CHANG WAH TECHNOLOGY CO., LTD (6548)

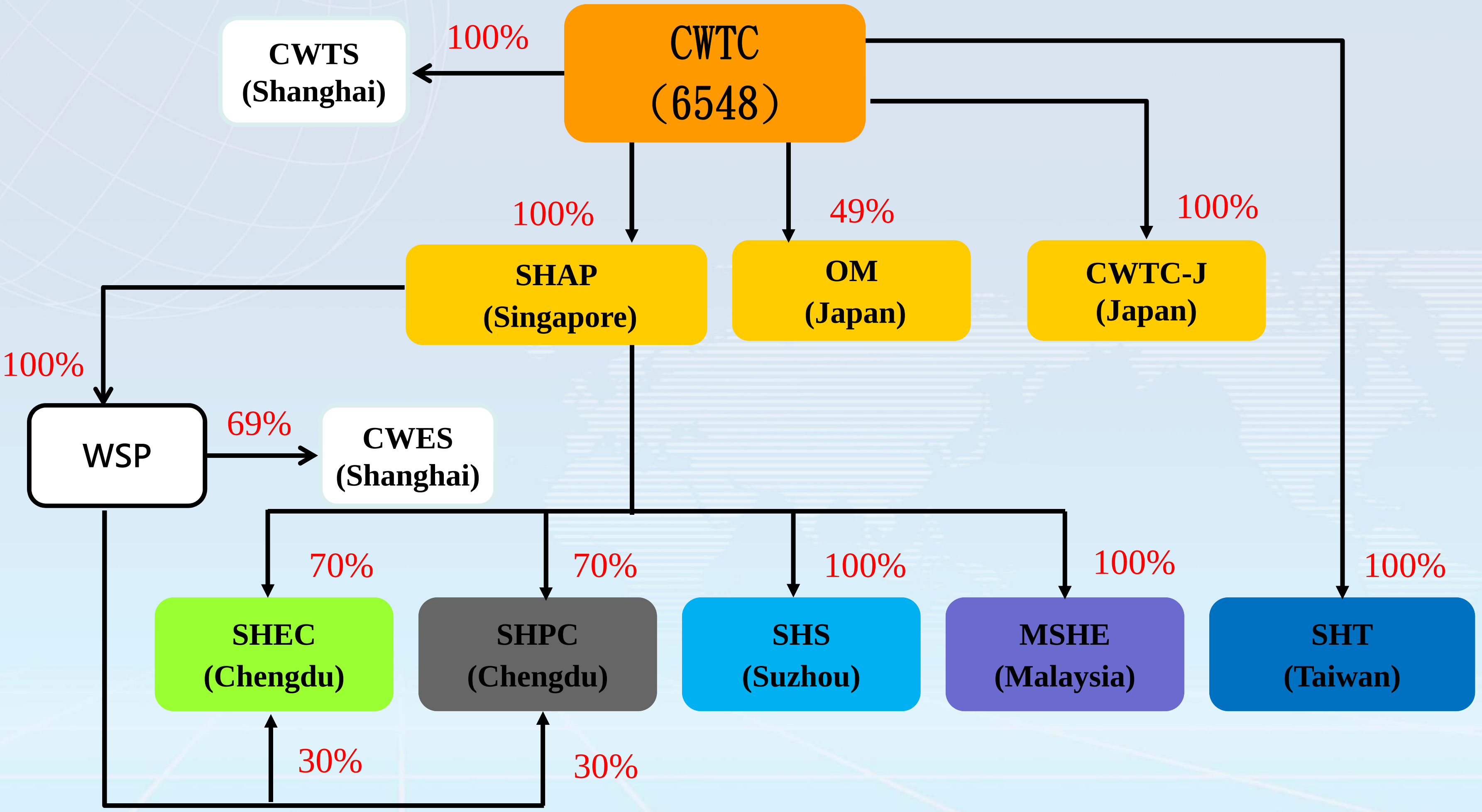
November 22, 2018

Outline

- A、Global Layout
- B、Competitive Advantages & Business Overview
- C、Market & Future Prospects
- D、Q & A
- E、Appendix (Pre-mold Technology)

A、Global Layout

Investment Structure



CWTC
(6548)

100%

CWTS
(Shanghai)

100%

SHAP
(Singapore)

49%

OM
(Japan)

100%

CWTC-J
(Japan)

100%

WSP

69%

CWES
(Shanghai)

70%

SHEC
(Chengdu)

70%

SHPC
(Chengdu)

100%

SHS
(Suzhou)

100%

MSHE
(Malaysia)

100%

SHT
(Taiwan)

30%

30%

Plants and Factories

Japan

OM, 1981

CHINA

SHEC，1998

SHPC，2008

SHS，2003

Taiwan

SHT，1994

CWTC，2009

Malaysia

MSHE，1989

B、Competitive Advantages & Business Overview

Competitive Advantages

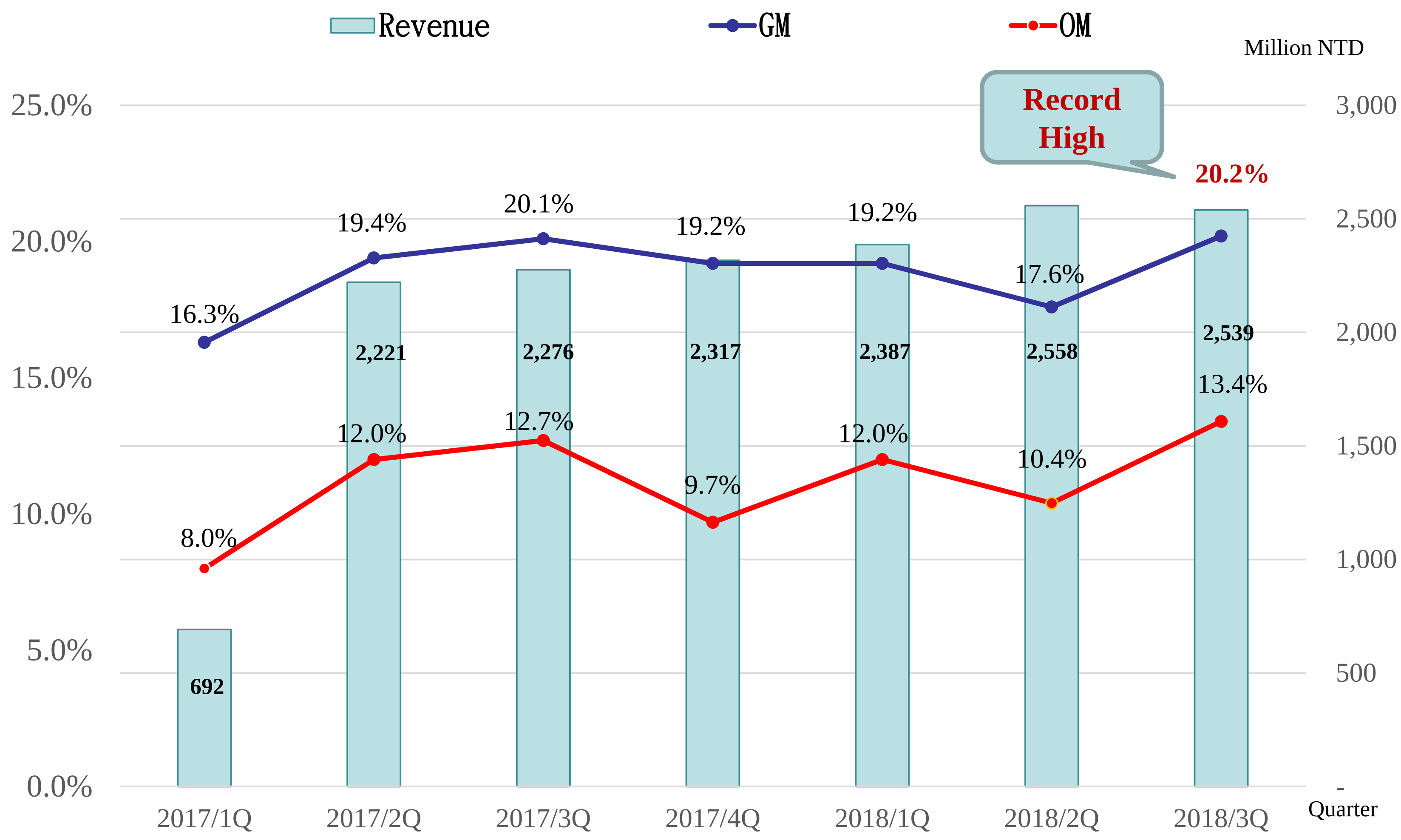
Manufacturing：
The best lead frame etching factory in global

