REPORT

ON

AUDIT & ASSESSMENT OF QUALITY OF SERVICE
OF
CELLULAR MOBILE TELEPHONE SERVICE

WIRELINE BASIC SERVICE
&
BROADBAND SERVICE

FOR

NORTH ZONE – PUNJAB CIRCLE

Report Period: OCT 2011 – DEC 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.
vii)   Emergency No. (Level 1) calling done.

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 Punjab 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 service provider have not baser of more than 10,000 only. Audit data was collected from the centralized NOC or through a remote access to the NOC were collected. Network parameters were also checked from the centralized NOC. MRTG, Cacti 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 & Broadband Services in Punjab Circle in 4th quarter (Oct – Dec2011). The primary data collection and verification of records (PMR data verification – quarterly) maintained by various operators was undertaken during the period April – June 2011.

Following are the various operators covered in Punjab circle (North 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	Oct-2011	2000-2100 Hrs
2	Airtel Ltd	Oct -2011	2000-2100 Hrs
3	Etisalat	Oct -2011	1900-2000 Hrs
4	Idea	Oct -2011	2100-2200 Hrs
5	Loop	Oct -2011	1000-1100 Hrs
6	BSNL	Oct -2011	1900-2000 Hrs
7	Reliance Communication	Nov -2011	1900-2000 Hrs
8	Tata Communications	Oct -2011	2000-2100 Hrs
9.	Videocon	Oct -2011	2100-2200 Hrs
10	Vodafone	Oct -2011	1900-2000 Hrs
CDMA Operators			
11	HFCL	Oct -2011	1900-2000 Hrs
12	MTS	Oct -- 2011	1900-2000 Hrs
13	Reliance Communication	Nov -2011	1900-2000 Hrs
14	Tata Communications	Oct -2011	1900-2000 Hrs

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

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

(A) Cellular Mobile Telephone Services

S/N	3 days Live Data Audit / Name of Parameter	Bench-mark	Aircel	Airtel	Etisalat	Idea	Loop	BSNL	Rcom GSM	TTSL GSM	Vi-cone	V-fone	MTS	HFCL	Rcom CDMA	Tata CDMA
			GSM Operators										CDMA Operators			
(A)-1	**Network Service Quality Parameter**															
	BTS Accumulated Downtime	<=2%	0.01%	0%	0.00%	0%	0%	0.13%	0%	0.01%	0.04%	0.01%	0%	0%	0.05%	0.01%
	Worst affected BTS due to downtime	<=2%	0%	0.00%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
1	**Connection Establishment (Accessibility)**															
	a) CSSR (Call Setup Success Rate)	>=95%	99.93%	99.63%	100.00%	98.69%	99.99%	98.32%	99.95%	99.87%	99.85%	99.86%	100.00%	99.33%	99.87%	99.97%
	b) SDCCH/PAGING congestion	<=1%	0.06%	0.12%	0.00%	0.22%	0.01%	0.59%	0.01%	0.01%	0.02%	0.05%	0%	0.25%	0.01%	0.00%
	c) TCH congestion	<=2%	0.01%	0.25%	0.00%	1.09%	0.00%	1.09%	0.04%	0.12%	0.13%	0.09%	0%	0.42%	0.12%	0.03%
2	**Connection maintenance (retainability)**															
	a) CDR	<=2%	0.63%	0.74%	0.73%	1.57%	2.90%	2.08%	0.54%	0.75%	0.79%	0.75%	0.00%	1.56%	0.54%	0.97%
	b) Worst affected cells>3% TCH drop	<=3%	1.59%	1.32%	1.85%	2.49%	0.00%	5.02%	0.13%	5.86%	2.84%	4.46%	0.00%	0.00%	0.14%	0.05%
	c) Good voice quality	>=95%	97.37%	98.69%	98.43%	96.29%	99.38%	95.10%	99.18%	96.34%	98.14%	97.68%	NA	NA	NA	NA
3	**No of POI having > 0.5% congestion**	<=0.5%	0	0	0	0	0	0	0	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%	100%	100%	99%	100%	100.00%	100%	100%	100%	99%	99%
	b) % call answered by operators(voice to voice) within 60 sec.	>=90%	95.66%	99.78%	100%	94.13%	100%	96.19%	61.85%	97.78%	99.76%	97.06%	100%	100%	91.14%	99.72%

NA: Not Applicable, NP: Data Not Provided

From the 3 days live data assessment, it is found that most of the operators are meeting the network parameters, except for BSNL, TTSL(GSM) & Vodafone for the parameter" Worst affected cells>3% TCH drop". CDMA operators have no provision to provide %age of connections with good voice quality. As far as Call drop rate is concerned, Loop & BSNL are not meeting the benchmark.

Performance related to customer care data is found to be satisfactory for most of the operators. For "calls answered by operators (voice-to-voice), only RCOM (GSM), is found to have below the benchmark value.

S/N	One Month Data Audit / Name of Parameter	Bench-mark	Aircel	Airtel	Etisalat	Idea	Loop	BSNL	Rcom GSM	TTSL GSM	Videocon	Vodafone	MTS	HFCL	Rcom CDMA	Tata CDMA
			GSM Operators										CDMA Operators			
(A)	**Network Service Quality Parameter**															
1	**Network Availability**															
	a) BTS Accumulated Downtime	<=2%	0.00%	0.05%	0.03%	0.00%	0.00%	0.01%	0.11%	0.02%	0.14%	0.01%	0.00%	0.00%	0.06%	0.02%
	b) Worst affected BTSs due to downtime	<=2%	0.00%	0.15%	0.00%	0.00%	0.00%	0.03%	0.06%	0.00%	0.00%	0.09%	0.00%	0.00%	0.00%	0.00%
2	**Connection Establishment (Accessibility)**															
	a) CSSR (Call Setup Success Rate)	>=95%	99.90%	99.61%	99.98%	98.72%	100%	98.02%	99.89%	99.80%	99.75%	99.70%	100.00%	98.85%	99.88%	99.96%
	b) SDCCH/PAGING congestion	<=1%	0.08%	0.13%	0.02%	0.23%	0.03%	0.61%	0.02%	0.02%	0.06%	0.11%	0.00%	0.23%	0.01%	0.00%
	c) TCH congestion	<=2%	0.02%	0.26%	0.00%	1.05%	0.00%	1.37%	0.09%	0.18%	0.19%	0.19%	0.00%	0.92%	0.11%	0.04%
3	**Connection maintenance (retainability)**															
	a) CDR	<=2%	0.66%	0.76%	0.72%	1.41%	2.68%	1.99%	0.57%	0.69%	0.78%	0.77%	0.00%	1.78%	0.52%	0.96%
	b) Worst affected cells>3% TCH drop	<=3%	1.70%	1.35%	3.70%	2.80%	0.00%	5.75%	0.21%	5.82%	2.66%	4.62%	0.00%	0.00%	0.14%	0.86%
	c) Good voice quality	>=95%	97.39%	98.71%	98.56%	96.60%	98.85%	95.22%	99.09%	96.41%	98.07%	97.67%	NA	NA	NA	NA
4	**No of POI having > 0.5% congestion**	>=0.5%	0	0	0	0	0	0	0	0	0	0	0	0	0	0
(B)	**Customer Service Quality Parameters**															
5	**Metering/billing credibility-Post paid**	<= 0.1%	0.00%	0.05%	NA	0.05%	NA	0.02%	0.10%	0.38%	NA	0.07%	NA	0.07%	0.10%	0.16%
6	**Metering /billing credibility-Pre paid**	<= 0.1%	0.02%	0.00%	0.00%	0.00%	0.00%	0.01%	0.04%	0.02%	0.04%	0.01%	0.00%	0.00%	0.04%	0.01%
7	**Resolution of billing/ charging complaints**	100% within 4 weeks	100%	100%	NA	100%	NA	100%	100%	100%	100%	100%	NA	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%	NA	100%	NA	100%	100%	100%	100%	100%	NA	100%	100%	100%
8	**Response time to customers for assistance**															
	a) Accessibility of call centre/Customer Care	>=95%	100%	99.60%	99%	100%	100%	100%	99%	100%	100.00%	100%	100%	100%	99%	99%
	b) % call answered by operators(voice to voice) within 60 sec.	>=90%	92.82%	98.47%	92%	88.37%	100%	95.05%	67.18%	93.24%	99.51%	90.77%	100%	98.04%	88.09%	95.04%
9	**Termination/closure of service**	<=7days	100%	100%	NA	100%	NA	100%	100%	100%	NA	100%	NA	NA	100%	100%
10	**Time taken for refunds of deposits after closures.**	100% within 60 days	100%	100%	NA	100%	NA	100%	100%	100%	NA	100%	NA	NA	100%	100%

NA: Not Applicable, NP: Data Not Provided

Analysis:--

➢ From the month data assessment, it is found that most of the operators are meeting the network parameters. Deviations are found in case of Etisalat , BSNL , TTSL (GSM) & Vodafone for not meeting the benchmark for "Worst affected cells>3% TCH drop".

➢ For Call drop Rate, Loop is the only operator in Punjab who is deviating from the benchmark.

➢ Under Billing Section for Post-Paid services, all operators are meeting the benchmark, except TTSL (GSM) & TTSL (CDMA).

➢ Performance related to customer care data for voice to voice call is found to be satisfactory for most of the operators, except for Idea, RCOM (GSM) & RCOM (CDMA).

Operator-Assisted Drive Test

The Operator Assisted Drive Test was conducted at Punjab Circle for all the operators. Route covered was about around 80-100 Km depending on city areas within the speed limit of 30-35Km/hr. The cities covered were Chandigarh, Hoshiarpur and Pathankot. In all the cities, zones were selected for covering different density areas (High, Medium & Low dense areas).

SN	Parameter	City Name	Airtel	Idea	BSNL	Rcom GSM	Tata GSM	Videocon	Vodafone	Rcom CDMA	Tata CDMA
			GSM operators							CDMA Operators	
1.1	Blocked Call Rate (<=3%)	Chandigarh	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	1.23%	0.00%	0.00%
		Hoshiarpur	0.00%	0.00%	2.32%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
		Pathankot	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
1.2	Dropped Call Rate (<=2%)	Chandigarh	0.00%	0.00%	0%	0%	0%	0%	0%	0%	0%
		Hoshiarpur	0.00%	0.00%	0%	0%	0%	0%	0%	0%	0%
		Pathankot	0.00%	0.00%	3.84%	0%	0%	0%	0%	0%	0%
1.3	Percentage of connections with good voice quality (=>95%)										
	(i) 0-4 (w/o frequency hopping)	Chandigarh								99.61%	99.11%
		Hoshiarpur								99.81%	97.37%
		Pathankot								99.01%	97.36%
	(ii) 0-5 (with frequency hopping)	Chandigarh	95.70%	96.40%	96.87%	97.30%	95.50%	95.36%	95.60%		
		Hoshiarpur	97.30%	96.50%	89.60%	99.21%	97.10%	95.46%	98.80%		
		Pathankot	97%	96%	92.80%	96.92%	99.93%	99.93%	97.10%		
1.4	Call Setup Success Rate (>=95%)	Chandigarh	100%	100%	100%	100%	100%	100%	98.77%	100%	100%
		Hoshiarpur	100%	100%	97.68%	100%	100%	100%	100%	100%	100%
		Pathankot	100%	100%	100%	100%	100%	100%	100%	100%	100%

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

• Drop Call Rate is not met by BSNL in Pathankot only, rest all are satisfying the benchmark
• Good Voice quality parameter is not met by BSNL in Hoshiarpur and Pathankot.
NOTE-- Aircel is having an ICR agreement with TTSL in Punjab Circle.
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Independent Drive Test:--

SN	Parameter	Aircel (Firozpur)	HFCL (Sangrur)	IDEA (Sangrur)	IDEA (Kapoorthala)
1.1	Call Attempts	62	34	32	51
1.2	Blocked Call Rate (<=3%)	0.00%	0.00%	0.00%	0.00%
1.3	Dropped Call Rate (<=2%)	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)				
	(ii) 0-5 (with frequency hopping)	97.28%	96.80%	94.87%	96.53%
1.5	Service Coverage				
	In door (>= -75dBm)	74.71%	74.88%	95.88%	89.33%
	In-vehicle (>= -85dBm)	95.43%	95.65%	99.93%	99.34%
	Outdoor- in city (>= -95dBm)	100%	100%	100.00%	99.99%
1.6	Call Setup Success Rate (>=95%)	100%	99.92%	100%	100%
1.7	Handover Success Rate	97%	100%	100%	100.00%

(B) Basic Telephone Service (Wireline) Providers

3 Days Live Data Audit

S/N	Name of Parameter	Bench mark	BSNL	AIRTEL	HFCL	RCOM	TTSL
1	Network Parameters						
a	Call Completion Rate	>= 55% (CCR) & >=75% (ASR)	80.83%(CCR)	60.1%(CCR)	55.46%(CCR)	92.79%(ASR)	57.88%(CCR)
b	No of POI having > 0.5% Congestion	<= 0.5%	0	0	0	0	0
a	Accessibility of Call Centre/Customer Care						
	within 40 seconds	>= 95%	100.00%	99%	100.00%	100.00%	98.71%
b	% age of calls answered by operator(voice to voice):						
	within 60 seconds	>= 90%	96.13%	92.91%	90.61%	99.75%	98.07%

From the 3 days live data audit, it was observed that all the five basic telephone service providers meet the benchmarks for all the parameters. While there is no congestion found on any network, the call completion rate is also good. The customer care parameters, all of the operators are satisfying with the Benchmarks**.**

One Month Data Audit (Basic Service):

S/N	Name of Parameter	Bench mark	BSNL	AIRTEL	HFCL	RCOM	TTSL
1	(No. of faults/100 subscribers /month)	< 5%	4.08%	0.19%	4.90%	0.58%	0.37%
2	Fault repair by next working day(Urban Area)						
a	By next working day	>90%	96.23%	95.91%	95.40%	100.00%	96.70%
b	Within 3 days	100%	99.72%	100%	96.58%	100%	100%
3	Fault repair by next working day(Rural & hilly Area)						
a	By next working day	>90%	96.75%	NA	NA	NA	NA
b	Within 5 days	100%	100.00%	NA	NA	NA	NA
4	Rent rebate						
a	Fault pending > 3 days & <7 days	Rebate for 7 days	0	0	78	0	0
b	Fault Pending > 7 days & < 15 days	Rebate for 15 days	67	0	0	0	0
c	Fault pending > 15 days	Rebate for one month	0	0	0	0	0
5	Mean time to Repair(MTTR)	<= 8 Hrs	5.82	5.39	7.99	2.14	1.68
6	Call Completion Ratio(CCR) & Answer to seizure Ratio(ASR)	> 55%(CCR) & > 75%(ASR)	73.71%	58.56%	55.67%	92.89%	57.61%
7	Metering and billing credibility(post paid)						
a	Disputed Bills over bills issued	< 0.1%	0.01%	0.09%	0.03%	0.07%	0.01%
8	% of billing complaints resolved within 4 weeks	Within 4 weeks	66.09%	100%	100.00%	100.00%	100.00%
a	Period of refunds after resolution of complaints within 1 weeks	Within 1 weeks	100%	100%	100%	100%	100%
9	No of POI having > 0.5% Congestion	<= 0.5%	0	0	0	0	0
10							
a	Accessibility of Call centre within 40 sec.	>= 95%	93.49%	100%	100.00%	100.00%	99.46%
b	% age of calls answered by operator(voice to voice) within 60 sec.	>= 90%	88.00%	94.47%	91.44%	98.00%	98.38%
11	Customer care(promptness in attending to customers request						
a	Termination / Closures	<= 7 Days	100%	79%	100%	100%	100%
b	Time taken refunds deposit after closures	100% within 60 days	100%	100%	100%	100%	100%

From the Month data table, it can be observed that all the operators are meeting the parameters except a few deviations. BSNL is not meeting the benchmark for "% of Billing complaints resolved within 4 weeks" as well as "response time to customers". As far as Termination cases are concerned, only Airtel is not meeting the benchmark.

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

(C) Broadband Service Providers

      3 days Live Data Audit:

S/N	Name of Parameter	Bench mark	AIRTEL	BSNL	RCOM	HFCL
1	**Response time to the customer for assistance % age of calls answered by operator (Voice to Voice)**					
	Within 60 seconds	>=60%	95.72%	92%	99%	87.73%
	Within 90 seconds	>=80%	96.07%	96%	98.98%	91.38%
2	**Bandwidth Utilization/ Throughput:**	>=80%				
	i) POP to ISP Gateway Node [Intra-network] Link(s)		19.21%	46.12%	54.00%	64%
	ii) ISP Gateway Node to IGSP / NIXI Node upstream Link(s) for International connectivity		74.52%	75.92%	NA	60.00%
3	**Broadband Connection Speed (download)**	>=80%	98%	97%	100%	93%
4	**Packet Loss**	<=1%	0.00%	0%	0%	0%
5	**Network Latency (for wired broadband access)**					
	Network Latency at POP / ISP Gateway Node to International Gateway (IGSP/NIXI)	<=120ms	30ms	16ms	NP	40 ms
	Network Latency at ISP Gateway Node to International nearest NAP port abroad	<=350ms	7ms	231 ms	163ms	306ms
	User reference point at ISP Gateway Node to International nearest NAP port abroad (Satellite)	<=800ms	NA	NA	NA	NA

NOTE: -- (a) only 4 operators are there in the broadband services in Punjab Circle

        (b) RCOM has no provision of capturing Network Latency data for 3 Days in system due to security reason

One Month Data Audit (Broadband):

S/N	Name of Parameter	Benchmark	Airtel	BSNL	RCom	HFCL
1	**Service Provisioning /Activation Time**					
	100% cases in 15 days (subject to technical feasibility)		82.49%	99.95%	NA	99.56%
	Fault Repair / Restoration Time					
	By next working day:	>90%	97.60%	92.75%	100%	96.13%
	within 3 working days:	≥99%	99.32%	99.55%	100%	99.12%
	Rebate:					
	Faults Pending for > 3 working days and < 7 working days:		0	40	0	28
	Faults Pending for > 7 working days and < 15 working days:		0	25	0	0
	Faults Pending for > 15 working days:		0	126	0	0
	Billing Performance					
	Billing complaints per 100 bills issued		0.29%	0.07%	0.14%	0.03%
4	%age of Billing Complaints resolved		98%	100%	100%	100%
5	Time taken for refund of deposits after closure:		100%	100%	100%	100%
	Response time to the customer for assistance % age of calls answered by operator (Voice to Voice)					
6	Within 60 seconds	>=60%	91.63%	88%	96%	89.00%
7	Within 90 seconds	>=80%	93.83%	94%	97%	92.89%

S/N	Name of Parameter	Benchmark	Airtel	BSNL	RCom	HFCL
	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) POP to ISP Gateway Node [Intra-network] Link(s)	< 80%	20.50%	54.17%	15.00%	63%
	ii) ISP Gateway Node to IGSP / NIXI Node upstream Link(s) for International connectivity	< 80%	75%	74.37%	NA	60.00%
9	Broadband Connection Speed	>=80%	99.0%	98%	100%	87.50%
	Service Availability / Uptime (for all users)					
10	Service Availability / Uptime	100% within 60 days	99.98%	99.90%	99.99%	99.72%
	Packet Loss	<=1%	0.00%	0%	0.19%	0%
	Network Latency (for wired broadband access)					
	User reference point at POP / ISP Gateway Node to International Gateway (IGSP/NIXI)	<=120ms	25ms	21ms	80.3ms	41 ms
	User reference point at ISP Gateway Node to International nearest NAP port abroad (Terrestrial)	<=350ms	8ms	227 ms	304ms	307ms
	User reference point at ISP Gateway Node to International nearest NAP port abroad (Satellite)	<=800ms	NA	NA	NA	NA

NA – Not Applicable, **NP** – Not Provided.

NOTE:--

a)   None of the operators are meeting the Service Provisioning Parameters except RCOM which has no cases of Service Activation & Rebate in that month of Audit.

b) None of the operators are having satellite connectivity.

c) For Rcom, ISP Gateway is in Mumbai, Delhi, Chennai and Calcutta. Hence No direct upstream link for Punjab Circle.

