

# **Internet Connectivity Report (July - September, 2016)**



**Telecom Division  
Department of IT and Telecom**

## **Executive Summary**

In compliance to the instruction of the Hon'ble Prime Minister to check and monitor the quality of Internet in the dzongkhags, the DITT/MoIC has prepared a report on the quality of internet access.

The data is collected from the dzongkhags on a monthly basis and the report is prepared on a quarterly basis. This is the first report for the fiscal year 2016-17 from July-September.

The major observation of this study is that Internet, especially, through LAN is found to be inconsistent in the dzongkhags. In addition to that, the dzongkhags have not been able to provide the data on time.

Overall, the upload speeds are observed higher than the download speeds in the study. This is however, not preferred for the end users.

## **Introduction**

There has been an increase in uptake of Internet in the country, with the increase in the number of internet service providers (ISPs). As of now, there are seven ISPs in Bhutan providing internet services to the citizens. The current coverage of internet in the country is 63%. Although the country has a fair internet coverage, there is no definite platform to actually measure the quality of internet in the country. Therefore, DITT, MoIC has developed a platform to measure the quality of internet throughout the country. Data collected during the study and findings are reported below.

## **Objective of the study**

To study the quality of Internet connectivity in the Dzongkhags.

## **Methodology**

A dashboard was prepared for measuring the internet speed of the LAN and shared with the Dzongkhag ICT Officers. The ICT officers were given instructions on the usage of the dashboard via email, letter and telephone after which they were asked to carry out and record measurements from time to time on a monthly basis starting July, 2016. This data collection is an ongoing process and will be refined from time to time.

Based on inputs provided by the Dzongkhag ICT Officers, data has been analysed and compiled in this report.

### **Key Findings**

All the dzongkhags have subscribed to 12 Mbps bandwidth (4Mbps Internet bandwidth and 8Mbps point-to-point links). Based on the data submitted by the Dzongkhags (only Chukha, Haa, Mongar and Tsirang have provided complete data set), average Internet speed of each dzongkhag per month, for the months of July, August and September has been compiled in Table 1 below. The maximum upload/download speed and the minimum upload/download speed has also been recorded.

Month	Dzongkhag	Internet speed (Avg.)	
		Upload (Mbps)	Download(Mbps)
July	Chukha	11.62	3.73
	Haa	2.759	0.686
	Mongar	1.125	0.575
	Tsirang	23.06	11.897
August	Chukha	11.452	4.644
	Haa	21.91	18.321
	Mongar	10.09	2.618
	Tsirang	22.929	10.681
Sept	Chukha	12.083	4.6
	Haa	56.358	57.008
	Mongar	6.545	5.375
	Tsirang	22.494	9.216

Table 1: Average upload and download speed in Mbps per Month

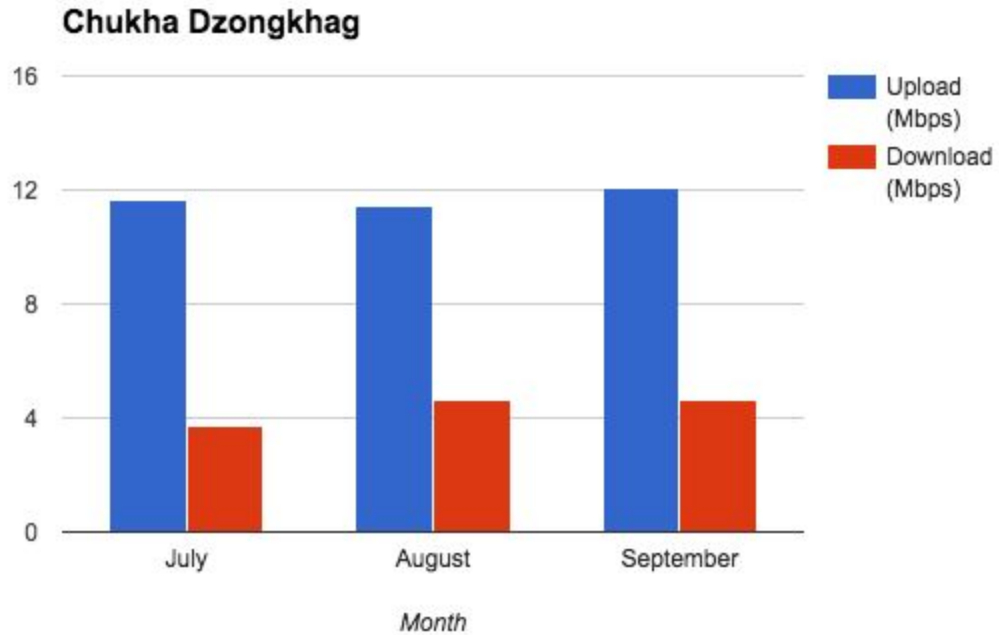


Figure 1: Average Upload and Download Internet Speed for Chukha Dzongkhag based on BTL network.

