

REPORT

ON

AUDIT & ASSESSMENT OF QUALITY OF SERVICE

OF

CELLULAR MOBILE TELEPHONE SERVICE

WIRELINE BASIC SERVICE

&

BROADBAND SERVICE

FOR

SOUTH ZONE – KARNATAKA CIRCLE

Report Period: JULY 2011 – SEP 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 Karnataka 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.
- ✓ For Broadband Services, audit data were collected from the centralized NOC or through a remote access to the NOC. Network parameters were also checked from the centralized NOC with relevant details. 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, Wireline Services & Broadband Services in Karnataka Circle in 3rd quarter (July - September 2011). The primary data collection and verification of records (PMR data verification – quarterly) maintained by various operators was undertaken during the period January - March 2011.

Following are the various operators covered in Karnataka circle (South 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	Jul-2011	1900-2000 hrs
2	Airtel Ltd	Jul-2011	1900-2000 hrs
3	BSNL	Jul-2011	1900-2000 hrs
4	Reliance Communication	Jul-2011	1900-2000 hrs
5	Tata Communications	Jul-2011	1900-2000 hrs
6	Vodafone	Jul-2011	1900-2000 hrs
7	Uninor	Jul-2011	1900-2000 hrs
8	Etisalat	Jul-2011	1900-2000 hrs
9	Idea	Jul-2011	1900-2000 hrs
10	Videocon	Jul-2011	1900-2000 hrs
CDMA operators			
11	MTS	Jul-2011	1900-2000 hrs
12	Reliance Communication	Jul-2011	1900-2000 hrs
13	Tata Communications	Jul-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

3 days Live Data Audit		Bench- mark	Aircel	Airtel	BSNL	Etisalat	Idea	Rcom GSM	Tata GSM	Uninor	Videocon	Vodafone	Rcom CDMA	Tata CDMA	MTS
S/ N	Name of Parameter		GSM Operators									CDMA			
1	Network Availability														
	a) BTS Accumulated Downtime	<=2%	0.20%	0.09%	0.08%	0.30%	0.02%	0.00%	0.10%	0.02%	0.05%	0.25%	0.11%	0.01%	0.12%
	b) Worst affected BTSs due to downtime	<=2%	0.00%	0.04%	1.25%	0.00%	0.00%	0.00%	0.07%	0.00%	0.00%	0.00%	0.05%	0.00%	0.20%
2	Connection Establishment (Accessibility)														
	a) CSSR (Call Setup Success Rate)	>=95%	99.61%	98.45%	99.00%	99.84%	98.10%	99.68%	98.70%	95.97%	98.12%	97.83%	99.69%	99.37%	98.33%
	b) SDCCH/PAGING congestion	<=1%	0.03%	0.60%	0.03%	0.00%	0.35%	0.01%	0.06%	0.02%	0.23%	0.20%	0.00%	0.00%	0.00%
	c) TCH congestion	<=2%	0.08%	0.33%	0.26%	0.00%	0.52%	0.23%	1.68%	0.00%	0.00%	1.48%	0.02%	0.00%	0.34%
3	Connection maintenance (retainability)														
	a) CDR	<=2%	0.42%	0.70%	1.15%	0.36%	1.09%	0.30%	0.79%	1.12%	0.59%	0.79%	0.31%	0.09%	0.83%
	b) Worst affected cells>3% TCH drop	<=3%	1.97%	NP	2.25%	9.52%	1.12%	0.94%	5.87%	2.03%	0.00%	2.35%	0.73%	0.24%	4.40%
	c) Good voice quality	>=95%	98.66%	NP	NP	98.81%	97.05%	99.11%	97.76%	98.69%	99.78%	98.73%	NP	NP	98.25%
4	No. of POI having >=0.5% congestion	<0.5%	0	0	0	0	1	0	0	1	0	0	0	NP	0
5	Response time to customers for assistance														
	a) Accessibility of call centre/Customer Care	>=95%	100%	NP	100%	100%	98.00%	99.30%	100%	NP	NP	NP	98.42%	95.03%	95.49%
	b) % call answered by operators(voice to voice) within 60 sec.	>=90%	99.50%	96.95%	94.95%	100%	87.00%	63.01%	97.70%	NP	NP	99.00%	69.99%	99.15%	91.53%

NA: Not Applicable, NP: Not Provided

Note: Bangalore city data is not included in case of BSNL.

From the 3 days live data assessment, it is found that most of the operators are meeting the network parameters , except the following:

- Worst affected cells >3% TCH drop is not meet by Etisalat , Tata GSM & MTS CDMA
- “%age of connections with Good Voice quality” data has not been provided by Airtel, while BSNL, Rcom CDMA &Tata CDMA have declared that this parameter is not system generated.
- Idea & Uninor have 1 POI each with >=0.5% congestion.

One Month Data Audit															
S/N	Name of Parameter	Bench mark	Aircel	Airtel	BSNL	Etisalat	Idea	Rcom GSM	Tata GSM	Uninor	Videoc on	Vodafo ne	Rcom CDM A	Tata CDM A	MTS
(A)	Network Service Quality Parameter														
1	Network Availability														
	a) BTS Accumulated Downtime	<=2%	0.23%	0.16%	0.12%	0.60%	0.05%	0.00%	0.05%	0.02%	0.12%	0.46%	0.07%	0.01%	0.22%
	b) Worst affected BTSs due to downtime	<=2%	1.23%	0.04%	1.94%	0.00%	0.17%	0.16%	0.07%	0.00%	0.00%	0.00%	0.10%	0.00%	0.30%
2	Connection Establishment (Accessibility)														
	a) CSSR (Call Setup Success Rate)	>=95%	99.41%	98.62%	99.00%	99.65%	97.87%	99.72%	98.03%	98.97%	97.94%	98.61%	99.83%	99.41%	97.62%
	b) SDCCH/PAGING congestion	<=1%	0.03%	0.39%	0.05%	0.00%	0.26%	0.03%	0.05%	0.03%	0.13%	0.16%	0	0	0
	c) TCH congestion	<=2%	0.08%	0.39%	0.33%	0.00%	0.73%	0.14%	0.43%	0.01%	0.00%	0.93%	0.01%	0.00%	0.98%
3	Connection maintenance (retainability)														
	a) CDR	<=2%	0.41%	0.78%	1.11%	0.45%	1.10%	0.30%	0.89%	1.04%	0.90%	0.78%	0.31%	0.09%	0.83%
	b) Worst affected cells>3% TCH drop	<=3%	1.35%	2.93%	2.13%	5.22%	1.09%	0.97%	3.22%	1.76%	0.00%	2.26%	0.83%	0.26%	4.54%
	c) Good voice quality	>=95%	98.56%	98.88%	NP	98.84%	97.03%	99.11%	97.60%	98.70%	99.41%	98.68%	NP	NP	98.26%
4	No. of POI having >=0.5% congestion	<0.5%	0	0	0	0	1	0	0	3	0	0	0	0	0
(B)	Customer Service Quality Parameters														
5	Metering/billing credibility-Post paid	<=0.1%	0.05%	0.02%	0.03%	NA	0.22%	0.10%	0.87%	NA	NA	0.08%	0.07%	0.01%	NA
6	Metering /billing credibility-Pre paid	<=0.1%	0.05%	0.00%	0.02%	0.00%	0.33%	0.07%	0.06%	0.01%	0.00%	0.08%	0.03%	0.07%	0.02%
7	Resolution of billing/ charging complaints	100% within 4 weeks	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%
8	Response time to customers for assistance														
	a) Accessibility of call centre/Customer Care	>=95%	100%	95.00%	100%	100%	96.00%	99.41%	100%	97.02%	100%	100%	98.40%	98.64%	95.18%
	b) % call answered by operators(voice to voice) within 60 sec.	>=90%	96.50%	89.60%	94.00%	100%	75.00%	51.50%	94.22%	87.08%	100%	99.00%	61.76%	93.21%	90.79%
9	Termination/closure of service	<=7days	89.67%	100%	93%	NA	94.89%	100%	100%	NA	NA	100%	100%	100%	NA
10	Time taken for refunds of deposits after closures.	100% within 60 days	100%	100%	100%	NA	100%	100%	100%	NA	NA	NP	100%	99%	NA

NA: Not Applicable, NP: Not Provided

Note: Bangalore city data is not included in case of BSNL.

From the month data assessment, it is found that all the operators are meeting the prescribed benchmarks for network & customer service quality parameters, except for the following:

- Worst affected cells >3% TCH drop is not meet by MTS, Etisalat &Tata GSM
- Idea & Uninor have 1 & 3 POIs respectively with congestion $\geq 0.5\%$.
- Metering & billing credibility for post-paid connections below benchmark in case of Idea & Tata GSM, while similar result was found for Idea once again in case of pre-paid connections.
- “% of calls answered by operator with in 60Secs” is low in case Airtel, Idea, Uninor and Rcom GSM & CDMA, and Uninor.
- The 100% benchmark for “Termination/Closure of service within 7 days” is not meet by Aircel, BSNL & Idea.

Operator-Assisted Drive Test

The Operator Assisted Drive Test was conducted at Karnataka for all the operators. Route covered was about around 80-100Km depending on city areas within the speed limit of 30Km/hr. The cities covered were Belgaum, Hubli-Dharwar and Gulbarga. In all the cities, zones were selected for covering different density areas (High, Medium & Low dense areas).

SN	Parameter	City Name	Aircel	Airtel	BSNL	Idea	Rcom GSM	Tata GSM	Uninor	Vodafone	Rcom CDMA	Tata CDMA	MTS
			GSM Operators							CDMA Operators			
1.1	Blocked Call Rate (<=3%)	Belgaum	0.00%	3.06%	0.89%	0.62%	0.00%	0.48%	0.00%	9.94%	0.57%	0.00%	1.09%
		Gulbarga	0.00%	6.45%	1.95%	0.70%	0.00%	0.00%	0.57%	5.42%	0.00%	0.00%	3.66%
		Hubli-Dharwar	0.00%	5.31%	0.38%	0.84%	0.00%	0.23%	0.00%	3.54%	0.00%	0.00%	1.47%
1.2	Dropped Call Rate (<=2%)	Belgaum	1.03%	3.16%	0.90%	1.26%	0.00%	2.86%	0.00%	1.38%	0.00%	0.00%	1.10%
		Gulbarga	0.64%	0.57%	0.66%	0.70%	0.00%	0.00%	0.00%	0.00%	0.00%	0.57%	0.00%
		Hubli-Dharwar	0.33%	0.00%	0.00%	0.00%	0.00%	0.92%	0.00%	0.00%	0.00%	1.56%	0.37%
1.3	Percentage of connections with good voice quality (=>95%)												
	(i) 0-4 (w/o frequency hopping)	Belgaum									98.38%	99.14%	99.53%
		Gulbarga									98.19%	97.91%	99.55%
		Hubli-Dharwar									97.82%	99.36%	99.59%
	(ii) 0-5 (with frequency hopping)	Belgaum	98.18%	88.41%	96.67%	93.79%	95.08%	88.13%	97.16%	90.06%			
		Gulbarga	98.53%	87.61%	96.10%	94.65%	95.16%	90.69%	96.53%	96.05%			
Hubli-Dharwar		98.29%	90.51%	96.17%	95.95%	96.00%	91.53%	96.21%	95.44%				
1.4	Call Setup Success Rate (>=95%)	Belgaum	100%	96.94%	99.11%	99.38%	100%	99.52%	100%	90.06%	99.43%	100%	98.91%
		Gulbarga	100%	93.55%	98.05%	99.30%	97.59%	100%	99.43%	94.58%	100%	100%	96.34%
		Hubli-Dharwar	100%	94.69%	99.62%	99.16%	98.94%	99.77%	100%	96.46%	100%	100%	98.53%

Key observations as could be derived from the table are as under:

1. Blocked Call Rate benchmark is not meet by Airtel & Vodafone in all the 3 cities and by MTS in Gulbarga.
2. "Percentage of connection with good voice quality" benchmark is not meet by Airtel & Tata GSM in all the 3 cities, by Idea in Belgaum & Gulbarga and by Vodafone in Belgaum.
3. Dropped call Rate parameter is not meet by Airtel & Tata GSM in Belgaum city.
4. Call success rate is not meet by Airtel in Gulbarga & Hubli-Dharwar and by Vodafone in Belgaum & Gulbarga.

(B) Basic Telephone Service (Wireline) Providers**3 Days Live Data Audit**

S/N	Name of Parameter	Bench mark	AIRTEL	BSNL	RCOM	TTSL
1	Network Parameters					
a	Call Completion Rate	>= 55% (CCR) & >=75% (ASR)	93.28%	54.89%	86.02%	63.29%
b	POI Congestion	<= 0.5%	0	0	0	0
2	Response Time to the customer for assistance					
a	Accessibility of Call Centre/Customer Care					
	within 40 seconds	>= 95%	86.23%	99.91%	98.00%	98.17%
b	% age of calls answered by operator(voice to voice):					
	within 60 seconds	>= 90%	97.27%	96.32%	93.25%	94.26%

From the 3 days live data audit, it was observed that all the operators meet the benchmarks for all the parameters except for BSNL not meeting CCR. There is no congestion found on the network. The customer care parameters, except accessibility of call centre in case of Airtel, also indicate above benchmark performance for the operators.

One Month Data Audit

S/N	Name of Parameter	Bench mark	AIRTEL	BSNL	RCOM	TTSL
1	(No. of faults/100 subscribers /month)	<= 5%	2.24%	4.22%	0.22%	0.19%
2	Fault repair by next working day(Urban Area)					
a	By next working day	>=90%	98.86%	92.79%	100%	84.42%
b	Within 3 days	100%	100%	99.32%	100%	96.98%
3	Fault repair by next working day(Rural & hilly Area)					
a	By next working day	>90%	NA	95.93%	NA	0.00%
b	Within 5 days	100%	NA	98.55%	NA	98.99%
4	Rent rebate					
a	Fault pending > 3 days & <7 days	Rebate for 7 days	0	398	0	0
b	Fault Pending > 7 days & < 15 days	Rebate for 15 days	0	7	0	0
c	Fault pending > 15 days	Rebate for one month	0	238	0	0
5	Mean time to Repair(MTTR)	<= 8 Hrs	2.6	5.52	2.3	7.17
6	Call Completion Ratio (CCR) & Answer to seizure Ratio (ASR)	>= 55% (CCR) & >= 75% (ASR)	92.62%	47.31%	85.63%	63.24%
7	Metering and billing credibility(post paid)					
a	Disputed Bills over bills issued	< =0.1%	0.00%	0.01%	0.00%	0.01%
8	% of billing complaints resolved within 4 weeks	Within 4 weeks	100%	99.92%	100%	100%
a	Period of refunds after resolution of complaints within 1 weeks	Within 1 weeks	100%	100%	100%	100%
9	POI Congestion	<= 0.5%	0	0	0	0
10	Response Time to customer for assistance					
a	Accessibility of Call centre within 40 sec.	>= 95%	92.26%	99.87%	96.00%	98.70%
b	% age of calls answered by operator(voice to voice) within 60 sec.	>= 90%	97.99%	95.33%	90.00%	94.92%
11	Customer care(promptness in attending to customers request)					
a	Termination / Closures	<= 7 Days	100%	97.99%	100%	100%
b	Time taken refunds deposit after closures	100% within 60 days	98%	97.99%	100%	100%

From the Month data table, it can be observed that all the operators are meeting the parameters except a few deviations. TTS is not meeting the benchmark for fault repair parameter. BSNL has a value slightly lower than the benchmark for fault repair within 3 days. BSNL is not meeting this benchmark only in case of rural/hilly areas for fault repair within 5 days. CCR is very low in case of BSNL. Also, for the parameter “%age of billing complaints resolved within 4 weeks”, BSNL has a

value slightly lower than the benchmark. “Accessibility of call centre within 40 sec” is low in case of Airtel. Airtel & BSNL take more than 60 days to refund after closure of service. BSNL is also taking more than 7 days for closure of service.

