Overnight operation of SPIRE
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Scope
This technical note describes the case for operating the SPIRE instrument overnight during EQM IMT campaigns.

Change notes

1	8 August 2005	first issue
2	30 August 2005	More detail added,

Applicable Documents

SPIRE-RAL-NOT-002402 SPIRE EMC test sequence for EQM testing

Reference Documents

Background
During IMTs it is desirable to carry out quantitative measurements during normal working hours. This is particularly applicable to EMC testing where we wish to do susceptibility measurements. For this we need SPIRE to be thermally stable otherwise we cannot distinguish thermal drift from injected noise effects, which are likely to cause heating of the bolometers.

Proposed scenario
The CQM cooler typically takes about 2 hours to recycle, after that SPIRE takes typically 6 to 8 hours to reach a stable thermal condition, defined as 10mK delta T/hour.
During instrument level testing (ILT) the SPIRE team routinely overcomes this problem by recycling the cooler at the end of the working day, so that it is stable by the start of the next working day. This requires that the instrument is powered on and in REDY or STANDBY mode. If the instrument is powered off, the cooler heat switches cool down and open, thus allowing everything to warm up to L0 temperature. No problems with this procedure have been seen at RAL during Instrument level testing.

Currently, during at RAL on CQM and PFM, the cooler is recycled using an interactive TCL procedure which requires manual intervention. During IMT it is envisaged that an automatic TCL procedure will be available for recycling. This procedure should still be performed interactively for the first few times time to get estimates on the time scales involved for recycling in this new cryostat environment.

During other test campaigns, overnight running will be required. Essentially any time we require stable thermal conditions. Specifically during cooler hold time tests.

SPIRE will provide a list of housekeeping parameters with associated hard and soft limits. The spacecraft could then execute a specific script if the instrument exceeds one or both of these limits. However, on the CQM, it is not advisable to switch SPIRE off other than using the prescribed power off sequence. This is because the non flight like power supply can expose the JFETs to power spikes on switch off, which could be damaging, hence the need for the switch box. Because of this the SPIRE team do not wish to use an automatic power down sequence in case of any alarm going out of limits. SPIRE accepts the risk associate with this scenario, as the risk to power down is likely to be greater.

There is a current limit built into the DRCU power supply, so in the event of excess current being consumed by the DRCU, power would be removed from the unit.

SPIRE support.

During the cooler recycling, support from the SPIRE team will be provided.
SPIRE will accept the risk to the instrument when powered on and not attended.