EAST ZONE

TRAI AUDIT WIRELESS REPORT-ORISSA CIRCLE - AMJ QUARTER, 2015

Prepared By -

IMRB International | eTech

Prepared For-

TRAI

सत्यमेव जयते

Telecom Regulatory Authority of India

(IS/ISO 9001-2008 Certified Organisation)

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2 INTRODUCTION

2.1 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).

2.2 OBJECTIVES

The primary objective of the Audit module is to-

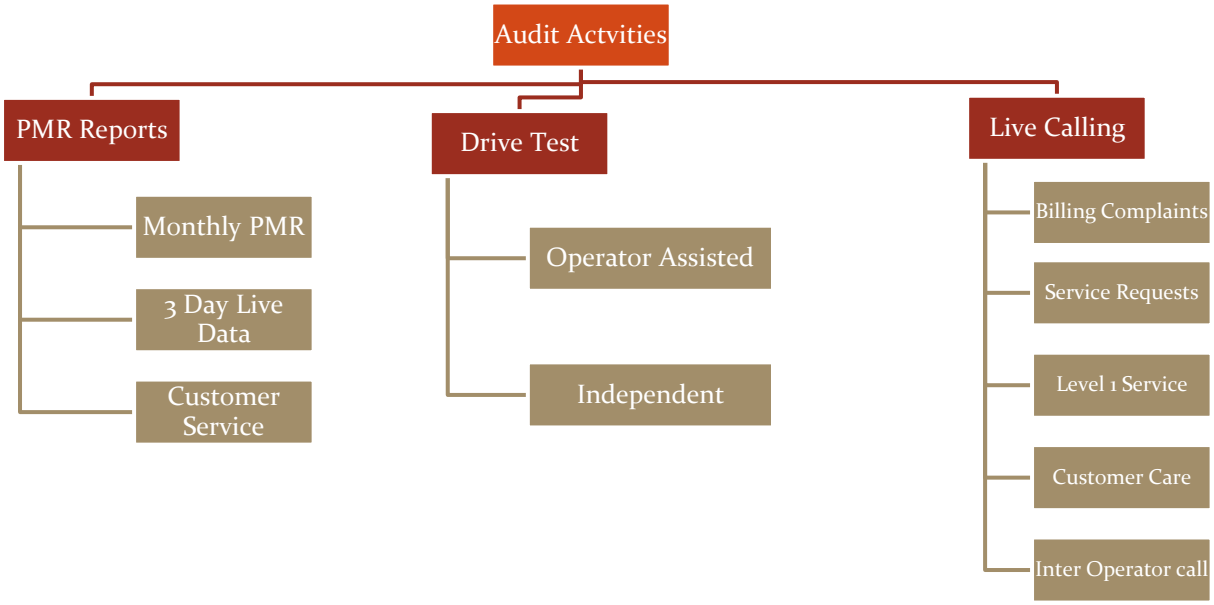
- Audit and Assess the Quality of Services being rendered by Basic (Wireline), Cellular Mobile (Wireless), and Broadband service against the parameters notified by TRAI. (The parameters of Quality of Services (QoS) have been specified by in the respective regulations published by TRAI).
- This report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

2.3 COVERAGE

The audit was conducted in Orissa circle covering all the SSAs (Secondary Switching Areas).

Image Source: BSNL website

2.4 FRAMEWORK USED

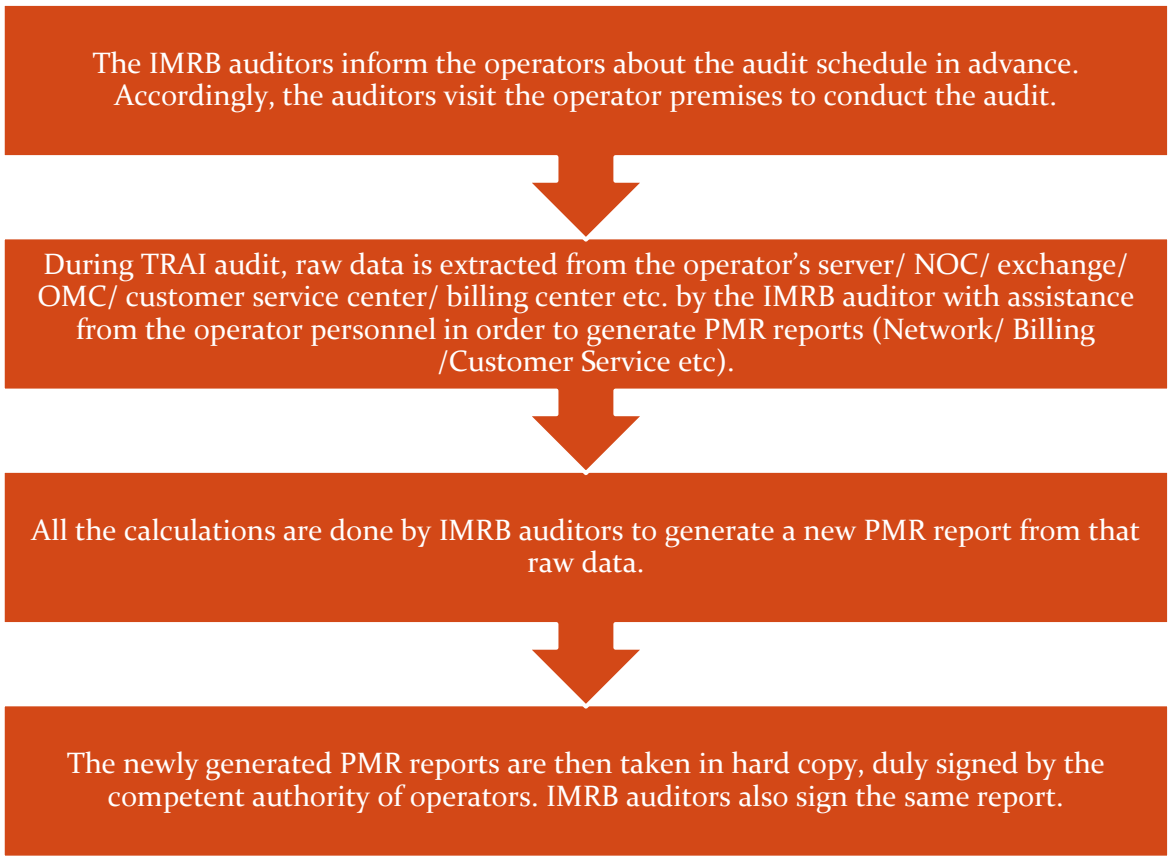


Let's discuss each of the activity in detail and the methodology adopted for each of the module.

