EDISON

Thin Film Electronics

Q318 results

Destocking holds back revenue development

Tech hardware & equipment

Thinfilm's results for the nine months ended September 2018 show that Q318 was adversely affected by the end-customer destocking of the anti-theft (EAS) tags. We therefore revise our estimates downwards and cut our indicative valuation from NOK1.92/share to NOK1.68p/share. However, we are encouraged that Apple recently launched iPhones with native background, NFC tag read functionality. This is generating renewed interest among brand owners for Thinfilm's NFC solutions, underpinning management's expectations of a strong NFC tag ramp-up during H219.

Year end	Revenue ($m)	EBITDA* ($m)	PBT* ($m)	EPS* (c)	DPS (c)	EV/Sales** (x)
12/16	3.8	(36.9)	(42.8)	(6.5)	0.0	17.5
12/17	5.9	(50.9)	(57.5)	(6.6)	0.0	11.3
12/18e	2.8	(48.5)	(53.2)	(4.5)	0.0	23.8
12/19e	9.2	(49.1)	(57.7)	(4.9)	0.0	7.2

Note: *EBITDA, PBT and EPS are normalised, excluding amortisation of acquired intangibles, exceptional items and share-based payments. **Cash at end September 18

Revenue development held back by destocking

Revenues from sales of EAS, NFC and CNECT products declined by 24% y-o-y during the nine months ended September 2018 to $1.1m. 12.3m EAS tags were shipped compared to 23.7m in Q317, as a result of inventory destocking by the fast-fashion end-customer. Shipments of NFC tags rose by 26%. Operating costs (excluding depreciation and amortisation) reduced by 6% y-o-y while operating losses were broadly unchanged at US$41.0m. After investing US$12.0m in capex, primarily for the new roll-to-roll (R2R) production facility, net cash fell by US$50.0m to US$48.1m. Noting that deployment of NFC tags on-package has been slower than anticipated, management has delayed cash break-even until during FY20 and is in discussions with a strategic equity partner regarding future funding requirements. We model a $60m funding gap.

Customer engagement increasing

Apple's adoption of native background NFC tag read functionality has been taken as an endorsement of NFC by brand owners, resulting in renewed interest in Thinfilm's offer, even though Thinfilm's NFC printed tags cannot be read by iPhones at present. Customer engagement appears to be shifting from small deployments for specific promotional campaigns to larger on-package programmes across a broader range of product categories including drinks, over-the-counter pharma, health supplements and beauty. Thinfilm has received expressions of interest from strategic partners representing more than 100m customised NFC tags for delivery starting in late FY19, after roll-to-roll NFC production comes on line in Q219.

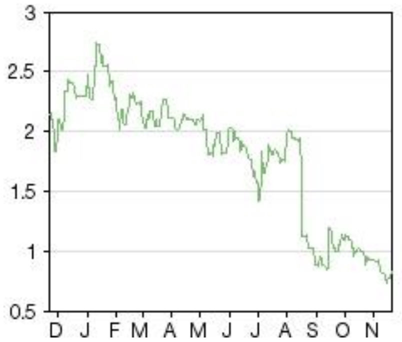
Valuation: Substantial upside potential, execution key

Our base case scenario returns a DCF valuation of NOK1.68/share (previously NOK1.92/share). The key triggers to close the gap are Thinfilm announcing more campaigns requiring a million-plus NFC tags and being able to disclose meaningful volumes of NFC tag shipments per quarter.

20 November 2018

Price	**NOK0.83**
Market cap	**NOK971m**
	NOK8.46/US$
Net cash ($m) at 30 September 2018 excluding financial lease	48.1
Shares in issue	1.17bn
Free float	TBA
Code	THIN
Primary exchange	Oslo
Secondary exchange	OTCQX

Share price performance



%	1m	3m	12m
Abs	(16.6)	(26.0)	(60.8)
Rel (local)	(12.3)	(22.7)	(62.8)
52-week high/low		NOK2.7	NOK0.7

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

FY18 results	February 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-field deployments during Q3 began to use the CNECT Cloud 2.0 Services. This features improved tag management, marketing campaign creation tools, and enhanced analytics capabilities. Customers continue to devise new use cases. For example, during the 2018 London Design Festival, premium furniture retailer The Conran Shop applied NFC tags to furniture displayed in its installation. Visitors to the installation could tap on items of interest and automatically add information to their personal Pinterest boards.

Switching to R2R production

Management had originally intended production of EAS tags on the R2R process to have started by the end of 2017. However, there were delays shipping the equipment to San Jose, so Thinfilm did not start fully processing EAS tags in the facility until the end of May 2018. In September, Thinfilm announced that it had completed its first lots of fully roll-processed EAS die. Management expects that engineering samples of EAS tags from roll-manufactured die will be shipped to Thinfilm's lead customer for qualification later this quarter.

