The DAC analog signal peak power attenuation issues in AD9746/9783 Evaluation boards

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Test environment in AD9746/9783 Evaluations (00)

DAC Clock Source 8644A HP
245.76MHz, +3dBm
J1(CLOCK IN)

+5V Power Supply PAD35-5L KIKUSUI
AD9746:0.66A
AD9783:0.32A

AD9746 & AD9783 Evaluation Board

DPG2 HSC-DAC-DPG-B
P1 and P2

Spectrum Analyzer N9010A KEYSIGHT
RBW • VBW: 220Hz(Sweep)
SPAN: ≤ 4MHz
Point: 100001pt
RF Input: 50Ω

PC
OS: Windows 7 Pro 32bit
Processor: Intel(R) Core™ i5 CPU@2.50GHz
Memory: 4.00GB (available 2.92GB)
AD9746 Evaluation: Configurations and Spectrum measurements
Step#1: To select “Clocked via data connection…” in “Port Configuration” pull-down menu for the AD9746.

Step#2: To set “Data Rate”, “Desired Frequency”, “DAC Resolution” and “Record Length” in the AD9746 to 245.760[MHz, 14 bits, 524288, 70.000[MHz:, respectively.

Step#3: To click the check-boxes in “Bypass” fields for the AD9746.
The default values and configurations in the AD9746 were used in “AD9516-General” tab.

The DCO frequency value at 245.718[MHz] in the AD9746 was much similar to but not the same as the Data Rate at 245.760[MHz]. The measured DCO frequency of the AD9746 was mostly equal to the Data Rate.
“Full-Scale Adjustment” in the AD9746 was set to 0x1F9 as the default value when the analog signal peak power of the AD9746 was -13.86[dBm].
The analog signal peak power of the AD9746 was -13.86[dBm] with the default settings when “Full-Scale Adjustment” in the AD9746 was set to 0x1F9.
“Full-Scale Adjustment” in the AD9746 was set to 0x3FF when the analog signal peak power of the AD9746 was -9.86[dBm].
AD9746 DAC analog output spectrum with the “Full-Scale Adjustment” at 0x3FF (06)

The analog signal peak power of the AD9746 was -9.86[dBm] when “Full-Scale Adjustment” in the AD9746 was set to 0x3FF.
"Full-Scale Adjustment" was set to 0x3FF and "Amplitude" was set to -20dB (Full Scale) in the AD9746 when the analog signal peak power of the AD9746 was -29.85[dBm].
AD9746 DAC analog output spectrum with both of the “Full-Scale Adjustment” at 0x3FF and the “Amplitude” at -20[dB] (Full Scale) (08)

The signal peak power of AD9746 was -29.85[dBm] when both “Full-Scale Adjustment” was set to 0x3FF and “Amplitude” was set to -20[dB] (Full Scale).
AD9783 Evaluation board: Configurations and Spectrum measurements
To set “Data Rate”, “Desired Frequency”, “DAC Resolution” and “Record Length” in the AD9783 to 245.760[MHz, 16 bits, 524288, 70.000[MHz:], respectively.
AD9783-DPG2-EBZ SPI PC tool screenshot with the default configurations (10)
The analog signal peak power of the AD9783 was -1.70[dBm] with the default configurations.
To set FSC DAC1 and DAC2 in the AD9783 to 1023 (dec) as DAC code.
The analog signal peak power of the AD9783 was 2.33[dBm] when the FSC DAC1 code in the AD9783 was set to 1023 (dec).
The analog signal peak power of the AD9783 was 0.00[dBm] when the FSC DAC1 code in the AD9783 was set to 697 (dec). The DAC code for the 0[dBm] analog signal peak power of the AD9783 was calculated at 512(dec).
AD9783 DAC analog output spectrum with both of the FSC DAC1 code at 697 (dec) and the “Amplitude” at -20[dB] (Full Scale) (15)

The analog signal peak power of the AD9783 was -20.00[dBm] when the FSC DAC1 code and the “Amplitude” in the AD9783 were set to 697 (dec) and -20dB (Full Scale), respectively.
Questions
Questions

**Q1:** Even if “Full-Scale Adjustment” was set to 0x3FF in the AD9746 Evaluation board, the analog signal peak power of the AD9746 was -9.86[dBm]. Is it reasonable? If it is not reasonable, why is it? 

*Note:* Please refer to the p.10 of this document.

My customer expected that the analog signal peak power of the AD9746 would be about 0[dBm] with the “Full-Scale Adjustment” at 0x3FF.

**Q2:** What should my customer do with AD9746 Evaluation board in order to make the AD9746 output the DAC analog signal peak power at 0[dBm]?
Questions

Q3: My customer calculated the DAC code for the analog signal peak power of the AD9783 at 0[dBm]. The DAC code which my customer calculated in the AD9783 was 512 (dec). However, my customer measured the analog signal peak power of AD9783 at 0[dBm] when the DAC code in the AD9783 was set to 697 (dec). Why is the difference of the DAC codes of the AD9783 between the calculation and the measurement for the analog signal peak power of the AD9783 at 0[dBm]?
Thank you so much!