

**REPORT**

**ON**

**AUDIT & ASSESSMENT OF QUALITY OF SERVICE**

**OF**

**BASIC SERVICE (WIRELINE),  
BASIC SERVICE (WIRELESS) &  
CELLULAR MOBILE TELEPHONE SERVICE  
AND  
BROADBAND SERVICE**

**FOR**

**WEST ZONE – GUJARAT CIRCLE**

**Report Period: October 09- December 09**

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## **PREFACE**

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

*In pursuance of above objective TRAI has issued from time to time a large number of regulations, orders and directives to deal with issues coming before it and provided the required direction to the evolution of Indian telecom industry in a multi operator, multi service open competitive market. In continuation to that efforts, TRAI has selected through bidding process Audit Agency to audit and assess the Quality of Service (QoS) rendered by the service providers namely Basic Wireline, Cellular Mobile Telephone and Broadband Services.*

*The Audit would assess the Quality of Service of telecom operators 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.*

*The Audit for various circles within the Zone has been distributed across various quarterly periods. TCIL auditors have carried out audits in Gujarat Circle, West Zone in the period from October 09-December 09. This report details the performance of various service providers in Gujarat Circle against Quality of Services benchmarks for various parameters laid down by TRAI in respective regulations, 2009 for Basic Wireline, Cellular Mobile Telephone and Broadband Services.*

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## CHAPTER – 1

### BACKGROUND

#### 1.1 Introduction

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

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

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

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

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

TRAI has been carrying out regular reviews of the status of quality of service of the networks of all operators. In continuation to these efforts TRAI has selected through bidding process Audit Agency to audit and assess the Quality of Service rendered by the service providers' namely basic wireline, Cellular Mobile Telephone Services and broadband service.

The objective of assessment for the Quality of Services (QoS) has been carried out by TCIL for all the basic wireline, Cellular Mobile Telephone Services and broadband service Providers during the period starting from October 09 to December 09 in Gujarat Circles. The report provides the critical findings of the Audit by providing: -

- "Service provider performance report" based on quarterly Performance Monthly Report (PMR), 3-days live assessment and one month data audited for the basic wireline, Cellular Mobile Telephone Services and broadband service, which highlights the performance of various operators against the benchmark specified by TRAI, during the month in which the Audit was carried out by TCIL.
- "Parameter wise critical findings" for the basic wireline, Cellular Mobile Telephone Services and broadband service. This indicates parameter wise observations and findings from different activities carried out during the Audit process by TCIL.

## 1.2 Scope of Work

The audit and assessment of Quality of Service is conducted for BSNL, private basic service providers, unified access service providers, cellular mobile service providers and ISPs (Internet Service Provider) in Gujarat Service areas in the Western Zone for basic wireline, Cellular Mobile Telephone Services and broadband service.

The detailed scope of work is given below:-

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

## 1.3 Methodology

### 1.3.1 Basic Wireline Service:

The Network parameter of the QoS TRAI regulations is observed / verified for the 3 days for nearly 5% of the telephone exchanges covering 10% of the SDCA in a Service area. For details of exchanges see annexure 1: List of exchanges/switches/POP. The network parameter for the entire month is also collected from the operator as per the requirement. There are operators who have unified NMS/NOC from where the entire data can be seen. At the same time on several occasions the data had to be collected from the respective exchange as the centralized monitoring is not available. The data related to Billing and Customer care is checked for the previous month and verified with the customer by calling the customer by the auditing officers in presence of operator. The process of registration and handling of the complaints was also studied for the various operators. Call centre number was called for measuring the efficiency of the call centre in two sessions (morning/evening), 50 calls in each session at Network/Call center busy hours.

### 1.3.2 Basic Service (Wireless) and Cellular Mobile Telephone Services:

All the NSS (Network Sub System) and BSS (Base-station Sub System) data for the relevant details were collected either directly from the centralized NOC or through a remote access to the NOC. For details of switches see annexure 1: List of exchanges/switches/POP. The Radio parameters of the QoS TRAI Regulations were audited/observed/verified from the data collected from OMC-R (Operation and Maintenance Center – Radio, as part of BSS data). The Drive test was conducted in high, low and medium dense areas inclusive of highways, commercial complex

and residential areas and special attention was paid for the areas for which TRAI has received complaints. The POI and other network parameters were audited/observed/verified from the data collected from the OMC-S (Operation and Maintenance Center – Switch as part of NSS data). The data related to Billing and Customer care is checked for the previous month and verified with the customer by calling the customer by the auditing officers in presence of operator. The process of registration and handling of the complaints was also studied for the various operators. Call centre number were called for measuring the efficiency of the call centre. The Inter operator congestion was checked by calling the operators during the time specified in the tender. TCBH (Time Consistent Busy Hour) is taken as 11:00 Hrs and 19:00 Hrs as per the maximum traffic being observed for three consecutive days.

### **1.3.3 Broadband Services:**

5% of the POPs (Point Of Presence) in 10% of the SDCA were audited for the relevant details from the centralized NOC or through a remote access to the NOC. For details of POPs refer annexure 1: List of exchanges/switches/POP. The network parameter was also checked from the centralized NOC. MRTG, Cactii and Sandvine software were used for monitoring link utilization. Smoke Ping and Ping Test were used for monitoring Network Latency. The data related to Billing and Customer care was checked for the previous month and verified with sample of customers by calling them and taking their feedback. The process of registration and handling of the complaints was also studied for the various operators. Test Calls were made to the Helpline number of the Call Centre of different ISPs for measuring the efficiency of the call centre during the peak hours as per the TRAI benchmark.

## CHAPTER – 2

### REFERENCE DOCUMENTS / SOFTWARE / TOOLS USED

The following documents shall be followed and consulted while conducting the Audit and Assessment of Quality of Services for basic wireline, Cellular Mobile Telephone Services and broadband service:

1. TRAI Regulations documents
  - a. Regulations on Quality of Service of Basic and Cellular Mobile Telephone Services, 2009
  - b. Quality of Service of Broadband Service Regulations 2006.
2. Quarterly Performance Monitoring Report (PMR) for the quarter ending June 2009, provided by TRAI.
3. TRAI Tender document no. II (Audit)
4. Manufacturer's operating and configuration manual where ever made available.
5. The following Systems /Tools were used while conducting the Audit and Assessment of QoS of Basic (Wireless) and Cellular Mobile Services.
  - a. Drive Test Tools.
  - b. OMC-R
  - c. OMC-S
6. The following Software /Tools were used while conducting the Audit and Assessment of QoS of Broadband Services.
  - MRTG, Cactii and Sandvine for link utilisation.
  - Smoke Ping and Ping Test for Latency calculations.
  - Internet Explorer and Speed test tools for testing download speed.
  - FTP and PING Test for packet loss.



## CHAPTER – 3

### OPERATORS AUDITED

#### 3.1 BASIC WIRELINE SERVICE

| Sl. | Service Provider                 | Zone | Circle/ Service Area |
|-----|----------------------------------|------|----------------------|
| 1   | Bharat Sanchar Nigam Ltd. (BSNL) | West | Gujarat              |
| 2   | Airtel Ltd                       | West | Gujarat              |
| 3   | TTSL                             | West | Gujarat              |
| 4   | Reliance Communications Ltd      | West | Gujarat              |

More than 5 % of the total exchanges were audited as per the scope of works Out of 17 nos. of SSA/SDCA in Gujarat 7 nos. of SSA/SDCA were covered namely Ahmedabad, Baroda, Surat, Rajkot, Jamnagar, Palanpur & Mehsana were audited. Among these 7 nos. of SSA/SDCA 170 exchanges were covered for the purpose of audit.

#### 3.2 CELLULAR MOBILE TELEPHONE SERVICES

| Sl. | Name of service Provider         | Zone | Circle/ Service Area |
|-----|----------------------------------|------|----------------------|
| 1   | Airtel Ltd                       | West | Gujarat              |
| 2   | Idea Cellular                    | West | Gujarat              |
| 3   | Vodafone                         | West | Gujarat              |
| 4   | Bharat Sanchar Nigam Ltd. (BSNL) | West | Gujarat              |
| 5   | TATA Teleservices (TTSL)         | West | Gujarat              |
| 8   | Reliance Communications Ltd      | West | Gujarat              |

All the NSS and BSS systems were considered for audit and assessment for the TCBH hours of individual operators.

#### 3.3 BROADBAND SERVICES

| Sl. | Name of service Provider         | Zone | Circle/ Service Area |
|-----|----------------------------------|------|----------------------|
| 1   | Bharat Sanchar Nigam Ltd. (BSNL) | West | Gujarat              |
| 2   | Airtel Ltd.                      | West | Gujarat              |
| 3   | Tata Communications (VSNL)       | West | Gujarat              |
| 4   | Sify Limited                     | West | Gujarat              |
| 5   | Reliance Communications Ltd.     | West | Gujarat              |
| 6   | You Telecom                      | West | Gujarat              |
| 7   | Hathway                          | West | Gujarat              |

More than 5% of the POPs of ISP spread over in 10% SDCAs in specified service area were covered.

## CHAPTER – 4

### SERVICES / SYSTEMS AUDITED

The following **Services** were audited as per the documents under reference in chapter – 2.

1. Basic Wireline Service
2. Basic Service (Wireless) and Cellular Mobile Telephone Services
3. Broadband Service

The following **Systems** were audited as per the documents under reference in chapter – 2.

1. PSTN Exchanges
2. Mobile Switching Centre (NSS)
3. Base Station (BSS)
4. Broadband PoPs
5. Billing Applications
6. Customer Care applications

The following **Facilities** that were audited as per the documents under reference in chapter – 2

1. Billing documents.
2. Customer Care records.

The following **field verifications** were conducted as per the documents under reference in chapter – 2.

1. RF network coverage including KPIs (Key Parameter Index)
2. Inter Operator Congestion (POI)
3. Billing Complaints
4. Network Complaints
5. Customer Care efficiency

The live calling was made to assess the quality of services for Inter Operator Congestion, Billing Complaints, Network Complaints and Customer Care efficiency.


## CHAPTER – 5


**PMR DATA VERIFICATION REPORT  
PERIOD: APRIL 2009 – JUNE 2009**

**Verification of quarterly Performance Monitoring Report (PMR) submitted by operator to TRAI with Quality of Services (QoS) records maintained by Operator.**

**5.1 Basic Service (Wireline) (PMR Period : April 2009 – June 2009)**

|   |   | AIRTEL |                  | BSNL  |                  | TTSL   |                  | Reliance |                  |        |
|---|---|--------|------------------|-------|------------------|--------|------------------|----------|------------------|--------|
|   |   | PMR    | Verified by TCIL | PMR   | Verified by TCIL | PMR    | Verified by TCIL | PMR      | Verified by TCIL |        |
| 1 | Provision of a telephone after registration of demand                 |        |                  |       |                  |        |                  |          |                  |        |
|   | 100 % cases within 7 days (subject to technical feasibility)          | 100%   | 100%             | 100%  | 100%             | 100%   | 100%             | 100%     | 100%             |        |
| 2 | Fault incidences  |        |                  |       |                  |        |                  |          |                  |        |
|   | (No. of faults/100 subscribers /month)                                | <3     | 2.00%            | 2.00% | 5.4%             | 5.4%   | 2.58%            | 2.58%    | 1.78%            | 1.78%  |
| 3 | Fault repair by next working day                                      |        |                  |       |                  |        |                  |          |                  |        |
|   | By next working day   | > 90%  | 99%              | 99%   | 95.95%           | 95.95% | 99.88%           | 99.88%   | 99.66%           | 99.66% |
| 4 | Mean Time To Repair (MTTR)  | < 8Hrs | 7:1              | 7:1   | 6:56             | 6:56   | 4:00             | 4:00     | 2:27             | 2:27   |
| 5 | Call Completion Rate within a local network                           |        |                  |       |                  |        |                  |          |                  |        |
|   | Should be better than 55%   | > 55%  | 62%              | 62%   | 66%              | 66%    | 100%             | 100%     | NP               | NP     |
| 6 | Metering and billing credibility                                      |        |                  |       |                  |        |                  |          |                  |        |
|   | Disputed Bills over bills issued                                      | <0.1%  | 0.0%             | 0.0%  | 0.05%            | 0.05%  | 0.01%            | 0.01%    | 0.0%             | 0.0%   |
| 7 | Customer Care   |        |                  |       |                  |        |                  |          |                  |        |
|   | (Promptness in attending to customers requests) 95% of requests       |        |                  |       |                  |        |                  |          |                  |        |
|   | - Shifts (< 3 days)   | 97%    | 97%              | 97%   | 100%             | 100%   | 100%             | 100%     | 97%              | 97%    |
|   | - Closures (< 24 Hrs)   | 100%   | 100%             | 100%  | 100%             | 100%   | 100%             | 100%     | 99.24%           | 99.24% |
|   | - Additional Facility (< 24 Hrs)                                      | 99%    | 99%              | 99%   | 100%             | 100%   | 97.49%           | 97.49%   | 98.45%           | 98.45% |
| 8 | Response Time to the customer for assistance                          |        |                  |       |                  |        |                  |          |                  |        |
|   | (i) % age of calls answered (electronically):                         |        |                  |       |                  |        |                  |          |                  |        |
|   | within 20 seconds   | >80%   | NA               | NA    | 100%             | 100%   | 100%             | 100%     | 100%             | 100%   |
|   | within 40 seconds   | >95%   | NA               | NA    | 100%             | 100%   | 100%             | 100%     | 100%             | 100%   |
|   | (ii) % age of calls answered by operator(voice to voice):             |        |                  |       |                  |        |                  |          |                  |        |
|   | within 60 seconds   | >80%   | NA               | NA    | 99.72%           | 99.72% | 90%              | 90%      | 86%              | 86%    |
|   | within 90 seconds   | >90%   | NA               | NA    | 99.72%           | 99.72% | 93%              | 93%      | 98%              | 98%    |
| 9 | Time taken for refund of deposits after closure (100% within 60 days) | 100%   | 100%             | 100%  | 100%             | 100%   | 100%             | 100%     | 100%             | 100%   |

 Indicates deviation from benchmark of TRAI.

 Discrepancy found

**Observation:**

The PMR data was verified with the data provided by the operators. The data was found to be as per the detail provided in the table above.

**Airtel:**

Airtel is found to be meeting all the benchmarks.

**BSNL**

BSNL is meeting most of the benchmarks except for fault incidences (no. of faults/100 sub./month) with the value of 5.4% against benchmark of  $\leq 3\%$ .

**TTSL**

TTSL is meeting the benchmarks except for additional facility parameter under customer care section with the value of 97.49%.


**Reliance**


Reliance has not filed for CCR parameter in PMR report for June 2009. Other than that under the section of customer care there is minor deviation for parameters like closures within 24 Hrs & additional facility within 24 Hrs.

## 5.2 Cellular Mobile Telephone Services (PMR Period : April 2009 – June 2009)

| S. N.    | Parameters  | Ben chm arks | GSM OPERATORS |                  |        |                  |          |                  |       |                  | CDMA OPERATORS |                  |                |                  |
|----------|---|--------------|---------------|------------------|--------|------------------|----------|------------------|-------|------------------|----------------|------------------|----------------|------------------|
|          |   |              | Airtel        |                  | Idea   |                  | Vodafone |                  | BSNL  |                  | TTSL           |                  | Reliance Comm. |                  |
|          |   |              | PMR           | Verified by TCIL | PMR    | Verified by TCIL | PMR      | Verified by TCIL | PMR   | Verified by TCIL | PMR            | Verified by TCIL | PMR            | Verified by TCIL |
| <b>1</b> | <b>Network Performance</b>                                  |              |               |                  |        |                  |          |                  |       |                  |                |                  |                |                  |
| 1.1      | Accumulated down time of Community Isolation                | < 24 Hrs     | 16.88         | 16.88            | 2.4    | 2.4              | 21.35    | 21.35            | 0     | 0                | 0              | 0                | 0.46           | 0.46             |
| 1.2      | Call set-up Success Rate (within licensees own network) (%) | > 95%        | 96.78%        | 96.78%           | 99.49% | 99.49%           | 99.33%   | 99.33%           | 100%  | 100%             | 99.51%         | 99.51%           | 99.09%         | 99.09%           |
| 1.3      | Service Access Delay (Sec)                                  | 9 – 20 Sec   | 11.01         | 11.01            | 12.93  | 12.93            | 14.28    | 14.28            | 2     | 2                | 3.43 Sec       | 3.43 Sec         | 11.96          | 11.96            |
| 1.4      | Blocked Call Rate   |              |               |                  |        |                  |          |                  |       |                  |                |                  |                |                  |
|          | (i) SDCCH Congestion (%)                                    | < 1%         | 0.13%         | 0.13%            | 0.23%  | 0.23%            | 16.33%   | 16.33%           | 0.43% | 0.43%            | 0%             | 0%               | 0%             | 0%               |
|          | (ii)TCH Congestion (%)                                      | < 2%         | 0.23%         | 0.23%            | 0.16%  | 0.16%            | 29.33%   | 29.33%           | 1.57% | 1.57%            | 0%             | 0%               | 0.09%          | 0.09%            |
|          | (iii) Cell exceeding 80% TCH utilization (Nos.)             |              |               |                  |        |                  |          |                  |       |                  |                |                  |                |                  |
| 1.5      | Call Drop Rate (%)  | < 3%         | 1.28%         | 1.28%            | 1.16%  | 1.16%            | 0.64%    | 0.64%            | 1.69% | 1.69%            | 0.45%          | 0.45%            | 0.45%          | 0.45%            |
| 1.6      | Percentage of connections with good voice quality (%)       | > 95%        | 98.75%        | 98.75%           | 97.04% | 97.04%           | 98.20%   | 98.20%           | 96%   | 96%              | 99.23%         | 99.23%           | 99.63%         | 99.63%           |
| 1.8      | POI Congestion (%)  | < 0.5%       | 0%            | 0%               | 0%     | 0%               | 0%       | 0%               | 0%    | 0%               | 0%             | 0%               | 0%             | 0%               |
|          |   |              |               |                  |        |                  |          |                  |       |                  |                |                  |                |                  |

| S. N.      | Parameters   | Ben chm arks | GSM OPERATORS |                  |           |                  |           |                  |           |                  | CDMA OPERATORS |                  |                |                  |
|------------|--|--------------|---------------|------------------|-----------|------------------|-----------|------------------|-----------|------------------|----------------|------------------|----------------|------------------|
|            |  |              | Airtel        |                  | Idea      |                  | Vodafone  |                  | BSNL      |                  | TTSL           |                  | Reliance Comm. |                  |
|            |  |              | PMR           | Verified by TCIL | PMR       | Verified by TCIL | PMR       | Verified by TCIL | PMR       | Verified by TCIL | PMR            | Verified by TCIL | PMR            | Verified by TCIL |
| <b>2</b>   | <b>Customer Help Lines:</b>  |              |               |                  |           |                  |           |                  |           |                  |                |                  |                |                  |
| <b>2.1</b> | <b>Response time to the customer for assistance</b>  |              |               |                  |           |                  |           |                  |           |                  |                |                  |                |                  |
|            | (i) % age of calls answered (electronically)   |              |               |                  |           |                  |           |                  |           |                  |                |                  |                |                  |
|            | Within 20 seconds (%)  | 80%          | 100%          | 100%             | 100%      | 100%             | 100%      | 100%             | 100%      | 100%             | 100%           | 100%             | 99%            | 98.87%           |
|            | Within 40 seconds (%)  | 95%          | NA            | NA               | 100%      | 100%             | 100%      | 100%             | 100%      | 100%             | 100%           | 100%             | 99%            | 98.87%           |
|            | (ii) % age of calls answered by operator (voice to voice):   |              |               |                  |           |                  |           |                  |           |                  |                |                  |                |                  |
|            | Within 60 seconds (%)  | 80%          | 91.35%        | 91.35%           | 99%       | 99%              | 99%       | 99%              | 86%       | 86%              | 95%            | 95.33%           | 71.29%         | 69.76%           |
|            | Within 90 seconds (%)  | 95%          | 97.12%        | 97.12%           | 99%       | 99%              | 100%      | 100%             | 95%       | 95%              | 98%            | 97.6%            | 78.56%         | 77.1%            |
| <b>3</b>   | <b>Billing Complaints</b>  |              |               |                  |           |                  |           |                  |           |                  |                |                  |                |                  |
| 3.1        | Billing complaints per 100 bills issued (%)  | <0.1 %       | 0.02%         | 0.02%            | 0.08%     | 0.08%            | 0.06%     | 0.06%            | 0.03%     | 0.03%            | 0.07%          | 0.07%            | 0.07%          | 0.07%            |
| 3.2        | % of billing complaints resolved within 4 weeks (%)  | 100 %        | 100%          | 100%             | 100%      | 100%             | 100%      | 100%             | 100%      | 100%             | 100%           | 100%             | 100%           | 100%             |
| 3.3        | Period of all refunds / payments due to customers from the date of resolution of complaints as in (ii) above (weeks) | < 4 Weeks    | < 4 Weeks     | < 4 Weeks        | < 4 Weeks | < 4 Weeks        | < 4 Weeks | < 4 Weeks        | < 4 Weeks | < 4 Weeks        | < 4 Weeks      | < 4 Weeks        | < 4 Weeks      | < 4 Weeks        |

 Indicates deviation from benchmark of TRAI.

 Discrepancy found

NA – Not Applicable

NP – Data Not Provided

**Observation:**

The above data was verified with the data provided by the operators. The data were found to be as per the detail provided above.

**Airtel**

Airtel is meeting all the benchmarks. However, Airtel have not provided Response time to the customer for assistance (Electronically) within 40sec.

**Idea**

Idea is meeting all the benchmarks.

**Vodafone**

Vodafone is meeting all the benchmarks.

**BSNL**

BSNL is meeting all the benchmarks.

**TTSL**

TTSL is meeting all the benchmarks. However it is found that Response time to the customer for assistance (Voice to Voice) data shows minor deviation from its original values submitted in PMR report by the operator.

**Reliance Communications (RCOM.)**

Reliance Communication is meeting all the benchmarks. However it is found that Response time to the customer for assistance for both electronically and Voice to Voice data shows minor deviation from its original values submitted in PMR report by the operator.

**5.3 Broadband Service (PMR Period : April 2009 – June 2009)**

| s/n      | Parameters  | Bench mark                | BSNL   |                  | HATHWAY |                  | YOU TELECOM |                  | SIFY   |                  | Airtel |                  | VSNL   |                  | Reliance Comm.         |                  |
|----------|---|---------------------------|--------|------------------|---------|------------------|-------------|------------------|--------|------------------|--------|------------------|--------|------------------|------------------------|------------------|
|          |   |                           | PMR    | Verified by TCIL | PMR     | Verified by TCIL | PMR         | Verified by TCIL | PMR    | Verified by TCIL | PMR    | Verified by TCIL | PMR    | Verified by TCIL | PMR                    | Verified by TCIL |
| <b>1</b> | <b>Service Provisioning/ Activation Time</b>                          | 100% in =<15 working days |        |                  |         |                  |             |                  |        |                  |        |                  |        |                  |                        |                  |
| 1.1      | No. of connections registered   |                           | 25095  | <b>25095</b>     | 1705    | <b>1705</b>      | 2022        | <b>2022</b>      | 24249  | <b>24249</b>     | 2908   | <b>2908</b>      | 24249  | <b>24249</b>     | 6517                   | <b>6517</b>      |
| 1.2      | %age of connections provided within 15 days of registration of demand |                           | 100%   | <b>100%</b>      | 100%    | <b>100%</b>      | 100%        | <b>100%</b>      | 99%    | <b>99%</b>       | 100%   | <b>100%</b>      | 99%    | <b>99%</b>       | 100%                   | <b>100%</b>      |
| 1.3      | %age of connections provided after 15 days of registration of demand  |                           | 0%     | <b>0%</b>        | 0.00%   | <b>0.00%</b>     | 0           | <b>0</b>         | 1%     | <b>1%</b>        | 0%     | <b>0%</b>        | 1%     | <b>1%</b>        | 0                      | <b>0</b>         |
| 1.4      | No. of customers to whom credit is given for delayed connections      |                           | 0      | <b>0</b>         | 0       | <b>0</b>         | 0           | <b>0</b>         | Nil    | <b>0</b>         | 0      | <b>0</b>         | NIL    | <b>0</b>         | No delayed connections | <b>0</b>         |
| 1.5      | Total no. of connections provided during the period                   |                           | 24837  | <b>24837</b>     | 1589    | <b>1589</b>      | 2022        | <b>2022</b>      | 18934  | <b>18934</b>     | 2847   | <b>2847</b>      | 18934  | <b>18934</b>     | 118888                 | <b>118888</b>    |
| 1.6      | Total no. of working connections at the period                        |                           | 809684 | <b>809684</b>    | 21561   | <b>21561</b>     | 2022        | <b>2022</b>      | 169827 | <b>169827</b>    | 42459  | <b>42459</b>     | 169827 | <b>169827</b>    | 118888                 | <b>118888</b>    |
|          |   |                           |        |                  |         |                  |             |                  |        |                  |        |                  |        |                  |                        |                  |
|          |   |                           |        |                  |         |                  |             |                  |        |                  |        |                  |        |                  |                        |                  |



| s/n      | Parameters   | Bench mark          | BSNL   |                  | HATHWAY |                  | YOU TELECOM |                  | SIFY            |                        | Airtel |                  | VSNL   |                  | Reliance Comm. |                  |
|----------|--|---------------------|--------|------------------|---------|------------------|-------------|------------------|-----------------|------------------------|--------|------------------|--------|------------------|----------------|------------------|
|          |  |                     | PMR    | Verified by TCIL | PMR     | Verified by TCIL | PMR         | Verified by TCIL | PMR             | Verified by TCIL       | PMR    | Verified by TCIL | PMR    | Verified by TCIL | PMR            | Verified by TCIL |
| <b>2</b> | <b>Faults repair/restoration time</b>  |                     |        |                  |         |                  |             |                  |                 |                        |        |                  |        |                  |                |                  |
| 2.1      | Total no. of faults registered   |                     | 58777  | <b>58777</b>     | 23583   | <b>23583</b>     | 3408        | <b>3408</b>      | 389891          | <b>389891</b>          | 4980   | <b>4980</b>      | 389891 | <b>389891</b>    | 2713           | <b>2713</b>      |
| 2.2      | %age of faults repaired by next working day  | >90%                | 92.52% | <b>92.52%</b>    | 95.07%  | <b>95.07%</b>    | 86%         | <b>86%</b>       | 93%             | <b>93%</b>             | 99%    | <b>99%</b>       | 93%    | <b>93%</b>       | 100%           | <b>100%</b>      |
| 2.3      | %age of faults repaired within 3 working days  | =>99%               | 99.56% | <b>99.56%</b>    | 99.20%  | <b>99.20%</b>    | 98%         | <b>98%</b>       | 98%             | <b>98%</b>             | 100%   | <b>100%</b>      | 98%    | <b>98%</b>       | 100%           | <b>100%</b>      |
| 2.4      | No. of customers to whom rent rebate is given in minimum monthly charges or equivalent usage allowance for delay in fault repair |                     | 0      | <b>0</b>         | 0       | <b>0</b>         | 75          | <b>75</b>        | 46631           | <b>46631</b>           | 0      | <b>0</b>         | 46631  | <b>46631</b>     | NP             | -                |
|          | a. Rent Rebate of 7 days   |                     | 0      | <b>0</b>         | 0       | <b>0</b>         | 74          | <b>74</b>        | 46042           | <b>46042</b>           | 0      | <b>0</b>         | 46042  | <b>46042</b>     | 24             | <b>24</b>        |
|          | b. Rent Rebate of 15 days  |                     | 0      | <b>0</b>         | 0       | <b>0</b>         | 1           | <b>1</b>         | 548             | <b>548</b>             | 0      | <b>0</b>         | 548    | <b>548</b>       | 10             | <b>10</b>        |
|          | c. Rent Rebate of One Month  |                     | 0      | <b>0</b>         | 0       | <b>0</b>         | 0           | <b>0</b>         | 41              | <b>41</b>              | 0      | <b>0</b>         | 41     | <b>41</b>        | 5              | <b>5</b>         |
| <b>3</b> | <b>Billing Performance</b>   |                     |        |                  |         |                  |             |                  |                 |                        |        |                  |        |                  |                |                  |
| 3.1      | Total no. of bills issued  |                     | 635209 | <b>635209</b>    | 2026    | <b>2026</b>      | 58436       | <b>58436</b>     | 0               | <b>0</b>               | 78676  | <b>78676</b>     | 332030 | <b>332030</b>    | 244080         | <b>244080</b>    |
| 3.2      | No. of bills disputed  |                     | 1083   | <b>1083</b>      | 2       | <b>2</b>         | 221         | <b>221</b>       | 0               | <b>0</b>               | 4      | <b>4</b>         | 1483   | <b>1483</b>      | 1095           | <b>1095</b>      |
| 3.3      | %age of bills disputed   | <2%                 | 0.17%  | <b>0.17%</b>     | 0.09%   | <b>0.09%</b>     | 0.38%       | <b>0.38%</b>     | 0.0%            | <b>0.0%</b>            | 0%     | <b>0%</b>        | 0.54%  | <b>0.54%</b>     | 0.45%          | <b>0.45%</b>     |
| 3.4      | %age of complaints resolved within 4 weeks   | 100% within 4 weeks | 98.02% | <b>98.02%</b>    | 100.00% | <b>100.00%</b>   | 100%        | <b>100%</b>      | Prepaid Module. | <b>Prepaid Module.</b> | 100%   | <b>100%</b>      | 100%   | <b>100%</b>      | NP             | -                |

| 3.5      | %age of cases to whom refund of deposits is made within 60 days of closures           | 100% within 60 days | 99.96% | <b>99.96%</b>       | 100 %   | <b>100 %</b>     | 59%         | <b>59%</b>          | 100 % | <b>100 %</b>     | 100%   | <b>100%</b>      | 1354(100%)     | <b>1354(100%)</b> | 100%                     | <b>100%</b>      |
|----------|---|---------------------|--------|---------------------|---------|------------------|-------------|---------------------|-------|------------------|--------|------------------|----------------|-------------------|--------------------------|------------------|
| s/n      | Parameters  | Bench mark          | BSNL   |                     | HATHWAY |                  | YOU TELECOM |                     | SIFY  |                  | Airtel |                  | VSNL (GUJARAT) |                   | Reliance Comm. (GUJARAT) |                  |
|          |   |                     | PMR    | Verified by TCIL    | PMR     | Verified by TCIL | PMR         | Verified by TCIL    | PMR   | Verified by TCIL | PMR    | Verified by TCIL | PMR            | Verified by TCIL  | PMR                      | Verified by TCIL |
| <b>4</b> | <b>Response Time to the Customer for assistance</b>                                   |                     |        |                     |         |                  |             |                     |       |                  |        |                  |                |                   |                          |                  |
| 4.1      | Total no. of calls received by operators (Voice to voice)                             |                     | 100493 | <b>100493</b>       | 48751   | <b>48751</b>     | 66234       | <b>66234</b>        | 123   | <b>123</b>       | 260239 | <b>260239</b>    | 1068934        | <b>1068934</b>    | 804734                   | <b>804734</b>    |
| 4.2      | %age of calls answered by operator (Voice to voice) within 60 sec                     | >60%                | 74.41% | <b>74.41%</b>       | 100%    | <b>100%</b>      | 78%         | <b>78%</b>          | 100%  | <b>100%</b>      | 86%    | <b>86%</b>       | 70.45%         | <b>70.45%</b>     | 84%                      | <b>84%</b>       |
| 4.3      | %age of calls answered by operator (Voice to voice) within 90 sec                     | >80%                | 87.10% | <b>87.10%</b>       | 100%    | <b>100%</b>      | 86%         | <b>86%</b>          | 100%  | <b>100%</b>      | 95%    | <b>95%</b>       | 74.75%         | <b>74.75%</b>     | 88%                      | <b>88%</b>       |
| <b>5</b> | <b>Bandwidth utilisation/throughout</b>   |                     |        |                     |         |                  |             |                     |       |                  |        |                  |                |                   |                          |                  |
| 5.1      | No. of intra network links (POP to ISP Gateway nodes)                                 |                     | 3      | <b>3</b>            | 3       | <b>3</b>         |             |                     | 2     | <b>2</b>         | 10     | <b>10</b>        | 16             | <b>16</b>         | 132                      | <b>132</b>       |
| 5.2      | No. of intra network links having Bandwidth utilisation >90% during peak hours (TCBH) |                     |        | ** (See note below) | >85     | <b>&gt;85</b>    |             | ** (See note below) | 48%   | <b>48%</b>       | 0%     | <b>0%</b>        | 56.66%         | <b>56.66%</b>     | 0                        | <b>0</b>         |

| s/n | Parameters  | Benchmark | BSNL                   |                    | HATHWAY  |                  | YOU TELECOM   |   | SIFY   |                  | Airtel      |                  | VSNL           |                  | Reliance Comm. |                  |
|-----|---|-----------|------------------------|--------------------|----------|------------------|---|---|--------|------------------|-------------|------------------|----------------|------------------|----------------|------------------|
|     |   |           | PMR                    | Verified by TCIL   | PMR      | Verified by TCIL | PMR   | Verified by TCIL  | PMR    | Verified by TCIL | PMR         | Verified by TCIL | PMR            | Verified by TCIL | PMR            | Verified by TCIL |
| 5.3 | No. of Upstream links for International connectivity (ISP Gateway nodes to IGSP/NIXI node/NAP)                  |           |                        |                    | 2        | 2                | 6 Links (2 for Surat, 2 for Baroda and 2 for Ahmedabad) | 6 Links (2 for Surat, 2 for Baroda and 2 for Ahmedabad) | 2      | 2                | 1           | 1                | 11 stm1 B-bone | 11 stm1 B-bone   | 52             | 52               |
| 5.4 | No. of Upstream links for International connectivity having bandwidth utilisation >90% during peak hours (TCBH) |           |                        | **(See note below) | 0        | 0                | None of the link is having utilisation more than 90%    | <90%  | 42.58% | 42.58%           | 0           | 0                | NIL            | NIL              | 0              | 0                |
| 5.5 | Total International bandwidth available from ISP Node to IGSP/NIXI/NAP in Mbps                                  |           |                        |                    | 128 Mbps | 128 Mbps         | 124.33 Mbps   | 124.33 Mbps   | 2      | 2                | 450 Mbps    | 450 Mbps         | 51390          | 51390            | 63433          | 63433            |
| 5.6 | Total International bandwidth during peak hours (TCBH) in Mbps (Enclose MRTG)                                   |           |                        |                    | 108 Mbps | 108 Mbps         | 97.66 Mbps  | 97.66 Mbps  | 66 MB  | 66 MB            | 334.66 Mbps | 334.66 Mbps      | 24869          | 24869            | 28537          | 28537            |
| 5.7 | %age International bandwidth utilisation during peak hours (TCBH) in Mbps (enclose MRTG)                        | <80%      |                        |                    | 84%      | 84%              | 78.55%  | 78.55%  | 43%    | 43%              | 74%         | 74%              | 48.47%         | 48.47%           | 45.00%         | 45.00%           |
| 5.8 | Broadband Connection Speed available (download) from  | >80%      | For 2Mbps-1.79Mbps;For |                    | >=85%    | >=85%            | 85%   | 85%   | >=85%  | >=85%            | 99%         | 99%              | >80%           | >80%             | 88%            | 88%              |

|          |   |      |                |        |        |        |          |          |      |      |          |          |          |          |        |        |
|----------|---|------|----------------|--------|--------|--------|----------|----------|------|------|----------|----------|----------|----------|--------|--------|
|          | ISP node to user  |      | 8Mbps-2.14Mbps |        |        |        |          |          |      |      |          |          |          |          |        |        |
| <b>6</b> | <b>Service Availability / Uptime (for all users) in %age benchmark &gt;98% w.e.f. quarter ending.</b> |      |                |        |        |        |          |          |      |      |          |          |          |          |        |        |
| 6.1      | Total Operational Hours   |      | 2184           | 2184   | 2208   | 2208   | 21551572 | 21551572 | 100% | 100% | 29679264 | 29679264 | 32842008 | 32842008 | 728    | 728    |
| 6.2      | Total downtime in hours   |      | 7.37           | 7.37   | 7.18   | 7.18   | 175101   | 175101   | 100% | 100% | 31265    | 31265    | 656934   | 656934   | 1.65   | 1.65   |
| 6.3      | Service availability/uptime (for all users) in %age   | >98% | 99.66%         | 99.66% | 99.00% | 99.00% | 99.19%   | 99.19%   | 100% | 100% | 100%     | 100%     | 98.97%   | 98.97%   | 99.77% | 99.77% |
| <b>7</b> | <b>Packet loss (for wired broadband access) in %age</b>   | <1%  | <0%            | <0%    | <0%    | <0%    | <1%      | <1%      | <0%  | <0%  | <0%      | <0%      | 0%       | 0%       | <1%    | <1%    |

| s/n | Parameters  | Bench mark | BSNL |                    | HATHWAY |                  | YOU TELECOM |                  | SIFY    |                  | Airtel  |                  | VSNL    |                  | Reliance Comm. |                  |
|-----|---|------------|------|--------------------|---------|------------------|-------------|------------------|---------|------------------|---------|------------------|---------|------------------|----------------|------------------|
|     |   |            | PMR  | Verified by TCIL   | PMR     | Verified by TCIL | PMR         | Verified by TCIL | PMR     | Verified by TCIL | PMR     | Verified by TCIL | PMR     | Verified by TCIL | PMR            | Verified by TCIL |
| 8   | <b>Network latency (for wired broadband access)</b>   |            |      |                    |         |                  |             |                  |         |                  |         |                  |         |                  |                |                  |
| 8.1 | User reference point at POP/ISP Gateway node to IGSP/NIXI   | <120 ms    |      | **(See note below) | < 55ms  | < 55ms           | < 40 ms     | < 40 ms          | <27ms   | <27ms            | 49.1ms  | 49.1ms           | < 80 ms | < 80 ms          | <22.32 ms      | <22.32ms         |
| 8.2 | User reference point at ISP Gateway node to IGSP/NIXI   | <350 ms    |      |                    | <250 ms | <250ms           | < 300 ms    | < 300 ms         | <318 ms | <318ms           | <250 ms | <250ms           | <250 ms | <250ms           | <101.92 ms     | <101.92ms        |
| 8.3 | User reference point at ISP Gateway node to international nearest NAP port abroad (satellite)<br>**(See note below) | <800 ms    |      |                    | N/A     | N/A              | N/A         | N/A              | N/A     | N/A              | N/A     | N/A              | N/A     | N/A              | N/A            | N/A              |

Indicates deviation from benchmark of TRAI.

