Current Status of Mobile Satellite Services in Japan and Next Stage

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NTT DoCoMo Mobile Communications Services Subscribers

Satellite Mobile Communications Service started in March 1996

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<table>
<thead>
<tr>
<th>Service</th>
<th>Mode</th>
<th>Equipment</th>
</tr>
</thead>
</table>
| Satellite Land Mobile Telephone Service          | Single/Dual| WideStar Portable Phone
Car Phone                                                |
| Satellite Marine Telephone Service               | Single     | WideStar Portable Marine Phone
Car Phone
Marine Phone Ship Mounted                              |
| In Flight Telephone Service                      |            | WideStar WingPhone Introduced in 2001:
Public Aviation Telephone Service Analog Type         |
| Voice/Non-Voice Telecommunications Services      |            | Satellite Packet Communications Service
Uplink 4.8kbps/Downlink 64kbps                         |
WideStar PortablePhone, CarPhone, MarinePhone Subscribers

Number of subscribers for PortablePhone, CarPhone (×1000)

Number of subscribers for maritime use

- Maritime Subscriber using Previous System
- Satellite Maritime Subscriber

1999.3.31: Previous System Removal

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WideStar Service Configuration

- **Feeder link:** C-band (6/4GHz)
- **Service link:** S-band (2.6/2.5GHz)

High reliable satellite network using 2 satellites with 2 base-stations
WideStar Service Configuration

A satellite mobile communications Service covering all of Japan Including offshore areas.

- This satellite system provides maritime telephone service up to 200 nautical miles offshore.
- Stable communications with digital service.
  (Voice: 5.6kbps. Fax and data: 4.8kbps.)
- Satellite packet service is also offered.
  (64kbps, 4.8kbps)
## WideStar System Parameters

<table>
<thead>
<tr>
<th>Items</th>
<th>Circuit Switch</th>
<th>Packet Switch</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Frequency Band</strong></td>
<td>Mobile Terminal to Satellite: S Band (2.6/2.5GHz)</td>
<td>Satellite to Base Station: C Band (6/4GHz)</td>
</tr>
<tr>
<td><strong>Channel Separation</strong></td>
<td>12.5kHz</td>
<td>Return Link: 12.5kHz</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Forward Link: 150kHz</td>
</tr>
<tr>
<td><strong>Modulation</strong></td>
<td>p/4 Shift-QPSK, Coherent demodulation</td>
<td></td>
</tr>
<tr>
<td><strong>Access Technique</strong></td>
<td>FDMA( SCPC)</td>
<td>Return Link: FDMA( SCPC)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Forward Link: TDM</td>
</tr>
<tr>
<td><strong>Channel Capacity</strong></td>
<td>4.8kbps</td>
<td>Return Link: 4.8kbps</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Forward Link: 64kbps</td>
</tr>
<tr>
<td><strong>Coding</strong></td>
<td>5.6kbps PSI-CELP</td>
<td>-------</td>
</tr>
<tr>
<td><strong>Services</strong></td>
<td>Voice/FAX/Data Communication? LAN, Internet Connect</td>
<td></td>
</tr>
</tbody>
</table>
**Satellite Packet Communications Service**

- E-Mail
- Internet access
- Maritime Navigation and control
- Weather Information

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**DoCoMo PDC-P NW**

- **Satellite Base Station**
- **GW**
- **Route**
- **Provider**
- **Server**
- **Router**
- **Intranet-B**
- **Intranet-A**
- **Leased Circuit/ISDN**

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**Ship**

- **WideStar DoPa N21**
- **4.8kbps**
- **64kbps**

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**Data terminal**

- **HOST**
- **HOST**

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Example for WideStar MarinePhone Service

Features:

- Satellite maritime telephone service with coverage up to 200 nautical miles offshore.
- Fax Information Service is offered.
  - A service that provides you with useful information such as current weather conditions and forecast.
Voice and Fax Transmission System

This service is suitable for business use in mountainous areas, for outdoor leisure and as backup communications in the event of disaster.

- Business contact in mountainous areas communications system from construction facilities.
- Outdoor leisure activities.
- Standard interface with telephone call (Credit Card Phone, Private PHS terminals)
Data Transmission System

Achieves reliable data transmission from remote mountainous regions and on the ships.

- Internet/LAN applications from maritime users
- Transmission of patient electrocardiograms from ambulances to hospitals
- Mountain road information system
- Positioning Management system (Ships, Vehicle)
Image Transmission System

This service can be used for a variety of purpose, including remote observation of inaccessible areas and transmission of photographs for news coverage.

- Observation of plant and animal ecosystems
- Transmission of press photographs
- Volcano observation data transmission system
Remote Measuring System

These systems enable to gather telemetric data from remote locations. Measuring equipment and solar panels can be linked with satellite service to provide significant surveillance and observation systems.

- Meteorological observation
- Seismic activity observation
- Water level observation of rivers and dams
- Diastrophic observation
Future Plans for the Satellite Mobile Communications Services

1. **Maritime Satellite Communications Services**
   - Maintain the satellite communications services for the maritime customers who have no other methods to communicate.
   - Improve the satellite communications services such as connecting Internet or data transmissions.

2. **High reliable communications network using 2 Satellites**
   - Keep the good satellite communications network performance with high reliability even in the disaster.
   - Data transmission usage in the area where the terrestrial mobile services don’t cover.
Future Plans for the Satellite Mobile Communications Services

3. Integrated services for the next stage after launch of higher performance satellites.

- High speed satellite communications services using S-Band and provide new services in the broadband satellite network connecting to IP Network.
- Small size satellite terminals for easily portable use.
Satellite Mobile Communications Service Image

N-STAR

C Band (6/4GHz)

S Band (2.6/2.5GHz)

WideStar CarPhone

WideStar PortablePhone

WideStar MarinePhone

DoCoMo Earth Station

WideStar WingPhone
(Introduced in 2001)

DoCoMo NW

NTT NW

Mobile Station

FAX

PC

PSTN

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