

REPORT
ON
AUDIT & ASSESSMENT OF QUALITY OF SERVICE
OF
CELLULAR MOBILE TELEPHONE SERVICE
WIRELINE BASIC SERVICE
&
BROADBAND SERVICE
FOR
NORTH ZONE – JAMMU & KASHMIR CIRCLE
Report Period: October 2011 – December 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.

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 lay 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.
- vii) Emergency (level 1) calls testing.

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 Jammu & Kashmir 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 was conducted for only operators who have a subscriber base of more than 10,000 in the circle. 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, Wireline and Broadband Services in Jammu & Kashmir Circle in 4th quarter (October – December 2011). The primary data collection and verification of records (PMR data verification – quarterly) maintained by various operators was undertaken for the period April – June 2011.

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

S/N	Name of Service Provider	Month of Audit	TCBH Hour
GSM Operators			
1	Aircel Ltd	Dec-2011	2000-2100 Hrs
2	Airtel Ltd	Oct-2011	2000-2100 Hrs
3	BSNL	Dec-2011	2000-2100 Hrs
4	Idea	Oct-2011	2000-2100 Hrs
5	Reliance Communications	Nov-2011	2000-2100 Hrs
6	Vodafone	Oct-2011	2000-2100 Hrs
CDMA Operators			
7	Tata Communications	Nov-2011	2000-2100 Hrs

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	idea	Reliance	V-fone	TATA
S/N	Name of Parameter								
1	Network Service Quality Parameter								
	Network Availability								
	a) BTS Accumulated Downtime	<=2%	0.53%	0.02%	2.11%	1.39%	0.28%	0.04%	0.05%
	b) Worst affected BTSs due to downtime	<=2%	0.00%	0.00%	0.54%	0.00%	0.00%	0.00%	0.00%
	Connection Establishment (Accessibility)								
	c) CSSR (Call Setup Success Rate)	>=95%	97.76%	99.10%	98.00%	99.14%	99.21%	99.60%	99.27%
	d) SDCCH/PAGING congestion	<=1%	0.12%	0.10%	0.83%	0.09%	0.01%	0.01%	0.00%
e) TCH congestion	<=2%	1.75%	0.18%	1.74%	0.45%	0.17%	0.40%	0.00%	
2	Connection maintenance (retainability)								
	a) CDR	<=2%	1.63%	0.90%	1.77%	1.49%	0.70%	1.22%	0.68%
	b) Worst affected cells>3% TCH drop	<=3%	7.27	1.76	0.16	2.6	0.25	4.60	2.24
	c) Good voice quality	>=95%	92.97%	98.46%	NA	96.27%	98.65%	97.40%	NA
3	No. of POI having congestion >0.5%	<0.5%	0	0	0	0	0	0	0
4	Response time to customers for assistance								
	a) Accessibility of call centre/Customer Care	>=95%	100%	NP	100%	100%	99%	100%	100%
	b) % call answered by operators(voice to voice) within 60 sec.	>=90%	93%	98%	92%	95%	95%	98%	98%
NA: Not Applicable, NR: Not Received									

According to the live data findings, Aircel & Vodafone are not meeting the benchmark for "Worst affected cells >3% TCH drop". BSNL and Tata CDMA have not reported parameter named "Good Voice Quality" as data is not fetched by their systems. Aircel is not meeting "Good Voice Quality" and BSNL is having a high "BTS Accumulated Downtime".

One Month Data Audit		Bench- mark	Aircel	Airtel	BSNL	idea	Reliance	V-fone	TATA
S/N	Name of Parameter		GSM Operators						CDMA Operator
(A)	Network Service Quality Parameter								
1	Network Availability								
	a) BTS Accumulated Downtime	<=2%	0.05%	0.00%	0.20%	0.13%	0.03%	0.00%	0.01%
	b) Worst affected BTSs due to downtime	<=2%	0.16%	0.01%	0.12%	0.01%	0.06%	0.00%	0.00%
2	Connection Establishment (Accessibility)								
	a) CSSR (Call Setup Success Rate)	>=95%	97.62%	99.12%	98.00%	99.20%	99.01%	99.34%	99.21%
	b) SDCCH/PAGING congestion	<=1%	0.17%	0.13%	0.83%	0.09%	0.01%	0.14%	0.00%
	c) TCH congestion	<=2%	1.82%	0.18%	1.57%	0.25%	0.29%	0.66%	0.00%
3	Connection maintenance (retainability)								
	a) CDR	<=2%	1.51%	0.89%	1.59%	1.38%	0.66%	1.23%	0.73%
	b) Worst affected cells>3% TCH drop	<=3%	6.38	1.74	0.16	2.9	0.65	4.58	2.02
	c) Good voice quality	>=95%	92.85%	98.67%	NA	96.06%	98.71%	97.39%	NA
4	No of POI having congestion>0.5%	<0.5%	0	0	0	0	0	0	0
(B)	Customer Service Quality Parameters								
5	Metering/billing credibility-Post paid	<= 0.1%	0.02%	0.01%	0.00%	0.00%	0.04%	0.02%	0.06%
6	Metering /billing credibility-Pre paid	<= 0.1%	0.00%	0.00%	0.03%	0.00%	0.07%	0.01%	0.02%
7	Resolution of billing/ charging complaints	100% within 4 weeks	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%
8	Response time to customers for assistance								
	a) Accessibility of call centre/Customer Care	>=95%	100%	99%	100%	95%	99%	100%	99%
	b) % call answered by operators(voice to voice) within 60 sec.	>=90%	90.40%	97.00%	95.19%	87.00%	96.55%	96.00%	NP
9	Termination/closure of service	<=7days	100%	100%	100%	100%	100%	100%	100%
10	Time taken for refunds of deposits after closures.	100% within 60 days	100%	100%	100%	100%	100%	100%	100%

NA: Not Applicable, NR: Not Received

According to the month data findings, benchmark for "Worst affected cells > 3% TCH Drops" is not met by Aircel & Vodafone. Aircel is not meeting the parameter named "Good Voice quality". BSNL & Tata CDMA have not reported "Good Voice Quality" as data is not fetched by their systems. Idea is not meeting the parameter "% call answered by operators (voice to voice) within 60 sec."

Operator-Assisted Drive Test

The Operator Assisted Drive Test was conducted in Jammu & Kashmir for all the operators. The main agenda of this Drive Test was to capture the actual picture of all Service Providers on ground level and for that cities chosen are Jammu & Baramula. During test drive, Route covered was about around 80-100 Km depending on city areas within the speed limit of 30Km/hr. In all the cities, zones were selected for covering different density areas (High, Medium & Low dense areas).

The drive test could not be held in Kargil due to the blockage of roads in the winter season due to heavy snowfall.

SN	Parameter	City Name	Aircel	Airtel	BSNL	Idea	Reliance	Vodafone	Tata		
			GSM Operators							CDMA Operators	
1.1	Blocked Call Rate (<=3%)	Jammu	0.00%	0.00%	1.14%	0.00%	1.34%	0.00%	0.00%		
		Baramula	0.00%	0.00%	1.14%	0.00%	0.00%	1.25%	0.00%		
1.2	Dropped Call Rate (<=2%)	Jammu	0.00%	0.00%	0.01%	0.00%	0.00%	0.94%	2.56%		
		Baramula	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%		
1.3	Percentage of connections with good voice quality (=>95%)										
		(i) 0-4 (w/o frequency hopping)	Jammu	NA							96.16%
			Baramula	NA							97.77%
		(ii) 0-5 (with frequency hopping)	Jammu	94.83	98%	98.79%	96.50%	95.00%	97.70%	NA	
	Baramula	94.83	96%	96.20%	96.20%	95%	98.75%				
1.4	Call Setup Success Rate (>=95%)	Jammu	100%	100%	98.86%	100%	98.66%	100%	100%		
		Baramula	100%	100%	98.86%	100%	100%	98.75%	100%		

According to the Operator Assisted Drive Test Findings, "Percentage of connections with good Quality" is not met by Aircel. Tata CDMA not meeting the benchmark Dropped call rate in Jammu.

Independent Drive Test

SN	Parameter	Reliance (Udhampur r)	Aircel (Doda)
		GSM Operators	
1.1	Call Attempts	32	20
1.2	Blocked Call Rate ($\leq 3\%$)	0.00%	0.00%
1.3	Dropped Call Rate ($\leq 2\%$)	0.00%	0.00%
1.4	Percentage of connections with good voice quality ($\geq 95\%$)		
	(i) 0-4 (w/o frequency hopping)		
	(ii) 0-5 (with frequency hopping)	98.00%	100.00%
1.5	Service Coverage		
	In door ($\geq -75\text{dBm}$)	92	99
	In-vehicle ($\geq -85\text{dBm}$)	100	100
	Out door- in city ($\geq -95\text{dBm}$)	100	100
1.6	Call Setup Success Rate ($\geq 95\%$)	100%	100%

According to Independent Drive Tests, both the Operators (Reliance and Aircel) are meeting all the parameters in the respective cities. Since Airtel has no service in Poonch town, Drive test was not conducted there.

(B) Basic Telephone Service (Wireline) Providers

3 Days Live Data Audit

S/N	Name of Parameter	Bench mark	BSNL
1	No. of faults/100 subscribers /month	$\leq 5\%$	4.18%
2	Call Completion Ratio (CCR) & Answer to Seizure Ratio (ASR)	$\geq 55\%$ (CCR) & $\geq 75\%$ (ASR)	58.95%
3	POI Congestion	$\leq 0.5\%$	2
4	Response Time to customer for assistance		
a	Accessibility of Call centre within 40 sec.	$\geq 95\%$	95.00%
b	% age of calls answered by operator (voice to voice) within 60 sec.	$\geq 90\%$	91.00%

From the 3 days live data audit, it was observed that BSNL meets the benchmarks for all the parameters. BSNL shows 2 POIs with congestion $\geq 0.5\%$.

One Month Data Audit

S/N	Name of Parameter	Bench mark	BSNL
1	No. of faults/100 subscribers /month	$\leq 5\%$	5.07%
2	Fault repair (Urban Area)		
a	By next working day	$\geq 90\%$	NP
b	Within 3 days	100%	63.07%
3	Fault repair (Rural & Hilly Area)		
a	By next working day	$\geq 90\%$	NP
b	Within 5 days	100%	88.84%
4	Rent rebate		
a	Fault pending > 3 days & <7 days	Rebate for 7 days	NP
b	Fault Pending > 7 days & < 15 days	Rebate for 15 days	NP
c	Fault pending > 15 days	Rebate for one month	NP
5	Mean time to Repair (MTTR)	≤ 8 Hrs	5.25
6	Call Completion Ratio (CCR) & Answer to Seizure Ratio (ASR)	$\geq 55\%$ (CCR) & $\geq 75\%$ (ASR)	60.69%
7	Metering and billing credibility (Post-paid)		
a	Disputed Bills over bills issued	$< 0.1\%$	NP
8	% of billing complaints resolved within 4 weeks	Within 4 weeks	NP
a	Period of refunds after resolution of complaints within 1 weeks	Within 1 week	NP
9	POI Congestion	$\leq 0.5\%$	2
10	Response Time to customer for assistance		
a	Accessibility of Call centre within 40 sec.	$\geq 95\%$	NP
b	% age of calls answered by operator (voice to voice) within 60 sec.	$\geq 90\%$	NP
11	Customer care (promptness in attending to customers' requests)		
a	Termination / Closures	≤ 7 Days	NP
b	Time taken refunds deposit after closures	100% within 60 days	NP

From the Month data table, it can be observed that BSNL has a slight deviation in the “fault incidence” parameter. It has 2 POIs with more than benchmark congestion.

(C) Broadband Service Providers**3 Days Live Data Audit**

S/N	Parameters	Bench- marks	BSNL
1	<i>Response time to the customer for assistance % age of calls answered by operator (Voice to Voice)</i>		
	within 60 sec	> 60%	67.85%
	within 90 sec	> 80%	85%
2	<i>Bandwidth Utilization/ Throughput</i>		
2.1	POP to ISP Gateway Node [Intra-network] Link(s)	< 90%	47.20%
2.2	ISP Gateway Node to IGSP / NIXI Node upstream Link(s) for International connectivity	< 90%	76.00%
2.3	Broadband Connection Speed (download) - from ISP Node to User	> 80%	89.9%
3	<i>Service Availability/Uptime (for all users)</i>		
	Service Availability(%)	> 98%	100%
4	<i>Packet loss</i>		
	% of Packet loss	< 1%	0.02%
5	<i>Network latency (for wired broadband access)</i>		
5.1	User reference point at POP/ISP Gateway node to IGSP/NIXI	< 120 ms	68
5.2	User reference point at ISP Gateway node to International nearest NAP port abroad (terrestrial)	< 350 ms	236

NA – Not Applicable, NP – Data Not Provided

BSNL is meeting all the prescribed benchmarks.

