Order of Ministry of Industry and Information Technology of the People's Republic of China

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工业和信息化部关于加强和规范 2400MHz、5100MHz 和 5800MHz 频段无线电管理有关事宜的通知

工信部无［2021］129号

In order to maintain the order of airwaves and promote the development of the radio industry, in accordance with the *Radio Management Regulations of the People's Republic of China* and the *Radio Frequency Allocation Regulations of the People's Republic of China*, and with reference to the *Radio Regulations* of the International Telecommunication Union, the following matters concerning strengthening and standardizing radio management in the 2400-2483.5MHz, 5150-5350MHz and 5725-5850MHz frequency bands (hereinafter referred to as the 2400MHz, 5100MHz and 5800MHz frequency bands, respectively) are hereby notified:

Notice of the Ministry of Industry and Information Technology on Strengthening and Standardizing Radio Management in the 2400MHz, 5100MHz and 5800MHz Frequency Bands

Article 1 The 2400MHz, 5100MHz and 5800MHz frequency bands are allocated to one or more radio services, such as fixed, mobile, radio positioning, satellite fixed, satellite Earth exploration, satellite radio determination, space research, etc. The 2400MHz and 5800MHz frequency bands are also designated for non-radio equipment that radiates radio waves, such as industrial, scientific and medical (ISM) applications that generate radio frequency energy. No radio station or equipment may exclusively use the frequencies in the 2400MHz, 5100MHz and 5800MHz frequency bands.

Article 2 According to the corresponding mobile or fixed service radio frequency division, the 2400MHz frequency band can be used for radio communication systems such as broadband wireless access (including wireless LAN), Bluetooth, and point-to-point transmission; the 5100MHz frequency band can be used for radio communication systems such as broadband wireless access (including wireless LAN), however, it is limited to indoor use (not including in cars); the 5800MHz frequency band can be used for radio communication systems such as broadband wireless access (including wireless LAN), point-to-point transmission, and electronic non-stop toll collection.

Article 3 The radio frequency unit and antenna of radio transmitting equipment operating in the 2400MHz, 5100MHz and 5800MHz frequency bands must be designed and produced in an integrated or synchronously matched manner. It is not allowed to use other antennas or add additional radio frequency power amplifiers without authorization. The transmitting equipment shall comply with the technical requirements listed in the appendix (see Appendix 1 and Appendix 2) and obtain the radio transmitting equipment type approval certificate in accordance with the law (except for micro-power short-range radio transmitting equipment).

Article 4 In order to achieve compatible coexistence with other business frequencies such as radio positioning, radio transmission equipment operating in the 5250-5350MHz frequency band shall adopt transmit power control (TPC) and dynamic frequency selection (DFS) interference suppression technology, and the function option of turning off DFS shall not be set. The TPC range shall be no less

than 6dB; if there is no TPC function, the equivalent isotropic radiated power and equivalent isotropic radiated power spectral density limits shall be reduced by 3dB compared with the corresponding limits listed in the appendix.

In order to achieve compatible coexistence of different radio service frequencies, radio transmitting equipment operating in the 2400MHz, 5100MHz and 5800MHz frequency bands shall comply with one of the interference avoidance technical requirements listed in Appendix 2.

Wireless LAN devices with public network IP address allocation function shall support IPv6 protocol and enable IPv6 address allocation function by default. For wireless LAN devices with special national requirements for information security, the air interface access control security capability shall also comply with GB 15629 national wireless LAN security series standards.

Article 5 Where wireless LAN access points (APs), broadband wireless access system central stations, and point-to-point transmission radio stations are set and used, and the following conditions are met at the same time, a radio station license shall be applied from the local radio management agency of the province, autonomous region, or municipality directly under the central government:

(I) Deployed in outdoor environment;

(II) The equivalent isotropic radiated power of radio transmitting equipment operating in the 2400MHz frequency band shall be greater than 20dBm; the equivalent isotropic radiated power of radio transmitting equipment operating in the 5800MHz frequency band shall be greater than 30dBm.

