

International Accreditation Service, Inc.

CERTIFICATE OF ACCREDITATION

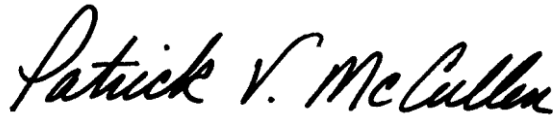
This is to signify that

INyMET

SALVATIERRA NO. 32-5, COL. SAN BARTOLO ATEPEHUACAN
D.F. 07730 MEXICO

Calibration Laboratory CL-101
(Revised August 26, 2011)

has demonstrated compliance with the ANS/ISO/IEC Standard 17025:2005, *General criteria for the competence of testing and calibration laboratories*, and has been accredited commencing September 23, 2008, for the calibration discipline(s) listed in the approved scope of accreditation. The laboratory meets the IAS program requirements in the field of calibration.



Patrick V. McCullen
Vice President



C. P. Ramani, P.E.
President

(see attached scope of accreditation for measurement area or type of test, range or quantity, best measurement capability, technique reference, standard equipment or unique conditions)

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SCOPE OF ACCREDITATION


INyMET CL-101
(August 14, 2011)

INyMET
Salvatierra No. 32-5, Col. San Bartola Atepehuacan
D.F. 07730 Mexico

Javier Garcia
Quality Assurance Manager
+52-55-5754-3087

MEASUREMENT AREA	RANGE & RESOLUTION	CALIBRATION & MEASUREMENT CAPABILITY ¹ (CMC) (±)	TECHNIQUE, REFERENCE STANDARD, EQUIPMENT
<i>Dimensional</i>			
Calipers (Vernier and dial)	0-100 mm/0,02 mm 0-1000 mm/0,02 mm	5.78 µm 18 µm	Gauge blocks
Calipers (Digital-electronic)	0-150 mm/0,01 mm 0-300 mm/0,01 mm 0-600 mm/0,01 mm	8 µm 10 µm 25 µm	Gauge blocks
Outside Micrometers	0-25 mm/0,001 mm 0-50 mm/0,001 mm 0-25 mm/0,01 mm 0-50 mm/0,01 mm 0-300 mm/0,01 mm	0.58 µm 0.8 µm 2.50 µm 9 µm 12 µm	Gauge blocks
Inside Micrometer	5-25 mm/0,01 mm 10-30 mm/0,01 mm	8 µm 8 µm	Gauge blocks & gauge block holder
Depth Micrometer	0-100 mm/0,01 mm	7.49 µm	Gauge blocks

September 23, 2008
Commencement Date


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Micrometer Head (Mechanical)	0-25 mm/0,01 mm 0-50 mm/0,01 mm	7 µm 9 µm	Gauge blocks
Height Gauges (Vernier & dial type)	0-300 mm/0,02 mm 0-600 mm/0,02 mm 0-1000 mm/0,02 mm	15 µm 18 µm 20 µm	Gauge blocks, long gauge blocks and electronic pick-up
Height Gauges (Digital-electronic)	0-600 mm/0,001 mm 0-1,000 mm/0,001 mm	2 µm 3,5 µm	Gauge blocks
Dial Indicators (Plunger type)	0-25 mm/0,001 mm (Electronic) 0-10 mm/0,01 mm (Mechanical) 0-100 mm/0,001 mm (Electronic)	1,5 µm 8 µm 2,6 µm	Gauge blocks
Dial Indicator (Lever type)	0-2 mm/0,01 mm 0-0,2 mm/0,002 mm	8µm 1.5 µm	Gauge blocks Electrical comparator
Electrical Comparator (Analogue/digital display)	0-50 mm/0,0001 mm	0,4 µm	Gauge blocks

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Ends Standards	up to 25 mm >25 up to 50 mm >50 up to 100 mm >100 up to 200 mm >200 up to 500 mm >500 up to 1000 mm	1 µm 1,5 µm 2 µm 2,2 µm 3,8 µm 7 µm	Gauge blocks, long gauge blocks and electronic pick-up
Scales/Steel Rules/Steel Tapes	Up to 50 meters	(0,5 + 0,021L) mm, Where L is in meters	Gauge blocks
Bevel Protractor	0-360°/5 mins	3 mins	Angle gauges
Surface Plate	up to 1600 mm x 1000 mm	3 µm	Using precision level of 0.02 mm/m sensitivity
<i>Mechanical</i> Pressure Pressure Gauges	Up to 62,16 kPa Up to 250 in H ₂ O	0.025% of reading	Pressure Calibrator DRUCK DPI 610LP Pressure Balance, PRESSUREMENTS T9000
	21 to 689,47 kPa 3 to 100 psi g	0,015% reading	Pressure Balance, PRESSUREMENTS T2400/3

