Objective Assessment of Quality of Services for (QoS) for Basic Wireline, Broadband, and Wireless Service Providers - West Bengal Circle

Report: January – February - March 2012

Prepared for: **Telecom Regulatory Authority of India**

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Preface

TRAI, the regulatory watch dog for the Quality of Service for the telecom services – Basic (Wireline), Cellular Mobile (Wireless) and Broadband has commissioned this study with the objective of measuring Quality of Services under the parameters as per the published notifications.

The Audit module would assess the Quality of Service of telecom operators (Basic (Wireline), Cellular Mobile (Wireless) and Broadband services) by auditing the service level records maintained by the operators as well as live measurements and comparing them with quality of service benchmarks stipulated by TRAI.

The Survey and Audit modules for various circles within the Zones, due the sheer scale of data collection, have been distributed across various Half Yearly periods. The auditor - IMRB International carried out the audits in Orissa, Bihar & Jharkhand, West Bengal, North-East, Assam and Kolkata circles. **This report details the performance of various service providers in West Bengal circle against Quality of Services benchmarks for various parameters laid down by TRAI in respective regulations for Basic (Wireline), Cellular mobile (Wireless) and broadband services.**

Table of contents

1.0 Background

The Telecom Regulatory Authority of India (TRAI) has a critical mandate to protect the interest of telecom consumers in addition to various other functions bestowed upon it. As part of the license conditions to telecom operators, it has the power and authority to measure the Quality of Service provided by various govt. (BSNL & MTNL) and private telecom operators. The parameters that need to be measured for Basic (Wireline) and Cellular Mobile (Wireless) services have been specified in the TRAI notification on Quality of Services of Basic (Wireline) and Cellular Mobile (Wireless) services dated 20th March, 2009. The parameters for Broadband Service have been specified in the TRAI notification for Quality of Services of Broadband Service Regulation, 2006

IMRB has been carrying out this exercise for TRAI since December 2007 to assess the quality of services being provided by Basic (Wireline), Cellular Mobile (Wireless) and Broadband service providers.

Audit module: To assess the quality of service of telecom operators (Basic (Wireline), Cellular Mobile (Wireless) and broadband services) by auditing the service level records maintained by the operators, conducting drive tests as well as live measurements and comparing them with quality of service benchmarks stipulated by TRAI

This report highlights the findings for the Audit module for Assam circle that was covered in the period of January – March 2012. The primary data collection and verification of records maintained by various operators of Basic (Wireline), Cellular Mobile (Wireless) and broadband services was undertaken by IMRB International during the period January – March 2012.

2.0 Objectives and Methodology

The primary objective of the Audit module is to Audit and Assess the Quality of Services being rendered by Basic (Wireline), Cellular Mobile (Wireless), and Broadband service against the parameters notified by TRAI. (The parameters of Quality of Services (QoS) have been specified by in the respective regulations published by TRAI). Following are the key activities undertaken by Auditors during the Audit process conducted at the operator's premises

All Network related and Non network related parameters notified by TRAI in various regulations were Audited

1. **Verification of the data submitted by service providers:** This involved verification of the quarterly Performance Monitoring Reports (PMR's) and monthly Point of Interconnect (POI) Congestion reports being submitted by various service providers. The raw data in the records maintained by service providers was audited to assess the book keeping methodology.

2. **Live measurement for three days:** Network performance of service providers was assessed for three days in the month in which the Audit was carried out. Live figures from the server/ NMS software were recorded for various network related parameters.

3. **Data verification for the month in which Audits were carried out:** Subsequent to the visits for Audit during the live measurement at various Exchanges/ISP Nodes/Exchanges, data for all the network and Non network related parameters was collected from various service providers for the complete month in which the Audit was carried out. Raw data/records pertaining to these were also verified on sample basis to check the veracity of data provided by the operators.

4. **Live calling:** Live testing was done on a sample basis to check efficiency of the customer care, inter operator call assessment, Back check calls for service provisioning and fault repair

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- Any changes or discrepancies found in the methodology were reported to the service providers and changes were suggested by IMRB Auditors.
- PMR verification was done as per the new parameters being reported to TRAI by all operators.
- Live measurement and 1 month data collection was done as per the new regulations published by TRAI on 20th March, 2009.
- Separate formats were designed each for Basic (Wireline), Cellular mobile (Wireless) and Broadband services to collect the information on various parameters

Section A: WIRELINE

3.0 Sampling Methodology

3.1 Sampling for Basic (Wireline) services

- For BSNL the sample of exchanges was selected was spread across 10% of SDCA's in the entire service.

- For rest of the service providers (private service providers) data was collected pertaining to all the exchanges present in the circle/service area

- Following service providers are providing Basic (Wireline) service in West Bengal circle –

	Name of Operator
Operator 1	BSNL – WB
Operator 2	BSNL – A&N
Operator 3	RCOM
Operator 4	TTSL

4.0 Audit methodology

4.1 Basic (Wireline) Services

Following table explains the audit methodology for Basic (Wireline) services:-

Sl. No.	Parameters	One month data verification	Live measurement	Live calling
1	Provision of telephone after registration of demand	YES	----	YES
2	Fault incidence/clearance related statistic	YES		
2.1	*- Total number of faults registered per month*	YES		YES
2.2	*- Fault repair by next working day*	YES		YES
3	Mean Time to Repair (MTTR)	YES		
4	Call Completion Rate (CCR)	YES	YES	
5	Metering and billing credibility – billing complaints	YES		YES
6	Customer care promptness	YES		
6.1	*- Shifting of telephone line*	YES		YES
6.2	*- Processing closure request*	YES		YES
6.3	*- Processing of additional supplementary services*	YES		YES
7	Response time to customer	YES		
7.1	- While call is getting connected and answered	YES		YES
7.2	- While call is answered by operator (voice to voice)	YES		YES
8	Time taken to refund of deposits after closure	YES		YES

Further, Reliance and Tata do not serve to retail customers and are only serving the business customers

5.0 Executive Summary

The objective assessment of Quality of Services (QoS) was carried out by IMRB International for all the Basic (Wireline) and Broadband service providers during the period starting from January to March 2012 in West Bengal circle. The executive summary encapsulates the key findings of the Audit by providing: -

- *"Service provider performance report"* for Basic (Wireline) service , which gives a glimpse of the performance of various operators against the benchmark specified by TRAI, during the month in which the Audit was carried out by IMRB Auditors
- *"Parameter wise critical findings"* for Basic (Wireline) service: This indicates key observations and findings from different activities carried out during the Audit process

5.1 Service provider performance report based on one month data verification – Basic (Wireline) Services

Parameters	Benchmarks	BSNL - (WB)	BSNL - (A&N)	RCOM	TTSL
Faults incidences (No. of faults/100 Subs./month)	≤5	11.21	3.58	0	0
% of faults repaired by next working day	≥ 90%	28.73%	36.04%	NA	NA
% of faults repaired within 3 days	100%	86.26%	66.08%	NA	NA
Faults pending for> 3days and ≤7 days	Rent rebate of 7 days	100.00%	100.00%	NA	NA
Faults pending for > 7 days and ≤15 days	Rent rebate of 15 days	100.00%	100.00%	NA	NA
Faults pending for > 15 days	Rent rebate of 1 month	100.00%	100.00%	NA	NA
Mean Time to Repair (MTTR)	≤ 8 Hrs	57.89	58.12	NA	NA
Call Completion Rate (CCR)	≥ 55%	50.78%	77.19%	NA	DNA
Answer to Seizure ratio (ASR)	≥ 75%	54.26%	69.31%	83.39%	NA
No. of POIs with congestion > 0.5%	≤ 0.5%	70.00	3.00	72.00	NA
Metering and billing credibility - Number of bills disputed during over a billing cycle	≤ 0.1%	0.02%	0.00%	0.00%	0.00%
Resolution of billing complaints within 4 weeks	100%	100.00%	100.00%	100.00%	100.00%
Period of applying credit / waiver	≤ 1 week	100.00%	NA	NA	NA
Closure within 7 days	100%	93.44%	51.35%	NA	NA
Response time to customer for assistance					
% age calls getting connected and answered	≥ 95%	94.92%		98.19%	97.58%
% age call answered by operator in 60 seconds	≥ 90%	93.00%		94.02%	96.00%
Time taken for refund of deposits after closures within 60 days	100%	75.01%	100.00%	NA	NA

{* Note: For BSNL data pertains to the sample 5% of exchanges audited during the audit period, whereas for rest of the operators figures pertain to all the exchanges present in the circle }

** Methodology not in line with QoS   ☐ Figures provided on All India basis   ☐ Not meeting the benchmark   **B'mar**k = TRAI Benchmark, **DNA** = Details not available, **NA:** Not Applicable

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Summary of Live Measurement Results – Wireline Services

Parameters	Benchmarks	BSNL - (WB)	BSNL - (A&N)	RCOM	TTSL
Call Completion Rate (CCR)	≥ 55%	54.48%	86.59%	NA	DNA
Answer to Seizure ratio (ASR)	≥ 75%	66.18%	60.03%	82.69%	NA

Summary of Live Calling Results – Wireline Services

Parameters	Benchmarks	BSNL - (WB)	BSNL - (A&N)	RCOM	TTSL
% of faults repaired by next working day	≥ 90%	21.53%	42.65%	NA	NA
% of faults repaired within 3 days	100%	49.50%	75.00%	NA	NA
Resolution of billing complaints within 4 weeks	100%	100.00%	NA	NA	NA
Response time to customer for assistance					
% age calls getting connected and answered	≥ 95%	99.00%	100.00%	100.00%	100.00%
% age call answered by operator in 60 seconds	≥ 90%	82.00%	94.00%	100.00%	100.00%

*There were no billing complaints and fault cases for RCOM and Tata Wireline hence live calling for the same was not done.

Critical findings and Key take outs: Basic (Wireline) services

BSNL, Tata and RCOM are the three operators offering Basic (Wireline) Services with BSNL is the only operator providing Basic (Wireline) Services to retail customers in West Bengal as well as Andaman & Nicobar circle. During the audit process it was observed that the service provider could not meet TRAI specified benchmark on most of the parameters specified by TRAI.

Further, Reliance and Tata are also offering their services but serving only to business customers and not to retail customers

The live calling results were found to be different from the 1 month audit data collection in certain places. To some extent the difference can be attributed to the smaller sample size undertaken for the live calling.

For live measurements conducted to assess Call Completion Rate (CCR) it was found that the service provider meets the TRAI specified benchmark with CCR during three days observed to be 51% for West Bengal ((WB)) and 77.2% for Andaman & Nicobar ((A&N))

The parameter wise key takeouts for the Wireline service providers for the West Bengal circle are as under:-

Fault incidence / clearance statistics

- Fault repair remains pain point as only 29% and 36% of the total complaints registered in (WB) and (A&N) circle in the BSNL sample exchanges were repaired within 24 hrs which is significantly short of TRAI specified benchmark of >90%.
- For live calling carried out by IMRB auditors only 22% of BSNL subscribers in (WB) and 43% in (A&N) in the urban areas claimed that fault was repaired within 24 hrs.
- Even for fault repair within 3 days BSNL falls short of the TRAI specified benchmark with a score of 50% for (WB) and 75% for (A&N).

Traffic statistics (CCR)

- BSNL A&N comfortably meets the benchmark on this parameter both during month in which audit was carried out and three days when live measurement whereas West Bengal does not meet in both the cases

Metering and billing credibility

- The service provider (BSNL) just met TRAI specified benchmark with percentage billing complaints being less than 0.1% of the total bills generated.

Customer care/helpline promptness

- BSNL meets this benchmark in both the circles

Time taken for refund of deposits after closure

- BSNL (WB) fell short of meeting this benchmark as only 75% of the closure request could be completed within 60 days for the month audit data whereas BSNL (A&N) met this benchmark

Level 1 service

Live calling for level 1 services

Level 1 services	Benchmark	BSNL - (WB)	BSNL - (A&N)	RCOM	TTSL
Total no. of calls made		150	150	150	150
Calls answered in 60 sec		139	150	150	150
Calls answered after 60 sec		11	0	0	0

To test the efficiency of level 1 services (Trunk booking, Child helpline, Women helpline, Airline booking, Fire, Police, Railways) offered by various service providers. 150 calls were made for each service provider to different numbers and time taken to answer the call was noticed.

6.0 Detailed findings – Includes comparison between Live calling/Live measurements and One month data collection for Basic Wireline Services

6.1 Graphical/Tabular Representations for Basic (Wireline) services

Fault incidence
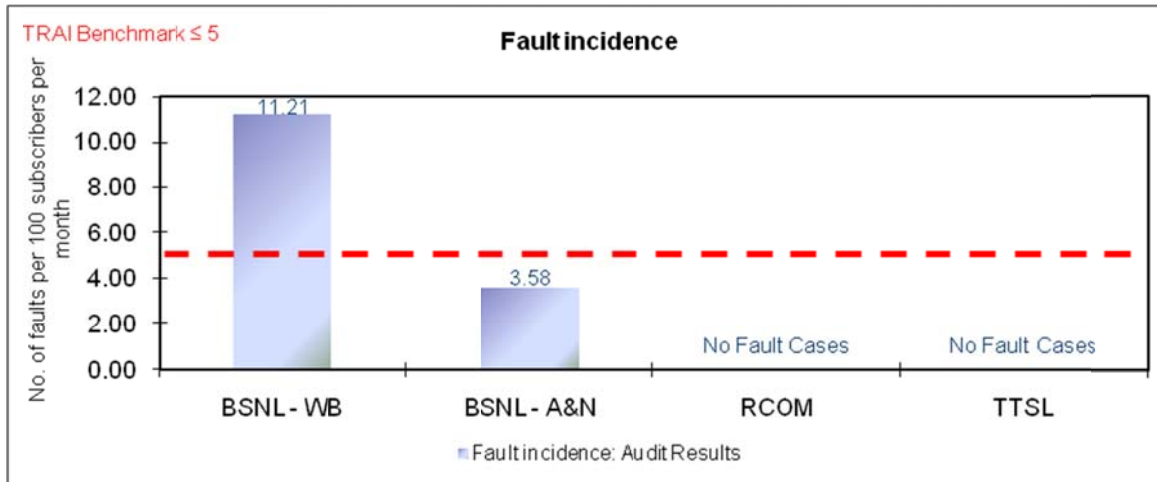
Operator meeting benchmark: BSNL - (A&N), RCOM, TTSL
Operator not meeting benchmark: BSNL - (WB)

Fault repair/Restoration time (Comparison between one month audit results and live calling results)
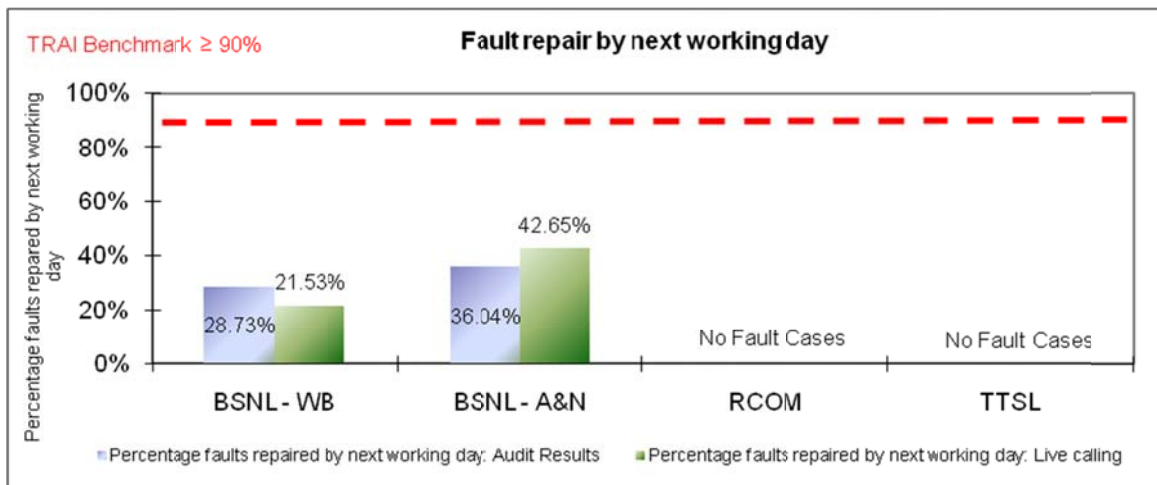
One month
No operator is meeting the benchmark

Live calling
No operator is meeting the benchmark
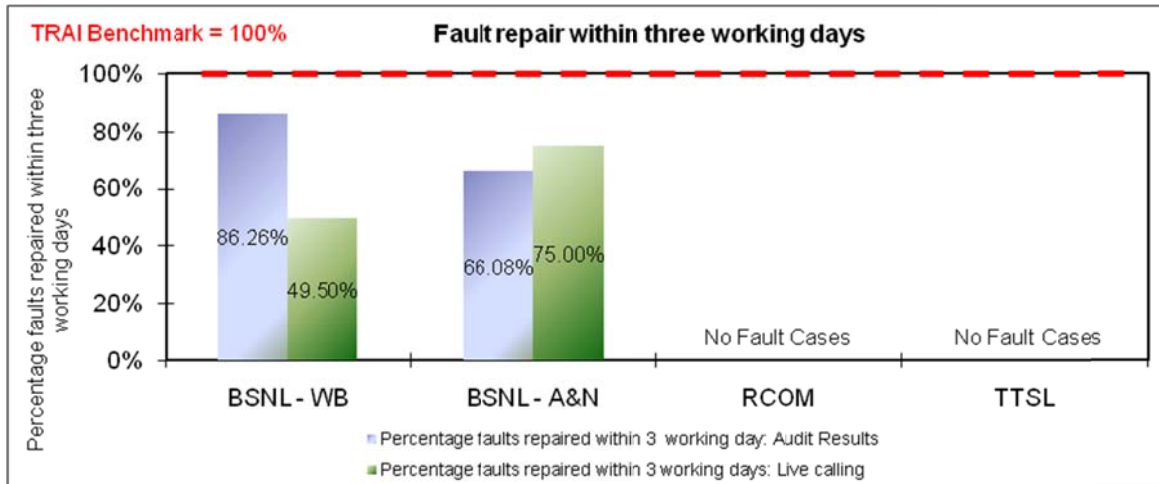
One month
No operator is meeting the benchmark

Live calling
No operator is meeting the benchmark

<u>**Mean time to repair**</u>
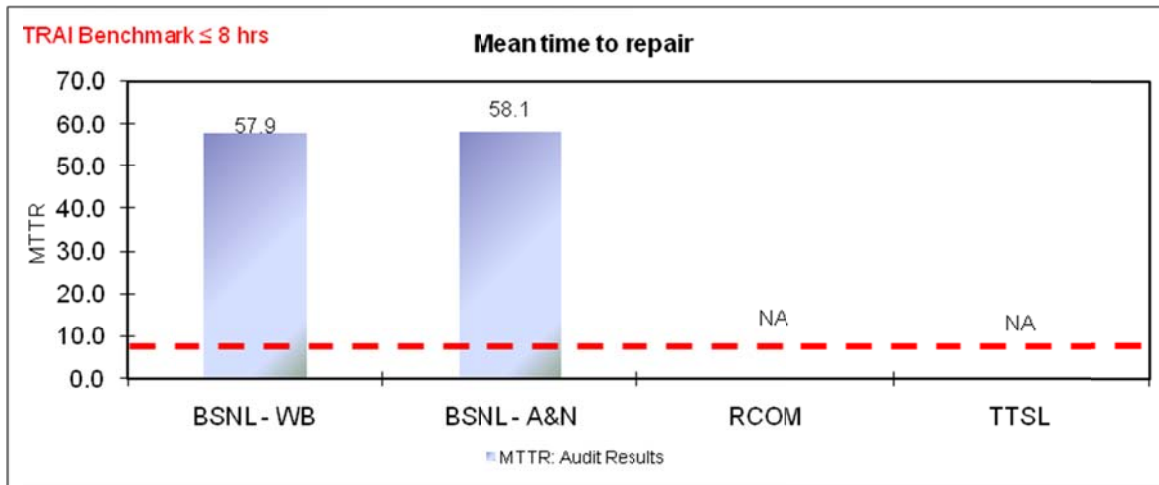
No operator is meeting the benchmark

Call completion rate (Comparison between one month audit results and three day live measurement)
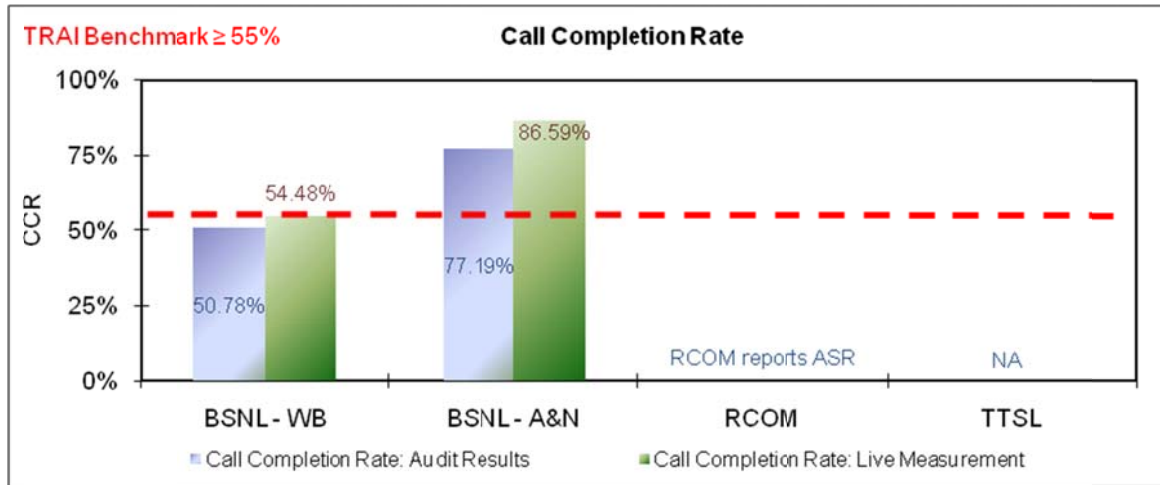
One month
Operator meeting benchmark: BSNL - (A&N)
Operator not meeting benchmark: BSNL - (WB)

Live measurement
Operator meeting benchmark: BSNL - (A&N)
Operator not meeting benchmark: BSNL - (WB)

Answer to Seizure Ratio (Comparison between one month audit results and three day live measurement)
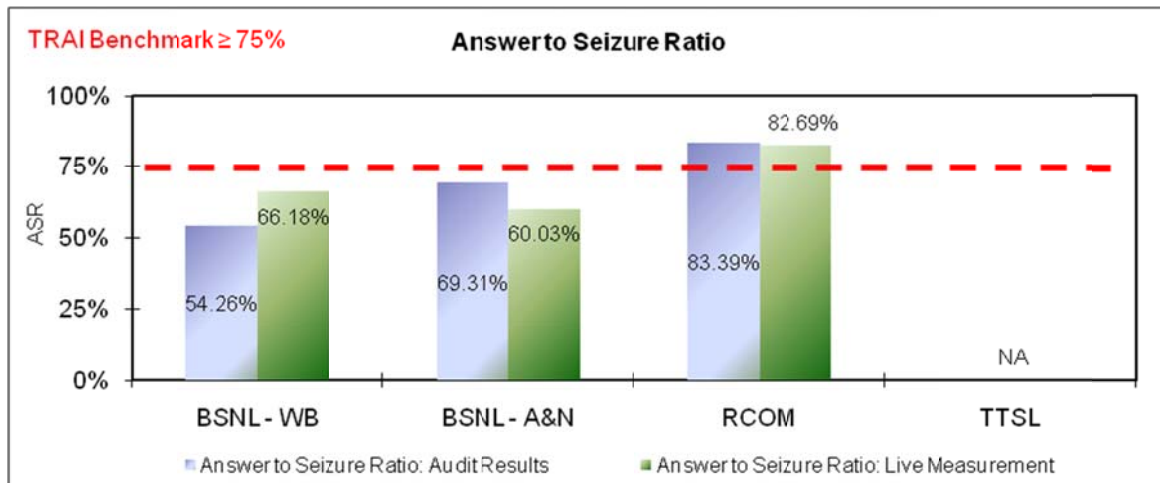
One month
Operator meeting benchmark: RCOM
Operator not meeting benchmark: BSNL - (WB), BSNL - (A&N)
Live measurement
Operator meeting benchmark: RCOM
Operator not meeting benchmark: BSNL - (WB), BSNL - (A&N)

