Results of investigation into cell phone and e-mail SPAM for the first half of 2012

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1. Outline

o Intent and purpose of the project

- To analyze reported SPAM statistics and received SPAM volume survey results, and regularly publish the status of SPAM circulation of cell phone or e-mail service providers to induce service providers' autonomous efforts to reduce SPAM and satisfy people's right to know.

※ The analysis is not based on the measurement of the total SPAM circulated, but the measurement of **samples** from the SPAM received from the network by the recipients (i.e. reported SPAM, trapped SPAM, received SPAM volume).

o Definition of SPAM

- **'For-profit advertising information'** unilaterally transmitted through the information network (cell phones, e-mail, etc.) against the will of the recipient.

※ General users tend to perceive advertisements they consented to or not-for-profit information (election campaigns, religion-related advertising, etc.) as SPAM, but they are not regulated by the Act on Promotion of Information and Communications Network Utilization and Information Protection, Etc.

2. Circulation status measurement method and standards

Circulation measurement method and standards	
Study group composition	- 14 members, including college professors (statistics), lawyers and operators (Mobile network operators, ISPs, portals, etc.) ※ Circulation measurement methods and standards began to be developed in April 2011 and were finalized in November 2011
Metrics	- SPAM amount by operator of cell phone and e-mail networks (sending/receiving) ※ Metrics will be separately used as operator groups providing sending and receiving networks are different.
Target operators	- Operators providing cell phone and e-mail networks Sending network / Receiving

			network
	Cell phone SPAM	- Mobile network operators, bulk SMS sending operators, Internet phones, landline phones	- Mobile network operators
	e-mail SPAM	- ISP and MSO Operators	- portal Operators
	※ Names of operators will be disclosed if they account for more than 5% of SPAM.		
Measurement time	- Sending network: January 2012~June 2012 / receiving network: June 11, 2012 ~ June 17, 2012		
Measurement method	- Sample data collected during the measurement period is analyzed, and SPAM circulation data of each operator is collected.		
Sample data		Cell phone SPAM	e-mail SPAM
	Sending	- SPAM reported to KISA - SPAM detected by KISA cell phone SPAM trap	- SPAM detected by KISA e-mail SPAM trap ※ As reported SPAM is very small, it is excluded.
	Receiving	- Result of the received volume survey	- Result of the received volume survey
Review of the validity of samples	- SPAM reported to KISA (cell phone: 15,380,000) and SPAM trap-detected (e-mail: 12,720,000) are valid data that can represent the total SPAM volume. ※ confidence interval 95%, sample error: ±0.01% or less		

[Table 1] Circulation status measurement method and standard

o Target operators: Operators providing sending and receiving networks for cell phone SMS SPAM and e-mail SPAM

- As different operators provide SPAM sending and receiving networks, sending and receiving networks are separately measured.

Classification	Sending network service provider	Receiving network service provider
Cell phone SPAM	- Mobile network operators (SKT, KT, LG U+) - Biz-SMS[1] (KT, LG U+, SKB, etc.) - C2P[2] (KT, LG U+) - Internet phones (LG U+, KT, etc.)	- Mobile network operators (SKT, KT, LG U+)
e-mail SPAM	- ISP[3] (KT, LG Dacom, SK Broadband) - MSO[4] (TBroad, CJ Hello Vision, etc.)	- Portals (Naver, Daum, Yahoo, etc.)

[Table 2] Classification of operators by transmission path

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1) BIZ-SMS: An operator who implemented the web-based bulk SMS sending system connects a leased line to the mobile network operator and sends text messages to the mobile network operator's subscribers.

2) C2P (Computer to Phone): This is the same web-based bulk SMS sending service as the BIZ-SMS service, but it refers to cases where the sending operator is a common carrier and interworking with the mobile network operator.

