

REPORT
ON
AUDIT & ASSESSMENT OF QUALITY OF SERVICE
OF
CELLULAR MOBILE TELEPHONE SERVICE
FOR
NORTH ZONE – HIMACHAL PRADESH CIRCLE

Report Period: April 2011 – June 2011

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- Not conducted for this quarter

III. Broadband Service Providers

- Not conducted for this quarter

CHAPTER-1: INTRODUCTION

I. Background

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

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

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

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

- i) Create conditions for consumer satisfaction by making known the quality of service, which the service provider is required to provide, and the user has a right to expect.
- ii) Measure the Quality of Service provided by the Service Providers from time to time and to compare them with the norms so as to assess the level of performance.
- iii) Generally protect the interests of consumers of telecommunication services.

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

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

II. Objectives and Methodology

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

- i) Verification of the data submitted by the service providers to TRAI as part of QoS monitoring reports i.e. Quarterly Performance Monitoring Reports (PMRs) and monthly Point of Interconnection (POI) Congestion Reports with reference to the records maintained by the service provider.
- ii) Verification of the performance of service providers against the Quality of Service benchmarks laid down by TRAI using live measurement for 3 days during the month in which the audit and assessment is carried out.
- iii) Verification of the performance of service providers against the Quality of Service benchmarks laid down by TRAI using the data for the entire month during which the live measurement is carried out.
- iv) Drive tests of the mobile networks both operators assisted and independent drive test (as and where required).
- v) Billing and call center's data verification.
- vi) Live testing of the efficiency of the call center / customer care help line.

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

Systems audited:-

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

Facilities audited:-

1. Billing documents.
2. Customer Care records.

Field data collections carried out:-

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

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

- ✓ TCIL auditors visited all the NSS (Network Sub System) and BSS (Base-station Sub System) to check data for all the operators in their respective service area.
- ✓ All the NSS and BSS data for the relevant details were collected either directly from the centralized NOC or through a remote access to the NOC.
- ✓ The Radio parameters were audited/verified from the data collected from OMC-R (Operation and Maintenance Center – Radio, as part of BSS data).
- ✓ The Drive test was conducted in high, low and medium dense areas including highways, commercial complex and residential areas and special attention was paid for the areas for which TRAI has received complaints.
- ✓ The POI and other network related parameters were audited/verified from the data collected from the OMC-S (Operation and Maintenance Center – Switch as part of NSS data).
- ✓ The data related to Billing and Customer care was checked for the previous month and verified with the customers by calling them on random basis. The process of registration and handling of the complaints was also studied for the various operators. Call centre number were called for measuring the efficiency of the call centre.
- ✓ The inter operator call assessment test was carried out during the time period as is specified in the tender document. TCBH (Time Consistent Busy Hour) is taken after observation of the traffic consistently for 3 days prior to the audit activity.
- ✓ Data has been collected for busy hour of network in case of live assessment & month of audit for all service providers & verified that service providers are providing busy hour data only for QoS service. We found that TCBH hour is matching with network busy hour as provided by service providers for Himachal Pradesh. 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.

CHAPTER-2: EXECUTIVE SUMMARY

I. Preface

This report highlights the findings for the audit & assessment of Quality of Service of Cellular Mobile Services in Himachal Pradesh in 2st quarter (April – June 2011). The primary data collection and verification of records (PMR data verification – quarterly) maintained by various operators was undertaken during the period Oct – Dec 2010.

Following are the various operators covered in Himachal Pradesh (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	May-2011	2100-2200 Hrs
2	Airtel Ltd	April-2011	1900-2000 Hrs
3	Idea	May- 2011	1900-2000 Hrs
4	BSNL	May- 2011	2000-2100 Hrs
5	Reliance Communication (GSM)	May-2011	2100-2200 Hrs
6	Tata Teleservices(GSM)	ICR WITH AIRCEL	
7	STel	May-2011	2000-2100 Hrs
8	Videocon	ICR WITH AIRCEL	
9	Vodafone	May-2011	2000-2100 Hrs
CDMA Operators			
10	Reliance Communication (CDMA)	May-2011	2000-2100 Hrs
11	Tata Teleservices (CDMA)	May-2011	2000-2100 Hrs

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

(A) Cellular Mobile Telephone Services

3 days Live Data Audit

3 days Live Data Audit													
S/N	Name of Parameter	Benchmark	Aircel	Airtel	Idea	BSNL	Rcom GSM	Tata GSM	Stel	Videoc on	Vodafo ne	Rcom CDMA	Tata CDMA
GSM Operators													
1	Connection Establishment (Accessibility)												
	a) CSSR (Call Setup Success Rate)	>=95%	97.61%	99.33%	98.42%	98.22%	98.99%	ICR WITH AIRCEL	98.53%	ICR WITH AIRCEL	99.54%	99.81%	99.43%
	b) SDCCH/PAGING congestion	<=1%	0.05%	0.09%	0.12%	0.60%	0.09%		0.02%		0.01%	0.00%	0.00%
	c) TCH congestion	<=2%	0.69%	0.29%	1.11%	1.80%	0.36%		0.07%		0.19%	0.02%	0.11%
2	Connection maintenance (Retainability)												
	a) CDR	<=2%	0.90%	1.06%	1.54%	1.82%	0.59%	ICR WITH AIRCEL	0.71%	ICR WITH AIRCEL	1.13%	0.45%	0.15%
	b) Worst affected cells>3% TCH drop	<=3%	12.09%	3.48%	2.40%	4.88%	0.99%		4.26%		2.78%	0.66%	1.06%
	c) Good voice quality	>=95%	95.00%	98.57%	96.47%	95.99%	97.11%		97.00%		97.26%	NA	NA
3	No of POI having >0.5% congestion		0	0	0	0	0		0		0	0	0
4	Response time to customers for assistance												
	a) Accessibility of call centre/Customer Care	>=95%	100.00%	98%	100.00%	100.00%	87.95%	100%	100.00%	100%	100%	100%	97.79%
	b) % call answered by operators(voice to voice) within 60 sec.	>=90%	93.00%	90.76%	94.27%	98.11%	94.78%	94.61%	50.55%	97.4%	98.10%	95.35%	93%

NA: Not Applicable, NR: Not Received

From the 3 days live data assessment, it is found that all the operators are meeting the network parameters by and large, except for Aircel ,Airtel, BSNL & STel are not meeting the benchmark for “Worst affected cells>3% TCH drop” with the value of 12.09% ,3.48%,4.88% & 4.26% respectively.

Performance related to customer care data is found to be satisfactory for all the operators except STel especially for the parameter “calls answered by operators (voice-to-voice) as well as Accessibility of call centre respectively and in Accessibility of call centre is concerned all operators are meeting the benchmarks except Rcom GSM respectively.

