

PART I. Executive Summary

American Cable Communications (ACC), one of the largest cable operators in the United States, is investigating its potential acquisition target, AirThread Connections (ATC), which is one of the largest regional wireless companies in the United States. The management team of ACC believes that the extensive acquisition can improve the efficiency of network utilization, which creates the economy of scales. To identify and evaluate the potential target of acquisition for ACC, the following report will conduct an analysis on the current situation of cable industry, and then analyze the performance and corporate strategies of ACC and AirThread. In addition, the report will also perform equity valuation for AirThread, using methods of APV, DCF, multiples and other valuation methods. Based on the analysis aforementioned, the report will provide a conclusive evaluation of AirThread acquisition.

PART II. Background Information of AirThread Acquisition

The Characteristics of Cable Industry

The cable industry, which provides cable TV service to audiences and operates a variety of infrastructures, has been undergoing significant transformation caused by technological advances over the recent decade. The industry-wide transformation has driven the companies to change their development strategies or to be weeded out otherwise. For better understanding the motivations of AirThread acquisitions, we will briefly analyze the transformation of cable industry and figure out its characteristics.

First, the construction of large-scale network infrastructure is realized with the development of telecommunications technology. The companies can serve more Internet subscribers and are more aggressive to expand their market shares and customer base. The increasing capacity of network infrastructure is the fundamental driver of the change in competitive dynamics.

Second, the expansion of customer base becomes essential to the success of a company. Because the technological improvement greatly increases the capacity of network infrastructure, the marginal costs caused by new consumers decrease significantly and the companies therefore have strong incentive to serve more subscribers. In addition, as cable industry gradually becomes commoditized, the profit margin of the industry demonstrates a downward trend. Under this business environment, the expansion of customer base is necessary for the companies in cable industry to maintain high revenue.

Third, the cost reduction through elevated efficiency of network utilization can largely improve the financial performance of the companies in the industry. The economy of scales can reduce the operating costs of the companies. As a result, the industry is experiencing the phase of consolidation, through which the smaller companies are weeded out or acquired by the larger companies.

The Overview of American Cable Communications

American Cable Communication (ACC) is one the largest cable operators in the United States, with cable system covering 48.5 million homes and serving 24.1 million video subscribers, 13.2 million high-speed Internet subscribers, and 4.6 million landline telephony subscribers. Realizing that the expansion of consumer base is essential to the development of the company, ACC is aggressively identifying the opportunities of additional acquisition.

The process of investigating potential acquisition for ACC can mainly be categorized into two stages. First, the business development group of ACC will identify the strategically fit target company, which can expand its business market, provide bundled service offering, reduce operation costs, etc. In the second stage, the business development group will conduct equity valuation for the target firm.

The Overview of AirThread Connections

AirThread Connections (ATC) is one of the largest regional wireless companies in the United States. The comparative advantage of ATC is the extensive geographical coverage of its network, which includes five geographical regions and more than 200 markets.

However, there are also significant risks lurking behind the business operation of AirThread. First, the business environment of wireless industry is increasingly competitive. AirThread are confronting the competition from several major competitors in the wireless industry. Second, AirThread has cost disadvantage, especially compared with its competitors. The higher operating cost can be attributed to technological reasons, which causes its operating costs to be approximately 20% higher than its rivals. Third, AirThread cannot provide a bundled service because its service is not diversified. The monotonous service greatly reduces the attractiveness of AirThread for customers and is difficult to retain customers.

Consequently, the comparative disadvantages of AirThread Connections are reflected in its deteriorated financial performance. Although return on equity demonstrated a

steady growth from 2005 to 2007, most of the major performance indicators of AirThread Connections are lower than the counterparts of its competitors. The current market shares of AirThread may be untenable and exposed to the risk of takeover.

The Significances of AirThread Acquisition

The potential acquisition can lead to a win-win situation for acquirer, ACC and target company, AirThread. The synergy effects can mainly be categorized into two aspects, revenue synergy and cost synergy.

After acquisition, the market base of ACC can be largely expanded because of the extensive geographical coverage of AirThread. In addition, ACC can integrate wireless service with its existing cable service, to provide a bundled service offering for the customers. The types of services are greatly diversified after the acquisition and therefore the revenue is expected to grow significantly. In addition to revenue synergy, cost reduction may also be realized by the acquisition. The efficiency of network utilization can be improved as some technical problems can be resolved after the acquisition. The backhaul cost of AirThread can be gradually reduced by over 20%.

