

机械校准套件

数据手册
CN03C

概述

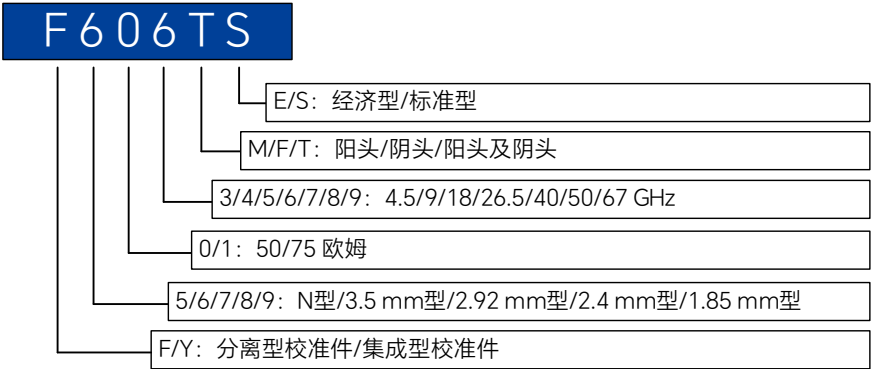
机械校准套件包含独立标准来表征系统误差，用于校准标量或矢量网络分析仪。

鼎阳科技提供多种型号的机械校准套件，包括 2.4mm、2.92mm、3.5mm 以及 Type N 连接器的同轴校准件，以及 K/V/W 波段的波导校准件。

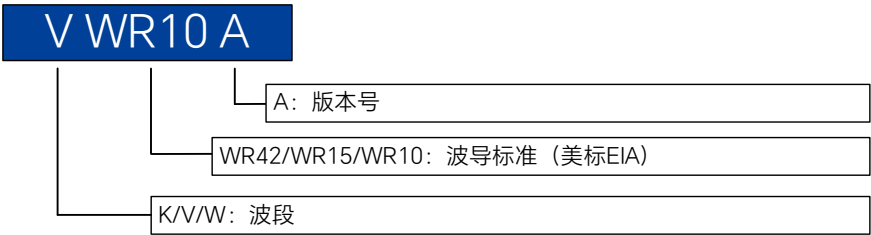
型号* ¹ * ²	频率范围	类型* ³	连接形式	阻抗	兼容替代
F503ME	DC - 4.5 GHz	OSLT	Type N - Male	50 Ω	85032B/E
F503FE	DC - 4.5 GHz	OSLT	Type N - Female	50 Ω	85032B/E
F603ME	DC - 4.5 GHz	OSLT	3.5mm - Male	50 Ω	/
F603FE	DC - 4.5 GHz	OSLT	3.5mm - Female	50 Ω	/
F504MS	DC - 9 GHz	OSLT	Type N - Male	50 Ω	85032F
Y504MS	DC - 9 GHz	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
Y707MS	DC - 40 GHz	OSLT	2.92mm - Male	50 Ω	8770D
Y707FS	DC - 40 GHz	OSLT	2.92mm - Female	50 Ω	8770D
F707TS	DC - 40 GHz	OSLT	2.92mm-Male AND Female	50 Ω	8770S
F808MS	DC - 50 GHz	OSLT	2.4mm - Male	50 Ω	85056D
Y808MS	DC - 50 GHz	OSLT	2.4mm - Male	50 Ω	85056D
F808FS	DC - 50 GHz	OSLT	2.4mm - Female	50 Ω	85056D
Y808FS	DC - 50 GHz	OSLT	2.4mm - Female	50 Ω	85056D
F808TS	DC - 50 GHz	OSLT	2.4mm - Male AND Female	50 Ω	85056D

型号*1*2	频率范围	类型*3	连接形式	阻抗
KWR42A	17.6 – 26.7 GHz	TRL	K-Band Waveguide	50 Ω
VWR15A	49.8 – 75.8 GHz	TRL	V-Band Waveguide	50 Ω
WWR10A	73.8 – 112 GHz	TRL	W-Band Waveguide	50 Ω

*1: 同轴校准套件编码规则



*2: 波导校准套件编码规则



*3: OSLT = 开路器(Open) + 短路器(Short) + 匹配负载(Load) + 直通适配器(Through)

TRL = 直通件(Through) + 反射件(Reflect) + 传输线(Line)

