附录A

**QL6747型PXI总线高采样率示波器模块测试记录**

机 号： 测试项目：

测试人： 测试日期：

（合格画√，不合格画 ×）

**表A1功能特性检查**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| 序号 | 测试项目 | 功能要求 | 测试结果 | 测试结论  (合格/不合格) |
| 1 | 信号采集与存储 | 实现模拟信号采集、转换和存储，支持多种信号的测量功能 |  |  |
| 2 | 采集与触发 | 支持多种采集方式和触发方式 |  |  |
| 3 | 信号运算和处理功能 | 支持复杂信号运算和处理功能 |  |  |
| 4 | 频域变换、时域变换 | FFT变换及时域变换（数字IIR滤波），并以波形方式显示分析 |  |  |
| 5 | 自动设置和跟踪测量 | 支持自动设置与信号跟踪测量 |  |  |
| 6 | 参考波形和仪器设置存储 | 板载参考波形和仪器设置存储 |  |  |
| 7 | 自动校准功能 | 支持自动校准功能 |  |  |
| 8 | 即插即用功能 | 支持即插即用功能 |  |  |
| 9 | IVI驱动 | 符合IVI标准，支持IVI.C和IVI.COM |  |  |

**表A2模拟输入指标测试**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| 序号 | 测试项目 | 指标要求 | | | 测试结果 | 测试结论  (合格/不合格) |
| 1 | 通道数 | 信号通道数2 | | |  |  |
| 2 | 带宽（-3dB） | ≥500MHz（50Ω）、  ≥300MHz（1MΩ） | CH1 | 1MΩ |  |  |
| 50Ω |  |
| CH2 | 1MΩ |  |
| 50Ω |  |
| 3 | 最大输入 | ±5VDC，±6VDC时有输入负载保护（50Ω），±250VDC（1MΩ） | CH1 | 1MΩ |  |  |
| 50Ω |  |
| CH2 | 1MΩ |  |
| 50Ω |  |
| 4 | 测量范围 | 50mVpp～10Vpp(50Ω)，500mVpp～100Vpp（1MΩ） | CH1 | 1MΩ |  |  |
| 50Ω |  |
| CH2 | 1MΩ |  |
| 50Ω |  |
| 5 | 幅度档位 | 50Ω：5mV/div,10mV/div,20mV/div,50mV/div,  100mV/div,200mV/div,500mV/div,1V/div  1MΩ：50mV/div,100mV/div,200mV/div,  500mV/div,1V/div,2V/div,5V/div,10V/div | | |  |  |
| 6 | DC增益精度 | ≤±1.5%×满量程 | | | 见附表A2.1与表A2.2 |  |
| 7 | 输入阻抗和精度 | 1MΩ/12pF或50Ω，±1%/±5pF | CH1 | 1MΩ |  |  |
| 电容 |  |
| 50Ω |  |
| CH2 | 1MΩ |  |
| 电容 |  |
| 50Ω |  |
| 8 | 耦合方式 | AC/DC，AC方式下的低端截止频率≤200kHz（50Ω）、10Hz（1MΩ）。 | CH1 | AC/DC |  |  |
| 1MΩ |  |
| 50Ω |  |
| CH2 | AC/DC |  |
| 1MΩ |  |
| 50Ω |  |
| 9 | 探头衰减比 | 0.9～1000:1 | CH1 | |  |  |
| CH2 | |  |
| 10 | 偏移调节 | 1MΩ：±100V:  1V/div～10V/div、  ±5V  50mV/div～500mV/div  50Ω：±10V:  100mV/div～1V/div、±0.5V:  5mV/div～50mV/div | CH1 | 1MΩ |  |  |
| 50Ω |  |
| CH2 | 1MΩ |  |
| 50Ω |  |
| 11 | 偏移精度 | ≤±(1%×偏置+ 2 %×满量程) | | | 见附表A2.3与表A2.4 |  |
| 12 | 平方根噪声值 | 50Ω：≤（350µV+0.5%×输入电压范围）50mV/div～5mV/div； ≤（350mV+0.5%×输入电压范围）1V/div～100mV/div；  1MΩ：平方根噪声值≤（2mV+0.5%×输入电压范围）00mV/div～50mV/div； ≤（20mV+0.5%×输入电压范围）10V/div～1V/div。 | | | 见附表A2.5与表A2.6 |  |
| 13 | 平方根噪声值(20MHz滤波) | ≤（0.25%×输入电压范围） | | | 见附表A2.7与表A2.8 |  |

