EDISON

Thin Film Electronics

Q418 results

Annus horribilis

Tech hardware & equipment

FY18 was a difficult year for Thinfilm. Revenues from tags dipped because of customer destocking. Timescales for commissioning the new roll-to-roll (R2R) manufacturing facility have been pushed out. Noting the extended sales cycle associated with on-package NFC tag deployments, which will result in higher volumes and greater customer retention in future, and delays in launching EAS (anti-theft tags) for placement in jeans, we cut our FY19 estimates.

Year end	Revenue (US$m)	EBITDA (US$m)	PBT* (US$m)	EPS* (c)	DPS (c)	EV/sales (x)
12/17	5.9	(50.9)	(57.5)	(6.6)	0.0	3.8
12/18	3.4	(49.3)	(54.5)	(4.6)	0.0	6.5
12/19e	7.9	(49.2)	(55.8)	(4.8)	0.0	2.8
12/20e	94.7	(5.4)	(12.6)	(1.1)	0.0	0.2

Note: *PBT and EPS are normalised, excluding amortisation of acquired intangibles, exceptional items and share-based payments.

Destocking causes dip in FY18 revenues

Total revenue and other income declined by $2.5m year-on-year during FY18 to $3.4m (ahead of our $2.8m estimate), reflecting the absence of joint development agreement income and lower profits on disposal of assets. Management noted that a weak retail environment meant 13.8m EAS (anti-theft) tags were shipped in FY18 compared to 25.9m in FY17 because of inventory destocking by the fast-fashion end-customer during H218. NFC tag volumes were slightly lower than the prior year. Cost-control activities reduced operating costs (excluding depreciation and amortisation charges) by 8% year-on-year, resulting in operating losses narrowing by US$5.3m to US$54.7m. After investing US$11.0m in fixed and intangible assets, primarily related to equipment for the new roll-based production line at the San Jose site, net cash (excluding long-term financial leases) reduced by US$65.5m to US$32.6m. Management continues its discussions with a strategic equity partner regarding future funding requirements. We model a $60m funding gap arising in FY19.

Further delays commissioning R2R facility

Further delays in commissioning equipment at the new R2R facility mean that the schedule for producing the first fully roll-processed batches of NFC tags has slipped from Q219 to Q419 and R2R NFC product qualification out into H120. However, management is confident that it will have the capacity in place in time to meet demand for customised labels for strategic partners, which will require production of more than 100 million of customised variants.

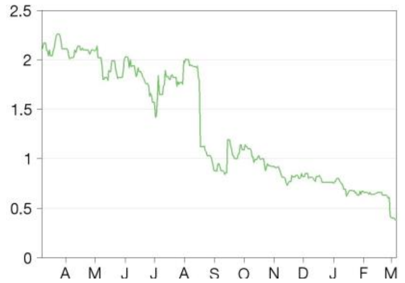
Valuation: Substantial upside potential, execution key

Our base case scenario returns a DCF valuation of NOK1.60/share (previously NOK1.68/share.) The key triggers to close the gap are Thinfilm announcing more campaigns requiring a million-plus NFC tags, confirmation of no further delays in commencing EAS or NFC tag production and progress in getting Thinfilm's proprietary protocol accepted by Apple.

7 March 2019

Price	**NOK0.40**
Market cap	**NOK469m**
	NOK8.56 /US$
Net cash (US$m) at end December 2018 (excluding finance leases)	32.6
Shares in issue	1,171.9m
Free float	96.2%
Code	THIN
Primary exchange	Oslo
Secondary exchange	OTCQX

Share price performance



%	1m	3m	12m
Abs	(41.5)	(54.7)	(81.4)
Rel (local)	(42.1)	(55.1)	(82.3)
52-week high/low		NOK2.26	NOK0.40

Business description

Thin Film Electronics is a global leader in NFC mobile marketing and smart-packaging solutions using printed electronics technology. This technology should enable it to offer printed NFC tags at a substantially lower price point than conventional silicon tags.

