

RESEARCH REPORT

February 5, 2018

Stock Rating **HOLD**
Price Target **USD \$70.00**



Ticker	NASDAQ:QCOM
Market Cap (\$MM)	\$97,808
P/E NTM	19.4x
EV/EBITDA NTM	11.9x

52 Week Performance



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Qualcomm Inc.

The Future of Semiconductors

Within the U.S. portfolio, TMT currently does not hold any companies in the semiconductors industry. Chipmakers have seen quite a bit of appreciation this past year, with semiconductor companies ranking among some of the best performers in the sector. Intel, Texas Instruments, and Qualcomm have all benefited from secular trends in the broader tech and internet space, particularly with regard to the increased need for advanced processors, memory, and system-on-a-chips in more devices.

In keeping with our strategy of investing in companies that play well into emerging industry themes, the TMT team believes that investing in a semiconductors name is the best way to gain exposure to the themes of greater network connectivity, machine learning, augmented/virtual reality, and cloud platforms. We narrowed down our search to Qualcomm because of its prominent scale and development of industry-leading semiconductors, and because a series of recent news have impacted its current valuation. As a result, the team wanted to analyze the company and consider whether the market has overreacted to negative news developments. This report provides an in-depth analysis of how these events may impact Qualcomm in the longer term, as well as our predictions on the future potential of the company's business segments.

TMT has concluded that although we find many aspects of the business to be attractive, ongoing uncertainty over regulatory approvals, legal disputes, and Broadcom's takeover attempt have amplified risks associated with Qualcomm. As such, we maintain an opportunistic hold rating and will continue to closely monitor the company for new developments.

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Company Overview

Founded in 1985, Qualcomm (QCOM) is a global leader in the development and commercialization of semiconductor products. The company is a sales leader in the smartphone vertical, designing integrated chip (IC) and microprocessor units for companies such as Apple and Samsung.

Qualcomm is the world's largest fabless semiconductor designer, meaning the company outsources its production processes to third party manufacturers. The fabless model allows Qualcomm to operate with relatively low CAPEX, re-directing its cash flows to research and development. As such, Qualcomm has a higher operational leverage than many of its manufacturing peers and is very focused on innovation.

Segments

The company operates in three segments:

- (1) CDMA Technologies (QCT), which develops and supplies integrated circuits and system software for use in mobile devices, wireless networks, broadband gateway equipment, and consumer electronic devices. In 2017, CDMA accounted for approximately 74% of QCOM's sales. The segment had a pre-tax margin of 17%.
- (2) Technology Licencing (QTL), which grants licences to use portions of QCOM's intellectual property (IP) portfolio, which includes patent rights and the right to sell various wireless products. In 2017, QTL accounted for approximately 29% of QCOM's sales. The segment had a pre-tax margin of 80%.
- (3) Strategic Initiatives (QSI), which invests in early stage companies in various industries, including digital media, e-commerce, healthcare, and wearable devices. Strategic Initiatives helps support the design and integration of Qualcomm's IC products. In 2017, SI accounted for approximately 1% of QCOM's sales. The segment had a pre-tax margin of 58%.

Products

Qualcomm's four product categories are mobile processors, cellular modems, Bluetooth products, and Wi-Fi products.

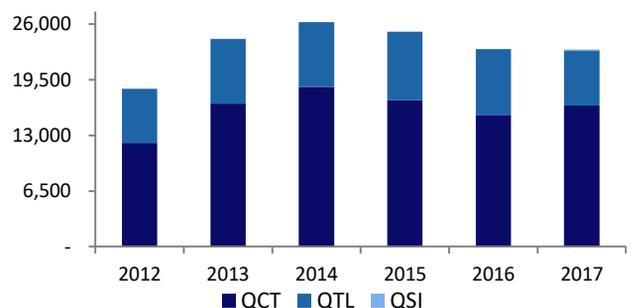
In the mobile processors market, which are essentially the 'brains' of a device, Qualcomm is a clear leader with a dominant position in the higher-end market. The company controls approximately 42% of the mobile application processor (AP) market and has a diversified processor range of 44 products. In the 64-bit IC subsegment, which can be thought of as the forefront of mobile IC technology, Qualcomm's Snapdragon series is the most widely-adopted and coveted product line.

Qualcomm's cellular modem and Bluetooth chips allow mobile devices to connect to telecommunication networks and pairing devices. As explained in Thesis III, Qualcomm is expected to lead the switch to 5G, and has strong footholds in Bluetooth applications including automotive connectivity, audio quality, and IoT hardware.

Qualcomm's Wi-Fi ICs allow devices to connect to local networks. The company has emphasised targeting three key sub-markets: network infrastructure, home automation/consumer electronics, and smartphone OEMs.

EXHIBIT I

Historical Segmented Revenue (\$m)



Source(s): Company Filings

Company Overview

IP Portfolio Licensing

Qualcomm owns significant intellectual property assets related to, among other things, wireless technologies. The company has an extensive IP portfolio in the United States, and continues to pursue patent applications and acquisitions globally.

Qualcomm boasts that its patent portfolio is the most widely and extensively used in the industry, with several hundred active licensees. Currently, Qualcomm has over 7000 pending patent applications globally. Unlike other firms, Qualcomm's IP strategy is to offer its entire patent portfolio to competitors for licensing. The company states that this approach to IP acts as a catalyst for industry growth, helping drive demand for many of the products the company offers.

A notable IP asset Qualcomm licences is its claim to certain CMDA and OFDMA frequency technologies. CMDA or code-division multiple access, is a channel access method used by mobile phones which allows

several users to share a band of frequencies without interference. CDMA is used as a standard access (connection) method in the mobile phone industry. OFDMA or Orthogonal Frequency-Division Multiple Access technology is an evolution of CDMA which boasts improved performance. Together, these technologies accounted for nearly 60% of all mobile connections in 2017.

Customer Base

As discussed under Risks, Qualcomm has a small number of large customers which account for a significant portion of the company's revenue. In FY15-17, Apple, Samsung, and GuangDong OPPO Mobile each accounted for over 10%. Other major phonemakers such as Huawei and Vivo, as well as emerging players like Google, also use Qualcomm's ICs in their products. The quality of these partnerships is indicative of the quality of Qualcomm's IC and connectivity offerings.

EXHIBIT II

Significant Customers



Qualcomm's industry-leading ICs have become an industry standard

Source(s): Company Filings

Recent Developments

1) NXP Bid – October 2016

In October 2016, Qualcomm commenced a tender offer for all outstanding shares of NXP Semiconductors for \$110 per share in cash. The deal has been held up by various regulatory approval processes and activist campaigns. Elliott Management, which owns ~7.2% of outstanding shares, has been pushing for a higher price. It has argued that the offer undervalues NXP. Elliott sees an intrinsic value of \$135 per share, ~23% higher than Qualcomm’s offer of \$110. If the deal does not close, management has indicated they would like to use some of Qualcomm’s \$39B cash balance to repurchase shares. The NXP acquisition would help Qualcomm expand into new, lucrative markets. Management believes that the Broadcom offer doesn’t account for this growth, undervaluing the company.

2) Broadcom Offer – November 2017

In November 2017, Broadcom offered to acquire Qualcomm for \$105B, or \$70 per share in cash and

stock. Qualcomm has been fending off the unsolicited bid, claiming it is opportunistic and undervalues the company. Management recently sent a letter to shareholders urging them to reject the offer. The offer values Qualcomm at 21x EV/EBITDA versus a median multiple of 15x for similar semiconductor deals.

3) EU Antitrust Ruling – January 2018

Qualcomm was recently fined €997MM (\$1.23B) by EU regulators for violating antitrust regulations. The violation centered around certain contracts Qualcomm had signed with Apple. In exchange for billions of dollars in rebate payments, Apple agreed to source chips exclusively from Qualcomm. The agreement also mandated that should Apple violate the contract, it would have to return the payments received. This contract cemented Qualcomm as a market leader, capturing up to 90% market share over the period 2011-2016. The fine represents less than 5% of Qualcomm’s cash balance, but significantly weakens its position in the EU market.

EXHIBIT III

Qualcomm, NXP, and Broadcom Annotated Share Price History



Source(s): Yahoo Finance, European Commission, Company Reports, Bloomberg, Seeking Alpha

Investment Thesis I: Leader in Chips for Mobile Devices

Why Qualcomm?