2.4.1 PMR REPORTS

2.4.1.1 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, May 2015 audit data was collected in the month of June 2015.

The PMR report for customer service parameters is extracted from Customer Service Center and verified once every quarter in the subsequent month of the last month of the quarter. For example, data for quarter ending June2015 (AMJ'15) was collected in the month of July 2015.

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 detail.

2.4.1.2 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 IMRB representative with the assistance of the operator at the operator's premises for the month of April, May and June 2015. The performance of operators on various parameters was assessed against the benchmarks. Parameters include-

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

All the parameters have been described in detail along with key findings of the parameters in section 5 of the report. The benchmark values for each parameter have been given in the table below.

2.4.1.3 AUDIT PARAMETERS - NETWORK

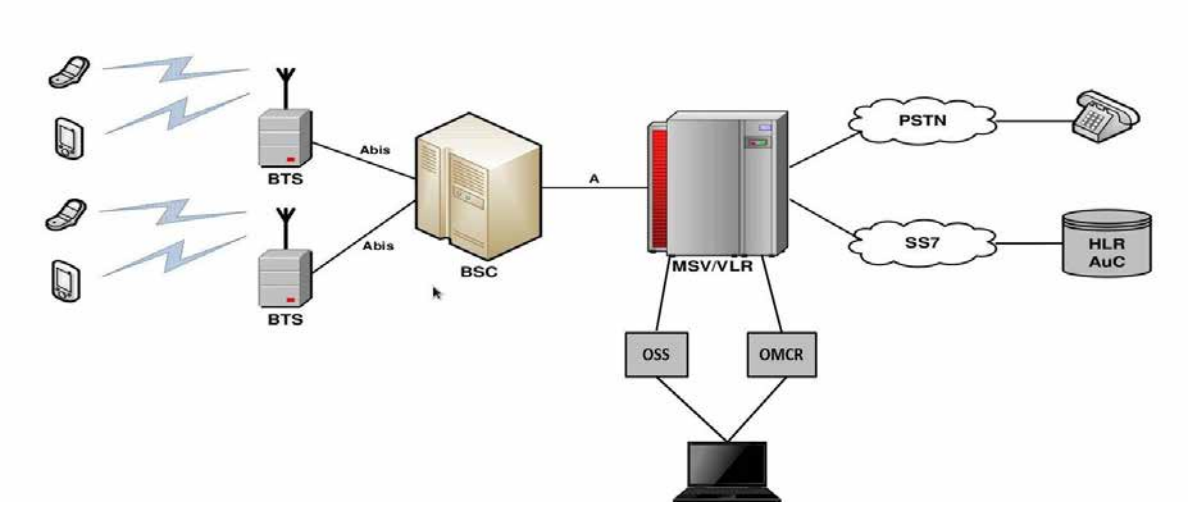
Let us now look at the various parameters involved in the audit reports.