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Pressure Pressure Gauges	(70 to 6894.7 kPa) 10 to 1000 psi g	0,015% reading	Pressure Balance, PRESSUREMENTS T2700/3LP
	(1380 to 68947,5 kPa) 200 to 10000 psi g	0,015% reading	Pressure Balance, PRESSUREMENTS M2200/3P
	(1380 to 13789,5 kPa) 200 to 2000 psi g	0,025% of full scale	Pressure Transducer, DRUCK PDCR2200-A145
	(7000 to 68947,5 kPa) 1000 to 10000 psi g	0,025% of full scale	Pressure Transducer, DRUCK PDCR220-A145
	(206,84 to 2068,4 kPa) 30 to 300 psi g	0,025% of full scale	Pressure Calibrator DRUCK 610
	70 kPa to 110 kPa	0,01% reading	Pressure Calibrator DH Instruments RPM4

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Vacuum and Pressure	(-100 to 200 kPa) -1 Bar to 2 Bar	0,05% reading	Pressure Calibrator CRYSTAL AX33
Volume – Glass	>100 µL up to 5 mL	0,30% of reading	Electronic Balance, Ohaus Explorer, Mettler-Toledo AB-104 (Automatic Micropipette)
	>1 mL up to 150 mL	0,07%	Electronic Balance, Ohaus Explorer, Mettler-Toledo AB-104 (Glassware)
	>150 mL up to 4000 mL	0,16%	Electronic Balance, Sartorius BA4100S (Glassware)
	>4L up to 20 L	0,16%	Electronic Balance, Sartorius LC34000P (Glassware)

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Volume – Metal	>2L up to 20 L	0,017% of reading	Electronic Balance, Sartorius LC34000P
	>20 L up to 500 L	0,02% of reading	Electronic Balance, Sartorius LC34000P Electronic Balance, Avery Weigh-Tronix E1010
	>200 L up to 5000 L	0,03% of reading	Volumetric Standard INYMET 200 L
	>5000 up to 1 000 000 L	0,12% of reading	Dual Rotor Turbine Meter, Exact Flow EFM32DR-W-CAN-B-Y
	200 000 L to 50 000 000 L	±0,5% of reading	Manual of Petroleum Measurement Standards, chap 4 Steel Tape Measure LUFKIN 25 m Square STANLEY 45-600

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Torque Torque Wrenches Torque Analyzer and Torque Transducer	0 to 25 Nm >25 to 160 Nm >160 to 1000 Nm 0-1000 Nm	0,075 Nm 0,48 Nm 3,0 Nm 0.13% reading 0, 08% reading	25 Nm Transducer 160 Nm Transducer 1000 Nm Transducer Balance Arms: 1m, 0,5m, 0,1m & Wheel: 0,1m Mass sets: 1g to 5kg to 100 kg
Vibration Transducer sensitivity 50Hz to 5kHz	Up to 10g	0.19dB at 160Hz	Endevco 28959F

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<i>Thermal</i> PRT	-38°C to 660°C	0,02°C	Super Thermometer II HART SCIENTIFIC 1590 with RTD ROSEMOUNT 162CE
Thermocouples (J,K,R,S,T)	0°C to 1000°C	0,5°C	Au-Pt Thermocouple HART 5629 and Digital Multimeter PREMA 6001
Forced convection ovens & furnaces	up to 300°C	1,5°C	ASTM D 5423 & D 5374 Standards (Reapproved 2005), NMX-J-417-ANCE-2005 Standard; Energy Meter SOAR 2720 and Digital Thermometer HART 1560 with 12 T Thermocouples
Liquid in Glass Thermometer	-38°C to 250°C	0.1°C	Thermometric Bridge ASL F150 and RTD
IR Thermometers	0°C to 500°C	1,0 % reading	IR Calibrator HART 4181, Digital Thermometer HART 1560 and RTD HART 5618-9

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Digital and Analog thermometers with Thermocouples type J, K, T, R, S or RTD or thermistor	-38°C to 600°C	0.1°C	Thermometric Bridge ASL F150 with RTDs or similar
Humidity – Measure and Generate	5 to 95% RH/1% HR 5 to 95% RH/0,1% HR	1,0 % R.H. 0.54% RH	Thermometric Bridge ASL F250RH or Relative Humidity Indicator with 2 RTD's Dew Point Analyzer General Eastern Optical
<i>Electromagnetics—DC/Low Frequency</i> DC Voltage – Generate	1 V 10 V 0 mV to 220 mV >220 mV to 2,2 V >2,2 V to 11 V >11 V to 22 V >22 V to 220 V >220 V to 1100 V 0 mV to 12 V	0,5 ppm 0,5 ppm (8 ppm + 0,6 µV) (7 ppm + 1 µV) (7 ppm + 3,5 µV) (7 ppm + 6,5 µV) (8 ppm + 80 µV) (9 ppm + 500 µV) (0,004% reading +0,004% range)	Fluke 732A Fluke 732A Fluke 5700A Fluke 5700A Fluke 5700A Fluke 5700A Fluke 5700A Fluke 5700A UNOMAT MCX

