**Texas Instruments**

**ADS54J40EVM Test Procedure**

**Revision 1.1**

**10/6/2015**

1. **General**
   1. **Purpose**
      1. The purpose of this document is to provide instructions for testing the ADS54J40EVM evaluation board.
   2. **Scope**
      1. This document provides details of test, safety, quality and disposition of the EVMs mentioned above. Additional information on the boards may be listed in the Reference Documentation section.
   3. **Reference Documentation as required**
      1. TIS# SLAU652 (ADS54J40EVM User’s Guide)
      2. TIS# SLWU086 (TSW14J56EVM User’s Guide)
      3. ADS54J40-SCH.pdf (Schematic)
   4. **Definitions**
      1. EVM is reference to Evaluation Module Assembly, in this case the ADS54J40EVM.
   5. **General Test Guidelines**
      1. Always check test equipment’s’ capabilities in terms of power, current and voltage rating to make sure it can support the test requirements. Failing to follow equipment specs may cause equipment damages, board assembly damages and could pose a hazard to safety of the operator
      2. A quick open/short test of the +5V supply terminal to GND of the EVM is recommended to make sure upon power up, the terminals are not shorted to ground. High current surge can occur as a result of a short and could damage the equipment as well as pose a hazard to operator
2. **Safety**
   1. **General Safety**
      1. This test must be performed by qualified personnel trained in electronics theory and who understand the risks and hazards of the assembly to be tested
   2. **Electrostatic Discharge (ESD)**
      1. Personnel handing ESD sensitive material must be familiar with ESD prevention procedures and be equipped with the appropriate attire listed in the Apparel section of this document.
      2. ESD precautions must be followed while handling assemblies
3. **Quality**
   1. Boards under test are to be visually examined for physical defects, damages or missing components. Defects are to be separated and disposed of as stated in the Material Disposition section.
   2. Test limits are to be followed strictly. Borderline or sporadic pass/fail are considered a FAIL
   3. In the event that the failure rate is greater than 10% (1 in 10), recorded data for the failed units are to be kept for further investigation.
4. **Apparel**
   1. Electrostatic Smock, are not required but are not discouraged.
   2. Ground ESD wrist straps.
5. **Training & Qualifications**
   1. This test must be performed by qualified personnel trained in electronics theory and PCB assembly testing. The testing technician must be familiar with standard bench test equipment and know how to safely operate them.
6. **Test Equipment/Software/Material**

* TSW14J56EVM – Capture card with version 4.0 or newer HSDC Pro ([www.ti.com](http://www.ti.com/))
* ADS54J40EVM
* ADS54Jxx EVM GUI
* HP 8643A Signal Generator or equivalent
* 170MHz band pass filter, from TTE or equivalent
* Standard USB cable
* USB3.0 cable
* Multi-meter
* Two CUI +5V, 3A output, 100-240VAC, 50-60Hz, 0.6A input or equivalent
* FT\_Prog Software
  1. Download the “ADS54Jxx GUI located at  [http://www.ti.com/lit/zip/slac594](%20http:/www.ti.com/lit/zip/slac594)
  2. Run the file called *setup.exe* and follow the installation prompts.
  3. Start the GUI by going to **Start Menu** → **All Programs** → **Texas Instruments ADCs** → **ADS54Jxx EVM**.

When plugging the board into the computer for the first time through the USB cable, you

are prompted to install the USB drivers.

* + Windows® XP: If Windows XP does not automatically install the drivers, follow the prompts on the screen to do so. Do not let Windows XP search Microsoft Update for the drivers, but do let Windows XP install the drivers automatically.
  + Windows 7: After installing the GUI, Windows 7 should automatically be able to install the drivers for the ADS54J40EVM with no input from the user.
  1. Install version v4.0 or newer of HSDC Pro GUI. This can be downloaded from the HSDC Pro Converter Software folder, located at [http://www.ti.com/tool/dataconverterpro-sw?keyMatch=HSDC Pro GUI&tisearch=Search-EN-Everything](http://www.ti.com/tool/dataconverterpro-sw?keyMatch=HSDC%20Pro%20GUI&tisearch=Search-EN-Everything)

1. **Equipment Setup**
   1. Connect the output of one of the +5VDC power supplies to J9 of the ADS54J40EVM. Connect the power supply input to a 110-240 AC source.
   2. Using the multimeter set to measure volts, verify that following test points have the following voltage levels:

TP8 3.0VDC +/- 0.2V

TP9 3.3VDC+/-0.1V

TP7 1.9VDC+/-0.1V

TP11 1.9VDC+/-0.1V

TP10 1.15VDC+/-0.2V

7.3 Copy and install the FTT\_Prog software to a local PC that will be used for the testing.

* 1. Connect a USB cable between the host PC and J8 (bottom of PCB) of the ADS54J40EVM.
  2. Run FT\_Prog.exe, which will be used to enumerate the ADS54J40EVM. Do the following

steps in this order:

1. Click on the magnifying glass to scan the USB (see Figure 2). Default should read

back FT245R USB FIFO. If it reads back ADS54J40 then it is already enumerated.

