

Social Organization Standard

T/GBA 002—2021

Technical requirements and test methods
for mobile terminals used in mobile
electronic sports (e-sports) (draft for
comments)

移动电竞赛事用机技术要求和测试方法（征求
意见稿）

(English Translation)

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Foreword

This standard is drafted in accordance with the rules given in the GB/T 1.1-2020 *Directives for standardizing-Part 1:Rules for the structure and drafting of standardizing documents*.

This standard was proposed by Shenzhen Tencent Computer Systems Co., Ltd.

This standard was prepared by Guangdong-Hong Kong-Macao Greater Bay Area Standard Innovation Alliance.

This standard authorizes the organization partners and all member units of Guangdong-Hong Kong-Macao Greater Bay Area Standard Innovation Alliance to use it, the organization partners shall adopt and convert this standard into their own social organization standard, and disclose the basic information of the standard on the National Information Platform of Social Organization Standard.

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

Introduction

With the development of mobile games and mobile intelligent terminal industry and technology, mobile electronic sports (e-sports) have also developed rapidly in the past two years, achieved a huge growth, overturned the PC-based e-sports market and become a new pillar of the e-sports industry.

The technological development of mobile intelligent terminals is the foundation for the prosperous of mobile e-sports industry; more and more manufacturers of mobile intelligent terminals launch terminal devices suitable for mobile games. However, there is still a lack of the technical requirements of equipment performance, security and anti-interference for mobile terminals used in mobile e-sports. At present, there is no standard to require and standardize the technical requirements and test methods of mobile terminals used in mobile e-sports.

This standard specifies the technical requirements and test methods for mobile terminals used in mobile e-sports, including equipment technical requirements, system requirements, security requirements and the corresponding test methods for mobile terminals. This standard will help the organizer and operator of mobile e-sports select mobile terminal devices to carry out the event, and provide technical reference for mobile terminal equipment manufacturers to improve comprehensive performance of devices and conduct targeted optimization and testing, so as to guide the orderly and healthy development of the whole mobile e-sports industry and improve the experience of organizing and watching events.

The technical requirements and test methods for mobile terminals used in mobile electronic sports(e-sports)

1 Scope

This standard specifies the technical requirements and test methods for mobile terminals used in mobile e-sports.

This standard is applicable to the organizer and operator of mobile electronic sports selecting mobile terminal devices to carry out the event, and mobile terminal equipment manufacturers improving comprehensive performance of devices and conducting targeted optimization and testing for mobile electronic sports.

2 Standardization and Reference Document

There is no standardization and reference document for this standard.

3 Terms and Definitions

For the purposes of this document, the following terms and definitions apply.

3.1

mobile electronic sports

an intellectual competition between people in a limited time by means of mobile information technology and mobile terminal devices, adopting unified competition rules in the virtual environment built by information technology

3.2

mobile terminals used in mobile electronic sports

a mobile terminal device approved by the organizer of mobile electronic sports to complete competition by carrying electronic games in mobile electronic sports
It is refers to as mobile terminal in this document.

3.3

screen refresh rate

the number of times a screen is refreshed per second

3.4

stutter rate

the proportion of pause time in total time

3.5

bluetooth headset sound delay

the time difference between clicking the screen and the sound of the Bluetooth headset

3.6

temperature rise

the highest temperature of the mobile terminal during electronic sports in a specified initial temperature environment

3.7

battery endurance

the ability of the mobile terminal to ensure that its battery can last for a long time

Note: In this document, battery endurance is demonstrated by two indicators: power consumption rate and charging time.

3.8

power consumption rate

the percentage of battery power of the mobile terminal consumed per unit of time during mobile electronic sports

Note: In this document, the unit of time is 1 hour.

3.9

charging time

the time it takes for a mobile terminal from battery depletion to full charge

3.10

frame rate

the number of frames a game sends to the screen per second

3.11

5G private network

a private network that provides 5G network services for the mobile terminal, the network is built entirely independently or some of the network elements are shared with the operator's public network

3.12

5G private network SIM card

the SIM card used to register the 5G private network for the mobile terminal

3.13

data centric

the mode in which the mobile terminal still stay on the current network when the 5G network does not support voice services

4 Abbreviation

For the purposes of this document, the following abbreviation apply.

