هيئة تنظيم الاتصالات
Telecommunications Regulatory Authority

Fixed Broadband Analysis Report
01 Jul 2010 – 30 Sept 2010 between 00:00:00 and 24:00:00 Bahrain

Published 19 October 2010

Public Document

Table of contents

Introduction

1. Internet access has become increasingly important to Consumer and Business users alike within the Kingdom of Bahrain. The Economic Vision 2030 and supporting National Economic Strategy 2009 - 2014 both identify explicitly the need for more readily available affordable broadband services and indentify specific actions that should be undertaken to ensure that the appropriate infrastructure is made available with the Kingdom of Bahrain over the coming few years.
2. Consumers have not had readily available to them data relating to the actual quality of service achieved by each of the Kingdom's Internet Service Providers (ISPs). Whilst ISPs do provide the basic level of information required to allow customers to make decisions relating to price, download speed and download threshold, they do not make available information relating to the actual download and upload speeds achieved on average by the ISP. Telecommunications Regulatory Authority (TRA) considers that at a minimum consumers should be able to make informed decisions with respect to understanding what is likely to be provided by each ISP.
3. On April 30, 2009 TRA launched a Request for Proposals (RFP) soliciting proposals from experienced companies to design and implement a test platform to monitor and measure the performance of the Kingdom's ISPs. The contract was awarded to Epitiro Ltd in July 2009.
4. Epitiro implemented and tuned its monitoring platform in the Kingdom of Bahrain during quarter 4, 2009 and quarter 1, 2010. Epitiro started monitoring and measuring live broadband connections on April 1, 2010. In total nine (9) ISPs have been connected to the Epitiro system.
5. It is the intention of TRA to publish periodic reports based on this and subsequent data gathered from the Broadband Quality of Service monitoring platform. These reports provide consumers with accurate, independently gathered and verified data concerning the actual quality of service that each of the ISPs offers, thereby ensuring that appropriate information is provided to consumers and that consumers' decisions are informed by such independently verified data.

Measurements Methods Overview

6. 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.
7. 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 programme. 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 and Europe.
8. To ensure the accuracy of the information gathered each probe is constantly monitored and any issues identified are recorded and resolved remotely by Epitiro.

9. Diagram 1 bellow 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.

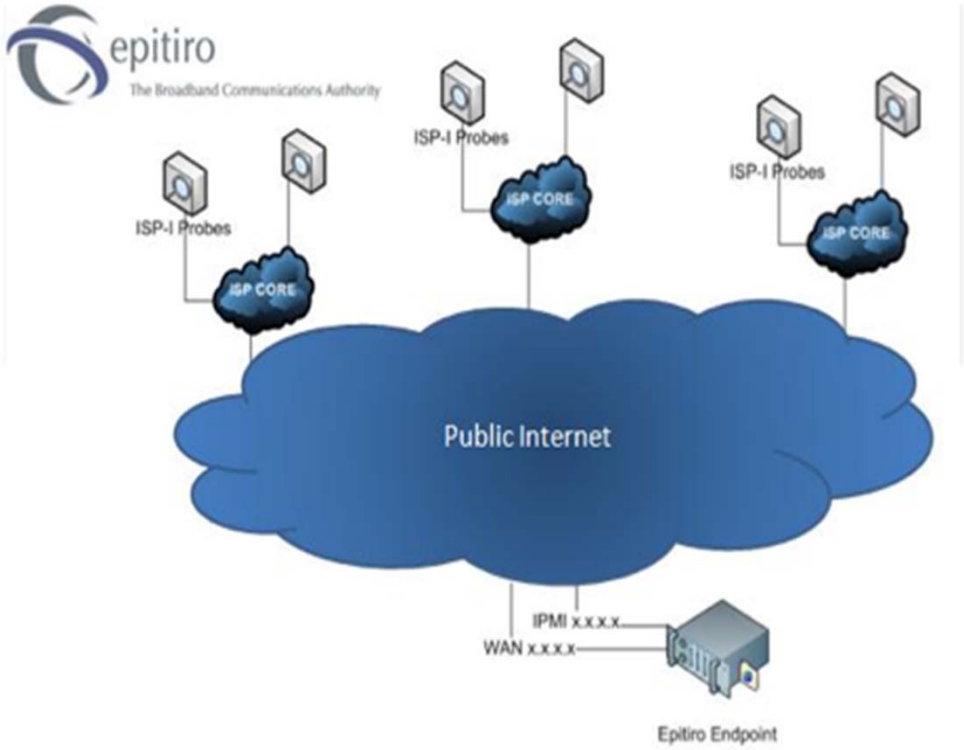


Diagram 1 - Broadband Quality of Service test platform overview

RESULTS

The following pages present the result of measurements taken every hour for each audited service during the period of Q3 2010, from 00:00:00 on the 1 July 2010 to 24:00:00 on the 30 September 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

