

The Consultative Committee for Space Data Systems Recommended Standard CCSDS 431.1-B-1 TECHNICAL CORRIGENDUM 1

Issue Date: April 2022

Variable Coded Modulation Protocol

TECHNICAL CORRIGENDUM 1

The Management Council of the Consultative Committee for Space Data Systems (CCSDS) has authorized the publication of technical corrigendum 1 to CCSDS 431.1-B-1, issued February 2021.

Page D-1, delete

"CADU channel access data unit"

Page 3-7, note under 3.4.2, change

from:

"including CSM and pseudo-randomization"

to:

"including CSM and codeblock pseudo-randomization"

Page 3-6, **3.3.2.4.2**, change

from:

"either H = 26 or H = 90 symbols"

to:

"H = $90 \pi/2$ BPSK symbols comprising a 26-symbol Start of Frame and 64-symbol Physical Layer Signalling (PLS) as specified in section 5 of reference [4], except that the PLS portion may be omitted"

Distribution Control Number: TC 22-09 Reference Number: CCSDS 431.1-B-1 Cor. 1

NOTE - Current versions of CCSDS documents are maintained at the CCSDS Web site:

https://public.ccsds.org/

Correspondence regarding CCSDS documents should be addressed to

CCSDS Secretariat
National Aeronautics and Space Administration
Washington, DC, USA
Email: secretariat@mailman.ccsds.org

TECHNICAL CORRIGENDUM 1 TO CCSDS 431.1-B-1 (Continued)

Page 3-5, **3.3.2.4.1**, change from: "as specified in reference [4]" to: "as specified in section 5 of reference [4]" Page 3-5, after 3.3.2.2 Encoder Input and Output Length, add 3.3.2.3 Base-Band Header Insertion When the VCM system uses DVB-S2 codes as given in mode table 3-4, a base-band header of 10 bytes shall be inserted in front of each K-bit information block, as described in subsection 5.1.6 of reference [4], to form K+80 bits. 3.3.2.4 Randomization Each information block, together with the base-band header if present (and called BBFRAME in reference [4]), shall be randomized with the scrambler described in subsection 5.2.2 of reference [4]. Page 3-4, 3.3.1.4.2, change from: "either H = 256 or H = 320 symbols" to: "H = $320 \pi/2$ BPSK symbols comprising a 256-symbol Frame Marker and 64-symbol Frame Descriptor as specified in section 5 of reference [2], except that the Frame Descriptor portion may be omitted" Page 3-4, **3.3.1.4.1**, change from: "as specified in reference [2]" to: "as specified in section 5 of reference [2]"

Distribution Control Number: TC 22-09 Reference Number: CCSDS 431.1-B-1 Cor. 1

TECHNICAL CORRIGENDUM 1 TO CCSDS 431.1-B-1 (Continued)

Page 3-2, before 3.3 SPECIFICATION, add

3.2.3 FRAME RANDOMIZATION

- **3.2.3.1** When Type 1 VCM is used, each Transfer Frame shall be randomized with the pseudo-randomizer described in section 8 of reference [2].
- **3.2.3.2** When Type 2 VCM is used, the Transfer Frames shall not be randomized.

Page 3-2, note at top of page, delete

" It is important to note that what is referred to here as SMTF is called CADU in references [2] and [3]."

Page 3-1, 3.1 DISCUSSION—SLICER AND PLFRAME STRUCTURE, change

from:

"The VCM protocol operates by taking CCSDS Transfer Frames as input, adding . . ."

to:

"The VCM protocol operates by taking CCSDS Transfer Frames as input, pseudorandomizing the Transfer Frames when one type of VCM is used, adding . . ."

Page 2-1, 2 OVERVIEW, second paragraph, change

from:

"This Recommended Standard covers functions in both the Synchronization and Channel Coding Sublayer and the Physical Layer."

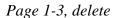
to:

"This Recommended Standard covers functions in both the Synchronization and Channel Coding Sublayer and the Physical Layer, the latter for what concerns the modulation schemes. CCSDS 401.0-B (reference [5]) covers additional features of the Physical Layer, such as frequency bands and polarizations, that are not described or referenced here."

[Editorially update references to current issues—these changes are not marked.]

Distribution Control Number: TC 22-09 Reference Number: CCSDS 431.1-B-1 Cor. 1

TECHNICAL CORRIGENDUM 1 TO CCSDS 431.1-B-1 (Continued)



"**channel access data unit, CADU**: A data unit consisting of either an ASM or a Code Synchronization Marker (CSM) followed by a Transfer Frame, a codeword, or a codeblock, depending on the coding scheme in use."

Distribution Control Number: TC 22-09 Reference Number: CCSDS 431.1-B-1 Cor. 1