INTERNATIONAL STANDARD

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Space data and information transfer systems — Data transmission and pseudo-random noise (PN) ranging for iTeh ST2 GHz code division multiple access (CDMA) link via data relay satellite (standards.iteh.ai)

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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see <u>www.iso.org/directives</u>).

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see <u>www.iso.org/patents</u>).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation on the meaning of **ISO specific terms and expressions** related to conformity assessment, as well as information about ISO's adherence to the WTO principles in the Technical Barriers to Trade (TBT) see the following URL: Foreword - Supplementary information

ISO 17810 was prepared by the Consultative Committee for Space Bata Systems (CCSDS) (as CCSDS 415.1-B-1, September 2011) and was adopted (without modifications except those stated in Clause 2 of this International Standard) by Technical Committee ISO/TC 20, *Aircraft and space vehicles*, Subcommittee SC 13, *Space data and information transfer systems*.

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Space data and information transfer systems — Data transmission and pseudo-random noise (PN) ranging for 2 GHz code division multiple access (CDMA) link via data relay satellite

1 Scope

This International Standard defines CDMA spread spectrum modulation schemes in terms of:

- a) the services provided to the users of this specification;
- b) spreading code formats; and
- c) the procedures performed to generate and process the code formats.

It does not specify: iTeh STANDARD PREVIEW

- a) individual implementations or products dards.iteh.ai)
- b) the methods or technologies required to perform the procedures; or
- c) the management activities required to configure and control the system.

This International Standard provides only those parameter requirements relating to signal compatibility with the existing SNIP PN spread modulation systems (see C.1). There are many other types of requirements, not specifically related to PN spread modulation signal formats, which must be met to ensure system compatibility with existing SNIP hardware. Examples would include forward error correction coding format, data signal formats, etc.

This International Standard applies to the creation of agency standards and to the future data communications over space links between CCSDS agencies in cross-support situations. This International Standard includes comprehensive specification of the data formats and procedures for inter-agency cross support. It is neither a specification of, nor a design for, real systems that may be implemented for existing or future missions.

This International Standard is to be invoked through the normal standards programs of each CCSDS agency, and is applicable to those missions for which cross support based on capabilities described in this International Standard is anticipated. Where mandatory capabilities are clearly indicated in sections of this International Standard, they must be implemented when this document is used as a basis for cross support. Where options are allowed or implied, implementation of these options is subject to specific bilateral cross-support agreements between the agencies involved.

2 Requirements

Requirements are the technical recommendations made in the following publication (reproduced on the following pages), which is adopted as an International Standard:

CCSDS 415.1-B-1, September 2011, Data transmission and PN ranging for 2 GHz CDMA link via data relay satellite

For the purposes of international standardization, the modifications outlined below shall apply to the specific clauses and paragraphs of publication CCSDS 415.1-B-1.

Pages i to vi

This part is information which is relevant to the CCSDS publication only.

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Add the following information to the reference indicated:

- [C2] Document CCSDS 414.1-B-1, March 2009, is equivalent to ISO 18423:2013.
- [C4] Document CCSDS 503-0-B-1, November 2007, is equivalent to ISO 13526:2010.

3 Revision of publication CCSDS 415.1-B-1

It has been agreed with the Consultative Committee for Space Data Systems that Subcommittee ISO/TC 20/SC 13 will be consulted in the event of any revision or amendment of publication CCSDS 415.1-B-1. To this end, NASA will act as a liaison body between CCSDS and ISO.

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Recommendation for Space Data System Standards



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RECOMMENDED STANDARD

CCSDS 415.1-B-1

BLUE BOOK September 2011

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AUTHORITY

Issue:	Recommended Standard, Issue 1
Date:	September 2011
Location:	Washington, DC, USA

This document has been approved for publication by the Management Council of the Consultative Committee for Space Data Systems (CCSDS) and represents the consensus technical agreement of the participating CCSDS Member Agencies. The procedure for review and authorization of CCSDS documents is detailed in the *Procedures Manual for the Consultative Committee for Space Data Systems*, and the record of Agency participation in the authorization of this document can be obtained from the CCSDS Secretariat at the address below.

This document is published and maintained by: ILEA STANDARD PREVIEW CCSDS Secretariat (standards.iteh.ai) Space Communications and Navigation Office, 7L70 Space Operations Mission Directorate NASA Headquarters NASA Headquarters Siteh ai/catalog/standards/sist/c341d2ad-d999-4a4e-9bf7-Washington, DC 20546-000 b, USAb/iso-17810-2014

STATEMENT OF INTENT

The Consultative Committee for Space Data Systems (CCSDS) is an organization officially established by the management of its members. The Committee meets periodically to address data systems problems that are common to all participants, and to formulate sound technical solutions to these problems. Inasmuch as participation in the CCSDS is completely voluntary, the results of Committee actions are termed **Recommended Standards** and are not considered binding on any Agency.

