New Technology Report

Special Article on IMT-2000 Services (3)
– Launch of FOMA, the Pioneer of the New Mobile Age –

Next Generation i-mode Service

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FOMA provides more attractive multimedia contents than 2G (PDC: Personal Digital Cellular) i-mode service by utilizing features of IMT-2000 network services such as high capacity and high speed communication.
This article describes the i-mode service of FOMA.

1. Introduction

The i-mode service provided in "FOMA: Freedom Of Mobile multimedia Access" (FOMA i-mode) is more attractive than the i-mode service provided in the Personal Digital Cellular (PDC) system (PDC i-mode) by inheriting the usability of PDC i-mode service and by utilizing the high-capacity and high-speed communication features of 3G mobile communications, International Mobile Telecommunications-2000 (IMT-2000).

Examples of more attractive multimedia contents are the connection to the FOMA i-mode mail sites and the new value-added i-motion service, which distribute video clips of about 10 to 15 seconds such as sports highlight scenes or promotional videos of the movies, etc.

FOMA i-mode service is described in the following.

2. Main Features of FOMA i-mode Service

Features of FOMA i-mode service are described below.

(1) High Speed Packet Data Communication

FOMA i-mode service allows the distribution of content with larger data volume by utilizing high speed packet data communication with maximum speeds of 64 kbit/s (about seven times faster than the current speed) in the uplink and 384 kbit/s (40 times faster than the current speed) in the downlink while maintaining PDC i-mode's simple operation.

(2) Expanded Terminal Functions

The terminal functions of FOMA i-mode are enhanced PDC i-mode functions, which are Hyper Text Markup Language

Table 1 Feature Specification Overview of FOMA Terminals

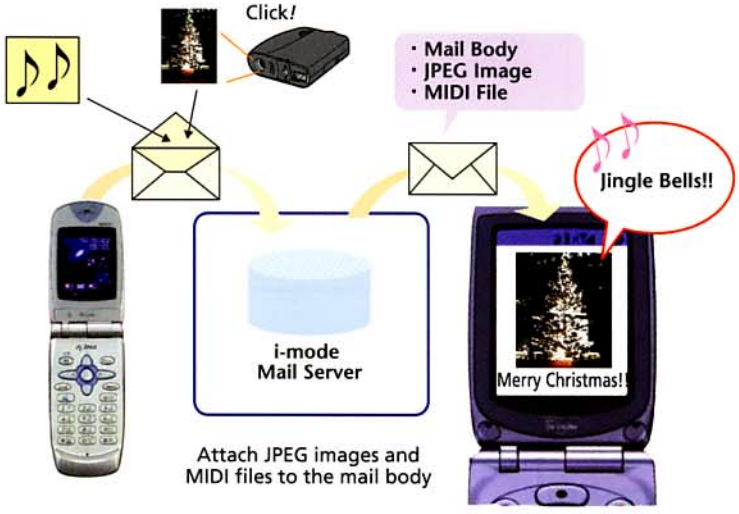
		PDC	FOMA
Site Connection	Data Size Available at a Site	10 kB/Page	100 kB/Page
	Viewable File	HTML Still Image (GIF) Melody (MFi)	HTML Still Image (GIF, JPEG) Melody (SMF, MFi)
i-appli	Program Size	10 kB	30 kB
i-mode Mail	Maximum Number of Characters to Transfer	250 Double Byte Characters	5,000 Double Byte Characters
	Files Allowed to be Attached	Melody (MFi)	Still Image (GIF, JPEG) Melody (SMF, MFi)
Messages	Message R	250 Double Byte Characters	5,000 Double Byte Characters
	Message F	250 Double Byte Characters	5,000 Double Byte Characters
i-motion	Image Size	—	100 kB
	Coding System	—	MPEG-4

FOMA: Freedom Of Mobile multimedia Access
GIF: Graphic Interchange Format
HTML: HyperText Markup Language
JPEG: Joint Photographic Experts Group
MFi: Melody Format for i-mode
MPEG: Moving Picture Experts Group
PDC: Personal Digital Cellular
SMF: Standard MIDI File

(HTML), mail, Java★, Secure Sockets Layer (SSL) and ring tone, and the i-motion function is newly added (**Table 1**).

(3) Multi-Access

Since FOMA allows voice call communication and packet data communication to occur simultaneously by utilizing the multi-access function, FOMA i-mode service (website access, etc.) can also be used during voice call communication.



