

**REPORT
ON
AUDIT & ASSESSMENT OF QUALITY OF
SERVICE
OF
CELLULAR MOBILE TELEPHONE SERVICE
FOR
NORTH ZONE – JAMMU & KASHMIR CIRCLE**

Report Period: April 2012 - June 2012

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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 (Wire line) 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 wire line, Cellular Mobile Telephone Services and broadband service. TCIL has undertaken the following audit works as per the Terms of Reference (TOR):

- i) Verification of the data submitted by the service providers to TRAI as part of QoS monitoring reports i.e. Quarterly Performance Monitoring Reports (PMRs) and monthly Point of Interconnection (POI) Congestion Reports with reference to the records maintained by the service provider.
- ii) Verification of the performance of service providers against the Quality of Service benchmarks laid down by TRAI using live measurement for 3 days during the month in which the audit and assessment is carried out.
- iii) Verification of the performance of service providers against the Quality of Service benchmarks laid down by TRAI using the data for the entire month during which the live measurement is carried out.
- iv) Drive tests of the mobile networks both operators assisted and independent drive test (as and where required).
- v) Billing and call center's data verification.
- vi) Live testing of the efficiency of the call center / customer care help line.
- vii) Emergency (Level 1) call testing done.

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

Systems audited:-

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

Facilities audited:-

1. Billing documents.
2. Customer Care records.

Field data collections carried out:-

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

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

- ✓ TCIL auditors visited all the NSS (Network Sub System) and BSS (Base-station Sub System) to check data for all the operators in their respective service area.
- ✓ All the NSS and BSS data for the relevant details were collected either directly from the centralized NOC or through a remote access to the NOC.
- ✓ The Radio parameters were audited/verified from the data collected from OMC-R (Operation and Maintenance Center – Radio, as part of BSS data).
- ✓ The Drive test was conducted in high, low and medium dense areas including highways, commercial complex and residential areas and special attention was paid for the areas for which TRAI has received complaints.
- ✓ The POI and other network related parameters were audited/verified from the data collected from the OMC-S (Operation and Maintenance Center – Switch as part of NSS data).
- ✓ The data related to Billing and Customer care was checked for the previous month and verified with the customers by calling them on random basis. The process of registration and handling of the complaints was also studied for the various operators. Call centre number were called for measuring the efficiency of the call centre.
- ✓ The inter operator call assessment test was carried out during the time period as is specified in the tender document. TCBH (Time Consistent Busy Hour) is taken after observation of the traffic consistently for 3 days prior to the audit activity.
- ✓ Data has been collected for busy hour of network in case of live assessment & month of audit for all service providers & verified that service providers are providing busy hour data only for QoS service. We found that TCBH hour is matching with network busy hour as provided by service providers for 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 2nd quarter (April – June 2012). The primary data collection and verification of records (PMR data verification – quarterly) maintained by various operators was undertaken for the period Oct– Dec 2011.

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

S/N	Name of Service Provider	Month of Audit	TCBH Hour
GSM Operators			
1	Aircel Ltd	May 2012	1900-2000 Hrs
2	Airtel Ltd	May 2012	1900-2000 Hrs
3	BSNL	May 2012	1900-2000 Hrs
4	Idea	May 2012	1900-2000 Hrs
5	Reliance Communication (GSM)	May 2012	1900-2000 Hrs
6	Vodafone	May 2012	1900-2000 Hrs
CDMA Operators			
7	Tata Communications	May 2012	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		GSM Operators						
1	Network Availability								
	a) BTS Accumulated Downtime	<=2%	1.02%	0.02%	1.23%	0.08%	0.38%	0.01%	0.00%
	b) Worst affected BTSs due to downtime	<=2%	0.66%	0.00%	0.36%	0.61%	0.00%	0.00%	0.00%
	Connection Establishment (Accessibility)								
	a) CSSR (Call Setup Success Rate)	>=95%	96.15%	99.20%	97.44%	98.98%	99.54%	98.86%	98.98%
	b) SDCCH/PAGING congestion	<=1%	0.39%	0.07%	0.77%	0.40%	0.01%	0.21%	0.00%
	c) TCH congestion	<=2%	2.97%	0.10%	1.73%	0.53%	0.08%	0.63%	0.19%
2	Connection maintenance (retainability)								
	a) CDR	<=2%	1.99%	0.73%	1.71%	1.26%	0.51%	0.92%	1.11%
	b) Worst affected cells>3% TCH drop	<=3%	2.94%	1.38%	0.75%	1.93%	0.14%	2.79%	2.10%
	c) Good voice quality	>=95%	95.69%	98.83%	NA	95.92%	98.53%	97.06%	NA
3	No. of POI's having congestion >0.5%		0	0	0	0	0	0	0
4	Response time to customers for assistance								
	a) Accessibility of call centre/Customer Care	>=95%	98.00%	99.00%	100%	100%	99.01%	100%	100%
	b) % call answered by operators(voice to voice) within 60 sec.	>=90%	97.66%	93.77%	64.65%	95.84%	96.90%	99.88%	96.0%

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 except parameter “TCH congestion” Aircel is not meeting the benchmark.. CDMA operators Tata & BSNL has declared that “Good voice quality” data was not system generated.

Performance related to customer care data is found to be satisfactory for most of the operators except parameter “% call answered by operators(voice to voice) within 60 sec” BSNL is not meeting the benchmark.

Month data assessment

One Month Data Audit		Bench-mark	Aircel	Airtel	BSNL	Idea	Rcom GSM	Vodafone	Tata CDMA
S/N	Name of Parameter		GSM Operators						CDMA
(A)	Network Service Quality Parameter								
1	Network Availability								
	a) BTS Accumulated Downtime	<=2%	1.67%	0.05%	0.12%	0.01%	0.37%	0.01%	0.06%
	b) Worst affected BTSs due to downtime	<=2%	13.86%	0.04%	0.62%	0.61%	1.59%	0.00%	0.00%
2	Connection Establishment (Accessibility)								
	a) CSSR (Call Setup Success Rate)	>=95%	95.91%	99.29%	96.96%	99.01%	99.53%	98.86%	98.58%
	b) SDCCH/PAGING congestion	<=1%	0.37%	0.07%	0.78%	0.47%	0.03%	0.13%	0.00%
	c) TCH congestion	<=2%	1.96%	0.07%	1.66%	0.49%	0.08%	0.66%	0.62%
3	Connection maintenance (retainability)								
	a) CDR	<=2%	1.92%	0.69%	1.70%	1.25%	0.52%	0.98%	1.05%
	b) Worst affected cells>3% TCH drop	<=3%	2.76%	1.34%	0.72%	2.44%	0.13%	2.82%	2.03%
	c) Good voice quality	>=95%	95.82%	98.89%	NA	95.96%	98.56%	97.14%	NA
4	No. of POI's having congestion >0.5%		0	0	0	0	0	0	0
(B)	Customer Service Quality Parameters								

