REPORT

ON

AUDIT & ASSESSMENT OF QUALITY OF SERVICE

OF

CELLULAR MOBILE TELEPHONE SERVICE

FOR

NORTH ZONE – PUNJAB CIRCLE

Report Period: Jan 2011 – March 2011

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- *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 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.

CHAPTER-2: EXECUTIVE SUMMARY

I.   Preface

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

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	Feb-2011	1900-2000 Hrs
2	Airtel Ltd	Feb-2011	1900-2000 Hrs
3	BSNL	Feb-2011	1900-2000 Hrs
4	Etisalat	Feb-2011	2000-2100 Hrs
5	Idea	Feb-2011	2000-2100 Hrs
6	Reliance Communication (GSM)	Feb-2011	1900-2000 Hrs
7	Tata Communications (GSM)	Feb-2011	1900-2000 Hrs
8	Videocon	Feb-2011	1900-2000 Hrs
9.	Loop	Feb-2011	1900-2000 Hrs
10	Vodafone	Feb-2011	1900-2000 Hrs
CDMA Operators			
11	HFCL (CDMA)	Feb-2011	1900-2000 Hrs
12	Reliance Communication (CDMA)	Feb-2011	1900-2000 Hrs
13	Tata Communications (CDMA)	Feb-2011	1900-2000 Hrs

II.   Findings from Quality of Service Audit (Operator wise for each parameter)
(A)   Cellular Mobile Telephone Services
3 days Live Data Audit

S/N	Name of Parameter	Bench-mark	Aircel	Airtel	BSNL	Etisalat	Idea	Rcom GSM	Tata GSM	Videocon	Vodafone	Loop	HFCL(CDMA)	Rcom CDMA	Tata CDMA
			GSM Operators										CDMA Operators		
1	Connection Establishment (Accessibility)														
	a) CSSR (Call Setup Success Rate)	>=95%	98.27%	99.10%	98.59%	99.58%	97.69%	99.64%	98.27%	98.43%	99.68%	98.06%	99.44%	99.20%	99.79%
	b) SDCCH/PAGING congestion	<=1%	0.26%	0.10%	0.48%	0.00%	0.75%	0.05%	0.26%	0.04%	0.06%	0.00%	0.41%	0.01%	0.00%
	c) TCH congestion	<=2%	0.37%	0.12%	2.07%	0.00%	1.53%	0.18%	0.37%	0.33%	0.32%	0.00%	0.00%	0.20%	0.00%
2	Connection maintenance (retainability)														
	a) CDR	<=2%	1.14%	0.75%	1.00%	1.28%	1.60%	0.37%	0.75%	1.38%	0.82%	0.00%	0.80%	0.57%	0.25%
	b) Worst affected cells>3% TCH drop	<=5%	8.72%	1.36%	13.00%	19.14%	10.25%	2.41%	1.36%	0.75%	4.19%	0.00%	0.25%	0.17%	0.00%
	c) Good voice quality	>=95%	96.47%	98.98%	95.61%	99.00%	97.24%	97.87%	98.98%	97.31%	97.96%	99.23%	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
4	Response time to customers for assistance														
	a) Accessibility of call centre/Customer Care	>=95%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
	b) % call answered by operators(voice to voice) within 60 sec.	>=90%	100%	97.00%	94.00%	95.00%	95%	93.00%	95.00%	96.00%	100%	100%	95.00%	92%	95%

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, Idea, Etisalat & BSNL not meeting the benchmark for "Worst affected cells>3% TCH drop" with the value of 8.72% & 10.25%, 19.14% & 13.00% respectively.

Performance related to customer care data is found to be satisfactory for most of the operators especially for the parameter "calls answered by operators (voice-to-voice)

Month data assessment:

S/N	One Month Data Audit Name of Parameter	Bench-mark	Aircel	Airtel	BSNL	Etisalat	Idea	Rcom GSM	Tata GSM	Videocon	Vodafone	Loop	HFCL(CDMA)	Rcom CDMA	Tata CDMA
							GSM Operators								
(A)	Network Service Quality Parameter														
1	Network Availability														
	a) BTS Accumulated Downtime	<=2%	0.00%	0.05%	0.35%	0.06%	0.06%	0.09%	0.00%	0.14%	0.02%	0.00%	0.03%	0.09%	0.00%
	b) Worst affected BTSs due to downtime	<=2%	0.00%	0.08%	2.86%	0.00%	1.01%	0.00%	0.00%	0.06%	0.07%	0.00%	0.00%	0.00%	0.00%
2	Connection Establishment (Accessibility)														
	a) CSSR (Call Setup Success Rate)	>=95%	97.10%	99.13%	98.27%	98.53%	97.40%	99.63%	97.10%	97.76%	99.63%	97.41%	99.41%	99.20%	99.79%
	b) SDCCH/PAGING congestion	<=1%	0.55%	0.13%	0.97%	0.00%	0.45%	0.06%	0.55%	0.06%	0.07%	0.02%	0.30%	0.01%	0.01%
	c) TCH congestion	<=2%	0.71%	0.15%	1.95%	0.00%	1.52%	0.29%	0.71%	0.79%	0.37%	0.00%	0.00%	0.14%	0.00%
3	Connection maintenance (retainability)														
	a) CDR	<=2%	1.10%	0.66%	1.00%	1.70%	1.65%	0.36%	0.66%	1.43%	0.87%	0.00%	0.82%	0.63%	0.26%
	b) Worst affected cells>3% TCH drop	<=5%	8.67%	1.28%	12.19%	20.83%	10.88%	2.37%	1.28%	1.15%	4.25%	0.00%	2.70%	0.33%	0.00%
	c) Good voice quality	>=95%	96.61%	98.96%	95.30%	99.25%	97.18%	98.09%	98.96%	97.09%	97.93%	98.86%	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
(B)	Customer Service Quality Parameters														
5	Metering/billing credibility-Post paid	<= 0.1%	0.00%	0.03%	0.03%	NA	0.06%	0.12%	0.03%	NA	0.03%	NA	0.02%	0.10%	0.02%
6	Metering /billing credibility-Pre paid	<= 0.1%	0.00%	0.02%	0.03%	0.10%	0.01%	0.10%	0.00%	0.01%	0.01%	0.00%	0.02%	0.10%	0.04%
7	Resolution of billing/ charging complaints	100% within 4 weeks	100%	100%	100%	100%	100%	100%	100%	100%	100%	NA	100%	100.00%	100%

One Month Data Audit		Bench-mark	Aircel	Airtel	BSNL	Etisalat	Idea	Rcom GSM	Tata GSM	Videocon	Vodafone	Loop	HFCL(CDMA)	Rcom CDMA	Tata CDMA
S/	Name of Parameter														
	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%	NA	100%	100%	100%
8	Response time to customers for assistance														
	a) Accessibility of call centre/Customer Care	>=95%	91%	100%	99%	100%	100%	100%	96%	100.00%	100.00%	100%	100%	91.26%	96%
	b) % call answered by operators(voice to voice) within 60 sec.	>=90%	80%	95.5%	99%	32%	69%	92.3%	92.6%	72.00%	85.00%	100%	90%	90.10%	98%
9	Termination/closure of service	<=7days	100%	100%	100%	NA	100%	100%	100%	NA	100%	NA	100%	100%	100%
10	Time taken for refunds of deposits after closures.	100% within 60 days	100%	100%	100%	NA	100%	100%	100%	NA	100%	NA	100%	100%	97%

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 ,BSNL, Idea & Etisalat not meeting the benchmark for "Worst affected cells>3% TCH drop" with the value of 8.67% ,12.19,10.88 & 20.83%.

Performance related to customer care data is not found to be satisfactory for most of the operators especially for the parameter "calls answered by operators (voice-to-voice)", with Aircel, Etisalat, Idea, Videocon, and Vodafone & HFCL not meeting the 90% benchmark. All the operators are meeting the benchmarks in Accessibility of call centre parameter except Aircel &Rcom CDMA with a value of 91% & 91.26%. Time taken to refunds of deposit is not met by Tata CDMA only. Tata GSM has not provided the data for customer care parameter.

Operator-Assisted Drive Test

S/N	Parameter	City Name	Aircel	Airtel	BSNL	Idea	Rcom GSM	Tata GSM	Videocon	Vodafone	Hfcl(CDMA)	Rcom CDMA	Tata CDMA
			GSM Operators								CDMA Operators		
1	Blocked Call Rate (<=3%)	Chandigarh	0.00%	0.00%	2.08%	0.00%	7.70%	0.00%	0.00%	0.00%	0.00%	0%	0.00%
		Ludhiana	0.00%	0.02%	1.72%	0.03%	3.09%	0.00%	0.00%	0.00%	0.00%	3.30%	0.00%
		Jalandhar	0.87%	0.01%	0.00%	0.00%	4.70%	0.01%	0.00%	0.00%	0.00%	6.02%	0.00%
1	Dropped Call Rate (<=2%)	Chandigarh	1.63%	0.00%	0.00%	0.00%	6.15%	0.02%	1.53%	1.72%	1.61%	1.96%	1.40%
		Ludhiana	0.01%	0.00%	4.31%	0.00%	1.03%	0.00%	0.93%	0.00%	0.88%	0%	0.00%
		Jalandhar	0.87%	0.00%	0.96%	0.00%	0.93%	0.01%	0%	0.00%	1.31%	6.02%	0.90%
1	Percentage of connections with good voice quality (=>95%)												
	(i) 0-4 (w/o frequency hopping)	Chandigarh									97.42%	95.76%	94.26%
		Ludhiana									96.41%	97.10%	94.17%
		Jalandhar									98.76%	96.91%	94.28%
	(ii) 0-5 (with frequency hopping)	Chandigarh	95.00%	96%	97%	97.11%	88.57%	95%	94.52%	95.20%			
		Ludhiana	91%	98%	97%	98.19%	93.35%	91%	93.07%	96%			
		Jalandhar	92%	97%	96.33%	96.67%	96.73%	88.94%	94.47%	98%			
1	Call Setup Success Rate (>=95%)	Chandigarh	98.40%	100%	100%	100%	95.33%	98.40%	99.12%	100%	99%	99%	100%
		Ludhiana	91%	100%	97%	99.24%	96.91%	98%	93%	100%	99.50%	99.50%	100%
		Jalandhar	99%	100%	99%	100%	95.33%	99.10%	100%	100%	96.18%	96.18%	100%

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

• Blocked Call Rate benchmark is not met by RcomGSM in Chandigarh (7.70%), Ludhiana (3.09%) & Jalandhar (4.70%) and also Rcom CDMA in Ludhiana (3.30%) and Jalandhar (6.02%).