Next event

Q119 results	10 May 2019

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Progress against strategic objectives

Management remains focused on three activities: (1) enhancing CNECT functionality to support an expanding number of marketing applications; (2) commissioning the R2R production facility in San Jose so it can manufacture tags in the volumes and at the price point required for deployment of billions of units; and (3) ensuring that it can provide marketing solutions that are relevant for consumers with Apple devices as well as those using Android or Windows operating systems.

Enhancing CNECT capability

In Q418 Thinfilm launched a variant of the CNECT 2.0 software platform for use in China which enables consumers in China to download content from tags without being limited by firewall issues. This functionality is of great interest to companies exporting products such as liquor to China, as it helps them counteract counterfeiting, as well as providing insights on when and where the liquor is consumed. The software is being expanded so that it can collate data obtained from RFID and QR scanning together with data from NFC scanning, giving brand owners a single view of all scanning activity.

Switching to R2R production

When the Q318 results were announced in November 2018, management expected that engineering samples of EAS tags from roll-manufactured die would be shipped to Thinfilm's lead customer for qualification later in Q418. However, while EAS yields from recent fully roll-processed lots are improving and the resultant tags exhibit full functionality, product qualification has slipped to late Q119/early Q219.

EAS tags use a subset of the processes required for NFC tags, so the first six tools required for NFC roll-based production are now in continuous operation. However, the Reactive Ion Etcher (RIE) did not complete factory acceptance testing in December as anticipated, so installation in San Jose has slipped from Q119 to Q219. This pushes out completion of the first fully roll-processed batches from Q219 to Q419, and R2R NFC product qualification out into H120. Management has admitted that it had previously been too optimistic regarding the timescales given that it is working on the world's first R2R printed electronics process, a technical feat requiring customisation of multiple production tools.

The delay is an issue because clearly there is still technical risk associated with R2R NFC production. However, the delay is not holding back uptake of Thinfilm's NFC solutions, as it is able to supply customers with third-party silicon tags programmed to work with the CNECT software platform. Despite the delay, Thinfilm will be able to manufacture proprietary printed NFC tags in high volumes (ie hundreds of millions of NFC tags/year) in time to meet anticipated customer demand.

Ensuring compatibility with Apple devices

All three of the Apple iPhone models launched in September 2018 (iPhone XS, XS Max and XR) support native background NFC tag read functionality. This means users with these new iPhones will not have to launch a dedicated app to tap and read an NFC tag, as they are obliged to do on the iPhone X. The move indicates that Apple wants its phone users to start scanning NFC tags, encouraging brand owners to take a more serious interest in NFC marketing. However, none of these Apple phones supports the TTF (Tag Talks First) protocol used in Thinfilm's printed tags even though Android-based phones have supported the protocol for several years. This means that for campaigns addressing both Android and iOS users, Thinfilm must supply silicon tags manufactured by third parties that are programmed for use with its proprietary CNECT software platform. It is important that the issue of Apple compatibility has also been resolved by the time that Thinfilm's new R2R manufacturing facility is producing high volumes of printed tags. Management's preferred strategy for achieving this is to get the TTF protocol embedded in the NFC standard. Together with a number of major semiconductor players, Thinfilm has submitted the TTF protocol for inclusion in the NFC standard to the NFC Forum. Management anticipates that will be decided by end 2019. As discussed in our July outlook note, management is pursuing other options in parallel to ensure it achieves this vital objective.

In December Thinfilm announced that it had been voted onto the NFC Forum board of directors, having been approved by at least 80% of the existing board, which includes Apple, Google, Mastercard Worldwide and Visa. Among other responsibilities, the board of directors is responsible for the specification of NFC standards and overall direction of NFC deployment.