Percentage bills disputed
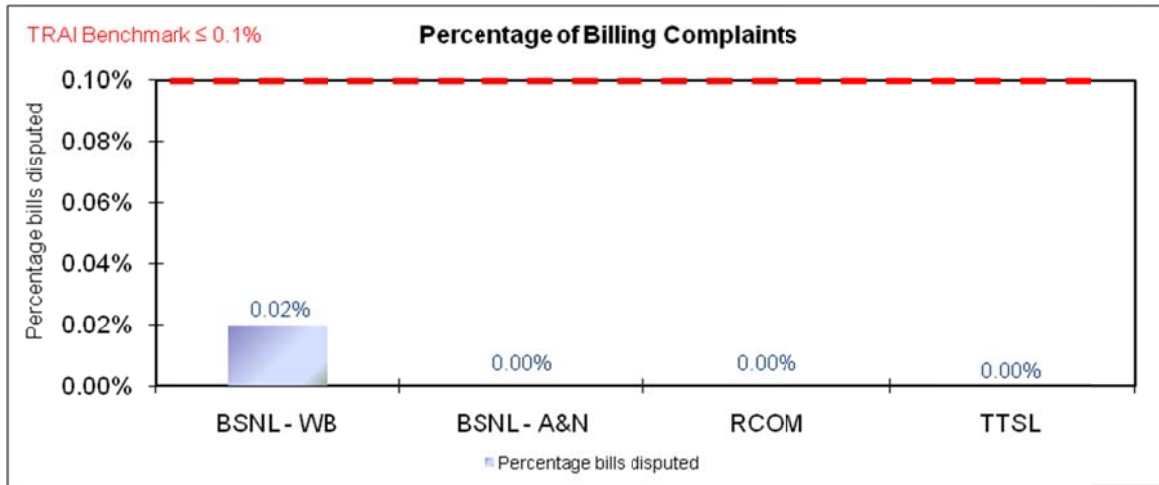
All operators are meeting the benchmark

Resolution of billing complaints - postpaid (Comparison between one month audit results and live calling results)
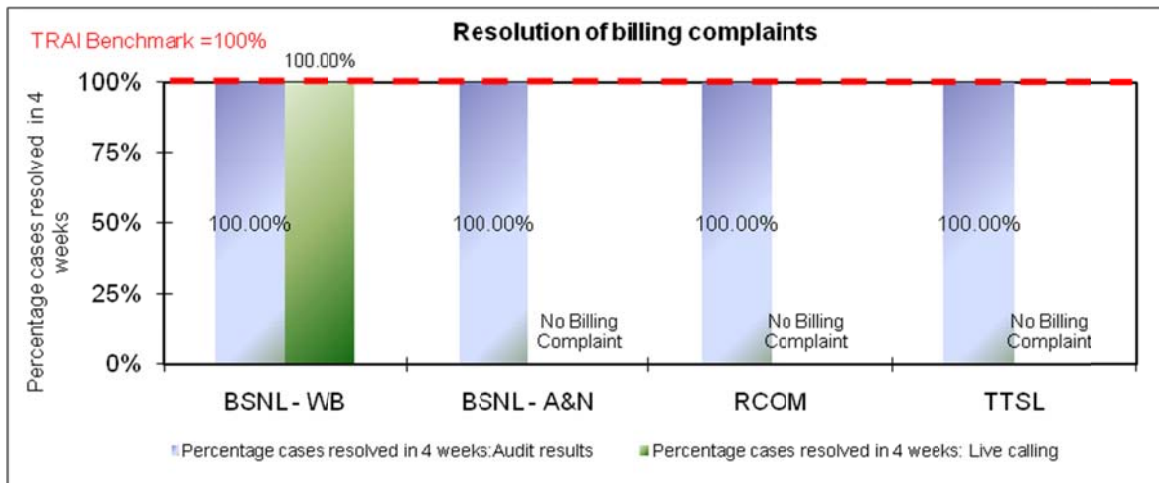
One month
All operators are meeting the benchmark

Live calling
All operators are meeting the benchmark

Closure requests attended within 7 days
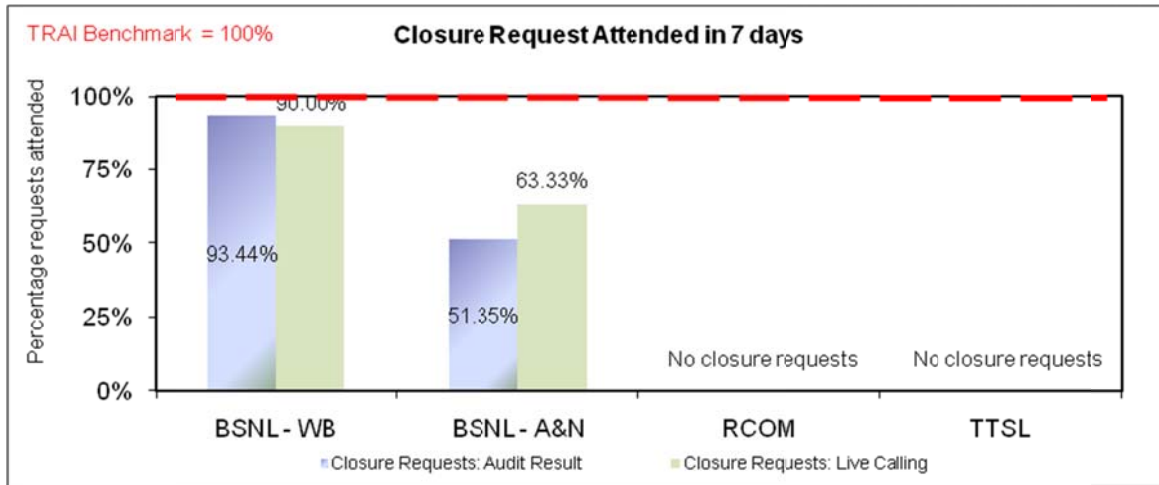
BSNL is not meeting the benchmark

Response time to customer for assistance - Calls answered and getting connected (Comparison between one month audit and live calling results)
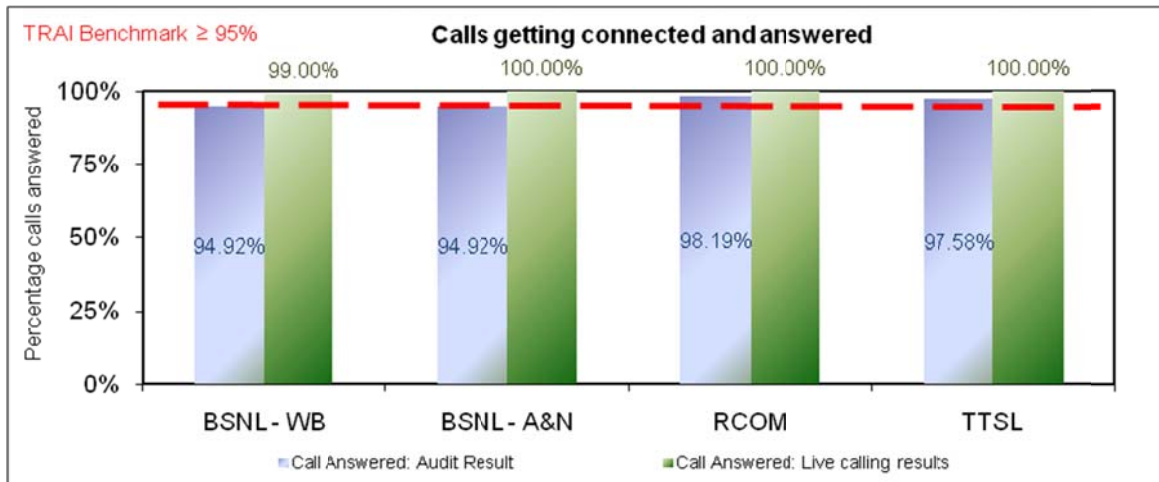
One month
Operator meeting benchmark: RCOM, TTSL
Operator not meeting benchmark: BSNL - (WB), BSNL - (A&N)

Live calling
All operators are meeting the benchmark

Response time to customer for assistance - Calls answered by the operator within 60 seconds (Comparison between one month audit results and live calling results)
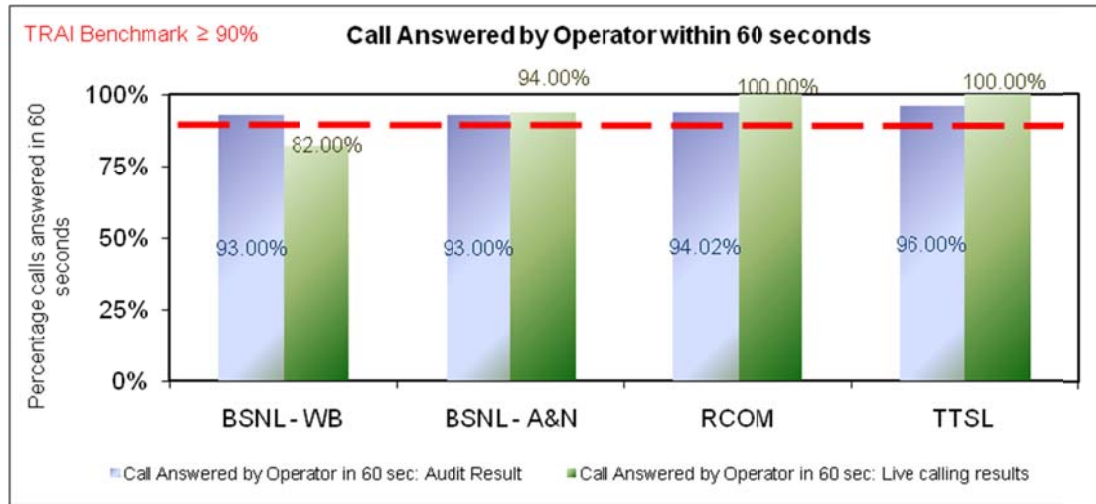
One month
All operators are meeting the benchmark

Live calling
Operator meeting benchmark: BSNL - (A&N), RCOM, TTSL
Operator not meeting benchmark: BSNL - (WB)

Time taken to refund of deposits after closure
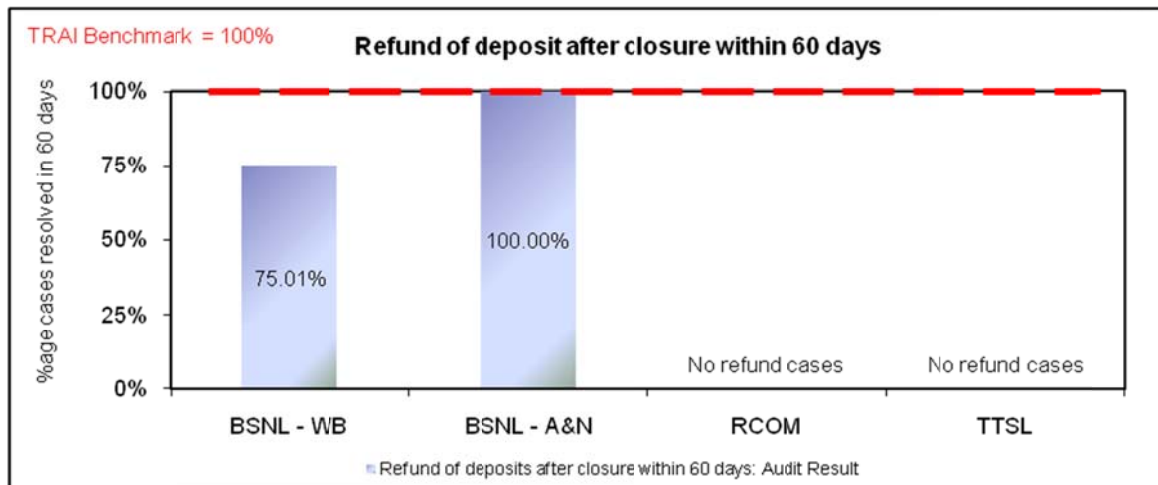
Operator meeting benchmark: BSNL - (A&N)
Operator not meeting benchmark: BSNL - (WB)

7.0 Compliance reports: Results of Verification of Records

7.1 Basic (Wireline) services

Parameters	Benchmarks	BSNL - (WB)		BSNL - (A&N)		RCOM		TTSL	
		PMR	IMRB*	PMR	IMRB*	PMR	IMRB	PMR	IMRB
Faults incidences (No. of faults/100 Subs./month)	≤5	5.32	18.05	4.13	4.35	0.00	0.00	0.00	0.00
% of faults repaired by next working day	By next working day: ≥ 90%	92.10%	54.02%	85.38%	53.79%	NA	NA	NA	NA
Total No. of faults registered during the quarter		DNA	41573	DNA	1647	NA	NA	NA	NA
No. of faults repaired by next working day during the quarter		DNA	22458	DNA	886	NA	NA	NA	NA
No. of faults repaired within 3 days during the quarter	For urban areas	DNA	24867	DNA	1293	NA	NA	NA	NA
% of faults repaired within 3 days	For urban areas: ≥ 100%	93.43%	75.32%	99.55%	78.51%	NA	NA	NA	NA
No. of faults repaired within 5 days during the quarter	For rural and hilly areas	DNA	7260	DNA	1293	NA	NA	NA	NA
% of faults repaired within 5 days	For rural and hilly areas:	92.65%	84.83%	100.00%	100.00%	NA	NA	NA	NA
Rent Rebate :	≥ 100%								
Faults pending for> 3days and ≤7 days	Rent Rebate for 7 days	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil
Faults pending for > 7 days and ≤15 days	Rent Rebate for 15 days	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil
Faults pending for > 15 days	Rent Rebate for 30 days	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil
Mean Time to Repair (MTTR)	≤ 8 Hrs	9.58	8.98	7.87	8.09	NA	NA	NA	NA
Call Completion Rate (CCR)	≥ 55%	60.87%	48.05%	61.63%	64.58%	NA	NA	NA	NA
Total Number of successful local calls		DNA	22387582	DNA	79247	NA	NA	NA	NA
Total local call attempts		DNA	10757180	DNA	51177	NA	NA	NA	NA
Answer to Seizure Ratio (ASR)	≥ 75 %	DNA	48.52%	DNA	69.47%	76.00%	76.00%	NA	NA
Total I/C seizures		DNA	20926061	DNA	315081	NA	NA	NA	NA
No. of answered calls		DNA	10152295	DNA	218879	NA	NA	NA	NA
Point of Interconnection (POI) Congestion (No. of Pols not meeting benchmark)	≤ 0.5%	0	0	0	0	0	0	0	0
Total number of working POI Service Area wise		DNA	67	DNA	0	NA	NA	NA	NA
Metering and billing credibility - post paid	Not more than 0.1%	DNA	0.01%	DNA	0.00%	0.00%	0.00%	0.03%	0.03%
No. of bills issued during the period		DNA	984944	DNA	23137	DNA	DNA	DNA	DNA
No. of bills disputed including billing complaints during the period		DNA	74	DNA	0	DNA	DNA	DNA	DNA
Metering and billing credibility - pre paid	Not more than 0.1%	DNA	DNA	DNA	NA	NA	NA	NA	NA

No. of charging / credit / validity complaints during the quarter		NA	NA	NA	NA	NA	NA	NA	NA
Total no. of pre-paid customers at the end of the quarter		NA	NA	NA	NA	NA	NA	NA	NA
Resolution of billing/ charging/ validity complaints	100% within 4 weeks	NA	NA	NA	NA	100.00%	100.00%	NA	NA
No. of billing/(post paid) and charging, credit / validity (pre paid) complaints resolved within 4 weeks during the quarter		DNA	DNA	DNA	DNA	DNA	DNA	DNA	DNA
Total no. of billing (post paid) and charging, credit / validity (pre paid) complaints received during the quarter		DNA	DNA	DNA	DNA	DNA	DNA	DNA	DNA
No. of billing complaints (post paid) and charging, credit/validity complaints (pre paid) resolved in favor of the customer during the quarter		DNA	DNA	DNA	DNA	DNA	DNA	DNA	DNA
No. of complaints disposed on account of not considered as valid complaints during the quarter		DNA	DNA	DNA	DNA	DNA	DNA	DNA	DNA
Period of applying credit/ waiver/ adjustment to customer's account from the date of resolution of complaints	within 1 week of resolution of complaint	DNA	DNA	DNA	DNA	DNA	DNA	DNA	DNA
Response time to the customer for assistance	≥ 95%	93.24%	93.00%	93.00%	93.00%	97.20%	97.20%	98.67%	98.67%
Total no. of call attempts to call centre / customer care nos. during TCBH		DNA	64513	64513	64513	DNA	DNA	DNA	DNA
Accessibility of call centre/ customer care		DNA	60377	60377	60377	DNA	DNA	DNA	DNA
Percentage of calls answered by the operators (voice to voice) within 60 seconds	≥ 90%	92.67%	93.00%	93.00%	93.00%	95.29%	95.29%	94.21%	94.21%
Termination / closure of service	≤ 7 days								
%age requests for Termination / Closure of service complied within 7 days	100.00%	DNA	100.00%	DNA	100.00%	NA	NA	NA	NA
Total No. of requests for Termination / Closure of service received during the quarter		DNA	38	242	242	0	0	0	0
No. of requests for Termination / Closure of service complied within 7 days during the quarter		DNA	38	242	242	0	0	0	0
Time taken for refund of deposits after closures	100% within 60 days.	DNA	100.00%	100.00%	100.00%	100.00%	100.00%	NA	NA

* These have been calculated cumulatively on the basis of figures reported by various exchanges

☐ (yellow)	Figures do not match with those reported in PMR	☐ (pink) Not meeting the benchmark	☐ (blue) Figures verified on all India bases

B'mark = TRAI Benchmark,   **DNA** = Details not available,   **NA:** Not Applicable

7.2 Conclusions

Basic Wireline Services

1. Variation observed in figures for BSNL is owing to the fact that only 5% of the total exchanges were audited for the operator whereas the data provided in the PMR is basis all the exchanges in the circle
2. BSNL in West Bengal is not meeting benchmark for Faults incidences (No. of faults/100 Subs./month) and % of faults repaired by next working day
3. BSNL is also observed to be not meeting benchmark for ASR and Response time to the customer for assistance parameters

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8.0 Annexure - I

Name of the Service Provider	Name of POI not meeting the benchmark	Total No. of circuits on POI	Total No. of call attempts on POI	Total traffic served on POI (Erlang)	% of Congestion POI	Action already taken/ action plan for meeting the benchmark
BSNL- WB	All POIs meeting benchmark					
BSNL – A&N	All POIs meeting benchmark					
TTSL	All POIs meeting benchmark					
RCOM	All POIs meeting benchmark					

8.1 Parameter wise performance reports for Basic Wireline services

2.1 Audit Results for Fault repair

Fault incidences	Benchmark	BSNL - (WB)	BSNL - (A&N)	RCOM	TTSL
Faults incidences (No. of faults/100 Subs./month)	≤ 5	11.21	3.58	0	0

Fault repair (Urban areas)	Benchmark	BSNL - (WB)	BSNL - (A&N)	RCOM	TTSL
Total No. of faults registered during the month		4111	283	0	0
No. of faults repaired by next working day during the month		1181	102	0	0
Percentage of faults repaired by next working day during the month	≥ 90%	28.73%	36.04%	NA	NA
No. of faults repaired within 3 days during the month		3546	187	0	0
Percentage of faults repaired within 3 days during the month	100%	86.26%	66.08%	NA	NA

Fault repair (Rural & Hilly areas)	Benchmark	BSNL - (WB)	BSNL - (A&N)	RCOM	TTSL
Total No. of faults registered during the month		2017	0	0	0
No. of faults repaired by next working day during the month		1562	0	0	0
Percentage of faults repaired by next working day during the month	≥ 90%	77.44%	NA	NA	NA
No. of faults repaired within 5 days during the month		1999	0	0	0
Percentage of faults repaired within 5 days during the month	100%	99.11%	NA	NA	NA

Rent rebate	Benchmark	BSNL - (WB)	BSNL - (A&N)	RCOM	TTSL
No. of cases with faults pending for >3 days and ≤7 days		757	22	0	0
Out of these number of cases where rent rebate for 7 days was given		757	22	0	0
Percentage of cases where rent rebate for 7 days was given	100%	100.00%	100.00%	NA	NA
No. of cases with faults pending for >7 days and ≤15 days		230	62	0	0
Out of these number of cases where rent rebate for 15 days was given		230	62	0	0
Percentage of cases where rent rebate for 15 days was given	100%	100.00%	100.00%	NA	NA
No. of cases with faults pending for ≥15 days		43	86	0	0
Out of these number of cases where rent rebate for 30 days was given		43	86	0	0
Percentage of cases where rent rebate for 30 days was given	100%	100.00%	100.00%	NA	NA
MTTR	**Benchmark**	**BSNL - (WB)**	**BSNL - (A&N)**	**RCOM**	**TTSL**

Mean time taken to repair the fault in hours	≤ 8	57.9	58.1	NA	NA

2.2 Live calling for fault repair

Rural & Hilly area	Benchmark	BSNL - (WB)	BSNL - (A&N)	RCOM	TTSL
Total Number of calls made		505	NA	NA	NA
Number of cases where faults were repaired by next working day		131	NA	NA	NA
Percentage cases where faults were repaired by next working day	≥ 90%	25.94%	NA	NA	NA
Number of cases where faults were repaired within 5 days		325	NA	NA	NA
Percentage cases where faults were repaired within 5 days	100%	64.36%	NA	NA	NA

3.1 Audit Results for Call Completion Rate (CCR) & ASR

Traffic statistics - Call Completion Rate	Benchmark	BSNL - (WB)	BSNL - (A&N)	RCOM	TTSL
Total local call attempts		11128962	26310	NA	DNA
Total number of successful local calls		5651823	20309	NA	DNA
Call Completion Rate (CCR) in the local network	≥ 55%	50.78%	77.19%	NA	DNA

Traffic statistics - Answer to Seizure Ratio	Benchmark	BSNL - (WB)	BSNL - (A&N)	RCOM	TTSL
Total number of calls processed by the switch		7182804	120252	66670	NA
Total number of calls answered		3897101	83352	55594	NA
Answer to Seizure Ratio (ASR)	≥ 75%	54.26%	69.31%	83.39%	NA

3.2 Live measurement results for Call Completion Rate (CCR) & ASR

Traffic statistics - Call Completion Rate	Benchmark	BSNL - (WB)	BSNL - (A&N)	RCOM	TTSL
Total local call attempts		2565693	28193	NA	DNA
Total number of successful local calls		1397669	24412	NA	DNA
Call Completion Rate (CCR) in the local network	≥ 55%	54.48%	86.59%	NA	DNA

Traffic statistics - Answer to Seizure Ratio	Benchmark	BSNL - (WB)	BSNL - (A&N)	RCOM	TTSL
Total number of calls processed by the switch		1891335	102924	3020	NA
Total number of calls answered		1251592	61789	2497	NA
Answer to Seizure Ratio (ASR)	≥ 75%	66.18%	60.03%	82.69%	NA

4.1 Audit Results for POI Congestion

POI congestion	Benchmark	BSNL - (WB)	BSNL - (A&N)	RCOM	TTSL
POI traffic offered on all individual POI's		315137	584	2119.05	NA
Served traffic for all POI's		279608	59.08	93	NA
Traffic failed on all POI's	≤ 0.5%	0.00%	0.00%	0.00%	NA

4.2 Live measurement results for POI congestion

POI congestion	Benchmark	BSNL - (WB)	BSNL - (A&N)	RCOM	TTSL
POI traffic offered on all individual POI's		11696	584	1897.6	NA
Served traffic for all POI's		10227	33.05	95.8	NA
Traffic failed on all POI's	≤ 0.5%	0.00	0.00	0.00	NA

