

ML1105 DAC Testing Solution

High-Throughput Automated Testing with ML4035

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Summary

In today's extremely competitive and fast-paced industry, time is the most expensive form of currency. Every second saved is a step ahead of the competition. This is what MultiLane is all about; with our high performance, automated and throughput optimized solutions, MultiLane completely redefines the status quo of large-scale production testing. The state-of-the-art solutions we provide are fully automated and engineered for the sole purpose of providing our customers with accurate and reliable measurements while also saving them valuable time.

MultiLane's ML4035 is a 3-in-1 400G BERT, 35 GHz electrical scope, and TDR instrument, allowing 400G BER tests, NRZ & PAM4 eye diagram measurements, as well as medium impedance characterization and S-parameter evaluation. With a total of 24 ports, the ML4035 allows simultaneous testing on 4-channels which allows it to redefine and optimize the characterization and production testing of 10G-400G DACs.

ML4035 400G Cable Tester

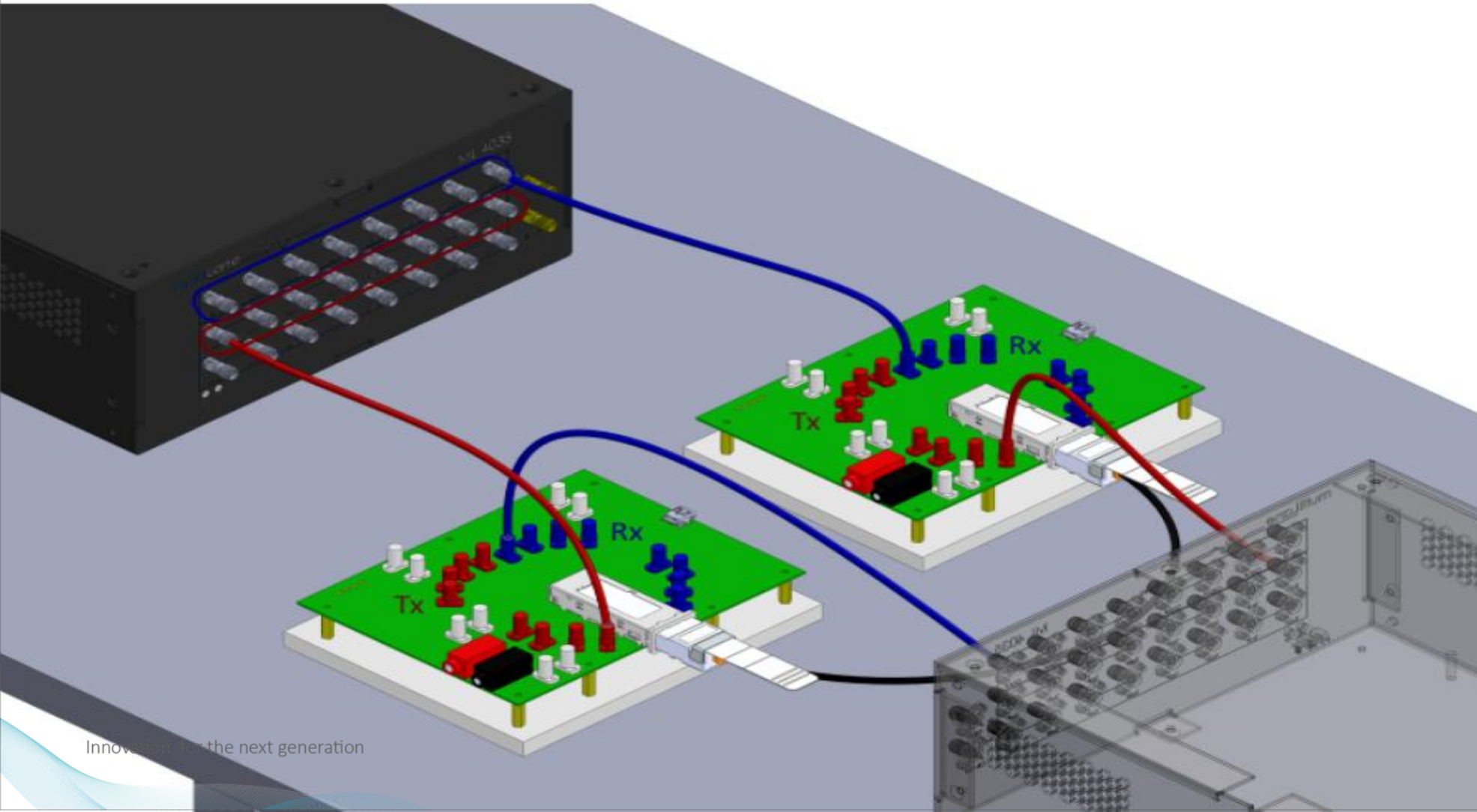
Key Features

- 1 4-Lane Sampling Scope
- 2 4-Lane 53GBd PPG
- 3 4-Lane True-Differential TDR/TDT
- 4 400G Bit Error Ratio Tester
- 5 Automation SW for DAC & TIA Testing
- 6 High Throughput