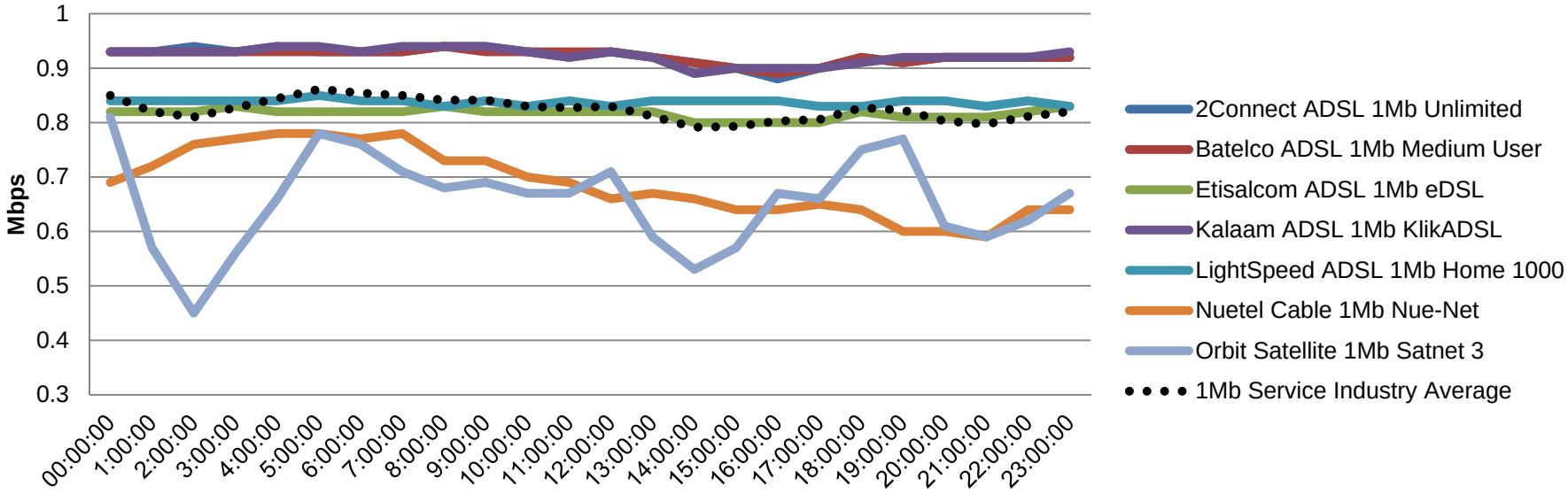
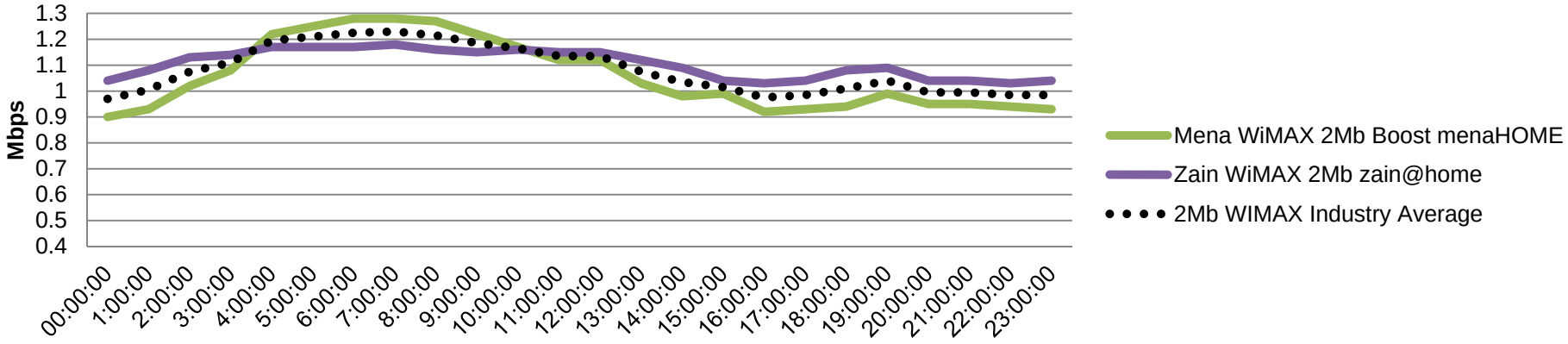


Chart 2 TCP Download Speed (average) 2 Mbps WiMax services



TCP Download Speed (Average) Line Chart (Peer view)																		
01 Jul 2010 00:00:00 - 30 Sep 2010 24:00:00 Asia/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**
2Connect ADSL 1Mb Unlimited	0.93	0.93	0.94	0.93	0.94	0.93	0.93	0.93	0.94	0.94	0.93	0.92	0.93	0.92	0.91	0.9	0.88	0.9
Batelco ADSL 1Mb Medium User	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.94	0.93	0.93	0.93	0.93	0.92	0.91	0.9	0.89	0.9
Etisalcom ADSL 1Mb eDSL	0.82	0.82	0.82	0.83	0.82	0.82	0.82	0.82	0.83	0.82	0.82	0.82	0.82	0.82	0.8	0.8	0.8	0.8
Kalaam ADSL 1Mb KlikADSL	0.93	0.93	0.93	0.93	0.94	0.94	0.93	0.94	0.94	0.94	0.93	0.92	0.93	0.92	0.89	0.9	0.9	0.9
LightSpeed ADSL 1Mb Home 1000	0.84	0.84	0.84	0.84	0.84	0.85	0.84	0.84	0.83	0.84	0.83	0.84	0.83	0.84	0.84	0.84	0.84	0.83
Nuetel Cable 1Mb Nue-Net	0.69	0.72	0.76	0.77	0.78	0.78	0.77	0.78	0.73	0.73	0.7	0.69	0.66	0.67	0.66	0.64	0.64	0.65
Orbit Satellite 1Mb Satnet 3	0.81	0.57	0.45	0.56	0.66	0.78	0.76	0.71	0.68	0.69	0.67	0.67	0.71	0.59	0.53	0.57	0.67	0.66
Mena WiMAX 2Mb Boost menaHOME	0.9	0.93	1.02	1.08	1.22	1.25	1.28	1.28	1.27	1.22	1.17	1.12	1.12	1.03	0.98	0.99	0.92	0.93
Zain WiMAX 2Mb zain@home	1.04	1.08	1.13	1.14	1.17	1.17	1.17	1.18	1.16	1.15	1.16	1.15	1.15	1.12	1.09	1.04	1.03	1.04
1Mb Service Industry Average	0.85	0.82	0.81	0.83	0.84	0.86	0.85	0.85	0.84	0.84	0.83	0.83	0.83	0.81	0.79	0.79	0.80	0.81
2Mb WIMAX Industry Average	0.97	1.01	1.08	1.11	1.20	1.21	1.23	1.23	1.22	1.19	1.17	1.14	1.14	1.08	1.04	1.02	0.98	0.99

TCP download measurements

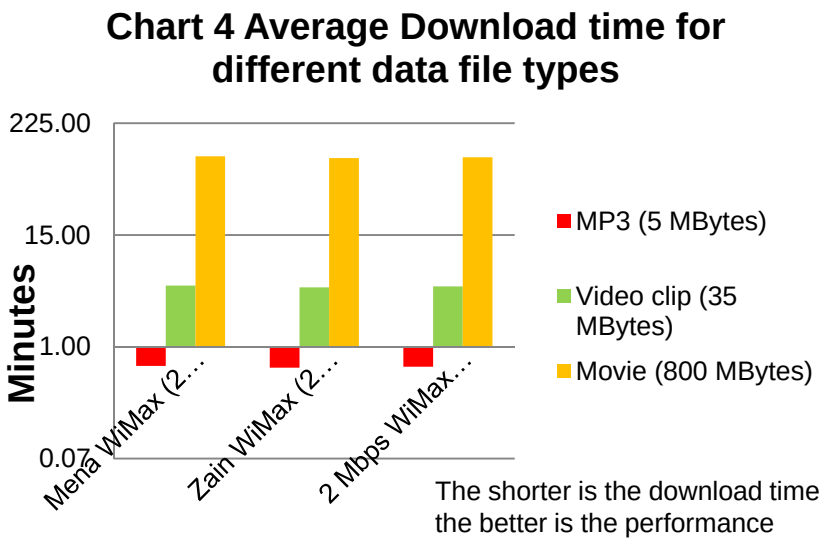
TCP (Transfer Control Protocol) throughput tests measuring download speeds are conducted at a raw socket level (a socket that allows access to the underlying transport provider (ISP) that is supported by protocols such as IPv4 and IPv6) in order to test the full capacity of the connection. The probe 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							
	File Type and size in Mbytes			Upload time in Minutes			
	24 Hour download speed	Mp3	Video clip	Movie	MP3 (5 MBytes)	Video clip (35 MBytes)	Movie (800 MBytes)
2 Connect ADSL (1 Mb unlimited)	0.92	5	35	800	0.72	5.06	115.63
Batelco ADSL (1 Mbps medium user)	0.92	5	35	800	0.72	5.06	115.68
Etisalcom ADSL (1 Mbps eDSL)	0.82	5	35	800	0.82	5.71	130.61
Kalaam (1 Mbps KlikADSL)	0.92	5	35	800	0.72	5.05	115.52
Lightspeed ADSL (1 Mbps Home 1000)	0.84	5	35	800	0.80	5.57	127.36
Neutel cable (1 Mbps Nue Net)	0.69	5	35	800	0.97	6.78	154.87
Orbit Satellite (1 Mbps Satnet 3)	0.66	5	35	800	1.02	7.11	162.54
Mena WiMax (2 Mbps Boost Mena Home)	1.06	5	35	800	0.63	4.41	100.75
Zain WiMax (2 Mbps Zain@Home)	1.10	5	35	800	0.60	4.23	96.64
1 Mbps ADSL Industry Average	0.82	5	35	800	0.81	5.66	129.47
2 Mbps WiMax Industry Average	1.08	5	35	800	0.62	4.32	98.65



