Mechanical Calibration Kit

Data Sheet

EN03C

SIGLENT TECHNOLOGIES CO., LTD.

Introduction

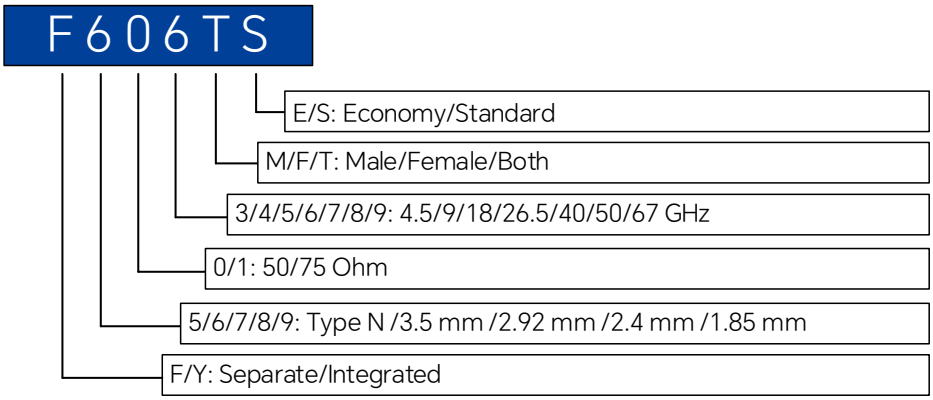
Mechanical calibration kit contains individual standards to characterize systematic errors, used to calibrate scalar or vector network analyzers.

SIGLENT supplies mechanical calibration kits with 3.5mm and Type N coaxial connectors, as well as K-band waveguide calibration kit.

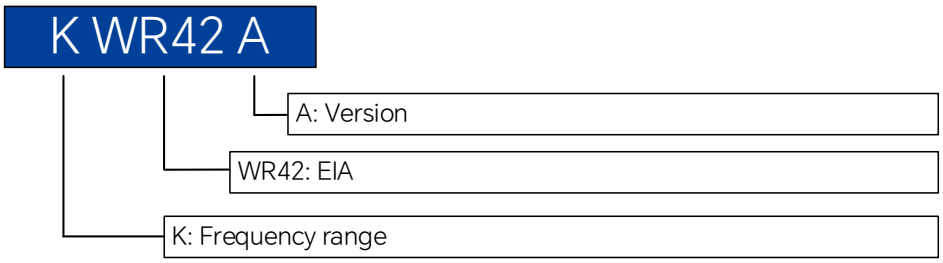
Model*1*2	Frequency	Type*3	Connector	Impendence	Similar
F503ME	DC - 4.5 GHz	OSLT	Type N - Male	50 Ω	85032B/E
F503FE	DC - 4.5 GHz	OSLT	Type N - Female	50 Ω	85032B/E
F603ME	DC - 4.5 GHz	OSLT	3.5mm - Male	50 Ω	/
F603FE	DC - 4.5 GHz	OSLT	3.5mm - Female	50 Ω	/
F504MS	DC - 9 GHz	OSLT	Type N - Male	50 Ω	85032F
Y504MS	DC - 9 GHz	OSLT	Type N - Male	50 Ω	85032F
F504FS	DC - 9 GHz	OSLT	Type N - Female	50 Ω	85032F
Y504FS	DC - 9 GHz	OSLT	Type N - Female	50 Ω	85032F
F504TS	DC - 9 GHz	OSLT	Type N - Male AND Female	50 Ω	85032F
F604MS	DC - 9 GHz	OSLT	3.5mm - Male	50 Ω	85033E
F604FS	DC - 9 GHz	OSLT	3.5mm - Female	50 Ω	85033E
F604TS	DC - 9 GHz	OSLT	3.5mm - Male AND Female	50 Ω	85033E
F505MS	DC - 18 GHz	OSLT	Type N - Male	50 Ω	85054D
F505FS	DC - 18 GHz	OSLT	Type N - Female	50 Ω	85054D
F505TS	DC - 18 GHz	OSLT	Type N - Male AND Female	50 Ω	85054D
F606MS	DC - 26.5 GHz	OSLT	3.5mm - Male	50 Ω	85052D
Y606MS	DC - 26.5 GHz	OSLT	3.5mm - Male	50 Ω	85052D
F606FS	DC - 26.5 GHz	OSLT	3.5mm - Female	50 Ω	85052D
Y606FS	DC - 26.5 GHz	OSLT	3.5mm - Female	50 Ω	85052D
F606TS	DC - 26.5 GHz	OSLT	3.5mm - Male AND Female	50 Ω	85052D

Model*1*2	Frequency	Type*3	Connector	Impendence
KWR42A	17.6 - 26.7 GHz	TRL	K-Band Waveguide	50 Ω

*1: Mechanical coaxial calibration kit naming rule



*2: Mechanical Waveguide calibration kit naming rule



*3: OSLT = Open + Short + Load + Through

TRL = Through + Reflect + Line

F503 Series

The F503ME and F503FE economy 50Ω N type coaxial mechanical calibration kit include termination loads, open circuits, short circuits, and through adapters, specified from DC to 4.5 GHz.

The F503 series performance specifications are very similar to the Keysight 85032B/E mechanical calibration kit and it can be used as an approximate replacement of 85032B/E, or use the STD of 85032B/E in network analyzers.



Figure 1 F503 series

Performance

Model	Type	Connector	Specification
F503ME	Open	N - Male	DC – 2 GHz, Phase Deviation* ≤ ± 0.65° 2 GHz – 4.5 GHz, Phase Deviation* ≤ ± 1°
	Short	N - Male	DC – 2 GHz, Phase Deviation* ≤ ± 0.65° 2 GHz – 4.5 GHz, Phase Deviation* ≤ ± 1°
	Load	N - Male	DC – 1 GHz, Return Loss ≥ 46 dB 1 GHz – 4.5 GHz, Return Loss ≥ 40 dB
	Adapter	N - Male to N - Male	DC – 4.5 GHz, SWR ≤ 1.05 (Return Loss ≥ 32.3 dB)
F503FE	Open	N - Female	DC – 2 GHz, Phase Deviation* ≤ ± 0.65° 2 GHz – 4.5 GHz, Phase Deviation* ≤ ± 1°
	Short	N - Female	DC – 2 GHz, Phase Deviation* ≤ ± 0.65° 2 GHz – 4.5 GHz, Phase Deviation* ≤ ± 1°
	Load	N - Female	DC – 1 GHz, Return Loss ≥ 46 dB 1 GHz – 4.5 GHz, Return Loss ≥ 40 dB
	Adapter	N - Female to N - Female	DC – 4.5 GHz, SWR ≤ 1.05 (Return Loss ≥ 32.3 dB)

* Phase deviation from the nominal model as defined in the standards definitions (see Appendix A)

General Specification

Impendence	50 Ω	Power	≤ 1 W
Interfaces Standard	IEC 60169-16 Grade 0	Durability	> 2000
Temperature	+ 15 °C ~ + 35 °C		

F603 Series

The F603ME and F603FE economy 50Ω 3.5mm type coaxial mechanical calibration kit include terminations loads, open circuits, short circuits, and through adapters, specified from DC to 4.5 GHz.

The F603 series performance specifications are very similar to the Keysight 85033E mechanical calibration kit and it can be used as an approximate replacement of 85033E, or use the STD of 85033E in network analyzers.



Figure 2 F603 series

Performance

Model	Type	Connector	Specification
F603ME	Open	3.5mm - Male	DC – 4.5 GHz, Phase Deviation* ≤ ± 1°
	Short	3.5mm - Male	DC – 4.5 GHz, Phase Deviation* ≤ ± 1°
	Load	3.5mm - Male	DC – 1 GHz, Return Loss ≥ 42 dB 1 GHz – 4.5 GHz, Return Loss ≥ 37.2 dB
	Adapter	3.5mm - Male to 3.5mm - Male	DC – 4.5 GHz, SWR ≤ 1.05 (Return Loss ≥ 32.3 dB)
F603FE	Open	3.5mm - Female	DC – 4.5 GHz, Phase Deviation* ≤ ± 1°
	Short	3.5mm - Female	DC – 4.5 GHz, Phase Deviation* ≤ ± 1°
	Load	3.5mm - Female	DC – 1 GHz, Return Loss ≥ 42 dB 1 GHz – 4.5 GHz, Return Loss ≥ 37.2 dB
	Adapter	3.5mm - Female to 3.5mm - Female	DC – 4.5 GHz, SWR ≤ 1.05 (Return Loss ≥ 32.3 dB)

* Phase deviation from the nominal model as defined in the standards definitions (see Appendix A)

General Specification

Impendence	50 Ω	Power	≤ 1 W
Interfaces Standard	IEEE Std 287	Durability	> 2000
Temperature	+ 15 ℃ ~ + 35 ℃		

F504 and Y504 Series

The F504MS and F504FS 50Ω N type coaxial mechanical calibration kit include termination loads, open circuits, short circuits, and through adapters, specified from DC to 9 GHz. The F504TS is a coaxial calibration kit consisting of F504MS and F504FS.

