

## 9. Telecommunication



India's first 3G mobile services by the state owned MTNL  
(Mahanagar Telephone Nigam Limited)



## 9. TELECOMMUNICATION

### Concepts and Definitions

**Code-Division Multiple Access-** refers to any of several protocols used in so-called second-generation (2G) and third-generation (3G) wireless communications. As the term implies, CDMA is a form of multiplexing, which allows numerous signals to occupy a single transmission channel, optimizing the use of available bandwidth. The technology is used in ultra-high-frequency (UHF) cellular telephone systems

**Wire-line Connections-** landline telephones

**Wireless Phones-** mobile telephones

**Microwave Systems- Microwave radio relay** - transmission of long distance telephone calls and television programs by highly directional radio microwaves that are received and sent from one booster station to another on an optical path.

**Optical Fibre System – using Fiber-optic cable** - a multichannel communications cable using a thread of optical glass fibers as a transmission medium in which the signal (voice, video, etc.) is in the form of a coded pulse of light.

**VSAT - A Very Small Aperture Terminal (VSAT)**, is a two-way satellite ground station with a dish antenna that is smaller than 3 meters.



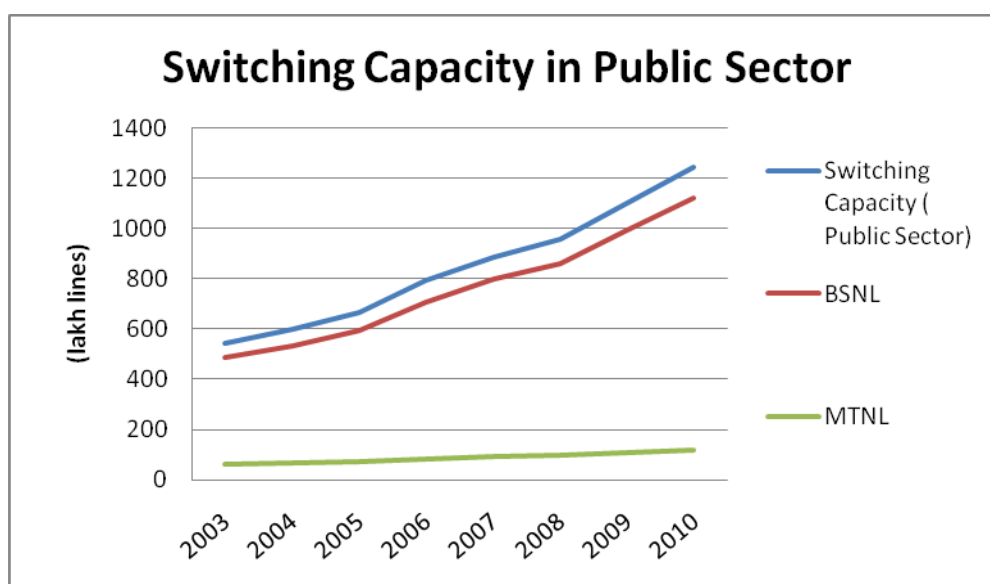
## 9. Telecommunication

9.1 The data sources for this sector are D/o Telecommunication and Telecom Regulatory Authority. Unless otherwise stated analytical highlights given below are based on Table No. 9.0 giving all India Trends for the Telecom sector.

### Telecom Network Capacity (Accessibility)

9.2 During 2003 to 2010 telecom network capacity has increased in terms of number of telephone exchanges and total switching capacity, rural direct exchange lines and trunk auto exchange lines.

