



Capital
Markets

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Weekly news roundup

C-Band auction update. C-band auction bids have reached \$69.83B in gross proceeds after 45 rounds of bidding. Bidding is set to resume January 4 after taking a break for the holidays. After 45 rounds, the nationwide price for A block licenses per MHz Pop was \$1.21, while BC prices were \$1.11 per MHz PoP according to BitPath COO Sasha Javid. New York has commanded the highest total price, standing at around \$515M for category A and BC. "Gross proceeds have been driven by surprisingly robust and persistent demand," wrote Javid. "In Round 36, I suspect that a large bidder pulled back significantly in the largest markets given that all the top 10 markets experienced a drop in demand." There are 57 participants in the clock phase, though winners won't be disclosed until the auction ends. T-Mobile, AT&T, Verizon and Dish are all among registered bidders. (*Fierce Wireless*)

FCC update. Outgoing Chairman Ajit Pai will use his last FCC meeting on Jan. 13 to showcase the commission's work over the past four years. "Serving as chairman of the FCC has been the honor of a lifetime," Pai wrote in a blog post. "And soon, my time in this position will conclude." Pai expressed pride in his efforts to increase transparency, and in the agency "show[ing] its work" by sharing ahead of time what the FCC would be voting on. "It's now routine for the agency to publish the exact text of commission meeting items three weeks in advance of any votes being cast; to include a one-page fact sheet describing in plain English what each item does; and to post a monthly blog from yours truly introducing the agenda in a hopefully engaging way." For the January meeting, Pai said he has invited FCC bureaus, offices, and task forces to prepare presentations highlighting their accomplishments over the past four years. (*Radio World*)

Verizon update. Verizon is expanding its "Food for Frontline Workers" program to doctors, nurses, first responders and healthcare workers in six cities experiencing high volumes of COVID-19 cases. An estimated 50,000 meals will be delivered during the 2020 holiday season and in January 2021. This program is the continuation of Verizon's initiative that kicked off in April, delivering more than 150,000 meals to frontline workers in cities across the U.S. including New York City. Verizon's expanded initiative will provide meals to healthcare workers and first responders in Milwaukee, Omaha, Minneapolis and Chicago, with additional markets to include Sioux Falls and Los Angeles. "Our 'Food for Frontline Workers' program is a way for us to deliver gratitude and support for first responders, healthcare workers, and to the local business restaurants who have been hit hardest by the pandemic," said Patty Roze, Vice President, Verizon Public Sector. "By putting themselves on the front lines of the response to COVID-19, first responders and healthcare workers have sacrificed their own comfort to care for others. We see the best part of humanity in their selfless acts of heroism." (*Company release*)

AT&T update. AT&T announced that AT&T Mobility and the Communications Workers of America have reached agreements on one-year extensions of two Mobility contracts. The extended Mobility Orange contract covers over 14,000 AT&T Mobility employees in 36 states and the District of Columbia. It goes into effect on February 13, 2021, and expires on February 11, 2022. The extended Mobility Southeast (or Mobility Black) contract covers nearly 10,000 AT&T Mobility employees in CWA District 3 – the Southeast Region, which includes Alabama, Florida, Georgia, Kentucky, Louisiana, Mississippi, North Carolina, South Carolina, Tennessee, and St. Croix, USVI. It goes into effect on February 12, 2022, and expires on February 10, 2023. Until the extended contracts take effect, employees are continuing to work under their current contracts. (*Company release*)

Exhibit 1: RBC Cable/Telecom and Communications Infrastructure Comps Sheet

Telco & Wireless

Company	Symbol	Price	2W	YTD	Mkt. Cap.	LT Debt	Cash	Ent. Val.	Net Debt/	Revenue (MM)		EBITDA (MM)		Div Yield	EV/EBITDA		P/FCF		P/E		EV/uFCF		2021 EV/EBITDA / 2021 EBITDA growth	
		12/24/20	% Chg.	% Chg.	(mil.)	(mil.)	(mil.)	(mil.)	LQA EBITDA	CY20E	CY21E	CY20E	CY21E		CY20E	CY21E	CY20E	CY21E	CY20E	CY21E	CY20E	CY21E		
AT&T	T	\$28.70	(6.5%)	(26.6%)	\$205,865	\$158,878	\$9,758	\$374,488	2.6x	\$170,743	\$174,266	\$54,959	\$56,853	7.2%	6.7x	6.4x	7.9x	8.4x	9.1x	9.0x	9.6x	9.3x	1.9x	
Verizon	VZ	\$58.87	(2.7%)	(4.1%)	\$243,840	\$115,560	\$8,983	\$351,878	2.4x	\$128,781	\$132,151	\$46,903	\$48,141	4.3%	7.5x	7.0x	11.8x	13.1x	12.1x	11.8x	12.4x	11.4x	2.6x	
T-Mobile	TMUS	\$132.92	1.8%	69.5%	\$166,549	\$69,192	\$6,571	\$229,170	2.8x	\$73,804	\$77,377	\$19,830	\$22,806	N/A	11.9x	10.1x	NM	38.2x	NM	39.3x	27.4x	27.2x	0.6x	
Lumen (CenturyLink)	LUMN	\$9.86	(1.7%)	(25.4%)	\$10,699	\$32,592	\$547	\$42,744	3.7x	\$20,707	\$20,321	\$8,848	\$8,917	10.1%	4.9x	4.6x	4.5x	4.2x	7.1x	7.2x	9.0x	8.4x	6.8x	
Telecom Carrier Average			(2.3%)	3.4%					2.9x					7.2%	7.8x	7.0x	8.0x	16.0x	9.4x	16.8x	14.6x	14.1x	3.0x	
U.S. Treasury Yield - 10 years			Spread vs VZ/T:		4.8%																			
Cable Average (ATUS, CHTR, CMCSA)			1.0%	26.4%					4.2x					1.8%	11.2x	10.5x	18.8x	16.4x	35.8x	27.1x	17.1x	15.7x	1.5x	

Tower Infrastructure

Company	Symbol	Price	2W	YTD	Mkt. Cap.	LT Debt	Cash	Ent. Val.	Net Debt/	Revenue (MM)		EBITDA (MM)		Div Yield	AFFO/share		EV/EBITDA		AFFO Multiple		EV/uFCF		2021 EV/EBITDA / 2021 EBITDA growth
		12/24/20	% Chg.	% Chg.	(MM)	(mil.)	(mil.)	(MM)	LQA EBITDA	CY20E	CY21E	CY20E	CY21E		CY20E	CY21E	CY20E	CY21E	CY20E	CY21E	CY20E	CY21E	
American Tower	AMT	\$218.64	(0.4%)	(4.9%)	\$97,548	\$24,782	\$1,730	\$121,612	4.4x	\$7,979	\$8,635	\$5,104	\$5,551	2.1%	\$8.42	\$9.30	24.5x	21.2x	26.8x	24.3x	31.8x	28.2x	2.6x
Crown Castle International	CCI	\$154.00	(2.0%)	8.3%	\$66,066	\$19,453	\$416	\$85,103	5.4x	\$5,848	\$6,160	\$3,420	\$3,614	3.5%	\$6.09	\$6.71	25.9x	23.6x	26.7x	24.2x	NM	46.3x	4.4x
SBA Communications	SBAC	\$275.02	(0.2%)	14.1%	\$31,271	\$10,717	\$333	\$41,654	7.0x	\$2,074	\$2,199	\$1,490	\$1,584	0.7%	\$9.41	\$10.27	29.1x	25.6x	31.3x	28.5x	32.2x	30.6x	4.2x
Landmark Infrastructure	LMRK	\$11.24	3.2%	(31.5%)	\$286	\$474	\$12	\$693	9.3x	\$58	\$65	\$64	\$66	7.1%	\$1.32	\$1.42	10.9x	11.2x	8.5x	8.0x	NM	30.0x	3.6x
US Wireless Tower Infrastructure Average (excl. LMRK)			(0.9%)	5.9%					5.6x					2.1%			26.5x	23.5x	28.3x	25.7x	32.0x	35.0x	3.7x

Fiber/Bandwidth Providers

Company	Symbol	Price	2W	YTD	Mkt. Cap.	LT Debt	Cash	Ent. Val.	Net Debt/	Revenue (MM)		EBITDA (MM)		Div Yield	EV/EBITDA		P/FCF		AFFO Multiple		EV/uFCF		2021 EV/EBITDA / 2021 EBITDA growth
		12/24/20	% Chg.	% Chg.	(mil.)	(mil.)	(mil.)	(mil.)	LQA EBITDA	CY20E	CY21E	CY20E	CY21E		CY20E	CY21E	CY20E	CY21E	CY20E	CY21E	CY20E	CY21E	
Cogent Communications	CCOI	\$59.56	1.3%	(9.5%)	\$2,729	\$1,079	\$393	\$3,414	3.1x	\$567	\$579	\$213	\$222	4.7%	18.2x	18.0x	45.8x	42.2x	30.1x	28.9x	25.2x	23.9x	5.3x
Uniti Group Inc.	UNIT	\$11.59	5.1%	41.2%	\$2,698	\$5,034	\$196	\$7,607	6.1x	\$1,058	\$1,088	\$817	\$858	5.2%	9.3x	8.9x	NM	26.9x	7.0x	7.2x	14.5x	14.8x	1.8x
Superloop Limited	SLC	AUD 1.06	3.4%	8.8%	AUD 386	AUD 44	AUD 16	AUD 414	3.5x	AUD 116	AUD 129	AUD 17	AUD 21	NA	25.5x	21.0x	NM	NM	NM	NM	NM	NM	0.9x
Megaport Limited	MP1	AUD 14.50	10.5%	35.0%	AUD 2,228	AUD 21	AUD 167	AUD 2,082	15.1x	AUD 71	AUD 104	-AUD 19	-AUD 2	NA	NM	NM	NM	NM	NM	NM	NM	NM	NM
Competitive Bandwidth Average (US only)			3.2%	15.8%					4.6x					5.0%	13.7x	13.5x	45.8x	34.6x	18.5x	18.0x	19.9x	19.4x	3.6x

* AMT excludes preferred stock (series A and B) from the share count and EV. ** P/FCF in this column reflects FCF from maintenance capex. **** GDS debt includes capital leases. The denominator used for Net debt/LQA EBITDA is "underlying adjusted EBITDA."

Notes: Multiples treat stock-based compensation as a cash expense; 21 Vianet and Switch are based on consensus estimates; all others RBC Capital Markets estimates.

Source: Company reports, RBC Capital Markets estimates, S&P Capital IQ

Exhibit 2: RBC Cable/Telecom and Communications Infrastructure Comps Sheet (continued)

Datacenters (excluding REITs)

Company	Symbol	Price 12/24/20	2W % Chg.	YTD % Chg.	Mkt. Cap. (mil.)	LT Debt (mil.)	Cash (mil.)	Ent. Val. (mil.)	Net Debt/ LQA EBITDA	Revenue (MM)		EBITDA (MM)		EV/EBITDA		P/FCF		AFFO Multiple		EV/uFCF		2021 EV/EBITDA / 2021 EBITDA growth
										CY20E	CY21E	CY20E	CY21E	CY20E	CY21E	CY20E	CY21E	CY20E**	CY21E**	CY20E	CY21E	
NEXTDC Limited	NXT	AUD 12.20	2.6%	99.3%	AUD 5,562	AUD 875	AUD 893	AUD 5,545	(0.2x)	AUD 223	AUD 271	AUD 111	AUD 148	51.6x	40.5x	NM	NM	NM	54.7x	NM	NM	1.2x
Chindata Group	NasdaqGS:CD	\$19.09	2.9%	41.4%	\$764	\$669	\$518	\$915	3.5x	\$274	\$418	NA	NA	NM	NM	NM	NM	NM	NM	NM	NM	NM
GDS Holdings **	GDS	\$91.30	0.4%	77.0%	\$16,598	\$3,392	\$919	\$19,234	5.6x	\$877	\$1,180	\$408	\$565	49.3x	36.8x	NM	NM	NM	NM	NM	NM	0.9x
21 Vianet Group	NasdaqGS:VNET	\$32.36	12.9%	346.3%	\$3,639	\$1,160	\$832	\$4,176	1.5x	\$738	\$958	\$199	\$268	21.0x	15.6x	2.8x	2.1x	2.8x	2.1x	NM	NM	NM
Switch, Inc.	NYSE:SWCH	\$16.32	3.7%	10.1%	\$3,976	\$1,111	\$156	\$5,296	4.0x	\$515	\$572	\$262	\$291	19.9x	18.0x	15.2x	13.7x	17.7x	15.9x	NM	NM	1.5x
Datacenters (excluding REITs) Average			4.5%	114.8%					2.9x					35.5x	27.7x	9.0x	7.9x	10.3x	24.2x	NM	NM	1.2x

Datacenter REITs

Company	Symbol	Price 12/24/20	2W % Chg.	YTD % Chg.	Mkt. Cap. (mil.)	LT Debt (mil.)	Cash (mil.)	Ent. Val. (mil.)	Net Debt/ LQA EBITDA	Revenue (MM)		EBITDA (MM)		Div Yield	EV/EBITDA		FFO Multiple		AFFO Multiple		EV/uFCF		2021 EV/EBITDA / 2021 EBITDA growth
										CY20E	CY21E	CY20E	CY21E		CY20E	CY21E	CY20E	CY21E	CY20E	CY21E	CY20E	CY21E	
CoreSite Realty Corp	COR	\$124.71	5.2%	11.2%	\$6,072	\$1,687	\$3	\$7,755	5.2x	\$606	\$650	\$324	\$348	3.9%	25.2x	24.1x	23.6x	22.5x	25.6x	24.5x	NM	NM	3.3x
CyrusOne Inc.	CONE	\$72.75	8.8%	11.2%	\$8,761	\$3,227	\$336	\$11,652	5.5x	\$1,031	\$1,118	\$538	\$590	2.7%	22.7x	21.2x	18.7x	18.0x	19.9x	19.0x	NM	NM	2.2x
Digital Realty Trust	DLR	\$137.29	5.9%	14.7%	\$38,650	\$13,444	\$1,939	\$51,469	5.6x	\$3,870	\$4,325	\$2,166	\$2,384	3.3%	23.9x	22.5x	22.4x	21.1x	24.8x	23.5x	NM	NM	2.2x
Equinix Inc.	EQIX	\$705.94	2.8%	20.9%	\$63,195	\$12,411	\$2,659	\$72,946	3.3x	\$5,994	\$6,585	\$2,837	\$3,150	1.5%	29.3x	26.4x	46.0x	36.0x	33.5x	30.6x	NM	NM	2.2x
QTS Realty Trust	QTS	\$61.57	5.1%	13.5%	\$4,477	\$1,691	\$45	\$6,546	6.8x	\$536	\$603	\$292	\$330	3.1%	24.6x	22.7x	22.2x	21.0x	29.7x	27.1x	NM	NM	1.8x
Datacenter REITs Average			5.6%	14.3%					5.3x					2.9%	25.1x	23.4x	26.6x	23.7x	26.7x	24.9x	NM	NM	2.4x

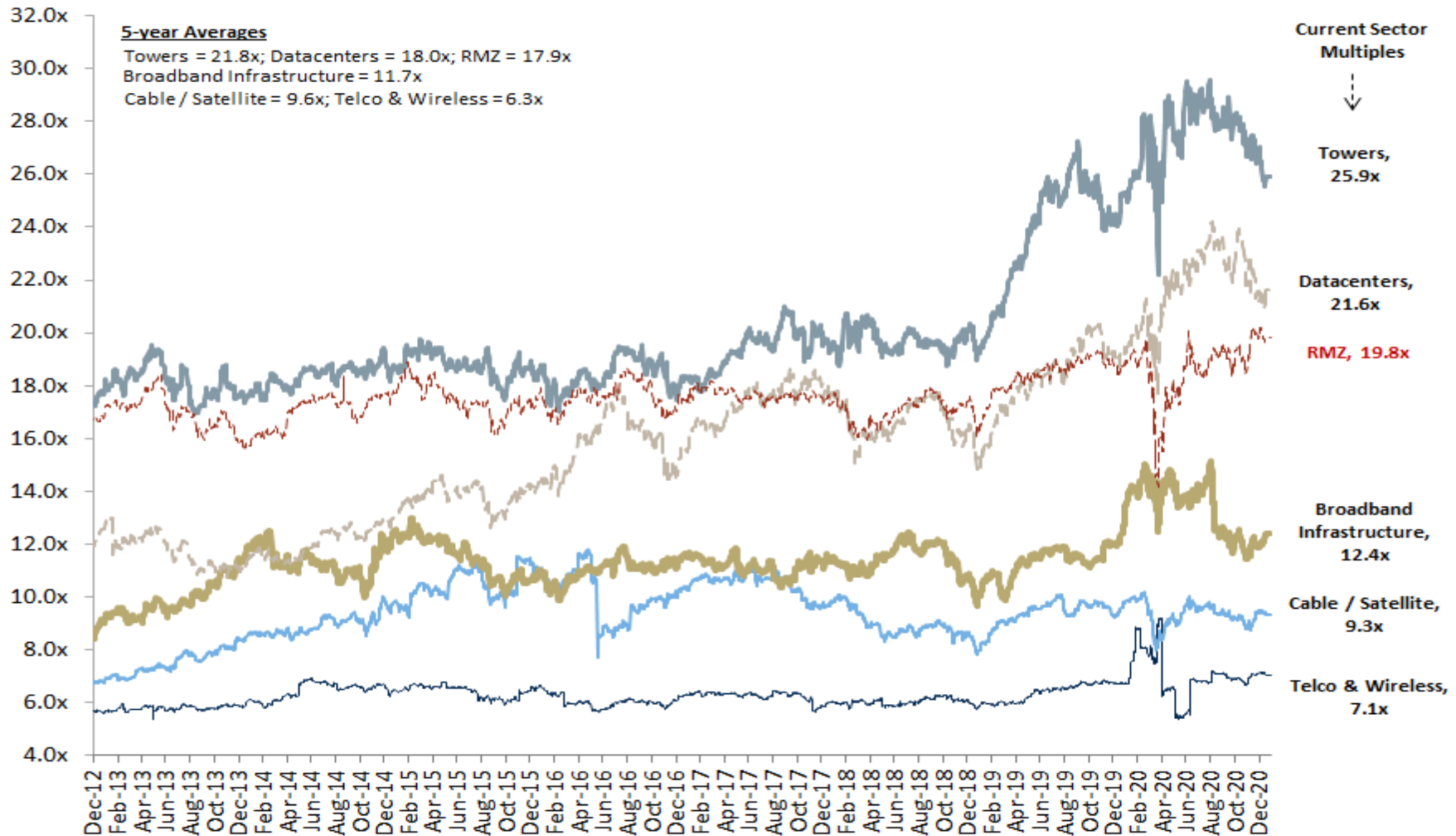
INDEX	Symbol	Price 12/24/20	2W % Chg.	YTD % Chg.	Mkt. Cap. (mil.)	Div Yield	AFFO (MM)		AFFO/share		AFFO Multiple	
							CY20E	CY21E	CY20E	CY21E	CY20E	CY21E
MSCIUSREITINDEX	RMZ	\$1,114.68	(0.3%)	(12.8%)	\$925,042	3.8%	\$44,829	\$45,994	\$54.02	\$55.42	20.6x	20.1x

** For NXT, GDS & SWCH recurring FCF is used as a proxy for AFFO. **** GDS debt includes capital leases. The denominator used for Net debt/LQA EBITDA is "underlying adjusted EBITDA." Notes: Multiples treat stock-based compensation as a cash expense; 21 Vianet, Switch and Chindata Group are based on consensus estimates; all others RBC Capital Markets estimates.

Source: Company reports, RBC Capital Markets estimates, S&P Capital IQ



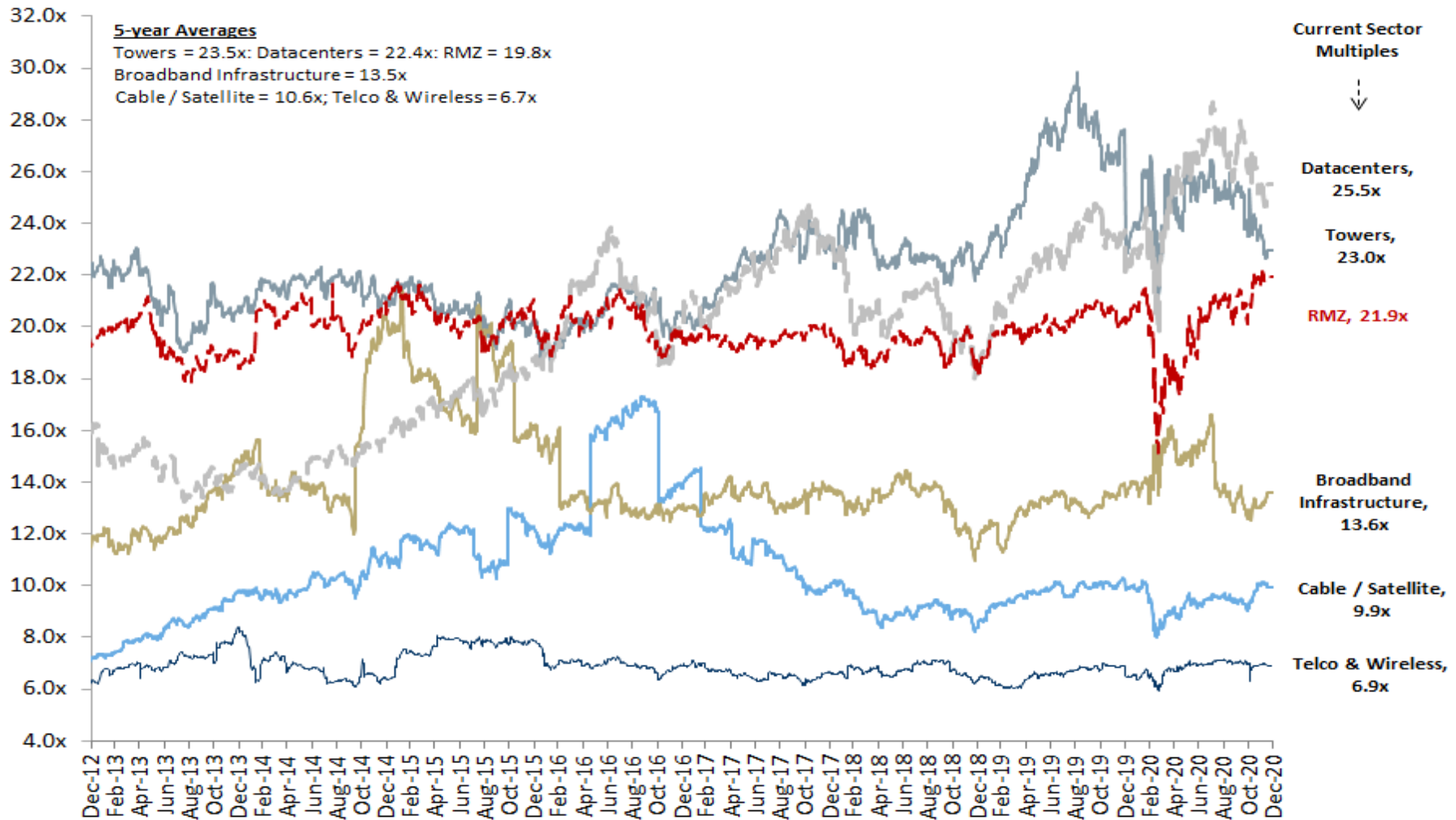
Exhibit 3: EV/NTM-EBITDA



Data as of 12/17/2020.
Source: Company reports, Capital IQ, RBC Capital Markets estimates



Exhibit 4: EV/TTM-EBITDA

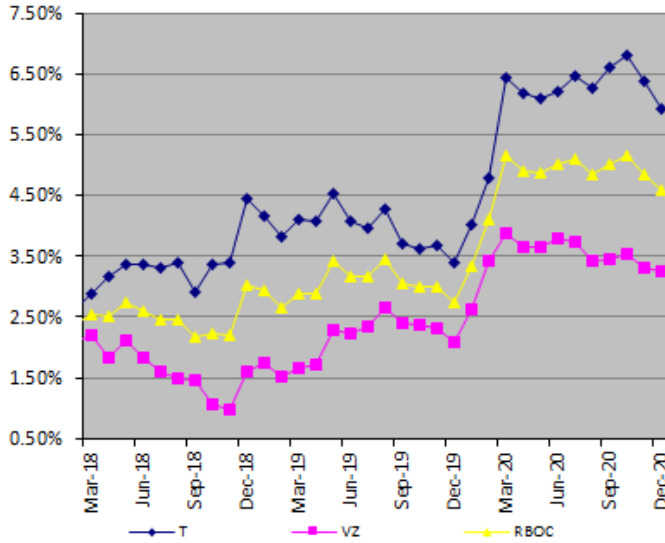


Data as of 12/17/2020. Source: Company reports, Capital IQ, RBC Capital Markets estimates

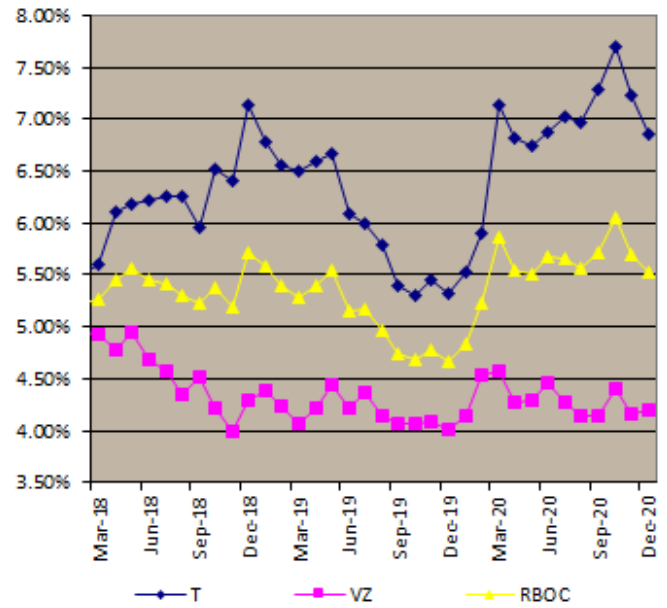


Exhibit 5: Dividend Yields Tracker

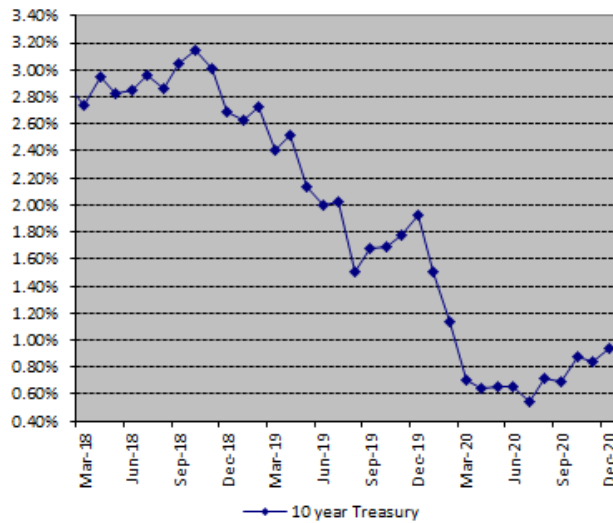
RBOC Dividend Yield Spreads vs. Treasury Yield



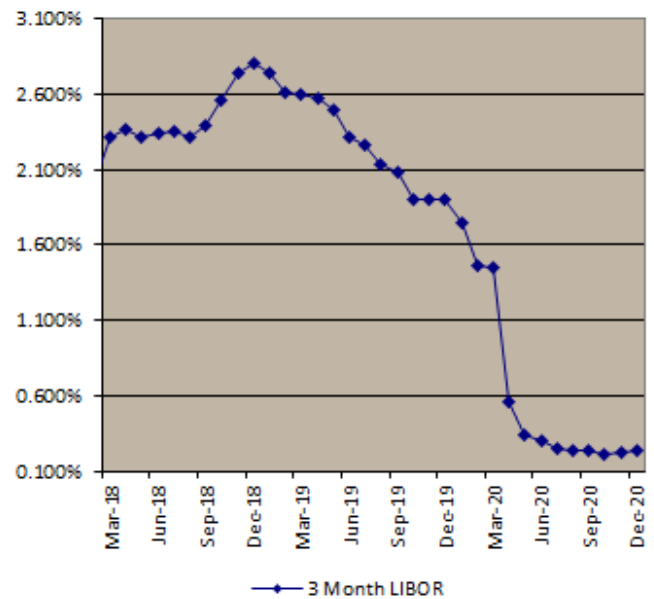
RBOC Dividend Yields



10 year Treasury



3 Month - ICE LIBOR (USD)

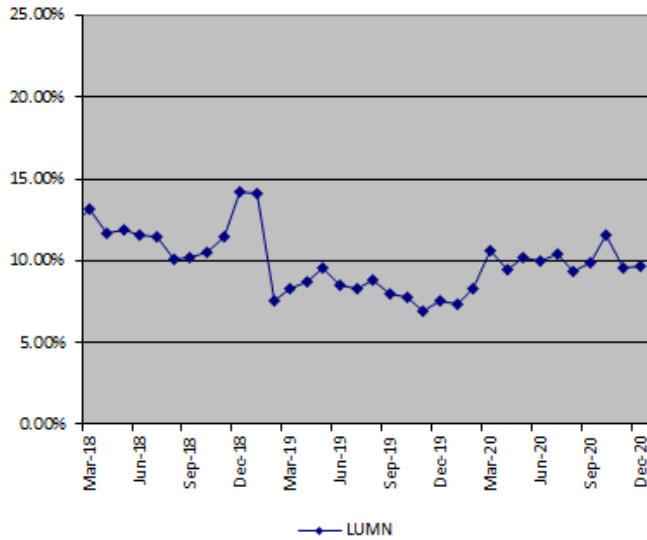


Data as of 12/17/2020.
Source: Company reports, Capital IQ, RBC Capital Markets

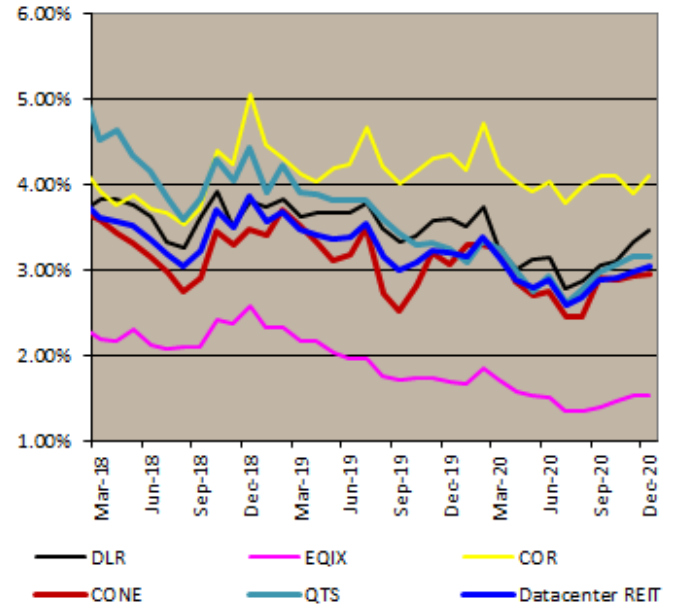


Exhibit 5: Dividend Yields Tracker (continued)

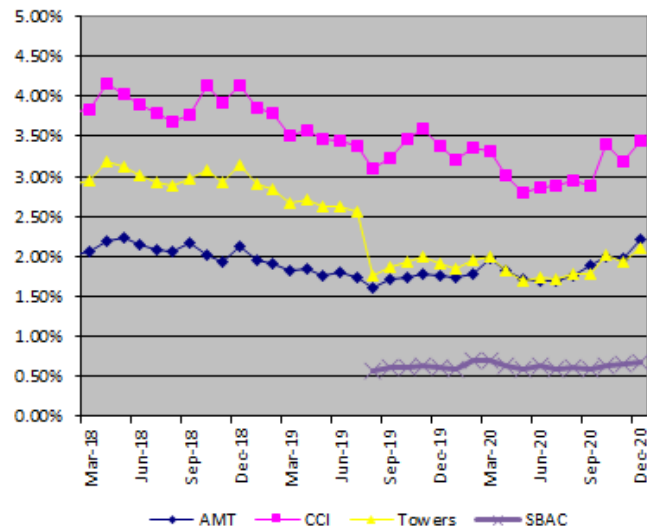
RLEC Dividend Yields



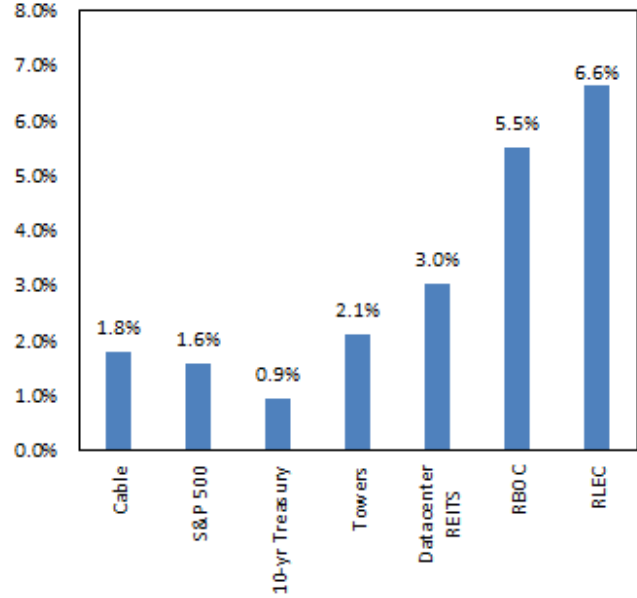
Datacenter REIT Dividend Yields



Tower Dividend Yields



Current Sector Yields



Data as of 12/17/2020.
Source: Company reports, Capital IQ, RBC Capital Markets



Exhibit 6: Broadband subscribers by platform

Subscriber figures in 000's	1Q18	2Q18	3Q18	4Q18	1Q19	2Q19	3Q19	4Q19	1Q20	2Q20	3Q20	4Q20E	2018	2019	2020E	2021E
Broadband subscribers by platform																
Broadband subscribers																
Cable	66,500	67,140	67,893	68,638	69,582	70,123	70,988	71,882	73,179	74,789	76,251	77,201	68,638	71,882	77,201	80,695
Telco	34,373	34,246	34,099	33,950	33,956	33,786	33,551	33,284	33,209	33,035	33,233	33,073	33,950	33,284	33,073	32,828
Total cable + telco broadband subscribers	100,873	101,386	101,992	102,587	103,538	103,909	104,539	105,165	106,388	107,825	109,483	110,274	102,587	105,165	110,274	113,524
Satellite	1,843	1,875	1,917	1,945	1,974	2,002	2,024	2,063	2,106	2,141	2,183	2,222	1,945	2,063	2,222	2,362
Total broadband subscribers	102,716	103,261	103,909	104,532	105,513	105,910	106,563	107,228	108,494	109,966	111,666	112,496	104,532	107,228	112,496	115,886
Cable share (cable + telco)	65.9%	66.2%	66.6%	66.9%	67.2%	67.5%	67.9%	68.4%	68.8%	69.4%	69.6%	70.0%	66.9%	68.4%	70.0%	71.1%
Telco share (cable + telco)	34.1%	33.8%	33.4%	33.1%	32.8%	32.5%	32.1%	31.6%	31.2%	30.6%	30.4%	30.0%	33.1%	31.6%	30.0%	28.9%
Broadband subscribers Y/Y % change																
Cable	4.4%	4.6%	4.8%	4.6%	4.6%	4.4%	4.6%	4.7%	5.2%	6.7%	7.4%	7.4%	4.6%	4.7%	7.4%	4.5%
Telco	-1.8%	-1.5%	-1.5%	-1.4%	-1.2%	-1.3%	-1.6%	-2.0%	-2.2%	-2.2%	-0.9%	-0.6%	-1.4%	-2.0%	-0.6%	-0.7%
Total cable + telco broadband subscribers Y/Y change	2.2%	2.4%	2.6%	2.6%	2.5%	2.5%	2.5%	2.5%	2.8%	3.8%	4.7%	4.9%	2.6%	2.5%	4.9%	2.9%
Broadband net adds																
Cable	908	640	754	744	944	541	864	893	1,298	1,610	1,432	950	3,047	3,242	5,290	3,494
Telco	(46)	(127)	(147)	(149)	7	(171)	(235)	(267)	(75)	(174)	197	(160)	(469)	(666)	(211)	(244)
Total cable + telco broadband net adds	863	513	607	595	950	370	630	626	1,223	1,437	1,629	791	2,578	2,576	5,079	3,250
Broadband net adds Y/Y change																
Cable	(160)	148	178	(53)	35	(99)	110	149	354	1,069	567	57	113	195	2,048	(1,796)
Telco	(3)	101	7	45	52	(44)	(88)	(118)	(81)	(3)	432	107	150	(197)	455	(33)
Total cable + telco broadband net adds Y/Y change	(162)	249	184	(8)	88	(143)	23	31	272	1,066	999	165	263	(2)	2,503	(1,829)

Note: Figures include our estimates for pro forma historicals. Includes illustrative metrics for companies not under direct coverage. Includes RBC calculations for commercial subscribers for certain operators. Source: Company reports, press reports, Kagan, RBC Capital Markets estimates

Exhibit 7: Cable and Telco broadband subscribers

Subscriber figures in 000's	1Q18	2Q18	3Q18	4Q18	1Q19	2Q19	3Q19	4Q19	1Q20	2Q20	3Q20	4Q20E	2018	2019	2020E	2021E
Total Cable + Telco Broadband Subscribers																
Broadband subs																
Comcast Corp.	26,249	26,509	26,871	27,222	27,598	27,807	28,186	28,629	29,106	29,429	30,062	30,562	27,222	28,629	30,562	32,028
Charter Communications (PF for TWC, Bright House)	24,355	24,622	24,930	25,259	25,687	25,945	26,325	26,664	27,246	28,096	28,633	28,972	25,259	26,664	28,972	30,377
AT&T (residential + commercial; PF for CT sale)	15,775	15,772	15,747	15,702	15,737	15,698	15,575	15,389	15,315	15,201	15,375	15,266	15,702	15,389	15,266	14,997
Verizon (PF for CTF sale)	6,966	6,956	6,958	6,961	6,973	6,968	6,961	6,956	6,982	6,959	7,069	7,089	6,961	6,956	7,089	7,357
Cox Communications	5,622	5,659	5,663	5,664	5,668	5,689	5,709	5,751	5,817	5,994	6,109	6,151	5,664	5,751	6,151	6,258
CenturyLink (incl. commercial)	5,592	5,501	5,427	5,385	5,368	5,301	5,254	5,205	5,185	5,145	5,059	5,012	5,385	5,207	5,012	4,813
Altice USA (PF for Cablevision, Suddenlink)	4,408	4,417	4,431	4,453	4,490	4,503	4,518	4,525	4,575	4,646	4,702	4,717	4,453	4,525	4,717	4,806
Frontier Broadband Subs (PF for VZ, Northwest sale)	3,580	3,548	3,487	3,420	3,382	3,315	3,249	3,211	3,183	3,142	3,119	3,081	3,420	3,211	3,081	2,951
Mediacom Communications Corp.	1,228	1,251	1,260	1,264	1,288	1,303	1,316	1,328	1,349	1,396	1,425	1,436	1,264	1,328	1,436	1,544
Windstream	1,004	1,007	1,015	1,021	1,032	1,034	1,040	1,049	1,067	1,089	1,102	1,114	1,021	1,049	1,114	1,169
TPG (PF for RCN, Grande, Wave)	897	908	922	931	946	952	962	973	968	1,010	1,031	1,042	931	973	1,042	1,103
Consolidated Comm. (PF for FairPoint and other)	782	784	782	779	781	783	784	784	786	791	792	792	779	784	792	799
WideOpenWest	744	748	755	760	766	764	774	782	798	806	809	812	760	782	812	834
Cable One (PF for NewWave)	729	731	739	742	759	763	771	773	793	838	866	873	742	773	873	969
Atlantic Broadband (PF for Metrocast)	413	420	425	426	430	444	446	451	457	479	492	497	426	451	497	540
Cincinnati Bell (PF for Hawaii)	422	423	425	426	427	426	425	426	428	432	435	435	426	426	435	440
Midcontinent Communications	352	358	365	372	382	380	386	391	400	400	406	410	372	391	410	427
Armstrong Cable Services	262	264	266	266	269	272	275	276	281	285	288	289	266	276	289	299
TDS (telco)	251	255	258	256	257	261	263	262	263	276	282	284	256	262	284	302
Buckeye Broadband	168	170	166	168	171	167	169	170	174	172	174	174	168	170	174	176
TDS (PF for BendBroadband)	157	159	164	167	171	173	175	178	181	184	186	189	167	178	189	197
Blue Ridge Communications	159	161	161	163	166	166	168	170	171	173	175	177	163	170	177	181
GCI Liberty, Inc.	135	134	135	135	134	133	134	136	141	142	142	144	135	136	144	149
Consolidated Communications	116	117	119	120	122	123	125	126	129	132	133	133	120	126	133	139
Service Electric Cable TV	111	112	115	116	118	119	120	122	122	135	137	138	116	122	139	154
Northland Cable Television	70	71	72	68	71	72	73	73	75	78	78	79	68	73	79	82
Shenandoah Telecommunications Co.	65	65	67	68	70	70	74	79	88	90	94	98	68	79	98	116
Vyve Broadband	61	63	65	66	67	67	68	69	73	75	75	75	66	69	75	80
Schurz Communications (PF for Blue Stream)	59	59	61	62	63	62	64	65	67	67	69	69	62	65	69	71
WEHCO Broadband	58	58	59	61	63	63	64	66	68	69	70	71	61	66	71	74
MCTV	43	43	43	45	45	46	46	45	46	48	49	47	45	45	47	47
Zito Media	37	38	39	39	40	40	41	41	42	44	45	44	39	41	44	45
Total cable + telco broadband subs	100,873	101,386	101,992	102,587	103,538	103,909	104,539	105,165	106,388	107,825	109,483	110,274	102,587	105,165	110,274	113,524
Y/Y % change	2.2%	2.4%	2.6%	2.6%	2.5%	2.5%	2.5%	2.5%	2.8%	3.8%	4.7%	4.9%	2.6%	2.5%	4.9%	2.9%
Sequential change in Y/Y % change	-19 bps	25 bps	18 bps	-2 bps	6 bps	-15 bps	1 bps	2 bps	24 bps	102 bps	96 bps	13 bps	-	-	-	-
Annual change in Y/Y % change	-80 bps	-53 bps	2 bps	21 bps	46 bps	6 bps	-11 bps	-6 bps	11 bps	128 bps	223 bps	234 bps	21 bps	-6 bps	234 bps	-191 bps
Net adds	864	513	606	595	951	370	630	627	1,223	1,437	1,658	791	2,578	2,578	5,108	3,250
Net adds Y/Y change	(162)	249	184	(8)	88	(143)	24	32	271	1,066	1,029	164	263	0	2,530	(1,859)

Note: Figures include our estimates for pro forma historicals. Includes illustrative metrics for companies not under direct coverage. Includes RBC calculations for commercial subscribers for certain operators. Source: Company reports, press reports, Kagan, RBC Capital Markets estimates



