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




# AUDIT & ASSESSMENT OF QUALITY OF SERVICE

## NORTH ZONE – JAMMU & KASHMIR CIRCLE
## CELLULAR MOBILE TELEPHONE SERVICE (CMTS)
## (JANUARY TO MARCH 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 market 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 (Wireline), Cellular Mobile (Wireless), and Broadband service against the parameters notified by TRAI. (The parameters of Quality of Services (QoS) have been specified by in the respective regulations published by TRAI).

- This report covers the audit results of the audit conducted for Cellular Mobile (Wireless) services in Jammu & Kashmir circle.

## 1.4. COVERAGE

The audit was conducted in Jammu and Kashmir Circle covering all SSAs (Secondary Switching Areas).

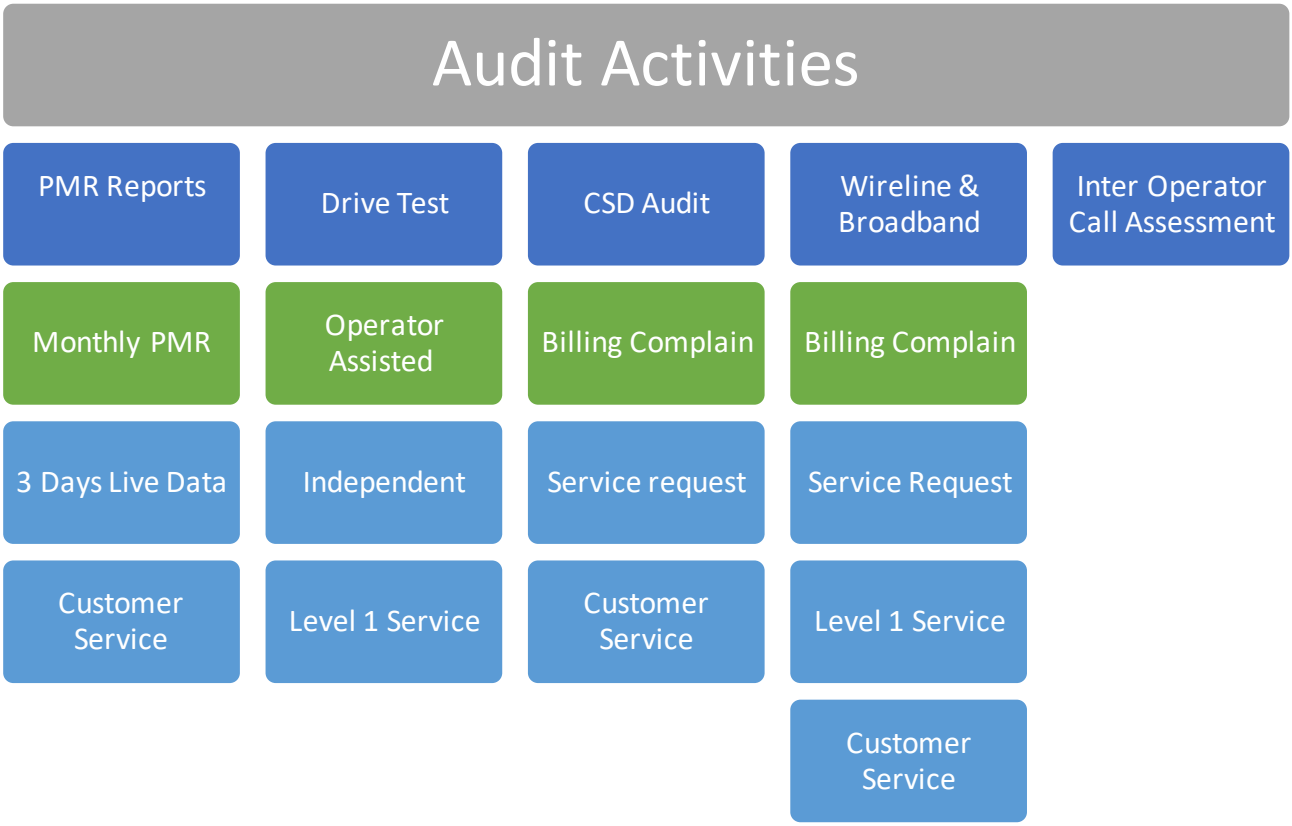

**Image Source: Wikipedia**

## 1.5. SSA LIST

| S. No. | Circle | SSA Name | SDCA Name |
|---|---|---|---|
| 1 | JK | Jammu | Akhnoor |
| 2 | JK | Jammu | Basholi |
| 3 | JK | Jammu | Jammu |
| 4 | JK | Jammu | Kathua |
| 5 | JK | Jammu | Samba |
| 6 | JK | Leh | Kargil |

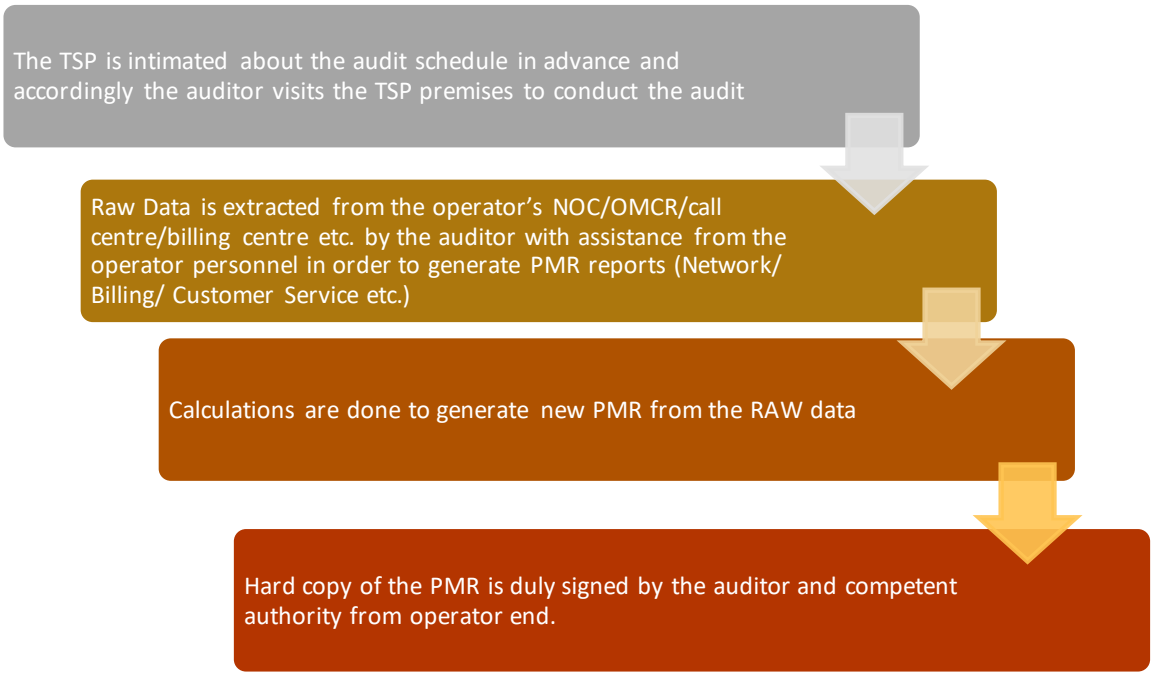
| | | | |
|---|---|---|---|
| **7** | JK | Leh | Leh |
| **8** | JK | Leh | Nobra |
| **9** | JK | Leh | Nyoma |
| **10** | JK | Leh | Zanaskar |
| **11** | JK | Rajouri | Kalakot |
| **12** | JK | Rajouri | Nowshera |
| **13** | JK | Rajouri | Poonch |
| **14** | JK | Rajouri | Rajouri |
| **15** | JK | Srinagar | Anantnag |
| **16** | JK | Srinagar | Badgam |
| **17** | JK | Srinagar | Bandipur |
| **18** | JK | Srinagar | Baramulla |
| **19** | JK | Srinagar | Karnah |
| **20** | JK | Srinagar | Kulgam |
| **21** | JK | Srinagar | Kupwara |
| **22** | JK | Srinagar | Pahalgam |
| **23** | JK | Srinagar | Pulwama |
| **24** | JK | Srinagar | Sopore |
| **25** | JK | Srinagar | Srinagar |
| **26** | JK | Srinagar | Uri |
| **27** | JK | Udhampur | Bedarwah |
| **28** | JK | Udhampur | Doda |
| **29** | JK | Udhampur | Kishtwar |
| **30** | JK | Udhampur | Mahore |
| **31** | JK | Udhampur | Ramban |
| **32** | JK | Udhampur | Ramnagar |
| **33** | JK | Udhampur | Reasi |
| **34** | JK | Udhampur | Udhampur |

## 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, January 2016 audit data was collected in the month of February 2016.

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 March 2016 was collected in the month of March 2016.

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 June 2016. 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

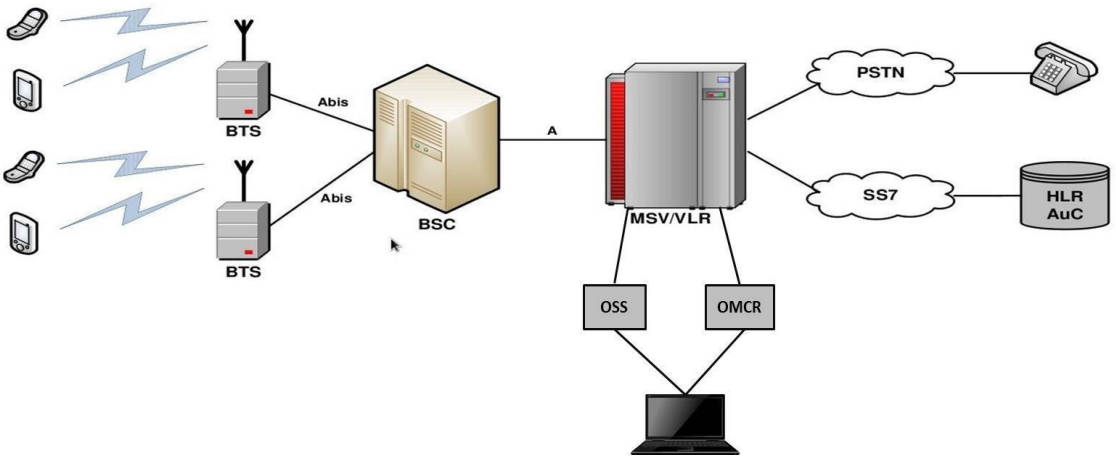
## 2.2. AUDIT PARAMETER: NETWORK

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

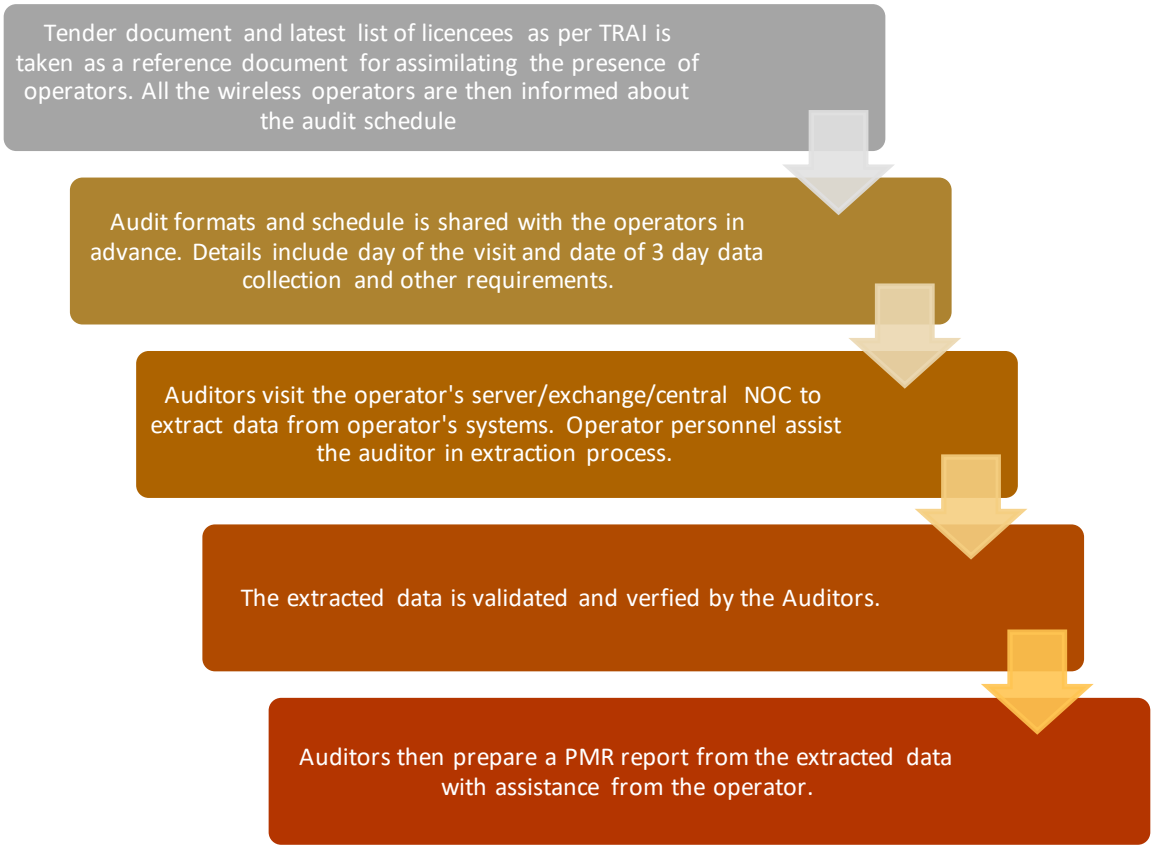
| Network Availability | |
|---|---|
| BTSs Accumulated downtime (not available for service) | ≤ 2% |
| Worst affected BTSs due to downtime | ≤ 2% |
| Connection Establishment (Accessibility) | |
| Call Set-up Success Rate (within licensee's own network) | ≥ 95% |
| SDCCH/ Paging Channel Congestion | ≤ 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. 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 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% 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 | No. of Node B's having accumulated downtime of >24 hours in a month | *<=2%* |

| | | | | |
|---|---|---|---|---|
| | | of Downtime in 3 Days | ((No. of Node B's having Accumulated Downtime of > 24 hrs in a month) / Total no. of BTSs in the licensed service area)*100 | |
| **d.** | Node B's accumulated downtime | Node B's downtime more than 24 hr in 3 days | Total no. of Node B's in the Licensed Service Area<br>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%* |
| **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 congession 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 | RNC originated PS Domain Iu | <=5% |

| | | | | |
|---|---|---|---|---|
| | | connection and is defined as the ratio of abnormal disconnects w.r.t. all disconnects. | Connection Setup Success (A) | |
| | | | RNC originated PS Domain Iu Connection Release (B) | |
| | | | Drop Rate = (B/A) * 100 | |

## 3. 3 DAYS LIVE DATA

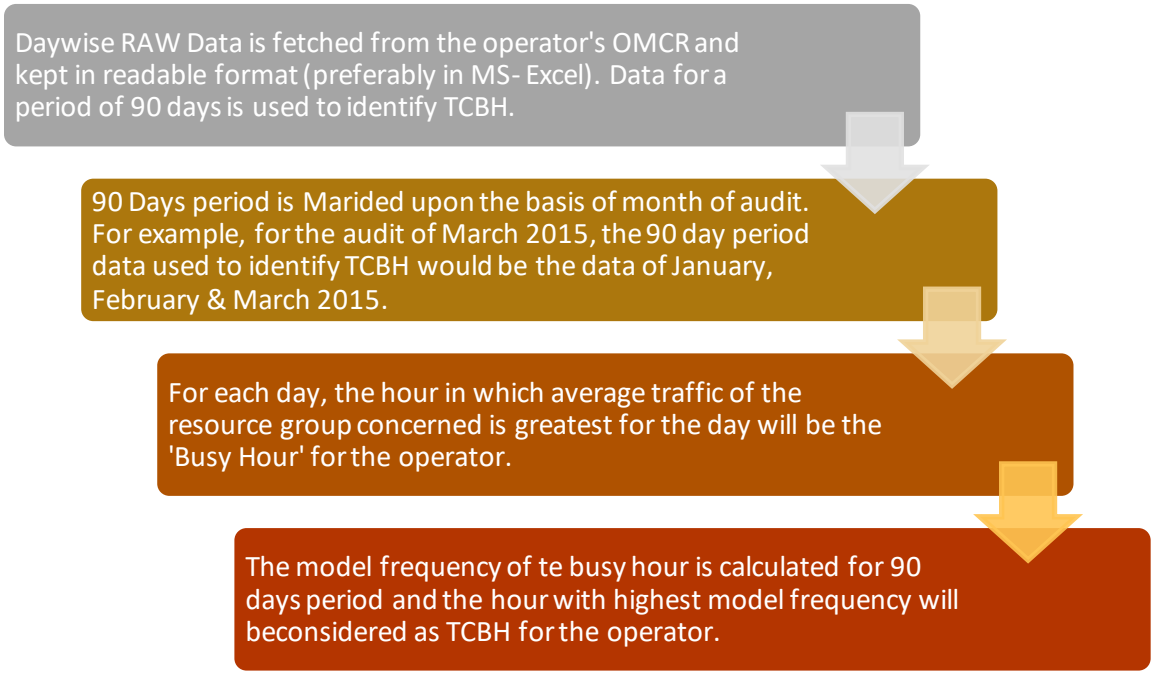
The main purpose of 3 day live measurement is to evaluate the network parameters on intraday basis. While the monthly PMR report provides an overall view of the performance of QoS parameters, the 3 day live data helps looking at intraday performance on the network parameters discussed earlier. All the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



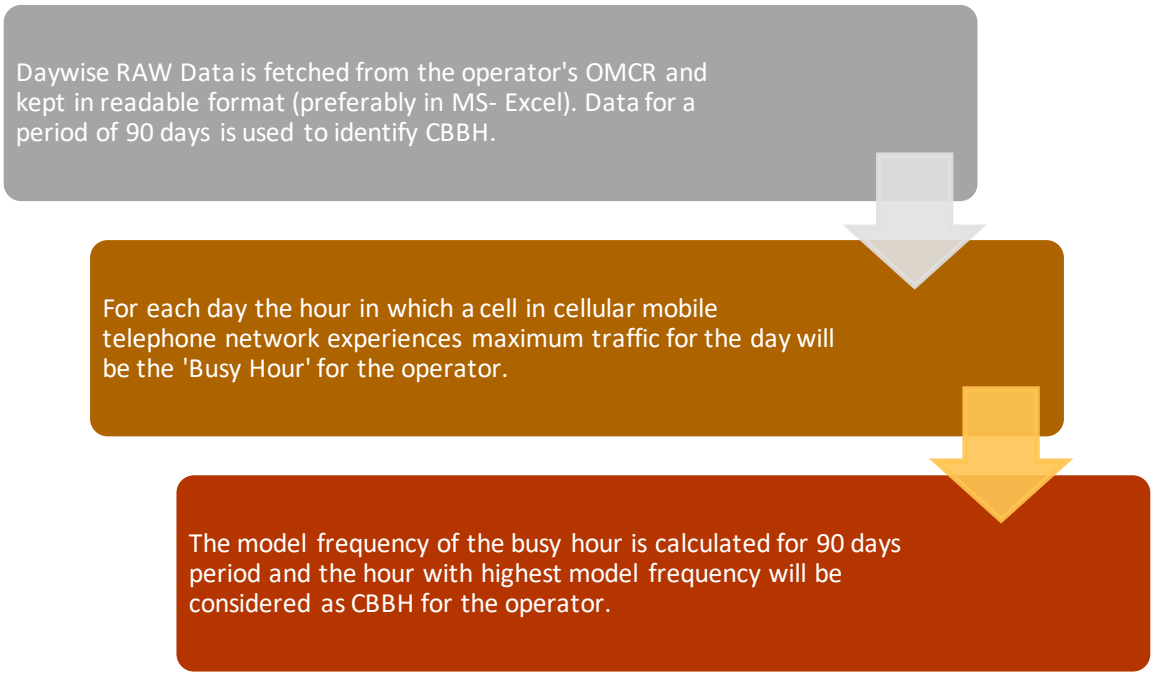

During audit, the auditors identified from the raw data that the TCBH for the operators in Jan – Feb – Mar 2016 was the time period as given below:

| Aircel | Airtel | BSNL | Idea | RCOM 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 |

## 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. CUSTOMER SERVICE 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 March 2016 was collected in the month of March 2016. 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.

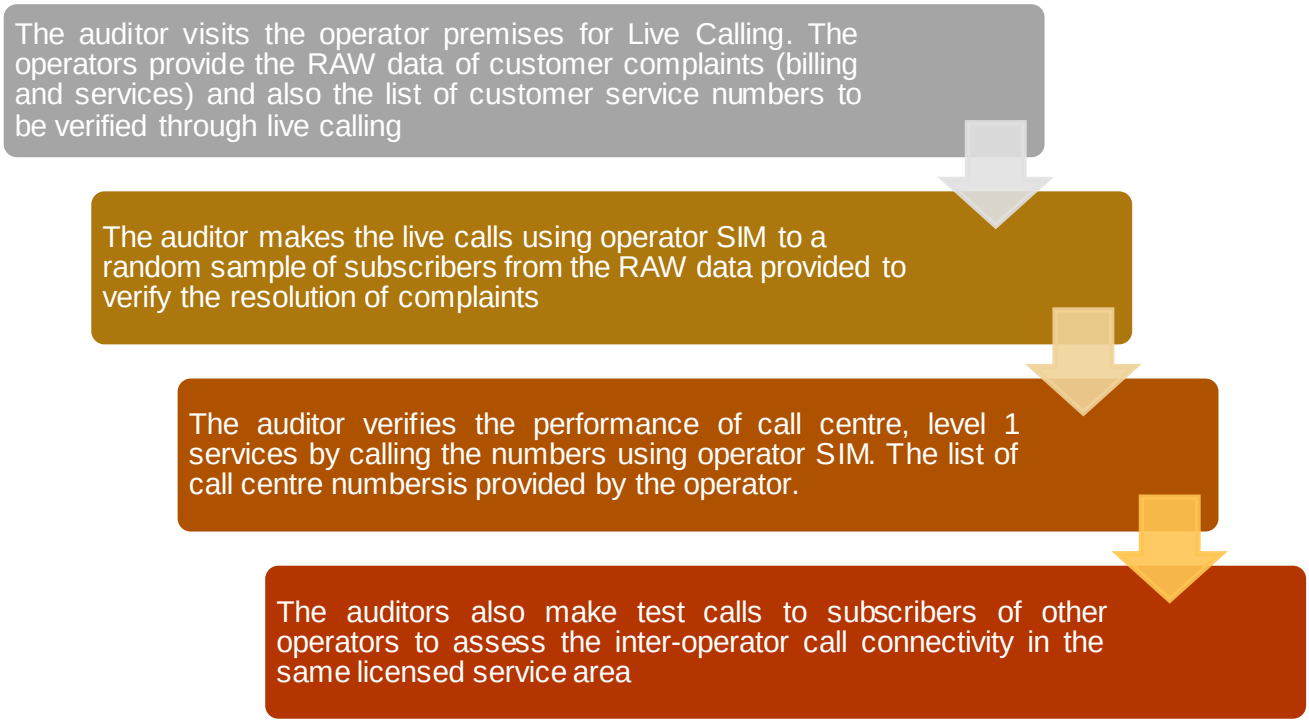
### 4.1. AUDIT PARAMETERS: CUSTOMER SERVICE

| 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<br>IVR/ All calls attempted to IVR * 100 |
| Call centre performance (Voice to Voice) | Call centre performance Voice to Voice = (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




Live calling activity was carried out during the period of March 2016. 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 January 2016 was considered for live calling activity conducted in February 2016.
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 January, February and March'15, auditor has tried contacting the list of Level 1 services provided by TRAI as per the NNP (National Numbering Plan).

### 4.6.1. 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 |

## 4.7. 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.

## 4.8. 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 | Reliance GSM | Vodafone |
|---|---|---|---|---|---|---|
| Aircel | - | 100% | 100% | 100% | 100% | 100% |
| Airtel | 100% | - | 100% | 100% | 100% | 100% |
| BSNL | 100% | 100% | - | 100% | 100% | 100% |
| Idea | 100% | 100% | 100% | - | 100% | 100% |
| Reliance GSM | 100% | 100% | 100% | 100% | - | 100% |
| Vodafone | 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

Jammu and Kashmir circle consist of total 5 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 SUMMARY

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

## 6.1. OPERATORS COVERED

| Name of Operator | Number of Subscriber (as on 31st Mar 2016) |
|---|---|
| **Aircel** | 2511329 |
| **Airtel** | 3340288 |
| **Idea** | 835780 |
| **BSNL** | 1233474 |
| **RCOM GSM** | 930372 |
| **Vodafone** | 1062347 |

| TSP | No. of cells | BTS | BSC | MSC+GMSC | Node B | RNC |
|---|---|---|---|---|---|---|
| **AIRCEL** | 2G-6896/3G-1731 | 2313 | 22 | 7 | 577 | 3 |
| **AIRTEL** | 1745 | 2903 | 33 | 12 | 1745 | 5 |
| **BSNL** | 3243 | 1092 | 21 | 8 | 392 | 7 |
| **IDEA** | 2G - 3632/ 3G - 1556 | 1240 | 8 | 2 | 522 | 2 |
| **RCOM GSM** | 2558 | 854 | 4 | 1 | 458 | 1 |
| **VODAFONE** | 5098 | 1691 | 17 | 2 | NA | NA |

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.

