

The Outline of Proposed Amendment to Ministerial Ordinance

1 Item

Partial amendment of Regulations for Radio Equipment

2 Amendment to ministerial ordinance

Regulations for Radio Equipment

3 Reasons for amendment

To amend the technical standards of the low-power wireless system (unlicensed) for the greater use of advanced radio equipment for specified low-power radio station about 1. Human and animal detection report system (150MHz Band), 2. Telemeter, telecontrol and data transmission system (400MHz and 1,200MHz Band), and 3. Voice communication radio system (400MHz Band). The reason for this amendment is to increase the channels to meet the demand of the heavy use of radio frequency, and to expand the new usage of such system.

4 Outline of the amendment

(1) HUMAN AND ANIMAL DETECTION REPORT SYSTEM

This radio equipment is used to keep track of wild animals to prevent their attacks and damage to the agricultural crops caused by them. In order to meet the demand for new usage, such as to explore the person in distress at a mountain, and for increase its channels, amend the technical standards of this system.

Technical requirements of radio equipment

| Item | Current | New |
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| Name | ANIMAL DETECTION NOTIFICATION SYETEM | HUMAN AND ANIMAL DETECTION REPORT SYSTEM |
| Usage | The radio equipment to report the actions and conditions of animals | The radio equipment to report the actions and conditions of human or animals |
| Frequency band | 142.93MHz~142.99MHz | 142.93MHz ~ 142.99MHz and additional band, 146.93MHz ~ 146.99MHz |

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| Channel spacing | 20kHz (10kHz interleave) | 1ch 6.25kHz 2ch-bonding 12.5kHz (6.25kHz interleave) 3ch-bonding 18.75kHz (6.25kHz offset) |
| Tolerance of OBW | 16kHz | 1ch 5.8kHz 2ch-bonding 11.6kHz 3ch-bonding 17.4kHz |
| Allowable deviation of frequency | $\pm 12 \times 10^{-6}$ | $\pm 2.5 \times 10^{-6}$ If EIRP is lower than 1mW: $\pm 12 \times 10^{-6}$ |

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| <p>Leakage power to the next channel</p> | <p>Less than $1\mu\text{W}^*$ within the $\pm 8\text{kHz}$ region of 20kHz separation from the carrier frequency</p> <p>*EIRP should be applied in case of using the transmission antenna which gain is less than 0 dBi</p> | <p>(1) In case of the antenna power is between 10mW to 1W: Less than -40dBc within the $\pm 2\text{kHz}$ region of 6.25kHz^{*1} separation from the carrier frequency</p> <p>When use ch.1, 9, 10 or 18, the leakage power to the $\pm 8\text{kHz}$ region in each of 142.92MHz, 143MHz, 146.92MHz or 147MHz is less than $1\mu\text{W}^{*2}$ in addition to the above.</p> <p>(2) In case of the antenna power is less than 10mW: Less than $1\mu\text{W}$ within the $\pm 2\text{kHz}$ region of 6.25kHz^{*1} separation from the carrier frequency.</p> <p>*1 when bonding the channel, the values are as follows; 9.375kHz (2ch-bonding), 12.5kHz (3ch-bonding)</p> <p>*2 EIRP should be applied in case of using the transmission antenna which gain is less than 0 dBi</p> |
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| <p>Unnecessary emissions</p> | <p>The boundary of the out of band region and the spurious region are $\pm 62.5\text{kHz}$ separation from the carrier frequency.</p> <p>1. Out of band emissions It's power must be less than $2.5\mu\text{W}$ or -40 dBc^* less than the mean power of the fundamental frequency.</p> <p>2. Spurious region emissions It's power must be less than $2.5\mu\text{W}$ or -43 dBc^* less than the mean power of the fundamental frequency.</p> <p>*EIRP should be applied in case of using the transmission antenna which gain is less than 0dBi.</p> | <p>The boundary of the out of band region and the spurious region are $\pm 62.5\text{kHz}$ separation from the carrier frequency.</p> <p>1. Out of band emissions It's power must be less than $2.5\mu\text{W}$ or -40 dBc^* less than the mean power of the fundamental frequency.</p> <p>2. Spurious region emissions It's power must be less than $2.5\mu\text{W}$ or -43 dBc^* less than the mean power of the fundamental frequency.</p> <p>*EIRP can be applied in case of using the transmission antenna which absolute gain is less than 0dBi.</p> |
| <p>Transmission time</p> | <p>The maximum continuous transmission time: 600 sec. The minimum pausing time: 1 sec. (It may be allowed to transmit again within 600 sec without pausing) However, in case of the antenna power is less than 10mW, the total sum of the transmission time per 5 seconds shall be less than 1 second.</p> | <p>The maximum continuous transmission time: 60 sec. The minimum pausing time: 2 sec. (It may be allowed to transmit again within 60 sec without pausing) However, in case of the antenna power is less than 10mW, the total sum of the transmission time per 5 seconds shall be less than 1 second.</p> |

