

**Sheet for Input of Market Data - WiMAX Business Case**

Services and Related Costs	Install & Commission Expense	Monthly Site Lease Expense	One Time Hook-up Fees Chgd to Customer	Monthly Equipment Lease if applicable	% of Equipment supplied by WiMAX Operator	Allowance for Bad Debts	Allowance for Churn
Residential Users: High Speed Internet	\$250	\$0	\$50	\$10	60%	10%	2%
Residential Users: Local Access	\$0	\$0	\$0	\$0	0%		
Roaming Services for Laptop Access	\$0	\$0	\$0	\$0	0%		
Small/Medium Business 512 kbps CIR, 1.5 Mbps PIR	\$500	\$50	\$500	\$35	50%	2%	1%
Small/Medium Business (Premium) 1 Mbps CIR, 5 Mbps PIR							
Business Local Access (POTS)	\$0	\$0	\$0	\$0	0%		
Mobile Subscribers	\$25	\$0	\$50	\$0	0%	1%	5%
Wi-Fi Hot Spot Backhaul: 1.5 Mbps CIR, 11 Mbps PIR	\$500	\$50	\$500	\$20	20%	1%	1%
Cellular Backhaul (per Site)	\$1,000	\$100	\$1,000	\$100			

OPEX Items	Year 1	Year 2	Year 3	Year 4	Year 5
Sales & Marketing Incl. Customer Technical Support as a % of Revenue	20%	16%	12%	10%	10%
Network Operations % of Revenue	10%	9%	8%	8%	7%
General & Administrative % of Revenue	6%	5%	4%	3%	3%
Spectrum Lease Fees (If Applicable) \$K	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0
Cost of Capital	10%				

Base Station WiMAX Equipment	\$K	Terminal/CPE ASPs	\$
Platform	\$7.0	Indoor CPE Residential Term/%	\$250 0%
\$K/Channel	\$7.0	Outdoor Residential Term/ASP	\$350 \$350
Install and Commissioning/channel	\$0.7	Small Business Terminal	\$700
<b>Other Base Station CAPEX</b>	<b>\$K</b>	Medium Business Terminal	\$1,400
Backhaul Equipment	\$25.0	Wi-Fi Hot Spot Backhaul Terminal	\$300
Other Base Station Equipment (ADM, Switch, etc)	\$15.0	Cellular Backhaul Terminal	\$3,500
Total Edge and Core Equipment for Metro Area	\$500.0	Residential Terminal Price Erosion per year	15.0%
Edge and/or Core network equipment amortized on a per BS basis	\$7.9	Other Terminal Equipment Price Erosion per yr	5.0%
Cost of Spectrum License (if applicable) \$K	\$280.0		
Spectrum License (if applicable) amortized on a per BS basis	\$4.4		
Site Acquisition & Civil Works	\$50.0		

