



Keysight Technologies
KEYS (NYSE)

Jan. 26, 2019

Pitch by: Julien Lin

Agenda

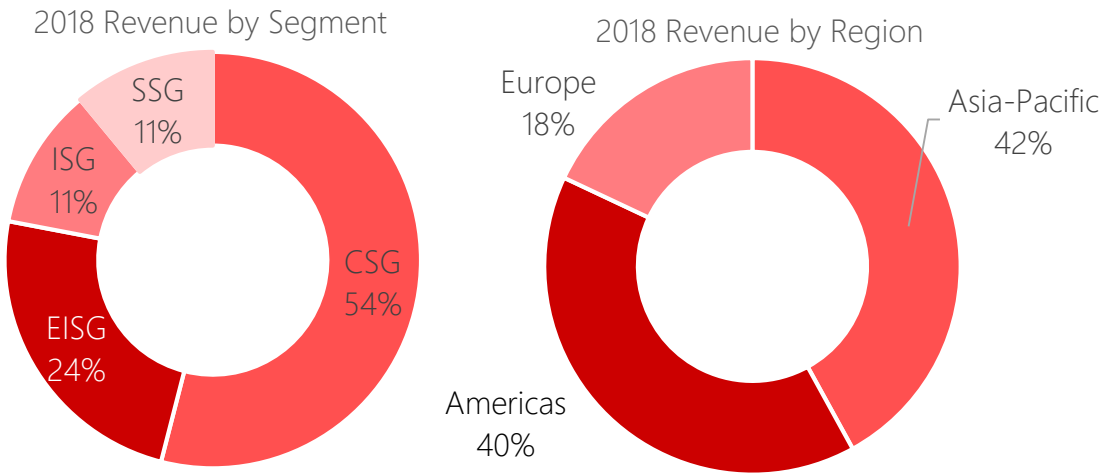
Content	Slide
Business Description	3-5
Industry Outlook	6-7
Investment Thesis I	8-9
Investment Thesis II	10
Investment Thesis III	11
Risks and Catalysts	12
Valuation	13-15
Appendix	16-21

Business Description

Summary

- Evolved from a oscilloscope manufacturer to a company that provides a variety of benchmarking solutions
- One of the largest manufacturers of field and electronics test/benchmarking instruments
- Target Customers: Aerospace & Defense Manufacturing, Consumer Electronics, Semi Conductor Manufacturing, Networking Hardware

Revenue Breakdown



History




1999 – Began as electronic test division of HP, before being separated into Agilent

2014 – Separation of Agilent and Keysight, with Keysight retaining all electronic testing services and products.

2015 – Acquired Anite PLC and Micro Movements for \$500 million USD, companies specializing in test equipment for a broad range of industries

2016 – Acquired Ixia Inc. for \$1.6 billion USD, a company specializing in network solutions and telecommunications.

Management Team

			
	Ron Nersesian	Neil Dougherty	Jay Alexander
Position	CEO	CFO	CTO
Recent Experience	Agilent Tech Teledyne	Hewlett-Packard	NIST Agilent Tech
Background	Engineering degree from Lehigh. MBA from NYU Stern	MBA from U. of Chicago. Ba. Of Economics from UCSD	Engineering degree and CS Masters from U. of Colorado

Business Description

Overview of Operations

Keysight has 4 Business Units

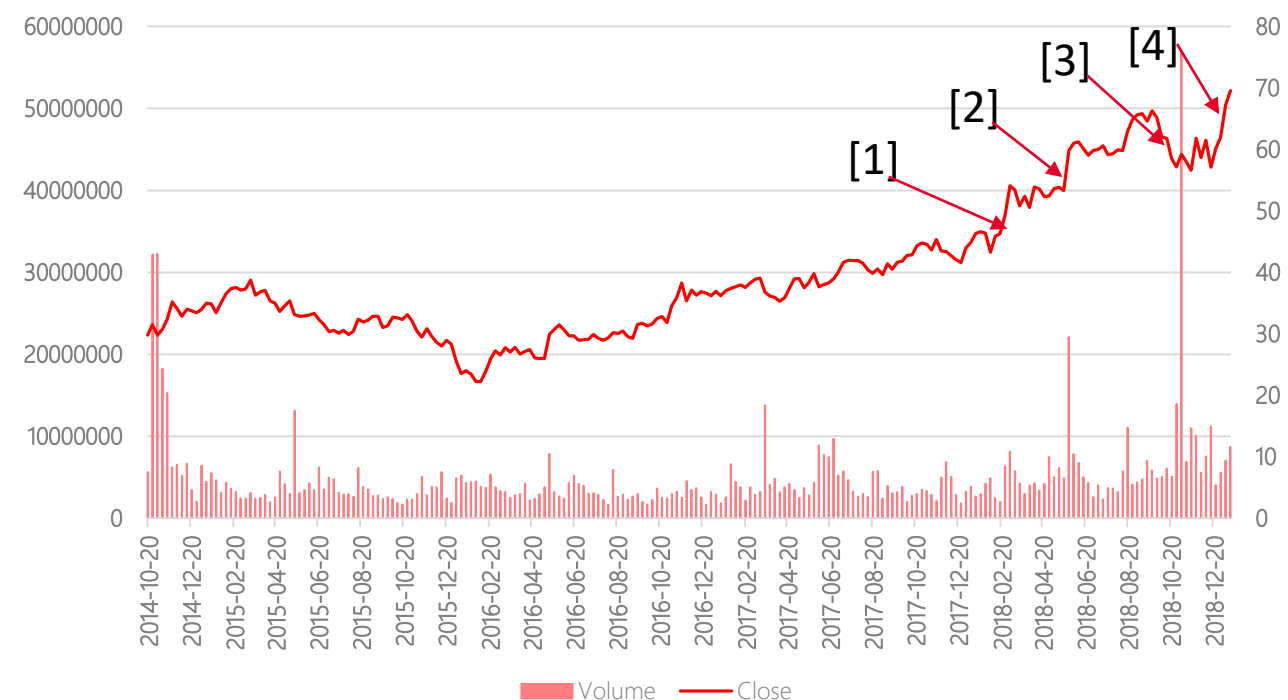
1. **Communications Service Group (CSG)** – Software Benchmarking → IoT, cloud, energy, and network markets
2. **Electronic Industrial Solutions Group (EISG)** – Benchmarking Solutions → automotive, semiconductor, and general electronic markets
3. **Ixia Solutions Group (ISG)** – Benchmarking Solutions → network and cloud server markets
4. **Services Solutions Group (SSG)** – Equipment Servicing → Calibration, IoT, tech refresh, repair and tracking services

Market Data

Last Price	68.32	Market Cap	12.72B
Day High/Low	69.39	Shares Out	187.64M
52 wk High/Low	67.42	Float %	89.9%
Volume	2.49M	Dividend Yield	-
Beta 5Y	1.06	EV	13.94B
TEV / Total Rev	3.59	TEV / EBITDA	19.15

Share Price Performance

5Y Keysight Price vs. Volume



[1] Keysight announces new Channel Emulation hardware

[2] Keysight releases earnings update.