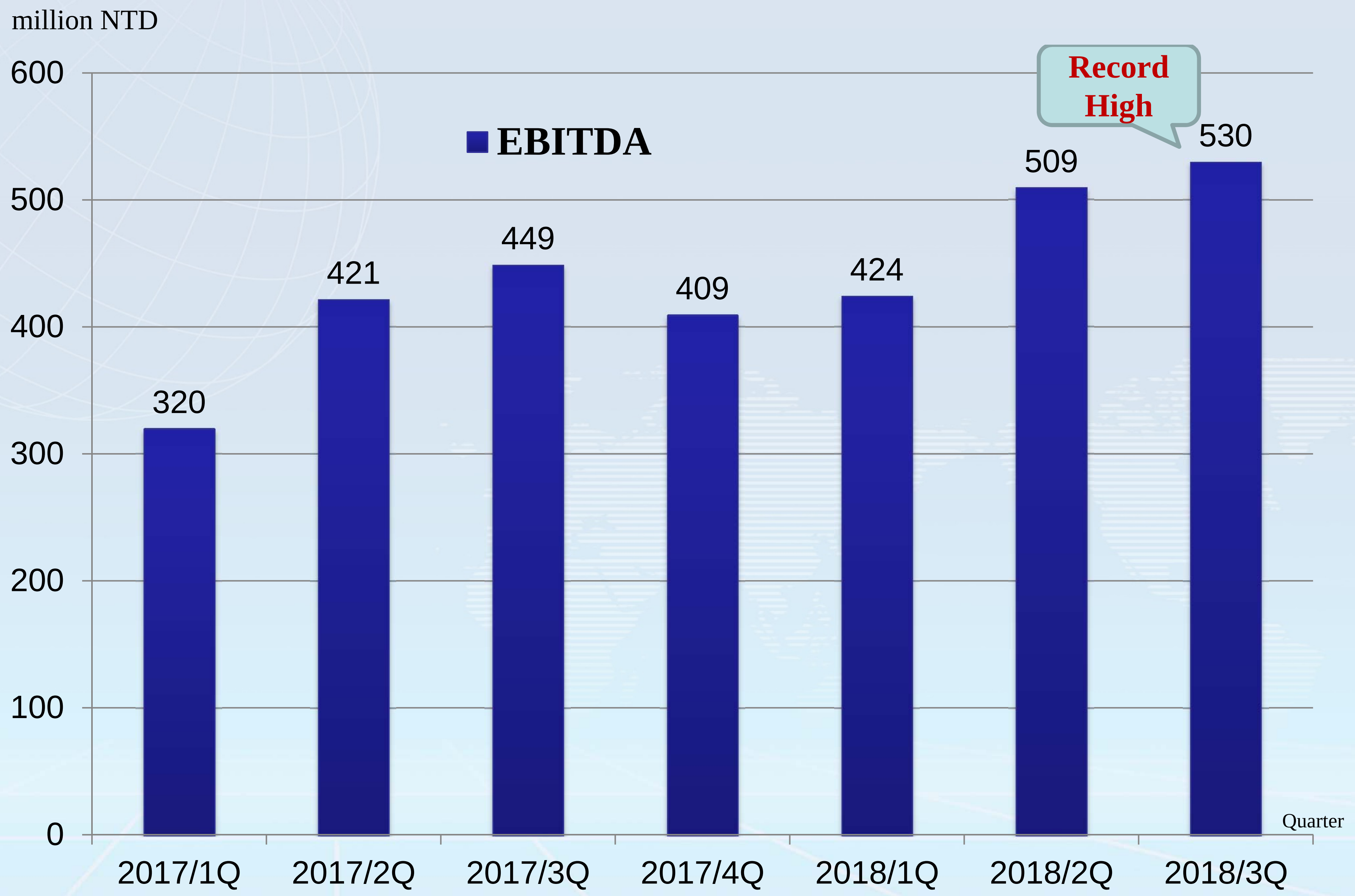
Customer:
Major IDM manufacturers & OSATs in the world