	Port Name	Description
1	Clk In/Out	The trigger input for the sampling scope (DSO). It is used in DSO mode only.
2	CH1 - CH4	TDR/DSO ports. Each channel can be either configured as TX or RX.
3	TX1 – TX4	PPG ports. Each channel can transmit a 53GBd NRZ/PAM4 signal.
4	RX1 – RX4	Error Detector ports. Used to measure BER.
5	LAN	RJ-45 port for data transfer and communication with the GUI

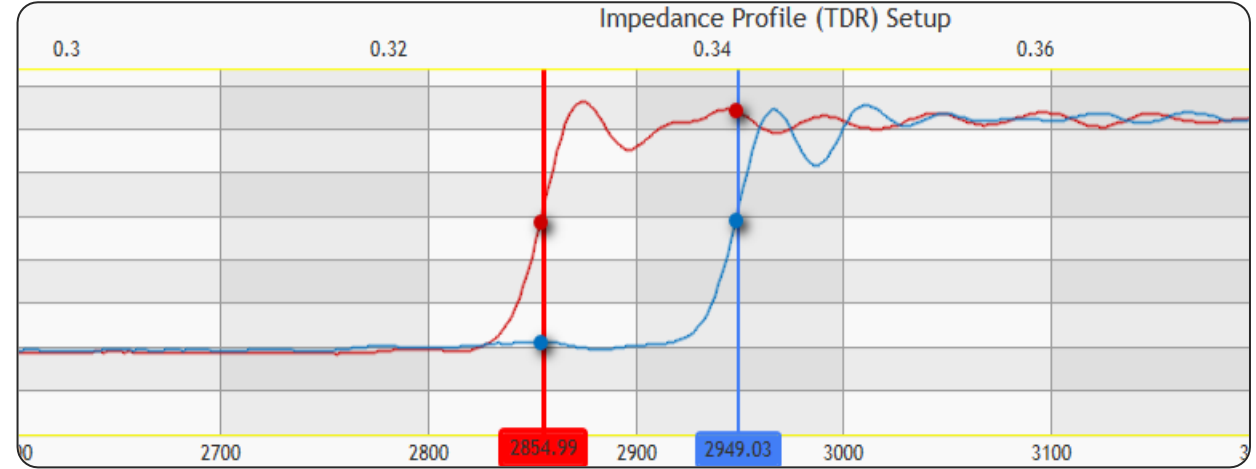
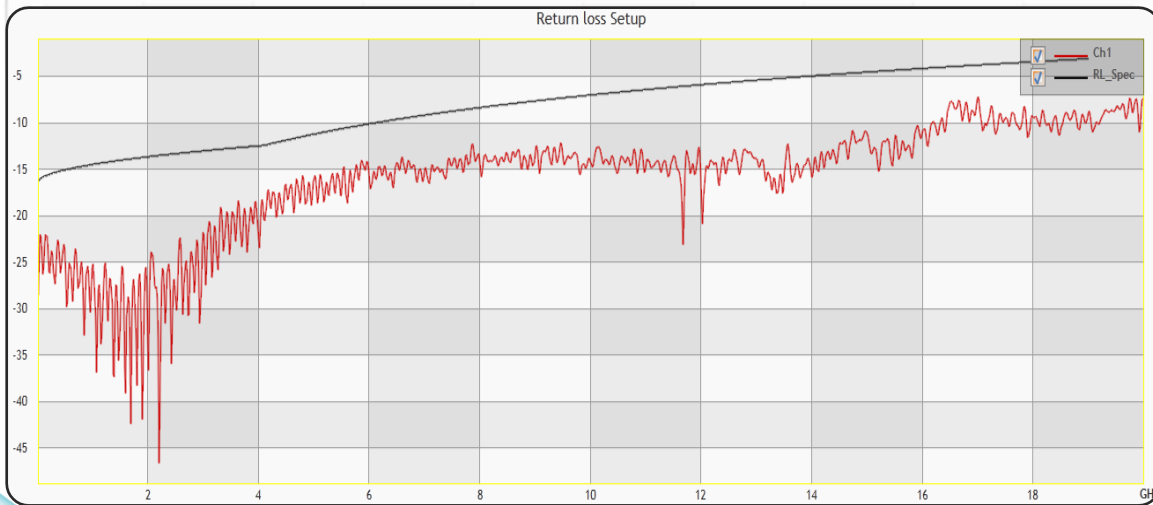
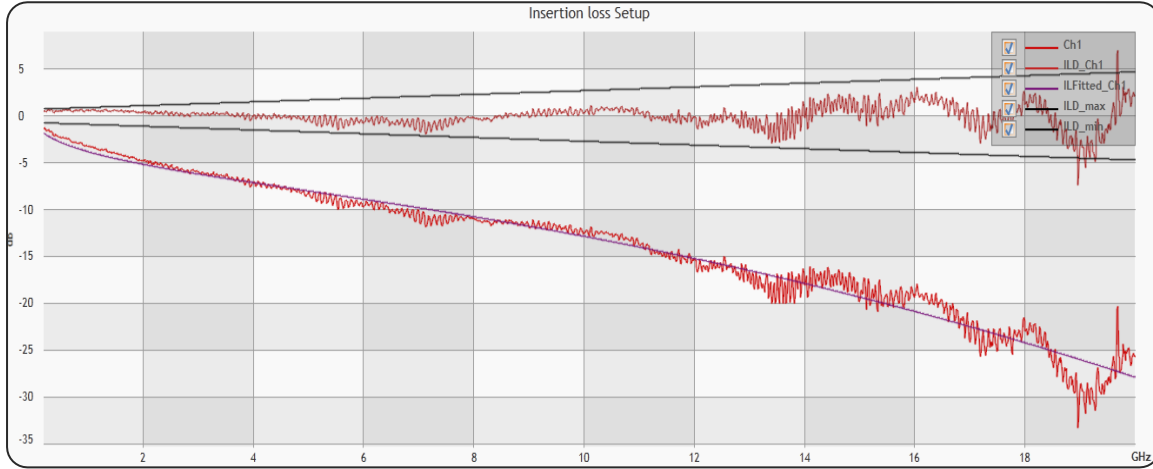


