A CASE STUDY OF CERTIFICATION FOR TELECOMMUNICATIONS EQUIPMENT IN JAPAN

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Radio Certification Department
Telecom Engineering Center
目次

1. The change of the Japanese radio station
2. Outline Certification System
3. About a procedure of the type certification
   A) Flow of Type certification
   B) Examination of the Type certification
   C) list of presentation documents
   D) The styles such as applications of the Type certification
   E) General Contractual Conditions
   F) Examination
      a. Examination of a Construction Type
      b. Collative Examination
      c. Characteristics Examination
      d. Examination of Confirmation Method
   G) Certificate of Construction Type
   H) The sample of Charges for type certification
   I) A representative Test System
4. INVESTIGATION OF TEST METHOD
5. Competence of MIC to Registered Certification Bodies
6. Obligation Registered Certification Bodies
1. The change of the Japanese radio station
The change of the radio station in Japan

unit: Ten thousand station

The financial year
REQUIREMENTS FOR RADIO STATION

EXTREMELY WEAK RADIO WHICH THE LICENSE IS NOT REQUIRED

Limitation of Field Strength at 3 meters

2. OUTLINE CERTIFICATION SYSTEM
Technical Requirements of Radio Equipment

Technical Regulations of Radio Equipment are
① To prevent radio interference
② To utilize radio spectrum equitably and efficiently etc.

Technical Requirements for cellular phone

Standards for various services
(Protocols, Standards for additional services etc.)

Technical Regulations for Radio Equipment
(Frequency, Maximum power, Spurious emissions, etc.)

Scope of certification system
Technical standards conformity certification of radio equipment and beginning to operate the radio station

General licence procedures
National inspection (e.g. broadcast station)

Provisional License
Completion inspection

License needed

Omission of provisional license and completion inspection

beginning to operate the radio station (usable)

Technical standards conformity certification

Mobile phone/ MCA, etc.
5-GHz band radio access system, etc.
PHS/cordless telephones/ Radio LAN networks etc.

Performance certification
Apply to TELEC

Extremely low power radio equipment

License not needed

Registration

Legal effect of the certification
Certification on the basis of equipment → Certification on the basis of type → Supplier’s Declaration of Conformity

Testing → Certification → Marking

Testing → Declaration → Marking

“R” No-license required etc.

“T” Connection to Telecommunications Network etc.

※ “R” Radio equipment
   “T” Terminal equipment
Certification procedures shall be made for each piece of equipment.

Each piece of equipment constructed based on the types shall be regarded as certified equipment.
3. About a procedure of the type certification

(Telecom Engineering Center)
TELEC was established in 1978 to provide services such as: certification of radio equipment for conformity to technical regulations calibration of measuring instruments maintenance and establishment of conventions for effective utilization of radio waves; and promotion of benefits for the public.
Outline of Our Work

1. Technical standards conformity certification, Test Certification and Type Certification
2. Calibration of measuring instrument
3. Test and Conformity Assessment for overseas markets
4. Testing and performance certification of radio equipment
   4-1 Extremely low power radio equipment performance certification
   4-2 Testing of RF devices
   4-3 EMC testing
5. Research and development
   5-1 Development of testing methods for Specified radio equipment
   5-2 Contract research
   5-3 Supporting researchers
6. Support for research and development
   6-1 Public-use services
   6-2 Technical consulting , Creation of application documentation
   6-3 Sale of publications
7. Public business
   7-1 International cooperation
   7-2 Knowledge dissemination activities
Locations

- Central Japan service center
- West Japan service center
- Nagano service center
- North Japan service center
- Matsudo Laboratory
- Tokyo Headquarters
A) Flow of Type certification

1. Applicant
   - Test
     - Test Report
   - Pre meeting
     - Application
       - Examination
         - Test
           - Issue of Certification
             - Test by test Labo.
             - Test by TELEC
               - For each type
                 - Report
               - For one sample
                 - Examination of documents
                   - Confirmation of connectivity to measuring system and check of documents.