3) ISP (Internet Service Provider): An operator who provides Internet service for individuals and corporations

4) MSO (Multiple System Operator): An operator owning many cable TVs, and providing Internet service as well
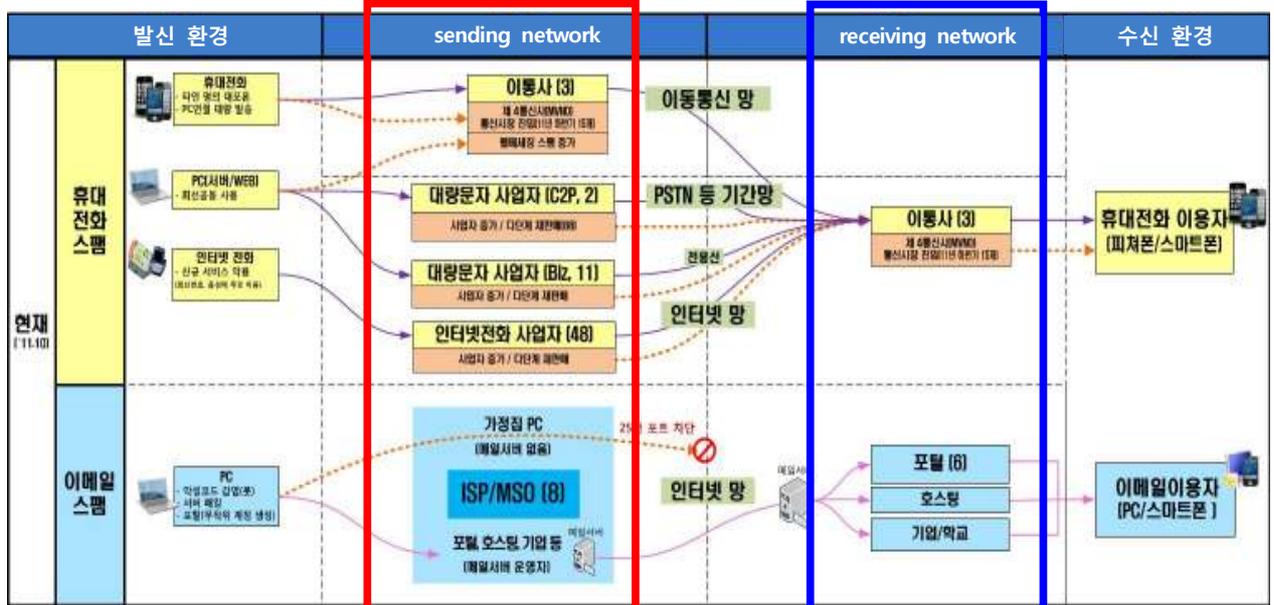
[Figure 1] Types of operators providing a SPAM transmission path

	Sending environment					Receiving environment
Present (October 2011)	Cell phone SPAM	Cell phones - illegal cell phones in others' names - connected to a PC to send bulk SPAM	Mobile network operators (3) 4th mobile network operators (MVNO) MVNO' entry into the telecommunications market (15 in the 2ndhalfof2011) Increasing the number of web messaging	Mobile communication networks	Mobile network operators 3 MVNO' entry into the telecommunications market (15 in the 2ndhalfof2011)	Cell phone users (feature phones, smart phones)
		PC server/Web - jointly using lines	Bulk SMS service providers (C2P, 2) increasing number of service providers/multi-level resale (88) -- Bulk SMS service providers (Biz, 11), increasing number of service providers/multi-level resale -- Internet phone service providers (48) Increasing number of service providers/multi-level resale	Backbone networks like PSTN Leased lines Internet networks	Portals (6) Hosting Enterprises/ schools	E-mail users (PCs/smart phones)
		Internet phones - abusing new services (mostly used for line numbers and voice)				
	e-mail SPAM	PC - infected with malicious codes (bot) - server hacking - portal (random accounts generated)	Home PCs (no mail server) ISP/MSO (8) Portal, hosting, enterprises, etc. (mail server operators) Mail server	Blocking port No. 25 Internet networks Mail server		

o Conditions of sample data

  - Limited to for-profit advertising (cell phone text messages and e-mail) that the recipient does not want to receive

  ※ As the analysis is based on the number of text messages users reported as SPAM, advertising and some not-for-profit text messages with whom they have business connections with may be included.

3. Cell phone SPAM circulation status measurement results

3.1 Sending network circulation status

o Information to be analyzed: 15,380,000

- Text message SPAM meeting the conditions of the sample data among the SPAM reported to KISA between January - June 2012, or SPAM detected by the cell phone SPAM trap

3.1.1 Status by advertising type

o Malicious SPAM (gambling, loan offers and restricted medicines) resulting in secondary harm such as gambling addiction, bankruptcy or illness accounts for 58.8% of total, whereas general SPAM (adult content, designated driving, etc.) accounts for 41.2% of total.

