

## V. Operational Highlights

### 5.1 Business Activities

#### 5.1.1 Business Scope

##### A. Main areas of business operations

1. F219010 Electronic materials retail sales
2. F113070 Wholesale of Telecom Instruments
3. F119010 Electronic materials wholesale trading
4. CC01050 Data storage and processing equipment manufacturing
5. CC01070 Wireless communication machinery and equipment manufacturing
6. CC01080 Electronic parts and components manufacturing
7. F213060 Retail Sale of Telecom Instruments
8. ZZ99999 In addition to licensed businesses, the Company may operate any other businesses that are not prohibited or restricted by law.

##### B. Revenue distribution

Unit : NT\$ thousands

Products	2018	Percentage
RF Front-End devices and modules	1,738,584	96.36%
Others	65,724	3.64%
Total	1,804,308	100%

##### C. Main products

RF Front-End devices and modules, including

1. Filter
2. Balun
3. Balanced Filter
4. Diplexer
5. Triplexer
6. Coupler
7. Antenna
8. Antenna Module
9. Bluetooth Module
10. Front-end Module
11. Antenna Switch Module
12. RF Chip Ceramic Device, including passive inductors and capacitor etc.

#### 5.1.2 Industry Overview

##### A. Current Status and Development of the Industry

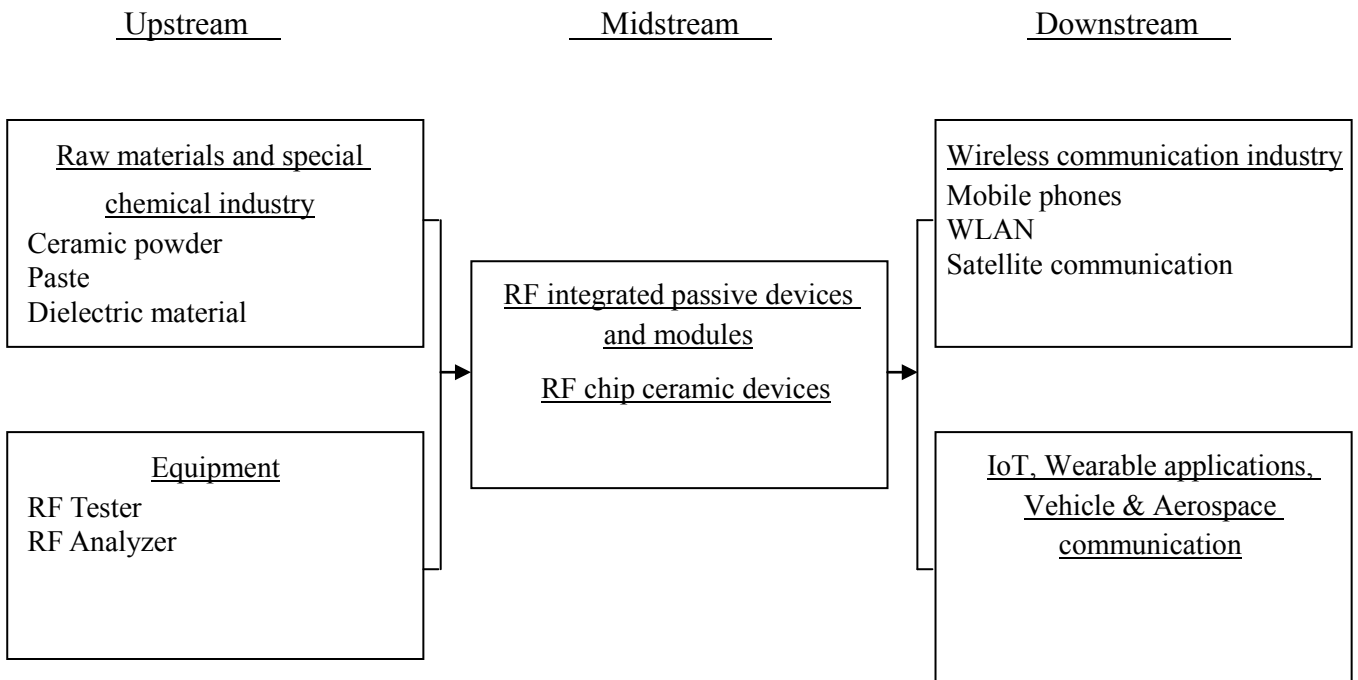
With the trend of telecommunication liberalization and the rapid development of mobile communication technology, the growth of related terminal products and communication equipment has further driven the demand for wireless communication. Wireless communication terminal applications such as mobile phones, wireless local area networks (WLAN), Bluetooth, global positioning systems (GPS), wireless PCs, wireless phones, walkie-talkies, pagers, home wireless (Home RF), digital broadcasting, wireless data machines, wireless fax machines, and emerging Internet of Things (IoT) and wearable applications, and more. Due to the rapid increase in the demand for wireless communication applications in the global market, the frequency band of wireless communication has risen sharply, and due to the trend of miniaturization, multi-function and high transmission speed of wireless portable products, this has triggered the market for high-frequency integrated components and the high demand for the modules.

