Technical Requirements for Micropower (Short Distance) Radio Equipment

I. Technical specification

(1) Common micropower (short distance) radio transmitting equipment

A-class equipment

1. Working frequency: 9kHz-190kHz

<table>
<thead>
<tr>
<th>Frequency Range</th>
<th>Transmitting Limit of Magnetic Field Intensity</th>
</tr>
</thead>
<tbody>
<tr>
<td>9kHz-50kHz</td>
<td>72dBµA/m (at 10m) (quasipeak)</td>
</tr>
<tr>
<td>50kHz-190kHz</td>
<td>Decrease 3dB per frequency interval (quasipeak)</td>
</tr>
</tbody>
</table>

B-class equipment

1. Working frequency: 1.7-2.1MHz, 2.2-3.0MHz, 3.1-4.1MHz, 4.2-5.6MHz, 5.7-6.2MHz, 7.3-8.3MHz, 8.4-9.9MHz

2. Magnetic field intensity at 10m distance from the equipment isn’t more than 9dBµA/m (quasipeak).

3. Frequency tolerance: 100×10^{-6}

4. Not more than 200kHz for 6dB bandwidth

C-class equipment


2. Magnetic field intensity at 10m distance from the equipment isn’t more than 42dBµA/m (quasipeak).

3. Frequency tolerance: 100×10^{-6}

4. Stray radiation: for the equipment with frequency range of 13.553-13.567MHz, frequency limit is 9dBµA/m (at 10m, quasipeak) when both ends of the range shift 140kHz.

D-class equipment

1. Working frequency: 315kHz-30MHz, excluding frequency ranges specified for A, B and C-class equipment above.
2. Magnetic field intensity is as follows what at 10m distance from equipment:
   - 315kHz-1MHz: not more than -5dBµA/m (quasipeak);
   - 1MHz-30MHz: not more than -15dBµA/m (quasipeak).

**E-class equipment**

1. Working frequency: 40.66-40.70MHz
2. Transmitting power limit: 10mW (e.r.p)
3. Frequency tolerance: $100 \times 10^{-6}$

**F-class equipment**

This equipment refers to short distance radio equipment with a frequency range of 2400-2483.5MHz, except for digital wireless telephone, blue-tooth equipment and wireless LAN equipment.

1. Working frequency: 2400-2483.50MHz
2. Transmitting power limit: 10mW (e.i.r.p)
3. Frequency tolerance: 75kHz

**G-class equipment**

1. Working frequency: 24.00-24.25GHz
2. Transmitting power limit: not more than 20mW (e.i.r.p)

(2) **General radio remote-control equipment**

Don’t apply in wireless control toy;
If same as those of local sound and TV/broadcasting station, working frequency is inapplicable locally.
If interfering with local sound and TV/broadcasting station, working frequency is inapplicable locally. However, it can be allowable after interference is eliminated or it is readjusted.

1. Working frequency: 470-566MHz, 606-787MHz
2. Transmitting power limit: 5mW (e.r.p)
3. Required bandwidth: not more than 1.0MHz

(3) **Radio microphone (wireless microphone) and civil radio metering device etc**

They are used in educational and cultural audio-visual programs, public places (such as cinema, concert hall
and conference room etc), and used as aural aid and as small broadcasting equipment.

When meeting TD (transmitting data) requirement, and if working time of their transmitters isn’t more than 5s, 470-510MHz of frequency range is available to civil radio metering devices.

If same as those of local sound and TV/broadcasting station, working frequency is inapplicable locally. If interfering with local sound and TV/broadcasting station, working frequency is inapplicable locally. However, it can be allowable after interference is eliminated or it is readjusted.

To avoid interference with biomedical telemeter equipment, radio microphone is unallowable in hospitals. The manufacturer must state this in product instruction.

1. Working frequency and transmitting power:

1) Working frequency: 87-108 MHz
   Transmitting power limit: 3mW (e.r.p)

2) Working frequency: 75.4-76.0MHz, 84-87MHz
   Transmitting power limit: 10mW (e.r.p)

3) Working frequency: 189.9-223.0MHz
   Transmitting power limit: 10mW (e.r.p)

4) Working frequency: 470-510MHz, 702-787MHz
   Transmitting power limit: 50mW (e.r.p)

2. Required bandwidth: not more than 200kHz

3. Frequency tolerance: $100 \times 10^{-6}$

(4) Biomedical telemeter equipment

It is a radio transmitting equipment to be used for transferring human’s and animal’s physiological phenomenon measurement signal, which is used in hospitals or medical research institutes only.