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. Two of the six additional tools are still with the tool vendors. One is scheduled to ship in mid-November. Minor modifications to the Reactive Ion Etcher (RIE) have been completed. Management expects that this tool will finish factory acceptance testing in December and be installed in Q119. This will enable Thinfilm to complete the first fully roll-processed batches in Q219, ahead of volume ramp-up in late 2019. The availability of fully roll-processed NFC tags is around eight months later than originally announced in December 2016. Management now expects the R2R programme to cost US$36.2m rather than the US$32.0m initially budgeted in November 2016. 67% of these costs have been incurred, including the pre-payments referred to above. 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) to meet anticipated customer demand. Management expects that demand will ramp up strongly towards the end of FY19. This view is based on discussions with strategic partners regarding the development of NFC labels with customer-specific features and with brand owners for deployments commencing in six to 12 months’ time. 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.

Once NFC R2R production is underway, the majority of the cost of an NFC tag will be related to ‘back-end’ costs, ie the additional processing steps required once the printed die have come off the R2R line. Thinfilm is currently prototyping module designs that substantially reduce back-end costs, as well as making the NFC module more robust. Management expects that the results of this product development will be in the market by end-FY20.

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 cumbersome nature of this approach has previously been cited by Thinfilm as a major inhibitor to adoption (see our August update note). 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. If necessary, it will redesign some of the functionality in the printed tags so that they are slower to read but compatible with both iOS and Android phones. This would not require any modification to the fabrication process.

Management

The current CEO, Dr Davor Sutija, will be replaced by Kevin Barber on 26 November 2018. Prior to joining Thinfilm, Mr Barber was senior VP of the General Mobile division of Synaptics, a Nasdaq-listed company, where he grew revenue fourfold to over $1bn annually. Mr Barber has also served as CEO of a venture capital-funded start-up, ACCO Semiconductor, as senior VP, General Manager Mobile Business at Skyworks Solutions and senior VP of Operations at Conexant. He is currently a board director at Intevac.

Financials

EAS destocking results in lower product revenues

A comparison of performance for the nine months ended September 2018 (Q318) with the corresponding period in the prior year is obscured by the receipt in Q317 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 $2.2m during Q318 to $2.6m, reflecting the absence of Joint Development A greement income and lower profits on disposal of assets. The key metric, revenue from sales of EAS, NFC and CNECT products, declined by 24% year-on-year to $1.1m. 12.3m EAS tags were shipped compared to 23.7m in Q317, as a result of inventory destocking by the fast-fashion end-customer that management notes was caused by a weak retail environment. Shipments of NFC tags rose by 26%. Operating costs (excluding depreciation and amortisation charges) reduced by 6% year-on-year to US$40.6m. 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 Q317 bore the cost of renting both the original and the new premises in San Jose. Operating losses were broadly unchanged at US$41.0m, as were losses before tax at US$39.5m. 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 medium term. Management aims to reduce cash-burn to c $4m/month within six months.

Thinfilm has not published financials for Q318, which is consistent with the presentation this time last year. We calculate that quarterly revenues from EAS, NFC and CNECT products were $234k in Q318 compared with $405k in Q118 and $429k in Q218 and that EAS tag volumes were c 1m in Q318 compared with c 6m in Q118 and c 5m in Q218.

Net cash (excluding long-term financial leases) reduced by US$50.0m to US$48.1m. Thinfilm invested US$12.0m 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$1.2m inflow from the disposal of Linköping site assets. The only financial liability is $11.6m, arising from a long-term financial lease for the R2R production facility. Management has announced that it has commenced 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

Exhibit 1: Revisions to estimates

	2017	2018e			2019e			2020e		
	Actual	Old	New	Chg (%)	Old	New	Chg (%)	Old	New	Chg (%)
NFC tags (m units)	0.0	14.0	2.0	(85.7)	203.0	40.0	(80.3)	960.0	650.0	(32.3)
EAS labels (m units)	25.9	33.0	14.0	(57.6)	125.0	45.0	(64.0)	197.0	100.0	(49.2)
Total revenue ($m)	5.9	5.4	2.8	(47.6)	34.5	9.2	(73.3)	141.1	94.7	(32.9)
EBITDA ($m)	(50.9)	(49.5)	(48.5)	(2.1)	(43.3)	(49.1)	13.4	15.7	(4.9)	N/A
Normalised PBT ($m)	(57.5)	(54.2)	(53.2)	(1.9)	(51.3)	(57.7)	12.5	6.6	(15.5)	N/A
Normalised EPS (c)	(6.6)	(4.6)	(4.5)	(1.9)	(4.4)	(4.9)	12.5	0.6	(1.3)	N/A
Net (cash)/debt	(86.0)	(20.3)	(21.8)	7.2	38.5	43.7	13.7	47.1	70.4	49.5

