

N5173B-07

# Information Only Service Note

Supersedes:  
NONE

## N5173B X-Series MXG $\mu$ Wave Signal Generator

Serial Numbers: ALL

**The Problem** – Identifying Damage from Excessive Reverse Power – Self Test 1105 and 1304 Failures

### Parts Required:

P/N	Description	Qty.
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NONE

### ADMINISTRATIVE INFORMATION

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Calibration Required
X Calibration NOT Required

PRODUCT LINE: 15
AUTHOR: MM

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ADDITIONAL INFORMATION:

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**Situation:**

There has been a growing number of replaced A3 RF assemblies that have been returned to the factory for rebuilding that have shown clear evidence of having failed due to damage caused by excessive reverse power being applied to the RF output by the user, or their test setup. The vast majority of these damaged assemblies have all exhibited the same failure symptoms.

While it may not be possible to positively identify that an instrument failure is the direct result of excessive reverse power with normal repair procedures outside of the factory, the intent of this information is to make everyone aware of this possibility, along with information to pass on to the instrument user to eliminate, or at least minimize, the possibility of the instrument being damaged again in the same way.

The failure symptoms that have been identified as common among the damaged A3 RF assemblies are:

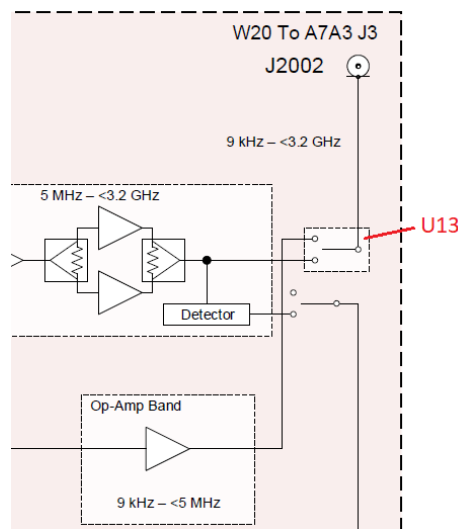
- Failing **Self Test 1105** and **1304**

Which may also be accompanied by one, or all, of the following:

- Low output power below 5 MHz
- Low output power below 2 GHz
- A7AT1 Step Attenuator damaged

The component level part on the A3 RF assembly that typically gets damaged under these conditions is the RF output solid state switch (U13) as shown in Figure 1, which is taken from a block diagram in the instrument service guide.

**Figure 1 - A3 RF Output Switch - U13**



When U13 is damaged in this way it may either be stuck in one position or the other, or it may not pass any signals at all.

The N5173B signal generator has a very low tolerance for reverse RF power, and no tolerance at all for DC voltage applied to its RF output. The maximum values for these are listed below and can be seen on the instrument front panels as seen in Figure 2 for both instrument color schemes.

Maximum Reverse RF Power = 0.5 Watts  
Maximum DC Voltage = 0 Volts

Figure 2 – X-Series  $\mu$ Wave Signal Generator Maximum Reverse Power Level Labels



**Solution/Action:**

Please do the following:

1. Inform the customer that the failure that their instrument presented with was consistent with failures that have been caused by excessive reverse power being applied to the instrument RF output port.
2. Provide the maximum reverse power specifications for the instrument to them.
3. Encourage the customer to evaluate their use of the instrument to determine if there is any way that they could be applying reverse power to the instrument’s RF output more than the maximum specified, and make any changes needed to correct this so that it does not happen again.
4. Provide the customer with a printed copy of the document “**Tips for Preventing Damage to Signal Generators**” which can be downloaded from:

<https://www.keysight.com/us/en/assets/7018-01850/technical-overviews/5989-8790.pdf>

Revision History:

Date	Service Note Revision	Author	Reason for Change
15 Dec 2021	01	Mike Medley	As Published