As discussed above, Qualcomm is a leader in application processor chipsets for mobile devices because of its technology leadership. Qualcomm's Snapdragon processor chips are continually leaders in areas such as connectivity, audio quality, security, and other features.

Premium Market vs. Emerging Market

Qualcomm's Snapdragon 800-series processor chips are the leader in the premium chips that power flagship phones, however its lower-powered 600-series processor chips are also making strides in the mid-range phone market which is experiencing the most significant growth.

The high rate of growth in the mid-range segment of the smartphone market is being driven by increasing demand for better entertainment, productivity, and gaming experiences among consumers in emerging markets. Furthermore, the increasing availability of micro-financing/installment payment plans for customers who do not own credit cards is making an

upgrade to a mid-range smartphone more affordable for many customers.

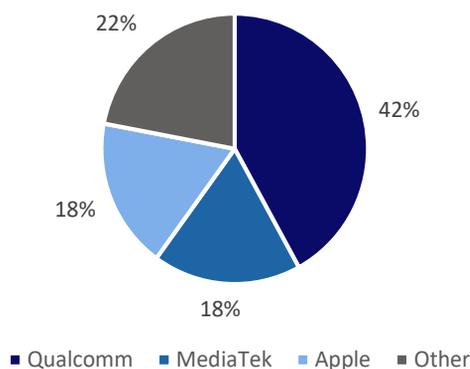
Qualcomm enjoys a similar technology lead in the mid-range market, with its most recent mid-tier chip offering greater processing power as well as larger screen resolution than competitors, for example. Qualcomm's leadership within the mid-range market is evidenced by its increasing market share within the space, at the expense of lower-end chipmakers like MediaTek and Spreadtrum. MediaTek has acknowledged that it has limited resources to compete with Qualcomm in this area, and has expressed its intention to focus on its chips that are made for more entry-level mobile phones.

Chip Design Going Internal?

Qualcomm enjoys a leadership position with respect to the processor chips in both premium and mid-range mobile devices, however, an important consideration is whether its leadership in these two areas will be challenged by phonemakers internalizing the production of their processor chips.

EXHIBIT IV

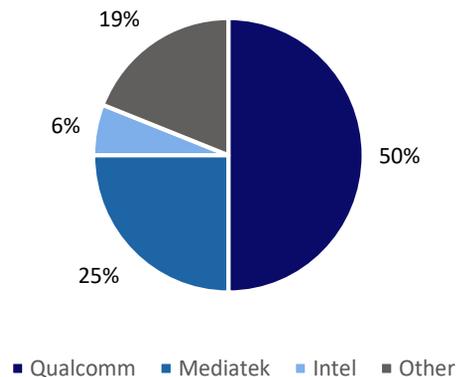
Processor Chip Market Share



Source: Gartner

EXHIBIT V

Modem Chip Market Share



Source: IHS Markit

Investment Thesis I: Leader in Chips for Mobile Devices

Qualcomm supplies chips for the flagship phones of three out of five of the world's largest smartphone makers – Samsung, Oppo, and Vivo. Apple and Huawei design their own A-series and Kirin processor chips, however these chips are designed for internal use, with their benefit being that they can be tailored more specifically to the designs of Apple and Huawei products. Since these processor chips are designed to be proprietary and are built for internal use, there is a low risk that Apple and Huawei's A-series and Kirin processor chips will compete with Qualcomm for third-party business.

Additionally, phonemakers require a significant amount of resources and energy in order to develop products that can match the performance of products from dedicated chipmakers like Qualcomm – Apple hired many engineers from its former supplier Imagination Technologies, and Huawei has been developing chips internally through its HiSilicon subsidiary since 2004. Samsung manufactures its own Exynos chips for phones sold within Asia, however, it still relies on Qualcomm's Snapdragon chips for phones sold in Europe and North America due to their superior connectivity.

Xiaomi recently designed and released its first proprietary processor chip, the Surge S1. The company will likely continue to use Snapdragon chips for many of its devices because of the risks that accompany internal chip development – namely, the risk of releasing products that lag in performance due to inferior resources and expertise, and the risk that the phonemaker misses out on industry-shifting trends such as AR/VR due to a lack of industry-leading components.

The Surge line of processor chips is mainly being developed as a hedge against a future in which smartphone processor chips are custom-built internally by each phonemaker, and where the processor chips themselves act as a point of differentiation, as opposed to the current paradigm in which most major phonemakers all rely on the same core hardware.

As a result, it is unlikely that processor chip development will become more internalized by phonemakers within the next several years, although this risk may become more substantial over a much longer time horizon.

Modem Design Going Internal in Apple Dispute?

Apple's announced intention to switch to Intel modems (which Apple uses in combination with its internally-developed A-series processor chips) for its next generation of iPhones and iPads is another risk to Qualcomm's leadership in the chipmaking business.

It is fairly likely that Apple will be able to switch to Intel chips entirely in upcoming generations of iPhones, given that 50% of its iPhone 8s and iPhone Xs were sold with Intel modems as opposed to Qualcomm modems. Furthermore, Qualcomm's ability to support CDMA on its mobile devices is becoming less important as Intel has recently developed modem chips with CDMA-capabilities, and as Verizon, one of the two CDMA-network mobile carriers out of the four major carriers in the United States, has announced that it will phase out its CDMA network by 2019 or 2020.

However, Qualcomm's leadership in 5G technology over competitors which include Intel, which will be discussed in the next section, should give it an advantage once more in its modem chipmaking business.

Furthermore, phonemakers such as Apple are likely to be much less motivated to focus on putting pricing pressure on their suppliers such as Qualcomm through action such as their announced switch to Intel modem chips once 5G connectivity is implemented. It makes sense to take actions that focus on improving margins during periods of stable technology, however once a significant technology such as 5G is implemented, it may be much more appealing to focus on growth opportunities made possible by the new technology, rather than focus on cutting costs.

Investment Thesis II: Exposure to Accelerated 5G Adoption

What is 5G?

5G, the fifth generation of mobile network standards, is the successor to the current generation of standards, 3G and 4G. Looking back at the history of mobile network standards, there are four overarching generations of advancement:

- 1G enabled voice using analog signals
- 2G enabled voice using digital signals, replacing the first generation
- 3G enabled mobile data
- 4G enabled mobile internet; i.e., the full web experience including functions like streaming video or uploading content

The next generation, 5G, will take on an even larger technological role. Whereas 3G and 4G were chiefly used to connect mobile devices to a network, 5G will

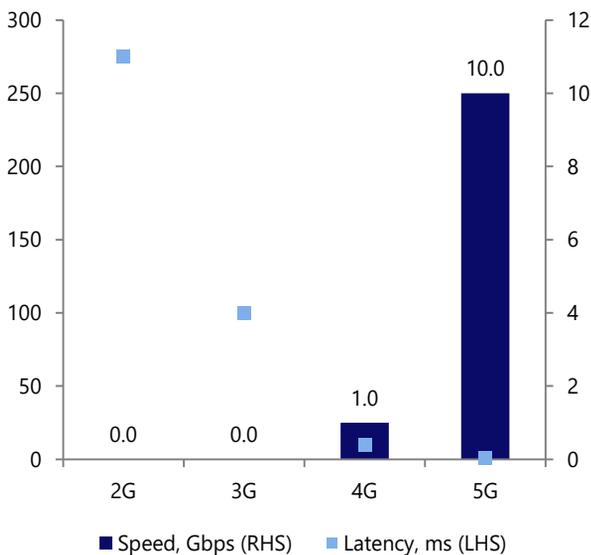
connect a broader array of objects to networks as well as to each other.

It is important to note that 5G is still a proposed set of standards. There has not yet been a universally agreed upon set of standards for deployment, although Qualcomm is at the forefront of driving the development and adoption of 5G standards.

The industry expects that widespread commercial deployment of 5G will occur in 2019. Two of the four major U.S. mobile carriers are on schedule to deploy 5G, along with three major European operators and several telecom groups in the Asia Pacific. Qualcomm is also working with several OEMs to launch 5G-enabled smartphones in 2019. Part of the reason for this accelerated timeline is that carriers are facing a shortage of capacity to handle the increasing number of devices connecting to their current-state networks.

