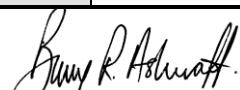


Schedule to
CERTIFICATE OF ACCREDITATION


Laboratory	Babcock Fitzroy Ltd																													
Address	Calibration Centre Private Bag 32903, Devonport, Auckland, 0744 HMNZ Dockyard, Devonport, Auckland, 0624																													
Telephone	09 446-1999																													
Fax	09 446-1940																													
URL	www.babcockfitzroy.co.nz																													
Authorised Representative	Mr Graham Lake Assistant Production Manager (Technical)																													
Client No.	1530																													
Programme	Metrology & Calibration Laboratory																													
Accreditation Number	472																													
Date of Accreditation	18 January 1993																													
Conformance Standard	NZS ISO/IEC 17025:2005 General requirements for the competence of testing and calibration laboratories																													
Testing Services Summary	<table border="0"> <tr> <td>5.55</td> <td>Speed Measuring Devices</td> </tr> <tr> <td>5.61</td> <td>Temperature Measuring Equipment</td> </tr> <tr> <td>5.82</td> <td>Resistors, Resistance Boxes and Potential Dividers</td> </tr> <tr> <td>5.84</td> <td>Capacitors</td> </tr> <tr> <td>5.85</td> <td>Inductors and Transformers</td> </tr> <tr> <td>5.86</td> <td>Voltage Standards and Current Standards</td> </tr> <tr> <td>5.88</td> <td>Calibrators for Instrumentation</td> </tr> <tr> <td>5.89</td> <td>Indicating Instruments and Recording Instruments</td> </tr> <tr> <td>5.90</td> <td>Bridges, Potentiometers and Test Sets</td> </tr> <tr> <td>5.91</td> <td>Frequency Measurement and Time Measurement</td> </tr> <tr> <td>5.92</td> <td>Waveform Measurement</td> </tr> <tr> <td>5.93</td> <td>Signal Sources</td> </tr> <tr> <td>5.95</td> <td>Communications Equipment</td> </tr> <tr> <td>5.96</td> <td>Electronic Equipment</td> </tr> </table>		5.55	Speed Measuring Devices	5.61	Temperature Measuring Equipment	5.82	Resistors, Resistance Boxes and Potential Dividers	5.84	Capacitors	5.85	Inductors and Transformers	5.86	Voltage Standards and Current Standards	5.88	Calibrators for Instrumentation	5.89	Indicating Instruments and Recording Instruments	5.90	Bridges, Potentiometers and Test Sets	5.91	Frequency Measurement and Time Measurement	5.92	Waveform Measurement	5.93	Signal Sources	5.95	Communications Equipment	5.96	Electronic Equipment
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Signatories	<table border="0"> <tr> <td>Mr Steve Grimmer</td> <td>5.55, 5.61, 5.82, 5.84, 5.85, 5.86, 5.88, 5.89, 5.90, 5.91, 5.92, 5.93, 5.95, 5.96</td> </tr> <tr> <td>Mr Robin Smith</td> <td>5.55, 5.61, 5.82, 5.84, 5.85, 5.86, 5.88, 5.89, 5.90, 5.91, 5.92, 5.93, 5.95, 5.96</td> </tr> <tr> <td>Mr Martin Snashall</td> <td>5.55, 5.61, 5.82, 5.84, 5.85, 5.86, 5.88, 5.89,</td> </tr> </table>		Mr Steve Grimmer	5.55, 5.61, 5.82, 5.84, 5.85, 5.86, 5.88, 5.89, 5.90, 5.91, 5.92, 5.93, 5.95, 5.96	Mr Robin Smith	5.55, 5.61, 5.82, 5.84, 5.85, 5.86, 5.88, 5.89, 5.90, 5.91, 5.92, 5.93, 5.95, 5.96	Mr Martin Snashall	5.55, 5.61, 5.82, 5.84, 5.85, 5.86, 5.88, 5.89,																						
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Authorised: General Manager		Issue 36	Date: 08/02/11	Page 1 of 18
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Schedule to
CERTIFICATE OF ACCREDITATION

	Mr Malcolm Stevens	5.90, 5.91, 5.92, 5.93, 5.95, 5.96 5.55, 5.61, 5.82, 5.84, 5.85, 5.86, 5.88, 5.89(excl. f,h,k,l), 5.90(excl. e,f,g), 5.91, 5.92, 5.93, 5.95, 5.96
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Authorised: General Manager		Issue 36	Date: 08/02/11	Page 2 of 18
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Schedule to

CERTIFICATE OF ACCREDITATION

Babcock Fitzroy Ltd
 Metrology & Calibration Laboratory
SCOPE OF ACCREDITATION

Accreditation No 472

Nominal calibration temperature 21 °C.
 All measurement uncertainties are based on a level of confidence of at least 95 %.
 Unless stated elsewhere in this schedule, calibrations are performed at the premises of the accredited laboratory.

