

FAREPORT

ON

AUDIT & ASSESSMENT OF QUALITY OF SERVICE

OF

CELLULAR MOBILE TELEPHONE SERVICE

FOR

NORTH ZONE – JAMMU & KASHMIR CIRCLE

Report Period: Jan 2011 – March 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 Jammu & Kashmir circle. But for parameters such as 'Worst affected cell exceeding 3% TCH drop' and 'BTSS accumulated down time' CBBH (Cell Bouncing Busy Hour) was taken instead of TCBH (Time Consistent Busy Hours) as per the TRAI new regulation 2009. This has resulted in high value for 'Cell exceeding 3% TCH drop' parameter for some of the service providers.

CHAPTER-2: EXECUTIVE SUMMARY

I. Preface

This report highlights the findings for the audit & assessment of Quality of Service of Cellular Mobile Services in Jammu & Kashmir 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 Jammu & Kashmir 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	March-2011	1900-2000 Hrs
2	Airtel Ltd	Feb-2011	1900-2000 Hrs
3	BSNL	Jan-2011	1900-2000 Hrs
4	Idea	Feb-2011	1900-2000 Hrs
5	Reliance Communication (GSM)	Jan-2011	1900-2000 Hrs
6	Vodafone	March-2011	1900-2000 Hrs
CDMA Operators			
7	Tata Teleservices (CDMA)	March-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		Bench- mark	Aircel	Airtel	BSNL	Idea	Rcom GSM	Vodafone	Tata CDMA
S/N	Name of Parameter								
1	Connection Establishment (Accessibility)								
	a) CSSR (Call Setup Success Rate)	$\geq 95\%$	97.15%	99.66%	98.00%	98.89%	99.63%	99.83%	99.46%
	b) SDCCH/PAGING congestion	$\leq 1\%$	1.18%	0.12%	0.90%	0.64%	0.06%	0.15%	0.00%
	c) TCH congestion	$\leq 2\%$	2.33%	0.13%	1.90%	0.58%	0.79%	0.17%	0.04%
2	Connection maintenance (retainability)								
	a) CDR	$\leq 2\%$	0.45%	0.87%	1.04%	0.78%	0.33%	0.72%	0.09%
	b) Worst affected cells>3% TCH drop	$\leq 5\%$	2.21%	1.85%	2.72%	6.30%	2.30%	3.63%	0.00%
	c) Good voice quality	$\geq 95\%$	96.03%	96.85%	NA	98.58%	97.14%	97.05%	NA
3	No of POIs having > 0.5% congestion.		1	0	1	0	1	0	0
4	Response time to customers for assistance								
	a) Accessibility of call centre/Customer Care	$\geq 95\%$	100%	96.20%	100%	100%	100%	100%	92%
	b) % call answered by operators(voice to voice) within 60 sec.	$\geq 90\%$	95.30%	93.93%	95.29%	5.33%	94.68%	100.00%	94.60%

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 Idea not meeting the benchmark for “Worst affected cells>3% TCH drop” with the value of 6.30% as well as Aircel which is not meeting the benchmark of SDCCH and TCH congestion with the values of 1.18% and 2.33% respectively.

Performance related to customer care data is found to be satisfactory for most of the operators except Idea especially for the parameter “calls answered by operators (voice-to-voice)”. In Accessibility of call centre parameter only Tata CDMA is not meeting the benchmark.

One Month Data Audit		Bench-mark	Aircel	Airtel	BSNL	Idea	Rcom GSM	Vodafone	Tata CDMA
S/N	Name of Parameter		GSM Operators						
(A)	Network Service Quality Parameter								
1	Network Availability								
	a) BTS Accumulated Downtime	<=2%	0.09%	0.18%	1.90%	0.26%	0.57%	0.00%	0.02%
	b) Worst affected BTSs due to downtime	<=2%	0.17%	0.59%	1.81%	1.49%	1.81%	0.00%	0.00%
2	Connection Establishment (Accessibility)								
	a) CSSR (Call Setup Success Rate)	>=95%	96.73%	99.10%	98.00%	98.92%	99.62%	99.78%	99.40%
	b) SDCCH/PAGING congestion	<=1%	0.28%	0.13%	0.90%	0.31%	0.08%	0.47%	0.00%
	c) TCH congestion	<=2%	2.69%	0.15%	1.90%	0.50%	0.81%	0.22%	0.03%
3	Connection maintenance (retainability)								
	a) CDR	<=2%	0.46%	0.89%	0.97%	0.79%	0.32%	0.79%	0.10%
	b) Worst affected cells>3% TCH drop	<=5%	2.19%	1.88%	3.10%	6.59%	2.78%	2.28%	0.00%
	c) Good voice quality	>=95%	96.07%	96.94%	NA	98.52%	98.92%	96.99%	NA
4	No of POIs having > 0.5% congestion.		1	0	1	0	1	0	0
(B)	Customer Service Quality Parameters								
5	Metering/billing credibility-Post paid	<= 0.1%	0.00%	0.15%	0.03%	0.00%	0.11%	0.01%	0.00%
6	Metering /billing credibility-Pre paid	<= 0.1%	0.02%	0.52%	0.04%	0.00%	0.11%	0.19%	0.50%
7	Resolution of billing/ charging complaints	100% within 4 weeks	100%	100%	100%	100%	100%	100%	100%
	a) Period of applying credit/waiver/adjustment to the customer's account from the date of resolutions of complaints	<=1 week	100%	100%	100%	100%	100%	100%	100%
8	Response time to customers for assistance								
	a) Accessibility of call centre/Customer Care	>=95%	100%	93.78%	100.00%	100.00%	100.00%	100.00%	97.58%
	b) % call answered by operators(voice to voice) within 60 sec.	>=90%	91.32%	87.61%	93.52%	4.37%	83.46%	98.18%	90.00%
9	Termination/closure of service	<=7days	100%	100%	100%	100%	100%	100%	100%
10	Time taken for refunds of deposits after closures.	100% within 60 days	100%	100%	100%	100%	100%	100%	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 for Idea not meeting the benchmark for “Worst affected cells>3% TCH drop” with the value of 6.59%. In TCH congestion parameter only Aircel is not meeting the benchmark.

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 only Airtel, Idea, & Rcom GSM are not meeting the 90% benchmark. A below benchmark performance is observed in case of Airtel (93.78%) and Aircel has not provided data for “accessibility of call centre” parameter. In Post-paid cases Airtel & Rcom GSM are not meeting the benchmark as well as in Prepaid Airtel, Vodafone, Rcom GSM & Tata CDMA are not meeting the benchmark.

Idea is having a very low value of 4.37% in the case of the benchmark “%calls answered by operators (voice to voice) within 60 seconds” as the operator has given the various reasons that this is due to old vendor was on exit path, High Attrition, Call Centre migration under way.

Operator-Assisted Drive Test

The Operator Assisted Drive Test was conducted at Jammu and Kashmir for all the operators. Route covered was about around 100-110Km depending on city areas within the speed limit of 30Km/hr. The cities covered were Jammu and Srinagar. In all the cities, zones were selected for covering different density areas (High, Medium & Low dense areas).

