

**STEVE MILES:** So we're very privileged to have people who've flown from as far away in the world as you can get from here to here to be with us today. And I'm going to load the latest version of the presentation. Dr. Zhang will be our first speaker. He is professor and director of the Department of High Technology, Development, and Industrialization at the Ministry of Science and Technology in China, and is one of the lead regulators for RFID. We've heard here throughout two days in many cases from companies looking at how do we integrate RFID? What do we want to do with RFID in our companies? And so he's got an even larger beast to wrestle with. So we're very privileged to have him with us.

Does anybody know the password on this machine?

[LAUGHTER]

**AUDIENCE:** Password is the same as the username. ABRedwood. And I think the cable should be plugged in on the right side.

**STEVE MILES:** Thank you.

Presentation at MIT.

**ZHIWEN** Thank you.

**ZHANG:**

**STEVE MILES:** Dr. Zhang.

**ZHIWEN** Thank you, Steve. I would like to take this opportunity to say several words for RFID in China. So I think a lot of  
**ZHANG:** people pay more attention to our country how to use RFID. So I think this is for several reasons. One is that China has the largest population in the world. So, also--

This is an old version. This is the old version. Not the new one.

**STEVE MILES:** Oh, this is the old version? OK. We have a new version.

**ZHIWEN** So I think.

**ZHANG:**

**STEVE MILES:** OK.

**ZHIWEN** Just open it. Just open it. Just open it. Yeah.

**ZHANG:**

At first I want to introduce to some of the mission statement for our ministry. Our ministry is a science and technology ministry and therefore unto research and set forth and macro-strategic for science and technology development. As well as the gathering of policies and regulations for science and technology. And also to conduct research on key issues related to the promotion of economic and social development by the science and technology. Also to research and determine major development and priority areas for science and technology development. And also to promote the building of the National Science and Technology innovation system, and improve the National Science and Technology innovation capacity.

So I think a lot of people look at how China developed RFID application. Because this is for several reasons. The first reason is it is the largest population and the largest consumer market in the world. So the second reason is that it has the manufacturing center of the world. And also related for the biggest company in the world.

So how to use the RFID is also not only related with the Chinese company, but also for the foreign big company. And also IT applications is just at the beginning with much more potential to be explored.

This picture is RFID market in 2004. And RFID technology and applications have promoted development in the last two years in China. And recently, everybody have a new ID use the RFID. So in total, the market is about \$150 million US.

The potential application in China market, I think maybe in several areas. One is security and safety. And also it's very important the area is anti-counterfeit. For example, some of the health care, tobacco, and [INAUDIBLE]. And also there's an application for RFID maybe in the logistics. And also for the manufacturing process management. And also for the e-ticket system, such as the subway ticket. We already use it in Shanghai. And also we use it in all the games in 2008 and Shanghai [INAUDIBLE] season in 2010.

And also we are developing this RFID using the vehicle management system. When the vehicle pass the gate, they can show you the picture and the color and you can find it. And also, we use it in the supply chain management. Harbor use the RFID. So this is a container tracking. This is located in Shanghai. And recently we are using the RFID to tag in Shanghai International Harbor. It connects with another very important harbor in Yantai, Shangdong province. As of now, they already have shipped more than 7,000 containers. They are still doing the demo.

Also, we are already using it in the fair works management. Because it is dangerous. Always take place some accident. And also we use the RFID in the dangerous case managements. So we put the tag in the tanks.

And also we use RFID to management animal and the foods. And also in Shanghai, we put the tag in the ear of the dog so we can find it.

And also we use it in the coal miner location and the tracking. So also in China, accidents take place with frequency in the mine. So how to catch time to save the life? This is very important. So I think I just look at a TV. North Korea also take place of the accident. So I think this is very popular in the near future. Applications of this technology to save the life.

And we have already gave the pilot project to the post office. This year, China post office use the tag. They put it into the bags for the EMS. This is how Shanghai post office used the RFID.

And this is a manufacturing process management for the products [INAUDIBLE] to manage each product point. Can control the product's quality.

