REPORT

ON

AUDIT & ASSESSMENT OF QUALITY OF SERVICE

OF

CELLULAR MOBILE TELEPHONE SERVICE

FOR

WEST ZONE – MUMBAI CIRCLE

Report Period: Jan 2011 – March 2011

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CHAPTER-1: INTRODUCTION

I.   Background

TRAI's mission is to create and nurture conditions for growth of telecommunications in the country in a manner and at a pace, which will enable India to play a leading role in emerging global information society. One of the main objectives of Telecom Regulatory Authority of India (TRAI) is to provide a fair and transparent policy environment, which promotes a level playing field and facilitates fair competition.

In pursuance of above objective TRAI has issued from time to time a large number of regulations, orders and directives to deal with issues coming before it and provided the required direction to the evolution of Indian telecom market from a Government owned monopoly to a multi-operator multi service open competitive market.

The directions, orders and regulations issued cover a wide range of subjects including tariff, interconnection and quality of service as well as governance of the Authority.

The purpose of laying down Quality of Service Parameters is to:

i)   Create conditions for consumer satisfaction by making known the quality of service, which the service provider is required to provide, and the user has a right to expect.

ii)   Measure the Quality of Service provided by the Service Providers from time to time and to compare them with the norms so as to assess the level of performance.

iii)   Generally protect the interests of consumers of telecommunication services.

TRAI has been carrying out regular reviews of the status of quality of service of the networks of all operators. In continuation to these efforts, TRAI has selected through bidding process TCIL as the Audit Agency to audit and assess the Quality of Service rendered by the service providers' namely Basic (Wireline) Services, Cellular Mobile Telephone (Wireless) Services and Broadband Services. The Audit for various telecom circles within the Zones has been distributed across four quarterly periods.

The parameters that need to be measured for Basic and Cellular Mobile Services have been specified in the TRAI notification on Quality of Service of Basic (Wireline) and Cellular Mobile (wireless) Services, 2009. The parameters for Broadband Services have been specified in the TRAI notification for Quality of Services of Broadband Service Regulation, 2006.

II.   Objectives and Methodology

The primary objective is to audit and assess the Quality of Service being rendered by Basic, Cellular Mobile & Broadband services against the parameters notified by TRAI. The audit and assessment of Quality of Service is conducted for all the basic service providers, unified access service providers, cellular mobile service providers and ISPs (Internet Service Provider) for basic wireline, Cellular Mobile Telephone Services and broadband service. TCIL has undertaken the following audit works as per the Terms of Reference (TOR):

i)   Verification of the data submitted by the service providers to TRAI as part of QoS monitoring reports i.e. Quarterly Performance Monitoring Reports (PMRs) and monthly Point of Interconnection (POI) Congestion Reports with reference to the records maintained by the service provider.

ii)   Verification of the performance of service providers against the Quality of Service benchmarks laid down by TRAI using live measurement for 3 days during the month in which the audit and assessment is carried out.

iii)   Verification of the performance of service providers against the Quality of Service benchmarks laid down by TRAI using the data for the entire month during which the live measurement is carried out.

iv)   Drive tests of the mobile networks both operators assisted and independent drive test (as and where required).

v)   Billing and call center's data verification.

vi)   Live testing of the efficiency of the call center / customer care help line.

To fulfill the above mentioned Scope of Work audit was performed on different Systems, Facilities and Field data collection.

Systems audited:-
   1. Network Switching Centre (NSS)
   2. Base Station Subsystem(BSS)
   3. Billing Applications
   4. Customer Care applications

Facilities audited:-
   1. Billing documents.
   2. Customer Care records.

Field data collections carried out:-
   1. RF network coverage including KPIs (Key Performance Index)
   2. Inter Operator Call Assessment
   3. Checking of Customer Billing/Refund Complaints (Random sample)
   4. Customer Care efficiency
   5. The live calling was made to assess the quality of services for Inter Operator Call Assessment, Customer Billing/Refund Complaints and Customer Care efficiency.

In order to carry out the above scope of work:-

✓ TCIL auditors visited all the NSS (Network Sub System) and BSS (Base-station Sub System) to check data for all the operators in their respective service area.

✓ All the NSS and BSS data for the relevant details were collected either directly from the centralized NOC or through a remote access to the NOC.

✓ The Radio parameters were audited/verified from the data collected from OMC-R (Operation and Maintenance Center – Radio, as part of BSS data).

✓ The Drive test was conducted in high, low and medium dense areas including highways, commercial complex and residential areas and special attention was paid for the areas for which TRAI has received complaints.

✓ The POI and other network related parameters were audited/verified from the data collected from the OMC-S (Operation and Maintenance Center – Switch as part of NSS data).

✓ The data related to Billing and Customer care was checked for the previous month and verified with the customers by calling them on random basis. The process of registration and handling of the complaints was also studied for the various operators. Call centre number were called for measuring the efficiency of the call centre.

✓ The inter operator call assessment test was carried out during the time period as is specified in the tender document. TCBH (Time Consistent Busy Hour) is taken after observation of the traffic consistently for 3 days prior to the audit activity.

✓ Data has been collected for busy hour of network in case of live assessment & month of audit for all service providers & verified that service providers are providing busy hour data only for QoS service. We found that TCBH hour is matching with network busy hour as provided by service providers for Mumbai circle. But for parameters such as 'Worst affected cell exceeding 3% TCH drop' and 'BTSs accumulated down time' CBBH (Cell Bouncing Busy Hour) was taken instead of TCBH (Time Consistent Busy Hours) as per the TRAI new regulation 2009. This has resulted in high value for 'Cell exceeding 3% TCH drop' parameter for some of the service providers.

✓ For Basic Wireline Service, the Network parameter of the QoS TRAI regulations is observed / verified for the 3 days for nearly 5% of the telephone exchanges covering 10% of the SDCA in a Service area.

✓ Also, for Broadband Services, 5% of the POPs (Point Of Presence) in 10% of the SDCA were audited for the relevant details from the centralized NOC or through a remote access to the NOC. The network parameter was also checked from the centralized NOC. MRTG, Cactii and Sandvine software were used for monitoring link utilization. Smoke Ping and Ping Test were used for monitoring Network Latency.

CHAPTER 2: EXECUTIVE SUMMARY

I.   Preface

This report highlights the findings for the audit & assessment of Quality of Service of Cellular Mobile Services in Mumbai Circle in 1st quarter (January – March 2011). The primary data collection and verification of records (PMR data verification – quarterly) maintained by various operators was undertaken for the period July – September 2010.

Following are the various operators covered in Mumbai circle (West Zone) for Cellular Mobile (Wireless) services QoS audit & assessment. The Month of audit & TCBH information is also given below:

Sl.	Name of Service Provider	Month of Audit	TCBH Hour
GSM Operators			
1	Aircel Ltd	Jan-2011	2000-2100 hrs
2	Airtel Ltd	Jan-2011	1900-2000 hrs
3	Etisalat	Jan-2011	1900-2000 hrs
4	Idea	Jan-2011	2000-2100 hrs
5	Loop Telecom	Jan-2011	2000-2100 hrs
6	MTNL	Jan-2011	1900-2000 hrs
7	Reliance Communication (GSM)	Jan-2011	1900-2000 hrs
8	Tata Communications (GSM)	Jan-2011	1900-2000 hrs
9	Videocon		2000-2100 hrs
10	Vodafone	Jan-2011	1900-2000 hrs
11	Uninor		1900-2000 hrs
CDMA Operators			
12	MTS	Jan-2011	1900-2000 hrs
13	Reliance Communication (CDMA)	Jan-2011	1900-2000 hrs
14	Tata Communications (CDMA)	Jan-2011	1900-2000 hrs

All the NSS and BSS systems were considered for audit and assessment for the TCBH hours of individual operators.

II. Findings from Quality of Service Audit (Operator wise for each parameter)

(A) Cellular Mobile Telephone Services

S/N	**3 days Live Data Audit** **Name of Parameter**	**Bench-mark**	**Aircel**	**Airtel**	**Etisalat**	**Idea**	**Loop**	**MTNL**	**Rcom GSM**	**Tata GSM**	**Video-con**	**Voda-fone**	**Uninor**	**MTS**	**Rcom CDMA**	**Tata CDMA**
			GSM Operators											**CDMA Operators**		
1	**Connection Establishment (Accessibility)**															
	a) CSSR (Call Setup Success Rate)	>=95%	98.78%	98.99%	99.75%	99.27%	99.90%	96.81%	99.65%	98.64%	99.90%	99.99%	99.39%	99.55%	99.43%	98.99%
	b) SDCCH/PAGING congestion	<=1%	0.36%	0.03%	0.03%	0.16%	0.16%	0.35%	0.17%	0.93%	0.16%	0.37%	0.10%	0.00%	0.00%	0.00%
	c) TCH congestion	<=2%	0.01%	0.10%	0.01%	0.17%	0.10%	0.85%	0.23%	0.28%	0.10%	0.45%	0.02%	0.00%	0.33%	0.00%
2	**Connection maintenance (retainability)**															
	a) CDR	<=2%	0.83%	0.88%	2.01%	1.16%	0.67%	1.57%	0.31%	0.88%	0.67%	0.67%	1.19%	0.15%	0.53%	0.70%
	b) Worst affected cells>3% TCH drop	<=5%	2.26%	1.99%	12.00%	6.75%	0.53%	2.02%	0.63%	1.70%	0.53%	0.30%	2.72%	0.94%	0.31%	1.39%
	c) Good voice quality	>=95%	98.32%	98.00%	97.40%	98.60%	97.86%	96.89%	98.28%	96.91%	97.86%	98.52%	98.39%	NA	NA	NA
3	**No of POIs not meeting benchmark**	<=0.5%	0	0	0	0	0	0	0	0	0	0	0	3	0	0
4	**Response time to customers for assistance**															
	a) Accessibility of call centre/Customer Care	>=95%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
	b) % call answered by operators(voice to voice) within 60 sec.	>=90%	87%	100%	96%	99%	100%	57%	96%	93%	97%	97%	91%	95%	93%	99%

NA: Not Applicable, NR: Not Received

From the 3 days live data assessment, it is found that all the operators are meeting the network parameters by and large, except for Etisalat not meeting the benchmark for "CDR" and Idea & Etisalat for "worst affected cells >3% TCH drop". MTS had 3 POIs with more than 0.5% congestion.

Performance related to customer care data is found to be satisfactory for most of the operators, except Aircel & MTNL not meeting the 90% benchmark for "%age of calls answered by operators within 60 seconds".

S/N	One Month Data Audit / Name of Parameter	Bench-mark	Aircel	Airtel	Etisalat	Idea	Loop	MTNL	Rcom GSM	Tata GSM	Video-con	Voda-fone	Uninor	MTS	Rcom CDMA	Tata CDMA
			GSM Operators											CDMA Operators		
(A)	Network Service Quality Parameter															
1	Network Availability															
	a) BTS Accumulated Downtime	<=2%	0.06%	0.04%	2.25%	0.02%	0.13%	1.25%	0.17%	0.03%	0.13%	0.01%	0.04%	0.03%	0.17%	1.31%
	b) Worst affected BTSs due to downtime	<=2%	0.20%	0.27%	8.18%	0.00%	0.80%	1.13%	0.06%	0.03%	0.80%	0.00%	0.00%	0.00%	0.00%	0.36%
2	Connection Establishment (Accessibility)															
	a) CSSR (Call Setup Success Rate)	>=95%	98.68%	99.04%	99.66%	99.30%	99.83%	96.26%	99.60%	98.84%	99.83%	99.99%	99.36%	99.38%	99.41%	98.88%
	b) SDCCH/PAGING congestion	<=1%	0.20%	0.03%	0.01%	0.14%	0.20%	0.74%	0.28%	0.48%	0.20%	0.21%	0.03%	0.00%	0.00%	0.00%
	c) TCH congestion	<=2%	0.01%	0.97%	0.04%	0.18%	0.17%	1.71%	0.16%	0.33%	0.17%	0.47%	0.22%	0.12%	0.40%	0.04%
3	Connection maintenance (retainability)															
	a) CDR	<=2%	0.83%	0.88%	2.15%	1.20%	0.67%	1.75%	0.34%	0.86%	0.67%	0.66%	1.12%	0.16%	0.54%	0.71%
	b) Worst affected cells>3% TCH drop	<=5%	2.45%	0.76%	13.34%	7.01%	0.55%	1.73%	0.00%	1.67%	0.55%	0.88%	2.59%	1.10%	0.19%	1.55%
	c) Good voice quality	>=95%	98.27%	98.01%	97.20%	98.77%	97.90%	96.14%	98.36%	96.95%	97.90%	98.54%	98.42%	NA	NA	NA
4	No of POIs not meeting benchmark	<=0.5%	0	0	0	0	0	0	0	0	0	1	1	3	0	0
(B)	Customer Service Quality Parameters															
5	Metering/billing credibility- Post paid	<= 0.1%	0.24%	0.02%	NA	0.03%	0.02%	0.10%	0.10%	0.26%	NA	0.00%	NA	0.00%	0.10%	0.18%
6	Metering /billing credibility- Pre paid	<= 0.1%	0.01%	0.00%	0.08%	0.04%	0.02%	0.00%	0.68%	0.00%	0.09%	0.00%	0.11%	0.02%	0.11%	0.01%
7	Resolution of billing/ charging complaints	100% within 4 weeks	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
	a) Period of applying credit/waiver/adjustment to the customers account from the date of resolutions of complaints	<=1 week	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
8	Response time to customers for assistance															
	a) Accessibility of call centre/Customer Care	>=95%	96.97%	100.00%	99.00%	100.00%	97.41%	95.00%	100.00%	91.89%	96.00%	99.84%	100.00%	100.00%	100.00%	100.00%
	b) % call answered by operators(voice to voice) within 60 sec.	>=90%	96.77%	100.00%	95.00%	72.50%	95.35%	41.74%	92.23%	96.94%	96.00%	94.00%	99.42%	96.07%	88.90%	92.00%

S/N	One Month Data Audit / Name of Parameter	Bench-mark	Aircel	Airtel	Etisalat	Idea	Loop	MTNL	Rcom GSM	Tata GSM	Video-con	Voda-fone	Uninor	MTS	Rcom CDMA	Tata CDMA
			GSM Operators											CDMA Operators		
9	Termination/closure of service	<=7days	100%	100%	NA	100%	100%	100%	100%	100%	NA	100%	NA	100%	100%	100%
10	Time taken for refunds of deposits after closures.	100% within 60 days	100%	100%	NA	100%	100%	100%	100%	100%	NA	100%	NA	100%	100%	100%

NA: Not Applicable, NR: Not Received

From the month data assessment, it is found that all the operators are meeting the network parameters by and large. Deviations were found for "Worst affected BTSs due to downtime" & "BTS accumulated downtime" in case Etisalat. Similarly, deviations were also found for "CDR" (Etisalat) and "Worst affected cells >3% TCH drop" (Etisalat & Idea). Vodafone, Uninor & MTS had POIs with more than 0.5% congestion.

In Metering and Billing credibility, Aircel, Tata GSM & CDMA are not meeting the benchmark for post-paid connections and Uninor, Reliance GSM & CDMA for pre-paid connections.

Performance related to customer care data is found to be satisfactory for most of the operators. However, for the parameter "Accessibility of call centre", Tata GSM has high deviation from the benchmark value of 90%. Idea, Reliance CDMA & MTNL have not meet the 90% benchmark value for "%age of calls answered by operators".

Operator-Assisted Drive Test

The Operator Assisted Drive Test was conducted at Mumbai for all the operators. Since Mumbai is a metro city, route covered was about around 100-150 Km within the speed limit of 40Km/hr. Zones were selected for covering different density areas (High, Medium & Low dense areas).

SN	Parameter	City Name	Aircel	Airtel	Etisalat	Idea	Loop	MTNL	Rcom GSM	Tata GSM	Video-con	Voda-fone	Uninor	MTS	Rcom CDMA	MTNL-CDMA	Tata CDMA
							GSM Operators										
1.1	Blocked Call Rate (<=3%)	Mumbai	0.00%	0.02%	8.60%	0.00%	0.00%	8.57%	1.67%	1.66%	0.00%	0.00%	1.19%	0.00%	3.64%	0.00%	0.00%
1.2	Dropped Call Rate (<=2%)	Mumbai	0.00%	0.00%	7.36%	0.00%	0.00%	5.46%	0.00%	3.33%	0.00%	0.00%	2.97%	0.00%	0.00%	9.45%	0.00%
1.3	Percentage of connections with good voice quality (=>95%)																	
	(i) 0-4 (w/o frequency hopping)	Mumbai													95.63%	91.73%	96.26%
	(ii) 0-5 (with frequency hopping)	Mumbai	96.93%	97.08%	91.00%	94.00%	95.10%	92.76%	98.71%	95.21%	95.10%	98.77%	92.83%	99.42%			
1.4	Call Setup Success Rate (>=95%)	Mumbai	100.00%	99.98%	91.40%	100.00%	100.00%	91.43%	98.33%	98.34%	100.00%	100.00%	98.81%	100.00%	96.36%	100.00%	100.00%

Key observations as could be derived from the table are as under:
• Blocked Call Rate benchmark is not met by Etisalat, MTNL GSM & Reliance CDMA.
• Dropped Call Rate benchmark is not met by Etisalat, MTNL GSM, Tata GSM & MTNL CDMA.
• "%age of Voice quality connections" parameter is not met by MTNL CDMA, Etisalat, Idea, MTNL GSM & Uninor.
• CSSR benchmark of 95% is not met by Etisalat & MTNL GSM.

Independent Drive Test The Independent Drive Test was conducted at Mumbai. Here again, zones were selected for covering different density areas (High, Medium & Low dense areas).

SN	Parameter	City Name	Aircel	Airtel	Etisalat	Idea	Loop	MTNL	Rcom GSM	Tata GSM	Videocon	Vodafone	Uninor
							GSM Operators						
1.1	Blocked Call Rate (<=3%)	Mumbai	0.0%	0.0%	1.3%	0.0%	0.0%	3.5%	1.0%	1.7%	0.0%	0.0%	2.1%
1.2	Dropped Call Rate (<=2%)	Mumbai	0.0%	0.0%	2.5%	0.0%	0.0%	4.8%	9.5%	1.7%	0.0%	0.0%	1.6%
1.3	Percentage of connections with good voice quality (=>95%)												
	(i) 0-4 (with frequency hopping)	Mumbai											
	(ii) 0-5 (w/o frequency hopping)	Mumbai	95.64%	97.78%	95.00%	93.00%	95.96%	89.42%	92.00%	96.25%	95.96%	99.20%	92.02%
1.4	Call Setup Success Rate (>=95%)	Mumbai	100%	100%	99%	100%	100%	96%	99%	98%	100%	100%	98%

Key observations as could be derived from the table are as under:
• Blocked Call Rate benchmark is not met by MTNL GSM.
• Dropped Call Rate benchmark is not met by Etisalat, MTNL GSM & Reliance GSM.
• "%age of Voice quality connections" parameter is not met by Idea, MTNL GSM, Reliance GSM & Uninor.

