

N4903B-06A

S E R V I C E N O T E

Supersedes:
N4903B-06

N4903B - Serial Bit Error Ratio Tester with Option J20

Serial Numbers of the N4903A-J20 or N4903B-J20:

- DE45A00100 – DE45A00350**
- DE45AEX000 - DE45AEX040**
- MY45AEX000 – MY45AEX370**
- MY45A00401**
- DE49100100 – DE49100150**
- MY49100200 - MY49100590**

**Unit fails Performance Verification / Calibration on the test
“PG Sinusoidal Interference Amplitude Accuracy”**

Parts Required:

P/N	Description	Qty.
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N4903-69531	J20 ISI Module	1
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If above part is not available, use the following part instead:

N4903-60531

ADMINISTRATIVE INFORMATION

SERVICE NOTE CLASSIFICATION:	
MODIFICATION RECOMMENDED	
ACTION XX ON SPECIFIED FAILURE CATEGORY: XX AGREEABLE TIME	STANDARDS LABOR: 1.0 Hours
LOCATION [[]] CUSTOMER INSTALLABLE CATEGORY: XX ON-SITE (active On-site contract required) XX SERVICE CENTER XX CHANNEL PARTNER	SERVICE XX RETURN INVENTORY: [[]] SCRAP [[]] SEE TEXT
AVAILABILITY: PRODUCT'S SUPPORT LIFE	USED XX RETURN PARTS: [[]] SCRAP [[]] SEE TEXT
[[]] Calibration Required XX Calibration NOT Required	NO CHARGE AVAILABLE UNTIL: 31-Dec-2016
	PRODUCT LINE: PL24 AUTHOR: MM
ADDITIONAL INFORMATION:	

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PRINTED IN U.S.A.

June 20, 2013

Rev. 21



Situation:

The N4903A Option J20 or N4903B Option J20 is a plug-in module that inserts into a N4903A or N4903B product as shown in the next 2 pictures.



Due to a degrading component inside the module, the module is failing Performance Verification / Calibration in the following way.

The Performance Verification / Calibration contains a measurement regarding Pattern Generator (PG) Sinusoidal Interference Amplitude Accuracy which is done for the normal and complement output.

The pattern of the failure looks like the following: massive consecutive failures:

PG Sinusoidal Interference Amplitude Accuracy Normal (J20)

Result	Set Frequency [MHz]	Set Amplitude [mV]	Min Test Limit [mV]	Max Test Limit [mV]	Meas. Amplitude [mV]	Amplitude Accuracy [mV]
pass	100.000	0.000	-20.000	30.000	7.128	7.128
pass	100.000	50.000	-29.000	38.500	55.311	5.311
pass	100.000	100.000	-38.000	47.000	104.924	4.924
pass	100.000	200.000	-56.000	64.000	209.162	9.162
pass	100.000	400.000	-92.000	98.000	411.183	11.183
pass	500.000	0.000	-20.000	30.000	6.926	6.926
*** FAIL ***	500.000	50.000	-29.000	38.500	18.754	-31.246
*** FAIL ***	500.000	100.000	-38.000	47.000	30.814	-69.186
*** FAIL ***	500.000	200.000	-56.000	64.000	53.640	-146.360
*** FAIL ***	500.000	400.000	-92.000	98.000	68.953	-331.047
pass	1000.000	0.000	-20.000	30.000	8.692	8.692
*** FAIL ***	1000.000	50.000	-29.000	38.500	20.602	-29.398
*** FAIL ***	1000.000	100.000	-38.000	47.000	35.069	-64.931
*** FAIL ***	1000.000	200.000	-56.000	64.000	66.076	-133.924
*** FAIL ***	1000.000	400.000	-92.000	98.000	123.057	-276.943
pass	2000.000	0.000	-20.000	30.000	11.268	11.268
pass	2000.000	50.000	-29.000	38.500	22.259	-27.741
*** FAIL ***	2000.000	100.000	-38.000	47.000	34.908	-65.092
*** FAIL ***	2000.000	200.000	-56.000	64.000	57.646	-142.354
*** FAIL ***	2000.000	400.000	-92.000	98.000	92.909	-307.091
pass	3000.000	0.000	-20.000	30.000	18.742	18.742
pass	3000.000	50.000	-29.000	38.500	23.377	-26.623
*** FAIL ***	3000.000	100.000	-38.000	47.000	34.051	-65.949
*** FAIL ***	3000.000	200.000	-56.000	64.000	57.784	-142.217
*** FAIL ***	3000.000	400.000	-92.000	98.000	97.463	-302.537

