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**Code for design of fire communication
and command system**

消防通信指挥系统设计规范

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Code for design of fire communication and command system

1 General provisions

1.0.1 This Code is stipulated so as to standardize design of fire communication and command system, to construct a complete supporting system for fire communication and command technology, to improve firefighting and rescue capability of fire brigade, to meet needs of fire control responsibility area at every level and cross-zone operational command communication, to protect citizens' lives, property and social public security.

1.0.2 This Code is applicable to designs of newly-built, rebuilt and expanded fire communication and command systems.

1.0.3 Design of fire communication and command system shall follow relevant national policies, guidelines, laws and regulations, adapt to needs to fight fires and dispose of other disasters, coordinate with development of public infrastructure such as communication and network, so as to be safe and practical, technology-advanced and economical.

1.0.4 In addition to this Code, design of fire communication and command system shall also comply with provisions of current national relevant standards.

2 Terms

2.0.1 fire communication and command center

the part that is set in fire command organization, that can communicate with command center of public security organ and relevant government department, that has functions such as acceptance of fire alarm and other disaster alarm, firefighting and rescue dispatching command, and intelligence information support

2.0.2 mobile fire communication and command center

the part that is set in mobile carrier such as fire communication command vehicle, that has functions such as communication network, command communication, intelligence information support at scene of fire and other disasters or at fire service site; it is an extension to fire communication and command center

2.0.3 fire alarm acceptance sub-system

the part in fire communication and command center that, through communication network, receives and handles fire and other disaster alarms and related information; major equipment includes fire alarm acceptance terminal, fire alarm terminal of fire station

2.0.4 cross-zone command and dispatch sub-system

the part in fire communication and command system that, through communication network, performs cross-zone firefighting and rescue dispatching command; major equipment includes dispatch command terminal

2.0.5 fireground command sub-system

the part in fire communication and command system that, through communication network, performs firefighting and rescue command, intelligence information support at scenes of fire and other disasters; major equipment includes fireground command terminal and portable firefighting command platform

2.0.6 command simulation drill subsystem

the part in fire communication and command system that uses system resources to carry out firefighting and rescue simulation command training for fire commanders

2.0.7 graphical fire information sub-system

3 Technical structure of system

3.0.1 Fire communication and command system can be divided into national, provincial (autonomous regional), regional (state, alliance) fire communication and command system AND urban fire communication and command system.

3.0.2 Technical structure of fire communication and command system consists of three parts: communication and command business, information support and basic communication network (see Figure 3.0.2), in accordance with following requirements:

- 1** Communication and command business mainly includes fire alarm acceptance sub-system, cross-zone command and dispatch sub-system, fireground command sub-system, command simulation drill subsystem, which respectively realize communication and command business functions such as acceptance and processing alarms of fire and other disasters, fire force dispatching, firefighting and rescue command as well as training;
- 2** Information support mainly includes graphical fire information sub-system, fire vehicle management subsystem, fire command and decision-making supporting sub-system, command information management sub-system, and geographical fire information sub-system, which are to provide information support to communication and command business;
- 3** Basic communication network part mainly includes fire wire communication sub-system, fire wireless communication sub-system, and fire satellite communication sub-system. It is based on computer communication network to form a fire integrated information transmission network that integrates voice, data and image.

4 System function and major performance

4.1 System function

4.1.1 Fire communication and command system shall have following basic functions:

- 1** Firefighting and rescue dispatching command of responsible jurisdiction and cross-zone firefighting and rescue dispatching command;
- 2** Ground command and communication of fire and other disasters;
- 3** Management of communication and command information;
- 4** Drill training of communication and command business;
- 5** Urban fire communication and command system shall be able to perform centralized acceptance and processing of fire in responsible jurisdiction as well as alarms of disasters such as hazardous chemical spills, road traffic accidents, earthquakes and secondary disasters, building collapses, major safety production accidents, air crashes, explosions, terrorist incidents and mass casualties in which priority shall be focused on personnel life rescue.

4.2 System interface

4.2.1 Fire communication and command system shall have following communication interfaces:

- 1** System communication interfaces for command center of public security organ;
- 2** System communication interfaces for relevant government department;
- 3** Communication interfaces for relevant firefighting and rescue organization;
- 4** Communication interfaces for mobile wireless data of public network.

