

This document contains the list of questions that compose the PUS-based checklist of the benchmark to be applied to software requirement specifications that describe the telecommand verification service of software implementing the packet utilization standard – PUS.

This document uses the following abbreviations:

- ID	Identifier
- APID	Application Process ID
- PEC	Packet Error Control
- TVSS	Telecommand Verification Service Specification
- CPDU	Command Pulse Distribution Unit
- CCSDS	Consultative Committee for Space Data Systems
- TC	Telecommand

Checklist questions

1. Does the TVSS state that the Telecommand Verification Service Type is 1?
2. Questions about the acceptance of the telecommands by the destination application process.
 - 2.1 Does the TVSS state that this service shall check whether the APID corresponds to a valid on-board application process?
 - 2.2 Does the TVSS state that this service shall verify the integrity of the complete telecommand packet by checking the Packet Error Control field (according to the type of PEC)?
3. Questions about the start execution of the telecommand.
 - 3.1 Does the TVSS state that this service shall check whether the version number of the telecommand is 0?
 - 3.2 Does the TVSS state that this service shall check whether the value of the Data Field Header Flag field is compatible with the APID field? (I.e. it is set to 0 for CPDU telecommands and set to 1 for any other telecommands).

- 3.3 Does the TVSS state that this service shall check whether the Sequence Flag field is coherent with the current state of this service, according to the interpretation of the sequence flags, as follows?
- 01 – used to represent the first packet of a sequence of packets
 - 00 – used to represent a continuation packet
 - 10 – used to represent a last packet of a sequence of packets
 - 11 – used to represent a “stand-alone” packet
- 3.4 Does the TVSS state that this service shall check whether the Sequence Count field is coherent concerning each Sequence Flag and APID currently handled by this service?
- 3.5 Does the TVSS state that this service shall check whether the Packet Length field value is at least 16 octets and at most 65535 octets?
- 3.6 Questions about the checking of the Data Field Header. (Applicable only when the Data Field Header Flag field is set to 1)
- 3.6.1 Does the TVSS state that this service shall check whether the CCSDS Secondary Header Flag field is set to 0?
- 3.6.2 Does the TVSS state that this service shall check whether the TC Packet PUS Version Number field is set to 1?
- 3.6.3 Does the TVSS state that this service shall check whether the Service Type corresponds to a valid service?
- 3.6.4 Does the TVSS state that this service shall check whether the Service Subtype corresponds to a valid service according to the specified Service Type?
- 3.6.5 If it is applicable to the mission, does the TVSS state that this service shall check whether the Source ID field corresponds to a valid source of the telecommand packet?
- 3.6.6 Does the TVSS state that this service shall consider the padding bits in the Spare field in order to complete an integral number of words (according to the processor architecture) in the Data Field Header before start reading the Application Data field?
- 3.6.7 Does the TVSS state that this service shall check whether all of the bits of the Spare field are set to 0?
- 3.7 Does the TVSS state that this service shall check the Application Data field data according to the service request from the service user?

- 3.8 Does the TVSS state that this service shall consider the padding bits in the Spare field in order to complete an integral number of words (according to the processor architecture) in the overall packet size before start reading the Packet Error Control field?
4. Does the TVSS state that this service shall generate a report if a telecommand fails at any of its identified stages of execution?
 5. Does the TVSS state that this service shall generate a report of acknowledge acceptance of the packet by the application process if the bit 3 of the Ack field is set to 1?
 6. Does the TVSS state that this service shall generate a report of acknowledge start of execution of the telecommand if the bit 2 of the Ack field is set to 1?
 7. Does the TVSS state that this service shall generate a report of acknowledge progress of execution of the telecommand if the bit 1 of the Ack field is set to 1?
 8. Does the TVSS state that this service shall generate a report of acknowledge completion of execution of the telecommand if the bit 0 of the Ack field is set to 1?
 9. Does the TVSS state that the report of successful telecommand acceptance shall have the subtype 1?
 10. Does the TVSS state that the first field of the Source Data field of the successful acceptance report shall be the Telecommand Packet ID?
 11. Does the TVSS state that the first field of the Source Data field of the successful acceptance report shall have 2 octets?
 12. Does the TVSS state that the second field of the Source Data field of the successful acceptance report shall be the Packet Sequence Control?
 13. Does the TVSS state that the second field of the Source Data field of the successful acceptance report shall have 2 octets?
 14. Does the TVSS state that the report of failure telecommand acceptance shall have the subtype 2?
 15. Does the TVSS state that the first field of the Source Data field of the failure acceptance report shall be the Telecommand Packet ID?
 16. Does the TVSS state that the first field of the Source Data field of the failure acceptance report shall have 2 octets?

17. Does the TVSS state that the second field of the Source Data field of the failure acceptance report shall be the Packet Sequence Control?
18. Does the TVSS state that the second field of the Source Data field of the failure acceptance report shall have 2 octets?
19. Does the TVSS state that the third field of the Source Data field of the failure acceptance report shall be the code of the failure?
20. Does the TVSS state that the third field of the Source Data field of the failure acceptance report shall be of the type enumerated?
21. Does the TVSS state that the code 0 of the failure acceptance report means illegal APID (PAC error)?
22. Does the TVSS state that the code 1 of the failure acceptance report means incomplete or invalid length packet?
23. Does the TVSS state that the code 2 of the failure acceptance report means incorrect checksum?
24. Does the TVSS state that the code 3 of the failure acceptance report means illegal packet type?
25. Does the TVSS state that the code 4 of the failure acceptance report means illegal packet subtype?
26. Does the TVSS state that the code 5 of the failure acceptance report means illegal or inconsistent application data?
27. If there are any other values to the codes than the ones described in the questions 21 to 26, are their values different from the ones described in these previous questions?
28. If there are any other values to the codes than the ones described in the questions 21 to 26, does the TVSS describe the meanings of these values?
29. If there are any other values to the codes than the ones described in the questions 21 to 26, are their meanings different from these ones?
30. If the fourth field of the Source Data field of the failure acceptance report exists, does the TVSS state that this is the Parameters field?
31. If the parameters field of the Source Data field of the failure acceptance report exists, does the TVSS state that this Parameters field shall conform to the structure rules set #1, described in the clause 23.6.2 of the PUS standard?