(C) Broadband Service Providers

3 Days Live Data Audit

S/N	Name of Parameter	Bench mark	BSNL	Airtel	RCom	TCL	Yutele	Hathway	Sify	TTSL	Tikona	Spectranet
1	Response time to the customer for assistance % age of calls answered by operator (Voice to Voice)											
	Within 60 seconds	>60%	78.30%	86.50%	88%	93.70%	92%	48.40%	98.99%	49.00%	NP	93.60%
	Within 90 seconds	>80%	NP	91.54%	NP	NP	97%	52.47%	99.37%	54.00%	NP	93.60%
2	Bandwidth Utilization/ Throughput:											
	i) POP to ISP Gateway Node [Intra-network] Link(s)	<80%	29.00%	4.00%	47.30%	37.00%	NA	7.00%	70.70%	22.76%	37.93%	6.6%
	ii) ISP Gateway Node to IGSP / NIXI Node upstream Link(s) for International connectivity	<80%	80.71%	65.20%	46.10%	50.00%	55.55%	65.00%	65.92%	87.27%	87.03%	77.2%
3	Broadband Connection Speed (download)	>80%	86.65%	100%	100%	89.00%	97.03%	94%	94.00%	95.00%	100%	92.10%
4	Service Availability (%)	>98%	99.09%	100%	NP	99.72%	100%	99%	99.99%	100%	99.08%	NP
5	Packet Loss	<1%	0%	0%	0%	0%	0%	0%	0%	0.02%	0%	0%
6	Network Latency (for wired broadband access)											
	Network Latency at POP / ISP Gateway Node to International Gateway (IGSP/NIXI)	<120ms	0	81.67	NP	21.7	4	1.72	44.5	67.66	1.55	2.9
	Network Latency at ISP Gateway Node to International nearest NAP port abroad	<350ms	231	270	53.5	281.7	223.33	238	248.33	140	237.3	263
	User reference point at ISP Gateway Node to International nearest NAP port abroad (Satellite)	<800ms	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

For the parameter Response Time to Customers, Hathway & TTSL are not meeting the benchmark.
BSNL, TTSL & Tikona are not meeting the benchmark for the parameter Bandwidth utilization (ISP Gateway Node to IGSP/NIXI node)

One Month Data Audit

S/N	Name of Parameter	Bench- mark	BSNL	Airtel	RCom	TCL	Yutele	Hathway	Sify	TTSL	Tikona	Spectranet
1	Service Provisioning /Activation Time											
	100% cases in 15 days (subject to technical feasibility)	100%	100%	100%	100%	99.63%	100%	94.40%	100%	100.00%	NP	99.12%
2	Fault Repair / Restoration Time											
	By next working day:	>90%	93.64%	97.15%	100%	94%	91.62%	91.00%	91.80%	87.69%	NP	98.70%
	within 3 working days:	99%	99.29%	99.94%	100%	99%	98.36%	97.00%	93.20%	93.85%	NP	100%
3	Rebate:											
	Faults Pending for > 3 working days and < 7 working days:		78	2	0	17	7	389	15	0	NP	0
	Faults Pending for > 7 working days and < 15 working days:		71	0	0	0	2	14	8	4	NP	0
	Faults Pending for > 15 working days:		131	0	0	0	0	1	0	1	NP	0
4	Billing Performance											
	Billing complaints per 100 bills issued	<2%	0.07%	0.00%	0.10%	0.14%	0.28%	1.82%	NA	0.01%	NP	0
	%age of Billing Complaints resolved	100% within 4 weeks	100%	100%	100%	100%	100%	100%	NA	100%	NP	100%
	Time taken for refund of deposits after closure:	100% within 60 days	100%	100%	100%	100%	100%	100%	NA	100%	NP	NP
5	Response time to the customer for assistance % age of calls answered by operator (Voice to Voice)											
	Within 60 seconds	>60%	86.60%	69.25%	93%	95.00%	96.00%	51%	94.97%	53%	NP	92.75%
	Within 90 seconds	>80%	96.20%	75.27%	NP	NP	96.00%	55%	97.15%	72%	NP	92.75%
7	Bandwidth Utilization/ Throughput:											
	i) POP to ISP Gateway Node [Intra-network] Link(s)	<80%	29.25%	3.90%	39.40%	39.00%	NA	7.00%	69.00%	27.60%	54.98%	6.60%
	ii) ISP Gateway Node to IGSP /	<80%	77.17%	70.00%	34.32%	51.00%	55.55%	72.50%	67.40%	80.52%	84.58%	76.80%

S/N	Name of Parameter	Bench- mark	BSNL	Airtel	RCom	TCL	Youtele	Hathway	Sify	TTSL	Tikona	Spectranet
	NIXI Node upstream Link(s) for International connectivity											
8	Broadband Connection Speed	>80%	86.65%	100%	NP	91.68%	92.85%	96.00%	94.70%	94.50%	100%	92.80%
9	Service Availability / Uptime (for all users)											
10	Service Availability / Uptime	>98%	99.54%	99.98%	99.99%	99.85%	98.70%	99.00%	98.66%	99.93%	98.81%	98.92%
11	Packet Loss	<1%	0%	0%	0.11%	0%	0.30%	0%	0%	0%	0%	0%
12	Network Latency (for wired broadband access)											
	User reference point at POP / ISP Gateway Node to International Gateway (IGSP/NIXI)	<120 ms	21	82	89.70	24	5.71	1.5	44.5	66.87	1.47	2.5
	User reference point at ISP Gateway Node to International nearest NAP port abroad (Terrestrial)	<350 ms	225	268	59.7	275	228.42	238	248.33	133	237	255
	User reference point at ISP Gateway Node to International nearest NAP port abroad (Satellite)	<800 ms	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

TCL, Spectranet & Hathway have taken more than 15 days in for Service provisioning in some cases. Airtel, Hathway & TTSL are having deviations in case of “Response time to customer” parameters. Tikona & TTSL have more than 80% Bandwidth utilization in case of ISP gateway to IGSP/NIXI node upstream links for International connectivity.

CHAPTER-3: AUDIT-PMR VERIFICATION

I. Cellular Mobile Telephone Service

PMR		Bench- mark	Audit	Aircel	Airtel	BSNL	Etisalat	Idea	Rcom GSM	Tata GSM	Uninor	Videocon	Vodafone	Rcom CDMA	Tata CDMA	MTS
S/N	Name of Parameter			GSM Operators									CDMA Operators			
(A)	Network Service Quality Parameter															
1	Network Availability															
	BTS Accumulated Downtime	<=2%	Reported	0.02%	0.15%	1.15%	0.25%	0.03%	0.13%	0.05%	0.03%	0.00%	0.06%	0.08%	0.01%	0.14%
			Verified	0.02%	NP	NP	0.25%	0.03%	0.13%	0.05%	0.03%	0.03%	0.01%	0.08%	0.01%	NP
	Worst affected BTSs due to downtime	<=2%	Reported	0.00%	0.01%	1.86%	0.00%	0.03%	0.31%	0.00%	0.00%	0.00%	0.00%	0.03%	0.00%	0.07%
			Verified	0.00%	NP	NP	0.00%	0.05%	0.31%	0.09%	0.00%	0.00%	0.00%	0.03%	0.00%	NP
2	Connection Establishment (Accessibility)															
	CSSR (Call Setup Success Rate)	>=95%	Reported	99.15%	99.22%	98.70%	99.52%	99.83%	99.51%	97.50%	99.26%	98.59%	99.33%	99.59%	99.85%	98.14%
			Verified	99.15%	NP	NP	99.53%	99.83%	99.51%	97.50%	99.26%	99.26%	99.33%	99.59%	99.85%	98.14%
	SDCCH/PAGING congestion	<=1%	Reported	0.05%	0.27%	0.28%	0.25%	0.07%	0.08%	0.34%	0.18%	0.39%	0.16%	0.00%	0.00%	0.00%
			Verified	0.05%	NP	0.28%	0.25%	0.10%	0.08%	0.34%	0.18%	0.18%	0.13%	0.00%	0.00%	0.00%
	TCH congestion	<=2%	Reported	0.04%	0.34%	0.70%	0.01%	0.47%	0.25%	0.57%	0.01%	0.12%	0.32%	0.08%	0.01%	0.29%
			Verified	0.04%	NP	NP	0.01%	0.50%	0.25%	0.57%	0.01%	0.01%	0.31%	0.08%	0.01%	0.29%
3	Connection maintenance (retainability)															
	CDR	<=2%	Reported	0.49%	1.00%	1.07%	0.44%	1.26%	0.48%	1.01%	0.42%	1.02%	0.72%	0.49%	0.06%	0.63%
			Verified	0.49%	NP	NP	0.44%	1.26%	0.48%	1.01%	0.42%	0.42%	0.60%	0.49%	0.06%	0.63%
	Worst affected cells>3% TCH drop	<=3%	Reported	1.33%	3.73%	4.46%	4.37%	3.96%	3.13%	4.32%	0.27%	0.00%	4.52%	1.38%	0.00%	1.81%
			Verified	1.33%	NP	NP	4.37%	3.53%	3.13%	4.32%	0.27%	0.27%	4.98%	1.38%	0.00%	NP
	Good voice quality	>=95%	Reported	98.24%	98.77%	98.77%	99.02%	96.87%	97.82%	96.96%	98.76%	95.89%	98.82%	98.67%	99.87%	99.87%
			Verified	98.21%	NP	NP	99.02%	96.87%	97.82%	96.96%	98.76%	98.76%	98.82%	98.67%	99.87%	99.87%
4	POI congestion	<=0.5%	Reported	0	0	0	0	0	0	0	1	0	0	0	0	0
			Verified	0	NP	NP	0	0	0	1	1	0	0	0	0	0
(B)	Customer Service Quality Parameters															
5	Metering/billing credibility-Post paid	<= 0.1%	Reported	0.04%	0.03%	0.00%	NA	NR	0.00%	0.06%	NA	NA	0.10%	0.00%	0.01%	0.00%
			Verified	0.04%	NP	NP	NA	0.09%	0.00%	0.06%	NA	NA	0.08%	0.00%	0.00%	NA
6	Metering /billing credibility-Pre paid	<= 0.1%	Reported	0.10%	0.00%	0.02%	0.00%	NR	0.04%	0.00%	0.00%	0.10%	0.05%	0.02%	0.10%	0.09%
			Verified	0.07%	NP	NP	0.00%	0.04%	0.04%	0.00%	0.00%	0.02%	0.05%	0.00%	0.02%	0.08%
7	Resolution of billing/charging complaints	100% within 4 weeks	Reported	100%	100%	100%	100%	NR	100%	100%	100%	100%	100%	100%	100%	100%
			Verified	100%	NP	NP	100%	85%	100%	100%	100%	100%	100%	100%	100%	100%
	Period of applying credit/waiver/adjustment to the customers account from the date of resolutions of complaints	<=1 week	Reported	100%	100%	100%	NA	NR	100%	100%	NA	100%	100%	100%	100%	100%
			Verified	100%	NP	NP	NA	100%	100%	100%	NA	100%	100.00%	100%	100%	100%
8	Response time to customers for assistance															
	Accessibility of call centre/Customer Care	>=95%	Reported	100%	98.00%	98.00%	99.24%	NR	100%	100%	97.56%	97.30%	100%	100%	97.00%	96.00%
			Verified	100%	NP	NP	99.24%	99	100%	100%	97.56%	100%	100%	100%	97.00%	NP

	% call answered by operators(voice to voice) within 60 sec.	>=90%	Reported	89.23%	82.00%	91.00%	98.43%	NR	85.00%	87.00%	90.49%	92.00%	74.00%	94.00%	93.00%	97.30%
			Verified	83.59%	NP	NP	98.43%	37.00%	85.00%	87.00%	90.49%	100%	74.00%	94.00%	93.00%	91.22%
9	Termination/closure of service															
	No.of requests for Termination / Closure of service complied within 7 days during the quarter(BM 100%)	<=7days	Reported	100%	100%	100%	NA	NR	100%	100%	NA	NA	100%	100%	100%	0.00%
			Verified	100%	NP	NP	NA	63.00%	100%	100%	NA	NA	100%	100%	100%	NA
10	Time taken for refunds of deposits after closures.	100% within 60 days	Reported	100%	100%	100%	NA	NR	100%	100%	NA	NA	100%	100%	99%	0.00%
			Verified	100%	NP	NP	NA	NP	100%	100%	NA	NA	100%	100%	98%	NA

The PMR figures provided by all the operators were verified/checked and minute variations were found, which are marked above.

II. Basic Telephone (Wireline) Service-PMR

S/N	Parameters	Bench-marks	Audit	AIRTEL	BSNL	RCOM	TTSL
1	<i>Fault incidences</i>						
	(No. of faults/100 subscribers /month) Benchmark <5%	< 5%	Reported	2.82%	4.28%	0.24%	0.40%
			Verified	2.82%	4.28%	0.24%	0.40%
2	<i>Faults Repair/Restoration Time</i>						
	Fault repair by next working day(Urban Area) Benchmark >90%	>90%	Reported	97.46%	93.73%	100%	97.56%
			Verified	97.46%	93.81%	100%	97.56%
	Within 3 days .Benchmark 100%	100%	Reported	97.46%	93.73%	100%	97.56%
			Verified	100%	97.35%	100%	100%
	Within 5 days (Hilly & Rural Area) Benchmark 100%	100%	Reported	NA	95.85%	NA	100%
			Verified	NA	95.84%	NA	100%
	Mean time to Repair(MTTR).Benchmark <=8 hrs	≤8 Hrs	Reported	2.64	5.58	2.23	3.11
			Verified	2.64	5.58	2.23	3.11
3	<i>Rent Rebate</i>						
	Rent Rebate		Reported	Nil	Nil	Nil	Nil
			Verified	Nil	Nil	Nil	Nil
4	<i>Call Completion Ratio(CCR) & Answer to seizure Ratio(ASR)</i>						
	CCR & ASR. Benchmark >55% & >75%	> 55%(CCR) & > 75%(ASR)	Reported	88.62%	66.22%	NA	98.69%
			Verified	88.62%	63.17%	79.07%	98.69%
5	<i>Metering & Billing Performance</i>						
	Metering & Billing Credibility-Post paid. Benchmark 0.1%	< 0.1%	Reported	0.01%	NR	0.02%	0.05%
			Verified	0.01%	NP	0.02%	0.05%
	Metering & Billing Credibility-Pre paid Benchmark 0.1%	100%	Reported	NA	NR	NR	NA
			Verified	NA	NA	NA	NA
	Resolution of billing charging/validity/Complaints within 4 weeks Benchmark 100%	100%	Reported	100%	NR	100%	100%
			Verified	100%	NR	100%	100%
	Period of all refunds/payments from the date of resolution of complaints within 1 weeks	100%	Reported	100%	NR	100%	100%
			Verified	100%	NR	100%	100%

S/N	Parameters	Bench-marks	Audit	AIRTEL	BSNL	RCOM	TTSL
6	<i>POI Congestion</i>						
	POI Congestion (%)	≤ 0.5%	Reported	0	0	0	0
			Verified	0	3	0	0
7	<i>Response Time to customer for assistance</i>						
	Accessibility of Call centre/customer Care within 40 seconds. Benchmark >95%	≥95%	Reported	99.92%	94.31%	97.99%	95.80%
			Verified	99.92%	95.76%	98.00%	95.80%
	% age of calls answered by operator(voice to voice) within 60 seconds. Benchmark >90%	≥90%	Reported	88.61%	90.72%	95.99%	90.05%
			Verified	88.61%	99.83%	96.00%	90.05%
8	<i>Customer care(promptness in attending to customers request</i>						
	Termination / Closures. Benchmark ≤7 days	100%	Reported	100%	100%	100%	100%
			Verified	100%	100%	100%	100%
	Time taken for refunds of deposit after closures. Benchmark 100% with in 60 days.	100%	Reported	99.85%	100%	100%	100%
			Verified	99.85%	100%	100%	100%

NA – Not Applicable NP – Data Not Provided

The PMR figures provided by all the operators were verified/checked and minute variations were found, which are marked above.

III. Broadband Service-PMR

S/N	Parameters	Bench- marks	Audit Period	BSNL	Airtel	Rcom (AI)	TCL(AI)	Youtele	Tikona (AI)	Sify (AI)	Spectranet	Hathway
1	Service Provisioning/Activation Time											
1.2	%age of connections provided within 15 days of registration of demand	100%	Reported	99.70%	100%	100%	100%	100%	100%	100%	99.28%	100%
			Verified	99.66%	100%	100%	100%	NP	100%	NP	NP	100%
2	Faults Repair/Restoraion Time											
2.1	% of faults repaired by next working day	>90%	Reported	96.10%	100%	100%	99%	98.00%	100.00%	90%	99%	98%
			Verified	96.37%	97%	100%	99%	NP	86.51%	NP	NP	98%
2.2	% of faults repaired within 3 working day	≥99%	Reported	99.80%	100%	100%	100%	100.00%	91.81%	99%	100%	100%
			Verified	99.80%	100%	100%	100%	NP	91.81%	NP	NP	100%
3	Rent Rebate											
3.1	Rent Rebate(nos)		Reported	379	0	0	741	2	7150	206	0	125
			Verified	0	0	0	741	NP	7150	NP	NP	125
4	Billing Performance											
4.1	%age of bills disputed	<2%	Reported	0.10%	0.01%	0.09%	1.00%	0.25%	5.51%	NA	0%	0.89%
			Verified	0.12%	0.01%	0.09%	0.00%	NP	5.51%	NP	NP	0.89%
4.2	%age of complaints resolved within 4 weeks	100%	Reported	100%	100%	100%	100%	33%	98.59%	NA	NA	100%
			Verified	99.93%	100%	100%	100%	NP	98.59%	NP	NP	100%
4.3	%age of cases to whom refund of deposits is made within 60 days of closures	100%	Reported	100%	100%	100%	93.65%	100%	100%	0%	NA	100%
			Verified	100%	100%	100%	100%	NP	100%	NP	NP	100%
5	Response Time to the Customer for assistance											
5.1	%age of calls answered by operator (Voice to voice) within 60 sec	>60%	Reported	86.40%	75%	96%	93.65%	59%	80.67%	85%	100%	89%
			Verified	86.37%	75%	96%	93.65%	NP	80.67%	NP	NP	89%
5.2	%age of calls answered by operator (Voice to voice) within 90 sec	>80%	Reported	95.40%	82.00%	98%	94.77%	65%	83.00%	92%	100%	92%
			Verified	95.37%	82.00%	98%	94.77%	NP	83.00%	NP	NP	92%
6	Bandwidth utilisation/throughput											
6.1	No. of Intra network links having Bandwidth utilisation >90% during peak hours (TCBH)		Reported	NP	0	0	0	NA	19	0	0	0
			Verified	NP	0	0	0	NP	19	NP	NP	0
6.2	No. of Upstream links for		Reported	NP	0	0	39.51%	0	4	0	0	0

S/N	Parameters	Bench- marks	Audit Period	BSNL	Airtel	Rcom (AI)	TCL(AI)	Yotele	Tikona (AI)	Sify (AI)	Spectranet	Hathway
	International connectivity having BW utilisation >90% Peak Hrs.(TCBH)		Verified	NP	0	0	39.51%	NP	4	NP	NP	0
6.3	% International bandwidth utilization during peak hours (TCBH) (Enclose MRTG)	<90%	Reported	NP	58.60%	43.34%	39.51%	74.40%	74.66%	87%	73.00%	85%
			Verified	NP	58.60%	43.34%	39.51%	NP	74.66%	NP	NP	NP
6.4	Broadband Connection Speed available (download) from ISP node to user	>80%	Reported	92.40%	102%	92%	100%	86.03%	97%	95%	C/DNF	90%
			Verified	92.40%	102%	92	91%	NP	97%	NP	NP	NP
7	Service Availability/Uptime (for all users) in %age											
7.1	Service availability /uptime (for all users) in %age	>98%	Reported	99.90%	99.96%	99.71%	100%	98.86%	98.46%	100%	DNF	100%
			Verified	99.95%	99.96%	99.71%	100%	NP	98.46%	NP	NP	NP
8	Packet loss											
8.1	% of Packet loss	<1%	Reported	NP	0%	C/DNF	0.49%	0%	NP	C/DNF	C/DNF	0.99%
			Verified	NP	0%	<1%	0.49%	NP	NP	NP	NP	0.99%
9	Network latency (for wired broadband access)											
9.1	User reference point at POP/ISP Gateway node to IGSP/NIXI	<120 ms	Reported	NP	81 ms	DNF	50 ms	9ms	NP	C/DNF	C/DNF	80 ms
			Verified	NP	81 ms	<120 ms	50 ms	NP	NP	NP	NP	NP
9.2	User reference point at ISP Gateway node to International nearest NAP port abroad (terrestrial)	<350 ms	Reported	NP	298 ms	DNF	267 ms	260 ms	NP	C/DNF	C/DNF	320 ms
			Verified	NP	298 ms	<350 ms	267 ms	NP	NP	NP	NP	NP
9.3	User reference point at ISP Gateway node to International nearest NAP port abroad (satellite)	<800 ms	Reported	NP	NA	NA	NA	NA	NP	0	NA	NA
			Verified	NP	NA	NA	NA	NP	NP	NP	NP	NP

The PMR figures provided by all the operators were verified/checked and minute variations were found, which are marked above.