Parameters

Amplitude range: 0 to 400mV (single ended), 0 to 800mV (differential)
 The output signal amplitude is reduced by 3 dB when sinusoidal interference is enabled.
 Specification: level accuracy: +/-10% +/- 10mV typical

Or like this: sporadic failures:

PG Sinusoidal Interference Amplitude Accuracy Complement (J20)

Result	Set Frequency [MHz]	Set Amplitude [mV]	Min Test Limit [mV]	Max Test Limit [mV]	Meas. Amplitude [mV]	Amplitude Accuracy [mV]
pass	100.000	0.000	-20.000	30.000	6.911	6.911
pass	100.000	50.000	-29.000	38.500	52.140	2.140
pass	100.000	100.000	-38.000	47.000	100.417	0.417
pass	100.000	200.000	-56.000	64.000	200.308	0.308
pass	100.000	400.000	-92.000	98.000	394.357	-5.643
pass	500.000	0.000	-20.000	30.000	6.399	6.399
pass	500.000	50.000	-29.000	38.500	42.612	-7.389
pass	500.000	100.000	-38.000	47.000	82.470	-17.531
pass	500.000	200.000	-56.000	64.000	160.411	-39.589
*** FAIL ***	500.000	400.000	-92.000	98.000	306.934	-93.066
pass	1000.000	0.000	-20.000	30.000	6.861	6.861
pass	1000.000	50.000	-29.000	38.500	40.463	-9.537
pass	1000.000	100.000	-38.000	47.000	77.434	-22.566
pass	1000.000	200.000	-56.000	64.000	154.475	-45.525
*** FAIL ***	1000.000	400.000	-92.000	98.000	301.792	-98.208
pass	2000.000	0.000	-20.000	30.000	9.099	9.099
pass	2000.000	50.000	-29.000	38.500	40.710	-9.290
pass	2000.000	100.000	-38.000	47.000	77.390	-22.610
pass	2000.000	200.000	-56.000	64.000	149.457	-50.543
*** FAIL ***	2000.000	400.000	-92.000	98.000	292.605	-107.395
pass	3000.000	0.000	-20.000	30.000	12.381	12.381
pass	3000.000	50.000	-29.000	38.500	39.858	-10.142
pass	3000.000	100.000	-38.000	47.000	76.326	-23.674
pass	3000.000	200.000	-56.000	64.000	147.394	-52.606
*** FAIL ***	3000.000	400.000	-92.000	98.000	287.861	-112.139

Parameters

Amplitude range: 0 to 400mV (single ended), 0 to 800mV (differential)
 The output signal amplitude is reduced by 3 dB when sinusoidal interference is enabled.
 Specification: level accuracy: +/-10% +/- 10mV typical

The failures may be limited to normal or complement or they may show up at normal and complement together.

The root cause for these failures is a component problem inside the module.

J20 modules with serial numbers

MY53301000 and greater

contain a newly designed component which fixes this problem, these modules may also be identified from the front panel. As shown below, the “Not Hot-Pluggable!” text will be highlighted in yellow:



The solution is to exchange the module at the expense of the factory. Removed modules should be returned to the factory for refurbishment.