JPEG: Joint Photographic Experts Group
MIDI: Musical Instrument Data Interface

Figure 1 Service Example of Greeting Card

3. FOMA i-mode Mail

Similar to PDC i-mode mail, FOMA i-mode mail can send and receive mail utilizing pictographic characters and can perform functions such as Phone to, Web to, Mail to and attach music files easily by utilizing a one-touch operation.

FOMA i-mode mail expands the maximum number of transferring characters up to 5000. Therefore, not only text based communication but images (Graphic Interchange Format (GIF) and Joint Photographic Experts Group (JPEG)) and music files (Standard MIDI File (SMF)) can be attached to mail so that for example, a greeting card can be created (**Figure 1**).

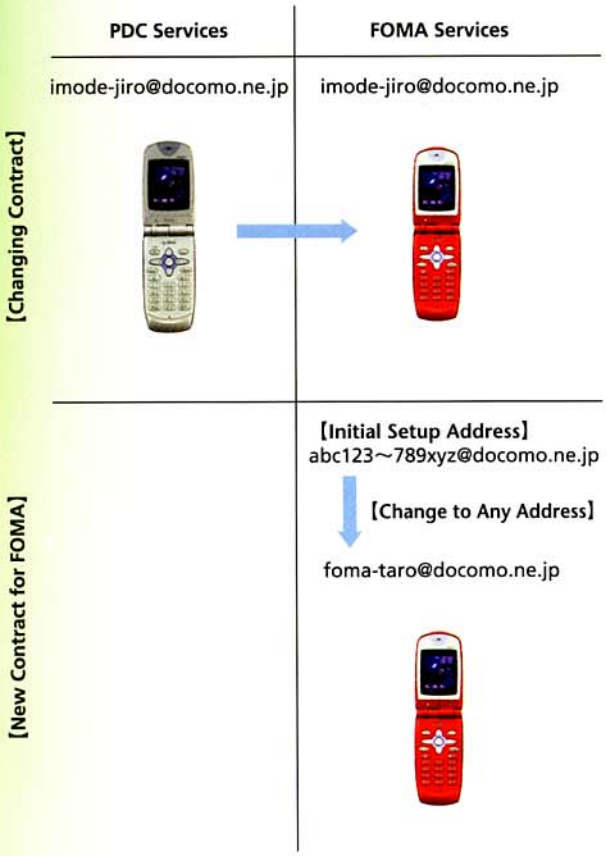
Furthermore, mail addresses used in PDC i-mode mail can be used for exchanging i-mode mails between FOMA terminals and for transferring mail to Internet mail addresses. When FOMA i-mode is newly subscribed, random alphanumerical characters are assigned to the left portion of the @ symbol in the initial mail address. This portion can be changed to any preferred characters (**Figure 2**).

In addition to this, FOMA i-mode mail provides the additional services described below in order to improve usability.

(1) Mail Re-send Function

When a FOMA terminal can not receive mail under conditions where the terminal is outside of the area, the power is off, or the terminal has stored the maximum number of unread mail and protected mail, mail is re-sent up to three times after a

★ Java: Object-oriented development environments specialized for the network proposed by Sun Microsystems, USA.



FOMA: Freedom Of Mobile multimedia Access
PDC: Personal Digital Cellular

Figure 2 Mail Address Use Example

defined period of time.

(2) Receive Selected Mail

Mail to be received can be selected or mail can be deleted at the i-mode center before transferring the mail by examining the subject, etc. of the mail stored in the i-mode center (**Figure 3**).

(3) Limiting Mail Size

Mail can be received by specifying the mail size (1000, 2000, 3000, 4000 or 5000 double byte characters) to be received.

