ICS 07.060
CCS A 47

NATIONAL STANDARD OF THE PEOPLE'S REPUBLIC OF CHINA

GB/T 31158-2014

Ionospheric total electron content (TEC) disturbance classification

电离层电子总含量（TEC）扰动分级

Issued on: September 3, 2014 **Implemented on: January 1, 2015**

Issued by: General Administration of Quality Supervision, Inspection and Quarantine;
Standardization Administration of the PRC

Table of Contents

Foreword

This standard was drafted in accordance with GB/T 1.1-2009 given rules. The standard proposed by the China Meteorological Administration. This standard by the national meteorological satellites and space weather Standardization Technical Committee on Space Weather Monitoring and Warning Technical Committee (SAC/TC347/SC3) centralized. This standard was drafted. National Satellite Meteorological Center (National Space Weather Monitoring and Warning Center). The main drafters of this standard. your music Ming, Yu Tao, Zhao Guangxin Wang Yungang, Chen Po. Ionospheric total electron content (TEC) rating disturbance

1 Scope

China's national standard for classifying ionospheric total electron content disturbances. It specifies the classification method for single-station ionospheric TEC disturbances, and it applies to ionospheric disturbance monitoring operations. The ionosphere is the region of the Earth's atmosphere between roughly 60 and 1000 km altitude in which free electrons are numerous enough to affect the propagation of radio waves significantly. Total electron content is the integral of electron density along a vertical column through it, measured in TEC units, one TECU being ten to the sixteenth electrons per square metre. It is the quantity that matters most to satellite navigation, because the delay a GNSS signal suffers passing through the ionosphere is proportional to the total electron content along its path - and that delay is the largest single error source in single-frequency positioning. When the ionosphere is disturbed, the content departs from its normal value and the correction models used by receivers stop working, so positioning error grows and, in severe cases, the signal is lost to scintillation. The standard defines an ionospheric TEC disturbance index, denoted W, describing the level of the disturbance, and classifies the state of the ionosphere on the basis of the magnitude of that index together with how long it persists. Four levels are defined: quiet, general disturbance, strong disturbance and extremely strong disturbance. Combining magnitude with duration is what distinguishes this classification from a simple threshold, and it reflects operational reality: a brief excursion is absorbed by a navigation filter, while the same magnitude sustained for hours is not. Issued on 3 September 2014 and in force since 1 January 2015.

This standard specifies the classification method for a single station ionospheric total electron content (TEC) of the disturbance. This standard applies to ionospheric disturbance monitor business.

2 Terms and definitions

The following terms and definitions apply to this document.

2.1 Ionosphere ionosphere Earth's atmosphere in the height range of about 60km ~ 1000km, the presence of a large number of free electrons, sufficient to significantly affect the propagation of radio waves area.

2.2 Total electron content totalelectroncontent; TEC Electron column content columnelectroncontent Electronic integrator content integralelectroncontent Electron density along the height of the integral units of TECU. NOTE. 1TECU = 1016/m2.

2.3 Ionospheric disturbances ionosphericdisturbance Ionospheric electron density and other parameters deviate from the normal state.

2.4 TEC ionospheric disturbances ionosphericTECdisturbance Ionospheric TEC deviation from the normal state.

2.5 Ionospheric TEC perturbation index ionosphericTECdisturbanceindex A description of ionospheric TEC perturbation parameter level, represented by W.

3 Rating

3.1 Principles Based on a single station ionospheric disturbance index W TEC values \u200b\u200bmagnitude and duration of the ionospheric TEC disturbances into calm, general Disturbances, disturbances and super strong perturbations total four. Ionospheric disturbance index W TEC determination, see Appendix A.

3.2 calm The absolute value of ionospheric TEC perturbation index W is equal to 0, or ionospheric TEC perturbation index W is equal to 1 and lasted less than 3h Ionosphere state.

3.3 General disturbance The absolute value of ionospheric TEC perturbation index W is equal to 1, and the duration of not less than 3h state of the ionosphere.