

# 4-Port MATE-AX PCB; Near End Receiver Crosstalk Measurement Results



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# Overview

- **2 Reference Quad MATE-AX PCBs**
  - PCB TP: Used for measuring NEXT and IL
  - PCB RL: Used for measuring RL
- **Measurement Setup**
- **Measurement Results**

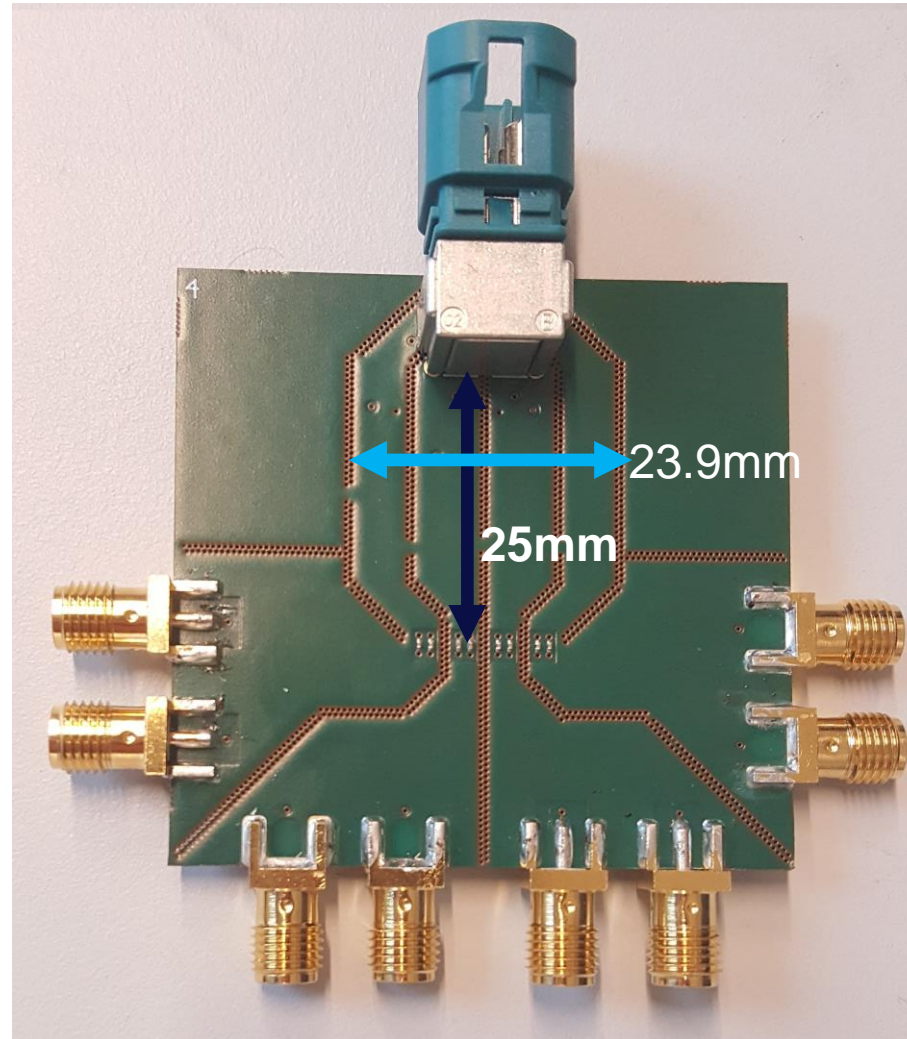
# PCB Boards

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# MATE-AX PCB

- **Standard FR-4 board**
- **6 layers**
- **Power over coax**
- **Stripline with via shielding**
- **Shared ground on PCB**

# Board size

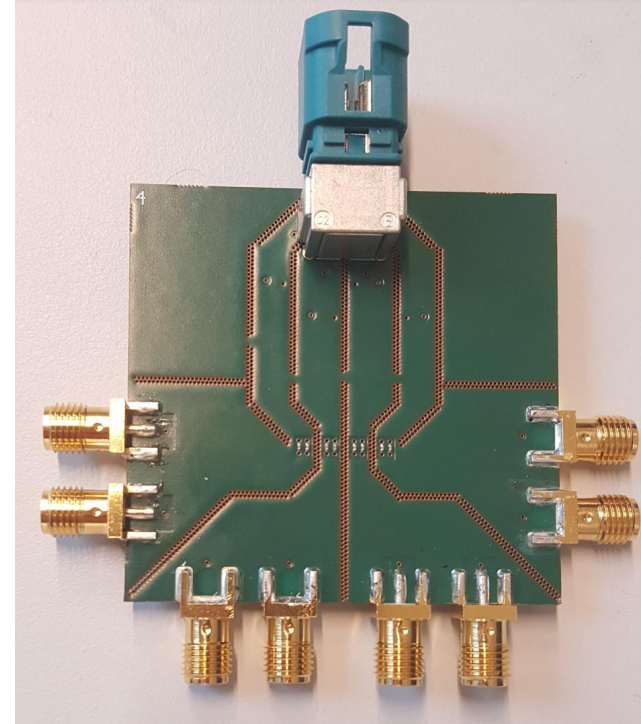
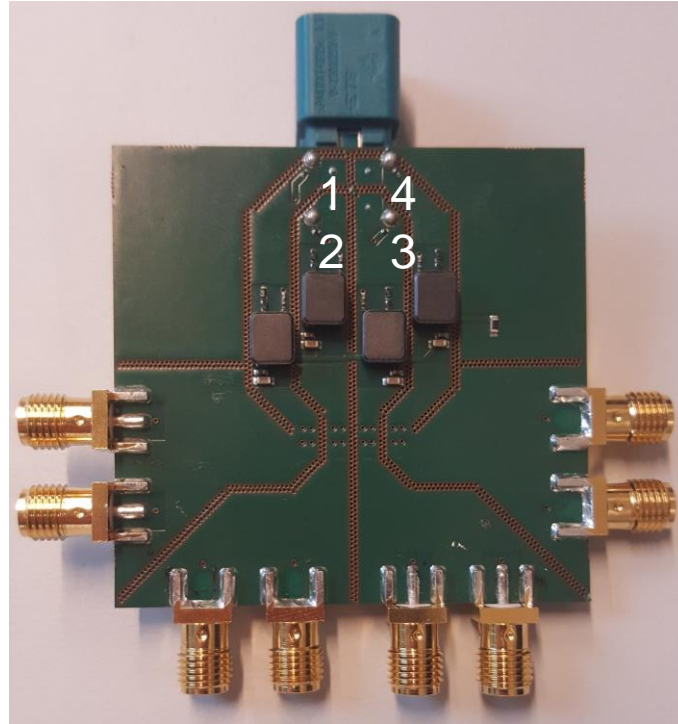


