BPM Layout for Sector Test
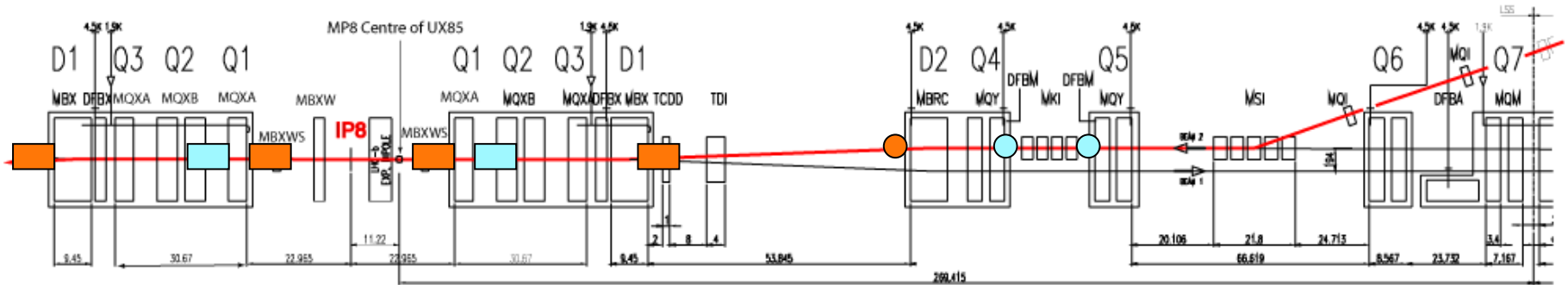

- ## Number of BPMs
  - TOTAL of 69 dual plane BPMs - 29 in 7R, 34 in 8L & 6 in 8R

- ## All cold BPMs installed or ready for installation
  - BPMS in first Q2 installed
  - BPMY in first Q4 & Q5 installed
  - All material for Arc BPMs available & installed on all SSS in tunnel

- ## Warm BPMs & supports
  - BPMs Under manufacture at Novosibirsk
 - Supports being manufactured in Europe

BPM Types in LSS8

Location	Assy name	BPM Type - on Beam - External	Internal	Beam Screen - Material	ID [mm]	Cooling Method	C. Bore Temp.
Q11L	MQ	BPM__.11L8.B1	BPM__.11L8.B2		44.4		1.9
Q10L	MQML	BPM__.10L8.B1	BPM__.10L8.B2		44.4		1.9
Q9L	MQMC	BPM__.9L8.B1	BPM__.9L8.B2		44.4		1.9
Q8L	MQM	BPM__.8L8.B1	BPM__.8L8.B2		44.4		1.9
Q7L	MQM	BPM__.7L8.B1	BPM__.7L8.B2		44.4		1.9
Q6BL	MQM	BPMR_.6L8.B1	BPM__.6L8.B2		44.4		4.5
Q5L	MQM	BPM__.5L8.B1	BPMR_.5L8.B2		44.4		4.5
		BPTX_.5L8.B1			Warm BPM - no beam screen		
Q4BL	MQY	BPMYB.4L8.B1	BPMYB.4L8.B2		57.9		4.5
D2 L		BPMWB.4L8.B1	BPMWB.4L8.B2		Warm BPM - no beam screen		
D1L		BPMSX.4L8.B1	BPMSX.4L8.B2		Warm BPM - no beam screen		
Q2AL	MQXB	BPMS_.2L8.B1	BPMS_.2L8.B2				1.9
Q1L	MQXA	BPMSW.1L8.B1	BPMSW.1L8.B2		Warm BPM - no beam screen		
Q1R	MQXA	BPMSW.1R8.B2	BPMSW.1R8.B1		Warm BPM - no beam screen		
Q2AR	MQXB	BPMS_.2R8.B2	BPMS_.2R8.B1				1.9
D1R		BPMSX.4R8.B2	BPMSX.4R8.B1		Warm BPM - no beam screen		
D2R		BPMWB.4R8.B2	BPMWB.4R8.B1		Warm BPM - no beam screen		
Q4BR	MQY	BPMYB.4R8.B2	BPMYB.4R8.B1		57.9		4.5
		BPTX_.5R8.B2			Warm BPM - no beam screen		
Q5BR	MQY	BPMYB.5R8.B2	BPMYB.5R8.B1		57.9		4.5
Q6AR	MQM	BPMR_.6R8.B2	BPM__.6R8.B1		44.4		4.5
Q7AR	LQNFE	BPM_A.7R8.B2	BPM_A.7R8.B1		44.4		1.9
Q8R	LQNCB	BPM__.8R8.B2	BPM__.8R8.B1		44.4		1.9
Q9R	LQNJB	BPM__.9R8.B2	BPM__.9R8.B1		44.4		1.9
Q10R	LQNCB	BPM__.10R8.B2	BPM__.10R8.B1		44.4		1.9
Q11R	LQTCC	BPM__.11R8.B2	BPM__.11R8.B1		44.4		1.9

