



**SCOPE OF ACCREDITATION TO ISO/IEC 17025:2005  
& ANSI/NCSL Z540-1-1994**

**Davis Calibration**

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**CALIBRATION**

Valid to: March 22, 2013

Certificate Number: AC-1180

**I. Electromagnetic DC/Low Frequency**

PARAMETER / EQUIPMENT	RANGE	CALIBRATION AND MEASUREMENT CAPABILITY [EXPRESSED AS UNCERTAINTY(±)]	REFERENCE STANDARD OR EQUIPMENT	METHOD(S)
DC Voltage - Source	Up to 220 mV 220 mV to 2.2 V (2 to 11) V (11 to 22) V (22 to 220) V 220 V to 1.1 kV	8 μV/V + 600 nV 7 μV/V + 1 μV 7 μV/V + 3.5 μV 7 μV/V + 6.5 μV 8 μV/V + 80 μV 9 μV/V + 500 μV	Fluke 5700A	OEM, GIDEP, and Laboratory Developed Procedures
DC Voltage - Measure	Up to 200 mV 200 mV to 2 V (2 to 20) V (20 to 200) V 200 V to 1 kV	4.5 μV/V + 1 μV 3 μV/V + 400 nV 3 μV/V + 4 μV 4.5 μV/V + 40 μV 4.5 μV/V + 500 μV	Fluke 8508A Opt 01	
DC Current - Source	Up to 220 μA 220 μA to 2.2 mA (2.2 to 22) mA (22 to 100) mA (100 to 220) mA  220 mA to 1 A (1 to 2.2) A  (2.2 to 3) A (3 to 11) A (11 to 20.5) A	50 μA/A + 8 nA 50 μA/A + 8 nA 50 μA/A + 80 nA 60 μA/A + 800 nA 60 μA/A + 800 nA + (200 x I <sup>2</sup> ) μA/A 80 μA/A + 2.5 mA 80 μA/A + 2.5 mA + (10 x I <sup>2</sup> ) μA/A 380 μA/A + 40 μA 500 μA/A + 500 μA 1 mA/A + 750 μA	Fluke 5700A          Fluke 5520A	



PARAMETER / EQUIPMENT	RANGE	CALIBRATION AND MEASUREMENT CAPABILITY [EXPRESSED AS UNCERTAINTY(±)]	REFERENCE STANDARD OR EQUIPMENT	METHOD(S)
DC Current - Measure	(100 to 200) µA 200 µA to 2 mA (2 to 20) mA (20 to 200) mA 200 mA to 2 A (2 to 20) A	12 µA/A + 400 pA 12 µA/A + 4 nA 13 µA/A + 40 nA 36 µA/A + 800 nA 170 µA/A + 16 µA 380 µA/A + 400 µA	Fluke 8508A Opt 01	
AC Voltage – Source	<b>Up to 2.2 mV</b> (10 to 20) Hz (20 to 40) Hz 40 Hz to 20 kHz (20 to 50) kHz (50 to 100) kHz (100 to 300) kHz (300 to 500) kHz 500 kHz to 1 MHz <b>(2.2 to 22) mV</b> (10 to 20) Hz (20 to 40) Hz 40 Hz to 20 kHz (20 to 50) kHz (50 to 100) kHz (100 to 300) kHz (300 to 500) kHz 500 kHz to 1 MHz <b>(22 to 220) mV</b> (10 to 20) Hz (20 to 40) Hz 40 Hz to 20 kHz (20 to 50) kHz (50 to 100) kHz (100 to 300) kHz (300 to 500) kHz 500 kHz to 1 MHz <b>220 mV to 2.2 V</b> (10 to 20) Hz (20 to 40) Hz 40 Hz to 20 kHz (20 to 50) kHz (50 to 100) kHz (100 to 300) kHz (300 to 500) kHz 500 kHz to 1 MHz	550 µV/V + 4.5 µV 210 µV/V + 4.5 µV 105 µV/V + 4.5 µV 370 µV/V + 4.5 µV 850 µV/V + 7 µV 1.1 mV/V + 13 µV 1.7 mV/V + 25 µV 3.4 mV/V + 25 µV  550 µV/V + 5 µV 210 µV/V + 5 µV 105 µV/V + 5 µV 370 µV/V + 5 µV 850 µV/V + 7 µV 1.1 mV/V + 12 µV 1.7 mV/V + 25 µV 3.4 mV/V + 25 µV  550 µV/V + 13 µV 210 µV/V + 8 µV 105 µV/V + 8 µV 320 µV/V + 8 µV 850 µV/V + 25 µV 1.1 mV/V + 25 µV 1.7 mV/V + 35 µV 3.4 mV/V + 80 µV  500 µV/V + 80 µV 160 µV/V + 25 µV 75 µV/V + 6 µV 120 µV/V + 16 µV 250 µV/V + 70 µV 430 µV/V + 130 µV 1.05 mV/V + 350 µV 2.2 mV/V + 850 µV	Fluke 5700A	OEM, GIDEP, and Laboratory Developed Procedures