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| Carrier sense | <p>If the voltage is generated more than 7uV at the antenna, which gain is 2.14 dBi, by receiving the other station's signal, carrier sense operation is required.</p> <p>However, in case of the antenna power is less than 10mW, carrier sense function is not required.</p> | <p>If the power is inputted more than -96dBm at the feeding point by receiving the other radio station's signal, carrier sense operation is required.</p> <p>However, in case of the antenna power is less than 10mW, carrier sense function is not required.</p> <ul style="list-style-type: none"> ▪ When bonding the channel, carrier sense operation is necessary to all the bonding channels. ▪ It may be allowed to transmit again within the maximum transmission time without carrier sense operation. ▪ The antenna circuit for carrier sense operation should be use the same as the transmission one. <p>However, this shall not apply if the other radio station's signal can be detected equivalently as above condition.</p> |
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(2) SPECIFIC LOW-POWER RADIO TELEMETER, TELEMETRY, TELECONTROL & DATA TRANSMISSION SYSTEM (400MHz, 1,200MHz)

This radio equipment is used as lower power radio systems like telemeters, telemetries, telecontrol and data transmissions. In order to meet the demand for narrow band devices, this system is amended.

Technical requirements of radio equipment

| Item | Current | New |
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| Channel spacing | <p>【400MHz】 12.5kHz 25kHz</p> <p>【1200MHz】 25kHz 50kHz</p> | <p>【400MHz】 6.25kHz 12.5kHz 25kHz</p> <p>【1200MHz】 12.5kHz 25kHz 50kHz</p> |
| Tolerance of OBW | <p>【400MHz】 If the channel spacing is 12.5kHz 8.5kHz If the channel spacing is 25kHz 16kHz</p> <p>【1200MHz】 If the channel spacing is 25kHz 16kHz If the channel spacing is 50kHz 32kHz</p> | <p>【400MHz】 If the channel spacing is 6.25kHz: 5.8kHz If the channel spacing is 12.5kHz: 8.5kHz If the channel spacing is 25kHz: 16kHz</p> <p>【1200MHz】 If the channel spacing is 12.5kHz: 8.5kHz If the channel spacing is 25kHz: 16kHz If the channel spacing is 50kHz: 32kHz</p> |
| Allowable deviation of frequency | <p>【400MHz】 If the channel spacing is 12.5kHz $\pm 4 \times 10^{-6}$ If the channel spacing is 25kHz $\pm 4 \times 10^{-6}$</p> <p>【1200MHz】 If the channel spacing is 25kHz</p> | <p>【400MHz】 If the channel spacing is 6.25kHz: $\pm 2 \times 10^{-6}$ If the channel spacing is 12.5kHz: $\pm 4 \times 10^{-6}$ If the channel spacing is 25kHz: $\pm 4 \times 10^{-6}$</p> <p>【1200MHz】</p> |