9.3 Total number of exchanges increased from 36.6 thousand to 39 thousand, while number of rural exchanges increased from 28.6 thousand to

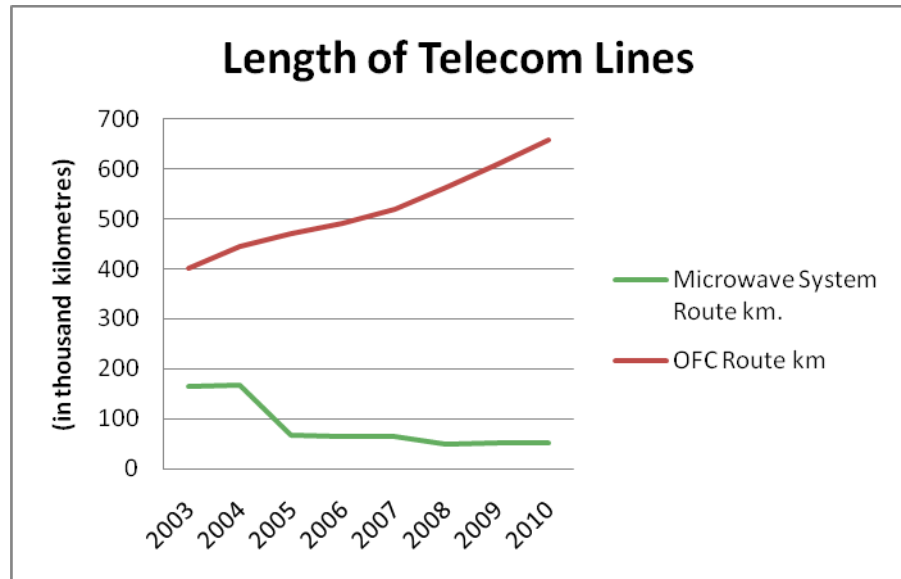


29.4 thousand during 2003 to 2010. Public sector switching capacity increased from 5.4 crore lines to 12.4 crore lines at a high CAGR of 12.5%. However total direct exchange fixed lines capacity in the public sector is showing a declining trend during the same period.

9.4 The length of optical fibre cable(OFC) route kilometers increased from 4 lakh km. to 6.6 lakh km. showing a positive CAGR of 7.3%, on the other hand, the microwave system route kilometers are showing a negative CAGR of 15.5% during 2003-2010.

### 9.5 Wireline

connections are showing a negative CAGR of 1.58%, on the other hand there is a significant increase in wireless subscribers showing a CAGR of 71.68%. Total number of telecom subscribers is also increasing steeply at a CAGR of 41.53% leading to increase in number of



connections per thousand population from 5 numbers in 2003 to 53 numbers in 2010.

There is tremendous increase in internet users showing a CAGR of 24.5% in which major share is of broadband and wireless internet users.

### Quality

9.6 As a result of heavy expansion in network capacity telecom connection services are more speedily available to the users. It is seen that waiting list for fixed phones is showing a remarkable negative growth at 32%.

### Fiscal Cost

9.7 The total annual outlay (RE) for the telecom sector from IEBR and gross budgetary support has varied between ₹12855 crore to ₹19950 crore during the period 2003 to 2010. Share of IEBR in total financial outlay for the sector is more than 90% during the period.

### Utilisation

9.8 Usage of dial up internet declined from 400 minutes per month per subscriber in 2004 to 227 minutes per month per subscriber in 2009. On the other hand usage of wireless internet increased from 225 minutes per month per subscriber in 2003 to 841 minutes per month per subscriber in 2009.