# Board TP

Board TP (Test Port)

PoC inductors on same side

Signal wires alternate on  
signal layer 3 and 4



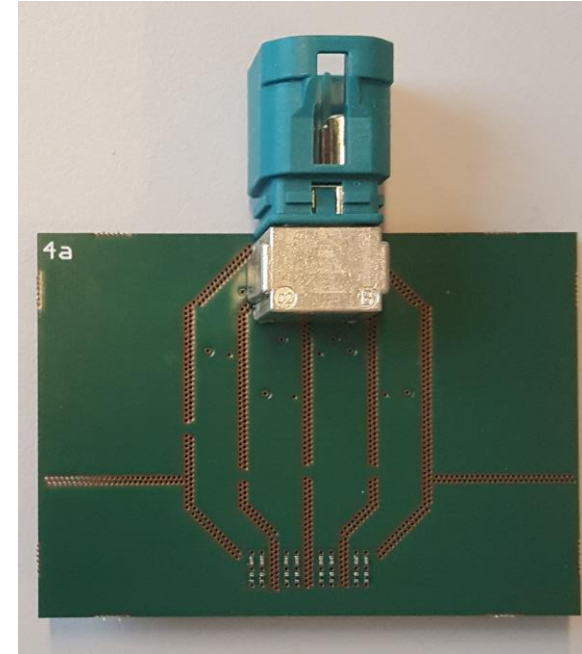
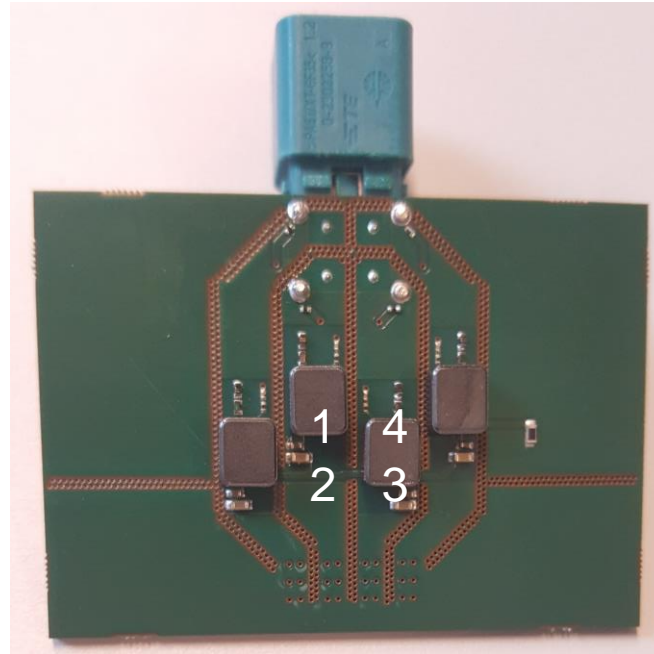
# Board RL

Board RL (for return loss)

PoC inductors on same side

Signal wires alternate on  
signal layer 3 and 4

50R termination at the end (IC).