Source: Company data, Edison Investment Research

We modify our estimates to reflect several developments:

Revenues: We cut back FY18 EAS volumes to model the impact of the destocking. The EAS tags are currently used only in shoes. Since Thinfilm has announced that its customer has approved the technology for use with denims, which potentially require much larger volumes of EAS tags than shoes, we continue to model strong EAS volume growth in FY19. Management notes that as customers become more familiar with the NFC technology, they are migrating from relatively low-volume individual promotions where the tags are embedded neck tags on bottles or beer mats, to larger-scale deployments where the tags are embedded within the product package. Such deployments typically take longer to prepare because modifications to both the packaging lines and packaging are required. We therefore push back ramp-up of NFC tags to H219, which is when the R2R fabrication facility will be supplying printed NFC tags in volume and customised NFC tags for potential strategic partners may start shipping. We note that given the relatively early stage of corporate development, visibility of volume roll-out and earnings is not good.

Operating costs: We modify our FY19 and FY20 indirect costs in line with the Q3 numbers.

Capex: We adjust our capex estimate in line with R2R cost overrun.

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 across a range of scenarios.

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 NOK1.68/share (formerly NOK1.92/share). For the share price to reach this level, investors will 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 and being able to disclose meaningful volumes of NFC tag shipments per quarter.

Exhibit 2: DCF summary

$m	2018e	2019e	2020e	2021e	2022e	2023e	2024e	2025e	2026e	2027e
Revenue by product line										
EAS	0.7	2.0	4.3	8.2	12.6	17.3	20.7	22.8	25.1	27.6
NFC OpenSense	0.0	0.4	9.2	17.3	26.6	32.6	37.4	39.2	50.2	53.7
NFC SpeedTap	0.0	2.7	69.9	137.7	220.7	236.7	260.7	273.8	273.8	287.5
NFC Silicon	0.2	1.9	6.1	-	-	-	-	-	-	-
Pass-through costs	0.0	0.3	3.3	8.2	12.7	15.7	16.5	16.4	15.5	15.5
Sales revenue	1.0	7.4	92.8	171.4	272.6	302.4	335.3	352.2	364.6	384.2
Total unit sales (m)	15	70	705	1,470	2,494	3,432	4,015	4,434	4,682	5,186
ASP per tag including software (c)	6.1	8.6	12.4	11.7	10.9	8.8	8.4	7.9	7.8	7.4
Production revenue	0.8	5.4	86.7	171.4	272.6	302.4	335.3	352.2	364.6	384.2
Other revenue	2.0	3.8	8.0	1.9	2.0	2.1	2.2	2.3	2.3	2.4
Total revenue	2.8	9.2	94.7	173.4	274.6	304.5	337.5	354.5	366.8	386.6
Gross margin own production (%)	N/A	1.2	49.7	52.1	49.5	48.7	48.6	48.6	48.5	48.4
EBITDA	(48.5)	(49.1)	(4.9)	30.6	70.8	76.3	85.3	87.8	91.3	97.1
EBITDA Margin (%)	N/A	N/A	N/A	17.6	25.8	25.1	25.3	24.8	24.9	25.1
Depreciation	(4.8)	(7.0)	(7.6)	(7.3)	(7.1)	(7.2)	(7.4)	(7.6)	(7.7)	(8.0)
Share-based payments	(1.4)	(1.4)	(1.4)	(1.4)	(1.4)	(1.4)	(1.4)	(1.4)	(1.4)	(1.4)
EBIT	(54.6)	(57.6)	(13.9)	21.9	62.3	67.7	76.6	78.7	82.3	87.8
Notional tax	0.0	0.0	0.0	0.0	0.0	0.0	0.0	(25.2)	(26.3)	(28.1)
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	(48.5)	(49.1)	(4.9)	30.6	70.8	76.3	85.3	62.6	65.0	69.0
Change in working capital	9.2	(1.0)	(14.1)	(12.9)	(16.6)	(4.9)	(5.4)	(2.8)	(4.8)	(5.3)
Capex	(25.0)	(13.8)	(4.8)	(5.4)	(7.6)	(8.5)	(9.4)	(10.0)	(10.5)	(11.2)
Free cash flow	(64.3)	(64.0)	(23.7)	12.2	46.5	62.9	70.5	49.8	49.7	52.6
Terminal value										457
NPV of future cash flows	(64.3)	(55.9)	(18.1)	8.2	27.1	32.0	31.3	19.3	16.8	150.7
Value of future cash flows	147		WACC	14.5%						
FY17 net debt/(cash)	(86.0)		Terminal growth rate	3%						
Equity value	233.0		TV as % of total EV	58.0%						
Per share value (NOK)	1.68		USD/NOK	8.46						

Source: Edison Investment Research

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 27% 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 now estimates that the maximum output obtainable from the R2R plant will be 7bn units per year, which is higher than the 5.2bn total for 2027 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.