Global Navigation Satellite System (GNSS)

Wireless Local Area Network (WLAN)

Near-Field Communication (NFC)

Frames Per Second (Fps)

Wireless Fidelity (WiFi)

IP Multimedia Subsystem (IMS)
 Application (APP)
 Ultra-reliable and Low Latency Communications (uRLLC)
 Software Development Kit (SDK)
 International Mobile Equipment Identity (IMEI)
 Identity Document (ID)
 Open Anonymous Device Identifier (OAID)
 International Mobile Subscriber Identifier (IMSI)
 Google Advertising Device Identifier (GAID)
 Environmental Characteristic Value (ECV)
 Physical Cell Identifier (PCI)
 Public Land Mobile Network (PLMN)
 Absolute Radio Frequency Channel Number (ARFCN)
 Access Point Name (APN)
 Stand Alone (SA)
 Media Access Control Address (MAC)
 Read-Only Memory (ROM)
 Central Processing Unit (CPU)

5 Technical Requirements

5.1 Equipment Technical Requirements for Mobile Terminals

5.1.1 Screen Refresh Rate

The screen refresh rate of the mobile terminal shall support 60Hz, 120Hz; and shall conform to the relevant requirements of the organizer.

5.1.2 Frame Rate

The frame rate of the mobile terminal used in mobile e-sports shall support 60fps, 90fps and 120fps, etc., count the average frame rate, the specific requirements in Table 1, and shall meet the relevant requirements of the organizer.

Table 1 Frame Rate Requirements

Serial number	frame rate	average frame rate
1	60fps	≥ 59 fps
2	90fps	≥ 88 fps
3	120fps	≥ 115 fps

5.1.3 Stutter Rate

Stutter rate is the proportion of pause time in total time. The stutter rate of the mobile terminal shall not be higher than 0.03%, and shall meet the relevant requirements of the organizer.

5.1.4 Screen Brightness

The maximum screen brightness of the mobile terminal in indoor environment shall not be less than 450nit.

The mobile terminal shall support screen brightness adjustment. It shall support locking brightness value during the game to avoid sudden change of screen brightness, and shall meet the relevant requirements of the organizer.

5.1.5 Temperature Rise

The maximum surface temperature of the mobile terminal shall not be higher than 48°C, and shall meet the relevant requirements of the organizer.

5.1.6 Touch Response

Click delay of the mobile terminal during the game shall be no more than 90ms, slide delay shall be no more than 190ms and shall meet the relevant requirements of the organizer.

5.1.7 Bluetooth Headset Sound Delay

The mobile terminal shall support Bluetooth headset sound output; the sound delay of the Bluetooth headset shall be no more than 500ms, and shall meet the relevant requirements of the organizer.

5.1.8 Battery Endurance

5.1.8.1 Power Consumption Rate

The power consumption rate of the mobile terminal shall be no more than 30%/h, and shall meet the relevant requirements of the organizer.

5.1.8.2 Charging Time

The charging time of the mobile terminal shall be no more than 1h, and shall meet the relevant requirements of the organizer.

5.1.9 Network Support

The mobile terminal shall support various network connection modes, such as WLAN, data network, specific requirements are as follows, and shall meet the relevant requirements of the organizer.

- a) WLAN supports WiFi 2.4G/5G;
- b) The data network should support 5G and shall meet the relevant requirements in “5.1.12 Requirements for 5G Mobile Terminals” .

5.1.10 Docking Station Support

The mobile terminal should support docking station, mainly including the support for type C network card, audio output, charging, digital audio and video interface, etc, and shall meet the relevant requirements of the organizer.

5.1.11 Equipment Fairness

To ensure fairness, additional devices such as heat dissipation, gamepad, shoulder key, key macro, key mapping and so on shall not be allowed to use in the competition, and shall meet the relevant requirements of the organizer.

5.1.12 Requirements for 5G Mobile Terminals

5.1.12.1 Overview

This part is applicable for the reference when the organizer of mobile e-sports tournaments select mobile terminal devices to carry out the event, and shall meet the relevant requirements of the organizer.

5.1.12.2 5G Networking and 5G Frequency Band Support

The 5G mobile terminal used in mobile e-sports shall support 5G SA network access; 5G SA working frequency band shall support N41 and N78, should support N79, and shall meet the relevant requirements of the organizer.

5.1.12.3 5G Private Network Support

The mobile terminal shall support 5G private network for the tournaments and accept network service, and conform to the following requirements:

- a) The mobile terminal shall support 5G private network SIM card and identify the parameters in the SIM card, such as special PLMN;
- b) The mobile terminal shall support the addition of a private access point (APN) of 5G private network;
- c) The mobile terminal shall support manual search of network, searching for 5G private network for the tournaments.

5.1.12.4 Core Network Access Support without IMS

The mobile terminal shall support the Data Centric Mode through secret code, setting or APP setting and support the normal access and operation of 5G private network without IMS network element.

