Trend of Technical Standard Certification System of Radio Equipment in Japan

March 6, 2019
Certification Promotion Office, MIC
Topics

1. Trend of Technical Standard Certification work
2. System Improvement of Standard Certification
3. Revision of Display Method for Technical Standard Conformity Certification Mark
Conformity Certification for process of licensed radio equipment

- In principal, any person who wished to establish a radio station shall obtain a license from Minister (Radio Act article 4).
- However, with radio stations specified by ministry order (Specified Radio Equipment), given the station which is affixed a mark (Technical Standard Conformity Mark) according to Radio Act, can simplify licensing process (Radio Act Article 4, Article 15).

Streamline of the process:

- Application
- Acceptance
- Review
- Preliminary license
- Inspection
- License
- Operation

※ Unlicensed Station (Wireless LAN, Bluetooth etc.)

Good communication
(1) Technical Standard Conformity Certification (Radio Act article 38 section 6)

After Certification Body (CB) certify the conformity of the radio equipment, a Technical Standard Conformity Certification Mark can be affixed to the proved equipment.

Registered CB

Certify

Affix certification mark

(2) Construction Type Certification (Radio Act article 38 section 24)

After certified dealer (who has received Construction Type Certification from a registered CB) carried out inspection based on the certification confirmation method, the mark can be affixed on the inspected equipment.

(3) Self-Confirmation of Technical Standard Conformity (Radio Act article 38 section 33)

After notifying supplier (who has submitted the notification to MIC) carried out inspection based on the confirmation method, the mark can be affixed on the inspected equipment (Radio Act article 38 section 35)
Mutual Agreement on Telecommunication Equipment (MRA)

MRA (Mutual Recognition Agreement)

- MRA is a system where accept the results of conformity assessment of telecommunications equipment to technical standards mutual between Japan and foreign countries.

Before MRA implementation:
- Manufacturer in Japan applies directly to foreign conformity assessment bodies.
- Overseas Market in foreign countries.
- After MRA implementation:
  - Application for foreign countries can be done in Japan.
  - Decrease time and expenses.
  - Manufacturer in Japan assess equipment based on foreign standards in Japan.
  - Overseas Market in foreign countries.

Application:
① Application
② Assessment
③ Export
Trends of Certification of Conformity to Technical Standards

(year)

(cases)
Breakdown of Conformity to Technical Standards in FY 2017

Main components are Designated Low Power, Wi-Fi etc.

Designated Low Power: 11132 cases

Wi-Fi, Bluetooth etc. (2.4GHz): 2519 cases

Frequency Modulation Analogue phone (F3E) etc. Land Mobile Station: 707 cases

Frequency Modulation Analogue phone (F3E) etc. Municipal Emergency Radio: 501 cases

Fixed Station for Telemeter: 707 cases

Fixed Station for Municipal Emergency Radio: 243 cases

Others: 1473 cases

Approx. 17,000 cases
Trends of acquired Construction Type Certification (for Japan)

The annual increase in the number of cases is approx. **1000 cases**

Year-over-Year approx. **14.4%**

* MRA usage rate: Percentage of the number of certifications by MRA to the total number of certification
Breakdown of Construction Type Certification in FY 2017

Main components are Low power data communication system such as Wi-Fi, Mobile phone Base station/ Mobile Station

- Wi-Fi, Bluetooth etc. (2.4GHz) 4581 cases
- LTE Base station 1869 cases
- Land Mobile Station for Next Generation PHS 273 cases
- 3G Land Mobile Station (W-CDMA(HSDPA)) 446 cases
- 3G Land Mobile Station (W-CDMA) 448 cases
- LTE Land Mobile Station 483 cases
- Designated low power 559 cases
- Wi-Fi etc. (5.6GHz) 729 cases
- Wi-Fi etc. (5.2,5.3GHz) 881 cases
- 3G Base station (W-CDMA) 1050 cases
- 3G Base station (W-CDMA(HSDPA)) 1051 cases
- Others 1822 cases

Total: Approx. 14,000 cases
Breakdown of Construction Type Certification in FY 2017

