

# F1325 Operation at 450 MHz

- July 28, 2014
- AT0105
- Non Automated Measurements

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# Agenda

- Introduction
- Test Requirements
- Test Results



# Introduction

- A customer is interested in using the F1325 DPD Demodulator with a RF frequency of 450 MHz.
- This demodulator has a switched LO and a Switched RF input paths which are currently specified at an RF frequency of 600 to 1100 MHz.
- The output is an I/Q signal in the 20 to 350 MHz range.
- We will test per their request with exceptions.
- *This is only for the non automated measurement for Return Losses and LO Isolations, RF Isolations.*



# Test Requirements (1)

## ➤ Fixed IF Testing

- Output IF = 138 MHz
- RF 435 to 495 MHz in 10 MHz Steps
- High Side Injection (LO > RF)
- Conditions
  - ✓ Case Temperature: -40, +25, and +105 °C
  - ✓ LO Power = -3, 0, and +3 dBm
  - ✓ Vcc = +4.75, +5.00, and +5.25 V
  - ✓ Maximum Gain (Attenuation = 0 dB)
- Parameters
  - ✓ Gain
  - ✓ Intermodulation Products, IP3, IP2
  - ✓ Harmonics
  - ✓ LO to IF Isolation
  - ✓ Power Compression
  - ✓ Current



# Test Requirements (2)

## ➤ Fixed LO Testing

- Output IF = 108 to 168 MHz in 10 MHz Steps
- RF 435 to 495 MHz in 10 MHz Steps
- High Side Injection (LO > RF)
- Conditions
  - ✓ Case Temperature: +25°C
  - ✓ LO Power = 0 dBm
  - ✓ Vcc = +5.00 V
  - ✓ Attenuation = 0 to 26 dB in 2 dB steps
- Parameters
  - ✓ Gain
  - ✓ Attenuator Accuracy
  - ✓ Intermodulation Products, IP3, IP2



# Test Requirements (3)

## ➤ Fixed IF

- Output IF = 138 MHz
- RF 435 to 495 MHz in 10 MHz Steps
- High Side Injection (LO > RF)
- Conditions
  - ✓ Case Temperature: -40, 25, and 105 °C
  - ✓ LO Power = -3, 0, and +3 dBm
  - ✓ Vcc = +4.75, +5.00, and +5.25 V
  - ✓ Maximum Gain (Attenuation = 0 dB)
- Parameters
  - ✓ Noise Figure
  - ✓ Quadrature Parameters (I/Q Imbalance)



