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Telecom Regulatory Authority of India
(IS/ISO 9001-2008 Certified Organisation)




# AUDIT & ASSESSMENT OF QUALITY OF SERVICE

## NORTH ZONE – RAJASTHAN CIRCLE

## WIRELINE & BROADBAND SERVICES (APRIL TO JUNE 2016)

**PREPARED BY:**

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# 1. INTRODUCTION

## 1.1. ABOUT TRAI

TRAI's mission is to create and nurture conditions for growth of telecommunications in the country in a manner and at a pace that will enable India to play a leading role in the emerging global information society. One of the main objectives of 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 been issuing regulations, order and directives to deal with the issues or complaints raised by the operators as well as the consumers. These regulations, order and directives have helped to nurture the growth of multi operator multi service - an open competitive Junket from a government owned monopoly. Also, 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.

TRAI initiated a regulation - The Standard of Quality of Service of Basic Telephone Service (Wireline) and Cellular Mobile Telephone Service regulations, 2009 (7 of 2009) dated June 20, 2009 and Quality of Service of Broadband Service Regulations, 2006 (11 of 2006) dated April 6, 2006 that provide the benchmarks for the parameters on customer perception of service to be achieved by service provider.

In order to assess the above regulations, TRAI has commissioned a third party agency to conduct the audit of the service providers and check the performance of the operators on the various benchmarks set by Telecom Regulatory Authority of India (TRAI).

## 1.2. ABOUT PHISTREAM CONSULTING PRIVATE LIMITED

Phistream Consulting Private Limited is an ISO: 9001 certified company who are one of the pioneers in the field of technical audit, quality assurance and third party inspection services. Established more than a decade ago in 2004, we aspire to provide longer term savings based on year-on-year productivity. With our size, we are nimble and aspire to being a full service partner for providing consultancy services.

We have been helping our clients by determining the best solutions and enabling businesses to enjoy the benefits of top-notch support without distracting their team from the main business focus. Our business analysts have enough experience to get involved at the requirements gather stage through consulting work handing off a detailed requirements document to our operations staff who in turn can train our support and maintenance resources for ongoing engagement.

In keeping with our goal of being a one stop quality assurance and consulting partner, our specialists employ a strategy and consulting-based implementation methodology and capitalize on strong program governance to offer a wide range of services for various industry verticals.

## 1.3. OBJECTIVES

The primary objective of the Audit module is to:

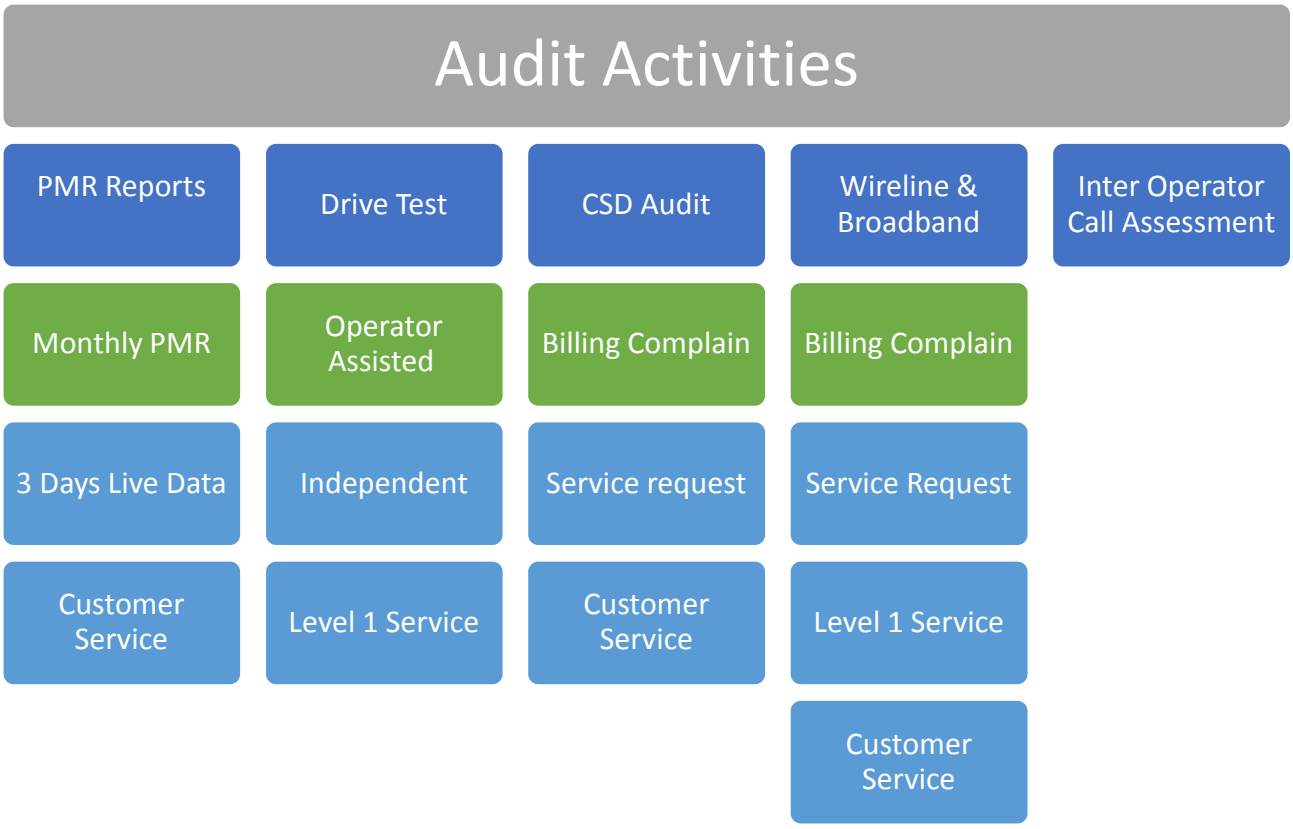
- Audit and Assess the Quality of Services being rendered by Basic Cellular Mobile (Wireless) service against the parameters notified by TRAI. (The parameters of Quality of Services (QoS) have been specified by in the respective regulations published by TRAI).

## 1.4. COVERAGE

The audit was conducted in Rajasthan Circle covering all SSAs (Secondary Switching Areas).


**Image Source: TTK Maps**

## 1.5. FRAMEWORK USED



## 2. BASIC TELEPHONE SERVICE (WIRELINE) AND BROADBAND SERVICES

### 2.1. WIRELINE SERVICE PARAMETER

| S. No. | Name of Parameter | Benchmark |
|---|---|---|
| 1 | Fault incidences (Fault incidences subscribers / month) | ≤ 7 |
| 2 | Fault repair by next working day | For urban areas:<br>By next working day: ≥85% and within 5 days: 100%.<br><br>For rural and hilly areas:<br>By next working day: ≥75% and within 7days: 100%.<br><br>Rent Rebate:<br>Faults pending for >3 days and ≤7 days: Rent rebate for 7 days.<br>Faults pending for >7 days and ≤15 days: Rent rebate for 15 days.<br>Faults pending for> 15 days: rent rebate for one month. |
| 3 | Mean Time To Repair (MTTR) | ≤ 10 Hrs |
| 4 | Point of Interconnection (POI) Congestion (on individual POI) | ≤ 0.5% |
| 5 | Metering and billing credibility – post paid | Not more than 0.1% of bills issued should be disputed over a billing cycle |
| 6 | Metering and billing credibility –- pre-paid | Not more than 1 complaint per 1000 customers, i.e. 0.1% complaints for metering, charging, credit, and validity |
| 7 | Resolution of billing / charging complaints | ≥ 98% within 4 weeks<br>100% within 6 weeks |
| 8 | Period of applying credit/ waiver/ adjustment to customer's account from the date of resolution of complaints | Within one week of resolution of complaint |
| 9 | Response Time to the customer for assistance | |
| | (a) Accessibility of call centre/ customer care | ≥ 95% |
| | (b)Percentage of calls answered by the operators (voice to voice) within 60 seconds | ≥ 95% |
| 10 | Termination/ closure of service | ≤ 7 |
| 11 | Time taken for refund of deposits after closures | 100% within 60 days. |

## 2.2. BROADBAND SERVICE PARAMETER

| S. No. | Name of Parameter | Benchmark |
|---|---|---|
| 1 | Service provisioning\ Activation | 100% cases in ≤ 15 working days (subject to technical feasibility). 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 ofRs.10/ per day, subject to a maximum of installation charge or equivalent usage allowance shall be given to the customer, at the time of issue of first bill. |
| 2 | Fault Repair\Restoration Time | By next working day: > 90% and within 3 working days: 99%<br><br>Rebate:<br>(a) Faults Pending for > 3 working days and < 7 working days: rebate equivalent to 7 days of minimum monthly charge or equivalent usage allowance<br>(b) Faults Pending for > 7 working days and < 15 working days: rebate equivalent to 15 days of minimum monthly charge or equivalent usage allowance<br>(c) Faults Pending for > 15 working to one month of minimum monthly usage allowance. |
| 3 | Billing Performance | |
| | • Billing complaints per 100 bills issued | <2% |
| | • %age of Billing Complaints Resolved | 100% within 4 weeks |
| | • Time taken for refund of deposits after closure | 100% within 60 days |
| 4 | Response time to the customer assistance | % age of calls answered by operator (Voice to Voice)<br>Within 60 seconds > 60%<br>Within 90 seconds > 80% |
| 5 | Bandwidth Utilization/ throughput | |
| | a) Bandwidth Utilization | |
| | i) POP to ISP Gateway Node (Intra – Network) Links. | <80% link(s)/route bandwidth utilization during peak hours (TCBH). |
| | ii) ISP Gateway Node to IGSP / NIXI upstream links for international connectivity. | |
| | b) Broadband connection speed (download). | Subscribed Broadband Connection Speed to be met >80% from ISP Node to User. |
| 6 | Service Availability / Uptime for all users | > 98% |
| 7 | Packet Loss (for wired broadband access) | <1% |
| 8 | Network Latency (for wired broadband access) | |
| | • User reference point at POP\ ISP gateway node to international gateway. | <120 msec |
| | • User reference point at ISP Gateway Node to international nearest NAP port abroad. | <350 msec |
| | • User reference point at ISP Gateway Node to international nearest NAP port abroad | <800 msec |

| | | |
|---|---|---|
| *9* | Customer perception of services | |
| *a* | % satisfied with the provision of services. | >90% |
| *b* | % satisfied with the billing performance. | >90% |
| *c* | % satisfied with help services | >90% |
| *d* | % satisfied with network performance, reliability and availability | >85% |
| *e* | % satisfied with maintainability | >85% |
| *f* | % satisfied with Overall customer satisfaction | >85% |
| *g* | % satisfied<br>Customer satisfaction with offered supplementary services such as allocation of static/fixed IP addresses, email-id's. | >85% |

## 3. EXECUTIVE SUMMARY : BASIC (WIRELINE)

The objective assessment of Quality of Service (QoS) carried out gives an insight into the overall performance of various wireline operators in the Rajasthan Circle, with a parameter wise performance evaluation as compared to TRAI benchmark.

### 3.1. BASIC (WIRELINE)

The QoS audit for basic (wire line) service was undertaken for assessment of quarterly performance of the service providers for quarter ended June-2016.

Sampling has been done for each service provider separately as per TRAI Guideline. In an LSA, sample has been included all POPs located in 10% of SDCAs in the LSA or 10 SDCAs, whichever is more, subject to maximum of the number of SDCAs covered by the service provider in the LSA. SDCAs selected should be evenly spread over the LSA and shall include major population centers. List and details of POPs shall be obtained from NOC/ISP Node of the operators. The performance of the Service providers against each parameter has been evaluated by taking average of performance value of each parameter for all the exchanges of the respective service providers. The averaged value of each parameter has been tabulated as follows.

| Sr. No | Service Provider | Circle | Audit Location | Total Exchange (Urban + Rural) | No. of Urban/Rural Exchanges Covered for audit | Total SDCA Covered for audit |
|---|---|---|---|---|---|---|
| 1 | BSNL | Rajasthan | Jaipur , Ajmer | 2183 | 112 | 26 |
| 2 | RCL | Rajasthan | DAKC Mumbai | 1 | 1 | 1 |
| 3 | AIRTEL | Rajasthan | Jaipur | 1 | 1 | 1 |
| 4 | TTSL | Rajasthan | Jaipur | 1 | 1 | 1 |
| 5 | MTS (SSTL) | Rajasthan | Jaipur | 1 | 1 | 1 |
| Total Exchanges at present | | | | 2187 | 116 | 30 |

## 3.2. SERVICE PROVIDER PERFORMANCE REPORT BASED ON QUARTERLY MEASUREMENT DATA VERIFICATION FOR BASIC TELEPHONE SERVICE (WIRELINE) PROVIDERS

| AVERAGED AUDITED DATA FOR WIRELINE (BASIC) SERVICES – RAJASTHAN CIRCLE | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Sl. No.** | **Parameters** | **Benchmark** | **Period** | **BSNL** | **RELIANCE** | **AIRTEL** | **TTSL** | **SISTEMA SHAYAM** |
| 1 | **Fault incidences** | | | | | | | |
| | (No. of faults/100 subscribers /month) | < 7% | *Quarterly* | **12.73%** | **0.04%** | **4.86%** | **0.50%** | **2.45%** |
| 2 | **Faults Repair/Restoration Time** | | | | | | | |
| | Fault repair by next working day(Urban Area) | >85% | *Quarterly* | **70.38%** | **100.00%** | **89.61%** | **100.00%** | **94.08%** |
| | % of fault repair within 5 days (Urban Area) | 100% | *Quarterly* | **96.00%** | **100.00%** | **100.00%** | **100.00%** | **100.00%** |
| | Fault repair by next working day(Rural & hilly Area) | >75% | *Quarterly* | **71.83%** | **DNA** | **DNA** | **DNA** | **96.84%** |
| | % of fault repair within 7 days(Rural & hilly Area) | 100% | *Quarterly* | **98.29%** | **DNA** | **DNA** | **DNA** | **100.00%** |
| | Mean time to Repair(MTTR) | ≤10 Hrs | *Quarterly* | **15.18** | **5.5** | **4.42** | **3.4** | **7.32** |
| 3 | **Rent Rebate** | | | | | | | |
| | Fault pending > 3 days & <7 days | Rebate for 7 days | *Quarterly* | 1 | 0 | 0 | 0 | 0 |
| | Fault Pending > 7 days & < 15 days | Rebate for 15 days | *Quarterly* | 2 | 0 | 0 | 0 | 0 |
| | Fault pending > 15 days | Rebate for 1 month | *Quarterly* | 3 | 0 | 0 | 0 | 0 |
| 4 | **Metering & Billing Performance** | | | | | | | |
| | % of disputed Bills over bills issued (Post Paid ) | < 0.1% | *Quarterly* | **0.00%** | **0.00%** | **0.02%** | **0.00%** | **0.06%** |
| | % of Pre-paid Charging Complaints | < 0.1% | *Quarterly* | **DNA** | **DNA** | **DNA** | **DNA** | **DNA** |
| | % of billing complaints resolved within 4 weeks | 98% within 4 weeks | *Quarterly* | **100.00%** | **100.00%** | **100.00%** | **100.00%** | **100.00%** |
| | % of billing complaints resolved within 6 weeks | 100% within 6 weeks | *Quarterly* | **100.00%** | **100.00%** | **100.00%** | **100.00%** | **100.00%** |
| | Period of all refunds/payments from the date of resolution of complaints within 1weeks | <=1 week | *Quarterly* | **100.00%** | **100.00%** | **100.00%** | **100.00%** | **100.00%** |
| 5 | **POI Congestion** | | | | | | | |
| | No. of POI's having congestion >0.5% | | *Quarterly* | 0 | 0 | 0 | 0 | 0 |
| 6 | **Response Time to customer for assistance** | | | | | | | |
| | Accessibility of Call centre/customer Care | >=95% | *Quarterly* | **99.42%** | **96.80%** | **100.00%** | **98.80%** | **98.40%** |
| | % age of calls answered by operator(voice to voice) within 90 seconds | >=95% | *Quarterly* | **99.94%** | **98.70%** | **94.46%** | **88.61%** | **96.50%** |
| 7 | **Customer care(promptness in attending to customers request)** | | | | | | | |
| | Termination / Closures | 100% | *Quarterly* | **98.86%** | **100.00%** | **100.00%** | **100.00%** | **100.00%** |
| | Time taken for refunds of deposit after closures | 100% | *Quarterly* | **100.00%** | **100.00%** | **100.00%** | **100.00%** | **100.00%** |

## 3.3. SERVICE PROVIDER PERFORMANCE REPORT BASED ON 3 DAYS LIVE MEASUREMENT DATA VERIFICATION FOR BASIC TELEPHONE SERVICE (WIRELINE) PROVIDERS

| 3 DAYS LIVE MEASUREMENT DATA FOR WIRELINE (BASIC) SERVICES - RAJASTHAN CIRCLE | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Sl No.** | **Parameters** | **Benchmark** | **Period** | **BSNL** | **RCL** | **AIRTEL** | **TTSL** | **SSTL** |
| 1 | **POI Congestion** | | | | | | | |
| | No. of POI's having congestion >0.5% | ≤0.5% | Quarterly | 0 | 0 | 0 | 0 | 0 |
| 2 | **Response Time to customer for assistance** | | | | | | | |
| | Accessibility of Call centre/customer Care | ≥95% | Quarterly | **99.47%** | **97.52%** | **100.00%** | **100.00%** | **100.00%** |
| | % age of calls answered by operator(voice to voice) within 90 seconds | ≥95% | Quarterly | **99.96%** | **98.86%** | **100.00%** | **100.00%** | **100.00%** |

## 3.4. KEY FINDINGS: BASIC TELEPHONE SERVICES (WIRELINE)

**Fault Incidences:** The audit of the service providers revealed that the performance of all service providers was well within the benchmark except **BSNL**. The performance of **BSNL** was **12.73%** for the parameter 'No. of faults/100 subscribers /month'.

**Fault Repair/Restoration Time:** For this parameter, **Only BSNL** failed to meet the benchmark of **fault repair by next working day (Urban Area)** with their performance as **70.38%.** Apart from this, **BSNL** also remained under performed as **96.00%** for parameters **Fault repair within 5 days (urban area), within next working day (rural and hilly areas) and within 7 days (rural & hilly areas)** with its performance as **71.83% and 98.29%** respectively.

**Mean Time to Repair:** Only **BSNL** could not achieve the benchmark with their achieved level as **15.18%** respectively.

**Metering and Billing performance:** For this parameter, all operators were meeting the benchmark.

**POI Congestion:** All operators were found meeting the benchmark for this parameter.

**Response Time to Customer for assistance:** All operators were found meeting the benchmark for this parameter except **Airtel** % age of calls answered by operator (voice to voice) within 90 seconds as **94.46%.**

**Termination/Closures**: All operators were found meeting the benchmark for this parameter except **BSNL**. **BSNL** could not meet the benchmark for the parameter with its performance as **98.86%** against the benchmark of 100%.

*Thus, from the above findings that, it was concluded that the performance of **BSNL** was not satisfactory in respect of the parameters **Fault incidences, Fault Repairs/Restoration Time, MTTR, Response time to customer for assistance and Termination/ Closure** . Hence, BSNL need to improve their services in respect of these parameters.*

## 3.5. INTER OPERATOR CALL ASSESSMENT (WIRELINE SERVICES)

Inter operator call assessment with a sample of 2x50 test calls for each Service provider operating in Rajasthan Circle service area during the time 1000 to 1300 Hrs and 1500 to 1700 was carried out by auditors. The test calls were made from one operator to another within the same licensed area to judge the ease of connectivity amongst the operators

| INTER OPERATOR CALL ASSESSMENT BASED ON LIVE MEASUREMENT | | | | | | | |
|---|---|---|---|---|---|---|---|
| Calling Operators | Circle Name | Total No. of calls Made | BSNL | RCL | Airtel | TTSL | SISTEMA SHYAN |
| **BSNL** | Rajasthan | 100 | -- | 100% | 100% | 100% | 100% |
| **RCL** | Rajasthan | 100 | 100% | -- | 100% | 100% | 100% |
| **AIRTEL** | Rajasthan | 100 | 100% | 100% | -- | 100% | 100% |
| **TTSL** | Rajasthan | 100 | 100% | 100% | 100% | -- | 100% |
| **SISTEM SHYAM** | Rajasthan | 100 | 100% | 100% | 100% | 100% | -- |

The result of the testing revealed that the inter connection performance among the operators was quite satisfactory. Thus there was no remarkable problem in interconnection from one operator to other operators.

## 3.6. LEVEL-1 LIVE CALLING (WIRELINE SERVICES)

| SR. N. | EMERGENCY NUMBER | CIRCLE | BSNL | Airtel | RCL | TTSL | SISTEMA SHYAM |
|---|---|---|---|---|---|---|---|
| **1** | 100 | RAJASTHAN | √ | √ | √ | √ | √ |
| **2** | 101 | RAJASTHAN | √ | √ | √ | √ | √ |
| **3** | 102 | RAJASTHAN | √ | √ | √ | √ | √ |
| **4** | 104 | RAJASTHAN | √ | √ | √ | √ | √ |
| **5** | 108 | RAJASTHAN | √ | √ | √ | √ | √ |
| **6** | 138 | RAJASTHAN | √ | √ | √ | √ | √ |
| **7** | 149 | RAJASTHAN | × | × | × | × | × |
| **8** | 181 | RAJASTHAN | √ | √ | √ | √ | √ |
| **9** | 182 | RAJASTHAN | √ | √ | √ | √ | √ |
| **10** | 1033 | RAJASTHAN | √ | √ | √ | √ | √ |
| **11** | 1037 | RAJASTHAN | × | × | × | × | × |
| **12** | 1056 | RAJASTHAN | × | × | × | × | × |
| **13** | 1060 | RAJASTHAN | × | × | × | × | × |
| **14** | 1063 | RAJASTHAN | × | × | × | × | × |
| **15** | 1064 | RAJASTHAN | × | × | × | × | × |
| **16** | 1070 | RAJASTHAN | × | × | × | × | × |
| **17** | 1071 | RAJASTHAN | × | × | × | × | × |
| **18** | 1072 | RAJASTHAN | √ | √ | √ | √ | √ |
| **19** | 1073 | RAJASTHAN | × | × | × | × | × |
| **20** | 1077 | RAJASTHAN | × | × | × | × | × |
| **21** | 1090 | RAJASTHAN | × | × | × | × | × |
| **22** | 1091 | RAJASTHAN | × | × | × | × | × |
| **23** | 1097 | RAJASTHAN | √ | √ | √ | √ | √ |
| **24** | 1099 | RAJASTHAN | × | × | × | × | × |
| **25** | 10580 | RAJASTHAN | × | × | × | × | × |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| **26** | 10589 | RAJASTHAN | × | × | × | × | × |
| **27** | 10740 | RAJASTHAN | × | × | × | × | × |
| **28** | 10741 | RAJASTHAN | × | × | × | × | × |
| **29** | 1511 | RAJASTHAN | × | × | × | × | × |
| **30** | 1512 | RAJASTHAN | × | × | × | × | × |
| **31** | 1514 | RAJASTHAN | × | × | × | × | × |
| **32** | 15100 | RAJASTHAN | √ | √ | √ | √ | √ |
| **33** | 155304 | RAJASTHAN | × | × | × | × | × |
| **34** | 155214 | RAJASTHAN | × | × | × | × | × |
| **35** | 1903 | RAJASTHAN | √ | √ | √ | √ | √ |
| **36** | 1909 | RAJASTHAN | √ | √ | √ | √ | √ |
| **37** | 1912 | RAJASTHAN | √ | √ | √ | √ | √ |
| **38** | 1916 | RAJASTHAN | × | × | × | × | × |
| **39** | 1950 | RAJASTHAN | √ | √ | √ | √ | √ |

To assess the availability and efficiency of level 1 service such as police, fire, ambulance (emergency services) offered by BSNL, Reliance and Systema Shyam, the calls were made from telephone provided by service providers, these services were found functional in the networks of all the service providers.

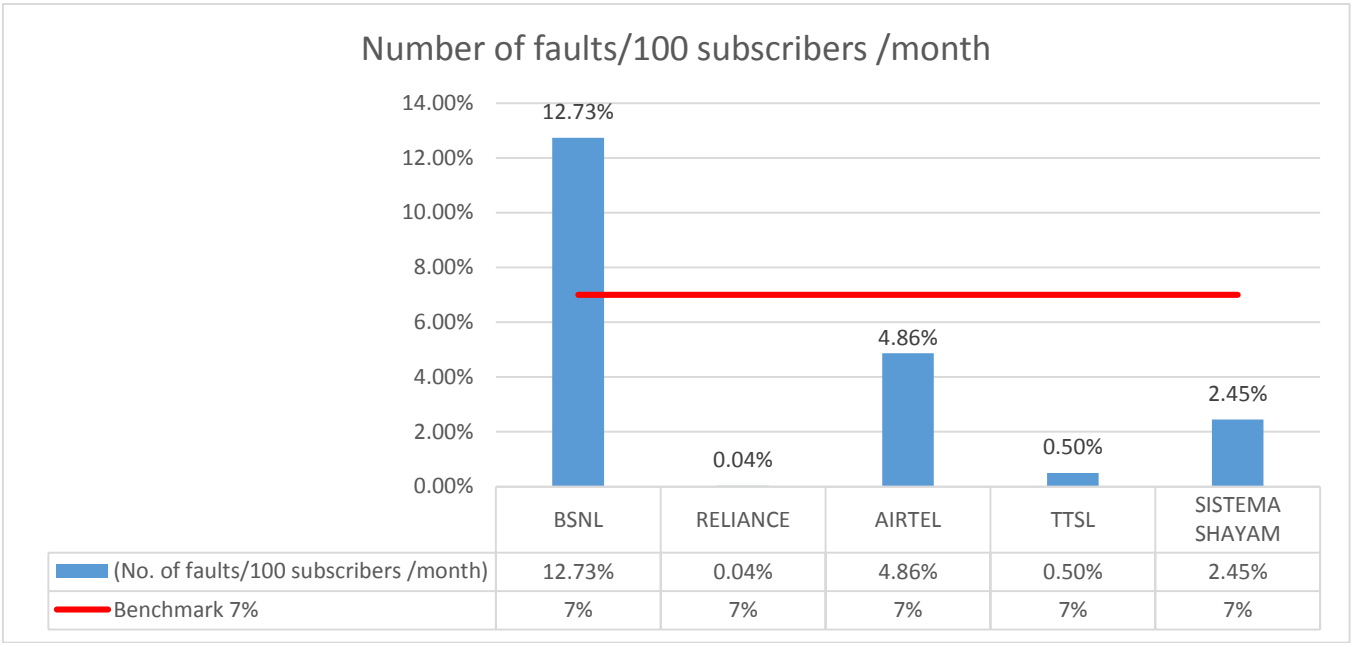
## 3.7. CUSTOMER CARE / HELPLINE ASSESSMENT (WIRELINE SERVICES)

**LIVE CALLING TO CALL CENTRE**

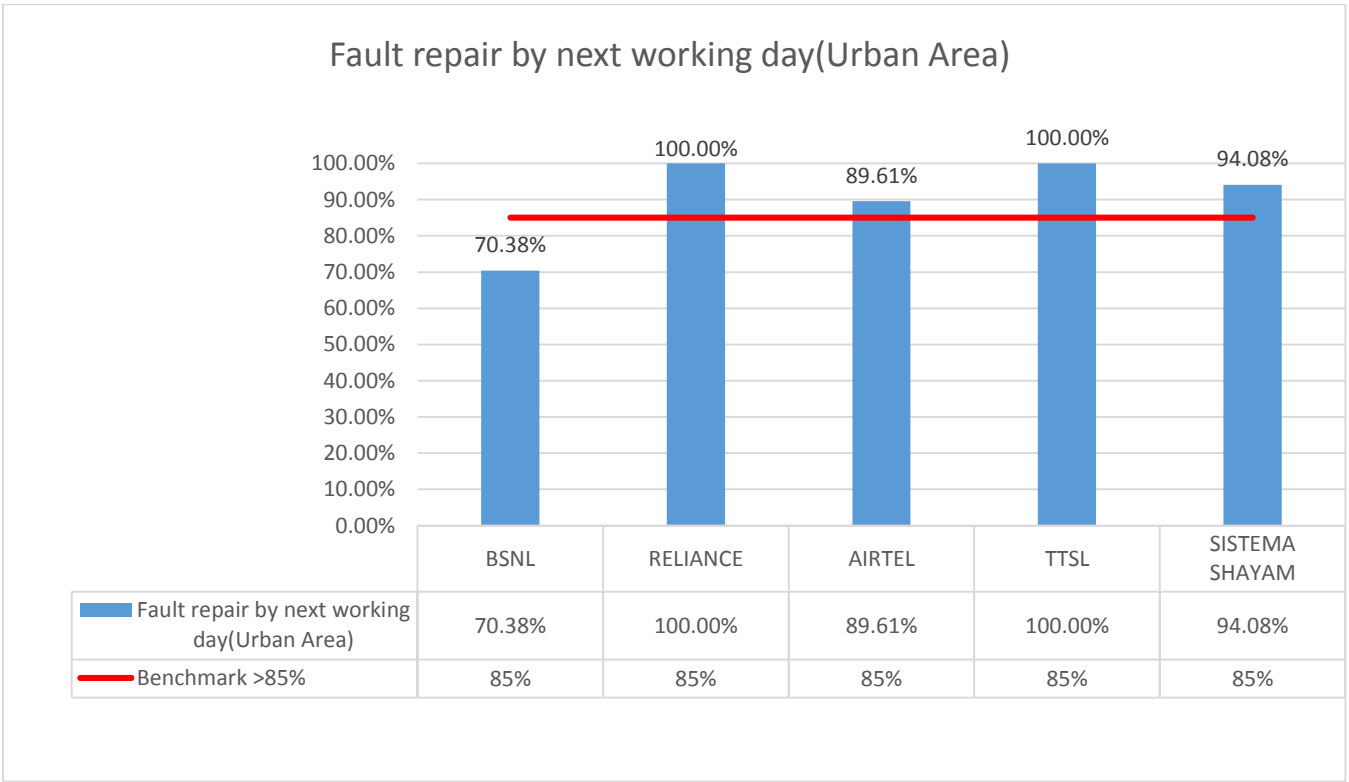
| | Benchmark | Circle | BSNL | RCL | AIRTEL | TTSL | SISTEMA SHYAM |
|---|---|---|---|---|---|---|---|
| ***Total No. of calls Attempted*** | | Rajasthan | 100 | 100 | 100 | 100 | 100 |
| **A) Total no of calls attempted to customer care/Call center** | | Rajasthan | 100 | 100 | 100 | 100 | 100 |
| **B) Total no. of calls successfully established to customer care/Call center** | | Rajasthan | 100 | 100 | 100 | 100 | 98 |
| **C) % Accessibility of Call centre /customer Care (Total call attempt*100/ Total call successfully established)** | *>=95%* | Rajasthan | **100.00%** | **100.00%** | **100.00%** | **100.00%** | **98.00%** |
| **D) Total Calls reached to agent desk for Voice to Voice (Total call attempt)** | | Rajasthan | 100 | 100 | 100 | 100 | 98 |
| **E) Total number of calls answered by the operator (Voice to voice) within 90 seconds** | | Rajasthan | 100 | 100 | 100 | 100 | 98 |
| **F) % age of calls answered by the operators (voice to voice) within 90 seconds (E *100/ D)** | *>=95%* | Rajasthan | **100.00%** | **100.00%** | **100.00%** | **100.00%** | **100.00%** |

In case of calls answered by operators (voice to voice), when test calls were made to the call centers, all service providers, 100% calls were connected to the call center within 90 seconds.

## 3.8. GRAPHICAL REPRESENTATION

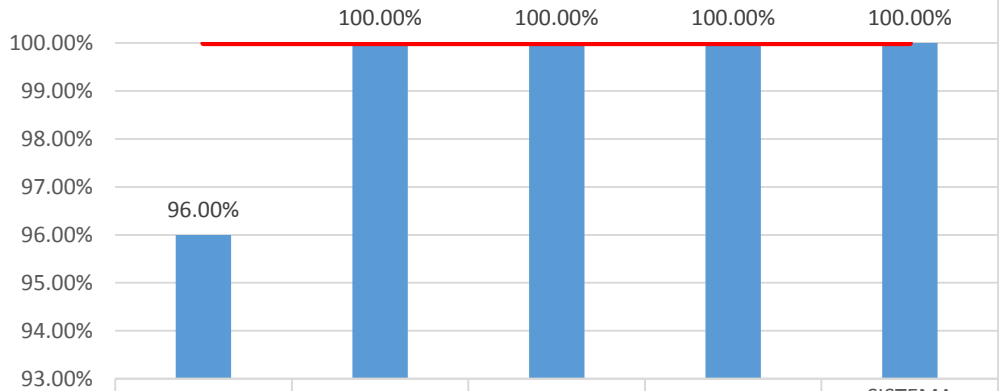



| | BSNL | RELIANCE | AIRTEL | TTSL | SISTEMA SHAYAM |
|---|---|---|---|---|---|
| (No. of faults/100 subscribers /month) | 12.73% | 0.04% | 4.86% | 0.50% | 2.45% |
| Benchmark 7% | 7% | 7% | 7% | 7% | 7% |



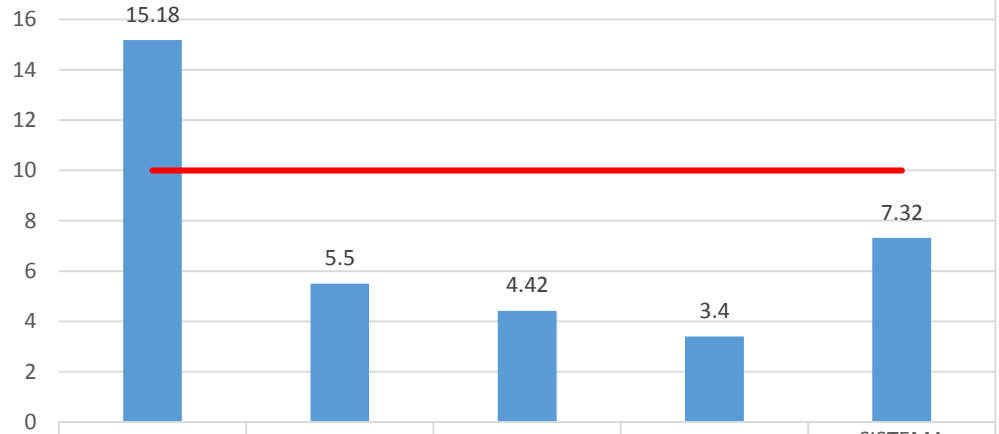

| | BSNL | RELIANCE | AIRTEL | TTSL | SISTEMA SHAYAM |
|---|---|---|---|---|---|
| Fault repair by next working day(Urban Area) | 70.38% | 100.00% | 89.61% | 100.00% | 94.08% |
| Benchmark >85% | 85% | 85% | 85% | 85% | 85% |

## Percentage of fault repair within 5 days (Urban Area)

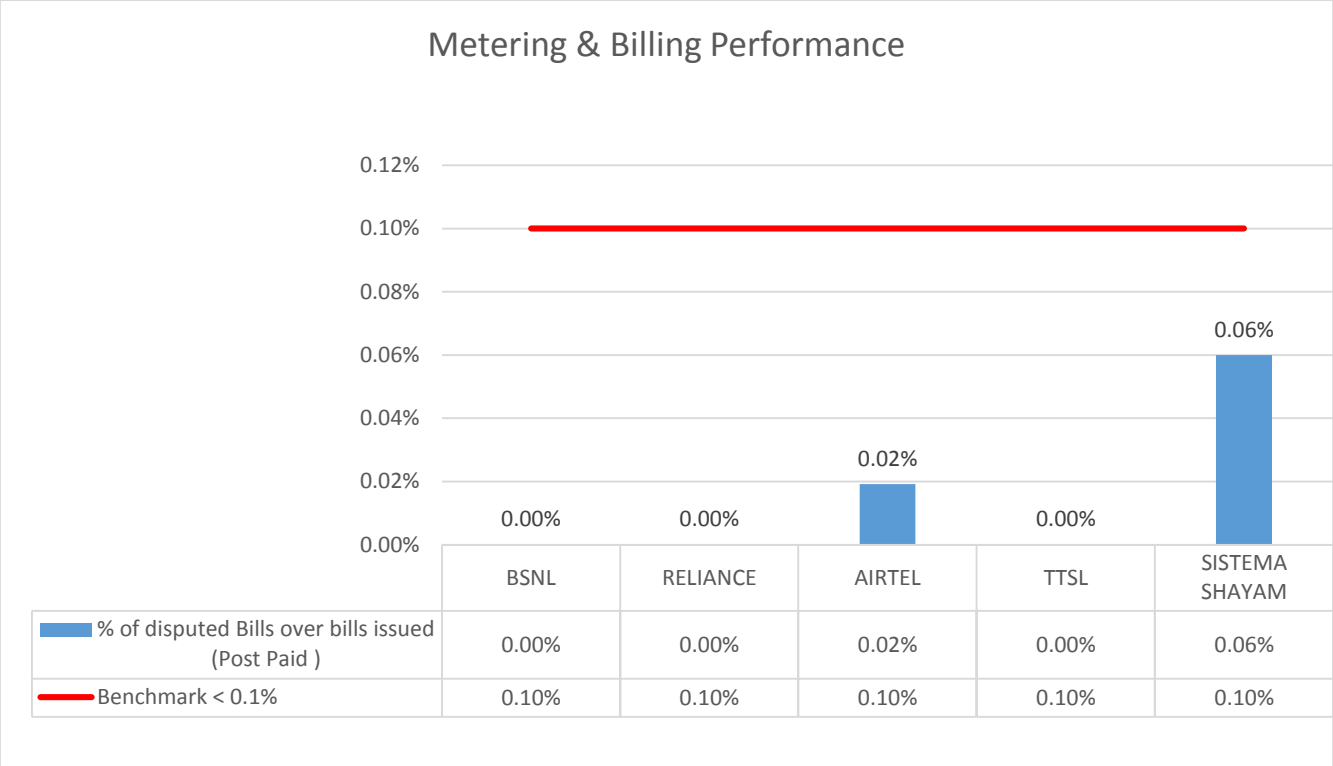



| | BSNL | RELIANCE | AIRTEL | TTSL | SISTEMA SHAYAM |
|---|---|---|---|---|---|
| % of fault repair within 5 days (Urban Area) | 96.00% | 100.00% | 100.00% | 100.00% | 100.00% |
| Benchmark 100% | 100% | 100% | 100% | 100% | 100% |

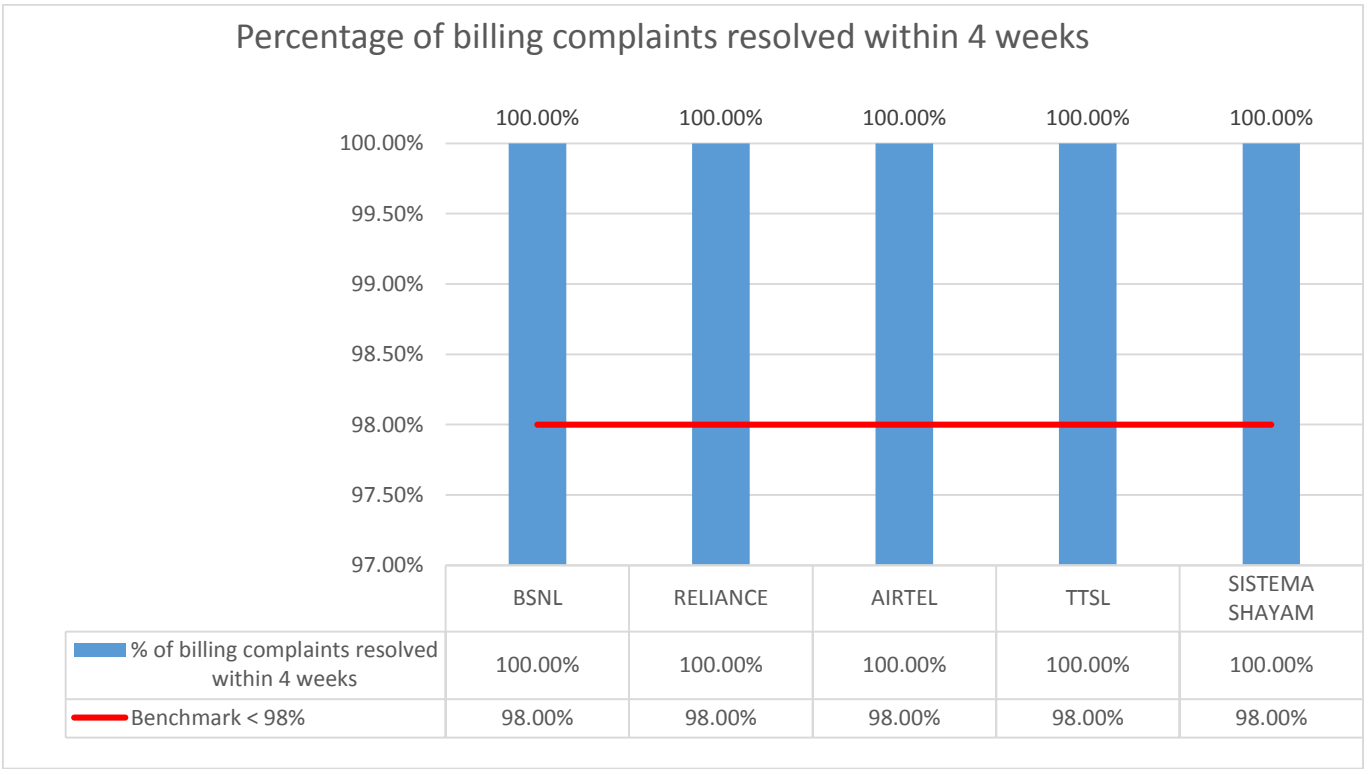
## Mean time to Repair(MTTR)




| | BSNL | RELIANCE | AIRTEL | TTSL | SISTEMA SHAYAM |
|---|---|---|---|---|---|
| Mean time to Repair(MTTR) | 15.18 | 5.5 | 4.42 | 3.4 | 7.32 |
| Benchmark ≤10 Hrs | 10 | 10 | 10 | 10 | 10 |

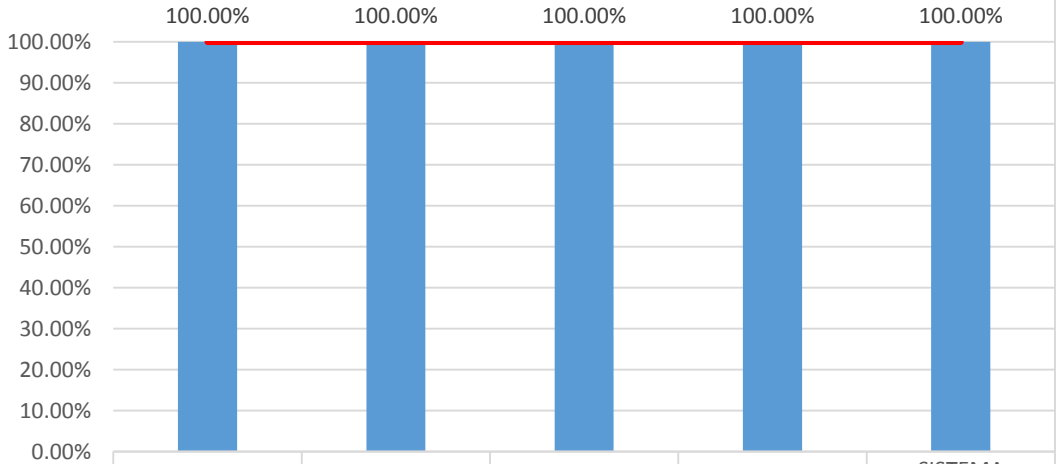



| | BSNL | RELIANCE | AIRTEL | TTSL | SISTEMA SHAYAM |
|---|---|---|---|---|---|
| % of disputed Bills over bills issued (Post Paid ) | 0.00% | 0.00% | 0.02% | 0.00% | 0.06% |
| Benchmark < 0.1% | 0.10% | 0.10% | 0.10% | 0.10% | 0.10% |



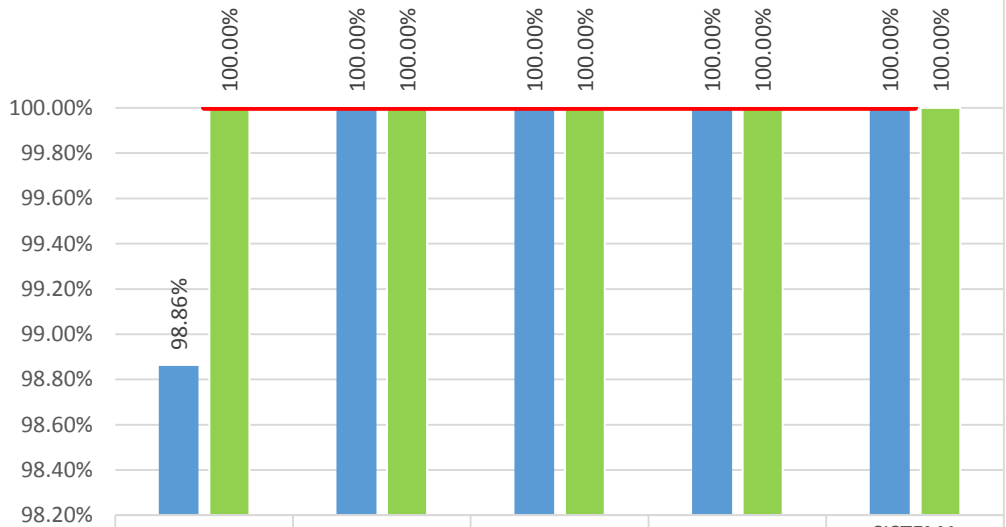

| | BSNL | RELIANCE | AIRTEL | TTSL | SISTEMA SHAYAM |
|---|---|---|---|---|---|
| % of billing complaints resolved within 4 weeks | 100.00% | 100.00% | 100.00% | 100.00% | 100.00% |
| Benchmark < 98% | 98.00% | 98.00% | 98.00% | 98.00% | 98.00% |

## Percentage of billing complaints resolved within 6 weeks



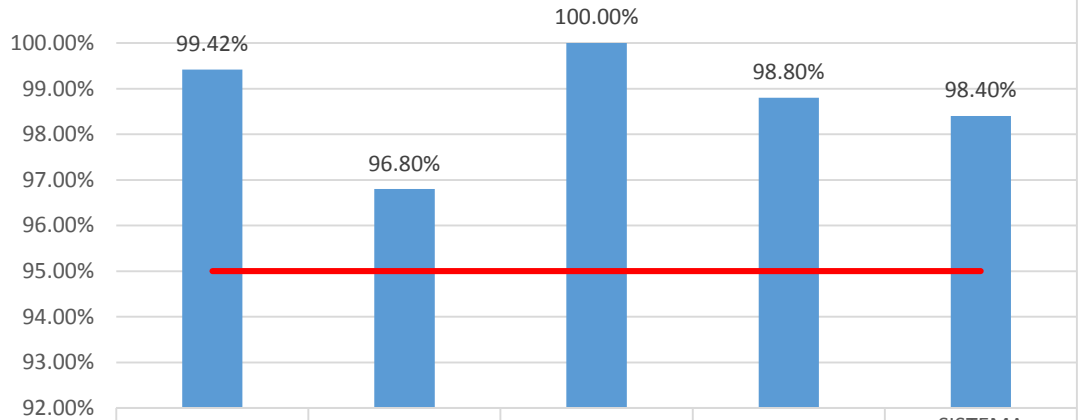

| | BSNL | RELIANCE | AIRTEL | TTSL | SISTEMA SHAYAM |
|---|---|---|---|---|---|
| % of billing complaints resolved within 6 weeks | 100.00% | 100.00% | 100.00% | 100.00% | 100.00% |
| Benchmark < 100% | 100.00% | 100.00% | 100.00% | 100.00% | 100.00% |

## Customer care(promptness in attending to customers request)



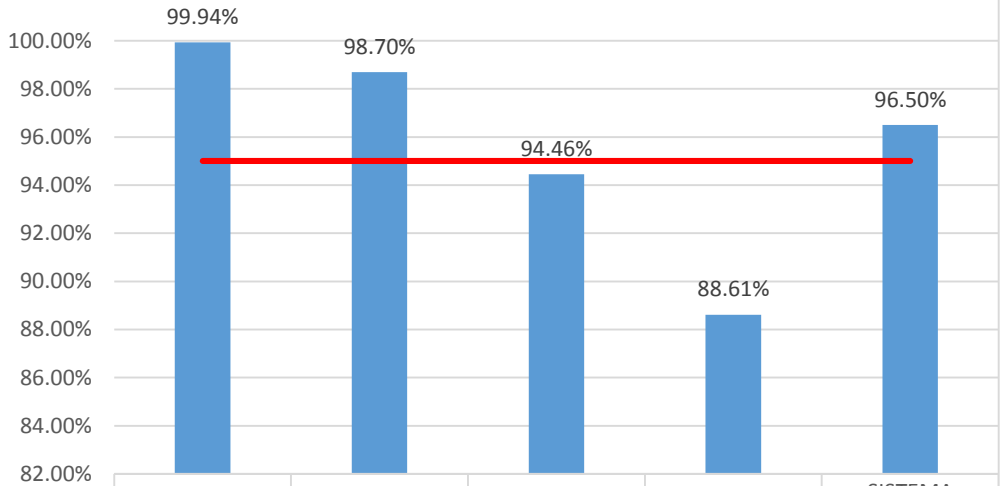

| | BSNL | RELIANCE | AIRTEL | TTSL | SISTEMA SHAYAM |
|---|---|---|---|---|---|
| Termination / Closures | 98.86% | 100.00% | 100.00% | 100.00% | 100.00% |
| Time taken for refunds of deposit after closures | 100.00% | 100.00% | 100.00% | 100.00% | 100.00% |
| Benchmark < 100% | 100.00% | 100.00% | 100.00% | 100.00% | 100.00% |

## Accessibility of Call centre/customer Care




| | BSNL | RELIANCE | AIRTEL | TTSL | SISTEMA SHAYAM |
|---|---|---|---|---|---|
| Accessibility of Call centre/customer Care | 99.42% | 96.80% | 100.00% | 98.80% | 98.40% |
| Benchmark >=95% | 95.00% | 95.00% | 95.00% | 95.00% | 95.00% |

## Percentage of calls answered by operator(voice to voice) within 90 seconds




| | BSNL | RELIANCE | AIRTEL | TTSL | SISTEMA SHAYAM |
|---|---|---|---|---|---|
| % age of calls answered by operator(voice to voice) within 90 seconds | 99.94% | 98.70% | 94.46% | 88.61% | 96.50% |
| Benchmark >=95% | 95.00% | 95.00% | 95.00% | 95.00% | 95.00% |

# 4. EXECUTIVE SUMMARY : BROADBAND

The objective assessment of Quality of Service (QoS) carried out gives an insight into the overall performance of various broadband operators in the Rajasthan Circle, with a parameter wise performance evaluation as compared to TRAI benchmark.

## 4.1. QUALITY OF SERVICE AUDIT OF BROADBAND SERVICE PROVIDERS

Phistream has to conduct the audit and assessment of Quality of Service of Broadband Service only in respect of the service providers who are having broadband subscriber base of more than 10,000 subscribers in their licensed service area as per TRAI guideline; Sampling shall be done for each service provider separately. In an LSA, sample shall include all POPs located in 10% of SDCAs in the LSA or 10 SDCAs, whichever is more, subject to maximum of the number of SDCAs covered by the service provider in the LSA. SDCAs selected should be evenly spread over the LSA and shall include major population centers. List and details of POPs shall be obtained from NOC/ISP Node of the operators. A service areal circle in the contracted Zone shall be audited only once in a year.

Discussion with the private broadband service providers reveals that there is no concept of their POPs on SDCA basis; they are maintaining their entire data on centralized basis so audit has been done for the centralized data.

Audit was done for the following Broadband service Providers in Rajasthan circle.

| Sl. No. | Name of Broadband Service Providers | Location of Audit |
|---|---|---|
| 1 | **BSNL** | BSNL OFFICE - BHILWARA, CHITTORGARH, UDAIPUR |
| 2 | **D-VOIS BROADBAND** | D-VOIS BROADBAND, JAIPUR |
| 3 | **FIVE-NETWORKS** | FIVE NETWORK PVT LTD, SADULSAHAR, RAJASTHAN |
| 4 | **BROADBAND PACENET INDIA PVT. LTD** | BROADBAND PACENET INDIA PRIVATE LIMITED, JAIPUR |
| 5 | **RELIANCE COMMUNICATION LIMITED (RCL)** | RELIANCE COMMUNICATION LIMITED, DAKC, MUMBAI |
| 6 | **DEN Network Limited** | Okhla, Phase III, New Delhi |
| 7 | **Airtel** | Bharti Hexacom Limited,Jaipur |
| 8 | **TTSL** | TTSL Jaipur |
| 9 | **TIKONA** | TIKONA DIGITAL NETWORKS PVT LTD, JAIPUR |

## 4.2. SERVICE PROVIDER PERFORMANCE REPORT BASED ON QUARTERLY MEASUREMENT DATA VERIFICATION FOR BROADBAND SERVICE PROVIDERS

AVERAGED QUARTERLY (APR TO JUN-16) AUDIT DATA FOR BROADBAND SERVICES

| Broadband Audit Data | | Benchmark | Circle DNAme | BSNL | D-VOIS | FIVE NETWORK | PACENET | RCL | DEN Network Limited | AIRTEL | TTSL | TIKODNA |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| S/N | DNAme of Parameter | | | | | | | | | | | |
| 1 | Service Provisioning/Activation Time | | | | | | | | | | | |
| | A) No of connections registered during the period | | Raj | 753 | 12 | 4 | 13 | 297 | 298 | 2813 | 849 | 451 |
| | B) Total number of connections provided within 15 days of registration on demand during the period | | Raj | 736 | 12 | 4 | 13 | 297 | 298 | 2813 | 722 | 451 |
| | C) % age of connections provided within 15 days of registration on demand (subject to technical feasibility) | <15 days | Raj | 97.74% | 100% | 100% | 100.00% | 100.00% | 100% | 100.00% | 85.00% | 100% |
| | D)Total number of connections provided after 15 days of registration on demand | | Raj | 17 | 0 | 0 | 0 | 0 | 0 | 0 | 849 | 0 |
| | E) %age of connections provided after 15 days of registration on demand | | Raj | 2.23% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 100.00% | 0.00% |
| | F) In all cases where payment towards installation charge & SD is taken and the Broadband connection is not provided within 15 working days | credit @ Rs.10/ per day. | Raj | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2 | Fault Repair/Restoration Time | | | | | | | | | | | |
| | A) Total number of faults registered during the period | | Raj | 8383 | 5122 | 99 | 26 | 366 | 454 | 3000 | 102 | 1317 |
| | B) Total number of faults repaired by next working day | | Raj | 6444 | 5054 | 99 | 26 | 366 | 354 | 2722 | 94 | 1192 |
| | C) % age of faults repaired by next working day | >90% | Raj | 76.87% | 98.67% | 100.00% | 100.00% | 100.00% | 77.97% | 90.73% | 92.16% | 90.51% |
| | D) Total number of faults repaired within three working days | | Raj | 8318 | 5122 | 99 | 26 | 366 | 445 | 2999 | 94 | 1311 |
| | E)% age of faults repaired within three working days | ≥99% | Raj | 99.22% | 100.00% | 100.00% | 100.00% | 100.00% | 98.02% | 99.97% | 100.00% | 99.54% |
| 3 | Rent Rebate | | | | | | | | | | | |
| | A) Faults Pending for > 3 working days and < 7 | | Raj | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 26 |

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | working days: (Rebate equivalent to 7 days of minimum monthly charge or equivalent usage allowance) | | | | | | | | | | | |
| | B) Faults Pending for > 7 working days and < 15 working days: (Rebate equivalent to 15 days of minimum monthly charge or equivalent usage allowance) | | Raj | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 22 |
| | C) Faults Pending for > 15 working days:(Rebate equivalent to one month of minimum monthly charge or equivalent usage allowance) | | Raj | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 9 |
| 4 | Billing Performance | | | | | | | | | | | |
| | A) Total bills generated during period | | Raj | DNA | 0 | 0 | 265 | 27544 | 0 | 140517 | 14000 | 4702 |
| | B) Total complaints received from customers/ Bills disputed | | Raj | DNA | 0 | 0 | 0 | 39 | 0 | 27 | 40 | 27 |
| | C) Billing complaints per 100 bills issued | <2% | Raj | DNA | 0.00% | 0.00% | 0.00% | 0.14% | 0.00% | 0.02% | 0.29% | 0.57% |
| | D) Total number of complaints resolved in 4 weeks from date of receipt | | Raj | DNA | 0 | 0 | 0 | 39 | 0 | 27 | 40 | 27 |
| | E) %age billing complaints resolved in 4 weeks | 100% | Raj | DNA | 100.00% | 100.00% | 100.00% | 100.00% | 100.00% | 100.00% | 100.00% | 100.00% |
| | F) Total number of cases requiring refund of deposits after closure | | Raj | DNA | 0 | 0 | 0 | 5 | 0 | 47 | 1 | 2 |
| | G) Total number of cases where refund was made in <60 days | | Raj | DNA | 0 | 0 | 0 | 5 | 0 | 47 | 1 | 2 |
| | H) Percentage cases in which refund received within 60 days | 100% | Raj | DNA | 100.00% | 100.00% | 100.00% | 100.00% | 100.00% | 100.00% | 100.00% | 100.00% |
| 5 | Response time to the customer for assistance % age of calls answered by operator (Voice to Voice) | | | | | | | | | | | |
| | A) Total number of calls received by the operator | | Raj | 122982 | 0 | 0 | 8 | 98281 | 298150 | 40033 | 4003 | 11439 |
| | B) Total number of calls answered by the operator within 60 seconds | | Raj | 122777 | 0 | 0 | 8 | 93118 | 217020 | 31634 | 3636 | 7114 |
| | C) % age calls answered by the operator in 60 seconds | >60% | Raj | 99.83% | 100.00% | 100.00% | 100.00% | 94.75% | 72.79% | 79.02% | 90.84% | 62.19% |
| | D) Total number of calls answered by the operator within 90 seconds | | Raj | 122915 | 0 | 0 | 8 | 93864 | 231983 | 33561 | 3774 | 9371 |
| | E) % age calls answered by the operator within 90 seconds | >80% | Raj | 99.95% | 100.00% | 100.00% | 100.00% | 95.51% | 80.42% | 83.83% | 94.27% | 81.92% |
| 6 | 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). | | | | | | | | | | | |

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 6.1 | POP to ISP Gateway Node [Intra-network] Link(s) | | | | | | | | | | | |
| | A) Total Bandwidth Available at the link for the period days | | Raj | DNA | 1065 | 90 | 240 | 3000 | 465 | 30101 | 1070 | 1275 |
| | B) Total Bandwidth utilized during the period during TCBH (In Mpbs) | | Raj | DNA | 575 | 44.57 | 190 | 1429 | 375 | 12490 | 580 | 979.66 |
| | C) % age Bandwidth utilized during the period | <80% | Raj | DNA | 53.99% | 49.52% | 79.17% | 47.63% | 80.65% | 41.49% | 54.21% | 76.84% |
| 6.2 | A) ISP Gateway Node to IGSP / NIXI Node upstream Link(s) for International connectivity | | | | | | | | | | | |
| | A) Total number of upstream links for Inter International connectivity | | Raj | DNA | 2 | DNA | DNA | 12 | 1 | DNA | 8 | 3 |
| | B) Number of Links having Bandwidth utilization > 90% during TCBH | | Raj | DNA | 0 | DNA | DNA | 0 | 0 | DNA | 0 | 0 |
| | C) Total Internationall bandwidth available from ISP Node to IGSP/NIXI/DNAP | | Raj | DNA | 355 | DNA | DNA | 348000 | 465 | DNA | 11600 | 1255 |
| | D) Total International bandwidth utilization during peak hours (TCBH) in Mpbs | | Raj | DNA | 192 | DNA | DNA | 142714 | 370 | DNA | 5200 | 944.9 |
| | E) %age International Bandwidth utilization during peak hours (TCBH) | <80% | Raj | DNA | 54.08% | DNA | DNA | 41.01% | 79.57% | DNA | 44.83% | 75.29% |
| 6.3 | Broadband Connection Speed (download) - from ISP Node to User | | | | | | | | | | | |
| | A) Total committed download speed to the sample subscribers (In mpbs) | | Raj | DNA | 3 | 4 | 16 | 1.536 | 15 | 6 | 4 | 12288 |
| | B) Total average download speed observed for the sample subscribers during TCBH (In Mpbs) | | Raj | DNA | 2.88 | 3.63 | 15.4 | 1.343 | 15 | 6 | 3.63 | 10919 |
| | C) % age subscribed speed available to the subscriber during TCBH | >80% | Raj | DNA | 96.00% | 90.75% | 96.25% | 87.43% | 100.00% | 100.00% | 90.75% | 88.86% |
| 7 | Service Availability/Uptime | | | | | | | | | | | |
| | A) Total operational Hours | | Raj | DNA | 2304 | 2184 | 2184 | 2184 | 2184 | 19,085,040 | 2184 | 2184 |
| | B) Total downtime (In hours) | | Raj | DNA | 0 | 0 | 7.76 | 12.12 | 0 | 9,787 | 23.59 | 1.98 |
| | C) Total time when the service was available (In Hrs) | | Raj | DNA | 2304 | 2184 | 2176.24 | 2171.88 | 2184 | 19,075,253 | 2160.41 | 2182.02 |
| | D) % age of Service availability uptime | >98% | Raj | DNA | 100.00% | 100.00% | 99.64% | 99.45% | 100.00% | 99.95% | 98.92% | 99.91% |
| 8 | Packet Loss | | | | | | | | | | | |
| | A) Total number of ping packets transmitted | | Raj | DNA | 3000 | 91000 | 3000 | 91000 | 3000 | 3000 | 3000 | 3000 |
| | B) Total number of ping packets lost | | Raj | DNA | 0 | 17 | 1 | 438 | 0 | 0 | 0 | 0 |

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | C) % age packet loss | <1% | Raj | DNA | 0.00% | 0.02% | 0.03% | 0.48% | 0.00% | 0.00% | 0.00% | 0.00% |
| 9 | Network latency (for wired broadband access) | | | | | | | | | | | |
| 9.1 | Network Latency from User reference point at POP/ISP Node to IGSP/NIXI gateway | | | | | | | | | | | |
| | A) Total number of ping packets transmitted | | Raj | DNA | 3000 | 91000 | 3000 | 3000 | 3000 | 3000 | 3000 | 3000 |
| | B) Total round trip time for all the ping packets transmitted during the period | | Raj | DNA | 258 | 5228000 | 152 | 3 | 165 | 109.83 | 110 | 257 |
| | C) Average round trip tip time for all the ping transmitted | <120 ms | Raj | DNA | 86 | 57.45 | 44 | 1.67 | 55 | 36.61 | 36 | 87 |
| 9.2 | Network Latency from User reference point at ISP Node to nearest NAP Port abroad (Terrestrial) | | | | | | | | | | | |
| | A) Total number of ping packets transmitted | | Raj | DNA | 3000 | 91000 | 3000 | 3000 | 3000 | 3000 | 3000 | 3000 |
| | B) Total round trip time for all the ping packets transmitted during the period | | Raj | DNA | 600 | 18728000 | 1161 | 72 | 798 | 246 | 799 | 71 |
| | C) Average round trip tip time for all the ping transmitted | <350 ms | Raj | DNA | 200 | 205.8 | 294 | 24 | 266 | 82 | 265 | 25 |
| 9.3 | Network Latency from User reference point at ISP Node to nearest NAP Port abroad (Satellite) | | | | | | | | | | | |
| | A) Total number of ping packets transmitted | | Raj | DNA | DNA | DNA | DNA | DNA | DNA | DNA | DNA | DNA |
| | B) Total round trip time for all the ping packets transmitted during the period | | Raj | DNA | DNA | DNA | DNA | DNA | DNA | DNA | DNA | DNA |
| | C) Average round trip tip time for all the ping transmitted | <800 ms | Raj | DNA | DNA | DNA | DNA | DNA | DNA | DNA | DNA | DNA |

## 4.3. SERVICE PROVIDER PERFORMANCE REPORT BASED ON 3 DAYS MEASUREMENT DATA VERIFICATION FOR BROADBAND SERVICE PROVIDERS

**3 DAYS LIVE DATA FOR BROADBAND SERVICES**

| 3 days live Broadband Audit Data | | Bench-mark | Circle DNAme | BSNL | D-VOIS | FIVE NETWORK | PACENET | RCL | DEN Network Limited | AIRTEL | TTSL | TIKODNA |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| S/N | Name of Parameter | | | | | | | | | | | |
| 1 | **Response time to the customer for assistance % age of calls answered by operator (Voice to Voice)** | | | | | | | | | | | |
| | A) Total number of calls received by the operator | | Raj | 4751 | 5 | 2 | 0 | 3674 | 9390 | 4673 | 5761 | 369 |
| | B) Total number of calls answered by the operator within 60 seconds | | Raj | 4750 | 5 | 2 | 0 | 3593 | 8967 | 4592 | 5760 | 245 |
| | C) % age calls answered by the operator in 60 seconds | >60% | Raj | 99.98% | 100.00% | 100.00% | 100.00% | 97.80% | 95.50% | 98.27% | 99.98% | 66.40% |
| | D) Total number of calls answered by the operator within 90 seconds | | Raj | 4750 | 5 | 2 | 0 | 3629 | 9118 | 4500 | 5759 | 307 |
| | E) % age calls answered by the operator within 90 seconds | >80% | Raj | 100.00% | 100.00% | 100.00% | 100.00% | 98.78% | 97.10% | 96.30% | 99.98% | 83.20% |
| 2 | **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).** | | | | | | | | | | | |

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2.1 | **POP to ISP Gateway Node [Intra-network] Link(s)** | | | | | | | | | | | |
| | A) Total Bandwidth Available at the link for the period days | | Raj | DNA | 1065 | 30 | 240 | 3000 | 465 | 30101 | 1070 | 425 |
| | B) Total Bandwidth utilized during the period during TCBH (In Mpbs) | | Raj | DNA | 94 | 16.47 | 190 | 1274.9 | 395 | 8630 | 340 | 326.5 |
| | C) % age Bandwidth utilized during the period | <80% | Raj | DNA | 8.83% | 54.90% | 79.17% | 42.50% | 84.95% | 28.67% | 31.78% | 76.82% |
| 2.2 | **A) ISP Gateway Node to IGSP / NIXI Node upstream Link(s) for International connectivity** | | | | | | | | | | | |
| | A) Total number of upstream links for InterDNAtioDNAI connectivity | | Raj | DNA | 2 | DNA | DNA | 12 | 1 | DNA | 8 | 3 |
| | B) Number of Links having Bandwidth utilization > 90% during TCBH | | Raj | DNA | 0 | DNA | DNA | 0 | 0 | DNA | 0 | 0 |
| | C) Total International bandwidth available from ISP Node to IGSP/NIXI/DNAP | | Raj | DNA | 355 | DNA | DNA | 348000 | 465 | DNA | 11200 | 485 |
| | D) Total interDNAtioDNAI bandwidth utilization during peak hours (TCBH) in Mpbs | | Raj | DNA | 32 | DNA | DNA | 176971 | 395 | DNA | 4400 | 348 |
| | E) %age International Bandwidth utilization during peak hours (TCBH) | <80% | Raj | DNA | 9.01% | DNA | DNA | 50.85% | 84.95% | DNA | 39.29% | 71.51% |
| 2.3 | Broadband Connection Speed (download) - from ISP Node to User | | | | | | | | | | | |
| | A) Total committed download speed to the sample subscribers (In mpbs) | | Raj | DNA | 3 | DNA | 5 | 3 | 15 | 6 | 4 | 4 |
| | B) Total average download speed observed for the sample subscribers during TCBH (In Mpbs) | | Raj | DNA | 3 | DNA | 4.82 | 2.81 | 14.91 | 6 | 3.9 | 3.97 |
| | C) % age subscribed speed available to the subscriber during TCBH | >80% | Raj | DNA | 100.00% | DNA | 96.40% | 93.67% | 99.40% | 100.00% | 90.75% | 99.25% |
| 3 | **Packet Loss** | | | | | | | | | | | |
| | A) Total number of ping packets transmitted | | Raj | DNA | 3000 | 3000 | 3000 | 1000 | 3000 | 3000 | 3000 | 3000 |
| | B) Total number of ping packets lost | | Raj | DNA | 5 | 1 | 6 | 0 | 0 | 0 | 0 | 0 |
| | C) % age packet loss | <1% | Raj | DNA | 0.17% | 0.03% | 0.20% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% |
| 4 | **Network latency (for wired broadband access)** | | | | | | | | | | | |
| 4.1 | Network Latency from User reference point at POP/ISP Node to IGSP/NIXI gateway | | | | | | | | | | | |
| | A) Total number of ping packets transmitted | | Raj | DNA | 3000 | 3000 | 3000 | 3000 | 3000 | 3000 | 3000 | DNA |
| | B) Total round trip time for all the ping packets transmitted during the period | | Raj | DNA | 243 | 161000 | 46 | 5.45 | 211 | 109.83 | 99 | DNA |
| | C) Average round trip tip time for all the ping transmitted | <120 ms | Raj | DNA | 81 | 53.66 | 15.33 | 1.82 | 70 | 36.61 | 33 | DNA |
| 4.2 | Network Latency from User reference point at ISP Node to nearest NAP Port abroad (Terrestrial) | | | | | | | | | | | |
| | A) Total number of ping packets transmitted | | Raj | DNA | 3000 | 3000 | 3000 | 3000 | 3000 | 3000 | 3000 | DNA |
| | B) Total round trip time for all the ping packets transmitted during the period | | Raj | DNA | 558 | 193000 | 395 | 5.43 | 216 | 246 | 88 | DNA |
| | C) Average round trip tip time for all the ping transmitted | <350 ms | Raj | DNA | 186 | 202.66 | 131.66 | 3.67 | 72.00 | 82 | 29 | DNA |
| 4.3 | Network Latency from User reference point at ISP Node to nearest NAP Port abroad (Satellite) | | | | | | | | | | | |
| | A) Total number of ping packets transmitted | | Raj | DNA | DNA | DNA | DNA | DNA | DNA | DNA | DNA | DNA |

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | B) Total round trip time for all the ping packets transmitted during the period | | Raj | DNA | DNA | DNA | DNA | DNA | DNA | DNA | DNA | DNA |
| | C) Average round trip tip time for all the ping transmitted | <800 ms | Raj | DNA | DNA | DNA | DNA | DNA | DNA | DNA | DNA | DNA |
| 5 | **Service Availability/Uptime** | | | | | | | | | | | |
| | A) Total operatioDNAl Hours | | Raj | 72 | 72 | 72 | 72 | 72 | 72 | 72 | 72 | 72 |
| | B) Total downtime (In hours) | | Raj | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | C) Total time when the service was available (In Hrs) | | Raj | 72 | 72 | 72 | 72 | 72 | 72 | 72 | 72 | 72 |
| | D) % age of Service availability uptime | >98% | Raj | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% |

## 4.4. KEY FINDINGS: BROADBAND SERVICES

**Service Provisioning / Activation Time:** For this parameter the performance of the service providers was found well within the compliance benchmarks.