Exhibit 8: Cable and Telco broadband subscriber net adds

Subscriber figures in 000's	1Q18	2Q18	3Q18	4Q18	1Q19	2Q19	3Q19	4Q19	1Q20	2Q20	3Q20	4Q20E	2018	2019	2020E	2021E
Total Cable + Telco Broadband Subscribers																
Broadband net adds																
Comcast Corp.	379	260	363	351	375	209	379	442	477	323	633	500	1,353	1,405	1,933	1,466
Charter Communications (PF for TWC, Bright House)	367	267	308	329	428	258	380	339	582	850	537	339	1,271	1,405	2,308	1,405
AT&T (residential + commercial; PF for CT sale)	56	(3)	(25)	(45)	35	(39)	(123)	(186)	(74)	(114)	174	(109)	(17)	(313)	(123)	(269)
Verizon (PF for CTF sale)	7	(10)	2	3	12	(5)	(7)	(5)	26	(23)	110	20	2	(5)	133	268
Cox Communications	47	37	3	2	3	21	19	42	66	177	114	42	89	87	400	107
CenturyLink (incl. commercial)	(70)	(91)	(74)	(42)	(17)	(67)	(47)	(47)	(22)	(40)	(86)	(47)	(277)	(178)	(195)	(199)
Altice USA (PF for Cablevision, Suddenlink)	26	10	14	22	37	13	15	7	50	70	26	15	72	72	162	90
Frontier Broadband Subs (PF for VZ)	(43)	(32)	(61)	(67)	(38)	(67)	(66)	(38)	(28)	(41)	(23)	(38)	(203)	(209)	(130)	(130)
Mediacom Communications Corp.	19	23	9	4	24	15	13	12	21	47	29	11	55	64	108	108
Windstream	(2)	2	8	6	11	2	6	9	18	22	13	11	14	28	64	55
TPG (PF for RCN, Grande, Wave)	12	12	13	10	15	6	10	11	(5)	42	21	11	47	41	69	61
Consolidated Comm. (PF for FairPoint and other)	2	2	(2)	(3)	2	2	1	0	2	5	1	(0)	(2)	5	8	7
WideOpenWest	9	4	7	5	6	(2)	10	8	16	8	3	3	24	22	30	22
Cable One (PF for NewWave)	9	3	8	3	17	4	8	3	19	45	28	8	22	32	100	96
Atlantic Broadband (PF for Metrocast)	13	7	5	1	4	14	2	5	6	21	14	5	26	26	46	43
Cincinnati Bell (PF for Hawaii)	3	1	2	1	1	(1)	(0)	1	2	5	3	1	7	0	9	5
Midcontinent Communications	5	6	7	6	10	(1)	6	5	8	0	6	5	24	20	19	17
Armstrong Cable Services	2	1	2	0	3	3	3	1	5	4	3	1	6	10	13	10
TDS (telco)	2	4	3	(2)	1	4	2	(1)	2	13	6	3	7	6	22	18
Buckeye Broadband	2	2	(4)	2	3	(3)	2	1	5	(2)	2	0	2	2	5	2
TDS (PF for BendBroadband)	4	3	4	4	4	2	2	3	3	3	2	2	14	10	11	8
Blue Ridge Communications	2	2	0	2	3	1	2	2	1	2	2	1	6	7	6	4
GCI Liberty, Inc.	(0)	(0)	0	0	(1)	(1)	1	2	5	1	1	2	0	1	8	6
Consolidated Communications	2	1	2	1	2	1	1	1	3	3	1	0	6	6	8	5
Service Electric Cable TV	2	1	3	1	2	1	1	1	13	2	1	1	7	5	17	15
Northland Cable Television	2	0	1	(3)	2	1	1	1	2	3	1	0	(0)	5	5	3
Shenandoah Telecommunications Co.	1	0	2	1	2	0	4	4	9	2	4	4	4	11	20	17
Vyve Broadband	1	1	3	0	1	0	1	1	4	2	1	0	5	3	7	4
Schurz Communications (PF for Blue Stream)	1	(0)	2	1	1	(1)	2	1	2	0	2	0	3	2	4	2
WEHCO Broadband	2	0	1	2	2	(0)	1	2	2	1	1	1	5	5	5	3
MCTV	0	(0)	0	2	1	0	0	(1)	1	2	0	(1)	2	1	2	(0)
Zito Media	1	1	1	0	1	1	1	0	1	2	1	(0)	2	2	3	1
Total broadband net adds	863	513	607	595	950	370	630	626	1,223	1,437	1,629	791	2,578	2,576	5,079	3,250
Net adds Y/Y change	(162)	249	184	(8)	88	(143)	23	31	272	1,066	999	165	263	(2)	2,503	(1,829)

Note: Figures include our estimates for pro forma historicals. Includes illustrative metrics for companies not under direct coverage. Includes RBC calculations for commercial subscribers for certain operators. Source: Company reports, press reports, Kagan, RBC Capital Markets estimates



Exhibit 9: Linear and virtual Pay TV subscribers

Subscriber figures in 000's	1Q18	2Q18	3Q18	4Q18	1Q19	2Q19	3Q19	4Q19	1Q20	2Q20	3Q20	4Q20E	2018	2019	2020E	2021E
Total Linear + Virtual MVPDs																
Video subscribers																
Linear video subs																
Comcast Corp.	22,261	22,121	22,015	21,986	21,866	21,641	21,404	21,254	20,844	20,367	20,094	19,824	21,986	21,254	19,824	18,511
AT&T (Satellite + U-verse)	23,902	23,640	23,294	22,903	22,359	21,581	20,418	19,473	18,576	17,690	17,100	16,355	22,903	19,473	16,355	14,142
Charter Communications (PF for TWC, Bright House)	16,739	16,682	16,628	16,606	16,461	16,320	16,245	16,144	16,074	16,168	16,235	16,139	16,606	16,144	16,139	15,528
DISH TV video subs	10,845	10,653	10,286	9,905	9,639	9,560	9,494	9,394	9,012	9,017	9,001	8,801	9,905	9,394	8,801	8,193
Verizon Fios	4,597	4,560	4,497	4,451	4,398	4,346	4,280	4,229	4,145	4,062	4,000	3,937	4,451	4,229	3,937	3,643
Cox Communications	3,604	3,553	3,532	3,510	3,372	3,234	3,177	3,120	3,022	2,923	2,864	2,803	3,510	3,120	2,803	2,461
Altice USA (PF for Cablevision, Suddenlink)	3,546	3,521	3,494	3,480	3,470	3,449	3,417	3,373	3,331	3,296	3,210	3,135	3,480	3,373	3,135	2,900
Frontier (PF)	899	867	838	803	749	705	667	631	594	560	518	487	803	631	487	366
Mediacom Communications Corp.	817	808	793	776	764	747	729	710	693	676	663	644	776	710	644	578
TPG (PF for RCN, Grande, Wave)	461	456	449	442	431	424	414	405	396	379	369	359	442	405	359	315
WideOpenWest	429	420	413	406	398	387	381	374	366	352	328	318	406	374	318	265
Cable One (PF for NewWave)	373	361	349	347	340	328	317	314	303	290	277	274	347	314	274	235
Atlantic Broadband (PF for Metrocast)	321	320	317	313	308	307	313	309	306	312	317	310	313	309	310	312
CenturyLink	221	189	160	134	111	82	61	45	34	24	18	14	134	45	14	5
Windstream	267	257	247	239	227	215	205	195	185	176	167	160	239	195	160	127
Midcontinent Communications	210	206	203	199	195	191	187	182	179	175	171	166	199	182	166	151
Armstrong Cable Services	205	202	198	193	188	185	182	178	174	172	169	164	193	178	164	151
Service Electric Cable TV	170	169	166	166	165	163	162	162	161	158	158	158	166	162	158	154
Cincinnati Bell	192	192	190	189	187	185	182	178	174	174	172	168	189	178	168	158
Blue Ridge Communications	134	133	130	130	130	128	127	127	127	124	124	124	130	127	124	121
Buckeye Broadband	120	119	113	111	108	107	105	101	98	98	96	93	111	101	93	86
GCI Liberty, Inc.	111	108	107	106	103	101	99	91	89	86	84	77	106	91	77	63
TDS (PF for BendBroadband)	101	102	102	103	101	100	98	98	97	94	89	87	103	98	87	76
Consolidated Communications	101	98	96	93	91	90	86	84	83	80	78	76	93	84	76	68
Vyve Broadband	57	56	56	54	52	50	48	47	48	46	43	41	54	47	41	35
Comporium Communications	54	55	55	54	54	53	54	53	47	47	48	46	54	53	46	40
TDS (telco)	51	52	54	54	55	57	58	59	59	62	63	63	54	59	63	68
Schurz Communications (PF for Blue Stream)	42	41	42	41	41	39	38	37	36	34	33	32	41	37	32	27
Shenandoah Telecommunications Co.	46	45	44	44	42	41	48	50	55	54	61	63	44	50	63	75
Zito Media	40	40	39	38	37	36	36	35	33	33	32	31	38	35	31	28
Northland Cable Television	39	37	37	32	31	31	30	29	29	29	28	28	32	29	28	26
MCTV	33	33	32	32	31	31	30	29	28	28	29	28	32	29	28	28
WEHCO Video	31	29	28	28	26	26	24	23	23	23	22	21	28	23	21	19
Total linear MVPD video subs	91,017	90,127	89,004	87,965	86,529	84,938	83,116	81,532	79,422	77,807	76,662	75,026	87,965	81,532	75,026	68,954
Y/Y % change	-3.8%	-3.8%	-3.8%	-4.2%	-4.9%	-5.8%	-6.6%	-7.3%	-8.2%	-8.4%	-7.8%	-8.0%	-4.2%	-7.3%	-8.0%	-8.1%
Sequential change in Y/Y % change	3 bps	6 bps	-2 bps	-39 bps	-74 bps	-83 bps	-86 bps	-70 bps	-90 bps	-18 bps	63 bps	-22 bps	-	-	-	-
Annual Y/Y % change	-110 bps	-83 bps	-14 bps	-32 bps	-109 bps	-198 bps	-282 bps	-313 bps	-328 bps	-264 bps	-115 bps	-67 bps	-32 bps	-313 bps	-67 bps	-11 bps
Net adds	(793)	(890)	(1,123)	(1,039)	(1,436)	(1,592)	(1,822)	(1,584)	(2,111)	(1,615)	(1,145)	(1,636)	(3,845)	(6,433)	(6,507)	(6,072)
Net adds Y/Y change	57	97	29	(335)	(643)	(701)	(699)	(545)	(675)	(24)	677	(52)	(152)	(2,588)	(74)	435
vMVPD video subs																
DISH - Sling TV (domestic est.)	2,066	2,097	2,112	2,148	2,144	2,182	2,385	2,280	1,988	1,922	2,075	1,920	2,148	2,280	1,920	1,660
AT&T - DIRECTV NOW (excl. trial)	1,418	1,743	1,806	1,526	1,437	1,332	1,133	918	783	717	677	558	1,526	918	558	341
Hulu TV	578	816	1,282	1,700	2,000	2,200	2,686	3,200	3,300	3,400	3,789	4,089	1,700	3,200	4,089	5,333
YouTube TV	410	560	760	960	1,110	1,435	1,785	2,157	2,557	2,882	3,182	3,504	960	2,157	3,504	4,426
PlayStation Vue	580	590	590	590	610	610	610	410	0	0	0	0	590	410	0	0
FuboTV	174	215	245	229	209	194	255	316	287	286	362	438	229	316	438	561
Philo	45	75	110	150	195	245	300	350	500	750	815	875	150	350	875	1,400
Total vMVPD video subs	5,271	6,096	6,905	7,303	7,705	8,197	9,153	9,631	9,416	9,957	10,900	11,384	7,303	9,631	11,384	13,721
Y/Y % change	127.3%	128.2%	97.0%	62.6%	46.2%	34.5%	32.6%	31.9%	22.2%	21.5%	19.1%	18.2%	62.6%	31.9%	18.2%	20.5%
Net adds	779	825	809	399	401	492	956	477	(215)	541	943	484	2,812	2,327	1,753	2,336
Net adds Y/Y change	410	473	(25)	(588)	(378)	(333)	148	79	(617)	49	(13)	7	270	(484)	(574)	583
Total Linear + Virtual MVPD video subs	96,287	96,223	95,909	95,269	94,234	93,135	92,269	91,163	88,837	87,763	87,561	86,410	95,269	91,163	86,410	82,675
Y/Y % change	-0.7%	-0.1%	-0.1%	-1.1%	-2.1%	-3.2%	-3.8%	-4.3%	-5.7%	-5.8%	-5.1%	-5.2%	-1.1%	-4.3%	-5.2%	-4.3%
Sequential change in Y/Y % change	48 bps	59 bps	0 bps	-96 bps	-106 bps	-108 bps	-59 bps	-52 bps	-142 bps	-4 bps	67 bps	-11 bps	-	-	-	-
Annual Y/Y % change	50 bps	110 bps	122 bps	11 bps	-143 bps	-309 bps	-368 bps	-324 bps	-359 bps	-256 bps	-131 bps	-90 bps	11 bps	-324 bps	-90 bps	89 bps
Net adds	(14)	(65)	(314)	(640)	(1,034)	(1,099)	(866)	(1,106)	(2,326)	(1,074)	(202)	(1,152)	(1,033)	(4,106)	(4,753)	(3,735)
Net adds Y/Y change	467	570	4	(923)	(1,020)	(1,034)	(552)	(466)	(1,291)	25	664	(45)	118	(3,073)	(648)	1,018

Note: Figures include our estimates for pro forma historicals. Includes illustrative metrics for companies not under direct coverage. Includes RBC calculations for commercial subscribers for certain operators.

Source: Company reports, press reports, Kagan, RBC Capital Markets estimates



Exhibit 10: Linear and Pay TV subscriber net adds

Subscriber figures in 000's	1Q18	2Q18	3Q18	4Q18	1Q19	2Q19	3Q19	4Q19	1Q20	2Q20	3Q20	4Q20E	2018	2019	2020E	2021E
Total Linear + Virtual MVPDs																
Video net adds																
Linear video net adds																
Comcast Corp.	(96)	(140)	(106)	(29)	(121)	(224)	(238)	(149)	(409)	(477)	(273)	(270)	(371)	(732)	(1,429)	(1,313)
AT&T (Satellite + U-verse)	(187)	(262)	(346)	(391)	(544)	(778)	(1,163)	(945)	(897)	(886)	(590)	(745)	(1,186)	(3,430)	(3,118)	(2,213)
Charter Communications (PF for TWC, Bright House)	(111)	(57)	(54)	(22)	(145)	(141)	(75)	(101)	(70)	94	67	(96)	(244)	(462)	(5)	(611)
DISH TV video subs	(185)	(192)	(367)	(381)	(266)	(79)	(66)	(100)	(382)	5	(16)	(200)	(1,125)	(511)	(593)	(608)
VZ - Fios - PF for Frontier transaction	(22)	(37)	(63)	(46)	(53)	(52)	(66)	(51)	(84)	(83)	(62)	(63)	(168)	(222)	(292)	(295)
Cox Communications	(51)	(51)	(21)	(22)	(138)	(138)	(58)	(56)	(98)	(100)	(63)	(61)	(144)	(390)	(321)	(341)
Altice USA (PF for Cablevision, Suddenlink)	(30)	(24)	(28)	(14)	(10)	(21)	(32)	(44)	(42)	(35)	(86)	(75)	(97)	(107)	(238)	(235)
Frontier* (PF for VZ 4/1/16 transaction starting 4Q13)	(28)	(31)	(29)	(35)	(54)	(44)	(38)	(36)	(37)	(34)	(42)	(31)	(123)	(172)	(144)	(121)
Mediacom Communications Corp.	(4)	(9)	(15)	(17)	(12)	(17)	(18)	(19)	(17)	(17)	(13)	(19)	(45)	(66)	(66)	(66)
TPG (PF for RCN, Grande, Wave)	(7)	(4)	(8)	(7)	(10)	(8)	(9)	(9)	(9)	(17)	(9)	(10)	(25)	(37)	(46)	(44)
WideOpenWest	(8)	(9)	(7)	(7)	(8)	(11)	(6)	(7)	(8)	(14)	(24)	(10)	(31)	(32)	(56)	(53)
Cable One (PF for NewWave)	(14)	(11)	(12)	(3)	(6)	(13)	(11)	(2)	(11)	(13)	(13)	(2)	(40)	(33)	(40)	(40)
Atlantic Broadband (PF for Metrocast)	14	(1)	(3)	(5)	(5)	(0)	5	(4)	(2)	6	6	(7)	5	(4)	2	1
CenturyLink	(35)	(32)	(29)	(26)	(23)	(29)	(21)	(16)	(11)	(10)	(6)	(5)	(122)	(89)	(32)	(9)
Windstream	(11)	(11)	(10)	(9)	(12)	(12)	(11)	(10)	(10)	(10)	(9)	(8)	(39)	(43)	(35)	(32)
Midcontinent Communications	(2)	(3)	(3)	(4)	(4)	(4)	(3)	(5)	(4)	(4)	(3)	(5)	(13)	(17)	(16)	(16)
Armstrong Cable Services	(4)	(3)	(4)	(5)	(5)	(3)	(3)	(5)	(4)	(3)	(3)	(5)	(16)	(15)	(13)	(13)
Service Electric Cable TV	(2)	(2)	(3)	(0)	(0)	(3)	(0)	(1)	(0)	(3)	(0)	(1)	(6)	(4)	(4)	(4)
Cincinnati Bell	0	0	(2)	(1)	(2)	(2)	(3)	(4)	(4)	(0)	(2)	(4)	(3)	(11)	(10)	(10)
Blue Ridge Communications	(1)	(1)	(2)	(0)	(0)	(2)	(0)	(0)	(0)	(2)	(0)	(0)	(5)	(3)	(3)	(3)
Buckeye Broadband	(0)	(1)	(6)	(2)	(3)	(1)	(3)	(4)	(4)	0	(2)	(3)	(10)	(10)	(8)	(8)
GCI Liberty, Inc.	(4)	(3)	(1)	(1)	(3)	(2)	(2)	(8)	(2)	(2)	(2)	(8)	(10)	(15)	(14)	(14)
TDS (PF for BendBroadband)	(1)	1	1	1	(2)	(1)	(2)	(0)	(1)	(3)	(4)	(2)	1	(5)	(11)	(11)
Consolidated Communications	(3)	(3)	(2)	(3)	(2)	(2)	(3)	(2)	(2)	(3)	(2)	(2)	(10)	(9)	(8)	(8)
Vyve Broadband	(1)	(1)	(1)	(2)	(2)	(1)	(2)	(1)	1	(2)	(3)	(2)	(4)	(6)	(6)	(6)
Comporium Communications	0	0	(0)	(0)	(0)	(1)	1	(1)	(6)	(1)	1	(1)	0	(1)	(6)	(6)
TDS (telco)	2	1	2	1	0	2	1	1	1	3	1	1	6	4	5	5
Schurz Communications (PF for Blue Stream)	(1)	(1)	0	(0)	(0)	(2)	(1)	(1)	(1)	(2)	(1)	(1)	(2)	(4)	(5)	(5)
Shenandoah Telecommunications Co.	(1)	(1)	(1)	(0)	(1)	(1)	7	2	4	(1)	7	2	(3)	7	12	13
Zito Media	(0)	(0)	(0)	(1)	(1)	(0)	(0)	(1)	(1)	(0)	(0)	(1)	(3)	(3)	(3)	(3)
Northland Cable Television	0	(1)	(1)	(5)	(1)	(0)	(1)	(1)	(0)	(0)	(1)	(1)	(7)	(2)	(2)	(1)
MCTV	(1)	(1)	(1)	(0)	(1)	(1)	(1)	(2)	(1)	0	0	(1)	(2)	(3)	(1)	(0)
WEHCO Video	(1)	(1)	(1)	(1)	(2)	(0)	(2)	(1)	0	(0)	(2)	(1)	(4)	(4)	(2)	(2)
Total linear video net adds	(793)	(890)	(1,123)	(1,039)	(1,437)	(1,591)	(1,823)	(1,582)	(2,110)	(1,615)	(1,149)	(1,636)	(3,845)	(6,433)	(6,509)	(6,072)
Net adds Y/Y change	58	96	29	(335)	(644)	(700)	(700)	(544)	(673)	(24)	674	(54)	(152)	(2,588)	(77)	438
vMVPD video net adds																
DISH - Sling TV (domestic est.)	80	30	15	36	(4)	37	203	(105)	(292)	(67)	153	(155)	29%	8%	9%	10%
AT&T - DIRECTV NOW (excl. trial)	336	325	63	(280)	(89)	(105)	(199)	(215)	(135)	(66)	(40)	(119)	444	(608)	(360)	(217)
Hulu TV	166	238	466	418	300	200	486	514	100	100	389	300	1288	1500	889	1244
YouTube TV	100	150	200	200	150	325	350	372	400	325	300	322	650	1197	1347	922
PlayStation Vue	30	10	0	0	20	0	0	(200)	(410)	0	0	0	40	(180)	(410)	0
FuboTV	42	42	30	(16)	(21)	(15)	61	61	(28)	(1)	76	76	97	86	122	122
Philo	25	30	35	40	45	50	55	50	150	250	65	60	130	200	525	525
Total vMVPD video net adds	779	825	809	399	401	492	956	477	(215)	541	943	484	2,812	2,327	1,753	2,336
Net adds Y/Y change	410	473	(25)	(588)	(378)	(333)	148	79	(617)	49	(13)	7	270	(484)	(574)	583
Total Linear + Virtual MVPD video net adds	(14)	(65)	(314)	(640)	(1,035)	(1,098)	(867)	(1,105)	(2,325)	(1,074)	(206)	(1,152)	(1,033)	(4,106)	(4,756)	(3,735)
Net adds Y/Y change	468	569	4	(923)	(1,021)	(1,033)	(553)	(465)	(1,290)	25	661	(47)	118	(3,072)	(650)	1,021

Note: Figures include our estimates for pro forma historicals. Includes illustrative metrics for companies not under direct coverage. Includes RBC calculations for commercial subscribers for certain operators.
Source: Company reports, press reports, Kagan, RBC Capital Markets estimates



Exhibit 11: Wireless Subscriber Trends

Postpaid analysis	1Q18	2Q18	3Q18	4Q18	1Q19	2Q19	3Q19	4Q19	1Q20	2Q20	3Q20	4Q20E	2020E	2021E
Postpaid subscribers and connections, net adds, and churn														
Postpaid subscribers (000)														
AT&T	76,601	76,543	76,173	76,068	75,737	75,478	75,152	75,207	75,148	74,919	75,969	76,539	76,539	77,416
Sprint	32,119	32,187	32,296	32,605	32,774	33,075	33,348	33,842	34,344					
T-Mobile	38,047	39,065	40,082	41,161	42,519	43,538	44,646	45,720	47,811					
New TMUS										77,753	79,732	81,132	81,132	86,432
Verizon	111,114	111,622	112,135	113,353	113,407	113,851	114,471	115,698	115,572	115,874	116,249	117,245	117,245	119,096
US Cellular	4,481	4,468	4,466	4,472	4,440	4,414	4,395	4,383	4,359	4,372	4,401			
Comcast	381	577	781	1,009	1,236	1,405	1,586	1,791	2,052	2,393	2,580	2,850	2,850	3,686
Charter				21	134	310	518	794	1,082	1,372	1,697	2,060	2,060	3,110
Total postpaid subscribers	262,743	264,462	265,933	268,689	270,247	272,071	274,116	277,435	280,368	276,683	280,628	279,826	279,826	289,740
Postpaid net adds (000)														
AT&T	53	73	(231)	15	(207)	(146)	(217)	135	27	(154)	1,081	570	1,524	877
Sprint	256	39	123	109	309	169	134	273	502					
T-Mobile	1,072	1,018	1,017	1,079	1,358	1,019	1,108	1,074	777					
New TMUS										1,112	1,979	1,400	5,770	5,300
Verizon	260	531	515	1,220	61	451	601	1,248	(50)	352	553	996	1,851	1,851
US Cellular	(37)	(13)	(2)	6	(32)	(26)	(19)	(12)	(26)	12	28			
Comcast	196	204	228	227	170	181	204	261	216	126	187	270	799	836
Charter			21	113	176	208	276	288	290	325	363	300	1,278	1,000
Total postpaid net adds	1,800	1,852	1,671	2,769	1,835	1,856	2,087	3,267	1,736	1,773	4,191	3,536	11,222	9,864
Y/Y % change	67.6%	14.5%	-1.8%	-4.8%	1.9%	0.2%	24.9%	18.0%	-5.4%	-4.5%	100.8%	8.2%	22.9%	-12.1%
Postpaid churn														
AT&T	1.06%	1.02%	1.16%	1.23%	1.16%	1.07%	1.19%	1.29%	1.08%	1.05%	0.85%	1.14%	1.03%	1.07%
Sprint	1.78%	1.63%	1.78%	1.85%	1.81%	1.74%	1.87%	1.98%	1.86%					
T-Mobile	1.07%	0.95%	1.02%	1.10%	0.99%	0.89%	1.00%	1.12%	1.01%					
New TMUS										0.96%	1.08%	1.04%	1.11%	1.00%
Verizon	1.04%	0.97%	1.04%	1.08%	1.12%	1.02%	1.09%	1.13%	1.08%	0.78%	0.89%	1.10%	0.96%	1.08%
US Cellular	1.23%	1.19%	1.29%	1.29%	1.26%	1.23%	1.38%	1.38%	1.21%	0.89%	1.06%			
Comcast (est.)	0.30%	0.45%	0.60%	0.75%	0.90%	0.45%	0.75%	1.10%	1.10%	0.90%	1.20%	1.20%	1.11%	1.20%
Charter (est.)			0.00%	0.30%	0.50%	0.80%	0.90%	0.95%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%
Total postpaid churn	1.16%	1.14%	1.06%	1.16%	1.22%	1.19%	1.10%	1.20%	1.28%	0.91%	0.94%	1.09%	1.03%	1.05%
Y/Y % change (bps)	-6 bps	-8 bps	-1 bps	4 bps	6 bps	5 bps	4 bps	3 bps	6 bps	-29 bps	-16 bps	-10 bps	-15 bps	3 bps
Postpaid ARPU (\$)														
AT&T	\$47.76	\$48.86	\$49.91	\$49.70	\$49.67	\$50.05	\$50.51	\$50.49	\$50.63	\$49.76	\$49.94	\$49.95	\$50.07	\$50.91
Sprint	\$44.40	\$43.55	\$43.99	\$43.64	\$43.25	\$42.57	\$42.30	\$42.02	\$41.14					
T-Mobile	\$43.94	\$43.51	\$43.10	\$43.02	\$42.55	\$42.43	\$42.39	\$41.84	\$41.38					
New TMUS										\$52.88	\$43.22	\$42.72	\$45.02	\$41.64
Verizon	\$41.97	\$42.68	\$43.10	\$42.38	\$42.65	\$42.86	\$43.05	\$42.45	\$42.38	\$41.39	\$42.30	\$42.79	\$42.22	\$43.42
US Cellular	\$44.34	\$44.74	\$45.31	\$45.58	\$45.44	\$45.90	\$46.16	\$46.57	\$47.23	\$46.24	\$47.10			
Total postpaid ARPU	\$44.24	\$44.66	\$45.10	\$44.62	\$44.54	\$44.57	\$44.66	\$44.20	\$43.93	\$46.50	\$44.11	\$44.04	\$44.62	\$44.03
Y/Y % change	-6.8%	-5.2%	-4.0%	-3.5%	0.7%	-0.2%	-1.0%	-1.0%	-1.4%	4.3%	-1.2%	-0.3%	0.3%	-1.3%
Postpaid phone analysis														
Postpaid phone subscribers, churn, and ARPU														
Postpaid phone subscribers (000)														
AT&T	63,043	62,930	62,850	62,882	62,830	62,811	62,812	62,915	63,062	62,994	63,184	63,695	63,695	64,947
Sprint	26,813	26,847	26,813	26,787	26,598	26,470	26,379	26,264	25,916					
T-Mobile	34,744	35,430	36,204	37,224	37,880	38,590	39,344	40,345	40,797					
New TMUS										65,105	65,794	66,494	66,494	69,194
Verizon	89,780	89,967	90,381	91,022	91,066	91,309	91,806	92,567	92,449	92,699	92,940	93,618	93,618	94,864
Total Big Three postpaid phone subscribers	214,380	215,174	216,248	217,915	218,374	219,180	220,341	222,091	222,224	220,797	221,918	223,807	223,807	229,005
Postpaid phone net adds (000)														
AT&T	(53)	49	67	131	79	74	101	229	163	(151)	645	420	1,077	1,277
Sprint	55	87	(34)	(26)	(189)	(128)	(91)	(115)	(348)					
T-Mobile	617	686	774	1,020	656	710	754	1,001	452					
New TMUS										253	689	700	1,746	2,700
Verizon	(24)	199	295	653	(44)	245	444	791	(68)	173	283	678	1,066	1,246
US Cellular	(16)	5	14	20	(14)	(11)	(2)	(20)	3	(11)	(2)			
Total Big Three postpaid phone net adds	595	1,021	1,102	1,778	502	901	1,208	1,906	199	275	1,617	1,798	3,889	5,223
Y/Y % change	200.5%	18.2%	9.9%	-1.3%	-15.6%	-11.8%	9.6%	7.2%	-60.4%	-69.5%	33.9%	-5.7%	-13.9%	34.3%
Total postpaid phone net adds	579	1,026	1,116	1,798	488	890	1,206	1,886	202	264	1,615	1,798	3,889	5,223
Y/Y % change	240.6%	16.2%	8.2%	-1.2%	-15.7%	-13.3%	8.0%	4.9%	-58.6%	-70.3%	33.9%	-4.7%	-13.9%	34.3%
Postpaid phone churn														
AT&T	0.83%	0.82%	0.93%	1.00%	0.92%	0.86%	0.95%	1.07%	0.86%	0.84%	0.69%	0.92%	0.83%	0.86%
Sprint	1.68%	1.55%	1.73%	1.84%	1.82%	1.78%	1.91%	2.06%	1.89%					
T-Mobile	1.07%	0.95%	1.02%	0.99%	0.88%	0.78%	0.89%	1.01%	0.86%					
New TMUS										0.80%	0.90%	1.01%	0.99%	0.97%
Verizon	0.80%	0.75%	0.80%	0.82%	0.84%	0.76%	0.82%	0.86%	0.81%	0.51%	0.62%	0.83%	0.69%	0.81%
US Cellular	0.97%	0.92%	1.02%	1.00%	0.99%	0.97%	1.09%	1.11%	0.95%	0.71%	0.88%			
Total Big Three postpaid phone churn	0.99%	0.96%	0.90%	0.99%	1.03%	0.99%	0.92%	1.00%	1.09%	0.69%	0.72%	0.91%	0.82%	0.87%
Y/Y % change (bps)	-7 bps	-5 bps	2 bps	3 bps	4 bps	3 bps	1 bps	1 bps	6 bps	-30 bps	-19 bps	-9 bps	-18 bps	5 bps
Postpaid phone ARPU (\$)														
AT&T	\$53.33	\$54.42	\$55.58	\$55.28	\$55.27	\$55.50	\$55.89	\$55.52	\$55.68	\$54.47	\$54.70	\$54.69	\$54.88	\$55.88
Sprint	\$50.44	\$49.57	\$50.16	\$50.01	\$50.18	\$49.87	\$50.10	\$50.37	\$50.20					
T-Mobile	\$46.66	\$46.52	\$46.17	\$46.29	\$46.07	\$46.10	\$46.22	\$45.79	\$45.80					
New TMUS										\$47.99	\$48.55	\$48.00	\$48.01	\$47.18
Verizon														
Total postpaid phone ARPU (excl. Verizon)	\$50.87	\$51.16	\$51.74	\$51.55	\$51.48	\$51.51	\$51.76	\$51.46	\$51.49	\$51.16	\$51.57	\$51.27	\$51.37	\$51.42
Y/Y % change	-7.0%	-6.3%	-4.5%	-3.2%	1.2%	0.7%	0.0%	-0.2%	0.0%	-0.7%	-0.4%	-0.4%	-0.4%	0.1%

Note: Altice, Comcast and Charter postpaid customers used to reflect postpaid phone customers as well.

Note: Tables do not include future forecasts for US Cellular

Source: Company reports, RBC Capital Markets estimates. Historical periods may not reflect restatements or changes in accounting standards.



Exhibit 12: Wireless Financial Trends by Carrier (\$M)

Wireless industry financial snapshot (\$M)	1Q18	2Q18	3Q18	4Q18	1Q19	2Q19	3Q19	4Q19	1Q20	2Q20	3Q20	4Q20E	2020E	2021E
Wireless revenue														
Service revenue														
AT&T	13,246	13,520	13,828	13,700	13,629	13,824	13,930	13,948	13,968	13,669	13,883	14,087	55,607	57,678
Sprint	5,573	5,460	5,498	5,449	5,409	5,322	5,045	5,195	5,124					
T-Mobile	7,806	7,931	8,066	8,189	8,277	8,426	8,583	8,708	8,713					
New T-Mobile										13,230	14,139	14,233	55,439	57,410
Verizon	15,402	15,754	15,966	15,898	16,072	16,244	16,398	16,314	16,357	15,948	16,432	16,700	65,437	67,913
Total service revenue	42,027	42,665	43,358	43,236	43,387	43,816	43,956	44,165	44,162	42,847	44,454	45,020	176,483	183,001
Y/Y % change	-2.6%	-1.0%	-0.2%	-0.3%	3.2%	2.7%	1.4%	2.1%	1.8%	-2.2%	1.1%	1.9%	0.7%	3.7%
Equipment revenue														
AT&T	3,905	3,559	3,907	4,856	3,734	3,468	3,771	4,752	3,434	3,480	4,011	5,276	16,201	17,496
Sprint	2,217	2,385	2,671	2,902	2,785	2,579	2,522	2,664	2,452					
T-Mobile	2,353	2,325	2,391	2,940	2,516	2,263	2,186	2,875	2,400					
New T-Mobile										4,269	4,953	5,034	19,108	19,263
Verizon	5,040	5,044	5,353	6,821	4,931	4,720	5,141	6,771	4,129	3,755	4,112	7,056	19,052	20,806
Total equipment revenue	13,515	13,313	14,322	17,519	13,966	13,030	13,620	17,062	12,415	11,504	13,076	17,366	54,361	57,565
Y/Y % change	24.8%	12.5%	26.8%	7.4%	3.3%	-2.1%	-4.9%	-2.6%	-11.1%	-11.7%	-4.0%	1.8%	-5.8%	5.9%
Total wireless revenue														
AT&T	17,151	17,079	17,735	18,556	17,363	17,292	17,701	18,700	17,402	17,149	17,894	19,363	71,808	75,173
Sprint	7,790	7,845	8,169	8,351	8,194	7,901	7,567	7,859	7,576					
T-Mobile	10,455	10,571	10,839	11,445	11,080	10,979	11,061	11,878	11,113					
New T-Mobile										17,671	19,272	19,453	75,085	77,377
Verizon	21,900	22,449	22,973	24,412	22,700	22,682	23,569	25,235	22,565	21,742	22,640	25,864	92,811	96,874
Total wireless revenue	57,296	57,944	59,716	62,764	59,337	58,854	59,898	63,672	58,656	56,562	59,806	64,680	239,704	249,425
Y/Y % change	3.1%	2.4%	5.9%	2.3%	3.6%	1.6%	0.3%	1.4%	-1.1%	-3.9%	-0.2%	1.6%	-0.9%	4.1%
Wireless adj. EBITDA (as reported)														
AT&T	7,193	7,538	7,631	7,469	7,322	7,770	7,530	7,833	7,817	7,712	7,700	8,069	31,299	32,100
Sprint	2,816	3,318	3,276	3,111	3,131	3,037	2,562	2,535	2,673					
T-Mobile	2,956	3,233	3,239	2,970	3,284	3,461	3,396	3,242	3,665					
New T-Mobile										7,017	7,129	6,551	27,035	27,679
Verizon	10,477	10,733	10,965	10,381	10,765	10,923	11,042	10,328	11,147	10,977	11,359	10,992	44,475	45,804
Total wireless adj. EBITDA	23,442	24,822	25,111	23,931	24,502	25,191	24,530	23,938	25,302	25,706	26,188	25,612	102,808	105,583
Y/Y % change	7.1%	8.2%	10.0%	13.2%	4.5%	1.5%	-2.3%	0.0%	3.3%	2.0%	6.8%	7.0%	4.7%	2.7%
Wireless adj. EBITDA margin														
AT&T	41.9%	44.1%	43.0%	40.3%	42.2%	44.9%	42.5%	41.9%	44.9%	45.0%	43.0%	41.7%	43.6%	42.7%
Sprint	36.1%	42.3%	40.1%	37.3%	38.2%	38.4%	33.9%	32.3%	35.3%					
T-Mobile	28.3%	30.6%	29.9%	26.0%	29.6%	31.5%	30.7%	27.3%	33.0%					
New T-Mobile										39.7%	37.0%	33.7%	36.0%	35.8%
Verizon	47.8%	47.8%	47.7%	42.5%	47.4%	48.2%	46.8%	40.9%	49.4%	50.5%	50.2%	42.5%	47.9%	47.3%
Total wireless adj. EBITDA margin	40.9%	42.8%	42.1%	38.1%	41.3%	42.8%	41.0%	37.6%	43.1%	45.4%	43.8%	39.6%	42.9%	42.3%
Y/Y % change (bps)	153 bps	228 bps	155 bps	369 bps	38 bps	-4 bps	-110 bps	-53 bps	184 bps	265 bps	284 bps	200 bps	229 bps	-56 bps
Wireless adj. EBITDA service margin														
AT&T	54.3%	55.8%	55.2%	54.5%	53.7%	56.2%	54.1%	56.2%	56.0%	56.4%	55.5%	57.3%	56.3%	55.7%
Sprint	50.5%	60.8%	59.6%	57.1%	57.9%	57.1%	50.8%	48.8%	52.2%					
T-Mobile	37.9%	40.8%	40.2%	36.3%	39.7%	41.1%	39.6%	37.2%	42.1%					
New T-Mobile										53.0%	50.4%	46.0%	48.8%	48.2%
Verizon	68.0%	68.1%	68.7%	65.3%	67.0%	67.2%	67.3%	63.3%	68.1%	68.8%	69.1%	65.8%	68.0%	67.4%
Total wireless adj. EBITDA service margin	54.3%	55.8%	55.2%	54.5%	53.7%	56.2%	54.1%	56.2%	56.0%	56.4%	55.5%	57.3%	58.3%	57.7%
Y/Y % change (bps)	433 bps	470 bps	432 bps	1048 bps	-58 bps	45 bps	-113 bps	164 bps	224 bps	21 bps	141 bps	112 bps	227 bps	-56 bps
Wireless capex (\$M)														
AT&T	2,891	2,414	2,539	2,728	2,401	2,490	2,749	2,847	2,339	2,472	2,798	2,987	10,596	10,854
Sprint	681	1,019	1,101	1,242	973	1,027	963	921	798					
T-Mobile	1,366	1,629	1,362	1,184	1,931	1,789	1,514	1,157	1,753					
New T-Mobile										2,138	3,109	3,477	11,275	13,595
Verizon	2,367	1,650	2,127	2,342	2,044	1,857	2,217	2,835	2,526	2,298	2,193	2,140	9,157	9,306
Total wireless capex	7,305	6,712	7,129	7,496	7,349	7,163	7,443	7,759	7,415	6,908	8,100	8,604	31,028	33,755
Y/Y % change	8.7%	-7.3%	-0.2%	2.5%	0.6%	6.7%	4.4%	3.5%	0.9%	-3.6%	8.8%	10.9%	4.4%	8.8%
Wireless capital intensity (on total revenue)														
AT&T	16.9%	14.1%	14.3%	14.7%	13.8%	14.4%	15.5%	15.2%	13.4%	14.4%	15.6%	15.4%	14.8%	14.4%
Sprint	8.7%	13.0%	13.5%	14.9%	11.9%	13.0%	12.7%	11.7%	10.5%					
T-Mobile	13.1%	15.4%	12.6%	10.3%	17.4%	16.3%	13.7%	9.7%	15.8%					
New T-Mobile										12.1%	16.1%	17.9%	15.0%	17.6%
Verizon	10.8%	7.3%	9.3%	9.6%	9.0%	8.2%	9.4%	11.2%	11.2%	10.6%	9.7%	8.3%	9.9%	9.6%
Total wireless capital intensity	12.7%	11.6%	11.9%	11.9%	12.4%	12.2%	12.4%	12.2%	12.6%	12.2%	13.5%	13.3%	12.9%	13.5%
Y/Y % change (bps)	66 bps	-121 bps	-73 bps	2 bps	-36 bps	59 bps	49 bps	24 bps	26 bps	4 bps	112 bps	112 bps	65 bps	59 bps

Note: Historical periods may not reflect restatements or changes in accounting standards.
Source: Company reports, RBC Capital Markets estimates

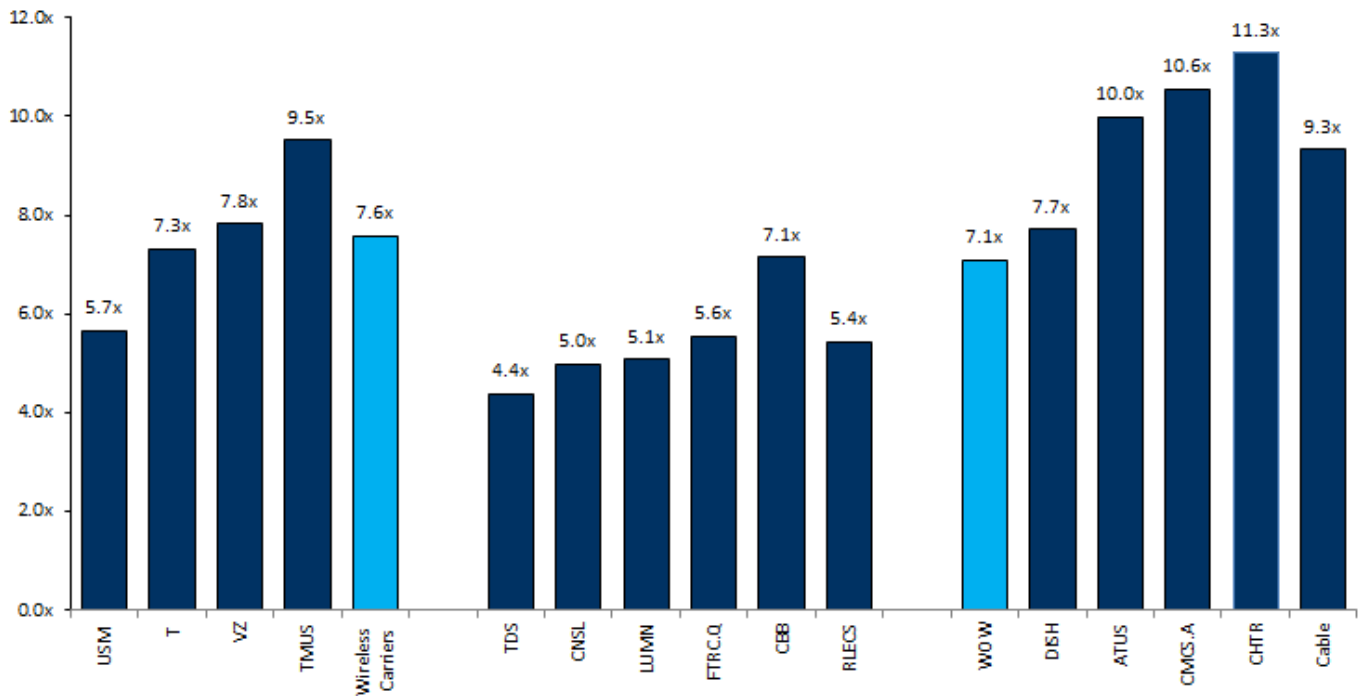


Exhibit 13: Telecom and Cable Cross Sector Returns

Wireless Carriers	1 Week	2 Weeks	1 Month	3 Months	6 Months	12 Months	YTD	3 Year CAGR	5 Year CAGR	10 Year CAGR
AT&T Inc.	-3.5%	1.8%	2.0%	2.4%	-2.3%	-23.1%	-23.8%	-8.3%	-2.5%	0.1%
T-Mobile US, Inc.	-0.4%	-2.4%	0.8%	17.4%	21.6%	72.2%	104.7%	27.0%	28.0%	NA
United States Cellular Corporation	0.2%	-1.6%	-3.3%	-4.3%	-1.4%	-10.8%	-18.5%	-4.0%	-5.0%	-4.4%
Verizon Communications Inc.	-0.8%	-2.2%	-1.2%	-0.6%	6.9%	-2.4%	13.4%	4.1%	5.7%	5.6%
Wireless Carriers Average	2.1%	5.1%	11.0%	25.6%	51.4%	33.3%	0.0%	-3.2%	3.3%	-6.1%
Rural Telecom Carriers	1 Week	2 Weeks	1 Month	3 Months	6 Months	12 Months	YTD	3 Year CAGR	5 Year CAGR	10 Year CAGR
Alaska Communications Systems Group, Inc.	-0.6%	16.6%	15.4%	59.2%	39.7%	100.6%	34.0%	8.6%	15.5%	-10.9%
Lumen Technologies, Inc.	2.2%	-2.4%	1.1%	-4.8%	1.0%	-21.9%	-38.5%	-16.7%	-16.4%	-13.8%
Cincinnati Bell Inc.	0.2%	0.7%	0.1%	1.5%	2.3%	104.3%	-26.6%	-10.8%	-2.4%	2.5%
Consolidated Communications Holdings, Inc.	-7.9%	-11.4%	-6.6%	-20.1%	-18.6%	30.1%	-59.6%	-27.4%	-25.3%	-12.4%
Telephone and Data Systems, Inc.	-1.7%	-2.6%	-4.1%	-7.8%	-6.6%	-23.1%	-32.9%	-10.6%	-5.9%	-5.8%
RLEC Average	-1.6%	0.2%	1.2%	5.6%	3.5%	38.0%	-24.7%	-11.4%	-6.9%	-8.1%
Cable/Satellite	1 Week	2 Weeks	1 Month	3 Months	6 Months	12 Months	YTD	3 Year CAGR	5 Year CAGR	10 Year CAGR
Altice USA, Inc.	1.3%	2.1%	13.1%	34.6%	45.7%	34.4%	66.5%	22.4%	NA	NA
Charter Communications, Inc.	-0.6%	-2.0%	1.9%	4.6%	21.9%	38.8%	94.7%	26.5%	27.1%	31.4%
Comcast Corporation	1.7%	0.6%	3.2%	13.5%	31.4%	18.4%	28.2%	9.1%	12.7%	17.0%
DISH Network Corporation	-13.3%	-15.1%	-7.8%	1.1%	-11.4%	-8.9%	-34.2%	-14.3%	-11.3%	5.7%
WideOpenWest, Inc.	1.0%	7.0%	22.6%	55.0%	40.5%	37.9%	-14.9%	NA	NA	NA
Cable/Satellite Average	-2.7%	-3.6%	2.6%	13.5%	21.9%	20.7%	38.8%	10.9%	9.5%	18.0%

