Microwave heating equipment microwave leakage standard problem

The main sources of leakage of microwaves are: door and cavity joints, door mesh and magnetron and waveguide box joints.

1. The joint between the door and the cavity, according to the linear refraction characteristics of the microwave, as long as the gap and the gap which maintain a certain uniformity during the installation process will not cause leakage;

2, the door mesh plate as long as the mesh is uniform, there is no break between the holes, evenly distributed is usually not leaking;

3. The magnetron replacement process is insulated by the combination of the copper wire pad on the magnetron and the coupling port of the waveguide box. As long as the magnetron is replaced, check the integrity of the soft copper wire mat, the flatness of the coupling and The fixing screws are tightened and will not leak. Generally, the mesh plate has no sharp gravity striking deformation or hole breakage, and the door body portion in maintenance generally does not need to be adjusted, and the leakage does not increase. According to the above situation, if there is a mesh break, the magnetron coupling is not good or the door body is combined with the phenomenon that the tight metal body is in contact with it, a sparking discharge may occur, or a slight "nourishing, nourishing" sound may be generated. Therefore, no leakage will occur during maintenance inspection.

Is microwave oven leaking harmful? How to prevent microwave leakage?

Therefore, the microwave oven leak is not necessarily harmful. Radiation in life is everywhere, microwave ovens are far less than computers and mobile phones, but we still need to pay attention. As long as you are in the process of installation and use, pay attention to the above points to prevent the microwave oven from leaking.

Microwave heating has many advantages such as fast heating speed, uniform heating, energy saving and high efficiency, easy control, low temperature sterilization, no pollution, and selective heating.
Applications in industry, medical applications, family life, etc. are becoming more common. The frequency used by microwave heating equipment can range from 30 0 M Hz to 3X ( ) G z H , while in practice the national microwave, which is used by industrial, scientific and medical (s IM) RF equipment, is mainly: 4 3 3 MH z , 9 1 5 MH z , 24 50 MH z , 5 800 MH z , 2 2 12 5 MH z microwave band,
Currently widely used are g l 5M Z H and 2 4 5 0 M H: . In China, only 2 4 5 0 M H z is allocated to s I M equipment. China's microwave energy leakage radiation limit standard is issued according to the National Bureau of Standards.
GB 59 5 . 9 6 - 8 7 Standard implementation, the allowable leakage limit is measured according to the power density, and the electromagnetic disturbance value is carried out according to the GB 48 24-12 2 4 standard, and the standard electromagnetic disturbance limit is radiation The

electric field strength is measured. The measurement methods and limits used for the microwave radiation limit values of the two standards are not the same, and the similarities and differences cannot be directly compared.
Therefore, the question arises: Does the microwave heating equipment produced according to the GB 5 95.9 6 - 8 7 standard also comply with the G B4 8 2 4 - 200 4 standard? Especially the gl 5M R z band microwave heating equipment that was previously allowed to be developed and produced. In the GB 4 824 - 2 0 4 standard,
9 1 SM H is not allowed in s I M microwave equipment. This paper compares the differences between the two standards from the perspective of quantitative calculations, and proposes some feasible suggestions for the problems arising from this.
G B 5959
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6-87 standard and G B 4824-2004 standard allow calculation and comparison of microwave leakage limits
The limits for microwave leakage in the GB 59 59 . 6 - 8 7 standard implemented from January 1, 1998 are as follows: The microwave surface power density leaking from the microwave equipment is equal to or at any distance from any accessible part of the equipment. For locations greater than .0 0 5 m, the microwave leakage power density shall not be greater than smw m Z (plane wave) fl J .
The GB 4 824-205 standard issued in 2005, the electromagnetic radiation disturbance limit for non-radio equipment in the band 2 30-100 0 MH z is specified as 2: Class A of the s IM microwave equipment Equipment, whose radiation disturbance limit is 10m away from the equipment, its radiation electric field strength shall not exceed 4 d 7 (B forest v / m).
Among them, group l equipment refers to all the medical equipment that intentionally generates and/or uses conductive RF energy for the purpose of exerting its own functions. Class A equipment refers to equipment used in non-domestic and not directly connected to residential low-voltage power supply network facilities. Since the measured values of the microwave radiation limits used by the two standards are different, the distance between the measurement points and the radiation source is not equal, and it is not easy to directly compare the two. Now take a microwave heating device that meets the G B4 824 - 20 0 4 radiation requirements as an example to quantitatively analyze and compare the limit values of the two.
The calculation idea is: Calculate the radiation power density of a device that meets the radiation requirements of G B4 8 24 2 2 004 at a distance of .0 0 5 m, and compare the difference between the two.