**Fault Repair/Restoration Time:** With regards to this parameter the performance of the service providers was within TRAI norms **Fault Repair by next working day**, **BSNL and DEN Network** underperformed as its performance **76.87% and 77.97%.** For parameter **Faults repaired within three working days DEN Network** with its performance as **98.02%.**

**Billing Performance:** For this parameter also the performance of the service providers was found well within the compliance benchmarks.

**Response Time to Customer for assistance by operator (Voice to Voice):** For this parameter also the performance of the service providers was found well within the compliance benchmarks.

**Bandwidth Utilization/ Throughput:** All the service providers were found using Multiple Router Traffic Grapher (MRTG) and also it was observed that all service providers were reporting combined bandwidth utilization for corporate customers and household customers.
The performance of service provider **DEN Network** underperformed for parameter **Bandwidth Utilization/ Throughput** with its performance as **80.65%.**

**Live measurement:** The performance of service provider **DEN Network** underperformed for parameter **Bandwidth Utilization/ Throughput** with its performance as **84.95%.**

**Service Availability/Uptime:** All service providers were found meeting the benchmark for this parameter.

**Packet Loss and Network Latency:** It was observed that almost all operators were measuring packet loss and latency by conducting ping test on random basis for their internal assessment.
However, the ping test conducted during live measurement revealed that all service providers were meeting the benchmark prescribed by TRAI.

## 4.5. CUSTOMER CARE / HELPLINE ASSESSMENT

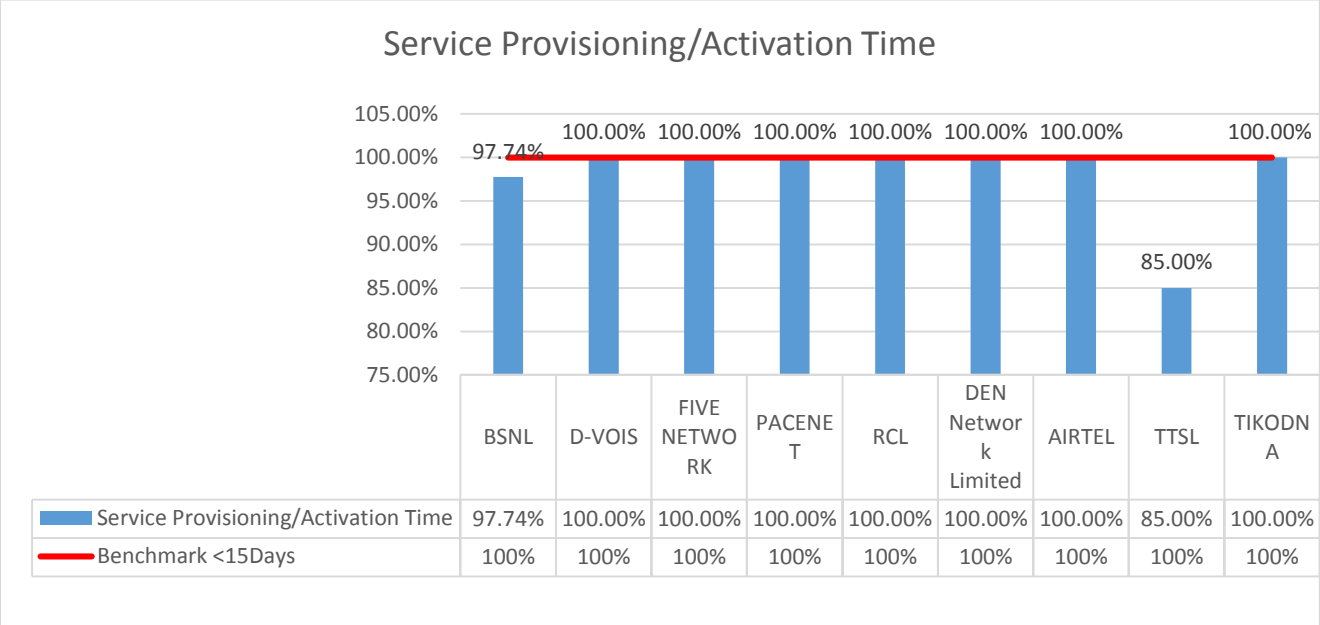
| LIVE CALLING TO CALL CENTRE FOR BROADBAND SERVICES | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Parameter | Circle Name | BSNL | D-VOIS | FIVE NETWORK | PACENET | RCL | DEN Network Limited | AIRTEL | TTSL | TIKODNA |
| Total No. of calls Attempted | Raj | 100 | 10 | 10 | 10 | 100 | 100 | 100 | 100 | 100 |
| Total number of calls answered by the operator within 60 seconds | Raj | 98 | 10 | 10 | 10 | 100 | 100 | 89 | 100 | 100 |
| % age calls answered by the operator in 60 seconds | Raj | 98.00% | 100.00% | 100.00% | 100.00% | 100.00% | 100.00% | 89.00% | 100.00% | 100.00% |
| Total number of calls answered by the operator within 90 seconds | Raj | 100 | 10 | 10 | 10 | 100 | 100 | 100 | 100 | 100 |
| % age calls answered by the operator within 90 seconds | Raj | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% |

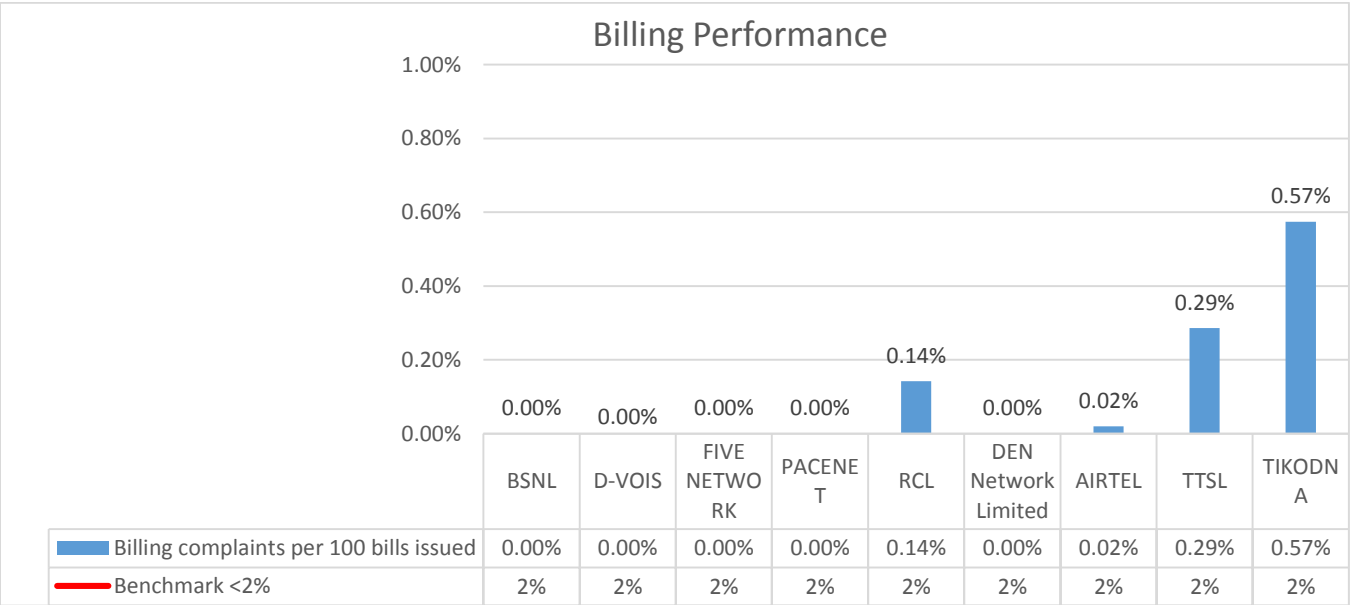
## 4.6. LIVE CALLING FOR BILLING COMPLAINTS

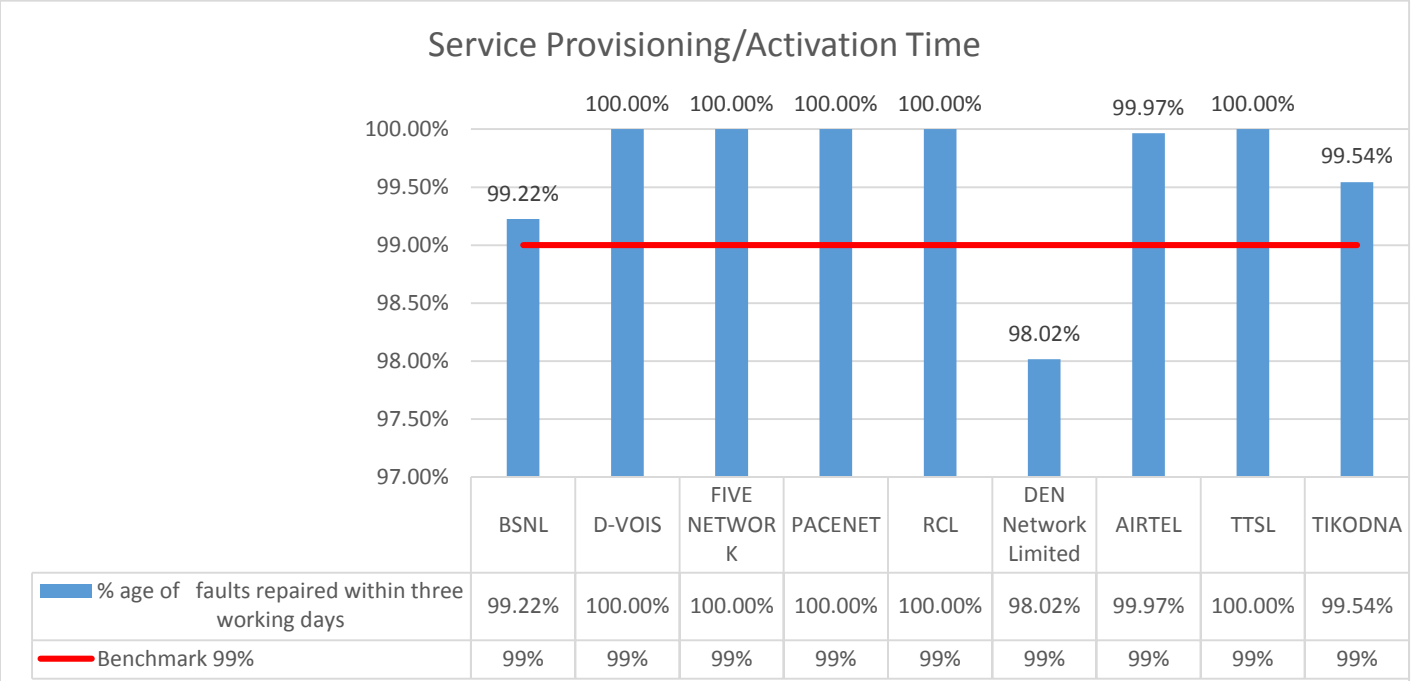
| TELEPHONIC INTERVIEW FOR BILLING COMPLAINTS | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Parameter | Circle Name | BSNL | D-VOIS | FIVE NETWORK | PACENET | RCL | DEN Network Limited | AIRTEL | TTSL | TIKONA |
| Total No. of calls Attempted | Raj | 2 | 0 | 0 | 0 | 39 | 0 | 1 | 0 | 27 |
| Total No. of calls Answered | Raj | 2 | 0 | 0 | 0 | 25 | 0 | 1 | 0 | 18 |
| Cases resolved within 4 weeks | Raj | 2 | 0 | 0 | 0 | 25 | 0 | 1 | 0 | 18 |
| %age of cases resolved | Raj | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% |

To test the Service Providers performance on billing related complaints and their resolutions, auditors conducted a customer feedback calling for about random 100 nos. of customers. However, in some cases, the number of customers contacted for verification was very less due to less number of billing complaints. During live calling, some of the customers did not attend the calls while few others reported that there complaints have been resolved but did not remember about the duration of their resolution. However, most of the customers reported their satisfaction on resolution of the billing complaints.

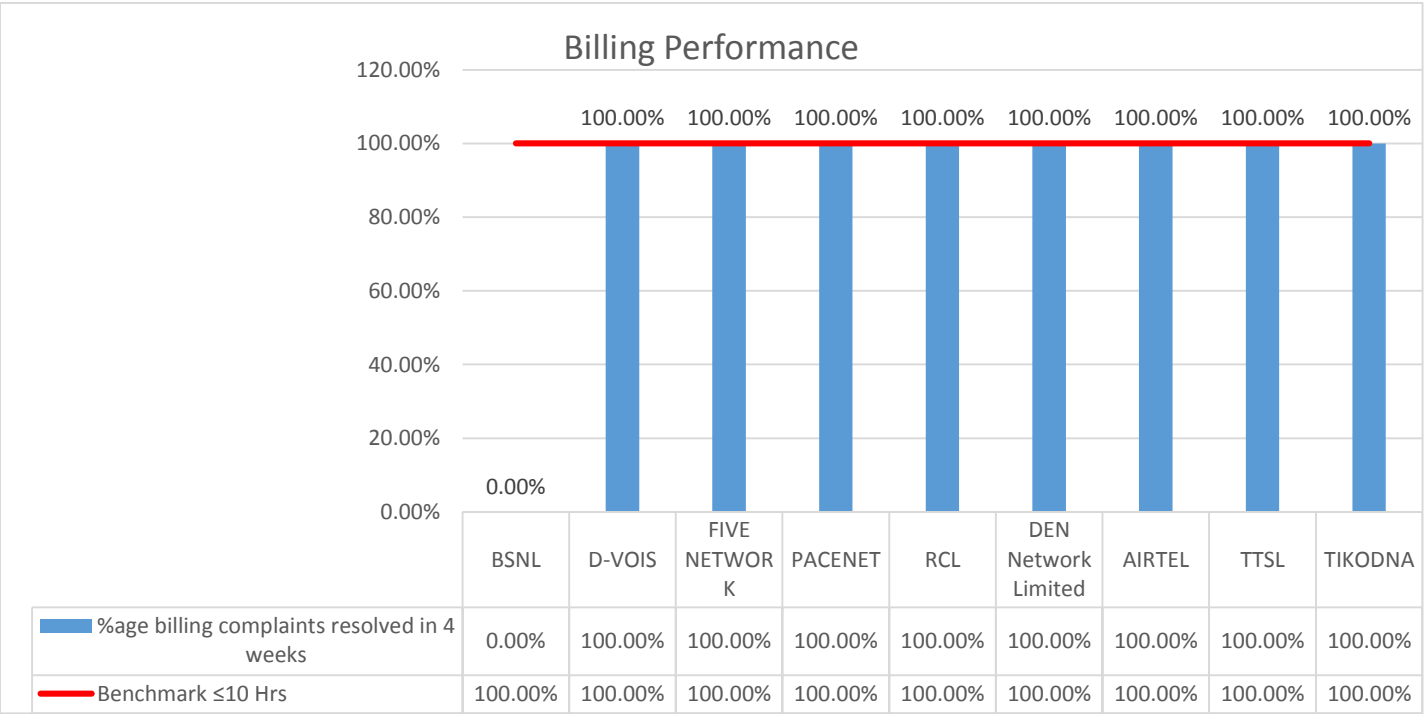
## 4.7. GRAPHICAL REPRESENTATION



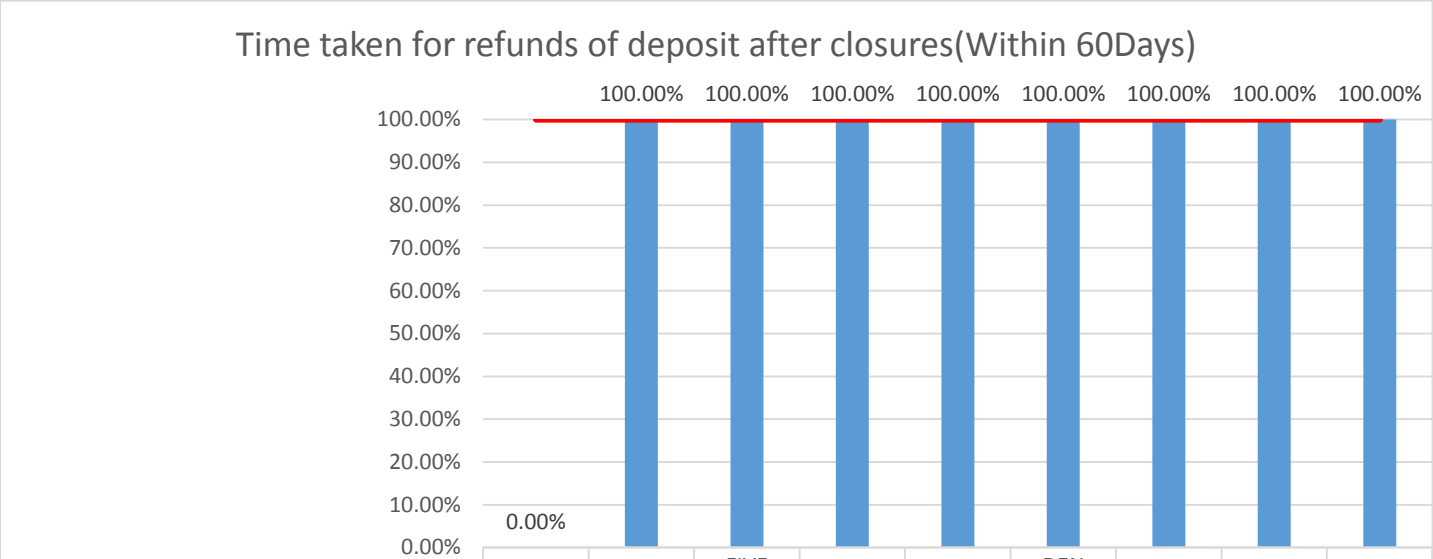





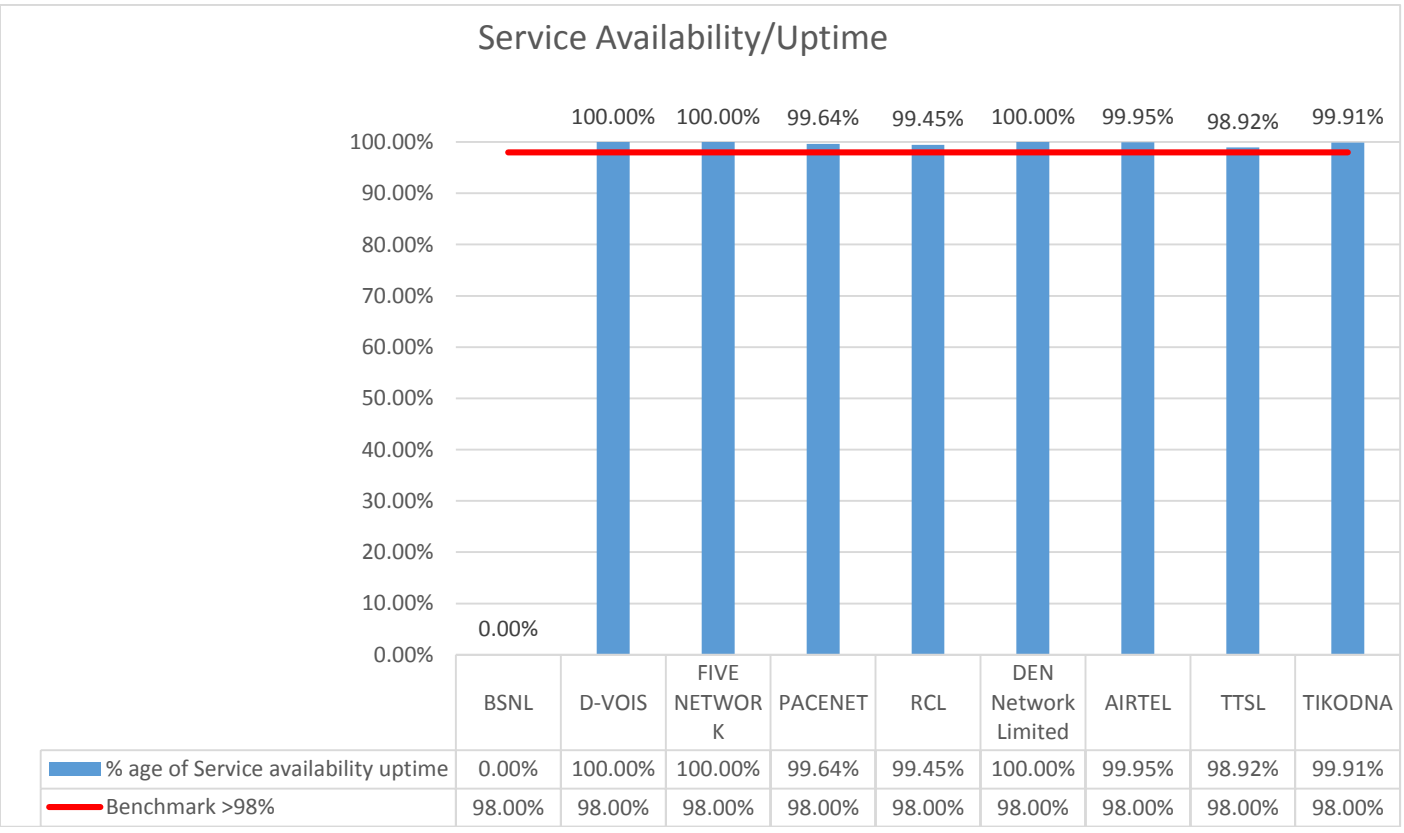

| | BSNL | D-VOIS | FIVE NETWORK | PACENET | RCL | DEN Network Limited | AIRTEL | TTSL | TIKODNA |
|---|---|---|---|---|---|---|---|---|---|
| % age of faults repaired within three working days | 99.22% | 100.00% | 100.00% | 100.00% | 100.00% | 98.02% | 99.97% | 100.00% | 99.54% |
| Benchmark 99% | 99% | 99% | 99% | 99% | 99% | 99% | 99% | 99% | 99% |




| | BSNL | D-VOIS | FIVE NETWORK | PACENET | RCL | DEN Network Limited | AIRTEL | TTSL | TIKODNA |
|---|---|---|---|---|---|---|---|---|---|
| %age billing complaints resolved in 4 weeks | 0.00% | 100.00% | 100.00% | 100.00% | 100.00% | 100.00% | 100.00% | 100.00% | 100.00% |
| Benchmark ≤10 Hrs | 100.00% | 100.00% | 100.00% | 100.00% | 100.00% | 100.00% | 100.00% | 100.00% | 100.00% |

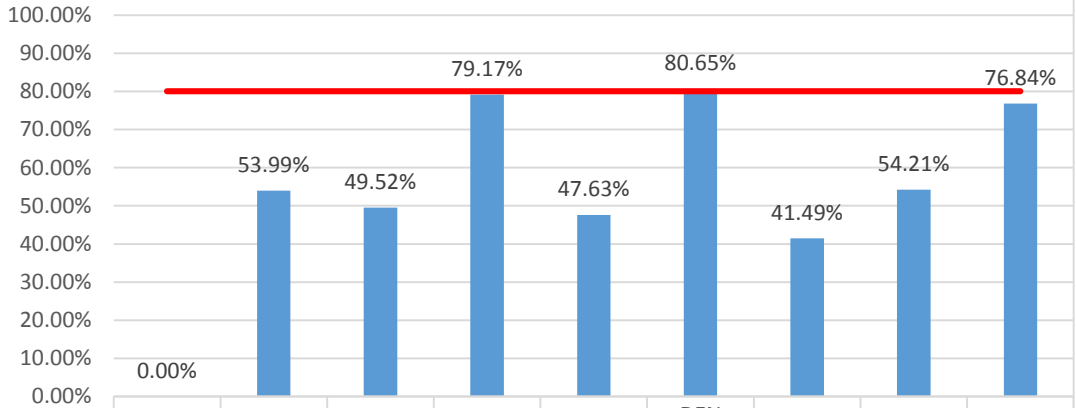



| | BSNL | D-VOIS | FIVE NETWORK | PACENET | RCL | DEN Network Limited | AIRTEL | TTSL | TIKODNA |
|---|---|---|---|---|---|---|---|---|---|
| Time taken for refunds of deposit after closures(Within 60Days) | 0.00% | 100.00% | 100.00% | 100.00% | 100.00% | 100.00% | 100.00% | 100.00% | 100.00% |
| Benchmark 100% | 100.00% | 100.00% | 100.00% | 100.00% | 100.00% | 100.00% | 100.00% | 100.00% | 100.00% |



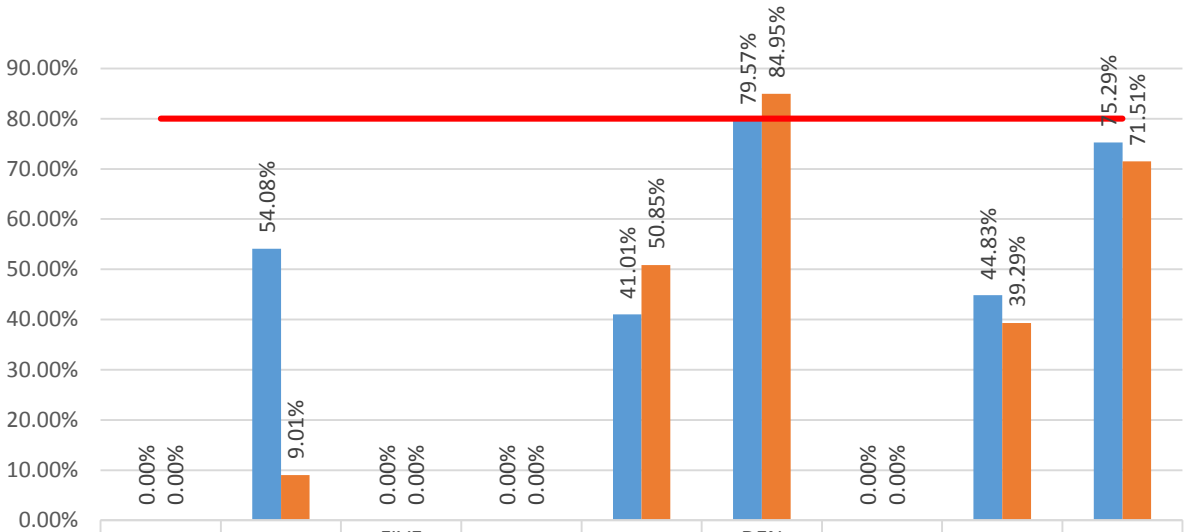

| | BSNL | D-VOIS | FIVE NETWORK | PACENET | RCL | DEN Network Limited | AIRTEL | TTSL | TIKODNA |
|---|---|---|---|---|---|---|---|---|---|
| % age of Service availability uptime | 0.00% | 100.00% | 100.00% | 99.64% | 99.45% | 100.00% | 99.95% | 98.92% | 99.91% |
| Benchmark >98% | 98.00% | 98.00% | 98.00% | 98.00% | 98.00% | 98.00% | 98.00% | 98.00% | 98.00% |

Bandwidth Utilization/ Throughput
POP to ISP Gateway Node [Intra-network] Links



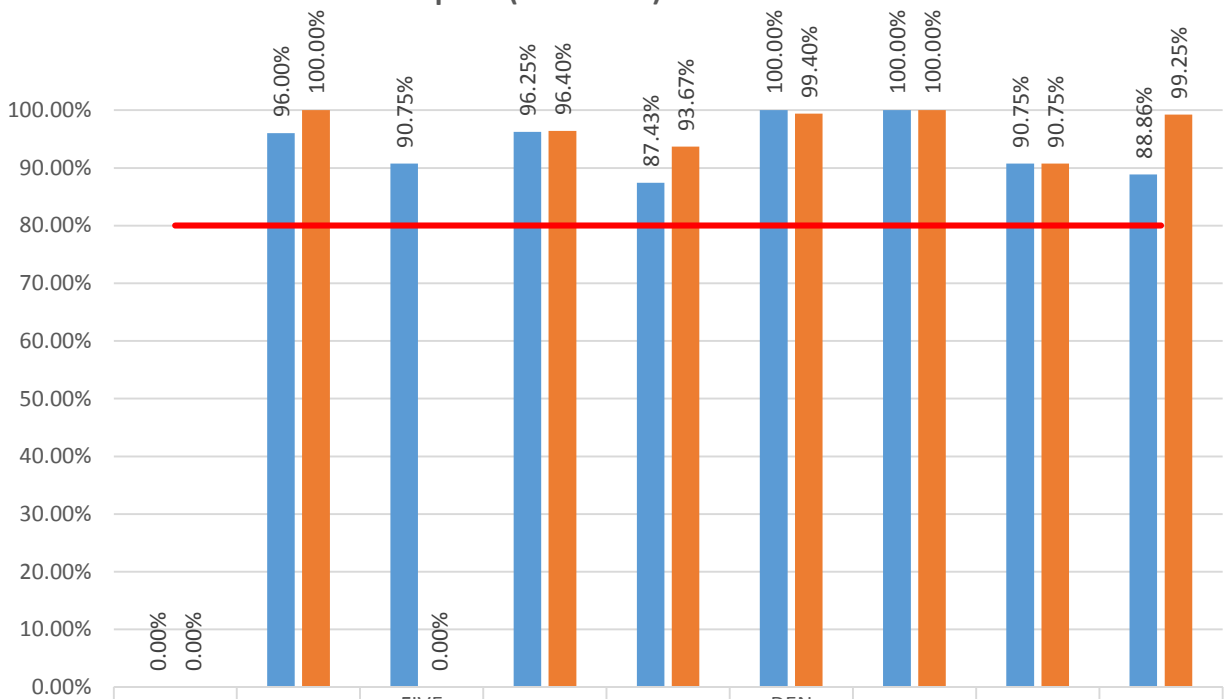

| | BSNL | D-VOIS | FIVE NETWORK | PACENET | RCL | DEN Network Limited | AIRTEL | TTSL | TIKODNA |
|---|---|---|---|---|---|---|---|---|---|
| Quarterly | 0.00% | 53.99% | 49.52% | 79.17% | 47.63% | 80.65% | 41.49% | 54.21% | 76.84% |
| Benchmark <80% | 80.00% | 80.00% | 80.00% | 80.00% | 80.00% | 80.00% | 80.00% | 80.00% | 80.00% |

Bandwidth Utilization/ Throughput ISP Gateway Node to IGSP / NIXI Node upstream Link(s) for International connectivity



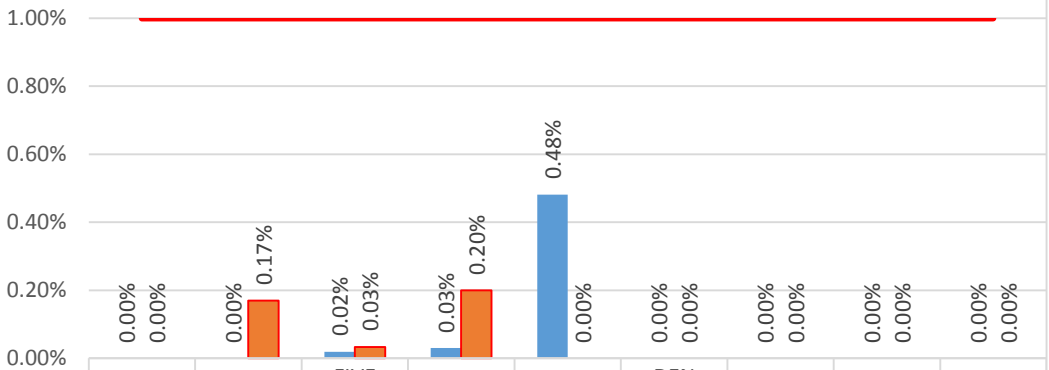

| | BSNL | D-VOIS | FIVE NETWORK | PACENET | RCL | DEN Network Limited | AIRTEL | TTSL | TIKODNA |
|---|---|---|---|---|---|---|---|---|---|
| Quarterly | 0.00% | 54.08% | 0.00% | 0.00% | 41.01% | 79.57% | 0.00% | 44.83% | 75.29% |
| 3Day Live | 0.00% | 9.01% | 0.00% | 0.00% | 50.85% | 84.95% | 0.00% | 39.29% | 71.51% |
| Benchmark <80% | 80.00% | 80.00% | 80.00% | 80.00% | 80.00% | 80.00% | 80.00% | 80.00% | 80.00% |

## Broadband Connection Speed (download) from ISP Node to User



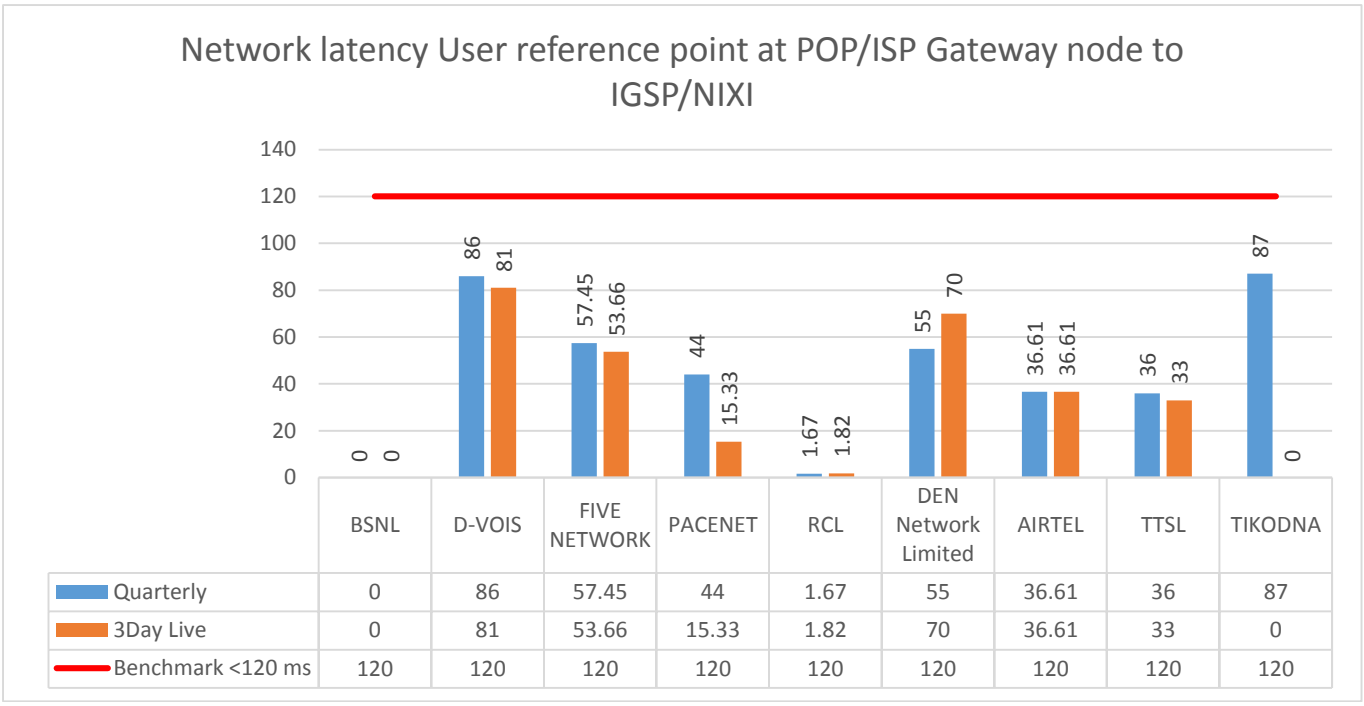

| | BSNL | D-VOIS | FIVE NETWORK | PACENET | RCL | DEN Network Limited | AIRTEL | TTSL | TIKODNA |
|---|---|---|---|---|---|---|---|---|---|
| Quarterly | 0.00% | 96.00% | 90.75% | 96.25% | 87.43% | 100.00% | 100.00% | 90.75% | 88.86% |
| 3Day Live | 0.00% | 100.00% | 0.00% | 96.40% | 93.67% | 99.40% | 100.00% | 90.75% | 99.25% |
| Benchmark >80% | 80.00% | 80.00% | 80.00% | 80.00% | 80.00% | 80.00% | 80.00% | 80.00% | 80.00% |

## Percentage Packet loss

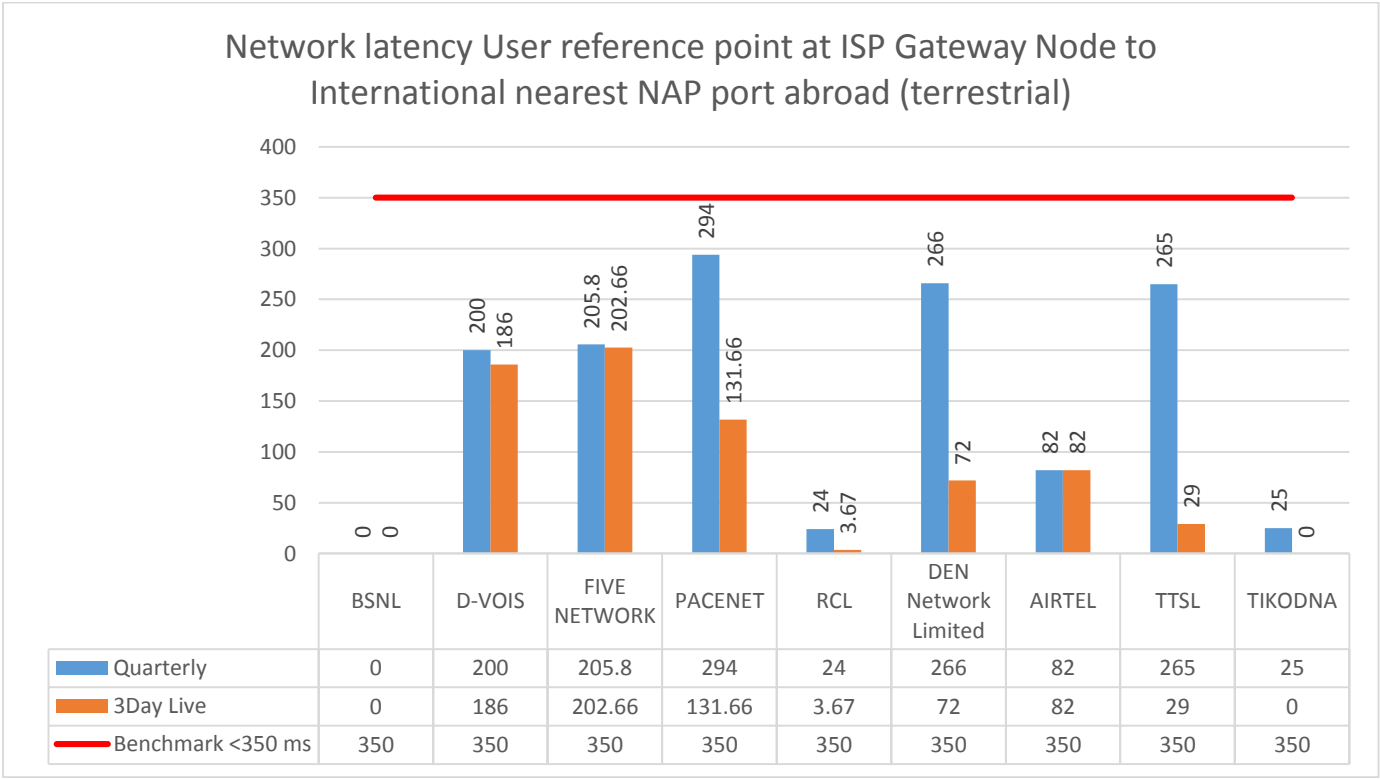



| | BSNL | D-VOIS | FIVE NETWORK | PACENET | RCL | DEN Network Limited | AIRTEL | TTSL | TIKODNA |
|---|---|---|---|---|---|---|---|---|---|
| Quarterly | 0.00% | 0.00% | 0.02% | 0.03% | 0.48% | 0.00% | 0.00% | 0.00% | 0.00% |
| 3Day Live | 0.00% | 0.17% | 0.03% | 0.20% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% |
| Benchmark <1% | 1.00% | 1.00% | 1.00% | 1.00% | 1.00% | 1.00% | 1.00% | 1.00% | 1.00% |

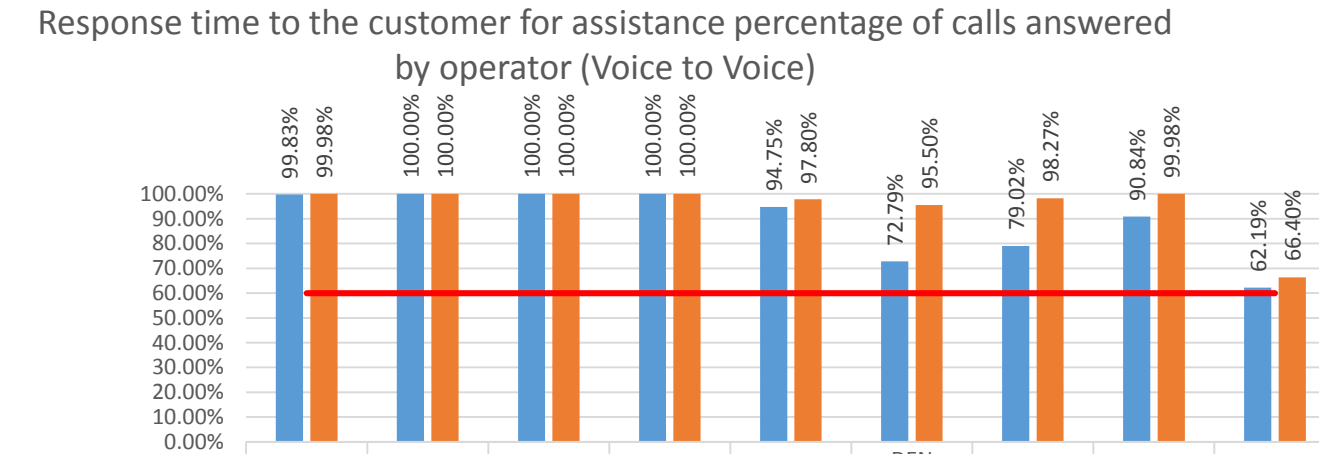
++



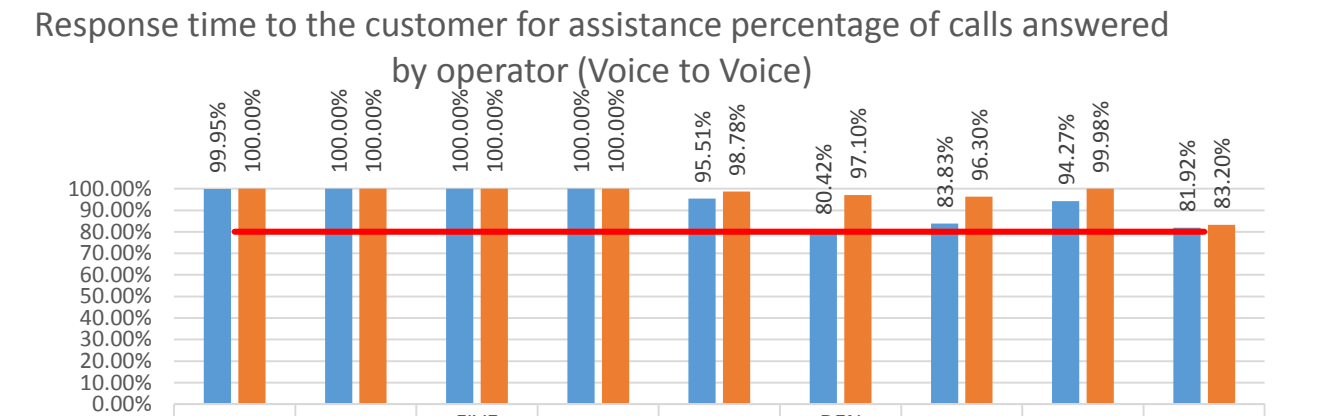

| | BSNL | D-VOIS | FIVE NETWORK | PACENET | RCL | DEN Network Limited | AIRTEL | TTSL | TIKODNA |
|---|---|---|---|---|---|---|---|---|---|
| Quarterly | 0 | 86 | 57.45 | 44 | 1.67 | 55 | 36.61 | 36 | 87 |
| 3Day Live | 0 | 81 | 53.66 | 15.33 | 1.82 | 70 | 36.61 | 33 | 0 |
| Benchmark <120 ms | 120 | 120 | 120 | 120 | 120 | 120 | 120 | 120 | 120 |




| | BSNL | D-VOIS | FIVE NETWORK | PACENET | RCL | DEN Network Limited | AIRTEL | TTSL | TIKODNA |
|---|---|---|---|---|---|---|---|---|---|
| Quarterly | 0 | 200 | 205.8 | 294 | 24 | 266 | 82 | 265 | 25 |
| 3Day Live | 0 | 186 | 202.66 | 131.66 | 3.67 | 72 | 82 | 29 | 0 |
| Benchmark <350 ms | 350 | 350 | 350 | 350 | 350 | 350 | 350 | 350 | 350 |




| | BSNL | D-VOIS | FIVE NETWORK | PACENET | RCL | DEN Network Limited | AIRTEL | TTSL | TIKODNA |
|---|---|---|---|---|---|---|---|---|---|
| Quarterly | 99.83% | 100.00% | 100.00% | 100.00% | 94.75% | 72.79% | 79.02% | 90.84% | 62.19% |
| 3Day Live | 99.98% | 100.00% | 100.00% | 100.00% | 97.80% | 95.50% | 98.27% | 99.98% | 66.40% |
| Benchmark >60% | 60.00% | 60.00% | 60.00% | 60.00% | 60.00% | 60.00% | 60.00% | 60.00% | 60.00% |




| | BSNL | D-VOIS | FIVE NETWORK | PACENET | RCL | DEN Network Limited | AIRTEL | TTSL | TIKODNA |
|---|---|---|---|---|---|---|---|---|---|
| Quarterly | 99.95% | 100.00% | 100.00% | 100.00% | 95.51% | 80.42% | 83.83% | 94.27% | 81.92% |
| 3Day Live | 100.00% | 100.00% | 100.00% | 100.00% | 98.78% | 97.10% | 96.30% | 99.98% | 83.20% |
| Benchmark >80% | 80.00% | 80.00% | 80.00% | 80.00% | 80.00% | 80.00% | 80.00% | 80.00% | 80.00% |

## 5. ABBREVIATIONS

Following terms/abbreviations have been used in this report. This section provides meaning of the abbreviations used in the report.

- TRAI – Telecom Regulatory Authority of India
- QoS – Quality of Service
- AMJ16 – Refers to the quarter of April, May and June 2016
- SSA – Secondary Switching Area
- NOC – Network Operation Center
- OMC – Operations and Maintenance Center
- MSC – Mobile Switching Center
- PMR – Performance Monitoring Reports
- TCBH – Time Consistent Busy Hour
- CBBH - Cell Bouncing Busy Hour
- BTS – Base Transceiver Station
- CSSR – Call Setup Success Rate
- TCH – Traffic Channel
- SDCCH – Standalone Dedicated Control Channel
- CDR – Call Drop Rate
- FER – Frame Error Rate
- SIM – Subscriber Identity Module
- GSM – Global System for Mobile
- CDMA – Code Division Multiple Access
- NA – Not Applicable
- NC – Non Compliance
- POI – Point of Interconnection
- IVR – Interactive Voice Response
- STD – Standard Trunk Dialing
- ISD – International Subscriber Dialing

## 6. ANNEXURE – I

### Exchanges covered for QoS audit in Rajasthan Circle

| S.NO | Service provider | SSA Name | Exchange Type | Exchange Code | Exchange Level |
|---|---|---|---|---|---|
| 1 | BSNL | Ajmer | URBAN | AJABWE | 01482-230 to 239 |
| 2 | BSNL | Ajmer | URBAN | AJAMDL | 01486-266 |
| 3 | BSNL | Ajmer | RURAL | AJABRA | 01487-272 |
| 4 | BSNL | Ajmer | URBAN | AJASPU | 01484-222 |
| 5 | BSNL | Ajmer | URBAN | AJAMGH | 01489-230 |
| 6 | BSNL | Ajmer | URBAN | AJTCTT | 01472-24X & 250 |
| 7 | BSNL | Ajmer | URBAN | AJTKPS | 01476-230 & 231 |
| 8 | BSNL | Ajmer | URBAN | AJTCSR | 01473-262,263 |
| 9 | BSNL | Ajmer | URBAN | AJTNMB | 01477-220 to 224 |
| 10 | BSNL | Ajmer | URBAN | AJTPGH | 01478-220 to 223 |
| 11 | BSNL | Ajmer | URBAN | AJRMAN | 0294-241,242,252,256 |
| 12 | BSNL | Ajmer | URBAN | AJRKUM | 0294-248, 258 |
| 13 | BSNL | Ajmer | URBAN | AJRFNR | 02955-220 to 221 |
| 14 | BSNL | Ajmer | URBAN | AJRNAW | 02953-230 to 235 |
| 15 | BSNL | Ajmer | URBAN | AJRKKR | 02952-220 to 226 |
| 16 | BSNL | Ajmer | URBAN | AJRBNR | 02955-220 |
| 17 | BSNL | Ajmer | RURAL | AJABDN | 01480-2255 |
| 18 | BSNL | Ajmer | RURAL | AJADLG | 01480-227 |
| 19 | BSNL | Ajmer | RURAL | AJASMG | 01480-2332 |
| 20 | BSNL | Ajmer | RURAL | AJAHMG | 01482-286 |
| 21 | BSNL | Ajmer | RURAL | AJAMGR | 01482-280 |
| 22 | BSNL | Ajmer | URBAN | AJACSA | 01482-267 |
| 23 | BSNL | Ajmer | RURAL | AJABGR | 01486-265 |
| 24 | BSNL | Ajmer | RURAL | AJABGP | 01486-264 |
| 25 | BSNL | Ajmer | RURAL | AJARKK | 01486-262 |
| 26 | BSNL | Ajmer | RURAL | AJAUPR | 01487-277 |
| 27 | BSNL | Ajmer | RURAL | AJARLA | 01487-273 |
| 28 | BSNL | Ajmer | RURAL | AJADBL | 01487-276 |
| 29 | BSNL | Ajmer | RURAL | AJAPLY | 01484-225 |
| 30 | BSNL | Ajmer | RURAL | AJADHL | 01483-228 |
| 31 | BSNL | Ajmer | RURAL | AJASNG | 01484-226 |
| 32 | BSNL | Ajmer | RURAL | AJABGD | 01489-232 |
| 33 | BSNL | Ajmer | RURAL | AJAKCL | 01489-239 |
| 34 | BSNL | Ajmer | RURAL | AJASLC | 01489-235 |
| 35 | BSNL | Ajmer | RURAL | AJANND | 01482-2342 |
| 36 | BSNL | Ajmer | RURAL | AJABRL | 01488-234 |
| 37 | BSNL | Ajmer | RURAL | AJAPRL | 01488-233 |
| 38 | BSNL | Ajmer | RURAL | AJAPND | 01485-235 |
| 39 | BSNL | Ajmer | RURAL | AJASKR | 01485-235 |
| 40 | BSNL | Ajmer | RURAL | AJAPPL | 01485-234 |
| 41 | BSNL | Ajmer | RURAL | AJTSBP | 01472-276 |
| 42 | BSNL | Ajmer | RURAL | AJTBZP | 01472-276 |
| 43 | BSNL | Ajmer | RURAL | AJTGSD | 01472-276 |
| 44 | BSNL | Ajmer | RURAL | AJTBUP | 01476-224 |
| 45 | BSNL | Ajmer | RURAL | AJTSGP | 01476-229 |
| 46 | BSNL | Ajmer | RURAL | AJTDNT | 01476-287 |
| 47 | BSNL | Ajmer | RURAL | AJTBNS | 01473-245 |
| 48 | BSNL | Ajmer | RURAL | AJTKSD | 01473-252 |
| 49 | BSNL | Ajmer | RURAL | AJTNKB | 01473-242 |
| 50 | BSNL | Ajmer | RURAL | AJTKNR | 01477-241 |
| 51 | BSNL | Ajmer | RURAL | AJTWON | 01477-226 |
| 52 | BSNL | Ajmer | RURAL | AJTBRI | 01477-244 |
| 53 | BSNL | Ajmer | RURAL | AJTCHC | 01474-231 |
| 54 | BSNL | Ajmer | RURAL | AJTNDW | 01474-252 |
| 55 | BSNL | Ajmer | RURAL | AJTPRS | 01474-233 |

| | | | | | |
|---|---|---|---|---|---|
| 56 | BSNL | Ajmer | RURAL | AJTDDL | 01471-239 |
| 57 | BSNL | Jaipur | RURAL | JATPHN | 01471-222 |
| 58 | BSNL | Jaipur | RURAL | JATRUD | 01471-234 |
| 59 | BSNL | Jaipur | RURAL | JATBSR | 01470-245 |
| 60 | BSNL | Jaipur | RURAL | JATBAS | 01470-243 |
| 61 | BSNL | Jaipur | RURAL | JATMGD | 01470-246 |
| 62 | BSNL | Jaipur | RURAL | JATBRV | 01478-251 |
| 63 | BSNL | Jaipur | RURAL | JATDMT | 01478-255 |
| 64 | BSNL | Jaipur | RURAL | JATSUG | 01478-265 |
| 65 | BSNL | Jaipur | RURAL | JARBBR | 0294-23982,23984 |
| 66 | BSNL | Jaipur | RURAL | JARCRW | 0294-2352 |
| 67 | BSNL | Jaipur | RURAL | JARKRB | 0294-23928-23927 |
| 68 | BSNL | Jaipur | RURAL | JARKNP | 0294-2342 |
| 69 | BSNL | Jaipur | RURAL | JARNAI | 0294-2762 |
| 70 | BSNL | Jaipur | RURAL | JARKWS | 0294-265 |
| 71 | BSNL | Jaipur | RURAL | JARHZL | 0294-2655 |
| 72 | BSNL | Jaipur | RURAL | JARMDA | 0294-2732,2734 |
| 73 | BSNL | Jaipur | RURAL | JARCDS | 02955- |
| 74 | BSNL | Jaipur | RURAL | JARGHS | 02955-273 |
| 75 | BSNL | Jaipur | RURAL | JARTML | 02955-236 |
| 76 | BSNL | Jaipur | RURAL | JARSKD | 02955-260 |
| 77 | BSNL | Jaipur | RURAL | JARBTR | 02957-226 |
| 78 | BSNL | Jaipur | RURAL | JARRND | 02955-244 |
| 79 | BSNL | Jaipur | RURAL | JARVNA | 02957-227 |
| 80 | BSNL | Jaipur | RURAL | JARBTD | 02957-2376 |
| 81 | BSNL | Jaipur | RURAL | JARKTR | 02958-227, 229 |
| 82 | BSNL | Jaipur | RURAL | JARWAS | 02958-223 |
| 83 | BSNL | Jaipur | RURAL | JARDLW | 02953-289 |
| 84 | BSNL | Jaipur | RURAL | JARKMR | 02953-285 |
| 85 | BSNL | Jaipur | RURAL | JARNMA | 02953-282 |
| 86 | BSNL | Jaipur | RURAL | JARGDA | 02953-286 |
| 87 | BSNL | Jaipur | RURAL | JARGLD | 02952-266 |
| 88 | BSNL | Jaipur | RURAL | JARKRJ | 02952-262 |
| 89 | BSNL | Jaipur | RURAL | JARMHI | 02952-275 |
| 90 | BSNL | Jaipur | RURAL | JARBNL | 02952-273 |
| 91 | BSNL | Jaipur | RURAL | JARJKG | 02952-232 |
| 92 | BSNL | Jaipur | RURAL | JARNSM | 02956-288,289 |
| 93 | BSNL | Jaipur | RURAL | JARSMD | 02956-285 |
| 94 | BSNL | Jaipur | RURAL | JARBNP | 02956- |
| 95 | BSNL | Jaipur | RURAL | JARGGD | 02956-282 |
| 96 | BSNL | Jaipur | RURAL | JARBRN | 02906-237 |
| 97 | BSNL | Jaipur | RURAL | JARITK | 02906-2216 |
| 98 | BSNL | Jaipur | RURAL | JARGGL | 02906-221 |
| 99 | BSNL | Jaipur | RURAL | JARSLB | 02906-232, 233 |
| 100 | BSNL | Jaipur | RURAL | JARSMR | 02905-263 |
| 101 | BSNL | Jaipur | RURAL | JARPRD | 02905-2684 |
| 102 | BSNL | Jaipur | RURAL | JARJDL | 02905-2675, 2678 |
| 103 | BSNL | Jaipur | RURAL | JARJWD | 02905-2672, 2673 |
| 104 | BSNL | Jaipur | RURAL | JARNYG | 02907-240 |
| 105 | BSNL | Jaipur | RURAL | JARBLW | 02907-251 |
| 106 | BSNL | Jaipur | RURAL | JARKLP | 02907-235 |
| 107 | TIKONA | Jaipur | URBAN | --- | --- |
| 108 | D-VOIS | Jaipur | URBAN | --- | --- |
| 109 | RCL | Jaipur | URBAN | --- | --- |
| 110 | FIVE NETWORK | Jaipur | URBAN | --- | --- |
| 111 | PACENET | Jaipur | URBAN | --- | --- |
| 112 | DEN Network Limited | Jaipur | URBAN | --- | --- |

PHISTREAM
EMPOWERING LEADERSHIP, TRANSFORMING BUSINESS

TRAI
सत्यमेव जयते
Telecom Regulatory Authority of India
(IS/ISO 9001-2008 Certified Organisation)




# AUDIT & ASSESSMENT OF QUALITY OF SERVICE

## NORTH ZONE – RAJASTHAN CIRCLE
## CELLULAR MOBILE TELEPHONE SERVICE (CMTS)
## (APRIL TO JUNE2016)

**PREPARED BY:**

**PHISTREAM CONSULTING PRIVATE LIMITED**
(An ISO – 9001:2008 Certified Company)
**Office:** C – 56A/5, First Floor, Sector – 62, Noida ● **Telephone:** +91-120-644-7778 ●
**Email:** info@phistream.com

## TABLE OF CONTENTS

# 1. INTRODUCTION

## 1.1. ABOUT TRAI

TRAI's mission is to create and nurture conditions for growth of telecommunications in the country in a manner and at a pace that will enable India to play a leading role in the emerging global information society. One of the main objectives of 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 been issuing regulations, order and directives to deal with the issues or complaints raised by the operators as well as the consumers. These regulations, order and directives have helped to nurture the growth of multi operator multi service - an open competitive Junket from a government owned monopoly. Also, 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.