SN	Parameter	City Name	Aircel	Airtel	BSNL	Idea	Rcom GSM	Vodafone	Tata CDMA
			GSM Operators						
1.1	Blocked Call Rate (<=3%)	Jammu	1.36%	1.63%	0%	0%	4.06%	0.01%	0%
		Srinagar	0.75%	1.66%	1.32%	0%	5.40%	0%	0%
1.2	Dropped Call Rate (<=2%)	Jammu	0%	0%	0.75%	0%	1.16%	0%	0%
		Srinagar	0%	0%	0%	0%	0%	0%	0%
1.3	Percentage of connections with good voice quality (=>95%)								
	(i) 0-4 (w/o frequency hopping)	Jammu							96.63%
		Srinagar							94.96%
(ii) 0-5 (with frequency hopping)	Jammu	95.10%	96.50%	96.10%	93.13%	93.51%	96.85%		
	Srinagar	95.00%	95.20%	95.50%	96.73%	92.99%	96.58%		
1.4	Call Setup Success Rate (>=95%)	Jammu	98.64%	98.37%	100.00%	100.00%	95.94%	99.99%	100.00%
		Srinagar	99.25%	98.34%	98.68%	99.99%	94.60%	100.00%	100.00%

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

- Blocked Call Rate benchmark is not met by Rcom GSM in Srinagar (5.40%) & in Jammu (4.06%).
- Good Voice quality parameter is not met by Tata CDMA in Srinagar while as in GSM operators Idea is not meeting in Jammu (93.13%) and Rcom GSM in Jammu (93.51%) & Srinagar (92.99%).
- In Call setup success rate is not met by Rcom GSM in Srinagar.

Independent Drive Test

The Independent Drive Test was conducted at Jammu and Srinagar. Here again, zones were selected for covering different density areas (High, Medium & Low dense areas).

SN	Parameter	City Name	Aircel	Airtel	Idea	Rcom GSM	Vodafone	Tata CDMA
			GSM Operators					
1.1	Blocked Call Rate (<=3%)	Jammu	0%	0%	0%	3.10%	0%	0%
		Srinagar	0%	0%	0%	2.23%	0%	0%
1.2	Dropped Call Rate (<=2%)	Jammu	0%	0%	0%	1.55%	0%	0%
		Srinagar	0%	0%	0%	0%	0%	0%
1.3	Percentage of connections with good voice quality (=>95%)							
	(i) 0-4 (w/o frequency hopping)	Jammu						95.73%
		Srinagar						95.10%
	(ii) 0-5 (with frequency hopping)	Jammu	95.10%	96.30%	96.23%	95.86%	97.33%	
Srinagar		95.30%	95.60%	97.03%	95.29%	98.26%		
1.4	Call Setup Success Rate (>=95%)	Jammu	100.00%	100.00%	100.00%	96.90%	100.00%	100.00%
		Srinagar	100.00%	100.00%	100.00%	97.77%	100.00%	100.00%

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

- Rcom GSM is not meeting the benchmark for Blocked call rate in Jammu.

CHAPTER-3: AUDIT-PMR VERIFICATION

I. Cellular Mobile Telephone Service

PMR		Bench- mark	Audit	Aircel	Airtel	BSNL	Idea	Rcom GSM	Vodafone	Tata CDMA
S/N	Name of Parameter			GSM Operators						
(A)	Network Service Quality Parameter									
1	Network Availability									
	BTS Accumulated Downtime	<=2%	Reported	0.20%	0.15%	1.89%	0.22%	0.35%	0.00%	0.04%
			Verified	0.20%	0.15%	1.89%	0.22%	0.35%	0.00%	0.04%
	Worst affected BTSs due to downtime	<=2%	Reported	1.11%	0.48%	1.90%	1.23%	0.95%	0.00%	0.13%
	Verified		1.11%	0.48%	1.90%	1.23%	0.95%	0.00%	0.13%	
2	Connection Establishment (Accessibility)									
	CSSR (Call Setup Success Rate)	>=95%	Reported	93.65%	99.05%	98.00%	98.54%	99.42%	97.98%	99.41%
			Verified	93.65%	99.05%	98.00%	98.54%	99.42%	97.98%	99.41%
	SDCCH/PAGING congestion	<=1%	Reported	2.47%	0.11%	0.90%	0.17%	0.14%	0.49%	0.00%
			Verified	2.47%	0.11%	0.90%	0.17%	0.14%	0.49%	0.00%
TCH congestion	<=2%	Reported	4.30%	0.09%	1.90%	0.53%	0.54%	1.27%	0.03%	
		Verified	4.30%	0.09%	1.90%	0.53%	0.54%	1.27%	0.03%	
3	Connection maintenance (retainability)									
	CDR	<=2%	Reported	2.34%	0.87%	2.00%	1.65%	0.43%	1.48%	0.61%
			Verified	2.34%	0.87%	2.00%	1.65%	0.43%	1.48%	0.61%
	Worst affected cells>3% TCH drop	<=5%	Reported	19.11%	1.39%	4.83%	11.28%	2.16%	3.01%	0.43%
			Verified	19.11%	1.39%	4.83%	11.28%	2.16%	3.01%	0.43%
Good voice quality	>=95%	Reported	91.74%	98.53%	98.00%	97.15%	98.04%	97.90%	99.26%	
		Verified	91.74%	98.53%	98.00%	97.15%	98.04%	97.90%	99.26%	
4	No. of POI's having >0.5% Congestion		Reported	3	0	0	0	0	0	0
			Verified	3	0	0	0	0	0	0
(B)	Customer Service Quality Parameters									
5	Metering/billing credibility-Post paid	<= 0.1%	Reported	0.00%	0.02%	0.01%	0.01%	0.02%	0.04%	0.03%
			Verified	0.00%	0.02%	0.01%	0.01%	0.02%	0.04%	0.03%
6	Metering /billing credibility-Pre paid	<= 0.1%	Reported	0.04%	0.03%	0.06%	0.01%	0.04%	0.02%	0.09%
			Verified	0.04%	0.03%	0.06%	0.01%	0.04%	0.02%	0.09%
7	Resolution of billing/ charging complaints	100% within 4 weeks	Reported	100%	100%	92%	100%	100%	100%	100%
			Verified	100%	100%	92%	100%	100%	100%	100%
	Period of applying credit/waiver/adjustment to the customers account from the date of resolutions of complaints	<=1 week	Reported	100%	100%	100%	100%	100%	100%	100%
			Verified	100%	100%	100%	100%	100%	100%	100%

PMR		Bench- mark	Audit	Aircel	Airtel	BSNL	Idea	Reom GSM	Vodafone	Tata CDMA
S/N	Name of Parameter									
GSM Operators										
8	Response time to customers for assistance									
	Accessibility of call centre/Customer Care	>=95%	Reported	100.00%	88.00%	100.00%	92.00%	NR	100%	97%
			Verified	100.00%	88.00%	100.00%	92.00%	NR	100%	97%
	% call answered by operators(voice to voice) within 60 sec.	>=90%	Reported	88.30%	77.60%	91.00%	92.33%	91.00%	96.57%	90.36%
Verified			88.30%	77.60%	91.00%	92.33%	91.00%	96.57%	90.36%	
9	Termination/closure of service									
	No.of requests for Termination / Closure of service complied within 7 days during the quarter	<=7days	Reported	100%	100%	100%	100%	100%	100%	100%
			Verified	100%	100%	100%	100%	100%	100%	100%
10	Time taken for refunds of deposits after closures.	100% within 60 days	Reported	100%	100%	100%	95%	100%	100%	95%
			Verified	100%	100%	100%	95%	100%	100%	95%

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.
- In case of POI congestion, only Aircel (3 POI's) are not meeting the benchmark.
- BSNL is not meeting the benchmark for "Resolution of billing/ charging complaints within 4 weeks".
- Accessibility of Airtel's and Idea's Customer Care Centre is not meeting with a value of (88%) and (92%) respectively.
- "% call answered by operators (voice to voice) within 60 sec." benchmark is not met by Aircel and Airtel.
- Tata-CDMA and Idea are not meeting the 60 days' benchmark for "Refund of deposits after closure of connection".

