REP033: MAX3516 Cable Upstream Amplifier Harmonic Distortion Measurements

Rapid engineering prototypes are real circuits that Maxim application engineers have built and measured in our labs. They can provide a starting point for new RF designs. They are not available as evaluation kits.

Additional Information: Wireless Product Line Page

Quick View Data Sheet for the MAX3516

Applications Technical Support

Objective: Upstream CATV amplifier 2nd and 3rd order harmonics

The MAX3516 was screened for 2nd and 3rd order harmonics which are important in the DOCSIS band between 5 AND 42MHz. The test conditions were 5V rail and an output of +62dBmv, and a set of plots was made to show the levels of the harmonics. The following data shows excellent performance.

The MAX3516 is one in a family of programmable-gain upstream amplifiers designed for use in CATV upstream applications. The MAX3516 operates over a frequency range of 5MHz to

65MHz and drives up to +64dBmV QPSK. Since both input and output ports are differential, an external balun at the output port is required. The variable gain feature provides greater than 56dB of dynamic range and is controlled by a SPI 3-wire interface. Gain control is available in 0.5dB steps. The MAX3516 is available in a 20-pin TSSOP-EP package and operates in the extended industrial temperature range (-40° Cto +85° C).
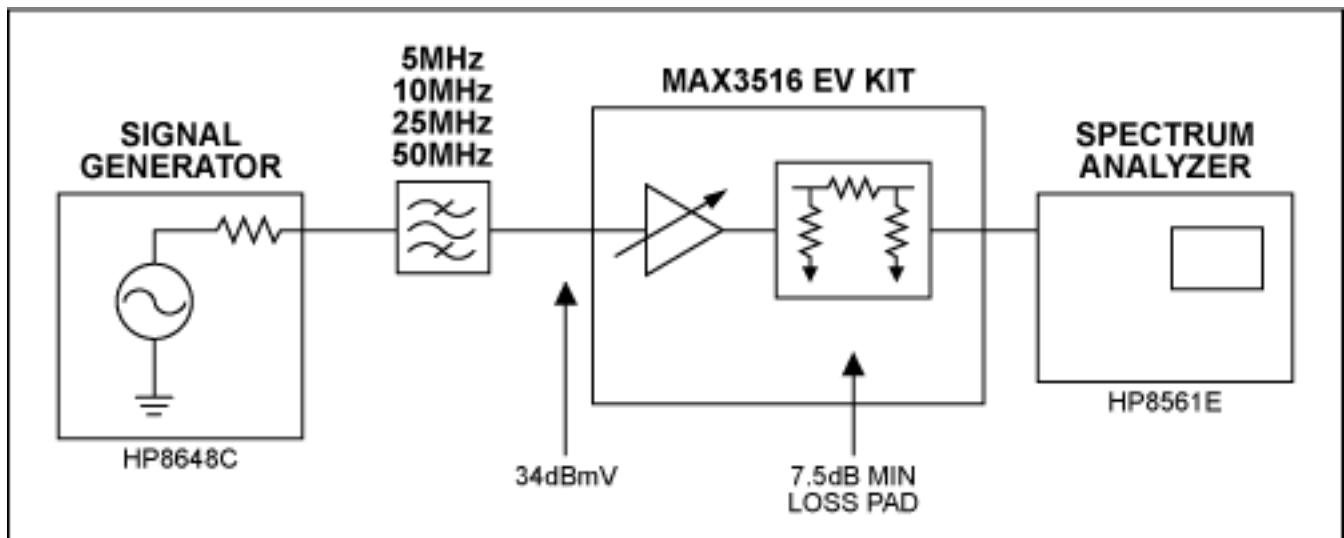
Test Conditions

- All test at room temperature.
- Vcc = 5V
- Pin = -13dBm / +34dBmV
- High Power Mode
- Gain code adjusted to meet output power

Bench Test Equipment List

Spectrum Analyzer:	HP8561E	S/N 3611A01372
Signal Generator:	HP8648D	S/N 3847A00658
Power Supply:	HP34401A	S/N 3146A60402
DMM:	HPE3631A	S/N KR73608150