EXHIBIT VI

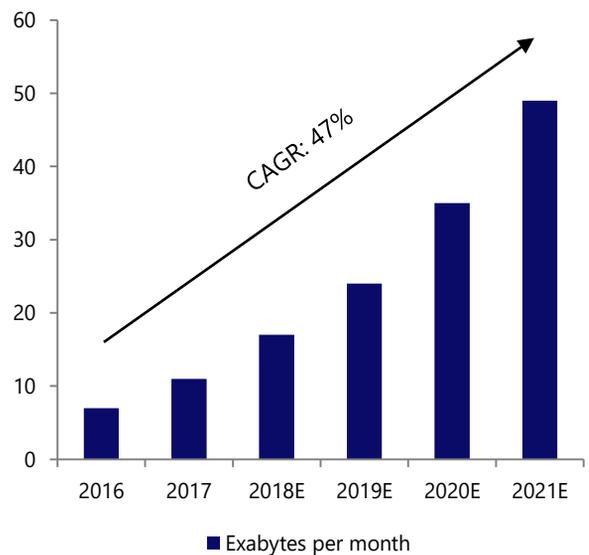
Evolution of Mobile Network Generations



Source: IHS

EXHIBIT VII

Global Mobile Data Traffic Growth



Source: Cisco

Investment Thesis II: Exposure to Accelerated 5G Adoption

Implications of 5G

Among the main advantages of 5G is that it will be much faster than previous generations, with speeds of several hundred megabits per second in urban areas and an initial maximum throughput of 10 gigabits. 5G also allows for greater coverage and capacity, meaning that more devices can be connected to network towers without overloading them. Furthermore, 5G's ultra-low latency will open the door for new application opportunities.

There are three broad use cases for 5G technology. The first use case is enhanced mobile broadband. Data though 5G will be faster, cheaper, and more widely accessible, which will facilitate new immersive mobile experiences like augmented reality or virtual reality. The second use case is mission-critical communications. 5G enables ultra-reliable and low latency links that have applications for infrastructure, automotive, and healthcare verticals, among others. The third use case is IoT devices. Because 5G chipsets scale down the cost of data and power requirements, it is feasible for more devices to have embedded sensors.

Qualcomm's Competitive Advantage

The TMT team believes that Qualcomm has positioned itself to hold several advantages concerning the state of 5G adoption. The company has been the first to market with several hardware and design innovations, such as the release of a reference design smartphone on a 5G network last quarter. Management has recently stated that Qualcomm is "12-24 months ahead of our merchant competitors in the transition to 5G".

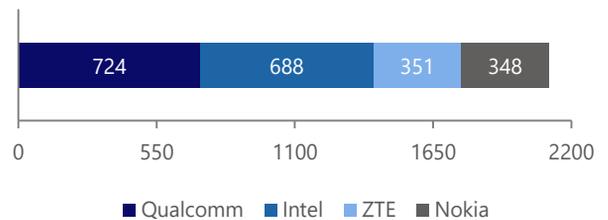
As well, Qualcomm's degree of readiness is more comprehensive than that of competitors. 5G requires more complex chipset designs, which require tighter coupling between parts, such as the modem, transceiver, antennas, etc. Qualcomm has differentiated itself here by positioning the company as an end-to-end platform provider for OEMs. In other

words, Qualcomm's highly integrated solutions start at the antenna and encompass all layers up to the end application processor.

As an investment team, it is challenging to understand all of the technical capabilities that give Qualcomm an advantage over competitors. Nonetheless, the TMT team recognizes that Qualcomm's development portfolio offers many more capabilities and meets the end-to-end, "modem-to-antenna" requirements of its customer base.

EXHIBIT VIII

Key Patent Holders for IoT



Source: LexInnova

EXHIBIT IX

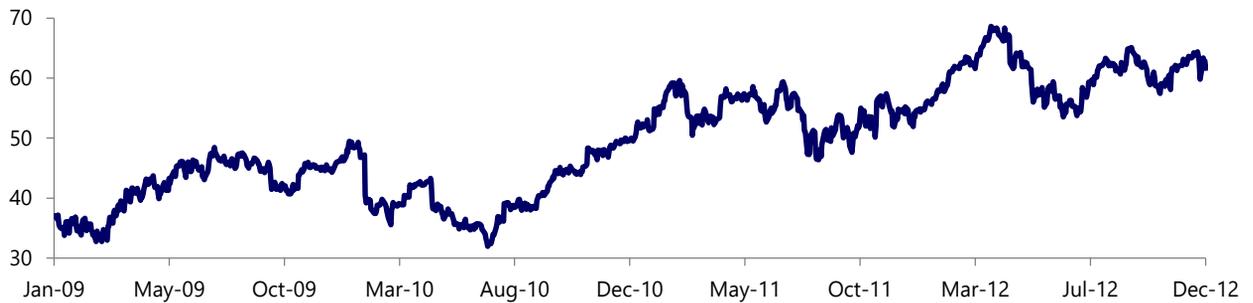
Capabilities Critical for 5G Success

	QUALCOMM	vs. Other Semiconductor Companies			
Modem-to-antenna portfolio	✓	×	×	×	×
Power Amps – MMPA	✓	✓	✓	✓	✓
Power Amps – PAMIDs	✓	✓	✓	✓	✓
LNA/Filter modules	✓	×	✓	✓	✓
Power tracker	✓	×	✓	✓	×
Antenna tuner	✓	×	✓	×	×
Filters – BAW/FBAR	✓	✓	✓	×	×
Filters – SAW	✓	×	✓	✓	✓
Filters – TC-SAW	✓	×	✓	✓	✓
RF transceiver	✓	×	×	×	×
Modem	✓	×	×	×	×
Modem intelligence and SW	✓	×	×	×	×
Full system-level solution	✓	×	×	×	×

Source: Company Report

EXHIBIT X

QCOM Share Price from 2009 to 2012



Source: Capital IQ

Investment Thesis II: Exposure to Accelerated 5G Adoption

Parallels to Qualcomm’s 4G Transition

At the start of the decade, Qualcomm made large investments in R&D for 4G technologies. This became a concern with investors and led to a decline in the company’s share price. Eventually Qualcomm’s early actions proved to be profitable as mobile operators deployed widespread 4G and resulted in Qualcomm’s share price bouncing back and further appreciating.

Can Qualcomm Turn Standardization into Commercialization?

A question that remains is whether Qualcomm can repeat this strategy of positioning itself as an early pioneer of a new technology standard, and then capitalizing on its advantageous position.

There are plenty of examples in the technology industry where another company was more successful at commercializing the innovation of an early pioneer. Xerox, for example, was the first company to develop the graphical user interface, yet Apple was able to copy it and better commercialize it in its Macintosh computers in the 1980s. Similarly, Netscape pioneered the web browser with Netscape Navigator in the 1990s, but Microsoft soon eclipsed its market share by including Internet Explorer with every copy of Windows.

So, is it reasonable to expect that Qualcomm will successfully capitalize on its current R&D efforts in the longer term? The TMT team has reason to believe that Qualcomm is well positioned to become a big winner of widespread 5G commercialization.

For one, Qualcomm has announced several partnerships within the 5G ecosystem. Last month, it announced a multi-year relationship agreement with Samsung, as well as strategic alliances with six leading Chinese device manufacturers, including Lenovo. Qualcomm also announced last year that it will be working with all four major U.S. carriers (AT&T, Sprint, Verizon, and T-Mobile), as well as leading overseas carriers, like China Mobile. Moreover, Qualcomm’s “Snapdragon on Windows 10” project is currently working with Microsoft and OEMs to bring advanced connectivity to laptops and tablets.

Beyond the many ongoing partnerships, Qualcomm has the strongest patent portfolio for 5G intellectual property due to its early investments. This allows the company to control the licensing out of standards and royalty fees from manufacturers. Thus, we expect that Qualcomm can successfully retain its leading position as 5G adoption accelerates, moving both the broader industry and the company forward from the standardization stage to the commercialization stage.

Investment Thesis III: Diversification in Rapidly-Growing Verticals

Furthermore, Qualcomm’s leadership in 5G technology and mobile processing will allow it to capitalize on diversification into rapidly-growing verticals of mobile computing and connectivity, such as autonomous vehicles, connected homes, and AR/VR. The company’s progress in pursuing these growth areas is evidenced by both the technology it has released as well as partnerships it has formed with other key players to accelerate the implementation of their technology.

Autonomous Vehicles

5G technology is important for autonomous vehicles because the higher data speeds and volumes it enables are important in allowing cars to respond quickly enough in real-life driving situations. Qualcomm has engaged in partnerships with automakers, connectivity technology providers, as well as software developers within this space.