5	Metering/billing credibility-Post paid	$\leq 0.1\%$	0.002%	0.003%	0.005%	0.01%	0.01%	0.02%	0.00%
6	Metering /billing credibility-Pre paid	$\leq 0.1\%$	0.001%	0.003%	0.05%	0.01%	0.10%	0.04%	0.01%
7	Resolution of billing/ charging complaints (within 4 weeks)	100%	100%	100%	100.0%	100%	100%	100%	100%
	a) Period of applying credit/waiver/adjustment to the customers account from the date of resolutions of complaints	≤ 1 week	100%	100%	100%	100%	100%	100%	100%
8	Response time to customers for assistance								
	a) Accessibility of call centre/Customer Care	$\geq 95\%$	98.00%	99.30%	100%	100%	98.99%	100%	99.03%
	b) % call answered by operators(voice to voice) within 60 sec.	$\geq 90\%$	96.36%	86.13%	64.98%	94.99%	96.37%	98.21%	97.95%
9	Termination/closure of service	≤ 7 days	100%	100%	100%	100%	100%	100%	100%
10	Time taken for refunds of deposits after closures. (within 60 days)	100%	100%	100%	100%	100%	100%	100%	100%

NA: Not Applicable, NR: Not Received

From the month data assessment, it is found that all the operators are meeting the network parameters, except for Aircel which is not meeting the benchmark for parameter “Worst affected BTSs due to downtime”. BSNL & TATA CDMA has declared that “Good voice quality” parameter was not system generated.

Performance related to customer care data is found to be satisfactory for most of the operators for the parameter “calls answered by operators (voice-to-voice)” BM is not meet by Airtel & BSNL.

Operator-Assisted Drive Test

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	137	93	106	152	102	141	114
		Srinagar	108	117	172	156	118	135	145
		Pulwama	100	85	103	53	86	86	74
1.2	Blocked Call Rate (<=3%)	Jammu	0.00%	0.00%	1.89%	0.00%	0.00%	0.71%	0.00%
		Srinagar	0.00%	0.00%	4.65%	3.21%	0.85%	2.22%	0.00%
		Pulwama	0.00%	0.00%	4.85%	0.00%	3.49%	2.33%	0.00%
1.3	Dropped Call Rate (<=2%)	Jammu	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
		Srinagar	0.00%	0.00%	4.07%	0.00%	0.00%	0.00%	0.00%
		Pulwama	0.00%	0.00%	3.88%	0.00%	0.00%	0.00%	0.00%
1.4	Percentage of connections with good voice quality (=>95%)								
	(i) 0-4 (w/o frequency hopping)	Jammu							97.76
		Srinagar							97.53
		Pulwama							93.65

		Jammu	95.10	96.30	96.40	96.90	97.70	97.10	
	(ii) 0-5 (with frequency hopping)	Srinagar	95.80	98.20	93.10	95.26	94.92	98.30	
		Pulwama	96.13	97.50	92.60	97.57	98.20	99.20	
	Service Coverage (%)								
1.5	In door (≥ -75 dBm)	Jammu	79.33	94.03	86.49	36.08	77.00	96.66	99.59
		Srinagar	52.67	87.20	69.30	74.16	75.00	91.90	94.85
		Pulwama	84.33	76.00	51.20	51.42	48.40	77.00	63.43
	In-vehicle (≥ -85 dBm)	Jammu	98.00	99.80	98.40	99.60	97.00	99.86	100
		Srinagar	99.00	97.3	97.10	100	98.00	99.50	99.81
		Pulwama	99.03	92.90	82.70	64.05	80.10	96.30	95.78
	Out door- in city (≥ -95 dBm)	Jammu	100	100	100	100	100	99.87	100
		Srinagar	99.00	100	100	100	100	100	99.97
		Pulwama	100	100	100	100	100	100	100
1.6	Call Setup Success Rate ($\geq 95\%$)	Jammu	100	100	98	100	100	99	100
		Srinagar	100	100	92	95	99	97	100
		Pulwama	100	100	95	100	97	98	100

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

1. “*Blocked call rate*” parameter is not met by BSNL in Srinagar & Pulwama, Idea in Srinagar & RCom-GSM in Pulwama.
2. “*Dropped call rate*” parameter is not met by BSNL in Srinagar & Pulwama.
3. “*Percentage of connection with good voice quality*” is not met by BSNL in Srinagar & Pulwama, RCom-GSM in Srinagar & Tata-CDMA in Pulwama.
4. “*CSSR*” is not met by BSNL in Srinagar.

Independent Drive Test--

SN	Parameter	Airtel (Kishtwar)	Tata-CDMA (Kulgam)
1.1	Call Attempts	42	48
1.2	Blocked Call Rate (<=3%)	0	0
1.3	Dropped Call Rate (<=2%)	0	0
1.4	% of connections with good voice quality (=>95%)		
	(i) 0-4 (w/o frequency hopping)		93.04
	(i) 0-5 (with frequency hopping)	97.60	
1.5	Service Coverage (%)		
	In door (>= -75dBm)	97.10	68.52
	In-vehicle (>= -85dBm)	99.99	97.58
	Outdoor- in city (>= -95dBm)	100	99.95
1.6	Call Setup Success Rate (>=95%)	100	100

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

“Good voice Quality” is not met by Tata-CDMA in Kulgam.

CHAPTER-3: AUDIT-PMR VERIFICATION

I. Cellular Mobile Telephone Service

PMR		Bench-mark	Audit	Aircel	Airtel	BSNL	Idea	Rcom GSM	V-fone	Tata CDMA
S/N	Name of Parameter									
(A)	Network Service Quality Parameter									
1	Network Availability									
	BTS Accumulated Downtime	<=2%	Reported	1.24%	0.07%	1.87%	0.16%	0.32%	0.02%	0.06%
			Verified	1.24%	0.07%	1.87%	0.16%	0.32%	0.02%	0.06%
	Worst affected BTSs due to downtime	<=2%	Reported	8%	0.21%	1.83%	0.49%	1.37%	0.00%	0.00%
			Verified	8%	0.21%	1.83%	0.49%	1.37%	0.00%	0.00%
2	Connection Establishment (Accessibility)									
	CSSR (Call Setup Success Rate)	>=95%	Reported	96.61%	99.09%	98.00%	99.28%	98.72%	99.40%	99.24%
			Verified	96.61%	99.09%	98.00%	99.28%	98.72%	99.40%	99.24%
	SDCCH/PAGING congestion	<=1%	Reported	0.27%	0.11%	0.90%	0.14%	0.13%	0.07%	0%
			Verified	0.27%	0.11%	0.90%	0.14%	0.13%	0.07%	0%
	TCH congestion	<=2%	Reported	1.98%	0.17%	1.90%	0.20%	0.35%	0.28%	0.01%
Verified			1.98%	0.17%	1.90%	0.20%	0.35%	0.28%	0.01%	
3	Connection maintenance (retainability)									
	CDR	<=2%	Reported	1.15%	0.85%	2.00%	1.34%	1.07%	1.08%	0.77%
			Verified	1.15%	0.85%	2.00%	1.34%	1.07%	1.08%	0.77%
	Worst affected cells>3% TCH drop	<=3%	Reported	5.68%	1.69%	4.87%	2.81%	0.67%	2.79%	2.99%
			Verified	5.68%	1.69%	4.87%	2.81%	0.67%	2.79%	2.99%
	Good voice quality	>=95%	Reported	93.12%	98.68%	98.00%	96.16%	97.22%	97.54%	98.77%
Verified			93.12%	98.68%	98.00%	96.16%	97.22%	97.54%	98.77%	
4	No. of POI's having congestion >0.5%		Reported	0	0	0	0	0	0	0
			Verified	0	0	0	0	0	0	0