# Test Requirements (4)

## ➤ Other Parameters

- Conditions

- ✓ Case Temperature: +25 °C

- ✓ LO Power = 0 dBm

- ✓ Vcc = +5.00 V

- Parameters

- ✓ Return Losses – RF, IF, and LO Ports

- ✓ Isolations

- RFA to RFB

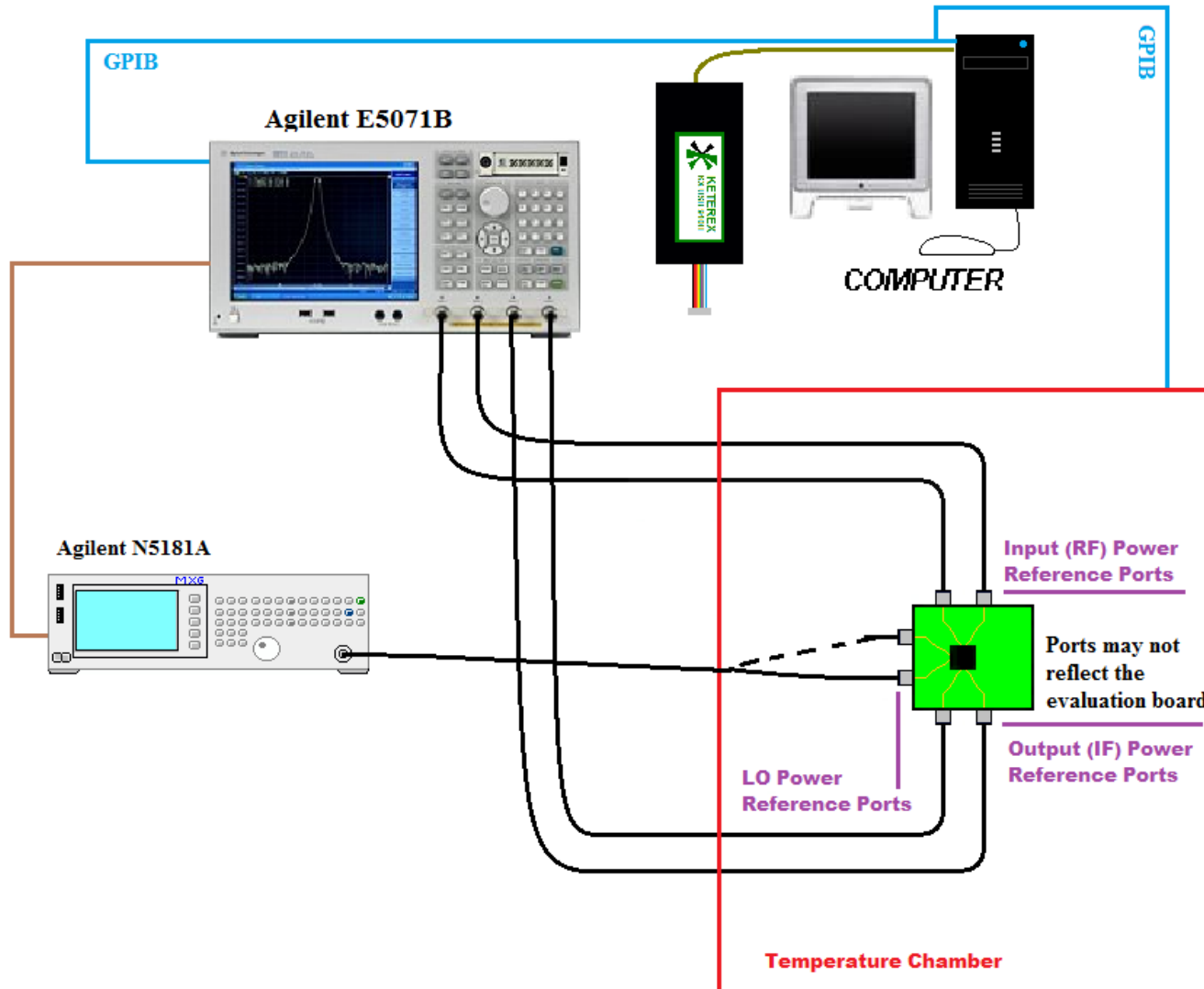
- LOA to LOB

- LO to IF

- LO to RF

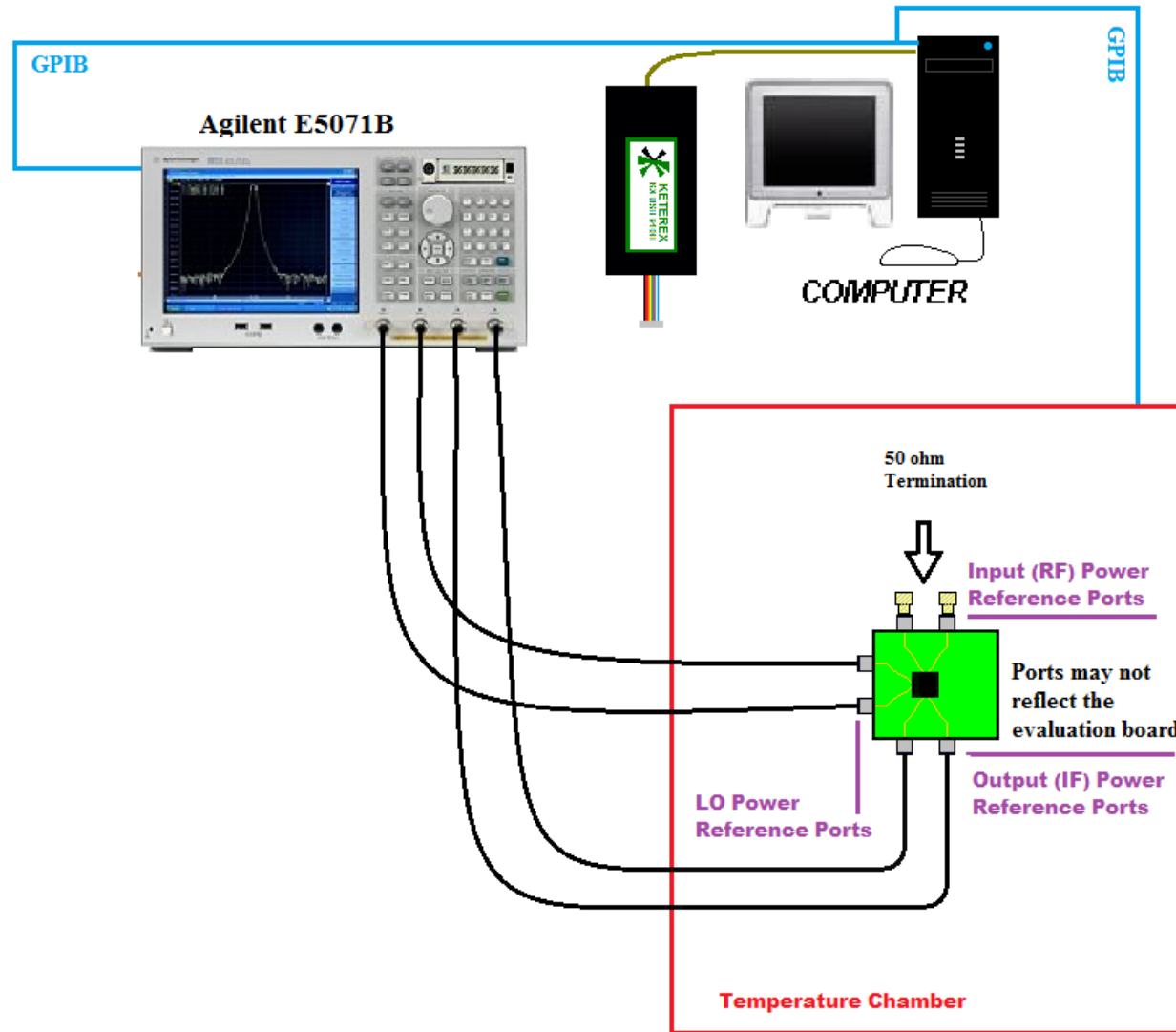


# Test Setup for Return Loss and Isolation between RF and IF ports

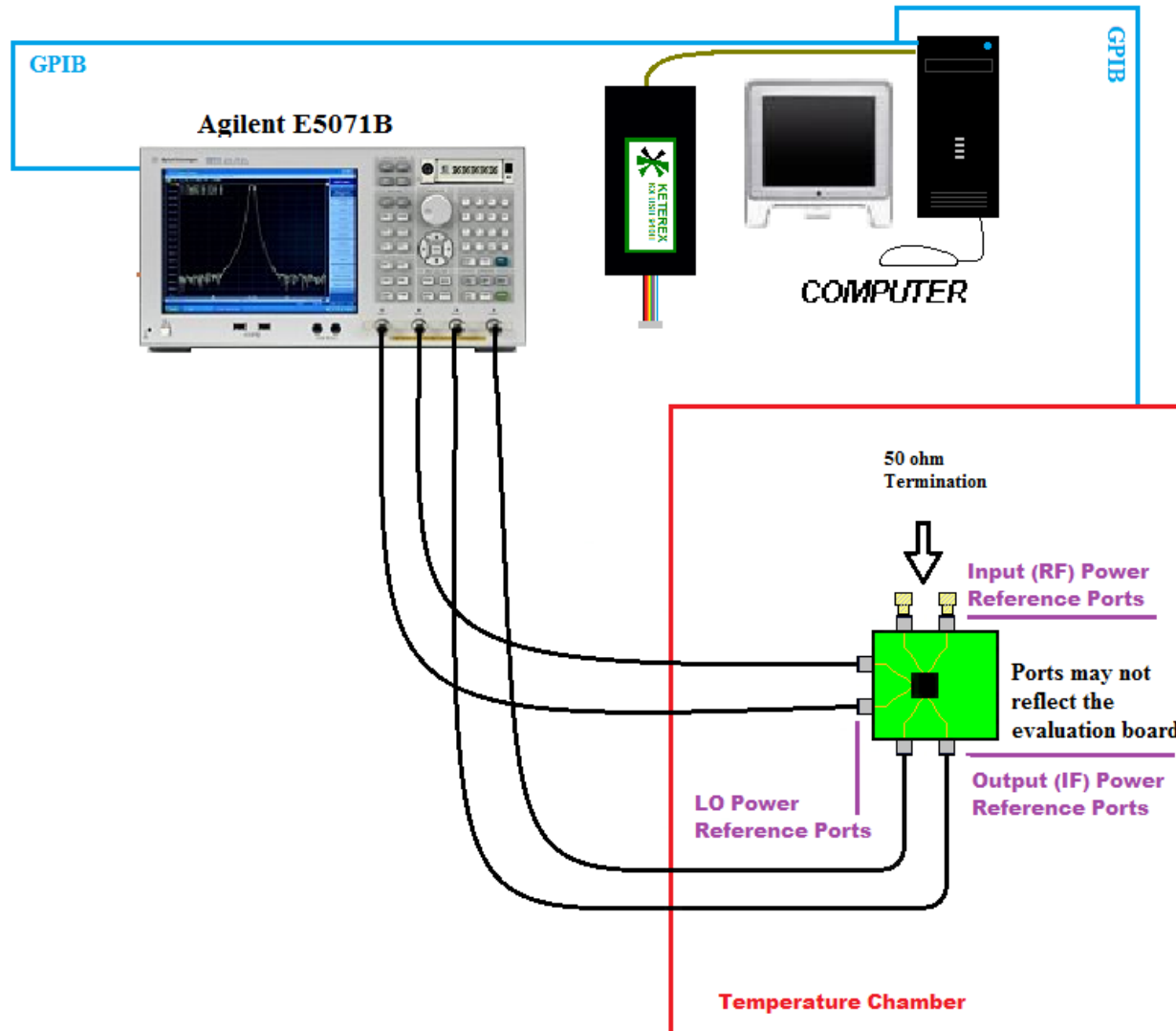




# Test Setup for Return Loss and Isolation between LO and IF



# Test Setup for Return Loss and Isolation between LO and RF



# Exceptions

- The RF and LO input capacitors (C17, C18, C19, C25) were changed from 160 pF to 390 pF.
  - This will assure that the capacitor will not affect the RF signals.
- The LO was rebiased by changing R20 from 2.8 kohms to 4.0 kohms.
  - A previous task showed that doing this helps for operation at 450 MHz.
- Under normal operation Noise Figure is greater than 15 dB and will not be measured.



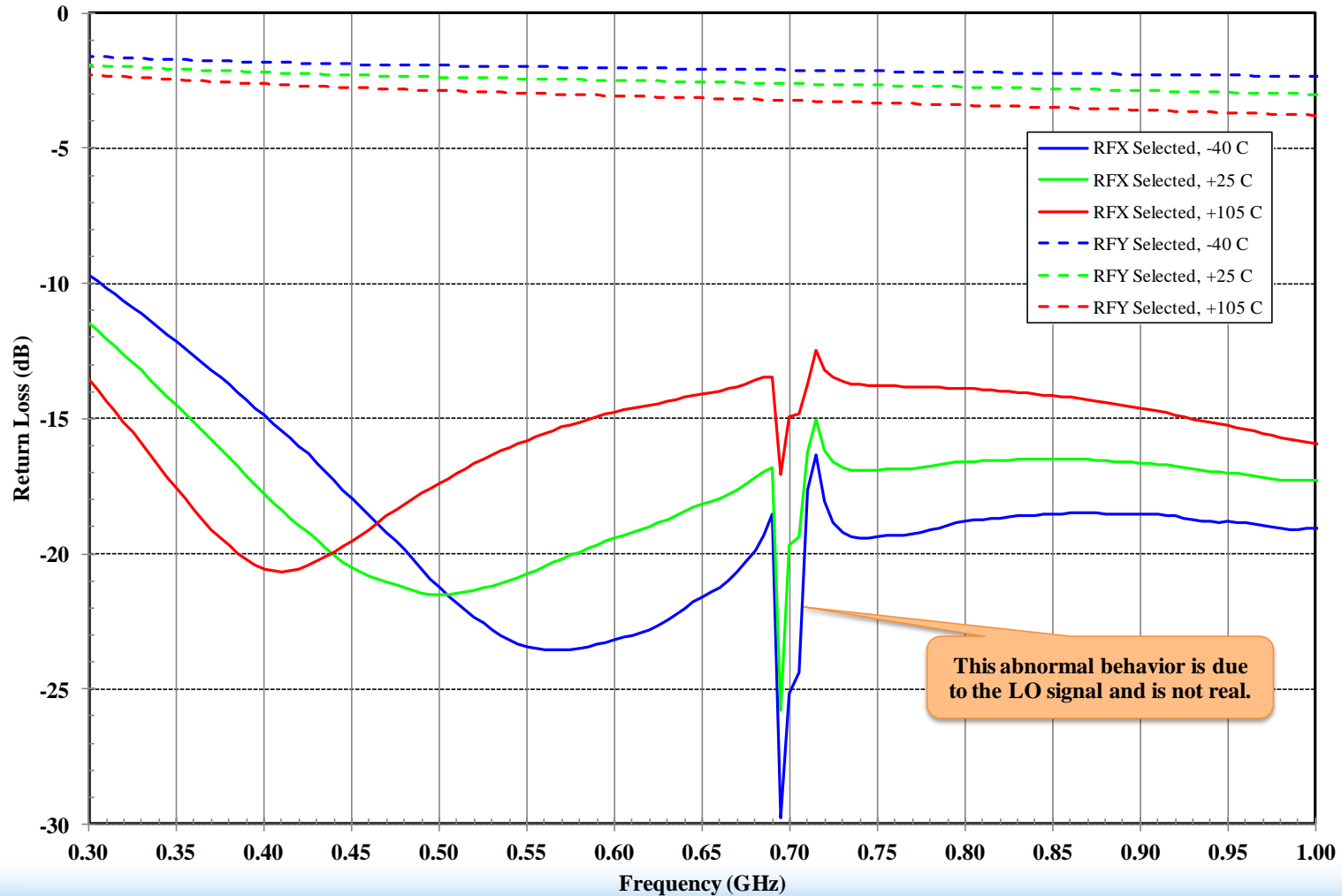
# Test Case 4 (TC4):

