

# New Services and Functions for Smartphones in 2010

## —e-mail Service for sp-mode—

*The market for smartphones has been expanding rapidly in recent years. It has been possible to freely download one's favorite applications using smartphones, but it has not been possible to use i-mode mail. In the e-mail service of sp-mode<sup>TM\*1</sup> that has now been launched it is possible to carry over the same e-mail address used in i-mode mail, in addition to being able to use pictograms and Deco-mail. This e-mail service offers an environment that enables users to make use of smartphones more comfortably by combining the convenience brought about by inheriting the functions from i-mode mail as well as the newly enhanced functions associated with smartphones.*

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## 1. Introduction

The market for smartphones has been expanding rapidly in recent years with the advent of new platforms targeting consumers. In response, NTT DOCOMO is introducing new Android<sup>TM\*2</sup> and Windows Mobile<sup>®\*3</sup>-powered terminals one after another. However, the platform for i-mode compatible terminals and that for smartphones are quite different so that there has been many technical issues inhibiting the equipping of smartphones with i-mode mail simply as it is. Thus it has not been possible to use e-mail with the

docomo.ne.jp domain on smartphones which has somewhat reduced appetite of users to buy them. Up to now, there has been one solution for users which is to send/receive and view i-mode mail via the imode.net<sup>TM\*4</sup>. However, users had to subscribe to the imode.net in addition to i-mode and the complexity of its usage has been an issue. Under these circumstances, in the new ISP service for the smartphone (i.e. "sp-mode") a new e-mail service (hereinafter referred to as "sp-mode mail") has been developed as one of its features and was put into service in September 2010.

sp-mode mail can carry the same e-

mail address as that used in i-mode mail. It is also equipped with functions enabling the use of pictograms and Deco-mails together with functions enhanced for smartphones.

In this article, service overview, basic functions and system configuration of sp-mode mail will be presented.

## 2. Overview of sp-mode Service

### 2.1 Services Provided

sp-mode is a new ISP service intended for smartphone users. The standard services of sp-mode are Internet connection, sp-mode mail (includ-

\*1 **sp-mode**<sup>TM</sup>: "sp-mode" and "sp-mode" logo are trademarks or registered trademarks of NTT DOCOMO, INC.

\*2 **Android**<sup>TM</sup>: A trademark or registered trademark of Google, Inc.

\*3 **Windows Mobile**<sup>®</sup>: A trademark or regis-

tered trademark of Microsoft Corp. in the United States and other countries.

\*4 **imode.net**<sup>TM</sup>: A trademark or registered trademark of NTT DOCOMO, INC.

ing spam mail countermeasures) and contents payment service. sp-mode’s optional services include the sp-mode mail virus check and access restriction services (sp-mode filter and sp-mode filter customization).

### 2.2 Overview of sp-mode mail

sp-mode mail aims at offering smartphones an “e-mail service that enables rich communication between i-mode compatible terminals, smartphones and PCs.” To this end, functions and services that can be classified into the following three categories are offered (Figure 1).

- (1) Highly convenient e-mail service: use of e-mail addresses in the docomo.ne.jp domain, real-time reception of new e-mail and spam mail countermeasures fall into this category.
- (2) Affinity with i-mode mail: pictograms and Deco-mail fall into this category.
- (3) Internet e-mail functions with emphasis on sending and receiving of e-mail between smartphones and PCs: Large sized e-mails and virus check functions belong to this category.

Among the above functions the most salient feature is that the docomo.ne.jp domain can be used so that users changing terminals to smartphones can continue to use their i-mode address.

### 2.3 Comparison of sp-mode mail and i-mode mail

offered in sp-mode mail and in i-mode mail.