The shorter is the download time the better is the performance

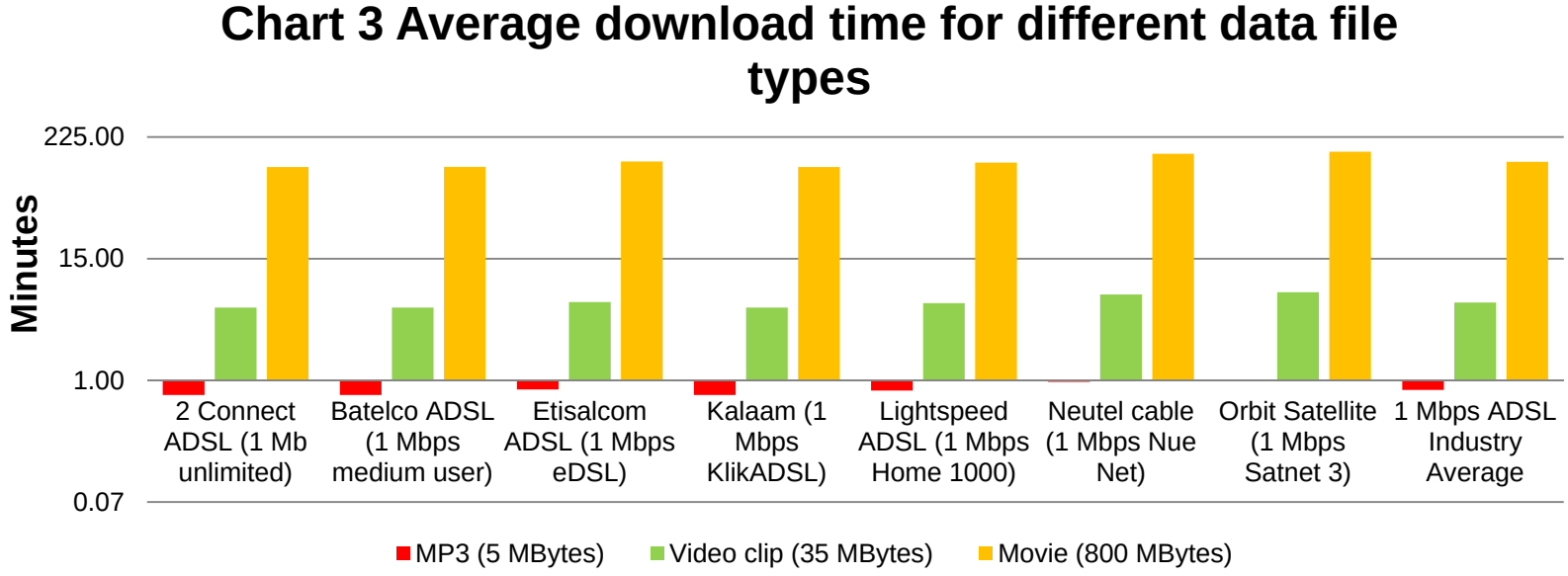
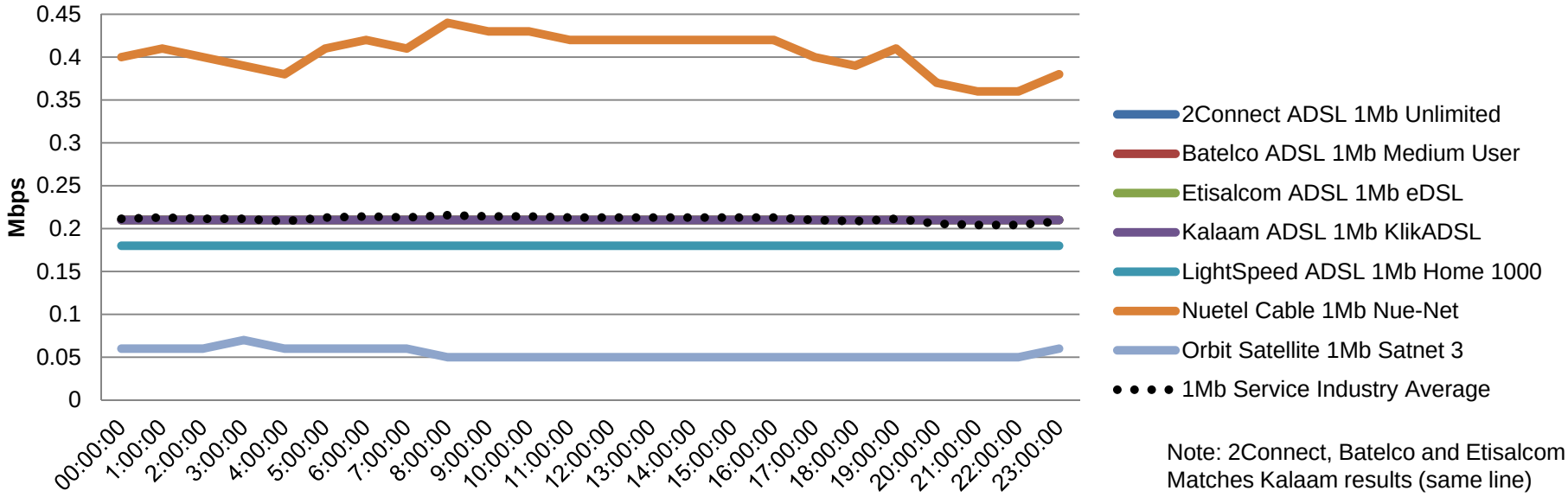
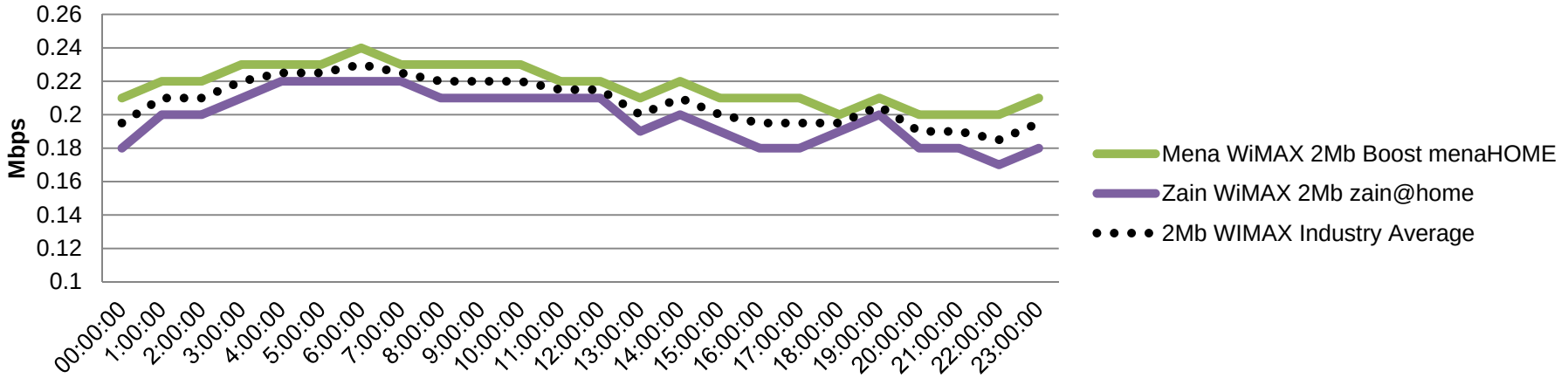