Y504MS shares the same parts and specs as F504MS, but in integrated exterior. So does Y504FS and F504FS.

The F504 and Y504 series performance specifications are very similar to the Keysight 85032F mechanical calibration kit and it can be used as an approximate replacement of 85032F, or use the STD of 85032F in network analyzers.



Figure 3 F504 series (left) and Y504 series (right)

Performance

Model		Type	Connector	Specification
F504TS	F504MS/ Y504MS	Open	N - Male	DC - 3 GHz, Phase Deviation* ≤ ± 0.65° 3 GHz - 9 GHz, Phase Deviation* ≤ ± 1°
		Short	N - Male	DC - 3 GHz, Phase Deviation* ≤ ± 0.65° 3 GHz - 9 GHz, Phase Deviation* ≤ ± 1°
		Load	N - Male	DC - 3 GHz, Return Loss ≥ 42 dB 3 GHz - 9 GHz, Return Loss ≥ 36 dB
		Adapter	N - Male to N - Male	DC - 9 GHz, SWR ≤ 1.06 (Return Loss ≥ 30.7dB)
	F504FS/ Y504FS	Open	N - Female	DC - 3 GHz, Phase Deviation* ≤ ± 0.65° 3 GHz - 9 GHz, Phase Deviation* ≤ ± 1°
		Short	N - Female	DC - 3 GHz, Phase Deviation* ≤ ± 0.65° 3 GHz - 9 GHz, Phase Deviation* ≤ ± 1°
		Load	N - Female	DC - 3 GHz, Return Loss ≥ 42 dB 3 GHz - 9 GHz, Return Loss ≥ 36 dB
		Adapter	N - Female to N - Female	DC - 9 GHz, SWR ≤ 1.06 (Return Loss ≥ 30.7dB)
	Adapter		N - Male to N - Female	DC - 9 GHz, SWR ≤ 1.06 (Return Loss ≥ 30.7dB)
	Wrench		N - 19mm	1.35 Nm

* Phase deviation from the nominal model as defined in the standards definitions (see Appendix A)

General Specification

Impendence	50 Ω	Power	≤ 1 W
Interfaces Standard	IEC 60169-16 Grade 0	Durability	> 2000
Temperature	+ 15 °C ~ + 35 °C		

F505 Series

The F505MS and F505FS 50Ω N type coaxial mechanical calibration kit include termination loads, open circuits, short circuits, and through adapters, specified from DC to 18 GHz. The F505TS is a coaxial calibration kit consisting of F505MS and F505FS.

The F505 series performance specifications are very similar to the Keysight 85054D mechanical calibration kit and it can be used as an approximate replacement of 85054D, or use the STD of 85054D in network analyzers.



Figure 4 F505 series

Performance

Model		Type	Connector	Specification
F505TS	F505MS	Open	N - Male	DC – 18 GHz, Phase Deviation* ≤ ± 1.5°
		Short	N - Male	DC –18 GHz, Phase Deviation* ≤ ± 1°
		Load	N - Male	DC – 2 GHz, Return Loss ≥ 40 dB 2 GHz – 8 GHz, Return Loss ≥ 36 dB 8 GHz – 18 GHz, Return Loss ≥ 32.6 dB
		Adapter	N - Male to N - Male	DC – 18 GHz, SWR ≤ 1.06 (Return Loss ≥ 30.7 dB)
	F505FS	Open	N - Female	DC – 18 GHz, Phase Deviation* ≤ ± 1.5°
		Short	N - Female	DC – 18 GHz, Phase Deviation* ≤ ± 1°
		Load	N - Female	DC – 2 GHz, Return Loss ≥ 40 dB 2 GHz – 8 GHz, Return Loss ≥ 36 dB 8 GHz – 18 GHz, Return Loss ≥ 32.6 dB
		Adapter	N - Female to N - Female	DC – 18 GHz, SWR ≤ 1.06 (Return Loss ≥ 30.7 dB)
	Adapter		N - Male to N - Female	DC – 18 GHz, SWR ≤ 1.06 (Return Loss ≥ -30.7 dB)
	Wrench		N - 19mm	1.35 Nm

* Phase deviation from the nominal model as defined in the standards definitions (see Appendix A)

General Specification

Impendence	50 Ω	Power	≤ 1 W
Interfaces Standard	IEC 60169-16	Durability	> 2000
Temperature	+ 15 °C ~ + 35 °C		

F604 Series

The F604MS and F604FS 50Ω 3.5mm type coaxial mechanical calibration kit include termination loads, open circuits, short circuits, and through adapters, specified from DC to 9 GHz. The F604TS is a coaxial calibration kit consisting of F604MS and F604FS.

The F604 series performance specifications are very similar to the Keysight 85033E mechanical calibration kit and it can be used as an approximate replacement of 85033E, or use the STD of 85033E in network analyzers.



Figure 5 F604 series

Performance

Model		Type	Connector	Specification
F604TS	F604MS	Open	3.5mm - Male	DC – 9 GHz, Phase Deviation* ≤ ± 1°
		Short	3.5mm - Male	DC – 9 GHz, Phase Deviation* ≤ ± 1°
		Load	3.5mm - Male	DC – 2 GHz, Return Loss ≥ 46 dB 2 GHz – 9 GHz, Return Loss ≥ 40 dB
		Adapter	3.5mm - Male to 3.5mm - Male	DC – 6 GHz, SWR ≤ 1.04 6 GHz – 9 GHz, SWR ≤ 1.06
	F604FS	Open	3.5mm - Female	DC – 9 GHz, Phase Deviation* ≤ ± 1°
		Short	3.5mm - Female	DC – 9 GHz, Phase Deviation* ≤ ± 1°
		Load	3.5mm - Female	DC – 2 GHz, Return Loss ≥ 46 dB 2 GHz – 9 GHz, Return Loss ≥ 40 dB
		Adapter	3.5mm - Female to 3.5mm - Female	DC – 6 GHz, SWR ≤ 1.04 6 GHz – 9 GHz, SWR ≤ 1.06
	Adapter		3.5mm - Male to 3.5mm - Female	DC – 6 GHz, SWR ≤ 1.04 6 GHz – 9 GHz, SWR ≤ 1.06
	Wrench		3.5mm - 8mm	0.9 Nm

* Phase deviation from the nominal model as defined in the standards definitions (see Appendix A)

General Specification

Impendence	50 Ω	Power	≤ 1 W
Interfaces Standard	IEEE Std 287	Durability	> 2000
Temperature	+ 15 °C ~ + 35 °C		

F606 and Y606 Series

The F606MS and F606FS 50Ω 3.5mm type coaxial mechanical calibration kit include termination loads, open circuits, short circuits, and through adapters, specified from DC to 26.5 GHz. The F606TS is a coaxial calibration kit consisting of F606MS and F606FS.

Y606MS shares the same parts and specs as F606MS, but in integrated exterior. So does Y606FS and F606FS.

The F606 and Y606 series performance specifications are very similar to the Keysight 85052D mechanical calibration kit and it can be used as an approximate replacement of 85052D, or use the STD of 85052D in network analyzers.



Figure 6 F606 series (left) and Y606 series (right)

Performance

Model		Type	Connector	Specification
F606TS	F606MS	Open	3.5mm - Male	DC – 3 GHz, Phase Deviation* ≤ ± 0.65° 3 GHz – 8 GHz, Phase Deviation* ≤ ± 1.2° 8 GHz – 26.5 GHz, Phase Deviation* ≤ ± 2°
		Short	3.5mm - Male	DC – 3 GHz, Phase Deviation* ≤ ± 0.65° 3 GHz – 8 GHz, Phase Deviation* ≤ ± 1° 8 GHz–26.5 GHz, Phase Deviation* ≤ ±1.75°
		Load	3.5mm - Male	DC – 8 GHz, Return Loss ≥ 38 dB 8 GHz – 20 GHz, Return Loss ≥ 36 dB 20 GHz – 26.5 GHz, Return Loss ≥ 34 dB
		Adapter	3.5mm - Male to 3.5mm - Male	DC – 26.5 GHz, SWR ≤ 1.08
	F606FS	Open	3.5mm - Female	DC – 3 GHz, Phase Deviation* ≤ ± 0.65° 3 GHz – 8 GHz, Phase Deviation* ≤ ± 1.2° 8 GHz – 26.5 GHz, Phase Deviation* ≤ ± 2°
		Short	3.5mm - Female	DC – 3 GHz, Phase Deviation* ≤ ± 0.65° 3 GHz – 8 GHz, Phase Deviation* ≤ ± 1° 8 GHz–26.5 GHz, Phase Deviation* ≤ ±1.75°
		Load	3.5mm - Female	DC – 8 GHz, Return Loss ≥ 38 dB 8 GHz – 20 GHz, Return Loss ≥ 36 dB 20 GHz – 26.5 GHz, Return Loss ≥ 34 dB
		Adapter	3.5mm - Female to 3.5mm - Female	DC – 26.5 GHz, SWR ≤ 1.08
	Adapter		3.5mm - Male to 3.5mm - Female	DC – 26.5 GHz, SWR ≤ 1.08
	Wrench		3.5mm - 8mm	0.9 Nm

