

# CERTIFICATE OF ACCREDITATION

This is to certify that:

**CONCILIUM TECHNOLOGIES (Pty) Ltd**

Laboratory Accreditation No. 106

is a South African National Accreditation System Accredited Laboratory  
for three years one month commencing **March 2003** provided that  
all SANAS conditions and requirements are complied with.

This certificate is valid for:

**DC LOW FREQUENCY METROLOGY**

as per scope on accompanying accreditation schedule

**THE LABORATORY COMPLIES WITH ISO/IEC 17025**

While this certificate remains valid,  
the Accredited Laboratory named above  
is authorised to issue SANAS certificates.

**Programme Manager**

*"Recognised as the official national accreditation body by the  
Department of Trade and Industry of the Republic of South Africa"*

This certificate is only valid when accompanied by its schedule of accreditation.

**SCHEDULE OF ACCREDITATION**

**DC LOW FREQUENCY METROLOGY**

Laboratory Accreditation Number 106

<u>Permanent Address of Laboratory:</u> Concilium Technologies (Pty) Ltd Building No 3 Highgrove Office Park 50 Tegel Avenue Highveld Technopark Centurion 0157  <u>Postal Address</u> Postnet Suite No 87 Private Bag X 65 Halfway House 1685  Tel : (012) 678-9211 / 9215 Fax : (012) 665-4160 Email: <a href="mailto:bart_bremmer@concilium.co.za">bart_bremmer@concilium.co.za</a>			<u>Technical Signatories:</u> Mr B J H Bremmer Mr G D Schuster  <u>Nominated Representative</u> Mr B J H Bremmer  Issue No. : 02 Date of issue : March 2003 Expiry date : April 2006		
ITEM	FUNCTION	NOMINAL RANGE	NOMINAL FREQUENCY	BEST MEASUREMENT CAPABILITIES EXPRESSED AS AN UNCERTAINTY ( $\pm$ )	NOTES
1	DC Voltage	Specific values: 1,018 V and 10 V  0 V to 10 V 10 V to 100 V 100 V to 1 kV 1 kV to 5 kV		$1 \cdot 10^{-6} \cdot U$  $1 \cdot 10^{-6} \cdot U + 0,3 \mu V$ $3 \cdot 10^{-6} \cdot U$ $5 \cdot 10^{-6} \cdot U$ $2 \cdot 10^{-2} \cdot U$	1
2	DC Current	1 pA to 100 pA 100 pA to 1 $\mu A$ 1 $\mu A$ to 100 mA 100 mA to 2 A 2 A to 10 A 10 A to 50 A 50 A to 1000 A		$1 \cdot 10^{-7} \cdot I$ $2 \cdot 10^{-3} \cdot I$ $5 \cdot 10^{-5} \cdot I$ $2 \cdot 10^{-4} \cdot I$ $2 \cdot 10^{-4} \cdot I$ $5 \cdot 10^{-4} \cdot I$ $2 \cdot 10^{-3} \cdot I$	2 2 1

Original date of accreditation: 1980

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Note 1: Measure only  
 Note 2: Generate only

The BMC, expressed as an expanded uncertainty of measurement, is stated as the standard uncertainty of measurement multiplied by a coverage factor  $k = 2$ , corresponding to a confidence level of approximately 95%

