

Series 8540C Universal Power Meters

B.2.1 Modulation Power Sensors

Table B-1: Power Sensor Selection Guide

Model	Freq. Range/ Power Range	Max. Power	Power Linearity ⁴ (Freq >8 GHz)	RF Conn	Length	Dia.	Wgt	VSWR			
Modulation Sensors											
80601A ⁹	10 MHz to 18 GHz -67 to +20 dBm, CW -60 to +20 dBm, Modulation	+23 dBm (200 mW)	-67 to -20 dBm ± 0.00 dB -20 to +20 dBm: ± 0.05 dB/ 10 dB	Type N(m) 50 Ω	114.5 mm (5.39 in)	32 mm (1.62 in)	0.23 kg (0.4 lb)	1.12:0.01 - 2 GHz 1.22:2 - 12.4 GHz 1.29:12.4 - 18 GHz			
80401A	10 MHz to 18 GHz -67 to +20 dBm, CW -60 to +20 dBm, Modulation	+23 dBm (200 mW)	-67 to -20 dBm ± 0.00 dB -20 to +20 dBm: ± 0.05 dB/ 10 dB	Type N(m) 50 Ω	114.5mm (4.5 in)	32 mm (1.25 in)	0.18 kg (0.4 lb)	1.12:0.01 - 2 GHz 1.22:2 - 12.4 GHz 1.29:12.4 - 18 GHz			
80402A	10 MHz to 18 GHz -67 to +20 dBm, CW -60 to +20 dBm, Modulation	+23 dBm (200 mW)	-67 to -20 dBm ± 0.00 dB -20 to +20 dBm: ± 0.05 dB/ 10 dB	APC-7 50 Ω							
80410A	10 MHz to 18 GHz -64 to +26 dBm, CW -57 to +26 dBm, Modulation	+29 dBm (800 mW)	-60 to -14 dBm ± 0.00 dB -14 to +26 dBm ± 0.05 dB/ 10 dB	Type K(m) ¹ 50 Ω	127 mm (5.0 in)	32 mm (1.25 in)	0.23 kg (0.5 lb)	1.13:0.01 - 2 GHz 1.16:2 - 12 GHz 1.23:12 - 18 GHz			
80420A	10 MHz to 18 GHz -60 to +30 dBm, CW -53 to +30 dBm, Modulation	+30 dBm (1 W)	-60 to -10 dBm ± 0.00 dB -10 to +30 dBm ± 0.05 dB/ 10 dB					1.11:0.01 - 2 GHz 1.12:2 - 12 GHz 1.18:12 - 18 GHz			
80421A	10 MHz to 18 GHz -50 to +37 dBm, CW -43 to +37 dBm, Modulation	+37 dBm (5 W)	-47 to +0 dBm ± 0.00 dB 0 to +37 dBm ± 0.05 dB/ 10 dB	Type N(m) 50 Ω	150 mm (5.9 in)	32 mm (1.25 in)	0.23 kg (0.5 lb)	1.20:0.011 - 6 GHz 1.25:6 - 12.4 GHz 1.35:12.4 - 18 GHz			
80422A	10 MHz to 18 GHz -40 to +44 dBm, CW -33 to +44 dBm, Modulation	+44 dBm (25 W)	-37 to +10 dBm ± 0.00 dB +10 to +44 dBm ± 0.05 dB/ 10 dB		230 mm (9.0 in)	104 mm (4.1 in)	0.3 kg (0.6 lb)	1.20:0.01 - 6 GHz 1.30:6 - 12.4 GHz 1.40:12.4 - 18 GHz			
80425A	10 MHz to 18 GHz -40 to +47 dBm, CW -33 to +47 dBm, Modulation	+47 dBm (50 W)	-34 to +10 dBm ± 0.00 dB +10 to +47 dBm ± 0.05 dB/ 10 dB					1.25:0.01 - 6 GHz 1.35:6 - 12.4 GHz 1.45:12.4 - 18 GHz			
Standard CW Sensors											
80301A	10 MHz to 18 GHz -70 to +20 dBm	+23 dBm (200 mW)	-70 to -20 dBm ± 0.00 dB -20 to +20 dBm: ± 0.05 dB/ 10 dB	Type N(m) 50 Ω	114.5 mm (4.5 in)	32 mm (1.25 in)	0.18 kg (0.4 lb)	1.12:0.01 - 2 GHz 1.22:2 - 12.4 GHz 1.29:12.4 - 18 GHz			
80302A	10 MHz to 18 GHz -70 to +20 dBm	+23 dBm (200 mW)		APC-7 50 Ω							
80303A	10 MHz to 26.5 GHz -70 to +20 dBm	+23 dBm (200 mW)	-70 to +20 dBm ± 0.00 dB -20 to +20 dBm ± 0.1 dB/ 10dB	Type K(m) ¹ 50 Ω				1.12:0.01 - 2 GHz 1.22:2 - 12.4 GHz 1.38:12.4 - 18 GHz 1.43:18 - 26.5 GHz 1.92:26.5 - 40 GHz			
80304A	10 MHz to 40 GHz -70 to 0 dBm	+23 dBm (200 mW)	-70 to -20 dBm ± 0.00 dB -20 to 0 dBm ± 0.2 dB/ 10 dB								
Low VSWR CW Sensors											
80310A	10 MHz to 18 GHz -64 to +26 dBm	+29 dBm (800 mW)	-64 to -14 dBm ± 0.00 dB -14 to +26 dBm ± 0.05 dB/ 10 dB	Type K(m) ¹ 50 Ω	127mm (5.0 in)	32 mm (1.25 in)	0.23 kg (0.5lb)	1.13:0.01 - 2 GHz 1.15:2 - 12 GHz 1.23:12 - 18 GHz 1.29:18 - 26.5 GHz 1.50:26.5 - 40 GHz			
80313A	10 MHz to 26.5 GHz -64 to +26 dBm		-64 to -14 dBm ± 0.00 dB -14 to +26 dBm ± 0.1 dB/ 10 dB								
80314A	10 MHz to 40 GHz -64 to +6 dBm		-64 to -14 dBm ± 0.00 dB -14 to +6 dBm ± 0.2 dB/ 10 dB								

