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Beijing Organising Committee for the 2022 Olympic and Paralympic Winter Games



Spectrum Management Plan

for the Beijing 2022 Olympic and Paralympic Winter Games

Ver 1.0

Beijing Organising Committee for the 2022 Olympic and Paralympic Winter Games

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1. Introduction

The Beijing 2022 Olympic and Paralympic Winter Games (Beijing 2022 Games) will be held in Beijing and Zhangjiakou from 4 February to 20 February and from 4 March to 13 March in 2022, respectively. The venues of the Beijing 2022 Games are divided into three competition zones respectively in Beijing, Yanqing, and Zhangjiakou.

1.1 Purpose

The spectrum management plan for the Beijing 2022 Games is formulated to guarantee necessary radio frequency resources and ensure that all legal radio stations which operate in accordance with relevant regulations can work normally and safely without harmful interference during the Beijing 2022 Games.

This document includes the following contents: 1. Introduction; 2. Radio equipment classification and frequency usage recommendations; 3. Radio frequency application and license; 4. Equipment testing and tagging; 5. Radio monitoring; 6. Spectrum Management of the Test Events for the Beijing 2022 Olympics and Paralympic Winter Games.

This plan will be implemented from the date of publication and will be valid until one week after the end of the Beijing 2022 Games.

1.2 Legal Basis

The plan is set out based on the “Radio Regulations of the People's Republic of China”, “Regulations of the People’s Republic of China on Radio Control”, and related commitment in “Host City Contract -Detailed Obligations of XXIV Olympic Winter Games in 2022”. Other radio-related laws and regulations during the games include the "Radio Management Regulation for the Olympic and Paralympic Games Beijing 2022" (to be published at the beginning of 2021). Any organization or individual that uses radio frequencies, establishes and operates radio stations, and

uses radio transmitting equipment in Beijing and Zhangjiakou shall abide by the corresponding laws and regulations.

1.3 Radio Administrations and Responsibilities

The Beijing Organising Committee for the 2022 Olympic and Paralympic Winter Games (Beijing 2022) is responsible for the organization and coordination of the Beijing 2022 Games. The Ministry of Industry and Information Technology (MIIT) is the radio administration of China.

MIIT and Beijing 2022 will jointly conduct the radio spectrum management work to ensure the smooth running of the Beijing 2022 Games.

2. Radio Equipment Classification and Frequency Usage Recommendations

Based on previous Olympic Games’ management experience and spectrum management practice in China, the radio equipment is divided into the following 12 categories, and the available frequency resources of each category of equipment are analyzed.

Table 1: Device type

Device Type	Abbreviation
Land mobile radio	LM
Handheld radios (Walkie-Talkie)	HR
Wireless camera	WC
Wireless microphone	WM
Telemetry and telecommand	TC
In-ear monitor system	IEMS
Wireless LAN & Bluetooth	WLAN&BT
Microwave fixed link	FL

Microwave mobile link	ML
Fixed earth station	FES
Mobile earth station	MES
Others	OTH

2.1 Land Mobile Radio (LM)

2.1.1 Description

Land mobile radio (LM) refers to the mobile communication equipment and its relay equipment (repeater/basestation) with multiple users for terrestrial data or voice communication, but does not include the handheld walkie-talkie without repeater/basestation. LM also includes wireless intercom systems used in broadcast or sports presentation. Generally, such equipment works in the frequency bands of 150MHz, 400MHz and 800MHz, with a bandwidth of 12.5kHz or 25kHz.

2.1.2 Available frequencies

According to China's relevant regulations and the specific usage of equipment, in the Beijing 2022 Games, the frequencies available for LM are mainly the unoccupied frequencies in three frequency bands of 137-167MHz, 403-423MHz and 450-470MHz.

The frequency band of 137-167MHz is mainly allocated to dual-frequency simplex intercom system and single-frequency simplex intercom system, of which the band of 144-146.025MHz is used for amateur service. At present, there are already a lot of current users in this frequency band, especially in Beijing.

The frequency bands of 403-423.5MHz and 450-470MHz are mainly used for fixed and mobile services in China, and have been planned for dual-frequency simplex intercom system and single-frequency simplex intercom system. There are a large number of existing users, some of which adopt dual-frequency simplex (duplex) mode with transmitting and receiving interval of 10MHz while others adopt single-frequency simplex mode. Due to the existence of relay stations, it

is difficult to reuse the frequency among adjacent venues. In general, the available frequency resources in the band of 400MHz are very scarce.

2.1.3 Recommendations

As mentioned above, the frequency resources of LM equipment are relatively scarce, and the available frequency resources are expected to be difficult to meet the requirements of all applications. Therefore, it is strongly recommended to use the LM equipment with a bandwidth of 6.25kHz or 12.5kHz to reduce the demand for frequency resources.

If available, Push-to-Talk Over Cellular (POC) system based on public mobile communication network is also recommended for communication.

2.2 Handheld Radios (HR)

2.2.1 Description

Handheld radios (HR) refer to the handheld Walkie-Talkie that is not used in repeater/basestation mode, or other point-to-point voice (simplex) communication equipment with the same working mode as the handheld walkie-talkie. Generally, such equipment works in the frequency bands of 150MHz and 400MHz, with a bandwidth of 12.5kHz or 25kHz.