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DC Voltage – Measure	0 to 100 mV	(9 + 3)	HP 3458A
	>100 mV to 1 V	(8 + 0,3)	HP 3458A
	>1 V to 10 V	(8 + 0,05)	HP 3458A
	>10 V to 100 V	(10 + 0,3)	HP 3458A
	>100 V to 1000 V	(10 + 0,1)	HP 3458A
	0 mV to 100 mV	(0,004% reading + 0,004% range)	UNOMAT MCX
>100 mV to 60 V	(0,01% reading + 0,006% range)	UNOMAT MCX	

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DC Current – Generate	0,1 nA to 2,2 mA	(50 ppm + 8 nA)	Fluke 5700A
	>2,2 mA to 22 mA	(50 ppm + 80 nA)	Fluke 5700A
	>22 mA to 220 mA	(60 ppm + 0,8 µA)	Fluke 5700A
	>220 mA to 2,2 A	(80 ppm + 25 µA)	Fluke 5700A
	>2,2 A to 11 A	(600 ppm + 330 µA)	Fluke 5500A
	>11 A to 20 A	(600 ppm + 4,8 mA)	WAVETEK/DATRON 9000
>20 A to 1000 A	0,6% output	Fluke 5500A W/100 turn coil	
0 to 24 mA	0,025% total scale	UNOMAT MCX	

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DC Current – Measure	0 to 100 nA >100 nA to 1 µA >1 µA to 100 µA >100 µA to 10 mA >10 mA to 100 mA >100 mA to 1 A >1 A to 100 A 0 to 52 mA	(ppm reading + ppm range) (30 + 400) (20 + 40) (20 + 10) (20 + 8) (35 + 5) (110 + 10) 0,01% reading (0,005% reading + 0,01% range)	HP 3458A HP 3458A HP 3458A HP 3458A HP 3458A HP 3458A Guildline 9230/15 + HP 3458A Guildline 9230/100 + HP 3458A UNOMAT MCX

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AC Current – Generate	1 nA to 220 µA 40 Hz to 1 kHz >1 kHz to 5 kHz >5 kHz to 10 kHz	(140 ppm + 16 nA) (600 ppm + 40 nA) (0,16% + 80 nA)	Fluke 5700A Fluke 5700A Fluke 5700A
	220 µA to 2,2 mA 40 Hz to 1 kHz >1 kHz to 5 kHz >5 kHz to 10 kHz	(140 ppm + 35 nA) (600 ppm + 400 nA) (0,16% + 800 nA)	Fluke 5700A Fluke 5700A Fluke 5700A
	>2,2 mA to 22 mA 40 Hz to 1 kHz >1 kHz to 5 kHz >5 kHz to 10 kHz	(140 ppm + 350 nA) (600 ppm + 4 µA) (0,16% + 8 µA)	Fluke 5700A Fluke 5700A Fluke 5700A
	>22 mA to 220 mA 40 Hz to 1 kHz >1 kHz to 5 kHz >5 kHz to 10 kHz	(140 ppm + 3,5 µA) (600 ppm + 40 µA) (0,16% + 80 µA)	Fluke 5700A Fluke 5700A Fluke 5700A

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AC Current – Generate	>220 mA to 2,2 A 20 Hz to 1 kHz	(650 ppm + 35 µA)	Fluke 5700A
	>1 kHz to 5 kHz >5 kHz to 10 kHz	(750 ppm + 80 µA) (0,85%+ 160 µA)	Fluke 5700A Fluke 5700A
	2,2 A to 11 A 45 Hz to 500 Hz >500 Hz to 1 kHz	(0,10% + 2 mA) (0,33% + 2 mA)	Fluke 5500A Fluke 5500A
	11 A to 20 A 10 Hz to 3 kHz >3 kHz to 10 kHz	(0,2% + 6,9 mA) (0,5% + 23 mA)	WAVETEK/DATRON 9000 WAVETEK/DATRON 9000
	20 A to 750 A @ 50/60 Hz	1% output	Fluke 5500A w/100 turn coil