5.55 Speed Measuring Devices

- (a) Electrical and mechanical tachometers

5.61 Temperature Measuring Equipment

(including temperature calibration of electronic thermometers)

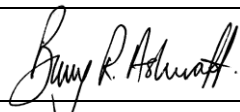
- (b) Base metal thermocouples
- (c) Platinum (and other metallic) resistance thermometers
- (e) Thermistors and other semi-conductor thermometers
- (k) Vapour pressure thermometers
- (l) Filled metal systems
- (m) Bimetallic systems
- (o) Indicators, recorders and controllers
- (p) Other direct reading temperature measuring equipment

Range	Least uncertainty of measurement
-25 °C to -20 °C	± 0.11 °C
>-20 °C to 0 °C	± 0.1 °C
0 °C	± 0.02 °C
>0 °C to 150 °C	± 0.1 °C
>150 °C to 250 °C	± 0.12 °C
>250 °C to 420 °C	± 0.20 °C
>420 °C to 660 °C	± 0.27 °C to ± 0.3 °C

- (j) Radiation pyrometers, including Infrared thermometers, Blackbodies and Infrared Imaging cameras

Range	Least uncertainty of measurement
-10 °C to 100 °C	± 0.3 °C
>100 °C to 500 °C	± 0.8 °C to ± 1.2 °C

Authorised:
 General Manager



Issue 36

Date: 08/02/11

Page 3 of 18

Schedule to

CERTIFICATE OF ACCREDITATION

Babcock Fitzroy Ltd
 Metrology & Calibration Laboratory
SCOPE OF ACCREDITATION

Accreditation No 472

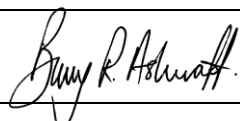
5.82 Resistors, Resistance Boxes and Potential Dividers

Resistance specific Values	Test Current	Least uncertainty of measurement
0.01 Ω	DC	± 150 ppm
0.10 Ω		± 11 ppm
1 Ω		± 14 ppm
10 Ω		± 5 ppm
100 Ω		± 6 ppm
1 kΩ		± 5 ppm
10 kΩ		± 6 ppm
100 kΩ		± 20 ppm
1 MΩ		± 28 ppm
10 MΩ		± 38 ppm
100 MΩ		± 380 ppm
1 GΩ		± 0.08 %
Ranges		
0.00 Ω to 0.01 Ω	DC	± 1.6 μΩ
0.01 Ω to 0.10 Ω		± 12 ppm
0.10 Ω to 1 Ω		± 15 ppm
1 Ω to 100 kΩ		± 7 ppm
100 kΩ to 1 MΩ		± 21 ppm
1 MΩ to 10 MΩ		± 28 ppm
10 MΩ to 100 MΩ		± 48 ppm
100 MΩ to 1 GΩ		± 390 ppm
Ranges		
0.00 Ω to 0.01 Ω	50 Hz to 2 kHz	± 1.4 mΩ
0.01 Ω to 0.10 Ω		± 1.6 %
0.10 Ω to 1 Ω		± 0.25 %
1 Ω to 10 Ω		± 0.13 %
10 Ω to 100 Ω		± 0.05 %
100 Ω to 1 kΩ		± 0.07 %
1 kΩ to 10 kΩ		± 0.05 %
10 kΩ to 100 kΩ		± 0.06 %

5.84 Capacitors

(a) Precision capacitors

Authorised:
 General Manager



Issue 36

Date: 08/02/11

Page 4 of 18

Schedule to

CERTIFICATE OF ACCREDITATION

Babcock Fitzroy Ltd
 Metrology & Calibration Laboratory
SCOPE OF ACCREDITATION

Accreditation No 472

Capacitance specific values	Frequency	Least uncertainty of measurement
1 pF	1.6 kHz	± 0.06 %
10 pF		± 250 ppm
100 pF		± 250 ppm
500 pF		± 420 ppm
1 nF		± 130 ppm
10 nF		± 280 ppm
100 nF		± 160 ppm
1 µF		± 170 ppm

Measurements taken using four terminal test configuration

Ranges

1 pF to 5 pF	1 kHz to 2 kHz	± 1.80 %
5 pF to 10 pF		± 0.96 %
10 pF to 50 pF		± 0.25 %
50 pF to 100 pF		± 0.10 %
100 pF to 500 pF		± 0.07 %
500 pF to 1 µF		± 0.06 %