(B) Basic Telephone Service (Wireline) Providers

3 Days Live Data Audit

S/N	Parameters	Benchmarks	MTNL	Airtel	TTSL	RCom
1	*Call Completion Ratio(CCR) & Answer to seizure Ratio(ASR)*					
	CCR & ASR	> 55%(CCR) & > 75%(ASR)	57.97%	93.33%	97.22%	87.94%
2	*POI Congestion*					
	No of POIs not meeting benchmark	<=0.5%	0	1	0	0
3	*Response Time to customer for assistance*					
	Accessibility of Call centre/customer Care within 40 seconds	≥95%	95.23%	100.00%	100.00%	98.00%
	% age of calls answered by operator(voice to voice) within 60 seconds	≥90%	95.00%	100.00%	98.00%	96.00%

From the 3 days live data audit, it was observed that all the three basic telephone service providers meet the benchmarks for all the parameters. While there is no congestion found on any network, the call completion rate is also good. The customer care parameters also indicate above benchmark performance for the operators.

One Month Data Audit

S/N	Parameters	Benchmarks	MTNL	Airtel	TTSL	RCom
1	*Fault incidences*					
	No. of faults/100 subscribers /month	< 5%	8.62%	1.14%	0.52%	0.21%
2	*Faults Repair/Restoration Time*					
	Fault repair by next working day(Urban Area)	>90%	93.93%	97.22%	96.44%	100.00%
	Within 3 days	100%	97.88%	100.00%	100.00%	100.00%
	Fault repair by next working day(Rural & hilly Area)	>90%	NA	NA	NA	NA
	Within 5 days	100%	NA	NA	NA	NA
	Mean time to Repair(MTTR)	≤8 Hrs	10.93	4.45	5.11	2.11
3	*Rent Rebate*					
	Fault pending > 3 days & <7 days	Rebate for 7 days	8196	123	NA	0
	Fault Pending > 7 days & < 15 days	Rebate for 15 days	1589	18	NA	0
	Fault pending > 15 days	Rebate for 1 month	151	3	NA	0

S/N	Parameters	Benchmarks	MTNL	Airtel	TTSL	RCom
4	*Call Completion Ratio(CCR) & Answer to seizure Ratio(ASR)*					
	CCR & ASR	**> 55%(CCR) & > 75%(ASR)**	58.37%	90.92%	92.23%	86.14%
5	*Metering & Billing Performance*					
	Disputed Bills over bills issued	**< 0.1%**	0.03%	0.20%	0.04%	0.04%
	% of billing complaints resolved within 4 weeks	**100%**	100.00%	100.00%	100.00%	100.00%
	Period of all refunds/payments from the date of resolution of complaints within 1week	**100%**	100.00%	54.00%	100.00%	100.00%
6	*POI Congestion*					
	No of POIs not meeting benchmark	*<=0.5%*	0	4	7	0
7	*Response Time to customer for assistance*					
	Accessibility of Call centre/customer Care within 40 seconds	**≥95%**	97.10%	91.18%	100.00%	98.19%
	% age of calls answered by operator(voice to voice) within 60 seconds	**≥90%**	97.00%	79.13%	82.14%	96.00%
8	*Customer care promptness in attending to customers request*					
	Termination / Closures	**100%**	100.00%	100.00%	100.00%	100.00%
	Time taken for refunds of deposit after closures within 60 days	**100%**	100.00%	91.43%	100.00%	100.00%

From the Month data table, it can be observed that all the operators are meeting the parameters by and large except for MTNL not meeting the benchmark for fault repair parameter. MTNL has 98.55% fault repair within 3 days in urban areas and 99.83% within 5 days in rural & hilly areas as opposed to the 100% benchmark.

(C) Broadband Service Providers

3 Days Live Data Audit

S/N	Parameters	Bench-marks	MTNL	Airtel	TTML	RCom	Hathway	Youtele	Sify	Spectranet
1	*Response time to the customer for assistance % age of calls answered by operator (Voice to Voice)*									
1.1	within 60 sec	**>60%**	67.37%	100.00%	99.00%	100.00%	100.00%	100.00%	90.56%	100.00%
1.2	within 90 sec	**>80%**	70.97%	100.00%	99.00%	100.00%	100.00%	100.00%	100.00%	100.00%
2	*Bandwidth Utilization/ Throughput: (If on any link(s) / route bandwidth utilization exceeds 90%, then network is considered to have congestion. For this additional provisioning of Bandwidth on immediate basis, but not later than one month, is mandated.) < 80% link(s) / route bandwidth utilization during peak hours (TCBH).*									
2.1	POP to ISP Gateway Node [Intra-network] Link(s)	**< 80%**	78.88%	NA	15.21%	43.80%	70.70%	45.80%	42.00%	39.96%
2.2	ISP Gateway Node to IGSP / NIXI Node upstream Link(s) for International connectivity	**< 80%**	76.60%	59.00%	70.73%	49.60%	63.60%	53.20%	65.00%	NA
2.3	Broadband Connection Speed (download) - from ISP Node to User	**> 80%**	90%	100%	82%	100%	95%	89%	93%	92%
3	*Packet loss*									
3.1	% of Packet loss	**<1%**	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
4	*Network latency (for wired broadband access)*									
4.1	User reference point at POP/ISP Gateway node to IGSP/NIXI	**<120 ms**	6.42 ms	37.1 ms	32.7 ms	40.3ms	2 ms	3 ms	52 ms	2 ms
4.2	User reference point at ISP Gateway node to International nearest NAP port abroad (terrestrial)	**<350 ms**	279.3 ms	102.1 ms	59 ms	58.3 ms	245.7 ms	229.3 ms	284 ms	268 ms

NA – Not Applicable, **NR** – Not Received.

All the broadband service providers meet the benchmarks by and large, except for MTNL not meeting the "Response time to the customer for assistance-%age of calls answered by operator within 90 sec" parameter with a value of 70.97%.

One Month Data Audit

S/N	Parameters	Bench-marks	MTNL	Airtel	TTML	RCom	Hathway	Youtele	Sify	Spectranet
1	*Service Provisioning/Activation Time*									
1.1	100% cases in 15 days (subject to technical feasibility)	**<15 days**	88.84%	100.00%	100.00%	100.00%	100.00%	100.00%	96.18%	95.00%
1.2	In all cases where payment towards installation charge & SD is taken and the Broadband connection is not provided within 15 working days	**credit @ Rs.10 per day**	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
2	*Faults Repair/Restoraion Time*									
	By next working day	**>90%**	85.81%	99.00%	99.00%	100.00%	94.74%	95.54%	92.00%	97.96%
	within 3 working day	**≥99%**	94.34%	100.00%	100.00%	100.00%	98.53%	99.41%	100.00%	100.00%
2.1	*Rebate*									
	Faults Pending for > 3 working days and < 7 working days: (Rebate equivalent to 7 days of minimum monthly charge or equivalent usage allowance)		3040	46	0	0	589	11	52	0
	Faults Pending for > 7 working days and < 15 working days: (Rebate equivalent to 15 days of minimum monthly charge or equivalent usage allowance)		399	10	0	0	253	2	34	0
	Faults Pending for > 15 working days:(Rebate equivalent to one month of minimum monthly charge or equivalent usage allowance)		14	0	0	0	66	0	0	0
3	*Billing Performance*									
	Billing complaints per 100 bills issued	**<2%**	0.01%	0.07%	1.33%	0.09%	1.33%	0.54%	NA	0.00%
	%age of complaints resolved within 4 weeks	**100%**	100%	100%	100%	100%	100%	100%	0%	100%
	Time taken for refund of deposits after closure (within 60 days)	**100%**	100%	75%	100%	100%	100%	100%	0%	100%
4	*Response time to the customer for assistance % age of calls answered by operator (Voice to Voice)*									
	within 60 sec	**>60%**	62.54%	100.00%	89.07%	94.00%	99.81%	73.00%	95.44%	100.00%
	within 90 sec	**>80%**	65.66%	100.00%	94.16%	96.00%	94.69%	79.00%	100.00%	100.00%
5	*Bandwidth Utilization/ Throughput: (If on any link(s) / route bandwidth utilization exceeds 90%, then network is considered to have congestion. For this additional provisioning of Bandwidth on immediate basis, but not later than one month, is mandated.) < 80% link(s) / route bandwidth utilization during peak hours (TCBH).*									
5.1	POP to ISP Gateway Node [Intra-network] Link(s)	**< 80%**	77.90%	NA	11.60%	31.90%	69.00%	47.30%	42.00%	39.81%
5.2	ISP Gateway Node to IGSP / NIXI Node upstream Link(s) for International connectivity	**< 80%**	78.80%	56.50%	61.80%	42.60%	66.20%	43.30%	64.00%	NA
5.3	Broadband Connection Speed (download) - from ISP Node to User	**> 80%**	87.40%	100.00%	85.00%	98.02%	91.50%	86.03%	94.06%	90.23%
6	*Service Availability/Uptime (for all users)*									
	Service Availability(%)	**>98%**	98.38%	99.71%	99.14%	99.99%	98.66%	98.69%	100.00%	99.96%

S/N	Parameters	Bench-marks	MTNL	Airtel	TTML	RCom	Hathway	Youtele	Sify	Spectranet
7	*Packet loss*									
	% of Packet loss	<1%	0.00%	0.02%	0.00%	0.16%	0.00%	0.00%	0.00%	0.02%
8	*Network latency (for wired broadband access)*									
8.1	User reference point at POP/ISP Gateway node to IGSP/NIXI	<120 ms	6.21 ms	69.6 ms	32.5 ms	43.3 ms	2 ms	19.6 ms	55 ms	20.6ms
8.2	User reference point at ISP Gateway node to International nearest NAP port abroad (terrestrial)	<350 ms	278.45 ms	345 ms	49.7 ms	55.9 ms	246 ms	247.9 ms	222 ms	298ms
8.3	User reference point at ISP Gateway node to International nearest NAP port abroad (satellite)** See note below	<800 ms	NA	NA	NA	NA	NA	NA	NA	NA

NA – Not Applicable, **NP** – Not Provided.
Note:
a) For S/N 8.3 none of the operator having satellite connectivity.
b) For S/N. 5.2 Spectranet not applicable because no Upstream Links for International Connectivity.
c) For S/N 3 SIFY not applicable because operator under in prepaid module.
d) For S/N. 8.1 Spectranet not applicable because no POP/ISP Gateway node to IGSP/NIXI Connectivity.

All the operators are found to be meeting the benchmarks for all the parameters by an large except for MTNL & Spectranet not meeting the "activation time" benchmark of 100% cases within 15 days with the values of 88.84% & 95% respectively. Below benchmark performance was seen for "Fault repair by next working day" in case of MTNL & "Fault repair within 3 working days" in case of MTNL & Hathway.

Airtel shows deviation in "Time taken for refund of deposits after closure (within 60 days)". Similarly, "Response time to the customer (voice-to-voice calls)" was not met by MTNL & You Telecom.

CHAPTER-3: AUDIT-PMR VERIFICATION

I. Cellular Mobile Telephone Service

S/N	PMR Name of Parameter	Bench-mark	Audit	Aircel	Airtel	Etisalat	Idea	Loop	MTNL	Rcom GSM	Tata GSM	Video-con	Voda-fone	Uninor	MTS	Rcom CDMA	Tata CDMA
				GSM Operators												CDMA Operators	
(A)	Network Service Quality Parameter																
1	Network Availability																
	BTS Accumulated Downtime	<=2%	Reported	0.03%	0.05%	1.61%	0.02%	0.26%	0.01%	0.11%	0.04%	0.26%	0.01%	0.09%	0.10%	0.12%	0.02%
			Verified	0.03%	0.05%	1.61%	0.02%	0.26%	0.01%	0.11%	0.04%	0.26%	0.01%	0.09%	0.10%	0.12%	0.02%
	Worst affected BTSs due to downtime	<=2%	Reported	0.05%	0.28%	11.04%	0.00%	1.46%	0.01%	0.08%	0.08%	1.46%	0.00%	0.19%	0.00%	0.14%	0.06%
			Verified	0.05%	0.28%	11.04%	0.00%	1.46%	0.01%	0.08%	0.08%	1.46%	0.00%	0.19%	0.00%	0.14%	0.06%
2	Connection Establishment (Accessibility)																
	CSSR (Call Setup Success Rate)	>=95%	Reported	98.13%	99.39%	99.62%	99.27%	99.99%	98.33%	99.60%	98.95%	99.99%	99.03%	99.94%	99.10%	99.51%	99.48%
			Verified	98.13%	99.39%	99.62%	99.27%	99.99%	98.33%	99.60%	98.95%	99.99%	99.03%	99.94%	99.10%	99.51%	99.48%
	SDCCH/PAGING congestion	<=1%	Reported	0.11%	0.01%	0.02%	0.10%	0.15%	0.01%	0.23%	0.70%	0.15%	0.10%	0.02%	0.00%	0.00%	0.00%
			Verified	0.11%	0.01%	0.02%	0.10%	0.15%	0.01%	0.23%	0.70%	0.15%	0.10%	0.02%	0.00%	0.00%	0.00%
	TCH congestion	<=2%	Reported	0.01%	0.04%	0.12%	0.17%	0.08%	0.02%	0.47%	1.04%	0.08%	0.37%	0.04%	0.00%	0.12%	0.02%
			Verified	0.01%	0.04%	0.12%	0.17%	0.08%	0.02%	0.47%	1.04%	0.08%	0.37%	0.04%	0.00%	0.12%	0.02%
3	Connection maintenance (retainability)																
	CDR	<=2%	Reported	0.90%	0.83%	1.57%	1.20%	0.90%	0.02%	0.32%	1.24%	0.90%	0.80%	0.49%	0.14%	0.59%	0.53%
			Verified	0.90%	0.83%	1.57%	1.20%	0.90%	0.02%	0.32%	1.24%	0.90%	0.80%	0.49%	0.14%	0.59%	0.53%
	Worst affected cells>3% TCH drop	<=5%	Reported	2.70%	0.81%	0.24%	7.92%	1.00%	0.04%	0.59%	2.45%	1.00%	1.50%	3.92%	1.49%	0.23%	0.43%
			Verified	2.70%	0.81%	0.24%	7.92%	1.00%	0.04%	0.59%	2.45%	1.00%	1.50%	3.92%	1.49%	0.23%	0.43%
	Good voice quality	>=95%	Reported	98.14%	98.80%	98.26%	98.86%	98.19%	96.00%	98.48%	97.48%	98.19%	98.44%	99.04%	99.54%	98.93%	99.73%
			Verified	98.14%	98.80%	98.26%	98.86%	98.19%	96.00%	98.48%	97.48%	98.19%	98.44%	99.04%	99.54%	98.93%	99.73%
4	No of POIs not meeting benchmark	>=0.5%	Reported	0	0	0	0	0	0	0	0	2	0	3	0	0	0
			Verified	0	0	0	0	0	0	0	0	2	0	3	0	0	0

PMR		Bench-mark	Audit	Aircel	Airtel	Etisalat	Idea	Loop	MTNL	Rcom GSM	Tata GSM	Video-con	Voda-fone	Uninor	MTS	Rcom CDMA	Tata CDMA
S/N	Name of Parameter			GSM Operators											CDMA Operators		
(B)	Customer Service Quality Parameters																
5	Metering/billing credibility- Post paid	<= 0.1%	Reported	0.10%	0.02%	NA	0.06%	0.03%	0.08%	0.08%	0.08%	NA	0.00%	NA	NA	0.07%	0.06%
			Verified	0.10%	0.02%	NA	0.06%	0.03%	0.08%	0.08%	0.08%	NA	100.00%	NA	NA	0.07%	0.06%
6	Metering /billing credibility- Pre paid	<= 0.1%	Reported	0.15%	0.02%	0.00%	0.04%	0.04%	0.005%	0.04%	0.006%	0.10%	0.01%	0.18%	0.02%	0.04%	0.02%
			Verified	0.15%	0.02%	0.00%	0.04%	0.04%	0.005%	0.04%	0.006%	0.10%	0.01%	0.18%	0.02%	0.04%	0.02%
7	Resolution of billing/ charging complaints	100% within 4 weeks	Reported	100%	100%	NA	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	92.00%
			Verified	100%	100%	NA	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	92.00%
	Period of applying credit/waiver/adjustment to the customers account from the date of resolutions of complaints	<=1 week	Reported	100%	100%	NA	100%	100%	100%	100%	100%	100%	100%	NA	100%	100%	91.00%
			Verified	100%	100%	NA	100%	100%	100%	100%	100%	100%	100%	NA	100%	100%	91.00%
8	Response time to customers for assistance																
	Accessibility of call centre/Customer Care	>=95%	Reported	100%	100%	97.76%	95.00%	97.24%	99.00%	100%	95.36%	100%	100%	94.52%	99.00%	100%	97.00%
			Verified	100%	100%	97.76%	95.00%	97.24%	99.00%	100%	95.36%	100%	100%	94.52%	99.00%	100%	97.00%
	% call answered by operators(voice to voice) within 60 sec.	>=90%	Reported	85.61%	73.30%	98.92%	87.63%	94.73%	96.98%	87.00%	96.25%	92.00%	76.29%	79.01%	81.00%	94.00%	93.00%
			Verified	85.61%	73.30%	98.92%	87.63%	94.73%	96.98%	87.00%	96.25%	92.00%	76.29%	79.01%	81.00%	94.00%	93.00%

PMR S/N	Name of Parameter	Bench-mark	Audit	Aircel	Airtel	Etisalat	Idea	Loop	MTNL	Rcom GSM	Tata GSM	Video-con	Voda-fone	Uninor	MTS	Rcom CDMA	Tata CDMA
				GSM Operators											CDMA Operators		
9	Termination/closure of service																
	No.of requests for Termination / Closure of service complied within 7 days during the quarter	<=7days	Reported	79%	100%	NA	100%	100%	100%	100%	100%	NA	100%	NA	100%	100%	100%
			Verified	79%	100%	NA	100%	100%	100%	100%	100%	NA	200%	NA	100%	100%	100%
10	Time taken for refunds of deposits after closures.	100% within 60 days	Reported	100%	100%	NA	100%	100%	after 90 days	100%	95.15%	NA	100%	NA	100%	100%	78%
			Verified	100%	100%	NA	100%	100%		100%	95.15%	NA	200%	NA	100%	100%	78%

Critical Analysis (PMR Verification):

a. The figures proved by all the operators match the figures obtained on verification.

b. Only Etisalat is not meeting the benchmark for "Worst affected BTSs due to Downtime".

c. Only Idea is not meeting the benchmark for the parameter "Worst affected cells>3% TCH drop".

d. Videocon & Uninor are having very high POI congestion of 2% & 3% respectively.

e. "Metering/Billing credibility -Prepaid" is not met by Aircel & Uninor.

f. Tata CDMA is not meeting the "Resolution of complaints within 4 weeks" and "period for applying credit"

g. Uninor is not meeting the benchmark for "Accessibility of call centre"

h. The benchmark for "% call answered by operators(voice to voice) within 60 sec." is not met by Aircel, Airtel, Idea, Reliance GSM, Vodaone, Uninor & MTS.

i. Tata GSM & CDMA are not meeting the 60 days' benchmark for "Refund of deposits after closure of connection".

j. Aircel is not meeting the benchmark for "Termination of services within 7 days".

