


# Schedule of Accreditation

issued by

## United Kingdom Accreditation Service

2 Pine Trees, Chertsey Lane, Staines-upon-Thames, TW18 3HR, UK

 <p>Accredited to ISO/IEC 17025:2005</p>	<b>Electronic Test and Calibration Ltd</b>	
	<b>Issue No:</b> 029	<b>Issue date:</b> 04 October 2017
	<b>Caddsdwn Industrial Estate</b> Clovelly Road Bideford Devon EX39 3DX	<b>Contact: Becky Scott</b> Tel: +44 (0)1237 423388 Fax: +44 (0)1237 423434 E-Mail: info@etcal.co.uk Website: etcal.co.uk
Testing performed at the above address only		

### DETAIL OF ACCREDITATION

Electronic Test and Calibration Ltd is accredited for a flexible scope that enables them to establish new and amended test methods, modification of existing methods and include newly revised or technically equivalent methods to conduct the activities detailed below, in accordance with their documented in-house procedure and UKAS Publication LAB 39.

Materials/Products tested	Type of test/Properties measured/Range of measurement	Standard specifications/ Equipment/Techniques used
Computers and peripherals Domestic appliances Electrical/Electronic components Electrical/Electronic products Telecommunications equipment IT equipment	<b>1 CIVIL EMC Tests</b>  1.1 Conducted Emissions 9 kHz to 30 MHz	EN 55011:1998+A1:1999 + A2:2002 EN 55011:2007 EN 55011:2007+A2:2007 EN 55011:2009 EN 55011: 2009+A1:2010 EN 55014-1:2000 EN 55014-1:2006 EN 55014-1:2006+A1:2009 EN 55014-1:2006+A2:2011 CISPR 14-1:2005 EN 55022:1998 EN 55022:1998+A1:2000+A2:2003 EN 55022:2006 EN 55022: 2006+A1:2007 EN 55022:2006+A2:2010 EN 55022:2010 CISPR 22:1997 CISPR 22:2005 CISPR 16-2-1:2003 CISPR 16-2-1:2003+A1:2005 CISPR 16-2-1:2008 CISPR 16-2-1:2008 Ed2+A1:2010 CISPR 16-2-1:2008 Ed2+A2:2013 CISPR 16-2-1: 2014-02 Edition 3.0 EN 55032:2015



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As listed on Page 1	<b>1 CIVIL EMC Tests (cont'd)</b>  1.2 Radiated Emissions Magnetic Field 10 kHz to 30 MHz	EN 60945:2002
	1.3 Radiated Emissions - Electric Field 30 MHz to 18 GHz	EN 55011:1998+A1:1999 + A2:2002 EN 55011:2007 EN 55011:2007+A2:2007 EN 55011:2009 EN 55011: 2009+A1:2010 EN 55014-1:2000 EN 55014-1:2006 EN 55014-1:2006+A1:2009 EN 55014-1:2006+A2:2011 CISPR 14-1:2005 EN 55022:1998 EN 55022:1998+A1:2000+A2:2003 EN 55022:2006 EN 55022:2006+A1:2007 EN 55022:2006+A2:2010 EN 55022:2010 CISPR 22:1997 CISPR 22:2005 CISPR 16-2-3:2006 CISPR 16-2-3:2010 Ed3 CISPR 16-2-3: 2014-03 Edition 3.0 EN 55032:2015
	1.4 Electrostatic Discharge Up to 30 kV	IEC 801-2:1991 IEC 1000-4-2:1995, A1 and A2 EN 61000-4-2:1995, A1 and A2 EN 61000-4-2:2009



