



Trend of Technical Standard Certification System of Radio Equipment in Japan

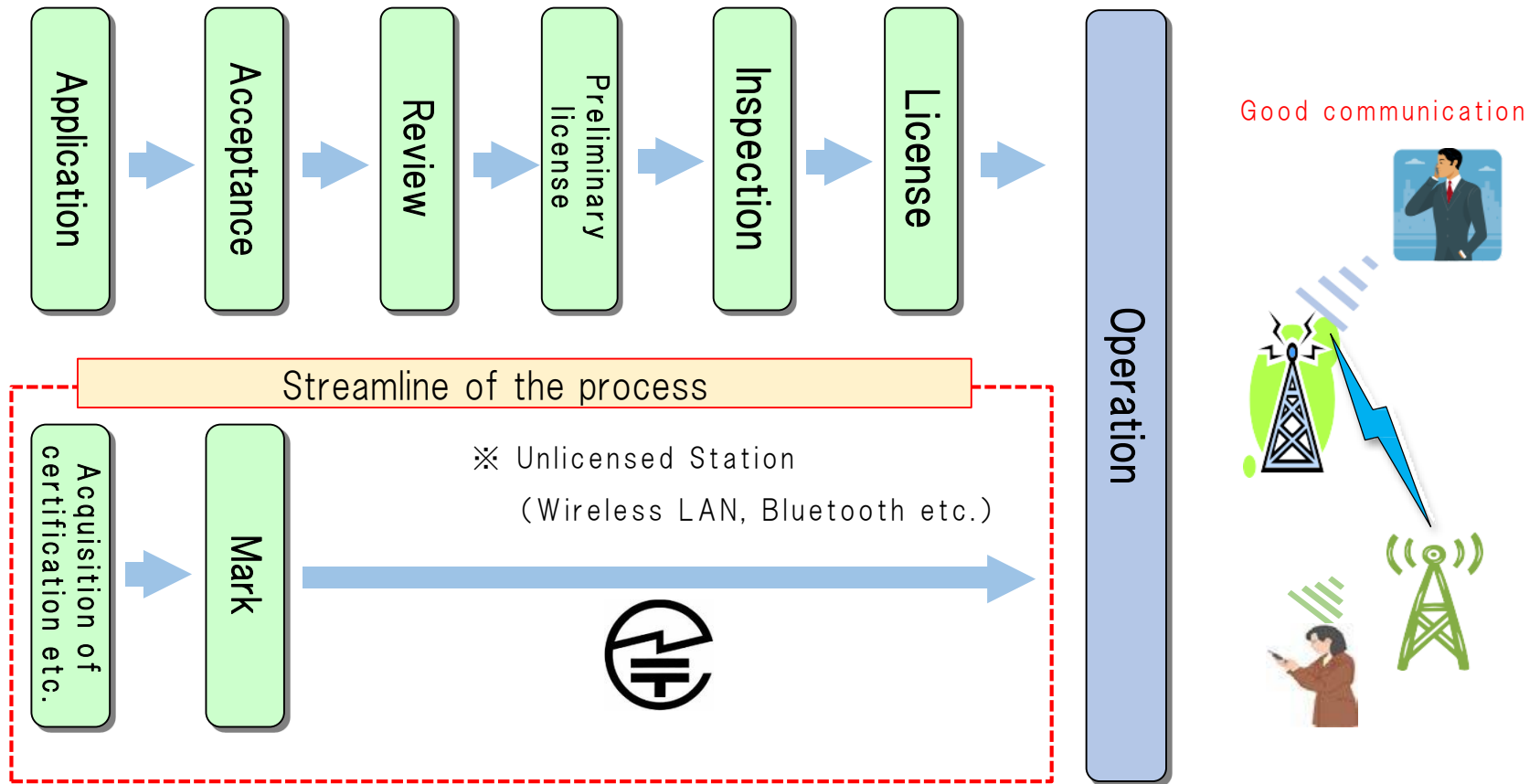
March 6, 2019

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

- ✓ 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)



(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.



(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)

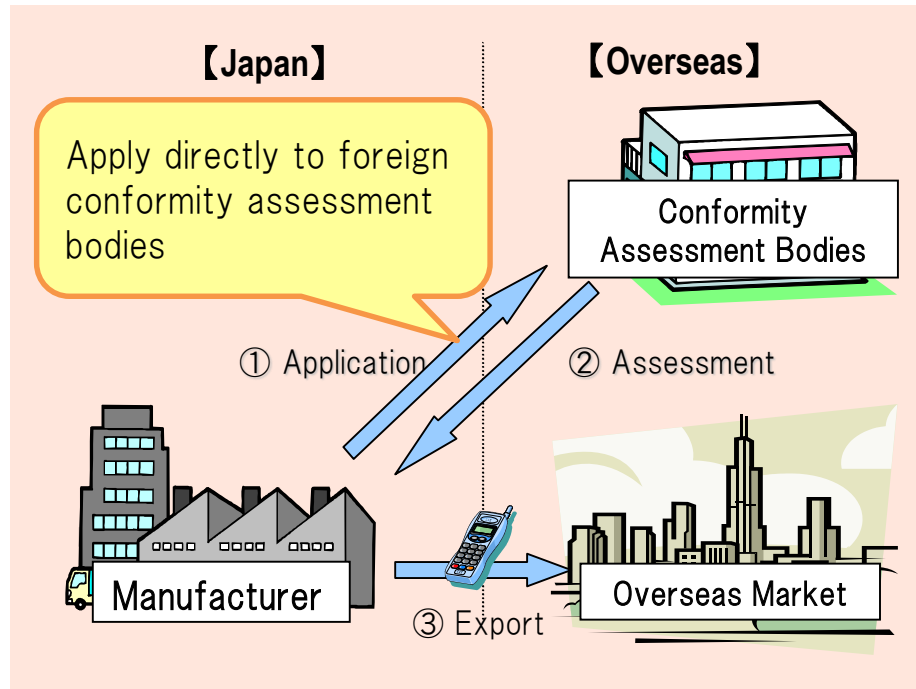
After notifying supplier (who has submitted the notification to MIC) carried out inspection based on the confirmation method, the mark can be affixed on the inspected equipment (Radio Act article 38 section 35)



