Clear & Clean Display Graphics

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SGC vs. Discrete TP: Provide a 2.7Gb/s Data Transfer Performance Comparison between Discrete Twisted Pair #34 Wire Construction and SGC40 50 ohm Impedance Controlled Coaxial Optimum construction as used in a typical notebook display application.

I-PEX Experience

Performance Parameters:

- **Construction Comparison: All SGC vs. Discrete T.P.**
  - **Process/ Mechanical Integrity**
- **Impedance Control (Tr = 130pS 20/80)**
- **Eye Pattern (Time Domain)**
- **Frequency Domain Scattering Parameters**
  - **Insertion Loss and Return Loss**
  - **FEXT**
- **EMI**

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I-PEX EXPERIENCE

1995

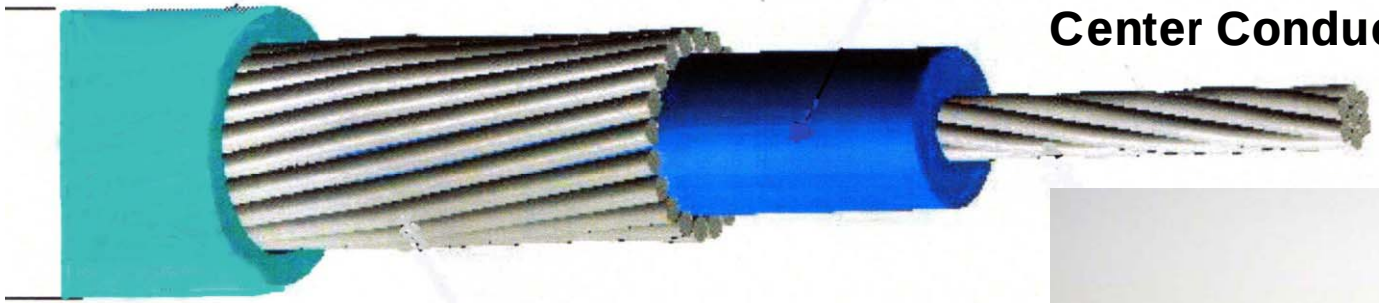
SGC Connector
CABLINE I

I-PEX® by DAI-ICHI SEIKO

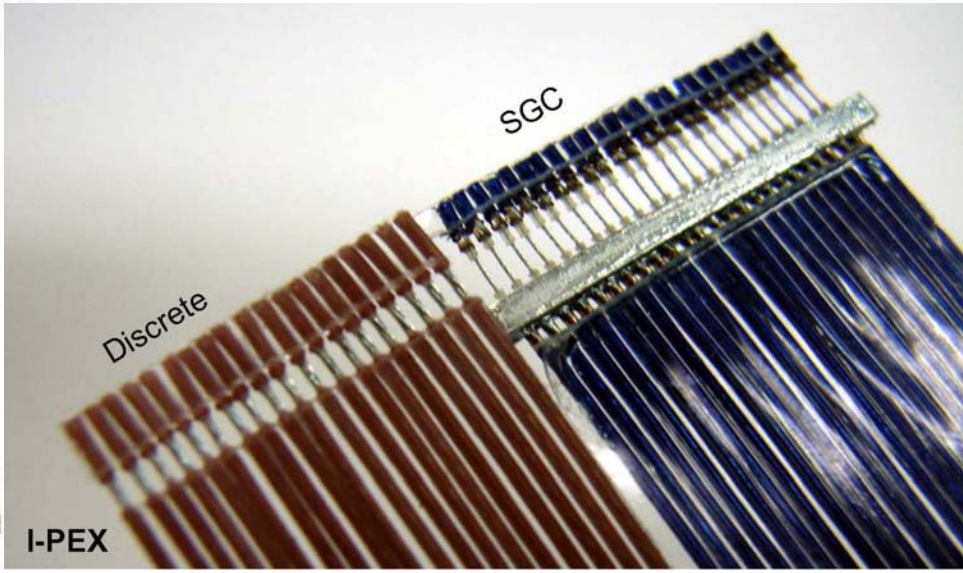
Construction : SMALL GAUGE COAXIAL WIRE (SGC) vs. Discrete Wire

Outer Insulation Braid (Shield) Inner Insulation

Center Conductor



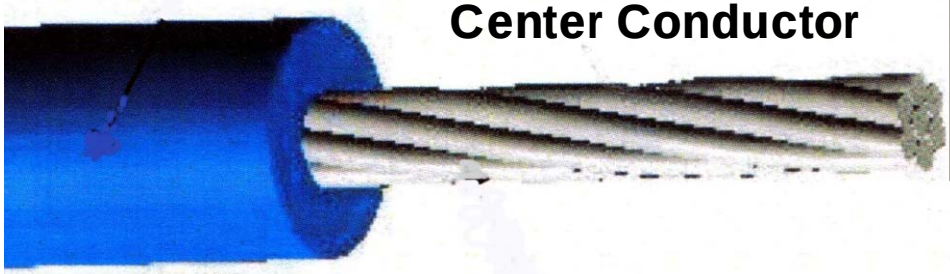
VERSES



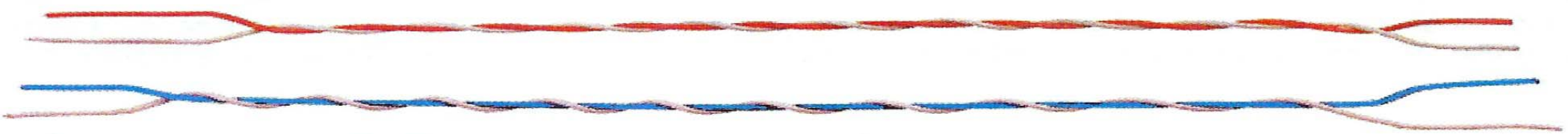
Discrete Twisted Pair

Insulation Jacket

Center Conductor



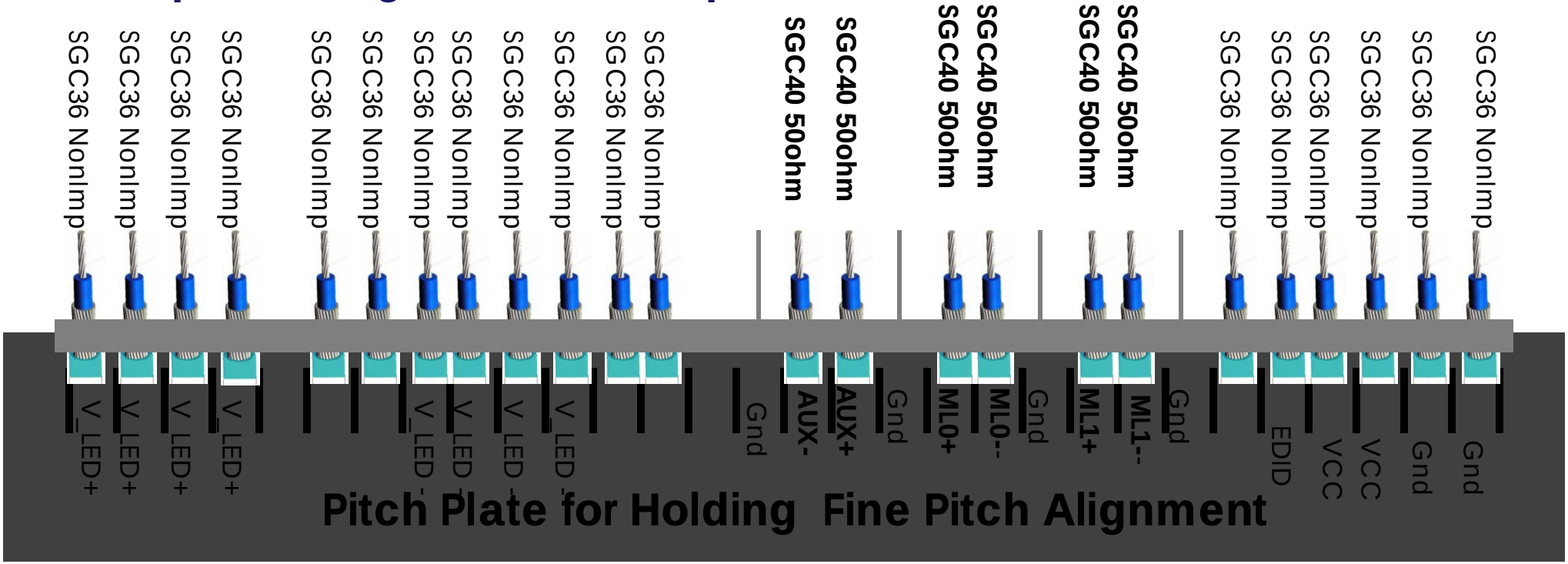
Twisted Pair Creates Common Mode Rejection for a 50 ohm transmission Line which performs well for slower LVDS Signals (0.6~0.9Gb/s) but may have some performance issues at 2.7 Gb/s and higher…



