N1996A-01A

S E R V I C E N O T E

Supersedes:
N1996A-01

Agilent CSA Spectrum Analyzer, N1996A

Serial Numbers: 0000000000 to US45310465

Residual Responses due to Shield Problem on A4 Digital IF Assembly

To Be Performed By: Agilent-Qualified Personnel

Parts Required:

P/N	Description	Qty.
5022-7816	Shield Cover	9

ADMINISTRATIVE INFORMATION

SERVICE NOTE CLASSIFICATION:

MODIFICATION RECOMMENDED

ACTION CATEGORY:	[ ] IMMEDIATELY X ON SPECIFIED FAILURE [ ] AGREEABLE TIME	STANDARDS: LABOR: 2.5 Hours	
LOCATION CATEGORY:	[ ] CUSTOMER INSTALLABLE [ ] ON-SITE X SERVICE CENTER	SERVICE INVENTORY: [ ] RETURN [ ] SCRAP [ ] SEE TEXT ☐ SEE TEXT	USED PARTS: [ ] RETURN X SCRAP [ ] SEE ☐ SEE TEXT
AVAILABILITY:	PRODUCT'S SUPPORT LIFE	AGILENT RESPONSIBLE UNTIL: June 2008	
AUTHOR: BDT	PRODUCT LINE 12		
ADDITIONAL INFORMATION:			

Agilent Technologies

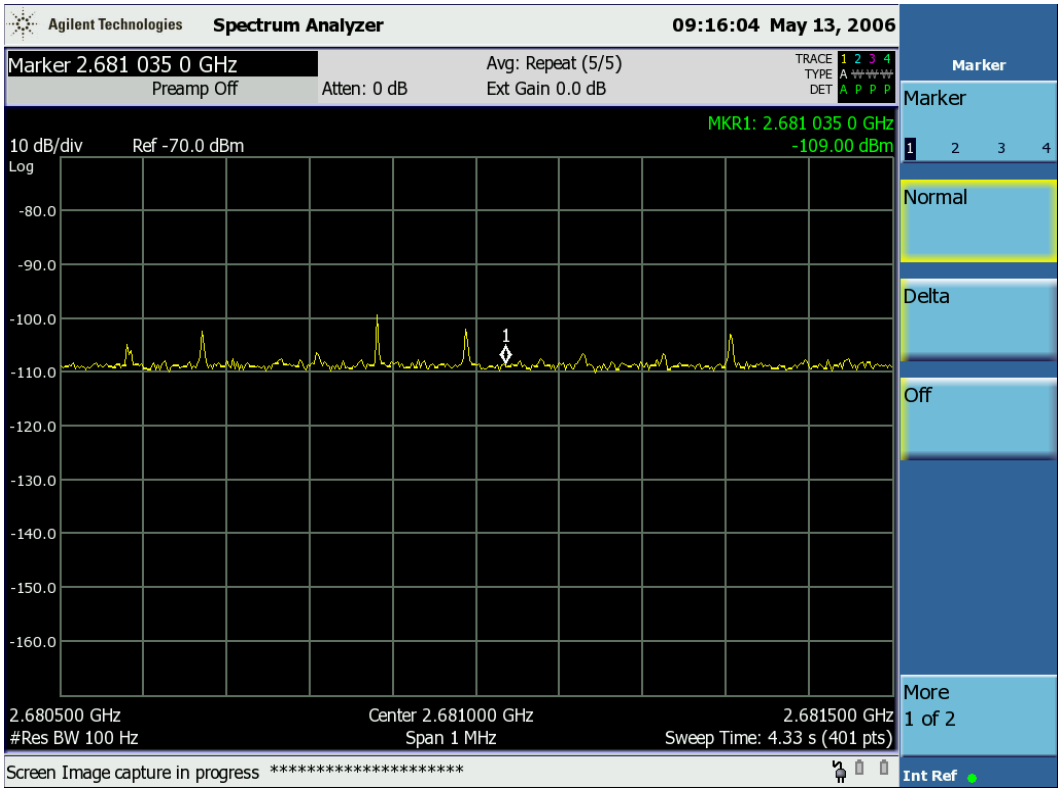
April 9, 2007

Situation:
Early production N1996A spectrum analyzers may exhibit a high-density of residual responses caused by switching power supply signals leaking into the circuitry on the A4 Digital IF (DIF) Assembly. The shield walls on some DIF assemblies were not properly soldered to the pc board. Also some shield covers were not manufactured to the proper tolerances and as a result might not be making good contact.