## 6.2. AUDIT SCHEDULE

| Operator | (3 Days Live) January 2016 | January 2016 | February 2016 | March 2016 |
|---|---|---|---|---|
| Airtel | 12th Jan 2016 | 6th Feb 2016 | 15th Mar 2016 | 12th Apr 2016 |
| Vodafone | 7th Jan 2016 | 9th Feb 2016 | 9th Mar 2016 | 7th Apr 2016 |
| Idea | 14th Jan 2016 | 9th Feb 2016 | 14th Mar 2016 | 14th Apr 2016 |
| Reliance | 6th Jan 2016 | 7th Feb 2016 | 8th Mar 2016 | 6th Apr 2016 |
| BSNL | 8th Jan 2016 | 10th Feb 2016 | 10th Mar 2016 | 8th Apr 2016 |
| Aircel | 5th Jan 2016 | 5th Feb 2016 | 7th Mar 2016 | 5th Apr 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 |

## 6.3. 2G VOICE PMR DATA: JANUARY

| Jan-16 | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Network Parameters | | Name of Service Provider | | | | | | |
| | | Benchmark | AIRCEL | AIRTEL | BSNL | IDEA | RCOM | VODAFONE |
| Network Availability | Sum of downtime of BTSs in a month in hrs. in the licensed service area | ≤ 2% | 0.70% | 0.12% | 1.97% | 0.42% | 0.07% | 0.19% |
| | No. of BTSs having accumulated downtime of >24 hours in a month | ≤ 2% | 4.37% | 0.14% | 0.82% | 1.74% | 0.00% | 1.02% |
| Connection Establishment (Accessibility) | Call Set-up Success Rate (Within Licensee own network | ≥ 95% | 97.31% | 97.37% | 98.79% | 98.37% | 98.04% | 98.85% |
| | SDDCH/Paging chl. Congestion | ≤ 1% | 0.16% | 0.49% | 0.59% | 0.16% | 0.05% | 0.06% |
| | TCH Congestion | ≤ 2% | 1.97% | 0.55% | 1.21% | 1.30% | 0.21% | 1.15% |
| Connection Maintenance (Retainability) | Call Drop Rate (%age) | ≤ 2% | 1.20% | 1.11% | 0.98% | 1.32% | 0.15% | 0.57% |
| | Worst Affected cell having more than 3% TCH drop | ≤ 3% | 11.28% | 1.90% | 2.89% | 1.92% | 0.46% | 2.85% |
| | %age of connection with good voice quality | ≥ 95% | 95.91% | 97.83% | 97.03% | 96.06% | 98.79% | 98.83% |

## 6.4. 2G VOICE PMR DATA: FEBRUARY

| Feb-16 | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Network Parameters | | Name of Service Provider | | | | | | |
| | | Benchmark | AIRCEL | AIRTEL | BSNL | IDEA | RCOM | VODAFONE |
| Network Availability | Sum of downtime of BTSs in a month in hrs. in the licensed service area | ≤ 2% | 0.73% | 0.12% | 1.71% | 0.32% | 0.06% | 0.27% |
| | No. of BTSs having accumulated downtime of >24 hours in a month | ≤ 2% | 3.95% | 0.10% | 1.10% | 1.58% | 0.23% | 1.13% |
| Connection Establishment (Accessibility) | Call Set-up Success Rate (Within Licensee own network | ≥ 95% | 96.99% | 97.09% | 98.82% | 98.31% | 96.28% | 99.23% |
| | SDDCH/Paging chl. Congestion | ≤ 1% | 0.27% | 0.77% | 0.60% | 0.12% | 0.05% | 0.01% |
| | TCH Congestion | ≤ 2% | 1.95% | 0.64% | 1.18% | 1.34% | 0.34% | 0.77% |
| Connection Maintenance (Retainability) | Call Drop Rate (%age) | ≤ 2% | 1.18% | 1.10% | 1.01% | 1.30% | 0.11% | 0.59% |
| | Worst Affected cell having more than 3% TCH drop | ≤ 3% | 10.76% | 2.11% | 2.65% | 1.58% | 0.43% | 2.76% |
| | %age of connection with good voice quality | ≥ 95% | 95.78% | 97.76% | 97.00% | 96.55% | 98.93% | 98.77% |

## 6.5. 2G VOICE PMR DATA: MARCH

| Mar-16 | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Network Parameters | | Name of Service Provider | | | | | | |
| | | Benchmark | AIRCEL | AIRTEL | BSNL | IDEA | RCOM | VODAFONE |
| Network Availability | Sum of downtime of BTSs in a month in hrs. in the licensed service area | ≤ 2% | 0.77% | 0.13% | 1.79% | 0.30% | 0.06% | 0.34% |
| | No. of BTSs having accumulated downtime of >24 hours in a month | ≤ 2% | 4.24% | 0.10% | 0.48% | 1.61% | 0.00% | 1.48% |
| Connection Establishment (Accessibility) | Call Set-up Success Rate (Within Licensee own network | ≥ 95% | 97.19% | 97.81% | 98.96% | 98.32% | 97.96% | 99.19% |
| | SDDCH/Paging chl. Congestion | ≤ 1% | 0.28% | 0.67% | 0.68% | 0.08% | 0.13% | 0.08% |
| | TCH Congestion | ≤ 2% | 1.98% | 0.46% | 0.97% | 1.15% | 0.33% | 0.81% |
| Connection Maintenance (Retainability) | Call Drop Rate (%age) | ≤ 2% | 1.24% | 1.11% | 0.99% | 1.36% | 0.11% | 0.60% |
| | Worst Affected cell having more than 3% TCH drop | ≤ 3% | 10.58% | 0.33% | 2.13% | 1.73% | 0.34% | 2.60% |
| | %age of connection with good voice quality | ≥ 95% | 95.46% | 97.66% | 96.37% | 96.35% | 99.25% | 98.76% |

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## 6.6. 2G VOICE PMR DATA: CONSOLIDATED

| Consolidated | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Network Parameters | | Name of Service Provider | | | | | | |
| | | Benchmark | AIRCEL | AIRTEL | BSNL | IDEA | RCOM | VODAFONE |
| Network Availability | Sum of downtime of BTSs in a month in hrs. in the licensed service area | ≤ 2% | 0.73% | 0.12% | 1.83% | 0.35% | 0.06% | 0.27% |
| | No. of BTSs having accumulated downtime of >24 hours in a month | ≤ 2% | 4.18% | 0.12% | 0.80% | 1.64% | 0.08% | 1.21% |
| Connection Establishment (Accessibility) | Call Set-up Success Rate (Within Licensee own network | ≥ 95% | 97.16% | 97.42% | 98.86% | 98.33% | 97.43% | 99.09% |
| | SDDCH/Paging chl. Congestion | ≤ 1% | 0.24% | 0.64% | 0.62% | 0.12% | 0.08% | 0.05% |
| | TCH Congestion | ≤ 2% | 1.97% | 0.55% | 1.12% | 1.26% | 0.29% | 0.91% |
| Connection Maintenance (Retainability) | Call Drop Rate (%age) | ≤ 2% | 1.20% | 1.11% | 0.99% | 1.32% | 0.12% | 0.58% |
| | Worst Affected cell having more than 3% TCH drop | ≤ 3% | 10.87% | 1.45% | 2.56% | 1.74% | 0.41% | 2.73% |
| | %age of connection with good voice quality | ≥ 95% | 95.72% | 97.75% | 96.80% | 96.32% | 98.99% | 98.79% |

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## 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: JANUARY

| Jan-16 | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Network Parameters | | Name of Service Provider | | | | | | |
| | | Benchmark | AIRCEL | AIRTEL | BSNL | IDEA | RCOM | VODAFONE |
| Network Availability | Sum of downtime of BTSs in a month in hrs. in the licensed service area | ≤ 2% | 0.64% | 0.09% | 1.67% | 0.62% | 0.05% | 0.21% |
| | No. of BTSs having accumulated downtime of >24 hours in a month | ≤ 2% | 0.31% | 0.00% | 0.00% | 0.00% | 0.00% | 0.06% |
| Connection Establishment (Accessibility) | Call Set-up Success Rate (Within Licensee own network | ≥ 95% | 98.19% | 96.67% | 98.83% | 97.92% | 99.72% | 99.02% |
| | SDDCH/Paging chl. Congestion | ≤ 1% | 0.19% | 0.34% | 0.60% | 0.11% | 0.05% | 0.04% |
| | TCH Congestion | ≤ 2% | 1.41% | 0.74% | 1.17% | 1.60% | 0.10% | 0.98% |
| Connection Maintenance (Retainability) | Call Drop Rate (%age) | ≤ 2% | 1.05% | 1.12% | 0.95% | 1.52% | 0.20% | 0.60% |
| | Worst Affected cell having more than 3% TCH drop | ≤ 3% | 11.72% | 1.94% | 2.23% | 1.88% | 0.20% | 2.85% |
| | %age of connection with good voice quality | ≥ 95% | 95.16% | 97.84% | 96.69% | 96.81% | 99.14% | 98.82% |

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

| Feb-16 | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Network Parameters | | Name of Service Provider | | | | | | |
| | | Benchmark | AIRCEL | AIRTEL | BSNL | IDEA | RCOM | VODAFONE |
| Network Availability | Sum of downtime of BTSs in a month in hrs. in the licensed service area | ≤ 2% | 0.95% | 0.05% | 1.39% | 0.26% | 0.10% | 0.32% |
| | No. of BTSs having accumulated downtime of >24 hours in a month | ≤ 2% | 0.30% | 0.00% | 0.00% | 0.00% | 0.00% | 0.26% |
| Connection Establishment (Accessibility) | Call Set-up Success Rate (Within Licensee own network | ≥ 95% | 96.69% | 97.99% | 98.83% | 97.91% | 96.83% | 98.98% |
| | SDDCH/Paging chl. Congestion | ≤ 1% | 0.45% | 1.14% | 0.64% | 0.34% | 0.07% | 0.01% |
| | TCH Congestion | ≤ 2% | 2.60% | 0.40% | 1.17% | 1.53% | 0.45% | 1.02% |
| Connection Maintenance (Retainability) | Call Drop Rate (%age) | ≤ 2% | 1.24% | 1.10% | 1.03% | 1.39% | 0.20% | 0.60% |
| | Worst Affected cell having more than 3% TCH drop | ≤ 3% | 11.26% | 1.79% | 2.23% | 1.74% | 0.59% | 2.84% |
| | %age of connection with good voice quality | ≥ 95% | 95.80% | 97.81% | 96.15% | 96.56% | 99.20% | 98.75% |

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

| Mar-16 | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Network Parameters | | Name of Service Provider | | | | | | |
| | | Benchmark | AIRCEL | AIRTEL | BSNL | IDEA | RCOM | VODAFONE |
| Network Availability | Sum of downtime of BTSs in a month in hrs. in the licensed service area | ≤ 2% | 0.87% | 0.04% | 1.74% | 0.27% | 0.11% | 0.34% |
| | No. of BTSs having accumulated downtime of >24 hours in a month | ≤ 2% | 0.43% | 0.00% | 0.18% | 0.08% | 0.00% | 0.19% |
| Connection Establishment (Accessibility) | Call Set-up Success Rate (Within Licensee own network | ≥ 95% | 96.71% | 95.74% | 98.45% | 97.85% | 98.25% | 98.95% |
| | SDDCH/Paging chl. Congestion | ≤ 1% | 0.14% | 0.35% | 0.57% | 0.09% | 0.06% | 0.01% |
| | TCH Congestion | ≤ 2% | 2.62% | 1.15% | 0.92% | 1.38% | 0.49% | 1.05% |
| Connection Maintenance (Retainability) | Call Drop Rate (%age) | ≤ 2% | 1.23% | 1.40% | 0.91% | 1.32% | 0.13% | 0.62% |
| | Worst Affected cell having more than 3% TCH drop | ≤ 3% | 10.92% | 0.37% | 2.37% | 2.20% | 0.30% | 2.74% |
| | %age of connection with good voice quality | ≥ 95% | 95.67% | 97.61% | 96.06% | 96.22% | 99.21% | 98.79% |

## 6.11. 3 Days Live Data: Consolidated

| Consolidated | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Network Parameters | | Name of Service Provider | | | | | | |
| | | Benchmark | AIRCEL | AIRTEL | BSNL | IDEA | RCOM | VODAFONE |
| Network Availability | Sum of downtime of BTSs in a month in hrs. in the licensed service area | ≤ 2% | 0.82% | 0.06% | 1.60% | 0.39% | 0.08% | 0.29% |
| | No. of BTSs having accumulated downtime of >24 hours in a month | ≤ 2% | 0.35% | 0.00% | 0.06% | 0.03% | 0.00% | 0.17% |
| Connection Establishment (Accessibility) | Call Set-up Success Rate (Within Licensee own network | ≥ 95% | 97.20% | 96.80% | 98.70% | 97.89% | 98.27% | 98.98% |
| | SDDCH/Paging chl. Congestion | ≤ 1% | 0.26% | 0.61% | 0.60% | 0.18% | 0.06% | 0.02% |
| | TCH Congestion | ≤ 2% | 2.21% | 0.76% | 1.09% | 1.50% | 0.35% | 1.02% |
| Connection Maintenance (Retainability) | Call Drop Rate (%age) | ≤ 2% | 1.17% | 1.20% | 0.96% | 1.41% | 0.18% | 0.61% |
| | Worst Affected cell having more than 3% TCH drop | ≤ 3% | 11.30% | 1.37% | 2.27% | 1.94% | 0.36% | 2.81% |
| | %age of connection with good voice quality | ≥ 95% | 95.54% | 97.75% | 96.30% | 96.53% | 99.18% | 98.79% |

## 6.12. 3G Voice PMR: Consolidated

| Consolidated | | | | | | | |
|---|---|---|---|---|---|---|---|
| Network Parameters | | Name of Service Provider | | | | | |
| | | Benchmark | AIRCEL | AIRTEL | BSNL | IDEA | RCOM |
| Network Availability | Sum of downtime of BTSs in a month in hrs. in the licensed service area | ≤ 2% | 0.85% | 0.21% | 1.69% | 0.37% | 0.43% |
| | No. of BTSs having accumulated downtime of >24 hours in a month | ≤ 2% | 5.67% | 0.18% | 1.36% | 1.51% | 0.77% |
| Connection Establishment (Accessibility) | Call Set-up Success Rate (Within Licensee own network | ≥ 95% | 96.88% | 98.52% | 96.57% | 99.48% | 97.03% |
| | RRC Congestion: | ≤ 1% | 0.50% | 0.30% | 0.78% | 0.29% | 0.18% |
| | RAB Congestion: | ≤ 2% | 0.17% | 0.03% | 1.34% | 0.13% | 0.44% |
| Connection Maintenance (Retainability) | Circuit Switched Voice Drop Rate | ≤ 2% | 2.35% | 0.64% | 0.79% | 1.46% | 0.43% |
| | Worst affected cells having more than 3% Circuit Switched Voice Drop Rate: | ≤ 3% | 23.60% | 1.21% | 2.75% | 1.92% | 1.32% |
| | Percentage of connections with Good Circuit Switched Voice Quality | ≥ 95% | 97.94% | 99.03% | 95.94% | 97.76% | 99.69% |

## 6.13. 3G VOICE PMR: JANUARY

| Jan-16 | | | | | | | |
|---|---|---|---|---|---|---|---|
| Network Parameters | | Name of Service Provider | | | | | |
| | | Benchmark | AIRCEL | AIRTEL | BSNL | IDEA | RCOM |
| Network Availability | Sum of downtime of BTSs in a month in hrs. in the licensed service area | ≤ 2% | 0.94% | 0.19% | 1.71% | 0.44% | DNA |
| | No. of BTSs having accumulated downtime of >24 hours in a month | ≤ 2% | 6.90% | 0.19% | 1.79% | 1.64% | DNA |
| Connection Establishment (Accessibility) | Call Set-up Success Rate (Within Licensee own network | ≥ 95% | 97.77% | 97.51% | 96.06% | 99.43% | DNA |
| | RRC Congestion: | ≤ 1% | 0.23% | 0.07% | 0.85% | 0.34% | DNA |
| | RAB Congestion: | ≤ 2% | 0.03% | 0.03% | 1.70% | 0.19% | DNA |
| Connection Maintenance (Retainability) | Circuit Switched Voice Drop Rate | ≤ 2% | 2.08% | 0.68% | 0.35% | 1.25% | DNA |
| | Worst affected cells having more than 3% Circuit Switched Voice Drop Rate: | ≤ 3% | 21.54% | 1.44% | 2.81% | 2.06% | DNA |
| | Percentage of connections with Good Circuit Switched Voice Quality | ≥ 95% | 97.71% | 99.00% | DNA | DNA | DNA |

## 6.14. 3G VOICE PMR: FEBRUARY

| Feb-16 | | | | | | | |
|---|---|---|---|---|---|---|---|
| Network Parameters | | Name of Service Provider | | | | | |
| | | Benchmark | AIRCEL | AIRTEL | BSNL | IDEA | RCOM |
| Network Availability | Sum of downtime of BTSs in a month in hrs. in the licensed service area | ≤ 2% | 0.74% | 0.20% | 1.69% | 0.35% | 0.03% |
| | No. of BTSs having accumulated downtime of >24 hours in a month | ≤ 2% | 4.72% | 0.18% | 1.53% | 1.35% | 0.02% |
| Connection Establishment (Accessibility) | Call Set-up Success Rate (Within Licensee own network | ≥ 95% | 97.44% | 99.20% | 96.81% | 99.53% | 97.90% |
| | RRC Congestion: | ≤ 1% | 0.32% | 0.10% | 0.78% | 0.08% | 0.22% |
| | RAB Congestion: | ≤ 2% | 0.09% | 0.05% | 1.41% | 0.03% | 0.67% |
| Connection Maintenance (Retainability) | Circuit Switched Voice Drop Rate | ≤ 2% | 2.37% | 0.63% | 0.94% | 1.59% | 0.72% |
| | Worst affected cells having more than 3% Circuit Switched Voice Drop Rate: | ≤ 3% | 23.10% | 1.09% | 2.47% | 1.71% | 2.09% |
| | Percentage of connections with Good Circuit Switched Voice Quality | ≥ 95% | 98.28% | 99.05% | DNA | 97.82% | 99.75% |

## 6.15. 3G VOICE PMR: MARCH

| Mar-16 | | | | | | | |
|---|---|---|---|---|---|---|---|
| Network Parameters | | Name of Service Provider | | | | | |
| | | Benchmark | AIRCEL | AIRTEL | BSNL | IDEA | RCOM |
| Network Availability | Sum of downtime of BTSs in a month in hrs. in the licensed service area | ≤ 2% | 0.86% | 0.23% | 1.68% | 0.31% | 0.84% |
| | No. of BTSs having accumulated downtime of >24 hours in a month | ≤ 2% | 5.37% | 0.17% | 0.77% | 1.53% | 1.53% |
| Connection Establishment (Accessibility) | Call Set-up Success Rate (Within Licensee own network | ≥ 95% | 95.42% | 98.83% | 96.83% | 99.48% | 96.16% |
| | RRC Congestion: | ≤ 1% | 0.96% | 0.72% | 0.72% | 0.45% | 0.14% |
| | RAB Congestion: | ≤ 2% | 0.39% | 0.02% | 0.92% | 0.17% | 0.21% |
| Connection Maintenance (Retainability) | Circuit Switched Voice Drop Rate | ≤ 2% | 2.61% | 0.61% | 1.09% | 1.56% | 0.13% |
| | Worst affected cells having more than 3% Circuit Switched Voice Drop Rate: | ≤ 3% | 26.17% | 1.11% | 2.98% | 1.99% | 0.55% |
| | Percentage of connections with Good Circuit Switched Voice Quality | ≥ 95% | 97.84% | 99.04% | 95.94% | 97.71% | 99.64% |

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

| Consolidated | | | | | | | |
|---|---|---|---|---|---|---|---|
| Network Parameters | | Name of Service Provider | | | | | |
| | | Benchmark | AIRCEL | AIRTEL | BSNL | IDEA | RCOM |
| Network Availability | Sum of downtime of BTSs in a month in hrs. in the licensed service area | ≤ 2% | 0.76% | 0.54% | 1.71% | 0.43% | 1.87% |
| | No. of BTSs having accumulated downtime of >24 hours in a month | ≤ 2% | 0.29% | 0.00% | 0.68% | 0.00% | 0.77% |
| Connection Establishment (Accessibility) | Call Set-up Success Rate (Within Licensee own network | ≥ 95% | 97.30% | 99.33% | 95.78% | 99.52% | 97.24% |
| | RRC Congestion: | ≤ 1% | 0.40% | 0.04% | 0.86% | 0.30% | 0.20% |
| | RAB Congestion: | ≤ 2% | 0.13% | 1.34% | 1.73% | 0.11% | 0.43% |
| Connection Maintenance (Retainability) | Circuit Switched Voice Drop Rate | ≤ 2% | 2.46% | 0.66% | 0.54% | 1.65% | 0.44% |
| | Worst affected cells having more than 3% Circuit Switched Voice Drop Rate: | ≤ 3% | 24.16% | 1.43% | 2.47% | 1.94% | 1.74% |
| | Percentage of connections with Good Circuit Switched Voice Quality | ≥ 95% | 97.72% | 99.02% | 96.76% | 97.65% | 99.69% |

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

| Jan-16 | | | | | | | |
|---|---|---|---|---|---|---|---|
| Network Parameters | | Name of Service Provider | | | | | |
| | | Benchmark | AIRCEL | AIRTEL | BSNL | IDEA | RCOM |
| Network Availability | Sum of downtime of BTSs in a month in hrs. in the licensed service area | ≤ 2% | 0.72% | 0.47% | 1.64% | 0.75% | DNA |
| | No. of BTSs having accumulated downtime of >24 hours in a month | ≤ 2% | 0.17% | 0.00% | 0.26% | 0.00% | DNA |
| Connection Establishment (Accessibility) | Call Set-up Success Rate (Within Licensee own network | ≥ 95% | 97.55% | 99.25% | 96.64% | 99.27% | DNA |
| | RRC Congestion: | ≤ 1% | 0.07% | 0.02% | 0.78% | 0.18% | DNA |
| | RAB Congestion: | ≤ 2% | 0.02% | 0.01% | 1.82% | 0.13% | DNA |
| Connection Maintenance (Retainability) | Circuit Switched Voice Drop Rate | ≤ 2% | 2.33% | 0.67% | 0.41% | 1.68% | DNA |
| | Worst affected cells having more than 3% Circuit Switched Voice Drop Rate: | ≤ 3% | 22.72% | 2.00% | 2.04% | 2.12% | DNA |
| | Percentage of connections with Good Circuit Switched Voice Quality | ≥ 95% | 97.23% | 98.97% | DNA | 98.00% | DNA |

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

| Feb-16 | | | | | | | |
|---|---|---|---|---|---|---|---|
| Network Parameters | | Name of Service Provider | | | | | |
| | | Benchmark | AIRCEL | AIRTEL | BSNL | IDEA | RCOM |
| Network Availability | Sum of downtime of BTSs in a month in hrs. in the licensed service area | ≤ 2% | 0.60% | 0.41% | 1.76% | 0.26% | 0.03% |
| | No. of BTSs having accumulated downtime of >24 hours in a month | ≤ 2% | 0.00% | 0.00% | 1.28% | 0.00% | 1.53% |
| Connection Establishment (Accessibility) | Call Set-up Success Rate (Within Licensee own network | ≥ 95% | 97.64% | 99.53% | 95.22% | 99.76% | 97.90% |
| | RRC Congestion: | ≤ 1% | 0.18% | 0.06% | 0.96% | 0.10% | 0.22% |
| | RAB Congestion: | ≤ 2% | 0.05% | 4.00% | 1.71% | 0.03% | 0.67% |
| Connection Maintenance (Retainability) | Circuit Switched Voice Drop Rate | ≤ 2% | 2.43% | 0.66% | 0.74% | 1.55% | 0.72% |
| | Worst affected cells having more than 3% Circuit Switched Voice Drop Rate: | ≤ 3% | 23.29% | 1.07% | 2.55% | 1.89% | 2.09% |
| | Percentage of connections with Good Circuit Switched Voice Quality | ≥ 95% | 98.27% | 99.05% | DNA | 98.05% | 99.75% |

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

| Mar-16 | | | | | | | |
|---|---|---|---|---|---|---|---|
| Network Parameters | | Name of Service Provider | | | | | |
| | | Benchmark | AIRCEL | AIRTEL | BSNL | IDEA | RCOM |
| Network Availability | Sum of downtime of BTSs in a month in hrs. in the licensed service area | ≤ 2% | 0.95% | 0.74% | 1.75% | 0.27% | 3.71% |
| | No. of BTSs having accumulated downtime of >24 hours in a month | ≤ 2% | 0.69% | 0.00% | 0.51% | 0.00% | 0.00% |
| Connection Establishment (Accessibility) | Call Set-up Success Rate (Within Licensee own network | ≥ 95% | 96.71% | 99.21% | 95.49% | 99.53% | 96.58% |
| | RRC Congestion: | ≤ 1% | 0.96% | 0.05% | 0.85% | 0.61% | 0.17% |
| | RAB Congestion: | ≤ 2% | 0.32% | 0.02% | 1.65% | 0.18% | 0.19% |
| Connection Maintenance (Retainability) | Circuit Switched Voice Drop Rate | ≤ 2% | 2.61% | 0.64% | 0.48% | 1.72% | 0.16% |
| | Worst affected cells having more than 3% Circuit Switched Voice Drop Rate: | ≤ 3% | 26.47% | 1.23% | 2.81% | 1.78% | 1.38% |
| | Percentage of connections with Good Circuit Switched Voice Quality | ≥ 95% | 97.67% | 99.05% | 96.76% | 96.89% | DNA |

## 6.20. POI CONGESTION: CONSOLIDATED

| S. No. | Name of Parameter | Benchmark | AIRCEL | AIRTEL | BSNL | IDEA | RCOM | VODAFONE |
|---|---|---|---|---|---|---|---|---|
| Network Service Quality Parameter | | | | | | | | |
| 1 | **Total No. of POI's in Month having < = 0.5% POI congestion** | | | | | | | |
| | Total No. of call attempts on POI | | 42284918 | 38259517 | 21612368 | 53860 | 13552162 | 24766803 |
| | Total traffic served on all POIs (Erlang) | | 889390 | 898359 | 361879 | 117212 | 204473 | 861282 |
| | Total No. of circuits on all individual POIs | | 2106011 | 1636334 | 856570 | 341672 | 298543 | 1264717 |
| | Total number of working POI Service Area wise | | 47 | 34 | 23 | 364 | 188539 | 1528 |
| | Capacity of all POIs | | 2023886 | 1619970 | 599599 | 328929 | 86591 | 1230868 |
| | No. of all POI's having >=0.5% POI congestion | | 0 | 0 | 0 | 0 | 0 | 1 |
| | Name of POI not meeting the benchmark (having >=0.5% POI congestion) | | NIL | NIL | NIL | NIL | NIL | NIL |

## 6.20.1. POI CONGESTION: JANUARY

| Jan-16 | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Monthly TRAI Network Performance Report of Cellular Mobile Telephone Service - Network Service | | | | | | | | |
| S. No. | Name of Parameter | Benchmark | AIRCEL | AIRTEL | BSNL | IDEA | RCOM | VODAFONE |
| Network Service Quality Parameter | | | | | | | | |
| 1 | **Total No. of POI's in Month having < = 0.5% POI congestion** | | | | | | | |
| | Total No. of call attempts on POI | | 40810771 | 37563450 | 24820967 | 47034 | 14491194 | 23834589 |
| | Total traffic served on all POIs (Erlang) | | 860793 | 928957.07 | 418422.04 | 103335.69 | 208704 | 458841.34 |
| | Total No. of circuits on all individual POIs | | 2145211 | 1678754 | 898287 | 341434 | 312630 | 1291305 |
| | Total number of working POI Service Area wise | | 46 | 34 | 22 | 372 | 287708 | 1550 |
| | Capacity of all POIs | | 2061967 | 1661966 | 628801 | 328452 | 560 | 1256932 |
| | No. of all POI's having >=0.5% POI congestion | | 0 | 0 | 0 | 0 | 0 | 0 |
| | Name of POI not meeting the benchmark (having >=0.5% POI congestion) | | NIL | NIL | NIL | NIL | NIL | NIL |