One Month Data Audit

S/N	Parameters	Bench- marks	BSNL
1	<i>Service Provisioning/Activation Time</i>		
1.1	in 15 days	<15 days	100%
1.2	In all cases where payment towards installation charge & SD is taken and the Broadband connection is not provided within 15 working days	credit @ Rs.10/ per day.	NA
2	<i>Faults Repair/Restoraion Time</i>		
	By next working day	≥90%	96.07.%
	within 3 working day	≥99%	98.35%
2.1	<i>Rebate</i>		
	Faults Pending for > 3 working days and < 7 working days: (Rebate equivalent to 7 days of minimum monthly charge or equivalent usage allowance)		0
	Faults Pending for > 7 working days and < 15 working days: (Rebate equivalent to 15 days of minimum monthly charge or equivalent usage allowance)		0
	Faults Pending for > 15 working days:(Rebate equivalent to one month of minimum monthly charge or equivalent usage allowance)		0
3	<i>Billing Performance</i>		
	Billing complaints per 100 bills issued	<2%	0.09%
	%age of Billing Complaints resolved within 4 weeks	100%	100%
	Time taken for refund of deposits after closure (within 60 days)	100%	100%
4	<i>Response time to the customer for assistance % age of calls answered by operator (Voice to Voice)</i>		
	within 60 sec	>60%	78.60%
	within 90 sec	>80%	90.40%
5	<i>Bandwidth Utilization/ Throughput</i>		
5.1	POP to ISP Gateway Node [Intra-network] Link(s)	< 90%	48.50%
5.2	ISP Gateway Node to IGSP / NIXI Node upstream Link(s) for International connectivity	< 90%	78.00%
5.3	Broadband Connection Speed (download) - from ISP Node to User	> 80%	90.40%
6	<i>Service Availability/Uptime (for all users)</i>		
	Service Availability(%)	>98%	99.33%
7	<i>Packet loss</i>		
	% of Packet loss	<1%	0.02%
8	<i>Network latency (for wired broadband access)</i>		
8.1	User reference point at POP/ISP Gateway node to IGSP/NIXI	<120 ms	70.5
8.2	User reference point at ISP Gateway node to International nearest NAP port abroad (terrestrial)	<350 ms	240.37
8.3	User reference point at ISP Gateway node to International nearest NAP port abroad (satellite)	<800 ms	NA

NA – Not Applicable, NP – Data Not Provided

BSNL is meeting all the prescribed benchmarks except for fault restoration within next 3 days..

CHAPTER-3: Audit-PMR data verification results

I. Cellular Mobile Telephone Service

PMR		Bench-mark	Audit	Aircel	Airtel	IDEA	BSNL	Reliance	V-FONE	TATA	
S/N	Name of Parameter			GSM Operators							CDMA Operator
(A)	Network Service Quality Parameter										
1	Network Availability										
	BTS Accumulated Downtime	<=2%	Reported	0.15%	0.14%	0.21%	1.90%	0.00%	0.00%	0.07%	
			Verified	0.15%	0.14%	0.21%	1.90%	0.00%	0.00%	0.07%	
	Worst affected BTSs due to downtime	<=2%	Reported	0.76%	0.67%	1.11%	1.74%	0.01%	0.00%	0.00%	
			Verified	0.76%	0.67%	1.11%	1.74%	0.01%	0.00%	0.00%	
2	Connection Establishment (Accessibility)										
	CSSR (Call Setup Success Rate)	>=95%	Reported	96.0%	99.0%	99.0%	98%	99%	99%	99%	
			Verified	96.0%	99.0%	99.0%	98%	99%	99%	99%	
	SDCCH/PAGING congestion	<=1%	Reported	0.43%	0.12%	0.19%	0.90%	0.00%	0.00%	0.00%	
			Verified	0.43%	0.12%	0.19%	0.90%	0.00%	0.00%	0.00%	
	TCH congestion	<=2%	Reported	3.32%	0.16%	0.31%	1.90%	0.01%	0.00%	0.10%	
			Verified	3.32%	0.16%	0.31%	1.90%	0.01%	0.00%	0.10%	
3	Connection maintenance (retainability)										
	CDR	<=2%	Reported	1.11%	0.80%	1.66%	2.00%	0.00%	0.01%	0.68%	
			Verified	1.11%	0.80%	1.66%	2.00%	0.00%	0.01%	0.68%	
	Worst affected cells>3% TCH drop	<=3%	Reported	0.06%	0.02%	2.69%	4.80%	0.00%	0.03%	1.00%	
			Verified	0.06%	0.02%	2.69%	4.80%	0.00%	0.03%	1.00%	
	Good voice quality	>=95%	Reported	93.0%	99%	97.0%	98.0%	97.0%	98.0%	99.0%	
			Verified	93.0%	99%	97.0%	98.0%	97.0%	98.0%	99.0%	
4	No. of POI having congestion>0.5%	<0.5%	Reported	0.67	0	0	0	0	0	0	
			Verified	0.67	0	0	0	0	0	0	
(B)	Customer Service Quality Parameters										
5	Metering/billing credibility-Post paid	<= 0.1%	Reported	0.00%	0.00%	0.00%	0.1%	0.00%	0.00%	0.00%	
			Verified	0.00%	0.00%	0.00%	0.05%	0.00%	0.00%	0.00%	
6	Metering /billing credibility-Pre paid	<= 0.1%	Reported	0.04%	0.00%	0.00%	0.06%	0.00%	0.00%	0.00%	
			Verified	0.04%	0.00%	0.00%	0.06%	0.00%	0.00%	0.00%	

PMR		Bench-mark	Audit	Aircel	Airtel	IDEA	BSNL	Reliance	V-FONE	TATA	
S/N	Name of Parameter			GSM Operators							CDMA Operator
7	Resolution of billing/ charging complaints	<i>100% within 4 weeks</i>	Reported	100%	100%	100%	100%	100%	100%	100%	
			Verified	100%	100%	100%	100%	100%	100%	100%	
	Period of applying credit/waiver/adjustment to the customers account from the date of resolutions of complaints	<i><=1 week</i>	Reported	100%	100%	100%	100%	100%	100%	100%	
			Verified	100%	100%	100%	100%	100%	100%	100%	
8	Response time to customers for assistance										
	Accessibility of call centre/Customer Care	<i>>=95%</i>	Reported	100%	97%	97%	100%	100%	100%	95%	
			Verified	100%	97%	97%	100%	100%	100%	95%	
	% call answered by operators(voice to voice) within 60 sec.	<i>>=90%</i>	Reported	88%	91%	72%	95%	96%	98%	95%	
			Verified	88%	91%	72%	95%	96%	98%	95%	
9	Termination/closure of service										
	No.of requests for Termination / Closure of service complied within 7 days during the quarter	<i><=7days</i>	Reported	100%	100%	100%	100%	100%	100%	100%	
			Verified	100%	100%	100%	100%	100%	100%	100%	
10	Time taken for refunds of deposits after closures.	<i>100% within 60 days</i>	Reported	100%	100%	100%	100%	100%	100%	100%	
			Verified	100%	100%	100%	100%	100%	100%	100%	

NA: Not Applicable, NR: Not Received

Note: No Deviation is found when compared with Operator reported data.

II. Basic Service (Wireline) Service

S/N	Parameters	Bench-marks	Audit	TTSL	BSNL
1	<i>Fault incidences</i>				
	(No. of faults/100 subscribers /month)	< 5%	Reported	NIL	6.15%
			Verified	NIL	6.15%
2	<i>Faults Repair/Restoration Time</i>				
	Fault repair by next working day(Urban Area)	>90%	Reported	NR	69.76%
			Verified	NR	69.76%
	Within 3 days	100%	Reported	NR	83.19%
			Verified	NR	83.19%
	Within 5 days (Hilly & Rural Area)	100%	Reported	NR	93.05%
			Verified	NR	93.05%
	Mean time to Repair(MTTR)	≤8 Hrs	Reported	NR	6.82
			Verified	NR	6.82
3	<i>Rent Rebate</i>				
	Rent Rebate		Reported	NIL	NIL
			Verified	NIL	NIL
4	<i>Call Completion Ratio(CCR) & Answer to seizure Ratio(ASR)</i>				
	CCR & ASR	> 55%(CCR) & > 75%(ASR)	Reported	98.89%	67.28%
			Verified	98.89%	67.28%
5	<i>Metering & Billing Performance</i>				
	Metering & Billing Credibility-Post paid	< 0.1%	Reported	NIL	0.01%
			Verified	NIL	0.01%
	Metering & Billing Credibility-Pre paid	100%	Reported	NA	NR
			Verified	NA	NR
	Resolution of billing charging/validity/Complaints within 4 weeks	100%	Reported	NR	NR
			Verified	NR	NR
	Period of all refunds/payments from the date of resolution of complaints within 1 weeks	100%	Reported	NR	NR
			Verified	NR	NR
6	<i>POI Congestion</i>				
	No. of POI's having Congestion >0.5%	≤ 0.5%	Reported	NIL	NR
			Verified	NIL	NR

S/N	Parameters	Bench-marks	Audit	TTSL	BSNL
7	<i>Response Time to customer for assistance</i>				
	Accessibility of Call centre/customer Care within 40 seconds	≥95%	Reported	98.61%	91.61%
			Verified	98.61%	91.61%
	% age of calls answered by operator(voice to voice) within 60 seconds	≥90%	Reported	95.65%	94.33%
			Verified	95.65%	94.33%
8	<i>Customer care(promptness in attending to customers request</i>				
	Termination / Closures	100%	Reported	NIL	100%
			Verified	NIL	100%
	Time taken for refunds of deposit after closures	100%	Reported	NIL	100%
			Verified	NIL	100%

NA – Not Applicable NR – Data Not Received

Note: No Deviation is found when compared with Operator reported data.

III. Broadband Service

S/N	Parameters	Benchmarks	Audit	BSNL
1	<i>Service Provisioning/Activation Time</i>			
1.2	%age of connections provided within 15 days of registration of demand	100%	Reported	100.00%
			Verified	100.00%
2	<i>Faults Repair/Restoration Time</i>			
2.1	% of faults repaired by next working day	>90%	Reported	94.30%
			Verified	94.30%
2.2	% of faults repaired within 3 working day	≥99%	Reported	98.60%
			Verified	98.60%
3	<i>Rent Rebate</i>			
3.1	Rent Rebate(nos)		Reported	0
			Verified	0
4	<i>Billing Performance</i>			
4.1	%age of bills disputed	<2%	Reported	0.10%
			Verified	0.10%
4.2	%age of complaints resolved within 4 weeks	100%	Reported	98.70%
			Verified	98.70%
4.3	%age of cases to whom refund of deposits is made within 60 days of closures	100%	Reported	99.90%
			Verified	99.90%
5	<i>Response Time to the Customer for assistance</i>			
5.1	%age of calls answered by operator (Voice to voice) within 60 sec	>60%	Reported	80.80%
			Verified	80.80%
5.2	%age of calls answered by operator (Voice to voice) within 90 sec	>80%	Reported	92.80%
			Verified	92.80%
6	<i>Bandwidth utilisation/throughput</i>			
6.1	No. of Intra network links having Bandwidth utilisation >90% during peak hours (TCBH)		Reported	0
			Verified	0
6.2	No. of Upstream links for International connectivity having BW utilisation >90% Peak Hrs.(TCBH)		Reported	3
			Verified	3
6.3	% International bandwidth utilization during peak hours (TCBH) (Enclose MRTG)	<90%	Reported	78.10%
			Verified	78.10%
6.4	Broadband Connection Speed available (download) from ISP node to user	>80%	Reported	91.20%
			Verified	91.20%
7	<i>Service Availability/Uptime (for all users) in %age</i>			
7.1	Service availability /uptime (for all users) in %age	>98%	Reported	98.50%
			Verified	98.50%

S/N	Parameters	Benchmarks	Audit	BSNL
8	<i>Packet loss</i>			
8.1	% of Packet loss	<1%	Reported	0.04%
			Verified	0.04%
9	<i>Network latency (for wired broadband access)</i>			
9.1	User reference point at POP/ISP Gateway node to IGSP/NIXI	<120 ms	Reported	26.3
			Verified	26.3
9.2	User reference point at ISP Gateway node to International nearest NAP port abroad (terrestrial)	<350 ms	Reported	233.7
			Verified	233.7
9.3	User reference point at ISP Gateway node to International nearest NAP port abroad (satellite)	<800 ms	Reported	0.00
			Verified	0.00

Note: No Deviation is found when compared with Operator reported data.