Follow this procedure to determine if the N1996A exhibits the problem described above:

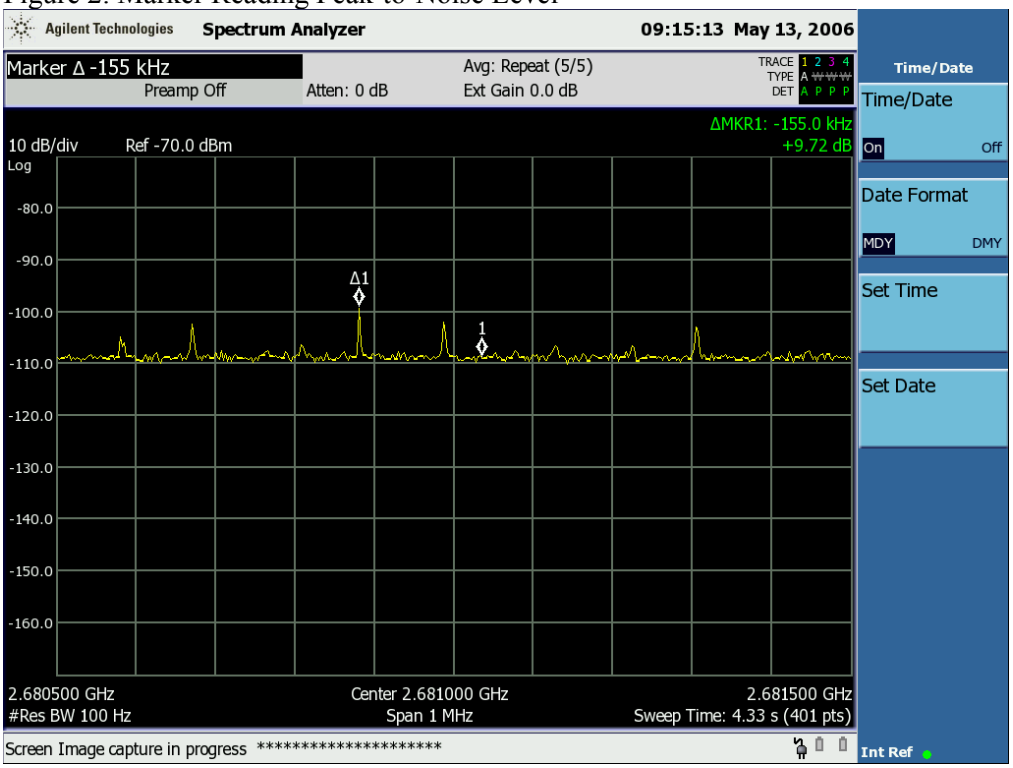
1. Terminate the analyzer input with a 50 Ohm load.
2. Press **Mode**, **Spectrum Analyzer**.
3. Press **Mode Preset**.
4. Press **FREQ**, **Center Freq**, 2681 MHz
5. Press **SPAN**, 1 MHz
6. Press **AMPTD**, **Ref Level**, -70 dBm.
7. Press **BW**, **Res BW**, 100 Hz.
8. Press **Meas Setup**, **Avg Mode**, **Repeat**
9. Press **Avg Number**, 5, **Enter**
10. Press **Trace/Detector**, **Average**
11. Press **Single**. Wait until the message "Paused. Press Continuous or Single to Continue" appears on the status line at the bottom of the display.
12. Press **Marker**. Use the knob to move the marker to a point which represents the average noise level, exclusive of any discrete responses, such as residual responses. See Figure 1.