5.85 Inductors and Transformers

(a) Inductors, self and mutual

Inductance range	Frequency	Least uncertainty of measurement
100 µH to 1000 µH	1 kHz to 2 kHz	± 0.14 %
100 µH to 50 H		± 0.08 %
50 H to 500 H		± 0.11 %
500 H to 1 kH		± 0.50 %

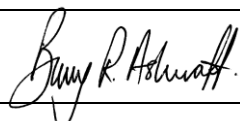
(j) Phase shifting transformers

Ranges and least uncertainties as under class 5.89 (g)

5.86 Voltage Standards and Current Standards

Ranges and least uncertainties as under class 5.89 for dc volts, ac volts, dc current and ac current

Authorised:
 General Manager



Issue 36

Date: 08/02/11

Page 5 of 18

Schedule to

CERTIFICATE OF ACCREDITATION

Babcock Fitzroy Ltd
 Metrology & Calibration Laboratory
SCOPE OF ACCREDITATION

Accreditation No 472

5.88 Calibrators for Instrumentation

Ranges and least uncertainties as under classes 5.82 and 5.89

5.89 Indicating Instruments and Recording Instruments

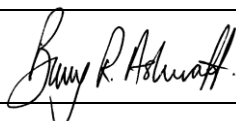
(a) DC voltmeters

Voltage ranges	Frequency	Least uncertainty of measurement
0 V to 1 mV		± 0.8 µV
1 mV to 10 mV		± 87 ppm
10 mV to 100 mV		± 12 ppm
100 mV to 1 V		± 6 ppm
1 V to 1100 V		± 5 ppm
1100 V to 100 kV		± 0.075 %

(b) AC voltmeters

≤ 2.2 mV	10 Hz to 20 Hz	± 0.09 %
	20 Hz to 50 kHz	± 0.08 %
	50 kHz to 100 kHz	± 0.12 %
	100 kHz to 300 kHz	± 0.15 %
	300 kHz to 500 kHz	± 0.26 %
	500 kHz to 1 MHz	± 0.56 %
2.2 mV to 7.0 mV	10 Hz to 20 Hz	± 360 ppm
	20 Hz to 40 Hz	± 320 ppm
	40 Hz to 50 kHz	± 320 ppm
	50 kHz to 100 kHz	± 470 ppm
	100 kHz to 300 kHz	± 0.06 %
	300 kHz to 500 kHz	± 0.10 %
7.0 mV to 22.0 mV	10 Hz to 20 Hz	± 160 ppm
	20 Hz to 40 Hz	± 130 ppm
	40 Hz to 50 kHz	± 130 ppm
	50 kHz to 100 kHz	± 190 ppm
	100 kHz to 300 kHz	± 260 ppm
	300 kHz to 500 kHz	± 450 ppm
	500 kHz to 1 MHz	± 0.11 %

Authorised:
 General Manager



Issue 36

Date: 08/02/11

Page 6 of 18

Schedule to

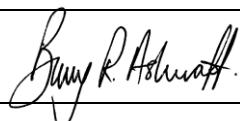
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SCOPE OF ACCREDITATION

Accreditation No 472

22.0 mV to 70.0 mV	10 Hz to 20 Hz	± 100 ppm
	20 Hz to 40 Hz	± 77 ppm
	40 Hz to 50 kHz	± 74 ppm
	50 kHz to 100 kHz	± 100 ppm
	100 kHz to 300 kHz	± 150 ppm
	300 kHz to 500 kHz	± 310 ppm
	500 kHz to 1 MHz	± 0.05 %
70.0 mV to 220.0 mV	10 Hz to 20 Hz	± 81 ppm
	20 Hz to 40 Hz	± 52 ppm
	40 Hz to 50 kHz	± 48 ppm
	50 kHz to 100 kHz	± 62 ppm
	100 kHz to 300 kHz	± 100 ppm
	300 kHz to 500 kHz	± 240 ppm
	500 kHz to 1 MHz	± 410 ppm
220.0 mV to 700.0 mV	10 Hz to 20 Hz	± 230 ppm
	20 Hz to 40 Hz	± 81 ppm
	40 Hz to 50 kHz	± 40 ppm
	50 kHz to 100 kHz	± 45 ppm
	100 kHz to 300 kHz	± 81 ppm
	300 kHz to 500 kHz	± 230 ppm
	500 kHz to 1 MHz	± 380 ppm
700.0 mV to 2.2 V	10 Hz to 20 Hz	± 230 ppm
	20 Hz to 40 Hz	± 80 ppm
	40 Hz to 50 kHz	± 32 ppm
	50 kHz to 100 kHz	± 41 ppm
	100 kHz to 300 kHz	± 68 ppm
	300 kHz to 500 kHz	± 210 ppm
	500 kHz to 1 MHz	± 320 ppm
2.2 V to 7.0 V	10 Hz to 20 Hz	± 230 ppm
	20 Hz to 40 Hz	± 81 ppm
	40 Hz to 50 kHz	± 32 ppm
	50 kHz to 100 kHz	± 44 ppm
	100 kHz to 300 kHz	± 86 ppm
	300 kHz to 500 kHz	± 230 ppm
	500 kHz to 1 MHz	± 0.05 %
7.0 V to 22.0 V	10 Hz to 20 Hz	± 230 ppm
	20 Hz to 40 Hz	± 82 ppm
	40 Hz to 20 kHz	± 34 ppm
	20 Hz to 50 kHz	± 41 ppm
	50 kHz to 100 kHz	± 80 ppm
	100 kHz to 300 kHz	± 200 ppm
	300 kHz to 500 kHz	± 0.05 %

