

Applications and market analysis on high speed RFID with a large memory

Chan-Won Park*, Eok-Soo Han**, Yeong-Wha Sawng***, Ji-Hoon Kim****
 *, **ETRI, Korea, ***Konkuk Univ., Korea, ****Chungnam National Univ, Korea

E-mail : cwp@etri.re.kr*, eshan@etri.re.kr**, sawng@konkuk.ac.kr***, jihoonkim@cnu.ac.kr****

1. Introduction

Since the RFID technology with a large memory is one of application areas which can create new business value, leading countries such as USA, Japan are developing the product. In addition, the research project for having a more fast speed is being fulfilled by Korea government. In this research, we limit the market range of new RFID technology to market for UHF passive RFID tag, reader, and system with high speed recognition and the high capacity of memory. In addition, we grasp its potential market, and estimate market scale, growth, share in major types of business. Based on this investigation, we analyze the economic impact and suggest market possibility for RFID service

LF passive tag (125/135KHz)	LF passive reader (125/135KHz)	Network/ Application System
HF passive tag (13.56MHz)	HF passive reader (13.56MHz)	
VHF active tag (433MHz)	VHF active reader (433MHz)	
UHF passive tag (840~960 MHz)	UHF passive reader (840~960 MHz)	
MW active tag (2.45 GHz)	MW active reader (2.45 GHz)	
High speed RFID market with large memory		

Figure 1. Market range for RFID

2. Case of Application

As we see the case of application for UHF passive RFID in table 1, UHF passive RFID accounts for 28 percent of overall market for RFID. Of these, it is shown that the USA has the largest case of application as 475. UHF passive RFID is available for various areas such as flight, car, shipbuilding, national defense, nuclear energy, and healthcare, and its market demands are expected to increase more and more.

<Table 1> Application of UHF passive RFID in leading countries (Unit : piece)

Frequency band	Worldwide	USA	China
Chipless (2Hz-100GHz)	18	11	0
LF(125-135KHz)	342	63	10
HF(13.56MHz)	1247	274	116
315-333MHz	58	16	0
433MHz	279	66	9
UHF(868-960MHz)	859	475	52
Microwave(2.45GHz)	196	92	8
Microwave(5.8GHz)	5	1	1
Ultra Wide Band(UWB)	34	13	0
Multiple frequencies	10	2	0

* Source : Made based on IDTechEx(2013.3), RFID Forecasts, Players and Opportunities 2012-2011

<Table 2> Application of UHF passive RFID in individual application field

Field	Application
Flight	• Location tracing and management for baggage
Car	• Location tracing for the parts of an automobile
Shipbuilding	• Location tracing for people in ship to alert danger • Management for baggage, information processing for container cargo
National defense	• Asset management for military by attaching UHF metallic RFID tag
Nuclear energy	• Tracking management for raw materials
Retail logistics	• Inventory management for consumer goods
Etc. (healthcare)	• Tracking management for medicine using UHF RFID system

* Source : Korea Association of RFID USN convergence, 2013. 2.

3. Market analysis

3.1. Market prospect

Market scale of RFID technology with high speed recognition and high capacity in world is expected to grow rapidly, averaging 41.8% a year, for example, from 2 hundred million dollars in 2015 to 68 hundred million dollars in 2025. In market scales for individual application field, retail and logistics account for the largest portion as 42 hundred million dollars, and the demands for flight and shipbuilding are predicted to increase in order.

Its market scale in Korea is expected to rise significantly, averaging 55.6% a year, for example, from 15 billion won in 2015 to 1,250 billion won in 2025. Worldwide market share of Korea for new RFID technology is predicted to increase from 7.3% in 2015 to 18.4% in 2025. In market scales for individual application field, retail and logistics are expected to account for the largest portion as 3,473 hundred million won in 2025, and the demands for national defense, car, and shipbuilding are predicted to expand market size in order.

3.2. Economical industry ripple effect

3.2.1 Industry ripple effect in an individual product

The effect on production inducement of RFID in individual product is expected to increase from 256 hundred million won in 2015 to 2,060 billion won in 2025. The effect on added value induction of RFID in individual product is expected to increase from 82 hundred million won in 2015 to 790 billion won in 2025. The effect on employment induction of RFID in individual product is expected to increase from 85 positions in 2015 to 8,500 positions in 2025.

<Table 3> The effect on production inducement of RFID in individual product (Unit : hundred million won)

Division	'15	'16	'17	'18	'19	'20	'21	'22	'23	'24	'25
Tag	165	293	546	830	1,236	1,805	2,617	3,297	4,451	5,875	7,667
Reader	63	141	271	382	517	796	1,290	2,000	3,099	4,649	6,969
System	28	70	136	269	403	609	932	1,472	2,414	3,815	6,019
Total	256	504	952	1,480	2,156	3,210	4,838	6,769	9,964	14,339	20,655

* Source : Using Production inducement coefficients based on Bank of Korea, 2013. 7.