Global
Lead Frame
Leading Factory

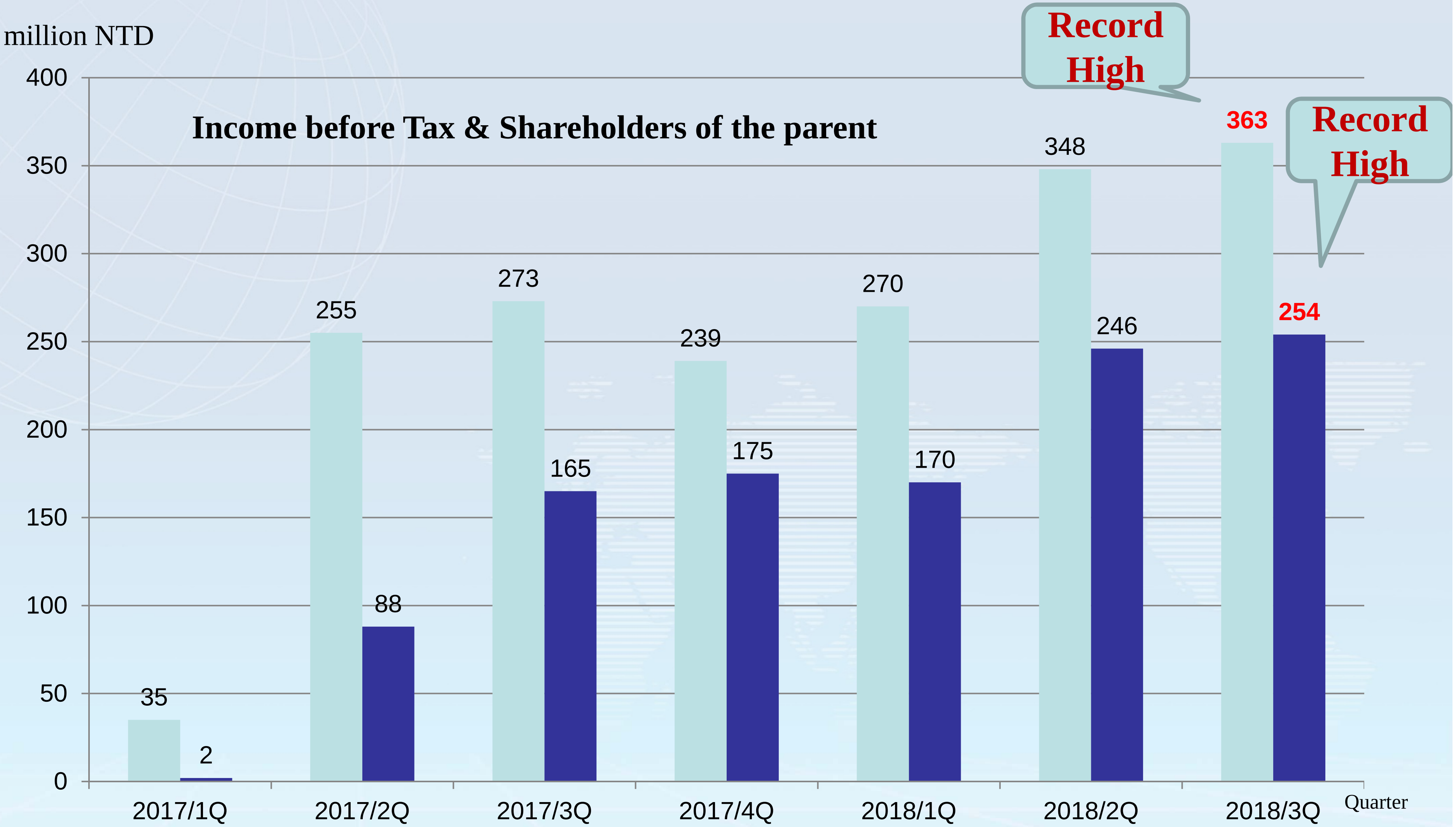
Sales:
Parent company CWE deep cultivation of packaging materials for nearly 30 years

Technology：
Japanese partner full support


Revenue
GM
OM
Million NTD
Record High
20.2%
25.0%
20.0%
15.0%
10.0%
5.0%
0.0%
3,000
2,500
2,000
1,500
1,000
500
-
Quarter
2017/1Q
2017/2Q
2017/3Q
2017/4Q
2018/1Q
2018/2Q
2018/3Q
692
2,221
2,276
2,317
2,387
2,558
2,539
16.3%
19.4%
20.1%
19.2%
19.2%
17.6%
8.0%
12.0%
12.7%
9.7%
12.0%
10.4%
13.4%


million NTD
600
500
400
300
200
100
0
EBITDA
320
421
449
409
424
509
530
Record High
Quarter
2017/1Q
2017/2Q
2017/3Q
2017/4Q
2018/1Q
2018/2Q
2018/3Q

Income before Tax & Shareholders of the parent



Record High

Record High

Financial Results(Consolidated Income Statement)

	3Q2018		2Q2018		QoQ	3Q2017 (After renumbering)		YoY
MNNTD	Amount	%	Amount	%	%	Amount	%	%
Revenues	2,539	100	2,558	100	(1)	2,276	100	12
Gross Profit	513	20	449	18	14	457	20	12
Operating Expenses	173	7	183	7	(5)	168	7	3
Operating Income	340	13	266	10	28	290	13	17
Non-operating Income	23	1	82	3	(72)	(4)	- 0	-
Income before Tax	363	14	348	14	4	286	13	27
Tax	106	4	100	4	6	89	4	19
Net Income	257	10	248	10	4	197	9	30
Shareholders of the parent	254		246		3	165		54
EPS(NTD)	7.23		6.79			5.49		

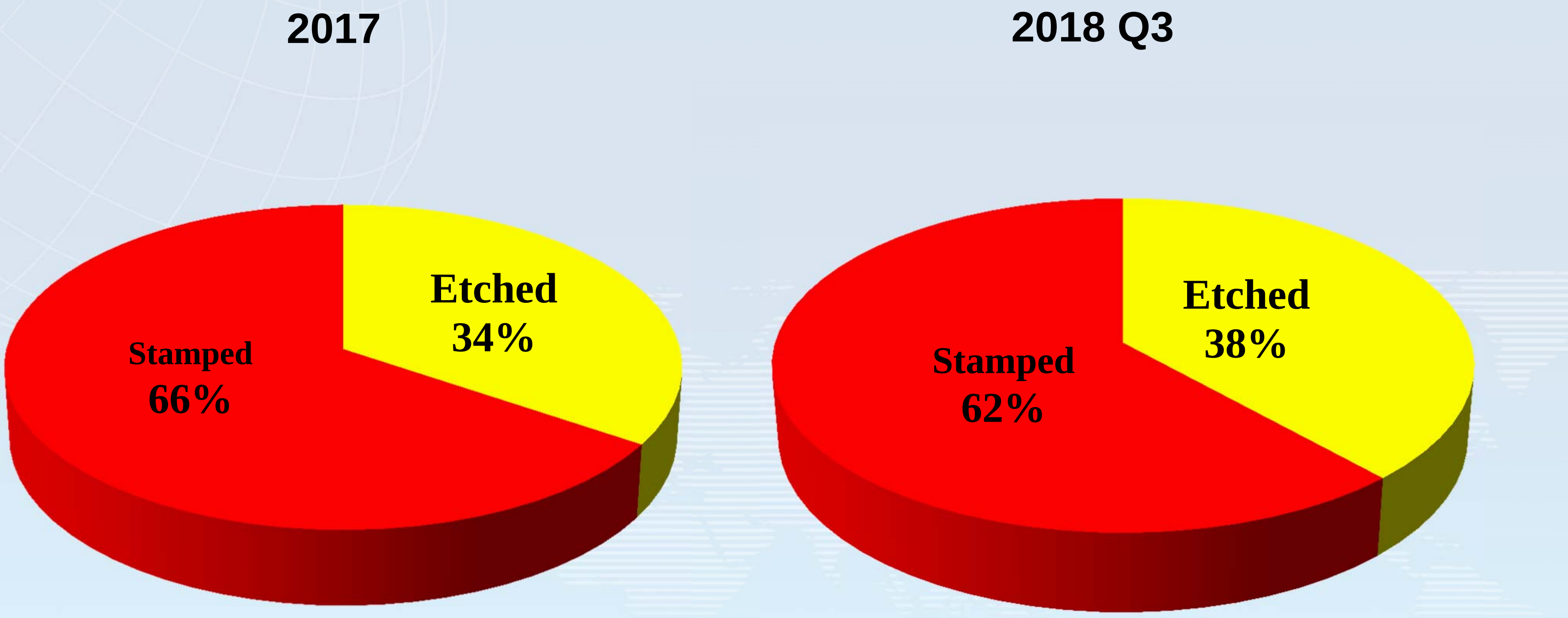
Financial Results(Consolidated Income Statement)

	1~3Q 2018		1~3Q 2017		YoY
MNNTD	Amount	%	Amount	%	%
Revenues	7,484	100	5,189	100	44
Gross Profit	1,421	19	1,000	19	42
Operating Expenses	530	7	389	7	36
Operating Income	891	12	612	12	46
Non-operating Income	90	1	221	4	(59)
Income before Tax	981	13	833	16	18
Tax	303	4	190	4	59
Net Income	678	9	643	12	5
Shareholders of the parent	671		256		162
EPS(NTD)	18.70		8.77		

