



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

Davis Calibration

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CALIBRATION

Valid to: September 8, 2011

Certificate Number: AC-1187

I. Electromagnetic DC/Low Frequency

PARAMETER / EQUIPMENT	RANGE	BEST MEASUREMENT CAPABILITY [EXPRESSED AS UNCERTAINTY (±)]	REFERENCE STANDARD OR EQUIPMENT	METHOD(S)
DC Volts – Source	Up to 220 mV 220 mV to 2.2 V (2.2 to 11) V (11 to 22) V (22 to 220) V (220 to 1 100) V	7.5 µV/V + 0.4 µV 5 µV/V + 0.7 µV 3.5 µV/V + 2.5 µV 3.5 µV/V + 4 µV 5 µV/V + 0.04 mV 6.5 µV/V + 0.4 mV	Fluke 5720A Opt 03 (5700A with EP option)	OEM and GIDEP Sourced Calibration Procedures
Fixed Points	1.018 V 10 V	0.61 µV 1.0 µV	Fluke 732B	
DC Volts - Measure	Up to 200 mV 200 mV to 2 V (2 to 20) V (20 to 200) V (200 to 1 000) V	2.7 µV/V + 0.1 µV 2.7 µV/V + 0.4 µV 2.7 µV/V + 4 µV 4 µV/V + 40 µV 4 µV/V + 0.5 mV	Fluke 8508A Opt 01	OEM, GIDEP, and National Instruments Sourced Calibration Procedures
DC Current - Source	Up to 220 µA 220 µA to 2.2 mA (2.2 to 22) mA (22 to 220) mA 220 mA to 2.2 A (10 to 100) A	40 µA/A + 6 nA 35 µA/A + 7 nA 35 µA/A + 40 nA 45 µA/A + 0.7 µA 80 µA/A + 12 µA 300 µA/A + 15 mA	Fluke 5720A Opt 03 Valhalla 2555A	OEM and GIDEP Sourced Calibration Procedures
DC Current - Measure	(10 to 100) nA 100 nA to 1 µA (1 to 10) µA (10 to 100) µA (100 to 200) µA 200 µA to 2 mA (2 to 20) mA (20 to 200) mA	30 µA/A + 0.04 nA 20 µA/A + 0.04 nA 20 µA/A + 0.1 nA 20 µA/A + 0.8 nA 12 µA/A + 0.4 nA 12 µA/A + 4 nA 14 µA/A + 40 nA 48 µA/A + 800 nA	HP 3458A OPT 02 Fluke 8508A OPT 01	OEM, GIDEP, and National Instruments Sourced Calibration Procedures



PARAMETER / EQUIPMENT	RANGE	BEST MEASUREMENT CAPABILITY [EXPRESSED AS UNCERTAINTY (±)]	REFERENCE STANDARD OR EQUIPMENT	METHOD(S)
AC Volts – Source	<p>(0 to 2.2) mV (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</p> <p>(2.2 to 22) mV (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</p> <p>(22 to 220) mV (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</p> <p>220 mV to 2.2 V (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</p>	<p>240 μV/V + 4 μV 90 μV/V + 4 μV 80 μV/V + 4 μV 200 μV/V + 4 μV 500 μV/V + 5 μV 1.05 mV/V + 10 μV 1.4 mV/V + 20 μV 2.7 mV/V + 20 μV</p> <p>240 μV/V + 4 μV 90 μV/V + 4 μV 80 μV/V + 4 μV 200 μV/V + 4 μV 500 μV/V + 5 μV 1.05 mV/V + 10 μV 1.4 mV/V + 20 μV 2.7 mV/V + 20 μV</p> <p>240 μV/V + 12 μV 90 μV/V + 7 μV 80 μV/V + 7 μV 200 μV/V + 7 μV 460 μV/V + 17 μV 900 μV/V + 20 μV 1.4 mV/V + 25 μV 2.7 mV/V + 45 μV</p> <p>240 μV/V + 40 μV 90 μV/V + 15 μV 45 μV/V + 8 μV 75 μV/V + 10 μV 110 μV/V + 30 μV 420 μV/V + 80 μV 1.0 mV/V + 200 μV 1.7 mV/V + 300 μV</p>	Fluke 5720A Opt 03	OEM and GIDEP Sourced Calibration Procedures