Test Set-Up

Performance Matrix

Frequency (MHz)	Power Fundamental (dBmV)		
	Part 4	Part 5	Part 7
4.9	62.2	62.37	62.03
9.8	62.2	62.37	62.2
15	62.2	62.03	62.2
20	62.2	62.2	62.03
24.8	62.2	62.37	62.2
30	62.03	62.03	62.2
35	62.03	62.03	62.03
40	62.03	62.03	62.37
42	62.37	62.03	62.37

Frequency (MHz)	HD2 (dBc)			HD3 (dBc)		
	Part 4	Part 5	Part 7	Part 4	Part 5	Part 7
4.9	-66.7	-67.17	-69.5	-69.17	-69.17	-68.33
9.8	-63.5	-65	-67.5	-63.33	-62.34	-62.5
15	-64.33	-67.16	-68.5	-59.17	-60.83	-59.33
20	-69.17	-73.17	-72.16	-58.33	-58.17	-58.33
24.8	-83.37	-72.17	-73	-57.5	-57.5	-57.5
30	-79	-66.33	-69.17	-58.5	-58.5	-57.33
35	-76.33	-66.5	-70	-58.66	-58.66	-59
40	-77.83	-67.53	-73.34	-59	-58.83	-58.17
42	-76.34	-69	-75.34	-58.34	-59.5	-58.34