Figure 1: Marker Positioned on Average Noise Level



13. Record the marker amplitude value in Table 1 in the Noise Level column of the "As Received" row.
14. Press **Marker**, **Delta**, **Peak Search**. The marker amplitude reading now represents the difference between the noise level and the highest residual response. See Figure 2. Record this marker amplitude value in Table 1 in the Peak-to-Noise Level column of the "As Received" row.

Figure 2: Marker Reading Peak-to-Noise Level



15. Press **Marker**, **Normal**. The marker amplitude reading now represents the peak amplitude of the highest residual response. Record this marker amplitude value in Table 1 in the Peak Level column of the "As Received" row.
16. If the Peak-to-Noise Level is greater than 5 dB, the residual responses are too high. Proceed with Solution/Action.
17. If the Peak Level is above -98 dBm, the residual responses are too high. Proceed with Solution/Action.
18. If the Peak-to-Noise Level is less than 5 dB and the Peak Level is lower than -98 dBm, the level of the residuals is OK and no further action is required.

Table 1: DIF Residual Response Measurements

Condition	Noise Level (dBm)	Peak-to-Noise Level (dB)	Max Peak-to-Noise Level (dB)	Peak Level (dBm)	Max Peak Level (dBm)
As Received			5.0		-98
After Repair			5.0		-98
After A4 DIF Assy Replacement			5.0		-98

Solution/Action:

1. Remove the analyzer's outer case as described in the Instrument Outer Case, Removal procedure in the N1996A Service Guide.
2. Remove the analyzer's board cover as described in the Board Cover, Removal procedure in the N1996A Service Guide.
3. Remove A4 DIF assembly as described in the A4 IF Board, Removal procedure in the N1996A Service Guide..
4. Remove all nine of the larger shield covers from the shield frames on the A4 DIF assembly. The one smaller shield frame and shield cover do not require inspection.
5. **Discard the original shield covers (quantity 9). These shield covers were not manufactured to the proper tolerances and should not be reused**.
6. Inspect the shield frames using an eye loupe or magnifying lens. Ensure that the shield frames meet the following criteria:
    a. Ideally, there should be a continuous fillet of solder along the outside and inside edges where the shield frame walls meet the pc board. On some pc boards, there will be a series of small gaps (approximately 2 mm) in the solder fillet. This is OK. If there is any gap in the solder fillet greater than 4 mm, re-solder to fill the gap. Refer to Figures 3 and 6. When soldering the edges of the shield walls, be careful not to accidentally touch any pc board components with the soldering iron.
    b. Check that excess solder has not wicked up the side of the shield walls. Refer to Figure 4. The uneven surface created does not allow the shield covers to make good contact.
    c. Check that the shield frame walls align properly with the pc board footprint. Refer to Figure 5. If possible, re-solder the shield frame walls so that they are properly aligned. If this is not possible, replace the A4 DIF board with a new assembly.
    d. Verify that the shield frame walls are perpendicular to the pc board surface and not bent inward. A shield which is bent inward will not make good contact with the shield cover. If any shield frame wall is bent inward, bend it until it is perpendicular to the pc board surface.
    e. Bend the center of the top of the long side of the shield walls outward approximately 1 mm. This helps to ensure that the shield fingers make good contact along the entire length of the shield wall.
7. Before installing the new shield covers, be sure that the fingers on the covers are bent approximately 6 degrees inward. This helps to ensure they make good electrical contact. Hold the shield cover with the fingers facing toward you and with one side against the table or desk. Bend the shield cover slightly toward you, approximately 6 degrees from vertical. Repeat this on all four sides of each shield cover.
8. Install the new shield covers. **Do not reuse the original shield covers**. They should fit firmly and uniformly.

NOTE: Do not re-install the original shield covers. If the original shield covers were re-installed, the performance may appear acceptable immediately after the repair, but the performance will degrade over time.