II. Basic Telephone (Wireline) Service

S/N	Parameters	Benchmarks	Audit	MTNL	Airtel	TTSL	RCom
1	*Fault incidences*						
	(No. of faults/100 subscribers /month)	**< 5%**	**Reported**	11.35	1.32	0.80	0.32
			Verified	11.35	1.32	0.80	0.32
2	*Faults Repair/Restoraion Time*						
	Fault repair by next working day(Urban Area)	**>90%**	**Reported**	82.62%	94.64%	96.60%	100.00%
			Verified	82.62%	94.64%	96.60%	100.00%
	Within 3 days	**100%**	**Reported**	91.84%	99.45%	100.00%	100.00%
			Verified	91.84%	99.45%	100.00%	100.00%
	Within 5 days (Hilly & Rural Area)	**100%**	**Reported**	NA	NA	NA	NA
			Verified	NA	NA	NA	NA
	Mean time to Repair(MTTR)	**≤8 Hrs**	**Reported**	22.01	5.29	5.44	2.30
			Verified	22.01	5.29	5.44	2.30
3	*Rent Rebate*						
	Rent Rebate		**Reported**	97230	1256	NA	NA
			Verified	97230	1256	NA	NA
4	*Call Completion Ratio(CCR) & Answer to seizure Ratio(ASR)*						
	CCR & ASR	**> 55%(CCR) & > 75%(ASR)**	**Reported**	56.39%	90.81%	66.90%	86.68%
			Verified	56.39%	90.81%	66.90%	86.68%
5	*Metering & Billing Performance*						
	Metering & Billing Credibility-Post paid	**< 0.1%**	**Reported**	0.05%	0.01%	0.01%	0.03%
			Verified	0.05%	0.01%	0.01%	0.03%
	Metering & Billing Credibility-Pre paid	**100%**	**Reported**	NA	NA	NA	NA
			Verified	NA	NA	NA	NA
	Resolution of billing charging/validity/Complaints within 4 weeks	**100%**	**Reported**	100%	100%	100%	100%
			Verified	100%	100%	100%	100%
	Period of all refunds/payments from the date of resolution of complaints within 1 weeks	**100%**	**Reported**	100%	100%	91%	100%
			Verified	100%	100%	91%	100%

S/N	Parameters	Benchmarks	Audit	MTNL	Airtel	TTSL	RCom
6	*POI Congestion*						
	No of POIs not meeting benchmark	*<=0.5%*	Reported	0	0	0	0
			Verified	0	0	0	0
7	*Response Time to customer for assistance*						
	Accessibility of Call centre/customer Care within 40 Sec.	**≥95%**	Reported	96.32%	99.90%	97.00%	96.00%
			Verified	96.32%	99.90%	97.00%	96.00%
	% age of calls answered by operator(voice to voice) within 60 seconds	**≥90%**	Reported	96.32%	85.33%	93.00%	92.00%
			Verified	96.32%	85.33%	93.00%	92.00%
8	*Customer care promptness in attending to customers request*						
	Termination / Closures	**100%**	Reported	95%	90%	100%	100%
			Verified	95%	90%	100%	100%
	Time taken for refunds of deposit after closures	**100%**	Reported	100%	100%	94.12%	100%
			Verified	100%	100%	94.12%	100%

Critical Analysis (PMR Verification):
a. The figures proved by all the operators match the figures obtained on verification.
b. MTNL is not meeting the "Fault Incidences" with a value of 11.35.
c. MTNL is not meeting the "Fault Repair / Restoration Time" benchmark of 90% by next working day as well as 100% within 3 days for urban areas. Similar deviation is found for Airtel in case of Urban areas' fault restoration within 3 days.
d. MTNL has a very high MTTR of 22.01 hrs. against the benchmark value of 8 hrs.
e. TTSL is not meeting the 100% benchmark for "refund/payment from the date of resolution of compliants within 1 week"
f. Airtel doenot meet the benchmark for "%age of calls answered by operator within 60 sec".
f. MTNL & Airtel donot meet the "termination/closures" parameter and TTSL is deviating from "time taken for refunds of deposits after closure".

III. Broadband Service

S/N	Parameters	Bench-marks	Audit	MTNL	Airtel	TTML	RCom	Hathway	Youtele	Sify	Spectranet
1	*Service Provisioning/Activation Time*										
1.2	%age of connections provided within 15 days of registration of demand	**100%**	**Reported**	83.90%	100%	100%	100%	100%	100%	100%	98.47%
			Verified	83.90%	100%	100%	100%	100%	100%	100%	98.47%
2	*Faults Repair/Restoraion Time*										
2.2	% of faults repaired by next working day	**>90%**	**Reported**	70.96%	93.24%	91.16%	100%	91%	93%	90%	99%
			Verified	70.96%	93.24%	91.16%	100%	91%	93%	90%	99%
2.3	% of faults repaired within 3 working day	**≥99%**	**Reported**	84.59%	99.68%	100%	100%	99%	99%	100%	100%
			Verified	84.59%	99.68%	100%	100%	99%	99%	100%	100%
2.4	Rent Rebate		**Reported**	41427	25	0	0	6013	214	223	0
			Verified	41427	25	0	0	6013	214	223	0
3	*Billing Performance*										
3.3	%age of bills disputed	**<2%**	**Reported**	0.13%	0.01%	0.29%	1.12%	0.80%	0.53%	NA	0%
			Verified	0.15%	0.01%	0.29%	1.12%	0.80%	0.53%		0%
3.4	%age of complaints resolved within 4 weeks	**100%**	**Reported**	100%	100%	99.63%	100%	100%	100%		0%
			Verified	100%	100%	99.63%	100%	100%	100%		0%
3.5	%age of cases to whom refund of deposits is made within 60 days of closures	**100%**	**Reported**	100%	100%	100%	100%	100%	100%		0%
			Verified	100%	100%	100%	100%	100%	100%		0%
4	*Response Time to the Customer for assistance*										
4.2	%age of calls answered by operator (Voice to voice) within 60 sec	**>60%**	**Reported**	66.19%	90.51%	95.20%	74%	87%	57%	99%	100%
			Verified	66.19%	90.51%	95.20%	74%	87%	57%	99%	100%
4.3	%age of calls answered by operator (Voice to voice) within 90 sec	**>80%**	**Reported**	85.22%	94.29%	97.41%	82%	96%	64%	100%	100%
			Verified	85.22%	94.29%	97.41%	82%	96%	64%	100%	100%
5	*Bandwidth utilisation/throughput*										
5.2	No. of Intra network links having Bandwidth utilisation >90% during peak hours (TCBH)		**Reported**	0	0	0	0	0	0	0	0
			Verified	0	0	0	0	0	0	0	0
5.4	No. of Upstream links for International connectivity having BW utilisation >90% Peak Hrs.(TCBH)		**Reported**	4	0	0	0	0	0	0	0
			Verified	4	0	0	0	0	0	0	0
5.7	% International bandwidth utilization during peak hours (TCBH) (Enclose MRTG)	**<90%**	**Reported**	89.57%	86.83%	66%	38.03%	89%	76.42%	85%	76%
			Verified	89.57%	86.43%	66%	38.03%	89%	76.42%	85%	76%
5.8	Broadband Connection Speed available (download) from ISP node to user	**>80%**	**Reported**	-	99%	90%	NP	85%	84.94%	95%	-
			Verified	-	99%	90%	NP	85%	84.94%	95%	-
6	*Service Availability/Uptime (for all users) in %age*										
6.3	Service availability /uptime (for all users) in %age	**>98%**	**Reported**	-	99.93%	99.63%	99.70%	99.96%	98.47%	100%	99%
			Verified	-	99.93%	99.63%	99.70%	99.96%	98.47%	100%	99%
7	*Packet loss*										
7.1	% of Packet loss	**<1%**	**Reported**	-	0%	0.37%	-	0.98%	0%	-	-
			Verified	-	0%	0.37%	-	0.98%	0%	-	-

S/N	Parameters	Bench-marks	Audit	MTNL	Airtel	TTML	RCom	Hathway	Youtele	Sify	Spectranet
8	*Network latency (for wired broadband access)*										
8.1	User reference point at POP/ISP Gateway node to IGSP/NIXI	**<120 ms**	Reported	-	48 ms	46 ms	-	80 ms	24 ms	-	-
			Verified	-	48 ms	46 ms	-	80 ms	24 ms	-	-
8.2	User reference point at ISP Gateway node to International nearest NAP port abroad (terrestrial)	**<350 ms**	Reported	-	55 ms	217 ms	-	325 ms	261 ms	-	-
			Verified	-	55 ms	217 ms	-	325 ms	261 ms	-	-
8.3	User reference point at ISP Gateway node to International nearest NAP port abroad (satellite)	**<800 ms**	Reported	NA							
			Verified								

NA – Not Applicable   **NP** – Not Provided
a) For S/N 3.4 & 3.5 SIFY not applicable because operator under in prepaid module.

Critical Analysis (PMR Verification):

a. The figures proved by all the operators match the figures obtained on verification.
b. MTNL & Specranet do not meet the 100% benchmark for "Activation Time within 15 days of registration".
c. MTNL has below benchmark performance for the parameter "Fault restoration by next working day and within next 3 working days".
d. TTML does not meet the benchmark for "%age of billing complaints resolved within 4 weeks" with a value of 99.63%.
e. You Telecom doesnot meet the benchmarks for "Response time to the customer for assistance".

CHAPTER-4: DETAILED FINDINGS & ANALYSIS

I. Cellular Mobile Telephone Service

(A) MSC Audit

(1) 3 Days Live Data Assessment & Summarized Findings

S/N	Name of Parameter	Bench-mark	Aircel	Airtel	Etisalat	Idea	Loop	MTNL	Rcom GSM	Tata GSM	Video-con	Voda-fone	Uninor	MTS	Rcom CDMA	Tata CDMA
							GSM Operators								CDMA Operators	
A	Network Service Quality Parameter															
1	Connection Establishment (Accessibility)															
	a) CSSR	>=95%	98.78%	98.99%	99.75%	99.27%	99.90%	96.81%	99.65%	98.64%	99.90%	99.99%	99.39%	99.55%	99.43%	98.99%
	b) SDCCH/PAGING congestion	<=1%	0.36%	0.03%	0.03%	0.16%	0.16%	0.35%	0.17%	0.93%	0.16%	0.37%	0.10%	0.00%	0.00%	0.00%
	c) TCH congestion	<=2%	0.01%	0.10%	0.01%	0.17%	0.10%	0.85%	0.23%	0.28%	0.10%	0.45%	0.02%	0.00%	0.33%	0.00%
2	Connection maintenance															
	a) CDR	<=2%	0.83%	0.88%	2.01%	1.16%	0.67%	1.57%	0.31%	0.88%	0.67%	0.67%	1.19%	0.15%	0.53%	0.70%
	b) Cells having > 3% TCH drop	<=5%	2.26%	1.99%	12.00%	6.75%	0.53%	2.02%	0.63%	1.70%	0.53%	0.30%	2.72%	0.94%	0.31%	1.39%
	c) Good voice quality	>=95%	98.32%	98.00%	97.40%	98.60%	97.86%	96.89%	98.28%	96.91%	97.86%	98.52%	98.39%	NA	NA	NA
	d) No. of cells > 3% TCH drop		129	149	128	402	29	156	34	28	29	24	101	12	3	6
	e) Total no. of cells in the network		5738	7595	1181	5986	5497	2136	5283	6072	5497	8068	3782	1272	769	2475
3	No of POIs not meeting benchmark	<=0.5%	0	0	0	0	0	0	0	0	0	0	0	3	0	0
	a) Name of POI not meeting the benchmark															
	b) Total No. of circuits on POI		138892	3362159	4761	261252	69857	16994	66419	58415	43061	213456	15437	9412	66419	58415
	c) Avg No. of call attempts on POI		2391890	7072999	18080	5657484	20680	287856	994060	3916182	1328121	2800780	915046	85324	994060	8513
	d) Avg traffic served on POI (Erlang)		41434	146961	341	195223	14258	6430	37169	83610	26441	62571	20888	1556	37169	83610
	e) Total number of working POI Service Area wise		53	383	67	NR	33	43	204	NR	63	460	38	40	204	NR

S/N	Name of Parameter	Bench-mark	Aircel	Airtel	Etisalat	Idea	Loop	MTNL	Rcom GSM	Tata GSM	Video-con	Voda-fone	Uninor	MTS	Rcom CDMA	Tata CDMA
			GSM Operators											CDMA Operators		
	f) Equipped Capacity of Network in respect of Traffic in erlang		79744	163119	8989	62855	131238	421451	51805	121875	131238	190223	38118	25200	178209	120000
	g) Total traffic handled in TCBH in erlang		16171	92642	536	55870	78010	162096	25340	27231	78010	156842	9674	2995	74675	81490
(B)	Customer Service Quality Parameters															
4	Response time to customers for assistance															
	a) Accessibility of call centre	>=95%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
	b) % of call answered by operators(voice to voice) within 60 sec	>=90%	87%	100%	96%	99%	100%	57%	96%	93%	97%	97%	91%	95%	93%	99%
	c) No. of call attempts to call centre / customer care nos. during TCBH (Avg)		100	100	100	100	100	100	100	100	100	100	100	100	100	100
	d) No. of calls connected and answered successfully to call centre / customer care nos. during TCBH (Avg)		87	100	96	99	100	57	96	93	97	97	91	95	93	99

NA: Not Applicable, NR: Not Received

Parameter-wise Findings (Live Data Assessment):

The parameter wise key takeouts for the Cellular Mobile Telephone Services providers in Mumbai Service Area are as given below:-

➢ **Call Setup Success Rate (CSSR) (benchmark >= 95%):** All operators are meeting the benchmark with values lying between 96.81% and 99.99%.
➢ **SDCCH/PAGING Channel congestion (benchmark <= 1%):** All operators are meeting the benchmark with values lying between 0% and 0.93%.
   Note: CDMA operators have provided the data for Paging Channel congestion and GSM operators provided SDCCH Channel congestion.
➢ **TCH congestion (benchmark <= 2%):** All operators are meeting the benchmark with values lying between 0% and 0.85%.
➢ **Call Drop Rate (CDR) (benchmark <= 2%):** All operators are meeting the benchmark with values lying between 0.15% and 1.57%, except Etisalat (2.01%).
➢ **Cell exceeding 3% TCH drop (benchmark <= 5%):** All the operators are satisfying the benchmark with value in between 0.30% and 2.72%, except Etisalat (12%) & Idea (6.75%).
➢ **Connections with good voice quality (benchmark >= 95%):** CDMA service providers have declared that the parameter is not system generated. GSM operators are meeting the benchmark with values lying between 96.89% and 98.60%.
➢ **POI Congestion (benchmark <= 0.5%):** MTS had 3 POIs with >=0.5% congestion. There was no congestion found overall on the POI, but cases were found where individual POIs are showing high utilization/usage. Some are in the range of over 100% though causing no traffic failure due to overflow technique i.e. the extra traffic is carried over by some other operating POI as has been designed to do so.
➢ **%age of call answered by operator (electronically) (benchmark >95):** All operators are meeting the benchmark.
➢ **%age of call answered by operator (Voice to voice) (benchmark >90%):** Except for Aircel (87%) & MTNL (57%), all other operators are meeting the benchmark with values 91% to 100%.

(2) Month Data Assessment & Summarized Findings

S/N	Name of Parameter	Bench-mark	Aircel	Airtel	Etisalat	Idea	Loop	MTNL	Rcom GSM	Tata GSM	Video-con	Voda-fone	Uninor	MTS	Rcom CDMA	Tata CDMA
			GSM Operators											CDMA Operators		
(A)	Network Service Quality Parameter															
1	Network Availability															
	a) BTS Accumulated Downtime	<=2%	0.06%	0.04%	2.25%	0.02%	0.13%	1.25%	0.17%	0.03%	0.13%	0.01%	0.04%	0.03%	0.17%	1.31%
	b) Worst affected BTSs due to downtime	<=2%	0.20%	0.27%	8.18%	0.00%	0.80%	1.13%	0.06%	0.03%	0.80%	0.00%	0.00%	0.00%	0.00%	0.36%
	c) Total no. of BTSs in the licensed service area		2042	2998	489	2107	2001	793	1761	2024	2001	3331	1279	424	769	826
	d) Sum of downtime of BTSs in a month in hours i.e. total outage time of all BTSs in hours during a month		859	972	8186	288	1981	7356	2126	460	1981	209	462	94	866	8064
	e) No. of BTSs having accumulated downtime of >24 hours in a month		4	8	40	0	16	9	1	2	16	0	0	0	0	3
2	Connection Establishment (Accessibility)															
	a) CSSR (Call Setup Success Rate)	>=95%	98.68%	99.04%	99.66%	99.30%	99.83%	96.26%	99.60%	98.84%	99.83%	99.99%	99.36%	99.38%	99.41%	98.88%
	b) SDCCH/PAGING congestion	<=1%	0.20%	0.03%	0.01%	0.14%	0.20%	0.74%	0.28%	0.48%	0.20%	0.21%	0.03%	0.00%	0.00%	0.00%
	c) TCH congestion	<=2%	0.01%	0.97%	0.04%	0.18%	0.17%	1.71%	0.16%	0.33%	0.17%	0.47%	0.22%	0.12%	0.40%	0.04%

S/N	Name of Parameter	Bench-mark	Aircel	Airtel	Etisalat	Idea	Loop	MTNL	Rcom GSM	Tata GSM	Video-con	Voda-fone	Uninor	MTS	Rcom CDMA	Tata CDMA
			GSM Operators											CDMA Operators		
3	Connection maintenance (retainability)															
	a) CDR	<=2%	0.83%	0.88%	2.15%	1.20%	0.67%	1.75%	0.34%	0.86%	0.67%	0.66%	1.12%	0.16%	0.54%	0.71%
	b) Worst affected cells>3% TCH drop	<=5%	2.45%	0.76%	13.34%	7.01%	0.55%	1.73%	0.00%	1.67%	0.55%	0.88%	2.59%	1.10%	0.19%	1.55%
	c) Good voice quality	>=95%	98.27%	98.01%	97.20%	98.77%	97.90%	96.14%	98.36%	96.95%	97.90%	98.54%	98.42%	NA	NA	NA
	d) Total No. of cells exceeding 3% TCH drop (call drop)		4367	158	115	418	30	863	35	29	30	71	95	14	2	8
	e) Total no. of cells in the network		5738	7595	1181	5986	5497	2136	5283	6072	5497	8068	3782	1272	769	2475
4	No of POIs not meeting benchmark	<=0.5%	0	0	0	0	0	0	0	0	0	1	1	3	0	0
	a) Name of POI not meeting the benchmark		Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil
	b) Total No. of call attempts on POI (Avg.)		12589081	72548019	216868	1922390	1112425	7861856	992239	1267591	1314205	2756648	9702040	85155	992239	1267491
	c) Total traffic served on POI (Erlang) (Avg.)		216663	1665041	3735	51125	22162	162096	36832	27280	25084	62414	213067	1568	36832	27280
	d) Total No. of circuits on POI		138892	3362159	4761	261252	69857	16994	66419	58415	43061	213456	15437	9412	66419	58415
	e) Total number of working POI Service Area wise		53	383	67	NR	33	43	204	NR	63	460	38	40	204	NR
	f) Capacity of POI		130664	3096986	3432	241111	63624	16992	59565	55687	41289	203220	13914	8033	59565	55687
5	Network Data															
	a) Equipped Capacity of Network Erlang		79744	163119	8989	62855	131238	421451	51805	121875	131238	190223	38118	25200	178209	120000
	b) Total traffic in TCBH in erlang (Avg.)		16171	92642	536	55870	78010	162096	25340	27231	78010	156842	9674	2995	74675	81490
	c) Total no. of customers served (as per VLR) on last day of the month		634969	2911648	16447	1645792	2006219	869401	NR	1125907	661475	258585	350008	86578	NR	1125907