POI congestion	Benchmark	BSNL - (WB)	BSNL - (A&N)	RCOM	TTSL
No. of POIs not meeting benchmark		70	3	72	NA
Total number of working POIs		0	0	0	NA

5.1 Audit Results for Billing performance

Billing Performance	Benchmark	BSNL - (WB)	BSNL - (A&N)	RCOM	TTSL
Billing disputes - Postpaid					
Total bills generated during the period		80482	7508	2020	3267
Total number of bills disputed		16	0	0	0
Percentage bills disputed	≤ 0.1%	0.02%	0.00%	0.00%	0.00%
Billing disputes - Prepaid					
No. of charging / credit / validity complaints during the month		0	0	0	0
Total no. of pre-paid customers at the end of the month		0	0	0	0
Number of complaints per 100 customers	≤ 0.1%	NA	NA	NA	NA
Resolution of billing complaints					
Total number of billing/charging complaints		16	0	0	0
Total complaints resolved in 4 weeks from date of receipt		4	0	0	0
Percentage complaints resolved within 4 weeks of date of receipt	100%	100.00%	100.00%	100.00%	100.00%
Period of applying credit / waiver					
No. of complaints resolved in favor of the customer during the month		4	0	0	0
No. of complaints disposed on account of not considered as valid complaints		12	0	0	0
Percentage cases in which credit/waiver was received within 1 week	100%	100.00%	NA	NA	NA

5.2 Live calling results for resolution of billing complaints

Resolution of billing complaints	Benchmark	BSNL - (WB)	BSNL - (A&N)	RCOM	TTSL
Total Number of calls made		10	0	0	0
Number of cases resolved in 4 weeks		10	0	0	0
Percentage cases resolved in 4 weeks	100%	100.00%	NA	NA	NA

6.1 Audit Results for Closure Requests

Closure Requests	Benchmark	BSNL - (WB)	BSNL - (A&N)	RCOM	TTSL
Total no. of requests received for Closures		259	37	0	0
Total no. of requests for closures attended within 7 days		242	19	0	0
Percentage of requests for closures attended within 7 days	100%	93.44%	51.35%	NA	NA
Total no. of requests for closures not attended or attended beyond 7 days		17	18	0	0

7.1 Audit results for customer care

Customer Care Assessment	Benchmark	BSNL - (WB)	BSNL - (A&N)	RCOM	TTSL
Total no. of call attempts to call centre / customer care nos. during TCBH		20150	20150	113283	143328
No. of calls connected and answered successfully to call centre / customer care nos. during TCBH		19127	19127	111234	139864
Percentage of calls getting connected and answered electronically	≥ 95%	94.92%	94.92%	98.19%	97.58%
Percentage of calls answered by the operators (voice to voice) within 60 seconds	≥ 90%	93.00%	93.00%	94.02%	96.00%

7.2 Live calling results for customer care

Customer Care Assessment	Benchmark	BSNL - (WB)	BSNL - (A&N)	RCOM	TTSL
Total Number of calls received		100	100	100	100
Total Number of calls getting connected and answered		99	100	100	100
Percentage calls getting connected and answered	≥ 95%	99.00%	100.00%	100.00%	100.00%

7.3 Live calling results for customer care (Voice to Voice)

Customer Care Assessment	Benchmark	BSNL - (WB)	BSNL - (A&N)	RCOM	TTSL
Total Number of calls received		100	100	100	100
Total Number of calls answered within 60 seconds		82	94	100	100
Percentage calls answered within 60 seconds	≥ 90%	82.00%	94.00%	100.00%	100.00%

8.1 Audit results for refund of deposits

Refund	Benchmark	BSNL - (WB)	BSNL - (A&N)	RCOM	TTSL
Total number of cases requiring refund of deposits		4321	9	0	0
Total number of cases where refund was made within 60 days		3241	9	0	0
Percentage cases in which refund was receive within 60 days	100%	75.01%	100.00%	NA	NA

9.1 Live calling for level 1 services

Level 1 services	Benchmark	BSNL - (WB)	BSNL - (A&N)	RCOM	TTSL
Total no. of calls made		150	150	150	150
Calls answered in 60 sec		139	150	150	150
Calls answered after 60 sec		11	0	0	0

10.1 Exchange capacity and Subscribers

	Benchmark	BSNL - (WB)	BSNL - (A&N)	RCOM	TTSL
Equipped Capacity of the exchange (in erlangs)		103634	15000	128K	DNA
Total number of customers served		52382	8376	2263	DNA

Section B
WIRELESS

9.0 Sampling methodology

9.1 Sampling for Cellular Mobile (Wireless) service providers

Data pertaining to 100% of the Gateway MSC's (GMSC's) and Mobile Switching Centers (MSC's) of all the Cellular Mobile Service Providers or Unified Access Service Providers (UASP) was collected and verified in specified circles/service areas. Following are the various operators covered in West Bengal circle

	Name of Operator	Month of Audit
Operator 1	Videocon	January, 2012
Operator 2	Vodafone	January, 2012
Operator 3	Reliance GSM	January, 2012
Operator 4	Reliance CDMA	January, 2012
Operator 5	Airtel	January, 2012
Operator 6	Uninor	January, 2012
Operator 7	Idea	January, 2012
Operator 8	MTS	January, 2012
Operator 9	Tata Docomo	January, 2012
Operator 10	Tata Tele CDMA	January, 2012
Operator 11	BSNL	January, 2012
Operator 12	Aircel	January, 2012

10.0 Audit methodology

10.1 Cellular Mobile Services

In a nutshell the following activities were done while auditing for various parameters for Cellular Mobile Services:

S.no	Parameter	AS REPORTED IN PMR	AS FOUND IN ACTUAL RECORDS AFTER VERIFICATION	AS FOUND IN VERIFICATION FOR THE MONTH OF AUDIT	AS FOUND IN 3 DAY LIVE MEASUREMENT DATA	LIVE CALLING	OPERATOR ASSISSTED DRIVE TESTS	INDEPENDENT DRIVE TESTS
A	**Network Performance**							
A (i)	BTS accumulated down time	Yes	Yes	Yes				
A (ii)	Call setup success rate (within licensee own network)	Yes	Yes	Yes	Yes		Yes	Yes
A (iii)	Blocked Call Rate	Yes	Yes	Yes	Yes		Yes	Yes
A (iv)	Call Drop rate	Yes	Yes	Yes	Yes		Yes	Yes
A (v)	% Connections with good voice quality	Yes	Yes	Yes			Yes	Yes
A (vi)	Service Coverage	Yes	Yes	Yes			Yes	Yes
A (vii)	PoI Congestion	Yes	Yes	Yes				
B	**Customer Helpline**							
B (i)	Response time to the customer for assistance	Yes	Yes	Yes		Yes		
C	**Billing Complaints**							
C (i)	Billing complaints per 100 bills issued	Yes	Yes	Yes				
C (ii)	%age of billing complaints resolved within 4 weeks	Yes	Yes	Yes		Yes		
C (iii)	Period of all refunds/payments due to customers from date of resolution as in (ii) above	Yes	Yes	Yes		Yes		

11.0 Executive Summary

The objective assessment of Quality of Services (QoS) was carried out by IMRB International for all the Cellular mobile service providers during the period starting from January 2012 to March 2012 in West Bengal circle. The executive summary encapsulates the key findings of the Audit by providing: -

- *"Service provider performance report"* for Cellular mobile service , which gives a glimpse of the performance of various operators against the benchmark specified by TRAI, during the month in which the Audit was carried out by IMRB Auditors

- *"Parameter wise critical findings"* for Cellular mobile services: This indicates key observations and findings from different activities carried out during the Audit process

11.1 Service provider performance report based on one month data verification: Cellular Mobile Services

Name of Service Provider	Time Consistent Busy Hour (TCBH)	Network Availability					Connection Establishment (Accessibility)			Connection Maintenance (Retainability)					POI	Total number of working POI Service Area wise	Network Traffic Capacity and Utilization		
		Total no. of BTSs in the licensed service area	Sum of downtime of BTSs in a month in hours i.e. total outage time of all BTSs in hours during a month	BTSs Accumulated downtime (not available for service) (%age)	No. of BTSs having accumulated downtime of >24 hours in a month	Worst affected BTSs due to downtime (%age)	Call Set-up Success Rate (within licensee's own network)	SDCCH/ Paging Chl. Congestion (%age)	TCH Congestion (%age)	Call Drop Rate (%age)	Total No. of cells exceeding 3% TCH drop (call drop)	Total no. of cells in the network	Worst affected cells having more than 3% TCH drop (call drop) rate (%age)	%age of connection with good voice quality	POI Congestion (No. of POIs not meeting the benchmark))		Equipped Capacity of Network in respect of Traffic in erlang	Total traffic handled in TCBH in erlang	Total no. of customers served (as per VLR) on last day of the month
Benchmark				≤ 2%		≤ 2%	≥ 95%	≤ 1%	≤ 2%	≤ 2%			≤ 5%	≥ 95%	≤ 0.5%				
Videocon	19:00 - 20:00	31	41	0.18%	0	0.00%	99.21%	0.25%	0.00%	0.54%	0	94	0.00%	98.55%	0	11	5000	1	260
Vodafone	19:00 - 20:00	6217	17659	0.38%	11	0.18%	97.67%	0.45%	1.07%	1.29%	693	18601	3.73%	95.45%	0	41	294170	253872	10259505
Reliance GSM	19:00 - 20:00	2602	6284	0.32%	41	1.58%	98.50%	0.02%	0.39%	0.70%	124	7806	1.59%	98.24%	0	21	138000	91917	4366029
Reliance CDMA	19:00 - 20:00	1061	1879	0.24%	7	0.66%	98.65%	0.00%	0.63%	0.80%	20	3183	0.63%	98.32%	0	21	148000	44677	1112509
Airtel	19:00 - 20:00	4787	1487	0.04%	7	0.15%	99.20%	0.11%	0.20%	1.11%	219	15430	1.42%	98.95%	0	31	232758	183357	7783897
Uninor	19:00 - 20:00	1935	21293	1.48%	22	1.14%	96.96%	0.29%	1.90%	1.47%	100	5813	1.72%	97.86%	3	101	76545	66370	1594871
Idea	19:00 - 20:00	2089	768	0.05%	12	0.57%	97.26%	0.45%	1.50%	1.13%	169	6265	2.70%	97.11%	0	81	48465	38251	1552019
MTS	19:00 - 20:00	894	839	0.13%	4	0.45%	99.22%	0.00%	0.48%	0.97%	70	2935	2.39%	98.29%	0	62	88200	43963	1071229
Tata Docomo	19:00 - 20:00	1412	123	0.01%	0	0.00%	98.78%	0.02%	0.05%	0.90%	6514	131316	4.96%	97.31%	0	27	59287	16185	834289
Tata Tele CDMA	19:00 - 20:00	628	4	0.00%	0	0.00%	98.82%	0.00%	0.26%	0.78%	40	1883	2.12%	99.02%	0	147	146534	19100	289274
BSNL	19:00 - 20:00	2536	22524	1.19%	49	1.93%	97.70%	0.53%	0.97%	0.42%	321	7410	4.33%	97.58%	0	98	176000	240455	1703269
Aircel	18:00 - 19:00	2654	4047	0.20%	35	1.32%	96.73%	0.68%	0.31%	1.54%	392	7889	4.97%	95.99%	0	129	122150	30904	1517298

** Methodology not in line with QoS

Figures provided on All India basis

Not meeting the benchmark

B'mark = TRAI Benchmark, DNA = Details not available, NA: Not Applicable

Critical findings: Cellular Mobile Services

The audit for cellular mobile service providers were conducted at their respective MSCs in the West Bengal circle apart from Reliance Communication whose audit was conducted at their central NOC at Mumbai.

The audit involved a three stage verification process which consisted of auditing the records of the service providers and verifying the data submitted to TRAI. The second step involved a three day live measurement of all the network parameters. Finally basis the three day live measurement the auditors needed to find out the busy hour for the service provider and collect the hourly data for this busy hour for the month in which the audit was conducted.

Busy Hour of Various Service Providers

Service Provider	Reported Time Consistent Busy Hour	Network Busy Hour found in 3 day live measurement
Videocon	19:00-20:00	19:00-20:00
Vodafone	19:00-20:00	19:00-20:00
Reliance GSM	19:00-20:00	19:00-20:00
Reliance CDMA	19:00-20:00	19:00-20:00
Airtel	19:00-20:00	19:00-20:00
Uninor	20:00-21:00	20:00-21:00
Idea Cellular	19:00-20:00	19:00-20:00
MTS	20:00-21:00	20:00-21:00
TATA Docomo GSM	19:00-20:00	19:00-20:00
TATA Tele CDMA	19:00-20:00	19:00-20:00
BSNL	19:00-20:00	19:00-20:00
Aircel	20:00-21:00	20:00-21:00

The TCBH reported by all the service providers matched the network busy hour calculated by IMRB auditors for the West Bengal circle.

BTSs Accumulated Downtime:
In the West Bengal circle, BSNL experienced the highest outage (22524 hours) in the month of audit. BSNL followed by Reliance GSM had maximum number of worst affected BTSs in the service area.

Call Set-up Success Rate (CSSR):
All the operators were comfortably meeting the benchmark on this parameter. During the audits the maximum CSSR was observed for MTS with 99.22% of their calls getting completed. All the operators were found to be calculating the parameter as per the norm specified by TRAI. CSSR was established as the ratio of total number of successful call attempts (establishment) to the total number of call attempts made.

Network Congestion parameters:
SDCCH / Paging Channel Congestion, TCH and POI are part of the network congestion parameters. All the operators for Traffic channel congestion are meeting the TRAI specified benchmarks on the congestion parameters. All operators meet the TRAI specified benchmark which was found during the one month data collected for the month of audit. TATA Docomo leads the way in network congestion parameters with almost negligible paging as well as traffic channel congestion. The calculation methodology of these parameters was found to be in complete accordance with what has been specified by TRAI. There were no POIs with congestion more than the benchmark (≤0.5%) apart from Uninor which had 3.

Call Drop Rate:
During the audit it was found that all the service providers were measuring this parameter as per the TRAI guidelines. The call drop rate was measured as the ratio of total calls dropped to the total number of call attempts for all operators. Also, all of

service providers were found to be meeting the TRAI specified benchmark. The lowest call drop rate was of TATA Tele at 0.54% while the highest was for Aircel at 1.54%.

Connections with good voice quality:
All the operators are measuring this parameter via their periodic drive tests. However, for some operators these parameters can be obtained at their switch as well. During the audit it was found that all the service providers were measuring this parameter as per the TRAI guidelines.

Customer Care / Helpline Assessment
For the accessibility of customer care aspect all the service providers meet the TRAI benchmark. TATA Docomo (for percentage calls answered within 60 seconds) does not meet the benchmark for the month of audit.

Billing performance
All the operators were found to be meeting the benchmark of ≤ 0.1% complaints registered per 100 bills issued and the benchmark of 100% billing complaints being resolved within 4 weeks. In all cases where customers were due for refund, all the service providers meet the TRAI benchmark of 100% with 1 week.

Inter operator calls assessment

Inter operator call Assessment To↓ From→	Videocon	Vodafone	Reliance GSM	Reliance CDMA	Airtel	Uninor	Idea	MTS	Tata Docomo	Tata Tele CDMA	BSNL	Aircel
Videocon	NA	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Vodafone	100%	NA	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Reliance GSM	100%	100%	NA	100%	100%	100%	100%	100%	100%	100%	100%	100%
Reliance CDMA	100%	100%	100%	NA	100%	100%	100%	100%	100%	100%	100%	100%
Airtel	100%	100%	100%	100%	NA	100%	100%	100%	100%	100%	100%	100%
Uninor	100%	100%	100%	100%	100%	NA	100%	100%	100%	100%	100%	100%
Idea	100%	100%	100%	100%	100%	100%	NA	100%	100%	100%	100%	100%
MTS	100%	100%	100%	100%	100%	100%	100%	NA	100%	100%	100%	100%
Tata Docomo	100%	100%	100%	100%	100%	100%	100%	100%	NA	100%	100%	100%
Tata Tele CDMA	100%	100%	100%	100%	100%	100%	100%	100%	100%	NA	100%	100%
Aircel	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	NA
BSNL	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	NA	100%

The maximum problem faced by the calling operator to other operators

In the inter-operator call assessment, calls were made from the test SIMs of service provider whose audit was being conducted to all the other service providers. All operators were able to connect to each other without any issues.

Results of Operator assisted Drive test

The drive test was conducted simultaneously for all the operators present in the West Bengal circle. There was in total of three drive tests conducted in the circle. These tests were conducted in the cities of Behrampur, Jalpaiguri and Medinapur. IMRB auditors were present in vehicles of every operator. A sample of 15 – 30 test calls were made along each of the routes. The holding period for all test calls was between 120 seconds to 180 seconds. The drive test vehicle across all routes plied at a speed of less than 20 km per hour. Taking into consideration the route that was taken for the drive test; most of the major areas West Bengal telecom circles were covered. Drive test for Videocon was not conducted.

For measuring voice quality RxQual samples for GSM operators and Frame Error Rate (FERs) for CDMA service providers were measured. RxQual greater than 5 meant that the sample was not of appropriate voice quality and for CDMA operators FERs of more than 4 were considered bad. Call drops were measured by the number of calls that were dropped to the total number of calls established during the drive test. Similarly CSSR was measured as the ratio of total calls established to the total call attempts made. Signal strength was measured in Dbm with strength > -75dbm for indoor, -85 dms for in-vehile and > -95 dbm outdoor routes.

The drive tests in the West Bengal circle were conducted in the cities of Behrampur, Jalpaiguri and Medinapur was conducted along the following route:

	Type of location	Behrampur	Jalpaiguri	Midnapur
Outdoor	Periphery of the city	NH34 to Bhagirathi to KN ROAD to ITI to Kasimbazar Railway Station	Cossimbazar railway station, Kazinajrul Sarani Alon Bhagirathi River to Gopal ghat to NH 34 corsssing Industrial training institute to Municipal primary school to cossimbazar railway station	Amtala-natunbazar-jagnath mandir-judge court-keranitola-railwaystation-busstand-lic more-abas-highway upto amtala
	Congested area	Khagra to Gorabazar via Indurpursth to Bus stand	Khagra court area-beharampur new gen hospital gorabazar beharampur busstand	Keranitola-lic more-college-bottola-schoolbazar-jaganath mandir
	Across the city	Kasimbazar to Mental hospital to church to NH34	NH 34 to Kazinajrul sarani through catholic church, Mental hospital to kendriya vidyalaya to Bishnupur Kalibari to Cossimbazar railway station	Jaganath mandir-schoolbazar-bottola-keranitola-railwaystation-university
Indoor	Office complex	District library	Samrat Hotel	Collectory office
	Shopping complex	Hotel samrat	District Library	Hotel hindustan

The tables given below gives a glimpse of the results of the operator assisted drive test:
Videocon has not participated in any of the 3 drive test locations in West Bengal due to non presence of its network in any of these cities.

Drive Test – Behrampur

	B'mark	Vodafone		BSNL		Reliance GSM		Reliance CDMA		Airtel		Uninor		Idea		MTS		Tata Docomo		Tata Tele CDMA		Aircel	
		In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor
Voice quality	≥ 95%	99.34%	95.18%	98.59	97.41	86.75	90.02	74.42	97.57	98.72%	95.67	98.06%	95.43%	98.82%	96.06%	97.93%	96.89%	99.67	96.18	98.91	98.03	97.16	91.84
CSSR	≥ 95%	100.00%	100.00%	100.00	100.00	100.00	99.34	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00	99.31%
%age Blocked calls		0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Call drop rate	≤ 2%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Hands off success rate		100.00%	100.00%	100.00%	100.00%	99.13043	99.38	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%

Drive Test – Jalpaiguri

	B'mark	Vodafone		BSNL		Reliance GSM		Reliance CDMA		Airtel		Uninor		Idea		MTS		Tata Docomo		Tata Tele CDMA		Aircel	
		In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor
Voice quality	≥ 95%	97.63%	95.55%	97.50	96.17	99.02	90.53	90.78	99.94	97.51%	96.37%	98.49%	95.89%	97.34%	96.87%	99.23%	98.95%	99.74	97.13	99.09	98.59	99.13	96.34
CSSR	≥ 95%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	99.34%	100.00%	100.00%	100.00%	99.34%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
%ag		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

		%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%
e Blocked calls																							
Call drop rate	≤ 2%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.67%	0.00%	0.00%	0.00%	0.00%	0.00%	0.67%
Hands off success rate		100.00%	100.00%	100.00%	100.00%	100.00	99.52%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%

Drive Test – Midnapur

	B'mark	Vodafone		BSNL		Reliance GSM		Reliance CDMA		Airtel		Uninor		Idea		MTS		Tata Docomo		Tata Tele CDMA		Aircel	
		In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor
Voice quality	≥ 95%	98.11%	96.19%	96.52%	96.42%	99.50%	96.31%	102.97%	98.85%	97.85%	96.62%	96.71%	95.46%	94.63%	94.39%	97.91%	99.05%	99.30%	98.17%	99.10%	97.99%	98.43%	96.97%
CSSR	≥ 95%	100.00%	100.00%	100.00%	98.68%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
%age Blocked calls		0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Call drop rate	≤ 2%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Hands off success rate		100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%

■ Not meeting the benchmark

Conclusions:

Drive test was conducted by IMRB with the help of service providers to measure this parameter. In the drive test it was found that all the operators meet the various TRAI benchmark apart from voice quality and Call Drop Rate

1. MTS does not meet the TRAI benchmark on Voice Quality in Jalpaiguri. Aircel does not meet the benchmark for indoor in Jalpaiguri.
2. MTS does not meet the TRAI benchmark on Voice Quality in Jalpaiguri.
3. Idea, MTS and TATA Tele does not meet the TRAI benchmark on Voice Quality in Medinapur.

Summary of Live Measurement Results – Cellular Mobile Services

Name of Service Provider	Network Availability		Connection Establishment (Accessibility)			Connection Maintenance (Retainability)		
	BTSs Accumulated downtime (not available for service)	Worst affected BTSs due to downtime	Call Set-up Success Rate (within licensee's own network)	SDCCH/ Paging Chl. Congestion (%age)	TCH Congestion (%age)	Call Drop Rate (%age)	Worst affected cells having more than 3% TCH drop	%age of connection with good voice quality
Benchmark	≤ 2%	≤ 2%	≥ 95%	≤ 1%	≤ 2%	≤ 2%	≤ 5%	≥ 95%
Videocon	1.22%	0.00%	99.24%	0.07%	0.09%	1.17%	0.00%	99.27%
Vodafone	0.36%	0.00%	96.73%	0.81%	1.56%	1.25%	3.38%	95.28%
Reliance GSM	0.21%	0.00%	99.02%	0.01%	0.12%	0.58%	0.15%	98.09%
Reliance CDMA	0.28%	0.00%	98.41%	0.00%	0.29%	0.77%	0.53%	98.32%
Airtel	0.02%	0.00%	99.27%	0.12%	0.14%	0.59%	1.26%	98.97%
Uninor	15.31%	2.08%	97.50%	0.08%	1.85%	1.42%	2.31%	95.06%
Idea	0.10%	0.29%	98.64%	0.36%	0.81%	1.02%	0.40%	97.58%
MTS	0.14%	0.00%	99.36%	0.00%	0.06%	1.04%	3.32%	98.85%
Tata Docomo	0.01%	0.00%	98.81%	0.02%	0.03%	0.86%	4.60%	97.23%
Tata Tele CDMA	0.04%	0.00%	99.17%	0.00%	0.02%	0.54%	0.07%	99.02%
Aircel	0.10%	0.00%	97.88%	0.17%	0.29%	1.31%	4.99%	96.41%
BSNL	1.39%	0.00%	97.54%	0.47%	0.00%	0.49%	2.73%	98.45%

 Not meeting the benchmark

During the three day live measurement, all operators, except Uninor for Network Availability, were found to be meeting the TRAI benchmark on all the parameters.