CHAPTER-4: DETAILED FINDINGS & ANALYSIS

I. Cellular Mobile Telephone Service

(A) MSC Audit

(1) 3 Days Live Data Assessment & Summarized Findings

S/N	Name of Parameter	Benchmark	Aircel	Airtel	BSNL	Idea	Rcom GSM	Vodafone	Tata CDMA
			GSM Operators						
A	Network Service Quality Parameter								
1	Connection Establishment (Accessibility)								
	a) CSSR	>=95%	97.15%	99.66%	98.00%	98.89%	99.63%	99.83%	99.46%
	b) SDCCH/PAGING congestion	<=1%	1.18%	0.12%	0.90%	0.64%	0.06%	0.15%	0.00%
	c) TCH congestion	<=2%	2.33%	0.13%	1.90%	0.58%	0.79%	0.17%	0.04%
2	Connection maintenance								
	a) CDR	<=2%	0.45%	0.87%	1.04%	0.78%	0.33%	0.72%	0.09%
	b) Cells having > 3% TCH drop	<=5%	2.21%	1.85%	2.72%	6.30%	2.30%	3.63%	0.00%
	c) Good voice quality	>=95%	96.03%	96.85%	NA	98.58%	97.14%	97.05%	NA
	d) No. of cells > 3% TCH drop		388	458	383	548	191	699	0
	e) Total no. of cells in the network		5195	6952	2909	1160	2322	2822	829
3	No of POIs having > 0.5% congestion		1	0	1	0	1	0	0
	a) Name of POI not meeting the benchmark		L1 TAX LOCAL TG	Nil	L1 TAX Jammu	Nil	BSNL JMMF LM1T1B	Nil	Nil
	b) Total No. of circuits on POI		53258	56324	33885	130930	7146	59280	8393
	c) Avg No. of call attempts on POI		45652	38522	31065	73981	7588	12888	46183
	d) Avg traffic served on POI (Erlang)		623	798	437	1842	168.85	190	1895
	e) Total number of working POI Service Area wise		45	34	7	14	21	36	38
	f) Equipped Capacity of Network in respect of Traffic in erlang		115905	128183	61000	9859	27233	21363	33989
	g) Total traffic handled in TCBH in erlang		51607	79970	59003	3265	25575	14820	8911

S/N	Name of Parameter	Benchmark	Aircel	Airtel	BSNL	Idea	Rcom GSM	Vodafone	Tata CDMA
			GSM Operators						
(B)	Customer Service Quality Parameters								
4	Response time to customers for assistance								
	a) Accessibility of call centre	>=95%	100%	96.20%	100%	100%	100%	100%	92.00%
	b) % of call answered by operators(voice to voice) within 60 sec	>=90%	95.30%	93.93%	95.29%	5.33%	94.68%	100.00%	94.60%
	c) No. of call attempts to call centre / customer care nos. during TCBH (Avg)		130	131	131	112	112	100	105
	d) No. of calls connected and answered successfully to call centre / customer care nos. during TCBH (Avg)		124	123	125	6	106	100	96

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 Jammu & Kashmir Service Area are as given below:-

- **Call setup success rate (benchmark $\geq 95\%$):** All operators are meeting the benchmark with values lying between 97.15% and 99.83%.
- **SDCCH/PAGING Channel congestion (benchmark $\leq 1\%$):** Except for Aircel with a value of 1.18% , rest of the operators are meeting the benchmark with values lying between 0% and 0.90%.
Note: CDMA operators have provided the data for Paging Channel congestion and GSM operators provided SDCCH Channel congestion.
- **TCH congestion (benchmark $\leq 2\%$):** Except for Aircel with a value of 2.33% rest of the operators are meeting the benchmark with values lying between 0.04% and 1.90%.
- **Call drop rate (benchmark $\leq 2\%$):** All operators are meeting the benchmark with values lying between 0.09% and 1.04%.
- **Cell exceeding 3% TCH drop (benchmark $\leq 5\%$):** Except for Idea with a value of 6.30%, rests of the operators are satisfying the benchmark with value in between 0% and 3.63%.
- **Connections with good voice quality (benchmark $\geq 95\%$):** All the GSM operators are meeting the benchmark with values lying between 96.03% and 100%. Except BSNL has not provided the data. CDMA service provided has not given this parameter, because of not system generated.
- **No. of POI's having $>0.5\%$ Congestion:** Except for BSNL, Aircel and Rcom GSM with congestion in 1 POI each respectively. Rest all the operators are meeting the benchmark with value in between 0% and 0.06%. 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, all operators are meeting the benchmark with values lying between 96.20% to 100%.
- **%age of call answered by operator (Voice to voice) (benchmark $>90\%$):** Except for Idea, all the operators are meeting the benchmark.

(2) Month Data Assessment & Summarized Findings

S/N	Name of Parameter	Benchmark	Aircel	Airtel	BSNL	Idea	Rcom GSM	Vodafone	Tata CDMA
			GSM Operators						
(A)	Network Service Quality Parameter								
1	Network Availability								
	a) BTS Accumulated Downtime	<=2%	0.09%	0.18%	1.90%	0.26%	0.57%	0.00%	0.02%
	b) Worst affected BTSs due to downtime	<=2%	0.17%	0.59%	1.81%	1.49%	1.81%	0.00%	0.00%
	c) Total no. of BTSs in the licensed service area		1,755	2383	1049	402	774	1018	263
	d) Sum of downtime of BTSs in a month in hours i.e. total outage time of all BTSs in hours during a month		1126	2948.23	14865	753.89	3,258	0	32
	e) No. of BTSs having accumulated downtime of >24 hours in a month		3	14	19	6	14	0	0
2	Connection Establishment (Accessibility)								
	a) CSSR (Call Setup Success Rate)	>=95%	96.73%	99.10%	98.00%	98.92%	99.62%	99.78%	99.40%
	b) SDCCH/PAGING congestion	<=1%	0.28%	0.13%	0.90%	0.31%	0.08%	0.47%	0.00%
	c) TCH congestion	<=2%	2.69%	0.15%	1.90%	0.50%	0.81%	0.22%	0.03%
3	Connection maintenance (retainability)								
	a) CDR	<=2%	0.46%	0.89%	0.97%	0.79%	0.32%	0.79%	0.10%
	b) Worst affected cells>3% TCH drop	<=5%	2.19%	1.88%	3.10%	6.59%	2.78%	2.28%	0.00%
	c) Good voice quality	>=95%	96.07%	96.94%	NA	98.52%	98.92%	96.99%	NA
	d) Total No. of cells exceeding 3% TCH drop (call drop)		385	465	366	573	231	438	0
	e) Total no. of cells in the network		5195	6952	2909	1160	2322	2822	829

S/N	Name of Parameter	Benchmark	Aircel	Airtel	BSNL	Idea	Rcom GSM	Vodafone	Tata CDMA
			GSM Operators						
4	No of POIs having >0.5% congestion		1	0	1	0	1	0	0
	a) Name of POI not meeting the benchmark		L1 TAX LOCAL TG	Nil	L1 TAX Jammu	Nil	BSNL JMMF LMIT1B	Nil	Nil
	b) Total No. of call attempts on POI (Avg.)		44738	50387	31917	70030	7350	13341	39334
	c) Total traffic served on POI (Erlang) (Avg.)		642	794	488	1,798	171	198	1,568
	d) Total No. of circuits on POI		53258	56324	33885	130930	7146	59280	8393
	e) Total number of working POI Service Area wise		45	34	7	14	21	36	38
	f) Capacity of POI		52232	54894	27108	118983	6488	56818	7375
5	Network Data								
	a) Equipped Capacity of Network Erlang		115905	128183	61000	9859	27233	21363	33989
	b) Total traffic in TCBH in erlang (Avg.)		51607	79970	59003	3265	25575	14820	8911
	c) Total no. of customers served (as per VLR) on last day of the month		1323005	1506650	NR	91924	NR	372076	62697
(B)	Customer Service Quality Parameters								
6	Metering/billing credibility-Post paid	$\leq 0.1\%$	0.00%	0.15%	0.03%	0.00%	0.11%	0.01%	0.00%
	a) No. of bills issued during the period		1,01,084	55,421	796988	7,253	29,429	21,262	46,244
	b) No. of bills disputed including billing complaints during the period		0	81	253	0	33	3	1
7	Metering /billing credibility-Pre paid	$\leq 0.1\%$	0.02%	0.52%	0.04%	0.00%	0.11%	0.19%	0.50%
	a) No. of charging / credit / validity complaints during the quarter		31	11,640	245	4	47	75	341
	b) Total no. of pre-paid customers at the end of the quarter		15,10,995	22,26,371	546,245	85,983	4,43,965	4,03,194	67,586