**附表A2.1 DC增益精度指标测试（1MΩ）**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| 输入范围  （垂直灵敏度） | 指标要求 | | | 测试结果 | | 测试结论  (合格/不合格) |
| 相对误差 | 测试条件 | 绝对误差 |
| 500mV  (50mV/div) | ≤±1.5%×满量程 | 200mV直流电压 | ±7.5mV | CH1 |  |  |
| CH2 |  |  |
| 1V  (100mV/div) | ≤±1.5%×满量程 | 400mV直流电压 | ±15mV | CH1 |  |  |
| CH2 |  |  |
| 2V  (200mV/div) | ≤±1.5%×满量程 | 800mV直流电压 | ±30mV | CH1 |  |  |
| CH2 |  |  |
| 5V  (500mV/div) | ≤±1.5%×满量程 | 2V直流电压 | ±75mV | CH1 |  |  |
| CH2 |  |  |
| 10V  (1V/div) | ≤±1.5%×满量程 | 4V直流电压 | ±150mV | CH1 |  |  |
| CH2 |  |  |
| 20V  (2V/div) | ≤±1.5%×满量程 | 8V直流电压 | ±300mV | CH1 |  |  |
| CH2 |  |  |
| 50V  (5V/div) | ≤±1.5%×满量程 | 20V直流电压 | ±750mV | CH1 |  |  |
| CH2 |  |  |
| 100V  (10V/div) | ≤±1.5%×满量程 | 40V直流电压 | ±1.5V | CH1 |  |  |
| CH2 |  |  |

**附表A2.2 DC增益精度指标测试（50Ω）**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| 输入范围  （垂直灵敏度） | 指标要求 | | | 测试结果 | | 测试结论  (合格/不合格) |
| 相对误差 | 测试条件 | 绝对误差 |
| 50mV  (5mV/div) | ≤±1.5%×满量程 | 20mV直流电压 | ±0.75mV | CH1 |  |  |
| CH2 |  |  |
| 100mV  (10mV/div) | ≤±1.5%×满量程 | 40mV直流电压 | ±1.5mV | CH1 |  |  |
| CH2 |  |  |
| 200mV  (20mV/div) | ≤±1.5%×满量程 | 80mV直流电压 | ±3mV | CH1 |  |  |
| CH2 |  |  |
| 500mV  (50mV/div) | ≤±1.5%×满量程 | 200mV直流电压 | ±7.5mV | CH1 |  |  |
| CH2 |  |  |
| 1V  (100mV/div) | ≤±1.5%×满量程 | 400mV直流电压 | ±15mV | CH1 |  |  |
| CH2 |  |  |
| 2V  (200mV/div) | ≤±1.5%×满量程 | 800mV直流电压 | ±30mV | CH1 |  |  |
| CH2 |  |  |
| 5V  (500mV/div) | ≤±1.5%×满量程 | 2V直流电压 | ±75mV | CH1 |  |  |
| CH2 |  |  |
| 10V  (1V/div) | ≤±1.5%×满量程 | 4V直流电压 | ±150mV | CH1 |  |  |
| CH2 |  |  |