Therefore, the potential acquisition can create values for these two companies through synergy effects on cost and revenue. The quantitative valuation of the synergy effects will be performed in details later in this report.

PART III. Valuation of AirThread Connections

Explicit forecast period: Financial Projection between 2008 and 2012

1. Methodology

To forecast the free cash flow from 2008 to 2012, the desirable method applied is Adjusted Present Value (APV) Approach. Compared to WACC and FTE, APV is a more viable measure since ATC goes through continuous debt repayment and hence, constantly changes its leverage ratio from 2008 to 2012.

2. Components of Adjusted Present Value

$$APV = NPV + NPVF$$

In words, the value of a project to a levered firm (APV) is equal to the value of the project to an unlevered firm (NPV) plus the net present value of the financing side effects (NPVF). In the following sections 2.1 and 2.2, we will discuss the relevant cash flows and respective discount rates separately.

2.1. Free Cash Flow

The free cash flow of the company should be separated into two parts, i.e., unlevered free cash flow used for calculating NPV and cash flow created by financing side effects for valuing NPVF. In the following parts, these two cash flows are analyzed separately.

2.1.1. NPV Part (value of the project to an unlevered firm)

A detailed illustration of the calculation was shown in the following parts step by step. Given the projection for AirThread, the FCF was calculated based on the formula below:

$$FCF = EBIT(1 - Tax\ rate) + Depreciation\ \&\ Amortisation \\ - Change\ in\ net\ working\ capital - Capital\ expenditure$$

From Ms. Zhang's perspective, a decline in service revenue growth will continue due to a predicted deterioration in the revenue per minute of airtime and the gradual maturation of the industry, while the growth rate of the equipment revenue will be maintained as well as operating expenses. The projection for EBIT, depreciation and amortisation expense, and total operating expenses was shown in Table 1 in the Appendix. As for working capital assumptions, we agreed with Ms. Zhang's opinion that the uncertainty in the prediction was not negligible concerning its significance level and adopted a market multiple approach. The projection for the working capital and the change in net working capital was shown in Table 2. Based on market multiple method, the account receivable and days sales equipment revenue were calculated as follows: the estimated multiple divided by 360-day year then multiplied by the total service revenue and total equipment sales revenue respectively. For the other accounts, they were based on total cash operating expenses, which means the final step of the calculation was multiplying the amount of the total cash operating expenses. Furthermore, the ratio of the capital expenditure over the total revenue was found based on the historical data of its business operations. Therefore, the estimated value of the capital expenditure was calculated based on previous revenue projection (Table 1). Above all, the FCF projection was shown in Table 3.

2.1.2. NPVF Part (net present value of the financing side effects)

1) Flotation cost of issuing new debt

Flotation costs are fees paid by the company when debt is issued, which may go to intermediaries, such as lawyers, and investment bankers and so on. In this case we estimate the flotation costs will be 1 percent of the gross proceeds of its loan according to the industry norm.

$$\text{Flotation Cost} = 3758 * 1\% = 37.58$$

Plus, flotation costs are paid immediately but its tax shields are deducted from taxes by amortizing on a straight-line basis over the life of the loan. Hence, annual tax shield from flotation cost = $37.58 * 40\% * (1/5) = 3.0064$.

2) Tax subsidy to debt

Even though the intermediaries receive the flotation costs, interest must be paid on the gross proceeds, which creates a benefit of tax shield for the company.

The interests on remaining principal from 2008 to 2012 are estimated as 199, 184, 165, 148, 127. Adding back the interest paid for flotation cost per year (Interest on flotation cost per year = $37.58 * 5.5\% = 2.0699$), the gross interest expense would be 201.0669, 186.0699, 167.0699, 150.0699, 129.0699 respectively. Hence, by interest tax shield = interest expense * tax rate, the interest tax shield would be 80.42676, 74.42676, 66.82676, 60.02676, 51.62676 for 2008-2012 respectively.

2.2. Discount Rate

After figuring out the cash flows used to calculate NPV and NPVF, we need to specify the discount rates for these two cash flows.