DAC Testing Using ML4035



- Impedance Profile
- Return Loss (S11)
- Insertion Loss (S21)
- Crosstalk (NEXT, FEXT)
- ICN
- COM
- Effective Return Loss
- Gating in Time Domain
- Eye Measurements
- BER Measurement

Measurements & Masks



Manual measurements can be performed using the standard ML4035 SW. All measurements are included as well as IEEE standard defined limits to test against. It is mainly intended for R&D and characterization. For production testing, a separate automated SW is provided free of charge.

ML1105 DAC Testing Solution

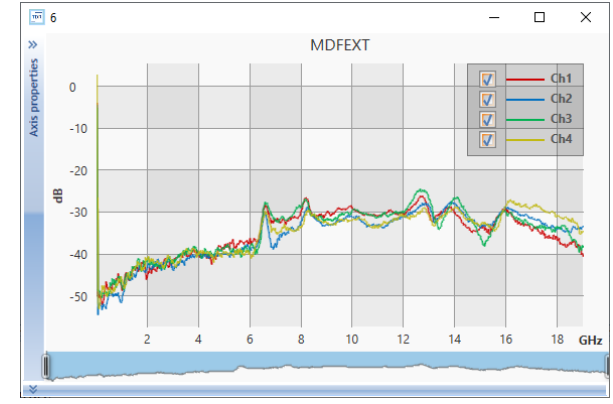
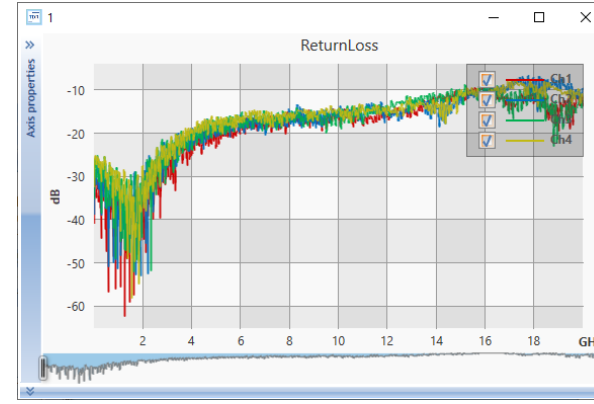
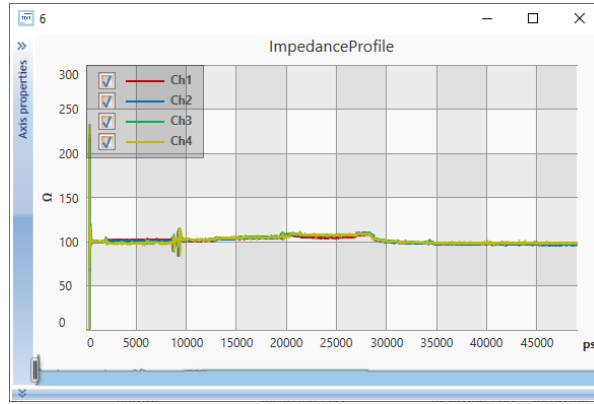
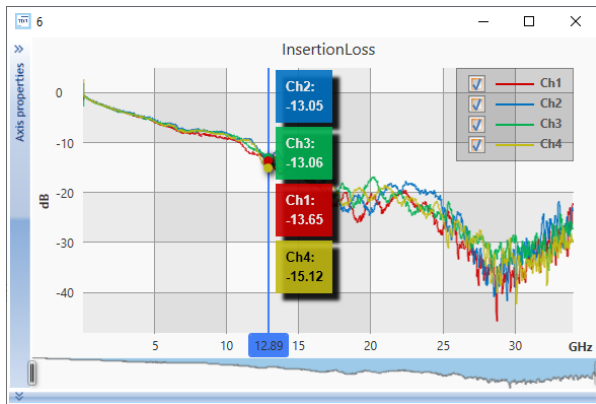
MultiLane's automated DAC testing solution (ML1105) takes full advantage of the ML4035's high-speed 16-port simultaneous measurement technique to automate S-parameter testing on DAC. With a click of a button, the automated SW only takes seconds to evaluate 10G-400G cables' impedance profile and perform tests including insertion loss, return loss, Far & Near-End Crosstalk, Integrated Crosstalk Noise, COM and Effective Return Loss, then generates a report with Pass/Fail criteria.