Discrepancy found

NA – Not Applicable

5.1 and 5.2 For You Telecom There is no separate POP; Surat, Baroda & Ahmedabad NOC and POP are the same place so Intra N/W link is not applicable.

8.1, 8.2, 5.2 to 5.7 For BSNL not applicable because NIB-Ahmedabad is connected to Mumbai and Noida only and there are no Upstream Links for International Connectivity.

8.2 For Reliance Mumbai-Hong Kong->89.30 ms. Mumbai-Singapore -> 79.64 ms. Mumbai-UK -> 14.67 ms. Mumbai-US (NWRK) -> 224.03 ms

8.1 For Reliance Delhi-NIXI ->37.19 ms Mumbai-VSNL ->10.97 ms, Chennai-NIXI -> 18.77 ms. Kindly refer point no. 8.1 in Annexure-1

8.3 None of the operators are having satellite connectivity.

**Observation:**

The above data was verified with the data provided by the operators. The data was found to be as per the detail provided above.

**BSNL**

BSNL is meeting all the benchmarks except for parameter (3.4) %age of complaints resolved within 4 weeks just meet the benchmark with small margin 98.2% & parameter (3.5) %age of cases to whom refund of deposits is made within 60 days just meet the benchmark with small margin 99.96% also.

**HATHWAY**

HATHWAY is meeting all the benchmarks except for parameter (5.7) %age international BW utilization during peak hours (TCBH) in Mbps (enclose MRTG) is not meeting benchmark accordingly operator benchmark with margin (84%).

**YOU TELECOM**

YOU TELECOM is meeting all the benchmark excepts parameter (2.2) %age of faults repaired by next working days is not meeting benchmark accordingly operator benchmark with margin 86% & parameter (2.3) %age of faults repaired within 3 working days is not meeting benchmark accordingly operator benchmark with margin 98% & %age of cases to whom refund of deposits is made within 60 days of closures is not meeting benchmark accordingly operator benchmark with margin 59% also.

**Reliance**

Reliance is meeting all the benchmark.

Reliance is submitting the PMR on all India bases; hence data is verified on All India basis not for Gujarat Circle particularly.

**Sify**

Sify is meeting all the benchmarks except for parameter (2.3) %age of faults repaired within 3 working days is not meeting benchmark accordingly operator benchmark with margin 98%.

**Airtel**

Airtel is meeting all the benchmark

**TATA Communications (VSNL)**

VSNL is meeting all of the benchmark except parameter (2.3) %age of faults repaired within 3 working days is not meeting benchmark accordingly operator benchmark with margin 98% & parameter (4.3) %age of calls answered by operator ( voice to voice )within 90 sec is not meeting benchmark accordingly operator benchmark with margin 74.75% also.

**CHAPTER -6****LIVE ASSESSMENT OF QoS OF DIFFERENT SERVICES  
3 DAYS DATA****6.1 LIVE ASSESSMENT : BASIC SERVICE (WIRELINE)**

Service Provider Performance Report based on 3-days live measurement data collected during the month of Nov 2009 to Jan 2010 for the audit period October 2009 – December 2009.

| S.N. | Parameters   | Bench marks       | AIRTEL          | BSNL            | TTSL            | R COMM.         |
|------|--|-------------------|-----------------|-----------------|-----------------|-----------------|
| 1    | Call Completion Rate within a local network Should be better than 55% & ASR should be better than 75%. | >= 55% &<br>>=75% | 66.64%<br>(CCR) | 65.15%<br>(CCR) | 59.33%<br>(CCR) | 80.86%<br>(ASR) |
| 2    | POI Congestion   | <= 0.5%           | 0%              | *0.07%          | 0%              | 0%              |
| 3    | Response Time to the customer for assistance   |                   |                 |                 |                 |                 |
| 3.1  | Accessibility of Call Centre/Customer Care   |                   |                 |                 |                 |                 |
|      | within 40 seconds  | >= 95%            | 100%            | 100%            | 100%            | 98%             |
| 3.2  | % age of calls answered by operator(voice to voice):   |                   |                 |                 |                 |                 |
|      | within 60 seconds  | >= 90%            | 98%             | 99%             | 100%            | 94%             |

Indicates deviation from benchmark of TRAI.

NA – Not Applicable

**NOTE:****BSNL:**

Out of 17 nos. of SSA/SDCA in Gujarat 7 nos. of SSA/SDCA were covered namely Ahmedabad, Baroda, Surat, Rajkot, Jamnagar, Palanpur & Mehsana were audited. Among these 7 nos. of SSA/SDCA 170 exchanges were covered for the purpose of audit.

For rest of the operators, Centralized data was provided for all the exchanges of Gujarat Circle.

**\*OPI Congestion Details:-****BSNL:**

Bharti Airtel Ltd: BAL CMTS has augmented POI with 10 E1s on 24.12.2009.

RComm: - Augmentation of POI requested by RCL but Due to nonpayment of O/S, said POI is not approved by Competent Authority.

### **6.1.1 Observation & Findings : Live Measurement – Basic Service (Wireline)**

#### **AIRTEL**

In the Network Section, both of the network parameters of Airtel are meeting the benchmark with a value of 66.64% and 0% for 'Call Completion Ratio' and 'POI congestion' respectively within the local network.

Airtel is also meeting the benchmark provided by TRAI under section 'Response Time to Customer for Assistance' for the parameters “%age Calls answered electronically within 40 Seconds” and “%age Calls answered Voice to Voice within 60 Seconds” during the live measurement.

#### **BSNL**

For BSNL, 170 Exchanges from the SSA/SDCA of Ahmedabad, Baroda, Surat, Rajkot, Jamnagar, Palanpur and Mehsana were audited. BSNL is meeting the benchmarks provided by TRAI during the live assessment for Call Completion Rate (CCR) as well as meeting the benchmark of POI congestion under Network section parameters. For POI it is seen that there are some congestions observed on Airtel and RComm POIs.

BSNL is also meeting the benchmark provided by TRAI for 'Response Time to Customer for Assistance' for the parameters “%age Calls answered electronically within 40 Seconds” and “%age Calls answered Voice to Voice within 60 Seconds” during the live measurement.

#### **TTSL**

In the Network Section, both of the network parameters of TTSL are meeting the benchmark with a value of 59.33% and 0% for 'Call Completion Ratio' and 'POI congestion' respectively within the local network.

TTSL is also meeting the benchmark provided by TRAI for 'Response Time to Customer for Assistance' for the parameters “%age Calls answered electronically within 40 Seconds” and “%age Calls answered Voice to Voice within 60 Seconds” during the live measurement.

#### **RELIANCE COMM.**

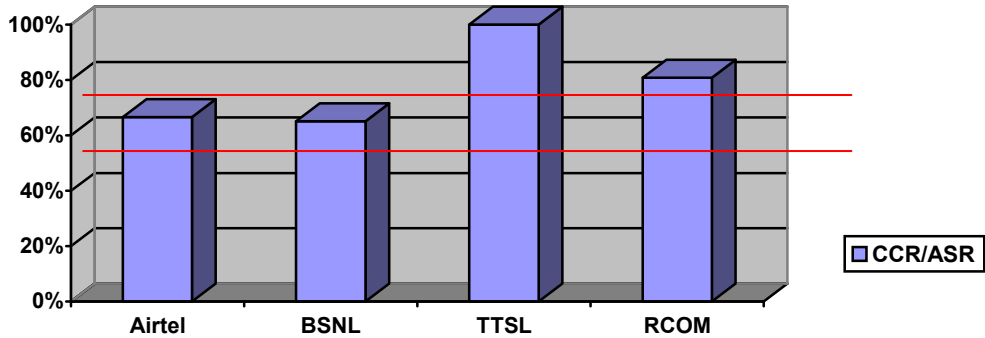
In the Network Section, both of the network parameters of Reliance are meeting the benchmark with a value of 80.86% and 0% for 'Call Completion Ratio' and 'POI congestion' respectively within the local network. Please note that Reliance have provided with ASR (Answer to Seizure ratio) value in case of call completion ratio.

Also Reliance is meeting the benchmark provided by TRAI for 'Response Time to Customer for Assistance' for the parameters “%age Calls answered electronically within 40 Seconds” and “%age Calls answered Voice to Voice within 60 Seconds” during the live measurement.

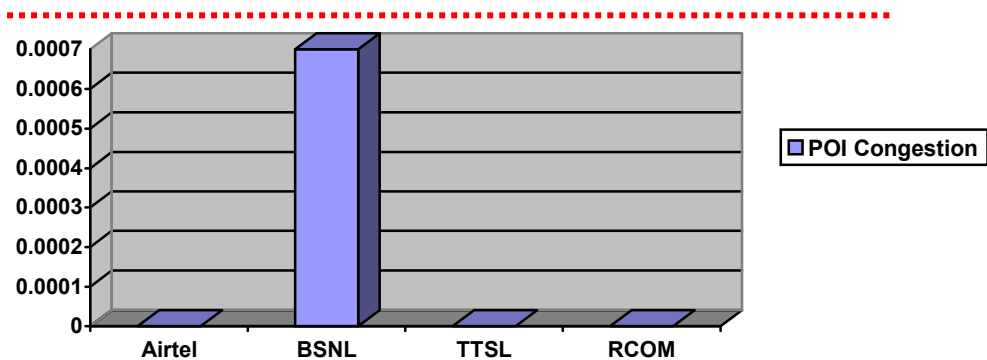


**6.1.2 Data Analysis & Graphical Representations – 3 Days Live Assessment – Basic Service (Wireline)**

**1.0 Call Completion Rate (CCR) or Answer to Seizure (ASR) within a local network: Should be better than 55% and 75%:**  
 All the operators are meeting the benchmark.



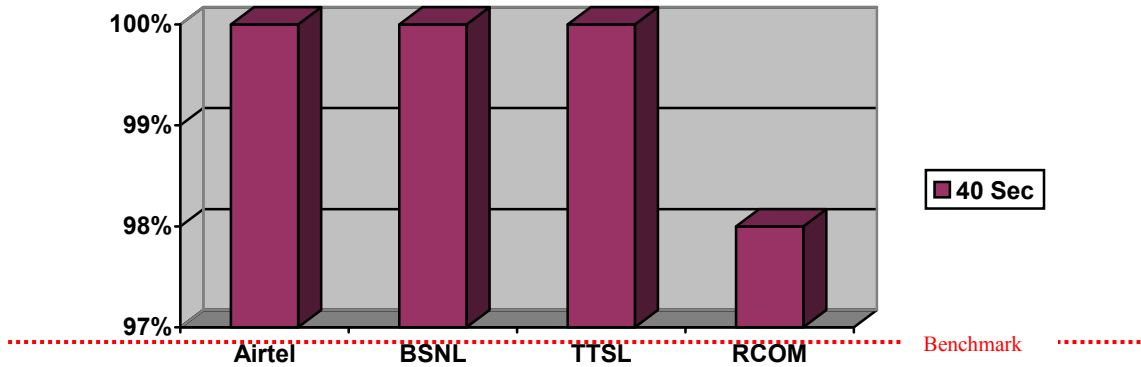
**2.0 POI Congestion (Benchmark <= 0.5%):**  
 All the operators are complying with the benchmarks set by TRAI. Other than BSNL rest of the operators are having 0% value.



**3.0 Response time to the customer for assistance:**

(i) Accessibility of call centre/ customer care;

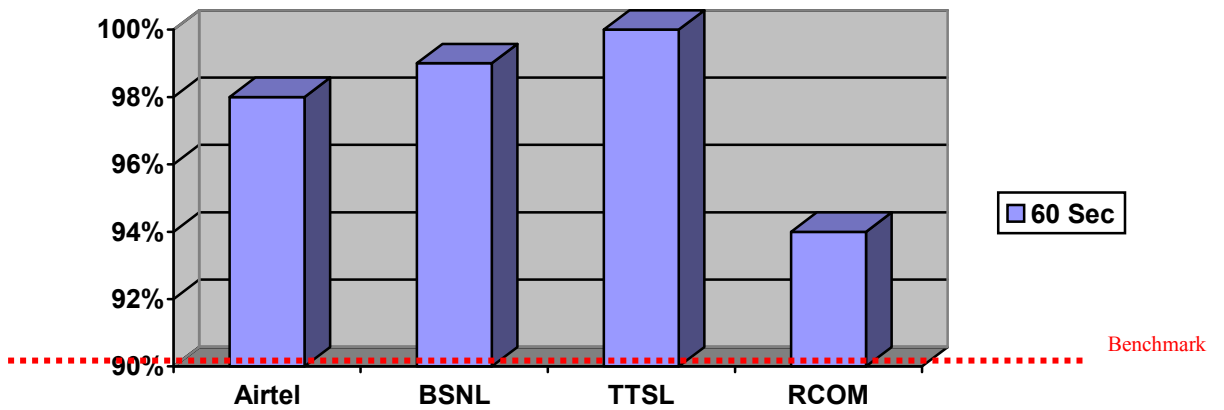
- **Within 40 seconds (>=95%) (Electronically):** All the operators are meeting the



benchmark.

(ii) % age of calls answered by operator (Voice to Voice)

- **Within 60 seconds (>=90%):** All the operators are meeting the benchmark.



## 6.2 LIVE ASSESSMENT : CELLULAR MOBILE TELEPHONE SERVICES

Service Provider Performance Report based on 3-days live measurement data done in between Nov 2009 to Jan 2010 for the audit period October 09- December 09.

| S/N | Name of Parameter  | Bench mark | Airtel               | Idea      | Vodafone  | BSNL      | TTSL                  | RCOM.   |
|-----|--|------------|----------------------|-----------|-----------|-----------|-----------------------|---------|
| (A) | <b>Network Service Quality Parameter</b>                             |            | <b>GSM Operators</b> |           |           |           | <b>CDMA Operators</b> |         |
| 1   | Connection Establishment (Accessibility)                             |            |                      |           |           |           |                       |         |
|     | (a) Call Set-up Success rate (Within licensee's own network)         | >=95%      | 99.79 %              | 99.46 %   | 99.52 %   | 99.67 %   | 98.97 %               | 99.60 % |
|     | (b) SDCCH/PAGING channel congestion                                  | <=1%       | 0.15 %               | 0.21 %    | 0.07 %    | 0.05 %    | 0%                    | 0%      |
|     | (c) TCH congestion   | <=2%       | 0.16 %               | 0.12 %    | 0.05 %    | 0.47 %    | 0%                    | 0.12 %  |
| 2   | Connection maintenance(retainability)                                |            |                      |           |           |           |                       |         |
|     | (a) call drop rate   | <=2%       | 1.43 %               | 1.28 %    | 0.79 %    | 0.82 %    | 0.52 %                | 0.76 %  |
|     | (b) Worst affected cells having more than 3% TCH drop(call drop)rate | <=5%       | 12.20 %              | 11.01 %   | 1.89 %    | 2.81 %    | 1.40 %                | 0.64 %  |
|     | (c) connections with good voice quality                              | >=95%      | 94.96 %              | 96.31 %   | 98.08 %   | 95.01 %   | *98.4 %               | *98.9 % |
|     | (d) Total No. of cells exceeding 3% TCH drop (call drop)             |            | 1,989                | 1,540     | 356       | 221       | 35                    | 51      |
|     | (e) Total no. of cells in the network                                |            | 16303                | 13990     | 18850     | 7868      | 2499                  | 7980    |
| 3   | a) Point of Interconnections(POI) congestion(on individual POI)      | <=0.5%     | 0.00 %               | 0.00 %    | 0.00 %    | 0.35/1.71 | 0%                    | 0%      |
|     | b) Name of POI not meeting the benchmark                             |            | *                    | *         | *         | *         | *                     | *       |
|     | c) Total No. of circuits on POI                                      |            | 112,694              | 91,765    | 61644     | 28,327    | 42,229                | 50,257  |
|     | d) Total No. of call attempts on POI                                 |            | 4,202,958            | 2,875,596 | 3,143,505 | 247,044   | 518,520               | 974,847 |
|     | e) Total traffic served on POI (Erlang)                              |            | 70,201               | 56,396    | 104,437   | 17,512    | 15,786                | 28267   |
|     | f) Total number of working POI Service Area wise                     |            | 165                  | 145       | 163       | 35        | 211                   | 46      |

|            |  |       |             |             |             |             |             |             |
|------------|--|-------|-------------|-------------|-------------|-------------|-------------|-------------|
|            |  |       |             |             |             |             |             |             |
| <b>4</b>   | <b>Network Parameters</b>  |       |             |             |             |             |             |             |
|            | a) Equipped Capacity of Network in respect of Traffic in erlang  |       | 212,2<br>68 | 165,5<br>31 | 300,4<br>31 | 104,7<br>22 | 220,9<br>08 | 200,0<br>00 |
|            | b) Total traffic handled in TCBH in erlang   |       | 118,2<br>20 | 111,9<br>68 | 234,9<br>83 | 77,49<br>3  | 61509       | 15,22<br>6  |
| <b>(B)</b> | <b>Customer Service Quality Parameters</b>   |       |             |             |             |             |             |             |
| <b>5</b>   | Response time to customers for assistance  |       |             |             |             |             |             |             |
|            | (a) Accessibility of call centre/customer care   | >=95% | 100<br>%    | 100<br>%    | 100<br>%    | 100<br>%    | 100<br>%    | 100<br>%    |
|            | (b) Percentage of call answered by operators(voice to voice) within 60 seconds                             | >=90% | 100<br>%    | 100<br>%    | 100<br>%    | 100<br>%    | 96%         | 92.40<br>%  |
|            | c) Total no. of call attempts to call centre / customer care nos. during TCBH (Note)                       |       | 50          | 50          | 50          | 50          | 50          | 50          |
|            | d) No. of calls connected and answered successfully to call centre / customer care nos. during TCBH (Note) |       | 50          | 50          | 50          | 50          | 50          | 50          |

Indicates deviation from benchmark of TRAI.

*NP- Data not provided.*

*Note: \**

Data collected form Drive test as because the service provider have not provided the required data from their system. CDMA operator have reported that there system do not generate such data.

For POI congestion details see Operators wise analysis (6.2.1) on individual POIs.

## 6.2.1 Observation & Findings : Live Measurement – Cellular Mobile Telephone Services

### **AIRTEL**

Airtel is deviating from the benchmarks for 'Worst affected cell exceeding 3% TCH drop' for which the benchmark is set to be  $\leq 5\%$  or better. As per TRAI new regulation of 2009 the above said parameter is to be measured at CBBH (Cell Bounce Busy Hour) instead of TCBH (Time Consistent Busy Hour) as used to be done before. For Airtel the value is as high as 12.20% and thus need to be taken into consideration ASAP.

In addition to the above '%age Call drop rate' shows a value of 1.43% which is little at the higher side but within the benchmark define ( $\leq 2\%$ ). Regarding POI congestion, Airtel is having 165 nos. of POIs and there is no congestion found on the POIs. However 2 nos. of POIs one for Cellone and the other for Vodafone connectivity have been found to have traffic load of over 95% and in future may have overflow on the POIs. Average traffic on 3 days live data observation was found to be 70,201 Erlang while system capacity (GoS) was found to be 18872.5 Erlang with 112694 nos. of circuit.

Else rests of the parameters are meeting the benchmarks.

### **IDEA**

Idea with a score of 11.01% also deviates from the TRAI benchmarks of "5%  $\leq$  or better" for 'Worst affected cell exceeding 3% TCH drop' taken at CBBH. The value 11.01% is considerably high as compared with the benchmark and thus falls under the category of high range deviation and hence needed to be taken into consideration ASAP. For Idea with 145 nos. of POIs no congestion was found on POIs as a whole but in case of individual POIs it is found to be having traffic utilization of more than 100% thus causing overflows. Such cases were found for VSNL, Vodafone and Idea (Pune). Average traffic on live data observation was found to be 56396 Erlang while system capacity (GoS) was found to be 88264 Erlang with 91765 nos. of circuits.

Rests of the parameters are meeting the benchmarks.

### **VODAFONE**

All the parameters are within the benchmarks as specified by TRAI. For Vodafone with 163 nos. of POI, no congestion was found overall on the POI. But in case of individual POI it is found that some of the POI are having more than 100% traffic utilization, such case are found on Aircel, Airtel, Idea, Cellone and Reliance POIs. Average traffic on live data observation was found to be 34812 Erlang while system capacity (GoS) was found to be 59050 Erlang with 61644 nos. of circuits.

### **BSNL**

All the parameters are within the benchmarks as specified by TRAI. But to be noted that '%age connections with good voice quality' parameter is marginally satisfying the benchmark of  $\geq 95\%$ . For BSNL with 35 nos. of POI, 0.06% congestion was found overall on the POI. For Vastrapur MSC Bharti Airtel and Reliance GSM POI were found to have traffic failure on it. Average traffic on live data observation was found to be 17512 Erlang while system capacity (GoS) was found to be 26899 Erlang with 28,327 nos. of circuits.

Rests of the parameters are meeting the benchmarks.

**TTSL**

All the parameters are within the benchmarks as specified by TRAI. For 'percentage connections with good voice quality' parameter we have taken the value from drive test data which was conducted in the month of audit as because CDMA system do not support such data from OMC-R. With 211 nos. of POIs, in TTSL no congestion was found on individual POIs while average traffic on 3 days live data observation was found to be 15786 Erlang for a system capacity (GoS) of 36824 Erlang with 42229 nos. of circuits. To be noted that though there was no congestion but 4 nos. of POI were found to have utilization over 85% but below 96%.

**RELIANCE Communication (RCOM.)**

All the parameters are within the benchmarks as specified by TRAI. For 'percentage connections with good voice quality' parameter we have taken the value from drive test data which was conducted in the month of audit as because CDMA system do not support such data from OMC-R. With 46 nos. of POIs, in RComm. no congestion was found on individual POIs while average traffic on live data observation was found to be 28267 Erlang for a system capacity (GoS) of 47860 Erlang on 50257 nos. of circuits. To be noted that though there was no congestion but 2 nos. of POI were found to have utilization just over 80%.

**Auditors comment:**

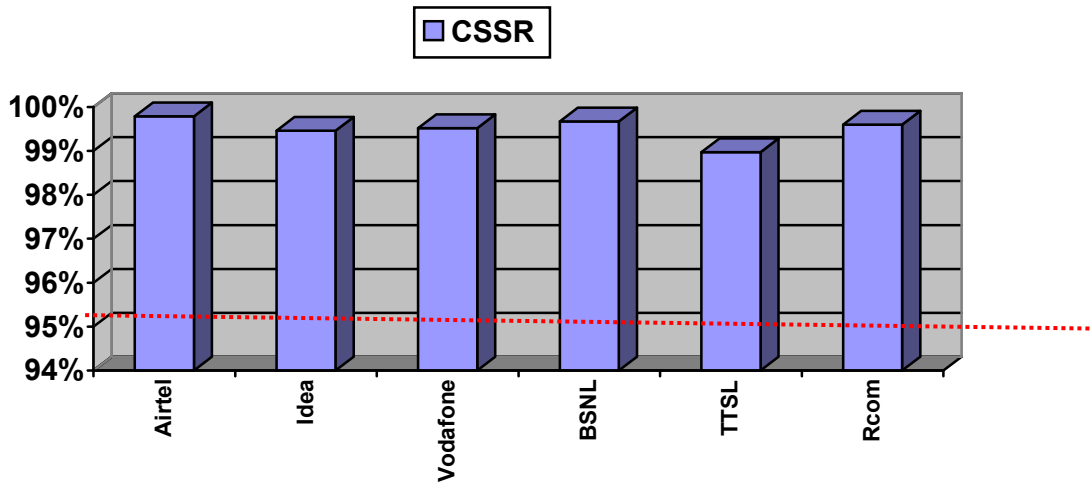
From the data table it can be seen that Airtel and Idea are not meeting the benchmark for the parameter of 'Worst affected cells are having more than 3% TCH drop rate' with huge margins. This may have happened due to mainly in the change adopted for calculating the parameter considering CBBH instead of TCBH, which reflects more practical way of calculating TCH drop keeping in view customer satisfaction. To be noted that Vodafone and BSNL among GSM operator and TTSL and RCOM among CDMA operator are satisfying the benchmark for the same thus reflecting better performance in terms of Connection maintenance (retain ability).

Regarding POI congestion all the operators are found to be performing quite well in terms of meeting the benchmark ( $\leq 0.5\%$ ). It is noticed that most of the operators are having individual POI satisfying the benchmark. But in some case overflows on individual POI are noticed causing traffic diversions to obtain net result for POI congestion. However it is seen that traffic utilization on POI is much less than the Grade of Service designed by each of the operators. Thus there are fewer failures on POIs.

**6.2.2 Data Analysis & Graphical Representations – 3 Days Live Assessment for Cellular Mobile Telephone Services**

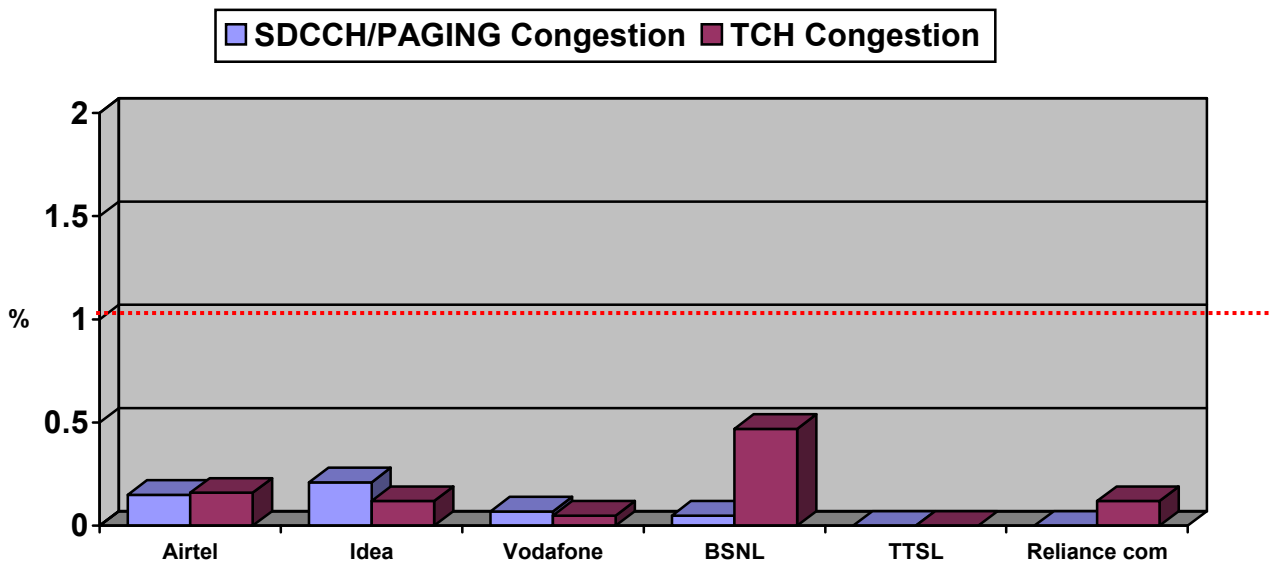
**A) NETWORK SERVICE QUALITY PARAMETERS**

I. **Call setup success rate:** All operators are meeting the TRAI benchmarks ( $\geq 95\%$ ) with value lying between 98.97% and 99.79%.



II. **Blocked call rate:**

(1) **SDCCH/PAGING Channel congestion (%)**: All operators are meeting the TRAI benchmark ( $<1\%$ ) with value lying between 0% and 0.21%. To be noted that GSM operators provides SDCCH congestion while a CDMA operators provides PAGING channel congestion.

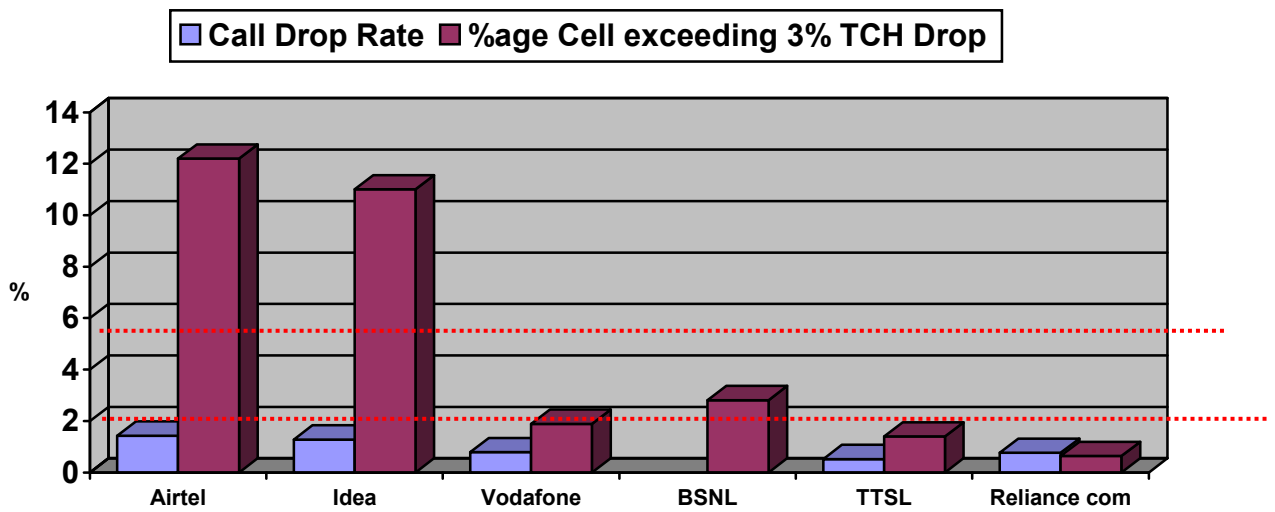


(2) **TCH congestion (%)**: All operators are meeting the benchmark ( $\leq 2\%$ ) with value lying between 0% and 0.47%.

**III) Connection maintenance (retainability):**

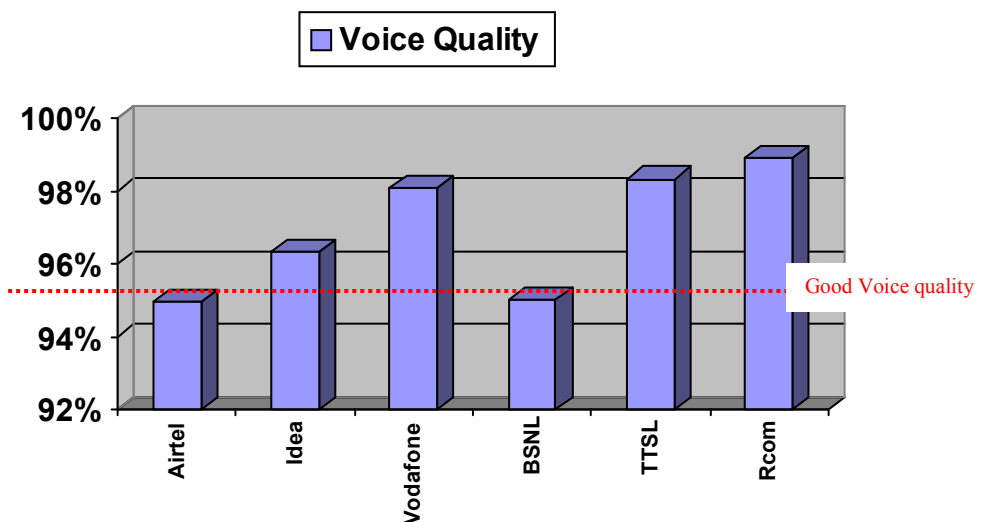
1) **Call drop rate (%)**: All operators are meeting the benchmark ( $\leq 2\%$ ) with value lying between 0.52% and 1.43%. But it can be seen that Airtel and Idea are at little higher side with value of 1.43% and 1.28% respectively.