Chart 5 - TCP Upload Speed (average) 1 Mbps services



Note: 2Connect, Batelco and Etisalcom Matches Kalaam results (same line)

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



TRA Fixed Broadband Analysis Report

TCP Upload Speed (Average) Line Chart (Peer view)																		
01 Jul 2010 00:00:00 - 30 Sep 2010 24:00:00 Asia/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**
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
Batelco ADSL 1Mb Medium User	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
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
Kalaam ADSL 1Mb KlikADSL	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
LightSpeed ADSL 1Mb Home 1000	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18
Nuetel Cable 1Mb Nue-Net	0.4	0.41	0.4	0.39	0.38	0.41	0.42	0.41	0.44	0.43	0.43	0.42	0.42	0.42	0.42	0.42	0.42	0.4
Orbit Satellite 1Mb Satnet 3	0.06	0.06	0.06	0.07	0.06	0.06	0.06	0.06	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05
Mena WiMAX 2Mb Boost menaHOME	0.21	0.22	0.22	0.23	0.23	0.23	0.24	0.23	0.23	0.23	0.23	0.22	0.22	0.21	0.22	0.21	0.21	0.21
Zain WiMAX 2Mb zain@home	0.18	0.2	0.2	0.21	0.22	0.22	0.22	0.22	0.21	0.21	0.21	0.21	0.21	0.19	0.2	0.19	0.18	0.18
1Mb Service Industry Average	0.21	0.21	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
2Mb WIMAX Industry Average	0.20	0.21	0.21	0.22	0.23	0.23	0.23	0.23	0.22	0.22	0.22	0.22	0.22	0.20	0.21	0.20	0.20	0.20

TCP upload measurements

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).

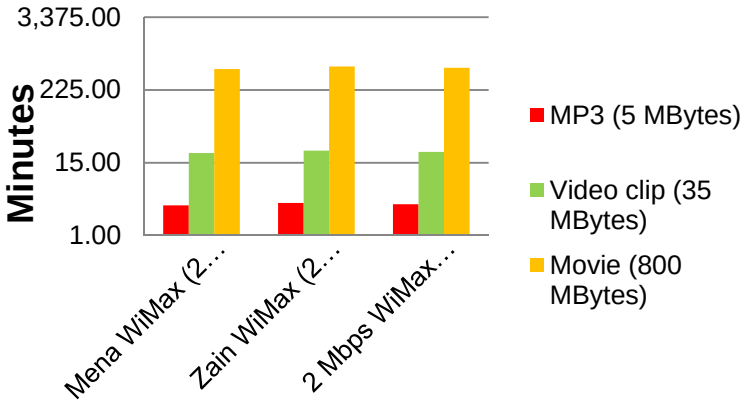
The higher is the upload speed the better is the performance.

TRA Fixed Broadband Analysis Report

Average Upload times for typical data types

	File Type and size in Mbytes			Upload time in Minutes			
	24 Hour 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	507.94
Batelco ADSL (1 Mbps medium user)	0.21	5	35	800	3.17	22.22	507.94
Etisalcom ADSL (1 Mbps eDSL)	0.21	5	35	800	3.17	22.22	507.94
Kalaam (1 Mbps KlikADSL)	0.21	5	35	800	3.17	22.22	507.94
Lightspeed ADSL (1 Mbps Home 1000)	0.18	5	35	800	3.70	25.93	592.59
Neutel cable (1 Mbps Nue Net)	0.40	5	35	800	1.65	11.53	263.65
Orbit Satellite (1 Mbps Satnet 3)	0.05	5	35	800	12.31	86.15	1,969.23
Mena WiMax (2 Mbps Boost Mena Home)	0.22	5	35	800	3.07	21.46	490.42
Zain WiMax (2 Mbps Zain@Home)	0.20	5	35	800	3.36	23.53	537.82
1 Mbps ADSL Industry Average	0.21	5	35	800	3.16	22.09	504.93
2 Mbps WiMax Industry Average	0.21	5	35	800	3.21	22.44	513.03