2.2.2 Available frequencies

According to China's relevant regulations and the specific usage of equipment, in the Beijing 2022 Games, the frequencies available for HR are mainly the unoccupied frequencies in three frequency bands of 137-167MHz, 403-423MHz and 450-470MHz.

The available frequencies for HR are the same as those of LM.

2.2.3 Recommendations

As mentioned above, it is strongly recommended to use the HR equipment with a bandwidth of 6.25kHz or 12.5kHz to reduce the demand for frequency resources.

If available, Push-to-Talk Over Cellular (POC) system based on public mobile communication network is also recommended for communication requirements.

2.3 Wireless Camera (WC)

2.3.1 Description

Wireless camera refers to a camera that uses wireless technology to transmit the captured image to a fixed receiving point, excluding the wireless remote-control device of the camera. It is mainly used for live broadcast of the Olympic Games, occupying a wide bandwidth (8-20MHz), but with lower power. Generally, the transmission distance is only tens to hundreds of meters. Most WCs use the frequency bands of 1467-1535MHz, 1990-2870MHz, 5200-5950MHz and 6400-7500MHz, while some also use the bands of 2400-2483.5MHz and 5725-5850MHz.

2.3.2 Available frequencies

In China, the frequency bands of 1467-1535MHz, 1990-2870MHz, 5200-5950MHz and 6400-7500MHz have been assigned to broadband private network, microwave, mobile communication, WLAN, satellite telemetry and control, etc.. Moreover, the 2400MHz-2483.5MHz and 5725MHz-5850MHz bands are used by many types of devices, such as Industrial, Science and Medical (ISM), WLAN etc., and the situation is very complicated.

Considering the lower power of wireless camera, it can be used in some frequency band conditionally in 1467-1535MHz, 1670-1710MHz, 2025-2110MHz, 2200-2300MHz, and 5850-7725MHz after coexistence analysis and coordination with existing users. However, since all of the above bands except 5850-7725 MHz are intensively used currently and the available frequency resources are very limited, the probability of successful coordination will be low. Therefore it's strongly recommended that wireless camera equipment use the 5850-7725MHz band as a primary option.

2.3.3 Recommendations

As mentioned above, considering that the WCs have large frequency bandwidth, the probability of successful coordination in 1467-1535MHz, 1670-1710MHz, 2025-2110MHz and 2200-2300MHz bands will be low. Therefore it is strongly recommended to use the frequency band of 5850-7725MHz as a primary option.

2.4 Wireless Microphone (WM)

2.4.1 Description

Wireless microphone refers to the microphone that uses wireless technology to transmit sound to acquisition equipment or loudspeaker, including handheld microphone, microphone fixed on the clothes or attached to other devices and in-ear feedback that works together with wireless microphone without using broadcast transmitter. Most wireless microphones have a bandwidth of 125kHz while some microphones have a bandwidth up to 180kHz, with the power of generally 30-50mW and relatively short transmission distance, which is convenient for frequency reuse. The frequency bands of 470-821MHz, 917-940MHz, 1920-2065MHz and 2110-2170MHz are mostly used by wireless microphones.

2.4.2 Available frequencies

Please refer to “*Catalog and Technical Requirements for Micropower Short-range Radio Transmitter*” for the current available frequencies for wireless microphone equipment, as shown in the table below:

Table 2: Available Frequency for Wireless microphone

Frequency (MHz)	Type of Equipment	Emission Power limitation (e.r.p, mW)	Bandwidth limitation (kHz)	Other Request
87-108	Wireless microphone	≤ 3	≤ 200	Must avoid local broadcast frequencies
75.4-76		≤ 10	≤ 200	Must avoid local broadcast frequencies
84-87		≤ 10	≤ 200	Must avoid local broadcast frequencies
189.9-223		≤ 10	≤ 200	Must avoid local broadcast frequencies
470-510		≤ 50	≤ 200	Must avoid local broadcast frequencies
630-698		≤ 50	≤ 200	Must avoid local broadcast frequencies

Besides the above frequencies, 800MHz, 900MHz and 2GHz frequency bands are intensively used for mobile communication and private network communication currently, and only 798-806MHz band can be used conditionally for wireless microphones.

In the broadcasting and television bands, there are a number of audio broadcasting, analog and digital TVs in the frequency bands of 87-108MHz, 470-566MHz and 606-702MHz in Beijing city; at the same time, it is expected that by the time of 2022, such bands will also carry other TV programs transferred from 702-798MHz. At that time, the unoccupied frequency resources in the urban area of Beijing will be quite scarce. There will be relatively more unoccupied frequency resources in Yanqing and Zhangjiakou.

2.4.3 Recommendations

As mentioned above, WM users can apply for the frequency bands such as 87-108MHz, 75.4-76MHz, 84-87MHz, 189.9-223MHz, 470-510MHz, 630-698MHz and 798-806MHz.

Considering the large number of frequency applications for wireless microphones in previous major events, it is predicted that the unoccupied frequency resources in the Beijing 2022 Games will be unable to meet the requirements of all applications. It is strongly recommended that users without special needs use wired microphones for their work.

In particular, the automatic frequency selective wireless microphone products (such as Sennheiser AVX Series) working in the frequency bands of 1.9GHz and 2GHz are quite popular, but 2GHz frequency band has been heavily used by mobile communication (e.g. IMT systems) in China, so users are strongly advised not to apply for such frequency band.