### Affordability

9.9 Use of internet has become cheaper during 2003 to 2009 in terms of average revenue per user per month.

**Table 9.0 : Trends in Important Indicators of Telecommunication Sector (2003-2009)**

Sl. No.	Indicators	2003	2004	2005	2006	2007	2008	2009	2010	CAGR %
( Reference Date / Period - As on 31st March for Stock Variables - Financial Year ending on 31st March for Flow Variables)										
<b>A</b>		<b>ACCESS</b>								
<b>I Telecom Network</b>										
1	Total Number of Exchanges (in number)	36628	37130	37560	37903	38338	38702	38780	39004	0.90
2	Number of Rural Exchanges (in number)	28583	28902	29081	29031	29203	29456	29346	29410	0.41
3	Switching Capacity (In Lakh)									
	Public	545.64	600.25	667.39	792.14	888.17	959.76	1103.68	1242.49	12.47
	BSNL	484.56	534.21	593.13	707.47	796.84	860.76	994.69	1122.85	12.76
	MTNL	61.08	66.04	74.26	84.67	91.33	99	109	119.64	10.08
4	Direct (Fixed) Exchange (in lakh lines)									
	Public	400.17	397.67	398.75	392.44	374.61	352.28	329.2	313.27	-3.44
	BSNL	354.17	354.36	358.59	354.23	337.39	315.52	293.46	278.31	-3.38
	MTNL	46	43.31	40.15	38.21	37.22	36.76	35.73	34.97	-3.84
5	Rural DELS (in lakh)	114.07	122.72	135.69	147.68	471.00	765.00	1235.13	2024.82	50.82
6	Trunk Auto Exchange Lines (TAX)(no. in lakh)	44.38	53.42	61.39	69.53	82.2	86.85	88.33	99.32	12.20
7	Microwave System(Rkm)	164314	167583	66591	63730	64507	50340	50430	50430	-15.53
8	OFC Route km	402083	445822	471199	490437	519155	564166	609223	658437	7.30
<b>II Telecom Connections</b>										
9	Wireline Connections(no. in lakh)									
	Total	413.24	409.2	414.24	402.26	407.73	394.13	379.65	369.57	-1.58
	Public	400.17	397.67	398.75	392.44	374.61	352.28	329.2	313.27	-3.44
	Private	13.07	11.53	15.49	9.82	33.13	41.85	50.45	56.29	23.20
10	Wireless Subscribers ( GSM+CDMA) (in lakh numbers)									
	Total	132.94	356.2	569.49	1018.66	1650.94	2610.79	3917.6	5842.91	71.68
	Public	31.54	67.16	122.14	218.39	339.3	443.21	566.27	745.44	57.12
	Private	101.39	289.04	447.35	800.27	1311.64	2167.58	3351.34	5097.47	75.01
11	Number of Connections / Subscribers (in lakh)									
	Total	546.17	765.4	983.73	1420.92	2058.67	3004.92	4297.25	6212.47	41.53
	Public	431.71	464.83	520.88	610.84	713.9	795.49	895.46	1058.71	13.67
	Private	114.46	300.56	462.85	810.08	1344.76	2209.44	3401.79	5153.76	72.27