5.1.12.5 Frequency Point Locking Function Support

The mobile terminal shall support locking 5G private network frequency point through secret code, setting or APP to prevent network instability caused by mobility.

5.1.12.6 Cell Locking Function Support

The mobile terminal shall support locking 5G private network cell through secret code, setting or APP to prevent network instability caused by mobility.

5.1.12.7 Ultra-low Latency Function Support

The Mobile terminal should support uRLLC, mini slot and dynamic time slot allocation, etc.

5.1.13 Screen Eye Protection

Mobile terminals shall support eye protection function, which can be turned on and work during the game, and shall meet the relevant requirements of the organizer.

5.2 System Requirements for Mobile Terminals

5.2.1 Anti-disturb

The mobile terminal shall support anti-disturb function; the mobile terminal shall not display any reminder and notice, including incoming call, alarm clock, pop-up window, etc. once the player starts the game.

5.2.2 Mistouch Prevention

The mobile terminal shall support mistouch prevention function; the mobile terminal shall block the functions, including physical keys, gesture operation and virtual keys, to prevent disturbing the game once the player starts the game. After the tournaments, the mobile terminal may restore the key function through some operations, such as multiple pressing keys and multiple sliding screens, etc.

5.3 Security Requirements for Mobile Terminals

5.3.1 Data Security

The information contained in the mobile terminal shall be strictly confidential and shall not be made public, and it is prohibited to use relevant information to conduct targeted data analysis on the characteristics of players.

Note: “Targeted” refers to the relevant behavior affecting the tournaments by using relevant data analysis.

The equipment information includes but is not limited to:

- a) Application basic information: application list, application ID information, SDK version, system update settings, application settings (region, language, time zone, font), time when the application enters or exits the foreground, and application status records (such as download, installation, update, deletion);
- b) Position information: information data generated by location related services;
- c) Log information: use information about certain features, APPs and websites, such as Cookie and other identifier technology, Internet Protocol (IP) address, network request information, temporary message history, standard system log, error crash information, log information generated by using the services (registration time, access time, activity time, etc.);
- d) Device and SIM card related information: such as IMEI/OAID number, GAID number, IMSI number, MAC address, serial number, system version and type, ROM version, system version, system ID, space ID, SIM card operator and home location, screen display information, device input information, device activation time, device manufacturer information and model name, network operator, connection type, hardware basic configuration information, sales channel and usage related information (such as CPU, memory, power usage, device resolution, device temperature, camera lens model, number of brightening and unlocking screen, touch screen operation track and frequency);
- e) Image information: image information of players by front and rear cameras;
- f) Other information: environmental characteristic value (ECV), i.e. information generated from account number, device identification, WLAN connection and geographic location information.

5.3.2 Background Program Security

During the competition, the mobile terminal shall not automatically or passively run any third-party program in the background other than approved, so as to affect the players' competition.

The mobile terminal shall realize “guided access” or “game mode” to particular programs (game client of the competition project) to avoid all kinds of interference of third-party programs on players during the competition, including but not limited to: program reminder, advertising push, call reminder, short message reminder, etc. of the equipment, and meet mistouch prevention function at the same time.

6 Test Methods for Mobile Terminals

6.1 Overview

The test of mobile terminals mainly includes: function and performance test of the mobile terminal, system test of the mobile terminal, players' simulation competition test, pre-test and debugging of the referee.

The function and performance test shall conform to the requirements of 6.2; the system test shall conform to the requirements of 6.3; the players' simulation competition test shall conform to the requirements of 6.4; the referee's pre-test and debugging of the referee shall conform to the requirements of annex A.

6.2 Function and Performance Test for Mobile Terminals

6.2.1 Screen Refresh Rate Test

6.2.1.1 Overview of Test

The higher the screen refresh rate, the smoother the game screen

6.2.1.2 Test Procedures

Enter the setting page of the mobile terminal to view the system refresh rate.

6.2.2 Frame Rate Test

6.2.2.1 Preset Conditions

The test environment shall conform to the following requirements:

- a) Temperature: $25^{\circ}\text{C} \pm 1^{\circ}\text{C}$;
- b) Humidity: 50%~90%.