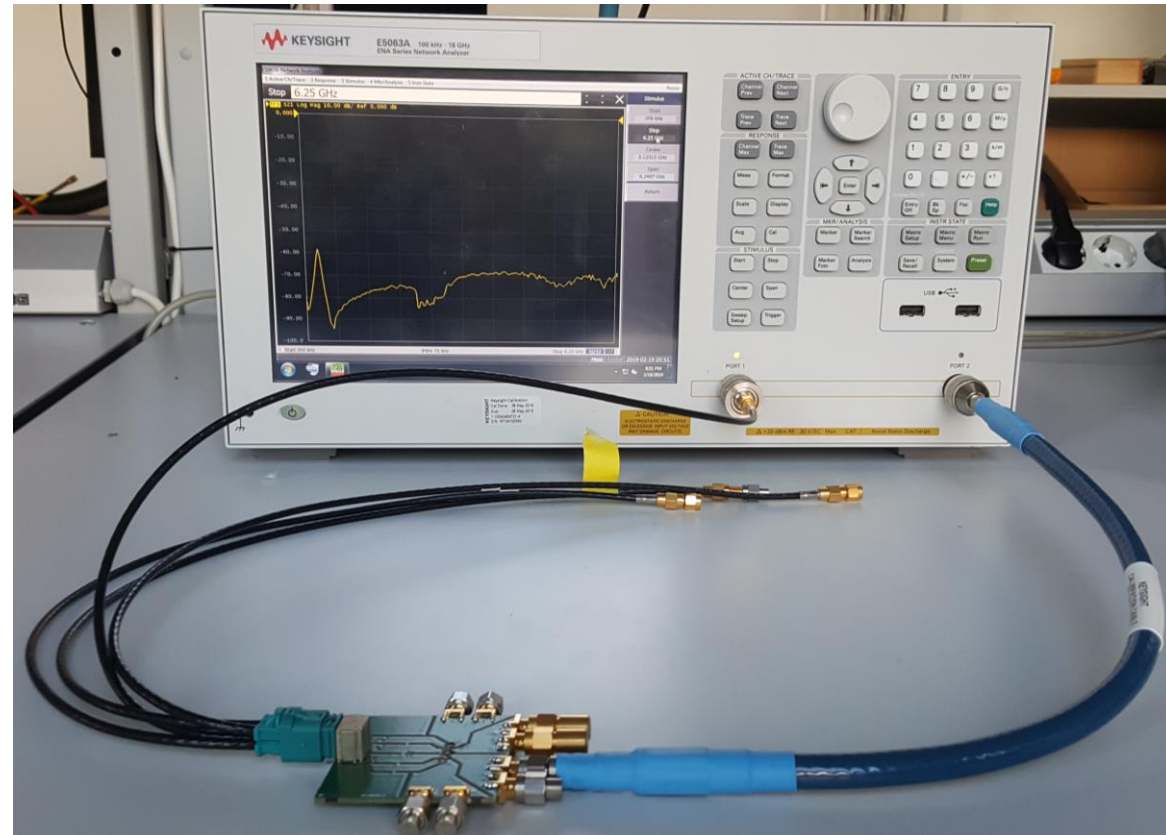
# Measurement Setup

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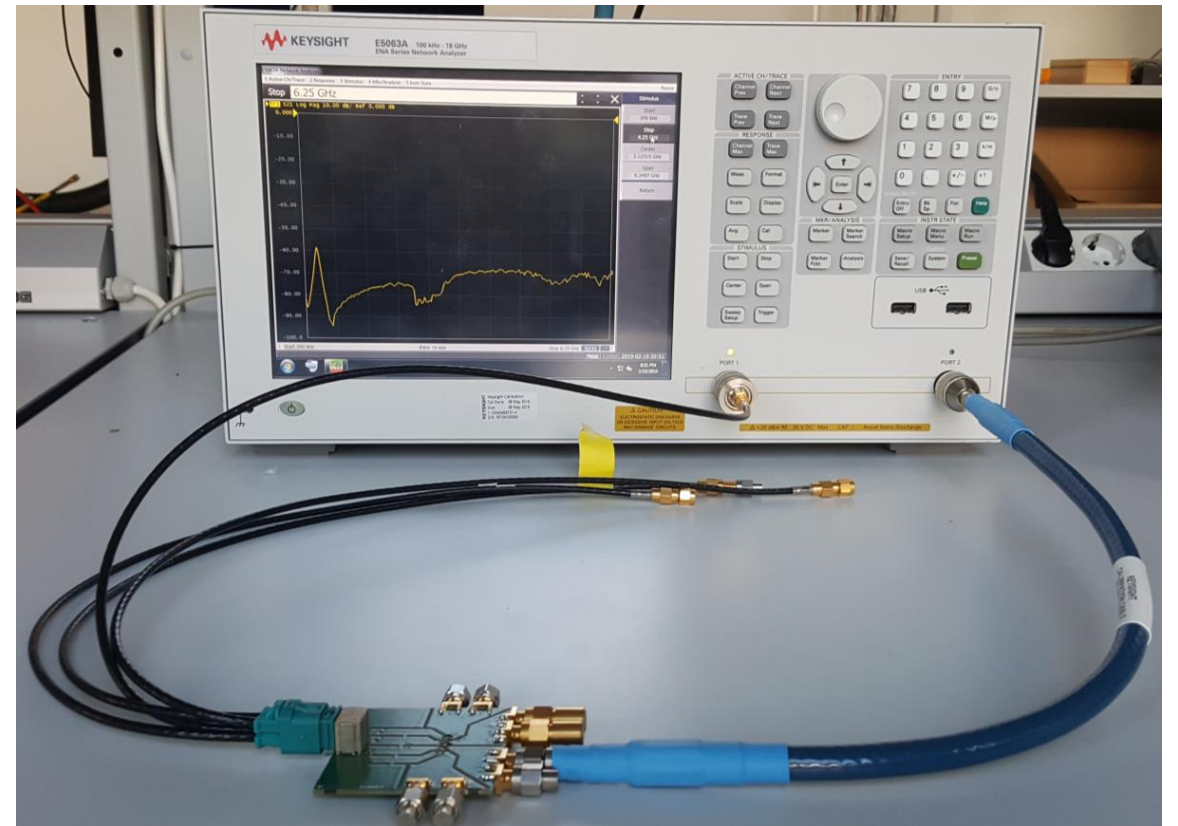
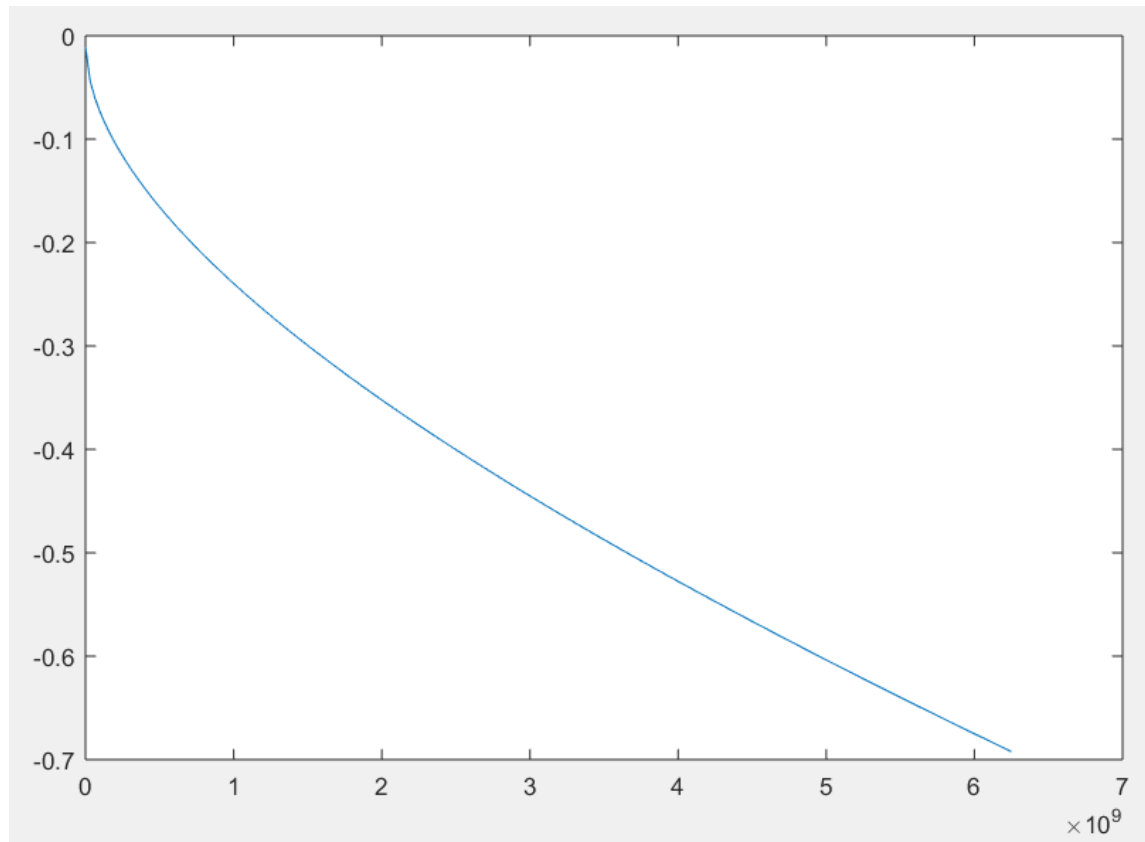
# Measurement Setup

