CCSDS Order of processing for Telecommand using SDLS[1].docx

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G. Kazz

CCSDS Order of processing for Telecommand using SDLS:

*On the Ground: (sending side)*

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| Virtual Channel Generation Function with SDLS | 232.0-B-3 | 6.4.2.1 |
| * TC Frame Generation Procedure | 232.0-B-3 | 6.4.2.1 (a)  6.4.3 – 6.4.6  6.4.8 – 6.4.9 |
| * + If SDLS used, add Security Header and make provision for optional Security Trailer | 232.0-B-3 | 6.4.7.2 |
| * + SDLS ApplySecurity Function | 232.0-B-3 | 6.4.2.1 (b) |
| * + - Encrypt only the Transfer Frame Data Field | 355.0-B-1 | 4.2.3.3 |
| * + - Populate the optional Security Trailer with the computed MAC\*\* (Authentication only) | 355.0-B-1 | 4.2.3.4 |
| * + Optional: Compute and add CRC-16 to FECF | 232.0-B-3 | 6.4.10 |
| * FOP-1 | 232.0-B-3 | 6.4.2.1 (c) |
| Encode \* | 231.0-B-3 | 3.3  4.3 |
| Randomize\* | 231.0-B-3 | 6.3 |
| Modulate onto Subcarrier/Carrier | 231.0-B-3 | 7 |

Notes: \* Encode then Randomize if LDPC codes used, else if BCH used, randomize then encode.

\*\* MAC (authentication) is computed over Masked TF Header, Complete Security Header, Complete Frame Data Field.

-Space Link –

*On the Spacecraft: (receiving side)*

|  |  |  |
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| Demodulate | 231.0-B-3 | 7 |
| Derandomize\* | 231.0-B-3 | 6.3 |
| Decode\* (BCH or LDPC decoding – see note below for order) | 231.0-B-3 | 3.5  4.5 |
| CRC, FECF | 232.0-B-3 | 4.4.8.3 |
| * FARM-1 | 232.0-B-3 | 6.5.2.1 (a) |
| * SDLS ProcessSecurity Function | 232.0-B-3 | 6.5.2.1 (b) |
| * + Optional: Validate the MAC, if invalid, report security error in Frame Status Report into the OCF in telemetry frame | 355.0-B-1 | 4.2.4.4 |
| * + Decrypt the Transfer Frame Data Field | 355.0-B-1 | 4.2.4.5 |
| * TC All Frames Reception Function | 232.0-B-3 | 6.5.2.1 (c) |
| * + Frame Delimiting and Fill Removal Procedure (invalid code blocks reported by C&S sublayer + fill removal ) | 232.0-B-3 | 4.4.8.2 |
| * + Frame Validation Check Procedure (includes optional CRC-16 check reported by C&S sublayer) | 232.0-B-3 | 4.4.8.3 |
| Transfer Frame provided to on-board processing, if both “TC All Frames Reception Functions” are valid |  |  |

Notes:

\* Derandomize then decode if LDPC codes used; else if BCH used, decode, then derandomize