As far as drop call rate is concerned BSNL (4.31%) in Ludhiana, Rcom GSM (6.15%) in Chandigarh & RCom CDMA (6.02%) in Jalandhar. In voice quality parameter Tata CDMA is not met in 3 cities and Rcom GSM in Chandigarh & Ludhiana & Videocon in Chandigarh, Jalandhar & Ludhiana as well as Aircel is in Ludhiana& Jalandhar also. Tata GSM is also in Ludhiana & Jalandhar respectively. • Aircel and Videocon also not meeting CSSR in Ludhiana.

Independent Drive Test:

SN	Parameter	City Name	Aircel	Airtel	BSNL	Idea	Rcom GSM	Tata GSM	Videocon	Vodafone
			GSM Operators							
1	Blocked Call Rate (<=3%)	Chandigarh	0%	0%	0%	3.92%	3.63%	0%	0.80%	0%
		Ludhiana	0.97%	1.51%	2.32%	0.00%	4.25%	0.20%	0.40%	0%
		Jalandhar	0%	1.40%	0%	0.00%	0%	0%	0.40%	0%
1	Dropped Call Rate (<=2%)	Chandigarh	0%	0%	0%	3.92%	0%	0%	0%	0%
		Ludhiana	1.94%	0%	1.16%	0.00%	0%	0.40%	0.77%	0%
		Jalandhar	0%	0%	0%	0.00%	0%	0%	0.40%	0%
1	Percentage of connections with good voice quality (=>95%)									
	(i) 0-5 (with frequency hopping)	Chandigarh	96.90%	95.60%	97%	96.53%	96.99%	96.90%	97.17%	95.80%
		Ludhiana	95.16%	96.70%	96.32%	97.33%	97.29%	95.16%	95.16%	96.10%
		Jalandhar	94.50%	97.50%	96%	96.99%	97.10%	94.50%	95%	97.90%
	(ii) 0-4 (w/o frequency hopping)									
1	Call Setup Success Rate (>=95%)	Chandigarh	100%	100%	100%	99%	96.36%	100%	100%	100%
		Ludhiana	99.41%	100%	97%	100%	97.29%	99.41%	99%	100%
		Jalandhar	100%	100%	98%	100%	100%	100%	99%	100%

Key observations as could be derived from the table are as under:
• Good Voice Quality parameter is not met by Aircel in Jalandhar (94.5%) and TataGSM (94.5%).
• RcomGSM is deviating the benchmarks for Blocked call rate in Chandigarh (3.63%) &Ludhiana (4.25%). As far as blocked call rate & Dropped Call Rate is concerned with Idea (3.92% & 3.92%) respectively is not meeting the benchmark in Chandigarh.

PMR Verification:

S/N	Name of Parameter	Bench-mark	Audit	Aircel	Airtel	BSNL	Etisalat	Idea	Rcom GSM	Tata GSM	Videocon	Vodafone	Loop	Hfcl(CDMA)	Rcom CDMA	Tata CDMA
	PMR															
									GSM Operators						CDMA Operators		
(A)	**Network Service Quality Parameter**																
1	**Network Availability**																
	BTS Accumulated Downtime	<=2%	Reported	ICR with TTSL	0.05%	0.44%	0.24%	0.06%	0.07%	0.03%	0.35%	0.04%	0.00%	0.02%	0.11%	0.00%
			Verified		0.05%	0.44%	0.24%	0.06%	0.07%	0.03%	0.35%	0.04%	0.00%	0.02%	0.11%	0.00%
	Worst affected BTSs due to downtime	<=2%	Reported		0.05%	2.47%	0.00%	0.42%	0.00%	0.00%	0.66%	0.14%	0.00%	0.00%	0.00%	0.00%
			Verified		0.05%	2.47%	0.00%	0.42%	0.00%	0.00%	0.66%	0.14%	0.00%	0.00%	0.00%	0.00%
2	**Connection Establishment (Accessibility)**																
	CSSR (Call Setup Success Rate)	>=95%	Reported	ICR with TTSL	99.12%	98.48%	98.82%	98.33%	99.60%	99.30%	97.52%	98.95%	98.4%	99.21%	99.14%	99.62%
			Verified		99.12%	98.48%	98.82%	98.33%	99.60%	99.30%	97.52%	98.95%	98.4%	99.21%	99.14%	99.62%
	SDCCH/PAGING congestion	<=1%	Reported		0.14%	0.84%	0.06%	0.26%	0.13%	0.03%	0.06%	0.10%	0.02%	0.00%	0.00%	0.00%
			Verified		0.14%	0.84%	0.06%	0.26%	0.13%	0.03%	0.06%	0.10%	0.02%	0.00%	0.00%	0.00%
	TCH congestion	<=2%	Reported		0.17%	1.93%	0.04%	1.10%	0.29%	0.04%	0.21%	0.31%	0.00%	0.00%	0.19%	0.01%
			Verified		0.17%	1.93%	0.04%	1.10%	0.29%	0.04%	0.21%	0.31%	0.00%	0.00%	0.19%	0.01%
3	**Connection maintenance (retainability)**																

S/N	PMR Name of Parameter	Bench-mark	Audit	Aircel	Airtel	BSNL	Etisalat	Idea	Rcom GSM	Tata GSM	Videocon	Vodafone	Loop	Hfcl(CDMA)	Rcom CDMA	Tata CDMA
	CDR	<=2%	Reported	ICR with TTSL	0.72%	1.23%	1.96%	1.59%	0.36%	1.18%	0.66%	1.01%	0.00%	0.01%	0.64%	0.47%
			Verified		0.72%	1.23%	1.96%	1.59%	0.36%	1.18%	0.66%	1.01%	0.00%	0.01%	0.64%	0.47%
	Worst affected cells>3% TCH drop	<=5%	Reported		1.27%	11.43%	0.08%	12.04%	2.61%	3.92%	4.46%	4.83%	0.00%	0.02%	0.24%	0.05%
			Verified		1.27%	11.43%	0.08%	12.04%	2.61%	3.92%	4.46%	4.83%	0.00%	0.02%	0.24%	0.05%
	Good voice quality	>=95%	Reported		98.92%	95.77%	97.76%	97.44%	98.33%	95.78%	98.07%	97.76%	98.00%	98.00%	98.70%	99.71%
			Verified		98.92%	95.77%	97.76%	97.44%	98.33%	95.78%	98.07%	97.76%	98.00%	98.00%	98.70%	99.71%
4	No of POI having > 0.5% congestion	>=0.5%	Reported	4	0	0	0	0	0	0	0	0	0	0	0	0
			Verified	4	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	0.00%	0.03%	0.01%	NA	0.10%	0.08%	0.04%	NA	0.04%	NA	0.01%	0.06%	0.06%
			Verified	0.00%	0.03%	0.01%	NA	0.10%	0.08%	0.04%	NA	0.04%	NA	0.01%	0.06%	0.06%
6	Metering /billing credibility-Pre paid	<= 0.1%	Reported	0.17%	0.02%	0.09%	0.22%	0.00%	0.06%	0.00%	0.04%	0.00%	0.00%	0.01%	0.04%	0.03%
			Verified	0.17%	0.02%	0.09%	0.22%	0.00%	0.06%	0.00%	0.04%	0.00%	0.00%	0.01%	0.04%	0.03%
7	Resolution of billing/ charging complaints	100% within 4 weeks	Reported	100%	100%	100%	100.0%	100%	100.0%	100%	100.00%	100%	NA	100%	100%	100%
			Verified	100%	100%	100%	100.0%	100%	100.0%	100%	100.00%	100%	NA	100%	100%	100%
	Period of applying credit/waiver/adjustment to the customers account from the date of resolutions of complaints	<=1 week	Reported	100%	100%	100%	NA	100%	100%	100%	100.00%	100%	NA	100%	100%	100%
			Verified	100%	100%	100%	NA	100%	100%	100%	100.00%	100%	NA	100%	100%	100%
8	Response time to customers for assistance															
	Accessibility of call centre/Customer	>=95%	Reported	100%	100%	100%	99%	99.00%	100%	100%	NA	100%	100%	93.00%	100.00%	98.00%
			Verified	100%	100%	100%	99%	99.00%	100%	100%	NA	100%	100%	93.00%	100.00%	98.00%