S/N	Name of Parameter	Bench-mark	Aircel	Airtel	Etisalat	Idea	Loop	MTNL	Rcom GSM	Tata GSM	Video-con	Voda-fone	Uninor	MTS	Rcom CDMA	Tata CDMA
							GSM Operators								CDMA Operators	
(B)	Customer Service Quality Parameters															
5	Metering/billing credibility-Post paid	<= 0.1%	0.24%	0.02%	NA	0.03%	0.02%	0.10%	0.10%	0.26%	NA	0.00%	NA	0.00%	0.10%	0.18%
	a) No. of bills issued during the period		21461	1173921	NA	127261	306338	165987	50954	34246	NA	1375633	NA	3122	573732	506612
	b) No. of bills disputed including billing complaints during the period		51	215	NA	44	65	162	51	90	NA	14	NA	0	563	901
6	Metering /billing credibility-Pre paid	<= 0.1%	0.01%	0.00%	0.08%	0.04%	0.02%	0.00%	0.68%	0.00%	0.09%	0.00%	0.11%	0.02%	0.11%	0.01%
	a) No. of charging / credit / validity complaints during the quarter		151	567	48	738	456	0	2159	67	1327	181	978	122	360	174
	b) Total no. of pre-paid customers at the end of the quarter		1239138	12081974	58057	1676850	2755247	1368313	3182531	2443737	1362737	4278765	913816	534270	3268390	2793969
7	Resolution of billing/ charging complaints	100% within 4 weeks	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
	a) No. of billing/(post paid) and charging, credit/validity (pre paid) complaints resolved within 4 weeks during the quarter		202	782	48	782	3061585	213	2210	6128	1327	195	4962	122	923	1306
	b) Total no. of billing (post paid) and charging, credit / validity (pre paid) complaints received during the quarter		202	782	48	782	3061585	213	2210	6128	1327	195	4962	122	923	1306
	c) No. of billing complaints (post paid) and charging, credit/ validity complaints (pre paid) resolved in favour of the customer during the quarter		202	782	0	0	521	0	97	157	1327	194	195	41	0	1075

S/N	Name of Parameter	Bench-mark	Aircel	Airtel	Etisalat	Idea	Loop	MTNL	Rcom GSM	Tata GSM	Video-con	Voda-fone	Uninor	MTS	Rcom CDMA	Tata CDMA
			GSM Operators												CDMA Operators	
	d) No. of complaints disposed on account of not considered as valid complaints during the quarter		581	0	48	782	521	119	2113	5971	0	1	225	69	923	231
	e) Period of applying credit/waiver/adjustment to the customers account from the date of resolutions of complaints	<=1 week	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
8	Response time to customers for assistance															
	a) Accessibility of call centre/Customer Care	>=95%	96.97%	100.00%	99.00%	100.00%	97.41%	95.00%	100.00%	91.89%	96.00%	99.84%	100.00%	100.00%	100.00%	100.00%
	b) % call answered by operators(voice to voice) within 60 sec.	>=90%	96.77%	100.00%	95.00%	72.50%	95.35%	41.74%	92.23%	96.94%	96.00%	94.00%	99.42%	96.07%	88.90%	92.00%
	c) Total no. of call attempts to call centre & customer care nos. during TCBH (Avg.).		316014	1427518	8990	42484	948191	1353	312799	26687	62675	1426007	23614	6171	224716	38303
	d) No. of calls connected and answered successfully to call centre & customer care nos. during TCBH (Avg.).		305823	1427518	8558	30804	904130	565	288516	25871	59930	1336832	23476	5929	199650	35305
9	Termination/closure of service	<=7days	100%	100%	NA	100%	100%	100%	100%	100%	NA	100%	NA	100%	100%	100%
	a) Total No. of requests for Termination / Closure of service received during the quarter		192	1026	NA	1045	NR	1308	457	910	NA	5924	NA	2	3164	3581
	b) No.of requests for Termination / Closure of service complied within 7 days during the quarter		167	1026	NA	1039	NR	1308	457	910	NA	5924	NA	2	3164	3581

S/N	Name of Parameter	Bench-mark	Aircel	Airtel	Etisalat	Idea	Loop	MTNL	Rcom GSM	Tata GSM	Video-con	Voda-fone	Uninor	MTS	Rcom CDMA	Tata CDMA
			GSM Operators											CDMA Operators		
10	Time taken for refunds of deposits after closures.	*100% within 60 days*	100%	100%	NA	100%	100%	100%	100%	100%	NA	100%	NA	100%	100%	100%
NA: Not Applicable, NR: Not Received																

Parameter-wise Findings (Month Data Assessment):

The parameter wise key takeouts for the Cellular Mobile Telephone Services providers in Mumbai Service Area are as given below:-

➢ **BTS accumulated downtime (benchmark <=2%):** All operators are meeting the benchmark with values lying between 0.01% and 1.31%, except Etisalat (2.25%).
➢ **Worst affected BTSs due to downtime (benchmark <= 2%):** All operators are meeting the benchmark with values lying between 0% and 1.13%, except Etisalat (8.18%).
➢ **Call setup success rate (benchmark >= 95%):** All operators are meeting the benchmark with values lying between 96.26% and 99.99%.
➢ **SDCCH/PAGING Channel congestion (benchmark <= 1%):** All operators are meeting the benchmark with values lying between 0% and 0.74%.
Note: CDMA operators have provided the data for Paging Channel congestion and GSM operators provided SDCCH Channel congestion.
➢ **TCH congestion (benchmark <= 2%):** All operators are meeting the benchmark with values lying between 0.01% and 1.71%.
➢ **Call drop rate (benchmark <= 2%):** All operators, except Etisalat (2.15%), are meeting the benchmark with values lying between 0.16% and 1.75%.
➢ **Cell exceeding 3% TCH drop (benchmark <= 5%):** All the operators, except Etisalat (13.34%) & Idea (7.01%), are satisfying the benchmark with value in between 0% and 2.59%.
➢ **Connections with good voice quality (benchmark >= 95%):** All operators are meeting the benchmark with values lying between 96.14% and 98.77%.
➢ **POI Congestion (benchmark <= 0.5%):** Vodafone, Uninor & MTS had POIs with more than 0.5% congestion. There was no congestion found overall on the POI. Cases were found where individual POIs are showing high utilization/usage. Some are in the range of over 100% though causing no traffic failure due to overflow technique i.e. the extra traffic is carried over by some other operating POI as has been designed to do so.
➢ **%age of call answered by operator (electronically) (benchmark >95%):** Except for Tata GSM (91.89%), all operators are meeting the benchmark.
➢ **%age of call answered by operator (Voice to voice) (benchmark >90%):** Except for Idea, MTNL & Reliance CDMA with 72.5%, 41.74% & 88.9% respectively, all the operators are meeting the benchmark with values lying between 92% and 100%.
➢ **Metering and billing credibility-Post paid (benchmark <= 0.1%):** All operators, except Airtel, Tata GSM & CDMA, are meeting the benchmark.
➢ **Metering and billing credibility-Pre paid (benchmark <= 0.1%):** Except for Uninor, Reliance GSM & CDMA, all operators are meeting the benchmark.
➢ **Resolution of billing/ charging complaints (benchmark 100% within 4 weeks):** All operators are meeting the benchmark.
➢ **Termination/Closure of service (Benchmark <= 7 days):** All operators have satisfied the benchmark.
➢ **Time taken for refunds of deposits after closures (benchmark 100% within <=60 days):** All operators have satisfied the benchmark.

(1)   Sample Coverage
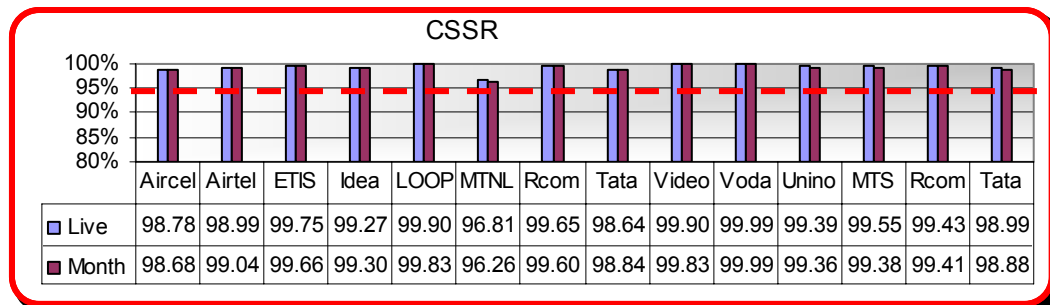
Switches/BSC/BTS details of operators:

Sl.	Name of Service Provider	No. of MSC/GMSC	No. of BSC	No. of BTS
GSM Operators
1	Aircel Ltd	2	20	2042
2	Airtel Ltd	8	62	2998
3	MTNL	5	38	896
4	Etisalat	1	9	489
5	Idea	5	21	2107
6	Loop Telecom	2	21	2001
7	Reliance Communication	2	11	1761
8	Tata Communications	3	15	2024
9	Videocon	2	21	2001
10	Vodafone	24	62	3331
11	Uninor	2	14	1279
CDMA Operators
12	MTS	1	2	424
13	Reliance Communication	7	NIL	769
14	Tata Communications	3	6	826

(2)   Performance (Graphical Representation)

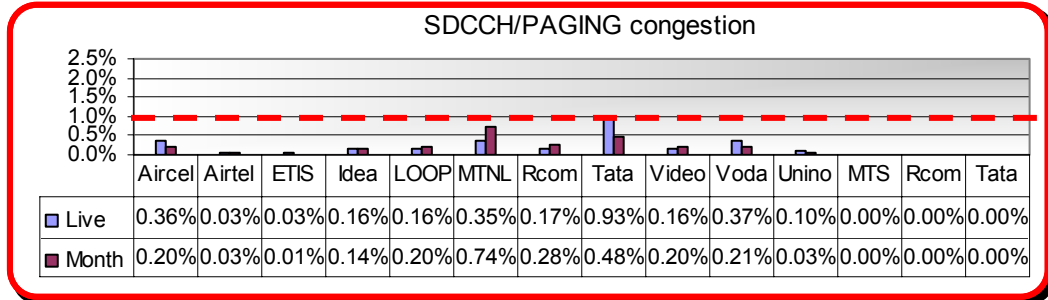**Comparison between Live measurements and One month data Audit – Cellular Mobile Telephone Services**

A)   NETWORK PERFORMANCE

I.   Call Setup Success Rate (CSSR): All operators are meeting the TRAI benchmarks (>= 95 %) for both one month data and 3 days live data taken in the month of audit

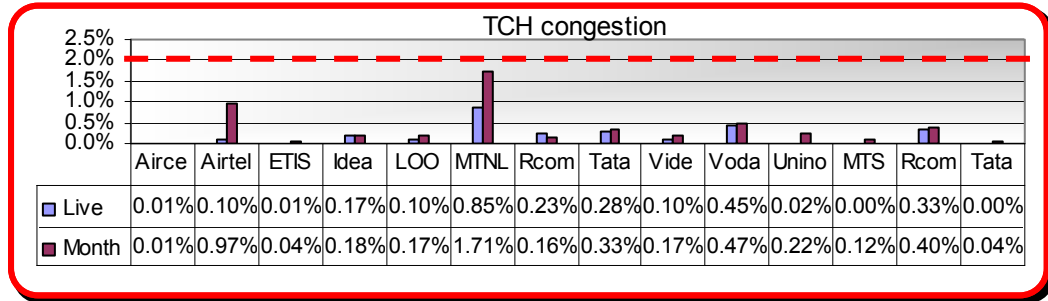|	Aircel	Airtel	ETIS	Idea	LOOP	MTNL	Rcom	Tata	Video	Voda	Unino	MTS	Rcom	Tata
Live	98.78	98.99	99.75	99.27	99.90	96.81	99.65	98.64	99.90	99.99	99.39	99.55	99.43	98.99
Month	98.68	99.04	99.66	99.30	99.83	96.26	99.60	98.84	99.83	99.99	99.36	99.38	99.41	98.88

II. Blocked call rate:

SDCCH congestion (%): All operators are meeting the TRAI benchmarks (<= 1 %) for both one month data and 3 days live data taken in the month of audit.

SDCCH/PAGING congestion

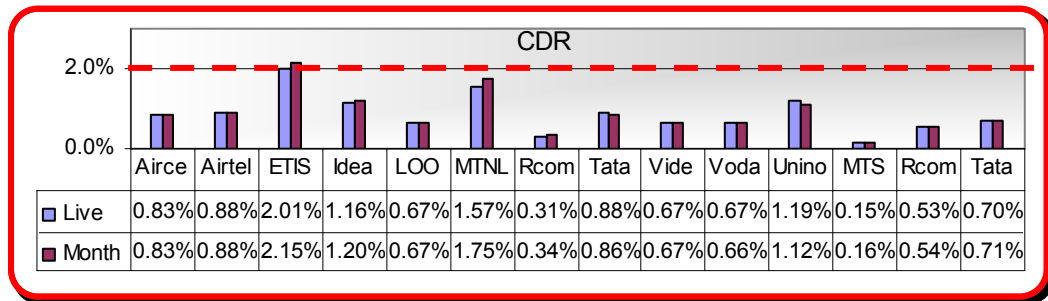|	Aircel	Airtel	ETIS	Idea	LOOP	MTNL	Rcom	Tata	Video	Voda	Unino	MTS	Rcom	Tata
Live	0.36%	0.03%	0.03%	0.16%	0.16%	0.35%	0.17%	0.93%	0.16%	0.37%	0.10%	0.00%	0.00%	0.00%
Month	0.20%	0.03%	0.01%	0.14%	0.20%	0.74%	0.28%	0.48%	0.20%	0.21%	0.03%	0.00%	0.00%	0.00%

TCH congestion (%): All operators are meeting the TRAI benchmarks (<= 2%) for both one month data and 3 days live data taken in the month of audit.
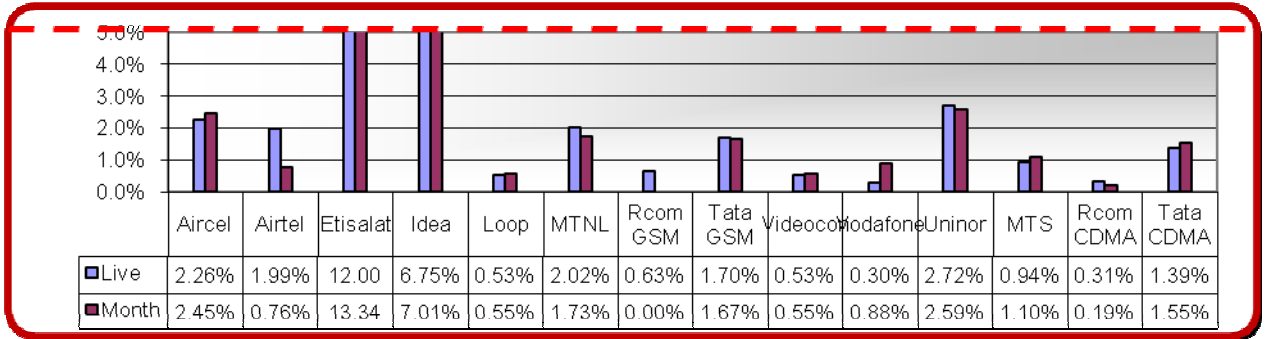
TCH congestion

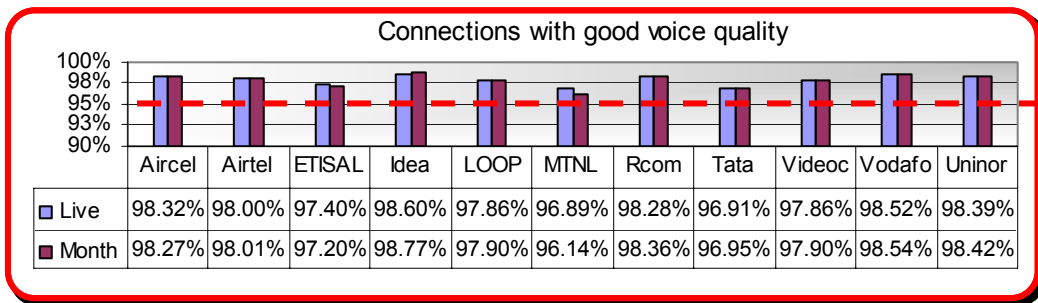|	Airce	Airtel	ETIS	Idea	LOO	MTNL	Rcom	Tata	Vide	Voda	Unino	MTS	Rcom	Tata
Live	0.01%	0.10%	0.01%	0.17%	0.10%	0.85%	0.23%	0.28%	0.10%	0.45%	0.02%	0.00%	0.33%	0.00%
Month	0.01%	0.97%	0.04%	0.18%	0.17%	1.71%	0.16%	0.33%	0.17%	0.47%	0.22%	0.12%	0.40%	0.04%

III. Connection Maintainability (Retainability):

Call Drop Rate (CDR) (%): All operators are meeting the TRAI benchmarks (<=2%) for both one month data and 3 days live data taken in the month of audit, except Etisalat (2.01% in live audit & 2.15% in month audit).

CDR

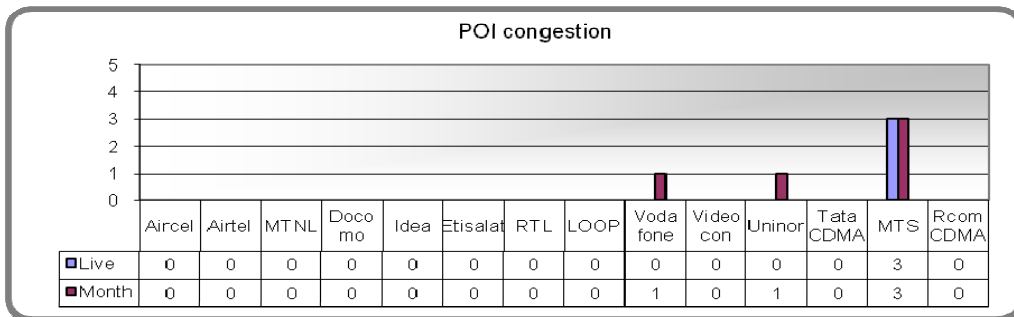|	Airce	Airtel	ETIS	Idea	LOO	MTNL	Rcom	Tata	Vide	Voda	Unino	MTS	Rcom	Tata
Live	0.83%	0.88%	2.01%	1.16%	0.67%	1.57%	0.31%	0.88%	0.67%	0.67%	1.19%	0.15%	0.53%	0.70%
Month	0.83%	0.88%	2.15%	1.20%	0.67%	1.75%	0.34%	0.86%	0.67%	0.66%	1.12%	0.16%	0.54%	0.71%

Worst affected Cell exceeding 3% TCH Drop: For both live and month data, Etisalat & Idea are having high deviations from the benchmark value of 5%. Rest of the operators are meeting the benchmark.