S/N	Name of Parameter	Benchmark	Aircel	Airtel	BSNL	Idea	Rcom GSM	Vodafone	Tata CDMA
			GSM Operators						
8	Resolution of billing/ charging complaints	<i>100% within 4 weeks</i>	100%	100%	100%	100%	100.0%	100%	100%
	a) No. of billing/(post paid) and charging, credit/validity (pre paid) complaints resolved within 4 weeks during the quarter		31	11,721	1068	478	80	78	342
	b) Total no. of billing (post paid) and charging, credit / validity (pre paid) complaints received during the quarter		31	11,721	1068	478	80	78	342
	c) No. of billing complaints (post paid) and charging, credit/ validity complaints (pre paid) resolved in favour of the customer during the quarter		31	189	1058	399	19	39	342
	d) No. of complaints disposed on account of not considered as valid complaints during the quarter		0	11,532	10	79	61	39	33
	e) Period of applying credit/waiver/adjustment to the customers account from the date of resolutions of complaints	<i><=1 week</i>	100%	100%	100%	100%	100%	100%	100%
9	Response time to customers for assistance								
	a) Accessibility of call centre/Customer Care	<i>>=95%</i>	100%	93.78%	100%	100%	100%	100%	97.58%
	b) % call answered by operators(voice to voice) within 60 sec.	<i>>=90%</i>	91.32%	87.61%	93.52%	4.37%	83.46%	98.18%	90.00%
	c) Total no. of call attempts to call centre & customer care nos. during TCBH (Avg.).		4,18,655	71,09,564	13,036	1,93,665	2,76,637	42676	63,054
	d) No. of calls connected and answered successfully to call centre & customer care nos. during TCBH (Avg.).		418655	66,67,837	13,036	1,93,665	2,76,637	42676	61,534

S/N	Name of Parameter	Benchmark	Aircel	Airtel	BSNL	Idea	Rcom GSM	Vodafone	Tata CDMA
			GSM Operators						
10	Termination/closure of service	<i><=7days</i>							
	a) Total No. of requests for Termination / Closure of service received during the quarter		171	318	NR	784	106	41	451
	b) No.of requests for Termination / Closure of service complied within 7 days during the quarter		171	318	NR	784	106	41	451
11	Time taken for refunds of deposits after closures.	<i>100% within 60 days</i>	100%	100%	NR	100%	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 Jammu & Kashmir Service Area are as given below:-

- **BTS accumulated downtime (benchmark $\leq 2\%$):** All operators are meeting the benchmark with values lying between 0% and 1.90%.
- **Worst affected BTSs due to downtime (benchmark $\leq 2\%$):** All operators are meeting the benchmark with values lying between 0% and 1.81%.
- **Call setup success rate (benchmark $\geq 95\%$):** All operators are meeting the benchmark with values lying between 96.73% and 99.78%.
- **SDCCH/PAGING Channel congestion (benchmark $\leq 1\%$):** All operators are meeting the benchmark with values lying between 0% and 0.90%.
Note: CDMA operators have provided the data for Paging Channel congestion and GSM operators provided SDCCH Channel congestion.
- **TCH congestion (benchmark $\leq 2\%$):** Except Aircel with a value of 2.69% rest of the operators are meeting the benchmark with values lying between 0.03% and 1.90%.
- **Call drop rate (benchmark $\leq 2\%$):** All operators are meeting the benchmark with values lying between 0.10% and 0.97%.
- **Cell exceeding 3% TCH drop (benchmark $\leq 5\%$):** Except Idea with a value of 6.59%, all the operators are satisfying the benchmark with value in between 0% and 3.10%.
- **Connections with good voice quality (benchmark $\geq 95\%$):** All the operators are meeting the benchmark with values lying between 96.07% and 100%. Except for BSNL which has not provided the data.
- **No. of POI's having $>0.5\%$ Congestion :** Except for Aircel, BSNL and Rcom GSM with the congestion in 1 POI each respectively ,rest of the operators are meeting the benchmark with value in between 0% and 0.39%. 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 Airtel with a value of 93.78%, all operators are meeting the benchmark with values lying between 97.58% to 100%. Aircel has not provided the data for this parameter due to some upgradation reason from Nortel to Cisco system.
- **%age of call answered by operator (Voice to voice) (benchmark $>90\%$):** Only Airtel, BSNL, Vodafone & Tata-CDMA are meeting the benchmark with values of 91.32%, 93.52% , 98.18% & 90.00% respectively. Values range from 4.37% to 87.61% for other operators.
- **Metering and billing credibility-Post paid (benchmark $\leq 0.1\%$):** Except Airtel & Rcom-GSM with values of 0.15% & 0.11% respectively, all other operators are meeting the benchmark.
- **Metering and billing credibility-Pre paid (benchmark $\leq 0.1\%$):** Except Airtel, Rcom GSM, Vodafone & Tata CDMA with value of 0.52%, 0.11%, 0.19% & 0.50% respectively, all the operators are meeting the benchmark with values lying between 0% and 0.02%.
- **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. Data has not been provided by BSNL.
- **Time taken for refunds of deposits after closures (benchmark 100% within ≤ 60 days):** Except for Tata with a value of 97% rest of the operators have satisfied the benchmark.

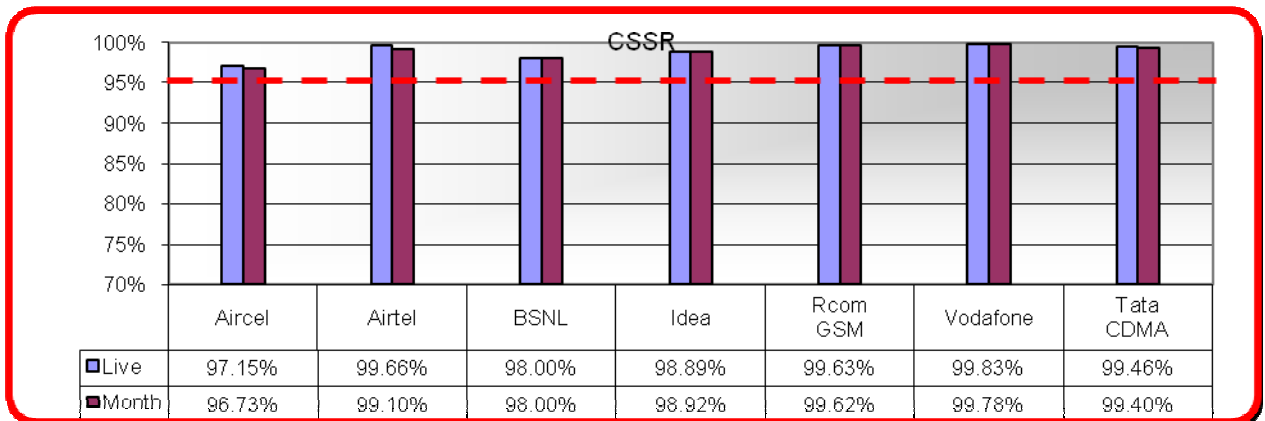
(1) Sample Coverage

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	4	21	1755
2	Airtel Ltd	11	26	2383
3	BSNL	5	20	1049
4	Idea	1	2	402
5	Reliance Communication (GSM)	2	5	774
6	Vodafone	2	12	1018
CDMA Operators				
7	Tata Communications (CDMA)	1	2	263