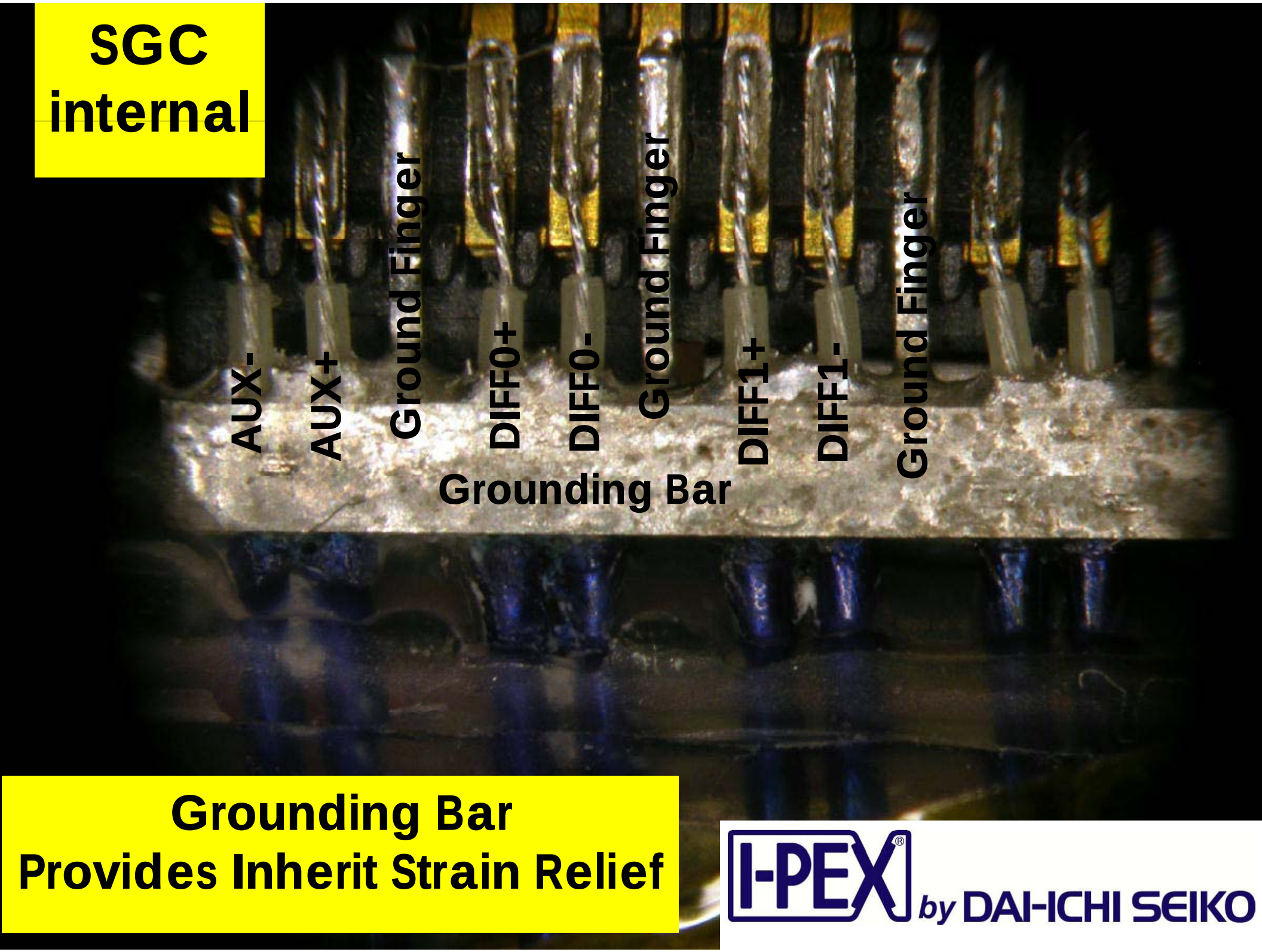
All Small Gauge Coaxial Construction Process

1. Cut each SGC wire to exact length.
2. Attach and Fix Each Wire with Laminate to the Pitch plate.
3. Score outer insulation batch with CO2 Laser and Remove it.
4. Dip the exposed braid shield into Tin for coating
5. Solder the Grounding Bar onto all the braids
6. Score the metal braid batch with YAG Laser and Remove it.
7. Score the inner insulation batch with CO2 Laser and Remove it.
8. Dip the exposed center conductor into Tin for coating

SGC 36 Non-impedance controlled wire can safely carry approximately 0.3Amps at 50degC Ambient Temperature



SGC
internal



Grounding Bar
Provides Inherit Strain Relief

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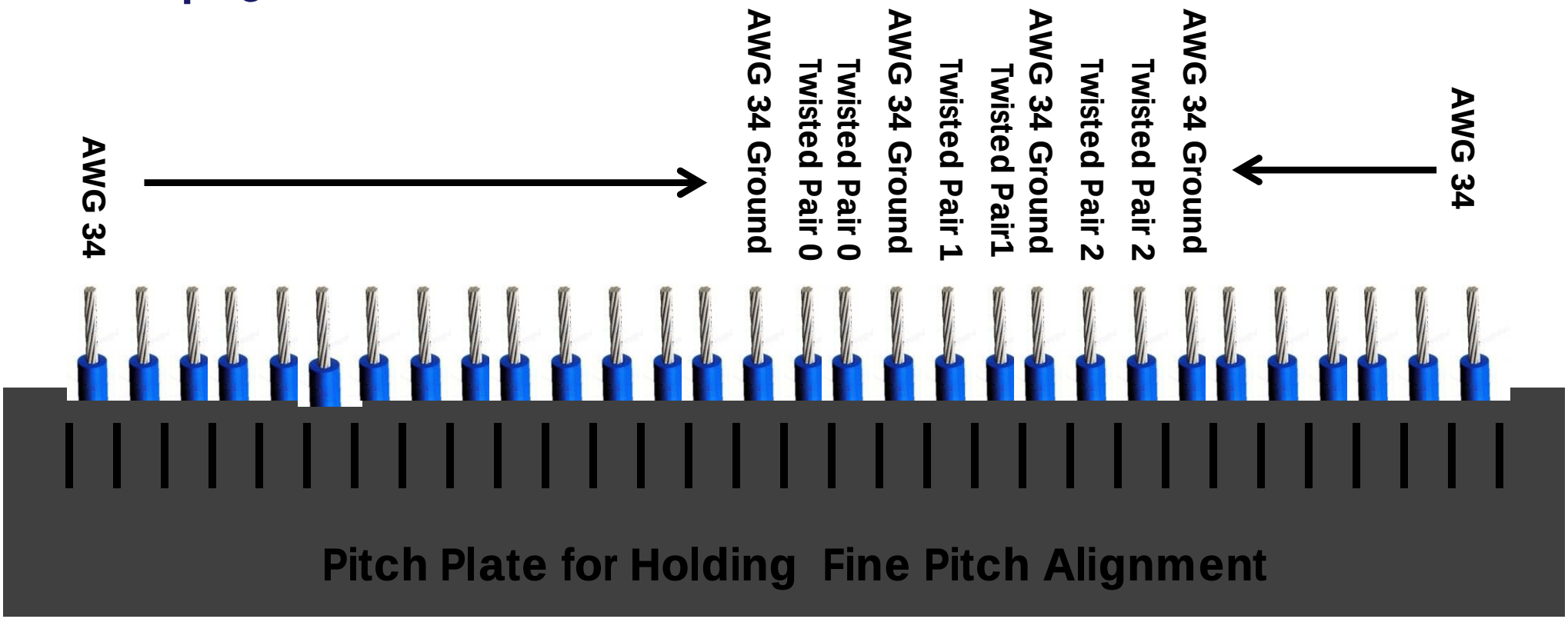
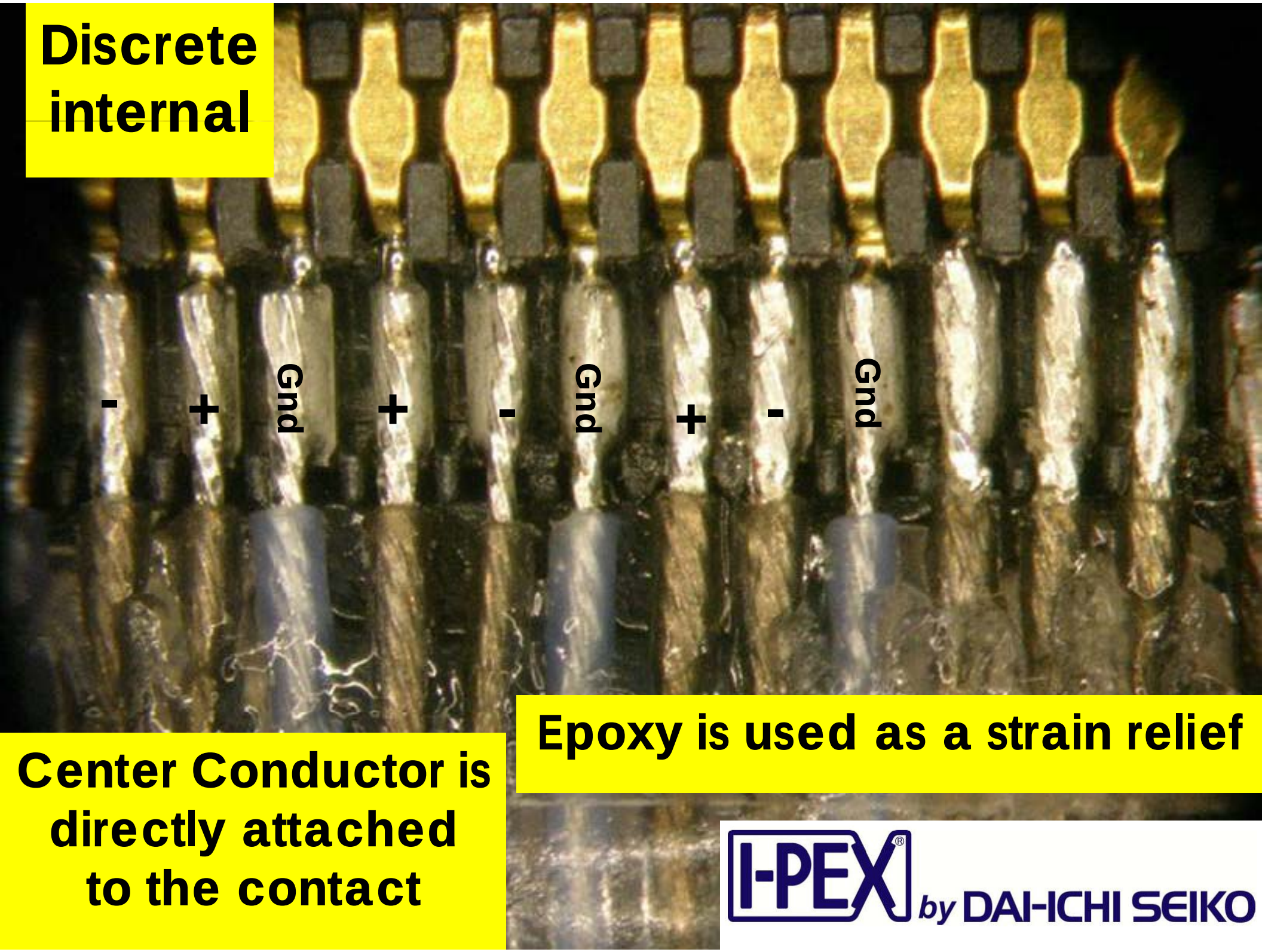
Discrete Wire Construction Process

1. Cut each Discrete wire to exact length.
2. Attach and Fix Each Wire with Laminate to the Pitch plate.
3. Score outer insulation batch with CO2 Laser and Remove it.
4. Dip the exposed center conductor into Tin for coating

AWG#34 discrete wire can safely carry approximately 0.385 Amps at 50degC Ambient Temperature . AWG#32 can safely carry approx. 0.45Amps @ 50C.