## 6.20.2. POI CONGESTION: FEBRUARY

| Feb-16 | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Monthly TRAI Network Performance Report of Cellular Mobile Telephone Service - Network Service | | | | | | | | |
| S. No. | Name of Parameter | Benchmark | AIRCEL | AIRTEL | BSNL | IDEA | RCOM | VODAFONE |
| Network Service Quality Parameter | | | | | | | | |
| 1 | Total No. of POI's in Month having < = 0.5% POI congestion | | | | | | | |
| | Total No. of call attempts on POI | | 41606066 | 36753414 | 20085533 | 48260 | 12909033 | 24488327 |
| | Total traffic served on all POIs (Erlang) | | 872995 | 868176.81 | 341452.66 | 106949.29 | 202564 | 453135.56 |
| | Total No. of circuits on all individual POIs | | 2012630 | 1572165 | 743346 | 328354 | 302109 | 1208876 |
| | Total number of working POI Service Area wise | | 47 | 34 | 23 | 348 | 277889 | 1454 |
| | Capacity of all POIs | | 1934217 | 1556443 | 520342.20 | 316170 | 20 | 1176581 |
| | No. of all POI's having >=0.5% POI congestion | | 0 | 0 | 0 | 0 | 0 | 1 |
| | Name of POI not meeting the benchmark (having >=0.5% POI congestion) | | NIL | NIL | NIL | NIL | NIL | TTSL-MOHALI |

## 6.20.3. POI CONGESTION: MARCH

| Mar-16 | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Monthly TRAI Network Performance Report of Cellular Mobile Telephone Service - Network Service | | | | | | | | |
| S. No. | Name of Parameter | Benchmark | AIRCEL | AIRTEL | BSNL | IDEA | RCOM | VODAFONE |
| Network Service Quality Parameter | | | | | | | | |
| 1 | Total No. of POI's in Month having < = 0.5% POI congestion | | | | | | | |
| | Total No. of call attempts on POI | | 44437918 | 40461688 | 19930603 | 66286 | 13256259 | 25977493 |
| | Total traffic served on all POIs (Erlang) | | 934381 | 897943 | 325762.5 | 141351.01 | 202152 | 1671867.75 |
| | Total No. of circuits on all individual POIs | | 2160191 | 1658082 | 928078 | 355229 | 280891 | 1293971 |
| | Total number of working POI Service Area wise | | 47 | 34 | 23 | 372 | 20 | 1581 |
| | Capacity of all POIs | | 2075475 | 1641501 | 649655 | 342165 | 259192 | 1259089 |
| | No. of all POI's having >=0.5% POI congestion | | 0 | 0 | 0 | NIL | 0 | 1 |
| | Name of POI not meeting the benchmark (having >=0.5% POI congestion) | | NIL | NIL | NIL | NIL | NIL | TTSL-MOHALI |

## 6.21. 2G WIRELESS DATA: JANUARY

| Jan-16 | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Cellular Mobile Telephone Services | | | | | | | | |
| S. No. | Name of Parameter | Benchmark | AIRCEL | AIRTEL | BSNL | IDEA | RCOM | VODAFONE |
| Network Service Quality Parameter | | | | | | | | |
| 1 | Service Activation/ Provisioning | | | | | | | |
| i) | Total No. of Subscribers for Service Activation (A) | | 534511 | DNA | 3179 | DNA | 22542 | DNA |
| ii) | Total Service Activations provided within 4 Hours (B) | | 533734 | DNA | 3179 | DNA | 22542 | DNA |
| iii) | Service Activation / Provisioning = (B/A) * 100 | *Within 4 Hours with 95% Success Rate* | 99.85% | DNA | 100.00% | DNA | 100.00% | DNA |
| 2 | PDP Context Activation Success Rate | | | | | | | |
| i) | Total No. of PDP Context Activation Requests (from SGSN to GGSN) (A) | | 545076592 | DNA | 630784 | DNA | DNA | 97946535 |
| ii) | Total No. of PDP Context Activation Success (path created b/w SGSN and GGSN) (B) | | 544193331 | DNA | 615678 | DNA | DNA | 97909633 |
| iii) | PDP Context Activation Success Rate =(B/A) *100 | >=95% | 99.84% | DNA | 97.61% | DNA | 99.54% | 99.96% |
| 3 | Drop Rate | | | | | | | |
| i) | RNC originated PS Domain Iu Connection Setup Success (A) | | DNA | DNA | 1613282980.00 | DNA | 623556175 | DNA |
| ii) | RNC originated PS Domain Iu Connection Release (B) | | DNA | DNA | 39543490.79 | DNA | 11238660 | DNA |
| iii) | Drop Rate = (B/A) * 100 | <=5% | 1.18% | DNA | 2.45% | DNA | 1.80% | DNA |

## 6.22. 2G WIRELESS DATA: FEBRUARY

| Feb-16 | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Cellular Mobile Telephone Services | | | | | | | | |
| S. No. | Name of Parameter | Benchmark | AIRCEL | AIRTEL | BSNL | IDEA | RCOM | VODAFONE |
| Network Service Quality Parameter | | | | | | | | |
| 1 | Service Activation/ Provisioning | | | | | | | |
| i) | Total No. of Subscribers for Service Activation (A) | | 443198 | DNA | 3342.00 | 6162 | 20927 | DNA |
| ii) | Total Service Activations provided within 4 Hours (B) | | 442317 | DNA | 3342.00 | 6162 | 20927 | DNA |
| iii) | Service Activation / Provisioning = (B/A) * 100 | *Within 4 Hours with 95% Success Rate* | 99.80% | DNA | 100% | 100.00% | 100.00% | DNA |
| 2 | PDP Context Activation Success Rate | | | | | | | |
| i) | Total No. of PDP Context Activation Requests (from SGSN to GGSN) (A) | | 505493302 | DNA | 652190 | 41678604.00 | DNA | 89276181 |
| ii) | Total No. of PDP Context Activation Success (path created b/w SGSN and GGSN) (B) | | 505378693 | DNA | 633849 | 41271842.00 | DNA | 88379157 |
| iii) | PDP Context Activation Success Rate =(B/A) *100 | >=95% | 99.98% | DNA | 97.19% | 99.02% | 99.44% | 99.00% |
| 3 | Drop Rate | | | | | | | |
| i) | RNC originated PS Domain Iu Connection Setup Success (A) | | DNA | DNA | 1724529105 | DNA | 13669303 | DNA |
| ii) | RNC originated PS Domain Iu Connection Release (B) | | DNA | DNA | 47190907 | DNA | 705327087 | DNA |
| iii) | Drop Rate = (B/A) * 100 | <=5% | 1.20% | DNA | 2.74% | DNA | 1.94% | DNA |

## 6.23. 2G WIRELESS DATA: MARCH

| Mar-16 | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Cellular Mobile Telephone Services | | | | | | | | |
| S. No. | Name of Parameter | Benchmark | AIRCEL | AIRTEL | BSNL | IDEA | RCOM | VODAFONE |
| Network Service Quality Parameter | | | | | | | | |
| 1 | Service Activation/ Provisioning | | | | | | | |
| i) | Total No. of Subscribers for Service Activation (A) | | 734382 | DNA | 2637 | 7238 | 18020 | DNA |
| ii) | Total Service Activations provided within 4 Hours (B) | | 733284 | DNA | 2637 | 7238 | 18244 | DNA |
| iii) | Service Activation / Provisioning = (B/A) * 100 | *Within 4 Hours with 95% Success Rate* | 99.85% | DNA | 100.00% | 100% | 98.77% | DNA |
| 2 | PDP Context Activation Success Rate | | | | | | | |
| i) | Total No. of PDP Context Activation Requests (from SGSN to GGSN) (A) | | 580343042 | 13447433 | 653213 | 34878407.00 | DNA | 95756804 |
| ii) | Total No. of PDP Context Activation Success (path created b/w SGSN and GGSN) (B) | | 576912863 | 13427774 | 635049 | 34380532.00 | DNA | 95726987 |
| iii) | PDP Context Activation Success Rate =(B/A) *100 | >=95% | 99.41% | 99.85% | 97.22% | 98.57% | 99.50% | 99.97% |
| 3 | Drop Rate | | | | | | | |
| i) | RNC originated PS Domain Iu Connection Setup Success (A) | | 1889284792 | 3352608484 | 1869566220 | 934328100.00 | 212640352 | DNA |
| ii) | RNC originated PS Domain Iu Connection Release (B) | | 25062461 | 37709076 | 51857671 | 5183338.00 | 10617918756 | DNA |
| iii) | Drop Rate = (B/A) * 100 | <=5% | 1.33% | 1.12% | 2.77% | 0.55% | 2.00% | DNA |

## 6.24. 2G WIRELESS DATA: CONSOLIDATED

| Consolidated | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Cellular Mobile Telephone Services | | | | | | | | |
| S. No. | Name of Parameter | Benchmark | AIRCEL | AIRTEL | BSNL | IDEA | RCOM | VODAFONE |
| Network Service Quality Parameter | | | | | | | | |
| 1 | Service Activation/ Provisioning | | | | | | | |
| i) | Total No. of Subscribers for Service Activation (A) | | 570697 | DNA | 3053 | 6700 | 20496 | DNA |
| ii) | Total Service Activations provided within 4 Hours (B) | | 569778 | DNA | 3053 | 6700 | 20571 | DNA |
| iii) | Service Activation / Provisioning = (B/A) * 100 | *Within 4 Hours with 95% Success Rate* | 99.84% | DNA | 100.00% | 100.00% | 99.59% | DNA |
| 2 | PDP Context Activation Success Rate | | | | | | | |
| i) | Total No. of PDP Context Activation Requests (from SGSN to GGSN) (A) | | 543637645 | 13447433 | 645396 | 38278506 | DNA | 94326507 |
| ii) | Total No. of PDP Context Activation Success (path created b/w SGSN and GGSN) (B) | | 542161629 | 13427774 | 628192 | 37826187 | DNA | 94005259 |
| iii) | PDP Context Activation Success Rate =(B/A) *100 | >=95% | 99.74% | 99.85% | 97.34% | 98.80% | 99.49% | 99.64% |
| 3 | Drop Rate | | | | | | | |
| i) | RNC originated PS Domain Iu Connection Setup Success (A) | | 1889284792 | 3352608484 | 1735792768 | 934328100 | 283288610 | DNA |
| ii) | RNC originated PS Domain Iu Connection Release (B) | | 25062461 | 37709076 | 46197356 | 5183338 | 3778161501 | DNA |
| iii) | Drop Rate = (B/A) * 100 | <=5% | 1.24% | 1.12% | 2.65% | 0.55% | 1.91% | DNA |

## 6.25. 2G WIRELESS 3 DAYS LIVE DATA: JANUARY

| Jan-16 | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Cellular Mobile Telephone Services | | | | | | | |
| S. No. | Name of Parameter | Benchmark | AIRCEL | AIRTEL | BSNL | IDEA | RCOM | VODAFONE |
| Network Service Quality Parameter | | | | | | | | |
| 1 | Service Activation/ Provisioning | | | | | | | |
| | Total No. of Subscribers for Service Activation (A) | | DNA | DNA | 421 | DNA | DNA | DNA |
| ii) | Total Service Activations provided within 4 Hours (B) | | DNA | DNA | 421 | DNA | DNA | DNA |
| iii) | Service Activation / Provisioning = (B/A) * 100 | *Within 4 Hours with 95% Success Rate* | DNA | DNA | 100.00% | DNA | DNA | DNA |
| 2 | **PDP Context Activation Success Rate** | | | | | | | |
| i) | Total No. of PDP Context Activation Requests (from SGSN to GGSN) (A) | | 52787846 | DNA | 17761 | DNA | DNA | DNA |
| ii) | Total No. of PDP Context Activation Success (path created b/w SGSN and GGSN) (B) | | 52758454 | DNA | 17171 | DNA | DNA | DNA |
| iii) | PDP Context Activation Success Rate =(B/A) *100 | >=95% | 99.94% | DNA | 96.68% | DNA | DNA | DNA |
| 3 | **Drop Rate** | | | | | | | |
| i) | TBF originated PS Domain Iu Connection Setup Success (A) | | DNA | DNA | 43535488.00 | DNA | DNA | DNA |
| ii) | TBF originated PS Domain Iu Connection Release (B) | | DNA | DNA | 755807.00 | DNA | DNA | DNA |
| iii) | Drop Rate = (B/A) * 100 | <=5% | 1.23% | DNA | 1.74% | DNA | DNA | DNA |

## 6.26. 2G WIRELESS 3 DAYS LIVE DATA: FEBRUARY

| Feb'16 | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| S. No. | Cellular Mobile Telephone Services | | | | | | | |
| Network Service | Name of Parameter | Benchmark | AIRCEL | AIRTEL | BSNL | IDEA | RCOM | VODAFONE |
| Network Service Quality Parameter | | | | | | | | |
| 1 | Service Activation/ Provisioning | | | | | | | |
| i) | Total No. of Subscribers for Service Activation (A) | | DNA | DNA | 360 | DNA | DNA | DNA |
| ii) | Total Service Activations provided within 4 Hours (B) | | DNA | DNA | 360 | DNA | DNA | DNA |
| iii) | Service Activation / Provisioning = (B/A) * 100 | *Within 4 Hours with 95% Success Rate* | DNA | DNA | 100.00% | DNA | DNA | DNA |
| 2 | **PDP Context Activation Success Rate** | | | | | | | |
| i) | Total No. of PDP Context Activation Requests (from SGSN to GGSN) (A) | | 38669386 | DNA | 6911 | DNA | **DNA** | DNA |
| ii) | Total No. of PDP Context Activation Success (path created b/w SGSN and GGSN) (B) | | 38658254 | DNA | 6639 | DNA | **DNA** | DNA |
| iii) | PDP Context Activation Success Rate =(B/A) *100 | >=95% | 99.97% | DNA | 96.06% | DNA | 99.88% | DNA |
| 3 | **Drop Rate** | | | | | | | |
| i) | RNC originated PS Domain Iu Connection Setup Success (A) | | DNA | DNA | 178389252.00 | DNA | 77558753 | DNA |
| ii) | RNC originated PS Domain Iu Connection Release (B) | | DNA | DNA | 5833385.00 | DNA | 1455189 | DNA |
| iii) | Drop Rate = (B/A) * 100 | <=5% | 1.22% | DNA | 3.27% | DNA | 1.88% | DNA |

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

| Mar'16 | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| S. No. | Cellular Mobile Telephone Services | | | | | | | |
| Network Service | Name of Parameter | Benchmark | AIRCEL | AIRTEL | BSNL | IDEA | RCOM | VODAFONE |
| Network Service Quality Parameter | | | | | | | | |
| 1 | Service Activation/ Provisioning | | | | | | | |
| i) | Total No. of Subscribers for Service Activation (A) | | DNA | DNA | 362 | 757 | 1962 | DNA |
| ii) | Total Service Activations provided within 4 Hours (B) | | DNA | DNA | 362 | 757 | 1900 | DNA |
| iii) | Service Activation / Provisioning = (B/A) * 100 | *Within 4 Hours with 95% Success Rate* | DNA | DNA | 100.00% | 100.00% | 96.84% | DNA |
| 2 | **PDP Context Activation Success Rate** | | | | | | | |
| i) | Total No. of PDP Context Activation Requests (from SGSN to GGSN) (A) | | 56885527 | DNA | 69957 | 4730513 | DNA | DNA |
| ii) | Total No. of PDP Context Activation Success (path created b/w SGSN and GGSN) (B) | | 55033853 | DNA | 67672 | 4691663 | DNA | DNA |
| iii) | PDP Context Activation Success Rate =(B/A) *100 | >=95% | 96.74% | DNA | 96.73% | 99.18% | 99.55% | DNA |
| 3 | **Drop Rate** | | | | | | | |
| i) | RNC originated PS Domain Iu Connection Setup Success (A) | | DNA | DNA | 186829252.00 | DNA | 77672681 | DNA |
| ii) | RNC originated PS Domain Iu Connection Release (B) | | DNA | DNA | 5337558.00 | DNA | 1509397 | DNA |
| iii) | Drop Rate = (B/A) * 100 | <=5% | 1.28% | DNA | 2.86% | DNA | 1.94% | DNA |

## 6.28. 2G Wireless 3 Days Live Data: Consolidated

| Consolidated | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Cellular Mobile Telephone Services | | | | | | | | |
| S. No. | Name of Parameter | Benchmark | AIRCEL | AIRTEL | BSNL | IDEA | RCOM | VODAFONE |
| Network Service Quality Parameter | | | | | | | | |
| 1 | Service Activation/ Provisioning | | | | | | | |
| i) | Total No. of Subscribers for Service Activation (A) | | DNA | DNA | 381 | 757 | 1962 | DNA |
| ii) | Total Service Activations provided within 4 Hours (B) | | DNA | DNA | 381 | 757 | 1900 | DNA |
| iii) | Service Activation / Provisioning = (B/A) * 100 | *Within 4 Hours with 95% Success Rate* | DNA | DNA | 100.00% | 100.00% | 96.84% | DNA |
| 2 | **PDP Context Activation Success Rate** | | | | | | | |
| i) | Total No. of PDP Context Activation Requests (from SGSN to GGSN) (A) | | 49447586 | DNA | 31543 | 4730513 | DNA | DNA |
| ii) | Total No. of PDP Context Activation Success (path created b/w SGSN and GGSN) (B) | | 48816854 | DNA | 30494 | 4691663 | DNA | DNA |
| iii) | PDP Context Activation Success Rate =(B/A) *100 | >=95% | 98.89% | DNA | 96.49% | 99.18% | 99.72% | DNA |
| 3 | **Drop Rate** | | | | | | | |
| i) | TBF originated PS Domain Iu Connection Setup Success (A) | | DNA | DNA | 136251331 | DNA | 77615717 | DNA |
| ii) | TBF originated PS Domain Iu Connection Release (B) | | DNA | DNA | 3975583 | DNA | 1482293 | DNA |
| iii) | Drop Rate = (B/A) * 100 | <=5% | 1.24% | DNA | 2.62% | DNA | 1.91% | DNA |

## 6.29. 3G Wireless Data: January

| Jan-16 | | | | | | | |
|---|---|---|---|---|---|---|---|
| Cellular Mobile Telephone Services | | | | | | | |
| S. No. | Name of Parameter | Benchmark | AIRCEL | AIRTEL | BSNL | IDEA | RCOM |
| Network Service Quality Parameter | | | | | | | |
| 1 | Service Activation/ Provisioning | | | | | | |
| i) | Total No. of Subscribers for Service Activation (A) | | 534511 | DNA | 3178 | DNA | 9318 |
| ii) | Total Service Activations provided within 4 Hours (B) | | 533734 | DNA | 3178 | DNA | 9318 |
| iii) | Service Activation / Provisioning = (B/A) * 100 | *Within 4 Hours with 95% Success Rate* | 99.85% | DNA | 100.0% | DNA | 100.00% |
| 2 | PDP Context Activation Success Rate | | | | | | |
| i) | Total No. of PDP Context Activation Requests (from SGSN to GGSN) (A) | | 545076592 | DNA | 388513 | DNA | DNA |
| ii) | Total No. of PDP Context Activation Success (path created b/w SGSN and GGSN) (B) | | 544193331 | DNA | 374413 | DNA | DNA |
| iii) | PDP Context Activation Success Rate =(B/A) *100 | >=95% | 99.84% | DNA | 96.37% | DNA | DNA |
| 3 | Drop Rate | | | | | | |
| i) | RNC originated PS Domain Iu Connection Setup Success (A) | | DNA | DNA | 394160441.99 | DNA | DNA |
| ii) | RNC originated PS Domain Iu Connection Release (B) | | DNA | DNA | 15769999.19 | DNA | DNA |
| iii) | Drop Rate = (B/A) * 100 | <=5% | 1.95% | DNA | 4.00% | DNA | DNA |

## 6.30. 3G Wireless Data: February

| Feb-16 | | | | | | | |
|---|---|---|---|---|---|---|---|
| Cellular Mobile Telephone Services | | | | | | | |
| S. No. | Name of Parameter | Benchmark | AIRCEL | AIRTEL | BSNL | IDEA | RCOM |
| Network Service Quality Parameter | | | | | | | |
| 1 | Service Activation/ Provisioning | | | | | | |
| i) | Total No. of Subscribers for Service Activation (A) | | 443198 | DNA | 3342 | 6162 | 10465 |
| ii) | Total Service Activations provided within 4 Hours (B) | | 442317 | DNA | 3342 | 6162 | 10465 |
| iii) | Service Activation / Provisioning = (B/A) * 100 | *Within 4 Hours with 95% Success Rate* | 99.80% | DNA | 100.00% | 100.00% | 100.00% |
| 2 | PDP Context Activation Success Rate | | | | | | |
| i) | Total No. of PDP Context Activation Requests (from SGSN to GGSN) (A) | | 505493302 | DNA | 319392 | 26024125 | DNA |
| ii) | Total No. of PDP Context Activation Success (path created b/w SGSN and GGSN) (B) | | 505378693 | DNA | 311552 | 25602220 | DNA |
| iii) | PDP Context Activation Success Rate =(B/A) *100 | >=95% | 99.98% | DNA | 97.55% | 98.38% | 97.45% |
| 3 | Drop Rate | | | | | | |
| i) | RNC originated PS Domain Iu Connection Setup Success (A) | | DNA | DNA | 344530501 | DNA | DNA |
| ii) | RNC originated PS Domain Iu Connection Release (B) | | DNA | DNA | 13633065 | DNA | DNA |
| iii) | Drop Rate = (B/A) * 100 | <=5% | 2.36% | DNA | 3.96% | DNA | 0.54% |

## 6.31. 3G WIRELESS DATA: MARCH

| Mar-16 | | | | | | | |
|---|---|---|---|---|---|---|---|
| Cellular Mobile Telephone Services | | | | | | | |
| S. No. | Name of Parameter | Benchmark | AIRCEL | AIRTEL | BSNL | IDEA | RCOM |
| Network Service Quality Parameter | | | | | | | |
| 1 | Service Activation/ Provisioning | | | | | | |
| i) | Total No. of Subscribers for Service Activation (A) | | 734382 | DNA | 2637 | 7238 | 9750 |
| ii) | Total Service Activations provided within 4 Hours (B) | | 733284 | DNA | 2637 | 7238 | 9857 |
| iii) | Service Activation / Provisioning = (B/A) * 100 | *Within 4 Hours with 95% Success Rate* | 99.85% | DNA | 100.00% | 100% | 98.91% |
| 2 | PDP Context Activation Success Rate | | | | | | |
| i) | Total No. of PDP Context Activation Requests (from SGSN to GGSN) (A) | | 580343042 | 3820537 | 333190.38 | 21635382.00 | DNA |
| ii) | Total No. of PDP Context Activation Success (path created b/w SGSN and GGSN) (B) | | 576912863 | 3820476 | 326266.27 | 21239857.00 | DNA |
| iii) | PDP Context Activation Success Rate =(B/A) *100 | >=95% | 99.41% | 100.00% | 97.92% | 98.17% | 99.19% |
| 3 | Drop Rate | | | | | | |
| i) | RNC originated PS Domain Iu Connection Setup Success (A) | | 77278089 | 23114610 | 443441848.00 | 59191544.00 | 294993 |
| ii) | RNC originated PS Domain Iu Connection Release (B) | | 1859269 | 123460 | 13196183.59 | 1290076.00 | 40657539 |
| iii) | Drop Rate = (B/A) * 100 | <=5% | 2.41% | 0.53% | 2.98% | 2.18% | 0.73% |

## 6.32. 3G WIRELESS DATA: CONSOLIDATED

| Consolidated | | | | | | | |
|---|---|---|---|---|---|---|---|
| Cellular Mobile Telephone Services | | | | | | | |
| S. No. | Name of Parameter | Benchmark | AIRCEL | AIRTEL | BSNL | IDEA | RCOM |
| Network Service Quality Parameter | | | | | | | |
| 1 | Service Activation/ Provisioning | | | | | | |
| i) | Total No. of Subscribers for Service Activation (A) | | 570697 | DNA | 3052 | 6700 | 9844 |
| ii) | Total Service Activations provided within 4 Hours (B) | | 569778 | DNA | 3052 | 6700 | 9880 |
| iii) | Service Activation / Provisioning = (B/A) * 100 | *Within 4 Hours with 95% Success Rate* | 99.84% | DNA | 100.00% | 100.00% | 99.64% |
| 2 | PDP Context Activation Success Rate | | | | | | |
| i) | Total No. of PDP Context Activation Requests (from SGSN to GGSN) (A) | | 543637645 | 3820537 | 347032 | 23829754 | DNA |
| ii) | Total No. of PDP Context Activation Success (path created b/w SGSN and GGSN) (B) | | 542161629 | 3820476 | 337410 | 23421039 | DNA |
| iii) | PDP Context Activation Success Rate =(B/A) *100 | >=95% | 99.74% | 100.00% | 97.28% | 98.28% | 98.32% |
| 3 | Drop Rate | | | | | | |
| i) | RNC originated PS Domain Iu Connection Setup Success (A) | | 77278089 | 23114610 | 394044264 | 59191544 | 294993 |
| ii) | RNC originated PS Domain Iu Connection Release (B) | | 1859269 | 123460 | 14199749 | 1290076 | 40657539 |
| iii) | Drop Rate = (B/A) * 100 | <=5% | 2.24% | 0.53% | 3.64% | 2.18% | 0.63% |

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

| Jan-16 | | | | | | | |
|---|---|---|---|---|---|---|---|
| | Cellular Mobile Telephone Services | | | | | | |
| S. No. | Name of Parameter | Benchmark | AIRCEL | AIRTEL | BSNL | IDEA | RCOM |
| Network Service Quality Parameter | | | | | | | |
| 1 | Service Activation/ Provisioning | | | | | | |
| | Total No. of Subscribers for Service Activation (A) | | DNA | DNA | 421 | DNA | DNA |
| ii) | Total Service Activations provided within 4 Hours (B) | | DNA | DNA | 421 | DNA | DNA |
| iii) | Service Activation / Provisioning = (B/A) * 100 | *Within 4 Hours with 95% Success Rate* | DNA | DNA | 100.0% | DNA | DNA |
| 2 | PDP Context Activation Success Rate | | | | | | |
| i) | Total No. of PDP Context Activation Requests (from SGSN to GGSN) (A) | | 52787846 | DNA | 69160 | DNA | DNA |
| ii) | Total No. of PDP Context Activation Success (path created b/w SGSN and GGSN) (B) | | 52758454 | DNA | 66312 | DNA | DNA |
| iii) | PDP Context Activation Success Rate =(B/A) *100 | >=95% | 99.94% | DNA | 95.88% | DNA | DNA |
| 3 | Drop Rate | | | | | | |
| i) | TBF originated PS Domain Iu Connection Setup Success (A) | | DNA | DNA | 36192013.00 | DNA | DNA |
| ii) | TBF originated PS Domain Iu Connection Release (B) | | DNA | DNA | 1552766.00 | DNA | DNA |
| iii) | Drop Rate = (B/A) * 100 | <=5% | 1.81% | DNA | 4.29% | DNA | DNA |