PARAMETER / EQUIPMENT	RANGE	BEST MEASUREMENT CAPABILITY [EXPRESSED AS UNCERTAINTY (±)]	REFERENCE STANDARD OR EQUIPMENT	METHOD(S)
AC Volts – Source (Cont.)	<p>(2.2 to 22) V (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</p> <p>(22 to 220) V (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</p> <p>(220 to 1100) V (15 to 50) Hz 50 Hz to 1 kHz</p>	<p>240 μV/V + 400 μV 90 μV/V + 150 μV 45 μV/V + 50 μV 70 μV/V + 100 μV 100 μV/V + 200 μV 275 μV/V + 0.6 mV 1.0 mV/V + 2.0 mV 1.5 mV/V + 3.2 mV</p> <p>240 μV/V + 4 mV 90 μV/V + 1.5 mV 52 μV/V + 0.6 mV 80 μV/V + 1.0 mV 150 μV/V + 2.5 mV 900 μV/V + 16 mV 4.4 mV/V + 40 mV 8 mV/V + 80 mV</p> <p>300 μV/V + 16 mV 70 μV/V + 3.5 mV</p>	Fluke 5720A Opt 03	OEM and GIDEP Sourced Calibration Procedures
AC Volts – Measure	<p>(0 to 2.2) mV (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</p> <p>(2.2 to 7) mV (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</p>	<p>1.7 mV/V + 1.3 μV 740 μV/V + 1.3 μV 420 μV/V + 1.3 μV 810 μV/V + 2 μV 1.2 mV/V + 2.5 μV 2.3 mV/V + 4 μV 2.4 mV/V + 8 μV</p> <p>850 μV/V + 1.3 μV 370 μV/V + 1.3 μV 210 μV/V + 1.3 μV 400 μV/V + 2 μV 600 μV/V + 2.5 μV 1.2 mV/V + 4 μV 1.3 mV/V + 8 μV 2.3 mV/V + 8 μV</p>	Fluke 5790A	

PARAMETER / EQUIPMENT	RANGE	BEST MEASUREMENT CAPABILITY [EXPRESSED AS UNCERTAINTY (\pm)]	REFERENCE STANDARD OR EQUIPMENT	METHOD(S)
AC Volts – Measure (cont)	(7 to 22) mV	290 μ V/V + 1.3 μ V	Fluke 5790A	OEM and GIDEP Sourced Calibration Procedures
	(10 to 20) Hz	190 μ V/V + 1.3 μ V		
	(20 to 40) Hz	110 μ V/V + 1.3 μ V		
	40 Hz to 20 kHz	210 μ V/V + 2 μ V		
	(20 to 50) kHz	310 μ V/V + 2.5 μ V		
	(50 to 100) kHz	810 μ V/V + 4 μ V		
	(100 to 300) kHz	890 μ V/V + 8 μ V		
	(300 to 500) kHz	1.7 mV/V + 8 μ V		
	500 kHz to 1 MHz	70 mV/V + 7 μ V	Fluke 3458A OPT 02	
	(1 to 4) MHz	400 mV/V + 8 μ V		
	(4 to 8) MHz	(22 to 70) mV		
	(10 to 20) Hz	240 μ V/V + 1.5 μ V	Fluke 5790A	
	(20 to 40) Hz	120 μ V/V + 1.5 μ V		
	40 Hz to 20 kHz	65 μ V/V + 1.5 μ V		
	(20 to 50) kHz	130 μ V/V + 2 μ V		
	(50 to 100) kHz	260 μ V/V + 2.5 μ V		
	(100 to 300) kHz	510 μ V/V + 4 μ V		
	(300 to 500) kHz	670 μ V/V + 8 μ V		
	500 kHz to 1 MHz	1.1 mV/V + 8 μ V		
	(1 to 4) MHz	15 mV/V + 10 μ V	Fluke 3458A OPT 02	
	(4 to 8) MHz	40 mV/V + 8 μ V		
	(8 to 10) MHz	150 mV/V + 100 μ V		
	(70 to 220) mV	210 μ V/V + 1.5 μ V	Fluke 5790A	
	(10 to 20) Hz	85 μ V/V + 1.5 μ V		
	(20 to 40) Hz	38 μ V/V + 1.5 μ V		
	40 Hz to 20 kHz	69 μ V/V + 2 μ V		
	(20 to 50) kHz	160 μ V/V + 2.5 μ V		
(50 to 100) kHz	250 μ V/V + 4 μ V			
(100 to 300) kHz	380 μ V/V + 8 μ V			
(300 to 500) kHz	1 mV/V + 8 μ V			
500 kHz to 1 MHz	15 mV/V + 0.1 mV	Fluke 3458A OPT 02		
(1 to 4) MHz	40 mV/V + 0.8 mV			
(4 to 8) MHz	150 mV/V + 1 mV			
(8 to 10) MHz				