Month data assessment

One Month Data Audit		Bench- mark	Aircel	Airtel	Idea	BSNL	Rcom GSM	Tata GSM	Stel	Videocon	Vodafon e	Rcom CDMA	Tata CDMA	
S/N	Name of Parameter		GSM Operators								CDMA Operators			
(A)	Network Service Quality Parameter													
1	Network Availability													
	a) BTS Accumulated Downtime	<=2%	0.06%	0.02%	0.12%	1.94%	0.00%	ICR WITH AIRCEL	0.018%	ICR WITH AIRCEL	0.01%	0.24%	0.00%	
b) Worst affected BTSs due to downtime	<=2%	0.00%	0.00%	0.00%	1.90%	0.00%	1.90%		0.00%		0.00%	0.21%	0.00%	
2	Connection Establishment (Accessibility)													
a) CSSR (Call Setup Success Rate)	>=95%	97.69%	99.12%	98.77%	98.30%	98.97%	98.60%		99.62%		99.82%	99.48%		
b) SDCC/PAGING congestion	<=1%	0.03%	0.11%	0.31%	0.70%	0.09%	0.03%		0.02%		0.00%	0.00%		
c) TCH congestion	<=2%	0.62%	0.28%	0.84%	1.80%	0.30%	0.38%		0.12%		0.02%	0.10%		
3	Connection maintenance (Retainability)													
a) CDR	<=2%	0.87%	1.03%	1.46%	1.90%	0.58%	0.70%		1.07%		0.43%	0.20%		
b) Worst affected cells>3% TCH drop	<=3%	11.98%	3.54%	2.27%	4.81%	1.81%	4.51%		2.83%		0.66%	1.06%		
c) Good voice quality	>=95%	95.02%	98.64%	96.35%	95.88%	96.93%	96.60%		97.28%		NA	NA		
4	No of POI having >0.5% congestion		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%	0.005%	0%	0.005%	0.09%	0.00%	NA	NA	0.00%	0.10%	0%	
6	Metering /billing credibility-Pre paid	<= 0.1%	0.05%	0%	0.01%	0.02%	0.009%	0.00%	0.04%	0.008%	0.00%	0.009%	0.006%	
7	Resolution of billing/ charging complaints	100% within 4 weeks	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	
	a) Period of applying credit/waiver/adjustment to the customers account from the date of resolutions of complaints	<=1 week	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	
8	Response time to customers for assistance													
	a) Accessibility of call centre/Customer Care	>=95%	100%	91%	100%	100%	90%	100%	98%	100%	100%	100%	98%	
	b) % call answered by operators(voice to voice) within 60 sec.	>=90%	100%	94.63%	94.90%	95.25%	92.58%	96.25%	95.77%	97.80%	93.91%	93.16%	96.64%	
9	Termination/closure of service	<=7days	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	

One Month Data Audit		Bench- mark	Aircel	Airtel	Idea	BSNL	Rcom GSM	Tata GSM	Stel	Videocon	Vodafon e	Rcom CDMA	Tata CDMA
S/N	Name of Parameter		GSM Operators									CDMA Operators	
10	Time taken for refunds of deposits after closures.	100% within 60 days	100%	100%	100%	100%	100%	100%	NA	NA	100%	100%	100%

NA: Not Applicable, NR: Not Received

From the month data assessment, it is found that all the operators are meeting the network parameters by and large, except, Aircel, Airtel ,BSNL & STel are not meeting the benchmark for “Worst affected cells>3% TCH drop” with the value of 11.98% ,3.54%,4.80% & 4.51% . In Metering and Billing credibility all the operators are meeting the benchmark in post paid and also meeting the benchmark in prepaid services respectively.

Performance related to customer care data is found to be satisfactory for all the operators especially for the parameter “calls answered by operators (voice-to-voice)”. Airtel (91%) and Rcom GSM (90%) are not meeting the benchmark for parameter “Accessibility” of call centre” while rest all operators are meeting the benchmarks. Since Videocon & STel has no postpaid services in this circle, hence not provided the data.

Operator-Assisted Drive Test

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

SN	Parameter	City Name	Aircel	Airtel	Idea	BSNL	Rcom GSM	STEL	Vodafone	Rcom CDMA	Tata CDMA			
			GSM Operators						CDMA Operators					
1.1	Blocked Call Rate (<=3%)	Shimla	0.00%	0.00%	0.00%	1.85%	0.00%	0.00%	0.00%	0.00%	0.00%			
		Mandi	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%			
		Kullu	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%			
1.2	Dropped Call Rate (<=2%)	Shimla	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%			
		Mandi	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%			
		Kullu	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%			
1.3	Percentage of connections with good voice quality (=>95%)													
		Shimla									98.00%	98.90%		
		Mandi									100.00%	99.74%		
	Kullu									100.00%	99.95%			
	(i) 0-4 (w/o frequency hopping)	Shimla												
		Mandi												
Kullu														
(ii) 0-5 (with frequency hopping)	Shimla	95.20%	96%	96.00%	95.20%	96.00%	98.30%	98.30%						
	Mandi	100%	99%	97.60%	95.10%	99.00%	99.30%	99.70%						
	Kullu	100%	96%	95.70%	97.68%	98.00%	99.30%	99.50%						
1.4	Call Setup Success Rate (>=95%)	Shimla	100.00%	100.00%	100.00%	98%	100.00%	100%	100%	100.00%	100%			
		Mandi	100.00%	100.00%	100.00%	100%	100.00%	100%	100%	100.00%	100%			
		Kullu	100.00%	100.00%	100.00%	100%	100.00%	100%	100%	100.00%	100%			

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

All operators are meeting the benchmarks..However Videocon & Tata GSM are having ICR agreement with Aircel in Himachal Pradesh Circle.

Independent Drive Test The Independent Drive Test was conducted at Himachal Pradesh in Shimla, Mandi & Kullu. Here again, zones were selected for covering different density areas (High, Medium & Low dense areas).

SN	Parameter	City Name	Aircel	Airtel	Idea	BSNL	Rcom GSM	Tata GSM	STel	Videocon	Vodafone
			GSM Operators								
1.1	Blocked Call Rate (<=3%)	Shimla	0%	0%	0%	2.80%	0.00%	ICR WITH AIRCEL	0.00%	ICR WITH AIRCEL	0%
1.2	Dropped Call Rate (<=2%)	Shimla	0%	0%	0%	0.00%	0%		0%		0%
1.3	Percentage of connections with good voice quality (>=95%)										
	(i) 0-5 (with frequency hopping)	Shimla	95.00%	95.40%	95%	96.00%	95.00%		98.40%		98.10%
	(ii) 0-4 (w/o frequency hopping)										
1.4	Call Setup Success Rate (>=95%)	Shimla	100%	100%	100%	98%	100.00%	100%	100%		

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

- All the operators are meeting the benchmark for all parameters..
- Videocon & Tata GSM is having ICR agreement with Aircel in Himachal Pradesh circle.

CHAPTER-3: AUDIT-PMR VERIFICATION

I. Cellular Mobile Telephone Service

PMR		Bench- mark	Audit	Aircel	Airtel	Idea	BSNL	Rcom GSM	Stel	Videocon	Vodafone	Rcom CDMA	Tata CDMA
S/N	Name of Parameter			GSM Operators									
(A)	Network Service Quality Parameter												
1	Network Availability												
	BTS Accumulated Downtime	<=2%	Reported	0.06%	0.06%	0.13%	1.86%	0.21%	0.43%	0.44%	0.01%	0.30%	0.00%
			Verified	0.06%	0.06%	0.13%	1.86%	0.21%	0.43%	0.44%	0.01%	0.30%	0.00%
	Worst affected BTSs due to downtime	<=2%	Reported	0.00%	0.06%	0.00%	1.89%	1.79%	0.92%	0.00%	0.00%	0.15%	0.00%
Verified			0.00%	0.06%	0.00%	1.89%	1.79%	0.92%	0.00%	0.00%	0.15%	0.00%	
2	Connection Establishment (Accessibility)												
	CSSR (Call Setup Success Rate)	>=95%	Reported	99.04%	99.17%	98.48%	95.30%	97.62%	97.59%	98.96%	99.78%	99.81%	99.82%
			Verified	99.04%	99.17%	98.48%	95.30%	97.62%	97.59%	98.96%	99.78%	99.81%	99.82%
	SDCCH/PAGING congestion	<=1%	Reported	0.21%	0.12%	0.13%	0.67%	0.51%	0.18%	0.12%	0.01%	0.00%	0.00%
			Verified	0.21%	0.12%	0.13%	0.67%	0.51%	0.18%	0.12%	0.01%	0.00%	0.00%
	TCH congestion	<=2%	Reported	0.55%	0.22%	0.93%	1.87%	0.58%	0.07%	0.51%	0.03%	0.26%	0.01%
Verified			0.55%	0.22%	0.93%	1.87%	0.58%	0.07%	0.51%	0.03%	0.26%	0.01%	
3	Connection maintenance (Retainability)												
	CDR	<=2%	Reported	1.85%	0.87%	1.65%	1.90%	1.20%	0.69%	0.41%	1.09%	0.86%	0.19%
			Verified	1.85%	0.87%	1.65%	1.90%	1.20%	0.69%	0.41%	1.09%	0.86%	0.19%
	Worst affected cells>3% TCH drop	<=5%	Reported	23%	2.63%	16.32%	4.83%	4.57%	4.64%	0.00%	3.59%	1.39%	0.24%
			Verified	23%	2.63%	16.32%	4.83%	4.57%	4.64%	0.00%	3.59%	1.39%	0.24%
	Good voice quality	>=95%	Reported	94.03%	98.65%	96.66%	95.50%	96.35%	96.86%	99.00%	97.64%	98.63%	99.82%
Verified			94.03%	98.65%	96.66%	95.50%	96.35%	96.86%	99.00%	97.64%	98.63%	99.82%	
4	No of POI having >0.5% congestion	>=0.5%	Reported	0	0	0	4	0	0	0	0	0	0
			Verified	0	0	0	4	0	0	0	0	0	0