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

| Feb'16 | | | | | | | |
|---|---|---|---|---|---|---|---|
| | Cellular Mobile Telephone Services | | | | | | |
| S. No. | Name of Parameter | Benchmark | AIRCEL | AIRTEL | BSNL | IDEA | RCOM |
| Network Service Quality Parameter | | | | | | | |
| 1 | Service Activation/ Provisioning | | | | | | |
| i) | Total No. of Subscribers for Service Activation (A) | | DNA | DNA | 360 | DNA | DNA |
| ii) | Total Service Activations provided within 4 Hours (B) | | DNA | DNA | 360 | DNA | DNA |
| iii) | Service Activation / Provisioning = (B/A) * 100 | *Within 4 Hours with 95% Success Rate* | DNA | DNA | 100.0% | DNA | DNA |
| 2 | PDP Context Activation Success Rate | | | | | | |
| i) | Total No. of PDP Context Activation Requests (from SGSN to GGSN) (A) | | 38669386 | DNA | 93735 | DNA | DNA |
| ii) | Total No. of PDP Context Activation Success (path created b/w SGSN and GGSN) (B) | | 38658254 | DNA | 90114 | DNA | DNA |
| iii) | PDP Context Activation Success Rate =(B/A) *100 | >=95% | 99.97% | DNA | 96.14% | DNA | DNA |
| 3 | Drop Rate | | | | | | |
| i) | RNC originated PS Domain Iu Connection Setup Success (A) | | DNA | DNA | 35947444.00 | DNA | DNA |
| ii) | RNC originated PS Domain Iu Connection Release (B) | | DNA | DNA | 1549193.00 | DNA | DNA |
| iii) | Drop Rate = (B/A) * 100 | <=5% | 2.35% | DNA | 4.31% | DNA | DNA |

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

| Mar'16 | | | | | | | |
|---|---|---|---|---|---|---|---|
| | Cellular Mobile Telephone Services | | | | | | |
| S. No. | Name of Parameter | Benchmark | AIRCEL | AIRTEL | BSNL | IDEA | RCOM |
| Network Service Quality Parameter | | | | | | | |
| 1 | **Service Activation/ Provisioning** | | | | | | |
| i) | Total No. of Subscribers for Service Activation (A) | | DNA | DNA | 362 | 757.00 | 1081 |
| ii) | Total Service Activations provided within 4 Hours (B) | | DNA | DNA | 362 | 757.00 | 1050 |
| iii) | Service Activation / Provisioning = (B/A) * 100 | *Within 4 Hours with 95% Success Rate* | DNA | DNA | 100.00% | 100.00% | 97.13% |
| 2 | **PDP Context Activation Success Rate** | | | | | | |
| i) | Total No. of PDP Context Activation Requests (from SGSN to GGSN) (A) | | 56885527 | DNA | 35133 | 3126004.00 | DNA |
| ii) | Total No. of PDP Context Activation Success (path created b/w SGSN and GGSN) (B) | | 55033853 | DNA | 34028 | 3075016.00 | DNA |
| iii) | PDP Context Activation Success Rate =(B/A) *100 | >=95% | 96.74% | DNA | 96.85% | 98.37% | 99.16% |
| 3 | **Drop Rate** | | | | | | |
| i) | RNC originated PS Domain Iu Connection Setup Success (A) | | DNA | DNA | 46911460 | DNA | DNA |
| ii) | RNC originated PS Domain Iu Connection Release (B) | | DNA | DNA | 1018385 | DNA | DNA |
| iii) | Drop Rate = (B/A) * 100 | <=5% | 2.43% | DNA | 2.17% | DNA | 0.47% |

## 6.36. 3G WIRELESS 3 DAYS LIVE DATA: CONSOLIDATED

| Consolidated | | | | | | | |
|---|---|---|---|---|---|---|---|
| Cellular Mobile Telephone Services | | | | | | | |
| S. No. | Name of Parameter | Benchmark | AIRCEL | AIRTEL | BSNL | IDEA | RCOM |
| Network Service Quality Parameter | | | | | | | |
| 1 | Service Activation/ Provisioning | | | | | | |
| i) | Total No. of Subscribers for Service Activation (A) | | DNA | DNA | 381 | 757 | 1081 |
| ii) | Total Service Activations provided within 4 Hours (B) | | DNA | DNA | 381 | 757 | 1050 |
| iii) | Service Activation / Provisioning = (B/A) * 100 | *Within 4 Hours with 95% Success Rate* | DNA | DNA | 100.00% | 100.00% | 97.13% |
| 2 | PDP Context Activation Success Rate | | | | | | |
| i) | Total No. of PDP Context Activation Requests (from SGSN to GGSN) (A) | | 49447586 | DNA | 66009 | 3126004 | DNA |
| ii) | Total No. of PDP Context Activation Success (path created b/w SGSN and GGSN) (B) | | 48816854 | DNA | 63485 | 3075016 | DNA |
| iii) | PDP Context Activation Success Rate =(B/A) *100 | >=95% | 98.89% | DNA | 96.29% | 98.37% | 99.16% |
| 3 | Drop Rate | | | | | | |
| i) | TBF originated PS Domain Iu Connection Setup Success (A) | | DNA | DNA | 39683639 | DNA | DNA |
| ii) | TBF originated PS Domain Iu Connection Release (B) | | DNA | DNA | 1373448 | DNA | DNA |
| iii) | Drop Rate = (B/A) * 100 | <=5% | 2.20% | DNA | 3.59% | DNA | 0.47% |

v

# 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% | 54.92% | 97.32% | 93.58% |
| AIRTEL | 0.02% | 0.00% | 100.00% | 100.00% | 100.00% | 100.00% | 100.00% | 93.67% | 64.31% |
| BSNL | 0.02% | 0.01% | 100.00% | 100.00% | 100.00% | 100.00% | 100.00% | 100.00% | 95.40% |
| IDEA | 0.03% | 0.10% | 100.00% | 100.00% | 100.00% | 100.00% | 100.00% | 96.63% | 97.19% |
| RCOM-GSM | 0.09% | 0.09% | 100.00% | 100.00% | 100.00% | 100.00% | 99.84% | 99.31% | 93.27% |
| VODAFONE | 0.04% | 0.10% | 100.00% | 100.00% | 100.00% | 100.00% | 100.00% | 100.00% | 99.58% |

| Name of Service Provider | Customer Care & Grievances Redressal | |
|---|---|---|
| | % of Complaints addressed at call center level | % of Complaints addressed by Appellate Authority |
| AIRCEL | 99.82% | NIL |
| AIRTEL | 100.00% | 100.00% |
| BSNL | 98.63% | NIL |
| IDEA | 24.09% | NIL |
| RCOM-GSM | 100.00% | 100.00% |
| VODAFONE | 100.00% | NIL |

## 7.2. LIVE CALLING DATA: CONSOLIDATED

| Name of Service Provider | Metering and Billing (Service Request) | | | | Response time to customer for Assistanse | |
|---|---|---|---|---|---|---|
| | Total Calls Attempted | No. of Subscribers reached | Compalints/ 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 | 60 | 60 | 100 | 98% | 96% |
| **AIRTEL** | 110 | 6 | 6 | 100 | 100% | 100% |
| **BSNL** | 167 | 58 | 55 | 94.83 | 100% | 100% |
| **IDEA** | 100 | 100 | 96 | 96 | 100% | 100% |
| **RCOM-GSM** | 260 | 192 | 183 | 95.31 | 100% | 96% |
| **VODAFONE** | 229 | 163 | 163 | 100 | 100% | 96% |

## 7.3. 3 DAYS LIVE CALL CENTRE DATA

| Response time to customer assistance | | | | | | |
|---|---|---|---|---|---|---|
| OPERATOR | Total no of calls attempted to customer care/Call center | 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 |
| | AVERAGE | | | | | |
| OPERATOR | | | >=95% | | | >=95% |
| AIRCEL | 694187 | 659013 | 94.93% | 63589 | 61479 | 96.68% |
| AIRTEL | 47760 | 47760 | 100.00% | 84280 | 62638 | 74.32% |
| BSNL | 5692 | 5692 | 100.00% | 741 | 741 | 100.00% |
| IDEA | 34603 | 33341 | 96.35% | 28774 | 22097 | 76.80% |
| RCOM-GSM | 80064 | 79132 | 98.84% | 14512 | 14230 | 98.06% |
| VODAFONE | 76459 | 76459 | 100.00% | 23552 | 23041 | 97.83% |

# 8. L1 CALLING DATA

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

- Rajouri: 29th Feb to 2nd March 2016

## 8.1. RAJOURI

### 8.1.1. AIRCEL

| | | AIRCEL | | | |
|---|---|---|---|---|---|
| SR. N. | EMERGENCY NUMBER | CALLS MADE | Kalkote | Rajouri | Poonch |
| 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. AIRTEL

| | AIRTEL | | | | |
|---|---|---|---|---|---|
| SR. N. | EMERGENCY NUMBER | Kalkote | Rajouri | Poonch | Nowshera |
| 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 | √ | √ | √ | √ |

## 8.1.3. BSNL

| | BSNL | | | |
|---|---|---|---|---|
| **SR. N.** | **EMERGENCY NUMBER** | **Kalkote** | **Rajouri** | **Poonch** |
| 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 | - | - | - |

## 8.1.4. IDEA

| | IDEA | | | | |
|---|---|---|---|---|---|
| SR. N. | EMERGENCY NUMBER | Kalkote | Rajouri | Poonch | Nowshera |
| 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 | √ | √ | √ | √ |

## 8.1.5. RCOM

| | RCOM | | | | |
|---|---|---|---|---|---|
| SR. N. | EMERGENCY NUMBER | Kalkote | Rajouri | Poonch | Nowshera |
| 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 | √ | √ | √ | √ |

## 8.1.6. VODAFONE

| | VODAFONE | | | |
|---|---|---|---|---|
| SR. N. | EMERGENCY NUMBER | Kalkote | Rajouri | Nowshera |
| 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 | × | × | × |

## 9. Operator Assisted Drive Test

The drive test was conducted simultaneously for all the operators present in the Jammu & Kashmir circle. As per the new directive given by TRAI headquarters, drive test for the month of January, February and March, 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 Jammu & Kashmir circle.

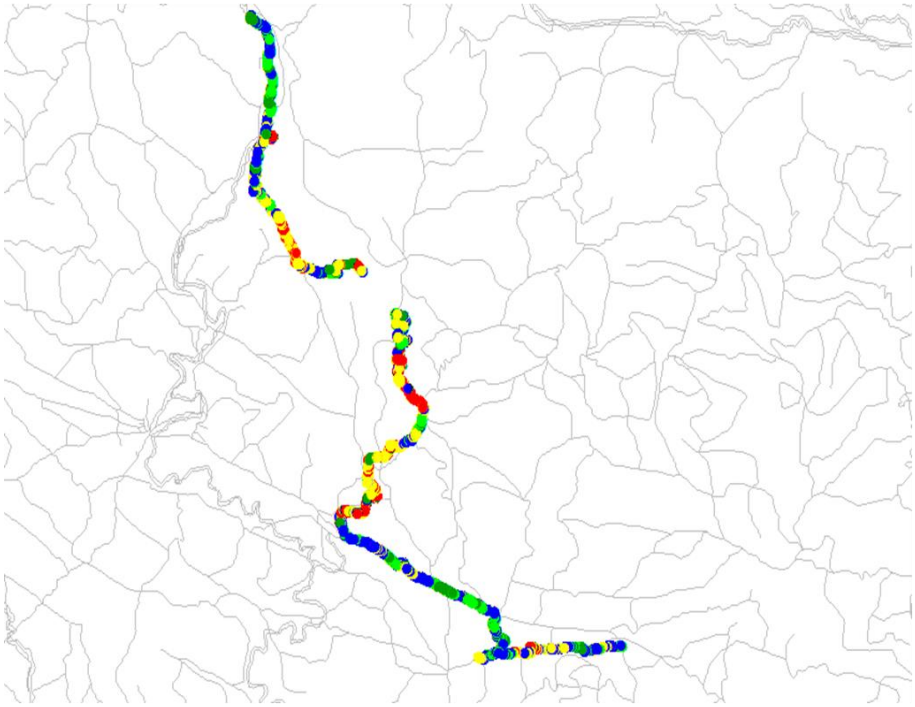
### 9.1. March: Rajouri SSA

| Month | Name of SSA covered | Drive Test Schedule |
|---|---|---|
| March 2016 | Rajouri | February 29, 2016 to March 2, 2016 |

### 9.2. Distance Covered: Rajouri SSA

| Drive Test Distance Covered | Day 1 | Day 2 | Day 3 |
|---|---|---|---|
| **Rajouri SSA** | 103 km | 110 km | 170 km |

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



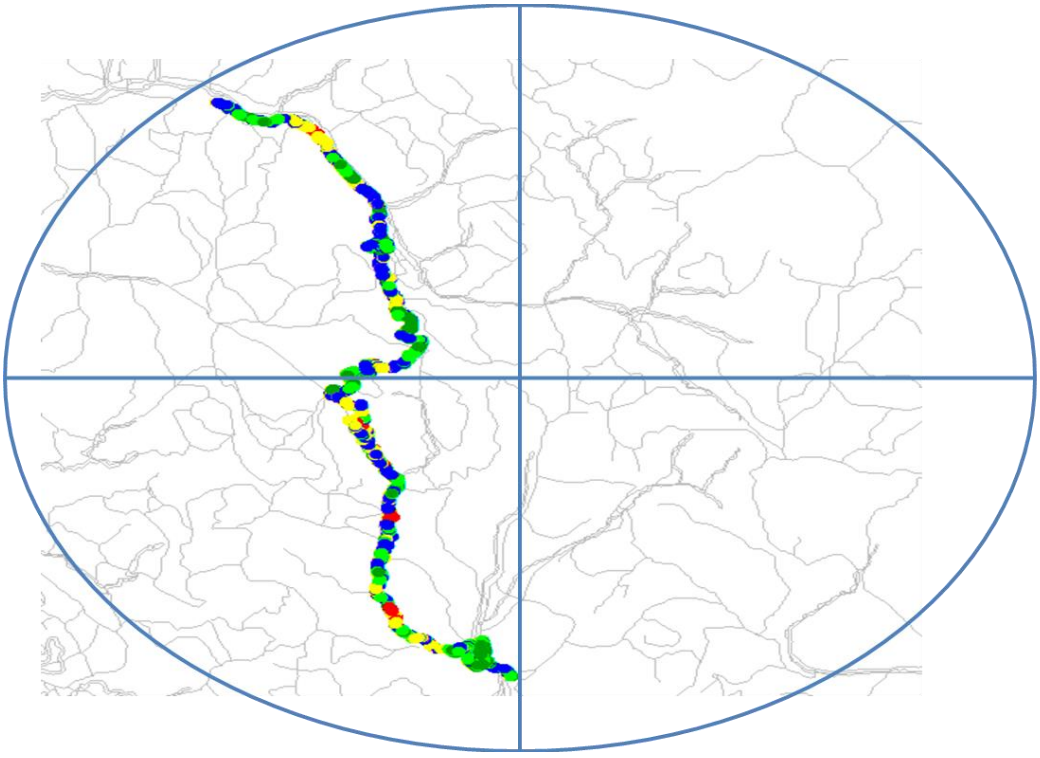
Route Covered- day 1

Major Rd- Sundarbani, Bakhar, Salki, potha, Siot, Dhangri

Highway- Bamla-Sundarbani, Siot-Kalakote

Within City- Sundarbani Bus stand Mkt, Army area, beravin Rd.

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

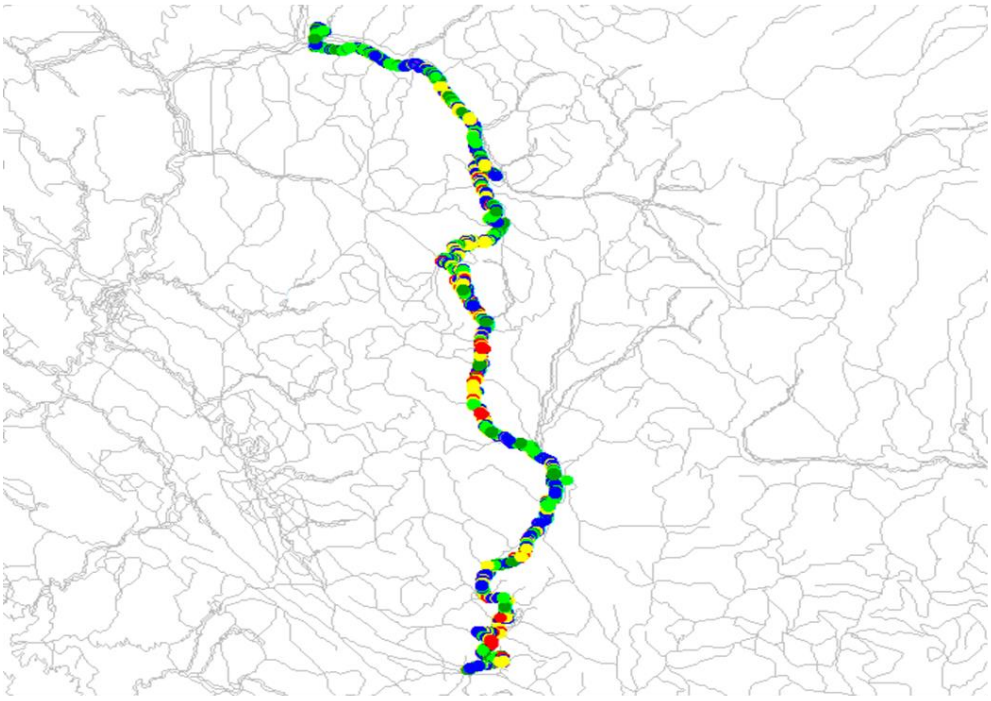


Route Covered- day 2

Within City- Jawahar Ngr, Bus Stand, Gujjar Mandi, Salani Pul, Panja Chownk.

Highway- Gambhir, Rajouri, Galuthi, B.G, Kallar, Manjakot.

## 9.5. Route Map: Rajouri SSA: Day 3



Route Covered- day 3

Within City- Surankot B.D.O, Bus stand, main Bazar, Nowshera Bus Stand, BSNL Exchange, Temple Nowshera

Major Rd- Hospital Rd, Kamsar, Radio Station, Poonch, P.O, Police Station, Jail Road

Highway- Poonch-Nowshera

## 9.6. Drive Test Outcome

| | Aircel | Airtel | BSNL | IDEA | RCOM | Vodafone |
|---|---|---|---|---|---|---|
| **Total Calls Attempt (A)** | 592 | 646 | 494 | 481 | 316 | 365 |
| **Total Calls Blocked (B)** | 2 | 3 | 34 | 0 | 0 | 0 |
| **Blocked Call Rate in % (B*100/A)** | 0.34% | 0.46% | 6.88% | 0.00% | 0.00% | 0.00% |
| **Total Calls Established ('C)** | 590 | 643 | 457 | 481 | 316 | 365 |
| **Total Calls Drop (D)** | 1 | 3 | 7 | 2 | 0 | 1 |
| **Dropped Calls Rate in % (D*100/C)** | 0.17% | 0.47% | 1.53% | 0.42% | 0.00% | 0.27% |
| **Call Setup Success Rate in % (C*100/A)** | 99.66% | 99.54% | 92.51% | 100.00% | 100.00% | 100.00% |
| **Handover Success Rate % (total HO Success * 100/Total HO attempt)** | 99.72% | 99.49% | 97.45% | 100.00% | 99.77% | 99.38% |

## 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))** |

## 10.1. 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** | Above formula with counters being used in CBBH. |

| | | |
|---|---|---|
| | **month*100)/Total no of cells in the licensed service area** | |
| 6 | **Connection with good quality voice= (Connection with good quality voice/Total voice samples)%** | Connection with good quality voice (Connection with good quality voice samples 0-5 /Total voice samples)= 100 * (QUAL50DL + QUAL40DL + QUAL30DL + QUAL20DL + 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 |

## 10.2. 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) |

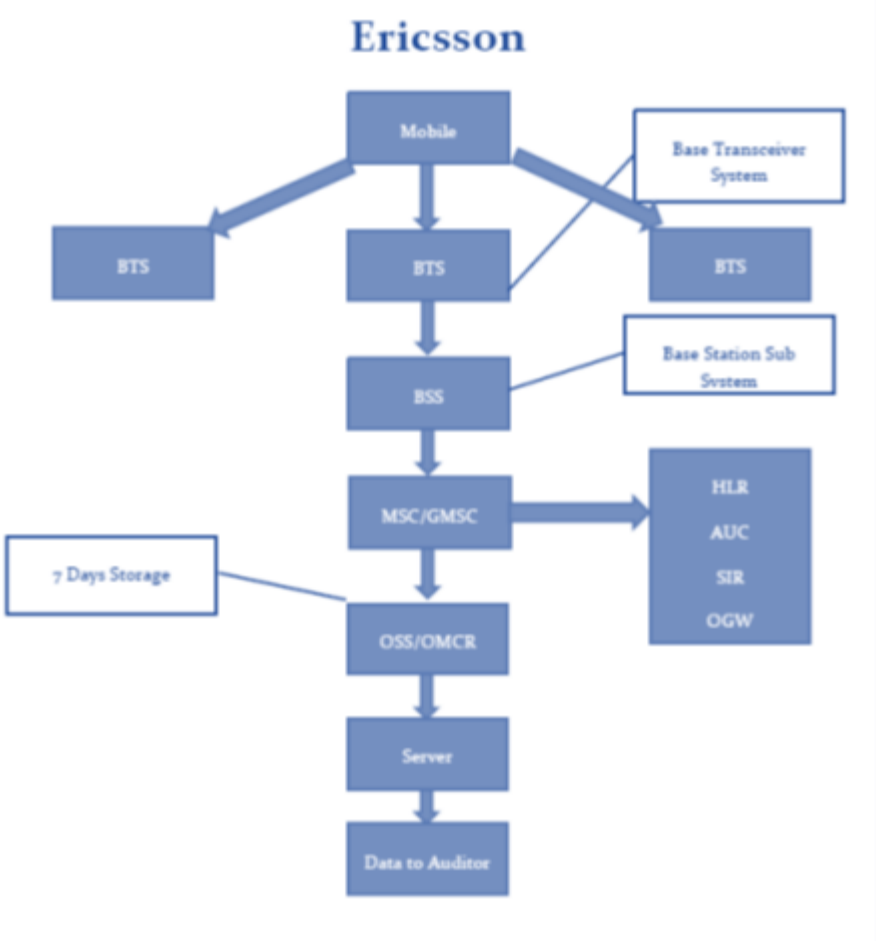
## 10.3. HUAWEI

| SR .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] ) |

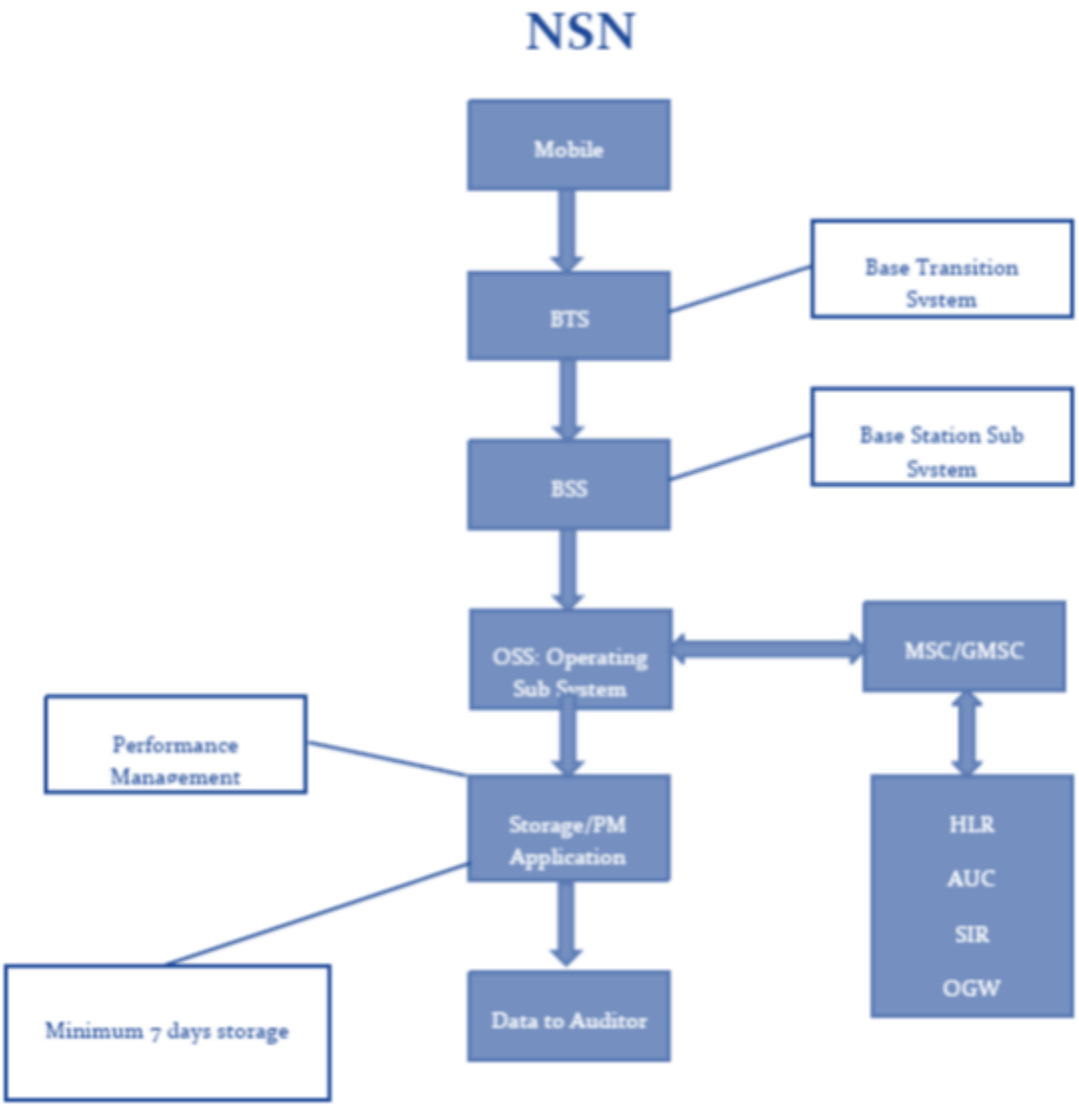
| | | |
|---|---|---|
| 2 | CALL SETUP SUCCES (DEN) | [CS IS-95 Orig Attempts + CS IS-2000 Orig Attempts + CS IS-95 Term Attempts + CS IS-2000 Term Attempts] ([1157628553] + [1157628573] + [1157628554] + [1157628574] ) |
| 3 | CALL SETUP SUCCESS RATE (%) | CALL SETUP SUCCES (NUM) / CALL SETUP SUCCES (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