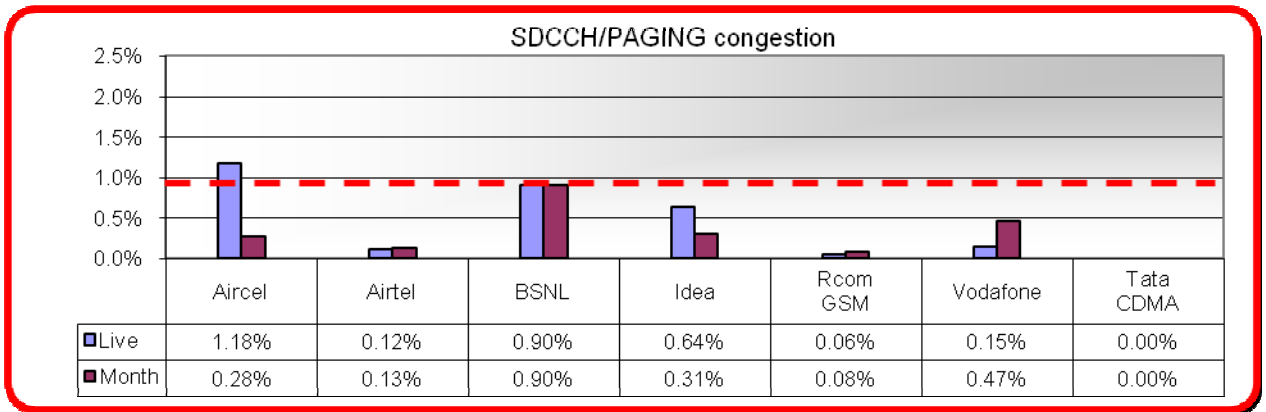
(2) Performance (Graphical Representation)**Comparison between Live measurements and One month data Audit – Cellular Mobile Telephone Services****A) NETWORK PERFORMANCE**

- 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.

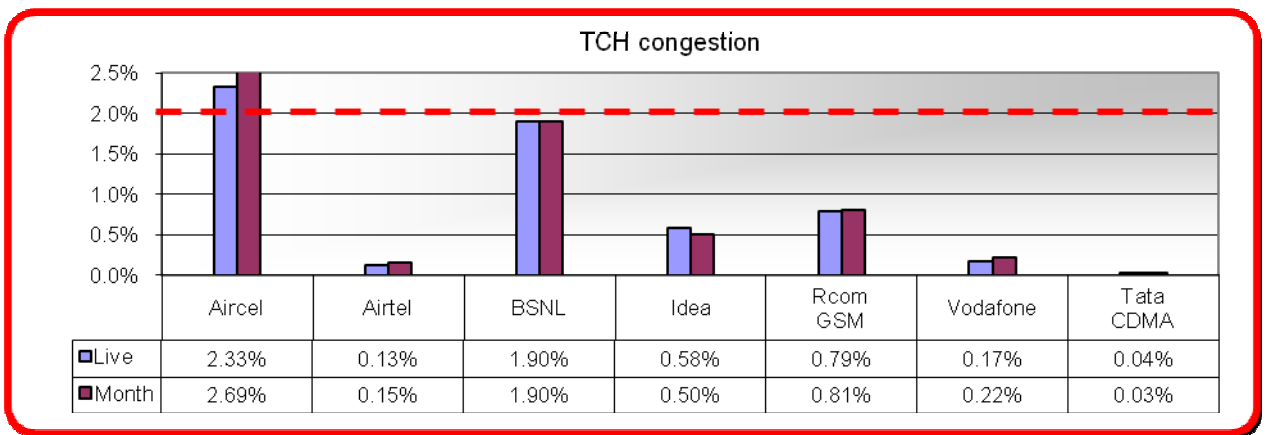


II. Blocked call rate:

SDCCH congestion (%): For month data except for Aircel, 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.

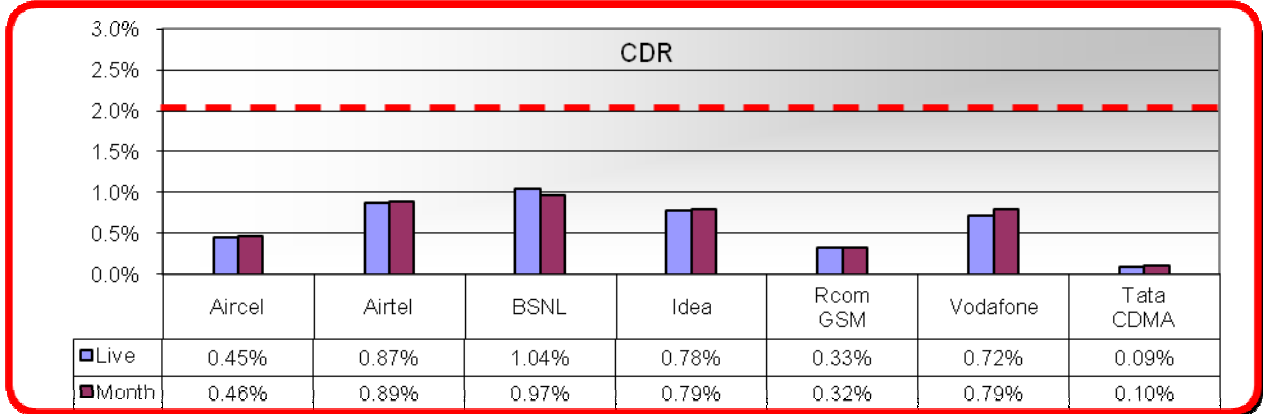


TCH congestion (%): For both live & month data, except for Aircel, All other operators are meeting the TRAI benchmarks ($\leq 2\%$) for both one month data and 3 days live data taken in the month of audit.