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| | $\pm 3 \times 10^{-6}$ If the channel spacing is 50kHz $\pm 4 \times 10^{-6}$ | If the channel spacing is 12.5kHz: $\pm 2 \times 10^{-6}$ If the channel spacing is 25kHz: $\pm 3 \times 10^{-6}$ If the channel spacing is 50kHz: $\pm 4 \times 10^{-6}$ |
| Leakage power to the next channel | <p>【400MHz】</p> <ul style="list-style-type: none"> If the channel spacing is 12.5kHz Less than -40dBc within the ± 4.25kHz region of 12.5kHz separation from the carrier frequency. If the channel spacing is 25kHz Less than -40dBc within the ± 8kHz region of 25kHz separation from the carrier frequency <p>【1200MHz】</p> <ul style="list-style-type: none"> If the channel spacing is 25kHz Less than -40dBc within the ± 8kHz of 25kHz separation from the carrier frequency If the channel spacing is 50kHz Less than -40dBc within the ± 16kHz of 50kHz separation from the carrier frequency | <p>【400MHz】</p> Add the following condition. <ul style="list-style-type: none"> If the channel spacing is 6.25kHz: Less than -40dBc within the ± 2kHz region of 6.25kHz separation from the carrier frequency. <p>【1200MHz】</p> Add the following condition. <ul style="list-style-type: none"> If the channel spacing is 12.5kHz: Less than -40dBc within the ± 4.25kHz region of 12.5kHz separation from the carrier frequency. |
| Transmission time | The max. continuous transmission time: 40 sec. The min. pausing time: 2 sec. For telecontrol in the frequency on 426.025~426.1375MHz, the max. continuous transmission time is 5 sec., and it is able to re-transmit | Add the following condition. <ul style="list-style-type: none"> Pausing time is unnecessary if the antenna power is less than 1mW, frequency is 429.815625 ~ 429.915625MHz, 449.715625 ~ 449.815625MHz, 449.840625 ~ 449.878125MHz or 469.440625 ~ 469.478125MHz and |

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| | <p>without pausing when within 90 sec. from the first transmission and the sum of transmission time is within 5 sec.. Then, pausing time after this re-transmit is :</p> <ul style="list-style-type: none"> ▪ 2 sec. if the time until the end of the transmission from the first transmission is within 5 sec. ▪ otherwise, more than 40% of the time until the end of the transmission from the first transmission otherwise above case. <p>Pausing time is unnecessary to follow conditions systems.</p> <ul style="list-style-type: none"> ▪ Frequency is 429.25MHz ~ 429.7375MHz, 1216.0375 ~ 1216.5MHz or 1252.0375 ~ 1252.5MHz ▪ Frequency is 1216.5375 ~ 1217MHz or 1252.5375 ~ 1253MHz , and EIRP shall be less than 2.14dBm. | <p>the channel spacing is 6.25kHz.</p> |
| <p>Carrier sense</p> | <p>【400MHz】</p> <ul style="list-style-type: none"> ▪ If the voltage is generated more than 7uV at the antenna, which gain is 2.14 dBi, by receiving the other station's signal, carrier sense operation is required. ▪ In case of antenna power is more than 10mW, transmission is not allowed until reaching the voltage equivalent to the excess | <p>【400MHz】</p> <ul style="list-style-type: none"> ▪ If the power is inputed more than -96dBm at the feeding point by receiving the other radio station's signal, carrier sense operation is required. ▪ In case of antenna power is more than 10mW, transmission is not allowed until reaching the voltage equivalent to the excess of 10mW when 2.14dBi of |

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| | <p>of 10mW when 2.14dBi of antenna gain is applied.</p> <ul style="list-style-type: none"> • However, in case of the frequency is between 426.025MHz ~ 426.1375MHz, carrier sense function is not required. <p>【1200MHz】</p> <ul style="list-style-type: none"> • If the voltage is generated more than 4.47uV at the antenna, which gain is 2.14 dBi, by receiving the other station's signal, carrier sense operation is required. • In case of antenna power is more than 10mW, transmission is not allowed until reaching the voltage equivalent to the excess of 10mW when 2.14dBi of antenna gain is applied. | <p>antenna gain is applied.</p> <ul style="list-style-type: none"> • However, in case of the frequency is between 426.025MHz ~ 426.1375MHz, carrier sense function is not required. <p>【1200MHz】</p> <ul style="list-style-type: none"> • If the power is inputted more than -100dBm at the feeding point by receiving the other radio station's signal, carrier sense operation is required. • In case of antenna power is more than 10mW, transmission is not allowed until reaching the voltage equivalent to the excess of 10mW when 2.14dBi of antenna gain is applied. <p>【Both bands】</p> <ul style="list-style-type: none"> • The antenna circuit for carrier sense operation should be use the same as the transmission one. <p>However, this shall not apply if the other radio station's signal can be detected equivalently as above condition.</p> |
| <p>Antenna power</p> | <ul style="list-style-type: none"> • 426.025MHz~426.1375MHz : Less than 100mW • Otherwise : Less than 1W | <ul style="list-style-type: none"> • 426.025MHz~426.1375MHz : Less than 100mW <p>If transmission antenna is separated from the equipment body, antenna power should be less than 1.637mW.</p> |

