LASER INTERFEROMETER GRAVITATIONAL WAVE OBSERVATORY

LIGO Laboratory / LIGO Scientific Collaboration

LIGO-E1400033-v1 Advanced LIGO 1/21/14

Test Procedure for IQ Demodulator Filtering

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LIGO Scientific Collaboration

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1 Introduction

This test procedure describes the test of proper filtering of the Quad I&Q Demodulator Module (D0902796) modified with RF splitter and filter based on E1300899. Basic operation of the Quad I&Q Demodulator Module should be tested beforehand by following the procedure described in T1100062.

2 Test Equipment

- Function generator (e.g. Tektronix AFG3102)
- Oscilloscope

3 Test

1) Apply LO input from the rear of the chassis and RF input to Ch1 or Ch3 (D0902745 with a low pass filter PLP-21.4+). Set the amplitude of LO and RF input to 10 dBm and 3 dBm, respectively. Set the frequency of LO and RF input to 18.2 MHz and 18.201 MHz, respectively. Read the peak to peak amplitude of 1 kHz components of I-Mon and Q-Mon output using an oscilloscope and check that they are within the typical values. Repeat the same thing with RF input frequency of 91.001 MHz.

LO frequency	**RFin frequency**	**Ch1/Ch3 I-Mon**	**Ch1/Ch3 Q-Mon**	**Typ.**
18.2 MHz	**18.201 MHz**			4.8 ±0.5 V
18.2 MHz	**91.001 MHz**			< 15 mV

2) Repeat 1) for Ch2 or Ch4 (D0902745 with a high pass filter PHP-100+) with LO frequency of 91 MHz.

LO frequency	**RFin frequency**	**Ch2/Ch4 I-Mon**	**Ch2/Ch4 Q-Mon**	**Typ.**
91 MHz	**18.201 MHz**			< 14 mV
91 MHz	**91.001 MHz**			4.3±0.4 V