F503 系列

F503ME 和 F503FE 是经济型 N 型接头同轴校准件，标配包括 50 欧负载匹配、开路器、短路器和直通适配器，工作频率是 DC - 4.5GHz。

F503 系列校准件的性能参数是和德科技的 85032B/E 校准件十分相近，可进行兼容替代。



图 1 F503 系列同轴校准件

性能参数

型号	类型	连接形式	参数
F503ME	开路 Open	N - Male	DC - 2 GHz, Phase Deviation* $\leq \pm 0.65^\circ$ 2 GHz - 4.5 GHz, Phase Deviation* $\leq \pm 1^\circ$
	短路 Short	N - Male	DC - 2 GHz, Phase Deviation* $\leq \pm 0.65^\circ$ 2 GHz - 4.5 GHz, Phase Deviation* $\leq \pm 1^\circ$
	匹配 Load	N - Male	DC - 1 GHz, Return Loss ≥ 46 dB 1 GHz - 4.5 GHz, Return Loss ≥ 40 dB
	直通 Adapter	N - Male to N - Male	DC - 4.5 GHz, SWR ≤ 1.05 (Return Loss ≥ 32.3 dB)
F503FE	开路 Open	N - Female	DC - 2 GHz, Phase Deviation* $\leq \pm 0.65^\circ$ 2 GHz - 4.5 GHz, Phase Deviation* $\leq \pm 1^\circ$
	短路 Short	N - Female	DC - 2 GHz, Phase Deviation* $\leq \pm 0.65^\circ$ 2 GHz - 4.5 GHz, Phase Deviation* $\leq \pm 1^\circ$
	匹配 Load	N - Female	DC - 1 GHz, Return Loss ≥ 46 dB 1 GHz - 4.5 GHz, Return Loss ≥ 40 dB
	直通 Adapter	N - Female to N - Female	DC - 4.5 GHz, SWR ≤ 1.05 (Return Loss ≥ 32.3 dB)

* Phase Deviation 表示与标准定义（见附录 A）中的标称模型的相位偏差

一般指标

阻抗	50 Ω	功率	≤ 1 W
接头标准	IEC 60169-16 Grade 0	匹配周期（次）	> 2000
工作温度	+ 15 $^\circ\text{C}$ ~ + 35 $^\circ\text{C}$		

F603 系列

F603ME 和 F603FE 是经济型 3.5mm 接头同轴校准件，标配包括 50 欧负载匹配、开路器、短路器和直通适配器，工作频率是 DC - 4.5GHz。



图 2 F603 系列同轴校准件

性能参数

型号	类型	连接形式	参数
F603ME	开路 Open	3.5mm - Male	DC - 4.5 GHz, Phase Deviation* $\leq \pm 1^\circ$
	短路 Short	3.5mm - Male	DC - 4.5 GHz, Phase Deviation* $\leq \pm 1^\circ$
	匹配 Load	3.5mm - Male	DC - 1 GHz, Return Loss ≥ 42 dB 1 GHz - 4.5 GHz, Return Loss ≥ 37.2 dB
	直通 Adapter	3.5mm - Male to 3.5mm - Male	DC - 4.5 GHz, SWR ≤ 1.05 (Return Loss ≥ 32.3 dB)
F603FE	开路 Open	3.5mm - Female	DC - 4.5 GHz, Phase Deviation* $\leq \pm 1^\circ$
	短路 Short	3.5mm - Female	DC - 4.5 GHz, Phase Deviation* $\leq \pm 1^\circ$
	匹配 Load	3.5mm - Female	DC - 1 GHz, Return Loss ≥ 42 dB 1 GHz - 4.5 GHz, Return Loss ≥ 37.2 dB
	直通 Adapter	3.5mm - Female to 3.5mm - Female	DC - 4.5 GHz, SWR ≤ 1.05 (Return Loss ≥ 32.3 dB)

* Phase Deviation 表示与标准定义（见附录 A）中的标称模型的相位偏差

一般指标

阻抗	50 Ω	功率	≤ 1 W
接头标准	IEEE Std 287	匹配周期（次）	> 2000
工作温度	+ 15 $^\circ\text{C}$ ~ + 35 $^\circ\text{C}$		

F504 和 Y504 系列

F504MS 和 F504FS 分别是标准型 N 公头和 N 母头同轴校准件，均包含 50 欧负载匹配、开路器、短路器和直通适配器，工作频率是 DC - 9GHz。F504TS 为包含一套 F504MS 和一套 F504FS 的同轴校准件。Y504MS 与 F504MS 具有相同的零件和规格，但具有一体式外观。Y504FS 和 F504MS 也是如此。

F504 和 Y504 系列的性能参数是和德科技的 85032F 校准件十分相近，可进行兼容替代。



图 3 F504 系列（左）和 Y504 系列（右）同轴校准件

性能参数

型号	类型	连接形式	参数
F504TS	F504MS /Y504MS	开路 Open	N - Male DC - 3 GHz, Phase Deviation* $\leq \pm 0.65^\circ$ 3 GHz - 9 GHz, Phase Deviation* $\leq \pm 1^\circ$
		短路 Short	N - Male DC - 3 GHz, Phase Deviation* $\leq \pm 0.65^\circ$ 3 GHz - 9 GHz, Phase Deviation* $\leq \pm 1^\circ$
		匹配 Load	N - Male DC - 3 GHz, Return Loss ≥ 42 dB 3 GHz - 9 GHz, Return Loss ≥ 36 dB
		直通 Adapter	N - Male to N - Male DC - 9 GHz, SWR ≤ 1.06 (Return Loss ≥ 30.7 dB)
	F504FS /Y504FS	开路 Open	N - Female DC - 3 GHz, Phase Deviation* $\leq \pm 0.65^\circ$ 3 GHz - 9 GHz, Phase Deviation* $\leq \pm 1^\circ$
		短路 Short	N - Female DC - 3 GHz, Phase Deviation* $\leq \pm 0.65^\circ$ 3 GHz - 9 GHz, Phase Deviation* $\leq \pm 1^\circ$
		匹配 Load	N - Female DC - 3 GHz, Return Loss ≥ 42 dB 3 GHz - 9 GHz, Return Loss ≥ 36 dB
		直通 Adapter	N - Female to N - Female DC - 9 GHz, SWR ≤ 1.06 (Return Loss ≥ 30.7 dB)
	直通 Adapter		N - Male to N - Female DC - 9 GHz, SWR ≤ 1.06 (Return Loss ≥ 30.7 dB)
	扳手 Wrench		N - 19mm 1.35 Nm