TRAI initiated a regulation - The Standard of Quality of Service of Basic Telephone Service (Wireline) and Cellular Mobile Telephone Service regulations, 2009 (7 of 2009) dated June 20, 2009 and Quality of Service of Broadband Service Regulations, 2006 (11 of 2006) dated April 6, 2006 that provide the benchmarks for the parameters on customer perception of service to be achieved by service provider.

In order to assess the above regulations, TRAI has commissioned a third party agency to conduct the audit of the service providers and check the performance of the operators on the various benchmarks set by Telecom Regulatory Authority of India (TRAI).

## 1.2. ABOUT PHISTREAM CONSULTING PRIVATE LIMITED

Phistream Consulting Private Limited is an ISO:9001 certified company who are one of the pioneers in the field of technical audit, quality assurance and third party inspection services. Established more than a decade ago in 2004, we aspire to provide longer term savings based on year-on-year productivity. With our size, we are nimble and aspire to being a full service partner for providing consultancy services.

We have been helping our clients by determining the best solutions and enabling businesses to enjoy the benefits of top-notch support without distracting their team from the main business focus. Our business analysts have enough experience to get involved at the requirements gather stage through consulting work handing off a detailed requirements document to our operations staff who in turn can train our support and maintenance resources for ongoing engagement.

In keeping with our goal of being a one stop quality assurance and consulting partner, our specialists employ a strategy and consulting-based implementation methodology and capitalize on strong program governance to offer a wide range of services for various industry verticals.

## 1.3. OBJECTIVES

The primary objective of the Audit module is to:

- Audit and Assess the Quality of Services being rendered by Basic Cellular Mobile (Wireless) service against the parameters notified by TRAI. (The parameters of Quality of Services (QoS) have been specified by in the respective regulations published by TRAI).
- This report covers the audit results of the audit conducted for Cellular Mobile (Wireless) services in Rajasthan circle.

## 1.4. COVERAGE

The audit was conducted in Rajasthan Circle covering all SSAs (Secondary Switching Areas).


**Image Source: TTK Maps**

## 1.5. SSA List

| S. No. | Circle | SSA Name | SDCA Name |
|---|---|---|---|
| 1 | RJ | Ajmer | Ajmer |
| 2 | RJ | Ajmer | Beawar |
| 3 | RJ | Ajmer | Kekri (e) |
| 4 | RJ | Ajmer | Kekri (w) (bhinai) |
| 5 | RJ | Ajmer | Kishangarh (n) (roopangarh) |
| 6 | RJ | Ajmer | Kishangarh (s) |
| 7 | RJ | Ajmer | Nasirabad |
| 8 | RJ | Ajmer | Sarwar |
| 9 | RJ | Alwar | Alwar |
| 10 | RJ | Alwar | Bansur |
| 11 | RJ | Alwar | Behror |
| 12 | RJ | Alwar | Kishangarhbas (khairthal) |
| 13 | RJ | Alwar | Laxmangarh (kherli) |
| 14 | RJ | Alwar | Mandawar |
| 15 | RJ | Alwar | Rajgarh |
| 16 | RJ | Alwar | Ramgarh |
| 17 | RJ | Alwar | Thanaghazi |
| 18 | RJ | Alwar | Tijara (n) (bhiwadi) |
| 19 | RJ | Alwar | Tijara (s) |
| 20 | RJ | Banswara | Aspur |
| 21 | RJ | Banswara | Bagidora |
| 22 | RJ | Banswara | Banswara |
| 23 | RJ | Banswara | Dungarpur |
| 24 | RJ | Banswara | Gerhi (partapur) |
| 25 | RJ | Banswara | Ghatol |
| 26 | RJ | Banswara | Kushalgarh |
| 27 | RJ | Banswara | Sagwara |
| 28 | RJ | Barmer | Barmer(c) |
| 29 | RJ | Barmer | Barmer (e) (gudda) |
| 30 | RJ | Barmer | Barmer (n) (kanot) |
| 31 | RJ | Barmer | Barmer (s) sindari |
| 32 | RJ | Barmer | Barmer (sw) (dhorimanna) |
| 33 | RJ | Barmer | Barmer (w) (ramsar) |
| 34 | RJ | Barmer | Chohtan (n) |
| 35 | RJ | Barmer | Chohtan (s) (gangasar) |
| 36 | RJ | Barmer | Pachpadra (e) (korna) |
| 37 | RJ | Barmer | Pachpadra (w) (balotra) |
| 38 | RJ | Barmer | Sheo (e) |
| 39 | RJ | Barmer | Sheo (w) (harsani) |
| 40 | RJ | Barmer | Siwana (e) (samdari) |
| 41 | RJ | Barmer | Siwana (w) |
| 42 | RJ | Bharatpur | Bari |
| 43 | RJ | Bharatpur | Baseri |
| 44 | RJ | Bharatpur | Bayana |
| 45 | RJ | Bharatpur | Bharatpur |
| 46 | RJ | Bharatpur | Deeg |
| 47 | RJ | Bharatpur | Dholpur |
| 48 | RJ | Bharatpur | Kaman |
| 49 | RJ | Bharatpur | Nadbai |
| 50 | RJ | Bharatpur | Rupbas |

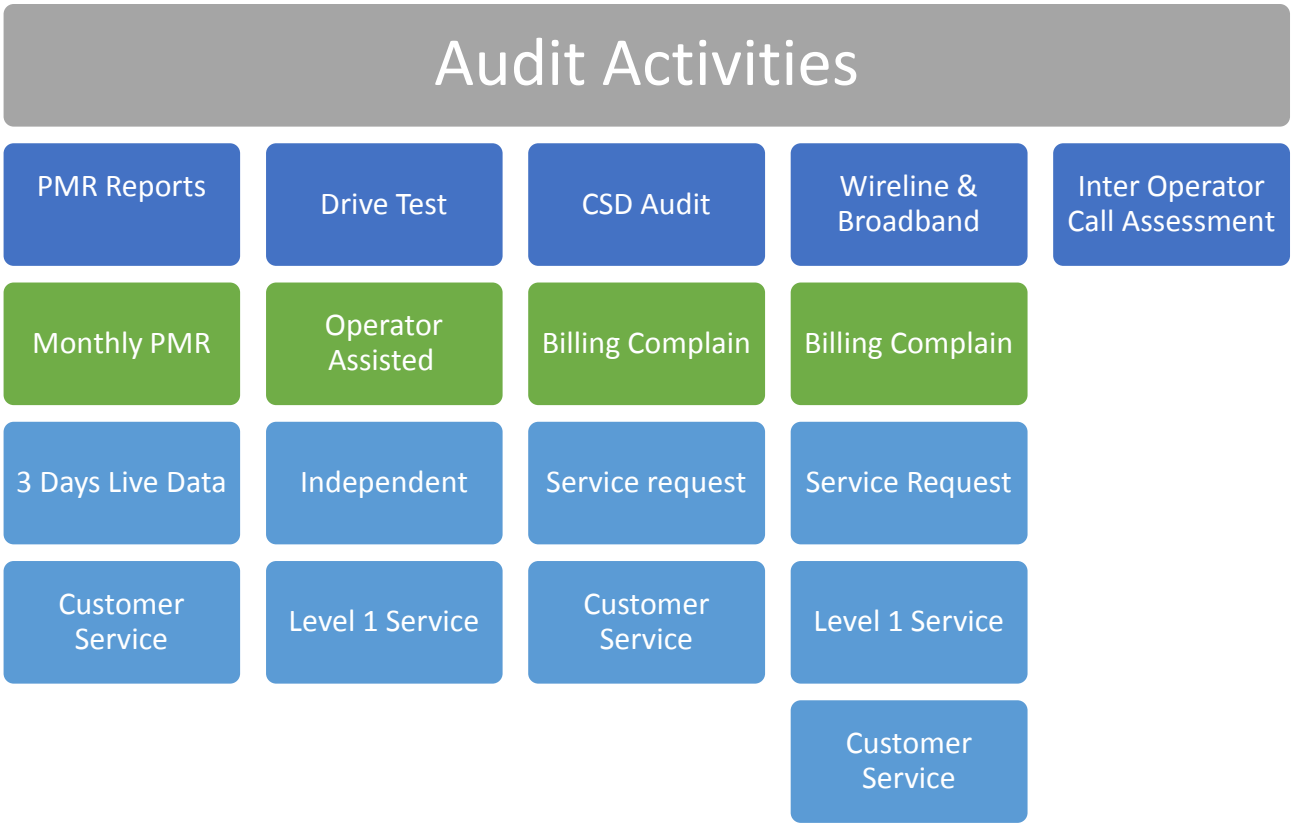
| | | | |
|---|---|---|---|
| **51** | RJ | Bhilwara | Asind |
| **52** | RJ | Bhilwara | Banera |
| **53** | RJ | Bhilwara | Bhilwara |
| **54** | RJ | Bhilwara | Hurda (gulabpura) |
| **55** | RJ | Bhilwara | Jahazpur |
| **56** | RJ | Bhilwara | Kotri |
| **57** | RJ | Bhilwara | Mandal |
| **58** | RJ | Bhilwara | Mandalgarh |
| **59** | RJ | Bhilwara | Raipur |
| **60** | RJ | Bhilwara | Shahapura |
| **61** | RJ | Bikaner | Bikaner(c) (jaimalsar) |
| **62** | RJ | Bikaner | Bikaner (e) (jamsar) |
| **63** | RJ | Bikaner | Bikaner (n) (chhatargarh) |
| **64** | RJ | Bikaner | Bikaner (s) |
| **65** | RJ | Bikaner | Bikaner (w) (poogal) |
| **66** | RJ | Bikaner | Kolayat-i (goddo) |
| **67** | RJ | Bikaner | Kolayat-ii |
| **68** | RJ | Bikaner | Kolayat-iii (bajju) |
| **69** | RJ | Bikaner | Kolayat-iv (daitra) |
| **70** | RJ | Bikaner | Lunkaransar-i (kanholi) |
| **71** | RJ | Bikaner | Lunkaransar-iii (rajasarb) |
| **72** | RJ | Bikaner | Lunkaransar-ii (mahaApr) |
| **73** | RJ | Bikaner | Lunkaransar-iv |
| **74** | RJ | Bikaner | Nokha (e) |
| **75** | RJ | Bikaner | Nokha (w) (nathusar) |
| **76** | RJ | Bundi | Bundi |
| **77** | RJ | Bundi | Hindoli |
| **78** | RJ | Bundi | Keshoraipatan (patan) |
| **79** | RJ | Bundi | Nainwa |
| **80** | RJ | Chittorgarh | Barisadri |
| **81** | RJ | Chittorgarh | Begun(n) |
| **82** | RJ | Chittorgarh | Begun(s) (rawatbhata) |
| **83** | RJ | Chittorgarh | Chittorgarh |
| **84** | RJ | Chittorgarh | Dungla |
| **85** | RJ | Chittorgarh | Kapasan |
| **86** | RJ | Chittorgarh | Nimbahera |
| **87** | RJ | Chittorgarh | Pratapgarh (n) |
| **88** | RJ | Chittorgarh | Pratapgarh (s) (arnod) |
| **89** | RJ | Chittorgarh | Rashmi |
| **90** | RJ | Churu | Churu |
| **91** | RJ | Churu | Rajgarh |
| **92** | RJ | Churu | Ratangarh |
| **93** | RJ | Churu | Sardarshahar (s) |
| **94** | RJ | Churu | Sardarshahar (n) - jaitsisar |
| **95** | RJ | Churu | Sridungargarh (n)- dungargh |
| **96** | RJ | Churu | Sridungargarh (s) (sudsar) |
| **97** | RJ | Churu | SuAprgarh(c) (bidasar) |
| **98** | RJ | Churu | SuAprgarh (e) |
| **99** | RJ | Churu | SuAprgarh (w) (lalgarh) |
| **100** | RJ | Churu | Taranagar |
| **101** | RJ | Jaipur | Amber (chomu) |
| **102** | RJ | Jaipur | Bassi |
| **103** | RJ | Jaipur | Baswa (bandikui) |

| | | | |
|---|---|---|---|
| **104** | RJ | Jaipur | Dausa |
| **105** | RJ | Jaipur | Dudu |
| **106** | RJ | Jaipur | Jaipur |
| **107** | RJ | Jaipur | Jamwa-ramgarh (achrol) |
| **108** | RJ | Jaipur | Kotputli |
| **109** | RJ | Jaipur | Lalsot |
| **110** | RJ | Jaipur | Phagi |
| **111** | RJ | Jaipur | Phulera (e) (renwal) |
| **112** | RJ | Jaipur | Phulera (w) (sambhar) |
| **113** | RJ | Jaipur | Viratnagar (shahpura) |
| **114** | RJ | Jaisalmer | Jaisalmer-1 (ramgarh) |
| **115** | RJ | Jaisalmer | Jaisalmer-10 (khuri) |
| **116** | RJ | Jaisalmer | Jaisalmer-11 (jaisalmer) |
| **117** | RJ | Jaisalmer | Jaisalmer-12 (devikot) |
| **118** | RJ | Jaisalmer | Jaisalmer-13 (myajlar) |
| **119** | RJ | Jaisalmer | Jaisalmer-14 (jheenApriyali) |
| **120** | RJ | Jaisalmer | Jaisalmer-2 (sadhna) |
| **121** | RJ | Jaisalmer | Jaisalmer-3 (nehdai) |
| **122** | RJ | Jaisalmer | Jaisalmer-4 (shahgarh) |
| **123** | RJ | Jaisalmer | Jaisalmer-5 (khuiyals) |
| **124** | RJ | Jaisalmer | Jaisalmer-6 (pasewar) |
| **125** | RJ | Jaisalmer | Jaisalmer-7 (mohargarh) |
| **126** | RJ | Jaisalmer | Jaisalmer-8 (mehsana) |
| **127** | RJ | Jaisalmer | Jaisalmer-9 (dhanaua) |
| **128** | RJ | Jaisalmer | Pokran-1 (nachna) |
| **129** | RJ | Jaisalmer | Pokran-2 (madasar) |
| **130** | RJ | Jaisalmer | Pokran-3 (loharki) |
| **131** | RJ | Jaisalmer | Pokran-4 (pokran) |
| **132** | RJ | Jaisalmer | Pokran-5 (phalsoond) |
| **133** | RJ | Jhalawar | Aklera |
| **134** | RJ | Jhalawar | Gangdhar |
| **135** | RJ | Jhalawar | Jhalawar |
| **136** | RJ | Jhalawar | Khanpur |
| **137** | RJ | Jhalawar | Pachpahar (bhawanimandi) |
| **138** | RJ | Jhalawar | Pirawa (raipur) |
| **139** | RJ | Jhunjhunu | Chirawa |
| **140** | RJ | Jhunjhunu | Jhunjhunu (n) (bissau) |
| **141** | RJ | Jhunjhunu | Jhunjhunu (s) |
| **142** | RJ | Jhunjhunu | Khetri |
| **143** | RJ | Jhunjhunu | Udaipurwati |
| **144** | RJ | Jodhpur | Bilara (n) (bhopalgarh) |
| **145** | RJ | Jodhpur | Bilara (s) (piparcity) |
| **146** | RJ | Jodhpur | Jodhpur (e) |
| **147** | RJ | Jodhpur | Jodhpur (w) (jhanwar) |
| **148** | RJ | Jodhpur | Osian (e) (dhanwara) |
| **149** | RJ | Jodhpur | Osian (n) |
| **150** | RJ | Jodhpur | Osian (s) (mathania) |
| **151** | RJ | Jodhpur | Phalodi (e) (lohawat) |
| **152** | RJ | Jodhpur | Phalodi (n) (bap) |
| **153** | RJ | Jodhpur | Phalodi (s) |
| **154** | RJ | Jodhpur | Phalodi (w) (baroo) |
| **155** | RJ | Jodhpur | Shergarh (n) (balesar) |
| **156** | RJ | Jodhpur | Shergarh (n) (deechu) |

| | | | |
|---|---|---|---|
| **157** | RJ | Kota | Atru |
| **158** | RJ | Kota | Baran |
| **159** | RJ | Kota | Chhabra |
| **160** | RJ | Kota | Chhipaborad |
| **161** | RJ | Kota | Digod (sultanpur) |
| **162** | RJ | Kota | Kishanganj (bhanwargarh) |
| **163** | RJ | Kota | Ladpura (kota) |
| **164** | RJ | Kota | Mangrol |
| **165** | RJ | Kota | Pipalda (sumerganj mandi) |
| **166** | RJ | Kota | Ramganj mandi |
| **167** | RJ | Kota | Sahabad |
| **168** | RJ | Kota | Sangod |
| **169** | RJ | Nagaur | Deedwana |
| **170** | RJ | Nagaur | Degana |
| **171** | RJ | Nagaur | Jayal |
| **172** | RJ | Nagaur | Ladnun |
| **173** | RJ | Nagaur | Merta (e) (merta-city) |
| **174** | RJ | Nagaur | Merta (w) (gotan) |
| **175** | RJ | Nagaur | Nagaur (e) (mundwa Junwar) |
| **176** | RJ | Nagaur | Nagaur (n) |
| **177** | RJ | Nagaur | Nagaur (w) (khinwsar) |
| **178** | RJ | Nagaur | Nawa (kuchamancity) |
| **179** | RJ | Nagaur | Parbatsar (n) (makrana) |
| **180** | RJ | Nagaur | Parbatsar (s) |
| **181** | RJ | Pali (Junwar) | Bali (n) (sumerpur) |
| **182** | RJ | Pali (Junwar) | Bali (s) |
| **183** | RJ | Pali (Junwar) | Desuri (rani) |
| **184** | RJ | Pali (Junwar) | Jaitaran |
| **185** | RJ | Pali (Junwar) | Junwar-jn |
| **186** | RJ | Pali (Junwar) | Pali (n) (rohat) |
| **187** | RJ | Pali (Junwar) | Pali (s) |
| **188** | RJ | Pali (Junwar) | Raipur |
| **189** | RJ | Pali (Junwar) | Sojat (sojat-city) |
| **190** | RJ | Sawaimadhopur | Bamanwas |
| **191** | RJ | Sawaimadhopur | Bonli |
| **192** | RJ | Sawaimadhopur | Gangapur |
| **193** | RJ | Sawaimadhopur | Hindaun |
| **194** | RJ | Sawaimadhopur | Karauli |
| **195** | RJ | Sawaimadhopur | Khandar |
| **196** | RJ | Sawaimadhopur | Mahuwa |
| **197** | RJ | Sawaimadhopur | Sapotra |
| **198** | RJ | Sawaimadhopur | Sawaimadhopur |
| **199** | RJ | Sikar | Dantaramgarh (e) (shyamji) |
| **200** | RJ | Sikar | Dantaramgarh (w) |
| **201** | RJ | Sikar | Fatehpur |
| **202** | RJ | Sikar | Laxmangarh (e) |
| **203** | RJ | Sikar | Laxmangarh (w) (nechwa) |
| **204** | RJ | Sikar | Neem ka thana |
| **205** | RJ | Sikar | Sikar |
| **206** | RJ | Sikar | Srimadhopur |
| **207** | RJ | Sirohi (abu road) | Abu road |
| **208** | RJ | Sirohi (abu road) | Ahore |
| **209** | RJ | Sirohi (abu road) | Bhinmal (n) |

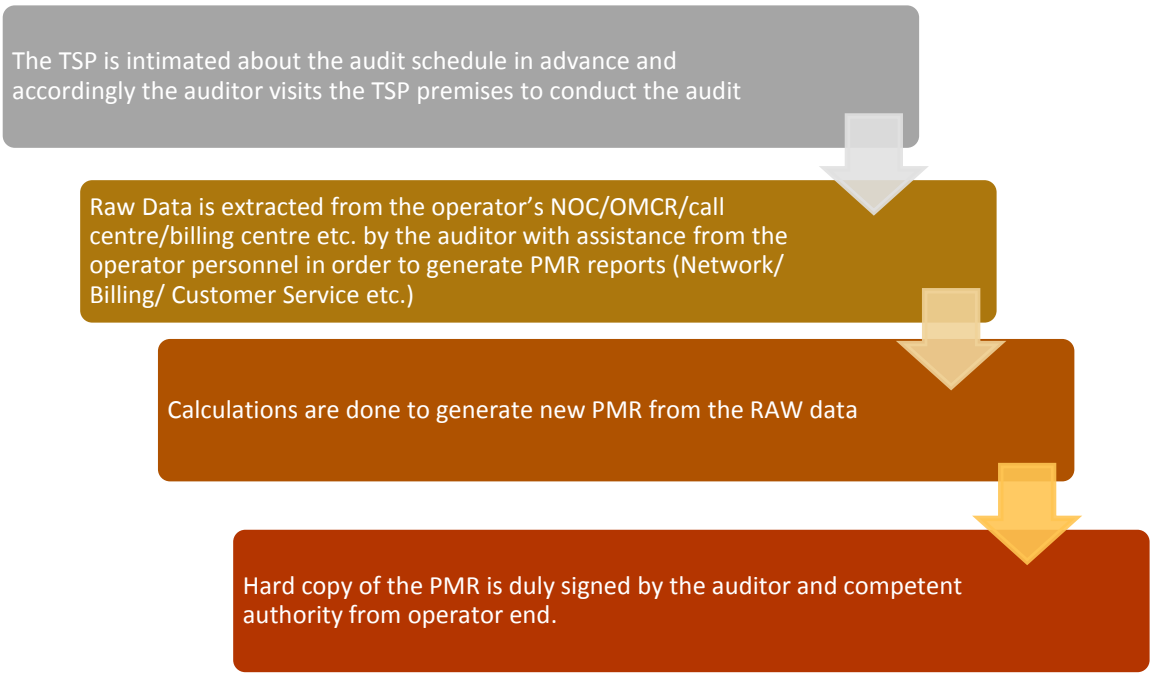
| | | | |
|---|---|---|---|
| **210** | RJ | Sirohi (abu road) | Bhinmal (s) (jasawantpura) |
| **211** | RJ | Sirohi (abu road) | Jalore |
| **212** | RJ | Sirohi (abu road) | Jalore (w) (sayla) |
| **213** | RJ | Sirohi (abu road) | Pindwara |
| **214** | RJ | Sirohi (abu road) | Reodar |
| **215** | RJ | Sirohi (abu road) | Sanchore (e) |
| **216** | RJ | Sirohi (abu road) | Sanchore (w) (haJunha) |
| **217** | RJ | Sirohi (abu road) | Sheoganj (posaliyan) |
| **218** | RJ | Sirohi (abu road) | Sirohi |
| **219** | RJ | Sriganganagar | Anupgarh (e) |
| **220** | RJ | Sriganganagar | Anupgarh (w) (gharsana) |
| **221** | RJ | Sriganganagar | Bhadra |
| **222** | RJ | Sriganganagar | Hanumangarh |
| **223** | RJ | Sriganganagar | Nohar(c) (rawatsar) |
| **224** | RJ | Sriganganagar | Nohar (e) |
| **225** | RJ | Sriganganagar | Nohar (w) (jedasar) |
| **226** | RJ | Sriganganagar | Padampur |
| **227** | RJ | Sriganganagar | Raisinghnagar |
| **228** | RJ | Sriganganagar | Sadulshahar |
| **229** | RJ | Sriganganagar | Sangaria |
| **230** | RJ | Sriganganagar | Sriganganagar |
| **231** | RJ | Sriganganagar | Srikaranpur |
| **232** | RJ | Sriganganagar | Suratgarh (n) (goluwala) |
| **233** | RJ | Sriganganagar | Suratgarh (s) |
| **234** | RJ | Sriganganagar | Tibbi |
| **235** | RJ | Tonk | Deoli |
| **236** | RJ | Tonk | Malpura |
| **237** | RJ | Tonk | Newai |
| **238** | RJ | Tonk | Todaraisingh |
| **239** | RJ | Tonk | Tonk (n) (piploo) |
| **240** | RJ | Tonk | Tonk (s) |
| **241** | RJ | Tonk | Uniayara |
| **242** | RJ | Udaipur | Amet |
| **243** | RJ | Udaipur | Bhim (n) |
| **244** | RJ | Udaipur | Bhim (s) (dawer) |
| **245** | RJ | Udaipur | Deogarh |
| **246** | RJ | Udaipur | Dhariawad |
| **247** | RJ | Udaipur | Girwa (udaipur) |
| **248** | RJ | Udaipur | Gogunda |
| **249** | RJ | Udaipur | Jhadol |
| **250** | RJ | Udaipur | Kherwara |
| **251** | RJ | Udaipur | Kotra |
| **252** | RJ | Udaipur | Kumbalgarh (charbhujaji) |
| **253** | RJ | Udaipur | Malvi (fatehnagar) |
| **254** | RJ | Udaipur | Nathdwara |
| **255** | RJ | Udaipur | Rajsamand (kankorli) |
| **256** | RJ | Udaipur | Salumber |
| **257** | RJ | Udaipur | Sarada (chawand) |
| **258** | RJ | Udaipur | Vallabhnagar |

## 1.6. FRAMEWORK USED



## 2. PMR REPORTS

Significance and methodology: PMR or Performance Monitoring Reports are generated to assess the various Quality of Service parameters involved in the mobile telephony service, which indicate the overall health of service for an operator.




The PMR report for network parameters is taken for each month of the audit quarter and is extracted and verified in the first week of the subsequent month of the audit month. For example, April2016 audit data was collected in the month of May2016.

The PMR report for customer service parameters is extracted from Customer Service Centre and verified once every quarter in the subsequent month of the last month of the quarter. For example, data for quarter ending June2016 was collected in the month of June2016.

The raw data extracted from operator's systems is used to create PMR in the following three formats:

- Monthly PMR (Network Parameters)
- 3 Day Live Measurement Data (Network Parameters)
- Customer Service Data

Let us understand these formats in details.

## 2.1. MONTHLY PMR

This involved calculation of the various Quality of Service network parameters through monthly Performance Monitoring Reports (PMR). The PMR reports were generated from the data extracted from operator's systems by the auditor with the assistance of the operator at the operator's premises for the month of April, May and June2016. The performance of operators on various parameters was assessed against the benchmarks.

Parameters includes:

**Network Availability**

- BTS accumulated downtime
- Worst affected BTS due to downtime

**Connection Establishment (Accessibility)**

- Call Set Up success Rate (CSSR)

**Network Congestion Parameters**

- SDCCH/Paging Channel Congestion
- TCH Congestion
- Point of Interconnection

**Connection Maintenance**

- Call Drop rate
- Worst affected cells having more than 3% TCH drop

**Voice Quality**

- % Connections with good voice quality

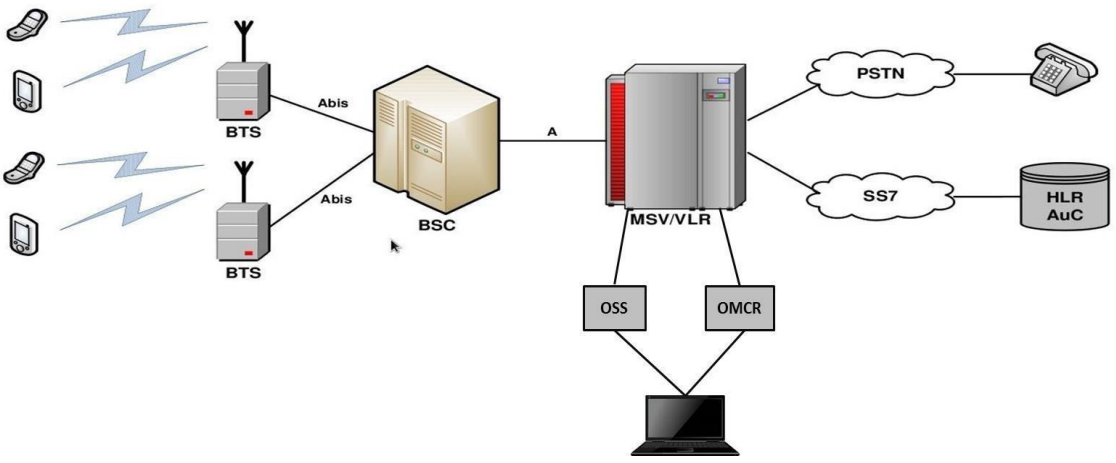
## 2.2. AUDIT PARAMETER: NETWORK

Let us now look at the various parameters involved in the audit reports.

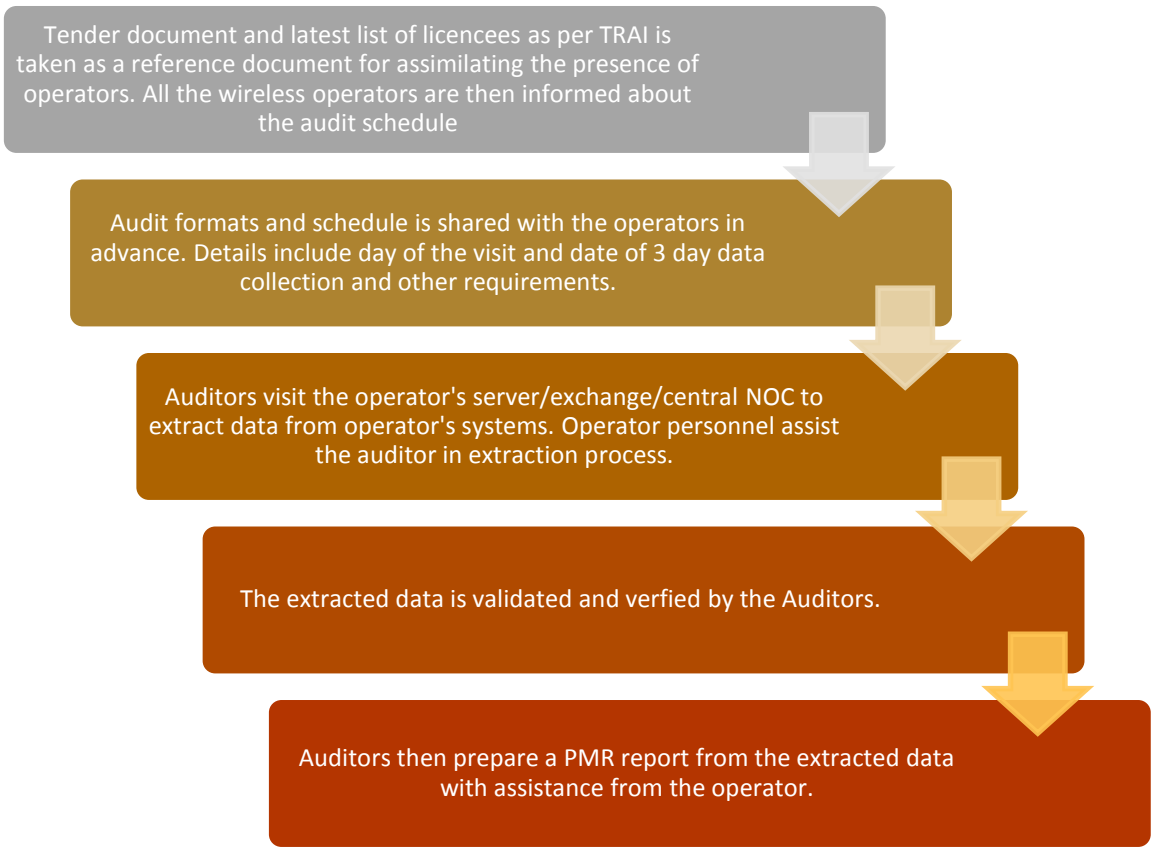
| Network Availability | |
|---|---|
| BTSs Accumulated downtime (not available for service) | ≤ 2% |
| Worst affected BTSs due to downtime | ≤ 2% |
| Connection Establishment (Accessibility) | |
| Call Set-up Success Rate (within licensee's own network) | ≥ 95% |
| SDCCH/ Paging Channel Congestion | ≤ 1 % |
| TCH Congestion | ≤ 2% |
| Connection Maintenance (Retainability) | |
| Call Drop Rate | ≤ 2% |
| Worst affected cells having more than 3% TCH drop (call drop) rate | ≤ 3% |
| Connections with good voice quality | ≥ 95% |
| Point of Interconnection | |
| (POI) Congestion ( on individual POI) | ≤ 0.5% |

## 2.3. DATA EXTRACTION POINTS

The data is extracted from a terminal/computer connected to OMCR & OSS on the operator network.



## 2.4. AUDIT PROCEDURE




Extracted data is calculated as per the counter details provided by the operators. The details of counters have been provided in the report. The calculation methodology for each parameter has been stated in the table given below:

## 2.5. NETWORK CALCULATION METHODOLOGY

| Parameter | Calculation Methodology |
|---|---|
| BTS Accumulated Downtime | Sum of downtime of BTSs in a month in hours i.e.<br>total outage time of all BTSs in hours during a month / (24 x Number of days in a month x Number of BTSs in the network in licensed service area) x 100 |
| Worst Affected BTS Due to Downtime | (Number of BTSs having accumulated downtime greater than 24 hours in a month / Number of BTS in<br>Licensed Service Area) * 100 |

| | |
|---|---|
| Call Setup Success Rate | (Calls Established / Total Call Attempts) * 100 |
| SDCCH/ Paging Channel Congestion | SDCCH / TCH Congestion% = [(A1 x C1) + (A2 x C2) +…….+ (An x Cn)] / (A1 + A2 +…+ An)<br><br>Where:<br>A1 = Number of attempts to establish SDCCH / TCH made on day 1<br>C1 = Average SDCCH / TCH Congestion % on day 1 A2 = Number of attempts to establish SDCCH / TCH made on day 2 |
| | |
| TCH Congestion | C2 = Average SDCCH / TCH Congestion % on day 2 An = Number of attempts to establish SDCCH / TCH made on day n<br>Cn = Average SDCCH / TCH Congestion % on day n |
| POI Congestion | POI Congestion% = [(A1 x C1) + (A2 x C2) +…….+ (An x Cn)] / (A1 + A2 +…+ An) Where:<br>A1 = POI traffic offered on all POIs (no. of calls) on day 1<br>C1 = Average POI Congestion % on day 1<br>A2 = POI traffic offered on all POIs (no. of calls) on day 2<br>C2 = Average POI Congestion % on day 2<br>An = POI traffic offered on all POIs (no. of calls) on day n<br>Cn = Average POI Congestion % on day n |
| Call Drop Rate | Total Calls Dropped / Total Calls Established x 100 |
| Worst Affected Cells having more than 3%<br>TCH drop | Total number of cells having more than 3% TCH drop during CBBH/ Total number of cells in the LSA x 100 |
| Connections with good voice quality | No. of voice samples with good voice quality / Total number of samples x 100 |

## 2.6. 3G VOICE

| S. No. | Name of Parameter | Definition | Formula | Benchmark |
|---|---|---|---|---|
| **1** | Network Availability | | | |
| **a.** | Total no. of Node B's in LSA | Total no. of Node B's Licensed in LSA | | |
| **b.** | Total downtime of all Node B's | When all the sector(s) of a Node B's are down for > 60 minutes at an instant in a whole day | | |
| **c.** | No. of Worst Affected Node B's | Node B'ss having more than 24 hours of Downtime in 3 Days | No. of Node B's having accumulated downtime of >24 hours in a month<br>((No. of Node B's having Accumulated Downtime of > 24 hrs in a month) / Total no. of BTSs in the licensed service area)*100 | *<=2%* |
| **d.** | Node B's accumulated | Node B's downtime more than 24 hr in 3 days | Total no. of Node B's in the Licensed Service Area | *<=2%* |

| | | | | |
|---|---|---|---|---|
| | downtime | | Sum of downtime of Node B's in a month in hours i.e. total outage time of all Node B's in hours in a month<br>[(Sum of downtime of Node B's in a month in hrs)/(24* no. of days in the month*no. of Node B's in the licensed service area)]*100 | |
| **2** | Connection Establishment (Accessibility) | | | |
| **a.** | Call Setup Success Rate: | It is the % of total no. of call established to the total no. of call attempt | Total No. of Voice Call Attempts<br>Total No. of Voice Call Establishment<br>CSSR (Call Setup Success Rate = (Total No. of Voice Call Attempts/ Total No. of Voice Call Establishment)*100) | *>=95%* |
| **b.** | RRC Congestion: | RRC Congestion rate is the % of Total No. of RRC Failed Calls to the Total no. of RRC Assigned Calls | RRC Attempts (RRC Connection Access) (A)<br>RRC Failed (RRC Connection Access Failed) (B)<br>RRC Congestion (%) [B/A]*100 | *<=1%* |
| **c.** | RAB Congestion: | RAB Congestion rate is the % of Total No. of RAB Failed Calls to the Total no. of RAB Assigned Calls | RAB Attempts (RAB Setup Access) (C)<br>RAB Failed (RAB Setup Access Failed) (D)<br>RAB Congestion (%) [D/C]*100 | *<=2%* |
| **3** | Connection Maintenance (Retainability) | | | |
| **a.** | Circuit Switched Voice Drop Rate | It is the % of total no. of Dropped Calls to the total no. of Calls Established | Total Established Calls (A)<br>Calls Dropped after Establishment (B)<br>Call Drop Rate [B/A]*100 | *<=2%* |
| **b.** | Worst affected cells having more than 3% Circuit Switched Voice Drop Rate: | It is the % of total no. of Cells having > 3% Circuit Switched Voice drop to the total no. cells | Total No. of Cells (Sector)<br>Total No. of Cells exceeding 3% Circuit Switched Voice Drop Rate in CBBH (Cell Bouncing Busy Hour)<br>% of cells having more than 3% Circuit Switched Voice Drop Rate [(No. of cells having Circuit Switched Voice Drop Rate > 3% during CBBH in 31 days*100) / Total no. of cells in the licensed service area] | *<=3%* |
| **c.** | Percentage of connections with Good Circuit Switched Voice Quality | It can be defined as the % of Good Voice Quality Samples to the total No. of Quality Samples | Percentage of connection with Good Circuit Switched Voice Quality | *>=95%* |
| **4** | Total No. of POI's in Month having >=0.5% POI congestion | Total no. Of POI's which are exceeding the POI congestion more than 0.5 %. | Total No. of call attempts on POI<br>Total traffic served on all POIs (Erlang)<br>Total No. of circuits on all individual POIs<br>Total number of working POI Service Area wise<br>Capacity of all POIs<br>No. of all POI's having >=0.5% POI congestion<br>Name of POI not meeting the benchmark (having >=0.5% POI congestion) | <=0.5% |

## 2.7. 2G & 3G WIRELESS

| S. No. | Name of Parameter | Definition | Formula | Benchmark |
|---|---|---|---|---|
| 1 | Service Activation/ Provisioning | This refers to the activation of services after activation of the SIM. This involves programming the various databases with the customer's information and any gateways to standard Internet chat or mail services or any data services. | Total No. of Subscribers for Service Activation (A)<br>Total Service Activations provided within 4 Hours (B)<br>Service Activation / Provisioning = (B/A) * 100 | *Within 4 Hours with 95% Success Rate* |
| 2 | PDP Context Activation Success Rate | PDP Context Activation Success Rate is the ratio of total number of successfully completed PDP context activations to the total attempts of context activation | Total No. of PDP Context Activation Requests (from SGSN to GGSN) (A)<br>Total No. of PDP Context Activation Success (path created b/w SGSN and GGSN) (B)<br>PDP Context Activation Success Rate =(B/A) *100 | >=95% |
| 3 | Drop Rate | It measures the inability of Network to maintain a connection and is defined as the ratio of abnormal disconnects w.r.t. all disconnects. | RNC originated PS Domain Iu Connection Setup Success (A)<br>RNC originated PS Domain Iu Connection Release (B)<br>Drop Rate = (B/A) * 100 | <=5% |

## 3. 3 DAYS LIVE DATA

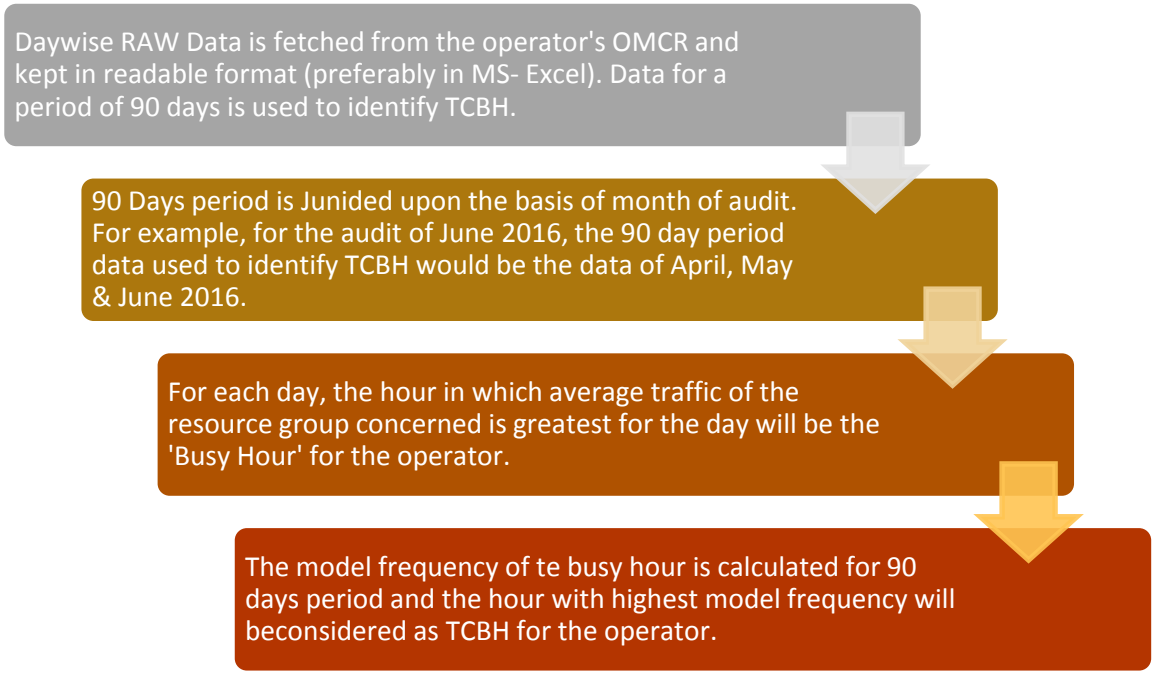
The main purpose of 3 day live measurement is to evaluate the network parameters on intraday basis. While the monthly PMR report provides an overall view of the performance of QoS parameters, the 3 day live data helps looking at intraday performance on the network parameters discussed earlier. All the calculations are done on the basis of that raw data of 3 days.

The 3 day live data provides a sample of 9 days in a quarter (3 days each month of a quarter) with hourly performance, which enables the auditor to identify and validate intraday issues for an operator on the Q0S network parameters. For example, network congestion being faced by an operator during busy/peak hours.

Network related parameters were evaluated for a period of 3 days in each month. 3 day live audit was conducted for 3 consecutive weekdays for each month. The data was extracted from each operator's server/ NOC etc. at the end of the 3rd day. The extracted data is then used to create a report (similar to PMR report) to assess the various QoS parameters.

### 3.1. TCBH: SIGNIFICANCE AND SELECTION METHODOLOGY

As per QoS regulations 2009 (7 of 2009), Time Consistent Busy Hour" or "TCBH" means the one hour period starting at the same time each day for which the average traffic of the resource group concerned is greatest over the days under consideration and such Time Consistent Busy Hour shall be established on the basis of analysis of traffic data for a period of ninety days.



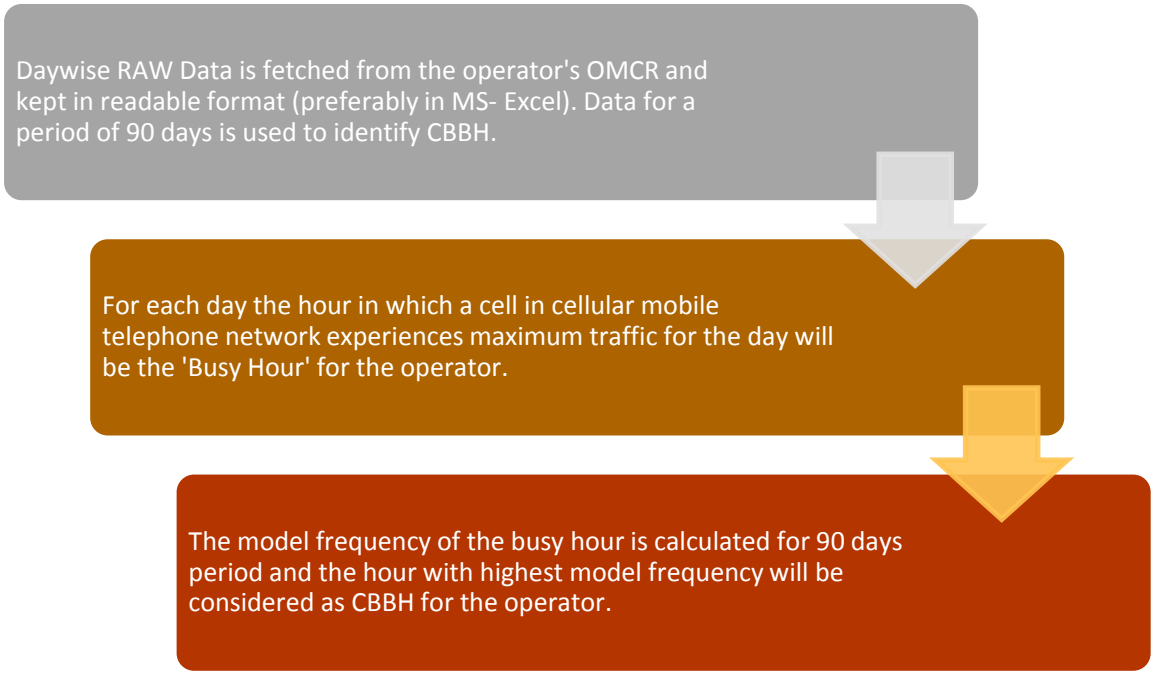

During audit, the auditors identified from the raw data that the TCBH for the operators in Apr – May – Jun2016 was the time period as given below:

| Aircel | Airtel | BSNL | Idea | RCOM GSM | RCOM CDMA | MTS | TTSL CDMA | TTSL GSM | Vodafone |
|---|---|---|---|---|---|---|---|---|---|
| 19:00-20:00 | 19:00-20:00 | 19:00-20:00 | 19:00-20:00 | 19:00-20:00 | 19:00-20:00 | 19:00-20:00 | 19:00-20:00 | 19:00-20:00 | 19:00-20:00 |

## 3.2. CBBH: SIGNIFICANCE AND SELECTION METHODOLOGY

As per QoS regulations 2009 (7 of 2009), Cell Bouncing Busy Hour (CBBH) means the one hour period in a day during which a cell in cellular mobile telephone network experiences the maximum traffic.

Step by step procedure to identify CBBH for an operator:



## 4. CUSTOMERSERVICE PARAMETERS

The data to generate PMR report for customer service parameters is extracted at the operator premises and verified once every quarter in the subsequent month of the last month of the quarter. For example, data for quarter ending June2016 was collected in the month of June2016. To extract the data for customer service parameters for the purpose of audit, auditors primarily visit the following locations/ departments/ offices at the operator's end.

- Central Billing Center
- Central Customer Service Center

The operators are duly informed in advance about the audit schedule.

The Customer Service Quality Parameters include the following:

- Metering and billing credibility (post-paid and prepaid)
- Resolution of billing/charging complaints
- Period of applying credit/waiver/adjustment to customer's account
- Response time to the customer for assistance
- Termination/closure of service
- Time taken for refund of security deposit after closures.

Most of the customer service parameters were calculated by averaging over the quarter; however billing parameters were calculated by averaging over one billing cycle for a quarter. All the parameters have been described in detail along with key findings of the parameter in the report.

The benchmark values for each parameter have been given in the table below.

### 4.1. AUDIT PARAMETERS: CUSTOMER SERVICE

| Metering and Billing Credibility | Benchmark |
|---|---|
| No of billing complaints received - Post paid | ≤ 0.1% |
| No. of billing complaints received- Prepaid | ≤ 0.1% |
| Resolution of billing/ charging complaints within 4 weeks | 98% |
| Resolution of billing/ charging complaints within 6 weeks | 100% |
| Period of applying credit/ waiver within 1 week of resolution of complaint | 100% |
| **Response Time to the Customer form Assistance** | |
| Accessibility of call centre/customer care | ≥ 95% |
| Percentage of calls answered by the operators (voice to voice) within 90 seconds | ≥ 95% |
| Termination/ closure of service | ≤ 7 days |
| Time taken for refund of deposits after closures within 60 days | 100% |

## 4.2. CALCULATION METHODOLOGY: CUSTOMER SERVICE PARAMETER

| Parameter | Calculation Methodology |
|---|---|
| Metering and billing credibility : Post-paid | Total billing complaints received during the relevant billing cycle / Total bills generated during the relevant billing cycle *100 |
| Metering and billing credibility : Pre-paid | Total charging complaints received during the quarter/ Total number of subscribers reported by the operator at the end of the quarter * 100 |
| Resolution of billing/ charging complaints (Post-paid + Pre-paid) | There are two benchmarks involved here:<br><br>Billing or Charging Complaints resolved in 4 weeks from date of receipt / Total billing or charging complaints received during the quarter) x 100<br><br>Billing or Charging Complaints resolved in 6 weeks from date of receipt / Total billing or charging complaints received during the quarter) x 100 |
| Period of applying credit waiver | Number of cases where credit waiver is applied within 7 days/ total number of cases eligible for credit waiver * 100 |
| Call centre performance IVR (Calling getting connected and answered by IVR) | Number of calls connected and answered by IVR/ All calls attempted to IVR * 100 |
| Call centre performance (Voice to Voice) | Call centre performance Voice to Voice =<br>(Number of calls answered by operator within 90 seconds/ All calls attempted to connect to the operator) * 100<br><br>The calculation excludes the calls dropped before 90 seconds |
| Time taken for termination/ closure of service | Number of closures done within 7 days/ total number of closure requests * 100 |
| Time taken for refund for deposit after closures | Number of cases of refund after closure done within 60 days/ total number of cases of refund after closure * 100 |

## 4.3. LIVE CALLING: SIGNIFICANCE AND METHODOLOGY

The auditor visits the operator premises for Live Calling. The operators provide the RAW data of customer complaints (billing and services) and also the list of customer service numbers to be verified through live calling

The auditor makes the live calls using operator SIM to a random sample of subscribers from the RAW data provided to verify the resolution of complaints

The auditor verifies the performance of call centre, level 1 services by calling the numbers using operator SIM. The list of call centre numbersis provided by the operator.

The auditors also make test calls to subscribers of other operators to assess the inter-operator call connectivity in the same licensed service area

Live calling activity was carried out during the period of June2016. The data considered for live calling was for the month prior to the month in which the live calling activity was being conducted. In this case, data of April2016 was considered for live calling activity conducted in May2016.
A detailed explanation of each parameter is explained below:

## 4.4. BILLING COMPLAINTS

Live calling is done to verify Resolution of billing complaints within stipulated time. The process for this parameter is stated below:

- Auditors request the operator provided the database of all the subscribers who reported billing complaints in one month prior to the auditor visit. In case of BSNL, data for the complaints from the subscribers belonging to the sample exchanges is requested specifically.
- A sample of 10% or 100 complainants, whichever is less, is selected randomly from the list provided by operator.

Calls are made by auditors to the sample of subscribers to check and record whether the complaint was resolved within the timeframes as mentioned in the benchmark.

All the complaints related to billing as per clause 3.7.2 of QoS regulation of 20th June, 2016 were considered as population for selection of samples.

TRAI Benchmark: Resolution of billing/ charging complaints: 98% within 4 weeks, 100% within 6 weeks.

## 4.5. SERVICE COMPLAINTS REQUESTS

"Service request" means a request made to a service provider by its consumer pertaining to his account, and includes:

- A request for change of tariff plan
- A request for activation or deactivation of a value added service or a supplementary service or a special pack
- A request for activation of any service available on the service provider's network
- A request for shift or closure or termination of service or for billing details

All the complaints other than billing were covered. A total of 100 calls per service provider for each service in licensed service area were done by the auditors.

## 4.6. LEVEL 1

Level 1 is used for accessing special services like emergency services, supplementary services, inquiry and operator-assisted services.

Level 1 Services include services such as police, fire, ambulance (Emergency services). Test calls were made from operator SIMs. A total of 150 test calls were made per service provider in the quarter.

While most of the Level 1 services are toll free, it has been observed that some Level 1 services may not be toll free. In April, May and June'15, auditor has tried contacting the list of Level 1 services provided by TRAI as per the NNP (National Numbering Plan).

## 4.7. PROCESS TO TEST LEVEL 1 SERVICE

- During the operator assisted drive test, auditors ask the operator authorized personnel to make 5 calls in each SDCA on the Level 1 Service numbers provided by TRAI. The list contains a description of the numbers along with dialling code.

- Operators might also provide a list of L1 services. To identify emergency L1 service numbers, auditors check if there is any number that starts with code '10' in that list. If auditors find any emergency number in addition to the below list, that number is also tested during live calling.

- On receiving the list, auditors verify it if the below given list of numbers are active in the service provider's network.

- If there are any other additional numbers provided by the operator, auditors also do live calling on those numbers along with below list.

- If any of these numbers is not active, then we would write the same in our report, auditors write in the report.

- Post verifying the list, auditors do live calling by equally distributing the calls among the various numbers and update the results in the live calling sheet.

| L1 Number Details |
|---|
| 100 Police |
| 101 Fire |
| 102 Ambulance |
| 104 Health Information Helpline |
| 108 Emergency and Disaster Management Helpline |
| 138 All India Helpine for Passangers |
| 149 Public Road Transport Utility Service |
| 181 Chief Minister Helpline |
| 182 Indian Railway Security Helpline |
| 1033 Road Accident Management Service |
| 1037 Public Grievance Cell DoT HQ as 'Telecom Consumer Grievance Redressal Helpline' |
| 1056 Emergency Medical Services |
| 106X State of the Art Hospitals - AIIMS |
| 1063 Public Grievance Cell DoT Hq |
| 1064 Anti Corruption Helpline |
| 1070 Relief Commission for Natural Calamities |
| 1071 Air Accident Helpline |
| 1072 Rail Accident Helpline |
| 1073 Road Accident Helpline |
| 1077 Control Room for District Collector |
| 1090 Call Alart ( Crime Branch) |
| 1091 Women Helpline |
| 1097 National AIDS Helpline to NACO |
| 1099 Central Accident and Trauma Services (CATS) |
| 10580 Educational& Vocational Guidance and Counselling |
| 10589 Mother and Child Tracking ( MCTH) |
| 10740 Central Pollution Control Board |
| 10741 Pollution Control Board |
| 1511 Police Related Service for all Metro Railway Project |
| 1512 Prevention of Crime in Railway |
| 1514 National Career Service(NCS) |
| 15100 Free Legal Service Helpline |
| 155304 Municipal Corporations |
| 155214 Labour Helpline |
| 1903 Sashastra Seema Bal (SSB) |
| 1909 National Do Not Call Registry |
| 1912 Complaint of Electricity |
| 1916 Drinking Water Supply |
| 1950 Election Commission of India |

## 4.8. CUSTOMER CARE

Live calling is done to verify response time for customer assistance is done to verify the performance of call centre in terms of:

- Calls getting connected and answered by operator's IVR.
- % age of calls answered by operator / voice to voice) within 90 seconds: In 95% of the cases or more

The process for this parameter is stated below:

- Overall sample size is 100 calls per service provider per circle at different points of time, evenly distributed across the selected exchanges – 50 calls between 1100 HRS to 1400 HRS and 50 calls between 1600 HRS to 1900 HRS.
- Time to answer the call by the operator was assessed from the time interviewer pressed the requisite button for being assisted by the operator.
- All the supplementary services that have any kind of human intervention are to be covered here. It also includes the IVR assisted services.

## 4.9. INTER OPERATOR CALL ASSESSMENT

A total of 100 calls per service provider to all the other service providers in a licensed service area were done for the purpose of audit.

| Inter Operator Call Assessment | Aircel | Airtel | BSNL | Idea | RCOM GSM | RCOM CDMA | TTSL CDMA | TTSL GSM | Vodafone | MTS |
|---|---|---|---|---|---|---|---|---|---|---|
| Aircel | - | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% |
| Airtel | 100% | - | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% |
| BSNL | 100% | 100% | - | 100% | 100% | 100% | 100% | 100% | 100% | 100% |
| Idea | 100% | 100% | 100% | - | 100% | 100% | 100% | 100% | 100% | 100% |
| RCOM GSM | 100% | 100% | 100% | 100% | - | 100% | 100% | 100% | 100% | 100% |
| RCOM CDMA | 100% | 100% | 100% | 100% | 100% | - | 100% | 100% | 100% | 100% |
| TTSL CDMA | 100% | 100% | 100% | 100% | 100% | 100% | - | 100% | 100% | 100% |
| TTSL GSM | 100% | 100% | 100% | 100% | 100% | 100% | 100% | - | 100% | 100% |
| VODAFONE | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% | - | 100% |
| MTS | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% | - |

## 5. Drive Test: Significance and Methodology

Drive test, as the name suggests, is conducted to measure the outdoor coverage in a moving vehicle in a specified network coverage area.

The main purpose of the drive test is to check the health of the mobile network of various operators in the area in terms of coverage (signal strength), voice quality, call drop rate, call set up success rate etc.