Sheet for Input of Market Data - WiMAX Business Case					Base Station Status						
1) Typical Metro Area deployment in larger cities will include BS deployments in Urban, Suburban and Exurban areas					Urban						
2) Rural deployments are expected to be isolated small cities and towns					Suburban						
3) To exclude a demographic area, set the "Approximate geographic area to be covered" to 0					ARPU Reduce	0%					
4) Go to "InputBSConfig" worksheet to configure WiMAX Base Stations for each geog. area					ARPU Erosion	5%					
<b>Customer Densities</b>					Urban	Suburban	Exurban	Rural	Summary Data		
Residential Density per sq-km	6,000	1,500	500	600	# HH	#SME	Pops				
Small/Medium Business Density as % of Residential	7.0%	4.0%	2.0%	7.5%	387,500	24,250	1,007,500				
WiFi Hot Spot Density (sites/sq-km) (5 yr Projection)	2.0	1.0	0.2	0.1	WiFi Spots	Mobile Sites	WiMAX PCs				
Cellular BS Site Density (sites/sq-km)	1.0	0.5	0.1	0.05	155	78	142,500				
Density of WiMAX enabled Laptops, PDAs, Cell Phones (5yrs) as % of Residential	35%	40%	60%	35%	Area =	125	sq-km				
<b>Approximate geographic area to be covered in sq-km</b>	50	50	25	0							
<b>Services and Expected Monthly ARPU</b>	Urban	Suburban	Exurban	Rural	1st Year	5th year					
Residential Users: High Speed Internet	\$30	\$30	\$30	\$30	\$30	\$ 24.44					
Residential Users: Local Access	\$20	\$20	\$20	\$20	\$20	\$ 16.29					
Roaming Services for Laptop Access	\$20	\$20	\$20	\$20	\$20	\$ 16.29					
Small/Medium Business 512 kbps CIR, 1.5 Mbps PIR	\$450	\$450	\$450	\$450	\$450	\$ 366.53					
Small/Medium Business (Premium) 1 Mbps CIR, 5 Mbps PIR	\$550	\$550	\$550	\$550	\$550	\$ 447.98					
Business Local Access (POTS)	\$250	\$250	\$250	\$250	\$250	\$ 203.63					
Mobile Subscribers	\$45	\$45	\$45	\$45	\$45	\$ 36.65					
Wi-Fi Hot Spot Backhaul: 1.5 Mbps CIR, 11 Mbps PIR	\$650	\$650	\$650	\$650	\$650	\$ 529.43					
Cellular Backhaul (per T1/E1)	\$300	\$600	\$900	\$1,200							
<b>Expected Mature Market Penetration</b>	Urban	Suburban	Exurban	Rural							
Residential Users: High Speed Internet	5%	10%	20%	40%							
Residential Users: Local Access % of total	20%	25%	31%	50%							
Roaming Services for Laptop Access % of total	0%	0%	0%	0%							
<b>Total Small/Medium Business Customers</b>	7%	10%	15%	0%							
Small/Medium Business 512 kbps CIR, 1.5 Mbps PIR as %of total	25%	40%	70%	90%							
Business Local Access (POTS) as % of total SME	50%	60%	70%	80%							
<b>Wi-Fi Hot Spot Backhaul: 1.5 Mbps CIR, 11 Mbps PIR</b>	15%	26%	39%	0%							
<b>Cellular Backhaul Sites</b>	0%	0%	0%	0%							
<b>Mobile Subscribers</b>	0%	0%	0%	0%							
<b>Years to reach 90% of Expected Mature Market Penetration</b>	4 Yr S-Curve	4 Yr S-Curve	4 Yr S-Curve	4 Yr S-Curve							
<b>Overbooking Factors</b>											
Residential Users: High Speed Internet			20								
Mobile Subscribers			20								
Small/Medium Business			1								
Small/Medium Business Local Access			10								
<b>T1 or E1</b>			T1								
<b>Base Station Deployment Summary (From "InputBSConf" Sheet)</b>											
Geographic Area	Urban	Suburban	Exurban	Rural							
Frequency Band	3.5GHz	3.5GHz	3.5GHz	3.5GHz							
Duplexing	FDD	FDD	FDD	FDD							
Channel BW	3.50	3.50	3.50	3.50							
Average BS Range km	0.59	1.18	1.671	n/a							
Numer of Base Stations	48	12	3	0							