PARAMETER / EQUIPMENT	RANGE	CALIBRATION AND MEASUREMENT CAPABILITY [EXPRESSED AS UNCERTAINTY(±)]	REFERENCE STANDARD OR EQUIPMENT	METHOD(S)
AC Voltage - Source (cont.)	<b>(2.2 to 22) V</b> (10 to 20) Hz (20 to 40) Hz 40 Hz to 20 kHz (20 to 50) kHz (50 to 100) kHz (100 to 300) kHz (300 to 500) kHz 500 kHz to 1 MHz <b>(22 to 220) V</b> (10 to 20) Hz (20 to 40) Hz 40 Hz to 20 kHz (20 to 50) kHz (50 to 100) kHz (100 to 300) kHz (300 to 500) kHz 500 kHz to 1 MHz <b>(220 to 250) V</b> (15 to 50) Hz 50 Hz to 1 kHz <b>250 V to 1.1 kV</b> 50 Hz to 1 kHz	500 μV/V + 800 μV 160 μV/V + 250 μV 75 μV/V + 60 μV 120 μV/V + 160 μV 250 μV/V + 350 μV 500 μV/V + 1.5 mV 1.25 mV/V + 4.3 mV 2.7 mV/V + 8.5 mV  500 μV/V + 8 mV 160 μV/V + 2.5 mV 80 μV/V + 800 μV 220 μV/V + 3.5 mV 500 μV/V + 8 mV 1.5 mV/V + 90 mV 4.7 mV/V + 90 mV 11.5 mV/V + 190 mV  400 μV/V + 16 mV 80 μV/V + 3.5 mV  80 μV/V + 3.5 mV	Fluke 5700A	OEM, GIDEP, and Laboratory Developed Procedures
AC Voltage - Measure	<b>(1 to 10) mV</b> (1 to 40) Hz 40 Hz to 1 kHz (1 to 20) kHz (20 to 50) kHz (50 to 100) kHz (100 to 300) kHz 300 kHz to 1 MHz (1 to 4) MHz (4 to 8) MHz <b>(10 to 100) mV</b> (1 to 40) Hz 40 Hz to 1 kHz (1 to 20) kHz (20 to 50) kHz (50 to 100) kHz (100 to 300) kHz 300 kHz to 1 MHz (1 to 2) MHz (2 to 4) MHz (4 to 8) MHz (8 to 10) MHz	302 μV/V + 3 μV 202 μV/V + 1.1 μV 302 μV/V + 1.1 μV 1 mV/V + 1.1 μV 5 mV/V + 1.1 μV 40 mV/V + 2 μV 12 mV/V + 5 μV 70 mV/V + 7 μV 200 mV/V + 8 μV  72 μV/V + 4 μV 72 μV/V + 2 μV 142 μV/V + 2 μV 302 μV/V + 2 μV 802 μV/V + 2 μV 3 mV/V + 10 μV 10 mV/V + 10 μV 15 mV/V + 10 μV 40 mV/V + 70 μV 40 mV/V + 80 μV 150 mV/V + 100 μV	Agilent 3458A	