4.2.2 Fire communication and command system shall have following alarm acceptance communication interfaces:

- 1** Alarm call communication interfaces for public network;
- 2** Alarm communication interfaces for private networks such as urban fire remote monitoring system;
- 3** Data transmission interfaces for installation address of landline telephone for alarm and positioning address of mobile phone for alarm.

fire and other disasters.

2 Identify authenticity of fire. Position fire and other disaster sites. Determine type and level of fire and other disasters.

3 Automatically or manually prepare dispatch plan for firefighting and rescue force.

4 Give dispatch command of first dispatch force to fire station. Give disaster notification and joint operation requirements to organizations related to firefighting and rescue.

5 Establish files for fire and other disasters. Generate reports.

5.1.2 Alarm acceptance function of fire alarm acceptance sub-system shall meet following requirements:

1 Be able to accept alarms from landline telephone or mobile phone of public network;

2 Be able to accept alarms from devices such as urban fire remote monitoring system;

3 Be able to accept alarms from other private network phones;

4 Be able to accept alarms from text message or multimedia messaging service sent by public network.

5.1.3 Alarm identification function of fire alarm acceptance sub-system shall meet following requirements:

1 Be able to accept and display caller ID, user name, phone installation address of landline phone for alarm;

2 Be able to accept and display caller ID, positioning address of mobile phone for alarm;

3 Through installation address or positioning address of phone for alarm, be able to perform fast positioning for sites of fire and other disasters;

4 Through input of organization name, address, street, target, phone number, be able to perform fast positioning for sites of fire and other disasters;

5 Be able to determine false alarm;

6 Be able to give prompt message for repeated alarm and combine to same event for processing after confirmation;

7 Be able to determine types of fires and other disasters;

- 4 Be able to select to playback recording at authorized terminal; be able to perform data dump and backup;
- 5 Recording files shall be stored not less than 6 months. Original information recorded cannot be modified;
- 6 Be able to display state of recording channel and remaining capacity of storage medium. When recorded information exceeds threshold of set storage capacity, it shall be able to give prompt information.

5.1.9 Fire alarm acceptance terminal shall meet following requirements:

- 1 Fire alarm acceptance terminal can be set in urban fire communication and command center or command center of public security organ. Fire alarm acceptance terminal that is set in command center of public security organ shall be interconnected with cross-zone command and dispatch terminal that is set in urban fire communication and command center. Keep accepted alarm data synchronized and information shared.
- 2 Number of fire alarm acceptance terminal shall not be less than 2 sets;
- 3 In cities where daily alarms accepted are large, fire alarm acceptance terminal can be divided into alarm accepted terminal and alarm processing terminal; perform alarm acceptance and processing simultaneously;
- 4 Multiple display screens can be set at seats of each set of fire alarm acceptance terminals to respectively display working interfaces specified in 5.1.10 of this Code;
- 5 Alarm transfer can be performed between seats of fire alarm acceptance terminal. Multiple terminals can collaborate to process alarms;
- 6 Have obvious incoming signal prompt of fire alarm.

5.1.10 Fire alarm acceptance terminal shall have following working interfaces:

- 1 Alarm acceptance and dispatch telephone, wireless radio operation windows;
- 2 Recording and playback operation windows;
- 3 Numbers of fire and other disasters, alarm time, alarm caller ID, alarm reporter name, alarm reporting address entry windows;
- 4 Organization name, address and responsible fire station entry windows of sites of fire and other disasters;
- 5 Entry windows of specific situations of fire and other disasters;

sub-system

5.2.2 Disaster acceptance function of cross-zone command and dispatch sub-system shall meet following requirements:

- 1 Be able to accept relative information such as information of fire and other disasters, dispatch force and disposal that are sent from subordinate communication and command center and fireground command sub-system at same level;
- 2 Be able to accept disaster notification and force dispatching instructions that are sent from superior communication and command center, command center of public security organ and relative government department.

5.2.3 Determination of disaster situation of cross-zone command and dispatch sub-system shall meet following requirements:

- 1 Be able to search types of fire and other disasters as well as level database;
- 2 Be able to make a judgement on type, level and development trend of accepted disaster.