Not used for orbit measurement – reserved for experiment timing

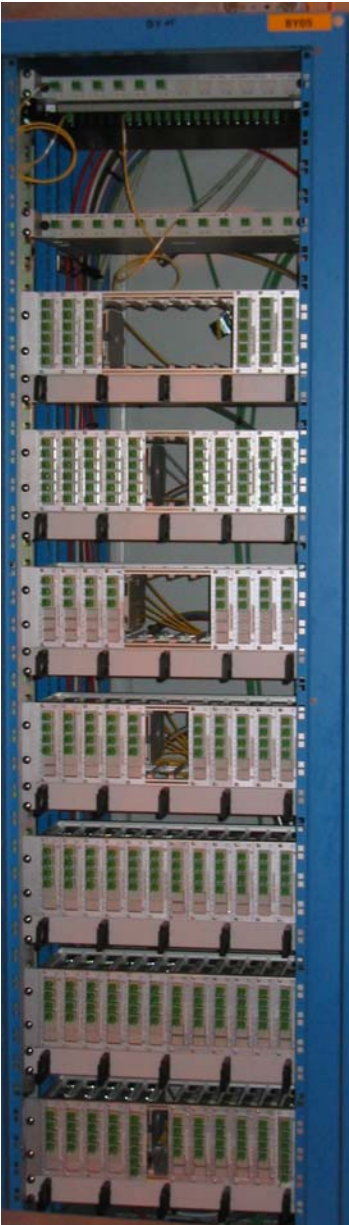# Fibre-Optic Cabling Schematic for Point 8