To assess the indoor coverage, the test is also conducted at two static indoor locations in each SSA, such as Malls, office buildings, shopping complexes, government buildings etc.

There are two types of drive test as mentioned below.

- Operator Assisted Drive Test
- Independent Drive Test

The main difference between the two is that in the operator assisted, operators participate in the drive test along with their hardware, software, phones etc. while in the independent drive test PhiStream conducts the drive test on solitary basis and uses its own hardware. Operators generally do not have any knowledge of the independent drive test being conducted.

### 5.1. Operator Assisted Drive Test

Rajasthan circle consist of total 24 SSA's and each SSA needs to be audit in the span of 12 months.

The methodology adopted for the drive test:

- 3 consecutive days drive test in each SSA. SSA would be defined as per DOT guidelines and month wise SSA list is finalized by regional TRAI office.
- On an average, a minimum of 80 kilometres are covered each day
- Route map was designed in such a way that all the major roads, highways and all the important towns and villages were covered as part of audit.
- Special emphasis was given to those areas where the number of complaints received were on the higher side, if provided by TRAI.
- The route is defined in a way that we cover maximum area in the SSA and try to cover maximum villages and cities within the SSA. The route is designed such that there is no overlap of roads and we can start from the point from where we had left last day (if possible).
- The route was classified as – Within City, Major Roads, Highways, Shopping complex/ Mall and Office Complex/ Government Building
- There were no fixed calls which we need to do for within city, major roads and highways, but a minimum of 30 calls in each route, i.e., within city, major roads and highways on each day. For indoors, 20 calls each for shopping and office complex each day preferably in relatively bigger city.
- The drive test covered selected cities and adjoining towns/rural areas where the service provider has commenced service, including congested areas and indoor sites.
- The drive test of each mobile network was conducted between 10 am and 8 pm on weekdays.
- The Vehicle used in the drive tests was equipped with the test tool that automatically generates calls on the mobile telephone networks.
- The speed of the vehicle was kept at around 30 km/hr.
- The holding period of each test call was 120 seconds.
- A test call was generated 10 seconds after the previous test call is completed.
- Height of the antenna was kept uniform in case of all service providers.

## 5.2. INDEPENDENT DRIVE TEST

The number of independent drive tests to be conducted and their locations are decided basis TRAI recommendation.

- A minimum of 80 kilometres was traversed during the independent drive test in a SSA. The SSA would be defined as per BSNL and SSA list will be finalized by regional TRAI office.
- Route map was designed in such a way that all the major roads, highways and all the important towns and villages were covered as part of audit.
- Special emphasis was given to those areas where the number of complaints received were on the higher side, if provided by TRAI.
- The route is defined in a way that we cover maximum area in the SSA and try to cover maximum villages and cities within the SSA. The route is designed such that there is no overlap of roads (if possible).
- The route was classified as – Within city, Major Roads, Highways, Shopping complex/ Mall and Office Complex/ Government Building
- There were no fixed calls which we need to do for within city, major roads and highways, but a minimum of 30 calls in each route, i.e., within city, major roads and highways on each day. For indoors, 20 calls each for shopping and office complex each day preferably in relatively bigger city.
- The drive test covered selected cities and adjoining towns/rural areas where the service provider has commenced service, including congested areas and indoor sites.
- The drive test of each mobile network was conducted between 10 am and 8 pm on weekdays.
- The Vehicle used in the drive tests was equipped with the test tool that automatically generates calls on the mobile telephone networks.
- The speed of the vehicle was kept at around 30 km/hr.
- The holding period of each test call was 120 seconds.
- A test call was generated 10 seconds after the previous test call is completed.
- Height of the antenna was kept uniform in case of all service providers.

## 5.3. PARAMETERS EVALUATED DURING DRIVE TEST

The parameters which were captured during the drive test include. Below are the parameters which are captured for the GSM and CDMA operators.

- Coverage-Signal strength (GSM)
  - Total calls made (A)
  - Number of calls with signal strength between 0 to -75 dBm
  - Number of calls with signal strength between 0 to -85 dBm
  - Number of calls with signal strength between 0 to -95 dBm

- Coverage-Signal strength (CDMA)
  - Total Ec/Io BINS (A)
  - Total Ec/Io BINS with less than –15 (B)
  - Low Interference = [1 - (B/A)] x 100

- Voice quality (GSM)
  - Total RxQual Samples– A
  - RxQual samples with 0-5 value – B
  - %age samples with good voice quality = B/A x 100

- Voice quality (CDMA)
  - Total FER BINs (forward FER) – A
  - FER BINs with 0-2 value (forward FER) – B
  - FER BINs with 0-4 value (forward FER) – C
  - %age samples with FER bins having 0-2 value (forward FER) = B/A x 100
  - %age samples with FER bins having 0-4 value (forward FER) = C/A x 100
  - No. of FER samples with value > 4 = [A-C]

- Call setup success rate
  - Total number of call attempts – A
  - Total Calls successfully established – B
  - Call success rate (%age) = (B/A) x 100

- Blocked calls
  - 100% - Call Set up Rate

- Call drop rate
  - Total Calls successfully established – A
  - Total calls dropped after being established – B
  - Call Drop Rate (%age) = (B/A) x 100

## 6. EXECUTIVE SUMJUNY

The objective assessment of Quality of Service (QoS) carried out gives an insight into the overall performance of various operators in the Rajasthan Circle, with a parameter wise performance evaluation as compared to TRAI benchmark.

### 6.1. OPERATORS COVERED

| Name of Operator | Number of Subscriber (Up to June 30, 2016) |
|---|---|
| **AIRCEL** | 6521992 |
| **AIRTEL** | 19643122 |
| **BSNL** | 4361962 |
| **IDEA** | 7575284 |
| **MTS** | 2107751 |
| **RCOM CDMA** | 924776 |
| **RCOM GSM** | 5853126 |
| **TTSL CDMA** | 465966 |
| **TTSL GSM** | 800940 |
| **VODAFONE** | 12048845 |

| TSP | No. of cells | BTS | BSC | MSC+GMSC | Node B | RNC |
|---|---|---|---|---|---|---|
| **Aircel** | 7599 | 2542 | 17 | 3 | NA | NA |
| **Airtel** | 41608 | 8398 | 82 | 45 | 5225 | 17 |
| **BSNL** | 15856 | 4113 | 55 | 13+3 | 1298 | 16 |
| **IDEA** | 21106 | 6833 | 57 | 12+1 | NA | NA |
| **RCOM GSM** | 6166 | 2058 | 15 | 3+1 | NA | NA |
| **RCOM CDMA** | 2791 | 931 | 6 | 4+2 | NA | NA |
| **TTSL CDMA** | 2227 | 689 | 6 | 3+2 | NA | NA |
| **TTSL GSM** | 4175 | 1388 | 12 | 2 | NA | NA |
| **MTS** | 5224 | 1582 | 7 | 2 | NA | NA |
| **VODAFONE** | 22926 | 7481 | 91 | 8+4 | 2296 | 10 |

Note: Node B & RNC is marked as Not Applicable (N.A.) for the services providers who do not have 3G services licence in the circle.

DNA: Data not available

## 6.2. AUDIT SCHEDULE

| Operator | (3 Days Live audit) April2016 | April 2016 | May 2016 | June 2016 |
|---|---|---|---|---|
| Airtel | 11th Apr 2016 | 10th May2016 | 11thJun2016 | 11thJul 2016 |
| Vodafone | 8th Apr 2016 | 9th May2016 | 10thJun2016 | 8thJul 2016 |
| Idea | 14th Apr 2016 | 17th May2016 | 14thJun2016 | 14thJul 2016 |
| Reliance | 13th Apr 2016 | 16th May2016 | 15thJun 2016 | 13thJul 2016 |
| BSNL | 12th Apr 2016 | 22nd May2016 | 16thJun 2016 | 12thJul 2016 |
| Aircel | 6th Apr 2016 | 5th May2016 | 8thJun2016 | 6thJul 2016 |
| Tata Teleservices | 5th Apr 2016 | 7th May2016 | 7thJun2016 | 5thJul 2016 |
| MTS | 7th Apr 2016 | 6th May2016 | 9thJun2016 | 7thJul 2016 |

Note: Audit schedule mentioned above is for the PMR audit for the last month. 3 day live monitoring for the current month was carried along with the PMR audit.

Colour codes to read the report:

| | |
|---|---|
| | Not meeting the benchmark |
| NA | Not applicable |
| DNA | Data not available (at TSP premises) |

## 6.3. 2G VOICE PMR DATA: APRIL

| Network Parameters | | Apr-16 | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Name of Service Provider | | | | | | | | | | |
| | | Benchmark | AIRCEL | AIRTEL | BSNL | IDEA | MTS | RCOM CDMA | RCOM GSM | TTSL CDMA | TTSL GSM | VODAFONE |
| Network Availability | Sum of downtime of BTSs in a month in hrs. in the licensed service area | ≤ 2% | 0.06% | 0.09% | 1.36% | 0.04% | 0.05% | 0.06% | 0.12% | 0.04% | 0.06% | 0.07% |
| | No. of BTSs having accumulated downtime of >24 hours in a month | ≤ 2% | 0.00% | 0.12% | 1.61% | 0.01% | 0.06% | 0.00% | 0.63% | 0.00% | 0.00% | 0.21% |
| Connection Establishment (Accessibility) | Call Set-up Success Rate (Within Licensee own network | ≥ 95% | 97.23% | 97.58% | 97.65% | 99.65% | 99.15% | 98.43% | 97.47% | 97.91% | 99.44% | 99.68% |
| | SDDCH/Paging chl. Congestion | ≤ 1% | 0.30% | 0.63% | 0.59% | 0.26% | NA | NA | 0.09% | NA | 0.05% | 0.22% |
| | TCH Congestion | ≤ 2% | 0.90% | 1.39% | 1.62% | 0.15% | 0.05% | 0.59% | 0.42% | 1.25% | 0.10% | 0.32% |
| Connection Maintenance (Retainability) | Call Drop Rate (%age) | ≤ 2% | 0.69% | 0.55% | 1.33% | 0.49% | 0.29% | 0.21% | 0.12% | 0.28% | 0.38% | 0.59% |
| | Worst Affected cell having more than 3% TCH drop | ≤ 3% | 2.88% | 0.55% | 1.81% | 1.25% | 0.26% | 1.72% | 0.51% | 2.25% | 2.06% | 1.85% |
| | %age of connection with good voice quality | ≥ 95% | 96.49% | 98.76% | 97.73% | 97.60% | 99.20% | 99.13% | 99.36% | 98.85% | 98.99% | 96.94% |

## 6.4. 2G VOICE PMR DATA: MAY

| Network Parameters | | May-16 | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Name of Service Provider | | | | | | | | | | |
| | | Benchmark | AIRCEL | AIRTEL | BSNL | IDEA | MTS | RCOM CDMA | RCOM GSM | TTSL CDMA | TTSL GSM | VODAFONE |
| Network Availability | Sum of downtime of BTSs in a month in hrs. in the licensed service area | ≤ 2% | 0.09% | 0.16% | 1.30% | 0.05% | 0.08% | 0.05% | 0.08% | 0.14% | 0.15% | 0.15% |
| | No. of BTSs having accumulated downtime of >24 hours in a month | ≤ 2% | 0.04% | 0.15% | 1.57% | 0.03% | 0.07% | 0.00% | 0.19% | 0.29% | 0.29% | 0.65% |
| Connection Establishment (Accessibility) | Call Set-up Success Rate (Within Licensee own network | ≥ 95% | 97.10% | 97.55% | 98.18% | 99.59% | 98.93% | 98.49% | 96.98% | 98.61% | 99.36% | 99.66% |
| | SDDCH/Paging chl. Congestion | ≤ 1% | 0.32% | 0.63% | 0.74% | 0.21% | NA | NA | 0.13% | NA | 0.09% | 0.24% |
| | TCH Congestion | ≤ 2% | 1.29% | 1.48% | 1.73% | 0.19% | 0.16% | 0.45% | 0.46% | 0.58% | 0.17% | 0.34% |
| Connection Maintenance (Retainability) | Call Drop Rate (%age) | ≤ 2% | 0.77% | 0.60% | 1.38% | 0.50% | 0.31% | 0.28% | 0.16% | 0.27% | 0.41% | 0.61% |
| | Worst Affected cell having more than 3% TCH drop | ≤ 3% | 2.99% | 0.71% | 2.05% | 1.23% | 0.50% | 1.95% | 0.77% | 2.41% | 2.20% | 2.27% |
| | %age of connection with good voice quality | ≥ 95% | 96.49% | 98.68% | 97.87% | 97.45% | 99.18% | 99.12% | 99.32% | 98.83% | 98.92% | 97.00% |

## 6.5. 2G VOICE PMR DATA: JUNE

| Network Parameters | | Jun-16 | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Name of Service Provider | | | | | | | | | | |
| | | Benchmark | AIRCEL | AIRTEL | BSNL | IDEA | MTS | RCOM CDMA | RCOM GSM | TTSL CDMA | TTSL GSM | VODAFONE |
| Network Availability | Sum of downtime of BTSs in a month in hrs. in the licensed service area | ≤ 2% | 0.09% | 0.16% | 1.30% | 0.07% | 0.09% | 0.09% | 0.07% | 0.15% | 0.14% | 13.64% |
| | No. of BTSs having accumulated downtime of >24 hours in a month | ≤ 2% | 0.08% | 0.18% | 1.42% | 0.00% | 0.00% | 0.43% | 0.19% | 0.29% | 0.03% | 0.39% |
| Connection Establishment (Accessibility) | Call Set-up Success Rate (Within Licensee own network | ≥ 95% | 96.60% | 97.72% | 98.45% | 99.53% | 98.94% | 98.95% | 96.60% | 98.02% | 99.20% | 99.64% |
| | SDDCH/Paging chl. Congestion | ≤ 1% | 0.47% | 0.45% | 0.78% | 0.19% | NA | NA | 0.15% | NA | 0.07% | 0.22% |
| | TCH Congestion | ≤ 2% | 1.53% | 1.30% | 1.50% | 0.25% | 0.14% | 0.08% | 0.38% | 1.24% | 0.27% | 0.36% |
| Connection Maintenance (Retainability) | Call Drop Rate (%age) | ≤ 2% | 1.03% | 0.64% | 1.41% | 0.52% | 0.37% | 0.28% | 0.17% | 0.25% | 0.50% | 0.64% |
| | Worst Affected cell having more than 3% TCH drop | ≤ 3% | 3.59% | 0.76% | 2.14% | 1.36% | 0.83% | 2.38% | 0.94% | 2.48% | 2.46% | 2.65% |
| | %age of connection with good voice quality | ≥ 95% | 96.37% | 98.61% | 97.97% | 97.39% | 99.17% | 99.13% | 99.31% | 98.89% | 98.86% | 96.97% |

## 6.6. 2G VOICE PMR DATA: CONSOLIDATED

| Consolidated | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Network Parameters | | Name of Service Provider | | | | | | | | | | |
| | | Benchmark | AIRCEL | AIRTEL | BSNL | IDEA | MTS | RCOM CDMA | RCOM GSM | TTSL CDMA | TTSL GSM | VODAFONE |
| Network Availability | Sum of downtime of BTSs in a month in hrs. in the licensed service area | ≤ 2% | 0.08% | 0.14% | 1.32% | 0.06% | 0.07% | 0.07% | 0.09% | 0.11% | 0.12% | 4.62% |
| | No. of BTSs having accumulated downtime of >24 hours in a month | ≤ 2% | 0.04% | 0.15% | 1.53% | 0.01% | 0.04% | 0.14% | 0.34% | 0.19% | 0.11% | 0.42% |
| Connection Establishment (Accessibility) | Call Set-up Success Rate (Within Licensee own network | ≥ 95% | 96.98% | 97.61% | 98.09% | 99.59% | 99.01% | 98.62% | 97.02% | 98.18% | 99.33% | 99.66% |
| | SDDCH/Paging chl. Congestion | ≤ 1% | 0.37% | 0.57% | 0.70% | 0.22% | NA | NA | 0.12% | NA | 0.07% | 0.22% |
| | TCH Congestion | ≤ 2% | 1.24% | 1.39% | 1.62% | 0.20% | 0.12% | 0.37% | 0.42% | 1.02% | 0.18% | 0.34% |
| Connection Maintenance (Retainability) | Call Drop Rate (%age) | ≤ 2% | 0.83% | 0.60% | 1.37% | 0.50% | 0.32% | 0.26% | 0.15% | 0.27% | 0.43% | 0.61% |
| | Worst Affected cell having more than 3% TCH drop | ≤ 3% | 3.15% | 0.67% | 2.00% | 1.28% | 0.53% | 2.02% | 0.74% | 2.38% | 2.24% | 2.25% |
| | %age of connection with good voice quality | ≥ 95% | 96.45% | 98.69% | 97.86% | 97.48% | 99.18% | 99.13% | 99.33% | 98.86% | 98.92% | 96.97% |

## 6.7. 2G VOICE 3 DAYS LIVE DATA

A three day live measurement was conducted to measure the QoS provided by the operators. It was seen from the live data collected, that the performance of the operators across all parameters more or less corroborated with the audit data collected.

## 6.8. 2G VOICE 3 DAYS LIVE DATA: APRIL

| Apr-16 | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Network Parameters | | Name of Service Provider | | | | | | | | | | |
| | | Benchmark | AIRCEL | AIRTEL | BSNL | IDEA | MTS | RCOM CDMA | RCOM GSM | TTSL CDMA | TTSL GSM | VODAFONE |
| Network Availability | Sum of downtime of BTSs in a month in hrs. in the licensed service area | ≤ 2% | 0.05% | 0.10% | 1.35% | 0.05% | 0.04% | 0.07% | 0.12% | 0.04% | 0.06% | 0.04% |
| | No. of BTSs having accumulated downtime of >24 hours in a month | ≤ 2% | 0.00% | 0.00% | 0.07% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% |
| Connection Establishment (Accessibility) | Call Set-up Success Rate (Within Licensee own network | ≥ 95% | 97.03% | 96.38% | 98.46% | 99.67% | 99.11% | 98.98% | 98.92% | 98.67% | 99.33% | 99.61% |
| | SDDCH/Paging chl. Congestion | ≤ 1% | 0.25% | 0.84% | 0.55% | 0.26% | NA | NA | 0.11% | NA | 0.05% | 0.30% |
| | TCH Congestion | ≤ 2% | 0.93% | 0.94% | 1.62% | 0.13% | 0.09% | 0.25% | 0.51% | 0.52% | 0.19% | 0.39% |
| Connection Maintenance (Retainability) | Call Drop Rate (%age) | ≤ 2% | 0.73% | 0.56% | 1.33% | 0.50% | 0.30% | 0.18% | 0.03% | 0.25% | 0.42% | 0.58% |
| | Worst Affected cell having more than 3% TCH drop | ≤ 3% | 3.23% | 0.57% | 2.28% | 1.27% | 0.26% | 1.64% | 0.18% | 1.66% | 2.11% | 1.94% |
| | %age of connection with good voice quality | ≥ 95% | 96.47% | 98.89% | 98.67% | 97.59% | 99.21% | 99.16% | 99.36% | 98.94% | 99.00% | 96.93% |

## 6.9. 2G VOICE 3 DAYS LIVE DATA: MAY

| Network Parameters | | May-16 | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Name of Service Provider | | | | | | | | | | |
| | | Benchmark | AIRCEL | AIRTEL | BSNL | IDEA | MTS | RCOM CDMA | RCOM GSM | TTSL CDMA | TTSL GSM | VODAFONE |
| Network Availability | Sum of downtime of BTSs in a month in hrs. in the licensed service area | ≤ 2% | 0.07% | 0.17% | 0.45% | 0.05% | 0.06% | 0.02% | 0.08% | 0.04% | 0.06% | 0.13% |
| | No. of BTSs having accumulated downtime of >24 hours in a month | ≤ 2% | 0.00% | 0.00% | 0.10% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% |
| Connection Establishment (Accessibility) | Call Set-up Success Rate (Within Licensee own network | ≥ 95% | 97.31% | 97.62% | 98.47% | 99.52% | 98.82% | 97.78% | 97.59% | 98.67% | 99.33% | 99.71% |
| | SDDCH/Paging chl. Congestion | ≤ 1% | 0.22% | 0.44% | 0.68% | 0.13% | NA | NA | 0.12% | NA | 0.05% | 0.20% |
| | TCH Congestion | ≤ 2% | 1.15% | 1.45% | 1.55% | 0.27% | 0.24% | 1.17% | 0.40% | 0.52% | 0.19% | 0.29% |
| Connection Maintenance (Retainability) | Call Drop Rate (%age) | ≤ 2% | 0.68% | 0.58% | 1.36% | 0.48% | 0.31% | 0.30% | 0.14% | 0.25% | 0.42% | 0.62% |
| | Worst Affected cell having more than 3% TCH drop | ≤ 3% | 2.56% | 0.67% | 2.13% | 1.06% | 0.33% | 1.54% | 0.79% | 1.66% | 2.11% | 2.27% |
| | %age of connection with good voice quality | ≥ 95% | 96.59% | 98.73% | 98.00% | 97.48% | 99.19% | 99.12% | 99.32% | 98.94% | 99.00% | 96.93% |

## 6.10. 2G VOICE 3 DAYS LIVE DATA: JUNE

| Network Parameters | | Jun-16 | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Name of Service Provider | | | | | | | | | | |
| | | Benchmark | AIRCEL | AIRTEL | BSNL | IDEA | MTS | RCOM CDMA | RCOM GSM | TTSL CDMA | TTSL GSM | VODAFONE |
| Network Availability | Sum of downtime of BTSs in a month in hrs. in the licensed service area | ≤ 2% | 0.08% | 0.10% | 1.31% | 0.03% | 0.10% | 0.12% | 0.08% | 0.09% | 0.11% | 0.11% |
| | No. of BTSs having accumulated downtime of >24 hours in a month | ≤ 2% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.04% |
| Connection Establishment (Accessibility) | Call Set-up Success Rate (Within Licensee own network | ≥ 95% | 96.82% | 97.67% | 98.00% | 99.69% | 99.03% | 98.70% | 96.76% | 97.78% | 99.30% | 99.68% |
| | SDDCH/Paging chl. Congestion | ≤ 1% | 0.20% | 0.26% | 0.72% | 0.08% | NA | 0.00% | 0.00% | NA | 0.05% | 0.15% |
| | TCH Congestion | ≤ 2% | 1.47% | 1.33% | 1.59% | 0.11% | 0.13% | 0.26% | 0.40% | 1.42% | 0.20% | 0.32% |
| Connection Maintenance (Retainability) | Call Drop Rate (%age) | ≤ 2% | 0.87% | 0.59% | 1.34% | 0.50% | 0.29% | 0.31% | 0.16% | 0.22% | 0.41% | 0.59% |
| | Worst Affected cell having more than 3% TCH drop | ≤ 3% | 3.81% | 0.66% | 2.49% | 1.29% | 0.73% | 2.44% | 0.85% | 2.40% | 2.33% | 2.14% |
| | %age of connection with good voice quality | ≥ 95% | 96.50% | 98.68% | DNA | 97.43% | 99.18% | 99.15% | 99.34% | 98.89% | 98.91% | 97.11% |

## 6.11. 2G 3 DAYS LIVE DATA: CONSOLIDATED

| Consolidated | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Network Parameters | | Name of Service Provider | | | | | | | | | |
| | | Benchmark | AIRCEL | AIRTEL | BSNL | IDEA | MTS | RCOM CDMA | RCOM GSM | TTSL CDMA | TTSL GSM | VODAFONE |
| Network Availability | Sum of downtime of BTSs in a month in hrs. in the licensed service area | ≤ 2% | 0.07% | 0.12% | 1.04% | 0.04% | 0.07% | 0.07% | 0.09% | 0.06% | 0.08% | 0.09% |
| | No. of BTSs having accumulated downtime of >24 hours in a month | ≤ 2% | 0.00% | 0.00% | 0.06% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.01% |
| Connection Establishment (Accessibility) | Call Set-up Success Rate (Within Licensee own network | ≥ 95% | 97.06% | 97.23% | 98.31% | 99.63% | 98.99% | 98.49% | 97.76% | 98.37% | 99.32% | 99.67% |
| | SDDCH/Paging chl. Congestion | ≤ 1% | 0.23% | 0.51% | 0.65% | 0.16% | NA | NA | 0.08% | NA | 0.05% | 0.21% |
| | TCH Congestion | ≤ 2% | 1.18% | 1.24% | 1.58% | 0.17% | 0.15% | 0.56% | 0.43% | 0.82% | 0.19% | 0.33% |
| Connection Maintenance (Retainability) | Call Drop Rate (%age) | ≤ 2% | 0.76% | 0.58% | 1.34% | 0.49% | 0.30% | 0.27% | 0.11% | 0.24% | 0.42% | 0.60% |
| | Worst Affected cell having more than 3% TCH drop | ≤ 3% | 3.20% | 0.63% | 2.30% | 1.21% | 0.44% | 1.87% | 0.61% | 1.91% | 2.18% | 2.12% |
| | %age of connection with good voice quality | ≥ 95% | 96.52% | 98.77% | 98.34% | 97.50% | 99.19% | 99.14% | 99.34% | 98.92% | 98.97% | 96.99% |

## 6.12. 3G VOICE PMR: CONSOLIDATED

| Consolidated | | | | | | |
|---|---|---|---|---|---|---|
| Network Parameters | | Name of Service Provider | | | | |
| | | Benchmark | AIRTEL | BSNL | RCOM | VODAFONE |
| Network Availability | Sum of downtime of BTSs in a month in hrs. in the licensed service area | ≤ 2% | 0.23% | 1.00% | 0.27% | 0.30% |
| | No. of BTSs having accumulated downtime of >24 hours in a month | ≤ 2% | 0.22% | 1.71% | 0.80% | 1.30% |
| Connection Establishment (Accessibility) | Call Set-up Success Rate (Within Licensee own network | ≥ 95% | 99.60% | 96.15% | 99.16% | 99.92% |
| | RRC Congestion: | ≤ 1% | 0.03% | 0.51% | 0.03% | 0.01% |
| | RAB Congestion: | ≤ 2% | 0.03% | 1.24% | 0.04% | 0.01% |
| Connection Maintenance (Retainability) | Circuit Switched Voice Drop Rate | ≤ 2% | 0.50% | 1.78% | 0.06% | 0.23% |
| | Worst affected cells having more than 3% Circuit Switched Voice Drop Rate: | ≤ 3% | 1.06% | 2.67% | 0.23% | 2.58% |
| | Percentage of connections with Good Circuit Switched Voice Quality | ≥ 95% | 98.89% | 97.70% | 99.85% | 98.93% |

## 6.13. 3G VOICE PMR: APRIL

| Apr-16 | | | | | | |
|---|---|---|---|---|---|---|
| Network Parameters | | Name of Service Provider | | | | |
| | | Benchmark | AIRTEL | BSNL | RCOM | VODAFONE |
| Network Availability | Sum of downtime of BTSs in a month in hrs. in the licensed service area | ≤ 2% | 0.14% | 1.51% | 0.24% | 0.23% |
| | No. of BTSs having accumulated downtime of >24 hours in a month | ≤ 2% | 0.19% | 1.38% | 0.00% | 1.11% |
| Connection Establishment (Accessibility) | Call Set-up Success Rate (Within Licensee own network | ≥ 95% | 99.57% | 95.87% | 99.58% | 99.92% |
| | RRC Congestion: | ≤ 1% | 0.04% | 0.65% | 0.02% | 0.02% |
| | RAB Congestion: | ≤ 2% | 0.04% | 1.34% | 0.03% | 0.02% |
| Connection Maintenance (Retainability) | Circuit Switched Voice Drop Rate | ≤ 2% | 0.47% | 1.76% | 0.05% | 0.21% |
| | Worst affected cells having more than 3% Circuit Switched Voice Drop Rate: | ≤ 3% | 0.99% | 2.69% | 0.22% | 2.64% |
| | Percentage of connections with Good Circuit Switched Voice Quality | ≥ 95% | 98.90% | 97.97% | 99.80% | 98.96% |

## 6.14. 3G VOICE PMR: MAY

| May-16 | | | | | | |
|---|---|---|---|---|---|---|
| Network Parameters | | Name of Service Provider | | | | |
| | | Benchmark | AIRTEL | BSNL | RCOM | VODAFONE |
| Network Availability | Sum of downtime of BTSs in a month in hrs. in the licensed service area | ≤ 2% | 0.31% | 0.05% | 0.31% | 0.36% |
| | No. of BTSs having accumulated downtime of >24 hours in a month | ≤ 2% | 0.21% | 1.90% | 1.06% | 1.67% |
| Connection Establishment (Accessibility) | Call Set-up Success Rate (Within Licensee own network | ≥ 95% | 99.61% | 96.22% | 98.16% | 99.91% |
| | RRC Congestion: | ≤ 1% | 0.03% | 0.46% | 0.03% | 0.01% |
| | RAB Congestion: | ≤ 2% | 0.03% | 1.20% | 0.06% | 0.01% |
| Connection Maintenance (Retainability) | Circuit Switched Voice Drop Rate | ≤ 2% | 0.48% | 1.78% | 0.08% | 0.25% |
| | Worst affected cells having more than 3% Circuit Switched Voice Drop Rate: | ≤ 3% | 1.02% | 2.69% | 0.22% | 2.53% |
| | Percentage of connections with Good Circuit Switched Voice Quality | ≥ 95% | 98.87% | 97.74% | 99.85% | 98.94% |

## 6.15. 3G VOICE PMR: JUNE

| Jun-16 | | | | | | |
|---|---|---|---|---|---|---|
| Network Parameters | | Name of Service Provider | | | | |
| | | Benchmark | AIRTEL | BSNL | RCOM | VODAFONE |
| Network Availability | Sum of downtime of BTSs in a month in hrs. in the licensed service area | ≤ 2% | 0.26% | 1.45% | 0.25% | 0.30% |
| | No. of BTSs having accumulated downtime of >24 hours in a month | ≤ 2% | 0.27% | 1.86% | 1.36% | 1.12% |
| Connection Establishment (Accessibility) | Call Set-up Success Rate (Within Licensee own network | ≥ 95% | 99.61% | 96.35% | 99.75% | 99.92% |
| | RRC Congestion: | ≤ 1% | 0.02% | 0.43% | 0.03% | 0.01% |
| | RAB Congestion: | ≤ 2% | 0.03% | 1.17% | 0.03% | 0.00% |
| Connection Maintenance (Retainability) | Circuit Switched Voice Drop Rate | ≤ 2% | 0.54% | 1.82% | 0.06% | 0.22% |
| | Worst affected cells having more than 3% Circuit Switched Voice Drop Rate: | ≤ 3% | 1.17% | 2.62% | 0.25% | 2.58% |
| | Percentage of connections with Good Circuit Switched Voice Quality | ≥ 95% | 98.89% | 97.40% | 99.91% | 98.91% |

## 6.16. 3G VOICE 3 DAYS LIVE DATA: CONSOLIDATED

| Consolidated | | | | | | |
|---|---|---|---|---|---|---|
| Network Parameters | | Name of Service Provider | | | | |
| | | Benchmark | AIRTEL | BSNL | RCOM | VODAFONE |
| Network Availability | Sum of downtime of BTSs in a month in hrs. in the licensed service area | ≤ 2% | 0.25% | 1.12% | 0.34% | 0.24% |
| | No. of BTSs having accumulated downtime of >24 hours in a month | ≤ 2% | 0.00% | 0.10% | 0.00% | 0.03% |
| Connection Establishment (Accessibility) | Call Set-up Success Rate (Within Licensee own network | ≥ 95% | 99.57% | 95.95% | 98.34% | 99.91% |
| | RRC Congestion: | ≤ 1% | 0.03% | 0.50% | 0.05% | 0.03% |
| | RAB Congestion: | ≤ 2% | 0.03% | 1.24% | 0.09% | 0.03% |
| Connection Maintenance (Retainability) | Circuit Switched Voice Drop Rate | ≤ 2% | 0.47% | 1.79% | 0.08% | 0.22% |
| | Worst affected cells having more than 3% Circuit Switched Voice Drop Rate: | ≤ 3% | 1.03% | 2.68% | 0.30% | 2.76% |
| | Percentage of connections with Good Circuit Switched Voice Quality | ≥ 95% | 98.90% | 97.00% | 99.79% | 98.93% |

## 6.17. 3G VOICE 3 DAYS LIVE DATA: APRIL

| Apr-16 | | | | | | |
|---|---|---|---|---|---|---|
| Network Parameters | | Name of Service Provider | | | | |
| | | Benchmark | AIRTEL | BSNL | RCOM | VODAFONE |
| Network Availability | Sum of downtime of BTSs in a month in hrs. in the licensed service area | ≤ 2% | 0.09% | 0.49% | 0.39% | 0.11% |
| | No. of BTSs having accumulated downtime of >24 hours in a month | ≤ 2% | 0.00% | 0.08% | 0.00% | 0.00% |
| Connection Establishment (Accessibility) | Call Set-up Success Rate (Within Licensee own network | ≥ 95% | 99.58% | 95.15% | 99.03% | 99.87% |
| | RRC Congestion: | ≤ 1% | 0.06% | 0.74% | 0.01% | 0.08% |
| | RAB Congestion: | ≤ 2% | 0.05% | 1.45% | 0.05% | 0.07% |
| Connection Maintenance (Retainability) | Circuit Switched Voice Drop Rate | ≤ 2% | 0.44% | 1.83% | 0.07% | 0.19% |
| | Worst affected cells having more than 3% Circuit Switched Voice Drop Rate: | ≤ 3% | 1.00% | 2.73% | 0.35% | 2.46% |
| | Percentage of connections with Good Circuit Switched Voice Quality | ≥ 95% | 98.92% | 97.00% | 99.85% | 98.95% |

## 6.18. 3G VOICE 3 DAYS LIVE DATA: MAY

| May-16 | | | | | | |
|---|---|---|---|---|---|---|
| Network Parameters | | Name of Service Provider | | | | |
| | | Benchmark | AIRTEL | BSNL | RCOM | VODAFONE |
| Network Availability | Sum of downtime of BTSs in a month in hrs. in the licensed service area | ≤ 2% | 0.46% | 1.45% | 0.40% | 0.32% |
| | No. of BTSs having accumulated downtime of >24 hours in a month | ≤ 2% | 0.00% | 0.23% | 0.00% | 0.00% |
| Connection Establishment (Accessibility) | Call Set-up Success Rate (Within Licensee own network | ≥ 95% | 99.46% | 96.13% | 96.13% | 99.92% |
| | RRC Congestion: | ≤ 1% | 0.02% | 0.45% | 0.08% | 0.00% |
| | RAB Congestion: | ≤ 2% | 0.02% | 1.11% | 0.18% | 0.00% |
| Connection Maintenance (Retainability) | Circuit Switched Voice Drop Rate | ≤ 2% | 0.48% | 1.69% | 0.11% | 0.25% |
| | Worst affected cells having more than 3% Circuit Switched Voice Drop Rate: | ≤ 3% | 1.01% | 2.70% | 0.25% | 2.98% |
| | Percentage of connections with Good Circuit Switched Voice Quality | ≥ 95% | 98.91% | 97.00% | 99.77% | 98.96% |

## 6.19. 3G VOICE 3 DAYS LIVE DATA: JUNE

| Jun-16 | | | | | | |
|---|---|---|---|---|---|---|
| Network Parameters | | Name of Service Provider | | | | |
| | | Benchmark | AIRTEL | BSNL | RCOM | VODAFONE |
| Network Availability | Sum of downtime of BTSs in a month in hrs. in the licensed service area | ≤ 2% | 0.20% | 1.44% | 0.23% | 0.29% |
| | No. of BTSs having accumulated downtime of >24 hours in a month | ≤ 2% | 0.00% | 0.00% | 0.00% | 0.08% |
| Connection Establishment (Accessibility) | Call Set-up Success Rate (Within Licensee own network | ≥ 95% | 99.66% | 96.57% | 99.85% | 99.93% |
| | RRC Congestion: | ≤ 1% | 0.01% | 0.30% | 0.07% | 0.00% |
| | RAB Congestion: | ≤ 2% | 0.01% | 1.16% | 0.02% | 0.00% |
| Connection Maintenance (Retainability) | Circuit Switched Voice Drop Rate | ≤ 2% | 0.48% | 1.85% | 0.05% | 0.22% |
| | Worst affected cells having more than 3% Circuit Switched Voice Drop Rate: | ≤ 3% | 1.08% | 2.60% | 0.30% | 2.82% |
| | Percentage of connections with Good Circuit Switched Voice Quality | ≥ 95% | 98.87% | 97.00% | 99.77% | 98.90% |

## 6.20. 2G WIRELESS DATA: APRIL

| Apr-16 | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Cellular Mobile Telephone Services | | | | | | | | | | | | |
| S. No. | Name of Parameter | Benchmark | AIRCEL | AIRTEL | BSNL | IDEA | MTS | RCOM CDMA | RCOM GSM | TTSL CDMA | TTSL GSM | VODAFONE |
| Network Service Quality Parameter | | | | | | | | | | | | |
| 1 | Service Activation/ Provisioning | | | | | | | | | | | |
| i) | Total No. of Subscribers for Service Activation (A) | | 1466984 | DNA | DNA | 327353 | 73519 | 19378 | 241253 | 5782 | 43009 | DNA |
| ii) | Total Service Activations provided within 4 Hours (B) | | 1460715 | DNA | DNA | 327342 | DNA | 19376 | 241246 | 5782 | 43009 | DNA |
| iii) | Service Activation / Provisioning = (B/A) * 100 | Within 4 Hours with 95% Success Rate | 99.57% | DNA | DNA | 100.00% | DNA | 99.99% | 100.00% | 100.00% | 100.00% | DNA |
| 2 | PDP Context Activation Success Rate | | | | | | | | | | | |
| i) | Total No. of PDP Context Activation Requests (from SGSN to GGSN) (A) | | 248213596 | DNA | DNA | 59814616 | 5021058 | DNA | DNA | 7865175 | 2450513 | 8466915 |
| ii) | Total No. of PDP Context Activation Success (path created b/w SGSN and GGSN) (B) | | 238570801 | DNA | DNA | 59440058 | 4968381 | DNA | DNA | 7592060 | 2446575 | 8460092 |
| iii) | PDP Context Activation Success Rate =(B/A) *100 | >=95% | 96.12% | 99.94% | DNA | 99.37% | 98.95% | 99.54% | 99.81% | 96.53% | 99.84% | 99.92% |
| 3 | Drop Rate | | | | | | | | | | | |
| i) | TBF originated PS Domain Iu Connection Setup Success (A) | | 7040530602 | DNA | DNA | 33311765424 | 149156752 | 3942006 | 1047069239 | 4644809 | 547680048 | 2272493323 |
| ii) | TBF originated PS Domain Iu Connection Release (B) | | 79494879 | DNA | DNA | 41042196 | 2487117 | 11613 | 22228975 | 65224 | 11352153 | 83978536 |
| iii) | Drop Rate = (B/A) * 100 | <=5% | 1.13% | 1.15% | DNA | 0.12% | 1.67% | 0.29% | 2.12% | 1.40% | 2.07% | 3.70% |

## 6.21. 2G WIRELESS DATA: MAY

| May-16 | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Cellular Mobile Telephone Services | | | | | | | | | | | | |
| S. No. | Name of Parameter | Benchmark | AIRCEL | AIRTEL | BSNL | IDEA | MTS | RCOM CDMA | RCOM GSM | TTSL CDMA | TTSL GSM | VODAFONE |
| Network Service Quality Parameter | | | | | | | | | | | | |
| 1 | Service Activation/ Provisioning | | | | | | | | | | | |
| i) | Total No. of Subscribers for Service Activation (A) | | 2107169 | DNA | DNA | DNA | 80573 | 6115 | 225926 | 5854 | 42057 | DNA |
| ii) | Total Service Activations provided within 4 Hours (B) | | 2104445 | DNA | DNA | DNA | DNA | 6109 | 225924 | 5854 | 42057 | DNA |
| iii) | Service Activation / Provisioning = (B/A) * 100 | Within 4 Hours with 95% Success Rate | 99.87% | DNA | DNA | DNA | DNA | 99.90% | 100.00% | 100.00% | 100.00% | DNA |
| 2 | PDP Context Activation Success Rate | | | | | | | | | | | |
| i) | Total No. of PDP Context Activation Requests (from SGSN to GGSN) (A) | | 141875665 | DNA | DNA | 63821272 | 5379082 | DNA | DNA | 8408074 | 1769331 | 461880556 |
| ii) | Total No. of PDP Context Activation Success (path created b/w SGSN and GGSN) (B) | | 141229155 | DNA | DNA | 63722132 | 5321357 | DNA | DNA | 8107240 | 1766831 | 460843864 |
| iii) | PDP Context Activation Success Rate =(B/A) *100 | >=95% | 99.54% | 99.94% | DNA | 99.84% | 98.93% | 99.54% | 99.85% | 96.42% | 99.86% | 99.78% |
| 3 | Drop Rate | | | | | | | | | | | |
| i) | TBF originated PS Domain Iu Connection Setup Success (A) | | 7389638480 | DNA | DNA | 36755045229 | 154662297 | 4754331 | 1933069777 | 5589717 | 555640090 | 2389682696 |
| ii) | TBF originated PS Domain Iu Connection Release (B) | | 80891286 | DNA | DNA | 46779321 | 3028367 | 20613 | 1839273889 | 70344 | 11209221 | 92855155 |
| iii) | Drop Rate = (B/A) * 100 | <=5% | 1.09% | 1.21% | DNA | 0.13% | 1.96% | 0.43% | 4.85% | 1.26% | 2.02% | 3.89% |

## 6.22. 2G WIRELESS DATA: JUNE

| Jun-16 | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Cellular Mobile Telephone Services | | | | | | | | | | | | |
| S. No. | Name of Parameter | Benchmark | AIRCEL | AIRTEL | BSNL | IDEA | MTS | RCOM CDMA | RCOM GSM | TTSL CDMA | TTSL GSM | VODAFONE |
| Network Service Quality Parameter | | | | | | | | | | | | |
| 1 | Service Activation/ Provisioning | | | | | | | | | | | |
| i) | Total No. of Subscribers for Service Activation (A) | | 1414836 | DNA | DNA | DNA | 77871 | 9689 | 215490 | 8510 | 39311 | DNA |
| ii) | Total Service Activations provided within 4 Hours (B) | | 1413502 | DNA | DNA | DNA | NA | 9687 | 215477 | 8510 | 39311 | DNA |
| iii) | Service Activation / Provisioning = (B/A) * 100 | Within 4 Hours with 95% Success Rate | 99.91% | DNA | DNA | DNA | NA | 99.98% | 99.99% | 100.00% | 100.00% | DNA |
| 2 | PDP Context Activation Success Rate | | | | | | | | | | | |
| i) | Total No. of PDP Context Activation Requests (from SGSN to GGSN) (A) | | 150590533 | DNA | 4120563 | 60603569 | 4789111 | DNA | DNA | 8253534 | 1646163 | 20008468 |
| ii) | Total No. of PDP Context Activation Success (path created b/w SGSN and GGSN) (B) | | 149950412 | DNA | 3965596.79 | 60322871 | 4743235 | DNA | DNA | 7965149 | 1643761 | 19996889 |
| iii) | PDP Context Activation Success Rate =(B/A) *100 | >=95% | 99.57% | 99.92% | 96.24% | 99.54% | 99.04% | 99.54% | 99.84% | 96.51% | 99.85% | 99.94% |
| 3 | Drop Rate | | | | | | | | | | | |
| i) | TBF originated PS Domain Iu Connection Setup Success (A) | | 7183230999 | DNA | DNA | 35717072942 | 148904640 | 3838723 | 1799082463 | 5258050 | 527184735 | 2277924103 |
| ii) | TBF originated PS Domain Iu Connection Release (B) | | 80992512 | DNA | DNA | 45583205 | 2922580 | 16609 | 38478905 | 66991 | 10971110 | 77231218 |
| iii) | Drop Rate = (B/A) * 100 | <=5% | 1.13% | 1.25% | DNA | 0.13% | 1.96% | 0.43% | 2.14% | 1.27% | 2.08% | 3.39% |

## 6.23. 2G WIRELESS DATA: CONSOLIDATED

| Consolidated | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Cellular Mobile Telephone Services | | | | | | | | | | | | |
| S. No. | Name of Parameter | Benchmark | AIRCEL | AIRTEL | BSNL | IDEA | MTS | RCOM CDMA | RCOM GSM | TTSL CDMA | TTSL GSM | VODAFONE |
| Network Service Quality Parameter | | | | | | | | | | | | |
| 1 | Service Activation/ Provisioning | | | | | | | | | | | |
| i) | Total No. of Subscribers for Service Activation (A) | | 1662996 | DNA | DNA | 327353 | 77321 | 11727 | 227556 | 6715 | 41459 | DNA |
| ii) | Total Service Activations provided within 4 Hours (B) | | 1659554 | DNA | DNA | 327342 | DNA | 11724 | 227549 | 6715 | 41459 | DNA |
| iii) | Service Activation / Provisioning = (B/A) * 100 | Within 4 Hours with 95% Success Rate | 99.78% | DNA | DNA | 100.00% | DNA | 99.96% | 100.00% | 100.00% | 100.00% | DNA |
| 2 | PDP Context Activation Success Rate | | | | | | | | | | | |
| i) | Total No. of PDP Context Activation Requests (from SGSN to GGSN) (A) | | 180226598 | DNA | 4120563 | 61413152 | 5063084 | DNA | DNA | 8175594 | 1955336 | 163451980 |
| ii) | Total No. of PDP Context Activation Success (path created b/w SGSN and GGSN) (B) | | 176583456 | DNA | 3965597 | 61161687 | 5010991 | DNA | DNA | 7888150 | 1952389 | 163100282 |
| iii) | PDP Context Activation Success Rate =(B/A) *100 | >=95% | 98.41% | 99.93% | 96.24% | 99.59% | 98.97% | 99.54% | 99.83% | 96.49% | 99.85% | 99.88% |
| 3 | Drop Rate | | | | | | | | | | | |
| i) | TBF originated PS Domain Iu Connection Setup Success (A) | | 7204466694 | DNA | DNA | 35261294532 | 150907896 | 4178353 | 1593073826 | 5164192 | 543501624 | 2313366707 |
| ii) | TBF originated PS Domain Iu Connection Release (B) | | 80459559 | DNA | DNA | 44468241 | 2812688 | 16278 | 633327256 | 67520 | 11177495 | 84688303 |
| iii) | Drop Rate = (B/A) * 100 | <=5% | 1.12% | 1.20% | DNA | 0.13% | 1.86% | 0.39% | 3.04% | 1.31% | 2.06% | 3.66% |

## 6.24. 2G WIRELESS 3 DAYS LIVE DATA: APRIL

| Apr-16 | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Cellular Mobile Telephone Services | | | | | | | | | | | | |
| S. No. | Name of Parameter | Benchmark | AIRCEL | AIRTEL | BSNL | IDEA | MTS | RCOM CDMA | RCOM GSM | TTSL CDMA | TTSL GSM | VODAFONE |
| Network Service Quality Parameter | | | | | | | | | | | | |
| 1 | Service Activation/ Provisioning | | | | | | | | | | | |
| i) | Total No. of Subscribers for Service Activation (A) | | DNA | DNA | DNA | DNA | 7656 | DNA | DNA | 550 | 4669 | DNA |
| ii) | Total Service Activations provided within 4 Hours (B) | | DNA | DNA | DNA | DNA | DNA | DNA | DNA | 550 | 4669 | DNA |
| iii) | Service Activation / Provisioning = (B/A) * 100 | *Within 4 Hours with 95% Success Rate* | DNA | DNA | DNA | DNA | DNA | DNA | DNA | 100.00% | 100.00% | DNA |
| 2 | PDP Context Activation Success Rate | | | | | | | | | | | |
| i) | Total No. of PDP Context Activation Requests (from SGSN to GGSN) (A) | | 20487856 | DNA | 5263105 | DNA | 505968 | DNA | DNA | 793625 | 226993 | 862313 |
| ii) | Total No. of PDP Context Activation Success (path created b/w SGSN and GGSN) (B) | | 20422416 | DNA | 5254999 | DNA | 511571 | DNA | DNA | 765895 | 226492 | 861639 |
| iii) | PDP Context Activation Success Rate =(B/A) *100 | >=95% | 99.68% | 99.94% | 99.85% | DNA | 98.90% | DNA | 99.87% | 96.51% | 99.78% | 99.92% |
| 3 | Drop Rate | | | | | | | | | | | |
| i) | TBF originated PS Domain Iu Connection Setup Success (A) | | DNA | DNA | DNA | 3351959508 | 15170973 | DNA | 3566757132 | 495842 | 55054759 | DNA |
| ii) | TBF originated PS Domain Iu Connection Release (B) | | DNA | DNA | DNA | 3977270 | 279673 | DNA | 81499399 | 6430 | 1136034 | DNA |
| | Drop Rate = (B/A) * 100 | <=5% | 1.15% | 1.15% | DNA | 0.12% | 1.84% | DNA | 2.28% | 1.30% | 2.06% | DNA |

## 6.25. 2G Wireless 3 Days Live Data: May

| May-16 | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Cellular Mobile Telephone Services | | | | | | | | | | | | |
| S. No. | Name of Parameter | Benchmark | AIRCEL | AIRTEL | BSNL | IDEA | MTS | RCOM CDMA | RCOM GSM | TTSL CDMA | TTSL GSM | VODAFONE |
| Network Service Quality Parameter | | | | | | | | | | | | |
| 1 | Service Activation/ Provisioning | | | | | | | | | | | |
| i) | Total No. of Subscribers for Service Activation (A) | | NA | DNA | DNA | DNA | 7745 | DNA | 21059 | 550 | 4669 | DNA |
| ii) | Total Service Activations provided within 4 Hours (B) | | NA | DNA | DNA | DNA | DNA | DNA | 21059 | 550 | 4669 | DNA |
| iii) | Service Activation / Provisioning = (B/A) * 100 | *Within 4 Hours with 95% Success Rate* | NA | DNA | DNA | DNA | DNA | DNA | 100% | 100% | 100% | DNA |
| 2 | PDP Context Activation Success Rate | | | | | | | | | | | |
| i) | Total No. of PDP Context Activation Requests (from SGSN to GGSN) (A) | | 17345652 | DNA | 5628078 | DNA | 508401 | DNA | DNA | 793625 | 226993 | 834972 |
| ii) | Total No. of PDP Context Activation Success (path created b/w SGSN and GGSN) (B) | | 17282342 | DNA | 5621969 | DNA | 514358 | DNA | DNA | 765895 | 226492 | 834316 |
| iii) | PDP Context Activation Success Rate =(B/A) *100 | >=95% | 99.64% | 99.95% | 99.89% | DNA | 98.84% | DNA | 99.82% | 96.51% | 99.78% | 99.92% |
| 3 | Drop Rate | | | | | | | | | | | |
| i) | TBF originated PS Domain Iu Connection Setup Success (A) | | 717519738 | DNA | DNA | DNA | 15119477 | DNA | 169901822 | 495842 | 55054759 | 232809680 |
| ii) | TBF originated PS Domain Iu Connection Release (B) | | 7714077 | DNA | DNA | DNA | 305806 | DNA | 3760980 | 6430 | 1136034 | 8789633 |
| iii) | Drop Rate = (B/A) * 100 | <=5% | 1.08% | 1.17% | DNA | DNA | 2.02% | DNA | 2.21% | 1.30% | 2.06% | 3.78% |

## 6.26. 2G Wireless 3 Days Live Data: June

| Jun-16 | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Cellular Mobile Telephone Services | | | | | | | | | | | | |
| S. No. | Name of Parameter | Benchmark | AIRCEL | AIRTEL | BSNL | IDEA | MTS | RCOM CDMA | RCOM GSM | TTSL CDMA | TTSL GSM | VODAFONE |
| Network Service Quality Parameter | | | | | | | | | | | | |
| 1 | Service Activation/ Provisioning | | | | | | | | | | | |
| i) | Total No. of Subscribers for Service Activation (A) | | DNA | DNA | DNA | DNA | 7792 | DNA | 18954 | 618 | 4195 | DNA |
| ii) | Total Service Activations provided within 4 Hours (B) | | DNA | DNA | DNA | DNA | DNA | DNA | 18954 | 618 | 4195 | DNA |
| iii) | Service Activation / Provisioning = (B/A) * 100 | *Within 4 Hours with 95% Success Rate* | DNA | DNA | DNA | DNA | DNA | DNA | 100.00% | 100.00% | 100.00% | DNA |
| 2 | PDP Context Activation Success Rate | | | | | | | | | | | |
| i) | Total No. of PDP Context Activation Requests (from SGSN to GGSN) (A) | | 14329481 | DNA | DNA | DNA | 511088 | DNA | DNA | 855242 | 167647 | 39779506 |
| ii) | Total No. of PDP Context Activation Success (path created b/w SGSN and GGSN) (B) | | 14268618 | DNA | DNA | DNA | 517421 | DNA | DNA | 824626 | 167200 | 39753992 |
| iii) | PDP Context Activation Success Rate =(B/A) *100 | >=95% | 99.58% | DNA | DNA | DNA | 98.78% | DNA | DNA | 96.42% | 99.73% | 99.94% |
| 3 | Drop Rate | | | | | | | | | | | |
| i) | TBF originated PS Domain Iu Connection Setup Success (A) | | DNA | DNA | DNA | DNA | 15264591 | DNA | 183433575 | 560962 | 54478085 | 230226248 |
| ii) | TBF originated PS Domain Iu Connection Release (B) | | DNA | DNA | DNA | DNA | 292230 | DNA | 3885638 | 6359 | 1133875 | 8778750 |
| iii) | Drop Rate = (B/A) * 100 | <=5% | DNA | DNA | DNA | DNA | 1.91% | DNA | 2.12% | 1.13% | 2.08% | 3.81% |

## 6.27. 2G Wireless 3 Days Live Data: Consolidated

| CONSOLIDATED | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Cellular Mobile Telephone Services | | | | | | | | | | | | |
| S. No. | Name of Parameter | Benchmark | AIRCEL | AIRTEL | BSNL | IDEA | MTS | RCOM CDMA | RCOM GSM | TTSL CDMA | TTSL GSM | VODAFONE |
| Network Service Quality Parameter | | | | | | | | | | | | |
| 1 | Service Activation/ Provisioning | | | | | | | | | | | |
| i) | Total No. of Subscribers for Service Activation (A) | | DNA | DNA | DNA | DNA | 7731 | DNA | 20007 | 573 | 4511 | DNA |
| ii) | Total Service Activations provided within 4 Hours (B) | | DNA | DNA | DNA | DNA | DNA | DNA | 20007 | 573 | 4511 | DNA |
| iii) | Service Activation / Provisioning = (B/A) * 100 | *Within 4 Hours with 95% Success Rate* | DNA | DNA | DNA | DNA | DNA | DNA | 100.00% | 100.00% | 100.00% | DNA |
| 2 | PDP Context Activation Success Rate | | | | | | | | | | | |
| i) | Total No. of PDP Context Activation Requests (from SGSN to GGSN) (A) | | 17387663 | DNA | 5445592 | DNA | 508486 | DNA | DNA | 814164 | 207211 | 13825597 |
| ii) | Total No. of PDP Context Activation Success (path created b/w SGSN and GGSN) (B) | | 17324459 | DNA | 5438484 | DNA | 514450 | DNA | DNA | 785472 | 206728 | 13816649 |
| iii) | PDP Context Activation Success Rate =(B/A) *100 | >=95% | 99.63% | 99.94% | 99.87% | DNA | 98.84% | DNA | 99.84% | 96.48% | 99.76% | 99.93% |
| 3 | Drop Rate | | | | | | | | | | | |
| i) | TBF originated PS Domain Iu Connection Setup Success (A) | | 717519738 | DNA | DNA | 3351959508 | 15185014 | DNA | 1306697510 | 517549 | 54862534 | 231517964 |
| ii) | TBF originated PS Domain Iu Connection Release (B) | | 7714077 | DNA | DNA | 3977270 | 292570 | DNA | 29715339 | 6406 | 1135314 | 8784192 |
| iii) | Drop Rate = (B/A) * 100 | <=5% | 1.11% | 1.16% | DNA | 0.12% | 1.93% | DNA | 2.21% | 1.24% | 2.07% | 3.79% |

## 6.28. 3G Wireless Data: April

| Apr-16 | | | | | | |
|---|---|---|---|---|---|---|
| Cellular Mobile Telephone Services | | | | | | |
| S. No. | Name of Parameter | Benchmark | AIRTEL | BSNL | RCOM | VODAFONE |
| Network Service Quality Parameter | | | | | | |
| 1 | Service Activation/ Provisioning | | | | | |
| i) | Total No. of Subscribers for Service Activation (A) | | DNA | DNA | 241253 | DNA |
| ii) | Total Service Activations provided within 4 Hours (B) | | DNA | DNA | 241246 | DNA |
| iii) | Service Activation / Provisioning = (B/A) * 100 | *Within 4 Hours with 95% Success Rate* | DNA | DNA | 100.00% | DNA |
| 2 | PDP Context Activation Success Rate | | | | | |
| i) | Total No. of PDP Context Activation Requests (from SGSN to GGSN) (A) | | DNA | 54673984 | DNA | 2638305 |
| ii) | Total No. of PDP Context Activation Success (path created b/w SGSN and GGSN) (B) | | DNA | 54610084 | DNA | 2622921 |
| iii) | PDP Context Activation Success Rate =(B/A) *100 | >=95% | 99.98% | 99.88% | 99.41% | 99.42% |
| 3 | Drop Rate | | | | | |
| i) | RNC originated PS Domain Iu Connection Setup Success (A) | | DNA | DNA | 4622950 | DNA |
| ii) | RNC originated PS Domain Iu Connection Release (B) | | DNA | DNA | 27365 | DNA |
| iii) | Drop Rate = (B/A) * 100 | <=5% | 0.48% | DNA | 0.59% | 0.30% |

## 6.29. 3G WIRELESS DATA: MAY

| May-16 | | | | | | |
|---|---|---|---|---|---|---|
| Cellular Mobile Telephone Services | | | | | | |
| S. No. | Name of Parameter | Benchmark | AIRTEL | BSNL | RCOM | VODAFONE |
| Network Service Quality Parameter | | | | | | |
| 1 | Service Activation/ Provisioning | | | | | |
| i) | Total No. of Subscribers for Service Activation (A) | | DNA | DNA | 225926 | DNA |
| ii) | Total Service Activations provided within 4 Hours (B) | | DNA | DNA | 225924 | DNA |
| iii) | Service Activation / Provisioning = (B/A) * 100 | *Within 4 Hours with 95% Success Rate* | DNA | DNA | 100.00% | DNA |
| 2 | PDP Context Activation Success Rate | | | | | |
| i) | Total No. of PDP Context Activation Requests (from SGSN to GGSN) (A) | | DNA | 59959371 | DNA | 3226591 |
| ii) | Total No. of PDP Context Activation Success (path created b/w SGSN and GGSN) (B) | | DNA | 59885983 | DNA | 3201033 |
| iii) | PDP Context Activation Success Rate =(B/A) *100 | >=95% | 99.98% | 99.88% | 99.36% | 99.21% |
| 3 | Drop Rate | | | | | |
| i) | RNC originated PS Domain Iu Connection Setup Success (A) | | DNA | DNA | 137555616 | 4627466171 |
| ii) | RNC originated PS Domain Iu Connection Release (B) | | DNA | DNA | 901796 | 13959676 |
| iii) | Drop Rate = (B/A) * 100 | <=5% | 0.45% | DNA | 0.66% | 0.30% |

## 6.30. 3G WIRELESS DATA: JUNE

| Jun-16 | | | | | | |
|---|---|---|---|---|---|---|
| Cellular Mobile Telephone Services | | | | | | |
| S. No. | Name of Parameter | Benchmark | AIRTEL | BSNL | RCOM | VODAFONE |
| Network Service Quality Parameter | | | | | | |
| 1 | Service Activation/ Provisioning | | | | | |
| i) | Total No. of Subscribers for Service Activation (A) | | DNA | DNA | 215490 | DNA |
| ii) | Total Service Activations provided within 4 Hours (B) | | DNA | DNA | 215477 | DNA |
| iii) | Service Activation / Provisioning = (B/A) * 100 | *Within 4 Hours with 95% Success Rate* | DNA | DNA | 99.99% | DNA |
| 2 | PDP Context Activation Success Rate | | | | | |
| i) | Total No. of PDP Context Activation Requests (from SGSN to GGSN) (A) | | DNA | 55839509 | DNA | 3305209 |
| ii) | Total No. of PDP Context Activation Success (path created b/w SGSN and GGSN) (B) | | DNA | 55681731 | DNA | 3278171 |
| iii) | PDP Context Activation Success Rate =(B/A) *100 | >=95% | 99.98% | 99.72% | 99.32% | 99.18% |
| 3 | Drop Rate | | | | | |
| i) | RNC originated PS Domain Iu Connection Setup Success (A) | | DNA | DNA | 131391498 | 4586704464 |
| ii) | RNC originated PS Domain Iu Connection Release (B) | | DNA | DNA | 916531 | 19282291 |
| iii) | Drop Rate = (B/A) * 100 | <=5% | 0.45% | DNA | 0.70% | 0.42% |

## 6.31. 3G WIRELESS DATA: CONSOLIDATED

| Consolidated | | | | | | |
|---|---|---|---|---|---|---|
| Cellular Mobile Telephone Services | | | | | | |
| S. No. | Name of Parameter | Benchmark | AIRTEL | RCOM-GSM | VODAFONE | BSNL |
| Network Service Quality Parameter | | | | | | |
| 1 | Service Activation/ Provisioning | | | | | |
| i) | Total No. of Subscribers for Service Activation (A) | | DNA | DNA | 227556 | DNA |
| ii) | Total Service Activations provided within 4 Hours (B) | | DNA | DNA | 227549 | DNA |
| iii) | Service Activation / Provisioning = (B/A) * 100 | *Within 4 Hours with 95% Success Rate* | DNA | DNA | 100.00% | DNA |
| 2 | PDP Context Activation Success Rate | | | | | |
| i) | Total No. of PDP Context Activation Requests (from SGSN to GGSN) (A) | | DNA | 56824288 | DNA | 3056702 |
| ii) | Total No. of PDP Context Activation Success (path created b/w SGSN and GGSN) (B) | | DNA | 56725933 | DNA | 3034042 |
| iii) | PDP Context Activation Success Rate =(B/A) *100 | >=95% | 99.98% | 99.83% | 99.36% | 99.27% |
| 3 | Drop Rate | | | | | |
| i) | RNC originated PS Domain Iu Connection Setup Success (A) | | DNA | DNA | 91190021 | 4607085318 |
| ii) | RNC originated PS Domain Iu Connection Release (B) | | DNA | DNA | 615231 | 16620984 |
| iii) | Drop Rate = (B/A) * 100 | <=5% | 0.46% | DNA | 0.65% | 0.34% |