[3] Keysight added to S&P 500.

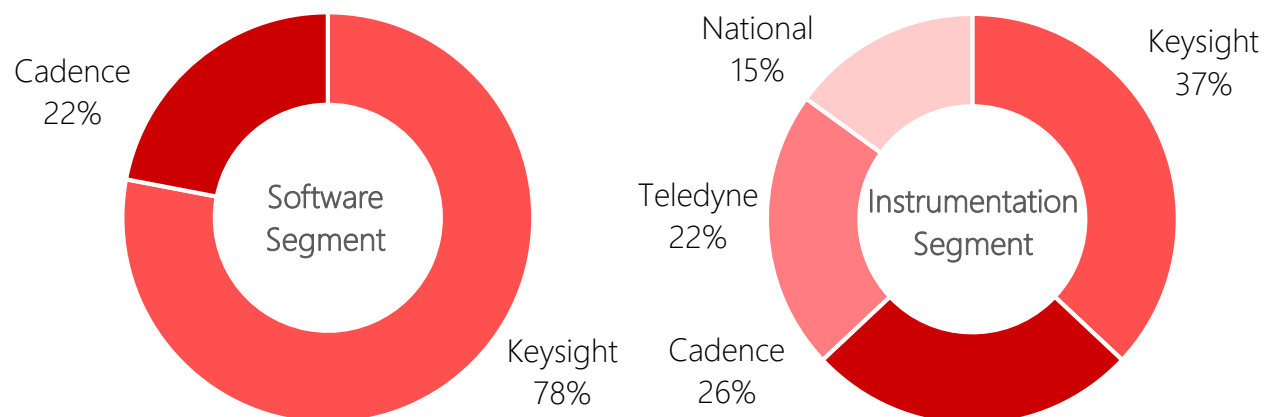
[4] Keysight announces new Ixia Visibility extension

Business Description

Customers



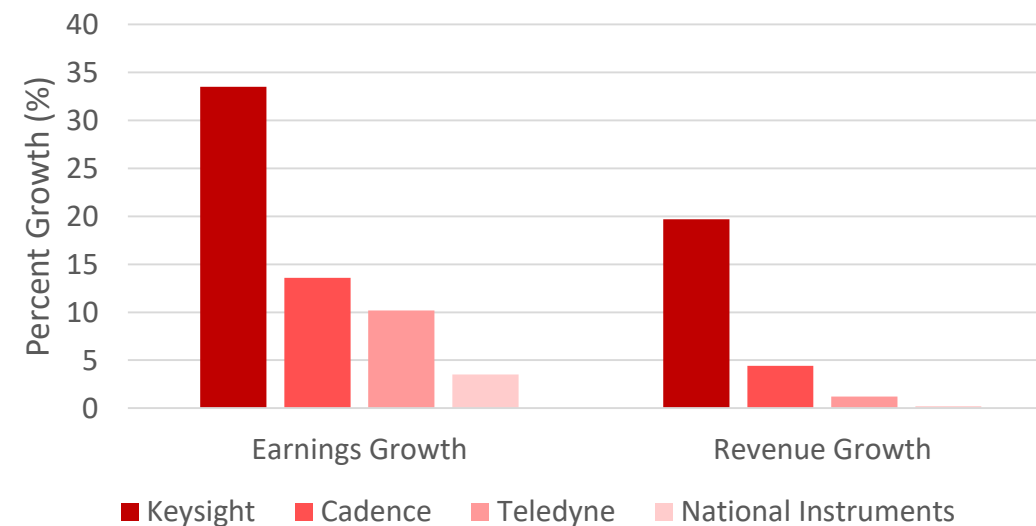
Market Share



Competitors



Competitor Analysis



Competitive Advantages

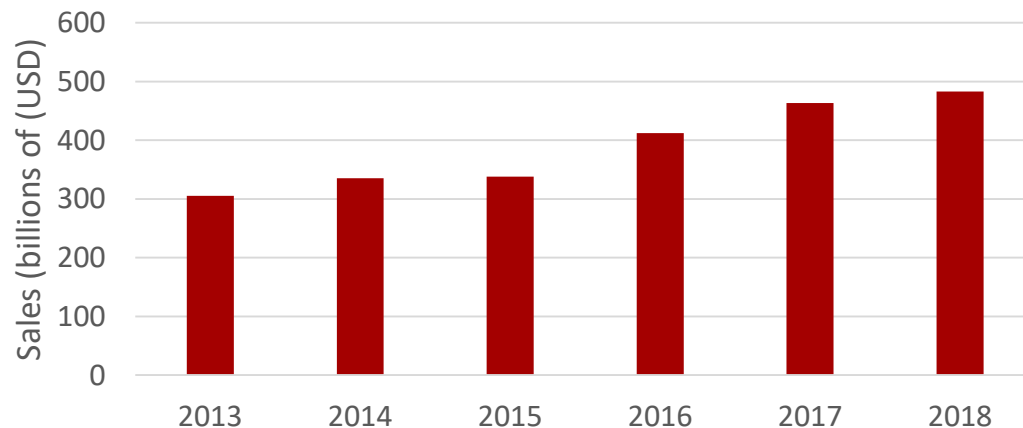
- First to integrate software-based solutions for streamlining test workflows
- First to offer testing for autonomous cars – important for self-driving cars
- Secured 5G test contracts with multiple telecom and electronic giants
- Only company in the market to offer all form factors, covering all stages of a product life cycle, including research, manufacturing, installation and maintenance