* Phase deviation from the nominal model as defined in the standards definitions (see Appendix A)

Model	Type	Connector	Specification
Y606MS	Open	3.5mm - Male	DC – 26.5 GHz, Phase Deviation* ≤ ± 3°
	Short	3.5mm - Male	DC – 26.5 GHz, Phase Deviation* ≤ ± 2.8°
	Load	3.5mm - Male	DC – 26.5 GHz, SWR ≤ 1.07
	Adapter	3.5mm - Male to 3.5mm - Male	DC – 26.5 GHz, SWR ≤ 1.12
	Wrench	3.5mm - 8mm	0.9 Nm
Y606FS	Open	3.5mm - Female	DC – 26.5 GHz, Phase Deviation* ≤ ± 3°
	Short	3.5mm - Female	DC – 26.5 GHz, Phase Deviation* ≤ ± 2.8°
	Load	3.5mm - Female	DC – 26.5 GHz, SWR ≤ 1.07
	Adapter	3.5mm - Female to 3.5mm - Female	DC – 26.5 GHz, SWR ≤ 1.12
	Wrench	3.5mm - 8mm	0.9 Nm

* Phase deviation from the nominal model as defined in the standards definitions (see Appendix A)

General Specification

Impendence	50 Ω	Power	≤ 0.5 W
Interfaces Standard	IEEE Std 287	Durability	> 2000
Temperature	+15 °C ~ + 35 °C		

KWR42A

The KWR42A precise K-band TRL waveguide mechanical calibration kit contains K-band load, K-band short, 1/8λ waveguide line, 1/4λ waveguide line and 3/8λ waveguide line, specified from 17.6 GHz to 26.7 GHz. For measurement convenience, the KWR42A includes 2.92mm coax-to-waveguide converters and some fasteners like screws, nuts, nut collars, position bolts, etc.



Figure 7 KWR42A

Performance

Model	Type	Connector	Specification	Qty
KWR42A	Short	Waveguide	17.6 - 26.7 GHz	2
	Load	Waveguide	17.6 - 26.7 GHz, VSWR≤1.03	1
	1/8λ Line	Waveguide	17.6 - 26.7 GHz	1
	1/4λ Line	Waveguide	17.6 - 26.7 GHz	1
	3/8λ Line	Waveguide	17.6 - 26.7 GHz	1
	Coax-to-waveguide converter	2.92 mm - Female to Waveguide	17.6 - 26.7 GHz, VSWR≤1.25, IL≤0.5 dB	1
		2.92 mm - Male to Waveguide	17.6 - 26.7 GHz, VSWR≤1.25, IL≤0.5 dB	1
	Fastener	Screw M3*12		4
		Screw M3*16		4
		Screw M3*20		4
		Nut M3		24
		Nut collar M3		24
		Nut collar M3		24
		Position bolt		12

General Specification

Impendence	50 Ω	Temperature	- 20 °C ~ + 70 °C

Appendix A Calibration Kit Standards Definitions

F503ME

Connectors

Cal Kit	Description	Connector Family	Min Freq (MHz)	Max Freq (MHz)	Gender	Media	Impedance Z0 (Ω)
F503ME	Type N (50) Calibration Kit (Siglent)	Type N (50)	0	4500	Gendered	COAX	50

Standards

Std. ID	Label	Description	Connector	Sex	C0 F(e-15)	C1 F(e-27)/Hz	C2 F(e-36)/Hz^2	C3 F(e-45)/Hz^3	F min (MHz)	F max (MHz)	Delay (pSec)	Loss (GΩ/Sec)	Z0 (Ω)
2	OPEN -M-	Type N (50) male open	Type N (50)	MALE	62.14	-143.07	82.92	0.76	0	4500	17.411	0.7	50

Std. ID	Label	Description	Connector	Sex	L0 H(e-12)	L1 H(e-24)/Hz	L2 H(e-33)/Hz^2	L3 H(e-42)/Hz^3	F min (MHz)	F max (MHz)	Delay (pSec)	Loss (GΩ/Sec)	Z0 (Ω)
3	SHORT -M-	Type N (50) male short	Type N (50)	MALE	0	0	0	0	0	4500	17.817	2.1002	50.209

Std. ID	Label	Description	Connector	Sex	Fixed/Sliding	Arbitrary Impedance	Offset Load	F min (MHz)	F max (MHz)	Delay (pSec)	Loss (GΩ/Sec)	Z0 (Ω)
1	BROADBAND LOAD -M-	Type N (50) male broadband load	Type N (50)	MALE	FIXED	OFF	OFF	0	4500	0	0.7	50

Std. ID	Label	Description	Connector Port1	Sex Port1	Connector Port2	Sex Port2	F min (MHz)	F max (MHz)	Delay (pSec)	Loss (GΩ/Sec)	Z0 (Ω)
4	THRU	Insertable thru standard	Type N (50)	FEMALE	Type N (50)	MALE	0	4500	0	0.7	50

SOLT Class Assignments

Class Label	A	B	C	D	E	F	G	H
OPEN	2							
SHORT	3							
LOAD	1							
THRU*	4							

* Link FWD TRANS, FWD MATCH, REV TRANS, REV MATCH

TRL Class Assignments

Class Label	A	B	C	D	E	F
THRU						
REFLECT						
LINE/MATCH						

Calibration Reference Z0 = SYSTEM Z0

Test Port Reference Plane = THRU

F503FE

Connectors

Cal Kit	Description	Connector Family	Min Freq (MHz)	Max Freq (MHz)	Gender	Media	Impedance Z0 (Ω)
F503FE	Type N (50) Calibration Kit (Siglent)	Type N (50)	0	4500	Gendered	COAX	50

Standards

Std. ID	Label	Description	Connector	Sex	C0 F(e-15)	C1 F(e-27)/Hz	C2 F(e-36)/Hz^2	C3 F(e-45)/Hz^3	F min (MHz)	F max (MHz)	Delay (pSec)	Loss (GΩ/Sec)	Z0 (Ω)
2	OPEN -F-	Type N (50) female open	Type N (50)	FEMALE	119.09	-36.955	26.258	5.5136	0	4500	0	0.7	50

Std. ID	Label	Description	Connector	Sex	L0 H(e-12)	L1 H(e-24)/Hz	L2 H(e-33)/Hz^2	L3 H(e-42)/Hz^3	F min (MHz)	F max (MHz)	Delay (pSec)	Loss (GΩ/Sec)	Z0 (Ω)
3	SHORT -F-	Type N (50) female short	Type N (50)	FEMALE	0	0	0	0	0	4500	0.093	0.7	49.992

Std. ID	Label	Description	Connector	Sex	Fixed/Sliding	Arbitrary Impedance	Offset Load	F min (MHz)	F max (MHz)	Delay (pSec)	Loss (GΩ/Sec)	Z0 (Ω)
1	BROADBAND LOAD -F-	Type N (50) female broadband load	Type N (50)	FEMALE	FIXED	OFF	OFF	0	4500	0	0.7	50

Std. ID	Label	Description	Connector Port1	Sex Port1	Connector Port2	Sex Port2	F min (MHz)	F max (MHz)	Delay (pSec)	Loss (GΩ/Sec)	Z0 (Ω)
4	THRU	Insertable thru standard	Type N (50)	FEMALE	Type N (50)	MALE	0	4500	0	0.7	50

SOLT Class Assignments

Class Label	A	B	C	D	E	F	G	H
OPEN	2							
SHORT	3							
LOAD	1							
THRU*	4							

* Link FWD TRANS, FWD MATCH, REV TRANS, REV MATCH

TRL Class Assignments

Class Label	A	B	C	D	E	F
THRU						
REFLECT						
LINE/MATCH						

Calibration Reference Z0 = SYSTEM Z0

Test Port Reference Plane = THRU

F603ME

Connectors

Cal Kit	Description	Connector Family	Min Freq (MHz)	Max Freq (MHz)	Gender	Media	Impedance Z0 (Ω)
F503ME	3.5mm Calibration Kit (Siglent)	APC 3.5	0	4500	Gendered	COAX	50

Standards

Std. ID	Label	Description	Connector	Sex	C0 F(e-15)	C1 F(e-27)/Hz	C2 F(e-36)/Hz^2	C3 F(e-45)/Hz^3	F min (MHz)	F max (MHz)	Delay (pSec)	Loss (GΩ/Sec)	Z0 (Ω)
2	OPEN -M-	3.5mm male open	APC 3.5	MALE	38.164	-2534.95	855.857	-73.52275	0	4500	0	0	50