Authorised:
 General Manager



Issue 36

Date: 08/02/11

Page 7 of 18

Schedule to

CERTIFICATE OF ACCREDITATION

Babcock Fitzroy Ltd
 Metrology & Calibration Laboratory
SCOPE OF ACCREDITATION

Accreditation No 472

22.0 V to 70.0 V	10 Hz to 20 Hz	± 230 ppm
	20 Hz to 100 Hz	± 160 ppm
	100 Hz to 50 kHz	± 40 ppm
	50 kHz to 100 kHz	± 48 ppm

70.0 V to 220.0 V	10 Hz to 20 Hz	± 230 ppm
	20 Hz to 100 Hz	± 83 ppm
	100 Hz to 50 kHz	± 41 ppm
	50 kHz to 100 kHz	± 58 ppm

220.0 V to 700.0 V	10 Hz to 20 Hz	± 89 ppm
	20 Hz to 40 Hz	± 68 ppm
	40 Hz to 100 Hz	± 61 ppm
	100 Hz to 1 kHz	± 55 ppm
	1 kHz to 50 kHz	± 53 ppm
	50 kHz to 100 kHz	± 160 ppm

700.0 V to 1000.0 V	10 Hz to 20 Hz	± 89 ppm
	20 Hz to 40 Hz	± 68 ppm
	40 Hz to 100 Hz	± 61 ppm
	100 Hz to 10 kHz	± 47 ppm
	10 kHz to 20 kHz	± 50 ppm
	20 kHz to 50 kHz	± 52 ppm
	50 kHz to 100 kHz	± 160 ppm

1000.0 V to 15 kV	50 Hz	± 1 %
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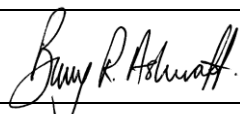
AC Voltage RF Voltmeters 50 Ω or ≥ 1 MΩ Impedance

Voltage ranges	Frequency	Least uncertainty of measurement
----------------	-----------	----------------------------------

≤ 2.2 mV	10 Hz to 30 Hz	± 1.0 %
	30 Hz to 120 kHz	± 1.0 %
	120 kHz to 3 MHz	± 1.0 %
	3 MHz to 4 MHz	± 1.1 %
	4 MHz to 12 MHz	± 1.1 %
	12 MHz to 20 MHz	± 1.2 %
	20 MHz to 23 MHz	± 1.2 %
	23 MHz to 30 MHz	± 1.7 %

2.2 mV to 7.0 mV	10 Hz to 30 Hz	± 0.93 %
	30 Hz to 120 kHz	± 0.92 %
	120 kHz to 1.2 MHz	± 0.91 %
	1.2 MHz to 3 MHz	± 0.92 %
	3 MHz to 6 MHz	± 0.94 %

Authorised:
 General Manager



Issue 36

Date: 08/02/11

Page 8 of 18

Schedule to

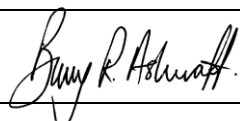
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SCOPE OF ACCREDITATION