Industry Outlook

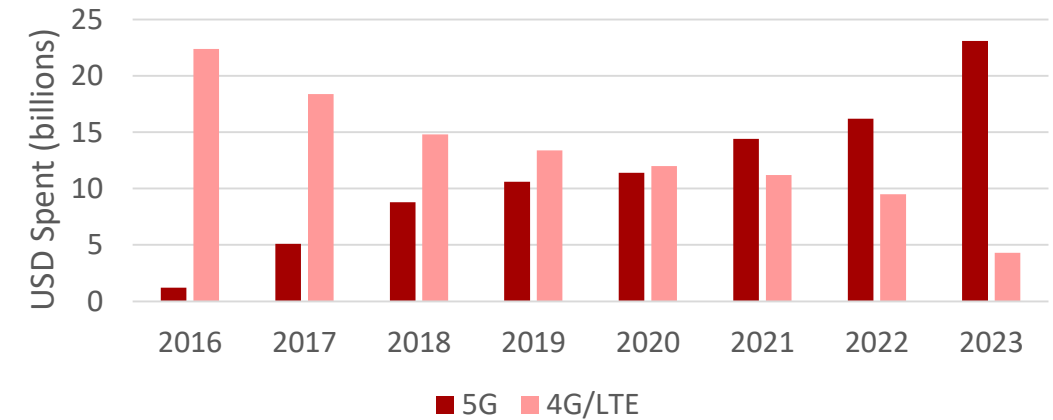
Market Trends

- The rush for 5G Standard approval has led to a sudden increase in demand for testing instruments.
- Most emerging markets require strenuous Layer 1-7 testing, precision measurement, and network visibility solutions as a package to de-risk development and operations
- End-use industries demand much higher precision than in the past, requiring constant innovation to refresh products
- Market is becoming increasingly defragmented, as industry leaders continue to buy out smaller companies

End-Use Market Growth: Semiconductors



End-Use Market Growth: 5G



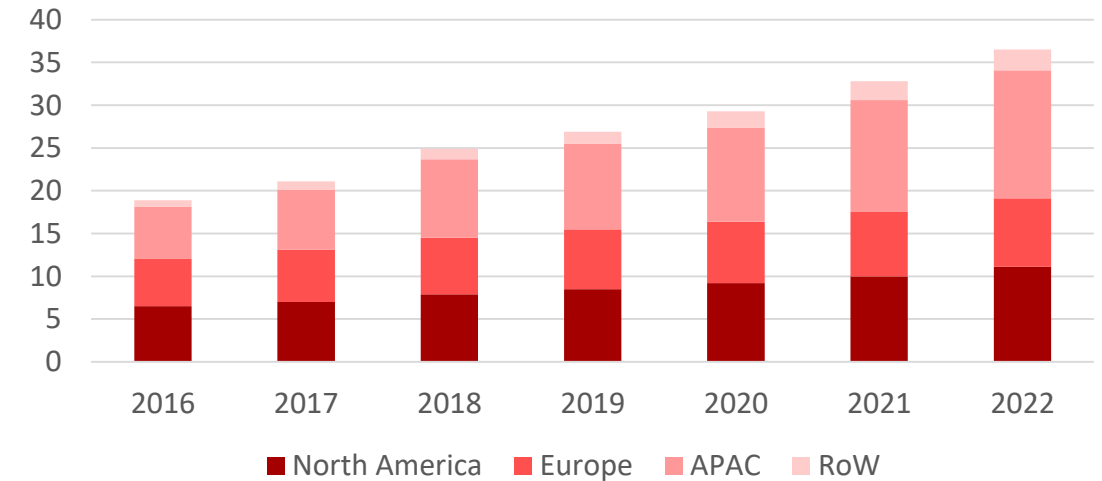
- 5G is expected to be the next big leap in consumer technology
- 100x faster than 4G/LTE in laboratory condition. Around 10x faster in everyday use-case.
- Expected 30-40% increase in productivity due to 5G enabling innovation in cloud computing, autonomous vehicles, IoT, and Aerospace & Defense
- Expected first adoption in 2019. Expected full adoption in developed countries by 2023.

Industry Outlook

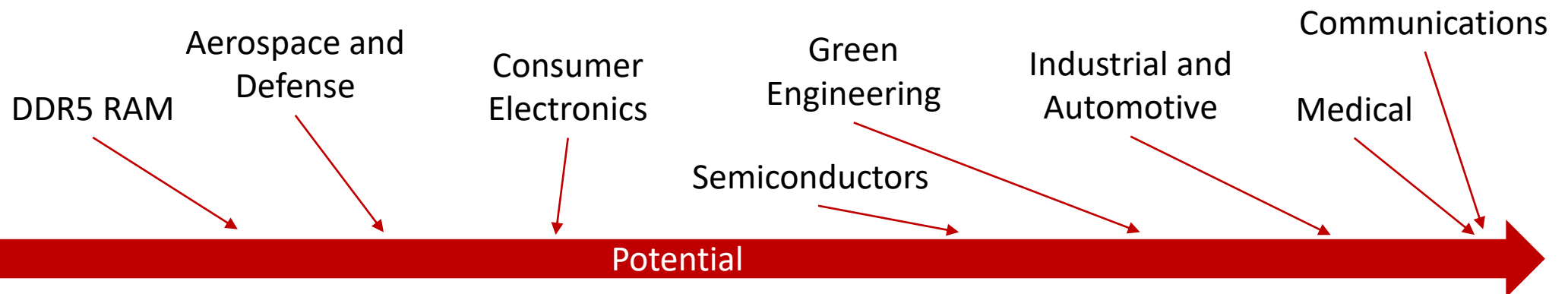
Future Outlook

- Several growth drivers including automotive industry, data centres, 5G, IoT, power management applications, IoT, and medical solutions.
- The electronic measurement industry enables other high-tech sectors to deliver high performance with precision
- Most emerging tech categories fall under Internet of Things (IoT), which requires testing to operate precisely. McKinsey says the IoT market will grow 15-20% to 35 billion units by 2022.
- Newer technology, such as autonomous cars, require an immense amount of semiconductors, all of which need to be tested before use.