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AC Current – Measure	100 µA 45 Hz to 5 kHz	(% reading + % range) (0,06% + 0,03%)	WAVETEK DATRON 1281
	1 mA to 100 mA 45 Hz to 5 kHz	(0,03% + 0,01%)	WAVETEK DATRON 1281
	>100 mA to 1 A 45 Hz to 1 kHz >1 kHz to 5 kHz	(0,06% + 0,02%) (0,2% + 0,04%)	WAVETEK DATRON 1281 WAVETEK DATRON 1281
AC Voltage – Generate	2,2 mV to 22 mV 40 Hz to 20 kHz	(105 ppm + 5 µV)	Fluke 5700A
	>20 kHz to 50 kHz	(370 ppm + 5 µV)	Fluke 5700A
	>50 kHz to 100 kHz	(850 ppm + 7 µV)	Fluke 5700A
	>100 kHz to 300 kHz	(0,11% + 13 µV)	Fluke 5700A
	>300 kHz to 500 kHz >500 kHz to 1 MHz	(0,17% + 25 µV) (0,34% + 25 µV)	Fluke 5700A Fluke 5700A

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AC Voltage – Generate	220 mV		
	40 Hz to 20 kHz	(105 ppm + 8 µV)	Fluke 5700A
	>20 kHz to 50 kHz	(320 ppm + 8 µV)	Fluke 5700A
	>50 kHz to 100 kHz	(850 ppm + 25 µV)	Fluke 5700A
	>100 kHz to 300 kHz	(0,11% + 25 µV)	Fluke 5700A
	>300 kHz to 500 kHz	(0,17% + 35 µV)	Fluke 5700A
	>500 kHz to 1 MHz	(0,34% + 80 µV)	Fluke 5700A
	2,2 V		
	40 Hz to 20 kHz	(75 ppm + 6 µV)	Fluke 5700A
	>20 kHz to 50 kHz	(120 ppm + 16 µV)	Fluke 5700A
	>50 kHz to 100 kHz	(250 ppm + 70 µV)	Fluke 5700A
	>100 kHz to 300 kHz	(430 ppm + 130 µV)	Fluke 5700A
>300 kHz to 500 kHz	(0,105% + 350 µV)	Fluke 5700A	
>500 kHz to 1 MHz	(0,22% + 850 µV)	Fluke 5700A	

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AC Voltage – Generate	22 V 40 Hz to 20 kHz >20 kHz to 50 kHz >50 kHz to 100 kHz >100 kHz to 300 kHz >300 kHz to 500 kHz	(75 ppm + 60 µV) (120 ppm + 160 µV) (250 ppm + 350 µV) (500 ppm + 1,5 mV) (0,125% + 4,3 mV)	Fluke 5700A Fluke 5700A Fluke 5700A Fluke 5700A Fluke 5700A
	>500 kHz to 1 MHz	(0,27% + 8,5 mV)	Fluke 5700A
	220 V 40 Hz to 20 kHz >20 kHz to 50 kHz >50 kHz to 100 kHz >100 kHz to 300 kHz >300 kHz to 500 kHz >500 kHz to 1 MHz	(80 ppm + 0,8 mV) (220 ppm + 3,5 mV) (500 ppm + 8 mV) (0,15% + 90 mV) (0,47% + 90 mV) (1,15% + 190 mV)	Fluke 5700A Fluke 5700A Fluke 5700A Fluke 5700A Fluke 5700A Fluke 5700A
	1100 V 50 Hz to 1 kHz	(80 ppm + 3,5 mV)	Fluke 5700A

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AC Voltage – Measure		(% reading + % range)	
	1 μV to 100 mV	(0,02% + 0,002%)	WAVETEK DATRON 1281
	40 Hz to 100 Hz	(0,02% + 0,001%)	WAVETEK DATRON 1281
	>100 Hz to 2 kHz	(0,02% + 0,002%)	WAVETEK DATRON 1281
	>2 kHz to 10 kHz	(0,04% + 0,004%)	WAVETEK DATRON 1281
	>10 kHz to 30 kHz	(0,07% + 0,01%)	WAVETEK DATRON 1281
	>30 kHz to 100 kHz		
	>100 mV to 100 V	(0,015% + 0,001%)	WAVETEK DATRON 1281
	40 Hz to 100 Hz	(0,013% + 0,001%)	WAVETEK DATRON 1281
	>100 Hz to 2 kHz	(0,015% + 0,001%)	WAVETEK DATRON 1281
	>2 kHz to 10 kHz	(0,025% + 0,001%)	WAVETEK DATRON 1281
	>10 kHz to 30 kHz	(0,05% + 0,01%)	WAVETEK DATRON 1281
	>30 kHz to 100 kHz		