This is a China RFID industry policy. The most important area in China is the National development planning and the high tech area for the coming years. So this is a big program. And also make the RFID technology strategy and policy. Funding RFID application to promote the RFID technology and industry development.

And our ministry and also constitutes the China RFID technology white paper. Worked together with the other 14 ministry or departments. Because this kind of application related with the different ministry or different department, so we must work with them together to make the policy and make some standard.

Also research and establish architecture for the China RFID standard, which connect with the international standard and accommodate the China surrounding. And the status specific RFID program in national high tech R&D program. This 836 program established in March 1986 is reviewed by the very famous leader, Deng Xiaoping to speed up the progress of RFID research, application, and industrialization, and set up a RFID committee to make the National RFID research plan and to fund RFID research and to fund the RFID application and help a local government to set up RFID research, technology, and industrial zone.

Also we are paying more attention, research our standard. I think this standard can restructure for the several direction the one is the product's coding standards. And also for the RFID communication and protocol. And also RFID products standard and equipment standard and also for the application standard. For example, if we want to use in the post office, we must make sure on which position you can put on and what the frequency you want to use it. And also for the different industrial area we must make decision, what kind of a frequency you can use it. For example, for the medicine pills. So, where you can put it in the bottle. So we must make a lot of application standard. This is very important, I think.

And also, we established the testing and the certification center. We set up the National testing center on RFID technology. So there we are testing the products' performance and also we evaluate the RFID products and simulate application environments. And as I said, the applications.

For example, I said that we used in the coal miner, the tracking system. Maybe we want to use the active tech. In the normal surrounding, maybe they can transfer the information more than 100 meter. But when take place the accident, the coal will fall down. So in this kind of situation, how long can they trace for the information? So this must be simulated in the lab.

Also we pay more attention to the tags. We set up some research project. For example, we research the UHF chips and UHF container design. And also tech integrate with the other sensor technology. And also, pay more attention to packaging. And in the reader, we are also researching some UHF reader and the UHF reader on design. And also active RFID technology.

For the research network architecture and product name, service system for supply chain management. And also we support the planning to set up the local products name service system on a China domestic supply chain environment, which could map the system and synchronize the data with the other name system. For example, the OS system.

So carry out the international collaboration with all kind of organizations, such as the standard committee and the Research Academy, also for some big company or some foreign government. So I think we open the door to want cooperation with the different partner. Basically, they are willing cooperation. So I think this is a big issue. Not only useful for China to develop technology. And also I think must have cooperation with every organization or every country that can do more best to reduce the cost and also develop the next generation of the technology. Make the chips more cheap. And also for the tags to reduce the cost. So I think this is a big issue. So we must cooperate with each other. Thanks.

**STEVE MILES:** Thank you very much, Dr. Zhang. And now for a different perspective from Europe, we're very privileged to have Peter Friess, who is the DG Information Society and Media Network And Communications Technologies ICT For Enterprise Networking director for Europe. And is actually one of the principal funders of some programs that you've already heard about, including the Promise Program that was introduced yesterday. Thank you.

**PETER FRIESS:** I put it here, or? It's fine? OK. Let's find this.

Perfect. Thanks very much. Good afternoon, ladies and gentlemen. Thanks a lot to Steve and John to have the opportunity to talk today on behalf of the European Commission. It was quite a long journey, anyhow, to come over. For me the last time I've been in the States was 26 years ago. And then I have been to California, so it's the first time to be the New England states.

Well, I would like to present you briefly the European perspective on RFID. I'm working in public administration at the European Commission. I'm sure that you're familiar how the Commission works. We are a supranational body. And we have no ministers, but we have a lot of director generals. And each director general has a commissioner.

And yesterday, Daniel told about the 3D models on pedigree. This reminded me quite well of our work because we always 25 member states. And depending on the subject, we have a very-- let me say, good, direct power or we are more working on the basis of being a facilitator. And for RFID, I think it's between those.