(B)	Customer Service Quality Parameters									
5	Metering/billing credibility-Post paid	<= 0.1%	Reported	0.07%	0.01%	0.10%	0.06%	0.10%	0.04%	0.00%
			Verified	0.07%	0.01%	0.10%	0.06%	0.10%	0.04%	0.00%
6	Metering /billing credibility-Pre paid	<= 0.1%	Reported	0.04%	0.00%	0.10%	0.11%	0.09%	0.02%	0.00%
			Verified	0.04%	0.00%	0.10%	0.11%	0.09%	0.02%	0.00%
7	Resolution of billing/ charging complaints	100% within 4 weeks	Reported	100%	100%	99%	100%	100%	100%	100%
			Verified	100%	100%	99%	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%
8	Response time to customers for assistance		Reported							
			Verified							
	Accessibility of call centre/Customer Care	>=95%	Reported	100%	95%	100%	97%	99%	100%	98%
			Verified	100%	95%	100%	97%	99%	100%	98%
% call answered by operators(voice to voice) within 60 sec.	>=90%	Reported	93%	94%	96%	95%	96%	97%	97%	
		Verified	93%	94%	96%	95%	96%	97%	97%	
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%	100%	100%	100%	100%
			Verified	100%	100%	100%	100%	100%	100%	100%

Critical Analysis (PMR Verification):

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

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	Network Availability								
	a) BTS Accumulated Downtime	<=2%	1.02%	0.02%	1.23%	0.08%	0.38%	0.01%	0.00%
	b) Worst affected BTSs due to downtime	<=2%	0.66%	0.00%	0.36%	0.61%	0.00%	0.00%	0.00%
	c) Total no. of BTSs in the licensed service area		1969	2474	1126	491	944	1208	268
	d) Sum of downtime of BTSs in a month in hours i.e. total outage time of all BTSs in hours during a month		1441	27	995	28	259	10	0
	e) No. of BTSs having accumulated downtime of >24 hours in a month		13	0	4	3	0	0	0
	c) CSSR	>=95%	96.15%	99.20%	97.44%	98.98%	99.54%	98.86%	98.98%
	d) SDCCH/PAGING congestion	<=1%	0.39%	0.07%	0.77%	0.40%	0.01%	0.21%	0.00%
	e) TCH congestion	<=2%	2.97%	0.10%	1.73%	0.53%	0.08%	0.63%	0.19%
2	Connection maintenance								
	a) CDR	<=2%	1.99%	0.73%	1.71%	1.26%	0.51%	0.92%	1.11%
	b) Cells having > 3% TCH drop	<=3%	2.94%	1.38%	0.75%	1.93%	0.14%	2.79%	2.10%
	c) Good voice quality	>=95%	95.69%	98.83%	NA	95.92%	98.53%	97.06%	NA
	d) No. of cells > 3% TCH drop		518	299	70	85	12	303	58
	e) Total no. of cells in the network		5876	7225	3105	1469	2832	3617	919
3	No.of POI's having congestion >0.5%		0	0	0	0	0	0	0
	a) Name of POI not meeting the benchmark		NIL	NIL	NIL	NIL	NIL	NIL	NIL
	b) Total No. of circuits on POI		60,527	57,127	21,189	6,597	13,073	26,877	8,378
	c) Avg No. of call attempts on POI		42,727	41,027	16,135	108,385	202,887	9,183	29,891
	d) Avg traffic served on POI (Erlang)		676	897	478	8,497	5,445	14,704	602
	e) Total number of working POI Service		52	33	22	16	25	52	42

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	Area wise								
	f) Capacity of POI		60798	55739	664	5685	12184	25742	7493
	g) Equipped Capacity of Network in respect of Traffic in erlang		136034	136921	72000	12970	40000	27199	62525
	h) Total traffic handled in TCBH in erlang		58713	88853	84579	6761	23010	26086	19873
(B)	Customer Service Quality Parameters								
4	Response time to customers for assistance								
	a) Accessibility of call centre	>=95%	98.00%	99.00%	100.00%	100.00%	99.01%	100%	100.00%
	b) % of call answered by operators(voice to voice) within 60 sec	>=90%	97.66%	93.77%	64.65%	95.84%	96.90%	99.88%	96.05%
	c) No. of call attempts to call centre / customer care nos. during TCBH (Avg)		4,322	118,061	2,243	9,892	5,035	1,665	708
	d) No. of calls connected and answered successfully to call centre / customer care nos. during TCBH (Avg)		4,221	110,710	1,450	9,480	4,879	1,663	680

NA: Not Applicable, NP: Not Provided

Parameter-wise Findings (Live Data Assessment):

The parameter wise key takeout's for the Cellular Mobile Telephone Services providers in Jammu & Kashmir Service Area are as given below:-

- **“BTS Accumulated Downtime”:** All operators are meeting the benchmark.
- **“Worst affected BTSs due to downtime”:** All operators are meeting the benchmark.
- **“Call setup success rate (benchmark $\geq 95\%$)”:** All operators are meeting the benchmark.
- **SDCCH/PAGING Channel congestion (benchmark $\leq 1\%$):** All the operators are meeting the benchmark.

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, all the operators are meeting the benchmark.
- **Call drop rate (benchmark $\leq 2\%$):** All operators are meeting the benchmark.
- **Cell exceeding 3% TCH drop (benchmark $\leq 3\%$):** All operators are meeting the benchmark.
- **Connections with good voice quality (benchmark $\geq 95\%$):** All the GSM operators are meeting the benchmark. Tata-CDMA & BSNL has not provided the data as same is not system generated.
- **No. of POI's having $>0.5\%$ Congestion:** All the operators are meeting the benchmark. 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 the operators are meeting the benchmark.
- **%age of call answered by operator (Voice to voice) (benchmark $>90\%$):** Except BSNL, 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%	1.67%	0.05%	0.12%	0.01%	0.37%	0.01%	0.06%
	b) Worst affected BTSs due to downtime	<=2%	13.86%	0.04%	0.62%	0.61%	1.59%	0.00%	0.00%
	c) Total no. of BTSs in the licensed service area		1,969	2,474	1,126	491	944	1,208	268
	d) Sum of downtime of BTSs in a month in hours i.e. total outage time of all BTSs in hours during a month		24526.08	867.69	1034	39	2606	121.17	118
	e) No. of BTSs having accumulated downtime of >24 hours in a month		273	1	7	3	15	0	0
2	Connection Establishment (Accessibility)								
	a) CSSR (Call Setup Success Rate)	>=95%	95.91%	99.29%	96.96%	99.01%	99.53%	98.86%	98.58%
	b) SDCCH/PAGING congestion	<=1%	0.37%	0.07%	0.78%	0.47%	0.03%	0.13%	0.00%
	c) TCH congestion	<=2%	1.96%	0.07%	1.66%	0.49%	0.08%	0.66%	0.62%
3	Connection maintenance (retainability)								
	a) CDR	<=2%	1.92%	0.69%	1.70%	1.25%	0.52%	0.98%	1.05%
	b) Worst affected cells>3% TCH drop	<=3%	2.76%	1.34%	0.72%	2.44%	0.13%	2.82%	2.03%
	c) Good voice quality	>=95%	95.82%	98.89%	NA	95.96%	98.56%	97.14%	NA
	d) Total No. of cells exceeding 3% TCH drop (call drop)		5021	2995	690	1113	111	3160	577
	e) Total no. of cells in the network		5876	7225	3105	1469	2832	3617	919