Network Related

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%

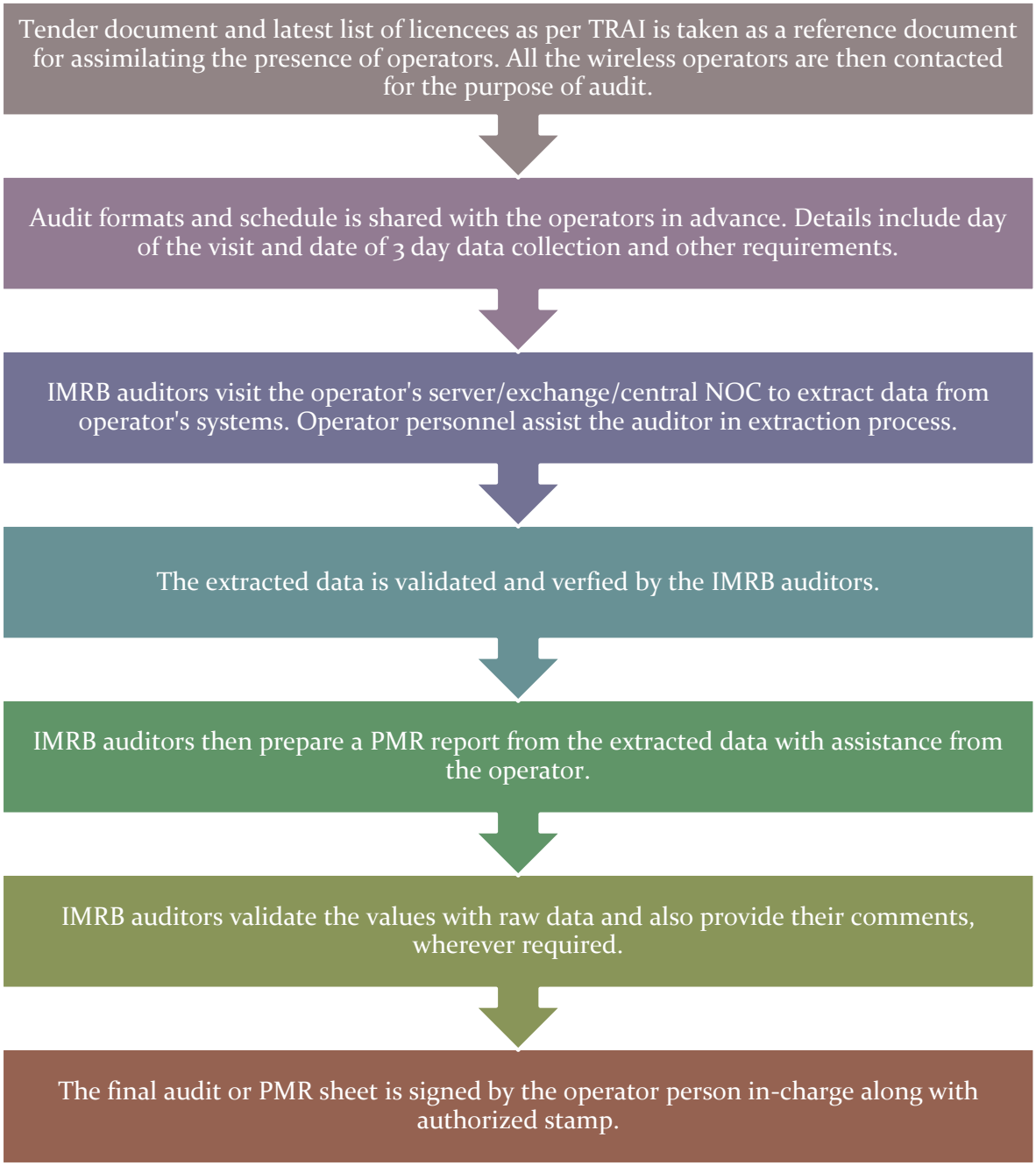
2.4.1.4 POINT OF DATA EXTRACTION

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



2.4.1.5 STEP BY STEP AUDIT PROCEDURE

The key steps followed for extraction of reports at the operator premises are given below.



Data has been extracted and calculated as per the counter details provided by the operators. The details of counters have been provided in section 8.15 of the report. The calculation methodology for each parameter has been stated in the table given below.

2.4.1.6 CALCULATION METHODOLOGY – NETWORK PARAMETERS

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) Where: A1 = Number of attempts to establish SDCCH / TCH made on day 1 C1 = Average SDCCH / TCH Congestion % on day 1 A2 = Number of attempts to establish SDCCH / TCH made on day 2 C2 = Average SDCCH / TCH Congestion % on day 2 An = Number of attempts to establish SDCCH / TCH made on day n Cn = Average SDCCH / TCH Congestion % on day n
TCH Congestion	
POI Congestion	POI Congestion% = [(A1 x C1) + (A2 x C2) +.....+ (An x Cn)] / (A1 + A2 +...+ An) Where: A1 = POI traffic offered on all POIs (no. of calls) on day 1 C1 = Average POI Congestion % on day 1 A2 = POI traffic offered on all POIs (no. of calls) on day 2 C2 = Average POI Congestion % on day 2 An = POI traffic offered on all POIs (no. of calls) on day n 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

2.4.1.7 3 DAY 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.

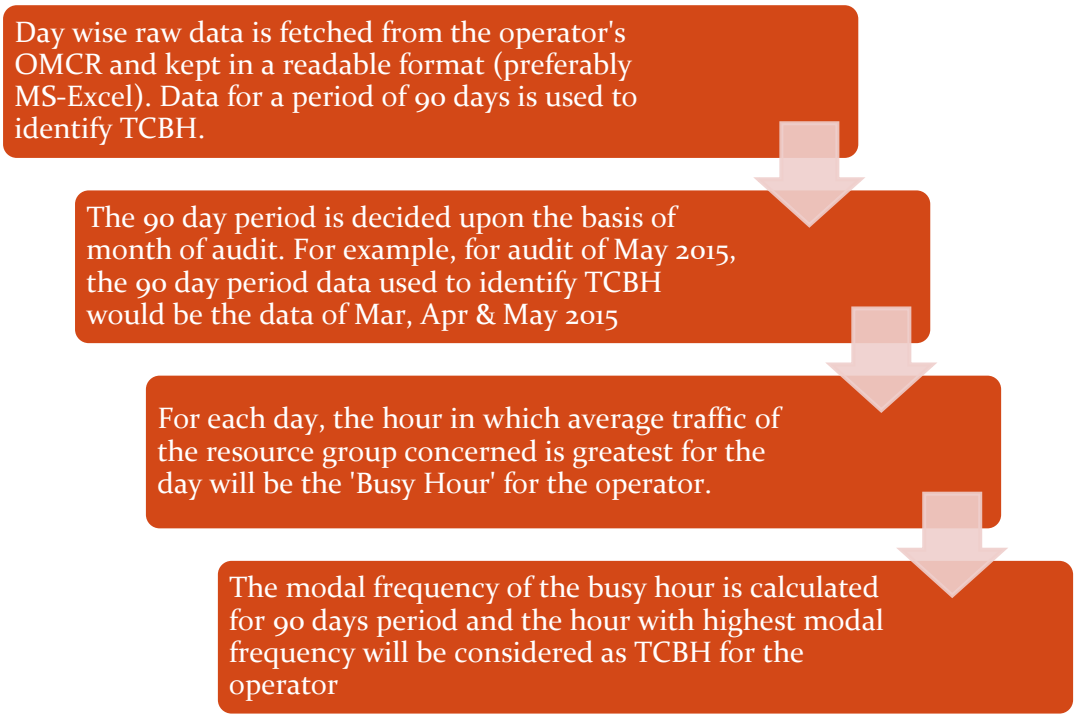
The 3 day live data provides a sample of 9 days in a quarter (3 days each month of a quarter) with hourly performance, which enables the auditor to identify and validate intraday issues for an operator on the QoS network parameters. For example, network congestion being faced by an operator during busy/peak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

2.4.1.8 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.

Step by step procedure to identify TCBH for an operator:



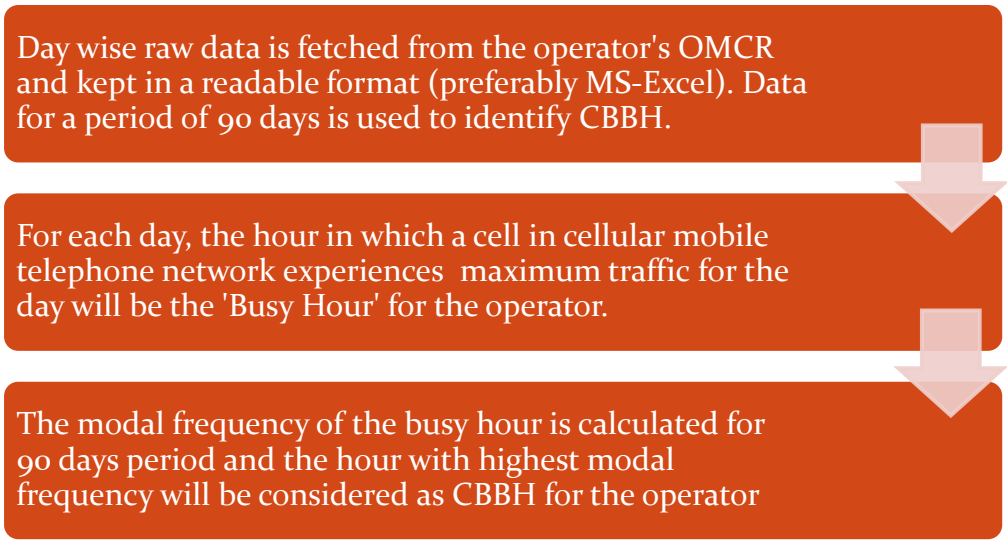
During audit, the auditors identified from the raw data that the TCBH for the operators in AMJ'15 was the time period as given below.