- The following data was taken at the evaluation board connectors.
- The following parameters was varied:
  - Case Temperature: -40, +25, +105 °C
  - Applied Voltage: 5.00 V
  - LO Frequency: 703 MHz
  - LO Power: 0 dBm
  - LO Input: LOA
  - RF Power: -10 dBm
  - Attenuation: 0 dB (Maximum Gain)
  - Frequency
    - ✓ IF Band 10 MHz to 400 MHz
    - ✓ RF/LO Band 300 to 1000 MHz



# TC4: Port RFX Return Loss

F1325 Return Loss - RFX Port  
LO = 703 MHz, 0 dBm, LOA Selected  
at Evaluation Board Connector

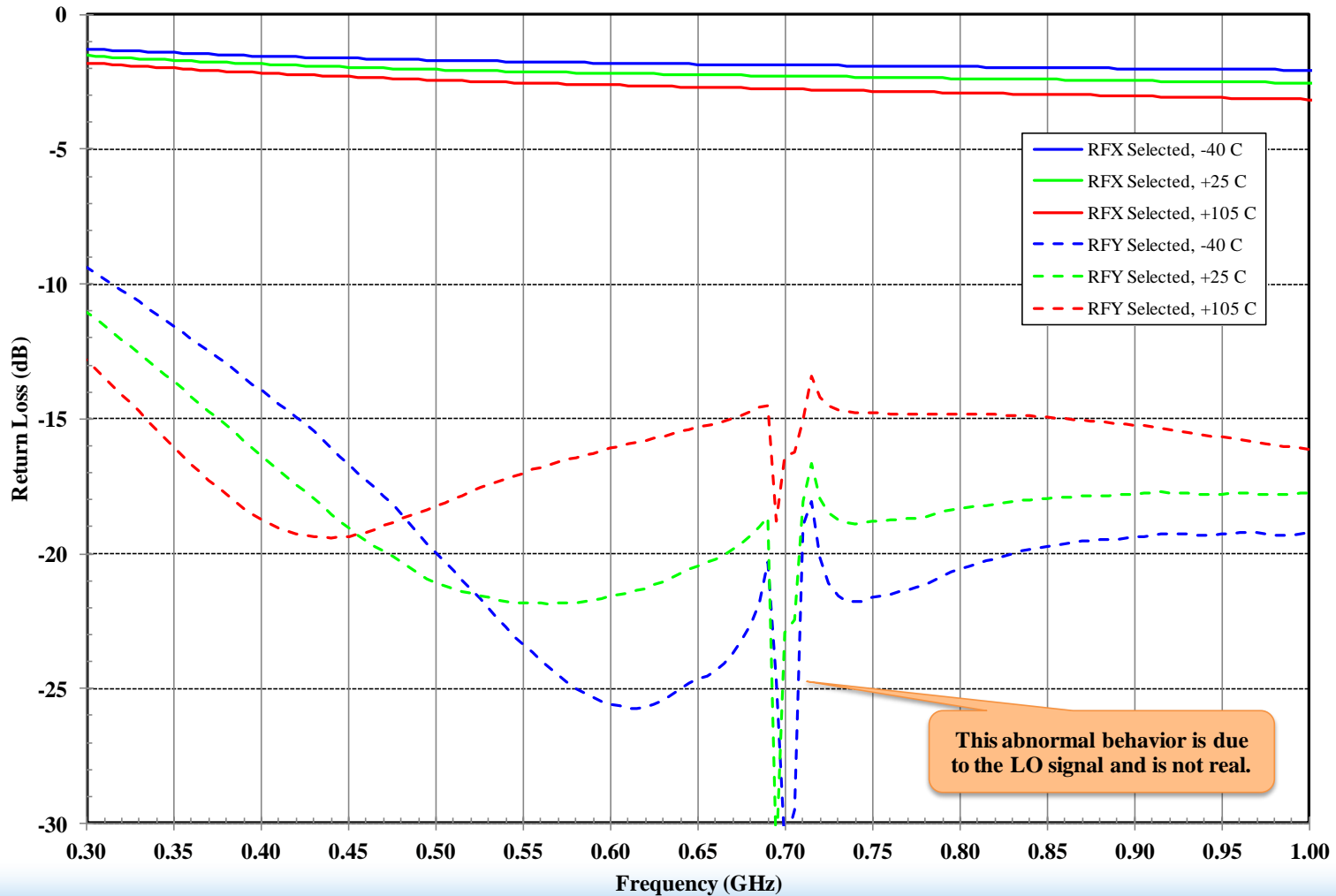


This abnormal behavior is due to the LO signal and is not real.



# TC4: Port RFY Return Loss

F1325 Return Loss - RFY Port  
LO = 703 MHz, 0 dBm, LOA Selected  
at Evaluation Board Connector

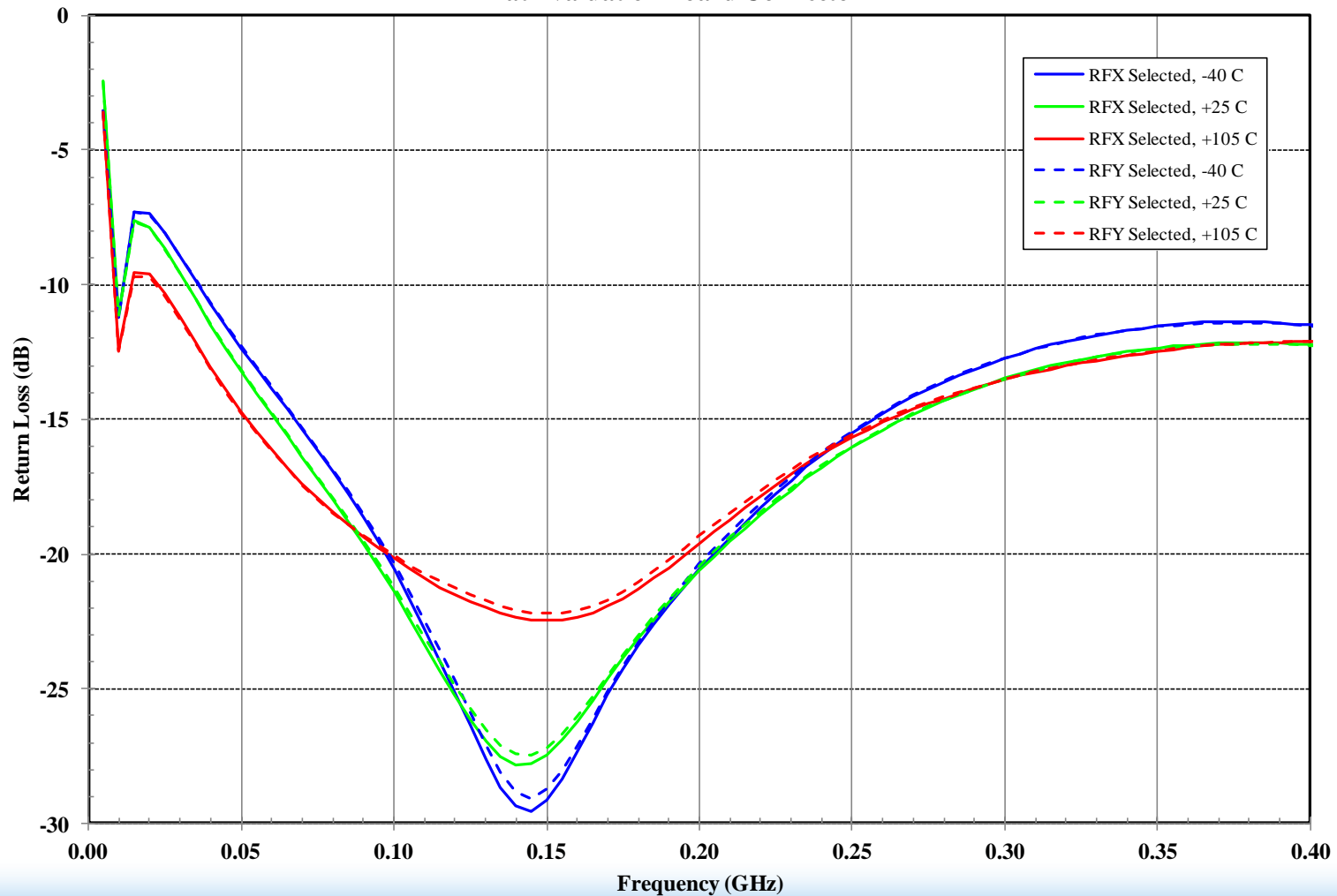


This abnormal behavior is due to the LO signal and is not real.