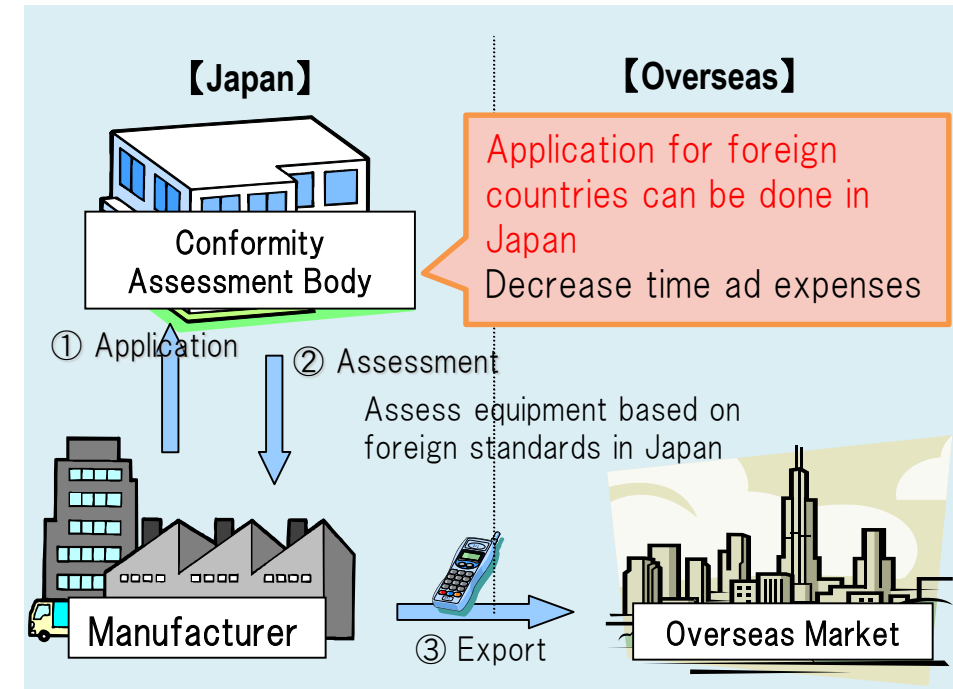
MRA (Mutual Recognition Agreement)

- ❑ MRA is a system where accept the results of conformity assessment of telecommunications equipment to technical standards mutual between Japan and foreign countries.
- ❑ With telecommunication equipment, Japan-Europe (entered into force in January, 2002), Japan-Singapore (in November, 2002), Japan-US (in January, 2008) MRAs are valid.