5.2.4 Force dispatch function of cross-zone command and dispatch sub-system shall meet following requirements:

- 1 Be able to randomly prepare firefighting force dispatch plan according to pre-arranged plans of key fire security organization, levels of fire and other disasters and firefighting force database;
- 2 Be able to give cross-zone dispatch command in forms of voice, data and command video;
- 3 Be able to give disaster notification and joint operation requirements to relevant firefighting and rescue organizations such as medical, ambulance, transportation, safety supervision organizations.

5.2.5 Decision-making function of cross-zone command and dispatch sub-system shall meet following requirements:

- 1 Be able to randomly prepare firefighting and rescue plan according to pre-arranged plans of key fire security organization and decision-making supporting database;
- 2 Be able to give cross-zone operational command in forms of voice, data and command video.

5.2.6 Cross-zone command and dispatch sub-system shall be able to make a

- 2 Information of fire vehicle, personnel, firefighting and rescue equipment, extinguishing agent at the scene;
- 3 Environment information such as ground meteorology, roads, fire water sources, buildings (structures);
- 4 Information of live fireground image.

5.3.4 Fighting command function of fireground command sub-system shall meet following requirements:

- 1 Be able to make a judgement on type, level and development trend of disaster;
- 2 Be able to randomly prepare firefighting and rescue plan according to pre-arranged plan of key fire security organization, decision-making supporting database;
- 3 Be able to give firefighting and rescue command in forms of voice, data and command video.

5.3.5 Ground information reported by fireground command sub-system shall include following information:

- 1 Ground situation information of fire and other disasters;
- 2 Environment information such as ground meteorology, roads, fire water sources, buildings (structures);
- 3 Information of ground firefighting and rescue;
- 4 Information of live fireground image.

5.3.6 Fireground command sub-system shall be able to make a real-time recording of information such as text, voice, image during entire process of fireground command and communication. Save into files of corresponding fire and other disasters. Generate relevant statistical report.

5.3.7 Voice-recording and time-recording during entire process of fireground command shall comply with provisions of 5.1.8 of this Code.

5.3.8 Fireground communication networking function of fireground command sub-system shall meet following requirements:

- 1 Be able to connect to wired telephones such as local calls at the scene through external telephone interface or satellite communication link;
- 2 Be able to connect to fireground wired telephone command communication network through car phone exchange and wired telephone communication

communication links;

- 7 Be able to perform switch display of live graphic information;
- 8 Be able to perform interactive multimedia combating conference operation;
- 9 Have sending function of emergency call signals such as retreat and distress;
- 10 Be able to perform fireground command broadcast amplification operation;
- 11 Be able to perform centralized control and monitoring of various electrical equipment.

5.3.11 Devices such as fireground command terminal shall have following working interfaces:

- 1 Information display and function operation windows specified in 5.3.2~5.3.10 of this Code;
- 2 Display windows of firefighting geographical information;
- 3 Display windows of various electrical equipment control operations and condition monitoring.

5.3.12 Portable firefighting command platform shall meet following requirements:

- 1 Have positioning, navigation functions;
- 2 Have display windows for live firefighting geographical information;
- 3 Have operation windows for firefighting command decision-making supporting function specified in 5.7.3 of this Code;
- 4 Have windows for fireground operational command information entry. Entry information cannot be modified;
- 5 Have windows for quickly entering fire rescue, emergency rescue, information inquiry;
- 6 Be able to perform firefighting and rescue deployment plotting and temporary disaster management plan preparation based on live fire protection geographical information, fire water source and pre-arranged fire rescue plan;
- 7 Have firefighting and rescue data association, information query, voice prompt function;

information that is collected and transmitted by collection points of fire monitoring image information that are set in key areas of urban fire protection, fire protection key construction (structure), key fire protection parts.

5.5.3 Graphical fire information sub-system shall be able to networked with public security image monitoring system to obtain image information of key areas, key parts, key roads.

5.5.4 Graphical fire information sub-system shall be able to accept live image information such as preparation for firefighting, alarm acceptance and fire force dispatch that is collected, transmitted by information collection points of remote monitoring images that are set in fire station in jurisdiction.