Spending on Test Equipment



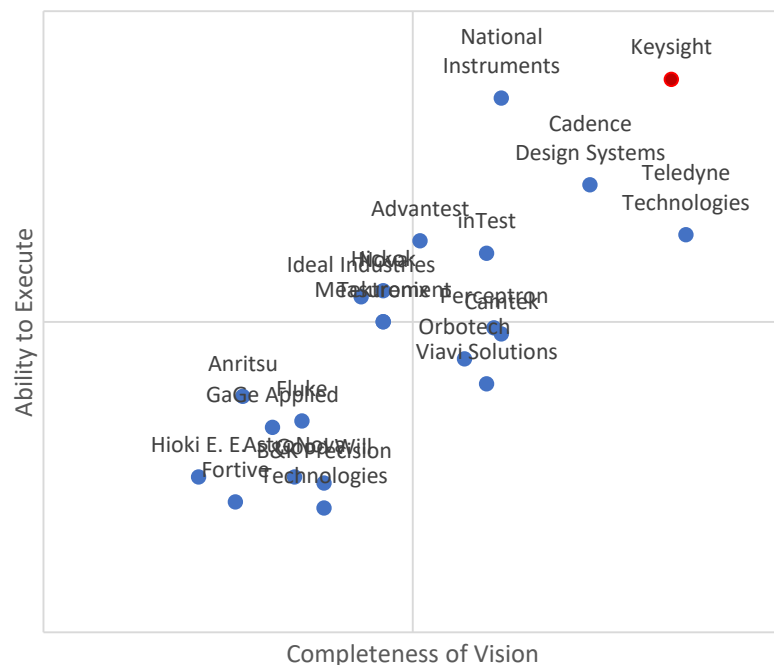
Several Emerging End Markets



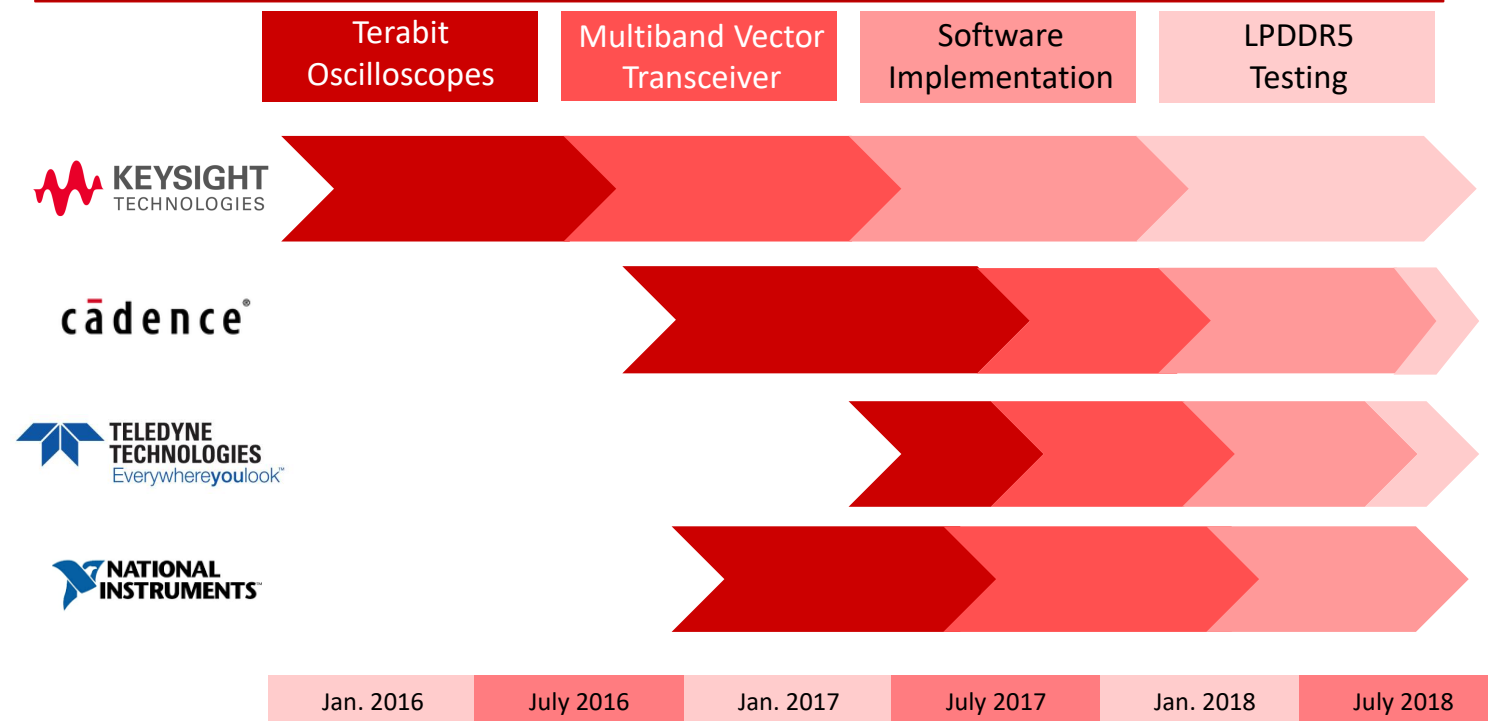
Investment Thesis I: Growth Opportunities

Keysight is an Industry Leader

- Has capacity to capitalize on growing demand
- Ideal situation for any company, at any point of a company's life cycle



Keysight is a First-Mover

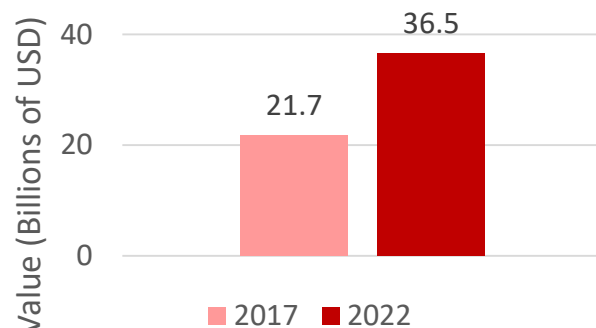


- Constant innovation allows for Keysight to adapt to any changes in emerging technology, while also providing the most precise of instruments
- First to release key testing instruments for emerging markets
- Only packaged solution, which is desirable for advanced electronics manufacturing, with integrated software that outperforms all competitors.
- 12600 US-based and foreign patents allow Keysight to maintain this advantage

Investment Thesis I: Growth Opportunities

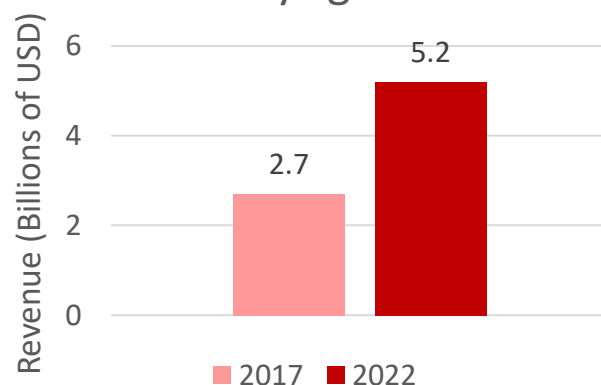
Keysight Outperforms In-Demand Market

Electronic Testing Industry



- McKinsey expects the industry to undergo growth from 2017 to 2022
- Expected Compounded Annual Growth Rate (CAGR) of 10.96%