Table 1 shows the functions

As has already been introduced in

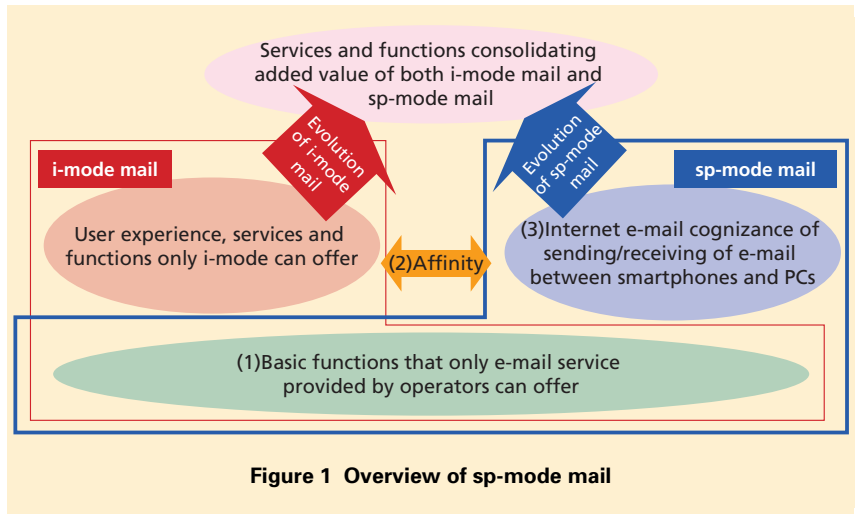


Figure 1 Overview of sp-mode mail

Table 1 e-mail functions offered and comparison

Data		Service detail		Continuation possible
		sp-mode	i-mode	
Option setting	Password	✓	✓	✓
e-mail address	e-mail address	✓*	✓	✓
Spam mail setting (typical)	Rejection of e-mail containing URL link	✓	✓	✓
	Restriction on incoming e-mail to user-designated carrier	✓	✓	✓
	Rejection of operator spoofing	✓	✓	✓
	Rejection of PC spoofing	✓	✓	✓
	Receipt of e-mail addressed to user-designated address	10 items	10 items	✓
	Restriction on incoming e-mail to user-designated domains and addresses	120 items	120 items	✓
	Rejection of address	120 items	120 items	✓
	Rejection of domain	120 items	120 items	✓
	Virus filter	✓	—	NA
e-mail service	Pictogram and Deco-mail	✓	✓	NA
	Decome-Anime	—	✓	NA
	Value added services such as imode.net, NTT DOCOMO Web mail	—	✓	NA
e-mail specifications	Display of e-mail address as comment	✓	—	NA
	Maximum number of broadcast e-mail that can be sent	100 items	5 items	NA
	Attachment file size	10 MB	2 MB	NA

\* Secret code not supported

(as of September 1, 2010)

Section 2.2, it has been decided to use the docomo.ne.jp domain for sp-mode mail addresses as in the case of i-mode mail. Furthermore, we have made it possible to continue using one's own e-mail address when changing contracts such as from i-mode to sp-mode and vice versa. Functions for spam mail countermeasures for sp-mode are the same with those for i-mode and it is also possible to carry on using the settings for acceptance/rejection. In addition, in consideration of the Internet usage environment by smartphones, it has been made possible to send e-mail of up to 10 MB in size, which is much bigger than is possible in i-mode.

In such a way, sp-mode mail offers an environment in which current i-mode users can also comfortably use smartphones by combining the affinity achieved by inheriting the functions of i-mode mail with the extended features available for smartphones.

### 3. Development of sp-mode mail

#### 3.1 Development of e-mail Client

e-mail clients supporting sp-mode mail have been developed for Windows Mobile 6.5 and the Android OS (Photo 1).

The e-mail client for Windows Mobile has been developed as a plug-in for Outlook<sup>\*5</sup> e-mail and its user interface is based on Outlook e-mail. On the other hand, all the functions for the e-

mail client for Android have been newly developed with a unique user interface whose display style and screen themes are changeable. Both e-mail clients support the basic functions of i-mode mail such as new e-mail notification, pictograms and Deco-mail. They are also equipped with a provisioning tool that renders initial setting by users unnecessary. It is also possible to preset whether or not to automatically receive e-mail when the user is roaming abroad.

With smartphones, it is foreseen that there will be frequent OS version updating so that it is assumed that there would be needs for functions to be modified. Therefore, the principle has been established that commonly available standard functions that do not depend on OS version numbers would be used when developing the basic functions of sp-mode mail, except in the case where they were functions peculiar to i-mode mail (e.g., pictogram, Deco-mail).



Photo 1 Examples of sp-mode mail client display

\*5 Outlook<sup>®</sup>: A trademark or registered trademark of Microsoft Corp. in the United States and other countries.

In particular, as regards the protocol between the e-mail client and the e-mail server, Post Office Protocol version3 over SSL (POP3S)<sup>\*6</sup> and Simple Mail Transfer Protocol over SSL (SMTPS)<sup>\*7</sup>, which are universal, have been chosen so as to reduce the impact on the e-mail client even when the version of the OS is upgraded.

However, because POP3S and SMTPS are protocols that use e-mail accounts (user ID and password) at the time of user authentication, users need to make an initial setting of their e-mail accounts if they choose commonly used e-mail clients.