CHAPTER-3: AUDIT-PMR VERIFICATION (April 2011—June 2011)
Cellular Mobile Service:--

S/N	PMR — Name of Parameter	Bench-mark	Audit	Aircel	Airtel	Etisalat	Idea	LOOP	BSNL	Rcom GSM	Tata GSM	Vi-cone	V-fone	MTS	HFCL	Rcom CDMA	Tata CDMA
							GSM Operators									CDMA Operators	
(A)	Network Service Quality Parameter																
1	Network Availability																
	BTS Accumulated Downtime	<=2%	Reported	0.83%	0.07%	0.05%	0.06%	0.00%	0.48%	0.00%	0.02%	0.00%	0.02%	0.14%	0.00%	0.00%	0.01%
			Verified	0.83%	0.07%	0.05%	0.06%	0.00%	0.48%	0.00%	0.02%	0.00%	0.02%	0.14%	0.00%	0.00%	0.01%
	Worst affected BTSs due to downtime	<=2%	Reported	0.28%	0.15%	0.00%	0.65%	0.00%	1.97%	0.00%	0.00%	0.01%	0.05%	0.00%	0.00%	0.00%	0.00%
			Verified	0.28%	0.15%	0.00%	0.65%	0.00%	1.97%	0.00%	0.00%	0.01%	0.05%	0.00%	0.00%	0.00%	0.00%
2	Connection Establishment (Accessibility)																
	CSSR (Call Setup Success Rate)	>=95%	Reported	98%	99%	99%	98%	98%	99%	100%	98%	98%	99%	98%	99%	99%	100%
			Verified	98%	99%	99%	98%	98%	99%	100%	98%	98%	99%	98%	99%	99%	100%
	SDCCH/PAGING congestion	<=1%	Reported	0.20%	0.12%	0.00%	0.46%	0.21%	0.76%	0.00%	0.22%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
			Verified	0.20%	0.12%	0.00%	0.46%	0.21%	0.76%	0.00%	0.22%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
	TCH congestion	<=2%	Reported	0.05%	0.16%	0.01%	1.65%	0.00%	0.55%	0.00%	0.31%	0.00%	0.00%	0.00%	0.00%	0.00%	0.01%
			Verified	0.05%	0.16%	0.01%	1.65%	0.00%	0.55%	0.00%	0.31%	0.00%	0.00%	0.00%	0.00%	0.00%	0.01%
3	Connection maintenance (retainability)																
	CDR	<=2%	Reported	1.06%	0.67%	0.52%	1.65%	0.00%	1.53%	0.00%	0.94%	0.01%	0.01%	0.11%	0.01%	0.01%	0.23%
			Verified	1.06%	0.67%	0.52%	1.65%	0.00%	1.53%	0.00%	0.94%	0.01%	0.01%	0.11%	0.01%	0.01%	0.23%
	Worst affected cells>3% TCH drop	<=3%	Reported	0.02%	0.01%	6.23%	2.35%	0.00%	8.57%	0.00%	2.40%	0.01%	0.03%	0.85%	0.02%	0.00%	0.61%
			Verified	0.02%	0.01%	6.23%	2.35%	0.00%	8.57%	0.00%	2.40%	0.01%	0.03%	0.85%	0.02%	0.00%	0.61%
	Good voice quality	>=95%	Reported	97%	99%	99%	97%	98%	95%	99%	96%	98%	98%	99%	98%	99%	100%
			Verified	97%	99%	99%	97%	98%	95%	99%	96%	98%	98%	99%	98%	99%	100%
4	POI congestion	<=0.5%	Reported	0	0	0	0	0	0	0	0	0	0	0	0	0	0
			Verified	0	0	0	0	0	0	0	0	0	0	0	0	0	0
(B)	Customer Service Quality Parameters																
5	Metering/billing credibility-Post paid	<= 0.1%	Reported	0.01%	0.03%	NA	0.00%	0.00%	0.01%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
			Verified	0.01%	0.03%	NA	0.00%	0.00%	0.01%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
6	Metering /billing credibility-Pre paid	<= 0.1%	Reported	0.00%	0.00%	0.00%	0.00%	0.00%	0.01%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
			Verified	0.00%	0.00%	0.00%	0.00%	0.00%	0.01%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
7	Resolution of billing/ charging complaints	100% within 4 weeks	Reported	100%	100%	1%	100%	100.0%	100.0%	100.0%	100.0%	100.0%	100%	100%	0%	100%	100%
			Verified	100%	100%	1%	100%	100.0%	100.0%	100.0%	100.0%	100.0%	100%	100%	0%	100%	100%
	Period of applying credit/waiver/adjustment	<=1 week	Reported	100%	100%	0%	100%	0%	100%	100%	100%	100%	100%	100%	100%	100%	100%
			Verified	100%	100%	0%	100%	0%	100%	100%	100%	100%	100%	100%	100%	100%	100%

S/N	PMR Name of Parameter	Bench-mark	Audit	Aircel	Airtel	Etisalat	Idea	LOOP	BSNL	Rcom GSM	Tata GSM	Vi-cone	V-fone	MTS	HFCL	Rcom CDMA	Tata CDMA
							GSM Operators									CDMA Operators	
	to the customers account from the date of resolutions of complaints																
8	**Response time to customers for assistance**																
	Accessibility of call centre/Customer Care	>=95%	Reported	100%	100%	1%	98%	100%	100%	100%	99%	100%	100%	100%	100%	100%	98%
			Verified	100%	100%	1%	98%	100%	100%	100%	99%	100%	100%	100%	100%	100%	98%
	% call answered by operators(voice to voice) within 60 sec.	>=90%	Reported	86%	87%	1%	46%	100%	96%	93%	86%	93%	94%	100%	96%	94%	93%
			Verified	86%	87%	1%	46%	100%	96%	93%	86%	93%	94%	100%	96%	94%	93%
9	**Termination/closure of service**																
	No.of requests for Termination / Closure of service complied within 7 days during the quarter	<=7days	Reported	100%	100%	0%	99%	0%	100%	100%	100%	0%	100%	NA	92%	100%	100%
			Verified	100%	100%	0%	99%	0%	100%	100%	100%	0%	100%	NA	92%	100%	100%
10	**Time taken for refunds of deposits after closures.**	100% within 60 days	Reported	100%	100%	0%	100%	0%	100%	100%	100%	0%	100%	NA	100%	100%	99%
			Verified	100%	100%	0%	100%	0%	100%	100%	100%	0%	100%	NA	100%	100%	99%

The figures obtained by data verification match the PMR figures.

II. Basic Service (Wire Line) Service (PMR Period : April 2011 - June 2011)

S/N	Parameters	Bench-marks	Audit	BSNL	AIRTEL	HFCL	RCOM	TTSL
1	*Fault incidences*							
	(No. of faults/100 subscribers /month)	< 5%	Reported	4.02%	2.32%	4.88%	0.60%	1.26%
			Verified	4.02%	2.32%	4.88%	0.60%	1.26%
2	*Faults Repair/Restoraion Time*							
	Fault repair by next working day(Urban Area)	>90%	Reported	95.66%	99.48%	87.43%	100%	96.81%
			Verified	95.66%	99.48%	87.43%	100%	96.81%
	Within 3 days	100%	Reported	99.55%	100.00%	97.26%	100%	100%
			Verified	99.55%	100.00%	97.26%	100%	100%
	Within 5 days (Hilly & Rural Area)	100%	Reported	99.48%	NA	NR	NA	100%
			Verified	99.48%	NA	NR	NA	100%
	Mean time to Repair(MTTR)	≤8 Hrs	Reported	6.30	4.91	10.16	2.11	2.96
			Verified	6.30	4.91	10.16	2.11	2.96
3	*Rent Rebate*							
	Rent Rebate		Reported	NIL	27	NIL	NIL	NIL
			Verified	NIL	27	NIL	NIL	NIL
4	*Call Completion Ratio(CCR) & Answer to seizure Ratio(ASR)*							
	CCR & ASR	> 55%(CCR) & > 75%(ASR)	Reported	70.43%	97.13%	55.84%	91.74%	99.58%
			Verified	70.43%	97.13%	55.84%	91.74%	99.58%
5	*Metering & Billing Performance*							
	Metering & Billing Credibility-Post paid	< 0.1%	Reported	0.02%	0.11%	0.04%	0.03%	0.05%
			Verified	0.02%	0.11%	0.04%	0.03%	0.05%
	Metering & Billing Credibility-Pre paid	100%	Reported	NA	NR	NA	NR	NA
			Verified	NA	NR	NA	NR	NA
	Resolution of billing charging/validity/Complaints within 4 weeks	100%	Reported	NR	100%	100%	100%	100%
			Verified	NR	100%	100%	100%	100%
	Period of all refunds/payments from the date of resolution of complaints within 1 weeks	100%	Reported	NR	98.89%	100%	100%	NR
			Verified	NR	98.89%	100%	100%	NR
6	*POI Congestion*							
	POI Congestion (%)	≤ 0.5%	Reported	NR	NIL	NIL	NIL	NIL
			Verified	NR	NIL	NIL	NIL	NIL
7	*Response Time to customer for assistance*							
	Accessibility of Call centre/customer Care within 40 seconds	≥95%	Reported	95.03%	97.95%	77.11%	96.00%	98.43%
			Verified	95.03%	97.95%	77.11%	96.00%	98.43%
	% age of calls answered by operator(voice to voice) within 60 seconds	≥90%	Reported	92.67%	93.92%	74.00%	91.00%	95.50%
			Verified	92.67%	93.92%	74.00%	91.00%	95.50%
8	*Customer care(promptness in attending to customers request*							
	Termination / Closures	100%	Reported	100%	NR	100%	100%	NR
			Verified	100%	NR	100%	100%	NR
	Time taken for refunds of deposit after closures	100%	Reported	100%	100%	100%	100%	NIL
			Verified	100%	100%	100%	100%	NIL

The figures obtained by data verification match the PMR figures.

III. Broadband Service (PMR Period Verification April 2011 - June 2011)

S/N	Parameters	Benchmarks	Audit Period	Airtel	BSNL	RCom	FIVE	HFCL	Hathway	Sify	TCISL	Spectranet	Zylog
1	*Service Provisioning/Activation Time*												
1.2	%age of connections provided within 15 days of registration of demand	100%	Reported	100%	100%	100%	100%	99.79%	100%	100%	100%	98.91%	100.00%
			Verified	100%	100%	100%	100%	99.79%	100%	100%	100%	98.91%	100.00%
2	*Faults Repair/Restoraion Time*												
2.1	% of faults repaired by next working day	>90%	Reported	99.67%	94.80%	100%	99.50%	97.99%	97.00%	90%	98%	99%	89%
			Verified	99.67%	94.80%	100%	99.50%	97.99%	97.00%	90%	98%	99%	89%
2.2	% of faults repaired within 3 working day	≥99%	Reported	99.84%	99.50%	100%	100%	99.40%	99.00%	99%	99%	100%	95%
			Verified	99.84%	99.50%	100%	100%	99.40%	99.00%	99%	99%	100%	95%
3	*Rent Rebate*												
3.1	Rent Rebate		Reported	11	196	0	NA	48	8	195	1819	0	48
			Verified	11	196	0	NA	48	8	195	1819	0	48
4	*Billing Performance*												
4.1	%age of bills disputed	<2%	Reported	0.13%	0.10%	0.09%	NR	0.03%	1.20%	NA	0%	NA	NR
			Verified	0.13%	0.10%	0.09%	NR	0.03%	1.20%		0%		NR
4.2	%age of complaints resolved within 4 weeks	100%	Reported	100%	99.90%	100%	100%	100%	100.00%		100%		100%
			Verified	100%	99.90%	100%	100%	100%	100.00%		100%		100%
4.3	%age of cases to whom refund of deposits is made within 60 days of closures	100%	Reported	100%	100%	100%	100%	100%	100%		100%		100%
			Verified	100%	100%	100%	100%	100%	100%		100%		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	68.69%	81.40%	85%	NA	65%	99.00%	85%	90.43%	100%	100%
			Verified	68.69%	81.40%	85%	NA	65%	99.00%	85%	90.43%	100%	100%
5.2	%age of calls answered by operator (Voice to voice) within 90 sec	>80%	Reported	78.21%	91.50%	89%	NA	72%	NA	93%	91.65%	100%	NR
			Verified	78.21%	91.50%	89%	NA	72%	NA	93%	91.65%	100%	NR
6	*Bandwidth utilisation/throughput*												
6.1	No. of Intra network links having Bandwidth utilisation >90% during peak hours (TCBH)		Reported	0	3	0	12	0	NR	0	DNF	0	0
			Verified	0	0	0	12	0	NR	0	DNF	0	0
6.2	No. of Upstream links for International connectivity having BW utilisation >90% Peak Hrs.(TCBH)		Reported	0	0	0	12	0	0	0	0	0	0
			Verified	0	0	0	12	0	0	0	0	0	0

S/N	Parameters	Benchmarks	Audit Period	Airtel	BSNL	RCom	FIVE	HFCL	Hathway	Sify	TCISL	Spectranet	Zylog
6.3	% International bandwidth utilization during peak hours (TCBH) (Enclose MRTG)	<90%	Reported	0.70%	78.10%	85.00%	NR	62%	88.00%	85%	42.05%	70%	82.00%
			Verified	0.70%	78.10%	85.00%	NR	62%	88.00%	85%	42.05%	70%	82.00%
6.4	Broadband Connection Speed available (download) from ISP node to user	>80%	Reported	100%	88.40%	DNF	95%	100%	85%	DNF	93.26%	DNF	90%
			Verified	100%	88.40%	DNF	95%	100%	85%	DNF	93.26%	DNF	90%
7	Service Availability/Uptime (for all users) in %age												
7.1	Service availability /uptime (for all users) in %age	>98%	Reported	100%	99.70%	99.69%	98%	99.66%	99.45%	100%	100%	C/DNF	99.60%
			Verified	100%	99.70%	99.69%	98%	99.66%	99.45%	100%	100%	C/DNF	99.60%
8	Packet loss												
8.1	% of Packet loss	<1%	Reported	0%	0.04%	C/DNF	NR	0%	0.98%	C/DNF	0.53%	C/DNF	NA
			Verified	0%	0.04%	C/DNF	NR	0%	0.98%	C/DNF	0.53%	C/DNF	NA
9	Network latency (for wired broadband access)												
9.1	User reference point at POP/ISP Gateway node to IGSP/NIXI	<120 ms	Reported	38 ms	26.3 ms	DNF	NR	49 ms	80ms	68ms	50.33ms	DNF	44ms
			Verified	38 ms	26.3 ms	DNF	NR	49 ms	80ms	68ms	50.33ms	DNF	44ms
9.2	User reference point at ISP Gateway node to International nearest NAP port abroad (terrestrial)	<350 ms	Reported	10 ms	233.7 ms	DNF	NR	292 ms	300ms	295ms	249ms	DNF	300ms
			Verified	10 ms	233.7 ms	DNF	NR	292 ms	300ms	295ms	249ms	DNF	300ms
9.3	User reference point at ISP Gateway node to International nearest NAP port abroad (satellite)	<800 ms	Reported						NA				
			Verified										

C/DNF—Complied the Parameter but data is not in required format

DNF--   Data not as per format.

The figures obtained by data verification match the PMR figures.

CHAPTER-4: DETAILED FINDINGS & ANALYSIS

I. Cellular Mobile Telephone Service
(A) MSC Audit
(1) 3 Days Live Data Assessment & Summarized Findings

S/N	Name of Parameter	Bench mark	Aircel	Airtel	Etisalat	Idea	Loop	BSNL	Rcom GSM	TTSL GSM	Videocon	Vodafone	MTS	HFCL	Rcom CDMA	Tata CDMA
						GSM Operators									CDMA Operators	
(A)-1	Network Service Quality Parameter															
	BTS Accumulated Downtime	<=2%	0.01%	0%	0.00%	0%	0%	0.13%	0.09%	0.01%	0.04%	0.01%	0%	0%	0.05%	0.01%
	Worst affected BTS due to downtime	<=2%	0%	0.00%	0%	0%	0%	0.06%	0%	0%	0%	0%	0%	0%	0%	0%
	Total No of BTS in licence service area.		607	4015	18	3743	4	3617	1736	1593	1666	4266	13	10	946	643
	Sum of downtime of BTSs in a month in hours i.e. total outage time of all BTSs in hours during a month		6.44	95	0	37	0	346	110	14	50	35	0	0	74	3
	No. of BTSs having accumulated downtime of >24 hours in a month		0	0	0	0	0	2	0	0	0	2	0	0	0	0
2	Connection Establishment (Accessibility)															
	a) CSSR	>=95%	99.93%	99.63%	100.00%	98.69%	100%	98.32%	99.95%	99.87%	99.85%	99.86%	100%	99.33%	99.87%	99.97%
	b) SDCCH/PAGING congestion	<=1%	0.06%	0.12%	0.00%	0.22%	0.01%	0.59%	0.01%	0.01%	0.02%	0.05%	0.00%	0.25%	0.01%	0.00%
	c) TCH congestion	<=2%	0.01%	0.25%	0.00%	1.09%	0.00%	1.09%	0.04%	0.12%	0.13%	0.09%	0.00%	0.42%	0.12%	0.03%
3	Connection maintenance															
	a) CDR	<=2%	0.63%	0.74%	0.73%	1.57%	2.90%	2.08%	0.54%	0.75%	0.79%	0.75%	0.00%	1.56%	0.54%	0.97%
	b) Cells having > 3% TCH drop	<=3%	1.59%	1.32%	1.85%	2.49%	0.00%	5.02%	0.13%	5.86%	2.84%	4.46%	0.00%	0.00%	0.14%	0.05%
	c) Good voice quality	>=95%	97.37%	98.69%	98.43%	96.29%	99.38%	95.10%	99.18%	96.34%	98.14%	97.68%	NA	NA	NA	NA

S/N	Name of Parameter	Bench mark	Aircel	Airtel	Etisalat	Idea	Loop	BSNL	Rcom GSM	TTSL GSM	Videocon	Vodafone	MTS	HFCL	Rcom CDMA	Tata CDMA
						GSM Operators									CDMA Operators	
	d) No. of cells > 3% TCH drop		29	158	1	279	0	425	7	280	142	585	0	0	4	1
	e) Total no. of cells in the network		1,821	12,007	54	11,221	12	8,458	5,208	4,780	5,006	13,126	39	30	2,838	1,976
4	No of POI having > 0.5% congestion	<=0.5 %	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	a) Name of POI not meeting the benchmark		Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil
	b) Total No. of circuits on POI		19,322	155,722	1,393	99,239	390	61,160	10,450	11,970	10,013	128,060	1239	228	525,768	28,511
	c) Avg No. of call attempts on POI		234,738	27670	1,306	1,733,044	32	1281564	217,193	204,580	2,868	43,612	26	1,212	98,272	95,330
	d) Avg traffic served on POI (Erlang)		4,715	907	46	27,390	0	36,161	5,234	5,758	108	1,579	0.90	36	6,336	1,135
	e) Total number of working POI Service Area wise		34	81	27	33	14	49	22	21	50	45	25	22	22	120
	f) Equipped Capacity of Network in respect of Traffic in erlang		50,000	269,620	443	158,902	89	260,005	72,000	92,533	63,594	137,397	4,200	16,800	141,000	58,000
	g)Network Traffic handled in TCBH in Erlang.		3898	209613	29	134350	15	100200	67809	24768	19571	123104	4.00	856	22367	41167
5	Response time to customers for assistance															
	a) Accessibility of call centre	>=95 %	100%	99%	100%	100%	100%	100%	99%	100%	100.00%	100%	100%	100%	99%	99%
	b) % of call answered by operators(voice to voice) within 60 sec	>=90%	95.66%	99.78%	100.00%	94.13%	100%	96.19%	61.85%	97.78%	99.76%	97.06%	100%	100.00 %	91.14%	99.72%
	c) No. of call attempts to call centre / customer care nos. during TCBH (Avg)		12976	63,096	9	50,573	1	7,347	20,408	45,148	420	5,613	2	72	2,765	3,219
	d) No. of calls connected and answered successfully to call centre / customer care nos. during TCBH (Avg)		12413	62,959	9	47,604	1	7,067	12,623	44,144	419	5,448	2	72	2,520	3,210

Parameter-wise Findings (Live Data Assessment):

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

➢ **Worst affected BTSs due to downtime (benchmark <= 2%):** All operators are meeting the benchmark with values lying between 0% and 0.13%.

➢ **Worst affected BTSs due to downtime (benchmark <= 2%):** All operators are meeting the benchmark with values lying between 0% and 0.06%.

➢ **Call Setup Success Rate (CSSR) (benchmark >= 95%):** All operators are meeting the benchmark with values lying between 98.32% and 100%.

➢ **SDCCH/PAGING Channel congestion (benchmark <= 1%):** All operators, are meeting the benchmark with values lying between 0% and 0.59%
Note: CDMA operators have provided the data for Paging Channel congestion and GSM operators provided SDCCH Channel congestion.

➢ **TCH congestion (benchmark <= 2%):** All operators are meeting the benchmark with values lying between 0% and 1.09%.