Although the system is becoming more and more complex, the number of internal components actually used in various communication systems is increasingly integrated, which is mainly due to the integration of the lines. As for the integration of passive components, the goal is toward system-level packaging (System in a Package: SiP) or System on a Chip (SoC) development. Since the wireless communication applications built into the terminal products are the mainstream of future development, modularization will also become the future development trend of communication components, and the high-performance component modularization needs to utilize high-density packaging processes to the communication market. From the perspective of the supply chain, manufacturers with SiP high-density system architecture technology can provide upstream and downstream integrated services, and will become an active partner of chip design and terminal product companies in the future.

In recent years, mobile phones, GPS, WLAN, and Bluetooth, which have grown dramatically in wireless communication applications, have different functions, features, or markets, but the same is high-density circuits, miniaturization, high-frequency for required components, that are highly integrated and modular. The high-frequency integrated components and modules and high-frequency chip ceramic components operated by the company are used in the wireless communication market. The Company is the first design and manufacturing company in Taiwan that focuses on RF integrated components and modules. The developed products are in line with market expectations and the integrated terminal applications have high growth momentum. The company has the highest growth and development in the domestic key component industry of RF communication.

#### B. The Interconnectivity of Upstream, Midstream, and Downstream Entities in the Industry

High-frequency integrated components and modules and high-frequency wafer ceramic components in the upstream raw material industry, and they mainly include ceramic powder, conductive ink and dielectric materials. The main process equipment includes laser drilling machine, end silver machine, continuous furnace, wire Machines, external inspection machines, RF testers and network analyzers. The downstream industries include the wireless communication industry, vehicle electronic systems and the aerospace communication industry. They are closely related to the supply and demand of the upstream, midstream and downstream industries. The relevant maps of the upstream, middle and downstream industries are listed as follows:



### C. Product Trends and Competition

The multi-functionalization and miniaturization of wireless communication products have become a market trend, and the development of wireless communication components will be in the direction of high frequency, miniaturization and modularization.

In recent years, wireless communications in Taiwan have flourished, and mainstream applications such as mobile phones, wireless local area networks (WLANs), global positioning systems (GPS) or Bluetooth have shown rapid growth. However, compared with international manufacturers, the development of wireless communication components and modular technology in Taiwan is still weak. At present, global integrated component manufacturers are headed by Japan, the United States and Europe, such as Murata, Kyocera, TDK, etc. in Japan; CTS in the US and Bosch, CMAC and other large manufacturers in Europe. In contrast, due to late start, the relative output of domestic manufacturers in the global market share is still very low.

As wireless communication applications will be at the heart of future market growth, the company is actively developing forward-looking and innovative high-frequency components and modular cutting-edge technologies to capture the opportunities for future wireless communications growth.

### 5.1.3 Technology and R&D Status

#### A. R&D Expenses

In 2018, the Company invested NT\$104,174 thousand in R&D.