Financials

Lower product revenues because of EAS destocking

A comparison of FY18 performance with the prior year is obscured by the receipt in FY17 of significant revenues from a joint development programme with a global pharmaceutical company, as well as a change in allocation of grant income. Total revenue and other income declined by $2.5m year-on-year during FY18 to $3.4m (ahead of our $2.8m estimate), reflecting the absence of joint development agreement income and lower profits on disposal of assets. The key metric, tag shipments, showed 13.8m EAS tags being shipped in FY18, compared to 25.9m in FY17. This was the result of inventory destocking during H218 by the fast-fashion end-customer that management notes was caused by a weak retail environment. We estimate that shipments of EAS tags were c 1m in Q318 and c 1.5m in Q418 compared with c 6m in Q118 and c 5m in Q218. Shipments of NFC tags declined slightly year-on-year. Cost-control activities reduced operating costs (excluding depreciation and amortisation charges) by 8% year-on-year to US$54.1m. Higher payroll costs associated with full-time operation at the R2R production facility in San Jose were balanced by higher capitalisable development costs and lower premises costs, as activity at the Linköping site has reduced, while H117 bore the cost of renting both the original and the new premises in San Jose. Operating losses narrowed by US$5.3m to US$54.7m (in line with our US$54.6m estimate) as management reduced staff numbers by 15% during Q318 as part of a wide-reaching initiative to reduce costs, including back-end production costs, by $10m pa in the medium term. Management aims to reduce cash-burn to c $4m/month by the middle of FY19.

Net cash (excluding long-term financial leases) reduced by US$65.5m to US$32.6m. Thinfilm invested US$11.0m in fixed and intangible assets (including pre-payments) primarily related to equipment for the new roll-based production line at the San Jose site. This was partly offset by a US$1.4m inflow from the disposal of Linköping site assets. The only financial liability is $11.5m arising from a long-term financial lease for the R2R production facility. Management has announced that it continues in discussions with a potential strategic equity funding partner to bridge the gap until the company reaches cash break-even, which it anticipates will occur during 2020.

Changes to estimates

We modify our estimates to reflect several developments:

EAS volumes: Noting the delay in completing trials of the anti-theft tags for placement in jeans, we reduce our FY19 estimate slightly. However, the original 45.0m target remains feasible provided that the destocking experienced in H218 is over and commercial deployment in shoes starts sufficiently early in H219, since EAS shipments for deployment in shoes was 25.9m in FY17 and the potential requirements for placement in jeans are substantially higher than those for shoes.

Exhibit 1: Revisions to estimates

	2018			2019e			2020e		
(US$m unless stated)	Old	Actual	Chg (%)	Old	New	Chg (%)	Old	New	Chg (%)
NFC tags (m units)	2.0	N/A*	0.0	40.0	30.0	(25.0)	650.0	650.0	0.0
EAS labels (m units)	14.0	13.8	(1.4)	45.0	40.0	(11.1)	100.0	100.0	0.0
Total revenue	2.8	3.4	19.7	9.2	7.9	(14.2)	94.7	94.7	0.0
Total operating costs	(52.7)	(54.1)	2.7	(59.8)	(58.4)	(2.2)	(101.0)	(101.4)	0.5
EBITDA	(48.5)	(49.3)	1.8	(49.1)	(49.2)	0.1	(4.9)	(5.4)	10.1
Normalised PBT	(53.2)	(54.5)	2.4	(57.7)	(55.8)	(3.3)	(15.5)	(12.6)	(18.5)
Normalised EPS (c)	(4.5)	(4.6)	2.4	(4.9)	(4.8)	(3.3)	(1.3)	(1.1)	(18.5)
Net (cash)/debt	(21.8)	(21.1)	(3.3)	43.7	38.9	(11.1)	70.4	63.4	(10.0)

Source: Thin Film Electronics accounts, Edison Investment Research. Note: *Not disclosed.