➢ **Call Drop Rate (CDR) (benchmark <= 2%):** All operators are meeting the benchmark with values lying between 0.08% and 2.90%, except Loop (2.90%) & BSNL (2.08%).

➢ **Cell exceeding 3% TCH drop (benchmark <= 3%):** BSNL, TTSL(GSM), & Vodafone are not satisfying the benchmark. Rest of the operators are meeting the benchmark .

➢ **Connections with good voice quality (benchmark >= 95%):** CDMA service providers have declared that the parameter is not system generated. Rest of the operators is meeting the benchmark.

➢ **No of POI > 0.5%Congestion (benchmark >= 0.5%):** None of the operators are having POIs more than 0.5% congestion. There was congestion found on the POIs in general, but was under the benchmark of 0.5%. Cases were found where individual POIs were showing high utilization/usage and some were 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.

➢ **Metering & Billing (benchmark <= 0.1%):-** All operators are meeting the benchmark, except TTSL (GSM & CDMA) .

➢ **%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 operators are meeting the benchmarks except Rcom (GSM) (61.85%) .

(2) Month Data Assessment & Summarized Findings

S/N	Name of Parameter	Bench mark	Aircel	Airtel	Etisalat	Idea	Loop	BSNL	Rcom GSM	TTSL GSM	Videocon	Vodafone	MTS	HFCL	Rcom CDMA	Tata CDMA
								GSM Operators						CDMA Operators		
(A)	Network Service Quality Parameter															
1	Network Availability															
	a) BTS Accumulated Downtime	<=2%	0.00%	0.05%	0.03%	0.00%	0.00%	0.01%	0.11%	0.02%	0.14%	0.01%	0.00%	0.00%	0.06%	0.02%
	b) Worst affected BTSs due to downtime	<=2%	0.00%	0.15%	0.00%	0.00%	0.00%	0.03%	0.06%	0.00%	0.00%	0.09%	0.00%	0.00%	0.00%	0.00%
	c) Total no. of BTSs in the licensed service area		607	4,015	18	3,743	4	3,617	1,736	1,593	1,666	4,266	13	10	946	643
	d) Sum of downtime of BTSs in a month in hours i.e. total outage time of all BTSs in hours during a month		6	1,586	4	27	0	360	1,365	215	1,743	216	0	0	397	81
	e) No. of BTSs having accumulated downtime of >24 hours in a month		0	6	0	0	0	1	1	0	0	4	0	0	0	0
2	Connection Establishment (Accessibility)															
	a) CSSR (Call Setup Success Rate)	>=95%	99.90%	99.61%	99.98%	98.72%	99.97%	98.02%	99.89%	99.80%	99.75%	99.70%	100.00%	98.85%	99.88%	99.96%
	b) SDCCH/PAGING congestion	<=1%	0.08%	0.13%	0.02%	0.23%	0.03%	0.61%	0.02%	0.02%	0.06%	0.11%	0.00%	0.23%	0.01%	0.00%
	c) TCH congestion	<=2%	0.02%	0.26%	0.00%	1.05%	0.00%	1.37%	0.09%	0.18%	0.19%	0.19%	0.00%	0.92%	0.11%	0.04%
3	Connection maintenance (retainability)															
	a) CDR	<=2%	0.66%	0.76%	0.72%	1.41%	2.68%	1.99%	0.57%	0.69%	0.78%	0.77%	0.00%	1.78%	0.52%	0.96%
	b) Worst affected cells>3% TCH drop	<=3%	1.70%	1.35%	3.70%	2.80%	0.00%	5.75%	0.21%	5.82%	2.66%	4.62%	0.00%	0.00%	0.14%	0.86%
	c) Good voice quality	>=95%	97.39%	98.71%	98.56%	96.60%	98.85%	95.22%	99.09%	96.41%	98.07%	97.67%	NA	NA	NA	NA
	d) Total No. of cells exceeding 3% TCH drop (call drop)		31	162	2	314	0	486	11	278	133	607	0	0	4	17
	e) Total no. of cells in the network		1,821	12,007	54	11,221	12	8,458	5,208	4,780	5,006	13,126	39	30	2,838	1,976

S/N	Name of Parameter	Bench mark	Aircel	Airtel	Etisalat	Idea	Loop	BSNL	Rcom GSM	TTSL GSM	Videocon	Vodafone	MTS	HFCL	Rcom CDMA	Tata CDMA
						GSM Operators									CDMA Operators	
4	**No of POI having > 0.5% congestion**	*>=0.5%*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	a) Name of POI not meeting the benchmark		NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL
	b) Total No. of call attempts on POI (Avg.)		217,853	33349	1,276	1,620,796	182	523,365	202,630	225,833	3,500	48,047	96	1,316	88,201	216,771
	c) Total traffic served on POI (Erlang) (Avg.)		4,441	1,022	45	26,190	0	7,317	4,870	5,743	124	1,632	2.73	40	5,814	1,202
	d) Total No. of circuits on POI		19,322	155,722	1,393	99,239	390	61,160	10,450	11,970	10,013	128,060	1239	228	525,768	28,511
	e) Total number of working POI Service Area wise		34	81	27	33	14	49	22	21	50	45	25	22	22	120
	f) Capacity of POI		17,054	152,295	1,044	94,299	348	NP	9,696	11,289	8,511	127,644	35	195	480,510	25,974
5	**Network Data**															
	a) Equipped Capacity of Network Erlang		50,000	269,620	443	158,902	89	260,005	72,000	92,533	63,594	137,397	4200	16,800	141,000	58,000
	b) Total traffic in TCBH in erlang (Avg.)		3,898	209,613	29	134,350	15	100,200	67,809	24,768	19,571	123,104	4.00	856	22,367	41,167
	c) Total no. of customers served (as per VLR) on last day of the month		401,381	6,262,498	2,501	4,487,537	16	2,311,077	2,225,530	1,059,365	506,104	3,692,650	321	830	566,747	527,838
(B)	**Customer Service Quality Parameters**															
5	**Metering/billing credibility-Post paid**	*<= 0.1%*	0.00%	0.05%	NA	0.05%	NA	0.02%	0.10%	0.38%	NA	0.07%	NA	0.07%	0.10%	0.16%
	a) No. of bills issued during the period		13,413	443,082	NA	450,292	NA	33,946	19,838	21,271	NA	284,374	NA	12,133	90,128	101,119
	b) No. of bills disputed including billing complaints during the period		0	211	NA	232	NA	7	19	81	NA	209	NA	8	90	157
6	**Metering /billing credibility-Pre paid**	*<= 0.1%*	0.02%	0.00%	0.00%	0.00%	0.00%	0.01%	0.04%	0.02%	0.04%	0.01%	0.00%	0.00%	0.04%	0.01%
	a) No. of charging / credit / validity complaints during the quarter		145	241	0	151	0	501	1,637	423	391	359	0	0	326	124

S/N	Name of Parameter	Bench mark	Aircel	Airtel	Etisalat	Idea	Loop	BSNL	Rcom GSM	TTSL GSM	Videocon	Vodafone	MTS	HFCL	Rcom CDMA	Tata CDMA
							GSM Operators								CDMA Operators	
	b) Total no. of pre-paid customers at the end of the quarter		810,209	7,891,481	15,493	4,481,092	139	4,623,199	3,813,234	1,836,637	1,102,040	4,064,747	688	41,145	907,891	1,367,157
7	Resolution of billing/ charging complaints	100% within 4 weeks	100%	100%	NA	100%	NA	100%	100%	100%	100%	100%	NA	100%	100%	100%
	a) No. of billing/(post paid) and charging, credit/validity (pre paid) complaints resolved within 4 weeks during the quarter		100%	100%	NA	100%	NA	100%	100%	100%	100%	100%	NA	100%	100%	100%
	b) Total no. of billing (post paid) and charging, credit / validity (pre paid) complaints received during the quarter		145	452	0	383	0	508	1,656	504	391	568	NA	8	416	281
	c) No. of billing complaints (post paid) and charging, credit/ validity complaints (pre paid) resolved in favour of the customer during the quarter		112	452	0	1,053	0	508	660	3	0	183	NA	8	117	1
	d) No. of complaints disposed on account of not considered as valid complaints during the quarter		33	0	0	791	0	0	996	501	391	385	NA	0	299	280
	e) Period of applying credit/waiver/adjustment to the customers account from the date of resolutions of complaints	<=1 week	100%	100%	NA	100%	NA	100%	100%	100%	100%	100%	NA	100%	100%	100%
8	Response time to customers for assistance															
	a) Accessibility of call centre/Customer Care	>=95%	100%	99.60%	99%	100%	100%	100%	99%	100%	100.00%	100%	100%	100%	99%	99%
	b) % call answered by operators(voice to voice) within 60 sec.	>=90%	92.82%	98.47%	92%	88.37%	100%	95.05%	67.18%	93.24%	99.51%	90.77%	100.00%	98.04%	88.09%	95.04%

S/N	Name of Parameter	Bench mark	Aircel	Airtel	Etisalat	Idea	Loop	BSNL	Rcom GSM	TTSL GSM	Videocon	Vodafone	MTS	HFCL	Rcom CDMA	Tata CDMA
			GSM Operators										CDMA Operators			
	c) Total no. of call attempts to call centre & customer care nos. during TCBH (Avg.).		12590	64892	9	50,573	1	7,347	20,408	45,148	420	149,794	1	72	2,765	3,219
	d) No. of calls connected and answered successfully to call centre & customer care nos. during TCBH (Avg.).		11686	63901	11	44,765	1	13,660	14,461	536,754	612	5,517	1	100	2,877	3,625
9	Termination/closure of service	<=7days	100%	100%	NA	100%	NA	100%	100%	100%	NA	100%	NA	100%	100%	100%
	a) Total No. of requests for Termination / Closure of service received during the quarter		118	4,656	NA	2,431	NA	254	201	358	NA	2,149	NA	223	637	2,227
	b) No.of requests for Termination / Closure of service complied within 7 days during the quarter		118	4,656	NA	2,431	NA	254	201	358	NA	2,149	NA	223	637	2,227
10	Time taken for refunds of deposits after closures.	100% within 60 days	100%	100%	NA	100%	NA	100%	100%	100%	NA	100%	NA	NA	100%	100%

NA: Not Applicable, NP:
-Data Not Provided

Parameter-wise Findings (Month Data Assessment):

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

- **BTS accumulated downtime (benchmark <=2%):** All operators are meeting the benchmark with values lying between 0% and 0.14%.
- **Worst affected BTSs due to downtime (benchmark <= 2%):** All operators are meeting the benchmark with values lying between 0% and 0.15%.
- **Call setup success rate (benchmark >= 95%):** All operators are meeting the benchmark with values lying between 98.02% and 100%.
- **SDCCH/PAGING Channel congestion (benchmark <= 1%):** All operators are meeting the benchmark with values lying between 0% and 0.61%.
  Note: CDMA operators have provided the data for Paging Channel congestion and GSM operators provided SDCCH Channel congestion.
- **TCH congestion (benchmark <= 2%):** All operators are meeting the benchmark with values lying between 0% and 1.37%.
- **Call drop rate (benchmark <= 2%):** All operators are meeting the benchmark with values lying between 0.42% and 2.68%. except Loop, which is slightly deviating from benchmark.
- **Cell exceeding 3% TCH drop (benchmark <= 3%):** All operators are meeting the benchmark except Etisalat (3.70%), BSNL (5.75%), TTSL-GSM (5.82%) & Vodafone (4.62%).
- **Connections with good voice quality (benchmark >= 95%):** All the operators are meeting the benchmark. CDMA service Provider has declared that the parameter is not system generated.
- **No of POI > 0.5%Congestion (benchmark >= 0.5%):** None of the operators are having POIs more than 0.5% congestion. There was congestion found on the POIs in general, but was under the benchmark of 0.5%. Cases were found where individual POIs were showing high utilization/usage and some were in the range of over 100%, though causing no traffic failure due to overflow technique i.e. the extra traffic is carried over by some other operating POI as has been designed to do so.
- **%age of call answered by operator (electronically) (benchmark >95%):** All operators are meeting the benchmark.
- **%age of call answered by operator (Voice to voice) (benchmark >90%):** Except Idea, Rcom (GSM) & RCOM (CDMA), rest of the operators are meeting the benchmark.
- **Metering and billing credibility-Post paid (benchmark <= 0.1%):** Rest of the operators are meeting the benchmark. except TTSL(GSM & CDMA) deviating with a value of 0.38%. & 0.16% respectively.
- **Metering and billing credibility-Pre paid (benchmark <= 0.1%):** Rest of the operators are meeting the benchmark.
- **Resolution of billing/ charging complaints (benchmark 100% within 4 weeks):** All operators are meeting the benchmark, except Etisalat, Loop & MTS, which has no post paid service in Punjab circle .
- **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**
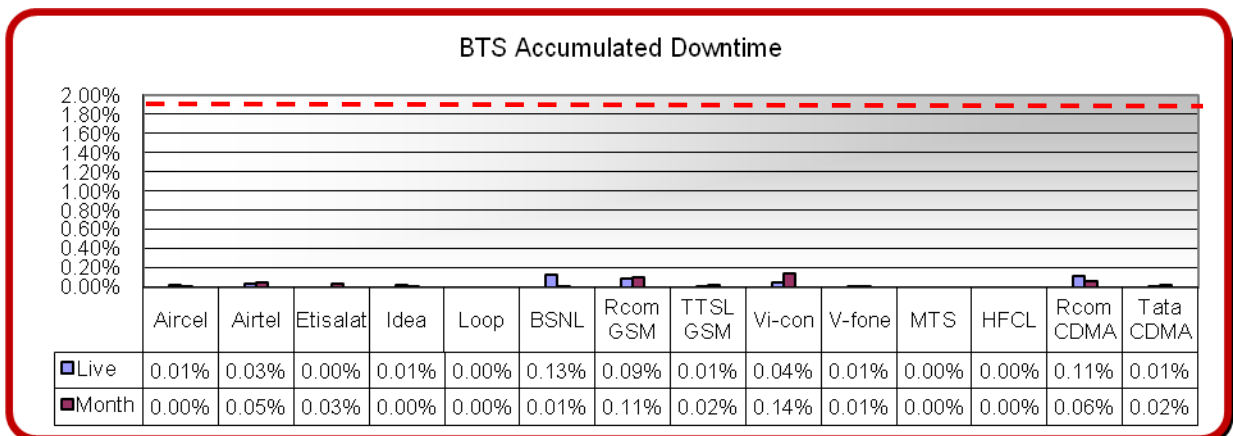
Switches/BSC/BTS details of operators:

Sl.	Name of Service Provider	No. of MSC	No. of BSC	No. of BTS
	GSM Operators			
1	Aircel Ltd	1	6	607
2	Airtel Ltd	24	51	4015
3	BSNL	13	45	3617
4	Etisalat	0	1	18
5	Idea	18	74	3743
6	Reliance Communication	3	8	1736
7	Tata Teleservices Ltd.	2	11	1593
8	Videocon	1	9	1666
9.	Loop	1	1	4
10	Vodafone	9	50	4266
	CDMA Operators			
11.	HFCL	1	2	10
12.	MTS	1	1	13
13	Reliance Communication	5	5	946
14.	Tata Teleservices Ltd.	5	5	643

**(4)**   **Performance (Graphical Representation)**

Comparison between Live measurements and One month data Audit – Cellular Mobile Telephone Services
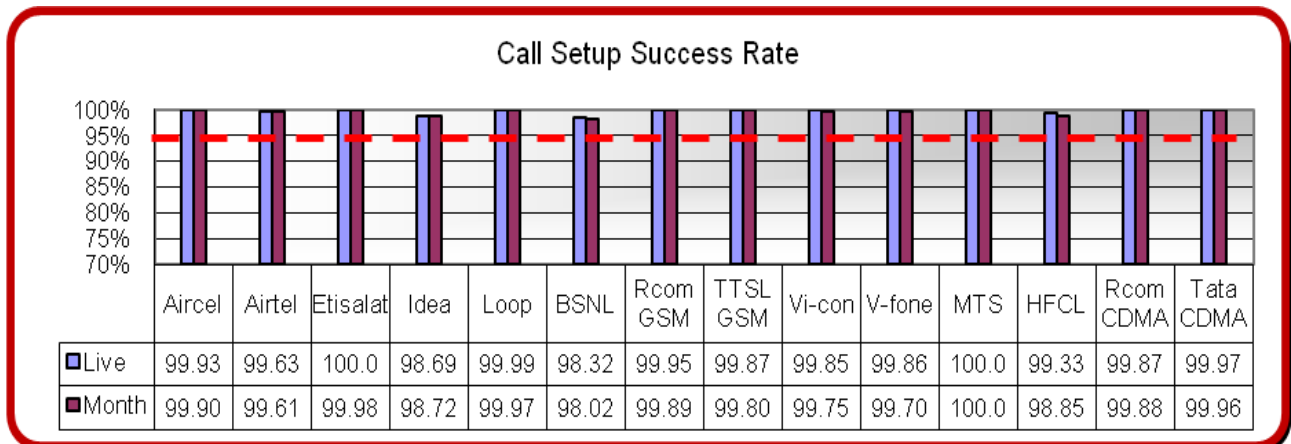
A)   NETWORK PERFORMANCE

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

	Aircel	Airtel	Etisalat	Idea	Loop	BSNL	Rcom GSM	TTSL GSM	Vi-con	V-fone	MTS	HFCL	Rcom CDMA	Tata CDMA
Live	0.01%	0.03%	0.00%	0.01%	0.00%	0.13%	0.09%	0.01%	0.04%	0.01%	0.00%	0.00%	0.11%	0.01%
Month	0.00%	0.05%	0.03%	0.00%	0.00%	0.01%	0.11%	0.02%	0.14%	0.01%	0.00%	0.00%	0.06%	0.02%

Worst Affected BTS Due to Downtime: All operators are meeting the TRAI benchmarks (<= 2 %) for both one month data and 3 days live data taken in the month of audit.
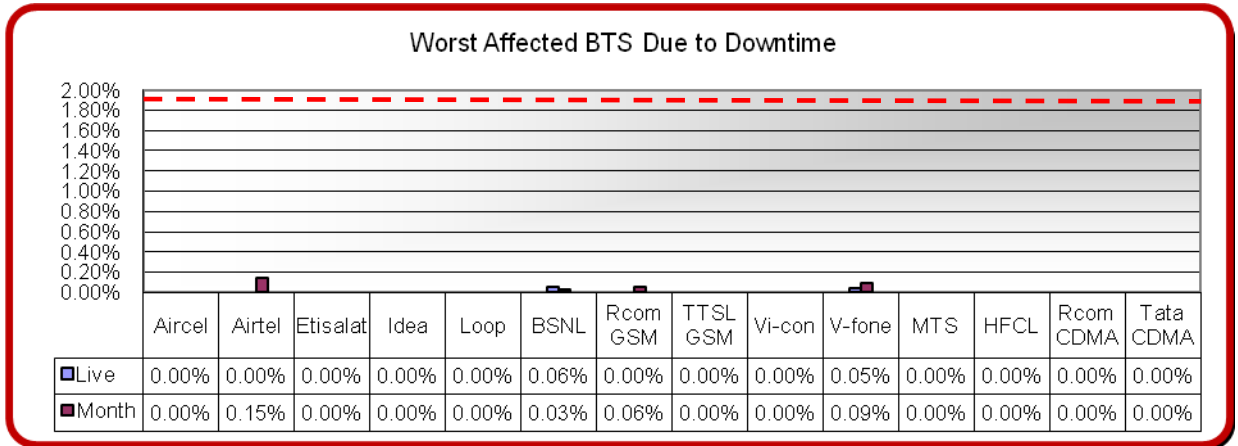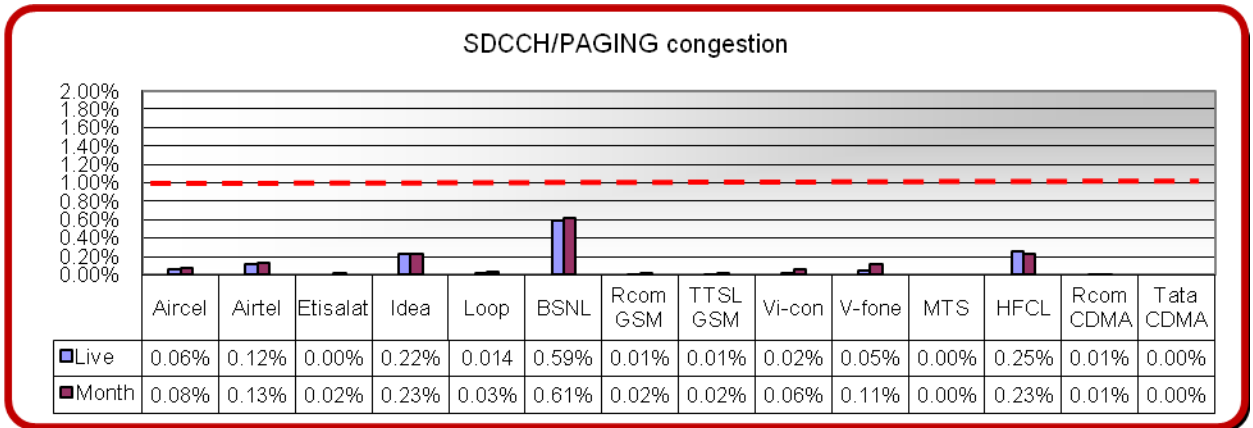