Connected Homes

Within the Connected Home space, Qualcomm has developed a Home Hub system-on-a-chip that will allow manufacturers to easily integrate Google Assistant and Android Things into connected products, the latter allowing data to be processed by a device locally, meaning it will be able to retain some functionality even if web connection is lost.

AR/VR

5G connectivity is important for augmented reality and virtual reality devices as it will allow for rich, wireless visual experiences that also offer low latency. Within this area, Qualcomm has worked to make its Snapdragon 800-series processors capable of supporting the Google Daydream VR platform and is working with Tencent to develop AR/VR games.

EXHIBIT XI

Partnerships within Autonomous Vehicle Space

Automakers	Connectivity	Software Developers
<p><i>Developing vehicle-to-X connectivity, integrating Snapdragon processors, and developing Car Open-Source Platform</i></p>	<p><i>Developing vehicle-to-X connectivity</i></p>	<p><i>Developing security technology and integrating high-definition maps with Qualcomm’s camera technologies and GPS data from Qualcomm Drive Data Platform</i></p>

Catalysts

NXP Deal

As discussed under Recent Developments, Qualcomm's \$110 per share bid for NXP has been heavily scrutinized by NXP shareholders, specifically activist shareholder Elliott Management who argues that the intrinsic value of the company should instead price NXP's shares at \$135. As of February 2, 2018, NXP is trading at \$120 dollars per share, nullifying Qualcomm's \$110 dollar offer.

Although there is a great deal of uncertainty to what this share price implies and how investors may react if Qualcomm raises its bid, the acquisition itself is expected to significantly diversify the combined entity and position Qualcomm to capture higher-growth segments including auto and IoT. Qualcomm's acquisition of NXP, if well priced, has enormous potential.

Broadcom Deal

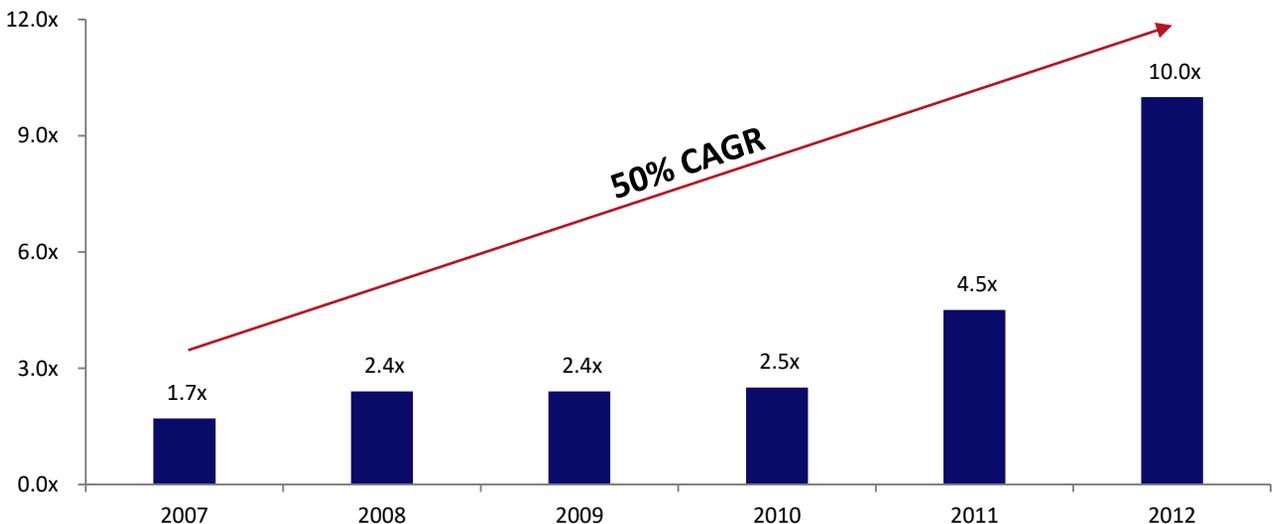
With Qualcomm's shares currently trading at \$66, Broadcom's \$70 per share bid represents a 6.1% premium. Despite management urging shareholders to reject the deal, in the event that shareholders accept, there will immediate upside. With only 10% of the bid being equity, the deal itself is expected to be largely a cash-grab and significantly less strategy-orientated (from the perspective of Qualcomm shareholders) than Qualcomm's bid for NXP. If the deal were to fall apart, the acquisition-driven share price may slip as opportunistic investors leave the name.

Innovation & IP Protection

As a fabless designer, Qualcomm is in the business of out-engineering its competitors and monetizing its technological advancements through IP licensing and hardware sales. As such, protectable break-throughs in growing segments such as 5G and Auto have the potential to be extremely lucrative for the company.

EXHIBIT XXII

Historical Semiconductor M&A EV/NTM Revenue Multiples



Source(s): GCA Research

Risks

Slowing Smartphone Growth

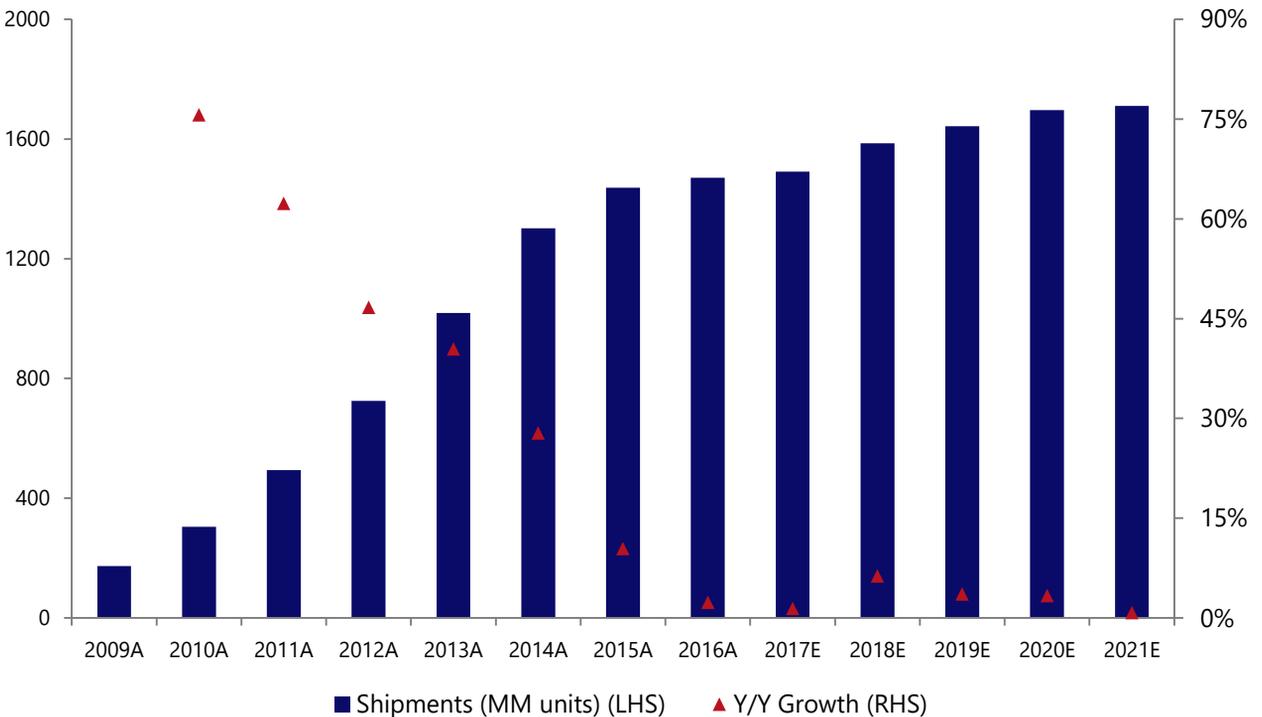
Global smartphone shipments have been slowing in recent years, growing by only ~1.4% in 2017. This growth is expected to remain in the low-single digits for the foreseeable future (**Exhibit [XX]**). China's smartphone market shrank for the first time in 2017, with shipments down 4% y/y. Market saturation and technological improvements are responsible for the slowdown. Entry-level smartphones, equipped with numerous features and high-performance specs, have increased smartphone life cycles substantially. At certain thresholds of performance, consumers see little reason to trade up to more expensive products.