The setting of mobile terminal shall conform to the following requirements:

- a) Before the test, the mobile terminal shall be turned on and let it sit for half an hour in the above test environment, or make temperature of the mobile terminal consistent with the environment temperature by other means;
- b) Before the test, the battery power of the mobile terminal shall be 50%~95%;
- c) The mobile terminal shall not be charged;
- d) When the screen of mobile terminal displays pure white, the screen brightness shall be $280\text{nit} \pm 5\text{nit}$;
- e) The volume of the mobile terminal is set to the maximum volume;
- f) The refresh rate, resolution and frame rate of the mobile terminal shall conform to the requirements of 5.1.1 and 5.1.2 respectively;
- g) The mobile terminal shall be connected to WLAN, the signal strength of WLAN shall be more than -50dbm , and the mobile terminal shall turn off Bluetooth, GNSS and NFC;
- h) The game designated by the organizer of mobile e-sports shall be run, and the organizer should provide standard test video;
- i) The game shall turn on all special effects;
- j) Clean up the background and keep only the test tools and tested games running;
- k) All kinds of terminals shall ensure that the games, methods and versions used in the testing case are consistent;
- l) This testing case is applicable to all kinds of games.

6.2.2.2 Test Procedures

For live game, the test shall be carried out according to the following steps:

- a) Turn on the test tool PerfDog, turn on the tested game, log in and enter the main interface, and turn on the background music;
- b) The frame rate is set to 60/90/120, and other settings are the highest settings, such as image quality, resolution, etc;
- c) Click to enter the game, after the game is loaded, purchase the equipment required by the game, set various parameters and functions, and turn on the recording function; After entering the game, the qualifying game is carried out normally, and the test machine shall traverse all game scenes as far as possible;
- d) The test time shall be one hour, and each round shall be at least 15 minutes;
- e) Check whether the test results conform to the standard requirements through the test tool or web page (non-game loading scenarios shall not be counted in the data).

For game playback, the test shall be carried out according to the following steps:

- a) Turn on the test tool PerfDog, turn on the tested game, log in and enter the main interface, and turn on the background music;
- b) The frame rate is set to 60/90/120, and other settings are the highest settings, such as image quality, resolution, etc;
- c) Click to enter the game and viewing -> local playback or spectators, turn on the recording tool after the game is loaded;
- d) The test time shall be one hour, and each round shall be watched for at least 15 minutes;
- e) Check whether the test results conform to the standard requirements through the test tool or web page.

6.2.3 Stutter Rate Test

6.2.3.1 Overview of Test

The more times the stuck or severely stuck, the more obvious the user feels stuck.

Refer to PerfDog for details.

6.2.3.2 Preset Conditions

The test environment shall conform to the following requirements:

- a) Temperature: $25^{\circ}\text{C} \pm 1^{\circ}\text{C}$;
- b) Humidity: 50%~90%.

The setting of the mobile terminals shall conform to the following requirements:

- a) Before the test, the mobile terminal shall be turned on and let it sit for half an hour in the above test environment, or make temperature of the mobile terminal consistent with the environment temperature by other means;
- b) Before the test, the battery power of the mobile terminal shall be 50%~95%;
- c) The mobile terminal shall not be charged;
- d) Cooling equipment such as electric fans shall not be used;
- e) When the screen of mobile terminal displays pure white, the screen brightness shall be $280\text{nit} \pm 5\text{nit}$;
- f) The refresh rate and frame rate shall conform to the requirements of 5.1.1 and 5.1.2 respectively;
- g) The volume of the mobile terminal is set to the maximum volume;

- h) The mobile terminal shall be connected to WLAN, the signal strength of WLAN shall be more than -50dbm , and the mobile terminal shall turn off GNSS and NFC;
- i) The game designated by the organizer of mobile e-sports shall be run;
- j) The game shall turn on all special effects;
- k) Clean up the background and keep only the tested games and test tools running.

6.2.3.3 Test Procedures

The test shall be carried out according to the following steps:

- a) By using the test tools, turn on the tested game, log in and enter the main interface;
- b) The frame rate is set to test frame rate, and other settings are the highest settings, such as image quality, anti-aliasing, etc;
- c) Click to enter the game, turn on the test tool after the game is loaded;
- d) Test for one hour, pause the data collection of test tools if the game character dies midway, and continue to collect data after re-entering the game;
- e) After one hour of testing, the test tool saves the data;
- f) Check the test results through the test tool or web page.

6.2.4 Screen Brightness Test

6.2.4.1 Preset Conditions

The test environment shall conform to the following requirements:

- a) Temperature: $25^{\circ}\text{C} \pm 3^{\circ}\text{C}$;
- b) Humidity: 50%~90%;
- c) Environment brightness: the surface brightness of the mobile terminal shall be less than 1lux when the screen is off.