Total: Approx. 3,500 cases

- **Wi-Fi, Bluetooth etc. (2.4GHz)**: 4,581 cases
- **LTE Base station**: 1,869 cases
- **LTE Land Mobile Station**: 483 cases
- **3G Land Mobile Station (W-CDMA(HSDPA))**: 446 cases
- **3G Land Mobile Station (W-CDMA)**: 448 cases
- **Designated low power**: 559 cases
- **Wi-Fi etc. (5.6GHz)**: 729 cases
- **Wi-Fi etc. (5.2, 5.3GHz)**: 881 cases
- **3G Base station (W-CDMA)**: 1,050 cases
- **3G Base station (W-CDMA(HSDPA))**: 1,051 cases
- **Others**: 1,822 cases

MRA (in red) → Wi-Fi, Bluetooth etc. Low power data communication system account for approx. 80% of the certification.
Trends of acquired Construction Type Certifications (for overseas)

FY2017 saw increased numbers (JPN to Europe) due to the change of European system.
Topics

1  Trend of Technical Standard Certification work

2  System Improvement of Standard Certification
   (1) 5G Mobile Communication System
   (2) Expansion of 5.2GHz band wireless LAN usage
   (3) Digital maritime wireless communication equipment

3  Revision of Display Method for Technical Standard Conformity Certification Mark
Revision of Ordinance for Enforcement of Radio law and related notices to implement 5G on 3.7GHz band (3.6~4.2GHz), 4.5GHz band (4.4~4.9GHz) and 28GHz band (27.0~29.5GHz)

☑ Ordinance for Regulating Radio Equipment: toward implementation of 5G
  → Addition of single carrier FDMA or OFDMA
    (Specified in Article 49-6-12 paragraph 1 for 3.7GHz and 4.5GHz band, in paragraph 2 for 28GHz band respectively)
    Specified technical standards Communication method (TDD), Multiplexing Scheme (OFDM and TDM combined system), Multiple access method (SC-FDMA or OFDMA) etc. aiming to the implementation of 5G.

☑ Regulation for enforcement of the Radio Act: Addition of 5G in the scope of radio equipment for specified radio station (Article 15-3)
  → Addition of 5G Land Mobile Station Radio stations as the subject to comprehensive license

☑ Ordinance on Technical Standards Conformity Certification of Specified Radio Equipment: Addition of 5G in the scope of specified radio equipment (Article 2-1-11 29 to 31)
  → Addition of 3.7GHz band and 4.5GHz band base station and land mobile station, 28GHz band base station to specified radio equipment

☑ Delete 27GHz band (27.0~27.5GHz) from scope of ‘Quasi millimeter wave band low power data communication system’
  (Regulation for enforcement of the Radio Act, Ordinance for Regulating Radio Equipment, Ordinance on Technical Standards Conformity Certification of Specified Radio Equipment)

☑ New notices for 5G technical requirement
  → Adjacent channel leakage power, spurius emission, unwanted emission strength etc.

【Promulgation/Enforcement date】1/24/2019
<table>
<thead>
<tr>
<th><strong>Main Technical Specifications for 5G</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Frequency Band</strong></td>
</tr>
<tr>
<td><strong>Communication Method</strong></td>
</tr>
<tr>
<td><strong>Multiplexing Scheme/ Multiple Access Scheme</strong></td>
</tr>
<tr>
<td>Base Station</td>
</tr>
<tr>
<td>Mobile Station</td>
</tr>
<tr>
<td><strong>Modulation Method</strong></td>
</tr>
<tr>
<td>Base Station</td>
</tr>
<tr>
<td>Mobile Station</td>
</tr>
<tr>
<td><strong>Occupied Bandwidth Allowance</strong></td>
</tr>
<tr>
<td>Base Station</td>
</tr>
<tr>
<td>Mobile Station</td>
</tr>
<tr>
<td><strong>Maximum antenna power &amp; Tolerances for antenna power</strong></td>
</tr>
<tr>
<td>Base Station</td>
</tr>
<tr>
<td>Mobile Station</td>
</tr>
<tr>
<td>Mobile Station</td>
</tr>
<tr>
<td><strong>Leakage current when carrier wave is not transmitted</strong></td>
</tr>
<tr>
<td>Mobile Station</td>
</tr>
<tr>
<td><strong>Unwanted emissions</strong></td>
</tr>
<tr>
<td>Base Station</td>
</tr>
<tr>
<td>Mobile Station</td>
</tr>
</tbody>
</table>
(2) Expansion of 5.2GHz band wireless LAN usage