In sp-mode mail, we have made it unnecessary for users to set their e-mail account settings by taking advantage of the provisioning function. Specifically, the e-mail account that has automatically been generated and then issued at the server is used for authentication. Security is enhanced by giving limited lifetime to the e-mail account that has been issued and by enforcing that it be changed from the server side. The sequence starting from the time of e-mail account acquisition to the sending/receiving of e-mail is shown in **Figure 2**.

### 3.2 Service Appli Authentication

In order to automatically issue an e-mail account for the sending/receiving of e-mail, it is necessary to confirm that the e-mail client used is an authentic

application of NTT DOCOMO (hereinafter referred to as “authentic appli”). In our system we have restricted the use of NTT DOCOMO’s unique services including sp-mode mail to authentic applis only, and have introduced a mechanism called service appli authentication to prevent illegal use for example by spoofing.

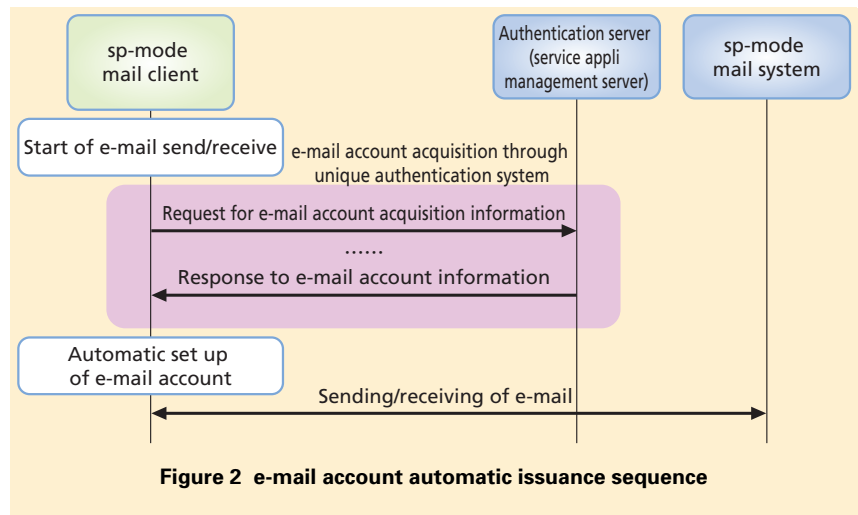
In the service appli authentication, whether or not the application requesting authentication is an authentic appli is judged by using an authentication method developed by NTT DOCOMO, and the user authentication information is issued only when it is identified as authentic. In addition, user authentication information can only be retrieved from the service appli management server when the user terminal is connected to sp-mode. It is judged that the appli is authentic when the e-mail account contained in the user authentication information issued under this procedure is used as the e-mail account

of sp-mode mail that has been sent by POP3S/SMTPS.

In the user authentication using POP3S/SMTPS, further robust authentication is achieved by adding the IP address issued at the time of sp-mode connection authentication, in addition to the service appli authentication. This further increases safety in the use of sp-mode mail.

### 3.3 Real-time Reception Using Push Notification

Real-time e-mail reception is possible with sp-mode mail by making e-mail notification at the time of the arrival of an e-mail in the e-mail box. **Figure 3** shows an overview of the system and **Figure 4** shows the SMS format used in the new e-mail notification. As shown in Fig. 3, when a new e-mail arrives at the sp-mode mail box, the SMS-Gateway (GW) server generates information that will enable the e-mail application to retrieve the new e-



\*6 **POP3S**: A protocol to receive e-mail securely by encrypting communication path using Secure Socket Layer (SSL). POP3 is a protocol for receiving e-mail.  
 \*7 **SMTPS**: A protocol to send e-mail securely by encrypting communication path using SSL.

SMTP is a protocol for sending e-mail.