(Unit: case)

Classification	Loan Offers	Gambling	Adult contents	Designated driving	Communications company	Bars & clubs	Medications	Real estate	Games	Fortune-telling	Other	Total
No of cases	4,729,369	3,974,826	3,228,059	550,810	400,520	370,673	336,072	82,265	29,624	8,050	1,669,598	15,379,866
%	30.8%	25.8%	21.0%	3.6%	2.6%	2.4%	2.2%	0.5%	0.2%	0.1%	10.9%	100%

[Table 3] Status by SPAM type

3.1.2 Status by sending service

(Unit: case)

Service		SPAM amount	%
Bulk SMS sending service	BIZ-SMS	4,690,000	30.5%
	C2P	4,105,525	26.7%
Mobile communication service	Personal web messaging service5)	4,554,548	29.6%
	cell phone	1,385,546	9.0%
Other	Internet phones, landline phones	644,247	4.2%
Total		15,379,866	100%

[Table 4] SPAM % by service

5) Personal web messaging service: Free or fee-based SMS sending service provided to mobile network operators'

o From the end of 2010, SPAM volume was greatly reduced thanks to strong regulations such as reducing the speed of the SMS-sending line of operators providing BIZ-SMS and C2P service, but

- from 2011, the personal web messaging services of mobile network operators, which are regulated relatively weakly, were abused, and a large quantity of SPAM (29.6%) was sent.

o Among 15,380,000 cases of SPAM that were analyzed, SPAM volume by service was 30.5% for BIZ-SMS, 29.6% for personal web messaging, 26.7% for C2P, 9.0% for cell phones, and 4.2% for others (Internet phones and landline telephones).

- It is said that SPAM sent by BIZ-SMS and C2P decreased, but they are still used as major means for sending SPAM.
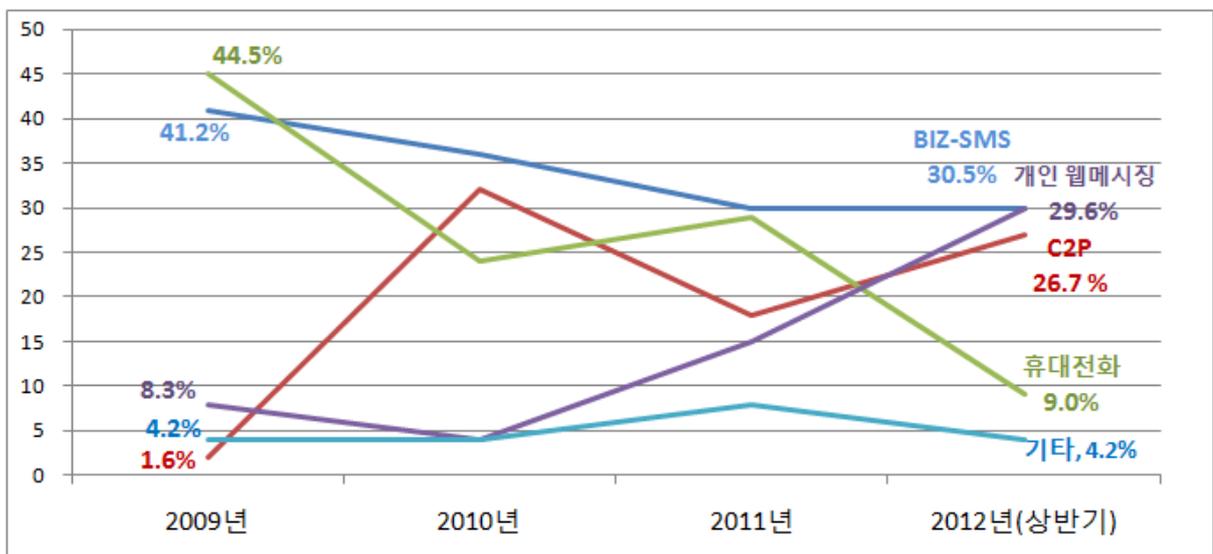
[Figure 2] SPAM trends by service

personal web messaging, cell phones, others
2009, 2010, 2011, 2012 (1st half)

3.1.2.1 Bulk SMS sending service - BIZ-SMS Operator

subscribers through their website

o The SPAM volume of the top 2 operators and bottom operators in terms of SPAM they sent greatly varies.