<Table 4> The effect on added value induction of RFID in individual product (Unit : hundred million won)

Division	'15	'16	'17	'18	'19	'20	'21	'22	'23	'24	'25
Tag	47	84	156	237	353	516	748	943	1,272	1,680	2,192
Reader	18	40	77	109	148	228	369	572	886	1,329	1,992
System	17	43	84	166	249	377	576	910	1,493	2,359	3,723
Total	82	167	317	513	751	1,120	1,693	2,425	3,652	5,368	7,907

* Source : Using Value added inducement coefficients based on Bank of Korea, 2013. 7.

<Table 5> The effect on employment induction of RFID in individual product (Unit : person)

Division	'15	'16	'17	'18	'19	'20	'21	'22	'23	'24	'25
Tag	47	83	154	234	349	509	738	930	1,255	1,657	2,162
Reader	18	40	76	108	146	225	364	564	874	1,311	1,965
System	20	51	99	196	294	443	679	1,072	1,758	2,778	4,384
Total	85	173	329	537	788	1,177	1,780	2,565	3,887	5,745	8,510

* Source : Using coefficients of employment based on Bank of Korea, 2013. 7.

3.2.2 Industry ripple effect in an application part

Retail and logistics are expected to achieve the largest effect on production inducement, for example, 5,736 hundred million won in 2025. Retail and logistics are expected to achieve the largest effect on added value induction, for example, 2,196 hundred million won in 2025. Retail and logistics are expected to achieve the largest effect on employment induction, for example, 2,363 positions in 2025.

<Table 6> The effect on production inducement of RFID in individual application field (Unit : hundred million won)

Division	'15	'16	'17	'18	'19	'20	'21	'22	'23	'24	'25
Flight	40	79	149	241	360	504	712	941	1,302	1,814	2,525
Car	37	75	145	222	317	449	646	907	1,331	1,919	2,770
Shipbuilding	40	73	130	198	282	430	664	941	1,412	1,936	2,656
National defense	42	82	156	244	358	526	783	1,076	1,556	2,258	3,277
Nuclear energy	28	54	102	153	216	318	471	663	985	1,378	1,924
Retail logistics	41	87	177	288	440	706	1,143	1,665	2,543	3,819	5,736
etc	29	53	93	135	183	276	419	575	834	1,215	1,768

* Source : Using Production inducement coefficients based on Bank of Korea, 2013. 7.

<Table 7> The effect on added value induction of RFID in individual application field (Unit : hundred million won)

Division	'15	'16	'17	'18	'19	'20	'21	'22	'23	'24	'25
Flight	13	26	50	83	125	176	249	337	477	679	967
Car	12	25	48	77	110	157	226	325	488	718	1,060
Shipbuilding	13	24	43	69	98	150	232	337	518	725	1,017
National defense	13	27	52	85	125	184	274	386	570	845	1,254
Nuclear energy	9	18	34	53	75	111	165	238	361	516	736
Retail logistics	13	29	59	100	153	246	400	596	932	1,430	2,196
etc	9	18	31	47	64	96	147	206	306	455	677

* Source : Using Value added inducement coefficients based on Bank of Korea, 2013. 7.

<Table 8> The effect on employment induction of RFID in individual application field (Unit : person)

Division	'15	'16	'17	'18	'19	'20	'21	'22	'23	'24	'25
Flight	13	27	52	87	132	185	262	357	508	727	1,040
Car	12	26	50	81	116	165	238	344	519	769	1,141
Shipbuilding	13	25	45	72	103	158	244	357	551	776	1,094
National defense	14	28	54	89	131	193	288	408	607	905	1,350
Nuclear energy	9	19	35	56	79	117	173	251	384	552	793
Retail logistics	14	30	61	105	161	259	421	631	992	1,530	2,363
etc	10	18	32	49	67	101	154	218	325	487	728

* Source : Using coefficients of employment based on Bank of Korea, 2013. 7.

4. Conclusion

Market for the high speed RFID with a large memory is expected to grow rapidly, averaging 41.8% a year in worldwide market and 55.6% a year in Korea market. In October 2013, we took Delphi for analyzing market possibility and economic impact. Our analysis found that the effect on production inducement in individual product is predicted to be the largest in market for tag, and the next is in market for reader and in market for system in order. On the other hand, the effect on added value induction and employment induction in individual product is expected to be the largest in market for system, and the next is in market for tag and in market for reader in order. In individual application field, effects on production inducement, added value induction, and employment induction are predicted to be the largest in retail and logistics, and the next is in national defense, and car in order. Market for high speed RFID with large memory is expected to rise in earnest from 2015 with market for retail and logistics tag as main market.

5. References

- [1] IDTechEx, "RFID Forecasts, Players and Opportunities 2011-2012", 2013.
- [2] Korea Association of RFID/USN convergence, 2013. 2.
- [3] Value added inducement coefficients, Bank of Korea, 2013. 7.