هيئة تنظيم الاتصالات
Telecommunications Regulatory Authority

Fixed Broadband Analysis Report
01 Oct 2010 – 31 Dec 2010 between 00:00:00 and 24:00:00 Bahrain

Published 20 January 2011

Public Document

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Introduction

TRA is publishing this third fixed Broadband Analysis Report which provides consumers with information based on measurements performed on available fixed Internet Service Providers (ISPs) Retail Broadband offers in the Kingdom of Bahrain .

Whilst ISPs do provide the basic level of information required to allow customers to make decisions relating to price, expected download speed and download threshold, they do not make available information relating to the download, upload and browsing speeds experienced on average by consumers.

Via this report TRA aim at providing consumers with data relating to the actual quality of service achieved by each of the monitored ISP Services to allow consumers to make informed decisions with respect to understanding what is likely to be provided by each ISP on the specific measured packages. It is not feasible for the TRA to monitor all the available packages from all ISPs and therefore the choice has been made to focus on the packages1 Mbps for aDSL, Fiber, Satellite Services and 2Mbps for WiMax Services for the following ISPs:

aDSL:	2Connect, Batelco, Etisalcom, Kalaam, Lightspeed,
Cable:	NueTel
Satellite:	Orbit Satnet
WiMax:	Menatelecom, Zain

Beside the difference in access technologies , with a specific highlight on Satellite which by nature provides a different customer experience, other important elements such as network load and dimensioning, network capacity towards the global internet and ISPs internal engineering rules based on specific commercial objectives have all an impact on end user experience.

As ISPs are all working at optimizing their respective networks, results between two specific measurement period are subject to change however after 3 consecutive measurements quarters TRA is confident that no significant service degradation has been identified and industry trends have established.

Measurements Methods Overview

The primary objective of the Broadband Quality of Service monitoring platform is to conduct a pre-defined set of tests each hour of the day, 7 days a week, 52 weeks of the year using standard fixed network broadband connections supplied by each of the Kingdom's ISPs. The results of these tests are transmitted in near real time to, and stored in, a centralised database server.

From each ISP two internet connections have been purchased and are monitored using the Epitiro Broadband Quality of Service monitoring platform. Standardised tests are conducted between the probes that have been deployed on each of the broadband connections under this test program . The tests involve requests being sent towards a standard specified list of public websites as well as dedicated servers located in the Kingdom of Bahrain, USA , Asia and Europe.

To ensure the accuracy of the information gathered each probe is constantly monitored and any issues identified are recorded and resolved remotely by Epitiro.

Diagram 1 provides a overview of the system that has been implemented. For the sake of simplicity only three of the nine ISPs connected to the platform and only one of the Epitiro Ltd endpoints have been illustrated.

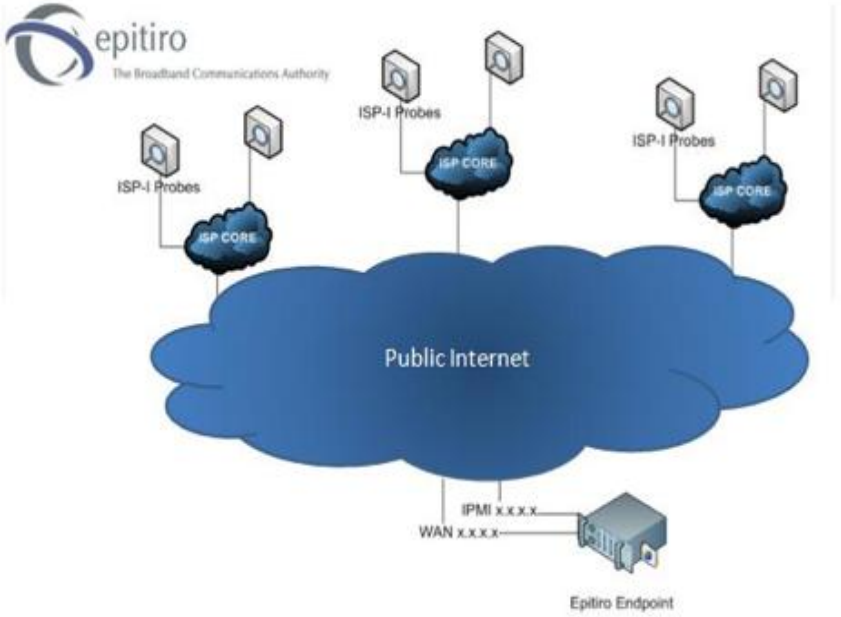


Diagram 1 - Broadband Quality of Service test platform overview

RESULTS

The following pages present the result of measurements taken every hour for each audited service during the period of Q4 2010, from 00:00:00 on the 1 October 2010 to 24:00:00 on the 31 December 2010.

For each ISP, one set of measurements is taken each hour, 24 hours a day. In this report, results for a given hour are then averaged to determine the average QoS in that hour over the three month period. i.e. all results recorded between 8:00 and 9:00 for an ISP are averaged and reported as one observation on the graph that provide the average performance of this specific time period over a three month period.

This method has the advantage that it can show trends over an audited period as well as show variations during a 24h period.

Chart 1 TCP Download Speed (average) 1 Mbps services

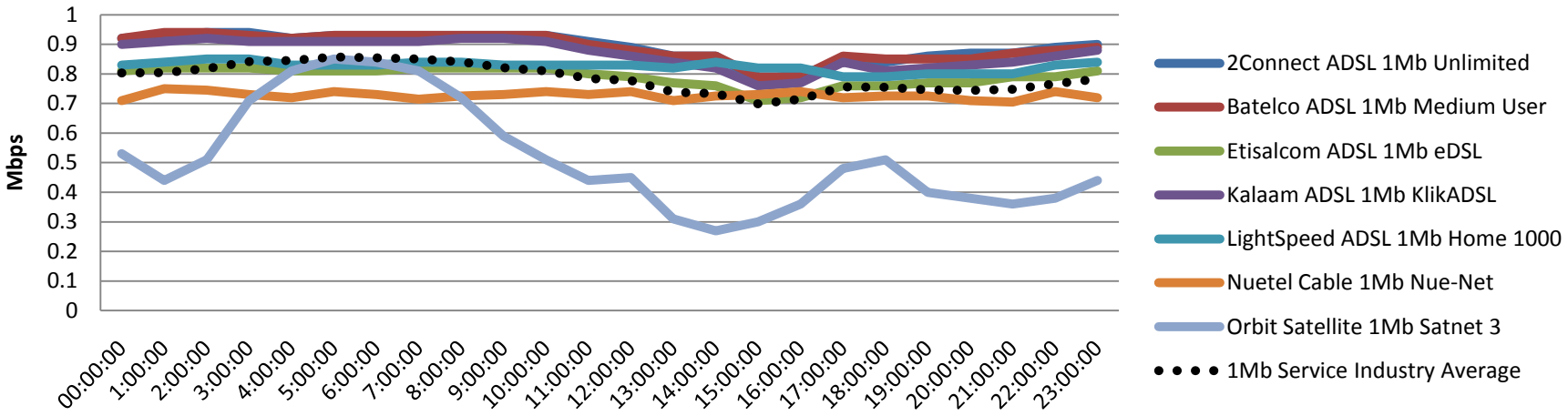
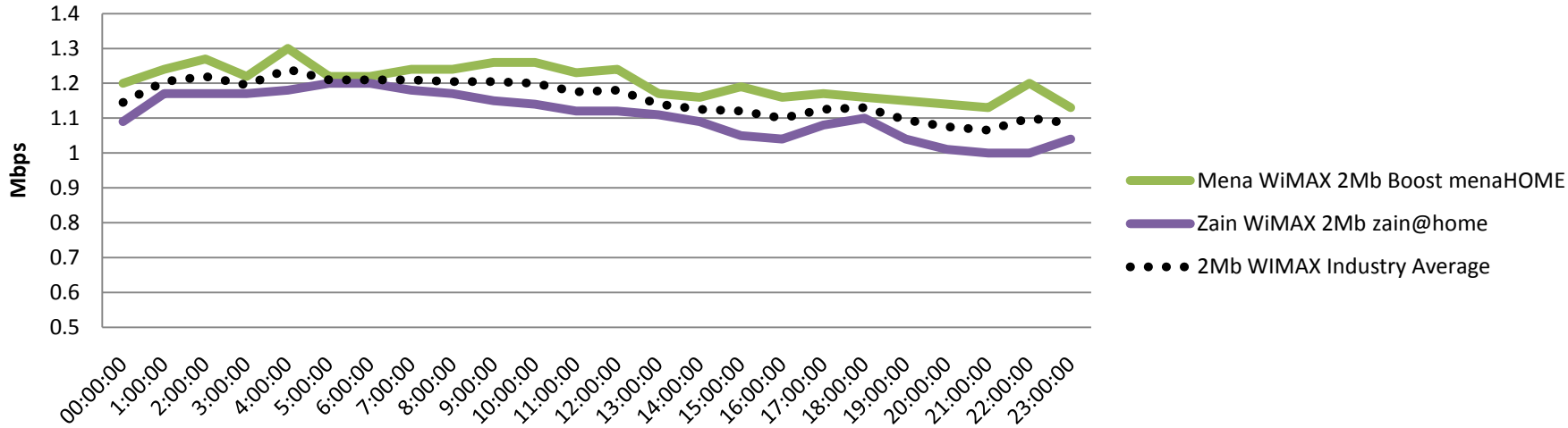