**附表A2.3 偏移精度指标测试（1MΩ）**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| 输入范围  （垂直灵敏度） | 指标要求 | | | 测试结果 | | 测试结论  (合格/不合格) |
| 相对误差 | 测试条件 | 绝对误差 |
| 500mV  (50mV/div) | ≤±(1%×偏置+ 2 %×满量程) | 50mV直流电压 | ±10.5mV | CH1 |  |  |
| CH2 |  |  |
| 1V  (100mV/div) | ≤±(1%×偏置+ 2 %×满量程) | 100mV直流电压 | ±21mV | CH1 |  |  |
| CH2 |  |  |
| 2V  (200mV/div) | ≤±(1%×偏置+ 2 %×满量程) | 200mV直流电压 | ±42mV | CH1 |  |  |
| CH2 |  |  |
| 5V  (500mV/div) | ≤±(1%×偏置+ 2 %×满量程) | 500mV直流电压 | ±105mV | CH1 |  |  |
| CH2 |  |  |
| 10V  (1V/div) | ≤±(1%×偏置+ 2 %×满量程) | 1V直流电压 | ±210mV | CH1 |  |  |
| CH2 |  |  |
| 20V  (2V/div) | ≤±(1%×偏置+ 2 %×满量程) | 2V直流电压 | ±420mV | CH1 |  |  |
| CH2 |  |  |
| 50V  (5V/div) | ≤±(1%×偏置+ 2 %×满量程) | 5V直流电压 | ±1.05V | CH1 |  |  |
| CH2 |  |  |
| 100V  (10V/div) | ≤±(1%×偏置+ 2 %×满量程) | 10V直流电压 | ±2.1V | CH1 |  |  |
| CH2 |  |  |

**附表A2.4 偏移精度指标测试（50Ω）**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| 输入范围  （垂直灵敏度） | 指标要求 | | | 测试结果 | | 测试结论  (合格/不合格) |
| 相对误差 | 测试条件 | 绝对误差 |
| 50mV  (5mV/div) | ≤±(1%×偏置+ 2 %×满量程) | 5mV直流电压 | ±1.05mV | CH1 |  |  |
| CH2 |  |  |
| 100mV  (10mV/div) | ≤±(1%×偏置+ 2 %×满量程) | 10mV直流电压 | ±2.1mV | CH1 |  |  |
| CH2 |  |  |
| 200mV  (20mV/div) | ≤±(1%×偏置+ 2 %×满量程) | 20mV直流电压 | ±4.2mV | CH1 |  |  |
| CH2 |  |  |
| 500mV  (50mV/div) | ≤±(1%×偏置+ 2 %×满量程) | 50mV直流电压 | ±10.5mV | CH1 |  |  |
| CH2 |  |  |
| 1V  (100mV/div) | ≤±(1%×偏置+ 2 %×满量程) | 100mV直流电压 | ±21mV | CH1 |  |  |
| CH2 |  |  |
| 2V  (200mV/div) | ≤±(1%×偏置+ 2 %×满量程) | 200mV直流电压 | ±42mV | CH1 |  |  |
| CH2 |  |  |
| 5V  (500mV/div) | ≤±(1%×偏置+ 2 %×满量程) | 500mV直流电压 | ±105mV | CH1 |  |  |
| CH2 |  |  |
| 10V  (1V/div) | ≤±(1%×偏置+ 2 %×满量程) | 1V直流电压 | ±210mV | CH1 |  |  |
| CH2 |  |  |

**附表A2.5 平方根噪声指标测试（1MΩ）**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| 输入范围  （垂直灵敏度） | 指标要求 | | 测试结果 | | 测试结论  (合格/不合格) |
| 相对误差 | 绝对误差 |
| 100mV  (10mV/div) | ≤1mV+0.5%×输入电压范围 | 4.5mV | CH1 |  |  |
| 200mV  (20mV/div) | ≤1mV+0.5%×输入电压范围 | 4.5mV | CH2 |  |  |
| 500mV  (50mV/div) | ≤1mV+0.5%×输入电压范围 | 3.5mV | CH2 |  |  |
| CH2 |  |  |
| 1V  (100mV/div) | ≤1mV+0.5%×输入电压范围 | 6mV | CH1 |  |  |
| CH2 |  |  |
| 2V  (200mV/div) | ≤20mV+0.5%×输入电压范围 | 30mV | CH1 |  |  |
| CH2 |  |  |
| 5V  (500mV/div) | ≤20mV+0.5%×输入电压范围 | 45mV | CH1 |  |  |
| CH2 |  |  |
| 10V  (1V/div) | ≤20mV+0.5%×输入电压范围 | 70mV | CH1 |  |  |
| CH2 |  |  |
| 20V  (2V/div) | ≤200mV+0.5%×输入电压范围 | 300mV | CH1 |  |  |
| CH2 |  |  |
| 50V  (5V/div) | ≤200mV+0.5%×输入电压范围 | 450mV | CH1 |  |  |
| CH2 |  |  |
| 100V  (10V/div) | ≤200mV+0.5%×输入电压范围 | 700mV | CH1 |  |  |
| CH2 |  |  |