2. Apply ADS54J40.xml template – Right click on Device: 0, then select “Apply

Template from File” and browse to the provided file called “ADS54J40.xml”.

3. Right click on the lightning bolt then select “Program”.

4. Right click on Device 0 then select “Cycle Port Rescan” – it should read ADS54J40 as

shown below. Enumeration is now complete.

5. Close FT\_Prog.

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Figure 1. FT\_Prog software

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Figure 2. FT\_Prog software

* 1. Connect the ADS54J40EVM to the TSW14J56.

7.7 Connect the USB3.0 cable between the TSW14J56EVM and the host PC.

7.8 Connect the output of one of the +5VDC power supplies to J11 of the TSW14J56EVM

and the input to a 110-240 AC source.

7.10 Connect a SMA cable between the output of the Signal Generator and the input of the

170MHz band pass filter. Set the frequency of the Signal Generator to 170MHz with an

amplitude of 15dBm.

7.11 Connect a SMA cable between the 170MHz band pass filter output and J2 (AINP) of the ADS54J40EVM. The setup shall look as shown in Figure 3.



**Figure 3: ADS54J40EVM Test Setup**

1. **Procedure**

Open the ADS54J40 GUI by going to *Start Menu* 🡪 *All Programs* 🡪 *Texas Instruments ADCs* 🡪 *ADS54Jxx EVM* 🡪ADS54Jxx EVM.exe

Verify that the green *USB Status* indicator is lit. If it is not lit, click the *Reconnect USB* button and check the *USB Status* indicator again. If it is still not lit then verify the EVM is connected to the computer through USB.

Click on the “Low Level View” tab then click on “Load Config”. Navigate C:\ProgramFiles(86)\Texas Instruments\ADS54Jxx EVM\Configuration Files and select the file called “*LMK\_Config\_Onboard\_983p04\_MSPS.cfg”*. This will provide a 983.04M sample clock to the ADC.



**Figure 4. ADS54J40 GUI Top Panel**

Verify that the LMK04828 PLL is locked by checking that the “PLL2 LOCKED” LED (D2) is lit.

Once the LMK04828 PLL is locked, press SW1 (*ADC RESET*) to provide a hardware reset to the ADC. This switch is located near the edge of the EVM.

In the “Low Level View” tab, click “Load Config”. Load the file called “ADS54J40\_LMF\_8224*.cfg”*. The ADS54J40EVM is now configured for bypass mode using 8 lanes.

**Channel 1 Setup for 170MHz tone test**

Open High Speed Data Converter Pro v4.0 or newer by going to *Start Menu* 🡪 *All Programs* 🡪 *Texas Instruments* 🡪 *High Speed Data Converter Pro*

Click “OK” to connect to the TSW14J56EVM.

Select the *ADC* tab at the top of the GUI.

Use the *Select ADC* drop down menu at the top left corner to select *ADS54J40\_LMF\_8224*.

When prompted to update the firmware for the ADC, click “Yes” and wait for the firmware to download to the TSW14J56.

Enter “983.04M” into the *ADC Output Data Rate* field at the bottom left corner.

Click the *Instrument Options* menu at the top of HSDC Pro and select *Reset Board*.

Click “Capture” in HSDC Pro to capture data from the ADC.

Channel 1 should look as shown in Figure 5.



**Figure 5. Channel 1 capture of 170MHz tone from Signal Generator**

Adjust the amplitude of the Signal Generator output until the Fund value on the HSDC Pro GUI is between -1.00 and -1.20 dBFs. Once in this range, notice the values of SNR and SFDR.

The SNR should be > 68dBFs

SFRD should be > 86dBFs

Save the captured screen shot to a file.

Move the SMA cable on the ADS54J40EVM from J2 to J3.

In the HSDC Pro GUI, change the channel setting to Channel 2/2.

Click on “Capture”. The data shall look as shown in Figure 6.



**Figure 6. Channel 2 capture of 170MHz tone**

Adjust the amplitude of the Signal Generator output until the Fund value on the HSDC Pro GUI is between -1.00 and -1.20 dBFs. Once in this range, notice the values of SNR and SFDR.

The SNR should be > 68dBFs

SFRD should be > 86dBFs

Save the captured screen shot to a file.

Place a black check mark or “X” on the white silkscreen box next to “ADS54J40”.

Place a label with “ADS54J40EVM” printed on it on the ESD bag.

**End of Test**