CHAPTER-4: DETAILED FINDINGS & ANALYSIS

I. Cellular Mobile Telephone Service

(A) MSC Audit

(1) 3 Days Live measurement Data assessment & Summarized Findings

S/N	Name of Parameter	Benchmark	Aircel	Airtel	BSNL	Idea	Reliance	Vodafone	TATA
			GSM Operators						
A	Network Service Quality Parameter								
1	Network Availability								
	a) BTS Accumulated Downtime	<=2%	0.53%	0.02%	2.11%	1.39%	0.28%	0.04%	0.05%
	b) Worst affected BTSs due to downtime	<=2%	0.00%	0.00%	0.54%	0.00%	0.00%	0.00%	0.00%
	1) Total no. of BTSs in the licensed service area		1775	2424	1113	469	950	1168	274
	2) Sum of downtime of BTSs in a month in hours i.e. total outage time of all BTSs in hours during a month		671	30.57	1689	469	191	29.706	10.5
	3) No. of BTSs having accumulated downtime of >24 hours in a month		0	0	6	0	0	0	0
	Connection Establishment (Accessibility)								
	c) CSSR	>=95%	97.76%	99.10%	98.00%	99.14%	99.21%	99.60%	99.27%
	d) SDCCH/PAGING congestion	<=1%	0.12%	0.10%	0.83%	0.09%	0.01%	0.01%	0.00%
	e) TCH congestion	<=2%	1.75%	0.18%	1.74%	0.45%	0.17%	0.40%	0.00%
2	Connection maintenance								
	a) CDR	<=2%	1.63%	0.90%	1.77%	1.49%	0.70%	1.22%	0.68%
	b) Cells having > 3% TCH drop	<=3%	7.27	1.76	0.16	2.6	0.25	4.60	2.24
	c) Good voice quality	>=95%	92.97%	98.46%	NA	96.27%	98.65%	97.40%	NA
	d) No. of cells > 3% TCH drop		383	125	5	108	7	160	20
	e) Total no. of cells in the network		5,270	7,085	3,038	1,370	2,850	3,476	893
3	No of POI having congestion>0.5%	<0.5%	0	0	0	0	0	0	0
	a) Name of POI not meeting the benchmark		Nil	NIL	NIL	NIL	NIL	NIL	NIL
	b) Total No. of circuits on POI		59,913	56,939	12,904	12,904	12,217	683,897	8,317
	c) Avg No. of call attempts on POI		2,024,060	1,266,077	287,194	701,276	174,253	13,120,464	35,652
	d) Avg traffic served on POI (Erlang)		29,929	27,168	9,923	20,374	5,367	256,783	761
	e) Total number of working POI Service Area wise		47	33	31	31	30	33	41

S/N	Name of Parameter	Benchmark	Aircel	Airtel	BSNL	Idea	Reliance	Vodafone	TATA
			GSM Operators						
	f) Equipped Capacity of Network in respect of Traffic in erlang		121,775	134,118	61,000	11,561	40,000	27,683	36,613
	g) Total traffic handled in TCBH in erlang		48,481	55,292	64,692	4,797	21,163	19,811	17,657
(B)	Customer Service Quality Parameters								
4	Response time to customers for assistance								
	a) Accessibility of call centre	$\geq 95\%$	100%	NP	100%	100%	99%	100%	100%
	b) % of call answered by operators(voice to voice) within 60 sec	$\geq 90\%$	93.42%	98.00%	91.50%	95.00%	94.50%	97.50%	98.00%
	c) No. of call attempts to call centre / customer care nos. during TCBH (Avg)		129,749	NP	518,052	253,253	4,620	1,944	3,081
	d) No. of calls connected and answered successfully to call centre / customer care nos. during TCBH (Avg)		121,209	92,735	471,882	8,161	4,433	19,613	3,047

Parameter-wise Findings (Live Data Assessment):

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

- **BTS accumulated downtime (benchmark $\leq 2\%$):** Except for BSNL with a value of 2.11%, all other operators are meeting the benchmark with values lying between 0.02% and 1.39%.
- **Worst affected BTSs due to downtime (benchmark $\leq 2\%$):** All operators are meeting benchmark with values lying between 0% and 0.54%.
- **Call setup success rate (benchmark $\geq 95\%$):** All operators are meeting the benchmark with values lying between 97.76% and 99.60%.
- **SDCCH/PAGING Channel congestion (benchmark $\leq 1\%$):** All operators are meeting the benchmark with values lying between 0% and 0.83%.
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% and 1.75%.
- **Call drop rate (benchmark $\leq 2\%$):** All other operators are meeting the benchmark with values lying between 0.68% and 1.77%.
- **Cell exceeding 3% TCH drop (benchmark $\leq 3\%$):** Except for Aircel (7.27%) and Vodafone (4.60%), rest of the operators are satisfying the benchmark with value in between 0.16% and 2.24%.
- **Connections with good voice quality (benchmark $\geq 95\%$):** Except for Aircel with a value of 92.97%, all other operators are meeting the benchmark with values lying between 96.27% and 98.65%. For this parameter, BSNL & Tata CDMA values are not system generated.
- **No. of POI's having Congestion $>0.5\%$:** No congestion on any operator's individual POI's. However, it was observed that some are in the range of over 100% though causing no traffic failure due to overflow technique i.e. the extra traffic is carried over by some other operating POI as has been designed to do so.
- **%age of call answered by operator (electronically) (benchmark >95):** All the operators are meeting the benchmark with values lying between 99% to 100%.
- **%age of call answered by operator (Voice to voice) (benchmark $>90\%$):** %): All the operators are meeting the benchmark with value in between 91.50% and 99%.

(2) One month audit Data report & Summarized Findings

S/N	Name of Parameter	Bench mark	Aircel	Airtel	BSNL	Idea	Reliance	Vodafone	TATA
			GSM Operators						
(A)	Network Service Quality Parameter								
1	Network Availability								
	a) BTS Accumulated Downtime	<=2%	0.05%	0.00%	0.20%	0.13%	0.03%	0.00%	0.01%
	b) Worst affected BTSs due to downtime	<=2%	0.16%	0.01%	0.12%	0.01%	0.06%	0.00%	0.00%
	c) Total no. of BTSs in the licensed service area		1,775	2,424	1,113	469	950	1,168	274
	d) Sum of downtime of BTSs in a month in hours i.e. total outage time of all BTSs in hours during a month		12,010	1,772	13,887	542	2,502	135	79
	e) No. of BTSs having accumulated downtime of >24 hours in a month		88	8	40	1	17	0	0
2	Connection Establishment (Accessibility)								
	a) CSSR (Call Setup Success Rate)	>=95%	97.62%	99.12%	98.00%	99.20%	99.01%	99.34%	99.21%
	b) SDCCH/PAGING congestion	<=1%	0.17%	0.13%	0.83%	0.09%	0.01%	0.14%	0.00%
	c) TCH congestion	<=2%	1.82%	0.18%	1.57%	0.25%	0.29%	0.66%	0.00%
3	Connection maintenance (retainability)								
	a) CDR	<=2%	1.51%	0.89%	1.59%	1.38%	0.66%	1.23%	0.73%
	b) Worst affected cells>3% TCH drop	<=3%	6.38	1.74	0.16	2.9	0.65	4.58	2.02
	c) Good voice quality	>=95%	92.85%	98.67%	NA	96.06%	98.71%	97.39%	NA
	d) Total No. of cells exceeding 3% TCH drop (call drop)		336	123	5	1,244	18	159	18
	e) Total no. of cells in the network		5,270	7,085	3,038	1,370	2,850	3,476	893
4	No of POI having congestion>0.5%	<0.5%	0	0	0	0	0	0	0
	a) Name of POI not meeting the benchmark		Nil	NIL	NIL	NIL	NIL	NIL	NIL
	b) Total No. of call attempts on POI (Avg.)		2,256,625	1,260,141	276,653	7,072,784	5,053,339	415,344	1,163,207
	c) Total traffic served on POI (Erlang) (Avg.)		32,544	32,320	9,957	206,354	155,655	24,648	25,777
	d) Total No. of circuits on POI		59,913	56,939	12,904	12,904	354,287	683897	8,317
	e) Total number of working POI Service Area wise		47	33	31	31	30	33	41

S/N	Name of Parameter	Bench mark	Aircel	Airtel	BSNL	Idea	Reliance	Vodafone	TATA
			GSM Operators						
	f) Capacity of POI		59,332	53,905	12,123	12,123	11,116	659,777	7,448
5	Network Data								
	a) Equipped Capacity of Network Erlang		121,775	134,118	61,000	11,561	40,000	27,683	36,613
	b) Total traffic handled in TCBH in erlang		48,481	85,009	77,786	5,122	21,163	29,432	17,558
	c) Total no. of customers served (as per VLR) on last day of the month		1,164,019	1,865,305	655,340	134,681	344,381	469054	78,990
(B)	Customer Service Quality Parameters								
6	Metering/billing credibility-Post paid	$\leq 0.1\%$	0.02%	0.01%	0.00%	0.00%	0.04%	0.02%	0.06%
	a) No. of bills issued during the period		88,947	54,420	7,188	7,188	19,014	20,023	44,057
	b) No. of bills disputed including billing complaints during the period		16	4	0	0	7	4	27
7	Metering /billing credibility-Pre paid	$\leq 0.1\%$	0.00%	0.00%	0.03%	0.00%	0.07%	0.01%	0.02%
	a) No. of charging / credit / validity complaints during the quarter		69	50	226	0	384	42	14
	b) Total no. of pre-paid customers at the end of the quarter		1,410,901	2,138,031	650,804	118,297	526,337	525,198	65,886
8	Resolution of billing/ charging complaints	<i>100% within 4 weeks</i>	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		3,055	3,431	16,150	362	403	1,143	41
	b) Total no. of billing (post paid) and charging, credit / validity (pre paid) complaints received during the quarter		3,055	3,431	16,313	362	403	1,143	41
	c) No. of billing complaints (post paid) and charging, credit/ validity complaints (pre paid) resolved in favour of the customer during the quarter		85	54	16,150	212	195	30	1

S/N	Name of Parameter	Bench mark	Aircel	Airtel	BSNL	Idea	Reliance	Vodafone	TATA
			GSM Operators						
	d) No. of complaints disposed on account of not considered as valid complaints during the quarter		2,970	3,377	163	150	208	16	40
	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%
9	Response time to customers for assistance								
	a) Accessibility of call centre/Customer Care	$\geq 95\%$	100%	99.00%	100%	95.00%	99.00%	100%	99.00%
	b) % call answered by operators(voice to voice) within 60 sec.	$\geq 90\%$	90.40%	97.00%	95.19%	87.00%	96.55%	96.00%	NP
	c) Total no. of call attempts to call centre & customer care nos. during TCBH (Avg.).		119,243	814,595	80,044	21,751	59,131	1,889	NP
	d) No. of calls connected and answered successfully to call centre & customer care nos. during TCBH (Avg.).		107,796	1,046,151	76,190	87,023	57,096	18,280	NP
10	Termination/closure of service	≤ 7 days	100%	100%	100%	100%	100%	100%	100%
	a) Total No. of requests for Termination / Closure of service received during the quarter		222	367	69008	149	48	190	149
	b) No.of requests for Termination / Closure of service complied within 7 days during the quarter		222	367	69008	149	48	190	149
11	Time taken for refunds of deposits after closures.	100% within 60 days	100%	100%	100%	100%	100%	100%	100%