PMR		Bench- mark	Audit	Aircel	Airtel	Idea	BSNL	Rcom GSM	Stel	Videocon	Vodafone	Rcom CDMA	Tata CDMA
S/N	Name of Parameter												
(B)	Customer Service Quality Parameters												
5	Metering/billing credibility-Post paid	<= 0.1%	Reported	0.05%	0.01%	0.00%	0.10%	0.06%	NA	NA	0.00%	0.09%	0.04%
			Verified	0.05%	0.01%	0.00%	0.10%	0.06%	NA	NA	0.00%	0.09%	0.04%
6	Metering /billing credibility-Pre paid	<= 0.1%	Reported	0.17%	0.01%	0.01%	0.10%	0.03%	0.02%	0.01%	0.00%	0.04%	0.06%
			Verified	0.17%	0.01%	0.01%	0.10%	0.03%	0.02%	0.01%	0.00%	0.04%	0.06%
7	Resolution of billing/ charging complaints	100% within 4 weeks	Reported	100.00%	100%	100%	100.0%	100.0%	100.00%	100%	100%	100%	100%
			Verified	100.00%	100%	100%	100.0%	100.0%	100.00%	100%	100%	100%	100%
	Period of applying credit/waiver/adjustment to the customers account from the date of resolutions of complaints	<=1 week	Reported	100.00%	100%	100%	100%	100%	100.00%	100%	100%	100%	100%
			Verified	100.00%	100%	100%	100%	100%	100.00%	100%	100%	100%	100%
8	Response time to customers for assistance	>=95%	Reported	100.00%	89.00%	99.00%	100%	81%	96.00%	98%	100%	89.00%	95.00%
			Verified	100.00%	89.00%	99.00%	100%	81%	96.00%	98%	100%	89.00%	95.00%
	% call answered by operators(voice to voice) within 60 sec.	>=90%	Reported	65.99%	50.00%	77.00%	91.00%	91.00%	96.00%	100.00%	97.00%	88.00%	88.00%
			Verified	65.99%	50.00%	77.00%	91.00%	91.00%	96.00%	100.00%	97.00%	88.00%	88.00%
9	Termination/closure of service	<=7days	Reported	100.00%	100.00%	100.00%	100.00%	100.00%	NA	NA	100.00%	100.00%	100.00%
			Verified	100.00%	100.00%	100.00%	100.00%	100.00%	NA	NA	100.00%	100.00%	100.00%
10	Time taken for refunds of deposits after closures.	100% within 60 days	Reported	100.00%	100.00%	100.00%	100.00%	100.00%	NA	NA	100.00%	100.00%	89%
			Verified	100.00%	100.00%	100.00%	100.00%	100.00%	NA	NA	100.00%	100.00%	89%

Critical Analysis (PMR Verification):

- The figures proved by all the operators match the figures obtained on verification.
- Only Idea & Aircel are not meeting the benchmark for the parameter "Worst affected cells>3% TCH drop" with high margins. and also Aircel (0.17%) is not meeting benchmarks in good voice quality with a value of 94.03%
- In case of POI congestion, only BSNL (4%) is not meeting the benchmark with high margins and Metering & Billing prepaid Aircel is deviating from benchmarks
- "% call answered by operators (voice to voice) within 60 sec." benchmark is not met by Aircel , Airtel, Idea, Tata-CDMA, Rcom CDMA. respectively, as well as Accessibility of call centre is concerned Airtel , Rcom-GSM & Rcom CDMA are not meeting the benchmarks set by TRAI. .
- Tata-CDMA is not meeting the 60 days' benchmark for "Refund of deposits after closure of connection".

CHAPTER-4 : DETAILED FINDING & ANALYSIS

1. Cellular Mobile Telephone Service

(A) MSC Audit

S/N	Name of Parameter	Benchmark	Aircel	Airtel	Idea	BSNL	Rcom GSM	Tata GSM	Stel	Videocon	Vodafone	Rcom CDMA	Tata CDMA	
			GSM Operators											
A	Network Service Quality Parameter													
1	Connection Establishment (Accessibility)													
	a) CSSR	>=95%	97.61%	99.33%	98.42%	98.22%	98.99%	ICR WITH AIRCEL	98.53%	ICR WITH AIRCEL	99.54%	99.81%	99.43%	
	b) SDCCH/PAGING congestion	<=1%	0.05%	0.09%	0.12%	0.60%	0.09%		0.02%		0.01%	0.00%	0.00%	
	c) TCH congestion	<=2%	0.69%	0.29%	1.11%	1.80%	0.36%		0.07%		0.19%	0.02%	0.11%	
2	Connection maintenance													
	a) CDR	<=2%	0.90%	1.06%	1.54%	1.82%	0.59%		0.71%		1.13%	0.45%	0.15%	
	b) Cells having > 3% TCH drop	<=3%	12.09%	3.48%	2.40%	4.88%	0.99%		4.26%		2.78%	0.66%	1.06%	
	c) Good voice quality	>=95%	95.00%	98.57%	96.47%	95.99%	97.11%		97.00%		97.26%	NA	NA	
	d) No. of cells > 3% TCH drop		222	112	37	132	17		67		58	3	6	
	e) Total no. of cells in the network		1836	3217	1,541	2705	1716		1574		2086	456	567	
3	No of POI having >0.5% congestion		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		
	b) Total No. of circuits on POI		10769	24207	12,076	13204	2433	8287	12090	2433	8053			
	c) Avg No. of call attempts on POI		1904580	420907	199,633	772606	15880	211002	5534	15880	94465			
	d) Avg traffic served on POI (Erlang)		5027	12417	6,031	28646	702	3491	167	702	1655			
	e) Total number of working POI Service Area wise		40	38	31	37	9	32	38	9	62			
	f) Equipped Capacity of Network in respect of Traffic in erlang		33473	65298	15,179	42000	32000	11722	15989	28000	9600			
	g) Total traffic handled in TCBH in erlang		11934	53234	9,128	37613	24756	5933	9045	6088	2210			

S/ N	Name of Parameter	Benchmark	Aircel	Airtel	Idea	BSNL	Rcom GSM	Tata GSM	Stel	Videocon	Vodafone	Rcom CDMA	Tata CDMA
			GSM Operators										
(B)	Customer Service Quality Parameters												
4	Response time to customers for assistance												
	a) Accessibility of call centre	>=95%	100%	98%	100%	100%	87.95%	100%	100%	100%	100%	100.00%	97.79%
	b) % of call answered by operators(voice to voice) within 60 sec	>=90%	93.00%	90.76%	94.27%	98.11%	94.78%	94.61%	50.55%	97.44%	98.10%	95.35%	93.00%
	c) No. of call attempts to call centre / customer care nos. during TCBH (Avg)		23840	65,682	9,954	24,549	35,421	27616	10,067	2,699	630	2,471	23,840
	d) No. of calls connected and answered successfully to call centre / customer care nos. during TCBH (Avg)		22171	59,611	9,384	24,084	33,572	26128	5,089	2,630	618	2,356	22,171