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Commencement Date



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INyMET CL-101

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MEASUREMENT AREA	RANGE & RESOLUTION	CALIBRATION & MEASUREMENT CAPABILITY ¹ (CMC) (±)	TECHNIQUE, REFERENCE STANDARD, EQUIPMENT
AC Voltage – Measure	>100 mV to 100 V	(0,3% + 0,1%)	WAVETEK DATRON 1281
	>100 kHz to 300 kHz	(1% + 1%)	WAVETEK DATRON 1281
	>300 kHz to 1 MHz		
	>100 V to 1000 V	(0,015% + 0,002%)	WAVETEK DATRON 1281
	40 Hz to 10 kHz	(0,025% + 0,004%)	WAVETEK DATRON 1281
	>10 kHz to 30 kHz		
	>30 kHz to 100 kHz	(0,05% + 0,002%)	WAVETEK DATRON 1281

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Resistance – Generate	1Ω	8.02 ppm	Fluke 742A-1
	10Ω	2 ppm	Fluke 742A-10
	1 kΩ	2 ppm	Fluke 742A-1k
	10 kΩ	2 ppm	Fluke 742A-10k
		(ppm reading)	
	(0,1 Ω to 1 Ω)	200 ppm	HP 3458A w/Decade Resistors: Guildline 9347/1 MΩ
	(1 Ω to 10 Ω)	35 ppm	HP 3458A w/Decade Resistors: Guildline 9347/1 MΩ
	(10 Ω to 100 Ω)	26 ppm	HP 3458A w/Decade Resistors: Guildline 9347/1 MΩ
	(100 Ω to 100 kΩ)	15 ppm	HP 3458A w/Decade Resistors: Guildline 9347/1 MΩ
	(100 kΩ to 1 MΩ)	22 ppm	HP 3458A w/Decade Resistors: Guildline 9347/1 MΩ

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Resistance – Generate	(1 MΩ to 10 MΩ)	80 ppm	HP 3458A w/Decade Resistors: Guildline 9343/1 GΩ
	(10 MΩ to 100 MΩ)	550 ppm	HP 3458A w/Decade Resistors: Guildline 9343/1 GΩ
	(100 MΩ to 1 GΩ)	0,6%	HP 3458A w/Decade Resistors: Guildline 9343/1 GΩ
	(0,1 Ω to 1 Ω)	1% setting	(range is per decade) Decade Resistors: Guildline 9347/1 MΩ
	(1 Ω to 10 Ω)	0,1% setting	Decade Resistors: Guildline 9347/1 MΩ
	(10 Ω to 100 Ω)	0,01% setting	Decade Resistors: Guildline 9347/1 MΩ
	(100 Ω to 1 kΩ)	0,03% setting	Decade Resistors: Guildline 9347/1 MΩ
	(1 kΩ to 1 MΩ)	0,01% setting	Decade Resistors: Guildline 9347/1 MΩ
	(0,01 Ω to 0,1 Ω)	7% setting	Decade Resistors ESI DB62 (0,01 Ω to 10 kΩ)
	(0,1 Ω to 1 Ω)	0,7% setting	Decade Resistors ESI DB62 (0,01 Ω to 10 kΩ)
(1 Ω to 10 Ω)	0,10% setting	Decade Resistors ESI DB62 (0,01 Ω to 10 kΩ)	
(10 Ω to 100 Ω)	0,04% setting	Decade Resistors ESI DB62 (0,01 Ω to 10 kΩ)	
(100 Ω to 10 MΩ)	0,03% setting	Decade Resistors ESI DB62 (0,01 Ω to 10 kΩ)	

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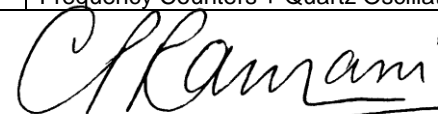
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Resistance – Measure	0,1 Ω to 10 Ω >10 Ω to 100 Ω >100 Ω to 100 kΩ	(ppm reading + ppm range) 600 ppm 60 ppm 20 ppm	HP 3458A HP 3458A HP 3458A
	>100 kΩ to 1 MΩ >1 MΩ to 10 MΩ >10 MΩ to 100 MΩ >100 MΩ to 1 GΩ	22 ppm 80 ppm 550 ppm 0,6%	HP 3458A HP 3458A HP 3458A HP 3458A
Capacitance – Generate	up to 10 nF >10 up to 100 nF >100 nF	0,06% setting + 5 pF 0,05% setting + 46 pF 0,05% setting + 454 pF	Decade Capacitor General Radio 1413
<i>Time and Frequency</i> Frequency – Measure, Pulse Signal	>100 Hz to 500 MHz	$4,7 \times 10^{-11}$	HP 5351B or HP 5335A or HP 5345A + HP 58503A Frequency Counters + GPS Time Base
	>100 Hz to 500 MHz	$2,0 \times 10^{-9}$	HP 5351B or HP 5335A or HP 5345A + HP 105B Frequency Counters + Quartz Oscillator