Calibration is performed only once, followed by the one-time connection of the full setup. This is all it takes to start testing large-volume DAC cables in a production environment.

Along with the Pass/Fail verdict & generated report, the SW saves S-Parameter files & screenshots as well. And with the integrated barcode scanning capability, all the mentioned above get automatically saved on the user's PC under the scanned DUT's SN.

ML1105 DAC Testing Solution

Example of Test Results

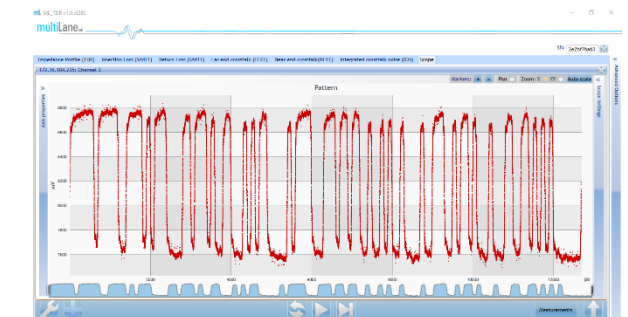
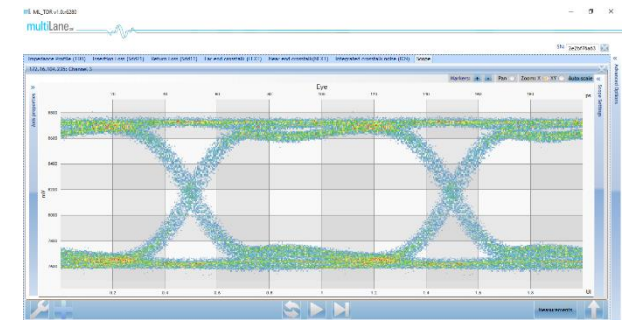
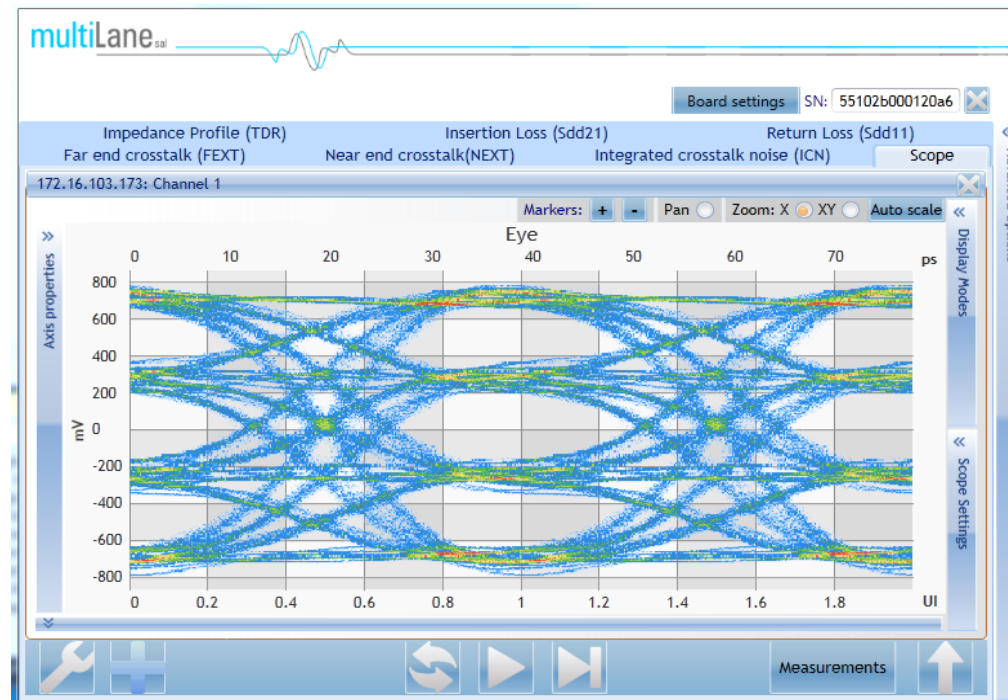


