

Q&A: “Why does my Total Harmonic Distortion (THD) result look poor?”

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Question:

The THD result of an ADC is bad. I expected -58 dB THD of 1 MHz signal at 10 MHz bandwidth but it only has -41 dB. What is wrong?

Answer:

A few things to check:

1. Over-driving the DUT. Check the DUT specs and make sure you are not supplying more voltage than the DUT requires. For THD tests, always try to under-drive the DUT by 5%. Also, keep in mind input offsets that could shift the voltage outside its linear operating limits. Look at the time domain of the sine wave input: does it appear “clipped” or flat at the maximum or minimum levels?
2. Check the INL and DNL of the DUT. Linearity performance is directly related to harmonics. You may have a bad DUT.

Glossary of “TLAs”:

ADC analog-to-digital converter
DNL differential nonlinearity
DUT device-under-test
INL integral nonlinearity
THD total harmonic distortion
TLA three-letter acronym
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