Table B-1: Power Sensor Selection Guide (Continued)

Notes:

1. The K connector is electrically and mechanically compatible with the APC-3.5 and SMA connectors.
2. Power coefficient equals <0.01 dB/Watt.
3. Power coefficient equals <0.015 dB/Watt.
4. For frequencies above 8 GHz, add power linearity to system linearity.
5. Peak operating range above CW maximum range is limited to <10% duty cycle.
6. Includes uncertainty of reference standard and transfer uncertainty. Directly traceable to NIST.
7. Square root of sum of the individual uncertainties squared (RSS).
8. Cal Factor numbers allow for 3% repeatability when connecting attenuator to sensor, and 3% for attenuator measurement uncertainty and mismatch of sensor/pad combination. Attenuator frequency response is added to the Sensor Cal Factors which are stored in the sensor's EEPROM.
9. The Model 80601 is compatible with the 8541C and 8542C, and later configurations.

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Table B-2: Power Sensor Cal Factor Uncertainties

Freq. (GHz)		Sum of Uncertainties (%) ⁶						Probable Uncertainties (%) ⁷					
Lower	Upper	80301A 80302A 80340 80401A 80402A 80601A ⁹	80303A 80304A 80343 80344	80310A 80313A 80314A	80320A 80323A 80324A	80321A ⁸ 80322A ⁸ 80325A ⁸	80330A 80333A 80334A	80301A 80302A 80340 80401A 80402A 80601A ⁹	80303A 80304A 80343 80344	80310A 80313A 80314A	80320A 80323A 80324A	80321A ⁸ 80322A ⁸ 80325A ⁸	80330A 80333A 80334A
0.1	1	1.61	3.06	2.98	2.96	7.61	2.95	1.04	1.64	1.58	1.58	4.54	1.58
1	2	1.95	3.51	3.58	3.57	7.95	3.55	1.20	1.73	1.73	1.73	4.67	1.73
2	4	2.44	4.42	4.33	4.29	8.44	4.27	1.33	1.93	1.91	1.91	4.89	1.90
4	6	2.67	4.74	4.67	4.63	8.67	4.60	1.41	2.03	2.02	2.02	5.01	2.01
6	8	2.86	4.94	4.87	4.82	8.86	4.80	1.52	2.08	2.07	2.07	5.12	2.06
8	12.4	3.59	6.04	5.95	5.90	9.59	5.87	1.92	2.55	2.54	2.53	5.56	2.53
12.4	18	4.09	6.86	6.76	6.69	10.09	6.64	2.11	2.83	2.80	2.79	5.89	2.78
18	26.5	—	9.27	9.43	9.28	—	9.21	—	3.63	3.68	3.62	—	3.59
26.5	40	—	15.19	14.20	13.86	—	13.66	—	6.05	5.54	5.39	—	5.30

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3. Power coefficient equals <0.015 dB/Watt.
4. For frequencies above 8 GHz, add power linearity to system linearity.
5. Peak operating range above CW maximum range is limited to <10% duty cycle.
6. Includes uncertainty of reference standard and transfer uncertainty. Directly traceable to NIST.
7. Square root of sum of the individual uncertainties squared (RSS).
8. Cal Factor numbers allow for 3% repeatability when connecting attenuator to sensor, and 3% for attenuator measurement uncertainty and mismatch of sensor/pad combination. Attenuator frequency response is added to the Sensor Cal Factors which are stored in the sensor's EEPROM.
9. The Model 80601 is compatible with the 8541C and 8542C and later configurations.