**附表A2.6 平方根噪声指标测试（50Ω）**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| 输入范围  （垂直灵敏度） | 指标要求 | | 测试结果 | | 测试结论  (合格/不合格) |
| 相对误差 | 绝对误差 |
| 100mV  (10mV/div) | ≤1mV+0.5%×输入电压范围 | 1.5mV | CH1 |  |  |
| CH2 |  |  |
| 200mV  (20mV/div) | ≤1mV+0.5%×输入电压范围 | 2mV | CH1 |  |  |
| CH2 |  |  |
| 500mV  (50mV/div) | ≤1mV+0.5%×输入电压范围 | 4mV | CH1 |  |  |
| CH2 |  |  |
| 1V  (100mV/div) | ≤1mV+0.5%×输入电压范围 | 6mV | CH1 |  |  |
| CH2 |  |  |
| 2V  (200mV/div) | ≤20mV+0.5%×输入电压范围 | 30mV | CH1 |  |  |
| CH2 |  |  |
| 5V  (500mV/div) | ≤50mV+0.5%×输入电压范围 | 75mV | CH1 |  |  |
| CH2 |  |  |
| 10V  (1V/div) | ≤100mV+0.5%×输入电压范围 | 150mV | CH1 |  |  |
| CH2 |  |  |

**附表A2.7 平方根噪声（20 MHz滤波）指标测试（1MΩ）**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| 输入范围  （垂直灵敏度） | 指标要求 | | 测试结果 | | 测试结论  (合格/不合格) |
| 相对误差 | 绝对误差 |
| 100mV  (10mV/div) | ≤0.25%×输入电压范围 | 1.25mV | CH1 |  |  |
| 200mV  (20mV/div) | ≤0.25%×输入电压范围 | 1.25mV | CH2 |  |  |
| 500mV  (50mV/div) | ≤0.25%×输入电压范围 | 1.25mV | CH2 |  |  |
| CH2 |  |  |
| 1V  (100mV/div) | ≤0.25%×输入电压范围 | 2.5mV | CH1 |  |  |
| CH2 |  |  |
| 2V  (200mV/div) | ≤0.25%×输入电压范围 | 5mV | CH1 |  |  |
| CH2 |  |  |
| 5V  (500mV/div) | ≤0.25%×输入电压范围 | 12.5mV | CH1 |  |  |
| CH2 |  |  |
| 10V  (1V/div) | ≤0.25%×输入电压范围 | 25mV | CH1 |  |  |
| CH2 |  |  |
| 20V  (2V/div) | ≤0.25%×输入电压范围 | 50mV | CH1 |  |  |
| CH2 |  |  |
| 50V  (5V/div) | ≤0.25%×输入电压范围 | 125mV | CH1 |  |  |
| CH2 |  |  |
| 100V  (10V/div) | ≤0.25%×输入电压范围 | 250mV | CH1 |  |  |
| CH2 |  |  |

**附表A2.8 平方根噪声（20 MHz滤波）指标测试（50Ω）**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| 输入范围  （垂直灵敏度） | 指标要求 | | 测试结果 | | 测试结论  (合格/不合格) |
| 相对误差 | 绝对误差 |
| 100mV  (10mV/div) | ≤0.25%×输入电压范围 | 250u V | CH1 |  |  |
| CH2 |  |  |
| 200mV  (20mV/div) | ≤0.25%×输入电压范围 | 500u V | CH1 |  |  |
| CH2 |  |  |
| 500mV  (50mV/div) | ≤0.25%×输入电压范围 | 1.25mV | CH1 |  |  |
| CH2 |  |  |
| 1V  (100mV/div) | ≤0.25%×输入电压范围 | 2.5mV | CH1 |  |  |
| CH2 |  |  |
| 2V  (200mV/div) | ≤0.25%×输入电压范围 | 5mV | CH1 |  |  |
| CH2 |  |  |
| 5V  (500mV/div) | ≤0.25%×输入电压范围 | 12.5mV | CH1 |  |  |
| CH2 |  |  |
| 10V  (1V/div) | ≤0.25%×输入电压范围 | 25mV | CH1 |  |  |
| CH2 |  |  |