## 6.32. 3G WIRELESS 3 DAYS LIVE DATA: APRIL

| Apr-16 | | | | | | |
|---|---|---|---|---|---|---|
| Cellular Mobile Telephone Services | | | | | | |
| S. No. | Name of Parameter | Benchmark | AIRTEL | BSNL | RCOM | VODAFONE |
| Network Service Quality Parameter | | | | | | |
| 1 | Service Activation/ Provisioning | | | | | |
| i) | Total No. of Subscribers for Service Activation (A) | | DNA | DNA | DNA | DNA |
| ii) | Total Service Activations provided within 4 Hours (B) | | DNA | DNA | DNA | DNA |
| iii) | Service Activation / Provisioning = (B/A) * 100 | *Within 4 Hours with 95% Success Rate* | DNA | DNA | DNA | DNA |
| 2 | PDP Context Activation Success Rate | | | | | |
| i) | otal No. of PDP Context Activation Requests (from SGSN to GGSN) (A) | | DNA | DNA | DNA | 261633 |
| ii) | . of PDP Context Activation Success (path created b/w SGSN and GGSN) (B) | | DNA | DNA | DNA | 260342 |
| iii) | PDP Context Activation Success Rate =(B/A) *100 | >=95% | 99.98% | DNA | 99.53% | 99.51% |
| 3 | Drop Rate | | | | | |
| i) | RNC originated PS Domain Iu Connection Setup Success (A) | | DNA | DNA | 13868318 | DNA |
| ii) | RNC originated PS Domain Iu Connection Release (B) | | DNA | DNA | 102915 | DNA |
| iii) | Drop Rate = (B/A) * 100 | <=5% | 0.47% | DNA | 0.74% | DNA |

## 6.33. 3G Wireless 3 Days Live Data: May

| May-16 | | | | | | |
|---|---|---|---|---|---|---|
| Cellular Mobile Telephone Services | | | | | | |
| S. No. | Name of Parameter | Benchmark | AIRTEL | BSNL | RCOM | VODAFONE |
| Network Service Quality Parameter | | | | | | |
| 1 | Service Activation/ Provisioning | | | | | |
| i) | Total No. of Subscribers for Service Activation (A) | | DNA | DNA | 21059 | DNA |
| ii) | Total Service Activations provided within 4 Hours (B) | | DNA | DNA | 21059 | DNA |
| iii) | Service Activation / Provisioning = (B/A) * 100 | *Within 4 Hours with 95% Success Rate* | DNA | DNA | 100.00% | DNA |
| 2 | PDP Context Activation Success Rate | | | | | |
| i) | Total No. of PDP Context Activation Requests (from SGSN to GGSN) (A) | | DNA | 5628078 | DNA | 271464 |
| ii) | No. of PDP Context Activation Success (path created b/w SGSN and GGSN) (B) | | DNA | 5621969 | DNA | 268811 |
| iii) | PDP Context Activation Success Rate =(B/A) *100 | >=95% | 99.98% | 99.89% | 99.35% | 99.02% |
| 3 | Drop Rate | | | | | |
| i) | RNC originated PS Domain Iu Connection Setup Success (A) | | DNA | DNA | 13190426 | DNA |
| ii) | RNC originated PS Domain Iu Connection Release (B) | | DNA | DNA | 82131 | DNA |
| iii) | Drop Rate = (B/A) * 100 | <=5% | 1.33% | DNA | 0.62% | 0.30% |

## 6.34. 3G Wireless 3 Days Live Data: June

| Jun-16 | | | | | | |
|---|---|---|---|---|---|---|
| Cellular Mobile Telephone Services | | | | | | |
| S. No. | Name of Parameter | Benchmark | AIRTEL | BSNL | RCOM | VODAFONE |
| Network Service Quality Parameter | | | | | | |
| 1 | Service Activation/ Provisioning | | | | | |
| i) | Total No. of Subscribers for Service Activation (A) | | DNA | DNA | 18954 | DNA |
| ii) | Total Service Activations provided within 4 Hours (B) | | DNA | DNA | 18954 | DNA |
| iii) | Service Activation / Provisioning = (B/A) * 100 | *Within 4 Hours with 95% Success Rate* | DNA | DNA | 100.00% | DNA |
| 2 | \ | | | | | |
| i) | Total No. of PDP Context Activation Requests (from SGSN to GGSN) (A) | | DNA | 5669656 | DNA | 321536 |
| ii) | Total No. of PDP Context Activation Success (path created b/w SGSN and GGSN) (B) | | DNA | 5653991 | DNA | 317723 |
| iii) | PDP Context Activation Success Rate =(B/A) *100 | >=95% | DNA | 99.72% | DNA | 98.81% |
| 3 | Drop Rate | | | | | |
| i) | RNC originated PS Domain Iu Connection Setup Success (A) | | DNA | DNA | 13459316 | 456031290 |
| ii) | RNC originated PS Domain Iu Connection Release (B) | | DNA | DNA | 88759 | 5450349 |
| iii) | Drop Rate = (B/A) * 100 | <=5% | DNA | DNA | 0.66% | 1.20% |

## 6.35. 3G WIRELESS 3 DAYS LIVE DATA: CONSOLIDATED

| CONSOLIDATED | | | | | | |
|---|---|---|---|---|---|---|
| Cellular Mobile Telephone Services | | | | | | |
| S. No. | Name of Parameter | Benchmark | AIRTEL | BSNL | RCOM | VODAFONE |
| Network Service Quality Parameter | | | | | | |
| 1 | Service Activation/ Provisioning | | | | | |
| i) | Total No. of Subscribers for Service Activation (A) | | DNA | DNA | 20007 | DNA |
| ii) | Total Service Activations provided within 4 Hours (B) | | DNA | DNA | 20007 | DNA |
| iii) | Service Activation / Provisioning = (B/A) * 100 | *Within 4 Hours with 95% Success Rate* | DNA | DNA | 100.00% | DNA |
| 2 | PDP Context Activation Success Rate | | | | | |
| i) | Total No. of PDP Context Activation Requests (from SGSN to GGSN) (A) | | DNA | 5648867 | DNA | 284878 |
| ii) | Total No. of PDP Context Activation Success (path created b/w SGSN and GGSN) (B) | | DNA | 5637980 | DNA | 282292 |
| iii) | PDP Context Activation Success Rate =(B/A) *100 | >=95% | 99.98% | 99.81% | 99.44% | 99.11% |
| 3 | Drop Rate | | | | | |
| i) | RNC originated PS Domain Iu Connection Setup Success (A) | | DNA | DNA | 13506020 | 456031290 |
| ii) | RNC originated PS Domain Iu Connection Release (B) | | DNA | DNA | 91268 | 5450349 |
| iii) | Drop Rate = (B/A) * 100 | <=5% | 0.90% | DNA | 0.67% | 0.75% |

## 6.36. POI CONGESTION: CONSOLIDATED

| Consolidated | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Monthly TRAI Network Performance Report of Cellular Mobile Telephone Service - Network Service | | | | | | | | | | |
| Name of Parameter | AIRCEL | AIRTEL | BSNL | IDEA | MTS | RCOM CDMA | RCOM GSM | TTSL CDMA | TTSL GSM | VODAFONE |
| Total No. of POI's in Month having < = 0.5% POI congestion | | | | | | | | | | |
| Total No. of call attempts on POI | 5006386 | 6356872 | 738848 | 3656307 | 913699 | 900018 | 1200287 | 539529 | 509850 | 4049585 |
| Total traffic served on all POIs (Erlang) | 106498 | 143960 | 13169 | 80048 | 21681 | 19208 | 25632 | 10639 | 11147 | 68717 |
| Total No. of circuits on all individual POIs | 183179 | 222677 | 33835 | 137832 | 49283 | 40246 | 40345 | 39922 | 28772 | 144188 |
| Total number of working POI Service Area wise | 37 | 118 | 137 | 133 | 65 | 118 | 33 | 219 | 30 | 65 |
| Capacity of all POIs | 179200 | 217502 | 30884 | 132848 | 49385 | 35680 | 38141 | 39974 | 28698 | 145550 |
| No. of all POI's having >=0.5% POI congestion | NIL | NIL | NIL | NIL | NIL | NIL | NIL | NIL | NIL | NIL |
| Name of POI not meeting the benchmark (having >=0.5% POI congestion) | NIL | NIL | NIL | NIL | NIL | NIL | NIL | NIL | NIL | NIL |

## 6.37. POI CONGESTION: APRIL

| Apr-16 | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Monthly TRAI Network Performance Report of Cellular Mobile Telephone Service - Network Service | | | | | | | | | | |
| Name of Parameter | AIRCEL | AIRTEL | BSNL | IDEA | MTS | RCOM CDMA | RCOM GSM | TTSL CDMA | TTSL GSM | VODAFONE |
| **Total No. of POI's in Month having < = 0.5% POI congestion** | | | | | | | | | | |
| Total No. of call attempts on POI | 4850839 | 6442941 | 780253 | 3711184 | 905230 | 1007838 | 1285286 | 499793 | 536271 | 4115107 |
| Total traffic served on all POIs (Erlang) | 105127 | 144987 | 13914 | 81071 | 22159 | 21288 | 27520 | 11131 | 11267 | 70962 |
| Total No. of circuits on all individual POIs | 182997 | 224686 | 33538 | 137628 | 49397 | 40194 | 40460 | 40136 | 28772 | 143889 |
| Total number of working POI Service Area wise | 37 | 118 | 137 | 132 | 65 | 105 | 33 | 214 | 30 | 65 |
| Capacity of all POIs | 178996 | 219535 | 30884 | 132674 | 49500 | 35494 | 38052 | 39409 | 28698 | 145248 |
| No. of all POI's having >=0.5% POI congestion | NIL | NIL | NIL | NIL | NIL | NIL | NIL | NIL | NIL | NIL |
| Name of POI not meeting the benchmark (having >=0.5% POI congestion) | NIL | NIL | NIL | NIL | NIL | NIL | NIL | NIL | NIL | NIL |

## 6.38. POI CONGESTION: MAY

| May-16 | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Monthly TRAI Network Performance Report of Cellular Mobile Telephone Service - Network Service | | | | | | | | | | |
| Name of Parameter | AIRCEL | AIRTEL | BSNL | IDEA | MTS | RCOM CDMA | RCOM GSM | TTSL CDMA | TTSL GSM | VODAFONE |
| **Total No. of POI's in Month having < = 0.5% POI congestion** | | | | | | | | | | |
| Total No. of call attempts on POI | 5094068 | 6467153 | 744537 | 3664622 | 929812 | 945256 | 1188580 | 565799 | 466569 | 4094893 |
| Total traffic served on all POIs (Erlang) | 106650 | 145042 | 13011 | 79034 | 21694 | 20443 | 25574 | 10461 | 11423 | 68525 |
| Total No. of circuits on all individual POIs | 184413 | 222060 | 33364 | 136530 | 49311 | 40386 | 40134 | 39815 | 28772 | 144061 |
| Total number of working POI Service Area wise | 37 | 117 | 137 | 132 | 65 | 125 | 33 | 221 | 30 | 65 |
| Capacity of all POIs | 180434 | 216896 | 30884 | 131594 | 49414 | 35843 | 38080 | 40257 | 28698 | 145422 |
| No. of all POI's having >=0.5% POI congestion | NIL | NIL | NIL | NIL | NIL | NIL | NIL | NIL | NIL | NIL |
| Name of POI not meeting the benchmark (having >=0.5% POI congestion) | NIL | NIL | NIL | NIL | NIL | NIL | NIL | NIL | NIL | NIL |

## 6.39. POI CONGESTION: JUNE

| Jun-16 | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Monthly TRAI Network Performance Report of Cellular Mobile Telephone Service - Network Service | | | | | | | | | | |
| Name of Parameter | AIRCEL | AIRTEL | BSNL | IDEA | MTS | RCOM CDMA | RCOM GSM | TTSL CDMA | TTSL GSM | VODAFONE |
| **Total No. of POI's in Month having < = 0.5% POI congestion** | | | | | | | | | | |
| Total No. of call attempts on POI | 5074252 | 6160523 | 691754 | 3593115 | 906056 | 746960 | 1126995 | 552994 | 526710 | 3938754 |
| Total traffic served on all POIs (Erlang) | 107718 | 141852 | 12581 | 80040 | 21188 | 15894 | 23803 | 10325 | 10751 | 66663 |
| Total No. of circuits on all individual POIs | 182128 | 221284 | 34602 | 139337 | 49140 | 40160 | 40442 | 39815 | 28772 | 144614 |
| Total number of working POI Service Area wise | 37 | 119 | 137 | 136 | 65 | 125 | 32 | 221 | 30 | 65 |
| Capacity of all POIs | 178169 | 216074 | 30884 | 134277 | 49242 | 35703 | 38289 | 40257 | 28698 | 145980 |
| No. of all POI's having >=0.5% POI congestion | NIL | NIL | NIL | NIL | NIL | NIL | NIL | NIL | NIL | NIL |
| Name of POI not meeting the benchmark (having >=0.5% POI congestion) | NIL | NIL | NIL | NIL | NIL | NIL | NIL | NIL | NIL | NIL |

# 7. CUSTOMER SERVICE DELIVERY

## 7.1. BILLING AND CUSTOMER CARE

| Name of Service Provider | Metering and Billing credibility | | Billing Complaints | | | Termination & Closures | Time taken for refund of deposits after closures: Benchmark | Response time to customer for assistance | |
|---|---|---|---|---|---|---|---|---|---|
| | Postpaid Subscribers | Prepaid Subscribers | %age complaints resolved within 4 weeks | %age complaints resolved within 6 weeks | %age of where credit/waiver is received within one week | % of Termination/ Closure of service within 7 days (100 %) | Cleared over a period of <60 days (100%) | %age of calls answered by the IVR | %age of call answered by the operators ( voice to voice) within 90 seconds |
| Benchmark | ≤ 0.1% | ≤ 0.1% | ≥ 98% | = 100% | = 100% | = 100% | = 100% | ≥ 95% | ≥ 95% |
| AIRCEL | 0.00% | 0.00% | 100.00% | 100.00% | 100.00% | 100.00% | 99.97% | 94.10% | 93.75% |
| AIRTEL | 0.01% | 0.00% | 100.00% | 100.00% | 100.00% | 100.00% | 100.00% | 100.00% | 82.74% |
| BSNL | 0.05% | 0.10% | 100.00% | 100.00% | 100.00% | 100.00% | 100.00% | 100.00% | 96.83% |
| IDEA | 0.06% | 0.03% | 100.00% | 100.00% | 100.00% | 90.53% | 100.00% | 99.29% | 99.79% |
| MTS | 0.08% | 0.02% | 100.00% | 100.00% | 100.00% | 100.00% | 100.00% | 99.96% | 95.50% |
| RCOM CDMA | 0.09% | 0.08% | 100.00% | 100.00% | 100.00% | 100.00% | 82.77% | 99.03% | 84.63% |
| RCOM GSM | 0.09% | 0.09% | 100.00% | 100.00% | 100.00% | 100.00% | 53.99% | 99.53% | 92.89% |
| TTSL CDMA | 0.00% | 0.00% | NA | NA | 100.00% | 100.00% | 100.00% | NA | 99.33% |
| TTSL GSM | 0.00% | 0.00% | NA | NA | 100.00% | 100.00% | NA | 96.21% | 98.25% |
| VODAFONE | 0.09% | 0.09% | 100.00% | 100.00% | 100.00% | 100.00% | 99.82% | 100.00% | 99.19% |

| Name of Service Provider | Customer Care & Grievances Redressal | |
|---|---|---|
| | % of Complaints addressed at call centre level | % of Complaints addressed by Appellate Authority |
| Benchmark | | |
| AIRCEL | 100.00% | 100.00% |
| AIRTEL | 92.95% | 70.59% |
| BSNL | 3.80% | NIL |
| IDEA | 87.76% | NIL |
| MTS | 100.00% | 100.00% |
| RCOM CDMA | 100.00% | 100.00% |
| RCOM GSM | 100.00% | 100.00% |
| TTSL CDMA | 99.86% | 100.00% |
| TTSL GSM | 100.00% | NIL |
| VODAFONE | 5.72% | 50.00% |

## 7.2. LIVE CALLING DATA: CONSOLIDATED

| Name of Service Provider | Metering and Billing (Service Request) | | | | Response time to customer for Assistance | |
|---|---|---|---|---|---|---|
| | Total Calls Attempted | No. of Subscribers reached | Complaints/ Request attended to satisfaction | % of Complaints/ Request attended to satisfaction | Accessibility of call centre / Customer care | %age of call answered by the operators ( voice to voice) within 90 seconds |
| **Benchmark** | | | | | **≥ 95%** | **≥ 95%** |
| **AIRCEL** | 200 | 200 | 200 | 100.00% | 100.00% | 100.00% |
| **AIRTEL** | DNA | DNA | DNA | DNA | 100% | 100% |
| **BSNL** | DNA | DNA | DNA | DNA | 100.00% | 100.00% |
| **IDEA** | 200 | 157 | 152 | 96.82% | 100% | 100% |
| **MTS** | DNA | DNA | DNA | DNA | 100% | 100% |
| **RCOM CDMA** | 200 | 200 | 198 | 99.00% | 98.00% | 99.00% |
| **RCOM GSM** | 200 | 200 | 196 | 98.00% | 98.00% | 99.00% |
| **TTSL CDMA** | DNA | DNA | DNA | DNA | 100% | 96% |
| **TTSL GSM** | DNA | DNA | DNA | DNA | 98% | 95% |
| **VODAFONE** | 205 | 170 | 166 | 97.65% | 100% | 99% |

## 7.3. 3 DAYS LIVE CALL CENTRE DATA

| Response time to customer assistance | | | | | |
|---|---|---|---|---|---|
| **OPERATOR** | **Total no. of calls successfully established to customer care/Call center** | **% age of Accessibility of Call centre** | **Total Calls reached to operator for (Voice to Voice)** | **Total number of calls answered by the operator (Voice to voice) within 90 seconds** | **% age calls answered by the operator within 90 seconds** |
| **DAYS** | AVERAGE | | | | |
| **OPERATOR** | | >=95% | | | >=95% |
| **AIRCEL** | 693518 | 98.68% | 149385 | 143124 | 95.81% |
| **AIRTEL** | 229474 | 98.67% | 49588 | 47580 | 95.95% |
| **BSNL** | 10730 | 100.00% | 7198 | 7196 | 99.97% |
| **IDEA** | 1081534 | 99.50% | 270550 | 269714 | 99.69% |
| **MTS** | 62399 | 99.96% | 18163 | 17258 | 95.02% |
| **RCOM CDMA** | 22066 | 99.45% | 2207 | 1320 | 59.81% |
| **RCOM GSM** | 79168 | 99.41% | 14126 | 13191 | 93.38% |
| **TTSL CDMA** | 2548 | 99.73% | 2539 | 2534 | 99.80% |
| **TTSL GSM** | 5236 | 99.73% | 5192 | 5129 | 98.79% |
| **VODAFONE** | 510639 | 100.00% | 225825 | 223823 | 99.11% |

# 8. L1 CALLING DATA

L1 Calling data covers all the SDCA covered across the two operator assisted drive tests:

- Pali: 16th May to 18th May 2016
- Bharatpur: 1st June to 3rd June 2016
- Jhunjhunu: 15th June to 17th June 2016

## 8.1. PALI

### 8.1.1. AIRCEL

| SR. NO. | EMERGENCY NUMBER | CALLS MADE | PALI |
|---|---|---|---|
| 1 | 100 | 5 | √ |
| 2 | 101 | 5 | √ |
| 3 | 102 | 5 | √ |
| 4 | 104 | 5 | √ |
| 5 | 108 | 5 | √ |
| 6 | 138 | 5 | × |
| 7 | 149 | 5 | × |
| 8 | 181 | 5 | × |
| 9 | 182 | 5 | √ |
| 10 | 1033 | 5 | √ |
| 11 | 1037 | 5 | × |
| 12 | 1056 | 5 | × |
| 13 | 1060 | 5 | × |
| 14 | 1063 | 5 | × |
| 15 | 1064 | 5 | × |
| 16 | 1070 | 5 | √ |
| 17 | 1071 | 5 | √ |
| 18 | 1072 | 5 | √ |
| 19 | 1073 | 5 | √ |
| 20 | 1077 | 5 | √ |
| 21 | 1090 | 5 | √ |
| 22 | 1091 | 5 | × |
| 23 | 1097 | 5 | √ |
| 24 | 1099 | 5 | × |
| 25 | 10580 | 5 | × |
| 26 | 10589 | 5 | × |
| 27 | 10740 | 5 | × |
| 28 | 10741 | 5 | × |
| 29 | 1511 | 5 | × |
| 30 | 1512 | 5 | × |
| 31 | 1514 | 5 | × |
| 32 | 15100 | 5 | × |
| 33 | 155304 | 5 | × |
| 34 | 155214 | 5 | × |
| 35 | 1903 | 5 | √ |
| 36 | 1909 | 5 | √ |
| 37 | 1912 | 5 | × |
| 38 | 1916 | 5 | × |
| 39 | 1950 | 5 | √ |

## 8.1.2. BSNL

| BSNL | | | | | |
|---|---|---|---|---|---|
| SR. NO. | EMERGENCY NUMBER | CALLS MADE | PALI | PALI | PALI |
| 1 | 100 | 3 | × | × | √ |
| 2 | 101 | 3 | √ | √ | √ |
| 3 | 102 | 3 | × | × | × |
| 4 | 104 | 3 | √ | √ | √ |
| 5 | 108 | 3 | √ | √ | √ |
| 6 | 138 | 3 | √ | √ | × |
| 7 | 149 | 3 | √ | √ | × |
| 8 | 181 | 3 | √ | × | × |
| 9 | 182 | 3 | √ | √ | × |
| 10 | 1033 | 3 | √ | √ | √ |
| 11 | 1037 | 3 | √ | × | × |
| 12 | 1056 | 3 | × | × | × |
| 13 | 1060 | 3 | × | √ | √ |
| 14 | 1063 | 3 | × | √ | × |
| 15 | 1064 | 3 | × | × | × |
| 16 | 1070 | 3 | × | × | × |
| 17 | 1071 | 3 | × | × | × |
| 18 | 1072 | 3 | √ | √ | × |
| 19 | 1073 | 3 | × | × | × |
| 20 | 1077 | 3 | √ | × | √ |
| 21 | 1090 | 3 | × | √ | √ |
| 22 | 1091 | 3 | √ | × | × |
| 23 | 1097 | 3 | √ | √ | × |
| 24 | 1099 | 3 | √ | × | × |
| 25 | 10580 | 3 | √ | × | × |
| 26 | 10589 | 3 | √ | × | × |
| 27 | 10740 | 3 | √ | × | × |
| 28 | 10741 | 3 | √ | × | × |
| 29 | 1511 | 3 | √ | × | × |
| 30 | 1512 | 3 | √ | × | × |
| 31 | 1514 | 3 | √ | √ | × |
| 32 | 15100 | 3 | √ | √ | √ |
| 33 | 155304 | 3 | √ | × | × |
| 34 | 155214 | 3 | × | × | × |
| 35 | 1903 | 3 | √ | √ | √ |
| 36 | 1909 | 3 | √ | √ | √ |
| 37 | 1912 | 3 | √ | √ | √ |
| 38 | 1916 | 3 | √ | × | √ |
| 39 | 1950 | 3 | × | √ | √ |

## 8.1.3. MTS

| MTS | | | | | |
|---|---|---|---|---|---|
| SR. NO. | EMERGENCY NUMBER | CALLS MADE | Nagaur | Nagaur | Nagaur |
| 1 | 100 | 5 | √ | √ | √ |
| 2 | 101 | 5 | √ | √ | √ |
| 3 | 102 | 5 | √ | √ | √ |
| 4 | 104 | 5 | √ | √ | √ |
| 5 | 108 | 5 | √ | √ | √ |
| 6 | 138 | 5 | √ | √ | √ |
| 7 | 149 | 5 | × | × | × |
| 8 | 181 | 5 | √ | √ | √ |
| 9 | 182 | 5 | √ | √ | √ |
| 10 | 1033 | 5 | √ | √ | √ |
| 11 | 1037 | 5 | × | × | × |
| 12 | 1056 | 5 | × | × | × |
| 13 | 1060 | 5 | × | × | × |
| 14 | 1063 | 5 | × | × | × |
| 15 | 1064 | 5 | × | × | × |
| 16 | 1070 | 5 | × | × | × |
| 17 | 1071 | 5 | × | × | × |
| 18 | 1072 | 5 | × | × | × |
| 19 | 1073 | 5 | × | × | × |
| 20 | 1077 | 5 | × | × | × |
| 21 | 1090 | 5 | × | × | × |
| 22 | 1091 | 5 | √ | √ | √ |
| 23 | 1097 | 5 | √ | √ | √ |
| 24 | 1099 | 5 | × | × | × |
| 25 | 10580 | 5 | × | × | × |
| 26 | 10589 | 5 | × | × | × |
| 27 | 10740 | 5 | × | × | × |
| 28 | 10741 | 5 | × | × | × |
| 29 | 1511 | 5 | √ | √ | √ |
| 30 | 1512 | 5 | √ | √ | √ |
| 31 | 1514 | 5 | × | × | × |
| 32 | 15100 | 5 | √ | √ | √ |
| 33 | 155304 | 5 | × | × | × |
| 34 | 155214 | 5 | × | × | × |
| 35 | 1903 | 5 | × | × | × |
| 36 | 1909 | 5 | × | × | × |
| 37 | 1912 | 5 | × | × | × |
| 38 | 1916 | 5 | × | × | × |
| 39 | 1950 | 5 | × | × | × |

## 8.1.4. RCOM CDMA

| RCOM CDMA | | | | | |
|---|---|---|---|---|---|
| SR. NO. | EMERGENCY NUMBER | CALLS MADE | Ajmer | Beawer | Kishangarh |
| 1 | 100 | 5 | √ | √ | √ |
| 2 | 101 | 5 | √ | √ | √ |
| 3 | 102 | 5 | √ | √ | √ |
| 4 | 104 | 5 | √ | √ | √ |
| 5 | 108 | 5 | √ | √ | √ |
| 6 | 138 | 5 | √ | √ | √ |
| 7 | 149 | 5 | × | × | × |
| 8 | 181 | 5 | √ | √ | √ |
| 9 | 182 | 5 | √ | √ | √ |
| 10 | 1033 | 5 | √ | √ | √ |
| 11 | 1037 | 5 | × | × | × |
| 12 | 1056 | 5 | × | × | × |
| 13 | 1060 | 5 | × | × | × |
| 14 | 1063 | 5 | × | × | × |
| 15 | 1064 | 5 | × | × | × |
| 16 | 1070 | 5 | × | × | × |
| 17 | 1071 | 5 | × | × | × |
| 18 | 1072 | 5 | √ | √ | √ |
| 19 | 1073 | 5 | × | × | × |
| 20 | 1077 | 5 | × | × | × |
| 21 | 1090 | 5 | × | × | × |
| 22 | 1091 | 5 | × | × | × |
| 23 | 1097 | 5 | √ | √ | √ |
| 24 | 1099 | 5 | × | × | × |
| 25 | 10580 | 5 | × | × | × |
| 26 | 10589 | 5 | × | × | × |
| 27 | 10740 | 5 | × | × | × |
| 28 | 10741 | 5 | × | × | × |
| 29 | 1511 | 5 | × | × | × |
| 30 | 1512 | 5 | × | × | × |
| 31 | 1514 | 5 | × | × | × |
| 32 | 15100 | 5 | √ | √ | √ |
| 33 | 155304 | 5 | × | × | × |
| 34 | 155214 | 5 | × | × | × |
| 35 | 1903 | 5 | √ | √ | √ |
| 36 | 1909 | 5 | √ | √ | √ |
| 37 | 1912 | 5 | √ | √ | √ |
| 38 | 1916 | 5 | × | × | × |
| 39 | 1950 | 5 | √ | √ | √ |

## 8.1.5. RCOM GSM

| RCOM GSM | | | | | |
|---|---|---|---|---|---|
| SR. NO. | EMERGENCY NUMBER | CALLS MADE | Ajmer | Beawer | Kishangarh |
| 1 | 100 | 5 | √ | √ | √ |
| 2 | 101 | 5 | √ | √ | √ |
| 3 | 102 | 5 | √ | √ | √ |
| 4 | 104 | 5 | √ | √ | √ |
| 5 | 108 | 5 | √ | √ | √ |
| 6 | 138 | 5 | √ | √ | √ |
| 7 | 149 | 5 | × | × | × |
| 8 | 181 | 5 | √ | √ | √ |
| 9 | 182 | 5 | √ | √ | √ |
| 10 | 1033 | 5 | √ | √ | √ |
| 11 | 1037 | 5 | × | × | × |
| 12 | 1056 | 5 | × | × | × |
| 13 | 1060 | 5 | × | × | × |
| 14 | 1063 | 5 | × | × | × |
| 15 | 1064 | 5 | × | × | × |
| 16 | 1070 | 5 | × | × | × |
| 17 | 1071 | 5 | × | × | × |
| 18 | 1072 | 5 | √ | √ | √ |
| 19 | 1073 | 5 | × | × | × |
| 20 | 1077 | 5 | × | × | × |
| 21 | 1090 | 5 | × | × | × |
| 22 | 1091 | 5 | × | × | × |
| 23 | 1097 | 5 | √ | √ | √ |
| 24 | 1099 | 5 | × | × | × |
| 25 | 10580 | 5 | × | × | × |
| 26 | 10589 | 5 | × | × | × |
| 27 | 10740 | 5 | × | × | × |
| 28 | 10741 | 5 | × | × | × |
| 29 | 1511 | 5 | × | × | × |
| 30 | 1512 | 5 | × | × | × |
| 31 | 1514 | 5 | × | × | × |
| 32 | 15100 | 5 | √ | √ | √ |
| 33 | 155304 | 5 | × | × | × |
| 34 | 155214 | 5 | × | × | × |
| 35 | 1903 | 5 | √ | √ | √ |
| 36 | 1909 | 5 | √ | √ | √ |
| 37 | 1912 | 5 | √ | √ | √ |
| 38 | 1916 | 5 | × | × | × |
| 39 | 1950 | 5 | √ | √ | √ |

## 8.1.6. TTSL CDMA

| TATA CDMA | | | |
|---|---|---|---|
| SR. NO. | EMERGENCY NUMBER | CALLS MADE | Pali |
| 1 | 100 | 5 | √ |
| 2 | 101 | 5 | √ |
| 3 | 102 | 5 | √ |
| 4 | 104 | 5 | √ |
| 5 | 108 | 5 | √ |
| 6 | 138 | 5 | × |
| 7 | 149 | 5 | × |
| 8 | 181 | 5 | × |
| 9 | 182 | 5 | √ |
| 10 | 1033 | 5 | × |
| 11 | 1037 | 5 | × |
| 12 | 1056 | 5 | × |
| 13 | 1060 | 5 | × |
| 14 | 1063 | 5 | × |
| 15 | 1064 | 5 | × |
| 16 | 1070 | 5 | × |
| 17 | 1071 | 5 | × |
| 18 | 1072 | 5 | √ |
| 19 | 1073 | 5 | × |
| 20 | 1077 | 5 | × |
| 21 | 1090 | 5 | √ |
| 22 | 1091 | 5 | × |
| 23 | 1097 | 5 | √ |
| 24 | 1099 | 5 | × |
| 25 | 10580 | 5 | × |
| 26 | 10589 | 5 | × |
| 27 | 10740 | 5 | × |
| 28 | 10741 | 5 | × |
| 29 | 1511 | 5 | × |
| 30 | 1512 | 5 | × |
| 31 | 1514 | 5 | × |
| 32 | 15100 | 5 | × |
| 33 | 155304 | 5 | × |
| 34 | 155214 | 5 | × |
| 35 | 1903 | 5 | × |
| 36 | 1909 | 5 | × |
| 37 | 1912 | 5 | × |
| 38 | 1916 | 5 | × |
| 39 | 1950 | 5 | √ |

## 8.1.7. TTSL GSM

| TATA GSM | | | |
|---|---|---|---|
| **SR. NO.** | **EMERGENCY NUMBER** | **CALLS MADE** | **Jaitaran** |
| 1 | 100 | 1 | × |
| 2 | 101 | 1 | √ |
| 3 | 102 | 1 | × |
| 4 | 104 | 1 | √ |
| 5 | 108 | 1 | √ |
| 6 | 138 | 1 | × |
| 7 | 149 | 1 | × |
| 8 | 181 | 1 | × |
| 9 | 182 | 1 | √ |
| 10 | 1033 | 1 | √ |
| 11 | 1037 | 1 | × |
| 12 | 1056 | 1 | × |
| 13 | 1060 | 1 | × |
| 14 | 1063 | 1 | × |
| 15 | 1064 | 1 | × |
| 16 | 1070 | 1 | × |
| 17 | 1071 | 1 | × |
| 18 | 1072 | 1 | × |
| 19 | 1073 | 1 | × |
| 20 | 1077 | 1 | × |
| 21 | 1090 | 1 | × |
| 22 | 1091 | 1 | × |
| 23 | 1097 | 1 | √ |
| 24 | 1099 | 1 | × |
| 25 | 10580 | 1 | × |
| 26 | 10589 | 1 | × |
| 27 | 10740 | 1 | × |
| 28 | 10741 | 1 | × |
| 29 | 1511 | 1 | × |
| 30 | 1512 | 1 | × |
| 31 | 1514 | 1 | × |
| 32 | 15100 | 1 | × |
| 33 | 155304 | 1 | × |
| 34 | 155214 | 1 | × |
| 35 | 1903 | 1 | × |
| 36 | 1909 | 1 | √ |
| 37 | 1912 | 1 | × |
| 38 | 1916 | 1 | × |
| 39 | 1950 | 1 | × |

## 8.1.8. VODAFONE

| VODAFONE | | |
|---|---|---|
| **SR. NO.** | **EMERGENCY NUMBER** | **CALLS MADE** |
| 1 | 100 | 5 |
| 2 | 101 | 5 |
| 3 | 102 | 5 |
| 4 | 104 | 5 |
| 5 | 108 | 5 |
| 6 | 138 | 5 |
| 7 | 149 | 5 |
| 8 | 181 | 5 |
| 9 | 182 | 5 |
| 10 | 1033 | 5 |
| 11 | 1037 | 5 |
| 12 | 1056 | 5 |
| 13 | 1060 | 5 |
| 14 | 1063 | 5 |
| 15 | 1064 | 5 |
| 16 | 1070 | 5 |
| 17 | 1071 | 5 |
| 18 | 1072 | 5 |
| 19 | 1073 | 5 |
| 20 | 1077 | 5 |
| 21 | 1090 | 5 |
| 22 | 1091 | 5 |
| 23 | 1097 | 5 |
| 24 | 1099 | 5 |
| 25 | 10580 | 5 |
| 26 | 10589 | 5 |
| 27 | 10740 | 5 |
| 28 | 10741 | 5 |
| 29 | 1511 | 5 |
| 30 | 1512 | 5 |
| 31 | 1514 | 5 |
| 32 | 15100 | 5 |
| 33 | 155304 | 5 |
| 34 | 155214 | 5 |
| 35 | 1903 | 5 |
| 36 | 1909 | 5 |
| 37 | 1912 | 5 |
| 38 | 1916 | 5 |
| 39 | 1950 | 5 |

## 8.2. BHARATPUR

### 8.2.1. AIRCEL

| AIRCEL | | | |
|---|---|---|---|
| **SR. NO.** | **EMERGENCY NUMBER** | **CALLS MADE** | **Bharatpur** |
| 1 | 100 | 5 | √ |
| 2 | 101 | 5 | √ |
| 3 | 102 | 5 | √ |
| 4 | 104 | 5 | √ |
| 5 | 108 | 5 | √ |
| 6 | 138 | 5 | × |
| 7 | 149 | 5 | × |
| 8 | 181 | 5 | × |
| 9 | 182 | 5 | √ |
| 10 | 1033 | 5 | √ |
| 11 | 1037 | 5 | × |
| 12 | 1056 | 5 | × |
| 13 | 1060 | 5 | × |
| 14 | 1063 | 5 | × |
| 15 | 1064 | 5 | × |
| 16 | 1070 | 5 | √ |
| 17 | 1071 | 5 | √ |
| 18 | 1072 | 5 | √ |
| 19 | 1073 | 5 | √ |
| 20 | 1077 | 5 | √ |
| 21 | 1090 | 5 | √ |
| 22 | 1091 | 5 | × |
| 23 | 1097 | 5 | √ |
| 24 | 1099 | 5 | × |
| 25 | 10580 | 5 | × |
| 26 | 10589 | 5 | × |
| 27 | 10740 | 5 | × |
| 28 | 10741 | 5 | × |
| 29 | 1511 | 5 | × |
| 30 | 1512 | 5 | × |
| 31 | 1514 | 5 | × |
| 32 | 15100 | 5 | × |
| 33 | 155304 | 5 | × |
| 34 | 155214 | 5 | × |
| 35 | 1903 | 5 | √ |
| 36 | 1909 | 5 | √ |
| 37 | 1912 | 5 | × |
| 38 | 1916 | 5 | × |
| 39 | 1950 | 5 | √ |

## 8.2.2. AIRTEL

| AIRTEL | | | | | |
|---|---|---|---|---|---|
| SR. NO. | EMERGENCY NUMBER | CALLS MADE | Railway Station, Bharatpur | Dholpur | Bayana |
| 1 | 100 | 5 | × | × | × |
| 2 | 101 | 5 | √ | √ | √ |
| 3 | 102 | 5 | √ | √ | √ |
| 4 | 104 | 5 | √ | √ | √ |
| 5 | 108 | 5 | √ | √ | √ |
| 6 | 138 | 5 | × | √ | √ |
| 7 | 149 | 5 | × | × | × |
| 8 | 181 | 5 | × | × | × |
| 9 | 182 | 5 | √ | √ | √ |
| 10 | 1033 | 5 | √ | √ | √ |
| 11 | 1037 | 5 | × | × | × |
| 12 | 1056 | 5 | × | × | × |
| 13 | 1060 | 5 | × | × | × |
| 14 | 1063 | 5 | × | × | × |
| 15 | 1064 | 5 | × | × | × |
| 16 | 1070 | 5 | × | × | × |
| 17 | 1071 | 5 | × | × | × |
| 18 | 1072 | 5 | × | × | × |
| 19 | 1073 | 5 | × | × | × |
| 20 | 1077 | 5 | × | × | × |
| 21 | 1090 | 5 | √ | √ | √ |
| 22 | 1091 | 5 | × | × | × |
| 23 | 1097 | 5 | √ | √ | √ |
| 24 | 1099 | 5 | × | × | × |
| 25 | 10580 | 5 | × | × | × |
| 26 | 10589 | 5 | × | × | × |
| 27 | 10740 | 5 | × | × | × |
| 28 | 10741 | 5 | × | × | × |
| 29 | 1511 | 5 | × | × | × |
| 30 | 1512 | 5 | √ | √ | √ |
| 31 | 1514 | 5 | × | × | × |
| 32 | 15100 | 5 | √ | √ | √ |
| 33 | 155304 | 5 | × | × | × |
| 34 | 155214 | 5 | × | × | × |
| 35 | 1903 | 5 | × | × | × |
| 36 | 1909 | 5 | √ | √ | √ |
| 37 | 1912 | 5 | √ | √ | √ |
| 38 | 1916 | 5 | × | × | × |
| 39 | 1950 | 5 | × | × | × |

## 8.2.3. IDEA

| IDEA | | |
|---|---|---|
| SR. NO. | EMERGENCY NUMBER | CALLS MADE |
| 1 | 100 | √ |
| 2 | 101 | √ |
| 3 | 102 | √ |
| 4 | 104 | √ |
| 5 | 108 | √ |
| 6 | 138 | √ |
| 7 | 149 | fficial guide |
| 8 | 181 | √ |
| 9 | 182 | √ |
| 10 | 1033 | × |
| 11 | 1037 | × |
| 12 | 1056 | × |
| 13 | 1060 | × |
| 14 | 1063 | × |
| 15 | 1064 | × |
| 16 | 1070 | × |
| 17 | 1071 | √ |
| 18 | 1072 | √ |
| 19 | 1073 | × |
| 20 | 1077 | √ |
| 21 | 1090 | √ |
| 22 | 1091 | fficial guide |
| 23 | 1097 | √ |
| 24 | 1099 | × |
| 25 | 10580 | × |
| 26 | 10589 | × |
| 27 | 10740 | × |
| 28 | 10741 | × |
| 29 | 1511 | × |
| 30 | 1512 | √ |
| 31 | 1514 | × |
| 32 | 15100 | × |
| 33 | 155304 | × |
| 34 | 155214 | × |
| 35 | 1903 | √ |
| 36 | 1909 | √ |
| 37 | 1912 | √ |
| 38 | 1916 | × |
| 39 | 1950 | √ |

## 8.2.4. MTS

| MTS | | | | | |
|---|---|---|---|---|---|
| SR. NO. | EMERGENCY NUMBER | CALLS MADE | Bharatpur | Bharatpur | Bharatpur |
| 1 | 100 | 5 | √ | √ | √ |
| 2 | 101 | 5 | √ | √ | √ |
| 3 | 102 | 5 | √ | √ | √ |
| 4 | 104 | 5 | √ | √ | √ |
| 5 | 108 | 5 | √ | √ | √ |
| 6 | 138 | 5 | √ | √ | √ |
| 7 | 149 | 5 | × | × | × |
| 8 | 181 | 5 | √ | √ | √ |
| 9 | 182 | 5 | √ | √ | √ |
| 10 | 1033 | 5 | √ | √ | √ |
| 11 | 1037 | 5 | × | × | × |
| 12 | 1056 | 5 | × | × | × |
| 13 | 1060 | 5 | × | × | × |
| 14 | 1063 | 5 | × | × | × |
| 15 | 1064 | 5 | × | × | × |
| 16 | 1070 | 5 | × | × | × |
| 17 | 1071 | 5 | × | × | × |
| 18 | 1072 | 5 | × | × | × |
| 19 | 1073 | 5 | × | × | × |
| 20 | 1077 | 5 | × | × | × |
| 21 | 1090 | 5 | × | × | × |
| 22 | 1091 | 5 | √ | √ | √ |
| 23 | 1097 | 5 | √ | √ | √ |
| 24 | 1099 | 5 | × | × | × |
| 25 | 10580 | 5 | × | × | × |
| 26 | 10589 | 5 | × | × | × |
| 27 | 10740 | 5 | × | × | × |
| 28 | 10741 | 5 | × | × | × |
| 29 | 1511 | 5 | √ | √ | √ |
| 30 | 1512 | 5 | √ | √ | √ |
| 31 | 1514 | 5 | × | × | × |
| 32 | 15100 | 5 | √ | √ | √ |
| 33 | 155304 | 5 | × | × | × |
| 34 | 155214 | 5 | × | × | × |
| 35 | 1903 | 5 | × | × | × |
| 36 | 1909 | 5 | × | × | × |
| 37 | 1912 | 5 | × | × | × |
| 38 | 1916 | 5 | × | × | × |
| 39 | 1950 | 5 | × | × | × |

## 8.2.5. RCOM CDMA

| RCOM CDMA | | | | | |
|---|---|---|---|---|---|
| **SR. NO.** | **EMERGENCY NUMBER** | **CALLS MADE** | **Bharatpur** | **Bayana** | **Dholpur** |
| 1 | 100 | 5 | √ | √ | √ |
| 2 | 101 | 5 | √ | √ | √ |
| 3 | 102 | 5 | √ | √ | √ |
| 4 | 104 | 5 | √ | √ | √ |
| 5 | 108 | 5 | √ | √ | √ |
| 6 | 138 | 5 | √ | √ | √ |
| 7 | 149 | 5 | × | × | × |
| 8 | 181 | 5 | √ | √ | √ |
| 9 | 182 | 5 | √ | √ | √ |
| 10 | 1033 | 5 | √ | √ | √ |
| 11 | 1037 | 5 | × | × | × |
| 12 | 1056 | 5 | × | × | × |
| 13 | 1060 | 5 | × | × | × |
| 14 | 1063 | 5 | × | × | × |
| 15 | 1064 | 5 | × | × | × |
| 16 | 1070 | 5 | × | × | × |
| 17 | 1071 | 5 | × | × | × |
| 18 | 1072 | 5 | √ | √ | √ |
| 19 | 1073 | 5 | × | × | × |
| 20 | 1077 | 5 | × | × | × |
| 21 | 1090 | 5 | × | × | × |
| 22 | 1091 | 5 | × | × | × |
| 23 | 1097 | 5 | √ | √ | √ |
| 24 | 1099 | 5 | × | × | × |
| 25 | 10580 | 5 | × | × | × |
| 26 | 10589 | 5 | × | × | × |
| 27 | 10740 | 5 | × | × | × |
| 28 | 10741 | 5 | × | × | × |
| 29 | 1511 | 5 | × | × | × |
| 30 | 1512 | 5 | × | × | × |
| 31 | 1514 | 5 | × | × | × |
| 32 | 15100 | 5 | √ | √ | √ |
| 33 | 155304 | 5 | × | × | × |
| 34 | 155214 | 5 | × | × | × |
| 35 | 1903 | 5 | √ | √ | √ |
| 36 | 1909 | 5 | √ | √ | √ |
| 37 | 1912 | 5 | √ | √ | √ |
| 38 | 1916 | 5 | × | × | × |
| 39 | 1950 | 5 | √ | √ | √ |

## 8.2.6. RCOM GSM

| RCOM GSM | | | | | |
|---|---|---|---|---|---|
| **SR. NO.** | **EMERGENCY NUMBER** | **CALLS MADE** | **Bharatpur** | **Bayana** | **Dholpur** |
| 1 | 100 | 5 | √ | √ | √ |
| 2 | 101 | 5 | √ | √ | √ |
| 3 | 102 | 5 | √ | √ | √ |
| 4 | 104 | 5 | √ | √ | √ |
| 5 | 108 | 5 | √ | √ | √ |
| 6 | 138 | 5 | √ | √ | √ |
| 7 | 149 | 5 | × | × | × |
| 8 | 181 | 5 | √ | √ | √ |
| 9 | 182 | 5 | √ | √ | √ |
| 10 | 1033 | 5 | √ | √ | √ |
| 11 | 1037 | 5 | × | × | × |
| 12 | 1056 | 5 | × | × | × |
| 13 | 1060 | 5 | × | × | × |
| 14 | 1063 | 5 | × | × | × |
| 15 | 1064 | 5 | × | × | × |
| 16 | 1070 | 5 | × | × | × |
| 17 | 1071 | 5 | × | × | × |
| 18 | 1072 | 5 | √ | √ | √ |
| 19 | 1073 | 5 | × | × | × |
| 20 | 1077 | 5 | × | × | × |
| 21 | 1090 | 5 | × | × | × |
| 22 | 1091 | 5 | × | × | × |
| 23 | 1097 | 5 | √ | √ | √ |
| 24 | 1099 | 5 | × | × | × |
| 25 | 10580 | 5 | × | × | × |
| 26 | 10589 | 5 | × | × | × |
| 27 | 10740 | 5 | × | × | × |
| 28 | 10741 | 5 | × | × | × |
| 29 | 1511 | 5 | × | × | × |
| 30 | 1512 | 5 | × | × | × |
| 31 | 1514 | 5 | × | × | × |
| 32 | 15100 | 5 | √ | √ | √ |
| 33 | 155304 | 5 | × | × | × |
| 34 | 155214 | 5 | × | × | × |
| 35 | 1903 | 5 | √ | √ | √ |
| 36 | 1909 | 5 | √ | √ | √ |
| 37 | 1912 | 5 | √ | √ | √ |
| 38 | 1916 | 5 | × | × | × |
| 39 | 1950 | 5 | √ | √ | √ |

## 8.2.7. TTSLCDMA

| TATA CDMA | | | |
|---|---|---|---|
| **SR. NO.** | **EMERGENCY NUMBER** | **CALLS MADE** | **Bharatpur** |
| 1 | 100 | 5 | √ |
| 2 | 101 | 5 | √ |
| 3 | 102 | 5 | √ |
| 4 | 104 | 5 | × |
| 5 | 108 | 5 | √ |
| 6 | 138 | 5 | × |
| 7 | 149 | 5 | × |
| 8 | 181 | 5 | × |
| 9 | 182 | 5 | √ |
| 10 | 1033 | 5 | √ |
| 11 | 1037 | 5 | × |
| 12 | 1056 | 5 | × |
| 13 | 1060 | 5 | × |
| 14 | 1063 | 5 | × |
| 15 | 1064 | 5 | × |
| 16 | 1070 | 5 | × |
| 17 | 1071 | 5 | × |
| 18 | 1072 | 5 | √ |
| 19 | 1073 | 5 | × |
| 20 | 1077 | 5 | × |
| 21 | 1090 | 5 | √ |
| 22 | 1091 | 5 | × |
| 23 | 1097 | 5 | √ |
| 24 | 1099 | 5 | × |
| 25 | 10580 | 5 | × |
| 26 | 10589 | 5 | × |
| 27 | 10740 | 5 | × |
| 28 | 10741 | 5 | × |
| 29 | 1511 | 5 | × |
| 30 | 1512 | 5 | × |
| 31 | 1514 | 5 | × |
| 32 | 15100 | 5 | × |
| 33 | 155304 | 5 | × |
| 34 | 155214 | 5 | × |
| 35 | 1903 | 5 | × |
| 36 | 1909 | 5 | × |
| 37 | 1912 | 5 | × |
| 38 | 1916 | 5 | × |
| 39 | 1950 | 5 | √ |

## 8.2.8. TTSL GSM

| TATA GSM | | | |
|---|---|---|---|
| **SR. NO.** | **EMERGENCY NUMBER** | **CALLS MADE** | **Bharatpur** |
| 1 | 100 | 1 | × |
| 2 | 101 | 1 | √ |
| 3 | 102 | 1 | × |
| 4 | 104 | 1 | √ |
| 5 | 108 | 1 | √ |
| 6 | 138 | 1 | × |
| 7 | 149 | 1 | × |
| 8 | 181 | 1 | × |
| 9 | 182 | 1 | √ |
| 10 | 1033 | 1 | √ |
| 11 | 1037 | 1 | × |
| 12 | 1056 | 1 | × |
| 13 | 1060 | 1 | × |
| 14 | 1063 | 1 | × |
| 15 | 1064 | 1 | × |
| 16 | 1070 | 1 | × |
| 17 | 1071 | 1 | × |
| 18 | 1072 | 1 | × |
| 19 | 1073 | 1 | × |
| 20 | 1077 | 1 | × |
| 21 | 1090 | 1 | × |
| 22 | 1091 | 1 | × |
| 23 | 1097 | 1 | √ |
| 24 | 1099 | 1 | × |
| 25 | 10580 | 1 | × |
| 26 | 10589 | 1 | × |
| 27 | 10740 | 1 | × |
| 28 | 10741 | 1 | × |
| 29 | 1511 | 1 | × |
| 30 | 1512 | 1 | × |
| 31 | 1514 | 1 | × |
| 32 | 15100 | 1 | × |
| 33 | 155304 | 1 | × |
| 34 | 155214 | 1 | × |
| 35 | 1903 | 1 | × |
| 36 | 1909 | 1 | √ |
| 37 | 1912 | 1 | × |
| 38 | 1916 | 1 | × |
| 39 | 1950 | 1 | × |

## 8.3. SIROHI

### 8.3.1. AIRCEL

| AIRCEL | | | |
|---|---|---|---|
| SR. NO. | EMERGENCY NUMBER | CALLS MADE | Day 1 |
| 1 | 100 | 5 | √ |
| 2 | 101 | 5 | √ |
| 3 | 102 | 5 | √ |
| 4 | 104 | 5 | √ |
| 5 | 108 | 5 | √ |
| 6 | 138 | 5 | × |
| 7 | 149 | 5 | × |
| 8 | 181 | 5 | × |
| 9 | 182 | 5 | √ |
| 10 | 1033 | 5 | √ |
| 11 | 1037 | 5 | × |
| 12 | 1056 | 5 | × |
| 13 | 1060 | 5 | × |
| 14 | 1063 | 5 | × |
| 15 | 1064 | 5 | × |
| 16 | 1070 | 5 | √ |
| 17 | 1071 | 5 | √ |
| 18 | 1072 | 5 | √ |
| 19 | 1073 | 5 | √ |
| 20 | 1077 | 5 | √ |
| 21 | 1090 | 5 | √ |
| 22 | 1091 | 5 | × |
| 23 | 1097 | 5 | √ |
| 24 | 1099 | 5 | × |
| 25 | 10580 | 5 | × |
| 26 | 10589 | 5 | × |
| 27 | 10740 | 5 | × |
| 28 | 10741 | 5 | × |
| 29 | 1511 | 5 | × |
| 30 | 1512 | 5 | × |
| 31 | 1514 | 5 | × |
| 32 | 15100 | 5 | × |
| 33 | 155304 | 5 | × |
| 34 | 155214 | 5 | × |
| 35 | 1903 | 5 | √ |
| 36 | 1909 | 5 | √ |
| 37 | 1912 | 5 | × |
| 38 | 1916 | 5 | × |
| 39 | 1950 | 5 | √ |

## 8.3.2. IDEA

| IDEA | | |
|---|---|---|
| SR. NO. | EMERGENCY NUMBER | CALLS MADE |
| 1 | 100 | × |
| 2 | 101 | × |
| 3 | 102 | √ |
| 4 | 104 | √ |
| 5 | 108 | √ |
| 6 | 138 | √ |
| 7 | 149 | × |
| 8 | 181 | √ |
| 9 | 182 | √ |
| 10 | 1033 | × |
| 11 | 1037 | × |
| 12 | 1056 | × |
| 13 | 1060 | × |
| 14 | 1063 | × |
| 15 | 1064 | × |
| 16 | 1070 | × |
| 17 | 1071 | √ |
| 18 | 1072 | √ |
| 19 | 1073 | × |
| 20 | 1077 | √ |
| 21 | 1090 | √ |
| 22 | 1091 | × |
| 23 | 1097 | √ |
| 24 | 1099 | × |
| 25 | 10580 | × |
| 26 | 10589 | × |
| 27 | 10740 | × |
| 28 | 10741 | × |
| 29 | 1511 | × |
| 30 | 1512 | √ |
| 31 | 1514 | × |
| 32 | 15100 | √ |
| 33 | 155304 | × |
| 34 | 155214 | × |
| 35 | 1903 | √ |
| 36 | 1909 | √ |
| 37 | 1912 | √ |
| 38 | 1916 | × |
| 39 | 1950 | √ |

## 8.3.3. MTS

| MTS | | | | | |
|---|---|---|---|---|---|
| SR. NO. | EMERGENCY NUMBER | CALLS MADE | Sirohi | Sirohi | Sirohi |
| 1 | 100 | 5 | × | × | × |
| 2 | 101 | 5 | × | × | × |
| 3 | 102 | 5 | × | × | × |
| 4 | 104 | 5 | √ | √ | √ |
| 5 | 108 | 5 | √ | √ | √ |
| 6 | 138 | 5 | √ | √ | √ |
| 7 | 149 | 5 | × | × | × |
| 8 | 181 | 5 | √ | √ | √ |
| 9 | 182 | 5 | √ | √ | √ |
| 10 | 1033 | 5 | √ | √ | √ |
| 11 | 1037 | 5 | × | × | × |
| 12 | 1056 | 5 | × | × | × |
| 13 | 1060 | 5 | × | × | × |
| 14 | 1063 | 5 | × | × | × |
| 15 | 1064 | 5 | × | × | × |
| 16 | 1070 | 5 | × | × | × |
| 17 | 1071 | 5 | × | × | × |
| 18 | 1072 | 5 | × | × | × |
| 19 | 1073 | 5 | × | × | × |
| 20 | 1077 | 5 | × | × | × |
| 21 | 1090 | 5 | × | × | × |
| 22 | 1091 | 5 | √ | √ | √ |
| 23 | 1097 | 5 | √ | √ | √ |
| 24 | 1099 | 5 | × | × | × |
| 25 | 10580 | 5 | × | × | × |
| 26 | 10589 | 5 | × | × | × |
| 27 | 10740 | 5 | × | × | × |
| 28 | 10741 | 5 | × | × | × |
| 29 | 1511 | 5 | × | × | × |
| 30 | 1512 | 5 | × | × | × |
| 31 | 1514 | 5 | × | × | × |
| 32 | 15100 | 5 | × | × | × |
| 33 | 155304 | 5 | × | × | × |
| 34 | 155214 | 5 | × | × | × |
| 35 | 1903 | 5 | × | × | × |
| 36 | 1909 | 5 | × | × | × |
| 37 | 1912 | 5 | × | × | × |
| 38 | 1916 | 5 | × | × | × |
| 39 | 1950 | 5 | × | × | × |

## 8.3.4. TTSL CDMA

| TATA CDMA | | | | | |
|---|---|---|---|---|---|
| **SR. NO.** | **EMERGENCY NUMBER** | **CALLS MADE** | **Jalore** | **Bhinmal** | **Sunset Ponit Mount Abu** |
| 1 | 100 | 5 | × | × | × |
| 2 | 101 | 5 | √ | √ | √ |
| 3 | 102 | 5 | × | × | × |
| 4 | 104 | 5 | √ | √ | √ |
| 5 | 108 | 5 | × | × | × |
| 6 | 138 | 5 | √ | √ | √ |
| 7 | 149 | 5 | × | × | × |
| 8 | 181 | 5 | × | × | × |
| 9 | 182 | 5 | × | × | × |
| 10 | 1033 | 5 | × | × | × |
| 11 | 1037 | 5 | × | × | × |
| 12 | 1056 | 5 | × | × | × |
| 13 | 1060 | 5 | × | × | × |
| 14 | 1063 | 5 | × | × | × |
| 15 | 1064 | 5 | × | × | × |
| 16 | 1070 | 5 | × | × | × |
| 17 | 1071 | 5 | × | × | × |
| 18 | 1072 | 5 | × | × | × |
| 19 | 1073 | 5 | × | × | × |
| 20 | 1077 | 5 | × | × | × |
| 21 | 1090 | 5 | √ | √ | √ |
| 22 | 1091 | 5 | × | × | × |
| 23 | 1097 | 5 | × | × | × |
| 24 | 1099 | 5 | × | × | × |
| 25 | 10580 | 5 | × | × | × |
| 26 | 10589 | 5 | × | × | × |
| 27 | 10740 | 5 | × | × | × |
| 28 | 10741 | 5 | × | × | × |
| 29 | 1511 | 5 | × | × | × |
| 30 | 1512 | 5 | × | × | × |
| 31 | 1514 | 5 | × | × | × |
| 32 | 15100 | 5 | × | × | × |
| 33 | 155304 | 5 | × | × | × |
| 34 | 155214 | 5 | × | × | × |
| 35 | 1903 | 5 | × | × | × |
| 36 | 1909 | 5 | × | × | × |
| 37 | 1912 | 5 | × | × | × |
| 38 | 1916 | 5 | × | × | × |
| 39 | 1950 | 5 | √ | √ | √ |

## 8.3.5. TTSL GSM

| TATA GSM | | | | | |
|---|---|---|---|---|---|
| SR. NO. | EMERGENCY NUMBER | CALLS MADE | Jalore | Bhinmal | Sunset Point Mount Abu |
| 1 | 100 | 1 | √ | √ | √ |
| 2 | 101 | 1 | √ | √ | √ |
| 3 | 102 | 1 | √ | √ | √ |
| 4 | 104 | 1 | √ | √ | √ |
| 5 | 108 | 1 | √ | √ | √ |
| 6 | 138 | 1 | × | × | × |
| 7 | 149 | 1 | × | × | × |
| 8 | 181 | 1 | × | × | × |
| 9 | 182 | 1 | × | × | × |
| 10 | 1033 | 1 | × | × | × |
| 11 | 1037 | 1 | × | × | × |
| 12 | 1056 | 1 | × | × | × |
| 13 | 1060 | 1 | × | × | × |
| 14 | 1063 | 1 | × | × | × |
| 15 | 1064 | 1 | × | × | × |
| 16 | 1070 | 1 | × | × | × |
| 17 | 1071 | 1 | × | × | × |
| 18 | 1072 | 1 | × | × | × |
| 19 | 1073 | 1 | × | × | × |
| 20 | 1077 | 1 | × | × | × |
| 21 | 1090 | 1 | √ | √ | √ |
| 22 | 1091 | 1 | × | × | × |
| 23 | 1097 | 1 | √ | √ | √ |
| 24 | 1099 | 1 | × | × | × |
| 25 | 10580 | 1 | × | × | × |
| 26 | 10589 | 1 | × | × | × |
| 27 | 10740 | 1 | × | × | × |
| 28 | 10741 | 1 | × | × | × |
| 29 | 1511 | 1 | × | × | × |
| 30 | 1512 | 1 | Ok | Ok | Ok |
| 31 | 1514 | 1 | × | × | × |
| 32 | 15100 | 1 | × | × | × |
| 33 | 155304 | 1 | × | × | × |
| 34 | 155214 | 1 | × | × | × |
| 35 | 1903 | 1 | × | × | × |
| 36 | 1909 | 1 | √ | √ | √ |
| 37 | 1912 | 1 | √ | √ | √ |
| 38 | 1916 | 1 | × | × | × |
| 39 | 1950 | 1 | × | × | × |

# 9. OPERATOR ASSISTED DRIVE TEST

The drive test was conducted simultaneously for all the operators present in the Rajasthan circle. As per the new directive given by TRAI headquarters, drive test for the month of April, May and June, 2016 were conducted at a SSA level. Drive test was conducted for three days in each SSA and the selection of routes ensured that the maximum towns, villages, highways are covered as part of drive test. The routes were selected on basis of the complaints received from the customers. The auditors were present in vehicles of every operator. The holding period for all test calls was 120 seconds and the gap between calls was 10 seconds.