2.2.1. Discount rate for NPV Part

1) Depreciation tax shield: since the benefit of depreciation tax shield is riskless, the discount rate for it would be risk-free rate. We take the interest rate of US 10-year Treasury Bond in 2007 as the risk-free rate, which is 4.63%.

2) The rest part of FCF (excluding depreciation tax shield): since the cash flow is unlevered (totally financing by equity), we need to employ the cost of equity for an unlevered firm.

$$R_E = R_0 + D/E * (1 - t)(R_0 - R_D)$$

Tax rate, t is equal to 40% and according to Balance sheet for ATC in 2007, debt to equity ratio is 0.732. As for the cost of debt, we refer to interest coverage ratio to calculate it. According to the Income Statement for ATC in 2007, the interest coverage ratio is calculated as 5.326. Since the market capital of ATC is lower than 2% of 5 billion, which is the lowest bound for market capital of large non-financial service companies, and thus we classify ATC as a small/median non-financial service company. The interest coverage ratio of 5.326 is estimated to offer a default spread of 1.25%.

$$R_D = R_f + \text{default spread} = 4.63\% + 1.25\% = 5.88\%$$

As CAPM model implies, $R_E = R_f + \beta \times (E(R_M) - R_f)$. In this equation, we assume that β is equal to 1, which is the average of comparable firms. In addition, $E(R_M) - R_f = 5\%$. Hence, cost of equity in levered firms is equal to 9.63%, R_E , and cost of equity in unlevered firms, R_0 , is equal to 8.49%.

Therefore, the rest of FCF excluding depreciation tax shield ($EBIT(1-t) - \text{Change in Net Working Capital} - \text{Capital Expenditure}$) should be discounted at $R_0 = 8.49\%$.

2.2.2. Discount rate for NPVF Part

As we discussed in the previous parts, NPVF is composed of annual tax shield from flotation cost and annual gross interest tax shield. Since both of the two components above are riskless, they should be both discounted with $R_f = 4.63\%$.

3. Adjusted Present Value

Based on the calculation above, we can conclude that APV, which is the sum of NPV and NPVF, should be $4068.83 + (294.453 + 13.15035 - 37.58) = 4338.849$.

4. Illiquidity Discount

Considering the illiquidity of private investments, and certain types of agency costs as well as the financial health and size of the firm, the APV of ATC shall be discounted. The revenue of ATC in 2007 is \$MM 4509.1, and larger than the expense. Hence it's profitable and subjected to a discount as 18% of value approximately. Plus, through the rules of thumb and academic research that Ms. Wang referred to, the upper bound of discount should be around 30%. In conclusion, the range of illiquidity discount rate of ATC should be 18%-30%. After illiquidity discount, the range of discounted APV of ATC would be \$MM 3399.93 - \$MM 3718.18.

Terminal Value: Financial Projection after 2012

In common practice, the perpetuity growth model is usually employed to calculate the terminal value, which accounts for the value of free cash flow (FCF) that continue growing at an assumed constant rate (g) in perpetuity. The formula below would guide the calculation of the terminal value for this case:

$$T_{2012} = \frac{FCF_{2012}(1 + g)}{r - g}$$

From the results shown in Table 3, the FCF_{2012} was concluded at 319.2. The subsequent step would be calculating the long-term growth rate. The long-term growth

rate was defined as a product of the company's return on capital and reinvestment rate in this case, implying that:

$$g = \text{Return on capital} \times \text{Reinvestment rate}$$

The case footnotes also provide the functions of return on capital and reinvestment rate. Return on capital was defined as net operating profit after taxes (NOPAT) divided by the book value of equity plus debt and the reinvestment rate was defined as capital expenditures plus investments in working capital minus depreciation divided by the NOPAT. The formulas for calculating those two formulas as follow:

$$\begin{aligned} \text{Return on capital} &= \frac{\text{NOPAT}}{\text{Equity} + \text{Debt}} \\ \text{Reinvestment rate} &= \frac{(\text{Capital expenditure} + \text{Investment in working capital} - \text{Depreciation})}{\text{NOPAT}} \end{aligned}$$

Based on the previous calculations, all the items except for book value of equity and debt were available. Meanwhile, the book value of equity and debt was traced back to the balance sheet of the company in 2007. The results of annual growth rate were shown in Table 4 and concluded that the long-term growth rate was expected to be 2.7%.