Chart 2 TCP Download Speed (average) 2 Mbps WiMax services



TCP Download Speed (Average) Line Chart (Peer view)
01 Oct 2010 00:00:00 - 31 Dec 2010 24:00:00 Bahrain

ISP Package	00:00:00	1:00:00	2:00:00	3:00:00	4:00:00	5:00:00	6:00:00	7:00:00	8:00:00	9:00:00	10:00:00	11:00:00	12:00:00	13:00:00	14:00:00	15:00:00	16:00:00	17:00:00	18:00:00	19:00:00	20:00:00	21:00:00	22:00:00	23:00:00
2Connect ADSL 1Mb Unlimited	0.92	0.93	0.94	0.94	0.92	0.93	0.93	0.93	0.93	0.93	0.93	0.91	0.89	0.86	0.86	0.78	0.8	0.84	0.84	0.86	0.87	0.87	0.89	0.9
Batelco ADSL 1Mb Medium User	0.92	0.94	0.94	0.93	0.92	0.93	0.93	0.93	0.93	0.93	0.93	0.9	0.88	0.86	0.86	0.79	0.79	0.86	0.85	0.85	0.85	0.87	0.88	0.89
Etisalcom ADSL 1Mb eDSL	0.81	0.82	0.82	0.82	0.81	0.81	0.81	0.82	0.82	0.82	0.82	0.8	0.79	0.77	0.76	0.71	0.72	0.76	0.76	0.77	0.77	0.79	0.79	0.81
Kalaam ADSL 1Mb KlikADSL	0.9	0.91	0.92	0.91	0.91	0.91	0.91	0.91	0.92	0.92	0.91	0.88	0.86	0.84	0.82	0.76	0.77	0.84	0.81	0.82	0.83	0.84	0.86	0.88
LightSpeed ADSL 1Mb Home 1000	0.83	0.84	0.85	0.85	0.83	0.83	0.83	0.84	0.84	0.83	0.83	0.83	0.83	0.82	0.84	0.82	0.82	0.79	0.79	0.8	0.8	0.8	0.83	0.84
Nuetel Cable 1Mb Nue-Net	0.71	0.75	0.75	0.73	0.72	0.74	0.73	0.72	0.73	0.73	0.74	0.73	0.74	0.71	0.73	0.73	0.74	0.72	0.73	0.73	0.71	0.71	0.74	0.72
Orbit Satellite 1Mb Satnet 3	0.53	0.44	0.51	0.71	0.81	0.85	0.84	0.81	0.72	0.59	0.51	0.44	0.45	0.31	0.27	0.3	0.36	0.48	0.51	0.4	0.38	0.36	0.38	0.44
Mena WiMAX 2Mb Boost menaHOME	1.2	1.24	1.27	1.22	1.3	1.22	1.22	1.24	1.24	1.26	1.26	1.23	1.24	1.17	1.16	1.19	1.16	1.17	1.16	1.15	1.14	1.13	1.2	1.13
Zain WiMAX 2Mb zain@home	1.09	1.17	1.17	1.17	1.18	1.2	1.2	1.18	1.17	1.15	1.14	1.12	1.12	1.11	1.09	1.05	1.04	1.08	1.1	1.04	1.01	1	1	1.04
1Mb Service Industry Average	0.80	0.80	0.82	0.84	0.85	0.86	0.85	0.85	0.84	0.82	0.81	0.78	0.78	0.74	0.73	0.70	0.71	0.76	0.76	0.75	0.74	0.75	0.77	0.78
2Mb WIMAX Industry Average	1.15	1.21	1.22	1.20	1.24	1.21	1.21	1.21	1.21	1.21	1.20	1.18	1.18	1.14	1.13	1.12	1.10	1.13	1.13	1.10	1.08	1.07	1.10	1.09

TCP download measurements (Mbit/s)

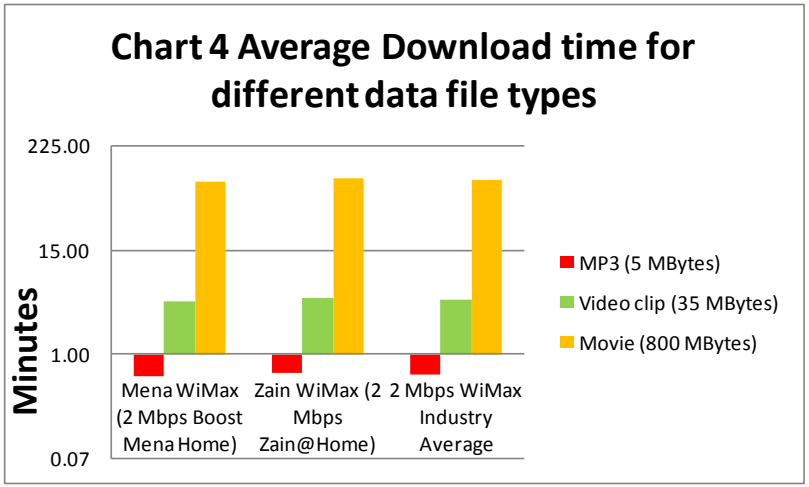
TCP (Transfer Control Protocol) throughput tests measuring download speeds are conducted at a raw socket level (a socket that allows access to the underlying transport provider (ISP) that is supported by protocols such as IPv4 and IPv6) in order to test the full capacity of the connection. The probe is configured to initiate multiple TCP sessions and simultaneously use all of the open sessions for the transmission of data. This effectively “floods” the connection and reports the throughput capacity of the line.

The test is conducted using a server endpoint running proprietary software that is hosted in a well peered data centre. Whilst the port through which the test is typically conducted is configurable, it is normal for port 80 to be used since this minimises the possibility of the traffic being managed or throttled during the test by an ISP. Once the session has been initiated standard data files are transmitted from the endpoint server to the probe and measurements taken of the download throughput of the connection. The test probe measures the time taken to transfer data and the volume of data transferred in a specific time. From these measurements the TCP download speeds can be derived.

For the sake of comparison the graphs showing TCP Download speeds have been separated out the 1 Mbps (Chart 1) and 2 Mbps (Chart 2) connections. Also for ease of comprehension graphs depicted the average time it would take to download typical data file types have been created (Charts 3 and 4).

The higher is the download speed the better is the performance.