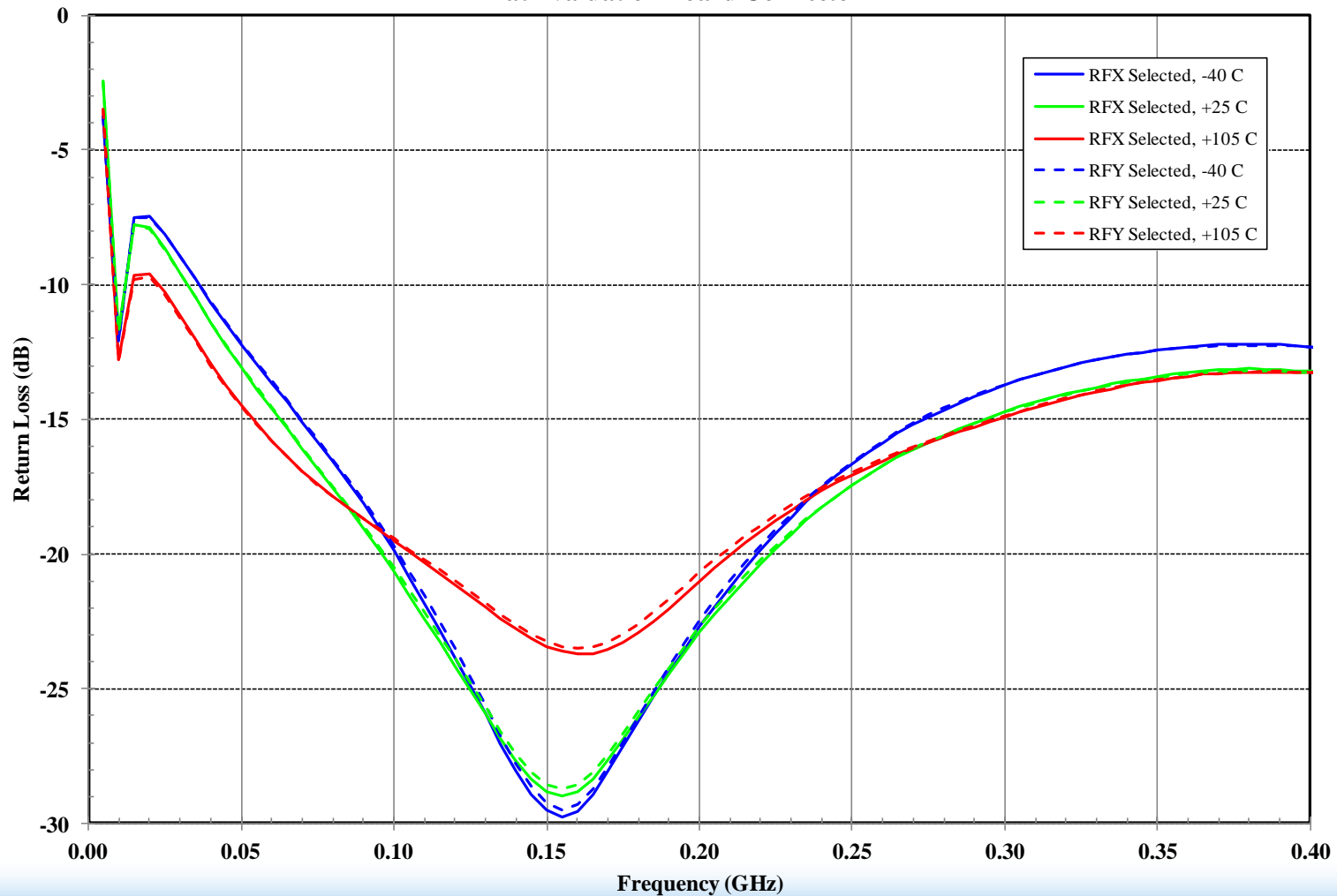
# TC4: Port IF-I Return Loss

F1325 Return Loss - IF-I Port  
LO = 703 MHz, 0 dBm, LOA Selected  
at Evaluation Board Connector



# TC4: Port IF-Q Return Loss

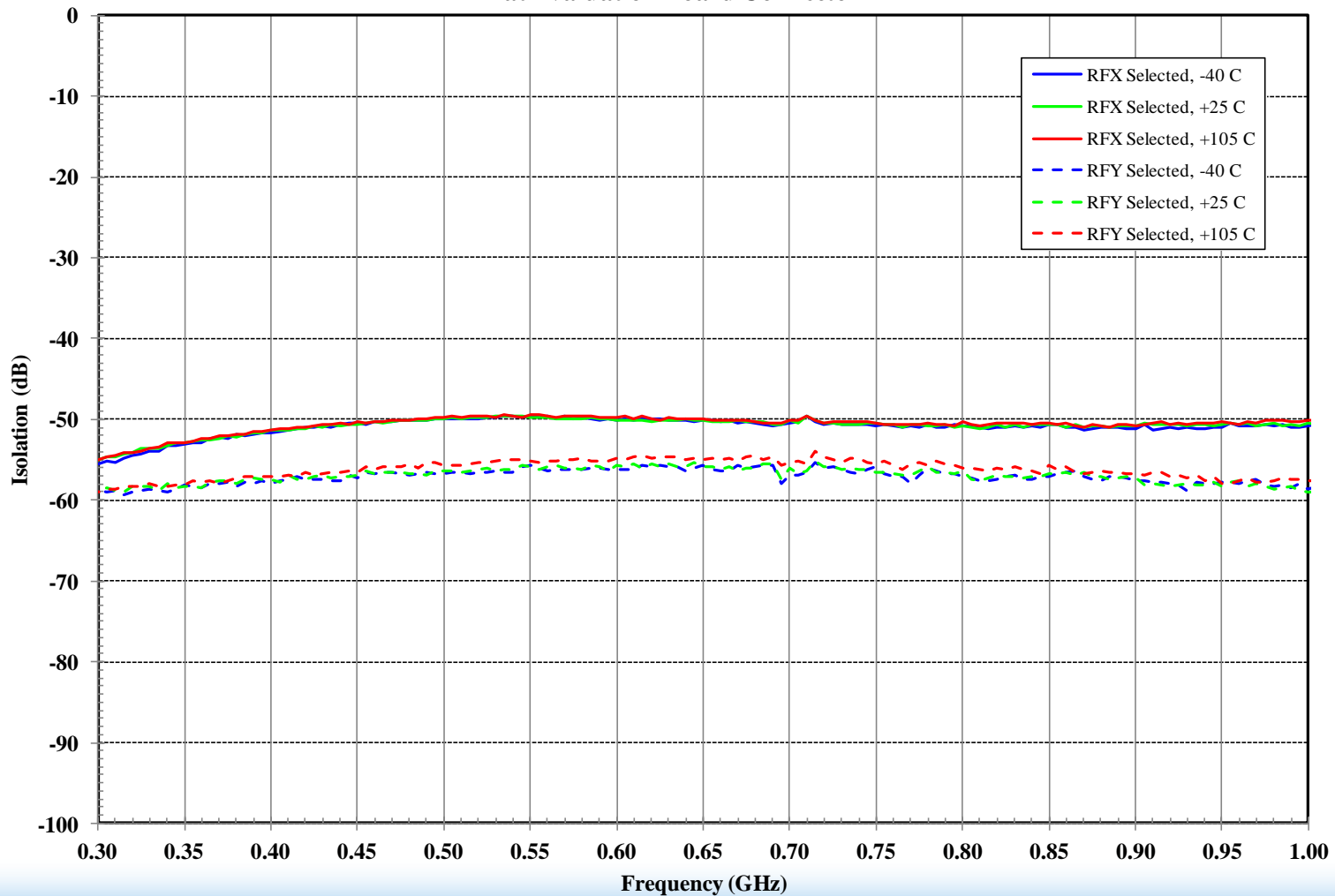
F1325 Return Loss - IF-Q Port  
LO = 703 MHz, 0 dBm, LOA Selected  
at Evaluation Board Connector