32. If the parameters field of the Source Data field of the failure acceptance report exists, does the TVSS state that each parameter of this field shall have one of the data types defined in the clause 23 of the PUS standard?
33. Does the TVSS state that the report of successful telecommand execution start shall have the subtype 3?
34. Does the TVSS state that the first field of the Source Data field of the successful telecommand execution start report shall be the Telecommand Packet ID?
35. Does the TVSS state that the first field of the Source Data field of the successful telecommand execution start report shall have 2 octets?
36. Does the TVSS state that the second field of the Source Data field of the successful telecommand execution start report shall be the Packet Sequence Control?
37. Does the TVSS state that the second field of the Source Data field of the successful telecommand execution start report shall have 2 octets?
38. Does the TVSS state that the report of failure telecommand execution start shall have the subtype 4?
39. Does the TVSS state that the first field of the Source Data field of the failure telecommand execution start report shall be the Telecommand Packet ID?
40. Does the TVSS state that the first field of the Source Data field of the failure telecommand execution start report shall have 2 octets?
41. Does the TVSS state that the second field of the Source Data field of the failure telecommand execution start report shall be the Packet Sequence Control?
42. Does the TVSS state that the second field of the Source Data field of the failure telecommand execution start report shall have 2 octets?
43. If the third field of the Source Data field of the failure telecommand execution start report exists, does the TVSS state that it shall be the Code of the failure?
44. If the third field of the Source Data field of the failure telecommand execution start report exists, does the TVSS state that it shall be of the type enumerated?
45. If the fourth field of the Source Data field of the failure telecommand execution start report exists, does the TVSS state that it shall be the Parameters of the failure?

46. Does the TVSS state that the report of successful telecommand execution progress shall have the subtype 5?
47. Does the TVSS state that the first field of the Source Data field of the successful telecommand progress report shall be the Telecommand Packet ID?
48. Does the TVSS state that the first field of the Source Data field of the successful telecommand progress report shall have 2 octets?
49. Does the TVSS state that the second field of the Source Data field of the successful telecommand progress report shall be the Packet Sequence Control?
50. Does the TVSS state that the second field of the Source Data field of the successful telecommand progress report shall have 2 octets?
51. Does the TVSS state that the third field of the Source Data field of the successful telecommand progress report shall be the Step Number?
52. Does the TVSS state that the third field of the Source Data field of the successful telecommand progress report shall be of the type enumerated?
53. Does the TVSS state that the Step Number field of the successful telecommand progress report shall represent the intermediate step number whose execution has been completed?
54. Does the TVSS state that the report of failure telecommand execution progress shall have the subtype 6?
55. Does the TVSS state that the first field of the Source Data field of the failure telecommand execution progress report shall be the Telecommand Packet ID?
56. Does the TVSS state that the first field of the Source Data field of the failure telecommand execution progress report shall have 2 octets?
57. Does the TVSS state that the second field of the Source Data field of the failure telecommand execution progress report shall be the Packet Sequence Control?
58. Does the TVSS state that the second field of the Source Data field of the failure telecommand execution progress report shall have 2 octets?
59. Does the TVSS state that the third field of the Source Data field of the failure telecommand execution progress report shall be the Step Number?

60. Does the TVSS state that the third field of the Source Data field of the failure telecommand execution progress report shall be of the type enumerated?
61. If the fourth field of the Source Data field of the failure telecommand execution progress report exists, does the TVSS state that this field shall be the Code of the failure?
62. If the fourth field of the Source Data field of the failure telecommand execution progress report exists, does the TVSS state that it shall be of the type enumerated?
63. If the fifth field of the Source Data field of the failure telecommand execution progress report exists, does the TVSS state that it shall be parameters of the failure?
64. Does the TVSS state that the report of successful telecommand execution completed shall have the subtype 7?
65. Does the TVSS state that the first field of the Source Data field of the successful telecommand execution completed report shall be the Telecommand Packet ID?
66. Does the TVSS state that the first field of the Source Data field of the successful telecommand execution completed report shall have 2 octets?
67. Does the TVSS state that the second field of the Source Data field of the successful telecommand execution completed report shall be the Packet Sequence Control?
68. Does the TVSS state that the second field of the Source Data field of the successful telecommand execution completed report shall have 2 octets?
69. Does the TVSS state that the report of failure telecommand execution completed shall have the subtype 8?
70. Does the TVSS state that the first field of the Source Data field of the failure telecommand execution completed report shall be the Telecommand Packet ID?
71. Does the TVSS state that the first field of the Source Data field of the failure telecommand execution completed report shall have 2 octets?
72. Does the TVSS state that the second field of the Source Data field of the failure telecommand execution completed report shall be the Packet Sequence Control?

73. Does the TVSS state that the second field of the Source Data field of the failure telecommand execution completed report shall have 2 octets?
74. If the third field of the Source Data field of the failure telecommand execution completed report exists, does the TVSS state that this field shall be the Code of the failure?
75. If the third field of the Source Data field of the failure telecommand execution completed report exists, does the TVSS state that this field shall be of the type enumerated?
76. If the fourth field of the Source Data field of the failure telecommand execution completed report exists, does the TVSS state that this field shall be the Parameters of the failure?
77. Does the TVSS cover at least the minimum capability set defined to this service?