Consolidated Balance Sheet Summary

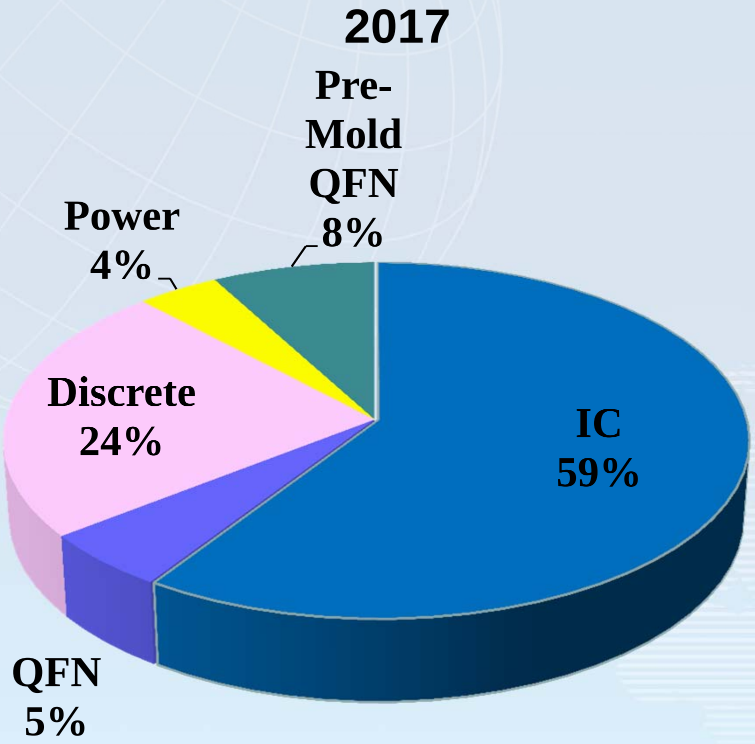
Amount NTD in MN	2016.12.31 (IFRSs) (After renumbering)	2017.12.31 (IFRSs)	2018.9.30 (IFRSs)
Cash & Short-Term Investments	637	2,131	1,833
Accounts Receivable	523	1,825	2,040
Current Assets	1,625	5,350	5,476
Long-Term Investments	292	146	304
Current Liabilities	295	2,150	3,266
Long-Term Liabilities	299	3,970	4,444
Shareholders' Equity	966	5,064	4,900
Total Assets	2,333	9,100	9,414
Book Value Per Share (NT$)	39	140	135
Current Ratio	550%	249%	168%
Debt Ratio	13%	44%	47%

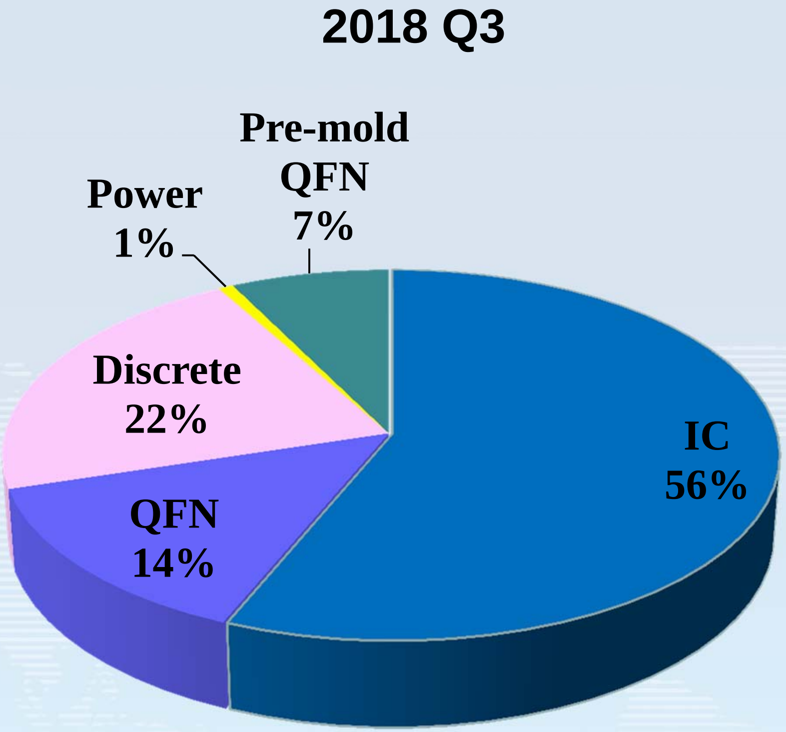
Products Percentage(Process)



*Classified by sales amount (US$)

Products Percentage(Application)