The setting requirements of mobile terminal:

- a) Turn off the automatic brightness adjustment function of the mobile terminal;
- b) The screen film of the mobile terminal needs to be removed;
- c) Set the brightness of the mobile terminal to the maximum state;
- d) Before the test, the battery power of the mobile terminal shall be 50%~95%;
- e) Turn on the picture to be tested and warm up for 5 minutes before starting the test.

6.2.4.2 Test Procedures

The test shall be carried out according to the following steps:

- a) Select the pure white picture for test, and use the brightness meter to collect the brightness value at the center of the screen of the mobile terminal;
- b) Test for 5 times and take the average value;
- c) Check whether there is a switch to lock the brightness in the mobile terminal settings.

6.2.5 Temperature Rise Test

6.2.5.1 Preset Conditions

The test environment shall conform to the following requirements:

- a) Temperature: $25^{\circ}\text{C} \pm 1^{\circ}\text{C}$;
- b) Humidity: 50%~90%.

The setting of the mobile terminals shall conform to the following requirements:

- a) Before the test, the mobile terminal shall be turned on and let it sit for half an hour in the above test environment, or make temperature of the mobile terminal consistent with the environment temperature by other means;
- b) Before the test, the battery power of the mobile terminal shall be 50%~95%;
- c) The mobile terminal shall not be charged;
- d) Cooling equipment such as electric fans shall not be used;
- e) When the screen of mobile terminal displays pure white, the screen brightness shall be 280nit \pm 5nit;
- f) The refresh rate and frame rate shall conform to the requirements of 5.1.1 and 5.1.2 respectively;
- g) The volume of the mobile terminal is set to the maximum volume;
- h) The mobile terminal shall be connected to WLAN, the signal strength of WLAN shall be more than -50dbm, and the mobile terminal shall turn off Bluetooth, GNSS and NFC;
- i) The game designated by the organizer of mobile e-sports shall be run, and the organizer should provide standard test resources;
- j) The game shall turn on all special effects;
- k) Clean up the background and keep only the tested games and test tools running.

6.2.5.2 Test Procedures

The test shall be carried out according to the following steps:

- a) Use the infrared temperature gun to test the front, back and each side of the mobile terminal to ensure that all tested temperatures conform to the temperature requirements of 4.1.5;
- b) Turn on the game and enter the game center, play back the game video or watch the game (depending on the functions provided by the game), and start timing;
- c) Every five minutes, test the front, back and each side of the mobile terminal with infrared temperature gun and record the maximum temperature;
- d) The duration of the test is 1h \pm 1min;
- e) After the test, use the infrared temperature gun to test the front, back and each side of the mobile terminal, and record the maximum temperature;
- f) The maximum value of the recorded temperature is the test result, and the test result shall conform to the requirements of 5.1.5.

6.2.6 Touch Response Test

6.2.6.1 Preset Conditions

The test environment shall conform to the following requirements:

- a) Temperature: 25°C \pm 3°C;
- b) Humidity: 50%~90%.

The setting requirements of mobile terminal:

- a) Before the test, the mobile terminal shall be turned on and let it sit for half an hour in the above test environment, or make temperature of the mobile terminal consistent with the environment temperature by other means;
- b) Before the test, the battery power of the mobile terminal shall be 50%~95%;
- c) The mobile terminal shall not be charged;
- d) Cooling equipment such as electric fans shall not be used;

- e) When the screen of mobile terminal displays pure white, the screen brightness shall be 280nit ± 5 nit;
- f) The refresh rate and frame rate shall conform to the requirements of 5.1.1 and 5.1.2 respectively;
- g) The mobile terminal shall turn off GNSS, NFC and Bluetooth;
- h) The game designated by the organizer of mobile e-sports shall be run, and the organizer should provide standard test resources;
- i) The game shall turn on all special effects;
- j) Clean up the background and keep only the tested games running.

6.2.6.2 Test Procedures

The test shall be carried out according to the following steps:

- a) Turn on the game to be tested and select the game interface that does not need networking;
- b) Shoot 240 frames with a high-speed camera and click with a manipulator;
- c) Record the time t_1 when the manipulator touches the screen, the time t_2 when the game starts to respond to the first frame of the action, and the click delay $t=t_2-t_1$;
- d) Continuously test for 20 times (let the mobile terminal sit for 5 minutes after each test), and calculate the average click delay t ;
- e) Shoot with a high-speed camera, set the sliding screen speed of the manipulator (such as 80mm/s, etc.) according to the actual competition game, and use the manipulator to do sliding action;
- f) Record the time t_3 when the manipulator touches the screen, the time t_4 when the game starts to respond to the first frame of the action, and the sliding delay $t=t_4-t_3$;
- g) Continuously test for 20 times (let the mobile terminal sit for 5 minutes after each test), calculate the average sliding delay t .