Data as of 12/17/2020
Source: CapitalIQ

Exhibit 14: Telecom and Cable EV/EBITDA Multiples



Data as of 12/17/2020.
Source: CapitalIQ, RBC Capital Markets estimates



Exhibit 15: Winning Bidders of 3.5 GHz Band Auction (Auction 105 - CBRS)

Parent	Bidding Entity	Winning Bids (\$mm)	% of total
Verizon	Verizon Wireless Network Procurement LP	\$1,894	41.3%
DISH	Wetterhorn Wireless LLC	\$913	19.9%
Charter	Spectrum Wireless Holdings, LLC	\$464	10.1%
Comcast	XF Wireless Investment, LLC	\$459	10.0%
Cox	Cox Communications, Inc.	\$213	4.6%
Other	-	\$643	14.0%
Total	-	\$4,586	100.0%

Source: FCC, RBC Capital Markets

Exhibit 16: Winning Bidders of Rural Digital Opportunity Fund Auction (Auction 904)

Company	Bidding entity	Amount	Locations	% of total bids
LTD Broadband	LTD Broadband LLC	\$1,320,920,719	528,088	14.3%
Charter	CCO Holdings, LLC (Charter Communications)	\$1,222,613,870	1,057,695	13.2%
Rural Electric Cooperative Consortium	Rural Electric Cooperative Consortium	\$1,104,395,953	618,476	12.0%
SpaceX	Space Exploration Technologies Corp.	\$885,509,638	642,925	9.6%
Windstream	Windstream Services LLC, Debtor-In-Possession	\$522,888,780	192,567	5.7%
Nextlink	AMG Technology Investment Group LLC	\$429,228,073	206,136	4.7%
Frontier	Frontier Communications Corporation, DIP	\$370,900,833	127,188	4.0%
Resound Networks	Resound Networks, LLC	\$310,681,609	219,239	3.4%
Starry	Connect Everyone LLC	\$268,851,316	108,506	2.9%
CenturyLink	CenturyLink, Inc.	\$262,367,614	77,257	2.8%
Other	-	\$2,532,310,310	1,442,756	27.4%
Total	-	\$9,230,668,715	5,220,833	100.0%

Source: FCC, RBC Capital Markets



Exhibit 17: RBC REIT Sectors Performance

Sectors	% of total MSCI Market Cap	Avg. 2W	Avg. 3- month	Avg. YTD	AFFO/sh YOY		Price / FFO		Price / AFFO		Dividend Yield
		% Chg. in closing price	% Chg. in closing price	% Chg. in closing price	FY2020E	FY2021E	FY2020E	FY2021E	FY2020E	FY2021E	12/17/20
		Priced as of:	Priced as of:	12/17/20							
Hotel & Resort REITs	5%	0%	38%	-24%	-30%	951%	36.8x	133.1x	300.6x	24.4x	0.8%
Retail REITs	12%	2%	24%	-26%	-18%	6%	13.7x	13.0x	16.8x	15.8x	3.5%
Diversified REITs	9%	3%	18%	-17%	-7%	6%	15.2x	15.9x	18.4x	17.0x	5.5%
Health Care REITs	12%	4%	12%	-10%	-2%	-5%	15.7x	15.3x	17.2x	29.3x	4.7%
Specialized REITs	11%	4%	3%	5%	3%	10%	20.4x	18.9x	19.8x	18.8x	4.1%
Office REITs	10%	0%	10%	-25%	-4%	5%	20.3x	28.7x	19.1x	18.6x	4.4%
Residential REITs	17%	-4%	5%	-10%	-1%	4%	20.9x	19.6x	23.6x	22.7x	5.5%
Industrial REITs	13%	6%	5%	8%	7%	6%	26.1x	24.6x	29.9x	28.0x	3.0%
Datacenter REITs	12%	2%	-4%	13%	4%	7%	26.4x	23.5x	26.4x	24.7x	2.9%
Towers REITs	-	-3%	-8%	8%	7%	8%	-	-	28.8x	26.1x	2.0%
RMZ	100%	1.9%	-10.3%	-10%	-12%	3%	18.7x	18.0x	20.6x	20.1x	4.4%

Specialized REITs include COR, CONE, DLR, EQIX, and QTS
Source: RBC Capital Markets estimates, S&P Capital IQ

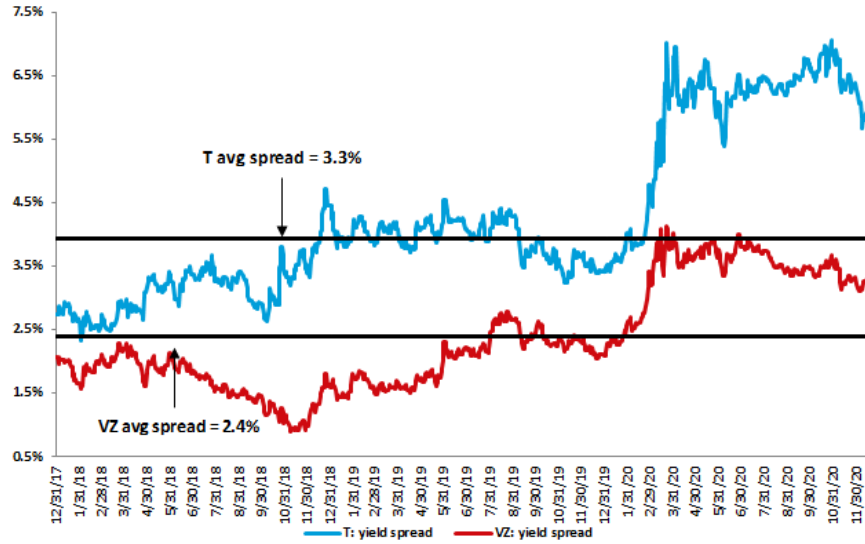


Exhibit 18: Short Interest History

Company	2 Years Ago	1 Year Ago	6 Months Ago	3 Months Ago	Latest
AT&T	70.74	99.57	120.95	112.85	133.10
% Float	1.0%	1.4%	1.7%	1.6%	1.9%
T-Mobile	9.13	10.26	16.67	13.19	9.42
% Float	3.0%	3.3%	5.2%	2.4%	1.6%
U.S. Cellular	0.60	0.88	0.85	0.73	0.77
% Float	4.1%	5.8%	5.9%	4.9%	5.1%
Verizon	43.49	35.33	28.77	30.06	31.52
% Float	1.1%	0.9%	0.7%	0.7%	0.8%
Alaska Communications	0.02	0.02	0.03	1.09	0.33
% Float	0.0%	0.0%	0.1%	2.5%	0.8%
Lumen (CenturyLink)	86.75	107.63	108.43	114.88	104.09
% Float	9.1%	10.9%	10.9%	11.6%	10.5%
Cincinnati Bell	3.72	8.88	5.40	5.94	8.70
% Float	7.9%	19.8%	12.0%	11.9%	17.5%
Consolidated Communicatio	12.40	10.44	7.52	7.19	4.23
% Float	17.9%	14.9%	10.5%	10.0%	5.9%
TDS	1.58	2.29	1.97	1.43	1.58
% Float	1.6%	2.3%	2.0%	1.4%	1.6%
Altice USA	14.44	19.51	34.49	34.79	39.05
% Float	4.4%	5.6%	11.3%	11.2%	15.8%
Charter	NA	9.70	9.25	8.48	7.45
% Float	NA	6.4%	6.5%	6.5%	5.9%
Comcast	69.65	77.92	76.96	76.44	85.85
% Float	1.5%	1.7%	1.7%	1.7%	1.9%
Dish	13.29	13.18	12.36	11.30	13.04
% Float	5.9%	5.6%	5.0%	4.6%	5.3%
American Tower	5.27	4.31	4.01	3.05	4.17
% Float	1.2%	1.0%	0.9%	0.7%	0.9%
Crown Castle	8.35	5.71	10.43	6.42	3.56
% Float	2.0%	1.4%	2.5%	1.5%	0.8%
SBA Communications	2.64	1.61	1.51	1.31	1.14
% Float	2.3%	1.4%	1.4%	1.2%	1.0%
Landmark Infrastructure	0.04	0.06	0.03	0.03	0.04
% Float	0.2%	0.3%	0.1%	0.2%	0.2%
CyrusOne	7.01	4.45	5.57	4.60	7.21
% Float	6.7%	4.0%	4.9%	4.0%	6.0%
Coresite	1.79	1.42	1.38	0.79	0.75
% Float	4.9%	3.8%	3.7%	1.9%	1.8%
Digital Realty	12.78	21.63	12.47	6.95	5.47
% Float	6.2%	10.4%	4.7%	2.6%	2.0%
Equinix	1.04	0.93	1.02	1.00	0.75
% Float	1.3%	1.1%	1.2%	1.1%	0.8%
GDS	11.24	12.96	14.71	12.70	13.45
% Float	22.7%	21.8%	20.5%	14.8%	12.5%
QTS	4.23	8.03	10.48	9.92	8.34
% Float	8.4%	14.0%	17.6%	16.3%	13.1%
Switch	NA	5.99	5.87	5.33	4.77
% Float	NA	13.1%	11.1%	7.9%	5.5%
21Vianet	0.55	0.36	1.15	1.99	2.55
% Float	1.0%	0.7%	1.7%	2.7%	3.0%
Cogent Communications	2.57	1.62	1.51	0.97	1.24
% Float	6.9%	4.4%	4.1%	2.6%	3.3%
GTT	12.03	15.35	10.02	11.61	8.26
% Float	39.1%	53.9%	36.8%	50.5%	38.9%
Uniti	12.22	27.23	18.20	15.06	11.70
% Float	6.9%	14.3%	9.6%	8.0%	5.6%

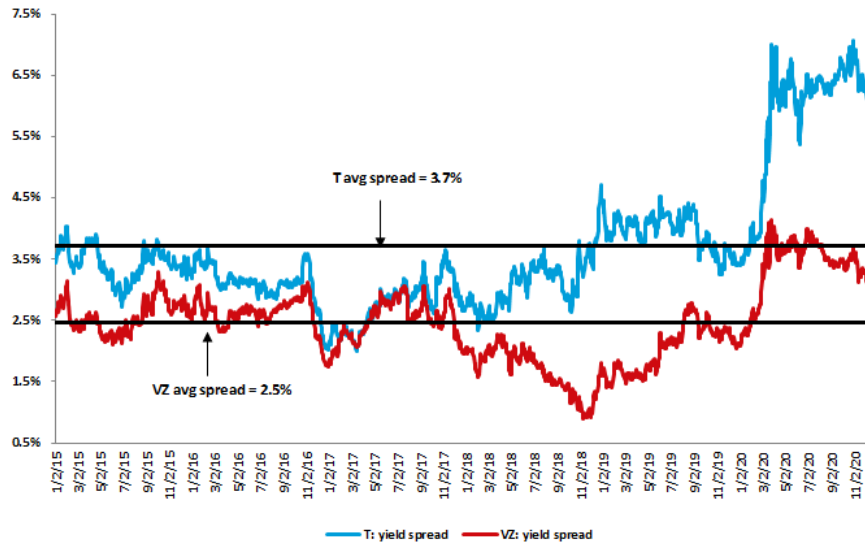
Data as of 12/17/2020.
Source: CapitalIQ

Exhibit 19: AT&T and Verizon Spreads vs. 10-yr Treasury (2017-2020)



Data as of 12/17/2020.
Source: CapitalIQ

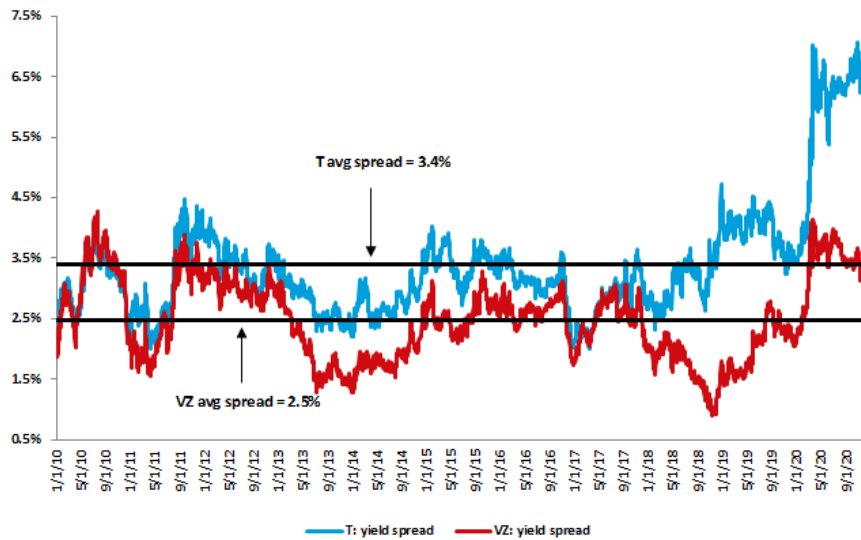
Exhibit 20: AT&T and Verizon Spreads vs. 10-yr Treasury (2015-2020)



Data as of 12/17/2020.
Source: CapitalIQ



Exhibit 21: AT&T and Verizon Spreads vs. 10-yr Treasury (2010-2020)



Data as of 12/17/2020.
Source: CapitalIQ

Exhibit 22: RBC Wireless Cell Site Addition and Overlay Estimates

CARRIER	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019E	2020E	Comments
AT&T new sites	1,822	2,450	1,200	2,000	3,700	800	630	1,000	800	2,400	2,180	2020 priorities include FirstNet completion alongside macro-site carrier adds. Our macro site addition estimate excludes ~200 anticipated high-rent relocation projects. We expected low 30K carrier adds vs. low 50K in 2019, and ~2800 4T4R deployments.
<i>AT&T lease equivalents from overlays</i>	2,200	6,200	4,730	5,200	3,650	2,200	4,100	3,800	4,750	5,300	4,200	
T-Mobile new sites	2,236	1,000	559	212	450	1,750	2,000	2,150	2,800	1,400	1,500	2020 priorities (standalone, excluding Sprint) include macro sites and 600-MHz deployments following a slowdown during 4Q19 coverage. Through 3Q19, T-Mobile had added 1,350 sites and 3,800 small cells.
<i>T-Mobile lease equivalents from overlays</i>	1,381	750	2,300	4,000	2,200	2,500	3,200	3,500	4,000	4,550	4,350	
Verizon new sites	327	1,100	1,400	2,613	3,600	3,950	3,500	3,400	2,200	2,250	2,175	For 2020, we anticipate a roughly flat levels of macro site additions vs. 2019, with a ~40% reduction in small cell additions (to low 3K) and ~20% reduction in macro carrier adds (to mid 6K), and a tapering of CBRS/LAA activity (to ~1,500 projects). Our estimates do not include mm-wave 5G activities.
<i>Verizon lease equivalents from overlays</i>	2,400	2,500	2,500	2,500	3,750	3,000	3,300	3,600	3,600	3,750	3,450	
Sprint new sites	230	400	200	100	100	100	100	250	600	250	850	2020 focus areas (standalone, excluding T-Mobile) include a ramp in macro-site additions, partly to enhance network density at 2.5 GHz, alongside small-cell deployments (leveraging Altice and Cox, with a significant mix of strand mounts), and massive MIMO deployment.
<i>Sprint lease equivalents added from overlays</i>	125	500	2,700	3,000	2,400	2,200	2,000	2,300	3,200	3,600	2,450	
TOTAL	21.3K	17.9K	16.8K	19.7K	19.9K	16.5K	18.8K	20K	22K	23.5K	21.2K	On a four-operator standalone basis (absent a Sprint/T-Mobile merger) we expect slightly less U.S. tower leasing totals in 2020 vs. 2019 due to flat or slightly tapering activity at AT&T and Verizon, roughly flat activity at T-Mobile, and slightly tapering activity at Verizon.

Note: Data includes site-equivalents from amendments/overlays, but does not include small-cell or DAS contributions.
Source: Company reports, RBC Capital Markets estimates



Exhibit 23: Network Performance Trends - Rootmetrics

Average population weighted scores by carrier for 2H20 markets tested thus far (103 markets out of 124).

	2H-18			1H-19			2H-19			2H-20		
	VZ	T	TMUS	VZ	T	TMUS	VZ	T	TMUS	VZ	T	TMUS
Overall Performance	97.5	96.5	96.3	97.8	96.9	96.2	97.3	96.4	95.6	99.0	97.0	94.3
Reliability Index	99.1	98.3	98.0	99.3	98.6	98.0	98.9	98.1	97.3	99.4	98.0	95.7
Speed Index	92.4	90.5	91.4	93.0	91.1	91.1	92.4	91.1	90.8	99.2	96.6	88.1
Data Performance	96.6	95.3	96.0	97.0	95.8	95.9	96.5	95.7	95.5	99.3	97.7	93.6
Call Performance	98.5	97.8	96.4	98.9	98.1	96.3	98.3	97.0	95.2	99.0	96.6	93.7
Text Performance	98.8	99.1	99.0	98.5	99.0	98.5	98.5	98.9	98.3	98.6	99.0	98.4

% of U.S. Population 59%

Rootmetrics stopped 1H20 testing at 55 markets. 1H20 results have been excluded from the charts for comparability.

The score comparisons are based on 2H-20 (partial) data released for a subset of the top 124 markets to date.

The data are a population-weighted aggregate view across metros to account for metros of different sizes, based on RBC calculations.

RootMetrics' preferred view of the scores is on a metro by metro basis, and is it thus difficult to draw definitive conclusions as to trends in carrier rankings on a national basis using an aggregation of metros.

Source: RootMetrics, RBC Capital Markets

Number of leading RootMetrics metro scores by carrier across markets tested thus far in 2H20 (103 markets out of 124)

	2H-18			1H-19			2H-19			2H-20		
	No. of Metros			No. of Metros			No. of Metros			No. of Metros		
	VZ	T	TMUS	VZ	T	TMUS	VZ	T	TMUS	VZ	T	TMUS
Overall Performance	77	7	9	85	9	5	80	15	2	87	12	0
Reliability Index	82	13	4	76	15	1	80	16	1	83	15	0
Speed Index	59	8	31	71	6	22	62	21	19	80	17	3
Data Performance	67	7	25	83	5	11	69	16	10	85	14	2
Call Performance	67	25	4	69	26	0	71	21	1	75	19	2
Text Performance	15	39	39	9	69	19	13	75	8	10	72	10

% of U.S. Population 59%

Rootmetrics stopped 1H20 testing at 55 markets. 1H20 results have been excluded from the charts to for comparability.

The score comparisons are based on 2H-20 (partial) data released for a subset of the top 124 markets to date.

RootMetrics' preferred view of the scores is on a metro by metro basis, and is it thus difficult to draw definitive conclusions as to trends in carrier rankings on a national basis using an aggregation of metros.

Source: RBC Capital Markets based on RootMetrics

RootMetrics score differentials Averaged across 103 markets out of 124

	2H-18			1H-19			2H-19			2H-20		
	VZ	T	TMUS	VZ	T	TMUS	VZ	T	TMUS	VZ	T	TMUS
Overall Performance	highest	(1.0)	(1.2)	highest	(0.9)	(1.6)	highest	(0.9)	(1.8)	highest	(2.0)	(4.7)
Reliability Index	highest	(0.8)	(1.1)	highest	(0.7)	(1.4)	highest	(0.8)	(1.6)	highest	(1.4)	(3.7)
Speed Index	highest	(2.0)	(1.0)	highest	(1.9)	(1.9)	highest	(1.2)	(1.6)	highest	(2.6)	(11.0)
Data Performance	highest	(1.3)	(0.6)	highest	(1.1)	(1.1)	highest	(0.7)	(0.9)	highest	(1.6)	(5.7)
Call Performance	highest	(0.8)	(2.1)	highest	(0.8)	(2.6)	highest	(1.3)	(3.1)	highest	(2.4)	(5.4)
Text Performance	(0.2)	highest	(0.1)	(0.5)	highest	(0.4)	(0.3)	highest	(0.6)	(0.4)	highest	(0.6)

% of U.S. Population 59%

Rootmetrics stopped 1H20 testing at 55 markets. 1H20 results have been excluded from the charts to for comparability.

The score comparisons are based on 2H-20 (partial) data released for a subset of the top 124 markets to date.

The data are a population-weighted aggregate view across metros to account for metros of different sizes, based on RBC calculations.

RootMetrics' preferred view of the scores is on a metro by metro basis, and is it thus difficult to draw definitive conclusions as to trends in carrier rankings on a national basis using an aggregation of metros.

Source: RBC Capital Markets based on RootMetrics



Regional Performance by carrier for 2H20 - markets tested thus far (103 markets out of 124).

2H20 Region	Overall Performance			Reliability Index			Speed Index			Data Performance			Call Performance			Text Performance			Network Accessibility		
	VZ	T	TMUS	VZ	T	TMUS	VZ	T	TMUS	VZ	T	TMUS	VZ	T	TMUS	VZ	T	TMUS	VZ	T	TMUS
Midwest	99.4	97.6	96.8	99.7	98.5	97.9	99.6	97.5	91.7	99.6	98.1	95.5	99.6	97.5	97.6	98.6	99.1	98.8	97.6	91.5	93.3
Northeast	98.6	95.5	93.2	99.0	96.2	94.2	98.5	94.7	91.3	99.0	96.7	94.3	98.3	93.4	91.0	98.1	98.7	97.8	97.5	94.1	90.9
South	99.1	97.9	95.2	99.6	99.1	97.0	99.2	97.1	86.5	99.3	98.0	93.5	99.5	98.5	95.6	98.8	99.0	98.7	95.9	90.0	91.7
West	98.9	96.9	92.6	99.4	98.0	94.3	99.5	96.9	84.1	99.4	97.8	91.5	99.0	96.5	91.8	98.7	98.9	98.3	95.7	90.3	90.5
Mid-Atlantic	98.5	96.4	93.6	98.7	97.1	93.8	98.8	95.4	94.9	99.1	97.1	95.9	97.7	95.2	89.8	98.5	99.2	98.0	97.7	93.8	94.6

% of U.S. Population 59%

The score comparisons are based on 2H-20 (partial) data released for a subset of the top 124 markets to date.
 The data are a population-weighted aggregate view across metros to account for metros of different sizes, based on RBC calculations.
 RootMetrics' preferred view of the scores is on a metro by metro basis, and is it thus difficult to draw definitive conclusions as to trends in carrier rankings on a national basis using an aggregation of metros.
 Rootmetrics started reporting "Market Accessibility" from 1H20
 Source: RootMetrics, RBC Capital Markets



Exhibit 24: Bottom 10 Trending Markets by Carrier (out of top 25 populous markets which have reported 2H20 data)

Verizon		AT&T		T-Mobile	
Metro	2H20/2H19 Change	Metro	2H20/2H19 Change	Metro	2H20/2H19 Change
Riverside	0.2	Las Vegas	-2.6	Denver	-6.5
Kansas City	0.4	Denver	-1.5	San Francisco	-5.0
Sacramento	0.8	Detroit	-1.2	Los Angeles	-4.1
San Antonio	0.9	Philadelphia	-0.9	Riverside	-3.9
Charlotte	0.9	Seattle	-0.6	San Antonio	-3.6
Austin	1.0	Minneapolis	-0.5	San Diego	-3.3
St. Louis	1.2	St. Louis	-0.1	Las Vegas	-2.1
Cleveland	1.2	Dallas	0.0	New York City and Tri-State Area	-1.9
Dallas	1.4	Chicago	0.1	Atlanta	-1.9
Atlanta	1.4	Sacramento	0.3	Houston	-1.7

Source: RBC Capital Markets based on RootMetrics

Exhibit 25: Top 25 Trending Markets Carrier (out of top 25 populous markets which have reported 2H20 data)

Verizon		AT&T		T-Mobile	
Metro	2H20/2H19 Change	Metro	2H20/2H19 Change	Metro	2H20/2H19 Change
Orlando	5.8	Orlando	6.6	St. Louis	2.3
San Diego	2.9	San Francisco	1.8	Orlando	2.0
Minneapolis	2.4	Charlotte	1.6	Detroit	1.1
New York City and Tri-State Area	2.4	Atlanta	1.3	Minneapolis	1.1
Phoenix	2.2	Miami	1.3	Seattle	0.8
Philadelphia	1.9	Riverside	1.3	Sacramento	0.2
Detroit	1.8	Cleveland	1.1	Cleveland	0.1
Los Angeles	1.7	Austin	1.1	Phoenix	0.0
Seattle	1.6	New York City and Tri-State Area	0.9	Chicago	-0.1
Miami	1.6	Phoenix	0.9	Kansas City	-0.2

Source: RBC Capital Markets based on RootMetrics



Exhibit 26: Network Performance Trends – OpenSignal (4Q19)

Average performance (population weighted) in all metros

Parameters (4G)	Verizon	AT&T	Sprint	T-Mobile
Availability	96.8	93.5	92.7	95.1
Download	29.4	32.1	26.5	26.6
Upload	9.5	7.0	3.0	8.7
Latency	49.4	43.9	49.7	50.0
video experience	62.1	53.9	59.2	55.2

Leading performance by carriers (No. of metros)

Parameters (4G)	Verizon	AT&T	Sprint	T-Mobile
Availability	256	44	22	57
Download	50	173	81	75
Upload	233	49	1	95
Latency	91	47	114	127
video experience	198	13	134	34

Source: RBC Capital Markets based on OpenSignal



Exhibit 27: Datacenter Leasing Tracker

	1Q19	2Q19	3Q19	4Q19	1Q20	2Q20	3Q20	P4Q Avg.	Total 2017	Total 2018	Total 2019	Total 2020
(\$M Annual GAAP revenue signed)												
DLR (incl. INXN from 2Q20, excl. intercc)	\$42	\$53	\$61	\$62	\$66	\$132	\$75	\$80	\$215	\$239	\$218	\$274
COR	\$7	\$27	\$14	\$7	\$12	\$3	\$12	\$9	\$38	\$28	\$55	\$28
CONE (excl. interconnection)	\$24	\$11	\$44	\$10	\$57	\$35	\$8	\$36	\$96	\$142	\$89	\$100
QTS (net of downgrades)	\$11	\$20	\$17	\$28	\$22	\$21	\$26	\$22	\$42	\$65	\$76	\$69
Total	\$85	\$111	\$136	\$107	\$157	\$191	\$122	\$148	\$391	\$473	\$438	\$470
GDS	\$65	\$85	\$90	\$93	\$92	\$193	\$99	\$117	\$186	\$330	\$334	\$385
EQIX	\$71	\$66	\$51	\$55	\$42	\$68	\$39	\$54	\$264	\$323	\$243	\$150
INXN	€19	€12	€5	NA	€9	€14	€23	€9	€59	€71	€36	€47
SWCH	\$20	\$13	\$7	\$20	\$10	\$12	\$18	\$12	-	\$52	\$40	\$40
IRM (Datacenter)	\$5	\$4	\$10	\$4	\$6	\$31	\$15	\$13	-	\$13	\$23	\$53
CLNY (Datacenters)					\$7	\$7	\$9	\$7	-	-	-	\$23
% Share in total annual GAAP revenue signed												
DLR (incl. INXN from 2Q20)	50%	48%	45%	58%	42%	69%	62%	54%	55%	50%	50%	58%
COR	8%	25%	11%	6%	8%	2%	10%	7%	10%	6%	13%	6%
CONE	29%	10%	32%	10%	36%	18%	7%	24%	25%	30%	20%	21%
QTS	13%	18%	13%	26%	14%	11%	21%	16%	11%	14%	17%	15%
Total	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
\$M New Signings GAAP rent % of Total In-place Annual rent												
DLR (incl. INXN from 2Q20)	1.8%	2.3%	2.8%	2.8%	2.9%	4.7%	2.6%	3.3%	10.5%	10.9%	9.8%	10.2%
COR	2.2%	9.1%	4.7%	2.1%	3.8%	1.1%	3.8%	2.9%	14.5%	9.7%	18.1%	8.7%
CONE	3.3%	1.4%	5.8%	1.3%	7.2%	4.4%	1.1%	4.7%	17.7%	22.0%	11.8%	12.7%
QTS	2.9%	5.0%	4.4%	6.8%	5.2%	4.9%	5.9%	5.3%	11.0%	18.3%	19.1%	15.9%
EQIX	1.8%	1.6%	1.3%	1.4%	1.0%	1.6%	0.9%	1.3%	8.2%	8.8%	6.1%	3.5%
INXN	3.4%	2.2%	0.9%	NA	NA	NA	NA	0.9%	13.5%	14.2%	6.5%	NA
GDS	11.8%	14.3%	14.6%	13.2%	12.9%	23.7%	10.6%	16.1%	74.3%	75.8%	53.9%	47.2%
SWCH	5.8%	3.6%	1.8%	5.1%	2.5%	2.9%	4.3%	3.1%	-	18.3%	16.3%	9.7%
IRM (Datacenters)	2.2%	1.8%	3.9%	1.4%	2.3%	10.8%	5.0%	4.6%	-	5.6%	9.3%	18.1%
CLNY (Datacenters)					4.3%	3.9%	2.5%	4.1%	-	-	-	10.7%
Total	2.8%	3.1%	3.1%	3.1%	3.3%	4.9%	2.8%	3.6%	12.6%	14.7%	12.1%	11.0%

DFT -- New leasing annual rent includes reimbursement for operating expenses.
 DLR -- New leasing annualized GAAP rent does not include the interconnection bookings signed during the quarter
 CONE- Excluding cross-connect bookings and the CME acquisition-lease back in 1Q16.
 QTS - Annual rent is a cash metric. The company reports annual rent net of downgrades.
 Total in-place annual rent are cash rents excluding reimbursements for metered power.
 EQIX based on net billable cabinets added in the quarter and average in-place pricing
 INXN based on net incremental revenue generating space added in the quarter and average in-place pricing
 Source: Company reports and RBC Capital Markets



Exhibit 28: Datacenter Hyperscale vs. Colocation Leasing Tracker

Hyperscale	1Q18	2Q18	3Q18	4Q18	1Q19	2Q19	3Q19	4Q19	1Q20	2Q20	3Q20	2018	2019	1Q20	2Q20	3Q20
(\$M Annual GAAP revenue signed)												(% of total \$M Hyperscale AGR signed)				
DLR - Turnkey	\$42	\$78	\$50	\$22	\$31	\$41	\$53	\$53	\$58	\$92	\$46	59%	58%	47%	71%	63%
COR (>5,000 NRSF)	\$3	\$5	\$1	\$0	\$0	\$22	\$10	\$0	\$4	\$0	\$7	2%	10%	3%	0%	9%
CONE (>500 kW)	\$31	\$56	\$15	\$5	\$17	\$5	\$35	\$3	\$47	\$24	\$2	33%	20%	38%	19%	3%
QTS (Hyperscale)	\$11	\$0	\$6	\$3	\$3	\$5	\$9	\$18	\$15	\$13	\$18	6%	12%	12%	10%	25%
Total Hyperscale (Traditional REIT)	\$86	\$139	\$72	\$30	\$50	\$73	\$106	\$74	\$123	\$130	\$73	100%	100%	100%	100%	100%
SWCH (Hyperscale)	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0					
IRM (Datacenter Hyperscale)	\$0	\$0	\$0	\$0	\$0	\$0	\$8	\$0	\$5	\$29	\$11					
GDS	\$82	\$82	\$76	\$89	\$65	\$85	\$90	\$93	\$92	\$193	\$99					
Total Hyperscale (including GDS)	\$169	\$222	\$148	\$119	\$115	\$158	\$204	\$167	\$220	\$352	\$183					

Colocation	1Q18	2Q18	3Q18	4Q18	1Q19	2Q19	3Q19	4Q19	1Q20	2Q20	3Q20	2018	2019	1Q20	2Q20	3Q20
(\$M Annual GAAP revenue signed)												(% of total \$M Colocation AGR signed)				
DLR - Colocation	\$6	\$7	\$10	\$10	\$7	\$8	\$7	\$8	\$8	\$22	\$29	25%	24%	22%	50%	60%
COR (<=5,000 NRSF)	\$4	\$6	\$5	\$4	\$7	\$5	\$5	\$7	\$8	\$3	\$6	15%	19%	25%	8%	11%
CONE (<=500 kW, Enterprise)	\$8	\$6	\$9	\$13	\$8	\$6	\$9	\$7	\$10	\$10	\$6	26%	24%	31%	24%	13%
QTS (Hybrid Colo, 500 kW to 2MV)	\$11	\$13	\$12	\$9	\$8	\$15	\$9	\$9	\$7	\$8	\$8	34%	33%	22%	18%	16%
Total Colocation (Traditional REIT)	\$29	\$33	\$36	\$36	\$29	\$34	\$30	\$31	\$33	\$44	\$49	100%	100%	100%	100%	100%
EQIX	\$56	\$98	\$67	\$102	\$71	\$66	\$51	\$55	\$42	\$68	\$39					
INXN	\$25	\$12	\$27	\$20	\$21	\$14	\$6	NA	\$10	\$15	\$25					
SWCH	\$16	\$18	\$17	\$7	\$20	\$13	\$7	\$20	\$10	\$12	\$18					
IRM (Datacenter)	\$2	\$3	\$3	\$4	\$5	\$4	\$2	\$4	\$1	\$2	\$4					
CLNY (Datacenters)									\$7	\$7	\$9					
Total Colocation	\$129	\$164	\$150	\$170	\$147	\$131	\$97	\$110	\$104	\$148	\$145					

DLR -- New leasing annualized GAAP rent does not include the interconnection bookings signed during the quarter.
 CONE -- excluding cross-connect bookings and the CME acquisition-lease back in 1Q16.
 QTS -- Annual rent is a cash metric. The company also reports annual rent net of downgrades and thus is not directly comparable to other companies that factor downgrades in new signings or churn.
 Total In-place annual rents are cash rents excluding reimbursements for metered power.
 EQIX based on net billable cabinets added in the quarter and average in-place pricing
 INXN based on net incremental revenue generating space added in the quarter and average in-place pricing
 All EQIX, INXN, CLNY and SWCH signings are classified as colocation (despite occasional multi-MW signings).
 Source: Company reports and RBC Capital Markets

Exhibit 29: Datacenters – Quarterly Revenue Churn Comparisons

	1Q19	2Q19	3Q19	4Q19	1Q20	2Q20	3Q20	Prior 4Q-avg	Annual 2017	Annual 2018	Annual 2019	YTD 2020
COR	2.7%	2.4%	3.1%	2.9%	3.3%	1.0%	1.9%	2.6%	5.6%	7.6%	11.1%	6.2%
DLR (estimated)	0.7%	1.7%	2.5%	3.3%	0.9%	0.8%	1.5%	1.9%	8.7%	4.5%	8.2%	3.2%
CONE	2.1%	0.6%	1.0%	0.7%	1.0%	1.1%	0.6%	1.0%	3.9%	5.0%	4.4%	2.7%
QTS	1.3%	1.0%	1.1%	1.7%	0.6%	0.5%	1.7%	1.0%	8.4%	5.7%	5.1%	2.8%
EQIX	2.1%	2.4%	2.3%	2.3%	2.4%	2.2%	2.6%	2.3%	9.7%	9.3%	9.0%	7.2%
Average	1.8%	1.6%	2.0%	2.2%	1.6%	1.1%	1.7%	1.7%	6.8%	6.4%	7.6%	4.4%
INXN (company provided)	1.5-2.25%	1.5-2.25%	1.5-2.25%	1.5-2.25%	1.5-2.25%	1.5-2.25%	1.5-2.25%	1.5-2.25%	6-9%	6-9%	6-9%	3-4.5%
GDS	1.0%	0.2%	0.6%	0.2%	0.5%	0.7%	NA	0.5%	6.5%	3.6%	2.0%	1.2%
SWCH	0.1%	0.2%	0.1%	0.2%	0.4%	0.2%	0.2%	0.2%	0.9%	0.9%	0.6%	0.8%
IRM (Datacenters)	5.1%	0.7%	2.4%	1.5%	0.5%	0.8%	1.6%	1.3%	3.4%	3.4%	9.7%	2.9%
CLNY (Datacenters)					2.7%	1.8%	1.0%	2.3%				5.5%
Average	2.1%	0.8%	1.3%	1.0%	1.1%	1.0%	1.2%	1.1%	5.2%	4.2%	5.1%	3.3%
Average - EQIX, INXN	2.1%	2.2%	2.1%	2.1%	2.2%	2.1%	2.3%	2.1%	8.9%	8.7%	8.5%	6.6%

Source: Company reports and RBC Capital Markets estimates for DLR



Exhibit 30: Datacenters – Average Pricing on New Leases Signed

Annual \$ per SF	1Q19	2Q19	3Q19	4Q19	1Q20	2Q20	3Q20	P4Q Avg.
DLR (incl. INXN from 2Q20)	\$109	\$116	\$130	\$132	\$122	\$93	\$175	\$119
DLR - Turnkey	\$137	\$138	\$122	\$134	\$117	\$117	\$157	\$123
DLR - Colocation	\$263	\$306	\$339	\$309	\$273	\$215	\$226	\$284
COR	\$207	\$191	\$197	\$216	\$202	\$156	\$173	\$193
CONE	\$262	\$235	\$186	\$365	\$196	\$231	\$565	\$244
QTS - Core business (C1/C2)	\$477	\$544	\$404	\$465	\$388	\$548	\$390	\$451
Avg. Wholesale pricing \$/sf	\$209	\$179	\$160	\$172	\$159	\$159	\$254	\$162

Monthly \$ per kW	1Q19	2Q19	3Q19	4Q19	1Q20	2Q20	3Q20	P4Q Avg.
DLR (incl. INXN from 2Q20)	\$132	\$131	\$113	\$123	\$110	\$107	\$148	\$113
DLR - Turnkey	\$159	\$118	\$105	\$114	\$102	\$94	\$120	\$103
DLR - Colocation	\$274	\$312	\$295	\$256	\$285	\$234	\$218	\$268
COR	\$108	\$100	\$103	\$112	\$105	\$81	\$90	\$100
CONE	\$131	\$152	\$119	\$181	\$108	\$131	\$188	\$135
QTS - Core business (C1/C2)	\$265	\$302	\$224	\$258	\$216	\$304	\$217	\$251
SWCH	\$182	\$187	\$177	\$274	\$231	\$323	\$188	\$251
IRM (Datacenters)	\$112	\$117	\$104	\$170	\$113	\$81	\$104	\$117
Avg. Wholesale pricing \$/kW	\$128	\$121	\$114	\$127	\$109	\$111	\$139	\$115

** Average wholesale pricing calculation based on QTS, COR, DLR-TKD and CONE.
Source: Company reports and RBC Capital Markets

Exhibit 31: Datacenters – Period-End Backlogs of Signed but Not Commenced Leases (Annualized Rent)

In \$M	1Q19			2Q19			3Q19			4Q19			Backlog Commencing				Backlog Commencing %			
	1Q19	2Q19	3Q19	4Q19	1Q20	2Q20	3Q20	1Q20	2Q20	3Q20	FY2020	FY2021	FY2022	Thereafter	FY2020	FY2021	FY2022	Thereafter		
DLR (excl. uncons. JVs)	\$85	\$91	\$71	\$90	\$100	\$251	\$229	\$0	\$83	\$127	\$19	\$0	\$83	\$127	\$19	0%	36%	55%	8%	
CONE	\$40	\$24	\$53	\$52	\$88	\$97	\$82	\$29	\$33	\$0	\$21	\$29	\$33	\$0	\$21	35%	40%	0%	25%	
COR	\$9	\$26	\$25	\$16	\$18	\$13	\$18	\$11	\$7	\$0	\$0	\$11	\$7	\$0	\$0	60%	40%	0%	0%	
QTS	\$55	\$68	\$80	\$93	\$101	\$111	\$131	\$23	\$72	\$0	\$15	\$23	\$72	\$0	\$15	18%	55%	0%	12%	
SWCH	\$35	\$26	\$22	\$37	\$24	\$24	\$27	\$1	\$13	\$13	\$0	\$1	\$13	\$13	\$0	4%	49%	47%	0%	
Total	\$223	\$235	\$251	\$288	\$331	\$496	\$486	\$63	\$195	\$127	\$55	\$63	\$195	\$127	\$55	13%	40%	26%	11%	
GDS	\$384	\$439	\$468	\$494	\$536	\$594	\$646													
\$M Backlog % of Total In-place Annual rent																				
DLR	4%	4%	3%	4%	4%	9%	8%													
CONE	5%	3%	7%	7%	11%	12%	10%													
COR	3%	9%	8%	5%	6%	4%	5%													
QTS	14%	17%	20%	23%	24%	26%	29%													
SWCH	10%	7%	6%	9%	6%	6%	6%													
Total	6%	6%	6%	7%	8%	10%	10%													
GDS backlog % of recurring revenue																				
	69%	74%	76%	70%	75%	73%	70%													

Note: Annualized MRR for QTS.
Source: Company reports and RBC Capital Markets

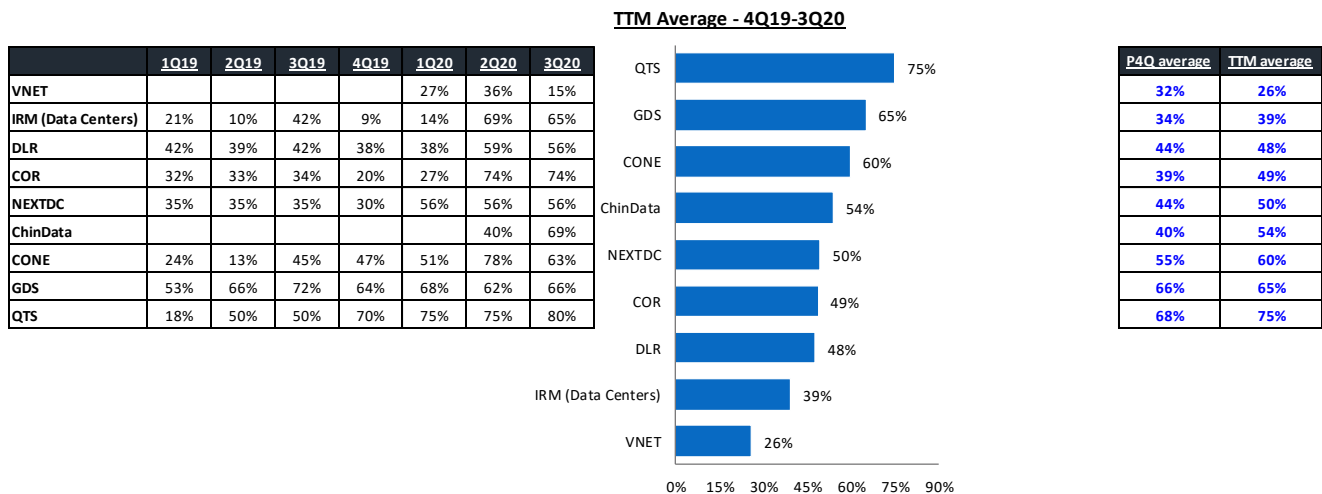


Exhibit 32: Datacenters – Renewal Spreads

	1Q18	2Q18	3Q18	4Q18	1Q19	2Q19	3Q19	4Q19	1Q20	2Q20	3Q20	Prior 4Q-avg	TTM-avg
DLR:													
Cash Rent change - Total	3.9%	3.4%	0.2%	(2.6%)	(6.9%)	(5.8%)	7.2%	(0.6%)	(1.5%)	(2.8%)	(0.2%)	0.6%	(1.3%)
GAAP Rent change - Total	9.7%	5.8%	1.6%	3.2%	7.1%	(3.7%)	10.1%	4.2%	0.7%	7.2%	0.4%	5.6%	3.1%
Cash Rent change - Turnkey	4.1%	4.7%	(1.9%)	(3.3%)	(5.9%)	(8.9%)	11.1%	(2.3%)	(9.3%)	(6.5%)	0.0%	(1.8%)	(4.5%)
GAAP Rent change - Turnkey	14.3%	10.5%	0.7%	5.6%	4.3%	(6.8%)	11.4%	3.4%	(2.7%)	3.5%	(0.1%)	3.9%	1.0%
Cash Rent change - Colocation	3.5%	2.8%	2.5%	(4.5%)	2.5%	2.4%	1.9%	2.2%	2.0%	(1.6%)	(0.2%)	1.1%	0.6%
GAAP Rent change - Colocation	3.5%	2.8%	2.6%	(4.0%)	2.5%	2.4%	1.9%	2.2%	2.0%	8.3%	0.4%	3.6%	3.2%
COR:													
Cash Rent change	5.6%	2.6%	3.2%	3.0%	3.2%	2.6%	(2.2%)	(0.8%)	1.4%	(1.5%)	2.9%	(0.8%)	0.5%
GAAP Rent change	11.5%	5.4%	5.8%	7.0%	5.9%	7.4%	4.2%	0.1%	7.2%	5.5%	5.1%	4.3%	4.5%
CONE:													
Cash Rent change	+/-2%	+/-2%	+/-2%	+/-2%	+/-2%	+/-2%	+/-2%	NA	NA	NA	NA	+/-2%	+/-2%
QTS:													
Cash Rent change	5.4%	5.6%	2.1%	(6.0%)	1.6%	1.2%	2.0%	(2.2%)	5.0%	2.6%	1.8%	1.9%	1.8%
IRM (datacenters):													
Cash Rent change	NA	NA	NA	NA	NA	NA	NA	NA	(3.6%)	(9.3%)	(1.2%)	(6.5%)	(4.7%)
GAAP Rent change	NA	NA	NA	NA	NA	NA	NA	NA	(2.8%)	(6.3%)	0.7%	(4.6%)	(2.8%)

Source: Company reports and RBC Capital Markets

Exhibit 33: Datacenter Pre-Leased Development Summary



Source: Company reports and RBC Capital Markets



Exhibit 34: Datacenters – Replacement Value Math

	Gross SF (000s)	NRSF (000s)	Est. MW (150 W/SF)	Critical Load MW	Est. Repl. Val. (150 W/SF)	Est. Repl. Val. Critical load	Current EV (\$M)	Capacity based on (150 W/SF)	Capacity based on Critical load
					\$6M per MW				
COR	3,196	1,598	240	240	\$1,438	\$1,438	\$7,529	5.2x	5.2x
CONE	7,605	4,427	664	830	\$3,984	\$4,980	\$12,549	3.1x	2.5x
DLR	34,015	17,007	2,551	1,723	\$15,307	\$10,340	\$54,373	3.6x	5.3x
QTS	3,610	1,413	212	212	\$1,272	\$1,272	\$6,739	5.3x	5.3x
					\$7M per MW				
								Enterprise Value / Replacement value	
								Capacity based on (150 W/SF)	Capacity based on Critical load
COR	3,196	1,598	240	240	\$1,678	\$1,678	\$7,529	4.5x	4.5x
CONE	7,605	4,427	664	830	\$4,648	\$5,810	\$12,549	2.7x	2.2x
DLR	34,015	17,007	2,551	1,723	\$17,858	\$12,063	\$54,373	3.0x	4.5x
QTS	3,610	1,413	212	212	\$1,484	\$1,484	\$6,739	4.5x	4.5x
					\$8M per MW				
								Enterprise Value / Replacement value	
								Capacity based on (150 W/SF)	Capacity based on Critical load
COR	3,196	1,598	240	240	\$1,917	\$1,917	\$7,529	3.9x	3.9x
CONE	7,605	4,427	664	830	\$5,312	\$6,640	\$12,549	2.4x	1.9x
DLR	34,015	17,007	2,551	1,723	\$20,409	\$13,786	\$54,373	2.7x	3.9x
QTS	3,610	1,413	212	212	\$1,696	\$1,696	\$6,739	4.0x	4.0x

COR – We assumed critical load capacity based on 150W/SF power density
 DLR – Critical load capacity is for the Turn-Key Flex & Colocation portfolio
 CONE – Available critical load capacity
 QTS – We assumed critical load capacity based on 150W/SF power density for the raised floor
 Source: Company reports and RBC Capital Markets



Exhibit 35: Datacenter FY-2020 Guidance Tracker

	COR	CONE	DLR (incl. INXN)	QTS	EQIX	SWCH	GDS	21Vianet	ChinData	NXT (FY21)	Average (excl. GDS, 21Vianet, Chindata and NXT)
Revenue (M)	\$605	\$1,028	\$3,863	\$534	\$5,993	\$514	C¥ 5,725	C¥ 4,810	C¥ 1,780	AUD 246	
EBITDA (M)	\$323	\$538	\$2,163	\$291	\$2,837	\$264	C¥ 2,665	C¥ 1,324	C¥ 840	AUD 128	
Core FFO/sh	\$5.28	\$3.85	\$6.13	\$2.79	-	-	-	-	-	-	
AFFO/sh	-	-	-	-	\$24.50	-	-	-	-	-	
Capex (M)	\$250	\$950	\$2,218	\$750	\$2,300	\$310	C¥ 10,000	C¥ 4,000	C¥ 3,550	AUD 390	
Revenue y/y	6%	5%	20%	11%	8%	11%	39%	27%	62%	23%	10%
EBITDA y/y	5%	5%	15%	16%	6%	14%	46%	26%	108%	22%	10%
FFO/sh y/y	4%	6%	-8%	6%	-	-	-	-	-	-	2%
AFFO/sh y/y	-	-	-	-	7%	-	-	-	-	-	7%
Capex y/y	-38%	8%	64%	116%	11%	1%	95%	217%	-	-6%	27%
Capex % of revenue	41%	92%	57%	140%	38%	60%	175%	83%	199%	159%	72%
Guidance Change vs. Prior guidance											
Revenue (M)	\$0	\$0	\$63	\$4	\$39	\$0	C¥ 95	C¥ 10	C¥ 1,780	AUD 0	
EBITDA (M)	\$2	\$0	\$51	\$6	\$21	\$8	C¥ 55	(C¥ 6)	C¥ 840	AUD 0	
Core FFO/sh	\$0.08	\$0.02	\$0.08	\$0.01	-	-	-	-	-	-	
AFFO/sh	-	-	-	-	\$0.22	-	-	-	-	-	
Capex (M)	\$0	\$50	(\$20)	\$50	\$0	(\$5)	C¥ 0	C¥ 700	C¥ 3,550	AUD 0	

Source: Company reports and RBC Capital Markets

Exhibit 36: Portion of Full-year Consensus Expectations Included in Existing Base Rent and Pending Commencements.