2) **Worst affected cell exceeding 3% TCH Drop** (benchmark  $\leq 5\%$ ): The parameter value lies between 0.64% and 12.20%. It is seen from the data table that Airtel and Idea are not meeting the benchmark having large deviation. And the same may be due to the new benchmark criteria kept which states that the measurement should be taken at CBBH.



3) **Percentage of connections with good voice quality** (benchmark  $\geq 95\%$ ): The parameter value for all the operators lies between 94.96% and 98.33% except for Airtel with 94.96% marginally below the benchmark. Rest of the operators are meeting the benchmark.

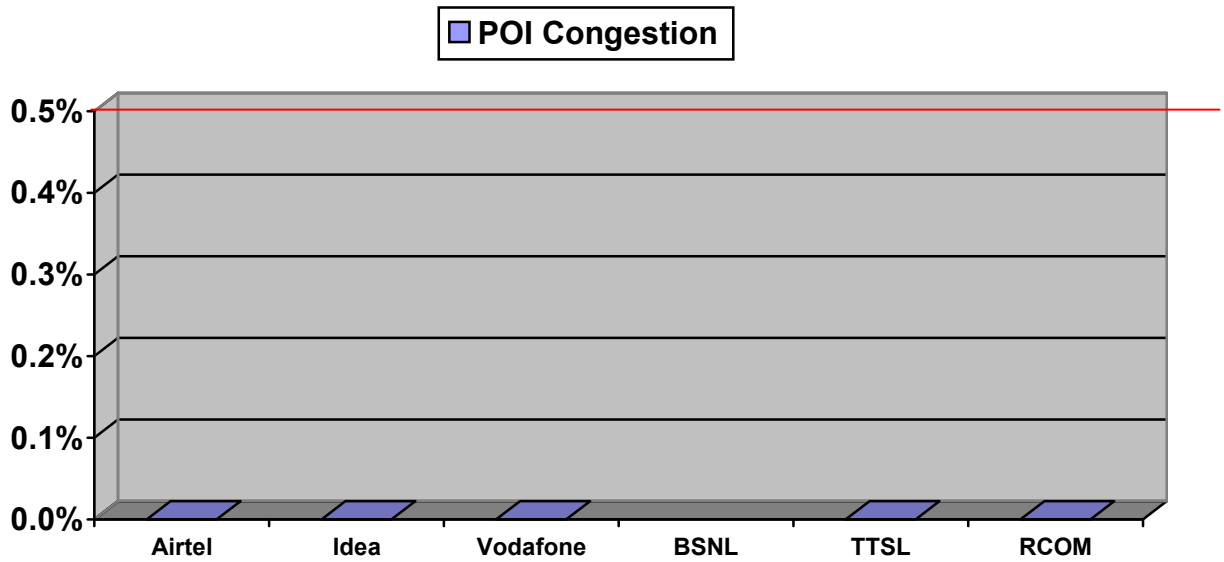
Note: For TTSL and RCOM drive test data was taken for comparison purpose as because CDMA systems do not support such data from OMC-R.





**III. POI Congestion (%):**

All operators are found to be meeting the benchmark ( $\leq 0.5\%$ ) for POI congestion. It is noticed that most of the operators are having individual POI satisfying the benchmark. But in some cases overflows on individual POI are noticed causing traffic diversions to obtain net result for POI congestion.



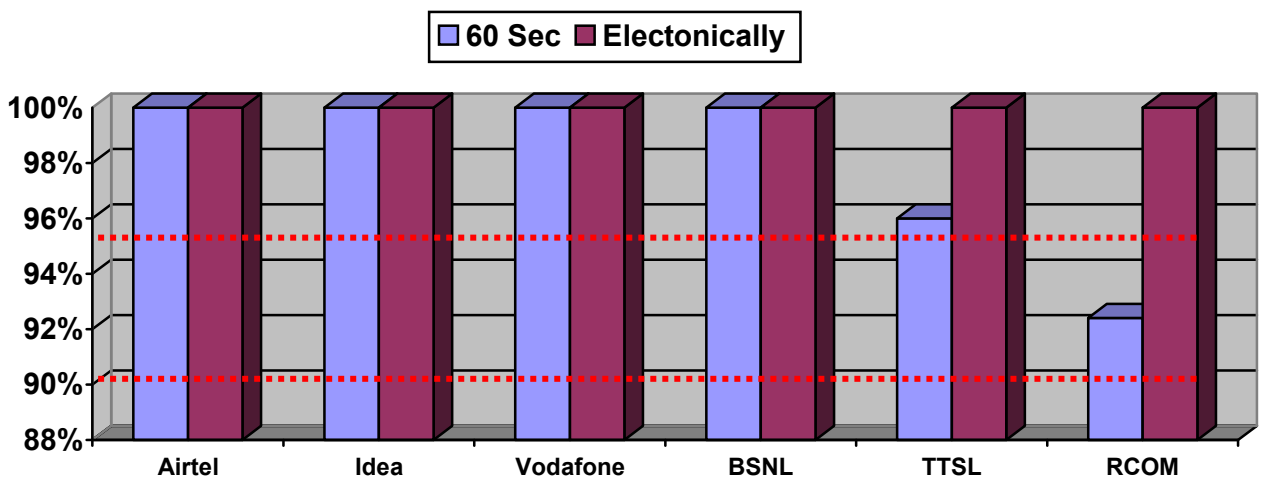
**B) CUSTOMER SERVICE QUALITY PARAMETERS**

Response time to the customer for assistance:

I. **Percentage of call answered (Electronically) benchmark ( $\geq 95\%$ ):** All operators are meeting the benchmark with a value of 100% for each and every operator.

II. **Percentage of call answered by operators (Voice to voice) within 60 Sec.;**

All operators are meeting the benchmark ( $\geq 90\%$ ) with values lying between 92.40% and 100%. However RCOM is seen to have meet the benchmark with a narrow margin.



**6.3 LIVE ASSESSMENT : BROADBAND SERVICE**

Service Provider Performance Report based on 3-days live measurement data collected during audit period (October 09- December 09).

| S. N. | Parameters   | Benchmark | BSNL              | HATHWAY           | YOU TELECOM       | SIFY          | AIRTEL          | VSNL           | R Comm.           |
|-------|--|-----------|-------------------|-------------------|-------------------|---------------|-----------------|----------------|-------------------|
| 1     | Response time to the customer for assistance % age of calls answered by operator (Voice to Voice)                  |           |                   |                   |                   |               |                 |                |                   |
|       | Within 60 seconds  | >60 %     | <b>95.20%</b>     | <b>100%</b>       | <b>100%</b>       | <b>96.80%</b> | <b>98.35 %</b>  | <b>100 %</b>   | <b>91%</b>        |
|       | Within 90 seconds  | >80 %     | <b>98%</b>        | <b>100%</b>       | <b>100%</b>       | <b>100%</b>   | <b>100%</b>     | <b>100 %</b>   | <b>96%</b>        |
| 2     | Bandwidth Utilization/ Throughput:   | <80 %     |                   |                   |                   |               |                 |                |                   |
|       | i) POP to ISP Gateway Node [Intra-network] Link(s)   |           | <b>29.74%</b>     | <b>13%</b>        | <b>78.17%</b>     | <b>35.71%</b> | <b>84.20 %</b>  | <b>41%</b>     | <b>53.11%</b>     |
|       | ii) ISP Gateway Node to IGSP / NIXI Node upstream Link(s) for International connectivity                           |           | ** see note below | ** see note below | ** see note below | <b>65.51%</b> | <b>89.21 %</b>  | <b>83.33 %</b> | ** see note below |
|       | Broadband Connection Speed (download)  | >80 %     | <b>100%</b>       | <b>99%</b>        | <b>86.50%</b>     | <b>11.67%</b> | <b>88%</b>      | <b>73.76 %</b> | <b>98.10%</b>     |
| 3     | Packet Loss  | <1%       | <b>0%</b>         | <b>0%</b>         | <b>0%</b>         | <b>0%</b>     | <b>0%</b>       | <b>0%</b>      | <b>0.001%</b>     |
| 4     | <b>Network Latency (for wired broadband access)</b>  |           |                   |                   |                   |               |                 |                |                   |
| 4.1   | User reference point at POP / ISP Gateway Node to International Gateway (IGSP/NIXI)                                | < 120 ms  |                   | <b>112 ms</b>     | <b>24 ms</b>      | <b>27 ms</b>  | <b>120.3 ms</b> | <b>43.5 ms</b> | <b>62.64 ms</b>   |
| 4.2   | User reference point at ISP Gateway Node to International nearest NAP port abroad (Terrestrial)                    | < 350 ms  | ** see note below | <b>239.66</b>     | <b>233.33 ms</b>  | <b>318 ms</b> | <b>340.33</b>   | <b>123 ms</b>  | <b>124.24 ms</b>  |
| 4.3   | User reference point at ISP Gateway Node to International nearest NAP port abroad (Satellite)<br>** see note below | < 800 ms  |                   |                   |                   |               |                 |                |                   |

■ Indicates deviation from benchmark of TRAI.

NA – Not Applicable

\*\*Note:

2(ii),4.1& 4.2 For BSNL not applicable because NIB-Ahmedabad is connected to Mumbai and Noida only and there are no Upstream Links for International Connectivity

4.3 None of the operator having satellite connectivity.

2(ii) For Hathway not having any hathway-NIXI upstream link.

2(ii) For SIFY Directly connected to ISP.

2(ii) For Comm. ISP gateway is in Mumbai, Delhi, Chennai. Hence No Upstream Link for GJ Circle

### 6.3.1 Observation & Findings : Live Measurement – Broadband Services

#### **BSNL**

BSNL is meeting the benchmarks for all the parameters for live measurement data collected & audited in 3 days duration.

For BSNL-Gujarat parameter 4.1, 4.2 & 4.3 is not applicable because NIB -Ahmedabad is connected to Mumbai and Noida only and there are no Upstream Links for International Connectivity.

#### **HATHWAY**

HATHWAY is meeting the benchmarks for all the parameters for live measurement data collected & audited for live performance.

For HATHWAY parameter 2(ii) & 4.3 is not applicable because HATHWAY is not having any hathway-NIXI upstream link & also not having any hathway-NAP (Satellite) connectivity.

#### **YOU TELECOM**

YOU TELECOM is meeting benchmarks for all the parameters for live measurement data collected & audited for 3 days duration.

For YOU TELECOM parameter 2(ii) & 4.3 is not applicable because YOU TELECOM is directly connected to ISP only.

#### **SIFY**

Sify is meeting all benchmarks except for the parameters of broadband connection speed (download) with a value of 11.67% which is much below the benchmark of 80%.

For Sify parameter 4.3 is not applicable because this link does not exist in case of Sify.

#### **AIRTEL**

Airtel is meeting all the benchmark except for parameter 2(i) Bandwidth utilization POP to ISP Gateway node [Intra-network] links with a value of 84.20% & parameter 2(ii) ISP Gateway node to IGSP/NIXI node upstream links for international connectivity with a value of 89.21% both against the benchmark of  $\leq 80\%$  & for parameter (4.1) user reference point at POP/ISP Gateway node to international gateway (IGSP/NIXI) with a value of 120.3 ms showing marginally at the higher site of the benchmark of  $\leq 120$  ms.

In AIRTEL parameter 4.3 is not applicable because No international satellite link available.

#### **VSNL**

VSNL is meeting all benchmarks except for the parameter 2(ii) ISP Gateway node to IGSP/NIXI Node upstream link(s) for international connectivity with a value of 83.33%

against the benchmark of  $\leq 80\%$  & parameter Broadband connection speed (download) with a value of 73.76% against the benchmark of  $\geq 80\%$  for live measurement data.

In VSNL parameter 4.3 is not applicable because VSNL does not use satellite B/W.

**Reliance Comm.**

Reliance is meeting the benchmarks for all the parameters for live measurement data collected & audited for live performance.

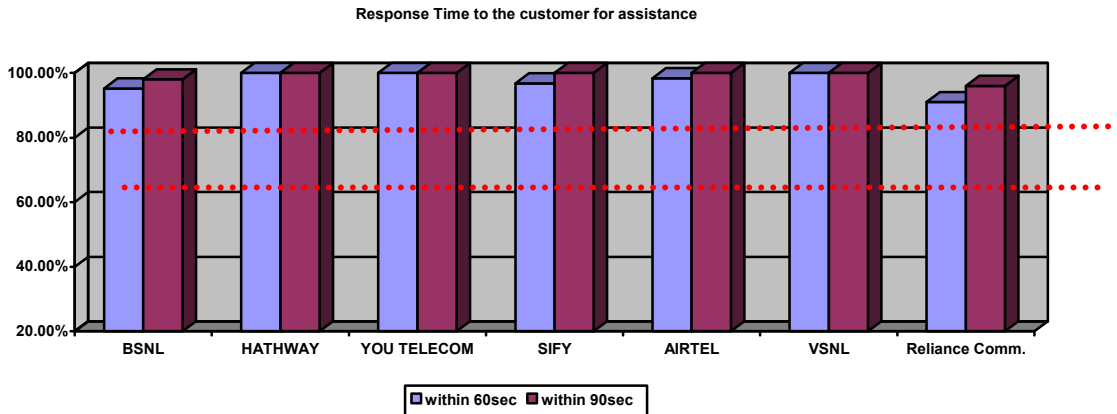
In Reliance parameter 2(ii) & 4.3 is not applicable because ISP gateway is in Mumbai, Delhi and Chennai. There is no separate upstream link for Gujarat Circle.

**Data Analysis & Graphical Representations – 3 Days Live Assessment – Broadband Services**

**1.0 Response time to the customer for assistance:**

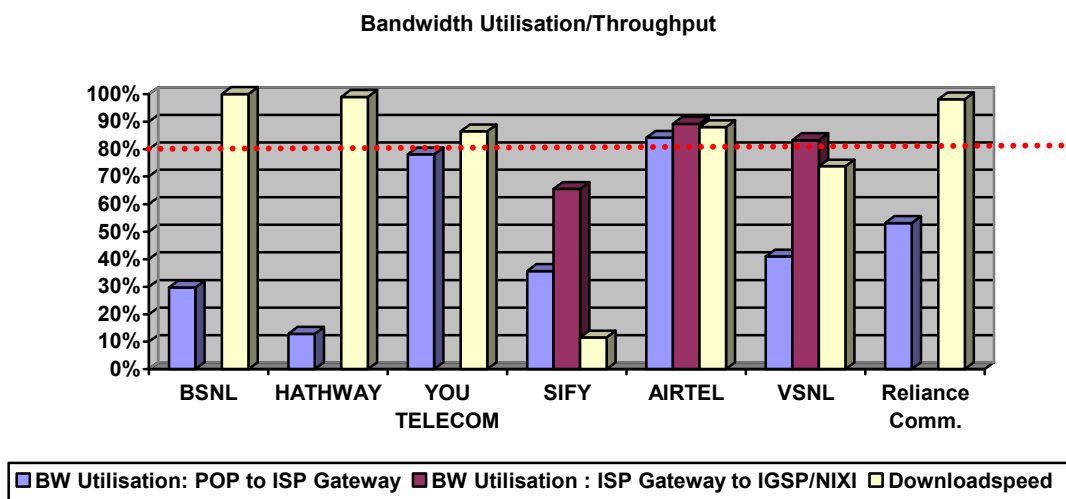
% age of calls answered by operator (Voice to Voice)

- **Within 60 seconds (>60%):** All the operators are meeting the benchmarks.
- **Within 90 seconds (>80%):** All the operators are meeting the benchmarks.

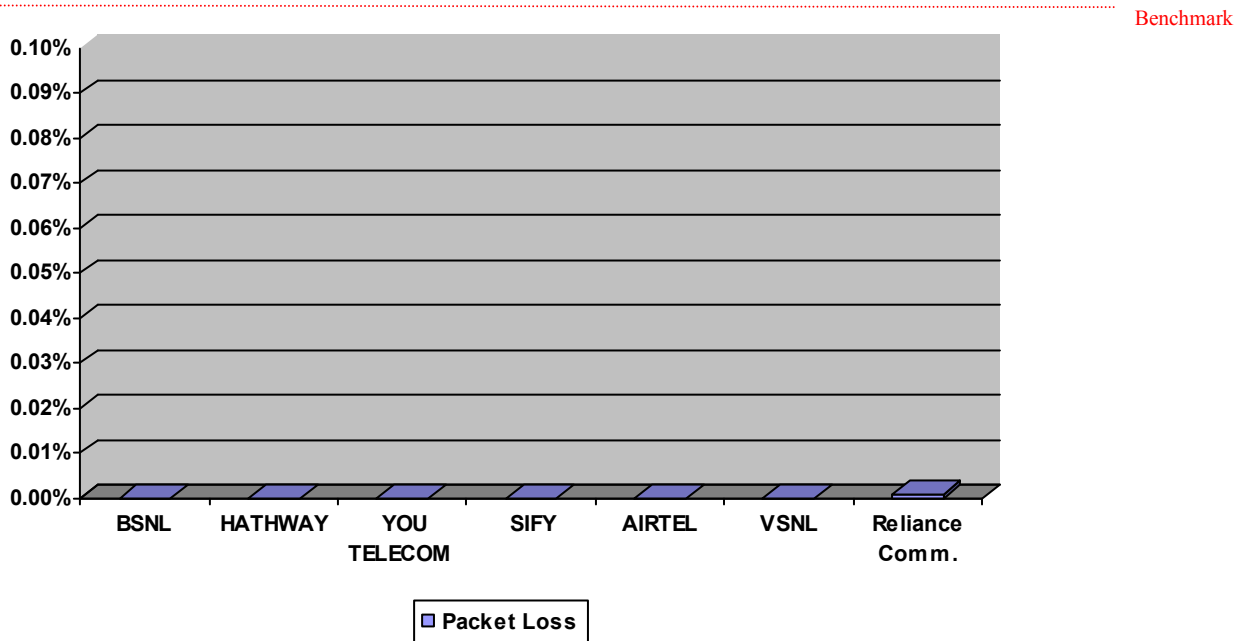


**2.0 Bandwidth Utilization/ Throughput:**

- **POP to ISP Gateway Node [Intra-network] Link(s): (Benchmark <80%):**  
All the operators meet the benchmark except Airtel with a value of 84.20%.
- **ISP Gateway Node to IGSP / NIXI Node upstream Link(s) for International connectivity: (Benchmark <80%):**  
All the operators are meeting the benchmarks except for Airtel and VSNL with a value of 89.21% and 83.33% respectively.
- **Broadband Connection Speed (download) (>80%):**  
All the operators are meeting the benchmark except for SIFY and VSNL with a value of 11.67% and 73.76% respectively.



**3.0 Packet Loss: (Benchmark <1%):** All the operators are meeting the benchmark.



**4.0 Network Latency:**

- **User reference point at POP / ISP Gateway Node to International Gateway (IGSP/NIXI): (Benchmark <120ms):**

All the operators are meeting the benchmark except Airtel with a value of **120.3 ms**, which can be seen as marginal deviation. For BSNL this link does not exist because NIB-Ahmedabad is connected to Mumbai and Noida only and there are no Upstream Links for International Connectivity

- **User reference point at ISP Gateway Node to International nearest NAP port abroad (Terrestrial): (Benchmark <350ms):**

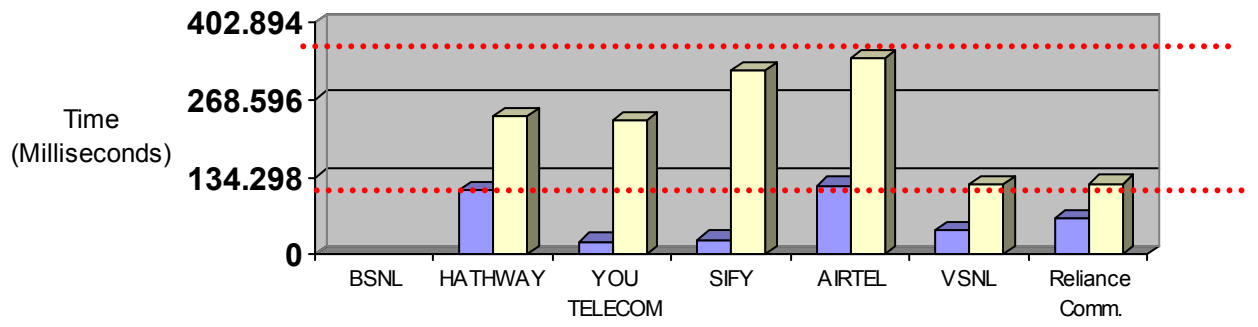
All the operators are meeting the benchmark. For BSNL this link does not exist because NIB-Ahmedabad is connected to Mumbai and Noida only and there are no Upstream Links for International Connectivity.

- **User reference point at ISP Gateway Node to International nearest NAP port abroad (Satellite):**

Link does not exist for any of the operators.



### Network Latency



- User reference point at POP / ISP Gateway Node to International Gateway (IGSP/NIXI)
- User reference point at ISP Gateway Node to International nearest NAP port abroad (Terrestrial)

## CHAPTER – 7

## PERFORMANCE REPORT OF OPERATORS

## 7.1 QUALITY OF SERVICE ASSESSMENT : BASIC SERVICE (WIRELINE)

## 7.1.1 Service Provider Performance Report based on One Month Data Verification in which audit was conducted (Nov 09 – Dec 09).

| S.N. | Parameters  | BENCH - MARKS           | AIRTEL       | BSNL               | TTSL                         | RELIANCE COMM. |
|------|---|-------------------------|--------------|--------------------|------------------------------|----------------|
| 1    | Fault incidences  |                         |              |                    |                              |                |
|      | (No. of faults/100 subscribers /month)  | < 5%                    | 2.5%         | 5.11%              | 1.5%                         | 0.88%          |
| 2.   | Fault repair by next working day(Urban Area)  |                         |              |                    |                              |                |
|      | By next working day   | >90%                    | 98.28%       | 96.67%             | 98%                          | 100%           |
|      | Within 3 days   | 100%                    | 99.5%        | 99.40%             | 100%                         | 100%           |
| 2.1  | Fault repair by next working day(Rural & hilly Area)                                      |                         |              |                    |                              |                |
|      | By next working day   | >90%                    | NA           | 94.30%             | NA                           | NA             |
|      | Within 5 days   | 100%                    | NA           | 99.65%             | NA                           | NA             |
| 3.   | Rent rebate   |                         |              |                    |                              |                |
| 3.1  | Fault pending > 3 days & <7 days  | Rebate for 7 days       | 1            | 22(all are in fig) | No eligible cases for Rebate | 2              |
| 3.2  | Fault Pending > 7 days & < 15 days  | Rebate for 15 days      | 0            | 36                 | No eligible cases for Rebate | 1              |
| 3.3  | Fault pending > 15 days   | Rebate for one month    | 0            | 64                 | No eligible cases for Rebate | 1              |
| 4.   | Mean time to Repair(MTTR)   | <= 8 Hrs                | 6.2 Hrs      | 6.53 Hrs           | 2.6Hrs                       | 1.59 Hrs       |
| 5.   | Call Completion Ratio(CCR) & Answer to seizure Ratio(ASR)                                 | > 55%(CCR) & > 75%(ASR) | 66.02% (CCR) | 65.87% (CCR)       | 58.5% (CCR)                  | 79.85% (ASR)   |
| 6.   | Metering and billing credibility(post paid)   |                         |              |                    |                              |                |
| 6.1  | Disputed Bills over bills issued  | < 0.1%                  | 0.024%       | 0.12%              | 0.04%                        | 0.03%          |
| 7.   | % of billing complaints resolved within 4 weeks   | Within 4 weeks          | 100%         | 95.86%             | 100%                         | 100%           |
| 8.   | Period of all refunds/payments from the date of resolution of complaints within one weeks | Within 1 weeks          | 100%         | 100%               | 100%                         | 100%           |

|      |   |                     |        |        |                 |                 |
|------|---|---------------------|--------|--------|-----------------|-----------------|
| 9.   | POI Congestion  | <= 0.5%             | 0.01%  | 0%*    | 0%              | 0.0%            |
| 10.  | Response Time to customer for assistance                              |                     |        |        |                 |                 |
| 10.1 | Accessibility of Call centre/customer Care within 40 seconds          | >= 95%              | 98.58% | 99.92% | 100%            | 96.42%          |
| 10.2 | % age of calls answered by operator(voice to voice) within 60 seconds | >= 90%              | 95.37% | 99.76% | 92%             | 92.09%          |
| 11   | Customer care(promptness in attending to customers request            |                     |        |        |                 |                 |
| 11.1 | Termination / Closures  | <= 7 Days           | 100%   | 98.22% | 100%            | 100%            |
| 12.  | Time taken for refunds of deposit after closures                      | 100% within 60 days | 100%   | 100%   | No refund cases | No refund cases |

Indicates deviation from benchmark of TRAI.

#### \* Note

##### BSNL: - POI details

- (GODHRA) TATA UASL POI on dated 14.11.09 PCM problem at TATA end.
- (VALSAD) RELIANCE BASIC POI congestion from 03.11.2009 TO 06.11.2009 due to technical problem at operator end.
- GMSC (Vastrapur & Shahibaug) BAL CMTS every day congestion hence Augmentation of 10 E1s commissioned on 24.12.2009.
- GMSC (Shahibaug) TATA CMTS congestion on 10.11.2009 due to work of GSM at TATA end.
- GMSC Vastrapur RCL GSM every day congestion, augmentation requested by RCI but Due to non payment of O/S, Augmentation POI not approved by Competent authority.

## **Critical findings and Key take outs**

### **7.1.2 Basic service (Wireline)**

- ◆ The Basic service (Wireline) audit for Gujarat Circle broadly indicates that almost all the service providers are meeting the benchmarks fixed by Telecom Regulatory Authority of India (TRAI) with exceptions in some areas as described in the report. In cases where benchmarks are not met by the operators, the short fall are found to be marginal only.
- ◆ The live calling results of call center for response time to the customer for assistance are found to be similar for the one month data audited and three-days live measurement for all the operators.
- ◆ In the live measurements conducted to assess Call Completion Rate (CCR), it was found that all the operators are meeting the benchmark. The results of three-day live measurement and one month data audited are found to be almost similar.
- ◆ The testing of the efficiency of level 1 service (Police, Fire brigade, Ambulance, Trunk booking, Child helpline, Women helpline, Airline booking, etc.) provided by the service providers in Gujarat Circle has been conducted by TCIL auditors. To test the same, 300 calls were made to different numbers provided by service providers and answered call was recorded. The efficiency of level 1 service of all the operators was found to be excellent with 100% successful calls rate.
- ◆ To test the Service Providers performance on Technical (Network related complains) & Non-Technical (Provisioning, Billing, Refund etc.) complaint TCIL auditors have conducted a customer feedback calling for random 100 nos. of customers in each segment. It was found that more than 96% customers are satisfied with services provided by the operators.
- ◆ The BSNL has a decentralised system for Book keeping, and data has been verified only for sample 5% of exchanges spread over 10% of Short Distance Charging Area (SDCA's) in Gujarat Circle.

The parameter wise key takeouts for the Basic (Wireline) Service providers for the Gujarat Circle are as under:-

#### **Fault incidence:**

Except for BSNL with a value of 5.11%, showing minor deviation from the bench mark of <= 5% rest of the operators are within the benchmark value.

#### **Fault Repair(Urban Area):**

It is found that all the operators are meeting the benchmarks of >=90% set by TRAI for faults repair by the next working day and in case of fault repair within 3 working days Airtel and BSNL are found to miss the benchmark of 100% marginally. Through live calling the fault repair within 24 hours data was verified and found that almost all the operators are better than 95% in customer satisfaction. While verification of records of service providers it was found that all the service providers are providing rebates as per TRAI norms.

**Fault Repair(Rural & Hilly Area):**

It is found that Airtel, TTSL and Reliance do not have cases of any Faults in Rural & Hilly areas as they have no such service in rural and hilly areas. Only BSNL is having services in such areas and is meeting the benchmarks of >90% set by TRAI for faults repair by next working day in case of one month data audit. As far as faults repair by next 5 working days are concerned, minor deviation is observed for one month data verification.

**Rent Rebate:**

All the operators are providing Rebate except TTSL having no rebate cases in the month of audit. Airtel is having only 1 rebate case for 7 days. Reliance is having 2 rebate case for 7 days and 1 cases each for 15 days and one month data category. For BSNL rebate cases are 22, 36 and 64 respectively for each type of refund cases.

**Mean Time to Repair(MTTR) :**

All the operators are meeting the benchmark of <8hrs fixed by TRAI during one month data audit.

**Call Completion Rate (CCR) :**

All the service providers are found to be meeting TRAI benchmark of >55% for Call Completion Rate (CCR) and > 75% for Answer to Seizure Ratio for the month of audit data verification  
However in the case of Reliance, the Answer Seizure Ratio (ASR) is measured in place of Call Completion Rate (CCR) and the firm claims that the same is a better indicator for the kind of network owned by the Reliance.

**Metering and billing credibility :**

All the operators are complying the benchmark of less than 0.1% billing complaints over the total number of bills issued except BSNL marginally missing the benchmark with a value of 0.12% for the month of audit.

**% of Billing complaints Resolved Within 4 Weeks :**

As per the findings for one-month data audit, all the operators were found 100% resolution of complain within 4 weeks except BSNL with a value of 95.86%.

**Period of All refunds/Payments from the date of resolution within 1 Week :**

As per the findings for one-month data audit, all the operators were found 100% refunds from the date of resolution within 1 week.

**POI Congestion :**

All the operators are meeting the benchmarks in POI Congestion set by TRAI(<0.5%) in one month data Audit.

**Response Time to Customer for Assistance :**

**(i) Accessibility of Call Centre/ Customer care within 40 seconds (Electronically)**

For accessibility of call centre i.e. call answered electronic through IVR menu parameter all the operators are meeting the benchmarks of  $\geq 95\%$ .

**(ii) % of Call answered by operators within 60 seconds (Voice to Voice):**

For %age of calls answered by operators within 60 Seconds parameters, all the operators are meeting the benchmark of 90% fixed by TRAI.

**Customer care (Promptness of Attending customer request) :**

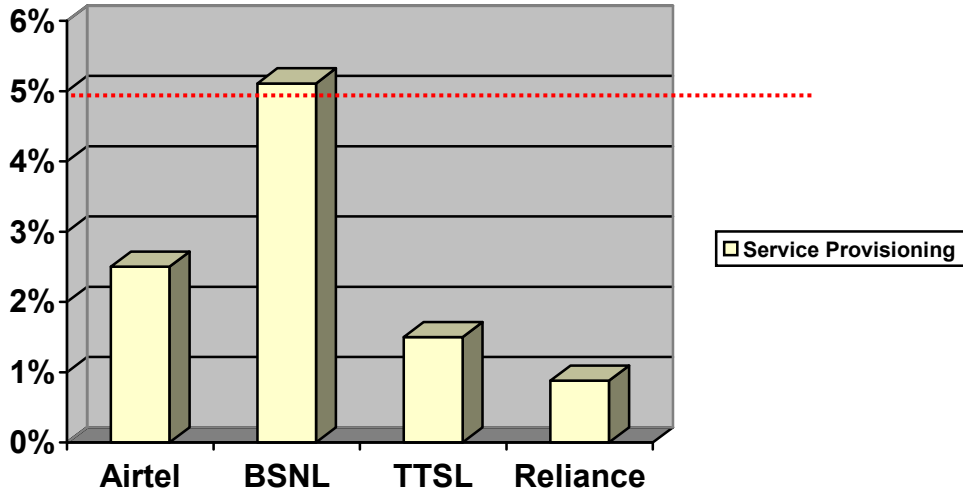
**(i) Termination / Closure:-** All the operators are meeting the TRAI benchmarks of 100% within  $\leq 7$  days for closure requests except for BSNL with a value of 98.22%.

**ii) Time taken for refund of deposits after closure:**

The audit finding on 'time taken for refund of deposit after closure' that all the operators are providing the refund to the customers within the benchmark, to be noted that BSNL and RComm are having no such cases.

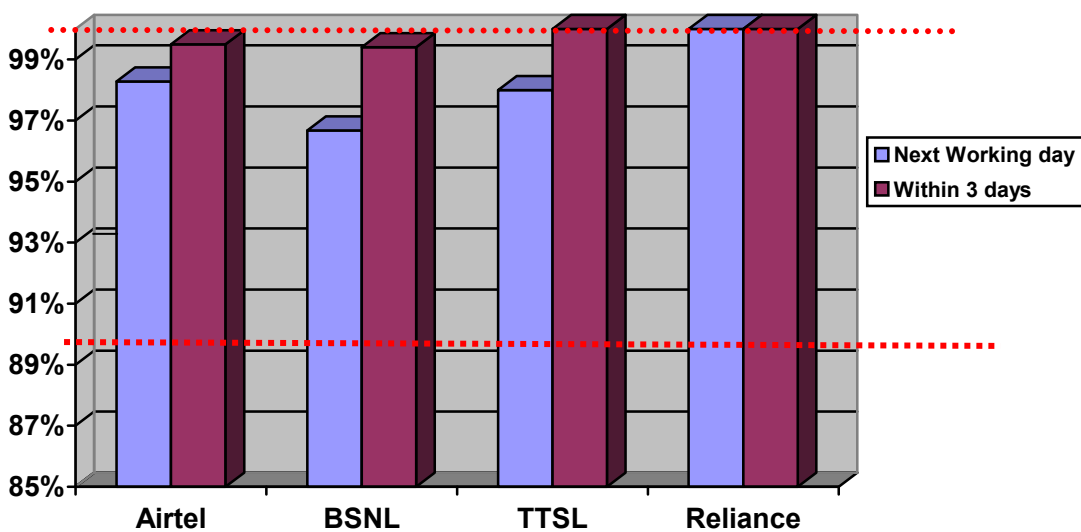
**7.1.3 Parameter wise Data Analysis & Graphical Representations – Basic Service (Wireline)**

**1.0 Fault incidences (No of faults/100 subscribers/month (<= 5):** Except for BSNL (5.11%) rest of the operator are meeting the benchmark set by TRAI.