I'm working on research administration, which means that basically the European Commission is not executing research on its own apart from some specialized institutes. We are always commissioning in the frame of some framework programs research. And what we try always is of course in terms of speeding up Europe's competence and competitiveness to facilitate the right research issues at the same time to ensure that the results of the research are going to be taken up afterwards. And there, quite often Europe has some weaknesses.

So basically what we try to do as I did yesterday and today is to learn and to see where should we proceed in terms of the future of RFID research. So I'm juggling around about an inter-service working group we established last year on RFID. On international collaboration, European research and RFID topics, of RFID discussion as I see it in Europe today and next steps.

What happens quite often is in public administration and depending on the application cases, a topic pops up in different administrations. And, for example, there is the topic on standardization RFID and frequency. It's about customs issue. It's about enterprise cooperation, supply chain management. And then we discovered actually last year that we should realign our forces and should go for a coherent approach.

So actually [INAUDIBLE] director general sentenced them to try to work together. And actually my head of unit is the coordinator and my colleague Fredericks and myself, we are managing this inter-service working group, which is quite promising and seems to be a good opportunity, a good action for Europe.

Actually, what we want to do is, of course, go for horizontal coordination of activities of RFID in Europe, try to cooperate with national authorities and standardization bodies as it has to do a lot with aligning, I would say, efforts and standards. And provision of ground for international cooperation.

Of course, we see that Europe and all the big economic zones, tries to be one of the leading ones. But still, as RFID is a global issue, we have to always go for global cooperation. And I give you some examples. We had quite some context with [INAUDIBLE] from the Department of Commerce. There was recently the US information society dialogue and one major issue was RFID. There are informal discussions since last year. And there was attendance for us on a Department of Commerce workshop.

Last week, our Commissioner Redding visited China. So there was a contact with the European ministry-- sorry, with the China Ministry of Science and Technology. We cooperate with the OECD, and we have as well a transatlantic consumer dialogue.

What we normally do in Europe is apart from National Research programs, we have so-called multi-annual framework programs which are like some big machinery that based on extensive stakeholder discussion, consultation, we're going to develop specific research subjects which then are updated each two years. And as you can see, we do quite a lot on RFID research since 10 years.

Difference between project and funding is that this is always a collaborative funding. So we normally ask the participants, which means research institutes and companies, to contribute up to 50% of the project budget to carry out the work. This figure gives you only an idea on European level. And a part of this I think you can easily double this. Is that we have all of course in different member states, National Research. And what to tries since some years is to go for so-called European research area, which means that we try to coordinate better, European and nationwide research. And I think it starts to work.

Just to give it a glance on the topics we cover, it's a very colorful pie, and it shows actually that it goes really from supply chain management, government, justice, liberty, and freedom-- I'm just picking up some smart devices. Goes into nanotechnology. So it's really a big bundle and a bunch of a diverse subject, all dealing around RFID.

What you see today on typical topics in Europe is in terms of the application areas. We see supply chain logistics on the forefront. We see product life, after sale service, intelligent maintenance. We see health is a very important issue. And to some extent as well, inclusion. Which means how can we help our older and disabled people-- people with additional needs to participate in a modern society. In particular as you notice, that Europe always try or has given a special emphasis on so-called social coherence and inclusion.

In terms of research and development it's basically about take away the hardware. It's about smart sensors. It's about software applications, about nanomaterials. Interoperability and standards. Basically frequencies, data structures, and tag interrogation, and particularly on this in terms of frequency of course, we have to harmonize frequency spectrums for RFID usage in 25 member states, and there we are on good track.

We gave a particular emphasis on RFID governance, which means rules and procedures, computation, robustness in terms of object naming services and discovery services. We see this as a very important issue and we want, of course, to have let me say incumbent power. We would like to go to for a mixture between an open and competitive approach.

Privacy and data protection is of course high on the political agenda. And as well, all the security issues around RFID. What we see as well, RPI free standards, intellectual property rights, international trade, health, environment, identity theft, ethical aspects I think are going to become very important. And what we see as well is label practices. And so we try to have a look that usage of RFID might have some impact on not only negative but might have impact of course on labor forces. And perhaps we do have to act as well besides some technological development to provide some measures.