Chart 8 Average upload time for different data file types



The shorter is the upload time the better is the performance

Chart 7 Average upload time for different data file types

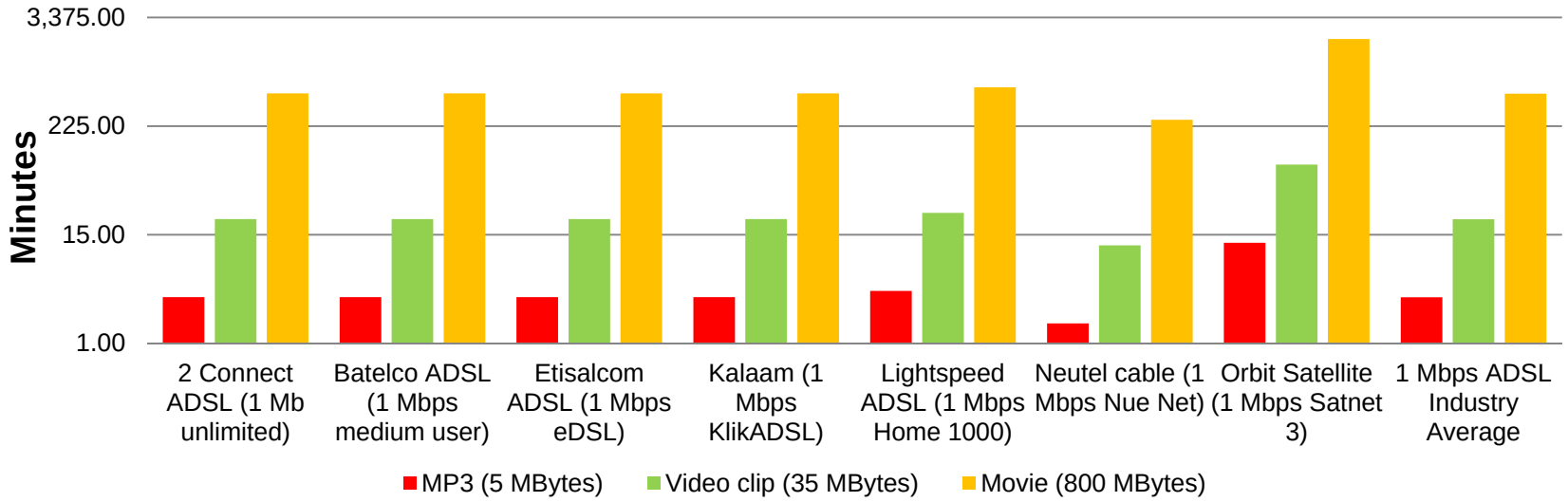


Chart 9 - HTTP Download Speed (average) (Cached) 1 Mbps services

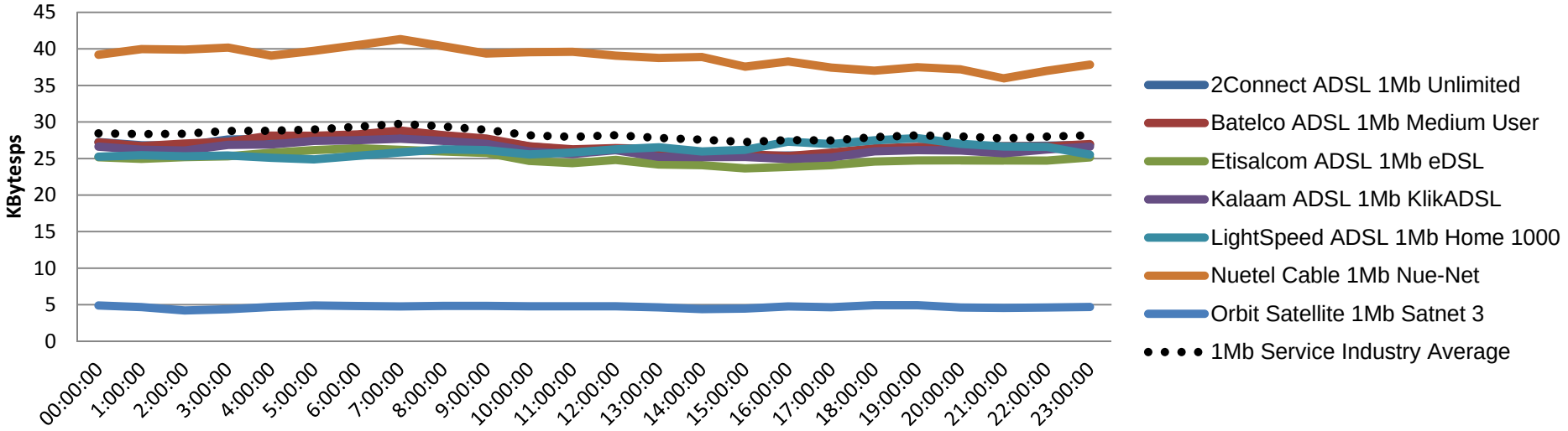
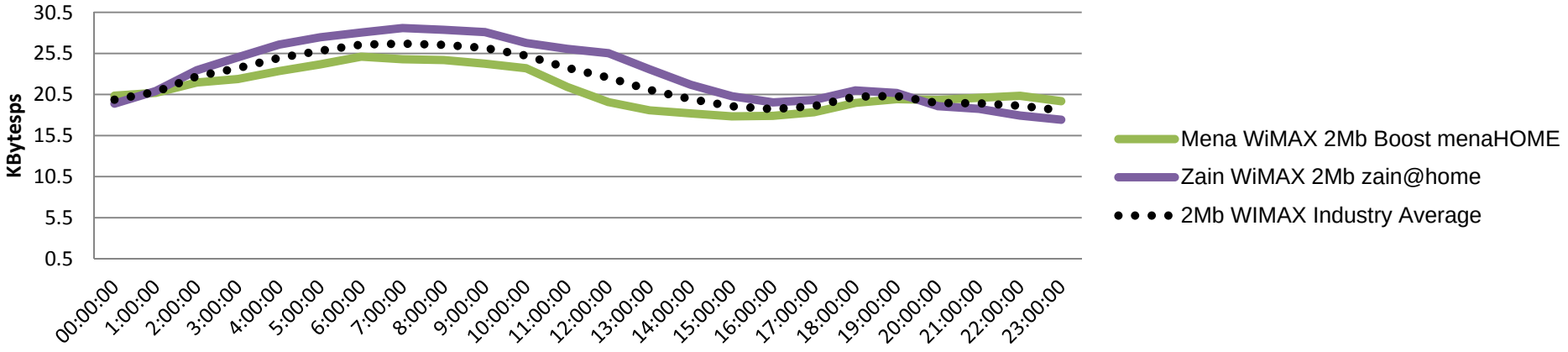


Chart 10 - HTTP Download Speed (average) (Cached) 2 Mbps WiMax services



TRA Fixed Broadband Analysis Report

HTTP Download Speed (Cached) Line Chart (Peer view)																		
01 Jul 2010 00:00:00 - 30 Sep 2010 24:00:00 Asia/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**
2Connect ADSL 1Mb Unlimited	27.25	26.81	26.78	27.59	27.68	27.56	28.02	28.6	28.14	27.54	26.64	26.16	26.35	25.88	25.55	25.3	25.41	25.32
Batelco ADSL 1Mb Medium User	27.22	26.7	27.04	27.28	28.13	28.12	28.3	28.83	28.18	27.73	26.66	26.25	26.43	26.29	25.8	25.57	25.34	25.8
Etisalcom ADSL 1Mb eDSL	25.17	24.96	25.2	25.31	25.78	26.15	26.4	26.18	25.97	25.77	24.66	24.36	24.8	24.19	24.09	23.65	23.85	24.09
Kalaam ADSL 1Mb KlikADSL	26.63	26.21	26.1	26.86	26.92	27.41	27.5	27.7	27.41	27.01	25.97	25.63	26.15	25.23	25.19	25.22	24.94	25.15
LightSpeed ADSL 1Mb Home 1000	25.24	25.45	25.3	25.42	25.11	24.89	25.36	25.84	26.25	26.15	25.56	25.81	26.26	26.54	25.97	26.18	27.3	26.98
Nuetel Cable 1Mb Nue-Net	39.19	39.97	39.9	40.16	39.07	39.73	40.49	41.33	40.35	39.36	39.55	39.6	39.07	38.75	38.88	37.57	38.27	37.43
Orbit Satellite 1Mb Satnet 3	4.89	4.68	4.21	4.38	4.69	4.89	4.83	4.76	4.85	4.85	4.79	4.79	4.79	4.64	4.41	4.48	4.77	4.66
Mena WiMAX 2Mb Boost menaHOME	20.36	20.7	21.96	22.39	23.35	24.18	25.1	24.79	24.7	24.25	23.69	21.43	19.57	18.57	18.2	17.84	17.91	18.34
Zain WiMAX 2Mb zain@home	19.39	20.92	23.46	25.04	26.57	27.46	28.05	28.59	28.38	28.1	26.78	26.05	25.53	23.57	21.68	20.3	19.54	19.83
1Mb Service Industry Average	28.45	28.35	28.39	28.77	28.78	28.98	29.35	29.75	29.38	28.93	28.17	27.97	28.18	27.81	27.58	27.25	27.52	27.46
2Mb WIMAX Industry Average	19.88	20.81	22.71	23.72	24.96	25.82	26.58	26.69	26.54	26.18	25.24	23.74	22.55	21.07	19.94	19.07	18.73	19.09

