

FIRST/PLANK - EMC & POWER QUESTIONNAIRE FOR PAYLOADS

PAYLOAD NAME:

REFERENCE PERSON:

1. Power Interface Requirement

Please describe the expected power interface of the experiment with the satellite bus through a table, (see example below) specifying the name and type of power line required and, possibly, the LCL class associated to them.

Example:

Function	Number of main lines required	Number of redundant lines required	LCL class eg 1,2,4,7A
+ 28 V primary power	1	1	(109W/4A Trip-off limit)
+28 V primary power (heaters)	1	1	(28W/1A Trip-off limit)
Keep alive supply 7 – 9V	0	0	1W max per line

Note

The inrush current of the instrument should be limited to <1.5 times the LCL peak value and of duration < 0.5 msec. The rate of change of the inrush current shall not exceed 1A/micro sec

2. Instrument Power Distribution Block Diagram and Redundancy Approach

Please describe the expected instrument internal power distribution block diagram and the redundancy concept within the instrument.

3. Instrument Power Requirements

Please provide the preliminary power requirements for the instrument for each operational mode specifying the power through a table or, if necessary through a current versus time diagram.

Example:

Experiment interface	Operational mode Average Power	Peak Power and duration
+28 Pr. Power		

Furthermore, state whether DC/DC converter synchronisation is required and, in the affirmative case, provide the relevant rationale.

4. Instrument Grounding Diagram

Please describe with suitable drawings the grounding diagram that you expect to implement in your experiment, including the grounding of the harness shielding.

5. Interconnecting Harness Block Diagram

Please describe the interconnecting harness block diagram within the instrument's subsystems, specifying the expected length and the type of the signals.

6. Instrument Susceptibilities

Please specify the frequencies and the levels for which you expect your instrument, or its parts/components, to be susceptible (Voltage and Current ripple, Electric Fields, Magnetic Fields, etc.).

7. Instrument Emissions

Please specify the frequencies and the levels you expect your instrument will emit (Voltage and Current ripple, Electric Fields, Magnetic Fields, etc.).

8. Instrument Frequency Plan

Please establish a frequency plan for your instrument assembly, including switching frequencies of power supplies, clocks, IF amplifiers etc. Information on pulse width, amplitude, rise and fall times of clocks are highly desirable.

9. Detailed questions on EMC

- A) Does your instrument require electrostatic or magneto-static cleanliness at spacecraft level?
- B) What is the topology of the electronic interfaces you are considering in the instrument design? (E.g. single ended-differential, balanced-differential, etc.). If available, please give an interface circuit diagram.
- C) Do you believe your experiment be compliant to the ISO EMC requirements, which are presently assumed as a reference? Please try to establish a compliance matrix with the ISO EMC requirements.
- D) Do you expect your experiment be vulnerable to Electrostatic Discharge (say 10 kV, 5.6 mJ)?
- E) Do you believe it is mandatory to use a static screen for the converters' transformers in order to minimise the winding capacitance and enhance AC de-coupling between primary and secondary power?
- F) Do you expect your experiment be vulnerable to voltage common mode transients? Which peak value and time characteristics?
- G) What is the EMC verification concept you plan to implement in the development phases of your instrument?

H) What are the major concerns of your instrument from the EMC discipline point of view?