Keysight



- Expected revenue growth from various signed contracts
- Expected CAGR of 14.05%

Established Customers with Guaranteed Contracts



- Selected Keysight's UXM-based 5G NR network emulation solution to test 5G connectivity
- Used to ensure compliancy with latest 3GP 5G NR standards
- Used emulation services to accelerate delivery of new 5G handsets



- Selected Keysight's RF DVT Toolset to test beam management across sub-6GHz and mmWave frequencies
- Validates performance of all network devices
- Streamlines workflow for all developing Google products
- Continuing contract through 2022



- Selected Keysight's UXM-based 5G NR network emulation solution to test hardware providing 5G connectivity
- Ensures that Chinese Huawei-based 5G standard submission fit lowest allowable benchmark
- Test equipment orders continue through 2021



- Selected Keysight's UXM-based 5G NR network emulation solution to test hardware providing 5G connectivity
- Testing in order to outperform Huawei-standard 5G and lowest allowable benchmark
- Test equipment orders continue through 2020

Investment Thesis II: Constant Innovation

Keysight Maintains Key Innovations



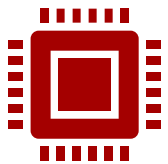
Integrated Workflow Software

- Software to guide testing from development to launch
- Subscription-based
- Only company to integrate all current equipment, and is backward and forward compatible
- Cadence to release complete software by 2020



5G Phased Array/Beamforming

- Ability to evaluate signals and signal performance to 0.01% of error margin
- Innovative beamforming software
- National Instruments expected to release lower tier beamforming in Feb. 2019

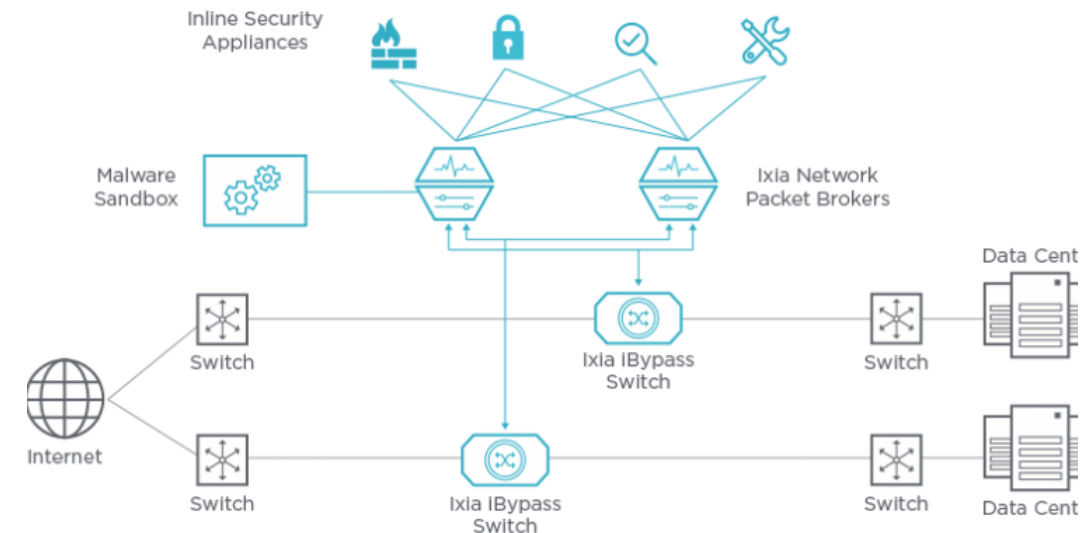


LPDDR5 RAM Testing

- First to release testing method to LPDDR5 RAM
- LPDDR5 RAM is expected to release in 2019, leaving Keysight as the only tested method to verify performance for 2019 release

A New Innovation

Network Visibility

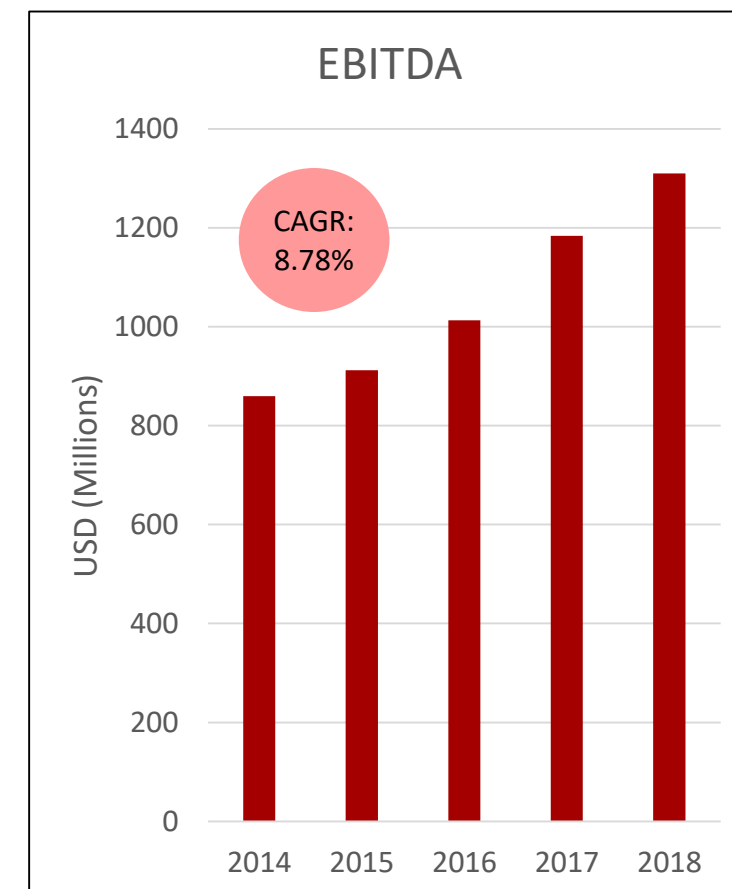
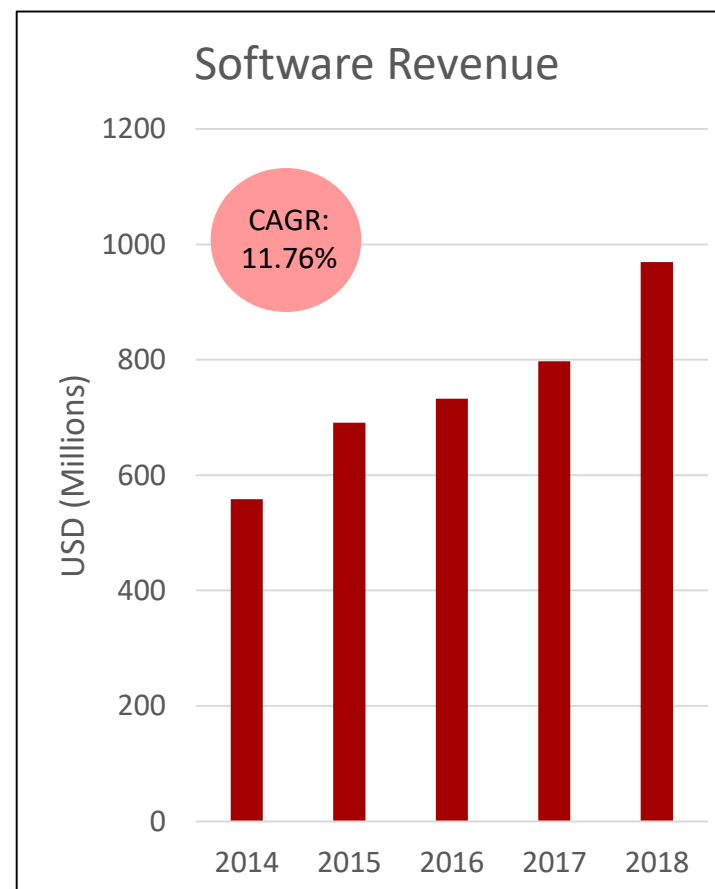