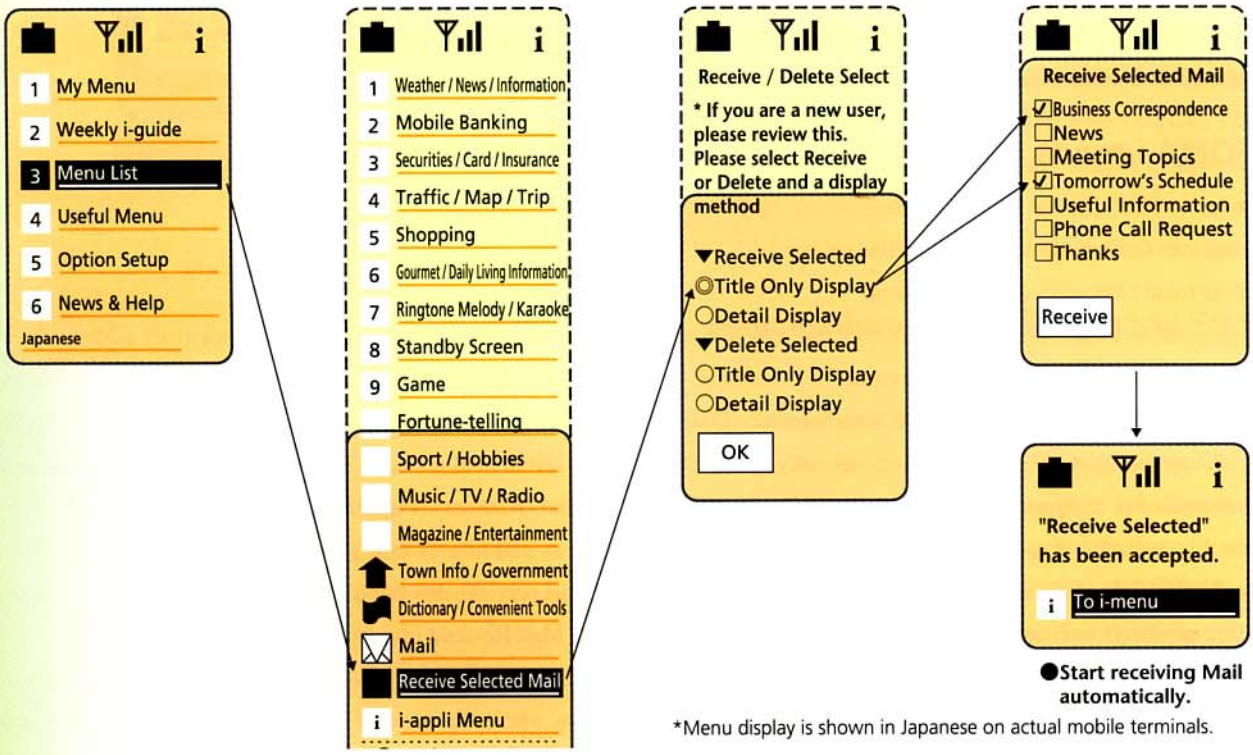
(4) Receive Selected Attached File

Mail can be received by selecting the type of attached files from "None," "Still Image File," "Melody File," and "All Files."

4. Site Connection

Since content providers can provide contents of 100 kB per page, it will be possible to prepare more vivid images (JPEG) than before. At the same time, users can browse more content information by utilizing FOMA i-mode service.

The program size of i-appli, which enables the user to enjoy applications such as games on a FOMA terminal, is expanded up to 30 kB so that the FOMA terminals can utilize applications with richer details than before.



*Menu display is shown in Japanese on actual mobile terminals.