The next step was to sort out discount rate. An average D/E ratio was 40.1% among five wireless comparable companies listed. It was assumed to be the target D/E ratio in 2012. The reason is that the acquisition was intended to complete by maximizing debt financing, which means at the year of acquisition, the D/E ratio would be much higher than the comparable average. Given the information about the predicted equity risk premium of 5%, the cost of debt of 5.5%, the corporate tax rate of 40% and the risk-free rate of 4.63%, the $r = WACC_{2012}$ was 7.7% (Table 6). One more step, the terminal value would be resulted at MM \$6,534 by applying the formula of the perpetuity growth model.

Concerning the high quality of AirThread's network assets, its valuable wireless spectrum licenses, and its steady cash flow, they would merit a debt to value ratio as high as 45% to 50% based on EBITDA coverage ratios exceeding 5.0x. In other words, the D/E ratio of the company would reach 100% if the debt to value ratio achieved 50%. Therefore, we assumed a linear reduction would happen to D/E ratio from 100% at the year of acquisition to 40.1% at the end of paying off the debt. The corresponding D/E ratios, debt to value ratios and equity to value ratios were shown in Table 5, and the

individual yearly WACCs from 2007 to 2012 were shown in Table 6. At the end, the present value of the terminal value would be discounted by individual yearly WACC and resulted in MM \$4,603.

Synergy Effects of AirThread Acquisitions

As we mentioned before, ACC and ATC, the two companies are specialized in different products. Through M&A, these two companies can maximize their own strength to achieve synergies from the aspects of revenue and cost.

1. Revenue Synergy

The revenue synergy mainly comes from the increasing number of new customers and increasing the retention rate of existing customers.

Operating Markets	209
Non-Operating Markets	9
Markets In Which ATC Has A Controlling Interest	218
Markets To Be Acquired Under Existing Purchase Agreements	25
Non-Controlling Investment Interests	17
Total Markets	260

Firstly, the combination of the complimentary products can help the company to expand into new markets and acquire the existing customers of other companies. Moreover, the leverage of idle resources can generate synergy as well. As table (1) suggests, ATC previously has some licensed but not operating area. After the acquisition, the company would be able to leverage these idle resources to generate more revenue.

Secondly, after the acquisition, the company is able to offer bundled products, which conforms the transition trend of the industry. This more thorough product and service offering can certainly attract new customers and boost the topline growth.

Thirdly, the synergy can be contributed from the increasing competition power of the company. After the acquisition, the company is able to expand its product line and customer base, which adds more competitive strength to it. With this competitive strength, it is able to gain larger market share and increase their market position, which is beneficial for its customer acquisition and revenue generating.

In addition to acquiring new customers, retaining the existing customers is also important. With bundled products and strengthened market position, the company is more likely to keep its customers, i.e., increasing the customer retention ratio. With the

trend of increasing customer-acquiring cost in the industry, this beneficial effect to topline growth can be critical in long term.

	2005	2006	2007	2008	2009	2010	2011	2012
<i>Wireless Business subscribers</i>								
Average Monthly Subscribers (in MM's)				0.3	0.5	0.7	1	1.2
Average Monthly Minutes	625	704	859	859	885	911	939	967
Total Monthly Minutes				258	443	638	939	1160
Revenue Per Minute	0.0724	0.0671	0.0595	0.0506	0.0506	0.0506	0.0506	0.0506
Annual Business Revenue Increase (\$MM)				156	269	387	570	704

2. Cost Synergy

2.1. Backhaul Cost

The cost synergy is essentially attributed to the improved efficiency of network utilization, which reduces backhaul costs. According to Jennifer's estimates, the backhaul costs are approximately 20% of the company's system operating expenses and the total cost savings are 6% realized over four years starting from 2009. In our analysis, a scenario analysis is launched to investigate the different cases of cost reduction that may occur.

2.2. Marketing Cost

When we acquiring the new customers, one of the largest costs is related to marketing. However, through the acquisition, the company is able to obtain ATC's existing customers, which save the marketing cost and other cost related to new customer acquisition. Moreover, the news about this M&A can be a good marketing by nature, which in another way, help to save the market cost and create synergy.