HTTP Measurements (Download Speed - Cache)

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

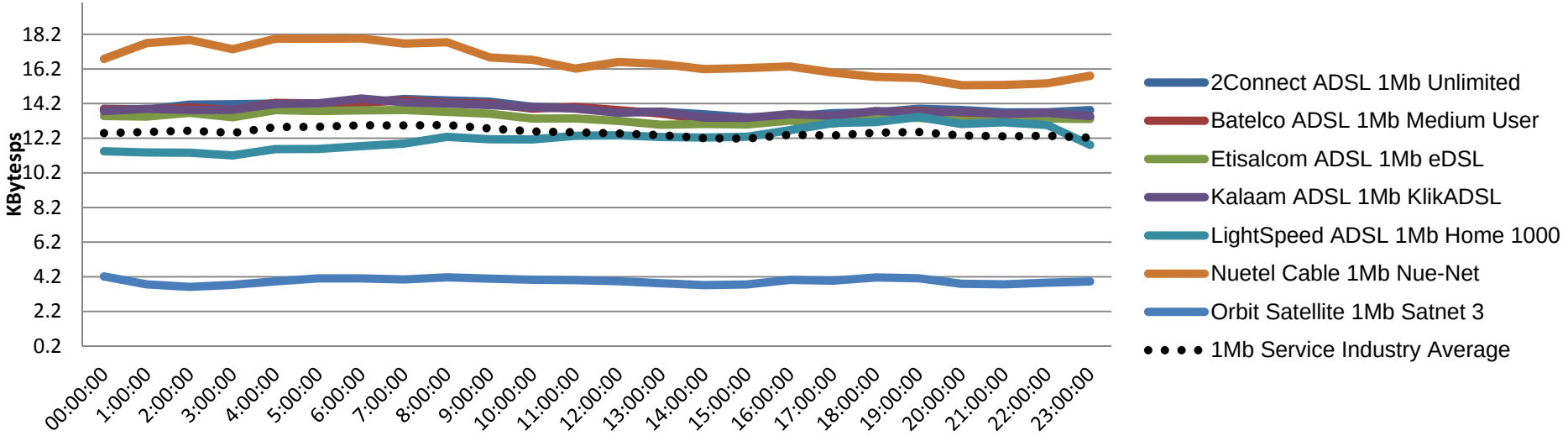
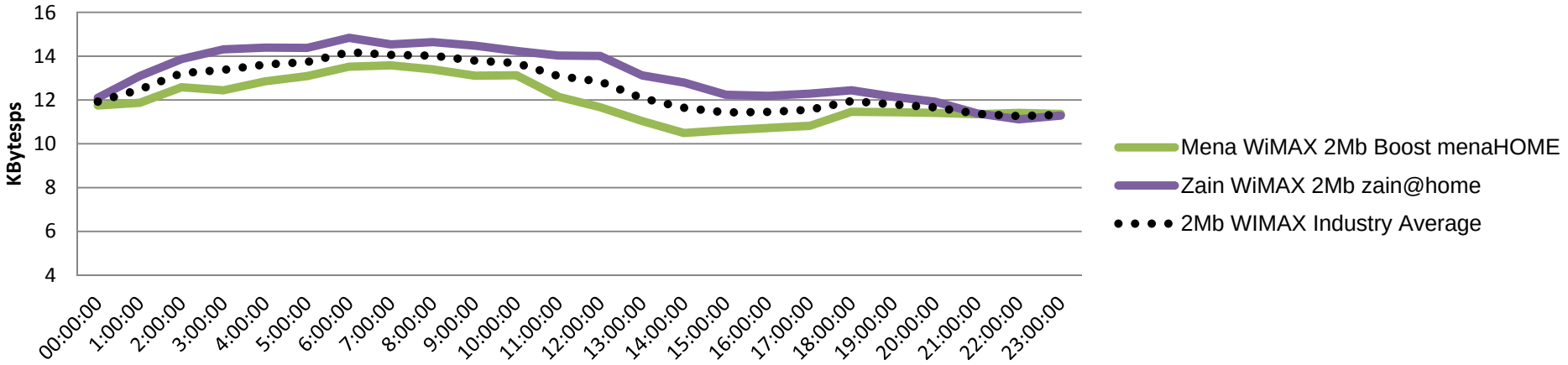


Chart 12 - HTTP Download Speed (average) (Non Cached) 2 Mbps WiMax services



TRA Fixed Broadband Analysis Report

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

01 Jul 2010 00:00:00 - 30 Sep 2010 24:00:00 Asia/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
2Connect ADSL 1Mb Unlimited	13.9	13.86	14.14	14.16	14.2	14.18	14.24	14.47	14.38	14.31	14.01	13.96	13.71	13.73	13.58	13.4	13.46	13.64	13.69
Batelco ADSL 1Mb Medium User	13.87	13.85	13.98	13.83	14.24	14.2	14.25	14.39	14.24	14.19	13.91	14.01	13.82	13.62	13.29	13.18	13.47	13.24	13.73
Etisalcom ADSL 1Mb eDSL	13.48	13.45	13.67	13.41	13.82	13.77	13.81	13.83	13.72	13.61	13.33	13.34	13.2	12.98	13.02	12.99	13.22	13.04	13.43
Kalaam ADSL 1Mb KlikADSL	13.77	13.9	13.83	13.84	14.18	14.22	14.49	14.27	14.2	14.11	13.99	13.91	13.67	13.74	13.39	13.37	13.59	13.5	13.77
LightSpeed ADSL 1Mb Home 1000	11.45	11.38	11.36	11.21	11.57	11.58	11.74	11.89	12.28	12.14	12.13	12.34	12.37	12.27	12.24	12.29	12.67	13.08	13.13
Nuetel Cable 1Mb Nue-Net	16.78	17.69	17.87	17.34	17.94	17.94	17.96	17.66	17.74	16.86	16.72	16.22	16.6	16.48	16.19	16.25	16.34	15.99	15.74
Orbit Satellite 1Mb Satnet 3	4.22	3.76	3.62	3.74	3.94	4.11	4.11	4.05	4.17	4.09	4.03	4.01	3.95	3.83	3.72	3.76	4.02	3.98	4.16
Mena WiMAX 2Mb Boost menaHO	11.75	11.87	12.58	12.44	12.85	13.09	13.52	13.58	13.4	13.11	13.13	12.15	11.67	11.04	10.49	10.62	10.72	10.82	11.46
Zain WiMAX 2Mb zain@home	12.1	13.09	13.87	14.31	14.39	14.38	14.84	14.54	14.64	14.48	14.24	14.03	14.01	13.12	12.8	12.24	12.19	12.29	12.44
1Mb Service Industry Average	12.50	12.56	12.64	12.50	12.84	12.86	12.94	12.94	12.96	12.76	12.59	12.54	12.47	12.38	12.20	12.18	12.40	12.35	12.52
2Mb WIMAX Industry Average	11.93	12.48	13.23	13.38	13.62	13.74	14.18	14.06	14.02	13.80	13.69	13.09	12.84	12.08	11.65	11.43	11.46	11.56	11.95