6.2.7 Bluetooth Headset Sound Delay Test

6.2.7.1 Preset Conditions

The test environment shall conform to the following requirements:

- a) Temperature: $25^{\circ}\text{C} \pm 1^{\circ}\text{C}$;
- b) Humidity: 50%~90%.

The setting of the mobile terminals shall conform to the following requirements:

- a) Before the test, the mobile terminal shall be turned on and let it sit for half an hour in the above test environment, or make temperature of the mobile terminal consistent with the environment temperature by other means;
- b) Before the test, the battery power of the mobile terminal shall be 50%~95%;
- c) The mobile terminal shall not be charged;
- d) After the mobile terminal is connected to the Bluetooth headset, the volume is set to 100%;
- e) The battery power of Bluetooth headset is more than 50%;
- f) The mobile terminal shall be connected to WLAN, the signal strength of WLAN shall be more than -50dbm , and the mobile terminal shall turn off GNSS and NFC;
- g) The game designated by the organizer of mobile e-sports shall be run.
- h) Clean up the background and keep only the tested games and test tools running.
- i) All kinds of terminals shall ensure that the games, methods and versions used in the testing case are consistent;
- j) This testing case is applicable to all kinds of games.

6.2.7.2 Test Procedures

The test shall be carried out according to the following steps:

- a) In a quiet room, turn on the game, turn off the background music, and set the image quality to the highest;
- b) Enter the game match, it is recommended to use the sound obvious operation (such as clicking);
- c) Using 240fps high-speed camera to capture the video, which from the game clicking to the sound output of Bluetooth headset;
- d) Collect data for 10 times, analyze the sampling data by computer, and calculate the time delay from clicking the screen to the sound output of Bluetooth headset.

6.2.8 battery endurance Test

6.2.8.1 power consumption rate

6.2.8.1.1 Preset Conditions

The test environment shall conform to the following requirements:

- a) Temperature: $25^{\circ}\text{C}\pm 1^{\circ}\text{C}$;
- b) Humidity: 50%~90%.

The setting of the mobile terminals shall conform to the following requirements:

- a) Before the test, the mobile terminal shall be turned on and let it sit for half an hour in the above test environment, or make temperature of the mobile terminal consistent with the environment temperature by other means;
- b) Before the test, the battery power of the mobile terminal shall be 50%~95%;
- c) The mobile terminal shall not be charged;
- d) Cooling equipment such as electric fans shall not be used;
- e) When the screen of mobile terminal displays pure white, the screen brightness shall be $280\text{nit}\pm 5\text{nit}$;
- f) The refresh rate and frame rate shall conform to the requirements of 5.1.1 and 5.1.2 respectively;
- g) The volume of the mobile terminal is set to the maximum volume;
- h) The mobile terminal shall be connected to WLAN, the signal strength of WLAN shall be more than -50dbm , and the mobile terminal shall turn off Bluetooth, GNSS and NFC;
- i) The game designated by the organizer of mobile e-sports shall be run, and the organizer should provide standard test video;
- j) The game shall turn on all special effects;
- k) Clean up the background and keep only the tested games and test tools running.

6.2.8.1.2 Test Procedures

The test shall be carried out according to the following steps:

- a) Record the initial percentage of battery power of the mobile terminal P_1 ;
- b) Turn on the game and enter the game center, play back the game video or watch the game (depending on the functions provided by the game), and start timing;
- c) The duration of the test is $1\text{h}\pm 1\text{min}$;
- d) Record the percentage of battery power of the mobile terminal P_2 at the end of the game and the game time duration T ;
- e) The test result of power consumption rate is: $\frac{P_1-P_2}{T}$, which shall conform to the requirements of 5.1.8.1.

6.2.8.2 charging time

6.2.8.2.1 Preset Conditions

The test environment shall conform to the following requirements:

- a) Temperature: $25^{\circ}\text{C} \pm 1^{\circ}\text{C}$;
- b) Humidity: 50%~90%;
- c) The mobile terminal shall be discharged to turn off naturally;
- d) The test shall be carried out with the charger and charging cable attached or specified by the manufacturer of mobile terminals.

6.2.8.2.2 Test Procedures

The test shall be carried out according to the following steps:

- a) Plug the charger into the power supply, connect the charger and mobile terminal with the charging cable, and start timing;
- b) At the end of charging, record the charging time T_C , which shall conform to the requirements of 5.1.8.2.