Customer Concentration

Qualcomm's revenues are concentrated among several large customers. Apple and Samsung each accounted for over 10% of revenues over the last three fiscal years. Guangdong OPPO Mobile Telecommunications Corp., and vivo Communication Technology Co. together accounted for over 10% of 2017 revenue. Recent fallout from the EU antitrust case highlights the risk of relying on such a concentrated customer base. There have been worries that Apple will begin sourcing more chips from Intel for its products this year. Apple has also been making an effort to design an increasing number of the chips used in its devices.

EXHIBIT XXIII

Global Smartphone Shipments Forecast



Source(s): Statista, Company Reports, BBC News

Risks

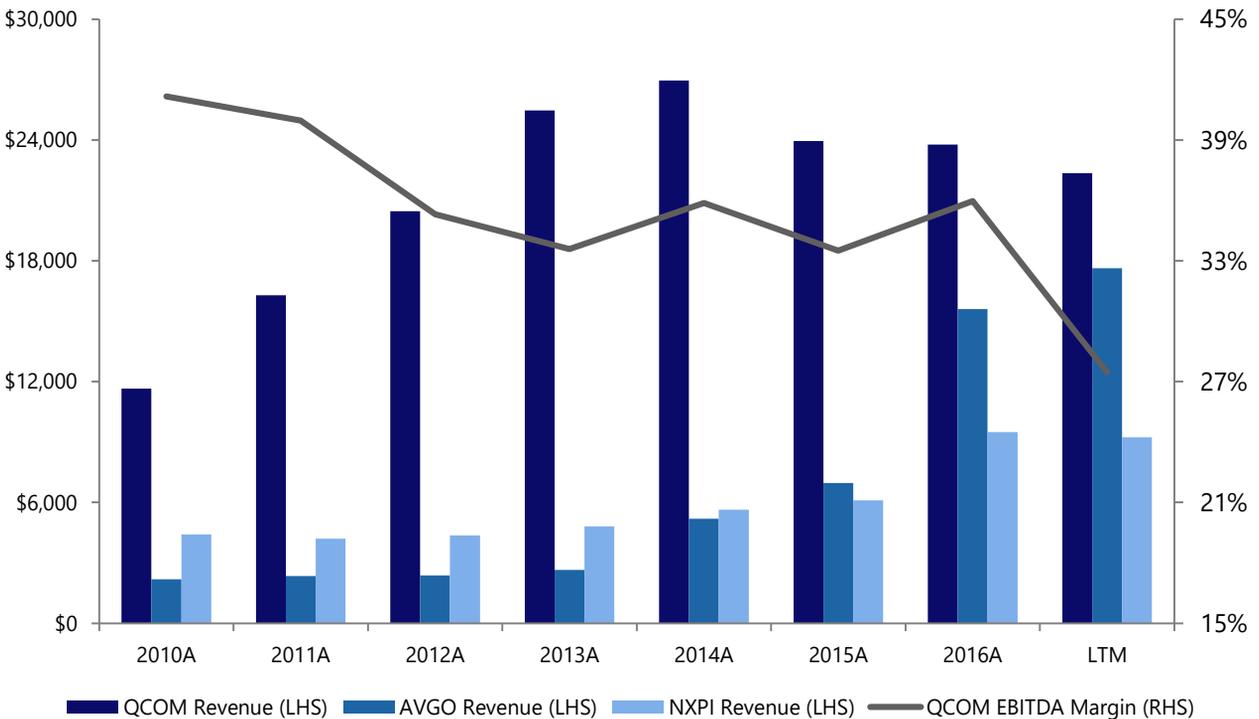
Worst Case Scenario

The worst case scenario for Qualcomm would be for neither the NXP or Broadcom deal to close. Qualcomm's business fundamentals have been deteriorating amidst industry headwinds and slowing growth. Without a combination with one of these higher growth companies, Qualcomm's future is less attractive. There continues to be a great deal of uncertainty surrounding Qualcomm's future. The NXP acquisition, which promised to diversify Qualcomm's revenue mix and provide attractive organic growth opportunities, is still pending regulatory approval in China. In addition to regulatory hurdles, Elliott

Management has been exercising its activist position to pressure Qualcomm to raise its offer price. Elliott believes that NXP is worth \$135 per share before a control premium. The \$135 per share mark is roughly where the deal would stop being immediately accretive to Qualcomm without accounting for synergies. The hostile bid from Broadcom is also uncertain; management has urged shareholders to reject the offer. Regardless, an acquisition by Broadcom would diversify Qualcomm and expose it to higher growth verticals, and provide an immediate return to Qualcomm shareholders. If neither of these deals close, Qualcomm will continue to suffer from weakening fundamentals (**Exhibit XXIV**).

EXHIBIT XXIV

Semiconductor Industry Fundamentals



Source(s): S&P Capital IQ, Bernstein Research, UBS, Bloomberg

Valuation

The team’s approach to valuing QUALCOMM involved multiple steps of analysis. The goal was to understand how the market is currently thinking about the company and how the market’s sentiment about QUALCOMM has changed over the course of recent news and events. The last two years have seen many changing variables for QUALCOMM, including ongoing disputes, acquisitions, and changing industry dynamics. With much uncertainty over how these factors will affect QUALCOMM in the long run, the team wanted to look at how the company’s market value has changed over the last two years and take a stance as to whether or not the market has reacted appropriately to all the information it has received.

The first step, as seen in the exhibit below, was analyzing how QUALCOMM’s stock has performed on an absolute basis over the last two years and gauging the market’s reactions to major news items. The next step, as seen on the following page in Exhibits XIII and XIV, was seeing how its performance and multiples have compared to peers in the semiconductor industry

over the last **year**. The first thought was to compare QUALCOMM only to other fabless semiconductor companies – companies that outsource the manufacturing of their chipsets. However, the team thought it would be better to compare it to all major semiconductor companies and see which companies the market values QUALCOMM the closest to.

After this, the team wanted to benchmark QUALCOMM’s key operating metrics – revenue growth and EBITDA margins – against those of its peers in the industry. Then, with these operating metrics in mind, the team benchmarked QUALCOMM’s current trading multiples against those of its peers in the industry (Exhibits XVII and XVIII). Exhibit XX summarizes this benchmarking and breaks it down into three groups of industry peers.

The last part of the valuation approach was establishing a range of what QUALCOMM would be worth on an intrinsic basis, considering different possible outcomes of ongoing events.