5.5.5 Graphical fire information sub-system shall be able to accept live image information that is uploaded in real time by fire vehicles.

5.5.6 Graphical fire information sub-system shall be able to access to fire command video and audio conference and participate in video and audio conferences held by public security organs, relevant government departments.

5.5.7 Graphical fire information sub-system shall be able to perform centralized management and control of various image information sources according to authority allocation.

5.5.8 Graphical fire information sub-system shall be able to store and perform search playback of various image information.

5.6 Fire vehicle management sub-system

5.6.1 Vehicle monitoring function of fire vehicle management sub-system shall meet following requirements:

- 1** Be able to accept and display real-time state information such as fire vehicle location, operation (speed, direction of travel), chassis, tops, car equipment, video and audio, atmospheric environment sent from vehicle terminal;
- 2** Be able to display dynamic track of fire vehicle. Have playback function of historical tracks;
- 3** Have monitoring management function for fire vehicles of different levels, different areas and particular fire vehicle.

5.6.2 Transmission function of firefighting and rescue information for fire vehicle management sub-system shall meet following requirements:

- 1** Be able to accept and display operational states such as stand-by, dispatch, underway, arrival, water output, water being carried, water stop, return,

route.

5.6.4 Performances of fire vehicle management sub-system shall meet following requirements:

- 1 Allowable horizontal deviation of fire vehicle positioning shall be $\pm 15\text{m}$;
- 2 Start time of vehicle terminal system shall not exceed 90s;
- 3 Start time of positioning function of vehicle terminal shall not exceed 180s;
- 4 Be able to simultaneously monitor positions, states of fire vehicles not less than 2 firefighting and rescue sites.

5.7 Fire command and decision-making supporting sub-system

5.7.1 Fire command and decision-making supporting sub-system shall be able to search and inquire information specified in 5.8.3~5.8.7 of this Code.

5.7.2 Pre-arranged plan management function of fire command and decision-making supporting sub-system shall meet following requirements:

- 1 Be able to provide template, prepare various pre-arranged firefighting and rescue plans in jurisdiction or cross zone, and build pre-arranged plan library;
- 2 Be able to perform alignment match based on input conditions such as type and level of disaster. Find corresponding pre-arranged plan;
- 3 Be able to edit and modify based on one pre-arranged plan to form a new pre-arranged plan;
- 4 Be able to make home or inter-view control authority according to pre-arranged plan. Provide functions such as addition, modification and deletion;
- 5 Have output functions such as download, print of pre-arranged plan.

5.7.3 Auxiliary decision-making function of fire command and decision-making supporting sub-system shall meet following requirements:

- 1 Be able to collect data of entry fire and other disasters as well as ground environment information;
- 2 Be able to utilize firefighting and rescue model, expert knowledge, typical case to evaluate development trends and consequences of fire and other disasters;
- 3 Be able to provide corresponding disposal measures on fire and other

functions.

5.8.2 Information classification and encoding, data structure, information exchange standards of command information management sub-system shall comply with provisions of relevant current national standards.

5.8.3 Information of fire and other disasters shall contain alarm acceptance situation, type of fire and other disasters, level of fire and other disasters.

5.8.4 Fire resource information shall contain information such as fire strength, fire vehicle status, firefighting and rescue equipment, fire water source, fire extinguishing agent, firefighting and rescue related organization, firefighting and rescue expert, and fighting protection.

5.8.5 Fire command and decision-making supporting information shall contain information such as key fire safety key organization, hazardous chemicals, various fire and disaster characteristics, firefighting and rescue techniques and tactics, and meteorology.

5.8.6 Firefighting and rescue action information shall contain pre-arranged plan information of various firefighting and rescues, force dispatch and firefighting and rescue situation.

5.8.7 Firefighting and rescue record and statistical information shall contain voice-recording and time-recording of alarm acceptance and alarm processing, firefighting and rescue record information, statistical information of firefighting and rescue.