Summary of Live Calling Results – Cellular Mobile Services

Name of Service Provider	Metering and Billing	Response time to customer for assistance	
	%age complaints resolved within 4 weeks	Accessibility of call centre/ customer care	Percentage of calls answered by the operators (voice to voice) within 60 seconds
Benchmark	100%	≥ 95%	≥ 90%
Videocon	NA	NA	NA
Vodafone	95.00%	100.00%	95.00%
Reliance GSM	100.00%	100.00%	88.00%
Reliance CDMA	NA	100.00%	87.00%
Airtel	93.00%	100.00%	92.00%
Uninor	96.77%	100.00%	NA
Idea	94.00%	100.00%	88.00%
MTS	86.00%	100.00%	88.00%
Tata Docomo	92.00%	100.00%	NA
Tata Tele CDMA	NA	100.00%	NA
Aircel	90.00%	100.00%	90.00%
BSNL	90.60%	100.00%	100.00%

12.0 Detailed findings – Includes comparison between Live calling/Live measurements and One month data collection

12.1 Graphical/Tabular Representations for Cellular Mobile Services

BTSs Accumulated Downtime
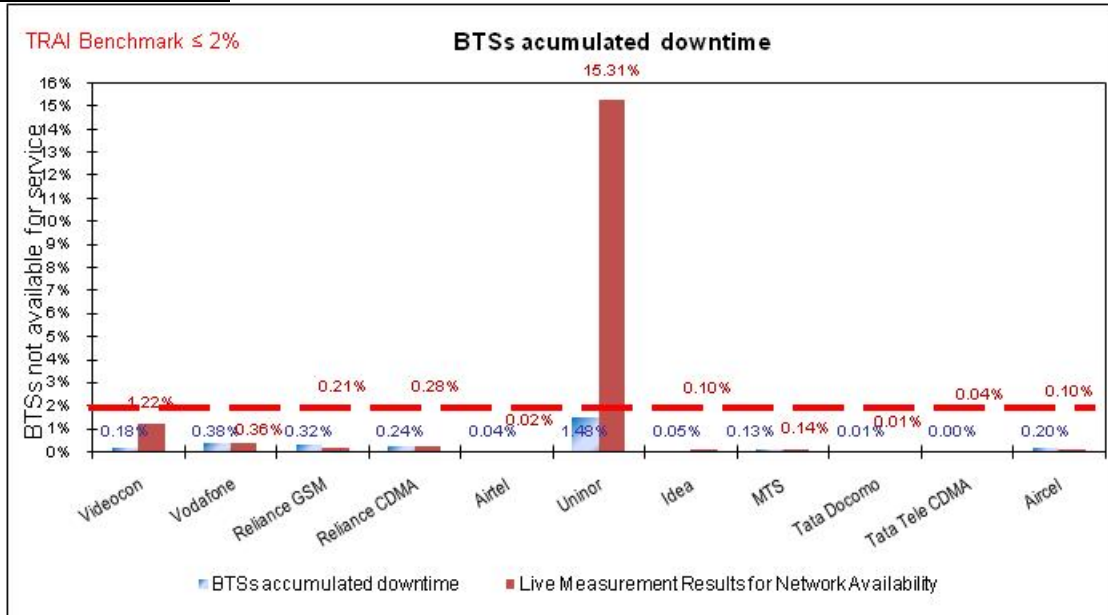
One month
All the operators meet the benchmark

Live measurement
Operator(s) meeting benchmark: Videocon, Vodafone, Reliance GSM, Reliance CDMA, Airtel, Idea, MTS, Tata Docomo, Tata Tele CDMA, BSNL, Aircel
Operator(s) not meeting the benchmark: Uninor

Worst Affected BTSs
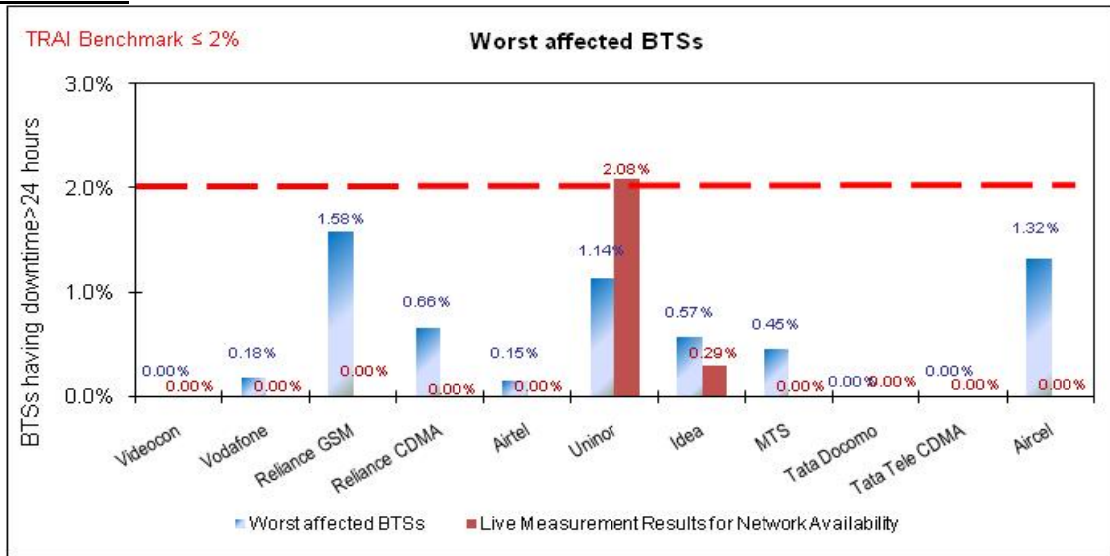
One month
All the operators meet the benchmark

Live measurement
Operator(s) meeting benchmark: Videocon, Vodafone, Reliance GSM, Reliance CDMA, Airtel, Idea, MTS, Tata Docomo, Tata Tele CDMA, BSNL, Aircel
Operator(s) not meeting the benchmark: Uninor

Call Set-up Success Rate (CSSR)
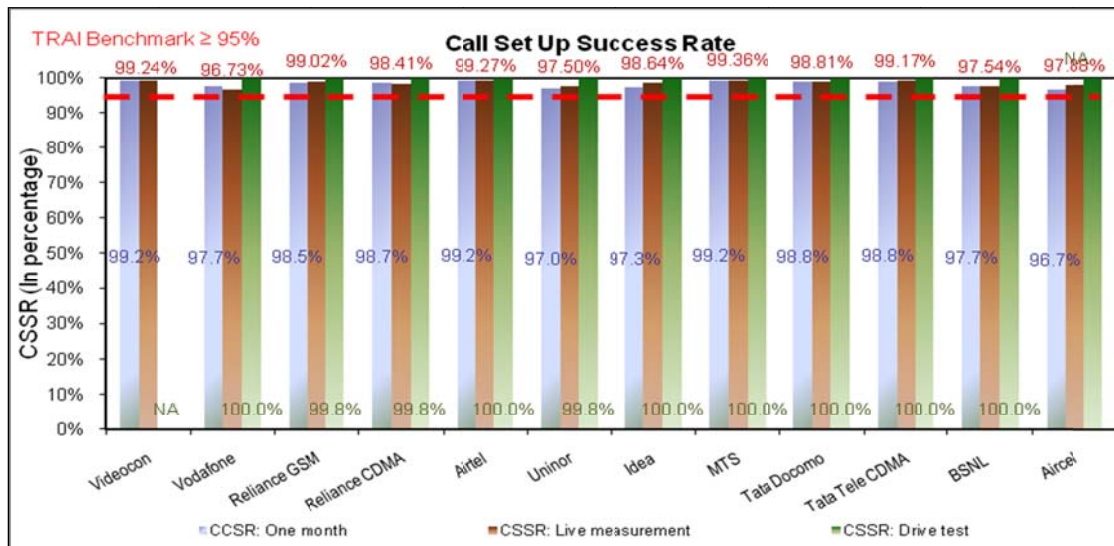
One month
All the operators meet the benchmark
Live measurement
All the operators meet the benchmark
Drive test
All the operators meet the benchmark

SDCCH / Paging Channel Congestion
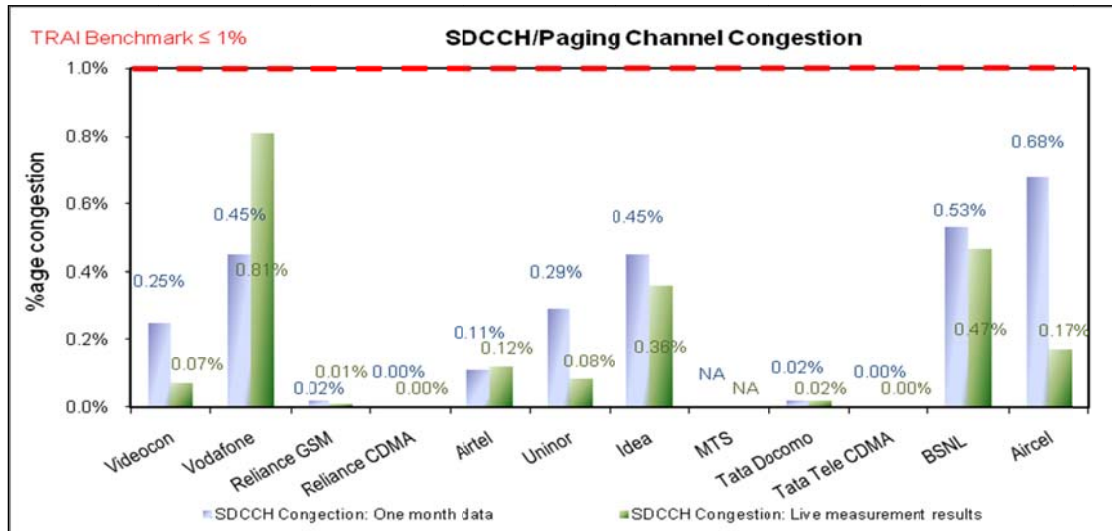
One month
All the operators meet the benchmark

Live measurement
All the operators meet the benchmark

TCH Congestion
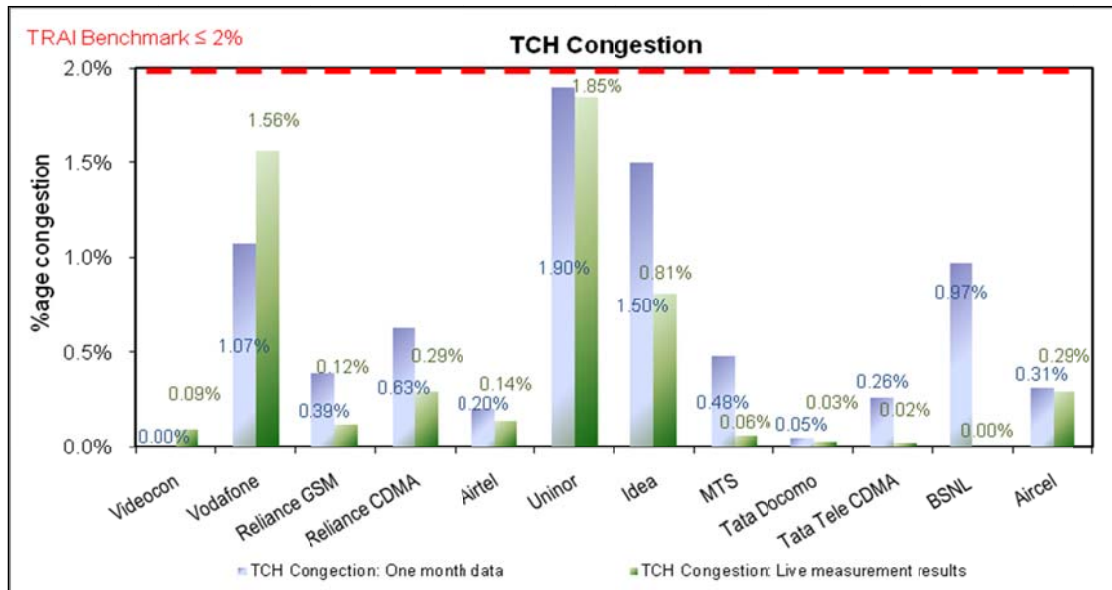
One month
All the operators meet the benchmark

Live measurement
All the operators meet the benchmark

Call Drop Rate
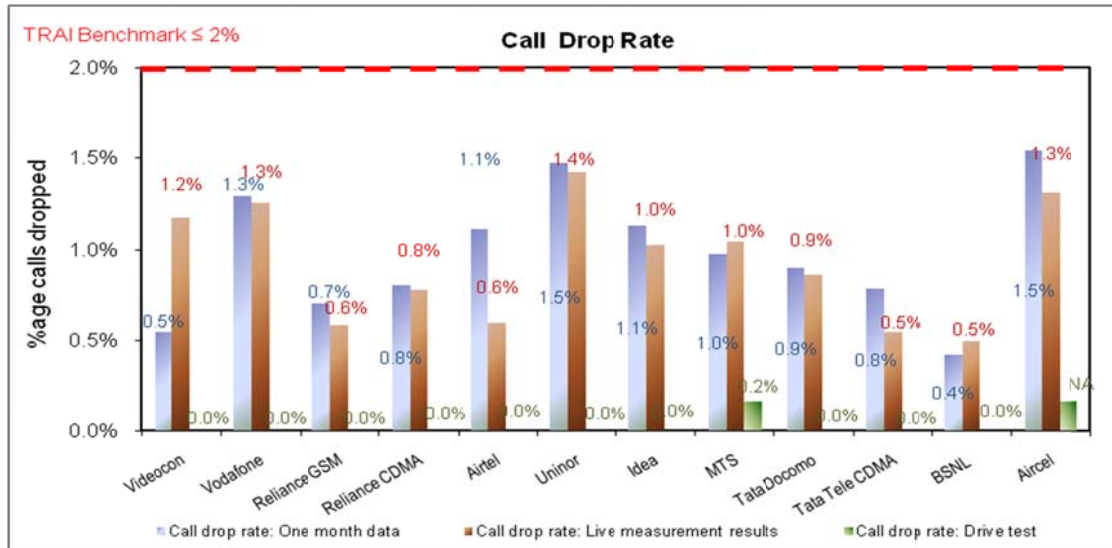
One month
All the operators meet the benchmark
Live measurement
All the operators meet the benchmark
Drive test
All the operators meet the benchmark

Cells with more than 3% TCH Drop Rate
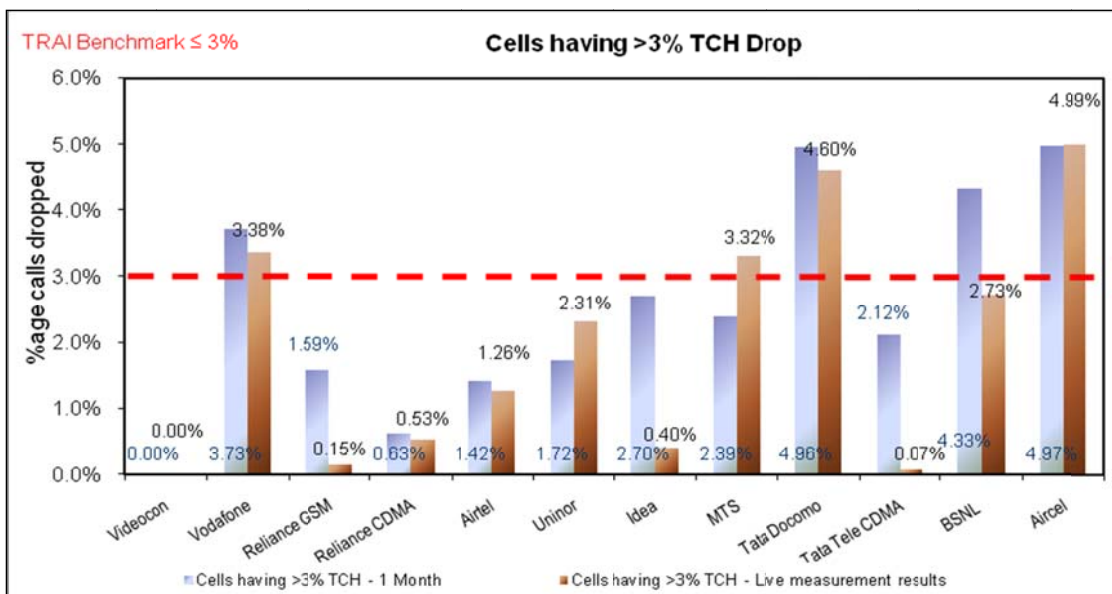
One month
Operator(s) meeting benchmark: Videocon, Reliance GSM, Reliance CDMA, Airtel, Uninor, Idea, MTS, Tata Tele CDMA
Operator(s) not meeting the benchmark: Vodafone, Tata Docomo, BSNL, Aircel
Live measurement
Operator(s) meeting benchmark: Videocon, Reliance GSM, Reliance CDMA, Airtel, Uninor, Idea, Tata Tele CDMA, BSNL
Operator(s) not meeting the benchmark: Vodafone, MTS, Tata Docomo, Aircel

Voice quality
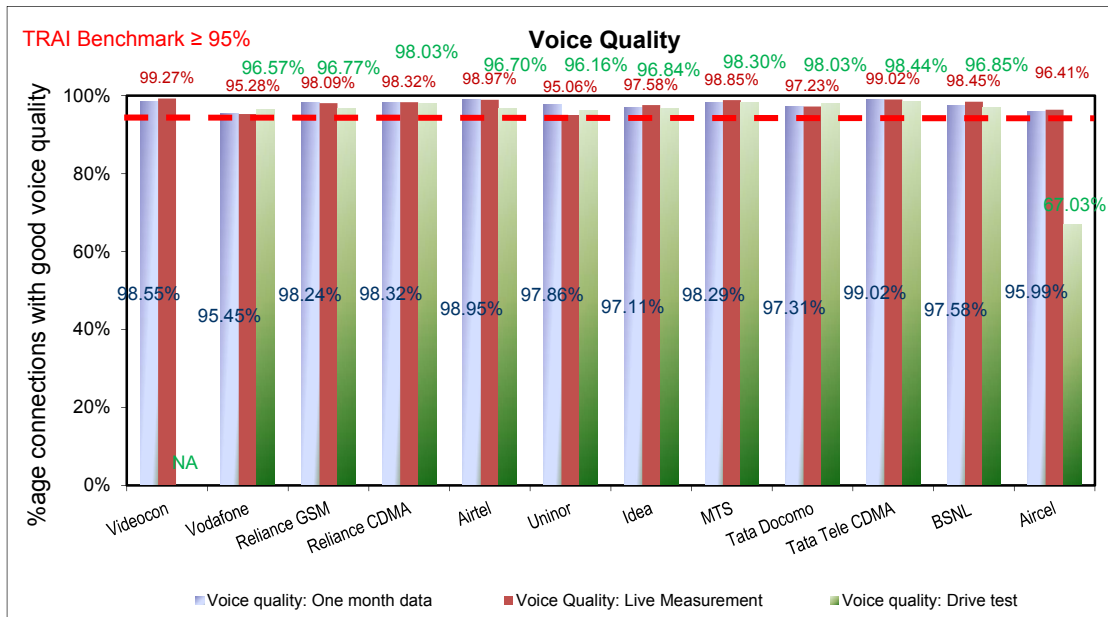
One month
All the operators meet the benchmark

Live measurement
All the operators meet the benchmark

Drive test
Operator(s) meeting benchmark: Vodafone, Reliance GSM, Airtel, Uninor, Idea, Tata Docomo, BSNL
Operator(s) not meeting the benchmark: Reliance CDMA, MTS, Tata Tele CDMA, Aircel

Billing Disputes - Postpaid
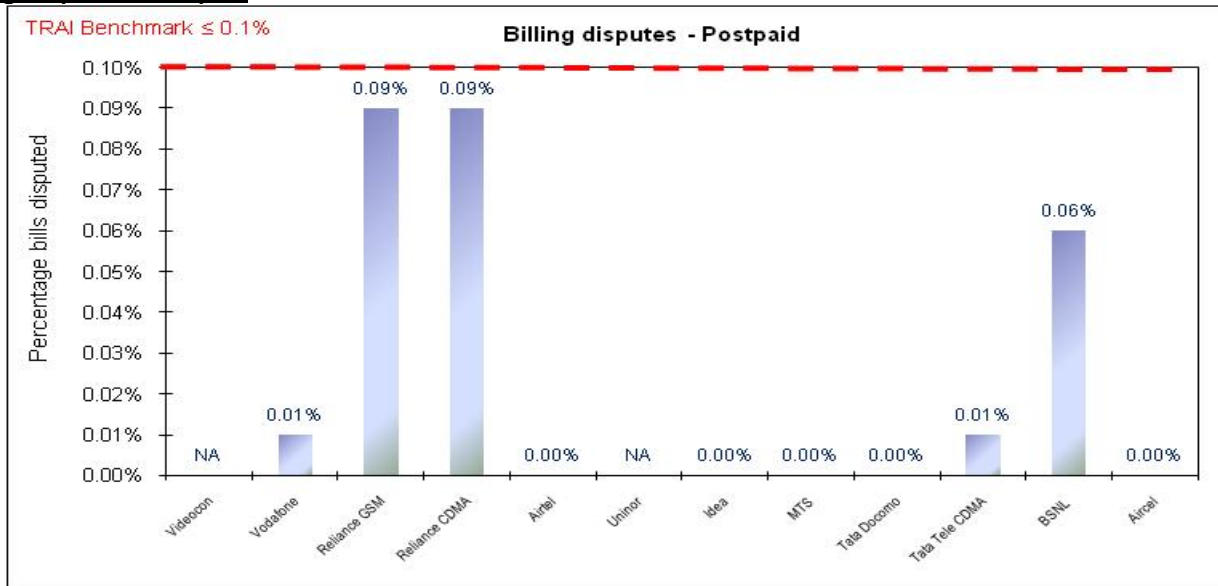
All the operators meet the benchmark

Complaints - Prepaid
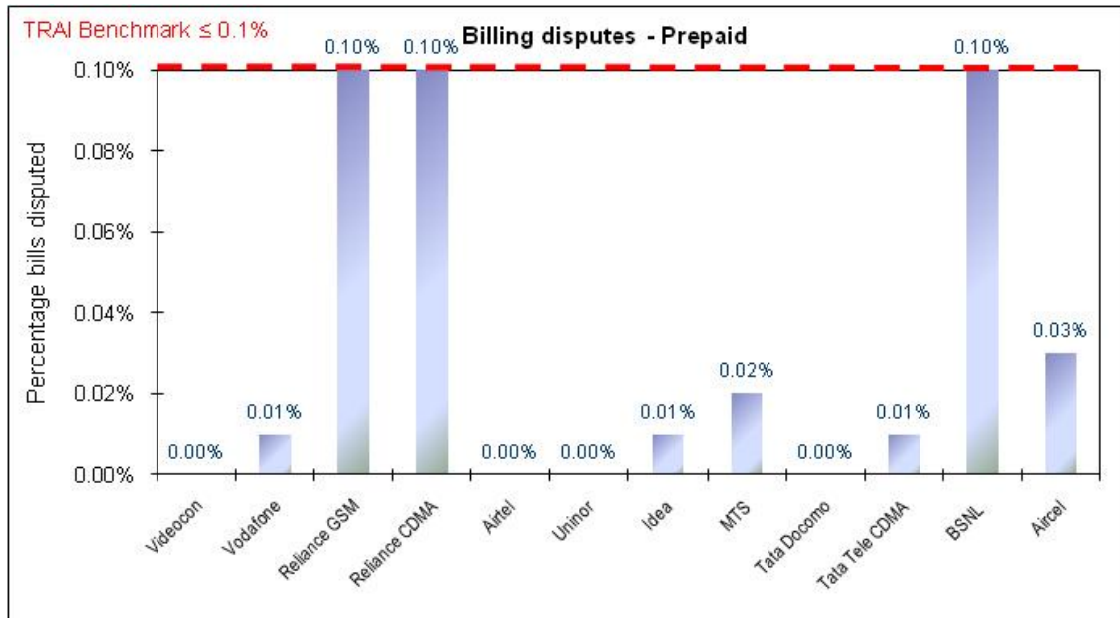
All the operators meet the benchmark