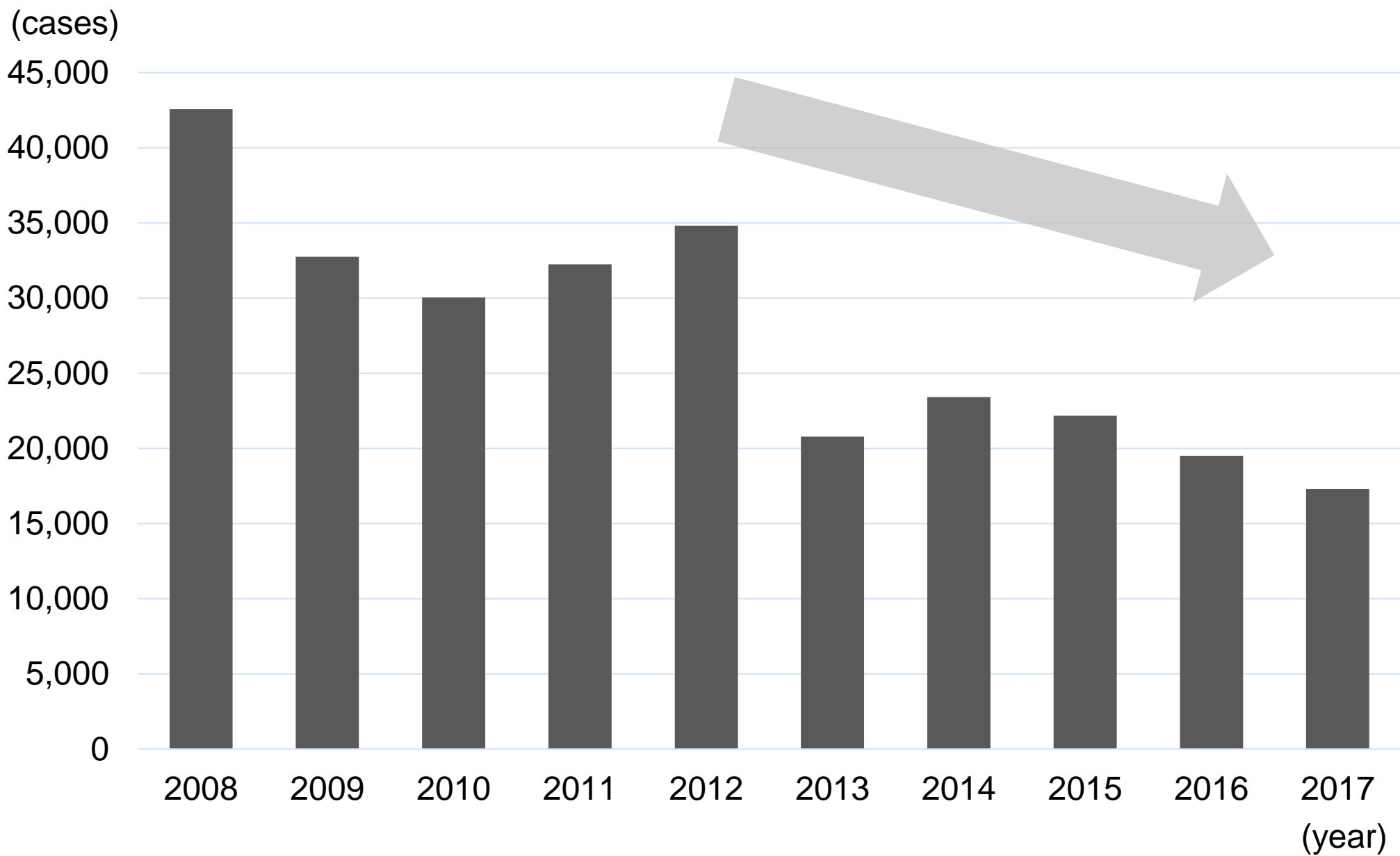
Before MRA implementation



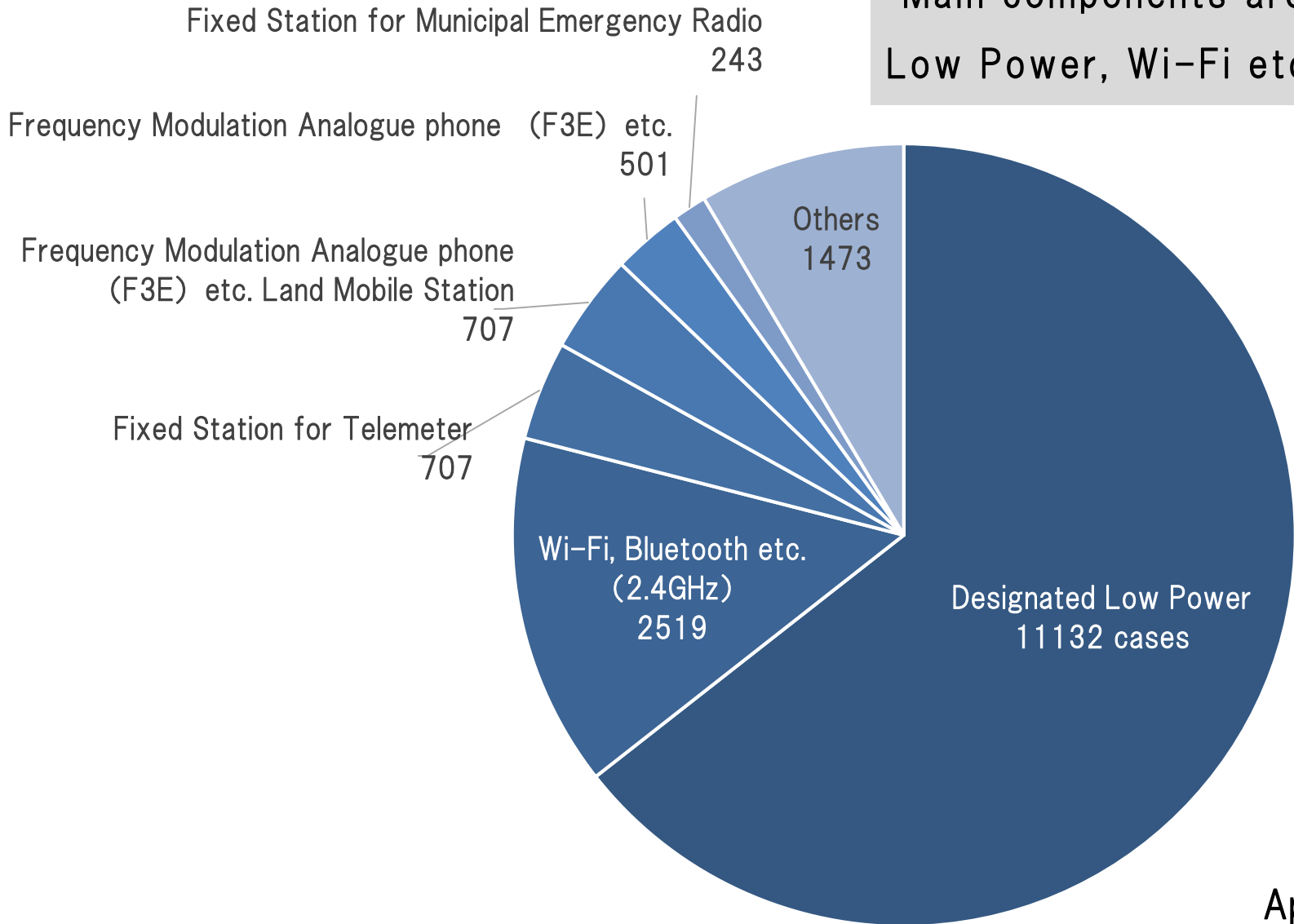
After MRA implementation



Trends of Certification of Conformity to Technical Standards

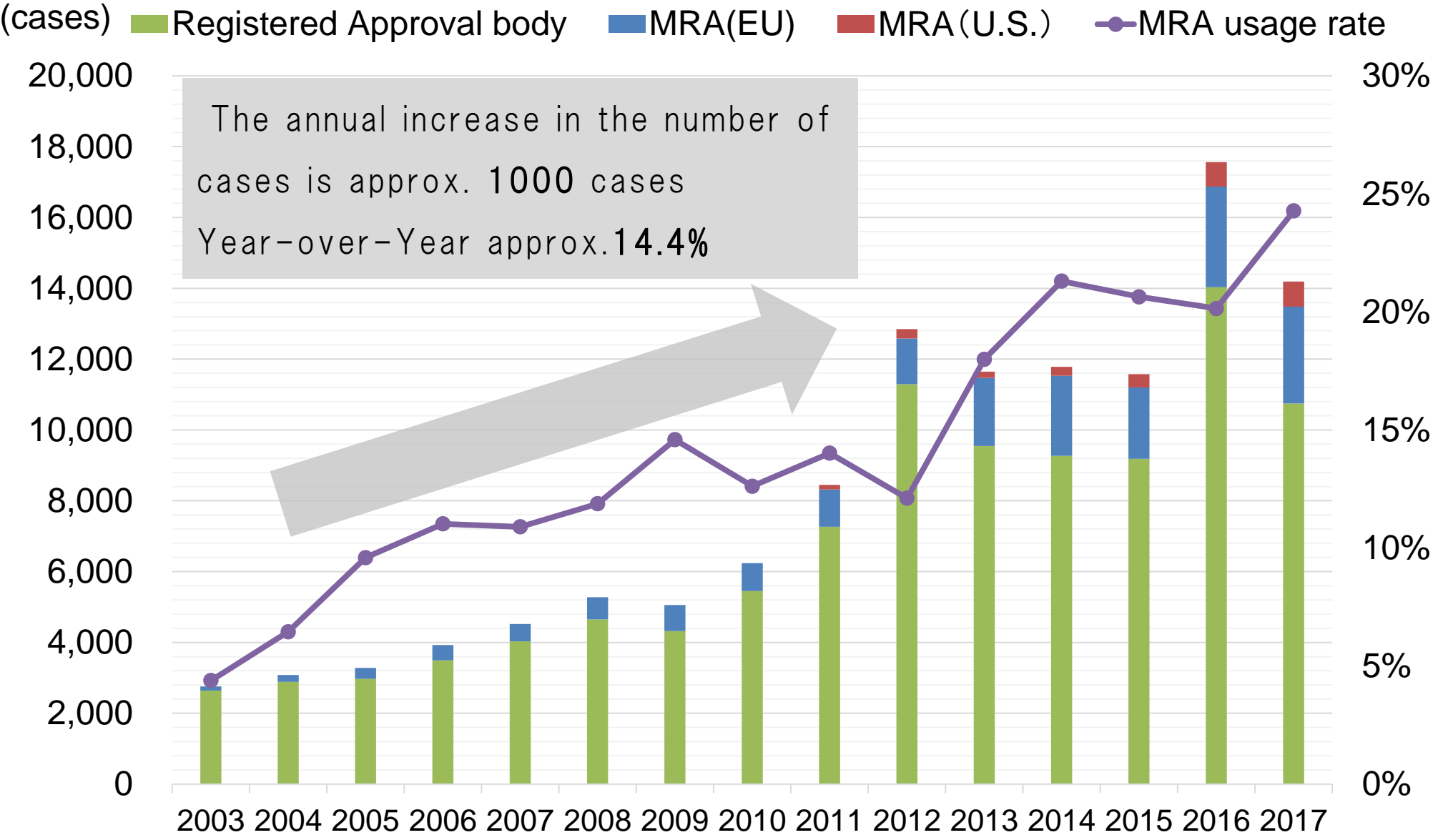


Main components are Designated Low Power, Wi-Fi etc.