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	Benchmark	Aircel	Airtel	BSNL	Etisalat	Idea	Rcom GSM	Tata GSM	Uninor	Videoc on	Vodafo ne	Rcom CDM A	Tata CD MA	MTS	
			GSM Operators										CDMA			
A	Network Service Quality Parameter															
1	Network Availability															
	a) BTS Accumulated Downtime	<=2%	0.20%	0.09%	0.08%	0.30%	0.02%	0.00%	0.10%	0.02%	0.05%	0.25%	0.11%	0.01%	0.12%	
	b) Worst affected BTSs due to downtime	<=2%	0.00%	0.04%	1.25%	0.00%	0.00%	0.00%	0.07%	0.00%	0.00%	0.00%	0.05%	0.00%	0.20%	
	c) Total no. of BTSs in the licensed service area		2,838	8,154	3,804	21	4,611	3,165	4,610	2,164	30	7,583	1,961	900	975	
	d) Sum of downtime of BTSs in a month in hours i.e. total outage time of all BTSs in hours during a month		408.67	528.38	219.11	4.54	66.40	0	331.92	31.16	1.08	1,364.94	155.31	6.48	84.24	
	e) No. of BTSs having accumulated downtime of >24 hours in a month		0	3	48	0	0	0	3	0	0	0	1	0	2	
2	Connection Establishment (Accessibility)															
	a) CSSR	>=95%	99.61%	98.45%	99.00%	99.84%	98.10%	99.68%	98.70%	95.97%	98.12%	97.83%	99.69%	99.37%	98.33%	
	b) SDCCH/PAGING congestion	<=1%	0.03%	0.60%	0.03%	0.00%	0.35%	0.01%	0.06%	0.02%	0.23%	0.20%	0.00%	0.00%	0.00%	
	c) TCH congestion	<=2%	0.08%	0.33%	0.26%	0.00%	0.52%	0.23%	1.68%	0.00%	0.00%	1.48%	0.02%	0.00%	0.34%	
3	Connection maintenance															
	a) CDR	<=2%	0.42%	0.70%	1.15%	0.36%	1.09%	0.30%	0.79%	1.12%	0.59%	0.79%	0.31%	0.09%	0.83%	
	b) Cells having > 3% TCH drop	<=3%	1.97%	NP	2.25%	9.52%	1.12%	0.94%	5.87%	2.03%	0.00%	2.35%	0.73%	0.24%	4.40%	
	c) Good voice quality	>=95%	98.66%	NP	NP	98.81%	97.05%	99.11%	97.76%	98.69%	99.78%	98.73%	NP	NP	98.25%	
	d) No. of cells > 3% TCH drop		163	NP	249	6	154	89	799	130	0	522	14	7	142	
	e) Total no. of cells in the network		8,286	22,736	11,042	63	13,699	9,495	13,607	6,380	90	22,130	1,961	2,730	3,088	
4	No. of POI having	<0.5%	0	0	0	0	1	0	0	1	0	0	0	NP	0	

S/N	Name of Parameter	Benchmark	Aircel	Airtel	BSNL	Etisalat	Idea	Rcom GSM	Tata GSM	Uninor	Videoc on	Vodafo ne	Rcom CDM A	Tata CD MA	MTS
			GSM Operators										CDMA		
	>=0.5% congestion														
	b) Name of POI not meeting the benchmark		Nil	Nil	Nil	Nil	BSNL Cellone GMSC from Idea MSC4 GMSC	Nil	Nil	BSNL LI Access Bang (AXE) TG=4	Nil	Nil	Nil	NP	Nil
	c) Total No. of circuits on POI		82,722	3,041,135	35,429	1,236	115,010	91,405	4,354	18,299	509	107,115	91,406	54,199	37,420
	d) Avg No. of call attempts on POI		388,542	5,974,343	669,938	908	1,995,392	596,826	141,347	364,294	4	NP	596,826	NP	947,038
	e) Avg traffic served on POI (Erlang)		9,935	107,926	669,938	21	70,626	27,141	2,212	9,831	40	NP	27,141	NP	18,664
	f) Total number of working POI Service Area wise		39	158	37	27	52	140	6	49	16	164	140	151	53
	g) Equipped Capacity of Network in respect of Traffic in erlang		80,919	NP	238,405	466	145,156	NP	237,356	69,098	5,000	183,780	NP	257,152	50,400
	h) Total traffic handled in TCBH in erlang		16,657	NP	60,742	29	109,201	NP	99,031	19,207	6	138,049	NP	43,400	31,878
(B)	Customer Service Quality Parameters														
4	Response time to customers for assistance														
	a) Accessibility of call centre	>=95%	100%	NP	100%	100%	98.00%	99.30%	100%	NP	NP	NP	98.42%	95.03%	95.49%
	b) % of call answered by operators(voice to voice) within 60 sec	>=90%	99.50%	96.95%	94.95%	100%	87.00%	63.01%	97.70%	NP	NP	99.00%	69.99%	99.15%	91.53%
	c) Total No. of call attempts to call centre / customer care nos. during TCBH (Avg)		4,238	217,889	123,795	32	634,909	2,411,204	17,080	35,853	36	5,900	192,352	17,700	17723
	d) No. of calls connected and answered successfully to call centre / customer care nos. during TCBH (Avg)		451	156,853	42,562	14	47,174	204,679	4,629	10,242	7	2,841	95,205	4,685	847

Parameter-wise Findings (Live Data Assessment):

- **Call Setup Success Rate (CSSR)** (benchmark $\geq 95\%$): All operators are meeting the benchmark with values lying between 95.97% and 99.84%.
- **SDCCH/PAGING Channel congestion** (benchmark $\leq 1\%$): All operators are meeting the benchmark with values lying between 0.00% and 0.6%.
Note: CDMA operators have provided the data for Paging Channel congestion and GSM operators provided SDCCH Channel congestion.
- **TCH congestion** (benchmark $\leq 2\%$): All operators are meeting the benchmark with values lying between 0.00% and 1.68%.
- **Call Drop Rate (CDR)** (benchmark $\leq 2\%$): All operators are meeting the benchmark with values lying between 1.15% and 0.09%.
- **Cell exceeding 3% TCH drop** (benchmark $\leq 3\%$): Etisalat, Tata GSM & MTS do not meet the benchmark
- **Connections with good voice quality** (benchmark $\geq 95\%$): Airtel has not provided data while BSNL, Rcom CDMA & Tata CDMA have declared that this KPI value is not generated in the system. Rest of the operators meet the Benchmark.
- **POI Congestion** (benchmark $< 0.5\%$): All the operators are meeting the benchmark except Idea Uninor having 1 POI each with congestion $\geq 0.5\%$. There was no congestion found overall on the network, but cases were found where individual POIs are showing high utilization/usage, 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 (Electronically)** (benchmark $>95\%$): %): All the operators are meeting the benchmark with values 95.03% to 100%.
- **%age of call answered by operator (Voice to voice)** (benchmark >90): Except for Idea, Rcom GSM & RCom CDMA, all the operators are meeting the benchmark with values lying between 91.53% to 100%.

(2) Month Data Assessment & Summarized Findings

S/ N	Name of Parameter	Bench mark	Aircel	Airtel	BSNL	Etisalat	Idea	Rcom GSM	Tata GSM	Uninor	Videocon	Vodafone	Rcom CDMA	Tata CDMA	MTS	
			GSM Operators										CDMA Operators			
(A)	Network Service Quality Parameter															
1	Network Availability															
	a) BTS Accumulated Downtime	<=2%	0.23%	0.16%	0.12%	0.60%	0.05%	0.00%	0.05%	0.02%	0.12%	0.46%	0.07%	0.01%	0.22%	
	b) Worst affected BTSs due to downtime	<=2%	1.23%	0.04%	1.94%	0.00%	0.17%	0.16%	0.07%	0.00%	0.00%	0.00%	0.10%	0.00%	0.30%	
	c) Total no. of BTSs in the licensed service area		2,838	8,154	3,804	21	4,611	3,165	4,610	2,164	30	7,583	1,961	900	975	
	d) Sum of downtime of BTSs in a month in hours i.e. total outage time of all BTSs in hours during a month		4,816	718	1,916	85.96	1,604	3,462	1,594	342.18	27.70	25,996	1,016	63.98	1,614	
e) No. of BTSs having accumulated downtime of >24 hours in a month		35	3	74	0	8	5	3	0	0	0	2	0	3		
2	Connection Establishment (Accessibility)															
	a) CSSR (Call Setup Success Rate)	>=95%	99.41%	98.62%	99.00%	99.65%	97.87%	99.72%	98.03%	98.97%	97.94%	98.61%	99.83%	99.41%	97.62%	
	b) SDCCH/PAGING congestion	<=1%	0.03%	0.39%	0.05%	0.00%	0.26%	0.03%	0.05%	0.03%	0.13%	0.16%	0.00%	0.00%	0.00%	
c) TCH congestion	<=2%	0.08%	0.39%	0.33%	0.00%	0.73%	0.14%	0.43%	0.01%	0.00%	0.93%	0.01%	0.00%	0.98%		
3	Connection maintenance (retainability)															
	a) CDR	<=2%	0.41%	0.78%	1.11%	0.45%	1.10%	0.30%	0.89%	1.04%	0.90%	0.78%	0.31%	0.09%	0.83%	
	b) Worst affected cells>3% TCH drop	<=3%	1.35%	2.93%	2.13%	5.22%	1.09%	0.97%	3.22%	1.76%	0.00%	2.26%	0.83%	0.26%	4.54%	
	c) Good voice quality	>=95%	98.56%	98.88%	NP	98.84%	97.03%	99.11%	97.60%	98.70%	99.41%	98.68%	NP	NP	98.26%	
	d) Total No. of cells exceeding 3% TCH drop (call drop)		112	667	235	3	149	92	438	112	0	500	16	7	140	
e) Total no. of cells in the network		8,286	22,736	11,042	63	13,699	9,495	13,607	6,380	90	22,130	1,961	2,730	3,088		
4	No. of POI having >=0.5% congestion	<0.5%	0	0	0	0	1	0	0	3	0	0	0	0	0	
	b) Name of POI not meeting the benchmark		Nil	Nil	Nil	Nil	BSNL Cellone GMSC from Idea MSC4 GMSC	Nil	Nil	BSNL L1 Access Bang (AXE) TG=4	Nil	Nil	Nil	Nil	Nil	
	c) Total No. of call attempts on POI (Avg.)		402,194	5,491,498	710,754	984	2,195,351	580,572	147,675	349,983	167	2,394,280	580,572	790,540	790,540	
	d) Total traffic served on POI (Erlang) (Avg.)		10,719	104,397	14,234	21	75,654	25,383	2,365	9,603	37	59,166	25,383	54,764	20,716	
	e) Total No. of circuits on POI		82,722	3,041,135	35,429	1,236	115,010	91,405	4,354	18,299	509	107,115	91,406	54,199	37,420	
	f) Total number of working POI Service Area wise		39	158	37	27	52	140	6	49	16	164	140	151	53	
	g) Capacity of POI		82,315	236,209	32,755	913	108,752	83,467	4,166	16,431	329	102,319	83,467	50,466	35,963	

S/ N	Name of Parameter	Bench mark	Aircel	Airtel	BSNL	Etisalat	Idea	Rcom GSM	Tata GSM	Uninor	Videocon	Vodafone	Rcom CDMA	Tata CDMA	MTS	
			GSM Operators										CDMA Operators			
5	Network Data															
	a) Equipped Capacity of Network Erlang		80,919	NP	238,405	466	145,156	NP	237,356	69,098	5,000	183,780	NP	257,152	50,400	
	b) Total traffic in TCBH in erlang (Avg.)		16,657	NP	60,742	29	109,201	NP	99,031	19,207	6	138,049	NP	43,400	31,878	
	c) Total no. of customers served (as per VLR) on last day of the month		696,779	NP	3,294,952	2,502	4,184,459	NP	3,389,197	632,530	198	4402915	NP	770,055	1,079,037	
(B)	Customer Service Quality Parameters															
6	Metering/billing credibility-Post paid	$\leq 0.1\%$	0.05%	0.02%	0.03%	NA	0.22%	0.10%	0.87%	NA	NA	0.08%	0.07%	0.01%	NA	
	a) No. of bills issued during the period		7,580	862,823	134,951	NA	125,661	25,516	39,146	NA	NA	401,749	249,616	147,263	NA	
	b) No. of bills disputed including billing complaints during the period		4	160	39	NA	271	25	342	NA	NA	308	178	18	NA	
7	Metering /billing credibility-Pre paid	$\leq 0.1\%$	0.05%	0.00%	0.02%	0.00%	0.33%	0.07%	0.06%	0.01%	0.00%	0.08%	0.03%	0.07%	0.02%	
	a) No. of charging / credit / validity complaints during the quarter		843	125	868	0	1,426	3,384	3,862	164	0	5,016	926	257	354	
	b) Total no. of pre-paid customers at the end of the quarter		1,732,425	14,050,985	5,522,858	19,977	4,291,190	4,555,211	6,851,739	1,197,524	11,232	6,215,556	3,071,770	371,608	1,457,421	
8	Resolution of billing/ charging complaints	100% within 4 weeks	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		847	285	907	0	1697	3409	4204	164	0	5324	1104	3358	354	
	b) Total no. of billing (post paid) and charging, credit / validity (pre paid) complaints received during the quarter		847	285	907	0	1697	3409	4204	164	0	5324	1104	3358	354	
	c) No. of billing complaints (post paid) and charging, credit/ validity complaints (pre paid) resolved in favour of the customer during the quarter		786	285	905	0	58	214	12	164	0	5215	201	275	48	
	d) No. of complaints disposed on account of not considered as valid complaints during the quarter		61	285	2	0	16694	3195	4192	164	0	109	903	3086	306	

S/ N	Name of Parameter	Bench mark	Aircel	Airtel	BSNL	Etisalat	Idea	Rcom GSM	Tata GSM	Uninor	Videocon	Vodafone	Rcom CDMA	Tata CDMA	MTS
			GSM Operators										CDMA Operators		
	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%
9	Response time to customers for assistance														
	a) Accessibility of call centre/Customer Care	>=95 %	100%	95.00%	100%	100%	96.00%	99.41%	100%	97.02%	100%	100%	98.40%	98.64%	95.18%
	b) % call answered by operators(voice to voice) within 60 sec.	>=90 %	96.50%	89.60%	94.00%	100%	75.00%	51.50%	94.22%	87.08%	100%	99.00%	61.76%	93.21%	90.79%
	c) Total no. of call attempts to call centre & customer care nos. during TCBH (Avg.).		4,847	217,889	126,121	32	634,909	2,396,916	17,080	35,853	36	5,900	192,352	17,700	17,723
	d) No. of calls connected and answered successfully to call centre & customer care nos. during TCBH (Avg.).		452	4,862,458	44,057	14	1,462,408	204,679	4,629	10,242	7	3,178	95,205	7,150	847
10	Termination/closure of service	<=7 days	89.67%	100%	93%	NA	94.89%	100%	100%	NA	NA	100%	100%	100%	NA
	a) Total No. of requests for Termination / Closure of service received during the quarter		184	5,938	2,578	NA	352	95	600	NA	NA	7,156	636	2,692	NA
	b) No.of requests for Termination / Closure of service complied within 7 days during the quarter		165	5,938	2,398	NA	334	95	600	NA	NA	7,156	636	2,692	NA
11	Time taken for refunds of deposits after closures.	100% within 60 days	100%	100%	100%	NA	100%	100%	100%	NA	NA	NP	100%	99.00%	NA

Parameter-wise Findings (Month Data Assessment):

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

- **BTS accumulated downtime (benchmark $\leq 2\%$):** All operators are meeting the benchmark with values lying between 0.00% and 0.6%.
- **Worst affected BTSs due to downtime (benchmark $\leq 2\%$):** All operators are meeting the benchmark with values lying between 0% and 1.23%.
- **Call setup success rate (benchmark $\geq 95\%$):** All operators are meeting the benchmark with values lying between 97.62% and 99.83%.
- **SDCCH/PAGING Channel congestion (benchmark $\leq 1\%$):** All operators are meeting the benchmark with values lying between 0.0% and 0.39%.
Note: CDMA operators have provided the data for Paging Channel congestion and GSM operators provided SDCCH Channel congestion.
- **TCH congestion (benchmark $\leq 2\%$):** All operators are meeting the benchmark with values lying between 0.00% and 0.98%.
- **Call drop rate (benchmark $\leq 2\%$):** All operators are meeting the benchmark with values lying between 0.09% and 1.11%.
- **Cell exceeding 3% TCH drop (benchmark $\leq 3\%$):** All the operators are meeting the benchmark except Etisalat, Tata GSM & MTS.
- **Connections with good voice quality (benchmark $\geq 95\%$):** All operators are meeting the benchmark with values lying between 97.03% and 99.41%. In case of Tata CDMA, Rcom CDMA & BSNL, this KPI data is not generated in the system.
- **POI Congestion (benchmark $< 0.5\%$):** All the operators are meeting the benchmark except Idea and Uninor having 1 & 3 POIs respectively with congestion greater than 0.5%. There was no congestion found overall on the network, but cases were found where individual POIs are showing high utilization/usage, 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 in the range of 95% to 100%.
- **%age of call answered by operator (Voice to voice) (benchmark $>90\%$):** Except for Aircel, Rcom GSM, Rcom CDMA & Uninor, all other operators are meeting the benchmark with values lying between 90.79% and 100%.
- **Metering and billing credibility-Post paid (benchmark $\leq 0.1\%$):** All operators, except Idea & Tata GSM, are meeting the benchmark.
- **Metering and billing credibility-Pre paid (benchmark $\leq 0.1\%$):** Except for Idea, 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 except Aircel, BSNL & Idea.
- **Time taken for refunds of deposits after closures (benchmark 100% within ≤ 60 days):** All operators have satisfied the benchmark except Tata CDMA. Vodafone has not provided data.