* Phase Deviation 表示与标准定义（见附录 A）中的标称模型的相位偏差

一般指标

阻抗	50 Ω	功率	≤ 1 W
接头标准	IEC 60169-16 Grade 0	匹配周期（次）	> 2000
工作温度	+ 15 $^\circ\text{C}$ ~ + 35 $^\circ\text{C}$		

F505 系列

F505MS 和 F505FS 分别是标准型 N 公头和 N 母头同轴校准件，均包含 50 欧负载匹配、开路器、短路器和直通适配器，工作频率是 DC - 18GHz。F505TS 为包含一套 F504MS 和一套 F504FS 的同轴校准件。

F505 系列的性能参数是和是德科技的 85054D 校准件十分相近，可进行兼容替代。



图 4 F505 系列同轴校准件

性能参数

型号		类型	连接形式	参数
F505TS	F505MS	开路 Open	N - Male	DC - 18 GHz, Phase Deviation* $\leq \pm 1.5^\circ$
		短路 Short	N - Male	DC - 18 GHz, Phase Deviation* $\leq \pm 1^\circ$
		匹配 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
		直通 Adapter	N - Male to N - Male	DC - 18 GHz, SWR ≤ 1.06 (Return Loss ≥ 30.7 dB)
	F505FS	开路 Open	N - Female	DC - 18 GHz, Phase Deviation* $\leq \pm 1.5^\circ$
		短路 Short	N - Female	DC - 18 GHz, Phase Deviation* $\leq \pm 1^\circ$
		匹配 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
		直通 Adapter	N - Female to N - Female	DC - 18 GHz, SWR ≤ 1.06 (Return Loss ≥ 30.7 dB)
	直通 Adapter		N - Male to N - Female	DC - 18 GHz, SWR ≤ 1.06 (Return Loss ≥ 30.7 dB)
	扳手 Wrench		N - 19mm	1.35 Nm

* Phase Deviation 表示与标准定义（见附录 A）中的标称模型的相位偏差

一般指标

阻抗	50 Ω	功率	≤ 1 W
接头标准	IEC 60169-16	匹配周期（次）	> 2000
工作温度	$+ 15^\circ\text{C} \sim + 35^\circ\text{C}$		

F604 系列

F604MS 和 F604FS 分别是标准型 3.5mm 公头和 3.5mm 母头同轴校准件，工作频率是 DC – 9GHz。F604TS 为包含一套 F604MS 和一套 F604FS 的同轴校准件。

F604 系列的性能参数和是德科技的 85033E 校准件十分相近，可进行兼容替代。



F606 和 Y606 系列

F606MS 和 F606FS 分别是标准型 3.5mm 公头和 3.5mm 母头同轴校准件，工作频率是 DC - 26.5GHz。F606TS 为包含一套 F606MS 和一套 F606FS 的同轴校准件。Y606MS 与 F606MS 具有相同的零件和规格，但具有一体式外观。Y606FS 和 F606MS 也是如此。

F606 系列和 Y606 系列的性能参数和是德科技的 85052D 校准件十分相近，可进行兼容替代。



图 6 F606 系列（左）和 Y606 系列（右）同轴校准件

性能参数

型号		类型	连接形式	参数
F606TS	F606MS	开路 Open	3.5mm - Male	DC - 3 GHz, Phase Deviation* $\leq \pm 0.65^\circ$ 3 GHz - 8 GHz, Phase Deviation* $\leq \pm 1.2^\circ$ 8 - 26.5 GHz, Phase Deviation* $\leq \pm 2^\circ$
		短路 Short	3.5mm - Male	DC - 3 GHz, Phase Deviation* $\leq \pm 0.65^\circ$ 3 GHz - 8 GHz, Phase Deviation* $\leq \pm 1^\circ$ 8 GHz - 26.5 GHz, Phase Deviation* $\leq \pm 1.75^\circ$
		匹配 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
		直通 Adapter	3.5mm - Male to 3.5mm - Male	DC - 26.5 GHz, SWR ≤ 1.08
	F606FS	开路 Open	3.5mm - Female	DC - 3 GHz, Phase Deviation* $\leq \pm 0.65^\circ$ 3 GHz - 8 GHz, Phase Deviation* $\leq \pm 1.2^\circ$ 8 GHz - 26.5 GHz, Phase Deviation* $\leq \pm 2^\circ$
		短路 Short	3.5mm - Female	DC - 3 GHz, Phase Deviation* $\leq \pm 0.65^\circ$ 3 GHz - 8 GHz, Phase Deviation* $\leq \pm 1^\circ$ 8 GHz - 26.5 GHz, Phase Deviation* $\leq \pm 1.75^\circ$
		匹配 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
		直通 Adapter	3.5mm - Female to 3.5mm - Female	DC - 26.5 GHz, SWR ≤ 1.08
	直通 Adapter		3.5mm - Male to 3.5mm - Female	DC - 26.5 GHz, SWR ≤ 1.08
	扳手 Wrench		3.5mm - 8mm	0.9 Nm