NA: Not Applicable, NR: Not Received

Parameter-wise Findings (Live Data Assessment):

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

- **Call setup success rate (benchmark >= 95%):** All operators are meeting the benchmark with values lying between 97.61% and 99.81%.
- **SDCCH/PAGING Channel congestion (benchmark <= 1%):** All operators are meeting the benchmark with values lying between 0% and 0.60%.
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 0.02% and 1.11%.
- **Call drop rate (benchmark <= 2%):** All operators are meeting the benchmark with values lying between 0.15% and 1.54%.
- **Cell exceeding 3% TCH drop (benchmark <= 5%):** Except for Idea Aircel, Airtel, Bsnl, TTSL & STel with a value of 12.09 % & ,3.48% , 4.87%, 12.09% & 4.25% in live data respectively, rest of the operators are satisfying the benchmark with value in between 0.51% and 12.09%.
- **Connections with good voice quality (benchmark >= 95%):** CDMA service providers have declared that the parameter is not system generated. Rest of the GSM operators are meeting the benchmark with values lying between 95% and 99.57%.
- **POI Congestion (benchmark <= 0.5%):** All the operators are meeting the benchmark with value of 0% . There was no congestion found overall on the POI, but cases were found where individual POIs are showing high utilization/usage. Some are in the range of over 100% though causing no traffic failure due to overflow technique i.e. the extra traffic is carried over by some other operating POI as has been designed to do so.
- **%age of call answered by operator (electronically) (benchmark >95):**, Rcom GSM is not met in Live data while rest operators are meeting the benchmark.
- **%age of call answered by operator (Voice to voice) (benchmark >90%): %):** All operators are meeting the benchmark. Except STel (50.55%).

(2) Month Data Assessment & Summarized Findings

S/N	Name of Parameter	Benchmark	Aircel	Airtel	Idea	BSNL	Rcom GSM	Tata GSM	Stel	Videoc on	Vodafon e	Rcom CDMA	Tata CDMA
			GSM Operators									CDMA Operators	
(A)	Network Service Quality Parameter												
1	Network Availability												
	a) BTS Accumulated Downtime	<=2%	0.06%	0.03%	0.13%	1.94%	0.00%	ICR WITH AIRCEL	0.02%	ICR WITH AIRCEL	0.02%	0.25%	0.00%
	b) Worst affected BTSs due to downtime	<=2%	0.00%	0.00%	0.00%	1.90%	0.00%		1.90%		0.00%	0.22%	0.00%
	c) Total no. of BTSs in the licensed service area		616	1,122	497	945	572		525		693	456	187
	d) Sum of downtime of BTSs in a month in hours i.e. total outage time of all BTSs in hours during a month		291	224	480	13,674	0		71		82	837	0
	e) No. of BTSs having accumulated downtime of >24 hours in a month		0	0	0	18	0		10		0	1	0
2	Connection Establishment (Accessibility)												
	a) CSSR (Call Setup Success Rate)	>=95%	97.69%	99.12%	98.77%	98.30%	98.97%	98.60%	99.62%	99.82%	99.48%		
	b) SDCCH/PAGING congestion	<=1%	0.03%	0.11%	0.31%	0.70%	0.09%	0.03%	0.02%	0.0%	0.00%		
	c) TCH congestion	<=2%	0.62%	0.28%	0.84%	1.80%	0.30%	0.38%	0.12%	0.02%	0.10%		
3	Connection maintenance (Retainability)												
	a) CDR	<=2%	0.87%	1.03%	1.46%	1.90%	0.58%	0.70%	1.07%	0.43%	0.20%		
	b) Worst affected cells>3% TCH drop	<=3%	11.98%	3.54%	2.27%	4.81%	1.81%	4.51%	2.83%	0.66%	1.06%		
	c) Good voice quality	>=95%	95.02%	98.64%	96.35%	95.88%	96.93%	96.60%	97.28%	NA	NA		
	d) Total No. of cells exceeding 3% TCH drop (call drop)		220	114	35	130	31	71	59	3	6		
	e) Total no. of cells in the network		1836	3217	1,541	2705	1716	1574	2086	456	567		
4	No of POI having > 0.5% congestion		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	
	b) Total No. of call attempts on POI (Avg.)		1880730	379985	212,093	273888	16343	199856	5310	16343	90050		

S/N	Name of Parameter	Benchmark	Aircel	Airtel	Idea	BSNL	Rcom GSM	Tata GSM	Stel	Videoc on	Vodafon e	Rcom CDMA	Tata CDMA
			GSM Operators							CDMA Operators			
	c) Total traffic served on POI (Erlang) (Avg.)		4978	11496	6,025	9941	706	ICR WITH AIRCEL	3305	ICR WITH AIRCEL	165	706	1649
	d) Total No. of circuits on POI		10769	24207	12,076	13204	2433		8287		12090	2433	8053
	e) Total number of working POI Service Area wise		40	38	31	37	9		32		38	9	62
	f) Capacity of POI		8700	23360	11,297	11883	2134		7735		10965	2134	6794
5	Network Data												
	a) Equipped Capacity of Network Erlang		33473	65298	15,179	42000	32000	ICR WITH AIRCEL	11722	ICR WITH AIRCEL	15989	28000	9600
	b) Total traffic in TCBH in erlang (Avg.)		11934	53234	9,128	37613	24756		5933		9045	6088	2210
	c) Total no. of customers served (as per VLR) on last day of the month		419592	1514406	331,518	977757	NP		207490		313409	NP	66802
(B)	Customer Service Quality Parameters												
5	Metering/billing credibility-Post paid	$\leq 0.1\%$	0.00%	0.01%	0.00%	0.01%	0.10%	0.00%	NA	NA	0.00%	0.10%	0.00%
	a) No. of bills issued during the period		2240	33480	268	55579	2103	1001	NA	NA	1291	6710	23836
	b) No. of bills disputed including billing complaints during the period		0	2	0	3	2	0	NA	NA	0	7	0
6	Metering /billing credibility-Pre paid	$\leq 0.1\%$	0.06%	0.00%	0.02%	0.03%	0.01%	0.00%	0.04%	0.01%	0.00%	0.01%	0.01%
	a) No. of charging / credit / validity complaints during the quarter		391	25	66	438	120	0.00%	177	8	4	31	9
	b) Total no. of pre-paid customers at the end of the quarter		692,760	2,066,834	377,951	1,558,280	1,202,325	212,942	421,429	89,976	343,528	334,921	133,396
7	Resolution of billing/ charging complaints	<i>100% within 4 weeks</i>	100%	100%	100%	100%	100%	100%	100%	100.0%	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%	100%	100%	100%	100%	100%	100%	100%	100%	100%

S/N	Name of Parameter	Benchmark	Aircel	Airtel	Idea	BSNL	Rcom GSM	Tata GSM	Stel	Videoc on	Vodafon e	Rcom CDMA	Tata CDMA
			GSM Operators										CDMA Operators
	b) Total no. of billing (post paid) and charging, credit / validity (pre paid) complaints received during the quarter		391	4231	502	441	122	107	177	198	4	38	56
	c) No. of billing complaints (post paid) and charging, credit/ validity complaints (pre paid) resolved in favour of the customer during the quarter		391	27	351	0	23	0	4	103	4	9	9
	d) No. of complaints disposed on account of not considered as valid complaints during the quarter		0	4204	151	441	99	107	173	95	0	29	47
	e) Period of applying credit/waiver/adjustment to the customers account from the date of resolutions of complaints	<=1 week	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
8	Response time to customers for assistance												
	a) Accessibility of call centre/Customer Care	>=95%	100.00%	91%	100%	100%	90%	100%	98%	100%	100%	100%	98%
	b) % call answered by operators(voice to voice) within 60 sec.	>=90%	100.00%	94.63%	94.90%	95.25%	92.58%	96.25%	95.77%	97.8%	93.91%	93.16%	96.64%
	c) Total no. of call attempts to call centre & customer care nos. during TCBH (Avg.).		491,245	618,928	57,353	203,592	346,695	42,850	59,279	34,501	6,389	22,390	11,266
	d) No. of calls connected and answered successfully to call centre & customer care nos. during TCBH (Avg.).		491,245	585,692	54,430	193,914	320,969	41,243	56,771	33,743	6,000	20,859	10,887
9	Termination/closure of service	<=7days	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
	a) Total No. of requests for Termination / Closure of service received during the quarter		29	374	3	617	4	16	NA	NA	14	21	220
	b) No. of requests for Termination / Closure of service complied within 7 days during the quarter		29	374	3	617	4	16	NA	NA	14	21	220
10	Time taken for refunds of deposits after closures.	100% within 60 days	100%	100%	100%	100%	100%	100%	NA	NA	100%	100%	100%