PARAMETER / EQUIPMENT	RANGE	BEST MEASUREMENT CAPABILITY [EXPRESSED AS UNCERTAINTY (\pm)]	REFERENCE STANDARD OR EQUIPMENT	METHOD(S)
AC Volts – Measure (cont)	(200 to 700) mV			
	(10 to 20) Hz	210 $\mu\text{V/V} + 1.5 \mu\text{V}$	Fluke 5790A	
	(20 to 40) Hz	76 $\mu\text{V/V} + 2 \mu\text{V}$		
	40 Hz to 20 kHz	33 $\mu\text{V/V} + 2.5 \mu\text{V}$		
	(20 to 50) kHz	51 $\mu\text{V/V} + 4 \mu\text{V}$		
	(50 to 100) kHz	79 $\mu\text{V/V} + 8 \mu\text{V}$		
	(100 to 300) kHz	180 $\mu\text{V/V} + 1.5 \mu\text{V}$		
	(300 to 500) kHz	300 $\mu\text{V/V} + 1.5 \mu\text{V}$		
	500 kHz to 1 MHz	960 $\mu\text{V/V} + 8 \mu\text{V}$		
	(1 to 4) MHz	15 mV/V + 0.1 mV		Fluke 3458A OPT 02
	(4 to 8) MHz	40 mV/V + 0.8 mV		
	(8 to 10) MHz	150 mV/V + 1 mV		
	700 mV to 2.2 V			
	(10 to 20) Hz	200 $\mu\text{V/V}$		Fluke 5790A
	(20 to 40) Hz	66 $\mu\text{V/V}$		
	40 Hz to 20 kHz	24 $\mu\text{V/V}$		
	(20 to 50) kHz	46 $\mu\text{V/V}$		
	(50 to 100) kHz	71 $\mu\text{V/V}$		
	(100 to 300) kHz	160 $\mu\text{V/V}$		
	(300 to 500) kHz	260 $\mu\text{V/V}$		
	500 kHz to 1 MHz	900 $\mu\text{V/V}$		
	(1 to 4) MHz	15 mV/V + 1 mV		Fluke 3458A OPT 02
	(4 to 8) MHz	40 mV/V + 8 mV		
	(8 to 10) MHz	150 mV/V + 10 mV		
(2.2 to 7) V				
(10 to 20) Hz	200 $\mu\text{V/V}$		Fluke 5790A	
(20 to 40) Hz	67 $\mu\text{V/V}$			
40 Hz to 20 kHz	24 $\mu\text{V/V}$			
(20 to 50) kHz	48 $\mu\text{V/V}$			
(50 to 100) kHz	71 $\mu\text{V/V}$			
(100 to 300) kHz	190 $\mu\text{V/V}$			
(300 to 500) kHz	400 $\mu\text{V/V}$			
500 kHz to 1 MHz	1.2 mV/V			
(1 to 4) MHz	15 mV/V + 1 mV		Fluke 3458A OPT 02	
(4 to 8) MHz	40 mV/V + 8 mV			
(8 to 10) MHz	150 mV/V + 10 mV			

PARAMETER / EQUIPMENT	RANGE	BEST MEASUREMENT CAPABILITY [EXPRESSED AS UNCERTAINTY (\pm)]	REFERENCE STANDARD OR EQUIPMENT	METHOD(S)
AC Volts – Measure (Cont.)	<p>(7 to 22) V</p> <p>(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</p> <p>(22 to 70) V</p> <p>(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</p> <p>(70 to 220) V</p> <p>(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</p> <p>(220 to 700) V</p> <p>(10 to 20) Hz (20 to 40) Hz 40 Hz to 20 kHz (20 to 50) kHz (50 to 100) kHz</p> <p>(700 to 1 000) V</p> <p>(10 to 20) Hz (20 to 40) Hz 40 Hz to 20 kHz (20 to 50) kHz (50 to 100) kHz</p>	<p>200 μV/V 67 μV/V 27 μV/V 48 μV/V 81 μV/V 190 μV/V 400 μV/V 1.2 mV/V</p> <p>200 μV/V 68 μV/V 32 μV/V 57 μV/V 94 μV/V 200 μV/V 410 μV/V 1.2 mV/V</p> <p>200 μV/V 68 μV/V 31 μV/V 69 μV/V 98 μV/V 210 μV/V 500 μV/V</p> <p>200 μV/V 99 μV/V 41 μV/V 130 μV/V 500 μV/V</p> <p>200 μV/V 99 μV/V 38 μV/V 130 μV/V 500 μV/V</p>	Fluke 5790A	OEM and GIDEP Sourced Calibration Procedures

