

# **Model Z10040B Broadband Norton Amplifier**

*Performance Measurements*

*Z10040B S/N 005*

*26 June 2009*

## Contents

1. Gain versus frequency. (300 KHz – 30 MHz)
2. Noise figure versus frequency (10 MHz – 50 MHz)
3. IP2 and IP3 at 10649 KHz
4. IP3 at 12 MHz

### Note:

[1] Gain versus frequency measured with HP 8752B Vector Network Analyzer. 13.8V DC supply, -15 dBm input signal.

[2] Noise figure measured with HP 8970A Noise Figure Meter and AIL 7615 noise source. 8970A low frequency limit is 10 MHz. Gain figures are also provided but the gain plot provided in (1) is more accurate.

[3] Data taken at 10649 KHz is more accurate than at 12 MHz because additional filtering is applied to overcome limits of test equipment.

[4] Classical view of IP3 with the two test signals seen on spectrum analyzer and IP3 products. Due to limits in the intermodulation performance of the test equipment, the IP3 computed from these spectrum analyzer images is less accurate than the values given in [3]

Computed IP3 from spectrum analyzer images is +48 dBm with respect to a single output tone.

CH1 TRN

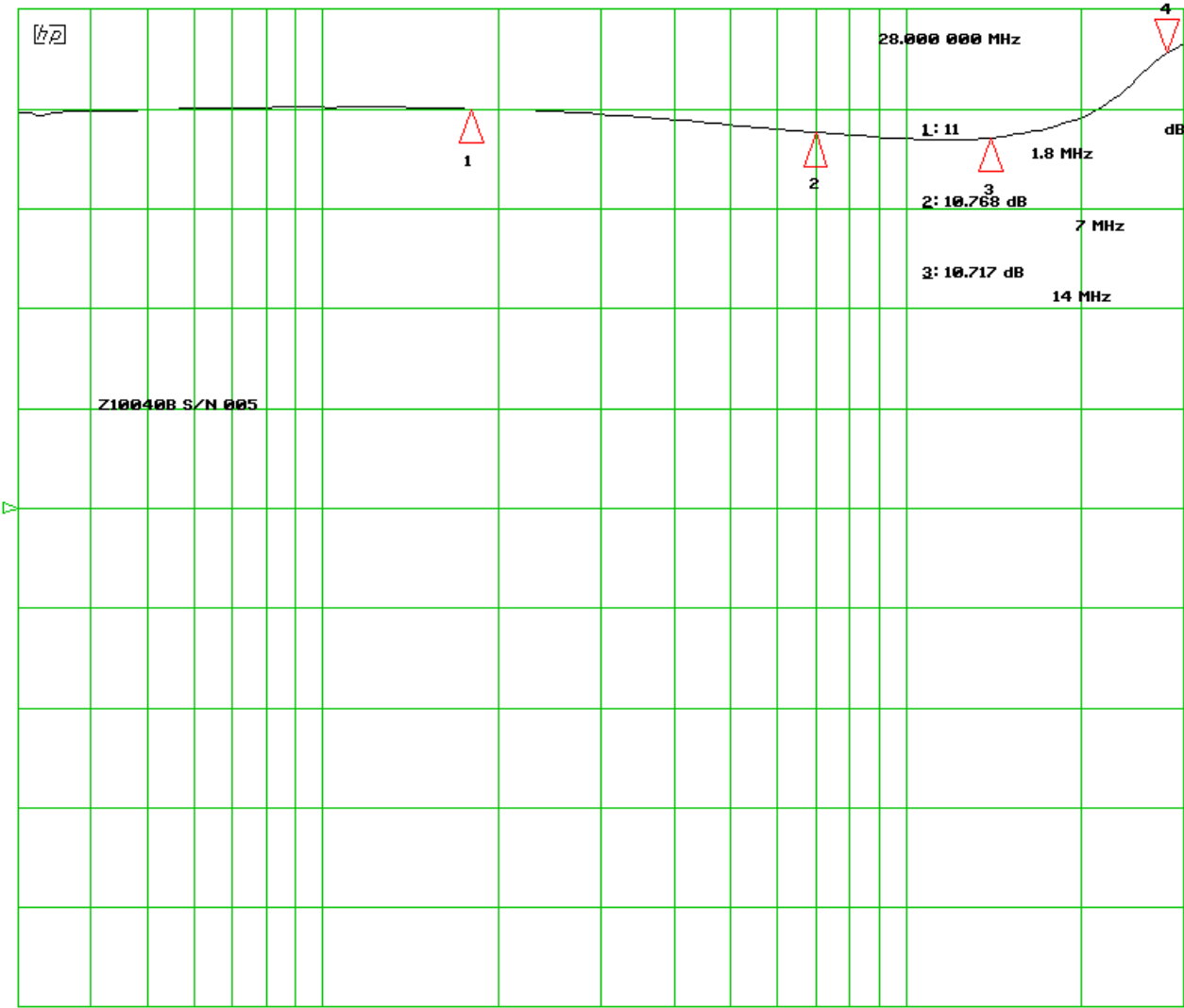
log MAG

1 dB/

REF 7 dB

4: 11.568 dB

Cor



START

.300 000 MHz

STOP

30.000 000 MHz

HP8970A Noise Figure Meter S/N 2116A00215  
Data by K8ZOA / Clifton Laboratories  
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Datafile Name c:\test\Z10040B SN-005 Complete NF.txt

AIL 7615 Noise Source

File Created: 6/25/2009 8:05:58 PM  
Prologix Ver:

Start Frequency (MHz): 10  
Stop Frequency (MHz): 50  
Frequency Step (MHz): 1

Z10040B S/N 005 Assembled in enclosure. 13.8V DC Supply.

Freq MHz	Gain dB	NF dB
10	10.908	1.732
11	10.918	1.722
12	10.948	1.684
13	10.951	1.680