Std. ID	Label	Description	Connector	Sex	L0 H(e-12)	L1 H(e-24)/Hz	L2 H(e-33)/Hz^2	L3 H(e-42)/Hz^3	F min (MHz)	F max (MHz)	Delay (pSec)	Loss (GΩ/Sec)	Z0 (Ω)
3	SHORT -M-	3.5mm male short	APC 3.5	MALE	0	0	0	0	0	4500	0	0	50

Std. ID	Label	Description	Connector	Sex	Fixed/Sliding	Arbitrary Impedance	Offset Load	F min (MHz)	F max (MHz)	Delay (pSec)	Loss (GΩ/Sec)	Z0 (Ω)
1	BROADBAND LOAD -M-	3.5mm male broadband load	APC 3.5	MALE	FIXED	OFF	OFF	0	4500	0	0	50

Std. ID	Label	Description	Connector Port1	Sex Port1	Connector Port2	Sex Port2	F min (MHz)	F max (MHz)	Delay (pSec)	Loss (GΩ/Sec)	Z0 (Ω)
4	THRU	Insertable thru standard	APC 3.5	FEMALE	APC 3.5	MALE	0	4500	0	0	50

SOLT Class Assignments

Class Label	A	B	C	D	E	F	G	H
OPEN	2							
SHORT	3							
LOAD	1							
THRU*	4							

* Link FWD TRANS, FWD MATCH, REV TRANS, REV MATCH

TRL Class Assignments

Class Label	A	B	C	D	E	F
THRU						
REFLECT						
LINE/MATCH						

Calibration Reference Z0 = SYSTEM Z0

Test Port Reference Plane = THRU

F603FE

Connectors

Cal Kit	Description	Connector Family	Min Freq (MHz)	Max Freq (MHz)	Gender	Media	Impedance Z0 (Ω)
F603FE	3.5mm Calibration Kit (Siglent)	APC 3.5	0	4500	Gendered	COAX	50

Standards

Std. ID	Label	Description	Connector	Sex	C0 F(e-15)	C1 F(e-27)/Hz	C2 F(e-36)/Hz^2	C3 F(e-45)/Hz^3	F min (MHz)	F max (MHz)	Delay (pSec)	Loss (GΩ/Sec)	Z0 (Ω)
2	OPEN -F-	3.5mm female open	APC 3.5	FEMALE	49.433	-310.13	23.168	-0.15966	0	4500	29.243	2.3	50

Std. ID	Label	Description	Connector	Sex	L0 H(e-12)	L1 H(e-24)/Hz	L2 H(e-33)/Hz^2	L3 H(e-42)/Hz^3	F min (MHz)	F max (MHz)	Delay (pSec)	Loss (GΩ/Sec)	Z0 (Ω)
3	SHORT -F-	3.5mm female short	APC 3.5	FEMALE	2.0765	-108.54	2.1705	-0.01	0	4500	31.785	2.36	50

Std. ID	Label	Description	Connector	Sex	Fixed/Sliding	Arbitrary Impedance	Offset Load	F min (MHz)	F max (MHz)	Delay (pSec)	Loss (GΩ/Sec)	Z0 (Ω)
1	BROADBAND LOAD -F-	3.5mm female broadband load	APC 3.5	FEMALE	FIXED	OFF	OFF	0	4500	0	0	50

Std. ID	Label	Description	Connector Port1	Sex Port1	Connector Port2	Sex Port2	F min (MHz)	F max (MHz)	Delay (pSec)	Loss (GΩ/Sec)	Z0 (Ω)
4	THRU	Insertable thru standard	APC 3.5	FEMALE	APC 3.5	MALE	0	4500	0	0	50

SOLT Class Assignments

Class Label	A	B	C	D	E	F	G	H
OPEN	2							
SHORT	3							
LOAD	1							
THRU*	4							

* Link FWD TRANS, FWD MATCH, REV TRANS, REV MATCH

TRL Class Assignments

Class Label	A	B	C	D	E	F
THRU						
REFLECT						
LINE/MATCH						

Calibration Reference Z0 = SYSTEM Z0

Test Port Reference Plane = THRU

F504MS / Y504MS

Connectors

Cal Kit	Description	Connector Family	Min Freq (MHz)	Max Freq (MHz)	Gender	Media	Impedance Z0 (Ω)
F504MS	Type N (50) Calibration Kit (Siglent)	Type N (50)	0	9000	Gendered	COAX	50
Y504MS	Type N (50) Calibration Kit (Siglent)	Type N (50)	0	9000	Gendered	COAX	50

Standards

Std. ID	Label	Description	Connector	Sex	C0 F(e-15)	C1 F(e-27)/Hz	C2 F(e-36)/Hz^2	C3 F(e-45)/Hz^3	F min (MHz)	F max (MHz)	Delay (pSec)	Loss (GΩ/Sec)	Z0 (Ω)
2	OPEN -M-	Type N (50) male open	Type N (50)	MALE	89.939	2536.8	-264.99	13.4	0	9000	40.856	0.93	50

Std. ID	Label	Description	Connector	Sex	L0 H(e-12)	L1 H(e-24)/Hz	L2 H(e-33)/Hz^2	L3 H(e-42)/Hz^3	F min (MHz)	F max (MHz)	Delay (pSec)	Loss (GΩ/Sec)	Z0 (Ω)
3	SHORT -M-	Type N (50) male short	Type N (50)	MALE	3.3998	-496.4808	34.8314	-0.7847	0	9000	45.955	1.087	49.992

Std. ID	Label	Description	Connector	Sex	Fixed/Sliding	Arbitrary Impedance	Offset Load	F min (MHz)	F max (MHz)	Delay (pSec)	Loss (GΩ/Sec)	Z0 (Ω)
1	BROADBAND LOAD -M-	Type N (50) male broadband load	Type N (50)	MALE	FIXED	OFF	OFF	0	9000	0	0	50

Std. ID	Label	Description	Connector Port1	Sex Port1	Connector Port2	Sex Port2	F min (MHz)	F max (MHz)	Delay (pSec)	Loss (GΩ/Sec)	Z0 (Ω)
4	THRU	Insertable thru standard	Type N (50)	FEMALE	Type N (50)	MALE	0	9000	0	0	50

SOLT Class Assignments

Class Label	A	B	C	D	E	F	G	H
OPEN	2							
SHORT	3							
LOAD	1							
THRU*	4							

* Link FWD TRANS, FWD MATCH, REV TRANS, REV MATCH

TRL Class Assignments

Class Label	A	B	C	D	E	F
THRU						
REFLECT						
LINE/MATCH						

Calibration Reference Z0 = SYSTEM Z0

Test Port Reference Plane = THRU

F504FS / Y504FS

Connectors

Cal Kit	Description	Connector Family	Min Freq (MHz)	Max Freq (MHz)	Gender	Media	Impedance Z0 (Ω)
F504FS	Type N (50) Calibration Kit (Siglent)	Type N (50)	0	9000	Gendered	COAX	50
Y504FS	Type N (50) Calibration Kit (Siglent)	Type N (50)	0	9000	Gendered	COAX	50

Standards

Std. ID	Label	Description	Connector	Sex	C0 F(e-15)	C1 F(e-27)/Hz	C2 F(e-36)/Hz^2	C3 F(e-45)/Hz^3	F min (MHz)	F max (MHz)	Delay (pSec)	Loss (GΩ/Sec)	Z0 (Ω)
2	OPEN -F-	Type N (50) female open	Type N (50)	FEMALE	89.939	2536.8	-264.99	13.4	0	9000	41.17	0.93	50

Std. ID	Label	Description	Connector	Sex	L0 H(e-12)	L1 H(e-24)/Hz	L2 H(e-33)/Hz^2	L3 H(e-42)/Hz^3	F min (MHz)	F max (MHz)	Delay (pSec)	Loss (GΩ/Sec)	Z0 (Ω)
3	SHORT -F-	Type N (50) female short	Type N (50)	FEMALE	3.3998	-496.4808	34.8314	-0.7847	0	9000	45.955	1.087	49.99

Std. ID	Label	Description	Connector	Sex	Fixed/Sliding	Arbitrary Impedance	Offset Load	F min (MHz)	F max (MHz)	Delay (pSec)	Loss (GΩ/Sec)	Z0 (Ω)
1	BROADBAND LOAD -F-	Type N (50) female broadband load	Type N (50)	FEMALE	FIXED	OFF	OFF	0	9000	0	0	50

Std. ID	Label	Description	Connector Port1	Sex Port1	Connector Port2	Sex Port2	F min (MHz)	F max (MHz)	Delay (pSec)	Loss (GΩ/Sec)	Z0 (Ω)
4	THRU	Insertable thru standard	Type N (50)	FEMALE	Type N (50)	MALE	0	9000	0	0	50