- Inspect live network for malware and attacks
- No disruption in network availability. Critical to 5G development for the future
- Increase in network productivity of up to 13%
- Public use by March 2019

Investment Thesis III: Strong Financials

Keysight has Strong Recurring Revenues

- Stable business model with clear growth opportunities
 - 2-4 Year contracts
 - 23% Revenue growth with existing companies
- Subscription service on workflow software that is hard to replace
- Diversification of products allows Keysight to tap into multiple markets
- Customers have global presence (Asia, North America, and Europe) with opportunities for global growth



Catalysts and Risks

Catalysts



Fight for 5G Standard

- Huawei, Ericsson, and other companies are competing to set the first accepted 5G standard
- Strenuous testing needed to prove each company's benchmarks
- Testing equipment & Software needed from Keysight



Increasing Focus on Software

- Keysight is investing more and more into its software testing components
- Ensures recurring subscription revenues and stickier revenue streams, lowering overall risk
- Offers better scale and margin potential



Need for Precision and Customization

- Newer technologies require much more precise measurements and testing mechanisms than before
- Companies require open-source solutions that can fit with its own work environment
- Keysight differentiates itself by using modular, software-driven PXI solutions to serve its various sub-industries

Risks



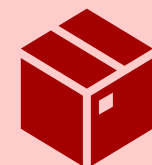
High Growth Expectations

- Keysight is in an industry with extremely high growth rates
- If Keysight cannot keep up through scale, then share price could take a hit as shareholder confidence decreases



Economic Downturn

- The testing industry is susceptible to changes in the economy.
- Companies could use older equipment or turn to smaller companies to provide less precise, but cost-efficient instruments instead



Companies with Scale Advantage

- Because Keysight is focused on modularity to sell to its multiple sub-industries, it does not have scale advantage
- Could be out scaled by companies like National Instruments who focus on one section of instrumentation

Valuation: DCF

	Actual					Forecast period				CAGR	CAGR
	2015A	2016A	2017A	2018A	2019E	2020E	2021E	2022E	2023E	2015-2018A	2019-
Net sales	2,862	2,930	3,189	3,878	4,188	4,481	4,750	4,988	5,187	10.7%	5.5%
growth, %		2.4%	8.8%	21.6%	8.0%	7.0%	6.0%	5.0%	4.0%		
COGS	-1,058	-994	-984	-1,356	-1,431	-1,532	-1,624	-1,705	-1,773	8.6%	5.5%
Gross profit	1,804	1,936	2,205	2,522	2,757	2,950	3,127	3,283	3,414	11.8%	5.5%
margin, %	63.0%	66.1%	69.1%	65.0%	65.8%	65.8%	65.8%	65.8%	65.8%		
OPEX	-892	-923	-1,021	-1,212	-1,260	-1,308	-1,356	-1,402	-1,448	10.8%	3.5%
growth, %		3.5%	10.6%	18.7%	4.0%	3.8%	3.6%	3.4%	3.3%		
in % of net sales	31.2%	31.5%	32.0%	31.3%	30.1%	29.2%	28.5%	28.1%	27.9%		
EBITDA	912	1,013	1,184	1,310	1,496	1,641	1,771	1,881	1,967	12.8%	7.1%
margin, %	31.9%	34.6%	37.1%	33.8%	35.7%	36.6%	37.3%	37.7%	37.9%		
Depreciation	-100	-44	-100	-55	-100	-107	-113	-119	-124	-18.1%	5.5%
in % of net sales	3.5%	1.5%	3.1%	1.4%	2.4%	2.4%	2.4%	2.4%	2.4%		
EBIT	812	969	1,084	1,255	1,396	1,534	1,658	1,762	1,843	15.6%	7.2%
Tax (21%)	-119	-138	-151	-164	-293	-322	-348	-370	-387	11.4%	7.2%
Capex		-91	-72	-132	-122	-131	-139	-146	-152	n.a.	0
in % of net sales		3.1%	2.3%	3.4%	2.9%	2.9%	2.9%	2.9%	2.9%		
Increase/Decrease in NWC		23	-106	93	-32	-30	-28	-24	-21		
Unlevered Free Cash Flow		807	855	1,107	1,049	1,158	1,256	1,341	1,407		

DCF-valuation	
Enterprise value ("EV")	15,526
Equity value ("market cap")	15,326
Price per share	81.68

Implied multiples	2018A	2019E	2020E	2021E	2022E
Sales	4.0x	3.7x	3.5x	3.3x	3.1x
EBITDA	11.9x	10.4x	9.5x	8.8x	8.3x
EBIT	12.4x	11.1x	10.1x	9.4x	8.8x

Terminal Value

Terminal Year Free Cash Flow	1,407
Perpetuity Growth Rate	2.5%
Terminal Year EBITDA	1,967
Terminal Value	17,762
Implied Exit Multiple	9.5x
Discount Period	5.0
Discount Factor	0.6
Present Value of Terminal Value	10,722
% of Enterprise Value	69%

The DCF Model shows an implied share price of \$81.68, which is a 19.4% upside from its current share price of \$68.32