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Frequency – Measure Sine, Square Pulse	1 mHz to 100 Hz 1 mHz to 100 Hz	$1,5 \times 10^{-4}$ $2,5 \times 10^{-5}$	HP 5351B or HP 5335A or HP 5345A + HP 58503A Frequency Counters + GPS Time Base
Frequency – Measure, Square Signal	>100 Hz to 1 kHz	$3,7 \times 10^{-7}$	HP 5351B or HP 5335A or HP 5345A + HP 58503A Frequency Counters + GPS Time Base
	>1 kHz to 500 MHz	$4,7 \times 10^{-11}$	HP 5351B or HP 5335A or HP 5345A + HP 58503A Frequency Counters + GPS Time Base
	1 mHz to 1 Hz	$3,0 \times 10^{-6}$	HP 5351B or HP 5335A or HP 5345A + HP 105B Frequency Counters + Quartz Oscillator
	>1 Hz to 1 kHz	$3,7 \times 10^{-7}$	HP 5351B or HP 5335A or HP 5345A + HP 105B Frequency Counters + Quartz Oscillator
	>1 kHz to 500 MHz	$2,0 \times 10^{-9}$	HP 5351B or HP 5335A or HP 5345A + HP 105B Frequency Counters + Quartz Oscillator

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Frequency – Measure, Sinusoidal Signal	>100 Hz to 1 kHz	$1,9 \times 10^{-9}$	HP 5351B or HP 5335A or HP 5345A + HP 58503A Frequency Counters + GPS Time Base
	>1 kHz to 1 MHz	$4,3 \times 10^{-10}$	HP 5351B or HP 5335A or HP 5345A + HP 58503A Frequency Counters + GPS Time Base
	>1 to 100 MHz	$1,9 \times 10^{-11}$	
	>100 to 500 MHz	$3,7 \times 10^{-11}$	HP 5351B or HP 5335A or HP 5345A + HP 105B Frequency Counters + Quartz Oscillator
	1 mHz to 1 Hz	$3,0 \times 10^{-3}$	
>1 Hz to 1 kHz	$3,0 \times 10^{-6}$		
Frequency – Measure, Sinusoidal Signal	>1 kHz to 500 MHz	$4,7 \times 10^{-9}$	HP 5351B or HP 5335A or HP 5345A + HP 105B Frequency Counters + Quartz Oscillator

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Frequency – Generate Pulse, Sinusoidal and Square Signals	1 mHz to 500 MHz	$4,3 \times 10^{-11}$	HP 8673B or HP 3325A or HP 3325B or HP 8663A or Tek TG501 + HP 58503A Synthesized Frequency/Waveform Generator/Time Mark Generator + GPS Time Base
	1 mHz to 500 MHz	$3,0 \times 10^{-10}$	HP 8673B or HP 3325A or HP 3325B or HP 8663A or Tek TG501 + HP 105 B Synthesized Frequency/Waveform Generator/Time Mark Generator + Quartz Oscillator
Period – Measure Pulse Signal	1,25 ns to 1000 s	$4,7 \times 10^{-11}$	HP 5345A or HP 5335A + HP 58503A Period Counters + GPS Time Base
	1,25 ns to 1000 s	$2,0 \times 10^{-9}$	HP 5345A or HP 5335a + HP 105B Period Counters + Quartz Oscillator

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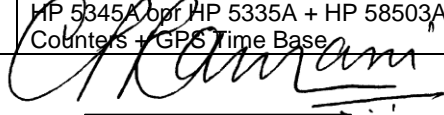
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Period – Measure Square Signal	>1 s to 1,000 s	$3,0 \times 10^{-4}$	HP 5345A or HP 5335A + HP 58503A Period Counters + GPS Time Base
	> 1 ms to 1 s	$3,0 \times 10^{-7}$	HP 5345A or HP 5335A + HP 58503A Period Counters + GPS Time Base
	1.25 ns to 1 ms	$4,7 \times 10^{-11}$	HP 5345A or HP 5335A + HP 58503A Period Counters + GPS Time Base
	>1 s to 1,000 s	$3,0 \times 10^{-4}$	HP 5345A or HP 5335A + HP 105B Period Counters + Quartz Oscillator
	>1 ms to 1 s	$3,0 \times 10^{-7}$	HP 5345A or HP 5335A + HP 105B Period Counters + Quartz Oscillator
	1.25 ns to 1 ms	$2,0 \times 10^{-9}$	HP 5345A or HP 5335A + HP 105B Period Counters + Quartz Oscillator
Period – Measure Sinusoidal Signal	>1 s to 1,000 s	$2,8 \times 10^{-3}$	HP 5345A or HP 5335A + HP 58503A Period Counters + GPS Time Base