Average Download times for typical data types							
	Mbits/s	File Type and size in Mbytes			Download time in Minutes		
	Average download speed	Mp3	Video clip	Movie	MP3 (5 MBytes)	Video clip (35 MBytes)	Movie (800 MBytes)
2 Connect ADSL (1 Mb unlimited)	0.89	5	35	800	0.75	5.23	119.63
Batelco ADSL (1 Mbps medium user)	0.89	5	35	800	0.75	5.24	119.85
Etisalcom ADSL (1 Mbps eDSL)	0.79	5	35	800	0.84	5.90	134.88
Kalaam (1 Mbps KlikADSL)	0.87	5	35	800	0.77	5.37	122.84
Lightspeed ADSL (1 Mbps Home 1000)	0.83	5	35	800	0.81	5.65	129.23
Nuetel cable (1 Mbps Nue Net)	0.73	5	35	800	0.92	6.42	146.66
Orbit Satellite (1 Mbps Satnet 3)	0.52	5	35	800	1.29	9.03	206.45
Mena WiMax (2 Mbps Boost Mena Home)	1.20	5	35	800	0.55	3.88	88.58
Zain WiMax (2 Mbps Zain@Home)	1.11	5	35	800	0.60	4.21	96.17
1 Mbps Industry Average	0.79	5	35	800	0.85	5.93	135.51
2 Mbps Wimax Industry Average	1.16	5	35	800	0.58	4.03	92.22



The shorter is the download time the better is the performance

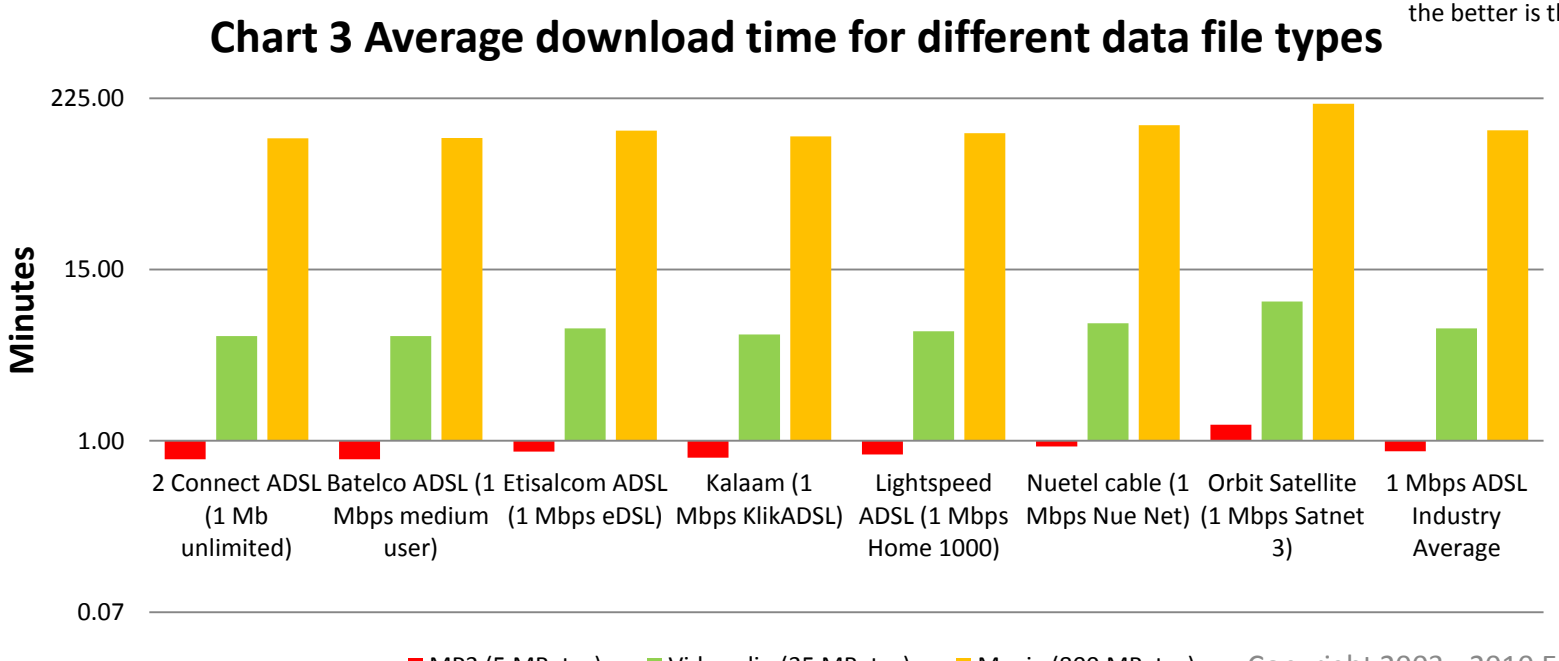
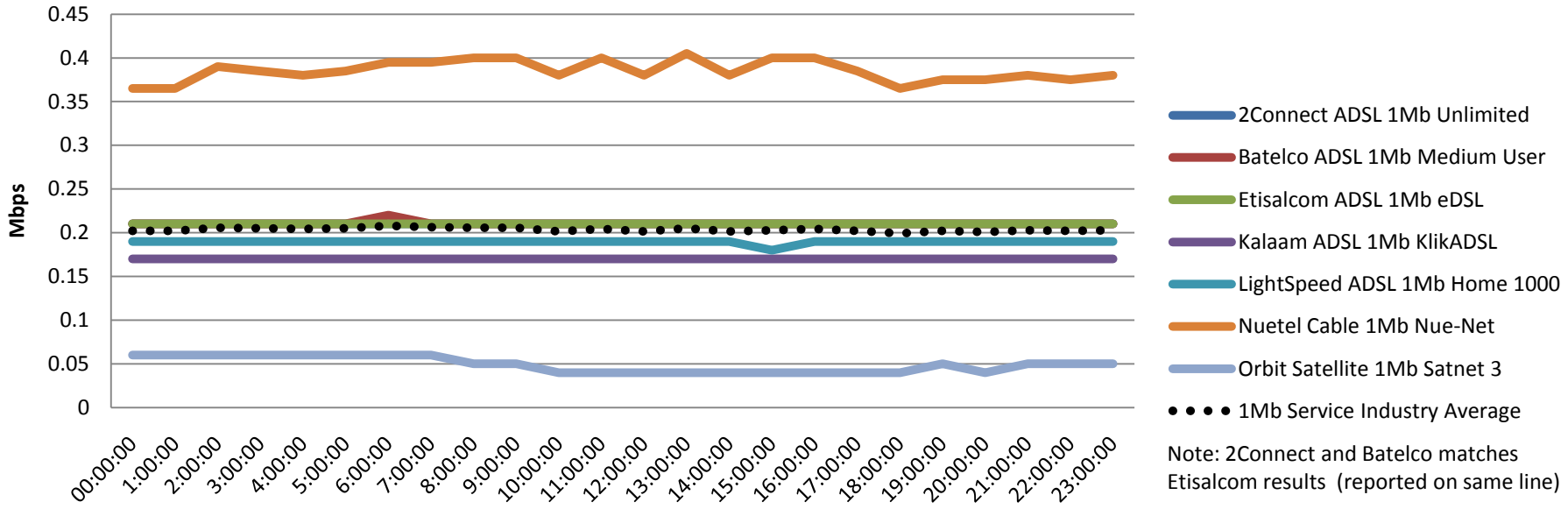
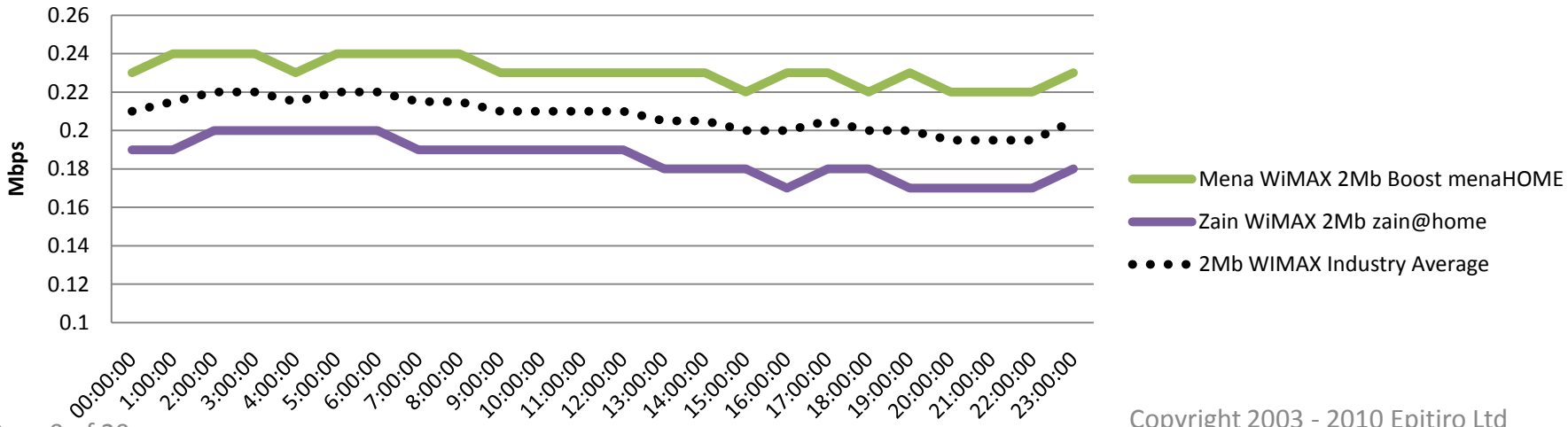