NA: Not Applicable, NR: Not Received

Parameter-wise Findings (Month Data Assessment):

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

- **BTS accumulated downtime (benchmark $\leq 2\%$):** All operators are meeting the benchmark with values lying between 0% and 0.20%.
- **Worst affected BTSs due to downtime (benchmark $\leq 2\%$):** All operators are meeting the benchmark with values lying between 0% and 0.16%.
- **Call setup success rate (benchmark $\geq 95\%$):** All operators are meeting the benchmark with values lying between 97.62% and 99.34%.
- **SDCCH/PAGING Channel congestion (benchmark $\leq 1\%$):** All operators are meeting the benchmark with values lying between 0% and 0.83%.
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% and 1.82%.
- **Call drop rate (benchmark $\leq 2\%$):** All operators are meeting the benchmark with values lying between 0.66% and 1.59%.
- **Cell exceeding 3% TCH drop (benchmark $\leq 3\%$):** Except for Aircel (6.38%) and Vodafone (4.58%), rest of the operators are satisfying the benchmark with value in between 0.16% and 2.90%.
- **Connections with good voice quality (benchmark $\geq 95\%$):** Except for Aircel (92.85%), all other operators are meeting the benchmark with values lying between 96.06% and 98.71%. For BSNL & Tata CDMA, values are not system generated.
- **No. of POI's having Congestion $>0.5\%$:** No congestion on any operator's individual POI's. However, it was also observed that some operators are in the range of over 100% though causing no traffic failure due to overflow technique i.e. the extra traffic is carried over by some other operating POI as has been designed to do so.
- **%age of call answered by operator (electronically) (benchmark $>95\%$):** All the operators are meeting the benchmark with values lying between 95% to 100%.
- **%age of call answered by operator (Voice to voice) (benchmark $>90\%$):** Except for Idea, rest of the operators are meeting the benchmark with values lying between 90.40% to 97%. Data not reported by Tata CDMA.
- **Metering and billing credibility-Postpaid (benchmark $\leq 0.1\%$):** All operators are meeting the benchmark with values lying between 0% and 0.06%.
- **Metering and billing credibility-Pre paid (benchmark $\leq 0.1\%$):** All the operators are meeting the benchmark with values lying between 0% and 0.07%.
- **Resolution of billing/ charging complaints (benchmark 100% within 4 weeks):** All operators are meeting the benchmark.
- **Termination/Closure of service (Benchmark ≤ 7 days):** All operators have satisfied the benchmark.
- **Time taken for refunds of deposits after closures (benchmark 100% within ≤ 60 days):** All operators have satisfied the benchmark.

3) Sample Coverage

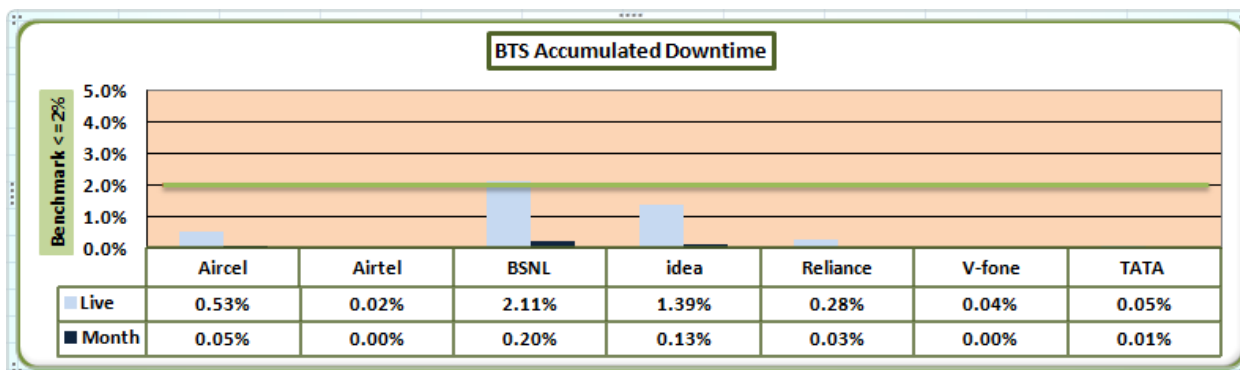
Switches/BSC/BTS details of operators:

S/N	Name of Service Provider	No. of MSC	No. of BSC	No. of BTS
GSM Operators				
1	Aircel Ltd	5	21	1774
2	Airtel Ltd	11	27	2415
3	BSNL	8	21	1082
4	Idea	1	2	525
5	Reliance Communications	2	5	918
6	Vodafone	4	15	1149
CDMA Operator				
7	Tata Communications	2	2	272

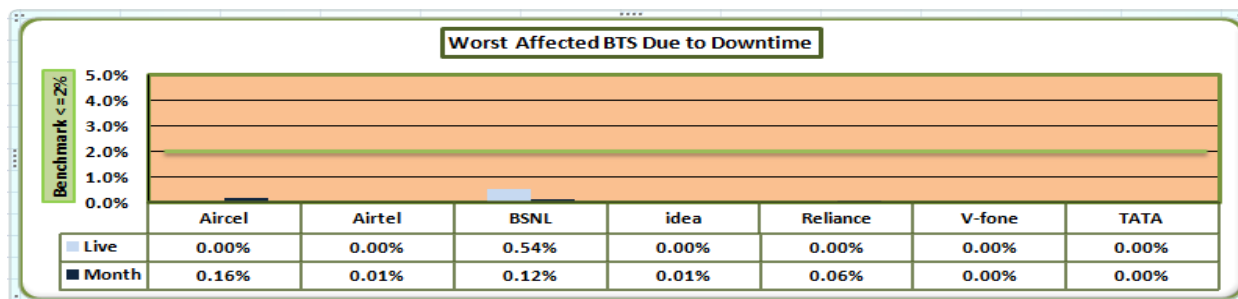
4) Performance (Graphical Representation)

A) NETWORK PERFORMANCE

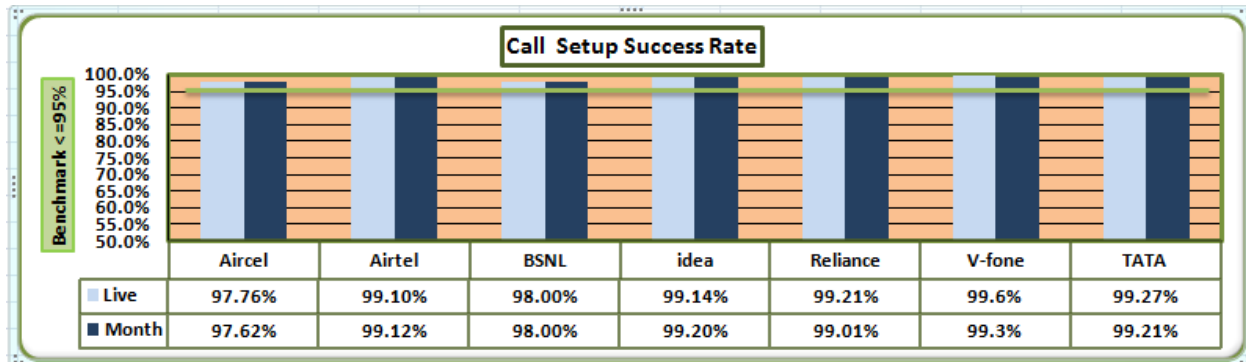
BTS accumulated downtime: Except BSNL for live data, all the operators are meeting the TRAI benchmark for both one month data and 3 days live data taken in the month of audit.



Worst affected BTSs due to downtime: All operators are meeting the TRAI benchmarks ($\geq 2\%$) for both one month data and 3 days live data taken in the month of audit.

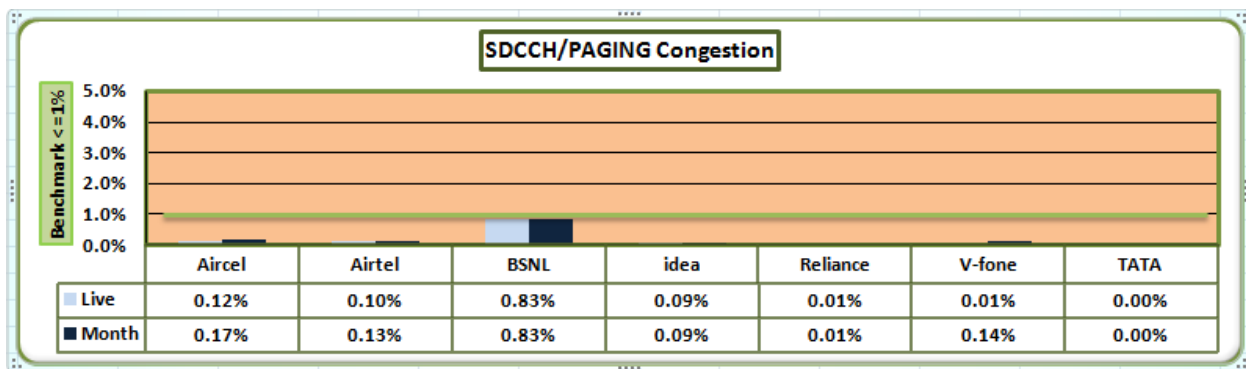


Call Setup Success Rate (CSSR): All operators are meeting the TRAI benchmarks ($\geq 95\%$) for both one month data and 3 days live data taken in the month of audit.

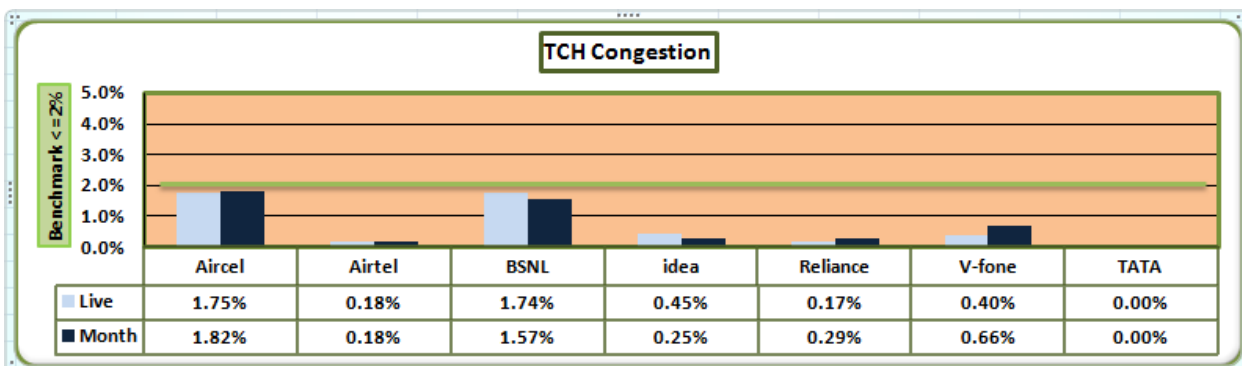


Blocked call rate:

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

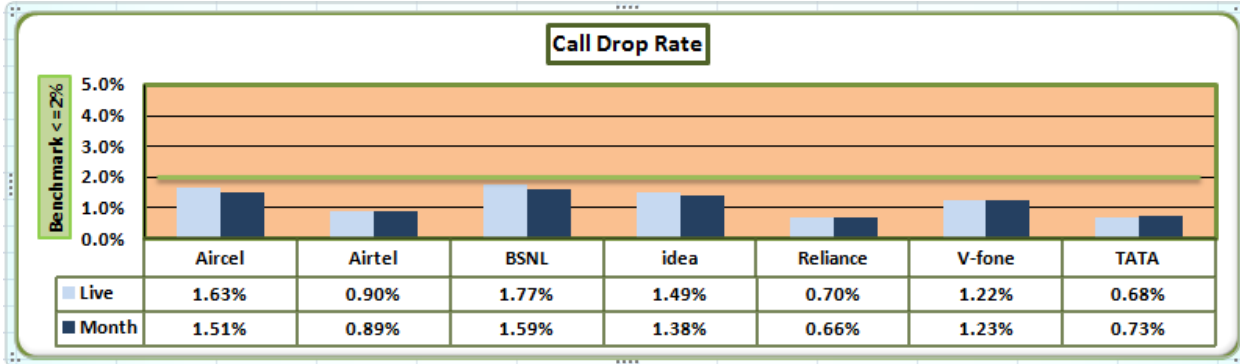


TCH congestion (%): All operators are meeting the TRAI benchmarks ($\leq 2\%$) for both one month data and 3 days live data.