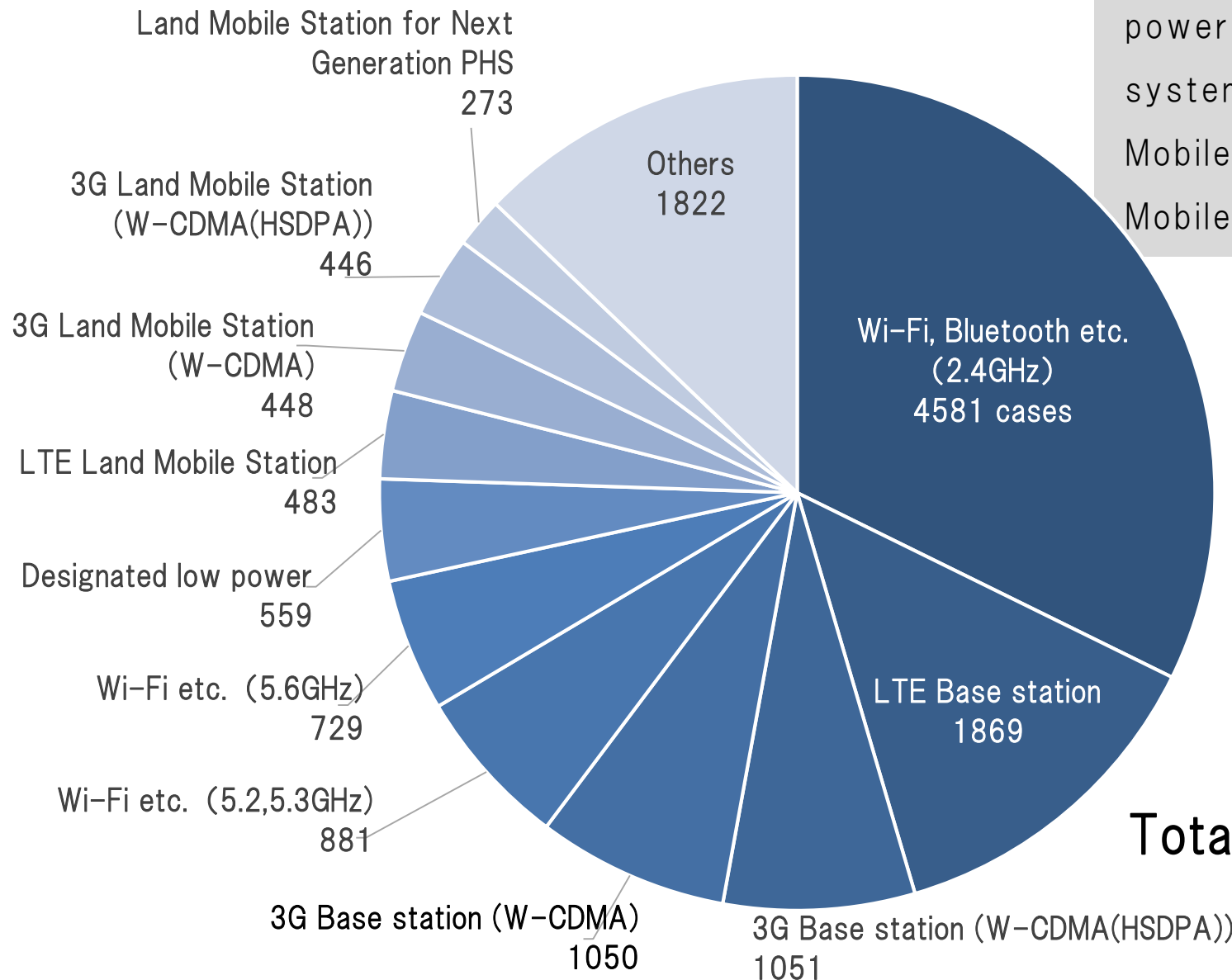
Approx. 17,000 cases

Trends of acquired Construction Type Certification (for Japan)



* MRA usage rate : Percentage of the number of certifications by MRA to the total number of certification