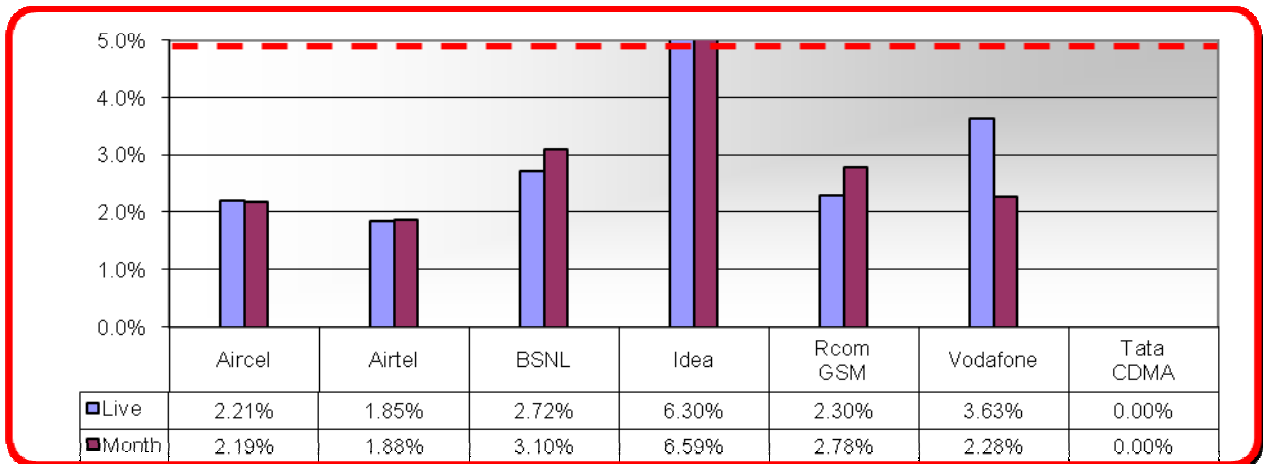


III. Connection Maintainability (Retainability):

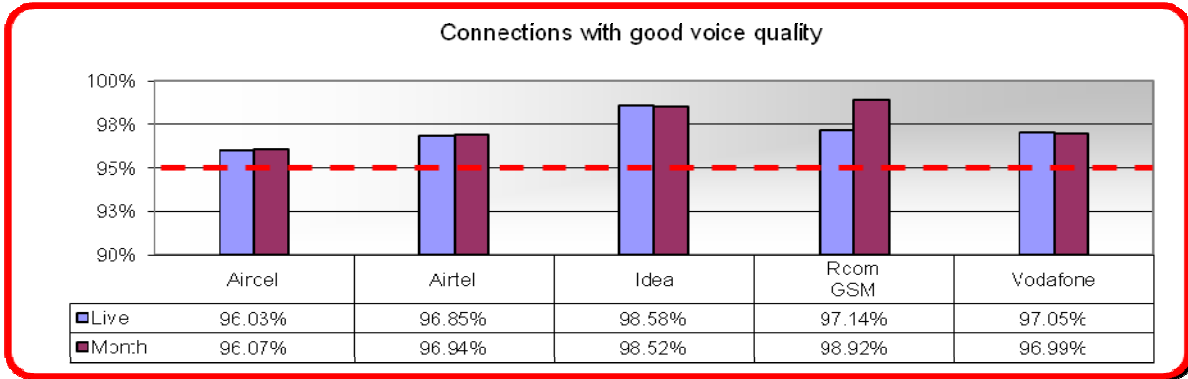
Call drop rate (%): All operators are meeting the TRAI benchmarks ($\leq 2\%$) for both one month data and 3 days live data taken in the month of audit.



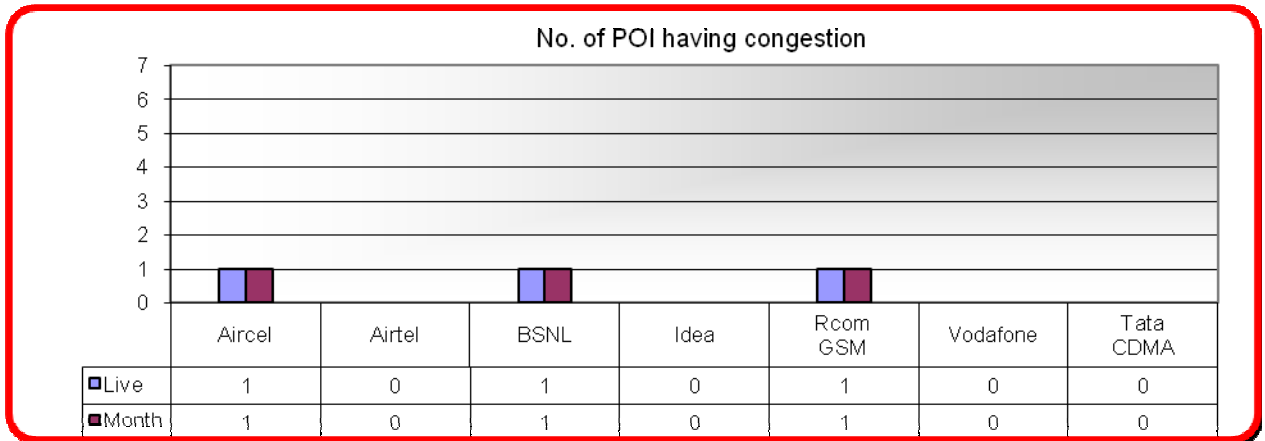
Worst affected Cell exceeding 3% TCH Drop: For both live and month data, Idea with a value of 6.30% and 6.59% respectively is found not meeting the benchmark of $\leq 5\%$. Rests of the operators are meeting the benchmark for both cases.



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. For BSNL and TATA CDMA, values are not system generated.



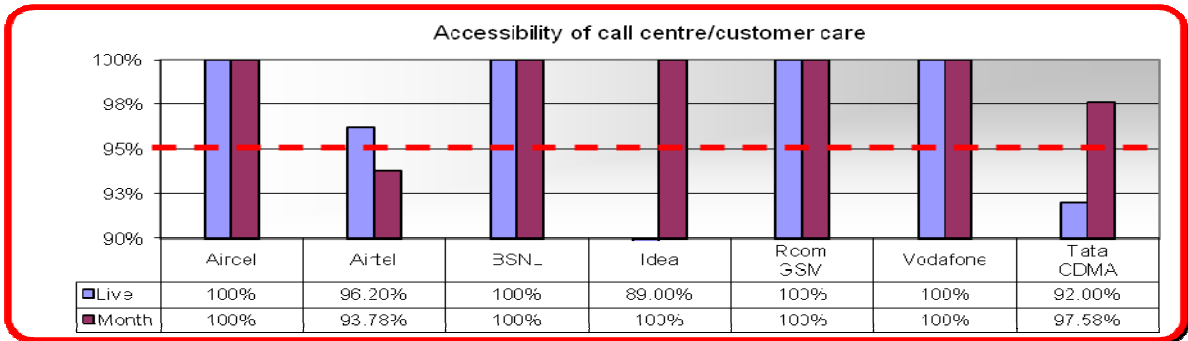
No. of POI's having $> 0.5\%$ Congestion: Except Aircel, BSNL and Rcom GSM (both live & month data) having congestion in 1 POI each respectively, rest all other operators are meeting the TRAI benchmarks ($\leq 0.5\%$) for both one month data and 3 days live data taken in the month of audit.



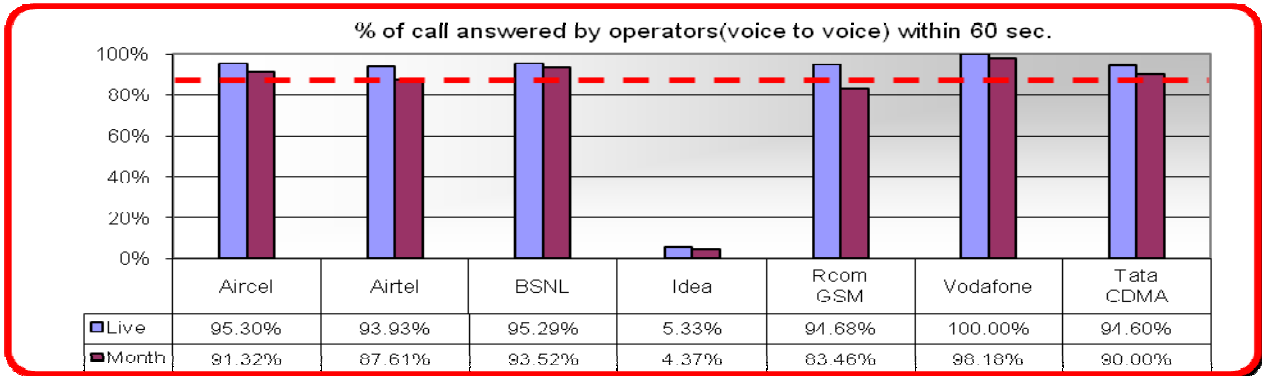
B) CUSTOMER SERVICE QUALITY PARAMETERS

(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 and 3 days live data taken in the month of audit except for Airtel in month data audit (93.78%) and Tata-CDMA in live data audit (92%).



Percentage of call answered by operators (Voice to voice) within 60 sec: For Live data, only Airtel (month data), Idea (month and Live data) & Reliance-GSM (month data) are not meeting the benchmark. Rest all other operators are meeting benchmark for both live and month data audit.



(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 “POI congestion” (Aircel & BSNL), “accessibility of call centre” (Airtel & Tata CDMA) and “%age of calls answered by operator” (Airtel, Idea & Reliance GSM).