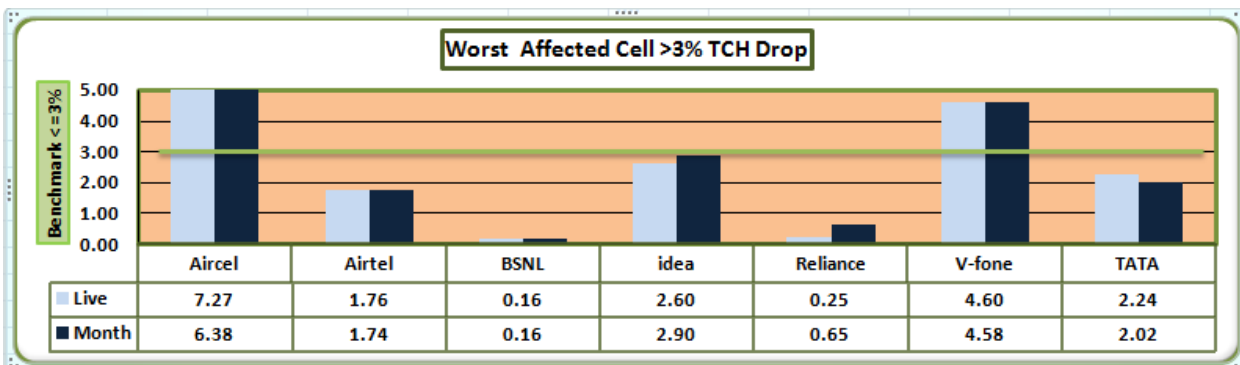


Connection Maintainability (Retainability):

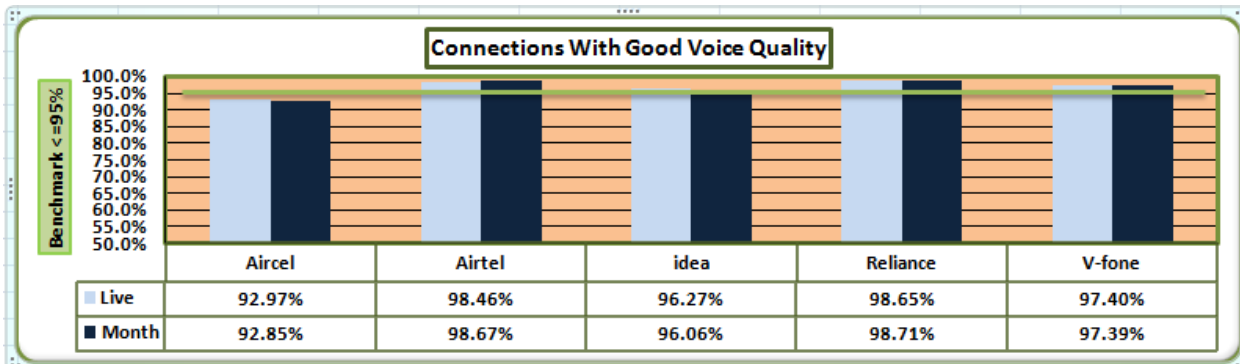
Call Drop Rate (CDR) (%): All the operators are meeting the TRAI benchmarks ($\leq 2\%$) for both one month data and 3 days live data.



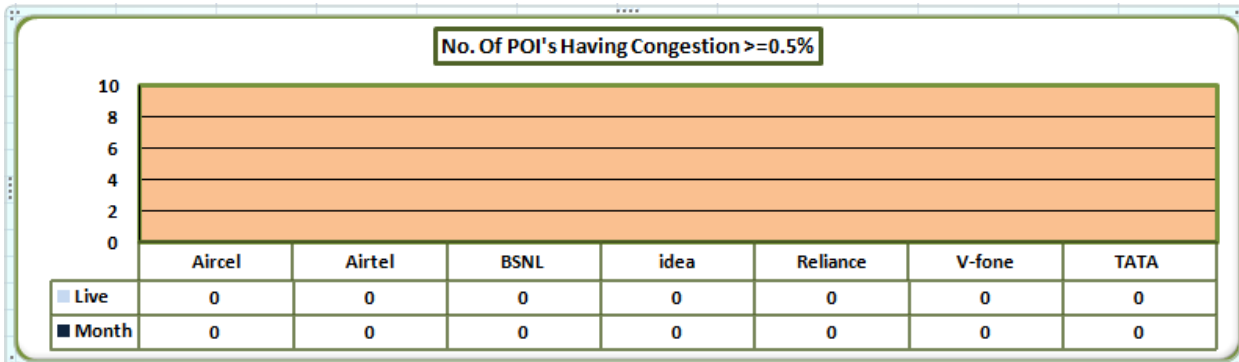
Worst affected Cell exceeding 3% TCH Drop: Except for Aircel & Vodafone for both month and live data, rest of the operators are meeting the benchmark for both cases.



Percentage of connections with good voice quality (benchmark $\geq 95\%$): Except for Aircel for both live and month data, rest all the operators are meeting the TRAI benchmarks ($\geq 95\%$) for both one month data and 3 days live data taken in the month of audit. For BSNL and Tata CDMA, values are not system generated.



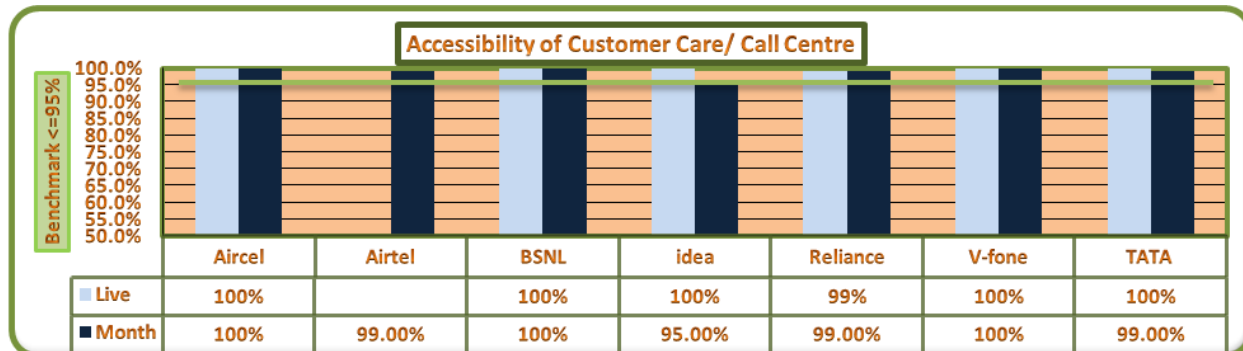
No of POI's having Congestion >0.5%: All operators are meeting the TRAI benchmarks ($\leq 0.5\%$) for both one month data and 3 days live data.



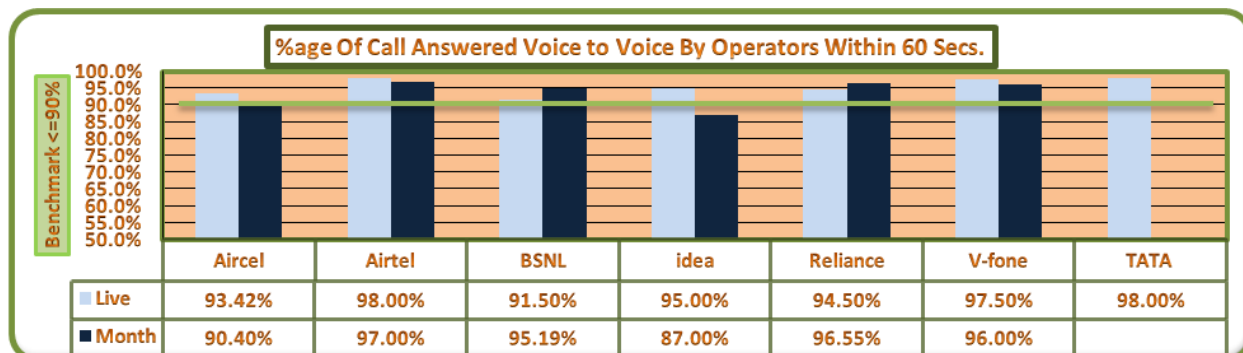
B) CUSTOMER SERVICE QUALITY PARAMETERS

Response time to the customer for assistance:

Percentage of call answered (Electronically): All operators are meeting the TRAI benchmarks ($\geq 95\%$) for both one month data and 3 days live data. Airtel has not provided the live data.



Percentage of call answered by operators (Voice to voice) within 60 sec: For month data, only Idea is not meeting the benchmark. Rest all the operators are meeting benchmark for both cases. Data not reported by Tata CDMA for month audit.



5) Critical Analysis

From the data table it can be seen that Vodafone & Aircel are not meeting the benchmark for the parameter of 'Worst affected cells are having more than 3% TCH drop rate' with high margins. This may have happened due to mainly in the change adopted for calculating the parameter considering CBBH instead of TCBH, which reflects more practical way of calculating TCH drop keeping in view customer satisfaction.

Regarding %age of connections with good voice quality, except Aircel, rest all the operators are found to be performing quite well in terms of meeting the benchmark ($\leq 95\%$).

In case of POI congestion, all the operators are found to be performing quite well in terms of meeting the benchmark ($\leq 0.5\%$). It is noticed that most of the operators are having individual POI satisfying the benchmark. But in some case overflows on individual POI are noticed causing traffic diversions to obtain the net result for POI congestion.

(B) Redressal**1) Sample coverage**

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

2) Performance (live calling for billing complaints)

Calling Operator	Aircel	Airtel	BSNL	Reliance	Idea	Vodafone	Tata CDMA
Total No. of Calls Attempted	10	10	45	40	20	10	10
Total No. of calls Answered	8	7	40	34	14	5	6
Cases resolved with 4 weeks	8	7	40	34	14	5	6
%age of cases resolved	100%	100%	100%	100%	100%	100%	100%

3) Live calling to call center:

Fifty nos. of calls were made in each half and below given no. of calls got connected to the call center within 60 sec.

Calling Operator	Aircel	Airtel	BSNL	Idea	Rcom GSM	Vodafone	Tata CDMA
Total No. of Calls Attempted	100	100	100	100	100	100	100
Total No. of calls connected to IVR	100	100	100	100	100	100	100
Calls got connected to agent within 60 Sec	100	90	92	80	100	96	99
%age of calls got answered	100%	90%	92%	80%	100%	96%	99%

- 4) **Level 1 Calling:** Level 1 calling such as calling at emergency no. (Police, Fire, and Hospital), Railway enquiry systems etc were made as shown in table below so as to check the service of such short codes. In the cities, it was found to be functional for respective providers.

Emergency no.		Calls attempted	Aircel	Airtel	BSNL	Idea	RCOM GSM	Vodafone	Tata CDMA
Jammu									
100	Police	1	1	1	1	1	1	1	1
101	Fire	1	1	1	1	1	1	1	1
102/108	Ambulance	1	1	1	1	1	1	1	1
139	Railway	2	2	2	2	2	2	2	2

Emergency no.		Calls attempted	Aircel	Airtel	BSNL	Idea	RCOM GSM	Vodafone	Tata CDMA
Srinagar									
100	Police	1	1	1	1	1	1	1	1
101	Fire	1	1	1	1	1	1	1	1

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. Similarly, 50-50 live calls were made to call center in each half i.e. 11 to 1pm and 4 to 7pm and it was found that except Idea, rest of the operators are meeting the 90% benchmark. Level 1 call testing was satisfactory for all service providers.

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

A sample of 2x50 test calls per Service Providers with in the licensed service area (Jammu and Kashmir Circle) were made between 1900 to 2000 hrs and between 2000 to 2100 hrs so that TCBH hours for all the operators were covered.