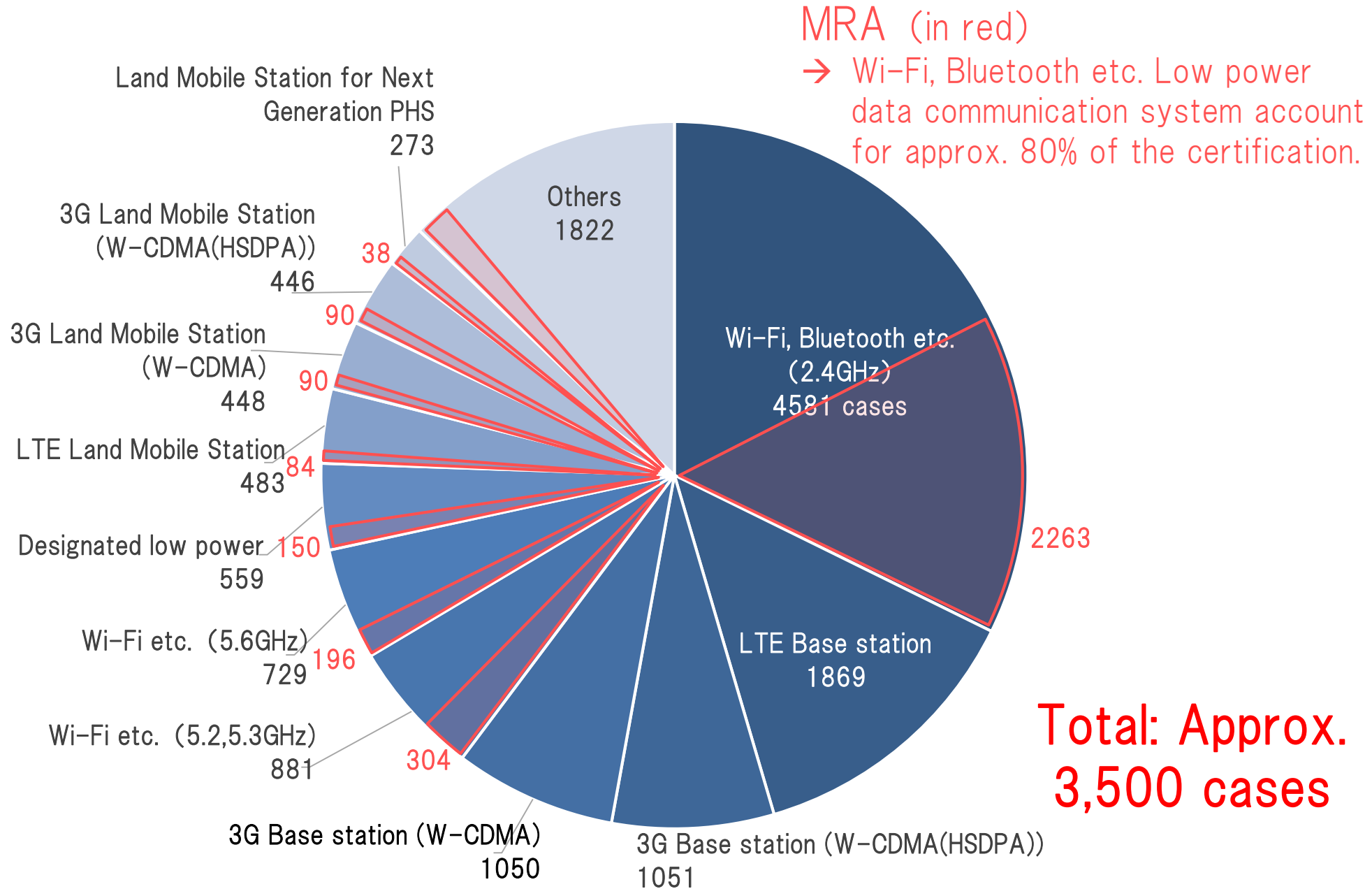
Breakdown of Construction Type Certification in FY 2017



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

Total : Approx. 14,000 cases

Breakdown of Construction Type Certification in FY 2017



Trends of acquired Construction Type Certifications (for overseas)

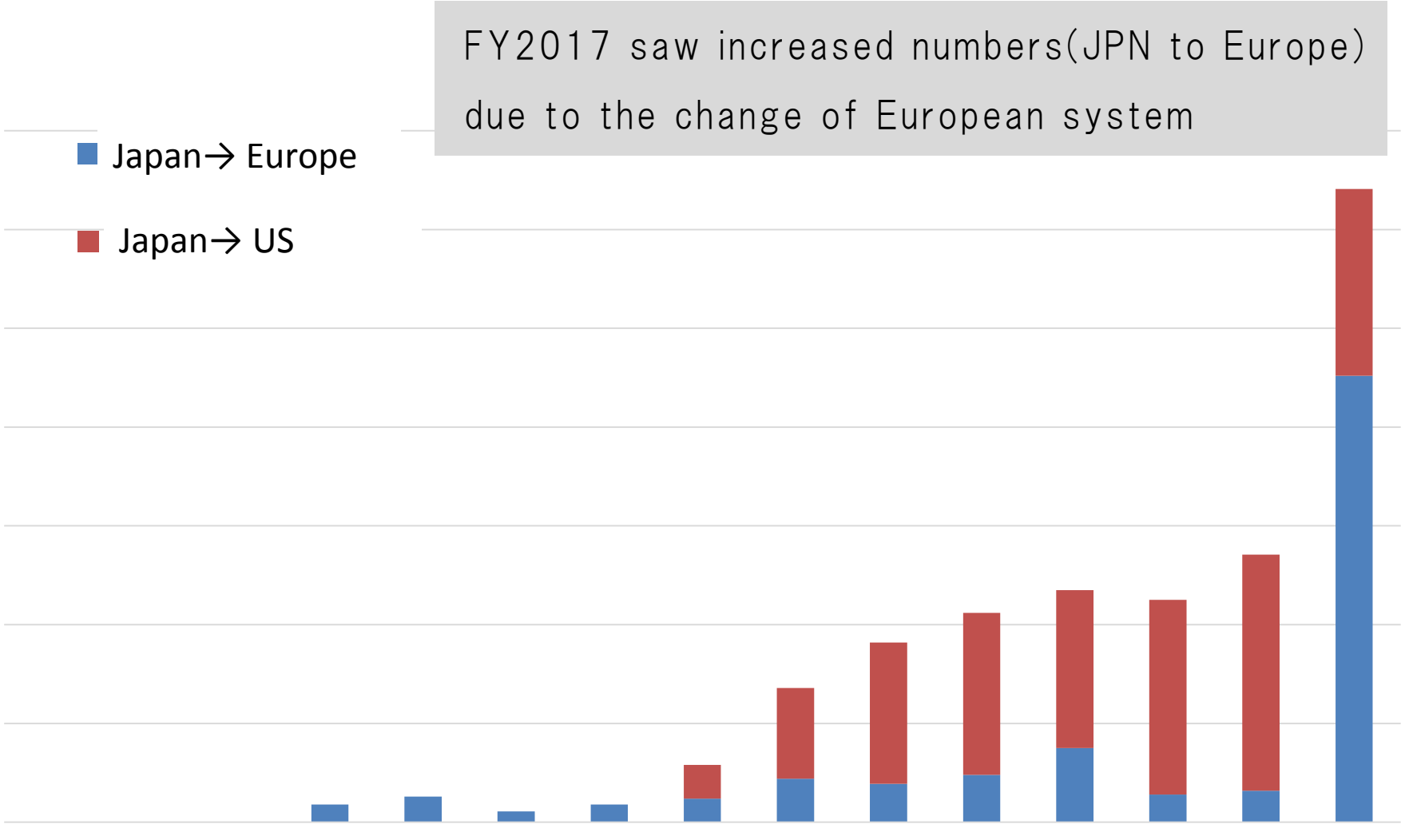
(cases)

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

- Japan→ Europe
- Japan→ US

700
600
500
400
300
200
100
0

2003 2004 2005 2006 2007 2008 2009 2010 2011 2012 2013 2014 2015 2016 2017



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, spurious emission, unwanted emission strength etc.