Aircel(DWL)	Airtel	BSNL	Idea	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Vodafone
19:00-20:00	18:00-19:00	20:00-21:00	19:00-20:00	20:00-21:00	19:00-20:00	19:00:20:00	19:00:20:00	19:00:20:00

2.4.1.9 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:



During audit, the auditors identified from the raw data that the CBBH for the operators in AMJ'15 was the time period as given below.

Aircel(DWL)	Airtel	BSNL	Idea	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Vodafone
19:00-20:00	18:00-19:00	19:00-20:00	19:00-20:00	20:00-21:00	19:00-20:00	20:00-21:00	19:00:20:00	19:00:20:00

2.4.1.10 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 June 2015 (AMJ'15) was collected in the month of July 2015. To extract the data for customer service parameters for the purpose of audit, IMRB 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 (postpaid 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 section 6 of the report. The benchmark values for each parameter have been given in the table below.

2.4.1.11 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%

2.4.1.12 CALCULATION METHODOLOGY – CUSTOMER SERVICE PARAMETERS

Parameter	Calculation Methodology
Metering and billing credibility - Postpaid	Total billing complaints received during the relevant billing cycle / Total bills generated during the relevant billing cycle *100
Metering and billing credibility – Prepaid	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 (Postpaid + Prepaid)	There are two benchmarks involved here: Billing or Charging Complaints resolved in 4 weeks from date of receipt / Total billing or charging complaints received during the quarter) x 100 Billing or Charging Complaints resolved in 6 weeks from date of receipt / Total billing or charging complaints received during the quarter) x 100
Period of applying credit waiver	Number of cases where credit waiver is applied within 7 days/ total number of cases eligible for credit waiver * 100
Call centre performance IVR (Calling getting connected and answered by IVR)	Number of calls connected and answered by IVR/ All calls attempted to IVR * 100
Call center 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 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

2.4.2 LIVE CALLING

2.4.2.1 SIGNIFICANCE AND METHODOLOGY

The main purpose of live calling is to verify the performance of various customer service parameters by doing test calls to the subscribers/ specific numbers. Below is a step wise procedure of live calling.

The IMRB auditor visits each operator premises to do live calling. The operators provide the raw data of customer complaints (billing & service) and also the list of customer service numbers to be verified through live calling

IMRB auditors then make live calls using operator SIM to a random sample of subscribers from the raw data provided to verify the resolution of complaints

The auditors also verify the performance of call center, level 1 services by calling the numbers using operator SIM. The list of call center numbers is provided by the operator. The process followed to test Level 1 services has been stated below.

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

Live calling activity was carried out during the period of June 2015. 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 May 2015 was considered for live calling activity conducted in June 2015.

A detailed explanation of each parameter is explained below.

2.4.2.2 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 IMRB 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, 2009 were considered as population for selection of samples. A complete list of the same has been provided in Section 6.1.1.

TRAI benchmark-

Resolution of billing/ charging complaints - 98% within 4 weeks, 100% within 6 weeks

2.4.2.3 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 IMRB auditors.

2.4.2.4 LEVEL 1 SERVICE

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 AMJ'15, IMRB has tried contacting the list of Level 1 services provided by TRAI as per the NNP (National Numbering Plan).

2.4.2.4.1 PROCESS TO TEST LEVEL 1 SERVICES

- On visiting the operator's premises (Exchange/Central Server etc.), auditors ask the operator authorized personnel to provide a list of Level 1 services being active in their service. The list should contain a description of the numbers along with dialing code.
- Operators might provide a long 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 Code	Description
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
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	Educationa & 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

2.4.2.5 CUSTOMER CARE

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

- Calls getting connected and answered within 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.

2.4.2.6 INTER OPERATOR CALL ASSESEMENT

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.

2.4.3 DRIVE TEST

2.4.3.1 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.

IMRB conducted two types of drive tests 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 IMRB conducts

the drive test on solitary basis and uses its own hardware. Operators generally do not have any knowledge of the drive test being conducted.
A detailed explanation of the two methodologies has been provided below.

2.4.3.2 OPERATOR ASSISTED DRIVE TEST

A total of 3 SSA were selected and audited in each quarter, 1 SSA in each month. The methodology adopted for the drive test-

- 3 consecutive days drive test in one SSA every month. SSA would be defined as per BSNL and month wise SSA list will be finalized by regional TRAI office.
- On an average, a minimum of 100 kilometers were 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-
    - With In city
    - Major Roads
    - Highways
    - Shopping complex/ Mall
    - 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.

2.4.3.3 INDEPENDENT DRIVE TEST

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

- A minimum of 100 kilometers 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-
    - With In city
    - Major Roads
    - Highways
    - Shopping complex/ Mall
    - 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.
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- 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.

2.4.3.4 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

2.5 OPERATORS COVERED

Name of Operator	Number of Subscriber as per VLR
Aircel(DWL)	2495446
Airtel	8857371
BSNL	4044641
Idea	1344249
Reliance CDMA	249456
Reliance GSM	3876436
TATA CDMA	103162
TATA GSM	1534814
Vodafone	3322005

June'15 VLR data was considered for the number of subscribers.