I give you here some typical examples of what we try to do in the European research on RFID. And I'm proud that in two projects, we have auto D-labs included. For example, Professor Fleisher's participating as well I think. It's even the MIT. And as part of the project, which is EPCglobal and CS1 organizations are going to participate.

So what you see for example apart from supply chain management, it's really about using RFID to go for a, let me say, a better customer service apart from just providing the right product, the right time and the right shelf or display. It's really to say, how could we use data to save resources and improve customer service?

I think RFID solutions for global environment purchase for you to say that in the seven application sectors from some sort of European perspective in a global wide frame, the CS1 organizations would like to drive the roll out of EPCglobal.

Yesterday, we talked as well about on anti-counter-fitting solutions. That's very important. And for example, another important issue is the quality of food. Traceability of livestock.

There was some scandal on meat some years ago. So there's some sort of sensibility and awareness in Europe to have good food and life quality. Perhaps what you see as well, it's not only that we see RFID in itself.

We try to see it in a broader context, which is apart from the saying it's internet of things, that we say, tomorrow the world will be networked and consisting of a lot of intelligent products and objective. In this case, of course, we have to go for different business models, different development processes, new ways of cooperation of suppliers and after sale service providers. I think it's about a very robust and safe IT. Infrastructure is the network will be the major backbone to facilitate the existence of all these intelligent objectives. And I think, of course, it's how in a world of increasing complexity, where and how we should use intelligent machines to handle all the data and information. I think it would be more and more difficult for human beings to cope with the increasing amount of data and information.

What we see this year is very important from European perspective as far as RFID is concerned. We're going to shape the next framework program, the FP7, which is going to start in 2007.

For some role, we try to provide orientation for stakeholders. We talked a lot to Intel, EPCglobal, various consumer organizations. And apart from the idea that there is or is not the need for some regulations, we see that quite often it's a question of orientation. Saying what would be a good practice or what should we conclude to go ahead?

And for this to try to carry out as part of a public consultation, five important workshops where we try to invite relevant stakeholders to come up with ideas. How we should go on? What should be-- in terms of regulation as well in terms of solutions, definitions, what should be a good way for Europe to go forward in the balance between being competitive and at the same time try to stick to European values as we try always to carry them on.

As I said as well, I think at the end of the year, we could have some ideas about political action in order to drive the usage of RFID.

I would like to invite you, if you are anyhow in Europe to try to come over. We're going to have two important workshops soon. One is called from RFID. The internet of things. It's more about sensor networks and I just discussed yesterday. So I would invite you to come over to participate in this workshop.

Or, one week earlier, it's the slightly enhanced perspective. It's about imminent intelligent technologies to enhance the product lifecycle, which goes more towards the idea of networked and intelligent objectives and further research needs. And of course we tried to take this to get the ideas and to follow up the next work programs, which then of course, later on will lead to call for tenders. And then of course, we would like to invite you to participate.

Last word to say, it's basically the European Research, but there are a lot of mechanisms to going for international cooperation with Asia, China, and the US. OK. Thanks very much.

**STEVE MILES:** Thank you very much. Our next speaker is a colleague from the auto eyed labs that ICU in Seoul, Korea. His name is Dai Young Kim. His talk is on the evolvable network of tiny sensors, otherwise known as ANTS, and the Hendra Mountain Disaster Management program. Which we gather is one of the flagship programs in Korea.

**DAI YOUNG KIM:** Yeah. Thank you.

Good afternoon. First of all, I want to thank also, Boston. Boston gave me a gift yesterday. It's a cold. I just got a cold. My ordinary voice is much worse than this. Thank you, Boston.

My topic is a little different from original RFID. I'm more interested in all the sensor network. And so actually the ANTS is the product I have carried out the last four years. And the ANTS aimed for some public sensor network.

In Korea, we would like to deploy sensor network in the nation like the internet. Internet is now worldwide, right? So that's a public sensor network. Is our public sensor network we can let the companies and government, the organization can match the sensor information. We need some standardization of sensor network. That's the public sensor network.