Mate-Ax to SMA cable from TE  
2-port VNA, E5063A



# Measurement Setup

IL of the MATE-AX cable end in dB

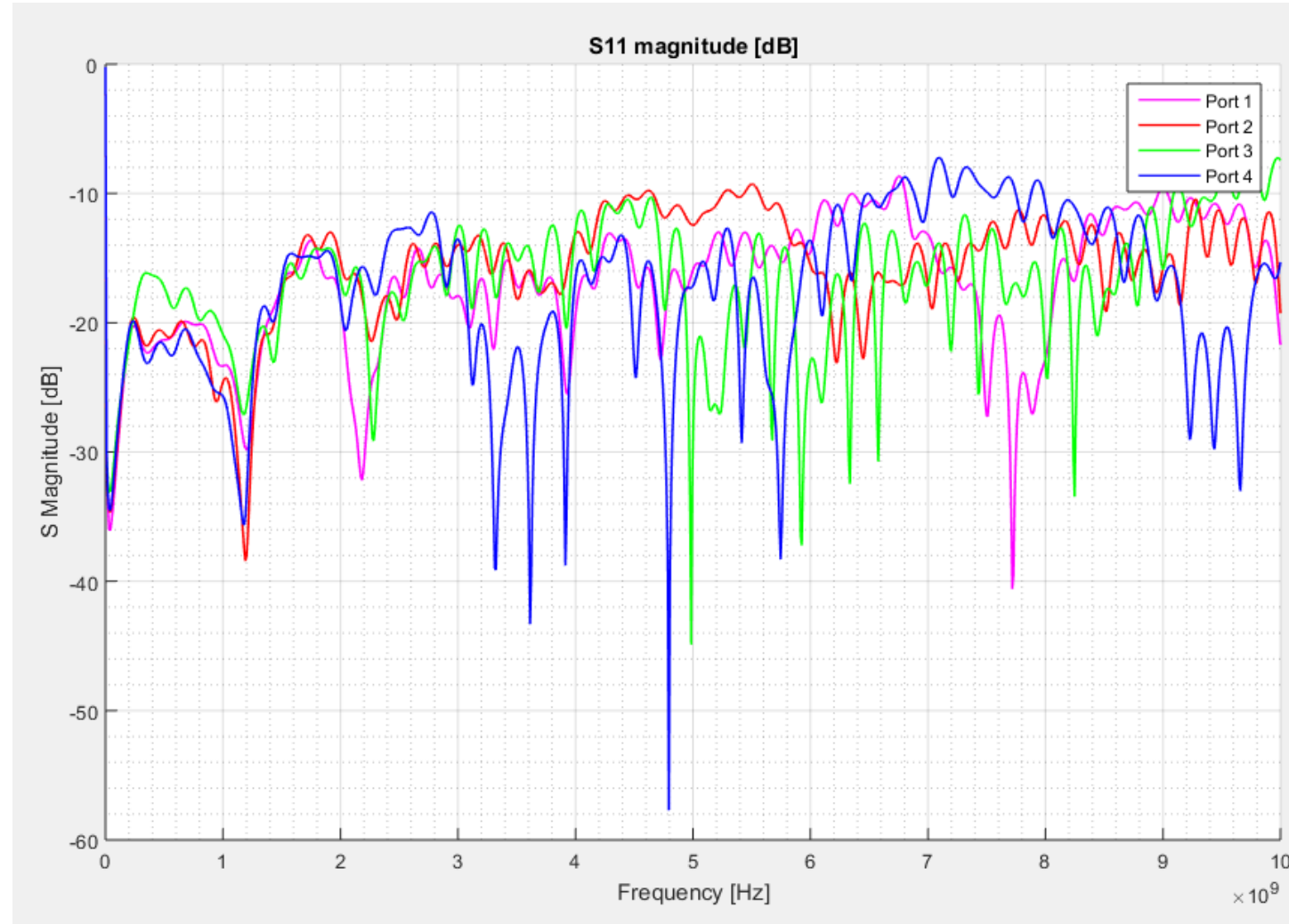
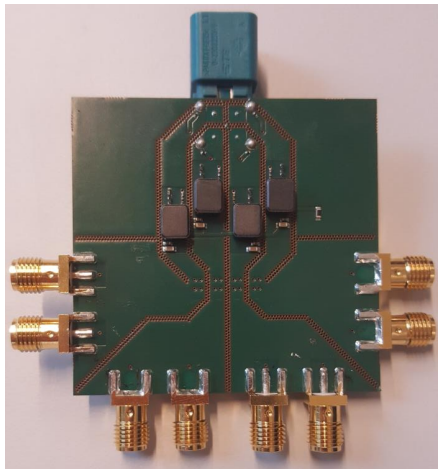


# Measurement Results

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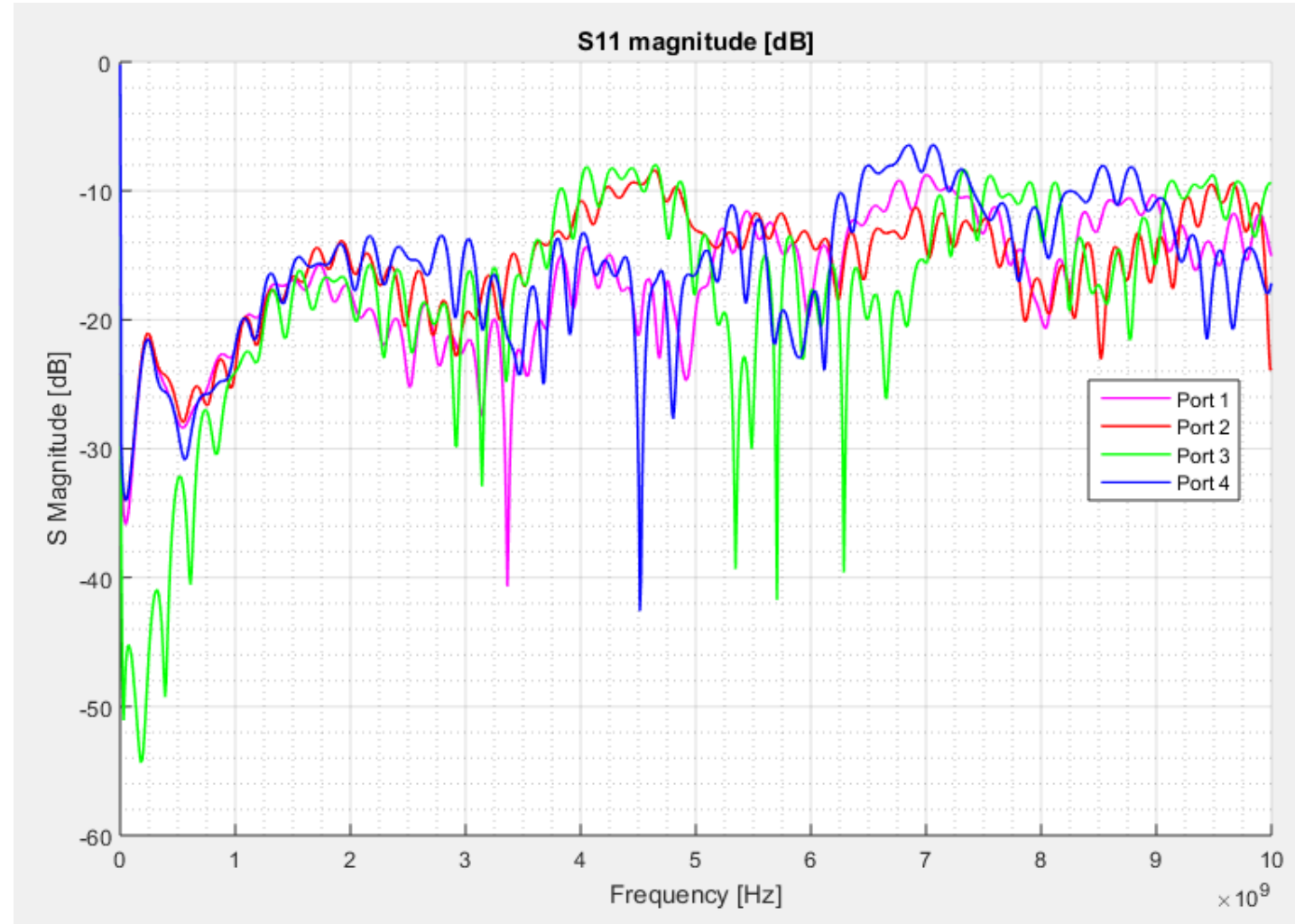
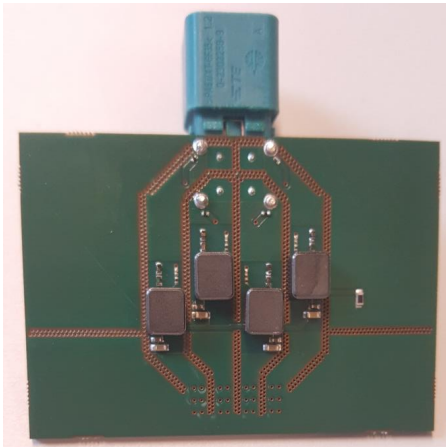
# Return Loss – Board TP