To TELEC
B) Examination of the type certification

(The examination item is prescribed by Table No.3 of Certification Ordinance)

1. Examination of a Construction Type

2. Collation

3. Characteristics Test

4. Examination of Confirmation Method
## C) list of presentation documents

<table>
<thead>
<tr>
<th>Item</th>
<th>When I examine it in TELEC</th>
<th>When I submit test data</th>
</tr>
</thead>
<tbody>
<tr>
<td>application</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>Certification of Construction Type</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>Examination of Confirmation Method</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>Application radio facilities</td>
<td>○</td>
<td></td>
</tr>
<tr>
<td>Test data</td>
<td></td>
<td>○</td>
</tr>
<tr>
<td>photograph or a figure</td>
<td>△</td>
<td>○</td>
</tr>
</tbody>
</table>
### Application for Certification of Construction Type

**To: Telecom Engineering Center**

#### Date of application:

Applicant’s Information:
- **Zip code:**
- **Address:**
- **Corporation name:**
- **Representative, position:**
- **Responsible person, division:**
- **(Seal or signature)**

Proxy Information:
- **Zip code:**
- **Address:**
- **Corporation name:**
- **Person’s name, position:**
- **(Seal or signature)**

**Classification of application**

<table>
<thead>
<tr>
<th>New ( )</th>
<th>Simplified ( )</th>
</tr>
</thead>
</table>

**Category of specified radio equipment**

Radio equipment under Article 2 Paragraph ( ) Item( ) of Certification Ordinance

**Type or name of radio equipment**

**Name of equipment manufacturer**

**Emission modes, frequencies and antenna power to be certified**

- **Connection to telecommunication link:**
  - Yes ( )
  - No ( )
- **Submission of radio equipment:**
  - Yes ( )
  - No ( )
- **Submission of characteristic test report**
  - Yes ( )
  - No ( )
- **In case of simplified application**
  - Changes in construction design:
    - Yes ( )
    - No ( )
  - Changes in statement of verification method:
    - Yes ( )
    - No ( )
  - Certification number:
  - Difference from certified Radio equipment:
    - (Attached sheet)

**ISO9000s certification of applicant**

- Yes ( )
- No ( )
- Name of factory:
- Address:
- ISO9000s certification of the factory: Yes ( ) No ( )

**Contact address**
- Zip code, address
- Division name
- Name of person
- Telephone number
- E-mail or facsimile

**Remarks**
## Type Specifications

<table>
<thead>
<tr>
<th>1. Communication method</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>2. Transmitter</td>
<td></td>
</tr>
<tr>
<td>(1) Rated output power</td>
<td>(2) Available type of emissions and frequency range</td>
</tr>
<tr>
<td>(3) Oscillation</td>
<td></td>
</tr>
<tr>
<td>(4) Modulation</td>
<td></td>
</tr>
<tr>
<td>3. Manufacturer information</td>
<td>Manufacturer name</td>
</tr>
<tr>
<td>4. Antenna</td>
<td></td>
</tr>
<tr>
<td>(1) Model name and configuration</td>
<td>(2) Gain</td>
</tr>
<tr>
<td>5. Classification and model name of associated equipment</td>
<td></td>
</tr>
<tr>
<td>6. Other type-specifications</td>
<td></td>
</tr>
<tr>
<td>7. Attached drawings</td>
<td>System diagram of radio equipment</td>
</tr>
<tr>
<td>8. References</td>
<td></td>
</tr>
</tbody>
</table>

**Note:** A style of construction specifications is prescribed in Table No.2 of Certification Ordinance
The result of performance examination is submitted. The applicant has responsibility for all the data of the result of the examination.

<table>
<thead>
<tr>
<th>1 Category of the specified radio equipment</th>
<th>Radio equipment under Article 2 Paragraph ( ) Item ( ) of the Certification Ordinance</th>
</tr>
</thead>
<tbody>
<tr>
<td>2 Type or name</td>
<td></td>
</tr>
<tr>
<td>3 Manufacturer</td>
<td></td>
</tr>
<tr>
<td>4 Serial number</td>
<td></td>
</tr>
<tr>
<td>5 The number of the specified radio equipment of examination</td>
<td></td>
</tr>
<tr>
<td>1. Type of emission, frequency and antenna power of the specified radio equipment</td>
<td></td>
</tr>
<tr>
<td>7 Test method</td>
<td></td>
</tr>
<tr>
<td>8 Result</td>
<td>attached</td>
</tr>
<tr>
<td>9 Note</td>
<td></td>
</tr>
</tbody>
</table>
E) General Contractual Conditions

General Contractual Conditions on Technical Regulations
Conformity Certification and Type Certification

- I will have a Contractual Conditions follow the verge for an application
- The main contents of the Contractual Conditions are as follows.