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As listed on Page 1	<p><b>1 CIVIL EMC Tests (cont'd)</b></p> <p>1.5 Radiated Immunity 80 MHz to 6 GHz up to 30 V/m:</p> <p>80 MHz to 1 GHz up to 20 V/m 1 GHz to 2 GHz up to 10 V/m 2 GHz to 6 GHz up to 5 V/m</p> <p>Levels include 80% modulation</p> <p>Spot frequencies from 80 MHz to 2.45 GHz up to 30 V/m CW and Pulse, and 10 V/m CW or Pulse @ 5.240, 5.500 and 5.785 GHz</p>	<p>IEC 1000-4-3:2002 EN 61000-4-3:1996 EN 61000-4-3:1996+A1:1998+A2:2001 EN 61000-4-3:2002 EN 61000-4-3:2002+A1:2002+IS1:2004 EN 61000-4-3:2006 EN 61000-4-3:2006+A1:2008 EN 61000-4-3:2006+A2:2010</p>																								
	<p>1.6 Radiated Susceptibility Alternative method Reverberation Chamber 80 MHz to 18 GHz</p> <p>Mode Tuning and Mode Stirring – Pulse &amp; CW</p> <table border="1"> <thead> <tr> <th>MHz</th> <th>V/m</th> <th>dBuV/m</th> </tr> </thead> <tbody> <tr> <td>80</td> <td>200</td> <td>166</td> </tr> <tr> <td>200</td> <td>400</td> <td>172</td> </tr> <tr> <td>300</td> <td>1000</td> <td>180</td> </tr> <tr> <td>1000</td> <td>2000</td> <td>186</td> </tr> </tbody> </table> <table border="1"> <thead> <tr> <th>GHz</th> <th>V/m</th> <th>dBuV/m</th> </tr> </thead> <tbody> <tr> <td>1 to 7.5</td> <td>2000</td> <td>186</td> </tr> <tr> <td>7.5 to 18</td> <td>1000</td> <td>180</td> </tr> </tbody> </table>	MHz	V/m	dBuV/m	80	200	166	200	400	172	300	1000	180	1000	2000	186	GHz	V/m	dBuV/m	1 to 7.5	2000	186	7.5 to 18	1000	180	<p>EN 61000-4-21:2003 EN 61000-4-21:2011</p>
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<p>1.7 Fast Transient and Burst Immunity</p>	<p>IEC 801-4:1988 IEC 1000-4-4:1995+A1:2001+A2:2001 EN 61000-4-4:1995 EN 61000-4-4:1995+A1:2001+A2:2001 EN 61000-4-4:2004 EN 61000-4-4:2004+A1:2010 EN 61000-4-4:2012</p>																									



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As listed on Page 1	<b>1 CIVIL EMC Tests (cont'd)</b>  1.8 Surge Immunity	IEC 1000-4-5:1995+A12001 EN 61000-4-5:1995+A1:2001 EN 61000-4-5:2006 EN 61000-4-5: 2014
	1.9 Conducted Radio Frequency Disturbance 150 kHz to 80 MHz	IEC 61000-4-6:1996+A1:2001 +A2:2004 EN 61000-4-6:1996 EN 61000-4-6:1996+A1:2001 +A2:2004 EN 61000-4-6:2007 EN 61000-4-6:2009 EN 61000-4-6:2014
	1.10 Power Frequency Magnetic Field Immunity	EN 61000-4-8:1994+A1 EN 61000-4-8: 2010
	1.11 Pulsed Magnetic Field immunity	EN 61000-4-9:1993
	1.12 Mains Dips and Interruptions (5 seconds Maximum)	IEC 1000-4-11:1994 EN 61000-4-11:1994 EN 61000-4-11:2004
	1.13 Conducted Voltage Harmonics (Emissions) Up to 40th Harmonic	EN 61000-3-2:1995 EN 61000-3-2:2000, Ed2 EN 61000-3-2:2006 EN 61000-3-2:2006+A2:2009 EN 61000-3-2: 2014
	1.14 Conducted AC Mains Flicker/Emissions	EN 61000-3-3:1995 EN 61000-3-3:1995+A1:2001+A2:2005 EN 61000-3-3:2008 EN 61000-3-3:2013