NFC tag volumes: When discussing the Q418 results, management noted that the typical time between customers placing an order and requiring volume deliveries of tags was lengthening. This is because customers are more familiar with NFC technology, so are shifting from using the tags in individual marketing campaigns where the tags are embedded in neck-collars or beer-mats to brand protection applications where the tags are embedded in the product packaging, for example underneath bottle labels. This shift inevitably lengthens the time taken for volume roll-out because of the need to make changes in the packaging process. Some customers are sufficiently committed to the embedded tag concept to have started working with Thinfilm on the development of NFC labels with customer-specific features. Deliveries of customised labels for strategic partners would potentially commence in late-FY19 and require production of more than 100 million of the customised variants. Management is therefore confident that demand will ramp up strongly towards the end of FY19.

Since it is not possible to predict with any certainty when any of the volume ramp-ups for strategic partners will commence, we reduce our FY19 estimate from 40.0m to 30.0m NFC tags, though the previous target still appears feasible depending on the timing of individual customer engagements. We leave our FY20 estimate unchanged for the moment. As this is predicated on multiple strategic partners moving to high-volume deployments fairly early in the year, and the R2R facility being able to fulfil customer requirements, we will be monitoring newsflow to assess whether this remains feasible. While we have no visibility of who the strategic partners are, we note that brand protection for bottles of liquor is a key target market and Thinfilm has previously commented that it is working with most of the big players. To give an idea of the size of only part of this market, data from HMRC and the Scottish Whisky Association states that 1,234m bottles of scotch were exported in 2017.

Operating costs: We modify our FY19 and FY20 indirect costs in line with the Q418 numbers.

Valuation

DCF valuation

Thinfilm is the only listed company focused on the development and manufacture of printed electronics, so a multiples-based analysis is not appropriate in our view. We therefore use a DCF approach to value the business.

Given Thinfilm's relatively early stage of corporate development and the uncertainty regarding Apple's adoption of the TTF protocol used in Thinfilm's proprietary printed NFC tags, there is a wide margin of error in our unit sales forecasts. With the product mix and growth profile shown in Exhibit 2, which assumes that Apple adopts the protocol by the end of 2019, our DCF calculation generates an indicative valuation of NOK1.60/share (formerly NOK1.68/share). For the share price to reach this level, investors would need to regain confidence in the stock. In our opinion, the key triggers for this are Thinfilm announcing more campaigns requiring a million-plus NFC tags, confirmation of no further delays in commencing EAS or NFC tag production and progress in getting Thinfilm's proprietary protocol accepted by Apple.