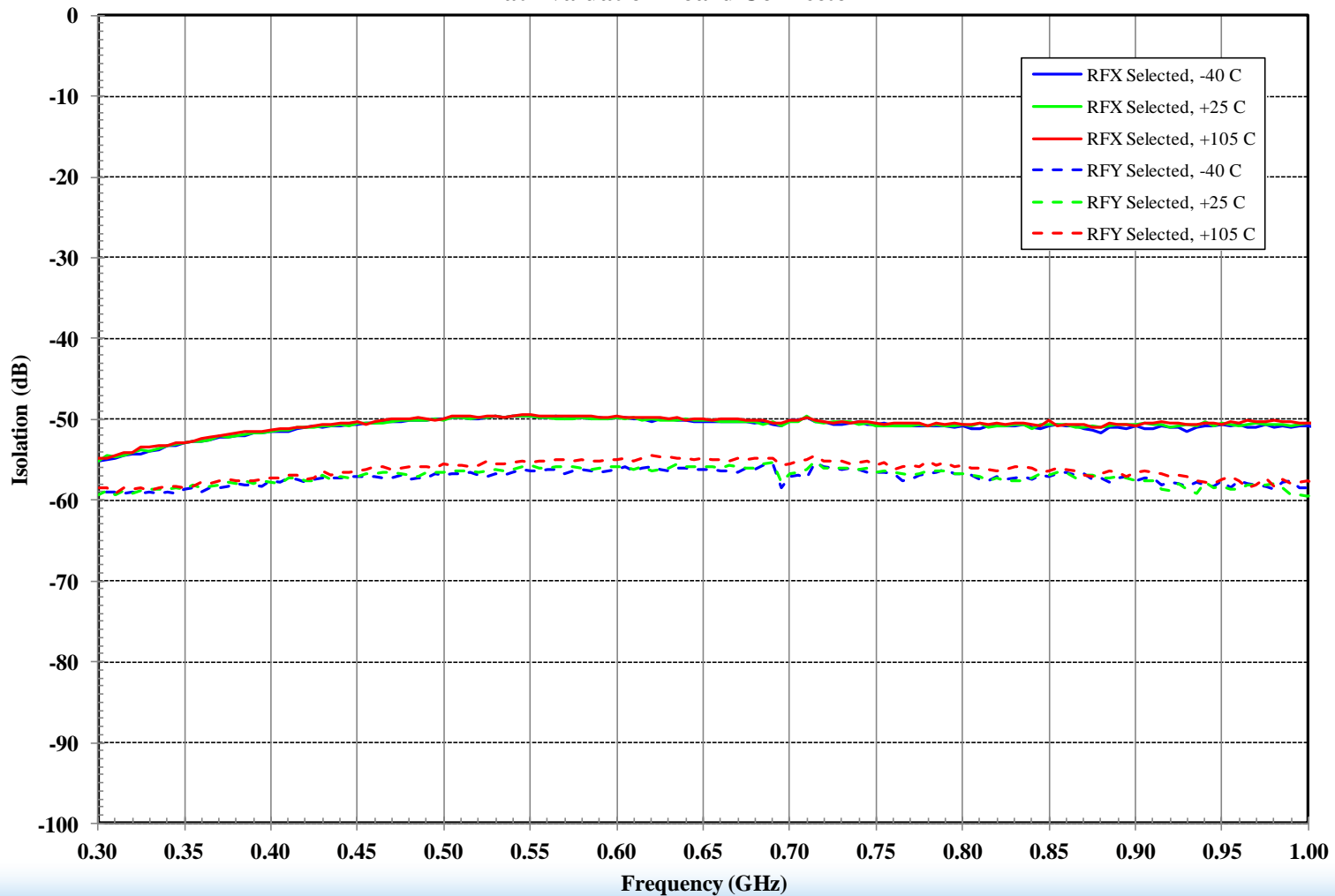
# TC4: Isolation RFX to RFY

F1325 Isolation RFX to RFY  
LO = 703 MHz, 0 dBm, LOA Selected  
at Evaluation Board Connector



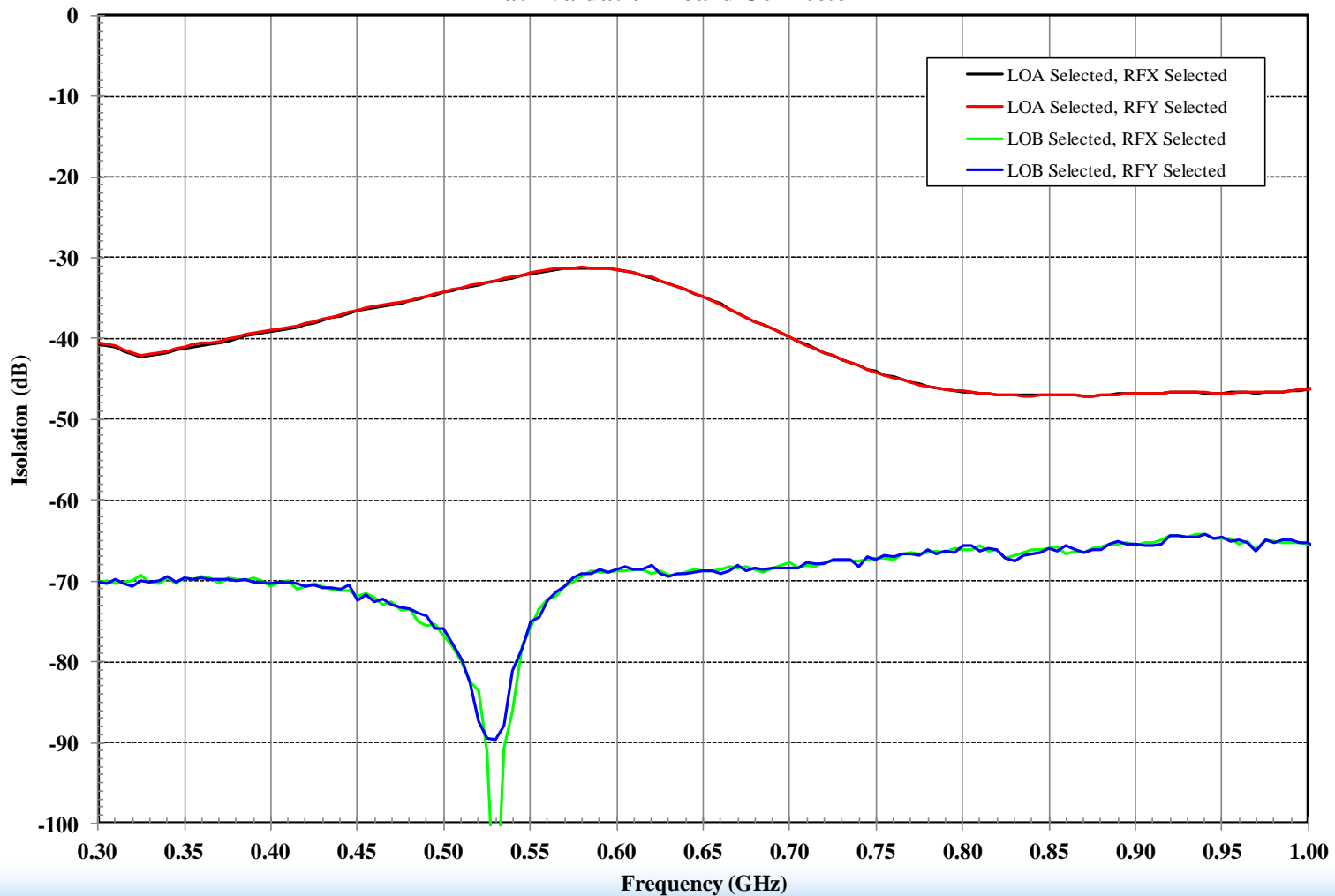
# TC4: Isolation RFY to RFX

F1325 Isolation RFY to RFX  
LO = 703 MHz, 0 dBm, LOA Selected  
at Evaluation Board Connector



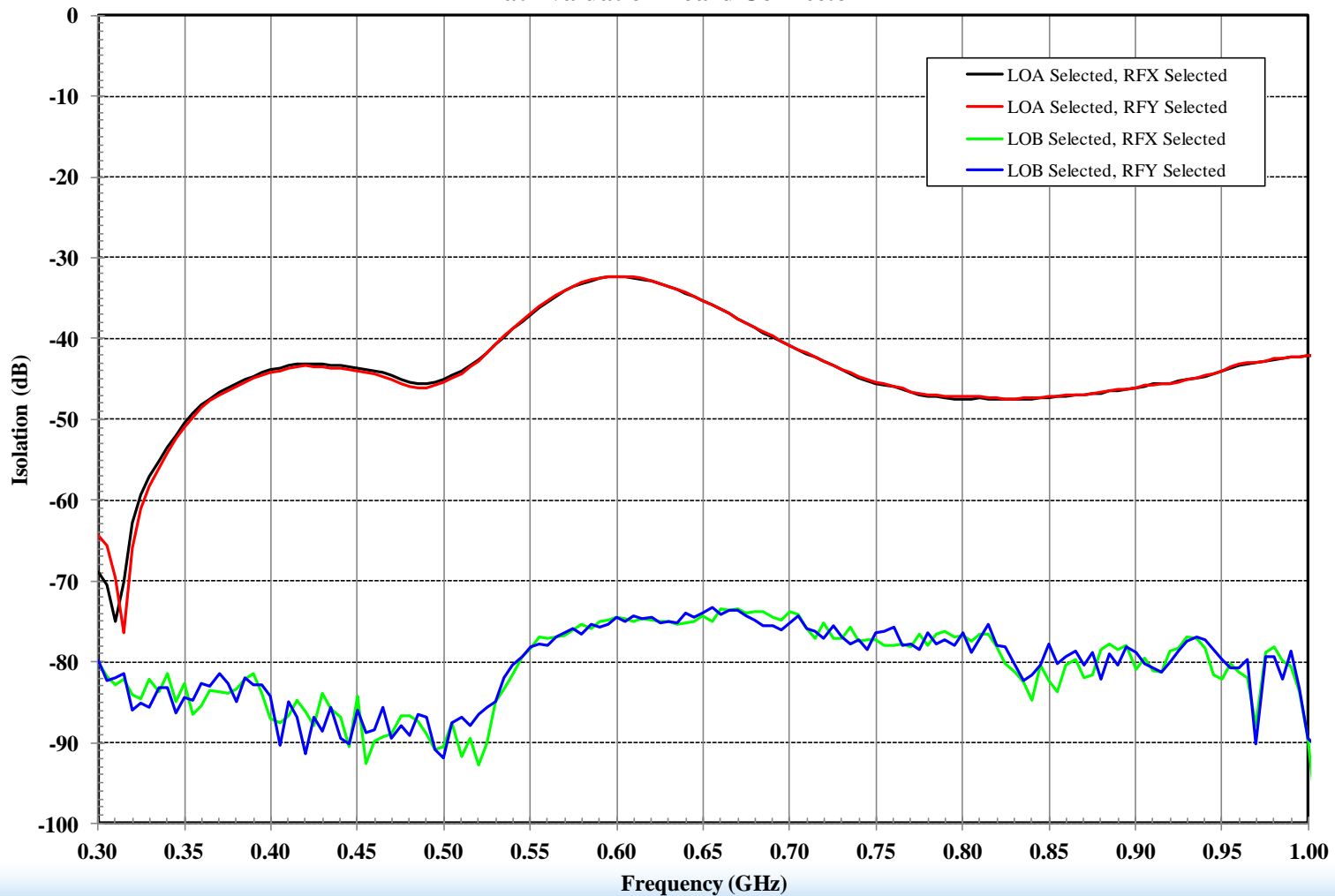
# TC4: Isolation LOA to RFX

F1325 Isolation LOA to RFX  
LO Power = 0 dBm, +25 C  
at Evaluation Board Connector