Chart 5 - TCP Upload Speed (average) 1 Mbps services



Note: 2Connect and Batelco matches Etisalcom results (reported on same line)

Chart 6 TCP Upload Speed (average) 2Mbps WiMax services



TCP Upload Speed (Average) Line Chart (Peer view)																								
01 Oct 2010 00:00:00 - 31 Dec 2010 24:00:00 Bahrain																								
ISP Package	**00:00:00**	**1:00:00**	**2:00:00**	**3:00:00**	**4:00:00**	**5:00:00**	**6:00:00**	**7:00:00**	**8:00:00**	**9:00:00**	**10:00:00**	**11:00:00**	**12:00:00**	**13:00:00**	**14:00:00**	**15:00:00**	**16:00:00**	**17:00:00**	**18:00:00**	**19:00:00**	**20:00:00**	**21:00:00**	**22:00:00**	**23:00:00**
2Connect ADSL 1Mb Unlimited	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21
Batelco ADSL 1Mb Medium User	0.21	0.21	0.21	0.21	0.21	0.21	0.22	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21
Etisalcom ADSL 1Mb eDSL	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21
Kalaam ADSL 1Mb KlikADSL	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17
LightSpeed ADSL 1Mb Home 1000	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.18	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19
Nuetel Cable 1Mb Nue-Net	0.37	0.37	0.39	0.39	0.38	0.39	0.40	0.40	0.40	0.40	0.38	0.40	0.38	0.41	0.38	0.40	0.40	0.39	0.37	0.38	0.38	0.38	0.38	0.38
Orbit Satellite 1Mb Satnet 3	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.05	0.05	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.05	0.04	0.05	0.05	0.05
Mena WiMAX 2Mb Boost menaHOME	0.23	0.24	0.24	0.24	0.23	0.24	0.24	0.24	0.24	0.23	0.23	0.23	0.23	0.23	0.23	0.22	0.23	0.23	0.22	0.23	0.22	0.22	0.22	0.23
Zain WiMAX 2Mb zain@home	0.19	0.19	0.2	0.2	0.2	0.2	0.2	0.19	0.19	0.19	0.19	0.19	0.19	0.18	0.18	0.18	0.17	0.18	0.18	0.17	0.17	0.17	0.17	0.18
1Mb Service Industry Average	0.20	0.20	0.21	0.21	0.20	0.21	0.21	0.21	0.21	0.21	0.20	0.20	0.20	0.21	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20
2Mb WIMAX Industry Average	0.21	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.21	0.21	0.21	0.21	0.21	0.21	0.20	0.20	0.21	0.20	0.20	0.20	0.20	0.20	0.21

TCP upload measurements (Mbits/s)

TCP (Transfer Control Protocol) throughput tests measuring upload speeds are conducted at a raw socket level (a socket that allows access to the underlying transport provider (ISP) that is supported by protocols such as IPv4 and IPv6) in order to test the full capacity of the connection. The probe is configured to initiate multiple TCP sessions and simultaneously use all of the open sessions for the transmission of data. This effectively "floods" the connection and reports the throughput capacity of the line.

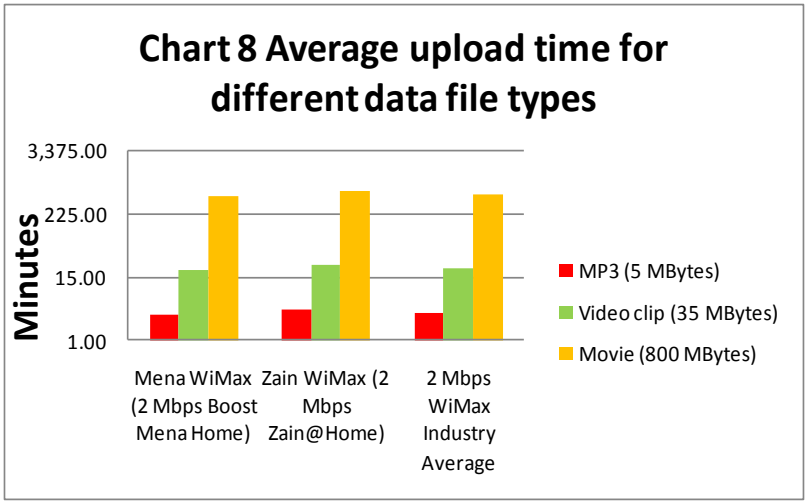
The test is conducted using a server endpoint running proprietary software that is hosted in a well peered data centre. Whilst the port through which the test is typically conducted is configurable, it is normal for port 80 to be used since this minimizes the possibility of the traffic being managed or throttled during the test by an ISP. Once the session has been initiated standard data files are transmitted from the probe to the endpoint server and measurements taken of the upload throughput of the connection. The test probe measures the time taken to transfer data and the volume of data transferred in a specific time. From these measurements the TCP upload speeds can be derived.

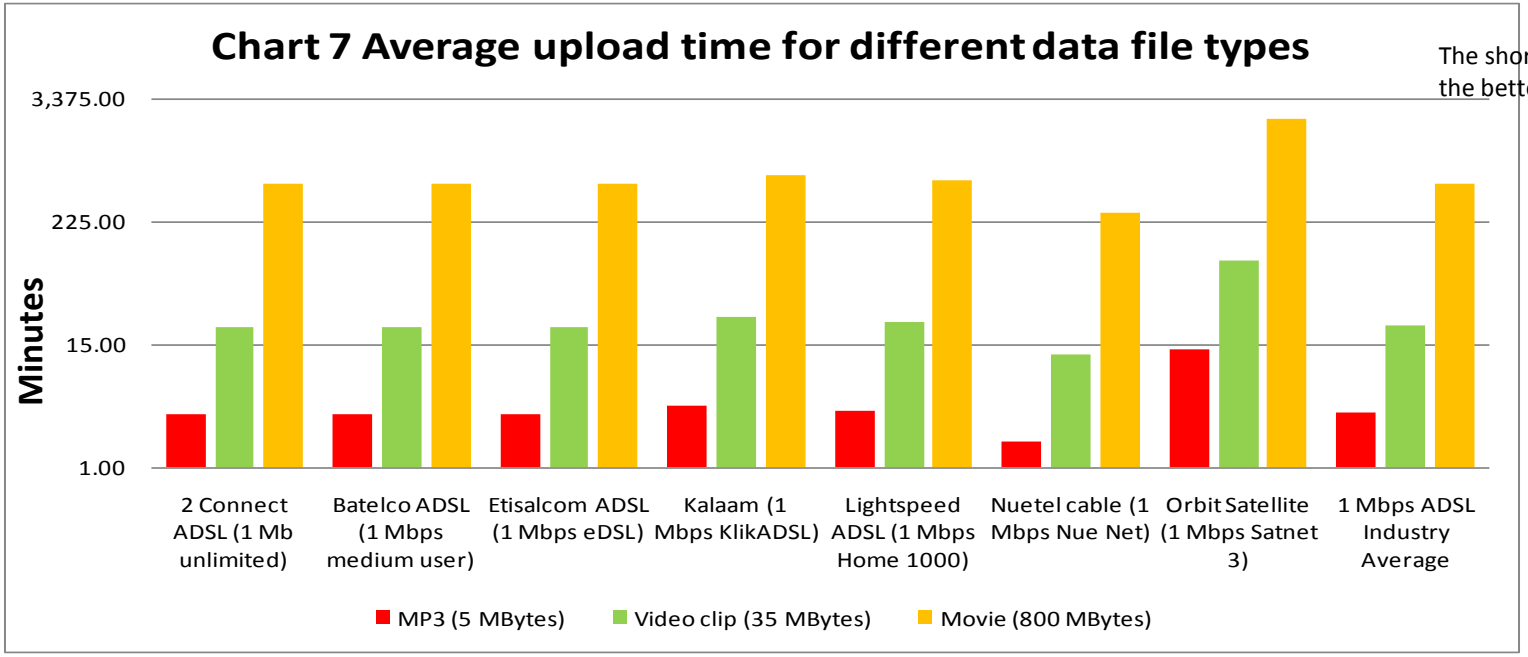
For the sake of comparison the graphs showing TCP upload speeds have been separated out the 1 Mbps (Chart 5) and 2 Mbps (Chart 6) connections. Also for ease of comprehension graphs depicted the average time it would take to download typical data file types have been created (Charts 7 and 8).

