

DRAFT SCOPE OF ACCREDITATION

1. Electrical-DC/Low Frequency

PARAMETER/ EQUIPMENT	RANGE	BEST MEASUREMENT UNCERTAINTY (+/-)	REFERENCE STANDARD OR EQUIPMENT	METHOD(S)
DC Voltage – Source	(1 to 10) V	1.2 V/V	Fluke 732A and 752 A	Local Procedure or GIDEP/OEM Sourced Procedures
	(10 to 100) V	2 V/V		
	100 V to 1 kV	2 V/V		
DC Voltage – Measure*	(10 to 100) V	4.8 V/V	Fluke 752A and HP 3458A Opt 002 5101B	
	100 V to 1 kV	5.1 V/V + 50 V		
	(0 to 1100) V	.005 + .001 + 5uV		
DC Voltage – Measure*	Up to 100 mV	5.5 V/V + 300 nV	3458A Opt 002	
	100mV to 1 V	5.1 V/V + 300 nV		
	(1 to 10) V	4.6 V/V + 500 nV		
	100V to 1 kV	6.5 V/V + 30 nV		
		18.5 V/V + 100 nV		
DC Current – Measure	(10 to 100) A to	10 A/A + 30 pA	Standard Resistors & 3458A Opt 2	
	1 mA	10 A/A + 300 pA		
	(1 to 10) mA	10 A/A + 3 nA	Fluke Y5020 with HP 3458A Opt 002	
	(10 to 100) mA	10 A/A + 30 nA		
	1 mA to 1 A	10 A/A + 300 nA		
	(1 to 10) A	10 A/A + 3 A		
	(10 to 20) A	120 A/A + 30 A		
AC Voltage – Source	50Hz to 1 kHz	.05 + .005 + 50 uV	5101B	
	1 kHz to 10 kHz			
DC Current – Source	10 uA to 2 A	.025 + .0025 + .01 uA	5101B	
	0 to 20 A	+(0.025% of output +1.0 mA)	5220A	
AC Current – Source	50 Hz to 1 kHz	.07 + .01 + 2 uA	5101B	
	30 Hz to 1 kHz	+(0.05% of output +1.0 mA)	5220A	
	1 kHz to 5 kHz	+(0.05% of output +1.0 mA)		

		mA) x f f = frequency in kHz	
--	--	---------------------------------	--

DRAFT SCOPE OF ACCREDITATION

PARAMETER/ EQUIPMENT	4 RANGE	2,9 BEST MEASUREMENT UNCERTAINTY (+/-)	REFERENCE STANDARD OR EQUIPMENT	METHOD(S)
3 RF Attenuation – Generate 1 MHz to 1 GHz	(1 to 12) dB (10 to 90) dB (100 to 120) dB	0.35 dB 1.5 dB 3.0 dB	HP 355C HP 355D	Local Procedure or GIDEP/OEM Sourced Procedures
RF Attenuation – Measure (-20 to +20) dBm (-100 to 0) dBm	100 kHz to 1.3 GHz	0.053 dB 0.11 dB	HP 8902A with 11793A, 11722A, 11792A,	
Amplitude Modulation- Generate Rate: 50 Hz to 100 kHz Depths: 5% to 99%	(11 to 13.5) MHz	0.2%	HP 11715A	
Frequency Modulation- Generate Rate: DC Hz to 200 kHz Dev.: ≤ 400 kHz peak	(11 to 13.5) MHz (88 to 108) MHz (352 to 432) MHz	0.3%	HP 11715A	
Amplitude Modulation- Measure	150 kHz to 10 MHz (10 MHz to 26.5) GHz Rate: 50Hz to 20 kHz	2.3% 2.2%	HP 8902A with 11793A, 11722A, 11792A	
Frequency Modulation- Measure	250 kHz to 10 MHz (10 MHz to 26.5) GHz Rate: 50 Hz to 100 kHz	2.3% 2.2%	HP 8902A with 11793A, 11722A, 11792A	

Phase Modulation- Measure	(10 MHz to 26.5) GHz Rate: 200 Hz to 20 kHz	4.5%	HP 8902A with 11793A, 11722A , 11792A	
------------------------------	--	------	---	--

PARAMETER/ EQUIPMENT	RANGE	BEST MEASUREMENT UNCERTAINTY (+/-)	REFERENCE STANDARD OR EQUIPMENT	METHOD(S)
Distortion Measure (0 to 99.9) dB	(50 to 500) kHz (50 to 500) kHz	1.2 dB 0.07 dB	8903B	