The S11 results contain the 0.5m coax cable that is connected to the MATE-AX connector.



# Return Loss – Board RL

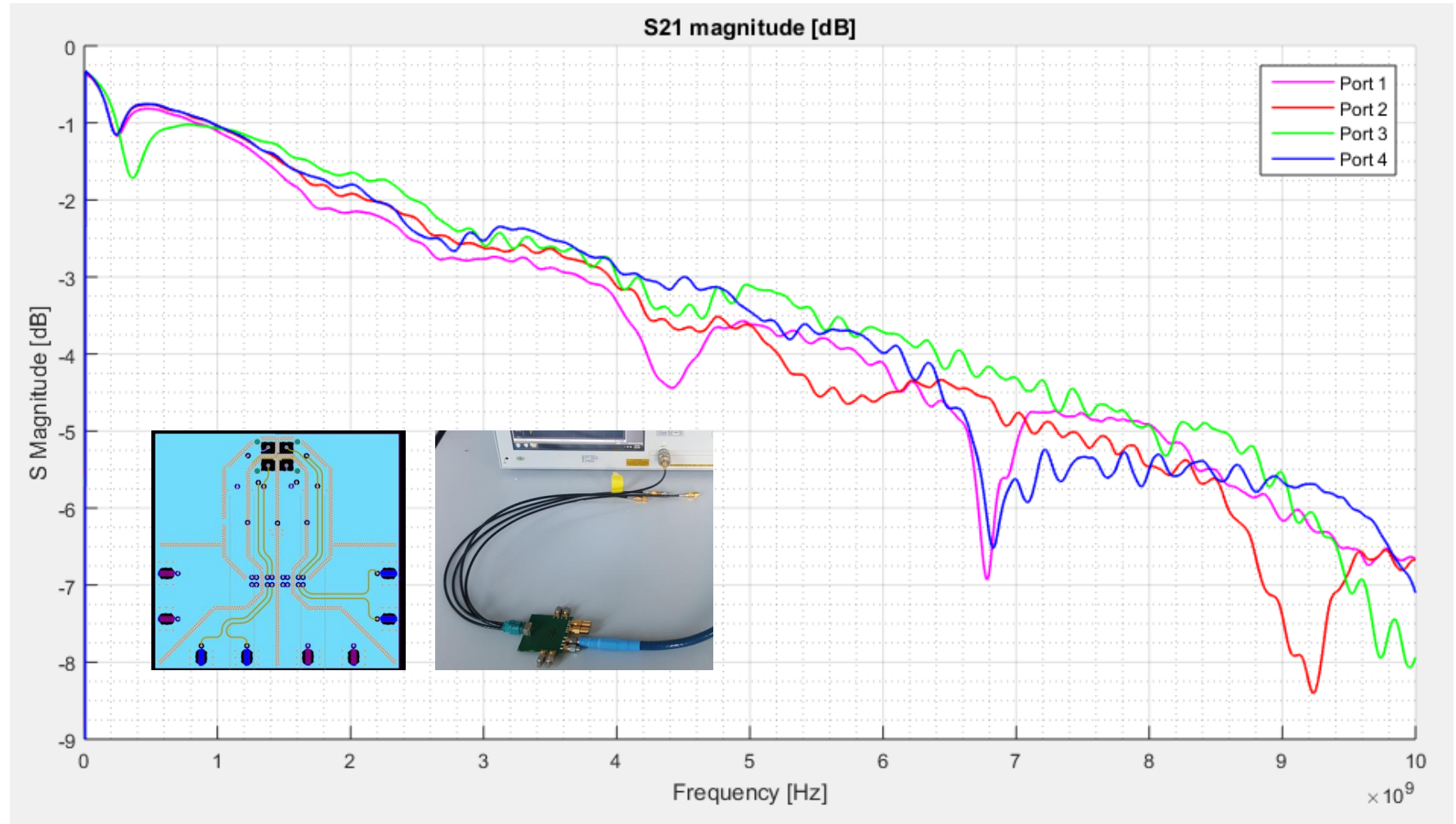
The S11 results contain the 0.5m coax cable that is connected to the MATE-AX connector.



# Insertion Loss

The measurement results below show the total insertion loss from the MATE-AX input to the differential output at the SMA connectors. This is twice as long as the originally specified 2.5cm length.

