Schedule of Accreditation

issued by

United Kingdom Accreditation Service

21 - 47 High Street, Feltham, Middlesex, TW13 4UN, UK

2379

Accredited to ISO/IEC 17025:2005

PARC Ltd

Issue No: 018 **Issue date:** 15 April 2011

Product Assessment & Reliability Centre Ltd
Unit 11, Caddsdown Industrial Park
Clovelly Road
Bideford
Devon
EX39 3DX

Contact: Mr Richard Tabor
Tel: +44 (0)1237 421255
Fax: +44 (0)1237 423541
E-Mail: info@parcsw.co.uk
Website: www.parcsw.co.uk

Testing performed at the above address only

DETAIL OF ACCREDITATION

Materials/Products tested	Type of test/Properties measured/Range of measurement	Standard specifications/ Equipment/Techniques used
General non-explosive stores and equipment including: Aerospace Structures, Materials and Equipment Agricultural Equipment Computers and Peripherals Domestic Appliances Electrical/Electronic Components, Connectors and Products Electro-Mechanical Devices Loaded Containers Marine Equipment Mining Equipment Missile Sub-Assemblies and Components Motor Vehicle Accessories and Components Office Equipment Radar Equipment Radio and Television Equipment Safety Appliances and Equipment Satellites and Sub-Assemblies Security Devices and Alarms Telecommunications Equipment Weapons and Sub-Assemblies	**ENVIRONMENTAL TESTS (non-explosive items)** **CLIMATIC** <u>High Temperature - Low Humidity</u> - Steady State and Cyclic Max temp: +200°C Max chamber size: 0.5 m x 0.6 m x 0.8 m Max temp: +60°C Max chamber size: 2 m x 1.6 m x 2.2 m Max temp: +100°C Max chamber size: 1 m x 1.2 m x 1.9 m Max temp: +170°C Max chamber size: 1.0 m x 1.0 m x 1.0 m	BS EN 60068-2-2:2007 Test B BS EN 60068-2-2:1993 Tests Ba, Bb IEC 68-2-2-:1974 Supp A:1976, Amd 1:1993 DEF 00-35 (Part 3)/3 Test CL1 DEF STAN 00-35: Part 3:iss 4 Test CL2 MIL-STD-810F, Method 501.4 MIL-STD-810E, Method 501.3 MIL-STD-810D, Method 501.2 RTCA DO-160D, Sections 4 & 5 RTCA DO-160E, Sections 4 & 5 RTCA DO-160F, Sections 4 & 5 TR2130 iss B:May 1993: Section 3.1 DEF STAN 08-123 (NES 1004) iss 1:April 2000: Data Sheet 9 TR2130C, Feb 2002, Section 3.2 BS EN 60068-2-14:2009 Test Nb BS EN 60945:2002, Test 8.2 BS 7987:2001 ISO 16750-4:2006 EN ISO 13628-6:2006

Materials/Products tested	Type of test/Properties measured/Range of measurement	Standard specifications/ Equipment/Techniques used
As listed on Page 1	**ENVIRONMENTAL TESTS non-explosive items)** (cont'd) **CLIMATIC** (cont'd) <u>Low Temperature</u> - Steady State and Cyclic Min temp: -70°C Max chamber size: 1.0 m x 1.0 m x 1.0 m Min temp: -40°C Max chamber size: 1 m x 1.2 m x 1.9 m Min temp: -5°C Max chamber size: 2 m x 1.6 m x 2.2 m <u>Thermal Shock</u> - Automated Transfer Max temp: +180°C Min temp: -70°C Max size: 0.46 m x 0.35 m x 0.6 m <u>Thermal Cycling</u>	 BS 2011:Part 2.1A:1990 MIL-STD-810F, Method 502.4 MIL-STD-810E, Method 502.3 MIL-STD-810D, Method 502.2 RTCA DO-160D, Sections 4 & 5 RTCA DO-160E, Sections 4 & 5 RTCA DO-160F, Sections 4 & 5 DEF STAN 00-35: Part 3: iss 4 Test CL5 TR2130C, Feb 2002, Section 3.3 TR2130 iss B: May 1993: Section 3.2 DEF STAN 08-123 (NES 1004) iss 1: April 2000: Data Sheet 9 BS EN 60068-2-14:2000 Test Nb BS EN 60068-2-1:1993 IEC 68-2-1:1990 DEF 00-35 (Part 3)/3 Tests CL4, CL5 BS EN 60945 :2002, Test 8.4 BS EN 60068-2-14 :2009 Test Nb BS 7987:2001 ISO 16750-4:2006 BS EN 60068-2-14:2009 Test Na IEC 68-2-14:1999 Test Na MIL-STD-810F, Method 503.4 MIL-STD-810E, Method 503.3 MIL-STD-810D, Method 503.2 TR2130 iss B: May 1993: Section 3.3 TR2130C, Feb 2002, Section 3.4 ISO 16750-4 :2006 RTCA DO-160 D, Section 5 RTCA DO-160 E, Section 5 RTCA DO-160 F, Section 5 BS EN 60068-2-14:2009 Test Nb IEC 68-2-14:1999 Test Nb ISO 16750-4 :2006 EN ISO 13628-6:2006