(Reference) Main Technical Specifications for 5G

Frequency Band		3.7GHz band, 4.5GHz band	28GHz
Communication Method		TDD	
Multiplexing Scheme/ Multiple Access Scheme	Base Station	OFDM and TDM	
	Mobile Station	OFDMA or SC-FDMA	
Modulation Method	Base Station	QPSK/16QAM/64QAM/256QAM	
	Mobile Station	$\pi/2$ -BPSK/QPSK/16QAM/64QAM/256QAM	
Occupied Bandwidth Allowance	Base Station	10MHz/15MHz/20MHz/30MHz/40MHz/50MHz/60MHz/70MHz/80MHz/90MHz/100MHz	50MHz/100MHz/200MHz/400MHz
	Mobile Station	10MHz/15MHz/20MHz/40MHz/50MHz/60MHz/80MHz/90MHz/100MHz	50MHz/100MHz/200MHz/400MHz
Maximum antenna power & Tolerances for antenna power	Base Station	Within ± 3.0 dB of rated antenna input power	Within ± 5.1 dB of rated antenna input power
	Mobile Station	Maximum antenna power is 23dBm and less	
		+3.0dB/-6.7dB of rated antenna input power	Less than the value add 3.6dB to the rated antenna input power
Leakage current when carrier wave is not transmitted	Mobile Station	Average power of frequency width should be -48.2dBm and less	Average power of frequency width of 50MHz/100MHz/200M/400MHz should be -13.6dBm/-10.6dBm/-7.6dBm/-4.6dBm and less respectively
Unwanted emissions	Base Station	Specified for each occupied frequency band width	
	Mobile Station		

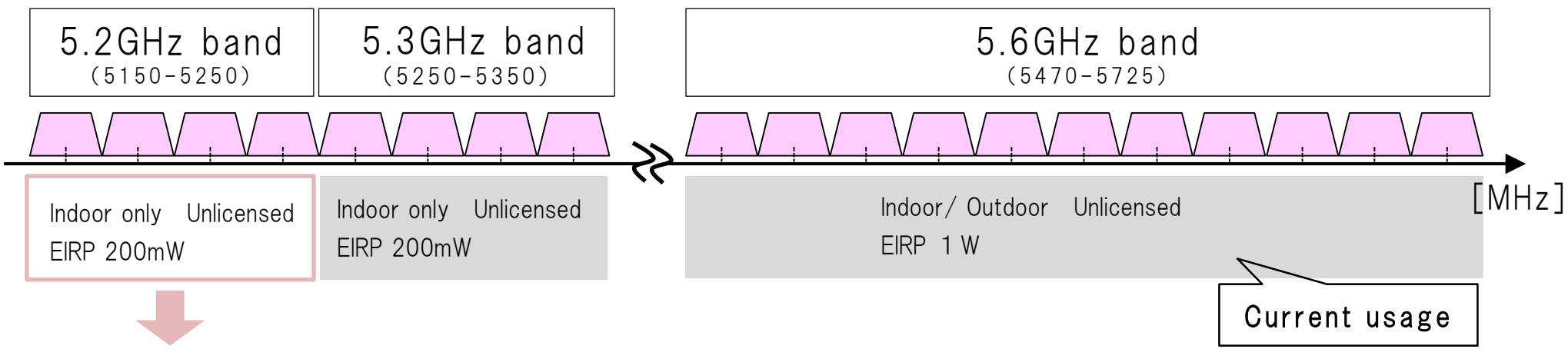
- ✓ 5.2 GHz band wireless Land Stations (AP) and Land Mobile relay (relay) used indoors or outdoors, or equivalent to maximum EIRP 1W are set to be subject of registered stations and name them “5.2GHz band high power data communication system”
- ✓ Land Mobile Stations (terminals) ※ of the system should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

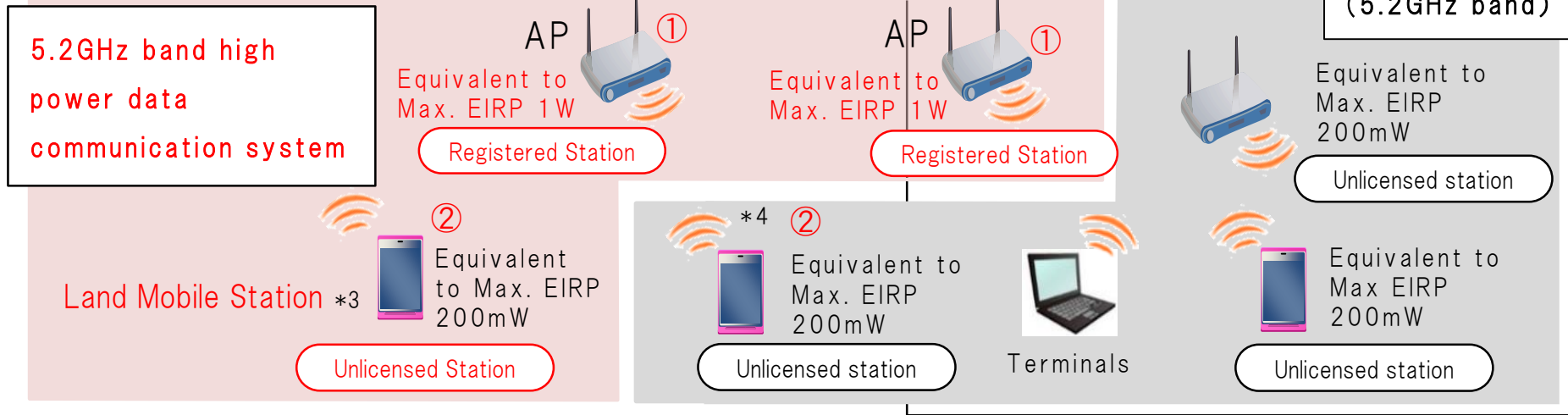
- ✓ By increasing the number of outdoor usable channels, improve the connectivity of wireless LANs in commercial/ public spaces such as stadiums and stations etc.
- ✓ By using up to maximum EIRP 1W, we can improve speed and extend the service area and connectivity of wireless LANs in indoors that was difficult to secure adequate communication speed and area.