Solution/Action:

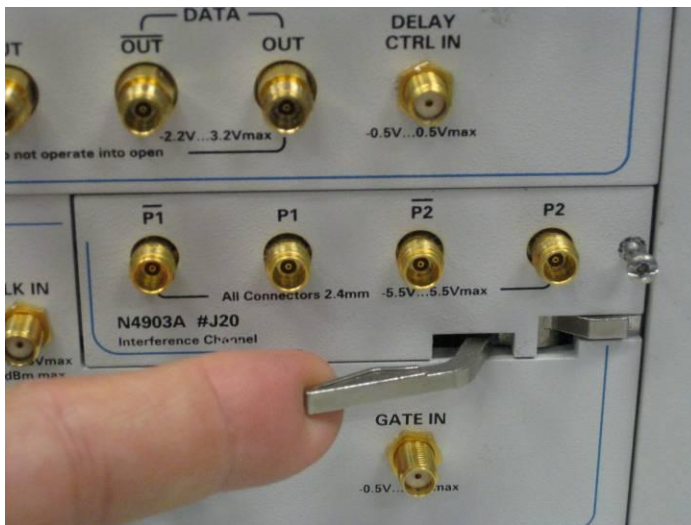
The following paragraphs contain instructions on how to exchange the J20 module. You will need a normal (Phillips or flat-tip) screw driver.

Power down the N4903A or N4903B.

Unplug the N4903A/B-J20 from the N4903A or N4903B. Completely loosen the screw shown in the next picture:



And then use the lever to unplug the old module:



Have a new N4903A/B-J20 module (N4903-69531 or N4903-60531) ready to slide in instead. Set aside the removed module to return to the factory.

Note the serial number of the removed J20 module:

Note the serial number of the replacement J20 module:

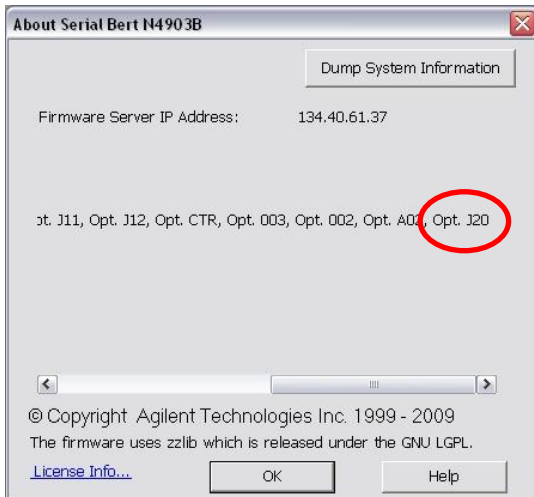
Note the serial number of the N4903A/B:

Re-assembly:

Insert the new N4903A/B-J20 module into the N4903A/B product and secure it by tightening the screw:



Turn on the N4903A/B and check whether the plug-in is recognized correctly. To check this, boot the unit, wait until the N4903A/B has started and go to the Help → About window and ensure that the new J20 module is listed:



Verifying the Repair at an Agilent Service Center

NOTE: You need Bigfoot2 version 2.78 or higher for the verification.

After warm up time (30 min.), use the Bigfoot2 Calibration / Performance Verification software (version 2.78 or higher) to verify that the N4903A/B-J20 plug-in is fully working. 3 measurements cover the J20:

- PG Sinusoidal Interference Amplitude Accuracy (Normal and Complement)
- PG Sinusoidal Interference Frequency Accuracy
- PG Intersymbol Interference Trace Length Accuracy (Normal and Complement)

Verifying the Repair at the Customer Site

This verification procedure can be executed at the customer site to verify the product performance without having to send the unit to the Agilent Service Center. Allow for 30 minute warm up time before beginning the verification.