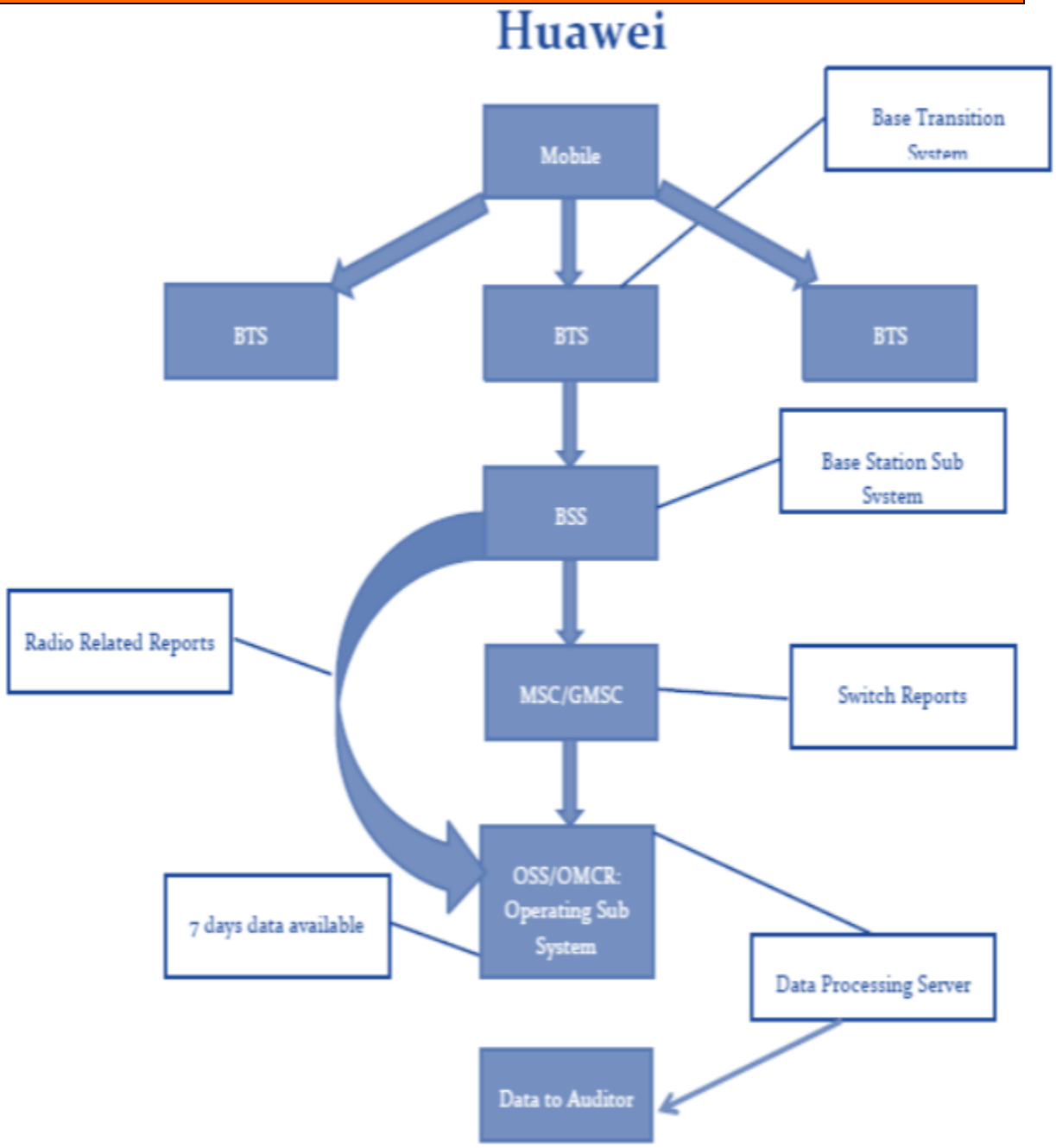
## 11.1. ERICSSON



## 11.2. NSN


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

## 11.3. 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
- PCPL – Phistream Consulting Private Limited
- QoS – Quality of Service
- JFM'16 – Refers to the quarter of January, February and March 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

# 13. ANNEXURE

## 13.1. 2G VOICE PMR DATA: CONSOLIDATED

| Consolidated | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Network Parameters | | Name of Service Provider | | | | | | |
| | | Benchmark | AIRCEL | AIRTEL | BSNL | IDEA | RCOM | VODAFONE |
| Network Availability | Sum of downtime of BTSs in a month in hrs. in the licensed service area | ≤ 2% | 0.73% | 0.12% | 1.83% | 0.35% | 0.06% | 0.27% |
| | No. of BTSs having accumulated downtime of >24 hours in a month | ≤ 2% | 4.18% | 0.12% | 0.80% | 1.64% | 0.08% | 1.21% |
| Connection Establishment (Accessibility) | Call Set-up Success Rate (Within Licensee own network | ≥ 95% | 97.16% | 97.42% | 98.86% | 98.33% | 97.43% | 99.09% |
| | SDDCH/Paging chl. Congestion | ≤ 1% | 0.24% | 0.64% | 0.62% | 0.12% | 0.08% | 0.05% |
| | TCH Congestion | ≤ 2% | 1.97% | 0.55% | 1.12% | 1.26% | 0.29% | 0.91% |
| Connection Maintenance (Retainability) | Call Drop Rate (%age) | ≤ 2% | 1.20% | 1.11% | 0.99% | 1.32% | 0.12% | 0.58% |
| | Worst Affected cell having more than 3% TCH drop | ≤ 3% | 10.87% | 1.45% | 2.56% | 1.74% | 0.41% | 2.73% |
| | %age of connection with good voice quality | ≥ 95% | 95.72% | 97.75% | 96.80% | 96.32% | 98.99% | 98.79% |

- AIRCEL has parameter value of 4.18% and failed to meet the benchmark of ≤ 2% No. of BTSs having accumulated downtime of >24 hours in a month.
- AIRCEL has parameter value of 10.87% and failed to meet the benchmark of ≤ 3% Worst Affected cell having more than 3% TCH drop.

## 13.2. 3G VOICE PMR: CONSOLIDATED

| Mar-16 | | | | | | | |
|---|---|---|---|---|---|---|---|
| Network Parameters | | Name of Service Provider | | | | | |
| | | Benchmark | AIRCEL | AIRTEL | BSNL | IDEA | RCOM |
| Network Availability | Sum of downtime of BTSs in a month in hrs. in the licensed service area | ≤ 2% | 0.86% | 0.23% | 1.68% | 0.31% | 0.84% |
| | No. of BTSs having accumulated downtime of >24 hours in a month | ≤ 2% | 5.37% | 0.17% | 0.77% | 1.53% | 1.53% |
| Connection Establishment (Accessibility) | Call Set-up Success Rate (Within Licensee own network | ≥ 95% | 95.42% | 98.83% | 96.83% | 99.48% | 96.16% |
| | RRC Congestion: | ≤ 1% | 0.96% | 0.72% | 0.72% | 0.45% | 0.14% |
| | RAB Congestion: | ≤ 2% | 0.39% | 0.02% | 0.92% | 0.17% | 0.21% |
| Connection Maintenance (Retainability) | Circuit Switched Voice Drop Rate | ≤ 2% | 2.61% | 0.61% | 1.09% | 1.56% | 0.13% |
| | Worst affected cells having more than 3% Circuit Switched Voice Drop Rate: | ≤ 3% | 26.17% | 1.11% | 2.98% | 1.99% | 0.55% |
| | Percentage of connections with Good Circuit Switched Voice Quality | ≥ 95% | 97.84% | 99.04% | 95.94% | 97.71% | 99.64% |

- AIRCEL has parameter value of 5.37% and failed to meet the benchmark of ≤ 2% No. of BTSs having accumulated downtime of >24 hours in a month
- AIRCEL has parameter value of 2.61% and failed to meet the benchmark of ≤ 2% Circuit Switched Voice Drop Rate.
- AIRCEL has parameter value of 26.17% and failed to meet the benchmark of ≤ 3% Worst affected cells having more than 3% Circuit Switched Voice Drop Rate.

## 13.3. BILLING AND CUSTOMER CARE

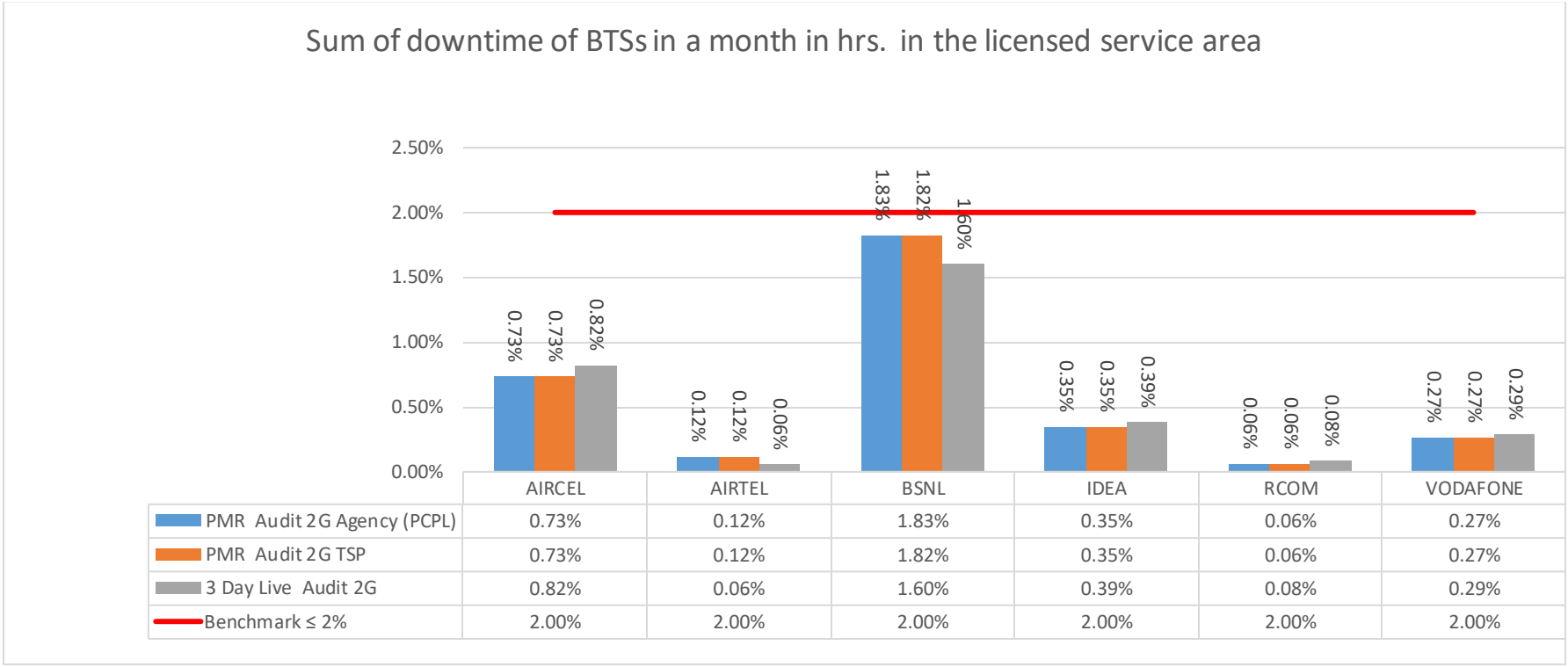
| Name of Service Provider | Metering and Billing credibility | | Billing Complaints | | | Termination & Closures | Time taken for refund of deposits after closures: Benchmark | Response time to customer for assistance | | Customer Care & Grievances Redressal | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | 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 | % of Complaints addressed at call center level | % of Complaints addressed by Appellate Authority |
| 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% | 54.92% | 97.32% | 93.58% | 99.82% | NIL |
| AIRTEL | 0.02% | 0.00% | 100.00% | 100.00% | 100.00% | 100.00% | 100.00% | 93.67% | 64.31% | 100.00% | 100.00% |
| BSNL | 0.02% | 0.01% | 100.00% | 100.00% | 100.00% | 100.00% | 100.00% | 100.00% | 95.40% | 98.63% | NIL |
| IDEA | 0.03% | 0.10% | 100.00% | 100.00% | 100.00% | 100.00% | 100.00% | 96.63% | 97.19% | 24.09% | NIL |
| RCOM-GSM | 0.09% | 0.09% | 100.00% | 100.00% | 100.00% | 100.00% | 99.84% | 99.31% | 93.27% | 100.00% | 100.00% |
| VODAFONE | 0.04% | 0.10% | 100.00% | 100.00% | 100.00% | 100.00% | 100.00% | 100.00% | 99.58% | 100.00% | NIL |

- AIRCEL has parameter value of 54.92% and failed to meet the benchmark of =100% Time taken for refund of deposits after closures cleared over a period of <60 days.
- AIRCEL has parameter value of 93.58% and failed to meet the benchmark of ≥95% Response time to customer for assistance %age of call answered by the operators (voice to voice) within 90 second.
- AIRTEL has parameter value of 93.67% and failed to meet the benchmark of ≥95% Response time to customer for assistance %age of call answered by the IVR.
- AIRTEL has parameter value of 64.31% and failed to meet the benchmark of ≥95% Response time to customer for assistance %age of call answered by the operators (voice to voice) within 90 second.
- RCOM GSM has parameter value of 99.84% and failed to meet the benchmark of ≥95% Time taken for refund of deposits after closures cleared over a period of <60 days.
- RCOM GSM has parameter value of 93.27% and failed to meet the benchmark of ≥95% Response time to customer for assistance %age of call answered by the operators (voice to voice) within 90 second.

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

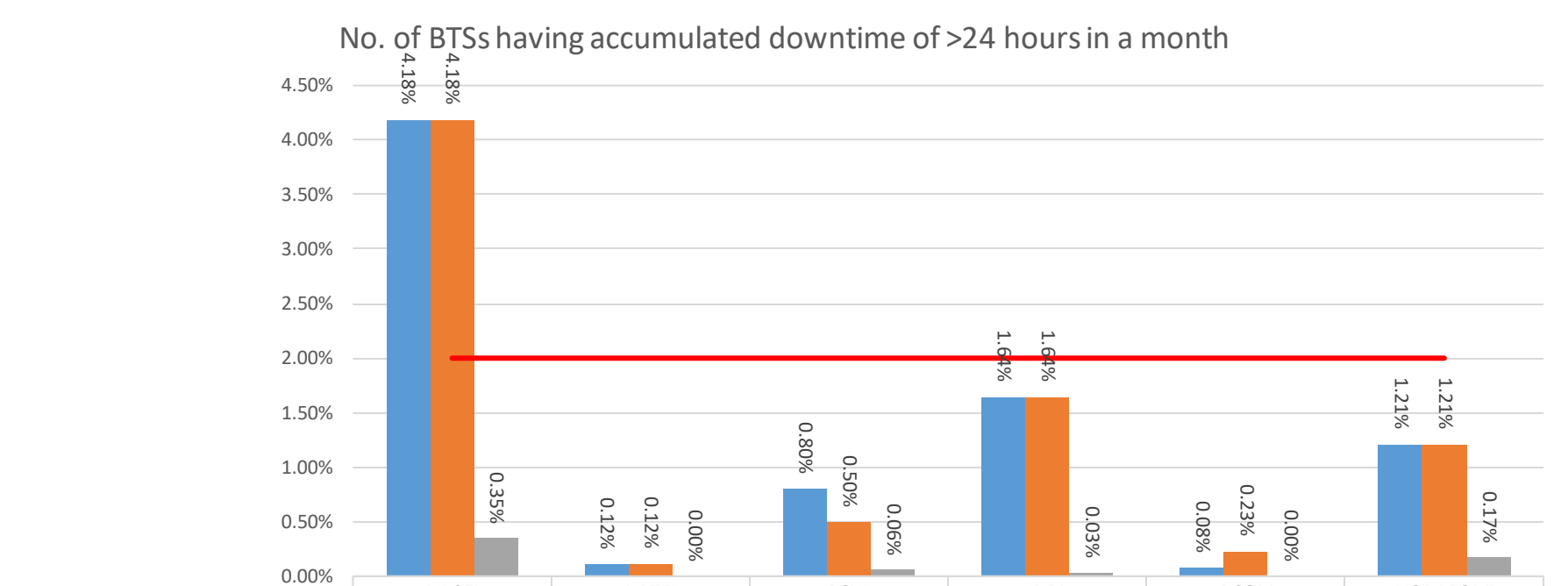
| 2G - PMR Report Comparison between Audit Agency and TSP | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Network Parameters | | Name of Service Provider | | | | | | | |
| | | Benchmark | | AIRCEL | AIRTEL | BSNL | IDEA | RCOM | VODAFONE |
| Network Availability | Sum of downtime of BTSs in a month in hrs. in the licensed service area | ≤ 2% | Agency | 0.73% | 0.12% | 1.83% | 0.35% | 0.06% | 0.27% |
| | | | TSP | 0.73% | 0.12% | 1.82% | 0.35% | 0.06% | 0.27% |
| | No. of BTSs having accumulated downtime of >24 hours in a month | ≤ 2% | Agency | 4.18% | 0.12% | 0.80% | 1.64% | 0.08% | 1.21% |
| | | | TSP | 4.18% | 0.12% | 0.50% | 1.64% | 0.23% | 1.21% |
| Connection Establishment (Accessibility) | Call Set-up Success Rate (Within Licensee own network | ≥ 95% | Agency | 97.16% | 97.42% | 98.86% | 98.33% | 97.43% | 99.09% |
| | | | TSP | 97.16% | 97.29% | 98.86% | 98.33% | 96.96% | 99.09% |
| | SDDCH/Paging chl. Congestion | ≤ 1% | Agency | 0.24% | 0.64% | 0.62% | 0.12% | 0.08% | 0.05% |
| | | | TSP | 0.24% | 0.63% | 0.62% | 0.12% | 0.09% | 0.05% |
| | TCH Congestion | ≤ 2% | Agency | 1.97% | 0.55% | 1.12% | 1.26% | 0.29% | 0.91% |
| | | | TSP | 1.97% | 0.58% | 1.12% | 1.26% | 0.31% | 0.91% |
| Connection Maintenance (Retainability) | Call Drop Rate (%age) | ≤ 2% | Agency | 1.20% | 1.11% | 0.99% | 1.32% | 0.12% | 0.58% |
| | | | TSP | 1.20% | 1.10% | 0.99% | 1.32% | 0.13% | 0.59% |
| | Worst Affected cell having more than 3% TCH drop | ≤ 3% | Agency | 10.87% | 1.45% | 2.56% | 1.74% | 0.41% | 2.73% |
| | | | TSP | 10.87% | 1.82% | 2.56% | 1.74% | 0.43% | 2.74% |
| | %age of connection with good voice quality | ≥ 95% | Agency | 95.72% | 97.75% | 96.80% | 96.32% | 98.99% | 98.79% |
| | | | TSP | 95.72% | 97.78% | 96.80% | 96.32% | 98.94% | 98.79% |

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



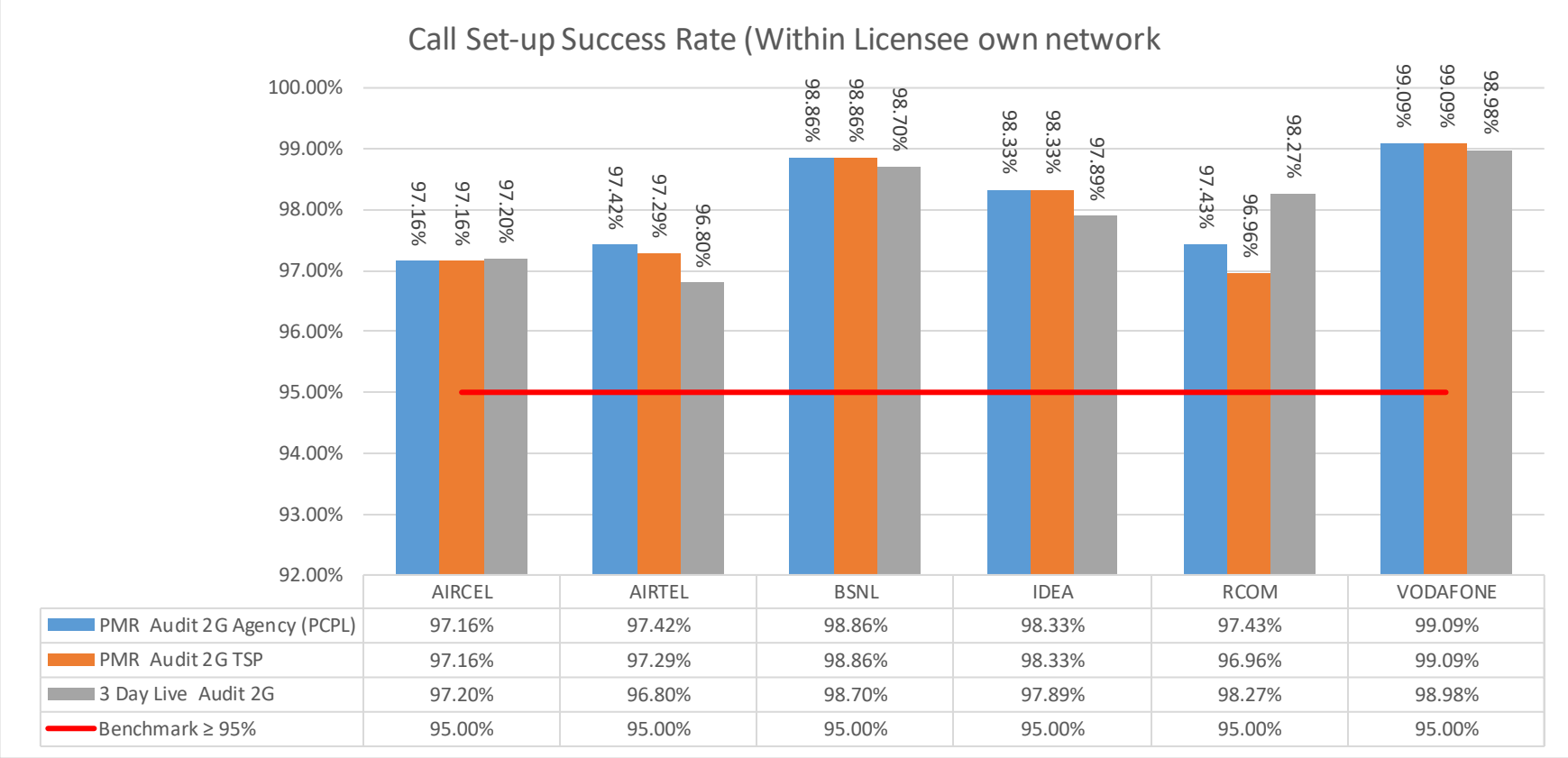

| | AIRCEL | AIRTEL | BSNL | IDEA | RCOM | VODAFONE |
|---|---|---|---|---|---|---|
| PMR Audit 2G Agency (PCPL) | 0.73% | 0.12% | 1.83% | 0.35% | 0.06% | 0.27% |
| PMR Audit 2G TSP | 0.73% | 0.12% | 1.82% | 0.35% | 0.06% | 0.27% |
| 3 Day Live Audit 2G | 0.82% | 0.06% | 1.60% | 0.39% | 0.08% | 0.29% |
| Benchmark ≤ 2% | 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



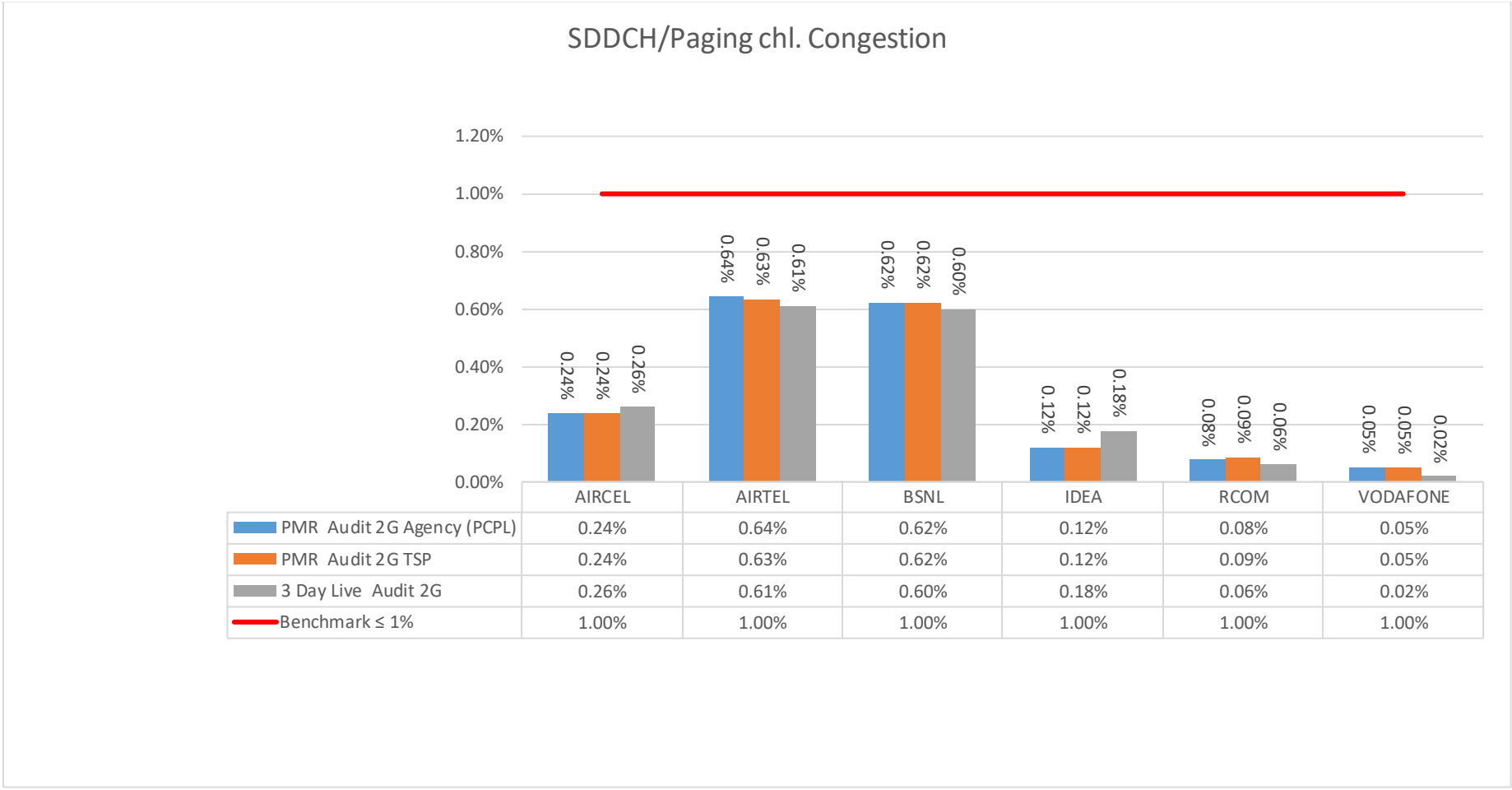

| | AIRCEL | AIRTEL | BSNL | IDEA | RCOM | VODAFONE |
|---|---|---|---|---|---|---|
| PMR Audit 2G Agency (PCPL) | 4.18% | 0.12% | 0.80% | 1.64% | 0.08% | 1.21% |
| PMR Audit 2G TSP | 4.18% | 0.12% | 0.50% | 1.64% | 0.23% | 1.21% |
| 3 Day Live Audit 2G | 0.35% | 0.00% | 0.06% | 0.03% | 0.00% | 0.17% |
| Benchmark ≤ 2% | 2.00% | 2.00% | 2.00% | 2.00% | 2.00% | 2.00% |