PARAMETER / EQUIPMENT	RANGE	BEST MEASUREMENT CAPABILITY [EXPRESSED AS UNCERTAINTY (\pm)]	REFERENCE STANDARD OR EQUIPMENT	METHOD(S)
AC Volts – Measure Flatness	(1 to 2.2) mV		Fluke 5790A OPT03	OEM and GIDEP Sourced Calibration Procedures
	(1 to 2) MHz	0.7 mV/V + 1 μ V		
	(2 to 10) MHz	1.7 mV/V + 1 μ V		
	(10 to 20) MHz	3.0 mV/V + 1 μ V		
	(20 to 30) MHz	7.0 mV/V + 1 μ V		
	(2.2 to 7) mV			
	(1 to 2) MHz	0.7 mV/V + 1 μ V		
	(2 to 10) MHz	1.0 mV/V + 1 μ V		
	(10 to 20) MHz	1.7 mV/V + 1 μ V		
	(20 to 30) MHz	3.7 mV/V + 1 μ V		
	(7 to 22) mV			
	(1 to 2) MHz	0.7 mV/V		
	(2 to 10) MHz	1.0 mV/V		
	(10 to 20) MHz	1.7 mV/V		
	(20 to 30) MHz	3.7 mV/V		
	(22 to 70) mV			
	(1 to 2) MHz	0.5 mV/V		
	(2 to 10) MHz	1.0 mV/V		
	(10 to 20) MHz	1.5 mV/V		
	(20 to 30) MHz	3.5 mV/V		
(70 to 220) mV				
(1 to 2) MHz	0.5 mV/V			
(2 to 10) MHz	1.0 mV/V			
(10 to 20) MHz	1.5 mV/V			
(20 to 30) MHz	3.5 mV/V			
(220 to 700) mV				
(1 to 2) MHz	0.5 mV/V			
(2 to 10) MHz	1.0 mV/V			
(10 to 20) MHz	1.5 mV/V			
(20 to 30) MHz	3.5 mV/V			
(0.7 to 2.2) V				
(1 to 2) MHz	0.5 mV/V			
(2 to 10) MHz	1.0 mV/V			
(10 to 20) MHz	1.5 mV/V			
(20 to 30) MHz	3.5 mV/V			

PARAMETER / EQUIPMENT	RANGE	BEST MEASUREMENT CAPABILITY [EXPRESSED AS UNCERTAINTY (\pm)]	REFERENCE STANDARD OR EQUIPMENT	METHOD(S)
AC Volts – Measure Flatness (cont.)	(2.2 to 7) V (1 to 2) MHz (2 to 10) MHz (10 to 20) MHz (20 to 30) MHz	0.5 mV/V 1.0 mV/V 1.5 mV/V 3.5 mV/V	Fluke 5790A OPT03	OEM and GIDEP Sourced Calibration Procedures
AC Voltage Flatness – Measure Up to 3 V	(10 to 30) MHz (30 to 100) MHz	1.33 mV/V 6.67 mV/V	Thermal Voltage Converters with Fluke 8508A Opt 01	
AC Current – Source	(9 to 220) μA (10 to 20) Hz (20 to 40) Hz 40 Hz to 1 kHz (1 to 5) kHz (5 to 10) kHz 220 μA to 2.2 mA (10 to 20) Hz (20 to 40) Hz 40 Hz to 1 kHz (1 to 5) kHz (5 to 10) kHz (2.2 to 22) mA (10 to 20) Hz (20 to 40) Hz 40 Hz to 1 kHz (1 to 5) kHz (5 to 10) kHz (22 to 220) mA (10 to 20) Hz (20 to 40) Hz 40 Hz to 1 kHz (1 to 5) kHz (5 to 10) kHz 220 mA to 2.2 A 20 Hz to 1 kHz (1 to 5) kHz (5 to 10) kHz	250 μ A/A + 16 nA 160 μ A/A + 10 nA 120 μ A/A + 8 nA 280 μ A/A + 12 nA 1.1 mA/A + 65 nA 250 μ A/A + 40 nA 160 μ A/A + 35 nA 120 μ A/A + 35 nA 200 μ A/A + 110 nA 1.1 mA/A + 650 nA 250 μ A/A + 400 nA 160 μ A/A + 350 nA 120 μ A/A + 350 nA 200 μ A/A + 550 nA 1.1 mA/A + 5 μ A 250 μ A/A + 4 μ A 160 μ A/A + 3.5 μ A 120 μ A/A + 2.5 μ A 200 μ A/A + 3.5 μ A 1.1 mA/A + 10 μ A 260 μ A/A + 35 μ A 450 μ A/A + 80 μ A 7.0 mA/A + 160 μ A	Fluke 5720A Opt 03	

