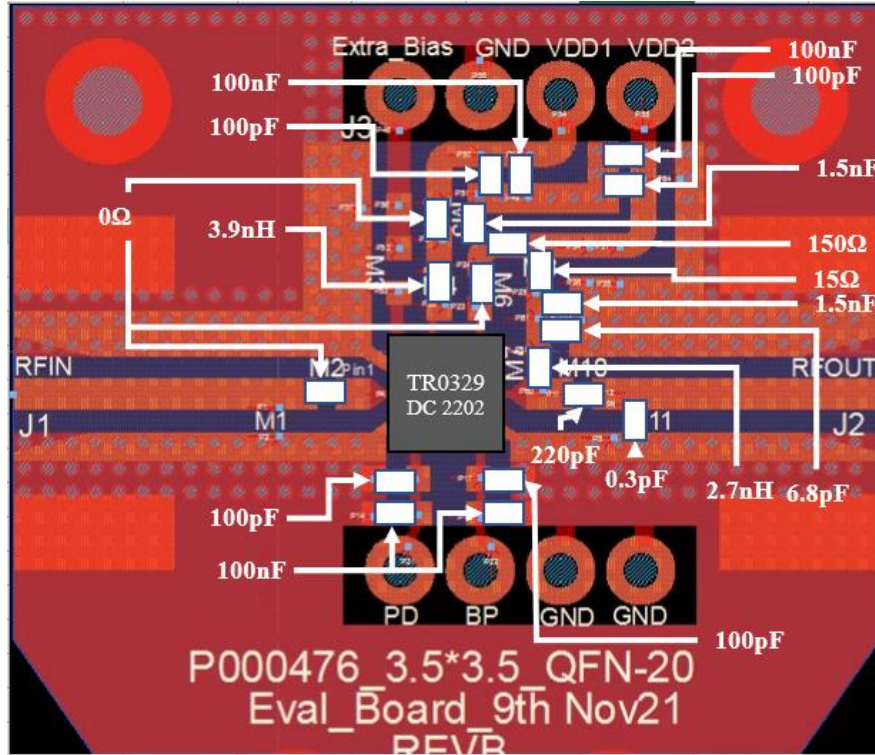


Figure 2 TR0329M-EVB-A 3300MHz ~ 4000MHz layout

4. TR0329M-EVB-B BILL OF MATERIAL

Component ID	Value	Manufacturer	Recommended Part Number	Qty
M1, R1, R2	0Ω	Panasonic	ERJ-2GE0R00X	3
C7	6.8pF	Murata	GJM1555C1H6R8BB01D	1
M2	220pF	Kemet	C0402C221K5GACAUTO	1
C2, C5, C9, C10	15 Ω	Panasonic	ERJ-H2RD15R0X	1
C1, C4, C8, C11	150Ω	Panasonic	ERJ-2RHD1500X	1
L1	1.5nF	Murata	04025C152JAT2A	2
C3, C6	100pF	AVX	04025A101JAT4A	4
L2	100nF	TDK	C1005X7R1H104K050BE	4
R4	3.9nH	Coil craft / Würth Electronics	0402HP-3N9XGE / 744916039	1
R3	2.7nH	Coil craft / Würth Electronics	0402HP-2N7XGE / 744916027	1
M3	0.3pF	Murata	GJM1555C1HR30BB01	1
PCB	Rogers RO4350B, 20 mils, 1 oz copper			1

5. TR0329M-EVB-A BOARD MEASUREMENT RESULTS

5.1. TR0329M-EVB-A TEST RESULTS

All the tests are carried out at room temperature.