DUT #1											
Test Status											
Lane	Return Loss		Return Loss Status	Insertion Loss			Insertion Loss Deviation Status	Insertion Loss Status	COM		COM Status
	ML4025_TDR Loss At Nyquist (dB)	IEEE(802.3) Min		ML4025_TDR Loss At Nyquist (dB)	IEEE(802.3) Min	Max			ML4025_TDR COM value	IEEE(802.3) Min	
1	16.61	6	Pass	14.11	8	22.48	Pass	Pass	9.55	3	Pass
2	15.77	6	Pass	14.86	8	22.48	Pass	Pass	8.68	3	Pass
3	16.36	6	Pass	14.40	8	22.48	Pass	Pass	10.21	3	Pass
4	16.47	6	Pass	14.09	8	22.48	Pass	Pass	9.41	3	Pass

ML4035 Electrical Scope

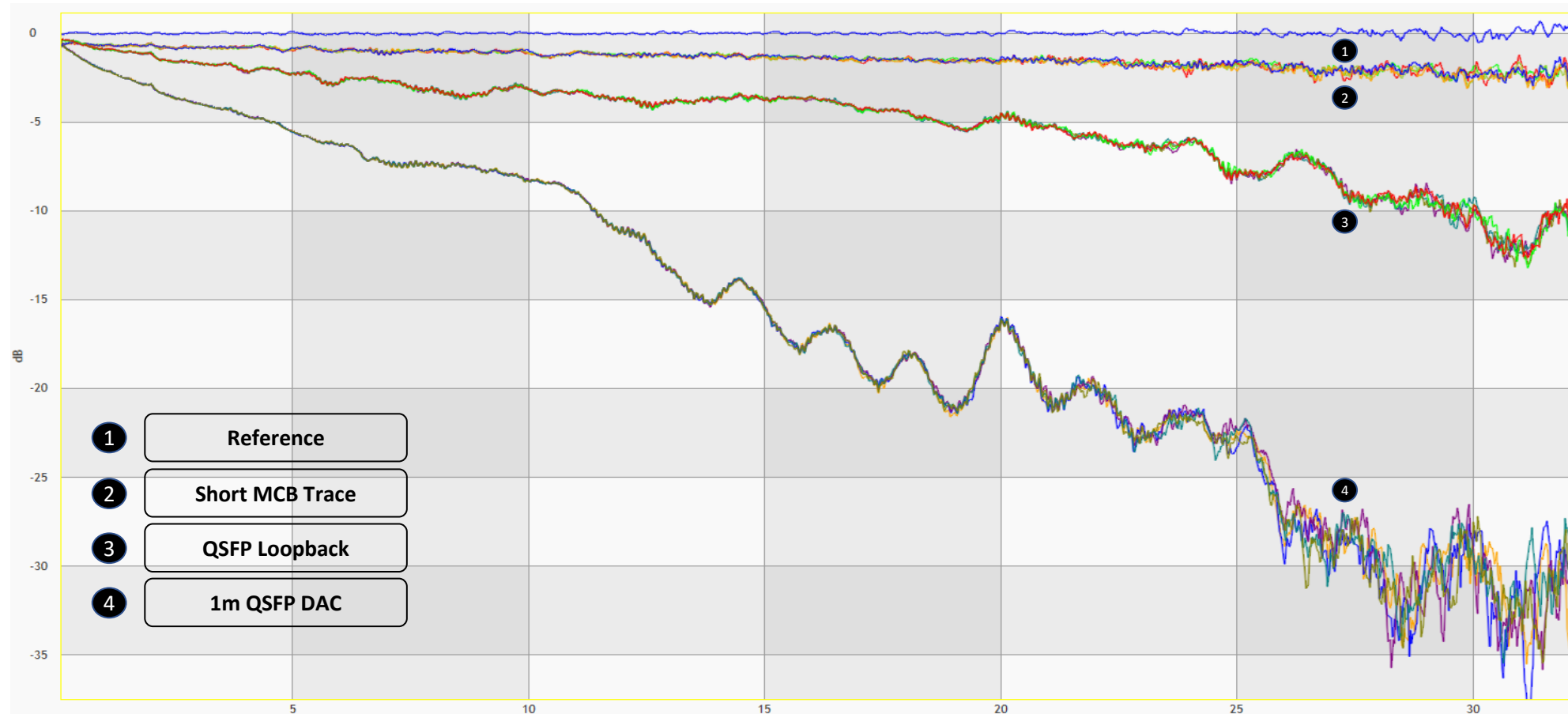
Eye/Pattern Measurements

- Eye Diagram
- Pattern
- Jitter Decomposition
- Histogram
- Filters / Equalizers
- De-embedding
- PAM4 Meas.