2.3. Scenario Analysis for the Value of Synergy Effects

Though the synergy generation can be the most valuable part of an M&A deal, there are situations that the synergy might not be able to be realized as we expect. For example, as we discussed before, the industry is experiencing a consolidation and upgrade stage, with fierce competition in the industry. Each firm fights very hard to gain the market share. This can potentially influence the synergy realization of market expansion and marketing cost saving. We might not be able to enter new market and increase the market share as we expected before. In addition, the competition can bring larger investment in marketing, which results in higher marketing expense. In the following sections, we investigate the different scenarios for the synergy effects.

According to the case, Jennifer's estimation of synergy is as below. We use the WACC and growth rate discussed before to discount the synergy effect to present.

Bull case:

<i>Bull</i>						
<i>\$mm</i>	2008	2009	2010	2011	2012	2013
Annual Business Revenue Increase	156	269	387	570	704	
Backhaul Savings	0	13	26	53	76	
Net effect to EBIT	156	282	413	623	780	801
Net effect to FCF (effect to income * (1-t))	94	169	248	374	468	481
Net effect to terminal value					9613	
Value of synergy	7853					

Jennifer believed that the growth in business subscribers would be similar to American Cable's early telephony adoption rate, which we think this might overestimate the synergy effect. Firstly, the company has entered a more mature stage, which means they might not be able to generate as high growth rate as the early stage. Secondly, when the size of the company grows larger, the base grows larger, it's harder to have high growth rate as well.

Therefore, we regard this case as a bull case and apply a discount to it to get the base case and the bear case. The details are in Table A and Table B.

Table A: Base Case

<i>Base</i>						
<i>\$mm</i>	2008	2009	2010	2011	2012	2013
Annual Business Revenue Increase	109	188	271	399	493	
Backhaul Savings	0	9	18	37	53	
Net effect to EBIT	109	198	289	436	546	561
Net effect to FCF (effect to income * (1-t))	66	119	173	261	328	336
Net effect to terminal value					6729	
Value of synergy	<u>5497</u>					

Table B: Base Case

Bear						
<i>\$mm</i>	<i>2008</i>	<i>2009</i>	<i>2010</i>	<i>2011</i>	<i>2012</i>	<i>2013</i>
Annual Business Revenue Increase	76	132	190	279	345	
Backhaul Savings	0	7	13	26	37	
Net effect to EBIT	76	138	202	305	382	561
Net effect to FCF (effect to income * (1-t))	46	83	121	183	229	336
Net effect to terminal value					4710	
Value of synergy	3843					

PART IV. Evaluation of AirThread Acquisition

Based on the valuation above, we summarize the NPV value of 2008-2012, terminal value, illiquidity discount, NPVF and synergy together to get the total value of the firm. We think that under different conditions, the illiquidity discount and synergy value premium can vary, so we apply a scenario analysis to get a range of revenue. Details can be seen in the table below.

According to our valuation, the total value of the firm is between \$11223m~\$14193m. To consider the acceptable value paid for this deal, we should be more conservative, thus, we look at the base and bear case. The acceptable deal value of the firm is between \$11223~\$12270m. We can take this deal as long as it's below \$12270m. Further negotiation between the two parties might be required to reach a final agreement.

	Bear	Base	Bull
NPV Value (08-12)	4068.83	4068.83	4068.83
Terminal value	4602.6	4602.6	4602.6
Illiquidity discount	18%	25%	30%
NPVF	270.02	270.02	270.02
Synergy	3843	5497	7853
Total	11223.6	12270.6	14193

