

RFPD Spot Check
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T1300506-v1

1. Overview

The aLIGO in-vacuum RFPDs (ASC and LSC) are manufactured by a multistep process. The circuit boards are first mounted in the aluminum boxes and the units are fully tested. The tested units are shipped to a laser welding facility for hermetic sealing and helium leak check. Once the welded boxes are received back from the welding facility, the sealed units are cleaned and baked per LIGO-E1300449 to prepare them for use in the UHV environment. This note describes the method by which a previously tested RFPD is verified as being operational after welding, and after cleaning and baking. A full optical retest of the RFPDs is impractical, so a truncated procedure has been written.

All tests performed on class-A clean parts must be performed on an approved flow bench, or in a cleanroom environment suitable for maintaining cleanliness. Personnel should be wearing gloves and gowns. All parts contacting the clean RFPDs must be cleaned to Class-B cleanliness levels.

2. Steps to verify an RFPD

- a. Using T1300488 as a baseline, compare the electrical transfer function from the test input to each RF output using an RF network analyzer. Ensure the notches are still tuned to the same frequency as the reference transfer functions, and that easily identifiable peaks are still comparable in magnitude and frequency.
- b. Measure the dark noise of each RF output, and compare this number with the number recorded in the test results for the serial number device under test.
- c. Measure the DC offset at the DC output of the RFPD. Compare this number with the number recorded in the test results for the serial number device under test.

By measuring these parameters, it is reasonable to assume the RFPD will be functional at the level of the original test results.