	3Q20				% of 2021E Consensus revenues included in existing run-rate plus pending commencements, as of 3Q20
	In-place Capacity (SF in 000s / Cabinets /SQM)	Under Construction (SF in 000s / Cabinets /SQM)	Under Construction % of In-place Capacity	Pre-leased Development	
Digital Realty (DLR)	30,918	2,321	8%	56%	37%
Equinix (EQIX, cabinets billed) *	307,600	31,725	10%	-	52%
Equinix (EQIX, CC growth) **	307,600	31,725	10%	-	78%
Coresite (COR)	2,761	51	2%	74%	62%
Coresite (COR) ***	2,761	51	2%	74%	102%
CyrusOne (CONE)	4,471	345	8%	63%	63%
QTS Realty (QTS)	1,514	78	5%	80%	71%

Note: For CONE, COR, DLR, QTS, our analysis is based on the existing uncommenced backlog.

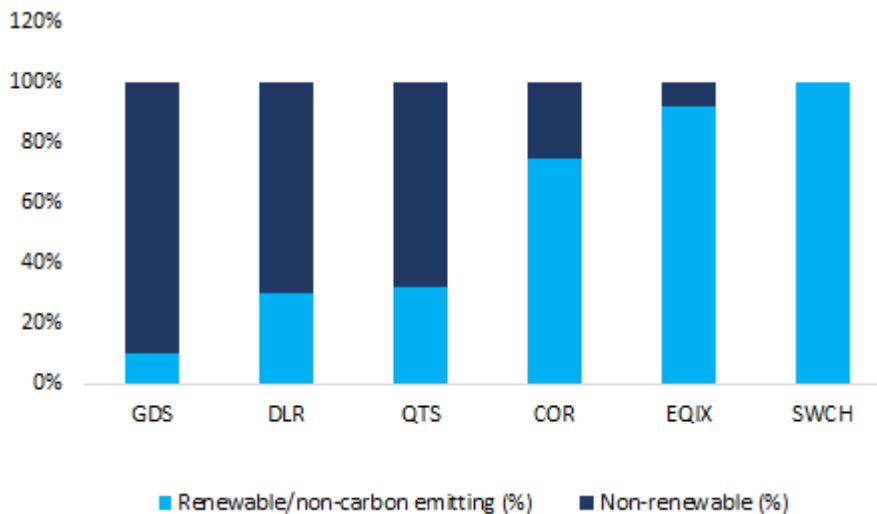
* For EQIX we assume that the new retail capacity gets billed within 12 months from completion.

** For EQIX our analysis assumes 8% constant-currency growth to consensus' 2020E recurring revenues expectations.

*** For COR, in addition to existing uncommenced backlog we include a \$3.5M recurring quarterly retail leasing assumption.

Source: Company reports, RBC Capital Markets, and VisibleAlpha for consensus estimates

Exhibit 37: Datacenter Energy Sources (2019)



Source: Company reports and RBC Capital Markets

Exhibit 38: Recent Datacenter Financing

Company	Date	Capital Offering type	Amount (\$M)	Cost of capital	Details
CONE	Sep-20	Senior Notes	\$400	2.15%	Senior notes due 2030 at 98.795% of their face value
EQIX	Sep-20	Senior Notes	\$700	1.00%	Senior notes due 2025 at 99.899% of their face value
EQIX	Sep-20	Senior Notes	\$650	1.55%	Senior notes due 2028 at 99.909% of their face value
EQIX	Sep-20	Senior Notes	\$500	2.95%	Senior notes due 2051 at 99.438% of their face value
QTS	Sep-20	Senior Notes	\$500	3.875%	Senior notes due 2028 at 100% of their face value
Stack	Sep-20	Securitized notes	\$325	1.893%	To help fund datacenter construction
DLR	Sep-20	Senior Notes	€300	Floating	Floating Rate (EURIBOR plus 0.48%) Guaranteed Notes due Sep. 23, 2022
DLR	Sep-20	Senior Notes	€750	1.00%	Guaranteed Notes due 2032
SWCH	Sep-20	Senior Notes	\$600	3.75%	senior unsecured notes due 2028
GDS	Aug-20	Equity	\$390.5	-	Issued 19.55M ADS at \$20.75 per ADS
DLR	Jun-20	Senior Notes	€500	1.250%	Guaranteed Notes due 2031
Data4	May-20	Equity	\$200	-	Commercial pension fund PFA bought a 20% stake
DigiPlex	May-20	Senior notes	\$63.5	-	2023 Senior Secured Bond
EQIX	May-20	Equity	\$1,500	-	2.25M shares @ \$665
Aligned	May-20	Credit Facility	\$575	-	Aligned increased its secured credit facility to \$575M
COR	May-20	Senior Notes	\$150	3.75%	\$150 million of 3.75% Senior Notes
DLR	2Q20	Equity	\$615	NA	ATM – 265K shares @\$139.49 per share
DLR	1Q20	Equity	\$37	NA	ATM – 4.3M shares @\$142.56 per share
Sabey	May-20	Securitized notes	\$800	NA	Refinance existing debt and help fund expansion.
MP1	May-20	Equity	A\$22.5	NA	Capital raising under Share purchase plan @A\$9.50 per share
NEXTDC	May-20	Equity	A\$191	NA	Capital raising under Share purchase plan @A\$7.80 per share
MP1	Apr-20	Equity	A\$50	NA	Institutional placement of 5.3M shares @A\$9.50 per share
NEXTDC	Apr-20	Equity	A\$672	NA	Issuance at A\$7.80/share to accelerate growth projects at S3 and elsewhere



Company	Date	Capital Offering type	Amount (\$M)	Cost of capital	Details
TierPoint	Mar-20	Preferred Equity	\$320	NA	Led by a consortium of new investors: Argo Infrastructure Partners, Wafra, and Macquarie Capital Principal Finance and Existing investors – including Cequel III, Ontario Teachers' Pension Plan, RedBird Capital Partners, The Stephens Group, and Thompson Street Capital Partners
CONE	Mar-20	Forward Equity	\$123	-	1.99M Shares of common stock under ATM for \$123M, settlement by March 2021.
QTS	Mar-20	Forward Equity	\$37	-	QTS raised an additional \$37M of incremental forward equity proceeds
Flexential	Feb-20	Senior Notes	\$250	11.25%	Senior Secured Notes due 2024
CONE	Jan-20	Senior Notes	€ 500	1.45%	Senior Notes due 2027
DLR	Jan-20	Senior Notes	\$825	1.50%	€750 million Guaranteed Notes due 2030
DLR	Jan-20	Senior Notes	\$715	0.63%	€650 million Guaranteed Notes due 2025
DLR	Jan-20	Senior Notes	\$330	0.13%	€300 million Guaranteed Notes due 2022
MP1	Dec-19	Equity	A\$62	-	Institutional placement of 7.1M shares at \$8.70/share
GDS	Dec-19	Equity	\$287	-	Issued 6.32M ADS at \$45.50 per ADS
CONE	Dec-19	Senior Notes	\$600	2.90%	2.900% senior notes due 2024
CONE	Dec-19	Senior Notes	\$600	3.45%	3.450% senior notes due 2029
CONE	4Q19	Forward Equity	\$99	-	1.6 million Shares of its common stock for \$99M, settlement by November 2020.
Stack	Nov-19	Securitized notes	\$225	-	With \$225M in new securitized notes, has now raised well over \$1 billion
COR	Nov-19	Credit Facility	\$1,150	-	Amended, extended and expanded Credit Facility by \$100M
DLR	Oct-19	Preferred stock	\$345	5.20%	13.8M shares of 5.200% Series L Cumulative Redeemable Preferred Stock
DLR	Oct-19	Senior Notes	\$550	1.13%	€500 million Euro-denominated 1.125% Notes due 2028
Aligned	Oct-19	Credit Facility	\$495.0	-	Aligned Energy completed a secured credit facility with Goldman Sachs Bank and CPPIB
QTS	Oct-19	Credit Facility	\$1,750	-	Amended, extended and expanded Credit Facility by \$180M
CONE	Sep-19	Credit Facility	\$500	-	Converted \$500M term loan maturing in March 2023 into more attractively priced EUR-denominated debt
Vantage	Aug-19	Securitized notes	\$548	-	New securitized notes
Vantage	Aug-19	Bank Loan	\$144	-	Project-based construction debt financing from a consortium of banks
EQIX	3Q19	Equity/ATM	\$99	-	Sold 181,194 shares under 2018 ATM program
EQIX	2Q19	Equity/ATM	\$348	-	Sold 722,361 shares under 2018 ATM program
NEXTEC	May-19	Senior unsecured	A\$200	Floating	2022 - Senior unsecured notes (Notes IV) - 3.75% over 3-month BBSW
AirTrunk	Apr-19	Debt	\$332	-	SG\$450M financing for new Singapore hyperscale datacenter
21Vianet	Apr-19	Senior Notes	\$300	7.88%	Senior notes due 2021
CONE	Apr-19	Equity	\$200	-	CONE sold 5.7M of GDS shares
COR	Apr-19	Senior Notes	\$200	4.11%	Series A Senior Notes due April 17, 2026
COR	Apr-19	Senior Notes	\$200	4.31%	Series B Senior Notes due April 17, 2029
CONE	Mar-19	Equity/ATM	\$252	-	Sold 4.9M shares through ATM program
GDS	Mar-19	Preferred stock	\$150	-	-
GDS	1Q19	Equity	\$445	-	Net proceeds from Equity offering
GDS	1Q19	Senior Debt	\$337	-	New debt financing and refinancing facilities
QTS	Feb-19	Equity	\$322	-	7.7625M shares @\$41.50
QTS	Feb-19	Equity	\$110	-	2.75 M shares @\$39.84 / Private placement
EQIX	Feb-19	Equity	\$1,242	-	2.985M shares @ \$416

Source: Company reports and RBC Capital Markets



Exhibit 39: Tower MLAs

	Date entered	Duration	Terms	Financial impact to the towerco
AT&T				
AMT	October 2010	Reset the leases to 2011	<ul style="list-style-type: none"> Annual escalator increased from greater than 3% to more than 6%. AT&T given the right to deploy at existing RAD centers and enter into approximately 900 leases at new sites with zero rent through 2016. 	Straight-line and reset impacts provided a boost to near-term revenues and EBITDA, in light of the increased escalator.
AMT	September 2019	Multi-year	<ul style="list-style-type: none"> Includes C-band amendments; Primarily predicated on the overall size of the footprint rather than equipment calculus; Annual escalator increased from greater than 3% to more than 6%. AT&T agreed to utilize AMT's emerging shared-generator infrastructure at a minimum number of sites (3,000). AT&T given the right to deploy at existing RAD centers and enter into approximately 900 leases at new sites with zero rent through 2016. 	~\$135 million in additional straight-line revenue for 2019.
CCI	October 2010	Reset the leases to 2011	<ul style="list-style-type: none"> Terms not disclosed; Per AT&T management comments at the time, "our new Crown Castle agreement will help us speed this process. The agreement simplifies and expands our long-term leasing deal for wireless network infrastructure. This will give us more flexibility as we deploy FirstNet as well as 5G technologies." 	Straight-line and reset impacts provided a boost to near-term revenues and EBITDA, in light of the increased escalator.
CCI	Apr-18	N/A		N/A
Sprint				
AMT	4Q11	10 years	<ul style="list-style-type: none"> Triggered a higher escalator, whose effect is straight lined; 	This MLA slowed American Tower's reported revenue growth from Sprint, but also provided greater predictability of reported revenue from this tenant and insulated the company from the effect of iDEN terminations (to which American Tower had greater exposure than its peers due to the acquired SpectraSite assets – SpectraSite had 28% exposure to iDEN leases).
SBAC	Late 2017	We believe SBAC's MLA with Sprint, which expires by the end of 2019, includes a contracted leasing revenue run-rate which is close to being fulfilled.	<ul style="list-style-type: none"> We believe the MLA involved minimum commitments, extended the towerco's term with that tenant, and provided for longer terms on new leases. 	Per management: "During the fourth quarter, we signed a master lease agreement with Sprint which commits them to amendment and collocation activity over the next year and a half, while also extending out the current term on thousands of their existing lease agreements."
T-Mobile				
AMT	September 2020	15 years	<ul style="list-style-type: none"> Two primary revenue components: (1) Escalator: 3-3.5% for entire term; (2) Bonus escalator (aka use fee) - amendments and colos: Includes certain #s of colos/amendments/sites in any given year; Rights are not unlted; TMUS is paying a prescribed dollar amount for certain rts in any given period. The total dollar amount will increase annually, but the growth rate will moderate given an increasing revenue base. Overall churn (multi-yr period) will be ~4% of total property revenue when it occurs, or ~7% of US property revenue. The new agreement enhances T-Mobile's access to American Tower's U.S. sites while locking in synergies and facilitating T-Mobile's continued rapid, efficient deployment of broad and deep nationwide 5G. 	Based on the MLA, AMT expects to recognize approximately \$95 million in additional straight-line revenue for the full year. The MLA provides for an average non-cancellable term of nearly 15 years on leases included in the MLA, thereby securing approximately \$17 billion in expected incremental contractually committed revenue over the contract term.
SBAC	Spring 2018	Unknown	<ul style="list-style-type: none"> Framework for deploying both 2.5 GHz and 600 MHz - pricing, volume, amendments excludes churn and C-band; MLA isn't structured with bonus escalators. Pricing per site. 	Revenue impact from site activity largely occurs ratably with site activity, per pre-determined triggers identified in the MLA, providing for a ramp in T-Mobile-derived revenues into 2021.
Verizon				
AMT	March 2017	1Q22 (RBCe), for holistic portion.	<ul style="list-style-type: none"> We believe the MLA entailed a five-year extension to existing leases as well as revenue certainty with that carrier. We believe Verizon's entitlements include an equipment envelope of up to 30,000 square inches, which can accommodate some of its potential C-band and requirements. If the MLA is not renewed before YE21, AMT will resume a la carte pricing with Verizon. Per AT&T management comments at the time, "our new Crown Castle agreement will help us speed this process. The agreement simplifies and expands our long-term leasing deal for wireless network infrastructure. This will give us more flexibility as we deploy FirstNet as well as 5G technologies." 	<ul style="list-style-type: none"> At least a \$100 million benefit to straight-line revenue; In light of Verizon's slower activity during 2018 (as of 3Q18), we believe American Tower's organic growth rate in its domestic tower business has benefited from this MLA as the company's revenue growth was, unlike at other tower companies, not affected.
CCI	2018			Terms not disclosed
SBAC	N/A			
DISH				
CCI	Nov-20	"Multi-year long term"	<ul style="list-style-type: none"> Crown Castle will lease DISH space on up to 20,000 towers. As part of the agreement, DISH will receive certain fiber transport services and also have the option to utilize Crown Castle for pre-construction services. Based on experiences with other towercos, we believe DISH rents have been in the \$1250-1500 range, and aiming for sub 2% escalators. The entitlements range from 6,000 to 8,000 square inches. 	<ul style="list-style-type: none"> CCI is able to recognize revenue once the lease begins, i.e., when DISH goes on a tower. This is in contrast to past MLAs which were for pre-existing leases and hence, had associated straight-line revenue adjustments. CCI assumes limited activity from DISH in 2021 guidance given DISH's comments around expected timing of receipt of equipment.

Source: RBC Capital Markets, company sources, and discussions with industry contacts.



Exhibit 40: Recent Tower Financings

Company	Date	Capital Offering type	Amount (\$M)	Cost of capital	Details
AMT	Sep-20	Senior Notes	\$300	3.1%	Senior Notes due 2050
AMT	Sep-20	Senior Notes	\$800	1.875%	Senior Notes due 2030
AMT	Sep-20	Senior Notes	€650	1.0%	Senior Notes due 2032
AMT	Sep-20	Senior Notes	€750	0.5%	Senior Notes due 2028
AMT	Jun-20	Senior Notes	\$500	1.3%	Senior Notes due 2025
AMT	Jun-20	Senior Notes	\$750	2.1%	Senior Notes due 2030
AMT	Jun-20	Senior Notes	\$750	3.1%	Senior Notes due 2050
CCI	Jun-20	Senior Notes	\$500	1.35%	Senior Notes due 2025
CCI	Jun-20	Senior Notes	\$1,100	2.25%	Senior Notes due 2031
CCI	Jun-20	Senior Notes	\$900	3.25%	Senior Notes due 2051
SBAC	May-20	Senior Notes	\$500	3.875%	Senior Notes due 2027
CCI	Mar-20	Senior Notes	\$750	3.3%	Senior Notes due 2030
CCI	Mar-20	Senior Notes	\$500	4.15%	Senior Notes due 2050
SBAC	Jan-20	Senior Notes	\$1,000	3.875%	Senior Notes due 2027
AMT	Jan-20	Senior Notes	\$750	2.4%	Senior Notes due 2025
AMT	Jan-20	Senior Notes	\$750	2.9%	Senior Notes due 2030
AMT	Sep-19	Senior Notes	\$750	2.75%	Senior Notes due 2027
AMT	Sep-19	Senior Notes	\$600	3.7%	Senior Notes due 2049
CCI	Aug-19	Senior Notes	\$550	3.1%	Senior Notes due 2029
CCI	Aug-19	Senior Notes	\$350	4.0%	Senior Notes due 2049
AMT	Jun-19	Senior Notes	\$650	2.95%	Senior Notes due 2025
AMT	Jun-19	Senior Notes	\$1,650	3.8%	Senior Notes due 2029
CCI	Jun-19	Credit Facility	\$5,000	-	Increased commitments by \$750M and extended maturity to June 2024
AMT	Mar-19	Senior Notes	\$650	3.375%	Senior Notes due 2024
AMT	Mar-19	Senior Notes	\$600	3.95%	Senior Notes due 2029
CCI	Jan-19	Senior Notes	\$600	4.3%	Senior Notes due 2029
CCI	Jan-19	Senior Notes	\$400	5.2%	Senior Notes due 2049

Source: Company reports and RBC Capital Markets



Exhibit 41: Datacenter M&A Tables

Date	Acquirer	Target	Price (M)	EBITDA Multiple
Jun-20	Equinix	BCE Inc. (13 Canada datacenters)	\$750	15.0x
Apr-20	Digital Colony	Grupo Folha	\$300-400	-
Apr-20	Macquarie Infrastructure and Real Assets	Airtrunk (Goldman Sachs, TPG Capital, 88% stake)	\$1,584	31.0x
Apr-20	Vantage Data Centers	InfraVia Capital Partners / Next Generation Data (Wales)	-	20-21x
Mar-20	Digital Realty	InterXion	\$8,500.0	21-21.5x
Feb-20	Vantage Data Centers	Etix Everywhere	-	-
Feb-20	Landmark Dividend	PayPal datacenter in Phoenix	\$122.0	
Feb-20	Digital Realty	Westin Building Exchange, Seattle (49%)	\$305.0	Mid-5% cap.
Jan-20	Colony Capital	DataBank (20% stake)	\$185.0	17.6x
Dec -19	Future Fund of Australia (Australia's sovereign wealth fund)	Canberra Data Centre (CDC, 24.1% stake)	-	-
Dec -19	Portobello Capital	BT (Spain DCs and fiber network assets)	-	-
Dec-19	Keppel DC REIT	Maena KG (Frankfurt DC)	\$90.8	-
Oct-19	Equinix	Axtel Data Centers (Mexico DCs)	\$175.0	-
Oct-19	ServerFarm	5NINES Global Holdings	-	-
Sep-19	Mapletree	Digital Realty (10 PBB DC's)	\$175.0	16-16.5x
Sep-19	Mapletree	Digital Realty 3 Virginia DC's (80%)	\$811.0	17-18x
Sep-19	New York Internet (NYI)	RDX (Chicago DC)	-	-
Aug-19	Macquarie Infrastructure Partners	Neutrality Data Centers	-	-
Jul-19	ChinData Group (Bain Capital)	Bridge Data Centres (Bain Capital)	-	-
May-19	Bain Capital	ChinData (Wangsu Science & Technology Co. Ltd)	-	-
May-19	Digital Colony	Cogeco Peer 1	\$720	-
May-19	Asterion Industrial Partners	Telefonica's datacenter portfolio	\$616.0	18-20x
Apr-19	QTS	TCN SIG Telehousing B.V. (2 DCs in Netherlands)	\$44.0	-
Feb-19	Landmark Dividend	Flexential datacenter in Fort Lauderdale, Florida	-	-
Jan-19	Brookfield Asset Management Inc.	DCI Datacenters (Australia)	\$385.0	19.2x
Jan-19	GI Partners	NTT Data's Quincy and Plano DCs	-	-
Jan-19	Berkshire Partners	Teraco Data Environments (Majority Stake)	\$1000.0	22.0x
Dec-18	Cologix	COLO-D (Canada)	-	-
Dec-18	Vantage Data Centers	4Degrees Colocation (Canada)	\$200.0	-
Oct-18	NEXTDC	APDC	\$200.0	21.0x
Oct-18	CyrusOne	ODATA (10% interest)	\$12.0	-
Sep-18	Digital Realty / Brookfield	Ascenty (Brazil)	\$1,827.0	21.0x
Jul-18	Strategic IDC Limited	Global Switch (25% stake)	\$2,772.0	34-35x
Jun-18	Brookfield Infrastructure	AT&T Datacenter assets	\$1,100.0	9-10x
Jun-18	Landmark Infrastructure	Carter Validus Mission Critical (Milwaukee DC)	\$21.0	-
Jun-18	Un-named Buyer	Carter Validus Mission Critical (Alpharetta DC)	\$64.0	-
May-18	Iron Mountain	EvoSwitch (Dutch DCs)	\$235.0	14.0x
May-18	Keppel DC REIT	Kingsland Data Centre (Singapore)	\$221.3	-
Apr-18	Carter Validus Mission Critical REIT II	Two Datacenters in Sacramento, CA	\$51.0	-
Mar-18	IPI Partners / Iron Point Partners / Iconiq Capital	Infomart San Jose, Hillsboro & Ashburn DCs	NA	NA
Feb-18	Equinix	Infomart Dallas	\$800.0	33-35x



Date	Acquirer	Target	Price (M)	EBITDA Multiple
Jan-18	GI Partners	Ericsson (Montreal DC)	-	-
Dec-17	CyrusOne	Zenium Data Centers (Frankfurt & London)	\$442.0	18.0x
Dec-17	Equinix	Metronode (Australia)	\$1,035.0	31-33x
Dec-17	Iron Mountain	IO Datacenters (US business)	\$1,340	15-16x
Oct-17	CyrusOne	GDS Holdings Ltd. (8% ownership)	\$100	17.0x
Oct-17	Digital Realty	50/50 JV with Mitsubishi Corporation (Japan)	\$350	16.0x
Oct-17	Mapletree	Carter Validus Mission Critical REIT (14 DCs)	\$750	-
Oct-17	Digital Realty	Carter Validus Mission Critical REIT (Chicago)	\$315	-
Oct-17	Iron Mountain	Credit Suisse DC's (London and Singapore)	\$100	-
Oct-17	Equinix	Zenium Datacenter (Istanbul)	\$93	22.0x
Oct-17	Equinix	Itconic (Carlyle Group)	\$259	22.0x
Jul-17	Iron Mountain	FORTRUST (Denver)	\$128	13.0x

*Reuters article, January 26, 2017 and CyrusOne presentation, March 7, 2017.
Source: Company reports and RBC Capital Markets

Exhibit 42: Cloud Outage

Date	Service provider	Location	Comments
14-Sep-20	Microsoft Azure	Europe	An extended outage due to a cooling incident. The UK South facility was brought offline when multiple chilled water pumps shut down for reasons unknown, forcing Microsoft to bring the rest of the facility to a standstill to stop temperatures rising precipitously.
18-Aug-20	Google	UK	Equinix suffered a power outage at its LD8 IBX datacentre in Docklands caused by a faulty uninterrupted power supply (UPS) system at the site.
09-Jun-20	IBM	Global	IBM cloud outage resulted from an external network provider flooding the IBM Cloud network with incorrect routing, resulting in severe congestion of traffic and impacting IBM Cloud services.
08-Apr-20	Google	US	Outage on Google's Cloud Platform led to failures at Gmail, Snapchat and the smart home company Nest.
27-Mar-20	Google	US	Services such as Dataflow, BigQuery and Compute Engine presented elevated error rates, according to the company.
26-Mar-20	Google	US	Google Cloud Platform went down for just over an hour after it suffered a "significant router failure" in one of its datacenters in Atlanta, which led to network congestion, according to the company's service status page.
24-Mar-20	Microsoft Azure	Europe	Microsoft Azure had an outage affecting Azure cloud services in Europe and the United Kingdom, resulting in certain service disruptions and issues until March 26th. Microsoft indicated that the outage was related to increased usage levels driven by the COVID-19 pandemic.
17-Mar-20	IBM Cloud	US	IBM indicated that customers running services hosted at its Dallas data center – including Watson AI, IBM Cloud, and DB2 – were either partially or completely down. The Dallas facility is one of 15 centers for IBM Cloud services in the US.
12-Nov-19	AWS	Frankfurt	An outage in AWS's eu-central-1 region impacted certain customers using AWS's EC2, Relational Database Service, CloudFormation and Auto Scaling products.
11-Nov-19	Google	Global	Google Cloud had an outage because of an issue with an infrastructure component. The outage lasted for more than two hours and impacted services including, Cloud Dataflow, AppEngine, Compute Engine, Cloud Storage, Dataflow, Dataproc, Pub/Sub, BigQuery, Networking. According to Google, the issue impacted some Google Cloud APIs across us-east1, us-east4 and southamerica-east1, with some APIs impacted globally.
22-Oct-19	Google	US	Google Cloud had an outage resulting from the cloud networking control plane experiencing failures in programming its virtualised networking stack. As a result, multiple Google Cloud products, including Google Compute Engine and Google Cloud Storage, were unavailable to clients. The issue caused 100 percent packet loss to and from ~20 percent of instances in its US-west1-b region for two-and-a-half hours.
22-Oct-19	AWS	US	AWS servers were hit by sustained distributed denial-of-service (DDoS) attack that resulted in an eight-hour outage for several AWS customers on the US East Coast.
16-Oct-19	Apple iCloud	US	According to CRN, Apple's iCloud storage service experienced an outage for some users, while other Apple services were reportedly affected for some users as well.
31-Aug-19	AWS	US	An Amazon AWS US-EAST-1 datacenter in North Virginia experienced a power failure that led the datacenter's backup generators to kick on, but stopped working after roughly 90 minutes, which led to 7.5% of the EC2 instances and EBS volumes becoming unavailable and later resulting in some EC2 instances and EBS volumes incurring hardware damage and irrecoverability of the data stored on them.
19-Aug-19	Google	US	Google and its email service, Gmail, experienced issues for thousands of users largely in the U.S.
02-Jul-19	Cloudflare	US	A bad software deployment resulted in a massive spike in CPU utilization and errors on Cloudflare's network that lasted for 30 minutes.
02-Jul-19	Google	US	Google Cloud us-east1 datacenters suffer outage due to physical damage to multiple fiber bundles.
24-Jun-19	Verizon	US	A Verizon BGP (Border Gateway Protocol) error resulted in an outage that impacted Amazon and Facebook and also services including popular chat app Discord, as well as Reddit, Twitch and others.
06-Jun-19	Facebook WhatsApp	/ Global	Facebook-owned messaging platform WhatsApp experienced a couple of outages on June 6 that affected users globally. Network monitoring company ThousandEyes initially attributed the cause to packet loss at Cogent's datacenter in the Docklands area of London, which was disputed by Cogent. ThousandEyes later said the packet loss likely occurred in the connection between the networks of Cogent and China Telecom, and that it was the latter that dropped the traffic.
04-Jun-19	CoreSite	Boston, US	Customers of CoreSite's Boston datacenter were affected for several hours on Monday night by a communications outage due to damage to fiber used in transmission lines at the center.
02-Jun-19	Google	Global	Google Cloud had an outage in East Coast that lasted more than four hours and impacted social media companies, such as Snapchat, Vimeo and Discord, that rely on Google Cloud as well as Google's own services, including YouTube, Gmail, Google Search, G Suite, Google Drive, Nest, and Google Docs. Google said the

Date	Service provider	Location	Comments
			outage was caused by a configuration change that affected more servers than intended. In an incident report, Google said that YouTube measured a 10 percent drop in global views during the incident, while Google Cloud Storage measured a 30 percent reduction in traffic.
18-May-19	Salesforce.com	US	Salesforce experienced a significant outage after a faulty database script accidentally gave users broader access to data than intended.
03-May-19	Microsoft (Azure)	Australia	A name server delegation issue with DNS resolution, impacted network connectivity and downstream impact to Compute, Storage, App Service, AAD, and SQL Database services.
13-Mar-19	Facebook WhatsApp	/ Global	Facebook suffered a 14-hour outage history. The cause of the 14-hour problem remained unknown, and impacted Facebook, Instagram, WhatsApp and Messenger.
13-Mar-19	Google	Global	A Google global outage affected its Gmail and Google Drive services
13-Nov-18	Google	Global	Google's services went down for an hour due to an accidental misconfiguration of the border gateway protocol (BGP), which exchanges routing information amongst internet nodes. News reports claimed that the routing information was accidentally leaked, via a Nigerian service provider and China Telecom
04-Sep-18	Microsoft (Azure)	South Central US region	Cooling issue in one part of a datacenter caused a localized spike in temperature resulting in a power outage.
24-Jul-18	Tencent	China	Tencent Holdings' cloud services went offline following an issue with a broken fiber-optic cable
16-Jul-18	Amazon	US	Amazon experienced a service disruption during its July 16 th Prime Day due to technical issues resulting from excessive demand and traffic volume. The issue extended to AWS users as well.
04-Jul-18	IBM	Europe	Storage systems in several of IBM's European datacenters went down due to an unspecified "network-related" problem. Impacted IBM cloud regions included AMS01, AMS03, FRA02, FRA04, MIL01.
28-Jun-18	Alibaba Cloud	China	Alibaba Cloud services went down for 30 minutes due to a malfunction that affected an unknown number of its user base.
19-Jun-18	Microsoft (Azure)	Ireland	Cooling issues at two Microsoft colocation facilities in Ireland resulted in an 11-hour outage.
10-Jun-18	Microsoft (Azure)	West Europe	Two storage scale units were affected by an unexpected increase in inter-cluster network latency, resulting in a four-hour outage.
31-May-18	Amazon (AWS)	US	Amazon Web Services suffered disruption to its operations in the US, with a "power event" affecting one of its cloud datacenters in Northern Virginia, comprising the US-EAST-1 region. Around the same time, minor problems were reported with US-EAST-2, affecting services including EC2 and EFS. A single Availability Zone saw connectivity issues, impacting services like RDS, Redshift, WorkSpaces, EC2 and EBS for approximately 30 minutes.
18-Apr-18	DigiPlex	Sweden	A gas-based fire suppression system was triggered at the DigiPlex datacenter in Väsby, 30km (18.6 miles) north of Stockholm, taking a data hall occupied by the Nasdaq Nordic stock exchange offline. Helsinki's Nasdaq Nordic stock exchange was closed until 4pm on Wednesday due to a problem in a DigiPlex datacenter.
02-Mar-18	Amazon (AWS)	US	Power loss at one of AWS's redundant internet connection points in Virginia, affected AWS customers using Direct Connect in the US-East-1 region.
15-Feb-18	Google	US	A Google Cloud outage knocked several games offline including 'Pokemon Go', 'Fire Emblem Heroes'
12-Dec-17	UKFast	UK	A civil contractor accidentally drove a spike through a power main in Manchester, England, cutting off power supply to two of the three buildings on the datacenter campus.
10-Nov-17	OVH	France	Three of OVH's datacenters in Strasbourg, France went down due to a power outage that lasted 3.5 hours.
12-Oct-17	Google	North America	Cloud Storage clients located in the Northeast of North America experienced up to a 10% error rate for a duration of 21 hours and 35 minutes when fetching objects stored in multi-regional buckets in the U.S.
02-Oct-17	Linode	Europe	Certain hardware and software failures, at a Linode datacenter in Germany led to connectivity issues with its cloud services.
29-Sep-17	Microsoft	Europe	Accidental release of fire-suppression agent into the datacenter environment in Europe led to a Azure cloud outage
06-Sep-17	IBM	US	Global load balancer and reverse DNS services fell for 21 hours, because of non-renewal of certain domain names
31-Aug-17	Google	US	Google Cloud suffers 19 hours of network load balancer issues
28-Aug-17	Google	Japan	Internet outage in Japan because of a border gateway protocol (BGP) error
19-Aug-17	Fujitsu (Homebush datacenter)	Sydney, Australia	Fujitsu's Australian cloud suffers storage crash, outage for 5 hours



Date	Service provider	Location	Comments
17-Jul-17	Global Switch	UK	Power outage at Global Switch 2 facility in UK
12-Jul-17	Internap	US	System wide outage for roughly an hour.
10-Jul-17	Global Switch	UK	Power outage at Global Switch 2 facility in UK
28-Jun-17	Apple	Global	~1% of Apple device owners unable to restore from backup because of iCloud outage.
28-May-17	Microsoft	Australia and Japan	The Office 365 service went down in Asia-pacific for several hours this past week. The outage impacted users primarily in Australia and Japan. Systems had to be reset.
28-May-17	British Airways Datacenter	UK	Power surge at a company owned datacenter location resulted in a IT failure
26-May-17	Capita	UK	A technical fault in one of its datacenters resulted in some clients experiencing issues with the availability of their IT service.
22-May-17	Unidentified Datacenter	UK	An outage at an unidentified third-party datacenter in the UK, caused by a major telecom failure in the UK
15-May-17	Interactive	Melbourne, Australia	Fire resulted in partial shutdown of a datacenter in Port Melbourne
31-Mar-17	Microsoft	Japan	Microsoft's Azure cloud services were impacted for several hours on Friday across Japan due to a cooling issue at a datacenter managed by a third party.
22-Mar-17	Microsoft	Atlanta, GA	Due to severe weather in Atlanta, Georgia, one of the 3 rd party peering sites experienced an infrastructure event resulting in loss of cooling. The network equipment in this site started to have increased temperature, and was shutdown to prevent failure. The automated peering load and fail out to a secondary region did not work as expected.
28-Feb-17	Amazon (AWS)	US	A six hour outage was caused by high error rates with S3 in US-EAST-1 region
27-Jan-17	IBM	Worldwide	Service outage was due to planned update to the interface
20-Jan-17	Equinix (LD9)	UK	Equinix experienced a brief loss of resilience at its LD9 IBX due to routine maintenance
08-Jan-17	IBM	Brazil	Power Outage
22-Nov-16	Microsoft	US	An unknown issue
15-Nov-16	Memset	UK	Power Outage
21-Oct-16	AWS, IBM	U.S.	2016 Dyn cyberattack
15-Sep-16	Google	Global	Unspecified technical problem which caused a mass outage for Google's Apps for Work and Gmail
15-Sep-16	Microsoft	Global	DNS (domain name system) malfunction
10-Sep-16	Global Switch	UK	Power fault at the Global Switch 2 datacenter in East London
11-Aug-16	Google	U.S.	Multiple maintenance updates led to two-hour outage
25-Jul-16	DreamHost	U.S.	Faulty file servers
20-Jun-16	Amazon (AWS)	Europe	An external provider outside the AWS network experienced an Internet connectivity issue affecting AWS customers in the EU-WEST-1 Region.
06-Jun-16	Salesforce.com	U.S.	Resource contention issue
04-Jun-16	Amazon (AWS) / Equinix SY3	/ Sydney, Australia	Utility failure related to adverse weather resulted in the loss of utility power to multiple AWS sites.
10-May-16	Salesforce.com	U.S.	A database failure on the NA14 instance
05-May-16	Equinix (LD4)	London, UK	Faulty UPS
11-Apr-16	Google	All regions	Google Compute Engine lost external connectivity in all regions for 18 minutes.
02-Mar-16	Salesforce.com	Europe	Storage hardware failure
29-Jan-16	GitHub	-	Power outage
14-Jan-16	Jetblue/Verizon Datacenter	U.S.	Power failure related to maintenance operation
17-Nov-15	AWS / Telety	London, UK	Power outage due to UPS Failure
30-Oct-15	PayPal / eBay Inc.	Worldwide	Power outage



Date	Service provider	Location	Comments
20-Sep-15	Amazon (AWS)	Northern Virginia, U.S.	Issue with metadata service within DynamoDB
20-Aug-15	CoreSite / Equinix (LA2) / Internap	Los Angeles, U.S.	Power outage and loss of Level 3 network connectivity.
25-Jun-15	Alibaba	Hong Kong	Severed Internet cable running between Hong Kong and the mainland and power outage.
20-May-14	Internap	New York, U.S.	Outage at the 111 8 th Avenue facility due to a power failure.

Source: Company reports and RBC Capital Markets



Exhibit 43: RBC Towerco Growth Rate Comparisons

Gross organic revenue growth (y/y)	1Q17	2Q17	3Q17	4Q17	1Q18	2Q18	3Q18	4Q18	1Q19	2Q19	3Q19	4Q19	1Q20	2Q20	3Q20
AMT Domestic Towers	8.5%	8.0%	7.9%	7.3%	7.5%	8.5%	8.9%	9.4%	9.6%	8.8%	8.7%	7.8%	7.6%	6.7%	6.2%
SBAC Domestic Towers	7.0%	7.0%	6.9%	6.6%	6.2%	6.4%	7.0%	7.4%	7.5%	8.3%	8.6%	8.2%	7.6%	6.7%	5.7%
CCI Domestic Towers (excl. small cells/fiber)	5.6%	5.0%	4.2%	4.5%	7.6%	7.9%	8.6%	8.6%	7.5%	7.5%	7.2%	6.6%	6.3%	6.3%	6.4%

Churn	1Q17	2Q17	3Q17	4Q17	1Q18	2Q18	3Q18	4Q18	1Q19	2Q19	3Q19	4Q19	1Q20	2Q20	3Q20
AMT Domestic Towers	2.0%	1.8%	1.6%	1.5%	1.2%	1.2%	1.5%	1.4%	1.3%	1.3%	1.6%	1.6%	2.0%	1.9%	2.0%
SBAC Domestic Towers	3.4%	3.2%	3.0%	2.5%	1.5%	1.7%	2.0%	2.3%	2.4%	2.7%	2.7%	2.6%	2.5%	2.2%	2.2%
CCI Domestic Towers (excl. small cells/fiber)	2.0%	1.7%	1.4%	1.2%	1.4%	1.3%	1.4%	1.1%	2.2%	2.2%	2.2%	2.5%	2.6%	2.3%	2.3%

Net organic revenue growth (y/y)	1Q17	2Q17	3Q17	4Q17	1Q18	2Q18	3Q18	4Q18	1Q19	2Q19	3Q19	4Q19	1Q20	2Q20	3Q20
AMT Domestic Towers	6.5%	6.2%	6.3%	5.9%	6.3%	7.4%	7.4%	8.0%	8.2%	7.5%	7.1%	6.2%	5.6%	4.7%	4.2%
SBAC Domestic Towers	3.6%	3.8%	3.9%	4.1%	4.7%	4.7%	5.0%	5.1%	5.1%	5.6%	5.9%	5.6%	5.1%	4.5%	3.5%
CCI Domestic Towers (excl. small cells/fiber)*	3.6%	3.3%	2.9%	3.2%	6.3%	6.6%	7.3%	7.5%	5.3%	5.3%	5.1%	4.2%	3.7%	4.0%	4.2%
CCI: Towers + Small cells/Fiber	3.4%	4.5%	3.3%	3.1%	4.8%	5.3%	6.0%	6.2%	5.7%	5.7%	6.0%	5.2%	4.7%	4.6%	4.8%

* RBC Capital Markets estimates.