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As listed on Page 1	<p><b>1 CIVIL EMC Tests (cont'd)</b></p> <p>1.15 EMC Tests</p> <p>These generic and product specific tests are included in this Schedule, but limited to those basic standards that are explicitly listed in Sections 1.1 to 1.14.</p>	<p>Generic and Product Standards</p> <p>EN 50081-1:1992 EN 50081-2:1994 EN 50082-1:1996 EN 50082-2:1996 EN 61000-6-1:2001 EN 61000-6-1:2007 EN 61000-6-2:2001 EN 61000-6-2:2005 EN 61000-6-3:2001 EN 61000-6-3:2007+A1 2011 EN 61000-6-4:2001 EN 61000-6-4:2007+ A1:2011 EN 61326:1997 EN 61326:1997 + A1:1998 + A2:2001 + A3:2003 EN 61326-1:2006 EN 61326-2-2:2006 EN 61326-2-2:2013 EN 61326-1:2013 EN 55024:1998 EN 55024:1998, A1:2001 + A2:2003 EN 55024:2010 EN 55024: 2010 A1: 2015 EN 60945:2002 Sections 9 &amp; 10 EN 60601-1-2:1993 EN 60601-1-2:2001 + A1:2006 EN 60601-1-2:2007 EN 60601-1-2: 2015 EN 55103-1:2009 EN 55103-2:2009 EN 50293:2012 EN 60947-4-2:2012 EN 50121-3-2:2006 EN 50121-3-2: 2015 EN 50121-4:2006 EN 50121-4: 2015 EN 50121-5:2006 EN 50121-5: 2015</p>



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	<p><b>2 MILITARY EMC Tests</b></p> <p>2.1 Conducted Emissions:</p> <p>Power, Control and Signal Leads: 20 Hz to 150 MHz</p> <p>Antenna Terminals 10 kHz to 18 GHz</p>	<p>MIL STD 461E MIL STD 461F CE101, CE102 DEF STAN 59-41:Part 3, Section 3, Issue 1:2003 DCE01, DCE02 RTCA DO 160 G Section 21</p> <p>DEF STAN 59-411 Am 1 DEF STAN 59-411 Issue 2 DCE01, DCE02 AECTP-500 Ed 4 NCE01, NCE02 NCE05 MIL STD 461E and F CE106</p>
	<p>2.2 Radiated Emissions: Electric Field: 10 kHz to 18 GHz</p>	<p>MIL STD 461D - RE102, RE103 MIL STD 461E - RE102, RE103 MIL STD 461F - RE102, RE103 DEF STAN 59-41:Part 3, Section 3, Issue 1:2003 DRE01 DEF STAN 59-411 Am 1 DEF STAN 59-411 Issue 2 DRE01 AECTP-500 Ed 4 NRE02, NRE03 RTCA DO 160 G Section 21</p>
	<p>2.3 Radiated Emissions: Magnetic Field: 20 Hz to 250 kHz</p>	<p>MIL STD 461E - RE101 MIL STD 461F - RE101 DEF STAN 59-41:Part 3, Section 3, Issue 1:2003 DRE02 DEF STAN 59-411 Am 1 DEF STAN 59-411 Issue 2 DRE02 AECTP-500 Ed 4 NCS12, NRE01</p>