In addition to meeting the above conditions, other radio transmitting equipment and radio stations setting and using the 2400MHz, 5100MHz and 5800MHz frequency bands shall be managed in accordance with the terrestrial public mobile communication terminals and no radio station license is required.

Article 6 The radio management agencies of all provinces, autonomous regions, and municipalities directly under the central government shall actively promote the online processing of relevant radio station licenses and other matters to improve the convenience of government services.

Article 7 The radio stations setting and using the 5100MHz frequency band shall be more than 3 km away from earth stations that legally use satellite radio determination (air-to-ground) services and satellite fixed (air-to-ground) services in the same frequency band. Relevant satellite earth stations shall have obvious signs at road intersections within 3 km to indicate that the setup and use of radio stations in the 5100MHz frequency band is prohibited.

Article 8 When radio stations operating in the 2400MHz, 5100MHz and 5800MHz

frequency bands and holding radio station licenses in accordance with the law are subject to harmful radio interference, report to the local radio management agency for coordination and resolution in accordance with the principle of "out-of-band services give way to within-band services, secondary services give way to primary services, later users give way to earlier users, and the unplanned give way to the planned".

Article 9 In principle, radio stations operating in the 2400MHz, 5100MHz and 5800MHz frequency bands that do not require a radio station license cannot make claims for protection from harmful interference. If they cause harmful interference to other radio stations that legally hold radio station licenses in the same or adjacent frequency bands, they shall be ceased immediately and may only continue to be used after efforts have been made to eliminate the harmful interference.

Radiocommunication services operating in the 2400MHz and 5800MHz bands shall also be subject to interference from ISM applications.

Article 10 When there are major national tasks or the state implements radio control, the setup and use of radio stations, radio transmitting equipment and non-radio equipment radiating radio waves in the 2400MHz, 5100MHz and 5800MHz frequency bands must comply with the radio management regulations issued during the major national tasks, or obey the radio control orders and radio control instructions issued by the state.

Article 11 Micro-power short-range radio transmitting equipment in the 2400MHz and 5800MHz frequency bands shall be implemented in accordance with the relevant provisions of Announcement No. 52 of 2019 of the Ministry of Industry and Information Technology.

Article 12 The setup and use of radio stations and radio transmitting equipment in the 2400MHz, 5100MHz and 5800MHz frequency bands shall also comply with the relevant regulations of other industry regulatory authorities.

Article 13 From October 15, 2023, applications for model approval of radio transmitting equipment must be carried out in accordance with the technical requirements listed in this notice.

Article 14 The relevant requirements of this notice shall come into effect on January 1, 2022. If any previous relevant regulations are inconsistent with this notice, this notice shall prevail.

Attachment:

1. Radio frequency technical requirements for radio transmission equipment in the 2400MHz, 5100MHz and 5800MHz frequency bands

Attachment 2

Technical requirements for interference avoidance of radio transmission equipment in the 2400MHz, 5100MHz and 5800MHz frequency bands

I. Technical requirements for interference avoidance of radio transmission equipment in the 2400MHz band based on the "pre-emission search" mechanism

(I) Radio transmission equipment based on frequency hopping technology

1. The equipment shall assess the channel availability before transmitting on the intended channel frequency. The idle channel assessment time before transmission shall not be less than 0.2% of the channel occupancy time and shall not be less than 16 μs.

2. After the equipment finds that the channel frequency is occupied, it can execute the following channel access method.

(1) Jump to other available frequencies immediately before the dwell time ends.

(2) After the equipment finds that the channel frequency is occupied, it can keep using the frequency during the remaining dwell time and re-perform the idle channel assessment. If the idle channel assessment determines that the channel frequency is no longer occupied, the frequency hopping frequency can continue to be reused; if it is still occupied, the idle channel assessment shall continue until the channel frequency is no longer occupied.

(3) After discovering that the channel frequency is occupied, the equipment may continue to transmit short-time management control signaling signals (short control signaling signals), and the duty cycle of the short control signaling signals shall be less than or equal to 10%.

3. Channel occupancy time: The total time required for the equipment to transmit on a given channel frequency without re-evaluating the availability of the channel frequency. This time shall be less than 60ms.