Figure 3 Receive Selected Mail Menus

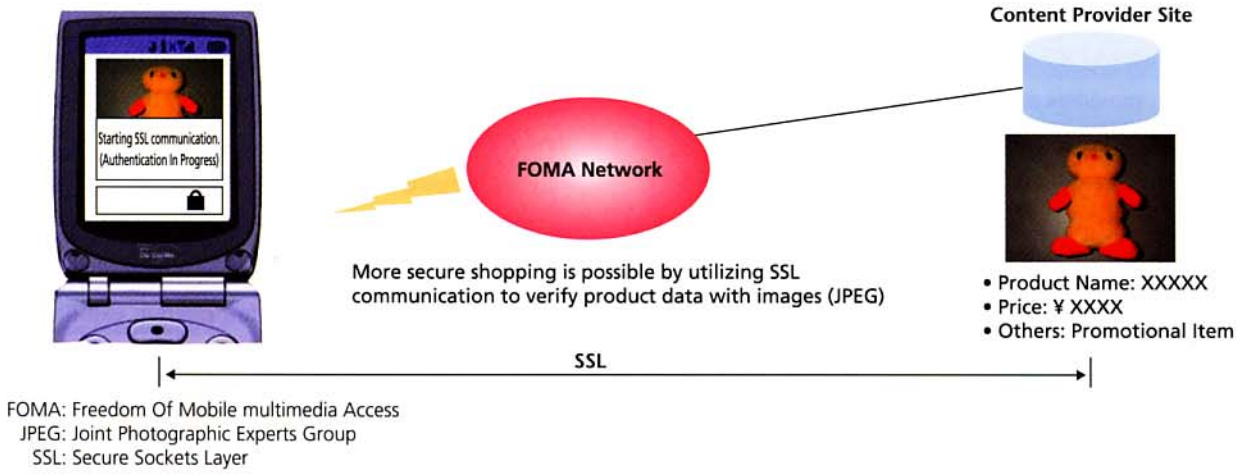


Figure 4 Shopping Example

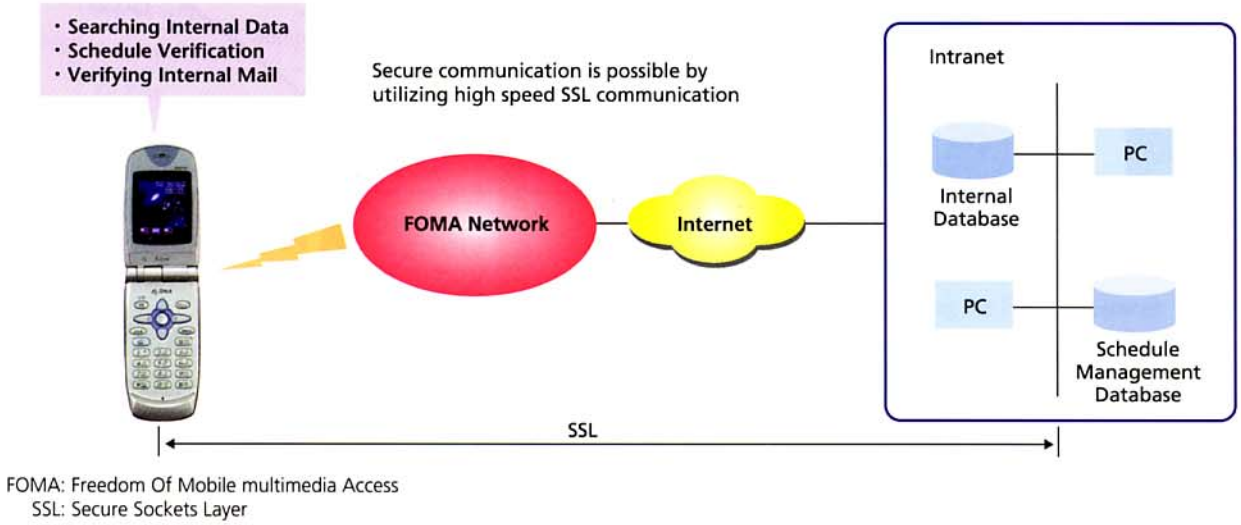


Figure 5 Intranet Access

In terms of musical contents (ring tone, etc.), since the Musical Instrument Data Interface (MIDI) file that is commonly used on the Internet and other media (Standard MIDI File (SMF)) is supported, FOMA terminals can use the latest music (MIDI file) offered on the Internet as the ring tone.

As far as the site connection is concerned, even though data volume of content offered by content providers is increased for FOMA i-mode, high capacity data can be downloaded at high speed by utilizing high speed packet communication, and thus, comfortable site connection is possible.

Since FOMA i-mode service can offer all kinds of content services, it is expected that Electronic Commerce (EC) utilizing FOMA i-mode becomes widespread and security becomes important. FOMA i-mode supports SSL communication between a FOMA terminal and a content provider server (End - End). Therefore, bank deposits, credit clearance and Intranet access can be done with high security by utilizing FOMA i-mode service (**Figures 4 and 5**).

5. Multi-Access

By using the multi-access feature of FOMA, it will be possible to search for a location while making arrangements to meet the other person over the phone; and verify stock status of products by accessing corporate Intranet using FOMA i-mode while having a phone conversation with the customer. A new type of communication, in which i-mode service is used during voice call communication, is also possible with this feature (**Figure 6**).