Discrete internal
- + Gnd + - Gnd + - Gnd
Epoxy is used as a strain relief
Center Conductor is directly attached to the contact
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Performance

- Impedance
- Eye Pattern
- Frequency Domain “S”
- EMI

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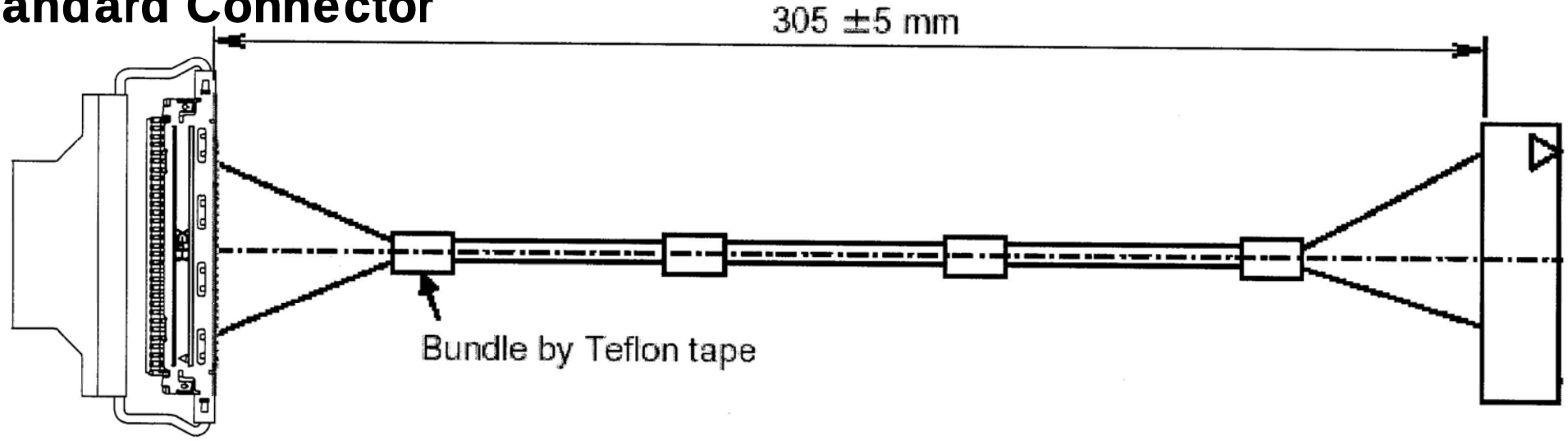
Cable Assembly Under Test
SGC Construction VS.
Discrete Twisted Pair Construction

VESA®
Standard Connector



I-PEX Cab-VS
20453-030T-01
20455-030E-02

I-PEX FPL-II
20437-040T-01
20439-030E-01

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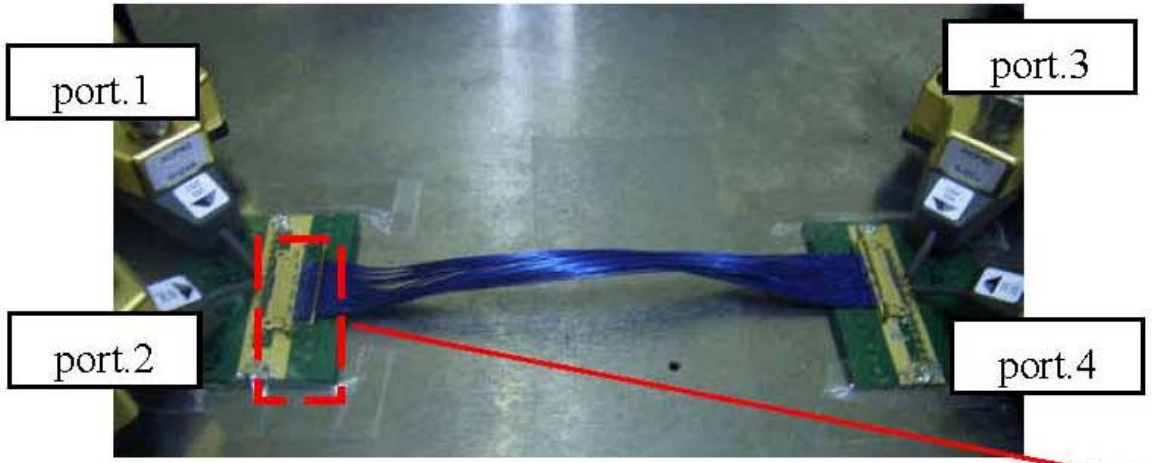
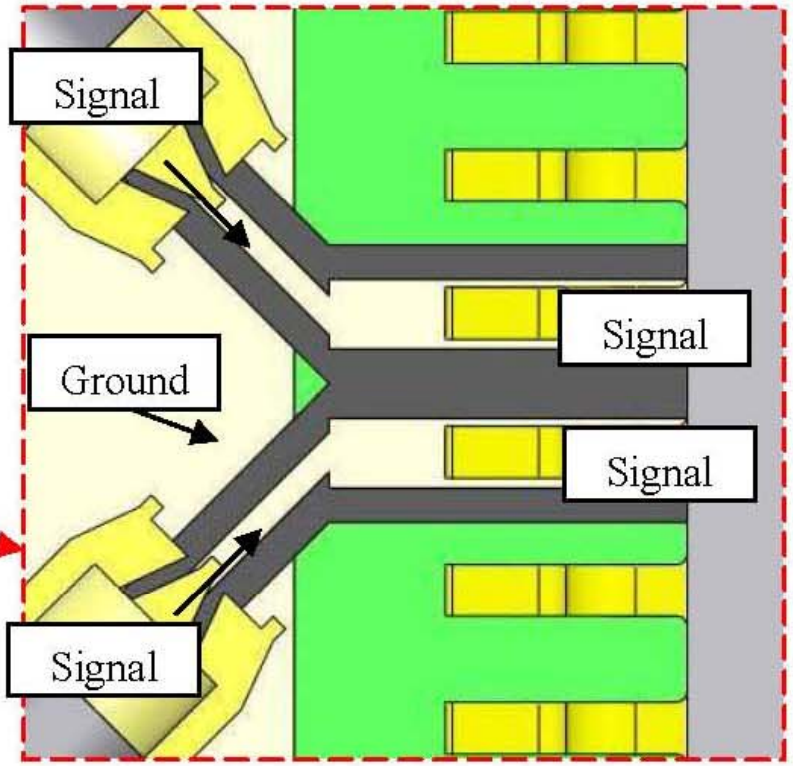
Empirical Probe Testing





Measurement equipment

Oscilloscope	:	Textronix 8000B
Pulse generator	:	Textronix AWG7102
Network Analyzer	:	Agilent technologies N5230A

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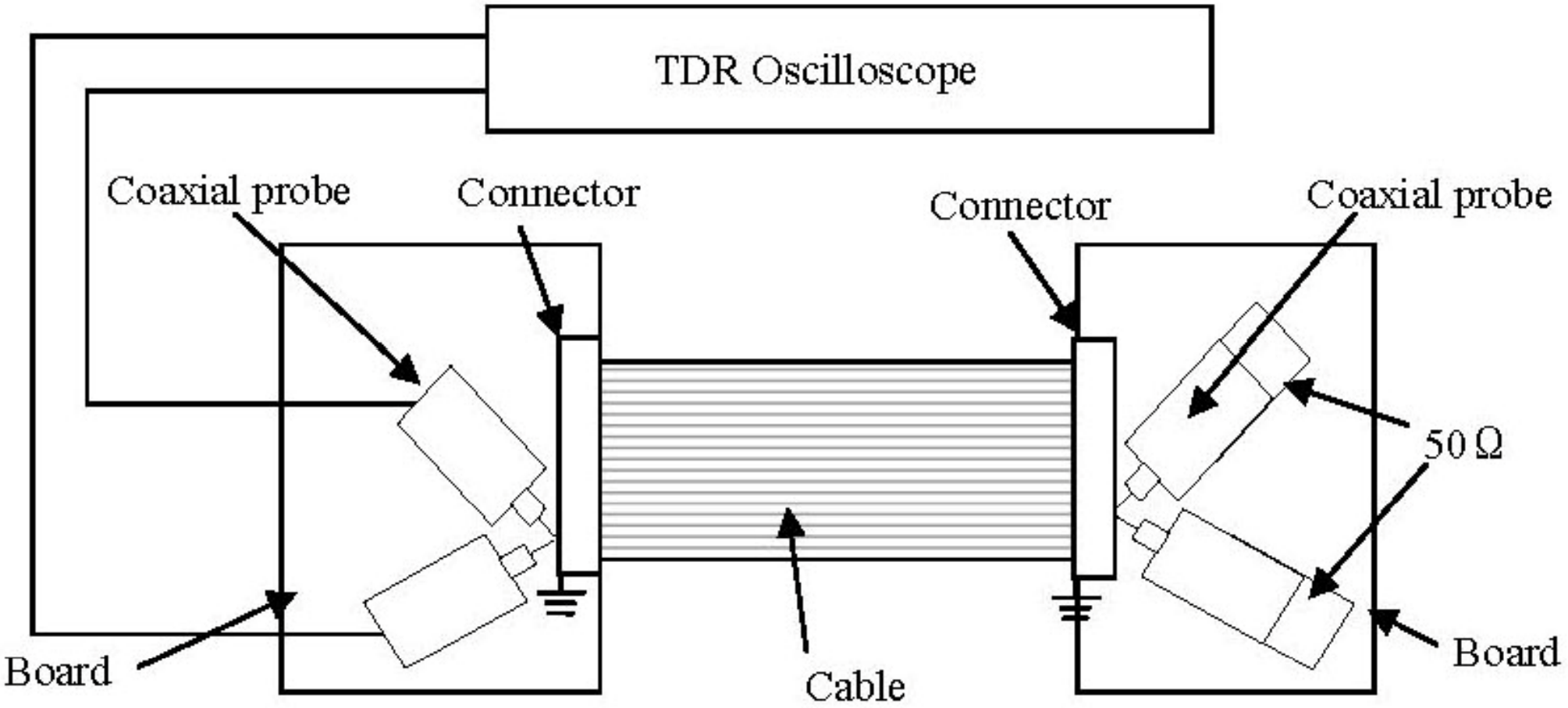
Impedance