14	10.944	1.686
15	10.945	1.703
16	10.960	1.732
17	10.992	1.732
18	10.997	1.767
19	11.009	1.823
20	11.030	1.866
21	11.073	1.910
22	11.113	1.958
23	11.172	1.998
24	11.223	2.041
25	11.292	2.064
26	11.346	2.093
27	11.383	2.151
28	11.422	2.198
29	11.440	2.249
30	11.418	2.296
31	11.382	2.360
32	11.268	2.441
33	11.128	2.518
34	10.924	2.625
35	10.699	2.690
36	10.390	2.814
37	10.040	2.908
38	9.637	3.021
39	9.209	3.154
40	8.717	3.302
41	8.223	3.430
42	7.698	3.593
43	7.136	3.757
44	6.580	3.911
45	5.995	4.209
46	5.395	4.975
47	4.785	5.687
48	4.139	6.268

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49	3.572	6.374
50	3.086	5.739

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## Intermodulation Intercept Report

Date of test: 25 June 2009

### Device Under Test:

Z10040B S/N 005

Gain at test frequency 11 dB

### IP2

#### Test equipment:

HP 8640B Signal Generator  
Coilcraft P7LP Low Pass Filter  
Z10020A Band Reject Filter  
Mini-Circuits CAT10 10 dB Attenuator  
HP 3586B Selective Voltmeter

Fundamental Frequency  
1500 KHz  
2nd Harmonic Frequency  
3000 KHz

Z10020A Loss  
0.2 dB

Input to DUT  
-2 dBm

Output from DUT  
9 dBm

Indicated 2nd Harmonic Level  
-104.9 dBm

2nd Harmonic at DUT Output  
-94.7 dBm

Computed IP2  
112.7 dBm

### IP3

#### Test Equipment

HP8657A Signal Generator (2 each)  
Mini-Circuits ZHL-3A Broadband amplifier (2 each)  
Mini-Circuits CAT6 6 dB Attenuator (2 each)  
Clifton Laboratories 14 MHz Low Pass Filter (2 each)  
Clifton Laboratories 6 dB Hybrid Combiner (1 each)  
Mini-circuits CAT10 10 dB Attenuator (1 each)  
Clifton Laboratories 10.7 MHz bandpass filter (1 each)  
Advantest R3463 Spectrum Analyzer (1 each)  
HP 3586B Selective Voltmeter (1 each)