This **Recommended Standard** is issued by, and represents the consensus of, the CCSDS members. Endorsement of this **Recommendation** is entirely voluntary. Endorsement, however, indicates the following understandings:

- o Whenever a member establishes a CCSDS-related **standard**, this **standard** will be in accord with the relevant **Recommended Standard**. Establishing such a **standard** does not preclude other provisions which a member may develop.
- o Whenever a member establishes a CCSDS-related **standard**, that member will provide other CCSDS members with the following information:
 - -- The standard itself.
 - -- The anticipated date of initial operational capability.
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 - -- The anticipated duration of operational service.
- o Specific service arrangements shall be made via memoranda of agreement. Neither this **Recommended Standard** nor any ensuing standard is a substitute for a memorandum of agreement.

No later than five years from its date of issuance, this **Recommended Standard** will be reviewed by the CCSDS to determine whether it should: (1) remain in effect without change; (2) be changed to reflect the impact of new technologies, new requirements, or new directions; or (3) be retired or canceled.

In those instances when a new version of a **Recommended Standard** is issued, existing CCSDS-related member standards and implementations are not negated or deemed to be non-CCSDS compatible. It is the responsibility of each member to determine when such standards or implementations are to be modified. Each member is, however, strongly encouraged to direct planning for its new standards and implementations towards the later version of the Recommended Standard.

FOREWORD

This document is a technical Recommended Standard for use in developing spread spectrum modulation systems and has been prepared by the Consultative Committee for Space Data Systems (CCSDS). The spread spectrum modulation concept described herein is intended for missions that are cross-supported between Agencies of the CCSDS.

The spread spectrum modulation systems currently used by the Space Network Interoperability Panel (SNIP) agencies involve Direct Sequence Spread Spectrum (DSSS) in the form of pseudo-random noise (PN) Gold codes and Maximal Length codes. The PN code libraries used by NASA Users are also shared by Users of the European Space Agency (ESA) and Japan Aerospace Exploration Agency (JAXA). Included in this Recommended Standard are proposed techniques for expanding the code libraries for additional CCSDS Users. The expanded code library fits into the existing SNIP architecture.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CCSDS shall not be held responsible for identifying any or all such patent rights.

Through the process of normal evolution, it is expected that expansion, deletion, or modification of this document may occur. This Recommended Standard is therefore subject to CCSDS document management and change control procedures, which are defined in the *Procedures Manual for the Consultative Committee for Space Data Systems*. Current versions of CCSDS documents are maintained at the CCSDS Web site:

<u>ISO 17810:2014</u> https://standards.iteh.ai/ca<u>http://wdwds/cicts@stbr29</u>d-d999-4a4e-9bf7-710a2cb78e3b/iso-17810-2014

Questions relating to the contents or status of this document should be addressed to the CCSDS Secretariat at the address indicated on page i.

At time of publication, the active Member and Observer Agencies of the CCSDS were:

Member Agencies

- Agenzia Spaziale Italiana (ASI)/Italy.
- Canadian Space Agency (CSA)/Canada.
- Centre National d'Etudes Spatiales (CNES)/France.
- China National Space Administration (CNSA)/People's Republic of China.
- Deutsches Zentrum für Luft- und Raumfahrt e.V. (DLR)/Germany.
- European Space Agency (ESA)/Europe.
- Federal Space Agency (FSA)/Russian Federation.
- Instituto Nacional de Pesquisas Espaciais (INPE)/Brazil.
- Japan Aerospace Exploration Agency (JAXA)/Japan.
- National Aeronautics and Space Administration (NASA)/USA.
- UK Space Agency/United Kingdom.

Observer Agencies

- Austrian Space Agency (ASA)/Austria.
- Belgian Federal Science Policy Office (BFSPO)/Belgium.
- Central Research Institute of Machine Building (TsNIIMash)/Russian Federation.
- China Satellite Launch and Tracking Control General, Beijing Institute of Tracking and Telecommunications Technology (CLTC/BITTT)/China.
- Chinese Academy of Sciences (CAS)/China.teh.ai)
- Chinese Academy of Space Technology (CAST)/China.
- Commonwealth Scientific and Industrial Research Organization (CSIRO)/Australia.
- CSIR Satellite Applications Centre (CSIR)/Republic of South Africa.
- Danish National Space Center (DNSC)/Denmark2014
- Departamento de Ciência e Tecnologia Aeroespacial (DCTA)/Brazil.
- European Organization for the Exploitation of Meteorological Satellites (EUMETSAT)/Europe.
- European Telecommunications Satellite Organization (EUTELSAT)/Europe.
- Geo-Informatics and Space Technology Development Agency (GISTDA)/Thailand.
- Hellenic National Space Committee (HNSC)/Greece.
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- Space and Upper Atmosphere Research Commission (SUPARCO)/Pakistan.
- Swedish Space Corporation (SSC)/Sweden.
- United States Geological Survey (USGS)/USA.

ISO 17810:2014(E)

CCSDS RECOMMENDED STANDARD FOR DATA TRANSMISSION AND PN RANGING FOR 2 GHz CDMA LINK VIA DATA RELAY SATELLITE

DOCUMENT CONTROL

Document	Title	Date	Status
CCSDS 415.1-B-1	Data Transmission and PN Ranging for 2 GHz CDMA Link via Data Relay Satellite, Recommended Standard, Issue 1	September 2011	Current issue

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