**Table 9.0 (contd.) : Trends in Important Indicators of Telecommunication Sector (2003-2009)**

Sl. No.	Indicators	2003	2004	2005	2006	2007	2008	2009	2010	CAGR
		( Reference Date / Period - As on 31st March for Stock Variables - Financial Year ending on 31st March for Flow Variables)								
<b>A</b>		<b>ACCESS</b>								
12	Tele Density (per 000' population)									
	Total	5.11	7.02	8.95	12.74	18.22	26.22	36.98	52.74	39.58
	Fixed	3.88	3.94	4.28	3.79	3.61	3.44	3.27	-	-2.81
	Mobile	1.22	3.1	4.84	9.01	14.62	22.78	33.71	-	73.87
13	Number of Village Public Telephones ( in lakh)									
	Total	5.14	5.21	5.31	5.47	5.65	5.32	5.62	5.79	1.72
	Public	5.05	5.09	5.18	5.34	5.52	5.20	5.49	5.66	1.64
	Private	0.09	0.13	0.13	0.13	0.13	0.13	0.13	0.13	5.39
14	PCOs (in lakh numbers)									
	Public	14.00	17.19	21.51	23.86	23.65	22.91	20.89	18.58	4.13
15	Internet Connections (excluding Internet access by wireless phone subscribers and includes broadband subscribers)( no. in million)	3.64	4.55	5.55	6.94	9.27	11.09	13.54	-	24.48
16	Broadband Connections ( no. in million)	NR	NR	0.183	1.348	2.339	3.87	6.22	-	141.45
17	Wireless Internet# (in million)	NR	NR	NR	NR	31.3	65.5	117.82	-	94.02
<b>B</b>		<b>QUALITY</b>								
19	Waiting List-Fixed Phones (in lakh numbers)	18.1	17.91	16.21	12.19	7.11	3.08	2.23	1.24	-31.82
<b>C</b>		<b>FISCAL COST</b>								
<b>III Financial outlays in Telecom (Rs.in crore)</b>										
20	<b>Total</b>									
	RE	14191.04	12855.01	9689.31	17143.40	17468.22	16039.30	19950.24	15828.00	1.57
	Actual Expenditure	11610.43	7423.14	6707.67	7925.13	7135.57	8414.04	12695.37	11707.86	0.12
	% Utilisation	81.82	57.75	69.23	46.23	40.85	52.46	63.64	73.97	-1.43
21	<b>Internal &amp; Extra Budgetary Resources</b>									
	RE	13349.73	12703.00	9394.00	17041.40	17313.70	15789.30	19225.24	15397.00	2.06
	Share of IEBR in total outlay(%)	94	99	97	99	99	98	96	97	
	Actual Expenditure	10766.54	7276.61	6434.88	7842.52	6989.54	8193.85	12008.45	11320.48	0.72
	% Utilisation	80.65	57.28	68.50	46.02	40.37	51.89	62.46	73.52	-1.31

# Accessing internet through wireless (GSM &amp; CDMA) networks

Note: w.e.f. 2004, &gt;256 Kbps internet connection has been defined as broadband

NR: Not reported



**Table 9.0 (contd.) : Trends in Important Indicators of Telecommunication Sector (2003-2009)**

Sl. No.	Indicators	2003	2004	2005	2006	2007	2008	2009	2010	CAGR %
( Reference Date / Period - As on 31st March for Stock Variables - Financial Year ending on 31st March for Flow Variables)										
<b>C</b>		<b>FISCAL COST</b>								
<b>III</b>	<b>Financial outlays in Telecom (Rs.in crore)</b>									
22	<b>Gross Budgetary Support</b>									
	RE	841.31	152.00	295.31	102.00	154.52	250.00	725.00	431.00	-9.11
	Actual Expenditure	843.89	146.53	272.79	82.61	146.03	220.19	686.92	387.38	-10.53
	% Utilisation	100.31	96.40	92.37	80.99	94.51	88.08	94.75	89.88	-1.56
<b>D</b>		<b>UTILISATION</b>								
23	Traffic (MOU(minutes of use per subscriber per month)) Wireless									
	GSM				395	471	493	484	-	-
	CDMA	225	302	344	550	471	364	357	-	-
24	Dial-up Internet (MOU(minutes of use per subscriber per month))	NA	400	305	175	180	220	226.58	-	-10.75
<b>E</b>		<b>AFFORDABILITY</b>								
25	Average Revenue per User (ARPU)(Rs. Per subscriber per Month) Wireless									
	GSM				366	298	264	205	-	-
	CDMA	634	469	394	256	202	159	99	-	-
26	Dial-up Internet (Rs. per subscriber per month)	NA	310	220	210	200	220	236.47	-	-5.27

Source: Material supplied by Deptt. of Telecommunications &amp; Deptt. of IT, TRAI website

**Table 9A.1 : Circle-wise Estimated No. of Fixed Phones and Wireless Phones as on 31st March**

(in lakh numbers)