Appendix

Table 1 AirThread's Projection

AirThread (\$MM)	2008	2009	2010	2011	2012
<i>Operating Results</i>					
Service Revenue	4,194.3	4,781.5	5,379.2	5,917.2	6,331.4
Plus: Equipment Sales	<u>314.8</u>	<u>358.8</u>	<u>403.7</u>	<u>444.1</u>	<u>475.2</u>
Total Revenue	<u>4,509.1</u>	<u>5,140.3</u>	<u>5,782.9</u>	<u>6,361.3</u>	<u>6,806.6</u>
Less: System Operating Expenses	838.9	956.3	1,075.8	1,183.4	1,266.3
Less: Cost of Equipment Sold	755.5	861.2	968.9	1,065.8	1,140.4
Less: Selling, General & Administrative	<u>1,803.6</u>	<u>2,056.2</u>	<u>2,313.2</u>	<u>2,544.5</u>	<u>2,722.6</u>
Total Operating Expenses	<u>3,398.0</u>	<u>3,873.7</u>	<u>4,357.9</u>	<u>4,793.7</u>	<u>5,129.3</u>
EBITDA	<u>1,111.1</u>	<u>1,266.6</u>	<u>1,425.0</u>	<u>1,567.6</u>	<u>1,677.3</u>
Less: Depreciation & Amortization	<u>705.2</u>	<u>804.0</u>	<u>867.4</u>	<u>922.4</u>	<u>952.9</u>
EBIT	<u>405.9</u>	<u>462.6</u>	<u>557.6</u>	<u>645.2</u>	<u>724.4</u>

Table 2 AirThread's Expected Values of Working Capital

<i>Working Capital Assumptions</i>	2008	2009	2010	2011	2012
Accounts Receivable	485.5	553.5	622.6	684.9	732.9
Days Sales Equip. Rev.	135.0	153.8	173.1	190.4	203.8
Prepaid Expenses	46.9	53.5	60.1	66.2	70.8
Accounts Payable	335.5	382.4	430.2	473.2	506.4
Deferred Serv. Revenue	132.2	150.8	169.6	186.6	199.6
Accrued Liabilities	<u>64.7</u>	<u>73.7</u>	<u>82.9</u>	<u>91.2</u>	<u>97.6</u>
Net Working Capital	<u>135.0</u>	<u>153.9</u>	<u>173.1</u>	<u>190.5</u>	<u>203.8</u>
Change in Net Working Capital	10.8	18.9	19.3	17.3	13.3

Table 3 AirThread's Free Cash Flow Projection

AirThread (\$MM)	2008	2009	2010	2011	2012
NOPAT = EBIT(1-Tc)	243.5	277.6	334.6	387.1	434.6
Plus: Depreciation & Amortization	705.2	804.0	867.4	922.4	952.9
Less: Working Capital	10.8	18.9	19.3	17.3	13.3
Less: Capital Expenditure	<u>631.1</u>	<u>719.7</u>	<u>867.4</u>	<u>970.1</u>	<u>1,055.0</u>
FCF	<u>306.8</u>	<u>343.0</u>	<u>315.3</u>	<u>322.1</u>	<u>319.2</u>

Table 4 AirThread's Long-term Growth Rate

AirThread	2008	2009	2010	2011	2012
Return on capital	5.7%	6.5%	7.9%	9.1%	10.2%
Reinvestment rate	<u>-26.0%</u>	<u>-23.6%</u>	<u>5.8%</u>	<u>16.8%</u>	<u>26.6%</u>
Long-term growth rate	<u>-1.5%</u>	<u>-1.5%</u>	<u>0.5%</u>	<u>1.5%</u>	<u>2.7%</u>

Table 5 AirThread's D/E Ratio Estimation

<i>Comparable Companies</i>	Debt/ Value	Debt/ Equity	Equity/Value
<i>Universal Mobile</i>	36.8%	58.3%	63.2%
<i>Neuberger Wireless</i>	29.5%	41.9%	70.5%
<i>Agile Connections</i>	19.4%	24.1%	80.6%
<i>Big Country Communications</i>	24.1%	31.7%	75.9%
<i>Rocky Mountain Wireless</i>	30.7%	44.4%	69.3%
2007	50.0%	100.0%	50.0%
2008	46.8%	88.0%	53.2%
2009	43.2%	76.0%	56.8%
2010	39.0%	64.0%	61.0%
2011	34.2%	52.0%	65.8%
2012/Average	28.1%	40.1%	71.9%

Table 6 AirThread's Annual WACC

Equity risk premium	5%
r_f	4.63%
R_E	9.6%
R_D	5.9%
$1-T_c$	60%
WACC 2007	6.5%
WACC 2008	6.7%
WACC 2009	6.9%
WACC 2010	7.2%
WACC 2011	7.5%
WACC 2012/Average	7.7%