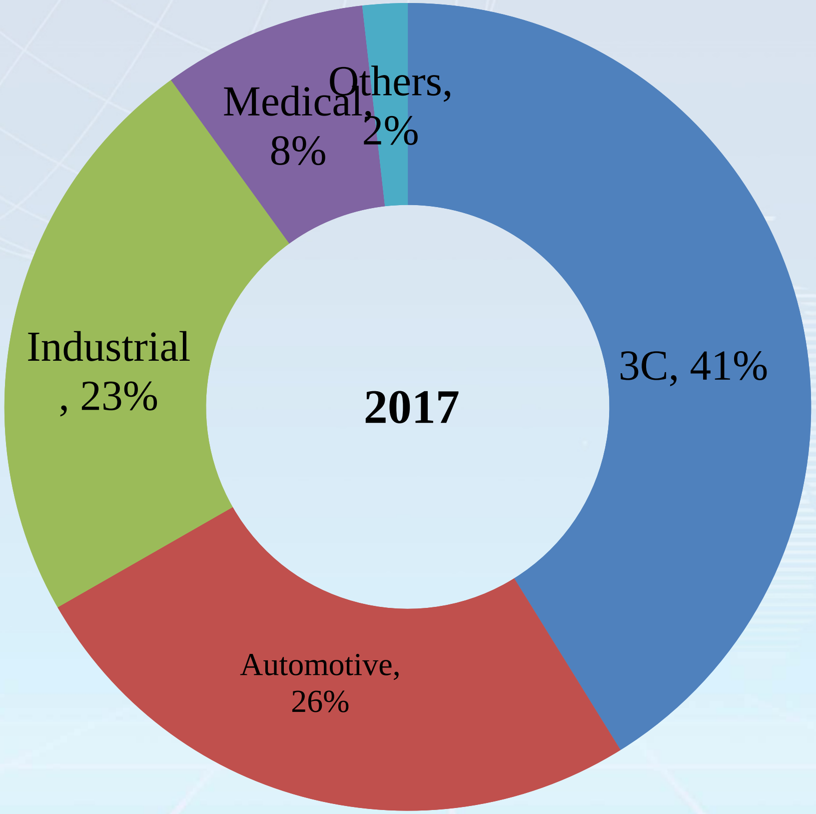


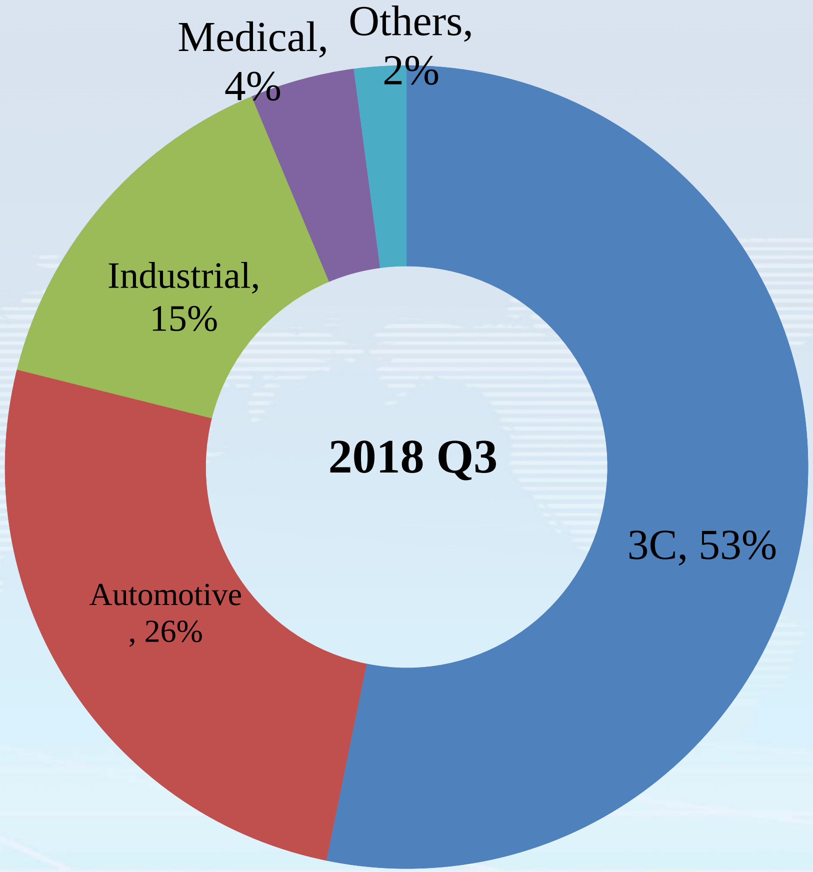
*Classified by sales amount (US$)