HTTP Measurements (Download Speed - Non Cache)

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)

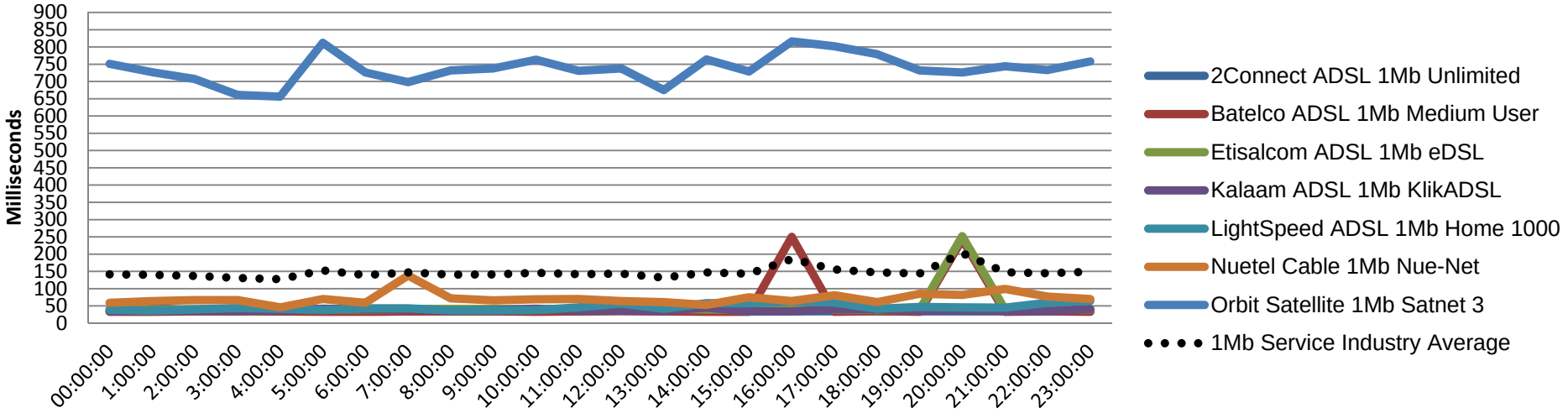
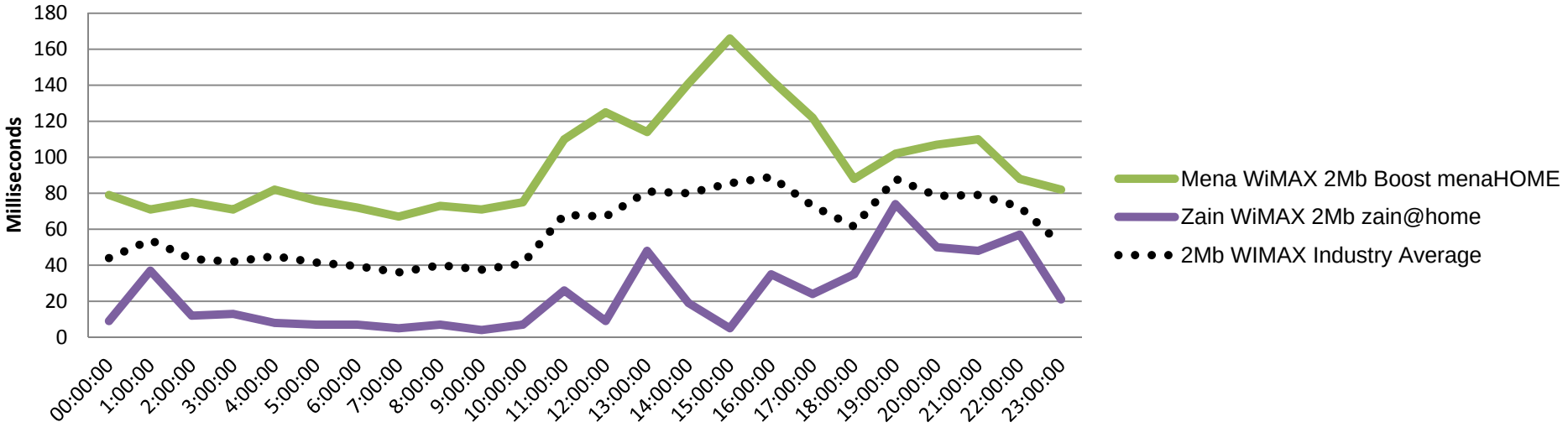


Chart 14 - DNS Time (2 Mbps WiMax services)



TRA Fixed Broadband Analysis Report

DNS Time Line Chart (Peer view)																			
01 Jul 2010 00:00:00 - 30 Sep 2010 24:00:00 Asia/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**
2Connect ADSL 1Mb Unlimited	35	45	35	34	40	34	35	34	34	35	36	34	36	34	37	34	35	34	34
Batelco ADSL 1Mb Medium User	33	33	34	34	34	33	33	34	34	34	33	34	35	34	33	33	250	33	35
Etisalcom ADSL 1Mb eDSL	40	39	40	42	40	41	39	41	41	41	40	41	39	41	40	39	39	39	38
Kalaam ADSL 1Mb KlikADSL	35	36	36	36	36	42	40	40	36	38	42	37	36	36	45	34	34	40	40
LightSpeed ADSL 1Mb Home 1000	39	36	40	44	42	38	43	43	37	37	38	46	57	42	58	58	63	60	42
Nuetel Cable 1Mb Nue-Net	59	64	67	67	46	70	59	138	72	66	69	70	64	61	53	75	64	81	61
Orbit Satellite 1Mb Satnet 3	751	727	707	661	656	812	726	698	732	738	763	731	738	675	764	729	816	802	779
Mena WiMAX 2Mb Boost menaHO	79	71	75	71	82	76	72	67	73	71	75	110	125	114	141	166	143	122	88
Zain WiMAX 2Mb zain@home	9	37	12	13	8	7	7	5	7	4	7	26	9	48	19	5	35	24	35
1Mb Service Industry Average	141.71	140.00	137.00	131.14	127.71	152.86	139.29	146.86	140.86	141.29	145.86	141.86	143.57	131.86	147.14	143.14	185.86	155.57	147.00
2Mb WIMAX Industry Average	44.00	54.00	43.50	42.00	45.00	41.50	39.50	36.00	40.00	37.50	41.00	68.00	67.00	81.00	80.00	85.50	89.00	73.00	61.50