- 5.2 GHz band wireless Land Stations (AP) and Land Mobile relay (relay) used indoors or outdoors, or equivalent to maximum EIRP 1W are set to be subject of registered stations and name them “5.2GHz band high power data communication system”

- Land Mobile Stations (terminals) ⋆ of the system should be equivalent to maximum EIRP 200 mW (the same as before), and if the registered stations control and communication are under registered stations, it can be used indoors with unlicensed condition (without registration).

- Determine the technical standard of the radio equipment of this system and set them to designated low power radio equipment ⋆ Includes existing low power data communication systems

Aim of this Revision

- By increasing the number of outdoor usable channels, improve the connectivity of wireless LANs in commercial/ public spaces such as stadiums and stations etc.

- By using up to maximum EIRP 1W, we can improve speed and extend the service area and connectivity of wireless LANs in indoors that was difficult to secure adequate communication speed and area.

【Promulgation/Enforcement date】 6/29/2018
Expansion of 5.2GHz band wireless LAN usage

5.2GHz band (5150-5250)
- Indoor only Unlicensed EIRP 200mW

5.3GHz band (5250-5350)
- Indoor only Unlicensed EIRP 200mW

5.6GHz band (5470-5725)
- Indoor/Outdoor Unlicensed EIRP 1W

Current usage

① AP*: Indoor/Outdoor EIRP 1W Registered Station
② Terminal: Outdoor*2 EIRP 200mW Unlicensed

*1 Includes relays
*2 Should be controlled by registered station’s AP etc.

5.2GHz band high power data communication system

Land Mobile Station *3
- Equivalent to Max. EIRP 200mW Unlicensed Station

① AP: Equivalent to Max. EIRP 1W Registered Station
② Equivalent to Max. EIRP 200mW

④ Equivalent to Max EIRP 200mW

Low power data communication system (5.2GHz band)

Equivalent to Max. EIRP 200mW

Unlicensed station

Equivalent to Max. EIRP 1W

Registered Station

Unlicensed station

Unlicensed station

*3 Indoor usage is possible
*4 Limited where controlled by registered station

(Source: MIC)
Main Specifications for 5.2GHz band wireless LAN usage expansion

<table>
<thead>
<tr>
<th>Radio station type</th>
<th>(AP) station, (Relay) Land mobile Relay Station</th>
<th>(Terminal) Mobile Land Station</th>
</tr>
</thead>
<tbody>
<tr>
<td>Equivalent isotropic radiated power</td>
<td><strong>1W maximum and restricted based on elevation angle</strong></td>
<td>The same as current low power data communication system (Equivalent to Max.200mW)</td>
</tr>
<tr>
<td>(Max. EIRP)</td>
<td><strong>Total power is equivalent to 1W</strong></td>
<td></td>
</tr>
<tr>
<td>Out-of-band leakage current</td>
<td>Increase Out-of-band leakage current due to the increase of Max EIRP (+7dB) that specifies the value</td>
<td>The same as current low power data communication system</td>
</tr>
<tr>
<td>Other function</td>
<td>Control function of the channel used by the land mobile station of the communication partner and transmission of radio waves</td>
<td>Communication function controlled by corresponding base station or land mobile relay station</td>
</tr>
</tbody>
</table>

Max EIRP should be equivalent to **1W** and restrict Max EIRPs based on elevation angle to protect satellites.