1. Working frequency: 174-216MHz, 402-425MHz, 608-614MHz

2. Transmitting power limit: 10mW (e.r.p)

3. Frequency tolerance: $100 \times 10^{-6}$

(5) Analog cordless telephone
1. Working frequency:

<table>
<thead>
<tr>
<th>No. of channel</th>
<th>Transmitting frequency of desk set (MHz)</th>
<th>Transmitting frequency of mobile set (MHz)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>45.000</td>
<td>48.000</td>
</tr>
<tr>
<td>2</td>
<td>45.025</td>
<td>48.025</td>
</tr>
<tr>
<td>3</td>
<td>45.050</td>
<td>48.050</td>
</tr>
<tr>
<td>4</td>
<td>45.075</td>
<td>48.075</td>
</tr>
<tr>
<td>5</td>
<td>45.100</td>
<td>48.100</td>
</tr>
<tr>
<td>6</td>
<td>45.125</td>
<td>48.125</td>
</tr>
<tr>
<td>7</td>
<td>45.150</td>
<td>48.150</td>
</tr>
<tr>
<td>8</td>
<td>45.175</td>
<td>48.175</td>
</tr>
<tr>
<td>9</td>
<td>45.200</td>
<td>48.200</td>
</tr>
<tr>
<td>10</td>
<td>45.225</td>
<td>48.225</td>
</tr>
<tr>
<td>11</td>
<td>45.250</td>
<td>48.250</td>
</tr>
<tr>
<td>12</td>
<td>45.275</td>
<td>48.275</td>
</tr>
<tr>
<td>13</td>
<td>45.300</td>
<td>48.300</td>
</tr>
<tr>
<td>14</td>
<td>45.325</td>
<td>48.325</td>
</tr>
<tr>
<td>15</td>
<td>45.350</td>
<td>48.350</td>
</tr>
<tr>
<td>16</td>
<td>45.375</td>
<td>48.375</td>
</tr>
<tr>
<td>17</td>
<td>45.400</td>
<td>48.400</td>
</tr>
<tr>
<td>18</td>
<td>45.425</td>
<td>48.425</td>
</tr>
<tr>
<td>19</td>
<td>45.450</td>
<td>48.450</td>
</tr>
<tr>
<td>20</td>
<td>45.475</td>
<td>48.475</td>
</tr>
</tbody>
</table>

2. Transmitting power limit of desk and mobile set: 20mW (e.r.p)

3. Max frequency deviation: 5kHz

4. Required bandwidth: not more than 16kHz

5. Frequency tolerance: 1.8kHz

6. Connection between antenna and desk set or mobile set must be fixed permanently, which shouldn’t be longer than 1m.

(6) 2.4GHz digital cordless telephone

1. Working frequency: 2400.0-2483.5MHz
2. Transmitting power limit in average and equivalent all-direction: 25mW

3. Frequency tolerance: \(20 \times 10^{-6}\)

4. The digital cordless telephone working in frequency range of 2400.0\(\text{MHz}\) to 2483.5\(\text{MHz}\) must adopt hopping frequency mode with at least 75 frequency hopping channels.

5. Average dwell time of optional channel shouldn’t be more than 0.4s within 1min.

(7) **Radio remote-control equipment exclusively used for crane or conveyor**

Before installed, the equipment must be provided with electromagnet environment test to avoid being interfered or interfering with other equipment, thus to cause industrial accident. When interfered adversely, it should be stopped immediately. It can be put into use after the interference is eliminated or readjustment is made.

To protect radio astronomy service in Beijing Observatory Station and in Pingtang, Guizhou Province, the equipment with following frequency range is forbidden in these areas:

1. Working frequency:
   - 230.700\(\text{MHz}\)
   - 223.700\(\text{MHz}\)
   - 230.975\(\text{MHz}\)
   - 223.975\(\text{MHz}\)
   - 231.600\(\text{MHz}\)
   - 224.600\(\text{MHz}\)
   - 232.325\(\text{MHz}\)
   - 225.325\(\text{MHz}\)
   - 230.100\(\text{MHz}\)
   - 223.100\(\text{MHz}\)
   - 232.025\(\text{MHz}\)
   - 225.025\(\text{MHz}\)

2. Transmitting power limit: 20mW (e.r.p)

3. Required bandwidth: not more than 16kHz

4. Frequency tolerance: \(4 \times 10^{-6}\)

(8) **Industrial radio remote-control equipment**

It is used in industrial workshops (or buildings) only.