5.2. Summary

Parameter	Test Condition	Typical Values	Unit
Operational frequency Range		3.3-4.0	GHz
Gain	HG	36.5-32	dB
	LG	16-14.3	dB
Noise Figure (De-embedded)	HG	0.5-0.8	dB
	LG	0.5-0.8	dB
EVB Noise Figure	HG	0.6-0.9	dB
	LG	0.7-0.9	dB
Input Return Loss	HG	Less than -9	dB
	LG	Less than -14	dB
Output Return Loss	HG	Less than -13	dB
	LG	Less than -8.3	dB
OP1dB	HG	19-20.5	dBm
	LG	9-11	dBm
OIP3 (With 1MHz tone spacing)	0dBm per tone,	33-36	dBm
	-2dBm per tone,	19-22	dBm
Current, Id	HG	90	mA
	LG	45	
	PD	5	
Isolation between RFIN and RF-out PD mode ON and Bypass ON	At 3.6GHz Receive operation	50	dB
Isolation between RFIN and RF-out PD mode ON and High Gain ON		50	dB

Figure 3 TR0329M-EVB-A Electrical Characteristics Summary

5.3. S parameters.

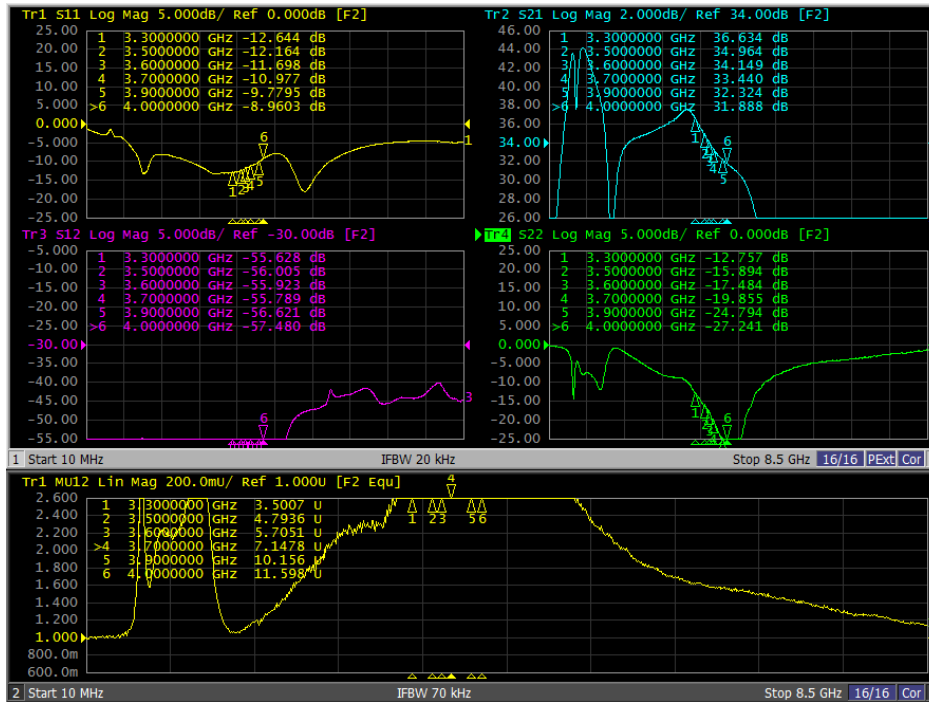


Figure 4.a. S parameters of HG mode of TR0329M-EVB-A

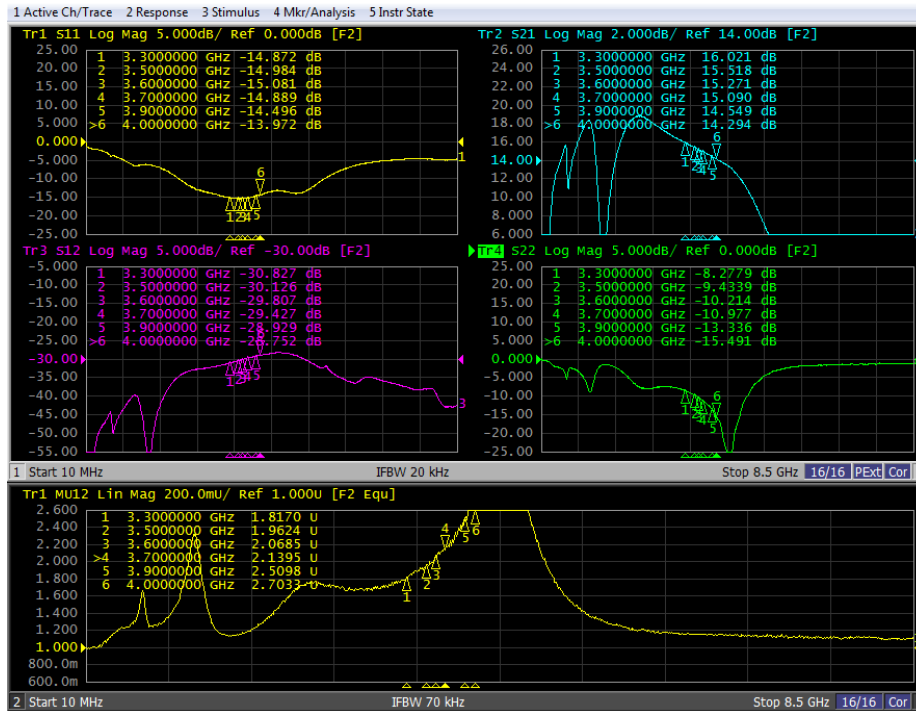