(2) Performance based on live calling

Calling Operator	Aircel	Airtel	BSNL	Idea	Reliance (GSM)	Vodafone	Tata (CDMA)
Jammu							
Aircel	-	100%	98%	100%	99%	100%	100%
Airtel	100%	-	96%	100%	100%	100%	100%
BSNL	100%	100%	-	100%	100%	100%	100%
Idea	100%	98%	98%	-	100%	100%	100%
Reliance (GSM)	100%	100%	100%	100%	-	100%	100%
Vodafone	100%	100%	100%	100%	100%	-	100%
Tata (CDMA)	98%	100%	100%	99%	100%	100%	-

(3) Critical Analysis

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

(D) Drive test of the mobile network of service providers**1. Sample Coverage**

The Operator Assisted Drive Test was conducted at Jammu and Kashmir for all the operators. Route covered was about around 80-100Km depending on city areas within the speed limit of 30Km/hr.

Drive Test could not be conducted in Kargil due to Blockage of Roads between Srinagar-Kargil due to heavy snowfall.

DRIVE TEST LOCATIONS***JAMMU***

LOW DENSE: Airport, Satwari, BSF camp.

MEDIUM DENSE: Gandhi Nagar, Channi Himmat, Trikuta Nagar.

HIGH DENSE: Bahu plaza, PTU, Bikram chowk, Jeewal Chowk, Bus Stand, Raghunath Bazaar.

BARAMULLA

LOW DENSE: Narbal, Srinagar-Sopore-Baramulla National Highway

MEDIUM DENSE: Pattan, Hanjiwera,
Dakbanglow, Baramulla exchange, Baramulla Hospital, Uri Bus stand

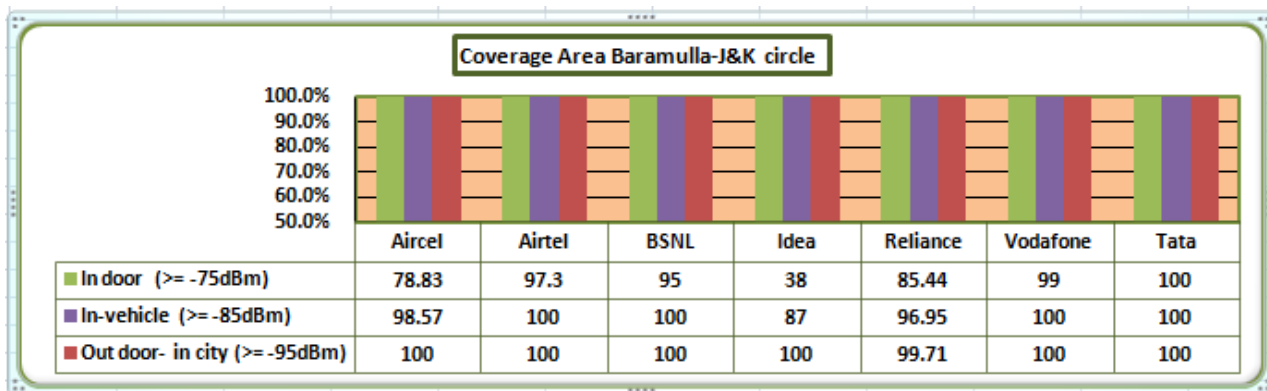
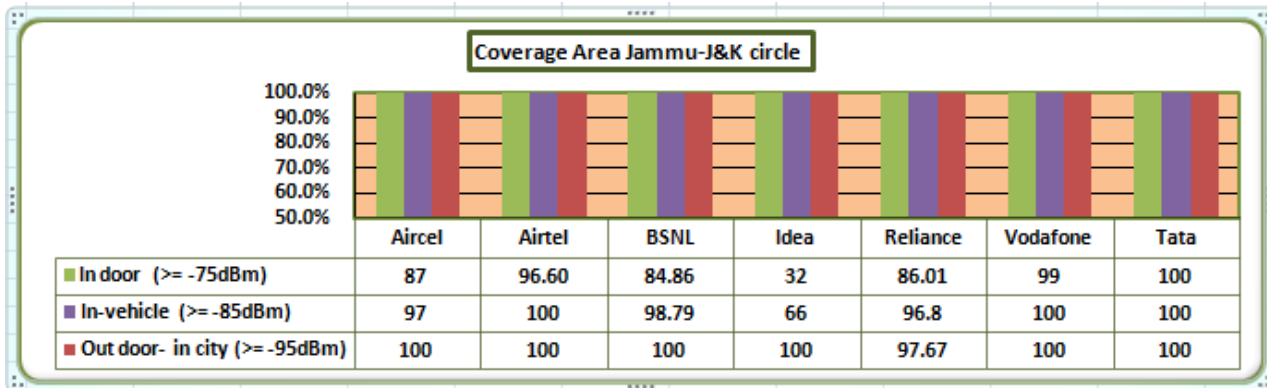
HIGH DENSE: Sangrama, Sopore Exchange, New Colony Sopore, Noor bagh main Bazaar

2) Performance (for the respective cities for Jammu & Kashmir Circle)

SN	Parameter	City Name	Aircel	Airtel	BSNL	Idea	Reliance	Vodafone	Tata
			GSM Operators						
1.1	Call Attempts	Jammu	127	111	88	112	149	106	78
		Baramula	127	83	88	87	87	80	98
1.2	Blocked Call Rate (<=3%)	Jammu	0.00%	0.00%	1.14%	0.00%	1.34%	0.00%	0.00%
		Baramula	0.00%	0.00%	1.14%	0.00%	0.00%	1.25%	0.00%
1.3	Dropped Call Rate (<=2%)	Jammu	0.00%	0.00%	0.01%	0.00%	0.00%	0.94%	2.56%
		Baramula	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
1.4	Percentage of connections with good voice quality (=>95%)								
	(i) 0-4 (w/o frequency hopping)	Jammu	NA						96.2%
		Baramula	NA						97.8%
	(ii) 0-5 (with frequency hopping)	Jammu	94.83	97.50%	98.8%	96.50%	95.00%	97.7%	NA
	Baramula	94.83	96.3%	96.2%	96.20%	95.14%	98.8%		
1.5	Service Coverage								
	In door (>= -75dBm)	Jammu	87	96.60	84.86	32	86.01	99	100
		Baramula	78.83	97.3	95	38	85.44	99	100
	In-vehicle (>= -85dBm)	Jammu	97	100	98.79	66	96.8	100	100
		Baramula	98.57	100	100	87	96.95	100	100
	Out door- in city (>= -95dBm)	Jammu	100	100	100	100	97.67	100	100
	Baramula	100	100	100	100	99.71	100	100	
1.6	Call Setup Success Rate (>=95%)	Jammu	100%	100%	98.86%	100%	98.66%	100%	100%
		Baramula	100%	100%	98.86%	100%	100%	98.75%	100%

Graphical Representation

The Radio coverage level as was found in the operator assisted drive test result is shown graphical below:



(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:

- Performance of all Operators in Jammu town was satisfactory for most of the KPI parameters. During Drive Test, CSSR was observed between 99% and 100%. Under Voice Quality Section, Aircel among GSM Operator performed slightly poor than others.
- Performance in Baramulla Town was satisfactory for most of the operators except for Aircel which fails to meet benchmark for "Good voice quality". Under RF coverage level section, Tata CDMA performed quite better than others.

(E) Independent Drive test

1. Sample Coverage

The independent drive test activity was conducted in Jammu and Kashmir Circle for two service providers in two different cities namely “Udhampur & Doda”. For testing the service provider performance on ground level, TCIL auditors carried out Drive Test and check the radio coverage along with different KPI parameters by making test calls of 120 sec. in different areas on different days. During Drive test, Route was covered about between 25 to 45 Km for both cities depending upon the city areas within the speed limit of 30-40Km/hr.

The Drive Test could not be held in Poonch due to no network service availability of the operator Airtel.

Area Coverage Details:

1) Udhampur

TCP Chowk, Bus Stand, Gole Market ,Omra Morh, Central Jail Road, Salathia Chowk

2) Doda

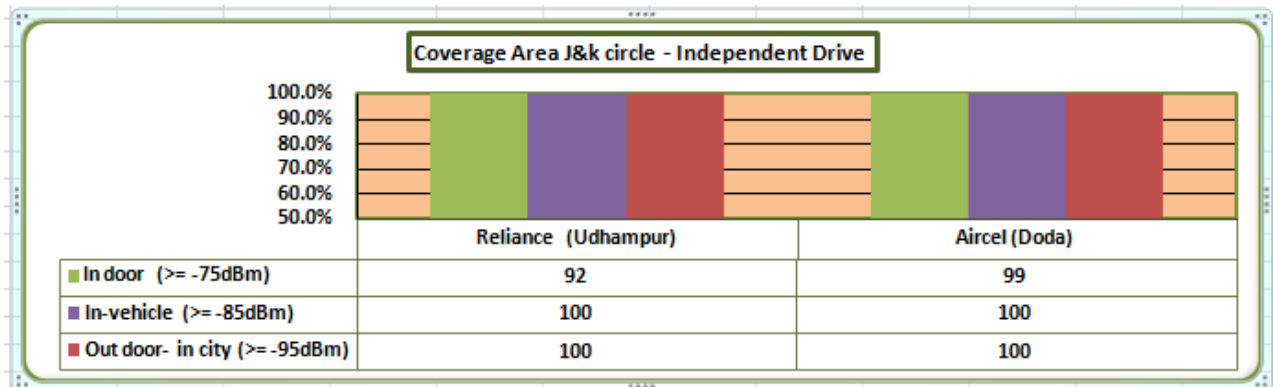
Main market, Masjid mohalla, Bus stand, D.C office , Old Hospital ,Bharat road, Nagri road, Dessa road, Khan plaza, Police line

2) Performance (for the respective cities for Jammu & Kashmir Circle)

SN	Parameter	Reliance (Udhampur)	Aircel (Doda)
		GSM Operators	
1.1	Call Attempts	32	20
1.2	Blocked Call Rate (<=3%)	0.00%	0.00%
1.3	Dropped Call Rate (<=2%)	0.00%	0.00%
1.4	Percentage of connections with good voice quality (=>95%)		
	(i) 0-4 (w/o frequency hopping)		
	(ii) 0-5 (with frequency hopping)	98.00%	100.00%
1.5	Service Coverage		
	In door (>= -75dBm)	92	99
	In-vehicle (>= -85dBm)	100	100
	Out door- in city (>= -95dBm)	100	100
1.6	Call Setup Success Rate (>=95%)	100%	100%

Graphical Representation

The Radio coverage level as was found in the operator assisted drive test result is shown graphical below:



(3) Critical Analysis

The drive test data was found to be satisfactory for all the parameters.

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

From live, month, PMR and Drive Tests findings, it can be concluded that on an average, performance of the operators in the service area (Jammu and Kashmir) is satisfactory for most of the **Network Parameters**. However, the benchmark of $\leq 3\%$ for “worst affected cells $> 3\%$ TCH drop” is not met by Aircel & Vodafone.

Under **Customer Service Quality Parameter** “operator answered calls (voice-to-voice) within 60 seconds” parameter it is found that most of the operators are fulfilling TRAI benchmark of $\geq 90\%$.