Valuation: Comps Table

Company Name	Market Data		Financial Data				EV/Revenue			EV/EBITDA			P/E			EBITDA Margin % (LTM)
	Price (\$/share)	Market Cap (\$M)	EV (\$M)	Revenue (\$M)	EBITDA (\$M)	Net Income (\$M)	LTM x	2019E x	2020E	LTM x	2019E	2020E	LTM	2019E	2020E	
Cadence Design Systems Inc. (Nasdaq: CDNS)	45.94	12,961	12,756	2,117	707	514	6.0x	5.7x	5.2x	18.0x	17.2x	15.2x	54.0x	36.2x	33.5x	0.3x
Trimble Inc. (Nasdaq: TRMB)	36.71	9,220	11,027	3,143	647	485	3.5x	3.2x	3.0x	17.0x	14.7x	13.2x	56.5x	29.1x	26.6x	0.2x
National Instruments, Inc. (Nasdaq: NATI)	44.94	5,952	5,469	1,379	276	187	4.0x	3.7x	3.4x	19.8x	17.5x	15.3x	78.8x	38.1x	33.0x	0.2x
Ametek (Nasdaq: AME)	71.2	16,527	17,910	4,833	1,272	762	3.7x	3.4x	3.3x	14.1x	12.8x	12.6x	22.5x	22.3x	21.8x	0.3x
Aerovironment Inc. (Nasdaq: AVAV)	76.19	1,823	1,533	298	25	15	5.2x	5.0x	4.1x	61.8x	33.6x	27.8x	88.6x	49.2x	46.7x	0.1x
Average							4.5x	4.2x	3.8x	26.2x	19.2x	16.8x	60.1x	35.0x	32.3x	0.2x
Median							4.0x	3.7x	3.4x	18.0x	19.6x	17.2x	61.6x	34.7x	32.0x	0.2x
Keysight Corp. (Nasdaq: KEYS)	70.65	13,256	14,104	3,914	818	596	3.6x	3.4x	3.1x	17.3x	13.5x	12.1x	55.2x	23.6x	21.7x	0.2x

EV/EBITDA

Implied share price of \$85.28 when using comparable companies' EV/EBITDA multiple, indicating an upside of 24.8%

EV/Revenue

Implied share price of \$77.03 when using comparable companies' EV/Revenue multiple, indicating an upside of 12.7%

P/E Ratio

Implied share price of \$78.85 when using comparable companies' EV/Revenue multiple, indicating an upside of 15.4%

Valuation: Football Field Analysis

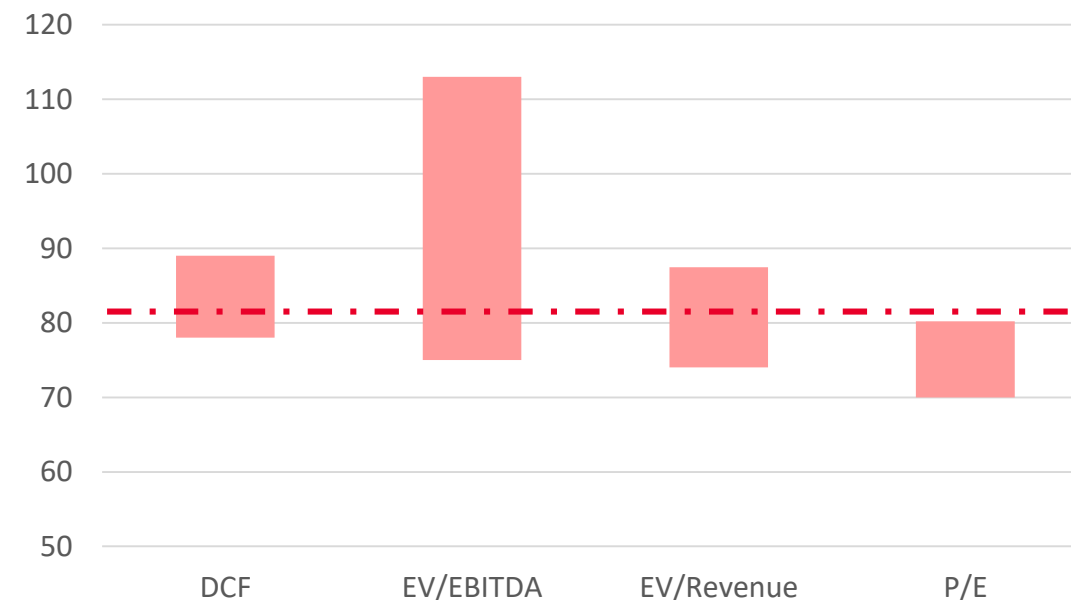
Analyst Predictions

Organization	Recommendation	Target Price
William O'Neil & Co.	Buy	\$75.00
Baird	Buy	\$78.00
Jefferies	Buy	\$81.00
Thompson, Davis & Co.	Buy	\$82.00
Credit Suisse	Buy	\$82.00
Stifel	Buy	\$82.00
Goldman Sachs	Buy	\$82.00

Price per Share Calculation

DCF	50%
EV/EBITDA	25%
EV/Revenue	12.5%
PE Ratio	12.5%
Total Price per Share	\$81.64

Football Field Analysis



Recommendation: Buy

Market Price: \$68.32

Target Price: \$81.64

Upside: 19.4%

Stop Loss: \$62.11



Appendices

Appendix: Sensitivity Analysis

Sensitivity Analysis

Share Value (\$)		Growth				
		6%	7%	8%	9%	10%
WACC	9.6%	75.91	80.62	84.12	88.90	93.01
	10.1%	74.60	79.17	82.89	87.66	91.78
	10.6%	73.45	78.92	81.68	86.54	90.23
	11.1%	72.03	77.46	80.45	85.28	89.21
	11.6%	70.78	76.26	79.20	83.97	88.18

Share Value (\$)		Terminal Value Multiplier				
		8.5%	9x	9.5x	10x	10.5x
WACC	9.6%	77.89	82.12	84.12	86.20	89.31
	10.1%	78.21	80.92	82.89	84.76	87.43
	10.6%	77.42	79.33	81.68	83.91	85.13
	11.1%	76.03	78.46	80.45	82.09	84.64
	11.6%	74.88	77.37	79.20	81.27	83.24