Also, there are another research topic, the EPC sensor network. Actually, you already know that the EPC [INAUDIBLE] already planed to develop EP Class two, three, four, and five. Actually, class four tech is ad hoc active tech. That's a very similar to the sensor network. So actually, this is not a new topic. So this is a reserved topic. So I'd like to propose to research more on EP sensor network.

This is the content that I would like to talk today. First of all is the ubiquitous sensor network. That's some new terminology. Actually, this was named by the minister of Information and Communications in Korea. He is Doctor Zin. He's a former CEO of Samsung Electronics.

I would like to define ubiquitousness as network first. And then ANTs. And also EP sensor network will be described. Ubiquitous sensor network actually includes passive, autopilot tag and active tag and also some sensor tags and the sensor network.

So actually, at least we conceived four different types of tag. The first one is EPC, the passive RFID network. As you know, tags, readers, and all bunches of the efficient network middlewares are for the RFID network architect. And the second one is active tags. We use a battery to lengthen the radial ranges. This is some examples from the company [INAUDIBLE]. They're using UHF-- we can achieve more than 100 meters of a radial range.

That's active tag. And this other one is smart active variable sensor stack. Here, we put some batteries and also sensors in very thin stack. So that's a smart active variables. They're also semi smart active variables and smart active variables in this type.

And a final one is the sensor network. The sensor network is-- that go with essential node. And each essential node has a microcontroller. So it has computation capabilities and also active wireless communication capability and lots of different types of sensors. If they are deployed, then the software configured.

They form an ad hoc network, right? So we can cover some large areas with a sensor network. So far, you know, there were the RFID researching community, development community, and also there are many people working in sensor network areas. Very, you know, the hot topics.

So I think wishing the RFID people and sensor network people should be together and then bind the different or the business-- types of a business model. So ubiquitous sensor network, we defined-- actually, you can see in the right-hand side, we call it [INAUDIBLE] on the convergence network. That's the high speed internet.

It also includes the cell phone networks and DMV's network. That's some kind of legacy network. We would like to include [INAUDIBLE] ID active tags, and all sensor tags and sensor network. And then [INAUDIBLE] make it as a [INAUDIBLE] infrastructure. That's a ubiquitous sensor network.

So [INAUDIBLE] yesterday, the Korean government has some vision, like IT839. Actually, the minister's car plate number is A390, OK. And the vice minister-- can we guess-- is A391, something like that. So the government, they emphasize this IT839 strategy.

And we said [INAUDIBLE] infrastructure, one is a broadband convergence network, and the second one is this ubiquitous sensor network, including those passive RFID active tags, sensor tags, and sensor network. And then the last one is IP version six. So that's some public infrastructure we would like to build in Korea.

I would like to introduce my current project. That's for the public sensor networks, you know. Sensor networks, as I said, are very-- the popular, the areas, and there are many people that are working on it. When I started this project four years ago, I set some steam. That's a evolvability, you know.



I envision that, in the future, sensor network will also populate the globe, like, currently, internet does today. So the sensor network-- there will be many, you know, the sensor nodes-- like, there will be many RFID tags in the world. So the lifetime of a sensor network will be also very long, 5 years, 10 years, 20 years for nodes, right?

So after they are deployed, then they will evolve, you know, for example, the mission is changed, so we have to update the mission. Or some network prot-- even the network protocols, in some, the key components also can be changed. So all the components of a sensor network from hardware operating system and network protocols, even some location sensing protocols should have a capability over some evolvability.

So to do that, we have developed the hardware and software platform. You know, those are hardwares and softwares. Maybe, similarly, if you see [INAUDIBLE] for tag may have this kind of a software inside. From the bottom-- actually, we have four types of hardwares.

The H1 is a very small sensor node. It can be attached to the switches or some light, you know. And H2 is more [INAUDIBLE] the sensor nodes, it's very similar to the [INAUDIBLE] 3s. And H3s, actually, [INAUDIBLE], the sensor node, it has sensors like CCD cameras and something like that.