6.2.9 Network Support Test

6.2.9.1 Preset Conditions

The test environment shall conform to the following requirements:

- a) Temperature: $25^{\circ}\text{C} \pm 1^{\circ}\text{C}$;
- b) Humidity: 50%~90%.

The setting of the mobile terminals shall conform to the following requirements:

- a) Before the test, the mobile terminal shall be turned on and let it sit for half an hour in the above test environment, or make temperature of the mobile terminal consistent with the environment temperature by other means;
- b) Before the test, the battery power of the mobile terminal shall be 50%~95%;
- c) The mobile terminal shall not be charged;
- d) The mobile terminal shall be inserted into the game SIM card, be connected the game private network and WLAN; the signal strength of data network shall be more than -80dbm, the signal strength of WLAN shall be more than -50dbm, and the mobile terminal shall turn off Bluetooth, GNSS and NFC.

6.2.9.2 Test Procedures

6.2.9.2.1 WLAN

The test of WLAN network support shall be carried out according to the following steps:

- a) The mobile terminal is connected to the designated WLAN of the competition;
- b) Download the third-party APP on the mobile terminal, read the signal strength, such as "WiFi assistant" and select "enhance";
- c) Download the third-party APP on the mobile terminal, select the same server node, read the network delay, jitter and packet loss;
- d) Download the third-party APP on the mobile terminal, select the same server node, read the network speed of download and upload, such as "WiFi assistant" and select "enhance".

6.2.9.2.2 5G Private Network

Test according to 6.1.12.

6.2.10 Docking Station Support Test

6.2.10.1 Overview of Test

In order to ensure the stability and improve the appreciation of the mobile e-sports, the mobile terminal needs to support the docking station.

6.2.10.2 Test Procedures

Check whether the mobile terminal supports type c network card, audio output, charging, digital audio and video interface, etc.

6.2.11 Equipment Fairness Test

6.2.11.1 Overview of Test

In order to ensure the fairness of the tournaments, the mobile terminal shall not be used with additional equipment during the competition.

6.2.11.2 Test Procedures

During the competition, the mobile terminal shall not use additional equipment such as heat dissipation, network signal enhancement, gamepad, shoulder key, key macro, key mapping and so on.

6.2.12 5G Mobile Terminals Requirements Test

6.2.12.1 Supporting 5G Private Network

The test shall be carried out according to the following steps:

- a) After installing of 5G private network SIM card on the mobile terminal to be tested, it may identify the SIM card and check the network settings of the SIM card through the settings, rather than the status without SIM card;
- b) Turn on the following steps on the mobile terminal to be tested separately: settings → name of access point, click “+”, then create a new access point, edit and add the network configurations of 5G private network, such as APN name and others; the APN name is specified by the organizer of competition, other APN parameters are the same as the operator's default APN;
- c) Turn on the following steps on the mobile terminal to be tested separately: settings → network operator, click to turn off “automatic selection”; the mobile terminal can manually search the 5G private network of competition provided by the organizer.

6.2.12.2 Supporting Frequency Locking Point

Preset Conditions are as follows:

- a) Download the third-party APP “UXTest” on the mobile terminal to be tested;
- b) The 5G private network SIM card PLMN non-operator's default PLMN has the private APN name; the APN name is specified by the organizer of competition, other APN parameters are the same as the operator's default APN.

Test Procedures are as follows:

- a) Turn on the secret code, setting or APP of frequency locking point on the mobile terminal to be tested, and find ARFCN, enter the frequency point (ARFCN) of 5G private network for the competition, and click “setting” or “locking”;

- b) Turn on the third-party APP “UXTest” on the mobile terminal to be tested, and select to check the “base station signal” ;
- c) Check the service cell information → ARFCN; if the ARFCN value is consistent with the frequency point of 5G private network for competition, it indicates that the mobile terminal to be tested supports frequency locking point.

6.2.12.3 Supporting Cell Locking

Preset Conditions are as follows:

- a) Download the third-party APP “UXTest” on the mobile terminal to be tested;
- b) The 5G private network SIM card PLMN non-operator’s default PLMN has the private APN name; the APN name is specified by the organizer of competition, other APN parameters are the same as the operator's default APN.

Test Procedures are as follows:

- a) Turn on the setting or APP of cell locking on the mobile terminal to be tested, and find PCI, enter the cell ID (PCI) of 5G private network for the competition, and click “setting” or “locking” ;
- b) Turn on the third-party APP “UXTest” on the mobile terminal to be tested, and select to check the “base station signal” ;
- c) Check the service cell information → PCI; if the PCI value is consistent with the cell ID of 5G private network for competition, it indicates that the mobile terminal to be tested supports cell locking.