Appendix: WACC Calculation

WACC

Target Capital Structure		
Debt to Total Capitalization	29.1%	
Equity to Total Capitalization	70.9%	
Debt to Equity Ratio	41.8%	
Cost of Equity		
Risk-free rate (2)	2.5%	Interpolated Yield on 10-year Treasury bond
Market risk Premium (3)	7.1%	Obtained from Ibbotson SBBI Valuation Yearbook
Levered Beta (4)	1.25	
Size Premium (5)	1.7%	Low-Cap Decile size premium based on market capitalization, per Ibbotson
Cost of Equity	13.0%	
Cost of Debt		
Cost of Debt	6.0%	
Corporate tax rate	21.0%	
After Tax Cost of Debt	4.7%	
WACC	10.6%	

Appendix: Keysight Balance Sheet

	October 31, 2018 (unaudited)	October 31, 2017
ASSETS		
Current assets:		
Cash and cash equivalents	\$ 913	\$ 818
Accounts receivable, net	624	547
Inventory	619	588
Other current assets	222	224
Total current assets	2,378	2,177
Property, plant and equipment, net	555	530
Goodwill	1,171	1,882
Other intangible assets, net	645	855
Long-term investments	46	63
Long-term deferred tax assets	750	186
Other assets	279	240
Total assets	<u>\$ 5,824</u>	<u>\$ 5,933</u>
LIABILITIES AND EQUITY		
Current liabilities:		
Short-term and current portion of long-term debt	\$ 499	\$ 10
Accounts payable	242	211
Employee compensation and benefits	276	217
Deferred revenue	334	291
Income and other taxes payable	42	28
Other accrued liabilities	69	62
Total current liabilities	1,462	819
Long-term debt	1,291	2,038
Retirement and post-retirement benefits	224	309
Long-term deferred revenue	127	101
Other long-term liabilities	287	356
Total liabilities	3,391	3,623
Stockholders' Equity:		
Preferred stock; \$0.01 par value; 100 million shares authorized; none issued and outstanding	-	-
Common stock; \$0.01 par value; 1 billion shares authorized; 191 million shares at October 31, 2018, and 188 million shares at October 31, 2017, issued	2	2
Treasury stock at cost; 4.4 million shares at October 31, 2018 and 2.3 million shares at October 31, 2017	(182)	(62)
Additional paid-in-capital	1,889	1,786
Retained earnings	1,212	1,041
Accumulated other comprehensive loss	(488)	(457)
Total stockholders' equity	2,433	2,310
Total liabilities and equity	<u>\$ 5,824</u>	<u>\$ 5,933</u>

Appendix: Keysight Income Statement

	Three months ended		Year ended	
	October 31,		October 31,	
	2018	2017	2018	2017
Net income (loss)	\$ (114)	\$ (38)	\$ 165	\$ 102
Other comprehensive income (loss), net of tax:				
Unrealized gain (loss) on investments	(5)	-	(14)	4
Unrealized gain (loss) on derivative instruments	(2)	2	-	4
Amounts reclassified into earnings related to derivative instruments	-	-	(3)	-
Foreign currency translation	(20)	(10)	(21)	(10)
Net defined benefit pension cost and post retirement plan costs:				
Change in actuarial net loss	(7)	126	23	178
Change in net prior service credit	(5)	(3)	(16)	(15)
Other comprehensive income (loss)	(39)	115	(31)	161
Total comprehensive income	<u>\$ (153)</u>	<u>\$ 77</u>	<u>\$ 134</u>	<u>\$ 263</u>

Appendix: Keysight Cash Flows Statement

KEYSIGHT TECHNOLOGIES, INC. CONDENSED CONSOLIDATED STATEMENT OF CASH FLOWS (In millions) PRELIMINARY				
	Three months ended October 31,		Year ended October 31,	
	2018 (unaudited)	2017 (unaudited)	2018 (unaudited)	2017
Cash flows from operating activities:				
Net income (loss)	\$ (114)	\$ (38)	\$ 165	\$ 102
Adjustments to reconcile net income (loss) to net cash provided by operating activities:				
Depreciation	25	22	103	92
Amortization	52	50	207	133
Share-based compensation expense	11	12	59	56
Debt issuance expense	-	-	-	9
Deferred tax (benefit)	(562)	(4)	(789)	(47)
Excess and obsolete inventory-related charges	5	4	25	16
Gain on sale of assets and divestitures	(12)	-	(20)	(8)
Goodwill impairment	709	-	709	-
Other assets impairment	5	-	5	7
Pension curtailment and settlement expense (gain)	1	(1)	1	(69)
Other non-cash expenses (income), net	1	9	10	10
Changes in assets and liabilities:				
Accounts receivable	(34)	(25)	(89)	(11)
Inventory	(18)	(14)	(61)	(4)
Accounts payable	9	32	22	15
Employee compensation and benefits	65	32	63	(1)
Deferred revenue	10	32	75	90
Income taxes payable	85	(5)	181	3
Retirement and post-retirement benefits	(11)	(5)	(127)	(15)
Other assets and liabilities	8	(38)	16	(50)
Net cash provided by operating activities ^(a)	235	63	555	328
Cash flows from investing activities:				
Purchases of property, plant and equipment	(34)	(18)	(132)	(72)
Proceeds from the sale of property, plant and equipment	-	-	-	8
Acquisitions of businesses and intangible assets, net of cash acquired	-	(60)	(11)	(1,702)
Proceeds from divestitures	17	-	29	-
Proceeds from the sale of investments	-	3	-	45
Other investing activities	(2)	(1)	(2)	(1)
Net cash used in investing activities	(19)	(76)	(116)	(1,722)
Cash flows from financing activities:				
Issuance of common stock under employee stock plans	2	-	64	51
Issuance of common stock under public offerings	-	-	-	444
Payment of taxes related to net share settlement of equity awards	-	-	(18)	(12)
Treasury stock repurchases	(40)	-	(120)	-
Proceeds from issuance of long-term debt	-	-	-	1,069
Debt issuance costs	-	-	-	(16)
Proceeds from short-term borrowings	-	42	40	212
Repayment of debt and credit facility	-	(83)	(300)	(323)
Other financing activities	(1)	-	(1)	-
Net cash provided by / (used in) financing activities	(39)	(41)	(335)	1,425
Effect of exchange rate movements	(6)	(1)	(9)	4
Net increase/(decrease) in cash and cash equivalents	171	(55)	95	35
Cash and cash equivalents at beginning of period	742	873	818	783
Cash and cash equivalents at end of period	\$ 913	\$ 818	\$ 913	\$ 818
^(a) Cash payments included in operating activities:				
Income tax payments, net	\$ (5)	\$ (78)	\$ (27)	\$ (121)
Interest payment on borrowings	\$ (38)	\$ (39)	\$ (79)	\$ (64)