The main source of leakage for continuous microwave heaters is the gate of the microwave suppressor outlet and the heater. The microwave suppressor outlet is now taken as an example for analysis. There is a microwave heating device whose microwave suppressor outlet is a rectangular surface radiation field with a length of o.6 m and a width of .0 2 m, using a g l 5M diver microwave frequency band. According to G 4 B 82 4 - 2 0 0 4 standard a l , it is known that the radiation electric field strength is 4 7 d B (bu v m /) at a distance of 10 m from the mouth surface. Based on this, the radiant power density at the center of the radiation field at o.0 5m (outward from the center of the radiation field perpendicular to the mouth) is calculated.
The equivalent surface magnetic flux can be obtained from the average power density of electromagnetic radiation at the center of the mouth surface along the normal outward direction o .0 5 m. Because ?o . 0 5 m is in, it is calculated by near-field theory. According to the near-

field theory, the electromagnetic field 5 [ ] here is:
As in the former case, the average power density in the z-axis direction is much larger than the X and Y-axis directions, and its size is: inverse 2.33 8 lxl 0 (W lm Z) 2 2. 338 lx l0 It is obvious that (mw C / m Z), in both cases, the calculated results are much smaller than the leakage standard of GB 59 5. 9 6 - 8 7 (sm w / c resistance). Therefore, for microwave heating equipment above the g l 5H z band,
If the G 4 B 8 2 4 - 2 0 0 1 standard is to be met (ie the radiation field strength at 10 m from the device is not more than 4 7 d (B Bu V / m)), then at the distance of the device. 0 0 5 m The average power density of the microwave leakage must be less than (1. 04 7 1~ 2. 33 8 1) xlo is (mw / em Z) (when other caliber fields are distributed, the values will be different, but there will be several orders of magnitude The change). It can be seen that the microwave leakage radiation limit required by the G B4 8 2 4 plus 0 4 standard is far lower than the requirements of GB 59 59 . 6 - 87 standard, that is, the equipment meeting the GB 59 59 . 6 - 8 7 standard may not be able to reach The GB 4 824-2004 standard, and the equipment that meets the requirements of the microwave leakage emission limit of the G B4 8 24-12 2 4 standard can meet the requirements of the GB 5 95.9 6 - 8 7 standard.
2 Cancel g l 5 M H z as the problem of s I M microwave equipment use frequency band and suggestion

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The problem is analyzed by the above calculations. The results of the G B4 82 4 2 0 0 4 standard for microwave radiation are much stricter than those of the GB 59 5.9 6 - 8 7 standard. Previously produced according to GB 595 .9 6 - 8 7 9 MH MH above the frequency band microwave heating equipment is not satisfied

2 0 ( ) 4 Standard requirements for electromagnetic disturbance limits in this band. In fact, many mobile phone operators have had disputes due to interference from the 9th M Hz band s M microwave equipment, and the above conclusions have been verified. As usual, since the G B4 8 2 4 1 2 0 4 standard does not include the 9 1SM H band in the band used by the s I M microwave device, it is only necessary for the s I M microwave device.
Microwave equipment in the g l 5 M H band is forbidden, but there are many deficiencies in practice.
First of all, the 9 M M z band microwave equipment in the s I M equipment was produced and used as early as the implementation of the G B4 824-20 ( ) 4 standard and its predecessor G B 48 2 4 - 19 % standard.
The microwave radiation standard is based on the national standard G B 59 5. 9 6 - 8 7 . This type of equipment has been widely used and used in China, and there are many manufacturers and user units. If the equipment is simply banned, it will inevitably bring huge economic losses to relevant manufacturers and users, and it will be a heavy blow to China's microwave application industry. Secondly, as early as the 1960s, the International Microwave Application Association recommended the use of the 9 MH Hz band in s I M microwave equipment. And only from the heating effect,
The gl 5M HZ band has a much better microwave penetration depth than the 24 50 MH z band when dealing with large heated objects. It is not a simple replacement for the 2 450 MH z or 580 0 M Hz band. It is also very much needed in the application.
2 2 Based on the above reasons, we have the following views: (1) The relevant administrative

departments are concerned with the use of microwave frequencies, if they can be used by manufacturers, users, relevant industry departments, microwave application associations, etc. The group exchanges opinions widely, taking into account the interests of all parties, and the resulting standards will be more realistic and more reasonable.
(2) Do not simply disable the use of the 9 Q M Hz band in l s M microwave equipment, which will bring greater economic benefits.
(3) The electromagnetic disturbance problem caused by the microwave heating equipment in the g l 5M H z band can be restrained by appropriately raising the electromagnetic disturbance standard, and the installation requirements of the equipment are strengthened so as not to affect the radio service.

3 Conclusion

The IS M microwave equipment in the g l5 MH z or higher frequency band does not necessarily meet the requirements of the GB 4 82 4 2 0 4 standard for electromagnetic disturbance limits in this frequency band, provided that the GB 59 59 . 6 - 8 7 standard is met. The microwave heating equipment that meets the GB 4 824-20 0 4 standard is capable of meeting the requirements of the microwave radiation of the GB 59 5. 9 6 - 8 7 standard; it is recommended to retain the 9 1 SM H z frequency band for use in the s IM microwave equipment. The electromagnetic disturbance problem it generates can be solved by appropriate measures.