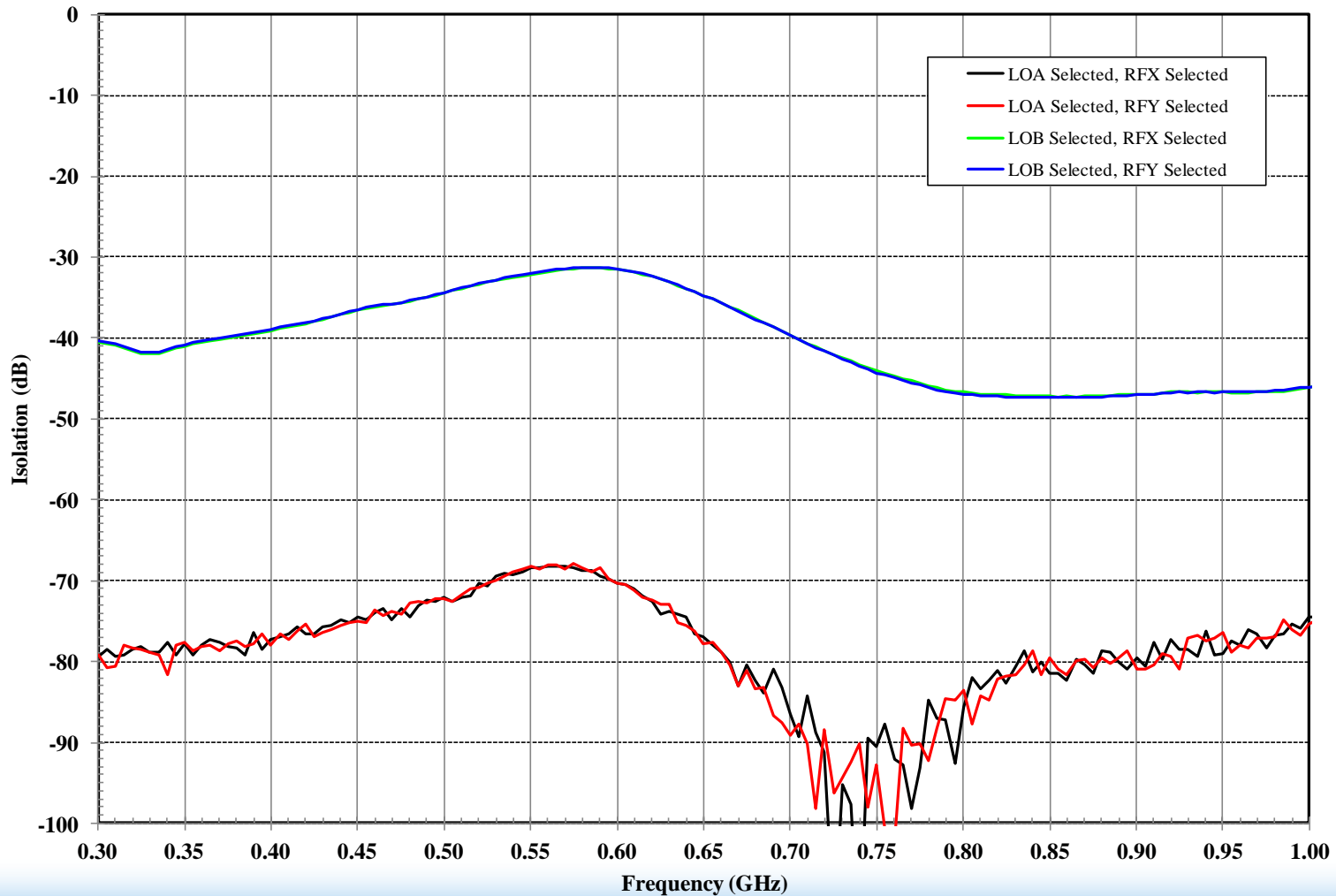
# TC4: Isolation LOA to RFY

F1325 Isolation LOA to RFY  
LO Power = 0 dBm, +25 C  
at Evaluation Board Connector



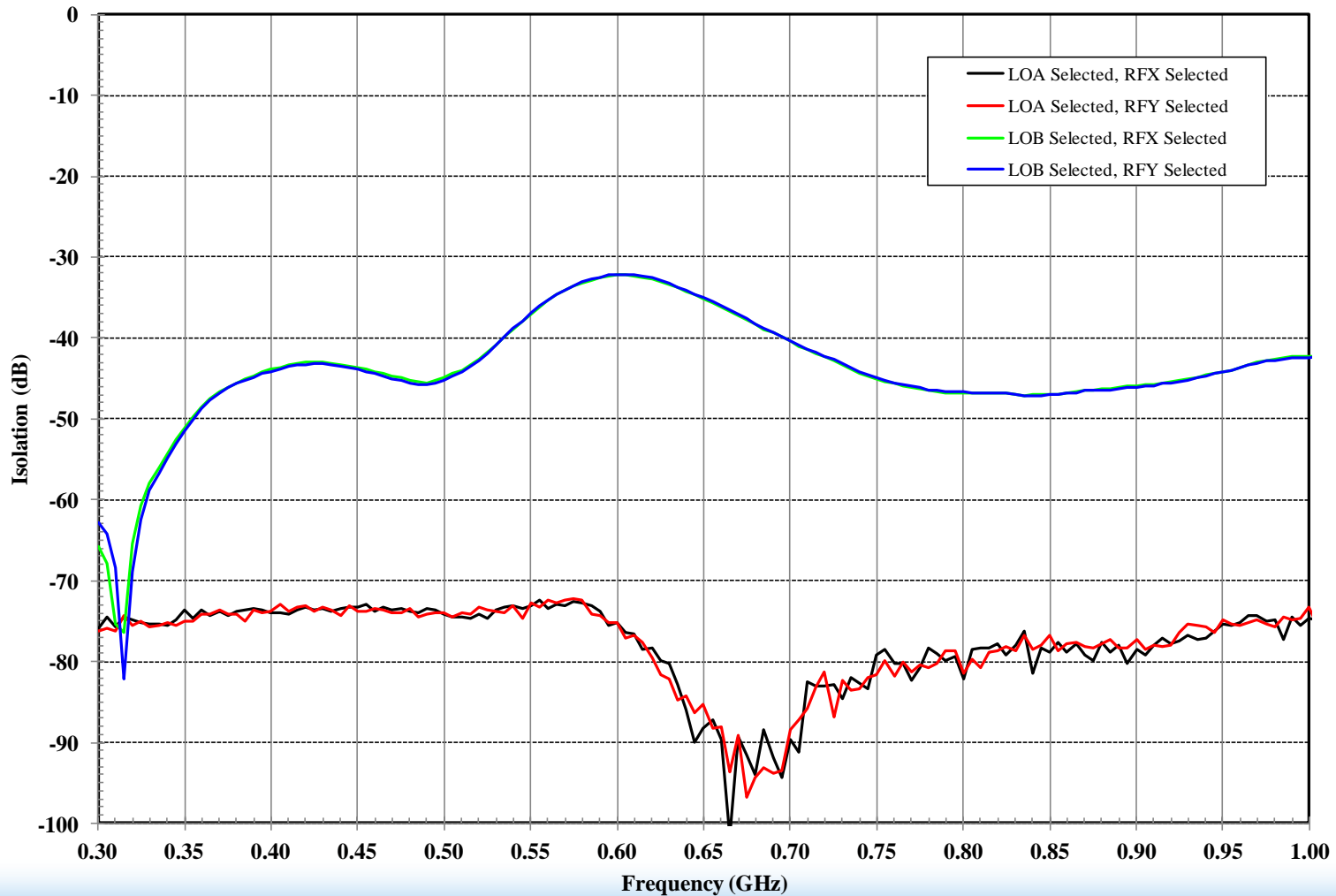
# TC4: Isolation LOB to RFX

F1325 Isolation LOB to RFX  
LO Power = 0 dBm, +25 C  
at Evaluation Board Connector