The higher is the upload speed the better is the performance.

TRA Fixed Broadband Analysis Report

Average Upload times for typical data types							
	Mbits/s	File Type and size in Mbytes			Upload time in Minutes		
	Average download speed	Mp3	Video clip	Movie	MP3 (5 MBytes)	Video clip (35 MBytes)	Movie (800 MBytes)
2 Connect ADSL (1 Mb unlimited)	0.21	5	35	800	3.17	22.22	508
Batelco ADSL (1 Mbps medium user)	0.21	5	35	800	3.17	22.18	507
Etisalcom ADSL (1 Mbps eDSL)	0.21	5	35	800	3.17	22.22	508
Kalaam (1 Mbps KlikADSL)	0.17	5	35	800	3.92	27.45	627
Lightspeed ADSL (1 Mbps Home 1000)	0.19	5	35	800	3.52	24.62	563
Nuetel cable (1 Mbps Nue Net)	0.39	5	35	800	1.73	12.12	277
Orbit Satellite (1 Mbps Satnet 3)	0.05	5	35	800	13.56	94.92	2169
Mena WiMax (2 Mbps Boost Mena Home)	0.23	5	35	800	2.89	20.22	462
Zain WiMax (2 Mbps Zain@Home)	0.19	5	35	800	3.60	25.17	575
1 Mbps Industry Average	0.20	5	35	800	3.28	22.94	524
2 Mbps WiMax Industry Average	0.21	5	35	800	3.20	22.42	513





The shorter is the upload time the better is the performance

Chart 9 - HTTP Download Speed (average) (Cached) 1 Mbps services

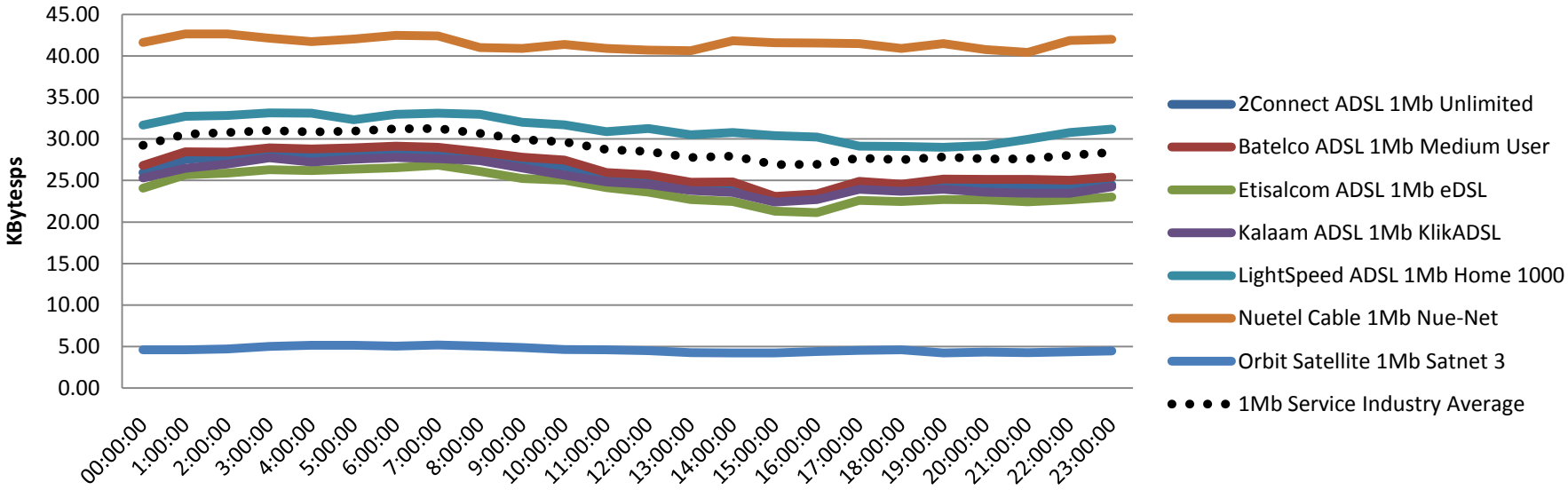
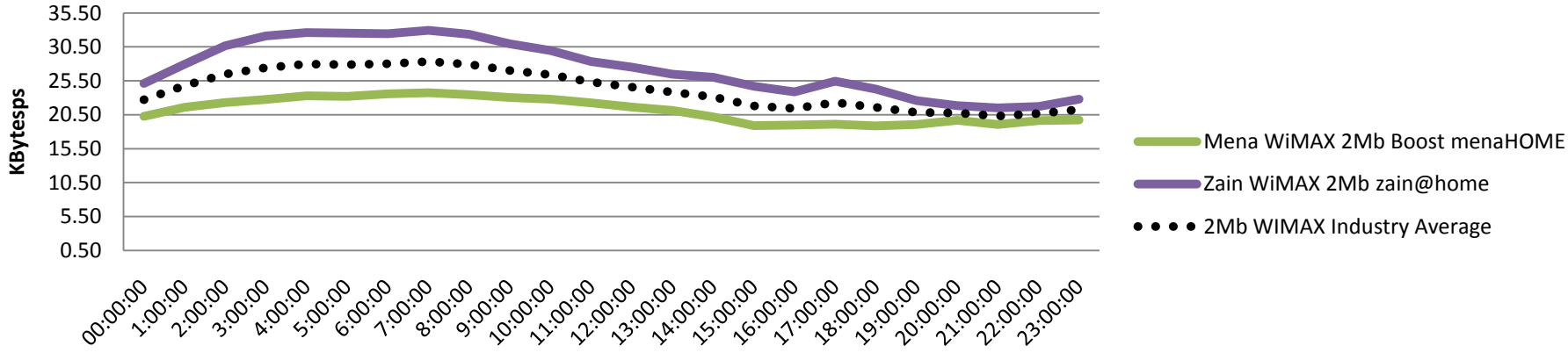


Chart 10 - HTTP Download Speed (average) (Cached) 2 Mbps WiMax services



HTTP Download Speed (Cached) Line Chart (Peer view)
01 Oct 2010 00:00:00 - 31 Dec 2010 24:00:00 Bahrain

ISP Package	00:00:00	1:00:00	2:00:00	3:00:00	4:00:00	5:00:00	6:00:00	7:00:00	8:00:00	9:00:00	10:00:00	11:00:00	12:00:00	13:00:00	14:00:00	15:00:00	16:00:00	17:00:00	18:00:00	19:00:00	20:00:00	21:00:00	22:00:00	23:00:00
2Connect ADSL 1Mb Unlimited	25.97	27.52	27.89	27.97	28.12	28.38	28.47	28.61	28.12	26.98	26.68	25.55	25.19	24.26	24.28	22.67	22.77	24.22	24.21	24.73	24.30	24.19	24.48	24.48
Batelco ADSL 1Mb Medium User	26.80	28.44	28.43	28.92	28.78	28.94	29.14	28.99	28.44	27.80	27.45	25.97	25.67	24.80	24.81	23.07	23.38	24.90	24.55	25.17	25.14	25.14	25.02	25.39
Etisalcom ADSL 1Mb eDSL	24.08	25.67	25.87	26.28	26.19	26.36	26.54	26.85	26.10	25.22	25.02	24.15	23.60	22.69	22.45	21.29	21.12	22.59	22.48	22.70	22.68	22.42	22.66	23.02
Kalaam ADSL 1Mb KlikADSL	25.32	26.46	26.98	27.74	27.21	27.55	27.76	27.64	27.39	26.50	25.65	24.83	24.53	23.79	23.57	22.41	22.69	23.95	23.69	23.94	23.60	23.47	23.47	24.23
LightSpeed ADSL 1Mb Home 1000	31.65	32.71	32.82	33.14	33.11	32.33	32.98	33.09	32.96	32.02	31.69	30.89	31.25	30.51	30.76	30.41	30.23	29.15	29.10	29.01	29.19	29.94	30.79	31.20
Nuetel Cable 1Mb Nue-Net	41.61	42.64	42.65	42.12	41.71	42.04	42.46	42.40	40.99	40.91	41.37	40.89	40.68	40.62	41.83	41.59	41.56	41.47	40.89	41.50	40.75	40.43	41.87	41.99
Orbit Satellite 1Mb Satnet 3	4.61	4.61	4.72	5.03	5.17	5.14	5.07	5.20	5.04	4.87	4.65	4.62	4.52	4.27	4.24	4.24	4.41	4.54	4.61	4.25	4.33	4.26	4.36	4.48
Mena WiMAX 2Mb Boost menaHOME	20.27	21.60	22.28	22.74	23.30	23.23	23.59	23.73	23.46	23.04	22.80	22.25	21.65	21.13	20.19	18.90	18.97	19.12	18.86	19.08	19.67	19.08	19.63	19.75
Zain WiMAX 2Mb zain@home	25.13	27.95	30.68	32.11	32.62	32.54	32.46	32.96	32.37	30.97	29.98	28.36	27.53	26.50	26.04	24.68	23.89	25.45	24.29	22.59	21.84	21.53	21.72	22.79
1Mb Service Industry Average	29.24	30.57	30.77	31.03	30.85	30.93	31.23	31.26	30.67	29.91	29.64	28.71	28.49	27.78	27.95	26.91	26.96	27.71	27.49	27.84	27.61	27.60	28.05	28.39
2Mb WIMAX Industry Average	22.70	24.78	26.48	27.43	27.96	27.89	28.03	28.35	27.92	27.01	26.39	25.31	24.59	23.82	23.12	21.79	21.43	22.29	21.58	20.84	20.76	20.31	20.68	21.27