SOLT Class Assignments

Class Label	A	B	C	D	E	F	G	H
OPEN	2							
SHORT	3							
LOAD	1							
THRU*	4							

* Link FWD TRANS, FWD MATCH, REV TRANS, REV MATCH

TRL Class Assignments

Class Label	A	B	C	D	E	F
THRU						
REFLECT						
LINE/MATCH						

Calibration Reference Z0 = SYSTEM Z0

Test Port Reference Plane = THRU

F504TS

Connectors

Cal Kit	Description	Connector Family	Min Freq (MHz)	Max Freq (MHz)	Gender	Media	Impedance Z0 (Ω)
F504TS	Type N (50) Calibration Kit (Siglent)	Type N (50)	0	9000	Gendered	COAX	50

Standards

Std. ID	Label	Description	Connector	Sex	C0 F(e-15)	C1 F(e-27)/Hz	C2 F(e-36)/Hz^2	C3 F(e-45)/Hz^3	F min (MHz)	F max (MHz)	Delay (pSec)	Loss (GΩ/Sec)	Z0 (Ω)
2	OPEN -M-	Type N (50) male open	Type N (50)	MALE	89.939	2536.8	-264.99	13.4	0	9000	40.856	0.93	50
5	OPEN -F-	Type N (50) female open	Type N (50)	FEMALE	89.939	2536.8	-264.99	13.4	0	9000	41.17	0.93	50

Std. ID	Label	Description	Connector	Sex	L0 H(e-12)	L1 H(e-24)/Hz	L2 H(e-33)/Hz^2	L3 H(e-42)/Hz^3	F min (MHz)	F max (MHz)	Delay (pSec)	Loss (GΩ/Sec)	Z0 (Ω)
3	SHORT -M-	Type N (50) male short	Type N (50)	MALE	3.3998	-496.4808	34.8314	-0.7847	0	9000	45.955	1.087	49.992
6	SHORT -F-	Type N (50) female short	Type N (50)	FEMALE	3.3998	-496.4808	34.8314	-0.7847	0	9000	45.955	1.087	49.99

Std. ID	Label	Description	Connector	Sex	Fixed/Sliding	Arbitrary Impedance	Offset Load	F min (MHz)	F max (MHz)	Delay (pSec)	Loss (GΩ/Sec)	Z0 (Ω)
1	BROADBAND LOAD -M-	Type N (50) male broadband load	Type N (50)	MALE	FIXED	OFF	OFF	0	9000	0	0	50
4	BROADBAND LOAD -F-	Type N (50) female broadband load	Type N (50)	FEMALE	FIXED	OFF	OFF	0	9000	0	0	50

Std. ID	Label	Description	Connector Port1	Sex Port1	Connector Port2	Sex Port2	F min (MHz)	F max (MHz)	Delay (pSec)	Loss (GΩ/Sec)	Z0 (Ω)
7	THRU	Insertable thru standard	Type N (50)	FEMALE	Type N (50)	MALE	0	9000	0	0	50

SOLT Class Assignments

Class Label	A	B	C	D	E	F	G	H
OPEN	2	5						
SHORT	3	6						
LOAD	1	4						
THRU*	7							

* Link FWD TRANS, FWD MATCH, REV TRANS, REV MATCH

TRL Class Assignments

Class Label	A	B	C	D	E	F
THRU						
REFLECT						
LINE/MATCH						

Calibration Reference Z0 = SYSTEM Z0

Test Port Reference Plane = THRU

F604MS

Connectors

Cal Kit	Description	Connector Family	Min Freq (MHz)	Max Freq (MHz)	Gender	Media	Impedance Z0 (Ω)
F604MS	3.5 mm Calibration Kit (Siglent)	APC 3.5	0	9000	Gendered	COAX	50

Standards

Std. ID	Label	Description	Connector	Sex	C0 F(e-15)	C1 F(e-27)/Hz	C2 F(e-36)/Hz^2	C3 F(e-45)/Hz^3	F min (MHz)	F max (MHz)	Delay (pSec)	Loss (GΩ/Sec)	Z0 (Ω)
2	OPEN -M-	3.5 mm male open	APC 3.5	MALE	49.433	-310.13	23.168	-0.15966	0	9000	29.243	2.2	50

Std. ID	Label	Description	Connector	Sex	L0 H(e-12)	L1 H(e-24)/Hz	L2 H(e-33)/Hz^2	L3 H(e-42)/Hz^3	F min (MHz)	F max (MHz)	Delay (pSec)	Loss (GΩ/Sec)	Z0 (Ω)
3	SHORT -M-	3.5 mm male short	APC 3.5	MALE	2.0765	-108.54	2.1705	-0.01	0	9000	31.785	2.36	50

Std. ID	Label	Description	Connector	Sex	Fixed/Sliding	Arbitrary Impedance	Offset Load	F min (MHz)	F max (MHz)	Delay (pSec)	Loss (GΩ/Sec)	Z0 (Ω)
1	BROADBAND LOAD -M-	3.5 mm male broadband load	APC 3.5	MALE	FIXED	OFF	OFF	0	9000	0	2.3	50

Std. ID	Label	Description	Connector Port1	Sex Port1	Connector Port2	Sex Port2	F min (MHz)	F max (MHz)	Delay (pSec)	Loss (GΩ/Sec)	Z0 (Ω)
4	THRU	Insertable thru standard	APC 3.5	FEMALE	APC 3.5	MALE	0	9000	0	2.3	50

SOLT Class Assignments

Class Label	A	B	C	D	E	F	G	H
OPEN	2							
SHORT	3							
LOAD	1							
THRU*	4							

* Link FWD TRANS, FWD MATCH, REV TRANS, REV MATCH

TRL Class Assignments

Class Label	A	B	C	D	E	F
THRU						
REFLECT						
LINE/MATCH						

Calibration Reference Z0 = SYSTEM Z0

Test Port Reference Plane = THRU

F604FS

Connectors

Cal Kit	Description	Connector Family	Min Freq (MHz)	Max Freq (MHz)	Gender	Media	Impedance Z0 (Ω)
F604FS	3.5mm Calibration Kit (Siglent)	APC 3.5	0	9000	Gendered	COAX	50

Standards

Std. ID	Label	Description	Connector	Sex	C0 F(e-15)	C1 F(e-27)/Hz	C2 F(e-36)/Hz^2	C3 F(e-45)/Hz^3	F min (MHz)	F max (MHz)	Delay (pSec)	Loss (GΩ/Sec)	Z0 (Ω)
2	OPEN -F-	3.5mm female open	APC 3.5	FEMALE	49.433	-310.13	23.168	-0.15966	0	9000	29.243	2.3	50

Std. ID	Label	Description	Connector	Sex	L0 H(e-12)	L1 H(e-24)/Hz	L2 H(e-33)/Hz^2	L3 H(e-42)/Hz^3	F min (MHz)	F max (MHz)	Delay (pSec)	Loss (GΩ/Sec)	Z0 (Ω)
3	SHORT -F-	3.5mm female short	APC 3.5	FEMALE	2.0765	-108.54	2.1705	-0.01	0	9000	31.785	2.36	50

Std. ID	Label	Description	Connector	Sex	Fixed/Sliding	Arbitrary Impedance	Offset Load	F min (MHz)	F max (MHz)	Delay (pSec)	Loss (GΩ/Sec)	Z0 (Ω)
1	BROADBAND LOAD -F-	3.5mm female broadband load	APC 3.5	FEMALE	FIXED	OFF	OFF	0	9000	0	0	50

Std. ID	Label	Description	Connector Port1	Sex Port1	Connector Port2	Sex Port2	F min (MHz)	F max (MHz)	Delay (pSec)	Loss (GΩ/Sec)	Z0 (Ω)
4	THRU	Insertable thru standard	APC 3.5	FEMALE	APC 3.5	MALE	0	9000	0	2.3	50

SOLT Class Assignments

Class Label	A	B	C	D	E	F	G	H
OPEN	2							
SHORT	3							
LOAD	1							
THRU*	4							

* Link FWD TRANS, FWD MATCH, REV TRANS, REV MATCH

TRL Class Assignments

Class Label	A	B	C	D	E	F
THRU						
REFLECT						
LINE/MATCH						

Calibration Reference Z0 = SYSTEM Z0

Test Port Reference Plane = THRU

F604TS

Connectors

Cal Kit	Description	Connector Family	Min Freq (MHz)	Max Freq (MHz)	Gender	Media	Impedance Z0 (Ω)
F604TS	3.5 mm Calibration Kit (Siglent)	APC 3.5	0	9000	Gendered	COAX	50

Standards

Std. ID	Label	Description	Connector	Sex	C0 F(e-15)	C1 F(e-27)/Hz	C2 F(e-36)/Hz^2	C3 F(e-45)/Hz^3	F min (MHz)	F max (MHz)	Delay (pSec)	Loss (GΩ/Sec)	Z0 (Ω)
2	OPEN -M-	3.5 mm male open	APC 3.5	MALE	49.433	-310.13	23.168	-0.15966	0	9000	29.243	2.2	50
15	OPEN -F-	3.5 mm female open	APC 3.5	FEMALE	49.433	-310.13	23.168	-0.15966	0	9000	29.243	2.3	50