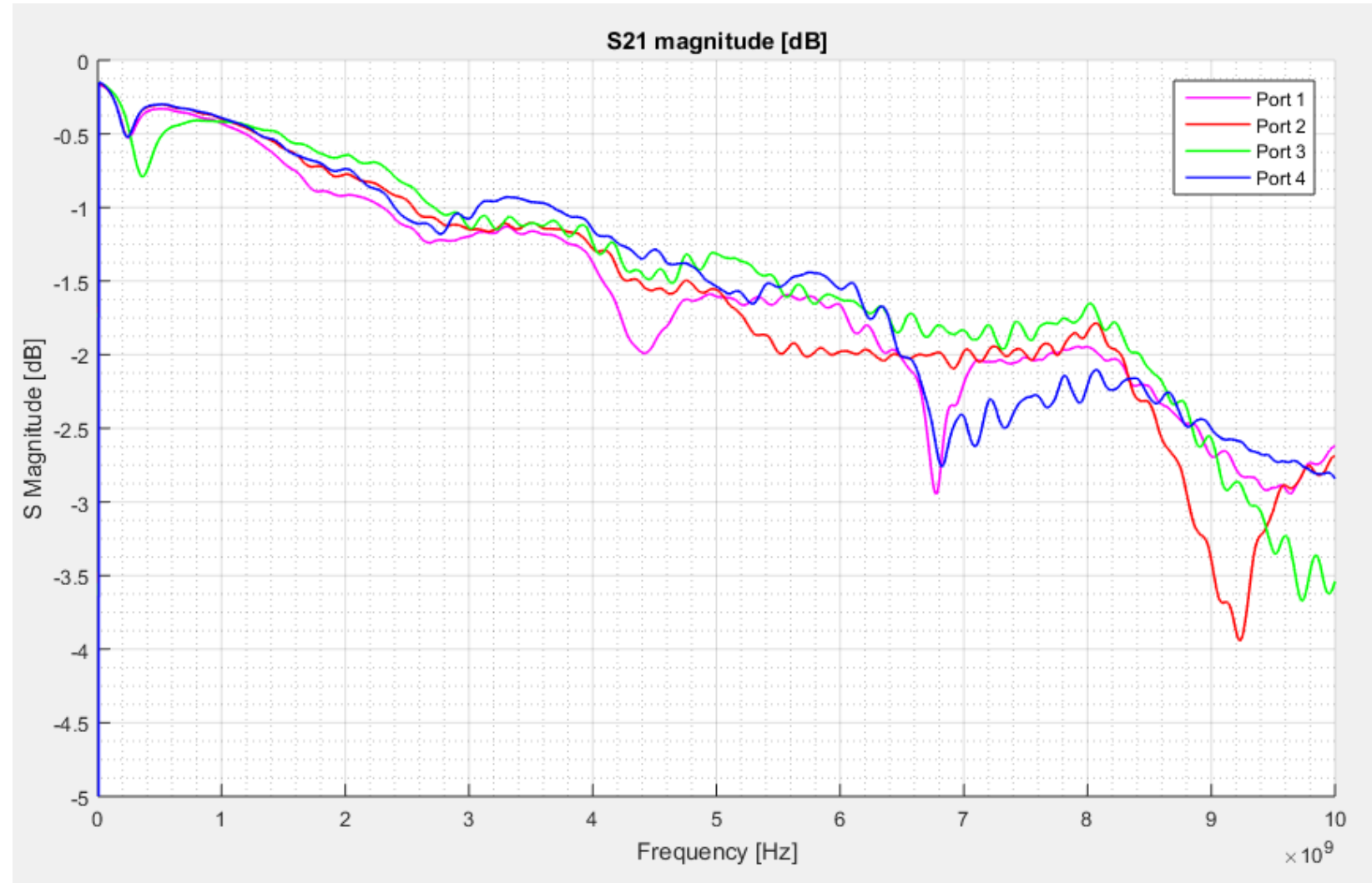
These results also include the 0.5m coax cable on the MATE-AX side