S/N	PMR Name of Parameter	Bench-mark	Audit	Aircel	Airtel	BSNL	Etisalat	Idea	Rcom GSM	Tata GSM	Videocon	Vodafone	Loop	Hfcl(CDMA)	Rcom CDMA	Tata CDMA
	Care															
	% call answered by operators(voice to voice) within 60 sec.	>=90%	Reported	44.93%	92%	91.00%	99.76%	60.97%	88.00%	81.22%	NA	83.24%	100%	99.00%	94.00%	90.88%
			Verified	44.93%	92%	91.00%	99.76%	60.97%	88.00%	81.22%	NA	83.24%	100%	99.00%	94.00%	90.88%
9	Termination/closure of service															
	No.of requests for Termination / Closure of service complied within 7 days during the quarter	<=7days	Reported	NA	100%	100%	NA	100%	100.00%	100%	NA	100.00%	NA	100.00%	100.00%	100%
			Verified	NA	100%	100%	NA	100%	100.00%	100%	NA	100.00%	NA	100.00%	100.00%	100%
10	Time taken for refunds of deposits after closures.	100% within 60 days	Reported	NA	100%	100%	NA	100%	100.00%	NA	NA	100.00%	NA	100.00%	100.00%	94%
			Verified	NA	100%	100%	NA	100%	100.00%	NA	NA	100.00%	NA	100.00%	100.00%	94%

Critical Analysis (PMR Verification):

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

b. Only Idea & BSNLare not meeting the benchmark for the parameter "Worst affected cells>3% TCH drop" with high margins. and also BSNL is not meeting benchmarks in worst affected BTS due to downtime with a value of 2.47%

c. In case of POI congestion, only Aircel (4%) is not meeting the benchmark with high margins.

d. "% call answered by operators (voice to voice) within 60 sec." benchmark is not met by Aircel, Idea, Tata-GSM, RcomGSM, & Vodafone.

e. Tata-CDMA is not meeting the 60 days' benchmark for "Refund of deposits after closure of connection".

f. Aircel & Etisalat is not meeting benchmark for "Metering/billing credibility-Prepaid"

g. HFCL(CDMA) is not meeting benchmark for "Accessibility of call Centre/Customer Care.

3 Days Live Data Assessment & Summarized Findings

S/N	Name of Parameter	Bench mark	Aircel	Airtel	BSNL	Etisalat	Idea	Rcom GSM	Tata GSM	Videocon	Vodafone	Loop	Hfcl(CDMA)	Rcom CDMA	Tata CDMA
			GSM Operators										CDMA Operators		
A	**Network Service Quality Parameter**														
1	**Connection Establishment (Accessibility)**														
	a) CSSR	>=95%	98.27%	99.10%	98.59%	99.58%	97.69%	99.64%	98.27%	98.43%	99.68%	98.06%	99.44%	99.20%	99.79%
	b) SDCCH/PAGING congestion	<=1%	0.26%	0.10%	0.48%	0.00%	0.75%	0.05%	0.26%	0.04%	0.06%	0.00%	0.41%	0.00%	0.00%
	c) TCH congestion	<=2%	0.37%	0.12%	2.07%	0.00%	1.53%	0.18%	0.37%	0.33%	0.32%	0.00%	0.00%	0.20%	0.00%
2	**Connection maintenance**														
	a) CDR	<=2%	1.14%	0.75%	1.00%	1.28%	1.60%	0.37%	0.75%	1.38%	0.82%	0.00%	0.80%	0.57%	0.25%
	b) Cells having > 3% TCH drop	<=5%	8.72%	1.36%	13.00%	19.14%	10.25%	2.41%	1.36%	0.75%	4.19%	0.00%	0.25%	0.17%	0.00%
	c) Good voice quality	>=95%	96.47%	98.98%	95.61%	99.00%	97.24%	97.87%	98.98%	97.31%	97.96%	99.23%	NA	NA	NA
	d) No. of cells > 3% TCH drop		403.66	156	900	10	1057	106	156	34	707	0	9	2	0
	e) Total no. of cells in the network		4628	11469	10,578	NR	10315	4,422	11,469	4,516	12611	12	1224	1001	1978
3	**No of POI having > 0.5% congestion**	>=0.5%	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
	b) Total No. of circuits on POI		31146	77552	60385	1,365	92690	25911	10734	400	107432	234	6730	25911	44841

S/N	Name of Parameter	Bench mark	Aircel	Airtel	BSNL	Etisalat	Idea	Rcom GSM	Tata GSM	Videocon	Vodafone	Loop	Hfcl(CDMA)	Rcom CDMA	Tata CDMA
						GSM Operators							CDMA Operators		
	c) Avg No. of call attempts on POI		7603	1336410	6,267,166	1005	1980144	128326	190620	8173	1870329	2	6462	128326	11490
	d) Avg traffic served on POI (Erlang)		15938	42148	99,727	35	31371	216658	5116	254	61516	0.013	262	216658	313
	e) Total number of working POI Service Area wise		33	48	44	22	33	70	16	50	44	9	28	70	177
	f) Equipped Capacity of Network in respect of Traffic in erlang		87304	238265	272,010	400	132142	115020	87304	56980	3549828	4000	16800	115020	58000
	g) Total traffic handled in TCBH in erlang		24634	192201	97,918	93	132202	38007	24634	16655	3205452	3	2866	38007	28927
(B)	Customer Service Quality Parameters														
4	Response time to customers for assistance														
	a) Accessibility of call centre	>=95%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100.00%	100.00%	100.00%
	b) % of call answered by operators(voice to voice) within 60 sec	>=90%	100%	97.00%	94%	95%	95%	93%	95%	96%	100%	100%	95.00%	92.00%	95.00%

S/N	Name of Parameter	Bench mark	Aircel	Airtel	BSNL	Etisalat	Idea	Rcom GSM	Tata GSM	Videocon	Vodafone	Loop	Hfcl(CDMA)	Rcom CDMA	Tata CDMA
			GSM Operators										CDMA Operators		
	c) No. of call attempts to call centre / customer care nos. during TCBH (Avg)		100	100	100	100	100	100	100	100	100	100	100	100	100
	d) No. of calls connected and answered successfully to call centre / customer care nos. during TCBH (Avg)		100	97	94	95	95	93	95	96	100	100	95	92	95

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 Punjab Service Area are as given below:-

- **Call setup success rate (benchmark >= 95%):** All operators are meeting the benchmark with values lying between 97.69% and 99.79%.
- **SDCCH/PAGING Channel congestion (benchmark <= 1%):** All operators are meeting the benchmark with values lying between 0% and 0.75%.
  Note: CDMA operators have provided the data for Paging Channel congestion and GSM operators provided SDCCH Channel congestion.
- **TCH congestion (benchmark <= 2%):** Except BSNL with value of 2.07% is not meeting benchmark, rest all operators are meeting the benchmark with values lying between 0% and 1.53%.
- **Call drop rate (benchmark <= 2%):** All operators are meeting the benchmark with values lying between 0.37% and 1.60%.
- **Cell exceeding 3% TCH drop (benchmark <= 5%):** Except for Idea Aircel, BSNL & Etisalat with a value of 8.72%,10.25, 13.00% &19.14% respectively, rest of the operators are satisfying the benchmark with value in between 0% and 4.19%.
- **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 95.61% and 99.05%.
- **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):** All operators are meeting the benchmark.
- **%age of call answered by operator (Voice to voice) (benchmark >90%): %):** All operators are meeting the benchmark.

(2) Month Data Assessment & Summarized Findings

S/N	Name of Parameter	Bench-mark	Aircel	Airtel	BSNL	Etisalat	Idea	Rcom GSM	Tata GSM	Videocon	Vodafone	Loop	Hfcl(CDMA)	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%	0.35%	0.06%	0.06%	0.09%	0.00%	0.14%	0.02%	0.00%	0.03%	0.09%	0.00%
	b) Worst affected BTSs due to downtime	<=2%	0.00%	0.08%	2.86%	0.00%	1.01%	0.00%	0.00%	0.06%	0.07%	0.00%	0.00%	0.00%	0.00%
	c) Total no. of BTSs in the licensed service area		1,548	3,850	3,526	18	3,451	1,474	1,548	1,601	4,096	4	408	1,001	649
	d) Sum of downtime of BTSs in a month in hours i.e. total outage time of all BTSs in hours during a month		119	1,203	9,183	8	1,638	932	119	1,433	507	0	75	603	49
	e) No. of BTSs having accumulated downtime of >24 hours in a month		0	3	101	0	35	0	0	1	3	0	0	0	0
2	Connection Establishment (Accessibility)														
	a) CSSR (Call Setup Success Rate)	>=95%	97.10%	99.13%	98.27%	98.53%	97.40%	99.63%	97.10%	97.76%	99.63%	97.41%	99.41%	99.20%	99.79%
	b) SDCCH/PAGING congestion	<=1%	0.55%	0.13%	0.97%	0.00%	0.45%	0.06%	0.55%	0.06%	0.07%	0.02%	0.30%	0.01%	0.01%
	c) TCH congestion	<=2%	0.71%	0.15%	1.95%	0.00%	1.52%	0.29%	0.71%	0.79%	0.37%	0.00%	0.00%	0.14%	0.00%
3	Connection maintenance (retainability)														
	a) CDR	<=2%	1.10%	0.66%	1.00%	1.70%	1.65%	0.36%	0.66%	1.43%	0.87%	0.00%	0.82%	0.63%	0.26%
	b) Worst affected cells>3% TCH drop	<=5%	8.67%	1.28%	12.19%	20.83%	10.88%	2.37%	1.28%	1.15%	4.25%	0.00%	2.70%	0.33%	0.00%
	c) Good voice quality	>=95%	96.61%	98.96%	95.30%	99.25%	97.18%	98.09%	98.96%	97.09%	97.93%	98.86%	NA	NA	NA
	d) Total No. of cells exceeding 3% TCH drop (call drop)		401.35	147	895	11.25	1122	104	147	54	786	0.00%	33	4	NR
	e) Total no. of cells in the network		4628	11469	10,578	54	10315	4422	11469	4,475	12611	12	1224	1,001	NR