* Phase Deviation 表示与标准定义（见附录 A）中的标称模型的相位偏差

型号	类型	连接形式	参数
Y606MS	开路 Open	3.5mm - Male	DC - 26.5 GHz, Phase Deviation* $\leq \pm 3^\circ$
	短路 Short	3.5mm - Male	DC - 26.5 GHz, Phase Deviation* $\leq \pm 2.8^\circ$
	匹配 Load	3.5mm - Male	DC - 26.5 GHz, SWR ≤ 1.07
	直通 Adapter	3.5mm - Male to 3.5mm - Male	DC - 26.5 GHz, SWR ≤ 1.12
	扳手 Wrench	3.5mm - 8mm	0.9 Nm
Y606FS	开路 Open	3.5mm - Female	DC - 26.5 GHz, Phase Deviation* $\leq \pm 3^\circ$
	短路 Short	3.5mm - Female	DC - 26.5 GHz, Phase Deviation* $\leq \pm 2.8^\circ$
	匹配 Load	3.5mm - Female	DC - 26.5 GHz, SWR ≤ 1.07
	直通 Adapter	3.5mm - Female to 3.5mm - Female	DC - 26.5 GHz, SWR ≤ 1.12
	扳手 Wrench	3.5mm - 8mm	0.9 Nm

* Phase Deviation 表示与标准定义（见附录 A）中的标称模型的相位偏差

一般指标

阻抗	50 Ω	功率	≤ 0.5 W
接头标准	IEEE Std 287	匹配周期（次）	> 2000
工作温度	+ 15 $^\circ\text{C}$ ~ + 35 $^\circ\text{C}$		

F707 和 Y707 系列

F707 系列和 Y707 系列同轴校准件的工作频率是 DC – 40GHz，连接器类型为 2.92mm。其中 F707TS 是同时包含公头和母头的标准型校准件，Y707MS 是集成型公头校准件，Y707FS 是集成型母头校准件。

F707 系列的性能参数与 Maury 的 8770S 校准件十分相近，Y707 系列的性能参数与 Maury 的 8770D 校准件十分相近，可进行兼容替代。



图 7 F707 系列（左）和 Y707 系列（右）同轴校准件

性能参数

型号	类型	连接形式	参数
F707TS	开路 Open	2.92mm - Male	DC – 40 GHz, Phase Deviation* $\leq \pm 6^\circ$
		2.92mm - Female	
	短路 Short	2.92mm - Male	DC – 40 GHz, Phase Deviation* $\leq \pm 4.5^\circ$
		2.92mm - Female	
	匹配 Load	2.92mm - Male	DC – 40 GHz, SWR ≤ 1.052
		2.92mm - Female	
	直通 Adapter	2.92mm - Male to 2.92mm - Male	DC – 40 GHz, SWR ≤ 1.12
		2.92mm - Female to 2.92mm - Female	
		2.92mm - Male to 2.92mm - Female	
	扳手 Wrench	8mm	0.9 Nm

* Phase Deviation 表示与标准定义（见附录 A）中的标称模型的相位偏差

型号	类型	连接形式	参数
Y707MS	开路 Open	2.92mm - Male	DC - 40 GHz, Phase Deviation* $\leq \pm 4^\circ$
	短路 Short	2.92mm - Male	DC - 40 GHz, Phase Deviation* $\leq \pm 3.5^\circ$
	匹配 Load	2.92mm - Male	DC - 40 GHz, SWR ≤ 1.11
	直通 Adapter	2.92mm - Male to 2.92mm - Male	DC - 40 GHz, SWR ≤ 1.18
	扳手 Wrench	8mm	0.9 Nm
Y707FS	开路 Open	2.92mm - Female	DC - 40 GHz, Phase Deviation* $\leq \pm 4^\circ$
	短路 Short	2.92mm - Female	DC - 40 GHz, Phase Deviation* $\leq \pm 3.5^\circ$
	匹配 Load	2.92mm - Female	DC - 40 GHz, SWR ≤ 1.11
	直通 Adapter	2.92mm - Female to 2.92mm - Female	DC - 40 GHz, SWR ≤ 1.18
	扳手 Wrench	8mm	0.9 Nm

* Phase Deviation 表示与标准定义（见附录 A）中的标称模型的相位偏差

一般指标

阻抗	50 Ω	功率	≤ 0.5 W
工作温度	+ 15 $^\circ\text{C}$ ~ + 35 $^\circ\text{C}$	匹配周期（次）	> 2000

F808 和 Y808 系列

F808 系列和 Y808 系列同轴校准件的工作频率是 DC - 50GHz，连接器类型为 2.4mm。其中 F808MS 是标准型公头校准件，F808FS 是标准型母头校准件，F808TS 为包含一套 F808MS 和一套 F808FS 的标准型校准件。Y808MS 是集成型公头校准件，Y808FS 是集成型母头校准件。