4	No. of POI's having congestion >0.5%	<=0.5%	0	0	0	0	0	0	0
	a) Name of POI not meeting the benchmark		NIL	NIL	NIL	NIL	NIL	NIL	NIL
	b) Total No. of call attempts on POI (Avg.)		44,346	41,240	16,340	100,055	190,223	8,203	41,157
	c) Total traffic served on POI (Erlang) (Avg.)		647	907	480	7,907	5,831	14,800	822
	d) Total No. of circuits on POI		60,806	57,285	21,196	6,434	13,229	26,871	8,378
	e) Total number of working POI Service Area wise		52	33	22	16	25	52	42
	f) Capacity of POI		60,805	55,848	NR	5,685	12,330	25,745	7,493
5	Network Data								
	a) Equipped Capacity of Network Erlang		136034	136921	12970	40000	40000	27199	62525
	b) Total traffic in TCBH in erlang (Avg.)		58713	88853	6761	23010	23010	26086	19873
	c) Total no. of customers served (as per VLR) on last day of the month		1473546	2097083	174349	400489	400489	597943	80963
(B)	Customer Service Quality Parameters								
5	Metering/billing credibility-Post paid	<= 0.1%	0.00%	0.00%	0.00%	0.01%	0.01%	0.02%	0.00%
	a) No. of bills issued during the period		129689	58326	264882	12095	17602	22950	42848
	b) No. of bills disputed including billing complaints during the period		3	2	12	1	2	5	1
6	Metering /billing credibility-Pre paid	<= 0.1%	0.00%	0.00%	0.05%	0.01%	0.10%	0.04%	0.01%
	a) No. of charging / credit / validity complaints during the quarter		14	75	364	21	524	280	6
	b) Total no. of pre-paid customers at the end of the quarter		1,529,604	2,265,062	750,166	176,221	524,698	692,686	54,556
7	Resolution of billing/ charging complaints (within 4 weeks)	100%	100%	100%	100%	100%	100%	100%	100%

	a) No. of billing/(post paid) and charging, credit/validity (pre paid) complaints resolved within 4 weeks during the quarter		17	77	376	22	526	285	7
	b) Total no. of billing (post paid) and charging, credit / validity (pre paid) complaints received during the quarter		17	77	376	22	526	285	7
	c) No. of billing complaints (post paid) and charging, credit/ validity complaints (pre paid) resolved in favour of the customer during the quarter		17	77	376	22	526	285	7
	d) No. of complaints disposed on account of not considered as valid complaints during the quarter		0	0	0	0	0	0	0
	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%
8	Response time to customers for assistance								
	a) Accessibility of call centre/Customer Care	<i>>=95%</i>	98.00%	99.30%	100.00%	100.00%	98.99%	100%	99.03%
	b) % call answered by operators(voice to voice) within 60 sec.	<i>>=90%</i>	96.36%	86.13%	64.98%	94.99%	96.37%	98.21%	97.95%
	c) Total no. of call attempts to call centre & customer care nos. during TCBH (Avg.).		11,184	1,366,129	24,180	99,019	48,238	17,007	16,362
	d) No. of calls connected and answered successfully to call centre & customer care nos. during TCBH (Avg.).		10,777	1,176,705	15,711	94,054	46,489	16,703	16,027
9	Termination/closure of service	<i><=7days</i>	100%	100%	100%	100%	100%	100%	100%
	a) Total No. of requests for Termination / Closure of service received during the quarter		461	416	14,423	96	190	105	870
	b) No.of requests for Termination / Closure of service complied within 7 days during the quarter		461	416	14,423	96	190	105	870
10	Time taken for refunds of deposits after closures.	<i>100% within 60 days</i>	100%	100%	100%	100%	100%	100%	100%

NA: Not Applicable, NP: Not Provided

Parameter-wise Findings (Month Data Assessment):

The parameter wise key takeout's for the Cellular Mobile Telephone Services providers in Jammu & Kashmir Service Area are as given below:-

- **BTS accumulated downtime (benchmark <=2%):** All operators are meeting the benchmark.
- **Worst affected BTSs due to downtime (benchmark <= 2%):** Except Airtel, All operators are meeting the benchmark.
- **Call setup success rate (benchmark >= 95%):** All operators are meeting the benchmark.
- **SDCCH/PAGING Channel congestion (benchmark <= 1%):** All operators are meeting the benchmark.
Note: CDMA operators have provided the data for Paging Channel congestion and GSM operators provided SDCCH Channel congestion.
- **TCH congestion (benchmark <= 2%):** All the operators are meeting the benchmark.
- **Call drop rate (benchmark <= 2%):** All operators are meeting the benchmark.
- **Cell exceeding 3% TCH drop (benchmark <= 3%):** All the other operators are satisfying the benchmark.
- **Connections with good voice quality (benchmark >= 95%):** All the operators are satisfying the benchmark. TATA CDMA operator & BSNL have declared that data is not system generated.
- **No. of POI's having>0.5%congestion:** All the operators are found meeting the benchmark. 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%):** Except for Airtel & BSNL ,all operators are meeting the benchmark.
- **Metering and billing credibility-Postpaid (benchmark <= 0.1%):** All the operators are meeting the benchmark.
- **Metering and billing credibility-Pre paid (benchmark <= 0.1%):** All the operators are meeting the benchmark.
- **Resolution of billing/ charging complaints (benchmark 100% within 4 weeks):** All operators are meeting the benchmark.
- **Termination/Closure of service (Benchmark <= 7 days):** All operators are satisfying the benchmark.
- **Time taken for refunds of deposits after closures (benchmark 100% within <=60 days):** All operators are satisfying the benchmark.