2nd Order Harmonic

HD2 vs FREQUENCY, MAX3516, P_OUT = 62dBmV, V_CC = 5V

3rd Order Harmonic

HD3 vs FREQUENCY, MAX3516, 62dBmV, V_CC = 5V
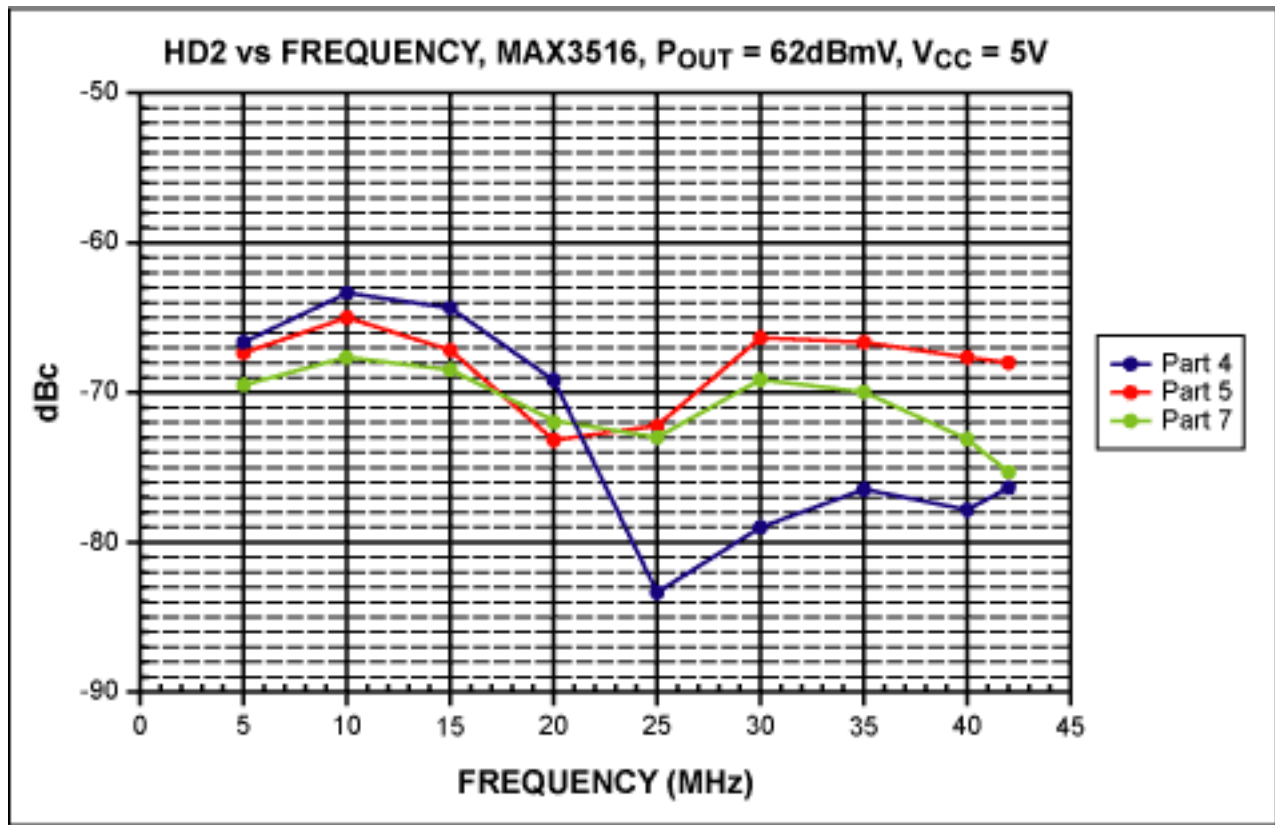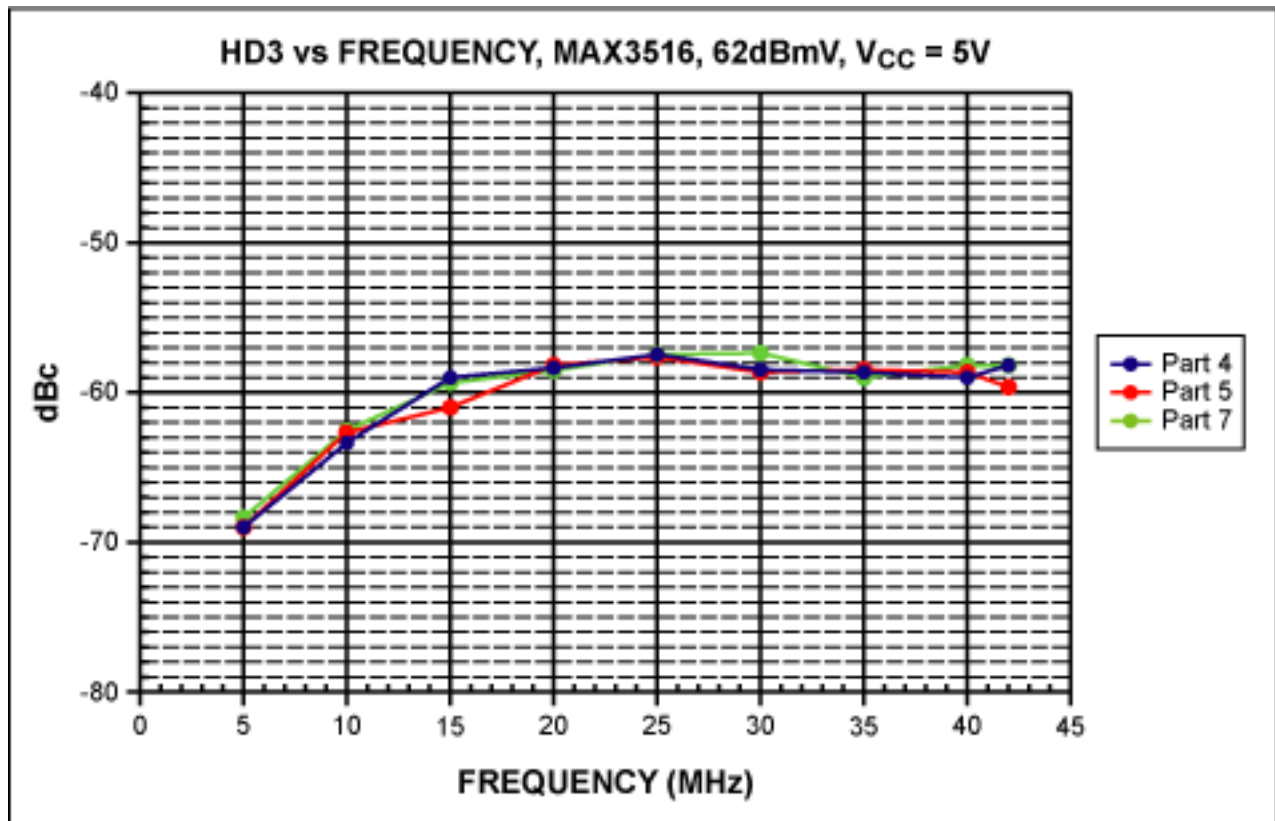
More Information

MAX3516: QuickView -- Full (PDF) Data Sheet -- Free Samples