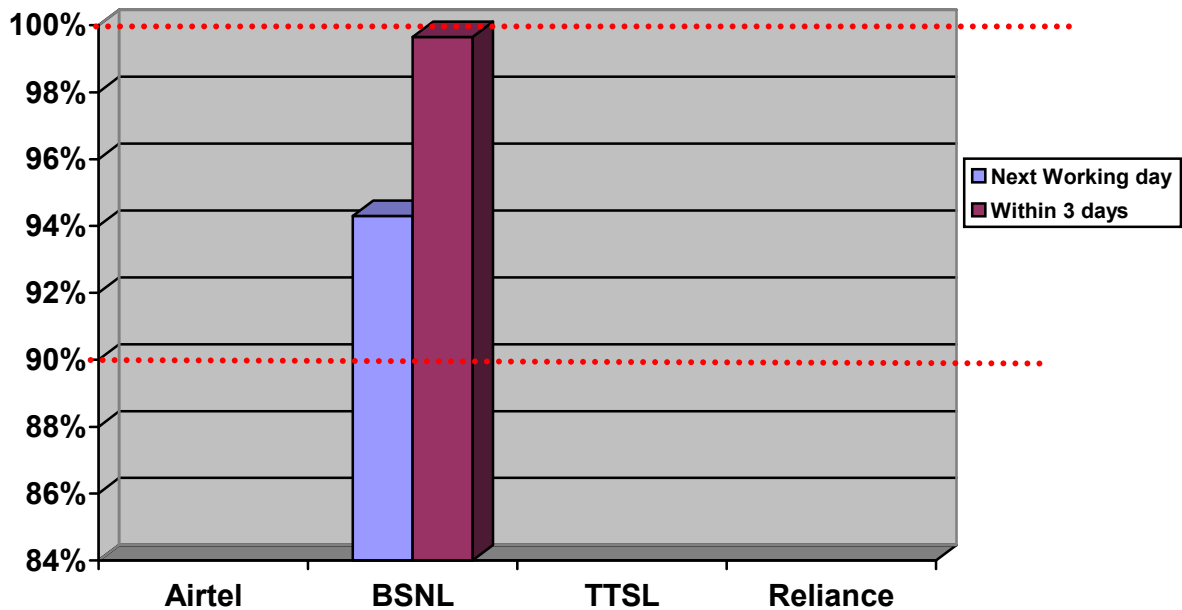
**2.0 Fault Repair (Urban Area):**

- **By next working day (>90%):** All the operators comply with the TRAI benchmark of 90%.
- **Within 3 days (100%):** TTSL & Reliance is complying with the TRAI benchmark of 100%. Airtel (99.50%) & BSNL (99.40%) show minor deviation in benchmark.



**2.1 Fault Repair(Rural & Hilly Area):**

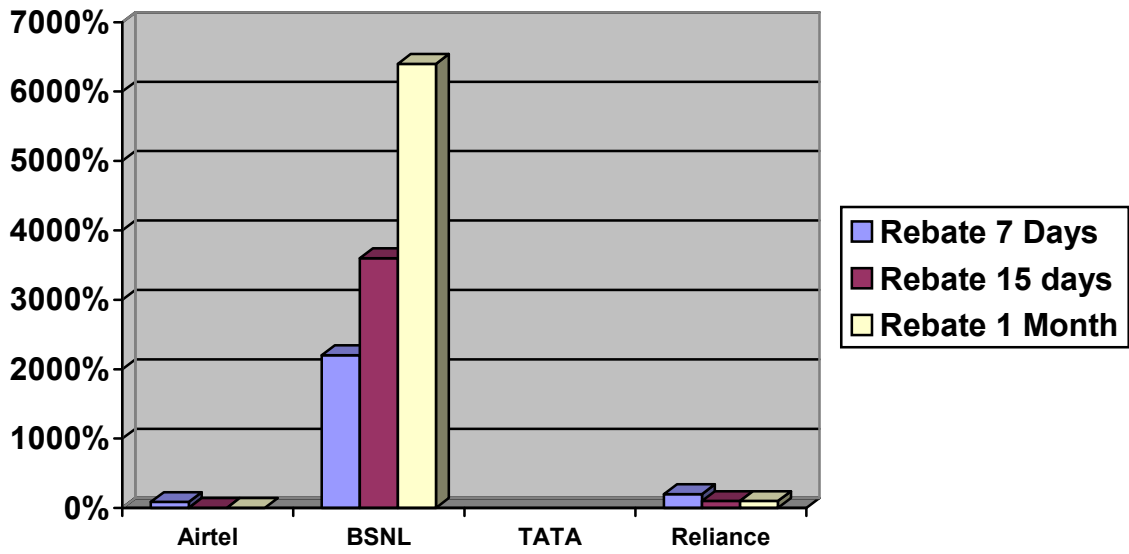
- By next working day (>90%): Airtel, TTSL & RComm do not have any services in Rural & hilly areas; the only operator BSNL providing service comply with the TRAI benchmark of 90%.
- Within 5 days (100%): BSNL is marginally missing the benchmark of 100%.



**3.0 Rent Rebate:**

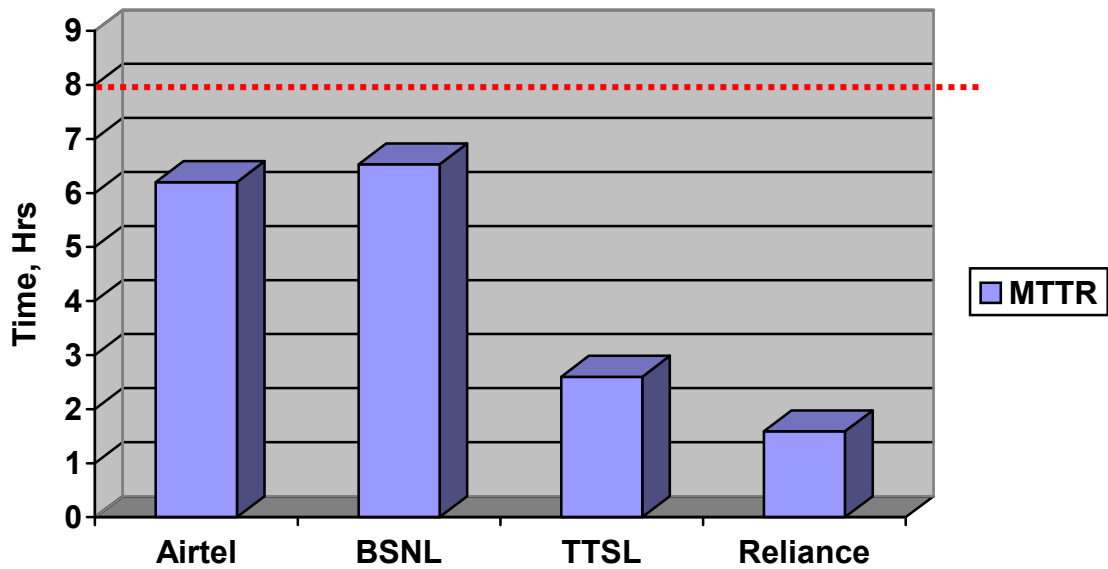
- Faults pending for > 3 days & < 7 days (Rebate 7 days)—As far as rebate is concerned Airtel, BSNL and Rcomm are giving rebate to 1, 22 and 2 no of customers. TTSL do not have any rebate case.
- Faults pending for > 7 days & < 15 days (Rebate 15 days) — As far as rebate is concerned BSNL and Rcomm are giving rebate to 36 and 1 no of customers. Airtel and TTSL do not have any rebate case.
- Faults pending for > 15 days (Rebate one month)--. As far as rebate is concerned BSNL and Rcomm are giving rebate to 64 and 1 no of customers. Airtel and TTSL do not have any rebate case.





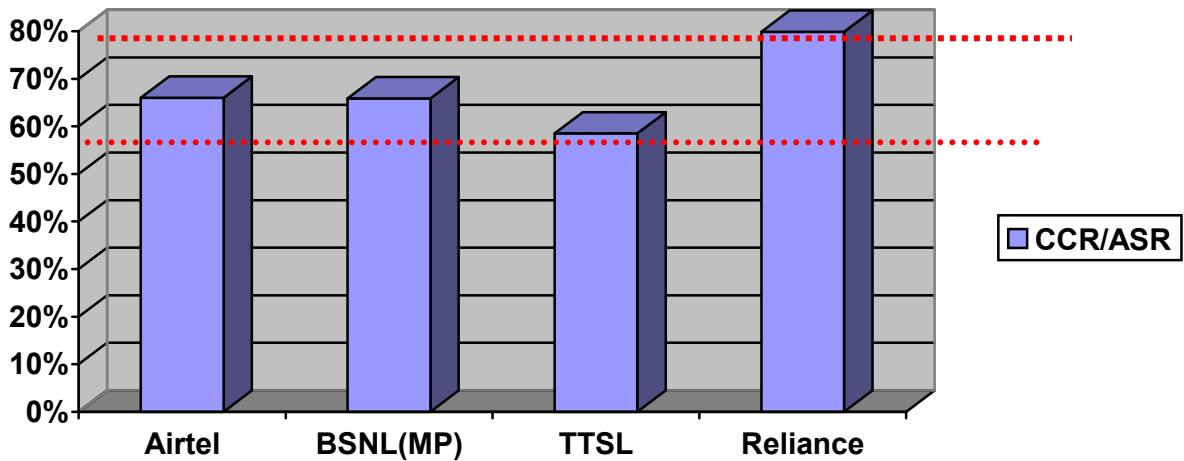
**4.0 Mean Time to Repair (MTTR) (<= 8 Hrs) :**

All the operators comply with the TRAI benchmarks.



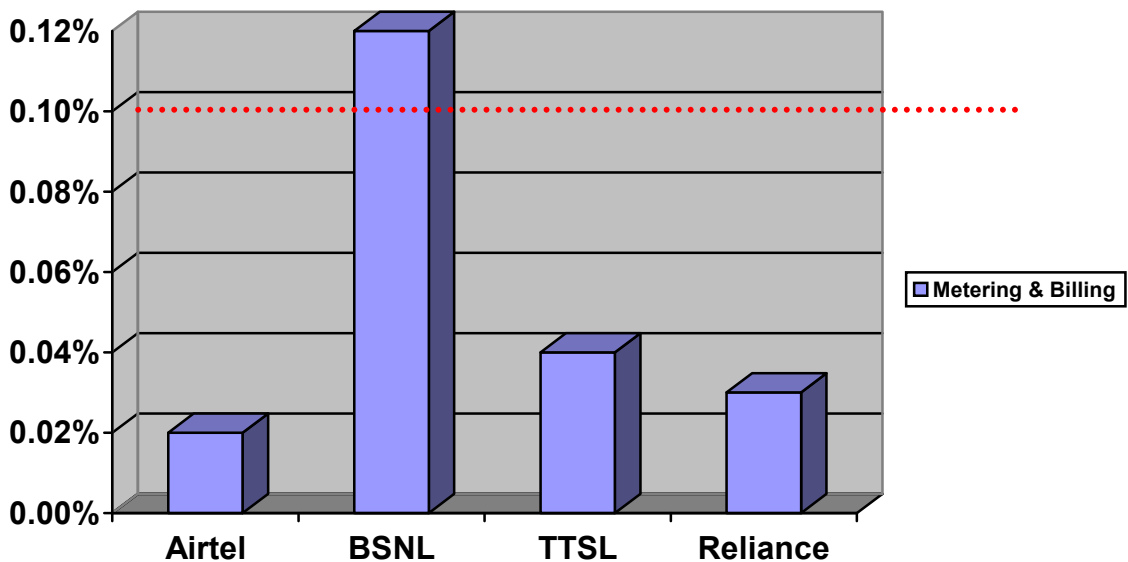
**5.0 Call Completion Rate (CCR)/ Answer to Seizure Ratio (ASR) (>55% & > 75%):**

All the operators comply with the TRAI standards. Other than RComm, which have given ASR rest of the operators, gave CCR value.



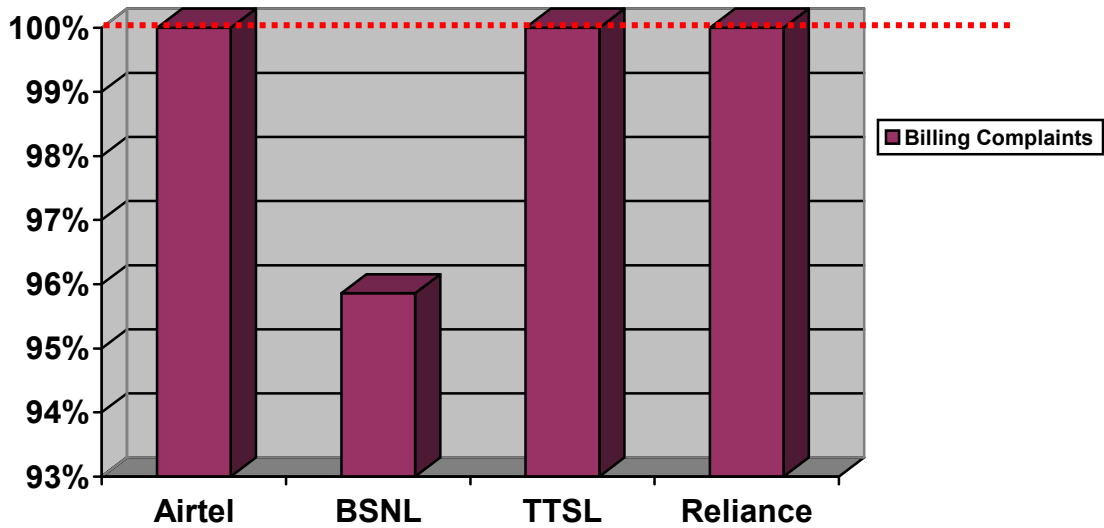
**6.0 Metering and Billing Credibility (< 0.1%):**

Disputed Bills over Bills issued: - All the operators comply with the TRAI standards except BSNL with 0.12% showing marginal deviation.



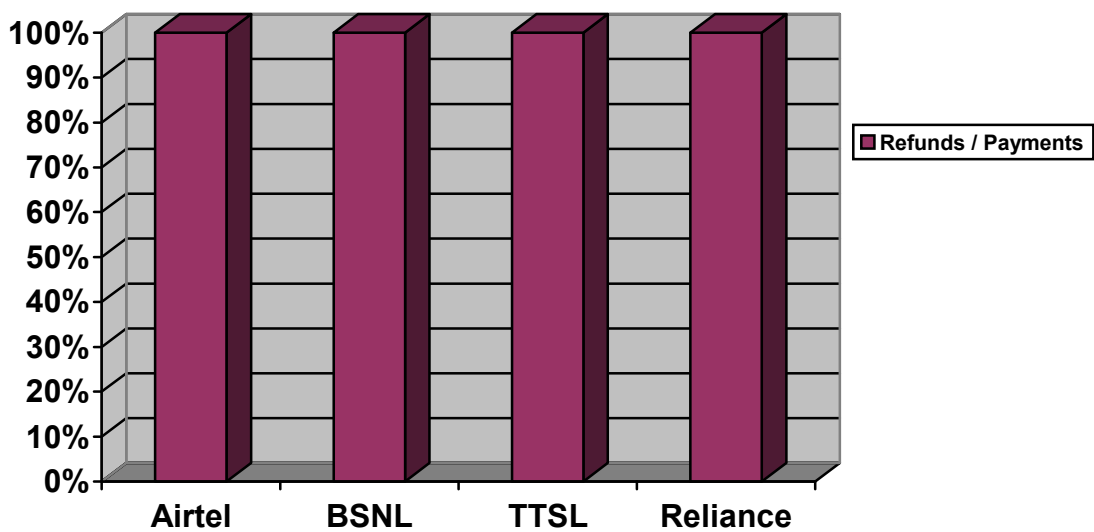
**7.0 % of Billing Complaints resolved within 4 Weeks:**

All the operators has resolved billing complaints 100% (benchmark) within 4 weeks except for, BSNL with a value of 95.86%.



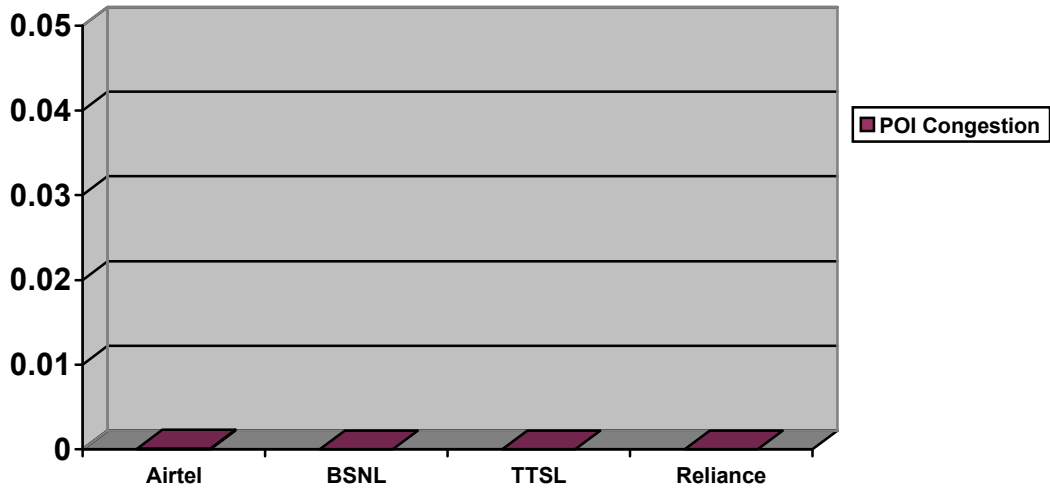
**8.0 Period of All refunds / Payments from the date of Complaints Within 1 week:**

As far as period of refunds from the date of complaints within 1 week, all the operators are meeting the benchmark of 100%.



**9.0 POI Congestion:**

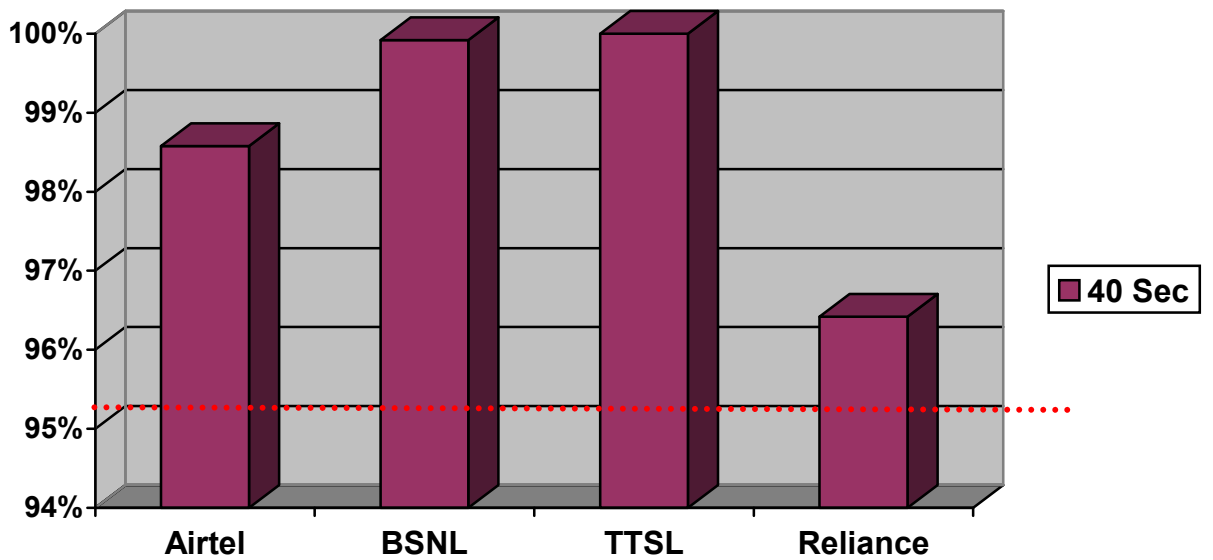
All the operators are complying with the TRAI benchmark ( $\leq 0.5\%$ ) by having 0% congestion.



**10.0 Response Time to Customer for Assistance:**

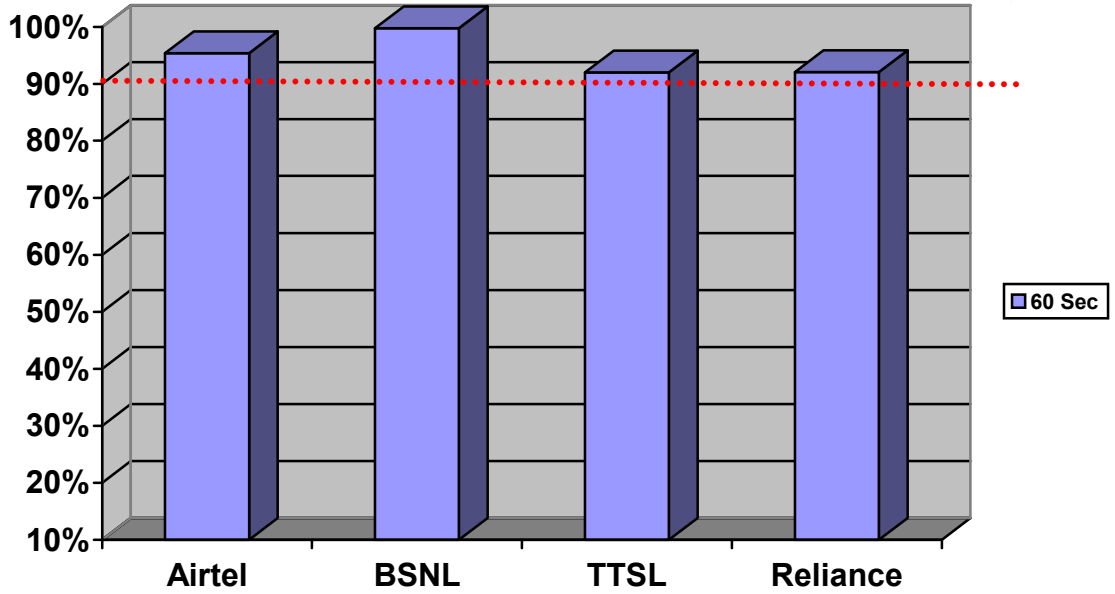
**(10.1) Accessibility of Call centre / customer care (Electronically):**

(A) Within 40 seconds (>95%): All the operators meeting the benchmark set by TRAI.



**.(10.2) % age of calls answered by operator (Voice to Voice)**

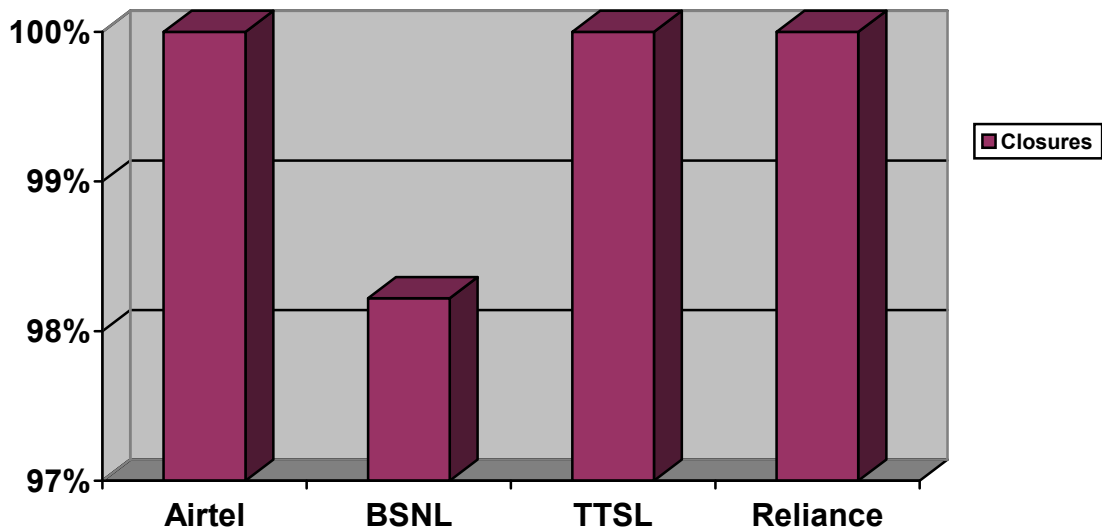
(B) Within 60 seconds (>90%): All the operators meet the TRAI benchmark.



**11.0 Customer Care Promptness in Attending Customer Request:**

**(11.1) Termination / Closures :( <= 7 Days)**

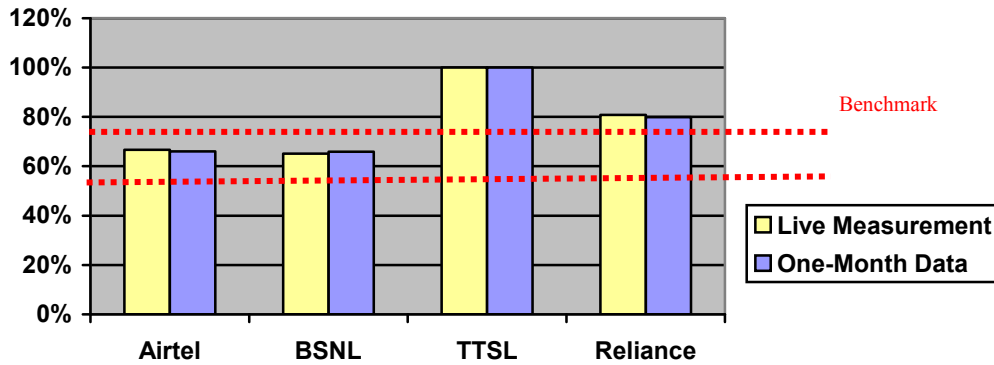
All the operators meet the benchmarks except BSNL (98.22%) provided by TRAI within 7 Days.



**7.1.4 Comparison between Live measurements and One month data Audit – Basic Service (Wireline).**

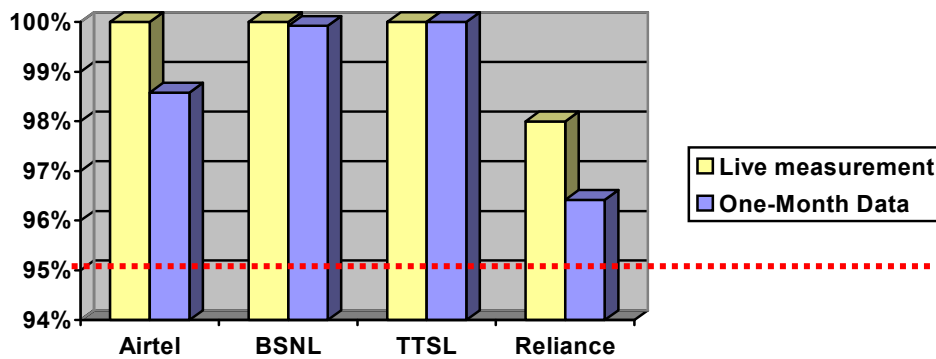
**1.0 Call Completion Rate (>55%) & Answer to Seizure (>75%)**

The performance based on live measurement as well as One-Month Data match for all operators and they meet the benchmarks.



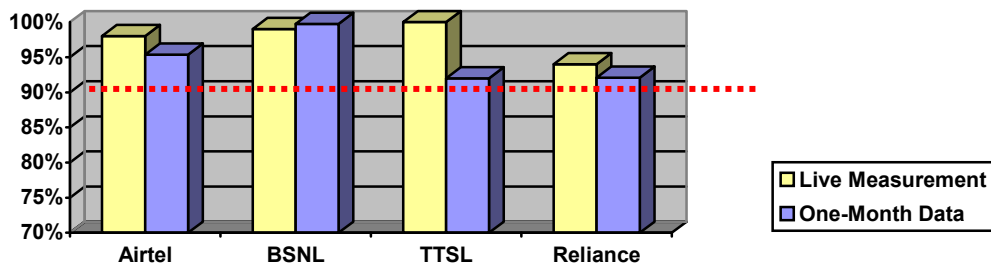
**2.0 Response time to the customer for assistance:**

**(i) Accessibility of Call Centre / Customer Care 40 sec (> 95 %.):** All the operators are meeting the benchmark in live and one month data.



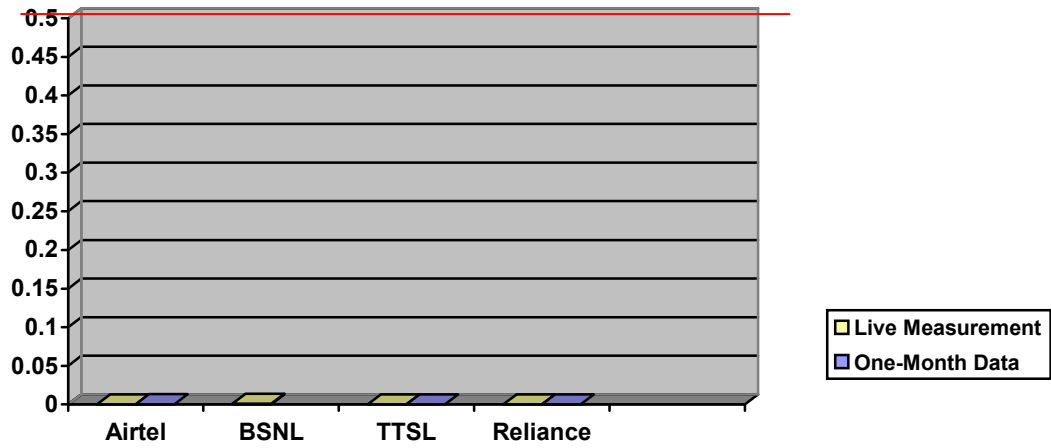
**(ii) Calls Answered by operator within 60 seconds (>90%) (Voice to Voice):**

The performance based on live measurement as well as One-Month Data are matching and all the operators are meeting the benchmark.



**3.0 POI Congestion (< 0.5%):**

The performance based on Live measurement as well as One-Month Data are similar for all the operators and meeting the benchmarks.



Note: It can be seen from the table and graphical method that in both cases of live performance and month data verification there is consistency in the parameters. Hence it can be concluded that operator's performance can be better analysed for further improvement in view of the quality of service (QoS) aspect.

## 7.2 QUALITY OF SERVICE ASSESSMENT : CELLULAR MOBILE TELEPHONE SERVICES

### 7.2.1 Service Provider Performance Report based on AUGUST (2009) Month Data Verification in which Audit was conducted for the quarter (October 09- December 09).

| S/<br>N    | Name of Parameter  | Bench<br>mark | Airte<br>l           | Idea       | Vod<br>afon<br>e | BSN<br>L   | TTS<br>L                  | RCO<br>M.  |
|------------|--|---------------|----------------------|------------|------------------|------------|---------------------------|------------|
| <b>(A)</b> | <b>Network Service Quality Parameter</b>   |               | <b>GSM Operators</b> |            |                  |            | <b>CDMA<br/>Operators</b> |            |
| <b>1</b>   | <b>Network Availability</b>  |               |                      |            |                  |            |                           |            |
|            | (a) BTS Accumulated Downtime (not available for service)   | <=2%          | 0.09<br>%            | 0.04<br>%  | 0.02<br>%        | 0.34<br>%  | 0.01<br>%                 | 0.06<br>%  |
|            | (b) Worst affected BTSs due to downtime (%)  | <=2%          | 0.24<br>%            | 0.04<br>%  | 0.11<br>%        | 0.68<br>%  | 0%                        | 0%         |
|            | (c) Total no. of BTSs in the licensed service area   |               | 5,530                | 4,687      | 6,306            | 2,651      | 833                       | 2,660      |
|            | (d) Sum of downtime of BTSs in a month in hours i.e. total outage time of all BTSs in hours during a month |               | 3454                 | 1,328      | 848              | 6,574      | 59                        | 1,216      |
|            | (e) No. of BTSs having accumulated downtime of >24 hours in a month  |               | 13                   | 2          | 7                | 18         | 0                         | 1          |
| <b>2</b>   | <b>Connection Establishment (Accessibility)</b>  |               |                      |            |                  |            |                           |            |
|            | (a) Call Set-up Success rate (Within licensee's own network)   | >=95%         | 98.91<br>%           | 99.38<br>% | 99.40<br>%       | 97.71<br>% | 98.92<br>%                | 99.56<br>% |
|            | (b) SDCCH/PAGING channel congestion  | <=1%          | 0.29<br>%            | 0.27<br>%  | 0.17<br>%        | 0.31<br>%  | 0%                        | 0%         |
|            | (c)TCH congestion  | <=2%          | 0.36<br>%            | 0.21<br>%  | 0.10<br>%        | 1.17<br>%  | 0%                        | 0.09<br>%  |
| <b>3</b>   | <b>Connection maintenance (retainability)</b>  |               |                      |            |                  |            |                           |            |
|            | (a) call drop rate   | <=2%          | 1.47<br>%            | 1.28<br>%  | 0.77<br>%        | 1.58<br>%  | 0.52<br>%                 | 0.77<br>%  |
|            | (b) Worst affected cells having more than 3% TCH drop(call drop)rate                                       | <=5%          | 12.01<br>%           | 9.49<br>%  | 1.47<br>%        | 4.22<br>%  | 1.60<br>%                 | 0.15<br>%  |
|            | (c) connections with good voice quality  | >=95%         | 95.16<br>%           | 96.31<br>% | 97.98<br>%       | 95.90<br>% | NA                        | NA         |
|            | (d) Total No. of cells exceeding 3% TCH drop (call drop)   |               | 1961                 | 1314       | 277              | 332        | 40                        | 12         |
|            | (e) Total no. of cells in the network  |               | 16328                | 13843      | 18850            | 7868       | 2499                      | 7,980      |
| <b>4</b>   | <b>a) Point of Interconnections congestion(on individual OI)</b>   | <=0.5<br>%    | 0%                   | 0%         | 0%               | 0.08<br>%  | 0%                        | 0%         |
|            | b) Name of POI not meeting the benchmark *   |               |                      |            |                  |            |                           |            |
|            | c) Total No. of circuits on POI  |               | 111,4<br>67          | 91,31<br>7 | 18,49<br>33      | 28,32<br>7 | 42,22<br>9                | 50,25<br>7 |



|            |   |                     |           |           |           |           |           |           |
|------------|---|---------------------|-----------|-----------|-----------|-----------|-----------|-----------|
|            | d) Total No. of call attempts on POI  |                     | 39,29,266 | 27,63,988 | 31,28,730 | 23,98,04  | 51,32,82  | 89,83,58  |
|            | e) Total traffic served on POI (Erlang)   |                     | 65,225    | 55,054    | 34,812    | 17,030    | 15,496    | 24,500    |
|            | f) Total number of working POI Service Area wise  |                     | 166       | 145       | 163       | 35        | 211       | 46        |
|            | g) Capacity of POI in Erlang(GOS)   |                     | 87,312    | 88,050    | 59,050    | 26,899    | 36,824    | 47,860    |
| <b>5</b>   | <b>Network Parameters</b>   |                     |           |           |           |           |           |           |
|            | a) Equipped Capacity of Network in respect of Traffic in Erlang   |                     | 212,268   | 165,531   | 299,176   | 104,722   | 220,908   | 200,000   |
|            | b) Total traffic handled in TCBH in Erlang  |                     | 116,675   | 111,405   | 229,249   | 75,046    | 61,724    | 15,000    |
|            | c) Total no. of customers served (as per VLR) on last day of the month  |                     | 4371320   | 4359407   | 7908691   | 2108726   | 801137    | NP        |
| <b>(B)</b> | <b>Customer Service Quality Parameters</b>  |                     |           |           |           |           |           |           |
|            |   |                     |           |           |           |           |           |           |
| <b>6</b>   | Metering and billing credibility- Post paid   | <= 0.1%             | 0.10%     | 0.04%     | 0.01%     | 0.02%     | 0.05%     | 0.10%     |
|            | No. of bills issued during the period   |                     | 277189    | 241366    | 833151    | 94131     | 235189    | 266199    |
|            | No. of bills disputed including billing complaints during the period  |                     | 328       | 101       | 95        | 17        | 127       | 276       |
|            | Metering and billing credibility- Pre paid  | <= 0.1%             | 0.00%     | 0.08%     | 0.02%     | 0.02%     | 0.09%     | 0.02%     |
|            | No. of charging / credit / validity complaints during the quarter   |                     | 03        | 355       | 1,600     | 7,302     | 1,181     | 637       |
|            | Total no. of pre-paid customers at the end of the quarter   |                     | 4,564,041 | 4,315,298 | 8,359,637 | 2,439,135 | 1,256,675 | 2,966,146 |
| <b>7</b>   | (a) Resolution of billing/ charging complaints  | 100% within 4 weeks | 100%      | 100%      | 100%      | 100%      | 100%      | 100%      |
|            | No. of billing/(post paid) and charging, credit/validity (pre paid) complaints resolved within 4 weeks during the quarter |                     | 331       | 456       | 204       | 7319      | 1308      | 913       |
|            | Total no. of billing (post paid) and charging, credit / validity (pre paid) complaints received during the quarter        |                     | 331       | 456       | 204       | 7319      | 1308      | 913       |
|            | No. of billing complaints (post paid) and charging, credit/ validity complaints (pre paid) resolved in favour of the      |                     | 323       | 456       | 204       | 7308      | 1308      | 913       |

|           | customer during the quarter   |                     |                |             |                |             |               |               |
|-----------|---|---------------------|----------------|-------------|----------------|-------------|---------------|---------------|
|           | No. of complaints disposed on account of not considered as valid complaints during the quarter                      |                     | 8              | 0           | 0              | 9           | 0             | 0             |
|           | (b) period of applying credit/waiver/adjustment to the customers account from the date of resolutions of complaints | <=1 week            | <1 week        | <1 week     | <1 week        | <1 week     | <1 week       | <1 week       |
| <b>8</b>  | Response time to customers for assistance   |                     |                |             |                |             |               |               |
|           | (a) Accessibility of call centre/customer care  | >=95%               | 98.39 %        | 99.98 %     | 100 %          | 97.14 %     | 99.52 %       | 100 %         |
|           | (b) Percentage of call answered by operators(voice to voice) within 60 seconds                                      | >=90%               | 98.40 %        | 99.98 %     | 95%            | 91.02 %     | 90.29 %       | 84.20 %       |
|           | c) Total no. of call attempts to call centre & customer care nos. during TCBH                                       |                     | 13,70<br>3,306 | 176,9<br>40 | 21,05<br>4,067 | 7,138       | 1,852,<br>890 | 1,325,<br>406 |
|           | d) No. of calls connected and answered successfully to call centre & customer care nos. during TCBH                 |                     | 13,48<br>2,491 | 176,9<br>11 | 21,05<br>4,067 | 6,934       | 1,844,<br>081 | 1,325,<br>406 |
| <b>9</b>  | Termination/ closure of service   | <=7days             | 90.28 %        | 100.0<br>0% | 99.80 %        | 100.0<br>0% | 95.57 %       | 100.0<br>0%   |
|           | Total No. of requests for Termination / Closure of service received during the quarter                              |                     | 3,363          | 1,185       | 5,061          | 512         | 1,717         | 1,863         |
|           | No.of requests for Termination / Closure of service complied within 7 days during the quarter                       |                     | 3,036          | 1,185       | 5,051          | 512         | 1,641         | 1,863         |
| <b>10</b> | Time taken for refunds of deposits after closures.  | 100% within 60 days | 100 %          | 100 %       | 100 %          | 100 %       | 100 %         | 100 %         |

Indicates deviation from benchmark of TRAI.

