**Fuse Clearing Transient Test, RBSP LVPS Flight Board**

Dates: 6/4/2010 – 6/7/2010

Equipment under test:

RBSP\_EFW\_LVPS\_003\_C

Equipment:

* Transient Test Circuit Board (schematic below)



* Tektronix, TDS 3014B Four Channel Digital Phosphor Oscilloscope
* Hewlett Packard, 8011A Pulse Generator
* Hewlett Packard, 721A Power Supply
* Power Designs, 2020B Precision DC Source
* Agilent, E3631A Triple Output DC Power Supply
* Agilent, E3634A DC Power Supply

Test Procedure:

With an input of 28V applied to the LVPS, an 8V drop for 80uS (worst case) is also applied to simulate the Fuse Blowing System Response as detailed in Section 4.8.1/5.9.1 of the EDTRD. The digital outputs of the converter are monitored for any voltage drop or overshoot outside of specification.

4.8.1/5.9.1 Bus Characteristics at the Load Input Power Connector

d)  Fuse Blowing System Response: in event of a fault requiring the Power Distribution Unit to blow a fuse, the bus voltage will temporarily drop. The magnitude and duration of the drop depends on the size of the fuse that blows. The magnitude and duration of the voltage drop expected at the load input power connector was measured using power subsystem brassboards (with realistic harness lengths) for the range of fuse values as shown in Table XXX. Designers should ensure that DC/DC converters do not have an adverse response to these transients (such as an overshoot of secondary voltages).

Table XXX. Power Bus Voltage Transient Due to a Fuse Clearing Event

|  |  |  |
| --- | --- | --- |
| **Fuse Size (A)** | **Voltage Drop (V)** | **Duration of Transient (uS)** |
| 1 | 2 | 3.6 |
| 2 | 3 | 5 |
| 5 | 4 | 20 |
| 7.5 | 6 | 32 |
| 15 | 8 | 80 |

Test Results:

**IDPU +5VD**

C:\Documents and Settings\christ\Desktop\SSL Files\RBSP\Fuse Clearing Waveforms\IDPU_+5V_DC-DC Overshoot_DC.TIF

Channel 1: 28V / 20V for 80uS

Channel 2: +5VD

**IDPU +3.6VD**

C:\Documents and Settings\christ\Desktop\SSL Files\RBSP\Fuse Clearing Waveforms\IDPU+3p6VD.TIF

Channel 1: 28V / 20V for 80uS

Channel 2: +3.6VD

**IDPU +1.8VD**

C:\Documents and Settings\christ\Desktop\SSL Files\RBSP\Fuse Clearing Waveforms\IDPU+1p8VD.TIF

Channel 1: 28V / 20V for 80uS

Channel 2: +1.8VD

**BEB +5VD**

C:\Documents and Settings\christ\Desktop\SSL Files\RBSP\Fuse Clearing Waveforms\BEB+5VD.TIF

Channel 1: 28V / 20V for 80uS

Channel 2: +5VD