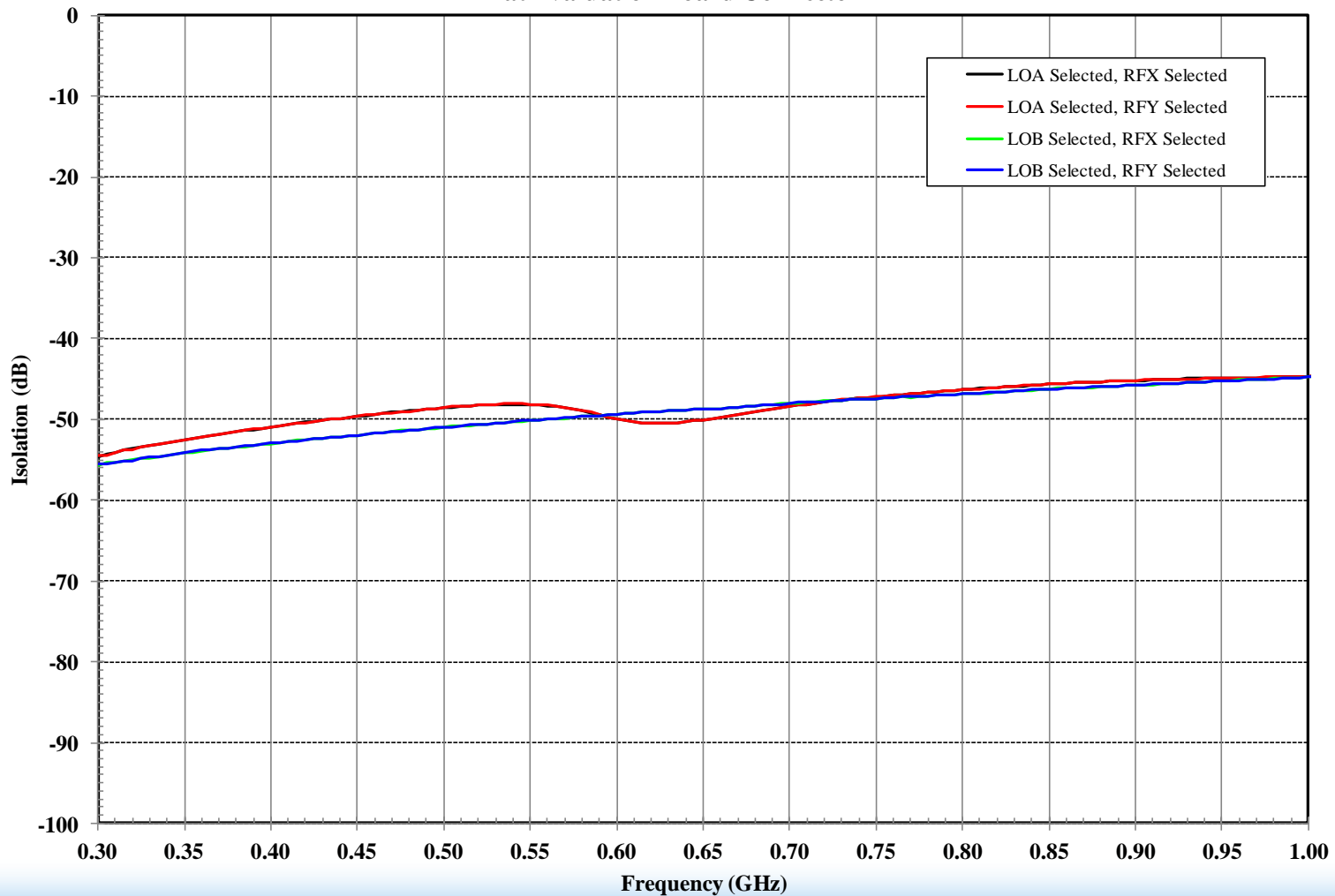
# TC4: Isolation LOB to RFY

F1325 Isolation LOB to RFY  
LO Power = 0 dBm, +25 C  
at Evaluation Board Connector



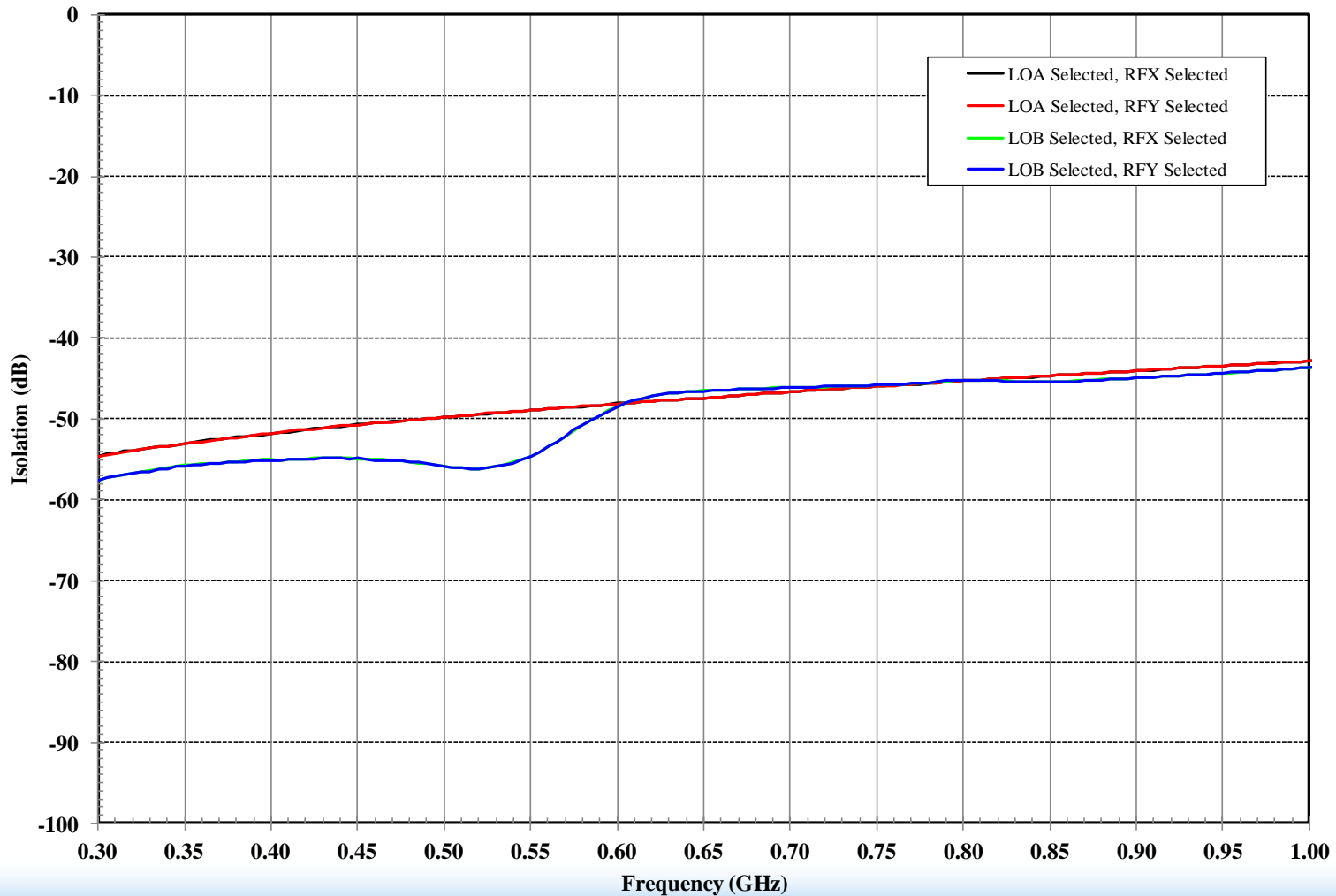
# TC4: Isolation LOA to LOB

F1325 Isolation LOA to LOB  
LO Power = 0 dBm, +25 C  
at Evaluation Board Connector



# TC4: Isolation LOB to LOA

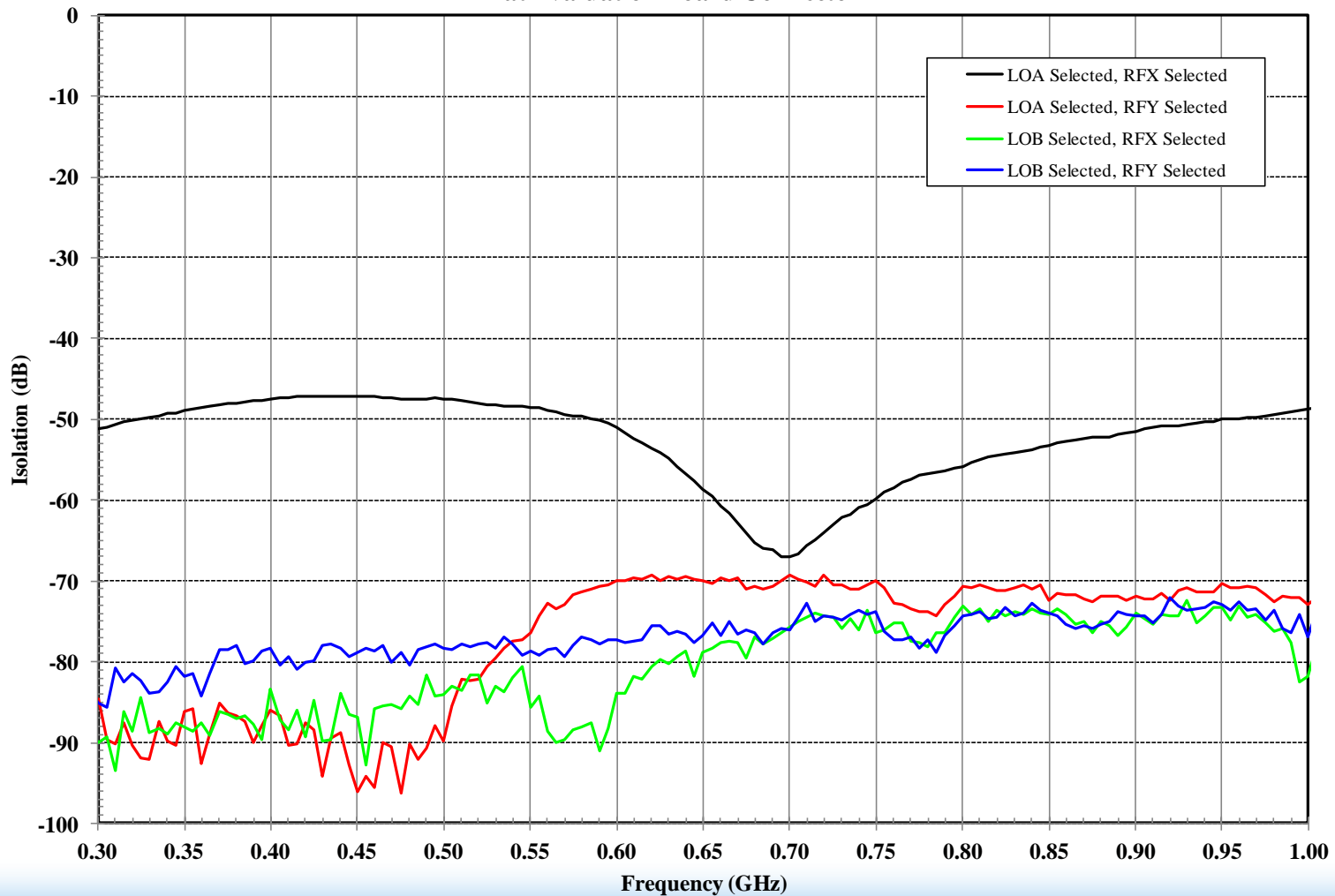
F1325 Isolation LOB to LOA  
LO Power = 0 dBm, +25 C  
at Evaluation Board Connector