NP- Data not provided.

Note:

- Data collected form Drive test as because the service provider have not provided the required data from there system. CDMA operator have reported that there system do not generate such data.

\* For POI details see section 7.2.2

## 7.2.2 Critical findings and parameters wise key take outs - Cellular Mobile Telephone Services

- ◆ Audit has been done for all the MSC/VLR service areas of all the service providers, both GSM and CDMA operators in Gujarat circle. Audit activity has been done in three categories a) 3 days live assessment, b) one-month data audit & c) PMR validation. We have found all the service providers are meeting benchmark by and large.
- ◆ Data has been collected for busy hour of network in case of live assessment & month of audit for all service providers & verified that service providers are providing busy hour data only for QoS service. We found that TCBH hour is matching with network busy hour as provided by service providers for Gujarat circle. But for parameters such as 'Worst affected cell exceeding 3% TCH drop' and 'BTSs accumulated down time' CBBH (Cell Busy Bounce Hour) was taken instead of TCBH (Time Consistent Busy Hours) as per the TRAI new regulation 2009. This has resulted in high value deviation for 'Cell exceeding 3% TCH drop' parameter in terms of benchmark for some of the service providers. For all the operators both 3 days live data and 1 month data shows consistency (having a common trend) with values being more or less equal.
- ◆ To test the Service Providers performance on Technical (Network related) & Non-Technical (Provisioning, Billing, Refund etc.) complaint, TCIL auditors have conducted a customer feedback calling for random 100 nos. of customers in each segment. It was found that more than 99% customers are satisfied with services provided by the operators.

The parameter wise key takeouts for the Cellular Mobile Telephone Services providers for the Gujarat Circle are as under:-

**BTS Accumulated downtime (benchmark  $\leq 2\%$ ):** All operators are meeting the benchmark with values lying between 0.01% and 0.34%.

**Worst affected BTSs due to downtime (benchmark  $\leq 2\%$ ):** All operators are meeting the benchmark with values lying between 0% and 0.68%.

**Call setup success rate (benchmark  $\geq 95\%$ ):** All operators are meeting the benchmark with values lying between 97.71% and 99.56%.

**SDCCH/PAGING Channel congestion (benchmark  $\leq 1\%$ ):** All operators are meeting the benchmark with values lying between 0% and 0.31%.

Note: CDMA operator have not provided the data for Paging Channel congestion and GSM operators as they have given SDCCH Channel congestion.

**TCH congestion (benchmark  $\leq 2\%$ ):** All operators are meeting the benchmark with values lying between 0% and 0.36%.

**Call drop rate (benchmark  $\leq 2\%$ ):** All operators are meeting the benchmark with values lying between 0.52% and 1.58%.

**Cell exceeding 3% TCH drop (benchmark  $\leq 5\%$ ):** Except for Airtel and Idea rest of the operators are satisfying the benchmark with values in between 0.15% and 4.22%. While for Airtel and Idea values are 12.01% and 9.49% respectively. Similar trend have been observed in live data audit report also.

**Connections with good voice quality (benchmark  $\geq 95\%$ ):** TTSL and RCOM being CDMA operators have declared that the parameter is not system generated. Rest of the operators are meeting the benchmark with values lying between 95.16% and 97.98%. It can be noted that Airtel with 95.16% is on the margin.

**POI Congestion (benchmark  $\leq 0.5\%$ ):** All the operators are meeting the benchmark. Except BSNL rest of the operators are having 0% POI congestion. BSNL is having marginal POI congestion of 0.08%. In case of BSNL it is observed that for Vastrapur and Shahibaug MSC Bharti Airtel, Reliance GSM and TATA POIs are having congestion thus causing traffic failure on those POIs. For rest of the operators there was no congestion found overall on the POI, but cases were found where individual POIs are showing high utilization/usage. Some are in the range of over 100% though causing no traffic failure due to overflow technique i.e. the extra traffic was carried over by some other operating POI as has been designed to do so.

**Metering and billing credibility-Post paid (benchmark  $\leq 0.1\%$ ):** All operators are meeting the benchmark with values lying between 0.01% and 0.10%. It is to be noted that Airtel and RCOM with 0.10% is just satisfying the benchmark.

**Metering and billing credibility-Pre paid (benchmark  $\leq 0.1\%$ ):** All operators are meeting the benchmark with values lying between 0.0% and 0.09%.

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

**%age of call answered by operator (electronically) (benchmark  $>95$ ):** All operators are meeting the benchmark with 100% value for each operator.

**%age of call answered by operator (Voice to voice) (benchmark  $>90\%$ ):** Except for RCOM with 84.20% rest of the operators are meeting the benchmark with values lying between 95% and 99.98%. It can be seen that Vodafone with 95% is just on the benchmark value.

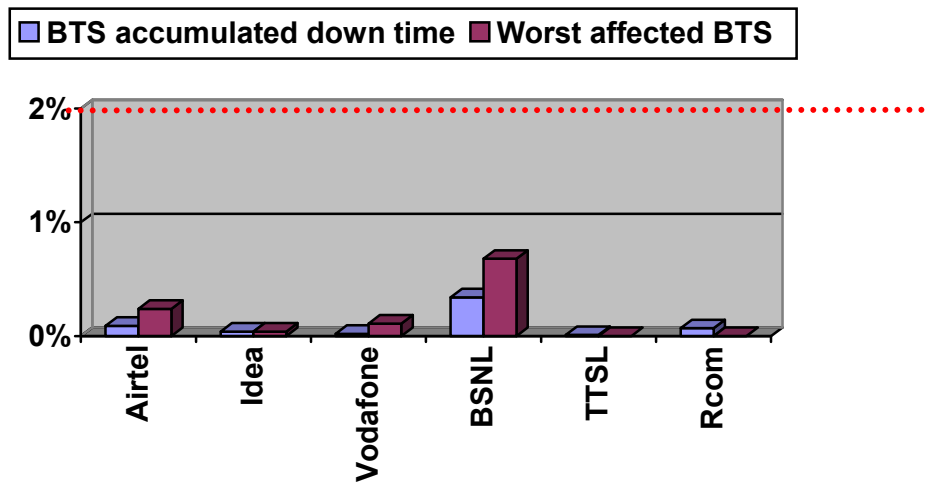
**Termination/Closure of service( Benchmark  $\leq 7$  days):** All operators have satisfied the benchmark of 100% termination within 7 days except for BSNL with a success rate of 99.80%, just marginally missing the benchmark.

**Time taken for refunds of deposits after closures (benchmark 100% within  $\leq 60$  days):** All operators have satisfied the benchmark of by 100% of return of funds within 60 days.

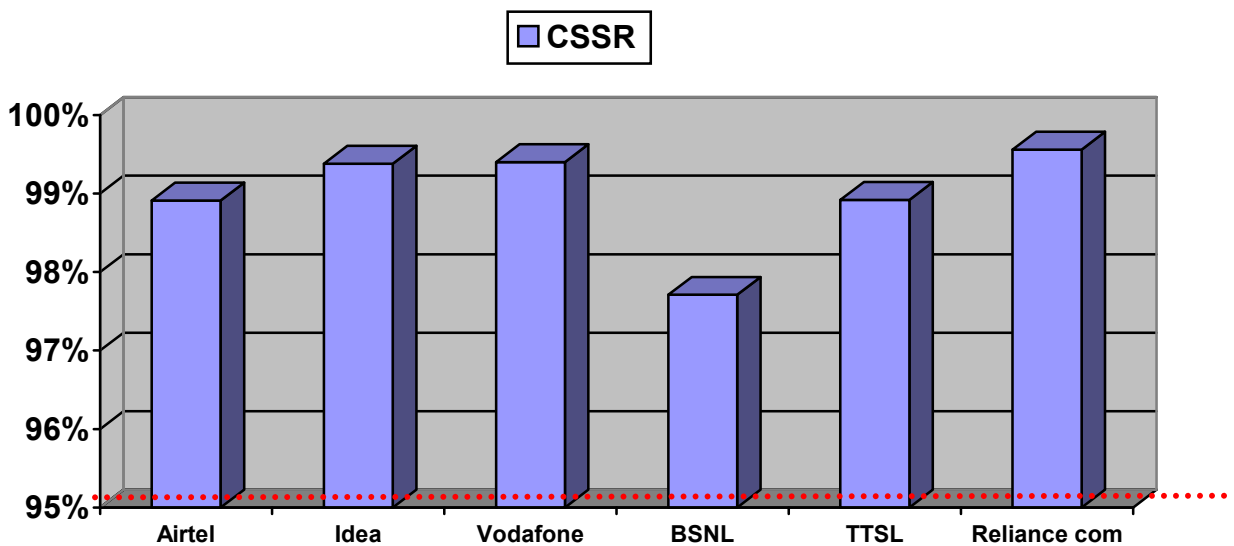
**7.2.3 Parameter wise Data Analysis & Graphical Representations – Cellular Mobile Telephone Services**

**A) NETWORK PERFORMANCE**

**1) BTS Accumulated down time (not available for service) (Benchmark <= 2%):** All operators are meeting the benchmark with values lying between 0.01% and 0.34%.

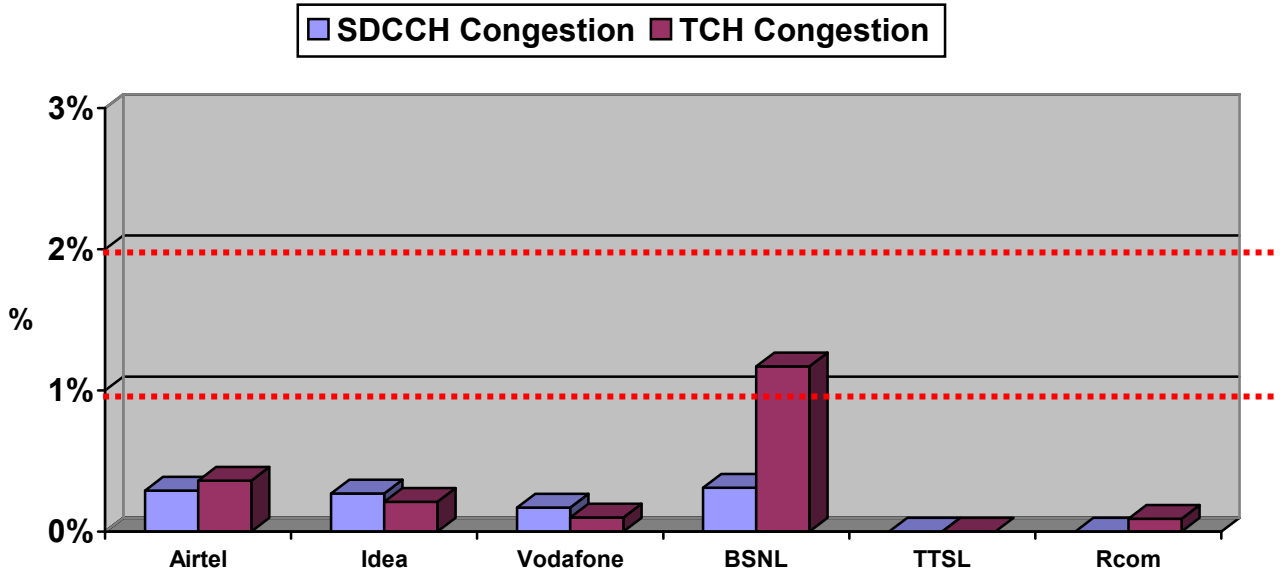


**3) Call setup success rate: (Benchmark >= 95):** All operators are meeting the benchmark with values lying between 97.71% and 99.56%.



4) **SDCCH/PAGING Channel congestion (benchmark <= 1%):** All operators are meeting the benchmark with values lying between 0% and 0.31%.  
 Note: CDMA operator have not provided the data for Paging Channel congestion and GSM operators as they have given SDCCH Channel congestion.

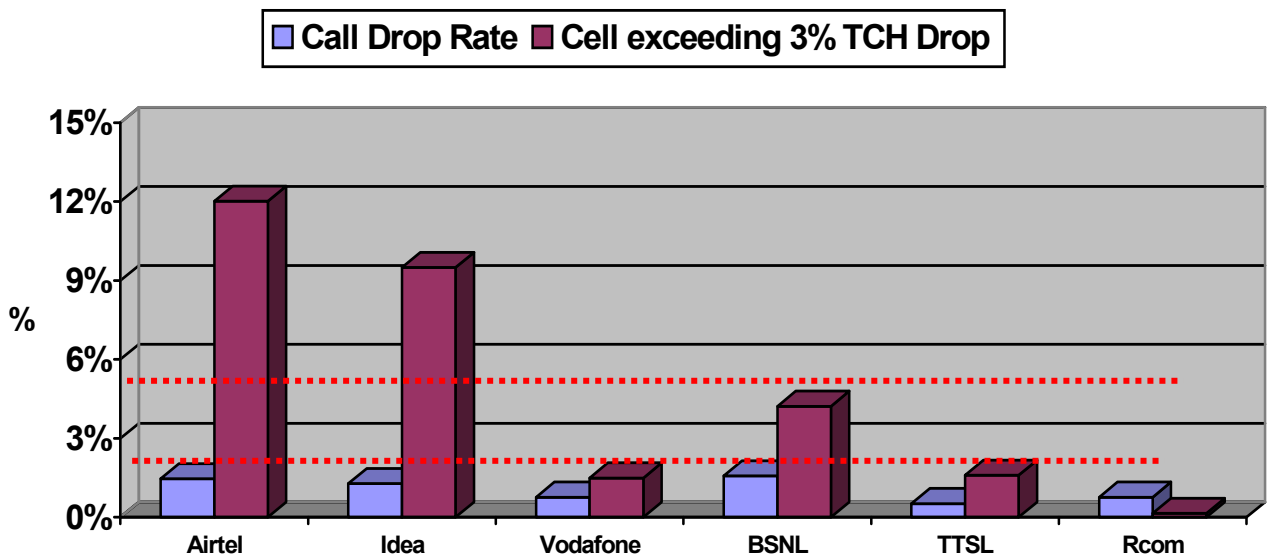
5) **TCH congestion (benchmark <= 2%):** All operators are meeting the benchmark with values



lying between 0% and 0.36%.

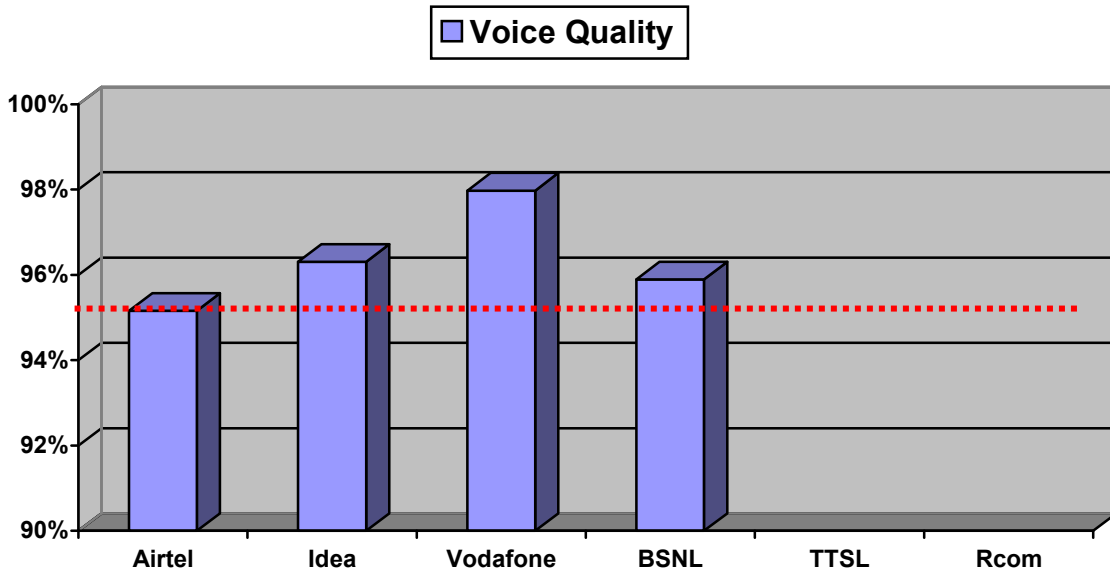
6) **Call drop rate (%) (Benchmark<= 2%):** All operators are meeting the benchmark with values lying between 0.52% and 1.58%.

7) **Percentage of Cell exceeding 3% TCH drop (benchmark <= 5%):** Except for Airtel and Idea rest of the operators are satisfying the benchmark with values in between 0.15% and 4.22%. While for Airtel and Idea the values are 12.01% and 9.49% respectively. Similar trend have been

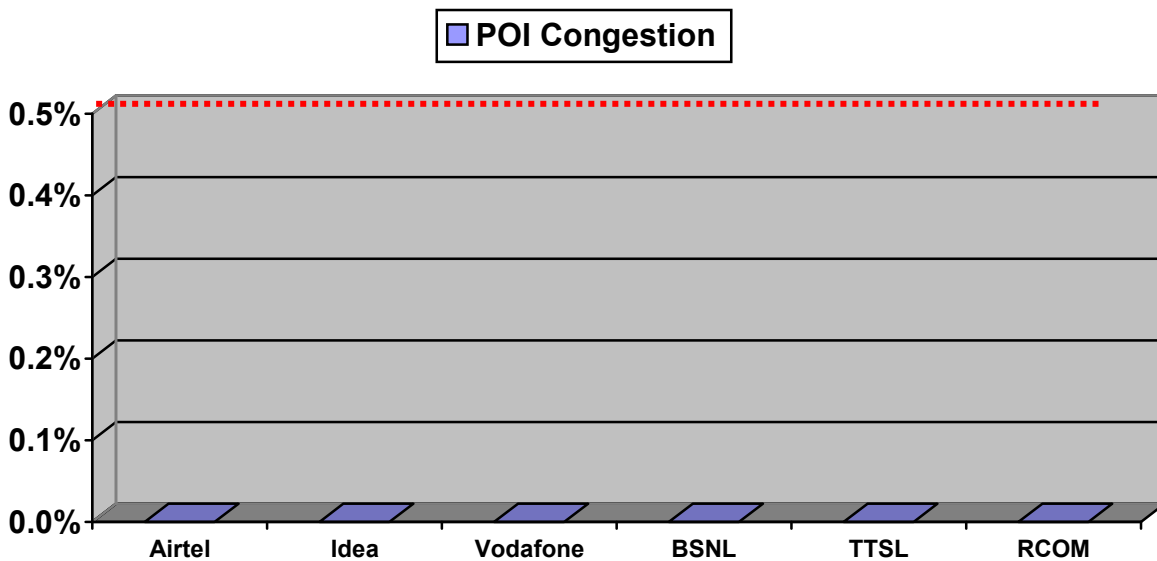


observed in live data audit report also.

**8) Percentage of connections with good voice quality (benchmark  $\geq 95\%$ ):** TTSL and RCOM being CDMA operators have declared that the parameter is not system generated. Rest of the operators are meeting the benchmark with values lying between 95.16% and 97.98%. It can be noted that Airtel with 95.16% is on the margin.

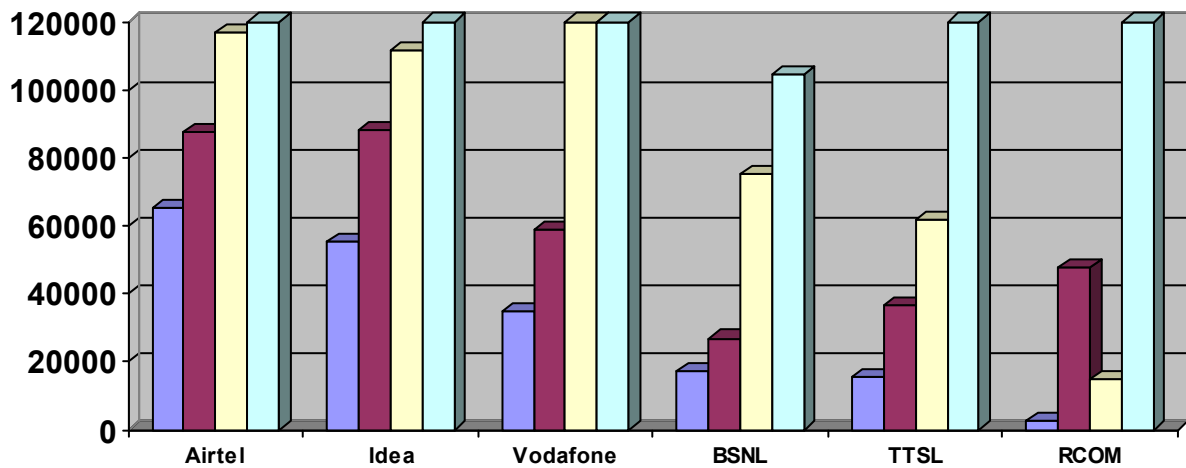


**9) POI Congestion: ( $<0.5\%$ ):** All the operators are meeting the benchmark.



10) Erlang usage on POI for month data: It can be seen that Capacity for POIs and utilization in terms of Erlang for respective operators have huge differences in addition with the advantage of overflow technique there seem to be no congestion on POIs. One thing can be concluded that in case of Airtel, Idea and Vodafone the total capacity of the equipment and the total traffic in the network are quite close and thus in future may required in enhance network capacity in terms of Erlang.

■ POI Usage Erlang ■ POI Capacity in Erlang ■ Total Traffic ■ Equipment capacity

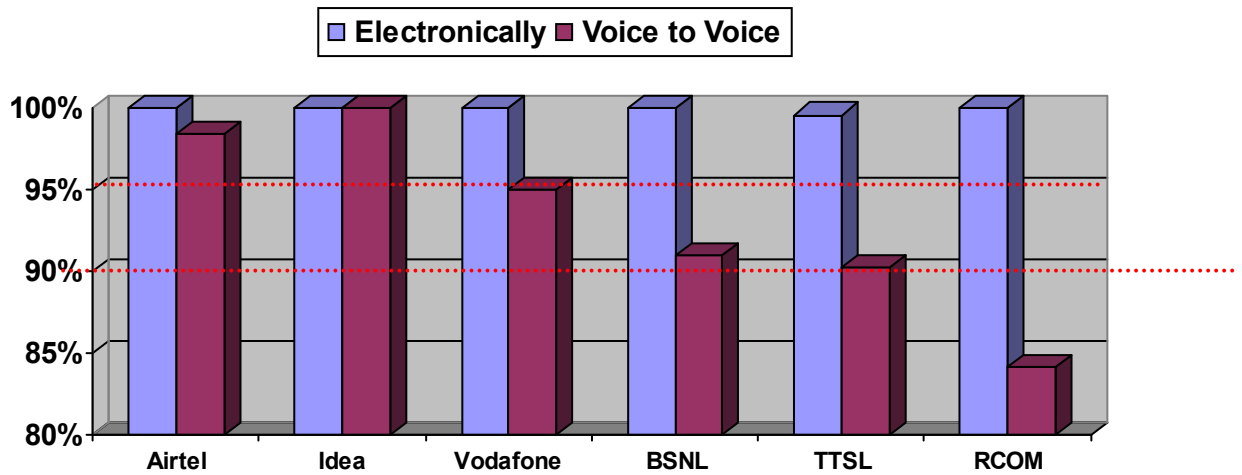




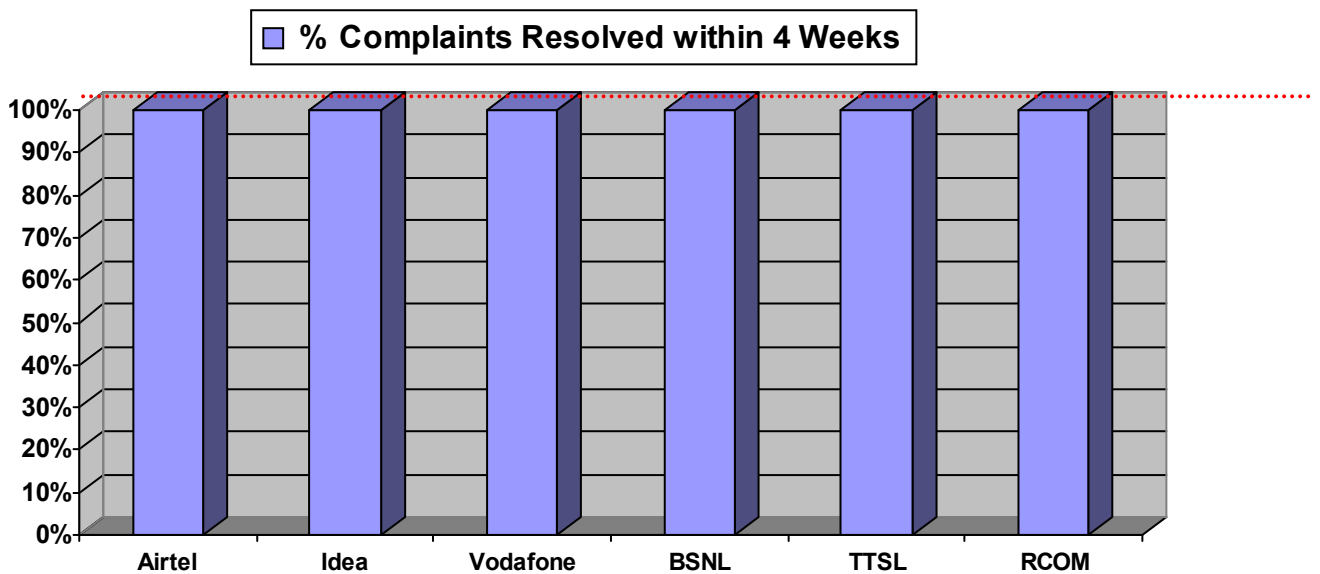
**B) CUSTOMER SERVICE QUALITY PARAMETERS:**

**10) Percentage of call answered (Electronically) (benchmark  $\geq 95\%$ ):** All operators are meeting the benchmark with 100% value for each service provider.

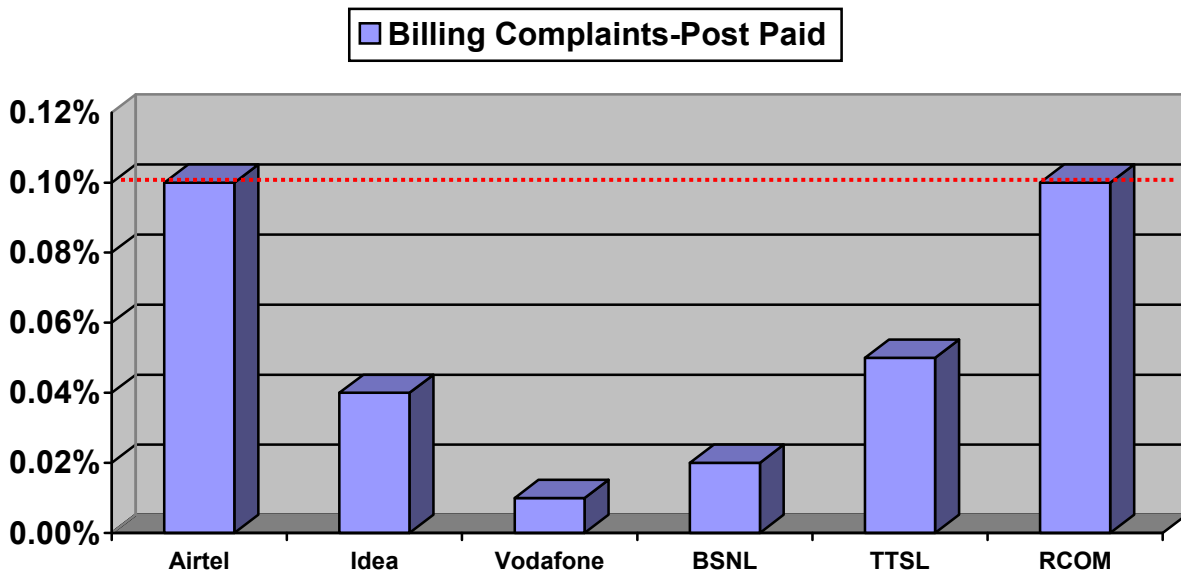
**11) Percentage of call answered by operator (Voice to voice) (benchmark  $\geq 90\%$ ):** Except for RCOM with 84.20% rest of the operators are meeting the benchmark with values lying between 95% and 99.98%. It can be seen that Vodafone with 95% is just on the benchmark value.



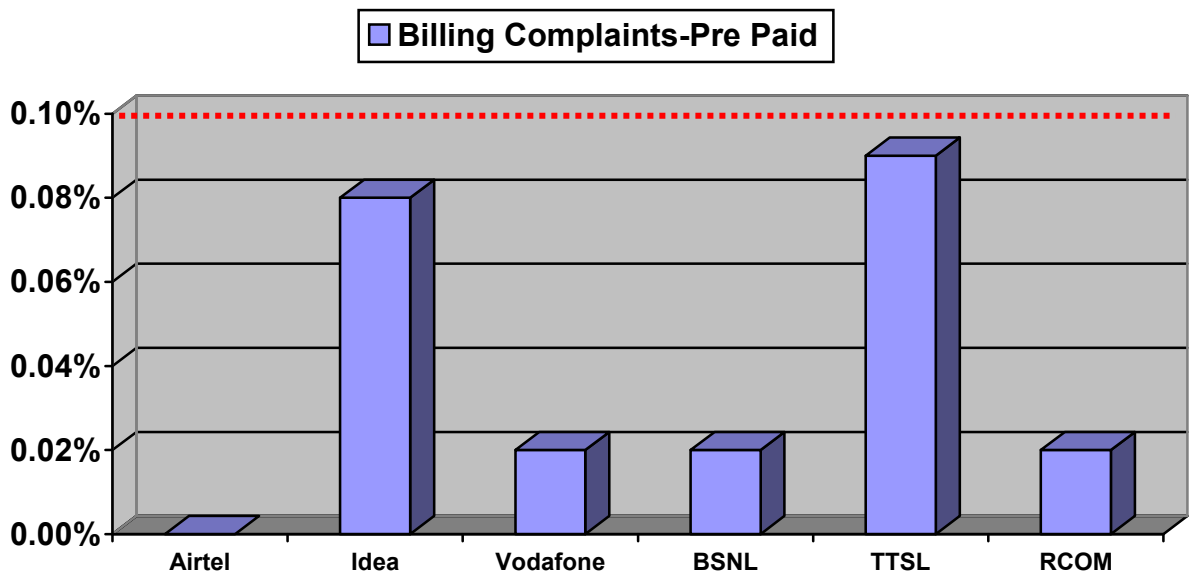
**12) Percentage of Billing Complaints resolved within 4 weeks: (100%):** All operators are meeting the benchmark of 100% within 4 weeks.



