

LHC RF Meeting 30th April 2004

Present: Luca Arnaudon, Olivier Brunner, Andy Butterworth, Edmond Ciapala, Wolfgang Hofle, Trevor Linnecar, Pierre Maesen, Joachim Tückmantel.

1) Indexing and exchange rates (Wolfgang)

- Yearly indexing for CERN's income depends on recent years' previous exchange rates (influenced mainly by the Euro) and on expenditure category (63 % of LHC is classed as investment). Since the indexing is in turn applied globally to the LHC CtoC, individual systems may at the end 'gain' or 'lose' with respect to their own initial CtoC, depending on the timing of purchase of major items, CERN wide.

2) Market Surveys

- Flexwell cables:** (Wolfgang) Documents for the Market Survey were presented to the Specification Committee of 29th April. The survey will be done, instead of taking results from a previous survey for coaxial cables. Long cables will be ordered to the required lengths; these are now better defined from J-C Perrier's study of the routing. Shorter cables could be cut from standard drums. The overall estimated length has increased from 75 km to 90 km. A close scrutiny of the cables, their routing and overall length will now be done with J-C Perrier; this will include the specification of which cables need to be phase compensated (twice the cost) and seeing if some standardization is possible to reduce the numbers of different types and the overall cost. A final list will then be made and circulated.

(Action: Philippe, Wolfgang and Jean-Claude)

- ➡ The aim is to have the specification approved in June, for Finance Committee approval in November or December.

- Faraday Cages:** (Philippe) This was also discussed at the Specification Committee, and the MS will be sent out next week. Specification of the installation date is difficult, until the schedule and planning are approved. This should be better known by the time we have to prepare the specification (in two months). The installation scenarios and planning will be reviewed at the same time.

3) ADT (Wolfgang)

- Kicker Fabrication:** Analysis at CERN has confirmed problems with CERN supplied steel (surface layer of organic material). Cleaning procedures are being studied. The factory is considering machining flanges from solid steel, rather than using CERN prefabricated flanges. The use of local steel would need CERN approval.

- Drive Amplifiers:** The prototype has been returned, tested successfully and re-delivered to us. The other (supplier's own) prototype is being returned. Production and test of 3 "head of series" amplifiers is ongoing. Testing of a pair of amplifiers in SPS will be done later in the year. The controls interface should be checked.

(Action: Luca and Frode)

- Feedthroughs:** J-F Malo is following up modifications with the supplier, together with L. Ducimetiere and N. Garrel (AB-BT)

4) Commissioning (Olivier)

- A draft planning of commissioning of the ACS system was presented for discussion. The extent to which certain activities might be done in parallel needs some further analysis. This brings general concern about available manpower, in all sections. Obtaining help from other section members, normally involved in other activities, is an option which has to be explored. The planning will be discussed in a dedicated meeting to be organized by Olivier. An updated draft will be circulated beforehand.

(Action: Olivier)

5) SM18 Planning (Pierre)

- Module 2 will shortly go into the bunker for thermal cycling, after bunker door and waveguide modifications. The planning shows this cycling continuing into the end of June. The need to test LLRF electronics is becoming urgent and Philippe would like to do tests (cables, calibrations, RF

front-end and possibly feedback modules) already in June. This would mean putting the already power tested module (module 3) back in the bunker, as the next module (module 1) will not be ready till July. It was agreed that module 2 should in any case go in for cycling and every effort made to complete it as quickly as possible. The situation will be reviewed on a weekly basis. The planned equipping of bunker 2 has been delayed, but it remains a priority and the aim now would now be to install minimum controls and equipment, i.e. just that needed for thermal cycling.

6) SA2 - LHC Klystron Installation (Luca)

- Most of the cabling has been completed, apart from some RF cables. The HV interlocks cabling needed significant modification and the interlocks are now being tested. RF detectors and klystron DCCTs still have to be calibrated. Power tests should start next week.

7) ACS Coupler Production (Ed on info from Eric)

- There is a slight delay on two couplers presently being assembled (109 and 110), the brazed polarization ceramics only being available now in the coming week. This does not affect the planning; SA2 is the critical element at the moment.

8) Klystron acceptance (Olivier)

- Klystron 9 has a blockage in the water cooling circuits, near the first cavity. All attempts to unblock it have failed so far. It will probably have to be returned to Thales.

9) EMC Meeting with PO on Friday 23rd (All)

- G. Fernquist (AB-PO) demonstrated and explained the precautions needed for EMC in the LHC power converters where equipment for very sensitive current measurements (a few μV) is situated near large power installations. Some points noted:

- Common grounding – copper grids (even on floor girders) and copper sheets
- Isolation not an option (for Power Converter systems) due to linearity and precision requirements
- No star point earthing. (Bad for HF)
- Conductive surfaces on crates, rack doors, no paint
- Connection of racks to ground, no paint
- Special RF-tight racks, finger contacts on doors
- Special ventilation units on rear of racks, linear control of cooling circuits (no ON/OFF switching or relays)
- Handling of commercial instruments in insulated cases.
- Consultant: Idea to invite one (e.g. A. Charroy - contact via F. Bordry) to check and advise on a proposed installation.
- Recommended book: "[Noise Reduction Techniques in Electronic Systems](#)" by Henry Ott.

10) Equipment naming (Ed)

- We are waiting on feedback from CO, OP and naming responsables on the RF equipment naming proposal, and on the choice of 'operations' names. Layout drawing LHCLJ4GA0007, showing names, is now in CDD.

11) AoB

- **LLRF** (Philippe) Measures may have to be looked at to eliminate spurious signals at around 500 MHz, resulting from oscillator and mixer products which couple via Module on-board power lines.

Next Meeting: Friday 7th May 2004 at 08:45 in the JB Adams Room 864-2-B14.

E. Ciapala, 3rd May 2004.

This version (ADT corrections) 10th May 2004 ec/wh