NA: Not Applicable, NR: Not Received

➤ **Parameter-wise Findings (Month Data Assessment):**

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

- **BTS accumulated downtime (benchmark $\leq 2\%$):** All operators are meeting the benchmark with values lying between 0% and 1.94%.
- **Worst affected BTSs due to downtime (benchmark $\leq 2\%$):** All operators are meeting the benchmark with values lying between 0% and 1.90%, respectively.
- **Call setup success rate (benchmark $\geq 95\%$):** All operators are meeting the benchmark with values lying between 97.69% and 99.82%.
- **SDCCH/PAGING Channel congestion (benchmark $\leq 1\%$):** All operators are meeting the benchmark with values lying between 0% and 0.70%.
Note: CDMA operators have provided the data for Paging Channel congestion and GSM operators provided SDCCH Channel congestion.
- **TCH congestion (benchmark $\leq 2\%$):** All operators are meeting the benchmark with values lying between 0.02% and 1.80%.
- **Call drop rate (benchmark $\leq 2\%$):** All operators are meeting the benchmark with values lying between 0.2% and 1.90%.
- **Cell exceeding 3% TCH drop (benchmark $\leq 5\%$):** All operators are meeting the benchmark with values lying between 0.01% and 12%, except Aircel(11.98%), Airtel(3.54%), Bsnl(4.80%) & STel (4.51%) respectively.
- **Connections with good voice quality (benchmark $\geq 95\%$):** CDMA service providers have declared that the parameter is not system generated. Rest of the GSM operators are meeting the benchmark with values lying between 95.02% and 99.66%.
- **POI Congestion (benchmark $\leq 0.5\%$):** All the operators are meeting the benchmark with value of 0%. There was no congestion found overall on the POI, but cases were found where individual POIs are showing high utilization/usage. Some are in the range of over 100% though causing no traffic failure due to overflow technique i.e. the extra traffic is carried over by some other operating POI as has been designed to do so.
- **%age of call answered by operator (electronically) (benchmark >95):** All operators are meeting the benchmark except Airtel (91%) & Rcom GSM(90%) which is not meeting the benchmarks.
- **%age of call answered by operator (Voice to voice) (benchmark $>90\%$):** All operators are meeting the benchmark. respectively
- **Metering and billing credibility-Post paid (benchmark $\leq 0.1\%$):** All other operators are meeting the benchmark.
- **Metering and billing credibility-Pre paid (benchmark $\leq 0.1\%$):** All the operators are meeting the benchmark.
- **Resolution of billing/ charging complaints (benchmark 100% within 4 weeks):** All operators are meeting the benchmark.
- **Termination/Closure of service (Benchmark ≤ 7 days** All operators are meeting the benchmark.
- **Time taken for refunds of deposits after closures (benchmark 100% within ≤ 60 days):** All operators are meeting the benchmark since STel & Videocon has no post paid services hence no refunds cases for those operators in this circle.

(1) Sample Coverage

Switches/BSC/BTS details of operators:

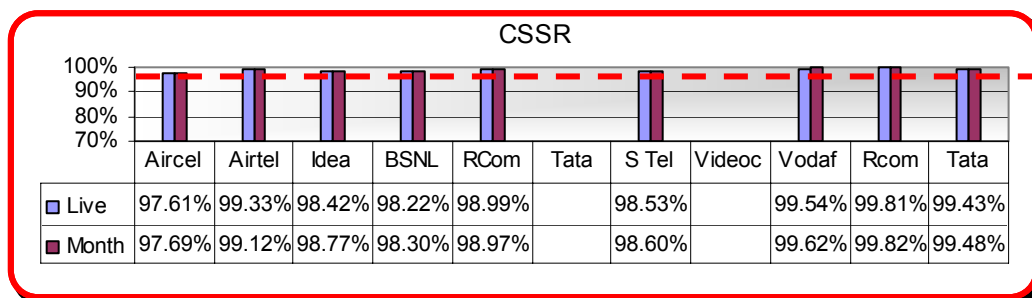
Sl.	Name of Service Provider	No. of MSC	No. of BSC	No. of BTS
GSM Operators				
1	Aircel Ltd	1	7	616
2	Airtel Ltd	5	15	1122
3	Idea	1	4	497
4	BSNL	3	14	945
5	Reliance Communication (GSM)	2	12	754
6	Tata Teleservices (GSM)	1	7	616
7	STel	1	4	525
8	Videocon	1	7	616
9	Vodafone	1	8	693
CDMA Operators				
10	Reliance Communication (CDMA)	1	0	461
11	Tata Teleservices (CDMA)	1	1	187

(2) Performance (Graphical Representation)

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

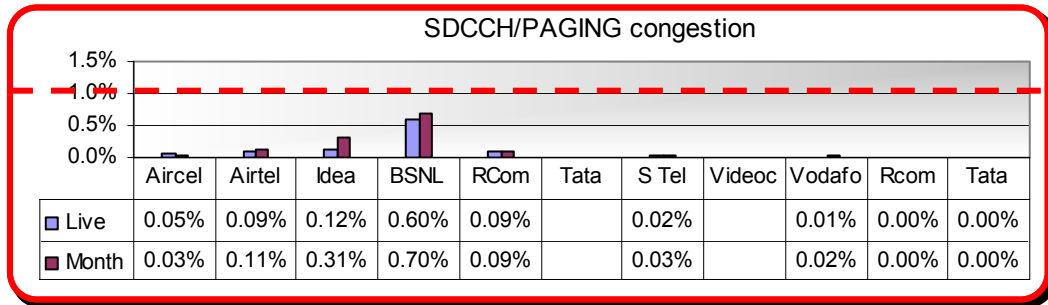
A) NETWORK PERFORMANCE

I. Call setup success rate: All operators are meeting the TRAI benchmarks ($\geq 95\%$) for both one month data and 3 days live data taken in the month of audit.

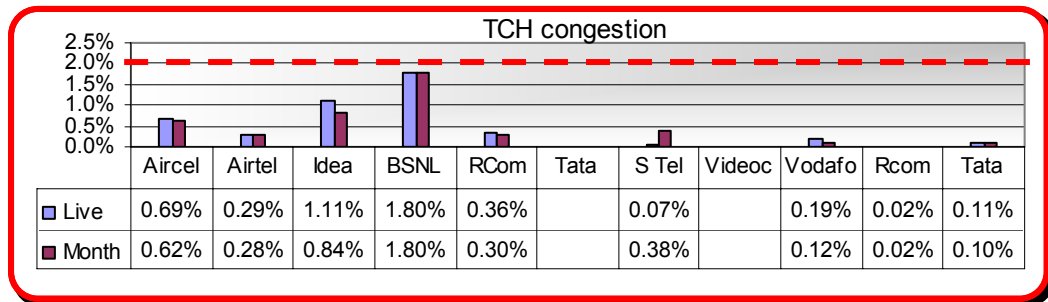


II. Blocked call rate:

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

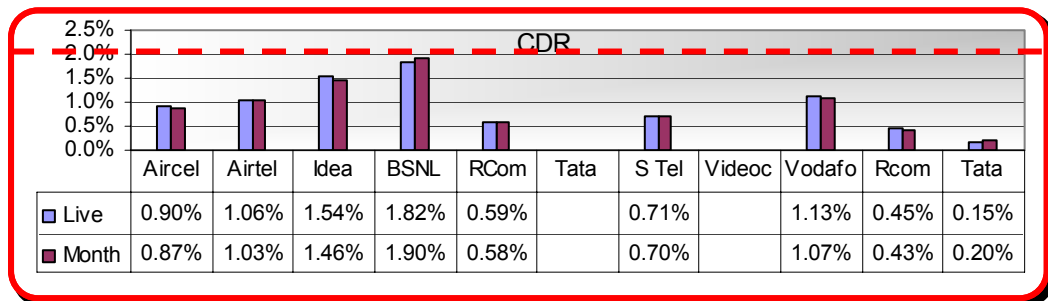


TCH congestion (%): All operators are meeting the TRAI benchmarks ($\leq 2\%$) for both one month data and 3 days live data taken in the month of audit.