5.9 Geographical fire information sub-system

5.9.1 Geographical fire information sub-system shall be able to associated and used with fire alarm acceptance sub-system, and display following information:

- 1** Position and display geographical location of landline telephone for alarm and mobile phone for alarm;
- 2** Position and display geographical location of sites of fire and other disasters;
- 3** Display information such as roads, fire water sources, buildings (structures) of sites of fire and other disasters;
- 4** Search and display distribution information of fire strength, firefighting and rescue equipment, fire extinguishing agent, public security police force, firefighting and rescue related organization;
- 5** Display best driving route, driving distance and time for fire vehicle to arrive at the scene.

5.9.8 Geographical fire information sub-system shall, at national level, use topographic map data not less than 1:250000; at provincial (autonomous regional) level, use map data not less than 1:50000; at urban level, use map data not less than 1:2000; at suburb, rural level, use map data not less than 1:10000.

5.9.9 Map data display and control function of geographical fire information sub-system shall meet following requirements:

- 1 Display of map data shall contain street name, starting point, ending point, street level, length, width, intersection, road condition, etc.;
- 2 Wide-area fire maps can display administrative areas as well as distribution of roads, fire water sources and fire stations;
- 3 Alarm-acceptance fire maps can display fire station area in jurisdiction as well as roads, fire water sources, key fire safety organizations, etc.;
- 4 Firefighting area maps can display fighting areas and roads that take locations of fire and other disasters as center, fire water sources, buildings (structures), force deployment and other related information;
- 5 Have map zoom-in, zoom-out, panning, roaming functions;
- 6 Be able to mark and set symbols, texts to display map key elements;
- 7 Be able to automatically switch image layers or regions according to display scope and proportional scale;
- 8 Be able to support image overlay display.

5.9.10 Address matching analysis and positioning function of geographical fire information sub-system shall meet following requirements:

- 1 Be able to set combination conditions for fuzzy query;
- 2 Be able to perform precise or fuzzy positioning on map according to names or addresses of roads, communities, organizations, water sources, fire hydrants, fire stations.

5.9.11 Measuring and analyzing function of geographical fire information sub-system shall meet following requirements:

- 1 Be able to perform distance measurement to targets such as roads, fire water sources, buildings (structures);
- 2 Be able to perform area measurement to targets such as roads, fire water sources, buildings (structures);

- 3 Date, clock;
- 4 Current weather, temperature, humidity, wind direction, wind power;
- 5 Information of current fire and other disasters;
- 6 Statistical data of firefighting and rescue;
- 7 Image information specified in 5.5.1~5.5.7 of this Code;
- 8 Information of business application systems such as fire alarm acceptance, dispatch command, on-sire command.

5.10.4 Hardware and software equipment of fire information display sub-system shall comply with provisions of relevant current national standards.

5.10.5 Technical performances of fire information display sub-system shall meet following requirements:

- 1 Be able to support various resolution signals from 640×480 to 1600×1200;
- 2 Screen brightness can adapt to high illumination environment. Brightness uniformity shall be greater than 90%;
- 3 Screen horizontal viewing angle is 180°. Vertical viewing angle is not less than 80°;
- 4 Be able to support protocols such as Control Protocol/Internet Protocol (TCP/IP). Network interface shall be 10M/100M Ethernet;
- 5 Have modular structure that is easy to overhaul;
- 6 Seam clearance of large screen projection wall shall not exceed 1mm;
- 7 Use graphical interface that is fully in Chinese for easy operation and control.

5.11 Fire wire communication sub-system

5.11.1 Fire wire communication sub-system shall have following calling lines for fire alarm:

- 1 Voice communication line that is connected to urban public telephone network;
- 2 Voice communication line that is connected to particular telephone network;
- 3 Voice, data communication lines that are connected to alarm terminal of urban fire remote monitoring system;