Materials/Products tested	Type of test/Properties measured/Range of measurement	Standard specifications/ Equipment/Techniques used
As listed on Page 1	**ENVIRONMENTAL TESTS non-explosive items)** (cont'd) **CLIMATIC** (cont'd) <u>High/Low Temperature & Humidity</u> - Steady State and Cyclic Temp range: -70°C to +180°C Humidity range: 25-98% RH Max chamber size: 0.58 m x 0.765 m x 0.780 m Temp range: -70°C to +170°C Humidity range: 30-95% RH Max chamber size: 1.0 m x 1.0 m x 1.0 m <u>Low Air Pressure</u> (altitude) Max chamber size: 0.915 m x 0.915 m x 0.915 m Max altitude: 100 000 ft	 BS 2011:Ca:1977 IEC 68-2-3:1969 IEC 68-2-56:1988 BS EN 60068-2-78:Cab: 2002 BS EN 60068-2-30:1999 BS EN 60068-2-30:2005 IEC 68-2-30:1980 (Amd 1, 1985) BS EN 60068-2-38:1999 IEC 68-2-38:1974 MIL-STD-810F, Method 507.4 MIL-STD-810E, Method 507.3 MIL-STD-810D, Method 507.2 DEF 00-35 (Part 3)/3 Test CL7 RTCA DO-160D, Section 6 RTCA DO-160E, Section 6 RTCA DO-160F, Section 6 TR2130 iss B: May 1993: Section 3.4 DEF STAN 08-123 (NES 1004) iss 1:April 2000: Data Sheet 9 DEF STAN 00-35: Part 3:iss 4 Test CL6 TR2130C, Feb 2002, Section 3.5 BS EN 60945:2002, Test 8.3 BS 7987:2001 ISO 16750-4:2006 BS EN 60068-2-13:M:1999 RTCA/DO-160D, Section 4 RTCA/DO-160E, Section 4 RTCA/DO-160F, Section 4 DEF STAN 00-35:Iss 4: Test CL21, Procs A, B & C MIL-STD 810F, Method 500.4

Materials/Products tested	Type of test/Properties measured/Range of measurement	Standard specifications/ Equipment/Techniques used
As listed on Page 1	**ENVIRONMENTAL TESTS non-explosive items)** (cont'd)	
	CLIMATIC (cont'd)	
	Low Air Pressure (altitude) (cont'd)	
	Dry Heat & Low Air Pressure (altitude)	BS EN 60068-2-41:Z/BM:2000 RTCA DO-160D, Section 4 RTCA DO-160E, Section 4 RTCA DO-160F, Section 4 DEF STAN 00-35:Iss 4: Test CL11 Proc A
	Low Temperature & Low Air Pressure (altitude)	RTCA DO-160D, Section 4 RTCA DO-160E, Section 4 RTCA DO-160F, Section 4 MIL-STD 810F, Method 500.4 BS EN 60068-2-40:2000:Z/AM DEF STAN 00-35:Iss 4:Test CL12
	Ingress Protection Tests (Probes)	
	IP1X Protected against solid objects greater than 50 mm dia IP2X Protected against solid objects greater than 12.5 mm dia IP3X Protected against solid objects greater than 2.5 mm dia IP4X Protected against solid objects greater than 1.0 mm dia	BS EN 60529:1992 (2000) EN 60529:1991
	Ingress Protection Tests (Dust)	
	IP5X Dust Protected IP6X Dust Tight	BS EN 60529:1992 (2000) EN 60529:1991 EN 60598-1:2008 ISO 20653:2006 BS 7987:2001