<table>
<thead>
<tr>
<th>EIRPs based on elevation angles</th>
<th>(Source: MIC)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Equivalent to EIRP 1.26mW</strong></td>
<td>45°</td>
</tr>
<tr>
<td><strong>Equivalent to EIRP 1W</strong></td>
<td>40°</td>
</tr>
<tr>
<td><strong>40°</strong></td>
<td>8°</td>
</tr>
<tr>
<td><strong>Horizontal Plane</strong></td>
<td><strong>Decrease EIRP based on elevation angle</strong></td>
</tr>
</tbody>
</table>

**Equivalent isotropic radiated power (Max. EIRP)***

*Occupied bandwidth is 19MHz and less

Elevation angle less than 8°: -13dBW/MHz (50mW/MHz) and less

Elevation angle 8° ~ 40°: -13 - 0.716(θ - 8)dBW/MHz and less

Elevation angle 40° ~ 45°: -35.9 - 1.22(θ - 40)dBW/MHz and less

Elevation angle 45° and more: -42dBW/MHz (0.063mW/MHz) and less
(3) Upgrading Digital maritime wireless communication equipment

(1) VHF Data Exchange Unit (150MHz band)

In order to realize upgraded the communication for safer navigation and efficiency, use international maritime radio frequency of 150 MHz band, and utilize data communication of ships and land, or among ships.

(2) Digital Marine Communication Unit (400MHz band)

In order to efficient frequency usage, implement narrow band digital communication scheme and increase the number of used channels to internal communication radio mainly used for inspections or work instruction among crews.

【Promulgation/Enforcement date】 9/25/2018
VHF Data Exchange Unit (150MHz band)

In addition to existing analogue voice communications, utilization of data exchange can improve the maritime safety, distribution efficiency and residential environment in the ships.

[ Frequency for Digital Data Exchanges ]

Ships (150MHz band)

<table>
<thead>
<tr>
<th>CH Number</th>
<th>MHz</th>
<th>80</th>
<th>81</th>
<th>82</th>
<th>83</th>
</tr>
</thead>
<tbody>
<tr>
<td>Used up to 100 kHz width</td>
<td>157.025</td>
<td>157.075</td>
<td>157.100</td>
<td>157.125</td>
<td>157.150</td>
</tr>
<tr>
<td>Used up to 50 kHz width</td>
<td>157.050</td>
<td>157.075</td>
<td>157.100</td>
<td>157.125</td>
<td>157.150</td>
</tr>
</tbody>
</table>

Coastal Stations (160MHz band)

<table>
<thead>
<tr>
<th>CH Number</th>
<th>MHz</th>
<th>80</th>
<th>81</th>
<th>82</th>
<th>83</th>
</tr>
</thead>
<tbody>
<tr>
<td>Used up to 100 kHz width</td>
<td>161.625</td>
<td>161.675</td>
<td>161.750</td>
<td>161.775</td>
<td></td>
</tr>
<tr>
<td>Used up to 50 kHz width</td>
<td>161.650</td>
<td>161.675</td>
<td>161.750</td>
<td>161.775</td>
<td></td>
</tr>
</tbody>
</table>

Digital Marine Communication Unit (400MHz band)

With internal communication radio for crews etc., by introducing a narrowband digital communication system to the existing voice communication, available channel numbers will increase.

Utilization of digital data communication facilities

- Search and rescue communication
- Mutual information exchanges
- Improvement of residential environment
- Real time management of ships
- Communication with small boat and large ships

Current Frequency Arrangement

New Frequency Arrangement (Analogue/Digital Coexistence)

[Analogue Method]
Channel width 25kHz : 6 waves

[Digital Method]
Channel width 6.25kHz : 24 waves
## Main Specifications for Digital maritime wireless communication equipment