Notes:

(1) AMT rates adjust for straight-line revenue, pass-thru revenue, prepaid amortization revenue, other non-run rate revenue (incl. decommissioning revenue) and FX. A small amount of revenue from managed sites and rooftops remains in the run rate.

(2) Reported SBAC same-store growth rates adjust for straight-line revenue, pass-through expense, augmentation capex reimbursement, rooftop/managed business, and non-recurring items.

(3) RBC estimates for CCI. Figures for AMT and SBAC are as reported by management.

Source: Company reports and RBC Capital Markets estimates



Exhibit 44: Illustration of Sprint/T-Mobile Churn Impact

		AMT	CCI	SBAC
Offsets and New Projects				
Merged Sprint/T-Mobile remaining macrosites	95,000			
2022E shares outstanding (M)		448.4	435.9	112.2
2022E AFFO/share (existing model)		\$10.09	\$7.21	\$11.19
Number of 2.5GHz overlays				
	35,000	9,333	9,333	3,733
Incremental monthly amendment per site	\$650			
Tailwind (annualized rent \$M)		\$73	\$73	\$29
Tailwind (AFFO/share)		\$0.16	\$0.17	\$0.26
Number of Low-band overlays				
	20,000	5,333	5,333	2,133
Incremental monthly amendment per site	\$650			
Tailwind (annualized rent \$M)		\$41.6	\$41.6	\$16.6
Tailwind (AFFO/share)		\$0.09	\$0.10	\$0.15
DISH Buildout				
Number of colocations	30,000	8,000	8,000	3,200
Monthly colocation revenue per site	\$1,300			
Tailwind (annualized rent \$M)		\$125	\$125	\$50
Tailwind (AFFO/share)		\$0.28	\$0.29	\$0.44
Tailwind from Sprint/T-Mobile and DISH Buildout		\$0.53	\$0.55	\$0.85
Net % tailwind/(headwind) (AFFO/share) from Sprint/T-Mobile		5.3%	7.6%	7.6%
Total S/TMUS sites	110,000			
Number of decommissioned sites	25,000			
Number of new sites during integration	10,000			
Net number of sites that Sprint/T-Mobile terminate	15,000	4,000	4,000	1,600
Merged Sprint/T-Mobile remaining macrosites	95,000			
Number of colocatable structures, and AMT/CCI/SBAC share				
	150,000	27%	27%	11%
Monthly site revenue	\$3,300			
Calculated towerco churn (annualized rent \$M)		(\$158)	(\$158)	(\$63)
Headwind (AFFO/share)		(\$0.35)	(\$0.36)	(\$0.56)
% decommissioning headwind (2022E AFFO/share)		(3.5%)	(5.0%)	(5.0%)
Net Impact (AFFO/sh) of T-Mobile/Sprint Integration and Ensuing DISH Buildout		\$0.18	\$0.19	\$0.29
Net % Impact of T-Mobile/Sprint Integration and Ensuing DISH Buildout		1.8%	2.6%	2.6%

Note: AFFO estimates are as of 3Q20.

Source: Company reports and RBC Capital Markets estimates



Exhibit 45: Illustrative C-band Impact

		AMT	CCI	SBAC
Aggregate impact by Towerco				
Number of colocatable structures, and AMT/CCI/SBAC share	150,000	27%	27%	11%
2024E shares outstanding (M)		450.6	438.9	111.8
2024E AFFO/share (existing model)		\$11.79	\$8.08	\$13.13
Number of C-band overlays per operator	35,000	9,333	9,333	3,733
Incremental monthly amendment per site	\$650			
# of operators deploying C-band overlays	2			
Tailwind (annualized rent, \$M)				
2024 Total revenue		\$10,063	\$7,169	\$2,622
% tailwind to total revenue		1.4%	2.0%	2.2%
% Flow-through from to AFFO	100%			
Tailwind (AFFO, \$M)		\$146	\$146	\$58
Tailwind (AFFO/share)		\$0.32	\$0.33	\$0.52
% tailwind to AFFO/share		2.7%	4.1%	4.0%

Annual impact by Towerco	2021	2022	2023	2024
Assumptions				
Assumed % deployed	10%	30%	30%	30%
Total revenue (\$M)				
AMT	\$8,635	\$9,037	\$9,486	\$10,063
CCI	\$6,160	\$6,486	\$6,829	\$7,169
SBAC	\$2,199	\$2,345	\$2,486	\$2,622
Tailwind to revenue				
AMT	\$15	\$44	\$44	\$44
CCI	\$15	\$44	\$44	\$44
SBAC	\$6	\$17	\$17	\$17
% Tailwind to revenue				
AMT	0.2%	0.5%	0.5%	0.4%
CCI	0.2%	0.7%	0.6%	0.6%
SBAC	0.3%	0.7%	0.7%	0.7%

Base AFFO/share	2021	2022	2023	2024
AMT	\$9.30	\$10.09	\$10.86	\$11.79
CCI	\$6.71	\$7.21	\$7.66	\$8.08
SBAC	\$10.27	\$11.19	\$12.22	\$13.13

Tailwind to AFFO/share	2021	2022	2023	2024
AMT	\$0.03	\$0.10	\$0.10	\$0.10
CCI	\$0.03	\$0.10	\$0.10	\$0.10
SBAC	\$0.05	\$0.16	\$0.16	\$0.16

% Tailwind to AFFO				
AMT	0.3%	1.0%	0.9%	0.8%
CCI	0.5%	1.4%	1.3%	1.2%
SBAC	0.5%	1.4%	1.3%	1.2%

Note: AFFO estimates are as of 3Q20
Source: Company reports and RBC Capital Markets estimates



Exhibit 46: Tillman Towers – 2020 Activity

Tillman Infrastructure - Towers by State				Change relative to 01/01/2020		
As of 12/08/2020	# Constructed	# Granted	Total	Constructed	Granted	Total
AL	+67	+39	+106	+36	-7	+29
AR	+45	+18	+63	+24	+2	+26
AZ		+1	+1	-	+1	+1
CO	+4		+4	+4	-1	+3
FL		+2	+2	-	+2	+2
GA	+15	+10	+25	+6	-1	+5
IL	+9	+11	+20	+5	+3	+8
IN	+8	+13	+21	+2	+9	+11
KS	+15	+2	+17	+10	-5	+5
KY	+60	+22	+82	+6	+15	+21
LA	+57	+19	+76	+16	+1	+17
MD		+2	+2	-	+1	+1
ME	+1		+1	-	-	-
MI	+46	+19	+65	+12	+5	+17
MN	+1	+2	+3	+1	-	+1
MO	+34	+41	+75	+21	-5	+16
MS	+55	+21	+76	+16	+4	+20
MT	+1		+1	+1	-	+1
NC	+6	+10	+16	+4	-1	+3
NE	+1		+1	+1	-	+1
ND	+2	+1	+3	+2	+1	+3
NM	+1	+1	+2	-	-	-
NY	+3	+7	+10	+2	+6	+8
OH	+58	+30	+88	+11	-	+11
OK	+38	+37	+75	+16	-2	+14
PA	+7	+7	+14	+3	+1	+4
SC	+4	+12	+16	+3	+4	+7
SD	+1	+2	+3	+1	+2	+3
TN	+29	+20	+49	+11	+1	+12
TX	+251	+104	+355	+96	-55	+41
VA	+2	+5	+7	+1	+2	+3
WI	+7	+17	+24	+7	-3	+4
WV	+4	+2	+6	+3	-	+3
Grand Total	+832	+477	+1,309	+321	-20	+301

Source: RBC Capital Markets and company reports



Exhibit 47: Uniti Towers – 2020 Activity

Uniti- As of 12/08/2020				Change relative to 01/01/2020		
State	Granted	Constructed	Total	Granted	Constructed	Total
AL	+25	+40	+65	-	+10	+10
AR	+17	+43	+60	+10	+13	+23
CO		+1	+1	-	+1	+1
FL	+6	+2	+8	+1	+1	+2
GA	+6	+19	+25	+2	+1	+3
IA	+2	+2	+4	+1	+1	+2
ID		+1	+1	-	+1	+1
IL	+13	+32	+45	-	+3	+3
IN		+1	+1	-	-	-
KS	+3	+10	+13	-1	+4	+3
KY	+11	+27	+38	+8	+9	+17
LA	+4	+91	+95	-	+8	+8
MI		+1	+1	-	-	-
MN	+5	+8	+13	+1	+2	+3
MO	+12	+19	+31	+1	+1	+2
MS	+15	+31	+46	+14	+5	+19
NC		+1	+1	-1	-	-1
ND		+1	+1	-	+1	+1
NE		+7	+7	-	-	-
NJ		+1	+1	-	-	-
NM		+2	+2	-	-	-
NY		+1	+1	-	+1	+1
OH		+12	+12	-1	+1	-
OK	+8	+23	+31	+3	+7	+10
PA		+5	+5	-	+2	+2
SC		+5	+5	-	+1	+1
SD		+5	+5	-	+5	+5
TN	+1	+13	+14	-1	+3	+2
TX	+15	+92	+107	-6	+12	+6
UT		+2	+2	-1	+1	-
VA		+1	+1	-	+1	+1
WI	+3	+18	+21	-5	+8	+3
Grand Total	+146	+517	+663	+25	+103	+128

Source: RBC Capital Markets and company reports

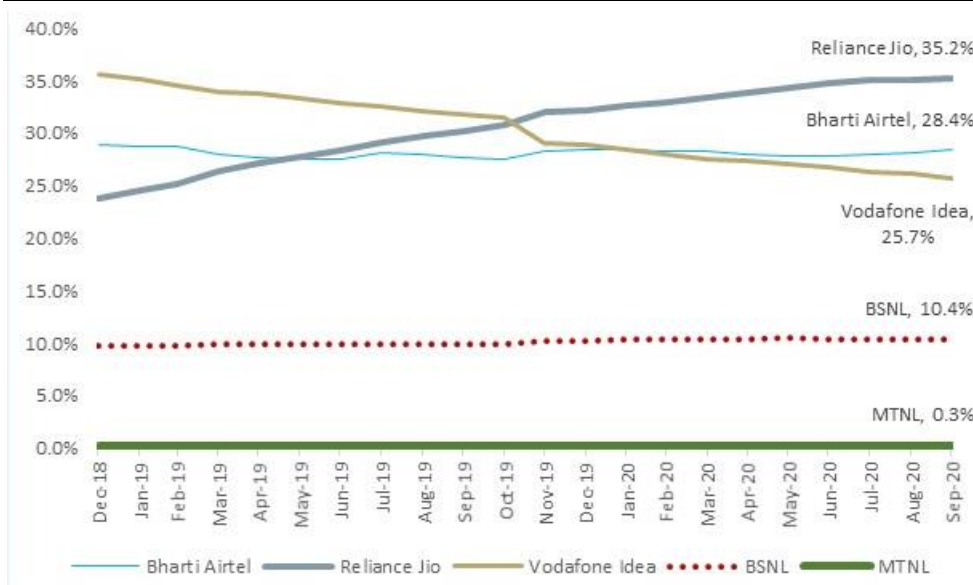


Exhibit 48: India Wireless Carriers

Names of Major Facilities-Based Carriers	Coverage	Owner	Total Wireless Subscribers (in MM)	Market Share	F2Q21 ARPU (\$)	Cell Sites	BTS Count	Frequencies	FY20 Total Capex (US\$, MM)	F1H21 Annualized (US\$, MM)	Note
Vodafone Idea	National	Aditya Birla Group	295.5	25.7%	\$1.61	~177k	~249k	900 MHz, 1800 MHz, 2100 MHz, 2300 MHz, 2500 MHz	\$1,279	\$502	Vodafone/Idea Cellular merged in August 2018
Bharti Airtel	National	Bharti (36%)/ SingTel (36%)	326.6	28.4%	\$2.18	~197k	~500k	900 MHz, 1800 MHz, 2100 MHz, 2300 MHz	\$3,353	\$2,908	Bharti Airtel acquired Telenor effective May 2018. Acquired Tata Teleservices in July 2019.
Reliance Jio	National	Reliance Industries	404.1	35.2%	\$1.96	~292k	~842k	850 MHz, 1800 MHz, 2300 MHz			Launched in Sept 2016.
BSNL	National	Gvt - Public sector undertaking (PSU)	118.9	10.4%							
MTNL	Regional	Gvt (PSU) 57%/ Publicly traded 43%	3.3	0.3%		~10k					Oct '19 - the gvt announced that MTNL will merge with BSNL; operating as a subsidiary of BSNL until the transaction is effected.

Note: Subscriber data as of Sep-20.
Source: TRAI and RBC industry contacts, Company reports

Exhibit 49: India Carriers Market Share Trends



Source: TRAI, RBC Capital Markets and company sources



Exhibit 50: India Tower Build Activity

	Dec-16	Mar-17	Jun-17	Sep-17	Dec-17	Mar-18	Jun-18	Sep-18	Dec-18	Mar-19	Jun-19	Sep-19	Dec-19	Mar-20	Jun-20	Sep-20
Bharti Infratel (Standalone)																
Total towers	38,997	39,099	39,211	39,264	39,363	39,523	39,719	39,946	40,192	40,388	40,636	41,050	41,471	42,053	42,339	43,110
New towers built in the quarter	165	102	112	53	99	160	196	227	246	196	248	414	421	582	286	771
Indus Towers																
Total towers	122,044	122,730	122,920	123,073	122,962	123,639	123,904	124,230	124,069	123,546	123,799	124,692	125,649	126,949	127,291	128,984
New towers built in the quarter	714	686	190	153	(111)	677	265	326	-161	-523	253	893	957	1,300	342	1,693
American Tower India																
Total towers	57,739	57,687	57,665	57,772	57,789	57,681	67,071	75,500	75,355	74,804	74,388	74,046	73,984	73,633	73,578	73,617
Acquisitions	-	-	-	-	-	10,238	9,031	-	-	-	-	-	-	-	-	-
Sales/Adjustments	(468)	(323)	(158)	(257)	(310)	(981)	(782)	(596)	(1,217)	(951)	(1,105)	(1,069)	(1,317)	(684)	(156)	(1,097)
New towers built in the quarter	416	301	265	274	202	133	180	451	666	535	763	1,007	966	629	195	979
Ending Balance	57,687	57,665	57,772	57,789	57,681	67,071	75,500	75,355	74,804	74,388	74,046	73,984	73,633	73,578	73,617	73,499

Note: AMT figures exclude the acquisitions of Viom (C2Q16), and VOD (C1Q18) and Idea (C2Q18) portfolios.
Source: Bharti Infratel, American Tower, RBC Capital Markets

Exhibit 51: India Towers - Organic Growth Rates

	1Q17A	2Q17A	3Q17A	4Q17A	1Q18A	2Q18A	3Q18A	4Q18A	1Q19A	2Q19A	3Q19A	4Q19A	1Q20A	2Q20A	3Q20A
American Tower															
Gross organic tenant billings	41.2%	14.6%	12.3%	11.0%	8.9%	8.2%	8.8%	10.6%	12.1%	11.9%	12.1%	14.9%	15.0%	14.6%	12.9%
Churn	12.7%	4.5%	3.8%	8.4%	13.6%	18.4%	20.8%	36.0%	40.7%	35.7%	32.2%	23.2%	15.6%	14.2%	13.4%
Net organic tenant billings	28.5%	10.1%	8.4%	2.6%	(4.7%)	(10.2%)	(12.0%)	(25.5%)	(28.5%)	(23.8%)	(20.1%)	(8.4%)	(0.7%)	0.4%	(0.5%)

Note: 1Q17 organic growth rate is impacted by the absence of Viom in the prior year run rate.
Source: Company sources, RBC Capital Markets

Exhibit 52: Bharti Infratel Standalone and Indus Towers

	Dec-18	Dec-19	Mar-19	Jun-19	Sep-19	Dec-19	Mar-20	Jun-20	Sep-20
Bharti Infratel Standalone									
Total towers	40,192	41,471	40,388	40,636	41,050	41,471	42,053	42,339	43,110
Sharing factor - period end	1.93x	1.84x	1.89x	1.87x	1.86x	1.84x	1.80x	1.78x	1.78x
Sharing revenue/tower per month	INR 83,040	INR 84,593	INR 82,460	INR 85,917	INR 87,669	INR 84,593	INR 84,878	INR 82,899	INR 85,767
Indus Towers - Tower									
Total towers	124,069	125,649	123,546	123,799	124,692	125,649	126,949	127,291	128,984
Sharing factor - period end	1.86x	1.85x	1.86x	1.87x	1.86x	1.85x	1.85x	1.85x	1.84x
Sharing revenue/tower per month	INR 70,237	INR 78,357	INR 71,283	INR 78,061	INR 74,373	INR 78,357	INR 74,640	INR 74,520	INR 75,638

Source: Bharti Infratel, American Tower

Exhibit 53: Bharti Infratel Consolidated

	CY2018	CY2019	C1Q19	C2Q19	C3Q19	C4Q19	C1Q20	C2Q20	C3Q20
Bharti Infratel Consolidated									
(Amount in INR, mns)									
Rent	86,009	88,910	21,086	22,606	22,385	22,833	22,513	22,430	23,199
Y-o-Y	(4.1%)	3.4%	(3.5%)	2.8%	5.6%	8.9%	6.8%	(0.8%)	3.6%
Total Revenue ¹	146,442	146,231	36,003	37,119	36,376	36,733	36,244	35,047	36,952
Y-o-Y	2.1%	(0.1%)	(1.7%)	1.0%	(0.8%)	0.9%	0.7%	(5.6%)	1.6%

Source: Bharti Infratel, RBC Capital Markets

Exhibit 54: Brazil Wireless Carriers

Names of Major Facilities-Based Carriers	Coverage	Owner	Nationality	Total Wireless		2019 Cell Sites	3Q20 Cell Sites	Site additions (19/18)	Site additions 2020 YTD	2019	2020E
				Subscribers (in MM)	Market Share					Wireless Capex (in R\$ MM)	Wireless Capex (in R\$ MM)
Vivo	National	Telefonica	Foreign	76.7	33.8%	25,687	26,006	1,645	319	5,727	4,627
Claro/Nextel	National	America Movil	Foreign	60.0	26.5%	27,792	32,348	417	4,556	3,526	2,276
TIM	National	Telecom Italia	Foreign	51.2	22.6%	24,513	25,146	1,705	633	3,776	3,295
Oi SA	National	Telemar, Participacoes, Portugal Telecom	Domestic	36.5	16.1%	18,544	18,875	314	331	7,637	6,873
Algar Telecom	Regional	Independent operator	Domestic	2.4	1.0%	710	728	(3)	18	-	-

Note: Subscriber and cell site data as of 3Q20.
Source: Anatel, RBC Capital Markets and company reports

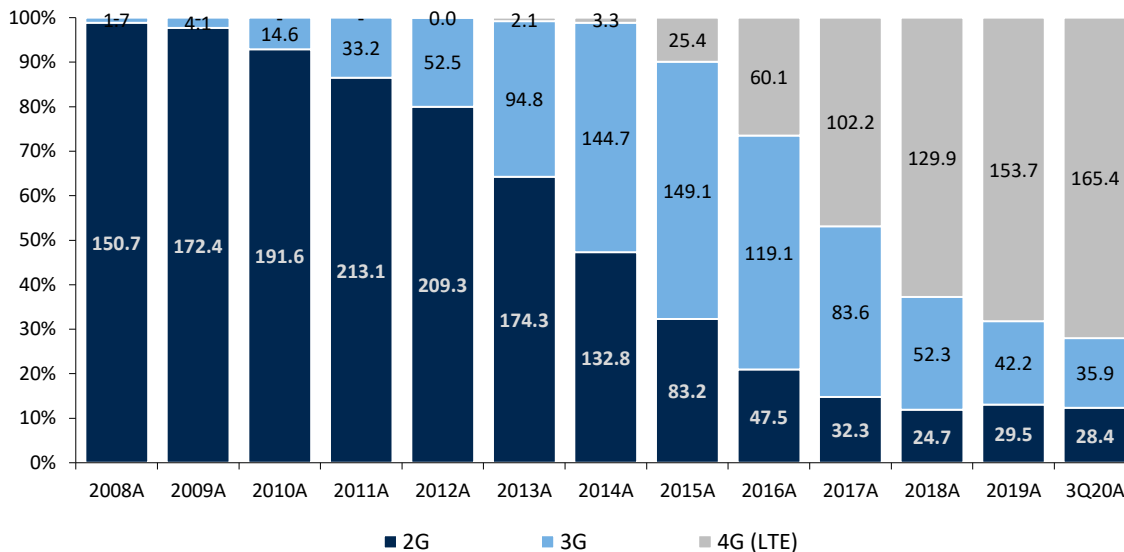


Exhibit 55: Brazil – Cell Sites by Operator

Cell Sites							Net Cell Site Adds by Operator					
	2015	2016	2017	2018	2019	3Q20		2016	2017	2018	2019	2020 YTD
Vivo	19,520	20,662	22,471	24,042	25,687	26,006	Vivo	1,142	1,809	1,571	1,645	319
TIM	17,667	20,092	21,514	22,808	24,513	25,146	TIM	2,425	1,422	1,294	1,705	633
Claro	15,666	16,228	18,722	20,269	20,550	20,591	Claro	562	2,494	1,547	281	41
Oi	16,592	17,562	18,148	18,230	18,544	18,875	Oi	970	586	82	314	331
Nextel	6,152	7,475	7,071	7,106	7,242	11,757	Nextel	1,323	(404)	35	136	4,515
Algar	618	679	701	713	710	728	Algar	61	22	12	(3)	18
Sercomtel	49	49	54	50	50	50	Sercomtel	-	5	(4)	-	-
Total	76,264	82,747	88,681	93,218	97,296	103,153	Total	6,483	5,934	4,537	4,078	5,857

Source: teleco.co.br, Anatel, RBC Capital Markets

Exhibit 56: Brazil Subscribers by Technology



Source: Anatel, RBC Capital Markets and company reports

Exhibit 57: Brazil Towers - Organic Growth Rates

	1Q17A	2Q17A	3Q17A	4Q17A	1Q18A	2Q18A	3Q18A	4Q18A	1Q19A	2Q19A	3Q19A	4Q19A	1Q20A	2Q20A	3Q20A
SBA Communications															
Gross organic growth, constant currency	10.7%	10.8%	11.5%	12.0%	10.1%	10.6%	12.9%	12.7%	12.2%	13.6%	12.7%	11.6%	10.8%	10.4%	9.0%
American Tower															
Gross organic tenant billings					~11%	~12%	~13%	~14%	~11%	~11%	~11%	~11%	~10%	~10%	~9%
Churn					1.2%	1.5%	1.5%	3.5%	4.0%	4.0%	4.4%	2.5%	~2%	~2%	~2%
Net organic tenant billings					~10%	~10%	~11%	~10%	~7%	~7%	~6%	~9%	~8%	~8%	~7%

Source: RBC Capital Markets and company sources



Exhibit 58: Mexico Wireless Carriers

Wireless Operator	Parent	% subscriber share	% wireless industry revenue share	Monthly ARPU (MXP)	% ownership of available spectrum
Telcel	America Movil	62.6%	65.3%	152	43.1%
Movistar	Telefonica	20.6%	9.0%	78	8.3%
AT&T Mexico	AT&T	14.8%	17.9%	145	35.2%
Altan		-	0.1%	-	13.4%
MVNOs		2.0%	7.7%	-	-

Subscriber data as of 3Q20.

Source: RBC Capital Markets and company sources

Exhibit 59: Telesites Portfolio

	4Q16	4Q17	1Q18	2Q18	3Q18	4Q18	1Q19	2Q19	3Q19	4Q19	1Q20	2Q20	3Q20
# of revenue-generating towers													
Mexico	14,306	15,066	15,109	15,402	15,559	15,763	15,953	16,308	16,635	16,961	17,297	17,567	17,660
Costa Rica	213	268	277	288	290	290	295	298	298	299	302	301	304
Total	14,519	15,334	15,386	15,690	15,849	16,053	16,248	16,606	16,933	17,260	17,599	17,868	17,964
Consolidated tenancy ratio	1.046	1.126	1.132	1.136	1.141	1.142	1.144	1.150	1.144	1.150	1.157	1.165	1.179
Monthly rent/tower (normalized)	MXN 19,180	MXN 19,965	MXN 21,149	MXN 21,197	MXN 21,638	MXN 21,014	MXN 22,151	MXN 22,145	MXN 22,242	MXN 22,038	MXN 22,653	MXN 22,540	MXN 22,539

Source: Telesites, RBC Capital Markets

Exhibit 60: Telesites Financial Trends (MXN, mns)

	4Q16	4Q17	1Q18	2Q18	3Q18	4Q18	1Q19	2Q19	3Q19	4Q19	1Q20	2Q20	3Q20
Tower rent revenue	878.1	1,008.0	1,100.2	1,120.5	1,165.5	1,147.7	1,226.8	1,251.5	1,285.5	1,298.6	1,366.6	1,393.2	1,419.7
y/y growth		14.8%	20.4%	20.7%	21.2%	13.9%	11.5%	11.7%	10.3%	13.1%	11.4%	11.3%	10.4%
Total revenue	1,327.0	1,467.8	1,587.8	1,624.8	1,681.7	1,709.6	1,770.3	1,802.8	1,849.9	1,873.7	1,990.1	2,001.0	2,036.7
y/y growth		10.6%	15.7%	16.9%	17.1%	16.5%	11.5%	11.0%	10.0%	9.6%	12.4%	11.0%	10.1%
EBITDA	787.7	911.0	999.8	1,021.9	1,075.6	1,085.1	1,196.9	1,257.9	1,753.2	1,783.5	1,887.2	1,904.8	1,942.3
y/y growth		15.7%	20.3%	22.9%	23.3%	19.1%	19.7%	23.1%	63.0%	64.4%	57.7%	51.4%	10.8%
EBITDA margin	59.4%	62.1%	63.0%	62.9%	64.0%	63.5%	67.6%	69.8%	94.8%	95.2%	94.8%	95.2%	95.4%

Source: Telesites, RBC Capital Markets

Exhibit 61: American Tower – Mexico Activity

American Tower - Mexico	Dec-16	Dec-17	Mar-18	Jun-18	Sep-18	Dec-18	Mar-19	Jun-19	Sep-19	Dec-19	Mar-20	Jun-20	Sep-20
Total towers	8,870	8,953	9,061	9,131	9,184	9,205	9,233	9,241	9,460	9,531	9,614	9,720	9,587
Acquisitions		142											
New towers built / Dispositions	(55)	(34)	70	53	21	28	8	219	71	83	106	(133)	50
Ending Balance	8,815	9,061	9,131	9,184	9,205	9,233	9,241	9,460	9,531	9,614	9,720	9,587	9,637

Source: American Tower, RBC Capital Markets

Exhibit 62: American Tower – Mexico Organic Growth Rates

American Tower	4Q16A	4Q17A	1Q18A	2Q18A	3Q18A	4Q18A	1Q19A	2Q19A	3Q19A	4Q19A	1Q20A	2Q20A	3Q20A
Gross organic tenant billings	-	-	-	-	-	~12%	~11%	~10%	~13%	~12%	~10%	~9%	~9%
Churn	-	-	-	-	-	2%	2%	3%	3%	3%	2%	2%	1%
Net organic tenant billings	12%	~15%	~17%	~18%	~12%	~10%	~9%	~7%	~9%	~10%	~8%	~7%	~8%

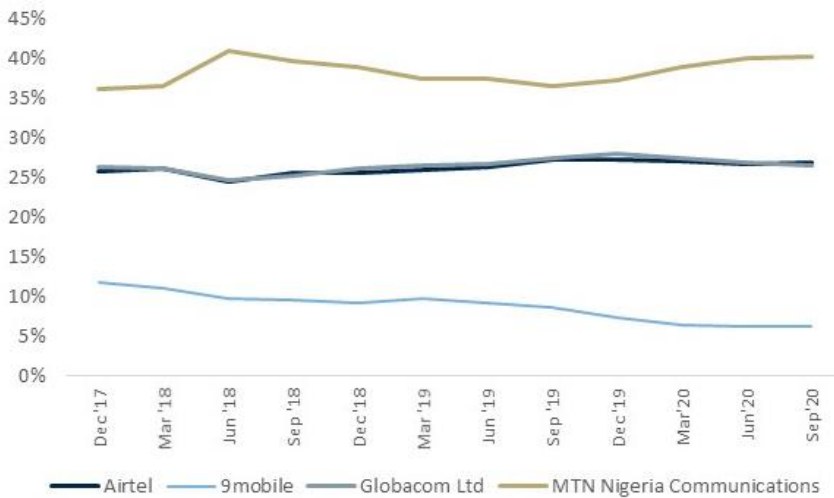
Source: American Tower, RBC Capital Markets

Exhibit 63: Nigeria Wireless Carriers

Names of Major Facilities-Based Carriers	Coverage	Owner	Nationality	Status	Total Wireless Subscribers (M)	C3Q20 Monthly ARPU (US\$)**	Market Share*	2019 Capex (US\$, M)	2020 Capex Estimate (US\$, M)
MTN Nigeria Communications	National	MTN Group	Foreign	Public	82.6	\$3.71	40%	\$545.4	\$680
Globacom Ltd	National	Conpetro	Domestic	Private	54.3	\$0.77	26%	\$94.5	-
Airtel Nigeria	National	Bharti Airtel	Foreign	Public	55.3	\$2.80	27%	\$205.2	\$323
9mobile	National	Teleology Nigeria Ltd (consortium)	Domestic	Private	12.7	\$2.05	6%	\$10.8	-

*Globacom and 9mobile ARPU reflect RBC estimates for 2019. ** Subscriber data as of 3Q20.
Source: NCC, RBC Capital Markets and company reports

Exhibit 64: Nigeria Carriers Market Share Trends



Source: NCC, RBC Capital Markets and company sources



Exhibit 65: Tower M&A Tables

Asia M&A

Announced Date	Seller	Buyer	Country	Transaction Value (in USD mm)	Tower Sites	Per Tower Valuation (in USD 000s)	TCF Multiple
Jan-20	XL Axiata	Centratama	Indonesia	\$125	1,054	\$118.9	NA
Jan-20	XL Axiata	Protelindo	Indonesia	\$164	1,728	\$94.9	NA
Dec-19	Reliance Jio Infratel	Consortium - incl. Brookfield	India	\$3,700	130,000	\$28.5	NA
Oct-19	Indosat Ooredoo	Mitratel, Protelindo	Indonesia	\$451	3,100	\$145.5	NA
Jan-19	Mekong Tower Company Ltd. (MTCL)	edotco	Laos	\$1	NA	NA	NA
2018	PAMEL	TPG	Myanmar	NA	NA	NA	NA
2018	SMI (MIG)	KPR Towers	Myanmar	\$11	100	\$108.0	NA
2018	Komet Infra Nusantara (KIN)	Sarana Menara Nusantara (SMN)	Indonesia	NA	NA	NA	NA
Dec-18	South East Asia Telecom (Cambodia) Co Ltd.	edotco	Cambodia	NA	325	NA	NA
Sep-18	Pan Asia Majestic Eagle	TPG	Myanmar	NA	1,200	\$0.0	NA
Apr-18	Indus Tower	Bharti Infratel	India	\$10,800	122,962	\$87.8	NA
Mar-18	Providence Equity Partners (KIN stake)	Protelindo	Indonesia	\$102	1,400	\$72.7	NA
2017	PT Sampoerna Telekomunikasi Indonesia (STI)	PT Inti Bangun Sejahtera (IBS)	Indonesia	\$31	371	\$83.6	NA
2017	Pakistan Mobile Communications Ltd (Jazz)	edotco & Dawood Hercules	Pakistan	\$940	13,000	\$72.3	NA
2017	Bharti Airtel (Nettle Infrastructure)	Secondary sale of Bharti Infratel	India	\$402	39,211	\$280.9	NA
2017	Towershare (Tazanite Tower)	edotco	Pakistan	\$89	700	\$127.0	NA
2017	edotco	Kumpulan Wang Persaraan	Malaysia	\$100	NA	NA	NA
Dec-17	Reliance Communications (RCom)	Reliance Jio	India	\$3,750	43,000	NA	NA
Nov-17	Vodafone (India)	American Tower	India	\$593	10,200	\$58.1	NA
Nov-17	Idea Cellular	American Tower	India	\$593	9,900	\$59.9	NA
Apr-17	Ascend Telecom Infrastructure	IDFC Alternatives	India	\$91	5,222	\$52.9	NA
Mar-17	Bharti Airtel (11.3% stake in Infratel)	Nettle Infrastructure (Bharti)	India	\$1,062	90,255	\$103.9	NA
Mar-17	Bharti Airtel (10.3% stake in Infratel)	KKR/CPPIB consortium	India	\$952	90,255	\$102.4	NA
Feb-17	Southern Cross Austereo	Axicom (former Crown Castle	Australia	\$10	56	\$169.6	NA
2016	edotco	Innovation Network Corporation	Malaysia	\$400	NA	NA	NA
2016	edotco	Khazanah Nasional Berhad	Malaysia	\$200	NA	NA	NA
2016	SMI (MIG)	Shining Star	Myanmar	\$13	100	\$127.1	NA
2016	VNI (SEATH)	OCC Group	Vietnam	\$50	1,972	\$25.4	NA
2016	XL Axiata	Protelindo	Indonesia	\$250	2,500	\$100.0	NA
2016	Crown Castle	MIRA-consortium	Australia	\$1,600	1,772	\$902.9	NA
Dec-16	Reliance	Brookfield	India	\$1,700	43,379	\$76.8	NA
2015	KEC International	American Tower	India	\$13	381	\$34.1	NA
2015	Digicel MTC	edotco	Myanmar	\$221	1,250	\$235.7	NA
Dec-15	Reliance Communications	Tillman Global Holdings and TPG	India	\$3,359	45,000	NA	NA
Oct-15	Viom Network	American Tower (51% stake)	India	\$1,925	42,200	\$89.4	9.9x / 11.5x
Oct-14	PT Telkom	Tower Bersama	Indonesia	\$904	4,000	\$226.0	NA
Oct-14	XL Axiata	PT Solusi Tunas Pratama	Indonesia	\$460	3,500	\$131.4	NA
Jun-14	KJS	YTL Power International	Malaysia	\$15	309	\$48.5	NA
2013	Hutchison	STP	Indonesia	\$68	300	\$300.2	NA
2012	Hutchison	Protelindo	Indonesia	NA	503	NA	NA
2012	PT Central Investindo	Protelindo	Indonesia	NA	152	NA	NA
2012	Indosat	Tower Bersama	Indonesia	\$519	2,500	\$207.6	NA
-	Indian Telecom Infrastructure Ltd	Ascend Telecom Infrastructure	India	NA	NA	NA	NA
2012	Reliance Infratel	Blackstone and Carlyle	India	\$3,500	50,000	\$70.0	NA
2011	Infratel	Tower Bersama	Indonesia	NA	595	NA	NA
2010	Essar Telecom Infrastructure	American Tower	India	\$432	4,450	\$97.1	NA
2010	Viom Network	Macquarie / SBI (11%)	India	\$304	37,500	\$81.1	NA
2010	Chennai Network Infrastructure Ltd	GTL Infrastructure Ltd	India	NA	NA	NA	NA
2010	Aircel Ltd	GTL Infrastructure Ltd	India	\$1,800	17,500	\$102.9	NA
2010	Hutchison	Protelindo	Indonesia	\$166	1,482	\$186.6	NA
2009	Idea Cellular	Idea Cellular Infrastructure Ltd	India	NA	NA	NA	NA
2009	Transcend Infrastructure	American Tower	India	\$23	327	\$70.3	NA
2009	XCEL Telecom Private Ltd	American Tower	India	\$170	1,730	\$98.3	NA
2009	Reliance Communication	Reliance Infratel	India	NA	NA	NA	NA
2009	Viom Network	QTL	India	\$2,407	18,000	\$133.7	NA
2008	Bakrie	STP	Indonesia	\$34	543	\$62.6	NA
2008	Hutchison	Protelindo	Indonesia	\$500	3,692	\$135.4	NA
2008	Tata Teleservices	21st Century Infratel Ltd	India	NA	NA	NA	NA
2008	Swan Telecom	BSNL	India	NA	NA	NA	NA
2007	Idea Cellular Ltd	Vodafone Essar Tower Ltd	India	NA	NA	NA	NA

Source: Company data, RBC Capital Markets, TowerXchange



Exhibit 66: Tower M&A Tables

EMEA M&A

Announced Date	Seller	Buyer	Country	Region	Transaction Value (in USD mm)		Per Tower Valuation (in USD 000s)	
					Tower Sites	TCF Multiple		
Oct-20	Iliad	Cellnex	Poland	Europe	\$944	7,000	\$134.9	NA
Oct-20	Axion (AMP Capital)	Asterion Industrial Partners	Spain	Europe	NA	\$635	NA	NA
Aug-20	Free Senegal	Helios Tower Plc	Senegal	Africa	\$189	1,220	\$154.9	NA
May-20	Eir	Phoenix Tower Intl (PTI)	Ireland	Europe	\$330	650	\$507.7	NA
Apr-20	NOS TOWERING	Cellnex	Portugal	Europe	\$409	2,000	\$204.4	NA
Mar-20	Bouygues Telecom	Phoenix Tower Intl (PTI)	France	Europe	NA	4,000	NA	NA
Jun-20	Telefonica Deutschland Holding AG	Telxius	Germany	Europe	\$1,698	10,080	\$168.5	NA
Jan-20	OMTEL	Cellnex	Portugal	Europe	\$894	3,000	\$298.0	NA
Dec-19	3i Infrastructure (93% stake in Wireless Infrastructure Group)	Brookfield Infrastructure	UK	Europe	\$317	2,000	\$158.7	NA
Dec-19	3i Infrastructure (93% interest in Wireless Infrastructure Gp)	Brookfield Infrastructure Partners	UK	Europe	\$0	0	\$0.0	0.0x
Oct-19	Atlas Tower	SBA Communications	South Africa	Africa	\$140	889	\$157.5	NA
Oct-19	Arqiva Group	Cellnex	UK	Europe	\$2,444	7,400	\$330.2	NA
Sep-19	Cignal	Cellnex	Ireland	Europe	\$232	546	\$424.7	NA
May-19	Iliad (Free)	Cellnex	France	Europe	\$2,208	5,700	\$387.4	NA
May-19	Iliad	Cellnex	Italy	Europe	\$663	2,200	\$301.1	NA
May-19	Salt	Cellnex	Switzerland	Europe	\$859	2,800	\$306.7	NA
May-19	Eaton Towers	American Tower	Burkina Faso, Ghana, Kenya,	Africa	\$1,850	5,510	\$335.8	11.2x
Jul-18	EI Towers S.p.A	2i Towers (60% F2i/40%)	Italy	Europe	\$1,475	3,300	\$446.9	NA
2Q18	Private	EI Towers	Italy	Europe	\$5	17	\$302.2	NA
Jun-18	SFR TowerCo (Altice Europe NV)	KKR	France	Europe	\$2,100	10,198	\$411.8	NA
Jun-18	Towers of Portugal (Altice Europe NV)	Morgan Stanley Infrastructure	Portugal	Europe	\$571	2,961	\$257.0	NA
Apr-18	Telkom Kenya	American Tower	Kenya	Africa	\$172	723	\$244.2	NA
Apr-18	Digita Oy (First State Investments)	Digital Colony	Finland	Europe	NA	556	NA	NA
1Q18	FWA operator	Cellnex	Italy	Europe	\$4	219	\$16.9	NA
1Q18	Private	EI Towers	Italy	Europe	\$17	94	\$186.1	NA
1Q18	Masmovil	Cellnex	Spain	Europe	\$4	85	\$43.5	NA
Feb-18	Bouygues	Cellnex	France	Europe	\$348	1,000	\$348.0	NA
Feb-18	Sanef	Cellnex	France	Europe	NA	300	NA	NA
4Q17	Freenet	Unknown	Germany	Europe	NA	450	NA	NA
4Q17	Private	EI Towers	Italy	Europe	\$20	43	\$466.9	NA
Dec-17	Barings LLC	3i Infrastructure	UK	Europe	\$589	750	\$785.5	NA
Dec-17	TMO NL	DT	Netherlands	Europe	\$577	1,750	\$329.8	NA
Dec-17	Masmovil	Cellnex	Spain	Europe	\$43	551	\$78.8	NA
Oct-17	Vodacom	HTA	Tanzania	Africa	\$59	1,149	\$207.8	NA
3Q17	Private	EI Towers	Italy	Europe	\$6	17	\$354.4	NA
Sep-17	Alitcum	Cellnex	Netherlands	Europe	\$158	30	\$5,274.8	NA
Jul-17	Private	Cellnex	Netherlands	Europe	\$14	32	\$440.8	NA
Jul-17	Bouygues	Cellnex	France	Europe	\$200	600	\$333.0	NA
Jun-17	Wind	Cellnex	Italy	Europe	\$86	7,500	\$115.1	NA
2Q17	Private	EI Towers	Italy	Europe	\$7	47	\$157.8	NA
May-17	Sunrise	Cellnex, Swiss Life, DTCF	Switzerland	Europe	\$470	2,239	\$210.1	NA
Feb-17	Bouygues	Cellnex	France	Europe	\$588	1,800	\$326.7	NA
Feb-17	Bouygues	Cellnex	France	Europe	\$416	1,200	\$346.9	NA
2016	ITAS TIM	TDF	France	Europe	NA	420	NA	NA
2016	Zantel	HTA	Tanzania	Africa	\$7	185	\$36.2	NA
2016	Shere Group	Cellnex	UK & Netherlands	Europe	\$462	1,004	\$460.3	NA
2016	Bouygues	Cellnex	France	Europe	\$94	230	\$409.1	NA
2016	Bouygues	Cellnex	France	Europe	\$79	270	\$291.8	NA
2016	Protelindo	Cellnex	Netherlands	Europe	\$128	261	\$491.1	NA
2016	Telefonica	Telxius	Germany	Europe	\$690	2,350	\$293.8	NA
2016	Telefonica	Telxius	Spain	Europe	NA	11,000	NA	NA
2016	Private	EI Towers	Italy	Europe	\$53	248	\$214.4	NA
2016	TEF	Telxius	Spain	Europe	\$1,277	10,741	\$118.9	NA
Dec-16	Antin Infrastructure Partners (FPS)	American Tower	France	Europe	\$726	2,482	\$292.5	14.5x
Sep-16	Arcus	Cellnex	UK	Europe	\$135	540	\$249.9	NA
Sep-16	Arcus	Cellnex	Netherlands	Europe	\$307	464	\$661.6	NA
Sep-16	Expresso Telecom	AI Karama Towers	Senegal	Africa	NA	450	NA	NA
Aug-16	Antin	AMP	France	Europe	\$178	584	\$305.5	NA
Jun-16	Not disclosed	Cellnex	Italy	Europe	\$19	NA	NA	NM
Jun-16	Gilles Bastard	TDF	France	Europe	NA	400	NA	NA
Jun-16	Eaton	American Tower	South Africa	Africa	NA	300	NA	18.0x
May-16	Airtel	HTA	DRC	Africa	\$165	967	\$170.6	NA
Apr-16	TEF DE	Telxius	Germany	Europe	\$668	2,359	\$283.3	NA
2Q16	WDR	American Tower	Germany	Europe	\$47	186	\$253.0	NA
Mar-16	Airtel	American Tower	Tanzania	Africa	\$179	1,350	\$132.6	NA
Mar-16	TPG	Freenet	Germany	Europe	\$321	450	\$712.5	NA
Jan-16	Lombardy	Inwit	Italy	Europe	\$9	76	\$114.6	NA