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



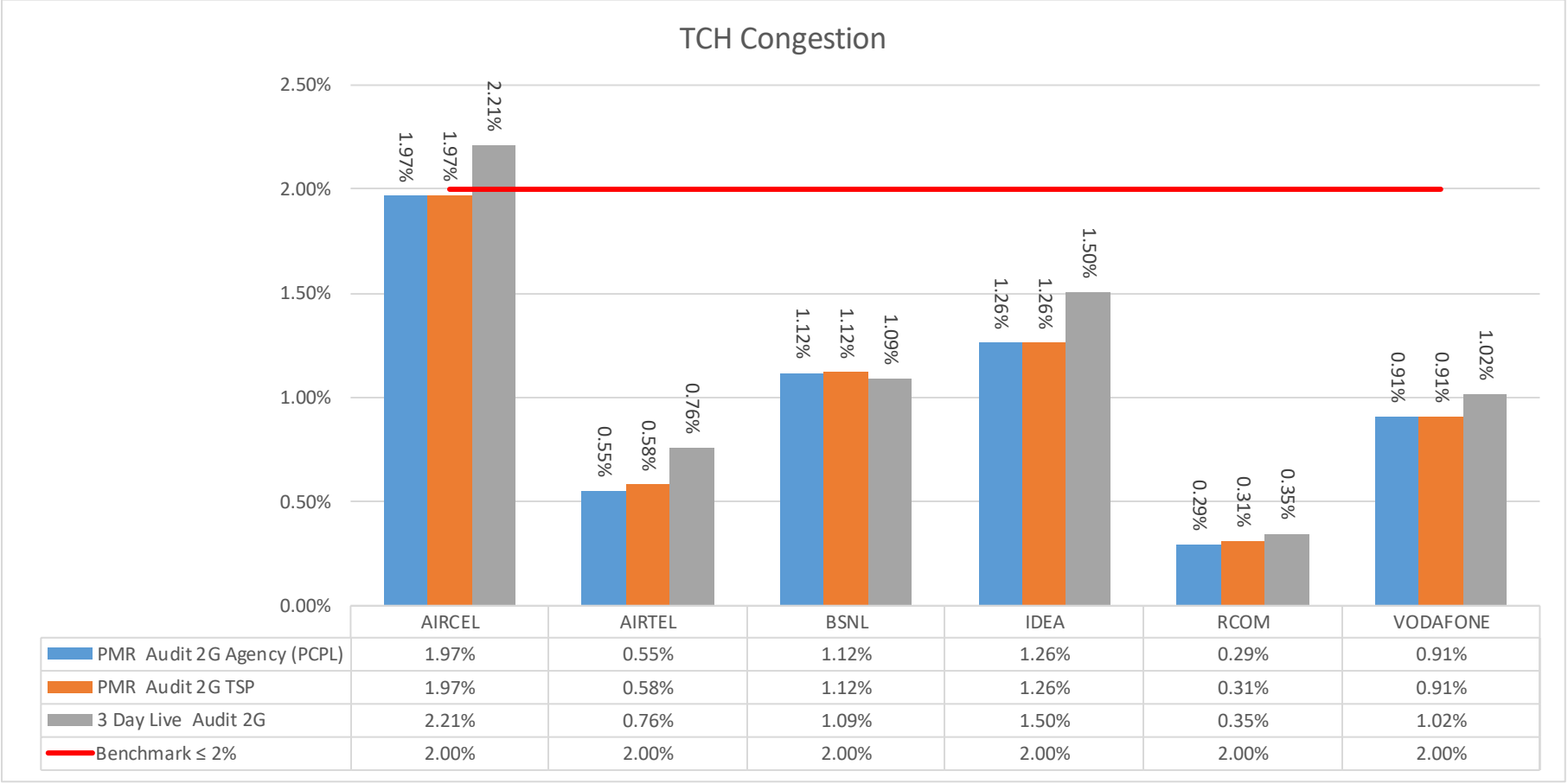

| | AIRCEL | AIRTEL | BSNL | IDEA | RCOM | VODAFONE |
|---|---|---|---|---|---|---|
| PMR Audit 2G Agency (PCPL) | 97.16% | 97.42% | 98.86% | 98.33% | 97.43% | 99.09% |
| PMR Audit 2G TSP | 97.16% | 97.29% | 98.86% | 98.33% | 96.96% | 99.09% |
| 3 Day Live Audit 2G | 97.20% | 96.80% | 98.70% | 97.89% | 98.27% | 98.98% |
| Benchmark ≥ 95% | 95.00% | 95.00% | 95.00% | 95.00% | 95.00% | 95.00% |

## 13.4.4. SDDCH/PAGING CHL. CONGESTION



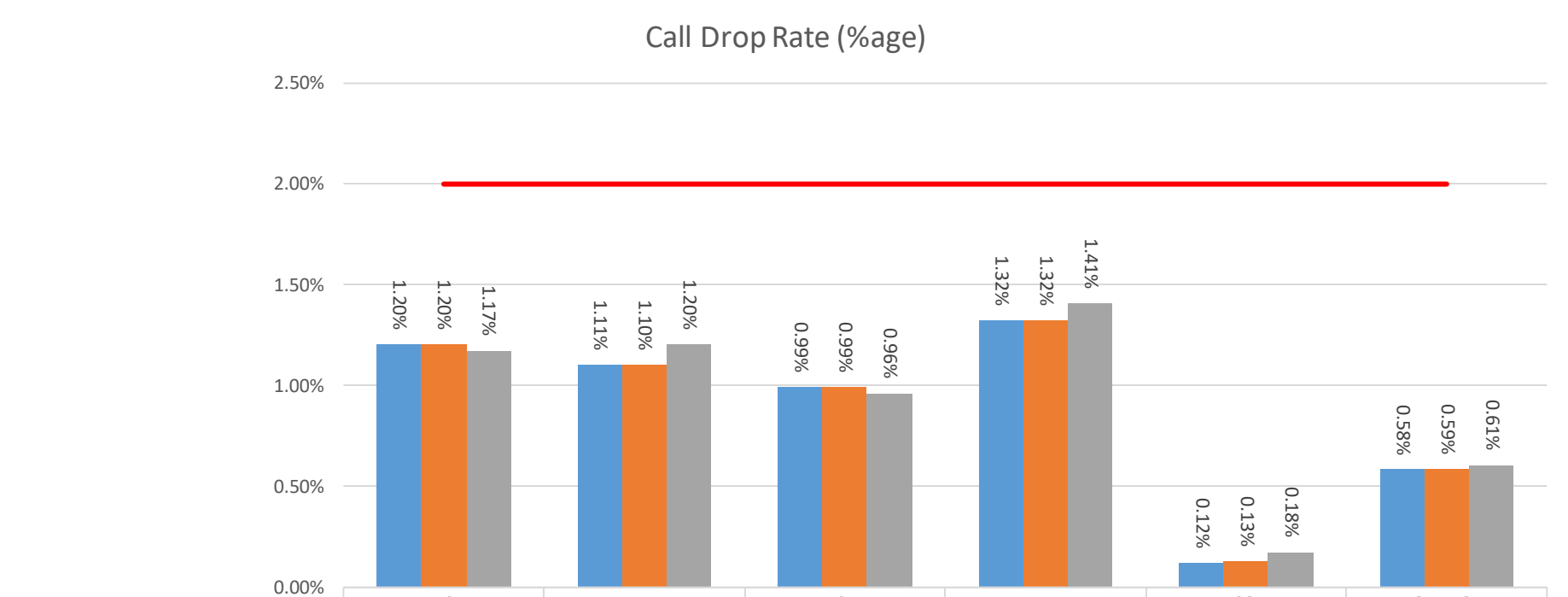

| | AIRCEL | AIRTEL | BSNL | IDEA | RCOM | VODAFONE |
|---|---|---|---|---|---|---|
| PMR Audit 2G Agency (PCPL) | 0.24% | 0.64% | 0.62% | 0.12% | 0.08% | 0.05% |
| PMR Audit 2G TSP | 0.24% | 0.63% | 0.62% | 0.12% | 0.09% | 0.05% |
| 3 Day Live Audit 2G | 0.26% | 0.61% | 0.60% | 0.18% | 0.06% | 0.02% |
| Benchmark ≤ 1% | 1.00% | 1.00% | 1.00% | 1.00% | 1.00% | 1.00% |

## 13.4.5. TCH CONGESTION



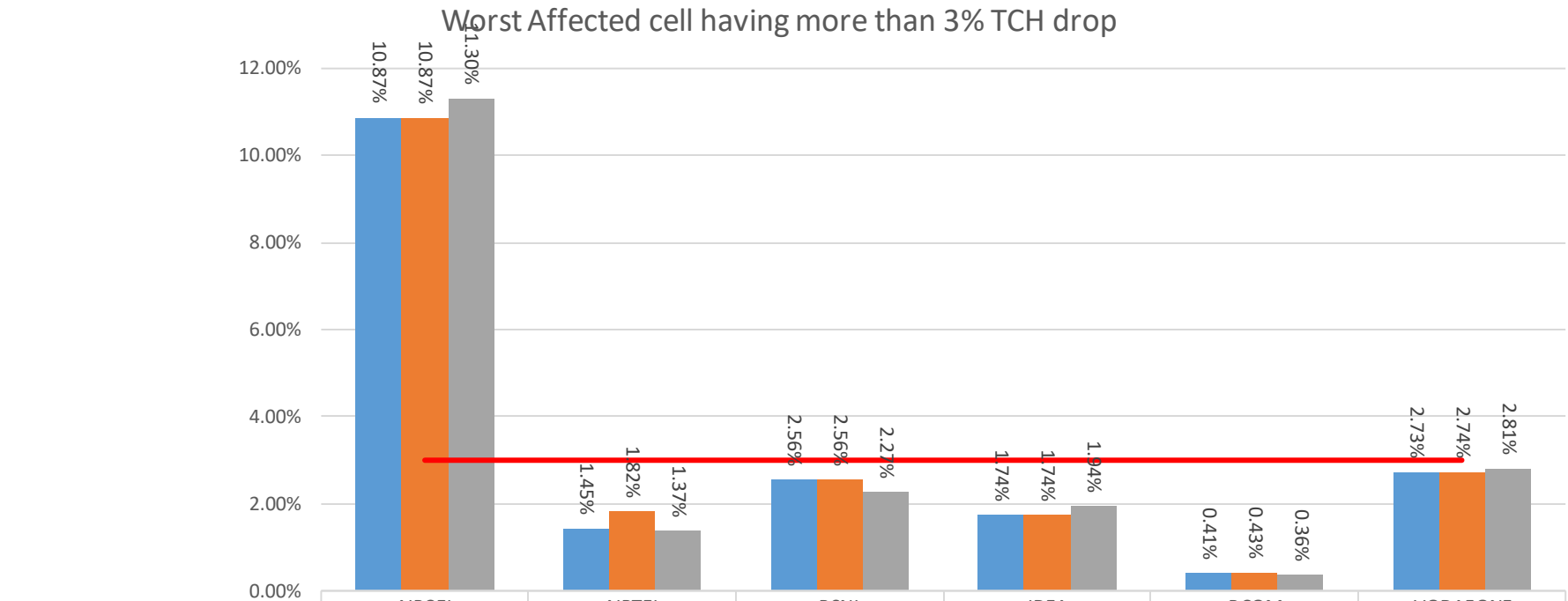

| | AIRCEL | AIRTEL | BSNL | IDEA | RCOM | VODAFONE |
|---|---|---|---|---|---|---|
| PMR Audit 2G Agency (PCPL) | 1.97% | 0.55% | 1.12% | 1.26% | 0.29% | 0.91% |
| PMR Audit 2G TSP | 1.97% | 0.58% | 1.12% | 1.26% | 0.31% | 0.91% |
| 3 Day Live Audit 2G | 2.21% | 0.76% | 1.09% | 1.50% | 0.35% | 1.02% |
| Benchmark ≤ 2% | 2.00% | 2.00% | 2.00% | 2.00% | 2.00% | 2.00% |

## 13.4.6. CALL DROP RATE (%AGE)




| | AIRCEL | AIRTEL | BSNL | IDEA | RCOM | VODAFONE |
|---|---|---|---|---|---|---|
| PMR Audit 2G Agency (PCPL) | 1.20% | 1.11% | 0.99% | 1.32% | 0.12% | 0.58% |
| PMR Audit 2G TSP | 1.20% | 1.10% | 0.99% | 1.32% | 0.13% | 0.59% |
| 3 Day Live Audit 2G | 1.17% | 1.20% | 0.96% | 1.41% | 0.18% | 0.61% |
| Benchmark ≤ 2% | 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 | RCOM | VODAFONE |
|---|---|---|---|---|---|---|
| PMR Audit 2G Agency (PCPL) | 10.87% | 1.45% | 2.56% | 1.74% | 0.41% | 2.73% |
| PMR Audit 2G TSP | 10.87% | 1.82% | 2.56% | 1.74% | 0.43% | 2.74% |
| 3 Day Live Audit 2G | 11.30% | 1.37% | 2.27% | 1.94% | 0.36% | 2.81% |
| Benchmark ≤ 3% | 3.00% | 3.00% | 3.00% | 3.00% | 3.00% | 3.00% |

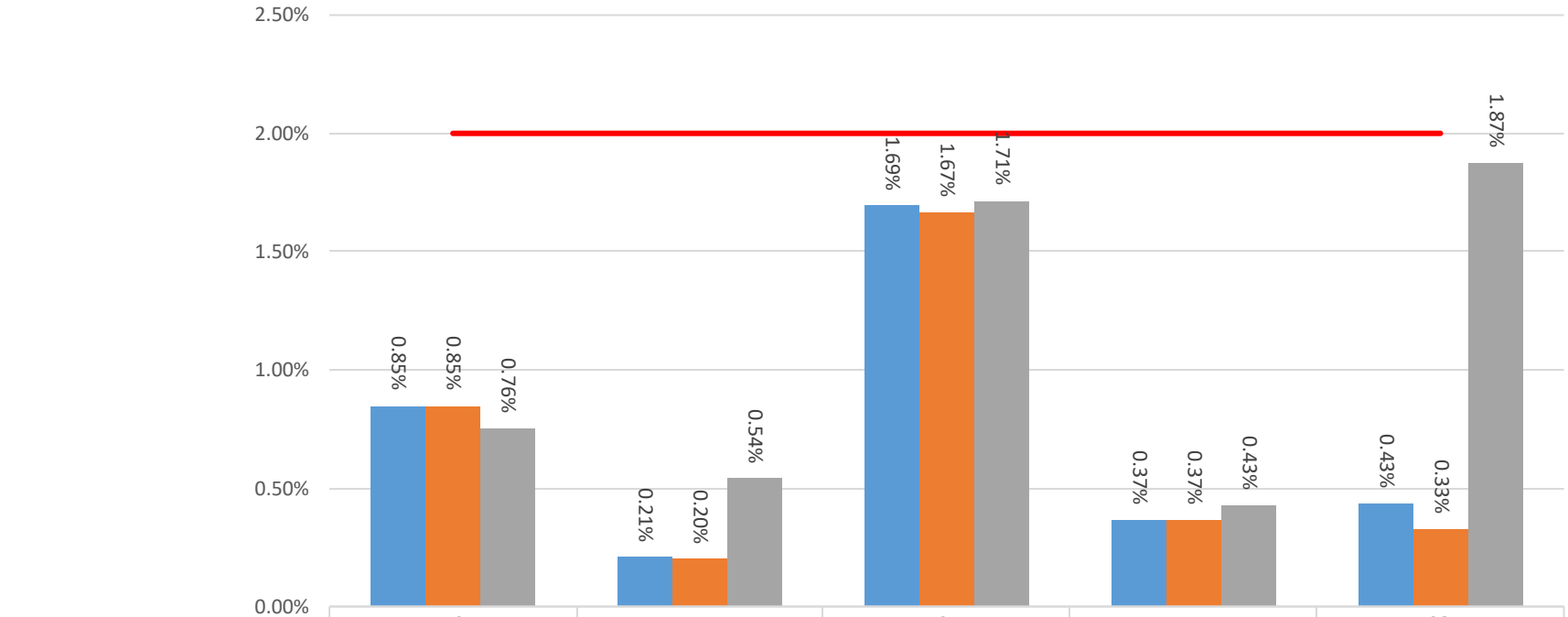
## 13.4.8. %AGE OF CONNECTION WITH GOOD VOICE QUALITY


| | AIRCEL | AIRTEL | BSNL | IDEA | RCOM | VODAFONE |
|---|---|---|---|---|---|---|
| PMR Audit 2G Agency (PCPL) | 95.72% | 97.75% | 96.80% | 96.32% | 98.99% | 98.79% |
| PMR Audit 2G TSP | 95.72% | 97.78% | 96.80% | 96.32% | 98.94% | 98.79% |
| 3 Day Live Audit 2G | 95.54% | 97.75% | 96.30% | 96.53% | 99.18% | 98.79% |
| Benchmark ≥ 95% | 95.00% | 95.00% | 95.00% | 95.00% | 95.00% | 95.00% |

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

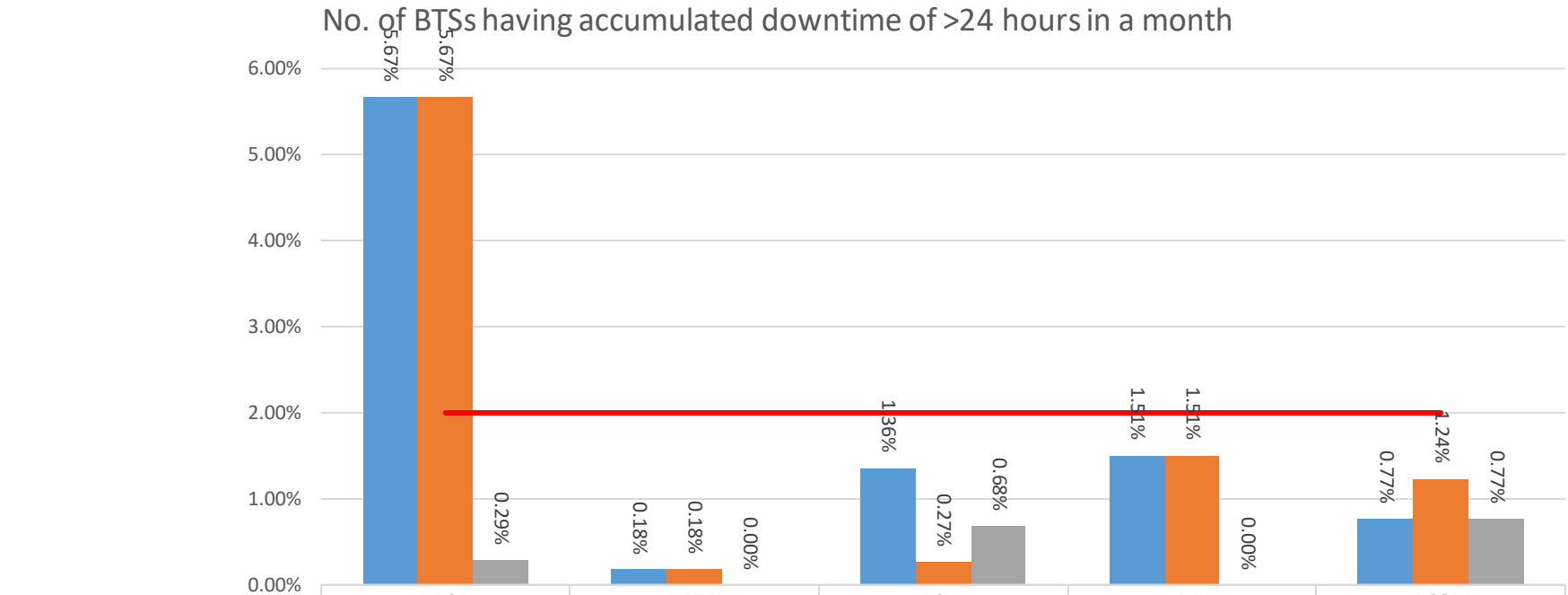
| 3G - PMR Report Comparison between Audit Agency and TSP | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Network Parameters | | Name of Service Provider | | | | | | |
| | | Benchmark | | AIRCEL | AIRTEL | BSNL | IDEA | RCOM |
| Network Availability | Sum of downtime of BTSs in a month in hrs. in the licensed service area | ≤ 2% | Agency | 0.85% | 0.21% | 1.69% | 0.37% | 0.43% |
| | | | TSP | 0.85% | 0.20% | 1.67% | 0.37% | 0.33% |
| | No. of BTSs having accumulated downtime of >24 hours in a month | ≤ 2% | Agency | 5.67% | 0.18% | 1.36% | 1.51% | 0.77% |
| | | | TSP | 5.67% | 0.18% | 0.27% | 1.51% | 1.24% |
| Connection Establishment (Accessibility) | Call Set-up Success Rate (Within Licensee own network | ≥ 95% | Agency | 96.88% | 98.52% | 96.57% | 99.48% | 97.03% |
| | | | TSP | 96.85% | 98.41% | 96.67% | 99.48% | 97.10% |
| | RRC Congestion: | ≤ 1% | Agency | 0.50% | 0.30% | 0.78% | 0.29% | 0.18% |
| | | | TSP | 0.50% | 0.09% | 0.73% | 0.29% | 0.14% |
| | RAB Congestion: | ≤ 2% | Agency | 0.17% | 0.03% | 1.34% | 0.13% | 0.44% |
| | | | TSP | 0.17% | 0.04% | 1.33% | 0.13% | 0.41% |
| Connection Maintenance (Retainability) | Circuit Switched Voice Drop Rate | ≤ 2% | Agency | 2.35% | 0.64% | 0.79% | 1.46% | 0.43% |
| | | | TSP | 2.35% | 0.65% | 0.73% | 1.46% | 0.53% |
| | Worst affected cells having more than 3% Circuit Switched Voice Drop Rate: | ≤ 3% | Agency | 23.60% | 1.21% | 2.75% | 1.92% | 1.32% |
| | | | TSP | 23.60% | 1.25% | 2.70% | 1.92% | 1.52% |
| | Percentage of connections with Good Circuit Switched Voice Quality | ≥ 95% | Agency | 97.94% | 99.03% | 95.94% | 97.76% | 99.69% |
| | | | TSP | 97.95% | 99.03% | 96.63% | 97.84% | 99.66% |

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



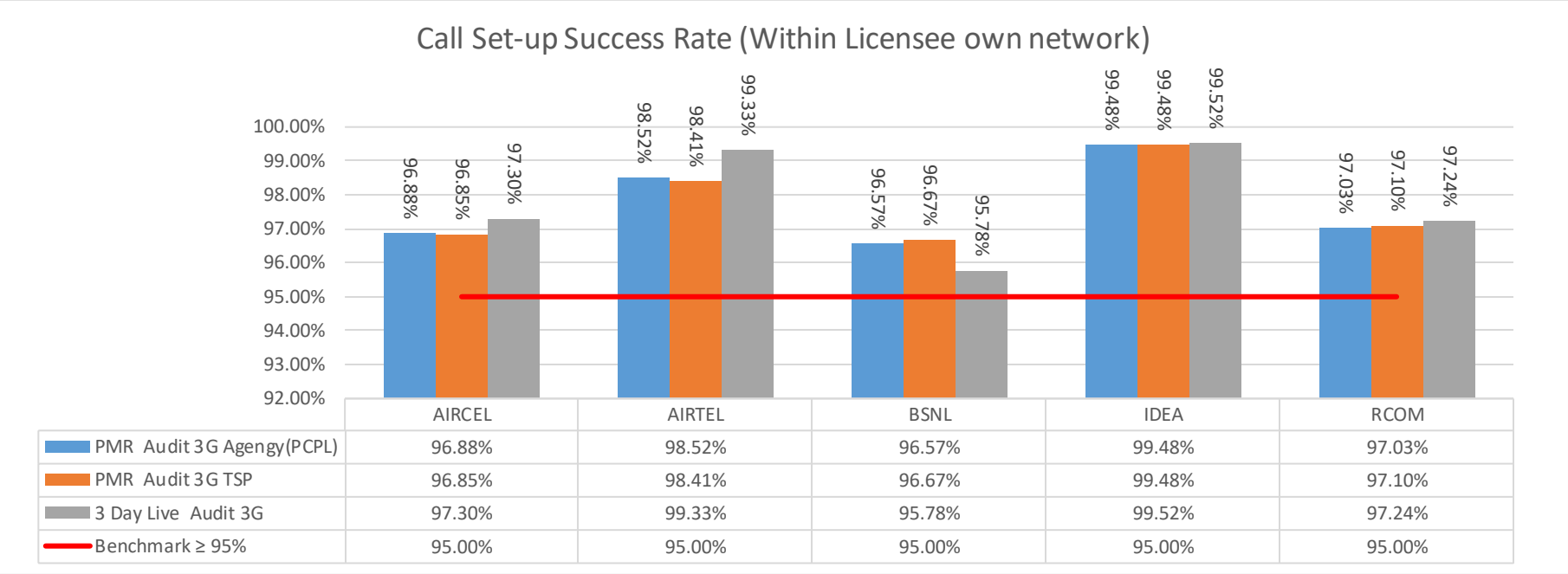

| | AIRCEL | AIRTEL | BSNL | IDEA | RCOM |
|---|---|---|---|---|---|
| PMR Audit 3G Agengy(PCPL) | 0.85% | 0.21% | 1.69% | 0.37% | 0.43% |
| PMR Audit 3G TSP | 0.85% | 0.20% | 1.67% | 0.37% | 0.33% |
| 3 Day Live Audit 3G | 0.76% | 0.54% | 1.71% | 0.43% | 1.87% |
| Benchmark ≤ 2% | 2.00% | 2.00% | 2.00% | 2.00% | 2.00% |