EXHIBIT XII

QUALCOMM 2-Year Stock Price Performance

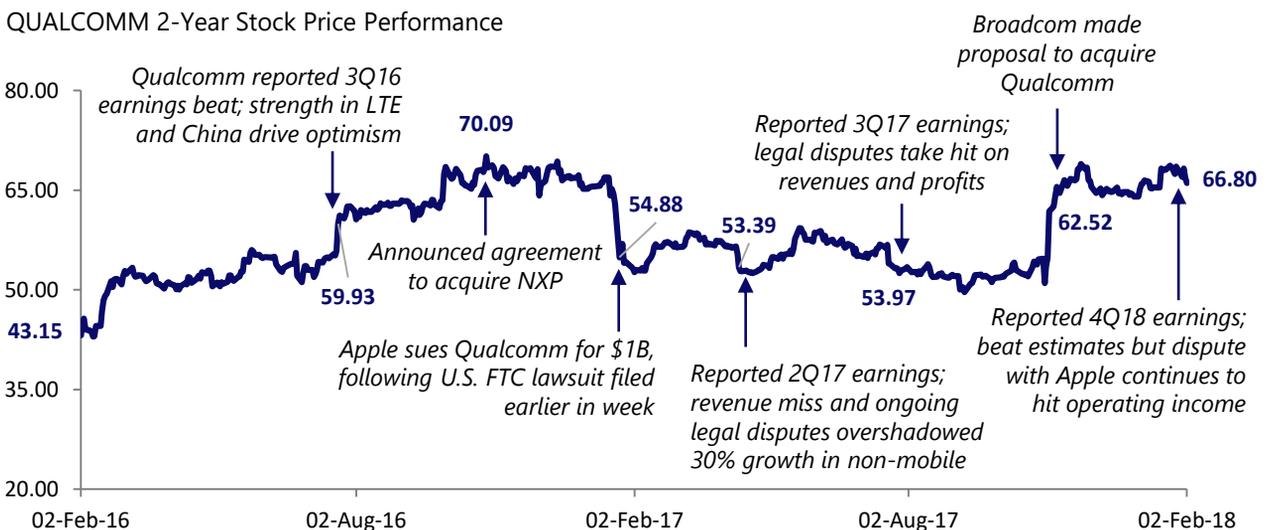
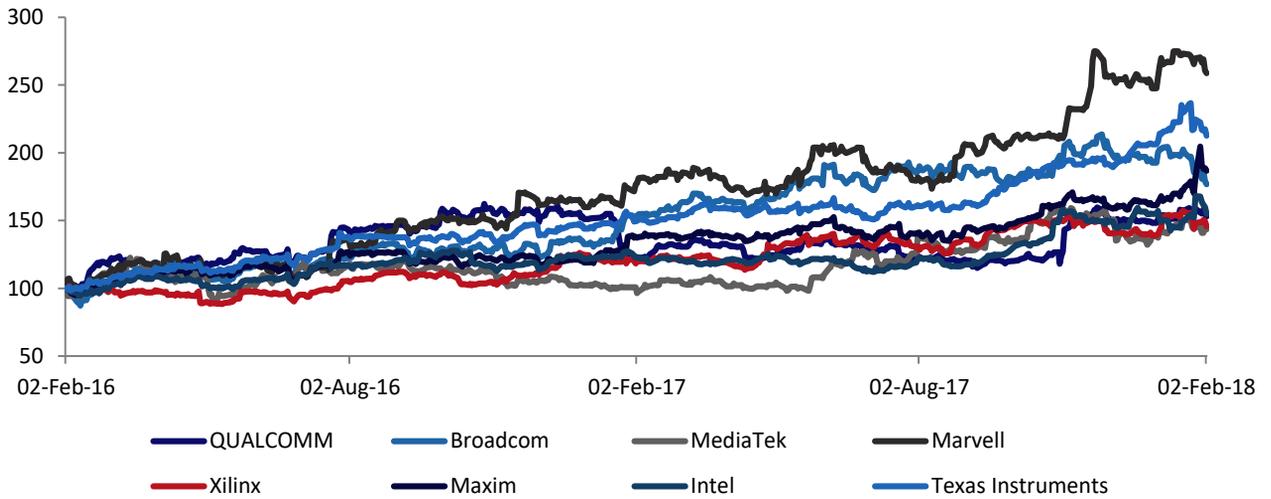


EXHIBIT XIII

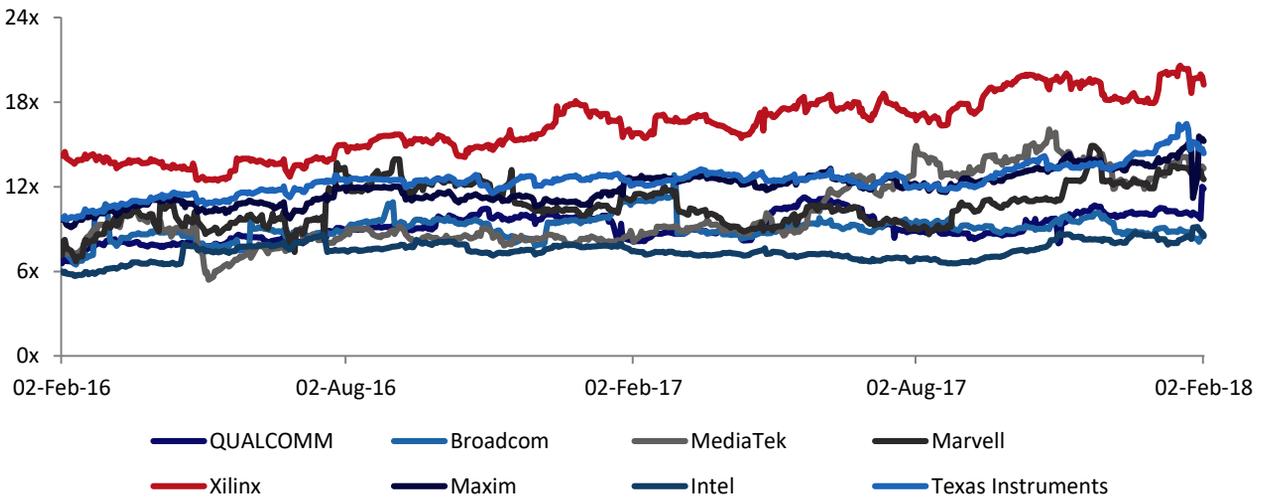
QUALCOMM Performance Relative to Industry Peers



Source(s): Capital IQ

EXHIBIT XIV

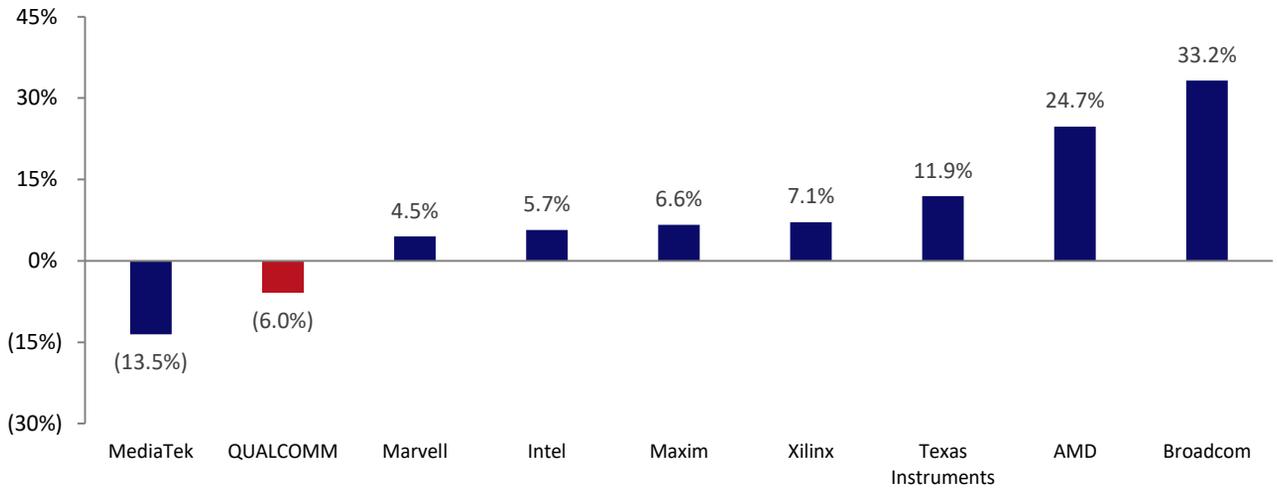
QUALCOMM and Industry Peers Historical EV / NTM EBITDA



Source(s): Capital IQ

EXHIBIT XV

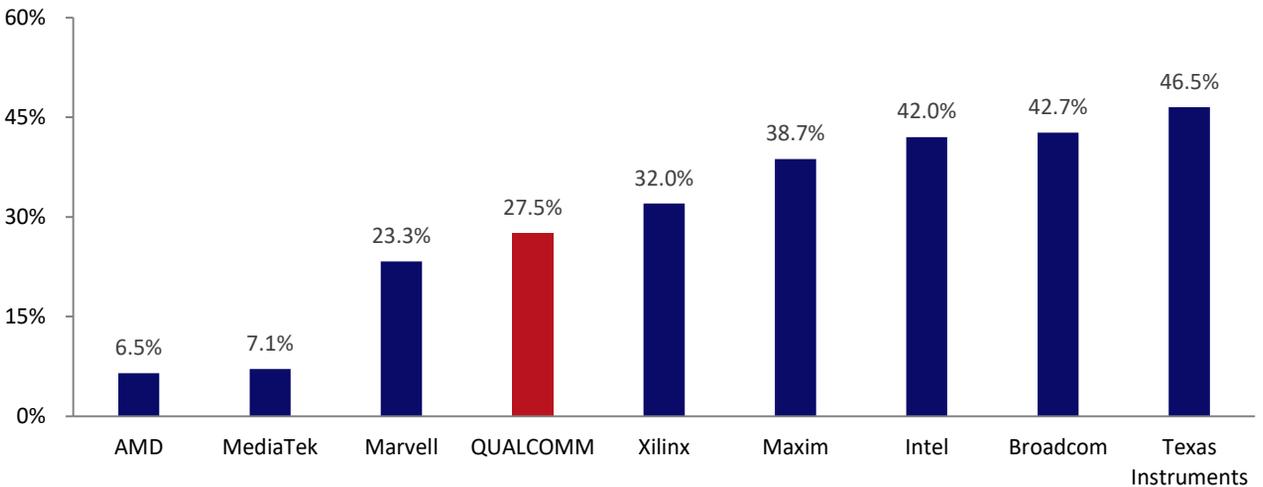
Semiconductor Company 1-Year Revenue Growth