HTTP Measurements (Download Speed - Cache) (Kbytes/s)

The HTTP (HyperText Transfer Protocol) test makes a request to a specified URL (Uniform Resource Locator) and records the time taken and the amount of data downloaded, from which the speed of the download is derived. Depending on the configuration of the test, test probe is also able to download the embedded content (e.g. images on a web page) in any HTML (HyperText Markup Language) that results from the HTTP request.

Any additional content downloaded is reflected in the captured timings and size of data downloaded. Additionally, the HTTP test can be configured to run in one of two modes of operation: cached and non-cached. When the test downloads from the specified URL in "cached[6]" mode, the speed of the download could be impacted by any caching mechanisms implemented by the network provider.

The higher is the download speed the better is the performance.

Chart 11 - HTTP Download Speed (average) (Non Cached) 1 Mbps services

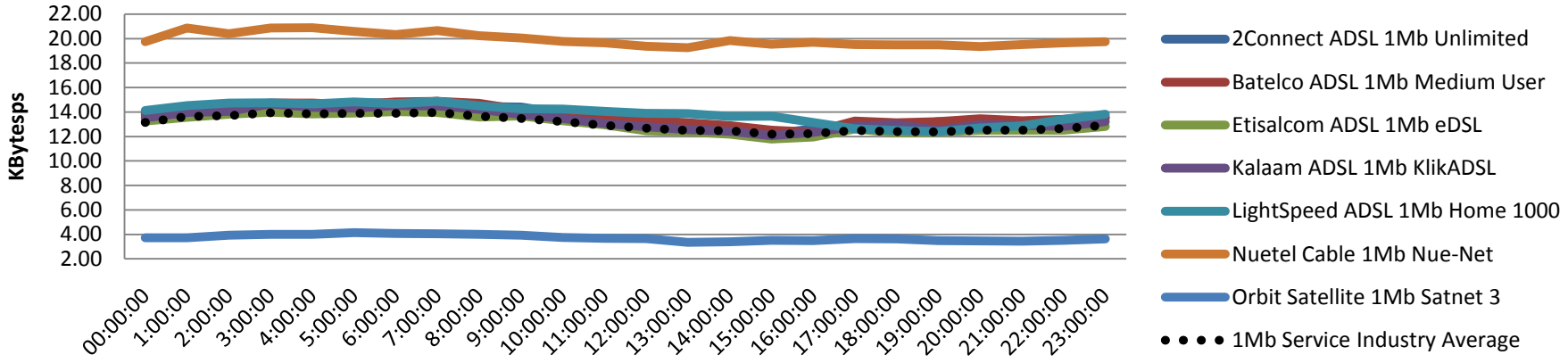
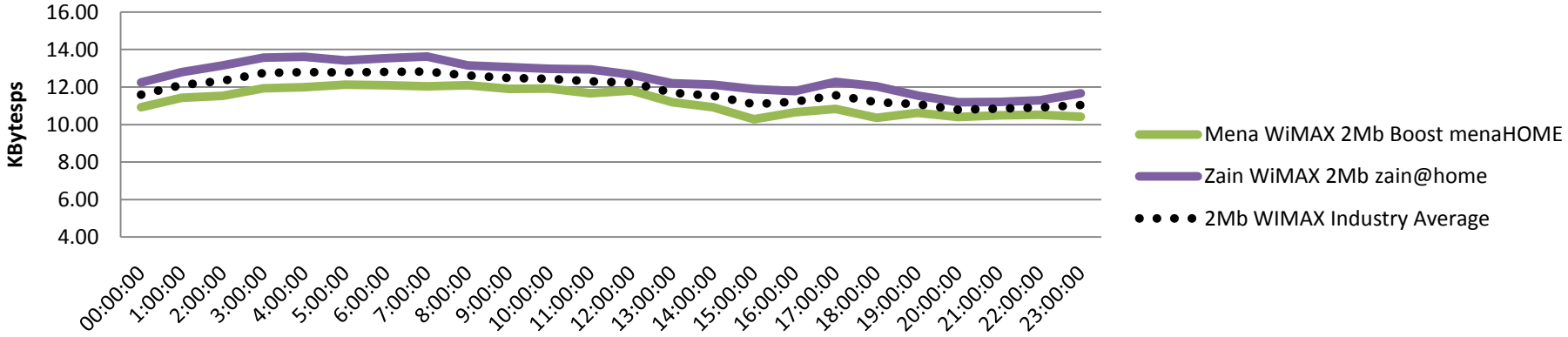


Chart 12 - HTTP Download Speed (average) (Non Cached) 2 Mbps WiMax services



HTTP Download Speed (Non cached) Line Chart (Peer view)

01 Oct 2010 00:00:00 - 31 Dec 2010 24:00:00 Bahrain

ISP Package	00:00:00	1:00:00	2:00:00	3:00:00	4:00:00	5:00:00	6:00:00	7:00:00	8:00:00	9:00:00	10:00:00	11:00:00	12:00:00	13:00:00	14:00:00	15:00:00	16:00:00	17:00:00	18:00:00	19:00:00	20:00:00	21:00:00	22:00:00	23:00:00
2Connect ADSL 1Mb Unlimited	13.76	14.37	14.54	14.57	14.37	14.78	14.70	14.87	14.45	14.41	13.89	13.40	13.21	12.84	12.84	12.19	12.62	12.95	12.80	13.21	13.13	13.01	13.28	13.49
Batelco ADSL 1Mb Medium User	13.94	14.45	14.43	14.72	14.72	14.60	14.83	14.88	14.71	14.18	14.12	13.66	13.34	13.12	12.89	12.51	12.35	13.25	13.11	13.22	13.45	13.28	13.40	13.62
Etisalcom ADSL 1Mb eDSL	13.27	13.56	13.81	13.99	13.85	13.91	14.04	13.96	13.58	13.69	13.29	12.95	12.46	12.37	12.18	11.80	11.96	12.61	12.30	12.35	12.52	12.52	12.52	12.82
Kalaam ADSL 1Mb KlikADSL	13.52	13.95	14.05	14.65	14.37	14.32	14.52	14.50	14.21	13.80	13.48	13.06	12.80	12.56	12.41	12.07	12.33	12.82	12.99	12.52	12.95	12.90	12.81	13.21
LightSpeed ADSL 1Mb Home 1000	14.12	14.51	14.73	14.75	14.67	14.83	14.68	14.88	14.49	14.26	14.25	14.05	13.88	13.86	13.64	13.66	13.15	12.63	12.50	12.40	12.69	12.86	13.41	13.82
Nuetel Cable 1Mb Nue-Net	19.75	20.86	20.41	20.88	20.89	20.60	20.32	20.66	20.23	20.05	19.77	19.65	19.37	19.27	19.85	19.54	19.69	19.51	19.49	19.50	19.36	19.52	19.66	19.76
Orbit Satellite 1Mb Satnet 3	3.71	3.72	3.92	4.01	4.01	4.13	4.07	4.04	3.99	3.94	3.75	3.68	3.64	3.35	3.39	3.52	3.48	3.65	3.63	3.48	3.47	3.45	3.52	3.62
Mena WiMAX 2Mb Boost menaHO	10.92	11.42	11.53	11.93	11.99	12.13	12.10	12.04	12.09	11.90	11.91	11.67	11.81	11.19	10.92	10.28	10.65	10.83	10.35	10.62	10.40	10.49	10.52	10.41
Zain WiMAX 2Mb zain@home	12.25	12.79	13.15	13.56	13.61	13.42	13.53	13.62	13.15	13.06	12.97	12.95	12.66	12.20	12.13	11.89	11.78	12.28	12.03	11.55	11.19	11.20	11.30	11.67
1Mb Service Industry Average	13.15	13.63	13.70	13.94	13.84	13.88	13.88	13.97	13.67	13.48	13.22	12.92	12.67	12.48	12.46	12.18	12.23	12.49	12.40	12.38	12.51	12.51	12.66	12.91
2Mb WIMAX Industry Average	11.59	12.11	12.34	12.75	12.80	12.78	12.82	12.83	12.62	12.48	12.44	12.31	12.24	11.70	11.53	11.09	11.22	11.56	11.19	11.09	10.80	10.85	10.91	11.04