(3) Sample Coverage

Switches/BSC/BTS details of operators:

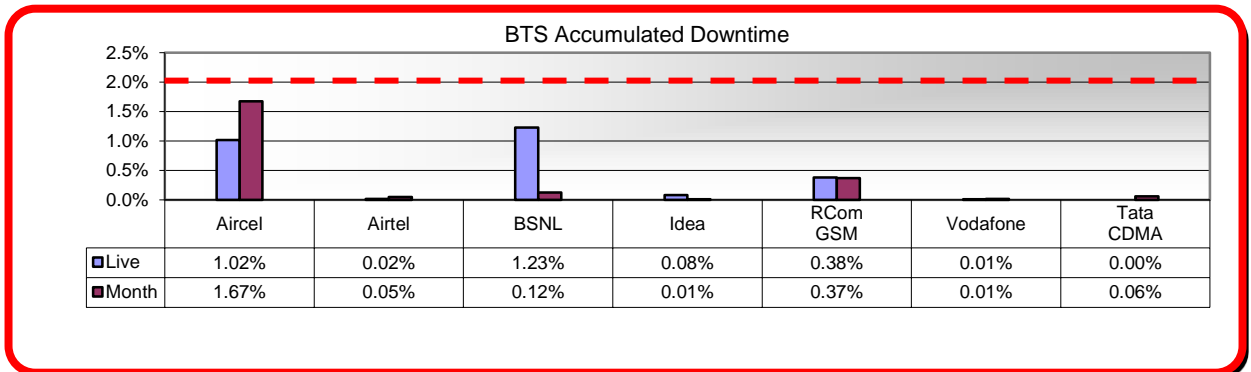
S/N	Name of Service Provider	No. of MSC	No. of BSC	No. of BTS
GSM Operators				
1	Aircel Ltd	5	22	1805
2	Airtel Ltd	11	27	2474
3	BSNL	8	21	1126
4	Idea	2	2	491
5	Reliance Communication	2	6	944
6	Vodafone	4	15	1208
CDMA Operator				
7	Tata Communications	2	2	268

(4) Performance (Graphical Representation)

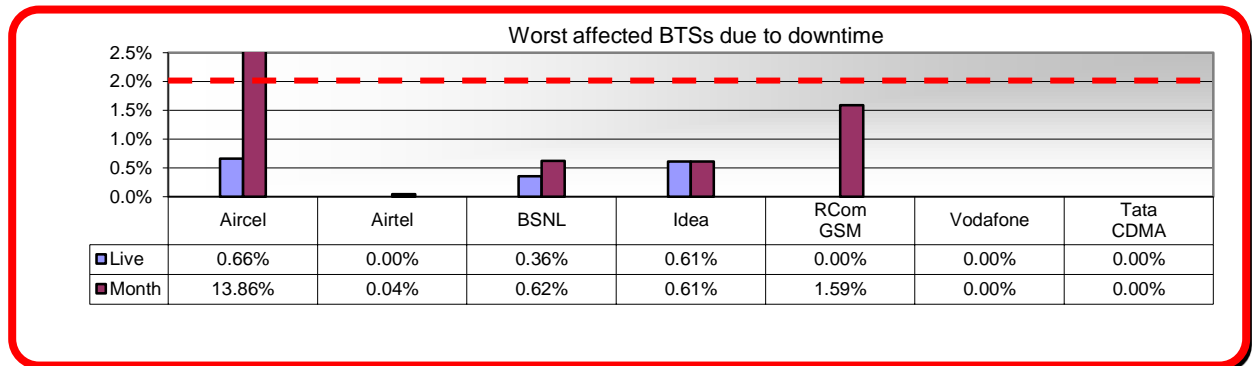
Comparison between Live measurements and One month data Audit – Cellular Mobile Telephone Services

A) NETWORK PERFORMANCE

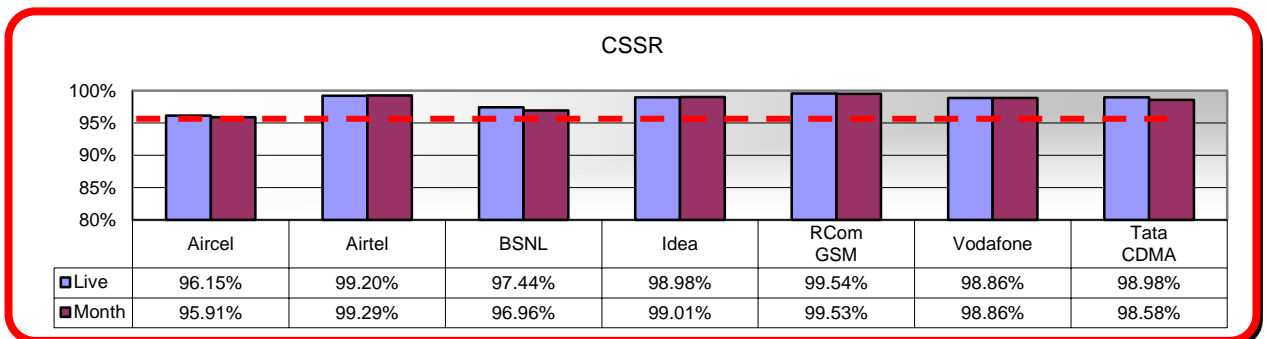
BTS accumulated downtime: All operators are meeting the TRAI benchmarks in both one month & live data Audit.



Worst affected BTSs due to downtime: Except Aircel in month audit, all operators are meeting the TRAI benchmarks in both one month & live data Audit.

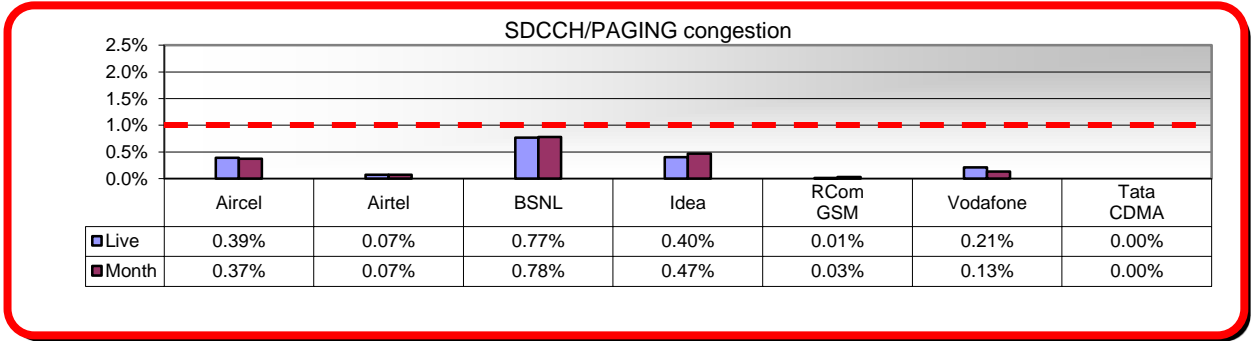


Call setup success rate: All operators are meeting the TRAI benchmarks ($\geq 95\%$) for both one month data and 3 days live data taken in the month of audit.

