# HARWIN

## Test Report Summary

### HT01902

Frequency Testing in accordance with EIA-364-108-2000 (2007) on Datamate (M80 series) L-Tek

# 1. Introduction

## 1.1. Description and Purpose

The Harwin Datamate (M80 Series) connector is manufactured to the requirements of BS9525-F0033. The following tests were carried out in accordance with EIA-364-108-2000(2007) to determine:

- Impedance
- Reflection coefficient
- Return loss
- Voltage Standing Wave Ratio measured in the frequency domain from 50MHz to 1GHz to determine the differential impedance
- Insertion loss between 50MHz and 2GHz

## 1.2. Conclusion

The following data has been collated from Harwin test report 200. Results are representative of the Datamate range. These results show a very good frequency performance for a board-mounted connector, and are very close to meeting the requirements of USB2.0.

# 2. Test Method, Requirements and Results

## 2.1. List of Test Samples

- M80-8671005 – male L-Tek Latched PC-Tail connector
- M80-8871005 – female L-Tek PC-Tail connector

## 2.2. Test Method and Results

Methodology: Measurements were carried out in the frequency domain from 50MHz to 1GHz with the analyzer configured as 1% smoothing, 16 averages, 201 measurement points. The open and short method was used to determine the impedance characteristics with Reflection co-efficient, return loss and VSWR calculated against the USB 90 ohm requirements.

### 2.2.1. Impedance
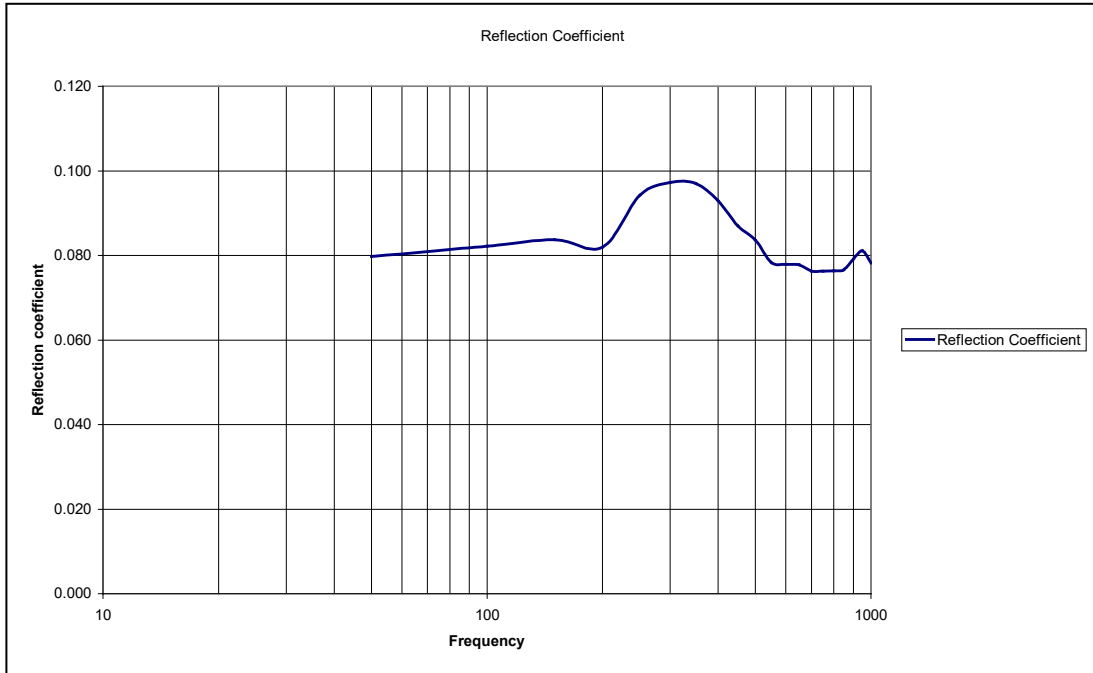
5 mating pairs, open and short method:
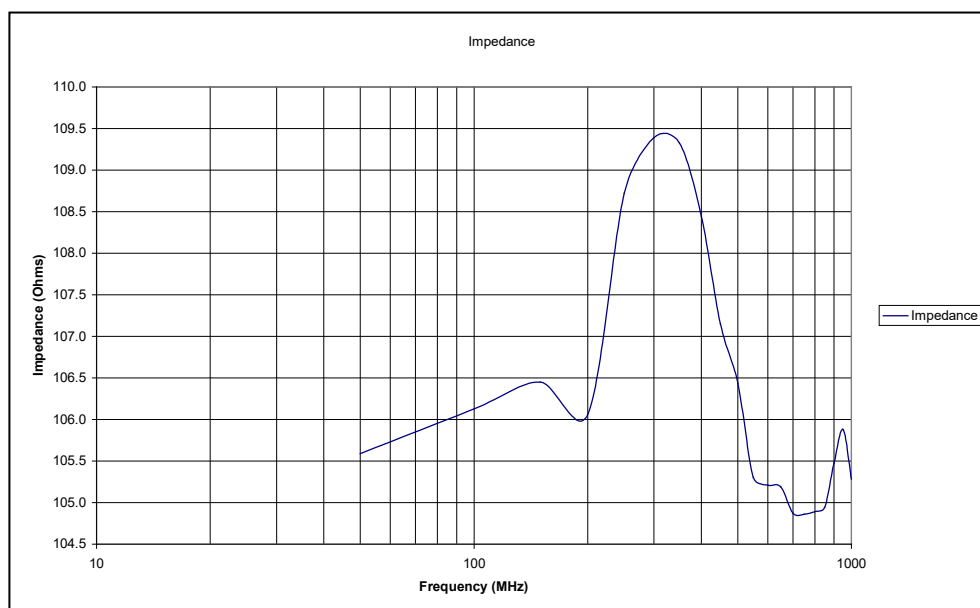
### 2.2.2. Reflection Coefficient