Figure 4.b. S parameters of LG mode of TR0329M-EVB-A

5.4. De-embedded Noise Figure.

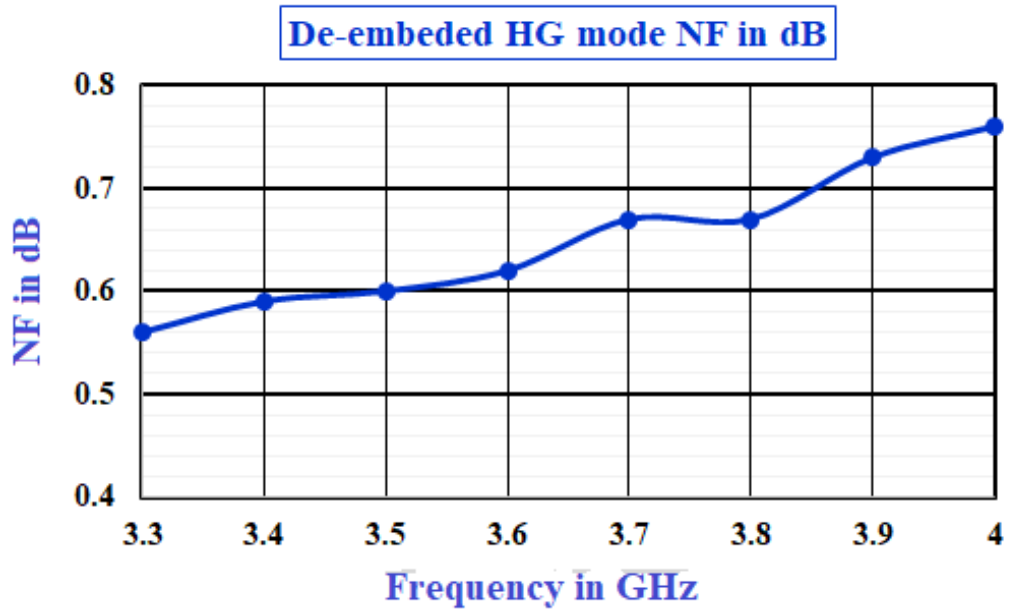


Figure 5.a. De-embedded NF of HG mode of TR0329M-EVB-A

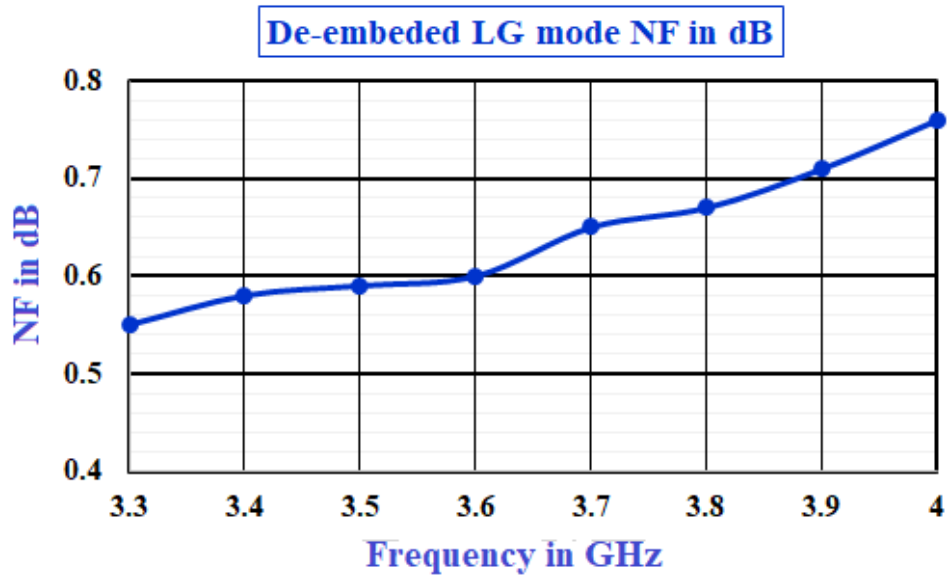


Figure 5.b. De-embedded NF of LG mode of TR0329M-EVB-A

5.5. Large Signal Test Results.