PARAMETER / EQUIPMENT	RANGE	BEST MEASUREMENT CAPABILITY [EXPRESSED AS UNCERTAINTY (±)]	REFERENCE STANDARD OR EQUIPMENT	METHOD(S)
Electrical Simulation of Thermocouple Indicators	Type "B"	(600 to 800) °C	Fluke 5500A-SC600	OEM and GIDEP Sourced Calibration Procedures
		(800 to 1 000) °C		
		(1 000 to 1 550) °C		
		(1 550 to 1 820) °C		
	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		
	Type "E"	(-250 to -100) °C		
		(-100 to -25) °C		
		(-25 to 350) °C		
		(350 to 650) °C		
		(650 to 1 000) °C		
	Type "J"	(-210 to -100) °C		
		(-100 to -30) °C		
		(-30 to 150) °C		
		(150 to 760) °C		
		(760 to 1 200) °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		
	Type "L"-	(-200 to -100) °C		
		(-100 to 800) °C		
		(800 to 900) °C		
	Type "N"-	(-200 to -100) °C		
	(-100 to -25) °C			
	(-25 to 120) °C			
	(120 to 410) °C			
	(410 to 1 300) °C			

PARAMETER / EQUIPMENT	RANGE	BEST MEASUREMENT CAPABILITY [EXPRESSED AS UNCERTAINTY (±)]	REFERENCE STANDARD OR EQUIPMENT	METHOD(S)
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 0.40 °C	Fluke 5500A-SC600	OEM and GIDEP Sourced Calibration Procedures
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 0.10 °C 0.12 °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 0.06 °C 0.10 °C 0.12 °C		
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 0.19 °C 0.10 °C 0.23 °C		

PARAMETER / EQUIPMENT	RANGE	BEST MEASUREMENT CAPABILITY [EXPRESSED AS UNCERTAINTY (±)]	REFERENCE STANDARD OR EQUIPMENT	METHOD(S)
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	Fluke 5500A-SC600	OEM and GIDEP Sourced Calibration Procedures
Pt 385 (500 Ω)	(-200 to 080) °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		
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		
Ni 120 (120 Ω)	(-80 to 100) °C (100 to 260) °C	0.08 °C 0.14 °C		
Cu 427 (10 Ω)	(-100 to 260) °C	0.30 °C		
Capacitance – Source				
50 Hz to 1 kHz	(0.33 to 0.5) nF	5 mF/F + 0.01 nF		
50 Hz to 1 kHz	(0.5 to 1.1) nF	5 mF/F + 0.01 nF		
50 Hz to 1 kHz	(1.1 to 3.3) nF	5 mF/F + 0.01 nF		
50 Hz to 1 kHz	(3.3 to 11) nF	5 mF/F + 0.01 nF		
50 Hz to 1 kHz	(11 to 33) nF	2.5 mF/F + 0.1 nF		
50 Hz to 1 kHz	(33 to 110) nF	2.5 mF/F + 0.1 nF		
50 Hz to 1 kHz	(110 to 330) nF	2.5 mF/F + 0.3 nF		
50 Hz to 1 kHz	(0.33 to 1.1) μF	2.5 mF/F + 1 nF		
50 Hz to 1 kHz	(1.1 to 3.3) μF	3.5 mF/F + 3 nF		
(50 to 400) Hz	(3.3 to 11) μF	3.5 mF/F + 10 nF		
(50 to 400) Hz	(11 to 33) μF	4 mF/F + 30 nF		
(50 to 200) Hz	(33 to 110) μF	5 mF/F + 100 nF		
(50 to 100) Hz	(110 to 330) μF	7 mF/F + 300 nF		
(50 to 100) Hz	(0.33 to 1.1) mF	10 mF/F + 300 nF		