A maximum upload speed of 13.26 Mbps and a maximum download speed of 9.40 Mbps were noticed during the period of study. A minimum upload speed of 1.62 Mbps and a minimum download speed of 0.62 Mbps were also observed. From Figure 1 above, an average upload speed of 11Mbps and an average download speed of 4 Mbps is observed. Internet speed is observed to be fair in the Dzongkhag and while download speed should be much higher, it is noticed to be on the lower side. One of the reasons for this could be the higher demand of download rather than upload services.

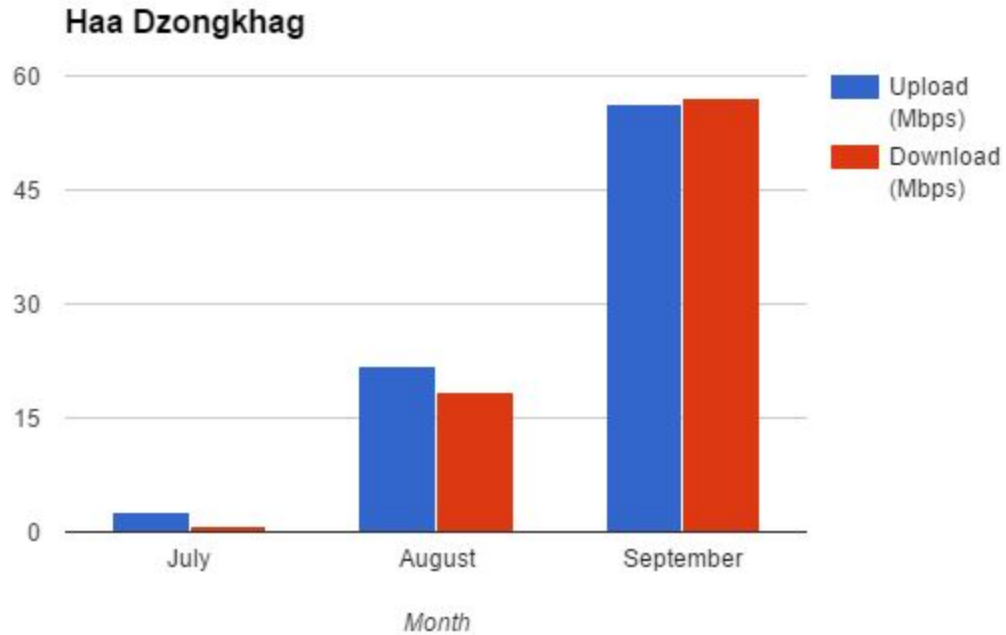


Figure 2: Average Upload and Download Internet Speed for Haa Dzongkhag based on BTL network and TICL network.

A maximum upload speed of 58.79 Mbps and a maximum download speed of 61.43 Mbps were noticed during the period of study. A minimum upload speed of 0.005 Mbps and a minimum download speed of 0.084 Mbps were also observed. From Figure 2 above, an average upload speed of 30 Mbps and an average download speed of 20 Mbps is observed. While average Internet speed is observed to be quite good in the Dzongkhag, the speed of both upload and download is noticed to be rather fluctuating and inconsistent. The reason for this could either be the short data collection period for this study. It could also be because the test was conducted as soon as a switch over from Tashi to BT network which was done in the month of September according to the Dzongkhag ICTO.