II. Basic Telephone Service (Wireline) Providers

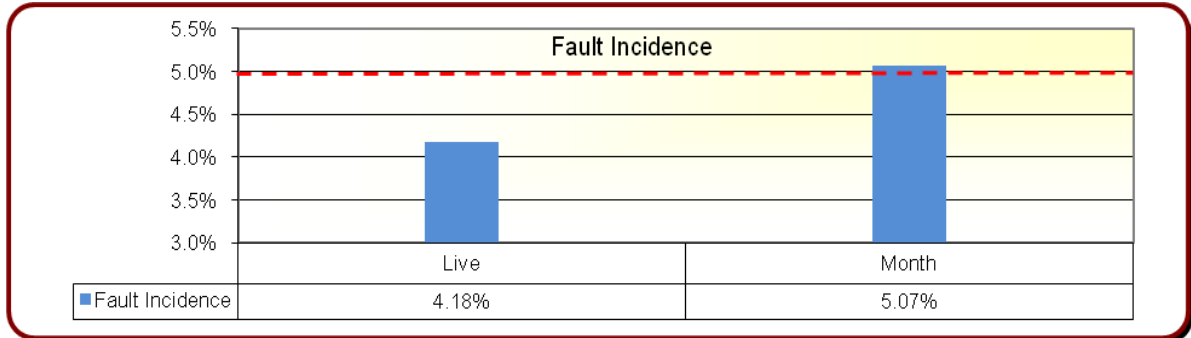
(A) Exchange Audit

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

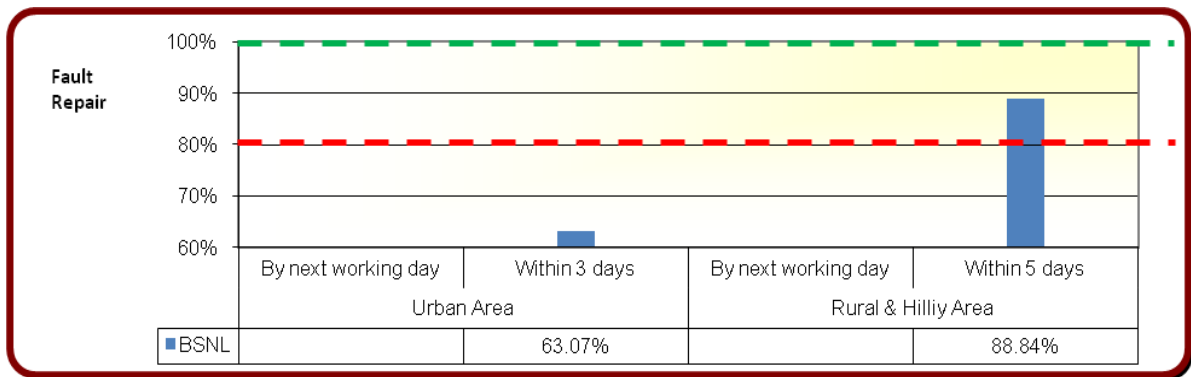
S/N	Name of Parameter	Bench mark	Audit	BSNL
1	No. of faults/100 subscribers /month	<=5%	Live	4.18%
			Month	5.07%
2	Fault repair (Urban Area)			
a	By next working day	>=90%	Month	NP
b	Within 3 days	100%	Month	63.07%
3	Fault repair (Rural & Hilly Area)			
a	By next working day	>=90%	Month	NP
b	Within 5 days	100%	Month	88.84%
4	Rent rebate			
a	Fault pending > 3 days & <7 days	<i>Rebate for 7 days</i>	Month	NP
b	Fault Pending > 7 days & < 15 days	<i>Rebate for 15 days</i>	Month	NP
c	Fault pending > 15 days	<i>Rebate for one month</i>	Month	NP
5	Mean time to Repair (MTTR)	<= 8 Hrs	Month	5.25
6	Call Completion Ratio (CCR) & Answer to Seizure Ratio (ASR)	>=55% (CCR) & >=75% (ASR)	Live	58.95%
			Month	60.69%
7	Metering and billing credibility (Post-paid)			
a	Disputed Bills over bills issued	< 0.1%	Month	NP
8	% of billing complaints resolved within 4 weeks	<i>Within 4 weeks</i>	Month	NP
a	Period of refunds after resolution of complaints within 1 weeks	<i>Within 1 week</i>	Month	NP
9	POI Congestion	<= 0.5%	Live	2
			Month	2
10	Response Time to customer for assistance			
a	Accessibility of Call centre within 40 sec.	>= 95%	Live	95%
			Month	NP
b	% age of calls answered by operator (voice to voice) within 60 sec.	>= 90%	Live	91%
			Month	NP
11	Customer care (promptness in attending to customers' requests)			
a	Termination / Closures	<= 7 Days	Month	NP
b	Time taken refunds deposit after closures	<i>100% within 60 days</i>	Month	NP

2) Performance (Graphical representation)

Fault incidences (No of faults/100 subscribers/month (<= 5%)): BSNL has a slight deviation in month data.

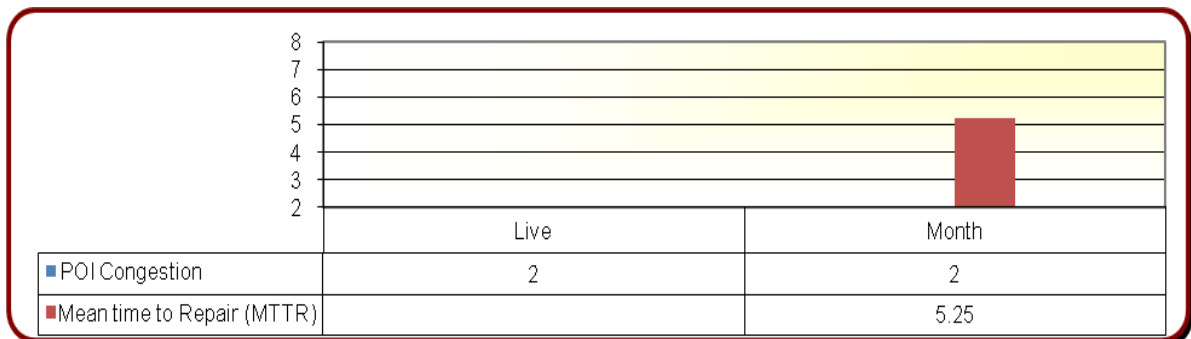


Fault Repair (Urban / Rural Area): Below benchmark performance is observed in both urban and rural cases.

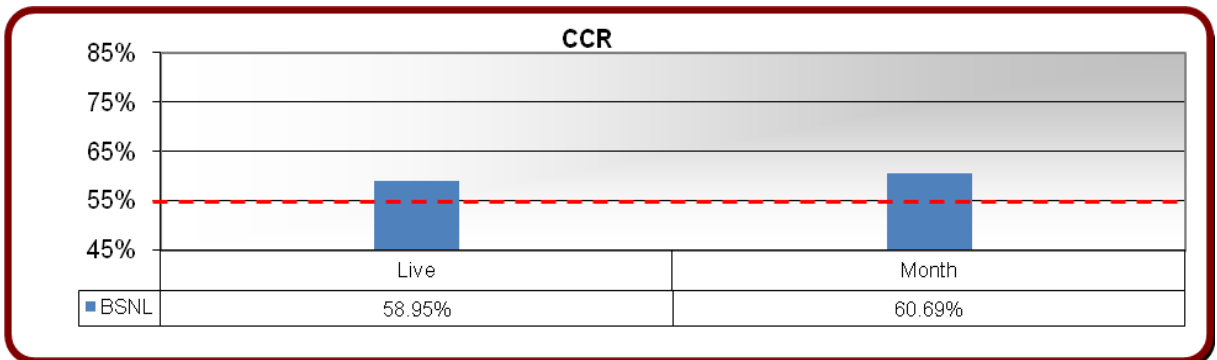


Mean Time to Repair (MTTR) (<= 8 Hrs): BSNL complies to TRAI benchmark with a less than 8 hrs MTTR.

POI Congestion (< 0.5%): 2 POIs were found in both live & month data with congestion greater than 0.5%.



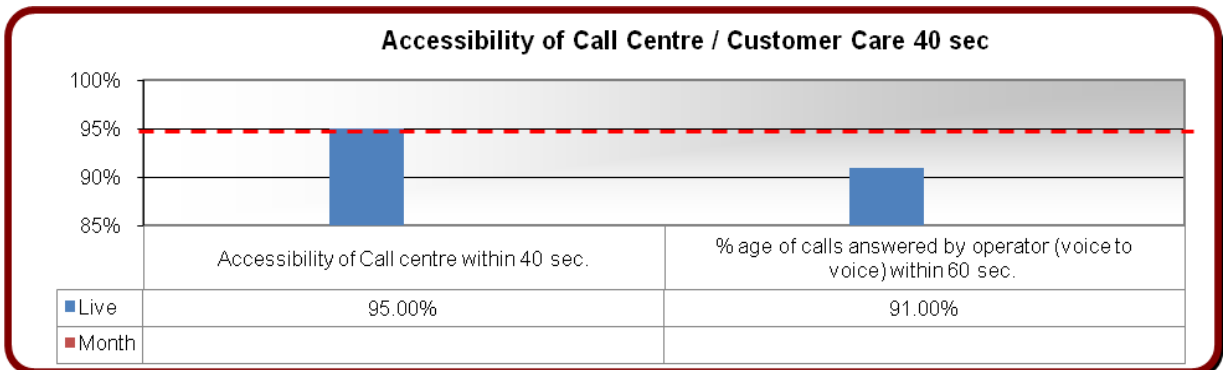
Call Completion Rate (>55%) & Answer to Seizure (>75%): The performance based on live measurement as well as One-Month Data is above the respective benchmarks for BSNL. Here, BSNL measures CCR.



Response time to the customer for assistance:

Accessibility of Call Centre / Customer Care 40 sec (> 95 %.): BSNL meets the benchmark during live audit. Data has not been provided for month.

Calls Answered by operator within 60 seconds (>90%) (Voice to Voice): BSNL meets the benchmark during live audit. Data has not been provided for month.



3) Live Calling to Call Centers

	BSNL
Total No. of Calls Attempted	100
Total No. of calls connected to IVR	95
Calls got connected to agent within 60 Sec	91
%age of calls got answered	95.79%

Good results were obtained for all the operators for call centre accessibility as tabulated.

4) Performance based on live calling for fault repair – data not provided by BSNL**5) Performance based on live calling for billing complaints**

	BSNL
Total Billing Complaints	484
Total No. of Calls Attempted	100
Total No. of calls Answered	48
Cases resolved with 4 weeks	48
%age of cases resolved	100%

Random numbers were selected from the operators' available database of billing & fault complaints and calls were made to the customers to get their feedback for complaint redressal. No proper response could be obtained in many of the call attempts made (no answer, number not reachable, customer busy, customer not available on phone, customer does not remember about the complaint redressal etc.). However, there was a congruence found in customer feedback and the operators' records wherever a proper response was obtained.

6) Level 1 Live Calling

Emergency no.		Calls attempted	BSNL
100	Police	2	2
101	Fire	2	2
102/108	Ambulance	2	2
139	Railways	5	5

Good results were found in case of Level-1 calling for emergency nos. 100, 101 & 102. The calls were found to land in the neighboring areas from where the calls were being made. The testing was performed at Jammu.

III. Broadband Service Providers

(A) POP Audit

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

S/N	Parameters	Bench-marks	Audit	BSNL
1	<i>Service Provisioning/Activation Time</i>			
1.1	in 15 days	<15 days	Month	99.68%
1.2	In all cases where payment towards installation charge & SD is taken and the Broadband connection is not provided within 15 working days	credit @ Rs.10/ per day	Month	NA
2	<i>Faults Repair/Restoration Time</i>			
	By next working day	≥90%	Month	96.07.%
	within 3 working day	≥99%	Month	98.35%
2.1	<i>Rebate</i>			
	Faults Pending for > 3 working days and < 7 working days: (Rebate equivalent to 7 days of minimum monthly charge or equivalent usage allowance)		Month	0
	Faults Pending for > 7 working days and < 15 working days: (Rebate equivalent to 15 days of minimum monthly charge or equivalent usage allowance)		Month	0
	Faults Pending for > 15 working days:(Rebate equivalent to one month of minimum monthly charge or equivalent usage allowance)		Month	0
3	<i>Billing Performance</i>			
	Billing complaints per 100 bills issued	<2%	Month	0.09%
	%age of Billing Complaints resolved within 4 weeks	100%	Month	100%
	Time taken for refund of deposits after closure (within 60 days)	100%	Month	100%
4	<i>Response time to the customer for assistance % age of calls answered by operator (Voice to Voice)</i>			
	within 60 sec	>60%	Live	67.85%
			Month	78.60%
	within 90 sec	>80%	Live	85.45%
			Month	90.40%
5	<i>Bandwidth Utilization/ Throughput: (If on any link(s) / route bandwidth utilization exceeds 90%, then network is considered to have congestion. For this additional provisioning of Bandwidth on immediate basis, but not later than one month, is mandated.) < 80% link(s) / route bandwidth utilization during peak hours (TCBH).</i>			
5.1	POP to ISP Gateway Node [Intra-network] Link(s)	< 90%	Live	47.20%
			Month	48.50%
5.2	ISP Gateway Node to IGSP / NIXI Node upstream Link(s) for International connectivity	< 90%	Live	76.00%
			Month	78.00%
5.3	Broadband Connection Speed (download) - from ISP Node to User	> 80%	Live	89.90%
			Month	90.40%
6	<i>Service Availability/Uptime (for all users)</i>			
	Service Availability (%)	>98%	Live	100%
			Month	99.33%
7	<i>Packet loss</i>			
	% of Packet loss	<1%	Live	0.02%
			Month	0.02%