And also, it can have some image processing capability inside. And H4 is some base station and gateway to the legacy network. It can be compared to the RFID reader in our efficient network. Of all the hardware layers, we have operating systems and several different types of network stack, including MACs and net layers, and also securities and time synchronization protocols, and also location sensing algorithms and power management and also some middlewares.

That's of the platforms we have. Using this platform, we have prototyped some systems, like some military reconnaissance system using manned helicopters. And also, you use the sensor network in the greenhouse, something like that. This is the current project, what I'm carrying out in Korea.

This Korea-- actually, this is South Korea. And then in southernmost area, we have some big, a fantastic island. It is called Treasure Island. We have the highest mountain in Treasure Island in Korea. It's almost two kilometers high. Now we are deploying sensor networks in the trail over this mountain, [INAUDIBLE] Mountain.

Actually, it has a fortress, among four, which was two. One is 4.7 kilometers long. The other one is 3.21 kilometers long. So we deploy sensors every 100 meters-- in some areas, every 250 meters. And then we collected the weather information in real time.

And then we actually, that collected information will be forwarded to my university. Actually, it's 500 kilometers away from this mountain. And then this collective information is going to be delivered to some climbers-- a climber who carries a cell phone. OK, so they can browse the weather information in the [INAUDIBLE], you know.

I actually-- because this is two kilometers high mountain, the weather varies a lot. When we go to the mountain to test, in the circuit, we see the mountain. Then it looks like raining. And then I ask a student to buy a raincoat, and I climb. Then-- at that time, actually, my face and arm are all burned, you know, so the weather is very varying.

And even, I arrive at peak. And then I saw people wet. They took another, you know. So this is very important for the climate. So this is one of our sensor network projects. So this is the pictures I have taken in the trial. And this is currently installed in the mountain. Actually, still we are in the development and the testing.

And so that's for the public ubiquitous sensor network. Actually, I'm the chair of Korean National Standards Committee for the public ubiquitous sensor network, you know. So we are trying to standardize our network protocols and also network management protocol and something like that.

And then, actually, we joined [INAUDIBLE] last April. And then we learn the RFID stuffs. And then there are also very interesting topics here, you know. Actually, this is maybe thrown by [INAUDIBLE]. So [INAUDIBLE] have the three different research, the categories, from bottom, RF and chip design, including EPC class 1, 2, 3, 4, and 5.

And networking and [INAUDIBLE], and business and application-- also, the privacy and security. Actually, we have interest in EPC class four. OK, so maybe just class one, it is a gentle air interface. Three may use the same interface, air interface. Three-- actually, I don't know. Maybe four-- four, air especially with changes.

We need a map protocol, and also we need [INAUDIBLE] protocol. So we have [INAUDIBLE]. And we also analyzed the sensor-- efficient network middlewares. To include-- OK, sorry. To include sensor tags and the sensor network, you know-- also the middlewares maybe should be changed, modified, and added, and something like that.

For example, [INAUDIBLE] and the [INAUDIBLE] protocol, it has some filtering capabilities, right? So it can filter out some specific EPC code. Same, the project for if we include sensors, then we can also filtering out some data, which has a sense of value within some ranges, something like that.

So filtering, also EPC IS repository-- you have to accommodate the sensor information-- and EPC IS discovery. You also have to use the sensor of value for the discovery, something like that. So I think this is also a very great challenge, you know. So this is the proposal I'd like to propose in this EPCglobal community. OK, thank you very much.

[APPLAUSE]

**STEVE MILES:** So by the way, the title of this session is "Beyond the Supply Chain," right? So we talked about some of the range of applications down into the coal mines in China and then in Europe and up in the mountains of Hanaro. And now we're privileged to have Jin Hee Yoon, who is the Emerging Business Incubation Manager of the Technology Strategy Office of SK Telecom in Korea, who will share with us how they're extending RFID into the network.

**JIN HEE YOON:** Thank you. Good afternoon, gentlemen. I am Jin Hee Yoon from SK Telecom, which has about 18 million mobile subscribers in Korea. Today, I would like to introduce the mobile applications for RFI technology, currently planned by SK Telecom.