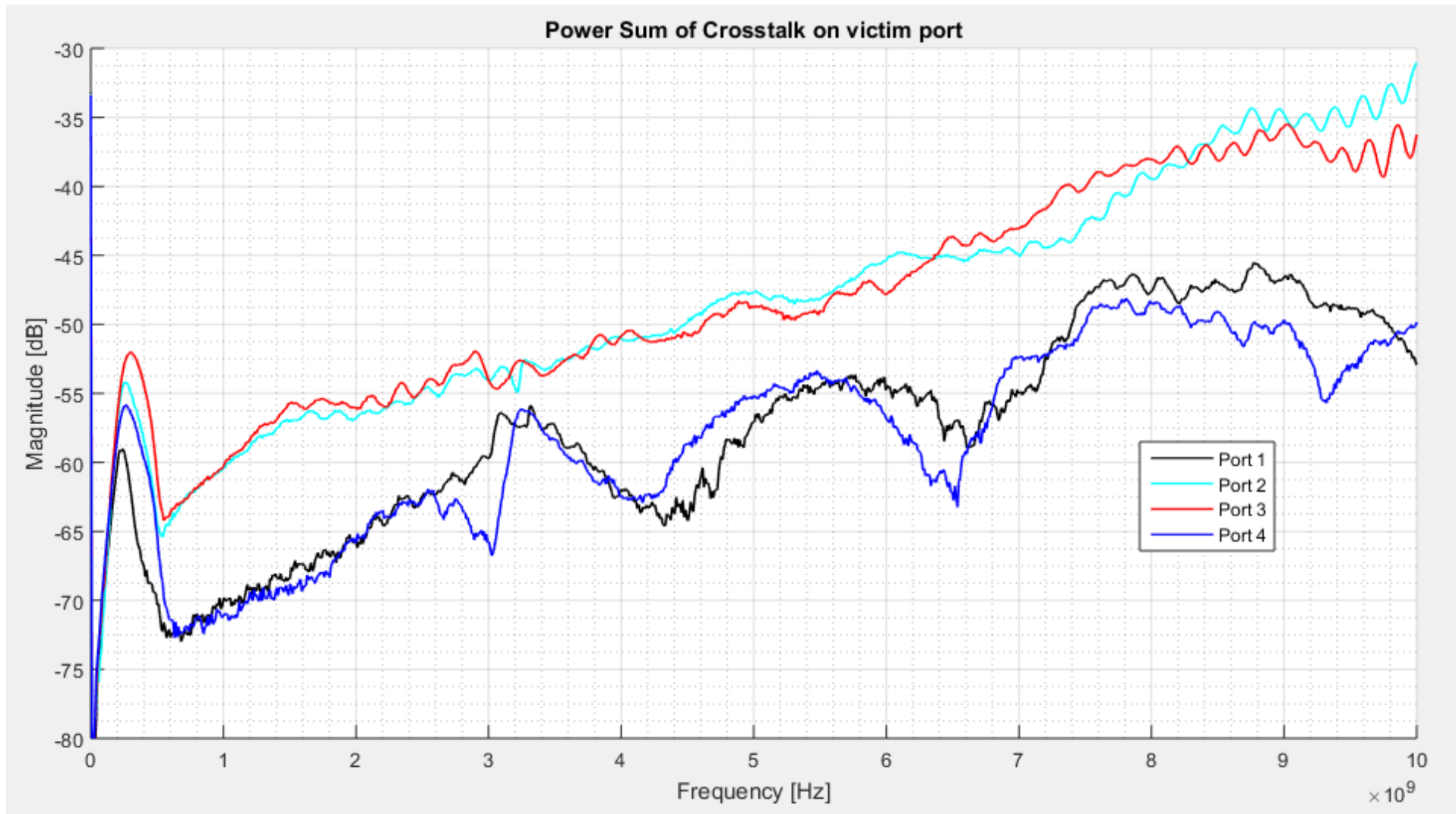
# Insertion Loss - Estimated

Insertion loss after compensating for the 0.5m cable loss and the extra PCB trace.