Call Setup Success Rate (CSSR): All operators are meeting the TRAI benchmarks (>= 95 %) for both one month data and 3 days live data taken in the month of audit
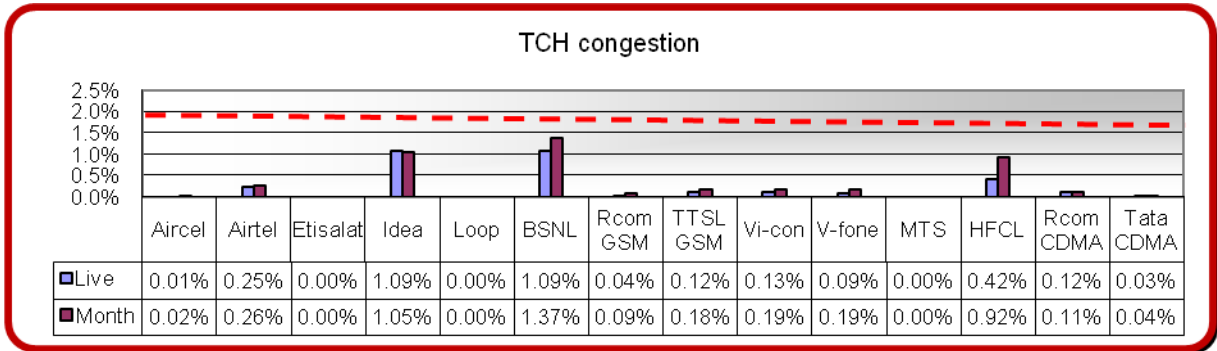
Blocked call rate:

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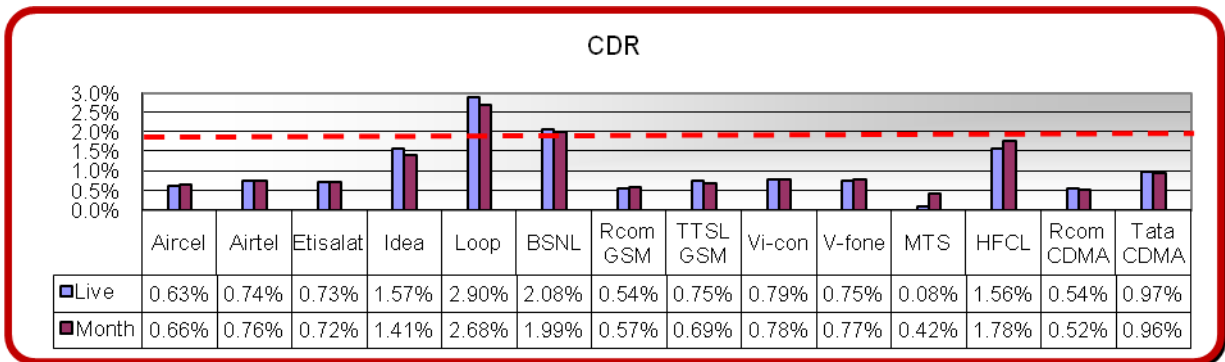

	Aircel	Airtel	Etisalat	Idea	Loop	BSNL	Rcom GSM	TTSL GSM	Vi-con	V-fone	MTS	HFCL	Rcom CDMA	Tata CDMA
Live	0.06%	0.12%	0.00%	0.22%	0.014	0.59%	0.01%	0.01%	0.02%	0.05%	0.00%	0.25%	0.01%	0.00%
Month	0.08%	0.13%	0.02%	0.23%	0.03%	0.61%	0.02%	0.02%	0.06%	0.11%	0.00%	0.23%	0.01%	0.00%

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

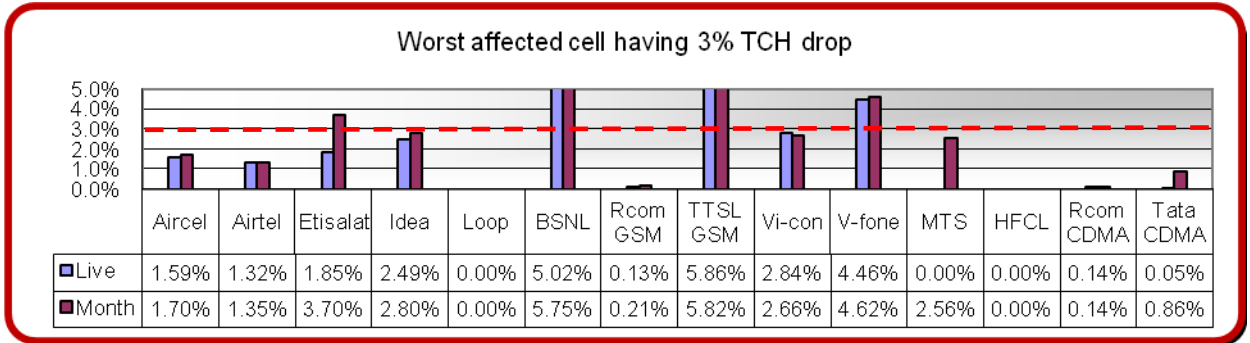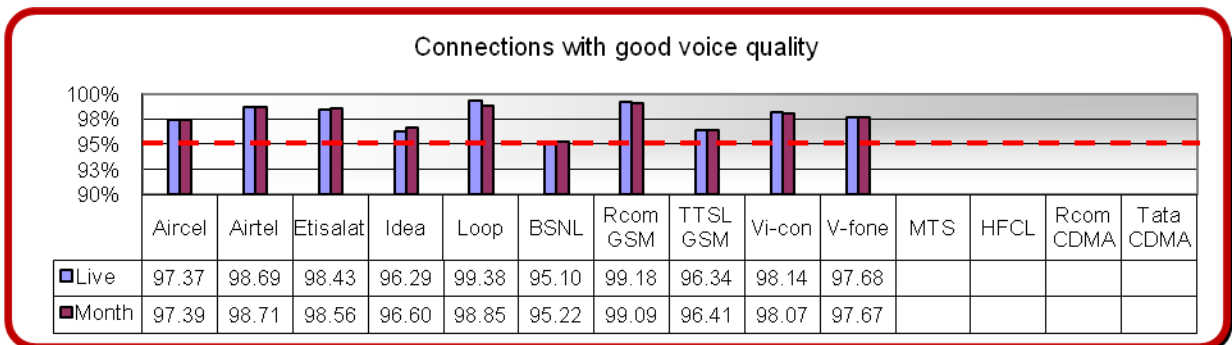|	Aircel	Airtel	Etisalat	Idea	Loop	BSNL	Rcom GSM	TTSL GSM	Vi-con	V-fone	MTS	HFCL	Rcom CDMA	Tata CDMA
Live	0.01%	0.25%	0.00%	1.09%	0.00%	1.09%	0.04%	0.12%	0.13%	0.09%	0.00%	0.42%	0.12%	0.03%
Month	0.02%	0.26%	0.00%	1.05%	0.00%	1.37%	0.09%	0.18%	0.19%	0.19%	0.00%	0.92%	0.11%	0.04%

Connection Maintainability (Retainability):

Call Drop Rate (CDR) (%): Rest of the operators are meeting the TRAI benchmarks (<=2%) for both one month data and 3 days live data taken in the month of audit, Except Loop & BSNL in case of Live and Loop in case of Month data, which are deviating from the benchmark.
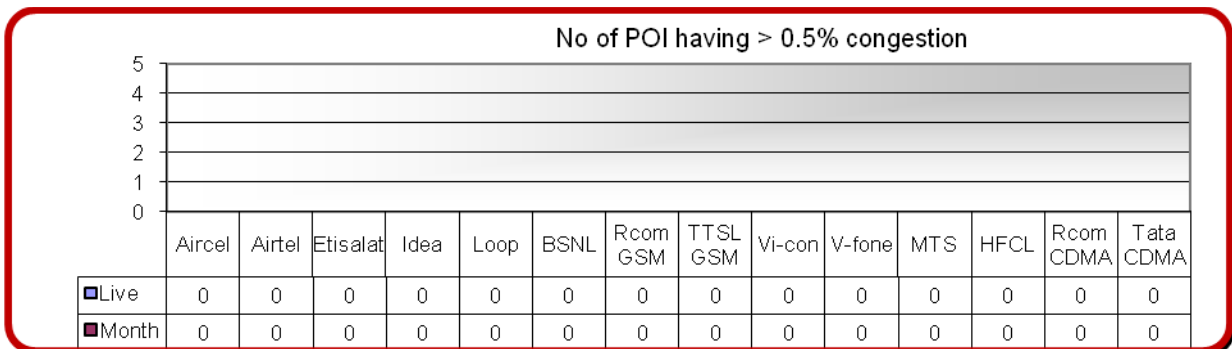

	Aircel	Airtel	Etisalat	Idea	Loop	BSNL	Rcom GSM	TTSL GSM	Vi-con	V-fone	MTS	HFCL	Rcom CDMA	Tata CDMA
Live	0.63%	0.74%	0.73%	1.57%	2.90%	2.08%	0.54%	0.75%	0.79%	0.75%	0.08%	1.56%	0.54%	0.97%
Month	0.66%	0.76%	0.72%	1.41%	2.68%	1.99%	0.57%	0.69%	0.78%	0.77%	0.42%	1.78%	0.52%	0.96%

Worst affected Cell exceeding 3% TCH Drop: In case of both live and month data, BSNL, TTSL(GSM) & Vodafone and for Month data, Etisalat are found not meeting the benchmark of <=3%. Rest of the operators is meeting the benchmark for both cases.

Worst affected cell having 3% TCH drop

	Aircel	Airtel	Etisalat	Idea	Loop	BSNL	Rcom GSM	TTSL GSM	Vi-con	V-fone	MTS	HFCL	Rcom CDMA	Tata CDMA
Live	1.59%	1.32%	1.85%	2.49%	0.00%	5.02%	0.13%	5.86%	2.84%	4.46%	0.00%	0.00%	0.14%	0.05%
Month	1.70%	1.35%	3.70%	2.80%	0.00%	5.75%	0.21%	5.82%	2.66%	4.62%	2.56%	0.00%	0.14%	0.86%

Percentage of connections with good voice quality (benchmark >= 95%): All the operators are meeting the TRAI benchmarks (=> 95%) for both one month data and 3 days live data. CDMA Service provided has not provided the data as data is not generated from the system.
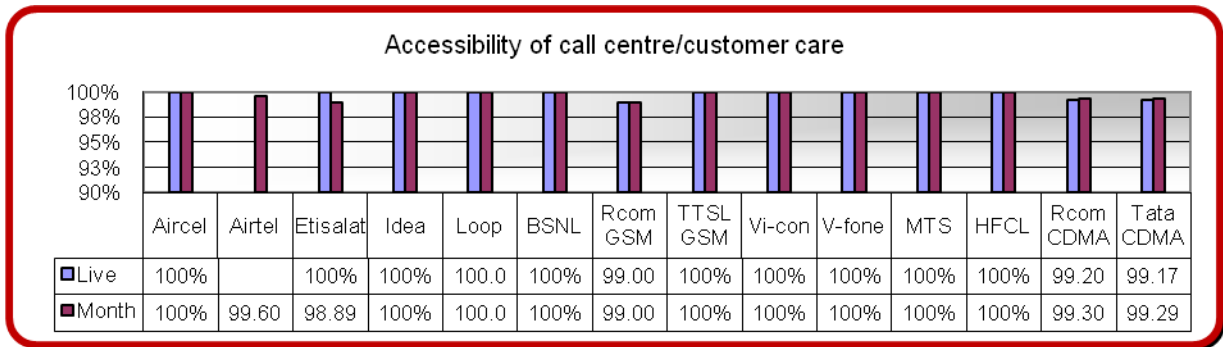
Connections with good voice quality

	Aircel	Airtel	Etisalat	Idea	Loop	BSNL	Rcom GSM	TTSL GSM	Vi-con	V-fone	MTS	HFCL	Rcom CDMA	Tata CDMA
Live	97.37	98.69	98.43	96.29	99.38	95.10	99.18	96.34	98.14	97.68				
Month	97.39	98.71	98.56	96.60	98.85	95.22	99.09	96.41	98.07	97.67				

No of POI having > 0.5% Congestion: None of the operators are having POIs above 0.5% congestion (>= 0.5%) for both one month data and 3 days live data.

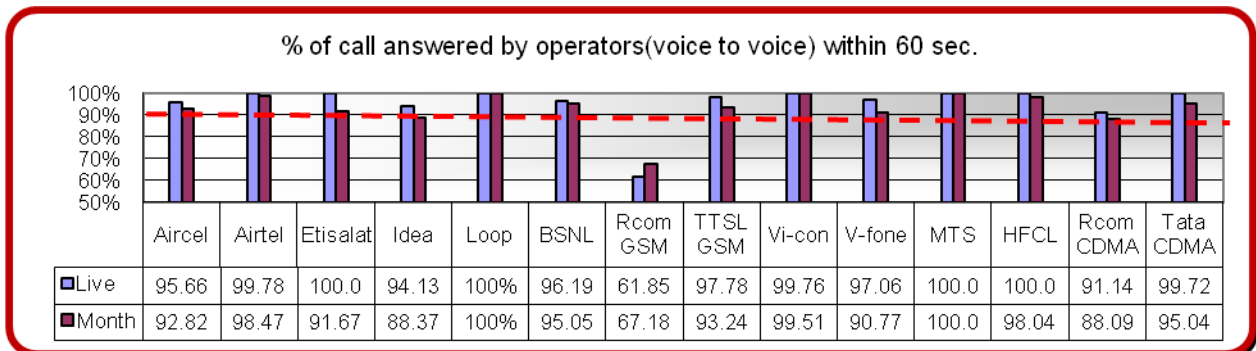No of POI having > 0.5% congestion

	Aircel	Airtel	Etisalat	Idea	Loop	BSNL	Rcom GSM	TTSL GSM	Vi-con	V-fone	MTS	HFCL	Rcom CDMA	Tata CDMA
Live	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Month	0	0	0	0	0	0	0	0	0	0	0	0	0	0

CUSTOMER SERVICE QUALITY PARAMETERS

Response time to the customer for assistance:

Percentage of call answered (Electronically): All operators are meeting the TRAI benchmarks (>= 95%) for both one month data and 3 days live data.

Accessibility of call centre/customer care

	Aircel	Airtel	Etisalat	Idea	Loop	BSNL	Rcom GSM	TTSL GSM	Vi-con	V-fone	MTS	HFCL	Rcom CDMA	Tata CDMA
Live	100%		100%	100%	100.0	100%	99.00	100%	100%	100%	100%	100%	99.20	99.17
Month	100%	99.60	98.89	100%	100.0	100%	99.00	100%	100%	100%	100%	100%	99.30	99.29

Percentage of call answered by operators (Voice to voice) within 60 sec: Except for RCOM (GSM) in both Month & Live cases and Idea & RCOM (CDMA) are only in Month case, not meeting the benchmarks. Rest of the operators are meeting the TRAI benchmarks (>= 90%) for both one month data and 3 days live data taken in the month of audit.

% of call answered by operators(voice to voice) within 60 sec.

	Aircel	Airtel	Etisalat	Idea	Loop	BSNL	Rcom GSM	TTSL GSM	Vi-con	V-fone	MTS	HFCL	Rcom CDMA	Tata CDMA
Live	95.66	99.78	100.0	94.13	100%	96.19	61.85	97.78	99.76	97.06	100.0	100.0	91.14	99.72
Month	92.82	98.47	91.67	88.37	100%	95.05	67.18	93.24	99.51	90.77	100.0	98.04	88.09	95.04

(5)   Critical Analysis

From the data table it can be seen that only Etisalat, BSNL, Tata GSM & Vodafone are not meeting the benchmark for the parameter of 'Worst affected cells have 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 Metering & Billing , only TTSL (GSM & CDMA) is having the value below benchmark, rest all operators are found to be performing quite well in terms of meeting the benchmark (<= 95%) . Aircel is having an ICR agreement with TTSL in Punjab Circle.

In case of POI congestion all the operators are performing quite well in terms of meeting the benchmark (<= 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. For the parameter % call answered by operator (voice to voice) are not met by Idea , TTSL(GSM & CDMA) in month cases respectively.

(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 based on Live calling for Billing Complaints

Calling Operator	Aircel	Airtel	Idea	Rcom(GSM)	TTSL GSM	Vodafone	HFCL	TTSL CDMA
Total No. of calls attempted	60	80	100	100	10	50	8	30
Total No. of calls answered	40	70	80	90	10	45	8	30
Cases resolved with 4 weeks	40	70	80	90	10	45	8	30
%age of cases resolved	100%	100%	100%	100%	100%	100%	100%	100%

(3) Live calling to call centre (Chandigarh)

Calling Operator	Aircel	Airtel	Idea	Etisalat	BSNL	LOOP	Tata GSM	Rcom GSM	Videocon	Vodafone	MTS	HFCL	Rcom CDMA	Tata CDMA
Call Centre No.	121/198	121/198	198/12345	121	1500	121/198	121	*222/*333	121	111/198	155	121	*222/*333	121
Total No. of Calls Attempted	100	100	100	100	100	100	100	100	100	100	100	100	100	100
Total No. of calls connected to IVR	100	100	100	100	100	100	100	100	100	100	100	100	100	100
Calls got connected to agent within 60 Sec	93	97	94	94	93	95	95	96	93	97	96	92	95	95
%age of calls got answered	93%	97%	94%	94%	93%	95%	95%	96%	93%	97%	96%	92%	95%	95%

(4) Level 1 live calling

Emergency no.	Calls Attempted	Airtel	Aircel	Idea	Tata (GSM)	V-fone	Tata (CDMA)	BSNL	Room (GSM)	Room (CDMA)	HFCL	Vi-con
Chandigarh												
100 (Police)	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
108/102 (ambulance)	2	2	2	2	2	2	2	2	2	2	2	2
139 (IR)	2	2	2	2	2	2	2	2	2	2	2	2
Hoshiarpur												
100 (Police)	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
108/102 (ambulance)	2	2	2	2	2	2	2	2	2	2	2	2
139 (IR)	2	2	2	2	2	2	2	2	2	2	2	2
Pathankot												
100 (Police)	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
108/102 (ambulance)	2	2	2	2	2	2	2	2	2	2	2	2
139 (IR)	2	2	2	2	2	2	2	2	2	2	2	2

Note: Etisalat, Loop and MTS are under roll out obligation in Punjab circle.

(5)   Critical Analysis

Random numbers were selected (for whom refund were given) 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. All the Emergency no's were got connected from every operator..

C) Inter operator call assessment

(1)   Sample coverage

A sample of 2x50 test calls per Service Providers with in the licensed service area Punjab 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 (Chandigarh)

Operator Name	Aircel	Airtel	Idea	Stel	BSNL	TTSL(GSM)	RTL GSM	Videocon	V- Fone	TATA CDMA	RCom CDMA
Aircel	-	96%	95%	100%	100%	100%	100%	100%	100%	100%	100%
Airtel	100%	-	100%	98%	100%	100%	99%	100%	100%	98%	100%
Idea	100%	100%	-	100%	95%	100%	100%	97%	99%	100%	98%
Stel	100%	100%	100%	-	100%	96%	96%	100%	100%	97%	100%
BSNL	100%	100%	100%	99%	-	97%	100%	100%	100%	100%	100%
RTL GSM	100%	100%	100%	100%	100%	100%	-	96%	95%	100%	96%
TTSL GSM	100%	100%	100%	98%	100%	-	100%	100%	100%	95%	100%
Videocon	100%	98%	100%	100%	97%	100%	98%	-	100%	100%	100%
V- Fone	100%	100%	96%	100%	100%	99%	100%	100%	-	100%	100%
TATA CDMA	97%	100%	100%	97%	100%	100%	97%	100%	98%	-	97%
RCom CDMA	100%	100%	100%	100%	100%	100%	100%	98%	96%	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 network.