S/N	Name of Parameter	Bench-mark	Aircel	Airtel	BSNL	Etisalat	Idea	Rcom GSM	Tata GSM	Videocon	Vodafone	Loop	Hfcl(CDMA)	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
	a) Name of POI not meeting the benchmark		NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL
	b) Total No. of call attempts on POI (Avg.)		203393	1397875	1,827,520	1016	1865477	146783	191075	7,348	2015346	6	71392	146783	74417
	c) Total traffic served on POI (Erlang) (Avg.)		414142	42881	30,935	36	29515	196880	4639	225	71296	0.07	2,491	196880	2630
	d) Total No. of circuits on POI		31146	77552	NG	1365	92690	25911	10734	400	107432	234	6730	25911	44841
	e) Total number of working POI Service Area wise		33	48	44	22	33	70	16	50	44	9	28	70	177
	f) Capacity of POI		27191	75898	60,385	1127	89037	23624	10643	377	104317	135	5844	23624	41670
5	Network Data														
	a) Equipped Capacity of Network Erlang		87304	238265	272,010	400	132142	115020	87304	56,980	3549828	4000	16800	115020	58000
	b) Total traffic in TCBH in erlang (Avg.)		24634	192201	97,918	93	132202	38007	24634	16,654	3205452	3	2866	38007	28927
	c) Total no. of customers served (as per VLR) on last day of the month		275797	5716431	2,457,222	1736	3898628	NR	1031601	487,364	3130370	8	97251	NR	622805
(B)	Customer Service Quality Parameters														
6	Metering/billing credibility-Post paid	<= 0.1%	0.00%	0.03%	0.03%	NA	0.06%	0.12%	0.03%	NA	0.03%	NA	0.02%	0.10%	0.02%
	a) No. of bills issued during the period		6348	379161	34,297	NA	344679	13388	7,038	NA	159001	NA	39022	131322	56325
	b) No. of bills disputed including billing complaints during the period		0	1097	8	NA	192	16	30	NA	52	NA	8	132	13
7	Metering /billing credibility-Pre paid	<= 0.1%	0.00%	0.02%	0.03%	0.10%	0.01%	0.10%	0.00%	0.01%	0.01%	0.00%	0.02%	0.10%	0.04%
	a) No. of charging / credit / validity complaints during the quarter		5	11465	1,163	5	292	270	1,171	113	37	0	3	87	159

S/N	Name of Parameter	Bench-mark	Aircel	Airtel	BSNL	Etisalat	Idea	Rcom GSM	Tata GSM	Videocon	Vodafone	Loop	Hfcl(CDMA)	Rcom CDMA	Tata CDMA
			GSM Operators										CDMA Operators		
	b) Total no. of pre-paid customers at the end of the quarter		448,623	7,291,028	4,476,351	6,631	3,824,032	2,782,869	1,696,058	1,127,723	3,493,146	106	188,903	875,614	434,822
8	**Resolution of billing/ charging complaints**	*100% within 4 weeks*	100%	100%	100%	100%	100%	100%	100%	100.0%	100.0%	NA	100%	100%	100.0%
	a) No. of billing/(post paid) and charging, credit/validity (pre paid) complaints resolved within 4 weeks during the quarter		6863	12562	1,193	5	2100	286	1,201	113	89	106	11	219	172
	b) Total no. of billing (post paid) and charging, credit / validity (pre paid) complaints received during the quarter		6863	12562	1,193	5	2100	286	1,201	113	89	106	11	219	172
	c) No. of billing complaints (post paid) and charging, credit/validity complaints (pre paid) resolved in favour of the customer during the quarter		5	1313	1,190	0	982	93	7	0	89	0	11	53	110
	d) No. of complaints disposed on account of not considered as valid complaints during the quarter		0	11249	3	5	1118	193	1,194	0	0	0	0	166	62
	e) Period of applying credit/waiver/adjustment to the customer's account from the date of resolutions of complaints	*<=1 week*	100%	100%	100%	100%	100%	100%	100%	100%	100%	NA	100%	100%	100%
9	**Response time to customers for assistance**														
	a) Accessibility of call centre/Customer Care	*>=95%*	91%	100%	99%	100%	100%	100%	96%	100%	100%	100%	100%	91.26%	96%
	b) % call answered by operators(voice to voice) within 60 sec.	*>=90%*	80%	95.5%	99%	99.75%	69%	92.03%	92.65%	72%	85%	100%	90%	90.10%	98%

S/N	Name of Parameter	Bench-mark	Aircel	Airtel	BSNL	Etisalat	Idea	Rcom GSM	Tata GSM	Videocon	Vodafone	Loop	Hfcl(CDMA)	Rcom CDMA	Tata CDMA
			GSM Operators										CDMA Operators		
	c) Total no. of call attempts to call centre & customer care nos. during TCBH (Avg.).		100	2,473,232	64,874	397	674,264	640,404	605628	504563	114,888	2	35,575	136,701	202216
	d) No. of calls connected and answered successfully to call centre & customer care nos. during TCBH (Avg.).		80	1,990,896	61,961	396	187,466	589,333	561118	363281	82,746	2	27,725	123,162	182223
10	Termination/closure of service	<=7days	100%	100%	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		179	4,240	184	NA	2,398	401	197	NA	1,432	NA	2,906	1,069	1,797
	b) No. of requests for Termination / Closure of service complied within 7 days during the quarter		179	4,240	184	NA	2,398	401	197	NA	1,432	NA	2,906	1,069	1,797
11	Time taken for refunds of deposits after closures.	100% within 60 days	100%	100%	100%	NA	100%	100%	100%	NA	100%	NA	100%	100%	97%

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 Punjab Service Area are as given below:-

➢ **BTS accumulated downtime (benchmark <=2%):** All operators are meeting the benchmark with values lying between 0% and 0.35%.

➢ **Worst affected BTSs due to downtime (benchmark <= 2%):** All operators are meeting the benchmark with values lying between 0% and 0.08%., except BSNL(2.86%) respectively

➢ **Call setup success rate (benchmark >= 95%):** All operators are meeting the benchmark with values lying between 97.10% and 99.79%.

➢ **SDCCH/PAGING Channel congestion (benchmark <= 1%):** All operators are meeting the benchmark with values lying between 0% and 0.97%.
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 1.95%.

➢ **Call drop rate (benchmark <= 2%):** All operators are meeting the benchmark with values lying between 0.26% and 1.70%.

➢ **Cell exceeding 3% TCH drop (benchmark <= 5%):** Except for Idea, Etisalat , Aircel & BSNL with a value of 10.88%,20.83%,8.67% & 12.19% all the operators are satisfying the benchmark with value in between 0% and 2.70%.

➢ **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 95.30% and 99.25%.

➢ **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):** Except for Tata-CDMA & Aircel all operators are meeting the benchmark.

➢ **%age of call answered by operator (Voice to voice) (benchmark >90%): %):** Only Aircel, Rcom GSM, Idea, Vodafone & HFCL CDMA are not meeting the benchmark with values of 80% , 69% ,32%, 72% & 85% respectively.

➢ **Metering and billing credibility-Post paid (benchmark <= 0.1%):** Except Rcom GSM, rest all other operators are meeting the benchmark.

➢ **Metering and billing credibility-Pre paid (benchmark <= 0.1%):** All the operators are meeting the benchmark with values lying between 0% and 0.1%.

➢ **Response time to customers for assistance- Accessibility of call centre/Customer Care(benchmark >=95%):** Except Airtel and Tata CDMA not meeting benchmark rest all the operators meeting the benchmark with values lying between 99.00% to 100%.

➢ **% call answered by operators(voice to voice) within 60 sec (benchmark >=90%):** Most of the operators Airtel, Idea, Rcom GSM, Vodafone & HFCL is not meeting benchmark, rest of all the operators meeting the benchmark.

➢ **Resolution of billing/ charging complaints (benchmark 100% within 4 weeks):** All operators are meeting the benchmark.

➢ **Termination/Closure of service (Benchmark <= 7 days):** All operators have satisfied the benchmark. Etisalat, Loop & Videocon has no cases of termination.

➢ **Time taken for refunds of deposits after closures (benchmark 100% within <=60 days):** All operators have satisfied the benchmark, except TTSL CDMA having value 97% respectively.

(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	2	11	1548
2	Airtel Ltd	22	49	3850
3	BSNL	12	43	3526
4	Etisalat	0	6	18
5	Idea	6	72	3451
6	Reliance Communication (GSM)	2	7	1615
7	Tata Communications (GSM)	2	11	1548
8	Videocon	1	9	1601
9.	Loop	1	1	4
10	Vodafone	9	46	4096
CDMA Operators				
11.	HFCL (CDMA)	1	2	408
12	Reliance Communication (CDMA)	3	5	1001
13	Tata Communications (CDMA)	3	10	631

(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 (>= 95 %) for both one month data and 3 days live data taken in the month of audit.