#### B. Successful R&D and Technologies Development

##### (a) Research and development

As the company's R&D team has deep academic foundations and product development experience in RF communications and materials engineering, it can grasp the market pulse in both technical development and commercial applications. In terms of research and development, the integration of RF components and modular technology are two key directions. The main R&D projects can be roughly divided into technical analysis, new product development, process improvement, material formulation and quality analysis.

(b) Technology or product that has been successfully developed in recent years

Year	Successful development of technologies or products
2018	<ol style="list-style-type: none"> <li>1. DC power transfer module with package size of 3.2mmx2.5mm for IoT system</li> <li>2. Dual band antenna with package size of 15mmx4.0mm for wireless communication system</li> <li>3. Bandpass filter with low profile package size of 0.9mmx0.7mm for 2.4GHz communication system</li> <li>4. DC power transfer module with package size of 5.0mmx5.0mm for IoT system</li> <li>5. Balanced antenna switch transceiver module with package size of 3.0mmx3.0mm for NB-IoT dual band system</li> <li>6. Bandpass filter with package size of 1.6mmx0.8mm for 2.0GHz communication system</li> <li>7. High rejection bandpass filter with package size of 3.2mmx2.5mm for 5.2GHz communication system</li> <li>8. NFC Antenna with package size of 3.2mmx1.6mm</li> <li>9. Dual-band balun with package size of 2.0mmx1.25mm for 900MHz/2400MHz communication system</li> <li>10. Bandpass filter with package size of 1.6mmx0.8mm for 3.8GHz communication system</li> <li>11. Lowpass filter with package size of 3.2mmx2.5mm for 700MHz communication system</li> <li>12. Bandpass filter with package size of 1.6mmx0.8mm for 4.7GHz communication system</li> <li>13. Balun filter with package size of 3.2mmx2.5mm for 4.9GHz communication system</li> <li>14. Bandpass filter with package size of 1.6mmx0.8mm for 5.4GHz communication system</li> <li>15. Diplexer with package size of 1.6mmx0.8mm for LTE communication system</li> <li>16. Bandpass filter with package size of 1.6mmx0.8mm for 0.8GHz communication system</li> <li>17. High isolation diplexer with package size of 1.6mmx0.8mm for WLAN dual-band communication system</li> <li>18. Bandpass filter with package size of 1.6mmx0.8mm for 5.5GHz communication system</li> <li>19. Balun filter with package size of 3.2mmx2.5mm for LNB 2.0GHz communication system</li> <li>20. Low profile lowpass filter with package size of 0.9mmx0.7mm for 2.4GHz communication system</li> <li>21. Bandpass filter with package size of 1.6mmx0.8mm for 5G communication system</li> <li>22. Duplexer with package size of 2.5mmx2.0mm for 1.7GHz/4.6GHz communication system</li> <li>23. Balun filter with package size of 1.0mmx0.5mm for LTE communication system</li> <li>24. Bandpass filter with package size of 2.0mmx1.25mm for 7.4GHz communication system</li> <li>25. Diplexer with package size of 1.6mmx0.8mm for WLAN dual-band communication system</li> <li>26. Lowpass filter with package size of 1.0mmx0.5mm for 800MHz communication system</li> <li>27. Bandpass filter with package size of 2.0mmx1.25mm for 5.5GHz communication system</li> <li>28. Bandpass filter with package size of 3.2mmx1.6mm for 2.0GHz communication system</li> <li>29. Bandpass filter with package size of 3.2mmx2.5mm for 4.9GHz communication system</li> <li>30. High rejection bandpass filter with package size of 3.2mmx2.5mm for 5.6GHz communication system</li> <li>31. High rejection bandpass filter with package size of 4.5mmx3.2mm for 5.9GHz communication system</li> <li>32. 1:1 balun diplexer with package size of 2.0mmx1.25mm for 400MHz communication system</li> <li>33. Lowpass filter with package size of 1.0mmx0.5mm for 2.4GHz communication system</li> <li>34. Diplexer with package size of 2.0mmx1.25mm for 0.8GHz/2.1GHz communication system</li> <li>35. 1:4 balun diplexer with package size of 2.0mmx1.25mm for 400MHz communication system</li> <li>36. Lowpass filter with package size of 1.0mmx0.5mm for LTE communication system</li> <li>37. Low profile coupler with package size of 1.0mmx0.5mm for 4.7GHz communication system</li> <li>38. Balanced lowpass filter with package size of 2.0mmx1.25mm for 1.3GHz communication system</li> <li>39. Diplexer with package size of 1.6mmx0.8mm for 1.2GHz/2.0GHz communication system</li> <li>40. Balun filter with package size of 1.0mmx0.5mm for 5.6GHz communication system</li> <li>41. Low loss diplexer with package size of 1.6mmx0.8mm for WLAN dual-band communication system</li> <li>42. Lowpass filter with package size of 1.6mmx0.8mm for 1.9GHz communication system</li> <li>43. High rejection diplexer with package size of 1.6mmx0.8mm for WLAN dual-band communication system</li> <li>44. Balun filter with package size of 1.6mmx0.8mm for LTE communication system</li> <li>45. Diplexer with package size of 2.0mmx1.25mm for 1.3GHz/2.5GHz communication system</li> <li>46. Lowpass filter with package size of 1.6mmx0.8mm for WLAN 2.4GHz communication system</li> <li>47. Diplexer with package size of 2.0mmx1.25mm for WLAN dual-band communication system</li> <li>48. Complex impedance balun filter with package size of 1.6mmx0.8mm for 2.4GHz communication system</li> <li>49. Low loss diplexer with package size of 2.0mmx1.25mm for WLAN dual-band communication system</li> <li>50. Lowpass filter with package size of 1.6mmx0.8mm for WLAN 5.4GHz communication system</li> <li>51. High isolation diplexer with package size of 2.0mmx1.25mm for WLAN dual-band communication system</li> <li>52. Balun filter with package size of 3.2mmx2.5mm for LNB 1.5GHz communication system</li> <li>53. Lowpass filter with package size of 1.6mmx0.8mm for 2.2GHz communication system</li> </ol>