4. Channel idle time: at least 5% of the channel occupancy time and not less than 100μs.

5. Detection threshold:

than 1ms and no more than 10ms. Equipment with a fixed frame period can also adjust the duration of the frame period which, however, shall not exceed 200ms/time.

2. For equipment based on a fixed frame period, signal transmission is only allowed after the fixed frame starts, and an idle channel assessment shall be performed before preparing for transmission. The idle channel assessment time before transmission shall be no less than 16μs. If a signal higher than the detection threshold is found on the intended frequency, the equipment shall not transmit on that frequency in the next fixed frame period, but the equipment is allowed to perform short control signaling signal transmission on that channel frequency (see requirements in Clause 5 for details). Otherwise, the frequency can be used normally. If the equipment supports transmission on multiple channels at the same time, the equipment can continue to transmit on other working channels, provided that idle channel assessment have been performed on other working channels and no occupation has been found.

3. The maximum channel occupancy time of equipment based on the frame structure technology system shall be less than or equal to 95% of the fixed frame period. After the channel occupancy time and before the start of the next fixed frame period, a channel idle period shall be reserved, and the duration of the channel idle period shall be at least 5% of the channel occupancy time and not less than 100μs.

4. The equipment can have multiple transmissions within a channel occupancy time. If the interval between the relevant transmission sequences does not exceed 16μs, there is no need to perform additional idle channel assessment on this working channel. If the interval exceeds 16μs, the equipment must perform an additional idle channel assessment and continue to use the working channel after finding that the channel is not occupied.

5. Short control signaling signals are used to send management and control frame transmissions. It is required that within the 50ms observation period, the number of short control signaling signal transmissions of the equipment shall be less than or equal to 50 times. Moreover, within the above observation period, the total time of the short control signal transmission of the equipment shall be less than 2500μs; alternatively, the duty cycle of the short control signal transmission signal shall not be greater than 10%.

6. After receiving the transmission authorization from the network initialization equipment associated with it, if the network access equipment transmits a signal within 16μs after the end of the last transmission sequence of the network initialization equipment, it can continue to transmit signals on the current working channel without re-performing the idle channel assessment of the channel; otherwise, the network access equipment shall re-perform the idle channel

assessment of the working channel before transmission.

7. The detection threshold is not greater than -75dBm/MHz.

(II) Radio transmission equipment based on load

1. Equipment based on the transmission load technology system shall conduct idle channel assessment before preparing to transmission. The idle channel assessment time before transmission shall be no less than 25μs. If a signal higher than the detection threshold is found on the intended frequency, the equipment shall stop transmitting immediately, but the equipment is allowed to perform short control signaling signal transmission on the channel frequency (see requirements in Clause 4 for details). Otherwise, the channel frequency can be used normally.

2. The channel occupancy time includes one or more transmissions of the network initialization equipment and zero or more transmissions of one or more network access devices. The maximum channel occupancy time shall not exceed 20ms.

3. Equipment based on the transmission load technology system can work on multiple adjacent or non-adjacent channels at the same time. Before the transmission, the equipment shall conduct an idle channel assessment for at least 25μs for each channel frequency to be used. If it is found that the channel is not occupied, it can combine and use any combination or group of 20MHz independent working channels.

4. Short control signaling signals are used to send management and control frame transmissions. It is required that within the 50ms observation period, the number of short control signaling signal transmissions of the equipment shall be less than or equal to 50 times. Moreover, within the above observation period, the total time of the short control signal transmission of the equipment shall be less than 2500μs; alternatively, the duty cycle of the short control signal transmission signal shall not be greater than 10%.

5. After receiving the transmission authorization from the network initialization equipment associated with it, if the network access equipment transmits a signal within 25μs after the end of the last transmission sequence of the network initialization equipment, it can continue to transmit signals on the current working channel without re-performing the idle channel assessment of the channel; otherwise, the network access equipment shall re-perform the idle channel assessment of the working channel before transmission.

6. The detection threshold is not greater than -75dBm/MHz.

IV. Technical requirements for interference mitigation based on other mechanisms

Technical requirements for interference mitigation based on the "equivalent

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