F808 系列和 Y808 系列的性能参数和是德科技的 85056D 校准件十分相近，可进行兼容替代。



图 8 F808 系列（左）和 Y808 系列（右）同轴校准件

性能参数

型号	类型	连接形式	参数
F808TS	F808MS	开路 Open	2.4mm - Male DC - 2 GHz, Phase Deviation* $\leq \pm 0.75^\circ$ 2 GHz - 20 GHz, Phase Deviation* $\leq \pm 1.5^\circ$ 20 GHz - 50 GHz, Phase Deviation* $\leq \pm 2.5^\circ$
		短路 Short	2.4mm - Male DC - 2 GHz, Phase Deviation* $\leq \pm 0.75^\circ$ 2 GHz - 20 GHz, Phase Deviation* $\leq \pm 1.5^\circ$ 20 GHz - 50 GHz, Phase Deviation* $\leq \pm 2.5^\circ$
		匹配 Load	2.4mm - Male DC - 4 GHz, Return Loss ≥ 40 dB 4 GHz - 20 GHz, Return Loss ≥ 34 dB 20 GHz - 50 GHz, Return Loss ≥ 32 dB
		直通 Adapter	2.4mm - Male to 2.4mm - Male DC - 50 GHz, SWR ≤ 1.12
	F808FS	开路 Open	2.4mm - Female DC - 2 GHz, Phase Deviation* $\leq \pm 0.75^\circ$ 2 GHz - 20 GHz, Phase Deviation* $\leq \pm 1.5^\circ$ 20 GHz - 50 GHz, Phase Deviation* $\leq \pm 2.5^\circ$
		短路 Short	2.4mm - Female DC - 2 GHz, Phase Deviation* $\leq \pm 0.75^\circ$ 2 GHz - 20 GHz, Phase Deviation* $\leq \pm 1.5^\circ$ 20 GHz - 50 GHz, Phase Deviation* $\leq \pm 2.5^\circ$
		匹配 Load	2.4mm - Female DC - 4 GHz, Return Loss ≥ 40 dB 4 GHz - 20 GHz, Return Loss ≥ 34 dB 20 GHz - 50 GHz, Return Loss ≥ 32 dB
		直通 Adapter	2.4mm - Female to 2.4mm - Female DC - 50 GHz, SWR ≤ 1.12
	直通 Adapter		2.4mm - Male to 2.4mm - Female DC - 50 GHz, SWR ≤ 1.12
	扳手 Wrench		8mm 0.9 Nm

* Phase Deviation 表示与标准定义（见附录 A）中的标称模型的相位偏差

型号	类型	连接形式	参数
Y808MS	开路 Open	2.4mm - Male	DC - 50 GHz, Phase Deviation* $\leq \pm 3.8^\circ$
	短路 Short	2.4mm - Male	DC - 50 GHz, Phase Deviation* $\leq \pm 3^\circ$
	匹配 Load	2.4mm - Male	DC - 50 GHz, SWR ≤ 1.1
	直通 Adapter	2.4mm - Male to 2.4mm - Male	DC - 50 GHz, SWR ≤ 1.18
	扳手 Wrench	8mm	0.9 Nm
Y808FS	开路 Open	2.4mm - Female	DC - 50 GHz, Phase Deviation* $\leq \pm 3.8^\circ$
	短路 Short	2.4mm - Female	DC - 50 GHz, Phase Deviation* $\leq \pm 3^\circ$
	匹配 Load	2.4mm - Female	DC - 50 GHz, SWR ≤ 1.1
	直通 Adapter	2.4mm - Female to 2.4mm - Female	DC - 50 GHz, SWR ≤ 1.18
	扳手 Wrench	8mm	0.9 Nm

* Phase Deviation 表示与标准定义（见附录 A）中的标称模型的相位偏差

一般指标

阻抗	50 Ω	功率	$\leq 0.5 \text{ W}$
工作温度	+ 15 $^\circ\text{C}$ ~ + 35 $^\circ\text{C}$	匹配周期（次）	> 2000

KWR42A

KWR42A 是精密的 K 波段 TRL 波导校准件，它包含 K 波段负载、K 波段短路器、1/8 波长波导、1/4 波长波导和 3/8 波长波导，支持频率范围为 17.6 GHz 到 26.7 GHz。为方便测试，KWR42A 还配备了 2.92mm 同轴公头/母头转波导的转接头，以及一些固定用的螺钉、螺母、垫片、定位螺栓等。



图 9 KWR42A 波导校准件

性能参数

型号	类型	连接形式	参数	数量
KWR42A	短路器 Short	Waveguide	17.6 - 26.7 GHz	2
	精密负载 Load	Waveguide	17.6 - 26.7 GHz, VSWR≤1.03	1
	1/8λ 精密波导段	Waveguide	17.6 - 26.7 GHz	1
	1/4λ 精密波导段	Waveguide	17.6 - 26.7 GHz	1
	3/8λ 精密波导段	Waveguide	17.6 - 26.7 GHz	1
	同轴-波导转接头	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
	紧固件	螺钉 M3*12		4
		螺钉 M3*16		4
		螺钉 M3*20		4
		螺母 M3		24
		垫圈 3 (GB/T 93)		24
		垫圈 3 (GB/T 97.1)		24
		定位螺栓		12

一般指标

阻抗	50 Ω	工作温度	- 20 °C ~ + 70 °C
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VWR15A