(c) The current progress of the unfinished R&D plan, the need to re-invest in R&D expenses and the expected time of completion of mass production

2018 unfinished R&D plan	Current status	Expected finished time	Additional imputed R&D expenses( NT\$ thousands)
Develop miniaturized integration components	90%	2019/Q3-Q4	8,000
Develop miniaturized multi-frequency, multi-mode integrated modules	75%	2019/Q3-Q4	15,000
High precision materials, process development	85%	2019/Q2-Q3	6,000

(d) Main factors for future R&D success

- ① Proper R&D strategy and effective mastery of product development timelines to achieve product time to market
- ② Good product design capability, early effective Design-in with client product design
- ③ Excellent and stable R&D team, enabling R&D experience to effectively accumulate and boost product development capabilities

(e) Future R&D plan and expected R&D expenses

Future R&D plan	For future three years R&D expenses( NT\$ thousand )
Develop miniaturized integration components	125,000
Develop miniaturized multi-frequency, multi-mode integrated modules	170,000
High precision materials, process development	90,000
Total	385,000

#### 5.1.4 Long-term and Short-term Development

##### A. Short-term Development

- (a) Develop the main products in module type
- (b) Product miniaturization and multi-functionality
- (c) Strengthen the demand development of China and emerging markets

##### B. Long-term Development

- (a) Develop new products in module type
- (b) System on Chip module technology development
- (c) Strategic alliance cooperation model

## 5.2 Market and Sales Overview

### 5.2.1 Market Analysis

#### A. Sales Region

Unit: NT\$ thousands

Year		2017		2018	
		Amount	%	Amount	%
Domestic (Taiwan)		364,937	18.59	295,487	16.38
Oversea	Americas	621,512	31.65	558,905	30.98
	Asia	964,642	49.13	936,704	51.91
	Europe	12,399	0.63	13,212	0.73
	Total	1,598,553	81.41	1,508,821	83.62
Total		1,963,490	100.00	1,804,308	100.00

#### B. Market Share

In recent years, due to the booming wireless communication market, the low-temperature ceramic (LTCC) component industry has shown a substantial growth. According to Market Insights Reports, the global annual output value of LTCC in 2018 is about 3.22 billion US dollars, and Japan is the largest supplier in the supply chain. The market share is as high as 50%, which dominates the global LTCC product market and technology, followed by Europe and the United States. Domestic manufacturers are still relatively low in global market share due to their late start.

