

REP029: MAX3510 Cable Upstream Amplifier Harmonic Distortion Performance to 55MHz

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 MAX3510](#)
[Applications Technical Support](#)



Objective: To complete a set of harmonic distortion tests for MAX3510, from 15MHz to 55MHz (extended band).

A set of single-tone tests and a set of two-tone tests for third-order distortion were successfully conducted on the MAX3510 amplifier. The test tone centers were 15MHz, 25MHz, 35MHz, 45MHz, and 55MHz and V_{CC} was varied 4.50 to 5.00 VDC, with the target between 4.75 and 5.00 VDC. The target was tested for no greater than -46dBc IMD or single-tone harmonics.

The single tone harmonic distortion was tested and essentially met at $+59\text{dBmV}$ output level. Degradation occurred with brown-out V_{CC} at 4.5V, and with highest gain at highest frequency.

The two-tone test limit condition was tested and essentially met at $+56\text{dBmV}$ per-tone output. The input level was varied from 34dBmV (i.e. -13dBm) to 27dBmV (i.e. -20dBm) with output constant. Some degradation occurred at 4.50 V_{CC} and highest gain.

The MAX3510 is a programmable power amplifier for use in CATV upstream (e.g. cablemodem) applications. It outputs up to 64dBmV (continuous wave) through a 2:1 (voltage ratio) transformer and operates over a frequency range of 5MHz to 65MHz. It features variable gain controlled by a 3-wire digital serial bus. Gain control is available in 1dB steps. Other features include: ultra-low power-up/down transients, low transmit output noise floor, low transmit-disable output noise and two power-down modes.

[Harmonic Distortion and Two-tone Third-Order Distortion Frequency and \$V_{CC}\$ Sweep Test Set-up](#) (PDF, 21K)

Harmonic Distortion Frequency and V_{CC} Sweep Test Results Performed at Room Temperature:

[Result1](#) (PDF, 19K),

[Result2](#) (PDF, 19K),

[Result3](#) (PDF, 19K),

[Result4](#) (PDF, 20K),

[Result5](#) (PDF, 19K)

Two-tone Third Order Distortion Frequency and V_{CC} Sweep Test Results Performed at Room Temperature:

[Result1](#) (PDF, 17K),

[Result2](#) (PDF, 18K),

[Result3](#) (PDF, 18K),

[Result4](#) (PDF, 18K),

[Result5](#) (PDF, 18K)

[Harmonic Temperature Frequency and Sweep Test Set-up](#)

Harmonic Temperature Frequency and Sweep Test Results:

[Result1](#) (PDF, 24K),

[Result2](#) (PDF, 21K)

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MORE INFORMATION

MAX3510: [QuickView](#)

-- [Full \(PDF\) Data Sheet \(152k\)](#)

-- [Free Sample](#)