(D) Drive Test of the Mobile Network of Service Providers:

SN	Parameter	City Name	Airtel	Idea	BSNL	Rcom GSM	Tata GSM	Vi-Con	V-Fone	Rcom CDMA	Tata CDMA
			GSM Operators							CDMA Operators	
1.1	Call Attempts	Chandigarh	78	98	103	108	81	103	81	108	115
		Hoshiarpur	30	71	43	46	60	59	61	46	68
		Pathankot	48	58	26	44	50	50	59	44	52
1.2	Blocked Call Rate (<=3%)	Chandigarh	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	1.23%	0.00%	0.00%
		Hoshiarpur	0.00%	0.00%	2.32%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
		Pathankot	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
1.3	Dropped Call Rate (<=2%)	Chandigarh	0.00%	0.00%	0%	0%	0%	0%	0%	0%	0%
		Hoshiarpur	0.00%	0.00%	0%	0%	0%	0%	0%	0%	0%
		Pathankot	0.00%	0.00%	3.84%	0%	0%	0%	0%	0%	0%
1.4	Percentage of connections with good										
	(i) 0-4 (w/o frequency hopping)>95%	Chandigarh								99.61%	99.11%
		Hoshiarpur								99.81%	97.37%
		Pathankot								99.01%	97.36%
	(ii) 0-5 (with frequency hopping)	Chandigarh	95.70%	96.40%	96.87%	97.30%	95.50%	95.36%	95.60%		
		Hoshiarpur	97.30%	96.50%	89.60%	99.21%	97.10%	95.46%	98.80%		
		Pathankot	97%	96%	92.80%	96.92%	99.93%	99.93%	97.10%		
1,5	Service Coverage In door (>= -75dBm)	Chandigarh	95.46%	90.59%	98%	50.51%	84.60%	49.50%	86.70%	94.81%	53.49%
		Hoshiarpur	95.34%	84%	77.80%	51.66%	95.75%	86.64%	88.70%	89.91%	50.49%
		Pathankot	97.46%	62%	86.70%	65.61%	99.87%	99.87%	96.27%	73.56%	24.26%
	In-vehicle (>= -85dBm)	Chandigarh	96.57%	100%	100%	87.69%	99.57%	90.19%	99%	100%	94.44%
		Hoshiarpur	96.58%	99%	96.70%	88.24%	99.94%	99.67%	98.40%	99.79%	89.04%
		Pathankot	98.13%	83%	98.30%	94.14%	99.93%	99.93%	99.90%	97.69%	69.86%
	Out door- in city (>= -95dBm)	Chandigarh	100.00%	100%	100%	99.46%	100%	99.43%	100%	100%	100%
		Hoshiarpur	100.00%	100%	100%	98.84%	100%	100%	100%	100%	99.76%
		Pathankot	99.70%	100%	99.90%	99.93%	100%	100%	100%	99.95%	98.73%
1.6	Call Setup Success Rate (>=95%)	Chandigarh	100%	100%	100%	100%	100%	100%	98.77%	100%	100%
		Hoshiarpur	100%	100%	97.68%	100%	100%	100%	100%	100%	100%
		Pathankot	100%	100%	100.00%	100%	100%	100%	100%	100%	100%

NOTE: -- Aircel is having an ICR agreement with TTSL in Punjab

(1) Sample Coverage

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

DRIVE TEST LOCATIONS

CHANDIGARH

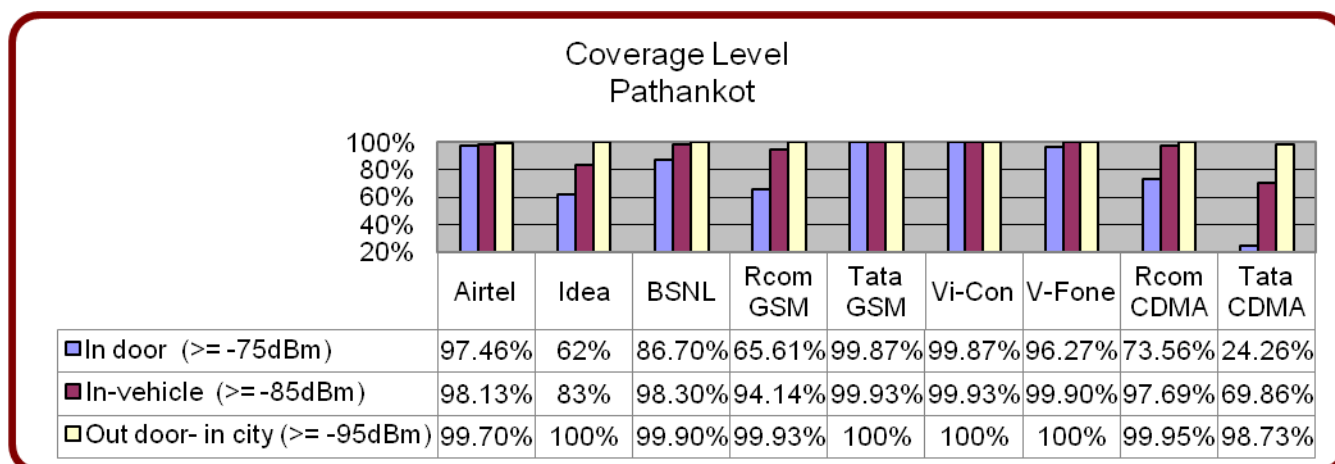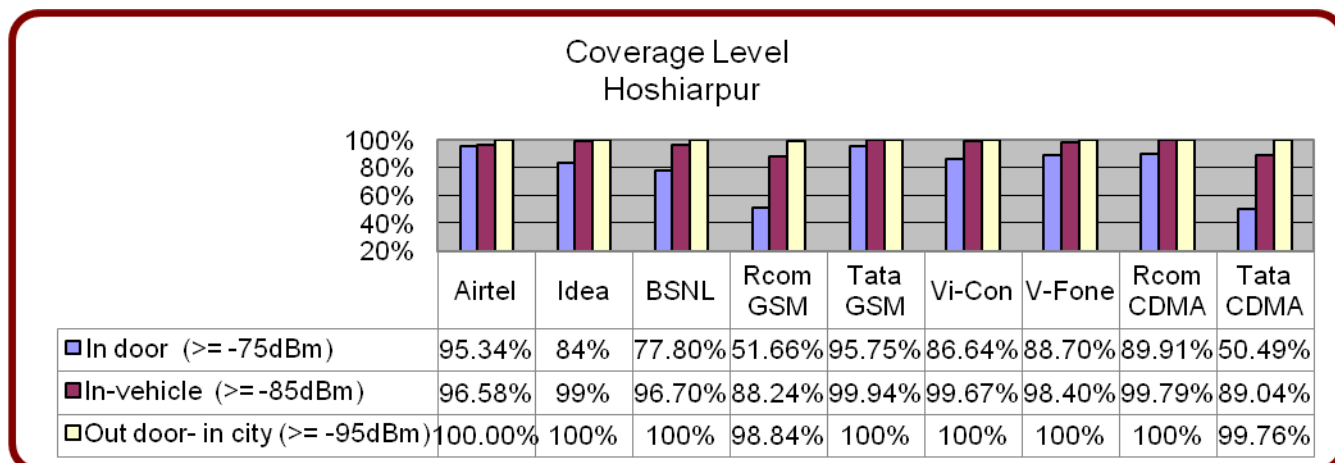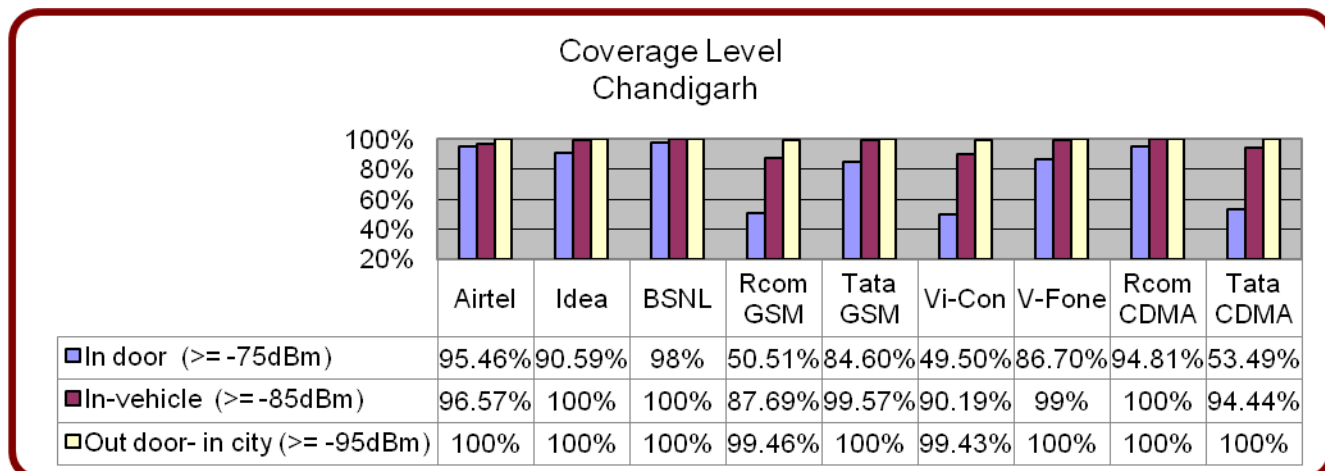|	
HIGH DENSE	Sec-34, Sec-35, Sec-17, Sec-22.
MEDIUM DENSE:	Tribune Chowk, PGI, Sec-36, Sec-34.
LOW DENSE:	Phase -7 Industrial area, Mohali-Ph-2, Lake, Golf course.

HOSHIARPUR

HIGH DENSE:	Fuverra Chowk, Maharajah Complex, Sarafa Bazar bus Stand..
MEDIUM DENSE:	Pharbhat Chowk, Sutheri Road, Industrial Area.
LOW DENSE:	Tagore Nagar, Gau Shala, HSP Committee office, civil lines.

PATHANKOT

HIGH DENSE:	Indira Market, Model town, Siali Road.
MEDIUM DENSE	Gurdaspur Road, Dhangu Road, Badoli Kalan. .
LOW DENSE:	Dhaki road, Parag Hotel, Jalandhar Road.

(2) Graphical Representation

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

Coverage Level Chandigarh

	Airtel	Idea	BSNL	Rcom GSM	Tata GSM	Vi-Con	V-Fone	Rcom CDMA	Tata CDMA
In door (>= -75dBm)	95.46%	90.59%	98%	50.51%	84.60%	49.50%	86.70%	94.81%	53.49%
In-vehicle (>=-85dBm)	96.57%	100%	100%	87.69%	99.57%	90.19%	99%	100%	94.44%
Out door- in city (>= -95dBm)	100%	100%	100%	99.46%	100%	99.43%	100%	100%	100%

Coverage Level Hoshiarpur

	Airtel	Idea	BSNL	Rcom GSM	Tata GSM	Vi-Con	V-Fone	Rcom CDMA	Tata CDMA
In door (>= -75dBm)	95.34%	84%	77.80%	51.66%	95.75%	86.64%	88.70%	89.91%	50.49%
In-vehicle (>=-85dBm)	96.58%	99%	96.70%	88.24%	99.94%	99.67%	98.40%	99.79%	89.04%
Out door- in city (>= -95dBm)	100.00%	100%	100%	98.84%	100%	100%	100%	100%	99.76%

Coverage Level Pathankot

	Airtel	Idea	BSNL	Rcom GSM	Tata GSM	Vi-Con	V-Fone	Rcom CDMA	Tata CDMA
In door (>= -75dBm)	97.46%	62%	86.70%	65.61%	99.87%	99.87%	96.27%	73.56%	24.26%
In-vehicle (>=-85dBm)	98.13%	83%	98.30%	94.14%	99.93%	99.93%	99.90%	97.69%	69.86%
Out door- in city (>= -95dBm)	99.70%	100%	99.90%	99.93%	100%	100%	100%	99.95%	98.73%

(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:

- Drop Call Rate is not met by BSNL in Pathankot only, rest all are satisfying the benchmark.
- Good Voice quality parameter is not met by BSNL in Hoshiarpur and Pathankot.
- Aircel has no service in Chandigarh, Hoshiarpur & pathankot..

Operators are found satisfying the TRAI benchmark for almost all the parameters such as Blocked Call Rate, Dropped Call rate, voice Quality & Call setup Success Rate. Except is found for BSNL in Hoshiarpur & Pathankot.
During Drive Test of BSNL in Pathankot & Hoshiarpur, some RF coverage issue was found in some areas like siali road and Patel chowk Due to this reason Voice Quality effected over there and as far as Call Drop Rate is concerned it is below the benchmark only in Pathankot.

NOTE-- Aircel is having an ICR agreement with TTSL in Punjab Circle

(E) Independent Drive Test :-

1.) Sample Coverage

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

DRIVE TEST LOCATIONS

FIROZPUR (AIRCEL)

HIGH DENSE   Arya samaj college , Firozpur market, Bharat nagar.
MEDIUM DENSE: Vira gate , Cantt , Mall road
LOW DENSE: mogaroad , Tankawali basti, Fazilka road, husaini road.

SANGRUR (IDEA)

HIGH DENSE: Dhuri Gate, Prem Basti, and Court Road.
MEDIUM DENSE: Gaushala Road, College road, Nankewala.
LOW DENSE: Dhuri Bypass, Patiala Road, Barnala road, Kheri road.

KAPOORTHALA (IDEA)

HIGH DENSE: Meena Bazar, Sabzi mandi, Bus stand, Mall road.
MEDIUM DENSE   Kartarpur Road, Amritsar Road, Jalandhar Road..   .
LOW DENSE: Sultanpur Road , Bus Stand, Jalandhar Bypass.

SANGRUR (HFCL)

HIGH DENSE: Adarsh Nagar, Nabha Gate, Transport Nagar, TE Area.
MEDIUM DENSE: Banasar Bagh, Bus Stand, J.P Nagar, Mangwal School.
LOW DENSE: National Agro chemical, Fountain Chowk, Dhuri Road,

2) Performance (for the respective cities)

SN	Parameter	AIRCEL (Firozpur)	HFCL (Sangrur)	IDEA (Sangrur)	IDEA (Kapoorthala)
1.1	Call Attempts	62	34	32	51
1.2	Blocked Call Rate (<=3%)	0.00%	0.00%	0.00%	0.00%
1.3	Dropped Call Rate (<=2%)	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)				
	(ii) 0-5 (with frequency hopping)	97.28%	96.80%	94.87%	96.53%
1.5	Service Coverage				
	In door (>= -75dBm)	74.71%	74.88%	95.88%	89.33%
	In-vehicle (>= -85dBm)	95.43%	95.65%	99.93%	99.34%
	Outdoor- in city (>= -95dBm)	100%	100%	100.00%	99.99%
1.6	Call Setup Success Rate (>=95%)	100%	99.92%	100%	100%
1.7	Handover Success Rate	97%	100%	100%	100.00%

(2)Graphical Representation

The Radio coverage level as was found in the operator assisted drive test result is shown graphical below
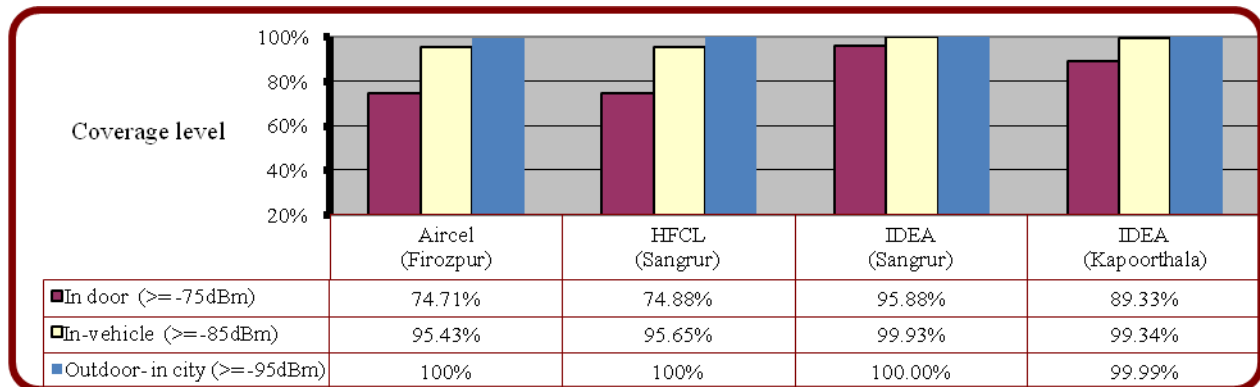
(3)Critical Analysis

The Independent drive test data was found to be satisfactory for most of the parameters. However, there is no deviation found in any parameter.

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- Aircel has no service in Chandigarh, Hoshiarpur & pathankot.

  During Drive Test of IDEA in Sangrur, some RF coverage issue was found in some area like College road and Nankewala. Due to this reason Voice Quality effected over there with a Value of 94.87%.

NOTE-- Aircel is having an ICR agreement with TTSL in Punjab Circle

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

From live & month audit findings, it can be concluded that on an average, performance of the operators in the service area Punjab is satisfactory for **Network Parameters**. However, It is found to be below benchmark standard for 2 no's of parameters namely 'worst affected cells >3% TCH drop' in which operators like Etisalat, BSNL, TTSL(GSM) & Vodafone are not meeting the benchmark values prescribed by TRAI and Call Drop Rate in which Loop & BSNL are not complying the benchmark in both month and Live measurement. Aircel is having an ICR agreement with TTSL in Punjab.

POI congestion is found to be satisfactory for all the operators for both month and live measurement.

Under **Customer Service Quality** section, benchmark for the parameter "Operator answered calls (voice-to-voice) within 60 seconds" it is found that Idea , Rcom (CDMA) in Month measurement and Rcom(GSM) in Month and Live measurement are not satisfying the prescribed benchmark .

Regarding **Metering/Billing Credibility** issues, all the operators are meeting the benchmark for Pre-paid services, but for post-paid services only TTSL(GSM & CDMA) are not meeting the benchmark set by TRAI .For 'Resolution of billing/ charging complaints' parameters all the operators are meeting 100% benchmark within 4 weeks. Also for the parameter 'Time taken for refunds of deposits after closures' all operators are meeting the benchmark of 100% within 60 days.

During **Drive Tests**,

- Drop Call Rate is not met by BSNL in Pathankot only, rest all are satisfying the benchmark.
- Good Voice quality parameter is not met by BSNL in Hoshiarpur and Pathankot.

NOTE: -- Aircel is having an ICR agreement with TTSL in Punjab Circle.