DNS Time (Domain Name System)

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)

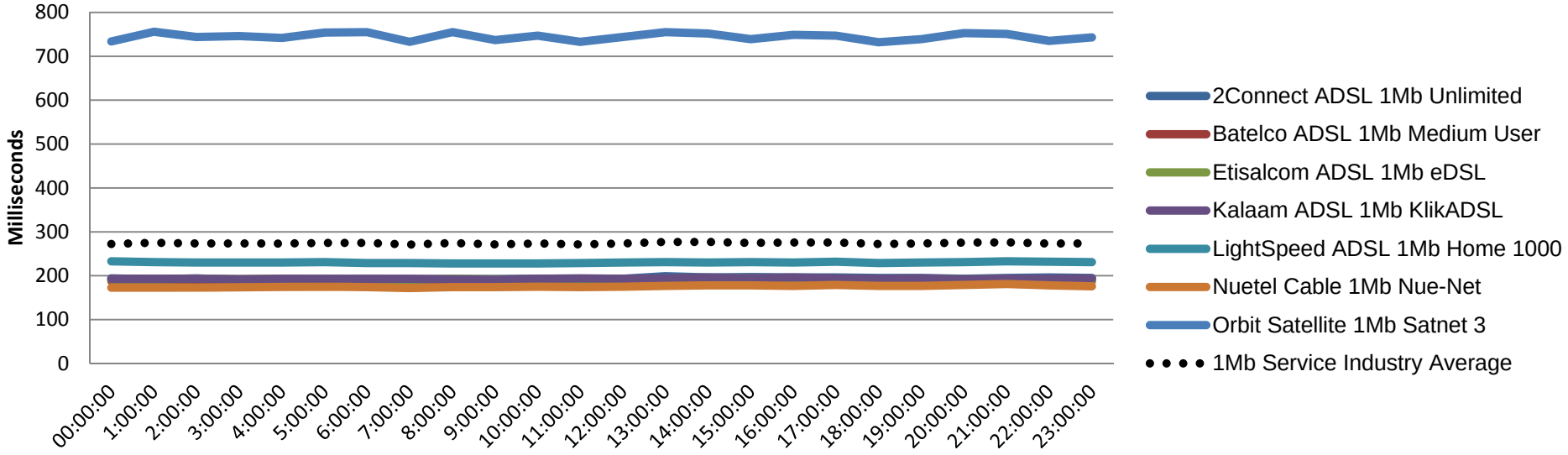
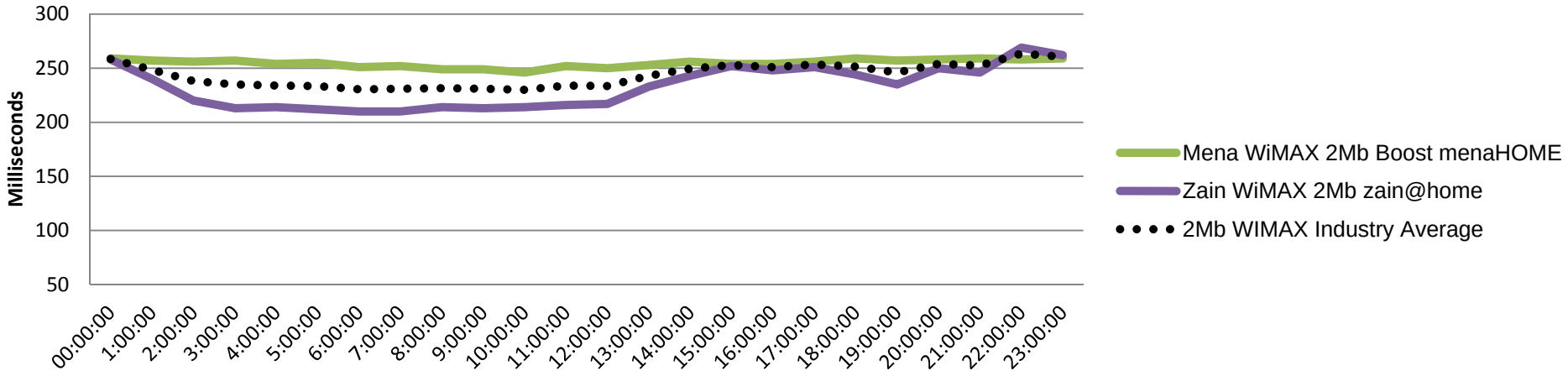


Chart 16 Ping Time (2 Mbps WiMax services)



TRA Fixed Broadband Analysis Report

Ping Time Line Chart (Peer view)																		
01 Jul 2010 00:00:00 - 30 Sep 2010 24:00:00 Asia/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**
2Connect ADSL 1Mb Unlimited	194	192	194	191	192	192	191	191	192	192	193	192	193	199	196	197	196	196	195
Batelco ADSL 1Mb Medium User	188	188	189	189	188	188	190	188	188	187	187	187	188	189	191	190	188	190	190
Etisalcom ADSL 1Mb eDSL	192	192	193	192	193	191	192	191	193	192	192	192	191	193	195	194	193	193	190
Kalaam ADSL 1Mb KlikADSL	193	193	193	192	193	193	193	193	192	191	193	194	193	194	196	194	196	194	193
LightSpeed ADSL 1Mb Home 1000	233	231	230	230	230	231	229	229	228	228	228	229	230	231	230	231	230	232	229
Nuetel Cable 1Mb Nue-Net	173	173	173	174	174	175	174	172	174	174	175	174	175	177	178	178	177	179	177
Orbit Satellite 1Mb Satnet 3	734	756	744	746	742	754	755	733	755	737	747	733	744	755	752	739	749	747	732
Mena WiMAX 2Mb Boost menaHO	259	257	256	257	254	255	251	252	249	249	246	252	250	253	256	254	254	256	259
Zain WiMAX 2Mb zain@home	258	240	220	213	214	212	210	210	214	213	214	216	217	233	243	252	248	251	244
1Mb Service Industry Average	272.43	275.00	273.71	273.43	273.14	274.86	274.86	271.00	274.57	271.57	273.57	271.57	273.43	276.86	276.86	274.71	275.57	275.86	272.29
2Mb WIMAX Industry Average	258.50	248.50	238.00	235.00	234.00	233.50	230.50	231.00	231.50	231.00	230.00	234.00	233.50	243.00	249.50	253.00	251.00	253.50	251.50

Ping Time (Latency)

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