2.5 Telemetry and Telecommand (TC)

2.5.1 Description

Telemetry and telecommand equipment refer to the equipment that uses wireless technology to measure or control, such as telecommand equipment used to control wireless camera or mechanical lifting device, timing & scoring device, etc.. Such equipment has a quite wide frequency

distribution, ranging from 125kHz to 24GHz, and with various types.

2.5.2 Available frequencies

Please refer to “*Catalog and Technical Requirements for Micropower Short-range Radio Transmitter*” for the current available frequencies for telemetry and telecommand equipment. The Technical Requirements has been revised and published, as shown in the table below:

Table 3: Available Frequency for Telemetry and telecommand equipment

Frequency (MHz)	Type of Equipment	Emission Power limitation (e.r.p, mW)	Bandwidth limitation (kHz)	Other Request
314-316	Universal remote-control equipment	≤ 10	≤ 400	
430-432		≤ 10	≤ 400	
433.05-434.79		≤ 10	≤ 400	
470-566		≤ 5	≤ 1000	Duration < 1s; Interval > 1hr; Must avoid local broadcast frequencies
614-698		≤ 5	≤ 1000	Duration < 1s; Interval > 1hr; Must avoid local broadcast frequencies
868-868.6		≤ 5	N/A	Duty Cycle $\leq 1\%$
418.950,418.975, 419.000,419.025, 419.050,419.075, 419.100,419.125, 419.150,419.175, 419.200,419.250, 419.275	Industrial remote-control equipment	≤ 20	≤ 16	For indoor use in Industrial building only; Interval $\geq 5s$

The frequency bands of 2400-2483.5MHz and 5725-5850MHz are ISM frequency bands in China, which are also used for WLAN and other equipment. According to the spectrum management policy of the Beijing 2022 Games, using these two frequency bands should be authorized. Because there

are many types of devices using these two bands and the situation is very complex, these two frequency bands are not recommended for TC equipment.

2.5.3 Recommendations

As mentioned above, it's strongly recommended that users use the frequencies in the above table to avoid interference.

2.6 In-ear Monitor System (IEM)

2.6.1 Description

In-ear monitor system includes transmitting equipment and receiving equipment, which is used for staff's one-way receiving of live broadcast or command and dispatch or for entertainers to listen to on-site sounds. It usually uses broadcast transmission mode, and the signals are received by the wireless headset worn in the ear. The transmitting equipment of in-ear monitor system has a bandwidth of 125kHz, and even up to 180kHz partially, with a power of 1-50W. The frequency bands of 30-87MHz and 470-821MHz are mostly used by IEMS.

2.6.2 Available frequencies

According to the current spectrum allocation in China, in-ear monitor system can use the unoccupied frequencies in the frequency bands of 30-87MHz, 470-566MHz and 606-702MHz.

At present, 30-87MHz is mainly used for some low-power broadcasting systems, with a few existing users; 470-566MHz and 606-702MHz have been discussed in section 2.4, and it is expected that they will be very crowded in the urban area of Beijing.

2.6.3 Recommendations

As mentioned above, 30-87MHz band is strongly recommended. The parameters of radio transmitting equipment must meet relevant standards and specifications.

For the frequency of the in-ear feedback that works together with wireless microphone without using broadcast transmitter, please refer to the section 2.4 of wireless microphone.

2.7 Wireless LAN and Bluetooth Equipment (WLAN&BT)

2.7.1 Description

Wireless LAN equipment refers to wireless LAN access point or data transmission equipment using WLAN technology.

Bluetooth equipment usually are portable devices, to connect and communicate wirelessly via short-range, ad-hoc networks. Each unit can simultaneously communicate with up to seven other units.

2.7.2 Available frequencies

The available frequencies for WLAN and Bluetooth systems are 2400-2483.5MHz, 5150-5350MHz(indoor use only) and 5725-5850MHz in China.

During the Olympic Winter Games, except personal terminals of WLAN and Bluetooth (such as public mobile communication terminal (mobile phones), computer embedded wireless network card, laptop, tablet computer, Bluetooth headset, wireless remote control for camera, smart bracelet, smart watch, Bluetooth headset, etc.) working in the frequency band of 2400-2483.5MHz, 5150-5350MHz(indoor use only) or 5725-5850MHz and simultaneously meeting the standards for Short Range Device (SRD) in China as shown in the table below, ALL OHTER WLAN and Bluetooth devices should apply for frequencies and obtain licenses.

In particular, after entering the Olympic venues and special control areas, mobile phones, computer embedded wireless network cards, laptops, tablet computers are prohibited to be used as hotpots, and mobile phones, wireless remote control for camera, smart watches, smart bracelets, Bluetooth headsets, etc., are prohibited to be turned on Bluetooth function.

Table 4: Parameter limits for WLAN & Bluetooth equipment

Type of System	Frequency (MHz)	Limitation of e.i.r.p (dBm)	Limitation of Equivalent Isotropic Radiant PSD	Other Request
WLAN	2400-2483.5	≤ 20	≤ 10 dBm/MHz	Equipment should have

				LBT (listen before talk) function
WLAN	5150-5350	≤ 23	≤ 10 dBm/MHz	Equipment should have LBT (listen before talk) function, for indoor use only
WLAN	5725-5850	≤ 33	≤ 19 dBm/MHz	Equipment should have LBT (listen before talk) function
Bluetooth	2400-2483.5	≤ 20	≤ 10 dBm/MHz	
Bluetooth	5725-5850	≤ 33	≤ 19 dBm/MHz	

2.7.3 Recommendations

As mentioned above, except for special requirement, it is strongly recommended that users access WLAN network provided by Beijing 2022 or by mobile communication operators, and the frequency applications for private WLAN access point or hotspots will not be approved.