The company's high-frequency integrated components, modules and high-frequency chip ceramic components, including filters, balun, balanced filter, diplexers, triplexers, couplers, chip antenna, antenna modules, Bluetooth modules, RF front-end modules and antenna switch modules are commonly used in mobile phones, wireless LANs, Bluetooth and GPS. Since the company invested in the early domestic market and focuses on RF integration of components and modules, when the company's products enter the market, they will obtain domestic and foreign customers with excellent quality and competitive price in a short time, and efficient service. At present, the company is in a leading position in terms of domestic technology and market share. The company's global market share is about 2%.

#### C. Future Market Supply, Demand, and Growth Status

With the globalization of telecommunications and the advancement of communication technologies, wireless communication has become the most dynamic industry in the 3C industry. Looking forward to the future, mobile phone penetration and portability are excellent when the terminal products are moving toward integration. The competitive advantage is to integrate other product features, of which smartphones are typical representatives. Smartphones have more and more powerful computing and multimedia features, with Internet access, download and sharing capabilities. This requires more transport channels, higher transmission bandwidth and better transmission efficiency. Therefore, it also triggers various communication functions that mobile phones will combine now and in the future. From regional WLAN, short-range Bluetooth and ZigBee, to long-distance WiMAX, plus GPS and mobile TV capabilities, smartphones can be said to have combined voice, data, video and other versatility to create a comprehensive communications platform. IDC estimates that by 2022, global shipments are expected to exceed 1.57 billion. The expansion of global GPS navigation and location services will also be products with high growth potential in the next few years; as for emerging IoT applications, the rapid development of smart applications, such as personal wearable devices, smart home, smart manufacturing, smart health and intelligence transportation. Gartner estimates that the number of related devices in the Internet of Things will reach 20.8 billion units in 2020. It is expected that the economic benefits brought by the Internet of Things in the future will be enormous.

The RF components and modules operated by the company are essential components for wireless communication products. Communication products such as mobile phones, computers, wireless networks, global satellite positioning systems, Internet of Things and wearable devices directly affect the future development of LTCC. As the current mainstream wireless communication applications are still growing at a high speed in the next few years, emerging communication products are also moving toward multi-functional integration, and the demand for integrated components and module products produced by the company will be higher.

#### D. Competitive Advantage

##### (a) Combine four core technologies

The company has four core technologies: advanced RF circuit design, material development, process design and product testing, which are rare in the industry. With independent control of key technologies in both RF and materials, the company has the ability to deliver highly efficient custom products and services.

##### (b) Positioning products in line with market development

Wireless communication is the most dynamic industry in recent years, and especially mobile communication has the fastest growth rate. As the end product grows dramatically, it will directly drive the demand for our products. In addition, due to the diversified functions and miniaturization of mobile communications, the company's SiP and LTCC process development of high-frequency integrated components and modules is in line with market expectations, which will further enhance market demand, so that the company's growth prospects are full of potential.

##### (c) Quality product service

Combining the advantages of R&D and process, the company can provide a full range of services that are more time-sensitive, highly customized, flexible and cost-competitive compared to international peers to win customers' high trust and recognition.

#### E. Favorable and Unfavorable Factors in the Long Term

##### (a) Favorable factors

- ① High growth in industry
- ② Leading LTCC technology in domestic market
- ③ Domestic market first and march straight into international
- ④ Highly competitive full service
- ⑤ Growing brand and OEM model

##### (b) Unfavorable factors

- ① Wireless communication products continue to introduce new products, with short product cycles and rapid price declines, so profit margins are squeezed

Related Countermeasures :

- Shorten the development schedule of new products, commit to high-end products, and avoid mature products that are in price wars.
- Participate in product development during the customer product design phase.
- Diversify products to spread the risk of price competition for a single product.
- Enhance process improvement, increase product yield and equipment utilization, and reduce costs.