(3) Sample Coverage

Switches/BSC/BTS details of operators:

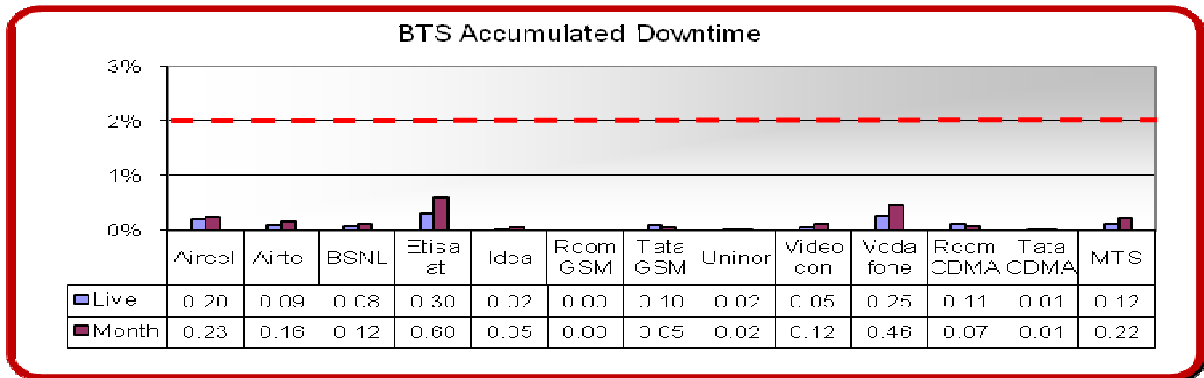
	Name of Service Provider	No. of MSC/GMSC/ MGW/MSC-server/GMGW	No. of BSC	No. of BTS
GSM Operators				
1	Aircel Ltd	11	20	2838
2	Airtel Ltd	41	97	8154
3	BSNL	37	57	4461
4	Reliance Communication	8	18	3165
5	Tata Communications	18	32	4608
6	Uninor	8	13	2164
7	Idea	23	48	4649
8	Vodafone	37	103	7624
9	Etisalat	11	6	21
10	Videocon	1	2	30
CDMA Operators				
11	Reliance Communication	20	6	1961
12	Tata Communications	9	11	900
13	MTS	3	4	996

(4) Performance (Graphical Representation)

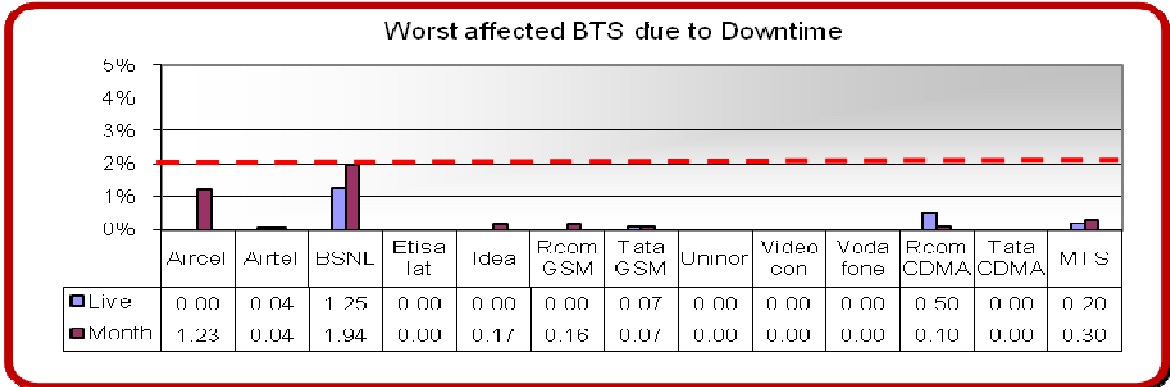
Comparison between Live measurements and One month data Audit – Cellular Mobile Telephone Services

A) NETWORK PERFORMANCE

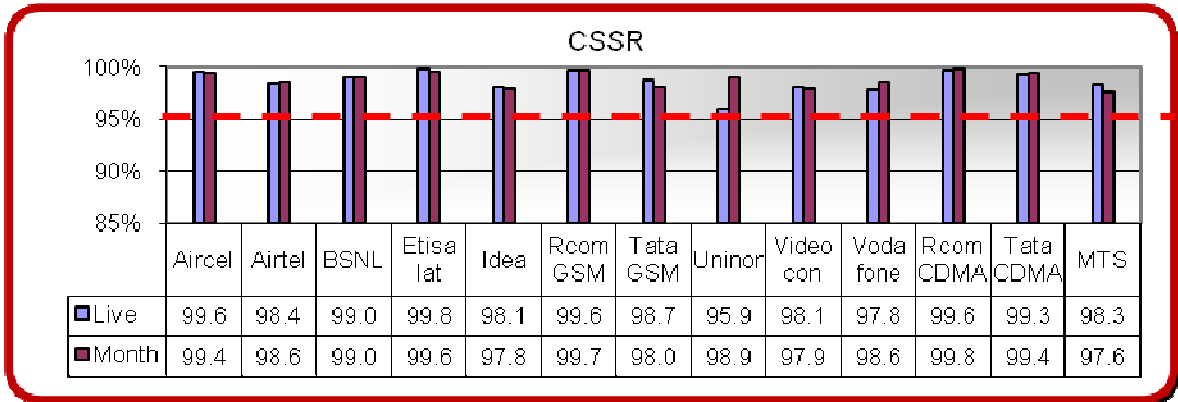
- I. (a) **BTS accumulated downtime:** All operators are meeting the TRAI benchmarks in both one month & live data Audit.



(b) Worst affected BTSs due to downtime: All operators are meeting the TRAI benchmarks in both one month & live data Audit.

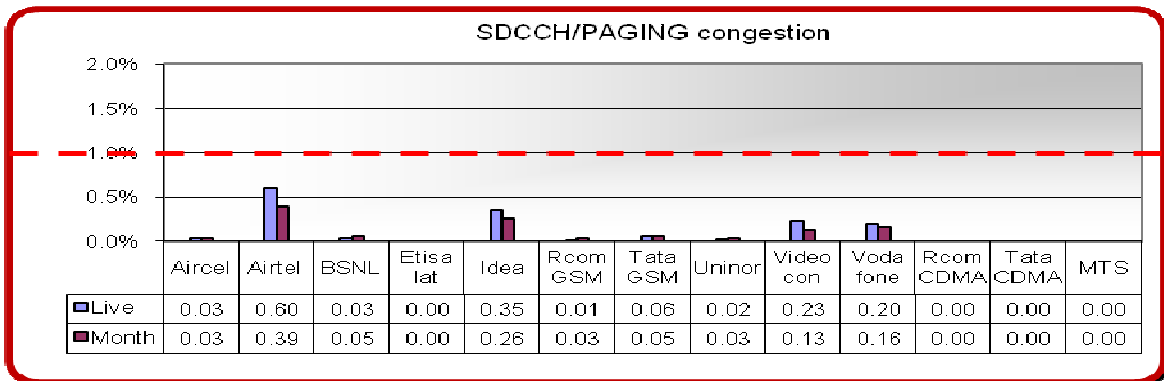


II. Call Setup Success Rate (CSSR): All operators are meeting the TRAI benchmarks ($\geq 95\%$) for both one month data and 3 days live data taken in the month of audit

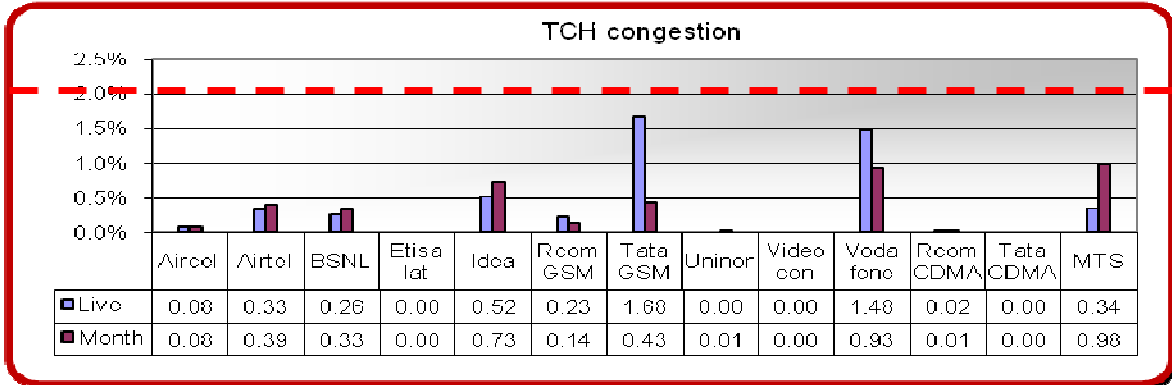


III. Blocked call rate:

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

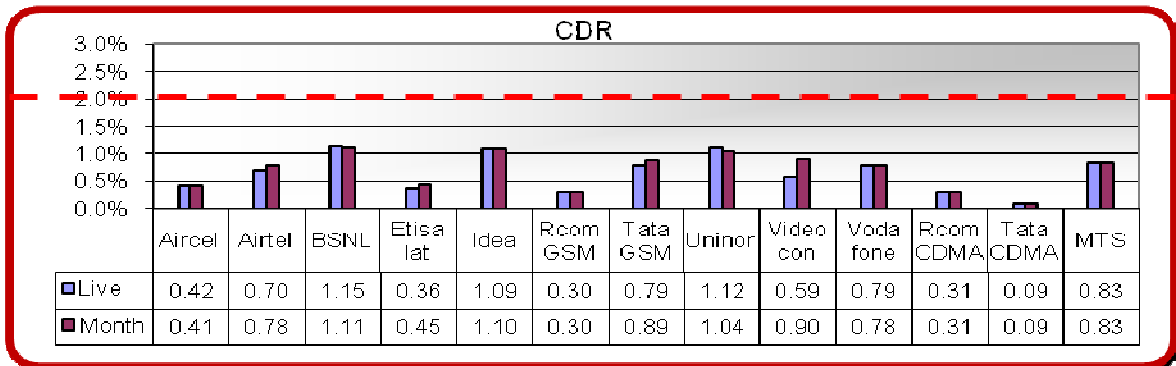


TCH congestion (%): All operators are meeting the TRAI benchmarks ($\leq 2\%$) for both one month data and 3 days live data taken in the month of audit.



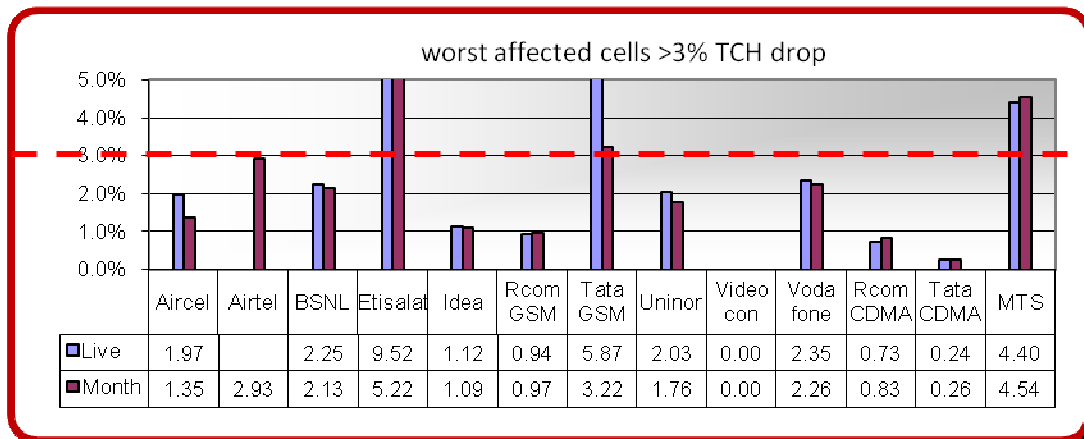
IV. Connection Maintainability (Retainability):

Call Drop Rate (CDR) (%): All operators are meeting the TRAI benchmarks ($\leq 2\%$) for both one month data and 3 days live data taken in the month of audit.



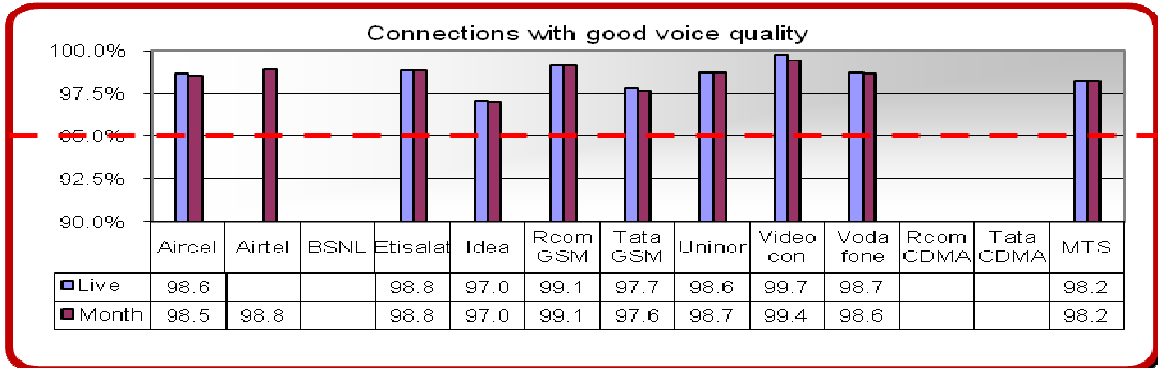
Worst affected Cell exceeding 3% TCH Drop: Benchmark 3%.

Etisalat, Tata GSM and MTS do not meet the Benchmark while others comply with the Benchmark.



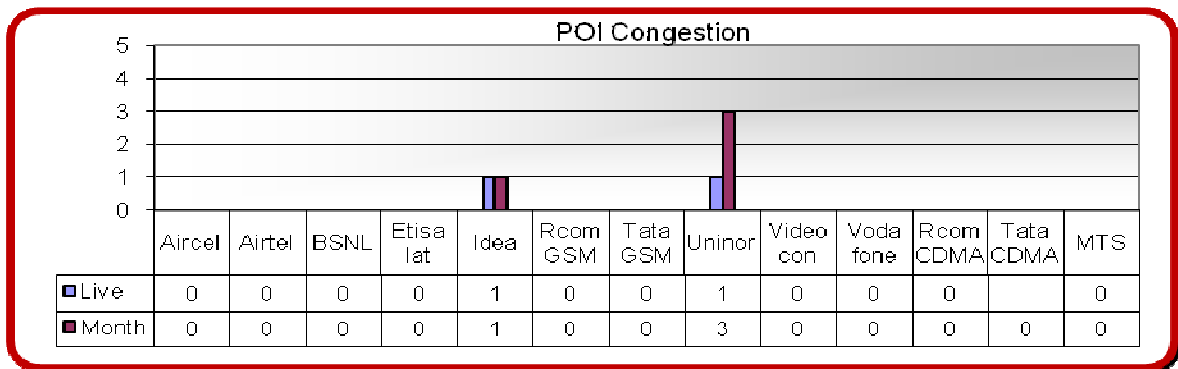
Percentage of connections with good voice quality (benchmark >= 95%):

Tata CDMA, Rcom CDMA & BSNL have declared that this KPI is not system generated. All other operators meet the Benchmark requirement.



POI Congestion:

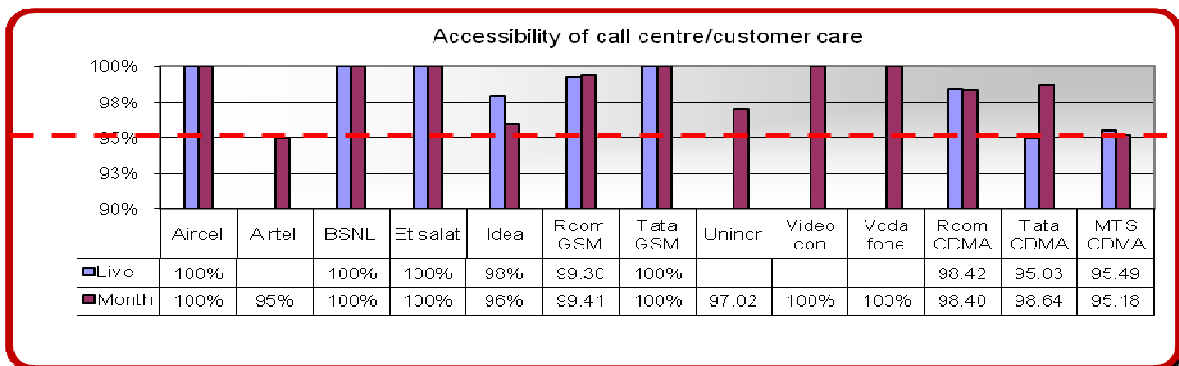
Idea has one no of POI for Live and month while Uninor has 1 no of POI for Live and 3 nos of POIs for month facing congestion beyond Benchmark. There is no congestion w.r.t other operators.



B) CUSTOMER SERVICE QUALITY PARAMETERS

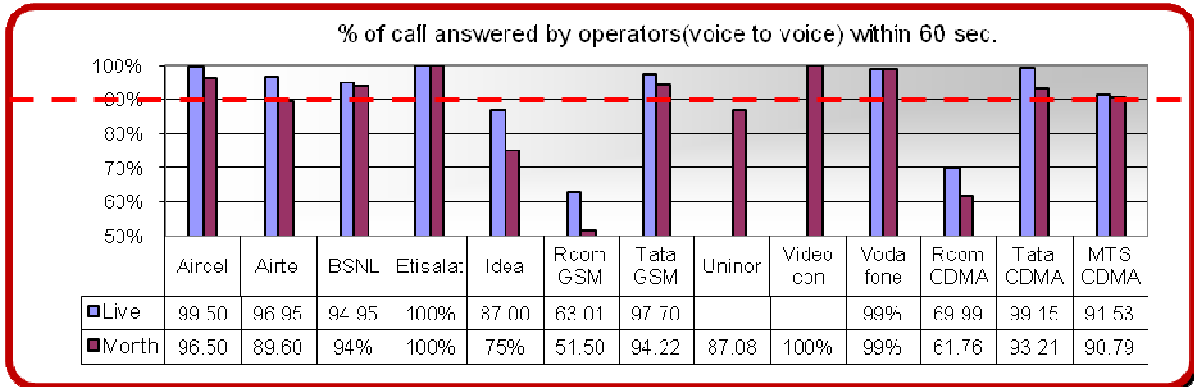
Response time to the customer for assistance:

Percentage of call answered (Electronically): Benchmark: >=95% : All other operators meet the Benchmark requirements.



Percentage of call answered by operators (Voice to voice) within 60 sec. Benchmark >=90%

Idea, Rcom GSM & CDMA do not meet the Bench mark for both Live and month data. Uninor is below the Bench Mark for month data.



(5) Critical Analysis

From the data tables, it is found that except a few deviations, all the operators are meeting the network parameters. Etisalat, Tata GSM and MTS have a high %age of cells exceeding 3% TCH Drop.

In case of POI congestion, most of the operators are found to be performing quite well except Idea (1 POI) and Uninor (3 POIs) facing more than 0.5% congestion in POIs. It is noticed that most of the operators are having individual POI satisfying the benchmark. But in some cases, overflow on individual POIs are noticed causing traffic diversions to obtain the net result for POI congestion.