IC：SOP、TSSOP、TSOP、QFP

Discrete：SOT

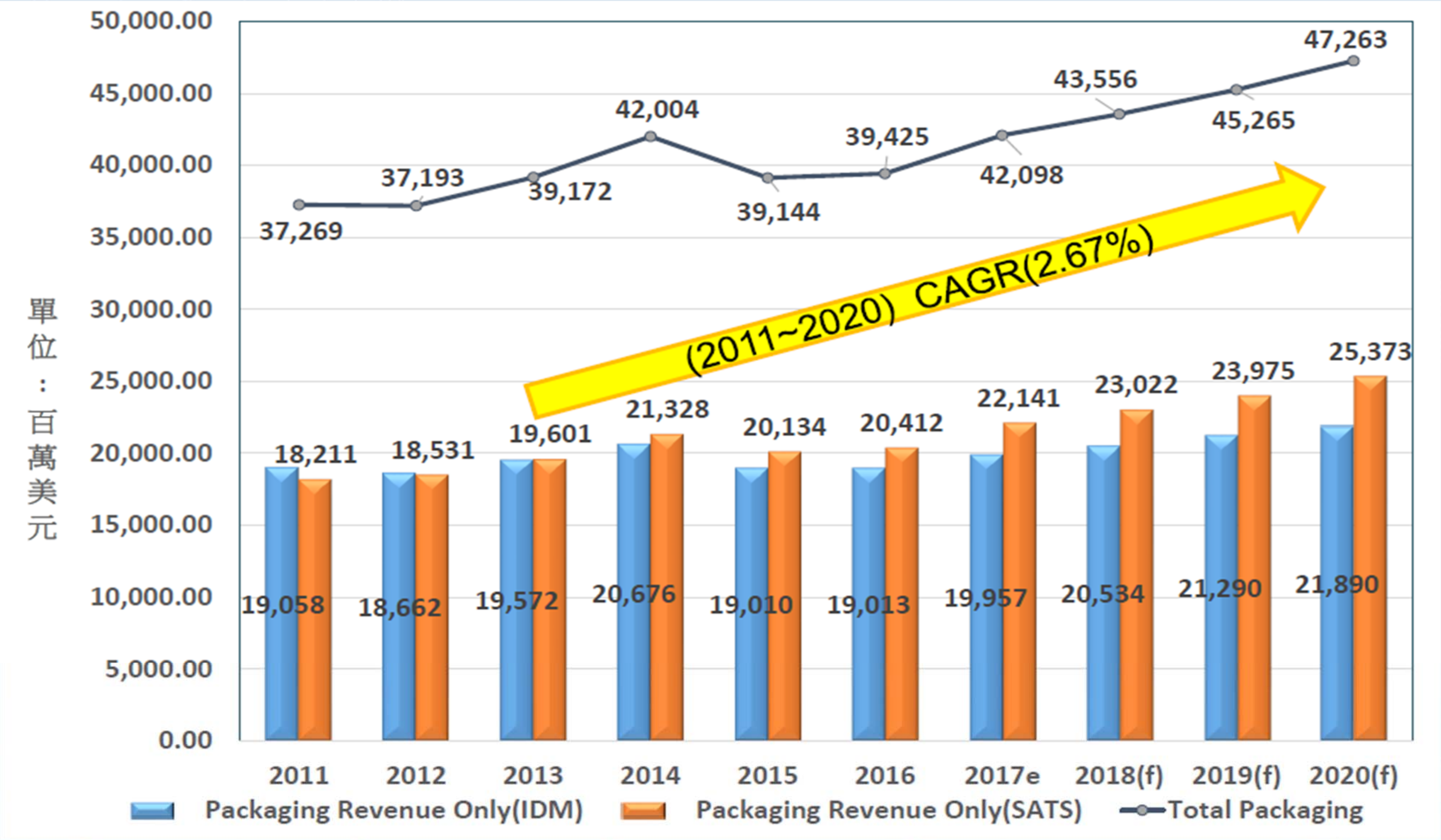
Lead Frame Application





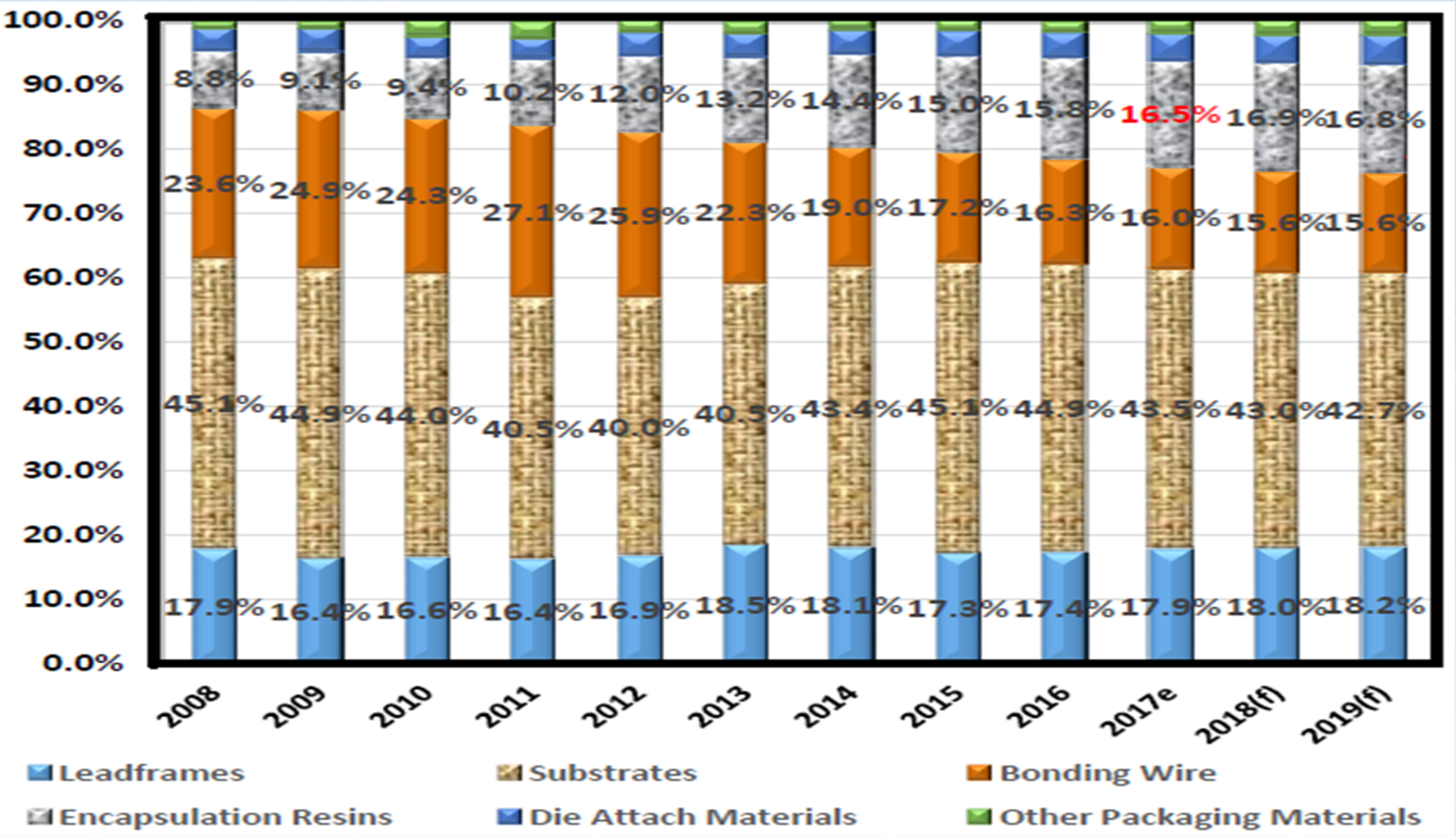
C、Market & Future Prospects

Semiconductor packaging market continues to grow



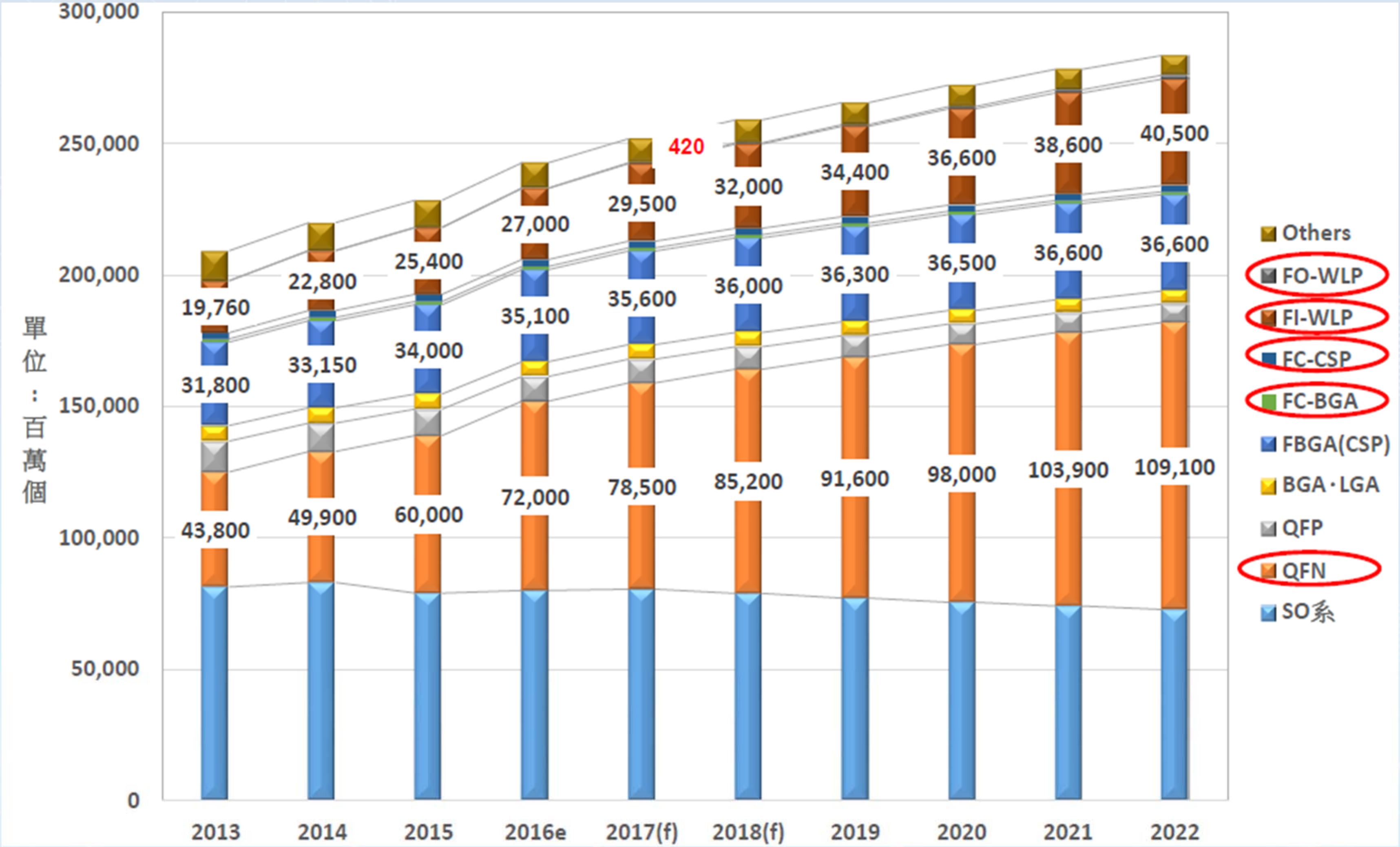
Source：IEK(2017/10)

The lead frame grows faster than the substrate



Source：IEK(2017/10)

QFN is still the main source of growth for leadframes



Source：IEK(2017/10)

Market Status

- 4Q/18~1Q/19：Customers reduced finished goods inventory and reduced stock inventory days, but terminal demand did not decline.