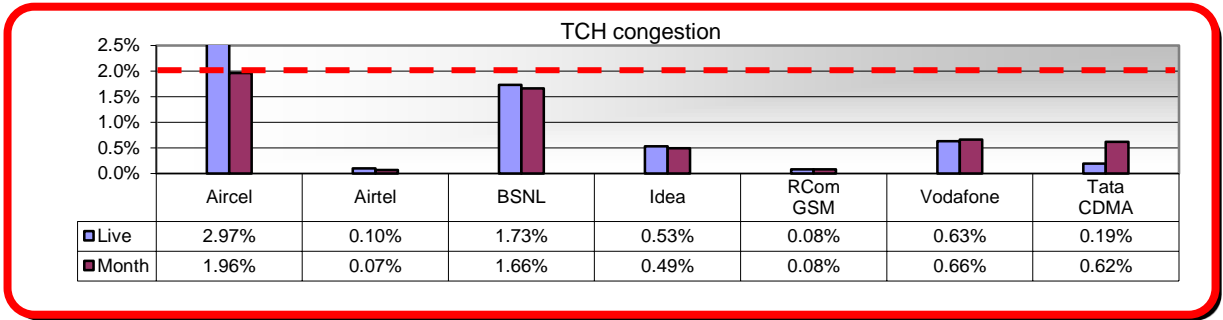


Blocked call rate:

SDCCH congestion (%): All operators have satisfied the benchmark successfully in both live and month audit

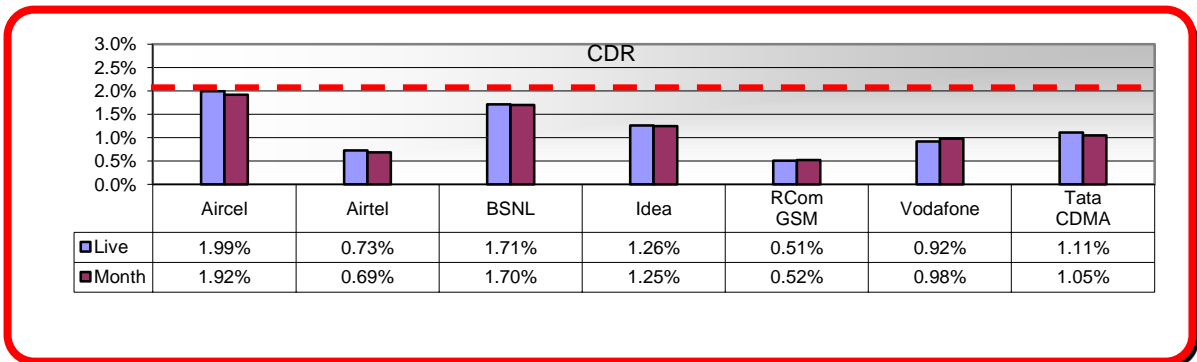


TCH congestion (%): Except Aircel in 3 days audit, all the operators are meeting the TRAI benchmarks ($\leq 2\%$) for both one month data and 3 days live data taken in the month of audit.

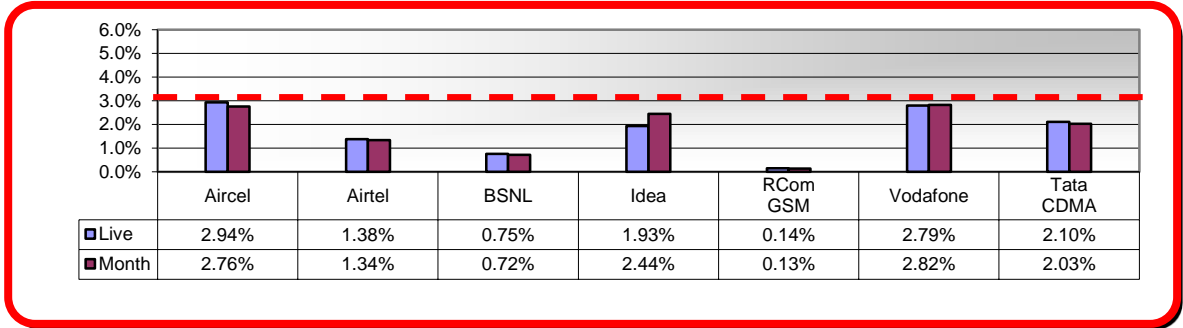


Connection Maintainability (Retainability):

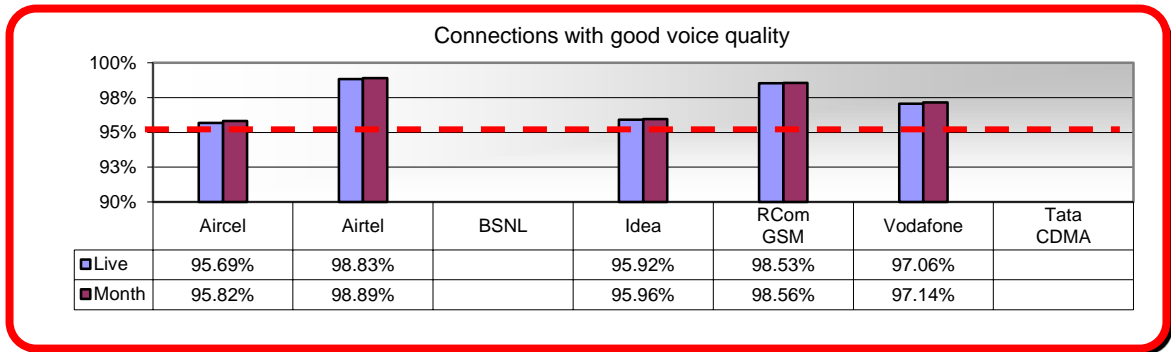
Call drop rate ($\leq 2\%$): All operators are meeting the TRAI benchmarks ($\leq 2\%$) for both one month data and 3 days live data taken in the month of audit.



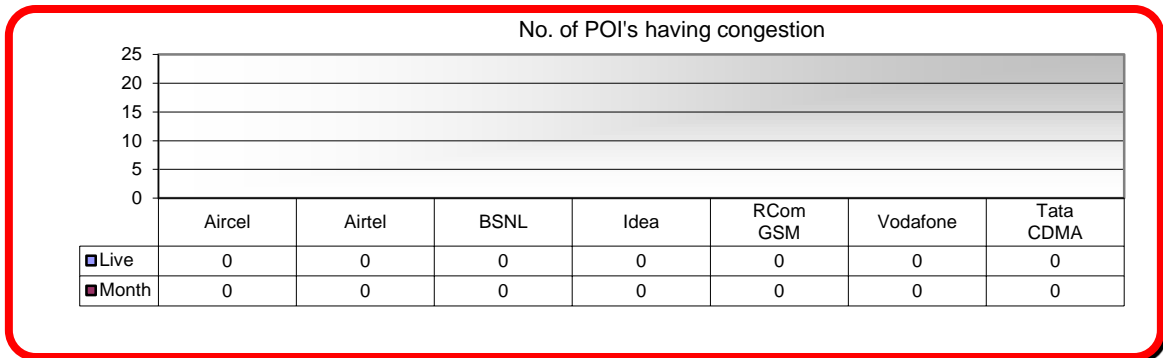
Worst affected Cell exceeding 3% TCH Drop: All operators are meeting the TRAI benchmarks ($\leq 2\%$) for both one month data and 3 days live data taken in the month of audit



Percentage of connections with good voice quality (benchmark $\geq 95\%$): All the operators are meeting the TRAI benchmarks ($\geq 95\%$) for both one month data and 3 days live data taken in the month of audit. BSNL and CDMA operator has declared that data is not system generated.