Percentage of calls answered by operator within 60 sec is not satisfactory in case of Idea, Rcom (GSM & CDMA) and Uninor.

(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	BSNL	Etisalat	Idea	Rcom GSM	Tata GSM	Uninor	Videocon	Vodafone	Rcom CDMA	Tata CDMA	MTS
Calls Attempted	100	100	100	100	100	100	100	100	100	100	100	100	100
Total No. of calls	94	96	93	98	98	94	94	98	94	96	94	94	92
Cases resolved with 4 weeks	94	96	93	97	98	93	94	98	94	96	94	94	92
%age of cases resolved	100%	100%	100%	99%	100%	99%	100%	100%	100%	100%	100%	100%	100%

(3) Live calling to call centre

Calling Operator	Aircel	Airtel	BSNL	Etisalat	Idea	Rcom GSM	Tata GSM	Uninor	Videocon	Vodafone	MTS	Rcom CDMA	Tata CDMA
Calls Attempted	100	100	100	42	50	60	100	50	55	100	100	60	100
Calls connected to IVR	100	100	100	42	50	60	100	50	55	100	100	60	100
Calls connected to agent within 60 Sec	100	100	100	42	50	60	100	50	55	95	100	60	100
%age of calls connected to agent within 60 Sec	100%	100%	100%	100%	100%	100%	100%	100%	100%	95%	100%	100%	100%

(4)Level 1 Live Calling

Emergency no.	No. of calls made	Aircel	Airtel	BSNL	Etisalat	Idea	Rcom GSM	Tata GSM	Uninor	Videocon	Vodafone	Rcom CDMA	Tata CDMA	MTS
BELGAUM														
100 (Police)	2	2	2	2	2	2	2	2	2	2	2	2	2	2
101 (Fire)	2	2	2	2	2	2	2	2	2	2	2	2	2	2
102 (ambulance)	2	0	2	2	2	0	2	2	0	2	2	2	2	2
139 (Rly. Inc.)	2	2	2	2	2	2	2	2	2	2	2	2	2	2
Hubli-Dharwar city														
100 (Police)	2	2	2	2	2	2	2	2	2	2	2	2	2	2
101 (Fire)	2	2	2	2	2	2	2	2	2	2	2	2	2	2
102 (ambulance)	2	0	2	2	2	0	2	2	0	2	2	2	2	2
139 (Rly. Inc.)	2	2	2	2	2	2	2	2	2	2	2	2	2	2
Gulbarga City														
100 (Police)	2	2	2	2	2	2	2	2	2	2	2	2	2	2
101 (Fire)	2	2	2	2	2	2	2	2	2	2	2	2	2	2
102 (ambulance)	2	0	2	2	2	0	2	2	0	2	2	2	2	2
139 (Rly. Inc.)	2	2	2	2	2	2	2	2	2	2	2	2	2	2

(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.

For live calling to call center it is found that all the operators are meeting the benchmark.

Emergency call got through for all the operators. A few cases of failure were noticed while making short calls (102 in Aircel, Uninor & Idea).

(C) Inter operator call assessment**(1) Sample coverage**

A sample of 2x50 test calls per Service Providers with in the licensed service area (Karnataka 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	Airtel	Aircel	Idea	Vodafone	Etisalat	Uninor	Tata CDMA	Tata GSM	MTS	BSNL	Videocon	Rel GSM	Rel CDMA
Airtel	-----	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Aircel	100%	-----	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Idea	100%	100%	-----	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Vodafone	100%	100%	100%	----- -	100%	100%	100%	100%	100%	100%	100%	100%	100%
Etisalat	100%	100%	100%	100%	----- -	100%	100%	100%	100%	100%	100%	100%	100%
Uninor	100%	100%	100%	100%	100%	-----	100%	100%	100%	100%	100%	100%	100%
Tata CDMA	100%	100%	100%	100%	100%	100%	----- -	100%	100%	100%	100%	100%	100%
Tata GSM	100%	100%	100%	100%	100%	100%	100%	-----	100%	100%	100%	100%	100%
MTS	100%	100%	100%	100%	100%	100%	100%	100%	-----	100%	100%	100%	100%
BSNL	100%	100%	100%	100%	100%	100%	100%	100%	100%	-----	100%	100%	100%
Videocon	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	----- -	100%	100%
Rel GSM	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	-----	100%
Rel CDMA	100%	100%	100%	100%	100%	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 no 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 Belgaum, Hubli-Dharwar and Gulbarga for all the operators except Videocon and Etisalat as they do not have any BTS in these areas. Route covered was about around 80-100Km depending on city areas within the speed limit of 30Km/hr.

DRIVE TEST LOCATIONS

BELGAUM City:

High Dense: Kadebazar, Kirloskar Rd, Maligalli, Maruthi Galli, Ganapathi Galli, Bogarves, Bus stand area, DC compound.

Medium Dense: VV Nagar, Sadhashiva Nagar, Azam Nagar, Mahantesh Nagar, Auto Nagar, Shahpur, KRC Nagar, Bagya Nagar, Vadagaon, Kapileshwar, Shastri Nagar, Tilakwadi, Anagaol, Udyam Bagh, Hanuman Nagar, Ganeshpur.

Low Dense: Vybhavnagar, Srinagar, Anagola, Ganeshpur,

Hubli-Dharwar city:

High Dense: Durgadabail, Begaumgalli, Pendargalli, RC circle, station road, Old Hubli, Old Busstand, Koppikar Rd, Line Bazar, Subhash Rd, Gandhi chowk, Jubilee circle, NTTF

Medium Dense: New Bus stand, Keshwapur, Vidhya Nagar, Karwar rd, Hosur Rd, Cotton Market, Desai cross., DC compound, Vidyagiri, Gandhi Nagar, Sapthapur, Srinagar, Sadhankere.

Low Dense: Gopanakoppa, Ram Nagara, Nrupathungabetta, Adyapaknagar, Gadag Road, Shanthi Nagar, Lingaraj Nagar, Sai Nagar, Taj Nagar, Nehrunagar, SDM engg college, Kalyan Nagar, Anjaneya Nagar, Murgamatt, Karnataka University.

Gulbarga City:

High Dense: Supermarket area, Thimmapur circle, Rly station, KBN Darga Road, Bus stand area, Ganj Market, Sedam Road, Basaveswara hospital.

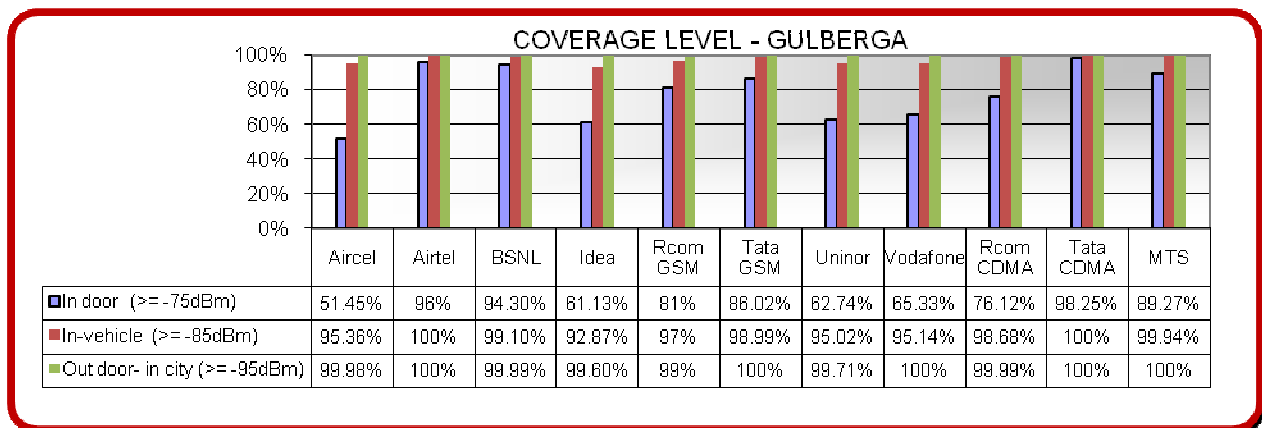
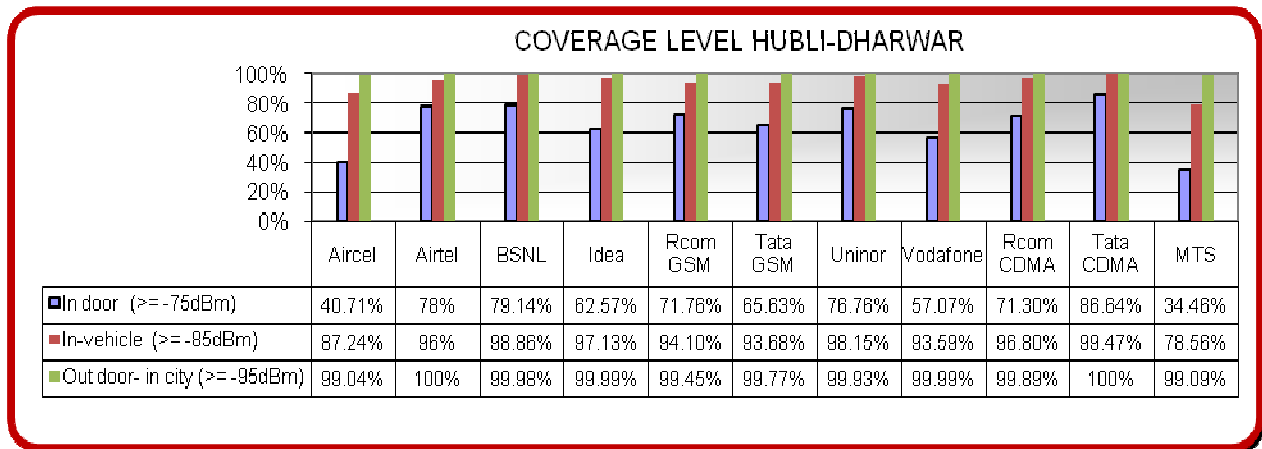
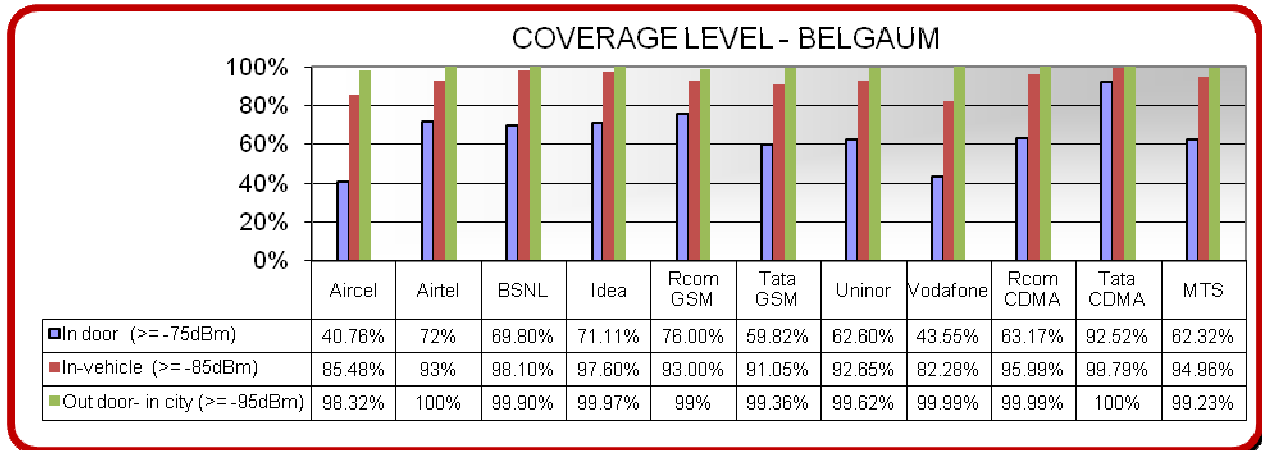
Medium Dense: Jewargi colony, Rammandira, Aland Road, Diddapur colony, Aiwan shahi, Sedam Road University, RTO road.

Low Dense: Kusnur Road, Kothanor Rd, Ring Road around Gulbarga, Kapanoor road

2) Performance (for the respective cities)

SN	Parameter	City Name	Aircel	Airtel	BSNL	Idea	Rcom GSM	Tata GSM	Uninor	Vodafone	Rcom CDMA	Tata CDMA	MTS	
			GSM Operators							CDMA Operators				
1.1	Call Attempts	Belgaum	194	98	224	160	180	210	180	161	175	244	184	
		Gulbarga	156	186	154	143	166	154	176	166	190	174	191	
		Hubli-Dharwar	300	226	262	239	282	435	203	226	292	320	273	
1.2	Blocked Call Rate (<=3%)	Belgaum	0.00%	3.06%	0.89%	0.62%	0.00%	0.48%	0.00%	9.94%	0.57%	0.00%	1.09%	
		Gulbarga	0.00%	6.45%	1.95%	0.70%	0.00%	0.00%	0.57%	5.42%	0.00%	0.00%	3.66%	
		Hubli-Dharwar	0.00%	5.31%	0.38%	0.84%	0.00%	0.23%	0.00%	3.54%	0.00%	0.00%	1.47%	
1.3	Dropped Call Rate (<=2%)	Belgaum	1.03%	3.16%	0.90%	1.26%	0.00%	2.86%	0.00%	1.38%	0.00%	0.00%	1.10%	
		Gulbarga	0.64%	0.57%	0.66%	0.70%	0.00%	0.00%	0.00%	0%	0.00%	0.57%	0.00%	
		Hubli-Dharwar	0.33%	0.00%	0.00%	0.00%	0.00%	0.92%	0.00%	0%	0.00%	1.56%	0.37%	
1.4	Percentage of connections with good voice quality (=>95%)													
	(i) 0-4 (w/o frequency hopping)	Belgaum										98.38%	99.14%	99.53%
		Gulbarga										98.19%	97.91%	99.55%
		Hubli-Dharwar										97.82%	99.36%	99.59%
	(ii) 0-5 (with frequency hopping)	Belgaum	98.18%	88.41%	96.67%	93.79%	95.08%	88.13%	97.16%	90.06%				
		Gulbarga	98.53%	87.61%	96.10%	94.65%	95.16%	90.69%	96.53%	96.05%				
Hubli-Dharwar		98.29%	90.51%	96.17%	95.95%	96.00%	91.53%	96.21%	95.44%					
1.5	Service Coverage													
	In door (>= -75dBm)	Belgaum	40.76%	72.00%	69.80%	71.11%	76.00%	59.82%	62.60%	43.55%	63.17%	92.52%	62.32%	
		Gulbarga	51.45%	96.00%	94.30%	61.13%	81.00%	86.02%	62.74%	65.33%	76.12%	98.25%	89.27%	
		Hubli-Dharwar	40.71%	78.00%	79.14%	62.57%	71.76%	65.63%	76.76%	57.07%	71.30%	86.64%	34.46%	
	In-vehicle (>= -85dBm)	Belgaum	85.48%	93.00%	98.10%	97.60%	93.00%	91.05%	92.65%	82.28%	95.99%	99.79%	94.96%	
		Gulbarga	95.36%	100%	99.10%	92.87%	97.00%	98.99%	95.02%	95.14%	98.68%	100%	99.94%	
		Hubli-Dharwar	87.24%	96%	98.86%	97.13%	94.10%	93.68%	98.15%	93.59%	96.80%	99.47%	78.56%	
	Out door- in city (>= -95dBm)	Belgaum	98.32%	100%	99.90%	99.97%	99.00%	99.36%	99.62%	99.99%	99.99%	100%	99.23%	
		Gulbarga	99.98%	100%	99.99%	99.60%	99.00%	100%	99.71%	100%	99.99%	100%	100%	
Hubli-Dharwar		99.04%	100%	99.98%	99.99%	99.45%	99.77%	99.93%	99.99%	99.89%	100%	99.09%		
1.6	Call Setup Success Rate (>=95%)	Belgaum	100%	96.94%	99.11%	99.38%	100%	99.52%	100%	90.06%	99.43%	100%	98.91%	
		Gulbarga	100%	93.55%	98.05%	99.30%	97.59%	100%	99.43%	94.58%	100%	100%	96.34%	
		Hubli-Dharwar	100%	94.69%	99.62%	99.16%	98.94%	99.77%	100%	96.46%	100%	100%	98.53%	

Graphical Representation



(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:

1. Blocked Call Rate benchmark is not meet by Airtel & Vodafone in all the 3 cities and by MTS in Gulbarga.
2. "Percentage of connection with good voice quality" benchmark is not meet by Airtel & Tata GSM in all the 3 cities, by Idea in Belgaum & Gulbarga and by Vodafone in Belgaum.
3. Dropped call Rate parameter is not meet by Airtel & Tata GSM in Belgaum city.
4. Call success rate is not meet by Airtel in Gulbarga & Hubli-Dharwar and by Vodafone in Belgaum & Gulbarga.

(E) Independent Drive Test

--- Submitted as a Separate Report

(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 Karnataka circle is satisfactory for **Network Parameters**. Tata GSM, Etisalat & MTS have high %age of cells with >3% TCH drop. Uninor & Idea have a few POIs with more than 0.5% congestion.

Under **Customer Service Quality** section, it is found that Airtel &, Idea & Rcom GSM have very low “%age of calls answered by operator (voice-to-voice) within 60 seconds”. These operators need to take care for an improvement in this regard.

Regarding **Metering/Billing Credibility** issues, the performance of Idea (both Pre & post paid) and Tata GSM (pre-paid) are found not meeting the benchmark.

During **Drive Tests**, high Blocked Call Rates were found for Airtel, Vodafone & MTS. High Dropped Call Rates were observed for Airtel & Tata GSM. Good voice quality connections were lower in case of Airtel, Tata GSM, idea & Vodafone.