PARAMETER / EQUIPMENT	RANGE	CALIBRATION AND MEASUREMENT CAPABILITY [EXPRESSED AS UNCERTAINTY(±)]	REFERENCE STANDARD OR EQUIPMENT	METHOD(S)
AC Voltage - Measure (cont.)	<p><b>100 mV to 1 V</b>  (1 to 40) Hz  40 Hz to 1 kHz  (1 to 20) kHz  (20 to 50) kHz  (50 to 100) kHz  (100 to 300) kHz  300 kHz to 1 MHz  (1 to 2) MHz  (2 to 4) MHz  (4 to 8) MHz  (8 to 10) MHz</p> <p><b>(1 to 10) V</b>  (1 to 40) Hz  40 Hz to 1 kHz  (1 to 20) kHz  (20 to 50) kHz  (50 to 100) kHz  (100 to 300) kHz  300 kHz to 1 MHz  (1 to 2) MHz  (2 to 4) MHz  (4 to 8) MHz  (8 to 10) MHz</p> <p><b>(10 to 100) V</b>  (1 to 40) Hz  40 Hz to 1 kHz  (1 to 20) kHz  (20 to 50) kHz  (50 to 100) kHz  (100 to 300) kHz  300 kHz to 1 MHz</p> <p><b>100 V to 1 kV</b>  (1 to 40) Hz  40 Hz to 1 kHz  (1 to 20) kHz  (20 to 50) kHz  (50 to 100) kHz</p>	<p>72 µV/V + 40 µV  72 µV/V + 20 µV  142 µV/V + 20 µV  302 µV/V + 20 µV  802 µV/V + 20 µV  3 mV/V + 100 µV  10 mV/V + 100 µV  15 mV/V + 100 µV  40 mV/V + 700 µV  40 mV/V + 800 µV  150 mV/V + 1 mV</p> <p>72 µV/V + 400 µV  72 µV/V + 200 µV  142 µV/V + 200 µV  302 µV/V + 200 µV  802 µV/V + 200 µV  3 mV/V + 1 mV  10 mV/V + 1 mV  15 mV/V + 1 mV  40 mV/V + 7 mV  40 mV/V + 8 mV  150 mV/V + 10 mV</p> <p>202 µV/V + 4 mV  202 µV/V + 2 mV  202 µV/V + 2 mV  352 µV/V + 2 mV  1.2 mV/V + 2 mV  4 mV/V + 10 mV  150 mV/V + 10 mV</p> <p>402 µV/V + 40 mV  402 µV/V + 20 mV  602 µV/V + 20 mV  1.2 mV/V + 20 mV  3.0 mV/V + 20 mV</p>	Agilent 3458A	OEM, GIDEP, and Laboratory Developed Procedures