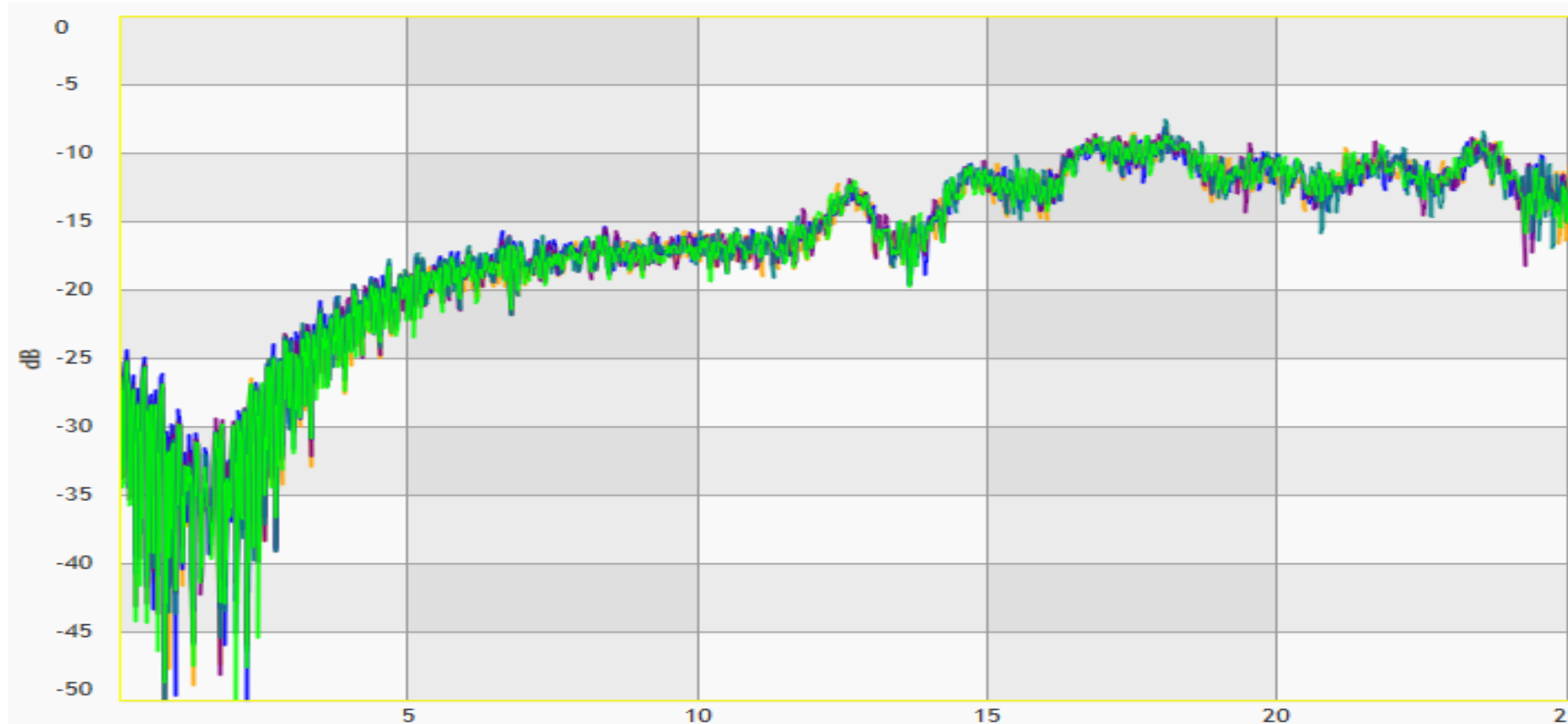
MultiLane Performance

Insertion Loss to 32GHz & Dynamic Range



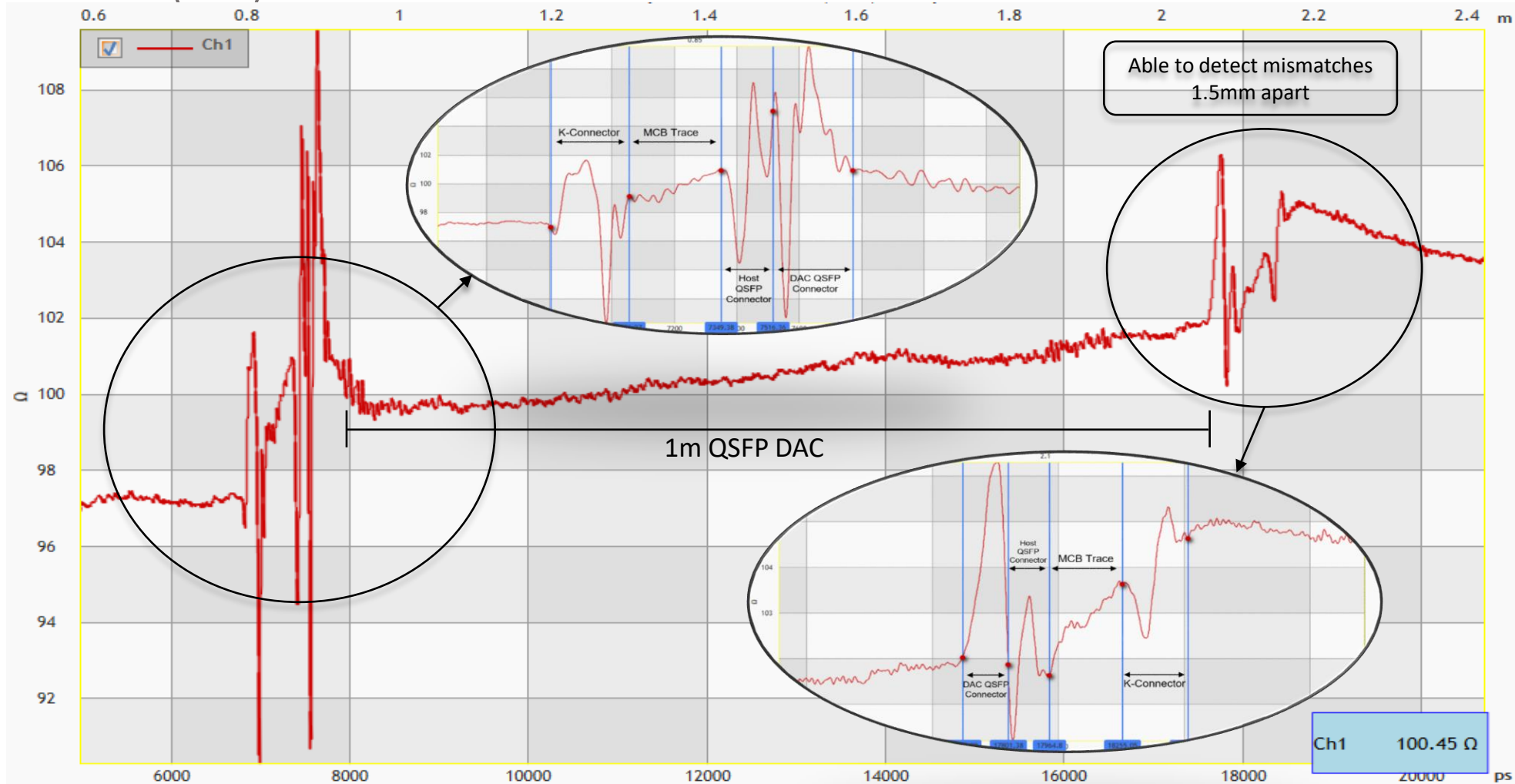