※ Info Bank, one of the BIZ-SMS operators, is a high-ranker in terms of text messages sent, but ranked 10th in terms of SPAM (0.6%). It is very capable of controlling SPAM.

Operator	SPAM volume	%
KT	1,532,830	10.0%
LG U+	1,319,739	8.6%
Other	1,837,431	11.9%
Total	4,690,000	30.5%

[Table 5] SPAM % by BIZ-SMS Operator
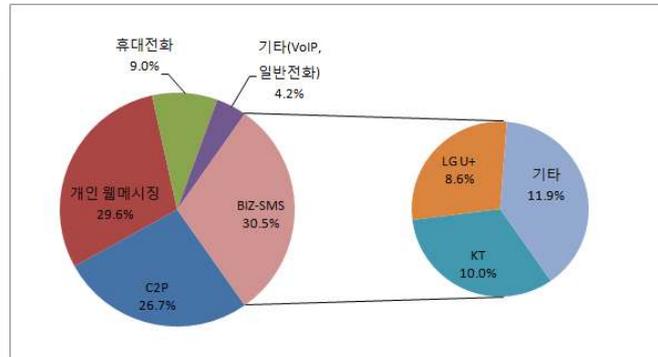
[Figure 3] % by BIZ-SMS Operator
cell phones
personal web messaging
C2P, BIZ-SMS, others (VoIP, general phones)
LG U+, KT, others

o After May 2012, SPAM was reduced drastically due to the government's regulatory policy to actively reduce adult content SPAM occurring at general numbers (02, 070, etc.) that were not previously regulated.
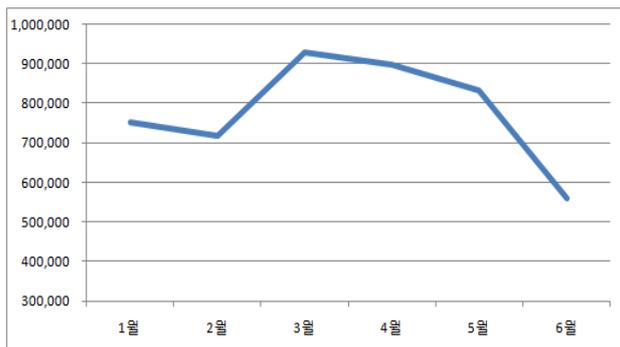
[Figure 4] SPAM volume sent by BIZ-SMS operators
January, February, March, April, May, June
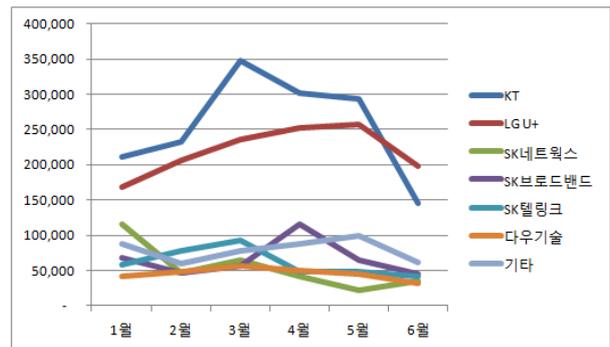
[Figure 5] Monthly SPAM volume sent by BIZ-SMS operators
January, February, March, April, May, June
SK Networks, SK Broadband, SK Telink, Daou Tech, Others

3.1.2.2 Bulk text message sending service - C2P Operator

o As the first C2P operator, KT began to enforce its own SPAM

policy for its resellers at the end of 2010, so SPAM declined throughout 2011, but then in the first half of 2012 it began to rise again.

o LG U+ began to provide service in earnest in early 2012, and the SPAM volume of other companies moved to LG U+, so SPAM volume greatly increased, but

- Thanks to LG U+'s regulatory policy and self-corrective efforts, e.g. canceling contracts with companies generating a great deal of SPAM, SPAM volume began to decrease rapidly in April 2012.