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Calibration of Oscilloscopes				
Amplitude DC Signal into 50 Ω Load into 1 M Ω Load	(-6.6 to 6.6) V (-130 to 130) V	2.5 mV/V + 40 μ V 0.5 mV/V + 40 μ V	Fluke 5500A-SC600	OEM and GIDEP Sourced Calibration Procedures
Amplitude Squarewave 50 Ω Load 1 M Ω Load	\pm 1 mV to \pm 6.6 Vp-p 10 Hz to 10 kHz \pm 1 mV to \pm 130 Vp-p 10 Hz to 1 kHz (1 to 10) kHz	2.5 mV/V + 40 μ V 1.0 mV/V + 40 μ V 2.5 mV/V + 40 μ V		
Rise Time	<300 ps	+0 ps/ -100 ps		
Leveled Sine Wave Relative to 50 kHz [5 mV to 5.5 V] p-p	50 kHz to 100 MHz (100 to 300) MHz (300 to 600) MHz	35 μ V/V + 300 μ V 40 μ V/V + 300 μ V 60 μ V/V + 300 μ V		
Time Marker into 50 Ω Load-Source	5 s to 50 ms 20 ms to 2 ns	(25 + 1 000t) parts in 10 ⁶ 2.5 parts in 10 ⁶		
Edge Specs into 50 Ω Load-Source Rise Time 50 Ω load Range (p-p)	\leq 350 ps 5.0 mV to 2.5 V	(0 /-100) ps 20 mV/V + 200 μ V		
Wave Generator - Source Amplitude (10 Hz to 10 kHz) Square, Sine, Triangle into 1 M Ω Square, Sine, Triangle into 50 Ω	1.8 mV to 55 Vp-p 1.8 mV to 2.5 Vp-p	30 mV/V + 100 μ V 30 mV/V + 100 μ V		
Calibration of Power Measuring Equipment DC Power – Source 33 mV to 1 000 V	(3.3 to 330) mA (0.33 to 4.5) A (4.5 to 11) A	0.04 % of Watts Output 0.12 % of Watts Output 0.09 % of Watts Output		

PARAMETER / EQUIPMENT	RANGE	BEST MEASUREMENT CAPABILITY [EXPRESSED AS UNCERTAINTY (\pm)]	REFERENCE STANDARD OR EQUIPMENT	METHOD(S)
AC Power (45 to 65) Hz -- Source (33 to 330) mV	(3.3 to 9) mA (9 to 33) mA (33 to 90) mA (90 to 330) mA (0.33 to 0.9) A (0.9 to 2.2) A (2.2 to 4.5) A (4.5 to 11) A	0.4 % of Watts Output 0.25 % of Watts Output 0.35 % of Watts Output 0.25 % of Watts Output 0.35 % of Watts Output 0.25 % of Watts Output 0.35 % of Watts Output 0.25 % of Watts Output	Fluke 5500A-SC600	OEM and GIDEP Sourced Calibration Procedures
AC Power (45 to 65) Hz (0.33 to 1 000) V	(3.3 to 9) mA (9 to 33) mA (33 to 90) mA (90 to 330) mA (0.33 to 0.9) A (0.9 to 2.2) A (2.2 to 4.5) A (4.5 to 11) A	0.25 % of Watts Output 0.15 % of Watts Output 0.25 % of Watts Output 0.15 % of Watts Output 0.25 % of Watts Output 0.15 % of Watts Output 0.2 % of Watts Output 0.15 % of Watts Output		

II. Electromagnetic RF/Microwave

PARAMETER / EQUIPMENT	RANGE	BEST MEASUREMENT CAPABILITY [EXPRESSED AS UNCERTAINTY (\pm)]	REFERENCE STANDARD OR EQUIPMENT	METHOD(S)
RF Power – Source 50 Ω load	1 dB (0.001 to 100) Hz 100 kHz to 20 MHz	0.1 dB 0.4 dB	HP 3325B	OEM, and GIDEP Sourced Calibration Procedures
	(2 to 8) dB (0.001 to 100) Hz 100 kHz to 10 MHz	0.2 dB 0.5 dB		
	(+13 to -120) dBm 10 kHz to 1280 MHz	1.0 dB	HP 8662A	
	(-120 to -127) dBm 10 kHz to 1280 MHz	3.0 dB		
	(+18 to +10) dBm (2.3 to 20) GHz (20 to 26.5) GHz	1.8 dB 2.3 dB	HP 8340B	
	(+10 to -10) dBm Up to 2.3 GHz (2.3 to 20) GHz (20 to 26.5) GHz	0.9 dB 1.5 dB 2.0 dB		
	(-10 to -20) dBm Up to 2.3 GHz (2.3 to 20) GHz (20 to 26.5) GHz	1.2 dB 2.0 dB 2.5 dB		
	(-20 to -50) dBm Up to 2.3 GHz (2.3 to 20) GHz (20 to 26.5) GHz	1.5 dB 2.3 dB 2.8 dB		
	(-50 to -80) dBm Up to 2.3 GHz (2.3 to 20) GHz (20 to 26.5) GHz	1.8 dB 2.6 dB 3.1 dB		
	(-80 to -100) dBm Up to 2.3 GHz (2.3 to 20) GHz (20 to 26.5) GHz	2.1 dB 2.9 dB 3.4 dB		