2.8 Microwave Fixed Link (FL) and Microwave Mobile Link (ML)

2.8.1 Description

It refers to a device used by the related media for transmitting videos, audios or other data between two fixed points or one fixed point and another mobile point via microwave link.

2.8.2 Available frequencies

The frequencies available for microwave fixed and mobile links include 4400-4800MHz, 6425-8500MHz, 10700-11700MHz, 14500-15350MHz, 17700-19700MHz and 21200-23600MHz. Currently, some of the existing FL/ML users and other service users are using these frequency bands. The frequency reuse can be realized if the conditions of direction and space isolation are satisfied.

2.8.3 Recommendations

The frequencies shall be assigned to microwave links after electromagnetic compatibility analysis according to the microwave path and specific equipment conditions during the Beijing 2022 Games.

2.9 Fixed Earth Station (FES) and Mobile Earth Station (MES)

It refers to a satellite earth station that works at a fixed position or on a mobile basis and communicates through a satellite. Due to the particularity of satellite communications, the applications for satellite earth stations during the Beijing 2022 Games need to be analyzed and permitted on a case-by-case basis.

During the Beijing 2022 Games and its preparation period, users who need to use FES or MES (including receiving-only earth stations) in venues and special control areas in Beijing and Zhangjiakou City should submit the frequency application and obtain the frequency license in advance. In order to improve the efficiency and safety of satellite frequency usage, and reduce the risk of interference, we recommend that users choose the satellites that have obtained the radio frequency license of MIIT, P.R.China. When these satellites cannot meet demands, users can choose the satellites that have finished coordination with China.

It is recommended that users choose Ku band and Ka band as a primary option; if the satellites in Ku band and Ka band cannot meet their demands, standard C band (3700-4200MHz) can also be used, with a higher interference risk; 3400-3700MHz is not available for satellite communication. If equipment in standard C-band (3700-4200 MHz) band is to be used, please make sure that the RF components of the equipment are capable of withstanding interference from public mobile communications signals in the 3300-3600 MHz band.

In particular, satellite mobile phones (such as Inmarsat) also need to be licensed through frequency applications.

2.10 Others

The applications for other radio equipment that is not included in the above types shall be approved or rejected after analysis on a case-by-case basis.

2.11 Summary of Available Frequency Resources for Various Types of Equipment

Table5: Summary of available Frequencies for Different Devices

Device type	Available frequency	Degree of	Remarks
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	band (MHz)	crowdedness	
Land mobile radio (LM)	137-167	Medium	It is strongly recommended to use the equipment with a bandwidth of 6.25kHz or 12.5kHz. POC system based on public mobile communication network(available via the Rate Card) is also recommended to use for communication.
	403-423	High	
	450-470	High	
Handheld Radios (walkie-talkie) (HR)	137-167	Medium	It is strongly recommended to use the equipment with a bandwidth of 6.25kHz or 12.5kHz. POC system based on public mobile communication network(available via the Rate Card) is also recommended to use for communication.
	403-423	High	
	450-470	High	
Wireless camera (WC)	1467-1535	High	The probability of successful coordination in bands except of 5850-7725MHz will be low. Therefore it's strongly recommended to use the 5850-7725MHz band.as a primary option
	1670-1710	High	
	2025-2110	High	
	2200-2300	High	
	5850-7725	Medium	
Wireless microphone (WM)	87-108	High	The frequency band listed in Table 2 of Section 2.4.2 can be used, and the power and bandwidth requirements corresponding to the frequencies are also detailed. It is strongly recommended that users without special needs use wired
	30-87	Low	
	189.9-223	High	
	470-510	High	

	630-698	High	microphones for their work. Users are strongly advised not to apply for 2GHz band.
	798-806	Medium	
Telemetry and telecommand (TC)	314-316	Low	Application is also required for using ISM frequency bands such as 2400MHz-2483.5MHz and 5725MHz-5850MHz. It is strongly recommended users to use the frequencies in Table 3 of Section 2.5.2, where the corresponding power and bandwidth requirements are also specified.
	430-432	Medium	
	433.05-434.79	Medium	
	470-566	High	
	614-698	High	
	868-868.6	Medium	
	418.950、418.975、419.000、419.025、419.050、419.075、419.100、419.125、419.150、419.175、419.200、419.250、419.275	Medium	
In-ear monitor system (IEMS)	76-87	Low	76-87MHz band is strongly recommended. For the frequency of the in-ear feedback that works together with wireless microphone without using broadcast transmitter, please refer to Section 2.4 of wireless microphone.
	470-566	High	
	606-702	High	
Wireless LAN and Bluetooth equipment (WLAN&BT)	2400-2483.5	High	Unless for special requirement, it is strongly recommended that users access WLAN network provided by Beijing 2022 or by mobile communication operators, and frequency applications for private WLAN access point or hotspots will not be approved
	5150-5350 (indoor use only)	High	
	5725-5850	High	