II Basic Telephone Service (Wire line) Providers

(A)Exchange Audit

1. 3 days live data & One month audit comparative table

S/N	Name of Parameter	Bench mark	Audit	BSNL	AIRTEL	HFCL	RCOM	TTSL
1	(No. of faults/100 subscribers /month)	< 5%	Month	4.08%	0.19%	4.90%	0.58%	0.37%
2	Fault repair by next working day(Urban Area)		Month					
a	By next working day	>90%	Month	96.23%	95.91%	95.40%	100.00%	96.70%
b	Within 3 days	100%	Month	99.72%	100.00%	96.58%	100.00%	100.00%
3	Fault repair by next working day(Rural & hilly Area)		Month					
a	By next working day	>90%	Month	96.75%	NA	NA	NA	NA
b	Within 5 days	100%	Month	100.00%	NA	NA	NA	NA
4	Rent rebate		Month					
a	Fault pending > 3 days & <7 days	Rebate for 7 days	Month	0	0	78	0	0
b	Fault Pending > 7 days & < 15 days	Rebate for 15 days	Month	67	0	0	0	0
c	Fault pending > 15 days	Rebate for one month	Month	0	0	0	0	0
5	Mean time to Repair(MTTR)	<= 8 Hrs	Month	5.82	5.39	7.99	2.14	1.68
6	Call Completion Ratio(CCR) & Answer to seizure Ratio(ASR)	> 55%(CCR) & > 75%(ASR)	Live	80.83%	60.10%	55.46%	92.79%	57.88%
			Month	73.71%	58.56%	55.67%	92.89%	57.61%
7	Metering and billing credibility(post paid)		Month					
a	Disputed Bills over bills issued	< 0.1%	Month	0.01%	0.09%	0.03%	0.07%	0.01%
8	% of billing complaints resolved within 4 weeks	Within 4 weeks	Month	66.09%	100%	100%	100%	100%
a	Period of refunds after resolution of complaints within 1 weeks	Within 1 weeks	Month	100%	100%	100%	100%	100%
9	No of POI having > 0.5% Congestion	>= 0.5%	Live	0	0	0	0	0
			Month	0	0	0	0	0
10	Response Time to customer for assistance		Month					
a	Accessibility of Call centre within 40 sec.	>= 95%	Live	100.00%	NP	100%	100.00%	98.71%
			Month	93.49%	100%	100%	100.00%	99.46%
b	% age of calls answered by operator(voice to voice) within 60 sec.	>= 90%	LIve	96.13%	92.91%	90.61%	99.75%	98.07%
			Month	88.00%	94.47%	91.44%	98.00%	98.38%
11	Customer care(promptness in attending to customers request		Month					
a	Termination / Closures	<= 7 Days	Month	100%	79%	100%	100%	100%
b	Time taken refunds deposit after closures	100% within 60 days	Month	100%	100%	100%	100%	100%

2.   Performance (Graphical representation)

Parameter wise Data Analysis & Graphical Representations – Basic Service (Wireline)

Fault incidences (No of faults/100 subscribers/month (≤5): All the operators are meeting the benchmark in one month audit.
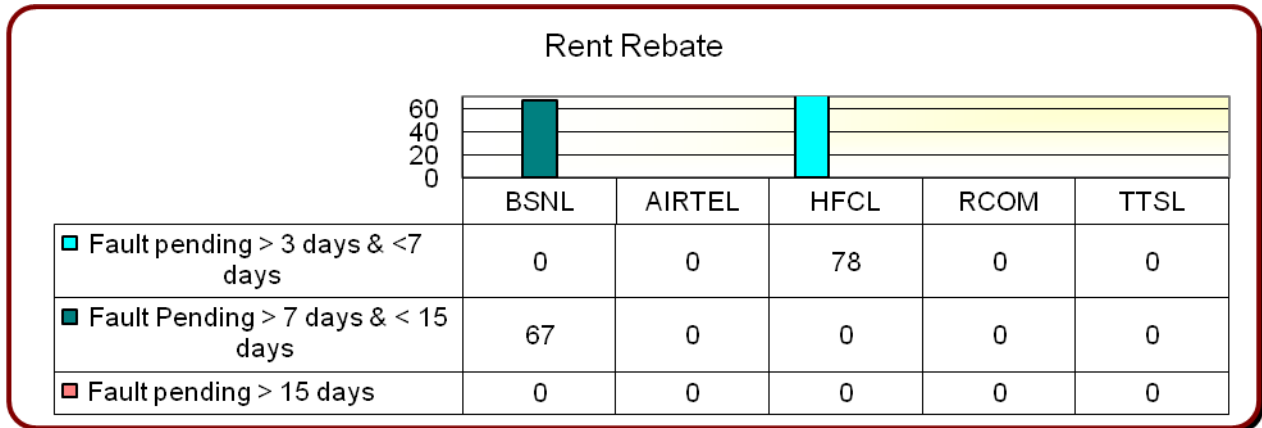
	BSNL	AIRTEL	HFCL	RCOM	TTSL
☐ (No. of faults/100 subscribers /month)	4.08%	0.19%	4.90%	0.58%	0.37%
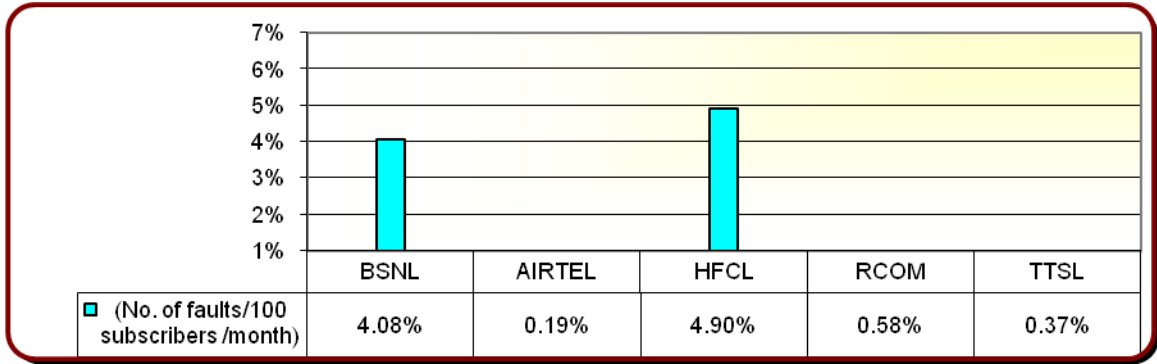
Fault Repair (Urban Area):
- **By next working day** (>90%)**:** All the operators are Satisfying with the TRAI benchmark.
- **Within 3 days (100%):** BSNL & HFCL are not complying with the TRAI benchmark of 100%.

	BSNL	AIRTEL	HFCL	RCOM	TTSL
☐ By next working day	96.23%	95.91%	95.40%	100.00%	96.70%
☐ Within 3 days	99.72%	100%	96.58%	100%	100%
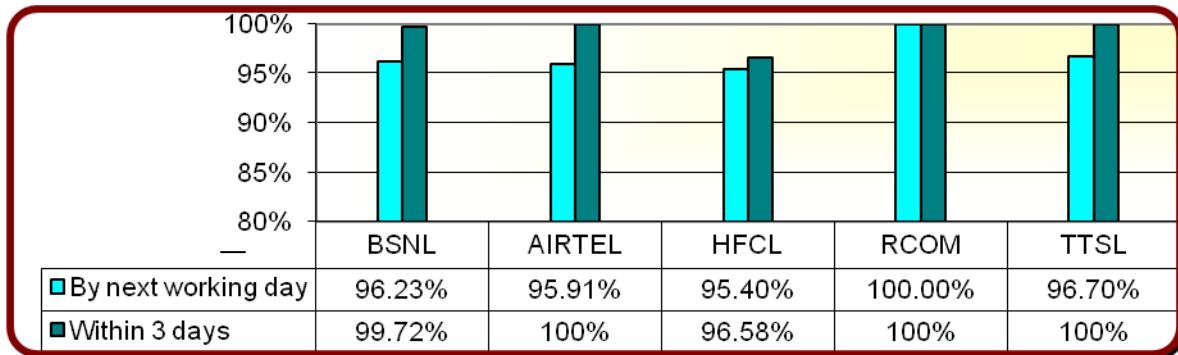
Rent Rebate
  a)   Faults pending for > 3 days & < 7 days (Rebate 7 days)—As far as rebate is concerned HFCL is having 78 nos of rebate cases .
  b)   Faults pending for > 7 days & < 15 days (Rebate 15 days) — As far as rebate is concerned only BSNL has 67 nos of rebate cases registered. RCOM, HFCL, AIRTEL. & TTSL do not have any rebate case.
  c)   Faults pending for > 15 days (Rebate one month)--. None of the operators are having any Rebate cases.

Rent Rebate

	BSNL	AIRTEL	HFCL	RCOM	TTSL
☐ Fault pending > 3 days & <7 days	0	0	78	0	0
■ Fault Pending > 7 days & < 15 days	67	0	0	0	0
☐ Fault pending > 15 days	0	0	0	0	0

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

	BSNL	AIRTEL	HFCL	RCOM	TTSL
☐ Mean time to Repair(MTTR)	5.82	5.39	7.99	2.14	1.68
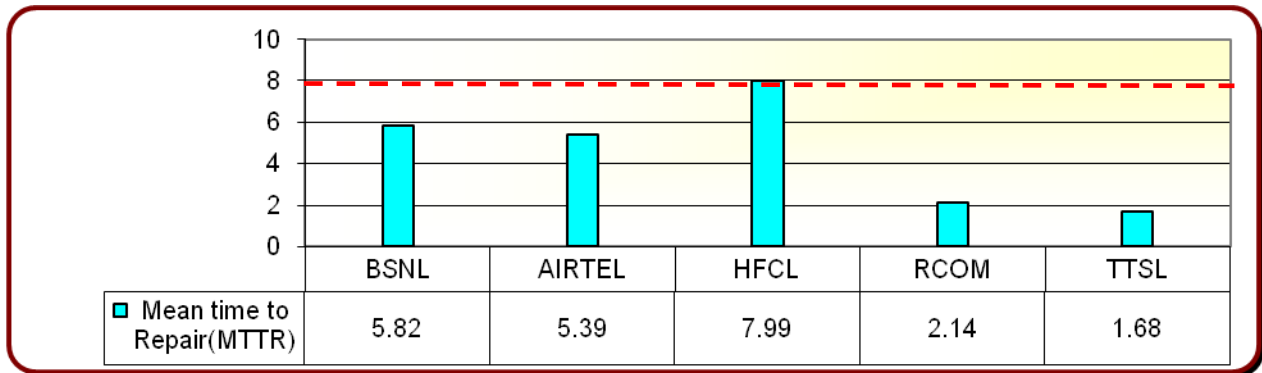
Call Completion Rate (CCR)/ Answer to Seizure Ratio (ASR) (>55% & > 75%): All the operators are complying the benchmark in both Live & month in comparison with RCom, given ASR.

CCR / ASR

	BSNL	AIRTEL	HFCL	RCOM	TTSL
■ Month	73.71%	58.56%	55.67%	92.89%	57.61%
■ Live	80.83%	60.10%	55.46%	92.79%	57.88%
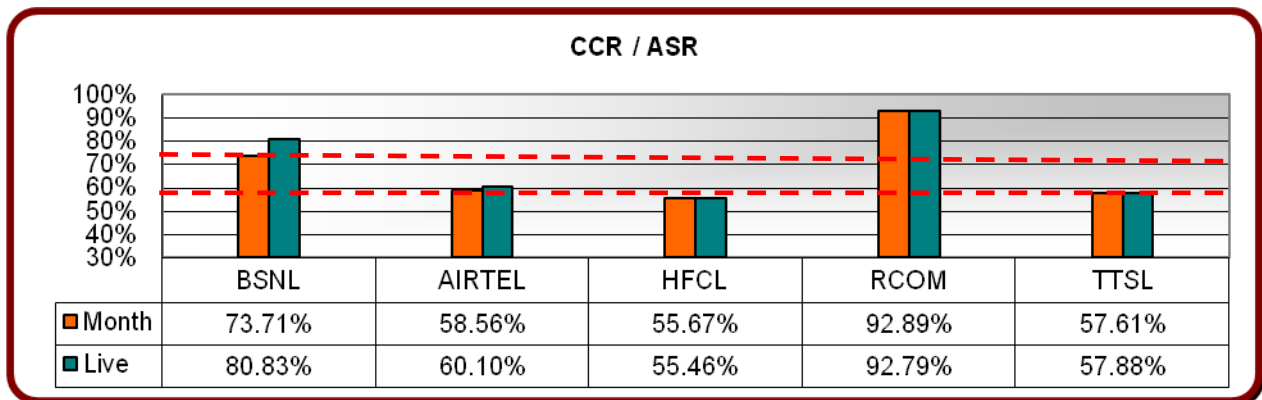
Metering and Billing Credibility (< 0.1%):
Disputed Bills over Bills issued: - All the operators comply with the TRAI standards for one-month data verification.

	BSNL	AIRTEL	HFCL	RCOM	TTSL
☐ Disputed Bills over bills issued	0.01%	0.09%	0.03%	0.07%	0.01%
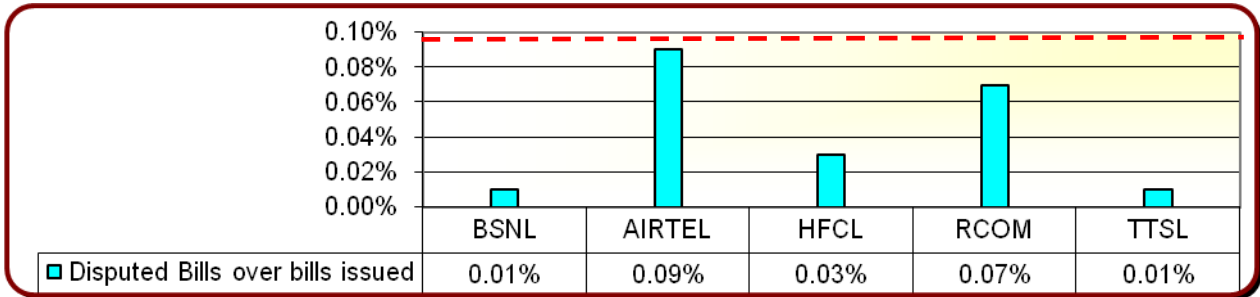
% of Billing Complaints resolved within 4 Weeks: All the operators have resolved billing complaints 100% (benchmark) within 4 weeks, except BSNL which is deviating from the benchmark in one-month data verification.

Period of All refunds / Payments from the date of Complaints Within 1 week: As far as period of refunds from the date of complaints within 1 week, all the operators are satisfying the benchmark set by TRAI in one-month data verification.

	BSNL	AIRTEL	HFCL	RCOM	TTSL
☐ % of billing complaints resolved within 4 weeks	66.09%	100%	100.00%	100.00%	100.00%
■ Period of refunds after resolution of complaints within 1 weeks	100%	100%	100%	100%	100%
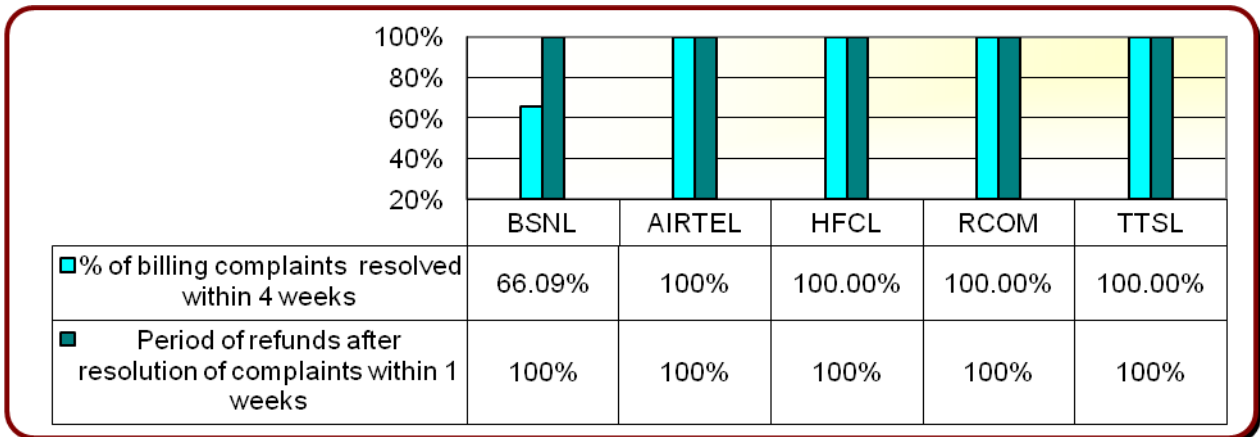
No of POI having > 0.5% Congestion: None of the operators are having POI more than 0.5% congestion.

No of having > 0.5% POI congestion

	BSNL	AIRTEL	HFCL	RCOM	TTSL
☐ Month	0	0	0	0	0
■ Live	0	0	0	0	0
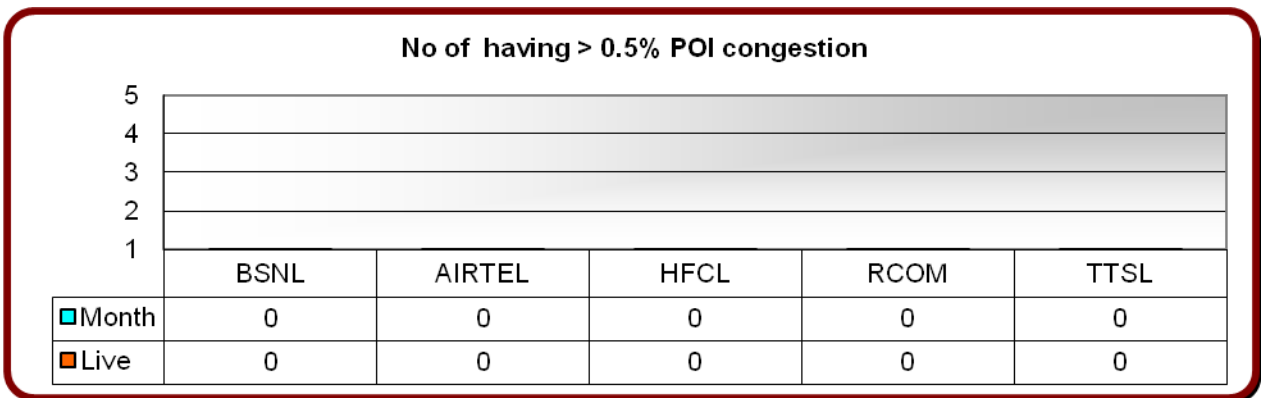
Response Time to Customer for Assistance:

Accessibility of Call centre / customer care (Electronically) within 40 sec (>95%): BSNL is not meeting the benchmark set by TRAI in one-month data verification.
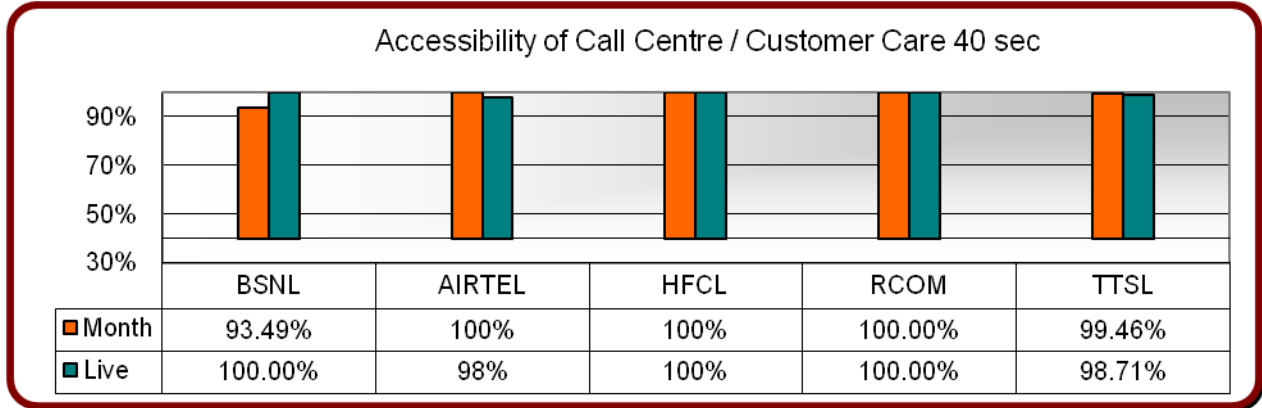
% age of calls answered by operator (Voice to Voice) within 60 sec (>90%): Only BSNL is not meeting the benchmark in Month data verification.
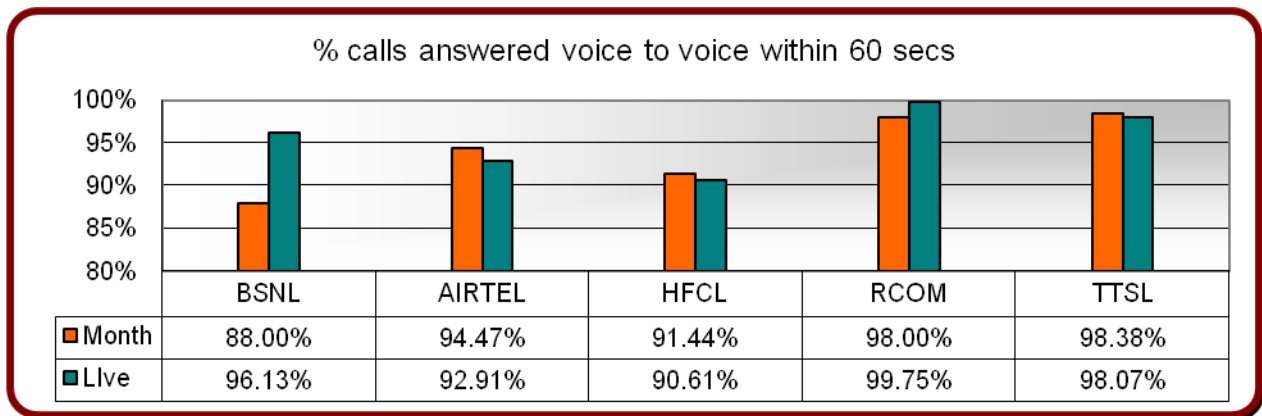
Customer Care Promptness in Attending Customer Request:

(i)Termination/Closure: In Termination only AIRTEL is having cases, while other operators have no termination cases in the month of audit.

ii) Time taken for refund of deposits after closure: The audit finding on 'time taken for refund of deposit after closure ,'all the operators are satisfying the benchmark set by TRAI..