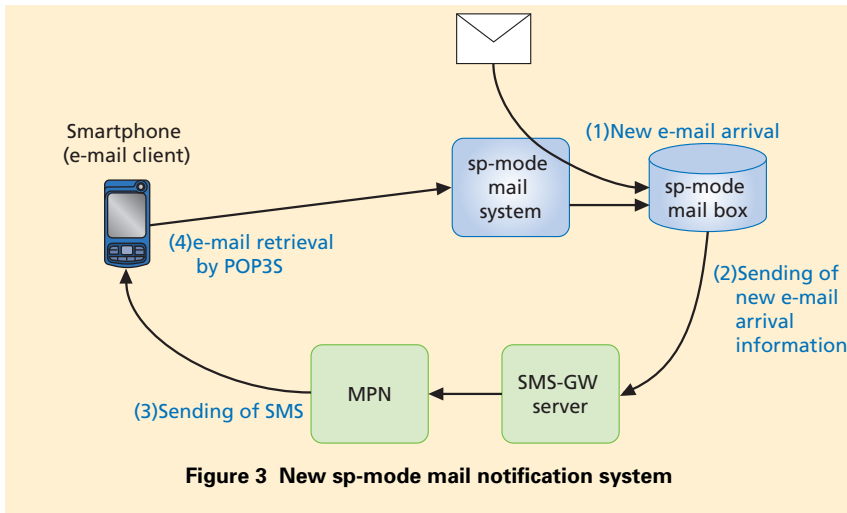


Figure 3 New sp-mode mail notification system

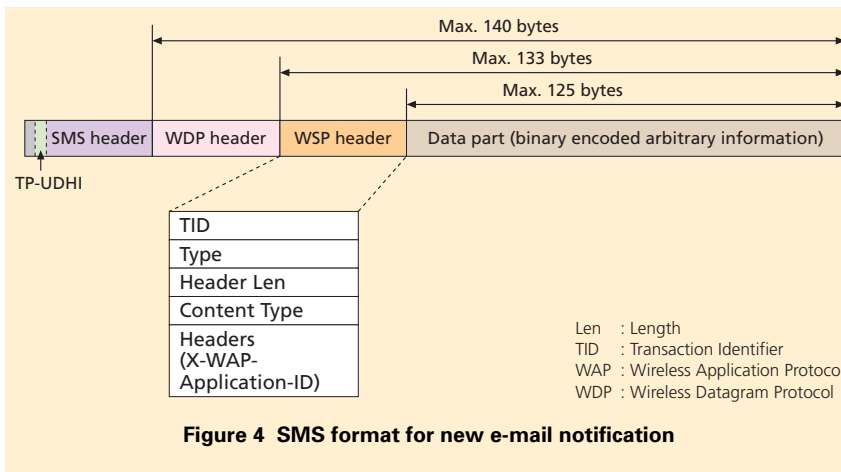


Figure 4 SMS format for new e-mail notification

mail, and, based on this information, the Media Processing Node (MPN) generates a special SMS and sends it to the e-mail client. Based on this information the e-mail client receives the e-mail from the sp-mode mail box using POP3S via the sp-mode mail system. The sp-mode mail system mentioned above refers to the system that bridges the e-mail application and the i-mode mail system. Whether the SMS type is normal or special is determined by the information element, Transfer Protocol-

User Data Header Indicator (TP-UDHI).

When a smartphone receives an SMS and finds it to be a special one, it checks the Content Type and the parameters of the Headers in the Wireless Session Protocol (WSP) header using the e-mail client, and if their values are found to be those of sp-mode mail, it moves on to retrieve the e-mail by POP3S.

Furthermore, this special SMS for sp-mode mail new arrival notification is

stored in the MPN for a certain period of time and has the feature of being overwritten by subsequent arrival notifications for the same telephone number. Because POP3S is used, multiple e-mails in the e-mail box can be retrieved by a single new e-mail notification. Thus, by taking care of the arrival of multiple e-mails by a single SMS, duplication of SMS can be avoided.

## 4. System Configuration of sp-mode mail and Processing Sequence

### 4.1 Use of docomo.ne.jp Domain

In sp-mode mail, the docomo.ne.jp domain is used as in the case of the i-mode mail. Therefore, the system has been designed so that the e-mail from external e-mail servers to sp-mode is sent to treasure Casket of i-mode service, high Reliability platform for Customer (CiRCUS)<sup>\*8</sup> that forms part of the i-mode system, as was the case for the i-mode. CiRCUS then decides whether the e-mail is addressed to i-mode or sp-mode making use of the contract information.

Figure 5 shows the receiving process of sp-mode mail. e-mail arriving from external e-mail servers is exclusively received by the i-mode mail system of CiRCUS. Referring to the contract information database, if the recipient is an i-mode subscriber, then the e-mail is stored in the i-mode mail

\*8 **CiRCUS**: A device that serves as an interface between the NTT DOCOMO core network and the Internet, provides i-mode mail, i-mode menu, ordinary Internet access, and other functions.

box. If the recipient is an sp-mode subscriber then the e-mail is relayed to Multi-Access Platform System (MAPS)<sup>\*9</sup> and is stored in the sp-mode mail box via the sp-mode mail system.