Microwave fixed link (FL) and microwave mobile link (ML)	4400-4800	Medium	Analysis shall be made according to the link conditions.
	6425-8500	Medium	
	10700-11700	Medium	
	14500-15350	Low	
	17700-19700	Low	
	21200-23600	Low	
Fixed earth station (FES) and mobile earth station (MES)	Ka-band	Low	Due to higher interference risks in C band, it is strongly recommended that users choose the satellites shown in Table 5-7 of Section 2.9
	Ku-band	Medium	Standard C band (3700-4200MHz) can also be used, with a higher interference risk. If standard C-band equipment is to be used, make sure that the RF components of the equipment are capable of withstanding interference from public mobile communications signals from the 3300-3600 MHz band.
	3700-4200(C-band)	High	

Special requirements other than the available frequency bands in the above table will be negotiated on a case-by-case basis.

3. Radio Frequency Application and License

During the Beijing 2022 Games and its preparation period, users who need to use radio transmission equipment (except for the license-free equipment specified in Section 4.1) in venues and special control areas in Beijing and Zhangjiakou City should submit the frequency application on the spectrum order portal (frequency application website, <https://spectrum.beijing2022.cn>) in advance and obtain the approved frequency license.

3.1 Application Schedule

There are three stages in the frequency application schedule of the Beijing 2022 Games.

3.1.1 Normal Application Period (The First Stage)

The normal application period (first stage of the frequency application) is from 1 Jan.2021 to 15 Jun.2021. In this stage, the frequency applications will be analyzed, coordinated and made necessary adjustments through considering comprehensively national radio frequency allocation, status of frequency usage, the collected frequency application and the results of electromagnetic compatibility analysis. The priority of application and the probability of obtaining approval are very high.

It is strongly recommended that users complete the frequency application as early as possible in the first stage.

From 16 Jun.2021 to 30 Jun.2021, the database system will be organized, and the frequency applications won't be accepted during this period.

Approval for frequency application in the first stage will be issued before October 15, 2021.

3.1.2 Late Application Period (The Second Stage)

The late application period (second stage of the frequency application) is from 1 Jul.2021 to 30 Nov.2021. Applications received in this stage will be approved on a first-come and first-served basis when frequency resources are available. The priority of the frequency application is lower than in the first stage. If the frequency resource in the applied band is limited, the probability to obtain the

approval is very low.

From 1 Dec.2021 to 31 Dec.2021, the database system will be organized, and the frequency applications won't be accepted during this period.

Approval for frequency application in the second stage will be issued before January 15, 2022.

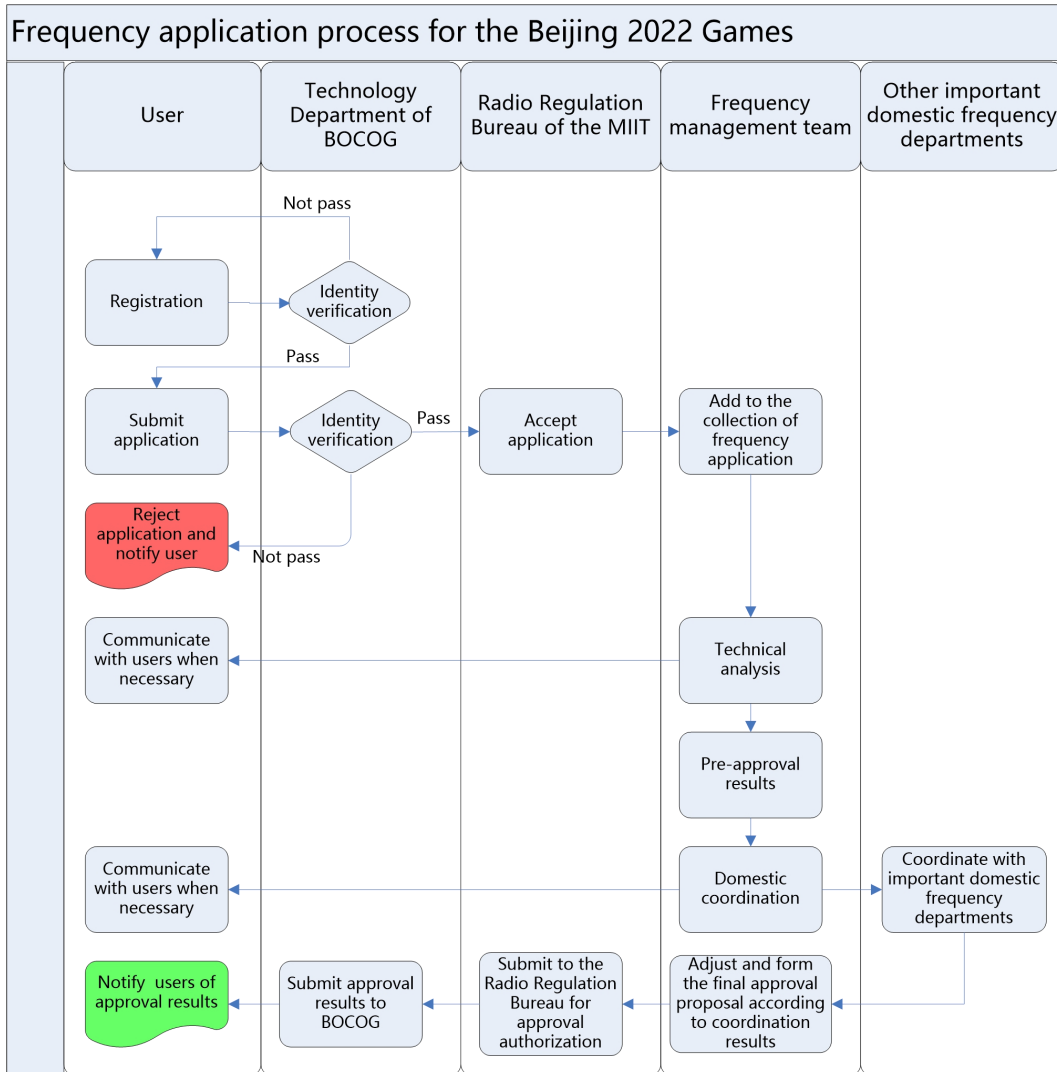
3.1.3 Extraordinary Application Period (The Games-Time Stage)