	Aircel	Airtel	Etisalat	Idea	Loop	MTNL	Rcom GSM	Tata GSM	Videoco	Vodafone	Uninor	MTS	Rcom CDMA	Tata CDMA
Live	2.26%	1.99%	12.00	6.75%	0.53%	2.02%	0.63%	1.70%	0.53%	0.30%	2.72%	0.94%	0.31%	1.39%
Month	2.45%	0.76%	13.34	7.01%	0.55%	1.73%	0.00%	1.67%	0.55%	0.88%	2.59%	1.10%	0.19%	1.55%

Percentage of connections with good voice quality (benchmark >= 95%): Except for MTNL in 3 days live audit, all operators are meeting the TRAI benchmarks (=> 95%) for both one month data and 3 days live data taken in the month of audit. Relaince (GSM & CDMA) and Tata CDMA have not provided the data.
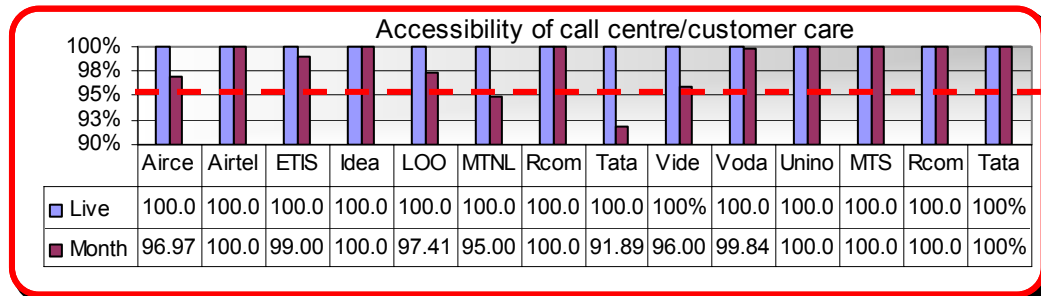
Connections with good voice quality

	Aircel	Airtel	ETISAL	Idea	LOOP	MTNL	Rcom	Tata	Videoc	Vodafo	Uninor
Live	98.32%	98.00%	97.40%	98.60%	97.86%	96.89%	98.28%	96.91%	97.86%	98.52%	98.39%
Month	98.27%	98.01%	97.20%	98.77%	97.90%	96.14%	98.36%	96.95%	97.90%	98.54%	98.42%

POI Congestion: Vodafone, Uninor & MTS have POIs with >=0.5% congestion.

POI congestion

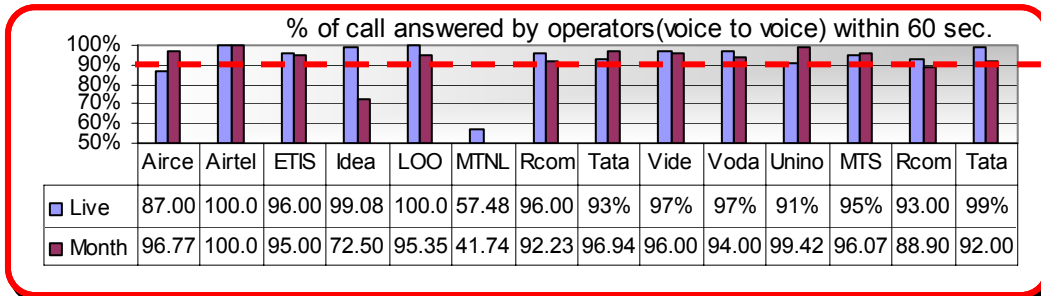|	Aircel	Airtel	MTNL	Docomo	Idea	Etisalat	RTL	LOOP	Vodafone	Videocon	Uninor	Tata CDMA	MTS	Rcom CDMA
Live	0	0	0	0	0	0	0	0	0	0	0	0	3	0
Month	0	0	0	0	0	0	0	0	1	0	1	0	3	0

B)   CUSTOMER SERVICE QUALITY PARAMETERS

Response time to the customer for assistance:
Percentage of call answered (Electronically): In the month data audit, Tata GSM is not meeting the benchmark. All other operators are meeting the 95% benchmark for both live & month data audit.

Accessibility of call centre/customer care	Airce	Airtel	ETIS	Idea	LOO	MTNL	Rcom	Tata	Vide	Voda	Unino	MTS	Rcom	Tata
Live	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100%	100.0	100.0	100.0	100.0	100%
Month	96.97	100.0	99.00	100.0	97.41	95.00	100.0	91.89	96.00	99.84	100.0	100.0	100.0	100%

Percentage of call answered by operators (Voice to voice) within 60 sec: MTNL does not meet the benchmark (>= 90%) for both one month data and 3 days live data taken in the month of audit. Idea is not satisfying the benchmark in case of month data audit. Aircel is not satisfying the benchmark in case of month data audit.

% of call answered by operators(voice to voice) within 60 sec.	Airce	Airtel	ETIS	Idea	LOO	MTNL	Rcom	Tata	Vide	Voda	Unino	MTS	Rcom	Tata
Live	87.00	100.0	96.00	99.08	100.0	57.48	96.00	93%	97%	97%	91%	95%	93.00	99%
Month	96.77	100.0	95.00	72.50	95.35	41.74	92.23	96.94	96.00	94.00	99.42	96.07	88.90	92.00

(3)   Critical Analysis

From the data tables, it is found that all the operators are meeting the network parameters by and large. However, deviations were found for the "Worst affected BTSs due to downtime" (Etisalat), "BTS accumulated downtime" (Etisalat), "Call Drop Rate" (Etisalat) and "Worst affected cells >3% TCH drop" (Etisalat & Idea).

Performance related to customer care data is found to be satisfactory for most of the operators. However, for the parameter "Accessibility of call centre", Tata GSM has high deviation from the benchmark value of 90%. Idea, Reliance CDMA & MTNL have not meet the 90% benchmark value for "%age of calls answered by operators (voice-to-voice)". In Metering and Billing credibility, Aircel, Tata GSM & CDMA are not meeting the benchmark for post-paid connections and Uninor, Reliance GSM & CDMA for pre-paid connections.

In case of POI congestion all the operators are found to be performing quite well in terms of meeting the benchmark (<= 0.5%). Some operators had POIs with more than 0.5% congestion, However, the overflows noticed on individual POI are noticed causing traffic diversions to obtain the net result for POI congestion.

(B) Redressal

(1) Sample coverage

A sample of billing complaints was taken for each operator and calls were made for assessing the resolution of billing/charging complaints within 4 weeks as claimed by the respective operators.

(2) Performance (live calling for billing complaints)

Calling Operator	Aircel	Airtel	Etisalat	Idea	Loop	MTNL	Rcom GSM	Tata GSM	Videocon	Vodafone	Uninor	MTS	Rcom GSM	Tata CDMA
Total No. of calls	15	13	12	10	14	11	15	15	12	13	10	9	10	12
Cases resolved with 4 weeks	15	13	12	10	14	11	15	15	12	13	10	9	10	12
%age of cases resolved	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%

(3) Live calling to Call centre: Fifty nos. of calls were made in each half and below given no. of calls got connected to the call centre within 60 Secs.

	OPERATORS NAME													
	Aircel	Airtel	Etisalat	Idea	Loop	MTNL	Rcom	Tata	Video-con	Voda-fone	Uninor	MTS	Rcom	Tata
	GSM												CDMA	
1ST HALF (10AM TO 01 PM)	46	47	47	44	46	36	44	40	44	47	48	47	47	45
2ND HALF (04PM TO 07 PM)	44	46	43	33	44	18	38	37	40	42	41	42	34	38
In % age	90.00	93.00	90.00	77.00	90.00	54.00	82.00	77.00	84.00	89.00	89.00	89.00	81.00	83.00

4) Level 1 Calling: Level 1 calling such as calling at emergency no. (Police, Fire, Hospital), Railway enquiry system etc were made in few nos. so as to check the service of such short codes. In Mumbai it was found to be functional.

5) Critical Analysis

Random numbers were selected from the operators' database of billing/metering complaints and calls were made to the customers to get their feedback for complaint redressal. It was found that the operators had made refunds in 100% cases as claimed by their records.

(C) Inter operator call assessment

(1) Sample coverage

A sample of 2x50 test calls per Service Providers with in the licensed service area (Mumbai Circle) were made between 1900 to 2000 hrs so that TCBH hours for all the operators were covered.

(2) Performance based on live measurement

Calling Operator	Aircel	Airtel	Etisalat	Idea	Loop	MTNL	Rcom GSM	Tata GSM	Videocon	Vodafone	Uninor	MTS	Rcom CDMA	Tata CDMA
Aircel	-	100%	100%	99%	100%	100%	100%	100%	100%	98%	100%	100%	100%	100%
Airtel	100%	-	100%	100%	100%	99%	100%	100%	100%	100%	100%	100%	100%	100%
Etisalat	100%	99%	-	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Idea	100%	100%	100%	-	100%	100%	100%	97%	100%	100%	100%	100%	100%	100%
Loop	100%	100%	98%	100%	-	100%	100%	100%	100%	100%	100%	100%	100%	100%
MTNL	100%	100%	100%	100%	100%	-	100%	100%	100%	100%	100%	100%	100%	100%
Rcom GSM	100%	100%	100%	100%	99%	100%	-	100%	100%	100%	100%	98%	100%	100%
Tata GSM	100%	100%	100%	100%	100%	100%	100%	-	100%	100%	100%	100%	100%	100%
Videocon	97%	100%	100%	100%	100%	100%	100%	100%	-	100%	100%	100%	100%	100%
Vodafone	100%	100%	100%	100%	99%	100%	98%	100%	100%	-	100%	100%	100%	100%
Uninor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	-	100%	100%	100%
MTS	100%	100%	100%	100%	100%	97%	100%	100%	100%	100%	100%	-	100%	100%
Rcom CDMA	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	-	97%
Tata CDMA	100%	100%	100%	100%	100%	98%	100%	100%	100%	100%	100%	100%	100%	-

(3) Critical Analysis

In the inter-operator call assessment test, calls were made from one operator to other operators so as to check congestion on both the operators' network. In such cases, the radio part, switch part & the POI in-between the operators are involved and hence if any congestion is found in the network, it may be due to any of these parts. The result shows that there is not much congestion on the operator networks.

(D) Drive test of the mobile network of service providers

(1) Sample Coverage

The Operator Assisted Drive Test was conducted at Mumbai for all the operators. Route covered was about around 100-150 Km depending on city areas within the speed limit of 40Km/hr.

DRIVE TEST LOCATIONS

MUMBAI CIRCLE:

High Dense: Marine Drive, Ambedkar Road, VT & Churchgate Station, Siddhivinayak, Bandra, Airport, Andheri

Medium Dense: Andheri, Versova, Jogeshwari, Malad, Kandivali, Borivali

Low Dense: EEH, Bhandup, Vikroli, Mulund, Thane, Airoli, Thane-Belapur Road, Kopar Khairane, Vashi

2) Performance (for the respective cities)

SN	Parameter	City Name	Aircel	Airtel	Etisalat	Idea	Loop	MTNL	Rcom GSM	Tata GSM	Video-con	Voda-fone	Uninor	MTS	Rcom CDMA	MTNL-CDMA	Tata CDMA
			GSM Operators														
1.1	Call Attempts	Mumbai	184	140	163	112	156	167	147	154	156	145	168	133	144	172	130
1.2	Blocked Call Rate (<=3%)	Mumbai	0.00%	0.02%	8.60%	0.00%	0.00%	8.57%	1.67%	1.66%	0.00%	0.00%	1.19%	0.00%	3.64%	0.00%	0.00%
1.3	Dropped Call Rate (<=2%)	Mumbai	0.00%	0.00%	7.36%	0.00%	0.00%	5.46%	0.00%	3.33%	0.00%	0.00%	2.97%	0.00%	0.00%	9.45%	0.00%
1.4	Percentage of connections with good voice quality (=>95%)																	
	(i) 0-4 (w/o frequency hopping)	Mumbai													95.63%	91.73%	96.26%
	(ii) 0-5 (with frequency hopping)	Mumbai	96.93%	97%	91%	94.00%	95.10%	92.76%	98.71%	95%	95.10%	98.77%	92.83%	99.42%			
1,5	Service Coverage	Mumbai															
	In door (>= -75dBm)	Mumbai	80.90%	74%	57.00%	92.00%	80.00%	74.00%	82.00%	74.00%	80.00%	77.13%	86.00%	95.23%	82.00%	78.00%	78%
	In-vehicle (>= -85dBm)	Mumbai	96%	96%	81.00%	99.33%	98%	89.00%	89.00%	89.00%	98%	95.53%	98.00%	99.35%	94.00%	88.00%	94%
	Out door- in city (>= -95dBm)	Mumbai	100%	100%	91%	100%	100%	98%	98.00%	99.00%	100%	100%	99%	100%	99.00%	96.00%	99%
1.6	Call Setup Success Rate (>=95%)	Mumbai	100.00%	99.98%	91.40%	100.00%	100.00%	91.43%	98.33%	98.34%	100.00%	100.00%	98.81%	100.00%	96.36%	100.00%	100.00%

Graphical Representation

Coverage level Mumbai	Aircel	Airtel	Etisala	Idea	Loop	MTN	Rcom	Tata	Videoc	Vodaf	Unino	MTS	Rcom	MTN	Tata
In door (>= -75dBm)	80.90	74%	57.00	92.00	80.00	74.00	82.00	74.00	80.00	77.13	86.00	95.23	82.00	78.00	78%
In-vehicle (>= -85dBm)	96%	96%	81.00	99.33	98%	89.00	89.00	89.00	98%	95.53	98.00	99.35	94.00	88.00	94%
Out door- in city (>= -95dBm)	100%	100%	91%	100%	100%	98%	98.00	99.00	100%	100%	99%	100%	99.00	96%	99%
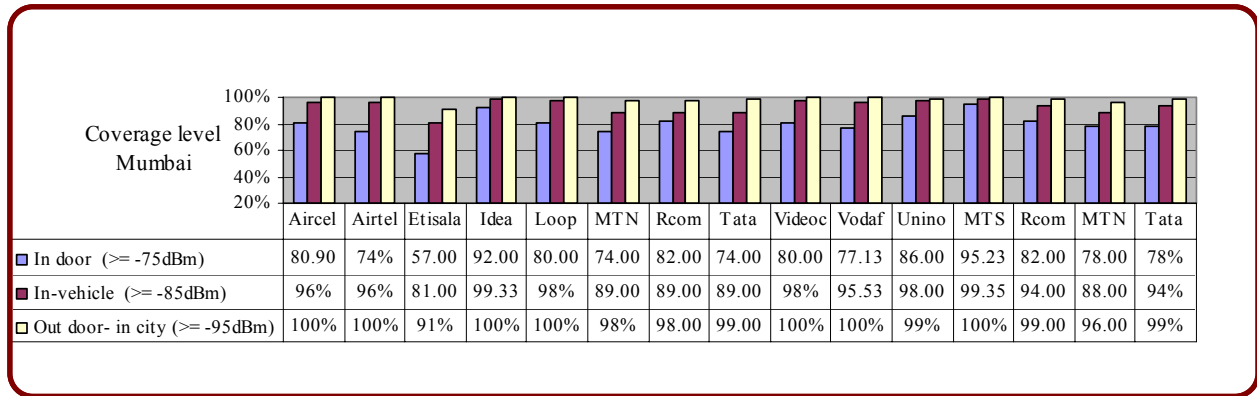
(3) Critical Analysis

The drive test data was found to be satisfactory for most of the parameters. However, a few deviations found are listed below:

a. Blocked Call Rate benchmark is not met by Etisalat, MTNL GSM & Reliance CDMA.
b. Dropped Call Rate benchmark is not met by Etisalat, MTNL GSM, Tata GSM & MTNL CDMA.
c. "%age of Voice quality connections" parameter is not met by MTNL CDMA, Etisalat, Idea, MTNL & Uninor.
d. CSSR benchmark of 95% is not met by Etisalat & MTNL GSM.

(E) Independent Drive Test

(1) Sample Coverage

The Independent Drive Test was conducted at Mumbai after operators assisted drive test was over for respective operators. Route cover was about around 100-150 Km depending on city areas within the speed limit of 40Km/hr.

DRIVE TEST LOCATIONS

MUMBAI CIRCLE:

High Dense: Marine Drive, Ambedkar Road, VT & Churchgate Station, Siddhivinayak, Bandra, Airport, Andheri

Medium Dense: Andheri, Versova, Jogeshwari, Malad, Kandivali, Borivali

Low Dense: EEH, Bhandup, Vikroli, Mulund, Thane, Airoli, Thane-Belapur Road, Kopar Khairane, Vashi

2) Performance (for the respective cities)

SN	Parameter	City Name	Aircel	Airtel	Etisalat	Idea	Loop	MTNL	Rcom GSM	Tata GSM	Videocon	Vodafone	Uninor
							GSM Operators						
1.1	Call Attempts	Mumbai	172	162	158	112	168	203	121	133	168	105	188
1.2	Blocked Call Rate (<=3%)	Mumbai	0.00%	0%	1%	0.00%	0.00%	3.52%	1.03%	2%	0.00%	0%	2%
1.3	Dropped Call Rate (<=2%)	Mumbai	0.00%	0%	3%	0.00%	0.00%	4.84%	9%	2%	0.00%	0%	2%
1.4	Percentage of connections with good voice quality (=>95%)													
	(i) 0-4 (w/o frequency hopping)	Mumbai											
	(ii) 0-5 (with frequency hopping)	Mumbai	95.64%	97.78%	95%	93.00%	95.96%	89.42%	92.00%	96.25%	95.96%	99.20%	92.02%
1.5	Service Coverage													
	In door (>= -75dBm)	Mumbai	82.98%	77%	86.00%	91.00%	81.66%	82.00%	87.00%	78.00%	81.66%	74.60%	90.00%
	In-vehicle (>= -85dBm)	Mumbai	98%	95%	97%	99.00%	98%	94.00%	94.00%	88.00%	98%	95.60%	99.00%
	Out door- in city (>= -95dBm)	Mumbai	100%	100%	100%	100.00%	100%	99.00%	100.00%	99.00%	100%	100%	100%
1.6	Call Setup Success Rate (>=95%)	Mumbai	100.00%	100.00%	98.74%	100.00%	100.00%	96.48%	98.97%	98.34%	100.00%	100.00%	97.88%

Graphical Representation

Coverage level Mumbai	Aircel	Airtel	Etisalat	Idea	Loop	MTNL	Rcom	Tata	Videoco	Vodafon	Uninor
■ In door (>= -75dBm)	82.98%	77%	86.00%	91.00%	81.66%	82.00%	87.00%	78.00%	81.66%	74.60%	90.00%
■ In-vehicle (>= -85dBm)	98%	95%	97%	99.00%	98%	94.00%	94.00%	88.00%	98%	95.60%	99.00%
□ Out door- in city (>= -95dBm)	100%	100%	100%	100.00%	100%	99.00%	100.00%	99.00%	100%	100%	100%
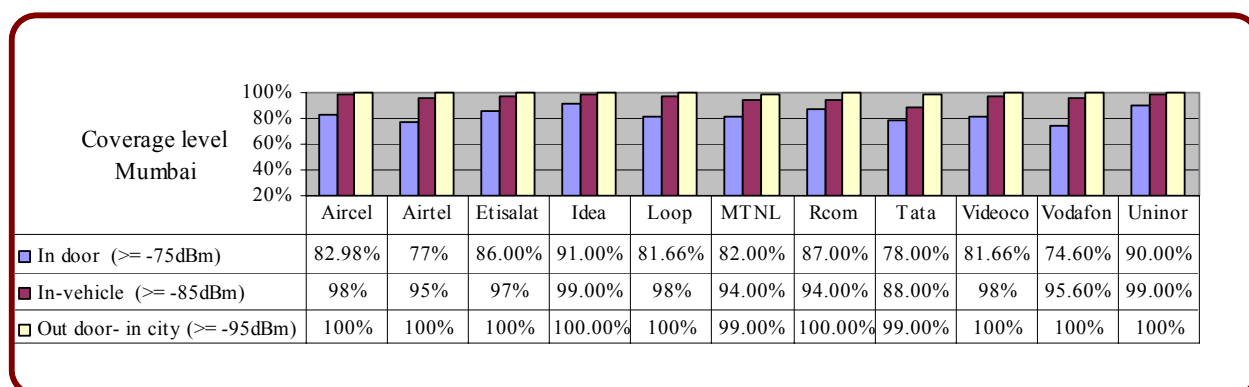
(3)   Critical Analysis

- Blocked Call Rate benchmark is not met by MTNL GSM.
- Dropped Call Rate benchmark is not met by Etisalat, MTNL GSM & Reliance GSM.
- "%age of Voice quality connections" parameter is not met by Idea, MTNL GSM, Reliance GSM & Uninor.