- 5 Be able to perform roll-polling calls to preset multiple telephones;
 - 6 Have functions of monitoring, forcible-inserting, forcible-demolishing and calling-back after hanging up;
 - 7 Be able to transfer between seats to complete transfer, pick-up functions. Perform synchronization transfer of calling data during this process;
 - 8 Have function of telephone traffic statistics to count data such as number of incoming calls, number of connections, number of queues, number of early releases, and average call duration;
 - 9 Telephone alarm connection has the fourth intercept function;
 - 10 Accept alarm telephone number sent from communication network inter-office signaling.
- 5.11.8** Queue way for incoming fire alarm call shall meet following requirements:
- 1 When seats are busy, it shall be able to queue up incoming fire alarm calls and send a voice prompt or ring back tone to user who is queuing up;
 - 2 Alarms from key organizations can be assigned preferentially;
 - 3 Incoming alarms of different office orientations can be assigned preferentially;
 - 4 When seats are off, incoming fire alarm calls cannot be assigned.
- 5.11.9** When there are incoming fire alarm calls, seat assignment can use following modes:
- 1 Assign successively to each seat according to a proper sequence in cycles;
 - 2 Assign successively according to a set fixed sequence;
 - 3 Preferentially assign to the seat with longest idling time;
 - 4 When assigning to one group of seats simultaneously, the first answerer shall answer the call;
 - 5 Assign according to seat business type and skill level.

5.12 Fire wireless communication sub-system

5.12.1 Fire wireless communication network shall meet following requirements:

- 1 Be able to set independent private fire wireless communication network or join public security cluster wireless communication system. In system, set

- 2 Level-2 fire networks (fireground command networks) are applicable to ensure communication between fire commanders at all levels within fire scene and other disaster scenes;
- 3 Level-3 fire networks (firefighting and rescue combating networks) are applicable to communication between each commander in fire brigade, combat squad leader, driver, combatant of special service rescue class within fire scene and other disaster scenes.

5.12.3 Data communication function of fire wireless communication sub-system shall meet following requirements:

- 1 Be able to establish mobile data communication link between fire scene and other disaster scenes AND fire communication and command center;
- 2 At fire scene and other disaster scenes, be able to realize inquiry, transmission of information such as disposal plan, fireground firefighting and rescue action plan, command decision data for fire and other disasters;
- 3 Have mobile access safety measures during data communication through public network;
- 4 Data communication transmission rate and bit error rate shall be able to meet requirements for firefighting and rescue command.

5.12.4 Working frequency of fire wireless communication sub-system shall meet following requirements:

- 1 Be able to fully utilize particular fire frequency networking;
- 2 Be able to apply civil frequency of which background noise is small, transmission characteristics are good, and it is not in same frequency band as civilian high-power transmitting equipment, according to needs and local conditions;
- 3 Particular frequency points of cross-zone fire joint communication must not set any control signaling;
- 4 Each fire station shall have a particular signal channel; or make each fire station have a particular signal channel through frequency reuse of fire station without supporting;
- 5 Number of preset signal channels of wireless station shall not be less than 16.

5.12.5 Working environment of fire wireless communication sub-system shall meet following requirements:

6 Basic environment demands of system

6.1 Computer communication network

6.1.1 Composition of computer communication network shall meet following requirements:

- 1** Network shall be switch-mode fast Ethernet;
- 2** Use star topology structure;
- 3** LAN backbone network line rate shall not be lower than 1000Mbit/s, not less than 100Mbit/s to each terminal computer network interface;
- 4** Properly divide virtual local area network (VLAN) according to functions of different components in system and data processing flow.

6.1.2 Computer communication network performances shall meet following requirements:

- 1** Be able to meet application requirements for multiple businesses such as voice, data and image;
- 2** Have network-unified security policy, quality of service (QoS) policy, traffic management policy, and system management policy;
- 3** Be able to ensure efficient transmission, strong timeliness and low latency of various business data streams;
- 4** Have good expansion performance. Be able to support future expansion needs.

6.2 Power supply of system

6.2.1 Power supply of system shall meet following requirements:

- 1** Power supply of fire communication and command center shall be designed according to level-1 load;
- 2** Major power of provincial (autonomous region) fire communication and command center and fire communication and command center in large and medium-sized cities shall be supplied by two stable and reliable independent powers. Set emergency power. Major power of other urban fire communication and command centers shall not be less than two-loop power supply;
- 3** System distribution lines shall be separated from other distribution lines. They shall be equipped with automatic switching device at the last level of

9 Fire station shall set up a communication-specific AC distribution box. Its power supply capacity shall not be less than $5\text{kV} \cdot \text{A}$.

6.2.2 Uninterruptible power supply shall meet following requirements:

- 1** AC power supply equipment that has requirements for being uninterruptible and no transient shall use uninterruptible power;
- 2** When alarm acceptance, dispatch systems use online uninterruptible power supply, after external mains power is cut off, it shall be able to ensure that normal power supply time of all devices is not less than 12h. When there is backup power generation system, uninterruptible power supply shall ensure that normal power supply time is not less than 2h.