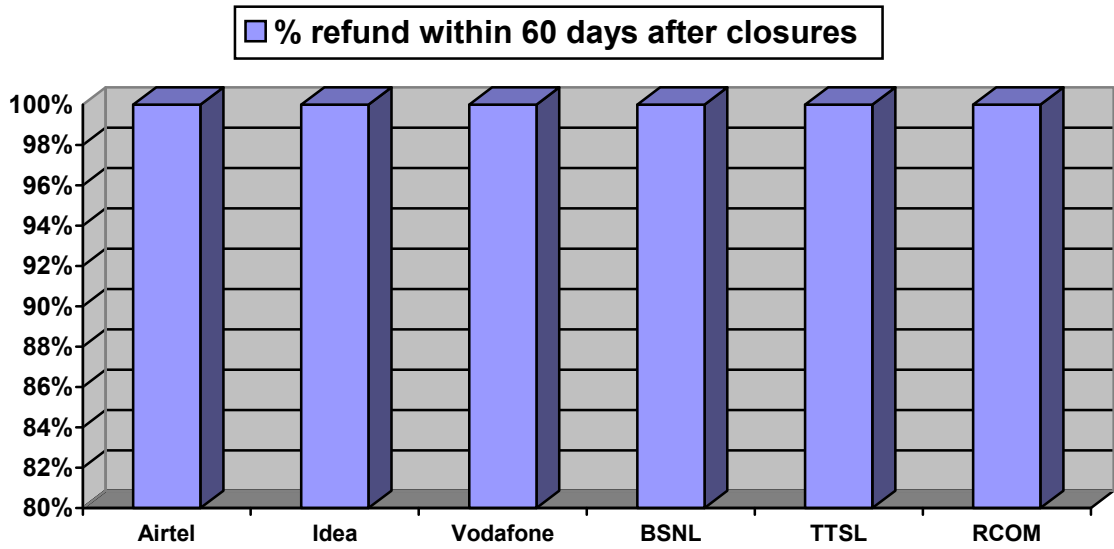
**13) Metering and billing credibility-Post paid (benchmark  $\leq 0.1\%$ ):** All operators are meeting the benchmark with values lying in between 0.01% and 0.10%. It is to be noted that Airtel and RCOM with 0.10% is just satisfying the benchmark.



**14) Metering and billing credibility-Pre paid (benchmark  $\leq 0.1\%$ ):** All operators are meeting the benchmark with values lying in between 0.0% and 0.09%



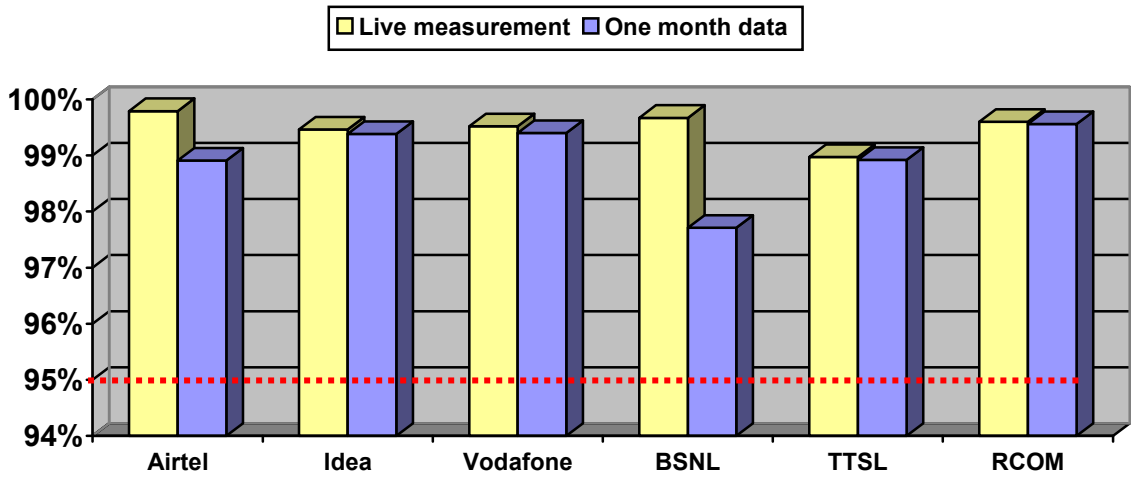
**15) Time taken for refunds of deposits after closures (benchmark 100% in <= 60 days):** All operators have satisfied the benchmark of by 100% of return of funds within 60 days.



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

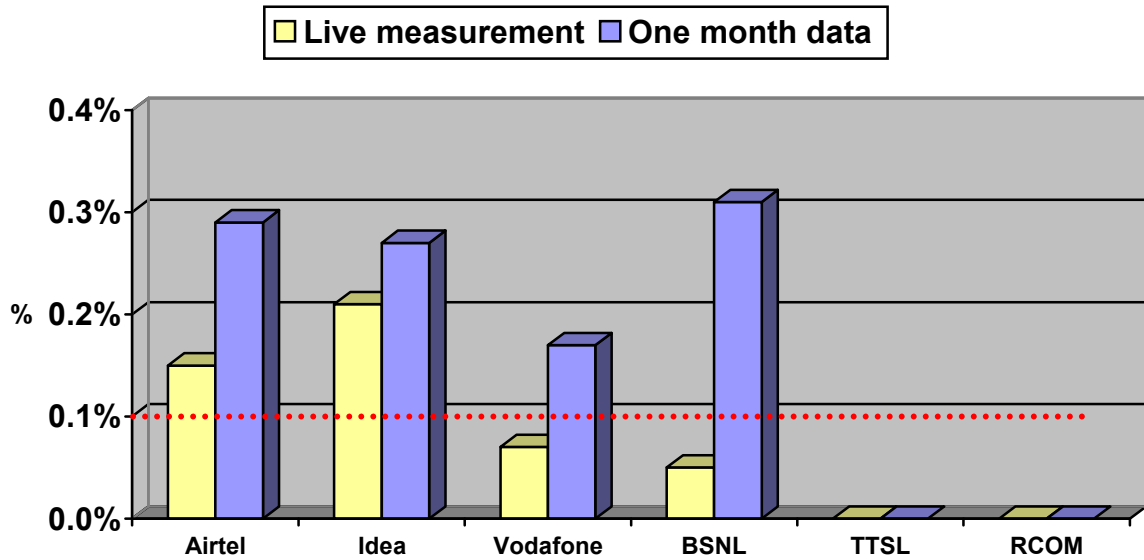
**A) NETWORK PERFORMANCE**

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

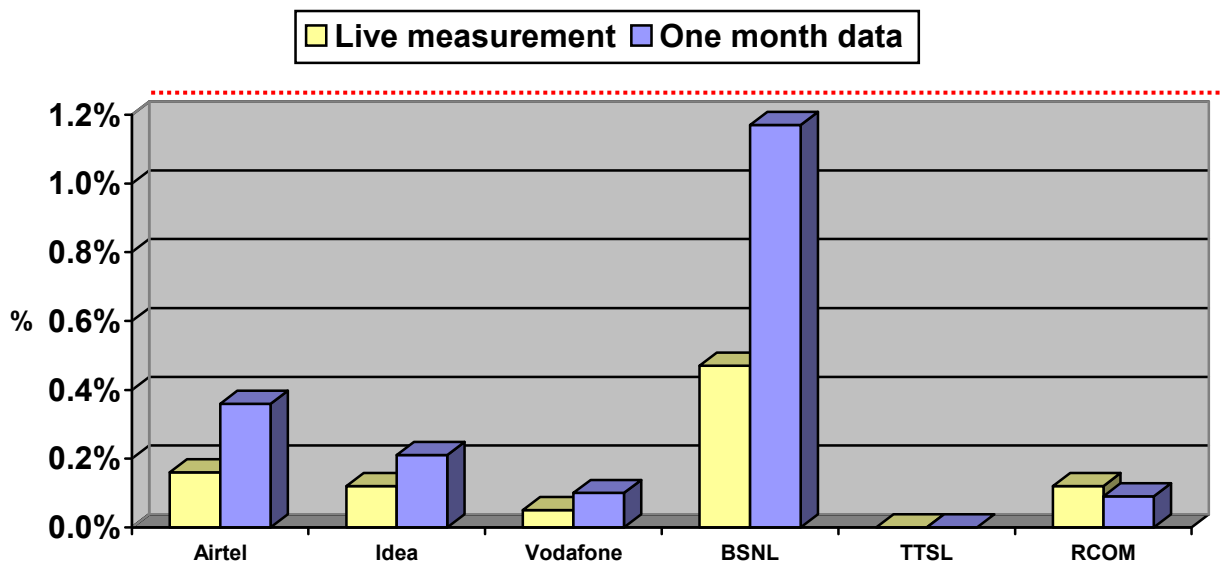


II. Blocked call rate:

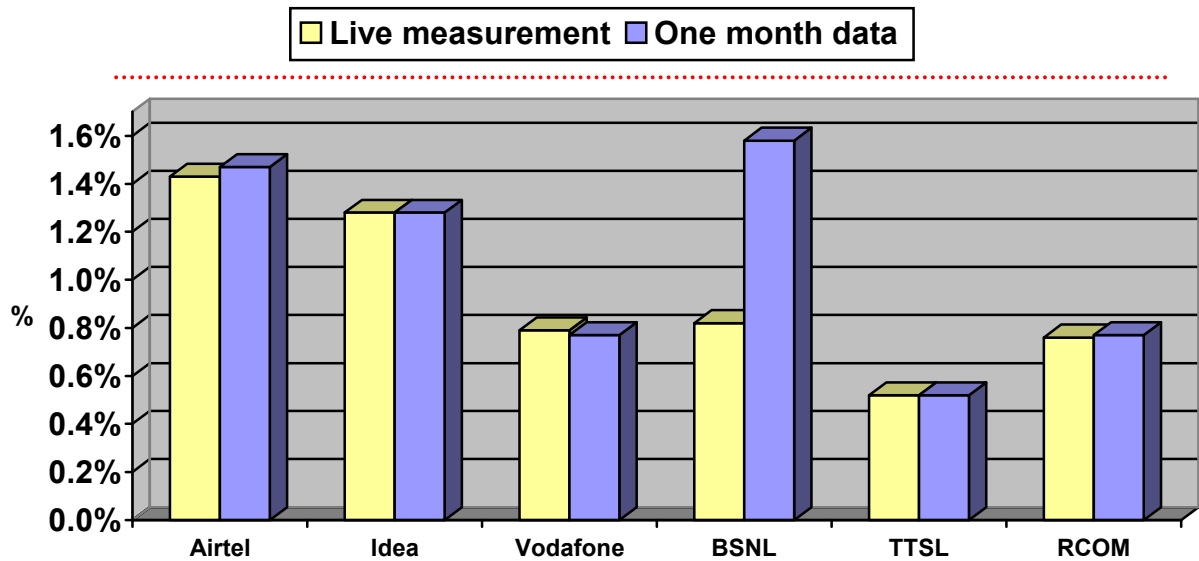
(1) **SDCCH congestion (%)**: All operators are meeting the TRAI benchmarks ( $\leq 1\%$ ) for both one month data and 3 days live data taken in the month of audit.



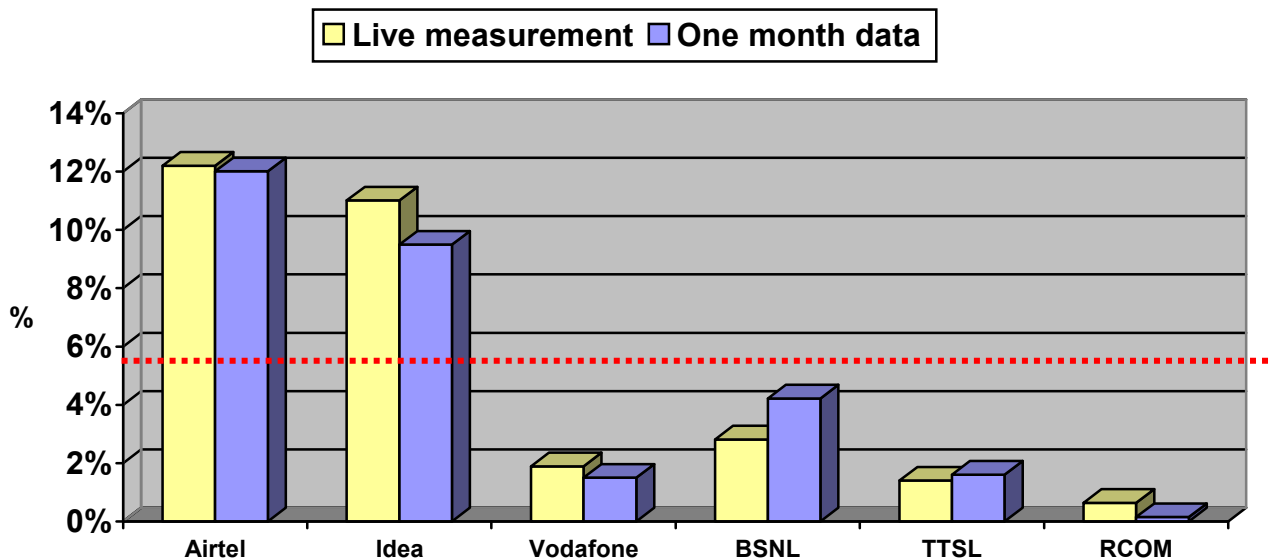
(2) **TCH congestion (%)**: All operators are meeting the TRAI benchmarks ( $\leq 2\%$ ) for both one month data and 3 days live data taken in the month of audit.



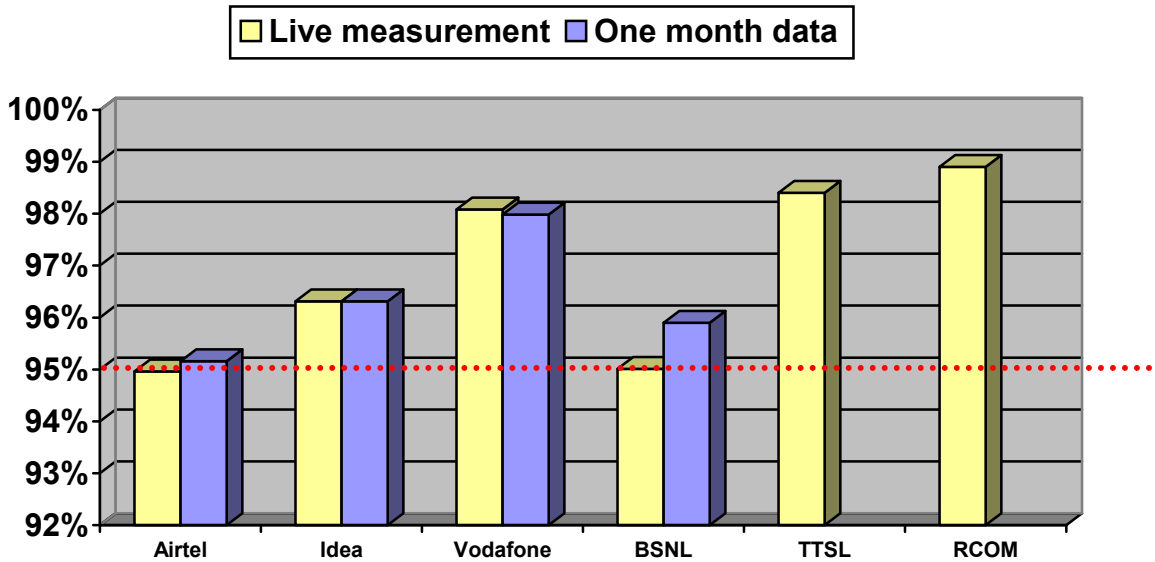
III. 1) **Call drop rate (%)**: All operators are meeting the TRAI benchmarks ( $\leq 2\%$ ) for both one month data and 3 days live data taken in the month of audit.



2) **Worst affected Cell exceeding 3% TCH Drop**: For both live and month data, Airtel(12.20% and 12.01%) and Idea(11.01% and 9.49%) are found not meeting the benchmark of  $\leq 5\%$ . Rest of the operators are meeting the benchmark in both cases. But in all cases data shows consistency for the operators.

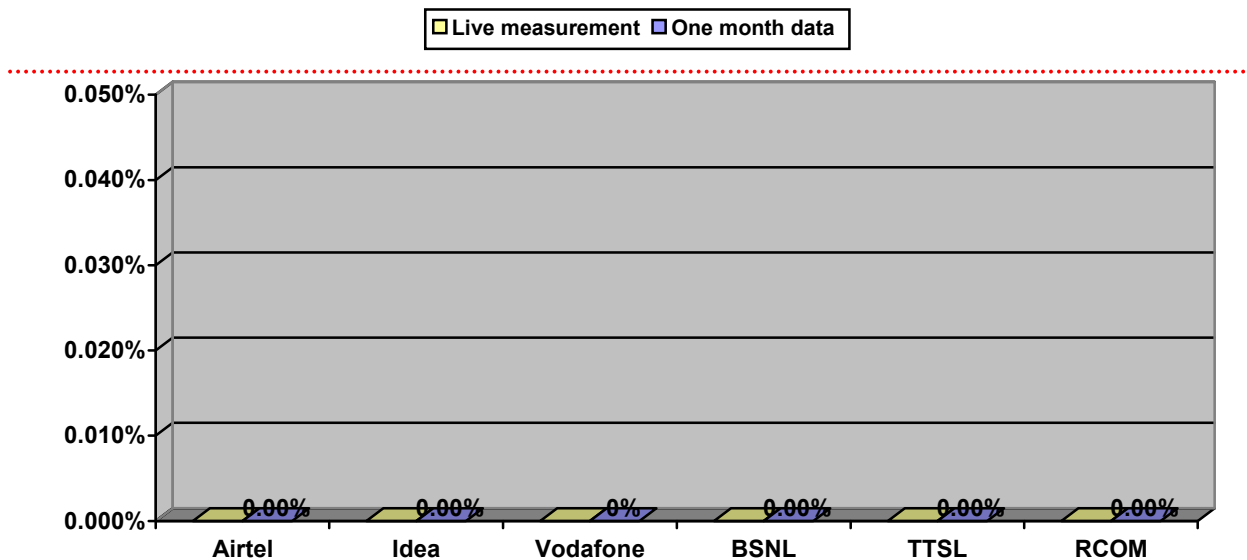


**3) Percentage of connections with good voice quality (benchmark => 95%):** Except for Airtel with 94.96% value in live measurement data all other operators are satisfying the benchmark. It is to be noted that Airtel and BSNL marginally qualifies the benchmark in case of month data verification.



**IV. POI Congestion:**

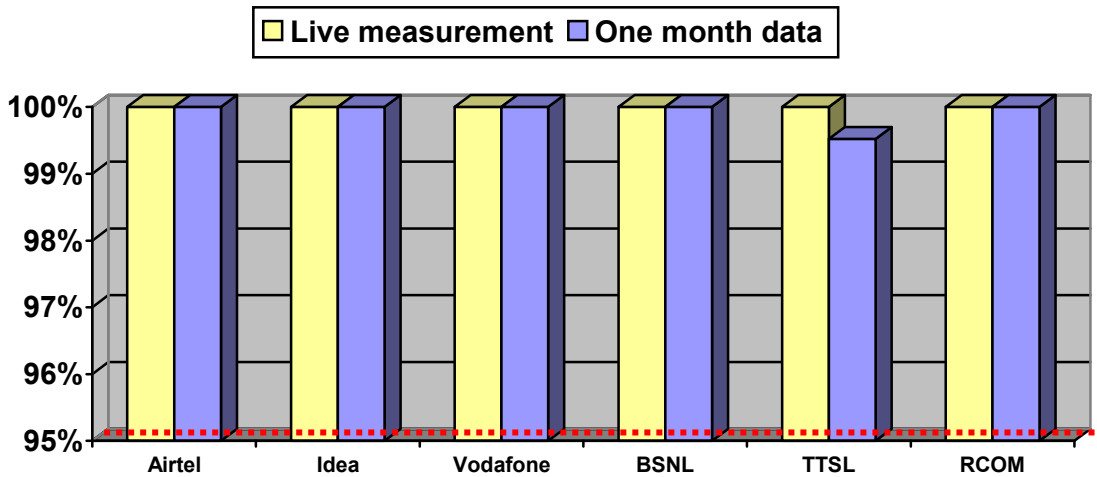
All operators are meeting the TRAI benchmarks ( $\leq 0.5\%$ ) for both one month data and 3 days live data taken in the month of audit



**B) CUSTOMER SERVICE QUALITY PARAMETERS**

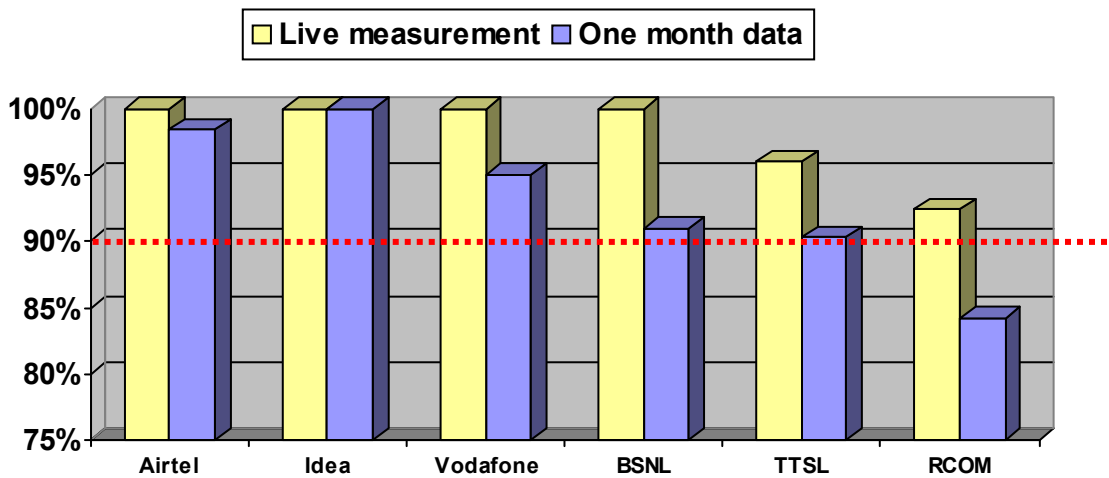
Response time to the customer for assistance:  
 III. Percentage of call answered (Electronically);

(i) All operators are meeting the TRAI benchmarks ( $\geq 95\%$ ) with a value of 100% for both one month data and 3 days live data taken in the month of audit.



Percentage of call answered by operators (Voice to voice);

(i) **With in 60 sec:** Except for RCOM (84.20%) in case of month data rest of the operators are meeting the benchmark ( $\geq 90\%$ ) for both one month data and 3 days live data taken in the month of audit. In case of BSNL and RCOM the value is marginally satisfying the benchmark for the month and live measurement respectively.





### 7.3 QUALITY OF SERVICE ASSESSMENT : BROADBAND SERVICE

#### 7.3.1 Service Provider Performance Report based on One Month Data Verification in which Audit was conducted (October 09- December 09).

| S. N. | Parameters   | Bench mark                              | BSNL    | HATH WAY         | YOU TELECOM | SIFY           | AIRTEL  | VSNL    | Reliance Comm. |
|-------|--|---|---------|------------------|-------------|----------------|---------|---------|----------------|
| 1     | Service Provisioning /Activation Time  |   |         |                  |             |                |         |         |                |
| 1.1   | 100% cases in 15 days (subject to technical feasibility)   | <15 working days                        | 100%    | 100%             | 100%        | 100%           | 100%    | 100%    | 100%           |
| 1.2   | In all cases where payment towards installation charge & security deposit is taken and the Broadband connection is not provided within 15 working days | A credit at the rate of Rs.10/ per day. | 0       | 0                | 0           | 0              | 0       | 0       | 0              |
| 2     | Fault Repair / Restoration Time  |   |         |                  |             |                |         |         |                |
|       | By next working day:   | > 90%                                   | 92.59 % | 95.21 %          | 90%         | 98.46%         | 96.89 % | 99%     | 100%           |
|       | within 3 working days:   | 99%                                     | 99.95 % | 99.50 %          | 98%         | 100%           | 99.59 % | 100%    | 100%           |
| 2.1   | <b>Rebate:</b>   |   |         |                  |             |                |         |         |                |
|       | Faults Pending for > 3 working days and < 7 working days:<br>(Rebate equivalent to 7 days of minimum monthly charge or equivalent usage allowance)     |   | 0       | Prepaid Modules. | 63          | 0              | 0       | 1044    | 1              |
|       | Faults Pending for > 7 working days and < 15 working days:<br>(Rebate equivalent to 15 days of minimum monthly charge or equivalent usage allowance)   |   | 0       |                  | 0           | 0              | 1       | 235     | 1              |
|       | Faults Pending for > 15 working days:<br>(Rebate equivalent to one month of minimum monthly charge or equivalent usage allowance)                      |   | 0       |                  | 0           | 0              | 0       | 84      | NIL            |
| 3     | <b>Billing Performance</b>   |   |         |                  |             |                |         |         |                |
|       | Billing complaints per 100 bills issued  | < 2%                                    | 0.09%   | Prepaid Modules. | 0.30%       | Prepaid Module | 0.005 % | 1%      | 0.22%          |
|       | %age of Billing Complaints resolved  | 100% within 4 weeks                     | 100%    |                  | 100%        |                | 100%    | 96.10 % | 100%           |
|       | Time taken for refund of deposits after closure:   | 100% within 60 days                     | 100%    |                  | 30%         |                | 100%    | 100%    | 100%           |

| S. N. | Parameters  | Bench mark | BSNL              | HATHWAY           | YOU TELECOM       | SIFY                         | AIRTEL | VSNL   | Reliance Comm.    |
|-------|---|------------|-------------------|-------------------|-------------------|------------------------------|--------|--------|-------------------|
| 4     | Response time to the customer for assistance % age of calls answered by operator (Voice to Voice)   |            |                   |                   |                   |                              |        |        |                   |
|       | Within 60 seconds   | > 60%      | 71.41%            | 85%               | 74.87%            | 95.27%                       | 97.32% | NP     | 90.82%            |
|       | Within 90 seconds   | > 80%      | 88.36%            | 100%              | 80.69%            | 100%                         | 98.63% | NP     | 95.03%            |
| 5     | Bandwidth Utilization/ Throughput: (If on any link(s) / route bandwidth utilization exceeds 90%, then network is considered to have congestion. For this additional provisioning of Bandwidth on immediate basis, but not later than one month, is mandated.) < 80% link(s) / route bandwidth utilization during peak hours (TCBH). |            |                   |                   |                   |                              |        |        |                   |
|       | i) POP to ISP Gateway Node [Intra-network] Link(s)  |            | 34.24%            | 12%               | 79.81%            | 39.11%                       | 86%    | 56%    | 19.1%             |
|       | ii) ISP Gateway Node to IGSP / NIXI Node upstream Link(s) for International connectivity  |            | ** See note below | ** See note below | ** See note below | 53.68%                       | 94%    | 75%    | ** See note below |
|       | Broadband Connection Speed (download) - from ISP Node to User   | > 80%      | 83.90%            | 99%               | 90.75%            | 11.59%                       | 70%    | >80%** | NP                |
| 6     | <b>Service Availability / Uptime (for all users)</b>  |            |                   |                   |                   |                              |        |        |                   |
|       | With effect from quarter ending September 2007 and onwards  | > 98%      | 99.90%            | 99.11%            | 99.2%             | **N P                        | 99.99% | 99.72% | 99.99%            |
| 7     | <b>Packet Loss</b>  | < 1%       | 0%                | 0%                | 0%                | No data available in systems | 0.03%  | 0%     | 0.1%              |
| 8     | <b>Network Latency (for wired broadband access)</b>   |            |                   |                   |                   |                              |        |        |                   |
|       |   |            |                   |                   |                   |                              |        |        |                   |

| S. N. | Parameters   | Bench mark | BSNL              | HATHWAY | YOU TELECOM | SIFY                         | AIRTEL  | VSNL   | Reliance Comm. |
|-------|--|------------|-------------------|---------|-------------|------------------------------|---------|--------|----------------|
| 8.1   | User reference point at POP / ISP Gateway Node to International Gateway (IGSP/NIXI)                                | < 120 ms   |                   | 101 ms  | 14 ms       | No data available in systems | 27.5 ms | <100ms | NP             |
| 8.2   | User reference point at ISP Gateway Node to International nearest NAP port abroad (Terrestrial)                    | < 350 ms   | ** See note below | 242 ms  | 255 ms      | No data available in systems | 306.90  | <250ms | NP             |
| 8.3   | User reference point at ISP Gateway Node to International nearest NAP port abroad (Satellite)<br>** See note below | < 800 ms   |                   | NA      | NA          | NA                           | NA      | NA     | NA             |

■ Indicates deviation from benchmark of TRAI.

NA – Not Applicable

NP – Not Provided.

8.3 None of the operator having satellite connectivity.

8.1, 8.2, 5.2 For BSNL not applicable because NIB-Ahmedabad is connected to Mumbai and Noida only and there are no Upstream Links for International Connectivity.

6. Data Will be provided to TRAI on request by Mr. Shyam Nair from SIFY

5.2 For HathWay Not having any hathway-NIXI upstream link

5.2 For RComm ISP gateway is in Mumbai, Delhi, Chennai. Hence No Upstream Link for GJ Circle

5.2 For Sify Directly connected

8 and Broadband data: For TATA data for Gujarat is not maintained separately as they have data for all over India.

The Satellite link does not exist with any of the Operator, hence data for the parameter “ 4.3 User reference point at ISP Gateway Node to International nearest NAP port abroad (Satellite)” is not applicable to the above Operators.

- VSNL : parameters 2.1 & 4 contains data on all India basis.

- Reliance: ISP gateway is in Mumbai, Delhi, Chennai. Hence No Upstream Link for Gujarat Circle.

**Critical findings and Key take outs****7.3.2 Broadband service**

- ◆ Reliance and VSNL are submitting the PMR on all India bases; hence data is verified on All India basis not for particularly for Gujarat Circle.
- ◆ The Satellite link does not exist with Operators, hence the parameter “User reference point at ISP Gateway Node to International nearest NAP port abroad (Satellite)” is not applicable to the Operator.
- ◆ To test the Service Providers performance on Technical (Network related complains) & Non-Technical (Provisioning, Billing, Refund etc.) complaint handling TCIL auditors have conducted a customer feedback calling for random 100 nos. of customers in each segment. It was found that more than 95% customers are satisfied with services provided by the operators.

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

**Service provisioning/Activation time:**

All the service providers are performing well and meeting the benchmarks for service provisioning.

**Fault Repair/Restoration time & Rebate:**

All the operators are meeting benchmark of more than 90%.

All the service providers are found to provide Rebate as per the guide lines set by TRAI except HATHWAY, have not any rebate because operator currently selling only prepaid module.

**Billing performance:**

All the operators are meeting the benchmark of Less than 2% for billing complaints. Also all the operators are meeting the benchmark of “100% cases 4 weeks” for billing complaint resolution except VSNL, is not meeting benchmark with the value of small margin 96.10% for on-month data verifications. All the operators are providing the refund of deposits after closure as per the benchmark of “100% cases within 60 days” except you telecom with the value of 30%.

HATWAY & SIFY claims that all its broadband customers are under in prepaid module and hence there are no bills issued.

**Customer Care/Helpline Assessment:**

All the service providers are meeting the benchmark for the parameters response time to the customer for assistance (Voice to Voice) within 60 and 90 seconds in one month data verifications.

**Bandwidth Utilisation:**

**POP to ISP Gateway Node (intra-network) links:**

All the operators are meeting all the benchmarks except Airtel with the value of 86% during measurements of one-month data verification.

**ISP Gateway Node to IGSP/ NIXI Node upstream links for International connectivity:**

All the operators are meeting all the benchmarks except Airtel with the value of 94% during measurements of one-month data verification.

For BSNL NIB Ahmedabad is connected to Mumbai & Noida only and there are no upstream links for international connectivity.

For HATHWAY, Operator is not having any NIXI upstream links.

For YOU TELECOM, Operator is directly connected to ISP only.

For Reliance comm., ISP gateway is in Mumbai, Delhi & Chennai. Hence no upstream link for the Gujarat Circle.

**Broadband Connection speed:**

All the operators are meeting the TRAI benchmark of greater than 80% connection speed except Sify and Airtel with the value of 11.59% & 70% respectively, during measurements of one-month data verification.

**Service Availability/Uptime:**

All the operators are meeting the TRAI benchmark of greater than 98% during one-month data verification except SIFY, stating that they will provide the same to TRAI directly.

**Packet Loss:**

All the operators are meeting the TRAI benchmark of less than 1% during live measurements and one-month data verification except SIFY, data is not systems generated.

**Network Latency:**

**User reference point at POP/ISP gateway node to international gateway (IGSP/NIXI) <120 ms**

All operators are meeting the benchmark except for SIFY, not providing the data. While for BSNL, NIB Ahmedabad is connected to Mumbai & Noida only thus there are no upstream links for international connectivity.

**User reference point at ISP gateway node to international nearest NAP Port abroad (Terrestrial) <350 ms**

All operators are meeting the benchmark except for SIFY, not providing the data. While for BSNL, NIB Ahmedabad is connected to Mumbai & Noida only thus there are no upstream links for international connectivity.

**User reference point at ISP gateway node to international nearest NAP Port abroad (Terrestrial) <850 ms**

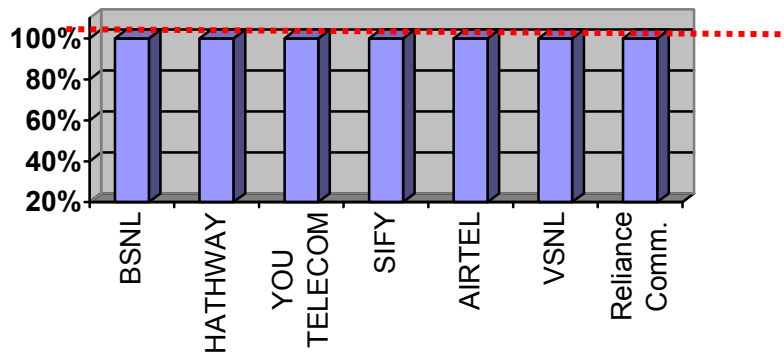
The Satellite link does not exist with any of the operators, hence the parameter "User reference point at ISP Gateway Node to International nearest NAP port abroad (Satellite)" is not applicable to all the operators.