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AC Current - Measure	<p><b>Up to 200 µA</b>  (1 to 10) Hz  10 Hz to 10 kHz  (10 to 30) kHz  (30 to 100) kHz</p> <p><b>200 µA to 2 mA</b>  (1 to 10) Hz  10 Hz to 10 kHz  (10 to 30) kHz  (30 to 100) kHz</p> <p><b>(2 to 20) mA</b>  (1 to 10) Hz  10 Hz to 10 kHz  (10 to 30) kHz  (30 to 100) kHz</p> <p><b>(20 to 200) mA</b>  (1 to 10) Hz  10 Hz to 10 kHz  (10 to 30) kHz</p> <p><b>200 mA to 2 A</b>  10 Hz to 2 kHz  (2 to 10) kHz  (10 to 30) kHz</p> <p><b>(2 to 20) A</b>  10 Hz to 2 kHz  (2 to 10) kHz</p>	<p>475 µA/A + 20 nA  475 µA/A + 20 nA  650 µA/A + 20 nA  4 mA/A + 20 nA</p> <p>290 µA/A + 200 nA  280 µA/A + 200 nA  650 µA/A + 200 nA  4 mA/A + 200 nA</p> <p>290 µA/A + 2 µA  280 µA/A + 2 µA  650 µA/A + 2 µA  4 mA/A + 2 µA</p> <p>290 µA/A + 20 µA  250 µA/A + 20 µA  600 µA/A + 20 µA</p> <p>600 µA/A + 200 µA  710 µA/A + 200 µA  3 mA/A + 200 µA</p> <p>800 µA/A + 2 mA  2.5 mA/A + 2 mA</p>	Fluke 8508A Opt 01	OEM, GIDEP, and Laboratory Developed Procedures
Resistance – Source	<p>Up to 11 Ω  (11 to 33) Ω  (33 to 110) Ω  (110 to 330) Ω  330 Ω to 1.1 kΩ  (1.1 to 3.3) kΩ  (3.3 to 11) kΩ  (11 to 33) kΩ  (33 to 110) kΩ  (110 to 330) kΩ  330 kΩ to 1.1 MΩ  (1.1 to 3.3) MΩ  (3.3 to 11) MΩ  (11 to 33) MΩ  (33 to 110) MΩ  (110 to 330) MΩ  330 MΩ to 1.1 GΩ</p>	<p>40 µΩ/Ω + 1 mΩ  30 µΩ/Ω + 1.5 mΩ  28 µΩ/Ω + 1.4 Ω  28 µΩ/Ω + 2 mΩ  28 µΩ/Ω + 2 mΩ  28 µΩ/Ω + 20 mΩ  28 µΩ Ω + 20 mΩ  28 µΩ/Ω + 200 mΩ  28 µΩ/Ω + 200 mΩ</p> <p>32 µΩ/Ω + 2 Ω  32 µΩ/Ω + 2 Ω  60 µΩ/Ω + 30 Ω  130 µΩ/Ω + 50 Ω  250 µΩ/Ω + 2.5 kΩ  500 µΩ/Ω + 3 kΩ  3 mΩ/Ω + 100 kΩ  15 mΩ/Ω + 500 kΩ</p>	Fluke 5520A/SC110	





PARAMETER / EQUIPMENT	RANGE	CALIBRATION AND MEASUREMENT CAPABILITY [EXPRESSED AS UNCERTAINTY(±)]	REFERENCE STANDARD OR EQUIPMENT	METHOD(S)
<b>Oscilloscopes</b>				
DC Signal into 50 Ω Load	0 V to ± 6.6 V	2.5 mV/V + 40 μV	Fluke 5520A/SC1100	OEM, GIDEP, and Laboratory Developed Procedures
DC Signal into 1 MΩ Load	0 V to ± 130 V	500 μV/V + 40 μV		
Amplitude Square Wave 50 Ω Load	1 mV to 6.6 V p-p 10 Hz to 10 kHz	2.5 mV/V + 40 μV		
1 MΩ Load	1 mV to 130 V p-p 10 Hz to 1 kHz (1 to 10) kHz	1 mV/V + 40 μV 2.5 mV/V + 40 μV		
Leveled Sine Wave – Flatness				
Relative to 50 kHz Time Marker into 50 Ω Load	<b>[5 mV to 5.5 V]</b> 50 kHz to 100 MHz (100 to 300) MHz (300 to 600) MHz	15 mV/V + 100 μV 20 mV/V + 100 μV 40 mV/V + 100 μV		
	<b>5 mV to 3.5 V</b> 600 MHz to 1.1 GHz	50 mV/V + 100 μV		
Spike or Square Wave Spike, Square, 20 % Pulse	5 s to 50 ms 20 ms to 100 ns	(25 + 1 000t) μs/s 2.5 μs/s		
Spike or Square Wave Square or Sine Wave Sine Wave	(50 to 20) ns 10 ns	2.5 μs/s 2.5 μs/s		
Edge Specs into 50 Ω Load – Source	(5 to 1) ns	2.5 μs/s		
Rise Time Amplitude (Peak to Peak) Frequency	≤300 ps 5 mV to 2.5 V 1 kHz to 10 MHz	+0 ps/-100 ps 20 mV/V + 200 μV 2.5 μs/s		

