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Design methods for satellite-earth data transmission link of remote sensing satellites

遥感卫星的星地数传链路设计方法

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Foreword

This document is in accordance with the provisions of GB/T 1.1-2020 "Guidelines for standardization work Part 1: Structure and drafting rules for standardization documents" Drafting.

Please note that some of the contents of this document may involve patents. The issuing organization of this document does not assume the responsibility for identifying patents.

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Introduction

The satellite-to-ground data transmission link is the channel for satellite to transmit data to the ground, which is related to the efficiency and quality of satellite data transmission to the ground.

The design of the ground data transmission link is one of the key technical links in satellite engineering, and it is also the key to enable the satellite to quickly and effectively download the collected data.

An important guarantee for transmission.

Remote sensing satellite data has the characteristics of large data volume and high data transmission rate. In order to meet the demand for high-speed data transmission between satellite and ground, polarization frequency complex The application of technologies such as Ka-band data transmission, high-order modulation and demodulation system and efficient encoding and decoding has become the core of remote sensing satellite satellite data transmission.

The introduction of these technologies has put forward new requirements for the design of satellite-to-ground data transmission links for remote sensing satellites.

The satellite-to-ground data transmission link design method provides a basis for the formulation of technical indicators and performance evaluation for the design, development, and testing of engineering systems, which is helpful Reduce technical risks of satellite-ground systems.

Design Method of Satellite-to-Earth Data Transmission Link for Remote Sensing Satellite

1 Scope

This document specifies the design requirements for the satellite-to-ground data transmission link of remote sensing satellites, gives the overall design process of the satellite-to-ground data transmission link, and provides the input parameters.

The number and its calculation method are described, and the method of judging and verifying that the link meets the design requirements of satellite-to-ground data transmission of remote sensing satellites is described.

This document is applicable to the design of microwave frequency satellite-to-ground data transmission links for remote sensing satellites. The design of microwave frequency satellite-to-ground data transmission links for other types of satellites is also applicable. Follow the instructions.

2 Normative references

GB/T 11299.4-1989

GB/T 11299.12-1989

GB/T 12639-2021

3 Terms and definitions

The following terms and definitions apply to this document.

3.1

A channel that directly transmits data from the output port of a satellite data transmission system through space to the output port of a ground receiving system.

3.2

Two different orthogonal polarization electromagnetic wave signals that meet the polarization isolation requirements are used for communication at the same time.

Note. Left-hand circularly polarized and right-hand circularly polarized electromagnetic wave signals in the same frequency band are usually used.

3.3 [Source. GB/T 14733.10-2024, 3.2.2.11]

The product of the power applied to an antenna and the absolute gain of the antenna in a given direction.

3.4 Modulation loss demodulationloss

The losses incurred by the satellite data transmission system during the modulation, amplification and transmission of electromagnetic wave signals.