#### 4.2 Overview of Spam Mail Countermeasures

We have aimed at offering users a secure and safe environment by providing the same level of spam mail countermeasures as in i-mode so as to prevent damage caused by, for example, fictitious invoices. To achieve this, we have chosen to make use of the existing system in i-mode mail with a view to maintaining the same service level, streamlining the system development work and achieving the smooth migration of users who had been using i-mode mail.

##### 1) Functions Implemented in Each System

It was decided to equip all of spam mail detection functions in CiRCUS and to implement the sp-mode specific virus filter in MAPS (Table 2).

##### 2) Functions for sp-mode Spam Mail Countermeasures

Figure 6 shows the sp-mode spam mail countermeasure functions. In sp-mode mail it has been designed that CiRCUS conducts the spam mail countermeasures. Therefore, processing of e-mail sent from sp-mode to sp-mode is made by forwarding them from MAPS to CiRCUS (Fig. 6 (1)), and sending them back to MAPS again after a spam

check is performed by CiRCUS (Fig. 6 (2)).

As such, existing applications and databases are efficiently utilized by making CiRCUS collectively conduct the spam mail countermeasures using the functions that have been offered in

i-mode. Meanwhile, the independence and expandability of the system is maintained by implementing functions specific to sp-mode such as the virus filtering in MAPS.

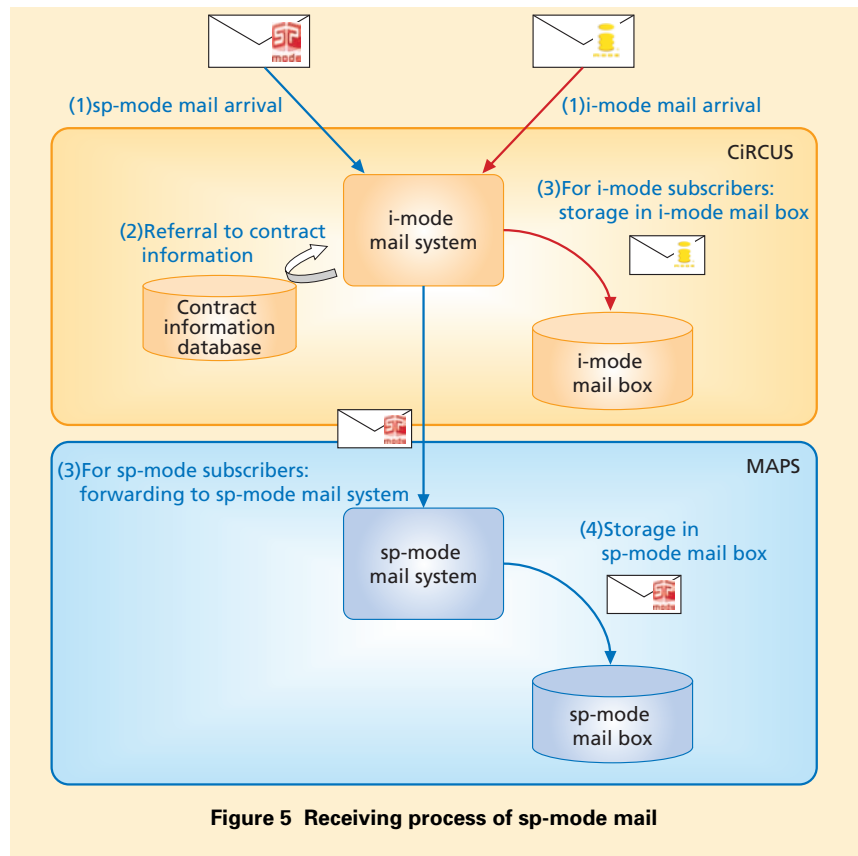
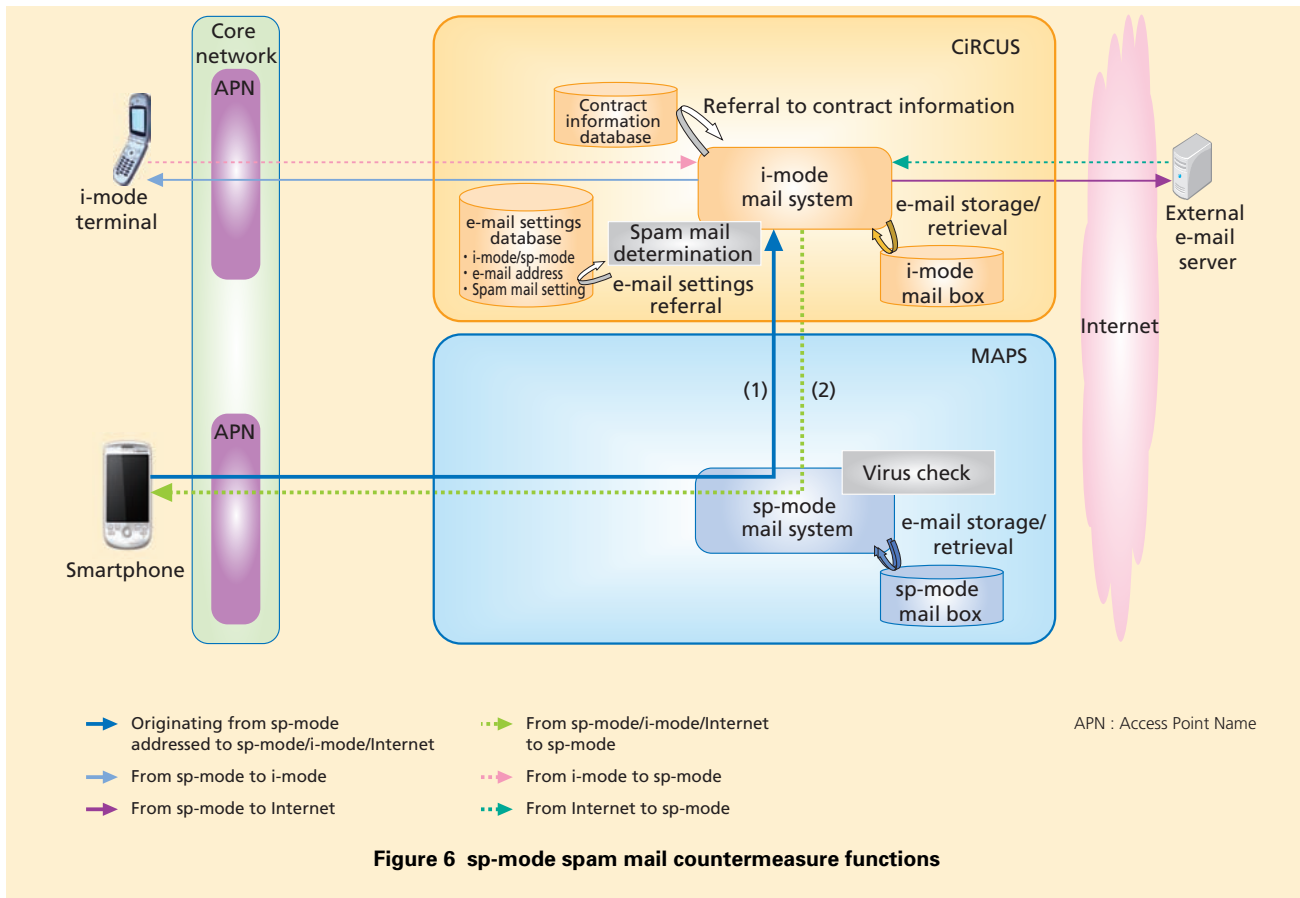