The extraordinary application period (games-time stage of the frequency application) is from 1 Jan.2022 to 13 Mar.2022. This stage is only used for emergency applications for important frequency requirements during the game. Since most of the frequency resources have been approved before this stage, demand for frequencies can not be satisfied directly. Therefore, it is not recommended to submit an application at this stage except in cases which an emergency application must be made to ensure the normal progress of the game and broadcast.

Approval for frequency application in the games-time stage will be issued as soon as possible, which is depended on the spectrum resources, technical analysis and the complexity of necessary adjustments.

3.2 Frequency Application Procedures

The overall application and licensing process for radio equipment use is as follows.



3.2.1 Application and Acceptance

Overseas and domestic users who need to use radio stations or radio transmission equipment in venues and special control areas in Beijing, Yanqing, or Zhangjiakou during the Beijing 2022 Games, according to the schedule specified in Section 3.1, should submit the frequency application on the spectrum order portal (frequency application website, <https://spectrum.beijing2022.cn>). The spectrum order portal (frequency application website) is expected to be online in January 2021. Once again, it is strongly recommended that users apply for frequency as early as possible in the first stage. After the frequency application being sent to the technical department of the Beijing Organising Committee for the 2022 Olympic and Paralympic Winter Games (Beijing 2022) through

the spectrum order portal website, the technical department of the Beijing 2022 will identify the users to confirm whether they belong to an organization or institution that must use the frequency in venues and special control areas during the game. If the frequency application has nothing to do with the game, the application will be rejected.

After confirmation by the Beijing 2022, the application data will be sent to the Radio Regulation Bureau of MIIT for processing.

3.2.2 Technical Analysis and Pre-approval

After the Radio Administration Bureau of MIIT accepts the application, the relevant application data will be sent to the frequency management team, which will carry out relevant technical analysis work. It needs to be emphasized that a large number of various radio stations and radio equipment will be used at the same time and in the same place during the game, which will lead to the scarcity of radio spectrum. Therefore, the applications received in the first stage will be analyzed and processed as a whole after June 15, rather than being processed immediately after receiving the applications.

After June 15, 2021, the frequency management team will conduct an overall technical analysis of frequency applications that have been collected in the first stage, taking into account China's radio frequency allocation, status of frequency usage, the frequency application and the results of electromagnetic compatibility analysis.

Based on the analysis results, the frequency management team will pre-approve each user's frequency application and make preliminary approving suggestions.

After the frequency management team receiving the frequency applications of the second and game-time phases, they will analyze and approve applications according to the application time. However, depending on the application time, the remaining frequency resources and the work schedule, the priority of these frequency applications in technical analysis will be affected.

In the process of technical analysis and coordination, if necessary, the frequency management team

will communicate and coordinate with the applicant through the Beijing 2022, using the email address or telephone number submitted by the user at the time of application.

3.2.3 Coordination

In the process of technical analysis, the frequency management team will coordinate with important domestic frequency departments in China (such as TV broadcasting, Civil Aviation, meteorology, etc.), and revise the pre-approval results according to the coordination results, and form the final approval suggestions.

In this period, if necessary, the frequency management team will communicate with the users through the Beijing 2022 using the e-mail address or phone number submitted at the time of application.

3.2.4 Approval Authorization

The frequency management team will submit the final approval suggestions to the Radio Regulation Bureau of MIIT through the spectrum order portal (frequency application website) system. The Radio Regulation Bureau of MIIT will approve frequency application on behalf of the Radio Administration of China. If the frequency application is approved, the users will obtain the electronic version of the "Radio Equipment Frequency License for the Beijing 2022 Olympics and Paralympic Winter Games" on the Beijing 2022 Games spectrum order portal (frequency application website) and by email. License for frequency application in different stages will be issued before the corresponding deadline according to the time schedule above.

3.3 Application Essentials

Overseas and domestic users who need to use radio stations and radio transmission equipment in venues and special control areas during the Beijing 2022 Games should submit the frequency application on the spectrum order portal (frequency application website, <https://spectrum.beijing2022.cn>) within the above date schedule. The essentials of application information to be filled in the website are as follows.

3.3.1 User Information

In order to determine the nature of the user's organization and facilitate communication with users during the processing of frequency application, users need to fill in their own information.