<b>Input Data for WiMAX Base Stations</b>					
<i>Step 1) Select frequency band, duplex (TDD or FDD) and channel BW</i>					
<i>Step 2) Size Base Stations (range, sectors &amp; channels) to match or exceed capacity requirements for each deployment area</i>					
<i>Step 3) Add channels (and/or sectors) as necessary, to increase capacity with time, taking care not to exceed available spectrum.</i>					
<b>Base Station Configuration for Deployment Area</b>		<b>Urban</b>			
<b>Base Station Characteristics</b>	Duplexing	Freq Band	Range in km	Coverage in sq-km	
	FDD	3.5GHz	0.59	1.0	
	Year 1	Year 2	Year 3	Year 4	Year 5
<b>Total Base Station Capacity Requirements in Mbps</b>	4.6	10.0	21.8	33.2	37.0
<b>Base Station Capacity Calculation</b>					
Channel Bandwidth in MHz	3.50	3.50	3.50	3.50	3.50
Spectral Efficiency	2.8	2.8	2.8	2.8	2.8
Number of Sectors	4	4	4	4	4
Number of Channels	4	4	4	4	4
"Avg" Base Station Capacity (payload) in Mbps (DL or UL)	39	39	39	39	39
<b>Spectrum Required in MHz (Frequency Re-Use = 1)</b>	28	28	28	28	28
Excess Capacity or Capacity Shortfall (-)	35	29	17	6	2
<b>Required Urban Coverage Area (sq-km)</b>	50				
<b>Number of WiMAX Base Stations Installed</b>	48	<b>Total Covered Households</b>		300,758	
<b>Actual Urban Coverage Area in sq-km</b>	50.1	<b>Total Covered SME</b>		21,053	
<b>Base Station Configuration for Deployment Area</b>		<b>Suburban</b>			
<b>Base Station Characteristics</b>	Duplexing	Freq Band	Range in km	Coverage in sq-km	
	FDD	3.5GHz	1.18	4.2	
	Year 1	Year 2	Year 3	Year 4	Year 5
<b>Total Base Station Capacity Requirements in Mbps</b>	5.2	10.6	22.2	33.8	36.6
<b>Base Station Capacity Calculation</b>					
Channel Bandwidth in MHz	4	4	4	4	4
Spectral Efficiency	2.8	2.8	2.8	2.8	2.8
Number of Sectors	4	4	4	4	4
Number of Channels	4	4	4	4	4
"Avg" Base Station Capacity (payload) in Mbps (DL or UL)	39	39	39	39	39
<b>Spectrum Required in MHz (Frequency Re-Use = 1)</b>	28	28	28	28	28
Excess Capacity or Capacity Shortfall (-)	34	29	17	5	3
<b>Required Suburban Coverage Area (sq-km)</b>	50				
<b>Number of WiMAX Base Stations Installed</b>	12	<b>Total Covered Households</b>		75,190	
<b>Actual Suburban Coverage Area in sq-km</b>	50.1	<b>Total Covered SME</b>		3,008	

Base Station Configuration for Deployment Area		Exurban				
Base Station Characteristics	Duplexing	Freq Band	Range in km	Coverage in sq-km		
	FDD	3.5GHz	1.67	8.4		
	Year 1	Year 2	Year 3	Year 4	Year 5	
<b>Total Base Station Capacity Requirements in Mbps</b>	3.4	7.7	16.0	24.4	26.4	
<b>Base Station Capacity Calculation</b>						
Channel Bandwidth in MHz	4	4	4	4	4	
Spectral Efficiency	2.8	2.8	2.8	2.8	2.8	
Number of Sectors	4	4	4	4	4	
Number of Channels	4	4	4	4	4	
"Avg" Base Station Capacity (payload) in Mbps (DL or UL)	39	39	39	39	39	
<b>Spectrum Required in MHz (Frequency Re-Use = 1)</b>	28	28	28	28	28	
Excess Capacity or Capacity Shortfall (-)	36	32	23	15	13	
<b>Required Exurban Coverage Area (sq-km)</b>	25					
<b>Number of WiMAX Base Stations Installed</b>	3	Total Covered Households		12,565		
<b>Actual Exurban Coverage Area in sq-km</b>	25.1	Total Covered SME		251		
Base Station Configuration for Deployment Area		Rural				
Base Station Characteristics	Duplexing	Freq Band	Range in km	Coverage in sq-km		
	FDD	3.5GHz	1.00	3.0		
	Year 1	Year 2	Year 3	Year 4	Year 5	
<b>Total Base Station Capacity Requirements in Mbps</b>	5.2	11.2	24.2	37.2	40.5	
<b>Base Station Capacity Calculation</b>						
Channel Bandwidth in MHz	4	4	4	4	4	
Spectral Efficiency	2.8	2.8	2.8	2.8	2.8	
Number of Sectors	4	4	4	4	4	
Number of Channels	4	4	4	4	4	
"Avg" Base Station Capacity (payload) in Mbps (DL or UL)	39	39	39	39	39	
<b>Spectrum Required in MHz (Frequency Re-Use = 1)</b>	28	28	28	28	28	
Excess Capacity or Capacity Shortfall (-)	34	28	15	2	-1	
<b>Required Rural Coverage Area (sq-km)</b>	0					
<b>Number of WiMAX Base Stations Installed</b>	0	Total Covered Households		0		
<b>Actual Exurban Coverage Area in sq-km</b>	0	Total Covered SME		0		

*Insufficient BS capacity, add channels or decrease range*