Operator	SPAM volume	%
KT	2,264,901	14.7%
LG U+	1,840,624	12.0%
Total	4,105,525	26.7%

[Total 6] C2P Operator SPAM volume
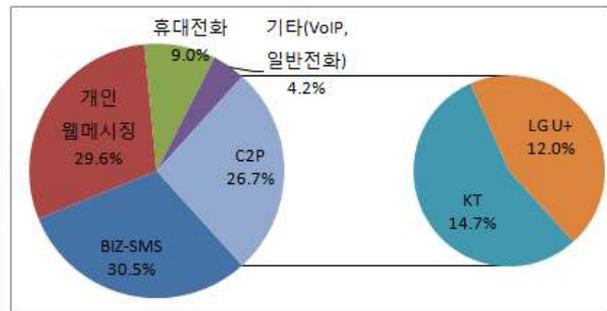
[Figure 6] % by C2P Operator
cell phones
personal web messaging
C2P, BIZ-SMS, others (VoIP, general phones)
LG U+. KT
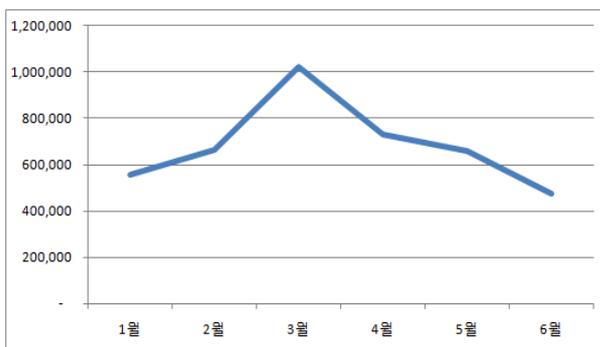
[Figure 7] SPAM volume sent by C2P Operator
January, February, March, April, May, June
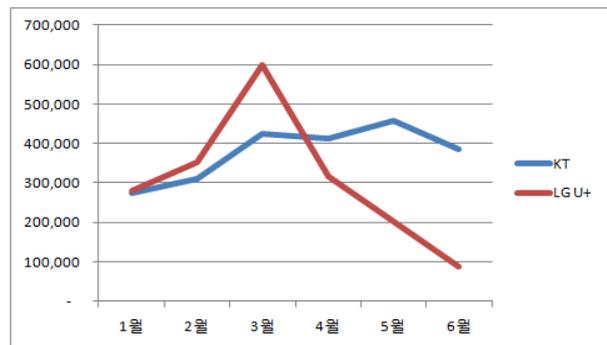
[Figure 8] Monthly SPAM volume sent by C2P Operator
January, February, March, April, May, June

3.1.2.3 Mobile network operators' personal web messaging service

o This is similar to a bulk SMS sending service in that SPAM is sent over the Internet, but SPAMMERS seems to have quickly moved over to personal web messaging services because they were not effectively regulated.

 - As the self-regulation of operators began in April 2012 in earnest, the SPAM volume dropped drastically.

[Figure 9] % by personal web messaging service provider

cell phones
personal web messaging
others (VoIP, general phones)
LG U+, Others

Operator	SPAM volume	%
LG U+	4,445,989	28.9%
Other	108,559	0.7%
Total	4,554,548	29.6%

[Table 7] SPAM volume of personal web messaging service providers
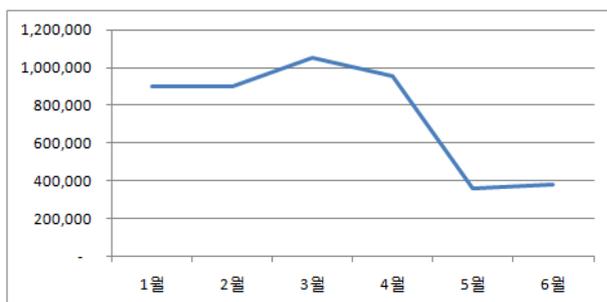
[Figure 10] Monthly SPAM volume sent by personal web messaging service provider
January, February, March, April, May, June

[Figure 11] Monthly SPAM volume sent by personal web messaging service providers by operator
January, February, March, April, May, June

3.1.2.4 Mobile network operators cell phone

o As regulatory policies such as limiting the number of text messages per day to 500 and reinforcing identification during subscription are continuously enforced, the SPAM volume sent

by cell phones (9.0%) remains relatively low.