Required Measurement Equipment and Accessories

Measurement Equipment	Part / Product Number
Scope	86100C (or equivalent)
Left Plug-in Module	86118A (or equivalent)

Accessories	Part / Product Number	QTY
10 dB Attenuators 2.4 mm	8490D #010	1
Adaptor 3.5 mm female to 2.4 mm male	N4911A-002	1
SMA Cable 3.5 mm (Giga clock cable)	E4809-61620	1
2.4 mm matched pair cables	N4910A (matched pair!)	1
50 Ω Termination, 2.4 mm	N4912A	10

Cable Connections

“Normal” Signal Path

Please make the following cable connections for testing the “normal” path:

Source	Destination
PG TRG OUT	50 Ω termination
PG TRG OUT\	50 Ω termination
PG AUX DATA OUT	50 Ω termination
PG AUX DATA OUT\	50 Ω termination
PG CLK OUT	50 Ω termination
PG CLK OUT\	50 Ω termination
PG DATA OUT	50 Ω termination
PG DATA OUT\	50 Ω termination
J20 P1	Scope channel 1 (86118A plug-in) using a 10 dB attenuator and a 2.4 mm cable
J20 P1\	Scope front panel trigger input use 2.4 mm to 3.5 mm adaptor and 3.5 mm cable
J20 P2	50 Ω termination
J20 P2\	50 Ω termination

“Complement” Signal Path

Please make the following cable connections for testing the “complement” path:

Source	Destination
PG TRG OUT	50 Ω termination
PG TRG OUT\	50 Ω termination
PG AUX DATA OUT	50 Ω termination
PG AUX DATA OUT\	50 Ω termination
PG CLK OUT	50 Ω termination
PG CLK OUT\	50 Ω termination
PG DATA OUT	50 Ω termination
PG DATA OUT\	50 Ω termination
J20 P1	Scope front panel trigger input use 2.4 mm to 3.5 mm adaptor and 3.5 mm cable
J20 P1\	Scope channel 1 (86118A plugin) using a 10 dB attenuator and a 2.4 mm cable
J20 P2	50 Ω termination
J20 P2\	50 Ω termination

High Level Description

This measurement verifies the J20 plug-in (ISI) Sinusoidal Interference Amplitude Accuracy.

ISI and sinusoidal interference are enabled via the N4903X software. For a number of frequency points (Sinusoidal Interference Frequency) an amplitude range is swept.

The frequency points and the expected amplitude are set via the N4903X GUI. The scope measures the signal amplitude. The deviation has to be below a certain threshold, where

$$\text{Deviation} = \text{Expected Amplitude} - \text{Measured Amplitude}$$

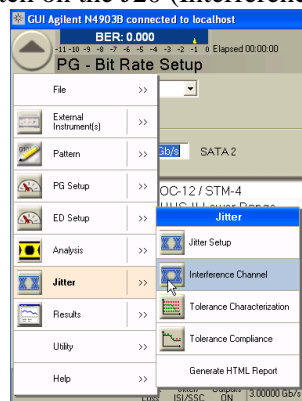
The allowed deviation is a function of the amplitude and is listed in the table below.

Detailed Description

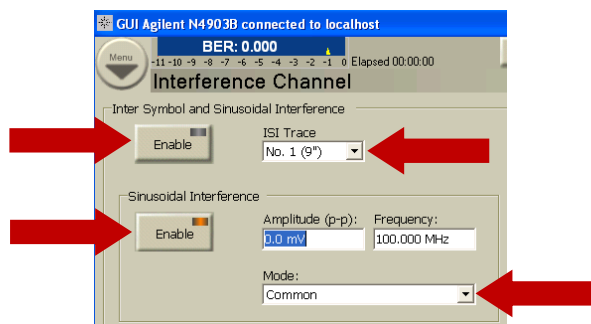
1. Start N4903X (BERT) and 86100C (Scope)
2. Establish cable connections as described in the table above (“Normal” Signal Path)
3. Set the N4903X to factory default settings by selecting “Preset Instrument State”:



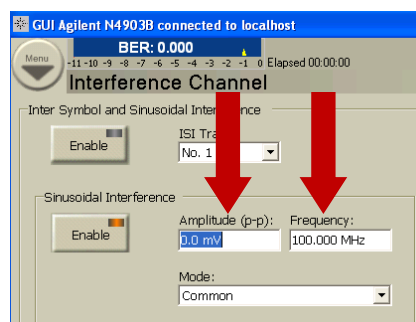
4. Switch on the J20 (Interference Channel, ISI channel):