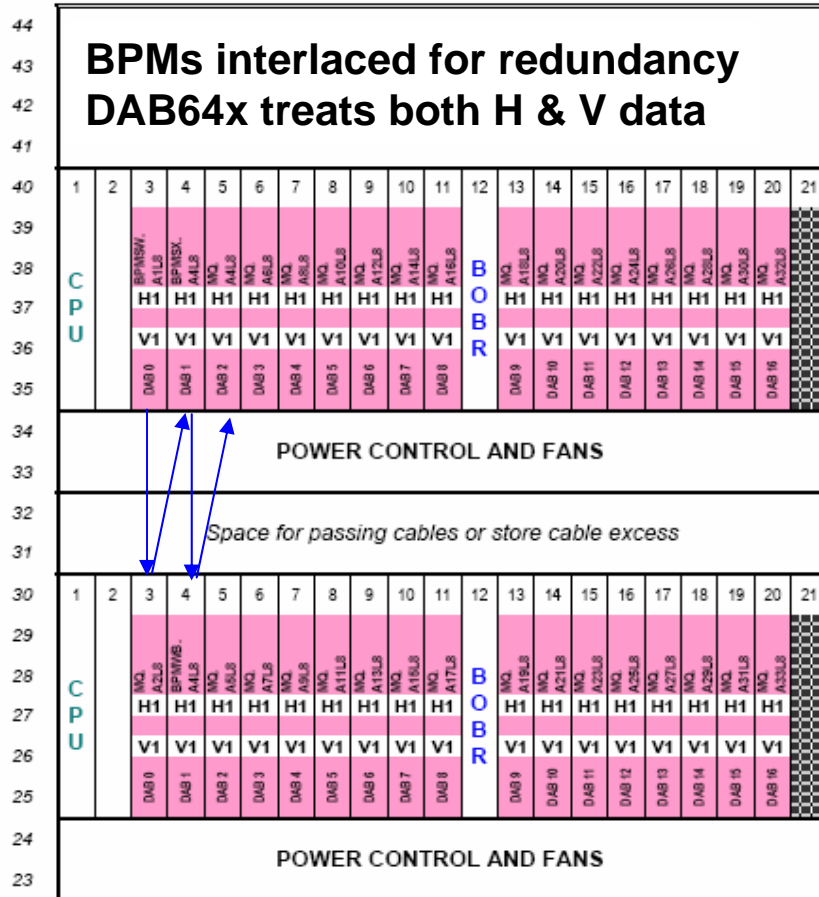Octant 8
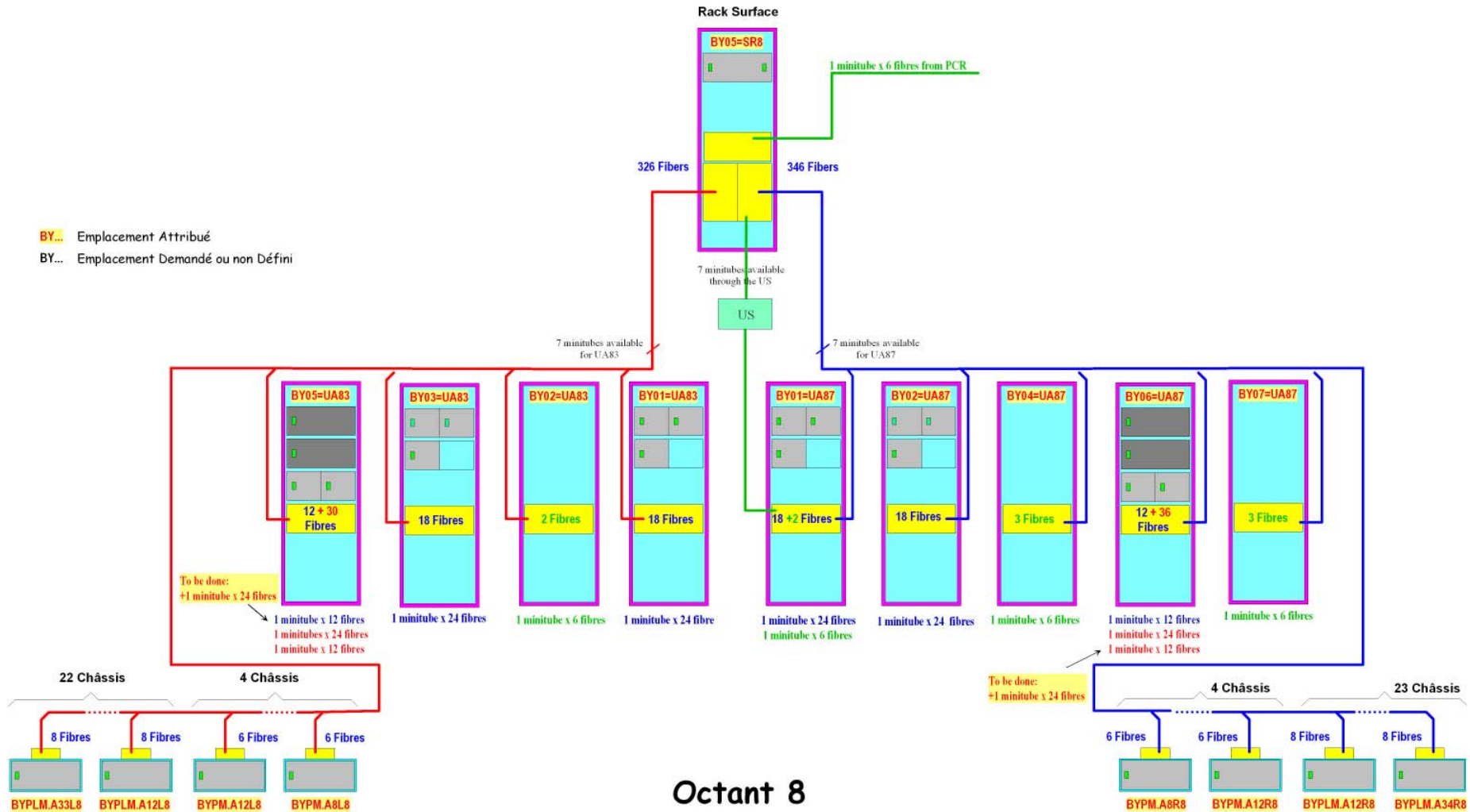
BPM/BLM Mini-Rack Location in the Arcs