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Wave Generator - Source: Amplitude (10 Hz to 10 kHz)				
Square,Sine,Triangle into 1 MΩ	1.8 mV to 55 V p-p	30 mV/V +100 μV	Fluke 5520A/SC1100	
Square,Sine,Triangle into 50 MΩ	1.8 mV to 2.5 V p-p	30 mV/V + 100 μV		
Frequency	10 Hz to 100 kHz	25 μHz/Hz + 15 mHz		
Pulse Generator - Source				
Width	(4 to 500) ns	50 ms/s ± 2 ns		
Period 50 Hz to 5 MHz	20 ms to 200 ns	2.5 μs/s		
DC Power - Source	<b>33 mV to 1.02 kV</b> 330 μA to 330 mA 330 mA to 3 A ( 3 to 20.5) A	0.023 % of Watts Output 0.022 % of Watts Output 0.07 % of Watts Output		OEM, GIDEP, and Laboratory Developed Procedures
AC Power (45 to 65)Hz PF=1 - Source	<b>(33 to 330) mV</b> (3.3 to 9) mA (9 to 33) mA (33 to 90) mA (90 to 330) mA (330 to 900) mA 900 mA to 2.2 A (2.2 to 4.5) A (4.5 to 20.5) A <b>330 mV to 1 kV</b> (3.3 to 9) mA (9 to 33) mA (33 to 90) mA (90 to 330) mA (330 to 900) mA 900 mA to 2.2 A (2.2 to 4.5) A (4.5 to 20.5) A	0.14 % of Watts Output 0.1 % of Watts Output 0.14 % of Watts Output 0.1 % of Watts Output 0.13 % of Watts Output 0.11 % of Watts Output 0.13 % of Watts Output 0.11 % of Watts Output  0.12 % of Watts Output 0.08 % of Watts Output 0.12 % of Watts Output 0.08 % of Watts Output 0.11 % of Watts Output 0.09 % of Watts Output 0.12 % of Watts Output 0.1 % of Watts Output	Fluke 5520A	

PARAMETER / EQUIPMENT	RANGE	CALIBRATION AND MEASUREMENT CAPABILITY [EXPRESSED AS UNCERTAINTY(±)]	REFERENCE STANDARD OR EQUIPMENT	METHOD(S)
Electrical Simulation of Thermocouples				
Type B	(600 to 800) °C (800 to 1 000) °C (1 000 to 1 550) °C (1 550 to 1 820) °C	0.44 °C 0.34 °C 0.3 °C 0.38 °C	Fluke 5520A	OEM, GIDEP, and Laboratory Developed Procedures
Type C	(0 to 150) °C (150 to 650) °C (650 to 1 000) °C (1 000 to 1 800) °C (1 800 to 2 316) °C	0.3 °C 0.26 °C 0.31 °C 0.5 °C 0.84 °C		
Type E	(-250 to -100) °C (-100 to -25) °C (-25 to 350) °C (350 to 650) °C (650 to 1 000) °C	0.5 °C 0.16 °C 0.14 °C 0.16 °C 0.21 °C		
Type J	(-210 to -100) °C (-100 to -30) °C (-30 to 150) °C (150 to 760) °C (760 to 1 200) °C	0.27 °C 0.16 °C 0.14 °C 0.17 °C 0.23 °C		
Type K	(-200 to -100) °C (-100 to -25) °C (-25 to 120) °C (120 to 1 000) °C (1 000 to 1 372) °C	0.33 °C 0.18 °C 0.16 °C 0.26 °C 0.4 °C		
Type N	(-200 to -100) °C (-100 to -25) °C (-25 to 120) °C (120 to 410) °C (410 to 1 300) °C	0.4 °C 0.22 °C 0.19 °C 0.18 °C 0.27 °C		
Type R	(0 to 250) °C (250 to 400) °C (400 to 1 000) °C (1 000 to 1 767) °C	0.57 °C 0.35 °C 0.33 °C 0.4 °C		