1. An examination period
2. Charges
3. Protection of secrecy
4. Information Disclosure
5. Compensation for damage
6. Statement of Protest
7. Market research

http://www.telec.or.jp/eng/e-001-contract.pdf
Examine the content of the construction type as to whether they meet the relevant technical requirements.
a. Examination of a Construction Type

The range of radio facilities

Definition in Radio Act:

“Radio equipment” means radiotelegraphy, radiotelephony, or any other electric equipment used for transmission and/or reception of radio waves.

- Facilities of the transmission
  - transmitter
  - antenna of the transmission
- Facilities of the reception
  - receiving set
  - antenna of the reception
- Incidental facilities

radio equipment
a. Examination of a Construction Type

main examination item of a Construction Type

1. Communication method
2. Transmitter
   ① Rated output power
   ② Available type of emissions and frequency range
   ③ Oscillation
   ④ Modulation
3. Manufacturer information
   ① Manufacturer name
   ② Model name
4. Antenna
   ① Model name and configuration
   ② Gain
5. Classification and model name of associated equipment
6. Other type-specifications
7. Attached drawings
   ① System diagram of radio equipment
8. References
b. Collation

- Examine the submitted radio equipment as to whether it conforms to the construction type.
c. Characteristics Test ①

- Examine the submitted radio equipment as to whether it complies with the relevant technical requirements.

- Test methods:
  - Test methods must be the same as or equal to the methods stipulated by MIC.

- Measuring instruments:
  - Each item of the examination requires specific measuring instruments.
  - Measuring instruments shall be taken calibration in accordance with relevant requirements.

- Acceptance of test data
  - Accept at our discretion, test data from any outside source.
  - Confirm that the tests are conducted in accordance with the test methods using the measuring instruments above prior to acceptance.
## Test items

Reference: Attached Table No. 1 of the Ordinance of Technical Regulations Conformity Certification of Specified Radio Equipment

### Test items: [http://www.telec.or.jp/eng/e-208.pdf](http://www.telec.or.jp/eng/e-208.pdf)

<table>
<thead>
<tr>
<th>Equipment</th>
<th>Transmitter</th>
<th>Receiver</th>
</tr>
</thead>
<tbody>
<tr>
<td>No. 1</td>
<td>1 2 3 4 5 6</td>
<td>7 8 9 10 11 12 13 14 15 16</td>
</tr>
<tr>
<td>Test items</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Classification of Radio Equipment</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Land mobile station for MC-CDMA cellular radio telephone</td>
<td>★ ★ ★ ★ ★</td>
<td>★</td>
</tr>
<tr>
<td>Base station, etc. for DS-CDMA cellular radio telephone</td>
<td>★ ★ ★ ★</td>
<td></td>
</tr>
<tr>
<td>2.4GHz band wide band low-power data communication system</td>
<td>★ ★ ★ ★</td>
<td></td>
</tr>
<tr>
<td>INMARSAT portable mobile earth station</td>
<td>★ ★ ★ ★</td>
<td></td>
</tr>
</tbody>
</table>
TELEC accepts test data from the test laboratory who complies with the following requirements.

1. Test shall be conducted according to the test method notified by the Minister of Internal Affairs and Communications.

2. Test items specified in Attached Table No. 1-(3) of Certification Ordinance shall be tested.

3. Measuring equipment which calibration date is within one year counting from the first day of the month following the month of calibration shall be used for the test. The calibration shall be conducted according to Article 24-2 paragraph 4-2 under Article 38-3 paragraph 1-2 of the Radio Act.