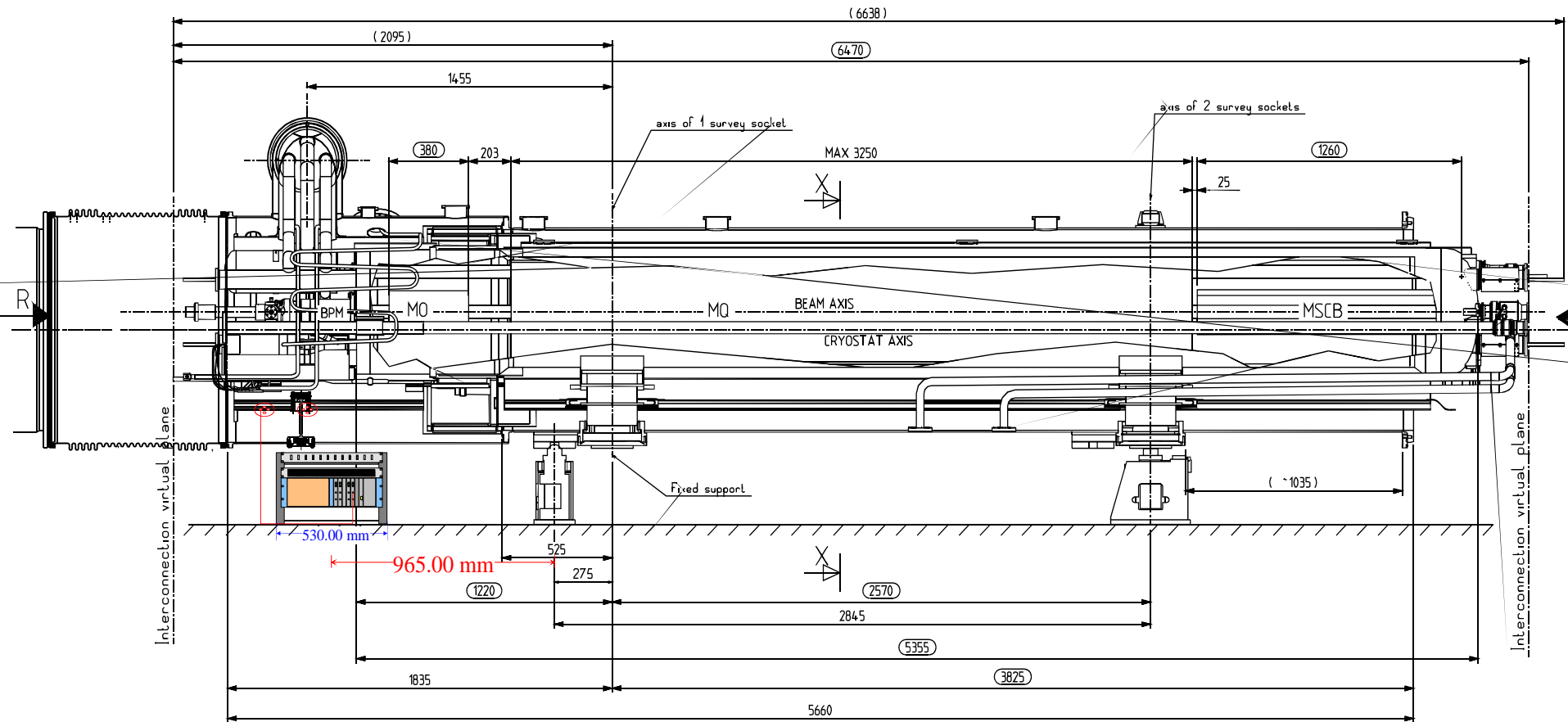
2 plane measurement on each BPM
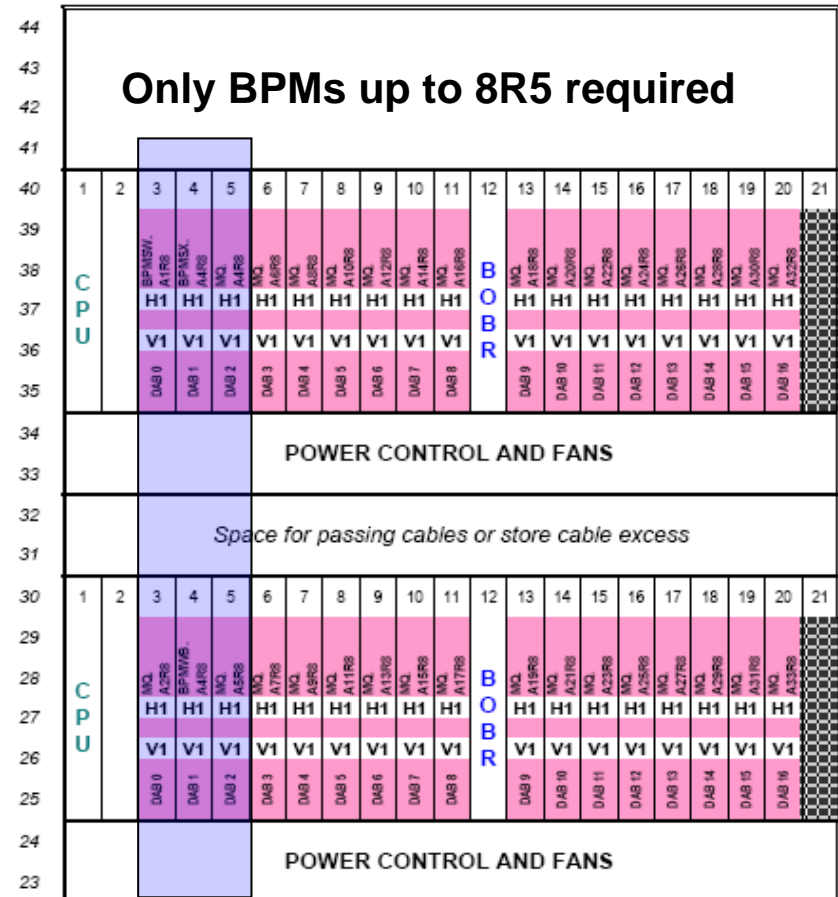
Fibre-Optic Rack Layout in SR8

