Test Sets

The test set in a VNA measurement system is used to separate the incident, the reflected, and the transmitted signals. It is also used to convert the RF signal to IF (intermediate fre- quency) signal and to pass the IF to the receiver.

Once signals are separated, their individual magnitude and phase differences can be measured. Test sets are classified into two groups: (1) one-path transmission or reflection and (2) two-path S-parameter allowing forward and reverse measurements of a two port device with a single connection. S-parameter test sets can be divided into two types: (1) sampler- based and (2) mixer-based, shown in Table 3. Sampler-based test sets require one external source to provide the RF stimulus. The mixer-based test sets require two external sources; one to provide the RF stimulus and the other to provide the LO signal.

Table 3. Family of test sets

Products	Frequency range (GHz) type	Test set (application) needed	Recommend RF source[1] needed	Recommend LO source[1] (GHz)	Test port connector[2] (GHz)
8511A[3]	0.045 to 26.5	Frequency Converter	N/A	N/A	3.5 mm (M)
8511B[3]	0.045 to 50	Frequency Converter	N/A	N/A	2.4 mm (F)
8512A	0.400 to 18	Transmission/ Reflection		Obsolete	
8513A	0.045 to 26.5	Transmission/ Reflection		Obsolete	
8514A	0.500 to 18	S-parameter		Obsolete	
8514B	0.045 to 20	S-parameter Sampler-based	83621B	-----	3.5 mm (M) (0.045 to 20)
8515A	0.045 to 26.5	S-parameter Sampler-based	83631B (0.045 to 26.5)	----- -----	3.5 mm (M)
8516A	0.045 to 40	S-parameter	Obsolete --- replaced with 8517A		
8517A	0.045 to 50	S-parameter	Obsolete --- replaced with 8517B		
8517B	0.045 to 50	S-parameter Sampler-based	83651B (0.045 to 50)	-----	2.4 mm (M)
85110L	0.045 to 2	Pulsed-RF S-parameter Mixer-based	83620B #001, 004, 008, H80	83620B #004, 008, H80	7 mm
85110A	2 to 20	Pulsed-RF S-parameter Mixer-based	83622B #001, 004, 008 [Option H50: 83650B (0.045 to 50) #001, 004, 008]	83623L #004, 008	3.5 mm (M)
85105A[4] MM-wave Controller	33 to 110 (waveguide bands)	S-parameter Mixer-based (waveguide bands)	83621B (0.045 to 20) [Option 050: 83651B (0.045 to 50)]	83621B (0.045 to 20)	WR-22 (33 to 50) WR-19 (40 to 60) WR-15 (50 to 75) WR-10 (75 to 110)
8510XF MM-wave Subsystem	0.045 to 110 (coaxial)	S-parameter Mixer-based (ultra-broadband)	83651B (0.045 to 50)	83621B (0.045 to 20)	1 mm (M)

1. Although general purpose 8360 series synthesized sweepers (836x0B) can be used in place of the 8510-dedicated 8360 series synthesized sweepers (836x1B), the following options are typically recommended: Option 004 (rear panel connectors) and Option 008 (1-Hz frequency resolution). These options are standard in the 8510-dedicated 8360 series synthesized sweepers.
   Mixed sources: While mixing synthesized series is acceptable in multiple-source applications, the following areas must be considered:
   • RF source = 8340, LO source = 8340, system performance will be degraded substantially.
   • RF source = 8340, LO source = 8360, better system performance
   • RF source = 8360, LO source = 8360, faster step frequency measurements. Using the 8340 as either the RF source or the LO source will more than double the measurement time.
2. All coaxial test port connectors are ruggedized connectors.
3. These test sets provide access to four samplers directly.
4. The following test set modules are available. Two test set modules must be ordered for complete waveguide S-parameter test set operation for each waveguide band:
   • Q85104A test set module (33 GHz to 50 GHz)
   • U85104A test set module (40 GHz to 60 GHz)
   • V85104A test set module (50 GHz to 75 GHz)
   • W85104A test set module (75 GHz to 110 GHz)