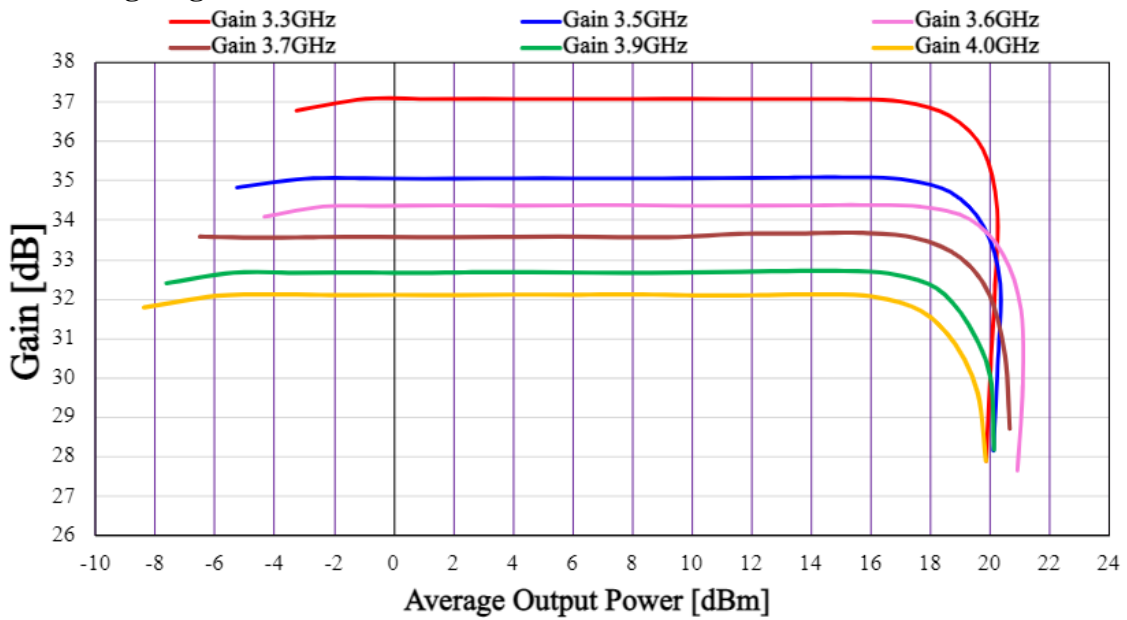


Figure 6.a. Gain Vs Pout of HG mode of TR0329M-EVB-A

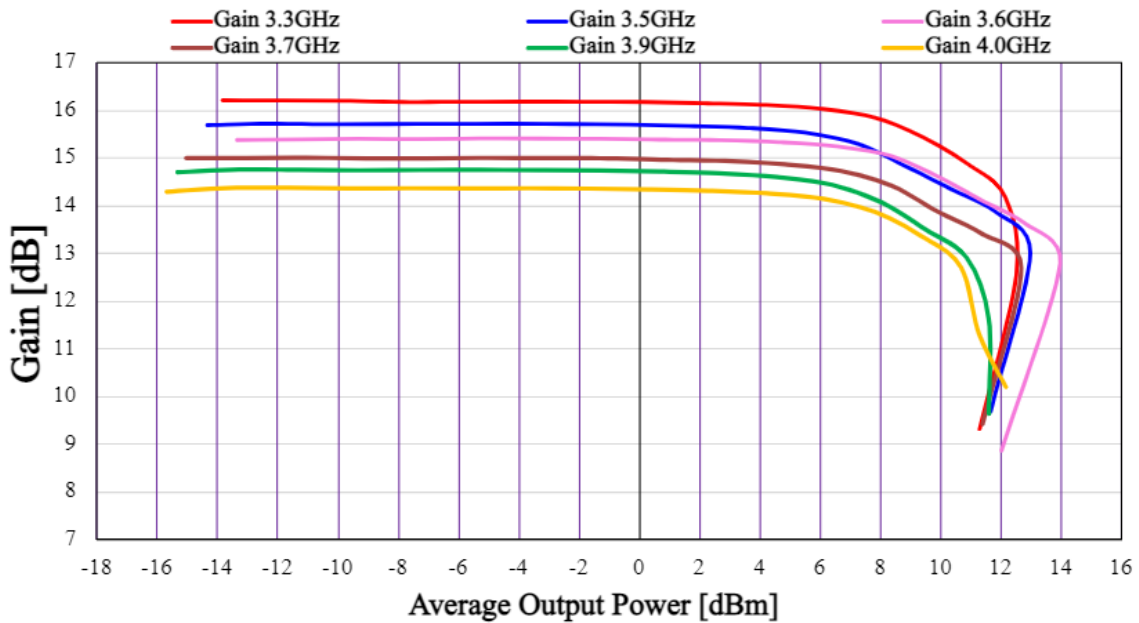


Figure 6.b. Gain Vs Pout of LG mode of TR0329M-EVB-A

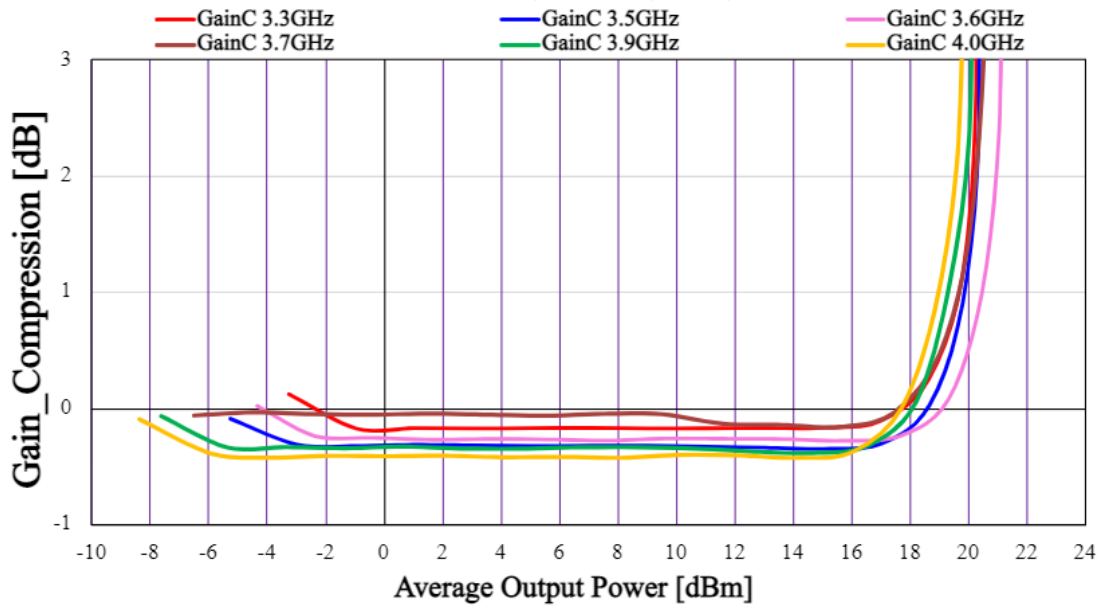


Figure 7.a. Gain compression Pout of HG mode of TR0329M-EVB-A