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Period – Measure Sinusoidal Signal	>1 ms to 1 s	$3,0 \times 10^{-6}$	HP 5345A or HP 5335A + HP 58503A Period Counters + GPS Time Base
	1.25 ns to 1 ms	$6,1 \times 10^{-11}$	HP 5345A or HP 5335A + HP 58503A Period Counters + GPS Time Base
	>1 ms to 1,000 s	$3,0 \times 10^{-3}$	HP 5345A or HP 5335A + HP 105B Period Counters + Quartz Oscillator
	>1 ms to 1 s	$3,0 \times 10^{-6}$	HP 5345A or HP 5335A + HP 105B Period Counters + Quartz Oscillator
	1.25 ns to 1 ms	$2,0 \times 10^{-9}$	HP 5345A or HP 5335A + HP 105B Period Counters + Quartz Oscillator

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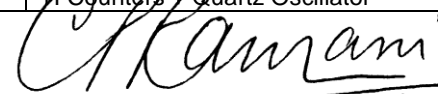
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MEASUREMENT AREA	RANGE & RESOLUTION	CALIBRATION & MEASUREMENT CAPABILITY ¹ (CMC) (±)	TECHNIQUE, REFERENCE STANDARD, EQUIPMENT
Period – Generate Pulse, Sinusoidal and Square Signals	1 ns to 1,000 s	$4,3 \times 10^{-11}$	HP 3325A or HP 3325B or HP 8663A or Tek TG50-1 + HP 58503A Synthesized Frequency/Waveform Generator/Time Mark Generator + GPS Time Base
	1000 s to 1 ns	$3,0 \times 10^{-10}$	HP 3325A or HP 3325B or HP 8663A or Tek TG501 + HP 105B Synthesized Frequency/Waveform Generator/Time Mark Generator + Quartz Oscillator
Time Interval – Measure	1,25 ns to 86400 s	$5,8 \times 10^{-11}$	HP 5345A or HP 5335A + HP 58503A TI Counters + GPS Time Base
	1,25 ns to 86400 s	$2,5 \times 10^{-9}$	HP 5345A or HP 5335A + HP 105B TI Counters + Quartz Oscillator

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Time Interval – Generate	1,25 ns to 86400 s	$4,3n \times 10^{-11}$	HP 3325A or HP 3325B or HP 8663A or Tek TG501 or INYMET C/G86400 + HP 58503A Synthesized Frequency/Waveform Generator/Time Mark Generator/Pulse Generator + GPS time Base
	1,25 ns to 86400 s	$3,0 \times 10^{-10}$	HP 3325A or HP 3325B or HP 8663A or Tek TG501 or INYMET C/G86400n + HP 105B Synthesized Frequency/Waveform Generator/Time Mark Generator/Pulse Generator + Quartz Oscillator
Timers – Measure	Up to 36,000 s	0,58 mS	HP 5335A or 5345A + HP 58503A GPS

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Power at Low Frequency – Measure	-40 dBm to +30 dBm 10 Hz to 1 MHz @ 50 Ω	0,01 dB	Fluke 8506A
	-40 dBm to +30 dBm 10 Hz to 1 MHz @ 75 Ω	0,01 dB	Fluke 8506A
Power at Low Frequency – Measure	-40 dBm to +30 dBm 10 Hz to 1 MHz @ 600Ω	0,01 dB	Fluke 8506A

MEASUREMENT AREA	RANGE & RESOLUTION	CALIBRATION & MEASUREMENT CAPABILITY ¹ (CMC) (±)	TECHNIQUE, REFERENCE STANDARD, EQUIPMENT
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Power at Low Frequency – Generate	-40 dBm to +30 dBm 10 Hz to 1 MHz @ 50Ω	0,01 dB	Fluke 5700A
	-40 dBm to +30 dBm 10 Hz to 1 MHz @ 75Ω	0,01 dB	Fluke 5700A
	-40 dBm to +30 dBm 10 Hz to 1 MHz @ 600Ω	0,01 dB	Fluke 5700A
Bandwidth – Measure	DC to 500 mHz	5%	Tek CG5011 or Tek PG506 or Tek SG503 or Tek SG504 + HP 5335A Calibration Generators/Wide Band Generators + Frequency Counter