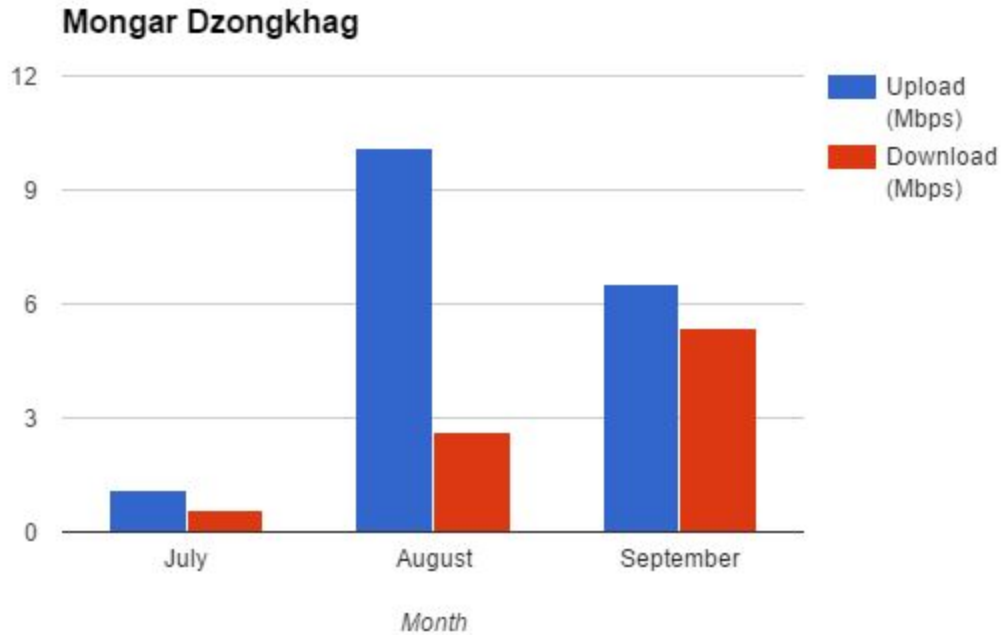


Figure 3: Average Upload and Download Internet Speed for Mongar Dzongkhag based on TICL network.

A maximum upload speed of 18.38 Mbps and a maximum download speed of 15.41 Mbps were noticed during the period of study. A minimum upload speed of 0.30 Mbps and a minimum download speed of 0.33 Mbps were also observed. From Figure 3 above, an average upload speed of 6 Mbps and an average download speed of 3 Mbps is observed. Internet speed is observed to be fair in the Dzongkhag. Here as well, while download speed should be much higher, it is noticed to be a bit low and could be due to higher demand for download.

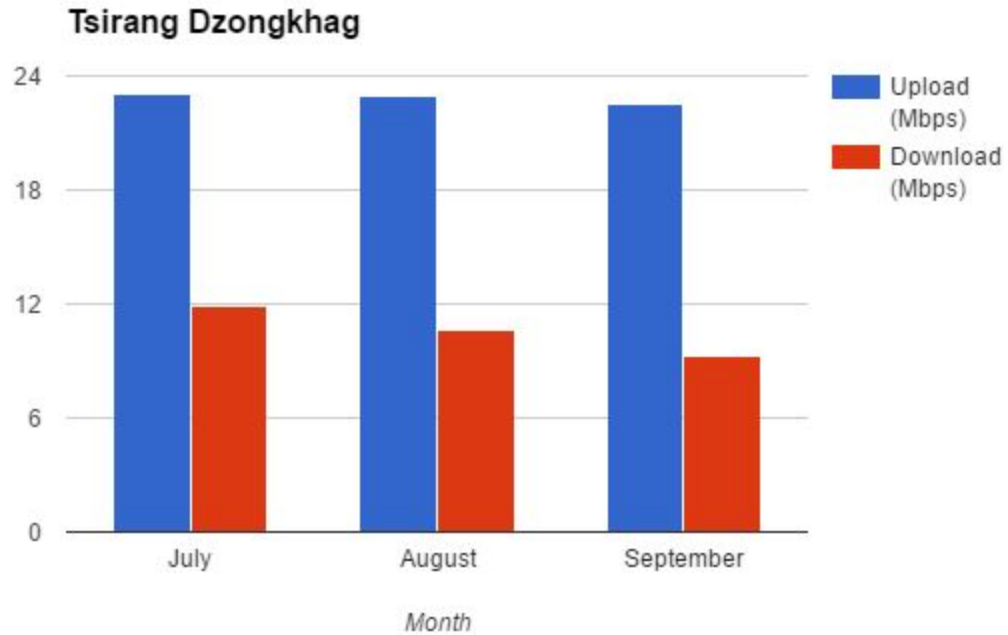


Figure 4: Average Upload and Download Internet Speed for Tsirang Dzongkhag based on TICL network.

A maximum upload speed of 23.75 Mbps and a maximum download speed of 21.54 Mbps were noticed during the period of study. A minimum upload speed of 21.61 Mbps and a minimum download speed of 0.93 Mbps were also observed. From Figure 4 above, an average upload speed of 22 Mbps and an average download speed of 10 Mbps is observed. Internet speed is observed to be quite good in the Dzongkhag, however observing the maximum and minimum download speed during the period of the study, the download speed is noticed to be quite inconsistent and fluctuating. Here too, the upload speed is higher than the download speed.

### **Conclusion**

While the above analysis is limited by the data collected during the short period of this study and also the Dzongkhags' willingness to participate and provide complete data set, a general trend can be noticed in that upload data rates tend to be higher than download data rates. While higher download data rates are preferred, this could be due to higher demand in download services from consumers.