Std. ID	Label	Description	Connector	Sex	L0 H(e-12)	L1 H(e-24)/Hz	L2 H(e-33)/Hz^2	L3 H(e-42)/Hz^3	F min (MHz)	F max (MHz)	Delay (pSec)	Loss (GΩ/Sec)	Z0 (Ω)
1	SHORT -M-	3.5 mm male short	APC 3.5	MALE	2.0765	-108.54	2.1705	-0.01	0	9000	31.785	2.36	50
7	SHORT -F-	3.5 mm female short	APC 3.5	FEMALE	2.0765	-108.54	2.1705	-0.01	0	9000	31.785	2.36	50

Std. ID	Label	Description	Connector	Sex	Fixed/Sliding	Arbitrary Impedance	Offset Load	F min (MHz)	F max (MHz)	Delay (pSec)	Loss (GΩ/Sec)	Z0 (Ω)
3	BROADBAND LOAD -M-	3.5 mm male broadband load	APC 3.5	MALE	FIXED	OFF	OFF	0	9000	0	2.3	50
14	BROADBAND LOAD -F-	3.5 mm female broadband load	APC 3.5	FEMALE	FIXED	OFF	OFF	0	9000	0	0	50

Std. ID	Label	Description	Connector Port1	Sex Port1	Connector Port2	Sex Port2	F min (MHz)	F max (MHz)	Delay (pSec)	Loss (GΩ/Sec)	Z0 (Ω)
4	THRU	Insertable thru standard	APC 3.5	FEMALE	APC 3.5	MALE	0	9000	0	0	50

SOLT Class Assignments

Class Label	A	B	C	D	E	F	G	H
OPEN	2	15						
SHORT	1	7						
LOAD	3	14						
THRU*	4							

* Link FWD TRANS, FWD MATCH, REV TRANS, REV MATCH

TRL Class Assignments

Class Label	A	B	C	D	E	F
THRU						
REFLECT						
LINE/MATCH						

Calibration Reference Z0 = SYSTEM Z0

Test Port Reference Plane = THRU

F505MS

Connectors

Cal Kit	Description	Connector Family	Min Freq (MHz)	Max Freq (MHz)	Gender	Media	Impedance Z0 (Ω)
F505MS	Type N (50) Calibration Kit (Siglent)	Type N (50)	0	18000	Gendered	COAX	50

Standards

Std. ID	Label	Description	Connector	Sex	C0 F(e-15)	C1 F(e-27)/Hz	C2 F(e-36)/Hz^2	C3 F(e-45)/Hz^3	F min (MHz)	F max (MHz)	Delay (pSec)	Loss (GΩ/Sec)	Z0 (Ω)
2	OPEN -M-	Type N (50) male open	Type N (50)	MALE	89.939	2536.7999	-264.9901	13.4	0	18000	57.993	0.93	50

Std. ID	Label	Description	Connector	Sex	L0 H(e-12)	L1 H(e-24)/Hz	L2 H(e-33)/Hz^2	L3 H(e-42)/Hz^3	F min (MHz)	F max (MHz)	Delay (pSec)	Loss (GΩ/Sec)	Z0 (Ω)
3	SHORT -M-	Type N (50) male short	Type N (50)	MALE	0.7563	459.8799	-52.429	1.5846	0	18000	63.078	1.1273	50

Std. ID	Label	Description	Connector	Sex	Fixed/Sliding	Arbitrary Impedance	Offset Load	F min (MHz)	F max (MHz)	Delay (pSec)	Loss (GΩ/Sec)	Z0 (Ω)
1	BROADBAND LOAD -M-	Type N (50) male broadband load	Type N (50)	MALE	FIXED	OFF	OFF	0	18000	0	0	50

Std. ID	Label	Description	Connector Port1	Sex Port1	Connector Port2	Sex Port2	F min (MHz)	F max (MHz)	Delay (pSec)	Loss (GΩ/Sec)	Z0 (Ω)
4	THRU	Insertable thru standard	Type N (50)	FEMALE	Type N (50)	MALE	0	18000	0	2.2	50

SOLT Class Assignments

Class Label	A	B	C	D	E	F	G	H
OPEN	2							
SHORT	3							
LOAD	1							
THRU*	4							

* Link FWD TRANS, FWD MATCH, REV TRANS, REV MATCH

TRL Class Assignments

Class Label	A	B	C	D	E	F
THRU						
REFLECT						
LINE/MATCH						

Calibration Reference Z0 = SYSTEM Z0

Test Port Reference Plane = THRU

F505FS

Connectors

Cal Kit	Description	Connector Family	Min Freq (MHz)	Max Freq (MHz)	Gender	Media	Impedance Z0 (Ω)
F505FS	Type N (50) Calibration Kit (Siglent)	Type N (50)	0	18000	Gendered	COAX	50

Standards

Std. ID	Label	Description	Connector	Sex	C0 F(e-15)	C1 F(e-27)/Hz	C2 F(e-36)/Hz^2	C3 F(e-45)/Hz^3	F min (MHz)	F max (MHz)	Delay (pSec)	Loss (GΩ/Sec)	Z0 (Ω)
2	OPEN -F-	Type N (50) female open	Type N (50)	FEMALE	104.13	-1943.4008	144.62	2.2258	0	18000	22.905	0.93	50

Std. ID	Label	Description	Connector	Sex	L0 H(e-12)	L1 H(e-24)/Hz	L2 H(e-33)/Hz^2	L3 H(e-42)/Hz^3	F min (MHz)	F max (MHz)	Delay (pSec)	Loss (GΩ/Sec)	Z0 (Ω)
3	SHORT -F-	Type N (50) female short	Type N (50)	FEMALE	-0.1315	606.2089	-68.405	2.0206	0	18000	27.99	1.3651	50

Std. ID	Label	Description	Connector	Sex	Fixed/Sliding	Arbitrary Impedance	Offset Load	F min (MHz)	F max (MHz)	Delay (pSec)	Loss (GΩ/Sec)	Z0 (Ω)
1	BROADBAND LOAD -F-	Type N (50) female broadband load	Type N (50)	FEMALE	FIXED	OFF	OFF	0	18000	0	0	50

Std. ID	Label	Description	Connector Port1	Sex Port1	Connector Port2	Sex Port2	F min (MHz)	F max (MHz)	Delay (pSec)	Loss (GΩ/Sec)	Z0 (Ω)
4	THRU	Insertable thru standard	Type N (50)	FEMALE	Type N (50)	MALE	0	18000	0	2.2	50

SOLT Class Assignments

Class Label	A	B	C	D	E	F	G	H
OPEN	2							
SHORT	3							
LOAD	1							
THRU*	4							

* Link FWD TRANS, FWD MATCH, REV TRANS, REV MATCH

TRL Class Assignments

Class Label	A	B	C	D	E	F
THRU						
REFLECT						
LINE/MATCH						

Calibration Reference Z0 = SYSTEM Z0

Test Port Reference Plane = THRU

F505TS

Connectors

Cal Kit	Description	Connector Family	Min Freq (MHz)	Max Freq (MHz)	Gender	Media	Impedance Z0 (Ω)
F505TS	Type N (50) Calibration Kit (Siglent)	Type N (50)	0	18000	Gendered	COAX	50

Standards

Std. ID	Label	Description	Connector	Sex	C0 F(e-15)	C1 F(e-27)/Hz	C2 F(e-36)/Hz^2	C3 F(e-45)/Hz^3	F min (MHz)	F max (MHz)	Delay (pSec)	Loss (GΩ/Sec)	Z0 (Ω)
2	OPEN -M-	Type N (50) male open	Type N (50)	MALE	89.939	2536.7999	-264.9901	13.4	0	18000	57.993	0.93	50
5	OPEN -F-	Type N (50) female open	Type N (50)	FEMALE	104.13	-1943.4008	144.62	2.2258	0	18000	22.905	0.93	50

Std. ID	Label	Description	Connector	Sex	L0 H(e-12)	L1 H(e-24)/Hz	L2 H(e-33)/Hz^2	L3 H(e-42)/Hz^3	F min (MHz)	F max (MHz)	Delay (pSec)	Loss (GΩ/Sec)	Z0 (Ω)
3	SHORT -M-	Type N (50) male short	Type N (50)	MALE	0.7563	459.8799	-52.429	1.5846	0	18000	63.078	1.1273	50
6	SHORT -F-	Type N (50) female short	Type N (50)	FEMALE	-0.1315	606.2089	-68.405	2.0206	0	18000	27.99	1.3651	50

Std. ID	Label	Description	Connector	Sex	Fixed/Sliding	Arbitrary Impedance	Offset Load	F min (MHz)	F max (MHz)	Delay (pSec)	Loss (GΩ/Sec)	Z0 (Ω)
1	BROADBAND LOAD -M-	Type N (50) male broadband load	Type N (50)	MALE	FIXED	OFF	OFF	0	18000	0	0	50
4	BROADBAND LOAD -F-	Type N (50) female broadband load	Type N (50)	FEMALE	FIXED	OFF	OFF	0	18000	0	0	50