II. Basic Telephone Service (Wireline) Providers

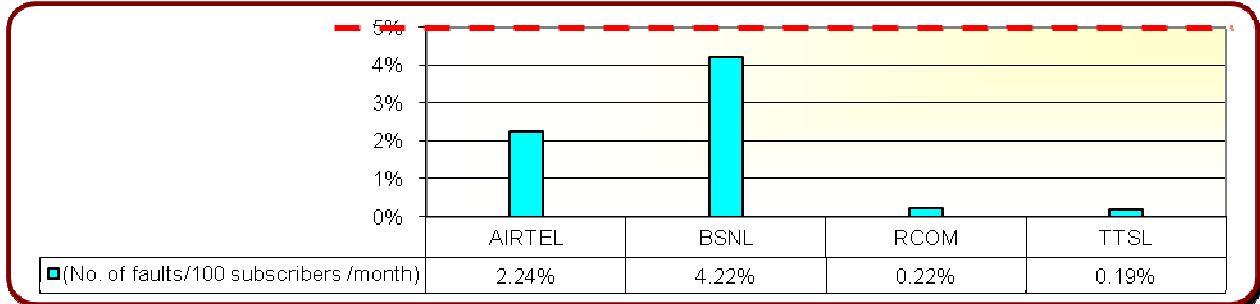
(A) Exchange Audit

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

S/N	Name of Parameter	Bench mark	Audit	AIRTEL	BSNL	RCOM	TTSL
1	(No. of faults/100 subscribers /month)	< 5%	Month	2.24%	4.22%	0.22%	0.19%
2	Fault repair by next working day(Urban Area)		Month				
a	By next working day	>90%	Month	98.86%	92.79%	100%	84.42%
b	Within 3 days	100%	Month	100%	99.32%	100%	96.98%
3	Fault repair by next working day(Rural & hilly Area)		Month				
a	By next working day	>90%	Month	NA	95.93%	NA	0.00%
b	Within 5 days	100%	Month	NA	98.55%	NA	98.99%
4	Rent rebate		Month				
a	Fault pending > 3 days & <7 days	Rebate for 7 days	Month	0	398	0	0
b	Fault Pending > 7 days & < 15 days	Rebate for 15 days	Month	0	7	0	0
c	Fault pending > 15 days	Rebate for one month	Month	0	238	0	0
5	Mean time to Repair(MTTR)	<= 8 Hrs	Month	2.6	5.52	2.3	7.17
6	Call Completion Ratio(CCR) & Answer to seizure Ratio(ASR)	> 55%(CCR) & > 75%(ASR)	Live	93.28%	54.89%	86.02%	63.29%
			Month	92.62%	47.31%	85.63%	63.24%
7	Metering and billing credibility(post paid)		Month				
a	Disputed Bills over bills issued	< 0.1%	Month	0.00%	0.01%	0.00%	0.01%
8	% of billing complaints resolved within 4 weeks	100% Within 4 weeks	Month	100%	99.92%	100%	100%
a	Period of refunds after resolution of complaints within 1 weeks	Within 1 weeks	Month	100%	100%	100%	100%
9	POI Congestion	<= 0.5%	Live	0	0	0	0
			Month	0	0	0	0
10	Response Time to customer for assistance						
a	Accessibility of Call centre within 40 sec.	>= 95%	Live	86.23%	99.91%	98.00%	98.17%
			Month	92.26%	99.87%	96.00%	98.70%
b	% age of calls answered by operator(voice to voice) within 60 sec.	>= 90%	Live	97.27%	96.32%	93.25%	94.26%
			Month	97.99%	95.33%	90.00%	94.92%
11	Customer care(promptness in attending to customers request)		Month				
a	Termination / Closures	<= 7 Days	Month	100%	97.99%	100%	100%
b	Time taken refunds deposit after closures	100% within 60 days	Month	98%	97.99%	100%	100%

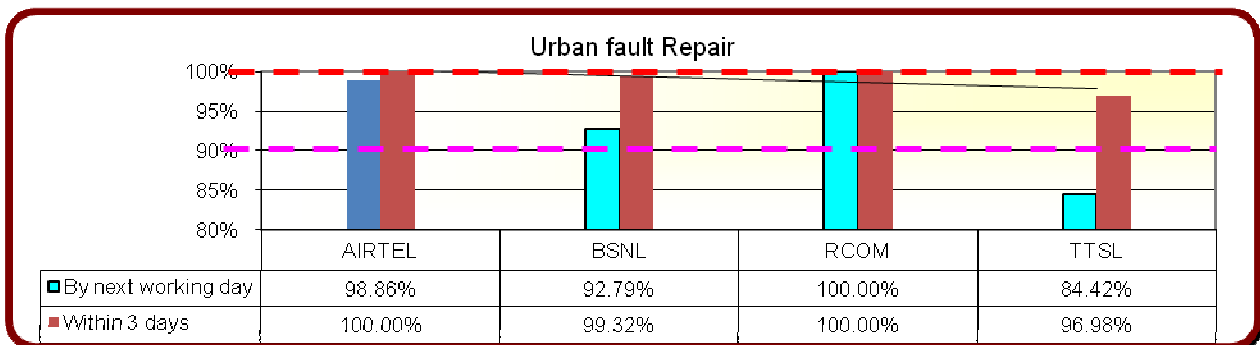
2) Performance (Graphical representation)

Fault incidences (No of faults/100 subscribers/month ($\leq 5\%$): All the three operators are meeting the benchmarks of 5%.



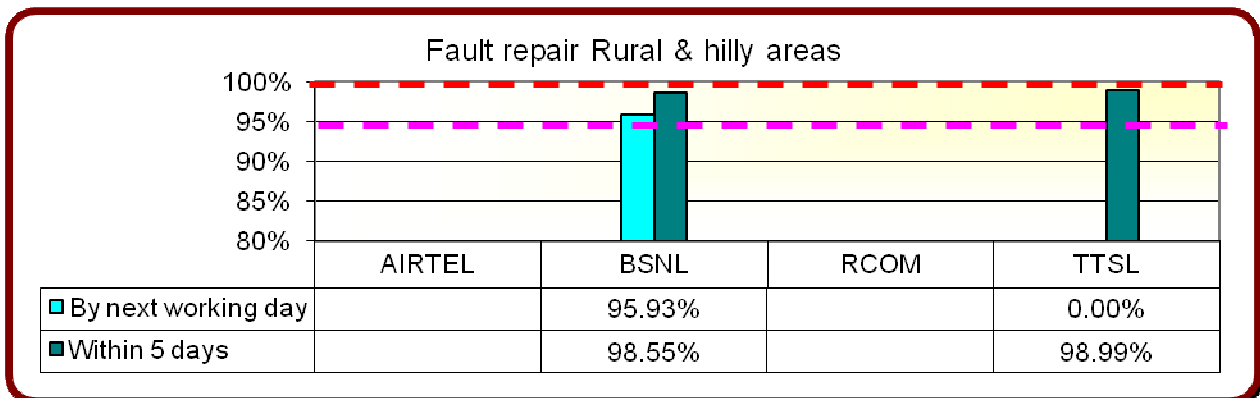
Fault Repair (Urban Area):

- **By next working day ($>90\%$):** All the operators comply with the TRAI benchmark of 90% except TTSL.
- **Within 3 days (100%):** TTSL and BSNL are not meeting the benchmark.

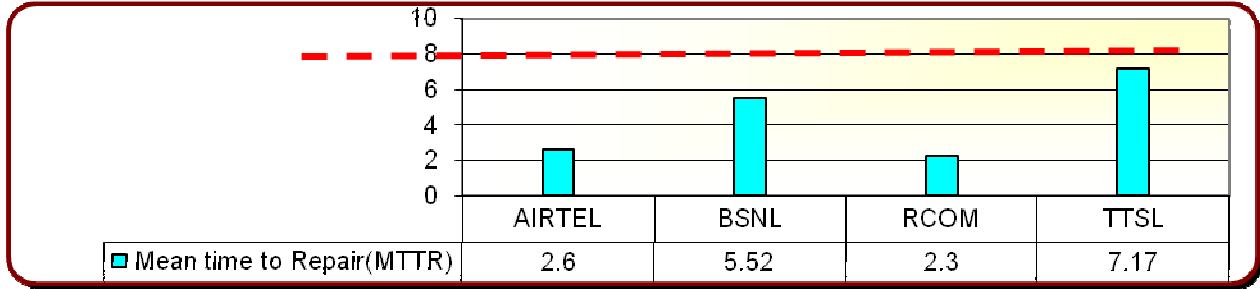


Fault Repair (Rural & Hilly Area): This parameter is not applicable for RCOM & Airtel in as they do not have services in these areas.

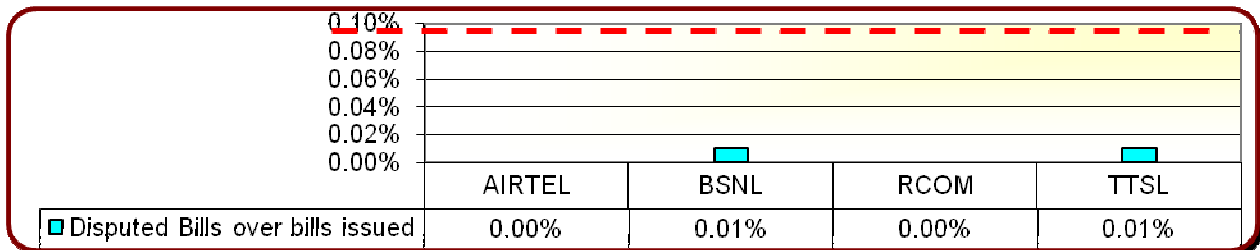
- **By next working day ($>90\%$):** TTSL is not meeting the Bench mark.
- **Within 5 days (100%):** Both TTSL & BSNL do not meet the Bench mark.



Mean Time to Repair (MTTR) (<= 8 Hrs): All the operators comply with the TRAI benchmarks of <= 8 hrs.

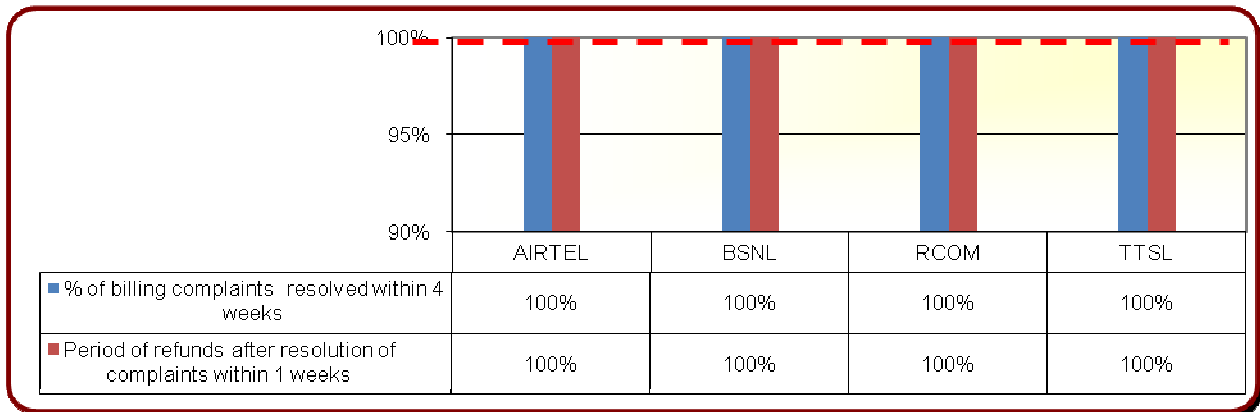


Metering and Billing Credibility (< 0.1%): Disputed Bills over Bills issued: - All the operators comply with the TRAI standard.



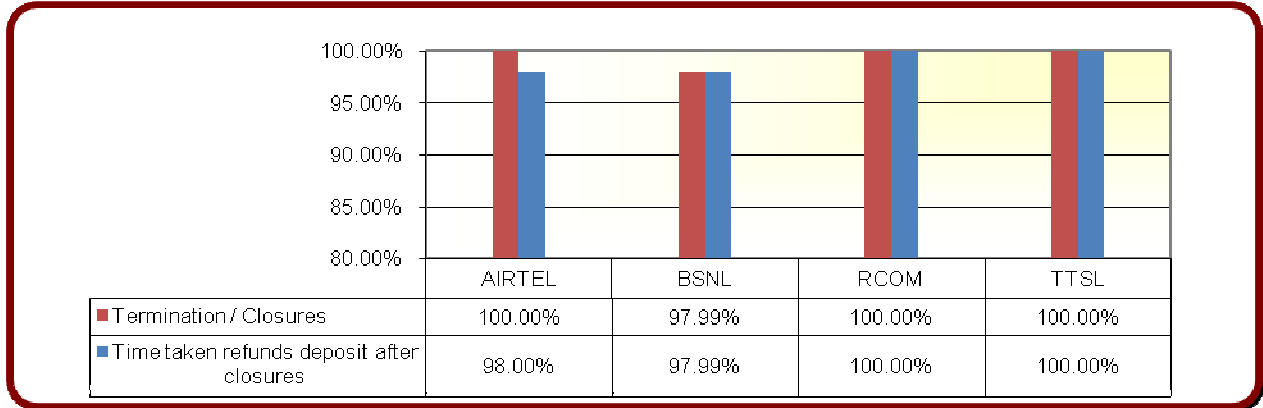
% of Billing Complaints resolved within 4 Weeks: All the operators have resolved 100% billing complaints within 4 weeks except BSNL which has marginally 0.08% below the 100% Bench mark.

Period of All refunds / Payments after resolution of Complaints Within 1 week: All the operators are meeting the benchmark of 100%.

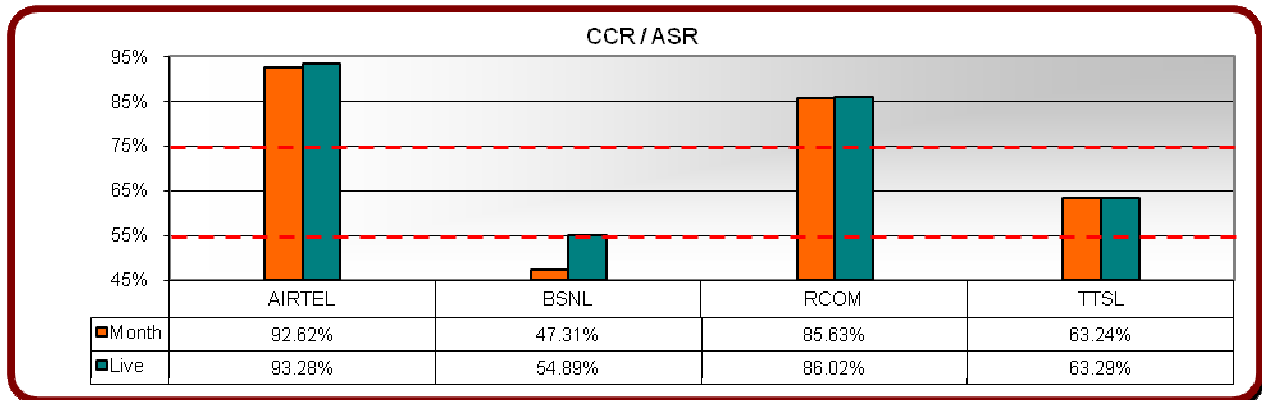


Customer Care Promptness in Attending Customer Request:

Termination / Closures :(<= 7 Days): All the operators are meeting the benchmark except BSNL.
Time taken for refund of deposits (100% within 60 days): All the operators are meeting the benchmarks except BSNL.

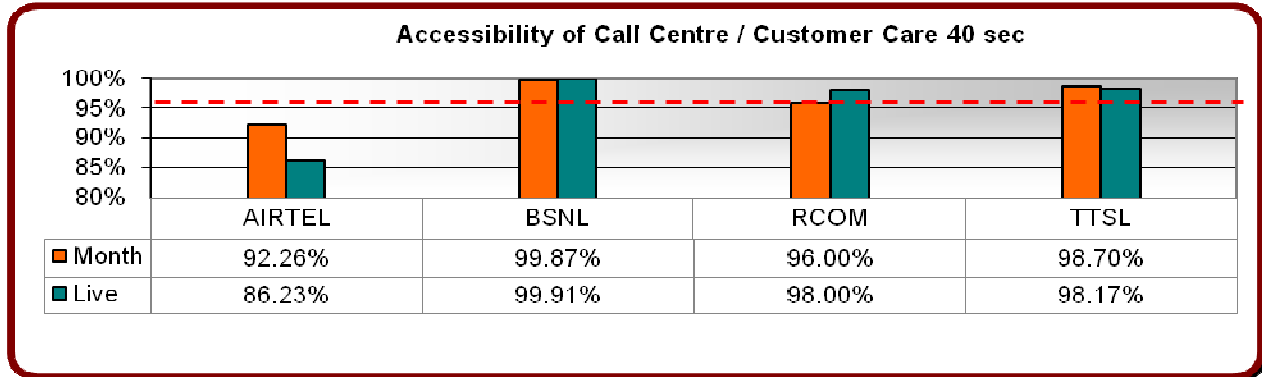


Call Completion Rate (>55%) & Answer to Seizure (>75%): The performance based on live measurement as well as One-Month Data match for Airtel, RCOM, TTSL and they are above the Benchmark stipulated by TRAI. BSNL does not meet the Bench Mark for both Live and month data. Airtel, BSNL and TTSL have given CCR while RCOM has given ASR as per their system capability for measurements.

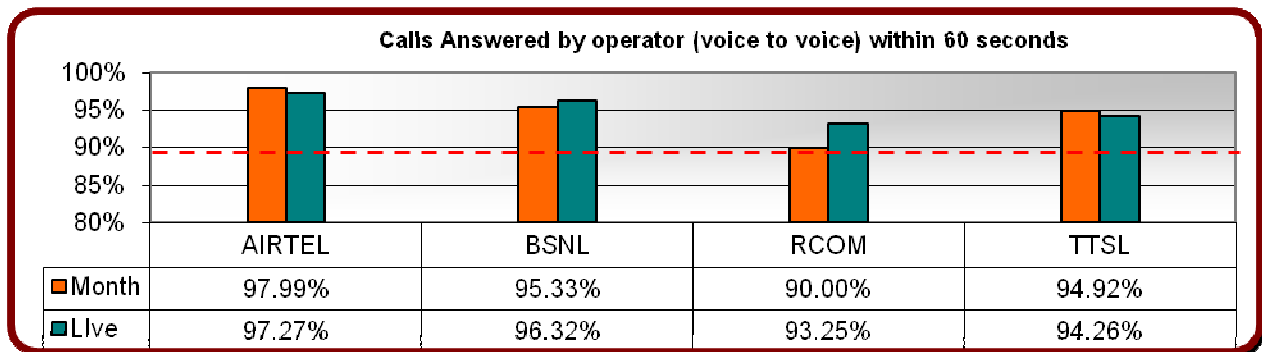


Response time to the customer for assistance:

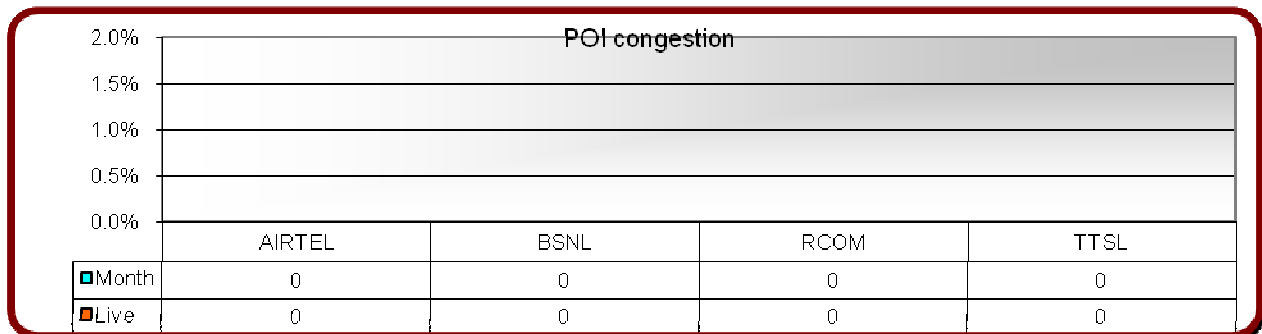
1. **Accessibility of Call Centre / Customer Care 40 sec (> 95 %):** Airtel do not meet the Bench Mark for Live as well as Month audit. Rcom, BSNL and TTSL meet the Bench Mark for both Live and month.