Accreditation No 472

	6 MHz to 12 MHz	± 0.95 %
	12 MHz to 23 MHz	± 0.99 %
	23 MHz to 26 MHz	± 1.2 %
	26 MHz to 30 MHz	± 1.2 %
7.0 mV to 22.0 mV	10 Hz to 30 Hz	± 0.90 %
	30 Hz to 500 kHz	± 0.88 %
	500 kHz to 3 MHz	± 0.89 %
	3 MHz to 12 MHz	± 0.90 %
	12 MHz to 23 MHz	± 0.94 %
	23 MHz to 26 MHz	± 1.1 %
	26 MHz to 30 MHz	± 1.1 %
22.0 mV to 70.0 mV	10 Hz to 30 Hz	± 0.77 %
	30 Hz to 3 MHz	± 0.76 %
	3 MHz to 9 MHz	± 0.77 %
	9 MHz to 12 MHz	± 0.78 %
	12 MHz to 15 MHz	± 0.80 %
	15 MHz to 23 MHz	± 0.81 %
	23 MHz to 30 MHz	± 0.99 %
70.0 mV to 220 mV	10 Hz to 30 Hz	± 0.65 %
	30 Hz to 1.2 MHz	± 0.63 %
	1.2 MHz to 3 MHz	± 0.65 %
	3 MHz to 12 MHz	± 0.65 %
	12 MHz to 15 MHz	± 0.68 %
	15 MHz to 23 MHz	± 0.69 %
	23 MHz to 28 MHz	± 0.89 %
	28 MHz to 30 MHz	± 0.90 %
220.0 mV to 700.0 mV	10 Hz to 30 Hz	± 0.66 %
	30 Hz to 1.2 MHz	± 0.63 %
	1.2 MHz to 3 MHz	± 0.64 %
	3 MHz to 10 MHz	± 0.66 %
	10 MHz to 12 MHz	± 0.67 %
	12 MHz to 23 MHz	± 0.70 %
	23 MHz to 26 MHz	± 0.90 %
	26 MHz to 30 MHz	± 0.91 %
700.0 mV to 2.2 V	10 Hz to 30 Hz	± 0.51 %
	30 Hz to 3 MHz	± 0.49 %
	3 MHz to 12 MHz	± 0.52 %
	12 MHz to 23 MHz	± 0.56 %
	23 MHz to 30 MHz	± 0.79 %
2.2 V to 7.0 V	10 Hz to 30 Hz	± 0.50 %
	30 Hz to 3 MHz	± 0.48 %
	3 MHz to 12 MHz	± 0.51 %

Authorised:
 General Manager



Issue 36

Date: 08/02/11

Page 9 of 18

Schedule to

CERTIFICATE OF ACCREDITATION

Babcock Fitzroy Ltd
 Metrology & Calibration Laboratory
SCOPE OF ACCREDITATION

Accreditation No 472

Current range	Frequency	Least uncertainty of measurement
	12 MHz to 20 MHz	± 0.55 %
	20 MHz to 23 MHz	± 0.56 %
	23 MHz to 30 MHz	± 0.79 %
(c) C ammeters		
Current range	Frequency	Least uncertainty of measurement
0 µA to 100 µA		± 100 pA
100 µA to 1 mA		± 23 ppm
1 mA to 10 mA		± 27 ppm
10 mA to 100 mA		± 30 ppm
100 mA to 1 A		± 31 ppm
1 A to 10 A		± 58 ppm
10 A to 100 A		± 93 ppm
100 A to 750 A		± 277 ppm

Current range	Frequency	Least uncertainty of measurement
	50 Hz to 1000 Hz	± 310 ppm
	1000 Hz to 10000 Hz	± 0.10 %
(d) AC ammeters		
Current range	Frequency	Least uncertainty of measurement
≤200 µA	50 Hz to 1000 Hz	± 310 ppm
	1000 Hz to 10000 Hz	± 0.10 %
200 µA to 2 mA	50 Hz to 1000 Hz	± 320 ppm
	1000 Hz to 10000 Hz	± 0.06 %
2 mA to 20 mA	50 Hz to 5000 Hz	± 220 ppm
	5000 Hz to 10000 Hz	± 260 ppm
20 mA to 200 mA	50 Hz to 10000 Hz	± 220 ppm
200 mA to 1 A	50 Hz to 5000 Hz	± 260 ppm
1 A to 10 A	50 Hz to 5000 Hz	± 460 ppm
10 A to 1000 A	50 Hz	± 0.07 %

(e) Wattmeters

Wattmeters with voltage range from 0 volts to 1000 volts and current range from 0 Amps to 20 Amps
 0 power factor to unity power factor, lead or lag

Schedule to

CERTIFICATE OF ACCREDITATION

Babcock Fitzroy Ltd
 Metrology & Calibration Laboratory
SCOPE OF ACCREDITATION Accreditation No 472

Range	Frequency	Least uncertainty of measurement
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100 mW to 20 kW	45 Hz to 10 kHz	± 0.06 %
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(f) Varmeters

Varmeters with voltage range from 0 volts to 1000 volts and current range from 0 Amps to 20 Amps
 0 power factor to unity power, lead or lag