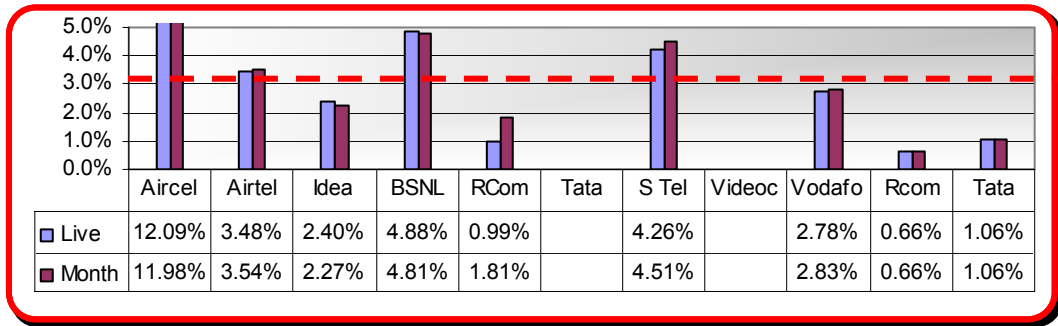


III. Connection Maintainability (Retainability):

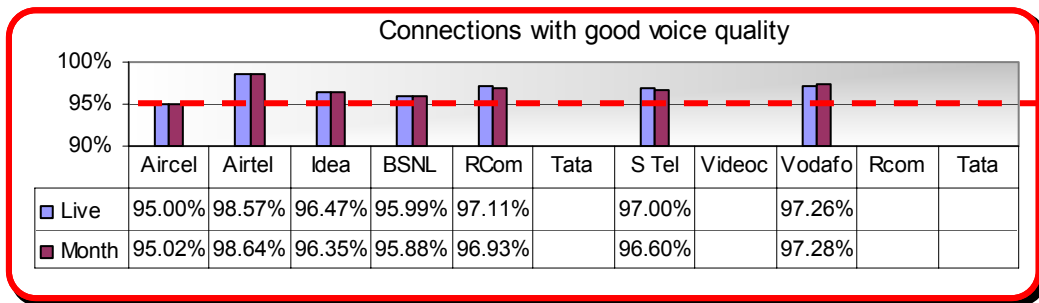
Call drop rate (%): All operators are meeting the TRAI benchmarks ($\leq 2\%$) for both one month data and 3 days live data taken in the month of audit.



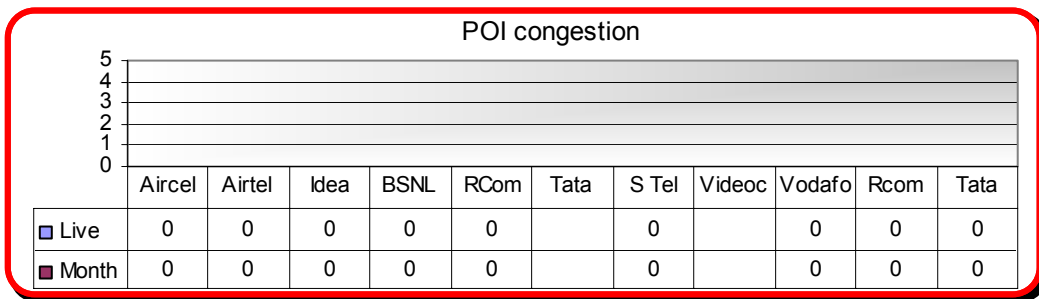
Worst affected Cell exceeding 3% TCH Drop: For both live and month data, Aircel with a value of 12.09% and 11.98%, Airtel with a value 3.48% & 3.54%, BSNL with a value 4.87% & 4.80% & STel with a value 4.25% & 4.51% respectively is found not meeting the benchmark of $\leq 5\%$. Rests of the operators are meeting the benchmark for both cases.



Percentage of connections with good voice quality (benchmark $\geq 95\%$): All operators are meeting the TRAI benchmarks ($\Rightarrow 95\%$) for both one month data and 3 days live data taken in the month of audit. CDMA operators have not provided the data.



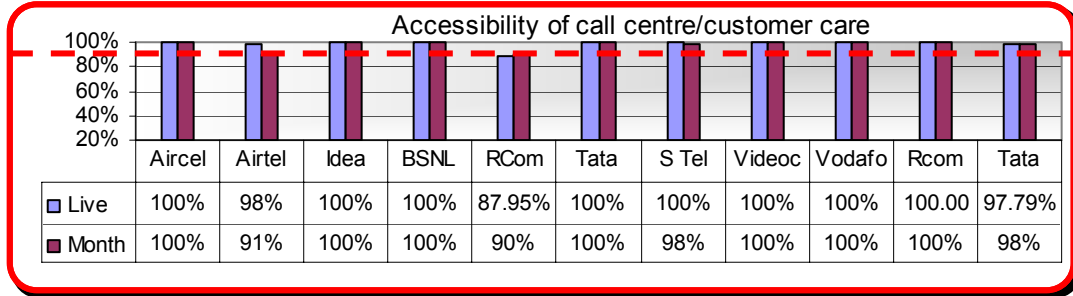
POI Congestion: All operators are meeting the TRAI benchmarks ($\leq 0.5\%$) for both one month data and 3 days live data taken in the month of audit .



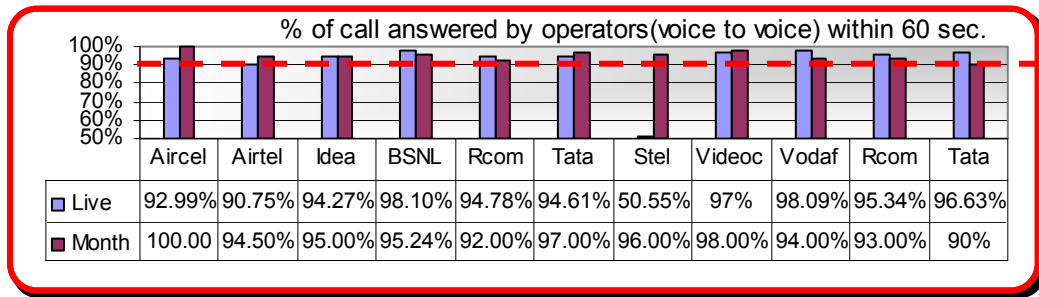
B) CUSTOMER SERVICE QUALITY PARAMETERS

(A) Response time to the customer for assistance:

Percentage of call answered (Electronically): All operators are meeting the TRAI benchmarks ($\geq 95\%$) for both one month data, except Airtel (91%) & Rcom (90% & 87.95%) deviating from benchmark in month data.



Percentage of call answered by operators (Voice to voice) within 60 sec: For Live & Month data, all operators are not meeting the benchmark. Except Stel (50.55%) not meeting the benchmark.