Std. ID	Label	Description	Connector Port1	Sex Port1	Connector Port2	Sex Port2	F min (MHz)	F max (MHz)	Delay (pSec)	Loss (GΩ/Sec)	Z0 (Ω)
7	THRU	Insertable thru standard	Type N (50)	FEMALE	Type N (50)	MALE	0	18000	0	2.2	50

SOLT Class Assignments

Class Label	A	B	C	D	E	F	G	H
OPEN	2	5						
SHORT	3	6						
LOAD	1	4						
THRU*	7							

* Link FWD TRANS, FWD MATCH, REV TRANS, REV MATCH

TRL Class Assignments

Class Label	A	B	C	D	E	F
THRU						
REFLECT						
LINE/MATCH						

Calibration Reference Z0 = SYSTEM Z0

Test Port Reference Plane = THRU

F606MS / Y606MS

Connectors

Cal Kit	Description	Connector Family	Min Freq (MHz)	Max Freq (MHz)	Gender	Media	Impedance Z0 (Ω)
F606MS	3.5 mm Calibration Kit (Siglent)	APC 3.5	0	26500	Gendered	COAX	50
Y606MS	3.5 mm Calibration Kit (Siglent)	APC 3.5	0	26500	Gendered	COAX	50

Standards

Std. ID	Label	Description	Connector	Sex	C0 F(e-15)	C1 F(e-27)/Hz	C2 F(e-36)/Hz^2	C3 F(e-45)/Hz^3	F min (MHz)	F max (MHz)	Delay (pSec)	Loss (GΩ/Sec)	Z0 (Ω)
2	OPEN -M-	3.5 mm male open	APC 3.5	MALE	49.433	-310.13	23.168	-0.15966	0	26500	29.243	2.2	50

Std. ID	Label	Description	Connector	Sex	L0 H(e-12)	L1 H(e-24)/Hz	L2 H(e-33)/Hz^2	L3 H(e-42)/Hz^3	F min (MHz)	F max (MHz)	Delay (pSec)	Loss (GΩ/Sec)	Z0 (Ω)
3	SHORT -M-	3.5 mm male short	APC 3.5	MALE	2.0765	-108.54	2.1705	-0.01	0	26500	31.785	2.36	50

Std. ID	Label	Description	Connector	Sex	Fixed/Sliding	Arbitrary Impedance	Offset Load	F min (MHz)	F max (MHz)	Delay (pSec)	Loss (GΩ/Sec)	Z0 (Ω)
1	BROADBAND LOAD -M-	3.5 mm male broadband load	APC 3.5	MALE	FIXED	OFF	OFF	0	26500	0	0	50

Std. ID	Label	Description	Connector Port1	Sex Port1	Connector Port2	Sex Port2	F min (MHz)	F max (MHz)	Delay (pSec)	Loss (GΩ/Sec)	Z0 (Ω)
4	THRU	Insertable thru standard	APC 3.5	FEMALE	APC 3.5	MALE	0	26500	0	0	50

SOLT Class Assignments

Class Label	A	B	C	D	E	F	G	H
OPEN	2							
SHORT	3							
LOAD	1							
THRU*	4							

* Link FWD TRANS, FWD MATCH, REV TRANS, REV MATCH

TRL Class Assignments

Class Label	A	B	C	D	E	F
THRU						
REFLECT						
LINE/MATCH						

Calibration Reference Z0 = SYSTEM Z0

Test Port Reference Plane = THRU

F606FS / Y606FS

Connectors

Cal Kit	Description	Connector Family	Min Freq (MHz)	Max Freq (MHz)	Gender	Media	Impedance Z0 (Ω)
F606FS	3.5 mm Calibration Kit (Siglent)	APC 3.5	0	26500	Gendered	COAX	50
Y606FS	3.5 mm Calibration Kit (Siglent)	APC 3.5	0	26500	Gendered	COAX	50

Standards

Std. ID	Label	Description	Connector	Sex	C0 F(e-15)	C1 F(e-27)/Hz	C2 F(e-36)/Hz^2	C3 F(e-45)/Hz^3	F min (MHz)	F max (MHz)	Delay (pSec)	Loss (GΩ/Sec)	Z0 (Ω)
2	OPEN -F-	3.5 mm female open	APC 3.5	FEMALE	49.433	-310.13	23.168	-0.15966	0	26500	29.243	2.2	50

Std. ID	Label	Description	Connector	Sex	L0 H(e-12)	L1 H(e-24)/Hz	L2 H(e-33)/Hz^2	L3 H(e-42)/Hz^3	F min (MHz)	F max (MHz)	Delay (pSec)	Loss (GΩ/Sec)	Z0 (Ω)
3	SHORT -F-	3.5 mm female short	APC 3.5	FEMALE	2.0765	-108.54	2.1705	-0.01	0	26500	31.785	2.36	50

Std. ID	Label	Description	Connector	Sex	Fixed/Sliding	Arbitrary Impedance	Offset Load	F min (MHz)	F max (MHz)	Delay (pSec)	Loss (GΩ/Sec)	Z0 (Ω)
1	BROADBAND LOAD -F-	3.5 mm female broadband load	APC 3.5	FEMALE	FIXED	OFF	OFF	0	26500	0	0	50

Std. ID	Label	Description	Connector Port1	Sex Port1	Connector Port2	Sex Port2	F min (MHz)	F max (MHz)	Delay (pSec)	Loss (GΩ/Sec)	Z0 (Ω)
4	THRU	Insertable thru standard	APC 3.5	FEMALE	APC 3.5	MALE	0	26500	0	0	50

SOLT Class Assignments

Class Label	A	B	C	D	E	F	G	H
OPEN	2							
SHORT	3							
LOAD	1							
THRU*	4							

* Link FWD TRANS, FWD MATCH, REV TRANS, REV MATCH

TRL Class Assignments

Class Label	A	B	C	D	E	F
THRU						
REFLECT						
LINE/MATCH						

Calibration Reference Z0 = SYSTEM Z0

Test Port Reference Plane = THRU

F606TS

Connectors

Cal Kit	Description	Connector Family	Min Freq (MHz)	Max Freq (MHz)	Gender	Media	Impedance Z0 (Ω)
F606TS	3.5 mm Calibration Kit (Siglent)	APC 3.5	0	26500	Gendered	COAX	50

Standards

Std. ID	Label	Description	Connector	Sex	C0 F(e-15)	C1 F(e-27)/Hz	C2 F(e-36)/Hz^2	C3 F(e-45)/Hz^3	F min (MHz)	F max (MHz)	Delay (pSec)	Loss (GΩ/Sec)	Z0 (Ω)
2	OPEN -M-	3.5 mm male open	APC 3.5	MALE	49.433	-310.13	23.168	-0.15966	0	26500	29.243	2.2	50
5	OPEN -F-	3.5 mm female open	APC 3.5	FEMALE	49.433	-310.13	23.168	-0.15966	0	26500	29.243	2.2	50

Std. ID	Label	Description	Connector	Sex	L0 H(e-12)	L1 H(e-24)/Hz	L2 H(e-33)/Hz^2	L3 H(e-42)/Hz^3	F min (MHz)	F max (MHz)	Delay (pSec)	Loss (GΩ/Sec)	Z0 (Ω)
3	SHORT -M-	3.5 mm male short	APC 3.5	MALE	2.0765	-108.54	2.1705	-0.01	0	26500	31.785	2.36	50
6	SHORT -F-	3.5 mm female short	APC 3.5	FEMALE	2.0765	-108.54	2.1705	-0.01	0	26500	31.785	2.36	50

Std. ID	Label	Description	Connector	Sex	Fixed/Sliding	Arbitrary Impedance	Offset Load	F min (MHz)	F max (MHz)	Delay (pSec)	Loss (GΩ/Sec)	Z0 (Ω)
1	BROADBAND LOAD -M-	3.5 mm male broadband load	APC 3.5	MALE	FIXED	OFF	OFF	0	26500	0	0	50
4	BROADBAND LOAD -F-	3.5 mm female broadband load	APC 3.5	FEMALE	FIXED	OFF	OFF	0	26500	0	0	50

Std. ID	Label	Description	Connector Port1	Sex Port1	Connector Port2	Sex Port2	F min (MHz)	F max (MHz)	Delay (pSec)	Loss (GΩ/Sec)	Z0 (Ω)
7	THRU	Insertable thru standard	APC 3.5	FEMALE	APC 3.5	MALE	0	26500	0	0	50

SOLT Class Assignments

Class Label	A	B	C	D	E	F	G	H
OPEN	2	15						
SHORT	1	7						
LOAD	3	14						
THRU*	4							