Domestic users need to fill in the organization name, organization code, operator's organization name, ID card number of the operator, code issued by the Beijing 2022 (the Beijing 2022 will send the initial user name and password to the important domestic frequency application users in advance), the operator's name, email address, telephone number, and upload the scanned copy of official application letter.

Overseas users need to fill in the country name (users from Hong Kong, Macao and Taiwan need to fill in the region name), the organization name, code issued by the Beijing 2022 (the Beijing 2022 will send the initial user name and password to the important overseas frequency application users in advance), the operator's name, email address and telephone number.

3.3.2 Type of Radio Transmitting Equipment

According to the previous Olympic Games management experience and China's radio management practice, the radio transmitting equipment is distinguished into the following 12 types: Land mobile radio (LM), Handheld Radios (HR), Wireless camera(WC), Wireless Microphone (WM), Telemetry & Telecommand (TC), In-ear monitor (IEM) system, Wireless LAN & Bluetooth (WLAN&BT), Microwave Fixed Link (FL), Microwave Mobile Link (ML), Fixed Earth Station (FES), Mobile Earth Station (MES) and Others. Please refer to Section 2 for details. When applying for frequencies, the type of equipment should be selected first, and the technical parameters to be filled in for different types of equipment are different.

3.3.3 Technical Information

Users should provide the following technical information so that the frequency management team can perform frequency availability analysis.

In the column of device type, users should select one device type described in Section 3.3.2;

In the column of usage area, users should fill in the location of the equipment. Where it is necessary to use the equipment in multiple locations or move within a certain area, each location or area should be chosen;

In the column of usage local location, users should choose the boxes from three options: indoor, outdoor, or aircraft;

In the columns of tunable frequency range of the system (start), tunable frequency range of the system (end) and tuning step, users should fill in the upper and lower limits of the frequency range that the whole system (including combiner, duplexer, antenna, etc.) can work within, and the minimum tuning step of the whole system;

In the columns of preferred center frequency, bandwidth and modulation, users should fill in the expected center frequency of transmitting and receiving, bandwidth and modulation, separately. If the same model of equipment works on different parameters (center frequency, bandwidth or modulation), all parameters should be listed in different columns of this equipment (Up to 10 different parameters can be filled in for each equipment);

If user has requirements for the frequency interval of a duplex system, please fill in the "Extra Requirements" column;

In the column of number of devices, users should fill in the number of devices working with this parameter;

In the column of the maximum transmitting power, users should fill in the equivalent isotropic radiated power (EIRP) of the device in dBm, and the antenna gain should be included in EIRP;

In the column of typical coverage distance, users should fill in the device's typical coverage radius in meters;

In the columns of the satellite name and antenna aperture for satellite earth stations, users should fill

in the name of the satellite and antenna aperture of the earth station;

In the columns of the manufacturer and model type, users should fill in the manufacturer and model type of the equipment, for similar devices with the same parameters, multiple model type names can be filled in one application;

In the columns of the start and end dates, users should fill in the dates when the equipment begin and end to work.

In the column of whether it affects the progress of the event or the broadcast, users should choose truthfully;

In the column of purpose description, users should briefly describe the purpose and usage scenarios of the equipment;

In the column of the device picture, users should paste the device photo, if possible.

3.3.4 Related Commitments

All overseas and domestic users, who apply for using radio stations and radio transmitting equipment in venues and special control areas in Beijing, Yanqing, or Zhangjiakou during the Beijing 2022 Games, are deemed to have made the following commitments:

1. The user information and technical information must be true;
2. When using the approved radio frequency, the equipment must work in accordance with the parameters stated in the radio frequency license, and the frequency, bandwidth, power, equipment model, usage area, usage time, business purpose and other content cannot be changed without authorization;
3. The approved radio frequency shall not be transferred;
4. Users should take the initiative to handle radio equipment testing and tagging before using the radio equipment. Radio equipment without the special tag mentioned in Section 4 should not be

brought into venues and special control areas, nor be used;

5. Users should consciously abide by the relevant laws and regulations of China's radio management, and actively cooperate with the supervision and inspection of the radio administrations. Those who violate the relevant regulations of radio management will be punished according to related law.

3.4 Equipment Entry

Overseas users, who need to bring radio transmission equipment into China, shall present the printed copies of "Radio Equipment Frequency License for the Beijing 2022 Olympics and Paralympic Winter Games" of the equipment to the Customs of the People's Republic of China when they go through the customs clearance procedures on arrival.

Radio transmission equipment approved for temporary entry shall be re-shipped out on time in accordance with the relevant customs regulations.

Foreign leaders, embassies and consulates of various countries in China, and other overseas users with diplomatic privileges, who need to use radio frequencies and equipment during the Beijing 2022 Games, should report in advance for approval through diplomatic channels to the Radio Regulation Bureau of MIIT.

3.5 Contact Information

If there are questions about the frequency application process, users can consult the Beijing 2022 in the following ways.

Overseas users can consult via email: *spectrum@beijing2022.cn*;

Domestic users can consult via email: *spectrum@beijing2022.cn* or call: +86-010-66681278.