Figure 5 Receiving process of sp-mode mail

Table 2 Functions implemented in sp-mode mail

	Functions implemented in CiRCUS	Functions implemented in MAPS
Spam mail countermeasures	<ul style="list-style-type: none"> <li>Spam mail determination</li> <li>e-mail setting database</li> </ul>	Virus filter
Contract status determination	<ul style="list-style-type: none"> <li>Contract status determination function</li> <li>Contract information database</li> </ul>	—
GW	<ul style="list-style-type: none"> <li>GW on i-mode terminal side</li> <li>GW on Internet side</li> </ul>	GW on smartphone side
e-mail box	—	e-mail box for sp-mode

\*9 MAPS: A platform that provides Internet connection and corporate system connection to various access circuits including FOMA.



## 5. Conclusion

As one of the functions offered in NTT DOCOMO's new ISP service, "sp-mode", a new e-mail service has been developed and put to service. With the new service, we have realized an environment in which users with smartphones can easily use functions such as pictograms and Deco-mail, not to speak of continuing to use the same e-mail address the user had been using in

i-mode. Furthermore, a high level of security has been achieved by strengthening the security measures for e-mail services by offering such functions as service appli authentication and virus check filtering.

We plan to offer a more comfortable utilization environment to smartphone users by further expanding and improving the functions of the e-mail service.

## REFERENCES

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