Radiation Hard Fibre Specifications

Introduction
The fibre should be a step-index multi-mode (SIMM) fibre.

Composition: The fibre should be made from a pure Silica core with a refractive index depressed Fluorine doped region. The outer jacket should not contain halogens or PVC.

Size: The fibre size should be as given in Table 1 below. The numerical aperture should be 0.2 +/- 0.02

Table 1 Fibre size

Diameter (μm)	Structure
50 +/- 3	Pure Silica core
60	Fluorine doped depressed refractive index cladding
125 +/- 3	Pure Silica Cladding
250 +/- 15	Outer protective jacket

Ribbonization: The fibres should be made into 12 way ribbon fibre. This should be suitable for subsequent termination with MT12 connectors. It should be possible to reduce a 1 metre length of the ribbon fibre back to individual fibres.

Transmission: The transmission for un-irradiated fibre should be better than 15 dB/km at a wavelength of 850 nm.

Bend Radius: The minimum bend radius for the single fibres should be better than 20mm with a loss per turn of less than 0.25 dB.

Proof Test: The fibre should survive a proof test of 1% (strain on fibre during test).

Radiation Hardness: The fibre should satisfy the following requirements:
Neutron irradiation: loss of less than 1 (5) dB for a 10 metre length of fibre for a 1 MeV neutron exposure of 2 10^{14} n/cm^2 (10^{15} n/m^2).

Gamma irradiation: loss of less than 1 dB for a 10 metre length of fibre exposed to a gamma source with a dose of 10 MRad. Loss of less than 1 dB/metre for a dose of 30 MRad.

Radiation hardness testing: The testing will be performed by ATLAS on single fibres from each preform before ribbonization. The test would involve n and gamma irradiations of 10m samples of fibre to the relevant doses for the SCT (2 10^{14} n/cm^2 and 10 MRad) and the Pixel detectors (10^{15} n/m^2 and 30 MRad).

Quantity of fibre:
Prices are also requested for either
(a) 10 km 12 way ribbon fibre plus 70 km of single (unribbonized) fibre.
(b) 119 km 12 way ribbon fibre plus 70 km of single (unribbonized) fibre.