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Electrical Simulation of Thermocouples (cont.)				
Type S	(0 to 250) °C (250 to 1 000) °C (1 000 to 1 400) °C (1 400 to 1 767) °C	0.47°C 0.36 °C 0.37 °C 0.46 °C		
Type T	(-250 to -150) °C (-150 to 0) °C (0 to 120) °C (120 to 400) °C	0.63 °C 0.24 °C 0.16 °C 0.14 °C		
Type U	(-200 to 0) °C (0 to 600) °C	0.56 °C 0.27 °C		
Electrical Simulation of RTDs				
Pt 385 (100 Ω)	(-200 to 0) °C (0 to 100) °C (100 to 300) °C (300 to 400) °C (400 to 630) °C (630 to 800) °C	0.05 °C 0.07 °C 0.09 °C 0.1 °C 0.12 °C 0.23 °C	Fluke 5520A/SC1100	OEM, GIDEP, and Laboratory Developed Procedures
Pt 385 (200 Ω)	(-200 to 100) °C (100 to 260) °C (260 to 300) °C (300 to 400) °C (400 to 600) °C (600 to 630) °C	0.04 °C 0.05 °C 0.12 °C 0.13 °C 0.14 °C 0.16 °C		
Pt 385 (500 Ω)	(-200 to -80) °C (-80 to 100) °C (100 to 260) °C (260 to 400) °C (400 to 600) °C (600 to 630) °C	0.04 °C 0.05 °C 0.06 °C 0.08 °C 0.09 °C 0.11 °C		



PARAMETER / EQUIPMENT	RANGE	CALIBRATION AND MEASUREMENT CAPABILITY [EXPRESSED AS UNCERTAINTY(±)]	REFERENCE STANDARD OR EQUIPMENT	METHOD(S)
Electrical Simulation of RTDs (cont.)				
Pt 385 (1 000 Ω)	(-200 to 0) °C (0 to 100) °C (100 to 260) °C (260 to 300) °C (300 to 600) °C (600 to 630) °C	0.03 °C 0.04 °C 0.05 °C 0.06 °C 0.07 °C 0.23 °C	Fluke 5520A/SC1100	OEM, GIDEP, and Laboratory Developed Procedures
Pt 3916 (100 Ω)	(-200 to -190) °C (-190 to -80) °C (-80 to 0) °C (0 to 100) °C (100 to 260) °C (260 to 300) °C (300 to 400) °C (400 to 600) °C (600 to 630) °C	0.25 °C 0.04 °C 0.05 °C 0.06 °C 0.07 °C 0.08 °C 0.09 °C 0.10 °C 0.23 °C		
Pt 3926 (100 Ω)	(-200 to 0) °C (0 to 100) °C (100 to 300) °C (300 to 400) °C (400 to 630) °C	0.05 °C 0.07 °C 0.09 °C 0.1 °C 0.12 °C		
PtNi 385 (120 Ω)	(-80 to 100) °C (100 to 260) °C	0.08 °C 0.14 °C		