4. Inspector for the test shall be a registered inspector who complies with the requirement for registered inspectors specified in Article 24-2 of the Radio Act, or a person who has the qualification specified in Attached Table No. 1 of the Radio Act.
The qualification of the inspector

Inspector (name) has the qualification of (name of qualification)

Example

RADIO OPERATOR LICENSE

Photograph
# Test Result and Measuring Apparatus

## 1 General

<table>
<thead>
<tr>
<th>Model Type or Name</th>
<th>Product Number</th>
<th>Date</th>
<th>Location</th>
<th>Type of Radio wave, Frequency, antenna power (Note1)</th>
<th>Remarks</th>
</tr>
</thead>
</table>

## 2 Measurement Apparatus

<table>
<thead>
<tr>
<th>Model Type or Name</th>
<th>Product Number</th>
<th>Manufacturer</th>
<th>Calibration Date</th>
<th>Calibration (Note2)</th>
<th>Remarks</th>
</tr>
</thead>
</table>

## 3 Test Result

<table>
<thead>
<tr>
<th>Test condition</th>
<th>Test Item (Note3)</th>
<th>Unit</th>
<th>x.xV (Lower Voltage)</th>
<th>x.xV (Normal Voltage)</th>
<th>x.xV (Higher Voltage)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>freq.1</td>
<td>freq.2</td>
<td>freq.3</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>freq.1</td>
<td>freq.2</td>
<td>freq.3</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>freq.1</td>
<td>freq.2</td>
<td>freq.3</td>
</tr>
</tbody>
</table>

- Frequency Error
- Occupied Bandwidth
- Spurious Emission Intensity
  - (near) μW/MHz
  - (in band) μW/MHz
  - (out band) μW/MHz
- Antenna Power Error
  - %
- Secondary Radiated Emission
  - (lower) dB
  - (higher) dB
- Antenna Gain
  - dBi
- Interference Prevention Function
  - Good/NG
- Holding Time of Hopping Frequency
  - Good/NG
d. Examination of Confirmation Method

Examine whether each piece of equipment constructed based on the type conforms to the type by inspecting the statement of Confirmation Method and submitted radio equipment.

Confirmation method contains the following entry items:

1. Organization, and responsibility and authority of the administrator
2. Administration method for fulfilling the type conformance obligation
3. Inspection of Specified Radio Equipment
4. Administration of measuring instruments and other equipment
5. Other

note: The requirements are prescribed by Table No.4 of Certification Ordinance
This is to certify that above type certification has been granted in accordance with the provisions set out in Article 38-24 Paragraph 1 of the Radio Act.

<table>
<thead>
<tr>
<th>Classification of Specified Radio Equipment</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Type of Emission, Frequency and Antenna Power</td>
<td></td>
</tr>
<tr>
<td>Model/Name of Equipment</td>
<td></td>
</tr>
<tr>
<td>Manufacturer Name</td>
<td></td>
</tr>
<tr>
<td>Certification Number</td>
<td></td>
</tr>
<tr>
<td>Date of Certification</td>
<td></td>
</tr>
</tbody>
</table>

G) Certificate of Construction Type

Date of Certification

An official seal

Telecom Engineering Center
### H) The sample of Charges for type certification

<table>
<thead>
<tr>
<th>Classification of radio equipment (example)</th>
<th>type certification (New application) Charge (Japanese yen)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>document examination fee</td>
</tr>
<tr>
<td>Land mobile station for cellular radio telephone</td>
<td>250,000</td>
</tr>
<tr>
<td>Base station, etc. for MC-CDMA cellular radio</td>
<td>300,000</td>
</tr>
<tr>
<td>2.4 GHz band wide-band low-power data communication system</td>
<td>250,000</td>
</tr>
<tr>
<td>INMARSAT portable mobile earth station</td>
<td>300,000</td>
</tr>
</tbody>
</table>

http://www.telec.or.jp/eng/e-312c.pdf
I) A representative Test System
An electric wave no sound room
(Measurement distance 10m)
Digital Test system for W-CDMA (BTS/MS) equipment
High frequency use facilities Test System
SAR Measuring System

This system evaluates the absorption to specific portion of human head by energy of electromagnetic waves.
4. INVESTIGATION OF TEST METHOD
TELEC investigates all test methods of radio equipments (120 types) until now.

1. MIC investigates all test methods of radio equipments from now.
2. TELEC must assist and take an active part in the process for investigation of MIC as before.

TEST METHOD: http://www.tele.soumu.go.jp/j/material/test.htm
For More Information

TELEC website
http://www.telec.or.jp/
http://www.telec.or.jp/eng/e-000.htm

MIC website
http://www.tele.soumu.go.jp/index.htm

Thank you