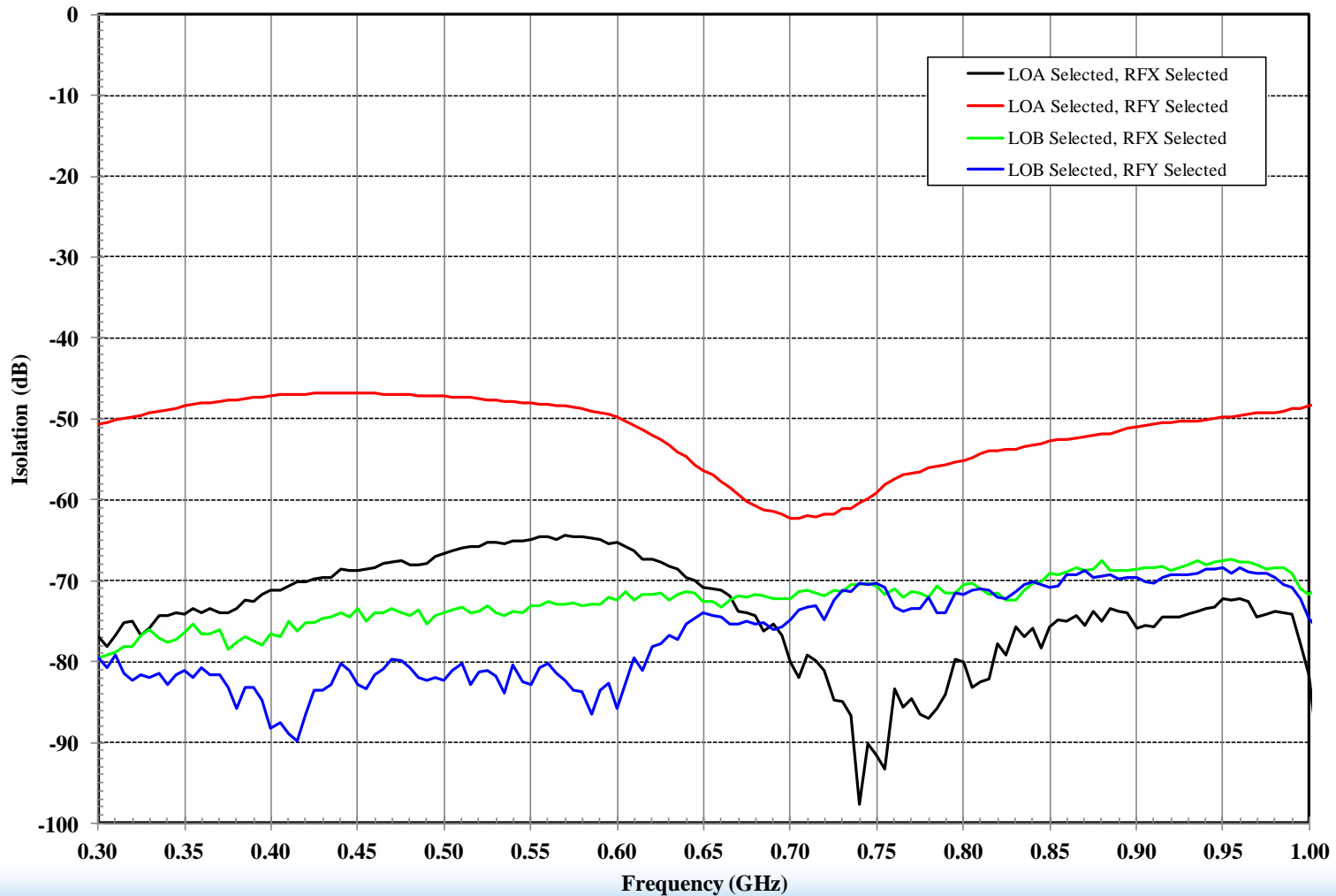
# TC4: Isolation LOA to IF-I

**F1325 Isolation LOA to IF-I**  
**LO Power = 0 dBm, +25 C**  
**at Evaluation Board Connector**



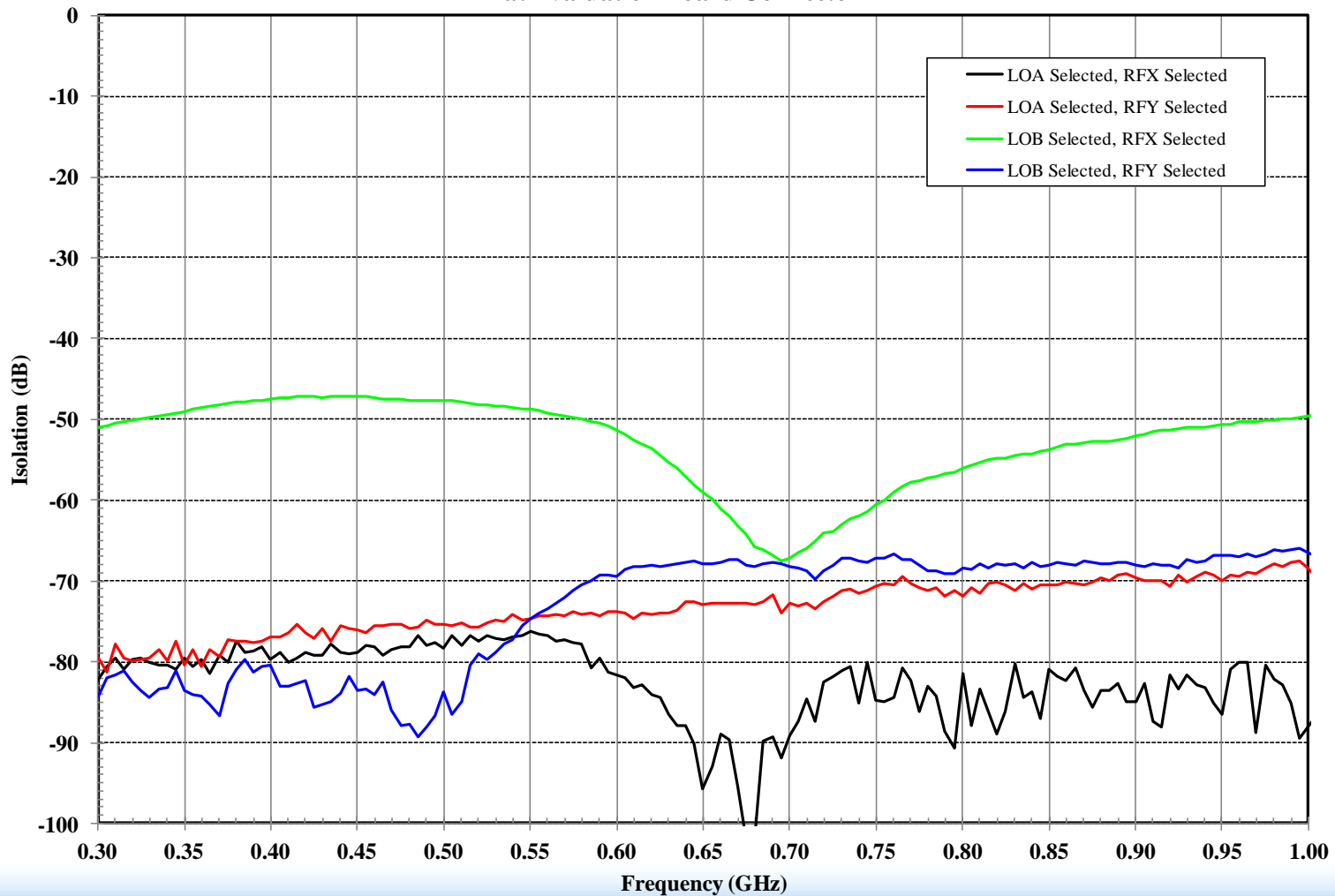
# TC4: Isolation LOA to IF-Q

F1325 Isolation LOA to IF-Q  
LO Power = 0 dBm, +25 C  
at Evaluation Board Connector



# TC4: Isolation LOA to IF-I

**F1325 Isolation LOB to IF-I**  
**LO Power = 0 dBm, +25 C**  
**at Evaluation Board Connector**



# TC4: Isolation LOB to IF-Q

F1325 Isolation LOB to IF-Q  
LO Power = 0 dBm, +25 C  
at Evaluation Board Connector