## ②Lack of R&D talent

Related Countermeasures :

- Actively participate in the leading new product plans of the Domestic Industrial Development Bureau, strive for foreign technology transfer or joint development opportunities, and promote R&D and technology upgrades.
- Establish a research and development knowledge management database to enable the effective development of research and development experience and results, and maximize the human resources efficiency of research and development.

### 5.2.2 Important Purpose and Production Process of the Main Products

#### A. Important Purpose of the Main Products

Products	Important Purpose
RF Front-End devices and modules	MSS, Cellular Phone, Cordless Phone, Wireless LAN, HyperLAN, GPS, Bluetooth, Ultra-wideband, WiMAX, ZigBee, MIMO, Wi-Fi, Power Amplifier, Low Noise Block (LNB), Home RF, IoT and Wearable applications

#### B. Manufacturing Process

Raw material → Slurry → Tape Casting → Via Punching → Via filling → Screen Printing → Laminating → Cutting → Co-firing → Upper electrode → Burning → Electroplating → Electrical Test → Packing → Shipping

### 5.2.3 Supply Status of Main Materials

Major Raw Materials	Source of Supply	Supply Situation
Powder	DUPONT, HERAEUS	Normal
Paste	DUPONT, HERAEUS, SOJITZ, DAEJOO	Normal



## 5.2.4 Major Suppliers and Clients

### A. Major Suppliers in the Last Two Calendar Years

Unit: NT\$ thousands

Item	2017				2018				2019 (As of March 31)			
	Company Name	Amount	Percent	Relation with Issuer	Company Name	Amount	Percent	Relation with Issuer	Company Name	Amount	Percent	Relation with Issuer
1	a	32,931	13.61	None	a	30,376	12.65	None	a	6,755	12.60	None
2	b	29,463	12.18	None	c	27,422	11.42	None				
3	c	29,041	12.01	None	b	25,902	10.79	None				
4					d	25,139	10.47	None				
5	Others	150,450	62.20		Others	131,313	54.67		Others	46,863	87.40	
	Net Total Supplies	241,885	100.00		Net Total Supplies	240,152	100.00		Net Total Supplies	53,618	100.00	

### B. Major Clients in the Last Two Calendar Years

Unit: NT\$ thousands

Item	2017				2018				2019 (As of March 31)			
	Company Name	Amount	Percent	Relation with Issuer	Company Name	Amount	Percent	Relation with Issuer	Company Name	Amount	Percent	Relation with Issuer
1	A	483,241	24.61	Note 1	A	399,080	22.12	Note 1	A	99,932	23.47	Note 1
2	Others	1,480,249	75.39		Others	1,405,228	77.88		Others	325,920	76.53	
	Net Sales	1,963,490	100.00		Net Sales	1,804,308	100.00		Net Sales	425,852	100.00	

Note 1 : Legal director of the company

## 5.2.5 Production in the Last Two Years

Unit: thousand PCS; NT\$ thousands

Output	Year	2017			2018		
		Capacity	Quantity	Amount	Capacity	Quantity	Amount
Major Products							
RF Front-End devices and modules		2,850,000	2,631,428	722,240	2,900,000	2,761,006	688,513

## 5.2.6 Shipments and Sales in the Last Two Years

Unit: thousand PCS; NT\$ thousands

Sales	Year	2017				2018			
		Local		Export		Local		Export	
		Quantity	Amount	Quantity	Amount	Quantity	Amount	Quantity	Amount
Major Products									
RF Front-End devices and modules		727,132	364,937	1,863,593	1,598,553	700,103	295,487	1,975,218	1,508,821