First of all, let me briefly introduce SK Telecom to you. SK Telecom, since its foundation in 1984, has been providing mobile communication service in Korea over 20 years. We commercialized the CDMA network in 1996 for the first time in the world. SK Telecom's wireless internet services are offered in two brands, Nate and June.

Nate is a general wireless internet service, whereas June is a multimedia service, based on CDMA video network technology. SK Telecom's wireless internet services recorded on [INAUDIBLE] over \$1.7 billion US dollar. The wireless internet service took up 20.6% of SK Telecom's entire revenue, which increased by threefold in the last three years. The current gross momentum is expected to continue, but Korean mobile market is first getting saturated. We must develop new gross opportunity now, and we think the mobile RFID application will be one of a growth engine.

We think we have found one solution that is ubiquitous service based on convergence. Our customers desire personalized, customized services and the more user-friendly devices. Such customer needs will spur an opportunity for operators to use as your new growth engine. This trend will be further accelerated by the interactions between drivers of convergence, while the convergence trend will present both opportunities and threats to Telecom operators. It will undoubtedly bring about much enhanced values to our customers.

I will explain the business strategy of SK Telecom. As you can see in the chart on the left, SK Telecom has recognized the convergence business as a new growth opportunity and is now stepping up its effort to find the new business models. So far, we have a presence in broadcasting, finance, and commerce, content distribution, fixed line services, and [INAUDIBLE] manufacturing businesses.

In the future, we plan to expand our business into telematics and RFID. Terminals equipped with RTMB, finance, and the built-in cameras are sold on the market today, and the terminal equipped RFID [INAUDIBLE] will be introduced by this year. Next I will explain the usage scenario of a fiscal mobile RDIF of application.

First, the users can start RFID tag with the mobile terminal. This result in the RFID code being transferred from the tag to the mobile terminal. The mobile terminal offsets the mobile network and ask the user to select the RFID service. RFID service then direct request for information to the RFID service platform, consisting of a projected directory server or projected traceability server and object information server.

These servers contain the necessary information about the tagged object from simple text information to audio-video content. This information is sent back to the mobile terminal. The user consumes this information, and then the mobile terminal will send billing information to the mobile letter operator. Future, many kinds of sensors will be applied to various place to sense in the environment condition which information transmit and to data managing equipment through mobile [INAUDIBLE].

We call it [INAUDIBLE] environment, which has the tremendous mobile business chance. Now we are trying to make a new kind of service with a mobile phone, which has RFID reader chip inside. This is the main [INAUDIBLE] mobile RFI service or a technology with a convergence between mobile phone and RFID.

Mobile RFID technologies are wireless technology that provides new valuable service to customers by integrating RFID infrastructure with the mobile communication and wireless internet. We hope a mobile RFID technology and the service would bring these four conditions. First one is creating new value for mobile phone users.

Second only is building new markets. Third one is improving quality of ubiquitous life. And the last one is developing and leading technology and the standards with mobile RFID services using 900 megahertz RFID. I would like to introduce some examples of mobile RFID services.

In this slide, you can see the information providing service. RFID tag is attached on [INAUDIBLE] or cases of medicine, cover page of books, videotapes, et cetera. Using mobile phone, which has RFID reader chip inside, lead this RFI tag. In the network, there is some kind of server, which provide the content address.

Mobile phones sends RFID tag ID for users, takes user data through the server. Then the sever returns address of contents in response to RFID tag ID to mobile phone. With this address, mobile phone can access content server, which has contents for medicine, books, et cetera.

These contents could be just a simple WAP, that is, a Wireless Application Protocol page or multimedia data, such as the preview of movie. Our product authentication is a very good example of RFID application. There is a strong demand for product authentication in used car market, for the drug industry, medical user, such as tracking blood supplies.

It's in almost all secondhand product markets. So at first, we developed the [INAUDIBLE] authentication service to detect the counterfeit product in domestic and the international market using cellular global roaming function. Now these are services started three shops and the one department store as a trial business. We use the handheld terminal, combining with the [INAUDIBLE] and the RFID reader. These services will launch commercially without verifying the performance.

