CCSDS Order of processing for Telecommand using SDLS:

*On the Ground: (sending side)*

Virtual Channel Generation Function with SDLS

TC Frame Generation Procedure

If SDLS used, add Security Header and make provision for optional Security Trailer

Encrypt only the Transfer Frame Data Field

Populate the optional Security Trailer with the computed MAC\*\* (Authentication only)

Optional: Compute and add CRC-16 to FECF

FOP-1

Encode \*

Randomize\*

Modulate onto Subcarrier/Carrier

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)*

Demodulate

Derandomize\*

Decode\* (BCH or LDPC decoding – see note below for order)

FARM-1

Optional: Validate the MAC, if invalid, report security error in Frame Status Report into the OCF in telemetry frame

Decrypt the Transfer Frame Data Field

TC All Frames Reception Function

Frame Delimiting and Fill Removal Procedure (invalid code blocks reported by C&S sublayer + fill removal )

Frame Validation Check Procedure (includes optional CRC-16 check reported by C&S sublayer)

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