2.6 COLOUR CODES TO READ THE REPORT

Not Meeting the benchmark

Best Performing Operator

3 EXECUTIVE SUMMARY

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

3.1 PMR DATA – 3 MONTHS- CONSOLIDATED

Name of Service Provider	Network Availability		Connection Establishment (Accessibility)			Connection Maintenance (Retainability)		
	BTSs Accumulated downtime (not available for service)	Worst affected BTSs due to downtime	Call Set-up Success Rate (within licensee's own network)	SDCCH/ Paging Chl. Congestion	TCH Congestion	Call Drop Rate (%age)	Worst affected cells having more than 3% TCH drop	%age of connection with good voice quality
Benchmark	≤ 2%	≤ 2%	≥ 95%	≤ 1%	≤ 2%	≤ 2%	≤ 3%	≥ 95%
Aircel(DWL)	1.76%	11.63%	97.78%	0.87%	1.88%	1.36%	11.28%	95.40%
Airtel	0.11%	0.03%	98.79%	0.52%	1.83%	0.87%	1.00%	96.11%
BSNL	0.50%	1.25%	98.71%	0.38%	1.68%	1.42%	2.04%	96.71%
Idea	0.26%	1.11%	96.59%	0.20%	0.68%	0.28%	0.76%	96.52%
Reliance CDMA	0.47%	1.05%	99.68%	NA	0.00%	0.30%	2.32%	99.78%
Reliance GSM	0.11%	0.21%	98.41%	0.23%	0.72%	0.54%	0.22%	98.29%
TATA CDMA	0.20%	0.00%	98.72%	NA	0.04%	0.54%	4.39%	98.25%
TATA GSM	0.09%	0.05%	98.75%	0.19%	0.57%	0.38%	1.28%	97.58%
Vodafone	0.16%	0.62%	99.63%	0.20%	0.37%	0.61%	1.79%	98.62%

For Reliance CDMA and Reliance GSM, data is pertaining to Apr'15 and May'15. Data for Jun'15 could not be audited due to a server issue at operator's end. The same was pre-informed to TRAI by the operator.

NA: SDCCH/ Paging channel congestion not applicable for CDMA operators. Hence, it has been reported as NA for Reliance CDMA and Tata CDMA.

Following are the parameter wise observations for Wireless Operators in Orissa circle:

BTSs Accumulated Downtime

All the operators met the TRAI specified criteria for the outage due to downtime of the base transceiver stations (BTS). Tata GSM performed the best with 0.09% BTS downtime reported.

Worst Affected BTSs Due to Downtime

Aircel failed to meet the TRAI benchmark for the parameter. Tata CDMA performed the best with 0.00% worst affected BTS due to downtime.

Call Set-up Success Rate (CSSR)

All the operators met the TRAI benchmark for the ratio of successful call attempts to the overall call attempts. The best performance was recorded for Reliance CDMA at 99.68% CSSR.

All the operators were found to be calculating the parameter as per the norm specified by TRAI, as given in parameter description section.

Network Congestion parameters:

In terms of network congestion parameters, all the operators had a congestion ratio within the TRAI specified limits. For the SDCCH/Paging channel congestion, the best performance was recorded for Tata GSM with 0.19% congestion. For TCH congestion, Reliance CDMA was the best performer by recording 0.00% TCH congestion.

The calculation methodology (given in parameter description section) followed by the operators was found to be in complete accordance with what has been specified by TRAI.

Call Drop Rate

All operators met the benchmark for call drop rate. Idea was the best performer with 0.28% call drop rate.

Worst Affected Cells Having More than 3% TCH Drop:

Aircel and Tata CDMA failed to meet the benchmark for the parameter. Reliance GSM was the best performer with 0.22% worst affected cells having more than 3% TCH drop.

Voice Quality

All the operators ensured an appropriate amount of voice quality, above the benchmark. Reliance CDMA reported the best performance at 99.78%.

All the service providers were measuring this parameter as per the TRAI guidelines that have been stated in parameter description section.

Below are the month wise summary tables for each network parameter basis PMR data.

3.1.1 PMR DATA – APRIL

Name of Service Provider Month April	Network Availability		Connection Establishment (Accessibility)			Connection Maintenance (Retainability)		
	BTSs Accumulated downtime (not available for service)	Worst affected BTSs due to downtime	Call Set-up Success Rate (within licensee's own network)	SDCCH/ Paging Chl. Congestion	TCH Congestion	Call Drop Rate (%age)	Worst affected cells having more than 3% TCH drop	%age of connection with good voice quality
Benchmark	≤ 2%	≤ 2%	≥ 95%	≤ 1%	≤ 2%	≤ 2%	≤ 3%	≥ 95%
Aircel(DWL)	1.62%	10.63%	97.87%	0.95%	1.87%	1.34%	10.86%	95.54%
Airtel	0.11%	0.02%	98.64%	0.62%	1.89%	0.86%	0.99%	96.11%
BSNL	0.56%	1.42%	98.99%	0.24%	1.28%	1.20%	1.02%	97.15%
Idea	0.32%	1.41%	96.47%	0.26%	0.86%	0.27%	0.66%	96.76%
Reliance CDMA	0.53%	1.05%	99.64%	NA	0.00%	0.30%	2.39%	99.78%
Reliance GSM	0.12%	0.21%	98.36%	0.24%	0.69%	0.54%	0.21%	98.28%
TATA CDMA	0.18%	0.00%	98.83%	NA	0.01%	0.44%	4.42%	98.25%
TATA GSM	0.09%	0.00%	98.67%	0.24%	0.68%	0.38%	1.38%	97.59%
Vodafone	0.16%	0.58%	99.58%	0.23%	0.42%	0.58%	1.75%	98.65%