Data Rate of 2.7 Gb/s, Tr = 130pS 20%-80%



Characteristic Impedance

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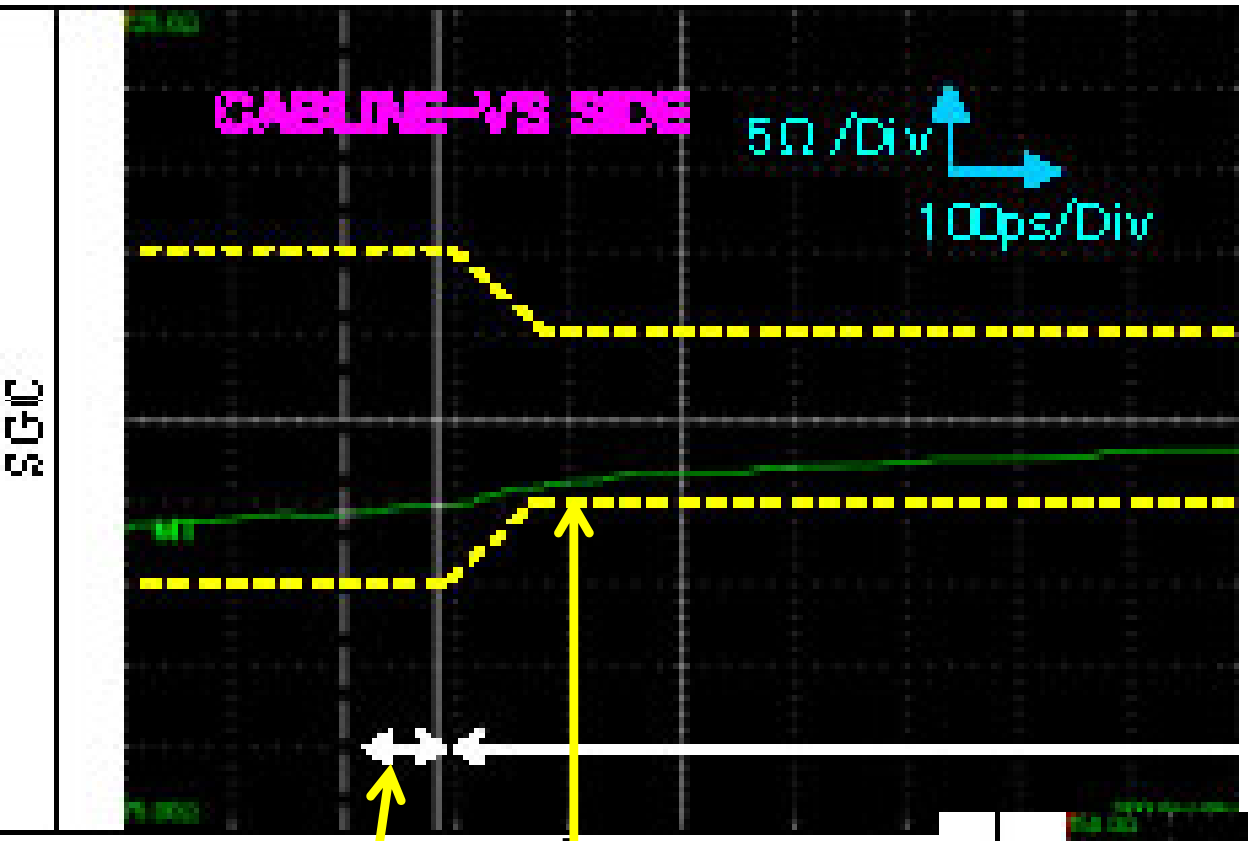
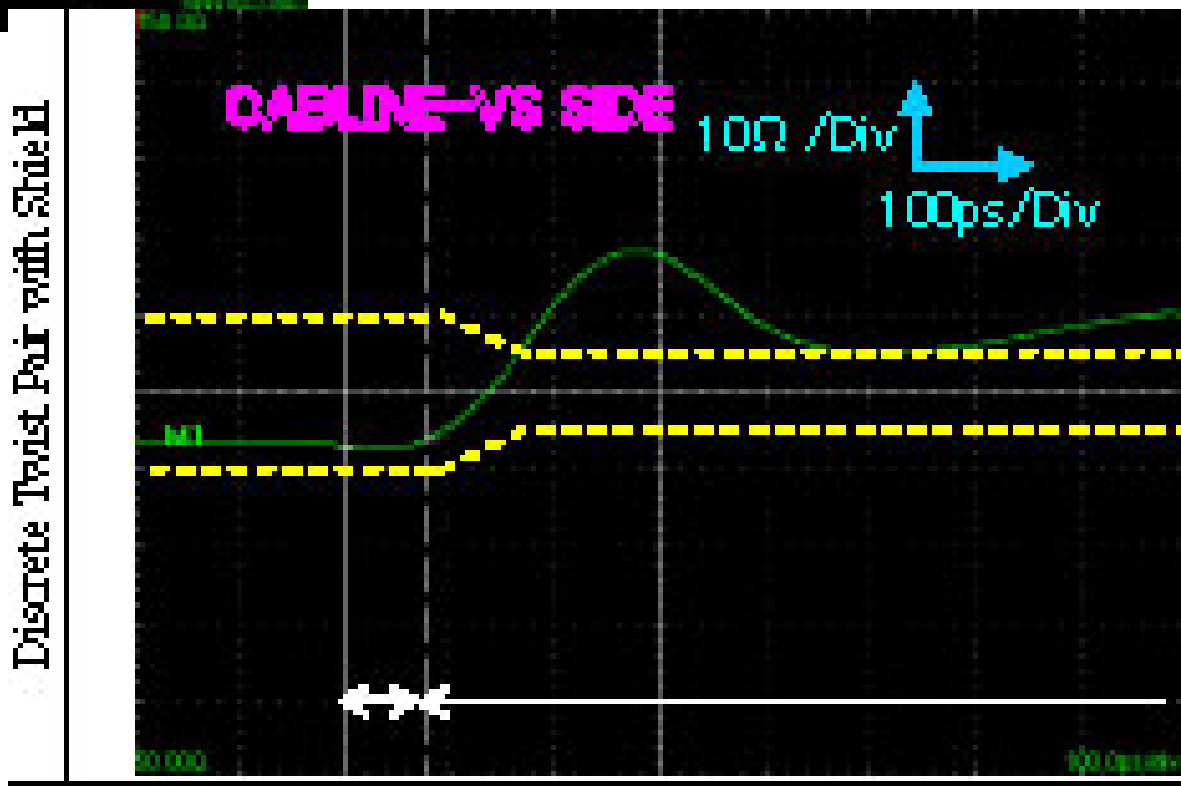
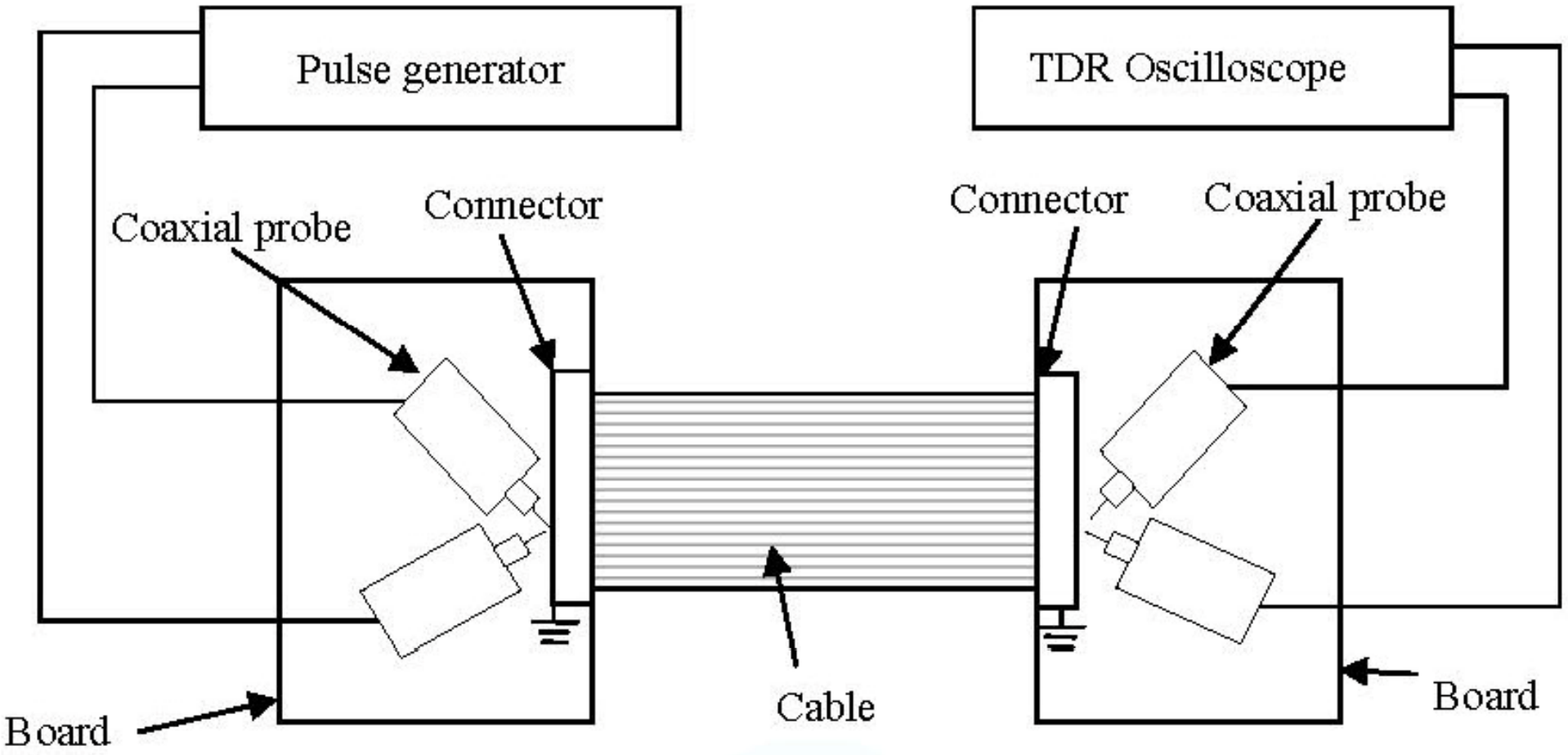


SGC40 has superior Impedance performance at 2.7Gb/s data rate.