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	<p><b>2 MILITARY EMC Tests (cont'd)</b></p> <p>2.4 Exported Transients Power Lines</p>	<p>DEF STAN 59-41:Part 3, Section 3, Issue 1:2003 DCE03 DEF STAN 59-411 Am 1 DEF STAN 59-411 Issue 2 DCE03 AECTP-500 Ed 4 NCE04</p>																		
	<p>2.5 Radiated Susceptibility: Electric Field: 10 kHz to 18 GHz</p> <table border="0"> <tr> <td>GHz</td> <td>V/m</td> <td>dBuV/m</td> </tr> <tr> <td>0.0001</td> <td>200 V/m</td> <td>166</td> </tr> <tr> <td>1 to 18</td> <td>50 V/m</td> <td>154</td> </tr> </table> <p>See also section 2.12 below Alternative method</p> <table border="0"> <tr> <td>GHz</td> <td>V/m</td> <td>dBuV/m</td> </tr> <tr> <td>1 to 12.4</td> <td>350</td> <td>171</td> </tr> <tr> <td>12.4 to 18</td> <td>200</td> <td>166</td> </tr> </table>	GHz	V/m	dBuV/m	0.0001	200 V/m	166	1 to 18	50 V/m	154	GHz	V/m	dBuV/m	1 to 12.4	350	171	12.4 to 18	200	166	<p>MIL STD 461E - RS103 MIL STD 461F - RS103 DEF STAN 59-41:Part 3, Section 3, Issue 1:2003 DRS02 DEF STAN 59-411 Am 1 DEF STAN 59-411 Issue 2 DRS02 AECTP-500 Ed 4 NRS02 RTCA DO 160 G Section 20</p>
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12.4 to 18	200	166																		
	<p>2.6 Radiated Susceptibility: Magnetic Field: 0 Hz to 100 kHz Maximum Field Strength: 196 dBpT</p>	<p>MIL STD 461E and F RS101 DEF STAN 59-41:Part 3, Section 3, Issue 1:2003 DRS01, DRS03 DEF STAN 59-411 Am 1 DEF STAN 59-411 Issue 2 DRS01, DRS03 AECTP-500 Ed 4 NRS01, NRS04</p>																		



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	<p><b>2 MILITARY EMC Tests (cont'd)</b></p> <p>2.7 Conducted</p> <p>Susceptibility: Power, Control and Signal Lines including Bulk Current Injection 20 Hz to 400 MHz</p>	<p>MIL STD 461D MIL STD 461E MIL STD 461F CS114 DEF STAN 59-41:Part 3, Section 3, Issue 1:2003 DCS02 and DCS03 DEF STAN 59-411 Am 1 DEF STAN 59-411 Issue 2 DCS02, DCS03 AECTP-500 Ed 4 NCS02, NCS07 RTCA DO 160 G Section 20</p>
	<p>2.8 Conducted</p> <p>Susceptibility: Primary Power Lines, 20 Hz - 150 kHz</p>	<p>MIL STD 461E MIL STD 461F CS101 DEF STAN 59-41:Part 3, Section 3, Issue 1:2003 DCS01 DEF STAN 59-411 Am 1 DCS01 AECTP-500 Ed 4 NCS01</p>
	<p>2.9 Electrostatic Discharge Up to 30 kV contact</p>	<p>DEF STAN 59-41:Part 3, Section 3, Issue 1:2003 DCS10 DEF STAN 59-411 Am 1 DEF STAN 59-411 Issue 2 DCS10 AECTP-500 Ed 4 NCS12 RTCA DO 160 G Section 25</p>
	<p>2.10 Conducted Susceptibility:</p> <p>Structure Current, 60 Hz - 100 kHz</p>	<p>MIL STD 461E MIL STD 461F CS109 AECTP-500 Ed 4 NCS06</p>