4. Equipment Testing and Tagging

4.1 Radio Equipment Exempt from Testing and Tagging

The following radio transmitting equipment can be used in venues and special control areas without

radio frequency license, testing and tagging, but the safety and security regulations of the venues and special control areas should also be followed: public mobile communication terminals (mobile phones); computer embedded wireless network cards; laptops; tablet computers; car remote keys with power below 2mW; wireless remote-control devices for cameras with power below 2mW; personal biomedical telemetry and medical implantation and related supporting equipment, smart watches, smart bracelets, Bluetooth headsets and other wearable smart devices that conforming to the technical standard prescribed in “Micropower Short Range Radio Transmitting Equipment Catalog and Technical Requirements” (Announcement No. 52 by MIIT of the People's Republic of China).

After entering the venues and special control areas, public mobile communication terminals (mobile phones), computer embedded wireless network cards, laptops, and tablets must not be used as wireless LAN hotspots; the Bluetooth function of wearable smart devices such as public mobile communication terminals (mobile phones), camera wireless remote-control devices, smart watches, smart bracelets, Bluetooth headsets, etc. shall be deactivated; The ultra-wideband functions of public mobile communication terminals (mobile phones) shall be disabled; The Walkie-Talkie functions using networks other than the public mobile communication must not be enabled.

In addition to the above-mentioned equipment, all other radio stations and radio transmitting equipment entering the venues or special control areas should be checked on-site by the radio administrations. The equipment without special tags will not be allowed into the venues and special control areas.

4.2 Equipment Testing

In order to ensure the smooth progress of the Beijing 2022 Games, the radio equipment with approved frequency license must go through the testing and tagging procedures.

Users who have obtained "Radio Equipment Frequency License for the Beijing 2022 Olympics and Paralympic Winter Games" must download the electronic copy, print it and bring all radio transmitting equipment to a designated location for testing and tagging. For equipment that is

inconvenient to move, users can also contact the radio administrations for on-site testing and tagging. Because the demand for radio transmitting equipment testing is expected to be very high before the opening ceremony, it is recommended that users contact the radio administrations for testing as early as possible. Users are recommended to ensure that their radio equipment have been configured with correct frequency, power, bandwidth and other technical parameters before testing. In addition, if the technical parameters of the radio transmitting equipment may need to be changed, users should prepare and carry relevant tools with them.

4.3 Equipment Tagging

After being qualified by the testing team, the radio transmitting equipment will be pasted the “Radio Transmitting Equipment Special Tag for the Beijing 2022 Olympics and Paralympic Winter Games” (hereinafter referred to as **the special tag**) by the radio administrations. Then, the equipment can be used following the specific time and area requirements indicated on the special tag.

The special tags are divided by blue and green colors. The blue tag is applicable to radio stations and radio transmitting equipment used in the Olympic venues and special control areas during the preparation period of the Beijing 2022 Games(including the test events). The green label is applicable to radio stations and radio transmitting equipment used in the Olympic venues and special control areas during the Games time. Any radio equipment without special tag is strictly prohibited to enter or be used in venues and special control areas, except for the equipment that are exempt from testing and tagging as specified in Section 4.1.

4.4 Testing and Tagging Location

The fixed-point testing and tagging service will be provided before and during the Games in Beijing Olympic/Paralympic Village (OLV/PLV), Main Media Center (MMC), Yanqing Olympic/Paralympic Village (YOV/YPV) and Zhangjiakou Olympic/Paralympic Village (ZOV/ZPV), etc. The specific time and location for testing and tagging will be published on the Spectrum Order Portal.

5. Radio Monitoring

5.1 Radio Monitoring Work

During the Beijing 2022 Games, the radio electromagnetic environment will be complex and changing due to the wide distribution and different landforms of the venues. Beijing 2022 will set up radio monitoring points and arrange radio frequency supervisors to conduct radio monitoring work in each venue. All users who set up radio stations should actively cooperate with the radio administrations to ensure that no harmful interference occurs, and jointly maintain a good electromagnetic environment.

Radio monitoring is an important means to understand the situation of frequency resources and provide basis for supervision, inspection and law enforcement. Through effective monitoring work, possible interference can be quickly located and dealt with, so as to ensure the normal operation of authorized radio stations and radio transmitting equipment.

5.2 Handling of Radio Interference

If any radio stations, radio transmitting equipment, and non-radio equipment radiating radio waves cause harmful interference, which may have negative impact on the Beijing 2022 Games or endanger national security, public safety, life and property safety, the owner or user of the equipment should take immediate measures to eliminate the interference. If the harmful interference cannot be eliminated, the radio administrations may order the owner or user to suspend the transmission of the radio stations or radio transmitting equipment that cause the interference. If the owner or user refuses to suspend the transmission, the radio administrations may temporarily detain the radio transmission equipment, seal-up the radio station, or take technical blocking measures if necessary.

When radio interference occurs to radio stations or radio transmitting equipment that are legally set up and used in venues and special control areas, users can report the interference to the Technical Operations Center (TOC) of the Beijing 2022 Games or relevant radio administrations. Then, the accepting agency will coordinate and handle the interference complaint immediately, and inform the

complainant of the result in time.

6. Spectrum Management of the Test Events for the Beijing 2022 Olympics and Paralympic Winter Games

The spectrum management policy of the Test Events for the Beijing 2022 Olympics and Paralympic Winter Games is basically the same as the Game time. Users can find related information from both the official website of the test event and the corresponding invitation letter, in which the relevant requirements and forms for frequency application can be found. Users can submit frequency applications through email: spectrum@beijing2022.cn for the test events. After obtaining the frequency license for the test event, the user also needs to bring the corresponding radio equipment to the designated locations for testing and tagging.