3.1.2 PMR DATA – MAY

Name of Service Provider Month May	Network Availability		Connection Establishment (Accessibility)			Connection Maintenance (Retainability)		
	BTSs Accumulated downtime (not available for service)	Worst affected BTSs due to downtime	Call Set-up Success Rate (within licensee's own network)	SDCCH/ Paging Chl. Congestion	TCH Congestion	Call Drop Rate (%age)	Worst affected cells having more than 3% TCH drop	%age of connection with good voice quality
Benchmark	≤ 2%	≤ 2%	≥ 95%	≤ 1%	≤ 2%	≤ 2%	≤ 3%	≥ 95%
Aircel(DWL)	1.97%	12.92%	97.67%	0.92%	1.86%	1.30%	10.72%	95.34%
Airtel	0.08%	0.02%	98.81%	0.50%	1.81%	0.86%	0.98%	96.12%
BSNL	0.27%	1.41%	98.77%	0.48%	1.94%	1.58%	2.53%	96.43%
Idea	0.22%	0.95%	96.28%	0.16%	0.86%	0.27%	0.70%	96.81%
Reliance CDMA	0.40%	1.05%	99.73%	NA	0.00%	0.29%	2.25%	99.77%
Reliance GSM	0.09%	0.21%	98.46%	0.21%	0.74%	0.54%	0.23%	98.29%
TATA CDMA	0.13%	0.00%	98.73%	NA	0.03%	0.39%	4.42%	98.25%
TATA GSM	0.09%	0.07%	98.84%	0.12%	0.48%	0.37%	1.14%	97.60%
Vodafone	0.14%	0.65%	99.65%	0.21%	0.35%	0.60%	1.77%	98.65%

3.1.3 PMR DATA - JUNE

Name of Service Provider Month June	Network Availability		Connection Establishment (Accessibility)			Connection Maintenance (Retainability)		
	BTSs Accumulated downtime (not available for service)	Worst affected BTSs due to downtime	Call Set-up Success Rate (within licensee's own network)	SDCCH/ Paging Chl. Congestion	TCH Congestion	Call Drop Rate (%age)	Worst affected cells having more than 3% TCH drop	%age of connection with good voice quality
Benchmark	≤ 2%	≤ 2%	≥ 95%	≤ 1%	≤ 2%	≤ 2%	≤ 3%	≥ 95%
Aircel(DWL)	1.69%	11.35%	97.78%	0.75%	1.90%	1.44%	12.26%	95.32%
Airtel	0.13%	0.04%	98.91%	0.43%	1.78%	0.88%	1.04%	96.10%
BSNL	0.68%	0.93%	98.37%	0.42%	1.83%	1.48%	2.57%	96.54%
Idea	0.24%	0.96%	97.01%	0.18%	0.32%	0.31%	0.93%	95.98%
Reliance CDMA	NDR	NDR	NDR	NA	NDR	NDR	NDR	NDR
Reliance GSM	NDR	NDR	NDR	NDR	NDR	NDR	NDR	NDR
TATA CDMA	0.30%	0.00%	98.60%	NA	0.09%	0.79%	4.32%	98.25%
TATA GSM	0.08%	0.07%	98.73%	0.21%	0.54%	0.39%	1.33%	97.55%
Vodafone	0.17%	0.62%	99.65%	0.16%	0.35%	0.65%	1.85%	98.55%

For Reliance CDMA and Reliance GSM, data for Jun'15 could not be audited due to a server issue at operator's end. The same was pre-informed to TRAI by the operator.

3.2 3 DAY DATA – CONSOLIDATED

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 parameter more or less corroborated with the audit data collected.

Name of Service Provider	Network Availability		Connection Establishment (Accessibility)			Connection Maintenance (Retainability)		
	BTSs Accumulated downtime (not available for service)	Worst affected BTSs due to downtime	Call Set-up Success Rate (within licensee's own network)	SDCCH/ Paging Chl. Congestion (%age)	TCH Congestion (%age)	Call Drop Rate (%age)	Worst affected cells having more than 3% TCH drop	%age of connection with good voice quality
Benchmark	≤ 2%	≤ 2%	≥ 95%	≤ 1%	≤ 2%	≤ 2%	≤ 3%	≥ 95%
Aircel(DWL)	1.70%	0.13%	97.87%	0.69%	1.84%	1.46%	12.21%	95.33%
Airtel	0.15%	0.00%	98.82%	0.49%	1.82%	0.89%	1.30%	96.13%
BSNL	0.12%	0.00%	98.54%	0.29%	1.82%	1.44%	1.82%	96.55%
Idea	0.39%	0.14%	96.84%	0.20%	0.63%	0.37%	0.85%	96.79%
Reliance CDMA	0.47%	0.11%	99.70%	NA	0.00%	0.30%	2.42%	99.77%
Reliance GSM	0.11%	0.00%	98.56%	0.30%	0.71%	0.51%	0.19%	98.26%
TATA CDMA	0.10%	0.00%	98.57%	NA	0.06%	0.49%	4.67%	98.26%
TATA GSM	0.21%	0.00%	98.85%	0.29%	0.45%	0.35%	1.33%	97.57%
Vodafone	0.15%	0.00%	99.62%	0.24%	0.38%	0.64%	1.85%	98.59%

For Reliance CDMA and Reliance GSM, data is pertaining to Apr'15 and May'15. Data for Jun'15 could not be audited due to a server issue at operator's end. The same was pre-informed to TRAI by the operator.

NA: SDCCH/ Paging channel congestion not applicable for CDMA operators. Hence, it has been reported as NA for Reliance CDMA and Tata CDMA.

Following is a parameter wise review of the performance of the operators:

BTSs Accumulated Downtime

All operators met the benchmark for BTS accumulated downtime during live measurements. Tata CDMA was the top performer by reporting 0.10% downtime.

Worst Affected BTSs Due to Downtime

All operators met the benchmark of worst affected BTS due to downtime with majority reporting 0.00% worst affected BTS due to downtime.

Call Set-up Success Rate (CSSR)

All operators met the benchmark for CSSR. Reliance CDMA had the best CSSR at 99.70%.

All the operators were found to be calculating the parameter as per the norm specified by TRAI, as given in parameter description section.

Network Congestion parameters

In terms of network congestion parameters, all the operators had a congestion ratio within the TRAI specified limits.

For the SDCCH/Paging channel congestion, the best performance was recorded for Idea with 0.20% congestion. For the TCH congestion, Reliance CDMA was the best performer with 0.00% TCH congestion.

The calculation methodology (given in parameter description section) followed by the operators was found to be in complete accordance with what has been specified by TRAI.

Call Drop Rate

All operators met the TRAI benchmark. Reliance CDMA was the best performer with 0.30% call drop rate as per live measurement data.

Worst Affected Cells Having More than 3% TCH Drop

Aircel and Tata CDMA failed to meet the benchmark for the parameter. Reliance GSM was the best performer with 0.19% worst affected cells having more than 3% TCH drop.