9. Re-install A4 DIF assembly as described in the A4 IF Board, Replacement procedure in the N1996A Service Guide.
10. Replace the board cover as described in the Board Cover, Replacement procedure in the N1996A Service Guide.
11. Replace the outer case as described in the Instrument Outer Case, Replacement procedure in the N1996A Service Guide.
12. Connect the output of the ac adapter to the analyzer.
13. Turn N1996A on and wait for analyzer to boot up.
14. Repeat test procedure described in Situation above, entering values in the "After Repair" row of Table 1.

15. If the residual levels are still too high after repair of the shields and replacement of the shield covers, replace the A4 DIF assembly with either a new assembly or a rebuilt exchange assembly (if available) as described in the A4 IF Board Removal and Replacement procedures in the N1996A Service Guide.
16. Repeat test procedure described in Situation above, entering value in the "After DIF Assy Replacement" row of Table 1.

Figure 3. Check that there is no gap longer than 4mm between shield wall and pc board footprint. Note that some pc boards will have a series of small (~2 mm), regularly-spaced gaps in the solder fillet. This is normal.

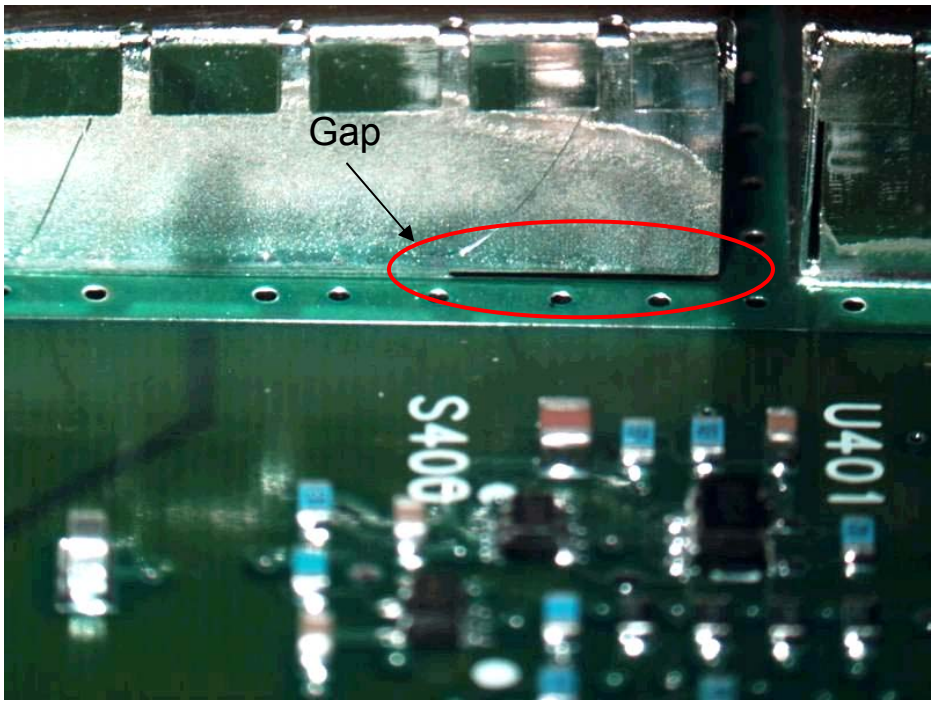


Figure 4. Ensure no excess solder wicked across the top of the shield walls. Uneven surface will prevent lid fingers to reside flat on the shields.