Click on “Enable” and select the mode to be “Common”. Make sure the ISI Trace is disabled and set to “No 1 (9)”:



5. Set Sinusoidal Interference Amplitude and Frequency according to the table below:



Set SI Frequency [MHz]	Set SI Amplitude [mV]	Min Test Limit [mV]	Max Test Limit [mV]
100	0	-20.0	30.0
100	100	-38.0	47.0
100	400	-92.0	98.0
500	0	-20.0	30.0
500	100	-38.0	47.0
500	400	-92.0	98.0
1000	0	-20.0	30.0
1000	100	-38.0	47.0
1000	400	-92.0	98.0
2000	0	-20.0	30.0
2000	100	-38.0	47.0
2000	400	-92.0	98.0
3000	0	-20.0	30.0
3000	100	-38.0	47.0
3000	400	-92.0	98.0

6. Setup the scope to measure the amplitude:
 - a. Reset Scope to factory defaults
 - b. Set channel attenuation to 10 dB
 - c. Set averaging number to 10
 - d. Set trigger bandwidth
 - e. Set trigger attenuation value
 - f. Set measurement window
 - g. Set auto scale
 - h. Measure peak-to-peak amplitude

7. Record the measured amplitude value in the following table:

Set SI Frequency [MHz]	Set SI Amplitude [mV]	Min Test Limit [mV]	Max Test Limit [mV]	Measured Amplitude [mV]	Deviation [mV] (Set Amp – Meas Amp)	Test Result (Pass/Fail)
100	0	-20.0	30.0			
100	100	-38.0	47.0			
100	400	-92.0	98.0			
500	0	-20.0	30.0			
500	100	-38.0	47.0			
500	400	-92.0	98.0			
1000	0	-20.0	30.0			
1000	100	-38.0	47.0			
1000	400	-92.0	98.0			
2000	0	-20.0	30.0			
2000	100	-38.0	47.0			
2000	400	-92.0	98.0			
3000	0	-20.0	30.0			
3000	100	-38.0	47.0			
3000	400	-92.0	98.0			

8. Do the above measurement for all frequency and amplitude points. Once you are done with the “normal” signal path, change the connections according to the table above (“Complement” Signal Path).

9. Record the measured amplitude value in the following table:

Set SI Frequency [MHz]	Set SI Amplitude [mV]	Min Test Limit [mV]	Max Test Limit [mV]	Measured Amplitude [mV]	Deviation [mV] (Set Amp – Meas Amp)	Test Result (Pass/Fail)
100	0	-20.0	30.0			
100	100	-38.0	47.0			
100	400	-92.0	98.0			
500	0	-20.0	30.0			
500	100	-38.0	47.0			
500	400	-92.0	98.0			
1000	0	-20.0	30.0			
1000	100	-38.0	47.0			
1000	400	-92.0	98.0			
2000	0	-20.0	30.0			
2000	100	-38.0	47.0			
2000	400	-92.0	98.0			
3000	0	-20.0	30.0			
3000	100	-38.0	47.0			
3000	400	-92.0	98.0			

10. If all points have passed for both the “normal” and “complement” signal paths, the new J20 module is working properly. The replaced (defective) J20 module should be returned to the factory for refurbishment.

Update the Asset Serial Numbers in Siebel

Since the customer now has a new J20 module and their old module is being sent to the factory for refurbishment, the records should be updated to reflect this change. Instructions for making this change can be found at the link below:

http://cosssuwebw01.cos.agilent.com/SSU_AM_DOCS/24BR/Instrument%20Exchange%20Guide%20%20Work%20Instruction%20Rev%201.doc

A Siebel login and proper access level are required to make this change. Instructions for requesting Siebel access can be found at the link below:

http://cosssuwebw01.cos.agilent.com/SSU_AM_DOCS/Request%20Access%20to%20Siebel%20%20Work%20Instruction%20Rev%201.doc

Revision History:

Revision Number	Date	Author	Reason For Change
1.0	6/19/13	MM	As published