6.2.12.4 Supporting Data Centric Mode

Test Procedures are as follows:

- a) Turn on the mode switching secret code, setting or APP on the mobile terminal to be tested, find the service mode, and select “Data Centric” ;
- b) The mobile terminal to be tested connects to premises network in 5G private network for competition, and IMS is not registered (i.e. no HD icon in the status bar);
- c) Dialing any phone from the dial, the call ends passively immediately, and observe that the premises network is not affected, it indicates that the mobile terminal to be tested supports the Data Centric mode.

6.2.13 Screen Eye Protection Test

6.2.13.1 Overview of Test

Reducing the harmful blue light ratio of the screen of the mobile terminal is conducive to eye protection.

6.2.13.2 Test Procedures

Enter the setting page of the mobile terminal to check whether it supports eye protection mode.

6.3 System Test for Mobile Terminals

6.3.1 Anti-Disturbance Test

6.3.1.1 Overview of Test

The mobile terminal shall support anti-disturbance function.

6.3.1.2 Test Procedures

After entering the game, dial the mobile terminal number to check whether there will be a call reminder.

Set the alarm clock; after entering the game, check whether there will be alarm clock reminder.

6.3.2 Mistouch Prevention Test

6.3.2.1 Overview of Test

The mobile terminal shall support mistouch prevention function.

6.3.2.2 Test Procedures

After entering the game, click the button of returning to desktop and slide to exit the game to check whether the mobile terminal exit the game.

6.4 Players' Simulation Competition Test for Mobile Terminals

6.4.1 Overview

The operation accuracy, speed and intensity of the professional players of electronic sports are higher than those of ordinary players, the requirements for the mobile terminal are also higher, so players should be invited to conduct the simulation competition test. In addition, 10 players from professional teams or players of the same level shall be invited for the simulation competition test.

6.4.2 Preset Conditions are as follows:

- a) Test time: players need to complete the playing time for no less than 30 hours in several consecutive days;
- b) Test environment: the room shall be able to accommodate 10 players and several staff, the temperature shall be appropriate and stable, and the tested private network shall be arranged in advance;
- c) Test requirements: try to cover as many characters, vehicles, weapons in the game as possible; encourage high-intensity confrontation, and the in-game mode shall be subject to the requirements of the competition.

6.4.3 Test Procedures are as follows:

- a) Test data collection: the corresponding data of each index in 5.1 shall be recorded and copied through the game background, the background or log of the mobile terminal manufacturer, special test tools, on-site measurement or record, etc;
- b) Test record: it is necessary to set up a camera for each player to capture the hand operation and the screen of mobile terminals in the whole process, which will be archived as test records to locate problems.
- c) Test results: according to the collected data, compare the standards of various indicators in 5.1 and 5.2, and output the test results.

Annex A
(Informative)
The Referee's Pre-test of Mobile Terminals

A.1 Overview

The referees of electronic sports are mainly responsible for maintaining the field order, implementing the competition rules, recording the competition data, preparing and testing the mobile terminals before the competition. Referees shall strictly perform their duties, strictly and impartially implement the competition rules, adhere to the principles of fairness, integrity and professionalism, abide by professional ethics, and ensure that the fair, stable and orderly competition is conducted.

A.2 Pre-test and Debugging

- a) The referee shall claim the mobile terminals provided by the organizer of competition, and complete the input and output related connections (such as audio output, power connection, etc.) of the mobile terminals according to the requirements of the organizer;
 - b) The referee sets the system volume and game volume of the mobile terminals to the maximum;
 - c) The referee turns off all the application notification management of the mobile terminals, and sets the status bar to display the power percentage;
 - d) The referee sets the display and brightness of the mobile terminals as follows: the screen brightness is adjusted to the middle; the maximum time for automatic screen locking is 10 minutes; the vertical screen lock is turned on; the screen color is the standard; the screen refresh rate is the highest value; the top of the screen displays -- game clothing -- display/hide the front camera;
 - e) Check the application software of the mobile terminals; uninstall all applications that are not related to the game.
 - f) Turn on the game optimization assistant; turn on and add the game clothes of the electronic sports;
 - g) Test and record the log information collection of the mobile terminals, and save the log of mobile terminals and start the second counting through the quality verification test;
 - h) Test the screen and shell of the mobile terminals; the screen and shell shall not be damaged and the surface shall be clean.
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