VME Chassis Rack Layout in SR8

- ## Total of 6 VME crates
  - 4 in SR8 (40 BPMs) & 2 in SR7 (29 BPMs)

System Element Availability

- **BPMs**
  - All foreseen to be installed

- **Mini-racks**
  - ready for installation after interconnect closure

- **Fibre-optics**
  - All in place, tunnel termination once mini-rack installed

- **Analogue Electronics**
  - Production run to start by end of 2005
  - Test bench being finalised for reception testing

- **Digital Electronics**
  - DAB64x production to start by end of 2005

- **Hardware commissioning**
  - SR8 installation to be tested May 2006 (requires WORLDFIP)
    - Complete chain tested with front-ends in calibration mode
  - SR7 installation to follow

Sector Test Functionality

- **Accuracy & Resolution**
  - As for TI8 test.
  - Nominal noise performance obtained with > ~2e10 cpb
  - More bunches gives better resolution through averaging

- **Acquisition mode**
  - New DAB64x will be implemented with auto-triggered FIFO mode.
    - Registers whatever passes after a given external trigger
    - Should allow "first time" measurement on all BPMs
    - No timing-in required
    - Loss of bunch to bunch tagging, i.e. missing bunches etc. not distinguishable – bunch to bunch measurement still available.
    - Can also be used in TI8
  - Using this mode should allow timing-in to be performed without perturbing average trajectory measurement

Sector Test Functionality

- **Control System Architecture**
  - Do we extend the TI8 system or base it on a prototype LHC system?
  - Data from Survey & MTF databases need to be available for offset & linearity correction
  - SPS BST used for timing & trigger

- **Debugging the system**
  - BPM location & polarity checks.
    - Jorg?
  - What is Logged?
    - Average position
    - Bunch to bunch position?

Accuracy & Resolution (Arc BPMs)

Bunch Type	*Pilot Bunch*		*Bunches of Nominal Intensity*		
Mode of Operation	**Trajectory** (single shot)	**Orbit** (224 turn average)	**Trajectory** (single shot, single bunch)	**Trajectory** (single shot, average of all bunches)	**Orbit** (average of all bunches over 224 turns)
ELECTRONICS **Resolution (rms)**	200μm	20μm	50μm	5μm	5μm
Accuracy (rms)	150μm				
MECHANICAL **Alignment Error (rms)**	200μm				
Residual after k-modulation (rms)	<50μm				