Sl.No.	Circle	Fixed Phones			Wireless Phones			Total Telephones		
		2008	2009	% Change	2008	2009	% Change	2008	2009	% Change
1	Andaman & Nicobar	0.25	0.19	-23.6	0.58	0.80	38.3	0.83	0.99	19.7
2	Andhra Pradesh	27.11	25.48	-6.0	205.78	304.05	47.8	232.89	329.53	41.5
3	Assam	4.30	3.51	-18.4	39.13	58.11	48.5	43.43	61.62	41.9
4	Bihar	9.78	9.68	-1.1	108.69	201.34	85.2	118.48	211.02	78.1
5	Chhattisgarh	3.19	2.91	-8.8	7.01	9.27	32.2	10.20	12.18	19.4
6	Gujarat	22.77	21.14	-7.1	169.68	241.10	42.1	192.45	262.24	36.3
7	Haryana	9.54	8.75	-8.3	6.40	99.02	1446.8	73.56	107.77	46.5
8	Himachal Pradesh	4.18	3.80	-9.0	22.99	33.21	44.4	27.17	37.01	36.2
9	Jammu & Kashmir	2.59	2.40	-7.5	22.02	35.04	59.1	24.61	37.44	52.1
10	Jharkhand	4.46	4.17	-6.6	6.40	8.44	31.8	10.87	12.61	16.0
11	Karnataka	28.44	27.83	-2.1	170.44	235.44	38.1	198.87	263.27	32.4
12	Kerala	36.73	35.76	-2.6	116.98	164.00	40.2	153.71	199.76	30.0
13	Madhya Pradesh	14.73	13.85	-6.0	124.91	196.72	57.5	139.65	210.57	50.8
14	Maharashtra	36.43	32.70	-10.2	210.79	313.45	48.7	247.22	346.15	40.0
15	North-East-I	2.12	2.08	-2.0	17.24	29.42	70.6	19.36	31.50	62.7
16	North-East-II	1.30	1.28	-1.6	3.94	4.07	3.2	5.24	5.35	2.0
17	Orissa	7.73	6.47	-16.3	51.80	86.87	67.7	59.53	93.34	56.8
18	Punjab	16.84	16.49	-2.1	11.72	148.81	1170.2	134.00	165.30	23.4
19	Rajasthan	17.57	16.66	-5.2	135.87	227.57	67.5	153.44	244.23	59.2
20	Tamil Nadu	25.02	22.60	-9.7	182.84	277.79	51.9	207.86	300.39	44.5
21	Uttaranchal	3.24	3.01	-7.2	6.86	8.19	19.5	10.10	11.20	10.9
22	Uttar Pradesh-[E]	15.12	15.25	0.8	161.65	271.50	68.0	176.78	286.75	62.2
23	Uttar Pradesh-[W]	9.75	9.85	1.0	122.01	186.75	53.1	131.77	196.60	49.2
24	West Bengal	11.23	10.34	-7.9	93.81	155.78	66.1	105.04	166.12	58.2
25	Kolkata	14.88	15.38	3.4	78.42	116.43	48.5	93.31	131.81	41.3
26	Chennai	13.76	14.04	2.1	70.61	92.29	30.7	84.37	106.33	26.0
27	Delhi	24.21	25.21	4.1	162.83	219.80	35.0	18.70	245.01	1210.0
28	Mumbai	26.85	28.81	7.3	136.32	192.33	41.1	163.17	221.14	35.5
	<b>All India</b>	<b>394.13</b>	<b>379.65</b>	<b>-3.7</b>	<b>2610.79</b>	<b>3917.61</b>	<b>50.1</b>	<b>3004.92</b>	<b>4297.26</b>	<b>43.0</b>
	<b>% Share in Total no. of Telephones</b>	<b>13.1</b>	<b>8.8</b>	<b>-</b>	<b>86.9</b>	<b>91.2</b>	<b>-</b>	<b>100.0</b>	<b>100.0</b>	<b>-</b>