Voice Quality

All operators met the TRAI benchmark for voice quality. Reliance CDMA was the best performer with 99.77%.

All the service providers were measuring this parameter as per the TRAI guidelines that have been stated in parameter description section.

Below are the month wise summary tables for each network parameter basis 3 day live data.

3.2.1 3 DAY DATA - APRIL

Name of Service Provider 3 Day April	Network Availability		Connection Establishment (Accessibility)			Connection Maintenance (Retainability)		
	BTSs Accumulated downtime (not available for service)	Worst affected BTSs due to downtime	Call Set-up Success Rate (within licensee's own network)	SDCCH/ Paging Chl. Congestion	TCH Congestion	Call Drop Rate (%age)	Worst affected cells having more than 3% TCH drop	%age of connection with good voice quality
Benchmark	≤ 2%	≤ 2%	≥ 95%	≤ 1%	≤ 2%	≤ 2%	≤ 3%	≥ 95%
Aircel(DWL)	1.70%	0.15%	98.09%	0.57%	1.60%	1.61%	11.18%	95.27%
Airtel	0.21%	0.00%	98.55%	0.70%	1.89%	0.95%	1.85%	96.13%
BSNL	0.08%	0.00%	99.11%	0.50%	1.62%	1.24%	0.99%	96.90%
Idea	0.74%	0.00%	97.47%	0.30%	0.90%	0.37%	0.98%	96.76%
Reliance CDMA	0.52%	0.21%	99.70%	NA	0.00%	0.33%	2.43%	99.77%
Reliance GSM	0.15%	0.00%	98.57%	0.52%	0.62%	0.51%	0.18%	98.23%
TATA CDMA	0.20%	0.00%	98.68%	NA	0.01%	0.49%	5.09%	98.26%
TATA GSM	0.38%	0.00%	98.88%	0.66%	0.45%	0.42%	1.59%	97.55%
Vodafone	0.18%	0.00%	99.58%	0.39%	0.42%	0.71%	2.38%	98.54%

3.2.2 3 DAY DATA – MAY

Name of Service Provider 3 day May	Network Availability		Connection Establishment (Accessibility)			Connection Maintenance (Retainability)		
	BTSs Accumulated downtime (not available for service)	Worst affected BTSs due to downtime	Call Set-up Success Rate (within licensee's own network)	SDCCH/ Paging Chl. Congestion	TCH Congestion	Call Drop Rate (%age)	Worst affected cells having more than 3% TCH drop	%age of connection with good voice quality
Benchmark	≤ 2%	≤ 2%	≥ 95%	≤ 1%	≤ 2%	≤ 2%	≤ 3%	≥ 95%
Aircel(DWL)	1.81%	0.19%	98.04%	0.69%	1.70%	1.27%	11.04%	95.44%
Airtel	0.09%	0.00%	98.97%	0.38%	1.81%	0.79%	0.91%	96.14%
BSNL	0.16%	0.00%	98.50%	0.17%	1.97%	1.48%	1.76%	96.36%
Idea	0.19%	0.24%	96.60%	0.10%	0.63%	0.41%	0.62%	96.95%
Reliance CDMA	0.42%	0.00%	99.70%	NA	0.00%	0.27%	2.41%	99.77%
Reliance GSM	0.07%	0.00%	98.56%	0.09%	0.81%	0.50%	0.19%	98.28%
TATA CDMA	0.05%	0.00%	98.51%	NA	0.14%	0.36%	4.13%	98.26%
TATA GSM	0.16%	0.00%	99.17%	0.06%	0.28%	0.35%	1.07%	97.67%
Vodafone	0.13%	0.00%	99.66%	0.21%	0.34%	0.54%	1.43%	98.71%

3.2.3 3 DAY DATA - JUNE

Name of Service Provider 3 Day June	Network Availability		Connection Establishment (Accessibility)			Connection Maintenance (Retainability)		
	BTSs Accumulated downtime (not available for service)	Worst affected BTSs due to downtime	Call Set-up Success Rate (within licensee's own network)	SDCCH/ Paging Chl. Congestion	TCH Congestion	Call Drop Rate (%age)	Worst affected cells having more than 3% TCH drop	%age of connection with good voice quality
Benchmark	≤ 2%	≤ 2%	≥ 95%	≤ 1%	≤ 2%	≤ 2%	≤ 3%	≥ 95%
Aircel(DWL)	1.60%	0.04%	97.47%	0.82%	2.22%	1.51%	14.40%	95.28%
Airtel	0.16%	0.00%	98.94%	0.40%	1.77%	0.92%	1.13%	96.12%
BSNL	0.13%	0.00%	98.03%	0.21%	1.88%	1.60%	2.72%	96.39%
Idea	0.25%	0.18%	96.43%	0.19%	0.35%	0.34%	0.94%	96.66%
Reliance CDMA	NDR	NDR	NDR	NA	NDR	NDR	NDR	NDR
Reliance GSM	NDR	NDR	NDR	NDR	NDR	NDR	NDR	NDR
TATA CDMA	0.06%	0.00%	98.52%	NA	0.03%	0.63%	4.80%	98.25%
TATA GSM	0.10%	0.00%	98.51%	0.13%	0.61%	0.27%	NA	97.50%
Vodafone	0.13%	0.00%	99.61%	0.12%	0.39%	0.68%	1.73%	98.53%

For Reliance CDMA and Reliance GSM, data for Jun'15 could not be audited due to a server issue at operator's end. The same was pre-informed to TRAI by the operator.

3.3 LIVE CALLING DATA – CONSOLIDATED

Name of Service Provider	Resolution of billing complaints		Service Requests	Level 1 Service	Customer Care	
	%age complaints resolved within 4 weeks	%age complaints resolved within 6 weeks	Complaint /Request attended to Satisfaction	Call answered	Accessibility of call centre/ customer care	Percentage of calls answered by the operators within 90 seconds
Benchmark	98.00%	100.00%		≥ 95%	≥ 95%	≥ 95%
Aircel(DWL)	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
Airtel	94.00%	100.00%	95.00%	98.67%	98.00%	94.00%
BSNL	92.00%	100.00%	97.00%	100.00%	100.00%	100.00%
Idea	100.00%	100.00%	98.00%	100.00%	100.00%	100.00%
Reliance CDMA	93.02%	100.00%	97.00%	100.00%	100.00%	99.00%
Reliance GSM	98.00%	100.00%	99.00%	100.00%	100.00%	97.00%
TATA CDMA	NA	NA	100.00%	100.00%	100.00%	100.00%
TATA GSM	NA	NA	100.00%	100.00%	100.00%	100.00%
Vodafone	93.00%	100.00%	97.00%	100.00%	100.00%	100.00%

Resolution of billing complaints

As per live calling, Airtel, BSNL, Reliance CDMA and Vodafone failed to meet the TRAI benchmark of resolution of billing complaints within 4 weeks. Aircel and Idea performed the best on the parameter. All the operators were able to resolve 100% complaints within 6 weeks.