(3) Critical Analysis

The above comparative study between live data & month data shows similar trends in both the cases. However, inconsistency in live & month data was found for parameters like “worst affected cells >3% TCH drop” in Aircel ,Airtel ,BSNL & STel are not meeting the benchmark with the value of 12.09% ,3.48%,4.87% & 4.25% respectively. As far as “accessibility of call centre”, all operators are meeting the benchmarks except Airtel & Rcom which is deviating the benchmarks with a value of 91% & 90% and “%age of calls answered by operator” all the operators are meeting the TRAI benchmarks except, STel which is not meeting the benchmark.

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

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

(2) Performance (live calling for billing complaints)

Calling Operator	Aircel	Airtel	Idea	BSNL	Rcom(GSM)	Tata (GSM)	Stel	Videocon	Vodafone	Reliance (CDMA)	Tata (CDMA)
Total No. of calls	100	25	50	100	60	0	100	8	4	30	9
Cases resolved with 4 weeks	100	25	50	100	60	0	100	8	4	30	9
%age of cases resolved	100%	100%	100%	100%	100%	0%	100%	100%	100%	100%	100%

(3) Live calling to Call center:

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

	OPERATORS NAME										
	Aircel	Airtel	BSNL	STel	Idea	Rcom	Tata	Videocon	Vodafone	Rcom	Tata
	GSM								CDMA		
1ST HALF (10AM TO 01 PM)	47	34	47	46	47	39	49	48	47	48	46
2ND HALF (04PM TO 07 PM)	48	41	41	45	43	41	42	44	42	40	44
In % age	95.00	75.00	88.00	91.00	90.00	80.00	91.00	92.00	89.00	88.00	90.00

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

(5) Critical Analysis

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

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

A sample of 2x50 test calls per Service Providers with in the licensed service area (Himachal Pradesh Circle) were made between 1100 to 1400 hrs and between 1600 to 1900 hrs so that TCBH hours for all the operators were covered.

(2) Performance based on live measurement

Calling Operator	Aircel	Airtel	Idea	BSNL	Reliance (GSM)	Tata (GSM)	Stel	Videocon	Vodafone	Reliance (CDMA)	Tata (CDMA)
Aircel	-	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Airtel	100%	-	100%	100%	100%	100%	100%	100%	100%	100%	100%
Idea	100%	100%	-	100%	100%	100%	100%	100%	100%	100%	100%
BSNL	100%	100%	100%	-	-	100%	100%	100%	100%	99%	100%
Reliance (GSM)	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Tata (GSM)	98%	97%	100%	100%	100%	100%	-	100%	100%	100%	100%
STel	100%	98%	96%	100%	100%	100%	100%	-	98%	100%	99%
Videocon	99%	100%	100%	100%	100%	100%	100%	100%	-	100%	100%
Vodafone	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Reliance (CDMA)	100%	100%	100%	-	100%	100%	100%	100%	100%	-	100%
Tata (CDMA)	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	-

Operator Assissment Drive Test :

SN	Parameter	City Name	Aircel	Airtel	Idea	BSNL	Rcom GSM	Stel	Vodafone	Rcom CDMA	Tata CDMA
			GSM Operators								
1.1	Call Attempts	Shimla	58	54	50	54	63	52	66	64	63
		Mandi	57	54	51	55	53	51	52	54	54
		Kullu	52	51	52	54	57	50	51	63	60
1.2	Blocked Call Rate (<=3%)	Shimla	0.00%	0.00%	0.00%	1.85%	0.00%	0.00%	0.00%	0.00%	0.00%
		Mandi	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
		Kullu	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
1.3	Dropped Call Rate (<=2%)	Shimla	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
		Mandi	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
		Kullu	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
1.4	Percentage of connections with good voice quality (<=95%)										
	(i) 0-4 (w/o frequency hopping)	Shimla								98%	98.90%
		Mandi								100%	99.74%
		Kullu								100%	99.95%
	(ii) 0-5 (with frequency	Shimla	95.20%	96%	96.00%	95.20%	96.00%	98.30%	98.30%		
	Mandi	100%	99%	97.60%	95.10%	99.00%	99.30%	99.70%			

SN	Parameter	City Name	Aircel	Airtel	Idea	BSNL	Rcom GSM	Stel	Vodafone	Rcom CDMA	Tata CDMA
			GSM Operators								
	hopping)	Kullu	100%	96%	95.70%	97.68%	98.00%	99.30%	99.50%		
1.5	Service Coverage										
	In door (\geq -75dBm)	Shimla	92%	91%	44%	97%	87%	95%	83%	62%	100%
		Mandi	93%	91%	82%	97%	93%	98%	94%	93%	100%
		Kullu	99%	93%	82%	99%	99%	98%	94%	91%	100%
	In-vehicle (\geq -85dBm)	Shimla	98%	98%	83%	100%	99%	99%	98%	91%	100%
		Mandi	99%	98%	96%	100%	100%	99%	100%	99%	100%
		Kullu	99%	100%	100%	100%	100%	99%	100%	99%	100%
	Out door-in city (\geq -95dBm)	Shimla	100%	100%	100%	100%	100%	100%	100%	100%	100%
		Mandi	100%	100%	100%	100%	100%	100%	100%	100%	100%
Kullu		100%	100%	100%	100%	100%	100%	100%	100%	100%	
1.6	Call Setup Success Rate (\geq 95%)	Shimla	100.00%	100.00%	100.00%	98%	100.00%	100%	100%	100.00%	100%
		Mandi	100.00%	100.00%	100.00%	100%	100.00%	100%	100%	100.00%	100%
		Kullu	100.00%	100.00%	100.00%	100%	100.00%	100%	100%	100.00%	100%

(3) Critical Analysis

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

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

(1) Sample Coverage

The Operator Assisted Drive Test was conducted at Himachal Pradesh 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

SHIMLA

LOW DENSE:	vikas nagar, malyana, dhalli, tauland.
MEDIUM DENSE:	New Shimla, khalini, lakkar bazaar
HIGH DENSE:	Sinjauli, bus stand, area, kasumpti. Sec-34, sec-17, Gurudwara, Sec-35, Fire works office