6. i-motion

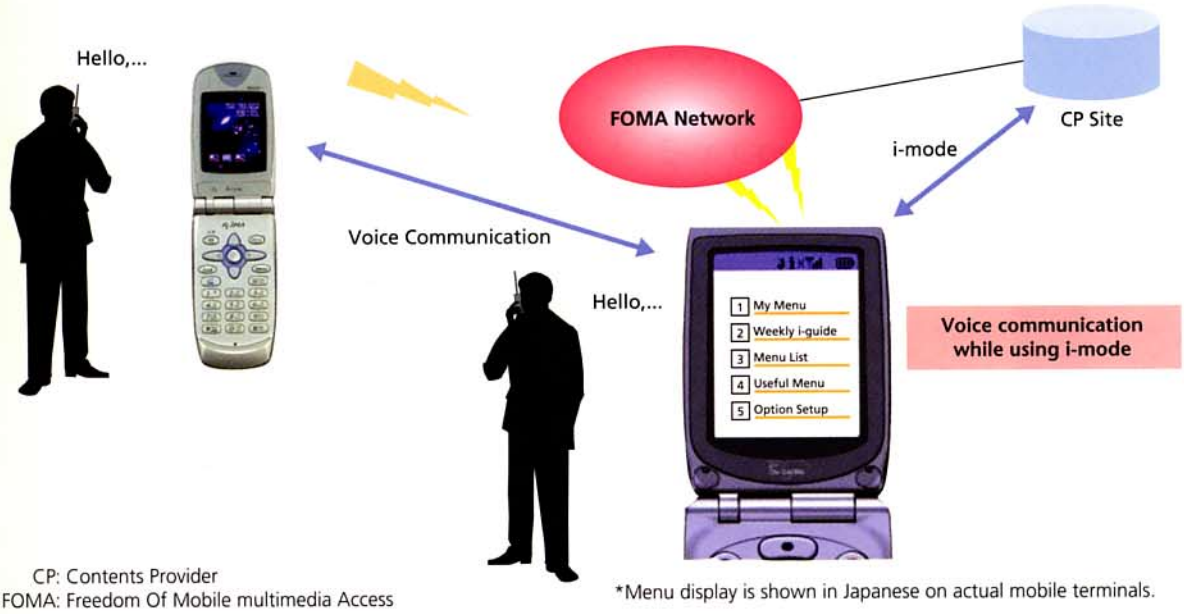
Though FOMA i-mode service described so far is an expansion of the features provided by PDC, the i-motion service is a brand new feature of FOMA i-mode. Contents including video clips of a movie or music video, sports highlight scenes and weather forecast can be distributed using i-motion service.

Conventional contents are character contents (501i), color contents and ring tone (502i), and i-appli and SSL (503i). However, since content providers can provide a new type of service utilizing i-motion and multi-access services, more attractive contents can be browsed using FOMA.

i-motion content is a downloading type where the content is downloaded to a terminal once and then played on the terminal. Therefore, unlike real time images of a streaming type, desired scenes of content can be browsed repeatedly on the terminal. Furthermore, downloaded content can be saved in the terminal (**Figures 7 and 8**).

The specification for playing back contents on a terminal is that the content size is a maximum of 100 kB (Image playing time is between 10 seconds to 30 seconds.), and an image display is Quarter CIF (Sub-QCIF) (**Table 2**).

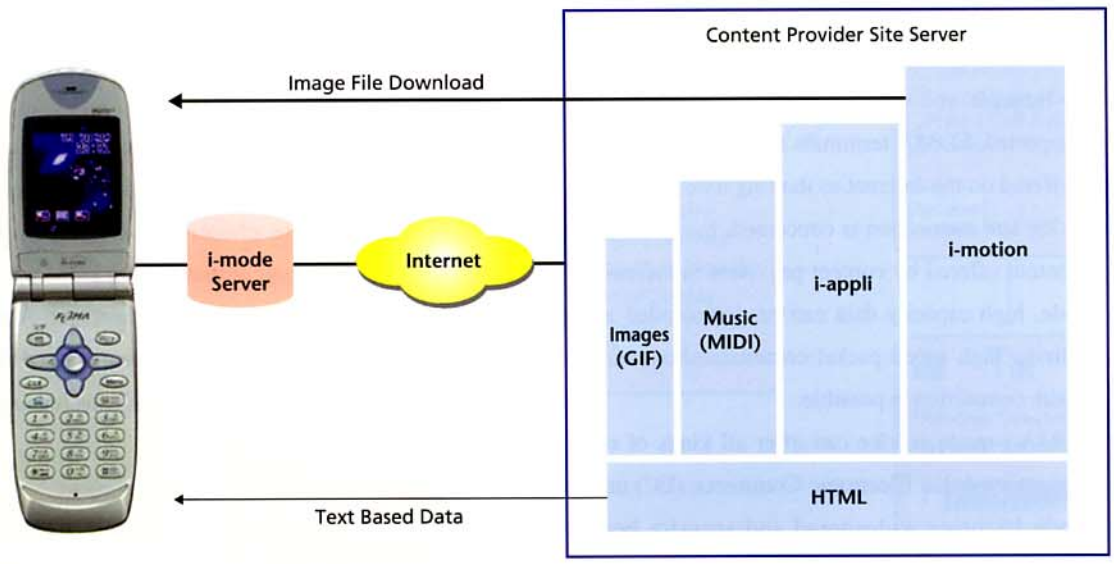
From now on, product introduction of EC, etc., can be displayed on a terminal as moving images not only as simple static images. Thus, more realistic information can be provided to FOMA terminal users and it is expected that i-motion service will accelerate widespread use of EC.