※ As the % of SPAM sent by each of the 3 mobile network operators does not exceed 5, the rankings by operator are not disclosed.
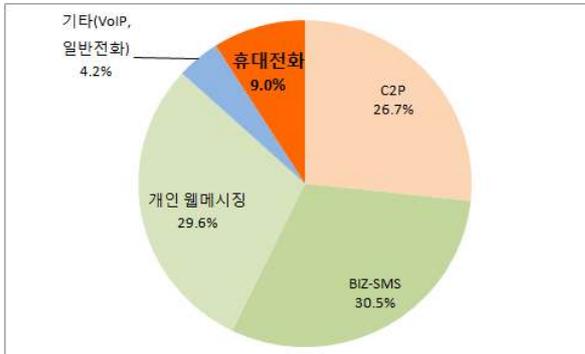
[Figure 12] % of cell phone SPAM out of total

Cell phones
Personal web messaging
Others (VoIP, general phones)
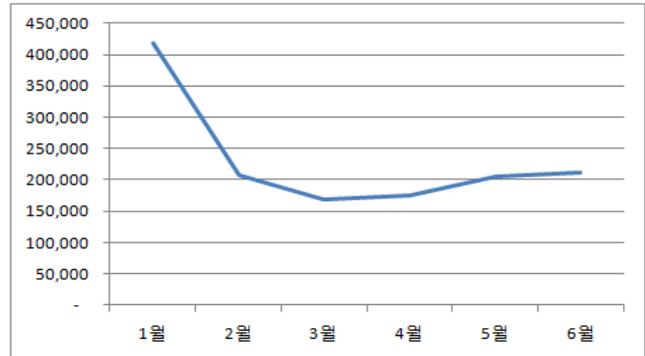
[Figure 13] Monthly SPAM sent by cell phones
January, February, March, April, May, June

3.2 Receiving network circulation status

o Analyzed information: Cell phone SPAM received per person

※ Most of the data came from top 3 mobile network operators, i.e. SKT, KT and LG U+.

o The received SPAM data was collected over a one-week period from 1,500 males and females aged between 12 and 59 from across the country.

※ The % of intelligent SPAM blocking service users (which greatly affecting the amount of received SPAM), of each mobile network operators was taken into consideration before the survey panel was recruited.

Classification	Received cell phone SPAM volume measurement method
Subjects	Cell phone users aged between 12 and 59
Period	7 days from June 11, 2012 - June 17, 2012
Area	Nationwide
No of samples	1,500 valid samples
Sampling	Quota sampling in consideration of gender, age, region and mobile network operators' market share
Sampling error	confidence interval 95%, error ±3%

[Table 8] Received cell phone SPAM volume measurement method

o The cell phone SMS SPAM received in the first half of 2012 is 0.26 for SKT, 0.25 for LG U+, and 0.21 for KT, and the average is 0.24 (excluding voice).

Operator	Daily average SMS SPAM received per person		
	Total	Subscribed to SPAM blocking service	Not subscribed to SPAM blocking service
SKT	**0.26**	0.11	0.34
LG U+	**0.25**	0.18	0.26
KT	**0.21**	0.14	0.28

[Table 9] Received SMS SPAM by mobile network operator

※ 「Intelligent SPAM blocking service[6]」 subscribers and non-subscribers were combined to measure the received SPAM volume.

- Status by SPAM type

Classification	Loans/financing	Gambling	Designated driving	Adult contents	Communications service subscription	Other
%	49.5%	18.1%	9.6%	7.7%	5.9%	9.2%

[Table 10] Status by SPAM type

o % subscription to mobile network operators' intelligent SPAM blocking service (as of June 2012)

Classification	KT	SKT	LG U+
Subscription rate	56.4%	38.9%	8.6%

[Table 11] Intelligent SPAM blocking service subscription rate by operator

※ To increase the subscription rate, KT and SKT set this service as a default for new subscribers.

4. e-mail SPAM circulation status measurement

4.1 Sending network circulation status

o Analyzed information: 12,720,000 cases

- SPAM detected by the e-mail SPAM trap operated by KISA from January 2012 ~ June 2012 which was originated in Korea

o Analysis results

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6) Intelligent SPAM blocking service: This service blocks SPAM by comprehensively analyzing the originating/terminating number, and contents/patterns in the process of transmission.