PARAMETER / EQUIPMENT	RANGE	BEST MEASUREMENT CAPABILITY [EXPRESSED AS UNCERTAINTY (±)]	REFERENCE STANDARD OR EQUIPMENT	METHOD(S)
RF Power – Source 50 Ω load (cont.)	(-100 to -110) dBm Up to 2.3 GHz (2.3 to 20) GHz (20 to 26.5) GHz	2.9 dB 3.7 dB 4.2 dB	HP 8340B	OEM, and GIDEP Sourced Calibration Procedures
RF Power – Measure 50 Ω load	(+30 to -20) dBm 0.1 MHz to 2 GHz (2 to 26.5) GHz	0.070 dB + M 0.074 dB + M	HP 8902 w/ 11722A HP 8902 w/ 11792A and 11793A	
	(+20 to -30) dBm 110 kHz to 4.2 GHz 50 MHz to 26.5 GHz	0.07 dBm + M 0.12 dBm + M	HP 438A w/8482A HP 438A w/8485A	
	(+10 to -20) dBm 10 MHz to 2.6 GHz (2.6 to 18) GHz (18 to 20) GHz (20 to 26.5) GHz	0.07 dBm + M 0.10 dBm + M 0.12 dBm + M 0.13 dBm + M	HP 8902A w/ 11793A, 11722A, and 11792A Sensors (M = mismatch error between ports.)	
	(+10 to +20) dBm 10MHz to 18GHz (18 to 26.5)GHz	0.08 dBm + M 0.12 dBm + M	HP 436A w/ 8481A HP 436A w/ 8485A	
	(-20 to -70) dBm 10MHz to 6GHz (6 to 15) GHz (17 to 18) GHz	0.10 dBm + M 0.10 dBm + M 0.11 dBm + M	HP 436A w/ 8481D	
	(-30 to +20) dBm 100 kHz to 4.2 GHz	0.07 dBm + M	HP 436A w/ 8482A	
Power Reference – 1 mW	50 MHz	0.015 dB (3.4 μW)	HP 478-H76 thermistor mount	
Phase Modulation – Measure Carrier Frequency: 150 kHz to 10 MHz 10 MHz to 26.5 GHz	200 Hz to 10 kHz 200 Hz to 20 kHz	5.00 % 4.00 %	HP 8902A w/ 11722A HP 8902A w/ 11793A	

PARAMETER / EQUIPMENT	RANGE	BEST MEASUREMENT CAPABILITY [EXPRESSED AS UNCERTAINTY (±)]	REFERENCE STANDARD OR EQUIPMENT	METHOD(S)
Amplitude Modulation -- Generate Rate: 50 Hz to 10 kHz Depths: 5 % to 99 %	(100 to 1280) MHz	2.30 %	HP 8902A w/ 8662A	OEM, and GIDEP Sourced Calibration Procedures
Amplitude Modulation -- Measure Rate: 20 Hz to 10 kHz, to 99 %	150 kHz to 10 MHz	3.50 %	HP 8902A w/ 11722A	
50 Hz to 10 kHz, 5 % to 99 %	150 kHz to 10 MHz	2.30 %	HP 8902A w/ 11793A	
20 Hz to 10 kHz, to 99 %	(10 to 1 300) MHz	3.50 %		
50 Hz to 10 kHz, 5 % to 99 %	(10 to 1 300) MHz	1.20 %		
Frequency Modulation -- Generate Modulation Rate: 20 Hz to 10 kHz 50 Hz to 100 kHz 20 Hz to 200 kHz	250 kHz to 10 MHz (10 to 1 300) MHz (10 to 1 300) MHz	2.40 % 1.30 % 5.80 %	HP 8902A w/ 8662A	
Frequency Modulation -- Measure Modulation Rate: 20 Hz to 10 kHz 50 Hz to 100 kHz 20 Hz to 200 kHz	250 kHz to 10 MHz (10 to 1 300) MHz (10 to 1 300) MHz	2.40 % 1.30 % 5.80 %	HP 8902A	
Insertion Loss (0 to 110) dB	2.5 MHz to 26.5 GHz	0.13 dB + M	HP 8902A w/ 11793A, 11722A, and 11792A	
RF Attenuation Source Fixed Values (0 to 40) dB 50 dB	30 MHz	0.017 dB 0.01 dB	HP 11812A Verification Kit	
Distortion – Measure Fundamental Frequency	20 Hz to 20 kHz (20 to 100) kHz	1.19 dB 2.38 dB	HP 8903B	