1. Working frequency:
   - 418.950\(\text{MHz}\)
   - 418.975\(\text{MHz}\)
   - 419.000\(\text{MHz}\)
   - 419.025\(\text{MHz}\)
   - 419.050\(\text{MHz}\)
   - 419.075\(\text{MHz}\)
   - 419.100\(\text{MHz}\)
   - 419.125\(\text{MHz}\)
   - 419.150\(\text{MHz}\)
   - 419.175\(\text{MHz}\)
   - 419.200\(\text{MHz}\)
   - 419.250\(\text{MHz}\)
   - 419.275\(\text{MHz}\)

2. Transmitting power limit: 20mW (e.r.p)

3. Required bandwidth: not more than 16kHz

4. Frequency tolerance: \(4 \times 10^{-6}\)
(9) **Radio data transmission equipment**

To protect radio astronomy service in Beijing Observatory Station and in Pingtang, Guizhou Province, the equipment with following frequency range is forbidden in these areas:

It is used in building only.

1. Working frequency:
   - 228.050MHz
   - 228.100MHz
   - 228.200MHz
   - 228.275MHz
   - 228.425MHz
   - 228.575MHz
   - 228.600MHz
   - 228.800MHz
   - 223.150MHz/230.150MHz
   - 223.250MHz/230.250MHz
   - 223.350MHz/230.350MHz
   - 224.050MHz/231.050MHz
   - 224.250MHz/231.250MHz

2. Transmitting power limit: 10mW (e.r.p)

3. Required bandwidth: not more than 16kHz

4. Frequency tolerance: $4 \times 10^{-6}$

(10) **Radio transmission equipment of electric crane scale**

1. Working frequency and required bandwidth:

   1) Working frequency: 223.300MHz, 224.900MHz, 230.050MHz, 233.050MHz, 234.050MHz
      Required bandwidth: not more than 50kHz

   2) Working frequency: 450.0125MHz, 450.0625MHz, 450.1125MHz, 450.1625MHz, 450.2125MHz
      Required bandwidth: not more than 20kHz

2. Effective radiation power limit: 50mW (e.r.p)

3. Frequency tolerance: $4 \times 10^{-6}$

(11) **Various civil wireless control devices**

They are inapplicable to wireless control of toys and models etc.
1. Working frequency: 314-316MHz, 430-432MHz, 433.00-434.79MHz

   Transmitting power limit: 10mW (e.r.p)

   Required bandwidth: not more than 400kHz

2. Working frequency: 779-787MHz

   Transmitting power limit: 10mW (e.r.p)

(12) Radio remote-control equipment for model and toy

   It is applicable to radio remote-controlling airplane models, ship models, car models and toys only.

1. Working frequency

   Ship models and car models with working frequency between 26~27MHz:

   26.975MHz, 26.995MHz, 27.025MHz, 27.045MHz, 27.075MHz,

   27.095MHz, 27.125MHz, 27.145MHz, 27.175MHz, 27.195MHz,

   27.225MHz, 27.255MHz

   Ship models and car models with working frequency of 40MHz:

   40.61MHz, 40.63MHz, 40.65MHz, 40.67MHz, 40.69MHz,

   40.71MHz, 40.73MHz, 40.75MHz

   Airplane models with working frequency of 40MHz:

   40.77MHz, 40.79MHz, 40.81MHz, 40.83MHz, 40.85MHz

   Airplane models with working frequency of 72MHz:

   72.13MHz, 72.15MHz, 72.17MHz, 72.19MHz, 72.21MHz,

   72.79MHz, 72.81MHz, 72.83MHz, 72.85MHz, 72.87MHz

2. Transmitting power limit: 750 mW (e.r.p)

3. Required bandwidth: between 26-27MHz, not more than 8kHz

   between 40MHz ~ 72MHz, not more than 20kHz
4. Frequency tolerance: between 26 to 27MHz, not more than $100 \times 10^{-6}$

between 40MHz to 72MHz, not more than $30 \times 10^{-6}$

5. Remote-controllers of these models must be unidirectional controller. No radio transmitting equipment is allowable to these models.

6. To protect electromagnet environment of aviation radio, no remote controller is accessible to the area centering at the center point of runway and in 5000m radius.

7. Voice communication signal is non-transmissible from these remote controllers

8. The remote controllers should be taken out of service when and in the area where radio control order is given by relevant national department.

(13) **Interphone**

When used, interphones must be in accordance with relevant radio control rules.