Exhibit 2: DCF analysis

(US$m unless stated)	2019e	2020e	2021e	2022e	2023e	2024e	2025e	2026e	2027e	2028e
Revenue by product line										
EAS	1.8	4.3	8.2	12.6	17.3	20.7	22.8	25.1	27.6	30.4
NFC OpenSense	0.3	9.2	17.3	26.6	32.6	37.4	39.2	50.2	53.7	57.5
NFC SpeedTap	2.0	69.9	137.7	220.7	236.7	260.7	273.8	273.8	287.5	295.1
NFC Silicon	1.7	6.1	-	-	-	-	-	-	-	-
Pass-through costs	0.2	3.3	8.2	12.7	6.2	6.5	6.5	6.1	6.1	6.3
Sales revenue	6.0	92.8	171.4	272.6	292.8	325.3	342.3	355.2	374.8	389.3
Total unit sales own production (m)	59	705	1,470	2,494	1,614	1,896	2,093	2,225	2,461	2,610
ASP including software (c/unit)	8.4	11.9*	11.1	10.4	17.8	16.8	16.0	15.7	15.0	14.7
Share units produced in-house (%)	84%	94%	100%	100%	100%	100%	100%	100%	100%	100%
Production revenue	6.0	92.8	171.4	272.6	292.8	325.3	342.3	355.2	374.8	389.3
License revenue	-	-	-	-	-	-	-	-	-	-
Other revenue	1.9	1.9	1.9	2.0	2.1	2.2	2.3	2.3	2.4	2.4
Total revenue	7.9	94.7	173.4	274.6	294.9	327.5	344.6	357.4	377.2	391.6
EBITDA	(49.2)	(5.4)	30.2	65.9	68.5	73.1	74.0	74.4	78.8	81.5
EBITDA Margin (%)	(621.3)	(5.7)	17.4	24.0	23.2	22.3	21.5	20.8	20.9	20.8
Depreciation	(6.6)	(7.3)	(7.0)	(6.9)	(7.0)	(7.2)	(7.5)	(7.5)	(7.8)	(7.9)
Share-based payments	(1.4)	(1.4)	(1.4)	(1.4)	(1.4)	(1.4)	(1.4)	(1.4)	(1.4)	(1.4)
EBIT	(57.2)	(14.0)	21.8	57.7	60.1	64.5	65.1	65.5	69.7	72.2
Notional tax	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	(22.3)	(23.1)
Tax rate (%)	32.00	32.00	32.00	32.00	32.00	32.00	32.00	32.00	32.00	32.00
EBITDA after tax	(49.2)	(5.4)	30.2	65.9	68.5	73.1	74.0	74.4	56.6	58.4
Change in working capital	3.1	(14.3)	(12.9)	(16.6)	(3.3)	(5.4)	(2.8)	(4.9)	(5.4)	(5.6)
Capex	(13.9)	(4.9)	(5.5)	(7.8)	(8.4)	(9.3)	(9.9)	(10.5)	(11.2)	(11.9)
Free cash flow	(60.0)	(24.5)	11.7	41.5	56.7	58.4	61.2	59.0	40.0	40.9
Terminal value										355
NPV of future cash flows	(60.0)	(21.4)	8.9	27.7	33.0	29.7	27.2	22.9	13.5	117.1
Value of future cash flows	199		WACC		14.5%					
FY18 net debt/(cash)	(21.1)		Terminal growth rate		3%					
Equity value	219.6		TV as % of total EV		47.8%					
Per share value (NOK)	**1.60**		US$/NOK		8.56					

Source: Edison Investment Research. Note: *Substantially higher proportion of higher ASP NFC tags in the product mix.

Sensitivity analysis – reverse DCF

Our indicative valuation is highly sensitive to the rate of adoption of NFC tags. Based on our DCF assumptions for WACC (14.5%) and terminal growth rate (3%), and the same pricing and cost assumptions as shown in Exhibit 2, our analysis (Exhibit 3) indicates that the current share price factors in a revenue ramp-up that is c 25% slower than that adopted in our forecast. In principle, the roll-out rate could be slower than this, but each new client win, especially those like Iovate or Kilchoman whisky, which require over a million tags each, reduces the downside risk to our base case. Conversely, tag deployment from 2021 onwards may be substantially more rapid than the rate shown in our base case if the tags are deployed as widely as management envisages and become as ubiquitous as semiconductors containing ARM processors, Bluetooth chips or graphics processors. Based on better-than-expected yields obtained from process equipment, management estimates that the maximum output obtainable from the R2R plant will be 7bn units per year, which is substantially higher than the 2.6bn total for 2028 used in our base case model. If Thinfilm licenses the technology to a third party, deployment is not limited by the capacity of the R2R facility, so volume sales could be several times higher than shown in Exhibit 2.

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Exhibit 3: Sensitivity analysis

(US$m unless stated)	2019e	2020e	2021e	2022e	2023e	2024e	2025e	2026e	2027e	2028e
Rate of roll-out implied by current share price										
Total revenue	6.7	78.4	130.5	206.4	221.7	246.2	259.0	268.6	283.5	294.3
EBITDA	(49.5)	(14.7)	7.5	31.5	32.0	32.8	33.2	34.0	36.4	37.6
Indicative valuation (NOK/share)	0.40									