2. (ii) **Calls Answered by operator within 60 seconds (>90%) (Voice to Voice):** The performance based on live measurement as well as One-Month data are matching and all the operators are meeting the benchmark.



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. No POI is having congestion.



3) Customer Care & Grievances Redressal

S.N.	Parameters	Reliance	Airtel	TTSL
1	Total no of complaints received in the call centre (Tech+ Non Tech)	236	46782	208
2	Total no of complaints redressed by the call centre within the specified time limit	NP	NP	NP
3	Nodal Officer			
3.1	Total no of complaints received by the nodal officers	0	674	NP
3.2	Percentage of complaints with reference to total no of complaints received at the call centre	0%	1.44%	NP
3.3	Total no of complaints redressed within the specified time limit	NP	NP	NP
4	Appellate Authority			
4.1	Total no of appeals received by the appellate authority	0	19	NP
4.2	Percentage of appeal received with reference to total no of complaints received by the nodal officers	0%	2.82%	NP

NP- Not Provided, NA- Not Applicable

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.

4) Level 1 Live Calling

Emergency no.	No. of calls made	Bangalore SDCA Bangalore SSA															
		BSNL	TTSL	RCOM	AIRTEL	Belgaum SDCA Belgaum SSA	Chikodi SDCA Belgaum SSA	Khanapur SDCA Belgaum SSA	Sankeshwar SDCA Belgaum SSA)	Dharwar SDCA Dharwar SSA	Gadag SDCA Dharwar SSA	Ron SDCA Dharwar SSA	Gulbarga SDCA Gulbarga SSA	Yadgir SDCA Gulbarga SSA	Chittapur SDCA Gulbarga SSA	Jewargi SDCA Gulbarga SSA	Shahpur SDCA Gulbarga SSA
100 (Police)	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
101 (Fire)	5	5	5	5	5	5	5	5	5	5	5	5	5	5	0	5	5
102 (ambulance)	5	5	5	5	5	5	5	5	5	5	5	5	5	5	0	5	0

All emergency calls were found to be functional except for BSNL in Chittapur & Shahpur SDCA under Gulbarga SSA.

5) Critical Analysis

Fault incidence: All the operators are meeting the benchmarks of 5%.

Fault Repair (Urban Area): It is found that Airtel, BSNL & RCOM are meeting the benchmarks of $\geq 90\%$ set by TRAI for faults repair by the next working day. Airtel & Rcom meet the Benchmark for repair within 3 days (Benchmark 100%) too. However, BSNL does not meet the Benchmark for fault repair within 3 days and TTSL does not meet the Benchmark for both within next working day and within 3 days. Through record verification, it was found that all the service providers are providing rebates as per TRAI norms.

Fault Repair (Rural & Hilly Area): Rcom & Airtel donot have services in rural/hilly areas. TTSL is deviating from the benchmarks in faults repaired by next working day ($>90\%$) and within 5 days (100%) in Rural & hilly area. BSNL does not meet the Benchmark for fault repair within 5 days.

Rent Rebate: No rent rebate cases are observed for Airtel, Rcom & TTSL. BSNL has given rent rebate for 7 days against 398 cases, 15 days rent rebate against 7 cases and one month rent rebate against 238 cases.

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

Call Completion Rate (CCR): 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 owned by the Reliance. Rests of the service providers have given CCR. All the service providers are found to be meeting applicable benchmark for the month of audit data.

Metering and billing credibility: All the operators 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, Airtel, Rcom and TTSL have resolved 100% of complaints within 4 weeks while BSNL has resolved 99.92%, just marginally below the Bench Mark of 100%.

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 provide 100% refunds of complaints within 1 week from the date of resolution.

POI Congestion: No operator has any POI with congestion $\geq 0.5\%$ in one month data Audit.

Response Time to Customer for Assistance:

1. **Accessibility of Call Centre/ Customer care within 40 seconds (Electronically):** All the operators, except Airtel, are meeting the benchmarks of $\geq 95\%$.
2. **% of Call answered by operators within 60 seconds (Voice to Voice):** All the operators are meeting the benchmark of $\geq 90\%$ fixed by TRAI.

Customer care (Promptness of attending customer request):

- i. Termination / Closure: - All the operators are meeting the TRAI benchmarks of 100% within <= 7 days for closure requests except BSNL (97.99%).
- ii. Time taken for refund of deposits after closure: Rcom & TTSL are providing refund to the customers within the prescribed time limit (100% within 60 days). Airtel and BSNL have a few cases where refunds were not med in the given time.

(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 there is consistency in the parameters. Also for each parameter trend's can be analyzed 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.

BSNL

BSNL is having a below benchmark performance for "Call Completion Rate". It is also not restoring 100% faults within 3 days in urban areas and within 5 days in rural/hilly areas. Deviations are also found in case of Termination/Closure of service where it is taking more than 7 days' stipulated time for service termination. Also, it is taking more than 60 days for refunds after closure in a few cases.

RCOM

Meets all the parameters.

TTSL

TTSL is meeting all the parameters' benchmarks as set by TRAI except the Fault Repair in urban and rural/hilly areas. While in urban areas, it rectifies 84.42% faults by next working day and 96.98% faults within 3 days, in rural/hilly areas, it does not rectify any fault by next working day but then 98.99% faults are rectified within 5 days.

AIRTEL

Airtel is meeting all the parameters' benchmarks as set by TRAI except "Accessibility of Call Centre within 40 sec". Also, refunds of deposits after closure of service were made within 60 days in 98% cases.

II. Broadband Service Providers

(A) POP Audit

(1) 3 days live data and one month audit comparative Table

S/N	Parameters	B-marks	Audit	BSNL	Airtel	RCom	TCL	Youtele	Hathway	Sify	TTSL (KTK)	Tikona	Spectranet	
1	Service Provisioning/Activation Time													
	100% cases in 15 days (subject to technical feasibility)	<15 days	Month	100%	100%	100%	99.63%	100%	94.40%	100%	100%	NP	99.12%	
	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/day.		NA	NA	NA	NA	NA	NA	NA	NA	NA	NP	0
2	Faults Repair/Restoraion Time													
	By next working day	>90%	Month	93.64%	97.15%	100%	94%	91.62%	91%	91.80%	87.69%	NP	98.70%	
	within 3 working day	≥99%		99.29%	99.94%	100%	99%	98.36%	97%	93.20%	93.85%	NP	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	78	2	0	17	7	389	15	0	NP	0	
	Faults Pending for > 7 working days and < 15 working days: (Rebate equivalent to 15 days of minimum monthly charge or equivalent usage allowance)			71	0	0	0	2	14	8	4	NP	0	
	Faults Pending for > 15 working days:(Rebate equivalent to one month of minimum monthly charge or equivalent usage allowance)			131	0	0	0	0	1	0	1	NP	0	
3	Billing Performance													
	Billing complaints per 100 bills issued	<2%	Month	0.07%	0.00%	0.10%	0.14%	0.28%	1.82%	NA	0.01%	NP	0%	
	%age of complaints resolved within 4 weeks	100%		100%	100%	100%	100%	100%	100%	100%	NA	100%	NP	100%
	Time taken for refund of deposits after closure (within 60 days)	100%		100%	100%	100%	100%	100%	100%	100%	NA	100%	NP	NA
4	Response time to the customer for assistance % age of calls answered by operator (Voice to Voice)													
	within 60 sec	>60%	Live	78.30%	86.50%	88%	93.70%	92%	48.40%	98.99%	49%	NP	93.60%	
			Month	86.60%	69.25%	93%	95.00%	96.00%	51%	94.97%	53%	NP	92.75%	
	within 90 sec	>80%	Live	NP	91.54%	NP	NP	97%	52.47%	99.37%	54%	NP	93.60%	
			Month	96.20%	75.27%	NP	NP	96.00%	55%	97.15%	72%	NP	92.75%	
5	Bandwidth Utilization/ Throughput: (If on any link(s) / route bandwidth utilization exceeds 90%, then network is considered to have													

S/N	Parameters	B-marks	Audit	BSNL	Airtel	RCom	TCL	Yotele	Hathway	Sify	TTSL (KTK)	Tikona	Spectranet
	<i>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).</i>												
5.1	POP to ISP Gateway Node [Intra-network] Link(s)	< 80%	Live	29.00%	4.00%	47.30%	37.00%	NA	7%	70.70%	22.76%	37.93%	6.6%
			Month	29.25%	3.90%	39.40%	39.00%	NA	7%	69%	27.60%	54.98%	6.6%
5.2	ISP Gateway Node to IGSP / NIXI Node upstream Link(s) for International connectivity	< 80%	Live	80.71%	65.20%	46.10%	50.00%	55.55%	65.00%	65.92%	87.27%	87.03%	77.2%
			Month	77.17%	70.00%	34.32%	51.00%	55.55%	72.50%	67.40%	80.52%	84.58%	76.8%
5.3	Broadband Connection Speed (download) - from ISP Node to User	> 80%	Live	86.65%	100%	100%	89.00%	97.03%	94%	94.00%	95%	100%	92.10%
			Month	87.0%	100%	NP	91.68%	92.85%	96%	94.70%	94.50%	100.00%	92.80%
6	<i>Service Availability/Uptime (for all users)</i>												
6.1	Service Availability(%)	>98%	Live	99.09%	100%	NP	99.72%	100%	99%	99.99%	100%	99.08%	NP
6.2			Month	99.54%	99.98%	99.99%	99.85%	98.70%	99%	98.66%	99.93%	98.81%	98.92%
7	<i>Packet loss</i>												
	% of Packet loss	<1%	Live	0.00%	0%	0%	0%	0%	0%	0%	0.02%	0%	0%
			Month	0.00%	0%	0.11%	0%	0.30%	0%	0%	0%	0%	0%
8	<i>Network latency (for wired broadband access)</i>												
8.1	User reference point at POP/ISP Gateway node to IGSP/NIXI	<120 ms	Live	0 ms	81.67 ms	NP	21.7 ms	4 ms	1.72 ms	44.5 ms	67.66 ms	1.55 ms	2.9 ms
			Month	21 ms	82 ms	89.7 ms	24 ms	5.71 ms	1.5 ms	44.5 ms	66.87 ms	1.47 ms	2.5 ms
8.2	User reference point at ISP Gateway node to International nearest NAP port abroad (terrestrial)	<350 ms	Live	231 ms	270 ms	53.5 ms	281.7 ms	223.33 ms	238 ms	248.33 ms	140 ms	237.3 ms	263 ms
			Month	225 ms	268 ms	59.7 ms	275 ms	228.42 ms	238 ms	248.33 ms	133 ms	237 ms	255 ms
8.3	User reference point at ISP Gateway node to International nearest NAP port abroad (satellite)** See note below	<800 ms	Month	NA									

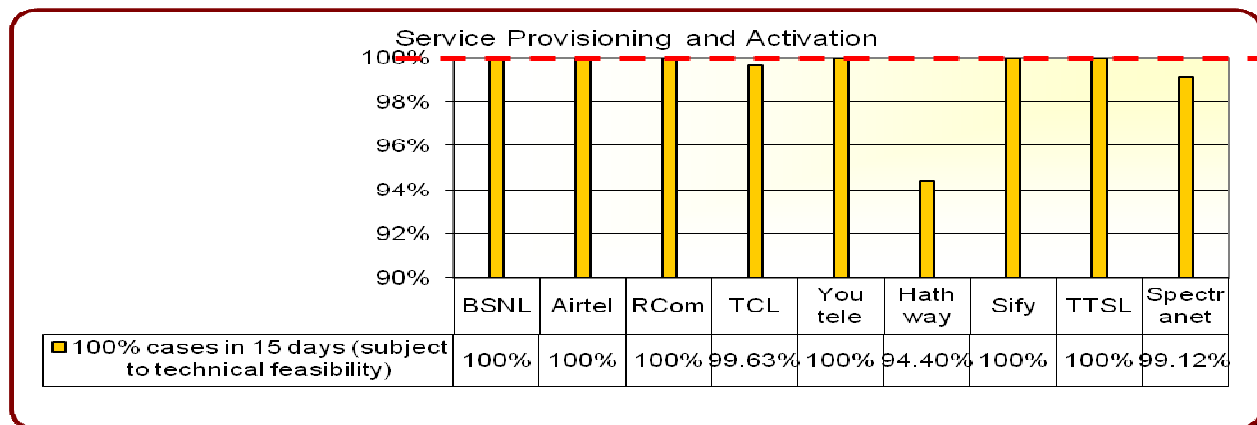
NA – Not Applicable, NP – Not Provided.

Note:

- For S/N 8.3 none of the operator having satellite connectivity.
- For S/N 3 SIFY not applicable because operator is under prepaid module.
- For S/N. 5.1 Yotele not applicable because no POP to ISP Gateway Node [Intra-network] Link(s) Connectivity.
- For S/N. 8.1 RCom Not provided because NIXI gateway is in Mumbai, Delhi, Chennai & Kolkata. Hence, latency is taken from nearest Gateway to POP (Chennai).

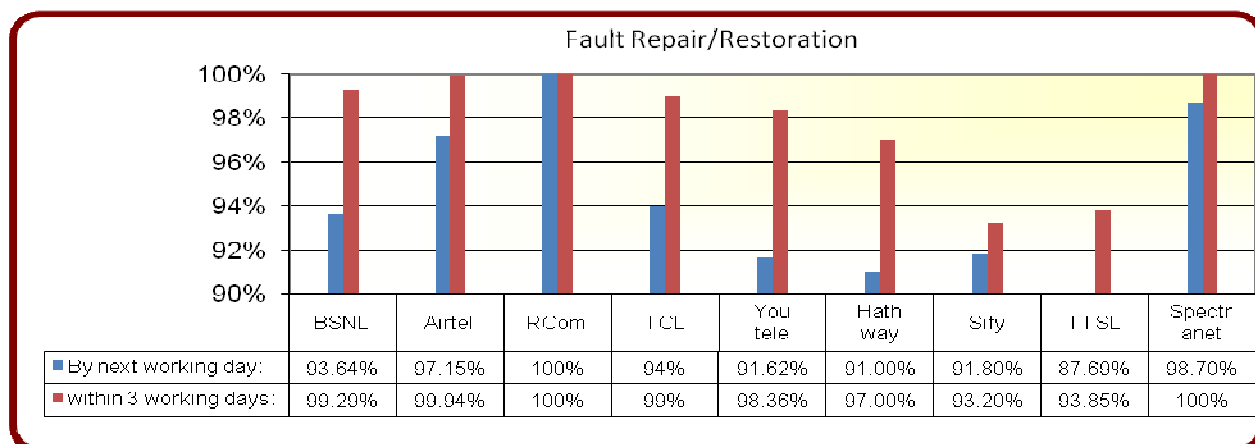
2) Performance (Graphical representation)

Service provisioning/activation Time (100% in 15 days): All service providers meet the Benchmark except TCL, Hathway & Spectranet.



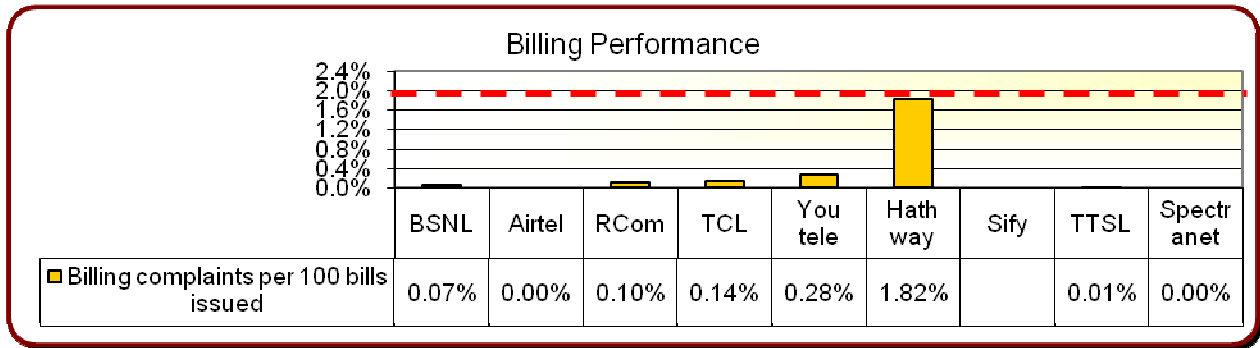
Fault Repair / Restoration Time:

- By next working day (>90%): All the operators are complying with the TRAI benchmark of 90% except TTSL (87.69%)
- Within 3 working days (>99%): All the operators are complying with the TRAI benchmark except You Broadband, Hathway, Sify & TTSL.
- Rebate: All the operators are giving rebate to the eligible customers.