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



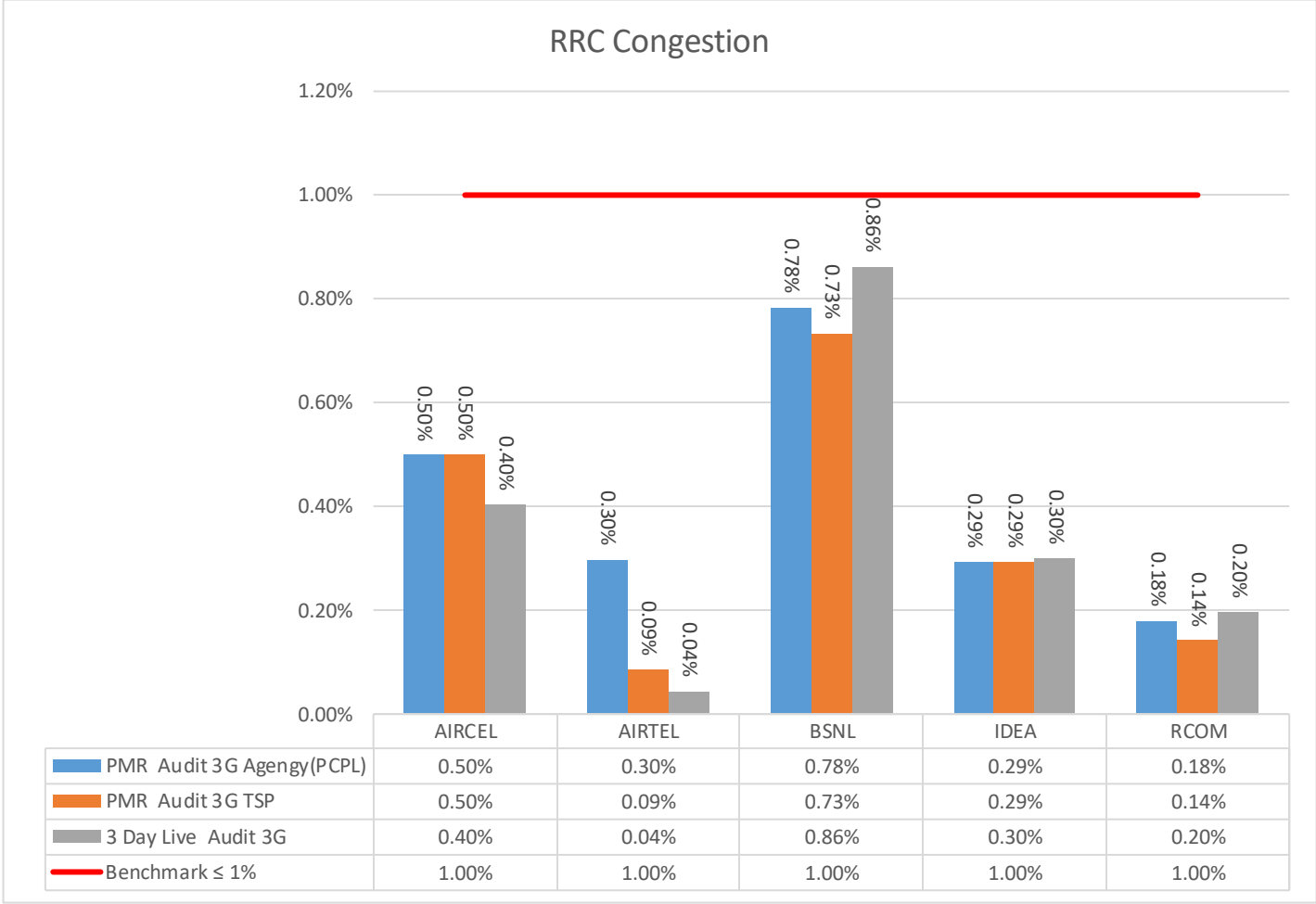

| | AIRCEL | AIRTEL | BSNL | IDEA | RCOM |
|---|---|---|---|---|---|
| PMR Audit 3G Agengy(PCPL) | 5.67% | 0.18% | 1.36% | 1.51% | 0.77% |
| PMR Audit 3G TSP | 5.67% | 0.18% | 0.27% | 1.51% | 1.24% |
| 3 Day Live Audit 3G | 0.29% | 0.00% | 0.68% | 0.00% | 0.77% |
| Benchmark ≤ 2% | 2.00% | 2.00% | 2.00% | 2.00% | 2.00% |

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



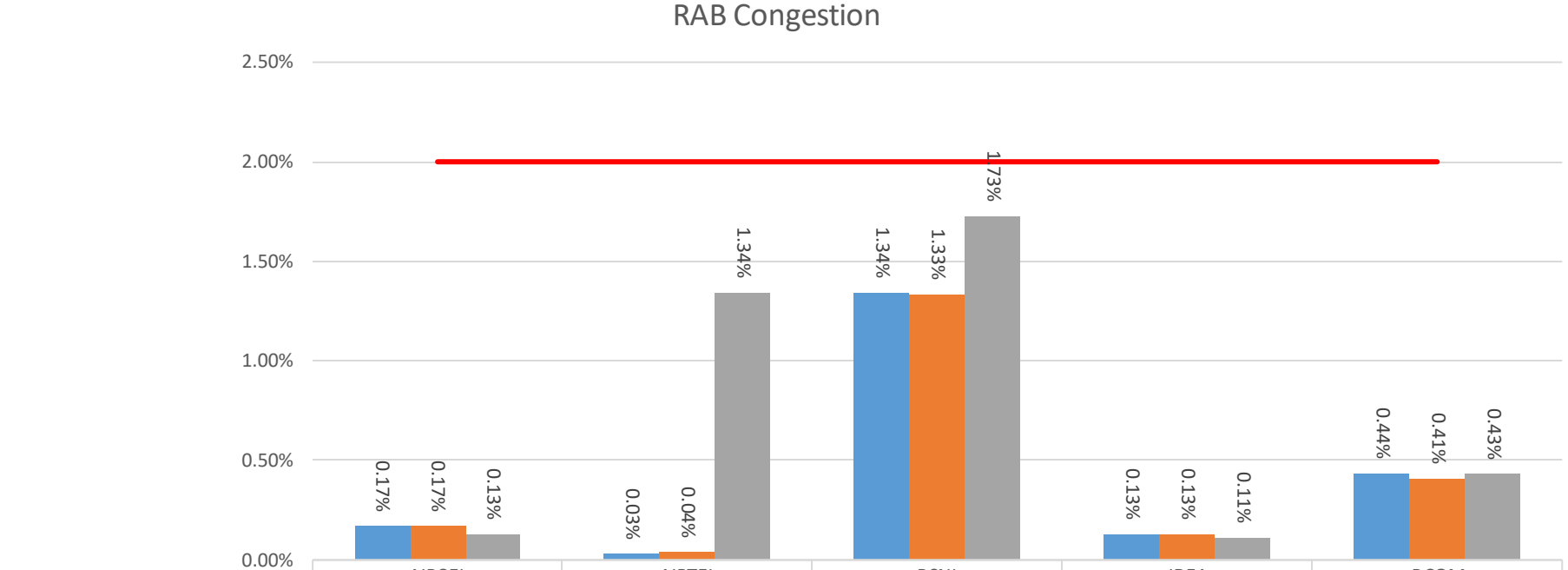

| | AIRCEL | AIRTEL | BSNL | IDEA | RCOM |
|---|---|---|---|---|---|
| PMR Audit 3G Agengy(PCPL) | 96.88% | 98.52% | 96.57% | 99.48% | 97.03% |
| PMR Audit 3G TSP | 96.85% | 98.41% | 96.67% | 99.48% | 97.10% |
| 3 Day Live Audit 3G | 97.30% | 99.33% | 95.78% | 99.52% | 97.24% |
| Benchmark ≥ 95% | 95.00% | 95.00% | 95.00% | 95.00% | 95.00% |

## 13.5.4. RRC CONGESTION



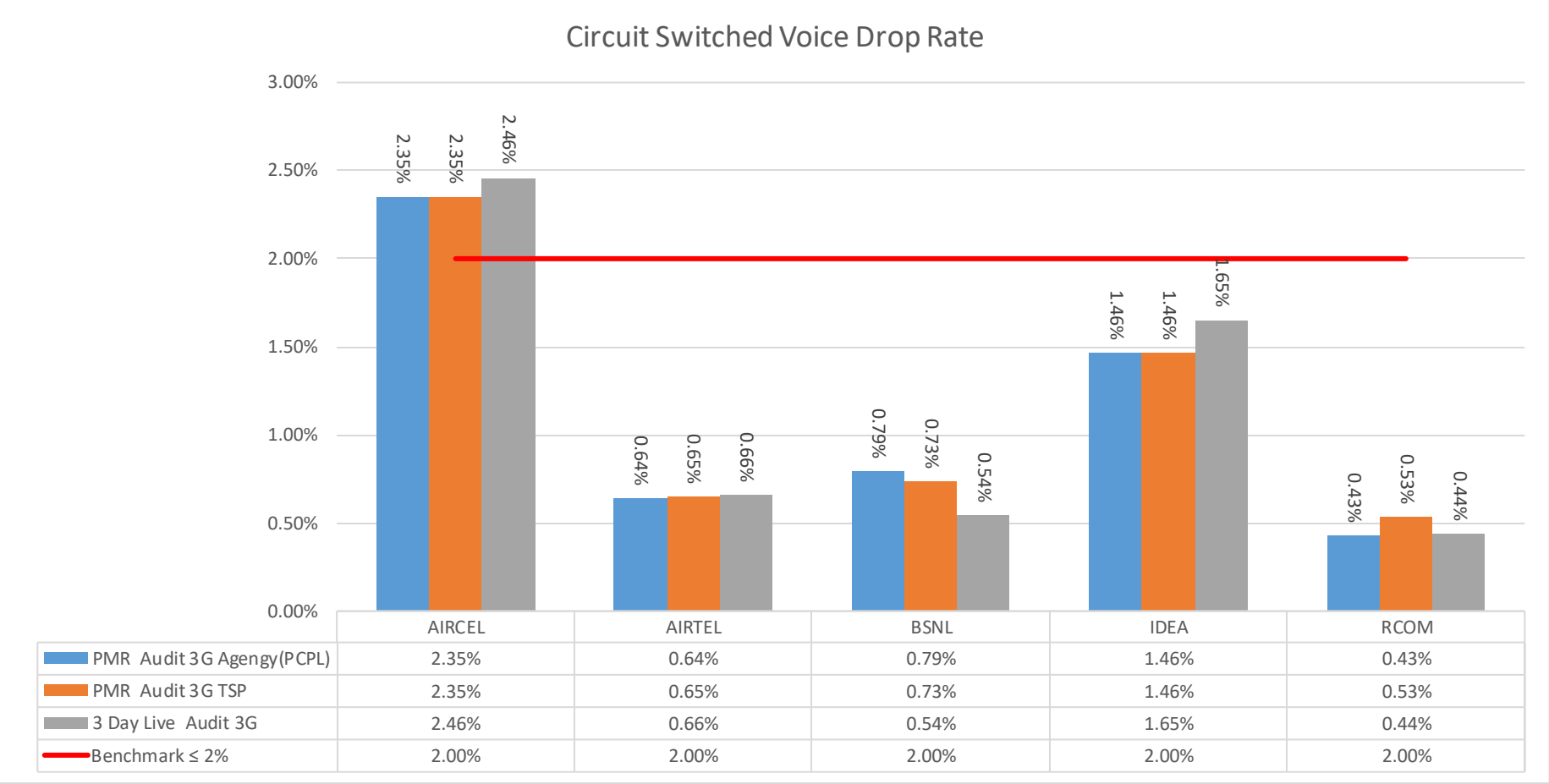

| | AIRCEL | AIRTEL | BSNL | IDEA | RCOM |
|---|---|---|---|---|---|
| PMR Audit 3G Agengy(PCPL) | 0.50% | 0.30% | 0.78% | 0.29% | 0.18% |
| PMR Audit 3G TSP | 0.50% | 0.09% | 0.73% | 0.29% | 0.14% |
| 3 Day Live Audit 3G | 0.40% | 0.04% | 0.86% | 0.30% | 0.20% |
| Benchmark ≤ 1% | 1.00% | 1.00% | 1.00% | 1.00% | 1.00% |

## 13.5.5. RAB CONGESTION



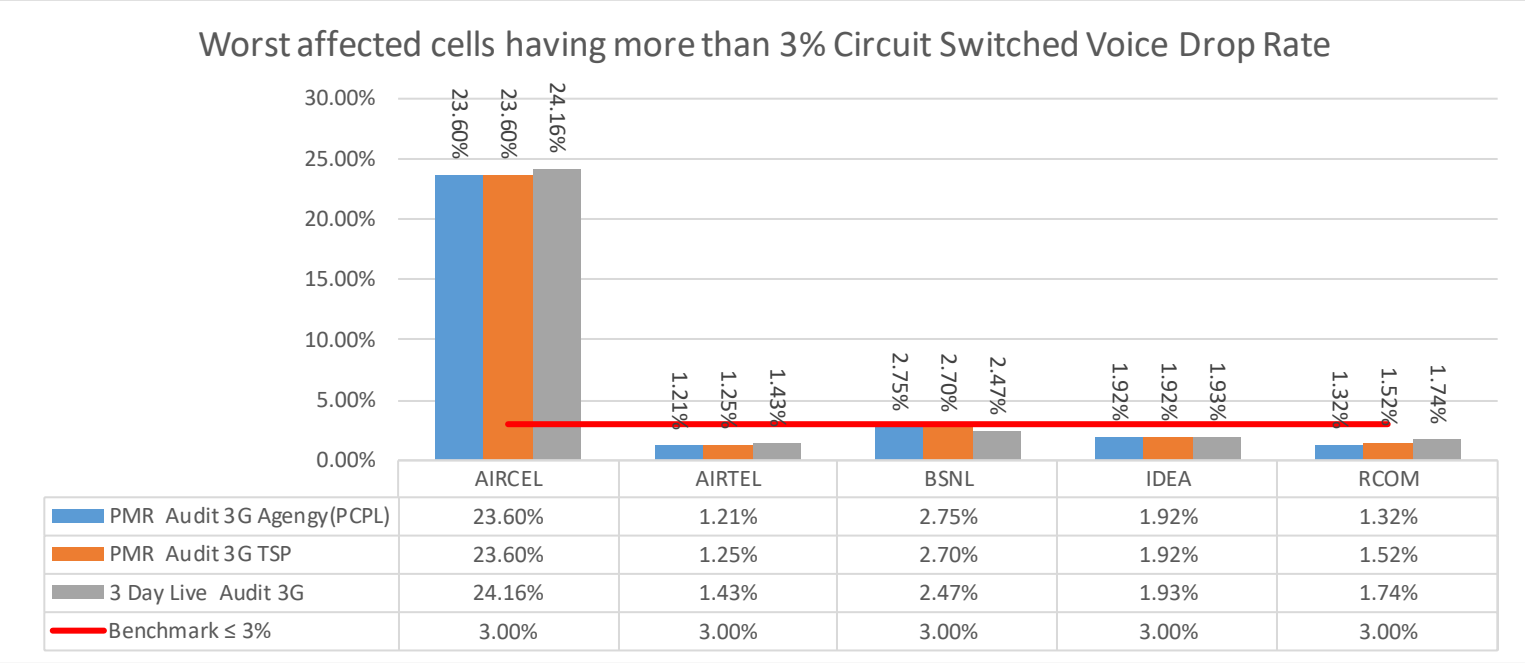

| | AIRCEL | AIRTEL | BSNL | IDEA | RCOM |
|---|---|---|---|---|---|
| PMR Audit 3G Agengy(PCPL) | 0.17% | 0.03% | 1.34% | 0.13% | 0.44% |
| PMR Audit 3G TSP | 0.17% | 0.04% | 1.33% | 0.13% | 0.41% |
| 3 Day Live Audit 3G | 0.13% | 1.34% | 1.73% | 0.11% | 0.43% |
| Benchmark ≤ 2% | 2.00% | 2.00% | 2.00% | 2.00% | 2.00% |

## 13.5.6. CIRCUIT SWITCHED VOICE DROP RATE



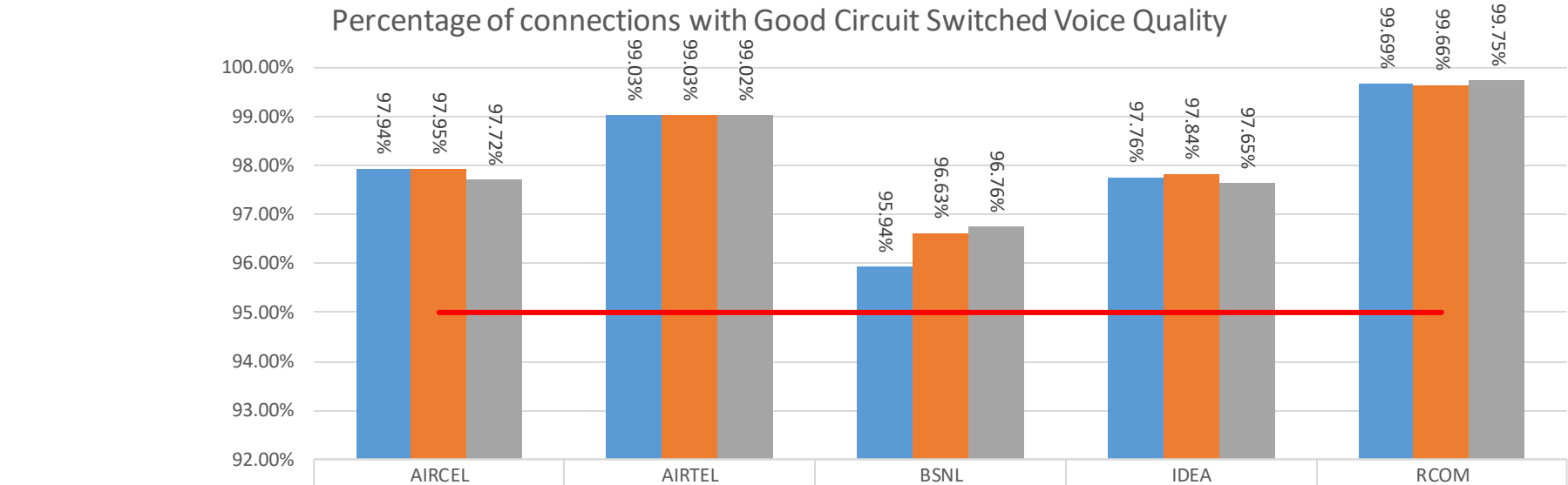

| | AIRCEL | AIRTEL | BSNL | IDEA | RCOM |
|---|---|---|---|---|---|
| PMR Audit 3G Agengy(PCPL) | 2.35% | 0.64% | 0.79% | 1.46% | 0.43% |
| PMR Audit 3G TSP | 2.35% | 0.65% | 0.73% | 1.46% | 0.53% |
| 3 Day Live Audit 3G | 2.46% | 0.66% | 0.54% | 1.65% | 0.44% |
| Benchmark ≤ 2% | 2.00% | 2.00% | 2.00% | 2.00% | 2.00% |

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




| | AIRCEL | AIRTEL | BSNL | IDEA | RCOM |
|---|---|---|---|---|---|
| PMR Audit 3G Agengy(PCPL) | 23.60% | 1.21% | 2.75% | 1.92% | 1.32% |
| PMR Audit 3G TSP | 23.60% | 1.25% | 2.70% | 1.92% | 1.52% |
| 3 Day Live Audit 3G | 24.16% | 1.43% | 2.47% | 1.93% | 1.74% |
| Benchmark ≤ 3% | 3.00% | 3.00% | 3.00% | 3.00% | 3.00% |

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

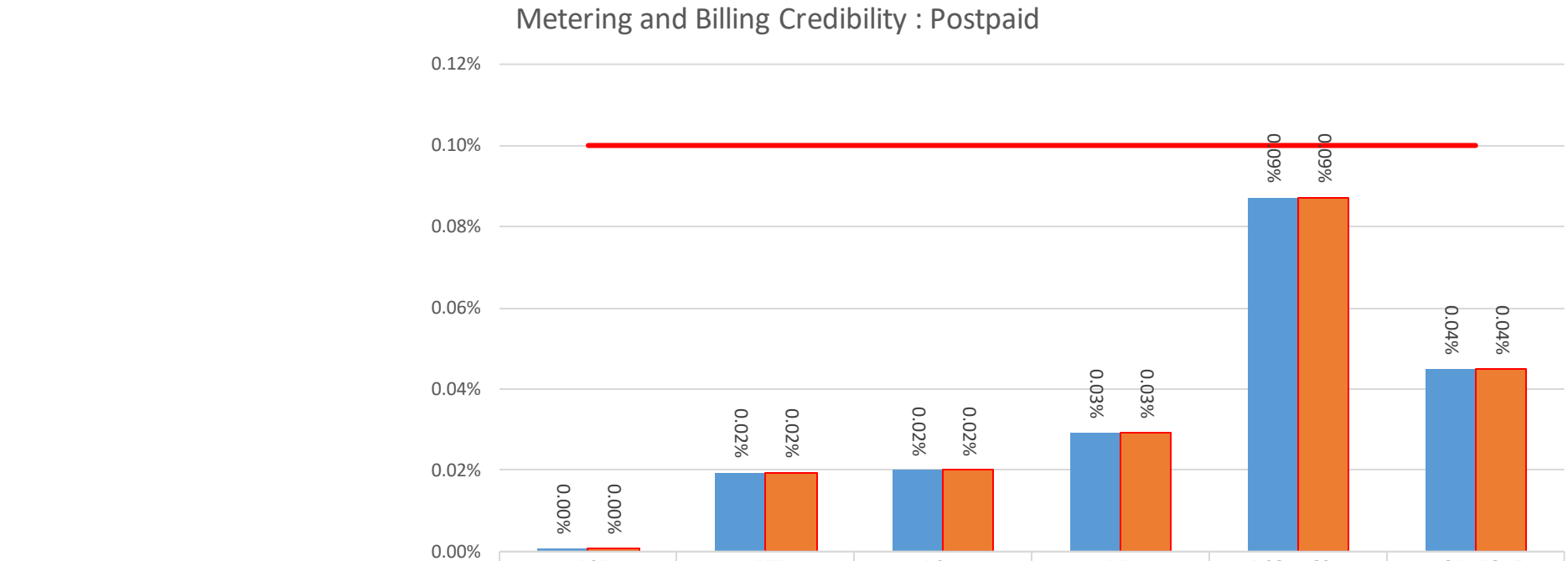



| | AIRCEL | AIRTEL | BSNL | IDEA | RCOM |
|---|---|---|---|---|---|
| PMR Audit 3G Agengy(PCPL) | 97.94% | 99.03% | 95.94% | 97.76% | 99.69% |
| PMR Audit 3G TSP | 97.95% | 99.03% | 96.63% | 97.84% | 99.66% |
| 3 Day Live Audit 3G | 97.72% | 99.02% | 96.76% | 97.65% | 99.75% |
| Benchmark ≥ 95% | 95.00% | 95.00% | 95.00% | 95.00% | 95.00% |

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

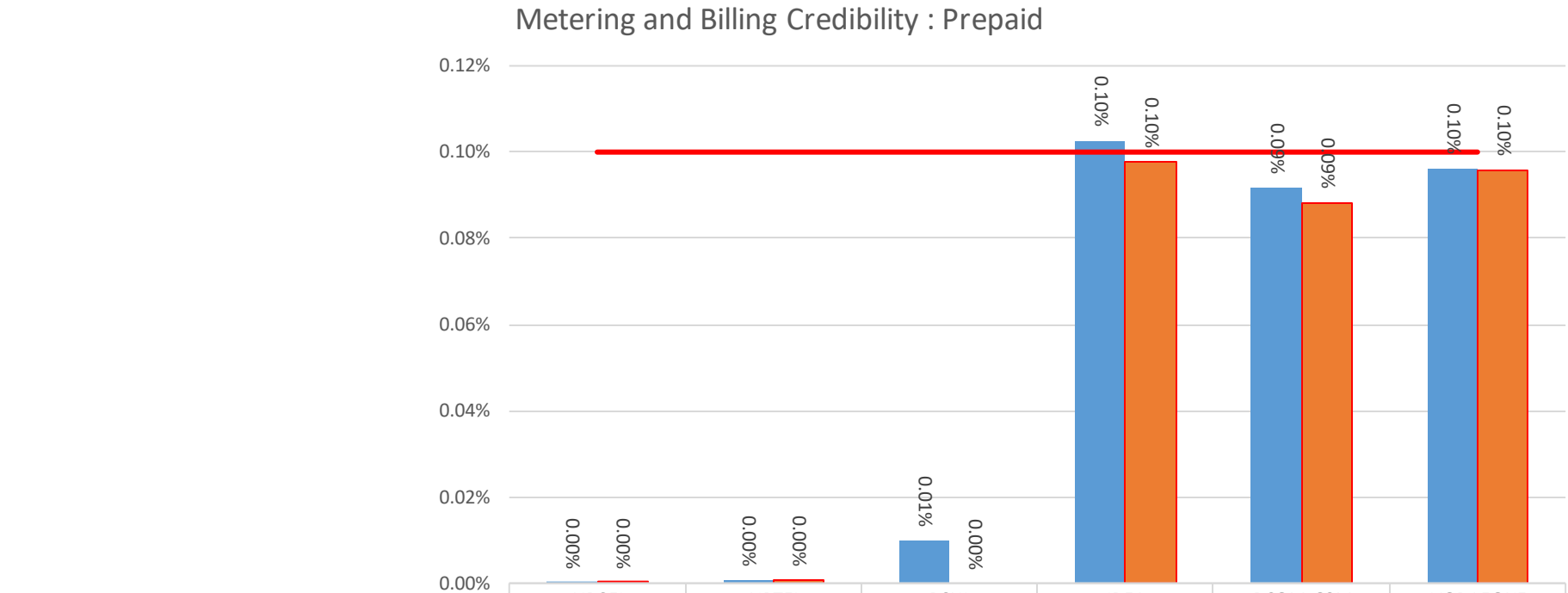
| Name of Service Provider | Metering and Billing credibility | | | | Billing Complaints | | | | | | Termination & Closures | | Time taken for refund of | | Response time to customer for assistance | | | | Customer Care & Grievances Redressal | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Postpaid Subscribers | | Prepaid Subscribers | | %age complaints resolved within 4 weeks | | %age complaints resolved within 6 weeks | | %age of where credit/waiver is received within | | % of Termination/ Closure of | | Cleared over a period of <60 days (100%) | | %age of calls answered by the IVR | | %age of call answered by the operators ( | | % of Complaints addressed at call center level | % of Complaints addressed by Appellate Authority |
| 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% | 54.92% | 54.92% | 97.32% | 97.32% | 93.58% | 93.58% | 99.82% | NIL |
| AIRTEL | 0.02% | 0.02% | 0.00% | 0.00% | 100.00% | 100.00% | 100.00% | 100.00% | 100.00% | 100.00% | 100.00% | 100.00% | 100.00% | 100.00% | 93.67% | 95.64% | 64.31% | 64.31% | 100.00% | 100.00% |
| BSNL | 0.02% | 0.02% | 0.01% | 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% | 95.40% | 99.00% | 98.63% | NIL |
| IDEA | 0.03% | 0.03% | 0.10% | 0.10% | 100.00% | 100.00% | 100.00% | 100.00% | 100.00% | 100.00% | 100.00% | 99.93% | 100.00% | 100.00% | 96.63% | 96.63% | 97.19% | 97.19% | 24.09% | NIL |
| 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% | 99.84% | 99.84% | 99.31% | 99.31% | 93.27% | 93.27% | 100.00% | 100.00% |
| VODAFONE | 0.04% | 0.04% | 0.10% | 0.10% | 100.00% | 100.00% | 100.00% | 100.00% | 100.00% | 100.00% | 100.00% | 100.00% | 100.00% | 100.00% | 100.00% | 100.00% | 99.58% | 99.59% | 100.00% | NIL |