Resolution of billing complaints
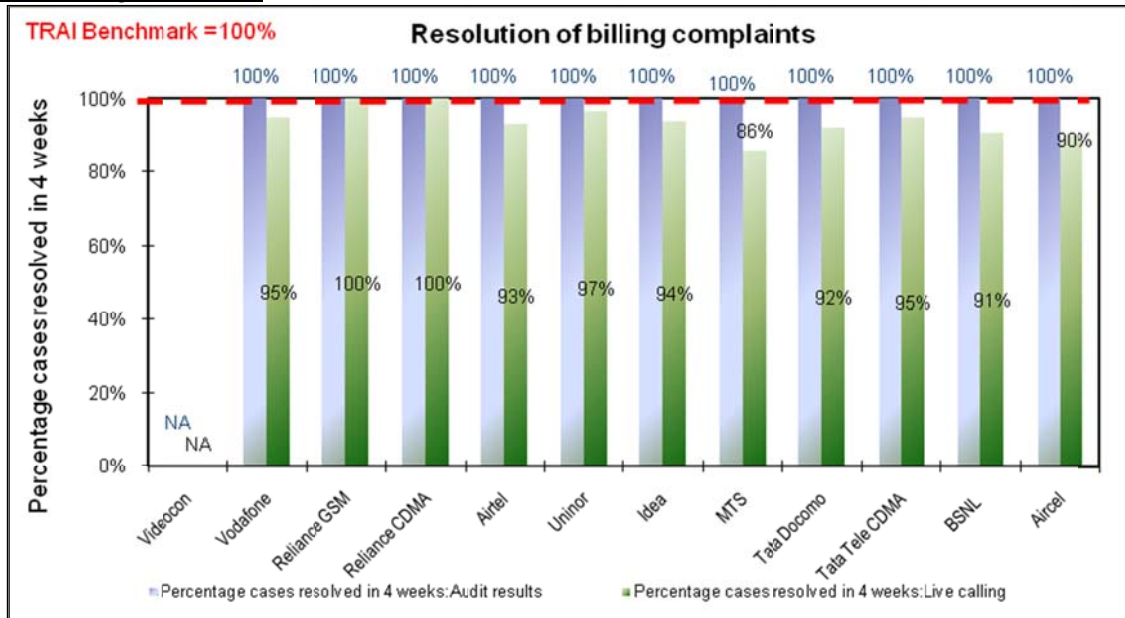
One month
All the operators meet the benchmark
Live calling

Operator(s) meeting benchmark: Reliance GSM
Operator(s) not meeting the benchmark: Vodafone, Airtel, Uninor, Idea, MTS, Tata Docomo, Tata Tele CDMA, BSNL, Aircel

Period of applying credit / waiver
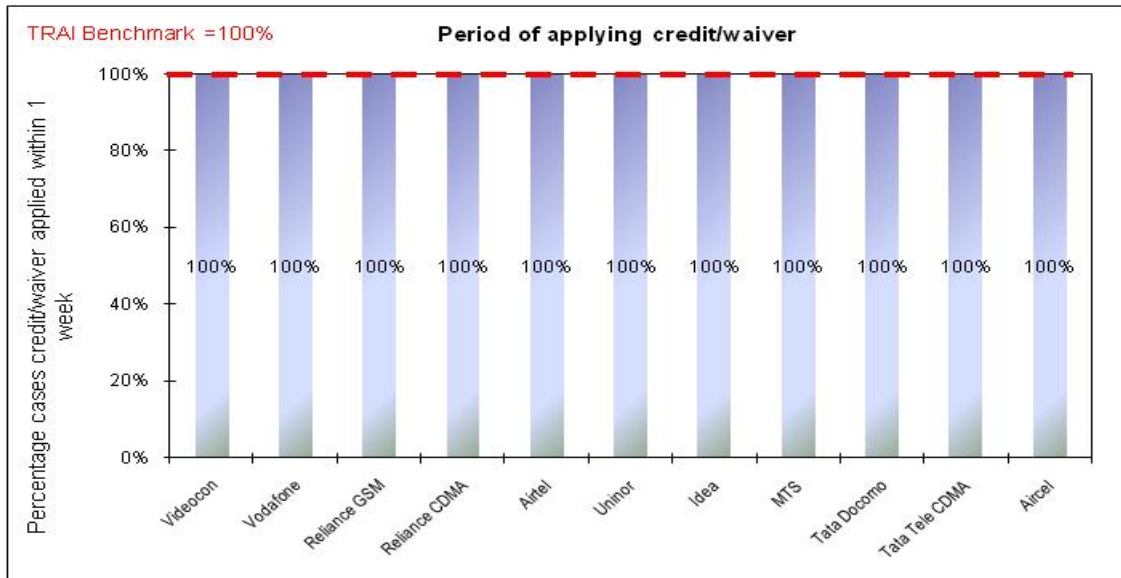
All the operators meet the benchmark

Live calling for billing Complaints

Resolution of billing complaints	Benchmark	Videocon	Vodafone	Reliance GSM	Reliance CDMA	Airtel	Uninor	Idea	MTS	Tata Docomo	Tata Tele CDMA	BSNL	Aircel
Total Number of calls made		NA	100	91	91	100	62	100	100	100	100	117	100
Number of cases resolved in 4 weeks		NA	95	91	91	93	60	94	86	92	95	106	90
Percentage cases resolved in four weeks	100%	NA	95%	100%	100%	93%	97%	94%	86%	92%	95%	91%	90%

Customer Care / Helpline: Calls answered
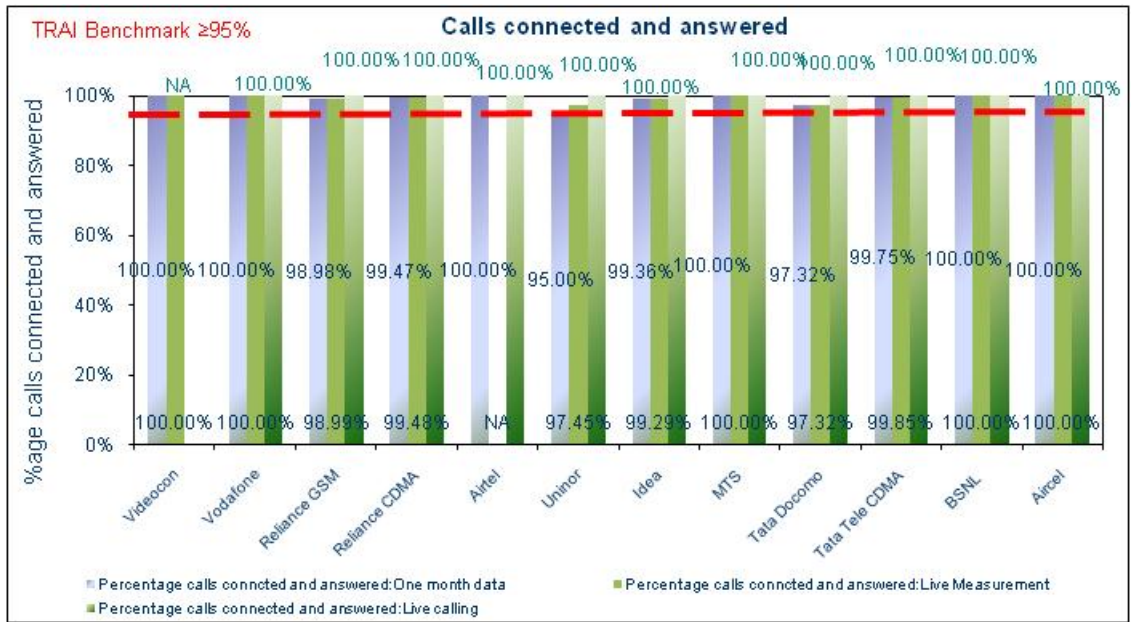
One month
All the operators meet the benchmark

Live measurement
All the operators meet the benchmark

Live calling
All the operators meet the benchmark

Customer Care / Helpline: Calls answered voice to voice
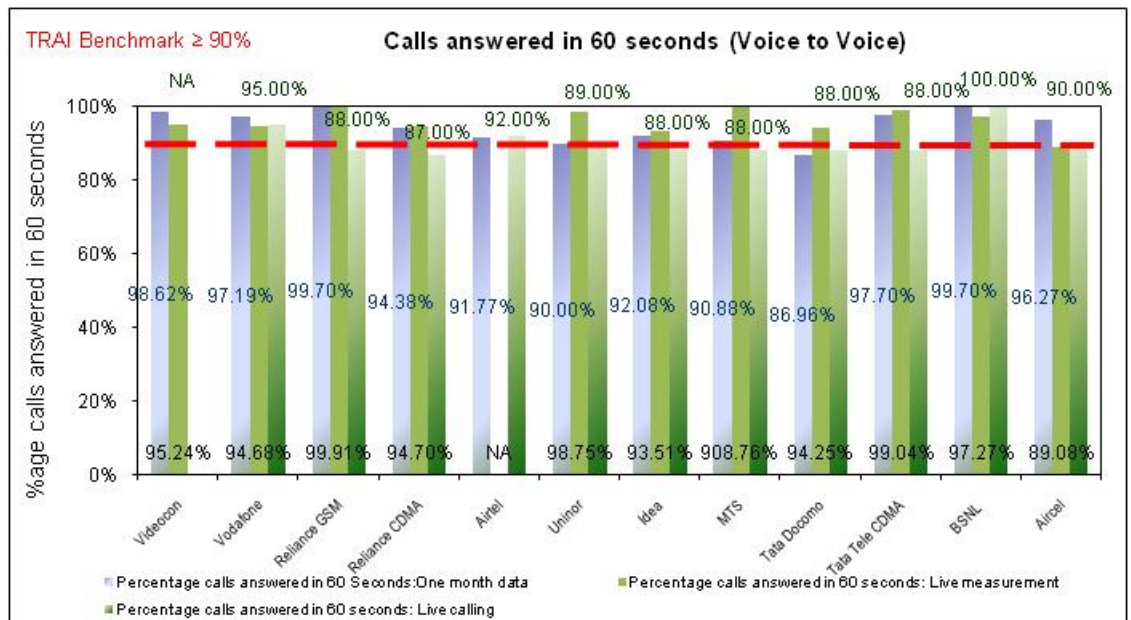
One month

Operator(s) meeting benchmark: Videocon, Vodafone, Reliance GSM, Reliance CDMA, Airtel, Uninor, Idea, MTS, Tata Tele CDMA, BSNL, Aircel
Operator(s) not meeting the benchmark: Tata Docomo

Live measurement
Operator(s) meeting benchmark: Videocon, Vodafone, Reliance GSM, Reliance CDMA, Uninor, Idea, MTS, Tata Docomo, Tata Tele CDMA, BSNL
Operator(s) not meeting the benchmark: Aircel

Live calling
Operator(s) meeting benchmark: Vodafone, Airtel, BSNL, Aircel
Operator(s) not meeting the benchmark: Reliance GSM, Reliance CDMA, Idea, MTS

Termination / Closure of service

All the operators meet the benchmark

Refund of deposits
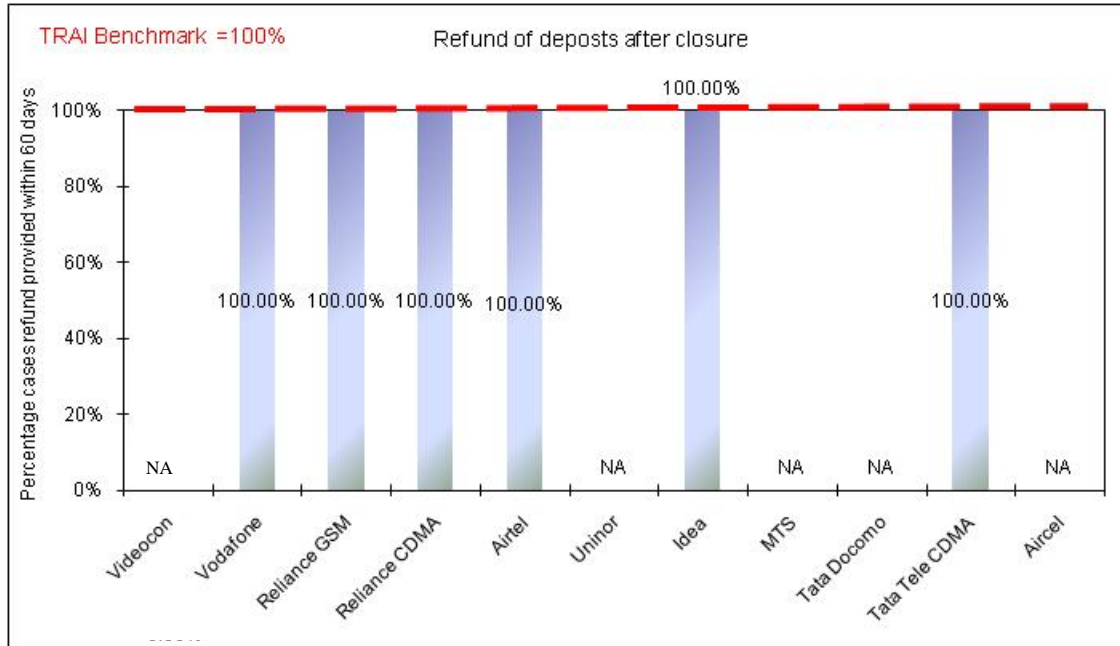
All the operators meet the benchmark

Inter operator calls assessment

Inter operator call Assessment To↓ From→	Videocon	Vodafone	Reliance GSM	Reliance CDMA	Airtel	Uninor	Idea	MTS	Tata Docomo	Tata Tele CDMA	BSNL	Aircel
Videocon	NA	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Vodafone	100%	NA	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Reliance GSM	100%	100%	NA	100%	100%	100%	100%	100%	100%	100%	100%	100%
Reliance CDMA	100%	100%	100%	NA	100%	100%	100%	100%	100%	100%	100%	100%
Airtel	100%	100%	100%	100%	NA	100%	100%	100%	100%	100%	100%	100%
Uninor	100%	100%	100%	100%	100%	NA	100%	100%	100%	100%	100%	100%
Idea	100%	100%	100%	100%	100%	100%	NA	100%	100%	100%	100%	100%
MTS	100%	100%	100%	100%	100%	100%	100%	NA	100%	100%	100%	100%
Tata Docomo	100%	100%	100%	100%	100%	100%	100%	100%	NA	100%	100%	100%
Tata Tele CDMA	100%	100%	100%	100%	100%	100%	100%	100%	100%	NA	100%	100%
Aircel	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	NA
BSNL	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	NA	100%

The maximum problem faced by the calling operator to other operators

In the inter-operator call assessment, calls were made from the test SIMs of service provider whose audit was being conducted to all the other service providers. All operators were able to connect to each other without any issues.

13.0 Compliance reports: Results of Verification of PMR

13.1 Cellular Mobile services

Name of Service Provider		Network Availability					Connection Establishment			Connection Maintenance (Retainability)					POI	Network Traffic Capacity		
		Total no. of BTSs in the licensed service area	Sum of downtime of BTSs in a month in hours i.e. total outage time of all BTSs in hours during a month	BTSs Accumulated downtime (not available for service) (%age)	No. of BTSs having accumulated downtime of >24 hours in a month	Worst affected BTSs due to downtime (%age)	Call Set-up Success Rate (within licensee's own network)	SDCCH/ Paging chl. Congestion (%age)	TCH Congestion (%age)	Call Drop Rate (%age)	Total No. of cells exceeding 3% TCH drop (call drop	Total no. of cells in the network	Worst affected cells having more than 3% TCH drop (call drop) rate (%age)	%age connection with good voice quality	Point of interconnection (POI) Congestion	Equipped Capacity of Network in respect of Traffic in erlang	Total traffic handled in TCHB in erlang	Total no. of customer serves (as per VLR) on last day of the month
Benchmark				≤ 2%		≤ 2%	≥ 95%	≤ 1%	≤ 2%	≤ 2%			≤ 5%	≥ 95%				
Videocon	PMR	3	0.33	0.02%	0	0.00%	99.26%	0.48%	0.10%	1.40%	0	9	0.00%	99.16%	0	17	5000.0	3
	IMRB	3	0.33	0.02%	0	0.00%	99.26%	0.48%	0.10%	1.40%	0	9	0.00%	99.16%	0	17	5000.0	3
Vodafone	PMR	6147	1555	0.04%	10	0.16%	96.48%	0.56%	1.88%	1.47%	716	18344	3.90%	95.25%	0	27	265744.3	258062
	IMRB	6147	1555	0.04%	10	0.16%	96.48%	0.76%	1.91%	1.47%	716	18344	3.90%	95.25%	0	41	265744.3	258062
Reliance GSM	PMR	2416	1079	0.07%	5	0.20%	99.31%	0.32%	0.88%	1.05%	91	6887	1.31%	98.76%	0	21	92000.0	80296
	IMRB	2416	1079	0.06%	5	0.20%	99.31%	0.32%	0.88%	1.05%	91	6887	1.30%	98.76%	0	21	92000.0	80296
Reliance CDMA	PMR	1268	2279	0.25%	8	0.63%	99.53%	0.14%	0.11%	0.55%	8	1268	0.67%	99.09%	0	0	148000.0	41681
	IMRB	1268	2133	0.25%	6	0.55%	99.56%	0.00%	0.05%	0.56%	8	1268	0.66%	99.23%	0	21	148000.0	41681
Airtel	PMR	4610	3203	0.10%	13	0.29%	98.73%	0.30%	0.80%	1.50%	407	14821	2.73%	98.77%	0	20	225633.7	172384
	IMRB	4610	3203	0.10%	13	0.28%	98.74%	0.25%	0.89%	1.51%	407	14821	2.75%	98.78%	0	30	225633.7	172384
Uninor	PMR	1805	22751	1.71%	35	1.94%	95.50%	0.82%	1.93%	1.67%	237	5426	4.37%	95.86%	0	93	59793.3	54522
	IMRB	1806	22751	1.71%	35	1.94%	95.50%	0.82%	1.93%	1.67%	237	5425	4.37%	95.86%	0	93	59793.3	54522
Idea	PMR	1420	1546	0.10%	33	1.61%	97.78%	0.27%	1.13%	1.30%	172	6058	2.84%	97.33%	0	63	47107.0	28019
	IMRB	1420	1546	0.10%	33	1.61%	97.75%	0.27%	1.13%	1.30%	172	6058	2.84%	97.33%	0	63	47107.0	28019
MTS	PMR	836	1607	0.26%	8	0.92%	97.94%	0.00%	0.14%	1.07%	79	2672	2.98%	97.59%	0	56	68600.0	37105
	IMRB	836	1607	0.26%	8	0.92%	97.94%	0.00%	0.14%	1.07%	79	2672	2.98%	97.59%	0	56	68600.0	37105
Tata Docomo	PMR	1409	144	0.02%	0	0.00%	98.42%	0.07%	0.12%	0.64%	106	4226	2.52%	96.67%	0	26	58673.7	15668
	IMRB	1409	144	0.08%	0	0.00%	98.42%	0.07%	0.12%	0.64%	106	4226	2.52%	96.67%	0	26	58673.7	15668
Tata Tele CDMA	PMR	628	643	0.14%	0	0.05%	99.38%	0.00%	0.03%	0.46%	12	1882	0.62%	99.51%	0	147	144866.7	16394
	IMRB	628	11	0.14%	0	0.05%	99.38%	0.00%	0.03%	0.46%	12	1882	0.62%	99.51%	0	147	144866.7	19727

Aircel	PMR	2645	7390	0.38%	53	1.99%	97.51%	1.17%	0.80%	1.33%	367	7929	4.63%	94.82%	0	129	142009.7	33627			
	IMRB	2645	7390	0.39%	53	2.00%	97.51%	1.17%	0.80%	1.33%	367	7929	4.63%	94.82%	0	129	142009.7	33627			
BSNL	PMR	9	32	0.48%	0	0.00%	99.21%	0.01%	0.39%	0.00%	0	27	0.00%	96.86%	0	200	5.0	24			
	IMRB	9	32	0.48%	0	0.00%	99.21%	0.01%	0.39%	0.00%	0	27	0.00%	96.86%	0	200	5.0	24			

Name of Service Provider		Metering and Billing											Response time to the customer for assistance				Termination/ closure of service			
		Metering and billing credibility - post paid	No. of bills issued during the period	No. of bills disputed including billing complaints during the period	Metering and billing credibility - pre paid	No. of charging / credit / validity complaints during the quarter	Total no. of pre-paid customers at the end of the quarter	Resolution of billing/charging complaints	No. of billing (post-paid) and charging, credit / validity (pre-paid) complaints resolved within 4 weeks during the quarter	Total no. of billing (post-paid) and charging, credit / validity (pre-paid) complaints received during the quarter	and charging, credit / validity complaints (pre paid) resolved in favor	No. of complaints disposed on account of not considered as valid complaints during the quarter	adjustment to customer/s account from the date of resolution of	Accessibility of call centre/ customer care	Total no. of call attempts to call centre / customer care nos. during TCBH (Note)	No. of calls connected and answered successfully to call centre / customer care nos. during TCBH (Note)	Percentage of calls answered by the operators (voice to voice) within 60 seconds	%age request for Termination / Clouse of service complied within 7 days	Total No. of request for Termination / Closure of service received during the quarter	No. of requests for Termination / Closure of service complied within 7 days during the quarter	Time taken for refund of deposits after closure
Benchmark		≤ 0.1%			≤ 0.1%			100% within 4 weeks					100% Within 1 week	≥ 95%			≥ 90%	100% within 7 days			100% within 60 days
Videocon	PMR	NA	NA	NA	0.0%	1	19520	100%	1	1	0	1	100%	100.00%	1904	1904	98.370%	NA	0	0	NA
	IMRB	NA	NA	NA	0.0%	1	19520	100%	1	1	0	1	100%	100.00%	1904	1904	98.370%	NA	0	0	NA
Vodafone	PMR	0%	245959	15	0.00%	643	11217332	100%	658	658	175	483	100%	100%	1035573	956906	82.74%	100%	1757	1757	100%
	IMRB	0%	245959	15	0.00%	643	11217332	100%	658	658	175	483	100%	100%	53998501	53998501	75.00%	100%	1757	1757	100%
Reliance GSM	PMR	0%	14969	13	0%	1223	5392701	100%	9683	9683	3753	5930	100%	99%	7877796	7795471	96%	100%	77	77	100%
	IMRB	0.00	18044	15	0.00%	5352.67	5277504	100.00%	16073	16073	16051	22	100.00%	98.99%	8139865	8222970	97.16%	100.00%	261	261	100.00%
Reliance CDMA	PMR	0.10%	42051	40	0.07%	1266	1923129	100%	3838	3838	1954	1884	100%	97%	1188587	1158348	92%	100%	227	227	100%
	IMRB	0.10%	41609	40	0.10%	1943	1972358	100%	5869	5869	5830	39	100%	98.40%	1548190	1523362	97.40%	100	41609	41609	100.00%
Airtel	PMR	0.00%	74944	2	0.00%	1359	32064917	100%	1361	19183	1361	17822	100%	95%	5930285	5646913	93.00%	100%	497	497	100%
	IMRB	0.00%	74944	2	0.00%	1359	32064917	100%	1361	19183	1361	17822	100%	100%	27268082	26887612	99.00%	100%	497	497	100%
Uninor	PMR	NA	NA	NA	0.00%	401	2696791	98%	401	392	DNA	DNA	DNA	96%	2137808	2048468	96.00%	NA	NA	NA	NA
	IMRB	NA	NA	NA	0.00%	401	2696791	98%	401	392	DNA	DNA	DNA	96%	2137808	2048468	96.00%	NA	NA	NA	NA
Idea	PMR	0.00%	2427	0	0.00%	205	6454220	100%	2331	2331	205	2126		99%	889819	879819	89.00%	100%	1	1	100%
	IMRB	0.00%	2477	0	0.01%	205	4454220	100%	2331	2331	205	2126	100%	99%	889318	879819	89.23%	100%	119	119	100%

Quality of Service – Audit module report for West Bengal Circle

MTS	PMR	NA	303	0	7.99%	0	1512908	100%	799	799	799	0	799%	100%	212071	200675	90.00%	NA	NA	NA	NA
	IMRB	NA	303	0	7.99%	0	1512908	100%	799	799	799	0	799%	100%	212071	200675	90.00%	NA	NA	NA	NA
Tata Docomo	PMR	NA	NA	NA	0.00%	9213	2335199	100%	9213	9213	0	9213	100%	99%	1163362	1122643	97.00%	100%	NA	NA	NA
	IMRB	NA	NA	NA	0.00%	9213	2335199	100%	9213	9213	0	9213	NA	99%	1163362	1122643	97.00%	NA	NA	NA	NA
Tata Tele CDMA	PMR	0.01%	38832	4	0.02%	164	971603	100%	2542	2542	168	2374	100%	100%	215649	215066	97.00%	100%	350	350	100%
	IMRB	0.01%	38832	4	0.02%	164	971603	100%	2542	2542	168	2374	100%	100%	215649	215066	97.00%	100%	550	550	100%
Aircel	PMR	0.02%	5166	1	0.13%	3979	3065524	100%	3980	3979	110	3979	100%	100%	400466	317405	90.40%	100%	36	36	100%
	IMRB	0.02%	5166	1	0.13%	3979	3032737	100%	3980	3980	111	3869	100%	100%	396964	314222	90.38%	100%	36	36	100%
BSNL	PMR	0.00%	0	0	0.00%	0	722	0%	0	0	0	0	0.00%	100.00%	3	3	100.00%	0%	0	0	0%
	IMRB	0.00%	0	0	0.00%	0	722	0%	0	0	0	0	0.00%	100.00%	3	3	100.00%	0%	0	0	0%

Figures do not match with those reported in PMR

Figures verified on all India basis

Not meeting benchmark

B'mark = TRAI Benchmark, DNA = Details not available

14.0 Conclusions

14.1 Cellular Mobile services

1. Vodafone and Idea are not meeting response time to the customer for assistance benchmark for number of calls answered within 60 seconds in voice to voice per 100 calls made.
2. MTS and Aircel are not meeting the benchmark for Metering and billing credibility for prepaid connection.