Discrete Twisted Pair (shielded) has poor Impedance performance at 2.7Gb/s data rate.

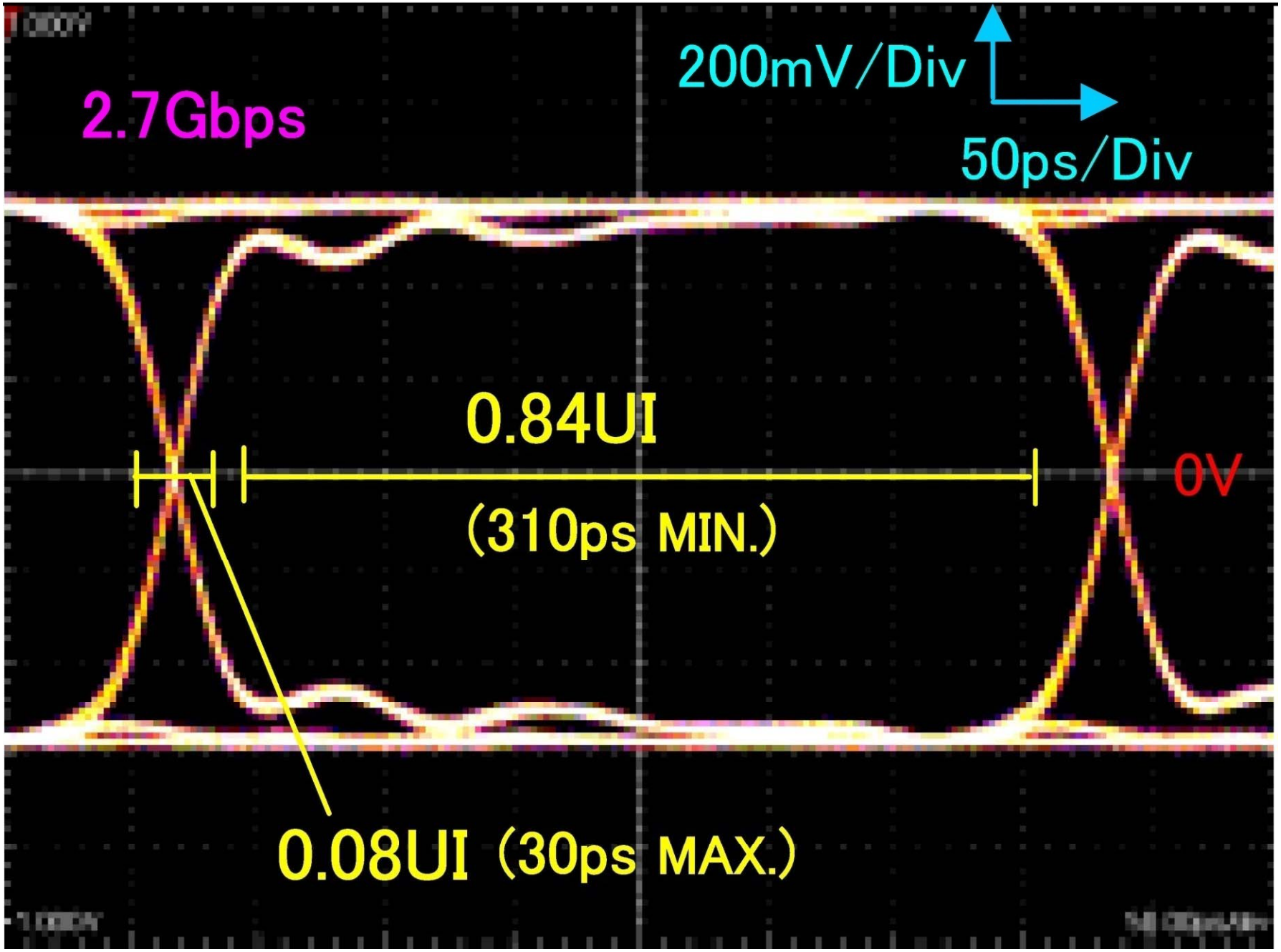


Eye Pattern (Time Domain) Test Setup

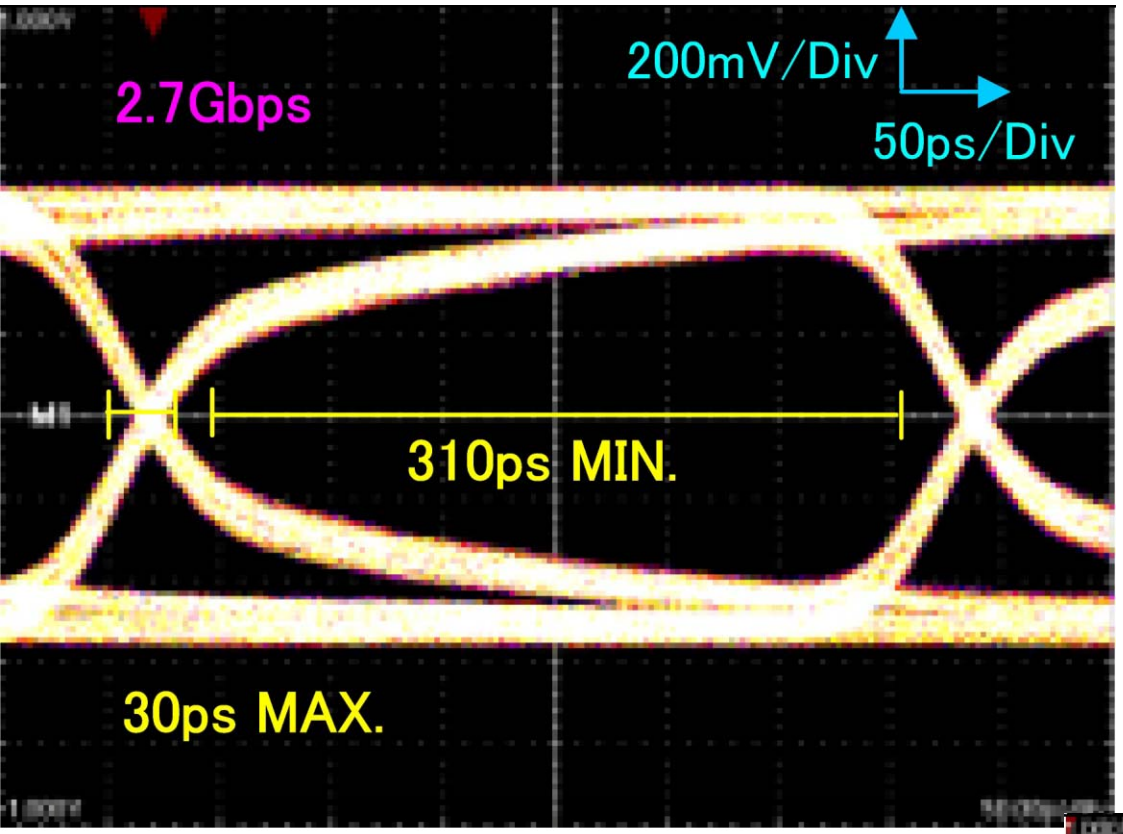


Eye Pattern from the Source (TX)