## 5.3 Human Resources

Year		2017	2018	As of 03/31/2019
Number of Employees	Direct	158	162	159
	Indirect	44	41	38
	Management & Sales	35	34	33
	R & D	45	44	43
	Total	282	281	273
Average Age		35.6	35.8	36
Average Years of Service		6.06	6.52	6.73
Education	Ph.D.	2.8%	2.5%	2.5%
	Masters	17.4%	16.0%	15.8%
	Bachelor's Degree	42.2%	46.3%	45.1%
	Senior High School	30.1%	28.1%	28.9%
	Below Senior High School	7.5%	7.1%	7.7%

## 5.4 Environmental Protection Expenditure

### 5.4.1 Total Losses and Penalties

The loss or penalty caused by environmental pollution during the latest year and up to the printing date of this annual report: None.

### 5.4.2 Countermeasures and possible disbursements to be made in the future: N/A.

## 5.5 Labor Relations

### 5.5.1 Employees' welfare, education, training and pension, employee relations and protection of employees' rights:

#### A. Employee Welfare

- Profit sharing: Article 25 of the Articles of Incorporation: The Company should distribute remuneration to employees not less than 5% of annual profits.
- Bonus system: Year-end bonus, performance bonus, operation bonus, etc.
- Annual salary review system.

- (d) Periodic health checkup.
- (e) Group insurances.
- (f) Facilities: Parking lots, staff lounge, nursing room, cafeterias, etc.
- (g) Activities: Welfare committee would organize activities such as trips, year-end party, prize drawing and various fun contests, and cash gifts for important festivals, birthday, wedding and new babies, subsidies for hospitalization and education of employees' children.

**B. Staff training and training situation**

In accordance with the "Employee Education Training Management Procedures", the company plans relevant training courses according to the professional functions and learning needs of employees.

**(a) Training system**

- ① Work-oriented training : The head of the unit is responsible for the work guidance of the subordinates or the training of the work.
- ② Centralized training : Consider developing human resources, organizing goals and employee education and propose annual education and training programs.
  - New recruit training : New recruits should receive pre-employment training
  - Functional training : Strengthen professional skills
  - General education course : Courses on corporate social responsibility, information security, occupational safety and health, and self-Inspiration
- ③ Management training: Training courses for grassroots supervisors, middle managers and senior management.

**(b) Summary of the implementation of education and training this year**

Courses name	Inside training		Outside training	
	Number of people trained	Expenses	Number of people trained	Expenses (NT\$ Thousands)
General education course	1,758	-	8	23.5
Function-management training	-	-	-	-
Function-professional skill training (Centralized)	112	-	12	25
Function-professional skill(OJT)	278	-	-	-
Total	2,148	-	21	48.5

### C. Employee retirement system

- (a) The Company allocates pension funds in accordance with the legislation from the Ministry of Labor and managed by the Bureau of Labor Funds. The annual budget for the allocation of the minimum income cannot be lower than the income calculated based on the interest rate of the banks' two-year time deposits in accordance with the legislation "Management and Utilization of the Labor Pension Funds".
- (b) The Company contributes at the rate of 6% of each employee's monthly wages to the Labor Pension personal account of the Bureau of the Labor Insurance in accordance with the provisions of the Labor Pension Act from July 1, 2005. Under this defined contribution plan, the Company's contribution to the Bureau of Labor Insurance requires no additional legal or constructive obligations thereafter.

### D. Agreement between labor and management

The company has an open management environment. Various forms of discussion and communication can be conducted at any time between management and employees. Any problem can be reached in a timely and interactive manner. The Company cares about the interaction and communication between colleagues, so that employees and employers can achieve common growth and development goals through communication and understanding. The company has built a challenging and learning environment where the relationship between workers and employers is harmonious, so there are no labor disputes.

E. Various employee rights maintenance measures : Follow the Labor Standards Act to handle everything.

**5.5.2 Total losses (including compensation) and fines for labor disputes in the most recent fiscal year and the current fiscal year up to the date of printing of the annual report:**  
None.

### 5.6 Important Contracts

Agreement	Counterparty	Period	Major Contents	Restrictions
Construction contracts	Xu Yuan Construction Corp.	2017.11~2020.03	New plant construction	None