15.0 Annexure - I

15.1 Service provider performance report based on one month data

Name of Service Provider	Network Availability		Connection Establishment (Accessibility)			Connection Maintenance (Retainability)			Metering and Billing				Response time to customer for assistance		Termination / closure of service	
	BTSs Accumulated downtime (not available for service)	Worst affected BTSs due to downtime	Call Set-up Success Rate (within licensee's own network)	SDCCH/ Paging Chl. Congestion	TCH Congestion	Call Drop Rate (%age)	Worst affected cells having more than 3% TCH drop	%age of connection with good voice quality	Metering and billing credibility (Postpaid)	Metering and billing credibility (Prepaid)	%age complaints resolved within 4 weeks	Period of applying credit/waiver less than 1 week	Accessibility of call centre/ customer care	Percentage of calls answered by operators within 60 sec	%age requests for Termination complied within 7 days	Refund of deposits after closure within 60 days
Benchmark	≤ 2%	≤ 2%	≥ 95%	≤ 1%	≤ 2%	≤ 2%	≤ 5%	≥ 95%	≤ 0.1%	≤ 0.1%	100%	100%	≥ 95%	≥ 90%	100%	100%
Videocon	0.18%	0.00%	99.21%	0.25%	0.00%	0.54%	0.00%	98.55%	NA	0.00%	100.00%	100.00%	100.00%	98.62%	NA	NA
Vodafone	0.38%	0.18%	97.67%	0.45%	1.07%	1.29%	3.73%	95.45%	0.01%	0.01%	100.00%	100.00%	100.00%	97.19%	100.00%	100.00%
Reliance GSM	0.32%	1.58%	98.50%	0.02%	0.39%	0.70%	1.59%	98.24%	0.09%	0.10%	100.00%	100.00%	98.98%	99.70%	100.00%	100.00%
Reliance CDMA	0.24%	0.66%	98.65%	0.00%	0.63%	0.80%	0.63%	98.32%	0.09%	0.10%	100.00%	100.00%	99.47%	94.38%	100.00%	100.00%
Airtel	0.04%	0.15%	99.20%	0.11%	0.20%	1.11%	1.42%	98.95%	0.00%	0.00%	100.00%	100.00%	100.00%	91.77%	100.00%	100.00%
Uninor	1.48%	1.14%	96.96%	0.29%	1.90%	1.47%	1.72%	97.86%	NA	0.00%	100.00%	100.00%	95.00%	90.00%	NA	NA
Idea	0.05%	0.57%	97.26%	0.45%	1.50%	1.13%	2.70%	97.11%	0.00%	0.01%	100.00%	100.00%	99.36%	92.08%	100.00%	100.00%
MTS	0.13%	0.45%	99.22%	0.00%	0.48%	0.97%	2.39%	98.29%	0.00%	0.02%	100.00%	100.00%	100.00%	90.88%	NA	NA
Tata Docomo	0.01%	0.00%	98.78%	0.02%	0.05%	0.90%	4.96%	97.31%	0.00%	0.00%	100.00%	100.00%	97.32%	86.96%	NA	NA
Tata Tele CDMA	0.00%	0.00%	98.82%	0.00%	0.26%	0.78%	2.12%	99.02%	0.01%	0.01%	100.00%	100.00%	99.75%	97.70%	100.00%	100.00%
Aircel	1.19%	1.93%	97.70%	0.53%	0.97%	0.42%	4.33%	97.58%	0.06%	0.10%	100.00%	100.00%	100.00%	99.70%	100.00%	100.00%
BSNL	0.20%	1.32%	96.73%	0.68%	0.31%	1.54%	4.97%	95.99%	0.00%	0.03%	100.00%	100.00%	100.00%	96.27%	100.00%	NA

15.2 Monthly Point of Interconnection (POI) Congestion Report

Name of the Service Provider		Name of POI not meeting the benchmark	Total No. of circuits on POI	Total No. of call attempts on POI	Total traffic served on POI (Erlang)	% of Congestion POI	Action already taken/ action plan for meeting the benchmark
Videocon		All POI's meeting TRAI specified benchmark					
Vodafone		All POI's meeting TRAI specified benchmark					
Reliance GSM		All POI's meeting TRAI specified benchmark					
Reliance CDMA		All POI's meeting TRAI specified benchmark					
Airtel		All POI's meeting TRAI specified benchmark					
Uninor	July'11	Vodafone(I/O) Asansol, Vodafone (O) Behrampur, Airtel (O) Silliguri	1693	122517	1626.03	78	NA
	Aug'11	Vodafone(I/O) Asansol, Vodafone (O) Behrampur, Vodafone Intecircle(I/O) Kolkata, Vodafone (O) Behrampur, Airtel (O) Silligurii	3800	366484	3752.03	156	NA
	Sept'11	BSNL L1(I/O) Asansol WB, Reliance GSM (IO) Durgapur WB, Vodafone (IO) Asansol, Airtel Beharampur (O) Vodafone (O) Behrampur, BSNL L1, 1LD (IO) Asansol WB, Airtel Kolkata_INTERCIRCLE (O), Airtel (O) Kharagpur, Reliance GSM (I/O) Durgarpur WB, Vodafone (O) Behrampur, BSNL L2 (I/O) Jalpalguri WB, BSNL L2 (I/O) Jallpalguri WB, BSNL L2 (I/O) Silliguri WB, Airtel (O) Silliguri	10484	1854412	10494.74	535	NA
Idea		All POI's meeting TRAI specified benchmark					
MTS		All POI's meeting TRAI specified benchmark					
Tata Docomo		All POI's meeting TRAI specified benchmark					
Tata Tele CDMA		All POI's meeting TRAI specified benchmark					
Aircel		All POI's meeting TRAI specified benchmark					
BSNL		All POI's meeting TRAI specified benchmark					

15.3 Parameter wise performance reports for Cellular Mobile services

1. Network Availability

Audit Results for Network Availability

	Benchmark	Videocon	Vodafone	Reliance GSM	Reliance CDMA	Airtel	Uninor	Idea	MTS	Tata Docomo	Tata Tele CDMA	BSNL	Aircel
Number of BTSs in the licensed service area		31	6217	2602	1061	4787	1935	2089	894	1412	628	2536	2654
Sum of downtime of BTSs in a month (in hours)		41.24	17659	6284	1879	1487	21293	768	838.85	123	4	22524	4047
BTSs accumulated downtime (not available for service)	≤ 2%	0.18%	0.38%	0.32%	0.24%	0.04%	1.48%	0.05%	0.13%	0.01%	0.00%	1.19%	0.20%
Number of BTSs having accumulated downtime >24 hours		0	11	41	7	7	22	12	4	0	0	49	35
Worst affected BTSs due to downtime	≤ 2%	0.00%	0.18%	1.58%	0.66%	0.15%	1.14%	0.57%	0.45%	0.00%	0.00%	1.93%	1.32%

	Benchmark	Videocon	Vodafone	Reliance GSM	Reliance CDMA	Airtel	Uninor	Idea	MTS	Tata Docomo	Tata Tele CDMA	BSNL	Aircel
Number of BTSs in the licensed service area		31	6217	2635	1069	14404	1777	2089	895	1412	628	2536	2658
Sum of downtime of BTSs in a month (in hours)		27.19	1615	407	215	169.56	19592	153	88.8	13	18	2536	192
BTSs accumulated downtime (not available for service)	≤ 2%	1.22%	0.36%	0.21%	0.28%	0.02%	15.31%	0.10%	0.14%	0.01%	0.04%	1.39%	0.10%
Number of BTSs having accumulated downtime >24 hours		0	0	0	0	0	37	6	0	0	0	0	0
Worst affected BTSs due to downtime	≤ 2%	0.00%	0.00%	0.00%	0.00%	0.00%	2.08%	0.29%	0.00%	0.00%	0.00%	0.00%	0.00%

2. Connection Establishment (Accessibility)

Audit Results for CSSR, SDCCH and TCH congestion

CSSR	Benchmark	Videocon	Vodafone	Reliance GSM	Reliance CDMA	Airtel	Uninor	Idea	MTS	Tata Docomo	Tata Tele CDMA	BSNL	Aircel
CSSR	≥ 95%	99.21%	97.67%	98.50%	98.65%	99.20%	96.96%	97.26%	99.22%	98.78%	98.82%	97.70%	96.73%

SDCCH congestion	Benchmark	Videocon	Vodafone	Reliance GSM	Reliance CDMA	Airtel	Uninor	Idea	MTS	Tata Docomo	Tata Tele CDMA	BSNL	Aircel
SDCCH/Paging channel congestion	≤ 1%	0.25%	0.45%	0.02%	0.00%	0.11%	0.29%	0.45%	0.00%	0.02%	0.00%	0.53%	0.68%

TCH congestion	Benchmark	Videocon	Vodafone	Reliance GSM	Reliance CDMA	Airtel	Uninor	Idea	MTS	Tata Docomo	Tata Tele CDMA	BSNL	Aircel
TCH congestion	≤ 2%	0.00%	1.07%	0.39%	0.63%	0.20%	1.90%	1.50%	0.48%	0.05%	0.26%	0.97%	0.31%

Live measurement results for CSSR, SDCCH and TCH congestion

CSSR	Benchmark	Videocon	Vodafone	Reliance GSM	Reliance CDMA	Airtel	Uninor	Idea	MTS	Tata Docomo	Tata Tele CDMA	BSNL	Aircel
CSSR	≥ 95%	99.24%	96.73%	99.02%	98.41%	99.27%	97.50%	98.64%	99.36%	98.81%	99.17%	97.54%	97.88%

SDCCH congestion	Benchmark	Videocon	Vodafone	Reliance GSM	Reliance CDMA	Airtel	Uninor	Idea	MTS	Tata Docomo	Tata Tele CDMA	BSNL	Aircel

SDCCH/Paging channel congestion	≤ 1%	0.07%	0.81%	0.01%	0.00%	0.12%	0.083%	0.36%	0.00%	0.02%	0.00%	0.47%	0.17%
TCH congestion	Benchmark	Videocon	Vodafone	Reliance GSM	Reliance CDMA	Airtel	Uninor	Idea	MTS	Tata Docomo	Tata Tele CDMA	BSNL	Aircel
TCH congestion	≤ 2%	0.09%	1.56%	0.12%	0.29%	0.14%	1.85%	0.81%	0.06%	0.03%	0.02%	0.00%	0.29%

Drive test results for CSSR (Average of three drive tests) and blocked calls

CSSR	Benchmark	Videocon	Vodafone	Reliance GSM	Reliance CDMA	Airtel	Uninor	Idea	MTS	Tata Docomo	Tata Tele CDMA	BSNL	Aircel
Total number of call attempts		NA	651	631	631	670	635	630	630	664	648	631	625
Total number of successful calls established		NA	651	630	630	670	634	630	630	664	648	629	624
CSSR	≥ 95%	NA	100.00%	99.84%	99.84%	100.00%	99.84%	100.00%	100.00%	100.00%	100.00%	100.00%	99.84%

Blocked calls	Benchmark	Videocon	Vodafone	Reliance GSM	Reliance CDMA	Airtel	Uninor	Idea	MTS	Tata Docomo	Tata Tele CDMA	BSNL	Aircel
%age blocked calls		#VALUE!	0.00%	0.16%	0.16%	0.00%	0.16%	0.00%	0.00%	0.00%	0.00%	0.00%	0.16%

3. Connection Maintenance (Retainability)
Audit Results for Call drop rate and for number of cells having more than 3% TCH

Call drop rate	Benchmark	Videocon	Vodafone	Reliance GSM	Reliance CDMA	Airtel	Uninor	Idea	MTS	Tata Docomo	Tata Tele CDMA	BSNL	Aircel
Total number of calls established		554	11793453	109181706	26406964	257558170	68290743	47131981	53314440	23056566	51305164	3184831205	46110851
Total number of calls dropped		3	152136	767533	212007	2853925	1002728	531136	514886	208085	402374	13219280	709169
Call drop rate	≤ 2%	0.54%	1.29%	0.70%	0.80%	1.11%	1.47%	1.13%	0.97%	0.90%	0.78%	0.42%	1.54%

Cells having more than 3% TCH	Benchmark	Videocon	Vodafone	Reliance GSM	Reliance CDMA	Airtel	Uninor	Idea	MTS	Tata Docomo	Tata Tele CDMA	BSNL	Aircel
Total number of cells in the network		94	18601	7806	3183	15430	5813	6265	2935	131316	1883	7410	7889
Total number of cells having more than 3% TCH		0	693	124	20	219	100	169	70	6514	40	321	392
Worst affected cells having more than 3% TCH	≤ 3%	0.00%	3.73%	1.59%	0.63%	1.42%	1.72%	2.70%	2.39%	4.96%	2.12%	4.33%	4.97%

Live measurement results for Call drop rate and for number of cells having more than 3% TCH

Call drop rate	Benchmark	Videocon	Vodafone	Reliance GSM	Reliance CDMA	Airtel	Uninor	Idea	MTS	Tata Docomo	Tata Tele CDMA	BSNL	Aircel
Total number of calls established		9764	123967555	117069052	33660318	27451705	7339773	59920992	6391012	23004127	284112	211244482	61197470
Total		114	155125	674384	259014	162851	104435	612212	66202	19818	1531	1043196	804525

number of calls dropped												
Call drop rate	≤ 2%	1.17%	1.25%	0.58%	0.77%	0.59%	1.42%	1.02%	1.04%	0.86%	0.54%	0.49%	1.31%

Cells having more than 3% TCH	Benchmark	Videocon	Vodafone	Reliance GSM	Reliance CDMA	Airtel	Uninor	Idea	MTS	Tata Docomo	Tata Tele CDMA	BSNL	Aircel
Total number of cells in the network		95	18628	7905	3207	46392	5762	6265	2979	12708	5649	7410	7895
Total number of cells having more than 3% TCH		0	629	12	17	583	133	25	99	585	4	202	394
Worst affected cells having more than 3% TCH	≤ 3%	0.00%	3.38%	0.15%	0.53%	1.26%	2.31%	0.40%	3.32%	4.60%	0.07%	2.73%	4.99%

Drive test results for Call drop rate (Average of three drive tests)

Call drop rate	Benchmark	Videocon	Vodafone	Reliance GSM	Reliance CDMA	Airtel	Uninor	Idea	MTS	Tata Docomo	Tata Tele CDMA	BSNL	Aircel
Total number of calls established		NA	651	630	630	630	634	630	630	664	648	629	630
Total number of calls dropped		NA	0	0	0	0	0	0	1	0	0	0	1
Call drop rate	≤ 2%	NA	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.16%	0.00%	0.00%	0.00%	0.16%

4. Voice quality
Audit & Live measurement Results for Voice quality

Voice quality	Benchmark	Videocon	Vodafone	Reliance GSM	Reliance CDMA	Airtel	Uninor	Idea	MTS	Tata Docomo	Tata Tele CDMA	BSNL	Aircel
Total number of sample calls		67558	17653988 99	19312161 98	7462565 1	377655860 14	117377406 39	65241455 67	5331444 0	37615131 82	9322	10256	593703004 18
Total number of calls with good voice quality		66580	16850732 49	189724765 76	7337052 4	373676603 00	112764474 32	63356070 45	5240175 4	36604545 80	9231	10008	569907157 8
%age calls with good voice quality	≥ 95%	98.55%	95.45%	98.24%	98.32%	98.95%	97.86%	97.11%	98.29%	97.31%	99.02 %	97.58 %	95.99%

Voice quality	Benchmark	Videocon	Vodafone	Reliance GSM	Reliance CDMA	Airtel	Uninor	Idea	MTS	Tata Docomo	Tata Tele CDMA	BSNL	Aircel
Total number of sample calls		1286768	183317157 3	2161449044 7	7462565 1	384956559 2	123919184 4	929985626 8	636398 1	73724519 4	11399	1034	762190479 3
Total number of calls with good		1277376	174660473 9	2120061967 1	7337052 4	381003222 9	117799222 1	907473012 0	629052 9	71681443 1	11287	1018	734852778 1

voice quality													
%age calls with good voice quality	≥ 95%	99.27%	95.28%	98.09%	98.32%	98.97%	95.06%	97.58%	98.85%	97.23%	99.02%	98.45%	96.41%

Drive test results for Voice quality (Average of three drive tests)

Voice quality	Benchmark	Videocon	Vodafone	Reliance GSM	Reliance CDMA	Airtel	Uninor	Idea	MTS	Tata Docomo	Tata Tele CDMA	BSNL	Aircel
Total number of sample calls	NA		818853	358183	42928	1064538	1044036	903588	37914	1130103	39392	1073529	1389305
Total number of calls with good voice quality	NA		790726	346606	42083	1029377	1003977	875066	37271	1107823	38778.75	1039743	931240
%age calls with good voice quality	≥ 95%	NA	96.57%	96.77%	98.03%	96.70%	96.16%	96.84%	98.30%	98.03%	98.44%	96.85%	67.03%

5. POI Congestion

Audit Results for POI Congestion

POI congestion	Benchmark	Videocon	Vodafone	Reliance GSM	Reliance CDMA	Airtel	Uninor	Idea	MTS	Tata Docomo	Tata Tele CDMA	BSNL	Aircel
Total number of working POIs		11	41	21	21	31	105	80	62	27	147	99	129
No. of POIs not meeting benchmark		0	0	0	0	0	0	0	0	0	0	0	0
Total Capacity of all POIs (A) - in erlangs		26.29	220673	736644	864035	97527	54863	53450	1053098.78	10400	39917	28845	50702
Traffic served for all POIs (B)- in erlangs		1.2	125283	564840	390525	54771	32524	34670.23	560782.01	5009	17894	14.17	20790
POI congestion	≤ 0.5%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Live measurement results for POI congestion

POI congestion	Benchmark	Videocon	Vodafone	Reliance GSM	Reliance CDMA	Airtel	Uninor	Idea	MTS	Tata Docomo	Tata Tele CDMA	BSNL	Aircel
Total number of working POIs		11	41	21	21	31	101	81	62	27	147	98	129
No. of POIs not meeting benchmark		0	0	0	0	0	3	0	0	0	0	0	0
Total Capacity of all POIs (A) - in erlangs		26.29	220841	109650.93	864035.4106	279743	54433	58500	92916.61	10216	39726	28823	53634
Traffic served for all POIs		1.62	128935	89168.02	390525.4431	182141	36686	40617	52650.98	5003	8011	17184	22338

(B)- in erlangs													
POI congestion	≤ 0.5%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

6. Inter Operator Call Assessment

Inter operator call Assessment To↓ From→	Videocon	Vodafone	Reliance GSM	Reliance CDMA	Airtel	Uninor	Idea	MTS	Tata Docomo	Tata Tele CDMA	BSNL	Aircel
Videocon	NA	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Vodafone	100%	NA	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Reliance GSM	100%	100%	NA	100%	100%	100%	100%	100%	100%	100%	100%	100%
Reliance CDMA	100%	100%	100%	NA	100%	100%	100%	100%	100%	100%	100%	100%
Airtel	100%	100%	100%	100%	NA	100%	100%	100%	100%	100%	100%	100%
Uninor	100%	100%	100%	100%	100%	NA	100%	100%	100%	100%	100%	100%
Idea	100%	100%	100%	100%	100%	100%	NA	100%	100%	100%	100%	100%
MTS	100%	100%	100%	100%	100%	100%	100%	NA	100%	100%	100%	100%
Tata Docomo	100%	100%	100%	100%	100%	100%	100%	100%	NA	100%	100%	100%
Tata Tele CDMA	100%	100%	100%	100%	100%	100%	100%	100%	100%	NA	100%	100%
Aircel	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	NA
BSNL	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	NA	100%

The maximum problem faced by the calling operator to other operators

7. Metering and Billing credibility

Audit Results for Billing performance

Billing Performance	Benchmark	Videocon	Vodafone	Reliance GSM	Reliance CDMA	Airtel	Uninor	Idea	MTS	Tata Docomo	Tata Tele CDMA	BSNL	Aircel

Live calling results for resolution of billing complaints

Resolution of billing complaints	Benchmark	Videocon	Vodafone	Reliance GSM	Reliance CDMA	Airtel	Uninor	Idea	MTS	Tata Docomo	Tata Tele CDMA	BSNL	Aircel
Total Number of calls made		NA	100	91	91	100	62	100	100	100	100	117	100
Number of cases resolved in 4 weeks		NA	95	91	91	93	60	94	86	92	95	106	90
Percentage cases resolved in four weeks	100%	NA	95%	100%	100%	93%	97%	94%	86%	92%	95%	91%	90%

8. Customer Care

Audit results for customer care

Customer Care Assessment	Benchmark	Videocon	Vodafone	Reliance GSM	Reliance CDMA	Airtel	Uninor	Idea	MTS	Tata Docomo	Tata Tele CDMA	BSNL	Aircel
Total number of call attempts to customer care for assistance		498	11513473	5843286	958919	1764277	4667595	357539	1229260	3871283	436336	1177561	1970868
Number of calls getting connected and answered (electronically)		498	11513473	5783801	953877	1764269	4473454	355260	1229260	3767653	435262	1177561	1970868

	Benchmark	Videocon	Vodafone	Reliance GSM	Reliance CDMA	Airtel	Uninor	Idea	MTS	Tata Docomo	Tata Tele CDMA	BSNL	Aircel
Percentage calls getting connected and answered	≥ 95%	100.00%	100.00%	98.98%	99.47%	100.00%	95.00%	99.36%	100.00%	97.32%	99.75%	100.00%	100.00%
Number of calls getting transferred to the operator (voice to voice)		290	3348802	1003910	367034	3865710	1228301	640075	1292129	889084	100425	48243	960559
Number of calls answered by operator (voice to voice) within 60 seconds		286	3254741	1000900	346419	3547621	966507	589361	1174286	773168	98111	48097	924757
Percentage calls answered within 60 seconds (V2V)	≥ 90%	98.62%	97.19%	99.70%	94.38%	91.77%	90.00%	92.08%	90.88%	86.96%	97.70%	99.70%	96.27%

