



Independent Test & Measurement Services for Electronic Product Development

When the physical layer limits high-speed and high-frequency performance

Our test and measurement services advance high-speed and high-frequency electronic product development. We work with OEMs and their suppliers to:

- ▶ create new products
- ▶ lower development costs
- ▶ reduce time-to-market
- ▶ control production costs

PCB Measurements is a suite of precise electrical measurements and tests required in all gigabit and gigahertz technology development. These services require expensive and sophisticated test equipment and expert high-frequency engineers.

By using **PCB Measurements** to acquire key design parameters, design verification and supplier qualification, you will:

- ▶ reduce engineering team costs
- ▶ limit R&D equipment expenditures
- ▶ increase product ROI

Since high-speed and high-frequency performance depends on your engineers using the correct design parameters, you gain additional benefit when using **PCB Measurements** to acquire the actual interconnect, component, and material parameters of your suppliers. We provide those parameters for your design and simulation. We then verify your physical layer performance against your specs.

After the design is verified, you use **PCB Measurements** to qualify your suppliers and to monitor the supply chain for the key parameters. In this way, **PCB Measurements** will

- ▶ improve product performance
- ▶ decrease design cycle time
- ▶ reduce production costs

Our highly-experienced measurement team is ready to assist you. Our staff have national metrology lab experience, and our President serves as Chair of the IPC High-Speed/High-Frequency Test Method Subcommittees.

PCB Measurements Success Stories

High-Speed Server Backplanes

PCB Measurements is working with original equipment manufacturers and circuit board laminators to assure that the circuit board material supply will meet tight backplane specifications. PCB Measurements' testing services provide engineers with key design parameters, and they qualify supplies. Matching engineering specs with true properties of the supply chain greatly reduces product development costs and production interruptions.

Communication System Design Solution

PCB Measurements provided the solution to a new com system design. Our high-frequency testing services and expertise extended the capabilities of an OEM engineering team during product development. Our customer created a new product line not possible otherwise. Their first run units met spec— all in record time!

Nano-Composite Material Development

The PCB Measurements team enabled the creation of new nano-composite materials while significantly reducing the customer's test costs. Our dielectric material testing services and expertise allowed our customer to focus on their specialty - material science - while we focused on ours - high-frequency electrical measurements. Using PCB Measurements, a new product was created and verified without the cost of building a high-frequency material testing lab.

Use **PCB Measurements** to improve your product development ROI.

Interconnect Testing Services	Frequency Range	Co-Ax Connectors	Probe Station
S-Parameters Two-Port S2P	10 kHz - 8.5 GHz	S2P-C08	S2P-P08
	10 MHz - 20 GHz	S2P-C20	S2P-P20
	50 MHz - 40 GHz	S2P-C40	S2P-P40
S-Parameters Four-Port S4P & Mixed-Mode	100 kHz - 8.5 GHz	S4P-C08	S4P-P08
	10 MHz - 20 GHz	S4P-C20	S4P-P20
Propagation Constant NIST Multiline Method	10 kHz - 8.5 GHz	PROP-C08	PROP-P08
	10 MHz - 20 GHz	PROP-C20	PROP-P20
	50 MHz - 40 GHz	PROP-C40	PROP-P40
	50 MHz - 60 GHz	PROP-C60	PROP-P60
Total Loss IPC TM-650 2.5.5.12	$t_r \leq 20$ ps	TLOSS-C01	TLOSS-P01
Time-Domain Delay IPC TM-650 2.5.5.11	$t_r \leq 20$ ps	TDEL-C01	TDEL-P01
TDR Impedance IPC TM-650 2.5.5.7a	$t_r \leq 20$ ps	TZ-C01	TZ-P01

Component Testing Services	Frequency Range	Order Number
SPICE Model Parameters CCNi Test Coupon	1 kHz - 1 MHz	COMP-SPC01
	1 MHz - 1 GHz	COMP-SPC02
	10 kHz - 8.5 GHz	COMP-SPC03
	10 MHz - 20 GHz	COMP-SPC04
S-Parameter S2P Models CCNi Test Coupon	10 kHz - 8.5 GHz	COMP-S2P08
	10 MHz - 20 GHz	COMP-S2P20
ESL vs. Height Model CCNi Test Coupon Measuring ESL as function of ground plane spacing	1 MHz - 1 GHz	COMP-ESL01
	10 kHz - 8.5 GHz	COMP-ESL08
	10 MHz - 20 GHz	COMP-ESL20

Materials Testing Services	Frequency Range	Order Number
Parallel-Plate Capacitor ASTM D 150 & TM-650 2.5.5.9	1 kHz - 1 MHz	PERM-CAP01
	10 MHz - 100 MHz	PERM-CAP02
	1 MHz - 1 GHz	PERM-CAP03
Split-Cylinder Resonator IPC TM-650 2.5.5.13	5-12 GHz	PERM-SC01
	9-20 GHz	PERM-SC02
Multiple Transmission Lines NIST	10 kHz - 8.5 GHz	PERM-TL08
	10 MHz - 20 GHz	PERM-TL20
	50 MHz - 40 GHz	PERM-TL40