(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)	Vodafone	Tata (CDMA)
Total No. of calls	9	10	8	11	7	10	6
Cases resolved with 4 weeks	9	10	8	11	7	10	6
%age of cases resolved	100%	100%	100%	100%	100%	100%	100%

(3) Live calling to call center:

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

	OPERATORS NAME						
	Aircel	Airtel	BSNL	Idea	Rcom	Vodafone	Tata
	GSM						CDMA
1ST HALF (10AM TO 01 PM)	40	39	46	45	45	47	44
2ND HALF (04PM TO 07 PM)	37	31	38	36	38	36	39
In % age	77.00	70.00	84.00	81.00	83.00	83.00	83.00

- (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 Jammu 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 (Jammu & Kashmir 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	Idea	Reliance (GSM)	Vodafone	Tata (CDMA)
Aircel	-	98%	99%	100%	100%	100%	100%
Airtel	100%	-	100%	100%	100%	100%	100%
BSNL	100%	99%	-	100%	98%	100%	100%
Idea	100%	100%	100%	-	100%	100%	100%
Reliance (GSM)	100%	100%	97%	100%	-	100%	100%
Vodafone	99%	100%	97%	100%	98%	-	100%
Tata (CDMA)	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 Jammu & Kashmir for all the operators. Route covered was about around 100-110Km depending on city areas within the speed limit of 30Km/hr.

Drive Test Locations

JAMMU

LOW DENSE: Airport, Satwari, BSF camp.
MEDIUM DENSE: Gandhi Nagar, Channi Himmat, Trikuta Nagar.
HIGH DENSE: Bahuplaza, PTU, Bikram chowk, Jeewal Chowk, Bus Stand, Raghunath Bazaar.

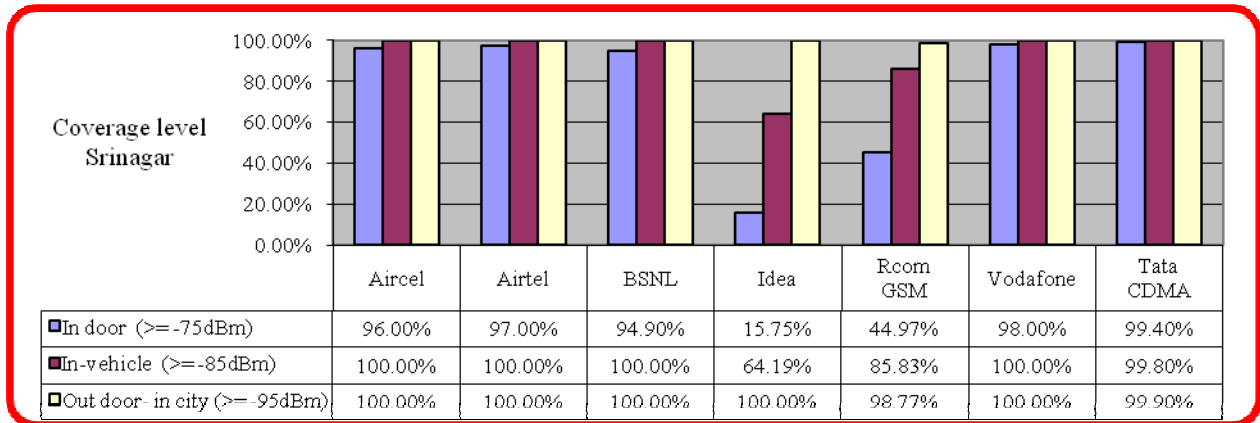
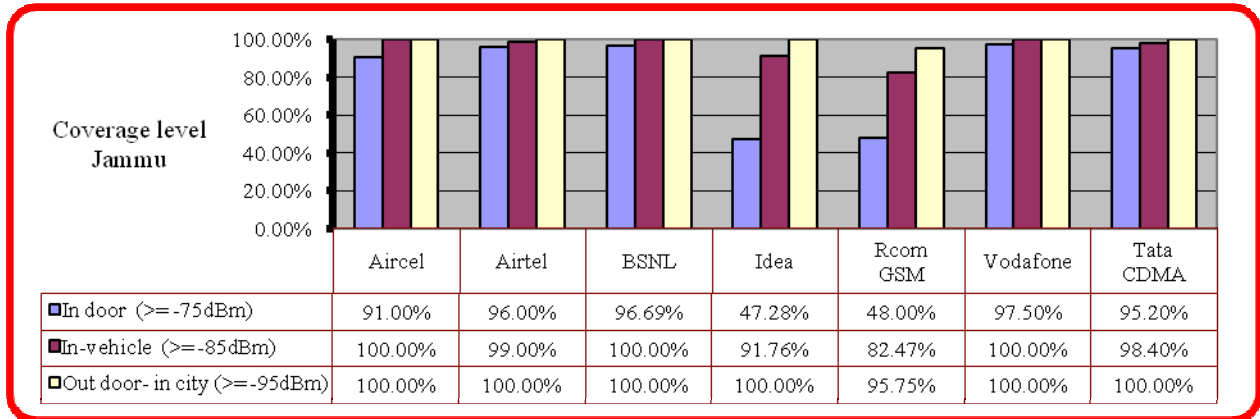
SRINAGAR

LOW DENSE: Pantha Chowk to Law Arpor.
MEDIUM DENSE: Karan Nagar, Nowhata, Soura, Lal Bazar.
HIGH DENSE: Hyderpora, Bemina, Lal Chowk.

2) Performance (for the respective cities)

SN	Parameter	City Name	Aircel	Airtel	BSNL	Idea	Rcom GSM	Vodafone	Tata CDMA
			GSM Operators						
1.1	Call Attempts	Jammu	147	122	132	163	172	159	151
		Srinagar	132	120	151	154	148	117	132
1.2	Blocked Call Rate (<=3%)	Jammu	1.36%	1.63%	0%	0%	4.06%	0.01%	0%
		Srinagar	0.75%	1.66%	1.32%	0%	5.40%	0%	0%
1.3	Dropped Call Rate (<=2%)	Jammu	0%	0%	0.75%	0%	1.16%	0%	0%
		Srinagar	0%	0%	0%	0%	0%	0%	0%
1.4	Percentage of connections with good voice quality (=>95%)								
	(i) 0-4 (w/o frequency hopping)	Jammu							96.63%
		Srinagar							94.96%
	(ii) 0-5 (with frequency hopping)	Jammu	95.10%	96.50%	96.10%	93.13%	93.51%	96.85%	
Srinagar		95.00%	95.20%	95.50%	96.73%	92.99%	96.58%		
1.5	Service Coverage								
	In door (>= -75dBm)	Jammu	91.00%	96.00%	96.69%	47.28%	48.00%	97.50%	95.20%
		Srinagar	96.00%	97.00%	94.90%	15.75%	44.97%	98.00%	99.40%
	In-vehicle (>= -85dBm)	Jammu	100%	99%	100%	91.76%	82.47%	100%	98.40%
		Srinagar	100%	100%	100%	64.19%	85.83%	100%	99.80%
	Out door- in city (>= -95dBm)	Jammu	100%	100%	100%	100%	95.75%	100%	100%
Srinagar		100%	100%	100%	100%	98.77%	100%	99.90%	
1.6	Call Setup Success Rate (>=95%)	Jammu	98.64%	98.37%	100%	100%	95.94%	99.99%	100%
		Srinagar	99.25%	98.34%	98.68%	99.99%	94.60%	100.00%	100%

Graphical Representation



(3) Critical Analysis

The drive test data was found to be satisfactory for most of the parameters. However, a few deviations found are listed below:

- Blocked Call Rate benchmark is not met by Rcom GSM in Srinagar (5.40%) & in Jammu (4.06%).
- Good Voice quality parameter is not met by Tata CDMA in Srinagar while as in GSM operators Idea is not meeting in Jammu (93.13%) and Rcom GSM in Jammu (93.51%) & Srinagar (92.99%).
- In Call setup success rate is not met by Rcom GSM in Srinagar.