(2) Expansion of 5.2GHz band wireless LAN usage



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

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

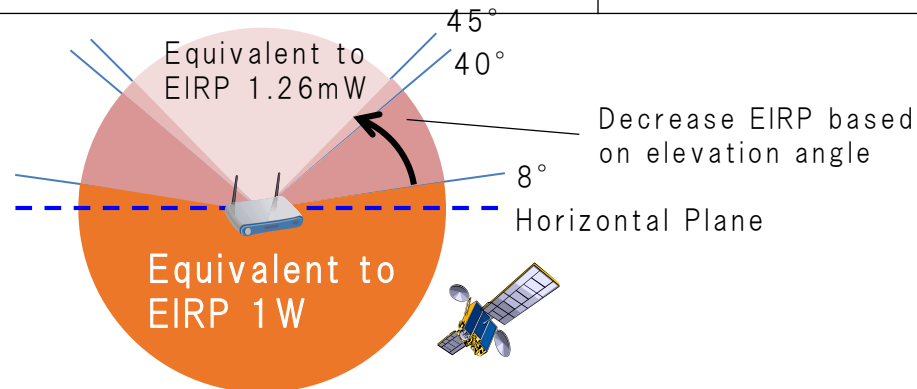


*3 Indoor usage is possible

*4 Limited where controlled by registered station

Radio station type	(AP) station, (Relay) Land mobile Relay Station	(Terminal) Mobile Land Station
Equivalent isotropic radiated power	<p>1W maximum and restricted based on elevation angle</p> <p>Total power is equivalent to 1W</p> <p>(e.g.) Occupied bandwidth is 19MHz and less</p> <p>Elevation angle less than 8° : -13dBW/MHz (50mW/MHz) and less</p> <p>Elevation angle 8° ~40° : -13 - 0.716(θ - 8)dBW/MHz and less</p> <p>Elevation angle 40° ~45° : -35.9 - 1.22(θ - 40)dBW/MHz and less</p> <p>Elevation angle 45° and more : -42dBW/MHz (0.063mW/MHz) and less</p>	The same as current low power data communication system (Equivalent to Max.200mW)
(Max. EIRP)		
Out-of-band leakage current	Increase Out-of-band leakage current due to the increase of Max EIRP (+7dB) that specifies the value	The same as current low power data communication system
Other function	Control function of the channel used by the land mobile station of the communication partner and transmission of radio waves	Communication function controlled by corresponding base station or land mobile relay station

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



【EIRPs based on elevation angles】 (Source: MIC)

(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.



Example of international VHF Radio (Icom Inc.)

(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.



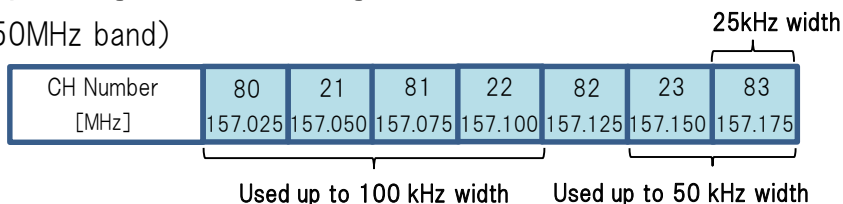
Example of maritime internal radio (JRC Nihon Musen)

VHF Data Exchange Unit (150MHz band)

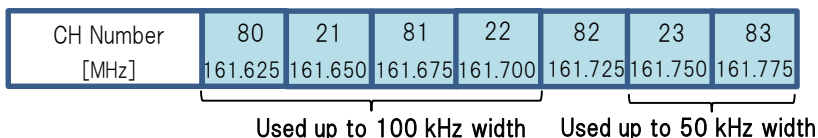
In addition to existing analogue voice communications, utilization of data exchange can improve the maritime safety, distribution efficiency and residential environment in the ships.

[Frequency for Digital Data Exchanges]

Ships (150MHz band)



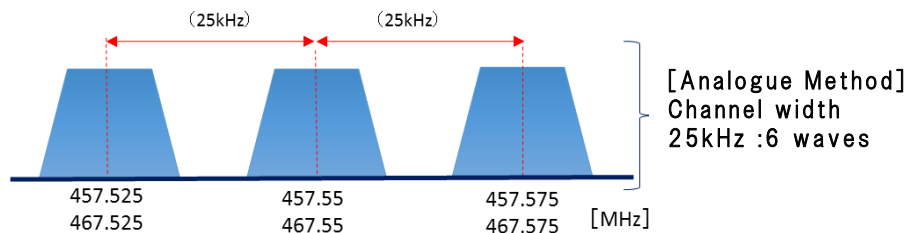
Coastal Stations (160MHz band)



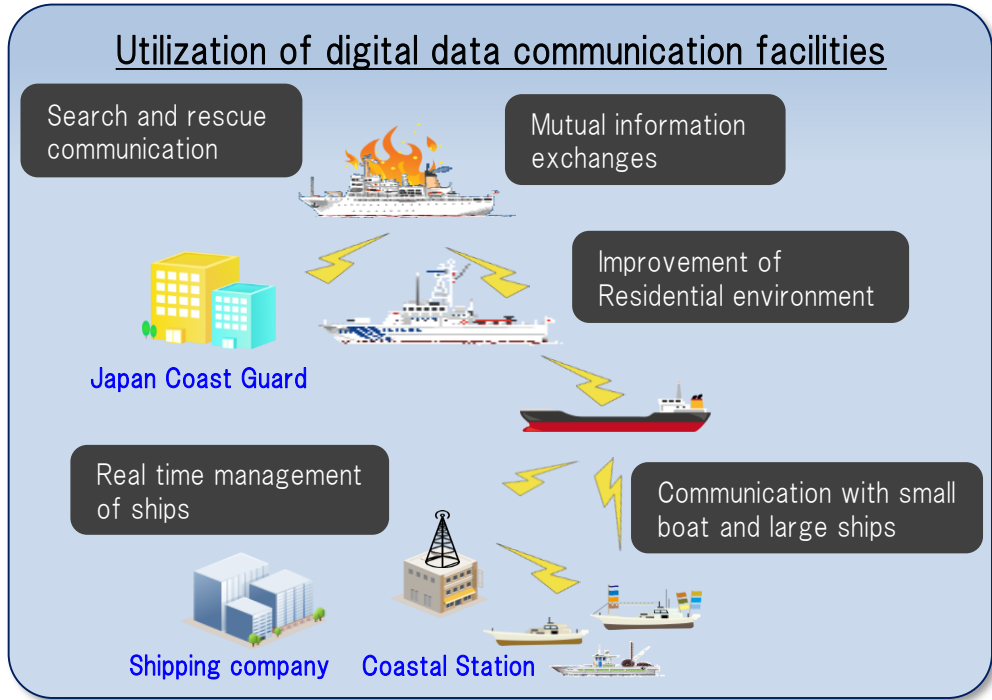
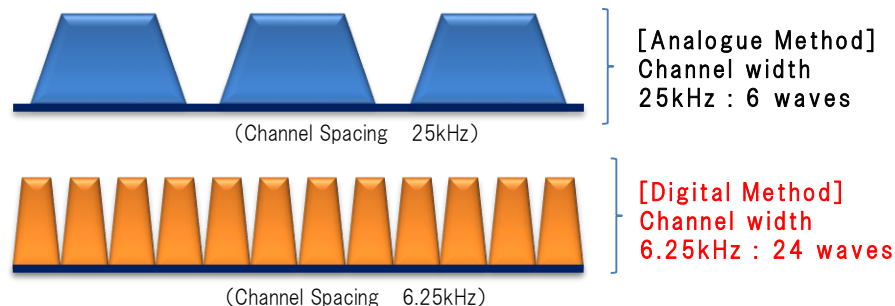
Digital Marine Communication Unit (400MHz band)