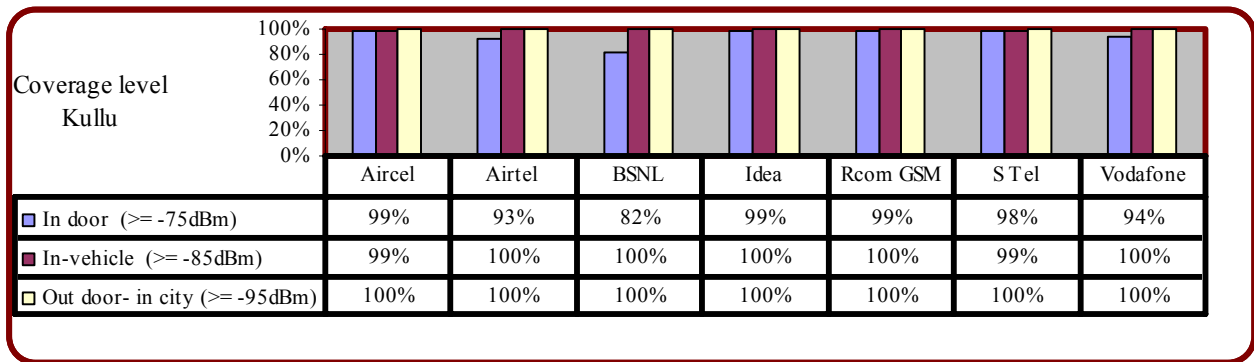
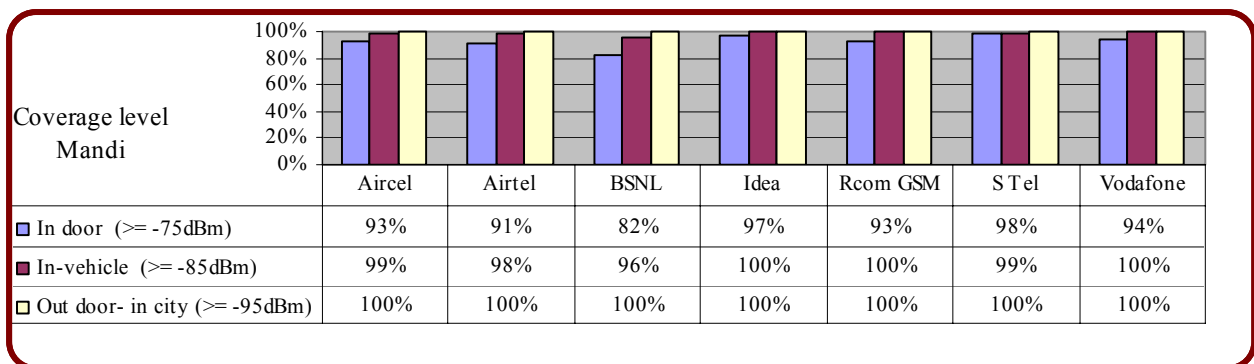
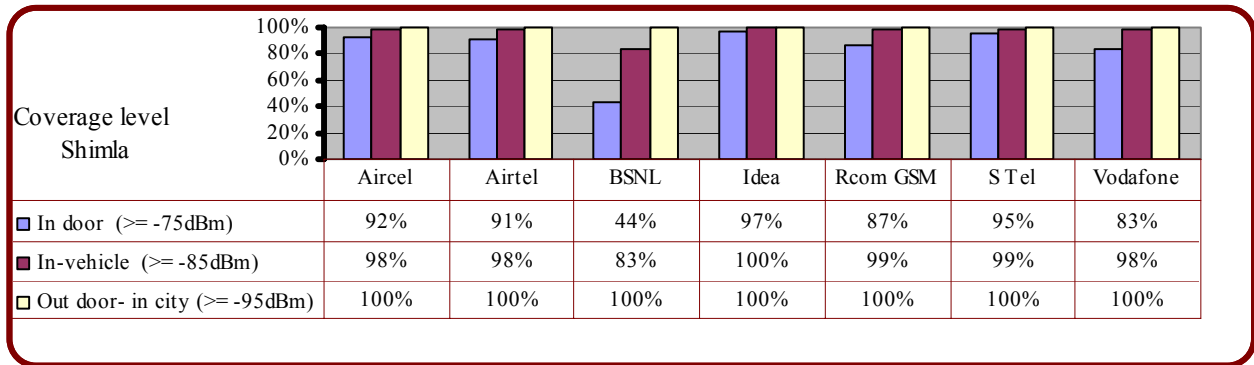
MANDI

LOW DENSE:	Beuli road, Ram nagar.
MEDIUM DENSE:	Jwar nagar, bus stand.
HIGH DENSE:	Indra market, bhootnath bazaar

KULLU

LOW DENSE:	Shashtri nagar, ramshila market.
MEDIUM DENSE:	Sultanpur, Sarvari market
HIGH DENSE:	Dhalpur market, Akhara bazaar.

Graphical Representation



(3) Critical Analysis

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

All the operators are meeting the benchmarks.

Independent Drive Test :

SN	Parameter	City Name	Aircel	Airtel	Idea	BSNL	Rcom GSM	Stel	Vodafone
			GSM Operators						
1.1	Call Attempts	Shimla	55	52	54	44	59	56	57
1.2	Blocked Call Rate (<=3%)	Shimla	0.00%	0%	0.00%	2.80%	0.00%	0.00%	0%
1.3	Dropped Call Rate (<=2%)	Shimla	0.00%	0%	0.00%	0.00%	0%	0.00%	0%
1.4	Percentage of connections with good voice quality (=>95%)								
	(i) 0-4 (w/o frequency hopping)								
	(ii) 0-5 (with frequency hopping)	Shimla	95.00%	95.40%	95.20%	96.00%	95.00%	98.40%	98.10%
1.5	Service Coverage								
	In door (>= -75dBm)	Shimla	91.40%	96%	42.00%	94.60%	90.00%	94.21%	82.00%
	In-vehicle (>= -85dBm)	Shimla	97%	100%	81.90%	99.70%	99.00%	99%	98.23%
	Out door- in city (>= -95dBm)	Shimla	99%	100%	100.00%	100.00%	100.00%	100%	100%
1.6	Call Setup Success Rate (>=95%)	Shimla	100.00%	100%	100%	98%	100.00%	100%	100%

(E) Independent Drive Test

(1) Sample Coverage

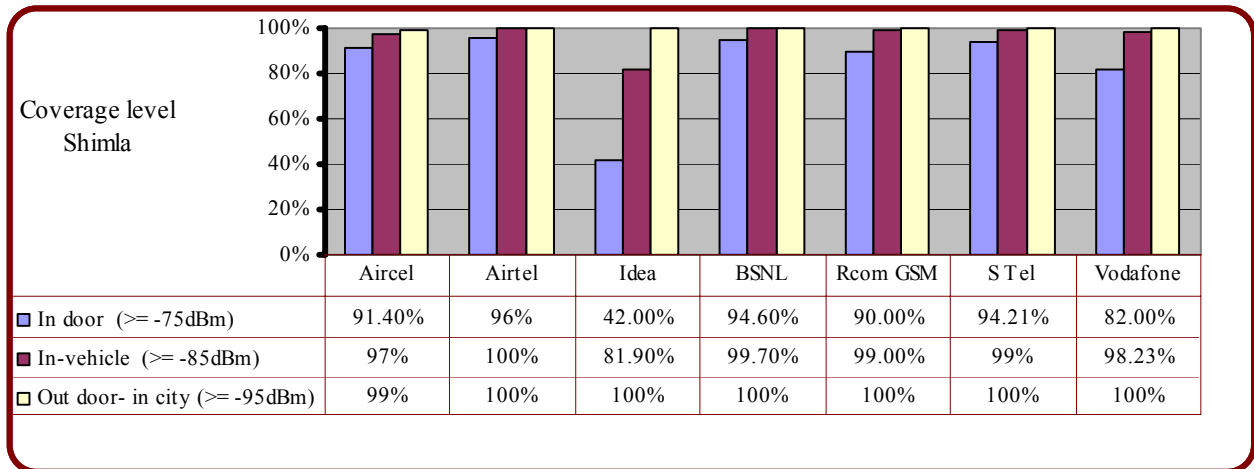
The Independent Drive Test was conducted at Himachal Pradesh operators assisted drive test was over for respective operators. Route cover was about around 80-100Km depending on city areas within the speed limit of 30Km/hr.

Drive Test Locations

SHIMLA

LOW DENSE: vikas nagar, malyana, dhalli, tauland.
 MEDIUM DENSE: New Shimla, khalini, lakkar bazaar
 HIGH DENSE: Sinjauli, bus stand, area, kasumpti.
 Sec-34, sec-17, Gurudwara, Sec-35, Fire works office

Graphical Representation



(3) Critical Analysis

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

All the operators are meeting the TRAI benchmarks

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

From live, month, PMR and Drive Tests findings, it can be concluded that on an average, performance of the operators in the service area (Himachal Pradesh) is by and large satisfactory for **Network Parameters**. However, the benchmark of $\leq 5\%$ for “worst affected cells $> 3\%$ TCH drop” is not met by Aircel (for month & live data) respectively.

Under **Customer Service Quality Parameter** “operator answered calls (voice-to-voice) within 60 seconds” parameter it is found that most of the operators are fulfilling TRAI benchmark of $\geq 90\%$. Apart from this, the “accessibility of call centre” parameter benchmark is not met by Airtel respectively.

Regarding **Metering/Billing Credibility** issues, all operators are meeting the benchmarks.

During **Drive Tests**, All the operators are meeting every parameters set by TRAI.

III. Basic Telephone Service (Wireline) Providers

.....Audit not done for this quarter

IV. Broadband Service Providers

.....Audit not done for this quarter