(F)   Compliance report (Status of service providers with respect to the QoS)

From live, month and PMR findings, it can be concluded that on an average, performance of the operators in the service area (Mumbai) is by and large satisfactory for **Network Parameters**.

Under **Customer Service Quality** section, benchmark for the parameter "operator answered calls (voice-to-voice) within 60 seconds" it is found not satisfying for a no. of operators. All the operators need to take care so that there is positive improvement in this regard.

Regarding **Metering/Billing Credibility** issues, Aircel, Tata GSM & CDMA are not meeting the benchmark for post-paid connections and Uninor, Reliance GSM & CDMA for pre-paid connections.

During **Drive Tests**, high Blocked Call Rates were found for Etisalat, MTNL GSM & Reliance CDMA. Whereas for MTNL CDMA, Etisalat, Idea, MTNL GSM & Uninor, performance against 'Good voice quality' was found not to be of much satisfaction.

II. Basic Telephone Service (Wireline) Providers

(A) Exchange Audit

1) 3 days live data & One Month Audit Comparative Table

S/N	Parameters	Benchmarks	Audit Period	MTNL	Airtel	TTSL	RCom
1	*Fault incidences*						
	No. of faults/100 subscribers /month	**< 5%**	**Month**	8.62%	1.14%	0.52%	0.21%
2	*Faults Repair/Restoraion Time*						
	Fault repair by next working day(Urban Area)	**>90%**	**Month**	93.93%	97.22%	96.44%	100.00%
	Within 3 days	**100%**		97.88%	100.00%	100.00%	100.00%
	Fault repair by next working day(Rural & hilly Area)	**>90%**		NA	NA	NA	NA
	Within 5 days	**100%**		NA	NA	NA	NA
	Mean time to Repair(MTTR)	**≤8 Hrs**		10.93	4.45	5.11	2.11
3	*Rent Rebate*						
	Fault pending > 3 days & <7 days	**Rebate for 7 days**	**Month**	8196	123	NA	0
	Fault Pending > 7 days & < 15 days	**Rebate for 15 days**		1589	18	NA	0
	Fault pending > 15 days	**Rebate for 1 month**		151	3	NA	0
4	*Call Completion Ratio(CCR) & Answer to seizure Ratio(ASR)*						
	CCR & ASR	**> 55%(CCR) & > 75%(ASR)**	**Live**	57.97%	93.33%	97.22%	87.94%
			Month	58.37%	90.92%	92.23%	86.14%
5	*Metering & Billing Performance*						
	Disputed Bills over bills issued	**< 0.1%**	**Month**	0.03%	0.20%	0.04%	0.04%
	% of billing complaints resolved within 4 weeks	**100%**		100.00%	100.00%	100.00%	100.00%
	Period of all refunds/payments from the date of resolution of complaints within 1week	**100%**		100.00%	54.00%	100.00%	100.00%
6	*POI Congestion*						
	No of POIs not meeting benchmark	*<=0.5%*	**Live**	0	1	0	0
			Month	0	4	7	0

S/N	Parameters	Benchmarks	Audit Period	MTNL	Airtel	TTSL	Rcom
7	*Response Time to customer for assistance*						
	Accessibility of Call centre/customer Care within 40 seconds	**≥95%**	**Live**	95.23%	100.00%	100.00%	98.00%
			Month	97.10%	91.18%	100.00%	98.19%
	% age of calls answered by operator(voice to voice) within 60 seconds	**≥90%**	**Live**	95.00%	100.00%	98.00%	96.00%
			Month	97.00%	79.13%	82.14%	96.00%
8	*Customer care(promptness in attending to customers request*						
	Termination / Closures	**100%**	**Month**	100.00%	100.00%	100.00%	100.00%
	Time taken for refunds of deposit after closures within 60 days	**100%**		100.00%	91.43%	100.00%	100.00%

1) Performance (Graphical representation)

Fault incidences (No of faults/100 subscribers/month (<= 5): Except MTNL, all the operators are meeting the benchmarks of 5%.

Fault Incidents	MTNL	Airtel	TTSL	RCom
No. of faults/100 subscribers /month	8.62%	1.14%	0.52%	0.21%
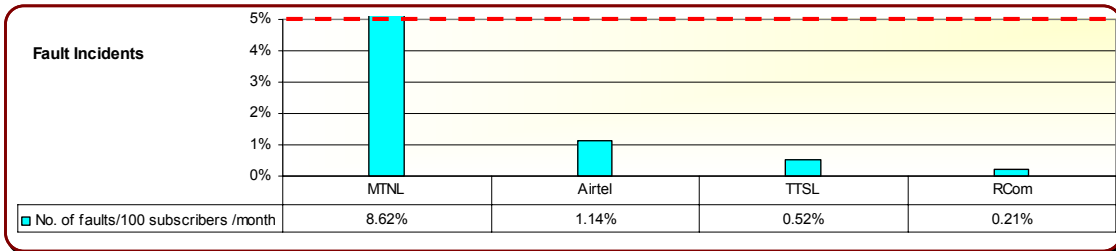
Fault Repair (Urban Area):
- **By next working day** (>90%)**:** All the operators comply with the TRAI benchmark of 90%.
- **Within 3 days (100%):** Except MTNL, all the operators are complying with the TRAI benchmark of 100%.

Fault Repair / Restoration Time	MTNL	Airtel	TTSL	RCom
Fault repair by next working day(Urban Area)	93.93%	97.22%	96.44%	100.00%
Within 3 days	97.88%	100.00%	100.00%	100.00%
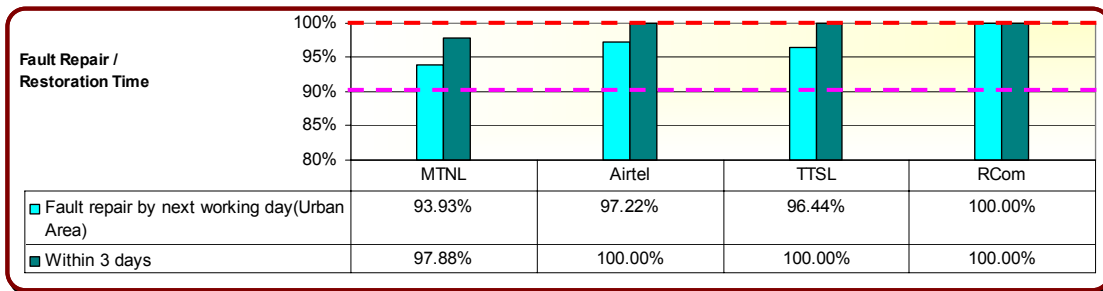
Fault Repair (Rural & Hilly Area): This parameter is not applicable for any of the operators.

Mean Time to Repair (MTTR) (<= 8 Hrs): All the operators comply with the TRAI benchmarks, except MTNL having MTTR value of 10.93 hrs.

	MTNL	Airtel	TTSL	RCom
Mean time to Repair(MTTR)	10.93	4.45	5.11	2.11
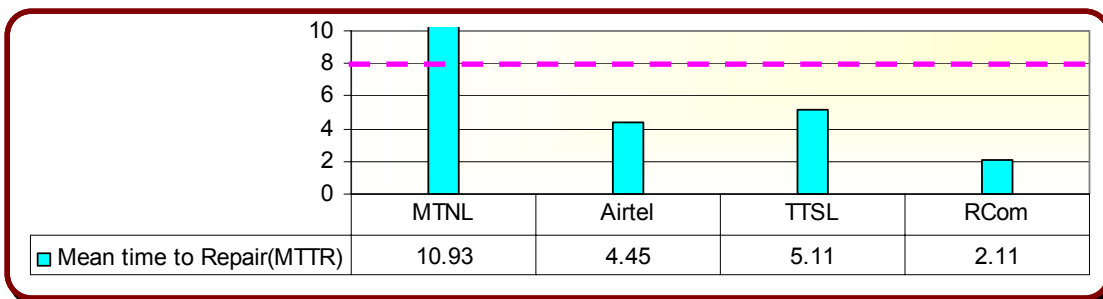
Metering and Billing Credibility (< 0.1%): Disputed Bills over Bills issued: - All the operators comply with the TRAI standard, except Airtel.

Metering / Billing Credibility		MTNL	Airtel	TTSL	RCom
☐ Disputed Bills over bills issued		0.03%	0.20%	0.04%	0.04%
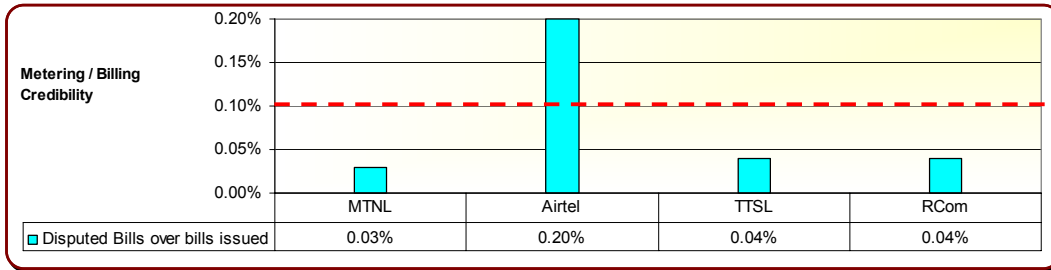
% of Billing Complaints resolved within 4 Weeks: All the operators have resolved billing complaints 100% (benchmark) within 4 weeks.

Period of All refunds / Payments from the date of Complaints Within 1 week: All the operators are meeting the benchmark of 100%, except Airtel having 54% refund cases solved within 1 week of resolution of complaints.

Metering / Billing Credibility		MTNL	Airtel	TTSL	RCom
☐ % of billing complaints resolved within 4 weeks		100.00%	100.00%	100.00%	100.00%
☐ Period of all refunds/payments from the date of resolution of complaints within		100.00%	54.00%	100.00%	100.00%
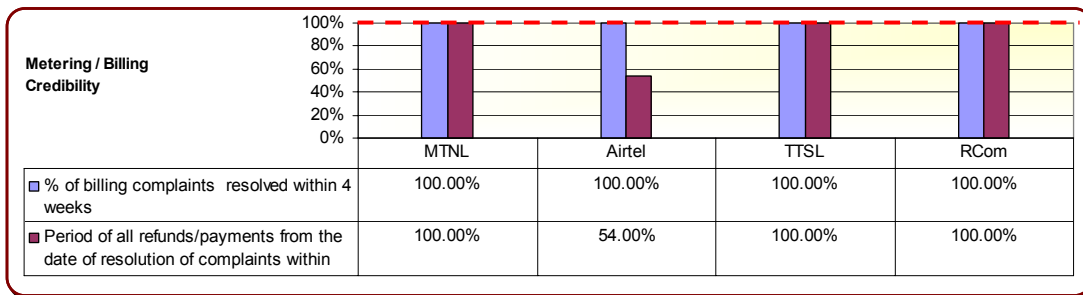
Customer Care Promptness in Attending Customer Request:
Termination / Closures :(<= 7 Days): All the operators are meeting the benchmarks except Airtel (91.43%) provided by TRAI within 7 Days.

Customer Care Promptness		MTNL	Airtel	TTSL	RCom
☐ Termination / Closures		100.00%	100.00%	100.00%	100.00%
☐ Time taken for refunds of deposit after closures within 60 days		100.00%	91.43%	100.00%	100.00%
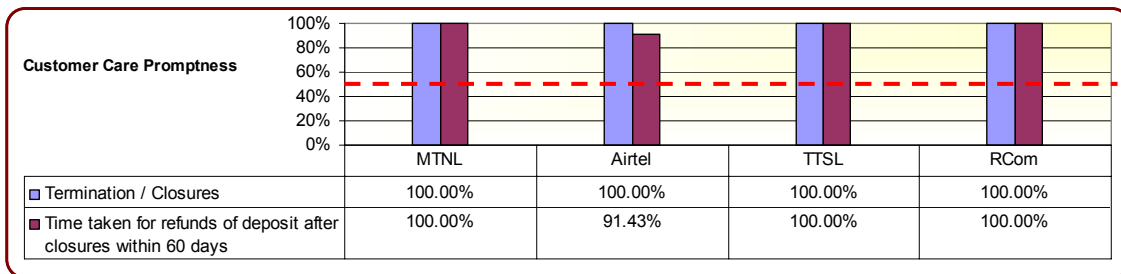
Comparison between Live measurements and One month data Audit – Basic Service (Wireline).

Call Completion Rate (>55%) & Answer to Seizure (>75%): The performance based on live measurement as well as One-Month Data match for all operators and they meet the benchmarks.
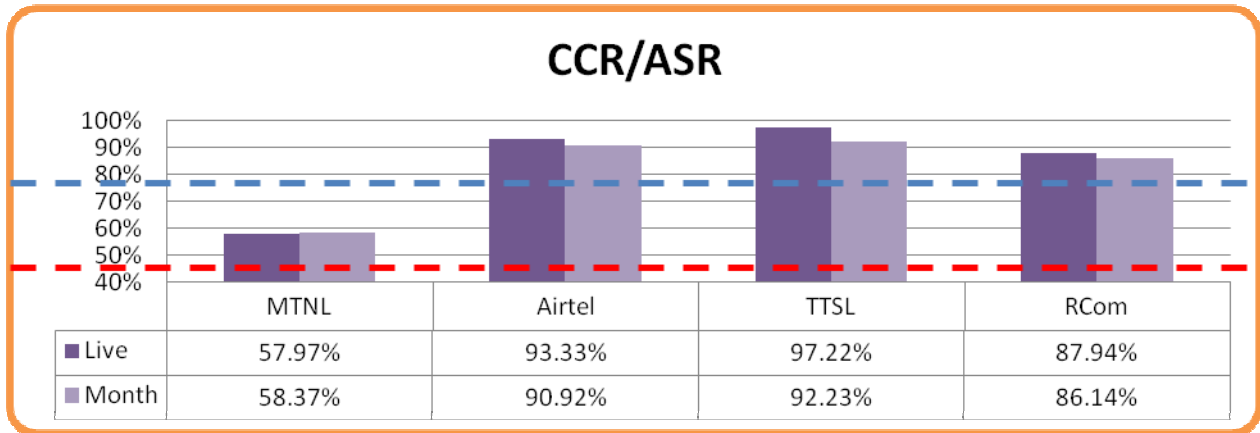
CCR/ASR

	MTNL	Airtel	TTSL	RCom
■ Live	57.97%	93.33%	97.22%	87.94%
■ Month	58.37%	90.92%	92.23%	86.14%

Response time to the customer for assistance:

1. **Accessibility of Call Centre / Customer Care 40 sec (> 95 %.):** All the operators are meeting the benchmark in live audit. However, during the month data audit, Airtel is not meeting the benchmark value of 95%.

Accessibility of Call Centre / Customer Care 40 sec

	MTNL	Airtel	TTSL	RCom
■ Live	95.23%	100.00%	100.00%	98.00%
■ Month	97.10%	91.18%	100.00%	98.19%
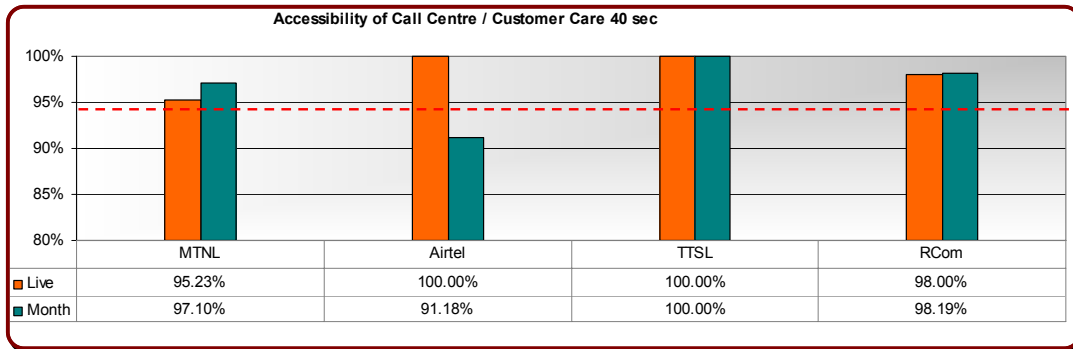
2. **Calls Answered by operator within 60 seconds (>90%) (Voice to Voice):** All the operators are meeting the benchmark except for Airtel & TTSL in Month audit.

Calls Answered by operator (voice to voice) within 60 seconds

	MTNL	Airtel	TTSL	RCom
■ Live	95.00%	100.00%	98.00%	96.00%
■ Month	97.00%	79.13%	82.14%	96.00%
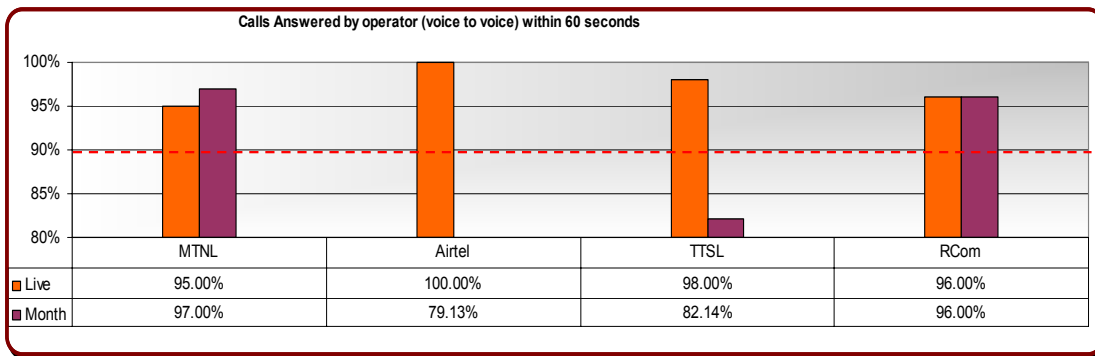
POI Congestion   (< 0.5%): The performance based on Live measurement as well as One-Month Data are similar for all the operators and meeting the benchmarks.
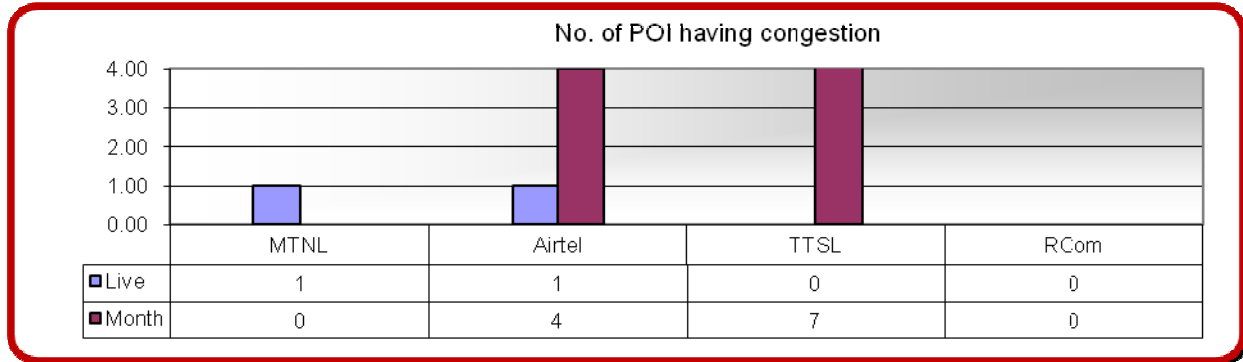
2) Customer Care & Grievances Redressal

S.N.	Parameters	MTNL	Airtel	TTSL	Rcom
1	Total no of complaints received in the call centre (Tech+ Non Tech)	NR	12819	NR	471
2	Total no of complaints redressed by the call centre within the specified time limit	NR	NR	NR	NR
3	**Nodal Officer**				
3.1	Total no of complaints received by the nodal officers	NR	265	NR	0
3.2	Percentage of complaints with reference to total no of complaints received at the call centre	NR	2.07%	NR	0%
3.3	Total no of complaints redressed within the specified time limit	NR	NR	NR	0
4	**Appellate Authority**				
4.1	Total no of appeals received by the appellate authority	NR	14	NR	0
4.2	Percentage of appeal received with reference to total no of complaints received by the nodal officers	NR	5.28%	NR	0%

It is found that there are many instances where customers directly approach to Nodal Officer without approaching to Call Center for redressal. Similarly there are many instances where customers directly approach to Appellate Authority without approaching to Nodal Officer for their grievances redressal.