Source: Material supplied by Deptt. of Telecommunications &amp; Deptt. of IT

**Table 9A.2 : Circle-wise Teledensity per 1000  
Population as on 31st March**

Sl. No.	Circle	(in numbers)					
		2008			2009		
		Overall	Urban	Rural	Overall	Urban	Rural
1	Andaman & Nicobar	1.84	2.54	1.42	2.12	2.89	1.66
2	Andhra Pradesh	2.83	7.50	1.04	3.96	10.34	1.52
3	Assam	1.47	7.63	0.44	2.07	8.70	0.94
4	Bihar	1.26	9.20	0.33	2.22	13.30	0.92
5	Chhattisgarh	0.44	1.49	0.14	0.52	1.67	0.18
6	Gujarat	3.36	6.01	1.64	4.52	7.54	2.52
7	Haryana	3.04	5.82	1.72	4.38	7.60	2.81
8	Himachal Pradesh	4.12	12.78	3.08	5.55	17.98	4.05
9	Jammu & Kashmir	2.18	6.12	0.79	3.28	7.74	1.67
10	Jharkhand	0.36	1.17	0.12	0.41	1.30	0.14
11	Karnataka	3.45	7.50	1.15	4.52	9.87	1.44
12	Kerala	4.53	10.08	2.62	5.85	12.53	3.54
13	Madhya Pradesh	2.03	6.02	0.53	3.01	8.04	1.11
14	Maharashtra	2.74	5.70	1.26	3.79	6.97	2.17
15	North-East-I	2.77	9.35	0.72	4.45	13.91	1.47
16	North-East-II	0.91	2.84	0.33	0.92	2.74	0.37
17	Orissa	1.50	5.56	0.71	2.33	7.81	1.26
18	Punjab	4.79	8.28	2.51	5.83	9.59	3.31
19	Rajasthan	2.37	5.91	1.27	3.72	10.26	1.67
20	Tamil Nadu	3.51	5.86	1.58	5.05	7.95	2.56
21	Uttaranchal	1.06	2.50	0.51	1.16	2.60	0.60
22	Uttar Pradesh-[E]	1.62	5.22	0.63	2.49	7.78	1.02
23	Uttar Pradesh-[W]	0.00	0.00	0.00	0.00	0.00	0.00
24	West Bengal	1.44	5.74	0.74	2.25	7.79	1.35
25	Kolkata	6.42	-	-	8.97	-	-
26	Chennai	10.39	-	-	12.74	-	-
27	Delhi	11.01	-	-	14.02	-	-
28	Mumbai	8.35	-	-	11.05	-	-
	<b>All India</b>	<b>2.62</b>	<b>6.64</b>	<b>0.95</b>	<b>3.70</b>	<b>8.88</b>	<b>1.51</b>

Source: Material supplied by Deptt. of Telecommunications & Deptt. of IT

**Table 9A.3 : Circle-wise Number of Villages with Direct Access to Telecom Facilities as on 31st March**

(in thousand numbers)