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

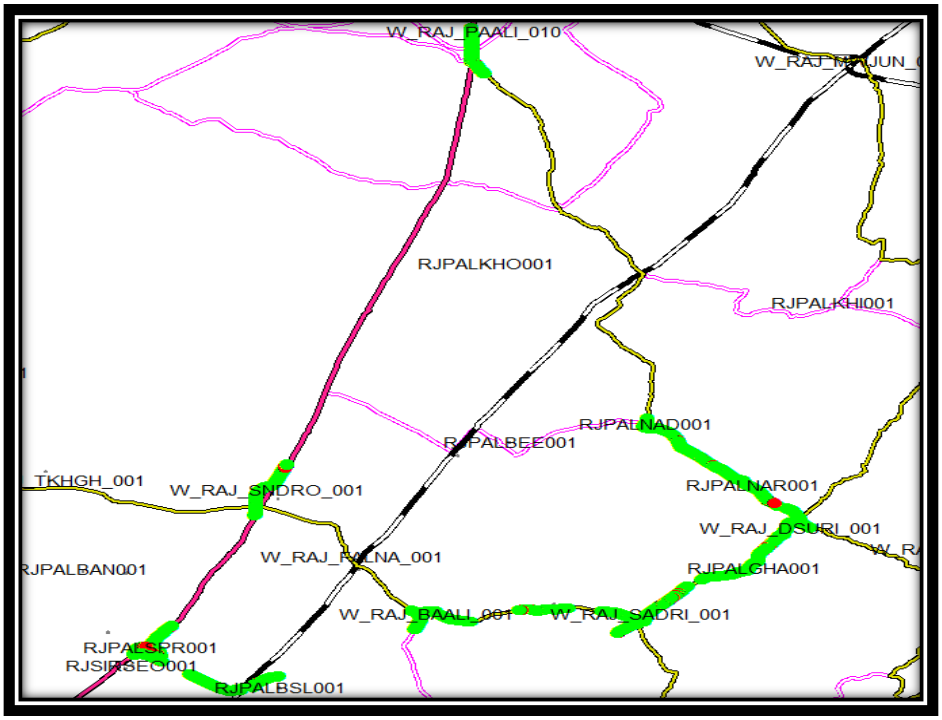
## 9.1. MAY: PALI SSA

| Month | Name of SSA covered | Drive Test Schedule |
|---|---|---|
| MAY 2016 | PALI | MAY 16, 2016 to MAY 18, 2016 |

## 9.2. DISTANCE COVERED: PALI SSA

| Drive Test Distance Covered | Day 1 | Day 2 | Day 3 |
|---|---|---|---|
| **PALI SSA** | 240 km | 110 km | 180 km |

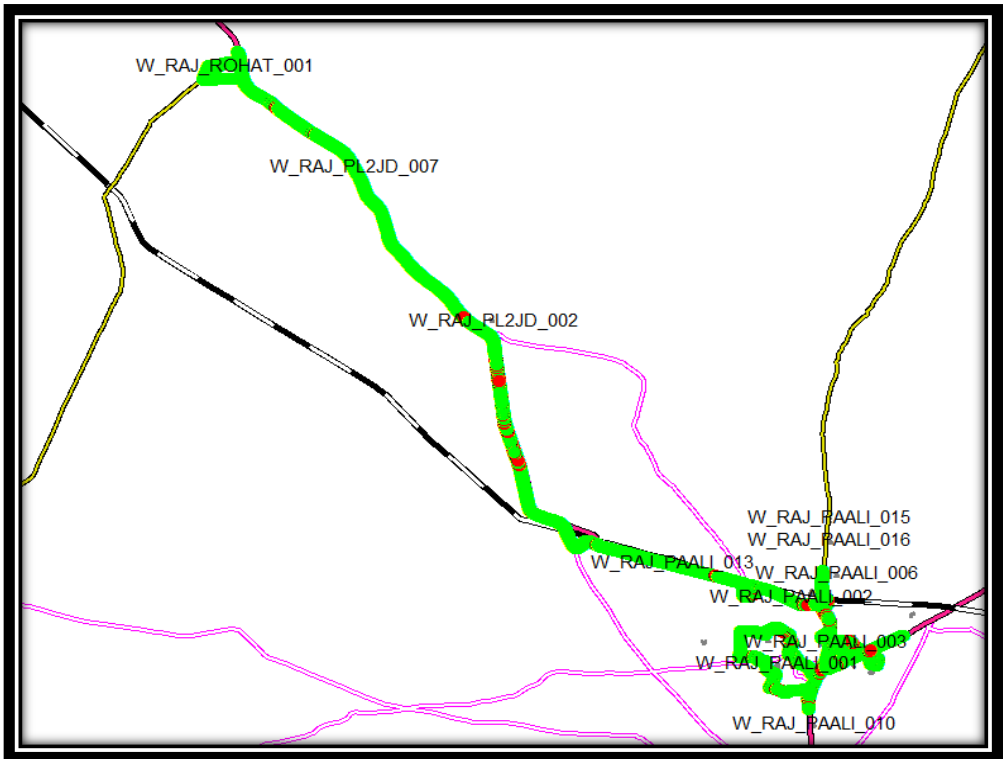
## 9.3. ROUTE MAP: PALI SSA: DAY 1




**Area covered- Day 1**

1. Pali bus stand
2. Pali railway station
3. Govt hospital
4. Desuri city
5. Sumerpur city
6. Maharaja ground
7. Bali
8. Jawai band
9. Sumerpur
10. pali desuri

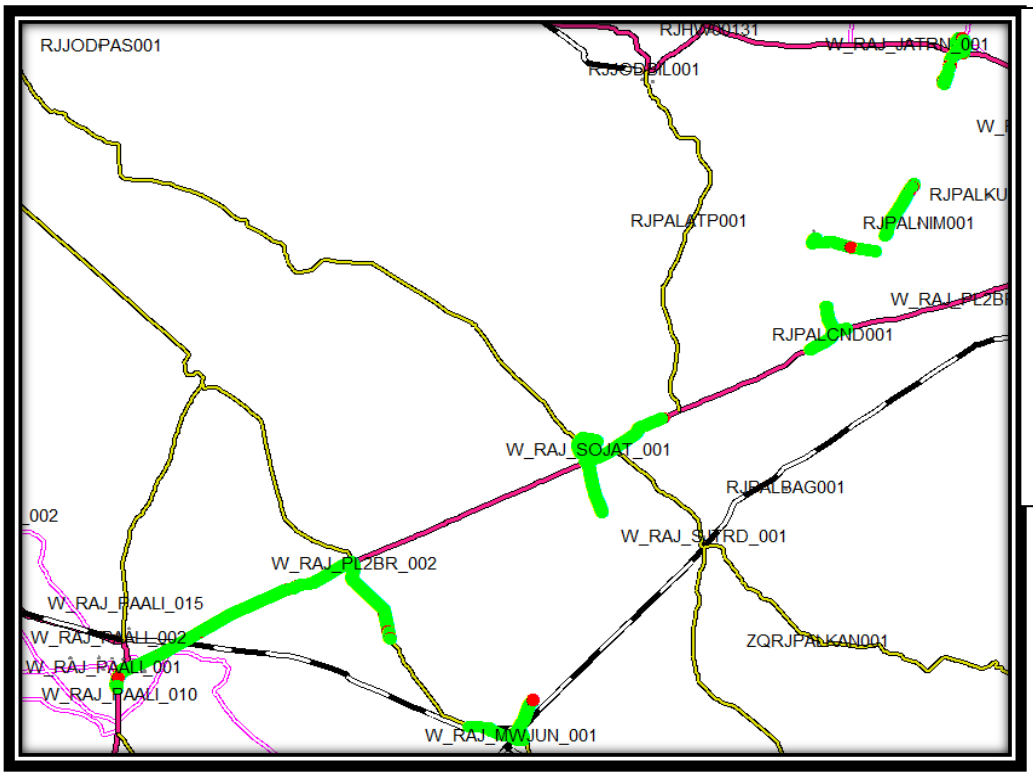
## 9.4. ROUTE MAP: PALI SSA: DAY 2




**Area covered - Day 2**

1. RTO
2. CMHO OFC
3. SURAJPOLE
4. SUNDAER NAGAR
5. Bapu nagar
6. Old bus stand
7. Mandia road
8. Ramdev road
9. Gandhi nagar
10. BSNL office

## 9.5. ROUTE MAP: PALI SSA: DAY 3




**Area covered-Day3**

1. Pali
2. Marwar juntion
3. Sojat
4. Jaitrain
5. Marwar road
6. Sojat city
7. Sojat road
8. Jaitrain city
9. Nimbera kalan
10. Jaitran city

## 9.6. DRIVE TEST OUTCOME

| | Aircel | Airtel | Idea | BSNL | MTS | RCOM CDMA | RCOM GSM | TTSL GSM | TTSL CDMA | Vodafone |
|---|---|---|---|---|---|---|---|---|---|---|
| **Total Calls Attempt (A)** | 345 | 507 | 436 | 470 | 457 | 352 | 331 | 308 | 349 | 530 |
| **Total Calls Blocked (B)** | 0 | 0 | 0 | 82 | 0 | 0 | 0 | 0 | 0 | 0 |
| **Blocked Call Rate in % (B*100/A)** | 0.00% | 0.00% | 0.00% | 17.60% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% |
| **Total Calls Established ('C)** | 345 | 507 | 433 | 358 | 457 | 352 | 331 | 308 | 349 | 530 |
| **Total Calls Drop (D)** | 0 | 0 | 0 | 17 | 0 | 0 | 0 | 0 | 0 | |
| **Dropped Calls Rate in % (D*100/C)** | 0.00% | 0.00% | 0.00% | 4.75% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% |
| **Call Setup Success Rate in % (C*100/A)** | 100% | 100% | 99.31% | 75.32% | 100% | 100% | 100% | 100% | 100.00% | 100% |
| **Handover Success Rate % (total HO Success * 100/Total HO attempt)** | 100% | 100% | 100% | 82% | 100% | 100% | 100% | 100% | 100.00% | 99.86% |

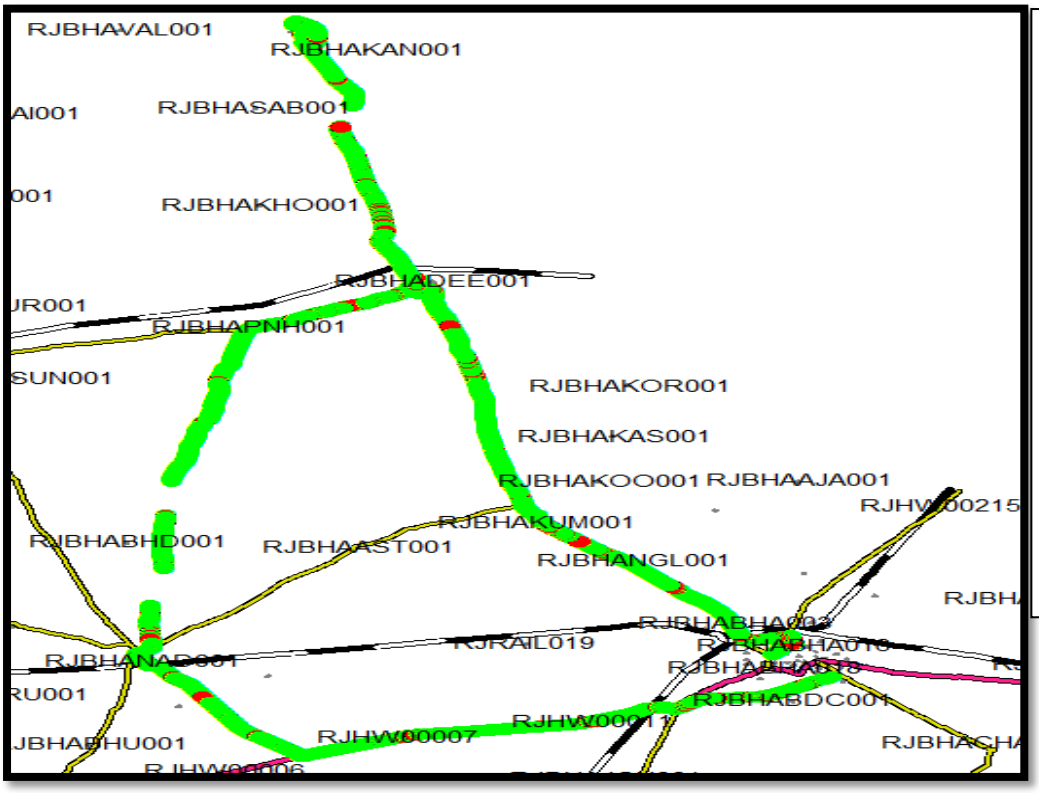
## 9.7. JUNE: BHARATPUR SSA

| Month | Name of SSA covered | Drive Test Schedule |
|---|---|---|
| JUNE 2016 | BHARATPUR | JUNE 1, 2016 to JUNE 3, 2016 |

## 9.8. DISTANCE COVERED: BHARATPUR SSA

| Drive Test Distance Covered | Day 1 | Day 2 | Day 3 |
|---|---|---|---|
| **BHARATPUR SSA** | 170 km | 220 km | 120 km |

## 9.9. ROUTE MAP: BHARATPUR SSA: DAY 1




**Area covered-Day 1**

1. Highway to deeg
2. Collectrate
3. Govt hospital
4. Toll plaza
5. Chatiya
6. Borai
7. Khatu indrloi
8. Bus stand new
9. Kaman
10. Deeg bypass
11. Nadbai to bharatpur

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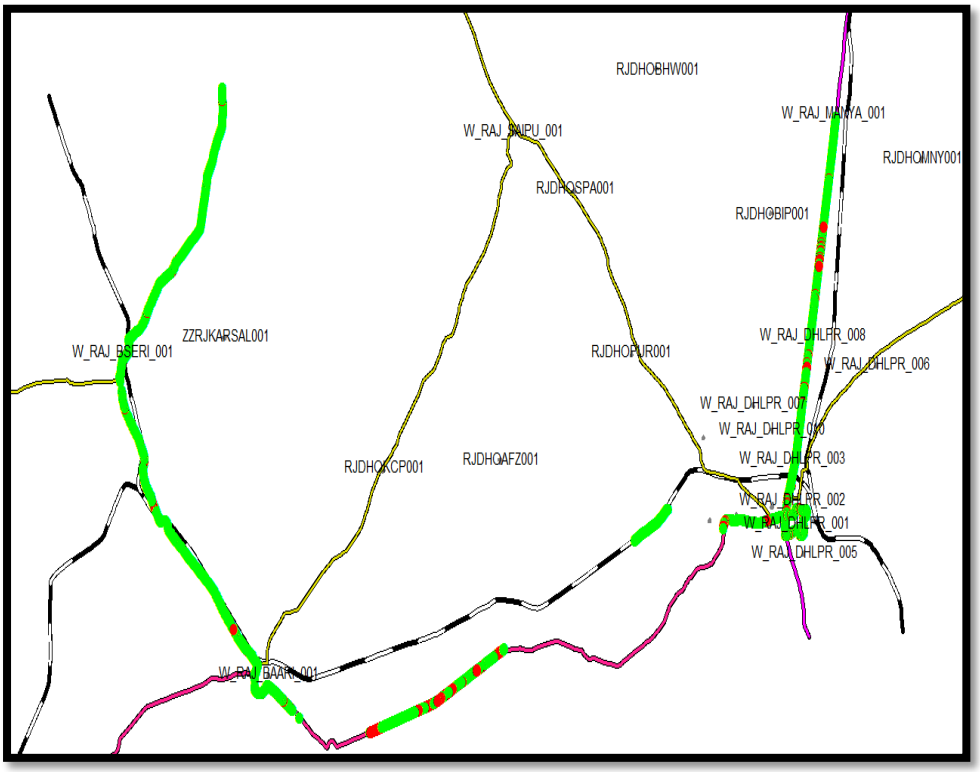
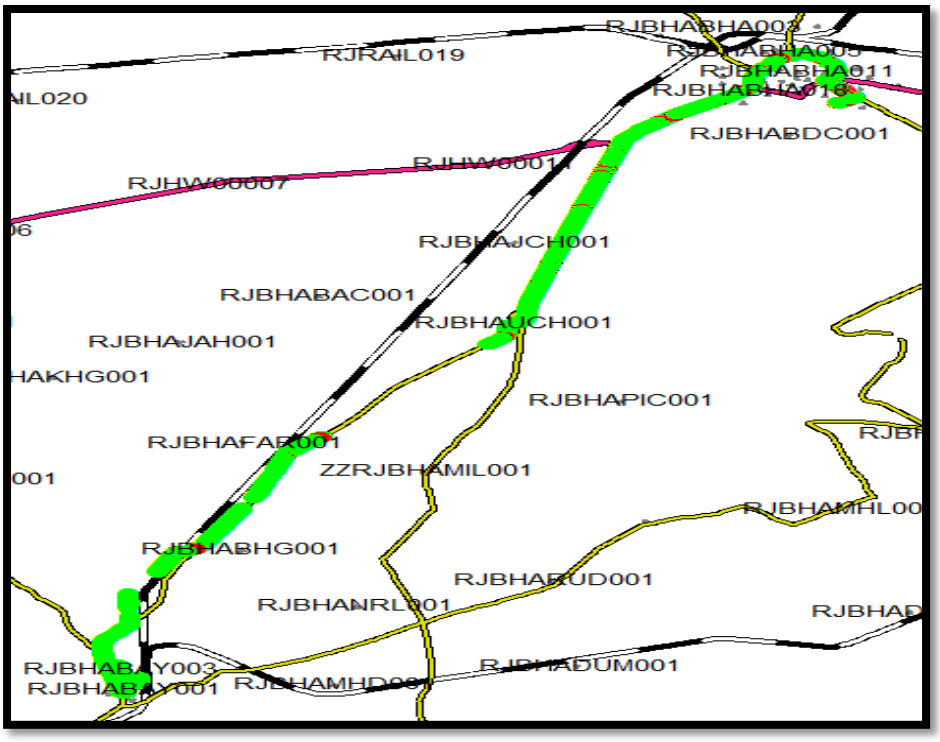
## 9.10. ROUTE MAP: BHARATPUR SSA: DAY 2




**Area covered- Day 2**

1. Dholpur
2. Mania
3. Toorpur
4. Bari nagar
5. Kareempur
6. Parvati pur
7. Kanchipur
8. Baseri
9. Sant hari resort
10. Rana nagar
11. Phed nagar

## 9.11. ROUTE MAP: BHARATPUR SSA: DAY 3




**Area covered-Day 3**

1. Bharatpur city
2. Anusandhanke ndra
3. Stadium top
4. Red cross circle
5. Karni gurjar
6. Rajendra nagar
7. Century ghanna
8. Adarsh nagar
9. Bayana
10. Ghanana

## 9.12. DRIVE TEST OUTCOME

| | Aircel | Airtel | Idea | BSNL | MTS | RCOM CDMA | RCOM GSM | TTSL GSM | TTSL CDMA | Vodafone |
|---|---|---|---|---|---|---|---|---|---|---|
| **Total Calls Attempt (A)** | 472 | 501 | 599 | 437 | 452 | 282 | 331 | 342 | 327 | 517 |
| **Total Calls Blocked (B)** | 0 | 0 | 3 | 42 | 0 | 0 | 0 | 0 | 0 | 0 |
| **Blocked Call Rate in % (B*100/A)** | 0.00% | 0.00% | 0.50% | 9.61% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% |
| **Total Calls Established ('C)** | 427 | 501 | 596 | 359 | 452 | 282 | 331 | 342 | 327 | 517 |
| **Total Calls Drop (D)** | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | |
| **Dropped Calls Rate in % (D*100/C)** | 0.00% | 0.00% | 0.00% | 0.55% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% |
| **Call Setup Success Rate in % (C*100/A)** | 100% | 100% | 99.50% | 82.15% | 100% | 100% | 100% | 100% | 100.00% | 100% |
| **Handover Success Rate % (total HO Success * 100/Total HO attempt)** | 100% | 100% | 100% | 94.1% | 100% | 100% | 99.8% | 100% | 99.81% | 100% |

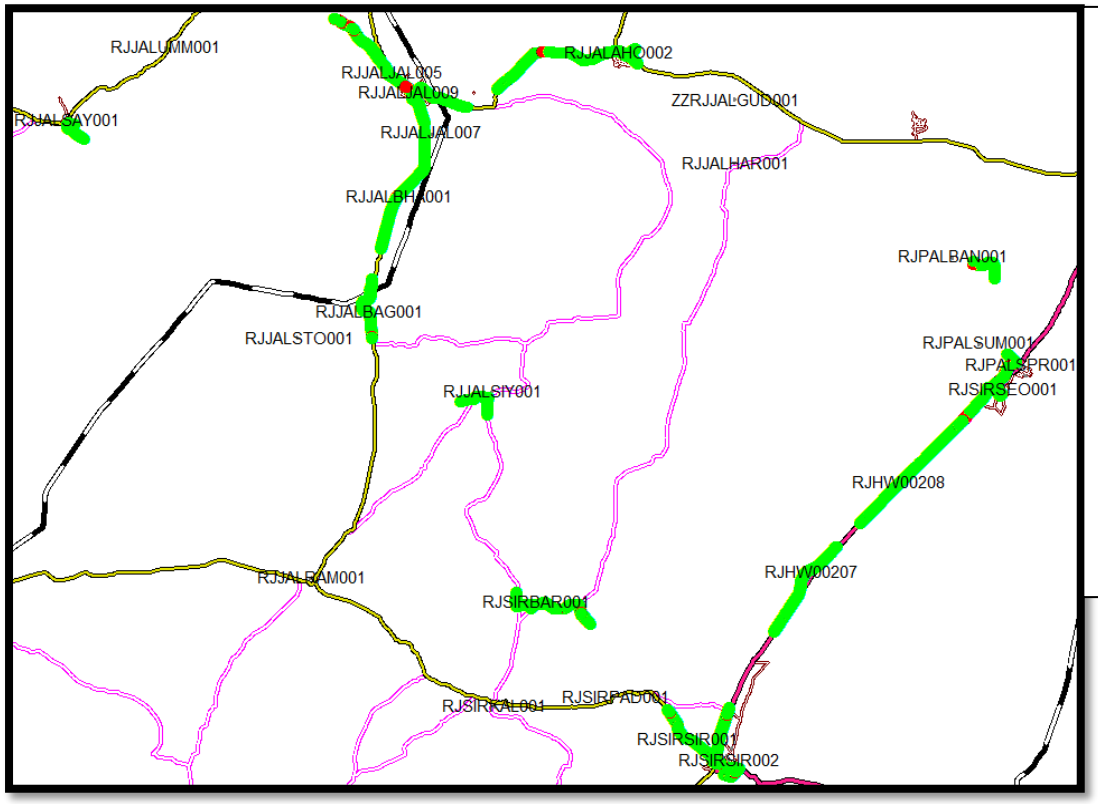
## 9.13. JUNE: SIROHI SSA

| Month | Name of SSA covered | Drive Test Schedule |
|---|---|---|
| JUNE 2016 | SIROHI | JUNE 15, 2016 to JUNE 17, 2016 |

## 9.14. DISTANCE COVERED: SIROHI SSA

| Drive Test Distance Covered | Day 1 | Day 2 | Day 3 |
|---|---|---|---|
| **SIROHI SSA** | 270 km | 325 km | 175 km |

## 9.15. ROUTE MAP: SIROHI SSA: DAY 1




**Area covered-Day 1**

1. Sheo ganj
2. Telephone colony
3. Tehsil public school
4. Public park chawni
5. Ahore
6. Khara
7. Jalore
8. District court
9. bhinmal
10. Geeta hospital.
11. Sayala

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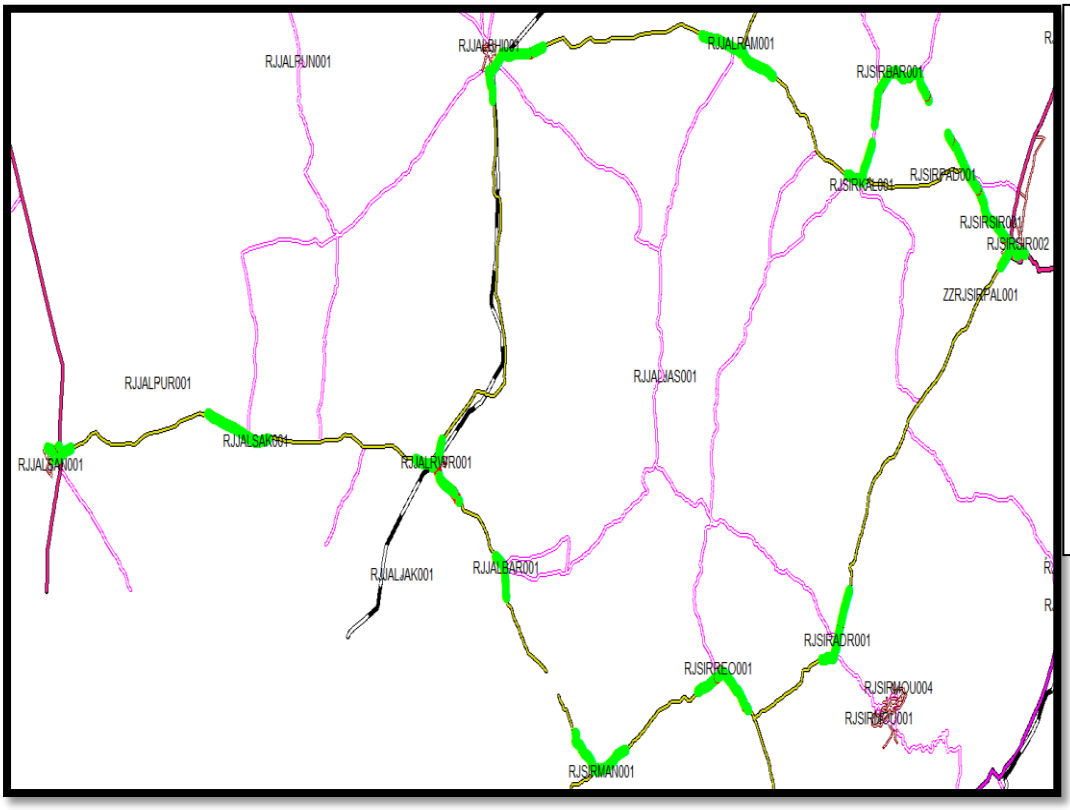
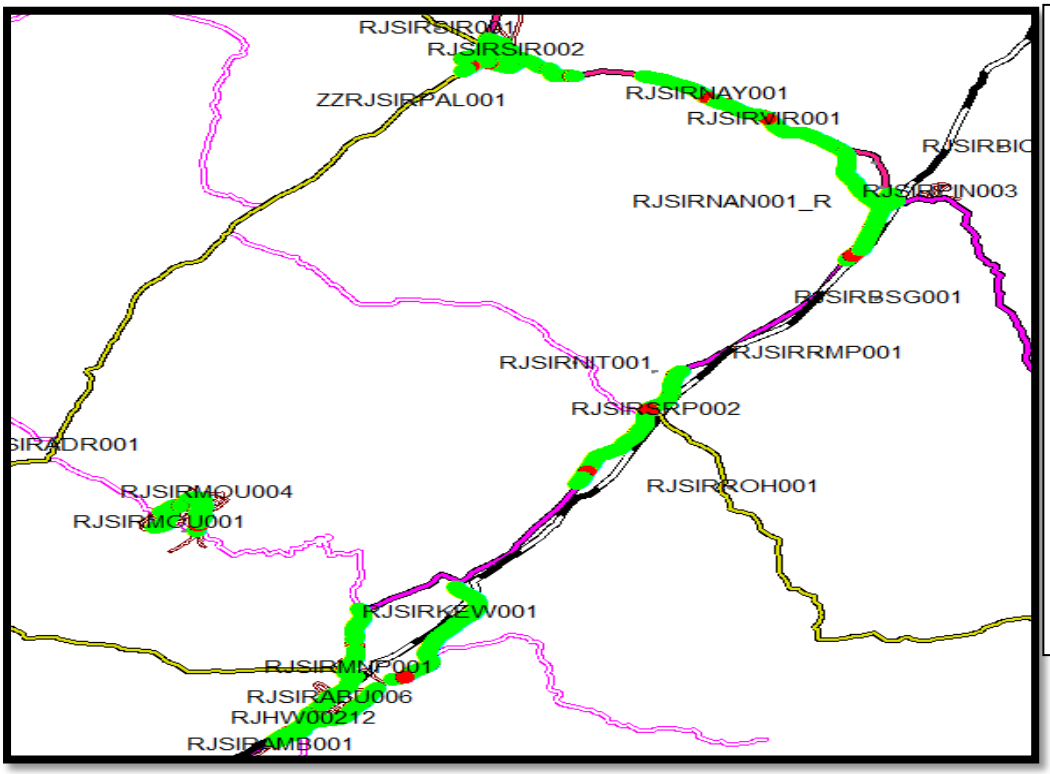
## 9.16. ROUTE MAP: SIROHI SSA: DAY 2




**Area covered-Day 2**

1. bhinmal
2. Railway station
3. Pradeep petrol pump
4. Sachore
5. Amar internation
6. Gramin bank
7. Readar
8. Kagmala
9. Dabani
10 sirohi
11. Ramsin
12. Sewara

## 9.17. Route Map: SIROHI SSA: Day 3




**Area covered- Day3**

1. Sirohi
2. Baba ramdev restorant
3. Forest department
4. Rampura police
5. Goyali chauk
6. Santpur
7. Sirohi
8. Sanawara
9. parlai

## 9.18. Drive Test Outcome

| | Aircel | Airtel | Idea | MTS | RCOM CDMA | RCOM GSM | TTSL GSM | TTSL CDMA | Vodafone |
|---|---|---|---|---|---|---|---|---|---|
| **Total Calls Attempt (A)** | 403 | 570 | 680 | 420 | 257 | 313 | 342 | 329 | 579 |
| **Total Calls Blocked (B)** | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 |
| **Blocked Call Rate in % (B*100/A)** | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.64% | 0.00% | 0.00% | 0.00% |
| **Total Calls Established ('C)** | 403 | 570 | 679 | 420 | 257 | 311 | 342 | 329 | 579 |
| **Total Calls Drop (D)** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| **Dropped Calls Rate in % (D*100/C)** | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% |
| **Call Setup Success Rate in % (C*100/A)** | 100% | 100% | 99.85% | 100% | 100% | 99.36% | 100% | 100.00% | 100% |
| **Handover Success Rate % (total HO Success * 100/Total HO attempt)** | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 99.96% | 100% |

## 10. COUNTER DETAILS

| S. No. | KPI | Formula with Counter Description |
|---|---|---|
| 1 | CSSR= (No of established Calls / No of Attempted Calls)% | *No of established Calls* = ([Assignment Requests]-([Failed Assignments (Signaling Channel)]+[Failed Assignments during MOC on the A Interface (Including Directed Retry)]+[Failed Assignments during MTC on the A Interface (Including Directed Retry)]+[Failed Assignments during Emergency Call on the A Interface (Including Directed Retry)] +[Failed Assignments during Call Re-establishment on the A Interface (Including Directed Retry)]+[Failed Mode Modify Attempts (MOC) (TCHF)]+[Failed Mode Modify Attempts (MTC) (TCHF)]+[Failed Mode Modify Attempts (Emergency Call) (TCHF)]+[Failed Mode Modify Attempts (Call Re-establishment) (TCHF)]+[Failed Mode Modify Attempts (MOC) (TCHH)]+[Failed Mode Modify Attempts (MTC) (TCHH)]+[Failed Mode Modify Attempts (Call Re-establishment) (TCHH)]))/*No of Attempted Calls* = ([Assignment Requests (Signaling Channel) (TCH)] + [Assignment Requests (Signaling Channel) (SDCCH)] + [Assignment Requests (TCHF Only)] + [Assignment Requests (TCHH Only)] + [Assignment Requests (TCHF Preferred, Channel Type Unchangeable)] + [Assignment Requests (TCHH Preferred, Channel Type Unchangeable)] + [Assignment Requests (TCHF or TCHH, Channel Type Unchangeable)] + [Assignment Requests (TCHF Preferred, Channel Type Changeable)] + [Assignment Requests (TCHH Preferred, Channel Type Changeable)] + [Assignment Requests (TCHF or TCHH, Channel Type Changeable)]) |
| 2 | SDCCH congestion= (SDCCH Failure/SDCCH attempts)% | *SDCCH Failure*= ([Channel Assignment Failures (All Channels Busy or Channels Unconfigured) in Immediate Assignment Procedure (SDCCH)] + [Failed Internal Intra-Cell Handovers (No Channel Available) (SDCCH)] + [Number of Unsuccessful Incoming Internal Inter-Cell Handovers (No Channel Available) (SDCCH)] + [Failed Incoming External Inter-Cell Handovers (No Channel Available) (SDCCH)])/*SDCCH attempts* = ([Channel Assignment Requests in Immediate Assignment Procedure (SDCCH)] + [Internal Intra-Cell Handover Requests (SDCCH)] + [Number of Incoming Internal Inter-Cell Handover Requests (SDCCH) (900/850/810-900/850/810)] + [Number of Incoming Internal Inter-Cell Handover Requests (SDCCH) (1800/1900-1800/1900)] + [Number of Incoming Internal Inter-Cell Handover Requests (SDCCH) (900/850/810-1800/1900)] + [Number of Incoming Internal Inter-Cell Handover Requests (SDCCH) (1800/1900-900/850/810)] + [Incoming External Inter-Cell Handover Requests (SDCCH) (900/850/810-900/850/810)] + [Incoming External Inter-Cell Handover Requests (SDCCH) (1800/1900-1800/1900)] + [Incoming External Inter-Cell Handover Requests (SDCCH) (900/850/810-1800/1900)] + [Incoming External Inter-Cell Handover Requests (SDCCH) (1800/1900-900/850/810)]) |
| 3 | TCH congestion= (TCH Failures /TCH Attempts)% | *TCH Failures*= ((Failed TCH Seizures due to Busy TCH (Signaling Channel)+([Failed Assignments (First Assignment, No Channel Available in Assignment Procedure)]+[Failed Assignments (First Assignment, No Channel Available in Directed Retry Procedure)]+[Failed Assignments (Reconnection to Old Channels, No Channel Available in Assignment)]+[Failed Assignments (Reconnection to Old Channels, No Channel Available in Directed Retry)])/*TCH Attempts* = ([Assignment Requests (Signaling Channel) (TCH)] + [Assignment Requests (Signaling Channel) (SDCCH)] + [Assignment Requests (TCHF Only)] + [Assignment Requests (TCHH Only)] + [Assignment Requests (TCHF Preferred, Channel Type Unchangeable)] + [Assignment Requests (TCHH Preferred, Channel Type Unchangeable)] + [Assignment Requests (TCHF or TCHH, Channel Type Unchangeable)] + [Assignment Requests (TCHF Preferred, Channel Type Changeable)] + [Assignment Requests (TCHH Preferred, Channel Type Changeable)] + [Assignment Requests (TCHF or TCHH, Channel Type Changeable)]) |
| 4 | Call Drop Rate= (The total no of dropped calls*100)/Total no of calls successfully established (where traffic channel is allotted) | *The total no of dropped calls*= ([Call Drops on Radio Interface in Stable State (Traffic Channel)] + [Call Drops on Radio Interface in Handover State (Traffic Channel)] + [Call Drops Due to No MR from MS for a Long Time (Traffic Channel)] + [Call Drops due to Abis Terrestrial Link Failure (Traffic Channel)] + [Call Drops due to Equipment Failure (Traffic Channel)] + [Call Drops due to Forced Handover (Traffic Channel)] + [Call Drops due to local switching Start Failure] + [Call Drops due to Failures to Return to Normal Call from local switching])/*Total no of calls successfully established (where traffic channel is allotted)* = ([Assignment Requests]-([Failed Assignments (Signaling Channel)]+[Failed Assignments during MOC on the A Interface (Including Directed |

| | | |
|---|---|---|
| | | **Retry)]+[Failed Assignments during MTC on the A Interface (Including Directed Retry)]+[Failed Assignments during Emergency Call on the A Interface (Including Directed Retry)] +[Failed Assignments during Call Re-establishment on the A Interface (Including Directed Retry)]+[Failed Mode Modify Attempts (MOC) (TCHF)]+[Failed Mode Modify Attempts (MTC) (TCHF)]+[Failed Mode Modify Attempts (Emergency Call) (TCHF)]+[Failed Mode Modify Attempts (Call Re-establishment) (TCHF)]+[Failed Mode Modify Attempts (MOC) (TCHH)]+[Failed Mode Modify Attempts (MTC) (TCHH)]+[Failed Mode Modify Attempts (Call Re-establishment) (TCHH)])** |
| 5 | **Call Drop Rate= (No of cells having call drop rate >3% during CBBH in a month*100)/Total no of cells in the licensed service area** | **Above formula with counters being used in CBBH.** |
| 6 | **Connection with good quality voice= (Connection with good quality voice/Total voice samples)%** | ***Connection with good quality voice* = ((Number of MRs on Downlink TCHF (Receive Quality Rank 0)+Number of MRs on Downlink TCHF (Receive Quality Rank 1)+Number of MRs on Downlink TCHF (Receive Quality Rank 2)+Number of MRs on Downlink TCHF (Receive Quality Rank 3)+Number of MRs on Downlink TCHF (Receive Quality Rank 4)+Number of MRs on Downlink TCHF (Receive Quality Rank 5)+Number of MRs on Downlink TCHH (Receive Quality Rank 0)+Number of MRs on Downlink TCHH (Receive Quality Rank 1)+Number of MRs on Downlink TCHH (Receive Quality Rank 2)+Number of MRs on Downlink TCHH (Receive Quality Rank 3)+Number of MRs on Downlink TCHH (Receive Quality Rank 4)+Number of MRs on Downlink TCHH (Receive Quality Rank 5)) /*Total voice samples*= ((Number of MRs on Downlink TCHF (Receive Quality Rank 0)+Number of MRs on Downlink TCHF (Receive Quality Rank 1)+Number of MRs on Downlink TCHF (Receive Quality Rank 2)+Number of MRs on Downlink TCHF (Receive Quality Rank 3)+Number of MRs on Downlink TCHF (Receive Quality Rank 4)+Number of MRs on Downlink TCHF (Receive Quality Rank 5)+Number of MRs on Downlink TCHF (Receive Quality Rank 6)+Number of MRs on Downlink TCHF (Receive Quality Rank 7)+Number of MRs on Downlink TCHH (Receive Quality Rank 0)+:Number of MRs on Downlink TCHH (Receive Quality Rank 1)+Number of MRs on Downlink TCHH (Receive Quality Rank 2)+Number of MRs on Downlink TCHH (Receive Quality Rank 3)+Number of MRs on Downlink TCHH (Receive Quality Rank 4)+Number of MRs on Downlink TCHH (Receive Quality Rank 5)+Number of MRs on Downlink TCHH (Receive Quality Rank 6)+Number of MRs on Downlink TCHH (Receive Quality Rank 7))** |

## 1.1. ERICSSON

| S. No. | KPI | Ericsson |
|---|---|---|
| 1 | **CSSR= (No of established Calls / No of Attempted Calls)%** | CSSR (No of established Calls / No of Attempted Calls)=(TCASSALL/TASSALL)*100 |
| 2 | **SDCCH congestion= (SDCCH Failure/SDCCH attempts)%** | SDCCH congestion (SDCCH Failure/SDCCH attempts)% = (CCONGS/CCALLS)*100 |
| 3 | **TCH congestion= (TCH Failures /TCH Attempts)%** | TCH congestion (TCH Failures /TCH Attempts)%= (CNRELCONG+TNRELCONG)/TASSALL)*100 |
| 4 | **Call Drop Rate= (The total no of dropped calls*100)/Total no of calls successfully established (where traffic channel is allotted)** | Call Drop Rate (Total no dropped calls/No of established calls)%= (TNDROP)/TCASSALL*100 |
| 5 | **Call Drop Rate= (No of cells having call drop rate >3% during CBBH in a month*100)/Total no of cells in the licensed service area** | Above formula with counters being used in CBBH. |
| 6 | **Connection with good quality voice= (Connection with good** | Connection with good quality voice (Connection with good quality voice samples 0-5 /Total voice samples)= 100 * (QUAL50DL + QUAL40DL + QUAL30DL + QUAL20DL + |

| | | |
|---|---|---|
| | **quality voice/Total voice samples)%** | QUAL10DL + QUAL00DL) / (QUAL70DL + QUAL60DL + QUAL50DL + QUAL40DL + QUAL30DL + QUAL20DL + QUAL10DL + QUAL00DL) |

***Ericsson Counters***

| Counter | Counter Description |
|---|---|
| TCASSALL | Number of assignment complete messages on TCH for all MS classes |
| TASSALL | Number of first assignment attempts on TCH for all MS classes. |
| CNRELCONG | Number of released connections on SDCCH due to TCH or Transcoder (TRA) congestion. |
| TNRELCONG | Number of released TCH signalling connections due to transcoder resource congestion during immediate assignment on TCH |
| CCONGS | Congestion counter for SDCCH. Stepped per congested allocation attempt. |
| CCALLS | Channel allocation attempt counter on SDCCH. |
| TNDROP | The total number of dropped TCH Connections. |
| QUAL00DL | Number of quality 0 reported on downlink. |
| QUAL10DL | Number of quality 1 reported on downlink. |
| QUAL20DL | Number of quality 2 reported on downlink. |
| QUAL30DL | Number of quality 3 reported on downlink. |
| QUAL40DL | Number of quality 4 reported on downlink. |
| QUAL50DL | Number of quality 5 reported on downlink. |
| QUAL60DL | Number of quality 6 reported on downlink. |
| QUAL70DL | Number of quality 7 reported on downlink |

## 1.2. NSN (NOKIA SIEMENS NETWORK)

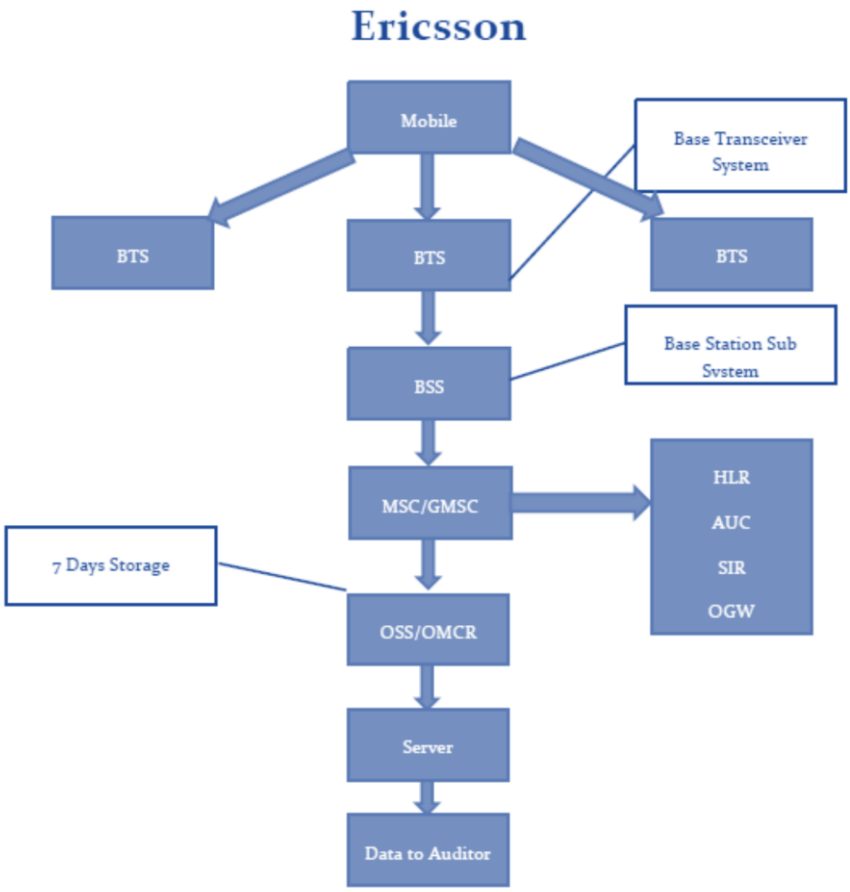
| Sl No. | KPI | NSN |
|---|---|---|
| 1 | CSSR= (No of established Calls / No of Attempted Calls)% | CSSR= 100-100*((SDCCH_BUSY_ATT)-(TCH_SEIZ_DUE_SDCCH_CON) + (SDCCH_RADIO_FAIL)+(SDCCH_RF_OLD_HO)+(SDCCH_USER_ACT)+(SDCCH_BCSU_RESET)+(SDCCH_NETW_ACT)+(SDCCH_BTS_FAIL)+(SDCCH_LAPD_FAIL)+ (BLCK_8I_NOM)/ {(CH_REQ_MSG_REC)+(PACKET_CH_REQ)}-{(GHOST_CCCH_RES)-(REJ_SEIZ_ATT_DUE_DIST)} |
| 2 | SDCCH congestion= (SDCCH Failure/SDCCH attempts)% | SDCCH congestion = (sdcch_busy_att - .tch_seiz_due_sdcch_con)/{(CH_REQ_MSG_REC)+(PACKET_CH_REQ)}-{(GHOST_CCCH_RES)-(REJ_SEIZ_ATT_DUE_DIST)} |
| 3 | TCH congestion= (TCH Failures /TCH Attempts)% | TCH congestion = BLCK_8I_NOM / {(TCH_NORM_SEIZ)+(MSC_I_SDCCH_TCH_AT)+(BSC_I_SDCCH_TCH_AT)} |
| 4 | Call Drop Rate= (The total no of dropped calls*100)/Total no of calls successfully established (where traffic channel is allotted) | TCH Drop = ( drop_after_tch_assign)-(tch_re_est_release) / {(TCH_NORM_SEIZ)+(MSC_I_SDCCH_TCH_AT)+(BSC_I_SDCCH_TCH_AT)} |
| 5 | Call Drop Rate= (No of cells having call drop rate >3% during CBBH in a month*100)/Total no of cells in the licensed service area | Above formula with counters being used in CBBH. |
| 6 | Connection with good quality voice= (Connection with good quality voice/Total voice samples)% | Connection with good quality voice= (FREQ_DL_QUAL0+FREQ_DL_QUAL1+FREQ_DL_QUAL2+FREQ_DL_QUAL3+FREQ_DL_QUAL4+FREQ_DL_QUAL5) / (FREQ_DL_QUAL0+FREQ_DL_QUAL1+FREQ_DL_QUAL2+FREQ_DL_QUAL3+FREQ_DL_QUAL4+FREQ_DL_QUAL5+FREQ_DL_QUAL6+FREQ_DL_QUAL7) |

## 1.3. HUAWEI

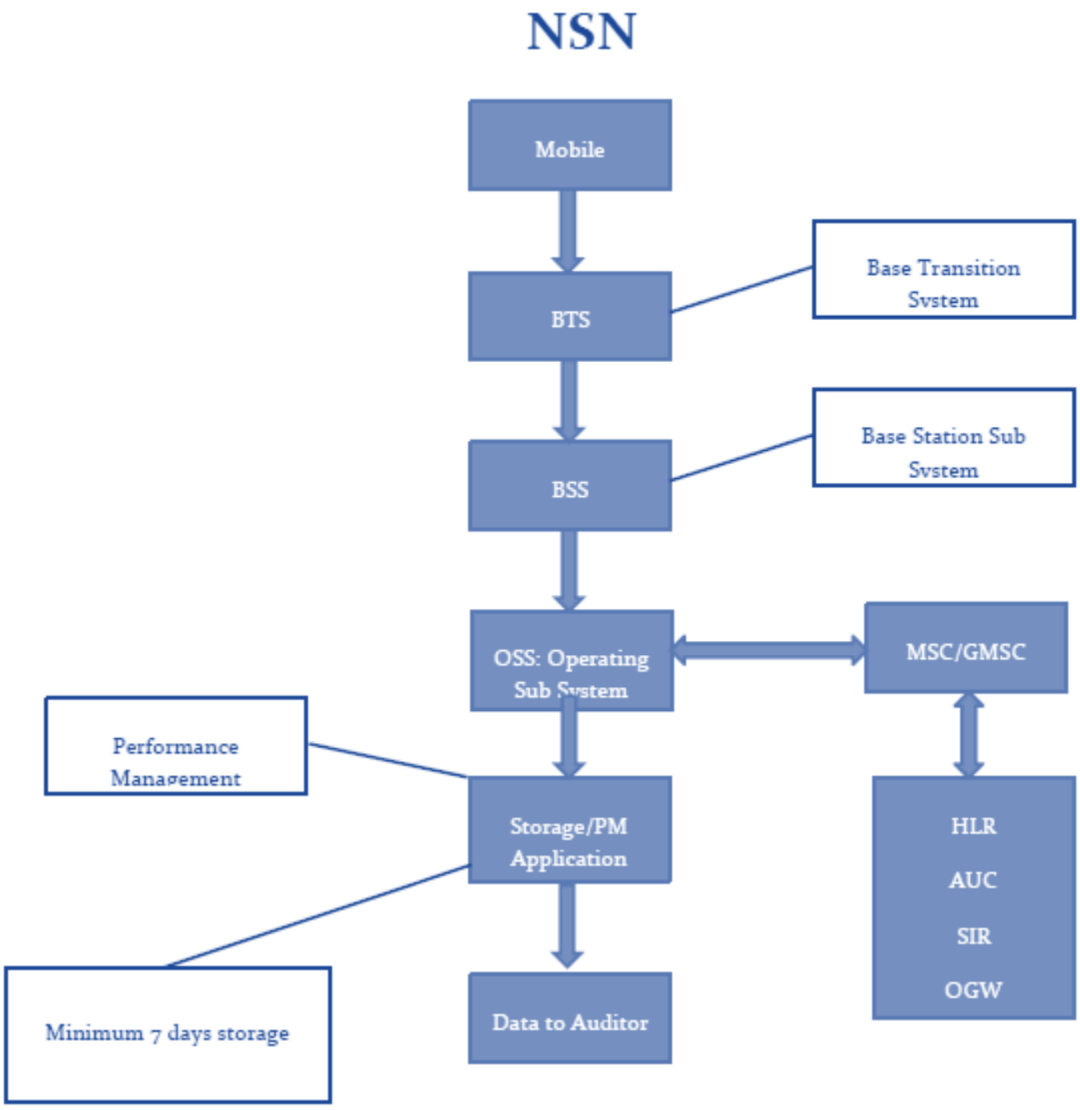
| S.NO | KPI | HUAWEI FORMULA |
|---|---|---|
| 1 | CALL SETUP SUCCES (NUM) | [Successful CS IS-95 Orig Call Setups + Successful CS IS-2000 Orig Call Setups + Successful CS IS-95 Term Call Setups + Successful CS IS-2000 Term Call Setups] ([1157628567] + [1157628587] + [1157628568] + [1157628588] ) |
| 2 | CALL SETUP SUCCES (DEN) | [CS IS-95 Orig Attempts + CS IS-2000 Orig Attempts + CS IS-95 Term Attempts + CS IS-2000 Term Attempts] ([1157628553] + [1157628573] + [1157628554] + [1157628574] ) |
| 3 | CALL SETUP SUCCESS RATE (%) | CALL SETUP SUCCES (NUM) / CALL SETUP SUCCES (DEN) * 100\ |
| 4 | CALL DROP RATE (NUM) | [CS IS-95 Call Drops (Too many Erasure frames) + CS IS-2000 Call Drops (Too many Erasure frames) + CS IS-95 Call Drops (No reverse frame received) + CS IS-2000 Call Drops (No reverse frame received) + CS IS-95 Call Drops (Abis interface abnormal) + CS IS-2000 Call Drops (Abis interface abnormal) + CS IS-95 Call Drops (A2 interface abnormal) + CS IS-2000 Call Drops (A2 interface abnormal) + CS IS-95 Call Drops (HHO fail) + CS IS-2000 Call Drops (HHO fail) + CS IS-95 Call Drops (Other causes) + CS IS-2000 Call Drops (Other causes)] ([1157628608] + [1157628614] + [1157628609] + [1157628615] + [1157628610] + [1157628616] + [1157628611] + [1157628617] + [1157628612] + [1157628618] + [1157628613] + [1157628619]) |
| 5 | CALL DROP RATE(DEN) | [Successful CS IS-95 Orig Call Setups + Successful CS IS-2000 Orig Call Setups + Successful CS IS-95 Term Call Setups + Successful CS IS-2000 Term Call Setups + CS IS-95 Successful Incoming Hard HOs + CS IS-2000 Successful Incoming Hard HOs] [1157628619]) x 100/([1157628567] + [1157628587] + [1157628568] + [1157628588] + [1157628569] + [1157628589]) ] |
| 6 | Call DROP Rate | CALL DROP RATE (NUM) / CALL DROP RATE(DEN) * 100\ |
| 7 | RF BLOCK RATE (NUM) | {[(TCH Assignment Requests-CS Orig-IS95[Times] + TCH Assignment Requests-CS Orig-IS2000[Times] + TCH Assignment Requests-CS Term-IS95[Times] + TCH Assignment Requests-CS Term-IS2000[Times]) - (Successful TCH Assignments-CS Orig-IS95[Times] + Successful TCH Assignments-CS Orig-IS2000[Times] + Successful TCH Assignments-CS Term-IS95[Times] + Successful TCH Assignments-CS Term-IS2000[Times] )] {[(1157628621 + 1157628628 + 1157628635+ 1157628642) |
| 8 | RF BLOCK RATE (DEN) | [(TCH Assignment Requests-CS Orig-IS95[Times] + TCH Assignment Requests-CS Orig-IS2000[Times] + TCH Assignment Requests-CS Term-IS95[Times] + TCH Assignment Requests-CS Term-IS2000[Times]))]} [(1157628621 + 1157628628 + 1157628635+ 1157628642)]} |
| 9 | RF BLOCK RATE | RF BLOCK RATE (NUM) / RF BLOCK RATE (DEN) *100 |
| 10 | Call Quality (RFER) | CS Reverse Link Average FER of Carrier[% |

## 11. BLOCK SCHEMATIC DIAGRAM

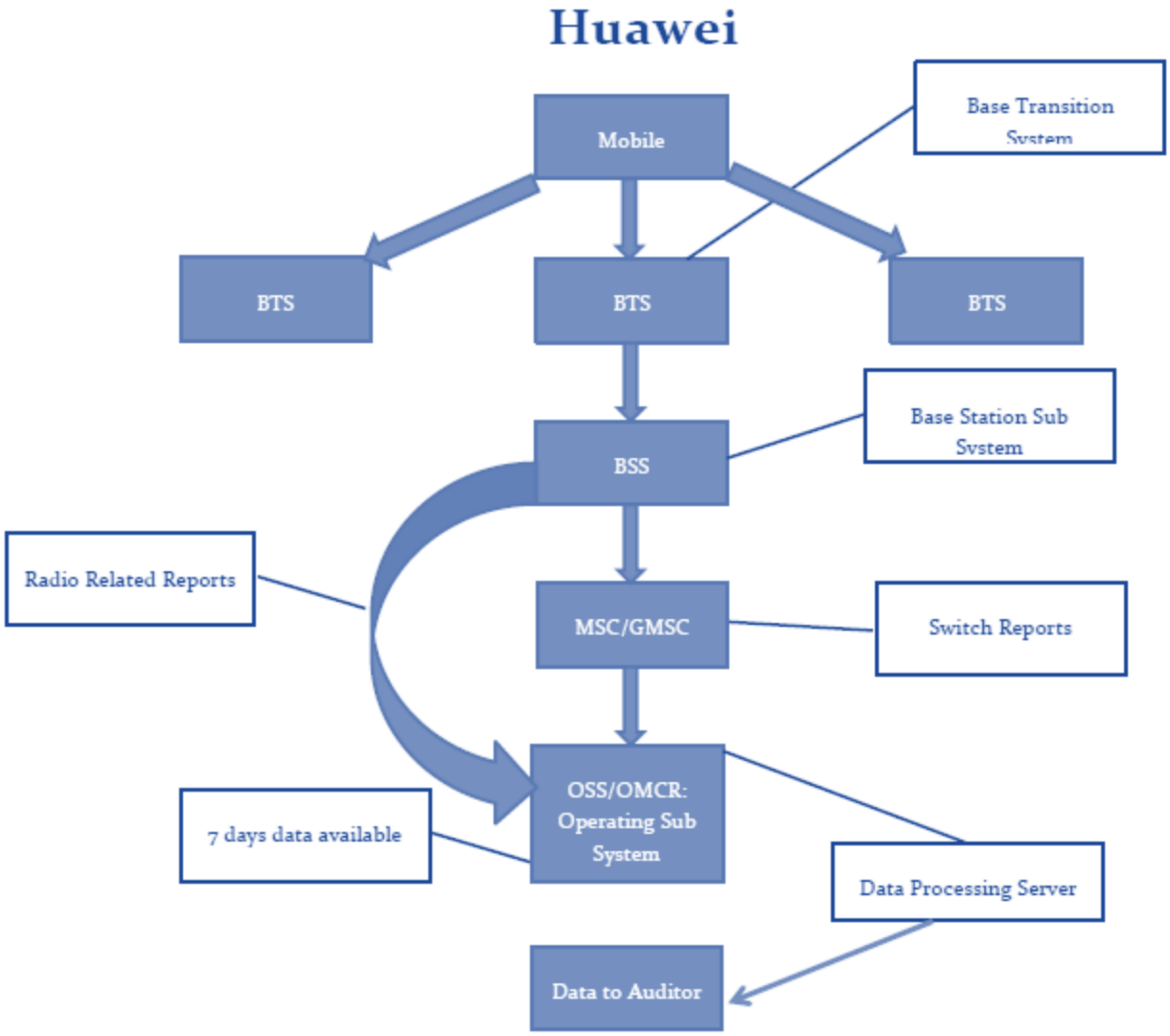
### 1.4. ERICSSON



## 1.5. NSN


NSN
Mobile
BTS
Base Transition Svstem
BSS
Base Station Sub Svstem
OSS: Operating Sub System
MSC/GMSC
Performance Management
Storage/PM Application
HLR
AUC
SIR
OGW
Minimum 7 days storage
Data to Auditor

## 1.6. HUAWEI


Huawei
Mobile
Base Transition System
BTS
BTS
BTS
Base Station Sub System
BSS
Radio Related Reports
MSC/GMSC
Switch Reports
OSS/OMCR: Operating Sub System
7 days data available
Data Processing Server
Data to Auditor

## 12. ABBREVIATIONS

Following terms/abbreviations have been used in this report. This section provides meaning of the abbreviations used in the report.

- TRAI – Telecom Regulatory Authority of India
- QoS – Quality of Service
- AMJ16 – Refers to the quarter of April, May and June 2016
- SSA – Secondary Switching Area
- NOC – Network Operation Center
- OMC – Operations and Maintenance Center
- MSC – Mobile Switching Center
- PMR – Performance Monitoring Reports
- TCBH – Time Consistent Busy Hour
- CBBH - Cell Bouncing Busy Hour
- BTS – Base Transceiver Station
- CSSR – Call Setup Success Rate
- TCH – Traffic Channel
- SDCCH – Standalone Dedicated Control Channel
- CDR – Call Drop Rate
- FER – Frame Error Rate
- SIM – Subscriber Identity Module
- GSM – Global System for Mobile
- CDMA – Code Division Multiple Access
- NA – Not Applicable
- NC – Non Compliance
- POI – Point of Interconnection
- IVR – Interactive Voice Response
- STD – Standard Trunk Dialling
- ISD – International Subscriber Dialling

# 13 ANNEXURE

## 13.1. 2G VOICE PMR DATA: CONSOLIDATED

| Consolidated | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Network Parameters | | Name of Service Provider | | | | | | | | | |
| | | Benchmark | AIRCEL | AIRTEL | BSNL | IDEA | MTS | RCOM CDMA | RCOM GSM | TTSL CDMA | TTSL GSM | VODAFONE |
| Network Availability | Sum of downtime of BTSs in a month in hrs. in the licensed service area | ≤ 2% | 0.08% | 0.14% | 1.32% | 0.06% | 0.07% | 0.07% | 0.09% | 0.11% | 0.12% | 4.62% |
| | No. of BTSs having accumulated downtime of >24 hours in a month | ≤ 2% | 0.04% | 0.15% | 1.53% | 0.01% | 0.04% | 0.14% | 0.34% | 0.19% | 0.11% | 0.42% |
| Connection Establishment (Accessibility) | Call Set-up Success Rate (Within Licensee own network | ≥ 95% | 96.98% | 97.61% | 98.09% | 99.59% | 99.01% | 98.62% | 97.02% | 98.18% | 99.33% | 99.66% |
| | SDDCH/Paging chl. Congestion | ≤ 1% | 0.37% | 0.57% | 0.70% | 0.22% | NA | NA | 0.12% | NA | 0.07% | 0.22% |
| | TCH Congestion | ≤ 2% | 1.24% | 1.39% | 1.62% | 0.20% | 0.12% | 0.37% | 0.42% | 1.02% | 0.18% | 0.34% |
| Connection Maintenance (Retainability) | Call Drop Rate (%age) | ≤ 2% | 0.83% | 0.60% | 1.37% | 0.50% | 0.32% | 0.26% | 0.15% | 0.27% | 0.43% | 0.61% |
| | Worst Affected cell having more than 3% TCH drop | ≤ 3% | 3.15% | 0.67% | 2.00% | 1.28% | 0.53% | 2.02% | 0.74% | 2.38% | 2.24% | 2.25% |
| | %age of connection with good voice quality | ≥ 95% | 96.45% | 98.69% | 97.86% | 97.48% | 99.18% | 99.13% | 99.33% | 98.86% | 98.92% | 96.97% |

## 13.2. 3G VOICE PMR: CONSOLIDATED

| Consolidated | | | | | | |
|---|---|---|---|---|---|---|
| Network Parameters | | Name of Service Provider | | | | |
| | | Benchmark | AIRTEL | BSNL | RCOM | VODAFONE |
| Network Availability | Sum of downtime of BTSs in a month in hrs. in the licensed service area | ≤ 2% | 0.23% | 1.00% | 0.27% | 0.30% |
| | No. of BTSs having accumulated downtime of >24 hours in a month | ≤ 2% | 0.22% | 1.71% | 0.80% | 1.30% |
| Connection Establishment (Accessibility) | Call Set-up Success Rate (Within Licensee own network | ≥ 95% | 99.60% | 96.15% | 99.16% | 99.92% |
| | RRC Congestion: | ≤ 1% | 0.03% | 0.51% | 0.03% | 0.01% |
| | RAB Congestion: | ≤ 2% | 0.03% | 1.24% | 0.04% | 0.01% |
| Connection Maintenance (Retainability) | Circuit Switched Voice Drop Rate | ≤ 2% | 0.50% | 1.78% | 0.06% | 0.23% |
| | Worst affected cells having more than 3% Circuit Switched Voice Drop Rate: | ≤ 3% | 1.06% | 2.67% | 0.23% | 2.58% |
| | Percentage of connections with Good Circuit Switched Voice Quality | ≥ 95% | 98.89% | 97.70% | 99.85% | 98.93% |

- **For each instance of “DNA (Data Not Available)”, please refer the respective hard copy of audit report(s).