Range	Frequency	Least uncertainty of measurement
-------	-----------	----------------------------------

100 mW to 20 kW	45 Hz to 10 kHz	± 0.06 %
-----------------	-----------------	----------

(g) Phase angle indicators

Range	Frequency	Least uncertainty of measurement
-------	-----------	----------------------------------

0 ° to 360 °	45 Hz to 1 kHz 1 kHz to 10 kHz	± 0.05 ° ± 0.2 °
--------------	-----------------------------------	---------------------

(h) Power factor meters

Range	Frequency	Least uncertainty of measurement
-------	-----------	----------------------------------

0 to 0.5	45 Hz to 1 kHz 1 kHz to 10 kHz	± 0.16 % ± 0.94 %
----------	-----------------------------------	----------------------


0.5 to 0.8	45 Hz to 1 kHz 1 kHz to 10 kHz	± 0.07 % ± 0.41 %
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0.8 to 0.95	45 Hz to 1 kHz 1 kHz to 10 kHz	± 0.03 % ± 0.18 %
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0.95 to 1.0	45 kHz to 1 kHz 1 kHz to 10 kHz	± 1 ppm ± 15 ppm
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(i) Ohmmeters

Ranges, values and least uncertainties as under class 5.82

Authorised: General Manager		Issue 36 Date: 08/02/11	Page 11 of 18
--------------------------------	---	------------------------------	---------------

Schedule to

CERTIFICATE OF ACCREDITATION

Babcock Fitzroy Ltd
 Metrology & Calibration Laboratory
SCOPE OF ACCREDITATION Accreditation No 472

(j) LCR meters

Ranges and least uncertainties as under classes 5.82, 5.84 and 5.85

(k) Galvanometers and null detectors

Ranges and least uncertainties as under 5.89(a)

(l) Energy meters

Ranges and least uncertainties as under classes 5.89(e) and 5.91

(m) Graphic recording instruments

(n) Digital storage recorders

(o) Instrumentation tape recorders

Ranges and least uncertainties as for other classes in this scope of accreditation

5.90 Bridges, Potentiometers and Test Sets

(a) DC bridges

(b) DC potentiometers

(c) AC bridges

(d) AC potentiometers

(e) Ratiometers

(f) Current transformer testing sets

(g) Voltage transformer testing sets

Note: Phase angle capability is limited for CT's and VT's

Range and least uncertainties as for other classes in this scope of accreditation

5.91 Frequency Measurement and Time Measurement


(a) Frequency meters

(c) Counters

(d) Time interval meters

(f) Stroboscopes

(g) Frequency standards

Authorised: General Manager 	Issue 36 Date: 08/02/11	Page 12 of 18
--	------------------------------	---------------

Schedule to

CERTIFICATE OF ACCREDITATION

Babcock Fitzroy Ltd
 Metrology & Calibration Laboratory
SCOPE OF ACCREDITATION

Accreditation No 472

Specific frequency values	Least uncertainty of measurement
1 MHz	$\pm 1.2 \times 10^{-11}$
2 MHz	$\pm 1.2 \times 10^{-11}$
2.5 MHz	$\pm 1.2 \times 10^{-11}$
5 MHz	$\pm 1.2 \times 10^{-11}$
10 MHz	$\pm 1.2 \times 10^{-11}$

Ranges

10 mHz to 100 MHz	$\pm 1 \times 10^9$
100 MHz to 18 GHz	± 1 Hz
18 GHz to 26.5 GHz	± 30 Hz

5.92 Waveform Measurement

- (a) Frequency characteristics
 - (b) Input characteristics
 - (c) Timing characteristics
 - (d) Distortion
- ≤ 1000 Volts

Range	Frequency	Least uncertainty of measurement
0.005 % to 99.99 %	20 Hz to 30 MHz	± 0.21 % of distortion level

- (e) Other characteristics – Sweep characteristics

Ranges and least uncertainties as for other classes in this scope

5.93 Signal Sources

- (a) Frequency characteristics
- (b) Output characteristics

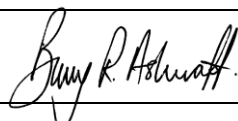
Ranges and least uncertainties as for other classes in this scope