HTTP Measurements (Download Speed - Non Cache) (Kbytes/s)

The HTTP (HyperText Transfer Protocol) test makes a request to a specified URL (Uniform Resource Locator) and records the time taken and the amount of data downloaded, from which the speed of the download is derived. Depending on the configuration of the test, test probe is also able to download the embedded content (e.g. images on a web page) in any HTML (HyperText Markup Language) that results from the HTTP request.

Any additional content downloaded is reflected in the captured timings and size of data downloaded. Additionally, the HTTP test can be configured to run in one of two modes of operation: cached and non-cached. When the test downloads from the specified URL in ““non-cached” mode a random query parameter is appended to the end of the URL, which will result in the request bypassing any caches present in the network, and the request will be serviced by the web server specified in the URL as opposed to any cache.

The higher is the download speed the better is the performance.

Chart 13 - DNS Time (1 Mbps services)

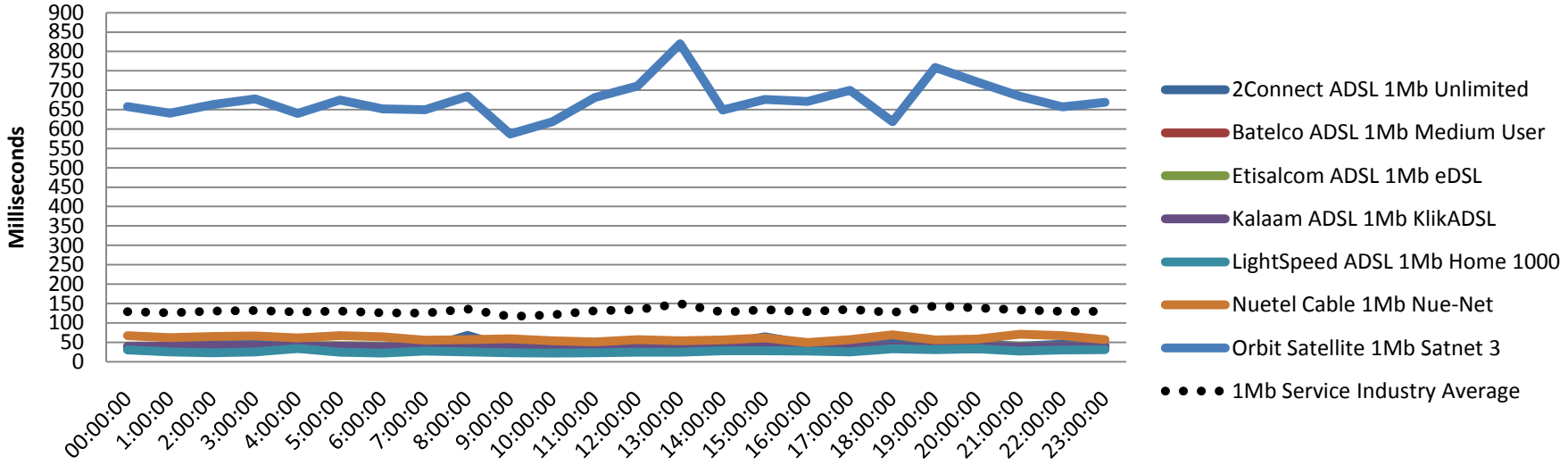
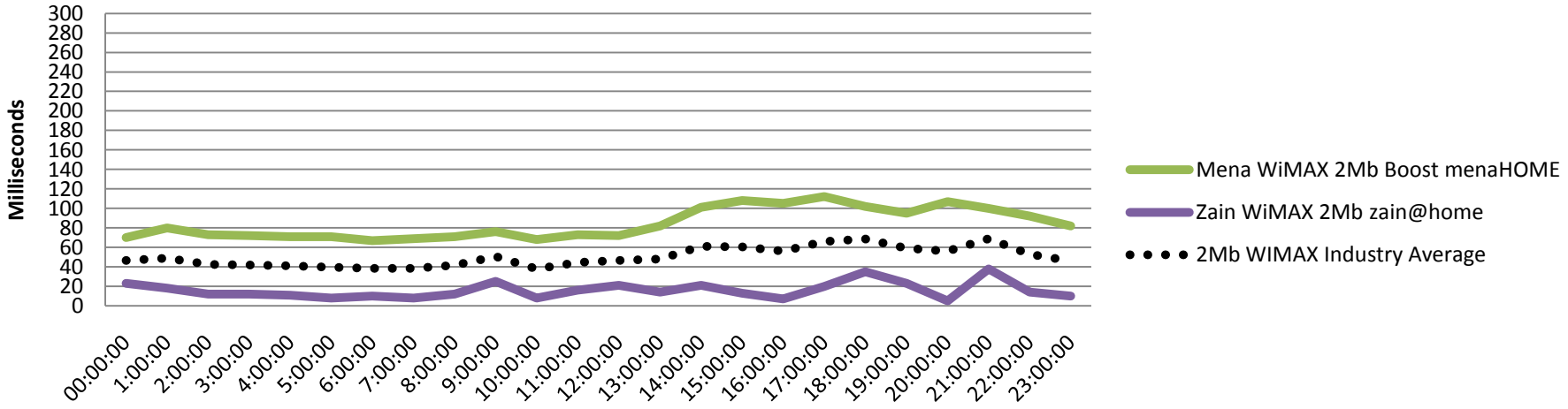


Chart 14 - DNS Time (2 Mbps WiMax services)



TRA Fixed Broadband Analysis Report

DNS Time Line Chart (Peer view)																								
01 Oct 2010 00:00:00 - 31 Dec 2010 24:00:00 Bahrain																								
ISP Package	**00:00:00**	**1:00:00**	**2:00:00**	**3:00:00**	**4:00:00**	**5:00:00**	**6:00:00**	**7:00:00**	**8:00:00**	**9:00:00**	**10:00:00**	**11:00:00**	**12:00:00**	**13:00:00**	**14:00:00**	**15:00:00**	**16:00:00**	**17:00:00**	**18:00:00**	**19:00:00**	**20:00:00**	**21:00:00**	**22:00:00**	**23:00:00**
2Connect ADSL 1Mb Unlimited	34	40	47	45	45	34	34	35	68	35	35	48	34	34	45	64	45	50	51	47	46	40	45	39
Batelco ADSL 1Mb Medium User	33	34	33	33	35	34	34	34	34	34	35	36	34	35	35	34	33	34	36	34	33	35	33	34
Etisalcom ADSL 1Mb eDSL	40	40	39	38	41	41	40	38	40	40	42	40	40	40	40	39	39	39	38	40	40	40	39	41
Kalaam ADSL 1Mb KlikADSL	39	40	41	40	40	40	38	39	40	39	39	41	39	40	38	39	40	38	39	38	39	38	39	39
LightSpeed ADSL 1Mb Home 1000	30	25	23	25	34	24	22	27	25	23	22	23	24	24	28	28	27	25	33	31	33	27	30	31
Nuetel Cable 1Mb Nue-Net	67	62	65	66	61	67	64	55	57	59	54	51	57	54	56	61	49	57	69	56	58	71	67	57
Orbit Satellite 1Mb Satnet 3	658	641	663	678	640	675	652	650	684	587	619	681	711	820	649	676	671	700	619	759	721	684	657	669
Mena WiMAX 2Mb Boost menaHO	70	80	73	72	71	71	67	69	71	76	68	73	72	82	101	108	105	112	102	95	107	100	92	82
Zain WiMAX 2Mb zain@home	23	18	12	12	11	8	10	8	12	25	8	16	21	14	21	13	7	20	35	23	5	38	14	10

DNS Time (Domain Name System) (Milliseconds)

The DNS test records the time taken (in milliseconds) to resolve a fully qualified domain name to a corresponding IP address. The DNS servers used for the query are the DNS servers (primary and secondary) dynamically assigned by the service provider when the network connection is initiated. Alternatively a specific DNS server can be configured for use during DNS tests. The test probe disables the Windows DNS Client Service responsible for caching the results of DNS requests so that the DNS query is performed on the DNS servers, and not returned from any local cache.