Sl. No	Circle/State	Villages covered with Village Public Telephones							PCO's (Local+STD+Highway)						
		2003	2004	2005	2006	2007	2008	2009	2003	2004	2005	2006	2007	2008	2009
1	Andaman & Nicobar	0.2	0.2	0.2	0.2	0.2	0.2	0.3	0.7	0.9	1.0	1.2	0.6	1.0	0.7
2	Andhra Pradesh	24.7	24.8	25.0	25.2	25.3	21.8	23.0	133.9	177.4	237.8	281.3	271.3	241.2	200.3
3	Assam	18.0	19.4	21.4	23.1	24.3	22.4	23.4	14.5	17.8	22.1	24.7	33.1	34.5	33.9
4	Bihar	38.5	38.5	38.5	38.5	38.5	36.6	37.9	43.1	47.6	55.4	63.0	68.9	66.4	67.2
5	Chhattisgarh	14.7	14.7	15.0	16.4	17.3	17.2	17.5	5.9	7.5	8.7	9.6	9.5	9.3	8.6
6	Gujarat	15.2	15.3	16.7	17.5	18.6	19.1	20.6	86.4	112.4	146.8	147.3	124.9	106.0	89.6
7	Haryana	6.8	6.8	6.8	6.8	6.8	6.4	6.6	26.0	31.7	35.4	35.0	30.4	28.2	26.3
8	Himachal Pradesh	16.6	16.6	16.6	16.8	16.8	15.9	17.1	7.2	8.2	10.2	11.4	12.0	12.0	11.4
9	Jammu & Kashmir	4.2	4.8	5.0	5.1	6.1	5.6	5.8	12.0	14.2	15.7	16.5	16.1	14.4	12.7
10	Jharkhand	26.3	26.9	27.0	27.0	27.6	26.5	27.2	11.0	13.1	16.6	23.3	23.5	21.1	19.0
11	Karnataka	27.1	27.1	27.1	27.1	27.1	26.4	27.3	102.3	164.4	234.1	262.5	262.6	256.3	242.0
12	Kerala	1.5	1.5	1.5	1.5	1.5	1.4	1.4	59.5	74.5	96.2	116.3	125.3	129.1	123.5
13	Madhya Pradesh	37.9	38.2	41.0	45.7	49.8	50.2	52.5	42.3	46.1	52.6	53.4	51.8	56.4	57.0
14	Maharashtra	33.4	34.2	35.8	37.0	39.3	37.9	41.1	165.0	223.2	284.2	311.9	328.1	313.8	262.8
15	North-East-I	3.3	4.2	4.4	4.4	4.5	4.1	4.3	3.3	4.1	5.2	6.0	8.2	9.7	9.5
16	North-East-II	2.3	3.3	3.5	3.6	3.9	3.8	4.1	3.8	4.5	5.2	6.8	7.4	7.9	8.6
17	Orissa	40.4	40.8	40.8	40.8	41.3	38.8	40.8	22.6	27.2	32.1	30.8	30.3	28.8	24.8
18	Punjab	13.5	13.6	13.6	12.7	12.7	12.9	12.9	40.6	44.1	43.2	41.8	33.3	27.8	23.9
19	Rajasthan	24.9	26.9	28.2	32.8	36.8	37.0	41.6	49.7	58.7	67.1	68.9	67.9	63.1	55.5
20	Tamil Nadu	17.9	17.9	17.9	16.2	16.2	13.4	13.8	97.1	123.8	176.8	208.4	213.6	236.4	216.6
21	Uttaranchal	11.6	11.7	11.9	12.1	13.2	12.5	13.0	8.6	10.6	13.4	14.6	14.3	12.9	11.1
22	Uttar Pradesh-[E]	76.0	76.0	76.0	76.0	76.0	70.5	76.5	68.3	84.7	96.3	104.5	110.6	122.8	124.8
23	Uttar Pradesh-[W]	21.3	21.3	21.3	21.3	21.3	19.5	20.1	43.5	52.0	60.1	57.7	48.4	43.4	44.1
24	West Bengal	37.3	37.3	37.3	37.3	37.3	30.1	31.5	27.3	34.5	43.4	58.2	64.8	65.7	60.2
25	Kolkata	0.4	0.4	0.4	0.4	0.4	0.6	0.6	53.0	62.5	66.5	65.4	59.8	60.0	64.1
26	Chennai	0.0	0	0	1.7	1.7	1.5	1.5	68.1	74.2	79.0	86.0	88.2	82.7	79.5
27	Delhi	0.2	0.2	0.2	0.2	0.2	0	0	73.2	89.8	101.8	97.1	91.5	82.7	73.8
28	Mumbai	0.0	0	0	0.0	0	0	0	131.3	149.9	180.5	181.9	168.6	156.6	137.4
<b>All India</b>		<b>514.3</b>	<b>522.3</b>	<b>532.8</b>	<b>547.1</b>	<b>564.6</b>	<b>532.3</b>	<b>562.0</b>	<b>1400.1</b>	<b>1759.3</b>	<b>2187.3</b>	<b>2385.6</b>	<b>2365.0</b>	<b>2290.5</b>	<b>2088.7</b>

Source: Material supplied by Deptt. of Telecommunications &amp; Deptt. of IT