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

Current Frequency Arrangement



New Frequency Arrangement (Analogue/Digital Coexistence)



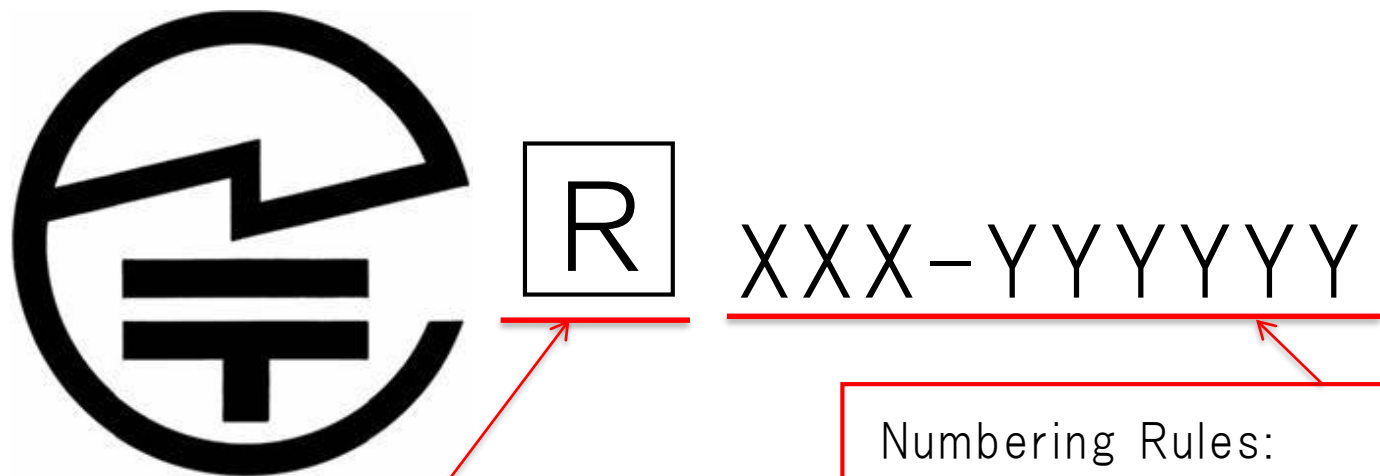
Item	VHF Data Exchange Unit (150MHz band)	Digital Marine Communication Unit (400MHz band)
Frequency	<p><u>Channel width 25kHz</u> 157.025MHz to157.175MHz, 7 waves of 25kHz interval 161.625MHz to161.775MHz, 7 waves of 25kHz interval</p> <p><u>Channel width 50kHz</u> 157.0375MHz, 157.0625MHz, 157.0875MHz or 157.1625MHz 161.6375MHz, 161.6625MHz, 161.6875MHz or 161.7625MHz</p> <p><u>Channel width 100kHz</u> 157.0625MHz or 161.6625MHz</p>	<p>457.515625MHz to 457.584375MHz, 12 waves of 6.25kHz interval</p> <p>467.515625MHz to 467.584375MHz, 12 waves of 6.25kHz interval</p>
Communication Method	Single frequency simplex operation, Dual frequency simplex operation, Dual frequency half duplex or Dual frequency duplex operation (Time division multiple access)	Single frequency simplex operation, Dual frequency simplex or Dual frequency half duplex operation
Modulation Method, Radio wave type & Occupied bandwidth	<p><u>Channel width 25kHz</u> π /4DQPSK G1D or G7D 21kHz π /8D8PSK G1D or G7D 21kHz</p> <p><u>Channel width 50kHz</u> M16QAM (Subcarrier : 16) D1D or D7D 47kHz</p> <p><u>Channel width 100kHz</u> M16QAM (Subcarrier : 32) D1D or D7D 90kHz</p>	4 Level FSK F1E or F1D 5.8kHz
Antenna Power	<p><u>Coastal Station</u> Less than 50W <u>Ship Station</u> Less than 25W</p>	Less than 2W

Topics

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- 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.) 123XXX00000001
 - Construction design Certifications
(e.g.) 001-XXXXXX
 - Self Approval
(e.g.) 123456AB03

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

【Promulgation/Enforcement date】 2/8/2019

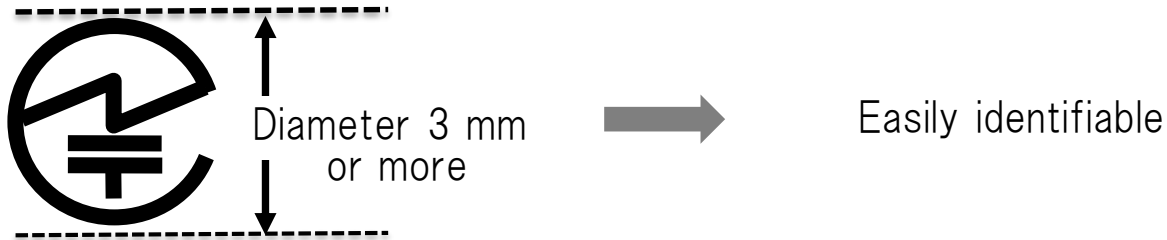
Major comments from 「Radio Efficiency and Growth Strategy Meeting」

- 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:

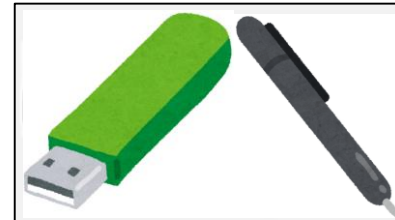
“Note 1 The size should be easily identifiable.”

2. New Electromagnetic display method



Built-in display

Electromagnetic display
using external display



Without display



Peripheral monitor

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

“An 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/>