DRAFT SCOPE OF ACCREDITATION

2. Oscilloscopes

PARAMETER/ EQUIPMENT	RANGE	BEST MEASUREMENT UNCERTAINTY (+/-)	REFERENCE STANDARD OR EQUIPMENT	METHOD(S)
Frequency accuracy	1.1 Hz to 4.9999 kHz: 5 to 49.999 kHz 50 kHz to 550 MHz	$-(0.0003\% \text{ iv} + 0.06\text{Hz})$ $\pm(0.0003\% \text{ iv} + 0.3 \text{ Hz})$ $\pm(0.0003\% \text{ iv} + 3 \text{ Hz})$	SG 5030	Measured with an electronic counter.
Output amplitude	Range: 4.5 mV to 5.5 V Tolerance: $\pm 1.5\% \text{ iv}$	$\pm 1.5\% \text{ iv}$	SG 5030	Measured with a digital multimeter
Frequency response	50.00 kHz to 100 MHz: <100MHz to 250 MHz: >250 MHz to 550 MHz:	$\pm 1.5\%$ of 50 kHz ref $\pm 3\%$ of 50 kHz ref $\pm 8\%$ of kHz ref	SG 5030	Measured to 25 MHz using a thermal converter and digital multimeter. Measured to 550 MHz using a power meter and power sensor.
Voltage Range and \pm DC Accuracy	Range: 1 M Load, 40 V to 200 V 50 Load, 40 V to 5 V	$\pm 0.25\%$, $\pm 1 \text{ V}$	CG 5011 OPT 01	Measured with a Digital multimeter
Square-Wave Voltage	Range: 40 V to 200 V	$\pm 0.25\%$, $\pm 1 \text{ V}$	CG 5011 OPT 01	Measured with an Oscilloscope
DC Current and Variable Range	Range: 1 mA to 100 mA	$\pm(0.25\% + 2 \text{ A})$ $\pm 9.9\%$	CG 5011 OPT 01	Measured with a Digital multimeter
Low Amplitude Edge (50 Load only)	Range: 20 mV p-p to 1 V p-p	$\pm 3\%$	CG 5011 OPT 01	Measured with an Oscilloscope
High Amplitude Edge	Range: 1.2 V p-p to 100 V p-p	$\pm 3\%$	CG 5011 OPT 01	Measured with an Oscilloscope

DRAFT SCOPE OF ACCREDITATION

3. Oscilloscopes (continued)

PARAMETER/ EQUIPMENT	RANGE	BEST MEASUREMENT UNCERTAINTY (+/-)	REFERENCE STANDARD OR EQUIPMENT	METHOD(S)
Reference Frequency	Range: 5 MHz, OPT 01	(+/-0.0003%, OPT 01)	CG 5011 OPT 01	Measured with an Electronic Counter
Marker and Trigger Period	Range: 5 s to .5 ns	+/-0.0003%, OPT 01	CG 5011 OPT 01	Measured with an Electronic Counter

4. Thermodynamic

PARAMETER/ EQUIPMENT	RANGE	BEST MEASUREMENT UNCERTAINTY (+/-)	REFERENCE STANDARD OR EQUIPMENT	METHOD(S)
Temperature Measuring Infrared Non-Contact	(50 – 650 degC) (-29 – 650 degC) (50 to 500) degC	+/- 0.1 degC +/- 0.11 degC 1.2 degC	Jofra ATC-650/AB Pt-100 – 90 deg Hart 9132 Black Body	OEM and GIDEP Sourced Calibration Procedures
Relative Humidity Measuring Instruments	11%RH 33% RH 75.5%RH 97%RH	1.3%RH 1.2%RH 1.5%RH 2.0%RH	Salt Solutions	ASTM E104
Relative Humidity Generating Equipment	(0 to 90) %RH (90 to 100)%RH	1.57%RH 2.34%RH	Vaisala HMP46	OEM and GIDEP Sourced Calibration Procedures

DRAFT SCOPE OF ACCREDITATION

5. Time & Frequency

PARAMETER/ EQUIPMENT	RANGE	BEST MEASUREMENT UNCERTAINTY (+/-)	REFERENCE STANDARD OR EQUIPMENT	METHOD(S)
Frequency – Measuring Equipment	10 MHz	2.3 parts in 10 ¹²	Symmetricon Xli	OEM and GIDEP Sourced Calibration Procedures
Frequency – Measure	10 Hz to 500 MHz (0.5 to 1.5) GHz (1.5 to 26.5) GHz (36 – 110) GHz	6.7 Parts in 10 ⁹ 3 parts in 10 ¹⁰ 1.1 parts in 10 ⁸ 2.8 parts in 10 ⁶	10 MHz distributed Signal into HP 5345A w/5355A plug-in w/5356C head w/5356D head	