MultiLane Performance

Return Loss – 1m QSFP DAC



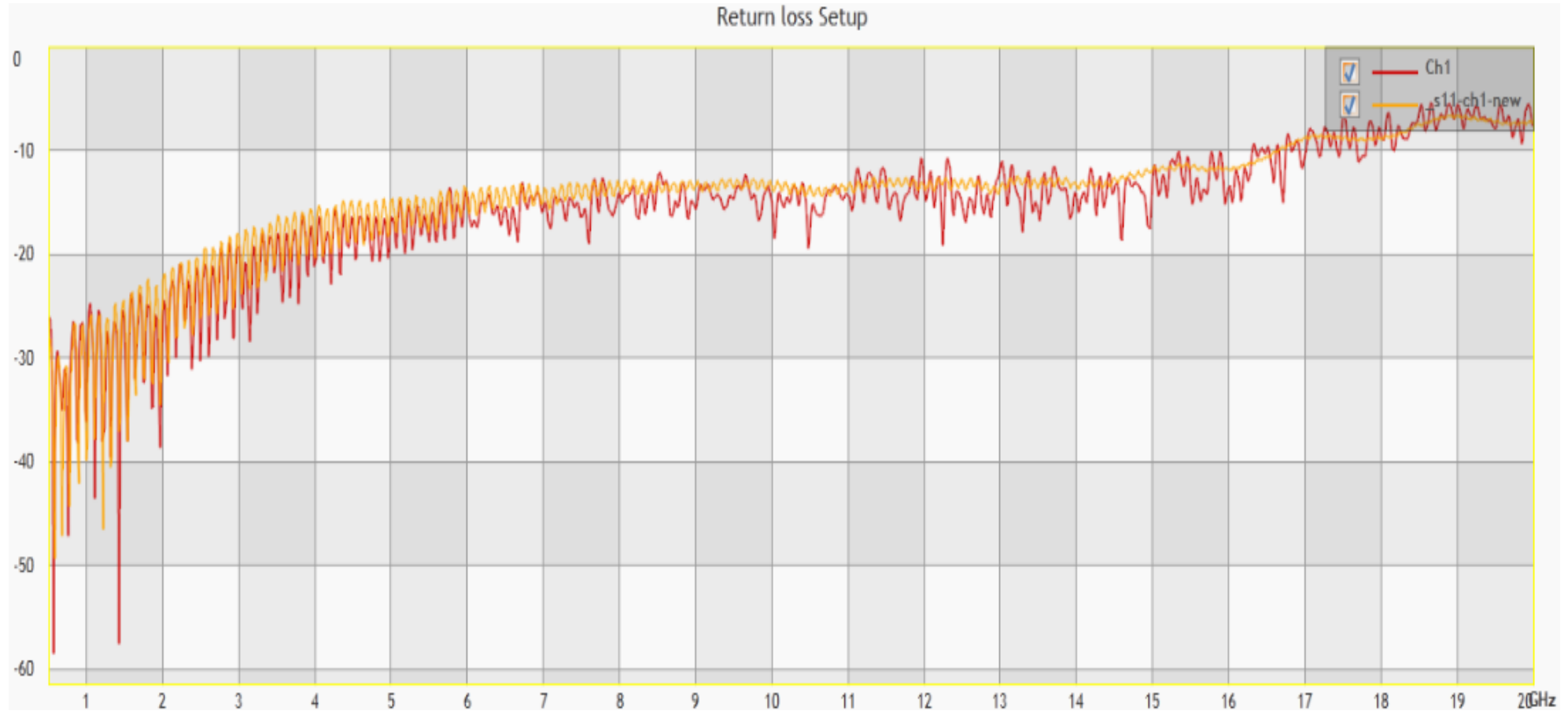
MultiLane Performance

Impedance Profile (TDR)



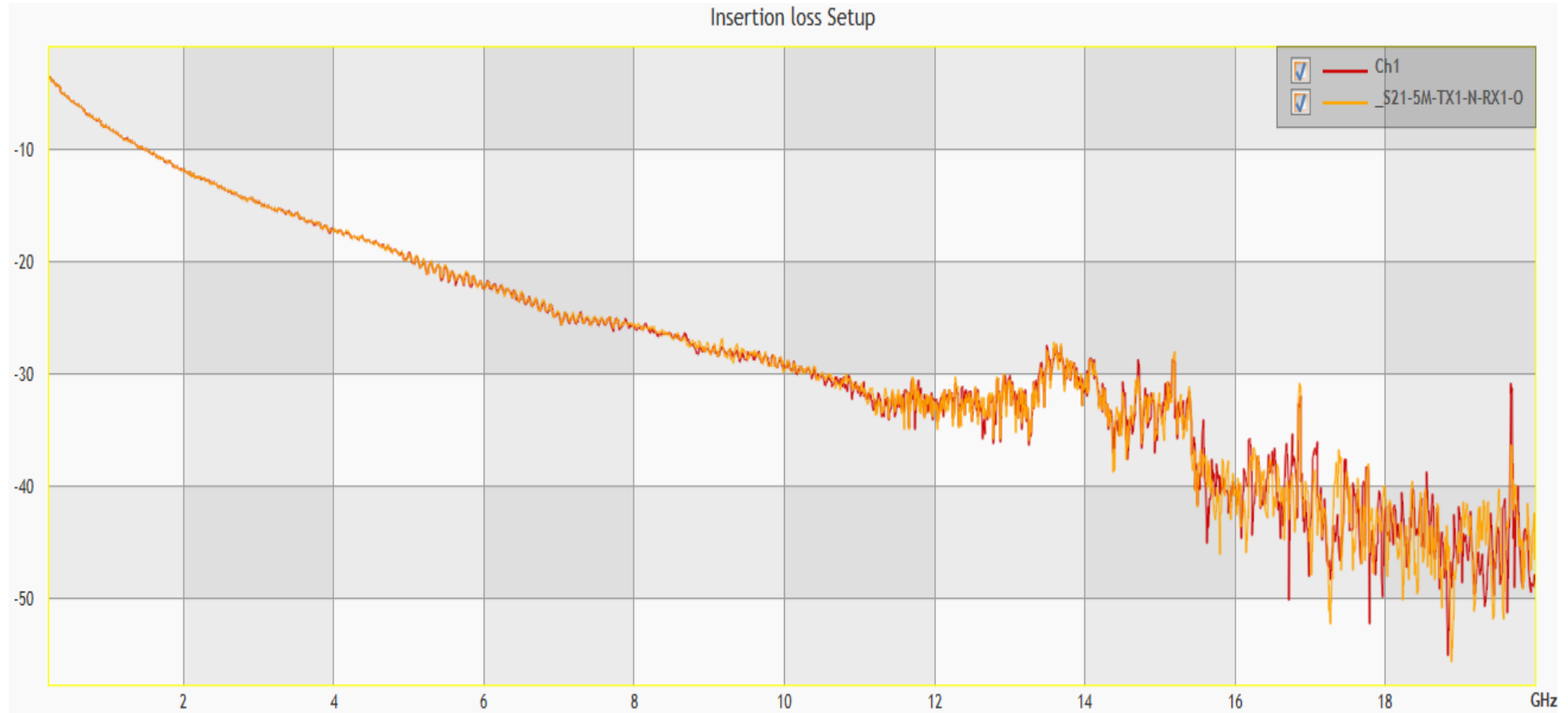
Benchmarking ML4035 vs. PNA

Return Loss



Benchmarking ML4035 vs. PNA

Insertion Loss





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