<table>
<thead>
<tr>
<th>Item</th>
<th>VHF Data Exchange Unit (150MHz band)</th>
<th>Digital Marine Communication Unit (400MHz band)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Frequency</strong></td>
<td>Channel width 25kHz 157.025MHz to 157.175MHz, 7 waves of 25kHz interval 161.625MHz to 161.775MHz, 7 waves of 25kHz interval</td>
<td>457.515625MHz to 457.584375MHz, 12 waves of 6.25kHz interval</td>
</tr>
<tr>
<td></td>
<td><strong>Channel width 50kHz</strong> 157.0375MHz, 157.0625MHz, 157.0875MHz or 157.1625MHz 161.6375MHz, 161.6625MHz, 161.6875MHz or 161.7625MHz</td>
<td>467.515625MHz to 467.584375MHz, 12 waves of 6.25kHz interval</td>
</tr>
<tr>
<td></td>
<td><strong>Channel width 100kHz</strong> 157.0625MHz or 161.6625MHz</td>
<td></td>
</tr>
<tr>
<td><strong>Communication Method</strong></td>
<td>Single frequency simplex operation, Dual frequency simplex operation, Dual frequency half duplex or Dual frequency duplex operation (Time division multiple access)</td>
<td>Single frequency simplex operation, Dual frequency simplex or Dual frequency half duplex operation</td>
</tr>
<tr>
<td><strong>Modulation Method, Radio wage type &amp; Occupied bandwidth</strong></td>
<td><strong>Channel width 25kHz</strong> (\pi/4)DQPSK G1D or G7D 21kHz (\pi/8)D8PSK G1D or G7D 21kHz</td>
<td>4 Level FSK F1E or F1D 5.8kHz</td>
</tr>
<tr>
<td></td>
<td><strong>Channel width 50kHz</strong> M16QAM (Subcarrier : 16) D1D or D7D 47kHz</td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>Channel width 100kHz</strong> M16QAM (Subcarrier : 32) D1D or D7D 90kHz</td>
<td></td>
</tr>
<tr>
<td><strong>Antenna Power</strong></td>
<td><strong>Coastal Station</strong> Less than 50W <strong>Ship Station</strong> Less than 25W</td>
<td>Less than 2W</td>
</tr>
</tbody>
</table>
Topics

1. Trend of Technical Standard Certification work
2. System Improvement of Standard Certification
3. Revision of Display Method for Technical Standard Conformity Certification Mark
Rules on technical standards compatibility certification of display to indicate terminal equipment that are certified, (MPT order No.37 in 1981) Format No.7

R Mark (R should be placed in a box)
※ Example of Technical Standard Conformity Certification for terminal facilities
Construction Design Certification begins with T

Numbering Rules:
・Technical Standard Conformity Certification
  (e.g.) 123XXX0000001
・Construction design Certifications
  (e.g.) 001-XXXXXXX
・Self Approval
  (e.g.) 123456AB03
Revision of Display Method for Technical Standard Conformity Certification Mark

✓ Revised based on opinions from expertise meeting to respond the diversity of radio communication equipment etc.

【Promulgation/Enforcement date】 2/8/2019

Major comments from 「Radio Efficiency and Growth Strategy Meeting」

- Due to the miniaturization and high integration of IoT devices, the indication of the mark of 3 mm on the modules etc. becomes difficult. Requirement of Display Method for Technical Standard Conformity Certification Mark (Diameter 3 mm or more) should be relaxed.
- Users are responsible for usage of illegal radio equipment. In the future, in order to ensure the usability of IoT equipment etc., we should make the mark easy to attach and recognize.

① Relaxation of the requirement of Technical Standard Conformity Certification Mark size

② Designated radio equipment without display can indicate the mark by outer display.
1. Relaxation of requirement for the Size of Certification Mark

Revision of Certification Rule Format 7, Format14 Note 1 as following:

“Note 1 The size should be easily identifiable.”

2. New Electromagnetic display method

Addition following rules to Certification Rule Article 8, 20, 27, 36, 41

“A electromagnetic method that the display can immediately display the Certification Mark based on Format No. 7 in a clear state on the display of the product connected to the specified radio equipment that meets Technical Standard Conformity by a specific operation (Given that it can be displayed by wired connection with another product with built-in display before the operation of the specific wireless facility is first started)”
Thank you very much.

OMIC Website
http://www.soumu.go.jp

OMIC The Radio Use Website
http://www.tele.soumu.go.jp/