## 13.6.1. METERING AND BILLING CREDIBILITY : POSTPAID



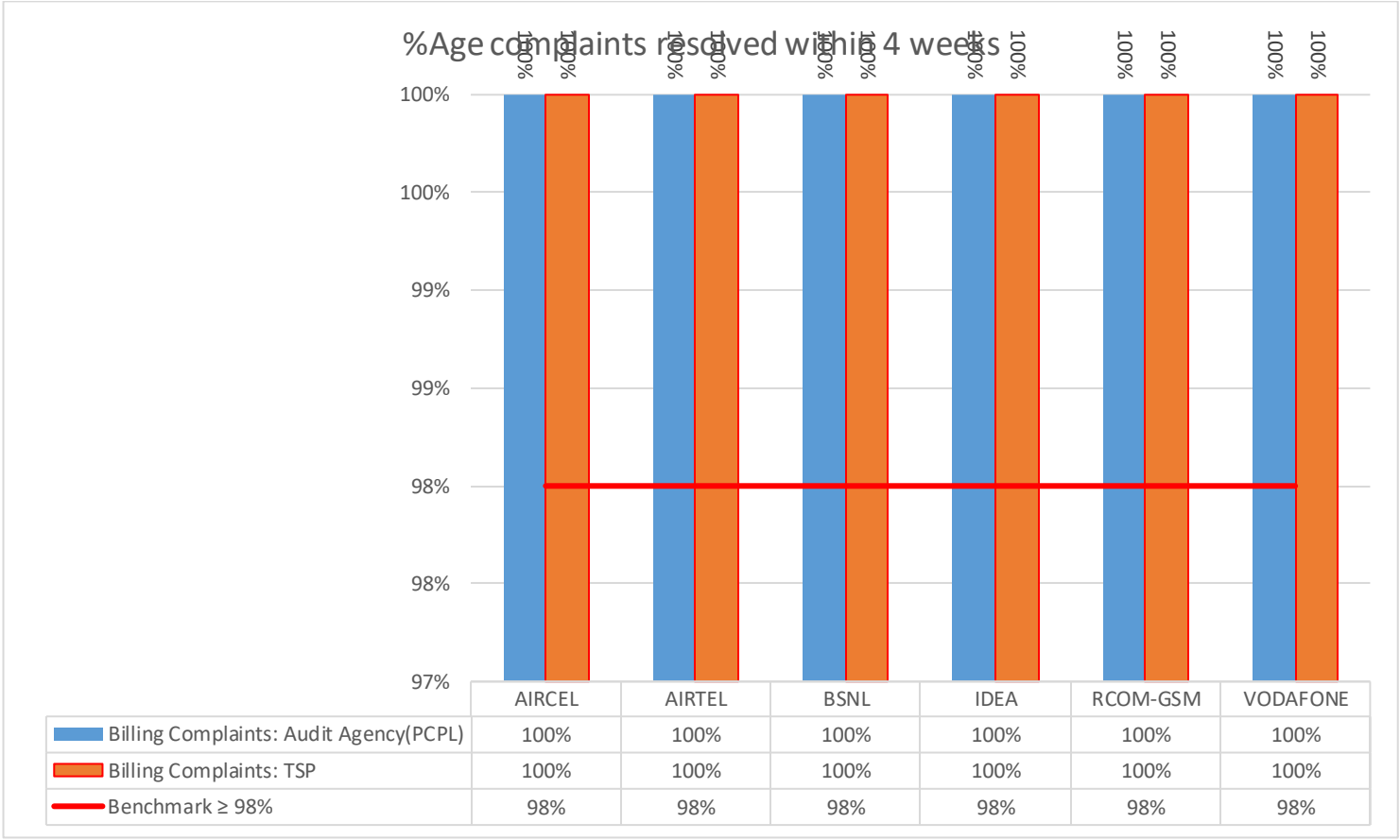

| | AIRCEL | AIRTEL | BSNL | IDEA | RCOM-GSM | VODAFONE |
|---|---|---|---|---|---|---|
| Billing Performance for Postpaid: Audit Agency(PCPL) | 0.00% | 0.02% | 0.02% | 0.03% | 0.09% | 0.04% |
| Billing Performance for Postpaid: TSP | 0.00% | 0.02% | 0.02% | 0.03% | 0.09% | 0.04% |
| Benchmark ≤ 0.1% | 0.10% | 0.10% | 0.10% | 0.10% | 0.10% | 0.10% |

## 13.6.2. METERING AND BILLING CREDIBILITY : PREPAID



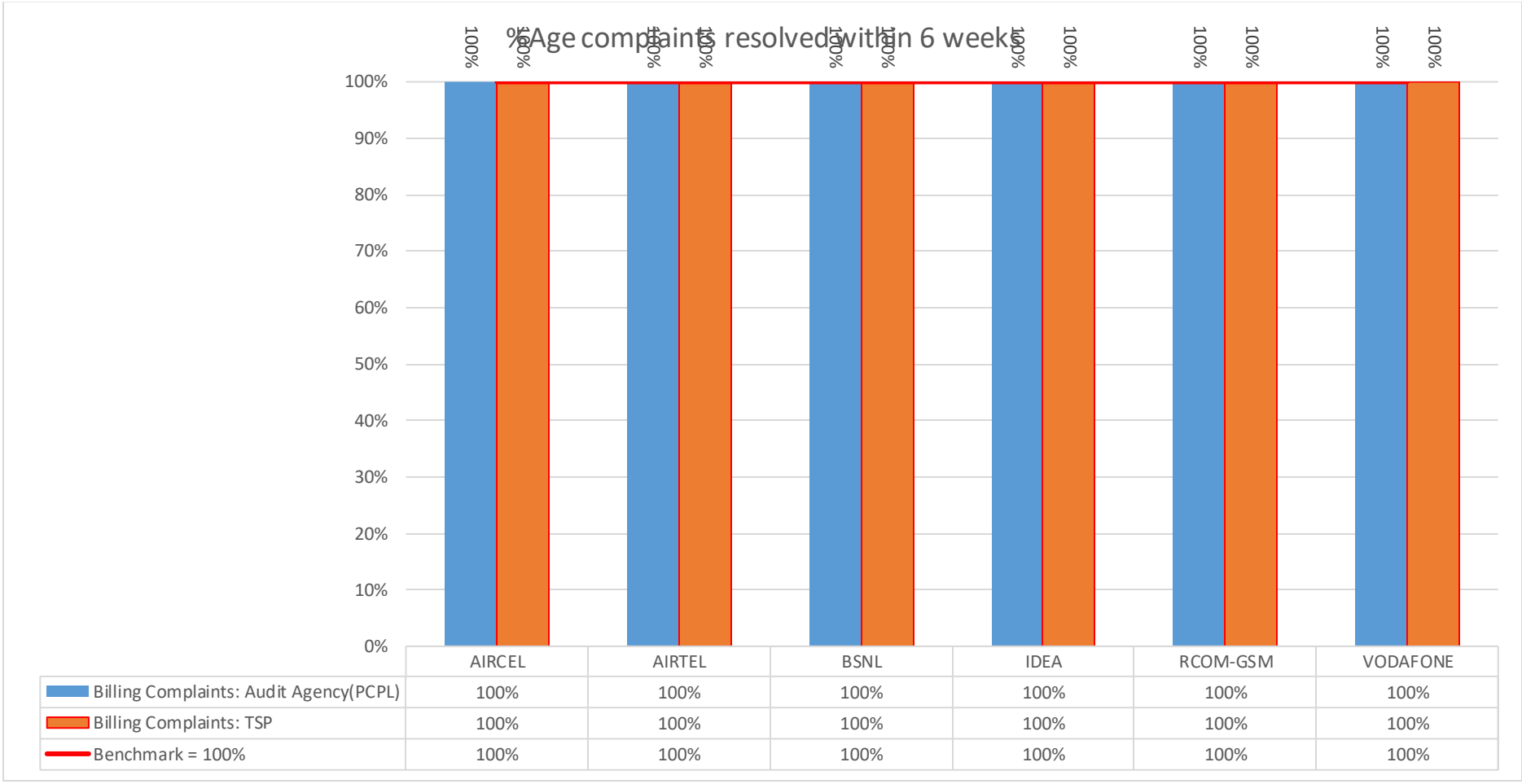

| | AIRCEL | AIRTEL | BSNL | IDEA | RCOM-GSM | VODAFONE |
|---|---|---|---|---|---|---|
| Billing Performance for Prepaid: Audit Agency(PCPL) | 0.00% | 0.00% | 0.01% | 0.10% | 0.09% | 0.10% |
| Billing Performance for Prepaid: TSP | 0.00% | 0.00% | 0.00% | 0.10% | 0.09% | 0.10% |
| Benchmark ≤ 0.1% | 0.10% | 0.10% | 0.10% | 0.10% | 0.10% | 0.10% |

## 13.6.3. %AGE COMPLAINT RESOLVED WITHIN 4 WEEKS



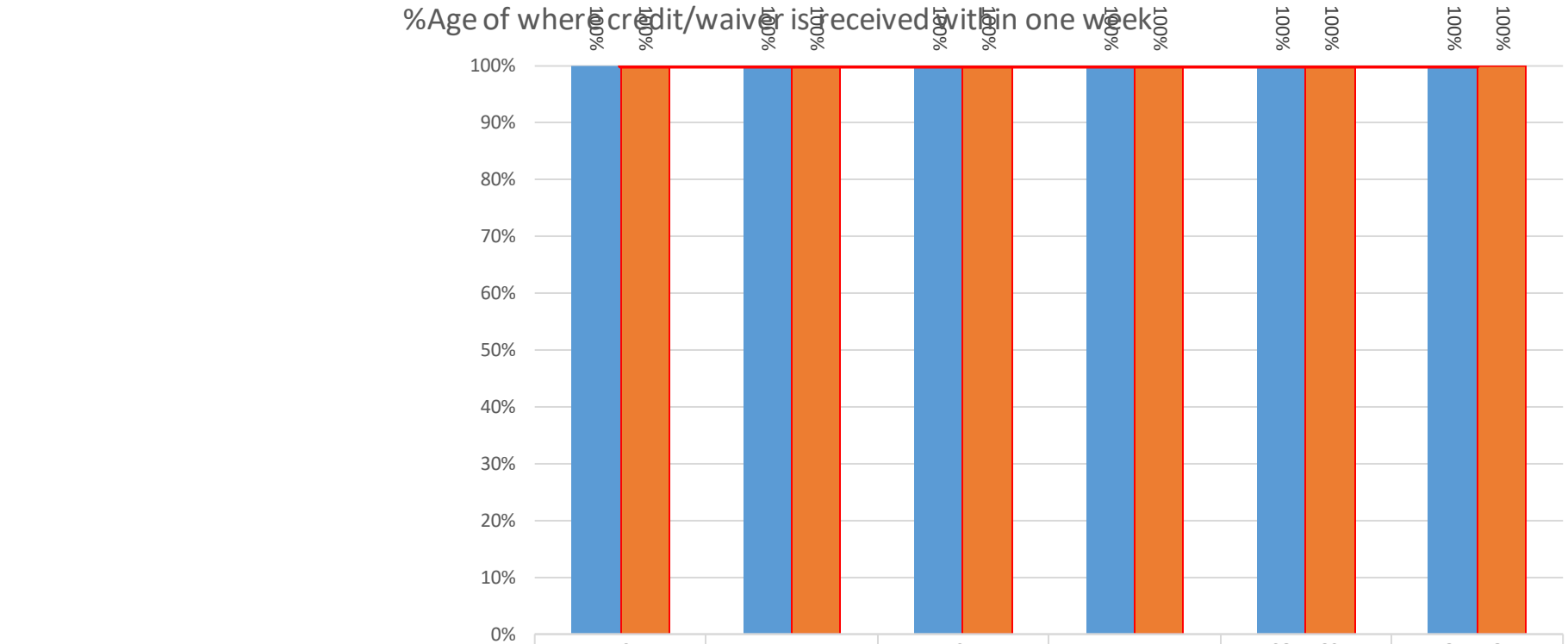

| | AIRCEL | AIRTEL | BSNL | IDEA | RCOM-GSM | VODAFONE |
|---|---|---|---|---|---|---|
| Billing Complaints: Audit Agency(PCPL) | 100% | 100% | 100% | 100% | 100% | 100% |
| Billing Complaints: TSP | 100% | 100% | 100% | 100% | 100% | 100% |
| Benchmark ≥ 98% | 98% | 98% | 98% | 98% | 98% | 98% |

## 13.6.4. %AGE COMPLAINTS RESOLVED WITHIN 6 WEEKS



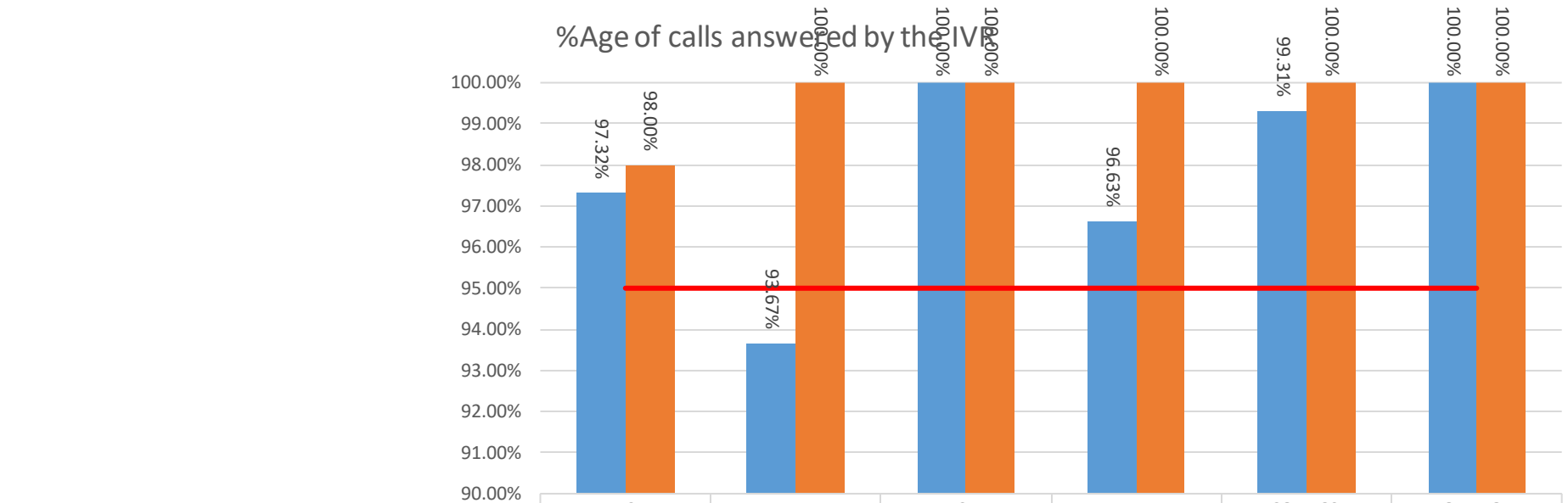

| | AIRCEL | AIRTEL | BSNL | IDEA | RCOM-GSM | VODAFONE |
|---|---|---|---|---|---|---|
| Billing Complaints: Audit Agency(PCPL) | 100% | 100% | 100% | 100% | 100% | 100% |
| Billing Complaints: TSP | 100% | 100% | 100% | 100% | 100% | 100% |
| Benchmark = 100% | 100% | 100% | 100% | 100% | 100% | 100% |

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



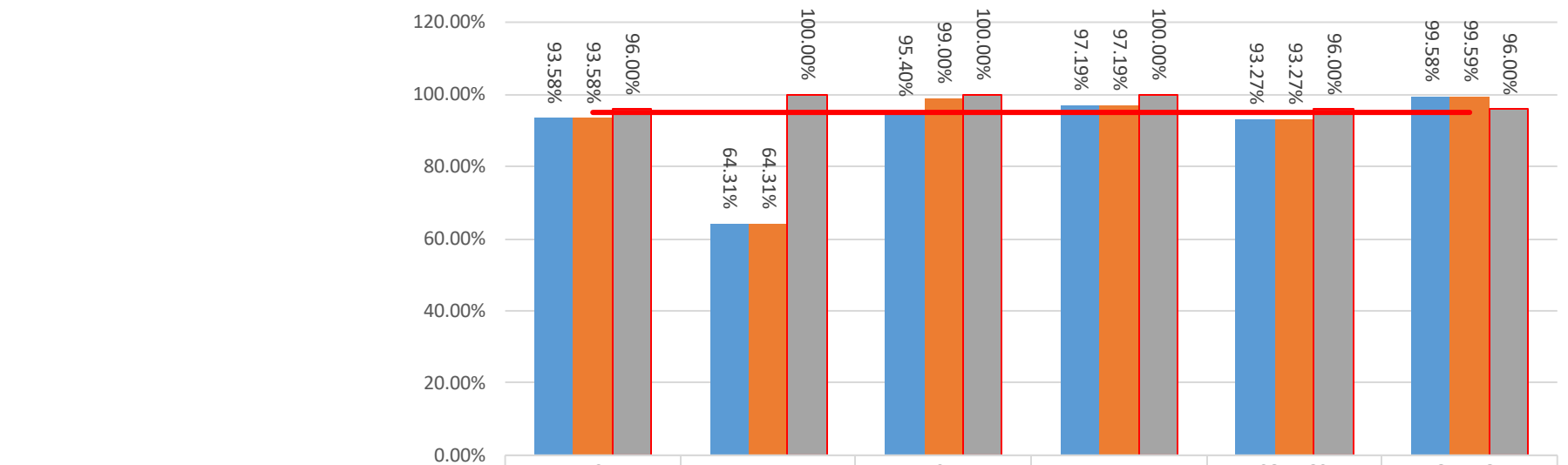

| | AIRCEL | AIRTEL | BSNL | IDEA | RCOM-GSM | VODAFONE |
|---|---|---|---|---|---|---|
| %Age of Credit/weiver is received within one week: Audit Agency(PCPL) | 100% | 100% | 100% | 100% | 100% | 100% |
| %Age of Credit/weiver is received within one week: TSP | 100% | 100% | 100% | 100% | 100% | 100% |
| Benchmark = 100% | 100% | 100% | 100% | 100% | 100% | 100% |

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



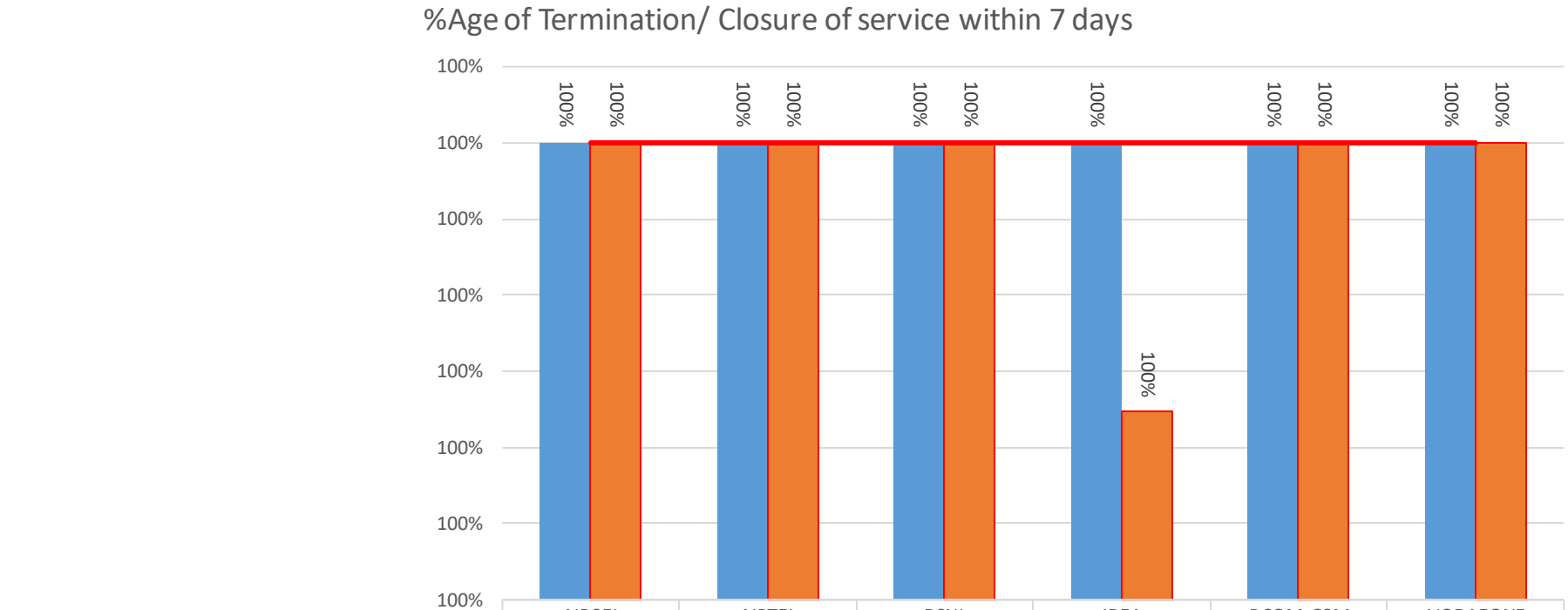

| | AIRCEL | AIRTEL | BSNL | IDEA | RCOM-GSM | VODAFONE |
|---|---|---|---|---|---|---|
| Percentage of calls connected and answered : Audit Agency(PCPL) | 97.32% | 93.67% | 100.00% | 96.63% | 99.31% | 100.00% |
| Percentage of calls connected and answered : Live Calling | 98.00% | 100.00% | 100.00% | 100.00% | 100.00% | 100.00% |
| Benchmark ≥ 95% | 95% | 95% | 95% | 95% | 95% | 95% |

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



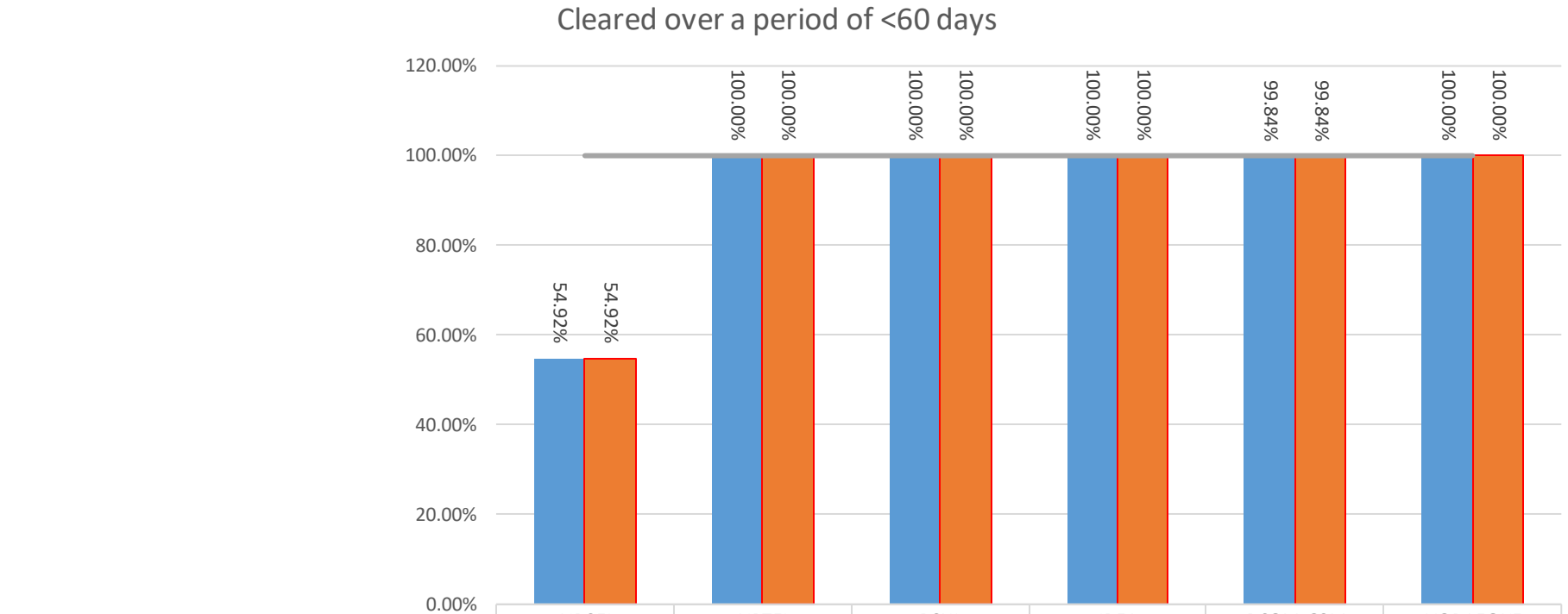

| | AIRCEL | AIRTEL | BSNL | IDEA | RCOM-GSM | VODAFONE |
|---|---|---|---|---|---|---|
| Percentage of calls connected and answered by the operators: Audit Agency(PCPL) | 93.58% | 64.31% | 95.40% | 97.19% | 93.27% | 99.58% |
| Percentage of calls connected and answered by the operators: TSP | 93.58% | 64.31% | 99.00% | 97.19% | 93.27% | 99.59% |
| Percentage of calls connected and answered by the operators: Live Calling | 96.00% | 100.00% | 100.00% | 100.00% | 96.00% | 96.00% |
| Benchmark ≥ 95% | 95.00% | 95.00% | 95.00% | 95.00% | 95.00% | 95.00% |

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




| | AIRCEL | AIRTEL | BSNL | IDEA | RCOM-GSM | VODAFONE |
|---|---|---|---|---|---|---|
| Percentage cases closure done within 7 days: Audit Agency(PCPL) | 100% | 100% | 100% | 100% | 100% | 100% |
| Percentage cases closure done within 7 days: TSP | 100% | 100% | 100% | 100% | 100% | 100% |
| Benchmark = 100% | 100% | 100% | 100% | 100% | 100% | 100% |

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




| | AIRCEL | AIRTEL | BSNL | IDEA | RCOM-GSM | VODAFONE |
|---|---|---|---|---|---|---|
| Percentage refund of deposits after closures: Audit Agency(PCPL) | 54.92% | 100.00% | 100.00% | 100.00% | 99.84% | 100.00% |
| Percentage refund of deposits after closures: TSP | 54.92% | 100.00% | 100.00% | 100.00% | 99.84% | 100.00% |
| Benchmark = 100% | 100% | 100% | 100% | 100% | 100% | 100% |

# 14. KEY FINDINGS

## 14.1. 2G VOICE PMR – CONSOLIDATED

- AIRCEL has parameter value of 4.18% and failed to meet the benchmark of ≤ 2% No. of BTSs having accumulated downtime of >24 hours in a month
- AIRCEL has parameter value of 10.87% and failed to meet the benchmark of ≤ 3% Worst Affected cell having more than 3% TCH drop

## 14.2. 3G VOICE PMR - CONSOLIDATED

- AIRCEL has parameter value of 5.67% and failed to meet the benchmark of ≤ 2% No. of BTSs having accumulated downtime of >24 hours in a month
- AIRCEL has parameter value of 2.35% and failed to meet the benchmark of ≤ 2% Circuit Switched Voice Drop Rate
- AIRCEL has parameter value of 23.60% and failed to meet the benchmark of ≤ 3% Worst affected cells having more than 3% Circuit Switched Voice Drop Rate

## 14.3. BILLING AND CUSTOMER CARE

- AIRCEL has parameter value of 54.92% and failed to meet the benchmark of =100% Time taken for refund of deposits after closures cleared over a period of <60 days.
- AIRCEL has parameter value of 93.58% and failed to meet the benchmark of ≥95% Response time to customer for assistance %age of call answered by the operators (voice to voice) within 90 second.
- AIRTEL has parameter value of 93.67% and failed to meet the benchmark of ≥95% Response time to customer for assistance %age of call answered by the IVR.
- AIRTEL has parameter value of 64.31% and failed to meet the benchmark of ≥95% Response time to customer for assistance %age of call answered by the operators (voice to voice) within 90 second.
- RCOM GSM has parameter value of 99.84% and failed to meet the benchmark of ≥95% Time taken for refund of deposits after closures cleared over a period of <60 days.
- RCOM GSM has parameter value of 93.27% and failed to meet the benchmark of ≥95% Response time to customer for assistance %age of call answered by the operators (voice to voice) within 90 second.