- (c) Modulation characteristics

Amplitude modulation – rates 20 Hz to 100 kHz

Modulation Range	Carrier Frequency	Least uncertainty of measurement

Authorised:
 General Manager



Issue 36

Date: 08/02/11

Page 13 of 18

Schedule to

CERTIFICATE OF ACCREDITATION

Babcock Fitzroy Ltd
 Metrology & Calibration Laboratory
SCOPE OF ACCREDITATION

Accreditation No 472

0 % to 99 % 150 kHz to 26.5 GHz ± 0.33 %

Frequency modulation – rates 20 Hz to 200 kHz
 Deviation Range

0 Hz to 400 kHz 150 kHz to 26.5 GHz ± 0.15 %

Phase modulation – rates 200 Hz to 20 kHz

0 Radians to 400 Radians 150 kHz to 26.5 GHz ± 0.15 %

- (d) Sweep characteristics
- (e) Other characteristics – Distortion

Ranges and least uncertainties as for other classes in this scope of accreditation

5.95 Communications Equipment

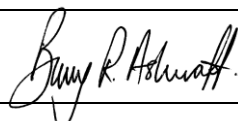
- (a) Line transmission measuring equipment
- (b) Radio transmission measuring equipment
- (d) Electrical noise and interference measuring equipment
- (e) Impedance and reflection measuring equipment
- (f) Spectrum analysis measuring equipment
- (g) Data transmission equipment
- (h) Power measuring equipment

Range	Frequency	Least uncertainty of measurement
100 pW to 100 mW	10 MHz to 26.5 GHz	± 0.56 %
100 mW to 100 W	1 MHz to 1 GHz	± 4.30 %
100 W to 1000 W	1 MHz to 35 MHz	± 4.30 %

- (i) Attenuators and amplifiers

Attenuator ranges	Frequency	Least uncertainty of measurement

Authorised:
 General Manager



Issue 36

Date: 08/02/11

Page 14 of 18

Schedule to

CERTIFICATE OF ACCREDITATION

Babcock Fitzroy Ltd
 Metrology & Calibration Laboratory
SCOPE OF ACCREDITATION

Accreditation No 472

0 dB to 10 dB	2.5 MHz to 1.3 GHz	± 0.03 dB
10 dB to 20 dB		± 0.04 dB
20 dB to 30 dB		± 0.04 dB
30 dB to 40 dB		± 0.05 dB
40 dB to 50 dB		± 0.06 dB
50 dB to 60 dB		± 0.07 dB
60 dB to 70 dB		± 0.09 dB
70 dB to 80 dB		± 0.10 dB
80 dB to 90 dB		± 0.11 dB
90 dB to 100 dB		± 0.12 dB
100 dB to 110 dB		± 0.26 dB
110 dB to 117 dB		± 0.27 dB

Note 1: Impedance 50 Ω

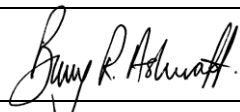
Note 2: Dynamic range is able to be extended by use of alternative test procedure but the measurement uncertainties will increase

0 dB to 10 dB	1.3 GHz to 2.3 GHz	± 0.03 dB
10 dB to 20 dB		± 0.04 dB
20 dB to 30 dB		± 0.04 dB
30 dB to 40 dB		± 0.05 dB
40 dB to 50 dB		± 0.06 dB
50 dB to 60 dB		± 0.08 dB
60 dB to 70 dB		± 0.09 dB
70 dB to 80 dB		± 0.10 dB
80 dB to 90 dB		± 0.23 dB

0 dB to 10 dB	2.3 GHz to 7 GHz	± 0.04 dB
10 dB to 20 dB		± 0.04 dB
20 dB to 30 dB		± 0.05 dB
30 dB to 40 dB		± 0.06 dB
40 dB to 50 dB		± 0.07 dB
50 dB to 60 dB		± 0.08 dB
60 dB to 70 dB		± 0.09 dB
70 dB to 80 dB		± 0.10 dB
80 dB to 92 dB		± 0.23 dB

0 dB to 10 dB	7 GHz to 13.5 GHz	± 0.04 dB
10 dB to 20 dB		± 0.04 dB
20 dB to 30 dB		± 0.05 dB
30 dB to 40 dB		± 0.06 dB
40 dB to 50 dB		± 0.07 dB
50 dB to 60 dB		± 0.08 dB
60 dB to 70 dB		± 0.09 dB
70 dB to 80 dB		± 0.10 dB

Authorised:
 General Manager



Issue 36

Date: 08/02/11

Page 15 of 18

Schedule to

CERTIFICATE OF ACCREDITATION

Babcock Fitzroy Ltd
 Metrology & Calibration Laboratory
SCOPE OF ACCREDITATION

Accreditation No 472

80 dB to 90 dB ± 0.23 dB

0 dB to 10 dB	13.5 GHz to 18 GHz	± 0.04 dB
10 dB to 20 dB		± 0.04 dB
20 dB to 30 dB		± 0.05 dB
30 dB to 40 dB		± 0.06 dB
40 dB to 50 dB		± 0.07 dB
50 dB to 60 dB		± 0.08 dB
60 dB to 70 dB		± 0.09 dB
70 dB to 80 dB		± 0.10 dB
80 dB to 89 dB		± 0.24 dB