Source: Company data, RBC Capital Markets, TowerXchange



Exhibit 67: Tower M&A Tables

LATIN AMERICA/CARIBBEAN TOWER M&A

Announced Date	Seller	Buyer	Country	Region	Transaction Value (in USD mm)	Tower Sites	Per Tower Valuation (in USD 000s)	TCF Multiple
Nov-20	Oi	Highline do Brasil (Digital Colony)	Brazil	Latin America	\$200	637	NA	NA
Nov-20	Phoenix Tower do Brasil (Blackstone)	Highline do Brasil (Digital Colony)	Brazil	Latin America	NA	2,500	NA	NA
Jul-20	Tower One Wireless	Not specified	Mexico	Latin America	\$3	28	\$100.0	NA
Jun-20	Telefonica	Telxius	Germany	Europe, Latin America	\$1,793	10,100	\$177.5	0.0x
Jan-20	Grupo Torresur	SBA Communications	Brazil	Latin America	\$460	1,300	\$353.8	14.8x
Jan-20	Entel	American Tower	Chile, Peru	Latin America	\$772	3,200	\$241.3	NA
Dec-19	Telefonica	Phoenix Tower Intl (PTI)	Colombia	Latin America	\$97	621	\$156.2	NA
Dec-19	Telefonica	Phoenix Tower Intl (PTI)	Ecuador	Latin America	\$225	1,408	\$160.0	NA
Nov-19	Telefonica Brasil (Vivo)	Telxius	Brazil	Latin America	\$154	1,909	\$80.6	NA
Feb-19	Uniti	Phoenix Tower Intl (PTI)	Mexico, Colombia, Nicaragua	Latin America	\$100	500	\$200.0	NA
Feb-19	Trilogy International Partners (NuevaTel)	Phoenix Tower Intl (PTI)	Bolivia	Latin America	\$100	600	\$166.7	NA
Feb-19	Uniti	Phoenix Tower Intl (PTI)	Mexico, Colombia, Nicaragua	Latin America	\$100	500	\$200.0	NA
2018	Not disclosed	Phoenix Tower Intl (PTI)	Guatemala	Latin America	NA	20	NA	NA
Oct-18	Teletorres del Caribe (Altice)	Phoenix Tower Intl (PTI)	Dominican Republic	Caribbean	\$170	1,039	\$163.6	NA
Oct-18	Digicel	Phoenix Tower Intl (PTI)	Jamaica	Caribbean	\$90	451	\$199.6	NA
Jul-18	Telefonica (Telxius)	Pontegadea	Spain, Germany, Peru,	Europe, Latin America	\$442	16,400	\$272.0	NA
Apr-18	Maxcom	MXT Capital Partners	Mexico	Latin America	\$10	72	\$143.1	NA
Feb-18	Digicel	Phoenix Tower International	French Antilles	Caribbean	NA	215	NA	NA
Feb-18	Millicom (Tigo El Salvador)	SBA Communications	El Salvador	Latin America	\$145	800	\$181.3	NA
Feb-18	Digicel	Phoenix Tower Intl (PTI)	French West Indies	Caribbean	NA	215	NA	NA
2017	Torres Andinas	SBA Communications	Colombia/Peru	Latin America	NA	350	NA	NA
2017	CTR	SBA Communications	Chile	Latin America	NA	172	NA	NA
2017	Not disclosed	Torrecom	Panama	Latin America	NA	25	NA	NA
Dec-17	Torres Unidas (Berkshire Partners)	Andean Tower Partners	Peru, Chile, Colombia	Latin America	NA	1,644	NA	NA
Oct-17	Highline do Brasil	SBA Communications	Brazil	Latin America	NA	900	NA	17.0x
Oct-17	KIO Networks	American Tower	Mexico	Latin America	\$500	NA	NA	NA
3Q17	Alta	American Tower	Brazil	Latin America	\$56	142	\$394.4	NA
3Q17	NA	SBA Communications	Argentina	Latin America	NA	35	NA	NA
Jul-17	NA	Phoenix Tower	Colombia/Peru	Latin America	NA	150	NA	NA
2Q17	NA	SBA Communications	Peru	Latin America	NA	143	NA	NA
Jul-17	Millicom/Colombia Movil (Tigo)	American Tower	Colombia	Latin America	\$147	1,200	\$122.5	NA
Jul-17	Axtel	American Tower	Mexico	Latin America	\$56	142	\$394.4	NA
Jul-17	TIM (Telecom Italia) Brasil	American Tower	Brazil	Latin America	\$6	54	\$112.0	NA
Apr-17	Millicom	American Tower	Paraguay	Latin America	\$125	1,400	\$89.3	NA
Apr-17	Digicel	Phoenix Tower	El Salvador	Latin America	NA	202	NA	NA
Nov-16	Comunicaciones y Consumos, SA (CyCSA)	American Tower	Argentina	Latin America	NA	1,000	NA	NA
Nov-16	Network Management Holdings (NMS)	Uniti	Mexico, Colombia, Nicaragua	Latin America	\$65	359	\$181.1	14.8x
Apr-16	Telefonica	Telxius	Peru	Latin America	NA	900	NA	NA
Apr-16	Telefonica	Telxius	Chile	Latin America	\$12	328	\$35.1	NA
Apr-16	Telefonica	Telxius	Brazil	Latin America	\$214	1,655	\$129.3	NA
Mar-16	Viva	Phoenix Tower	Dominican Republic	Latin America	NA	545	NA	NA
2015	Amzak/Teletower	Phoenix Tower	Dominican Republic	Latin America	NA	190	NA	NA
2015	Torresec	SBA Communications	Ecuador	Latin America	NA	130	NA	NA
Jun-15	Algar Telecom	Highline do Brasil	Brazil	Latin America	\$21	125	\$164.7	NA
Jun-15	T4U Holding Brasil, S.A.	Phoenix Tower International	Brazil	Latin America	NA	529	NA	NA
Nov-14	TIM (Telecom Italia)	American Tower	Brazil	Latin America	\$1,200	6,480	\$185.2	15.7x
Sep-14	American Tower	Phoenix Tower International	Panama	Latin America	NA	60	NA	NA
Jun-14	Oi	SBA Communications	Brazil	Latin America	\$527	1,641	\$321.1	15.8x
Jun-14	BR Towers	American Tower	Brazil	Latin America	\$978	4,630	\$211.2	12.1x
2013	Telefónica	American Tower	Brazil	Latin America	\$20	93	\$219.5	NA
2013	Sitesharing	BR Towers	Brazil	Latin America	NA	100	NA	NA
Dec-13	Oi	SBA Communications	Brazil	Latin America	\$645	2,007	\$321.4	16.3x
Sep-13	Z-Sites Locação de Imóveis	American Tower	Brazil	Latin America	\$127	236	\$538.6	NA
Sep-13	Global Tower Partners	American Tower	Costa Rica	Latin America	NA	500	NA	NA
Sep-13	Global Tower Partners	American Tower	Panama	Latin America	NA	50	NA	NA
Aug-13	NII Holdings	American Tower	Brazil	Latin America	\$343	1,937	\$176.9	14.7x
Aug-13	NII Holdings	American Tower	Brazil	Latin America	\$19	103	\$180.6	14.7x
Aug-13	NII Holdings	American Tower	Brazil	Latin America	\$52	750	\$68.9	14.7x
Aug-13	NII Holdings	American Tower	Mexico	Latin America	\$427	1,473	\$289.9	14.7x
May-13	Oi	BR Towers	Brazil	Latin America	\$251	2,113	\$118.8	NA
May-13	Oi	Grupo Torresur	Brazil	Latin America	\$293	2,113	\$138.7	NA
Jul-13	Oi	SBA Communications	Brazil	Latin America	\$303	2,113	\$143.2	10.2x
Jan-13	Axtel	American Tower	Mexico	Latin America	\$249	883	\$281.4	NA

Source: Company data, RBC Capital Markets, TowerXchange



Exhibit 68: Tower M&A Tables

U.S. TOWER M&A

Announced Date	Seller	Buyer	Country	Region	Transaction Value (in USD mm)	Tower Sites	Per Tower Valuation (in USD 000s)	TCF Multiple
Nov-20	Eco-Site	Vertical Bridge	USA	USA	NA	600	NA	NA
Nov-20	InSite Wireless	American Tower	USA	USA	\$3,500	3,000	\$1,166.7	30.4x
Oct-20	Lendlease	Apollo Infrastructure Funds	USA	USA	NA	500	NA	NA
Sep-20	CTI Towers	Melody Investment Advisors	USA	USA	NA	1,150	NA	NA
Aug-20	Cumulus Media	Vertical Bridge	USA	USA	\$213	250	\$852.0	14.3x
May-20	Uniti Group	Melody Investment Advisors	USA	USA	\$220	500	\$440.0	34.0x
Mar-20	Tower Ventures Holdings	Phoenix Tower Intl (PTI)	USA	USA	NA	197	NA	NA
Oct-19	AT&T	Peppertree Capital	USA	USA	\$680	1,000	\$680.0	NA
2Q19	Grain Management	American Tower	USA	USA	\$500	400	\$1,250.0	NA
2Q19	Milestone Towers	SBA Communications	USA	USA	NA	77	NA	NA
Nov-18	Frontier Communications	Everest Infrastructure Partners	USA	USA	\$80	95	\$842.1	NA
NA	K2 & Branch	American Tower	USA	USA	NA	900	NA	20.0x
Dec-17	City of Akron, OH	Everest Infrastructure Partners	USA	USA	\$11	15	\$733.3	NA
Nov-17	Mediacom Communications	CTI Towers	USA	USA	NA	360	NA	NA
2016	Private	Private	USA	Southeast	\$6	10	\$647.5	30.0x
2016	Private	Private	USA	Northeast	\$3	3	\$833.3	26.1x
2016	Private	Private	USA	Midwest	\$1	1	\$550.0	24.0x
2016	Private	Private	USA	Mid-Atlantic	\$3	2	\$1,600.0	23.1x
2016	Private	Private	USA	Midwest	\$1	1	\$530.0	29.0x
2016	Private	Private	USA	Southeast	\$2	4	\$525.0	27.6x
2016	Private	Private	USA	Midwest	\$15	27	\$555.6	22.2x
2016	Private	Private	USA	Southeast	\$21	19	\$1,105.3	26.7x
Dec-16	Verizon (Alltel)	American Tower	USA	USA	\$120	1,523	\$78.7	NA
May-16	Towerco	Grain	USA	USA	\$244	348	\$701.1	27.5x
Apr-16	Tower Development Corp.	Crown Castle	USA	USA, Puerto Rico	\$461	336	\$1,372.0	20.0x
Mar-16	Alpha Media LLC	Vertical Bridge Holdings, LLC	USA	USA	NA	200	NA	NA
Nov-15	Vyve Broadband	CTI Towers	USA	USA	NA	120	NA	NA
Nov-15	Nsight Towers	Vertical Bridge Holdings, LLC	USA	Midwest	NA	200	NA	NA
Nov-15	T-Mobile	Phoenix Tower International	USA	USA	\$140	600	\$311.1	NA
Aug-15	Townsquare Media	Vertical Bridge	USA	USA	\$23	43	\$1,039.7	NA
Apr-15	Quanta Fiber Networks (Sunesys)	Crown Castle	USA	USA	\$1,000	NA	NA	NA
Apr-15	CTI Towers, Inc.	InSite Wireless Group, LLC	USA	USA	NA	294	NA	NA
Mar-15	CIG Wireless Corp.	Vertical Bridge Holdings, LLC	USA	USA	\$143	200	\$715.0	28.3x
Jan-15	NTELOS	Grain	USA	USA	\$35	85	\$411.8	15.9x
Feb-15	Verizon	American Tower **	USA	USA	\$5,060	11,489	\$440.4	>21.5x
Dec-14	iHeartMedia, Inc.	Vertical Bridge Holdings, LLC	USA	USA	\$369	367	\$1,005.4	NA
Dec-14	iHeartMedia, Inc.	Vertical Bridge Holdings, LLC	USA	USA	\$31	44	\$704.5	NA
Dec-14	United States Cellular Corporation	Vertical Bridge Holdings, LLC	USA	USA	\$159	595	\$267.2	50.0x
Mar-14	Richland Properties LLC	American Tower	USA	USA	\$386	60	\$6,431.7	12.9x
Oct-13	AT&T	Crown Castle*	USA	USA	\$4,850	9,708	\$600.0	>20.5x
Sep-13	Global Tower Partners	American Tower	USA	USA	\$4,800	5,900	\$813.6	19.7x
Sep-12	T-Mobile	Crown Castle	USA	USA	\$2,500	7,100	\$352.1	NA
Jun-12	TowerCo	SBA Communications	USA	USA	\$1,450	3,252	\$445.9	15.4x
Feb-12	Mobilitie	SBA Communications	USA	USA	\$1,100	2,300	\$478.3	14.7x
Dec-11	NextG Networks	Crown Castle	USA	USA	\$1,000	8,500	\$117.6	NA
Aug-11	NV Energy	Global Tower Partners	USA	USA	NA	37	NA	NA
Jun-11	Convergys/Cincinnati SMSA Towers	AT&T	USA	USA	\$320	NA	NA	NA
May-11	Leap Wireless	Global Tower Partners	USA	USA	NA	130	NA	NA
Apr-11	Central States Tower	American Tower	USA	USA	NA	170	NA	NA
Oct-10	Pinebelt Cellular	Global Tower Partners	USA	USA	NA	32	NA	NA
2010	Horvath Towers	SBA Communications	USA	USA	NA	NA	NA	NA
Sep-10	CitySwitch, LLC	Global Tower Partners	USA	USA	NA	450	NA	NA
Sep-10	Highpointe Group	Global Tower Partners	USA	USA	NA	NA	NA	NA
Aug-10	Telefonica Peru	American Tower	USA	USA	NA	468	NA	NA
Jul-10	New Path Networks	Crown Castle	USA	USA	\$115	NA	NA	NA
Jun-10	Telefonica Chile	American Tower	USA	USA	NA	287	NA	NA
Jun-10	Reliance Towers	GTL Infrastructure	USA	USA	\$11,000	50,000	\$220.0	NA
Jun-10	Sierra Nevada Property Management	InSite Towers, LLC	USA	USA	NA	40	NA	NA
Jun-10	Robets Towers	American Tower	USA	USA	\$89	164	\$539.6	NA
Mar-10	Wireless Infrastructure Partners	PEG Bandwidth	USA	USA	NA	NA	NA	NA
Feb-10	(Multiple acquisitions)	Day Wireless	USA	USA	NA	30	NA	NA
Feb-10	Essar Telecom Infrastructure	American Tower	USA	USA	\$434	4,450	\$97.4	NA
Jan-10	Bay Communications	SBA Communications	USA	USA	NA	28	NA	NA
Jan-10	Millicom International Cellular	Helios Towers Ghana	USA	USA	\$50	750	\$66.7	NA
Jan-10	Royal Street Communications	Horvath Towers	USA	USA	NA	22	NA	NA
Jan-10	Aircell Towers	GTL Infrastructure	USA	USA	\$1,784	30,000	\$59.5	NA

* As per the deal, CCI will have the option to purchase the AT&T towers at the end of the respective lease terms for additional \$4.2B, and payments will be due mostly between 2032 and 2048.

** As per the deal, American Tower will have exclusive rights to lease and operate the Verizon towers. The average term of the lease rights is about 28 years. As the leases expire, American Tower will have fixed-price purchase options to acquire these towers based on their anticipated fair market values at the end of the lease terms.

Source: Company data, RBC Capital Markets, TowerXchange



Exhibit 69: Fiber-Small Cell M&A

Date Announced	Acquirer	Target	Transaction value (mils)	EBITDA Multiple	Fiber Route Miles	Per Fiber Route Mile Valuation (in US\$, '000s)	Markets
Oct-20	Abu Dhabi Investment Authority & Saudi Arabia's Public Investment Fund (51% total)	Digital Fibre Infrastructure Trust (51% owner of Jio Digital Fibre)	\$1,012	NA	434,960	-	India
Nov-20	Everstream	Uniti Fiber assets - Northeast	\$135	NA	5,600	\$24	Northeast US (PA, also NY, NJ, MD, DE, VA)
Oct-20	John Hancock Life Insurance Co.	Extenet (30% stake)	NA	NA	NA	NA	Jan-00
Oct-20	EQT Infrastructure V	Deutsche Glasfaser (12% stake)	NA	NA	NA	NA	Germany
Oct-20	I Squared Capital	GTT - fiber/datacenter assets	\$2,150	NA	64,000	\$34	Pan-European, North America
Oct-20	InstarAGF (Infra fund)	LS Networks	NA	NA	7,000	NA	Oregon, Pacific Northwest
Sep-20	FirstLight Fiber	KINBER	NA	NA	1,800	NA	Pennsylvania
Sep-20	Xplornet Communications	FG Networks Inc.	NA	NA	994	NA	Canada - New Brunswick, Nova Scotia
Jul-20	Morgan Stanley Infrastructure Partners	Lightpath Fiber Enterprise (Altime USA) - 49.99% stake	\$3,200	14.6x	8,800	\$364	New York
Jul-20	Cooperative Network Services (CNS)	West Central Transport Group (WCTG)	-	-	2,500	-	Minnesota
Jul-20	APG Group and Fiera Infrastructure	Conterra Networks (from Court Square)	NA	NA	11,100	NA	Primarily North Carolina, Texas, Louisiana, and California
Jun-20	IPI Partners	Dark Fiber and Infrastructure (DF&I) - investment	NA	NA	NA	NA	Jan-00
Jun-20	FirstLight	BestWeb	-	-	170	-	NY (lower Hudson Valley)
Jun-20	FirstLight	DFT (certain fiber routes)	NA	NA	NA	NA	Buffalo metro and Jamestown link (NY)
Jun-20	FirstLight	DFT Communications	-	-	-	-	Western NY
May-20	South Reach Networks	Resurgence Infrastructure Group	\$0	-	120,000	-	Florida
May-20	Beanfield Metroconnect	Aptum Technologies	\$181	-	2,113	\$86	Canada (Toronto, Montreal)
Apr-20	Everstream	Rocket Fiber LLC	-	-	41	-	Detroit-based ISP
Mar-20	Macquarie Infrastructure Partners	Cincinnati Bell	\$2,900	7.0x	17,000	\$171	OH, HI
Feb-20	FirstLight (Antina)	PrimeLink	NA	NA	NA	NA	Northeast NY, Montreal
Feb-20	EQT IV (51%) and OMERS (49%)	Deutsche Glasfaser (KKR 70% and Reggeborgh 30%)	\$2,740	"high-teens"	18,641	\$147	Germany
Feb-20	Beanfield Technologies	Openface	NA	NA	62	NA	Montreal
Jan-20	SDC Capital Partners	FatBeam Holdings (51% stake from Coeur d'Alene)	\$36	-	-	-	Metro areas of AZ, ID, MT, NV, OR, WA, WY; Transaction value for 51% stake
Jan-20	CityFibre	FibreNation (TalkTalk Group)	\$260	-	-	-	Jan-00
Dec-19	Segra (EQT)	North State Telecommunications Corp	\$240	6.6x	3,000	\$80	Noth Carolina
Dec-19*	Brookfield Infrastructure Partners	Cincinnati Bell	\$2,600	6.4x	17,000	\$153	OH, HI
Nov-19	Eurofiber	Eurafibre	-	-	1,243	-	France
Nov-19	Altime (SFR subsidiary)	Covage	\$1,109	-	-	-	France
Nov-19	Digital Colony	Beanfield Technologies Inc	-	-	227	-	Canada (Toronto, Montreal)
Oct-19	Everstream	DataBank (LightBound fiber assets and CLEC business)	-	-	200	-	Indianapolis, Indiana
Sep-19	EQT Infrastructure	Inexio (Warburg Pincus)	\$1,100	-	6,214	\$177	Germany (Rural)
Aug-19	Grain Management (financial sponsor)	Hunter Communications	-	-	2,011	-	Oregon and N. CA
Aug-19	Grain Management (financial sponsor)	Summit Vista (dba Summit Broadband)	\$333	-	1,800	-	FL; majority interest
Jun-19	UFINET	Netell Telecom	-	-	1,118	-	Brazil (Sao Paulo)
May-19	Great Plains Communications	InterCarrier Networks	-	-	2,037	-	IL, IN, St. Louis metro area in Missouri, and KY
May-19	FirstLight	Maine Fiber Company	-	-	1,300	-	Maine, border of Canada
May-19	Uniti	Southern Fiber Net	\$6	-	-	-	GA
May-19	EQT	Zayo	\$14,300	11.1x	130,000	\$110	US, Europe (France, UK, Ireland)
Apr-19	Horizon	Unspecified - Fiber and conduit assets	\$0	-	1,000	-	Downtown Indianapolis, IN
Apr-19	Everstream	Arch Fiber Networks	-	-	55	-	St. Louis, Missouri
Mar-19	euNetworks	Onstage Online GmbH	-	-	-	-	Vienna, Austria
Feb-19	Digital Colony	Cogeco Peer 1	\$574	-	3,000	NM	Toronto & Montreal
Jan-19	SDC Capital Partners	Summit IG	-	20.0x	500	-	Northern and Central VA
Jan-19	Uniti	Bluebird Network	\$319	10.4x	6,500	\$98	Sale leaseback; Missouri, Kansas, Illinois, and Oklahoma
Jan-19	Vast Broadband	NTS Communications	-	-	2,700	-	Select mkts in TX and LA
Jan-19	Hargray Communications	Dark Fiber Systems	-	-	150	-	FL (Jacksonville metro)
Jan-19	Hargray Communications	USA Communications (AL assets)	-	-	-	-	AL
Jan-19	Southern Cross Group (financial sponsor)	Movistar Mexico (unspecified network assets)	-	-	-	-	Unspecified network assets
Dec-18	Arvig Enterprises	Windstream (MN dk fiber assets)	\$50	-	-	-	MN
Dec-18	Arvig Enterprises	Windstream (NE dk fiber assets)	\$11	-	-	-	NE
Dec-18	InfraCapital (M&G Prudential)	SSE Enterprise Telecom (50% stake)	\$433	-	8,513	\$102	UK
Dec-18	Phoenix Tower International	Syscom Telecom	-	-	-	-	US and Canada
Nov-18	Resurgence Infrastructure Group (Resurgence IG)	Strome Fiber Holdings	-	-	-	-	Southeastern US (Miami-to-Atlanta) fiber route + colo huts
Nov-18	Cable One	Clearwave Communications	-	-	2,400	-	Southern Illinois
Sep-18	Broadnet Holding (EQT)	GlobalConnect (EQT)	-	-	14,913	-	Norway, Denmark, N. Germany
Sep-18	Independents Fiber Network (CNI)	Smart Connect Fiber (OH assets)	-	-	205	-	Southwest Ohio
Aug-18	Algar Telecom	CEMIG (Lot 2)	\$21	-	2,042	\$10	Brazil (Northeast and Goias)
Aug-18	American Tower	CEMIG (Lot 1)	\$154	-	3,861	\$40	Brazil (Minas Gerais, Rio de Janeiro and Sao Paulo)
Aug-18	Uniti	CableSouth Media - assets	\$31	-	607	\$51	Arkansas, Louisiana and Mississippi; Sale leaseback
Aug-18	Conterra Networks	Network Communications Telecom	-	-	"several hundred"	-	East Texas and Northwest Louisiana
Jul-18	Pontegadea	Pontel Participaciones (TEF sub that co-owns Telxius with KKR)	\$426	-	-	-	Pontegadea has bought a 16.65% stake in Pontel Participaciones, which is the subsidiary of Telefonica that shares ownership of Telxius with KKR's Taurus Bidco. Pontel owns 60% of Telxius, and selling just under a sixth of that will put its ownership at just above the 50% mark.
Jun-18	Grain Management (financial sponsor)	Great Plains Communications	-	-	-	-	Primarily NE (CO, IL, IA, KS, MN, SD, WY)
Jun-18	Enel	Ufinet (21% stake)	\$175	-	30,447	\$27	Latin America - Mexico, Chile
Jun-18	ExteNet Systems	Hudson Fiber Network (Tiger Infrastructure Partners)	-	-	-	-	Density in NY/NJ; Owned links to domestic and intl hubs (S. Korea, Japan, HK, Singapore)

* This deal was subsequently terminated by Cincinnati Bell.
Source: Company data, RBC Capital Markets, TowerXchange

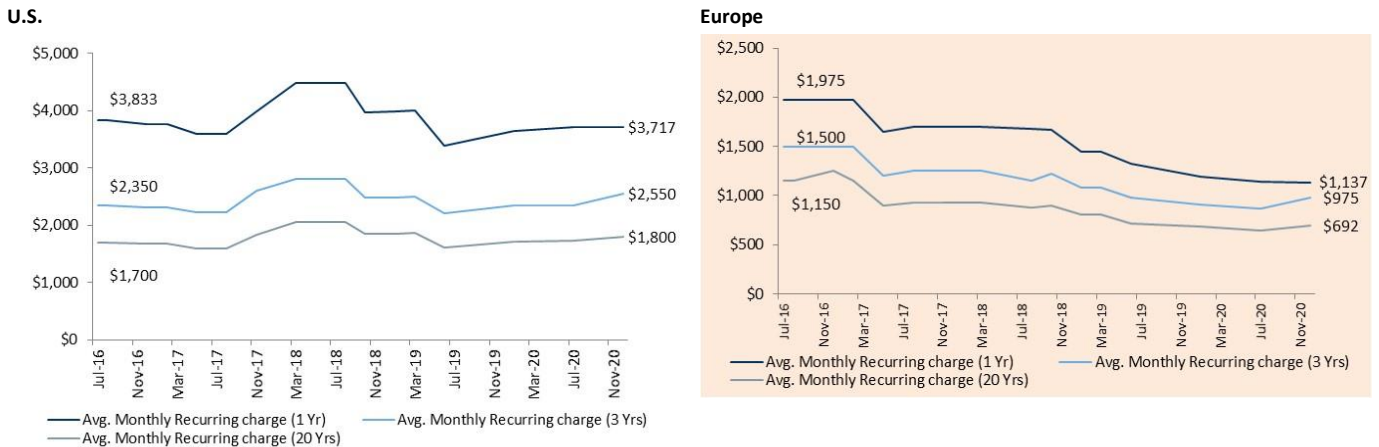


Exhibit 70: Select Cable, Satellite, and Telecom Transactions

Announcement Date	Transaction Status	Acquirer	Target	Target Type	Enterprise Value (M)	EV/EBITDA
05/23/18	Cancelled	Comcast Corp.	Twenty-First Century Fox, Inc.	Movies/Entertainment	\$77,464	11.9x
04/29/18	Pending	T-Mobile US, Inc.	Sprint Corp.	Wireless Telecommunications	\$58,849	5.4x
10/31/16	Complete	CenturyLink, Inc.	Level 3 Communications, Inc.	Major Telecommunications	\$34,663	13.0x
10/22/16	Complete	AT&T, Inc.	Time Warner, Inc.	Movies/Entertainment	\$106,262	13.2x
09/17/15	Complete	Alice NV	Cablevision Systems Corp.	Cable/Satellite TV	\$17,806	9.9x
05/26/15	Complete	Charter Communications, Inc.	Time Warner Cable, Inc.	Cable/Satellite TV	\$78,209	9.5x
03/31/15	Complete	Charter Communications, Inc.	Bright House Networks LLC	Cable/Satellite TV	\$10,623	-
02/05/15	Complete	Frontier Communications Corp.	Verizon Communications, Inc. (CA, FL & TX wireline operations)	Wireless Telecommunications	\$10,500	-
06/16/14	Complete	Level 3 Communications, Inc.	tw telecom, Inc.	Major Telecommunications	\$7,205	14.0x
05/18/14	Complete	AT&T, Inc.	DIRECTV	Cable/Satellite TV	\$65,660	8.0x
04/28/14	Cancelled	Charter Communications, Inc.	Comcast Corp. /Time Warner Cable Systems Ops	Cable/Satellite TV	\$7,300	-
02/13/14	Cancelled	Comcast Corp.	Time Warner Cable, Inc.	Cable/Satellite TV	\$69,138	8.7x
01/13/14	Cancelled	Charter Communications, Inc. /Old/	Time Warner Cable, Inc.	Cable/Satellite TV	\$61,877	7.8x
09/02/13	Complete	Verizon Communications, Inc.	Celco Partnership, Inc.	Wireless Telecommunications	\$283,974	-
04/15/13	Cancelled	DISH Network Corp.	Sprint Nextel Corp.	Major Telecommunications	\$36,051	7.5x
02/12/13	Complete	Comcast Corp.	NBCUniversal Media LLC	Movies/Entertainment	\$40,178	9.6x
01/08/13	Cancelled	DISH Network Corp.	Clearwire Corp.	Specialty Telecommunications	\$9,566	nm
12/17/12	Complete	Sprint Nextel Corp.	Clearwire Corp.	Specialty Telecommunications	\$10,448	nm
10/03/12	Complete	MetroPCS Communications, Inc.	T-Mobile USA, Inc.	Major Telecommunications	\$6,874	nm
03/20/11	Cancelled	AT&T, Inc.	T-Mobile USA, Inc.	Major Telecommunications	\$55,550	11.2x
04/22/10	Complete	CenturyLink, Inc.	Qwest Communications International, Inc.	Major Telecommunications	\$22,335	5.1x
05/13/09	Complete	Frontier Communications Corp.	Verizon Communications, Inc. (14 US States wireless operations)	Wireless Telecommunications	\$8,580	-
05/04/09	Complete	The DIRECTV Group, Inc.	Liberty Entertainment, Inc.	Cable/Satellite TV	\$14,686	nm
10/27/08	Complete	CenturyTel, Inc.	Embarq Corp.	Specialty Telecommunications	\$11,516	4.4x

Source: FactSet

Exhibit 71: Illustrative Metro Local Dark Fiber Prices (\$)



U.S. exhibit based on data from Dallas, New York, Miami and Atlanta. Europe exhibit based on data from London and Paris. Average installation charges are approximately \$5,000 for U.S. and \$2,200 for Europe
Source: RBC Capital Markets, Company data



Exhibit 72: Illustrative Metro Suburb Dark Fiber Prices (\$)

U.S.

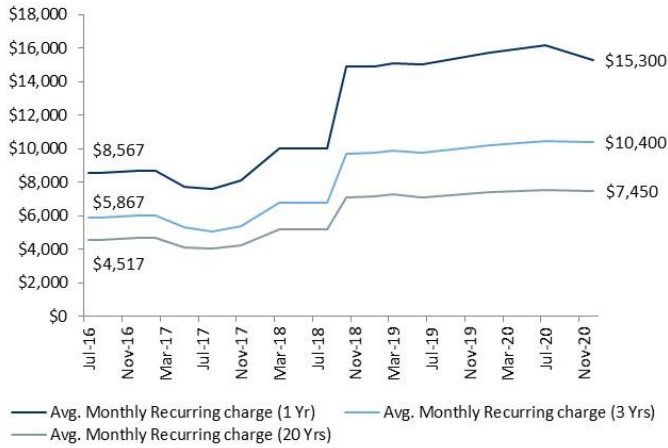
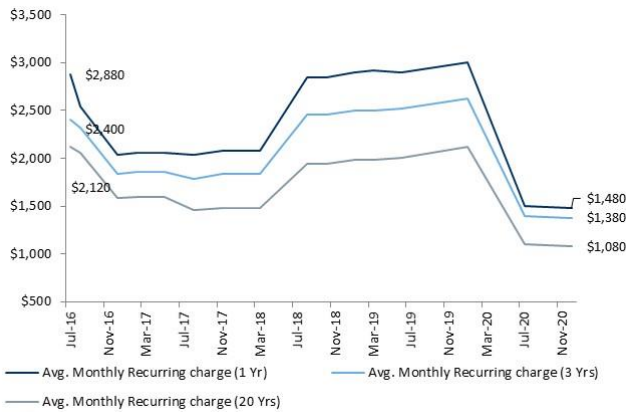


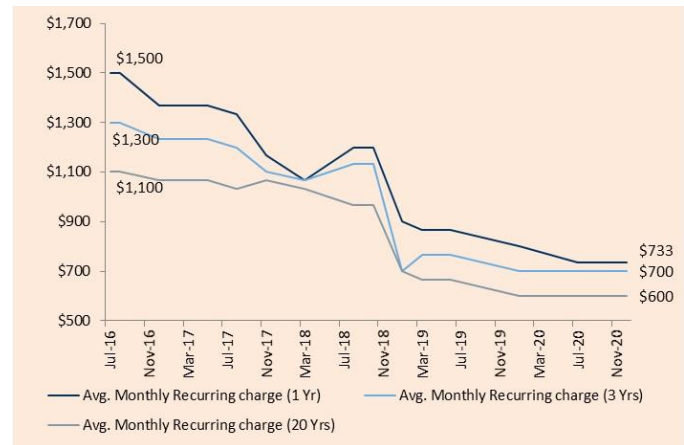
Exhibit based on data from Plano/Dallas, San Francisco/Santa Clara and Phoenix/Chandler route. Average installation charges are approximately \$4,500 for U.S.
 Note: Price increase in Aug-18 was due to sharp price increase in Santa Clara/San Francisco Route. Pricing of rest of the U.S. routes was largely unchanged.
 Source: RBC Capital Markets, Company data

Exhibit 73: Illustrative Metro 10G Wavelength Prices (\$)

U.S.



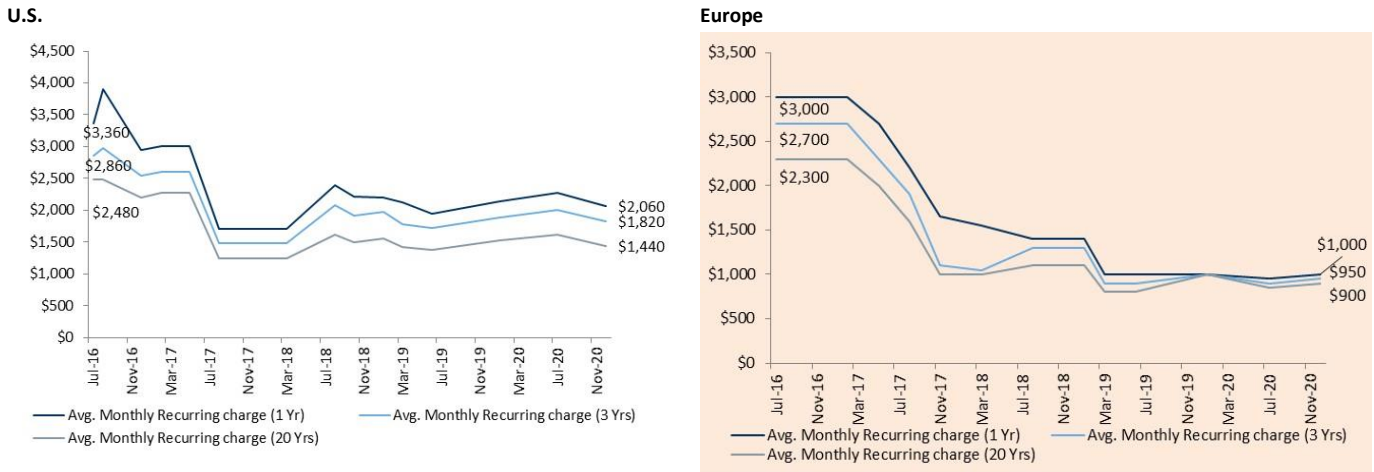
Europe



Average installation charge of \$450 for U.S. and \$800 for Europe (Dec 2020).
 Source: RBC Capital Markets, Company data



Exhibit 74: Illustrative Long-haul 10G Wavelength Prices (\$)



Average installation charge of \$2,000 for U.S. and \$1,300 for Europe (Jul 2020).
Source: RBC Capital Markets, Company data

Exhibit 75: Spectrum Holdings by Carrier and Bands in Top-25 Markets (MHz)

Metro	AT&T				New T-Mobile				Verizon						
	700 MHz	Cellular	PCS	AWS	WCS	600 MHz	700 MHz	SMR	PCS	AWS	2.5 GHz	700MHz	Cellular	PCS	AWS
Los Angeles	36	25	40	30	20	30	12	14	70	40	149	22	25	20	60
New York	36	25	30	20	20	20	12	14	60	50	134	22	25	40	40
Chicago	30	25	40	40	20	30	12	14	80	30	139	22	25	10	40
Dallas	30	50	20	20	20	20	12	14	80	50	150	22	0	30	60
Houston	30	25	50	40	20	20	12	14	60	50	157	22	25	20	40
Philadelphia	36	25	40	40	20	30	12	14	70	40	154	22	25	20	50
Washington DC	30	25	40	40	20	30	12	14	60	40	152	22	25	30	50
Atlanta	30	25	40	20	20	20	12	13	70	50	156	22	25	20	60
San Francisco	36	25	40	30	20	20	12	14	70	40	152	22	25	20	60
Boston	36	25	40	20	20	21	12	14	60	50	148	22	25	30	40
Detroit	30	25	40	20	20	30	12	14	70	50	155	22	25	20	60
Miami	30	50	20	40	20	30	12	14	80	50	153	22	0	30	40
Phoenix	30	0	50	40	20	20	12	14	70	50	157	22	50	10	50
San Diego	30	25	40	40	20	30	12	14	70	40	147	22	25	20	60
Minneapolis	30	25	40	30	20	30	12	14	70	40	152	22	25	20	40
Denver	30	25	46	50	20	30	12	14	60	40	125	22	25	20	40
Seattle	30	25	40	20	20	30	12	14	70	50	157	22	25	20	60
Tampa	30	25	30	30	20	20	12	14	70	50	157	22	25	30	50
Baltimore	30	25	40	40	20	30	12	14	60	30	143	22	25	30	60
St. Louis	30	25	40	40	20	31	0	14	80	30	155	22	25	10	50
Portland	30	25	40	40	20	20	12	14	70	40	157	22	25	20	50
San Antonio	30	50	30	50	20	30	12	14	70	50	134	22	0	30	40
Las Vegas	30	25	40	40	20	30	12	14	70	50	135	22	25	20	40
Sacramento	30	25	50	30	20	20	12	14	70	40	147	22	25	10	60
Orlando	30	50	20	20	20	20	12	14	80	50	152	22	0	30	60

Source: FCC data, RBC Capital Markets



Exhibit 76: Spectrum Transactions

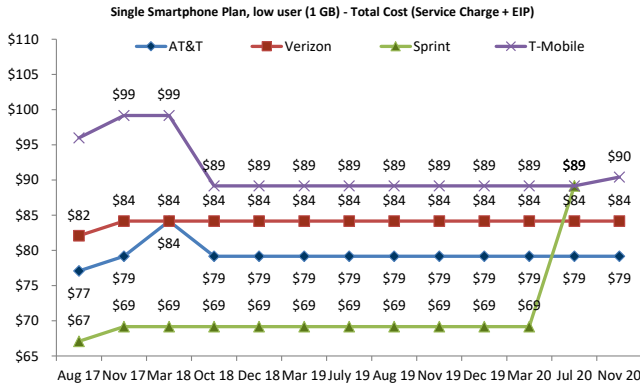
Date	Acquirer	Seller	Frequency	Price (mls)	MHz	POPs (000s)	\$/MHz/POP
08/25/2020	various bidders	FCC (Auction 105)	3.5 GHz	\$4,586	70	301,997	\$0.22
			Upper 37 GHz, 39 GHz, and 47				
03/05/2020	various bidders	FCC (Auction 103)	GHz	\$7,570	3,400	313,146	\$0.01
06/03/2019	various bidders	FCC (Auction 102)	24 GHz	\$2,024	700	317,321	\$0.01
01/24/2019	various bidders	FCC (Auction 101)	28 GHz	\$703	850	73,191	\$0.01
02/28/2018	Verizon	Straight Path	28 GHz, 39 GHz	\$3,100	620	130,000	\$0.04
02/09/2018	AT&T	FiberTower	39 GHz	\$207	375	N/A	N/A
02/01/2017	Verizon	XO Communications	28 GHz, 39 GHz	\$2,000	N/A	N/A	N/A
02/01/2016	T-Mobile	Multiple companies	700 MHz A-Block	\$700	12	48,000	\$1.20
01/01/2016	T-Mobile	Multiple companies	700 MHz A-Block	\$600	N/A	20,000	N/A
08/04/2015	T-Mobile/Verizon Wireless	T-Mobile/Verizon Wireless	AWS-1, PCS	\$173	N/A	N/A	N/A
01/28/2015	various bidders	FCC (AWS-3 auction)	AWS-3 A1, B1, G-J Block	\$44,899	65	312,846	\$2.21
12/02/2014	T-Mobile	NTELOS Holdings	1900 MHz PCS	\$56	N/A	3,000	N/A
11/26/2014	T-Mobile	Vulcan Spectrum	700 MHz A Block	N/A	12	4,800	N/A
09/25/2014	T-Mobile	Triad	700 MHz A Block	N/A	N/A	2,430	N/A
09/24/2014	T-Mobile	McBride Spect. Part.	700 MHz A Block	N/A	N/A	2,910	N/A
09/23/2014	T-Mobile	Frontier, Kurian	700 MHz A Block	N/A	N/A	2,130	N/A
08/11/2014	T-Mobile	Actel (subs. CenturyLink)	700 MHz A Block	N/A	N/A	6,100	N/A
01/07/2014	AT&T	Aloha Partners	AWS	N/A	10/20	50,000	N/A
01/06/2014	T-Mobile	Verizon Wireless	700 MHz A-block	\$3,315	12	148,000	\$1.85
06/28/2013	T-Mobile	US Cellular	AWS	\$308	10	32,000	\$0.96
01/25/2013	AT&T	Verizon Wireless	700 MHz B-block	\$1,900	12	42,000	\$3.77
11/07/2012	Sprint	US Cellular	PCS	\$480	30	272,000	\$0.06
08/02/2012	AT&T	NextWave Wireless	WCS/AWS	\$600	19	212,000	\$0.15
12/16/2011	Verizon	Cox	1.7 GHz/2.1 GHz	\$315	20	28,000	\$0.56
12/02/2011	Verizon	SpectrumCo	1.7 GHz/2.1 GHz	\$3,600	20	259,000	\$0.69
06/20/2011	DISH	Terrestar	2 GHz MSS 'S' band	\$1,380	20	6,860,000	\$0.01
03/15/2011	DISH	DBSD	2 GHz MSS 'S' band	\$1,413	20	6,180,000	\$0.01
12/20/2010	AT&T	Qualcomm	700 MHz	\$1,925	7.4	300,000	\$0.87
07/24/2008	various bidders	Nextwave PCS	AWS	\$150,100	N/A	N/A	\$0.25
03/18/2008	various bidders	FCC	700MHz	\$19,120	52	285,174	\$1.29
10/09/2007	AT&T Mobility	Aloha Partners	700MHz	\$2,500	12	196,000	\$1.06
07/24/2007	Telecom Ventures	Crown Castle	1670Mhz	\$143	5	300,000	\$0.10
02/20/2007	Clearwire	AT&T	2.5GHz	\$300	170	18,000	\$0.10
09/18/2006	various bidders	FCC	1.7GHz/2.1GHz	\$13,700	90	300,000	\$0.51
07/13/2005	XM Satellite Radio	WCS Wireless	N/A	\$196	10	163,000	\$0.12
03/04/2005	Verizon Wireless	Qwest Wireless	1.9GHz	\$418	10	30,800	\$1.36
03/03/2005	Verizon Wireless	Metro PCS	1.9GHz	\$230	10	7,237	\$3.18
02/15/2005	various bidders	FCC	1.9GHz	\$2,043	10	206,607	\$0.95
11/29/2004	Metro PCS	Cingular Wireless	1.9GHz	\$230	10	19,690	\$1.17
11/23/2004	Verizon Wireless	NTELOS	1.9GHz	\$16	10	2,100	\$0.74
11/05/2004	Verizon Wireless	Nextwave PCS	1.9GHz	\$3,000	14	73,000	\$2.85
04/13/2004	Cingular Wireless	Nextwave PCS	1.9GHz	\$1,400	10	83,000	\$1.69
11/30/2001	Airgate PCS	IPCS	1.9GHz	\$806	10	7,400	\$10.89
11/14/2001	Cingular Wireless	Leap Wire less	N/A	\$140	15	2,000	\$4.67
01/26/2001	Various bidders	FCC	1.9GHz	\$17,597	30	168,230	\$3.49

Source: FCC, RBC Capital Markets, company data

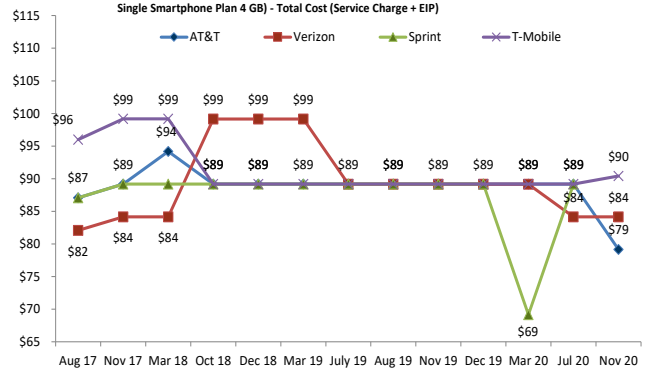


Exhibit 77: Postpaid Rate Plan Comparison – Total Monthly Billings Excluding Current Promotions (service plus device)

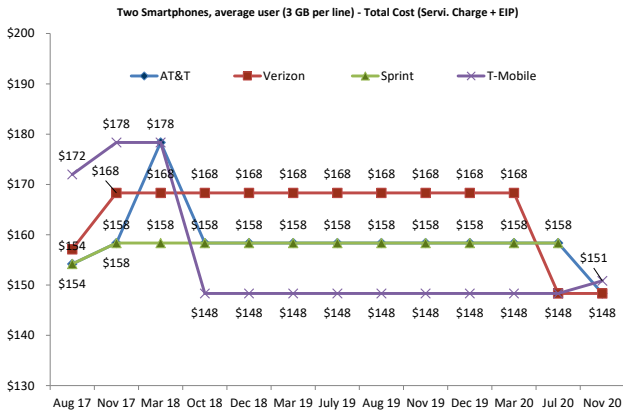
Single Smartphone Plan, low user (1 GB)