3) Live calling to Call centre:

Fifty nos. of calls were made in each half and below given no. of calls got connected to the call centre within 60 Secs (Voice to Voice).

CALL CENTRE CALLING STATISTICS

	OPERATORS NAME			
	Airtel	MTNL	RCom	TTSL
1ST HALF (10AM TO 01 PM)	39	46	46	46
2ND HALF (04PM TO 07 PM)	33	42	44	33
In % age	72.00	88.00	90.00	79.00

4) Level 1 Calling:

Level 1 calling such as calling at emergency no. (Police, Fire, Hospital), Railway enquiry system etc were made in few nos. so as to check the service of such short codes. In Mumbai it was found to be functional.

5) Critical Analysis

Fault incidence: All the three operators are meeting the benchmarks of 5%, except MTNL (8.62%).

Fault Repair (Urban Area): It is found that all the operators are meeting the benchmarks of >=90% set by TRAI for faults repair by the next working day and in case of fault repair within 3 working days, MTNL is found to miss the benchmark of 100% marginally with the value of 97.88%. Through live calling, the fault repair within 24 hours data was verified and found that almost all the operators are better than 95% in customer satisfaction. While verification of records of service providers, it was found that all the service providers are providing rebates as per TRAI norms.

Fault Repair (Rural & Hilly Area): In Mumbai Circle, this parameter is not applicable to any operator.

Rent Rebate: Only MTNL & Airtel are providing Rent Rebate and TTSL & RCOM are having no rebate cases in the month of audit. For MTNL and Airtel, rebate cases are (8196, 1589 & 151) and (123, 18 & 3) respectively for each type of rebate cases.

Mean Time to Repair (MTTR): All the operators, except MTNL, are meeting the benchmark of <8hrs fixed by TRAI during one month audit.

Call Completion Rate (CCR): All the service providers are found to be meeting TRAI benchmark of >55% for Call Completion Rate (CCR) and > 75% for Answer to Seizure Ratio for the month of audit data verification. However in the case of Reliance, the Answer Seizure Ratio (ASR) is measured in place of Call Completion Rate (CCR) and the firm claims that the same is a better indicator for the kind of network. Data has not been provided by TTSL for month of audit.

Metering and billing credibility: All the operators, except Airtel, are meeting the benchmark of less than 0.1% billing complaints over the total number of bills issued.

% of Billing complaints Resolved Within 4 Weeks: As per the findings for one-month data audit, all the operators were found 100% resolution of complain within 4 weeks.

Period of All refunds/Payments from the date of resolution within 1 Week: As per the findings for one-month data audit, all the operators were found 100% refunds from the date of resolution within 1 week respectively, except Airtel which refunded 54% cases.

POI Congestion: All the operators are meeting the benchmarks in POI Congestion set by TRAI (<0.5%) in one month data Audit. Data has not been provided by TTSL for month of audit.

Response Time to Customer for Assistance:
1. Accessibility of Call Centre/ Customer care within 40 seconds (Electronically): All the operators are meeting the benchmarks of >=95% during live audit. However, deviations were found in case of Airtel in month data audit.
2. % of Call answered by operators within 60 seconds (Voice to Voice): All the operators are meeting the benchmark of 90% fixed by TRAI during live audit. However, deviations were found in case of Airtel & TTSL in month data audit.

Customer care (Promptness of attending customer request):

(i) <u>Termination / Closure</u>: - All the operators are meeting the TRAI benchmarks of 100% within <= 7 days for closure requests.

(ii) <u>Time taken for refund of deposits after closure:</u> All the operators are providing the refund to the customers within the benchmark time limit, except Airtel.

(B) Compliance Report (Status of service providers with respect to the QoS)

It can be seen from the table and graphical method that in both cases of live performance and month data verification that there is consistency in the parameters except in the parameters related to "Response Time to Customer for Assistance" for Airtel & TTSL. Also, for each parameter, trends can be analysed comparing both type of data. This may help out the operators in making decision in view of their network performance so as to give customer satisfaction to its highest level, thus helping out TRAI to achieve its goal.

MTNL

MTNL is having high fault incidences, fault restoration time & MTTR. It is meeting the benchmarks provided by TRAI during the live assessment for Call Completion Rate (CCR) as well as for POI congestion under Network section parameters. MTNL is also meeting the benchmark for Response Time to Customer for Assistance for the parameters %age Calls answered electronically within 40 Seconds and %age Calls answered Voice to Voice within 60 Seconds during the live as well as month measurement.

AIRTEL

Airtel is having deviations in %age of disputed bills, refunds within1 week from the date of resolution of complaints and response time to customer for assistance. It is meeting the benchmarks provided by TRAI during the live assessment for Call Completion Rate (CCR) as well as for POI congestion under Network section parameters.

RCOM

In the Network Section, both the network parameters of Reliance are meeting the benchmark with a value of 86.14% & 0% for Call Completion Ratio & POI congestion respectively within the local network. Please note that Reliance have provided with ASR (Answer to Seizure ratio) value in case of call completion ratio. Reliance is meeting the benchmark for Response Time to Customer for Assistance for the parameters %age Calls answered electronically within 40 Seconds and %age Calls answered Voice to Voice within 60 Seconds during the live measurement.

TTSL

In the Network Section, both the network parameters of TTSL are meeting the benchmark with a value of 97.22% and 0% for Call Completion Ratio and POI congestion respectively within the local network. TTSL is also meeting the benchmark for 'Response Time to Customer for Assistance' for the parameters %age Calls answered electronically within 40 Seconds and %age Calls answered Voice to Voice within 60 Seconds during the live measurement However, data has not been provided for CSR & POI congestion for month data audit.

III. Broadband Service Providers

(A) POP Audit

1) 3 days Live Data & One Month Audit Comparative Table

S/N	Parameters	Bench-marks	Audit	MTNL	Airtel	TTML	RCom	Hathway	Youtele	Sify	Spectranet
1	*Service Provisioning/Activation Time*										
1.1	in 15 days	**<15 days**	**Month**	88.84%	100%	100%	100%	100%	100%	96.18%	95%
1.2	In all cases where payment towards installation charge & SD is taken and the Broadband connection is not provided within 15 working days	**credit @ Rs.10 per day**		100%	100%	100%	100%	100%	100%	100%	100%
2	*Faults Repair/Restoraion Time*										
	By next working day	**>90%**	**Month**	86%	99%	99%	100%	94.74%	95.54%	92%	97.96%
	within 3 working day	**≥99%**		94%	100%	100%	100%	98.53%	99.41%	100%	100%
2.1	*Rebate*										
	Faults Pending for > 3 working days and < 7 working days: (Rebate equivalent to 7 days of minimum monthly charge or equivalent usage allowance)		**Month**	3040	46	0	0	589	11	52	0
	Faults Pending for > 7 working days and < 15 working days: (Rebate equivalent to 15 days of minimum monthly charge or equivalent usage allowance)			399	10	0	0	253	2	34	0
	Faults Pending for > 15 working days:(Rebate equivalent to one month of minimum monthly charge or equivalent usage allowance)			14	0	0	0	66	0	0	0
3	*Billing Performance*										
	Billing complaints per 100 bills issued	**<2%**		0.01%	0.07%	1.3%	0.09%	1.33%	0.54%	NA	0%
	Billing complaints per 100 bills issued	**100%**	**Month**	100%	100%	100%	100%	100%	100%		100%
	Time taken for refund of deposits after closure (within 60 days)	**100%**		100%	75%	100%	100%	100%	100%		100%
4	*Response time to the customer for assistance % age of calls answered by operator (Voice to Voice)*										
	within 60 sec	**>60%**	**Live**	67.37%	100%	99%	100%	100%	100%	90.56%	100%
			Month	62.54%	100%	89.07%	94%	99.81%	73%	95.44%	100%
	within 90 sec	**>80%**	**Live**	70.97%	100%	99%	100%	100%	100%	100%	100%
			Month	65.66%	100%	94.16%	96%	94.69%	79%	100%	100%

S/N	Parameters	Bench-marks	Audit	MTNL	Airtel	TTML	RCom	Hathway	Youtele	Sify	Spectranet
5	*Bandwidth Utilization/ Throughput: (If on any link(s) / route bandwidth utilization exceeds 90%, then network is considered to have congestion. For this additional provisioning of Bandwidth on immediate basis, but not later than one month, is mandated.) < 80% link(s) / route bandwidth utilization during peak hours (TCBH).*										
5.1	POP to ISP Gateway Node [Intra-network] Link(s)	**< 80%**	Live	78.88%	NA	15.21%	43.8%	70.7%	45.8%	42%	39.96%
			Month	77.90%	NA	11.60%	31.9%	69%	47.3%	42%	39.81%
5.2	ISP Gateway Node to IGSP / NIXI Node upstream Link(s) for International connectivity	**< 80%**	Live	76.6%	59%	70.73%	49.6%	63.6%	53.2%	65%	NA
			Month	78.8%	56.5%	61.8%	42.6%	66.2%	43.3%	64%	NA
5.3	Broadband Connection Speed (download) - from ISP Node to User	**> 80%**	Live	89.99%	100%	82%	100%	95%	89%	93.02%	92.39
			Month	87.40%	100%	85%	98.02%	91.5%	86%	94.06%	90.23%
6	*Service Availability/Uptime (for all users)*										
	Service Availability(%)	**>98%**	Month	98.38%	99.71%	99.14%	99.99%	98.66%	98.69%	100%	99.96%
7	*Packet loss*										
	% of Packet loss	**<1%**	Live	0%	0%	0%	0%	0%	0.001%	0%	0%
			Month	0%	0.02%	0%	0.16%	0%	0%	0%	0.02%
8	*Network latency (for wired broadband access)*										
8.1	User reference point at POP/ISP Gateway node to IGSP/NIXI	**<120 ms**	Live	6.42 ms	37.1 ms	32.7 ms	40.3ms	2 ms	3 ms	52 ms	2 ms
			Month	6.21 ms	69.6 ms	32.5 ms	43.3 ms	2 ms	19.6 ms	55 ms	20.6ms
8.2	User reference point at ISP Gateway node to International nearest NAP port abroad (terrestrial)	**<350 ms**	Live	279.3 ms	102.1 ms	59 ms	58.3 ms	245.7 ms	229.3 ms	284 ms	268 ms
			Month	278.45 ms	345 ms	49.7 ms	55.9 ms	246 ms	247.9 ms	222 ms	298ms
8.3	User reference point at ISP Gateway node to International nearest NAP port abroad (satellite)	**<800 ms**	Month	NA	NA	NA	NA	NA	NA	NA	NA

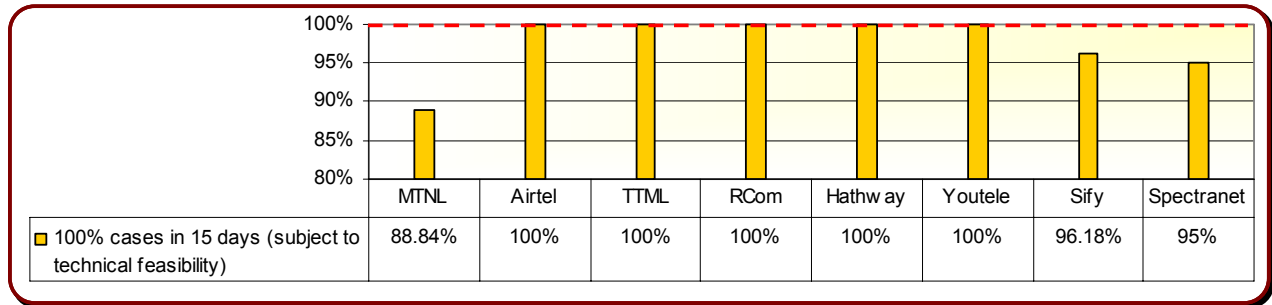NA – Not Applicable, NR – Not Provided.
Note:
a) For S/N 8.3 none of the operator having satellite connectivity.
b) For S/N. 5.2 Spectranet not applicable because no Upstream Links for International Connectivity.
c) For S/N 3 SIFY not applicable because operator under in prepaid module.
d) S/N 5.1 For Airtel not applicable because operator's ISP and POP are same.
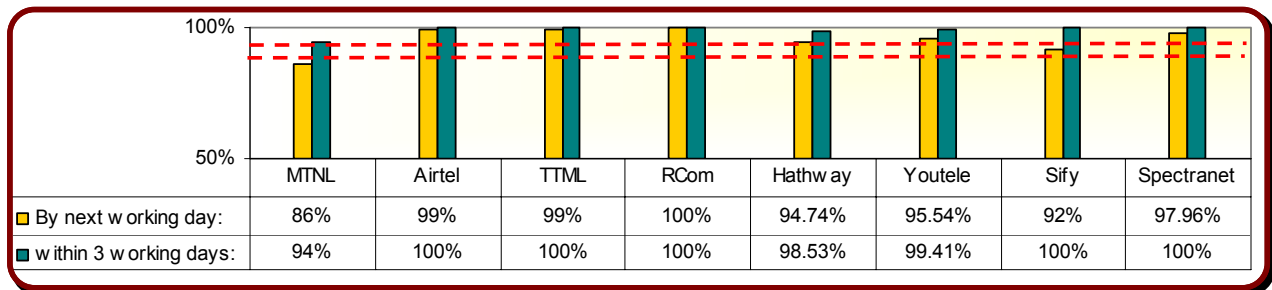
2) Performance (Graphical representation)

Service Provisioning /Activation Time: (Should be 100%)

All the operators are complying with the TRAI benchmark of 100% Except MTNL, Sify and Spectranet with the value of 88.84%, 96.18% and 95% respectively.
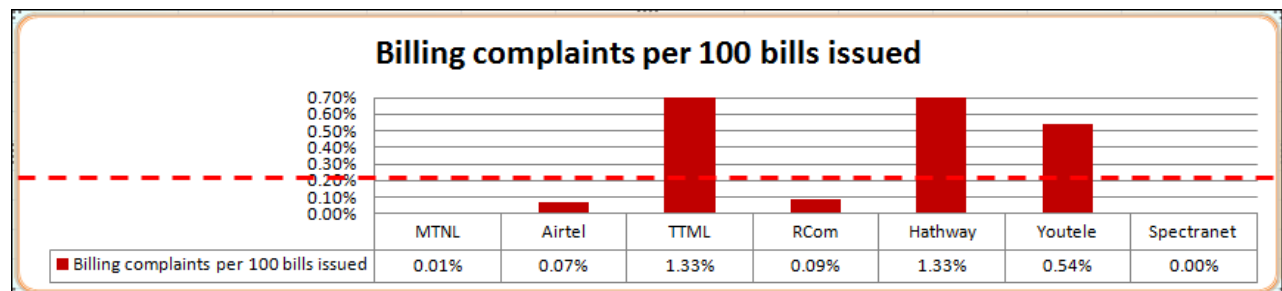
	MTNL	Airtel	TTML	RCom	Hathway	Youtele	Sify	Spectranet
100% cases in 15 days (subject to technical feasibility)	88.84%	100%	100%	100%	100%	100%	96.18%	95%

Fault Repair / Restoration Time:

- **By next working day (>90%):** All the operators are complying with the TRAI benchmark of 90% Except for MTNL with the value of 86% in one-month data verification.
- **Within 3 working days (>99%):** All the operators are complying with the TRAI benchmark except for MTNL and Hathway with the value of 94% & 98.53% respectively in one-month data verification.
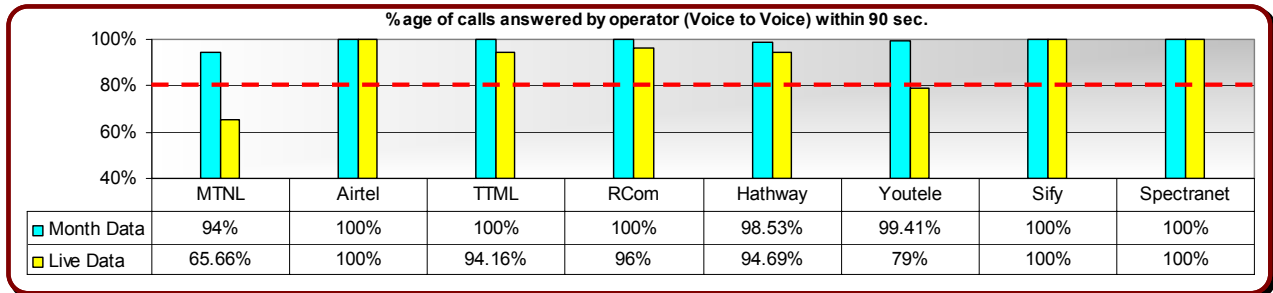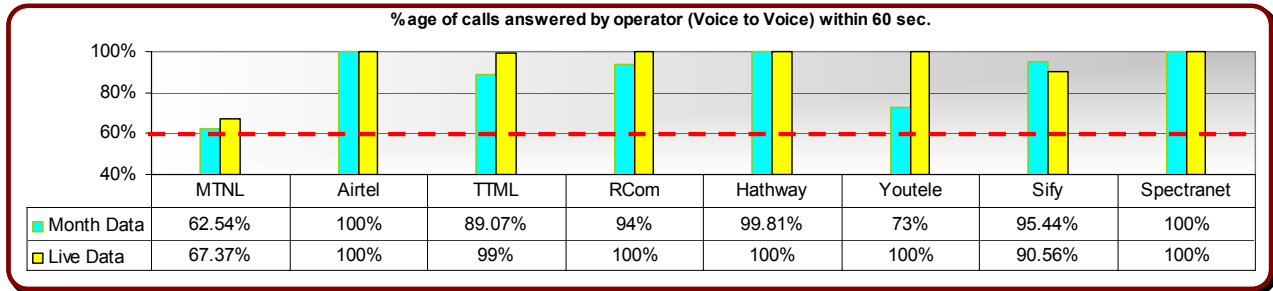- **Rebate:** All the operators are giving rebate to the eligible customers.