Exhibit 3: Sensitivity analysis

$m	2018e	2019e	2020e	2021e	2022e	2023e	2024e	2025e	2026e	2027e
Rate of roll-out implied by current share price										
Total revenue ($m)	1.0	7.4	93.4	128.2	203.7	226.8	252.0	264.9	274.6	289.7
EBITDA ($m)	(48.5)	(49.1)	(6.7)	7.1	35.3	37.7	42.6	42.9	45.0	48.4
Indicative valuation (NOK/share)	0.76									

Source: Edison Investment Research

Exhibit 4: Financial summary

US$'000s	2016	2017	2018e	2019e	2020e
Year end December	IFRS	IFRS	IFRS	IFRS	IFRS
PROFIT & LOSS					
Revenue	3,845	5,907	2,839	9,219	94,697
EBITDA	(36,873)	(50,867)	(48,456)	(49,141)	(4,870)
Operating Profit (norm, before amort. and except.)	(40,049)	(57,858)	(53,244)	(56,189)	(12,503)
Intangible Amortisation	0	0	0	0	0
Exceptionals	0	0	0	0	0
Share-based payments	(1,433)	(2,220)	(1,390)	(1,390)	(1,390)
Operating Profit	(41,482)	(60,078)	(54,634)	(57,579)	(13,893)
Net Interest	(2,731)	374	66	(1,470)	(2,986)
Profit Before Tax (norm)	(42,780)	(57,484)	(53,178)	(57,659)	(15,489)
Profit Before Tax (FRS 3)	(44,213)	(59,704)	(54,568)	(59,049)	(16,879)
Tax	(282)	122	0	0	0
Profit After Tax (norm)	(43,062)	(57,362)	(53,178)	(57,659)	(15,489)
Profit After Tax (FRS 3)	(44,495)	(59,582)	(54,568)	(59,049)	(16,879)
Average Number of Shares Outstanding (m)	659.1	862.7	1,172.0	1,172.0	1,172.0
EPS - normalised (c)	(6.5)	(6.6)	(4.5)	(4.9)	(1.3)
EPS - (IFRS) (c)	(6.8)	(6.9)	(4.7)	(5.0)	(1.4)
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	53,382	59,107	55,213
Intangible Assets	3,142	2,190	3,686	5,332	7,142
Tangible Assets	9,155	20,522	39,234	44,386	39,753
Investments	12,607	11,534	10,462	9,390	8,318
Current Assets	79,231	115,074	34,290	30,339	31,180
Stocks	1,086	709	467	1,516	15,567
Debtors	3,940	16,245	467	1,516	15,567
Cash	74,205	98,120	33,357	27,308	47
Other	0	0	0	0	0
Current Liabilities	(7,789)	(7,320)	(467)	(61,516)	(75,567)
Creditors	(7,789)	(7,320)	(467)	(1,516)	(15,567)
Short term borrowings	0	0	0	(60,000)	(60,000)
Long Term Liabilities	(12,850)	(12,125)	(11,581)	(11,037)	(10,493)
Long term borrowings	(12,581)	(12,125)	(11,581)	(11,037)	(10,493)
Other long term liabilities	(269)	0	0	0	0
Net Assets	83,495	129,875	75,624	16,893	333
CASH FLOW					
Operating Cash Flow	(37,412)	(52,281)	(39,289)	(50,190)	(18,921)
Net Interest	88	343	66	(1,470)	(2,986)
Tax	(118)	(38)	0	0	0
Capex	(5,350)	(27,107)	(24,996)	(13,846)	(4,810)
Acquisitions/disposals	0	0	0	0	0
Financing	101,124	103,285	0	0	0
Dividend payments and Other items	(67)	170	0	0	0
Net Cash Flow	58,265	24,372	(64,219)	(65,505)	(26,717)
Opening net debt/(cash)	(15,940)	(61,624)	(85,995)	(21,776)	43,729
Finance leases initiated	(12,581)	0	0	0	0
Other	0	0	0	0	0
Closing net debt/(cash)	(61,624)	(85,995)	(21,776)	43,729	70,446

Source: Company data, Edison Investment Research

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