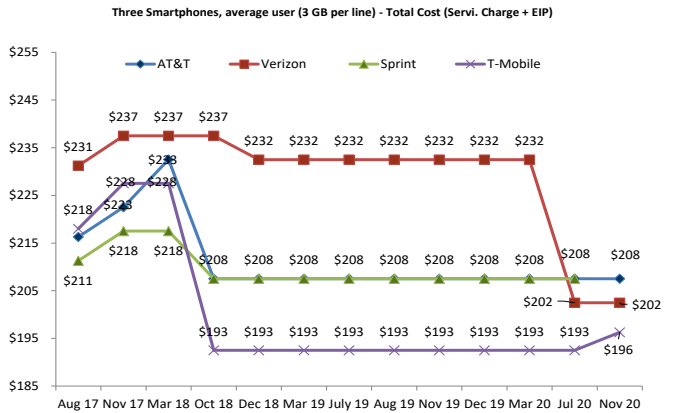
Single Smartphone Plan, heavy user (4 GB)



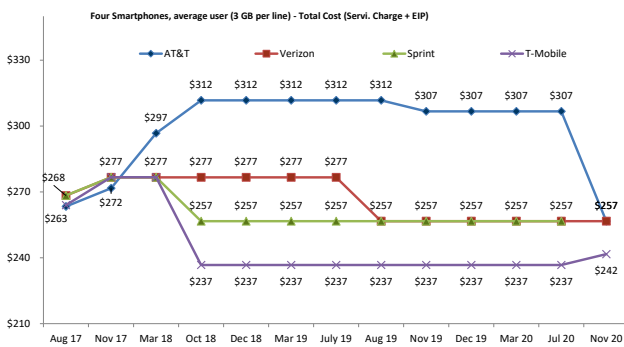
Two Smartphones, average user (min 3 GB per line)



Three Smartphones, average user (min 3 GB per line)



Four Smartphones, average user (min 3 GB per line)

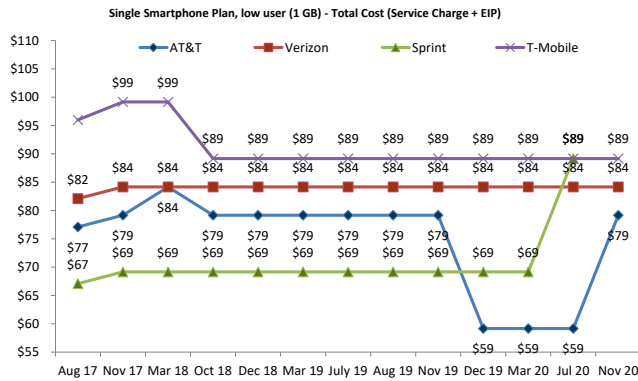


Source: RBC Capital Markets, Company reports

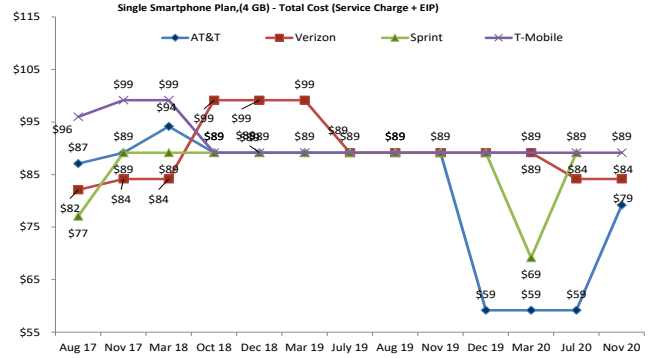


Exhibit 78: Postpaid Rate Plan Comparison – Total Monthly Billings Including Promotions (service plus device)

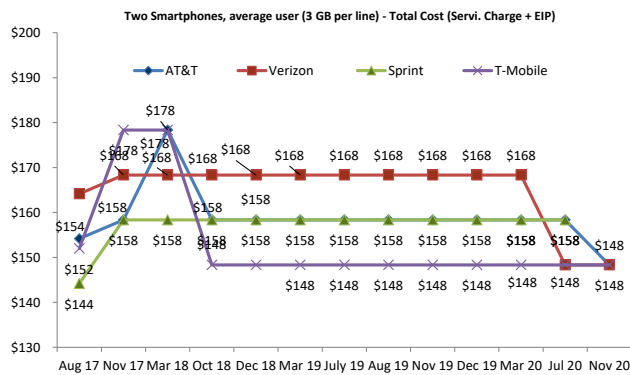
Single Smartphone Plan, low user (1 GB)



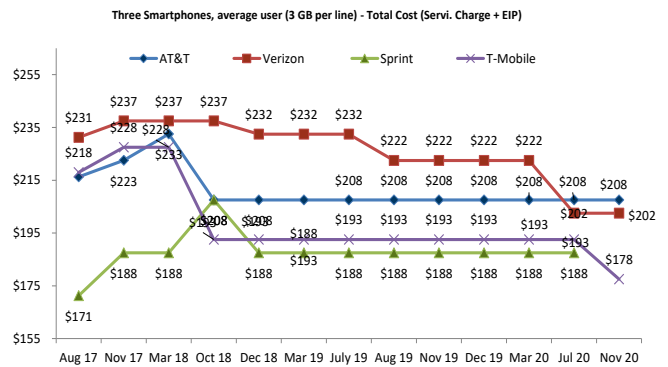
Single Smartphone Plan, heavy user (4 GB)



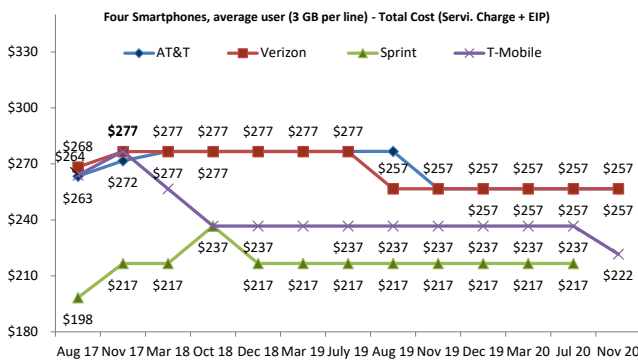
Two Smartphones, average user (min 3 GB per line)



Three Smartphones, average user (min 3 GB per line)



Four Smartphones, average user (min 3 GB per line)



Source: RBC Capital Markets, Company reports



Exhibit 79: Digital Realty + CyrusOne M&A Math

(in \$ millions, except per share data)	DLR (incl. INXN)		CONE Stand-alone		assuming 4Q20E Close		
	2020E	2021E	2020E	2021E	Pro Forma DLR + CONE	2021E	
Key Financials							
Revenue	\$3,823	\$4,257	\$1,031	\$1,141		\$5,398	
EBITDA	\$2,128	\$2,388	\$542	\$610		\$3,013	
EBITDA margin	56%	56%	53%	53%		56%	
FFO	\$1,630	\$1,851	\$454	\$501		\$2,418	
FFO/sh	\$6.05	\$6.50	\$3.87	\$4.10		\$6.96	7.1%
AFFO	\$1,520	\$1,680	\$449	\$494		\$2,222	
AFFO/sh	\$5.65	\$5.90	\$3.83	\$4.04		\$6.40	8.5%
Total Capex	\$2,156	\$2,022	\$900	\$807		\$2,829	
% of revenue	56%	48%	87%	71%		52%	
Average diluted shares and units C	269.3	284.9	117.5	122.4		347.4	
OPEX Synergies Realized						\$15	
Annualized OPEX Synergies						\$30	
% Synergies realized						50%	
Balance Sheet							
	2020E	2021E	2020E	2021E		2021E	
Gross Debt	\$11,622	\$13,472	\$3,186	\$3,573		\$17,045	
Preferred capital	\$1,206	\$1,206	\$0	\$0		\$1,206	
Net Debt	\$11,540	\$13,374	\$3,134	\$3,507		\$17,015	
Net Debt and preferred capital	\$12,747	\$14,581	\$3,134	\$3,507		\$18,221	
LQA Net Leverage (excluding preferred)	5.2x	5.4x	5.7x	5.6x		5.6x	
LQA Net Leverage (including preferred)	5.8x	5.9x	5.7x	5.6x		6.0x	
Target Net Leverage (excluding preferred)	5.5x	5.5x	5.0x	5.0x		5.5x	
Financing mix and other assumptions for CONE assets							
CONE per share acquisition price		\$71.30	at current trading price				
CONE diluted shares O/S 2020E		117.5					
CONE -- Implied Equity		\$8,378					
CONE -- TOTAL Debt - 2020E		\$3,186					
CONE -- Cash and equivalents -2020E		\$52					
CONE -- GDS ownership	\$95.00	\$200					
CONE -- Odata ownership		\$12					
CONE assets valuation - 2020E		\$11,300					
Implied EV / 2020E EBITDA Multiple		20.8x					
Debt	int / div %	\$0					
Long term debt	1.5%	\$0					
Preferred equity	5.3%	\$0					
Equity		\$8,378					
# new equity shares (M)		62.6					
DLR stock price	12/17/20	\$133.93					
CONE stock price	12/17/20	\$71.30					

Source: RBC Capital Markets estimates, company filing



Exhibit 80: Digital Realty + CoreSite M&A Math

(in \$ millions, except per share data)	DLR (incl. INXN)		Coresite Stand-alone		assuming 4Q20E Close Pro Forma DLR + COR	
	2020E	2021E	2020E	2021E	2021E	
Key Financials						
Revenue	\$3,823	\$4,257	\$605	\$650	\$4,907	
EBITDA	\$2,128	\$2,388	\$322	\$347	\$2,750	
EBITDA margin	56%	56%	53%	53%	56%	
FFO	\$1,630	\$1,851	\$252	\$269	\$2,182	
FFO/sh	\$6.05	\$6.50	\$5.21	\$5.53	\$6.63	2.0%
AFFO	\$1,520	\$1,680	\$251	\$265	\$1,981	
AFFO/sh	\$5.65	\$5.90	\$5.18	\$5.45	\$6.02	2.0%
Total Capex	\$2,156	\$2,022	\$250	\$293	\$2,315	
% of revenue	56%	48%	41%	45%	47%	
Average diluted shares and units C	269.3	284.9	48.4	48.7	329.3	
OPEX Synergies Realized						\$15
Annualized OPEX Synergies						\$30
% Synergies realized						50%
Balance Sheet						
Gross Debt	\$11,622	\$13,472	\$1,615	\$1,908	\$15,380	
Preferred capital	\$1,206	\$1,206	\$0	\$0	\$1,206	
Net Debt	\$11,540	\$13,374	\$1,612	\$1,905	\$15,147	
Net Debt and preferred capital	\$12,747	\$14,581	\$1,612	\$1,905	\$16,354	
LQA Net Leverage (excluding preferred)	5.2x	5.4x	4.9x	5.3x	5.5x	
LQA Net Leverage (including preferred)	5.8x	5.9x	4.9x	5.3x	5.9x	
Target Net Leverage (excluding preferred)	5.5x	5.5x	5.0x	5.0x	5.5x	
Financing mix and other assumptions for COR assets						
COR per share acquisition price	\$122.84		at current trading price			
COR diluted shares O/S 2020E	48.4					
COR -- Implied Equity	\$5,947					
COR -- TOTAL Debt - 2020E	\$1,615					
COR -- Cash and equivalents -2020E	\$4					
COR assets valuation - 2020E	\$7,558					
Implied EV / 2020E EBITDA Multiple	23.5x					
Debt	int / div %	\$0				
Long term debt	1.5%	\$0				
Preferred equity	5.3%	\$0				
Equity		\$5,947				
DLR stock price	12/17/20	\$133.93				
# new equity shares (M)		44.4				
COR stock price	12/17/20	\$122.84				

Source: RBC Capital Markets estimates, company filings



Exhibit 81: Digital Realty + NEXTDC M&A Math

(in \$ millions, except per share data)	DLR (incl. INXN)		NEXTDC Stand-alone (CY in US\$)		assuming 4Q20E Close Pro Forma DLR + NEXTDC	
	2020E	2021E	2020E	2021E	2021E	
Key Financials						
Revenue	\$3,823	\$4,257	\$156	\$190	\$4,447	
EBITDA	\$2,128	\$2,388	\$78	\$103	\$2,491	
EBITDA margin	56%	56%	50%	54%	56%	
FFO	\$1,630	\$1,851	\$51	\$63	\$1,935	
FFO/sh	\$6.05	\$6.50	\$0.11	\$0.14	\$6.19	-4.8%
AFFO	\$1,520	\$1,680	\$51	\$63	\$1,764	
AFFO/sh	\$5.65	\$5.90	\$0.11	\$0.14	\$5.64	-4.4%
Total Capex	\$2,156	\$2,022	\$275	\$230	\$2,252	
% of revenue	56%	48%	176%	121%	51%	
Average diluted shares and units C	269.3	284.9	455.0	455.0	312.9	
OPEX Synergies Realized						\$0
Annualized OPEX Synergies						\$0
% Synergies realized						50%
Balance Sheet						
	2020E	2021E	CY20E	CY21E	2021E	
Gross Debt	\$11,622	\$13,472	\$614	\$616	\$14,587	
Preferred capital	\$1,206	\$1,206	\$0	\$0	\$1,206	
Net Debt	\$11,540	\$13,374	\$115	\$292	\$14,435	
Net Debt and preferred capital	\$12,747	\$14,581	\$115	\$292	\$15,642	
LQA Net Leverage (excluding preferred)	5.2x	5.4x	1.4x	2.7x	5.7x	
LQA Net Leverage (including preferred)	5.8x	5.9x	1.4x	2.7x	6.2x	
Target Net Leverage (excluding preferred)	5.5x	5.5x	NA	NA	5.5x	
Financing mix and other assumptions for NEXTDC assets						
DLR stock price	12/17/20	\$133.93				
NEXTDC per share acquisition price		\$9.33	at current trading price			
NEXTDC diluted shares O/S 2020E		455.0				
NEXTDC -- Implied Equity		\$4,246				
NEXTDC -- TOTAL Debt - 2020E		\$614				
NEXTDC -- Cash and equivalents -2020E		\$499				
NEXTDC assets valuation - 2020E		\$4,362				
Implied EV / 2020E EBITDA Multiple		56.1x				
Debt	int / div %	\$500				
Long term debt	2.2%	\$500				
Preferred equity	5.3%	\$0				
Equity		\$3,746				
DLR stock price	12/17/20	\$133.93				
# new equity shares (M)		28.0				
NEXTDC stock price (AU)	12/17/20	\$12.25				
Average AUD / USD		0.76				

Source: RBC Capital Markets estimates, company filings



Exhibit 82: Potential 2021E FFO/share and AFFO/share Accretion for a Digital Realty and CyrusOne M&A

DLR -- 2021E FFO/sh accretion / dilution (\$)							DLR -- 2021E FFO/sh accretion / dilution (%)						
Annualized Opex Synergies (\$M)							Annualized Opex Synergies (\$M)						
		\$0	\$15	\$30	\$45	\$60		\$0	\$15	\$30	\$45	\$60	
CONE Acq. Stock Price	\$78	\$0.38	\$0.40	\$0.42	\$0.44	\$0.47	\$75	6.6%	6.9%	7.3%	7.6%	7.9%	
	\$83	\$0.30	\$0.32	\$0.34	\$0.36	\$0.38	\$81	5.2%	5.5%	5.9%	6.2%	6.5%	
	\$88	\$0.22	\$0.24	\$0.26	\$0.28	\$0.30	\$86	3.8%	4.2%	4.5%	4.8%	5.1%	
	\$93	\$0.14	\$0.16	\$0.19	\$0.21	\$0.23	\$92	2.5%	2.8%	3.1%	3.5%	3.8%	
	\$98	\$0.07	\$0.09	\$0.11	\$0.13	\$0.15	\$97	1.2%	1.5%	1.8%	2.1%	2.5%	
	\$103	(\$0.00)	\$0.02	\$0.04	\$0.06	\$0.08	\$103	(0.1%)	0.2%	0.6%	0.9%	1.2%	
	\$108	(\$0.08)	(\$0.06)	(\$0.04)	(\$0.02)	\$0.00	\$109	(1.4%)	(1.1%)	(0.8%)	(0.5%)	(0.2%)	
DLR -- 2021E AFFO/sh accretion / dilution (\$)							DLR -- 2021E AFFO/sh accretion / dilution (%)						
Annualized Opex Synergies (\$M)							Annualized Opex Synergies (\$M)						
		\$0	\$15	\$30	\$45	\$60		\$0	\$15	\$30	\$45	\$60	
CONE Acq. Stock Price	\$78	\$0.42	\$0.44	\$0.46	\$0.48	\$0.51	\$75	7.9%	8.3%	8.6%	9.0%	9.4%	
	\$83	\$0.35	\$0.37	\$0.39	\$0.41	\$0.43	\$81	6.5%	6.8%	7.2%	7.6%	7.9%	
	\$88	\$0.27	\$0.30	\$0.32	\$0.34	\$0.36	\$86	5.1%	5.4%	5.8%	6.2%	6.5%	
	\$93	\$0.20	\$0.22	\$0.25	\$0.27	\$0.29	\$92	3.7%	4.1%	4.4%	4.8%	5.2%	
	\$98	\$0.13	\$0.16	\$0.18	\$0.20	\$0.22	\$97	2.4%	2.8%	3.1%	3.5%	3.8%	
	\$103	\$0.07	\$0.09	\$0.11	\$0.13	\$0.15	\$103	1.1%	1.5%	1.8%	2.2%	2.5%	
	\$108	\$0.00	\$0.02	\$0.04	\$0.06	\$0.08	\$109	(0.2%)	0.1%	0.5%	0.8%	1.2%	

Note: 100% Equity Financing and 50% Opex synergies realized in year 1. Source: RBC Capital Markets estimates, company filings

Exhibit 83: Potential 2021E FFO/share and AFFO/share Dilution for a Digital Realty and CoreSite M&A

DLR -- 2021E FFO/sh accretion / dilution (\$)							DLR -- 2021E FFO/sh accretion / dilution (%)						
Annualized Opex Synergies (\$M)							Annualized Opex Synergies (\$M)						
		\$0	\$15	\$30	\$45	\$60		\$0	\$15	\$30	\$45	\$60	
COR Acq. Stock Price	\$117	\$0.17	\$0.20	\$0.22	\$0.24	\$0.27	\$117	2.7%	3.0%	3.4%	3.8%	4.1%	
	\$123	\$0.14	\$0.16	\$0.18	\$0.21	\$0.23	\$123	2.1%	2.5%	2.8%	3.2%	3.5%	
	\$128	\$0.10	\$0.12	\$0.14	\$0.17	\$0.19	\$128	1.5%	1.9%	2.2%	2.6%	2.9%	
	\$134	\$0.06	\$0.08	\$0.11	\$0.13	\$0.15	\$134	0.9%	1.3%	1.6%	2.0%	2.3%	
	\$139	\$0.02	\$0.05	\$0.07	\$0.09	\$0.11	\$139	0.4%	0.7%	1.1%	1.4%	1.8%	
	\$145	(\$0.01)	\$0.01	\$0.03	\$0.05	\$0.08	\$145	(0.2%)	0.2%	0.5%	0.8%	1.2%	
	\$150	(\$0.05)	(\$0.03)	(\$0.00)	\$0.02	\$0.04	\$150	(0.7%)	(0.4%)	(0.1%)	0.3%	0.6%	
DLR -- 2021E AFFO/sh accretion / dilution (\$)							DLR -- 2021E AFFO/sh accretion / dilution (%)						
Annualized Opex Synergies (\$M)							Annualized Opex Synergies (\$M)						
		\$0	\$15	\$30	\$45	\$60		\$0	\$15	\$30	\$45	\$60	
COR Acq. Stock Price	\$117	\$0.16	\$0.18	\$0.20	\$0.23	\$0.25	\$117	2.7%	3.0%	3.4%	3.8%	4.2%	
	\$123	\$0.12	\$0.14	\$0.17	\$0.19	\$0.21	\$123	2.1%	2.5%	2.8%	3.2%	3.6%	
	\$128	\$0.09	\$0.11	\$0.13	\$0.16	\$0.18	\$128	1.5%	1.9%	2.3%	2.6%	3.0%	
	\$134	\$0.05	\$0.08	\$0.10	\$0.12	\$0.14	\$134	0.9%	1.3%	1.7%	2.1%	2.4%	
	\$139	\$0.02	\$0.04	\$0.06	\$0.09	\$0.11	\$139	0.3%	0.7%	1.1%	1.5%	1.9%	
	\$145	(\$0.01)	\$0.01	\$0.03	\$0.05	\$0.08	\$145	(0.2%)	0.2%	0.5%	0.9%	1.3%	
	\$150	(\$0.05)	(\$0.02)	(\$0.00)	\$0.02	\$0.04	\$150	(0.8%)	(0.4%)	(0.0%)	0.4%	0.7%	

Note: 100% Equity Financing and 50% Opex synergies realized in year 1. Source: RBC Capital Markets estimates, company filings



Exhibit 84: Potential 2021E FFO/share and AFFO/share Dilution for a Digital Realty and NEXTDC M&A

DLR -- 2021E FFO/sh accretion / dilution (\$)						
Debt to purchase NEXTDC						
	\$0	\$750	\$1,750	\$2,750	\$3,750	
NEXTDC	\$11.50	(\$0.23)	(\$0.18)	(\$0.10)	(\$0.03)	\$0.06
Stock	\$12.00	(\$0.26)	(\$0.20)	(\$0.13)	(\$0.05)	\$0.03
Price in	\$12.50	(\$0.28)	(\$0.23)	(\$0.15)	(\$0.08)	\$0.00
A\$	\$13.00	(\$0.30)	(\$0.25)	(\$0.18)	(\$0.10)	(\$0.02)
	\$13.50	(\$0.32)	(\$0.27)	(\$0.20)	(\$0.12)	(\$0.05)
	\$14.00	(\$0.34)	(\$0.29)	(\$0.22)	(\$0.15)	(\$0.07)

DLR -- 2021E FFO/sh accretion / dilution (%)						
Debt to purchase NEXTDC						
	\$0	\$750	\$1,750	\$2,750	\$3,750	
NEXTDC	\$11.50	(3.6%)	(2.8%)	(1.6%)	(0.4%)	0.9%
Stock	\$12.00	(3.9%)	(3.1%)	(2.0%)	(0.8%)	0.5%
Price in	\$12.50	(4.3%)	(3.5%)	(2.3%)	(1.2%)	0.1%
A\$	\$13.00	(4.6%)	(3.8%)	(2.7%)	(1.5%)	(0.3%)
	\$13.50	(5.0%)	(4.2%)	(3.1%)	(1.9%)	(0.7%)
	\$14.00	(5.3%)	(4.5%)	(3.4%)	(2.3%)	(1.1%)

DLR -- 2021E AFFO/sh accretion / dilution (\$)						
Debt to purchase NEXTDC						
	\$0	\$750	\$1,750	\$2,750	\$3,750	
NEXTDC	\$11.50	(\$0.18)	(\$0.14)	(\$0.08)	(\$0.01)	\$0.05
Stock	\$12.00	(\$0.20)	(\$0.16)	(\$0.10)	(\$0.04)	\$0.03
Price in	\$12.50	(\$0.22)	(\$0.18)	(\$0.12)	(\$0.06)	\$0.01
A\$	\$13.00	(\$0.24)	(\$0.20)	(\$0.14)	(\$0.08)	(\$0.01)
	\$13.50	(\$0.26)	(\$0.22)	(\$0.16)	(\$0.10)	(\$0.04)
	\$14.00	(\$0.28)	(\$0.24)	(\$0.18)	(\$0.12)	(\$0.06)

DLR -- 2021E AFFO/sh accretion / dilution (%)						
Debt to purchase NEXTDC						
	\$0	\$750	\$1,750	\$2,750	\$3,750	
NEXTDC	\$11.50	(3.1%)	(2.4%)	(1.3%)	(0.2%)	0.9%
Stock	\$12.00	(3.5%)	(2.7%)	(1.7%)	(0.6%)	0.5%
Price in	\$12.50	(3.8%)	(3.1%)	(2.0%)	(1.0%)	0.1%
A\$	\$13.00	(4.1%)	(3.4%)	(2.4%)	(1.4%)	(0.3%)
	\$13.50	(4.5%)	(3.8%)	(2.8%)	(1.7%)	(0.6%)
	\$14.00	(4.8%)	(4.1%)	(3.1%)	(2.1%)	(1.0%)

Source: RBC Capital Markets estimates, company filings



Exhibit 85: Equinix and Sify Technologies M&A Scenarios

	EQIX	EQIX	EQIX	SIFY	SIFY	SIFY	EQIX+SIFY
	2018A	2019E	2020E	2018A	2019E	2020E	2020E
Recurring revenue	\$4,777	\$5,256	\$5,732	\$125	\$136	\$155	\$5,887
<u>Non recurring revenue</u>	<u>\$295</u>	<u>\$324</u>	<u>\$340</u>	<u>\$193</u>	<u>\$205</u>	<u>\$233</u>	<u>\$573</u>
Total Revenue	\$5,072	\$5,580	\$6,072	\$317	\$341	\$388	\$6,460
Adjusted EBITDA	\$2,413	\$2,680	\$2,947	\$44	\$55	\$66	\$3,013
EBITDA Margin	47.6%	48.0%	48.5%	13.8%	16.0%	17.0%	46.6%
Total Capex	\$2,096	\$2,000	\$2,013	\$51	\$79	\$51	\$2,065
NAREIT FFO	1,253.1	1,394	1,625				1,670
NAREIT FFO per share	\$15.64	\$16.46	\$18.74				\$19.18
Adjusted Funds from Operations (AFFO)	1,659.3	1,922	2,154				2,191
AFFO per share	\$20.69	\$22.70	\$24.84				\$25.16
Shares outstanding diluted, avg	80.2	84.6	87.1	152.6	154.3	154.3	87.1
Recurring revenue % of Total revenue	94%	94%	94%	39%	40%	40%	91%
Non recurring revenue % of Total revenue	6%	6%	6%	61%	60%	60%	9%
INR Revenue share %							6%

**SIFY Implied Take-Out Multiples based on
Different Take-Out Share Prices**

Price per share for SIFY Shares O/S	Implied Equity Valuation (\$M)	Implied EV for SIFY acquisition (\$M)	Implied EV/2019E multiple
\$1.60	\$247	\$337	6.2x
\$1.70	\$262	\$352	6.5x
\$1.80	\$278	\$368	6.7x
\$1.90	\$293	\$383	7.0x
\$2.00	\$309	\$399	7.3x
\$2.10	\$324	\$414	7.6x

2020E accretion / dilution (\$)	FFO/sh	AFFO/sh
\$1.60	\$0.44	\$0.32
\$1.70	\$0.43	\$0.31
\$1.80	\$0.42	\$0.30
\$1.90	\$0.41	\$0.29
\$2.00	\$0.40	\$0.29
\$2.10	\$0.39	\$0.28

2020E accretion / dilution (%)	FFO/sh	AFFO/sh
\$1.60	2.3%	1.3%
\$1.70	2.3%	1.3%
\$1.80	2.2%	1.2%
\$1.90	2.2%	1.2%
\$2.00	2.1%	1.1%
\$2.10	2.1%	1.1%

Note: For Sify Technologies (Nasdaq: SIFY) Enterprise value calculation we have assumed, diluted shares o/s of 154.3M, 2019E Total Debt of \$118M, 2019E Cash and equivalents of \$28M. Prices as of October 17, 2019.

Source: Company reports, RBC Capital Markets estimates, S&P Capital IQ consensus estimates for Sify Technologies Limited (Nasdaq: SIFY)



Exhibit 86: Chinese dual listed stock performance/discount

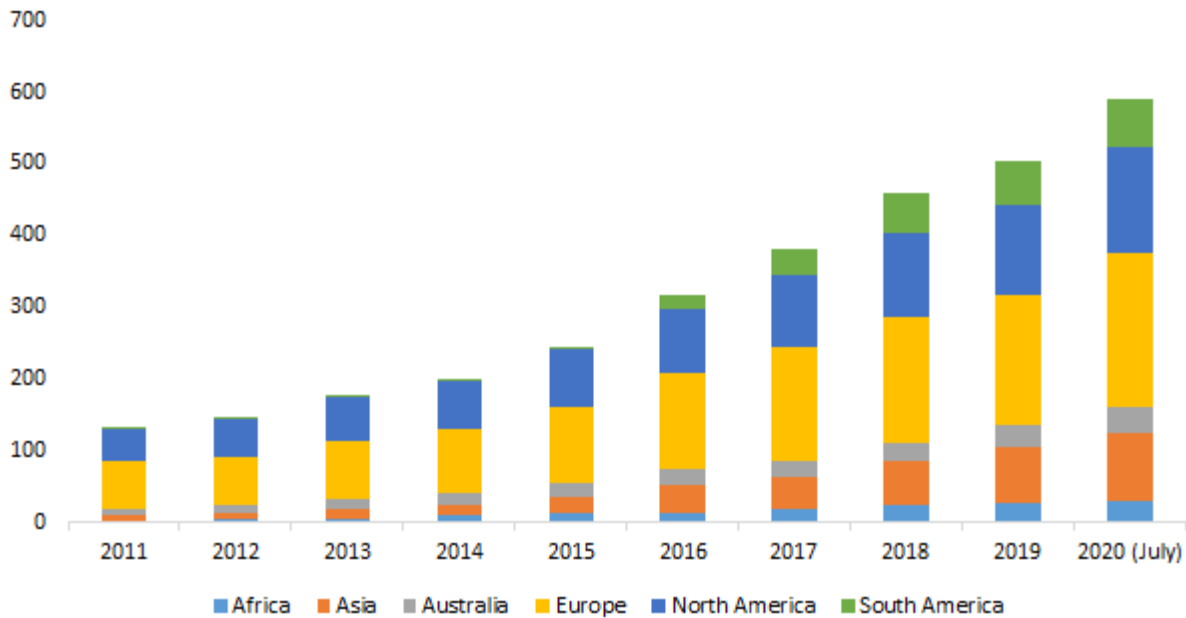
		Base date - filing date of HK prospectus						Base date - initial media mention of possible HK listing					
		Absolute performance						Absolute performance					
		1 yr prior	1-week	2-weeks	1-month	3-months	5-months	1-week	2-weeks	1-month	3-months	5-months	
Alibaba	NYSE:BABA	24%	(0%)	10%	12%	19%	8%	(0%)	5%	10%	7%	13%	
JD.com	NasdaqGS:JD	125%	(2%)	(1%)	-	-	-	(1%)	8%	17%	-	-	
NetEase	NASD:NTES	60%	3%	4%	8%	-	-	3%	14%	11%	-	-	
Average		70%	0%	4%	10%	19%	8%	0%	9%	13%	7%	13%	
		Performance relative to NASDAQ						Performance relative to NASDAQ					
		1 yr prior	1-week	2-weeks	1-month	3-months	5-months	1-week	2-weeks	1-month	3-months	5-months	
Alibaba	NYSE:BABA	6%	(1%)	7%	9%	5%	11%	1%	2%	6%	4%	4%	
JD.com	NasdaqGS:JD	96%	1%	(2%)	-	-	-	(3%)	3%	8%	-	-	
NetEase	NASD:NTES	32%	(1%)	2%	1%	-	-	1%	9%	4%	-	-	
Average		45%	(0%)	3%	5%	5%	11%	(1%)	5%	6%	4%	4%	
		Performance rel. to China Internet Index (KBEW)						Performance rel. to China Internet Index (KBEW)					
		1 yr prior	1-week	2-weeks	1-month	3-months	5-months	1-week	2-weeks	1-month	3-months	5-months	
Alibaba	NYSE:BABA	12%	4%	9%	10%	7%	8%	(0%)	0%	3%	6%	3%	
JD.com	NasdaqGS:JD	83%	(2%)	(9%)	-	-	-	1%	4%	12%	-	-	
NetEase	NASD:NTES	27%	(3%)	(4%)	(8%)	-	-	(3%)	(0%)	(13%)	-	-	
Average		41%	(0%)	(2%)	1%	7%	8%	(1%)	1%	0%	6%	3%	

US issue out/(under) performance rel. to HK issue					
1st HK trading day *					
	1-week	2-weeks	1-month	3-months	
Alibaba	(4%)	(3%)	(3%)	(2%)	(4%)
JD.com	(6%)	(2%)	(0%)	-	-
NetEase	(9%)	0%	2%	-	-
Average	(6%)	(2%)	(0%)	(2%)	(4%)

Note: 1st trading day performance relative to IPO price. Other metrics are relative to close of first day of trading.

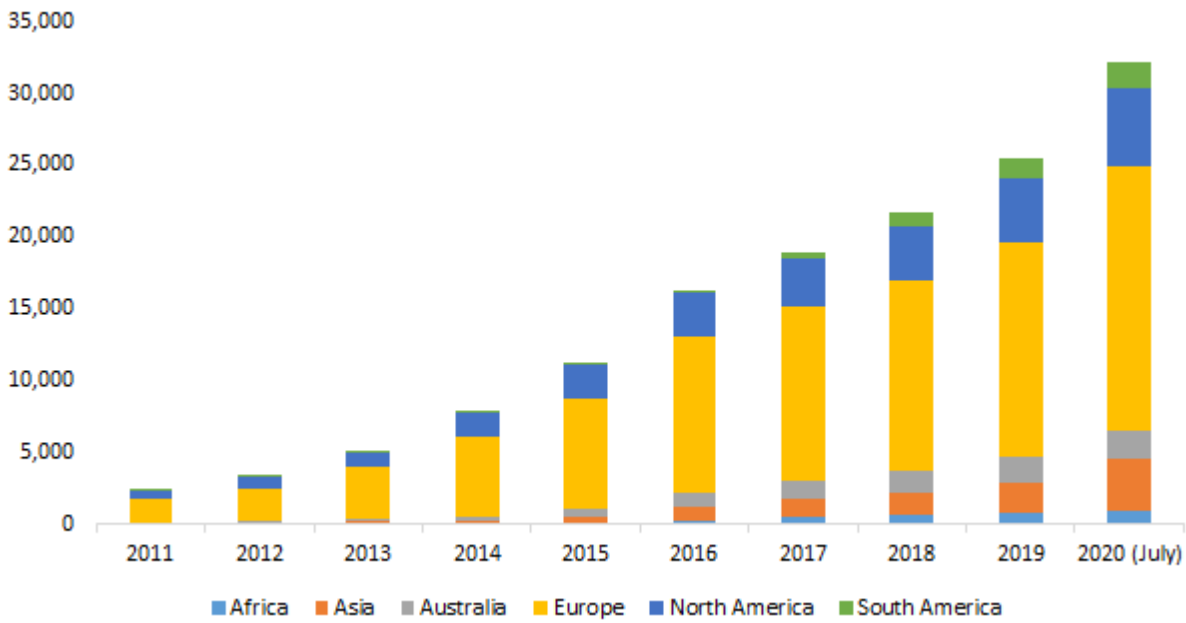
Source: RBC Capital Markets, Capital IQ

Exhibit 87: Exchange Count by Continent



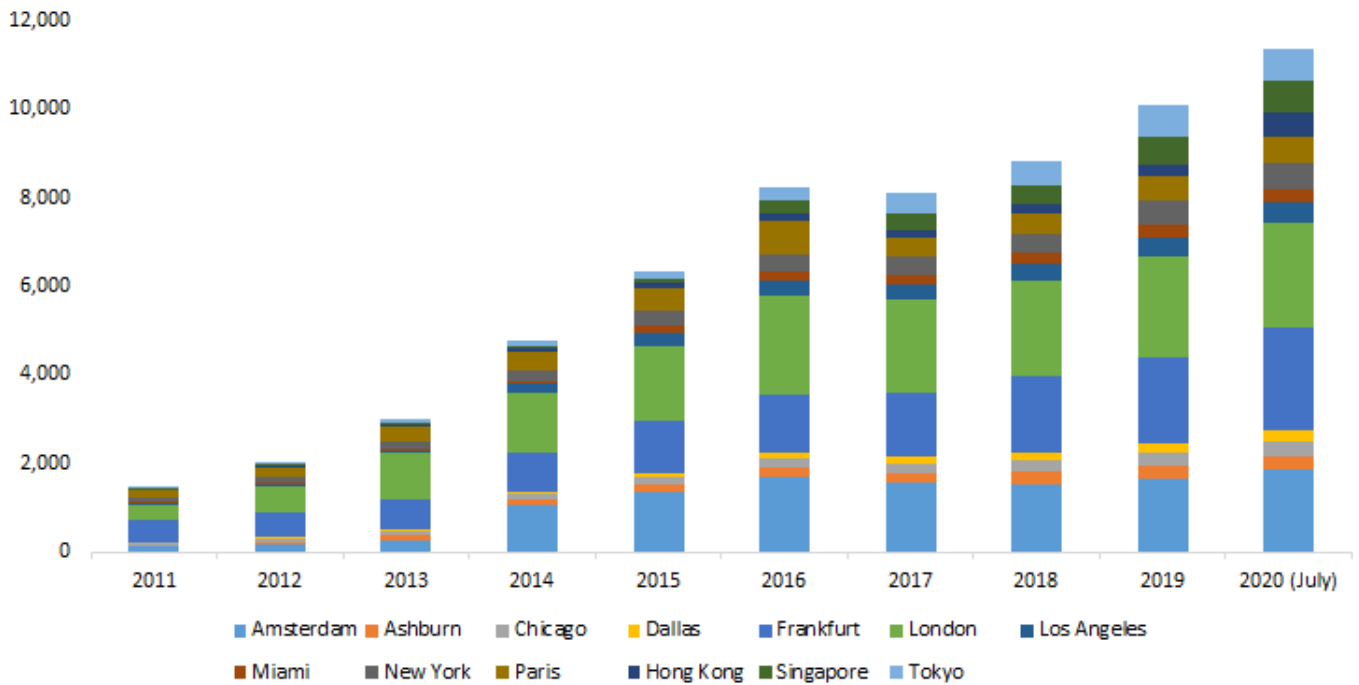
Source: open-ix

Exhibit 88: Port Count by Continent



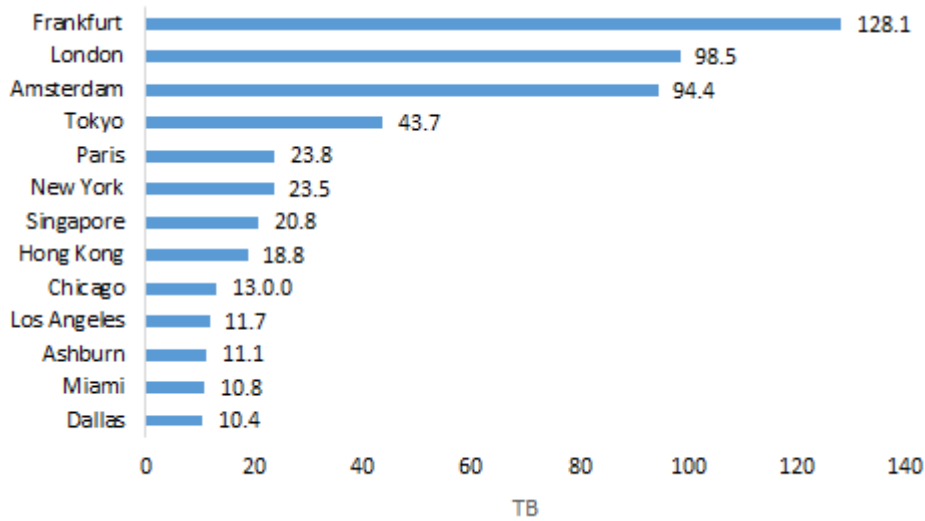
Source: open-ix

Exhibit 89: Port Count by Global Primary Hub



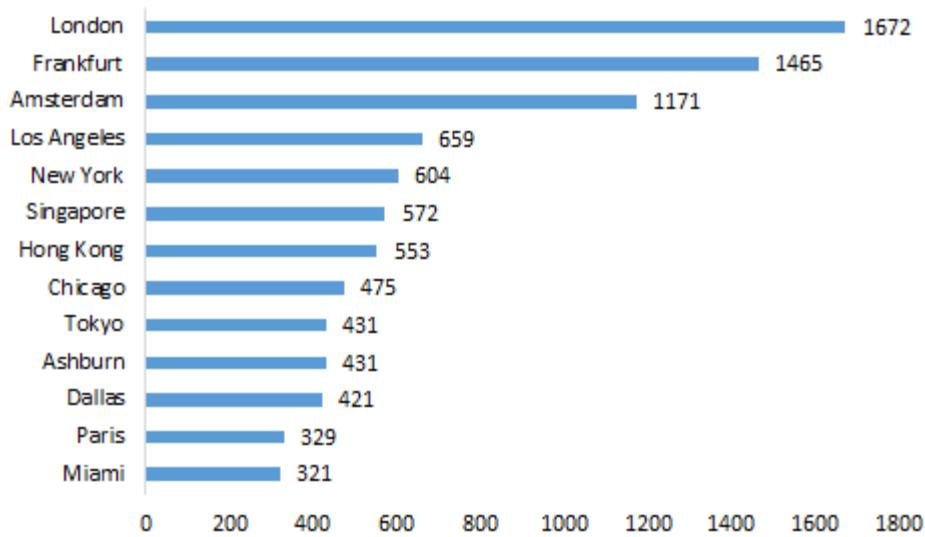
Source: Open-ix

Exhibit 90: Traffic Capacity by Global Primary Hub (July 2020)



Source: Open-ix

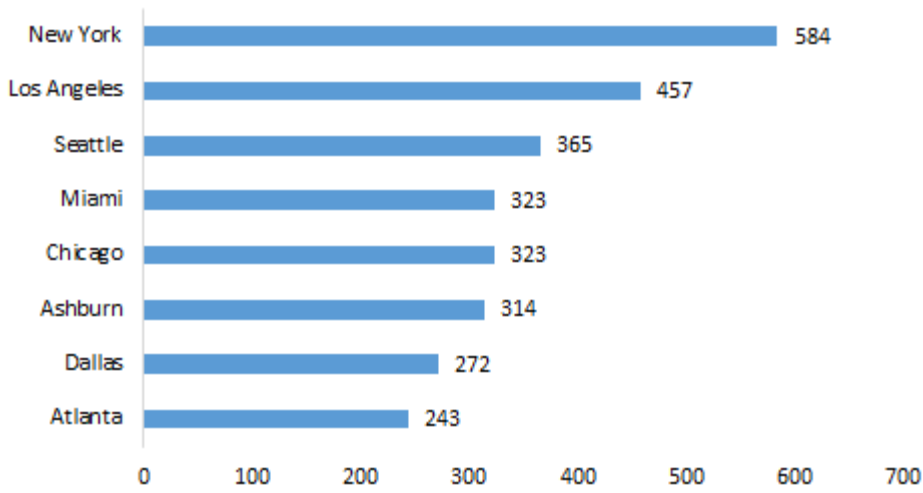
Exhibit 91: Unique ASN by Global Primary Hub (July 2020)



Source: Open-ix

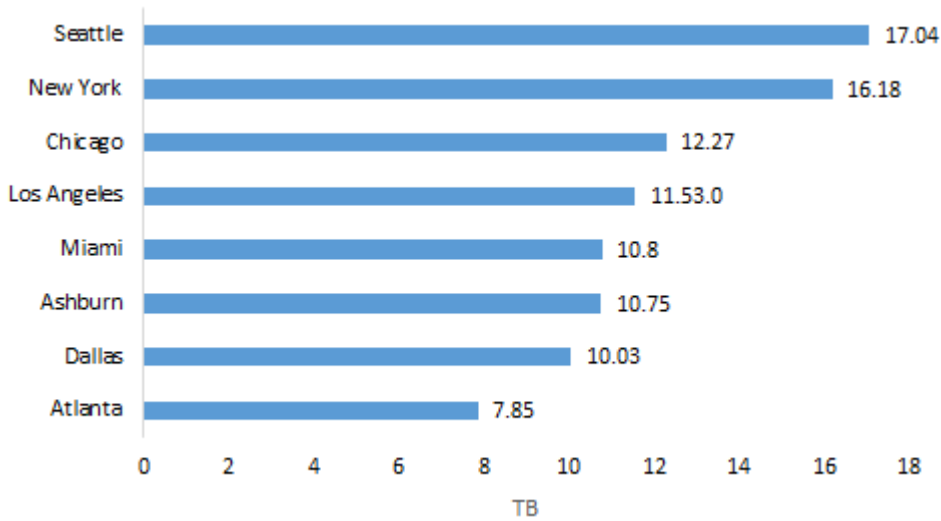


Exhibit 92: Port Count by US Primary Hub (July 2020)