Materials/Products tested	Type of test/Properties measured/Range of measurement	Standard specifications/ Equipment/Techniques used
As listed on Page 1	**ENVIRONMENTAL TESTS non-explosive items)** (cont'd) **CLIMATIC** (cont'd) <u>Ingress Protection Tests (Water)</u> IPX2 Protected against dripping water when tilted up to 15° IPX3 Protected against spraying water IPX4 Protection against splashing water IPX5 Protected against water jets IPX6 Protected against powerful water jets IPX7 Protected against the effects of immersion IPX8 Protected against the effects of submersion <u>Rain & Spray</u> Chamber size: 0.94 m x 0.86 m x 0.9 m <u>Driving Rain</u> <u>Salt Spray</u> Chamber size: W 1650 mm D 540 mm H 740 mm	 BS EN 60529:1992 (2000) EN 60529:1991 EN 60598-1:2008 DIN 40050 Part 9:May 1991 TR 2130B:1993 TR 2130C:2002 BS 7987:2001 BS EN 60945:2002, Test 8.8 TR2130 iss B:May 1993: section 3.8 DEF STAN 00-35:Iss 4, Test CL27 MIL-STD 810D, Method 509.2 MIL-STD 810E, Method 509.3 MIL-STD 810F, Method 509.4 EN 60068-2-11:1999 Ka IEC 60068-2-11:1981 Ka EN 60068-2-52:1996 Kb IEC 60068-2-52:1996 Kb ASTM-B117-07a 12/02/2008 ASTM-B117-02 RTCA DO-160D, Section 14 RTCA DO-160E, Section 14 RTCA DO-160F, Section 14 DEF STAN 00-35:Part 3:iss 4 Test CN2 BS EN 60945:2002, Test 8.12 ISO 16750-4:2006

Materials/Products tested	Type of test/Properties measured/Range of measurement	Standard specifications/ Equipment/Techniques used
As listed on Page 1	**ENVIRONMENTAL TESTS (non-explosive items)** (cont'd) **DYNAMIC** **Single Parameters** <u>VIBRATION - Sinusoidal</u> (ambient temperature) Freq range: 3 to 2400 Hz Max load: 1200 kg Max pk-pk displacement: 50 mm Max item height: 2.2 m <u>VIBRATION - Random</u> (ambient temperature) Freq range: 3 to 2400 Hz Max load: 1200 kg Max pk-pk displacement: 50 mm Max item height: 2.2 m	DEF 00-35 (Part 3)/3:Test M1:1990 DEF STAN 00-35: Part 3:iss 4 Test M1 MIL-STD 810 F:Method 514:1998 MIL-STD 810E:Method 514:1989 MIL-STD 810 D:Method 514:1991 BS 2011:Part 2.1:Fc:1973 (1983) BS EN 60068-2-6:1996 RTCA DO-160D, Section 8 RTCA DO-160E, Section 8 RTCA DO-160F, Section 8 DEF STAN 08-123 (NES 1004) iss 1:April 2000:Data Sheet 25 TR2130 iss B:May 1993: Section 3.12 BS EN 60945:2002, Test 8.7 MIL-STD 167-1A:2005, Test 5.1, Type 1 BS ISO 16750-3:2007 EN ISO 13628-6:2006 BS EN 60068-2-64:1995 DEF 00-35 (Part 3)/3:Test M1:1990 DEF STAN 00-35: Part 3:iss 4 Test M1 MIL-STD 810 F:Method 514:1998 MIL-STD 810 E:Method 514:1989 MIL-STD 810 D:Method 514:1991 BS 2011:Part 2.1:Fd:1973 (1983) BS 2011:Part 2.1:Fda:1973 (1983) BS 2011:Part 2.1:Fdb:1973 (1983) BS 2011:Part 2.1:Fdc:1973 (1983) RTCA DO-160D, Section 8 RTCA DO-160E, Section 8 RTCA DO-160F, Section 8 DEF STAN 08-123 (NES 1004) iss 1: April 2000:Data Sheet 25 TR2130 iss B:May 1993: Sections 3.11 & 3.14 TR2130C, Feb 2002, Section 5.2 - 5.4