$$IL = ( IL_{\text{meas}} - IL_{\text{cable}} ) / 2$$



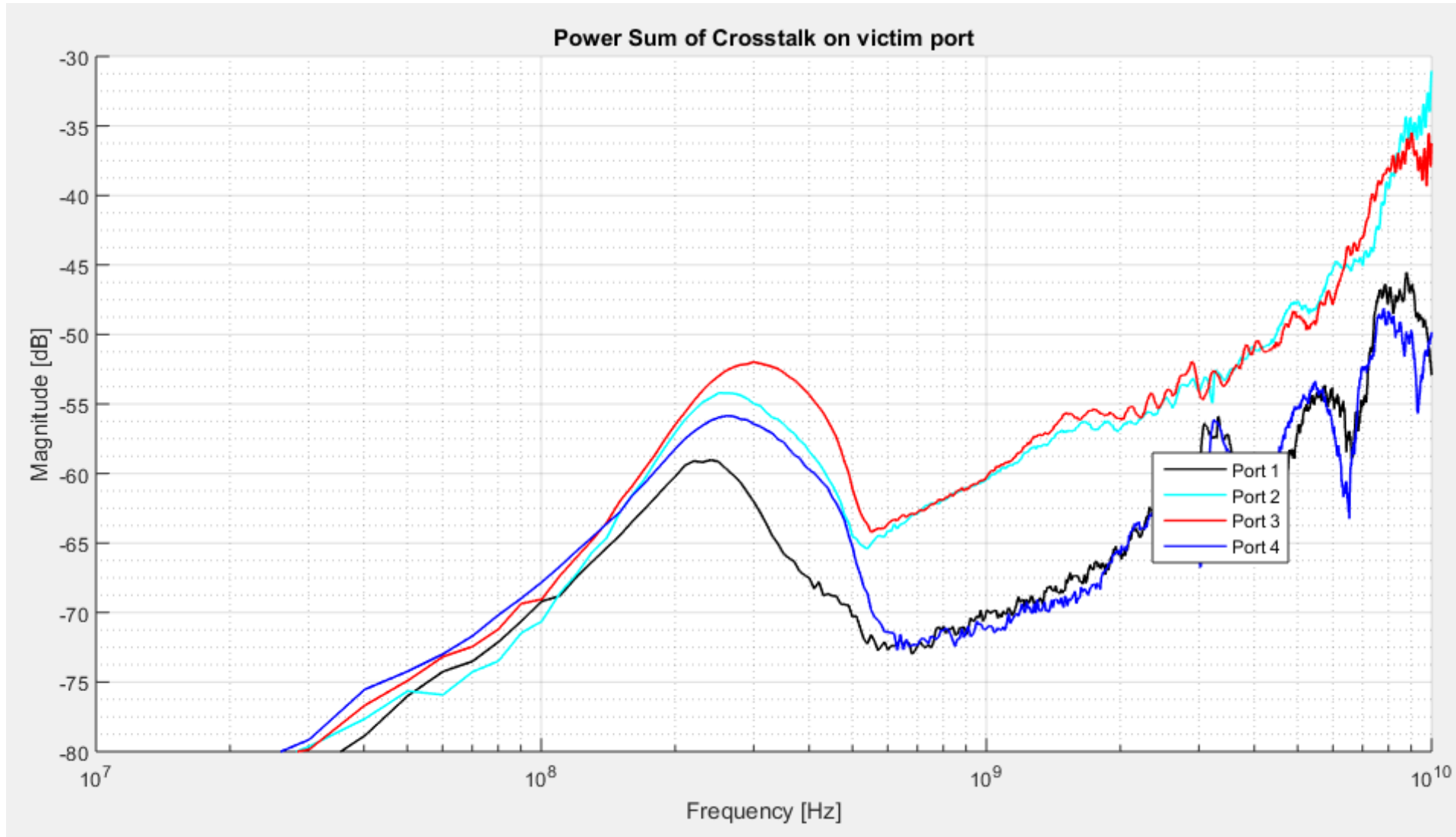
# Total Crosstalk Victim Ports





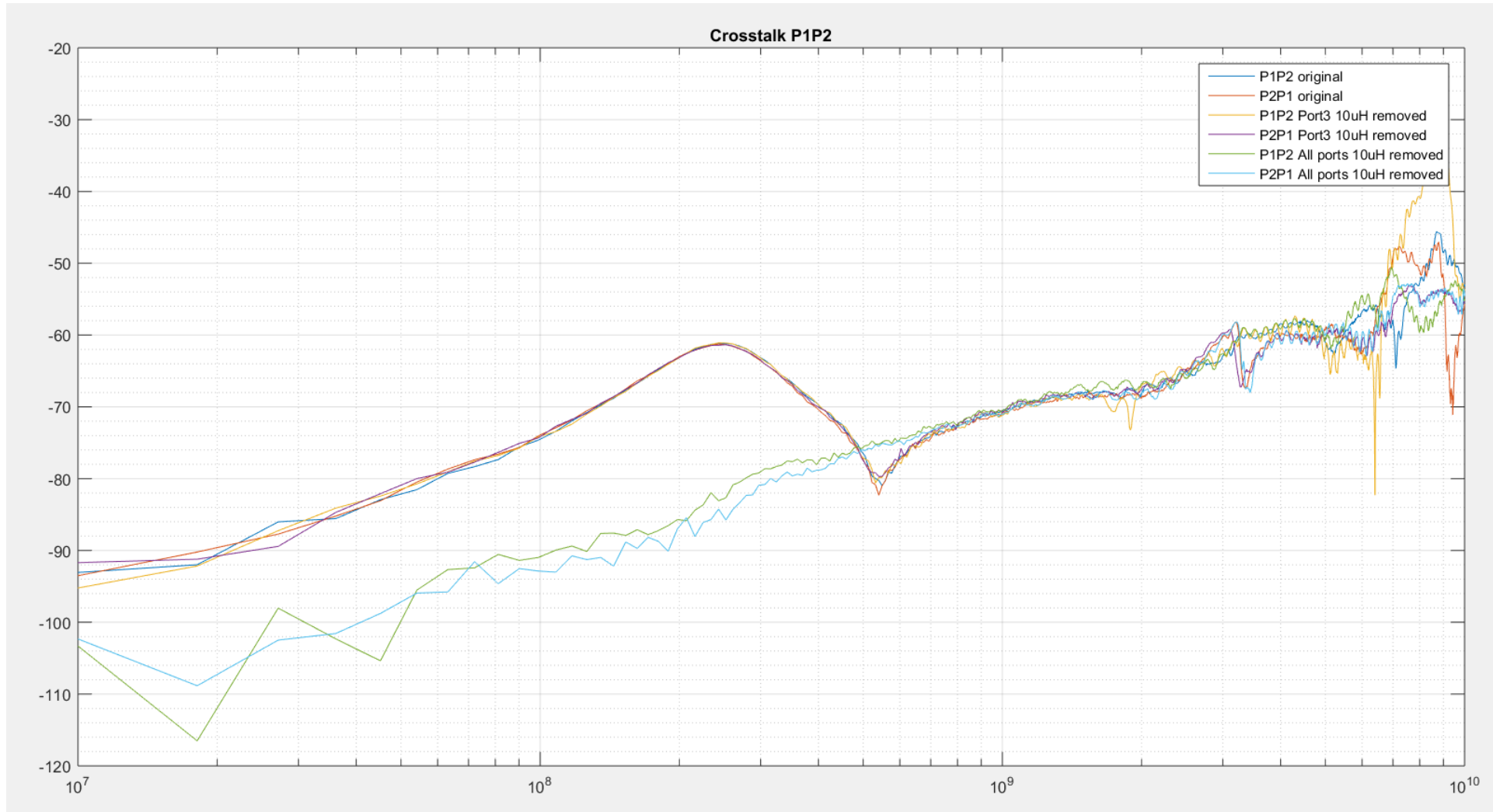
# Total Crosstalk Victim Ports

Same as previous graph but with logarithmic x axis



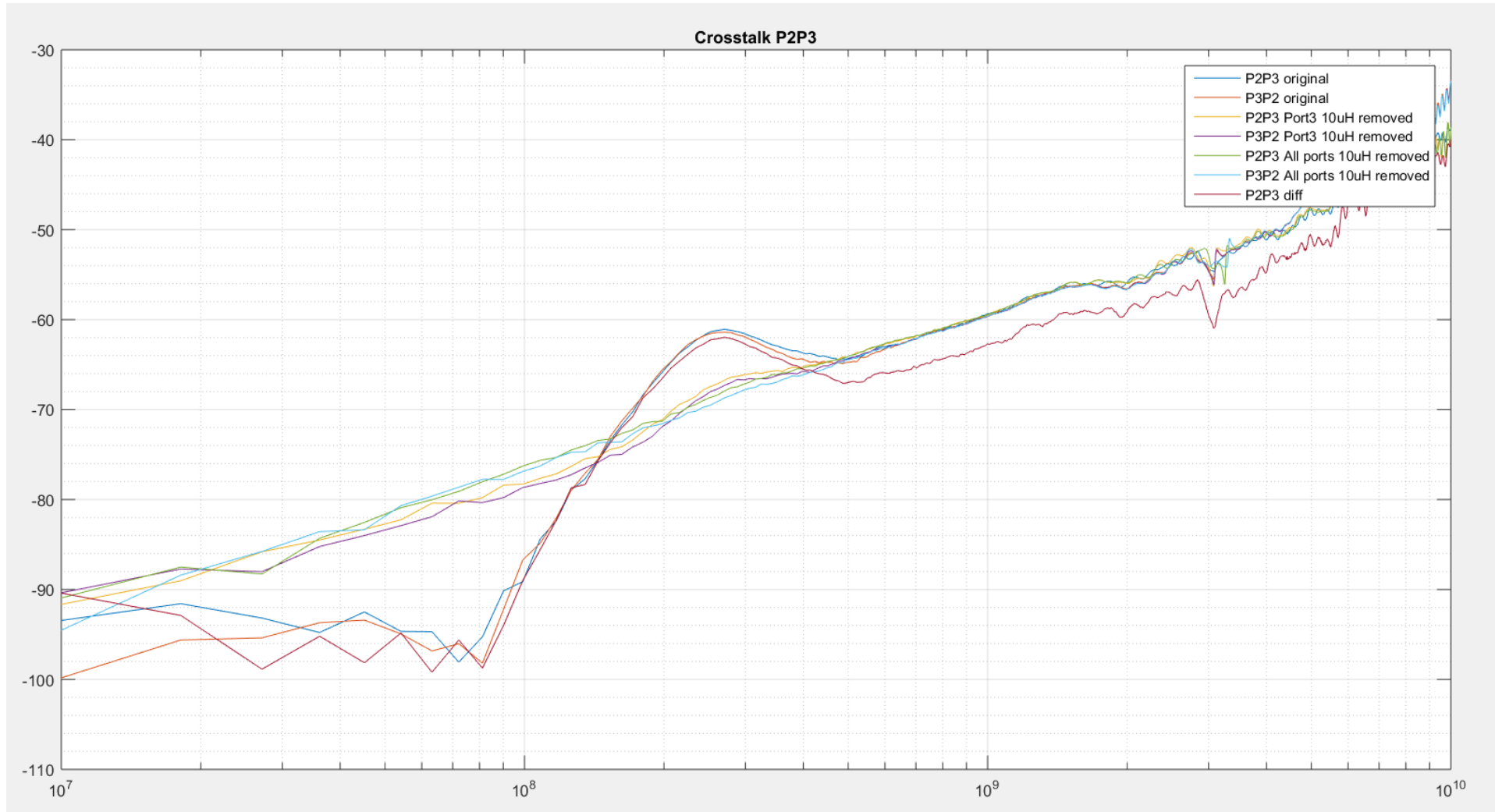
# Port 1 to Port 2 Crosstalk

Port 1 and Port 2 crosstalk with 10uH inductor populated / removed



# Port 2 to Port 3 Crosstalk

Port 2 and Port 3 crosstalk with 10uH inductor populated / removed



# Thank You