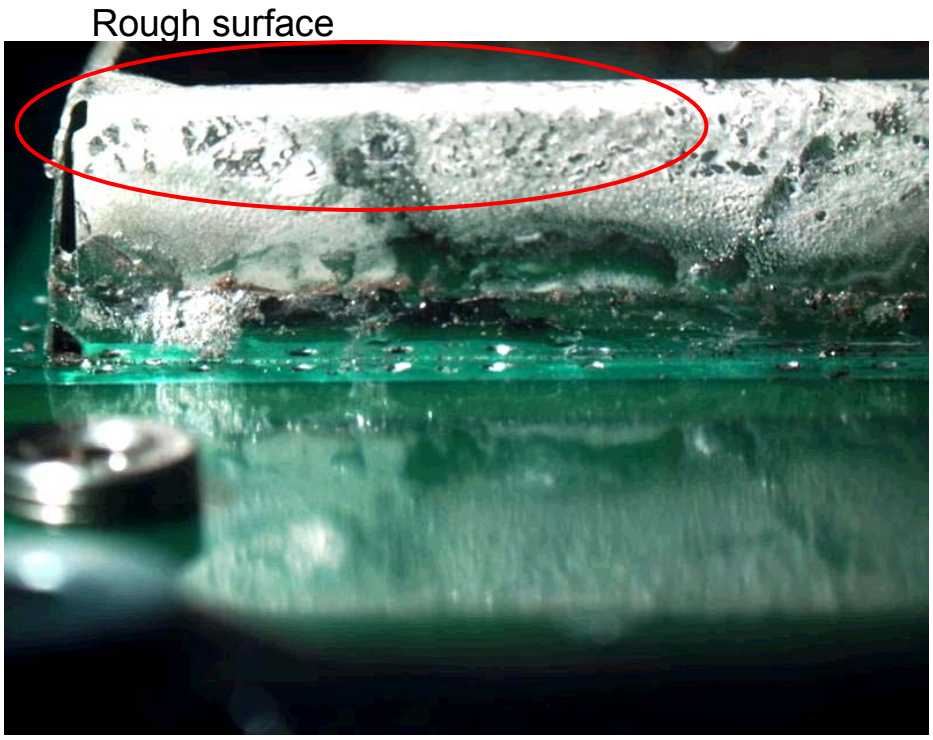


Figure 5. All shields must align properly to the pc board footprints. No bent or misaligned shields are allowed.

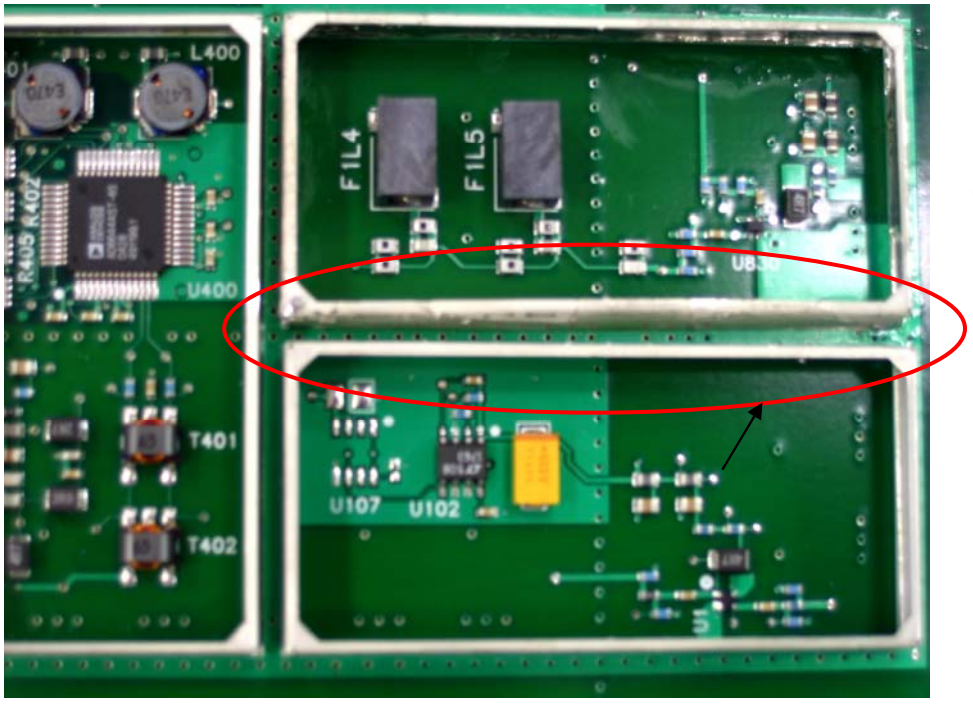


Figure 6. Correctly-soldered shield wall. Note that there is no excess solder wicked across the wall and the lid fingers rest uniformly on the shield