Source(s): Capital IQ, Company Filings

EXHIBIT XVI

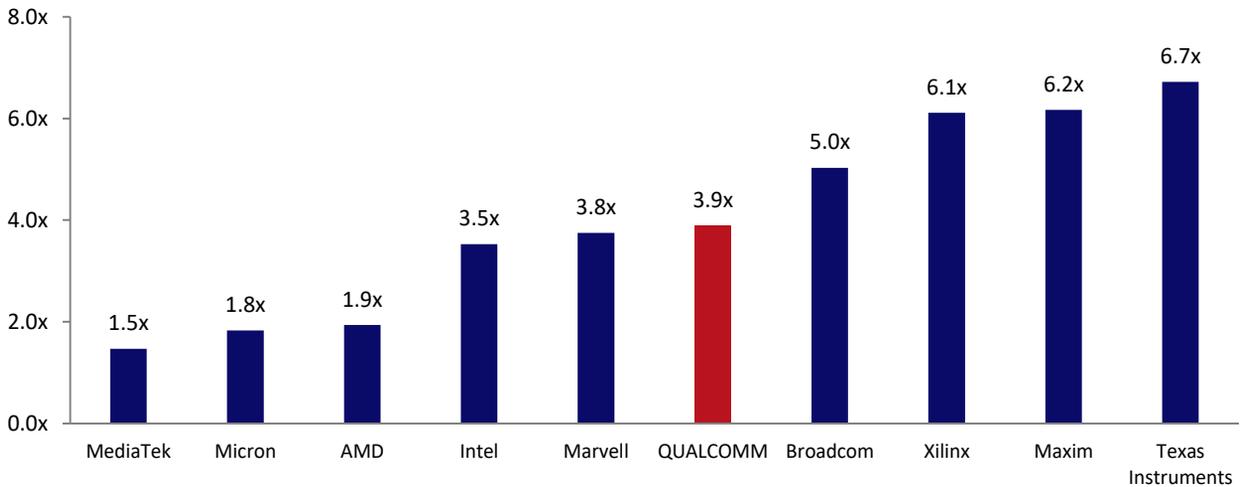
Semiconductor Company LTM EBITDA Margins



Source(s): Capital IQ, Company Filings

EXHIBIT XVII

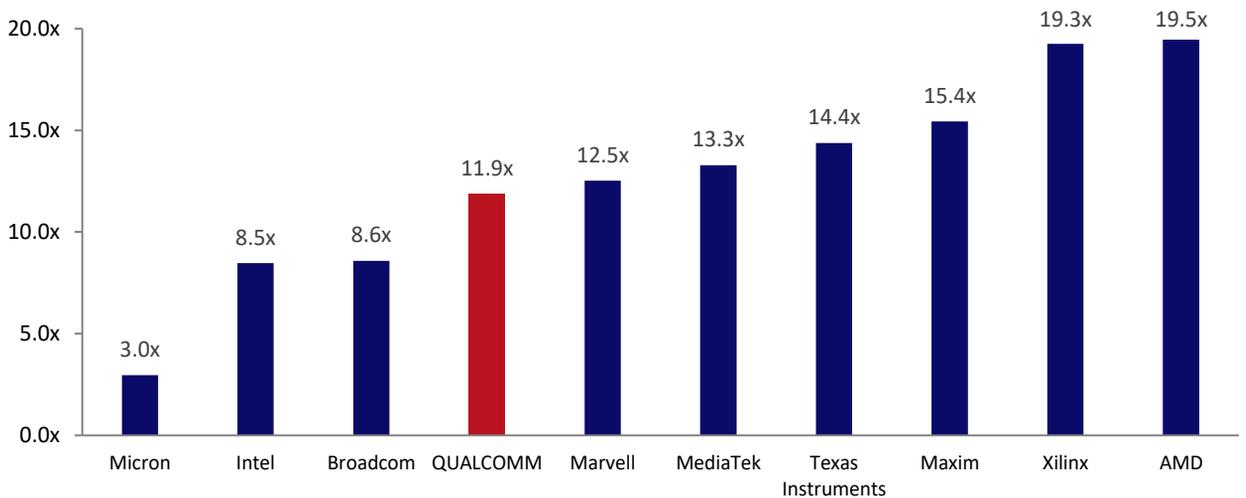
Semiconductor Company Trading Multiples – EV / NTM Revenue



Source(s): Capital IQ, Company Filings

EXHIBIT XVIII

Semiconductor Company Trading Multiples – EV / NTM EBITDA



Source(s): Capital IQ, Company Filings

EXHIBIT XIX

Comparable Company Analysis Summary

SELECT COMPARABLE COMPANIES - FABLESS AND INTEGRATED DEVICE MANUFACTURERS

Company Name	Market Capitalization	Enterprise Value	EV / Revenue		EV / EBITDA		Price / EPS NTM	EBITDA Margin LTM	1-Yr Rev. Growth LTM
			LTM	NTM	LTM	NTM			
Intel	215,982	228,793	3.6x	3.5x	8.7x	8.5x	13.0x	42.0%	5.7%
Texas Instruments	105,847	105,455	7.0x	6.7x	15.2x	14.4x	20.9x	46.5%	11.9%
Broadcom	96,397	105,642	6.0x	5.0x	14.0x	8.6x	11.9x	42.7%	33.2%
Micron	47,201	50,957	2.2x	1.8x	3.9x	3.0x	4.2x	55.7%	77.9%
Xilinx	18,000	16,201	6.5x	6.1x	20.5x	19.3x	24.8x	32.0%	7.1%
Maxim	17,025	15,691	6.6x	6.2x	17.0x	15.4x	22.0x	38.7%	6.6%
MediaTek	16,326	12,769	1.6x	1.5x	22.0x	13.3x	18.3x	7.1%	(13.5%)
AMD	12,012	12,222	2.3x	1.9x	nmf	19.5x	33.3x	6.5%	24.7%
Marvell	11,018	9,286	3.9x	3.8x	16.8x	12.5x	17.5x	23.3%	4.5%
Mean	59,979	61,890	4.4x	4.1x	14.8x	12.7x	18.4x	32.7%	17.6%
Median	18,000	16,201	3.9x	3.8x	16.0x	13.3x	18.3x	38.7%	7.1%
QUALCOMM	97,808	85,251	3.8x	3.9x	14.1x	11.9x	19.4x	27.5%	(6.0%)

SELECT COMPARABLE COMPANIES - FABLESS

Company Name	Market Capitalization	Enterprise Value	EV / Revenue		EV / EBITDA		Price / EPS NTM	EBITDA Margin LTM	1-Yr Rev. Growth LTM
			LTM	NTM	LTM	NTM			
Broadcom	96,397	105,642	6.0x	5.0x	14.0x	8.6x	11.9x	42.7%	33.2%
Xilinx	18,000	16,201	6.5x	6.1x	20.5x	19.3x	24.8x	32.0%	7.1%
MediaTek	16,326	12,769	1.6x	1.5x	22.0x	13.3x	18.3x	7.1%	(13.5%)
AMD	12,012	12,222	2.3x	1.9x	nmf	19.5x	33.3x	6.5%	24.7%
Marvell	11,018	9,286	3.9x	3.8x	16.8x	12.5x	17.5x	23.3%	4.5%
Mean	30,751	31,224	4.1x	3.7x	18.3x	14.6x	21.2x	22.3%	11.2%
Median	16,326	12,769	3.9x	3.8x	18.7x	13.3x	18.3x	23.3%	7.1%
QUALCOMM	97,808	85,251	3.8x	3.9x	14.1x	11.9x	19.4x	27.5%	(6.0%)

SELECT COMPARABLE COMPANIES - LARGEST PLAYERS

Company Name	Market Capitalization	Enterprise Value	EV / Revenue		EV / EBITDA		Price / EPS NTM	EBITDA Margin LTM	1-Yr Rev. Growth LTM
			LTM	NTM	LTM	NTM			
Intel	215,982	228,793	3.6x	3.5x	8.7x	8.5x	13.0x	42.0%	5.7%
Texas Instruments	105,847	105,455	7.0x	6.7x	15.2x	14.4x	20.9x	46.5%	11.9%
Micron	47,201	50,957	2.2x	1.8x	3.9x	3.0x	4.2x	55.7%	77.9%
Mean	123,010	128,402	4.3x	4.0x	9.3x	8.6x	12.7x	48.1%	31.8%
Median	105,847	105,455	3.6x	3.5x	8.7x	8.5x	13.0x	46.5%	11.9%
QUALCOMM	97,808	85,251	3.8x	3.9x	14.1x	11.9x	19.4x	27.5%	(6.0%)

Source(s): Capital IQ, Company Filings

Valuation

The team's approach to an intrinsic valuation was assessing Qualcomm's core business on a stand-alone basis, excluding the possibility of a combination with NXP Semiconductors or excess growth from 5G implementation. The team wanted to establish a base case for Qualcomm, given the uncertainty around factors such as price and regulatory approval in its deal with NXP, its ongoing legal disputes with Apple and trade commissions, and the takeover attempt from Broadcom.