Materials/Products tested	Type of test/Properties measured/Range of measurement	Standard specifications/ Equipment/Techniques used
As listed on Page 1	**ENVIRONMENTAL TESTS (non-explosive items)** (cont'd) **DYNAMIC** (cont'd) **Single Parameters** (cont'd) <u>VIBRATION - Random</u> (ambient temperature) (cont'd) <u>VIBRATION</u> (High/Low Temperature) Freq range: 3 to 2000 Hz Max Load: - Vertical: 600 kg - Horizontal: 600 kg Max pk-pk displacement: 50 mm Max temperature: +140°C Min temperature: -70°C Max chamber size: 0.85 m x 0.85 m x 0.85 m <u>BUMP</u> (ambient temperature) Max item mass: 1200 kg Max item height: 2.2 m Max severity: 100 g Pulse duration: 1-30 ms	 BS EN 50155 :2007, Section 12.2.11 BS EN 50125-3:2003, Section 4.13.1 BS EN 61373:1999, Section 8 BS 7987:2001 BS ISO 16750-3:2007 EN ISO 13628-6:2006 MIL-STD 810F:2001 BS EN 60068-2-50 BS EN 60068-2-51 BS EN 60068-2-53 BS 2011:Part 2.2, 2/AFC and Z/BFC DEF 00-35 (Part 3)/3: Test M12:1986 DEF STAN 00-35: Part 3:iss 4 Test M12 BS 2011:Part 2.1:Eb:1987 BS EN 60068-2-29:1993 BS EN 60068-2-27:2009 TR2130 iss B:May 1993: Section 3.10 TR2130C, Feb 2002, Section 5.7 - 5.9 BS ISO 16750-3:2007

Materials/Products tested	Type of test/Properties measured/Range of measurement	Standard specifications/ Equipment/Techniques used
As listed on Page 1	**ENVIRONMENTAL TESTS (non-explosive items)** (cont'd) **DYNAMIC** (cont'd) **Single Parameters** (cont'd)	
	SHOCK - All classical shock pulse shapes, inc half sine, rectangular, trapezoidal and sawtooth, plus synthesized shock and bump signatures duplicating measured conditions (ambient temperature) Max item mass: 1200 kg Max severity: 100 g Max item height: 2.2 m Max temperature: +125°C Min temperature: -70°C using in-house Procedure	DEF 00-35 (Part 3)/3:Test M3:1990 DEF STAN 00-35: Part 3:iss 4 Tests M3 & M6 MIL-STD 810F:Method 516:1998 MIL-STD 810E:Method 516:1989 MIL-STD 810D:Method 516:1991 BS 2011:Part 2.1:Ea:1988 BS EN 60068-2-27:2009 BS EN 60068-2-27:1993 DEF 00-35 (Part 3)/3:Test M6:1999 BS EN 60068-2-81:2003 DEF STAN 08-123 (NES 1004) iss 1:April 2000: Data Sheet 28 RTCA/DO-160D, Section 7 RTCA/DO-160E, Section 7 RTCA/DO-160F, Section 7 PARC Operating Procedure OP20, Rev 1, 2 June 2008 BS ISO 16750-3:2007 EN ISO 13628-6:2006
	DROP & TOPPLE	BS EN 60068-2-31: Ec:1993 DEF STAN 00-35:Part 3:iss 4 Test M4 MIL-STD 810D:Method 516.3:1986 MIL-STD 810E:Method 516.4:1990 MIL-STD 810F:Method 516.5:2000
	FREE FALL Max drop ht: 2.5 m Max item mass: 250 kg	BS EN 60068-2-32:Ed:1993 MIL-STD 810D:Method 516.3:1986 MIL-STD 810E:Method 516.4:1990 MIL-STD 810F:Method 516.5:2000 BS ISO 16750-3:2007

Materials/Products tested	Type of test/Properties measured/Range of measurement	Standard specifications/ Equipment/Techniques used
As listed on Page 1	**ENVIRONMENTAL TESTS (non-explosive items)** (cont'd) Highly Accelerated Life Testing (HALT) (Using Screening Systems Incorporated QRS-410T CE HALT System) Analysed frequency range: 10 Hz to 2 kHz Max item mass: 40 kg Max item size: 610 mm x 520 mm x 350 mm Temperature range: -60 °C to 150 °C Max rate of change: 50 °C/min	Documented In House Procedure: OP30:Rev 2: Sept 2010
	END	