**7.3.3 Parameter wise Data Analysis & Graphical Representations – Broadband Service**

**1.0 Service Provisioning /Activation Time: (Should be 100%)**

All the operators are complying with the TRAI benchmark of 100%.

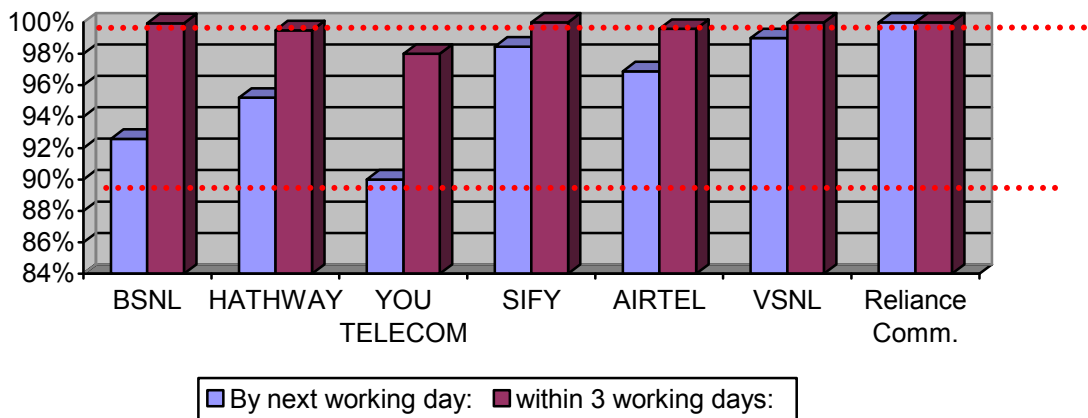
**Service Provisioning/Activation Time**



**2.0 Fault Repair / Restoration Time:**

- **By next working day (>90%):** All the operators are complying with the TRAI benchmark of 90%.
- **Within 3 working days (>99%):** All the operators are complying with the TRAI benchmark except for Airtel showing marginal deviation.
- **Rebate:** All the operators are giving rebate to the eligible customers except HATHWAY have not any rebate because operator currently selling only prepaid module.

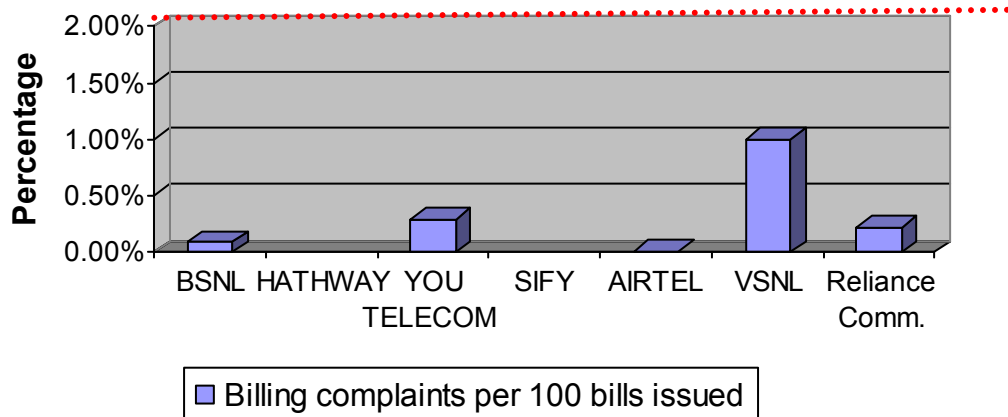
**Fault Repair/ Restoration Time**



**3.0 Billing Performance: (Benchmark <2%)**

All the operators are complying with the TRAI standards, Except Sify & Hathway which has only prepaid module.

**Billing Performance**

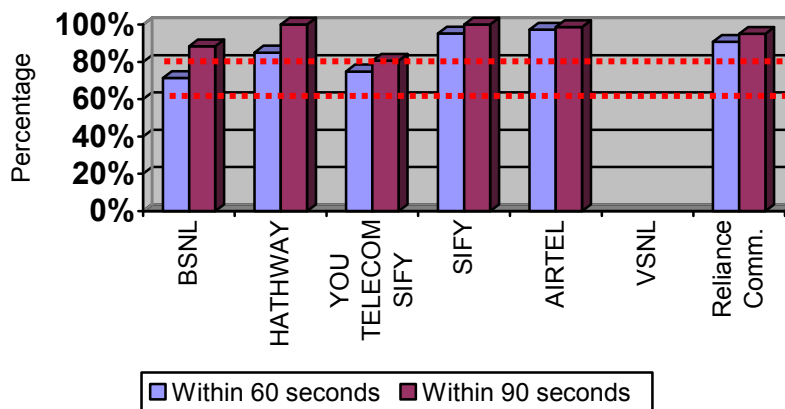


**4.0 Response time to the customer for assistance:**

% age of calls answered by operator (Voice to Voice)

- **Within 60 seconds (>60%):** All the operators are meeting the benchmark.
- **Within 90 seconds (>80%):** All the operators are meeting the benchmark.

**Response Time to the Customer for Assistance**





**5.0 Bandwidth Utilization/ Throughput:**

- **POP to ISP Gateway Node [Intra-network] Link(s): (Benchmark <80%):**

All the operators are meeting the benchmarks except Airtel with a value of 86% during measurements of one-month data verification.

- **ISP Gateway Node to IGSP / NIXI Node upstream Link(s) for International connectivity: (Benchmark <80%):**

All the operators are meeting the benchmarks except for Airtel with a value of 94%.

For BSNL NIB Ahmedabad is connected to Mumbai & Noida only and there are no up-streams links for international connectivity.

For HATHWAY, Operator is not having any NIXI upstream links.

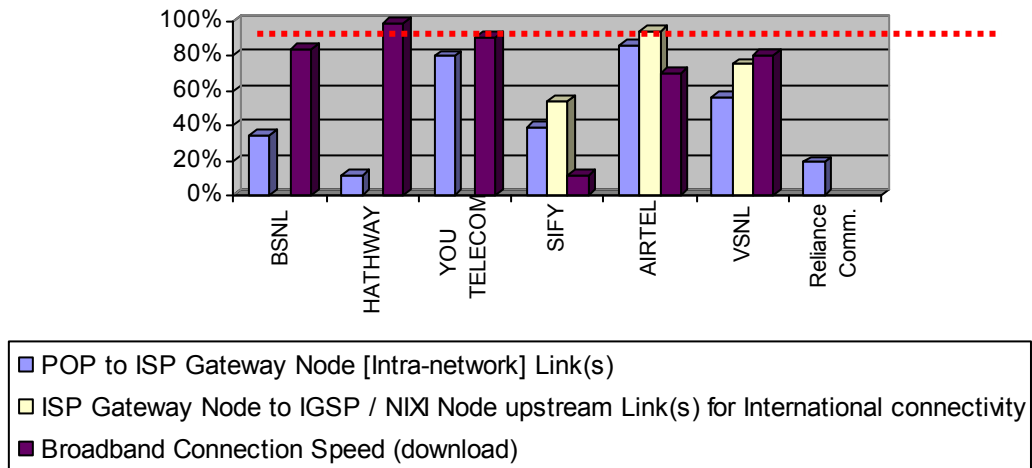
For YOU TELECOM, Operator is directly connected to ISP only.

For Reliance comm., ISP gateway is in Mumbai, Delhi & Chennai. Hence No Up-stream link for Gujarat Circle.

- **Broadband Connection Speed (download) (>80%):**

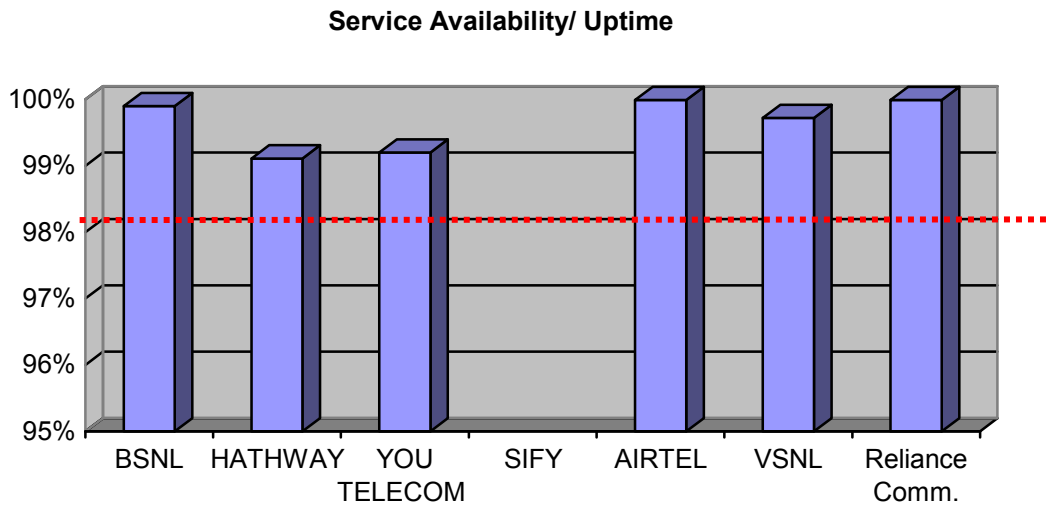
All the operators are meeting the TRAI benchmark of greater than 80% connection speed except for Sify and & Airtel with a value of 11.59% and 70%, respectively.

**Bandwidth Utilisation**

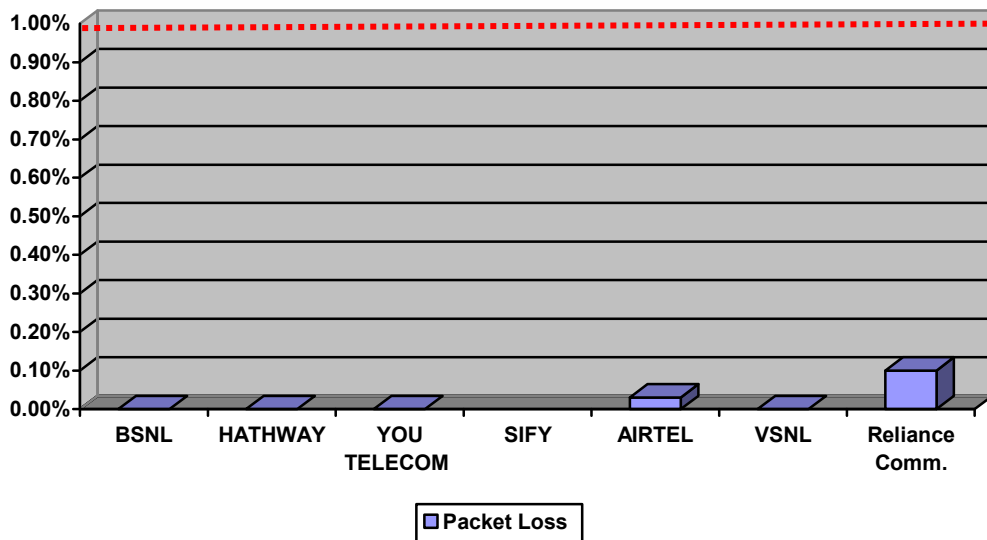


**6.0 Service Availability / Uptime (for all users) (better than 98%):**

All the operators are meeting the TRAI benchmark of greater than 98% during one-month data verification except SIFY stating that they will provide the same directly to TRAI.



**Packet Loss (Should be less than 1%):** All the operators comply with the TRAI benchmarks



## 7.0 Network Latency:

- **User reference point at POP/ISP gateway node to international gateway (IGSP/NIXI) <120 ms:**

All operators are meeting the benchmark except for SIFY, not providing the data. While for BSNL, NIB Ahmedabad is connected to Mumbai & Noida only and there are no Upstream links for international connectivity.

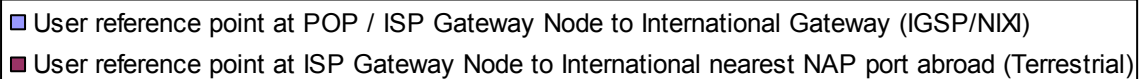
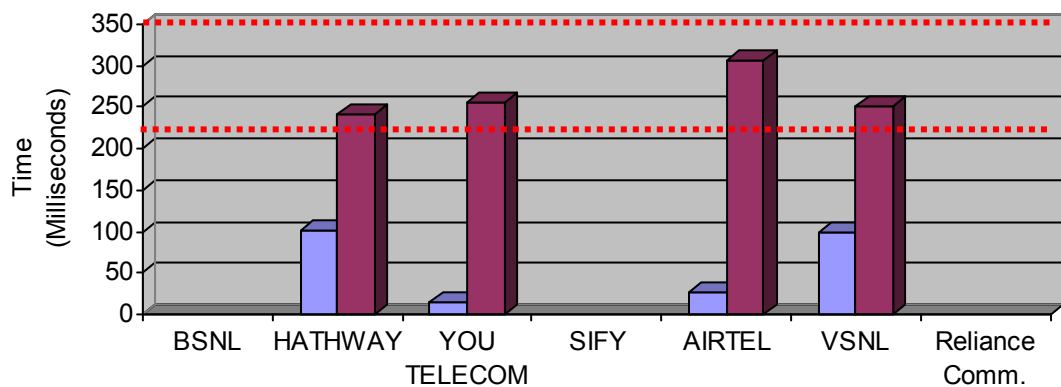
- **User reference point at ISP gateway node to international nearest NAP Port abroad (Terrestrial) <350 ms:**

All operators are meeting the benchmark except for SIFY, not providing the data. While for BSNL, NIB Ahmedabad is connected to Mumbai & Noida only and there are no Upstream links for international connectivity.

- **User reference point at ISP Gateway Node to International nearest NAP port abroad (Satellite) <850 ms:**

The Satellite link does not exist with any of the operator, hence the parameter “User reference point at ISP Gateway Node to International nearest NAP port abroad (Satellite)” is not applicable to the operators.

### Network Latency



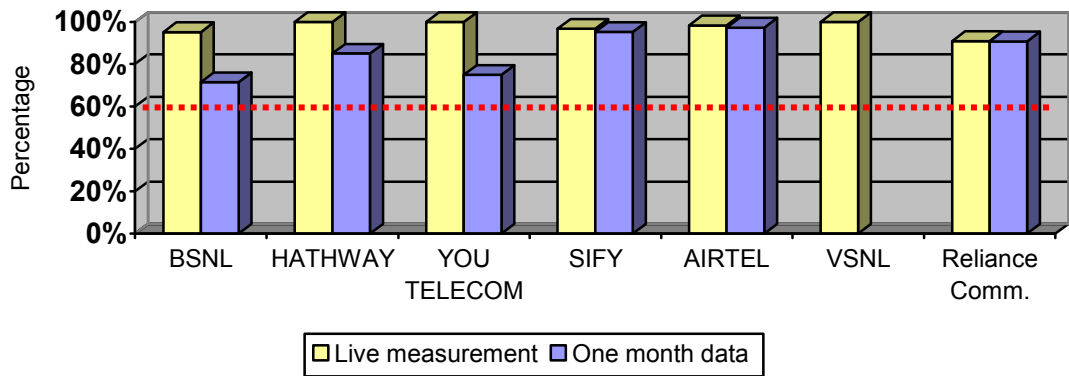
**7.3.4 Comparison between Live measurements and One month data Audit – Broadband Service**

**1. Response time to the customer for assistance (Voice to Voice):**

**(i) Calls answered by operator within 60 seconds (>60%)**

All the operators are meeting the benchmark.

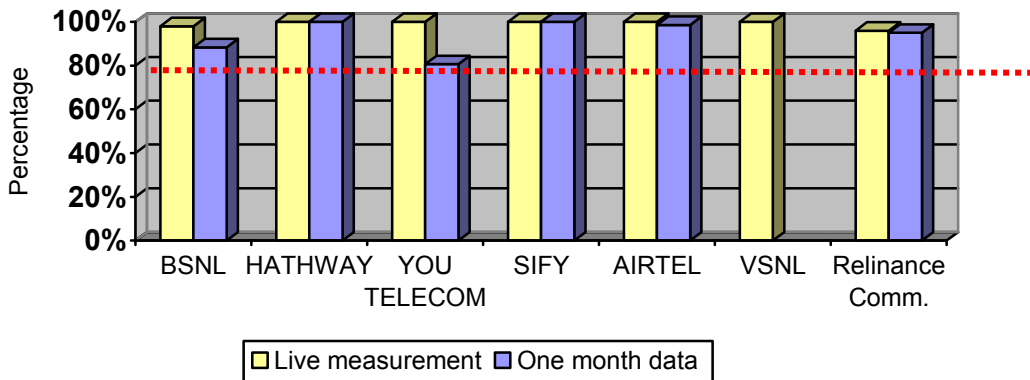
**Response Time to the Customer for Assistance**



**(ii) Calls answered by operator within 90 seconds (>80%)**

All the operators are meeting the benchmark.

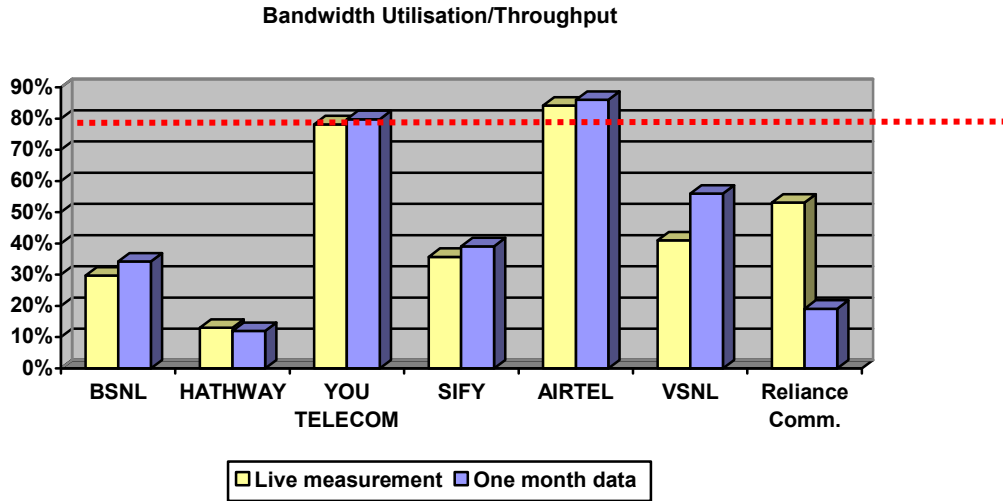
**Response Time to the Customer for Assistance**



**2. Bandwidth Utilization/ Throughput:**

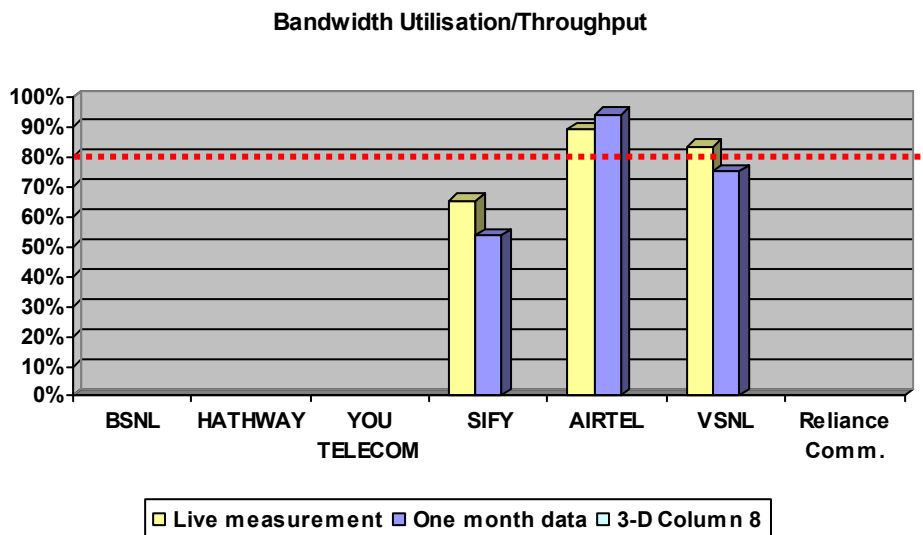
- POP to ISP Gateway Node [Intra-network] Link(s) (<80%):**

All the operators are meeting the benchmark except for Airtel with a value of 84.20% for live performance.



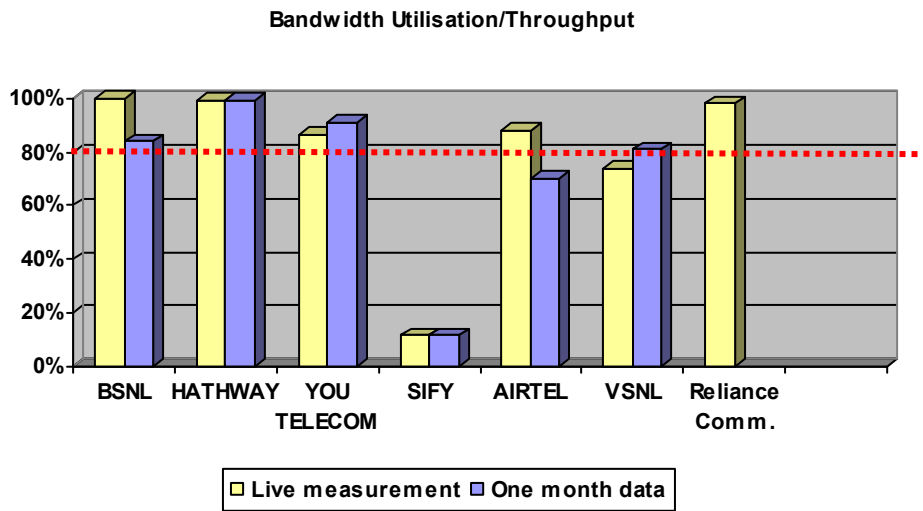
- ISP Gateway Node to IGSP / NIXI Node upstream Link(s) for International connectivity (Should be less than 80%):**

All the operators are meeting the benchmark except Airtel and VSNL with a value of 89.21% and 83.33% showing deviation on the live performance audit data. However, the parameter is not applicable for Reliance, You Telecom, Hathway & BSNL.



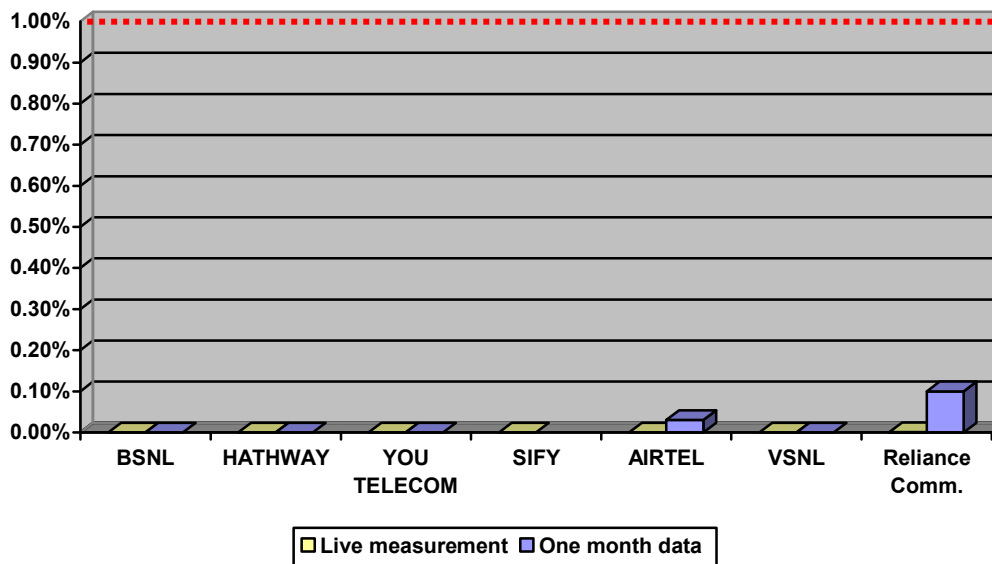
• **Broadband Connection Speed (download) (>80%):**

All the operators are meeting the benchmark except Sify and VSNL with a value of 11.67% & 73.76% respectively, for 3-days live performance.



**3. Packet Loss: (Benchmark <1%):**

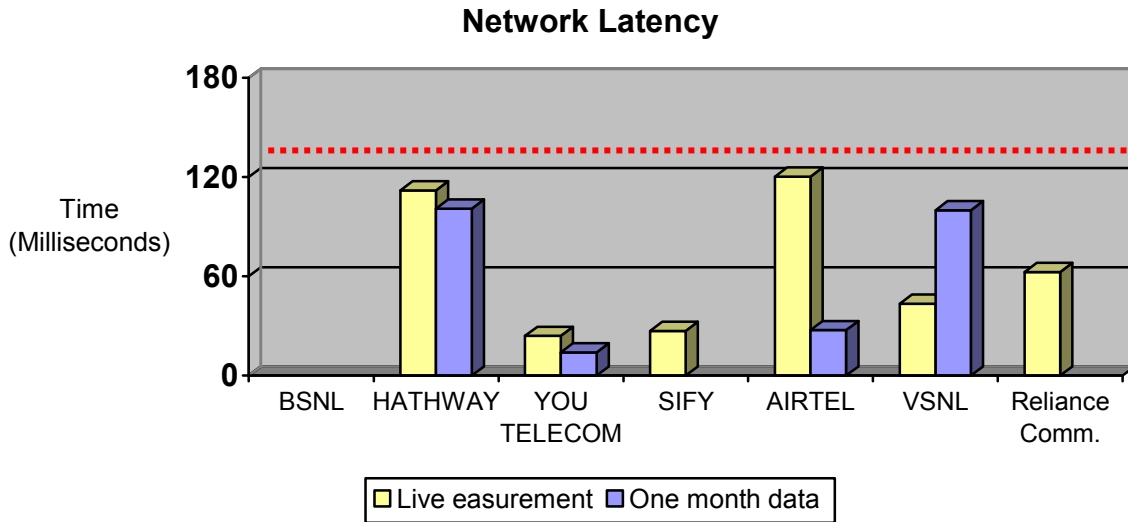
All the operators are meeting the benchmark in one month and 3 days comparison data.



**4. Network Latency:**

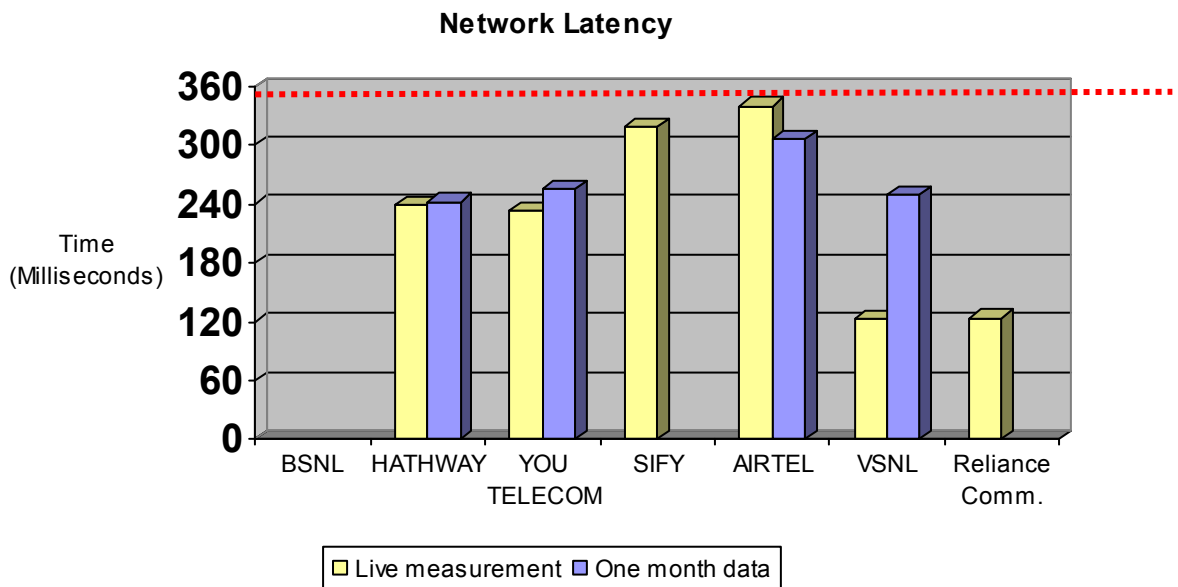
- **User reference point at POP / ISP Gateway Node to International Gateway (IGSP/NIXI): (Benchmark <120ms):**

All the operators are meeting the benchmark except Airtel with a a value of 120.3% , showing marginal deviation for the data collected in 3-days live performance. However, the parameter it is not applicable for BSNL.



- **User reference point at ISP Gateway Node to International nearest NAP port abroad (Terrestrial): (Benchmark <350ms):**

All the operators are meeting the benchmark however; the parameter is not applicable for BSNL.



**CHAPTER – 8****DRIVE TEST FINDING****8.1 Drive Test Procedure :**

TCIL have conducted individually drive test for each service provider, both GSM and CDMA operators. TCIL auditors have selected 3 types of clutter in city on the basis of population & geography of the city. The clutters are divided into dense population, medium population & low population. Auditors have covered 100 Kms. on drive test covering all the above mention clusters.

During the drive test, auditors have taken short calls of 120 second call duration & 10 second waiting time after each call & covered maximum possible routes in the selected clutters. At the drive test moment, vehicle speed was maintained within 20- 30 km/hr. For route details see annexure II of the report.

For GSM operators, auditors have taken Rx quality (Bit Error Rate) & in case of CDMA operators, FER (Frame Error Rate) has been taken. The range of Rx quality is scaled between 0-5 for system using frequency hopping & between 0-4 for system without frequency hopping. Other then this call drop and blocked call details were taken cluster wise to get a better picture of the QoS for a particular service provider.



## 8.2 Drive Test Data Analysis (Operator assisted Drive Test)

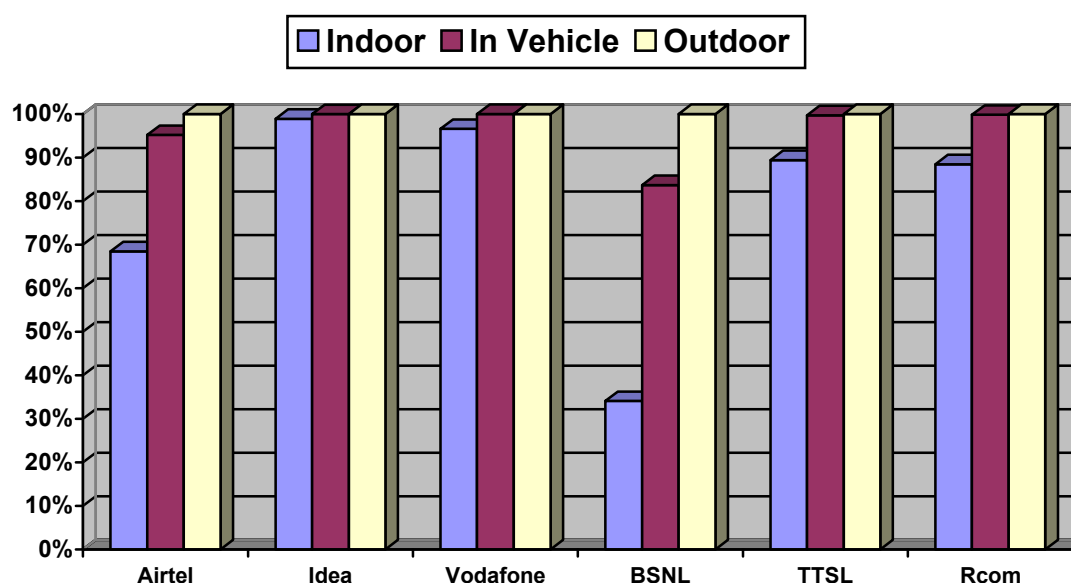
### 8.2.1 Ahmedabad

| S.N | Parameters  | Airtel  | IDEA    | Voda fone | BSNL    | TTCL    | RCom    |
|-----|---|---------|---------|-----------|---------|---------|---------|
| 1   | Drive Test  |         |         |           |         |         |         |
| 1.1 | Call Attempts   | 176     | 166     | 256       | 115     | 141     | 139     |
| 1.2 | Blocked Call Rate (<=3%)                                  | 1.96%   | 1.19%   | 0.00%     | 1.28%   | 0.23%   | 0.00%   |
| 1.3 | Dropped Call Rate (<=2%)                                  | 1.91%   | 2.23%   | 0.00%     | 0.00%   | 0.00%   | 0.00%   |
| 1.4 | Percentage of connections with good voice quality (=>95%) |         |         |           |         |         |         |
|     | (i) 0-4 (w/o frequency hopping)                           |         |         |           |         | 99.16 % | 98.40 % |
|     | (ii) 0-5 ( with frequency hopping)                        | 96.63 % | 95.36 % | 97.24 %   | 94.68 % |         |         |
| 1.5 | Service Coverage  |         |         |           |         |         |         |
|     | In door (>= -75dBm)                                       | 68.43 % | 98.90 % | 96.57 %   | 34.09 % | 89.40 % | 88.46 % |
|     | In-vehicle (>= -85dBm)                                    | 95.16 % | 99.96 % | 99.97 %   | 83.68 % | 99.70 % | 99.80 % |
|     | Out door- in city (>= -95dBm)                             | 100%    | 100%    | 100%      | 100%    | 100%    | 100%    |
| 1.6 | Call Setup Success Rate (>=95%)                           | 96.83 % | 98.81 % | 100%      | 98.66 % | 99.40 % | 100%    |

Indicates deviation from benchmark of TRAI.

NA – Not Applicable.