PRBS 2^{7-1}, BER 10^{-9}

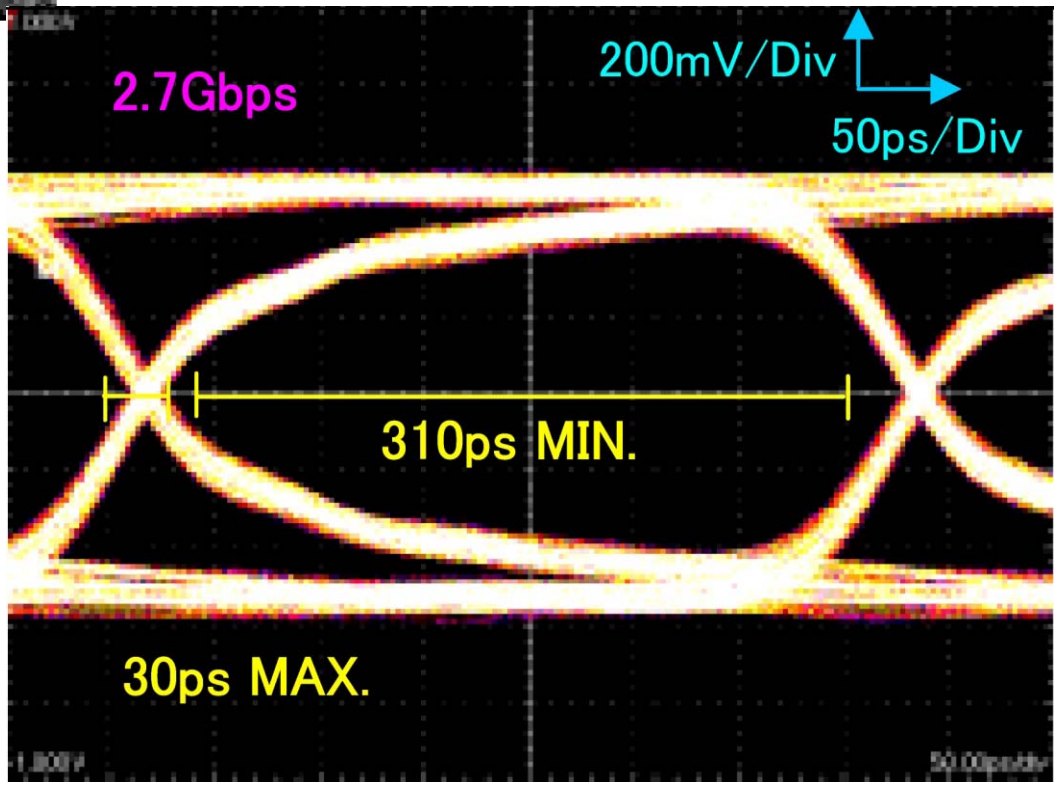


Eye Pattern @ RX



The SGC cable had acceptable results

The Discrete Twisted Pair Shielded cable had acceptable results



FREQUENCY DOMAIN “S” Parameters
10MHz to 10GHz

Insertion Loss
Return Loss
FEXT

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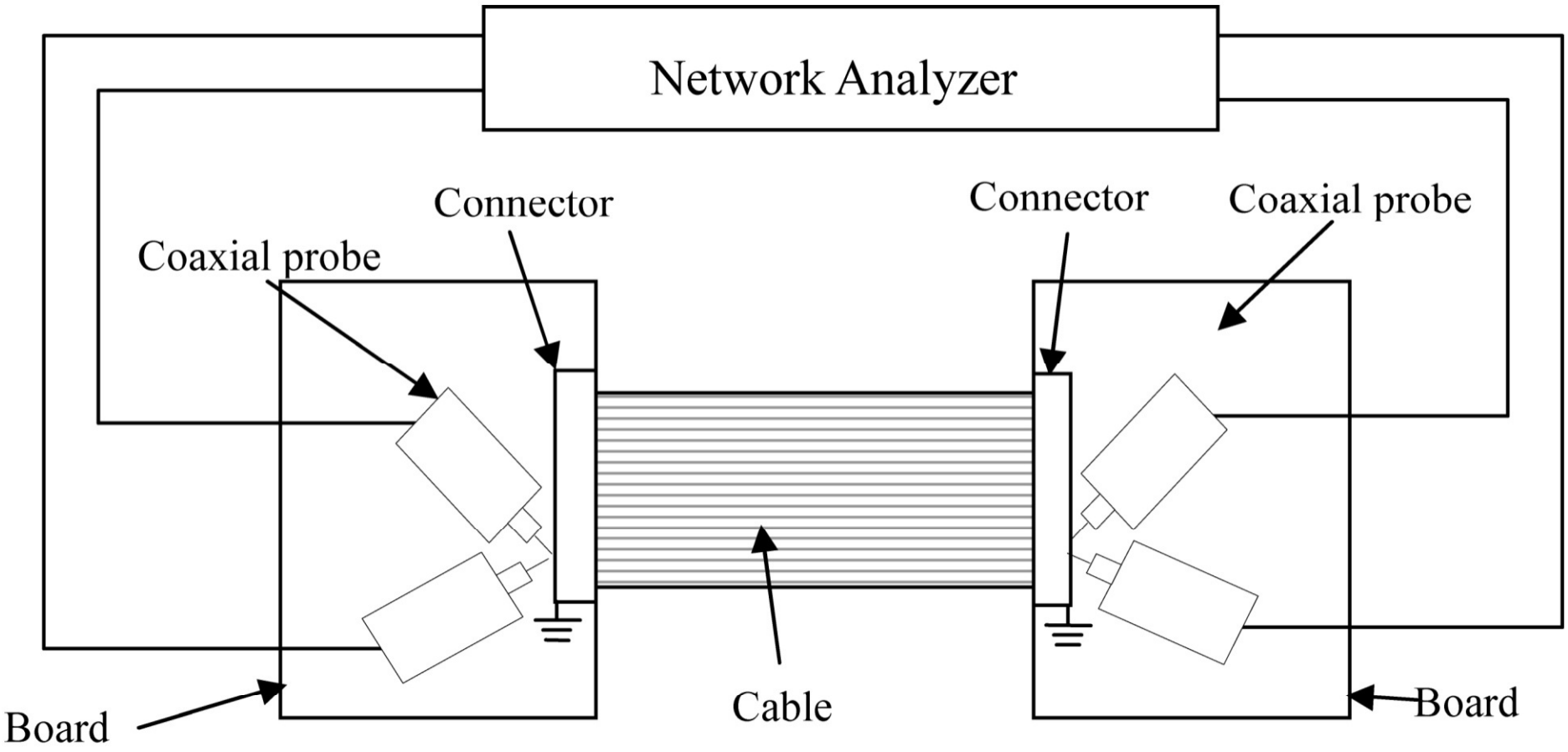
INSERTION and RETURN LOSS TEST SETUP
IL & RL



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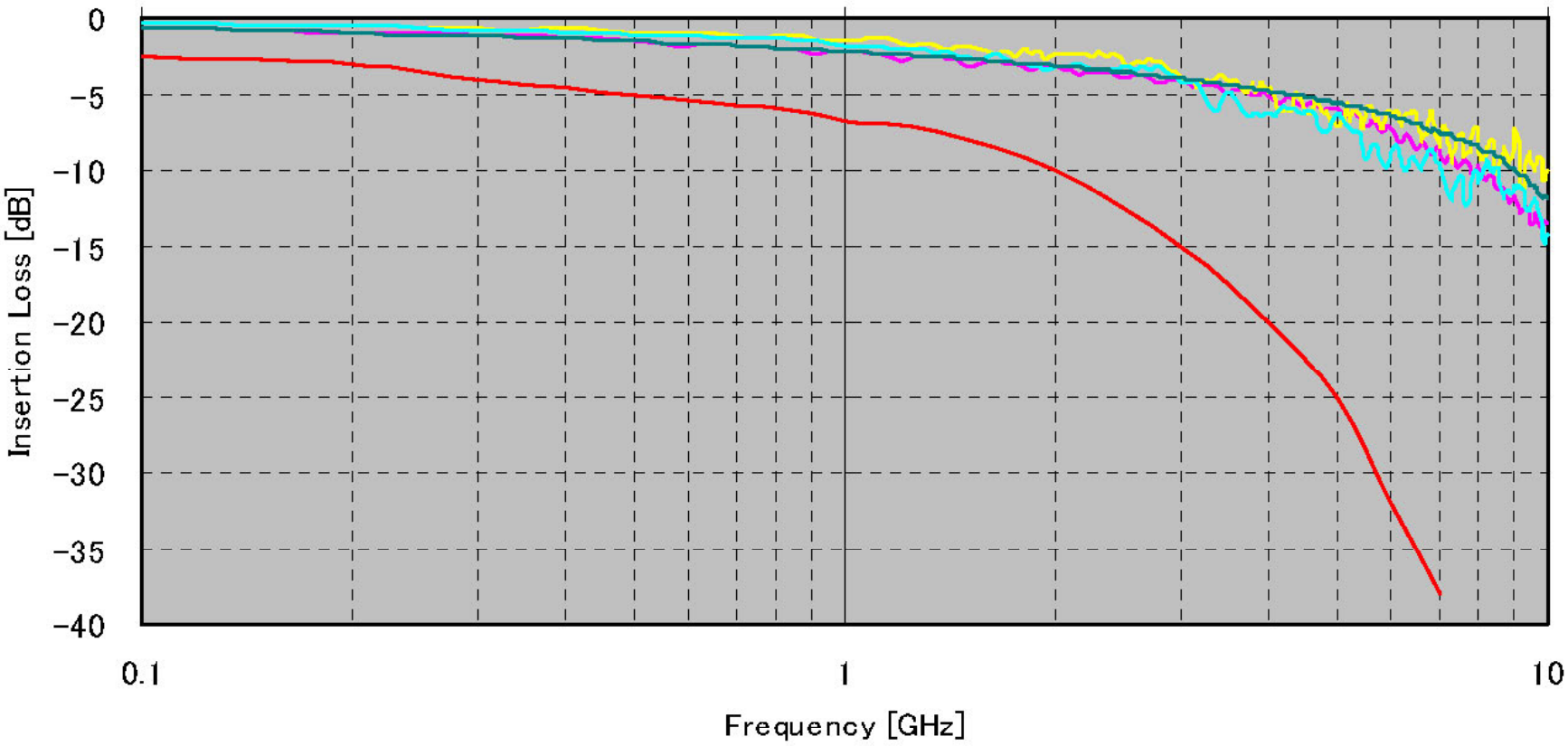
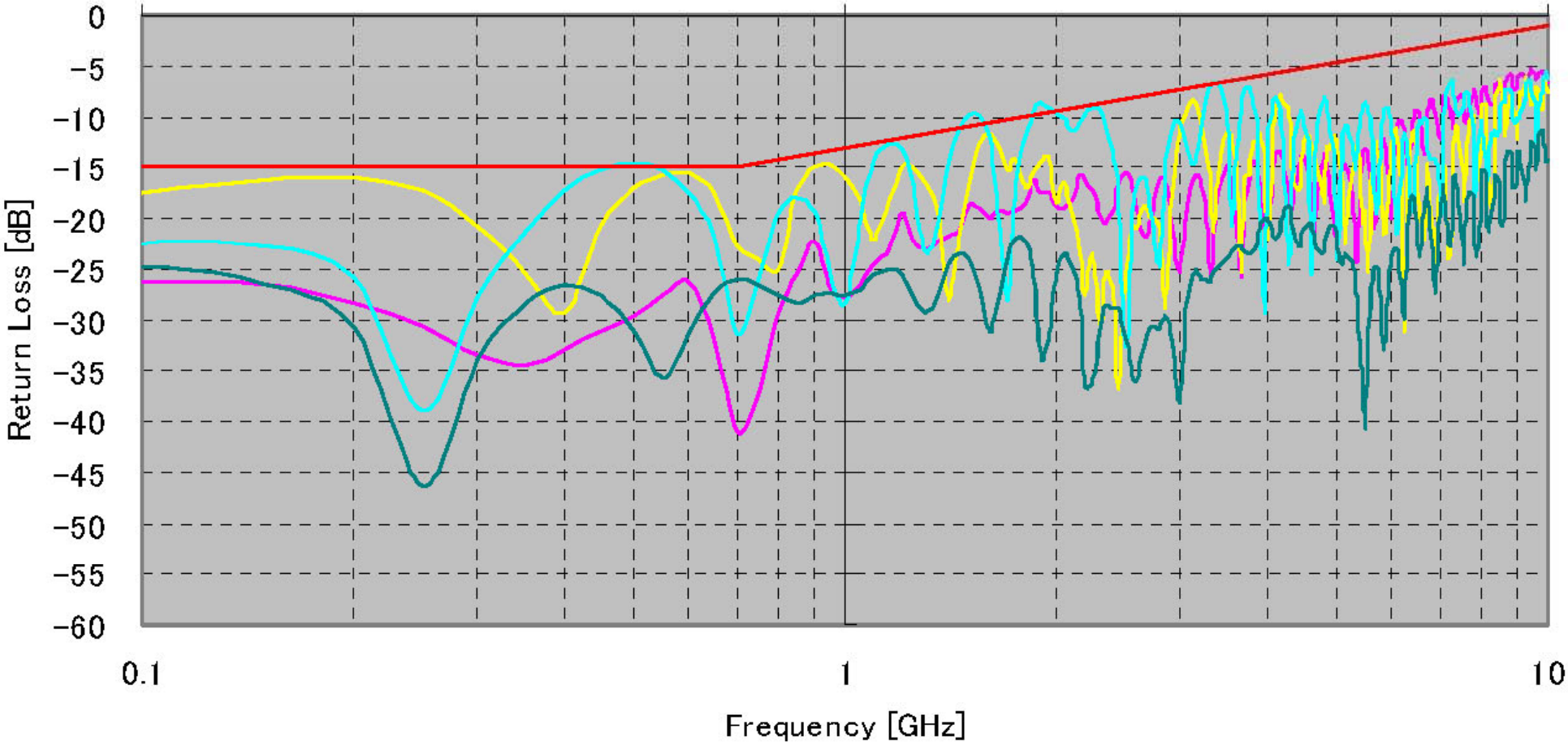
All Cable Results had acceptable IL results



- Sample No. 1 CABLINE-VS / FPL Ⅱ (SGC)
- Sample No. 2 CABLINE-VS / FPL-D (Discrete Twist Pair)
- Sample No. 3 CABLINE-VS / FPL-D (Discrete Twist Pair with Shield)
- Sample No. 4 CABLINE-FX Ⅲ / FPL-D (Twincoax)
- DisplayPort Spec.