DRAFT SCOPE OF ACCREDITATION

6. Mechanical

PARAMETER/ EQUIPMENT	RANGE	BEST MEASUREMENT UNCERTAINTY (+/-)	REFERENCE STANDARD OR EQUIPMENT	METHOD(S)
³ Scales ³ Scales and Balances	(0.5 to 5) lb (5 to 100) lb (100 to 1000) lb (1 to 500) mg 500 mg to 30 g 30 g to 8 kg (8 to 50) kg	0.002 lb 0.02 lb 0.2 lb 0.003 mg 0.012 mg 1.1 mg 0.02 g	Verification with Class F weights Verification with Ultra Class 1, 2	
Force – Tension & Compression	30 -3000 LBF 200 – 10,000 LBF 2000 – 100,000 LBF 3000 – 300,000 LBF 5000 – 500,000 LBF 7500 – 750,000 LBF	0.49 = (2.4 times S) in lbs 1.30 = (2.4 times S) in lbs 10.5 = (2.4 times S) in lbs 16.7 = (2.4 times S) in lbs 24.8 = (2.4 times S) in lbs 31.4 = (2.4 times S) in lbs	Morehouse Proving Rings	OEM, GIDEP and ASTM Sourced Calibrations Procedures
Accelerometers Acceleration Frequency	10Hz to 2 kHz 2 kHz to 10 kHz 10 Hz to 10 kHz	+/- 0.3 db +/- 1.0 db .001% +/- 1 count	Endevco	
³ Refractometers	(0 to 100) %	0.28 % rdg	Standard solutions	
Manometers	(0 to 24) in H ₂ O	0.00016 inH ₂ O	Hook gage	
Deadweight Testers- Piston and Cylinder Area	(0 to 10000) psi	(10) in	Laser Micrometer Ultra Class weights	

Mass			and scales	
------	--	--	------------	--

Chemical

PARAMETER/ EQUIPMENT	RANGE	BEST MEASUREMENT UNCERTAINTY (+/-)	REFERENCE STANDARD OR EQUIPMENT	METHOD(S)
Gs Concentration Alarms				OEM and GIDEP Sourced Calibration Procedures
Carbon Monoxide (CO)	25 parts in 10 ⁶ 50 parts in 10 ⁶	2.8 parts in 10 ⁶ 5.5 parts in 10 ⁶	Standard Gases	
Sulfur Dioxide (SO ₂)	10 parts in 10 ⁶	2 parts in 10 ⁶		
Conductivity	(0 to 15,000) us	1.2 %	Standard Solutions	
pH Meters	(4, 7, 10) pH	0.02 pH	Standard pH Solutions	

DRAFT SCOPE OF ACCREDITATION

6. Mechanical (continued)

PARAMETER/ EQUIPMENT	RANGE	BEST MEASUREMENT UNCERTAINTY (+/-)	REFERENCE STANDARD OR EQUIPMENT	METHOD(S)
Indirect Verification of Rockwell Hardness and Rockwell Superficial Hardness Testers	HRA: Low, Middle, High HRB: Low, Middle, High HRC: Low, Middle, High HRE: Low, Middle, High HRF: Low, Middle, High	0.8 HRA 1.2 HRB 0.8 HRC 0.8 HRE 1.0 HRF	ASTM E18	
Torque Wrenches Torque Watches Cable Tensiometers Torque – Calibration of Torque Meters and Sensors	(0.040 to 2.000) N.m (10 to 100) lbf.ft (25 to 250) lbf.ft (100 to 1000) lbf.ft (250 to 2000) lbf.ft (0.1 to 1000) ft lb	+/- 0.5 % rdg 20-100 % FS. 0.14 % rdg	Weights/12,24,48, ARMS	OEM and GIDEP Sourced Calibration Procedures
³ Tachometers – Photo Contact	(0 to 100000) rpm (0 to 5000) rpm (5000 to 15000) rpm	0.014 % rdg + 1.2R 1.3 rpm 0.032 % rdg + 0.6 rpm	Function generator/ optical pickup Tachometer calibrator	

DRAFT SCOPE OF ACCREDITATION

7. Dimensional

PARAMETER/ EQUIPMENT	RANGE	BEST MEASUREMENT UNCERTAINTY (+/-)	REFERENCE STANDARD OR EQUIPMENT	METHOD(S)
Cylindrical Plugs Fixed Points	Up to 1 in 1 in 2 in 3 in 4 in 5 in 6 in 7 in 8 in 9 in 10 in 11 in 12 in 13 in	5.2 in 8.0 in 13 in 18 in 24 in 29 in 34 in 40 in 45 in 50 in 55 in 60 in 65 in 72 in	Labmaster/ Laser Micrometer	OEM and GIDEP Sourced Calibration Procedures
Depth Gauge ³	Up to 12 in	$0.6R + (10L)$ in	Gage blocks or depth mikemaster	
Angle Blocks	0 deg to 90 deg	7"	Measuring Machine	
Optical Flats	Up to 8 in	2.8 in	Reference flat and monochromatic light source	
Diameter External Threads	0.10 to 4.0 in	$26 + 10L$ in	Supermicrometer and Thread Wires	
Length Rods	2 to 49 in 1 to 85 in	+/- 30 in +/- 30 in	Height Master	