VWR15A 是精密的 V 波段 TRL 波导校准件，它包含 V 波段负载、V 波段短路器、1/8 波长波导、1/4 波长波导和 3/8 波长波导，支持频率范围为 49.8GHz 到 75.8GHz。为方便测试，VWR15A 还配备了 1.85mm 同轴公头/母头转波导的转接头，以及一些固定用的螺钉、定位螺栓等。



图 10 VWR15A 波导校准件

性能参数

型号	类型	连接形式	参数	数量
VWR15A	短路器 Short	Waveguide	49.8 – 75.8 GHz, VSWR≥60	2
	精密负载 Load	Waveguide	49.8 – 75.8 GHz, VSWR≤1.15	1
	1/8λ 精密波导段	Waveguide	49.8 – 75.8 GHz	1
	1/4λ 精密波导段	Waveguide	49.8 – 75.8 GHz	1
	3/8λ 精密波导段	Waveguide	49.8 – 75.8 GHz	1
	同轴-波导转接头	1.85mm – Female to Waveguide	49.8 – 75.8 GHz, VSWR≤2	1
		1.85mm – Male to Waveguide	49.8 – 75.8 GHz, VSWR≤2	1
	紧固件	英制螺钉 (L=8.3)		12
		加长型定位螺栓 (L=10.3)		8
		扳手		1

一般指标

阻抗	50 Ω	工作温度	- 20 °C ~ + 70 °C
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WWR10A

WWR10A 是精密的 W 波段 TRL 波导校准件，它包含 W 波段负载、W 波段短路器、1/8 波长波导、1/4 波长波导和 3/8 波长波导，支持频率范围为 73.8GHz 到 112GHz。为方便测试，WWR10A 还配备了 1.0mm 同轴母头转波导的转接头，以及一些固定用的螺钉、定位螺栓等。



图 11 WWR10A 波导校准件

性能参数

型号	类型	连接形式	参数	数量
WWR10A	短路器 Short	Waveguide	73.8 - 112 GHz, VSWR $\geq$ 60	2
	精密负载 Load	Waveguide	73.8 - 112 GHz, VSWR $\leq$ 1.15	1
	1/8 λ 精密波导段	Waveguide	73.8 - 112 GHz	1
	1/4 λ 精密波导段	Waveguide	73.8 - 112 GHz	1
	3/8 λ 精密波导段	Waveguide	73.8 - 112 GHz	1
	同轴-波导转接头	1.0mm - Female to Waveguide	73.8 - 112 GHz, VSWR $\leq$ 1.8	2
	紧固件	英制螺钉 (L=8.3)		12
		加长型定位螺栓 (L=10.3)		8
		扳手		1

一般指标

阻抗	50 Ω	工作温度	- 20 $^{\circ}\text{C}$ ~ + 70 $^{\circ}\text{C}$
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附录 A 校准件标准定义

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
15	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)
1	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
7	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)
3	BROADBAND LOAD -M-	3.5 mm male broadband load	APC 3.5	MALE	FIXED	OFF	OFF	0	26500	0	0	50
14	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	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

Y707MS

Connectors

Cal Kit	Description	Connector Family	Min Freq (MHz)	Max Freq (MHz)	Gender	Media	Impedance Z0 (Ω)
Y707MS	2.92 mm Calibration Kit (Siglent)	2.92 mm	0	40000	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)
1	OPEN -M-	2.92 mm male open	2.92 mm	MALE	47.5	0	3.8	0.19	0	40000	14.982	1.8	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)
2	SHORT -M-	2.92 mm male short	2.92 mm	MALE	0	0	0	0	0	40000	16.83	1.8	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-	2.92 mm male broadband load	2.92 mm	MALE	FIXED	OFF	OFF	0	40000	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	2.92 mm	FEMALE	2.92 mm	MALE	0	40000	0	0	50

SOLT Class Assignments

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

Y707FS

Connectors

Cal Kit	Description	Connector Family	Min Freq (MHz)	Max Freq (MHz)	Gender	Media	Impedance Z0 (Ω)
Y707FS	2.92 mm Calibration Kit (Siglent)	2.92 mm	0	40000	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)
1	OPEN -F-	2.92 mm female open	2.92 mm	FEMALE	45.5	100	0.3	0.21	0	40000	14.883	1.8	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)
2	SHORT -F-	2.92 mm female short	2.92 mm	FEMALE	0	0	0	0	0	40000	16.73	1.8	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 -F-	2.92 mm female broadband load	2.92 mm	FEMALE	FIXED	OFF	OFF	0	40000	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	2.92 mm	FEMALE	2.92 mm	MALE	0	40000	0	0	50

SOLT Class Assignments

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

 F707TS

Connectors

Cal Kit	Description	Connector Family	Min Freq (MHz)	Max Freq (MHz)	Gender	Media	Impedance Z0 (Ω)
F707TS	2.92 mm Calibration Kit (Siglent)	2.92 mm	0	40000	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)
1	OPEN -M-	2.92 mm male open	2.92 mm	MALE	44.1578	71.4204	-0.1716	0.2048	0	40000	14.8487	3.39	50
4	OPEN -F-	2.92 mm female open	2.92 mm	FEMALE	42.9684	729.336	-31.7551	0.6628	0	40000	14.8487	3.46	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)
2	SHORT -M-	2.92 mm male short	2.92 mm	MALE	8.7413	-1036.9	41.5223	-0.5055	0	40000	16.6963	2.5639	50
5	SHORT -F-	2.92 mm female short	2.92 mm	FEMALE	-11.2831	1910.57	-85.3145	1.0864	0	40000	16.6963	2.0059	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-	2.92 mm male broadband load	2.92 mm	MALE	FIXED	OFF	OFF	0	40000	0	0	50
6	BROADBAND LOAD -F-	2.92 mm female broadband load	2.92 mm	FEMALE	FIXED	OFF	OFF	0	40000	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	2.92 mm	FEMALE	2.92 mm	MALE	0	40000	0	0	50