Live measurement results for customer care

Customer Care Assessment	Benchmark	Videocon	Vodafone	Reliance GSM	Reliance CDMA	Airtel	Uninor	Idea	MTS	Tata Docomo	Tata Tele CDMA	BSNL	Aircel
Total number of call attempts to customer care for assistance		38	1126842	524581	82136	NA	404835	43578	1229260	370909	46690	113723	215726
Number of calls getting connected and answered (electronically)		38	1126842	519299	81712	NA	394507	43268	1229260	360961	46619	113723	215726
Percentage calls getting connected and answered	≥ 95%	100.00%	100.00%	98.99%	99.48%	NA	97.45%	99.29%	100.00%	97.32%	99.85%	100.00%	100.00%
Number of calls getting transferred to the operator (voice to voice)		21	345118	102533	30228	NA	113130	65483	129219	80082	9640	4097	103213
Number of calls answered by operator (voice to voice) within 60 seconds		20	326750	102439	28626	NA	111713	61232	1174286	75477	9547	3985	91944
Percentage calls answered within 60 seconds (V2V)	≥ 90%	95.24%	94.68%	99.91%	94.70%	NA	98.75%	93.51%	908.76%	94.25%	99.04%	97.27%	89.08%

Live calling results for customer care

Customer Care Assessment	Benchmark	Videocon	Vodafone	Reliance GSM	Reliance CDMA	Airtel	Uninor	Idea	MTS	Tata Docomo	Tata Tele CDMA	BSNL	Aircel
Total Number of calls received		NA	100	100	100	100	100	100	100	100	100	100	100
Total Number of calls getting connected and answered		NA	100	100	100	100	100	100	100	100	100	100	100
Percentage calls getting connected and answered	≥ 95%	NA	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%

Live calling results for customer care (Voice to Voice)

Customer Care Assessment	Benchmark	Videocon	Vodafone	Reliance GSM	Reliance CDMA	Airtel	Uninor	Idea	MTS	Tata Docomo	Tata Tele CDMA	BSNL	Aircel
Total Number of calls received		NA	100	100	100	100	100	100	100	100	100	100	100
Total Number of calls answered within 60 seconds		NA	95	88	87	92	NA	88	88	NA	NA	100	90
Percentage calls answered within 60 seconds	≥ 90%	NA	95.00%	88.00%	87.00%	92.00%	NA	88.00%	88.00%	NA	NA	100.00%	90.00%

Operator	WB
Aircel	121
Airtel	121
BSNL	9434024365
Idea	12345
MTS	91531555155
Reliance CDMA	*222/*333
Reliance GSM	*222/*333
Tata Indicom	9231012345
Tata Docomo	9038012345
Vodafone	111
Uninor	9126091260

9. Termination / closure of service

Audit results for termination / closure of service

Termination	Benchmark	Videocon	Vodafone	Reliance GSM	Reliance CDMA	Airtel	Uninor	Idea	MTS	Tata Docomo	Tata Tele CDMA	BSNL	Aircel
Total number of closure request		0	1275	43	91	185	0	79	0	0	170	132	18
Number of requests attended within 7 days		0	1275	43	91	185	0	79	0	0	170	132	18
Percentage cases in which termination done within 7 days	100%	NA	100.00%	100.00%	100.00%	100.00%	NA	100.00%	NA	NA	100.00%	100.00%	100.00%

Audit results for refund of deposits

Refund	Benchmark	Videocon	Vodafone	Reliance GSM	Reliance CDMA	Airtel	Uninor	Idea	MTS	Tata Docomo	Tata Tele CDMA	BSNL	Aircel
Total number of cases requiring refund of deposits		0	680	87	80	34	0	24	0	0	97	132	0
Total number of cases where refund was made within 60 days		0	680	87	80	34	0	24	0	0	97	132	0
Percentage cases in which refund was receive within 60 days	100%	NA	100.00%	100.00%	100.00%	100.00%	NA	100.00%	NA	NA	100.00%	100.00%	NA

11. Additional Network Related parameters												
Audit Results for Total Traffic Handled in Erlang												
Traffic in Erlang	Videocon	Vodafone	Reliance GSM	Reliance CDMA	Airtel	Uninor	Idea	MTS	Tata Docomo	Tata Tele CDMA	BSNL	Aircel
Equipped capacity of the network	5000	294170	138000	148000	232758	76545	48465	88200	59287	146534	176000	122150
Total traffic handled in erlang during TCBH	0.81	253872	91917	44677	183357	66370	38251.381	43962.57	16185	19100	240454.94	30904

Total number of customers as per VLR												
		Videocon	Vodafone	Reliance GSM	Reliance CDMA	Airtel	Uninor	Idea	MTS	Tata Docomo	Tata Tele CDMA	BSNL	Aircel
Total no. of customers served (as per VLR)		260	10259505	4366029	1112509	7783897	1594871	1552019	1071229	834289	289274	1703269	1517298

Level 1 services		Videocon	Vodafone	Reliance GSM	Reliance CDMA	Airtel	Uninor	Idea	MTS	Tata Docomo	Tata Tele CDMA	BSNL	Aircel
Total no. of calls made		150	150	150	150	150	150	150	150	150	150	150	150
Calls answered in 60 sec		150	150	150	150	150	150	150	150	150	150	150	150
Calls answered after 60 sec		0	0	0	0	0	0	0	0	0	0	0	0

Section C
BOADBAND

16.0 Sampling Methodology

16.1 Sampling for Broadband service providers

- Audits for various Broadband service providers were conducted at the service provider's central node. Since most of the private operators have a centralized system of monitoring their network data was obtained for all the Point of Presence (POPs) present in the circle.

- For BSNL, Audit was conducted at the various exchanges/POPs providing Broadband service was verified and collected. This was done in such a way that at least 5% of POPs spread across 10% of SDCA's were covered

- For BSNL, the data pertaining to network related parameters was obtained by IMRB Auditors at the central node in Bangalore.

- For RCOM, the data pertaining to network related parameters was obtained by IMRB Auditors at the central node in Mumbai.

- For VSNL, the data pertaining to network related parameters was obtained by IMRB Auditors at the central node in Pune.

- Following Broadband service providers were Audited in West Bengal circle:

	Name of Operator
Operator 1	BSNL – West Bengal
Operator 2	BSNL – Andaman &Nicobar
Operator 3	RCOM
Operator 4	VSNL

17.0 Audit methodology

17.1 Broadband Services

In a nutshell, the audit methodology was as follows:

	Parameters	Verification of PMR	Three day live measurement	Data Verification for one month	Live calling
(i)	Service Provisioning/ Activation time	YES	YES	YES	YES
(ii)	Fault Repair/ Restoration Time	YES	YES	YES	YES
(iii)	Billing Performance				
-	Billing Complaints per 100 Bills issued	YES	YES	YES	
-	%age of billing complaints resolved in four weeks	YES	YES	YES	YES
-	Time taken for refund of deposits after closure	YES	YES	YES	YES
(iv)	Response time to the customer for assistance(Voice to Voice)				
-	*Within 60 seconds > 60%*	YES	YES	YES	YES
-	*Within 90 seconds > 90%*	YES	YES	YES	YES
(V)	Bandwidth Utilization/ Throughput:				
▪	*A)Bandwidth Utilization*				
-	POP to ISP gateway Node [Intra – network] Links	YES	YES	YES	
-	ISP Gateway Node to IGSP / NIXI Node upstream Link(s) for international connectivity	YES	YES	YES	
▪	*B) Broadband Connection Speed (Download)*	YES	YES	YES	YES
(vi)	Service availability / Uptime	YES	YES	YES	
vii)	Packet Loss	YES	YES	YES	
(viii)	Network Latency for wired broadband access)				
-	*User reference point at POP / ISP Gateway Note to International Gateway (IGSP/NIXI)*	YES	YES	YES	
-	*User reference point at ISP Gateway Node to International nearest NAP port abroad (Satellite)*	YES	YES	YES	
-	*User reference point at ISP Gateway Node to International nearest NAP port abroad (Satellite)*	YES	YES	YES	

18.0 Executive Summary

The objective assessment of Quality of Services (QoS) was carried out by IMRB International for all the Broadband service providers during the period starting from January 2012 to March 2012 in West Bengal circle.

18.1 Service provider performance report based on one month data Verification – Broadband Services

Parameters	Benchmarks	BSNL - WB	BSNL - A&N	RCOM	VSNL
Service provisioning uptime					
Percentage connections provided within 15 days	100%	96.71%	68.97%	NA	100.00%
Fault repair restoration time					
Percentage faults repaired by next working days	> 90%	57.19%	71.11%	NA	NA
Percentage faults repaired within three working days	> 99%	91.44%	94.81%	NA	NA
Billing performance					
Billing complaints per 100 bills issued	< 2%	0.00%	0.00%	0.00%	0.32%
%age of billing complaints resolved in 4 weeks	100%	NA	NA	NA	100.00%
%age cases in which refund of deposits after closure was made in 60 days	100%	99.48%	100.00%	NA	100.00%
Customer care/helpline assessment (Voice to Voice)					
Percentage calls answered within 60 seconds	> 60%	89.16%	90.70%	73.00%	
Percentage calls answered within 90 seconds	> 80%	94.92%	92.70%	76.00%	
Bandwidth utilization/Throughput					
Intra network links (POP to ISP Node)		279	5	4	
Total number of intra network links > 90%		0	0	0	
Upstream Bandwidth (ISP Node to NIXI/NAP/IGSP)		896	4	2	
Percentage bandwidth utilized on upstream links	< 80%	78.41%	54.34%	64.94%	
Broadband download speed	> 80%	85.71%	96.00%	93.75%	
Service availability/uptime	> 98%	99.92%	100.00%	99.89%	
Packet loss	< 1%	0.03%	0.06%	0.40%	
Network Latency					
POP/ISP Node to NIXI	< 120 msec	49.61	61.5	39.74	
ISP node to NAP port (Terrestrial)	< 350 msec	228.69	47.9	281.01	

{*Note: For BSNL data pertains to the sample 5% of exchanges audited during the month of audit, whereas for rest of the operators figures pertain to all the exchanges present in the circle }

** Methodology not in line with QoS   ☐ Figures provided on All India basis   ☐ Not meeting the benchmark   **B'mar**k = TRAI Benchmark, **DNA** = Details not available, **NA:** Not Applicable

Critical findings and Key take outs: Broadband services

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

Service provisioning/Activation time
- BSNL West Bengal (96.71%) and BSNL A&N (68.97%) fall short of TRAI benchmark of 100% connections to be provided within 15 days.
- For Live calling carried BSNL A&N scores the lowest with 68.97% subscribers claiming that connection was provided within 15 days.

Fault Repair/Restoration time
- BSNL WB (57.19%) and BSNL A&N (71.11%) are falling below the benchmark for fault repair within next working day.
- For fault repair within three working days again BSNL WB (91.44%) and BSNL A&N (94.81%) are not meeting the TRAI specified benchmark of 99%.
- Also, the parameters were not applicable for RCOM and VSNL operators due to non occurrence of fault cases in the audit period.

Billing performance
- All the service providers were found to be meeting the benchmark of percentage billings complaints received and time taken for resolution of billing complaints for the month in which data was collected.

Customer Care/Helpline Assessment
- All service providers meet the TRAI specified benchmark for calls answered by the operator in 60 and 90 seconds for the month in which audit was carried out. The live calling also found that the operators fulfilled the requirement.

Bandwidth Utilization:
- All the service providers were found to be using Multiple Router Traffic Grapher (MRTG) to measure the bandwidth utilization at intra network links.
- All the service providers were found to be reporting combined bandwidth utilization for corporate and household customers as there is no mechanism available to provide it separately for different users.
- For Intra network link, data for BSNL, Reliance and VSNL (TATA Communications) was obtained on all India bases. None of the links tested for these operators was found to be having above 80% bandwidth utilization for the month in which audit was carried out.
- For Bandwidth utilization on upstream links (From ISP Node to IGSP/NIXI), all the operators meet the TRAI specified benchmark.

Download speed
- During live measurements carried out at Pop's/ISP Node it was observed that all the operators are meeting the TRAI prescribed benchmark of greater than 80% speed available to the customer (highest being 96% for RCOM). These measurements were carried out by IMRB auditors on a sample basis during visits at PoPs and ISP Node

Service Availability/Uptime:
- All the service providers are meeting the benchmark on service availability/uptime for the month in which audit was carried out.

Packet Loss and Network Latency
- It was observed that all the service providers are measuring packet loss and latency by conducting random ping tests for their internal performance measurement. It should be noted that the network related data for BSNL for verification was obtained from their central node in Bangalore.
- However, ping tests conducted/smoked ping results during live measurements revealed that all the service providers are meeting the benchmark prescribed by TRAI.

Summary of Live Measurement Results – Broadband Services

Parameters	Benchmarks	BSNL - WB	BSNL - A&N	RCOM	VSNL
Bandwidth utilization/Throughput					
Intra network links (POP to ISP Node)		279		5	4
Total number of intra network links > 90%		0		0	0
Upstream Bandwidth (ISP Node to NIXI/NAP/IGSP)		960		4	2
Percentage bandwidth utilized on upstream links	< 80%	81.82%		51.95%	58.50%
Broadband download speed	> 80%	84.29%		94.00%	93.00%
Service availability/uptime	> 98%	99.91%		100.00%	100.00%
Packet loss	< 1%	0.01%		0.00%	0.12%
Network Latency					
POP/ISP Node to NIXI	< 120 msec	36.9		72	41
ISP node to NAP port (Terrestrial)	< 350 msec	235.53		45.1	299

- The testing for Bandwidth utilization on upstream links during live measurement was carried out on sample basis by IMRB auditors for intra network links. Intra network links for BSNL were found to have a utilization of slightly more than 80%benchmark.
- For network latency all the service providers comfortably meet the TRAI specified benchmark for ping tests carried out during live measurements.

## Summary of Live Calling Results – Broadband Services

Parameters	Benchmarks	BSNL - WB	BSNL - A&N	RCOM	VSNL
Service provisioning uptime					
Percentage connections provided within 15 days	100%	83.00%	68.97%	NA	100.00%
Fault repair restoration time					
Percentage faults repaired by next working days	> 90%	36.92%	86.67%	NA	NA
Percentage faults repaired within three working days	> 99%	61.54%	100.00%	NA	NA
Billing performance					
%age of billing complaints resolved in 4 weeks	100%	NA	NA	NA	100.00%
Customer care/helpline assessment (Voice to Voice)					
Percentage calls answered within 60 seconds	> 60%	83.00%	90.00%	95.00%	88.00%
Percentage calls answered within 90 seconds	> 80%	100.00%	100.00%	100.00%	100.00%

- BSNL (WB & A&N) are not meeting the benchmark for service provisioning and fault repair parameter during live calling

19.0 Detailed findings – Includes comparison between Live calling/Live measurements and One month data collection for Broadband Services

19.1 Graphical/Tabular Representations for Broadband services

<u>Service provisioning / Activation time (Comparison between one month audit results and live calling results)</u>
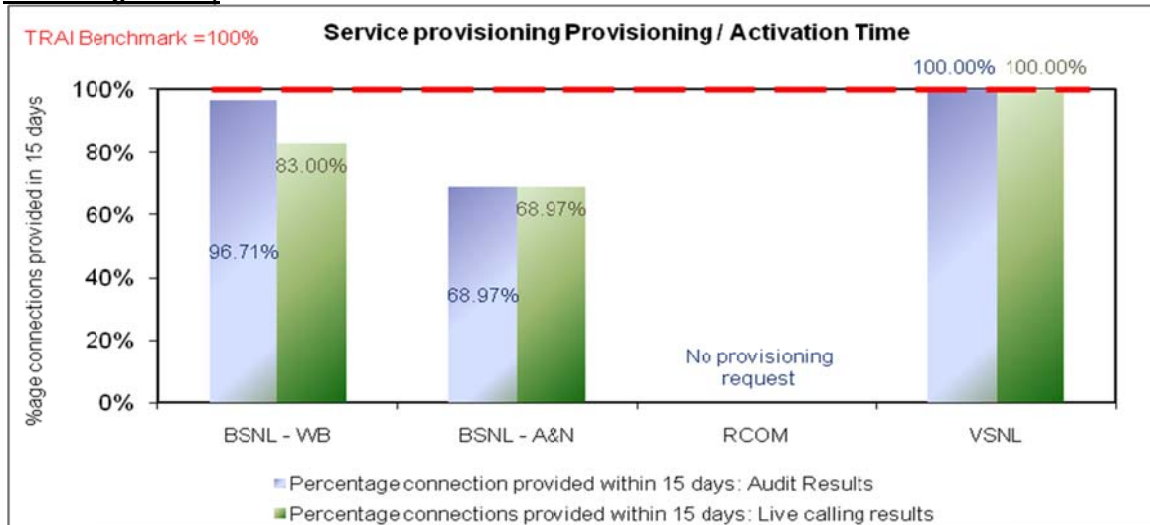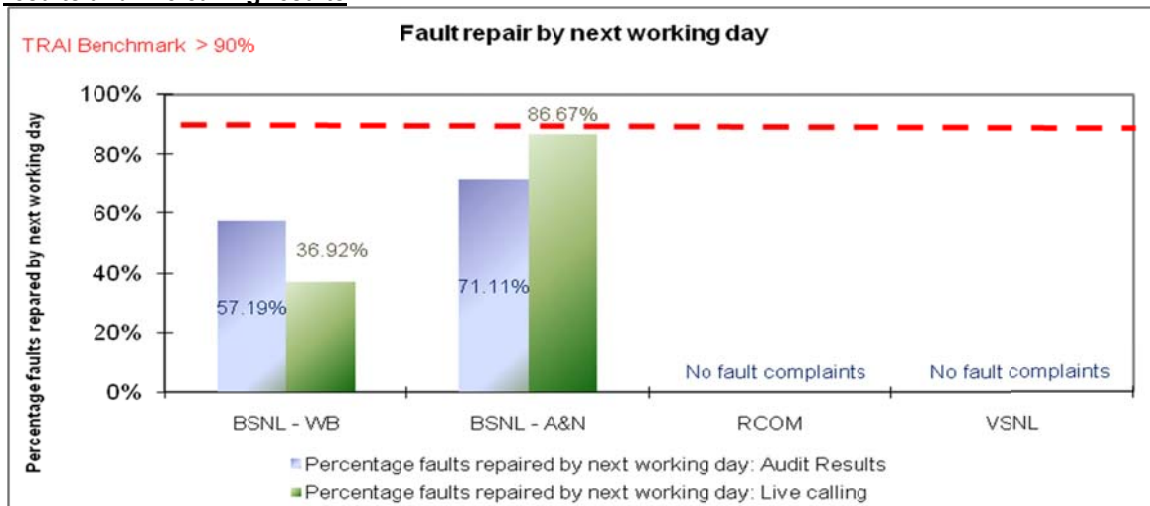

One month
Operator meeting benchmark: VSNL
Operator not meeting benchmark: BSNL - WB, BSNL - A&N
Live calling
Operator meeting benchmark: VSNL
Operator not meeting benchmark: BSNL - WB, BSNL - A&N

<u>Fault repair/Restoration time (By next working day) - Comparison between one month audit results and live calling results</u>
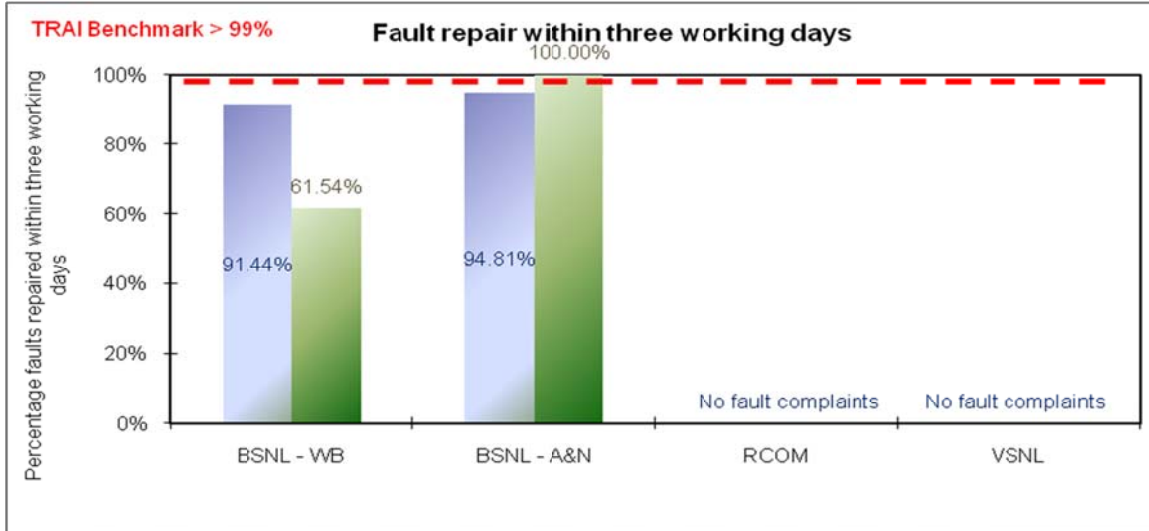

One month
Both BSNL WB & A&N are not meeting the benchmark

Live calling
Both BSNL WB & A&N are not meeting the benchmark

Fault repair/Restoration time within three working days (Comparison between one month audit results and live calling results
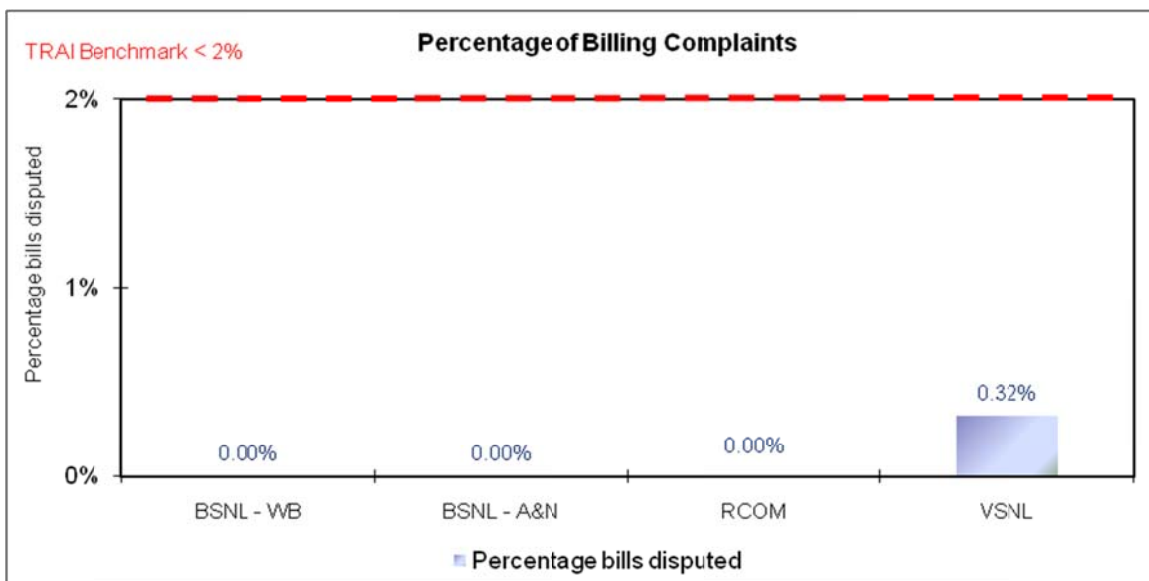