6.3 Lightning proof and grounding of system

6.3.1 Lightning proof of system shall comply with relevant provisions of current national standard GB 50343 "Technical code for protection of building electronic information system against lightning".

6.3.2 Grounding of system shall meet following requirements:

- 1** Various groundings such as machine room AC function grounding, protective earthing, DC function grounding, lightning proof grounding shall share grounding grid. Grounding resistance shall be determined according to minimum value;
- 2** When grounding adopts split mode, grounding resistance of each grounding system shall be determined according to minimum value required by equipment;
- 3** Building lightning proof grounding resistance shall not exceed 10Ω ;
- 4** Do equipotential bonding in machine room. Set equipotential bonding terminal box. A machine room where working frequency is less than 30kHz and number of devices is small can use single-point grounding mode. A machine room where working frequency is greater than 300kHz and number of devices is large can use multiple-point grounding mode;
- 5** In machine room, grounding trunk and grounding terminal box shall be set;
- 6** When each system shares grounding grid, it shall use grounding conductor to respectively connect to each system.

6.3.3 Grounding body, grounding lead-in wire, grounding total collecting wire and grounding wire in share grounding system shall meet following requirements:

time and material is not easy to dust;

- 4 Raised floors in machine room can be made of steel, aluminum or other flame-retardant materials with sufficient mechanical strength. Conductive floor surface shall be made of static conductive material. Do not expose metal parts.

6.5.7 Device room illumination of fire communication and command center and fire station shall meet following requirements:

- 1 200lx~500lx for horizontal working surface 0.75m from floor surface;
- 2 50lx~200lx for vertical working surface 1.40m from floor surface.

6.5.8 Device layout of system machine room shall meet following requirements:

- 1 Devices of machine room shall be arranged according to system configuration and management needs. When several systems share a machine room, it shall be arranged according to functional division;
- 2 In areas where basic intensity of earthquake is 7 degrees and more, installation of device in machine room shall take earthquake-resistance measures;
- 3 Height of wall-mounted device center shall be 1.5m from ground. Distance from side surface to wall shall not exceed 0.5m.

6.5.9 Spacing and passage of device in machine room shall meet following requirements:

- 1 When cabinet front is arranged oppositely, net distance shall not be less than 1.5m;
- 2 For device that is opened from back, distance from back to wall shall not be less than 0.8m;
- 3 Distance from side surface of cabinet to wall shall not be less than 0.5m. Net distance from side surface of cabinet to other devices shall not be less than 0.8m. When repair testing is required, distance from wall shall not be less than 1.2m;
- 4 When total length of devices arranged side by side is greater than 4m, channels shall be set on both sides;
- 5 Clear width of passage in machine room shall not be less than 1.2m.

6.5.10 Device rooms of fire communication and command center and fire station shall avoid strong electromagnetic field interference; or take effective

7 Requirements for general system devices and software

7.1 General system device

7.1.1 Hardware used in fire communication and command system such as computers, input devices, output devices, data storage and data backup devices, and uninterruptible power supplies, shall be products that have passed China's compulsory product quality certification.

7.1.2 Products used in fire communication and command system such as telecommunication terminal equipment, wireless communication equipment, satellite communication equipment and network equipment involved in interconnection of networks shall have a network access license issued by competent national authority.

7.1.3 Electrical materials such as switch sockets, terminal blocks (boxes), wire and cable, and wire-case bridges used in fire communication and command system shall be products that comply with relevant national standards. Products subject to production license or safety certification system shall have a license number or safety certification mark.

7.2 System software

7.2.1 Operating system software, platform software shall have a software use (authorization) license.

7.2.2 Application software shall provide technical documentation such as installation procedures and program structure descriptions and use maintenance manuals.

7.2.3 Application software shall be tested by relevant national product quality supervision and inspection or software evaluation agency in accordance with technical requirements of relevant standards.

7.2.4 Application software's man-machine interface shall be displayed in Chinese. Interface is clear. Style is uniform. Operation is easy.

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