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ITEM	FUNCTION	NOMINAL RANGE	NOMINAL FREQUENCY	BEST MEASUREMENT CAPABILITIES EXPRESSED AS AN UNCERTAINTY ( $\pm$ )	NOTES
3	Resistance	Specific values: 1 $\Omega$ and 10 k $\Omega$ 1 m $\Omega$ 10 m $\Omega$ , 0,1 $\Omega$ 1 $\Omega$ , 10 $\Omega$ , 100 $\Omega$ 1 k $\Omega$ , 10 k $\Omega$ 100 k $\Omega$ , 1 M $\Omega$ 10 M $\Omega$ 100 M $\Omega$ 1 G $\Omega$ 10 G $\Omega$ 100 G $\Omega$		5 $\cdot$ 10 <sup>-6</sup> •R	2
				2 $\cdot$ 10 <sup>-4</sup> •R	
				1 $\cdot$ 10 <sup>-4</sup> •R	
4	Capacitance	100 pF to 1 $\mu$ F 1 $\mu$ F to 10 $\mu$ F 10 $\mu$ F to 100 $\mu$ F	120 Hz to 10 kHz	1 $\cdot$ 10 <sup>-3</sup> •C	
			120 Hz to 10 kHz	2 $\cdot$ 10 <sup>-3</sup> •C	
			120 Hz to 1 kHz	2 $\cdot$ 10 <sup>-3</sup> •C	
		1 pF, 10 pF 100 pF, 1 nF	50 Hz to 1 kHz	5 $\cdot$ 10 <sup>-5</sup> •C	2
			1 kHz to 1 MHz	5 $\cdot$ 10 <sup>-4</sup> •C	2
		10 nF	50 Hz to 1 kHz	5 $\cdot$ 10 <sup>-5</sup> •C	2
			1 kHz to 100 kHz	5 $\cdot$ 10 <sup>-4</sup> •C	2
			100 kHz to 500 kHz	1 $\cdot$ 10 <sup>-3</sup> •C	2
		100 nF	500 kHz to 1 MHz	1 $\cdot$ 10 <sup>-2</sup> •C	2
			50 Hz to 1 kHz	5 $\cdot$ 10 <sup>-5</sup> •C	2
			1 kHz to 10 kHz	5 $\cdot$ 10 <sup>-4</sup> •C	2
1 $\mu$ F	10 kHz to 200 kHz	3 $\cdot$ 10 <sup>-3</sup> •C	2		
	50 Hz to 1 kHz	5 $\cdot$ 10 <sup>-5</sup> •C	2		
	1 kHz to 10 kHz	1 $\cdot$ 10 <sup>-3</sup> •C	2		
5	Inductance	1 mH to 1 H 1 H to 10 H	120 Hz to 1 kHz	2 $\cdot$ 10 <sup>-3</sup> •L	
			120 Hz	5 $\cdot$ 10 <sup>-3</sup> •L	

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ITEM	FUNCTION	NOMINAL RANGE	NOMINAL FREQUENCY	BEST MEASUREMENT CAPABILITIES EXPRESSED AS AN UNCERTAINTY ( $\pm$ )	NOTES
6	AC Voltage	0 V to 10 V	30 Hz to 20 kHz	$1 \cdot 10^{-4} \cdot U + 10 \mu V$	
		10 V to 20 V	20 kHz to 100 kHz	$2 \cdot 10^{-4} \cdot U + 10 \mu V$	
			100 kHz to 1 MHz	$3 \cdot 10^{-4} \cdot U + 10 \mu V$	
			30 Hz to 20 kHz	$1 \cdot 10^{-4} \cdot U$	2
		20 V to 200 V	20 kHz to 100 kHz	$2 \cdot 10^{-4} \cdot U$	
			100 kHz to 500 kHz	$3 \cdot 10^{-4} \cdot U$	2
		200 V to 1 kV	500 kHz to 1 MHz	$4 \cdot 10^{-4} \cdot U$	
			30 Hz to 20 kHz	$1 \cdot 10^{-4} \cdot U$	
20 kHz to 100 kHz	$2 \cdot 10^{-4} \cdot U$				
30 Hz to 1 kHz	$3 \cdot 10^{-4} \cdot U$		1		
7	AC Current	0 A to 2 A	50 Hz to 1 kHz	$3 \cdot 10^{-4} \cdot U$	2
			1 kHz to 20 kHz	$4 \cdot 10^{-4} \cdot U$	1
			20 kHz to 100 kHz	$6 \cdot 10^{-4} \cdot U$	1
			30 Hz to 5kHz	$5 \cdot 10^{-4} \cdot I + 2 \mu A$	

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