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**NATIONAL STANDARD OF THE
PEOPLE'S REPUBLIC OF CHINA**

GB 31223-2014

**Specifications for observing environs protection of weather
radar station**

气象探测环境保护规范 天气雷达站

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Foreword

All technical content of this standard is mandatory. This standard was drafted in accordance with rules GB/T 1.1-2009 given. The standard proposed by the China Meteorological Administration. This standard by the national meteorological Standardization Technical Committee (SAC/TC507) instruments and methods of observation. Drafted by: China Meteorological Administration meteorological centers, Fujian Meteorological Bureau, Guizhou Provincial Meteorological Bureau, the Liaoning Provincial Meteorological Bureau. The main drafters of this standard. Daren Chen, high Yuchun, Li Lin, Zhang Hu students, Wu Taiwang, Chai Xiumei, Cheng Fei, Li Zhe, Guo Rui, Chen Bao.

Weather radar is to monitor the typhoon, heavy rain, hail, tornadoes, downburst and other disastrous weather system for disaster prevention and mitigation, to protect people's life and property Important remote sensing equipment production safety, short-term nowcasting warning to provide a scientific basis for decisions. To protect the environment, weather radar detection, charge Minutes played using weather radar performance, formulated standards. Meteorological environmental protection norms Weather Radar

1 Scope

GB 31223-2014 is the Chinese national standard on specifications for observing environs protection of weather radar station, in the field of natural and applied sciences. It carries no /T suffix, which in the Chinese system means compliance is mandatory: a product or a practice within its scope has to meet it to be lawfully made, sold or carried out in China. It was issued on 30 September 2014 by the General Administration of Quality Supervision, Inspection and Quarantine of the People's Republic of China; Standardization Administration of China, and has been in force since 1 January 2015. Classification: ICS 07.060, CCS A47. This page is published from the official record of the standard held by the Chinese standards administration: the identification, the dates, the classification and the issuing body are taken from there. The clause text, the tables and the numeric limits are in the document itself, which is delivered complete in English translation.

This standard specifies the scope and requirements of the weather radar to detect environmental protection. This standard applies to weather radar to detect environmental protection activities.

2 Normative references

The following documents for the application of this document is essential. For dated references, only applies to the version dated paper Pieces. For undated references, the latest edition (including any amendments) applies to this document.

GB 4824-2004 industrial, scientific and medical (ISM) radio disturbance characteristics Limits apparatus and methods of measurement (CISPR11. 2003, IDT) GB air intelligence radar station on the electromagnetic environment protection requirements 13618-1992

3 Terms and Definitions

The following terms and definitions apply to this document.

3.1 Weather radar weatherradarstation Weather radar by the operating environment and equipment to meet the requirements of the facility and its spatial composition.

Note. weather radar is based on scattering clouds, fog, rain, snow and other particles and electromagnetic wave generation principle Doppler effect and the like, and detect the Doppler velocity echo intensity rainfall And the evolution of the spatial distribution, and thus precipitation weather surveillance radar tracking system.

3.2 Beamwidth beamwidth Antenna pattern angle between the direction of maximum radiation two half-power points.

3.3 Obstacle obstacle Generating object and the shielding effect on high frequency electromagnetic waves emitted and received by the radar.

3.4 Isolated obstacles isolatedobstacle Obstacle adjacent lateral spacing is greater than 2 azimuth beamwidth and not greater than the tolerance value shielding obstacle.

3.5 Blocking elevation blockelevationangle Start from the radar minimum operational elevation angle of the lifting beam away from the obstacle until its lower edge, i.e. from the occlusion to occlusion on the presence of The beam angle of the edge lifting disappears.

3.6 Occlusion azimuth blockazimuthangle Blocking obstacle beamforming radar, which radar beam edge orientation (-3dB) into the barrier region, and the edge of the radar beam (-3dB) when the angle between the orientation in which the exit obstacle region.

3.7 Total occlusion azimuth totalblockangleinazimuth All occlusion sum azimuth angle.

3.8 Obstacle limitation altitude restrictedaltitudeforobstacle The maximum allowed blocking obstacle elevation of the highest point is located calculated altitude.

3.9 Obstacle limitation azimuth width restrictedazimuthwidthforobstacle The width of the obstacle obtained by calculating the maximum allowable occlusion azimuth.

3.10 Headroom clearance Weather radar based business work at the lowest elevation, antenna main beam is not obstructed detection environment.

4 Scope of protection

4.1 General Weather radar detection range of environmental protection and the protection zone consists of a two protected areas, the scope of illustration and description in Appendix A. In the days There should be no other air Zhou Bian the radar station interference affecting the normal operation of the radar. For electromagnetic interference protection scope is not limited to one, two Level protected areas.

4.2 a protected area The near-field region of radiation above and below the weather radar radar antenna port 10 along the vertical parallel lines radar wavelength transition region "side Edge "area thereof.

4.3 two protected areas In weather radar as the center from the outer edge of a protected area to the distance from the radar 20km annular region.

5.1 General

5.1.1 obstacle to echo strength loss caused by weather radar should not exceed 1dB.

5.1.2 radar receiver sensitivity loss due to the inevitable interference active should not exceed 1dB.

5.2 A protected area

5.2.1 There should be no obstacles blocking caused by weather radar.

5.2.2 limit altitude corresponding to h_2 by formula (1) is calculated, see the illustration and description B.1. $h_2 = h_1 - 10\lambda \left(\frac{D}{2} - d \right) \tan\left(\frac{180\lambda}{\pi D}\right)$
 $h_1 \geq \frac{D}{2} - d \times \tan\left(\frac{180\lambda}{\pi D}\right)$ Where. H_2

--- radar antenna to limit the horizontal scanning altitudes of the highest point of the object, in meters (m); Point along the altitude h_1 of the radar antenna port

--- in meters (m);

--- radar wavelength $[\lambda]$, in meters (m); D

--- the radar antenna to the level of the highest point along the mouth of the object point distance in meters (m); D

--- radar antenna diameter, in meters (m).

5.3 Two protected areas

5.3.1 isolated obstacles block the elevation limit Radar at the lowest elevation, isolated from blocking the elevation tolerance values in Table C.1, the calculation method, see Appendix C.

5.3.2 obstructions azimuth limitation Radar at the lowest elevation, azimuth isolated obstructions Table C.1 tolerance value, calculated in Appendix C. All Zhou Bian obstacles total occlusion azimuth angle greater than 5° .

5.3.3 height restrictions Obstacle altitude limit according to formula (2) is calculated, and schematic description see B.2.1. $h_3 = h_1 \left(\frac{D}{2} - d \right) \cos\phi \left[\frac{D}{2} - d \right] \sin\phi \times \tan\left(\frac{\phi - \theta}{2}\right)$
 $d > \frac{D}{2}$ Where. H_3

--- elevation occlusion margin value β corresponding to the highest point of the obstacle limit altitude in meters (m); D

--- the radar antenna port in the point to the horizontal distance of the highest point of the obstacle, in meters (m);

--- obstacle β corresponding to the highest point of elevation occlusion tolerance value, in degrees ($[\deg.]$); $[\phi]$

--- traffic mode radar minimum operational elevation in degrees ($[\deg.]$);

--- radar antenna beam width $[\theta]$, in degrees ($[\deg.]$); h_1 , D

--- in formula (1).

5.3.4 azimuth width restrictions Isolated obstacles limit the width of the azimuth according to formula (3) is calculated, see the illustration and description B.2.2. $b = 2 \times d_1 \times \tan\left(\frac{\psi}{2}\right)$ (3) Where. B