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<i>RF/Microwave and Electromagnetics</i> Frequency – Measure, Pulse Signal	>500 MHz to 1.3 GHz >1.3 GHz to 18 GHz	$4,7 \times 10^{-11}$ See Footnote 2	HP 5351B or HP 5335A or HP 5345A + HP 58503A Frequency Counters + GPS Time Base
	>500 MHz to 1.3 GHz >1.3 GHz to 18 GHz	$2,0 \times 10^{-9}$ See Footnote 2	HP 5351B or HP 5335A or HP 5345A + HP 105B Frequency Counters + Quartz Oscillator
Frequency – Measure, Square Signal	>500 MHz to 1.3 GHz >1.3 GHz to 18 GHz	$4,7 \times 10^{-11}$ See Footnote 2	HP 5351B or HP 5335A or HP 5345A + HP 58503A Frequency Counters + GPS Time Base
	>500 MHz to 1.3 GHz >1.3 GHz to 18 GHz	$2,0 \times 10^{-9}$ See Footnote 2	HP 5351B or HP 5335A or HP 5345A + HP 105B Frequency Counters + Quartz Oscillator
Frequency – Measure, Sinusoidal Signal	>500 MHz to 1.3 GHz >1.3 GHz to 18 GHz	$4,7 \times 10^{-11}$ See Footnote 2	HP 5351B or HP 5335A or HP 5345A + HP 58503A Frequency Counters + GPS Time Base
	>500 MHz to 1.3 GHz >1.3 GHz to 18 GHz	$2,0 \times 10^{-9}$ See Footnote 2	HP 5351B or HP 5335A or HP 5345A + HP 105B Frequency Counters + Quartz Oscillator

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Frequency – Generate Pulse, Sinusoidal and Square Signals	>500 MHz to 18 GHz	$4,3 \times 10^{-11}$	HP 8673B or HP 3325A or HP3325B or HP 8663A or Tek TG501 + HP 58503A Synthesized Frequency/Waveform Generator/Time Mark Generator + GPS Time Base
	>500 MHz to 18 GHz	$3,0 \times 10^{-10}$	HP 8673B or HP 3325A or HP 3325B or HP 8663A or Tek TG501 + HP 105B Synthesized Frequency/Waveform Generator/Time Mark Generator + Quartz Oscillator
RF Power – Measure	-60 dBm to -30 dBm 10 MHz to 18 GHz	0,32 dB	HP 436A + HP 8481D Power Meter + Sensor Head or 8901B + 8481D
	-20 dBm to +20 dBm 10 MHz to 4.2 GHz	0,1 dB	HP 436A + HP 8482A Power Meter + Sensor Head
	-30 dBm to +20 dBm 50 MHz to 18 GHz	0,2 dB	HP 436A + HP 8485A Power Meter + Sensor Head

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Bandwidth – Measure	>500 mHz to 1 GHz >1 GHz to 18 GHz	5% See Footnote 2	Tek CG5011 or Tek PG506 or Tek SG503 or Tek SG504 + HP 5335A Calibration Generators/Wide Band Generators + Frequency Counter
	> 1 GHz to 2,5 GHz	0,2 dB	HP 8663A + HP 436A + HP 8482A Synthesizer + Power Meter + Sensor Head
<i>Optical Radiation</i> Optical Power – Measure	-70 dBm to +10 dBm 1330 nm y 1550 nm	0,2 dB	W&G OLA-25 + W&G OLP-25 Optical Power Attenuator + Optical Power Meter

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Optical Power – Generate	-70 dBm to +10 dBm 1330 nm y 1550 nm	0,2 dB	W&G OLS-25 + W&G OLA-25 + W&G OLP-25 Optical Power Generator + Optical Power Attenuator + Optical Power Meter

¹“Calibration Measurement Capability” is the smallest uncertainty of measurement that a laboratory can achieve within its scope of accreditation when performing more or less routine calibrations of nearly ideal measurement standards or of nearly ideal measuring instruments. Calibration Measurement Capabilities are expressed as uncertainties at approximately the 95% level of confidence, usually using a coverage factor of $k=2$. The measurement uncertainty of a specific calibration performed by the laboratory may be greater than the least uncertainty due to the behavior of the customer’s device, to the environment (if the calibration is performed in the field), and to influences from the circumstances of the specific calibration.

² Measure above 1GHz is accomplished using customer provided equipment such as counters, uncertainties are calculated for each calibration completed.

NOTE: Calibration parameters are performed primarily on-site at customer locations. The uncertainty of scale/balance calibration is highly dependent on local conditions, such as scale resolution and sensitivity, scale cleanliness, local gravity, temperature and humidity, dust, vibration, etc.; therefore, any statement of uncertainty is misleading. The class of the best weights used by the laboratory is shown in the Technique column. Use of weights in combination, whether in the same class or different classes, will increase measurement uncertainty resulting from the additive effect of weight tolerances, as defined in ASTM E 617.

September 23, 2008
Commencement Date



C. P. Ramani, P.E.
President

This accreditation certificate supersedes any IAS accreditation certificate bearing an earlier date. The certificate becomes invalid upon suspension, cancellation, or revocation of accreditation. See the *IAS Accreditation Listings* on the web at www.iasonline.org for current accreditation information, or contact IAS directly at (562) 699-0541. Print Date: 08/26/2011