	BSNL	AIRTEL	HFCL	RCOM	TTSL
□Termination / Closures	100%	79%	100%	100%	100%
■Time taken refunds deposit after closures	100%	100%	100%	100%	100%
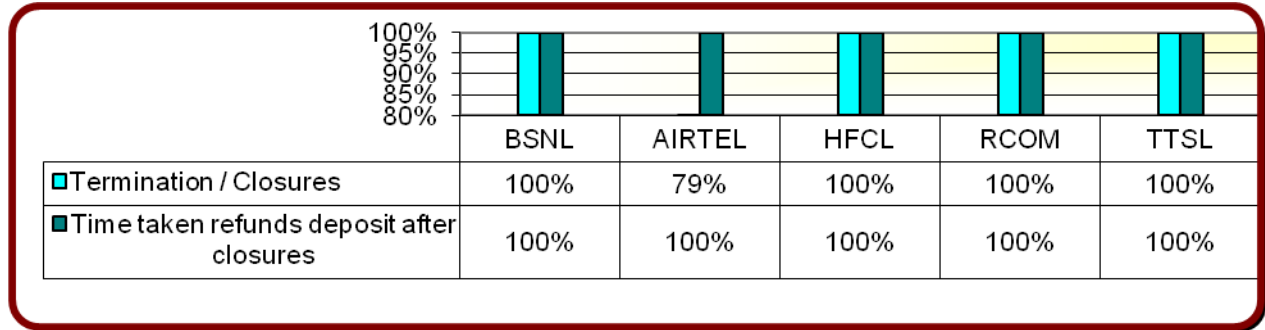
3. Customer Care & Grievances Redressal

Basic Service (Wireline)

S.N.	Parameters	BSNL	AIRTEL	RCOM	HFCL	TTSL
1	Total no of complaints received in the call centre (Tech+ Non Tech)	47137	4335	211	10697	0
3	**Nodal Officer**					
3.1	Total no of complaints received by the nodal officers	1636	10	0	14	0
3.2	Percentage of complaints with reference to total no of complaints received at the call centre	3.47%	0.23%	0%	0.13%	0%
4	**Appellate Authority**					
4.1	Total no of appeals received by the appellate authority	1	41	0	0	0
4.2	Percentage of appeal received with reference to total no of complaints received by the nodal officers	0.06	0.94%	0%	0%	0%

Note:
It is found that there are many instances where customers directly approach to Nodal Officer without approaching to Call Center for redressal. Similarly there are many instances where customers directly approach like in case of airtel to Appellate Authority without approaching to

Nodal Officer for their grievances redressal. TTSL has no complaints on call centre, Nodal & Appellate authority respectively.

4. Performance based on Live calling for call centre

Calling Operator	BSNL	AIRTEL	HFCL	TTSL	RCOM
Call Centre No.	1500	121/198	1920	1515	*377
Total No. of Calls Attempted	100	100	100	100	100
Total No. of calls connected to IVR	100	100	100	100	100
Calls got connected to agent within 60 Sec	95	97	96	95	96
%age of calls got answered	95%	97%	96%	95%	96%

5. Performance based on live calling for fault Repair Complaints Customer Feedback:-

	AIRTEL	HFCL	RCOM	TATA
Total No. of Calls Attempted	100	100	100	61
Total No. of calls Answered	90	85	90	55
Cases resolved within 3 days	90	85	90	55
%age of complain resolved	100%	100%	100%	100%

NOTE:- The Call answered were found less the call attempt due to number busy , no response From the customer end .

6. Performance based on live calling for Billing Complaints Customer Feedback:

	AIRTEL	HFCL	RCOM	TATA
Total No. of Calls Attempted	90	14	11	2
Total No. of calls Answered	70	12	10	2
Cases resolved with 4 weeks	70	12	10	2
%age of cases resolved	100%	100%	100%	100%

NOTE:-- RCOM , TTSL & HFCL are having less no of billing complaints. Out of total call

Attempt call answered was found less due to line busy and no response from the Customer end.

7. **Level 1 live calling**

Emergency no.	No. of calls made	Airtel	BSNL(Patiala)							HFCL	TTSL	RCOM
		Chandigarh	Patiala	Sirhand	Mandi	Nabha	Samana	Rajpura	Chandigarh	Chandigarh	Chandigarh
100	1	1	1	1	1	1	1	1	1	1	1
101	1	1	1	1	1	1	1	1	1	1	1
102/108	1	1	1	1	1	1	1	1	1	1	1

NOTE:-- For Level 1 service calling in 1 SSA covering 6 SDCA of Patiala in Punjab circle.

8. Critical Analysis

Critical findings and Key take outs for Basic service (Wire line) are as follows:

♦ The Basic service (Wire line) audit for Punjab Circle broadly indicates that almost the service providers are meeting the benchmarks fixed by Telecom Regulatory Authority of India (TRAI) with exceptions in some areas as described in the report.

♦ In the live measurements conducted to assess Call Completion Rate (CCR) and Answer to seizure (ASR), it is found that all the operators are providing CCR except RCOM, who is providing ASR in both Live &Month. The results of three-day live measurement and one month data audited are found to be almost similar.

♦ For testing the Service Providers performance on Technical (Network related complains) & Non-Technical (Provisioning, Billing, Refund etc.) complaint TCIL auditors have make some random basis calls to customer to cross verify about billing cases. In most of the cases positive feedback were received regarding complaint attendance.

The parameter wise key takeouts for the Basic (Wire line) Service providers for the Punjab Circle are as under:-

Fault incidence:

All the operator are meeting the benchmark for fault incidence cases in that month.

Fault Repair (Urban Area):

  All operators are meeting the benchmarks set by TRAI for the parameters "faults repair by the next working day" but as far as "fault repair within 3 working days" is concerned it is not met by BSNL & HFCL.

Rent Rebate:
 In this, only BSNL & HFCL have Rebate cases in that month of audit.

Call Completion Rate (CCR):
 BSNL is found meeting TRAI benchmark of ≥55% for the parameters Call Completion Rate (CCR) while as RCOM is meeting the benchmark for the parameter , Rcom provides ASR while BSNL provides CCR Answer to Seizure Ratio in both live and one- month data verification.

Metering and billing credibility:
All the operators are complying the benchmark of less than 0.1% billing complaints over the total number of bills issued in the month.

% of Billing complaints Resolved Within 4 Weeks:
As per the findings for one-month data audit, BSNL is found 66.09% resolution of complain within 4 weeks.

Period of All refunds/Payments from the date of resolution within 1 Week:
As per the findings for one-month data audit, all operators are found 100% refunds from the date of resolution within 1 week.

POI Congestion:
All the operators are meeting the benchmarks having POI below 0.5% congestion set by TRAI (>=0.5%) for both live and one- month data verification.

 Response Time to Customer for Assistance:
(i) Accessibility of Call Centre/ Customer care within 40 seconds (Electronically)
For accessibility of call centre i.e. call answered electronic through IVR menu parameter BSNL is not complying the benchmarks of ≥95% in one- month data verification, rest of the operators are complying in both Live & Month part.

(ii) % of Call answered by operators within 60 seconds (Voice to Voice):
For the parameter "%age of calls answered by operators within 60 Seconds" BSNL is not complying the benchmarks of ≥90% in one- month data verification. Rest all are complying the benchmark in Live & month.

Customer care (Promptness of attending customer request):

(i)Termination/Closure: -

All operators are having 100% cases for termination except Airtel which is deviating from benchmark set by TRAI.

ii) Time taken for refund of deposits after closure:

The audit finding on 'time taken for refund of deposit after closure' is that all operators are having 100% cases of refunds.

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 audit there are deviation from the benchmark set by TRAI at parameter level.

Observation & Findings for the Live and One-Month data measurement for Basic Service (Wire line) are as given below:

Under the Network Section, parameters like Faults repair by next working days and within 3 days it has been observed that BSNL & HFCL are not complying the benchmark for one-month data verifications .As far as faults registered in Hilly areas and Rural area is concerned only BSNL is having some base over there, other operators have no services in these area. For Rent Rebate only BSNL and HFCL are eligible for rebate cases in that period of audit.

In POI congestion parameter, no POI is having more than 0.5% congestion within the local network for most of the operators.

% of billing complaints resolved within 4 weeks is not met by BSNL only also BSNL is found not

Meeting the benchmark in one month data for both Accessibility of call centre & % of calls answered voice to voice parameters respectively. Reliance has provided ASR (Answer to Seizure ratio) value instead of CCR (call completion ratio).

For Termination & Closures case all of the operators are satisfying the benchmark except Airtel with a value of 79% respectively.

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III. Broadband Service Providers
(A) POP Audit
1.)   3 days live and One month audit comparative table

S/N	Parameters	B-marks	Audit	AIRTEL	BSNL	RCOM	HFCL
1	*Service Provisioning/Activation Time*						
	100% cases in 15 days (subject to technical feasibility)	**<15 days**	**Month**	82.49%	99.95%	-	99.56%
	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.**		100%	100%	-	100%
2	*Faults Repair/Restoraion Time*						
	By next working day	**>90%**	**Month**	97.60%	92.75%	100%	96.13%
	within 3 working day	**≥99%**		99.32%	99.55%	100%	99.12%
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**	0	40	0	28
	Faults Pending for > 7 working days and < 15 working days: (Rebate equivalent to 15 days of minimum monthly charge or equivalent usage allowance)			0	25	0	0
	Faults Pending for > 15 working days:(Rebate equivalent to one month of minimum monthly charge or equivalent usage allowance)			0	126	0	0
3	*Billing Performance*						
	Billing complaints per 100 bills issued	**<2%**	**Month**	0.29%	0.07%	0.14%	0.03%
	%age of complaints resolved within 4 weeks	**100%**		98%	100%	100%	100%
	Time taken for refund of deposits after closure (within 60 days)	**100%**		100%	100%	100%	100%
4	*Response time to the customer for assistance % age of calls answered by operator (Voice to Voice)*						
	within 60 sec	**>60%**	**Live**	95.72%	92%	99%	87.73%
			Month	91.63%	88%	96%	89.00%
	within 90 sec	**>80%**	**Live**	96.07%	96%	98.98%	91.38%
			Month	93.83%	94%	97%	92.89%
5	*Bandwidth Utilization/ Throughput: (If on any link(s) / route bandwidth utilization exceeds 90%, then network is considered to have congestion. For this additional provisioning of Bandwidth on immediate basis, but not later than one month, is mandated.) < 80% link(s) / route bandwidth utilization during peak hours (TCBH).*						
5.1	POP to ISP Gateway Node [Intra-network] Link(s)	**< 80%**	**Live**	19.21%	46.12%	54.00%	64%
			Month	20.50%	54.17%	15.00%	63%
5.2	ISP Gateway Node to IGSP / NIXI Node upstream Link(s) for International connectivity	**< 80%**	**Live**	74.52%	75.92%	NA	60.00%
			Month	75%	74.37%	NA	60.00%
5.3	Broadband Connection Speed (download) - from ISP Node to User	**> 80%**	**Live**	98%	97%	100%	93%
			Month	99.0%	98%	100%	87.50%
6	*Service Availability/Uptime (for all users)*						
	Service Availability(%)	**>98%**	**Month**	99.98%	99.90%	99.99%	99.72%

S/N	Parameters	B-marks	Audit	Airtel	BSNL	RCom	HFCL
7	*Packet loss*						
	% of Packet loss	**<1%**	**Live**	0.00%	0%	0%	0%
			Month	0.00%	0%	0.19%	0%
8	*Network latency (for wired broadband access)*						
8.1	User reference point at POP/ISP Gateway node to IGSP/NIXI	**<120 ms**	**Live**	30ms	16ms	NP	40 ms
			Month	25ms	21ms	80.3ms	41 ms
8.2	User reference point at ISP Gateway node to International nearest NAP port abroad (terrestrial)	**<350 ms**	**Live**	7ms	231 ms	163ms	306ms
			Month	8ms	227 ms	304ms	307ms
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:--

a) There are no cases in the month of audit for the parameters like Service Provisioning, Rebate, for RCOM.
b) None of the operators are having satellite connectivity.
c) Airtel, BSNL & HFCL are not complying the benchmark for service provisioning parameter.
d) % of billing complaints resolved within 4 weeks are not met by Airtel in that month of audit.

2.) Performance (Graphical representation)

Service Provisioning /Activation Time: (Benchmark 100%)

No operators are complying with the TRAI benchmark of 100% in the month of audit; however RCOM has no new Service Activation in that month.
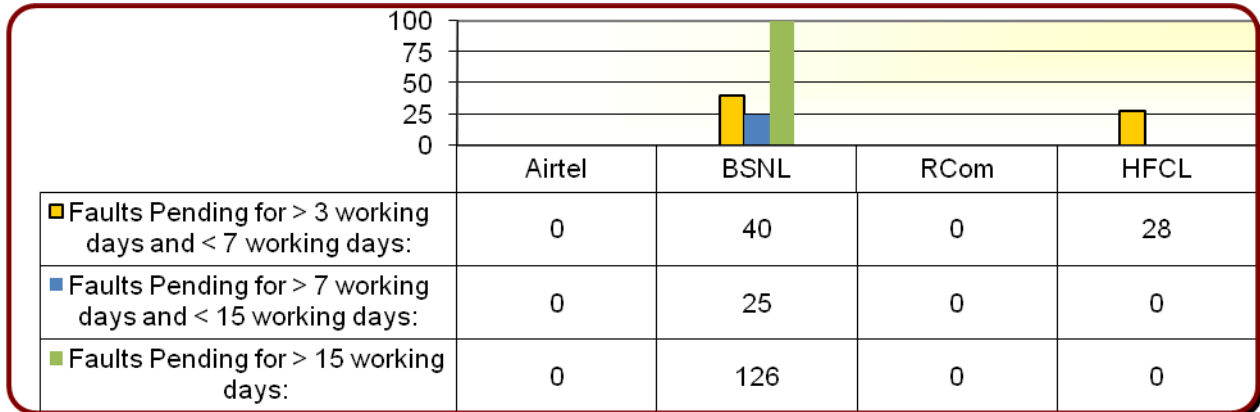
	Airtel	BSNL	HFCL
100% cases in 15 days (subject to technical feasibility)	82.49%	99.95%	99.56%
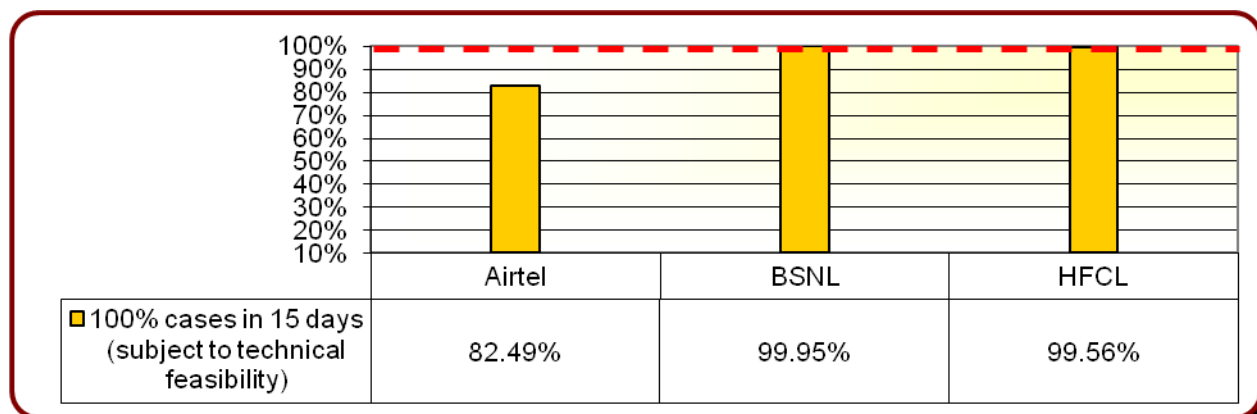
Fault Repair / Restoration Time:
   o **By next working day (>90%):** All operators are complying with the TRAI benchmark of 90% in one-month data verification.
   o **Within 3 working days (>99%):** All operators are complying with the TRAI benchmark of 99% in one-month data verification.
   o **Rebate:** Only BSNL & HFCL are having eligible cases for rebate to the customers.
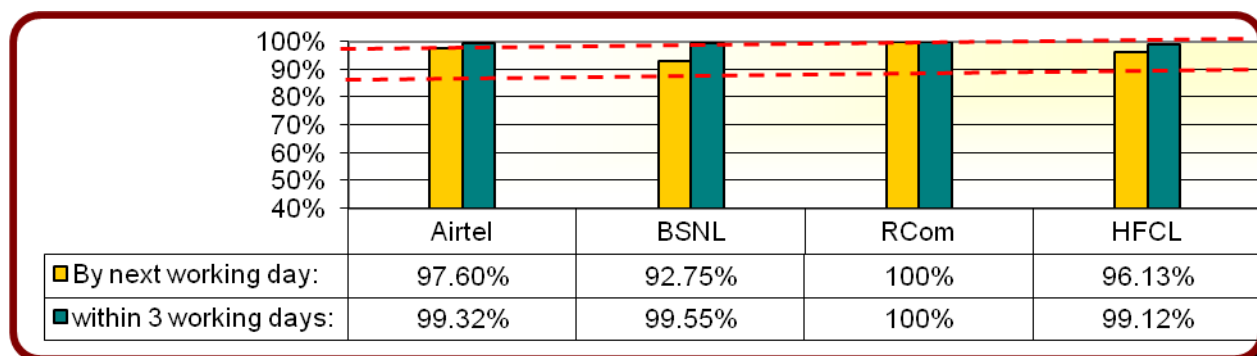
	Airtel	BSNL	RCom	HFCL
By next working day:	97.60%	92.75%	100%	96.13%
within 3 working days:	99.32%	99.55%	100%	99.12%

Rent Rebate
   a) **Faults pending for > 3 days & < 7 days (Rebate 7 days)**—As far as rebate is concerned BSNL & HFCL have rebate cases .

   b) **Faults pending for > 7 days & < 15 days (Rebate 15 days**) — As far as rebate is concerned BSNL has only rebate cases for customer.

   c) **Faults pending for > 15 days (Rebate one month**)--. BSNL has only eligible cases for rebate.

