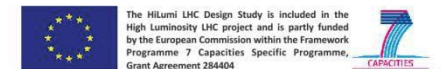


Electrical Engineering Standards Conclusion Session

JC. Gascon
O. Tison



HL-LHC Standards and Best Practices
Workshop (11-13 June 2014)



Introduction

- 2 sessions, 5 participants each one
- Electrical engineering is strongly ruled but involves several diverse fields (semiconductors, superconductive materials, electrical insulation, power converters, power networks, electronics,...)
- Work packages attending the workshop not much impacted by electrical standards
- At this stage, few electrical may be discussed (cables, EMC, connectors and magnets)
- Excellent participation and constructive discussions among the participants

Discussed Topics (I)

- Magnet Testing procedures for electrical insulation acceptance
 - Voltage ratings
 - Tests conditions (helium, room temperature)
 - Ground references for voltages
 - All Circuits tested at once or separately?
 - Special requirements as part of a system?

- Electromagnetic Compatibility (EMC)
 - EMC standards (IEC-61000) should be accepted by all parties
 - According to the grounding/reference scheme, sensors technology differs
 - Beam emissions are not covered by EMC standards
 - Need to define beam emission and immunity levels for the whole project?



Discussed Topics (II)

- Cables and wiring
 - IS23 safety requirements
 - IEEE cable standards in US
 - Definition of Radiation requirements
- Connectors
 - Some convenient materials in connectors (Teflon) not allowed at CERN
 - Connectors “catalog” is required for project? Use Project connectors
 - From the operation and maintenance side, connector standardization preferred but... technically speaking appropriated?
- Soldering
 - Some requirements? Not considered in any standard
 - Tin-Lead technic is commonly used but other technics allowed? Standards?



Conclusions

- ✓ Electrical tests requirements should be established in the technical specifications particularly for the magnet insulation tests.
- ✓ Guidelines are requested at project level for
 - electrical magnet testing
 - signals wiring convention (grounding) and junction best practices
 - EMC Beam emissions: not covered by EMC standards
- ✓ Connectors standardization may be convenient for the project
- ✓ More electrical issues will come later with electrical systems to be designed in WPs

Thank you for your attention and
collaboration!!!!

Questions?