Mobile RFID technology can be applied for route guidance, such as public transportation route and the road guidance. In leisure and lifestyle area, it can be used for route guidance, natural experience, promotional events, and for shopping, banking applications, and so on. SK Telecom will start the trial experience for these businesses within this year, and plan to more business case for commercial [INAUDIBLE] trial.

Actually, we draw prints about the 200 deponent service models that will be commercial visionists targeting for our mobile customers. There was a major area of RFID technology is in information downloading applications. [INAUDIBLE] is very good showcase for such a propose. Scanning RFID tags on prints and flowers, we can get information about flowers, like name, press, and the story of origin, for roaming time, medical treatment, as well as download of related pictures and the songs to mobile handset and combined with the promotion events.

Each customer records the delivery of items for sale with the mobile phone as a gift. We can send the favorite song and the message with it by greeting either by the tag on flowers. Shops and restaurants are also perfectly well suited for the brewing RFID technology to enhance value for customers.

Tags attached to the entrance and/or tables can [INAUDIBLE] tag with a mobile phone, and then mobile phone display the contents. Users can access the contents very easily, then download information about restaurant. Record their favorite page at their own site. A businessman needs to promote their product and record the information on mobile phone. Also, the customer can need to decide the menu for lunch or dinner especially. This service is good mobile business because our customer desire personalized and customized the services and more user-friendly access

RFID-based route information service can be made into a whole platform for providing all types of route information service. RFID technology can use location determination where it cannot fulfill to buy cheapest technology, such as inside of buildings, and could ultimately be cheaper once tech prices decline.

Customers can get the route guidance. There is a store location, location maps, and the building information very easily and simply. We expect these services can increase the mobile data access traffic. Poll is sometimes a very troublesome work. If the poll company can send the reward, like a free mobile phone bell sound download, purchasing coupons, so then customers can do it willingly. Users touch the RFID tag attached on the bus stops subway advertisement board and download the poll information on their mobile terminals.

Our taxi is not always a safe place for a woman at night. Safe return home service uses RFID technology to track taxis in case of theft and any other unpleasant experience a passenger may experience. Our passenger can leave the tag installed in the taxi on the ceiling, under the seat, or under the driver registration card. Then taxi companies send the information about the taxi to the passenger. Passenger can send those information to their parents or friends using the mobile [INAUDIBLE] message service, pressing just the Send button on mobile phone.

Finally, I think customers are always the most critical element in our business. I believe that RFID can drive the success factors and get insight into the future direction operators must take. If we study these issues from the customer's perspective, which enhance customer values and improve user-friendliness, we will seek continuous technology innovation to get the most optimal service environment. Thank you very much for your attention.

[APPLAUSE]

**STEVE MILES:** Thank you very much. Are there any questions? If there are, if you could come down to the mic, please. And once again, thanks very much to our speakers who have come from halfway around the world. If they're-- oh [INAUDIBLE].

**AUDIENCE:** Hi, I'm Matthew Dorfman from MIT, and I have two questions for Mr. Yoon. First, there are several different protocols that have been discussed for mobile RFID applications. NFC is probably the most well known, that there's also something called R to R. And I think there are a few others. So my first question is, which of those do you see being the choice of SK Telecom, or is it too soon to tell?

**JIN HEE YOON:** Oh, yes, SK Telecom consider several technologies, like NFC, RFID, or [INAUDIBLE] and many things. When we compare the NFC and RFID, 900-megahertz RFID, NFC has many dedicated functions like the security and many simple functions.

The tag is more expensive than the 900 megahertz tags. Also, NFC leaves the very short distance, leading distance, but RFID takes the longer distance. So we selected the 900 megahertz RFID for useful things. And also we started the NFC service as our pay or tickets.

**AUDIENCE:** OK, you would use the NFC service for payment for tickets?

**JIN HEE YOON:** We prepared now.

**AUDIENCE:** OK, so this would sort of replace the MONETA program that you have had, or would it just be an extension of the MONETA program?

**JIN HEE YOON:** Yes, OK, thank you.

**STEVE MILES:** So thank you very much to the panel.

[APPLAUSE]