



Radiation Working Group report :  
RWG n°23 – ESTEC - 13/14<sup>th</sup> of June, 2018



DEFENCE AND SPACE

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- 14<sup>th</sup> of June, 2018

**AIRBUS**



## At the agenda of the RWG n°23

- **Displacement Damage specification** [CP]
- **SHE on SDRAM / status vs ECSS** [RM/CP]
- **CERN & FAIR collaboration agreements and activities** [ED/VFC]
- **Radiation belt models** [ED]
- **Radiation summer school** [VFC]
- **SET template**
  - **for optocouplers** [CP]
  - **For analog devices** [TC]
- **SEE on diodes, latest status** [CP]
- **HCMOS tested as per MIL** [GC]
- **GaAs and SEE testing** [RM/MGP]
- **LDR on III-V devices** [RM]
- **Maximum fluence to reach for SEE testing** [TC]



## RWG report to CTB – 1/4

- **Review of the Displacement Damage draft specification**
  - It is agreed by the RWG (pending CTB position) that the specification will be written as a guideline (e.g. ESCC 25100-like).
  - Writing and review completed.
  - **Action TN/CP: to perform final update of the specification and to send it for final review to RWG members**
- **SHE on SDRAM / status vs ESCC 25100**
  - Some in orbit events due to stuck bits recorded by ESA
  - Need to characterize at ground level w.r.t. this kind of SEE
    - The first recommendation would be to widely advertise about this effect (design, radiation engineering).
  - **There is a strong need to investigate further in this area (R&D), in particular for DDR products**
    - **3D+ is highly interested to support.**
  - **As of today, RWG does not recommend to update ESCC 25100**



## RWG report to CTB – 2/4

- **CERN & FAIR collaboration agreements and activities**
  - Interest from RWG participant for high energy HI beam (already expressed during RWG n°22)
  - RWG to write a support letter to FAIR
- **Radiation belt models**
  - Feedback from ECSS-E-ST-10-04C: ECSS not the proper forum to discuss about “too recent” models
  - To organize a meeting at RADECS with US people in order to initiate discussion about IRENE (AE9/AP9)
  - Need to define upfront the requirements for radiation environment standard
    - Set up of a working group, RM to initiate the process
    - Starting point is about industrial needs definition.
    - Action RM to provide a cost estimate of what is needed to initiate this first step.

## RWG report to CTB – 3/4

- **SET template**

- Optocouplers

- RWG members think that templates for optocouplers shall be split in (at least) two categories.
- This would need to be considered in the next update of ECSS-Q-ST-60-15C (RHA)

- Analog devices

- Next RWG, action for the RWG attendees to provide examples of SET which apparently defeat the template (if any) and to provide more insight on how the designers takes this into consideration.

- **HCMOS from STM tested as per MIL**

- Nonconformance procedure regarding TID test on this old family qualified internally at STM, then, in the frame of the ESCC system. At that time, the non-compliance to ESCC 22900 was accepted.
- STM asks for RWG status about applying annealing sequence as per MIL system for this family
- RWG technically approves the proposal of STM to deviate from ESCC 22900 specification for the HCMOS family since it does not represent a technical risk (it is still following the MIL standard).



## RWG report to CTB – 4/4

- **LDR on III-V devices**

- RWG attendees are in general not aware of this potential issue, the general statement in this area is that such devices are generally quite tolerant to TID.
- General action to RWG members to implement a survey within each individual network/bibliography about the topic and report back at the next RWG

- **Maximum fluence to reach for SEE**

- SEE proton test as specified in ESCC 25100: highest fluence to reach is  $1E11$  #/cm<sup>2</sup>. this may not cover reliability requirements.
- RWG statement is that the proton SEE test shall be performed up to this minimum fluence of  $1E11$ , and that the device shall meet the reliability requirement of the considered application/system.
  - This may trigger the need to reach larger fluence values (through increase of fluence on individual devices (pending TID issues) or sample size)

- **Next RWG scheduled the 3<sup>rd</sup>/4<sup>th</sup> of December, 2018, hosted by STM in Montrouge (France)**