	MTNL	Airtel	TTML	RCom	Hathway	Youtele	Sify	Spectranet
By next working day:	86%	99%	99%	100%	94.74%	95.54%	92%	97.96%
within 3 working days:	94%	100%	100%	100%	98.53%	99.41%	100%	100%

Billing Performance: (Benchmark <2%)

All the operators are complying with the TRAI standards, Except Sify which has only prepaid module.

Billing complaints per 100 bills issued

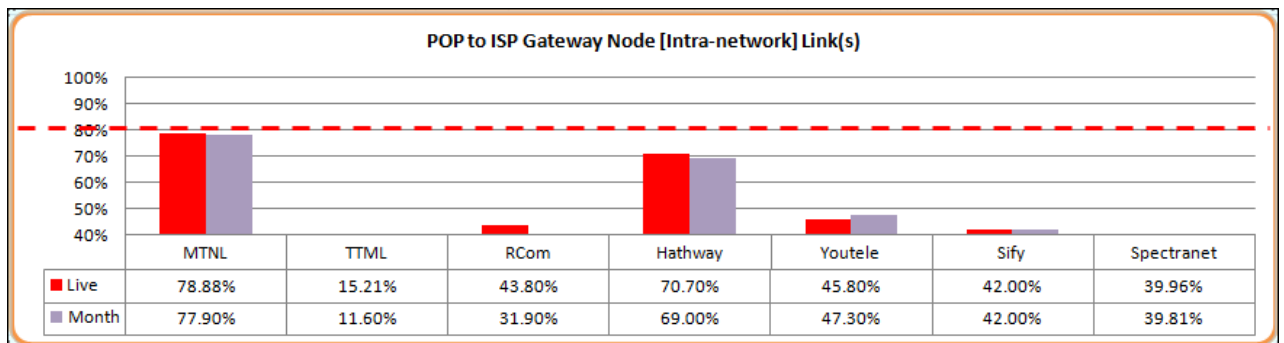|	MTNL	Airtel	TTML	RCom	Hathway	Youtele	Spectranet
Billing complaints per 100 bills issued	0.01%	0.07%	1.33%	0.09%	1.33%	0.54%	0.00%

Response time to the customer for assistance: % age of calls answered by operator (Voice to Voice)

- **Within 60 seconds (>60%):** All the operators are meeting the benchmark in both live and one month data verification.
- **Within 90 seconds (>80%):** All the operators are meeting the benchmark except MTNL with the value of 70.97% & 65.66% in live & one-month data verification respectively and for You Telecom with the value of 79% in one-month data verification.


%age of calls answered by operator (Voice to Voice) within 60 sec.

	MTNL	Airtel	TTML	RCom	Hathway	Youtele	Sify	Spectranet
Month Data	62.54%	100%	89.07%	94%	99.81%	73%	95.44%	100%
Live Data	67.37%	100%	99%	100%	100%	100%	90.56%	100%

%age of calls answered by operator (Voice to Voice) within 90 sec.

	MTNL	Airtel	TTML	RCom	Hathway	Youtele	Sify	Spectranet
Month Data	94%	100%	100%	100%	98.53%	99.41%	100%	100%
Live Data	65.66%	100%	94.16%	96%	94.69%	79%	100%	100%

Bandwidth Utilization/ Throughput:

- **POP to ISP Gateway Node [Intra-network] Link(s): (Benchmark <80%):** All the operators are meeting the benchmarks in both live and one-month data verification.

-

POP to ISP Gateway Node [Intra-network] Link(s)

	MTNL	TTML	RCom	Hathway	Youtele	Sify	Spectranet
Live	78.88%	15.21%	43.80%	70.70%	45.80%	42.00%	39.96%
Month	77.90%	11.60%	31.90%	69.00%	47.30%	42.00%	39.81%

- **ISP Gateway Node to IGSP / NIXI Node upstream Link(s) for International connectivity: (Benchmark <80%):** All the operators are meeting the benchmarks in both live and one-month data verification. for Spectranet; Operator is not having any NIXI upstream links.
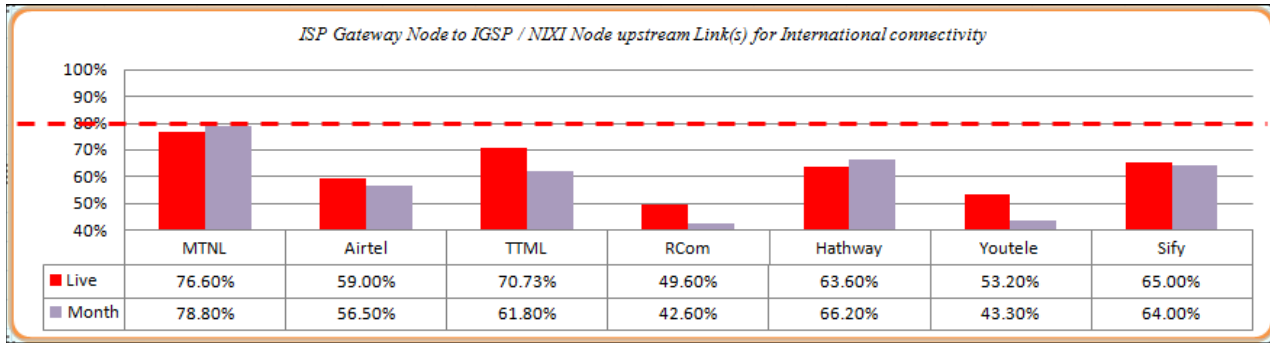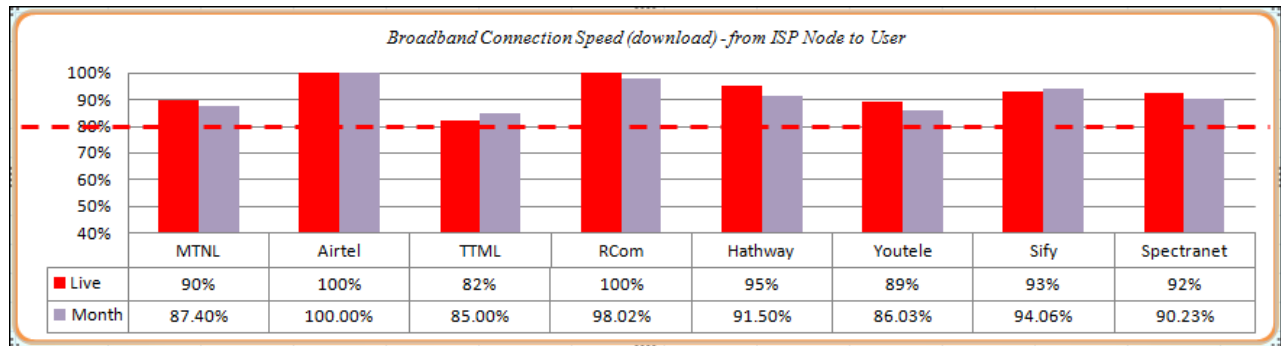
Broadband Connection Speed (download) (>80%):

All the operators are meeting the TRAI benchmark of greater than 80% connection in both live and one-month data verification.
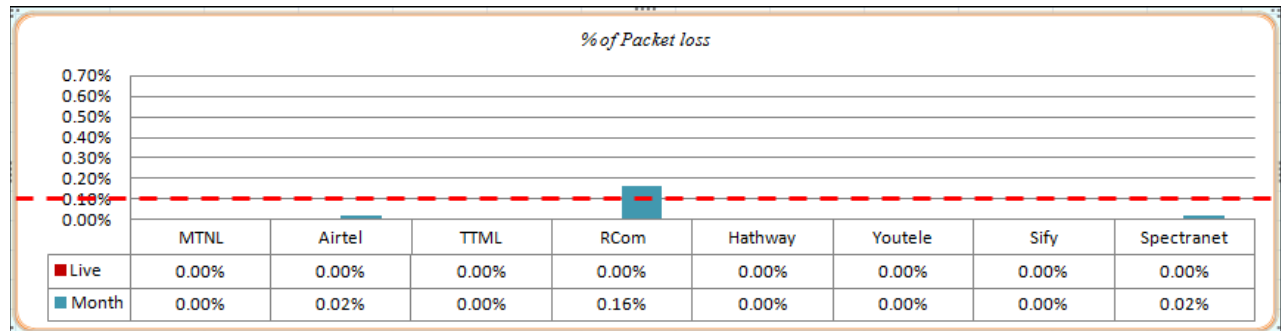
Service Availability / Uptime (for all users) (better than 98%):

All the operators are meeting the TRAI benchmark of greater than 98% during one-month data verification.
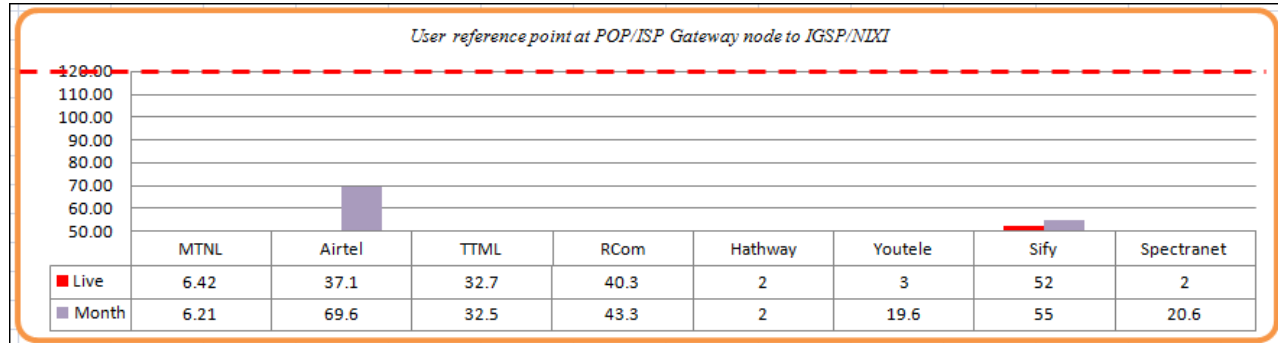

Packet Loss (Should be less than 1%):

All operators are meeting the benchmark in both live and one-month data verification except for Spectranet have not provided the data.
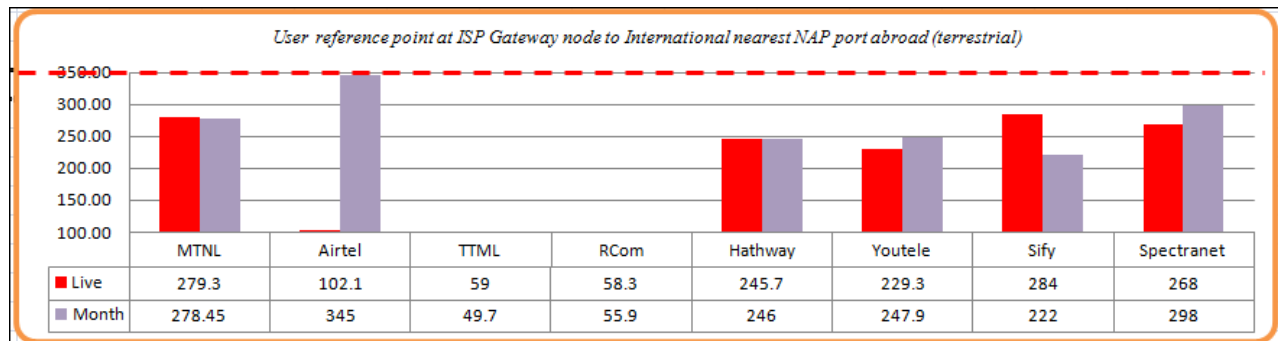
Network Latency:

- **User reference point at POP/ISP gateway node to international gateway (IGSP/NIXI) <120 ms:**
  All operators are meeting the benchmark in both live and one-month data verification except for Spectranet have not provided the data.

User reference point at POP/ISP Gateway node to IGSP/NIXI							
	MTNL	Airtel	TTML	RCom	Hathway	Youtele	Sify	Spectranet
Live	6.42	37.1	32.7	40.3	2	3	52	2
Month	6.21	69.6	32.5	43.3	2	19.6	55	20.6

- **User reference point at ISP gateway node to international nearest NAP Port abroad (Terrestrial) <350 ms:**
  All operators are meeting the benchmark in both live and one-month data verification except for Spectranet have not provided the data.

User reference point at ISP Gateway node to International nearest NAP port abroad (terrestrial)							
	MTNL	Airtel	TTML	RCom	Hathway	Youtele	Sify	Spectranet
Live	279.3	102.1	59	58.3	245.7	229.3	284	268
Month	278.45	345	49.7	55.9	246	247.9	222	298

- **User reference point at ISP Gateway Node to International nearest NAP port abroad (Satellite) <850 ms:**
  The Satellite link does not exist with any of the operator, hence the parameter "User reference point at ISP Gateway Node to International nearest NAP port abroad (Satellite)" is not applicable to the operators.

3) Customer Care & Grievances Redressal

S.N.	Parameters	MTNL	Hathway	You Tele	Sify	Airtel	TTML	RCom	Spectranet
1	**Call Centre**								
1.1	Total no of complaints received in the call centre	456548	15337	2199	2303	12829	6509	364	197
1.2	Complaints per 100 customers per months	0.01%	1.33%	0.54%	0%	0.07%	1.33%	0.09%	0%
2	**Nodal Officer**								
2.1	Total no of complaints received by the nodal officers	0	100	7	4	266	124	0	0
2.2	Percentage of complaints with reference to total no of complaints received at the call centre	0%	0.65%	0.32%	0%	2.10%	1.19%	0%	0%
3	**Appellate Authority**								
3.1	Total no of appeals received by the appellate authority	0	28	4	2	14	0	0	0
3.2	Percentage of appeal received with reference to total no of complaints received by the nodal officers	0%	0.18%	0.18%	0.09%	5.30%	0%	0%	0%

Note:
It is found that there are many instances where customers directly approach to Nodal Officer without approaching to Call Center for redressal. Similarly there are many instances where customers directly approach to Appellate Authority without approaching to Nodal Officer for their grievances redressal.

3. Live calling to Call centre:

Fifty nos. of calls were made in each half and below given no. of calls got connected to the call centre within 60 Secs (Voice to Voice).

CALL CENTRE CALLING STATISTICS

	OPERATORS NAME							
	MTNL	Airtel	TTML	RCom	Hathway	Youtele	Sify	Spectranet
1ST HALF (10AM TO 01 PM)	24	40	46	33	38	20	47	44
2ND HALF (04PM TO 07 PM)	30	33	44	40	44	16	40	40
In % age	54.00	73.00	90.00	73.00	82.00	36.00	87.00	84.00

4) Critical Analysis

♦ Reliance, Spectranet & Sify are submitting the PMR on all India bases; hence data is verified on all India basis and not particularly for Mumbai Circle only.

♦ The Satellite link do not exist with any of the Operators, hence the parameter "User reference point at ISP Gateway Node to International nearest NAP port abroad (Satellite)" is not applicable to the Operator.

The key conclusions (Parameter wise) emerging out from the Audit exercise of Broadband service providers are mentioned below

Service provisioning/Activation time: All the service providers are performing well and meeting the benchmarks for service provisioning except MTNL, Sify & Sprctranet with the value of 88.84%, 96.18% & 95% respectively.

Fault Repair/Restoration time & Rebate: All the operators are meeting benchmark of more than 90% except MTNL with the value of 86% (by next working day) & with the value of 94% (by 3 working days) respectively and Hathway with the value of 98.53% (by 3 working days). All the service providers are found to provide Rebate as per the guide lines set by TRAI except Sify, having no rebate case because the operator currently is having only prepaid module.

Billing performance: All the operators are meeting the benchmark of Less than 2% for billing complaints. Also all the operators are meeting the benchmark of "100% cases 4 weeks" for billing complaint resolution for on-month data verifications. Also all the operators are providing the refund of deposits after closure as per the benchmark of "100% cases within 60 days" except Airtel with the value of 75%. Sify claims that all its broadband customers are under in prepaid module and hence there are no bills issued.

Customer Care/Helpline Assessment: All the service providers are meeting the benchmark for the parameters response time to the customer for assistance (Voice to Voice) within 60 and 90 seconds in both live and one-month data verifications except MTNL with the value of 70.97% & 65.66%(within 90 sec) in both live & one-month data Verification respectively and for You Telecom with the value of 79% (within 90 sec) in one-month data Verification.

Bandwidth Utilization:

• **POP to ISP Gateway Node (intra-network) links:** All the operators are meeting all the benchmark during measurements of both live & one-month data Verification.
• **ISP Gateway Node to IGSP/ NIXI Node upstream links for International connectivity:** All the operators are meeting all the benchmark during measurements of both live & one-month data Verification.
For Spectranet, the operator is not having any NIXI upstream links.

Broadband Connection speed: All the operators are meeting the TRAI benchmark of greater than 80% connection speed during measurements of both live & one-month data Verification except RCom & Spectranet have not provided the data.

Service Availability/Uptime: All the operators are meeting the TRAI benchmark of greater than 98% during one-month data verification.

Packet Loss: All the operators are meeting the TRAI benchmark of less than 1% during measurements of both live and one-month data verification except Spectranet have not provided the month data.

Network Latency:

- **User reference point at POP/ISP gateway node to international gateway (IGSP/NIXI) <120 ms:** All operators are meeting the benchmark in both live and one-month data verification except for Spectranet have not provided the data.

- **User reference point at ISP gateway node to international nearest NAP Port abroad (Terrestrial) <350 ms:** All operators are meeting the benchmark in both live and one-month data verification except for Spectranet have not provided the data.

- **User reference point at ISP gateway node to international nearest NAP Port abroad (Terrestrial) <850 ms:** The Satellite link does not exist with any of the operators, hence the parameter "User reference point at ISP Gateway Node to International nearest NAP port abroad (Satellite)" is not applicable to all the operators.

(B)   Compliance report (Status of service providers with respect to the QoS)

MTNL
MTNL is meeting all the benchmarks except for parameter %age of connections provided within 15 days of registration of demand, % of faults repaired by next working day & % of faults repaired within 3 working day with the value of 83.90%, 70.96% & 84.59% respectively.

AIRTEL
Airtel is meeting all the benchmarks.

TTML
TTML is meeting all of the benchmark except for parameter %age of complaints resolved within 4 weeks with the value of 99.63%.

R Com
Reliance is meeting all the benchmarks.
Reliance submits the PMR on all India bases; hence data is verified on All India basis not for Mumbai Circle particularly.

HATHWAY
HATHWAY is meeting all the benchmarks.

YOU TELECOM
YOU TELECOM is meeting all the benchmark except for parameter %age of calls answered by operator (Voice to voice) within 60 sec & %age of calls answered by operator (Voice to voice) within 90 secwith the value of 57% and 64% respectively.

SIFY
Sify is meeting all the benchmarks.

SPECTRANET
SPECTRANET is meeting all the benchmarks except for parameter %age of connections provided within 15 days of registration of demand with the value of 98.47%.