CSSR	Aircel	Airtel	BSNL	Etisal	Idea	Rcom	Tata	Video	Voda	Loop	Hfcl(	Rcom	Tata
Live	98.27	99.10	98.59	99.58	97.69	99.64	98.27	98.43	99.68	98.06	99.44	99.20	99.79
Month	97.10	99.13	98.27	98.53	97.40	99.63	97.10	97.76	99.63	97.41	99.41	99.20	99.79
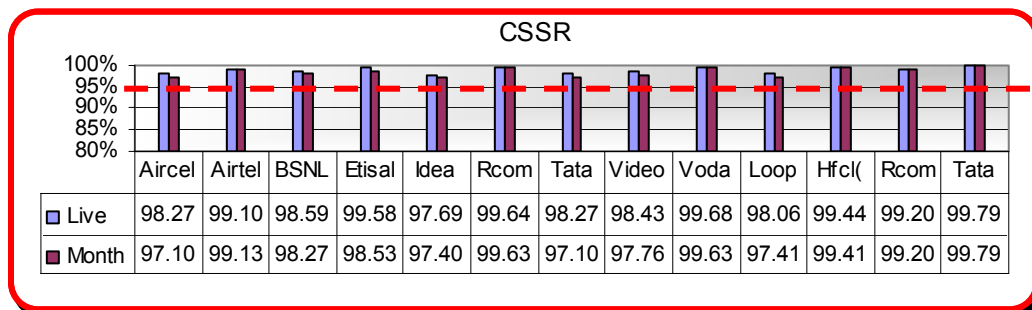
II. Blocked call rate:

SDCCH congestion (%): All operators are meeting the TRAI benchmarks (<= 1 %) for both one month data and 3 days live data taken in the month of audit.
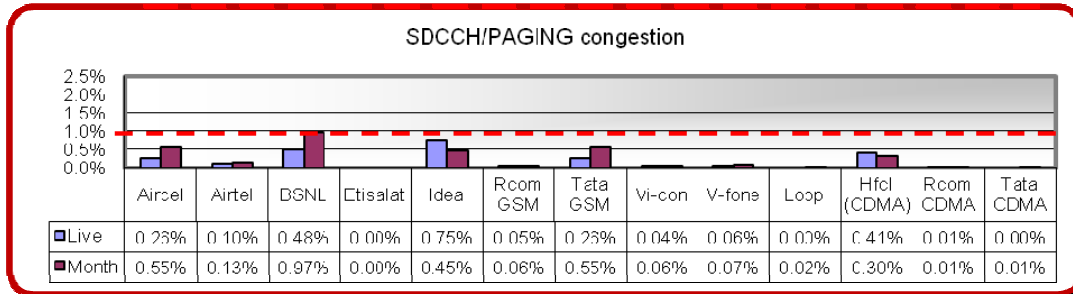
TCH congestion (%): All operators are meeting the TRAI benchmarks (<= 2%) for both one month data and 3 days live data taken in the month of audit.
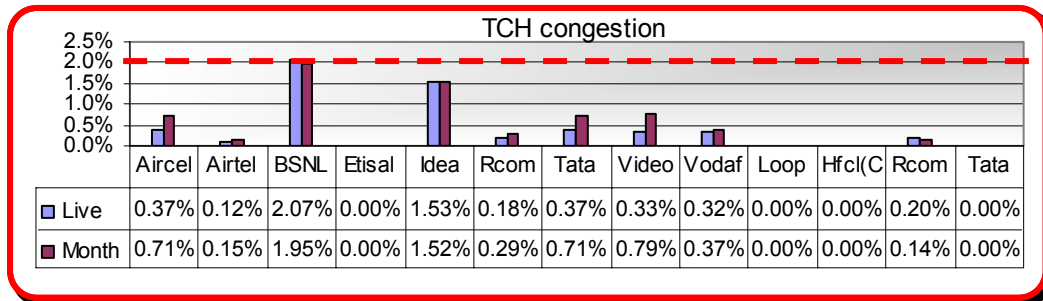
III. Connection Maintainability (Retainability):

Call drop rate (%): All operators are meeting the TRAI benchmarks (<=2%) for both one month data and 3 days live data taken in the month of audit.
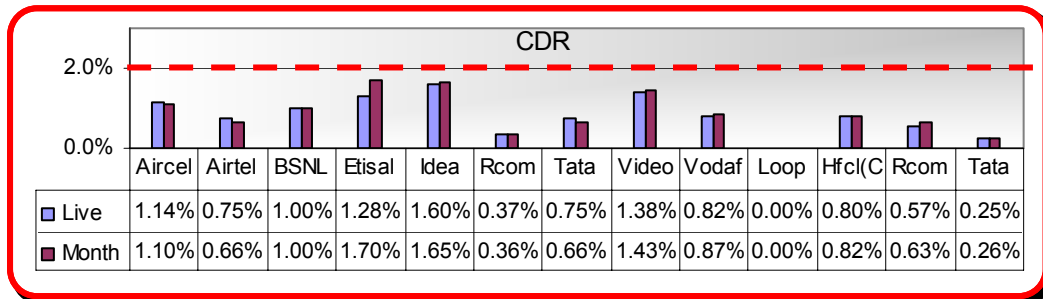
Worst affected Cell exceeding 3% TCH Drop: For both live and month data, Idea with a value of 10.25% and 10.88%, BSNL with a value 13.00% and 12.19%, Etisalat with a value of 19.14% and 20.83% & Aircel with a value 8.72% and 8.67% respectively is found not meeting the benchmark of <=5%. Rests of the operators are meeting the benchmark for both cases.

	Aircel	Airtel	BSNL	Etisal	Idea	Rcom	Tata	Video	Vodaf	Loop	Hfcl(C	Rcom	Tata
Live	8.72%	1.36%	13.00	19.14	10.25	2.41%	1.36%	0.75%	4.19%	0.00%	0.25%	0.17%	0.00%
Month	8.67%	1.28%	12.19	20.83	10.88	2.37%	1.28%	1.15%	4.25%	0.00%	2.70%	0.33%	0.00%

Percentage of connections with good voice quality (benchmark >= 95%): All operators are meeting the TRAI benchmarks (=> 95%) for both one month data and 3 days live data taken in the month of audit.

Connections with good voice quality

	Aircel	Airtel	BSNL	Etisalat	Idea	Rcom GSM	Tata GSM	Videocon	Vodafone	Loop
Live	96.47%	98.98%	95.61%	99.00%	97.24%	97.87%	98.98%	97.31%	97.96%	99.23%
Month	96.61%	98.96%	95.30%	99.25%	97.18%	98.09%	98.96%	97.09%	97.93%	98.86%
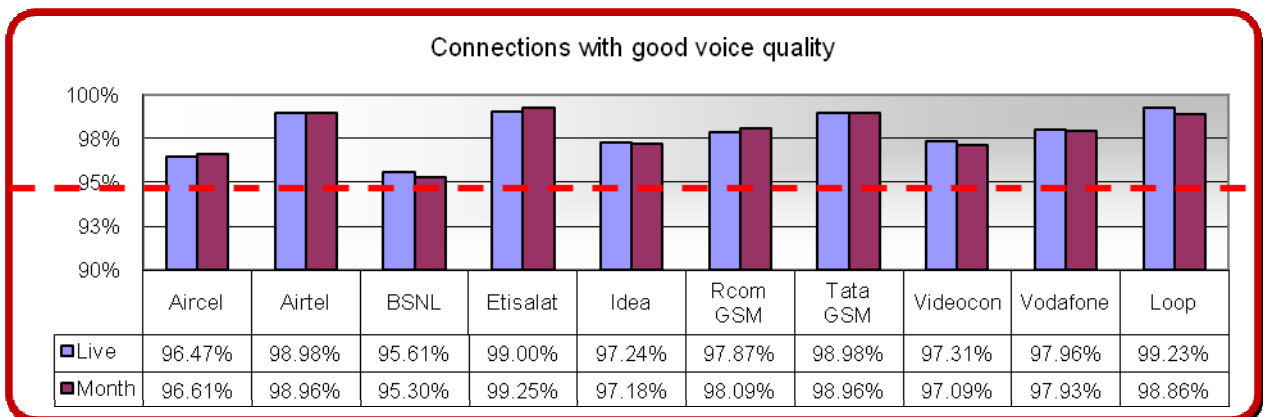
POI Congestion: All operators are meeting the TRAI benchmarks (<= 0.5%) for both one month data and 3 days live data taken in the month of audit.

POI congestion

	Aircel	Airtel	ETIS	Idea	LOOP	BSNL	Rcom	Tata	Video	Voda	HFCL	Rcom	Tata
Live	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
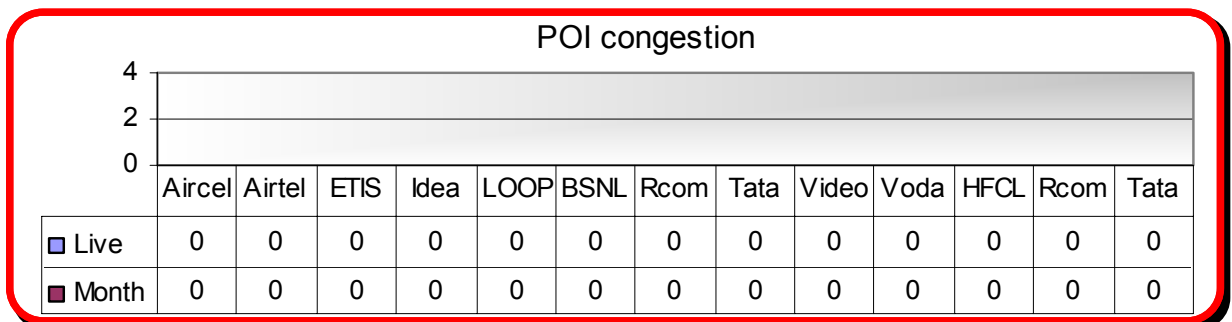
B)   CUSTOMER SERVICE QUALITY PARAMETERS

(A)   Response time to the customer for assistance:

Percentage of call answered (Electronically): All operators are meeting the TRAI benchmarks (>= 95%) for both one month data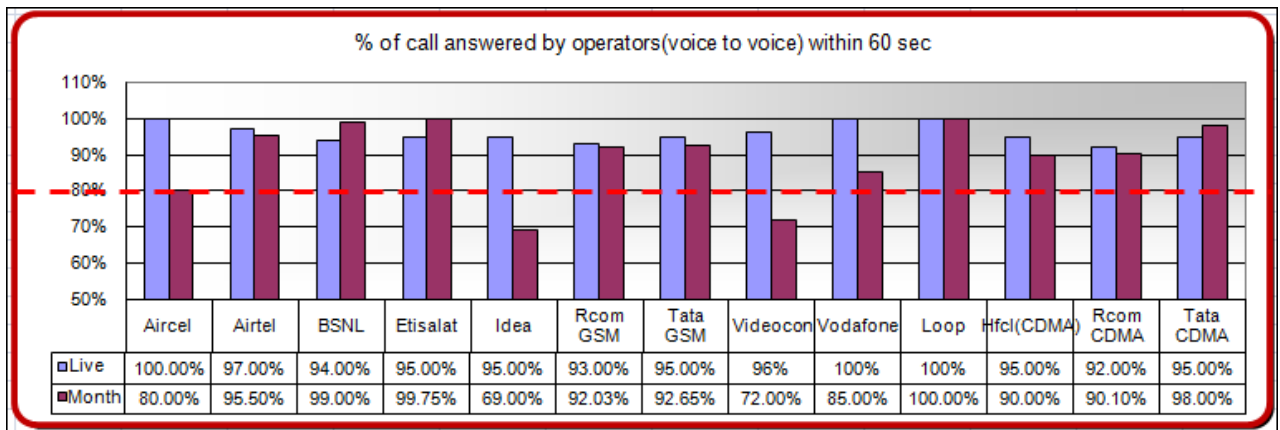 and 3 days live data, except for Aircel in month data audit (91.00%), Rcom CDMA in month data audit (91.26%) . Data has not been provided by Tata-GSM for Month data audit.