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| | | <ul style="list-style-type: none"> Otherwise : Less than 1W If transmission antenna is separated from the body, antenna power should be less than 16.37mW. |
| Antenna Gain | <ul style="list-style-type: none"> The value which EIRP will be less than 12.14dBm (If the frequency is 426.025MHz ~ 426.1375MHz, EIRP will be less than 2.14dBm) If the transmission antenna is not separated from the equipment body, the antenna gain shall be more than 0dBi, in addition to the above conditions. | <ul style="list-style-type: none"> The value which EIRP will be less than 12.14dBm (If the frequency is 426.025MHz ~ 426.1375MHz, EIRP will be less than 2.14dBm) |

(3) SPECIFIC LOW-POWER RADIO WIRELESS TELEPHONE (400MHz)

This radio equipment is used as lower power radio systems like wireless telephones. In order to meet the demand for narrow band devices, this system is amended.

Technical requirements of radio equipment

| Item | Current | New |
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| Channel spacing | 12.5kHz | 6.25kHz 12.5kHz |
| Tolerance of OBW | 8.5kHz | If the channel spacing is 6.25kHz: 5.8kHz If the channel spacing is 12.5kHz : 8.5kHz |
| Allowable deviation of frequency | $\pm 4 \times 10^{-6}$ | If the channel spacing is 6.25kHz: $\pm 2 \times 10^{-6}$ If the channel spacing is 12.5kHz: $\pm 4 \times 10^{-6}$ |
| Antenna Power | 10mW | 10mW 100mW* |

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| | | <p>*In case of the frequency is 421.809375MHz ~ 421.909375MHz or 440.259375MHz ~ 440.359375MHz, and the channel spacing is 6.25kHz.</p> |
| Leakage power to the next channel | Less than -40dBc within the \pm 4.25kHz region of 12.5kHz separation from the carrier frequency | <ul style="list-style-type: none"> ▪ If the channel spacing is 6.25kHz: Less than -40dBc within the \pm 2kHz region of 6.25kHz separation from the carrier frequency ▪ If the channel spacing is 12.5kHz: Less than -40dBc within the \pm 4.25kHz region of 12.5kHz separation from the carrier frequency |
| Carrier sense | <ul style="list-style-type: none"> ▪ If the voltage is generated more than 7uV at the antenna, which gain is 2.14 dBi, by receiving the other station's signal, carrier sense operation is required. ▪ In case of the antenna power is less than 1mW, it can be operate carrier sense by transmission frequency in spite of duplex or semi duplex systems. ▪ However, in case of the frequency is between 413.7 MHz ~ 414.14375MHz or 454.05 MHz ~ 454.19375MHz, and antenna power is less than 1mW, carrier sense function is not required. | <ul style="list-style-type: none"> ▪ If the power is inputed more than -96dBm at the feeding point by receiving the other radio station's signal, carrier sense operation is required. ▪ In case of the antenna power is less than 1mW, it can be operate carrier sense by transmission frequency in spite of duplex or semi duplex systems. ▪ However, in case of the frequency is between 413.7 MHz ~ 414.14375MHz or 454.05 MHz ~ 454.19375MHz, and antenna power is less than 1mW, carrier sense function is not required. ▪ The antenna circuit for carrier sense operation should be use |

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| | | <p>the same as the transmission one.</p> <p>However, this shall not apply if the other radio station's signal can be detected equivalently as above condition.</p> |
| Antenna gain | <ul style="list-style-type: none"> ▪ 413.7 ~ 414.14375MHz and 454.05 ~ 454.19375MHz : <p>The value which EIRP will be less than 2.14dBm</p> <ul style="list-style-type: none"> ▪ The other case: <p>The value which EIRP will be less than 12.14dBm</p> | <p>Add the following condition.</p> <ul style="list-style-type: none"> ▪ 421.809375MHz ~ 421.909375MHz and 440.259375MHz ~ 440.359375MHz (which channel spacing is 6.25kHz) : <p>The value which EIRP will be less than 22.14dBm</p> |

5 Proposed date of entry into force

August, 2016*

* The existing technical regulations are also valid for five years after date of entry into force.