Discrete Twisted Pair with Shield Failed DP1.1a RL Limit



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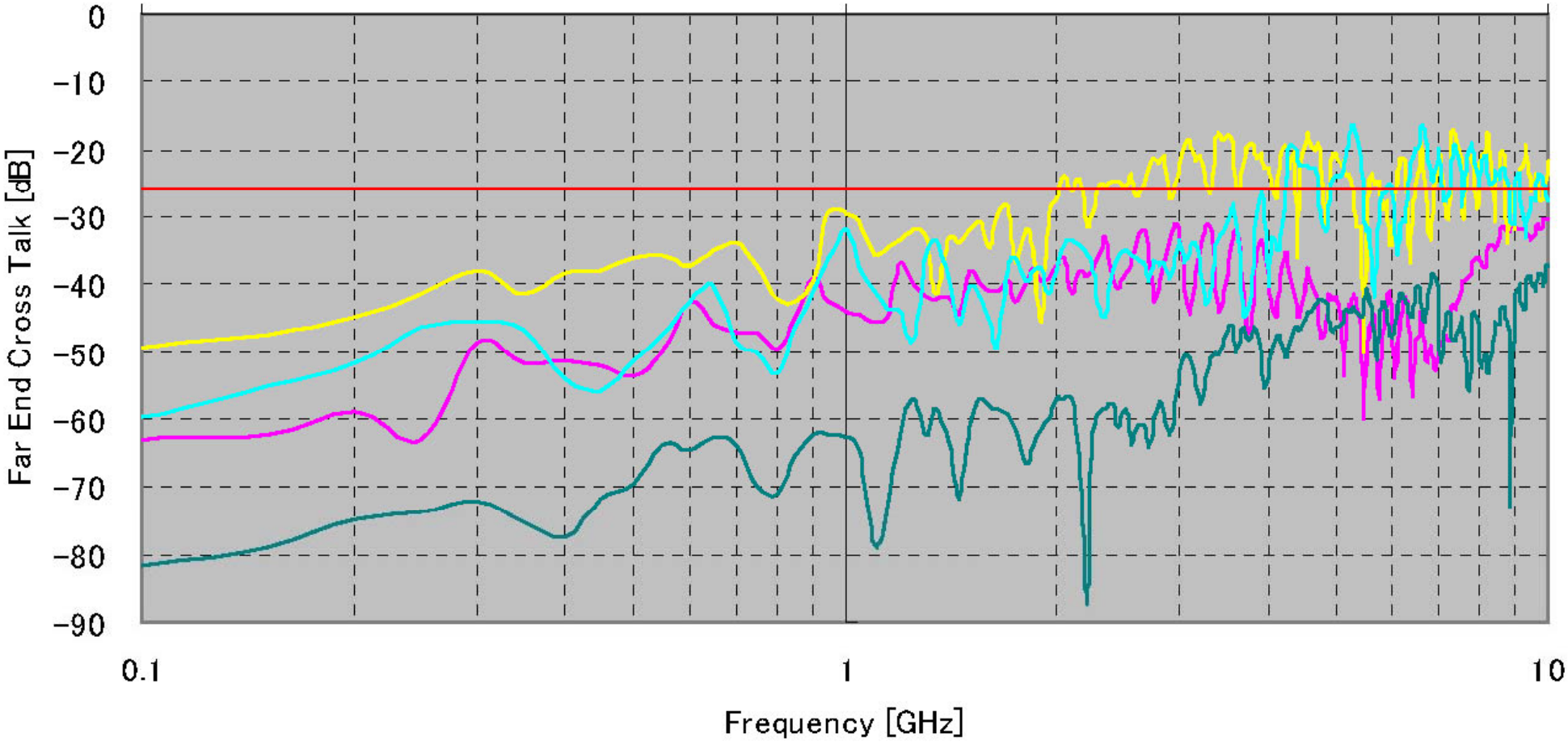
- DisplayPort Spec.

Both Discrete Wire Cables Fail DP1.1a FEXT Limits



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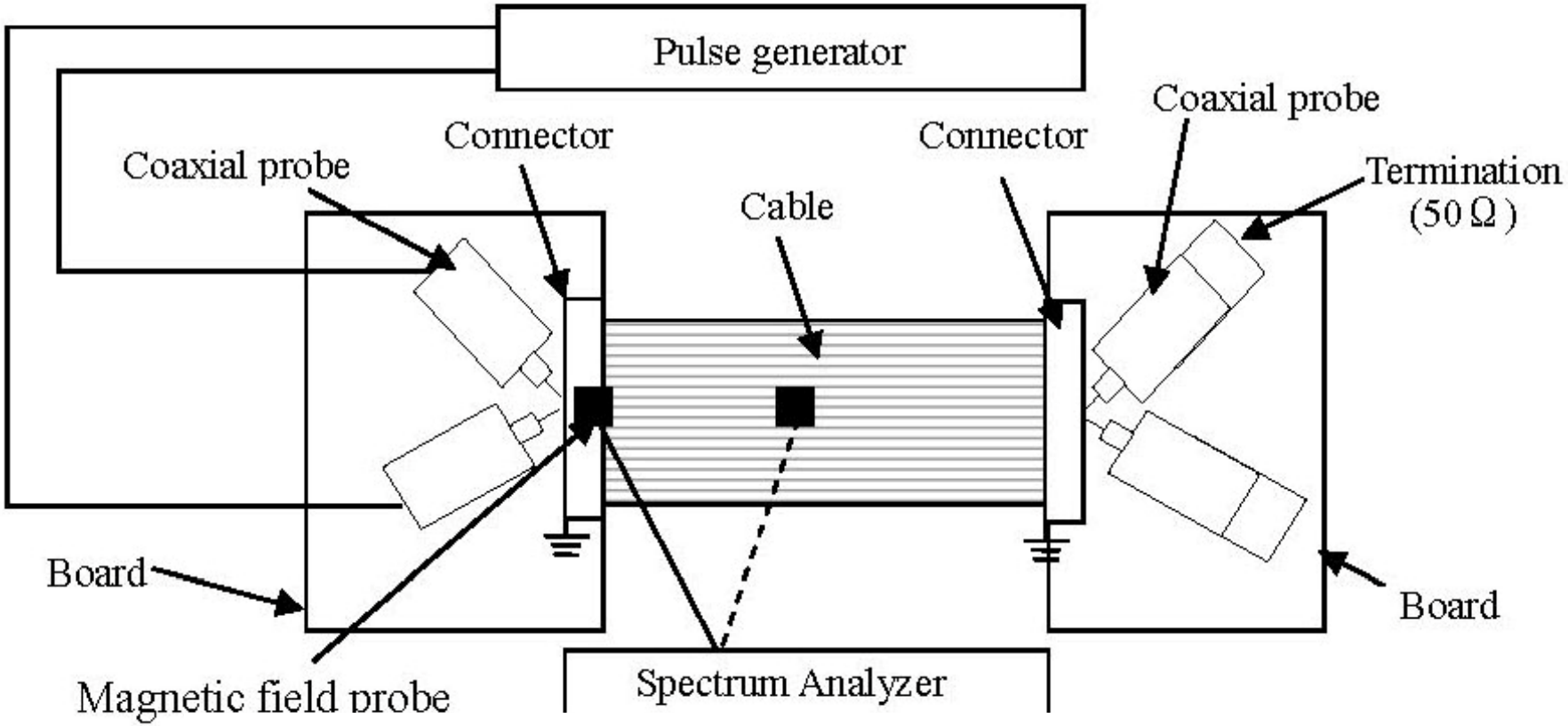
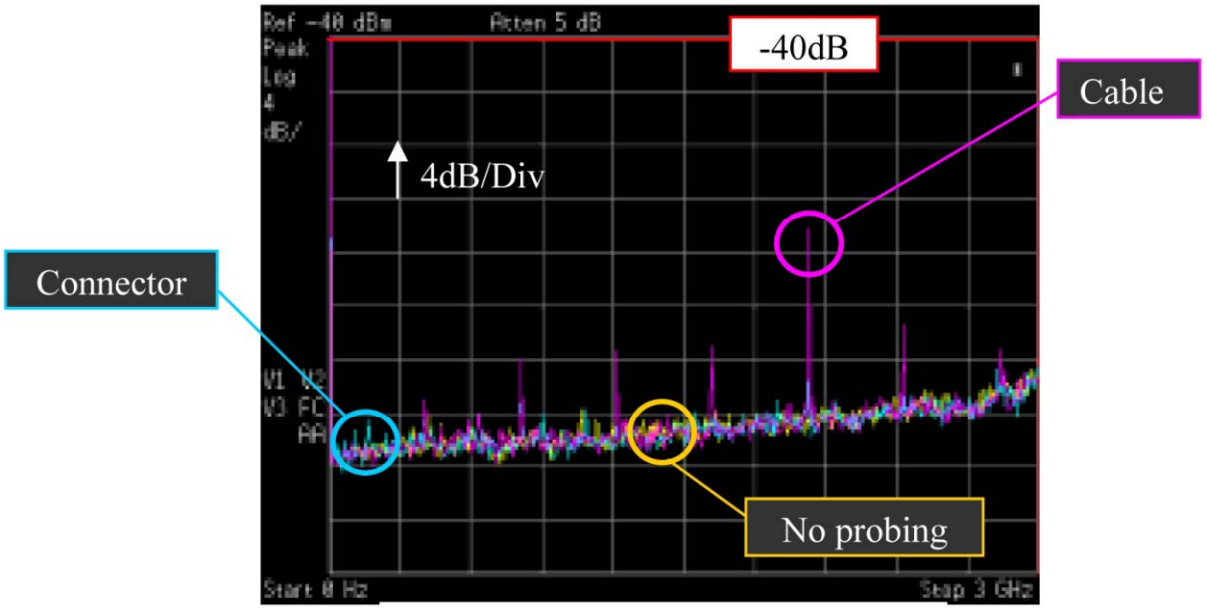
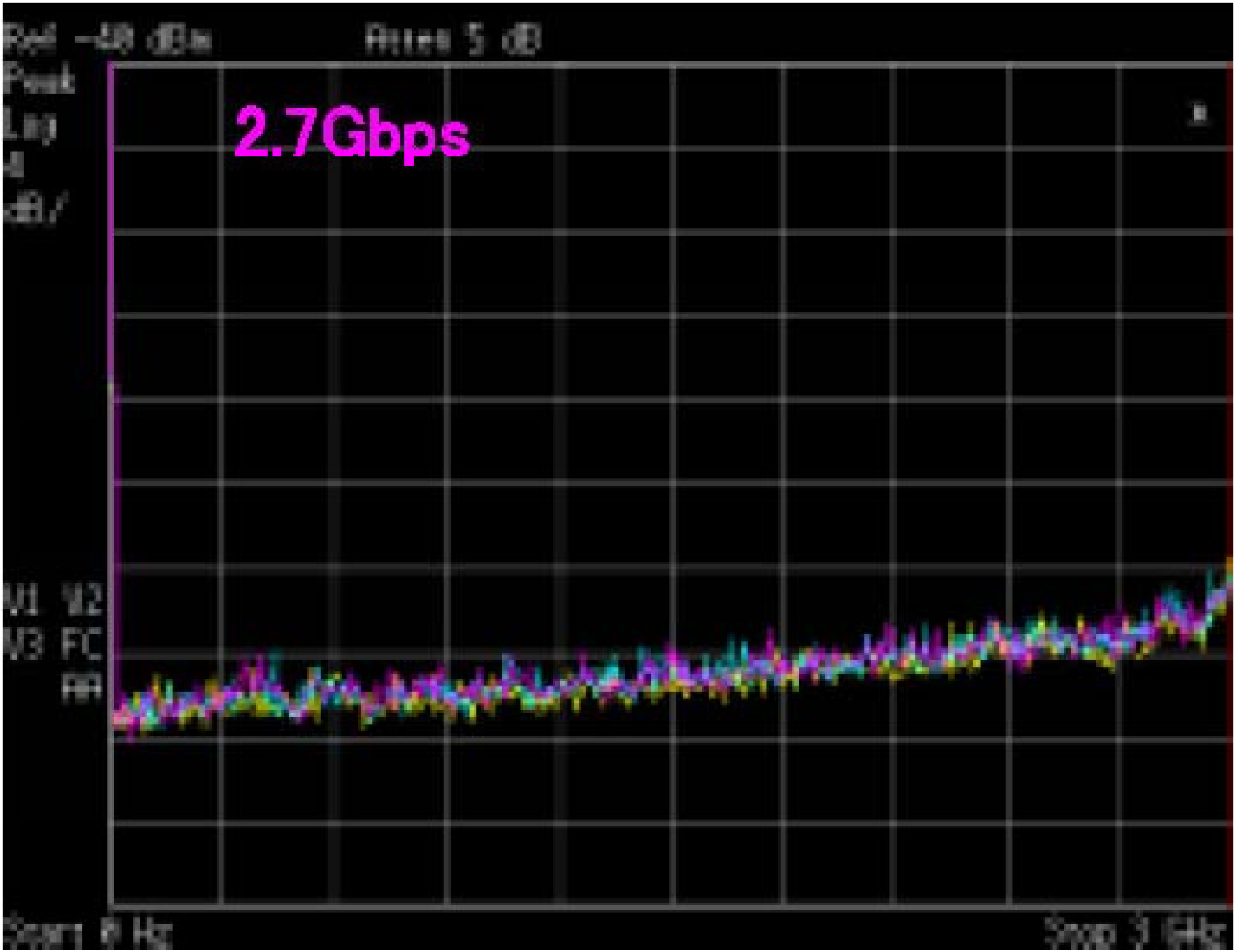
- DisplayPort Spec.