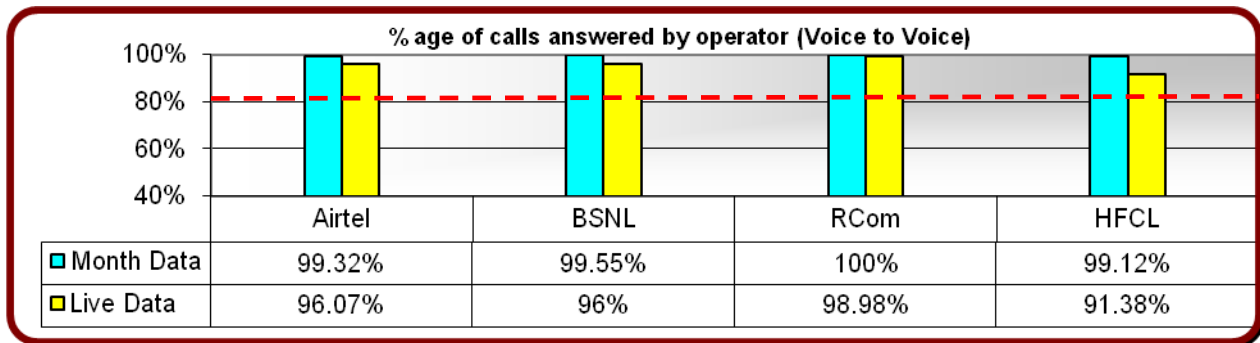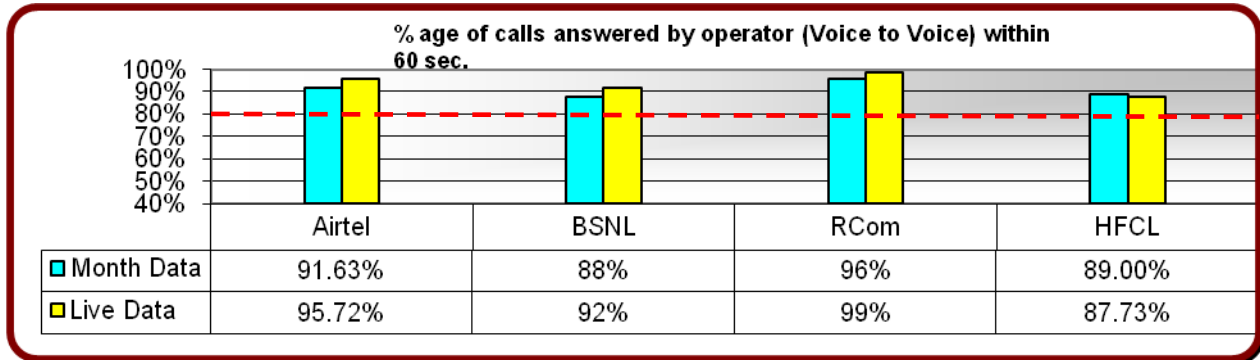|	Airtel	BSNL	RCom	HFCL
□ Faults Pending for > 3 working days and < 7 working days:	0	40	0	28
■ Faults Pending for > 7 working days and < 15 working days:	0	25	0	0
■ Faults Pending for > 15 working days:	0	126	0	0

Billing Performance: (Benchmark <2%)

All operators are complying with the TRAI standards for the parameter "Billing complaints per 100 bills issued" in one-month data verification.
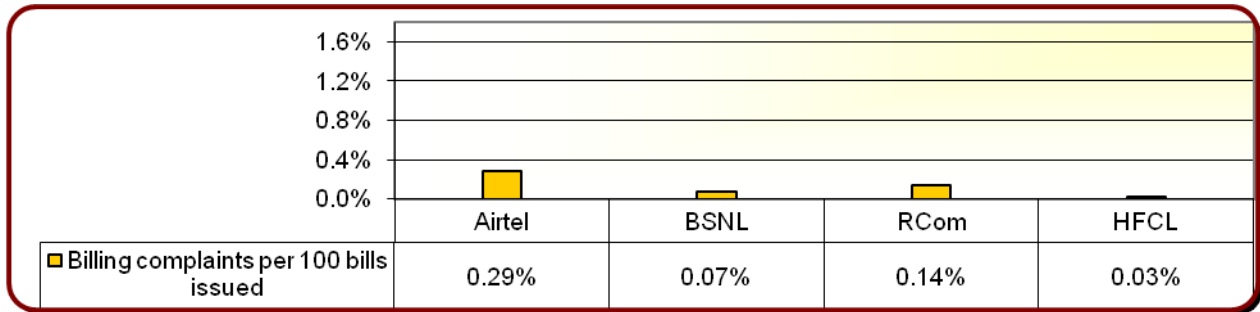
	Airtel	BSNL	RCom	HFCL
□ Billing complaints per 100 bills issued	0.29%	0.07%	0.14%	0.03%

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

- **Within 60 seconds (>60%):** All the operators are meeting the benchmark in both live and one- month data verification.
- **Within 90 seconds (>80%):** All the operators are meeting the benchmark in both live and one- month data verification.

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

	Airtel	BSNL	RCom	HFCL
Month Data	91.63%	88%	96%	89.00%
Live Data	95.72%	92%	99%	87.73%

% age of calls answered by operator (Voice to Voice)

	Airtel	BSNL	RCom	HFCL
Month Data	99.32%	99.55%	100%	99.12%
Live Data	96.07%	96%	98.98%	91.38%

Bandwidth Utilization/ Throughput:

- **POP to ISP Gateway Node [Intra-network] Link(s): (Benchmark <80%):** All the 4 operators are meeting the TRAI benchmarks.

- **ISP Gateway Node to IGSP / NIXI Node upstream Link(s) for International connectivity: (Benchmark <80%):** All the operators are complying the parameter **,** except RCOM has no provision of generating this parameter from the system..

Bandwidth Utilization/ Throughput:
POP to ISP Gateway Node [Intra-network] Link(s)

|	Airtel	BSNL	RCom	HFCL
Month Data	20.50%	54.17%	15.00%	63%
Live Data	19.21%	46.12%	54.00%	64%
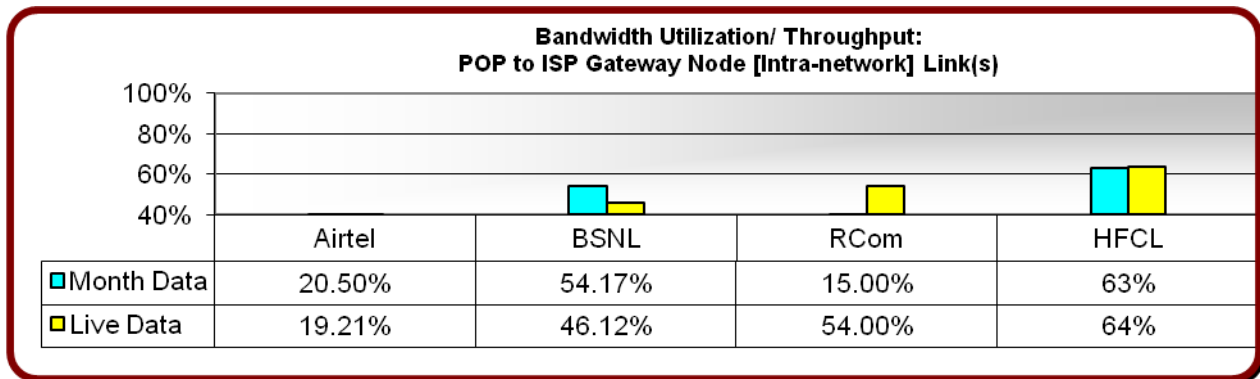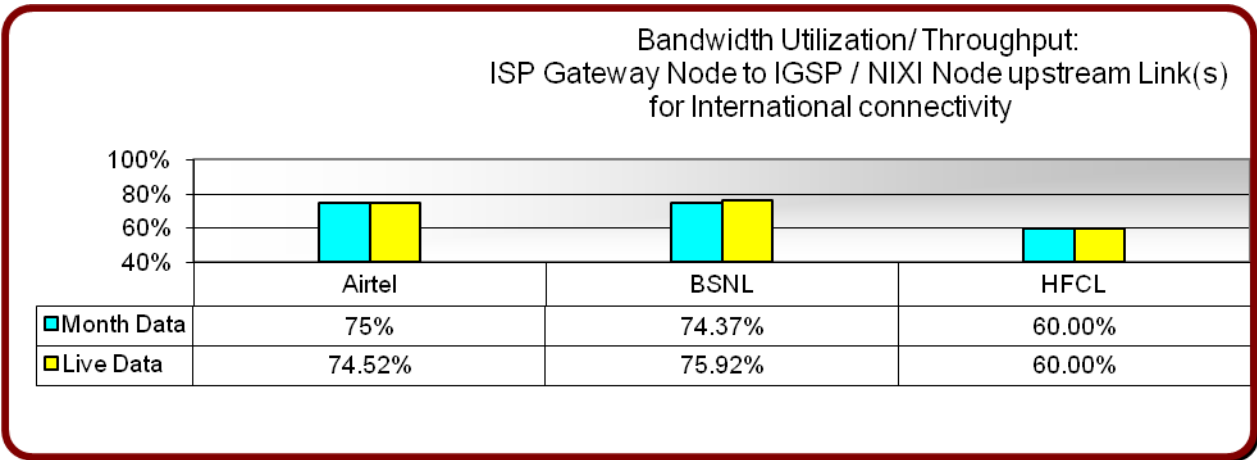
Broadband Connection Speed (download) (>80%): All the operators are meeting the TRAI benchmark of greater than 80% connection in both live and one-month data verification.
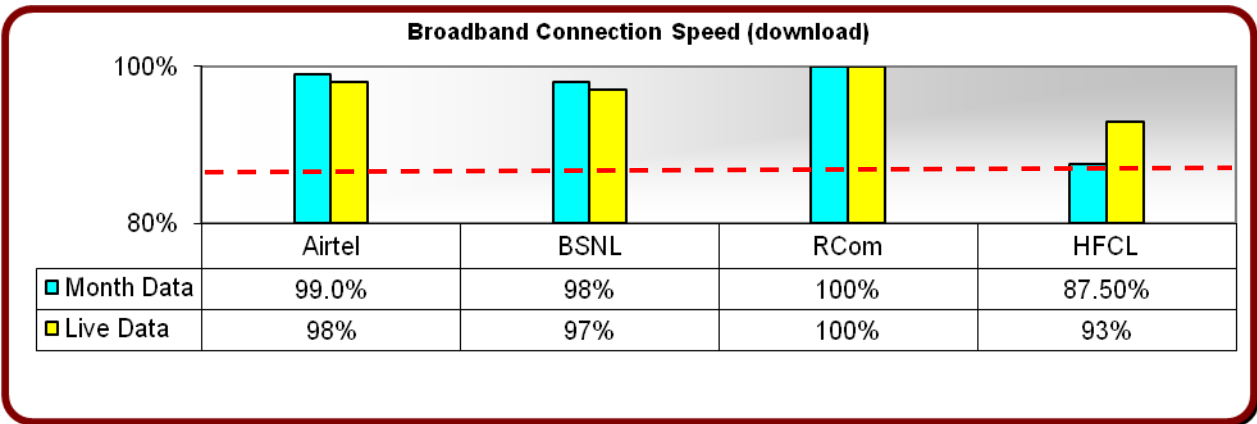
Service Availability / Uptime (for all users) (better than 98%): All the operators are meeting the TRAI benchmark of greater than 98% during one-month data verification.
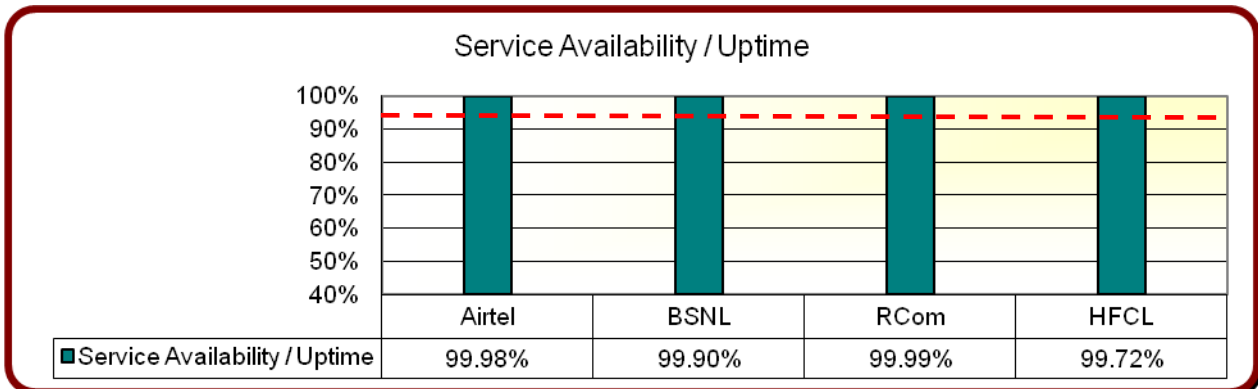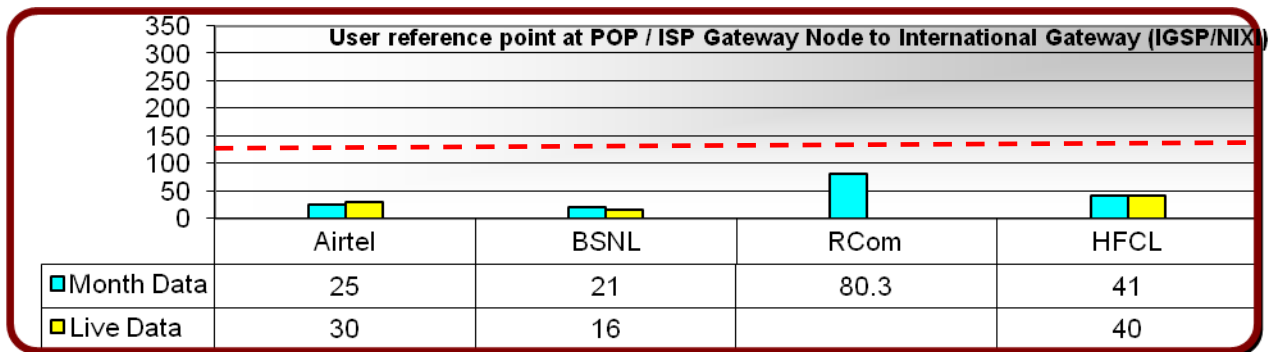
Packet Loss (Should be less than 1%): All operators are meeting the benchmark in both live and one-month data verification.
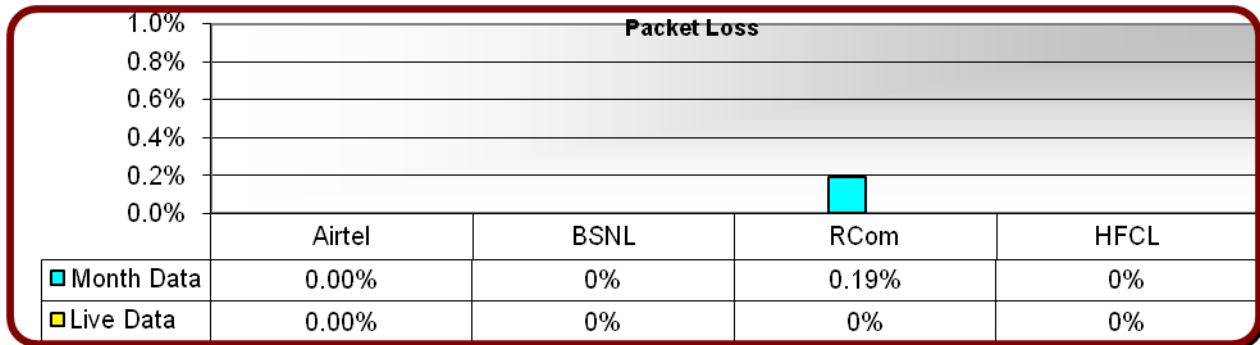
| Packet Loss	Airtel	BSNL	RCom	HFCL
Month Data	0.00%	0%	0.19%	0%
Live Data	0.00%	0%	0%	0%

Network Latency:

- **User reference point at POP/ISP gateway node to international gateway (IGSP/NIXI) <120 ms:** All the operators are satisfying the benchmark in live & month part both respectively. RCOM has no provision of capturing 3 days Latency from the system due to some security reasons.

User reference point at POP / ISP Gateway Node to International Gateway (IGSP/NIXI)	Airtel	BSNL	RCom	HFCL
Month Data	25	21	80.3	41
Live Data	30	16		40

- **User reference point at ISP gateway node to international nearest NAP Port abroad (Terrestrial) <350 ms:** All the operators are meeting the benchmarks in Live & Month data audit .
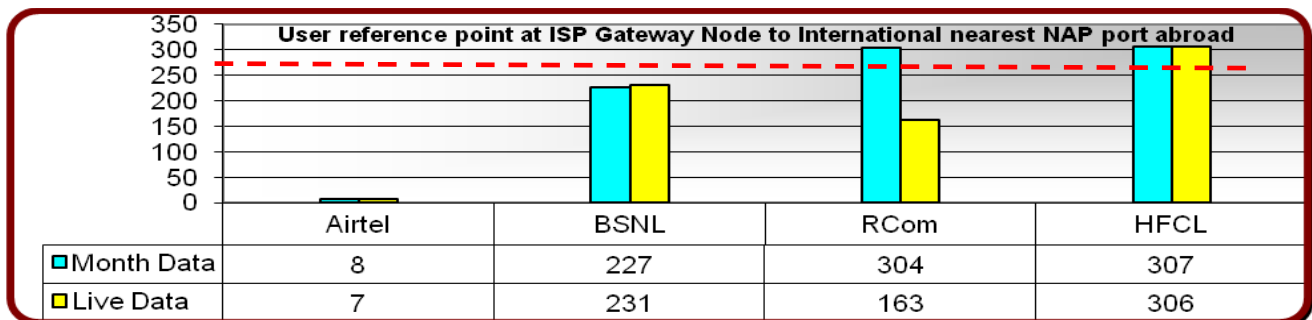
User reference point at ISP Gateway Node to International nearest NAP port abroad	Airtel	BSNL	RCom	HFCL
Month Data	8	227	304	307
Live Data	7	231	163	306

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

3.) Customer Care & Grievances Redressal

S.N.	Parameters	BSNL	AIRTEL	HFCL	RCOM.
1	Call Centre				
1.1	Total no of complaints received in the call centre	177	3988	4469	261
1.2	Complaints per 100 customers per months	1.72%	0%	0%	0%
2	Nodal Officer				
2.1	Total no of complaints received by the nodal officers	7	7	59	0
2.2	Percentage of complaints with reference to total no of complaints received at the call centre	3.95%	0.17%	1.32%	0%
3	Appellate Authority				
3.1	Total no of appeals received by the appellate authority	0	17	0	0
3.2	Percentage of appeal received with reference to total no of complaints received by the nodal officers	0%	---	0%	0%

Note:
It is found that there are many instances where customers directly approach to Nodal Officer without approaching to Call Center for redressal. Similarly there are many instances where customers directly approach to Appellate Authority as the case of Airtel where 17 nos of complaints are directly to Appellate Authority without approaching to Nodal Officer for their grievances redressal.

4. Live calling to call centre (Chandigarh)

Calling Operator	BSNL	RCOM	HFCL	AIRTEL
Call Centre No.	1500	*377	1920	121/198
Total No. of Calls Attempted	100	100	100	100
Total No. of calls connected to IVR	100	100	100	100
Calls got connected to agent within 60 Sec	95	97	96	98
%age of calls got answered	95%	97%	96%	98%

5. Performance based on live calling for New Connection Customer Feedback:-

	AIRTEL	HFCL
Total No. of Calls Attempted	100	100
Total No. of calls Answered	90	85
Connection provided within 15 days	74	83
%age of successful connection	83%	99%

NOTE-- RCOM has no new connection registered in the month of audit and BSNL has not provided the data for calling.

6. Performance based on live calling for Fault Repair Complaints Customer Feedback:

	AIRTEL	RCOM	HFCL
Total No. of Calls Attempted	100	100	100
Total No. of calls Answered	90	93	88
Cases resolved within 3 days	89	93	87
%age of complain resolved	99%	100%	99%

7. Performance based on live calling for Billing Complaints Customer Feedback :-

	AIRTEL	RCOM	HFCL
Total No. of Calls Attempted	70	18	32
Total No. of calls Answered	60	16	30
Cases resolved with 4 weeks	60	16	30
%age of cases resolved	100%	100%	100%

NOTE:-- BSNL has not provided any supporting data for this parameter**.**

8.) Critical Analysis

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

Service provisioning/Activation time:
None of the operators are complying the benchmark set by TRAI and RCOM has no new Activation in that month of audit.

Fault Repair/Restoration time & Rebate:
All operators are meeting the benchmark of more than 90% in one-month data verification. As far as Rebate is concerned BSNL & HFCL are having rebate cases in that period.

Billing performance:
All operators are satisfying with the benchmark set by TRAI. However Airtel is not meeting the benchmark of "100% cases 4 weeks" for billing complaint resolution , rest all are comply with that. All the operators is meeting the benchmark for this part as per the benchmark of "100% cases within 60 days".

Customer Care/Helpline Assessment:
All the service providers are meeting the benchmark for the parameters response time to the customer for assistance (Voice to Voice) within 60 and 90 seconds in both live and one-month data verifications.
Bandwidth Utilization:

POP to ISP Gateway Node (intra-network) links:
All the service providers are meeting the benchmarks for both live & one-month data Verification.

ISP Gateway Node to IGSP/ NIXI Node upstream links for International connectivity:
RCOM has not provided the data for this parameter due to some security reasons .

Broadband Connection speed:
All the operators are meeting the TRAI benchmark of greater than 80% connection speed during measurements of both live & one-month data Verification.

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 the operators are meeting the benchmarks in both Live & Month data .

User reference point at ISP gateway node to international nearest NAP Port abroad (Terrestrial) <350 ms:
All the operators are meeting the benchmarks in both Live & Month data .

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

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

BSNL
BSNL is not meeting in parameters service Activation, but it is meeting in all technical and customer care parameters respectively.

RCOM
Reliance has no cases in New Activation in the month of audit, rest all parameter are met by RCOM in Live & Month data audit. In Technical Parameter like Network Latency, the system has no provision of capturing 3 days data due to some technical reasons..

AIRTEL

Airtel is not meeting the benchmark in Service provisioning while other parameters of Technical as well as customer part is met by Airtel in both Live & Month data audit.Airtel has no eligible cases of rebate to the customer. only exception is for % of billing complaints resolved within 4 weeks.

HFCL

HFCL is not meeting the benchmark in Service provisioning and having some eligible cases for rebate to the customer , rest all parameters are in respect of Technical as well as customer part are met by HFCL in Live and Month data audit Verification.

Note:
For all the operators the parameter User reference point at ISP Gateway Node to International nearest NAP port abroad (Satellite) is not applicable because they do not have any NAP (Satellite) connectivity.