**Service Coverage levels for all the operators in Ahmedabad: Operator assisted drive test result.**

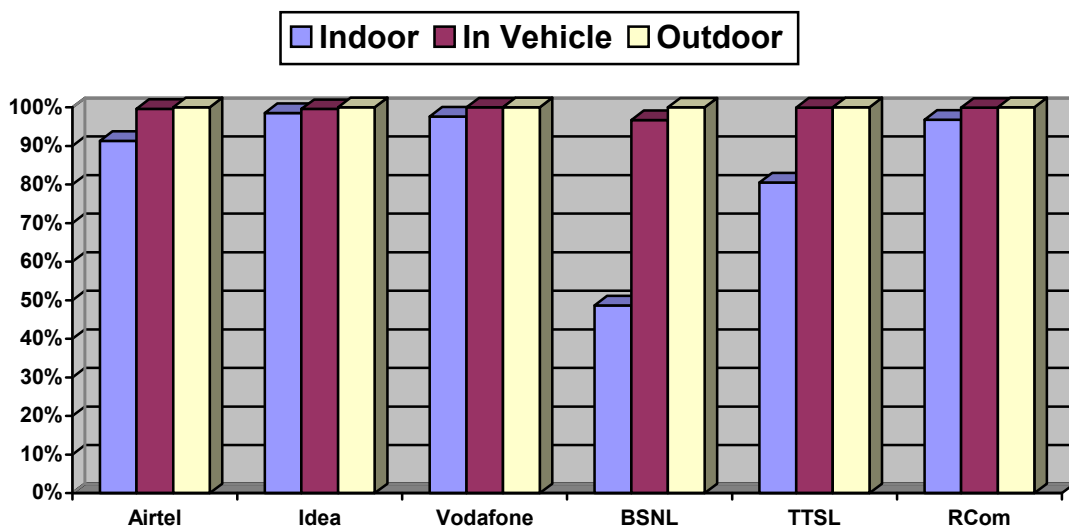


### 8.2.2 Baroda (Operator assisted Drive Test)

| S.N | Parameters  | Airtel | IDEA   | Vodafone | BSNL   | TTCL   | RCom   |
|-----|---|--------|--------|----------|--------|--------|--------|
| 1   | Drive Test  |        |        |          |        |        |        |
| 1.1 | Call Attempts   | 145    | 147    | 141      | 145    | 141    | 96     |
| 1.2 | Blocked Call Rate (<=3%)                                  | 0.47%  | 0.00%  | 0.69%    | 1.18%  | 0.00%  | 0.00%  |
| 1.3 | Dropped Call Rate (<=2%)                                  | 0.95%  | 1.41%  | 0.69%    | 1.18%  | 0.00%  | 0.00%  |
| 1.4 | Percentage of connections with good voice quality (>=95%) |        |        |          |        |        |        |
|     | (i) 0-4 (w/o frequency hopping)                           |        |        |          |        | 99.00% | 98.40% |
|     | (ii) 0-5 ( with frequency hopping)                        | 94.20% | 97.40% | 97.86%   | 95.93% |        |        |
| 1.5 | Service Coverage  |        |        |          |        |        |        |
|     | In door (>= -75dBm)                                       | 91.30% | 98.53% | 97.60%   | 48.69% | 80.55% | 96.80% |
|     | In-vehicle (>= -85dBm)                                    | 99.60% | 99.58% | 99.98%   | 96.70% | 99.92% | 99.90% |
|     | Out door- in city (>= -95dBm)                             | 100%   | 100%   | 100%     | 99.99% | 100%   | 100%   |
| 1.6 | Call Setup Success Rate (>=95%)                           | 99.00% | 98.83% | 99.33%   | 98.76% | 100%   | 100%   |

Indicates deviation from benchmark of TRAI.

### Service Coverage levels for all the operators in Baroda: Operator assisted drive test result.

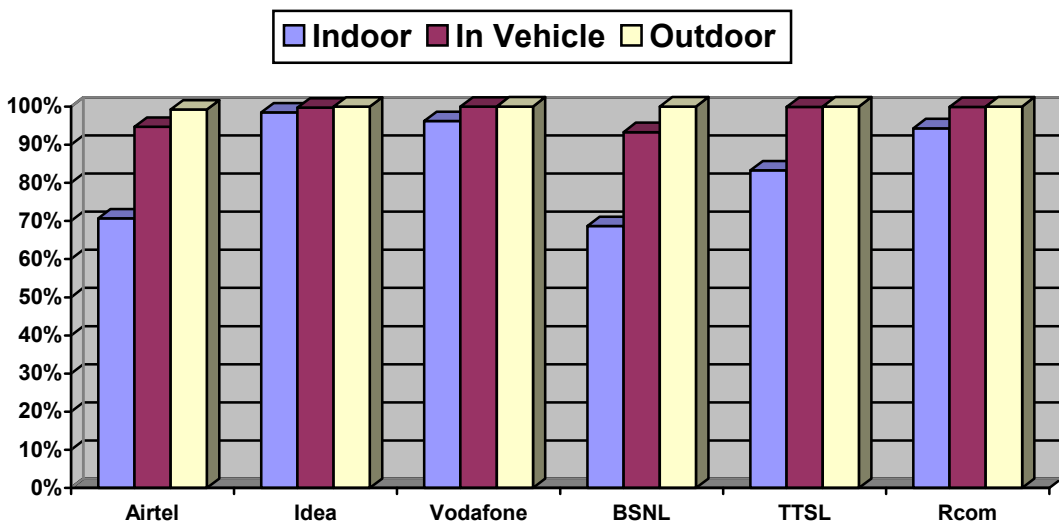


### 8.2.3 Surat (Operator assisted Drive Test)

| S.N | Parameters  | Airtel  | IDEA   | Vodafone | BSNL    | TTSL    | RCOM    |
|-----|---|---------|--------|----------|---------|---------|---------|
| 1   | Drive Test  |         |        |          |         |         |         |
| 1.1 | Call Attempts   | 159     | 160    | 265      | 216     | 122     | 123     |
| 1.2 | Blocked Call Rate (<=3%)                                  | 0.00 %  | 0.00%  | 0.31%    | 2.17%   | 0.45%   | 0.00%   |
| 1.3 | Dropped Call Rate (<=2%)                                  | 0.60 %  | 0.33%  | 0.31%    | 0.27%   | 0.45%   | 0.00%   |
| 1.4 | Percentage of connections with good voice quality (>=95%) |         |        |          |         |         |         |
|     | (i) 0-4 (w/o frequency hopping)                           |         |        |          |         | 98.70 % | 98.50 % |
|     | (ii) 0-5 ( with frequency hopping)                        | 94.53 % | 94.07% | 96.89%   | 96.16 % |         |         |
| 1.5 | Service Coverage  |         |        |          |         |         |         |
|     | In door (>= -75dBm)                                       | 70.66 % | 98.45% | 96.22%   | 68.65 % | 83.30 % | 94.30 % |
|     | In-vehicle (>= -85dBm)                                    | 94.70 % | 99.74% | 99.95%   | 93.31 % | 99.90 % | 99.90 % |
|     | Out door- in city (>= -95dBm)                             | 99.20 % | 99.99% | 100%     | 100%    | 100%    | 100%    |
| 1.6 | Call Setup Success Rate (>=95%)                           | 99.33 % | 100%   | 99.99%   | 97.70 % | 99.50 % | 100%    |

Indicates deviation from benchmark of TRAI.

**Service Coverage levels for all the operators in Surat: Operator assisted drive test result.**



**Observation (Operator assisted Drive Test):**

The Operator Assisted Drive Test was conducted at Ahmedabad, Baroda and Surat cities for all the operators. Route cover was about around 80-100Km depending on city areas within the speed limit of 30Km/hr. Details of route are given in Annexure II. The operator wise observations based on drive test are as follows:

**Airtel**

Airtel is meeting most of the benchmarks in all the three cities (Ahmedabad, Baroda and Surat). However, Airtel is marginally deviating in the ‘%age of connections with good voice quality’ in cities like Baroda and Surat. In Ahmedabad it is seen that the ‘%age of Dropped Call’ as high as 1.91% against the benchmark of 2%.

**Idea**

Idea is meeting most of the benchmarks in all the three cities except for ‘Dropped Call rate’ with a value of 2.23% for Ahmedabad and ‘%age of connections with good voice quality’ parameter with a value of 94.07% for Surat city, in both case showing marginal deviation.

**Vodafone**

Vodafone is meeting all the benchmarks in all the three cities (Ahmedabad, Baroda and Surat).

**BSNL**

BSNL is meeting most of the benchmarks in all the three cities. However, BSNL has shown marginal deviation in ‘percentage of connections with good voice quality’ with a value of 94.68% in Ahmedabad and in Surat there is also a deviation for ‘Blocked call rate’ with a value of 2.17%.

**TTSL**

TTSL is meeting all the benchmarks in all the three cities (Ahmedabad, Baroda and Surat).

**Reliance Communication (RCOM)**

Reliance Comm. is meeting all the benchmarks in all the three cities (Ahmedabad, Baroda and Surat).

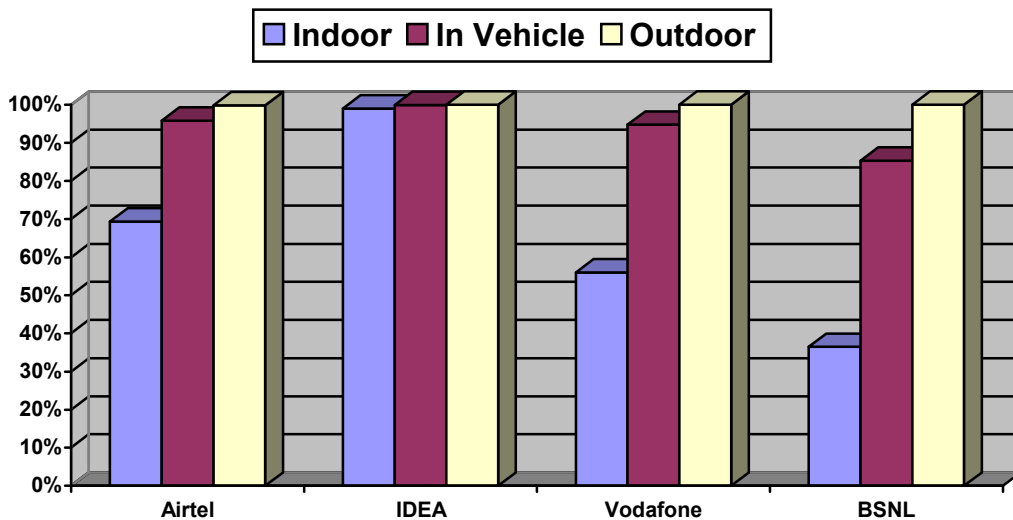
### 8.3 Drive Test Data Analysis (Independent Drive Test)

#### 8.3.1 Ahmedabad

| S.N | Parameters   | Airtel | IDEA    | Vodafone | BSNL   |
|-----|--|--------|---------|----------|--------|
| 1   | Drive Test   |        |         |          |        |
| 1.1 | Call Attempts  | 140    | 131     | 139      | 128    |
| 1.2 | Blocked Call Rate (<= 3%)                                  | 1.21%  | 0.66%   | 0.54%    | 1.16%  |
| 1.3 | Dropped Call Rate (<= 2%)                                  | 1.14%  | 0.00%   | 0.00%    | 0.00%  |
| 1.4 | Percentage of connections with good voice quality (>= 95%) |        |         |          |        |
|     | (i) 0-4 (w/o frequency hopping)                            |        |         |          |        |
|     | (ii) 0-5 ( with frequency hopping)                         | 96.79% | 94.83 % | 97.36%   | 96.13% |
| 1.5 | Service Coverage   |        |         |          |        |
|     | In door (>= -75dBm)  | 69.34% | 99.03 % | 56.07%   | 36.46% |
|     | In-vehicle (>= -85dBm)                                     | 95.85% | 99.98 % | 94.80%   | 85.28% |
|     | Out door- in city (>= -95dBm)                              | 99.87% | 100%    | 100%     | 100%   |
| 1.6 | Call Setup Success Rate (>=95%)                            | 98.78% | 99.34 % | 99.45%   | 98.24% |

Indicates deviation from benchmark of TRAI.

Service Coverage levels for all the operators in Ahmedabad: Independent drive test result.

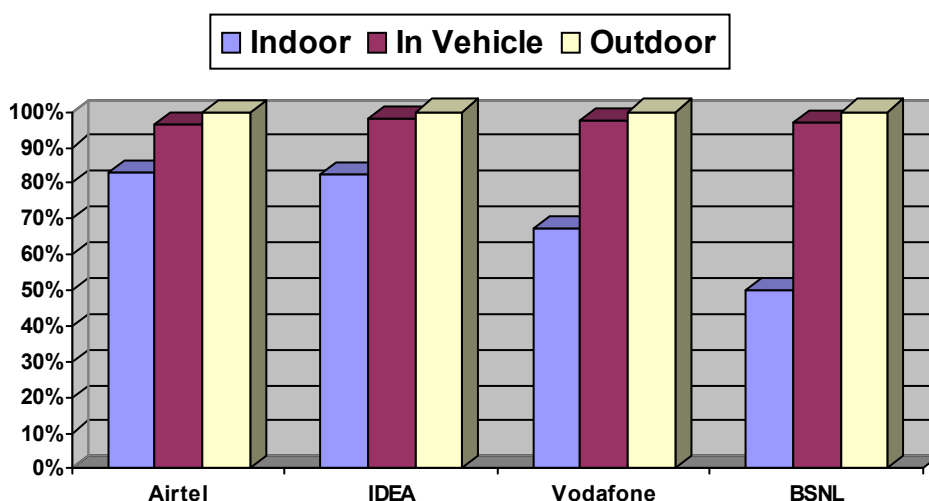


## 8.3.2 Baroda (Independent Drive Test)

| S.N. | Parameters   | Airtel | IDEA   | Vodafone | BSNL   |
|------|--|--------|--------|----------|--------|
| 1    | Drive Test   |        |        |          |        |
| 1.1  | Call Attempts  | 116    | 108    | 111      | 105    |
| 1.2  | Blocked Call Rate (<= 3%)                                  | 6.88%  | 1.66%  | 4.69%    | 4.14%  |
| 1.3  | Dropped Call Rate (<= 2%)                                  | 3.35%  | 1.54%  | 1.41%    | 0.72%  |
| 1.4  | Percentage of connections with good voice quality (>= 95%) |        |        |          |        |
|      | (i) 0-4 (w/o frequency hopping)                            |        |        |          |        |
|      | (ii) 0-5 ( with frequency hopping)                         | 93.36% | 95.93% | 97.42%   | 96.17% |
| 1,5  | Service Coverage   |        |        |          |        |
|      | In door (>= -75dBm)  | 83.01% | 82.58% | 67.28%   | 49.89% |
|      | In-vehicle (>= -85dBm)                                     | 96.59% | 98.17% | 97.57%   | 97.18% |
|      | Out door- in city (>= -95dBm)                              | 99.83% | 100%   | 100%     | 100%   |
| 1.6  | Call Setup Success Rate (>=95%)                            | 92.80% | 99.13% | 95.26%   | 99.20% |

Indicates deviation from benchmark of TRAI.

## Service Coverage levels for all the operators in Baroda: Independent drive test result.

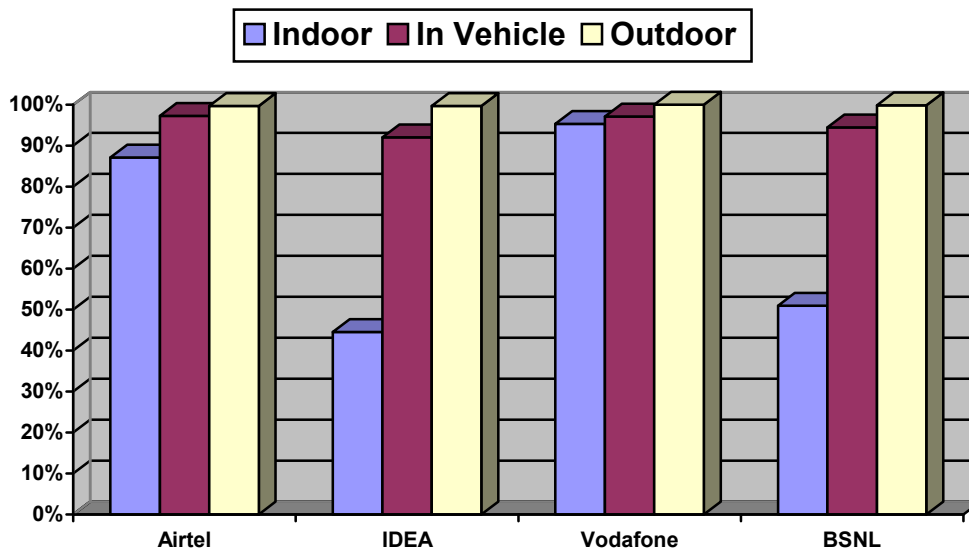


### 8.3.3 Surat (Independent Drive Test)

| S.N | Parameters   | Airtel | IDEA   | Vodafone | BSNL   |
|-----|--|--------|--------|----------|--------|
| 1   | Drive Test   |        |        |          |        |
| 1.1 | Call Attempts  | 136    | 123    | 153      | 116    |
| 1.2 | Blocked Call Rate (<= 3%)                                  | 1.86%  | 2.89%  | 0.32%    | 0.74%  |
| 1.3 | Dropped Call Rate (<= 2%)                                  | 3.09%  | 1.78%  | 0.00%    | 1.14%  |
| 1.4 | Percentage of connections with good voice quality (>= 95%) |        |        |          |        |
|     | (i) 0-4 (w/o frequency hopping)                            |        |        |          |        |
|     | (ii) 0-5 ( with frequency hopping)                         | 94.94% | 95.40% | 97.09%   | 95.85% |
| 1.5 | Service Coverage   |        |        |          |        |
|     | In door (>= -75dBm)  | 87.17% | 44.53% | 95.32%   | 50.94% |
|     | In-vehicle (>= -85dBm)                                     | 97.29% | 92.08% | 97.15%   | 94.50% |
|     | Out door- in city (>= -95dBm)                              | 99.76% | 99.74% | 100%     | 99.90% |
| 1.6 | Call Setup Success Rate (>95%)                             | 96.30% | 96.00% | 99.99%   | 99.20% |

Indicates deviation from benchmark of TRAI.

**Service Coverage levels for all the operators in Surat: Independent drive test result.**



## **Observation:**

The Independent Drive Test was conducted at Ahmedabad, Baroda and Surat cities for all the operators. Route cover was about around 80-100Km depending on city areas within the speed limit of 30Km/hr. Details of route are given in Annexure II. The operator wise observations based on drive test are as follows:

### **Airtel**

Airtel is meeting all the benchmarks in Ahmedabad city only. For Baroda it is found that none of the parameters are meeting the benchmarks and deviation are significantly high as can be seen from the table. Later on Airtel reported that on that particular day they were having some Radio-network problem. In Surat also Airtel is not meeting the benchmark marginally for the parameters like 'Dropped call rate' with a value of 3.09% and '%age of connections with good voice quality' with a value of 94.94%.

### **Idea**

Idea is meeting most of the benchmarks in all the 3 cities. Only in Ahmedabad city '%age of connections with good voice quality' shows a value of 94.83%, minor deviation from the benchmark.

### **Vodafone**

Except for 'Blocked call rate' in Baroda with a value of 4.69% against benchmark of  $\leq 3\%$  all other benchmarks are meeting the expectation.

### **BSNL**

Except for 'Blocked call rate' in Baroda with a value of 4.14% against benchmark of  $\leq 3\%$  all other benchmarks are meeting the expectation.



**Note:**

It has been observed that for some operators in different cities, parameters like 'Call dropped rate' and 'Blocked call rate' through may have met the benchmark in overall performances are not meeting the benchmark when seen individually for densely, medium and low populated areas. Below table shows the values of the parameters operators/city wise. Only those values are shown those are not fulfilling the benchmark.

| Operators | City   | Blocked Call Rate<br>Benchmark <=3% |        |       | Dropped Call Rate<br>Benchmark <=2% |        |       |
|-----------|--------|-------------------------------------|--------|-------|-------------------------------------|--------|-------|
|           |        | Dense                               | Medium | Low   | Dense                               | Medium | Low   |
| Airtel    | AHD    |                                     | 3.63%  | 3.03% | 2.40%                               | 3.33%  |       |
|           | Baroda | 5.00%                               | 11.32% | 4.34% | 2.85%                               | 5.66%  | 4.34% |
|           | Surat  |                                     | 3.84%  |       |                                     | 3.84%  | 3.70% |
| Idea      | AHD    |                                     |        |       |                                     |        |       |
|           | Baroda | 5.00%                               |        |       | 4.25%                               |        |       |
|           | Surat  | 4.25%                               | 4.44%  |       |                                     |        | 3.22% |
| Vodafone  | AHD    |                                     |        |       |                                     |        |       |
|           | Baroda |                                     | 9.09%  | 5.00% | 4.25%                               |        |       |
|           | Surat  |                                     |        |       |                                     |        |       |
| BSNL      | AHD    | 3.85%                               |        |       |                                     |        |       |
|           | Baroda |                                     | 5.00%  | 5.26% |                                     |        |       |
|           | Surat  |                                     |        | 3.33% |                                     |        | 3.44% |
| TTSL      | AHD    |                                     |        |       |                                     |        |       |
|           | Baroda |                                     |        |       |                                     |        |       |
|           | Surat  |                                     |        |       |                                     |        |       |
| RCom      | AHD    |                                     |        |       |                                     |        |       |
|           | Baroda |                                     |        |       |                                     |        |       |
|           | Surat  |                                     |        |       |                                     |        |       |

## CHAPTER – 9

## POI CONGESTION: VOICE CALL TEST

## 9.1 INTER OPERATOR CALL CONGESTION ASSESSMENT

## 9.1.1 Summary of Successful Calls

| Calling Operator | Called Operator |      |          |      |      |                |
|------------------|-----------------|------|----------|------|------|----------------|
|                  | Airtel          | Idea | Vodafone | BSNL | TTSL | Reliance Comm. |
| Airtel           | -               | 100% | 100%     | 100% | 100% | 100%           |
| Idea             | 100%            | -    | 100%     | 100% | 100% | 100%           |
| Vodafone         | 100%            | 100% | -        | 100% | 100% | 100%           |
| BSNL             | 100%            | 100% | 100%     | -    | 100% | 100%           |
| TTSL             | 100%            | 100% | 100%     | 100% | -    | 100%           |
| RComm            | 100%            | 100% | 100%     | 100% | 100% | -              |

## 9.1.2 Detailed Records

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

| S. No | Calling Number Operator | Called operator | Total no of calls | Total no of Successful calls | Call Success % |
|-------|-------------------------|-----------------|-------------------|------------------------------|----------------|
| 1     | Airtel                  | Idea            | 50                | 50                           | 100%           |
|       |                         | Vodafone        | 50                | 50                           | 100%           |
|       |                         | BSNL            | 50                | 50                           | 100%           |
|       |                         | TTSL            | 50                | 50                           | 100%           |
|       |                         | RComm           | 50                | 50                           | 100%           |
|       | Idea                    | Idea            | 50                | 50                           | 100%           |
|       |                         | Vodafone        | 50                | 50                           | 100%           |
|       |                         | BSNL            | 50                | 50                           | 100%           |
|       |                         | TTSL            | 50                | 50                           | 100%           |
|       |                         | RComm           | 50                | 50                           | 100%           |
| 2     | Idea                    | Airtel          | 50                | 50                           | 100%           |
|       |                         | Vodafone        | 50                | 50                           | 100%           |
|       |                         | BSNL            | 50                | 50                           | 100%           |
|       |                         | TTSL            | 50                | 50                           | 100%           |
|       |                         | RComm           | 50                | 50                           | 100%           |
|       | Airtel                  | Airtel          | 50                | 50                           | 100%           |
|       |                         | Vodafone        | 50                | 50                           | 100%           |
|       |                         | BSNL            | 50                | 50                           | 100%           |
|       |                         | TTSL            | 50                | 50                           | 100%           |
|       |                         | RComm           | 50                | 50                           | 100%           |

| S. No | Calling Number Operator | Called operator | Total no of calls | Total no of Successful calls | Call Success % |
|-------|-------------------------|-----------------|-------------------|------------------------------|----------------|
| 3     | Vodafone                | Airtel          | 50                | 50                           | 100%           |
|       |                         | Idea            | 50                | 50                           | 100%           |
|       |                         | BSNL            | 50                | 50                           | 100%           |
|       |                         | TTSL            | 50                | 50                           | 100%           |
|       |                         | RComm           | 50                | 50                           | 100%           |
|       |                         |                 |                   |                              |                |
|       |                         | Airtel          | 50                | 50                           | 100%           |
|       |                         | Idea            | 50                | 50                           | 100%           |
|       |                         | BSNL            | 50                | 50                           | 100%           |
|       |                         | TTSL            | 50                | 50                           | 100%           |
|       |                         | RComm           | 50                | 50                           | 100%           |
|       |                         |                 |                   |                              |                |
| 4     | BSNL                    |                 |                   |                              |                |
|       |                         | Airtel          | 50                | 50                           | 100%           |
|       |                         | Idea            | 50                | 50                           | 100%           |
|       |                         | Vodafone        | 50                | 50                           | 100%           |
|       |                         | TTSL            | 50                | 50                           | 100%           |
|       |                         | RComm           | 50                | 50                           | 100%           |
|       |                         |                 |                   |                              |                |
|       |                         | Airtel          | 50                | 50                           | 100%           |
|       |                         | Idea            | 50                | 50                           | 100%           |
|       |                         | Vodafone        | 50                | 50                           | 100%           |
|       |                         | TTSL            | 50                | 50                           | 100%           |
|       |                         | RComm           | 50                | 50                           | 100%           |
|       |                         |                 |                   |                              |                |
| 5     | TTSL.                   | Airtel          | 50                | 50                           | 100%           |
|       |                         | Idea            | 50                | 50                           | 100%           |
|       |                         | Vodafone        | 50                | 50                           | 100%           |
|       |                         | BSNL            | 50                | 50                           | 100%           |
|       |                         | RComm           | 50                | 50                           | 100%           |
|       |                         |                 |                   |                              |                |
|       |                         | Airtel          | 50                | 50                           | 100%           |
|       |                         | Idea            | 50                | 50                           | 100%           |
|       |                         | Vodafone        | 50                | 50                           | 100%           |
|       |                         | BSNL            | 50                | 50                           | 100%           |
|       |                         | RComm           | 50                | 50                           | 100%           |
|       |                         |                 |                   |                              |                |
| 6     | Reliance Comm.          | Airtel          | 50                | 50                           | 100%           |
|       |                         | Idea            | 50                | 50                           | 100%           |
|       |                         | Vodafone        | 50                | 50                           | 100%           |
|       |                         | BSNL            | 50                | 50                           | 100%           |
|       |                         | TTSL            | 50                | 50                           | 100%           |
|       |                         |                 |                   |                              |                |
|       |                         | Airtel          | 50                | 50                           | 100%           |
|       |                         | Idea            | 50                | 50                           | 100%           |
|       |                         | Vodafone        | 50                | 50                           | 100%           |
|       |                         | BSNL            | 50                | 50                           | 100%           |
|       |                         | TTSL            | 50                | 50                           | 100%           |

## CHAPTER – 10

## CUSTOMER CARE &amp; GRIEVANCES REDRESSAL

## 10.1 Basic Service (Wireline)

| S.N. | Parameters  | Airtel | BSNL | TTSL  | Reliance Comm. |
|------|---|--------|------|-------|----------------|
| 1    | Total no of complaints received in the call centre (Tech+ Non Tech)                                   | 3001   | 1329 | 802   | 1264           |
| 2    | Total no of complaints redressed by the call centre within the specified time limit                   | 2978   | 1206 | 793   | 1264           |
| 3    | <b>Nodal Officer</b>  |        |      |       |                |
| 3.1  | Total no of complaints received by the nodal officers   | 23     | 123  | 9     | 0              |
| 3.2  | Percentage of complaints with reference to total no of complaints received at the call centre         | 0.77%  | 9.2% | 1.12% | Nil            |
| 3.3  | Total no of complaints redressed within the specified time limit                                      | 15     | Nil  | Nil   | Nil            |
| 4    | <b>Appellate Authority</b>  |        |      |       |                |
| 4.1  | Total no of appeals received by the appellate authority   | 8      | Nil  | Nil   | Nil            |
| 4.2  | Percentage of appeal received with reference to total no of complaints received by the nodal officers | 34.78% | Nil  | Nil   | Nil            |

**Note:**

It is found that there are many instances where customers directly approach to Nodal Officer without approaching to Call Center for redressal. Similarly there are many instances where customers directly approach to Appellate Authority without approaching to Nodal Officer for their grievances redressal.

**10.2 Cellular Mobile Telephone Services**

| S.N.     | Parameters  | Airtel | Idea  | Vodafone | BSNL  | TTSL  | Reliance Comm. |
|----------|---|--------|-------|----------|-------|-------|----------------|
| <b>A</b> | <b>Call Centre Statistics</b>   |        |       |          |       |       |                |
| 1        | Total no of complaints received in the call centre (Post paid)  | 43525  | 3440  | 4214     | 570   | 8348  | 828            |
| 2        | Total no of complaints received in the call centre (Pre paid)   | 241142 | 4586  | 6128     | 12519 |       |                |
| 3        | Total no of complaints redressed by the call centre within the specified time limit                   | 284386 | 7984  | 10229    | 13051 | 8271  | 828            |
| <b>B</b> | <b>Nodal Officer</b>  |        |       |          |       |       |                |
| 1        | Total no of complaints received by the nodal officers   | 281    | 42    | 113      | 38    | 77    | 0              |
| 2        | Percentage of complaints with reference to total no of complaints received at the call centre         | 0.10%  | 0.52% | 1.09%    | 0.29% | 0.92% | Nil            |
| 3        | Total no of complaints redressed within the specified time limit                                      |        | 100%  | 100%     | 100%  | 100%  | Nil            |
| <b>C</b> | <b>Appellate Authority</b>  |        |       |          |       |       |                |
| 1        | Total no of appeals received by the appellate authority   | 80     | Nil   | Nil      | Nil   | Nil   | Nil            |
| 2        | Percentage of appeal received with reference to total no of complaints received by the nodal officers | 28.4%  | Nil   | Nil      | Nil   | Nil   | Nil            |

**Note:**

It is found that there are many instances where customers directly approach to Nodal Officer without approaching to Call Center for redressal. Similarly there are many instances where customers directly approach to Appellate Authority without approaching to Nodal Officer for their grievances redressal.

**10.3 Broadband Services**

| S.N. | Parameters  | Airtel | BSNL (MP) | BSNL (CG) | Sify | Reliance Comm. | VSNL   |
|------|---|--------|-----------|-----------|------|----------------|--------|
| 1    | Call Centre   |        |           |           |      |                |        |
| 1.1  | Total no of complaints received in the call centre  | 11361  | 335       | 1690      | 29   | 7546           | 337    |
| 1.2  | Complaints per 100 customers per months   | 11%    | 0.138%    | 5.12%     | 3%   | 2.62%          | 62.52% |
| 1.3  | Total no of complaints redressed by the call centre within the specified time limit                   | 7837   | 33        | 1609      | 29   | 8696           | 334    |
| 2    | Nodal Officer   |        |           |           |      |                |        |
| 2.1  | Total no of complaints received by the nodal officers   | 0      | 3505      | 15        | 0    | 6              | 3      |
| 2.2  | Percentage of complaints with reference to total no of complaints received at the call centre         | 0      | 9.50%     | 0.89%     | 0%   | 0.06%          | 0.89%  |
| 2.3  | Total no of complaints redressed within the specified time limit                                      | 0      | 0         | 15        | 0    | 6              | 3      |
| 3    | Appellate Authority   |        |           |           |      |                |        |
| 3.1  | Total no of appeals received by the appellate authority   | 0      | 0         | 1         | 0    | 0              | 0      |
| 3.2  | Percentage of appeal received with reference to total no of complaints received by the nodal officers | 0      | 0         | 6.67%     | 0%   | 0              | 0      |
| 3.3  | Total no of appeals decided within 3 months   | 0      | 0         | 1         | 0    | 0              | 0      |

**Note:**

It is found that there are many instances where customers directly approach to Nodal Officer without approaching to Call Center for redressal. Similarly there are many instances where customers directly approach to Appellate Authority without approaching to Nodal Officer for their grievances redressal.

**ANNEXURE - I****List of Exchanges / Switches****1. BASIC WIRELINE SERVICE:**

AIRTEL: Ahmedabad

RELAINCE COMM: Ahmedabad

TTSL: Ahmedabad and Surat.

BSNL: 170 Exchanges from the SSA/SDCA of Ahmedabad, Baroda, Surat, Rajkot, Jamnagar, Palanpur & Mehsana were audited. More than 5 % of the total exchanges were audited as per the scope of works Out of 17 nos. of SSA/SDCA in Gujarat 7 nos. of SSA/SDCA were covered namely Ahmedabad, Baroda, Surat, Rajkot, Jamnagar, Palanpur & Mehsana were audited. Among these 7 nos. of SSA/SDCA 170 exchanges were covered for the purpose of audit..

For all other operators, Centralized data was provided for all the exchanges of Gujarat Circle.

**2. BASIC (WIRELESS) AND CELLULAR MOBILE SERVICE:**

AIRTEL: Ahmedabad: MSC01AHD, MSC03AHD, MSS01AHD, MSS04AHD, MSS05AHD  
Surat: MSC04SRT, MSS03SRT, MSS07SRT  
Rajkot: MSC02RJKT, MSS02RJKT, MSS06RJKT

IDEA: Gandhi Nagar : MSCGNR1, MSCGNR2, MSSGN01, MSSGN02, MSSGN03, MSSGN04  
Surat: MSCSUR1  
Rajkot: MSCRAJ1, MSCRAJ2  
Ahmedabad: MSSAB01, MSSAB02, MSSAB03, GMSSAB01

VODAFONE: MSC1, MSC2, MSC3, MSC4, MSC5, MSC6, MSC7, MSC8, GMSC9, GMSC10, GCS01, GCS02, GCS03, GCS04, MSS01, MSS02, MSS03, MSS04, MSS05, MSS06, MSS07, MSS08, MSS09, MSS10 and MSS11.

BSNL : AHM\_MSC, RAJ\_MSC, SHAHI\_BAG\_MSC, SURAT\_MSC, GMSC10, GMSC9, GCS01, GCS02, MSS01, MSS02, MSS03, MSS04, MSS05, MSS06, MSS07, MSS09.

TTSL: Ahmedabad: MSC1, MSC2  
Baroda : Baroda MSC  
Surat : Surat MSC  
Rajkot : Rajkot MSC

RELAINCE: Ahmedabad: MSC1, MSC2  
Surat : MSC1, MSC2  
Rajkot : MSC1

**3. BROADBAND SERVICE:**

AIRTEL: Ahmedabad

SIFY: Ahmedabad Tears Towers

BSNL: Ahmedabad, Baroda, Surat, Bharuch, Mehsana, Palanpur, Rajkot and Jamnagar

RELIANCE: Ahmedabad

HATHWAY: Baroda, Surat

YOU TELECOM: Ahmedabad, Baroda & Surat

TATA COMM (VSNL): Ahmedabad

## ANNEXURE - II

### DRIVE TEST LOCATIONS

#### A. AHMEDABAD

Dense : Relief Road, Railway st, Prem darwaja

Medium Dense 1 : Maninagar, C G Road, SG Road

Low Dense: Naroda Industrial area, Naroda canal area

#### B. BARODA

Dense : Jublibagh, Raopura, Mangal bazaar, Salatwada, Mandavi, Nyaymandir etc

Medium Dense : H.T. road , Ellora park road, Race corse, Old padara road, Alkapuri

Low Dense : Makarpura, GIDC, Makarpura gam

#### C. SURAT

Dense : Varachha mini Bazaar, Railway st, Bombay Market road

Medium Dense 1 : Udhana Darwaja, Nausari bazaar, Harinagar, Ved darwaja, Singhanpur road

Low Dense : Jahangirpura, Gopinath society road, Palanpur patia, Navyug college