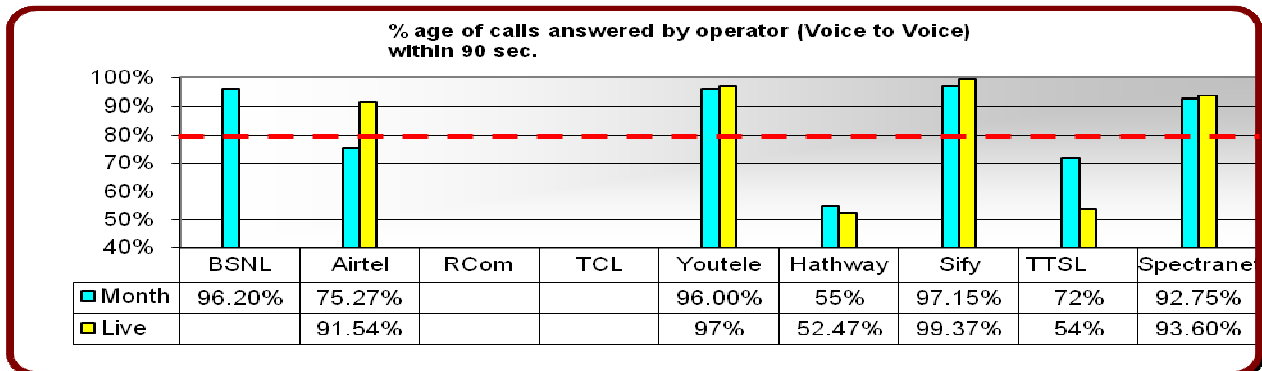
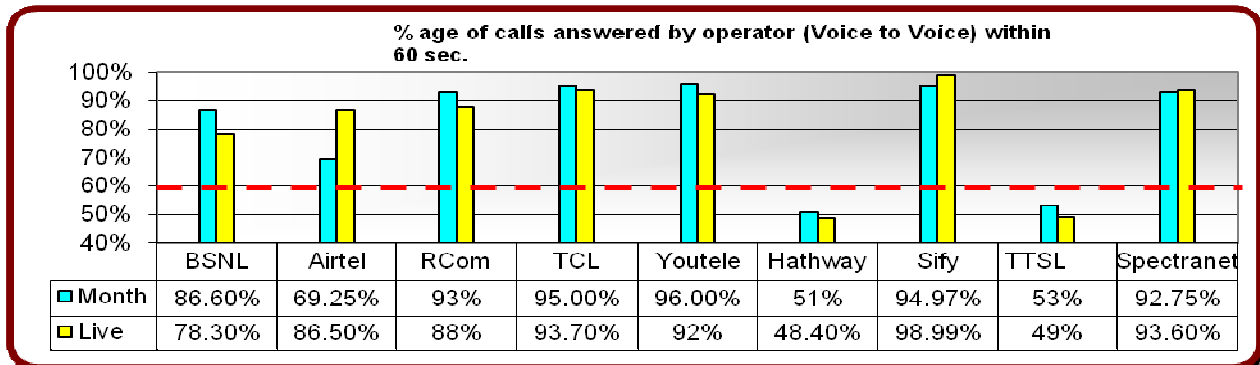
Billing Performance: (Benchmark <2%)

All the operators are complying with the TRAI standards. Sify has only prepaid module and hence the parameter is not applicable for it.



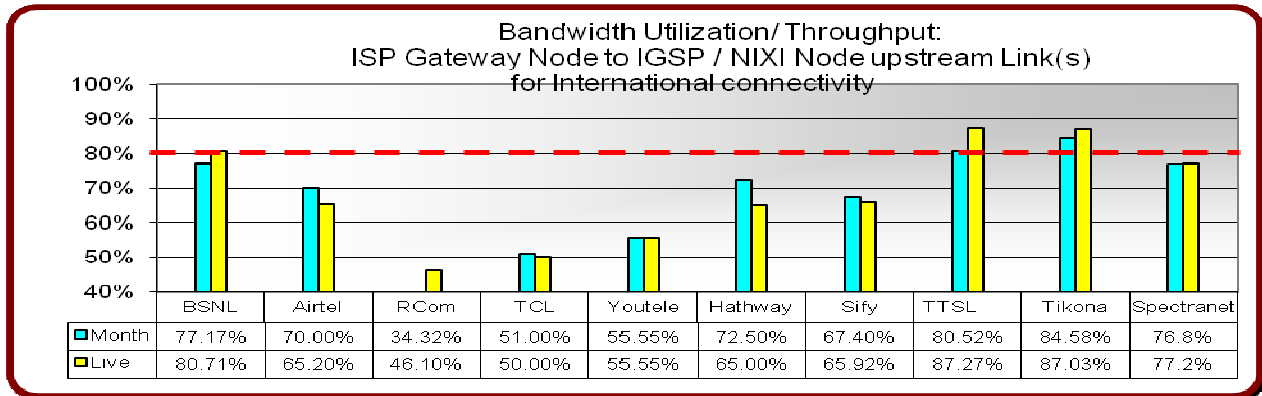
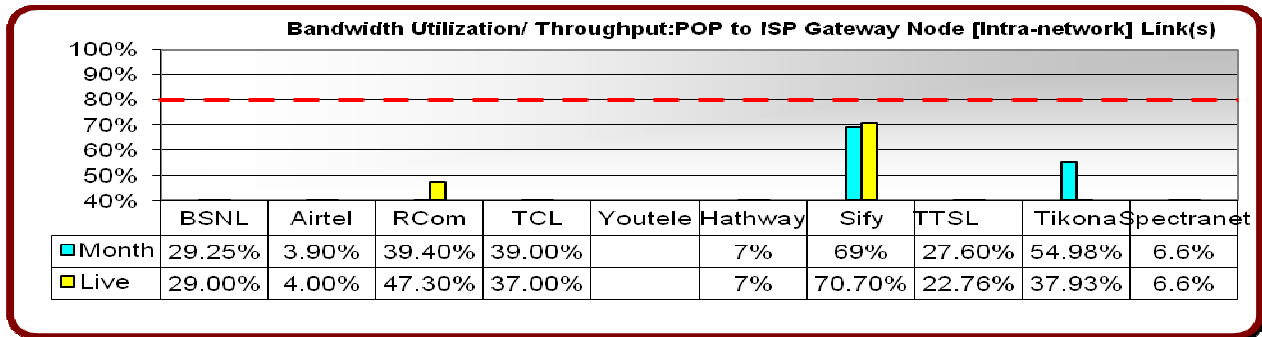
Response time to the customer for assistance: % age of calls answered by operator (Voice to Voice)

- **Within 60 seconds (>60%):** All the operators are meeting the benchmark except Hathway and TTSL which do not meet the Bench mark in both live and one month data verification.
- **Within 90 seconds (>80%):** Hathway, TTSL do not meet live and Month Benchmark while Airtel do not meet Month Benchmark.

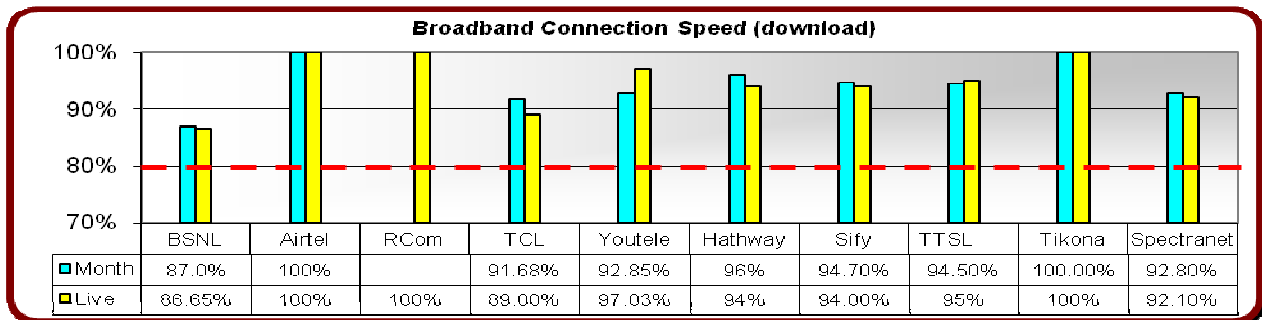


Bandwidth Utilization/ Throughput:

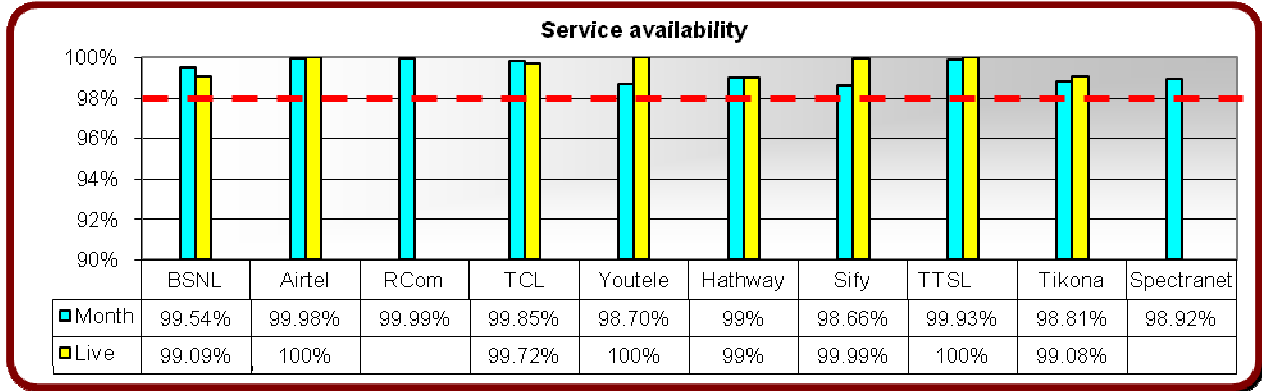
- **POP to ISP Gateway Node [Intra-network] Link(s): (Benchmark <80%):** All the operators are meeting the benchmarks in both live and one-month data verification. The parameter is not applicable for You telecom its since POP and ISP GW are co-located.
- **ISP Gateway Node to IGSP / NIXI Node upstream Link(s) for International connectivity: (Benchmark <80%):** All the operators are meeting the benchmarks in both live and one-month data verification except BSNL with the value of 80.71% in 3 days live verification. Tikona has exceeded the Benchmark limits in both Live and Month data (84.58% &87.03% respectively). TTSL has also exceeded the Benchmark limits for both Live and Month data.



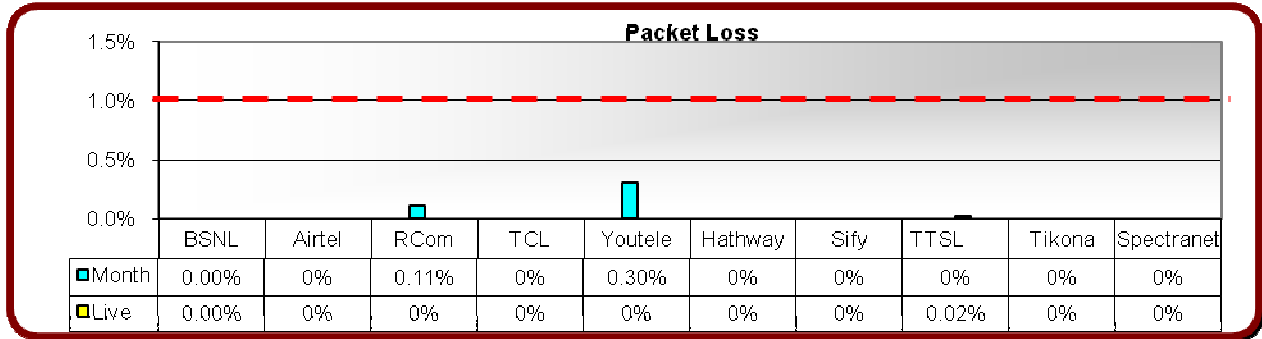
Broadband Connection Speed (download) (>80%): All the operators are meeting the TRAI benchmark of greater than 80% connection speed in both live and one-month data verification . Rcom has not provided Month data.



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.

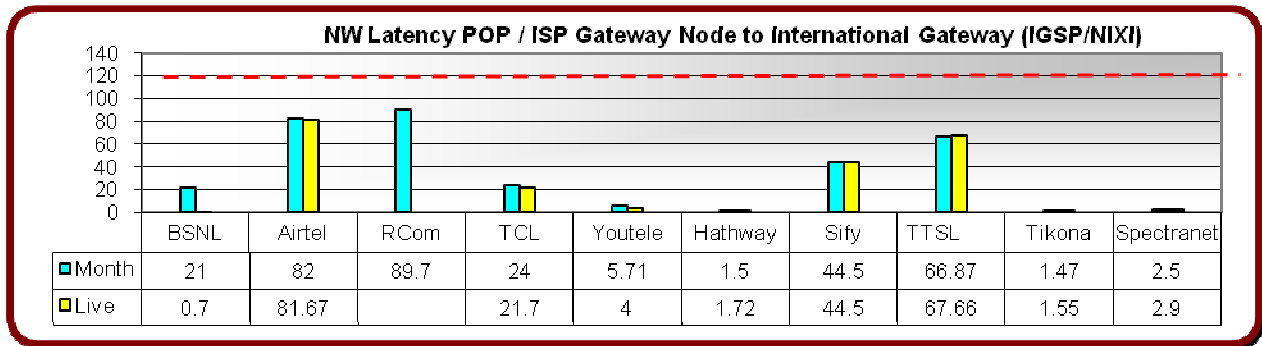


Packet Loss (Should be less than 1%): All operators are meeting the benchmark in both live and one-month data verification

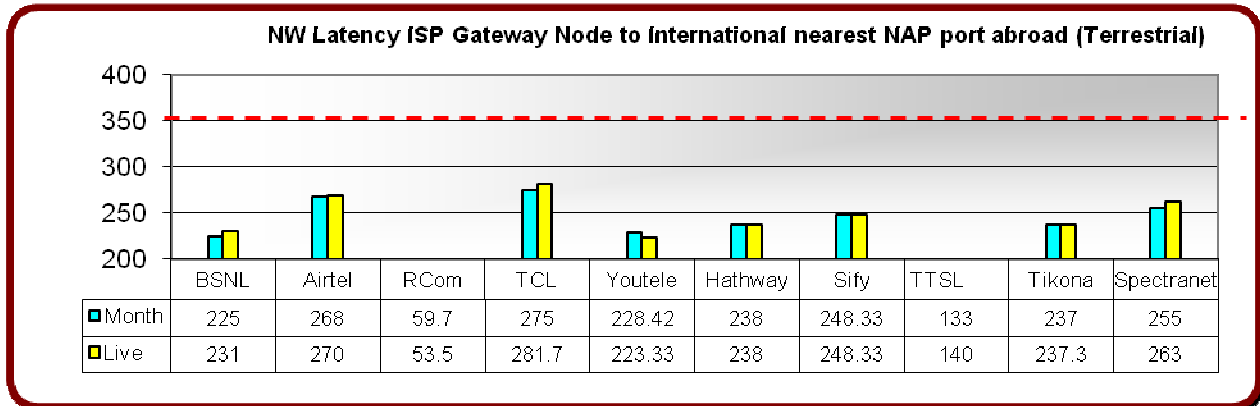


Network Latency:

- **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.



- **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.



- **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 all the operators.

3) Customer Care & Grievances Redressal

Call centre	BSNL	Airtel	TCL	RCOM	TTSL	Spectranet	Hathway	Yotele	Sify
Total complaints received in Call centre	1486	28114	3286	291	42	486	60612	549	407
Complaints per 100 subscribers / month	0.29%	11.96%	NP	2.3%	NP	NP	NP	NP	NP
Total complaints redressed by Call centre with in specified Limit	NP	NP	NP	NP	NP	NP	NP	NP	NP
Total complaints received by nodal officers	NP	271	53	0	0	0	126	8	0
%age of complaints received by Nodal officer w.r.t to total complaints at call centre	NP	0.96%	1.6%	0%	0%	0%	0.21%	1.46%	0%
Total complaints redressed with in specified time limit, by Nodal officer	NP	NP	NP	NA	NA	NA	NP	NP	0
Total appeals received by appellate authority	NP	1	0	0	0	0	23	6	0
Percentage of appeal received with reference to total no of complaints received by the nodal officers	NP	NP	NP	0%	0%	0%	18.2%	75%	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.

4) Critical Analysis

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

Service provisioning/Activation time: Except TCL, Hathway and Spectranet, other service providers are found to be performing well by providing 100% service within 15 days.

Fault Repair/Restoration time & Rebate: TTSL is deviating in both the cases, i.e. fault repair by next working day & within 3 days. You telecom, Hathway and Sify do not meet the Benchmark for repair within 3days. All the service providers are found to provide Rebate as per the guide lines set by TRAI.

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”. Sify has all its customers under prepaid module and hence no bills are issued.

Customer Care/Helpline Assessment: Hathway & TTSL do not meet the benchmarks for both calls answered within 60 sec and within 90 sec. The later parameter value has not been provided by Rcom & TCL and therefore, their compliance to this parameter cannot be ascertained. All other operators are meeting these benchmarks

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. In case of You Telecom, POP & ISP GW are co-located and therefore, this parameter is not applicable.
- **ISP Gateway Node to IGSP/ NIXI Node upstream links for International connectivity:** All the operators are meeting the benchmark during measurements of both live & one-month data Verification except TTSL and Tikona which have exceeded the Benchmark limit of $\leq 80\%$ for both Live and Month and BSNL which has a marginal above-benchmark value in live data.
- **Broadband Connection speed:** All the operators are meeting the TRAI benchmark of greater than 80% speed during measurements of both live & one-month data verification.

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.

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.
- **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.
- **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 any of the operators.

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

Airtel: Meets all the QOS Benchmark except Response time to customer assistance for calls answered by operator with in 90 sec. with a low value of 75.27%.

BSNL: All the QOS Parameters are meet except the Bandwidth Utilisation between ISP GW to IGSP/NIXI upstream links for international connectivity where the 3 days live traffic is just marginally above the Benchmark (exceeding by 0.71%).

Reliance: Meets all the QOS Benchmark except Response time to customer assistance –answer within 90 Secs for which it has provided any data.

TCL: Meets all the QOS Benchmark except Service provisioning (99.63%). Also, it has not provided data for Response time to customer assistance –answer with in 90Sec.

You telecom: Meets all the QOS parameters except Fault repair within 3 days where it has a value of 98.36% against the benchmark of 99%. Bandwidth Utilisation between POP to ISP Gateway Node is not applicable as they are co-located.

Hathway: It has activated 94.4% connections in 15 days’ time against the benchmark value of 100%. Also, Fault repair within 3 days is below benchmark (97%). Response time to customer assistance (within 60 sec and within 90 sec) is well below the Benchmark.

Sify: Meets all the QOS parameters except Fault repair within 3 days is 93.2%. Billing performance data is not applicable since the operator has only prepaid customers.

Tikona: It has not provided data for customer service/satisfaction related parameters despite several interactions with them. The BW utilization between ISP GW – IGSP/NIXI upstream node is above the 80% benchmark in both 3 days live & month data audit.

TTSL: Fault repair within 3 days is below benchmark in both 3 days live & month data audit. Also, Response time to customer assistance (within 60 sec and within 90 sec) is well below the Benchmark. The BW utilization between ISP GW – IGSP/NIXI upstream node is above the 80% benchmark in both 3 days live & month data audit.

Spectranet: It has activated 99.12% connections in 15 days’ time against the benchmark value of 100%. Meets all the other QOS parameters.