SOLT Class Assignments

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

F808MS / Y808MS

Connectors

Cal Kit	Description	Connector Family	Min Freq (MHz)	Max Freq (MHz)	Gender	Media	Impedance Z0 (Ω)
F808MS	2.4 mm Calibration Kit (Siglent)	APC 2.4	0	50000	Gendered	COAX	50
Y808MS	2.4 mm Calibration Kit (Siglent)	APC 2.4	0	50000	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-	2.4 mm male open	APC 2.4	MALE	29.722	165.78	-3.5386	0.071	0	50000	20.837	3.23	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-	2.4 mm male short	APC 2.4	MALE	2.1636	-146.35	4.0443	-0.0363	0	50000	22.548	3.554	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-	2.4 mm male broadband load	APC 2.4	MALE	FIXED	OFF	OFF	0	50000	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 2.4	FEMALE	APC 2.4	MALE	0	50000	0	3.554	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

F808FS / Y808FS

Connectors

Cal Kit	Description	Connector Family	Min Freq (MHz)	Max Freq (MHz)	Gender	Media	Impedance Z0 (Ω)
F808FS	2.4 mm Calibration Kit (Siglent)	APC 2.4	0	50000	Gendered	COAX	50
Y808FS	2.4 mm Calibration Kit (Siglent)	APC 2.4	0	50000	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-	2.4 mm female open	APC 2.4	FEMALE	29.72	165.78	-3.5385	0.071	0	50000	20.837	3.23	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-	2.4 mm female short	APC 2.4	FEMALE	2.1636	-146.35	4.0443	-0.0363	0	50000	22.548	3.554	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-	2.4 mm female broadband load	APC 2.4	FEMALE	FIXED	OFF	OFF	0	50000	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 2.4	FEMALE	APC 2.4	MALE	0	50000	0	3.554	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

F808TS

Connectors

Cal Kit	Description	Connector Family	Min Freq (MHz)	Max Freq (MHz)	Gender	Media	Impedance Z0 (Ω)
F808TS	2.4 mm Calibration Kit (Siglent)	APC 2.4	0	50000	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-	2.4 mm male open	APC 2.4	MALE	29.722	165.78	-3.5386	0.071	0	50000	20.837	3.23	50
5	OPEN -F-	2.4 mm female open	APC 2.4	FEMALE	29.72	165.78	-3.5385	0.071	0	50000	20.837	3.23	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-	2.4 mm male short	APC 2.4	MALE	2.1636	-146.35	4.0443	-0.0363	0	50000	22.548	3.554	50
6	SHORT -F-	2.4 mm female short	APC 2.4	FEMALE	2.1636	-146.35	4.0443	-0.0363	0	50000	22.548	3.554	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-	2.4 mm male broadband load	APC 2.4	MALE	FIXED	OFF	OFF	0	50000	0	0	50
4	BROADBAND LOAD -F-	2.4 mm female broadband load	APC 2.4	FEMALE	FIXED	OFF	OFF	0	50000	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 2.4	FEMALE	APC 2.4	MALE	0	50000	0	3.554	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

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

VWR15A

Connectors

Cal Kit	Description	Connector Family	Min Freq (MHz)	Max Freq (MHz)	Cutoff Freq (MHz)	Gender	Height/Width Ratio	Media	Impedance Z0 (Ω)
VWR15A	V-band Waveguide TRL Calibration Kit (Siglent)	V-band Waveguide	39873	79745	39873	Genderless	0.5	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	V-band short	V-band Waveguide	0	0	0	0	39873	79745	0	0	1
5	Offset Short	V-band 1/4 offset short	V-band Waveguide	0	0	0	0	39873	79745	5.3755	24.226	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	V-band offset load	V-band Waveguide	FIXED	OFF	ON	39873	79745	/	/	/
2	Fixed Load	V-band fixed load	V-band Waveguide	FIXED	OFF	OFF	39873	79745	0	0	1
3	Sliding Load	V-band sliding load	V-band Waveguide	SLIDING	OFF	OFF	39873	79745	/	/	/

Std. ID	Label	Description	Connector Port1	Connector Port2	F min (MHz)	F max (MHz)	Delay (pSec)	Loss (GΩ/Sec)	Z0 (Ω)
6	Thru	V-band Thru	V-band Waveguide	V-band Waveguide	39873	79745	0	0	1
7	1/4 Line	V-band 1/4 wavelength line	V-band Waveguide	V-band Waveguide	39873	79745	5.3755	24.226	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