S/N	Parameters	Bench-marks	Audit	BSNL
8	Network latency (for wired broadband access)			
8.1	User reference point at POP/ISP Gateway node to IGSP/NIXI	<120 ms	Live	68.00
			Month	70.50
8.2	User reference point at ISP Gateway node to International nearest NAP port abroad (terrestrial)	<350 ms	Live	235.67
			Month	240.37
8.3	User reference point at ISP Gateway node to International nearest NAP port abroad (satellite)	<800 ms	Month	NA

NA – Not Applicable, NP – Data Not Provided

Note:

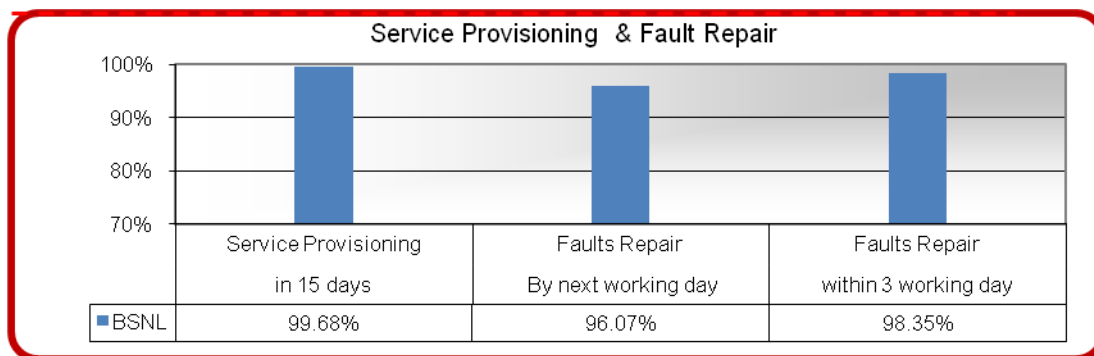
- a) For S/N 8.3, the operator is not having satellite connectivity.

2) Performance (Graphical representation)

Service provisioning/activation time (100% in 15 days): BSNL meets the BM.

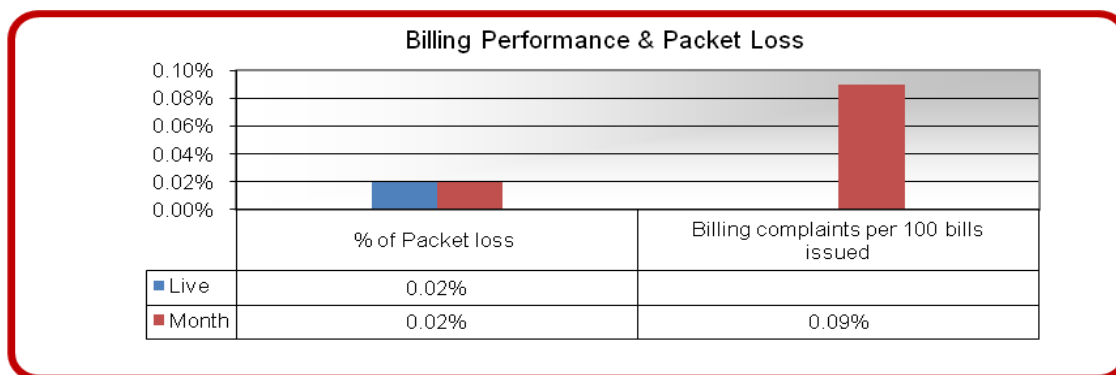
Fault Repair / Restoration Time:

- By next working day (>90%): BSNL meets the BM.
- Within 3 working days (>99%): The benchmark is slightly missed by BSNL.
- Rebate: No eligible rebate case.



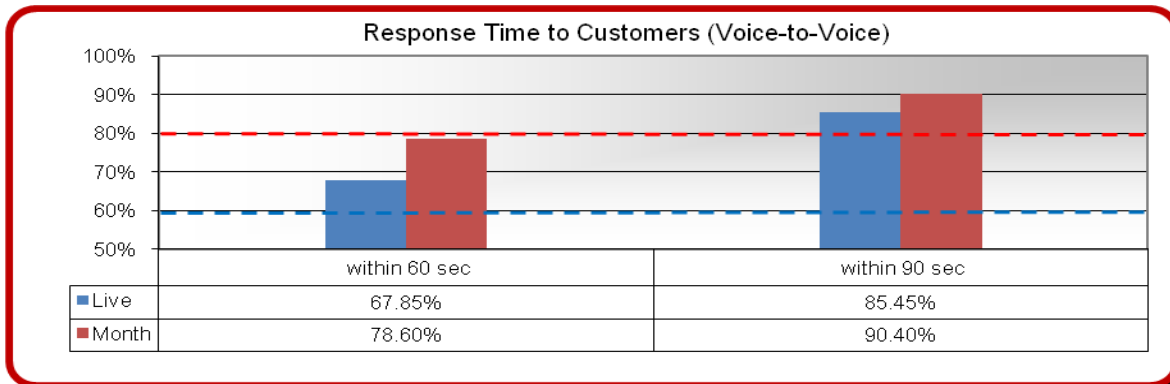
Billing Performance: (Benchmark <2%): BSNL meets the BM

Packet Loss (Should be less than 1%): BSNL meets the BM.

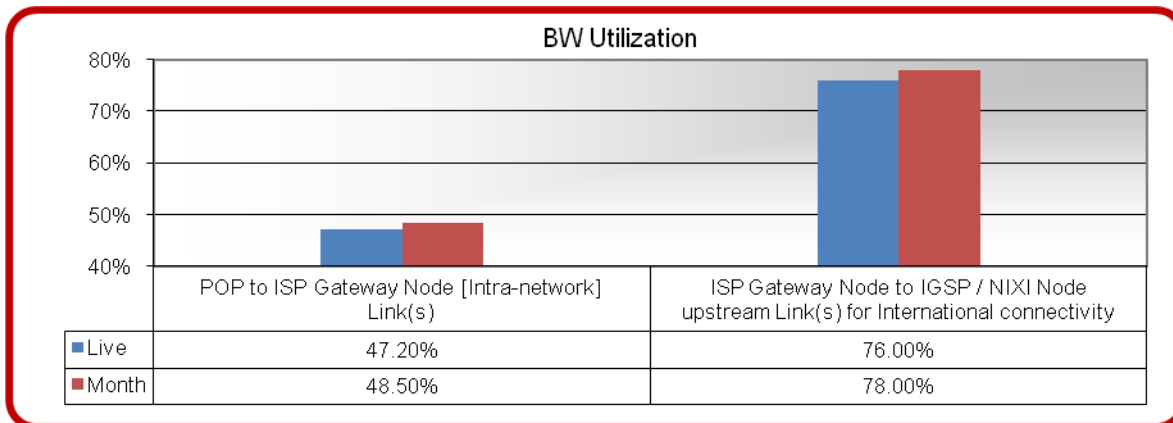


Response time to the customer for assistance: % age of calls answered by operator (Voice to Voice)

- **Within 60 seconds (>60%):** BSNL meets the BM.
- **Within 90 seconds (>80%):** BSNL meets the BM.

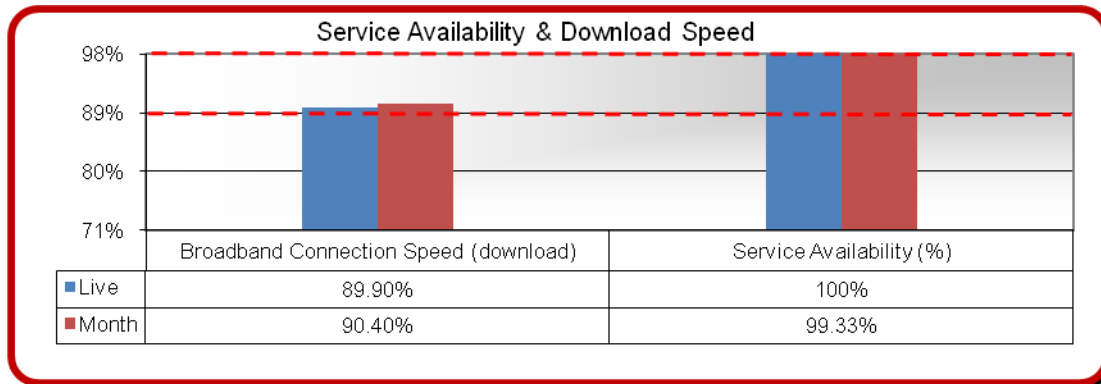
**Bandwidth Utilization/ Throughput:**

- **POP to ISP Gateway Node [Intra-network] Link(s): (Benchmark <80%):** BSNL meets the BM.
- **ISP Gateway Node to IGSP / NIXI Node upstream Link(s) for International connectivity: (Benchmark <80%):** BSNL meets the BM.



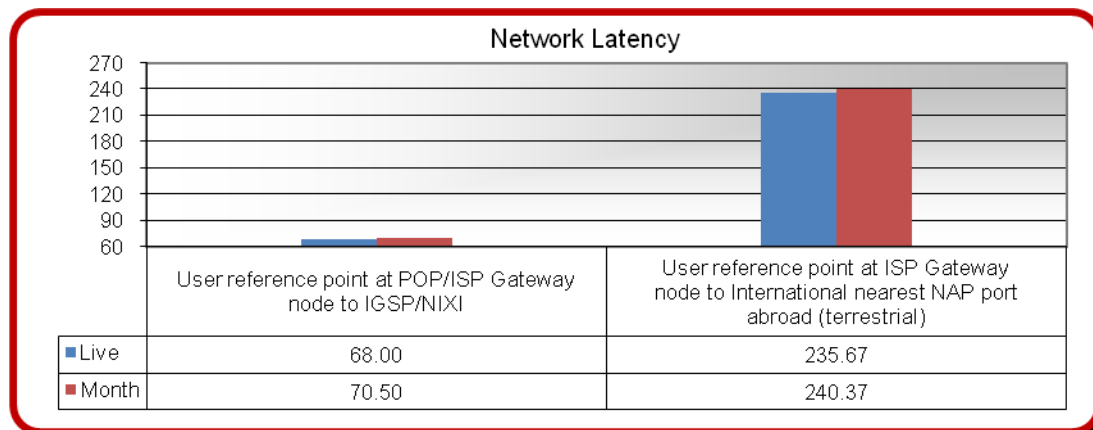
Service Availability / Uptime (for all users better than 98%): BSNL meets the BM.

Broadband Connection Speed (download) (>80%): BSNL meets the BM.



Network Latency:

- **User reference point at POP/ISP gateway node to international gateway (IGSP/NIXI) <120 ms:** BSNL meets the BM.
- **User reference point at ISP gateway node to international nearest NAP Port abroad (Terrestrial) <350 ms:** BSNL meets the BM.
- **User reference point at ISP Gateway Node to International nearest NAP port abroad (Satellite) <850 ms:** The Satellite link does not exist with the operator, hence the parameter is not applicable.



3) Live Calling to Call Centre

	BSNL
Total No. of Calls Attempted	100
Total No. of calls connected to IVR	85
Calls got connected to agent within 60 Sec	83
%age of calls got answered	97.64%

Good results were obtained for call centre accessibility as tabulated.

4) Performance based on live calling for new connections

	BSNL
New Connections	880
Total No. of Calls Attempted	30
Total No. of calls Answered	19
Connection provided within 15 days	19
%age of successful connection	100%

5) Performance based on live calling for fault repair

	BSNL
Total No. of Fault Complaints	2418
Total No. of Calls Attempted	30
Total No. of calls Answered	18
Cases resolved within 3 days	18
%age of complain resolved	100%

6) Performance based on live calling for billing complaints

	BSNL
Total Billing Complaints	35
Total No. of Calls Attempted	35
Total No. of calls Answered	25
Cases resolved with 4 weeks	25
%age of cases resolved	100%

Random numbers were selected from the operator's available database of billing & fault complaints and new connection. Calls were made to the customers to get their feedback. No proper response could be obtained in many of the call attempts made (no answer, number not reachable, customer busy, customer not available on phone, customer does not remember about the complaint redressal etc.). However, there was a congruence found in customer feedback and the operators' records wherever a proper response was obtained.