- SPAM origination (domestic/overseas)

※ It is easy to send e-mail SPAM from overseas to Korean users via the Internet network.

Classification	Sent volume	%
Domestic	12,723,726	11.4%
Overseas	98,683,272	88.6%

[Table 12] Sending network SPAM source
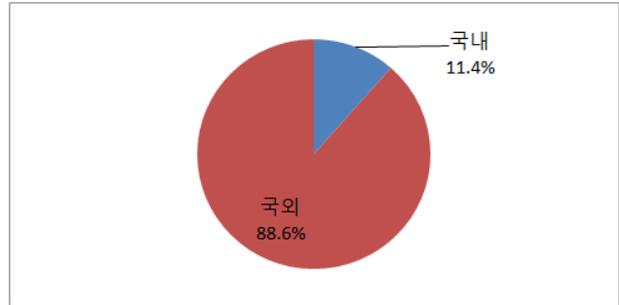
[Figure 14] % of sending network SPAM source Domestic/Overseas

- Domestic sending service status

※ As the network of the operators[7] having more subscribers has more PCs infected with malicious codes, there tends to be more SPAM as well.

Operator	SPAM volume	%
KT	4,903,856	38.5%
LG U+	3,437,318	27.0%
SKB	1,088,904	8.6%
Other	3,293,648	25.9%
Total	12,723,726	100%

[Table 13] SPAM volume by operator
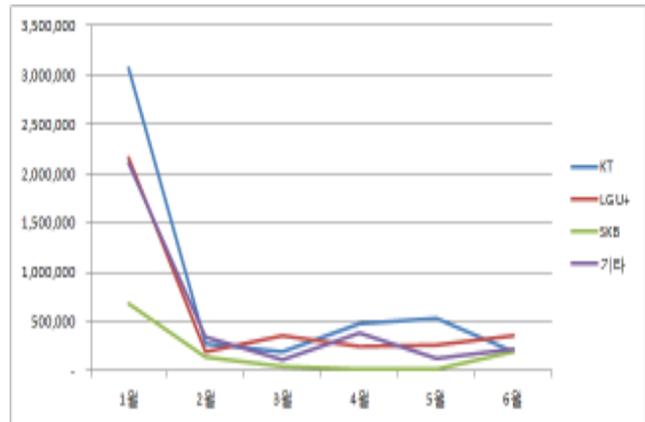
[Figure 15] Monthly SPAM volume by operator January, February, March, April, May, June Others

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7) The sending operators mentioned in 'e-mail SPAM circulation status' are Internet service providers used for sending SPAM.

4.2 Receiving network circulation status

o Analyzed information: e-mail SPAM received per person

※ Target operators were key domestic portal operators with many e-mail users like Naver, Daum and Nate.

o The received SPAM volume was measured from 1,500 males and females aged between 12 and 59 around the country over a period of one week.

Classification	Received e-mail SPAM volume measurement method
Subjects	e-mail users aged between 12 and 59
Period	7 days from June 11, 2012 - June 17, 2012
Area	Nationwide
No of samples	1,500 valid samples
Sampling	Quota sampling in consideration of the Internet user percentage by sex and age
Sampling error	Confidence interval 95%, error ±3%

[Table 14] Received e-mail SPAM volume measurement method

o The daily average e-mail SPAM received per person in the first half of 2012 was 1.64.

Name of company	No. of accounts	SPAM count	Daily average received SPAM per person (SPAM count/no. of accounts/7 days)
Daum	289	1,037	0.51
Naver	630	1,458	0.33
Nate	347	369	0.15

[Table 15] Received SPAM by operator

※ As the e-mail accounts currently used by the 1,500 people on the panel were collected, the number of accounts for each portal is not the same.

- Status by SPAM type

Classification	Adult contents	Gambling	Loans/financing	Other
%	30.5%	22.9%	1.2%	45.4%

[Table 16] Status by SPAM type

- SPAM source status (domestic/overseas)

※ It is estimated that more SPAM was sent from domestic sources than there are sending networks (domestic 11.4%) because the SPAM blocking solutions of

portals blocked SPAM sent from foreign PCs infected with botnet.