## 13.3. BILLING AND CUSTOMER CARE

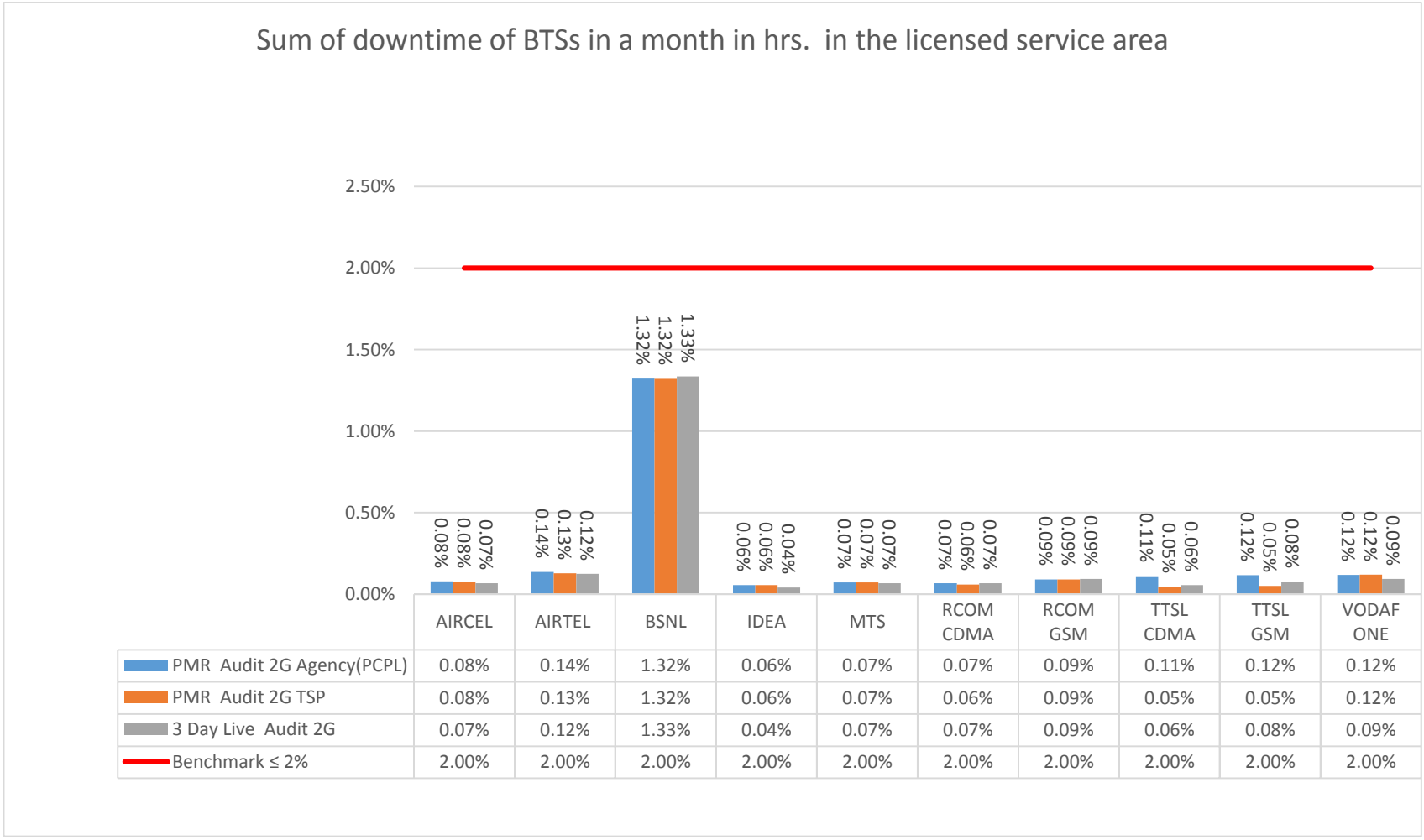
| Name of Service Provider | Metering and Billing credibility | | Billing Complaints | | | Termination & Closures | Time taken for refund of deposits after closures: Benchmark | Response time to customer for assistance | |
|---|---|---|---|---|---|---|---|---|---|
| | Postpaid Subscribers | Prepaid Subscribers | %age complaints resolved within 4 weeks | %age complaints resolved within 6 weeks | %age of where credit/waiver is received within one week | % of Termination/ Closure of service within 7 days (100 %) | Cleared over a period of <60 days (100%) | %age of calls answered by the IVR | %age of call answered by the operators ( voice to voice) within 90 seconds |
| Benchmark | ≤ 0.1% | ≤ 0.1% | ≥ 98% | = 100% | = 100% | = 100% | = 100% | ≥ 95% | ≥ 95% |
| AIRCEL | 0.00% | 0.00% | 100.00% | 100.00% | 100.00% | 100.00% | 99.97% | 94.10% | 93.75% |
| AIRTEL | 0.01% | 0.00% | 100.00% | 100.00% | 100.00% | 100.00% | 100.00% | 100.00% | 82.74% |
| BSNL | 0.05% | 0.10% | 100.00% | 100.00% | 100.00% | 100.00% | 100.00% | 100.00% | 96.83% |
| IDEA | 0.06% | 0.03% | 100.00% | 100.00% | 100.00% | 90.53% | 100.00% | 99.29% | 99.79% |
| MTS | 0.08% | 0.02% | 100.00% | 100.00% | 100.00% | 100.00% | 100.00% | 99.96% | 95.50% |
| RCOM CDMA | 0.09% | 0.08% | 100.00% | 100.00% | 100.00% | 100.00% | 82.77% | 99.03% | 84.63% |
| RCOM GSM | 0.09% | 0.09% | 100.00% | 100.00% | 100.00% | 100.00% | 53.99% | 99.53% | 92.89% |
| TTSL CDMA | 0.00% | 0.00% | NA | NA | 100.00% | 100.00% | 100.00% | NA | 99.33% |
| TTSL GSM | 0.00% | 0.00% | NA | NA | 100.00% | 100.00% | NA | 96.21% | 98.25% |
| VODAFONE | 0.09% | 0.09% | 100.00% | 100.00% | 100.00% | 100.00% | 99.82% | 100.00% | 99.19% |

## 13.4. PMR Comparison (TSP vs. Audit Agency): Network Parameters

PMR Report Comparison between Audit Agency and TSP

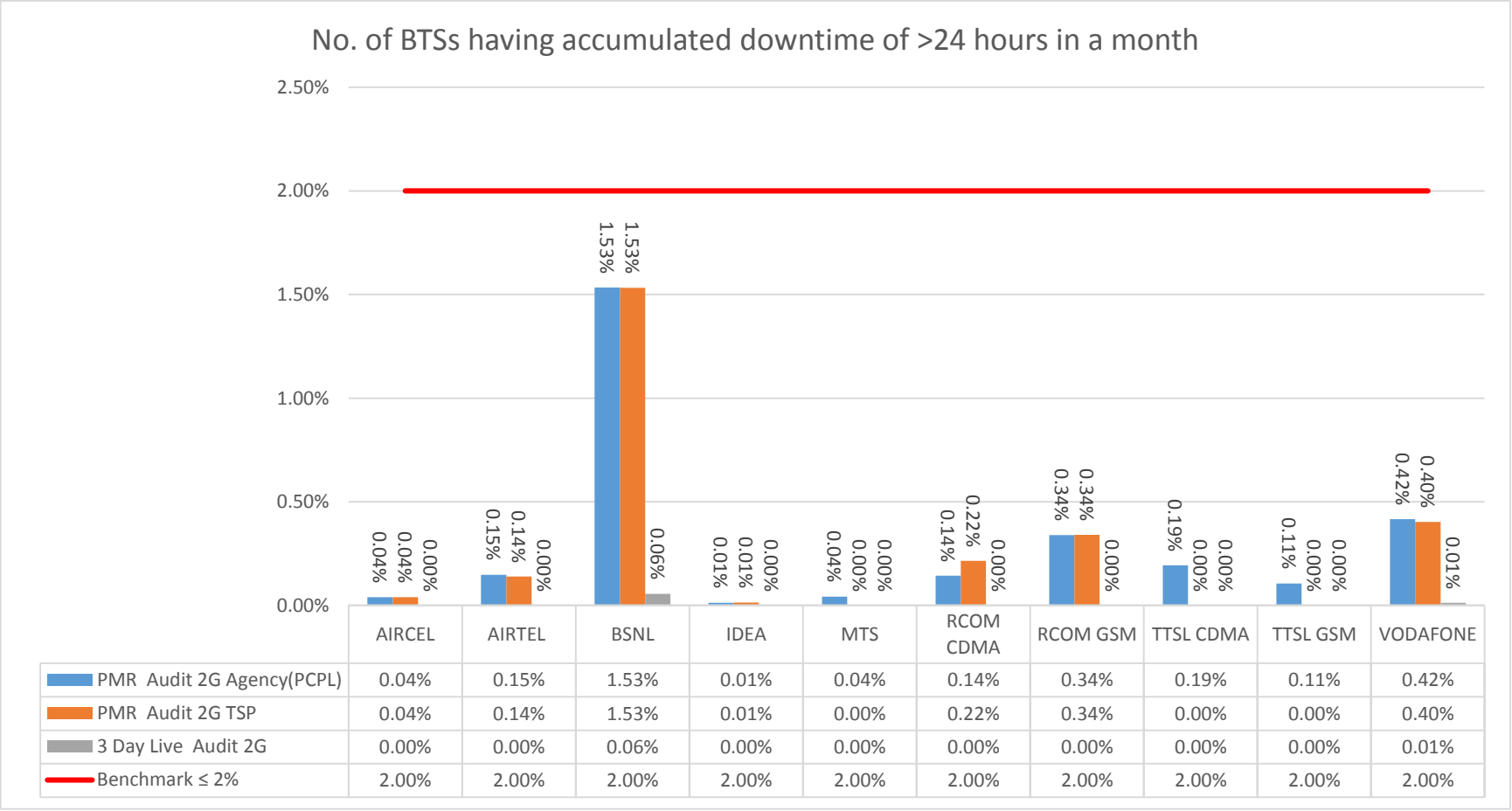
| Network Parameters | | Benchmark | | Name of Service Provider | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | AIRCEL | AIRTEL | BSNL | IDEA | MTS | RCOM CDMA | RCOM GSM | TTSL CDMA | TTSL GSM | VODAFONE |
| Network Availability | Sum of downtime of BTSs in a month in hrs. in the licensed service area | ≤ 2% | Agency | 0.08% | 0.14% | 1.32% | 0.06% | 0.07% | 0.07% | 0.09% | 0.11% | 0.12% | 0.12% |
| | | | TSP | 0.08% | 0.13% | 1.32% | 0.06% | 0.07% | 0.06% | 0.09% | 0.05% | 0.05% | 0.12% |
| | No. of BTSs having accumulated downtime of >24 hours in a month | ≤ 2% | Agency | 0.04% | 0.15% | 1.53% | 0.01% | 0.04% | 0.14% | 0.34% | 0.19% | 0.11% | 0.42% |
| | | | TSP | 0.04% | 0.14% | 1.53% | 0.01% | 0.00% | 0.22% | 0.34% | 0.00% | 0.00% | 0.40% |
| Connection Establishment (Accessibility) | Call Set-up Success Rate (Within Licensee own network | ≥ 95% | Agency | 96.98% | 97.61% | 98.09% | 99.59% | 99.01% | 98.62% | 97.02% | 98.18% | 99.33% | 99.66% |
| | | | TSP | 96.98% | 97.58% | 98.09% | 99.59% | 99.01% | 98.62% | 96.20% | 98.18% | 99.33% | 99.66% |
| | SDDCH/Paging chl. Congestion | ≤ 1% | Agency | 0.37% | 0.57% | 0.70% | 0.22% | NA | NA | 0.12% | NA | 0.07% | 0.22% |
| | | | TSP | 0.37% | 0.61% | 0.70% | 0.22% | 0.00% | 0.00% | 0.13% | 0.00% | 0.07% | 0.23% |
| | TCH Congestion | ≤ 2% | Agency | 1.24% | 1.39% | 1.62% | 0.20% | 0.12% | 0.37% | 0.42% | 1.02% | 0.18% | 0.34% |
| | | | TSP | 1.24% | 1.42% | 1.62% | 0.20% | 0.12% | 0.37% | 0.44% | 1.02% | 0.18% | 0.34% |
| Connection Maintenance (Retainability) | Call Drop Rate (%age) | ≤ 2% | Agency | 0.83% | 0.60% | 1.37% | 0.50% | 0.32% | 0.26% | 0.15% | 0.27% | 0.43% | 0.61% |
| | | | TSP | 0.83% | 0.58% | 1.37% | 0.50% | 0.33% | 0.26% | 0.15% | 0.27% | 0.43% | 0.61% |
| | Worst Affected cell having more than 3% TCH drop | ≤ 3% | Agency | 3.15% | 0.67% | 2.00% | 1.28% | 0.53% | 2.02% | 0.74% | 2.38% | 2.24% | 2.25% |
| | | | TSP | 3.16% | 0.64% | 2.00% | 1.28% | 0.53% | 2.01% | 0.77% | 2.38% | 2.24% | 2.29% |
| | %age of connection with good voice quality | ≥ 95% | Agency | 96.45% | 98.69% | 97.86% | 97.48% | 99.18% | 99.13% | 99.33% | 98.86% | 98.92% | 96.97% |
| | | | TSP | 96.45% | 98.71% | 97.92% | 97.48% | 99.18% | 99.13% | 99.33% | 98.86% | 98.92% | 96.97% |

## 13.4.1. SUM OF DOWNTIME OF BTSS IN A MONTH IN HRS. IN THE LICENSED SERVICE



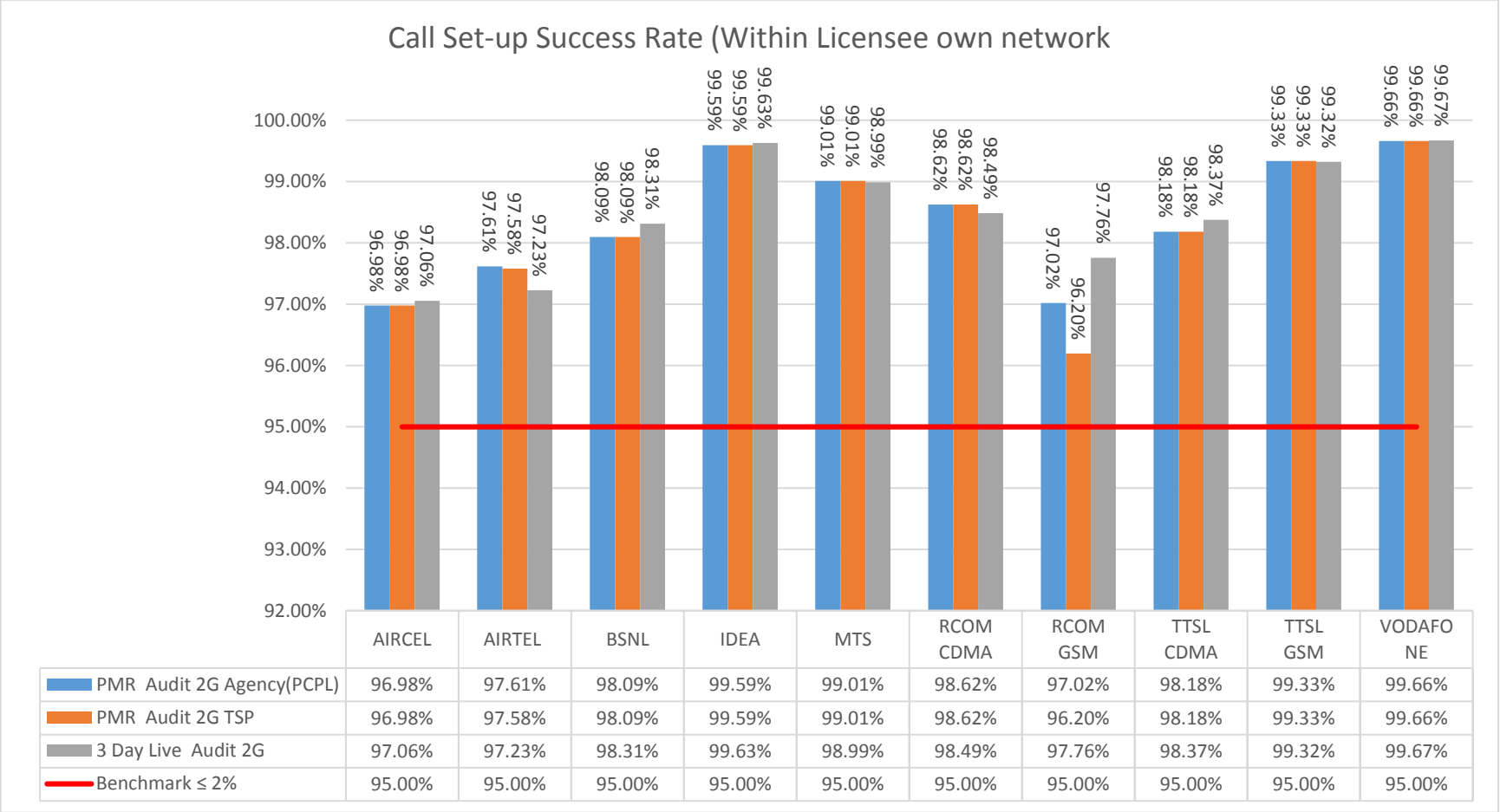

| | AIRCEL | AIRTEL | BSNL | IDEA | MTS | RCOM CDMA | RCOM GSM | TTSL CDMA | TTSL GSM | VODAFONE |
|---|---|---|---|---|---|---|---|---|---|---|
| PMR Audit 2G Agency(PCPL) | 0.08% | 0.14% | 1.32% | 0.06% | 0.07% | 0.07% | 0.09% | 0.11% | 0.12% | 0.12% |
| PMR Audit 2G TSP | 0.08% | 0.13% | 1.32% | 0.06% | 0.07% | 0.06% | 0.09% | 0.05% | 0.05% | 0.12% |
| 3 Day Live Audit 2G | 0.07% | 0.12% | 1.33% | 0.04% | 0.07% | 0.07% | 0.09% | 0.06% | 0.08% | 0.09% |
| Benchmark ≤ 2% | 2.00% | 2.00% | 2.00% | 2.00% | 2.00% | 2.00% | 2.00% | 2.00% | 2.00% | 2.00% |

## 13.4.2. NO. OF BTSS HAVING ACCUMULATED DOWNTIME OF >24 HOURS IN A MONTH



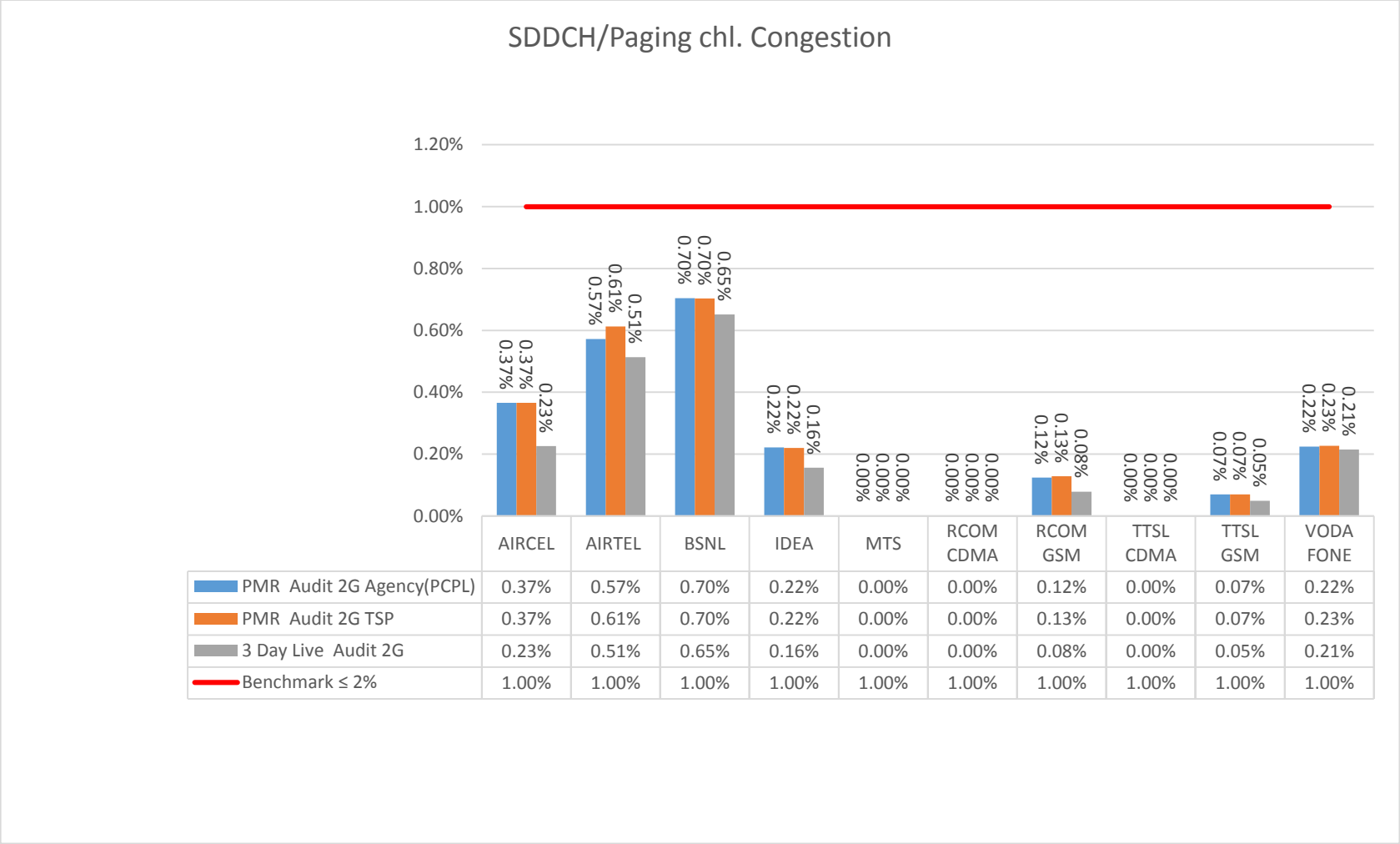

| | AIRCEL | AIRTEL | BSNL | IDEA | MTS | RCOM CDMA | RCOM GSM | TTSL CDMA | TTSL GSM | VODAFONE |
|---|---|---|---|---|---|---|---|---|---|---|
| PMR Audit 2G Agency(PCPL) | 0.04% | 0.15% | 1.53% | 0.01% | 0.04% | 0.14% | 0.34% | 0.19% | 0.11% | 0.42% |
| PMR Audit 2G TSP | 0.04% | 0.14% | 1.53% | 0.01% | 0.00% | 0.22% | 0.34% | 0.00% | 0.00% | 0.40% |
| 3 Day Live Audit 2G | 0.00% | 0.00% | 0.06% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.01% |
| Benchmark ≤ 2% | 2.00% | 2.00% | 2.00% | 2.00% | 2.00% | 2.00% | 2.00% | 2.00% | 2.00% | 2.00% |

## 13.4.3. CALL SET-UP SUCCESS RATE (WITHIN LICENSEE OWN NETWORK)



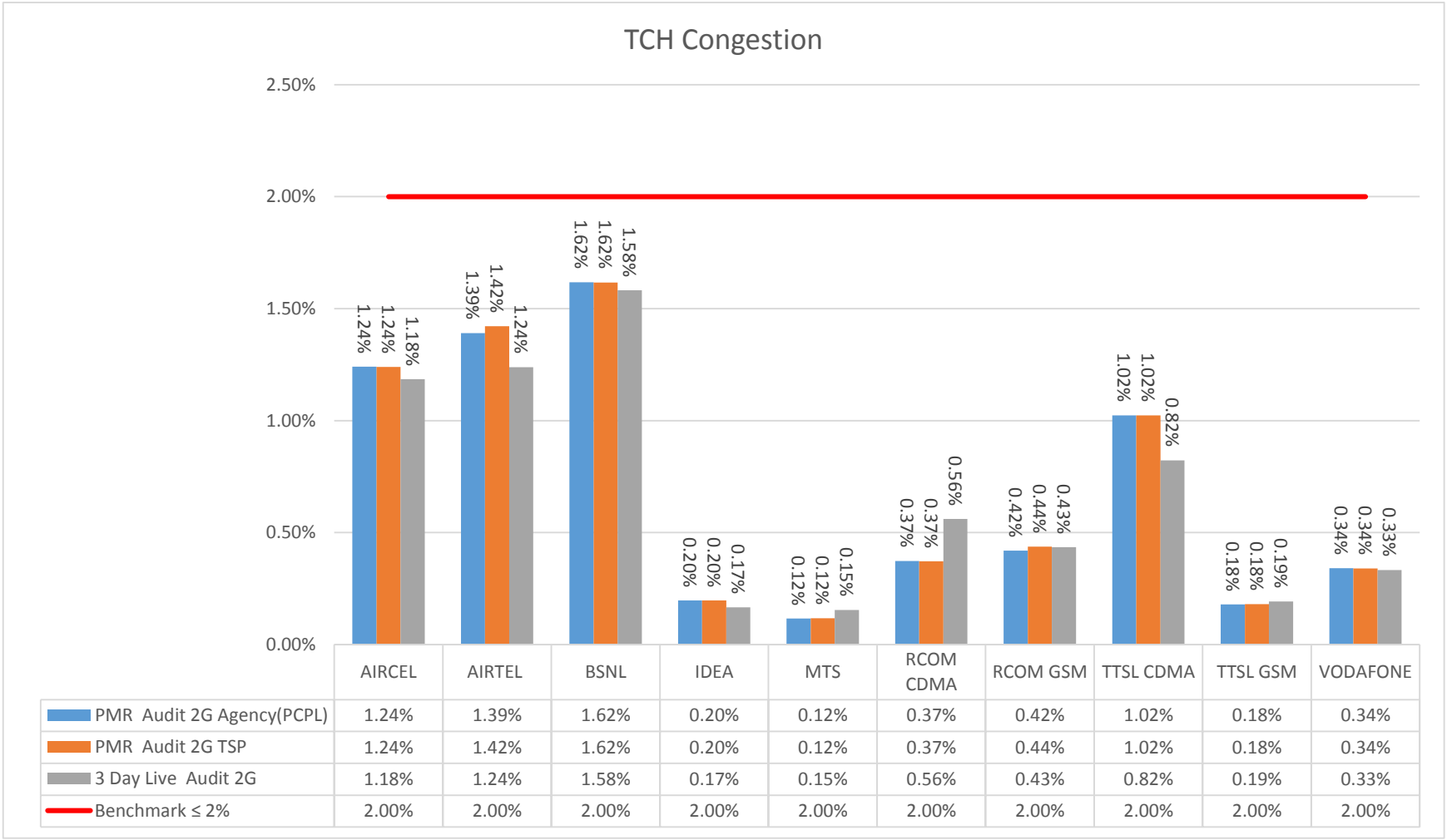

| | AIRCEL | AIRTEL | BSNL | IDEA | MTS | RCOM CDMA | RCOM GSM | TTSL CDMA | TTSL GSM | VODAFONE |
|---|---|---|---|---|---|---|---|---|---|---|
| PMR Audit 2G Agency(PCPL) | 96.98% | 97.61% | 98.09% | 99.59% | 99.01% | 98.62% | 97.02% | 98.18% | 99.33% | 99.66% |
| PMR Audit 2G TSP | 96.98% | 97.58% | 98.09% | 99.59% | 99.01% | 98.62% | 96.20% | 98.18% | 99.33% | 99.66% |
| 3 Day Live Audit 2G | 97.06% | 97.23% | 98.31% | 99.63% | 98.99% | 98.49% | 97.76% | 98.37% | 99.32% | 99.67% |
| Benchmark ≤ 2% | 95.00% | 95.00% | 95.00% | 95.00% | 95.00% | 95.00% | 95.00% | 95.00% | 95.00% | 95.00% |

## 13.4.4. SDDCH/PAGING CHL. CONGESTION



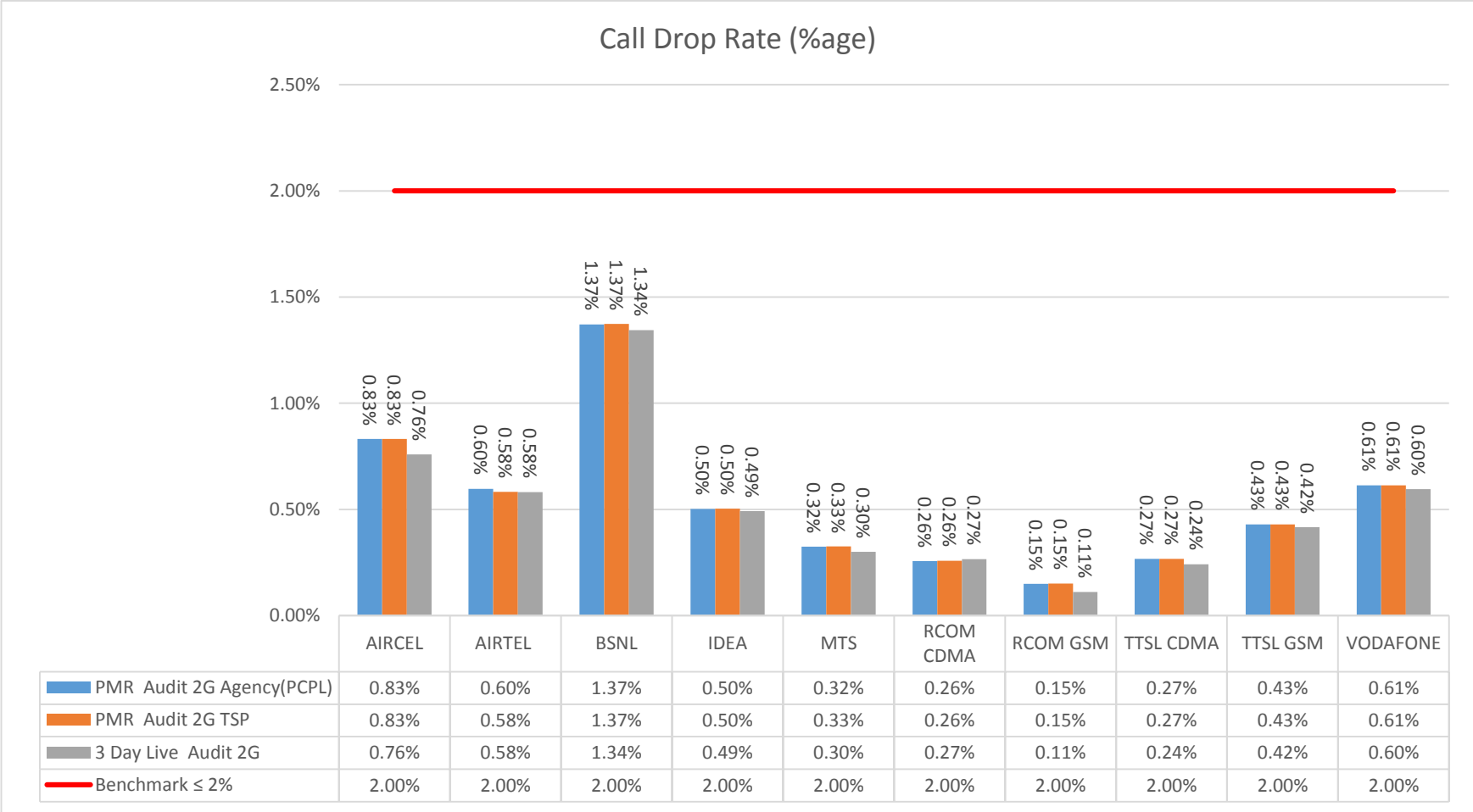

| | AIRCEL | AIRTEL | BSNL | IDEA | MTS | RCOM CDMA | RCOM GSM | TTSL CDMA | TTSL GSM | VODA FONE |
|---|---|---|---|---|---|---|---|---|---|---|
| PMR Audit 2G Agency(PCPL) | 0.37% | 0.57% | 0.70% | 0.22% | 0.00% | 0.00% | 0.12% | 0.00% | 0.07% | 0.22% |
| PMR Audit 2G TSP | 0.37% | 0.61% | 0.70% | 0.22% | 0.00% | 0.00% | 0.13% | 0.00% | 0.07% | 0.23% |
| 3 Day Live Audit 2G | 0.23% | 0.51% | 0.65% | 0.16% | 0.00% | 0.00% | 0.08% | 0.00% | 0.05% | 0.21% |
| Benchmark ≤ 2% | 1.00% | 1.00% | 1.00% | 1.00% | 1.00% | 1.00% | 1.00% | 1.00% | 1.00% | 1.00% |

## 13.4.5. TCH CONGESTION



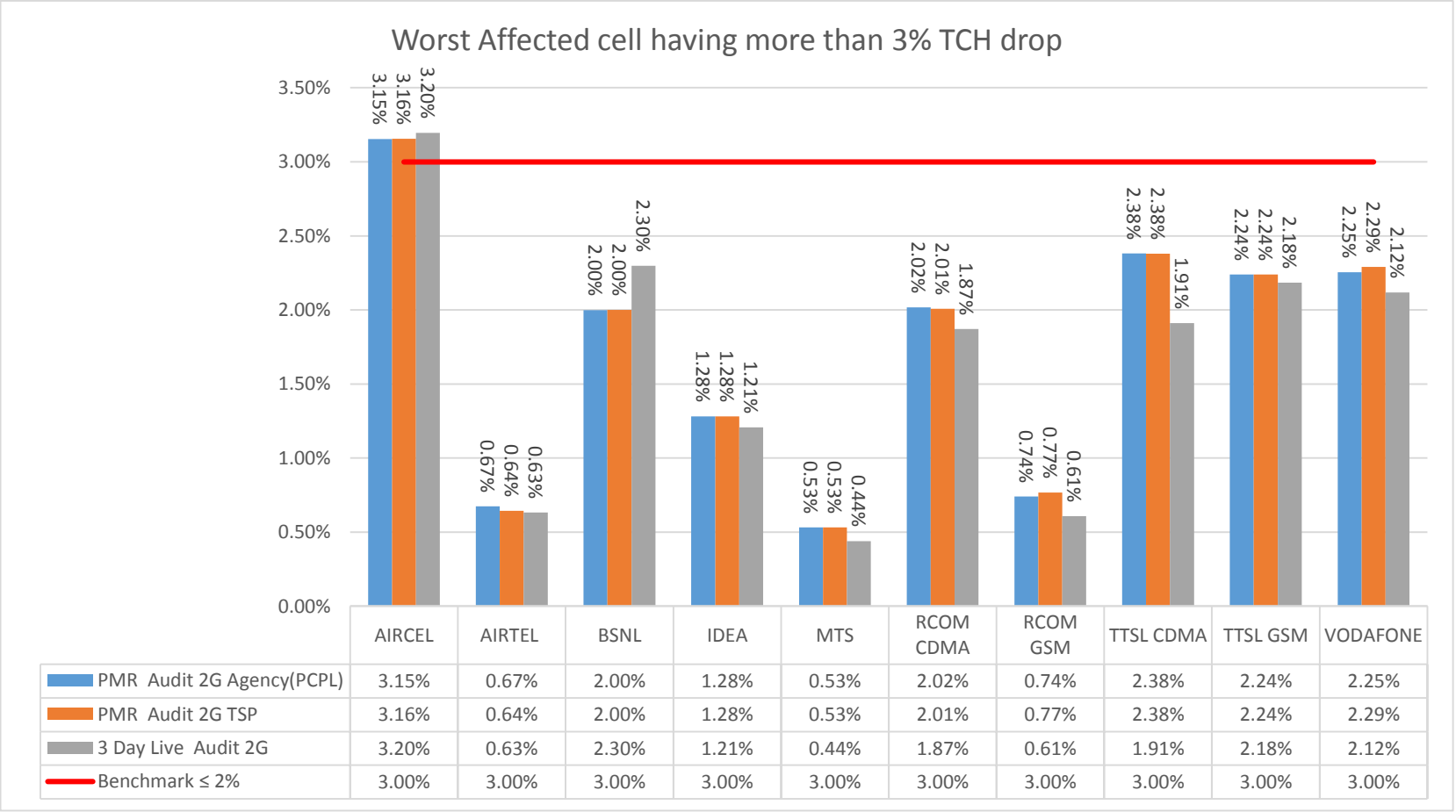

| | AIRCEL | AIRTEL | BSNL | IDEA | MTS | RCOM CDMA | RCOM GSM | TTSL CDMA | TTSL GSM | VODAFONE |
|---|---|---|---|---|---|---|---|---|---|---|
| PMR Audit 2G Agency(PCPL) | 1.24% | 1.39% | 1.62% | 0.20% | 0.12% | 0.37% | 0.42% | 1.02% | 0.18% | 0.34% |
| PMR Audit 2G TSP | 1.24% | 1.42% | 1.62% | 0.20% | 0.12% | 0.37% | 0.44% | 1.02% | 0.18% | 0.34% |
| 3 Day Live Audit 2G | 1.18% | 1.24% | 1.58% | 0.17% | 0.15% | 0.56% | 0.43% | 0.82% | 0.19% | 0.33% |
| Benchmark ≤ 2% | 2.00% | 2.00% | 2.00% | 2.00% | 2.00% | 2.00% | 2.00% | 2.00% | 2.00% | 2.00% |

## 13.4.6. CALL DROP RATE (%AGE)



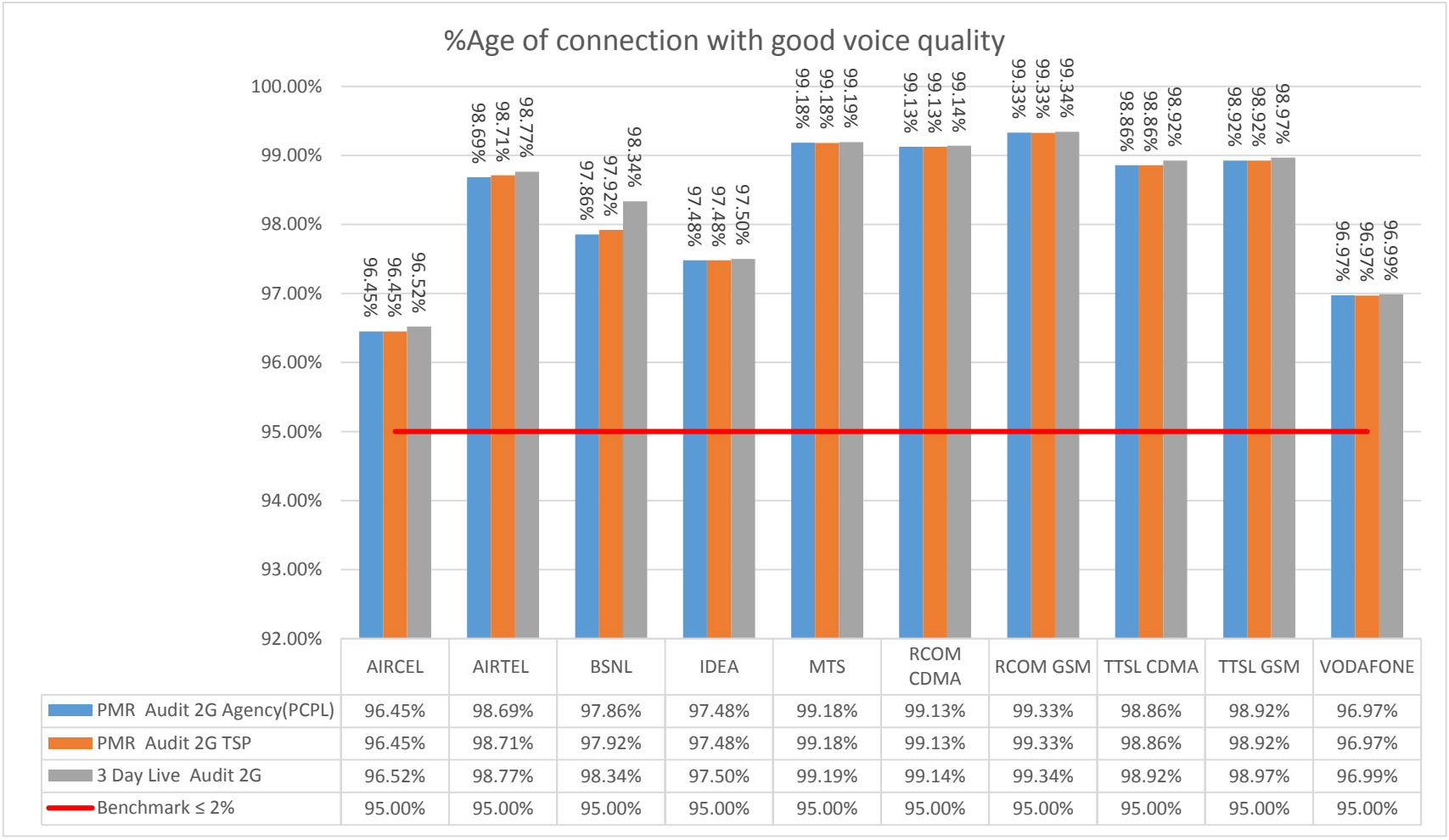

| | AIRCEL | AIRTEL | BSNL | IDEA | MTS | RCOM CDMA | RCOM GSM | TTSL CDMA | TTSL GSM | VODAFONE |
|---|---|---|---|---|---|---|---|---|---|---|
| PMR Audit 2G Agency(PCPL) | 0.83% | 0.60% | 1.37% | 0.50% | 0.32% | 0.26% | 0.15% | 0.27% | 0.43% | 0.61% |
| PMR Audit 2G TSP | 0.83% | 0.58% | 1.37% | 0.50% | 0.33% | 0.26% | 0.15% | 0.27% | 0.43% | 0.61% |
| 3 Day Live Audit 2G | 0.76% | 0.58% | 1.34% | 0.49% | 0.30% | 0.27% | 0.11% | 0.24% | 0.42% | 0.60% |
| Benchmark ≤ 2% | 2.00% | 2.00% | 2.00% | 2.00% | 2.00% | 2.00% | 2.00% | 2.00% | 2.00% | 2.00% |

## 13.4.7. WORST AFFECTED CELL HAVING MORE THAN 3% TCH DROP




| | AIRCEL | AIRTEL | BSNL | IDEA | MTS | RCOM CDMA | RCOM GSM | TTSL CDMA | TTSL GSM | VODAFONE |
|---|---|---|---|---|---|---|---|---|---|---|
| PMR Audit 2G Agency(PCPL) | 3.15% | 0.67% | 2.00% | 1.28% | 0.53% | 2.02% | 0.74% | 2.38% | 2.24% | 2.25% |
| PMR Audit 2G TSP | 3.16% | 0.64% | 2.00% | 1.28% | 0.53% | 2.01% | 0.77% | 2.38% | 2.24% | 2.29% |
| 3 Day Live Audit 2G | 3.20% | 0.63% | 2.30% | 1.21% | 0.44% | 1.87% | 0.61% | 1.91% | 2.18% | 2.12% |
| Benchmark ≤ 2% | 3.00% | 3.00% | 3.00% | 3.00% | 3.00% | 3.00% | 3.00% | 3.00% | 3.00% | 3.00% |

## 13.4.8. %AGE OF CONNECTION WITH GOOD VOICE QUALITY

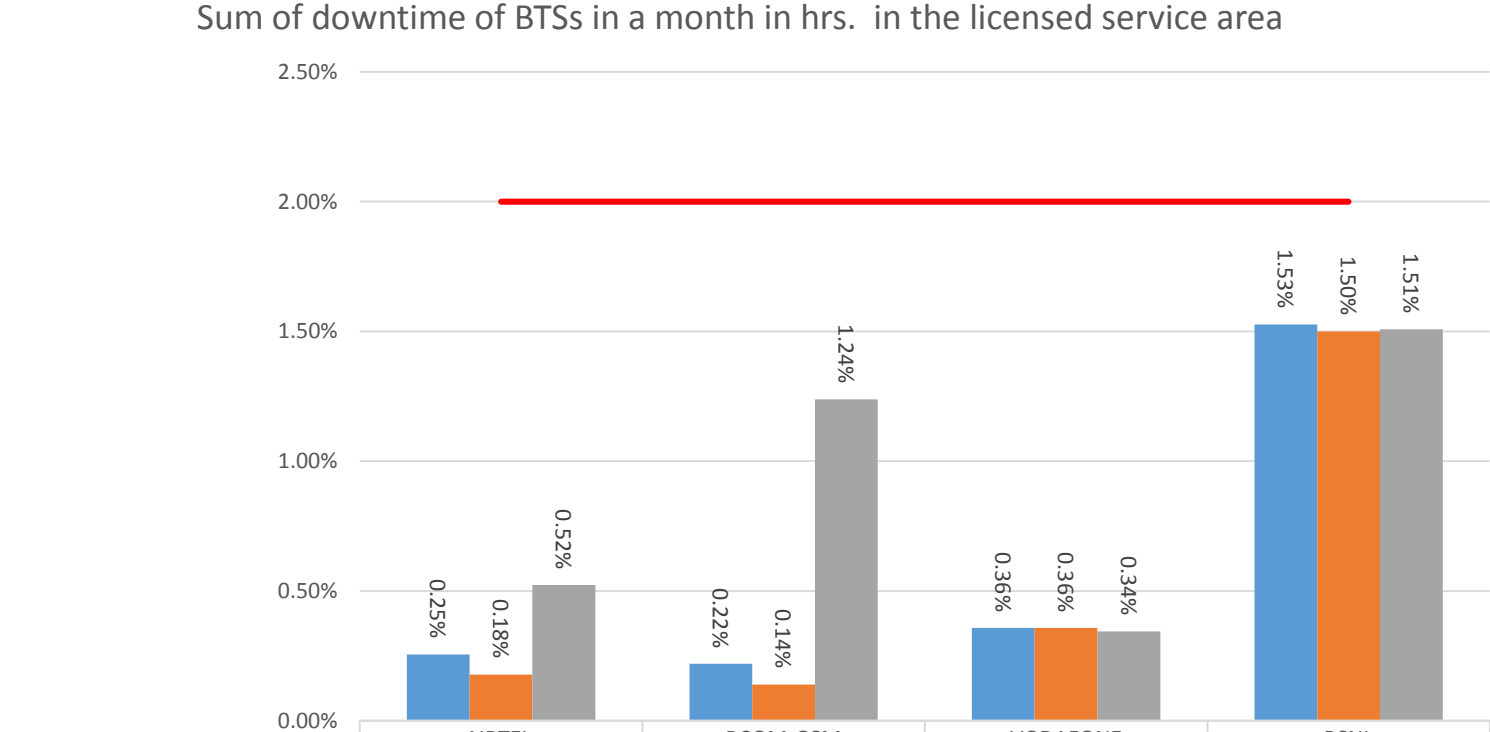



| | AIRCEL | AIRTEL | BSNL | IDEA | MTS | RCOM CDMA | RCOM GSM | TTSL CDMA | TTSL GSM | VODAFONE |
|---|---|---|---|---|---|---|---|---|---|---|
| PMR Audit 2G Agency(PCPL) | 96.45% | 98.69% | 97.86% | 97.48% | 99.18% | 99.13% | 99.33% | 98.86% | 98.92% | 96.97% |
| PMR Audit 2G TSP | 96.45% | 98.71% | 97.92% | 97.48% | 99.18% | 99.13% | 99.33% | 98.86% | 98.92% | 96.97% |
| 3 Day Live Audit 2G | 96.52% | 98.77% | 98.34% | 97.50% | 99.19% | 99.14% | 99.34% | 98.92% | 98.97% | 96.99% |
| Benchmark ≤ 2% | 95.00% | 95.00% | 95.00% | 95.00% | 95.00% | 95.00% | 95.00% | 95.00% | 95.00% | 95.00% |

## 13.5. PMR Comparison (TSP vs. Audit Agency): Network Parameters

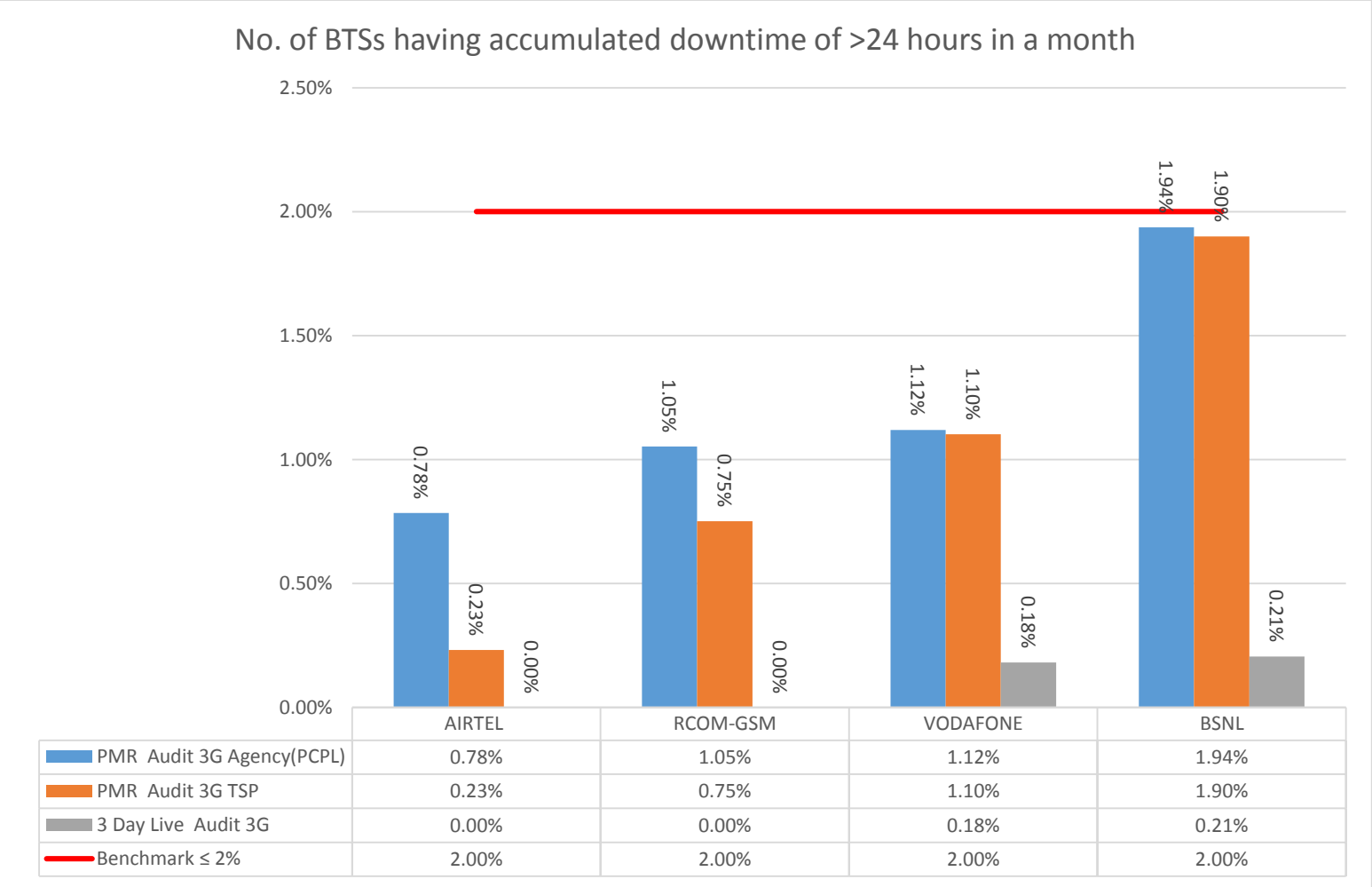
| PMR Report Comparison between Audit Agency and TSP | | | | | | | |
|---|---|---|---|---|---|---|---|
| Network Parameters | | Name of Service Provider | | | | | |
| | | Benchmark | | AIRTEL | BSNL | RCOM | VODAFONE |
| Network Availability | Sum of downtime of BTSs in a month in hrs. in the licensed service area | ≤ 2% | Agency | 0.23% | 1.00% | 0.27% | 0.30% |
| | | | TSP | 0.23% | 1.47% | 0.34% | 0.30% |
| | No. of BTSs having accumulated downtime of >24 hours in a month | ≤ 2% | Agency | 0.22% | 1.71% | 0.80% | 1.30% |
| | | | TSP | 0.14% | 1.67% | 1.20% | 0.75% |
| Connection Establishment (Accessibility) | Call Set-up Success Rate (Within Licensee own network | ≥ 95% | Agency | 99.60% | 96.15% | 99.16% | 99.92% |
| | | | TSP | 99.59% | 96.00% | 99.16% | 99.92% |
| | RRC Congestion: | ≤ 1% | Agency | 0.03% | 0.51% | 0.03% | 0.01% |
| | | | TSP | 0.03% | 0.47% | 0.03% | 0.01% |
| | RAB Congestion: | ≤ 2% | Agency | 0.03% | 1.24% | 0.04% | 0.01% |
| | | | TSP | 0.03% | 1.20% | 0.04% | 0.01% |
| Connection Maintenance (Retainability) | Circuit Switched Voice Drop Rate | ≤ 2% | Agency | 0.50% | 1.78% | 0.06% | 0.23% |
| | | | TSP | 0.48% | 1.73% | 0.06% | 0.23% |
| | Worst affected cells having more than 3% Circuit Switched Voice Drop Rate: | ≤ 3% | Agency | 1.06% | 2.67% | 0.23% | 2.58% |
| | | | TSP | 1.02% | 2.60% | 0.25% | 2.53% |
| | Percentage of connections with Good Circuit Switched Voice Quality | ≥ 95% | Agency | 98.89% | 97.70% | 99.85% | 98.93% |
| | | | TSP | 98.89% | 97.53% | 99.85% | 98.94% |

## 13.5.1. SUM OF DOWNTIME OF BTSS IN A MONTH IN HRS. IN THE LICENSED SERVICE AREA



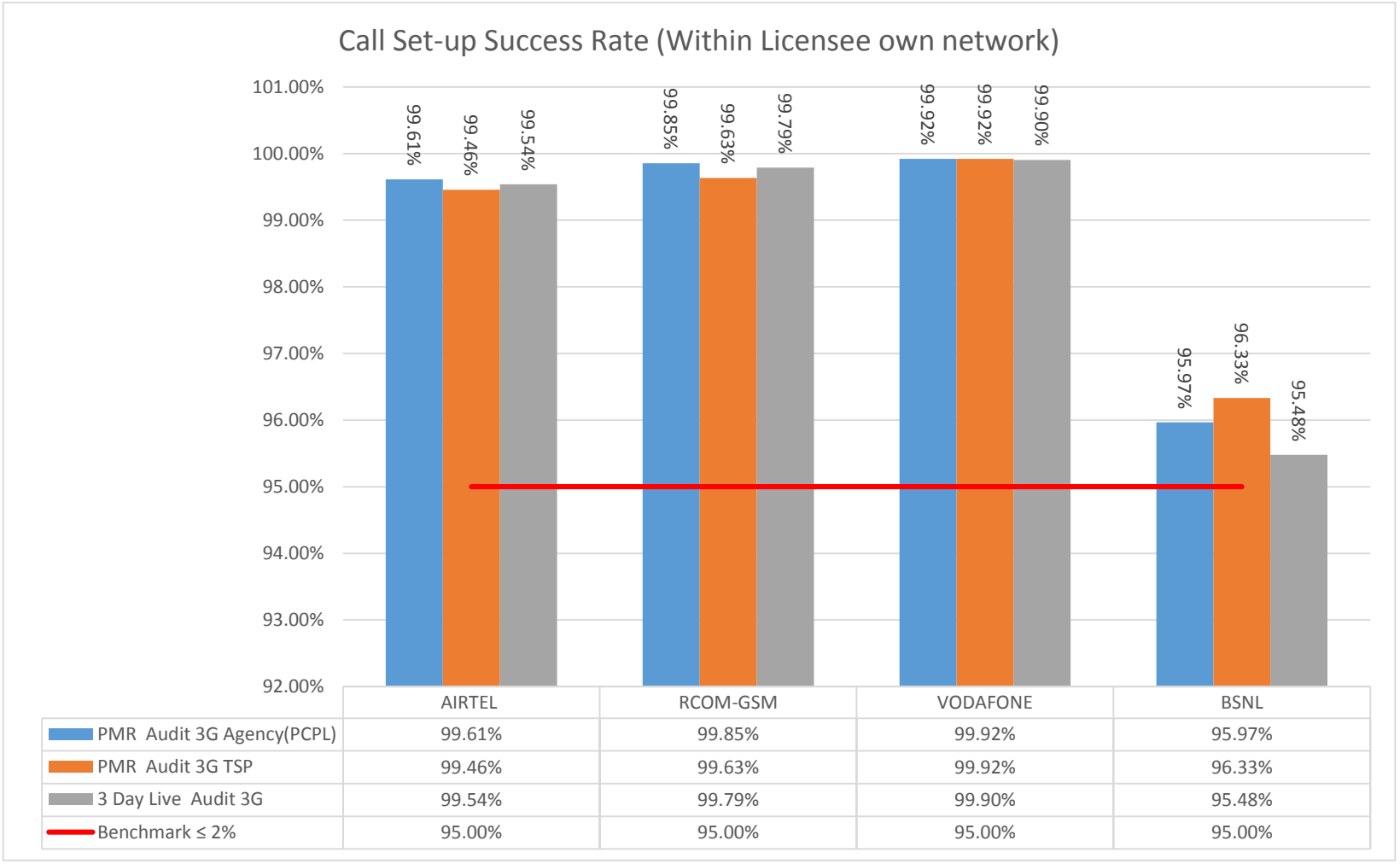

| | AIRTEL | RCOM-GSM | VODAFONE | BSNL |
|---|---|---|---|---|
| PMR Audit 3G Agency(PCPL) | 0.25% | 0.22% | 0.36% | 1.53% |
| PMR Audit 3G TSP | 0.18% | 0.14% | 0.36% | 1.50% |
| 3 Day Live Audit 3G | 0.52% | 1.24% | 0.34% | 1.51% |
| Benchmark ≤ 2% | 2.00% | 2.00% | 2.00% | 2.00% |

## 13.5.2. NO. OF BTSS HAVING ACCUMULATED DOWNTIME OF >24 HOURS IN A MONTH



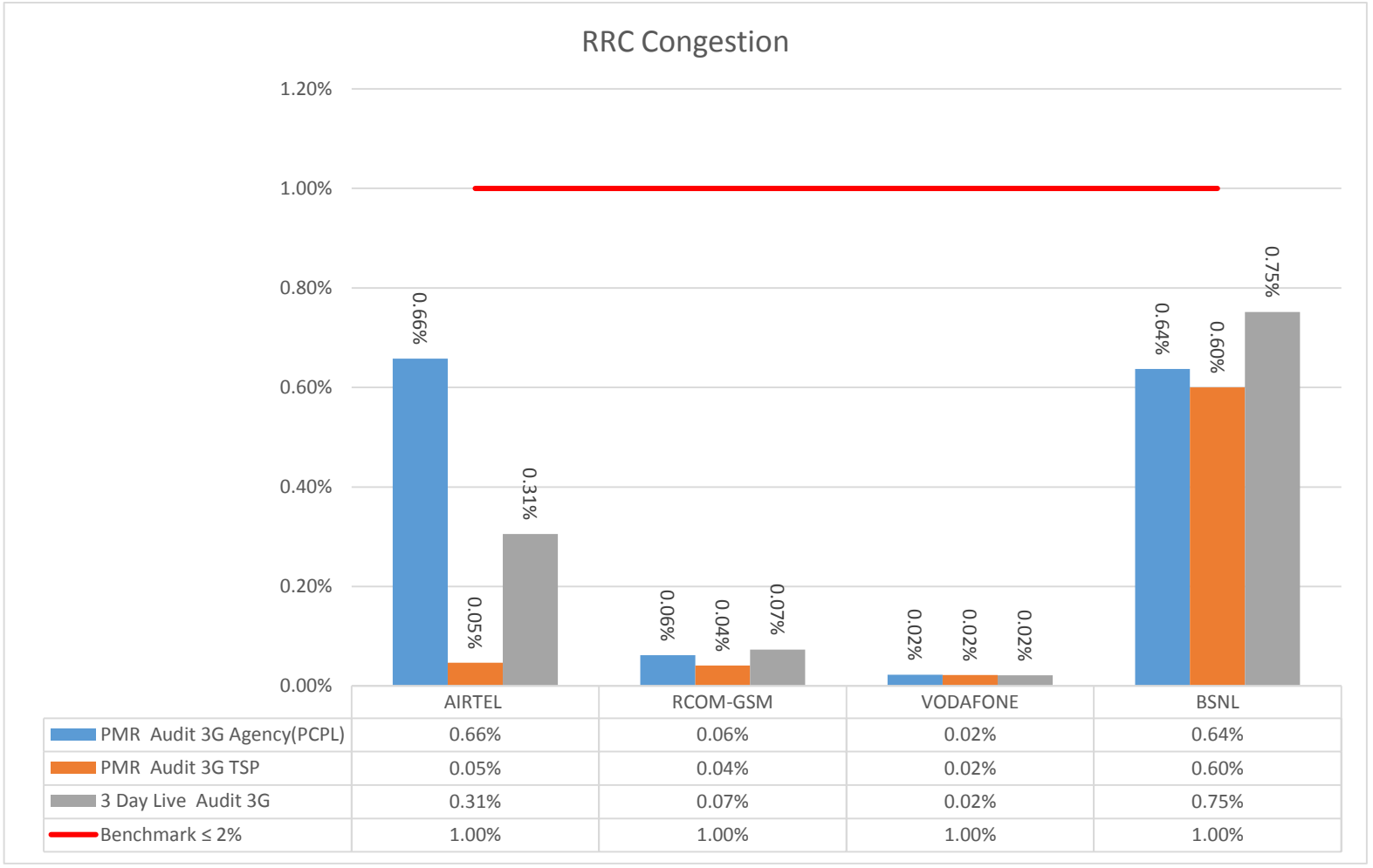

| | AIRTEL | RCOM-GSM | VODAFONE | BSNL |
|---|---|---|---|---|
| PMR Audit 3G Agency(PCPL) | 0.78% | 1.05% | 1.12% | 1.94% |
| PMR Audit 3G TSP | 0.23% | 0.75% | 1.10% | 1.90% |
| 3 Day Live Audit 3G | 0.00% | 0.00% | 0.18% | 0.21% |
| Benchmark ≤ 2% | 2.00% | 2.00% | 2.00% | 2.00% |