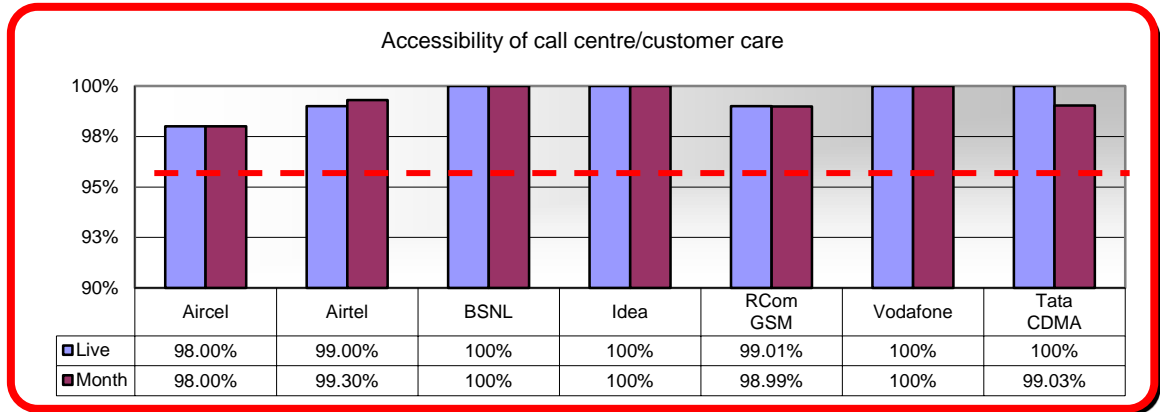
No. of POI's having $>0.5\%$ Congestion: All the operators are meeting the TRAI benchmarks ($\leq 0.5\%$) for both one month data and 3 days live data taken in the month of audit.



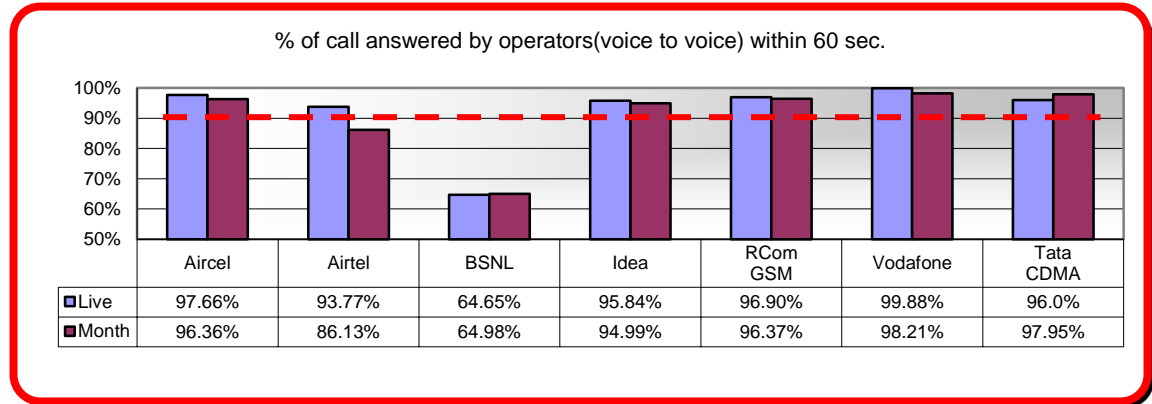
B) CUSTOMER SERVICE QUALITY PARAMETERS

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.



Percentage of call answered by operators (Voice to voice) within 60 sec: Except Airtel (in month data) & BSNL (in both 3 days & month data), All other operators are meeting benchmark for both live and month data audit.



(5) 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 BTSs due to downtime” “TCH Congestion” & “% call answered by operators (voice to voice) within 60 sec”.

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

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	Rcom GSM	V-fone	Tata CDMA
Total No. of Calls Attempted	17	77	100	22	100	100	7
Total No. of calls Answered	14	69	96	19	97	96	6
Cases resolved within 4 weeks	14	69	96	19	97	96	6
%age of cases resolved	100%	100%	100%	100%	100%	100%	100%

(3) Live calling to call centre

Calling Operator	Aircel	Airtel	Idea	Rcom GSM	Vodafone	Tata CDMA	BSNL
Total No. of Calls Attempted	100	100	100	100	100	100	100
Total No. of calls connected to IVR	100	100	100	100	100	100	100
Calls got connected to agent within 60 Sec	95	90	97	93	97	92	93
%age of calls got answered	95%	90%	97%	93%	97%	92%	93%

(4) Level 1 calling

Emergency no.		No. of calls made	Aircel	Airtel	BSNL	Idea	RCOM GSM	Vodafone	Tata CDMA
Jammu									
100	Police	2	2	2	2	2	2	2	2
101	Fire	2	2	2	2	2	2	2	2
102	Ambulance(Directly Routed to Hospital)	2	0	0	1	0	0	0	0
139	Railway	3	3	3	3	3	3	3	3
Srinagar									
100	Police	2	2	2	2	2	2	2	2
101	Fire	2	2	2	2	2	2	2	2
102	Ambulance(Directly Routed to Hospital)	2	0	2	2	2	2	2	2
139	Railway	3	3	3	3	3	3	3	3
Pulwama									
100	Police	2	2	2	2	2	2	2	2
101	Fire	2	0	2	2	2	2	2	2
102	Ambulance (Directly Routed to Hospital)	2	0	0	2	2	0	2	2
139	Railway	3	3	3	3	2	3	3	3

(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.

The Status of Calls made on Emergency no's in Jammu and Pulwama is much below satisfactory level. Only exception was for Railway no. 139. It is to be noted that 102 no is not in use in J&K for ambulance service instead 102 no. is directly routed to hospital by some of the operators. It is also to be noted that in all the districts or towns or cities where emergency numbers got connected the routing of the nos. were not properly directed. Like call made on 100 no from Pulwama from Aircel no. was routed to Srinagar PCR instead of local Pulwama PCR. Similarly call made on 101 no. from Airtel from Kishtwar, Doda, Udhampur was routed to Jammu fire service. Overall it can be concluded that out of the 3 towns in Srinagar emergency no. calling were better.

Call centre calls were successfully connected within the 60 seconds time for all the operators to the IVR and calls connected to call centre agents was also satisfactory for all the operators.

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 1900 to 2100 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)	V-fone	Tata (CDMA)
Aircel	-	96%	97%	100%	100%	100%	100%
Airtel	100%	-	100%	100%	100%	100%	100%
BSNL	100%	97%	-	100%	99%	100%	100%
Idea	100%	100%	99%	-	100%	100%	100%
Reliance (GSM)	96%	100%	99%	100%	-	100%	100%
Vodafone	98%	100%	100%	100%	99%	-	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.

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

The Operator Assisted Drive Test was conducted at Jammu, Srinagar & Pulwama for all the operators. Route covered was about around 100-140 Km depending on city areas within the speed limit of 30-40Km/hr.