Source: Edison Investment Research

Exhibit 4: Financial summary

US$000s	2016	2017	2018	2019e	2020e
Year end 31 December	IFRS	IFRS	IFRS	IFRS	IFRS
PROFIT & LOSS					
Revenue	3,845	5,907	3,397	7,913	94,697
EBITDA	(36,873)	(50,867)	(49,337)	(49,166)	(5,363)
Operating Profit (norm, before amort. and except.)	(40,049)	(57,858)	(53,374)	(55,800)	(12,647)
Intangible Amortisation	0	0	0	0	0
Exceptionals	0	0	0	0	0
Share-based payments	(1,433)	(2,220)	(1,369)	(1,369)	(1,369)
Operating Profit	(41,482)	(60,078)	(54,743)	(57,169)	(14,016)
Net Interest	(2,731)	374	(1,089)	32	20
Profit Before Tax (norm)	(42,780)	(57,484)	(54,463)	(55,768)	(12,627)
Profit Before Tax (FRS 3)	(44,213)	(59,704)	(55,832)	(57,137)	(13,996)
Tax	(282)	122	(11)	0	0
Profit After Tax (norm)	(43,062)	(57,362)	(54,474)	(55,768)	(12,627)
Profit After Tax (FRS 3)	(44,495)	(59,582)	(55,843)	(57,137)	(13,996)
Average Number of Shares Outstanding (m)	659.1	862.7	1,172.0	1,171.9	1,171.9
EPS - normalised (c)	(6.5)	(6.6)	(4.6)	(4.8)	(1.1)
EPS - (IFRS) (c)	(6.8)	(6.9)	(4.8)	(4.9)	(1.2)
Dividend per share (c)	0.0	0.0	0.0	0.0	0.0
EBITDA Margin (%)	N/A	N/A	N/A	N/A	N/A
Operating Margin (before GW and except.) (%)	N/A	N/A	N/A	N/A	N/A
BALANCE SHEET					
Fixed Assets	24,903	34,246	50,110	56,342	52,897
Intangible Assets	3,142	2,190	3,622	5,360	7,272
Tangible Assets	9,155	20,522	36,113	41,679	37,394
Investments	12,607	11,534	10,375	9,303	8,231
Current Assets	79,231	115,074	44,461	34,681	38,142
Stocks	1,086	709	3,010	1,301	15,567
Debtors	3,940	16,245	8,863	1,301	15,567
Cash	74,205	98,120	32,588	32,080	7,009
Other	0	0	0	0	0
Current Liabilities	(7,789)	(7,320)	(7,458)	(61,301)	(75,567)
Creditors	(7,789)	(7,320)	(7,458)	(1,301)	(15,567)
Short term borrowings	0	0	0	(60,000)*	(60,000)
Long Term Liabilities	(12,850)	(12,125)	(11,525)	(10,975)	(10,424)
Long term borrowings	(12,581)	(12,125)	(11,525)	(10,975)	(10,424)
Other long term liabilities	(269)	0	0	0	0
Net Assets	83,495	129,875	75,588	18,748	5,049
CASH FLOW					
Operating Cash Flow	(37,412)	(52,281)	(52,328)	(46,052)	(19,628)
Net Interest	88	343	291	32	20
Tax	(118)	(38)	(91)	0	0
Capex	(5,350)	(27,107)	(11,200)	(13,938)	(4,912)
Acquisitions/disposals	0	0	0	0	0
Financing	101,124	103,285	(15)	0	0
Dividend payments and Other items	(67)	170	(1,590)	0	0
Net Cash Flow	58,265	24,372	(64,933)	(59,958)	(24,520)
Opening net debt/(cash)	(15,940)	(61,624)	(85,995)	(21,063)	38,895
Finance leases initiated	(12,581)	0	0	0	0
Other	0	0	0	0	0
Closing net debt/(cash)	(61,624)	(85,995)	(21,063)	38,895	63,415

Source: Thin Film Electronics data, Edison Investment Research. Note: *Funding gap, modelled as satisfied through debt in line with Edison's policy.

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