Given a calculated WACC of 7.34% and a long-term free cash flow growth rate of 1.5%, the team estimates Qualcomm to be worth approximately \$70 per share

on an intrinsic basis. However, to reflect the risk associated with Qualcomm's future patent licensing business, the exhibit below shows a share price valuation under higher-WACC scenarios; and, to reflect the possibility of a high-growth case in the 5G market, the exhibit shows a share price valuation under higher terminal growth rates.

With this being said, the team maintains conviction in its base case valuation of \$70 per share and keeps in mind there may be additional upside from a successful acquisition of NXP, success in the 5G market, and/or the closing of a deal with Broadcom at its *most recent offer price of \$82 per share*.

EXHIBIT XX

Discounted Cash Flow Valuation

Free Cash Flow Build	FY '16A	FY '17A	FY '18E	FY '19E	FY '20E	FY '21E	FY '22E
Revenue	23,554	22,291	22,625	23,078	23,539	24,010	24,490
Cost of Goods Sold	(9,749)	(9,792)	(9,955)	(10,154)	(10,357)	(10,324)	(10,531)
Gross Profit	13,805	12,499	12,670	12,924	13,182	13,686	13,960
R&D	(5,151)	(5,485)	(5,656)	(5,769)	(5,885)	(6,003)	(5,831)
SG&A	(2,385)	(2,658)	(2,602)	(2,654)	(2,707)	(2,761)	(2,816)
EBIT	6,269	4,356	4,412	4,500	4,590	4,922	5,312
Income Taxes	(1,131)	(555)	(6,158)	(473)	(505)	(541)	(584)
NOPAT	5,138	3,801	(1,746)	4,028	4,085	4,381	4,728
Plus: Depr. & Amort.	1,428	1,461	1,471	1,500	1,530	1,561	1,592
Less: Capital Expenditures	(539)	(690)	(679)	(577)	(588)	(600)	(612)
(Investment) / Recovery of NWC	987	(791)	(75)	34	190	(13)	203
Unlevered Free Cash Flow	7,014	3,781	(1,029)	4,984	5,217	5,329	5,911
Discount Periods			0.50	1.50	2.50	3.50	4.50
Present Value			(993)	4,482	4,371	4,159	4,298

WACC

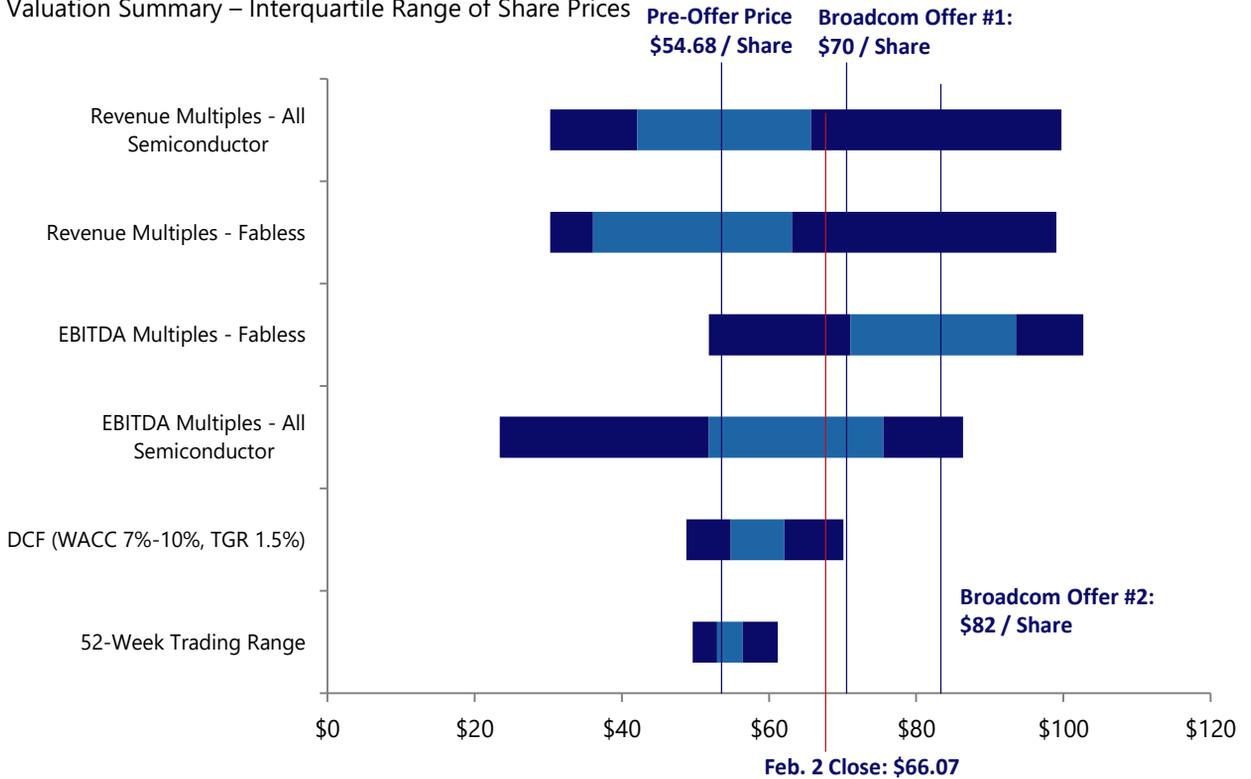
Risk-Free Rate	2.85%
Market Risk Premium	5.60%
Levered Company Beta	1.38
Cost of Equity	10.58%
Equity / Capitalization	55%
Pre-Tax Cost of Debt	3.75%
Effective Tax Rate	10%
After-Tax Cost of Debt	3.38%
Debt / Capitalization	45%
WACC	7.34%

Share Price Under Different WACC and Terminal Growth Scenarios

WACC		Terminal Growth Rate			
		1.25%	1.50%	1.75%	2.00%
		7.00%	\$71.47	\$73.96	\$76.68
7.34%	\$67.81	\$70.00	\$72.39	\$75.00	
7.50%	\$66.17	\$68.23	\$70.48	\$72.93	
8.00%	\$61.65	\$63.39	\$65.27	\$67.30	
8.50%	\$57.77	\$59.24	\$60.83	\$62.54	
9.00%	\$54.38	\$55.65	\$57.01	\$58.47	
9.50%	\$51.41	\$52.51	\$53.68	\$54.93	
10.00%	\$48.78	\$49.74	\$50.76	\$51.85	

EXHIBIT XXI

Valuation Summary – Interquartile Range of Share Prices



Valuation and Conclusion

On a multiples basis, it appears as though Qualcomm trades at an appropriate spot within its peer group given how its operating metrics line up with those of comparable semiconductor companies. Exhibit XXI above provides a full range of potential valuations for Qualcomm based on how comparable companies trade and how Qualcomm looks on an intrinsic basis. The lighter blue area represents the interquartile range – the range from the 25th percentile of potential values to the 75th percentile – which is the area the team placed more weight toward, as it partially removes the effect of outlier valuations. Given this range, the team holds conviction in its \$70 base case intrinsic valuation.

Conclusion

Qualcomm has clearly established itself as a leader in the mobile space, and there may very well exist high growth potential in the 5G market. And, while the team initially thought there may exist a gap between Qualcomm’s trading price and its intrinsic value, due to potential overreactions to major news events and transactions, a multi-approach valuation suggested there is not much of a price-value gap to realize with Qualcomm. For this reason, TMT will maintain a hold rating on the stock, and continue to follow it closely in light of crucial ongoing events.

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