## II. Electromagnetic – RF / Microwave

PARAMETER / EQUIPMENT	RANGE	CALIBRATION AND MEASUREMENT CAPABILITY [EXPRESSED AS UNCERTAINTY(±)]	REFERENCE STANDARD OR EQUIPMENT	METHOD(S)
RF Power - Source <sup>5</sup> 50 Ω load	<b>+7 to -127 dB</b> 10 MHz to 2.3 GHz (2.3 to 20) GHz <b>Up to 2.3 GHz</b> (+10 to -10) dBm (-10 to -20) dBm (-20 to -50) dBm (-50 to -80) dBm (-80 to -100) dBm (-100 to -110) dBm <b>(2.3 to 20) GHz</b> (+18 to +10) dBm (+10 to -10) dBm (-10 to -20) dBm (-20 to -50) dBm (-50 to -80) dBm (-80 to -100) dBm (-100 to -110) dBm <b>(20 to 26.5) GHz</b> (+18 to +10) dBm (+10 to -10) dBm (-10 to -20) dBm (-20 to -50) dBm (-50 to -80) dBm (-80 to -100) dBm (-100 to -110) dBm	1 dB 1 dB 1.2 dB 1.6 dB 2 dB 2.4 dB 2.8 dB 3.6 dB 2.3 dB 1.9 dB 2.6 dB 3.1 dB 3.5 dB 3.9 dB 4.9 dB 2.9 dB 2.7 dB 3.4 dB 3.8 dB 4.2 dB 4.6 dB 5.7 dB	HP 8340B	OEM, GIDEP, and Laboratory Developed Procedures
RF Power - Measure <sup>5</sup> 50 Ω load	<b>(+30 to -20) dBm</b> 150 kHz to 1.3 GHz <b>(+20 to -30) dBm</b> 110 kHz to 4.2 GHz, 50 MHz to 26.5 GHz <b>(+20 to -10 dBm)</b> 50 MHz to 18 GHz <b>(-20 to -70) dBm</b> 50 MHz to 18 GHz	0.07 dB 0.07 dB 0.12 dB 0.10 dB 0.11 dB	HP 8902A w/11722A HP E4419A w/ 8482A HP E4419A w/ E4413A HP E4419A w/ 8481A HP E4419A w/ E4413A	

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Power Reference <sup>5</sup> 50 MHz	1 mW	0.07 dB (0.016 mW)	HP 8902A w/ 11722A	OEM, GIDEP, and Laboratory Developed Procedures
Phase Modulation - Measure <sup>5</sup> Carrier Frequency: 150 kHz to 10 MHz 10 MHz to 1.3 GHz	200 Hz to 10 kHz 200 Hz to 20 kHz	5 % 4 %	HP 8902A w/ 11722A	
Amplitude Modulation <sup>5</sup> - Source Rate: 50 Hz to 10 kHz Depths: (5 to 99) %	100 MHz to 1.04 GHz	2.3 %	HP 8902A w/ 8657B and 3325A	
Amplitude Modulation - Measure <sup>6</sup> Rate: 20 Hz to 10 kHz up to 99 % 50 Hz to 10 kHz (5 to 99) % 20 Hz to 10 kHz up to 99 % 50 Hz to 10 kHz (5 to 99) %	150 kHz to 10 MHz 150 kHz to 10 MHz 10 MHz to 1.3 GHz 10 MHz to 1.3 GHz	3.5 % 2.3 % 3.5 % 1.2 %	HP 8902A w/ 11722A	
Frequency Modulation -- Generate <sup>5</sup> Modulation Rate: 20 Hz to 10 kHz 50 Hz to 100 kHz 20 Hz to 200 kHz	250 kHz to 10 MHz 10 MHz to 1.04 GHz 10 MHz to 1.04 GHz	2.4 % 1.3 % 5.8 %	HP 8902A w/ 8657B and 3325A	
Frequency Modulation - Measure <sup>5</sup> Modulation Rate: 20 Hz to 10 kHz 50 Hz to 100 kHz 20 Hz to 200 kHz	250 kHz to 10 MHz 10 MHz to 1.3 GHz 10 MHz to 1.3 GHz	2.4 % 1.3 % 5.8 %	HP 8902A	
Insertion Loss <sup>5</sup> (0 to 110) dB (0 to 30) dB (0 to 30) dB	2.5 MHz to 1.3 GHz 50 MHz to 18 GHz 50 MHz to 26.5 GHz	0.13 dB 0.1 dB 0.12 dB	HP 8902A w/ 11722A HP E4419A w/ 8481A HP E4419A w/ E4413A	