5 mating pairs. The reflection coefficient is stated against a predetermined reference impedance, 90 ohms has been used as required by the USB standard.

This is calculated as $\dfrac{Z_l - Z_o}{Z_l + Z_o}$



### 2.2.3. Return Loss

5 mating pairs. Return loss is calculated by $20\log(abs(\Gamma))$ where $\Gamma$ is the reflection coefficient. These results have been calculated against the USB 90 ohm requirements.
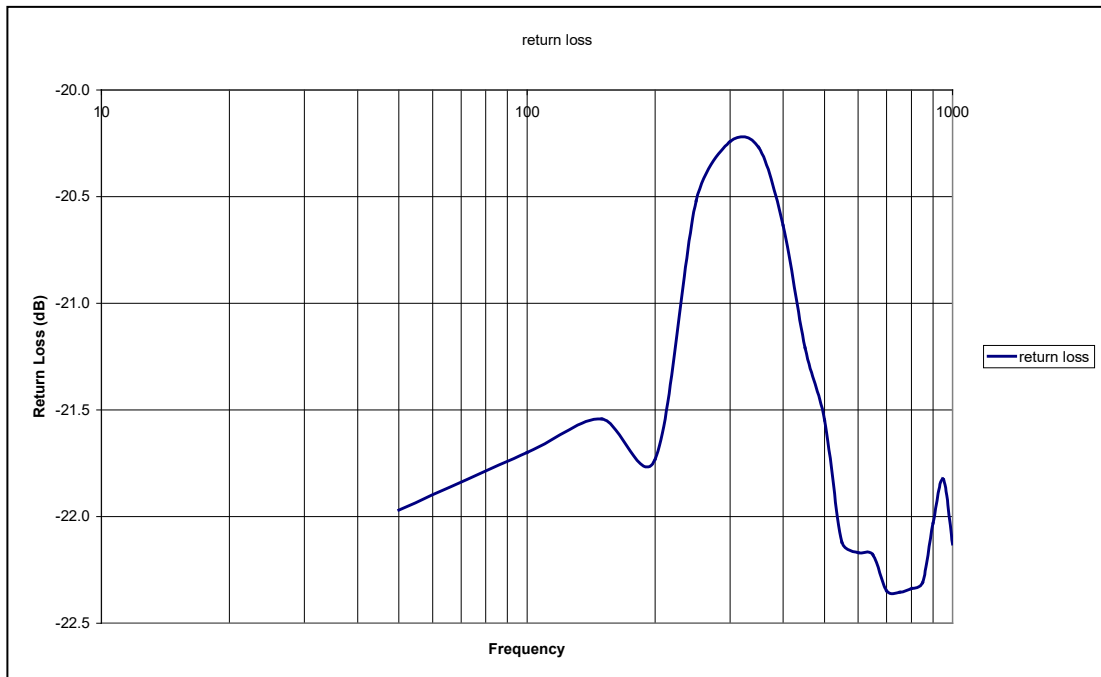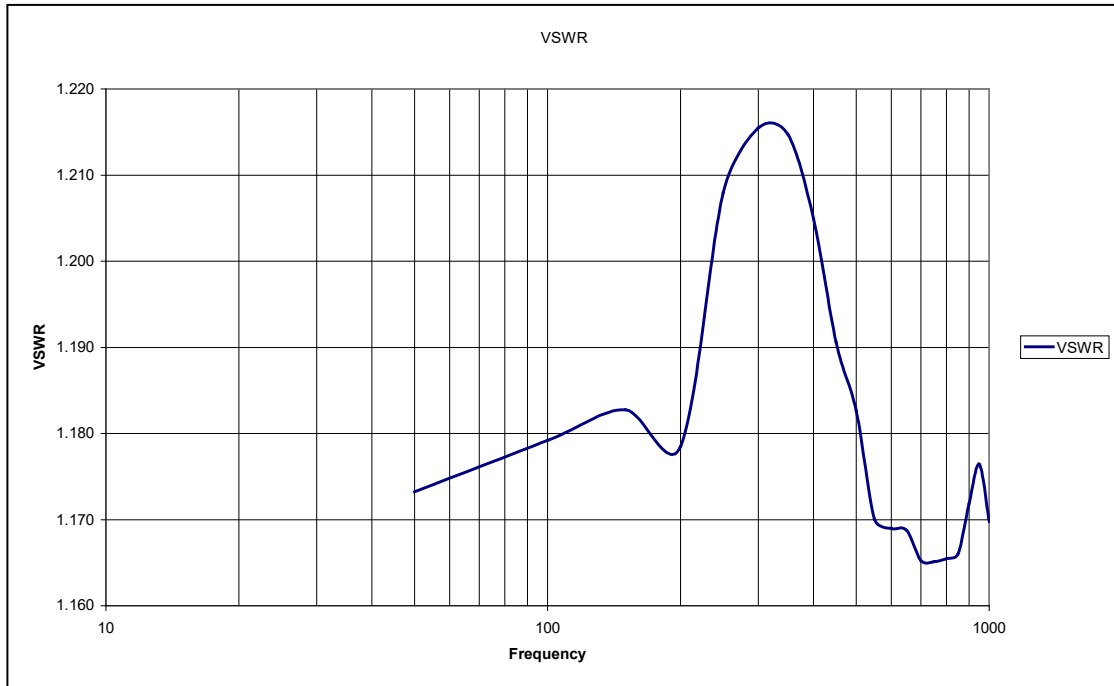
### 2.2.4. Voltage Standing Wave Ratio – VSWR

5 mating pairs. The VSWR has been calculated against the USB 90 ohm requirements.

The VSWR is given by $\dfrac{(1+(abs(\Gamma))}{(1-(abs(\Gamma))}$



### 2.2.5. Insertion Loss

Methodology: Measurements were carried out in the frequency domain from 50MHz to 2GHz with the analyzer configured as 1% smoothing, 16 averages and 201 measurement points.

Result: The measured -3dB point of the connector was between 1750 and 1800MHz.