Classification	Received volume	%
Domestic	0.76	45.9%
Overseas	0.88	54.1%

[Table 17] Receiving network SPAM source status
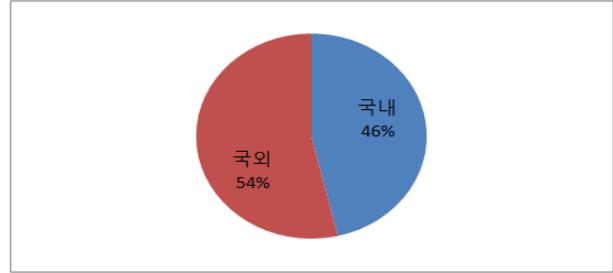
[Figure 16] % of receiving network SPAM source
Domestic/ Overseas

5. Analysis results

5.1 Cell phones

o The daily average number of SPAM reported in 2012 was reduced by 25.2% as compared to 2011 (115,000 → 86,000), and the daily average cell phone SMS SPAM received per person was decreased by 42.9% as compared to the first half of 2011 (0.42→0.24)

- It is believed that SPAM circulation status measurement and the reinforcement of operators' self-regulation of SPAM and government policies contributed to reduction of the SPAM volume.

Classification	2011	Jan. - June 2012	Remarks
Daily average SPAM reported	115,000 cases	86,000 cases	**down 25.2% from 2011**

[Table 18] Average reported SPAM per day

Classification	1st half of 2011	1st half of 2012	Remarks
Cell phone SMS SPAM received per person	0.42	0.24	**down 42.9% from the first half of 2011**

[Table 19] Daily average cell phone SMS SPAM received per person

o New services vulnerable to SPAM like personal web messaging service are appearing, and SPAM is quickly moving to these new services.

- However, improvement of the vulnerabilities to personal web messaging service greatly reduced SPAM, and the volume seems likely to decline in the 2nd-half circulation status survey as well.

※ Services, which have been strongly regulated like cell phones, maintained a relatively low SPAM volume.

o When it comes to advertising for adult contents and designated driving, it is impossible to see whether any SPAM was sent when the service contract is concluded or when text messages are

sent, and it is difficult to check whether there is any violation of the law. So the operator may have difficulty blocking them for themselves.

o The received SPAM volume survey showed that % subscription to mobile network operators' intelligent SPAM blocking service, which is proven to be effective in blocking SPAM (blocking 51% of SPAM on average) was 56.4% for KT, 38.9% for SKT and 8.6% for LG U+ as of June 2012.

- Operators with a low subscription rate must make efforts to increase the subscription rate by expanding the default subscription program, and enhance users' trust in SPAM blocking service by continuously improving its performance.

5.2 e-mail

o As far as e-mail SPAM sources are concerned, most SPAM is circulated through the networks of KT and LG U+, which have a high market share.

- To effectively block the e-mail SPAM sent from botnet[8], the "e-mail sending port switching"[9] policy will be enforced.

o Continuous efforts to upgrade the filtering level of portal operators are also needed.

6. Future policies

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8) botnet: the aggregate of zombie PCs that are infected by malicious codes and remotely controlled by others in spite of the owners

9) e-mail sending port switching: a policy for changing the e-mail sending port from No. 25 (not having sender authentication) to No. 587 (having sender authentication) to prevent botnet-based SPAM

◼ **Cell phone**

▷ **(Subscription)** To prevent subscription to services with the Internet to send SPAM (illegal use of others' names, etc.), supervision of agents and shops will be reinforced.

▷ **(Sending)** A similar level of policy for suppressing the sending of SPAM, like limiting the origination volume, will be applied to different services to prevent SPAM from moving from service to service.

▷ **(Receiving)** Improving the three mobile network operators' ability to block SPAM by increasing % subscription to the intelligent SPAM blocking service and periodically measuring performance

◼ **e-mail**

▷ **(Sending)** Implement the "e-mail sending port switching" policy early to effectively block SPAM from the botnet.

▷ **(Receiving)** Improve the ability to respond to SPAM by sharing SPAM data with portal operators.

◼ **Comprehensive measures**

▷ The **'implementation of the comprehensive SPAM monitoring system'** will secure information on the SPAM actually in circulation on the network, and make it possible to efficiently regulate SPAM by enforcing self-regulation, estimating the actual circulation volume, and effectively respond to SPAM by better understanding SPAM.