1. Working frequency is as follows (unit: MHz):
   
   409.7500; 409.7625; 409.7750; 409.7875; 409.8000; 409.8125;

   409.8250; 409.8375; 409.8500; 409.8625; 409.8750; 409.8875;

   409.9000; 409.9125; 409.9250; 409.9375; 409.9500; 409.9625;

   409.9750; 409.9875

2. Modulation mode: F3E

3. Transmitting power limit: 500mW (e.r.p)

4. Frequency tolerance: $5 \times 10^{-6}$

5. Channel interval: 12.5kHz

(14) **Carborne distance-measuring radar**

1. Working frequency is 76-77GHz

2. Omnidirectional radiation power limit of peak equivalent: 55dBm
II. General requirements

1. Measured frequency range of stray radiation:

<table>
<thead>
<tr>
<th>Working frequency range</th>
<th>Measured frequency range of stray radiation</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Lower limit</td>
</tr>
<tr>
<td>9kHz ~ 100MHz</td>
<td>9kHz</td>
</tr>
<tr>
<td>100MHz ~ 600MHz</td>
<td>30MHz</td>
</tr>
<tr>
<td>600MHz ~ 2.5GHz</td>
<td>30MHz</td>
</tr>
<tr>
<td>2.5 ~ 13GHz</td>
<td>30MHz</td>
</tr>
<tr>
<td>13GHz ~ 2.5GHz</td>
<td>30MHz</td>
</tr>
</tbody>
</table>

2. Stray radiation limit (boundary point between stray radiation and out of band radiation is channel bandwidth as ±2.5 times of carrier frequency);

   2.1 Transmission state at transmitter’s max power

<table>
<thead>
<tr>
<th>Frequency range</th>
<th>Bandwidth to be test</th>
<th>Limit</th>
<th>Detection mode</th>
</tr>
</thead>
<tbody>
<tr>
<td>9kHz ~ 150kHz</td>
<td>200Hz (6dB)</td>
<td>27dBµA/m (at 10m) decrease 3dB per frequency interval</td>
<td>quasipeak</td>
</tr>
<tr>
<td>150kHz ~ 10MHz</td>
<td>9kHz (6dB)</td>
<td>-3.5dBµA/m (at 10m)</td>
<td>quasipeak</td>
</tr>
<tr>
<td>10MHz ~ 30MHz</td>
<td>9kHz (6dB)</td>
<td>-36dBm</td>
<td>quasipeak</td>
</tr>
<tr>
<td>30MHz ~ 1GHz</td>
<td>1MHz (3dB)</td>
<td>-30dBm</td>
<td>Effective value</td>
</tr>
<tr>
<td>&gt;1GHz</td>
<td>1MHz (3dB)</td>
<td>-20dBm</td>
<td>Effective value</td>
</tr>
</tbody>
</table>

2.2 Standby or idle state of transmitter

<table>
<thead>
<tr>
<th>Frequency range</th>
<th>Bandwidth to be test</th>
<th>Limit</th>
<th>Detection mode</th>
</tr>
</thead>
<tbody>
<tr>
<td>9kHz ~ 150kHz</td>
<td>200Hz (6dB)</td>
<td>6dBµA/m (at 10m) decrease 3dB per frequency interval</td>
<td>quasipeak</td>
</tr>
<tr>
<td>150kHz ~ 10MHz</td>
<td>9kHz (6dB)</td>
<td>-24.5dBµA/m (at 10m)</td>
<td>quasipeak</td>
</tr>
<tr>
<td>10MHz ~ 30MHz</td>
<td>9kHz (6dB)</td>
<td>-47dBm</td>
<td>Effective value</td>
</tr>
<tr>
<td>&gt;1GHz</td>
<td>1MHz (3dB)</td>
<td>-54dBm</td>
<td>Effective value</td>
</tr>
</tbody>
</table>

Note: magnetic field is tested in open field and radiation power in electric wave darkroom.

The equipment below 30MHz of working frequency may be set as single-carrier-wave transmission mode.

If actual specification is different from general specification, it is subject to actual specification.

3. Between 48.5MHz ~ 72.5MHz, 76MHz ~ 108MHz, 167MHz ~ 223MHz, 470MHz ~ 566MHz, 606MHz ~ 798MHz, stray radiation shouldn’t be more than -54dBm.
4. Conducted interference transmission at power port, signal port and telecom port shall be in accordance with GB9254-1998.

5. For frequency range above 30MHz, radiation power at lower and upper limit of working frequency required shouldn’t be more than -80dBm/Hz(e.i.r.p). For frequency range below 30MHz, lower and upper limit corresponding to required bandwidth (99% energy) of any channel cannot be beyond working frequency required.

6. Manufacturer of micropower (short distance) radio equipment should indicate extreme environment condition under which transmitting power and frequency tolerance should meet specified requirements.