PARAMETER/ EQUIPMENT	4 RANGE	2,9 BEST MEASUREMENT UNCERTAINTY (+/-)	REFERENCE STANDARD OR EQUIPMENT	METHOD(S)
Frequency Generate	2.0 to 26.0 GHz 26.5 to 40 GHz 40.0 to 60.0 GHz 50 to 75 GHz 75 to 110 GHz	+/- 0.1825 ppm 9 kHz 12 kHz	8673D and 8349B / 83554A, 83556A, 83557A, 83558A And wave guides	Local Procedure or GIDEP/OEM Sourced Procedures
RF level accuracy 2.0 to 6.6 GHz	-10 dBm -20 dBm -30 dBm	+/- 2.25 dB +/- 2.45 dB +/- 2.75 dB + 0.1 dB/10 dB step below -30 dBm	8673D and 8349B / 83554A, 83556A, 83557A, 83558A And wave guides	
6.6 to 12.3 GHz	-10 dBm -20 dBm -30 dBm	+/- 2.5 dB +/- 2.7 dB +/- 3.0 dB + 0.1 dB/10 dB step below -30 dBm		
12.3 to 18.6 GHz	-10 dBm -20 dBm -30 dBm	+/- 2.85 dB +/- 3.05dB +/- 3.45 dB + 0.1 dB/10 dB step below -30 dBm		
18.6 to 26.0 GHz	-10 dBm -20 dBm -30 dBm	+/- 3.3 dB +/- 3.6dB +/- 4.05 dB + 0.1 dB/10 dB step below -30 dBm		
40.0 to 60.0 GHz	-5 to +2 dBm	+/-2.5 dB		
50.0 to 75 GHz	-5 to +2 dBm	+/-2.5 dB		
75 to 110 GHz	-5 to -1 dBm	+/-2.5 dB		
AM Modulation Generate	0 to 30% and 0 – 100%	+/- 7% iv + 3% fs Depth range 0 to 75%		8673D
FM Modulation- Generate	0 to 10 MHz	+/- 12% iv + 3% fs	8673D	
Power Amplifier Generate	0 dBm to + 20 dBm	+/- 1.5 dB	8349B	
RF Output	+20 to -140 dBm	+/-1 dB	8642B	

Absolute			
----------	--	--	--

PARAMETER/ EQUIPMENT	RANGE	BEST MEASUREMENT UNCERTAINTY (+/-)	REFERENCE STANDARD OR EQUIPMENT	METHOD(S)
Frequency Generate	0.1 to 2115 MHz	+/- 3.7 * 10 ⁻⁷	8642B	
AM Modulation	0 to 99% Depth Range	+/-3.5% rdg + 1% AM	8642B	
FM Modulation	3 to 11.718 kHz	+/- 5% of setting + 10 z	86542B	
Power Level Measure 10MHz to 110GHz	+10 dBm to +20 dBm -30 dBm to +10 dBm -30 dBm to -20dBm -70 dBm to -30dBm	+/- 3% +/-1.5% +/- 1% +/- 2.5%	EPM E4418B/8484A, 8481A, 8481D, 8487D, 8486A	Local Procedure or GIDEP/OEM Sourced Procedures

Pressure

PARAMETER/ EQUIPMENT	RANGE	BEST MEASUREMENT UNCERTAINTY (+/-)	REFERENCE STANDARD OR EQUIPMENT	METHOD(S)
Manometers	(0 to 24) in H ₂ O	0.00016 in H ₂ O	Hook gage	OEM and GIDEP Sourced Calibration Procedures
Deadweight Testers- Piston and Cylinder Area Mass - Measure	(0 to 10,000) psi	(10) in	Laser Micrometer Ultra Class weights and scales	
Pressure – Generate	(200 – 10,000) psi		W2200	
Pressure – Generate -Measure	(0 to 300) psi	0.01% FS	PPC2/AF	
	(0 to 600) psi	0.01% FS		
	(0-1000) psi	0.01% FS	PCS 400	
	(0-500)psia	0.016 psia		
	(0 to 103) inHgA	0.01% FS		
(0 to 50)psia		7010		
(0 to 10,000)psia		7310		
Altitude	(-4000 to 100,000)FT	0.01% FS	8201	
Airspeed	(20 to 1000) Knots	0.01% FS	8201	
Air Velocity	(80 to 5900) ft/min	+/- (3% + 4) ft/min	AN100	
	(92 to 2596) ccm	+/- 1% of rdg	60510	