* Link FWD TRANS, FWD MATCH, REV TRANS, REV MATCH

TRL Class Assignments

Class Label	A	B	C	D	E	F
THRU						
REFLECT						
LINE/MATCH						

Calibration Reference Z0 = SYSTEM Z0

Test Port Reference Plane = THRU

KWR42A

Connectors

Cal Kit	Description	Connector Family	Min Freq (MHz)	Max Freq (MHz)	Cutoff Freq (MHz)	Gender	Height/Width Ratio	Media	Impedance Z0 (Ω)
KWR42A	K-band Waveguide TRL Calibration Kit (Siglent)	K-band Waveguide	14047	28094	14047	Genderless	0.405	WAVEGUIDE	1

Standards

Std. ID	Label	Description	Connector	L0 H(e-12)	L1 H(e-24)/Hz	L2 H(e-33)/Hz^2	L3 H(e-42)/Hz^3	F min (MHz)	F max (MHz)	Delay (pSec)	Loss (GΩ/Sec)	Z0 (Ω)
4	Short	K-band short	K-band Waveguide	0	0	0	0	14047	28094	0	0	1
5	Offset Short	K-band 1/4 offset short	K-band Waveguide	0	0	0	0	14047	28094	15.02	2.75	1

Std. ID	Label	Description	Connector	Fixed/Sliding	Arbitrary Impedance	Offset Load	F min (MHz)	F max (MHz)	Delay (pSec)	Loss (GΩ/Sec)	Z0 (Ω)
1	Offset Load	K-band offset load	K-band Waveguide	FIXED	OFF	ON	14047	28094	/	/	/
2	Fixed Load	K-band fixed load	K-band Waveguide	FIXED	OFF	OFF	14047	28094	0	0	1
3	Sliding Load	K-band sliding load	K-band Waveguide	SLIDING	OFF	OFF	14047	28094	/	/	/

Std. ID	Label	Description	Connector Port1	Connector Port2	F min (MHz)	F max (MHz)	Delay (pSec)	Loss (GΩ/Sec)	Z0 (Ω)
6	Thru	K-band Thru	K-band Waveguide	K-band Waveguide	14047	28094	0	0	1
7	1/4 Line	K-band 1/4 wavelength line	K-band Waveguide	K-band Waveguide	14047	28094	15.02	2.75	1

SOLT Class Assignments

Class Label	A	B	C	D	E	F	G	H
OPEN								
SHORT								
LOAD								
THRU*								

* Link FWD TRANS, FWD MATCH, REV TRANS, REV MATCH

TRL Class Assignments

Class Label	A	B	C	D	E	F
THRU	6					
REFLECT	4					
LINE/MATCH	7					

Calibration Reference Z0 = LINE Z0

Test Port Reference Plane = THRU

Appendix B Derivation of Coaxial Calibration Model

The model definition of coaxial mechanical calibration kit is shown in Figure 10.

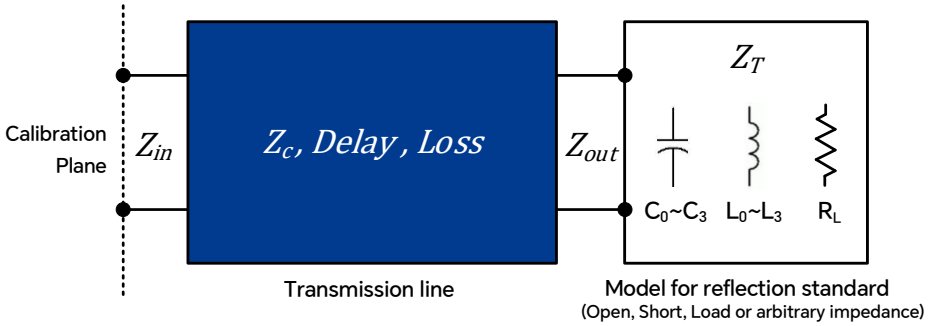


Figure 8 Model definition of coaxial mechanical calibration kit

Where:

- Z_{in} = the input impedance of transmission line
- Z_{out} = the output impedance of transmission line
- $Delay$ = the dispersion free, TEM mode, electrical delay defined by:

$$Delay = \frac{l}{v}$$

  Where l is the physical offset length of transmission line and v is the speed of light in transmission medium.

- $Loss$ = the propagation loss per unit length of transmission line at a normalization frequency of 1 GHz multiplied by the speed of light in the transmission medium, and the unit is GΩ/Sec. For coaxial mechanical calibration kit, if the log magnitude S_{11dB} of Short, Open, Load at 1GHz is obtained, or the log magnitude S_{21dB} of Through at 1GHz is obtained, $Loss$ can be estimated as:

$$Loss = -\frac{ln(10)\,S_{11dB}}{20}\left(\frac{Z_0}{Delay}\right)$$

$$Loss = -\frac{ln(10)\,S_{21dB}}{10}\left(\frac{Z_0}{Delay}\right)$$

- Z_C = the characteristic impedance of transmission line, given as:

$$Z_C = Z_0 + (1-j)\left(\frac{Loss}{4\pi f}\right)\sqrt{\frac{f}{10^9}}$$

  Where Z_0 is the lossless characteristic impedance of transmission line and f is the frequency in Hz.

- Z_T = the termination impedance. For Short and Open, there are:

$$Z_{T(Short)} = j2\pi f L_{Short} = j2\pi f(L_0 + L_1 f + L_2 f^2 + L_3 f^3)$$

$$Z_{T(Open)} = \frac{1}{j2\pi f C_{Open}} = \frac{1}{j2\pi f(C_0 + C_1 f + C_2 f^2 + C_3 f^3)}$$

- L_0~L_3 = the third order polynomial capacitance model
- C_0~C_3 = the third order polynomial inductance model
- R_L = the resistance model

According to the transmission line model, the flowgraph representation of coaxial mechanical calibration kit is shown in Figure 11.

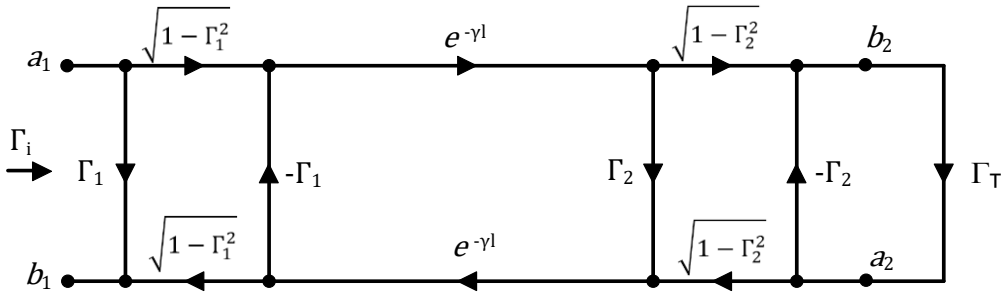


Figure 9 Flowgraph representation of coaxial mechanical calibration kit

Where:

- $\gamma =$ the propagation constant of the line, defined by:

$$\gamma = \alpha + j\beta$$

- $\alpha =$ the propagation loss constant of the line, $\beta =$ the propagation phase constant of the line, given as:

$$\alpha l = \frac{(Loss)(Delay)}{2Z_0}\sqrt{\frac{f}{10^9}}$$

$$\beta l = (2\pi f \times Delay) + al$$

- $\Gamma_1 =$ input reflection coefficient of transmission line, $\Gamma_2 =$ output reflection coefficient of transmission line, given as:

$$\Gamma_1 = \frac{Z_c - Z_{in}}{Z_c + Z_{in}}$$

$$\Gamma_2 = \frac{Z_{out} - Z_c}{Z_{out} + Z_c}$$

Let $Z_{in} = Z_{out} = Z_0$ we get:

$$\Gamma_1 = -\Gamma_2 = \frac{Z_c - Z_0}{Z_c + Z_0}$$

- $\Gamma_T =$ terminal reflection coefficient, given as:

$$\Gamma_T = \frac{Z_T - Z_0}{Z_T + Z_0}$$

Based on the flowgraph in Figure 11, the formula of the input reflection coefficient can be derived, that is, the one-port response of the coaxial mechanical calibration kit:

$$\Gamma_i = \frac{\Gamma_1(1 - e^{-2\gamma l} - \Gamma_1\Gamma_T) + \Gamma_T e^{-2\gamma l}}{1 - \Gamma_1(\Gamma_1 e^{-2\gamma l} + \Gamma_T(1 - e^{-2\gamma l}))}$$

About SIGLENT

SIGLENT is an international high-tech company, concentrating on R&D, sales, production and services of electronic test & measurement instruments.

SIGLENT first began developing digital oscilloscopes independently in 2002. After more than a decade of continuous development, SIGLENT has extended its product line to include digital oscilloscopes, isolated handheld oscilloscopes, function/arbitrary waveform generators, RF/MW signal generators, spectrum analyzers, vector network analyzers, digital multimeters, DC power supplies, electronic loads and other general purpose test instrumentation. Since its first oscilloscope was launched in 2005, SIGLENT has become the fastest growing manufacturer of digital oscilloscopes. We firmly believe that today SIGLENT is the best value in electronic test & measurement.

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