Accessibility of call centre/Customer Care

	Aircel	Airtel	BSNL	Etisalat	Idea	Rcom GSM	Tata GSM	Videocon	Vodafone	Loop	Hfcl(CDMA)	Rcom CDMA	Tata CDMA
Live	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100%	100%	100%	100.00%	100.00%	100.00%
Month	91.00%	100.00%	99.00%	100.00%	100.00%	100.00%	96.00%	100.00%	100.00%	100.00%	100.00%	91.26%	96.00%
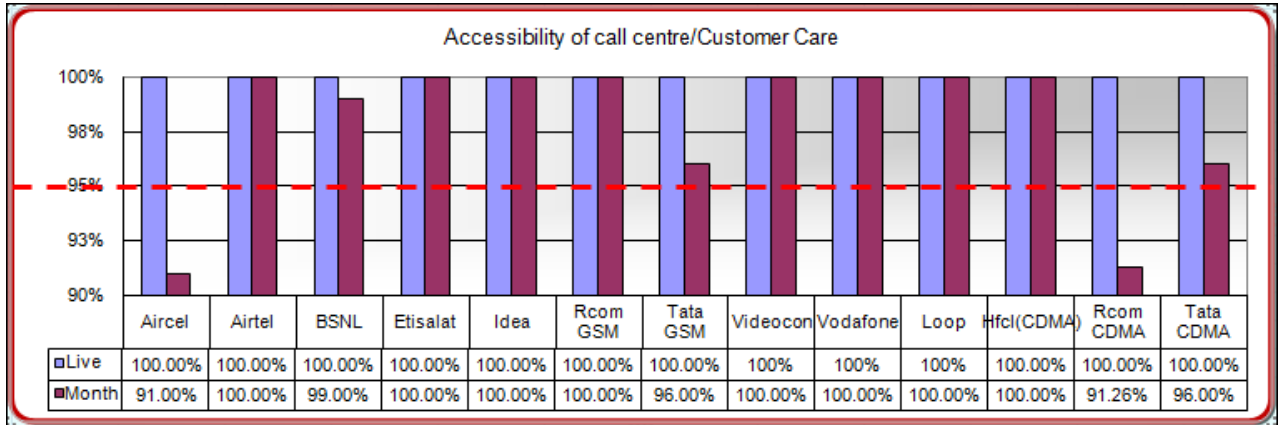
Percentage of call answered by operators (Voice to voice) within 60 sec: For Live data, all operators are not meeting the benchmark. For month data, only Idea & Aircel are not meeting the benchmark. Data has not been provided by Rcom-CDMA, Rcom GSM & TTSL-GSM for month data audit.

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

	Aircel	Airtel	BSNL	Etisalat	Idea	Rcom GSM	Tata GSM	Videocon	Vodafone	Loop	Hfcl(CDMA)	Rcom CDMA	Tata CDMA
Live	100.00%	97.00%	94.00%	95.00%	95.00%	93.00%	95.00%	96%	100%	100%	95.00%	92.00%	95.00%
Month	80.00%	95.50%	99.00%	99.75%	69.00%	92.03%	92.65%	72.00%	85.00%	100.00%	90.00%	90.10%	98.00%

(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, BSNL ,Etisalat, Idea "accessibility of call centre" (Aircel & Rcom-CDMA) and "%age of calls answered by operator" in Aircel , Etisalat, Idea, Videocon & Vodafone 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 (live calling for billing complaints)

Calling Operator	Aircel	Airtel	BSNL	Idea	Reliance (GSM)	Tata (GSM)	Vodafone	Hfcl(CDMA)	Reliance (CDMA)	Tata (CDMA)
Total No. of calls	50	60	8	50	16	20	40	8	50	13
Cases resolved with 4 weeks	50	60	8	50	16	20	40	8	50	13
%age of cases resolved	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%

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

	OPERATORS NAME												
	Aircel	Airtel	BSNL	Etisalat	Idea	Rcom	Tata	Videocon	Vodafone	Loop	HFCL	Rcom	Tata
	GSM										CDMA		
1ST HALF (10AM TO 01 PM)	40	46	47	39	42	46	39	40	39	44	47	39	44
2ND HALF (04PM TO 07 PM)	33	40	39	12	30	34	30	31	30	40	41	40	42
In % age	73.00	86.00	86.00	51.00	72.00	80.00	69.00	71.00	69.00	84.00	88.00	79.00	86.00

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 Chandigarh it was found to be functional.

5)   Critical Analysis

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

(C) Inter operator call assessment

(1) Sample coverage

A sample of 2x50 test calls per Service Providers with in the licensed service area (Punjab 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	BSNL	Etisalat	Idea	Reliance (GSM)	Tata (GSM)	Videocon	Vodafone	Loop	Hfcl(CDMA)	Reliance (CDMA)	Tata (CDMA)
Aircel	-	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Airtel	100%	-	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
BSNL	100%	100%	-	100%	100%	98%	100%	100%	100%	100%	100%	100%	100%
Etisalat	100%	100%	100%	-	100%	100%	100%	100%	100%	100%	100%	97%	100%
Idea	100%	100%	100%	100%	-	100%	100%	100%	100%	100%	100%	100%	100%
Reliance (GSM)	100%	100%	100%	100%	100%	-	100%	100%	100%	100%	100%	100%	100%
Tata (GSM)	97%	96%	100%	100%	100%	97%	-	100%	100%	100%	100%	100%	100%
Videocon	100%	96%	95%	100%	100%	98%	100%	-	98%	100%	100%	100%	99%
Vodafone	99%	100%	100%	100%	100%	100%	100%	100%	-	100%	100%	100%	100%
Loop	100%	100%	100%	100%	100%	98%	100%	100%	100%	-	100%	100%	100%
HFCL	100%	98%	100%	100%	100%	100%	100%	100%	100%	100%	-	100%	100%
Reliance (CDMA)	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	-	100%
Tata (CDMA)	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	-

(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 Punjab 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

LOW DENSE:	Phase-6, Sec-40, PGI-sec-11, Ind Area, Balongi-ph-6.
MEDIUM DENSE:	Sec-38, sec-22, sec-20
HIGH DENSE:	Sec-34, sec-17, Gurudwara, Sec-35, Fire works office.