The shorter the DNS resolution time is the better is the performance.

Chart 15 Ping Time (1 Mbps services)

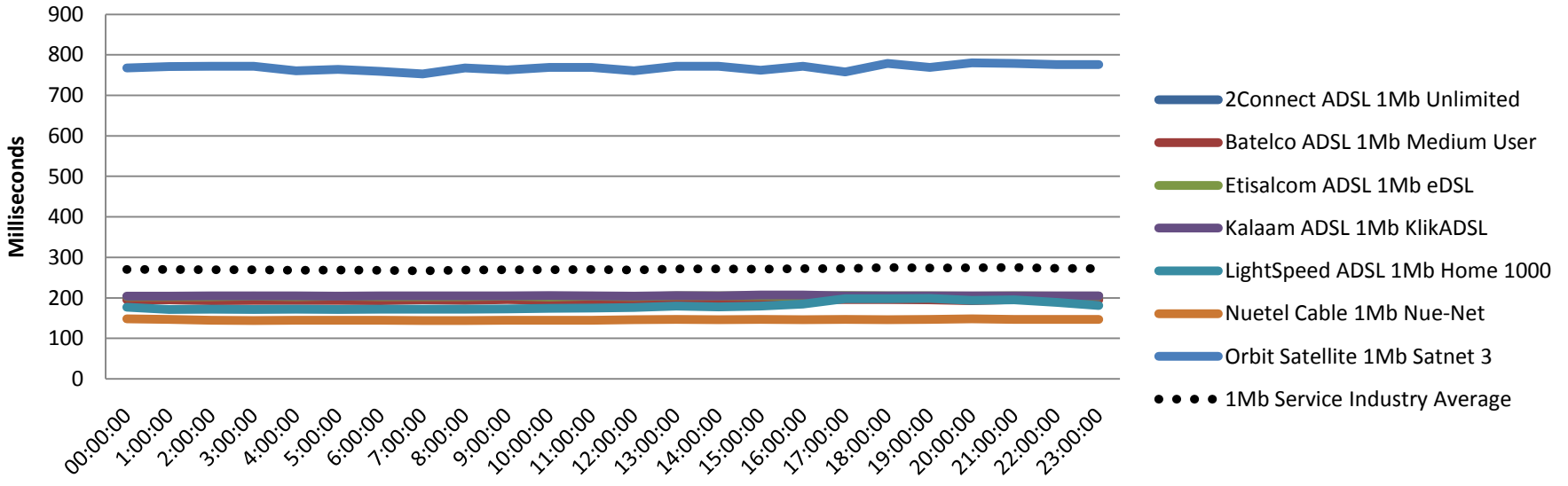
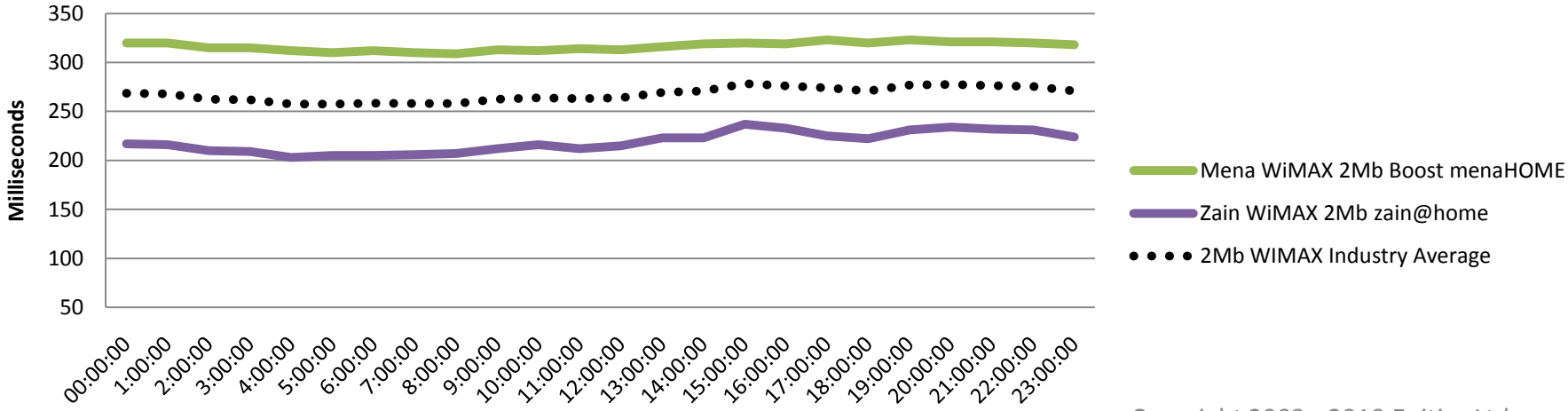


Chart 16 Ping Time (2 Mbps WiMax services)



Ping Time Line Chart (Peer view)																								
01 Oct 2010 00:00:00 - 31 Dec 2010 24:00:00 Bahrain																								
ISP Package	**00:00:00**	**1:00:00**	**2:00:00**	**3:00:00**	**4:00:00**	**5:00:00**	**6:00:00**	**7:00:00**	**8:00:00**	**9:00:00**	**10:00:00**	**11:00:00**	**12:00:00**	**13:00:00**	**14:00:00**	**15:00:00**	**16:00:00**	**17:00:00**	**18:00:00**	**19:00:00**	**20:00:00**	**21:00:00**	**22:00:00**	**23:00:00**
2Connect ADSL 1Mb Unlimited	198	198	197	197	197	197	197	196	197	198	197	199	198	198	200	199	198	198	197	198	198	198	196	198
Batelco ADSL 1Mb Medium User	195	195	193	194	194	194	193	195	194	196	194	195	195	195	195	195	196	196	196	195	193	196	194	195
Etisalcom ADSL 1Mb eDSL	203	203	203	204	203	204	203	203	203	204	202	204	203	205	205	205	204	206	205	205	204	205	204	204
Kalaam ADSL 1Mb KlikADSL	204	204	205	205	205	204	205	205	205	205	206	205	204	206	205	207	207	205	205	205	205	205	205	205
LightSpeed ADSL 1Mb Home 1000	177	171	172	171	172	171	172	172	172	173	174	175	176	180	178	180	185	198	198	199	194	195	189	181
Nuetel Cable 1Mb Nue-Net	148	147	145	144	145	145	145	144	144	145	145	145	146	147	146	147	146	147	146	147	148	147	147	147
Orbit Satellite 1Mb Satnet 3	768	771	772	772	761	764	759	753	768	763	769	769	761	772	772	762	772	758	779	769	780	779	776	776
Mena WiMAX 2Mb Boost menaHO	320	320	315	315	312	310	312	310	309	313	312	314	313	316	319	320	319	323	320	323	321	321	320	318
Zain WiMAX 2Mb zain@home	217	216	210	209	203	205	205	206	207	212	216	212	215	223	223	237	233	225	222	231	234	232	231	224

Ping Time (Latency) (Milliseconds)

The Ping test measures network latency by sending an ICMP (Internet Control Message Protocol) echo request to the specified server. The time recorded by test probe is the total round trip time (in milliseconds) from the request to the echo response being received from the server. The measurements reported are the average time for tests to servers located in Bahrain, Europe and the USA.

The shorter the Latency is the better is the performance.

End of document