EMI Test Setup

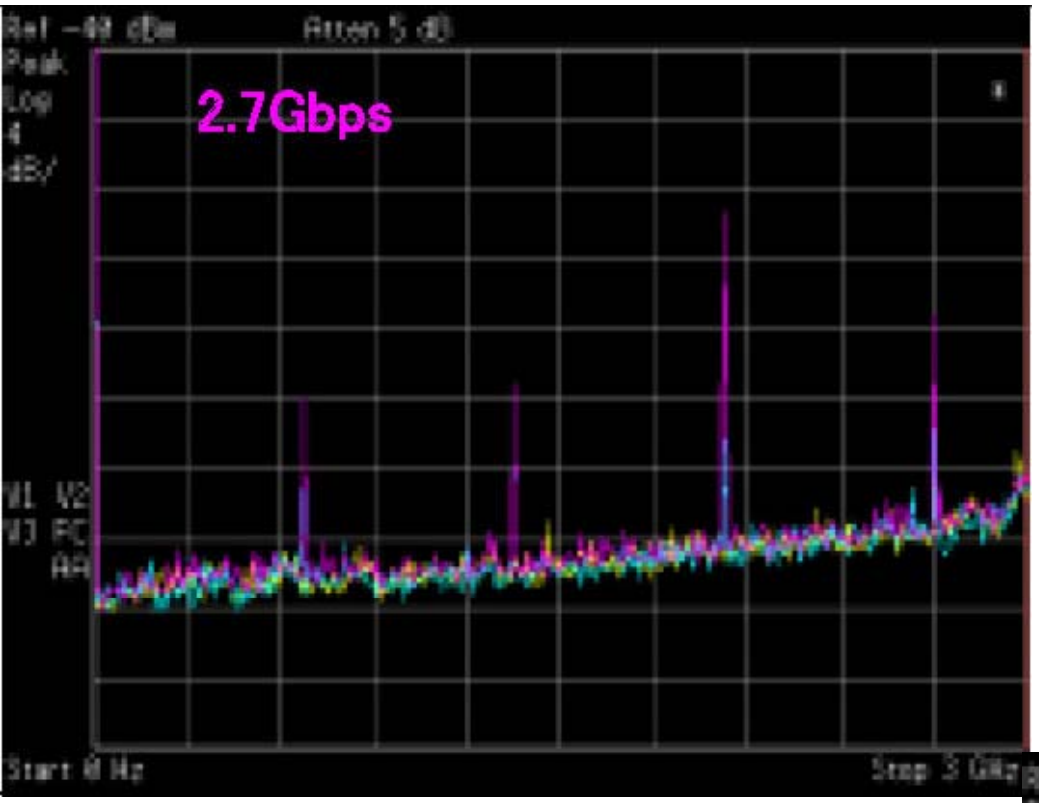




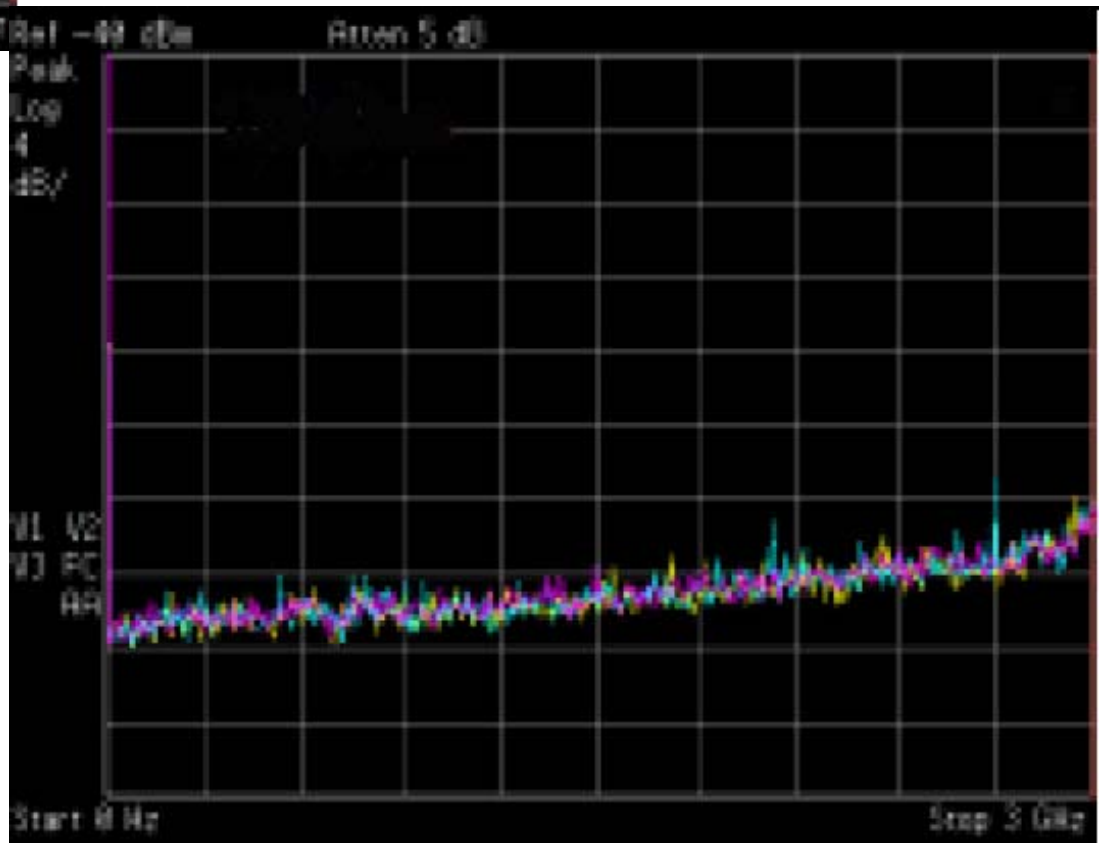
The SGC cable had acceptable EMI Performance



EMI Test Results at 2.7Gb/s



The Discrete Twisted without a shield had many leaks



The Discrete Twisted with a Shield had acceptable results

WHY use Small Gauge Coaxial Wire?

Cable Assembly using SGC **Cable Assembly without SGC**

Clear and Clean Appearance

THANK YOU