III. Time & Frequency

PARAMETER / EQUIPMENT	RANGE	BEST MEASUREMENT CAPABILITY [EXPRESSED AS UNCERTAINTY (\pm)]	REFERENCE STANDARD OR EQUIPMENT	METHOD(S)
Frequency – Source	10 MHz DC to 500 MHz (0.5 to 26.5) GHz	6 parts in 10^8 6 parts in 10^8 6 parts in 10^{10}	Datum 9390-6000 HP 5335A HP 5352B	OEM, and GIDEP Sourced Calibration Procedures
Frequency – Measure	10 MHz DC to 500 MHz (0.5 to 26.5) GHz	6 parts in 10^8 6 parts in 10^8 6 parts in 10^{10}	Datum 9390-6000 HP 5335A HP 5352B	

IV. Thermodynamic

PARAMETER / EQUIPMENT	RANGE	BEST MEASUREMENT CAPABILITY [EXPRESSED AS UNCERTAINTY (\pm)]	REFERENCE STANDARD OR EQUIPMENT	METHOD(S)
Temperature -- Source	(-30 to 231) °C	0.76 °C	ASL PRT with F250 Precision Thermometer And Fluke 9011 Well	OEM, GIDEP, NIST, and ASTM Sourced Calibration Procedures
Temperature – Measure	-39 °C 0.01 °C 157 °C 231 °C	0.008 °C 0.005 °C 0.008 °C 0.009 °C	ASL PRT with F250 Precision Thermometer	

V. Dimensional

PARAMETER / EQUIPMENT	RANGE	BEST MEASUREMENT CAPABILITY [EXPRESSED AS UNCERTAINTY (\pm)]	REFERENCE STANDARD OR EQUIPMENT	METHOD(S)
*Single Axis Dimensional Gaging – Outside	Up to 11 in	(15.6 + 0.9L) μ in	P&W Universal Supermicrometer	OEM and GIDEP Sourced Calibration Procedures
– Inside	Up to 11.5 in	(15.8 + 0.9L) μ in		
*Thread Plug Gage- Simple Pitch Diameter	Up to 11 in	(26.9 + 0.9L) μ in	P&W with thread wires	
*Thread Ring Gage- Simple Pitch Diameter	Up to 11 in	(26.9 + 0.9L) μ in	Setting Plugs	
Micrometers	Up to 4 in (4 to 10) in (10 to 20) in (20 to 48) in	67 μ in 105 μ in 182 μ in 832 μ in	Grade 1 and 3 Gage Blocks with Optical Flats	
Calipers	Up to 6 in (6 to 20) in (20 to 48) in	128 μ in 208 μ in 737 μ in	Grade 1 and 3 Gage Blocks	
Height Gages	Up to 4 in (4 to 10) in (10 to 20) in (20 to 48) in	67 μ in 105 μ in 182 μ in 730 μ in	Grade 1 and 3 Gage Blocks with Granite Surface Plate	
Indicators	Up to 4 in	67 μ in	Grade 1 Gage Blocks	

Notes:

1. Best Measurement Uncertainties (Expanded Uncertainty) are based on approximately a 95% confidence interval, using a coverage of $k=2$
2. This laboratory's capabilities include commercial and on-site calibration services. Since field (on-site) conditions are typically more variable than those in the laboratory, larger measurement uncertainties are expected in the field (on-site) than what is reported on the accredited scope.
3. Capabilities denoted with an asterisk (*) cannot be performed on-site
4. The use of (L) signifies an expression of Length in inches.
5. The use of (M) signifies mismatch error.
6. The use of (t) signifies an expression of Time in seconds.
7. This scope is part of and must be included with the Certificate of Accreditation No. AC-1187

Karl Greenway

Vice-President