

# CERTIFICATE OF ACCREDITATION

*In terms of section 22(2) (b) of the Accreditation for Conformity Assessment, Calibration and Good Laboratory Practice Act, 2006 (Act 19 of 2006), read with sections 23(1), (2) and (3) of the said Act I hereby certify that:-*

**DENEL DYNAMICS  
A DIVISION OF  
DENEL (PTY) LTD  
Co. reg no: 1992/001337/07**

Facility Accreditation Number: **711**

is a South African National Accreditation System accredited Calibration laboratory provided that all SANAS conditions and requirements are complied with

This certificate is valid as per the scope as stated in the accompanying schedule of accreditation, Annexure "A", bearing the above accreditation number for

## **RADIO FREQUENCY METROLOGY**

*The facility is accredited in accordance with the recognised International Standard*

**ISO/IEC 17025:2005**

*The accreditation demonstrates technical competency for a defined scope and the operation of a laboratory quality management system*

While this certificate remains valid, the Accredited Facility named above is authorised to use the relevant SANAS accreditation symbol to issue facility reports and/or certificates

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**Mr R Josias  
Acting Chief Executive Officer**

**Effective Date: 31 March 2008  
Certificate Expires: 31 March 2013**

ANNEXURE A

**SCHEDULE OF ACCREDITATION**

**RADIO FREQUENCY METROLOGY**

Laboratory Accreditation Number: 711

<p><b>Permanent Address of Laboratory:</b> Denel Dynamics Electrical Laboratory Old Production Building Nellmapius Drive Irene</p> <p><b>Postal Address:</b> P O Box 7412 Centurion 0046</p> <p>Tel : (012) 671-2550/2446 Fax : (012) 675 -2446 Email : <a href="mailto:sdumo.hlope@deneldynamics.co.za">sdumo.hlope@deneldynamics.co.za</a></p>		<p><b>Technical Signatory</b> : Mr W Schmidt</p> <p><b>Nominated Representative</b> : Mr S Hlope</p> <p>Issue no. : 09 Date of issue : 17 November 2009 Expiry date : 31 March 2013</p>		
ITEM	FUNCTION	NOMINAL RANGE	NOMINAL FREQUENCY	CALIBRATION AND MEASUREMENT CAPABILITY EXPRESSED AS AN UNCERTAINTY (±)
1	Power (50 Ω)	0 dBm (1 mW) -60 dBm to -20 dBm (1 nW to 10 μW) -30 dBm to +20 dBm (1 μW to 100 mW) -60 dBm to +20 dBm* (1 nW to 100 mW) -60 dBm to +20 dBm* (1 nW to 100 mW) +20 dBm to +35 dBm (100 mW to 3 W) -100 dBm to -30 dBm (100 fW to 1 μW) -90 dBm to -60 dBm (1 pW to 10 nW) -90 dBm to -60 dBm (1 pW to 10 nW)	50 MHz 10 MHz to 1 GHz 100 kHz to 1 GHz 1 GHz to 10 GHz 10 GHz to 18 GHz 100 MHz to 1 GHz 100 kHz to 1 GHz 1 GHz to 10 GHz 10 GHz to 18 GHz	0,08 dB 0,2 dB 0,2 dB 0,3 dB 0,4 dB 0,8 dB 0,2 dB + 0,005 dB per dBm 0,3 dB + 0,010 dB per dBm 0,4 dB + 0,015 dB per dBm
	Calibration Factor	1 % to 150 %	100 kHz to 2 GHz 2 GHz to 6 GHz 6 GHz to 12 GHz 12 GHz to 16 GHz 16 GHz to 18 GHz	3,0 % 3,5 % 4,5 % 5,5 % 7,0 %

Original date of accreditation: 1981

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\* = Generation limitation: + 16 dBm (40 mW)

The CMC, 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%

**Field Manager**

# ANNEXURE A

Laboratory Accreditation Number: 711  
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ITEM	FUNCTION	NOMINAL RANGE	NOMINAL FREQUENCY	CALIBRATION AND MEASUREMENT CAPABILITY EXPRESSED AS AN UNCERTAINTY ( $\pm$ )
2	Attenuation (50 $\Omega$ )	0 dB to 60 dB	DC	0,002 dB
		60 dB to 80 dB	DC	0,020 dB
		0 dB to 10 dB	100 kHz to 1 GHz	0,030 dB
		10 dB to 80 dB	100 kHz to 1 GHz	0,003 dB per dB
		80 dB to 100 dB	100 kHz to 1 GHz	0,005 dB per dB
0 dB to 10 dB	10 dB to 80 dB	80 dB to 100 dB	1 GHz to 8 GHz	0,070 dB
			1 GHz to 8 GHz	0,007 dB per dB
			1 GHz to 8 GHz	0,010 dB per dB
0 dB to 10 dB	10 dB to 80 dB	80 dB to 90 dB	8 GHz to 12 GHz	0,100 dB
			8 GHz to 12 GHz	0,010 dB per dB
			8 GHz to 12 GHz	0,020 dB per dB
0 dB to 10 dB	10 dB to 80 dB	80 dB to 100 dB	12 GHz to 18 GHz	0,150 dB
			12 GHz to 18 GHz	0,015 dB per dB
			12 GHz to 18 GHz	0,030 dB per dB
3	Voltage Reflection Coefficient (50 $\Omega$ )	Ratio		
		0 to 0,5	100 kHz to 10 MHz	0,02
		0,5 to 1	10 MHz to 18 GHz	0,01
			100 kHz to 18 GHz	0,04

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The CMC, 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%

ISSUED BY THE SOUTH AFRICAN NATIONAL ACCREDITATION SYSTEM

**Field Manager**