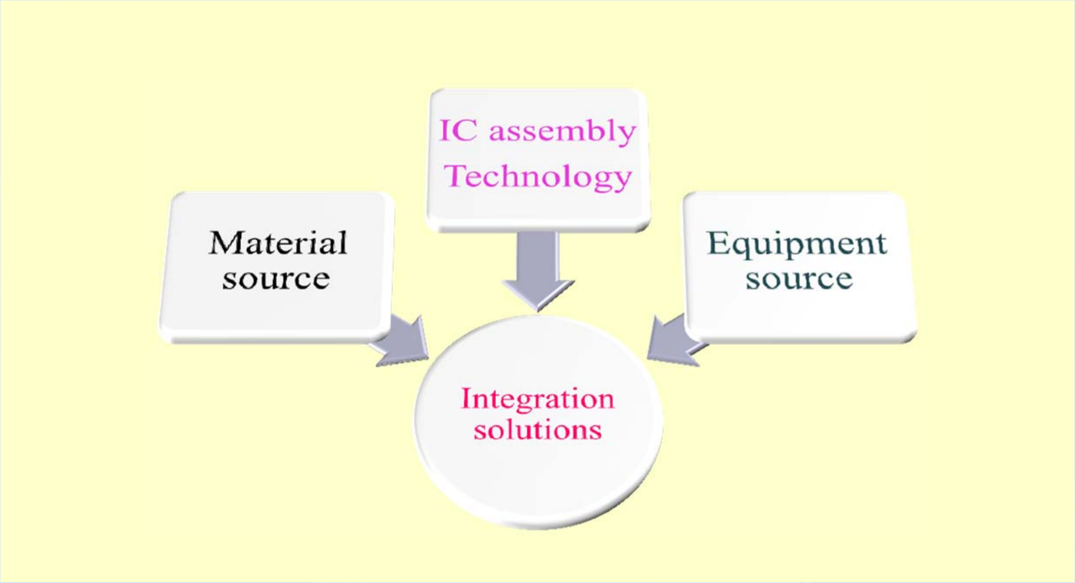
- 2Q/19：Market conditions may have the opportunity to return to the first half of 2018.

Future Prospects

- Expand Pre-mold QFN customers
- Etching elements for other applications
- New Factory
- M&A Opportunity

D、Q & A

E、Appendix
(Pre-mold Technology)



IC assembly Technology

Material source

Equipment source

Integration solutions

New process

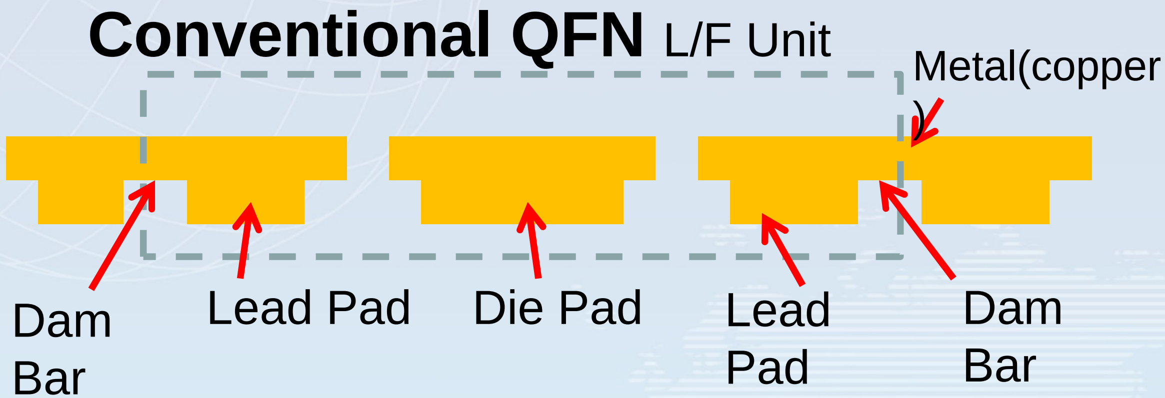
(Post Plating)

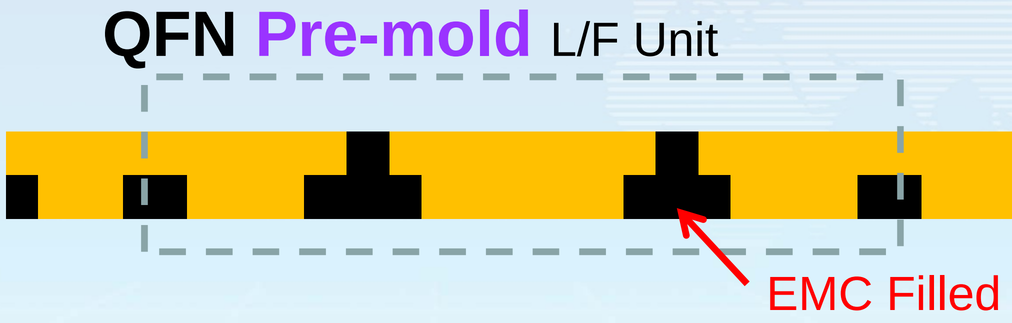
Process	Advantage
Transfer Mold	Auto
De-flashing	Auto
Plating	Auto- Strip
AOI Inspection	Auto

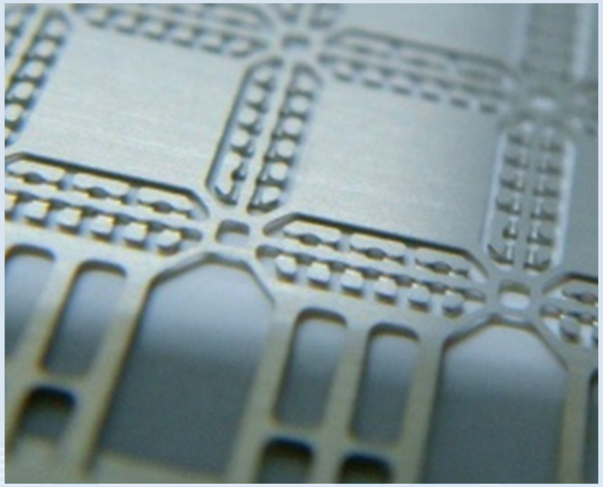
Mold Design

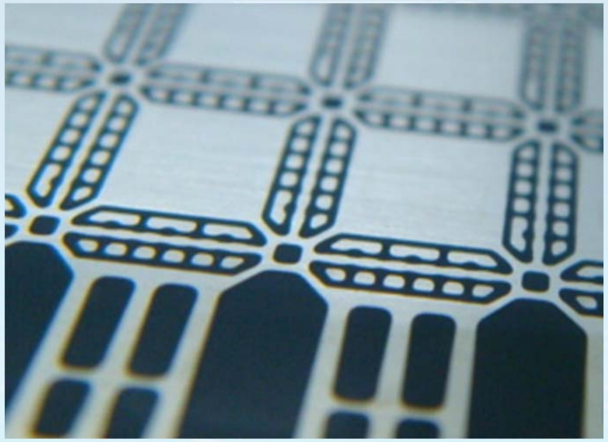
Structure

X-Section View









Features

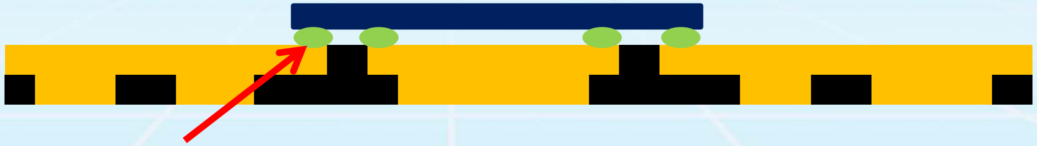
- **No need of back side tape**

No flash issue on back side when packing

- **Good wire bondability**

Solid support for wire bond process

- **Reliable Flip Chip bondability**

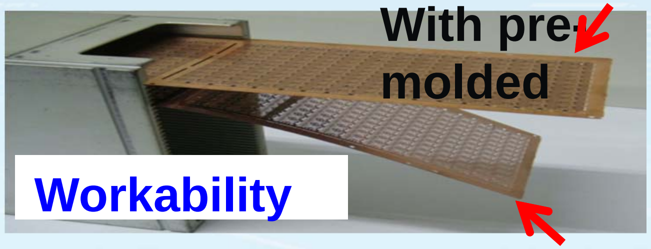


Solid support for solder joint in F/C application

1. **No more yield loss by mold flash!**
2. **Increase W/B UPH**
3. **FC Bonder /UPH ++ No more bump crack during handling!!!**