#### Test Tones

12683 KHz  
14717 KHz

Tone Level Into DUT  
0 dBm

Tone Level Out of DUT  
11 dBm

Net Loss between measuring receiver and DUT Output  
13 dB

Measured 3rd Order Product at 10649 KHz  
-80.1 dBm

3rd Order Product at DUT Output  
-67.1 dBm

Computed IP3  
50.1 dBm

REF 20.0 dBm

A\_Avg

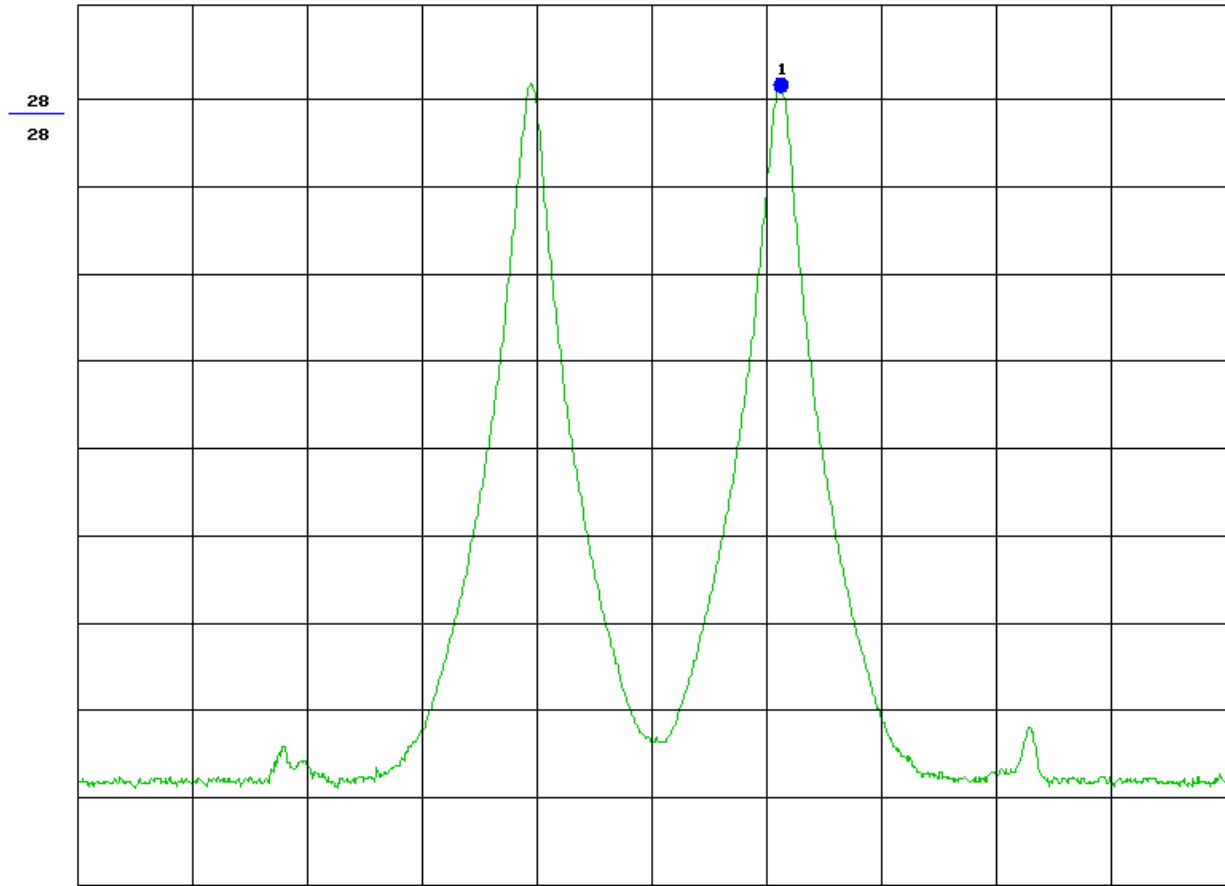