### III. Time & Frequency

PARAMETER / EQUIPMENT	RANGE	CALIBRATION AND MEASUREMENT CAPABILITY [EXPRESSED AS UNCERTAINTY(±)]	REFERENCE STANDARD OR EQUIPMENT	METHOD(S)
Frequency - Source	10 MHz DC to 500 MHz 500 MHz to 26.5 GHz	2.31 parts in 10 <sup>12</sup> 1.15 parts in 10 <sup>8</sup> 1.15 parts in 10 <sup>8</sup>	Datum 9390 Datum 9390 w/5335A Datum 9390 w/548A	OEM, GIDEP, and Laboratory Developed Procedures

### IV. Thermodynamic

PARAMETER / EQUIPMENT	RANGE	CALIBRATION AND MEASUREMENT CAPABILITY [EXPRESSED AS UNCERTAINTY(±)]	REFERENCE STANDARD OR EQUIPMENT	METHOD(S)
Temperature - Measure	-190 °C -39 °C 0.01 °C 231 °C 420 °C	0.003 °C 0.006 °C 0.002 °C 0.007 °C 0.007 °C	Hart 8163B SPRT with ASL F300 Bridge	NIST, ASTM, OEM and GIDEP Sourced Calibration Procedures
Humidity	(10 to 90) %RH	1.26 %RH	Rotronic A2 Humidity - Temperature Indicator	

### V. Mechanical

PARAMETER / EQUIPMENT	RANGE	CALIBRATION AND MEASUREMENT CAPABILITY [EXPRESSED AS UNCERTAINTY(±)]	REFERENCE STANDARD OR EQUIPMENT	METHOD(S)
Pressure (High)	(30 to 12 000) psi/psig	0.001 %	Ruska 2400 Deadweight Tester	OEM, GIDEP, and Laboratory Developed Procedures
Pressure (Low)	(0.005 to 5) psig/psia (5 to 50) psig/psia	0.024 % 0.027 %	CEC 6-201 Deadweight Tester	
Torque	5 in·lb to 600 ft·lb	1.17 % of reading	CDI Suretest Model 5000ST	
Scale and Balances	1 mg to 500 mg 1 kg to 5 kg	0.1 mg 1.5 mg	Ultra Class Weights	

**VI. Dimensional**

<b>PARAMETER / EQUIPMENT</b>	<b>RANGE</b>	<b>CALIBRATION AND MEASUREMENT CAPABILITY [EXPRESSED AS UNCERTAINTY(±)]</b>	<b>REFERENCE STANDARD OR EQUIPMENT</b>	<b>METHOD(S)</b>
*Single Axis Dimensional Gaging: Inside: as a comparator	(0.02 to 14) in	6.9 μin	Pratt & Whitney Labmaster	OEM, GIDEP, and Laboratory Developed Procedures
Outside: as a comparator	Up to 13 in	6.9 μin		
Thread Pitch: free measure	Up to 13 in	152 μin	hP&W Labmaster with Thread Wires	
Calipers	(0.01 to 4) in	(580 + 40L) μin	Grades 1 and 2 Gage Blocks	
Micrometers	(0.01 to 4) in	(58 + 40L) μin		

**Notes:**

1. Calibration and Measurement Capabilities (CMC)(Expanded Uncertainties)are based on approximately a 95% confidence interval, using a coverage of k=2.
2. This laboratory offers calibration service in its laboratory and on-site at customer-designated locations. Since on-site conditions are typically more variable than those in the laboratory, larger measurement uncertainties are expected on-site than what is reported on the accredited scope.
3. Capabilities denoted by an asterisk (\*) are laboratory-only, not available for on-site calibration activity.
4. The CMC for Electromagnetic – DC/Low Frequency and RF/Microwave do not include possible contributions to uncertainty caused by a “best available” unit under test.
5. The CMC for Electromagnetic – RF/Microwave does not include possible contributions to uncertainty caused by mismatch.
6. The use of (t) signifies Time in seconds.
7. The use of (L) signifies an expression of Length in inches.
8. This scope is part of and must be included with the Certificate of Accreditation No. AC-1180.




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Vice President