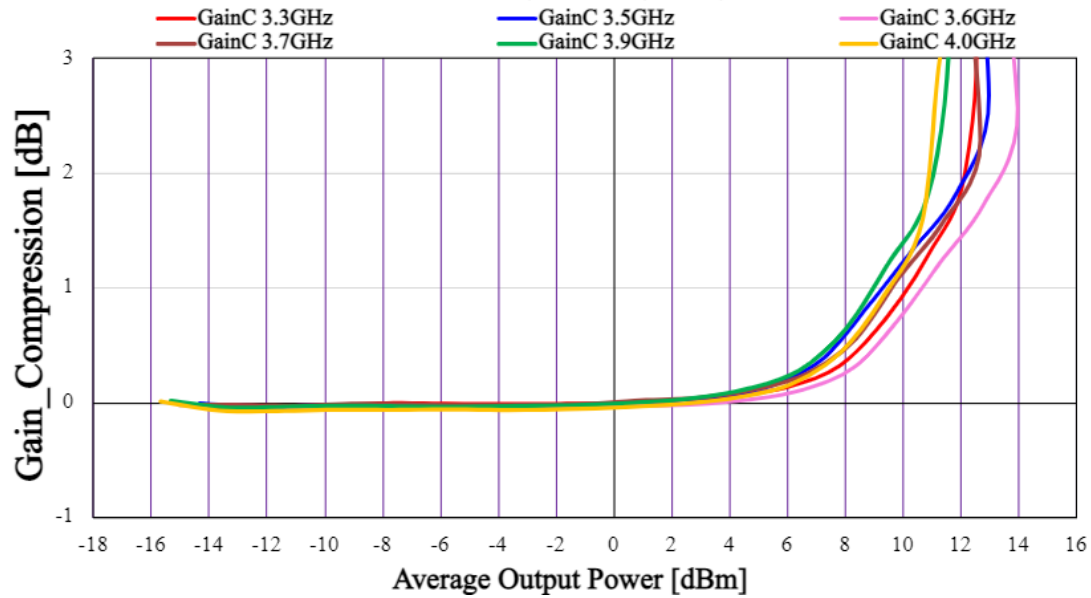


Figure 7.b. Gain compression Pout of LG mode of TR0329M-EVB-A

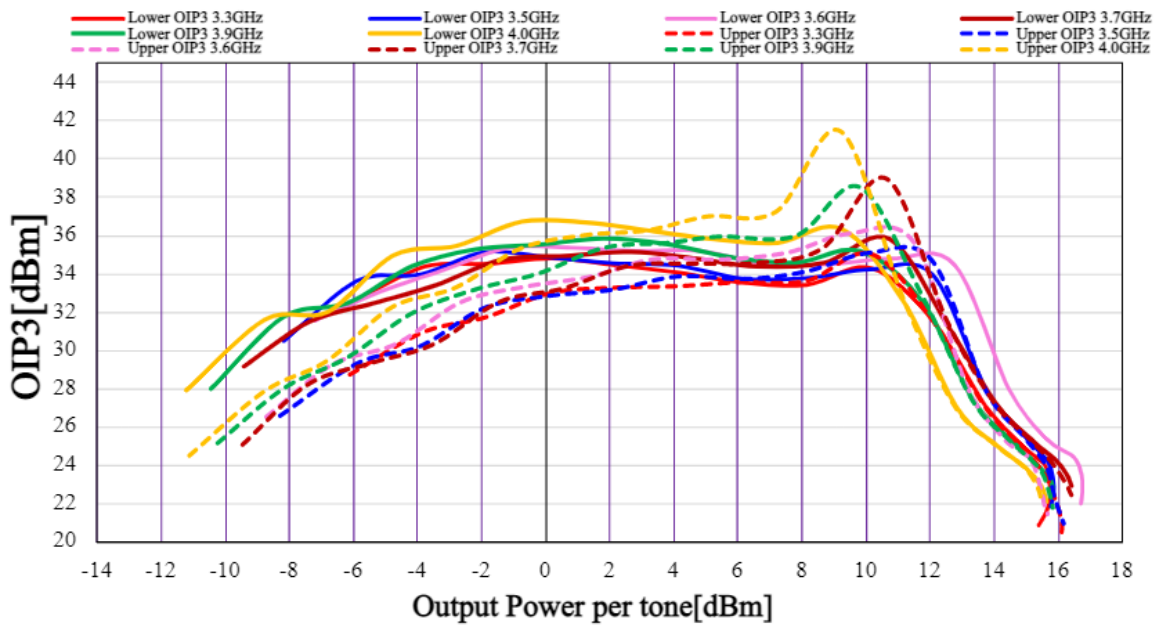


Figure 8.a. OIP3 Vs Pout per tone of HG mode of TR0329M-EVB-A

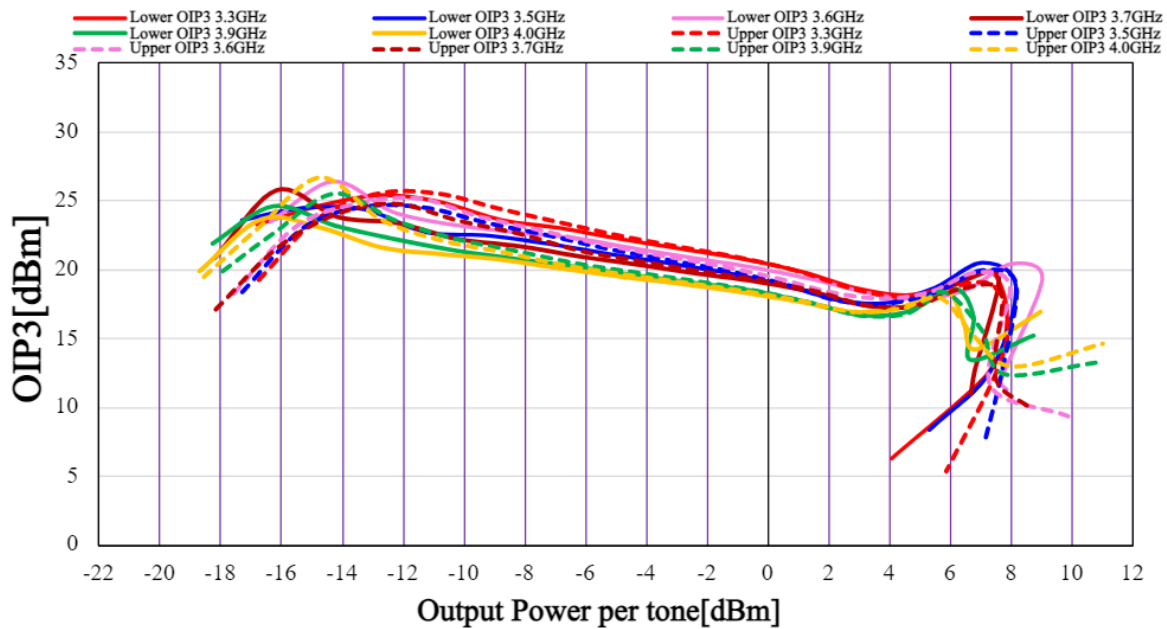


Figure 8.b. OIP3 Vs Pout per tone of LG mode of TR0329M-EVB-A