## 13.5.3. CALL SET-UP SUCCESS RATE (WITHIN LICENSEE OWN NETWORK)



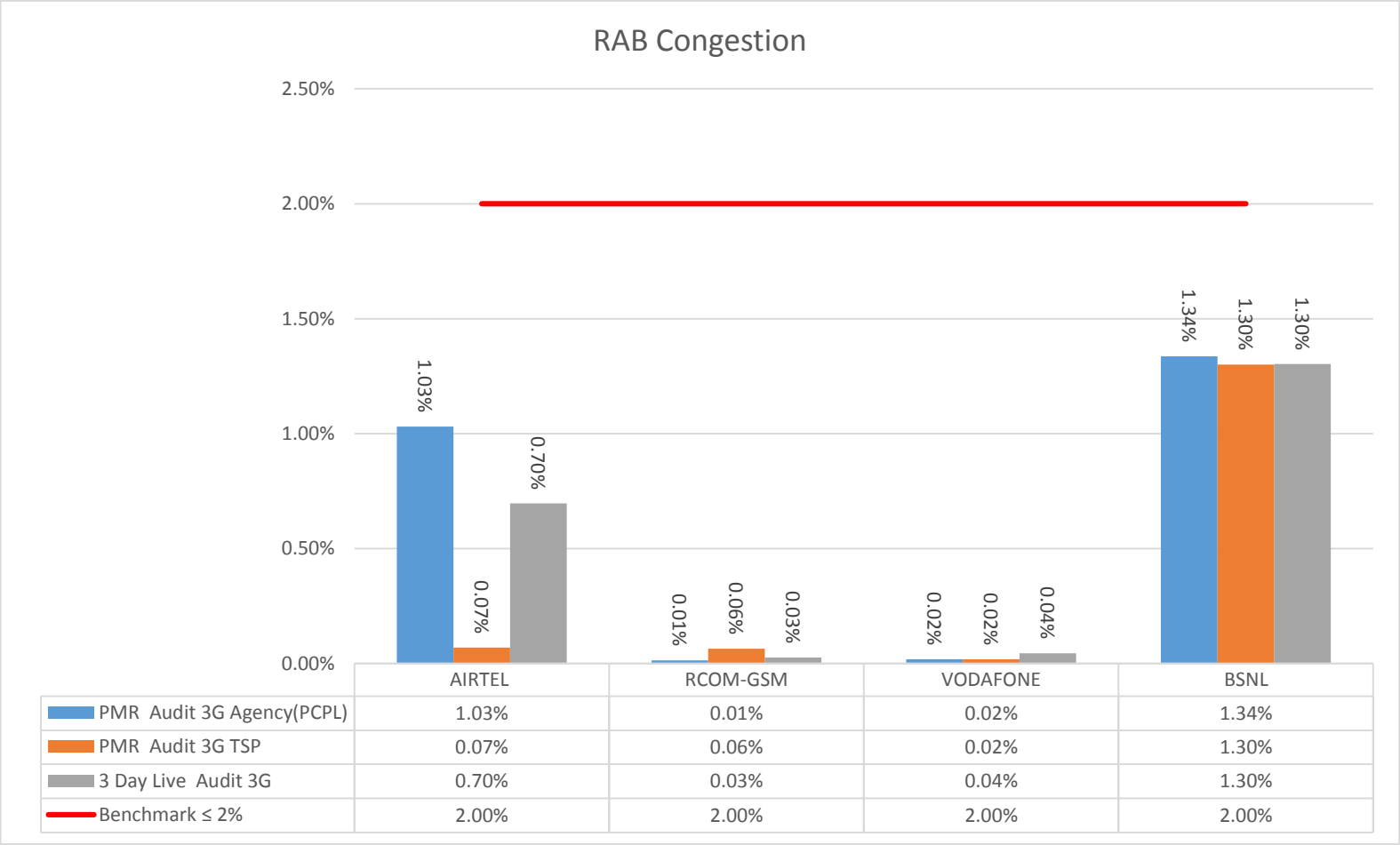

| | AIRTEL | RCOM-GSM | VODAFONE | BSNL |
|---|---|---|---|---|
| PMR Audit 3G Agency(PCPL) | 99.61% | 99.85% | 99.92% | 95.97% |
| PMR Audit 3G TSP | 99.46% | 99.63% | 99.92% | 96.33% |
| 3 Day Live Audit 3G | 99.54% | 99.79% | 99.90% | 95.48% |
| Benchmark ≤ 2% | 95.00% | 95.00% | 95.00% | 95.00% |

## 13.5.4. RRC CONGESTION



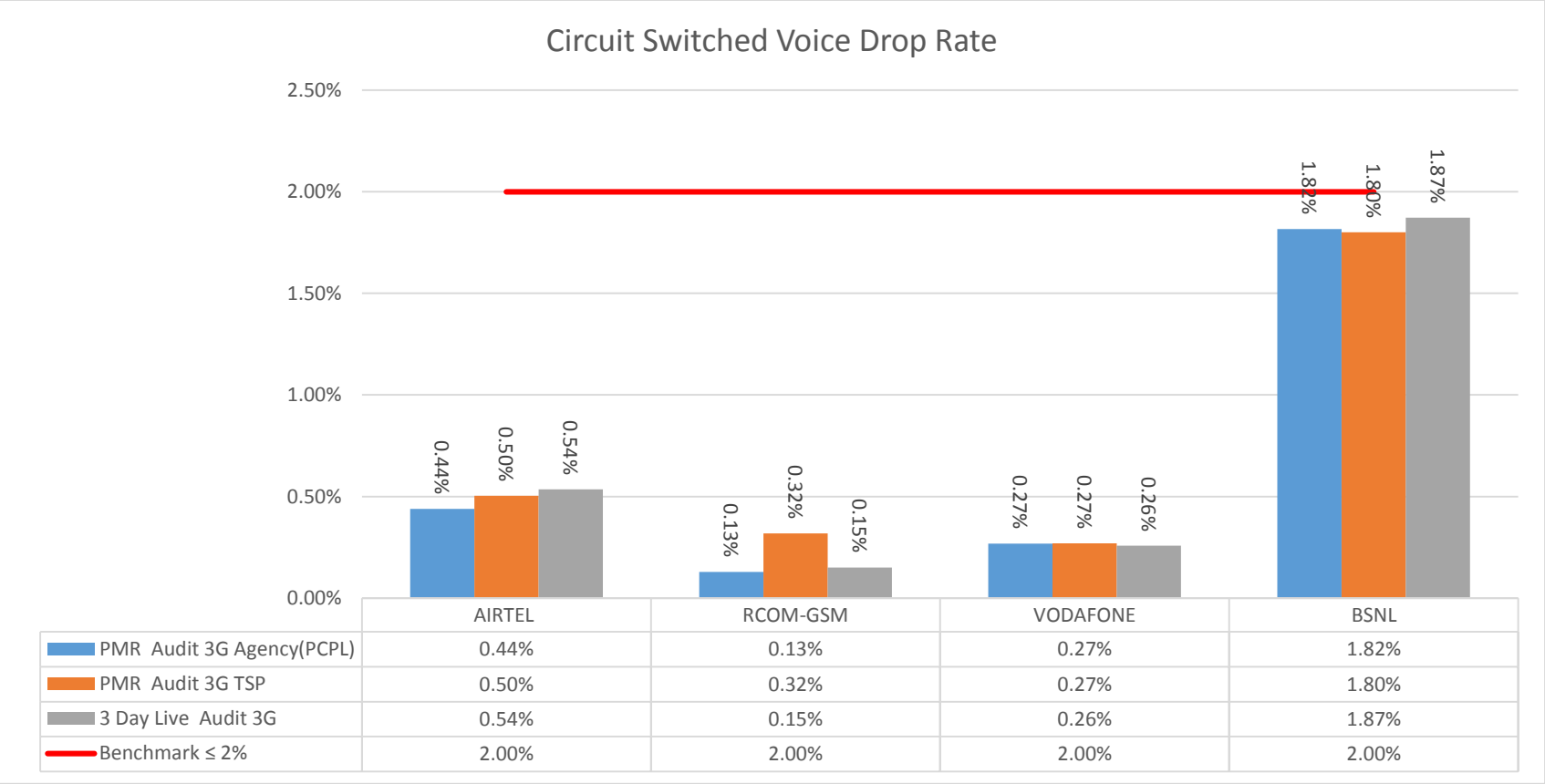

| | AIRTEL | RCOM-GSM | VODAFONE | BSNL |
|---|---|---|---|---|
| PMR Audit 3G Agency(PCPL) | 0.66% | 0.06% | 0.02% | 0.64% |
| PMR Audit 3G TSP | 0.05% | 0.04% | 0.02% | 0.60% |
| 3 Day Live Audit 3G | 0.31% | 0.07% | 0.02% | 0.75% |
| Benchmark ≤ 2% | 1.00% | 1.00% | 1.00% | 1.00% |

## 13.5.5. RAB CONGESTION



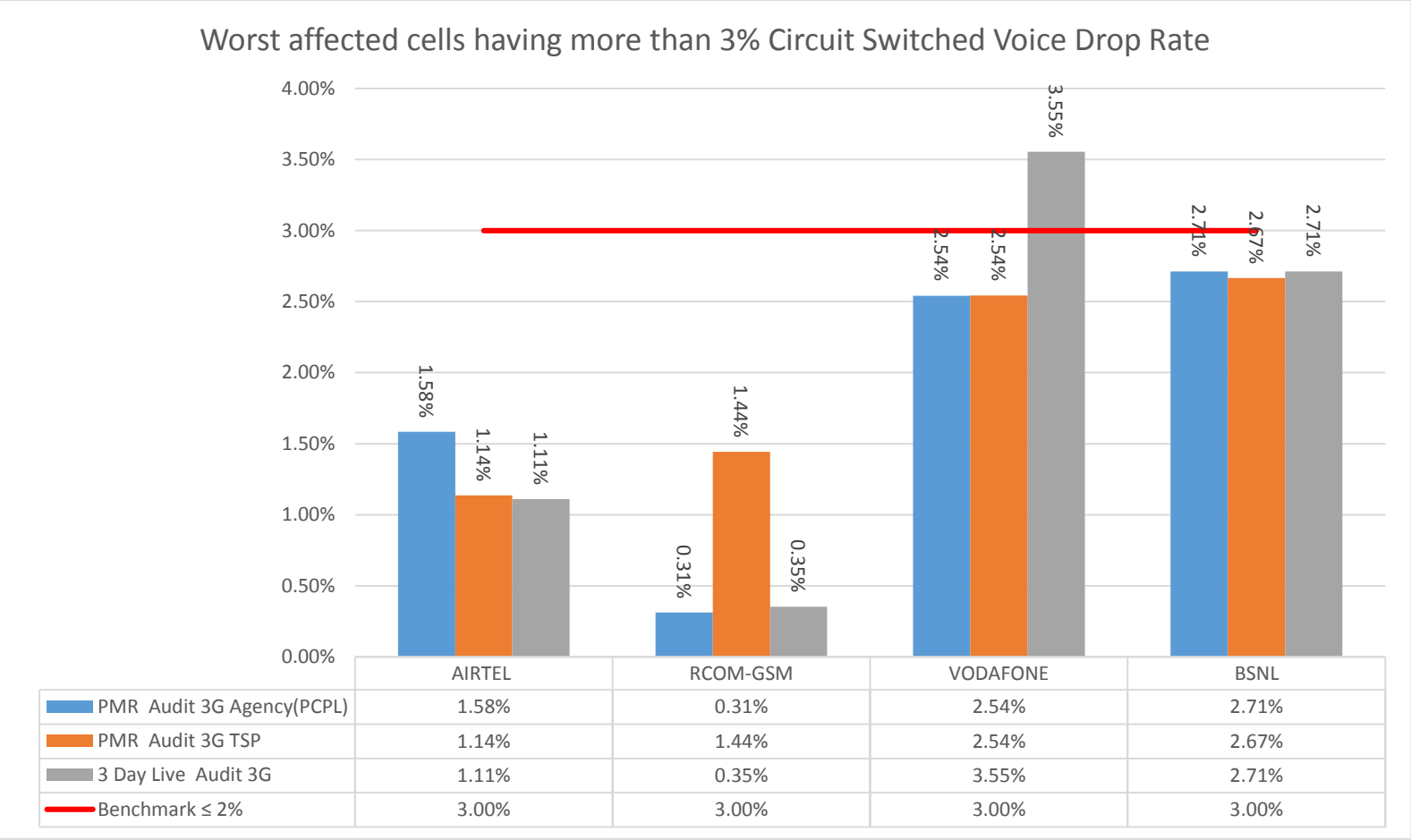

| | AIRTEL | RCOM-GSM | VODAFONE | BSNL |
|---|---|---|---|---|
| PMR Audit 3G Agency(PCPL) | 1.03% | 0.01% | 0.02% | 1.34% |
| PMR Audit 3G TSP | 0.07% | 0.06% | 0.02% | 1.30% |
| 3 Day Live Audit 3G | 0.70% | 0.03% | 0.04% | 1.30% |
| Benchmark ≤ 2% | 2.00% | 2.00% | 2.00% | 2.00% |

## 13.5.6. CIRCUIT SWITCHED VOICE DROP RATE



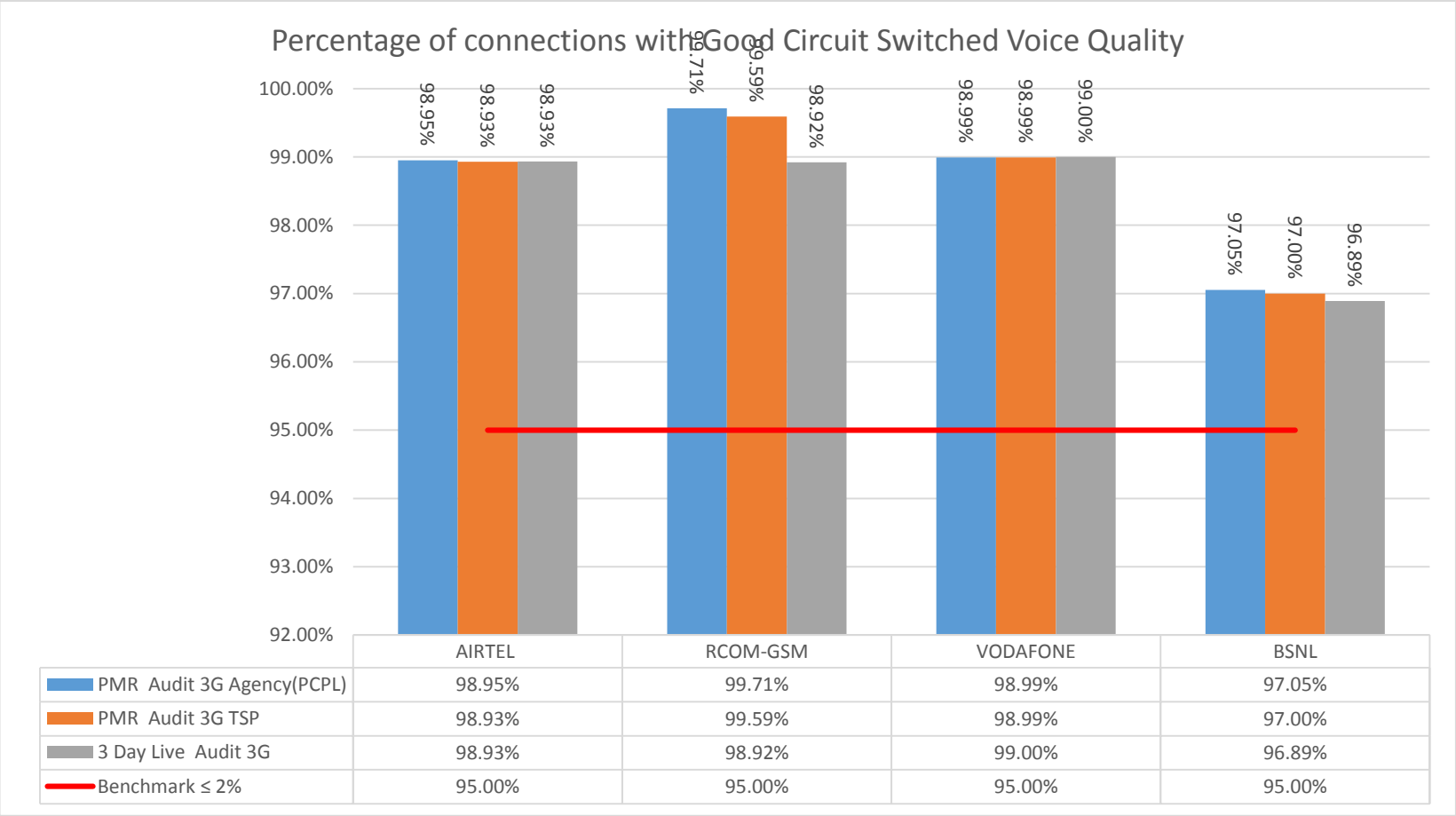

| | AIRTEL | RCOM-GSM | VODAFONE | BSNL |
|---|---|---|---|---|
| PMR Audit 3G Agency(PCPL) | 0.44% | 0.13% | 0.27% | 1.82% |
| PMR Audit 3G TSP | 0.50% | 0.32% | 0.27% | 1.80% |
| 3 Day Live Audit 3G | 0.54% | 0.15% | 0.26% | 1.87% |
| Benchmark ≤ 2% | 2.00% | 2.00% | 2.00% | 2.00% |

## 13.5.7. WORST AFFECTED CELLS HAVING MORE THAN 3% CIRCUIT SWITCHED VOICE DROP RATE




| | AIRTEL | RCOM-GSM | VODAFONE | BSNL |
|---|---|---|---|---|
| PMR Audit 3G Agency(PCPL) | 1.58% | 0.31% | 2.54% | 2.71% |
| PMR Audit 3G TSP | 1.14% | 1.44% | 2.54% | 2.67% |
| 3 Day Live Audit 3G | 1.11% | 0.35% | 3.55% | 2.71% |
| Benchmark ≤ 2% | 3.00% | 3.00% | 3.00% | 3.00% |

## 13.5.8. PERCENTAGE OF CONNECTIONS WITH GOOD CIRCUIT SWITCHED VOICE QUALITY

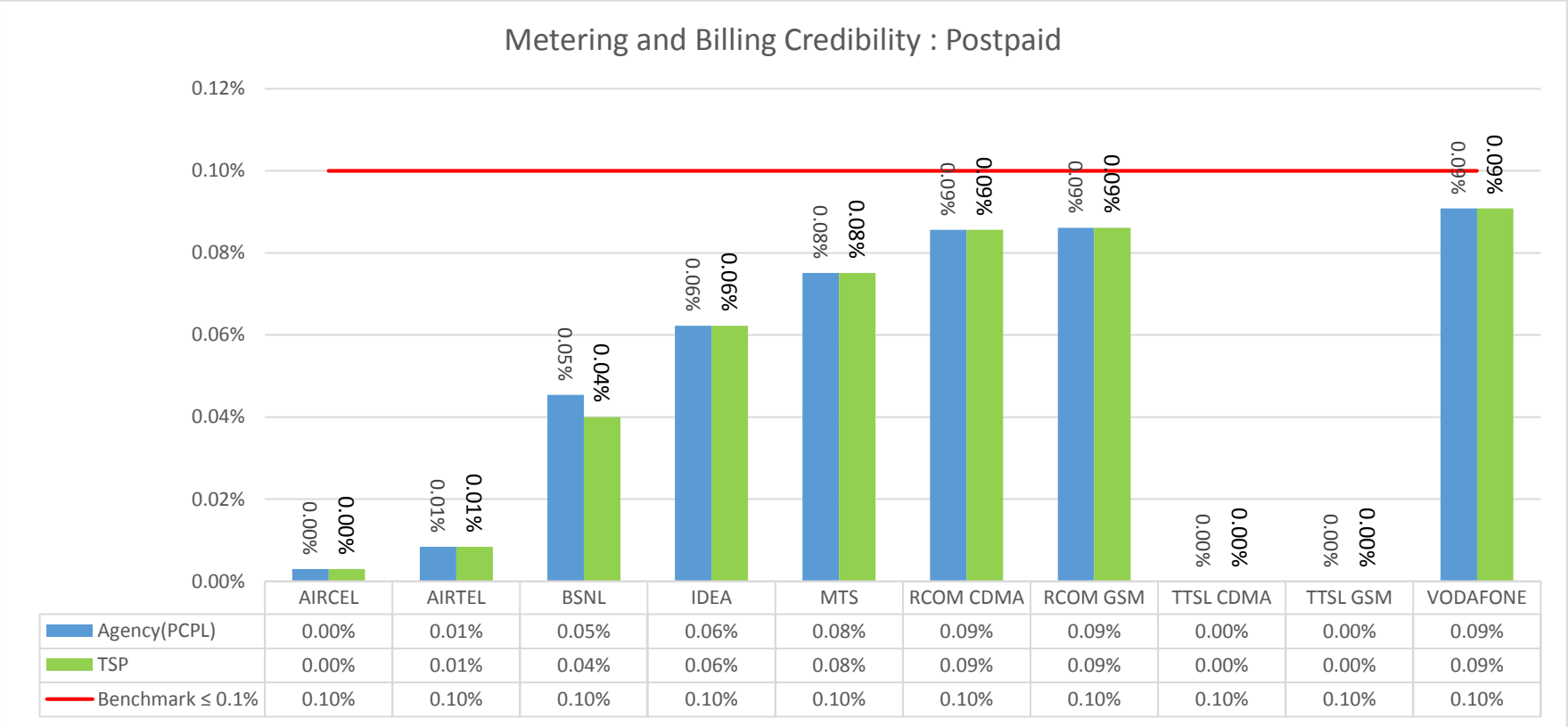



| | AIRTEL | RCOM-GSM | VODAFONE | BSNL |
|---|---|---|---|---|
| PMR Audit 3G Agency(PCPL) | 98.95% | 99.71% | 98.99% | 97.05% |
| PMR Audit 3G TSP | 98.93% | 99.59% | 98.99% | 97.00% |
| 3 Day Live Audit 3G | 98.93% | 98.92% | 99.00% | 96.89% |
| Benchmark ≤ 2% | 95.00% | 95.00% | 95.00% | 95.00% |

## 13.6. PMR Comparison (TSP vs. Audit Agency): CSD Parameters

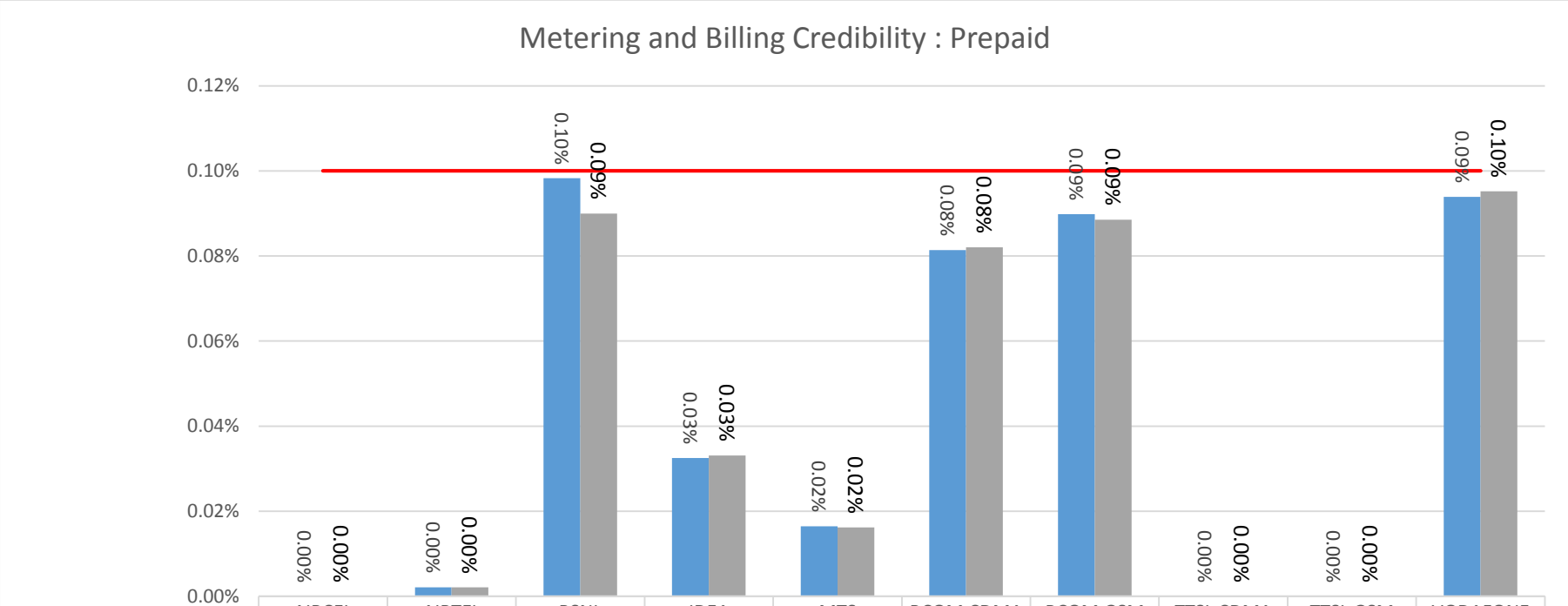
| Name of Service Provider | Metering and Billing credibility | | | | Billing Complaints | | | | | | Termination & Closures | | Time taken for refund of deposits after closures: Benchmark | | Response time to customer for assistance | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Postpaid Subscribers | | Prepaid Subscribers | | %age complaints resolved within 4 weeks | | %age complaints resolved within 6 weeks | | %age of where credit/waiver is received within one week | | % of Termination/ Closure of service within 7 days (100 %) | | Cleared over a period of <60 days (100%) | | %age of calls answered by the IVR | | %age of call answered by the operators ( voice to voice) within 90 seconds | |
| Benchmark | ≤ 0.1% | | ≤ 0.1% | | ≥ 98% | | = 100% | | = 100% | | = 100% | | = 100% | | ≥ 95% | | ≥ 95% | |
| | Agency | TSP | Agency | TSP | Agency | TSP | Agency | TSP | Agency | TSP | Agency | TSP | Agency | TSP | Agency | TSP | Agency | TSP |
| AIRCEL | 0.00% | 0.00% | 0.00% | 0.00% | 100.00% | 100.00% | 100.00% | 100.00% | 100.00% | 100.00% | 100.00% | 100.00% | 99.97% | 100.00% | 94.10% | 94.10% | 93.75% | 93.75% |
| AIRTEL | 0.01% | 0.01% | 0.00% | 0.00% | 100.00% | 100.00% | 100.00% | 100.00% | 100.00% | 100.00% | 100.00% | 100.00% | 100.00% | 100.00% | 100.00% | 100.00% | 82.74% | 82.74% |
| BSNL | 0.05% | 0.04% | 0.10% | 0.09% | 100.00% | 100.00% | 100.00% | 100.00% | 100.00% | 100.00% | 100.00% | 100.00% | 100.00% | 100.00% | 100.00% | 100.00% | 96.83% | 96.83% |
| IDEA | 0.06% | 0.06% | 0.03% | 0.03% | 100.00% | 100.00% | 100.00% | 100.00% | 100.00% | 100.00% | 90.53% | 100.00% | 100.00% | 100.00% | 99.29% | 99.29% | 99.79% | 99.79% |
| MTS | 0.08% | 0.08% | 0.02% | 0.02% | 100.00% | 100.00% | 100.00% | 100.00% | 100.00% | 100.00% | 100.00% | 100.00% | 100.00% | 100.00% | 99.96% | 99.96% | 95.50% | 95.50% |
| RCOM CDMA | 0.09% | 0.09% | 0.08% | 0.08% | 100.00% | 100.00% | 100.00% | 100.00% | 100.00% | 100.00% | 100.00% | 100.00% | 82.77% | 82.77% | 99.03% | 99.03% | 84.63% | 84.63% |
| RCOM GSM | 0.09% | 0.09% | 0.09% | 0.09% | 100.00% | 100.00% | 100.00% | 100.00% | 100.00% | 100.00% | 100.00% | 100.00% | 53.99% | 53.99% | 99.53% | 99.53% | 92.89% | 92.89% |
| TTSL CDMA | 0.00% | 0.00% | 0.00% | 0.00% | NA | 100.00% | NA | 100.00% | 100.00% | 100.00% | 100.00% | 100.00% | 100.00% | 100.00% | NA | 100.00% | 99.33% | 99.33% |
| TTSL GSM | 0.00% | 0.00% | 0.00% | 0.00% | NA | 100.00% | NA | 100.00% | 100.00% | 100.00% | 100.00% | 100.00% | NA | 100.00% | 96.21% | 96.21% | 98.25% | 98.25% |
| VODAFONE | 0.09% | 0.09% | 0.09% | 0.10% | 100.00% | 100.00% | 100.00% | 100.00% | 100.00% | 100.00% | 100.00% | 100.00% | 99.82% | 99.82% | 100.00% | 100.00% | 99.19% | 99.19% |

## 13.6.1. METERING AND BILLING CREDIBILITY : POSTPAID



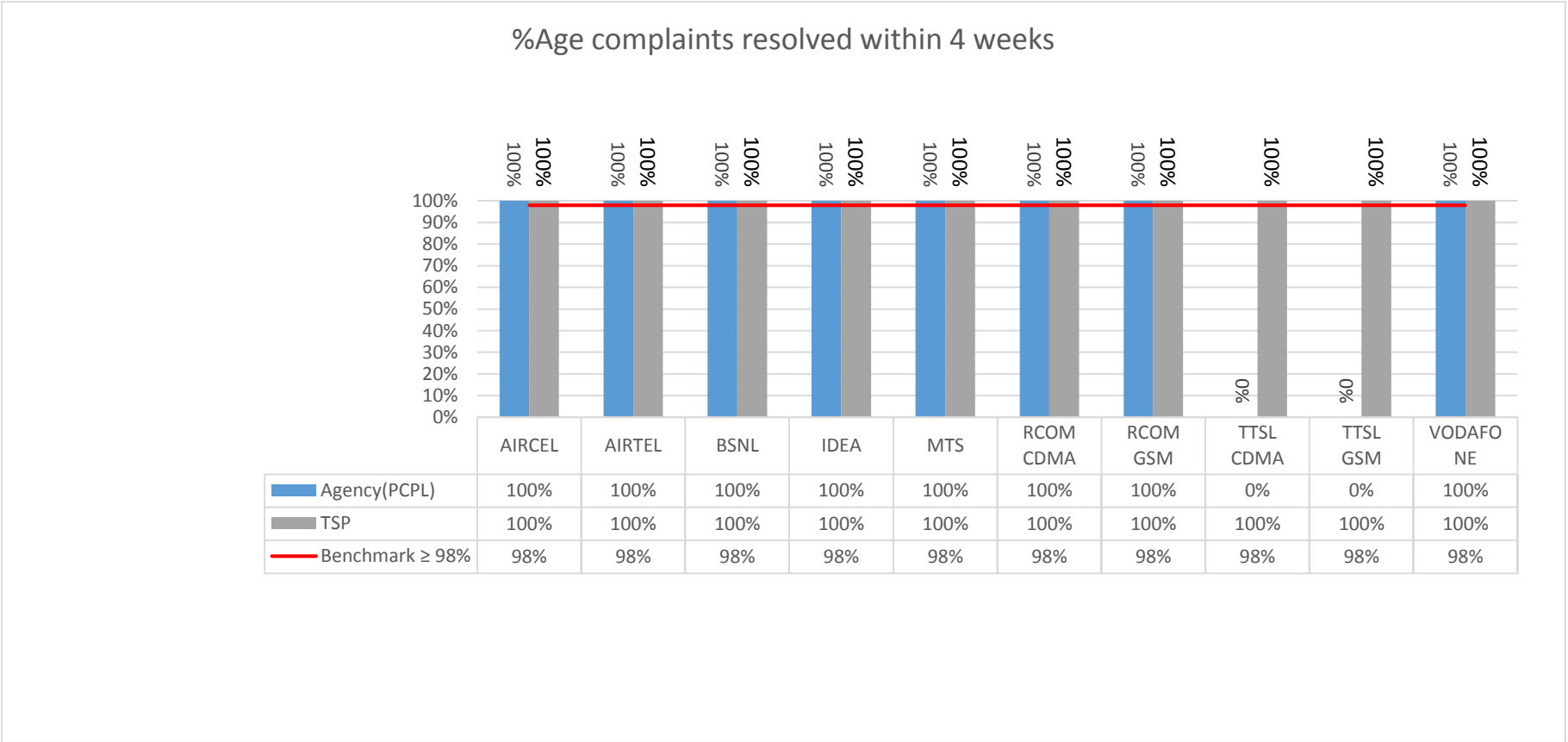

| | AIRCEL | AIRTEL | BSNL | IDEA | MTS | RCOM CDMA | RCOM GSM | TTSL CDMA | TTSL GSM | VODAFONE |
|---|---|---|---|---|---|---|---|---|---|---|
| Agency(PCPL) | 0.00% | 0.01% | 0.05% | 0.06% | 0.08% | 0.09% | 0.09% | 0.00% | 0.00% | 0.09% |
| TSP | 0.00% | 0.01% | 0.04% | 0.06% | 0.08% | 0.09% | 0.09% | 0.00% | 0.00% | 0.09% |
| Benchmark ≤ 0.1% | 0.10% | 0.10% | 0.10% | 0.10% | 0.10% | 0.10% | 0.10% | 0.10% | 0.10% | 0.10% |

## 13.6.2. METERING AND BILLING CREDIBILITY : PREPAID



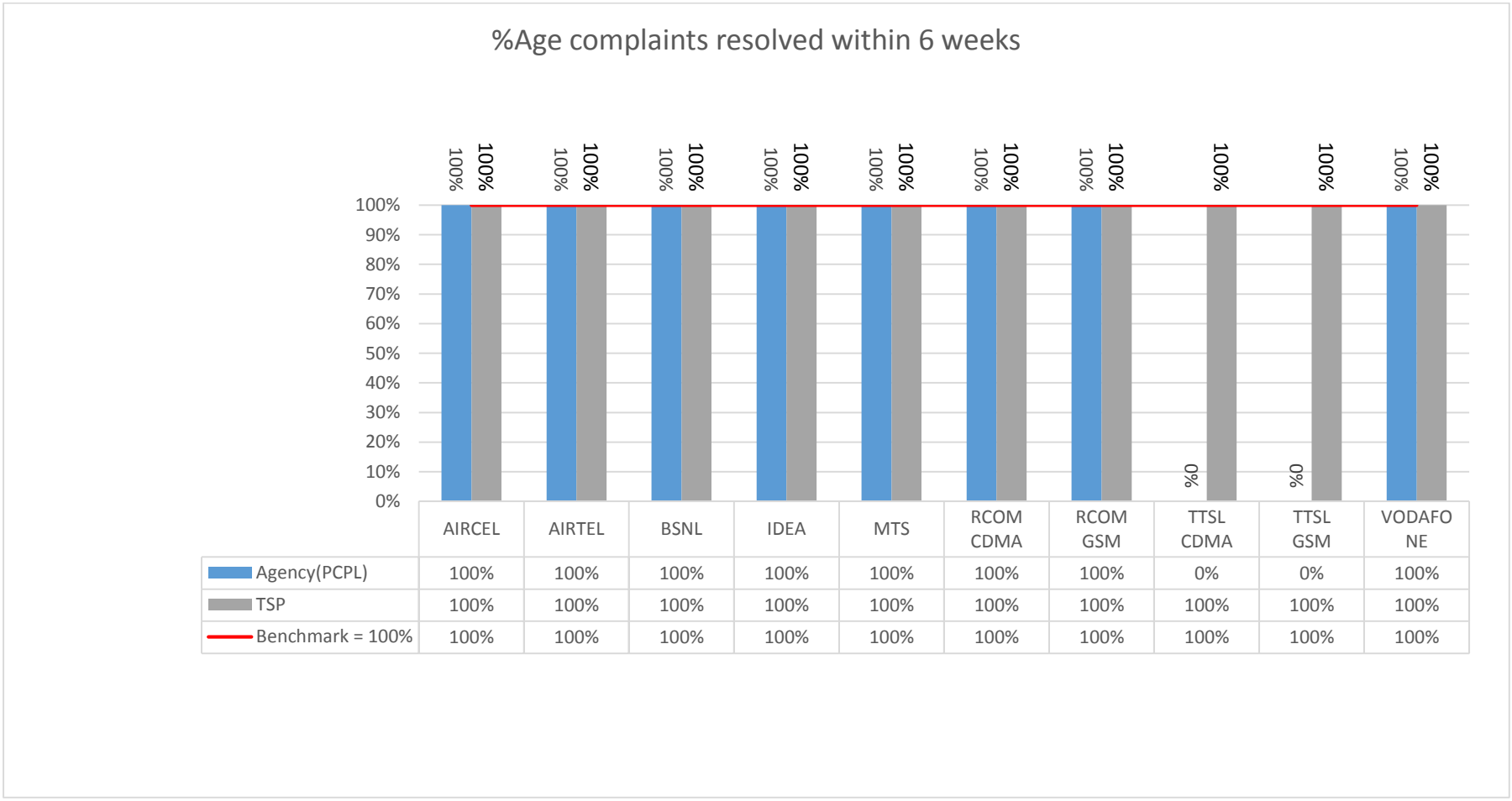

| | AIRCEL | AIRTEL | BSNL | IDEA | MTS | RCOM CDMA | RCOM GSM | TTSL CDMA | TTSL GSM | VODAFONE |
|---|---|---|---|---|---|---|---|---|---|---|
| Agency(PCPL) | 0.00% | 0.00% | 0.10% | 0.03% | 0.02% | 0.08% | 0.09% | 0.00% | 0.00% | 0.09% |
| TSP | 0.00% | 0.00% | 0.09% | 0.03% | 0.02% | 0.08% | 0.09% | 0.00% | 0.00% | 0.10% |
| Benchmark ≤ 0.1% | 0.10% | 0.10% | 0.10% | 0.10% | 0.10% | 0.10% | 0.10% | 0.10% | 0.10% | 0.10% |

## 13.6.3. %AGE COMPLAINT RESOLVED WITHIN 4 WEEKS



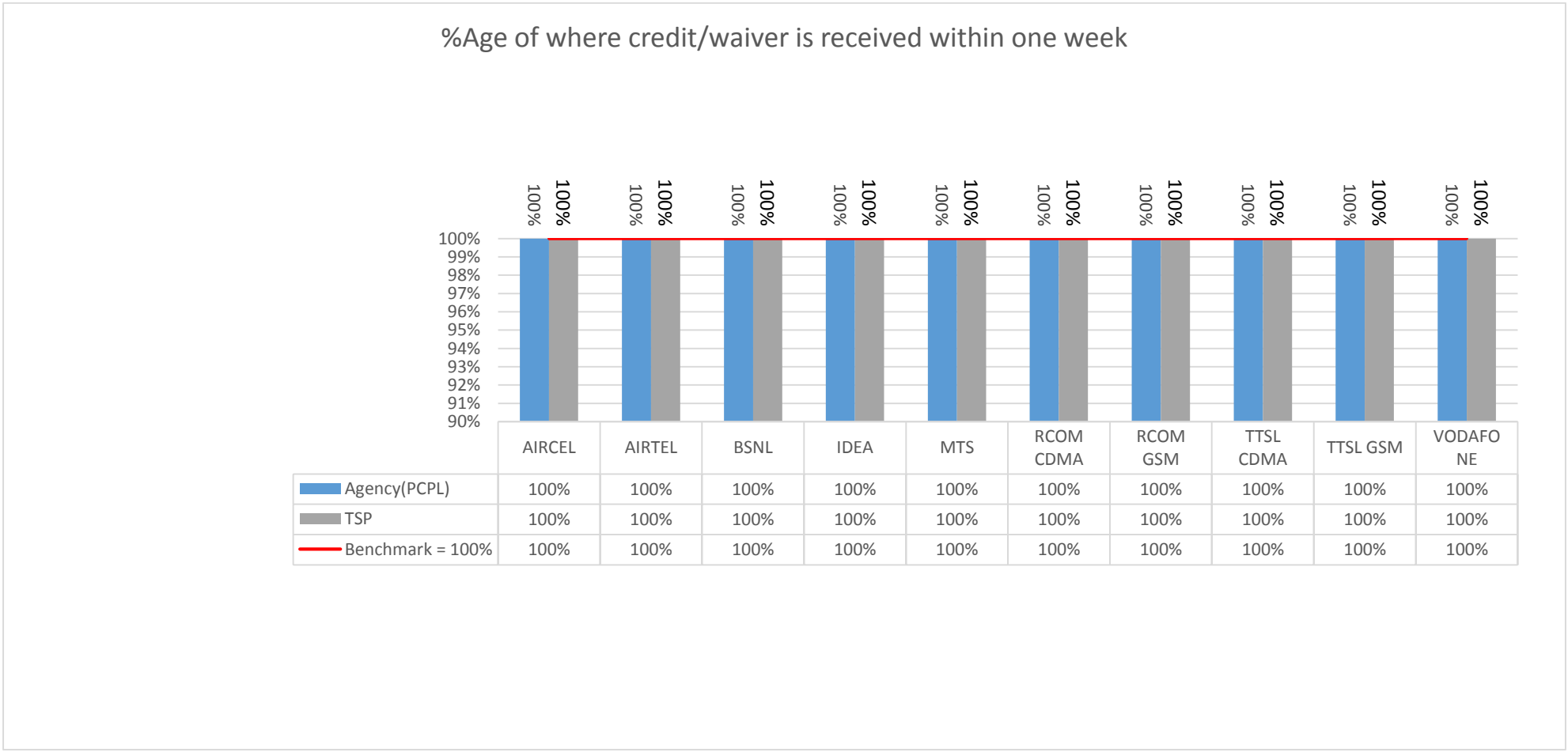

| | AIRCEL | AIRTEL | BSNL | IDEA | MTS | RCOM CDMA | RCOM GSM | TTSL CDMA | TTSL GSM | VODAFONE |
|---|---|---|---|---|---|---|---|---|---|---|
| Agency(PCPL) | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 0% | 0% | 100% |
| TSP | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% |
| Benchmark ≥ 98% | 98% | 98% | 98% | 98% | 98% | 98% | 98% | 98% | 98% | 98% |

## 13.6.4. %AGE COMPLAINTS RESOLVED WITHIN 6 WEEKS



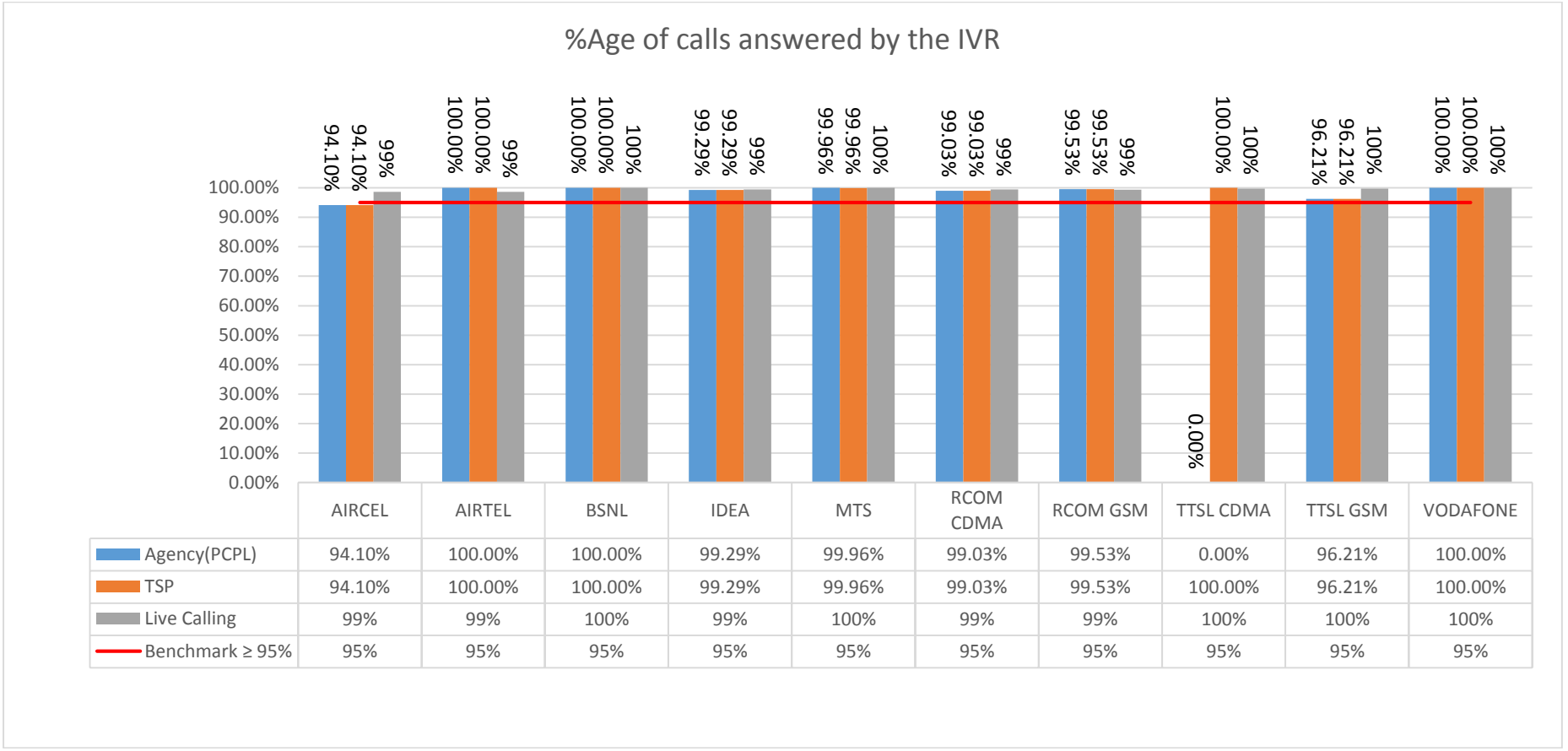

| | AIRCEL | AIRTEL | BSNL | IDEA | MTS | RCOM CDMA | RCOM GSM | TTSL CDMA | TTSL GSM | VODAFONE |
|---|---|---|---|---|---|---|---|---|---|---|
| Agency(PCPL) | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 0% | 0% | 100% |
| TSP | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% |
| Benchmark = 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% |

## 13.6.5. %AGE OF WHERE CREDIT/WAIVER IS RECEIVED WITHIN ONE WEEK



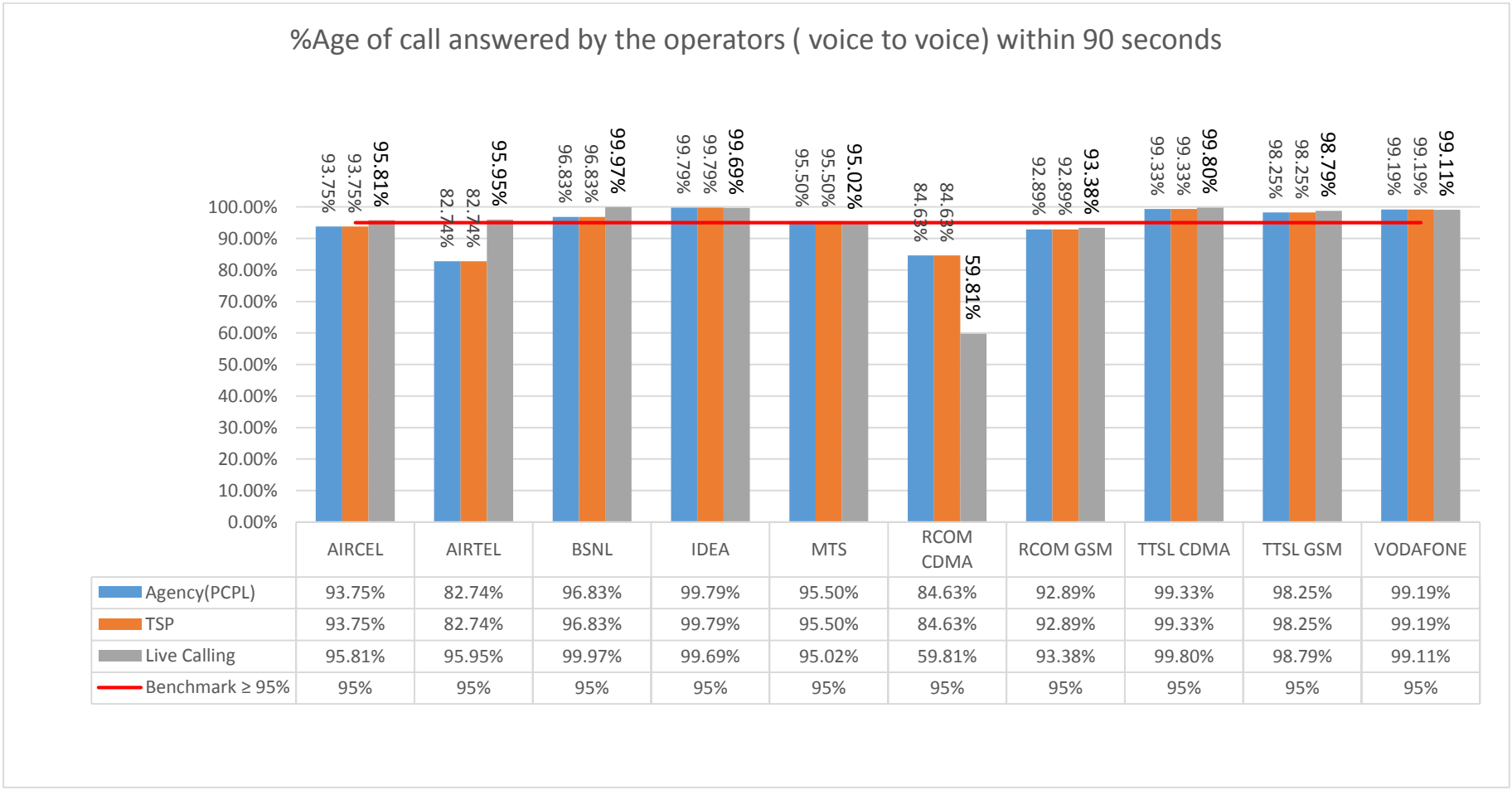

| | AIRCEL | AIRTEL | BSNL | IDEA | MTS | RCOM CDMA | RCOM GSM | TTSL CDMA | TTSL GSM | VODAFONE |
|---|---|---|---|---|---|---|---|---|---|---|
| Agency(PCPL) | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% |
| TSP | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% |
| Benchmark = 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% |

## 13.6.6. %AGE OF CALLS ANSWERED BY THE IVR



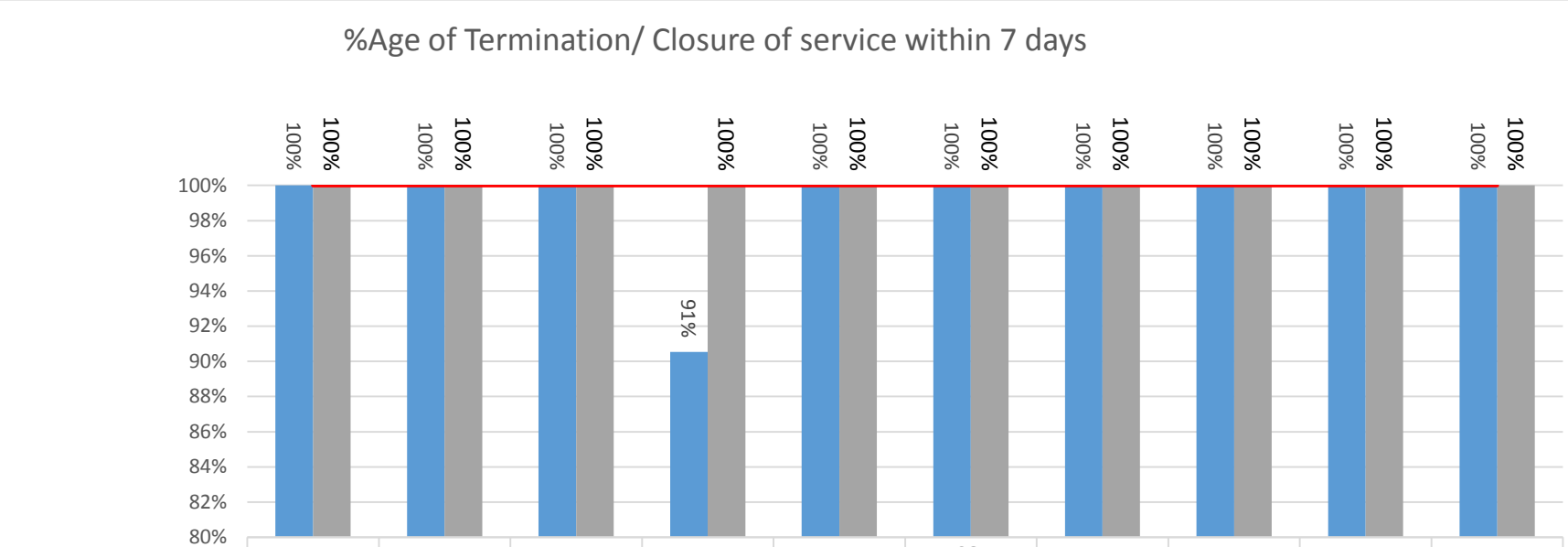

| | AIRCEL | AIRTEL | BSNL | IDEA | MTS | RCOM CDMA | RCOM GSM | TTSL CDMA | TTSL GSM | VODAFONE |
|---|---|---|---|---|---|---|---|---|---|---|
| Agency(PCPL) | 94.10% | 100.00% | 100.00% | 99.29% | 99.96% | 99.03% | 99.53% | 0.00% | 96.21% | 100.00% |
| TSP | 94.10% | 100.00% | 100.00% | 99.29% | 99.96% | 99.03% | 99.53% | 100.00% | 96.21% | 100.00% |
| Live Calling | 99% | 99% | 100% | 99% | 100% | 99% | 99% | 100% | 100% | 100% |
| Benchmark ≥ 95% | 95% | 95% | 95% | 95% | 95% | 95% | 95% | 95% | 95% | 95% |

## 13.6.7. %AGE OF CALLS ANSWERED BY THE OPERATORS (VOICE TO VOICE) WITHIN 90 SECONDS



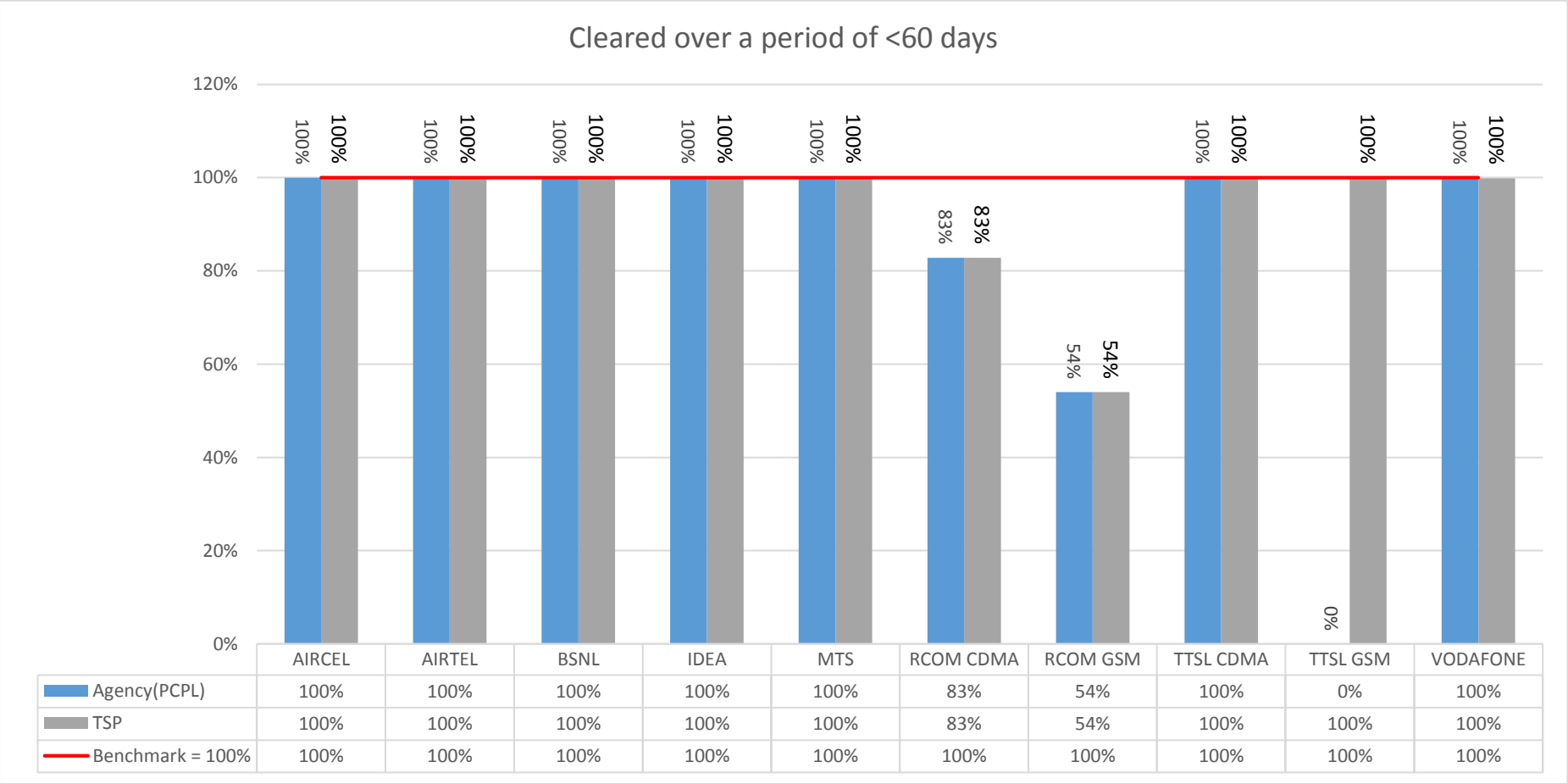

| | AIRCEL | AIRTEL | BSNL | IDEA | MTS | RCOM CDMA | RCOM GSM | TTSL CDMA | TTSL GSM | VODAFONE |
|---|---|---|---|---|---|---|---|---|---|---|
| Agency(PCPL) | 93.75% | 82.74% | 96.83% | 99.79% | 95.50% | 84.63% | 92.89% | 99.33% | 98.25% | 99.19% |
| TSP | 93.75% | 82.74% | 96.83% | 99.79% | 95.50% | 84.63% | 92.89% | 99.33% | 98.25% | 99.19% |
| Live Calling | 95.81% | 95.95% | 99.97% | 99.69% | 95.02% | 59.81% | 93.38% | 99.80% | 98.79% | 99.11% |
| Benchmark ≥ 95% | 95% | 95% | 95% | 95% | 95% | 95% | 95% | 95% | 95% | 95% |

## 13.6.8. %AGE OF TERMINATION/CLOSURE OF SERVICE WITHIN 7 DAYS




| | AIRCEL | AIRTEL | BSNL | IDEA | MTS | RCOM CDMA | RCOM GSM | TTSL CDMA | TTSL GSM | VODAFONE |
|---|---|---|---|---|---|---|---|---|---|---|
| Agency(PCPL) | 100% | 100% | 100% | 91% | 100% | 100% | 100% | 100% | 100% | 100% |
| TSP | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% |
| Benchmark = 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% |

## 13.6.9. CLEARED OVER A PERIOD OF <60 DAYS




| | AIRCEL | AIRTEL | BSNL | IDEA | MTS | RCOM CDMA | RCOM GSM | TTSL CDMA | TTSL GSM | VODAFONE |
|---|---|---|---|---|---|---|---|---|---|---|
| Agency(PCPL) | 100% | 100% | 100% | 100% | 100% | 83% | 54% | 100% | 0% | 100% |
| TSP | 100% | 100% | 100% | 100% | 100% | 83% | 54% | 100% | 100% | 100% |
| Benchmark = 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% |

## 14 KEY FINDINGS

### NETOWORK FINDINGS (2G):

- AIRCEL has parameter value of 3.15% and failed to meet the benchmark of ≤ 3% for worst affected cell having more than 3% TCH drop.

### CUSTOMER SERVICE DELIVERY:

- IDEA has parameter value of 90.53% and failed to meet the benchmark of = 100% for percentage of where credit/waiver is received within one week for billing complaints.
- AIRCEL has parameter value of 99.97% and failed to meet the benchmark of = 100% refund of deposits after closure Cleared over a period of <60 days.
- RCOM CDMA has parameter value of 82.77% and failed to meet the benchmark of = 100% refund of deposits after closure Cleared over a period of <60 days.
- RCOM GSM has parameter value of 53.99% and failed to meet the benchmark of = 100% refund of deposits after closure Cleared over a period of <60 days.
- VODAFONE has parameter value of 99.82% and failed to meet the benchmark of = 100% refund of deposits after closure Cleared over a period of <60 days.
- AIRCEL has parameter value of 94.10% and failed to meet the benchmark of ≥ 95% percentage of calls answered by the IVR
- AIRCEL has parameter value of 93.75% and failed to meet the benchmark of ≥ 95% percentage of call answered by the operators (voice to voice) within 90 seconds
- AIRTEL has parameter value of 82.74% and failed to meet the benchmark of ≥ 95% percentage of call answered by the operators (voice to voice) within 90 seconds
- RCOM CDMA has parameter value of 84.63% and failed to meet the benchmark of ≥ 95% percentage of call answered by the operators (voice to voice) within 90 seconds
- RCOM GSM has parameter value of 92.89% and failed to meet the benchmark of ≥ 95% percentage of call answered by the operators (voice to voice) within 90 seconds