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	<p><b>2 MILITARY EMC Tests (cont'd)</b></p> <p>2.11 Radiated Susceptibility</p> <p>Alternative method Reverberation Chamber 80 MHz to 18 GHz Mode Tuning and Mode Stirring – Pulse &amp; CW</p> <table border="0"> <tr> <td>MHz</td> <td>V/m</td> <td>dBuV/m</td> </tr> <tr> <td>80</td> <td>200</td> <td>166</td> </tr> <tr> <td>200</td> <td>400</td> <td>172</td> </tr> <tr> <td>300</td> <td>1000</td> <td>180</td> </tr> <tr> <td>1000</td> <td>2000</td> <td>180</td> </tr> <tr> <td>GHz</td> <td>V/m</td> <td>dBuV/m</td> </tr> <tr> <td>1 to 18</td> <td>2000 to 1000</td> <td>180 180</td> </tr> </table>	MHz	V/m	dBuV/m	80	200	166	200	400	172	300	1000	180	1000	2000	180	GHz	V/m	dBuV/m	1 to 18	2000 to 1000	180 180	<p>MIL STD 461E MIL STD 461F RS103 DEF STAN 59-41:Part 3, Section 3, Issue 1:2003 DRS02 DEF STAN 59-411 Am 1 DEF STAN 59-411 Issue 2 DRS02 AECTP-500 Ed 4 NRS02 RTCA DO160 E, F and G Section 20 EN 61000-4-21:2003 EN 61000-4-21:2011</p>
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	2.12 Audio Frequency Conducted Susceptibility	RTCA DO 160 G Section 18																					
	2.13 Voltage Spike	RTCA DO 160 G Section 17																					
	2.14 Power Input Voltage and Frequency Voltage Modulation Frequency Modulation Momentary power interruptions Normal transients Normal Surge Voltage Normal Frequency Transients Normal Frequency Variations Voltage DC Content Voltage Distortion	RTCA DO 160 G Section 16																					
	2.15 Magnetic Effect	RTCA DO 160 G Section 15																					



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	<p><b>2 MILITARY EMC Tests (cont'd)</b></p> <p>2.16 Induced Signal Susceptibility 20 Hz to 50 kHz Magnetic Fields into equipment Electric Fields into equipment Magnetic Fields into Cables Electric Fields into Cables Spikes induced into Cables</p>	<p>RTCA DO 160 G Section 19</p>
	<p>2.17 Aircraft Electrical Power Characteristics 28 VDC</p>	<p>Mil Std 704F including Notice 1 2008 MIL HNBK 704-8</p>
<p>Facilities and Resources</p>	<p><b>Laboratory Facilities Main Building</b></p> <p>Fully Lined Anechoic Chamber ETC799 7.3 m x 4.3 m x 5 m Doors 2 m x 1.4 m Max load 250 kg / m<sup>2</sup></p> <p>Supplies 32 A 230 V / 415 V 50 Hz 16 A 115 V 50 Hz : 60 Hz and 400 Hz @ 3 kVA</p> <p>Reverberation Chamber / Screened Room ETC800 7.3m x 4.3 m x 5 m Doors 2 m x 2 m Max load 1 tonne / m<sup>2</sup></p> <p>Reverberation Chamber / Screened Room ETC1285 2 m x 1.4 m x 1.1 m Test Volume 600 mm x 600 mm x 900 mm Door 600 mm x 600 mm Max Load 100 kg</p> <p>Supplies 32 A 230 V / 415 V 50Hz 16 A 115 V 50 Hz : 60 Hz and 400 Hz @ 3 kVA</p> <p>EUT volume 3.2 m x 2.4 m x 2 m</p>	



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Facilities and Resources (cont'd)	<p><b>Laboratory Facilities Main Building (cont'd)</b></p> <p><b>Laboratory Facilities Unit 14</b></p> <p>Semi Anechoic Chamber EMC054</p> <p>7.3 m x 4.2 m x 4.2 m Door 0.9 m x 2 m Turntable max load 250 kg</p> <p>Supplies 32 A 230 V / 415 V 50Hz 16 A 115 V 50 Hz : 60 Hz and 400 Hz @ 3 kVA</p> <p>Screened Room EMC</p> <p>3.6 m x 2.4 m x 2.4 m Door 0.86 m x 1.9 m</p> <p>Supplies 32 A 230 V / 415 V 50Hz 16 A 115 V 50 Hz : 60 Hz and 400 Hz @ 3 kVA</p> <p>Dedicated Test areas for: ESD Dips, variation, flicker &amp; harmonics EFT Surge Conducted RF immunity</p> <p><b>Open Area Test Site Unit 14</b></p> <p>10 m and 3 m Covered Turntable max load 250 kg</p> <p>Supplies 64 A 230 V / 415 V 50Hz 16 A 115 V 50 Hz : 60 Hz and 400 Hz @ 3 kVA</p>	
END		