Source: Open-ix

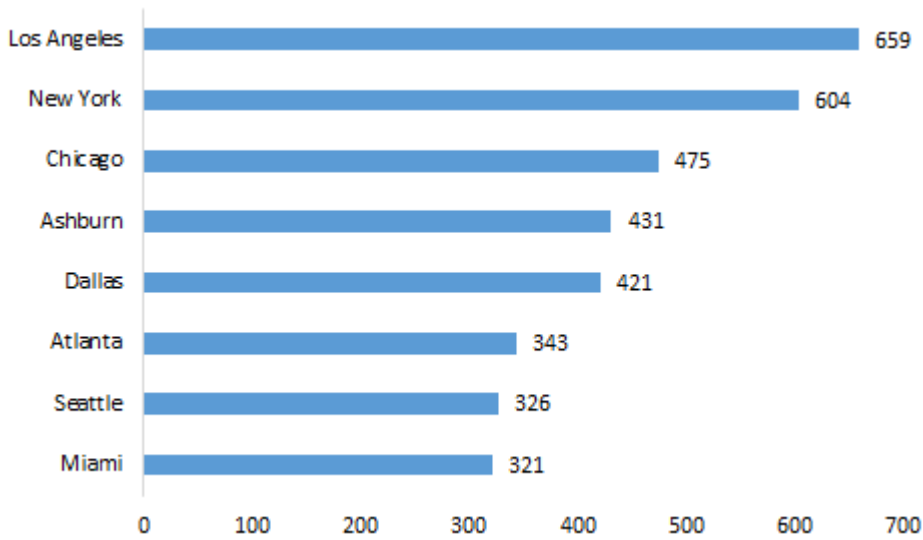
Exhibit 93: Traffic Capacity by US Primary Hub (July 2020)



Source: Open-ix

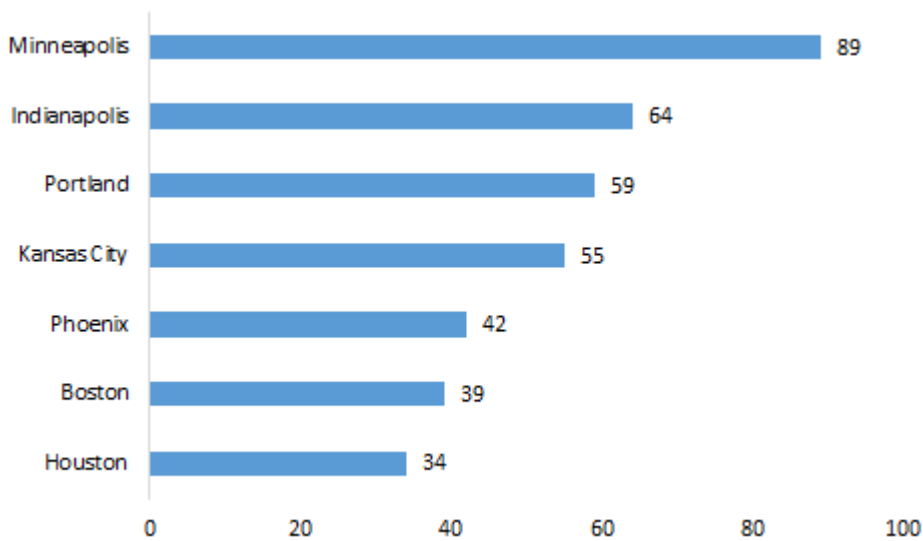


Exhibit 94: Unique ASN by US Primary Hub (July 2020)



Source: Open-ix

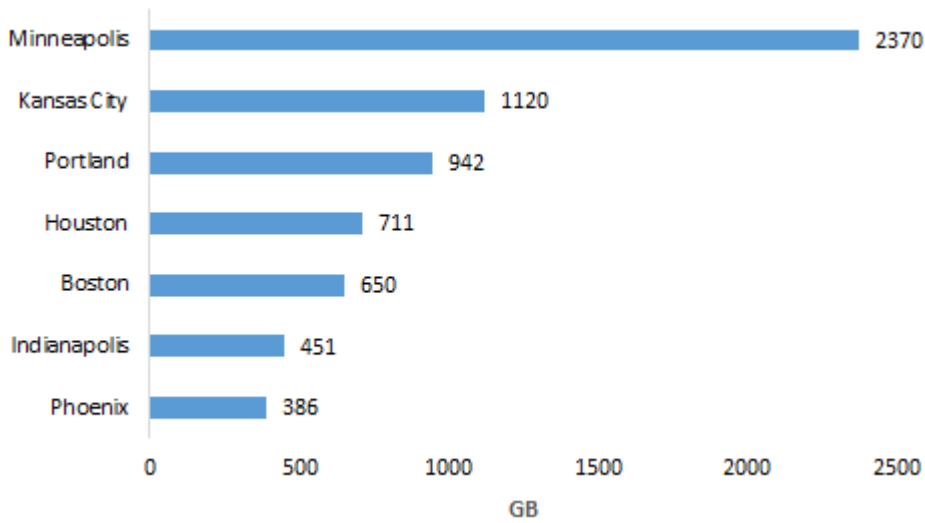
Exhibit 95: Port Count by US Secondary Market (July 2020)



Source: Open-ix

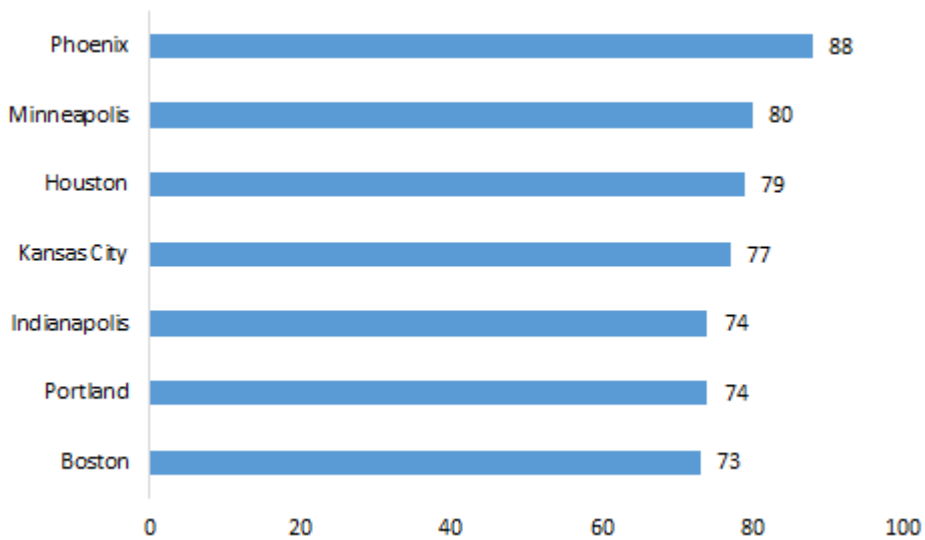


Exhibit 96: Traffic Capacity by US Secondary Market (July 2020)



Source: Open-ix

Exhibit 97: Unique ASN by US Secondary Market (July 2020)



Source: Open-ix

Exhibit 98: COVID-19 response by country

	2019		1Q20		2Q20		Employee support	End date	Firm stimulus	End date
	Nominal GDP (US\$, bns)	Q/Q	Y/Y	Q/Q	Y/Y	Q/Q				
Germany	\$3,867	(1.5%)	0.2%	(8.9%)	(8.9%)		Expanded short-term work ("Kurzarbeit")	Mar-22	€50 billion in grants to small business owners and self-employed persons; grants to help companies cover fixed costs €2bn of venture capital funding for start-ups	Dec-20 Dec-20
France	\$2,717	(4.8%)	(3.7%)	(11.5%)	(15.2%)		Government pays 70% of wages of furloughed employees, lowered to 60% in June	Mar-22	Postponement of rent and utility payments for affected microenterprises and SMEs Liquidity support through postponements of social security and tax payments for companies and accelerated refund of tax credits (e.g. CIT and VAT); €30 billion for the move to a greener economy, with money earmarked to renovate buildings to be more energy-efficient, to boost investments in environmentally friendly industries and decarbonize the economy; €35 billion to boost companies' competitiveness through a €20 billion reduction in taxes on production and funds to help companies in strategic sectors scale-up and/or relocate; €35 billion for social and territorial cohesion to boost youth employment and training.	Been slowly phased out since June Been slowly phased out since June Dec-22 Dec-22 Dec-22
UK	\$2,828	(1.2%)	0.3%	(15.4%)	(15.6%)		Government pays 80% of wages of furloughed employees, lowered to 70% in June (up to a cap of £2,500)	Oct-20	The UK government has operated a program under which it purchases newly issued commercial paper from eligible companies. The CCFF is unlimited in size, and available to larger companies. The Term Funding Scheme with additional incentives for SMEs (TFSME) is offering four-year funding of at least 10% of the participants' stock of real economy lending at interest rates at, or very close to, the Bank of England Base Rate The Coronavirus Large Business Interruption Loan Scheme (CLBILS) provides a government guarantee of 80% for banks to make loans of up to £25m to firms with an annual turnover of more than £45m. All viable businesses with turnover of more than £45 million per year can apply for up to £25 million of finance. Firms with a turnover of more than £250 million can apply for up to £50 million of finance.	Mar-21 Apr-21 No stated deadline
Italy	\$2,001	(5.2%)	(4.6%)	(12.3%)	(16.5%)		Furloughed employees receive 80% of wages (up to a cap of EUR 939.89 or EUR 1,199.72 depending on salary)	Oct-20	Grants for SMEs and tax deferrals Labor and social measures (€12 billion) include, among other things, an extension of the short-time work program, extensions of the moratorium on SMEs' debt repayment and the time to pay back tax obligations. Until 31 December 2020, SACE S.p.A. issues guarantees for loans granted to companies of any size (€200 billion of which €30 billion for SMEs). SACE guarantees between 90% and 70% of the granted loans' amount; the guarantees' amount depends on the number of companies' employees in Italy and on the relative annual turnover (less or more than 5000 employees and until €1,5 billions, between €1,5 billions and €5 billions or greater than €5 billion annual turnover). Certain conditions should be met: e.g. companies should not approve the distribution of dividends or the repurchase of shares within 2020 and they must use them for employment expenses, investments or business activities in Italy.	No stated deadline No stated deadline Dec-20



	2019		1Q20		2Q20		Employee support	End date	Firm stimulus	End date
	Nominal GDP (US\$, bns)	Q/Q	Y/Y	Q/Q	Y/Y	Q/Q				
									The Central Fund issues guarantees, free of charge, to companies with less than 499 employees and in relation to loans with an amount up to €5 million.	Dec-20
Netherlands	\$909	(1.1%)	2.0%	(8.2%)	(7.2%)	Government will pay up to 90% of company's wage bill, depending on the loss of turnover	NA	Credit facilities for SMEs. Growth Facility Scheme: The Growth Facility Scheme, which makes it easier for SMEs to raise capital	No stated deadline Jul-21	
								Because overhead is also a problem for many companies and organizations, the Government has introduced a new scheme, the Overhead Compensation SMEs (Tegemoetkoming Vaste Lasten mkb; TVL). This new compensation can be applied for by SME entrepreneurs working in sectors that qualify for the current TOGS scheme (Tax-exempt compensation for Entrepreneurs in Affected Sectors COVID-19; Tegemoetkoming Ondernemers Getroffen Sectoren COVID-19; TOGS).	Oct-20	
Switzerland	\$705	(2.4%)	(1.1%)	(8.4%)	(9.7%)	Government will reimburse up to 80% of employee's gross salary	NA	CHF8 billion for partial unemployment compensation CHF1 billion for financial aid to particularly-affected firms CHF580 million for loan guarantees for SMEs.	No stated deadline No stated deadline No stated deadline	
								Deferral of social insurance contributions: Companies affected by the crisis are able to request to defer the payment of social insurance contributions temporarily. No late interest is then levied on instalment payments until 20 September 2020. An adjustment of the usual amount of advance payments made under these insurances in the event of a significant drop in the wage bill could be requested. Moreover, no payment reminders will be sent until June 2020. These measures also apply to self-employed persons whose turnover has dropped. Moreover, employers may temporarily use their accumulated employer contribution reserves to pay employer contributions to occupational pension funds.	Sep-20	
								Immediate assistance in the form of specific transitional credits: the Confederation has set up a guarantee program with a volume approx. CHF 60 billion to ensure that affected SMEs (sole proprietorships, partnerships and legal entities) obtain transitional bank credits. This program is based on the existing structures of the guarantee organizations. Therefore, requests for such credits could have been made by the Swiss bank where the requestor has its bank account between 26 March and 31 July 2020.	Jul-20	
Turkey	\$726	(11.1%)	16.0%	(3.0%)	1.3%	Short-term work allowances, or TRY 39.24 per day for furloughed employees	Dec-20	A TL100 billion package was announced which included: reduced/postponed taxes for affected industries (e.g. tourism), extension of personal and corporate income tax filing deadlines, and Turkey Wealth Fund (TWF) given new rights to buy stakes in distressed firm. Accommodation tax will not be applied until November 2020	Dec-20 Nov-20	
								On June 30, the short-work allowance system that provides income support to employees of fully or partially closed businesses due to force majeure was extended by one month. VAT on several services sectors that are affected severely by the coronavirus pandemic were reduced temporarily till the end of 2020.	Dec-20	



	2019		1Q20		2Q20		Employee support	End date	Firm stimulus	End date
	Nominal GDP (US\$, bns)	Q/Q	Y/Y	Q/Q	Y/Y	Q/Q				
									VAT on several services sectors that are affected severely by the coronavirus pandemic were reduced temporarily till the end of 2020.	Dec-20
Spain	\$1,394	(5.1%)	(2.5%)	(18.3%)	(21.1%)	Government pays 70% of wages of furloughed employees	Sep-20	Expansion of ERTE (furlough scheme) to cover workers and companies with significant activity reduction in sectors considered essential	Sep-20	
								Exemptions of social contributions for impacted companies that maintain employment under the ERTE (€2.2 billion)	Sep-20	
								Tax payment deferrals for small and medium enterprises and self-employed for six months, with the first four months exempt from interest	No stated deadline	
								Extension of the deadlines for filing tax returns and self-assessment to May 30 for SMEs and self-employed;	May-20	
								Flexibility for SMEs and self-employed to calculate their income tax and VAT installment payment based on the actual profit in 2020	Dec-20	
								No surcharge for late payment of tax debts for companies obtaining financing through the Instituto de Crédito Oficial (ICO) Guarantee Lines	No stated deadline	
Russia*	\$1,701	(15.1%)	1.5%	(8.0%)	(11.8%)	Short-term work allowances; working hours may be reduced 30% at 80-90% of regular pay. Employees only pay hours worked, while the rest is paid by the government	Sep-20	Interest rate subsidies for SMEs and systemically important enterprises.	No stated deadline	
								Tax deferrals for most affected companies on most taxes.	No stated deadline	
								Deferrals on social contributions for SMEs in affected sectors for 6 months.	Sep-20	
								Social contributions by SMEs on wages in excess of the minimum wage permanently reduced;	No stated deadline	
								A tax holiday on all taxes (excluding VAT) and social contributions for Q2 for SMEs, sole proprietors, and NGOs providing social services;	Jun-20	
								Guaranteed loans to SMEs and affected industries	No stated deadline	
Poland*	\$592	(13.4%)	5.8%	(5.0%)	(4.2%)	Businesses may apply for a three-month subsidiary of 50-90% of the minimum wage for each employee	NA	Deduction of this year's losses for 2021 tax settlement (tax returns for 2019 might be corrected in order to deduct the losses of 2020 from the 2019 income);	Dec-20	
								Possibility of suspending certain social benefits obligations during the period of epidemic emergency	No stated deadline	

	2019		1Q20		2Q20		Employee support	End date	Firm stimulus	End date
	Nominal GDP (US\$, bns)	Q/Q	Y/Y	Q/Q	Y/Y	Q/Q				
Japan	\$5,082	(0.5%)	(1.1%)	(7.6%)	(9.0%)		Government of JPY 15,000/day/employee on leave	Dec-20	<p>Ministry of Finance (MOF) decided to use loan for crisis response. Low interest rate loan provided by Development Bank of Japan (DBJ) . Under this scheme, there are no upper limit of loan and Japanese media reported to use by large companies (e.g. Airline companies, Automotive manufactures etc.). As of End of July, total lending outstanding was ¥1,877.6 billion (147 cases)</p> <p>Ministry of Finance (MOF) decided to use safety net loan (loan limit:JPY720million) and loan for crisis response (loan limit: JPY300million) to support SMEs. Low interest rate loan provided by government financial institutions (JFC, Shoko Chukin Bank etc.).</p> <p>Ministry of Finance (MOF) established special loan program for novel coronavirus. Low interest rate loan provided by Japan Finance Corporation (JFC) and Okinawa development finance corporation. Loan limit is JPY300million.</p> <p>Ministry of Economy, Trade and Industry (METI) decided to use safety net guarantee program (guarantee limit: JPY280 million) and crisis related guarantee (guarantee limit:JPY280 million) to support SMEs.</p>	No stated deadline
HK*	\$366	(11.1%)	(6.5%)	(3.6%)	(8.1%)		Wage subsidy (50% of monthly wage, subject to a cap) for six months; and short-term work allowances	NA	<p>Tax and fee reliefs and other one-off relief measures (HK\$79.5 billion or 2.8 percent of GDP)</p> <p>Sector-specific relief measures (HK\$21 billion or 0.7 percent of GDP)</p>	No stated deadline
Australia	\$1,386	0.9%	3.3%	(7.6%)	(5.9%)		Wage subsidy of A\$1,500/employee/every two weeks	Mar-21	<p>Cash flow support to businesses, investment incentives, and targeted measures for affected regions and industries (including the HomeBuilder program supporting the construction industry).</p>	2023-2024 (majority executed in 2020-2021)
Singapore	\$372	(0.4%)	(2.2%)	(16.3%)	(18.1%)		Wage subsidy, with levels of support depending on the sector	Mar-21	<p>Enhancement of financing schemes, and additional support for the self-employed and industries most directly affected (aviation, tourism, construction, transportation, arts and culture).</p> <p>The authorities have increased their contingencies funds for unforeseen expenditure needs and also set aside loan capital of S\$20 billion to help businesses and individuals facing cash flow challenges with loan obligations and insurance premium payments.</p>	No stated deadline



	2019		1Q20		2Q20		Employee support	End date	Firm stimulus	End date
	Nominal GDP (US\$, bns)	Q/Q	Y/Y	Q/Q	Y/Y	Q/Q				
India*	\$2,888	3.0%	7.5%	(28.5%)	(22.6%)		Farmers receive payments through minimum income support scheme; Mahatma Gandhi National Rural Employment Guarantee Act workers wages increased	NA	India's fiscal support measures can be divided into two broad categories: (i) direct spending (about 1.7 percent of GDP) and foregone or deferred revenue (about 0.3 percent of GDP falling due within the current year); and (ii) below-the-line measures designed to support businesses and shore up credit provision to several sectors (about 4.9% of GDP).	No stated deadline
									Several measures to ease the tax compliance burden across a range of sectors have also been announced, including postponing some tax-filing and other compliance deadlines, and a reduction in the penalty interest rate for overdue GST filings.	No stated deadline
									Key elements of the business-support package are various financial sector measures for micro, small, and medium-sized enterprises and non-bank financial companies, whereas additional support to farmers will mainly be in the form of providing concessional credit to farmers, as well as a credit facility for street vendors. Agricultural sector support is mainly for infrastructure development.	No stated deadline
Indonesia	\$1,120	(2.4%)	3.7%	(6.0%)	(7.0%)		Employees are entitled to receive full pay if they are suspected of being infected or are actually infected with COVID-19; expanded unemployment benefits	NA	Permanent reductions of the corporate income tax rate from 25 percent to 22 percent in 2020-21 and 20 percent starting in 2022. In addition to tax and spending measures, the fiscal packages include capital injection into SOEs and interest subsidies, credit guarantees, and loan restructuring funds for micro, small, and medium enterprises (MSMEs).	No stated deadline

*Not seasonally adjusted. GDP growth/contraction is based on seasonally adjusted, nominal GDP unless otherwise noted
Source: Government websites, FactSet, IMF, KMPG, Reuters, Japan Times, Whitecase, Accurity, Financial Times, JDSupra



Exhibit 99: F/X Impact Sheet for 4Q20E

Company	CapIQ Ticker	FX exposure	% of revenues	Base FX Rate (in reporting currency)	4Q20 Period-to-date average FX rate as of 12/17/2020	Variance vs. Base Rate	4Q20E Total Revenue	4Q20E International revenue contribution	4Q20E revenue tailwind/(headwind)	Impact 4Q20E revenues	Percentage impact on 4Q20E revenues
Equinix	NasdaqGS:EQIX	EUR	21.0%	1.1400	1.1874	4.2%	\$1,559,751	\$327,548	\$13,630	\$22,697	1.5%
		GBP	9.0%	1.2800	1.3158	2.8%					
		SGD	7.0%	0.7300	0.7412	1.5%					
		BRL	2.0%	0.1800	0.1840	2.2%					
		AUD	4.0%	0.7200	0.7264	0.9%					
		HKD	4.0%	0.1300	0.1290	(0.8%)					
		JPY	6.0%	0.0096	0.0096	(0.3%)					
		CHF	1.0%	1.0500	1.1031	5.1%					
		CAD	1.0%	0.7500	0.7654	2.1%					
		SEK	1.0%	0.1100	0.1153	4.9%					
		CNY	0.0%	0.1400	0.1507	7.6%					
		AED	0.4%	0.2722	0.2723	0.0%					
		TRY	0.4%	0.1209	0.1262	4.4%					
		BGN	0.4%	0.6012	0.6071	1.0%					
		COP	0.4%	0.0003	0.0003	4.1%					
KRW	0.4%	0.0009	0.0009	1.3%							
MXN	0.4%	0.0473	0.0485	2.4%							
PLN	0.4%	0.2546	0.2638	3.6%							
American Tower	NYSE:AMT	ARS	0.3%	0.0124	0.0126	1.9%	\$2,059,713	\$6,179	\$119	\$16,735	0.8%
		BRL	6.1%	0.1818	0.1840	1.2%					
		CLP	0.9%	0.0013	0.0013	4.2%					
		COP	1.1%	0.0003	0.0003	3.1%					
		CRC	0.3%	0.0016	0.0016	0.5%					
		EUR	1.9%	1.1765	1.1874	0.9%					
		GHS	2.2%	0.1724	0.1723	(0.0%)					
		INR	15.4%	0.0136	0.0135	(0.5%)					
		MXN	5.9%	0.0450	0.0485	7.6%					
		PEN	0.6%	0.2817	0.2777	(1.4%)					
		ZAR	1.5%	0.0580	0.0634	9.4%					
		UGX	1.9%	0.0003	0.0003	(0.1%)					
		NGN	3.2%	0.0026	0.0026	2.2%					
		KES	1.1%	0.0091	0.0091	0.5%					
		XOF	1.1%	0.0017	0.0018	8.6%					
PYG	0.1%	0.0001	0.0001	(2.1%)							
Digital Realty Trust	NYSE:DLR	GBP	7.0%	1.2906	1.3158	2.0%	\$1,028,729	\$72,011	\$1,407	\$8,060	0.8%
		SGD	3.0%	0.7311	0.7412	1.4%					
		EUR	23.0%	1.1660	1.1874	1.8%					
		AUD	1.0%	0.7014	0.7264	3.6%					
		CAD	1.0%	0.7489	0.7654	2.2%					
		CHF	0.1%	1.0914	1.1031	1.1%					
		JPY	2.0%	0.0096	0.0096	(0.0%)					
		BRL	2.0%	0.1732	0.1840	6.2%					
		HKD	0.9%	0.1290	0.1290	0.0%					
		SBAC	NasdaqGS:SBAC	BRL	8.0%	0.1770					
CAD	0.8%			0.7519	0.7654	1.8%					
CLP	0.2%			0.0013	0.0013	0.2%					
ZAR	1.6%			0.0571	0.0634	11.0%					
COP	0.2%			0.0003	0.0003	4.1%					
PEN	0.2%			0.2767	0.2777	0.3%					
ARS	0.2%			0.0127	0.0126	(0.9%)					
Lumen (CenturyLink)	NYSE:LUMN			GBP	0.2%	1.2979	1.3158	1.4%	\$5,119,966	\$10,240	\$141
		EUR	1.0%	1.1710	1.1874	1.4%					
		BRL	0.2%	0.1764	0.1840	4.4%					
Megaport Ltd	ASX:MP1	USD	45.4%	1.3829	1.3773	(0.4%)	AUD 19,171	AUD 8,703	-AUD 35	-AUD 59	(0.3%)
		EUR	19.2%	1.6455	1.6350	(0.6%)					
Cogent	NasdaqGS:CCOI	EUR	17.1%	1.1830	1.1874	0.4%	\$143,198	\$24,554	\$92	\$94	0.1%
		CAD	2.3%	0.7670	0.7654	(0.2%)					
		MXN	2.3%	0.0481	0.0485	0.7%					
		JPY	1.3%	0.0096	0.0096	(0.8%)					
Company	CapIQ Ticker	Reporting currency	Stock listing currency	Base FX Rate (in reporting currency)	Spot rate as of 12/17/2020	Variance vs. Base Rate	Current Price Target	FX impact on Price Target	FX-adjusted Price Target	FX impact per share (\$)	FX impact per share (%)
Translational FX risk on per share valuation											
GDS	NasdaqGM:GDS	CNY	USD	0.1519	0.1531	0.8%	\$112	\$0.87	\$113	\$0.87	0.8%

Source: Company Reports, RBC Capital Markets estimates



Exhibit 100: F/X impact Sheet for FY2020E

Company	FX exposure	% of revenues	Base FX Rate (in reporting currency)	Spot FX rate as of 12/17/2020	Variance vs. Base FX rate	2020E Revenue	2020E International revenue contribution	2020E revenue tailwind/ (headwind)	Impact 2020E revenues	Percentage impact on 2020E revenues
Equinix	EUR	21.0%	1.1400	1.2243	7.4%	\$5,994,181	\$1,258,778	\$93,072	\$192,995	3.2%
	GBP	9.0%	1.2800	1.3600	6.2%		\$539,476	\$33,713		
	SGD	7.0%	0.7300	0.7542	3.3%		\$419,593	\$13,904		
	BRL	2.0%	0.1800	0.1980	10.0%		\$119,884	\$11,988		
	AUD	4.0%	0.7200	0.7618	5.8%		\$239,767	\$13,916		
	HKD	4.0%	0.1300	0.1290	(0.8%)		\$239,767	-\$1,844		
	JPY	6.0%	0.0096	0.0097	1.1%		\$359,651	\$4,125		
	CHF	1.0%	1.0500	1.1302	7.6%		\$59,942	\$4,577		
	CAD	1.0%	0.7500	0.7862	4.8%		\$59,942	\$2,891		
	SEK	1.0%	0.1100	0.1209	9.9%		\$59,942	\$5,956		
	CNY	0.0%	0.1400	0.1531	9.3%		\$0	\$0		
	AED	0.4%	0.2722	0.2723	0.0%		\$25,689	\$2		
	TRY	0.4%	0.1209	0.1299	7.4%		\$25,689	\$1,904		
	BGN	0.4%	0.6012	0.6261	4.2%		\$25,689	\$1,066		
	COP	0.4%	0.0003	0.0003	11.5%		\$25,689	\$2,964		
KRW	0.4%	0.0009	0.0009	3.4%		\$25,689	\$876			
MXN	0.4%	0.0473	0.0505	6.7%		\$25,689	\$1,726			
PLN	0.4%	0.2546	0.2760	8.4%		\$25,689	\$2,158			
American Tower	ARS	0.3%	0.0124	0.0121	(2.2%)	\$7,979,026	\$23,937	-\$525	\$153,791	1.9%
	BRL	6.1%	0.1818	0.1980	8.9%		\$486,721	\$43,318		
	CLP	0.9%	0.0013	0.0014	11.2%		\$71,811	\$8,043		
	COP	1.1%	0.0003	0.0003	10.5%		\$87,769	\$9,207		
	CRC	0.3%	0.0016	0.0017	0.6%		\$23,937	\$146		
	EUR	1.9%	1.1765	1.2243	4.1%		\$151,602	\$6,162		
	GHS	2.2%	0.1724	0.1711	(0.7%)		\$175,539	-\$1,307		
	INR	15.4%	0.0136	0.0136	(0.1%)		\$1,228,770	-\$1,395		
	MXN	5.9%	0.0450	0.0505	12.2%		\$470,763	\$57,218		
	PEN	0.6%	0.2817	0.2790	(0.9%)		\$47,874	-\$454		
	ZAR	1.5%	0.0580	0.0681	17.5%		\$119,685	\$20,974		
	UGX	1.9%	0.0003	0.0003	(0.1%)		\$151,602	-\$152		
	NGN	3.2%	0.0026	0.0026	2.6%		\$255,329	\$3,281		
	KES	1.1%	0.0091	0.0090	(1.4%)		\$87,769	-\$1,264		
	XOF	1.1%	0.0017	0.0019	12.2%		\$87,769	\$10,708		
PYG	0.1%	0.0001	0.0001	(2.1%)		\$7,979	-\$171			
Digital Realty Trust	GBP	7.0%	1.2906	1.3600	5.4%	\$3,869,729	\$270,881	\$14,571	\$80,253	2.1%
	SGD	3.0%	0.7311	0.7542	3.2%		\$116,092	\$3,666		
	EUR	23.0%	1.1660	1.2243	5.0%		\$890,038	\$44,462		
	AUD	1.0%	0.7014	0.7618	8.6%		\$38,697	\$3,334		
	CAD	1.0%	0.7489	0.7862	5.0%		\$38,697	\$1,928		
	CHF	0.1%	1.0914	1.1302	3.6%		\$2,556	\$91		
	JPY	2.0%	0.0096	0.0097	1.5%		\$77,395	\$1,133		
	BRL	2.0%	0.1732	0.1980	14.3%		\$77,395	\$11,061		
	HKD	0.9%	0.1290	0.1290	0.0%		\$34,828	\$5		
SBAC	BRL	8.0%	0.1770	0.1980	11.9%	\$2,074,471	\$165,958	\$19,699	\$27,436	1.3%
	CAD	0.8%	0.7519	0.7862	4.6%		\$16,596	\$757		
	CLP	0.2%	0.0013	0.0014	6.9%		\$4,149	\$287		
	ZAR	1.6%	0.0571	0.0681	19.2%		\$33,192	\$6,382		
	COP	0.2%	0.0003	0.0003	11.5%		\$4,149	\$479		
	PEN	0.2%	0.2767	0.2790	0.8%		\$4,149	\$34		
	ARS	0.2%	0.0127	0.0121	(4.9%)		\$4,149	-\$202		
Lumen (CenturyLink)	GBP	0.2%	1.2979	1.3600	4.8%	\$20,706,966	\$41,414	\$1,982	\$16,497	0.1%
	EUR	1.0%	1.1710	1.2243	4.6%		\$207,070	\$9,431		
	BRL	0.2%	0.1764	0.1980	12.3%		\$41,414	\$5,084		
Megaport Ltd	USD	45.4%	1.3829	1.3127	(5.1%)	AUD 70,526	AUD 32,019	-AUD 1,625	-AUD 1,941	(2.8%)
	EUR	19.2%	1.6455	1.6071	(2.3%)		AUD 13,541	-AUD 316		
Cogent	EUR	17.1%	1.1830	1.2243	3.5%	\$567,405	\$97,291	\$3,395	\$4,438	0.8%
	CAD	2.3%	0.7670	0.7862	2.5%		\$13,300	\$333		
	MXN	2.3%	0.0481	0.0505	5.0%		\$13,300	\$663		
	JPY	1.3%	0.0096	0.0097	0.6%		\$7,445	\$46		
Company	Reporting currency	Stock listing currency	Base FX Rate (in reporting currency)	Spot rate as of 12/17/2020	Variance vs. Base Rate	Current Price Target	FX impact on Price Target	FX-adjusted Price Target	FX impact per share (\$)	FX impact per share (%)
Translational FX risk on per share valuation										
GDS	CNY	USD	0.1519	0.1531	0.8%	\$112	\$0.87	\$113	\$0.87	0.8%

Source: Company Reports, RBC Capital Markets estimates



Recent Industry and Company Developments

AT&T update. WarnerMedia has completed its acquisition of You.i TV, a provider of cross-platform development tools for TV and media companies. The company's You.i Engine One enterprise development platform delivers video apps across mobile, tablet, game consoles, streaming devices, set-top boxes, and Smart TVs using a single codebase. The single codebase approach allows developers to build app features and make user experience changes once and then deploy across a variety of devices and operating systems. "The You.i Engine One technology, and the development teams behind it, are best-in-class," said Jason Press, WarnerMedia Executive Vice President of Direct-to-Consumer Technology & Program Management. "The You.i platform will enhance the HBO Max technology stack, increase developer efficiency, and accelerate delivery as we bring HBO Max to consumer devices all around the world." WarnerMedia and other affiliates of AT&T currently utilize You.i TV technology to enable apps for AT&T TV Now, TNT, TBS, truTV, B/R Live, Rooster Teeth, DIRECTV GO in Latin America, WarnerMedia International, and the WarnerMedia RIDE in-car entertainment experience in partnership with AT&T and General Motors. *(Company release)*

Verizon update. Verizon Business is teaming with Deloitte to co-innovate 5G and mobile edge computing (MEC) solutions. The companies are co-developing a smart factory solution at Verizon's Customer Technology Center in Richardson, TX, that will utilize computer vision and sensor-based detection coupled with MEC to identify and predict quality defects on the assembly line and automatically alert plant engineering and management in near real-time. "By bringing together Verizon's 5G and MEC prowess with Deloitte's deep industry expertise and track record in system integration with large enterprises on smart factories, we plan to deliver cutting-edge solutions that will close the gap between digital business operations and legacy manufacturing environments and unlock the value of the end-to-end digital enterprise," said Tami Erwin, CEO of Verizon Business. "This collaboration is part of Verizon's broader strategy to align with enterprises, startups, universities and government to explore how 5G and MEC can disrupt and transform nearly every industry." *(Company release)*

CCI 2019 Corporate Sustainability Report. Crown Castle International Corp announced the release of its 2019 Corporate Sustainability Report ("CSR"). "Our lives in the US changed dramatically in 2020 and, as a result, how we connect has evolved," stated Jay Brown, Crown Castle's Chief Executive Officer. "Crown Castle, now more than ever, is committed to building and maintaining the essential communications infrastructure connecting our communities – making them safer, better places to live. We are excited about the enhancements we have made to this year's CSR, and we look forward to continued engagement on this important area of focus." *(Company release)*

Cogent and BDx partner in Singapore (SIN1) Facility. Big Data Exchange (BDx), a pan-Asian carrier-neutral data center cluster, announced a new partnership with Cogent Communications in the company's Singapore (SIN1) datacenter facility. Acquired by BDx earlier this year, SIN1 is one of the facilities still available to service new customers in capacity-constrained Singapore. SIN1 houses 1,500 racks with a 6 MW power capacity within 14,400 square meters. It has been awarded an UpTime Tier 3 Design Certificate, as well as holding SS564 GreenMark Gold Plus, TVRA, ISO27001 and PCI-DSS certifications. Construction to add four floors and an additional 8 MW of capacity has also started. Upon completion, the SIN1 data center will house a total of 14 MW of capacity, making BDx one of the few data centers still able to service new customers in Singapore. The addition of Cogent as a new carrier in the BDx SIN1 facility will allow BDx customers to benefit from Cogent's footprint, network capabilities and range of services. Cogent is available as a connectivity option to all BDx customers regardless of the type of colocation services they require. "This new agreement with Cogent marks the beginning of a strategic partnership which we look forward to



developing," says Sona Singh, Business Development Director at BDx. "We are proud that Cogent has chosen BDx to partner within the important Singapore market. Together, we offer an even wider range of services for our customers. We are pleased to welcome Cogent into our SIN1 facility and look forward to expanding our partnership in the near future." (*Company release*)

Digital Realty Earns Nareit's Data Center Sustainability Award for Fourth Consecutive Year.

Digital Realty announced it has earned the National Association of Real Estate Investments Trusts (Nareit) "Leader in the Light" award for data center sustainability for the fourth consecutive year. The award honors Nareit member companies that have produced measurable results from the implementation of sustainable business practices. "We are proud to recognize our members who demonstrate leadership in the REIT and publicly traded commercial real estate industry with their vision, innovation and strategy in addressing ESG issues," said Fulya Kocak, senior vice president, ESG issues, Nareit. In 2020, Digital Realty added 154 MWs of renewable energy contracts across its U.S. portfolio, bringing the total executed under long-term contracts to 556 MWs of renewable energy. Last year, the company's renewable energy efforts resulted in 1.25M metric tons of avoided carbon emissions, the equivalent of taking 271,000 cars off the road each year, or the electricity needs of more than 212,000 homes per year. "Accelerating digital transformation has driven rapid growth in data center demand, underscoring the importance of environmental stewardship," said Digital Realty Chief Executive Officer A. William Stein. "We're honored to be recognized by Nareit for the fourth consecutive year, a testament to our consistent track record of setting the standard for responsible business practices. Looking forward, we remain committed to accelerating and expanding our sustainability initiatives and making progress towards our recently announced carbon reduction goals." Digital Realty recently committed to a carbon emissions reduction target with the Science-Based Targets initiative (SBTi). As part of the pledge, Digital Realty has committed to reducing direct emissions by 68% and indirect emissions by 24% by 2030. (*Company release*)

Landmark Announces Cash Distribution for its 8.00% Series A Preferred Units. Landmark Infrastructure Partners LP announced that the board of directors of its general partner declared a quarterly cash distribution for its 8.00% Series A Cumulative Redeemable Perpetual Preferred Units of \$0.500 per Series A Preferred Unit, payable on January 15, 2021, to Series A Preferred Unitholders of record as of January 4, 2021. (*Company release*)

T-Mobile Selected as State of Texas Telecommunications Relay and Captioned Telephone Services Provider.

T-Mobile announced that it has been selected to provide Telecommunications Relay Service (TRS) and Captioned Telephone service (CapTel) in the state of Texas, referred to as Relay Texas. The Public Utilities Commission of Texas (PUCT) renewed its relationship with T-Mobile, effective December 1, 2020, after more than 30 years of history with Sprint, now part of T-Mobile. TRS communications, including Relay Texas, can be accessed by dialing 711 anywhere in the U.S. from any phone and is available 24 hours a day, 365 days a year. "We are excited to continue our wonderful relationship with the great state of Texas, as well as working with the Public Utilities Commission and Relay Texas consumers as we endeavor to improve the quality of life for all," said Mike Ellis, who leads accessibility at T-Mobile. "T-Mobile provides a comprehensive array of accessible communication services to empower people who are Deaf, Hard of Hearing, DeafBlind, Low-Vision or have a Speech Disability that provide functionally equivalent communication options." (*Company release*)

American Tower Closes InSite Wireless Group Acquisition. American Tower Corporation announced that it has closed its acquisition of InSite Wireless Group, LLC. The total consideration for the transaction, subject to certain post-closing adjustments, was approximately \$3.5B, including the assumption or repayment of existing InSite debt, and was



funded by a combination of cash on hand and revolver borrowings. Tom Bartlett, American Tower's Chief Executive Officer stated, "We are pleased to close this immediately accretive transaction and expect to quickly begin driving new leasing activity on these high-quality, well-located assets. As 5G densification initiatives in the U.S. accelerate and network deployments in international markets continue, we believe we are well positioned to generate attractive, sustainable long-term growth, including on these new sites, while playing a key role in enhancing mobile broadband connectivity." American Tower expects the assets acquired from InSite to generate approximately \$150M in property revenue and approximately \$115M in gross margin in 2021. *(Company release)*

APAC update. 1) Chindata Group has started construction of its first high-end equipment manufacturing industrial base in Hebei Province, China, which will cover the research & development, design and manufacturing of prefabricated modules, flexible intelligent manufacturing, data center modules, equipment modules and professional products. Mr. Alex Ju, Founder and CEO of Chindata Group, said high-end equipment manufacturing is a strategic industry fundamental to the digital age and will propel the iterative product upgrade in the hyperscale data center campuses. Speaking at the groundbreaking ceremony held in Zhangjiakou, Mr. Ju shared that Chindata Group will continue to leverage on the advantage of its business model and master the core technologies in key areas that will improve its innovation capabilities and drive the long-term development of the industry. He believes that Chindata Group will strive to advance equipment manufacturing together with the industrial partners for a better and shared digital society. *(Company release)* 2) Based on our discussion with industry contacts, datacenter demand in Japan (both Tokyo and Osaka) and Singapore remains strong. We believe DLR is well positioned to see commitments on unleased capacity it has in those markets. As it pertains to GDS, we have heard from industry contacts continued indications that the company continues to evaluate ways to expand beyond China into additional Asian markets, which is in line with comments that GDS management made at our investor conference on May 27th. We note that GDS' largest stakeholder, STT, owns and operates datacenter businesses elsewhere in the region, which could potentially facilitate the creation of a joint regional datacenter entity with cross-ownership stakes, as just one example of how this expansion could be achieved. In this manner, GDS could continue to serve its large Chinese clients outside of mainland China.

Equinix and GIC JV. Equinix and GIC, Singapore's sovereign wealth fund, closed a joint venture whereby the JV acquired three sites in Japan for the development and operation of data centers with an opportunity to add more sites at later dates. The data center sites have been acquired and are held by wholly owned subsidiaries of APAC 1 Hyperscale LP, a limited partnership formed and registered under the laws of Singapore, of which Equinix owns a 20% interest and GIC owns an 80% interest. The three sites are located in Tokyo (two data center sites) and Osaka (one data center site). Equinix will provide a number of services, and each of the data centers will be managed and operated by Equinix. The services will include the sales and marketing of the data centers, managing the development of the data centers (and any expansions to those data centers), and facilities management of the data centers. *(Company release)*

Comcast Launching 10 WiFi-Connected "Lift Zones" In Greater Boston Area. Comcast announced plans to equip 10 different locations in the Boston area with WiFi-connected "Lift Zones" over the next few months. Working with its network of nonprofit partners, Comcast will be providing WiFi coverage at spaces in the City of Boston and beyond that are expected to help thousands of low-income students get online and do their homework. Lift Zones will feature free WiFi provided by Comcast, which allows students to work on laptops simultaneously so they can participate in distance learning. This initiative provides free connectivity inside partner community centers for the next three years. "We know that our



families – youth and their parents – have a fundamental need for access to crucial resources like WiFi Lift Zones, bridging the gap when at-home connectivity may not be available," said William Morales, Commissioner of Boston Centers for Youth & Families (BCYF). "Thanks to Comcast, we look forward to connecting many of our community centers with this super-charged WiFi to provide a dynamic learning environment for our kids." (*Company release*)

Brazil update. 1) The number of Brazilian smartphone users who subscribe to video streaming services has grown from 45 percent in 2019 to 56 percent in 2020, according to the new Panorama Mobile Time/Opinion Box survey on apps usage in Brazil. Netflix continues to lead with a 76 percent market share, although it is constantly losing share (85% in 2019). Amazon Prime Video is second with 11 percent, followed by Globoplay (3%), Disney+ (1%) and Telecine (1%). (*Telecompaper*) 2) The WiFi 6E Brazil Coalition has sent a letter to Brazil's National Telecommunications Agency (Anatel), expressing support for the regulatory agency to recommend the unlicensed use of the 6 GHz band, reports Teletime. The Wi-Fi coalition, whose members include Oi, Facebook, Google, Amazon and telecom sector associations such as Abrint, said the regulator's decision will enable widespread broadband connectivity. (*Telecompaper, Teletime*) 3) American Tower has signed an agreement with Technology Park of Belo Horizonte (BH Tec) for the development of IoT services, reports Telesintese. An IoT reference centre will be in charge of mobilizing developers and those who join will be able to use the LoRaWAN network of American Tower. (*Telecompaper, Telesintese*)

Nigeria update. Nigeria has extended the timeline for telecoms providers to update SIM card registrations following a meeting on Monday with chief executives of mobile phone companies, the telecoms regulator said. The regulator said it had extended registrations to Jan. 19 from Dec. 30 for providers to add valid National Identification Numbers (NIN) to every SIM card registered in the country. Subscribers without an NIN attached to their SIM cards have until Feb 9, 2021, to register, the regulator said in a statement. It has said SIM cards without a NIN attached will be blocked. Nigeria created the SIM card registration rules in an attempt to stop terrorists and criminals from using unregistered SIMs. (*Reuters*)



Companies mentioned

American Tower Corporation (NYSE: AMT US; \$218.65; Outperform)
 AT&T Inc. (NYSE: T US; \$28.69; Sector Perform)
 Cogent Communications Holdings, Inc. (NASDAQ: CCOI US; \$59.56; Sector Perform)
 Comcast Corporation (NASDAQ: CMCSA US; \$50.38; Sector Perform)
 Crown Castle International Corp. (NYSE: CCI US; \$154.00; Outperform)
 Digital Realty Trust, Inc. (NYSE: DLR US; \$137.43; Outperform)
 DISH Network Corporation (NASDAQ: DISH US; \$31.06; Sector Perform)
 Equinix, Inc. (NASDAQ: EQIX US; \$705.94; Outperform)
 GDS Holdings Limited (NASDAQ: GDS US; \$91.30; Outperform)
 Landmark Infrastructure Partners LP (NASDAQ: LMRK US; \$11.24; Sector Perform)
 T-Mobile US, Inc. (NASDAQ: TMUS US; \$132.92; Sector Perform)
 Verizon Communications Inc. (NYSE: VZ US; \$58.84; Sector Perform)

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