CP: Contents Provider
FOMA: Freedom Of Mobile multimedia Access

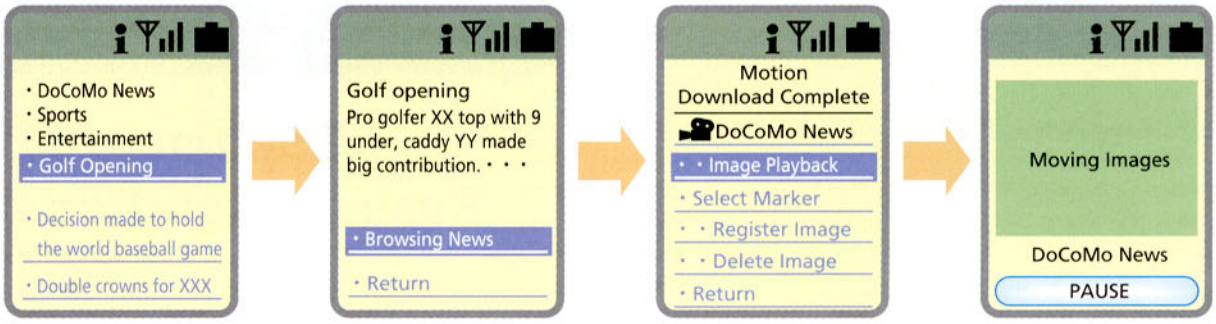
*Menu display is shown in Japanese on actual mobile terminals.

Figure 6 Multi-Access



GIF: Graphic Interchange Format
HTML: HyperText Markup Language
MIDI: Musical Instrument Data Interface

Figure 7 i-motion Download



*Menu display is shown in Japanese on actual mobile terminals.

Figure 8 i-motion Example

Table 2 Terminal Specification of Mobile Station

Image Processing	Coding System	MPEG-4 Simple Profile Level 0
	Screen Size	Sub-QCIF
	Frame Rate	15 fps Maximum
	Bit Rate	40 kbit/s
Voice Processing	Coding System	3G-AMR
	Coding Rate	4.75～12.2 kbit/s

AMR: Adaptive Multi Rate
MPEG: Moving Picture Experts Group
QCIF: Quarter CIF

7. Future View

(1) Terminal Size Down-sizing

When FOMA services were started, the sizes of FOMA terminals were somewhat larger and their prices were relatively higher than PDC. It is expected that compact size terminals similar to the current 503i series will be available around 2003.

(2) Service Expansion

PDC i-mode contents are mainly information type contents such as still images (standby screen) and music (ring tone). In the future, soft drinks can be purchased from vending machines by using FOMA i-mode service such as C-mode and a terminal can be used as an identification card by registering personal information into the User Identity Module (UIM) within the terminal. EC becomes simpler in this way and FOMA i-mode service can be used freely for services closely connected to everyday life.

(3) Global Roaming

As the 3rd Generation Partnership Project (3GPP) standard specification which is IMT-2000 adopted by DoCoMo, becomes widely adopted by European countries in the future, and an i-mode compatible terminal can be used not only in Japan but also in other countries for FOMA i-mode service. This means that it is expected that contents can be accessed or required information can be obtained even in other countries, in the same way as in Japan and i-mode service will be more widely used.

8. Conclusion

This article described the overview of FOMA i-mode features and service. In the future, we will examine new services and global expansion utilizing the FOMA features.

GLOSSARY

3GPP: 3rd Generation Partnership Project
AMR: Adaptive Multi Rate
CP: Contents Provider
EC: Electronic Commerce
FOMA: Freedom Of Mobile multimedia Access
GIF: Graphic Interchange Format
HTML: HyperText Markup Language
IMT-2000: International Mobile Telecommunications-2000
JPEG: Joint Photographic Experts Group
MFi: Melody Format for i-mode
MIDI: Musical Instrument Data Interface
MPEG: Moving Picture Experts Group
PDC: Personal Digital Cellular
QCIF: Quarter CIF
SMF: Standard MIDI File
SSL: Secure Sockets Layer
UIM: User Identity Module