While good data rates (Internet speed) can be noticed throughout, there is also inconsistency in the data rates observed, i.e Internet speed is fluctuating. This could also be due to network issue in itself or due to some events like higher access at certain times.

More rounds of data collection needs to be done to get accurate results.

### **Constraints**

This study has been limited by following constraints:

- The measurement of the Internet speed has been done in an inconsistent manner.
- Following Dzongkhags have not carried out the speed measurements at all:
  - Bumthang
  - Gasa
  - Lhuntse
  - Paro
  - Pemagatshel
  - Punakha
  - Sarpang
  - Samdrup Jongkhar
  - Samtse
  - Trashigang
  - Trashi Yangtse
  - Zhemgang
  
- Following dzongkhags have submitted incomplete data:
  - Wangdue Phodrang
  - Dagana
  - Thimphu
  - Trongsa
  
- Following dzongkhags have submitted complete data on which this report is based:
  - Chhukha
  - Haa
  - Mongar
  - Tsirang



**Annexure**

**I. Average Internet Speed recorded Dzongkhag-wise for the months of July, August and September**

Month	D/khag	Internet speed (Avg.)		Signal Coverage
		Upload (Mbps)	Download (Mbps)	
July	Wangdue	10.87	0.32	-
	Chukha	11.62	3.73	coverage is good within dzongkhag but very poor between Watsa and Tanalum, Gedu and Sorchen. Fair at gewogs.(Metakha and Dungna have only Tcell connection)
	Haa	2.759	0.686	Sangbaykha and Gakiling Geogs have no 3G and 2G/GPRS is erratic
	Mongar	1.125	0.575	Weak in shadow areas
	Dagana	6.57	6.86	-
	Tsirang	23.06	11.897	-
	Thimphu	8 (speed)		Good
August	Chukha	11.452	4.644	-
	Haa	21.91	18.321	-
	Mongar	10.09	2.618	-
	Tsirang	22.929	10.681	-
Sept	Chukha	12.083	4.6	-
	Haa	56.358	57.008	-
	Mongar	6.545	5.375	-

	Tsirang	22.494	9.216	-
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## II. Maximum Upload/Download and Minimum Upload/Download Speed recorded Dzongkhag-wise for the months of July, August and September

### 1. July

Service Provider	Dzongkhag	Internet Speed (Mbps)		Signal Coverage
		Max/Time (Upload/Download)	Min/Time (Upload/Download)	
TICL	W/Phodrang	-14.05@4:31 pm -15.71@ 8:56am	-6.97@3:56pm -0.26@3@56pm	-
BTL	Chukha	-12.70@12:19am -8.74@10:21am	-10.17@11:15am -0.95@11:15am	-
BTL	Haa	-7@10:44am -4.35@9:25am	-0.005 -0.084	erratic
BTL	Mongar	-1.95@3:33pm -0.82@3:33pm	-0.30@4:30pm -0.33@4:30pm	Weak in shadow areas
TICL	Dagana	-6.57:4:46pm -6.86@4:46pm	-	-
TICL	Tsirang	-23.75@10:25am -20.49@5:06pm	-22.29@1:45pm -0.93@1:18pm	-

### 2. August

Service Provider	Dzongkhag	Internet Speed (Mbps)		Signal Coverage
		Max/Time (Upload/Download)	Min/Time (Upload/Download)	
BTL	Chukha	-13.26@9:47am -8.80@5:00pm	-1.62@1:32pm -0.62@12:47pm	Coverage weak in Samphelling

				CC
BTL	Haa	-58.79@10:30am -61.43@10:30am	-0.95@4:30pm -0.33@4:30pm	erratic
TICL	Mongar	-11.62@4:39pm -5.91@10:22am	-0.30@4:30pm -1.27@4:39pm	Weak in shadow areas
TICL	Tsirang	-23.60@10:00am -21.54@5:00pm	-21.62@4:25pm -1.97@11:13am	-
TICL	Trongsa	-11.18@10:25am -9.26@10:25am	10.40@10:25am -0.93@10:25am	-

### 3. September

Service Provider	Dzongkhag	Internet Speed (Mbps)		Signal Coverage
		Max/Time (Upload/Download)	Min/Time (Upload/Download)	
BTL	Chukha	-12.97@1:52pm -9.40@2:05pm	-11.56@2:27pm -1.74@4:37pm	-
BTL	Haa	-58.79@10:30am -61.43@10:30am	-53.64@12:00pm -52.30@9:24am	-
TICL	Mongar	-18.38@2:20pm -15.41@11:11am	-7.33@10:08am -6.17@10:08am	-
TICL	Tsirang	-23.56@1:05pm -17.28@4:25pm	-21.61@4:45pm -3.79@3:12pm	-