Drive Test Locations**JAMMU**

LOW DENSE: Samba, Jakh, Sarore, Bari brahmana, Greater Kailash, Kunjwani, Gangyal, Satwari, Airport

MEDIUM DENSE: University, Gandhinagar, Gole market, Shastri nagar, Nanak nagar, Trikuta nagar, Channi, Bathindi, Sanik colony

HIGH DENSE: Bahu Plaza, Jewel, Bus Stand, Amphalla, New Plot, Janipur, Bantalab, Barnai, Talab Tillo, Canal Road, Kachi Chawni

SRINAGAR

LOW DENSE: Nowgam Bypass, Airport Road Hyderpora Crossing, Bemina Crossing, Hmt, Narbal Hwy

MEDIUM DENSE: Harwan, Nishat, Shalimar, Fore Shore Road, Sonawar. Army Cantonment Area, DPS

HIGH DENSE: Lalchowk, Grand Palace, Skims, Smhs, 90 Feet Road

PULWAMA

LOW DENSE: Galandhar, Puhroo, Kandizal, Zonipora, Badhibagh

MEDIUM DENSE: Arihal, Themna, Sohasimili, Kanipora

HIGH DENSE: Quil, Moghal Pora, Dc Pulwama, Police Station Pulwama, Panchatghar

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	137	93	106	152	102	141	114
		Srinagar	108	117	172	156	118	135	145
		Pulwama	100	85	103	53	86	86	74
1.2	Blocked Call Rate (<=3%)	Jammu	0.00%	0.00%	1.89%	0.00%	0.00%	0.71%	0.00%
		Srinagar	0.00%	0.00%	4.65%	3.21%	0.85%	2.22%	0.00%
		Pulwama	0.00%	0.00%	4.85%	0.00%	3.49%	2.33%	0.00%
1.3	Dropped Call Rate (<=2%)	Jammu	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
		Srinagar	0.00%	0.00%	4.07%	0.00%	0.00%	0.00%	0.00%
		Pulwama	0.00%	0.00%	3.88%	0.00%	0.00%	0.00%	0.00%
1.4	Percentage of connections with good voice quality (>=95%)								
	(i) 0-4 (w/o frequency hopping)	Jammu							97.76
		Srinagar							97.53
		Pulwama							93.65
	(ii) 0-5 (with frequency hopping)	Jammu	95.10	96.30	96.40	96.90	97.70	97.10	
		Srinagar	95.80	98.20	93.10	95.26	94.92	98.30	
Pulwama		96.13	97.50	92.60	97.57	98.20	99.20		
1.5	Service Coverage (%)								
	In door (>= -75dBm)	Jammu	79.33	94.03	86.49	36.08	77.00	96.66	99.59

		Srinagar	52.67	87.20	69.30	74.16	75.00	91.90	94.85
		Pulwama	84.33	76.00	51.20	51.42	48.40	77.00	63.43
	In-vehicle (≥ -85 dBm)	Jammu	98.00	99.80	98.40	99.60	97.00	99.86	100
		Srinagar	99.00	97.3	97.10	100	98.00	99.50	99.81
		Pulwama	99.03	92.90	82.70	64.05	80.10	96.30	95.78
	Out door- in city (≥ -95 dBm)	Jammu	100	100	100	100	100	99.87	100
		Srinagar	99.00	100	100	100	100	100	99.97
		Pulwama	100	100	100	100	100	100	100
	1.6	Call Setup Success Rate ($\geq 95\%$)	Jammu	100	100	98	100	100	99
Srinagar			100	100	92	95	99	97	100
Pulwama			100	100	95	100	97	98	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:

1. Blocked call rate parameter is not met by BSNL in Srinagar & Pulwama, Idea in Srinagar & RCom-GSM in Pulwama.
2. Dropped call rate parameter is not met by BSNL in Srinagar & Pulwama.
3. Percentage of connection with good voice quality BM was not met by BSNL in Srinagar & Pulwama, RCom-GSM in Srinagar & Tata-CDMA in Pulwama
4. CSSR BM was not met by BSNL in Srinagar.

(D) Independent Drive Test**(1) Sample Coverage**

The Independent Drive Test was conducted at Kulgam and Kishtwar in Jammu & Kashmir Circle. Route covered was about around 28-65 Km depending on city areas within the speed limit of 30-40Km/hr.

Name and Drive Test Places of the service provider :

- i) Kulgam - Tata-CDMA
- ii) Kishtwar - Airtel

Area Coverage Details:

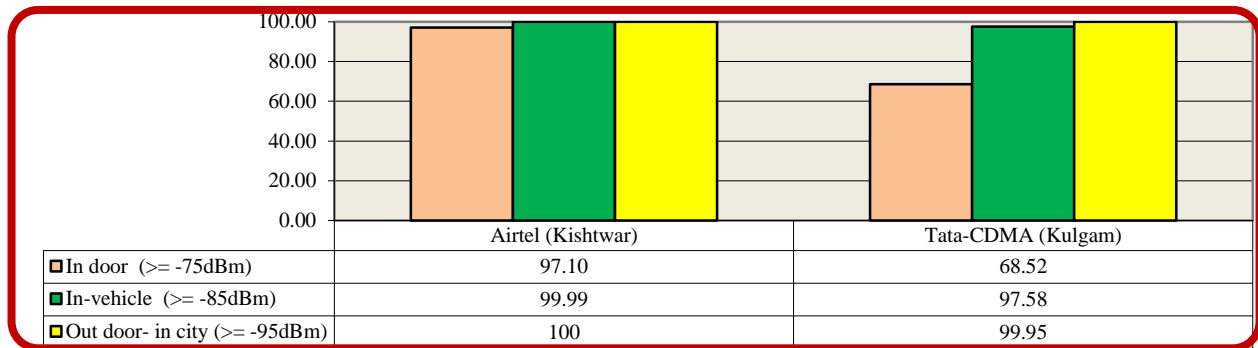
KULGAM

Qazigund Road, New Hospital, D.C Office, Old Town , Old Bus Stand , Ziarat Road, Women Degree College, New Bus Stand To Aharbal Road Toll Post

KISHTWAR

Bus stand road, Semna colony, Playground road, Dool Paddar road, Hasti, Hidyah Mohalla, Hospital road,BSNL exchange road

SN	Parameter	Airtel (Kishtwar)	Tata-CDMA (Kulgam)
1.1	Call Attempts	42	48
1.2	Blocked Call Rate (<=3%)	0%	0%
1.3	Dropped Call Rate (<=2%)	0%	0%
1.4	Percentage of connections with good voice quality (=>95%)		
	(i) 0-4 (w/o frequency hopping)		93.04%
	(i) 0-5 (with frequency hopping)	97.60%	
1.5	Service Coverage (%)		
	In door (>= -75dBm)	97.10	68.52
	In-vehicle (>= -85dBm)	99.99	97.58
	Outdoor- in city (>= -95dBm)	100	99.95
1.6	Call Setup Success Rate (>=95%)	100	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:

“Percentage of connection with good voice quality” BM was not met Tata-CDMA in Kulgam.

(E) 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 satisfactory for **Network Parameters**. However, the benchmark of “*Worst affected BTSs due to downtime*” is not met by Aircel & for “TCH Congestion” is not met by Aircel.
- Under **Customer Service Quality Parameter** “operator answered calls (voice-to-voice) within 60 seconds” parameter it is found that most of the operators are fulfilling TRAI benchmark of except Airtel & BSNL.
- During **Drive Tests**, high “Blocked Call Rates” were found in case of BSNL, Idea & RCom-GSM, “Dropped call rate” is not met by BSNL, “% of good voice quality” is not met by BSNL, RCom-GSM & Tata-CDMA.

II. Basic Telephone Service (Wire line) Providers

.....Audit not done for this quarter

III. Broadband Service Providers

.....Audit not done for this quarter