One month
Both BSNL WB & A&N are not meeting the benchmark
Live calling
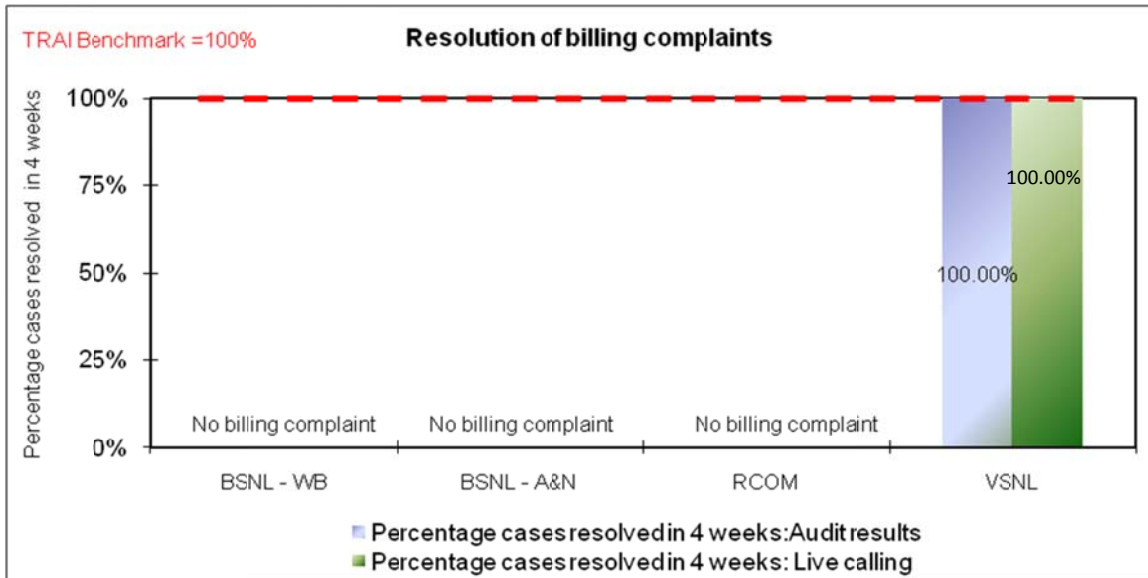Operator meeting benchmark: BSNL - A&N
Operator not meeting benchmark: BSNL - WB

Percentage bills disputed

All operators are meeting the benchmark

Resolution of billing complaints (Comparison between one month audit results and live calling results)
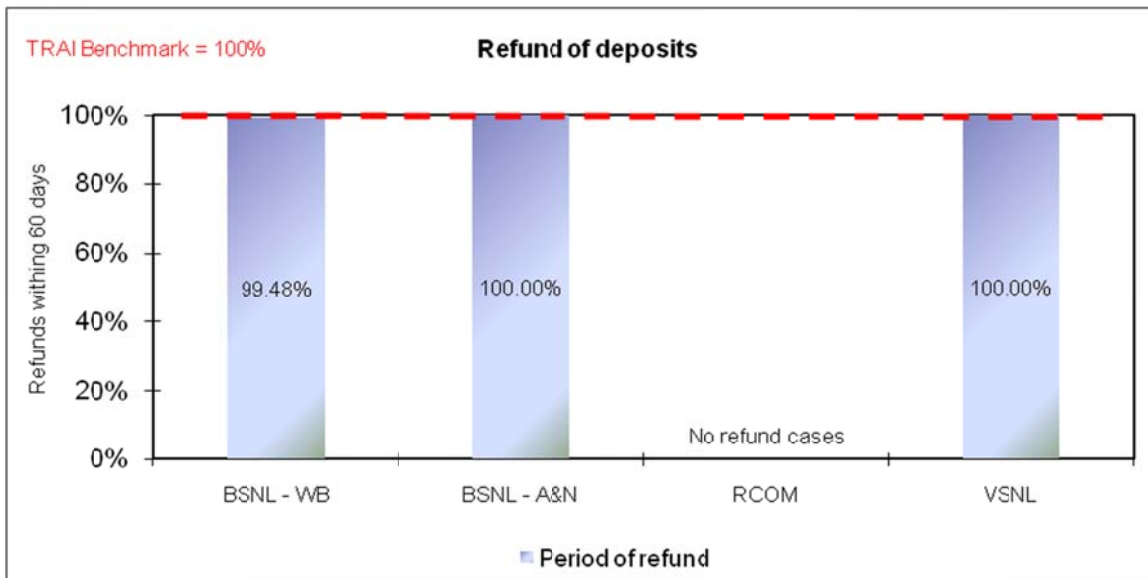

One month
All operators are meeting the benchmark
Live calling
All operators are meeting the benchmark

Refund of deposits after closure

Operator meeting benchmark: BSNL - A&N, VSNL
Operator not meeting benchmark: BSNL - WB

Response time to customer for assistance - Calls answered by the operator within 60 seconds (Comparison between one month audit results and live calling results)

One month
All operators are meeting the benchmark
Live calling
All operators are meeting the benchmark

Response time to customer for assistance - Calls answered by the operator within 90 seconds (Comparison between one month audit results and live calling results)

One month
Operator meeting benchmark: BSNL - WB, BSNL - A&N, RCOM
Operator not meeting benchmark: VSNL

Live calling
All operators are meeting the benchmark

Bandwidth utilization at Intra network links (Comparison between one month audit results and live measurement results)

Bandwidth Utilization (One month)	B'mark	BSNL - WB	BSNL - A&N	RCOM	VSNL
Total number of intra network links		279		5	4
No of Intra network found to be above 90%		0		0	0

Bandwidth Utilization (Live measurement)	B'mark	BSNL - WB	BSNL - A&N	RCOM	VSNL
Total number of intra network links		279		5	4
No of Intra network found to be above 90%		0		0	0

Broadband download speed	Benchmark	BSNL - WB	BSNL - A&N	RCOM	VSNL
Total committed download speed to the sample subscribers (In mpbs) (A)		1.4		2	1
Total average download speed observed during TCBH (In Mpbs) (B)		1.18		1.88	0.93
%age subscribed speed available to the subscriber during TCBH (B/A)*100	>80%	84.29%		94.00%	93.00%

As far as bandwidth utilization on the intra network links is concerned all the operators seem to performing well as all the sample intra network links (Access segment) tested during live measurement were found to be below 90%.

Service availability/Uptime (Comparison between one month audit results and live measurement results)

One month
All operators are meeting the benchmark
Live calling
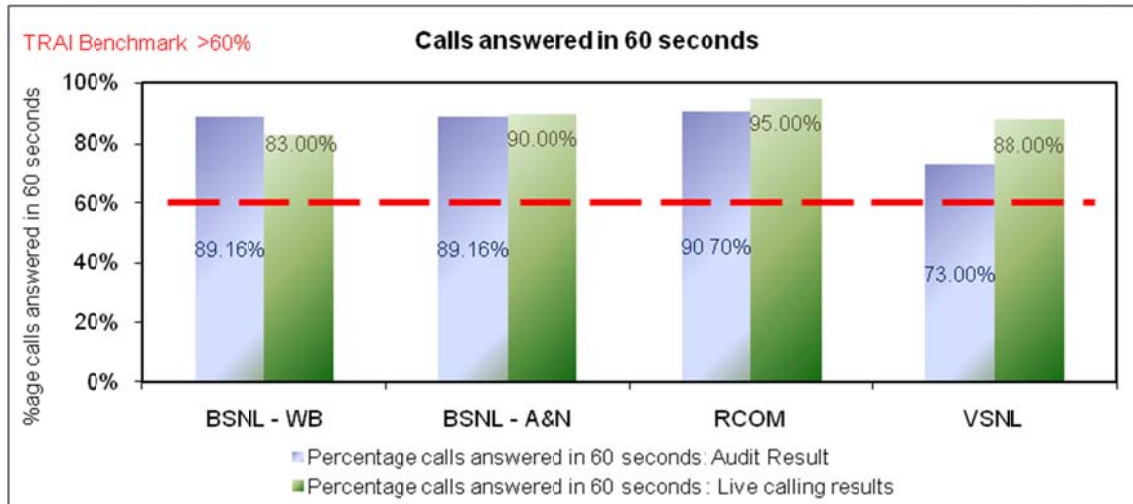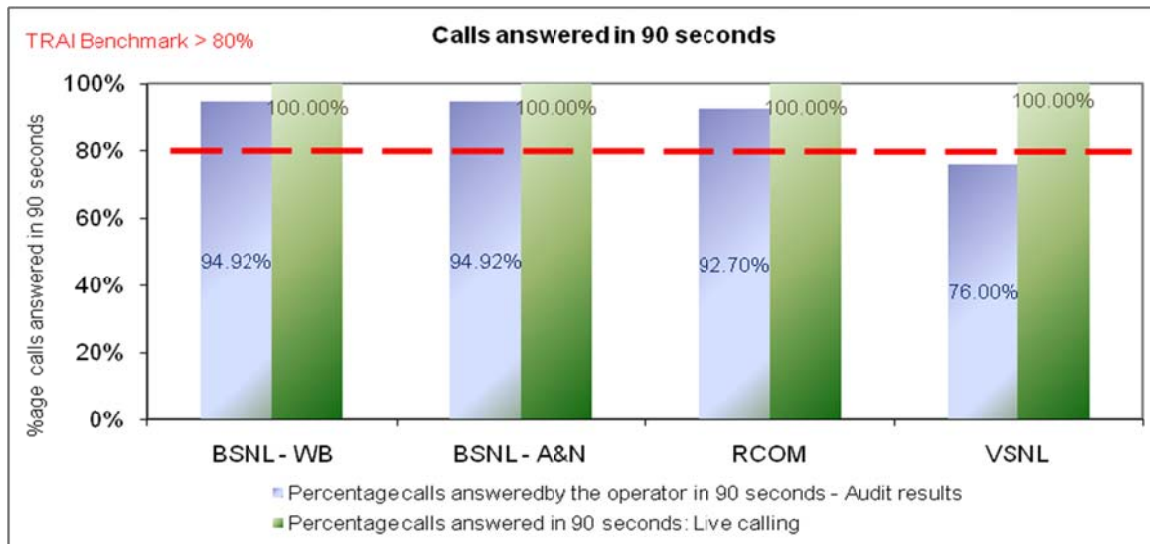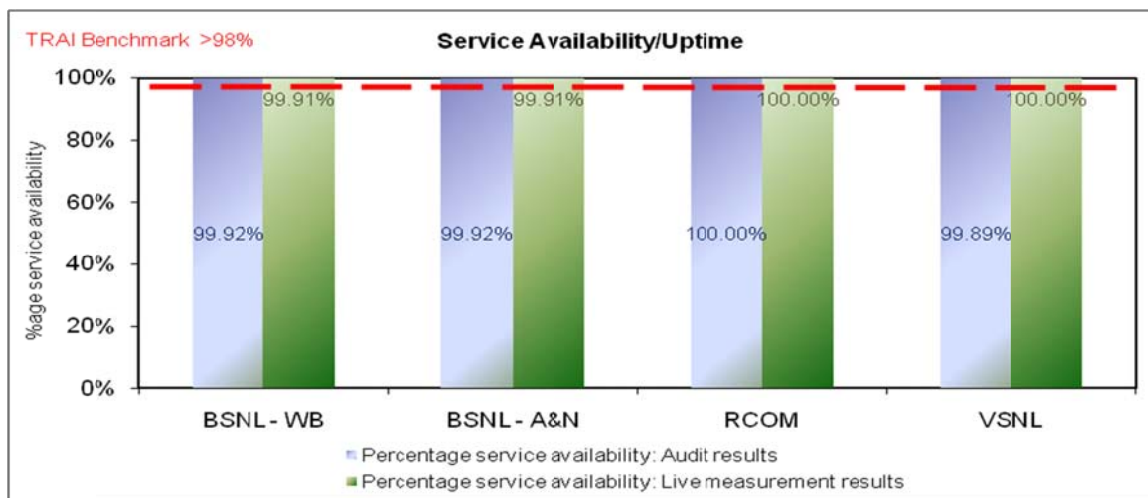All operators are meeting the benchmark

20.0 Compliance reports: Results of Verification of Records

20.1 Broadband services

Parameters	Benchmarks	BSNL - WB		BSNL - A&N		RCOM		VSNL	
		PMR	IMRB*	PMR	IMRB*	PMR	IMRB	PMR	IMRB
Service provisioning uptime									
Percentage connections provided within 15 days	100%	97.40%	81.79%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
Fault repair restoration time									
Percentage faults repaired by next working days	> 90%	93.50%	70.26%	91.40%	91.47%	100.00%	100.00%	NA	NA
Percentage faults repaired within three working days	> 99%	98.60%	91.36%	100.00%	100.00%	100.00%	100.00%	NA	NA
Billing performance									
Billing complaints per 100 bills issued	< 2%	0.20%	0.18%	0.00%	0.00%	0.11%	0.11%	0.00%	0.00%
%age of billing complaints resolved in 4 weeks	100%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	NA	NA
%age cases in which refund of deposits after closure was made in 60 days	100%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	NA	NA
Customer care/helpline assessment (Voice to Voice)									
Percentage calls answered within 60 seconds	> 60%	86.90%	86.90%	76.70%	76.70%	93.00%	93.00%	93.10%	93.10%
Percentage calls answered within 90 seconds	> 80%	95.60%	95.60%	91.70%	91.70%	95.00%	95.00%	94.46%	94.46%
Bandwidth utilization/Throughput									
Intra network links (POP to ISP Node)		0	0	0	0	116	116	0	0
Total number of intra network links > 90%		0	0	0	0	0	0	0	0
Upstream Bandwidth (ISP Node to NIXI/NAP/IGSP)		0	0	0	0	0	0	0	0
Percentage bandwidth utilized on upstream links	< 90%	75.10%	75.10%	75.10%	75.10%	48.97%	48.97%	45.43%	45.43%
Broadband download speed	> 80%	91.10%	84.00%	15.00%	99.12%	90.00%	90.00%	91.85%	91.85%
Service availability/uptime	> 98%	99.40%	99.40%	99.30%	99.30%	99.69%	99.69%	100.00%	100.00%
Packet loss	< 1%	0.04%	0.04%	0.04%	0.04%	1.00%	1.00%	0.54%	0.54%
Network Latency									
POP/ISP Node to NIXI (in msec)	< 120 msec	25	25	25	25	DNA	84.5	50	50
ISP node to NAP port (Terrestrial) (in msec)	< 350 msec	230.3	230.3	230.3	230.3	DNA	72	269	269

* These have been calculated cumulatively on the basis of figures reported by various exchanges

🟨 Figures do not match with those reported in PMR	🟪 Not meeting the benchmark **B'mar**k = TRAI Benchmark, **DNA** = Details not available, **NA:** Not Applicable

20.2 Conclusions

Broadband services

1. For BSNL WB and BSNL A&N there is slight variation observed in for some parameters such as percentage of connections provided within 15 days, percentage of faults repaired by next working day, broadband download speed when compared to the figures reported in PMR. But the reason is largely the fact that data was obtained for sample 5% of exchanges whereas reporting is done for 100% of exchange

2. BSNL WB failed to meet benchmarks for service provisioning and fault repair restoration time.

3. RCOM marginally failed to meet Packet loss benchmark of less than 1%

21.0 Annexure - I

21.1 Parameter wise performance reports for Broadband services
1. Service Provisioning

1.1 Audit Results for Service provisioning					
	Benchmark	BSNL - WB	BSNL - A&N	RCOM	VSNL
Total connections registered during the period		152	29	0	111
Number of connections provided within 15 days		147	20	0	111
Percentage of connections provided within 15 days	100%	96.71%	68.97%	NA	100.00%
Number of connections provided after 15 days of registration of demand		4	9	0	0
Number of customers to whom credit is given for delayed connections		4	9	0	0
Percentage of customers to whom credit is given for delayed connections	100%	100.00%	100.00%	NA	NA

1.2 Live calling for Service provisioning					
	Benchmark	BSNL - WB	BSNL - A&N	RCOM	VSNL
Total connections registered during the period		100	29	0	100
Number of connections provided within 15 days		83	20	0	100
Percentage of connections provided within 15 days	100%	83.00%	68.97%	NA	100.00%

2. Fault Incidence / Clearance Statistics

2.1 Audit Results for Fault repair					
Fault repair	Benchmark	BSNL - WB	BSNL - A&N	RCOM	VSNL
Total No. of faults registered during the month		292	135	0	0
No. of faults repaired by next working day during the month		167	96	NA	NA
Percentage of faults repaired by next working day during the month	> 90%	57.19%	71.11%	NA	NA
No. of faults repaired within 3 days during the month		267	128	NA	NA
Percentage of faults repaired within 3 days during the month	>99%	91.44%	94.81%	NA	NA

Rent rebate	Benchmark	BSNL - WB	BSNL - A&N	RCOM	VSNL
No. of cases with faults pending for >3 days and ≤7 days		13	7	0	0
Out of these number of cases where rent rebate for 7 days was given		13	7	0	0
Percentage of cases where rent rebate for 7 days was given	100%	100.00%	100.00%	NA	NA
No. of cases with faults pending for >7 days and ≤15 days		12	0	0	0
Out of these number of cases where rent rebate for 15 days was given		12	0	0	0
Percentage of cases where rent rebate for 15 days was given	100%	100.00%	NA	NA	NA
No. of cases with faults pending for ≥15 days		0	0	0	0
Out of these number of cases where rent rebate for 30 days was given		0	0	0	0
Percentage of cases where rent rebate for 30 days was given	100%	NA	NA	NA	NA

2.2 Live calling for fault repair					
Fault repair	Benchmark	BSNL - WB	BSNL - A&N	RCOM	VSNL
Total Number of calls made		65	30	0	0
Number of cases where faults were repaired by next working day		24	26	0	0
Percentage cases where faults were repaired by next working day	> 90%	36.92%	86.67%	NA	NA
Number of cases where faults were repaired within 3 days		40	30	0	0
Percentage cases where faults were repaired within 3 days	>99%	61.54%	100.00%	NA	NA

3. Billing performance

3.1 Audit Results for Billing performance					
Billing Performance	Benchmark	BSNL - WB	BSNL - A&N	RCOM	VSNL
Billing disputes					
Total bills generated during the period		16372	2154	1392	4308
Total number of bills disputed		0	0	0	14
Percentage bills disputed	< 2%	0.00%	0.00%	0.00%	0.32%
Resolution of billing complaints					
Total number of complaints		0	0	0	14
Total complaints resolved in 4 weeks from date of receipt		0	0	0	14
Percentage complaints resolved within 4 weeks of date of receipt	100%	NA	NA	NA	100.00%
Period of refund					
Total number of cases requiring refund		193	15	0	28
Total number of cases where credit/waiver was made within 60 days		192	15	0	28
Percentage cases in which credit/waiver was received within 60 days	100%	99.48%	100.00%	NA	100.00%

3.2 Live calling results for resolution of billing complaints					
Resolution of billing complaints	Benchmark	BSNL - WB	BSNL - A&N	RCOM	VSNL
Total Number of calls made		0	0	0	14
Number of cases resolved in 4 weeks		0	0	0	14
Percentage cases resolved in 4 weeks	100%	NA	NA	NA	100.00%

4. Response time to the customer for assistance

4.1 Audit results for customer care (Voice to Voice)					
Customer Care Assessment	Benchmark	BSNL - WB	BSNL - A&N	RCOM	VSNL
Total Number of calls received		20150	20150	185066	214019
Total Number of calls answered within 60 seconds		17965	17965	167850	156233
Percentage calls answered within 60 seconds	> 60%	89.16%	89.16%	90.70%	73.00%

4.2 Live calling results for customer care (Voice to Voice)					
Customer Care Assessment	Benchmark	BSNL - WB	BSNL - A&N	RCOM	VSNL
Total Number of calls received		100	100	100	100

Total Number of calls answered within 60 seconds		83	90	95	88
Percentage calls answered within 60 seconds	> 60%	83.00%	90.00%	95.00%	88.00%

4.3 Audit results for customer care (Voice to Voice)

Customer Care Assessment	Benchmark	BSNL - WB	BSNL - A&N	RCOM	VSNL
Total Number of calls received		20150	20150	185066	214019
Total Number of calls answered within 90 seconds		19127	19127	171552	162654
Percentage calls answered within 90 seconds	> 80%	94.92%	94.92%	92.70%	76.00%

4.4 Live calling results for customer care (Voice to Voice)

Customer Care Assessment	Benchmark	BSNL - WB	BSNL - A&N	RCOM	VSNL
Total Number of calls received		100	100	100	100
Total Number of calls answered within 90 seconds		100	100	100	100
Percentage calls answered within 90 seconds	> 80%	100.00%	100.00%	100.00%	100.00%

5. Bandwidth utilization

5.1 Audit results for Bandwidth Utilization

Bandwidth utilization	Benchmark	BSNL - WB	BSNL - A&N	RCOM	VSNL
Intra-network links (POP to ISP Node)					
Total number of intra network links		279	279	5	4
No of Intra network found to be above 90%		0	0	0	0
International Bandwidth					
Total number of upstream links		896	896	4	2
Total International Bandwidth available from ISP Node to IGSP/NIXI/NAP (In mpbs)		138880	138880	22100	2048
Total International Bandwidth utilized during peak hours		108902	108902	12009	1330
Percentage Bandwidth utilization during peak hours (In mpbs)	<80%	78.41%	78.41%	54.34%	64.94%
No of Intra network found to be above 90%		0	0	0	0

5.2 Live measurement results for Bandwidth Utilization

Bandwidth utilization	Benchmark	BSNL - WB	BSNL - A&N	RCOM	VSNL
Intra-network links (POP to ISP Node)					
Total number of intra network links		279	279	5	4
No of Intra network found to be above 90%		0	0	0	0
International Bandwidth					
Total number of upstream links		960	960	4	2
Total International Bandwidth available from ISP Node to IGSP/NIXI/NAP (In mpbs)		148800	148800	22100	2048
Total International Bandwidth utilized during peak hours		121749	121749	11480	1198
Percentage Bandwidth utilization during peak hours (In mpbs)	<80%	81.82%	81.82%	51.95%	58.50%
No of Intra network found to be above 90%		0	0	0	0

6. Broadband download speed

6.2 Live measurement results for broadband download speed					
Broadband download speed	Benchmark	BSNL - WB	BSNL - A&N	RCOM	VSNL
Total committed download speed to the sample subscribers (In mpbs) (A)		1.4	1.4	2	1
Total average download speed observed during TCBH (In Mpbs) (B)		1.18	1.18	1.88	0.93
%age subscribed speed available to the subscriber during TCBH (B/A)*100	>80%	84.29%	84.29%	94.00%	93.00%

7. Service availability/uptime

7.1 Audit results for service availability					
Service Availability	Benchmark	BSNL - WB	BSNL - A&N	RCOM	VSNL
Total Operational Hours		122016	122016	744	25296
Total Downtime		97	97	0	29.05
Total time when the service was available		121919	121919	744	25266.95
Service Availability Uptime in Percentage	>98%	99.92%	99.92%	100.00%	99.89%

7.2 Live measurement results for service availability					
Service Availability	Benchmark	BSNL - WB	BSNL - A&N	RCOM	VSNL
Total Operational Hours		11808	11808	22512	2376
Total Downtime		10.42	10.42	0	0
Total time when the service was available		11797.58	11797.58	22512	2376
Service Availability Uptime in Percentage	>98%	99.91%	99.91%	100.00%	100.00%

8. Network latency / Packet loss

8.1 Audit results for Latency and packet loss					
Network Latency and Packet Loss	Benchmark	BSNL - WB	BSNL - A&N	RCOM	VSNL
Packet Loss (Percentage)	< 1%	0.03%	0.03%	0.06%	0.40%
Network Latency					
From user reference point at POP/ISP Node to IGSP/ NIXI (msec)	<120msec	49.61	49.61	61.5	39.74
From user reference point at ISP Gateway Node to nearest NAP Port (Terrestrial) (In msec)	<350msec	228.69	228.69	47.9	281.01

8.2 Live measurement results for Latency and packet loss					
Network Latency and Packet Loss	Benchmark	BSNL - WB	BSNL - A&N	RCOM	VSNL
Packet Loss (Percentage)	< 1%	0.01%	0.01%	0.00%	0.12%
Network Latency					
From user reference point at POP/ISP Node to IGSP/ NIXI (msec)	<120msec	36.9	36.9	72	41
From user reference point at ISP Gateway Node to nearest NAP Port (Terrestrial) (In msec)	<350msec	235.53	235.53	45.1	299

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