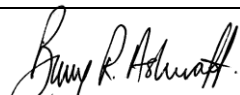
0 dB to 20 dB	18 GHz to 20 GHz	± 0.06 dB
20 dB to 40 dB		± 0.07 dB
40 dB to 50 dB		± 0.08 dB
50 dB to 60 dB		± 0.10 dB
60 dB to 70 dB		± 0.11 dB
70 dB to 80 dB		± 0.14 dB
80 dB to 84 dB		± 0.27 dB

0 dB to 20 dB	20 GHz to 23 GHz	± 0.06 dB
20 dB to 30 dB		± 0.07 dB
30 dB to 40 dB		± 0.08 dB
40 dB to 50 dB		± 0.09 dB
50 dB to 60 dB		± 0.10 dB
60 dB to 70 dB		± 0.11 dB
70 dB to 78 dB		± 0.26 dB

0 dB to 20 dB	23 GHz to 26.5 GHz	± 0.06 dB
20 dB to 30 dB		± 0.07 dB
30 dB to 40 dB		± 0.08 dB
40 dB to 50 dB		± 0.09 dB
50 dB to 60 dB		± 0.10 dB
60 dB to 70 dB		± 0.11 dB
70 dB to 76 dB		± 0.26 dB

Reflection

Note: Least uncertainties quoted are a sample from VSWR of 1 to 2
 Coaxial impedance can be measured for most types of connectors and the results reported in any form of reflection unit (i.e. VSWR, Reflection Coefficient or Return Loss)
 The measurement system used is based on 50 Ω. Any device to be measured that is based on any other impedance, and/or is fitted with different connectors other than those indicated,

Authorised: General Manager 	Issue 36	Date: 08/02/11	Page 16 of 18
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Schedule to

CERTIFICATE OF ACCREDITATION

Babcock Fitzroy Ltd
 Metrology & Calibration Laboratory
SCOPE OF ACCREDITATION

Accreditation No 472

will have larger uncertainties attached to their measurement

Male and Female N-Type Connector

Frequency	VSWR	Least uncertainty of measurement in units of VSWR
10 MHz to 8 GHz	1 to 2	± 0.032 to 0.24
8 GHz to 12.4 GHz		± 0.032 to 0.25
12.4 GHz to 18 GHz		± 0.041 to 0.28

APC 3.5 and SMA Connectors

10 MHz to 8.4 GHz	1 to 2	± 0.02 to 0.23
8.4 GHz to 20 GHz		± 0.02 to 0.26
20 GHz to 26.5 GHz		± 0.032 to 0.30

Directivity

APC-7 and N-Type Connectors

Range dB	Frequency	Least uncertainty of measurement
10 to 15	1.8 GHz to 18 GHz	± 0.05 to ± 0.09
15 to 20		± 0.09 to ± 0.16
20 to 25		± 0.16 to ± 0.30
25 to 30		± 0.30 to -0.5, + 0.53
30 to 35		-0.5, + 0.53 to -0.87, + 0.97
35 to 40		-0.87, + 0.97 to -1.5, + 1.8
40 to 45		-1.5, + 1.8 to -2.5, + 3.5
45 to 55		-2.5, + 3.5 to -6.0, + ∞

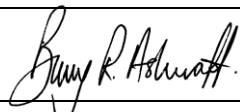
APC 3.5 and SMA Connectors

10 to 15	2 GHz to 26.5 GHz	± 0.19 to ± 0.34
15 to 20		± 0.34 to -0.57, + 0.61
20 to 25		-0.57, + 0.61 to -0.99, + 1.1
30 to 35		-1.7, + 2.1 to -2.8, + 4.2
35 to 43		-2.8, + 4.2 to -6.0, + ∞

(j) Waveguide and coaxial components

(l) Data acquisition systems

Authorised:
 General Manager



Issue 36

Date: 08/02/11

Page 17 of 18

Schedule to

CERTIFICATE OF ACCREDITATION

Babcock Fitzroy Ltd
Metrology & Calibration Laboratory
SCOPE OF ACCREDITATION

Accreditation No 472

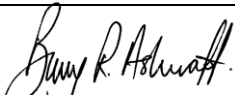
Ranges and least uncertainties as for other classes in this scope

5.96 Electronic Equipment

(b) Transducer indicators and calibrators

Ranges and least uncertainties as for other classes in this scope

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Authorised: General Manager		Issue 36	Date: 08/02/11	Page 18 of 18
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