Without pre-molded

With pre-molded



Without pre-molded

Customized Process

Copper plate | 1st Etching | 1st molding | Plating

Process Simplification

Copper plate | 1st Etching | 1st molding | **2nd** Etching | Plating

Wettable Frank QFN

Process Simplification

- **Conventional LF Packing Process**

LF → D/B W/B → Back side Taping → Molding → Tape Removing → De-flashing → Back side Plating → Singulation

- **Pre-mold LF Packing Process (Remove plating process in Customer side)**

PMLF **Ni/Pd/Au Post Plated** → D/B W/B → Molding → Singulation

Reduce Process, Minimize Yield Loss

No Wasted water/chemical treatment

Process Comparison(Wettable Frank QFN)

Step saw process flow

Conventional lead frame → ❯❯❯❯ → **Molding** → **First saw** → **De-burr** → **Plating** → **Package saw** → **Inspection (AVI)**

!! Copper smear for 0.4 pitch

Pre-mold LF process flow (PPF)

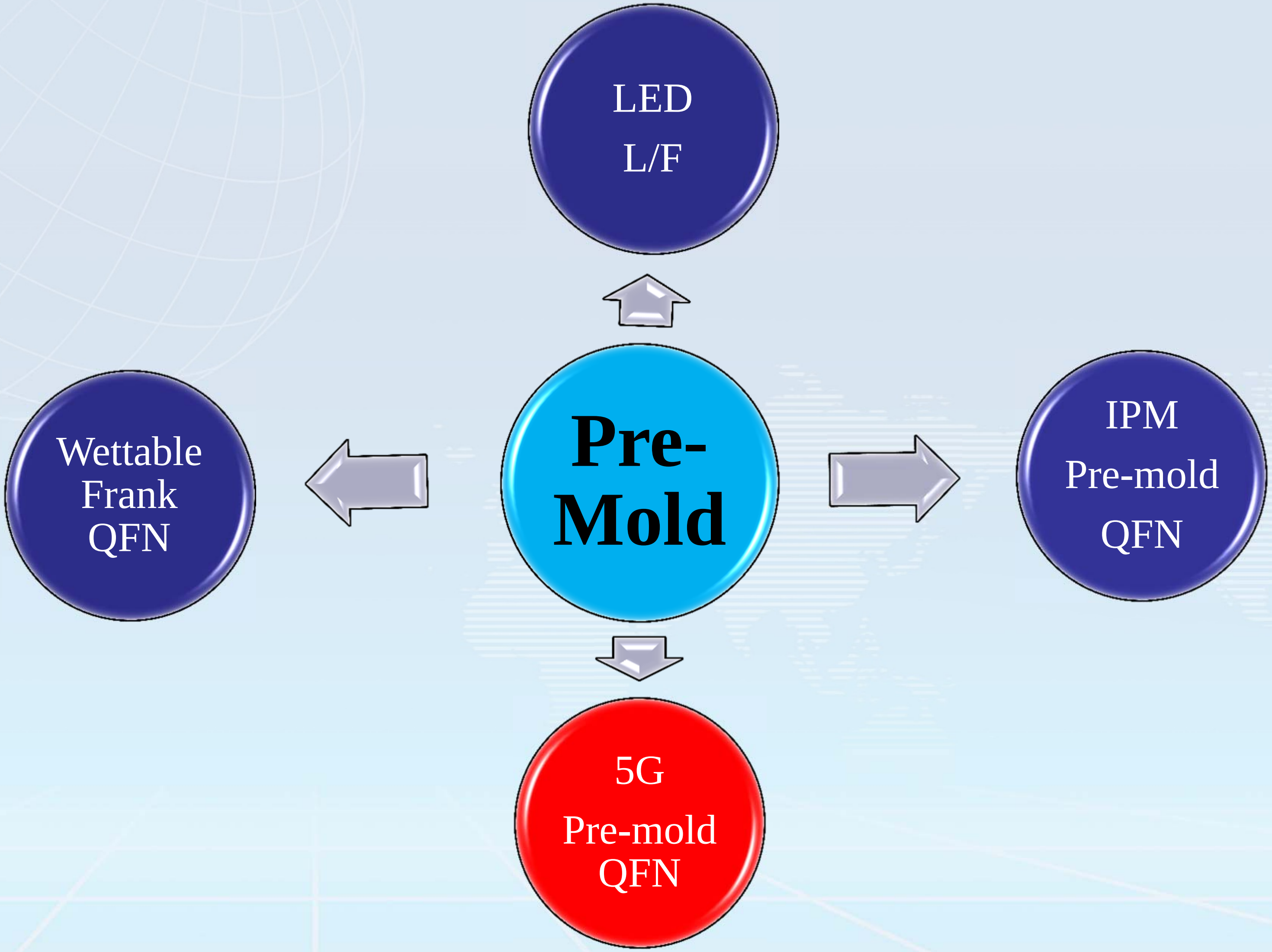
Pre mold LF with 2nd etching → ❯❯❯❯ → **Molding** → ~~**First saw**~~ → ~~**De-burr**~~ → ~~**Plating**~~ → **Package saw** → **Inspection (AVI)**

Wettable Frank QFN

Dimple design LF process flow

Conventional lead frame with dimple → ❯❯❯❯ → **Molding** → **De flash** → **Water jet** → **Plating** → **Package saw** → **Inspection (AVI)**

!! Mold flash in dimple



Pre-Mold

LED
L/F

IPM
Pre-mold
QFN

5G
Pre-mold
QFN

Wettable
Frank
QFN

Pre-mold Patent Layout

	TW	China	US	JP	Korea	Malasia	Germany
QFN	M521265	5334918	—	—	—	—	—
Tie-bar less L/F	M523189	5744144	Currently applying	3210520	Currently applying	—	—
Moat design L/F	M531057	6003205	US9799613B1	—	Currently applying	Currently applying	—
Routable Metal Substrate L/F	I620279	6562112	US9984980B2	—	—	—	—
SST L/F (Wettable Frank)	M539698	6475513	Currently applying	3213791	—	—	—
LLGA	M541118	6458427	Currently applying	3211532	Currently applying	Currently applying	—
Generic L/F	M551755	6971552	has been passed	—	Currently applying	—	—
Pre-formed lead frame with contact grooves	M556934	7670717	Currently applying	Currently applying	—	—	Currently applying
Preformed lead frame with tint groove with maximum viewing angle and its packaging component	M566910	Currently applying	Currently applying	Currently applying	Currently applying	Currently applying	—