LUDHIANA

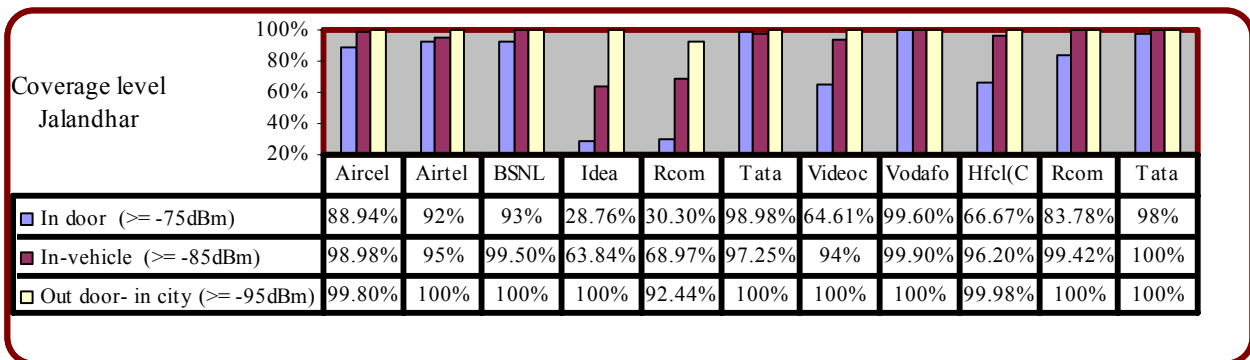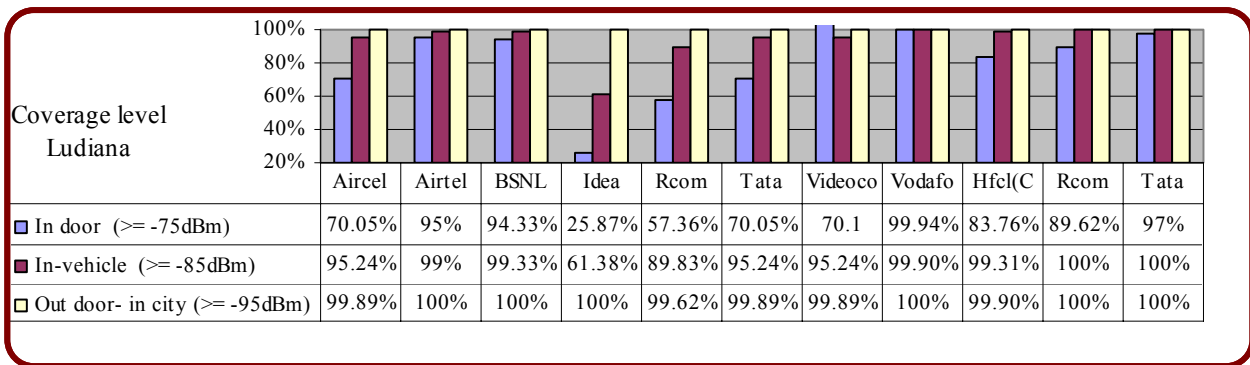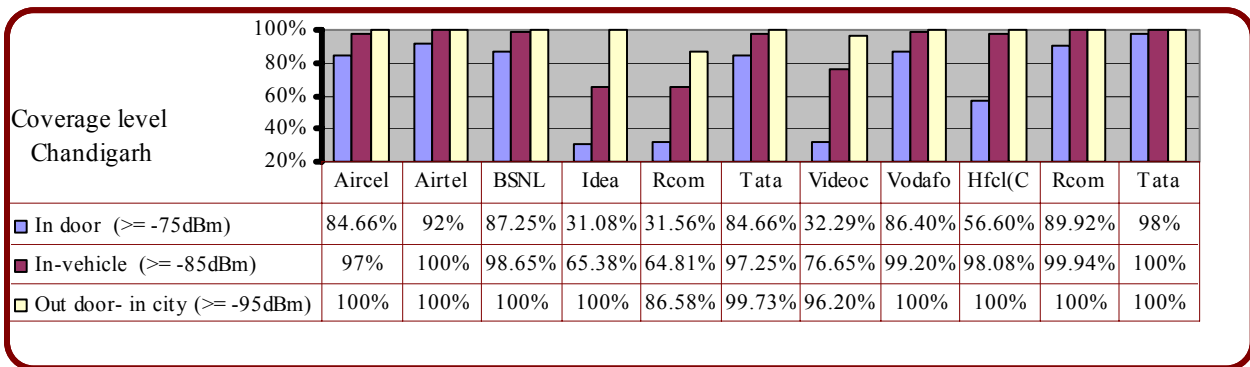|	
LOW DENSE:	Samrala chk, Jamalpur, tibba road, dhandari Rly Stn.
MEDIUM DENSE:	Inder nagar, Sarabha Ngr, mana singh ngr, alpha tower.
HIGH DENSE:	Shivaji Ngr, Hargovind Ngr, Amarpura Rly Stn flyover.

JALANDHAR

LOW DENSE:	DAV college, PAP chowk, Medical Institute.
MEDIUM DENSE:	Nakoder chowk, Kapurthala chowk, Suransi.
HIGH DENSE:	Kapurthala chowk, Rly Station market.

(2)   Performance (for the respective cities)

	Parameter	City Name	Aircel	Airtel	BSNL	Idea	Rcom GSM	Tata GSM	Videocon	Vodafone	Hfcl(CDMA)	Rcom CDMA	Tata CDMA
			GSM Operators								CDMA Operators		
1.1	Call Attempts	Chandigarh	61	72	48	66	51	61	65	58	62	51	75
		Ludhiana	107	72	116	76	153	107	107	102	113	153	113
		Jalandhar	114	66	104	109	83	104	135	121	152	83	111
1.2	Blocked Call Rate (<=3%)	Chandigarh	0.00%	0.00%	2.08%	0.00%	7.70%	0.00%	0.00%	0.00%	0.00%	0%	0.00%
		Ludhiana	0.00%	0.02%	1.72%	0.03%	3.09%	0.00%	0.00%	0.00%	0.00%	3.30%	0.00%
		Jalandhar	0.87%	0.01%	0.00%	0.00%	4.70%	0.01%	0.00%	0.00%	0.00%	6.02%	0.00%
1.3	Dropped Call Rate (<=2%)	Chandigarh	1.63%	0.00%	0.00%	0.00%	6.15%	0.02%	1.53%	1.72%	1.61%	1.96%	1.40%
		Ludhiana	0.01%	0.00%	4.31%	0.00%	1.03%	0.00%	0.93%	0.00%	0.88%	0%	0.00%
		Jalandhar	0.87%	0.00%	0.96%	0.00%	0.93%	0.01%	0%	0.00%	1.31%	6.02%	0.90%
1.4	Percentage of connections with good voice quality (=>95%)												
	(i) 0-4 (w/o frequency hopping)	Chandigarh									97.42%	95.76%	94.26%
		Ludhiana									96.41%	97.10%	94.17%
		Jalandhar									98.76%	96.91%	94.28%
	(ii) 0-5 (with frequency hopping)	Chandigarh	95.00%	96%	97%	97.11%	88.57%	95%	94.52%	95.20%			
		Ludhiana	91%	98%	97%	98.19%	93.35%	91%	93.07%	96%			
		Jalandhar	92%	97%	96.33%	96.67%	96.73%	88.94%	94.47%	98%			
1,5	Service Coverage												
	In door (>= -75dBm)	Chandigarh	84.66%	92%	87.25%	31.08%	31.56%	84.66%	32.29%	86.40%	56.60%	89.92%	98%
		Ludhiana	70.05%	95%	94.33%	25.87%	57.36%	70.05%	70.1	99.94%	83.76%	89.62%	97%
		Jalandhar	88.94%	92%	93%	28.76%	30.30%	98.98%	64.61%	99.60%	66.67%	83.78%	98%
	In-vehicle (>= -85dBm)	Chandigarh	97%	100%	98.65%	65.38%	64.81%	97.25%	76.65%	99.20%	98.08%	99.94%	100%
		Ludhiana	95.24%	99%	99.33%	61.38%	89.83%	95.24%	95.24%	99.90%	99.31%	100%	100%
		Jalandhar	98.98%	95%	99.50%	63.84%	68.97%	97.25%	94%	99.90%	96.20%	99.42%	100%
	Outdoor- in city (>= -95dBm)	Chandigarh	100%	100%	100%	100%	86.58%	99.73%	96.20%	100%	100%	100%	100%
		Ludhiana	99.89%	100%	100%	100%	99.62%	99.89%	99.89%	100%	99.90%	100%	100%
		Jalandhar	99.80%	100%	100%	100%	92.44%	100%	100%	100%	99.98%	100%	100%
1.6	Call Setup Success Rate (>=95%)	Chandigarh	98.40%	100%	100%	100%	95.33%	98.40%	99.12%	100%	99%	99%	100%
		Ludhiana	91%	100%	97%	99.24%	96.91%	98%	93%	100%	99.50%	99.50%	100%
		Jalandhar	99%	100%	99%	100%	95.33%	99.10%	100%	100%	96.18%	96.18%	100%

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Graphical Representation

Coverage level Chandigarh	Aircel	Airtel	BSNL	Idea	Rcom	Tata	Videoc	Vodafo	Hfcl(C	Rcom	Tata
■ In door (>= -75dBm)	84.66%	92%	87.25%	31.08%	31.56%	84.66%	32.29%	86.40%	56.60%	89.92%	98%
■ In-vehicle (>= -85dBm)	97%	100%	98.65%	65.38%	64.81%	97.25%	76.65%	99.20%	98.08%	99.94%	100%
□ Out door- in city (>= -95dBm)	100%	100%	100%	100%	86.58%	99.73%	96.20%	100%	100%	100%	100%

Coverage level Ludiana	Aircel	Airtel	BSNL	Idea	Rcom	Tata	Videoco	Vodafo	Hfcl(C	Rcom	Tata
■ In door (>= -75dBm)	70.05%	95%	94.33%	25.87%	57.36%	70.05%	70.1	99.94%	83.76%	89.62%	97%
■ In-vehicle (>= -85dBm)	95.24%	99%	99.33%	61.38%	89.83%	95.24%	95.24%	99.90%	99.31%	100%	100%
□ Out door- in city (>= -95dBm)	99.89%	100%	100%	100%	99.62%	99.89%	99.89%	100%	99.90%	100%	100%

Coverage level Jalandhar	Aircel	Airtel	BSNL	Idea	Rcom	Tata	Videoc	Vodafo	Hfcl(C	Rcom	Tata
■ In door (>= -75dBm)	88.94%	92%	93%	28.76%	30.30%	98.98%	64.61%	99.60%	66.67%	83.78%	98%
■ In-vehicle (>= -85dBm)	98.98%	95%	99.50%	63.84%	68.97%	97.25%	94%	99.90%	96.20%	99.42%	100%
□ Out door- in city (>= -95dBm)	99.80%	100%	100%	100%	92.44%	100%	100%	100%	99.98%	100%	100%

(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:

Key observations as could be derived from the table are as under:
- Blocked Call Rate benchmark is not met by Rcom GSM in Chandigarh (7.70%), Ludhiana (3.09%)   & Jalandhar (4.70%) as well as Rcom CDMA in Ludhiana (3.30%) & Jalandhar (6.02%).
- Drop call is not met by Rcom GSM in Chandigarh (6.15%), BSNL in Ludhiana (4.31%) & Rcom CDMA in Jalandhar (6.02%).

- Voice quality parameter is not met Aircel in Ludiana (91%) & Jalandhar (92%), Rcom GSM in Chandigarh (88.57%) & Ludhiana (93.35%), Tata GSM in Ludhiana (91%) & Jalandhar (88.94%) as well as Videocon & Tata CDMA in all 3 cities.
- Call setup success rate is not met by Aircel (91%) & Videocon (93%) in Ludhiana.