B\_Blank

MKR 12.903 MHz

10 dB/

11.03 dBm

Z10040B S/N 005



CENTER 12.791 MHz

SPAN 1.000 MHz

RBW 10 kHz

VBW 3 kHz

SWP 70 ms

\*ATT 40 dB

REF 20.0 dBm

A\_Avg

B\_Blank

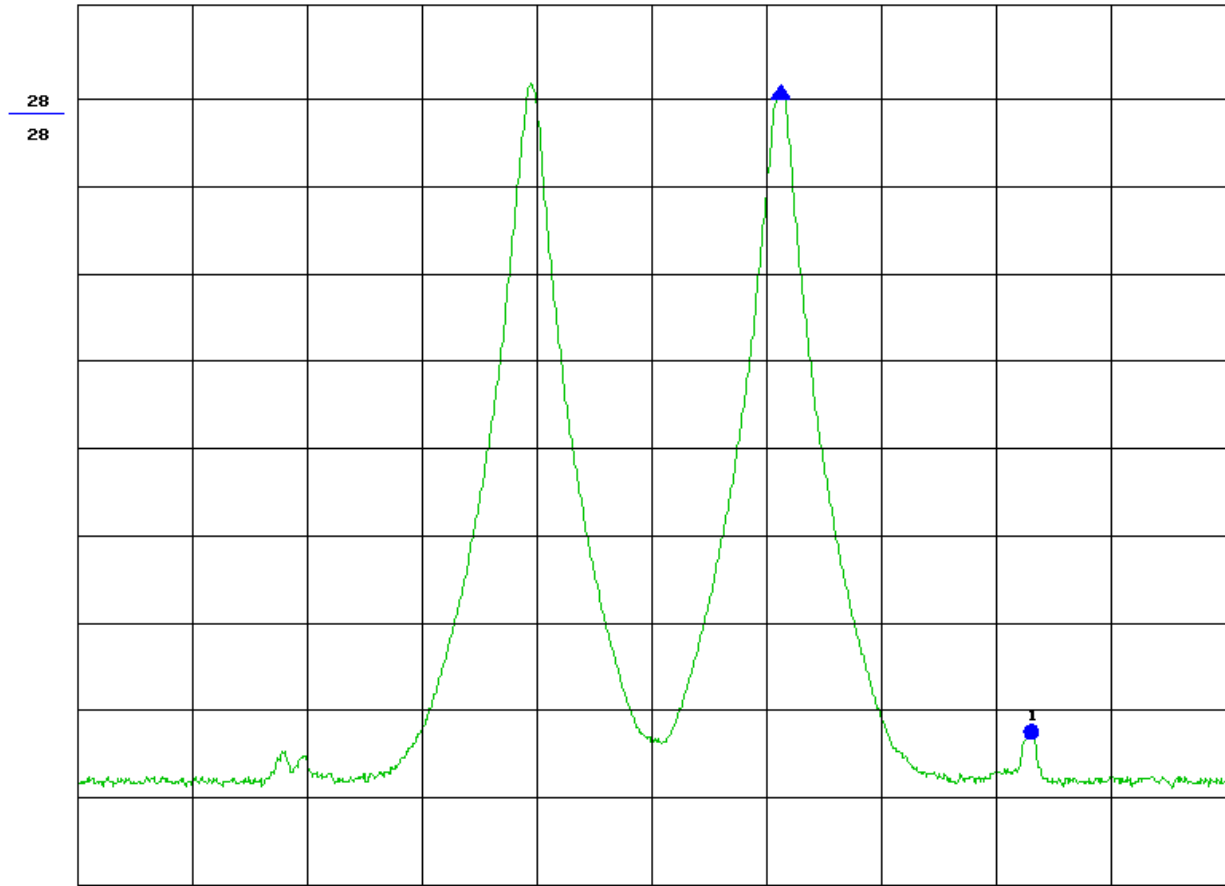


219 kHz

10 dB/

-73.23 dB

Z10040B S/N 005



CENTER 12.791 MHz

SPAN 1.000 MHz

RBW 10 kHz

VBW 3 kHz

SWP 70 ms

\*ATT 40 dB