WWR10A

Connectors

Cal Kit	Description	Connector Family	Min Freq (MHz)	Max Freq (MHz)	Cutoff Freq (MHz)	Gender	Height/Width Ratio	Media	Impedance Z0 (Ω)
VWR15A	W-band Waveguide TRL Calibration Kit (Siglent)	W-band Waveguide	59024	118050	59024	Genderless	0.5	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	W-band short	W-band Waveguide	0	0	0	0	59024	118050	0	0	1
5	Offset Short	W-band 1/4 offset short	W-band Waveguide	0	0	0	0	59024	118050	3.6203	64.85	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	W-band offset load	W-band Waveguide	FIXED	OFF	ON	59024	118050	/	/	/
2	Fixed Load	W-band fixed load	W-band Waveguide	FIXED	OFF	OFF	59024	118050	0	0	1
3	Sliding Load	W-band sliding load	W-band Waveguide	SLIDING	OFF	OFF	59024	118050	/	/	/

Std. ID	Label	Description	Connector Port1	Connector Port2	F min (MHz)	F max (MHz)	Delay (pSec)	Loss (GΩ/Sec)	Z0 (Ω)
6	Thru	W-band Thru	W-band Waveguide	W-band Waveguide	59024	118050	0	0	1
7	1/4 Line	W-band 1/4 wavelength line	W-band Waveguide	W-band Waveguide	59024	118050	3.6203	64.85	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

附录 B 同轴校准模型推导

同轴机械校准件的模型定义如图 10 所示。

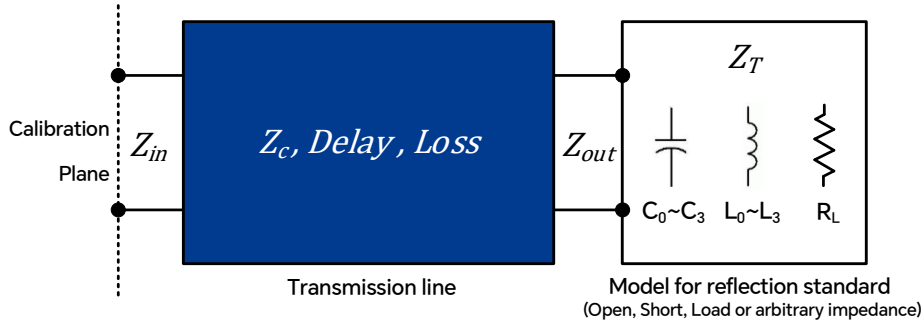


图 12 同轴机械校准件模型定义

其中：

- Z_{in} = 传输线输入阻抗
- Z_{out} = 传输线输出阻抗
- $Delay$ = 无色散 TEM 模式的传输线电延时，定义为：

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

其中， l 为传输线的物理长度， v 为光在介质中的传播速度。

- $Loss$ = 归一化频率为 1 GHz 时传输线每单位长度的传播损耗乘以光在介质中的传播速度，单位是 $G\Omega/Sec$ 。对于同轴机械校准件，若得到短路件、开路件、负载件在 1GHz 处的对数幅度 S_{11dB} ，或直通件在 1GHz 处的对数幅度 S_{21dB} ，则 $Loss$ 可根据下式估算：

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

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

- Z_c = 传输线特性阻抗，有：

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

其中， Z_0 为传输线的无损特性阻抗， f 为频率（Hz）。

- Z_T = 终端阻抗。对于短路件和开路件，分别有：

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

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

- $L_0 \sim L_3$ = 三阶多项式分布电感模型
- $C_0 \sim C_3$ = 三阶多项式分布电容模型
- R_L = 电阻模型

根据传输线模型，可以得到含偏置传输线的校准件的信号流图，如图 11 所示。

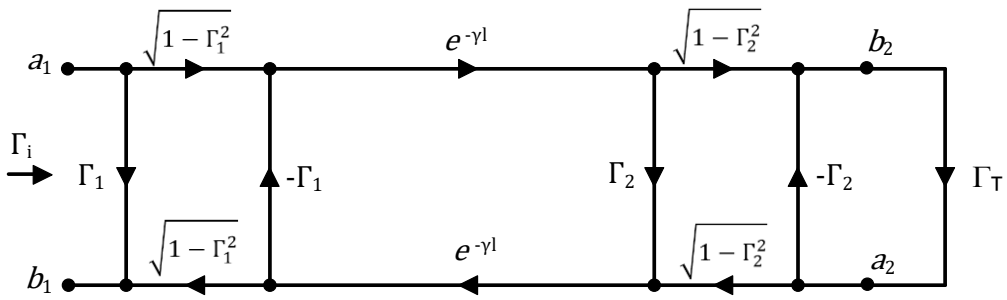


图 13 含偏置传输线的校准件的信号流图

其中：

- γ = 传输线的传播常数，定义为：

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

- α = 传输线的衰减常数， β = 传输线的相位常数，有：

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

$$\beta l = (2\pi f \times \text{Delay}) + \alpha l$$

- Γ_1 = 传输线输入反射系数， Γ_2 = 传输线输出反射系数，有：

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

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

令 $Z_{in} = Z_{out} = Z_0$ ，可得到：

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

- Γ_T = 终端反射系数，有：

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

基于图 11 的信号流图，可推导出输入反射系数 (Γ_i) 的计算公式，即同轴机械校准件的单端口标准响应：

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



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