(E) Independent Drive Test

(1) Sample Coverage

The Independent Drive Test was conducted at Jammu & Kashmir after operators assisted drive test was over for respective operators. Route cover was about around 100-110Km depending on city areas within the speed limit of 30Km/hr.

Drive Test Locations

JAMMU

LOW DENSE: Airport, Satwari, BSF camp.
MEDIUM DENSE: Gandhi Nagar, Channi Himmat, Trikuta Nagar.
HIGH DENSE: Bahuplaza, PTU, Bikram Chowk, Jeewal Chowk, Bus Stand, Raghunath Bazaar.

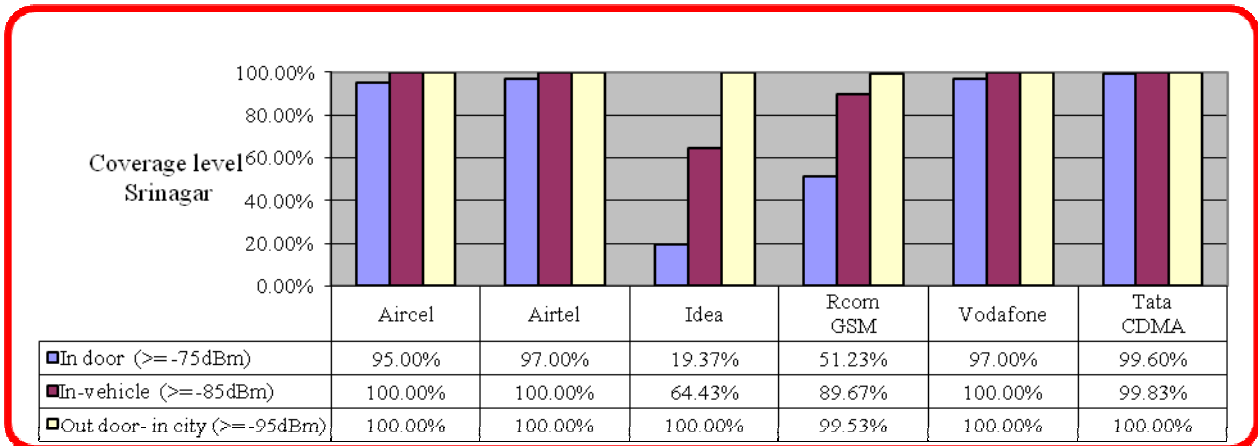
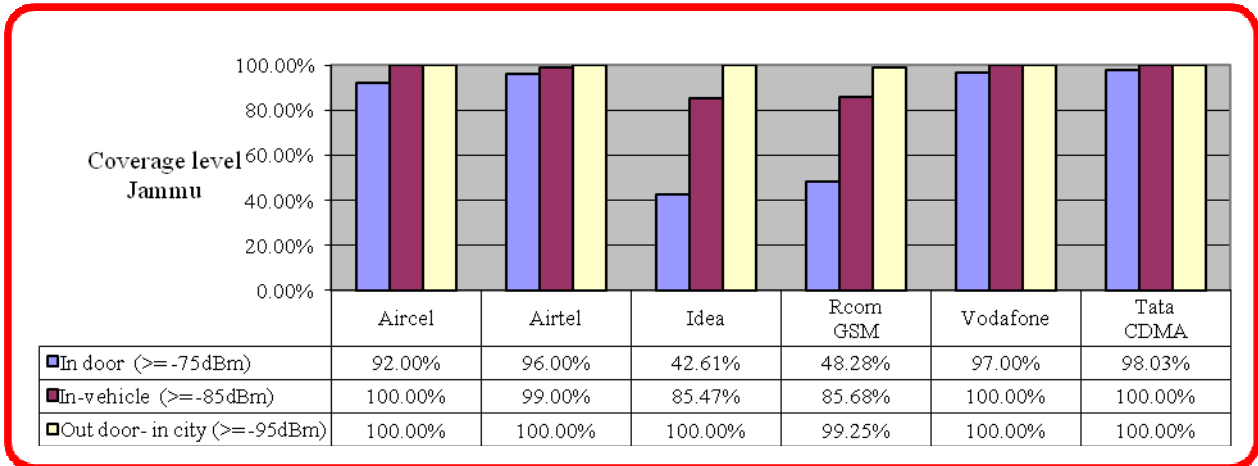
SRINAGAR

LOW DENSE: Pantha Chowk to Law Arpor.
MEDIUM DENSE: Karan Nagar, Nowhata, Soura,Lal Bazar.
HIGH DENSE: Hyderpora, Bemina,Lal Chowk.

2) Performance (for the respective cities)

SN	Parameter	City Name	Aircel	Airtel	Idea	Rcom GSM	Vodafone	Tata CDMA
			GSM Operators					
1.1	Call Attempts	Jammu	153	107	137	129	150	87
		Srinagar	164	77	129	134	115	95
1.2	Blocked Call Rate (<=3%)	Jammu	0%	0%	0%	3.10%	0%	0%
		Srinagar	0%	0%	0%	2.23%	0%	0%
1.3	Dropped Call Rate (<=2%)	Jammu	0%	0%	0%	1.55%	0%	0%
		Srinagar	0%	0%	0%	0%	0%	0%
1.4	Percentage of connections with good voice quality (=>95%)							
	(i) 0-4 (w/o frequency hopping)	Jammu						95.73
		Srinagar						95.10
	(ii) 0-5 (with frequency hopping)	Jammu	95.10	96.30	96.23	95.86	97.33	
Srinagar		95.30	95.60	97.03	95.29	98.26		
1.5	Service Coverage							
	In door (>= -75dBm)	Jammu	92.00%	96.00%	42.61%	48.28%	97.00%	98.03%
		Srinagar	95.00%	97.00%	19.37%	51.23%	97.00%	99.60%
	In-vehicle (>= -85dBm)	Jammu	100.00%	99.00%	85.47%	85.68%	100%	100%
		Srinagar	100.00%	100.00%	64.43%	89.67%	100%	99.83%
	Out door- in city (>= -95dBm)	Jammu	100%	100%	100%	99.25%	100%	100%
Srinagar		100%	100%	100%	99.53%	100%	100%	
1.6	Call Setup Success Rate (>=95%)	Jammu	100%	100%	100%	96.90%	100%	100%
		Srinagar	100%	100%	100%	97.77%	100%	100%

Graphical Representation



(3) Critical Analysis

- Rcom GSM is not meeting the benchmark of Blocked call rate.
- Rest all the operators are meeting the prescribed Benchmark in both cities.

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

From live, month, PMR and Drive Tests findings, it can be concluded that on an average, performance of the operators in the service area (Jammu & Kashmir) 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 Idea (6.59% & 6.30% 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 not fulfilling TRAI benchmark of $\geq 90\%$. Apart from this, the “accessibility of call centre” parameter benchmark is not met by Airtel(month data), Idea and Tata CDMA(live data).

Regarding **Metering/Billing Credibility** issues, Airtel and Rcom GSM shows below benchmark value for both Pre-paid & Post-paid connections. Similar results are found for Vodafone & Tata CDMA for pre-paid connections.

During **Drive Tests**, high Blocked Call Rates were found in case of Rcom GSM (Jammu and Srinagar). Most of the GSM operators have below benchmark %age of connections with good voice quality. Rcom GSM is seen to have 94.59% CSSR in Srinagar which is less than the TRAI benchmark of 95%.

III. Basic Telephone Service (Wireline) Providers

.....Audit not done for this quarter

IV. Broadband Service Providers

.....Audit not done for this quarter