(E) Independent Drive Test

(1) Sample Coverage

The Independent Drive Test was conducted at Punjab 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

CHANDIGARH

LOW DENSE: Phase-6, Sec-40, PGI-sec-11, Ind Area, Balongi-ph-6.
MEDIUM DENSE: Sec-38, sec-22, sec-20
HIGH DENSE: Sec-34, sec-17, Gurudwara, Sec-35, Fire works office.

LUDHIANA

LOW DENSE: Samrala chk, Jamalpur, tibba road, dhandari Rly Stn.
MEDIUM DENSE: Inder nagar, Sarabha Ngr, mana singh ngr, alpha tower.
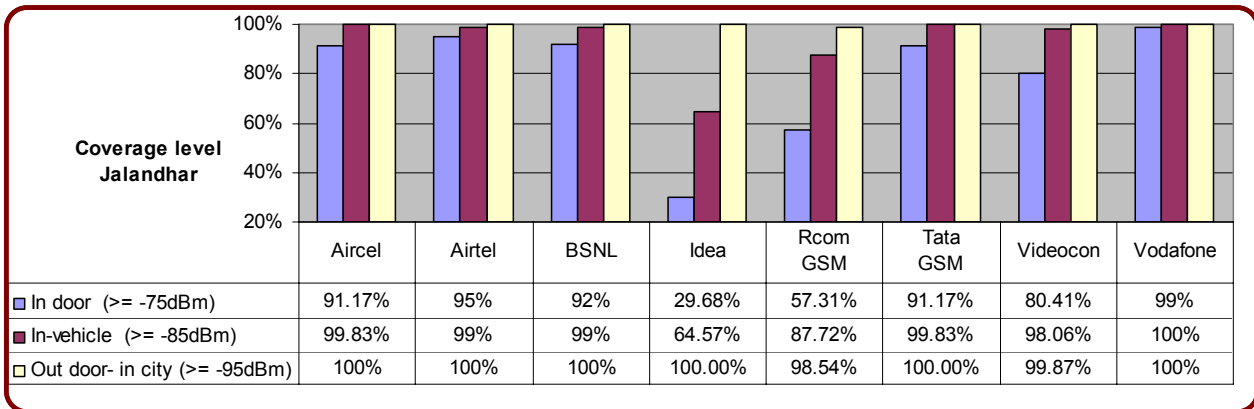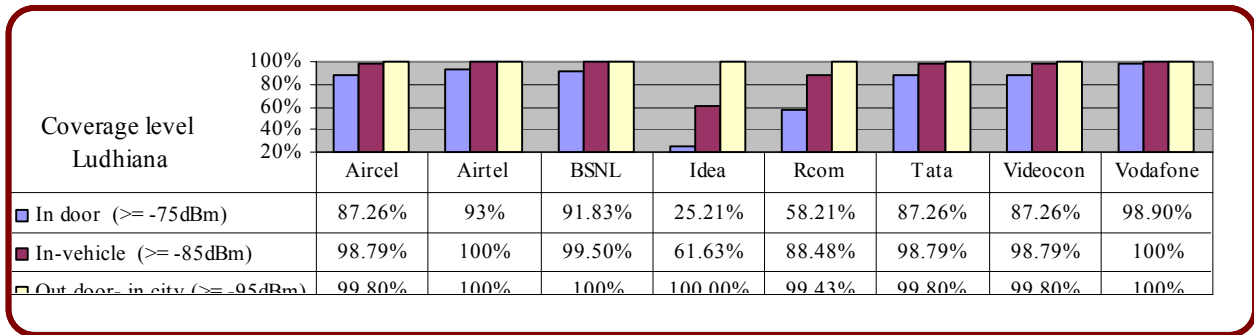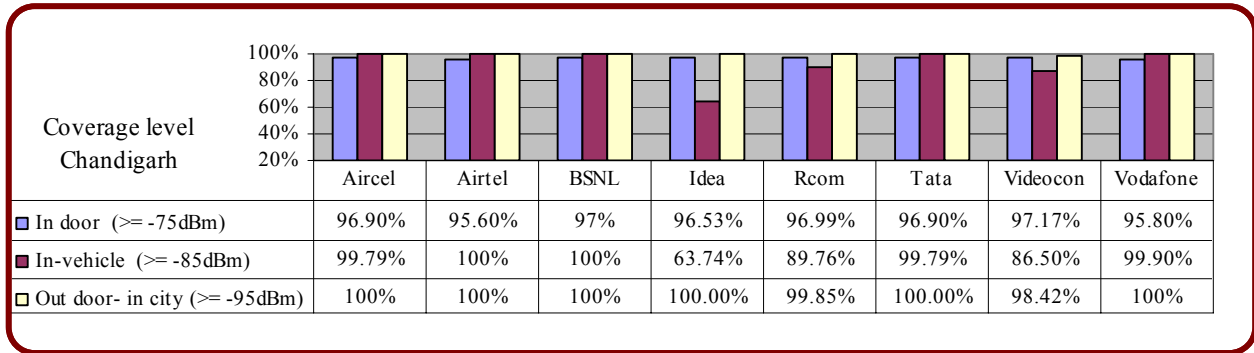HIGH DENSE: Shivaji Ngr, Hargovind Ngr, Amarpura Rly Stn flyover.

JALANDHAR

LOW DENSE: DAV College, PAP chowk, Medical Institute.
MEDIUM DENSE: Nakoder chowk, Kapurthala chowk, Suransi.
HIGH DENSE: Kapurthala chowk, Rly Station market.

Independent Drive Test:

SN	Parameter	City Name	Aircel	Airtel	BSNL	Idea	Rcom GSM	Tata GSM	Videocon	Vodafone
			GSM Operators							
1.1	Blocked Call Rate (<=3%)	Chandigarh	0%	0%	0%	3.92%	3.63%	0%	0.80%	0%
		Ludhiana	0.97%	1.51%	2.32%	0.00%	4.25%	0.20%	0.40%	0%
		Jalandhar	0%	1.40%	0%	0.00%	0%	0%	0.40%	0%
1.2	Dropped Call Rate (<=2%)	Chandigarh	0%	0%	0%	3.92%	0%	0%	0%	0%
		Ludhiana	1.94%	0%	1.16%	0.00%	0%	0.40%	0.77%	0%
		Jalandhar	0%	0%	0%	0.00%	0%	0%	0.40%	0%
1.3	Percentage of connections with good voice quality (=>95%)									
	(i) 0-5 (with frequency hopping)	Chandigarh	96.90%	95.60%	97%	96.53%	96.99%	96.90%	97.17%	95.80%
		Ludhiana	95.16%	96.70%	96.32%	97.33%	97.29%	95.16%	95.16%	96.10%
		Jalandhar	94.50%	97.50%	96%	96.99%	97.10%	94.50%	95%	97.90%
	(ii) 0-4 (w/o frequency hopping)									
1.4	Call Setup Success Rate (>=95%)	Chandigarh	100%	100%	100%	99%	96.36%	100%	100%	100%
		Ludhiana	99.41%	100%	97%	100%	97.29%	99.41%	99%	100%
		Jalandhar	100%	100%	98%	100%	100%	100%	99%	100%

Graphical Representation

Coverage level Chandigarh	Aircel	Airtel	BSNL	Idea	Rcom	Tata	Videocon	Vodafone
■ In door (>= -75dBm)	96.90%	95.60%	97%	96.53%	96.99%	96.90%	97.17%	95.80%
■ In-vehicle (>= -85dBm)	99.79%	100%	100%	63.74%	89.76%	99.79%	86.50%	99.90%
□ Out door- in city (>= -95dBm)	100%	100%	100%	100.00%	99.85%	100.00%	98.42%	100%

Coverage level Ludhiana	Aircel	Airtel	BSNL	Idea	Rcom	Tata	Videocon	Vodafone
■ In door (>= -75dBm)	87.26%	93%	91.83%	25.21%	58.21%	87.26%	87.26%	98.90%
■ In-vehicle (>= -85dBm)	98.79%	100%	99.50%	61.63%	88.48%	98.79%	98.79%	100%
□ Out door- in city (>= -95dBm)	99.80%	100%	100%	100.00%	99.43%	99.80%	99.80%	100%

Coverage level Jalandhar	Aircel	Airtel	BSNL	Idea	Rcom GSM	Tata GSM	Videocon	Vodafone
■ In door (>= -75dBm)	91.17%	95%	92%	29.68%	57.31%	91.17%	80.41%	99%
■ In-vehicle (>= -85dBm)	99.83%	99%	99%	64.57%	87.72%	99.83%	98.06%	100%
□ Out door- in city (>= -95dBm)	100%	100%	100%	100.00%	98.54%	100.00%	99.87%	100%

(3)   Critical Analysis

- Key observations as could be derived from the table are as under:
- Blocked Call rate is not met by Rcom GSM in Chandigarh (3.63%) & Ludhiana (4.25%).and Idea in Chandigarh (3.92%).
- Good Voice Quality parameter is not met by Aircel in Jalandhar (94.5%) and TataGSM (94.5%).
- Dropped Call rate is not met by Idea in Chandigarh (3.92%).
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(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 (Punjab) is by and large satisfactory for **Network Parameters**. However, the benchmark of <=5% for "worst affected cells >3% TCH drop" is not met by Aircel, BSNL, Etisalat & Idea somehow in month or Live 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 not fulfilling TRAI benchmark of >=90%. Apart from this, the "accessibility of call centre" parameter benchmark is not met by Aircel, Rcom CDMA.

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

During **Drive Tests**, high Blocked Call Rates were found in case of RCOM GSM (Chandigarh, Ludhiana, & Jalandhar), RcomCDMA (Ludiana), and also not meeting benchmarks. RcomGSM & Videocon of the GSM operators have below benchmark %age of connections with good voice quality.

III.   Basic Telephone Service (Wireline) Providers
        ……...Audit not done for this quarter

IV.   Broadband Service Providers
        ……...Audit not done for this quarter