NA: Live calling for Tata CDMA and Tata GSM was not conducted due to non-availability of base of complaints.

Complaint/Request Attended to Satisfaction

Aircel, Tata CDMA and Tata GSM performed the best on the parameter.

Level 1 Service

All operators met the TRAI benchmark for Level 1 services. The details of live calling done for the level 1 service have been provided in the annexure for each operator.

As per live calling conducted for 'level 1' services, a number of Category-I (i.e. mandatory) services were not being operated by most of the operators.

Accessibility of Call Centre/Customer Care-IVR

For the IVR aspect all the service providers meet the TRAI benchmark for the parameter.

Customer Care / Helpline Assessment

Airtel failed to meet the TRAI benchmark of 95% of calls (voice to voice) answered by the call center executives within 90 seconds.

3.4 BILLING AND CUSTOMER CARE - CONSOLIDATED

Name of Service Provider	Metering and billing credibility		Resolution of billing complaints		Response time to customer for assistance	Customer care	
	Postpaid Subscribers	Prepaid Subscribers	% of complaints resolved in 4 weeks	% of complaints resolved in 6 weeks	% of cases where credit/wavier is received within one week	Percentage of calls answered by the IVR	Percentage of calls answered by the operators (Voice to Voice) Within 90 Seconds
Benchmark	≤ 0.1%	≤ 0.1%	≥ 98%	≥ 100%	≥ 100%	≥ 95%	≥ 95%
Aircel(DWL)	0.02%	0.02%	100.00%	100.00%	100.00%	97.68%	99.75%
Airtel	0.05%	0.02%	100.00%	100.00%	100.00%	100.00%	97.89%
BSNL	0.00%	0.01%	100.00%	100.00%	100.00%	95.64%	95.30%
Idea	0.10%	0.05%	100.00%	100.00%	100.00%	98.55%	98.33%
Reliance CDMA	0.07%	0.01%	100.00%	100.00%	100.00%	98.68%	99.67%
Reliance GSM	0.10%	0.03%	100.00%	100.00%	100.00%	98.89%	73.88%
TATA CDMA	0.00%	0.00%	NA	NA	NA	99.37%	98.28%
TATA GSM	0.00%	0.00%	NA	NA	NA	96.09%	98.31%
Vodafone	0.07%	0.03%	100.00%	100.00%	100.00%	99.97%	98.75%

Metering and billing credibility – Postpaid Subscribers

For the postpaid customers, all operators met the TRAI benchmark. Tata CDMA and Tata GSM performed the best with 0.00% billing disputes.

Metering and billing credibility – Prepaid Subscribers

For the charging disputes of the prepaid subscribers, all operators met the TRAI benchmark. Tata CDMA and Tata GSM performed the best with 0.00% disputes.

Resolution of Billing Complaints

It was seen that that all the operators met the TRAI criteria of resolving the billing complaints within 4 weeks as well as within 6 weeks. It is to be noted that Aircel, Airtel and Idea have reported high ratio of invalid complaints. Auditors recommend further investigation of the issue independently by TRAI. Further details could be found in annexure (section 8.7).

NA: There were no complaints that were logged by subscribers of Tata CDMA and Tata GSM during the audit period. Hence the parameter is not applicable for these operators.

Response Time to customer for assistance - % of cases in which advance wavier is received within one week

It was seen that all the operators met the TRAI benchmark of providing credit or waiver within one week in case of complaints received.

Customer Care Percentage of calls answered by the operators IVR

All operators met the benchmark for calls answered by IVR. Airtel performed the best by connecting 100% IVR calls.

Customer Care Percentage of calls answered by the operators (Voice to Voice)

Reliance GSM failed to meet the benchmark of calls being answered within 90 seconds. Aircel was the best performer on the parameter with 99.75%.

3.5 INTER OPERATOR CALL ASSESSMENT - CONSOLIDATED

6. Inter Operator Call Assessment									
Inter operator call Assessment To↓ From→	Aircel(DWL)	Airtel	BSNL	Idea	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Vodafone
Aircel(DWL)	NA	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
Airtel	100.00%	NA	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
BSNL	100.00%	100.00%	NA	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
Idea	100.00%	100.00%	100.00%	NA	100.00%	100.00%	100.00%	100.00%	100.00%
Reliance CDMA	100.00%	100.00%	100.00%	100.00%	NA	100.00%	100.00%	100.00%	100.00%
Reliance GSM	100.00%	100.00%	100.00%	100.00%	100.00%	NA	100.00%	100.00%	100.00%
TATA CDMA	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	NA	100.00%	100.00%
TATA GSM	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	NA	100.00%
Vodafone	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	NA

None of the operators faced any problem in connecting to other operators as per live calling done for inter-operator call assessment.

Maximum Problem faced by the calling operator to other operator. The orange colour denotes performance below circle average.

4 CRITICAL FINDINGS

PMR Consolidated (Network Parameters)

Aircel failed to meet the TRAI benchmark for worst affected BTS due to downtime. Aircel and Tata CDMA failed to meet the benchmark for worst affected cells having more than 3% TCH drop.

3 Day Live Measurement (Network Parameters)

Aircel and Tata CDMA failed to meet the benchmark for worst affected cells having more than 3% TCH drop.

For 'Worst affected BTS due to downtime', significant difference was observed between PMR & live measurement data for Aircel. The possible reason for the variation could be the difference in time frame of data as PMR data is for 30 days and live measurement data is for three days.

Live Calling

Airtel, BSNL, Reliance CDMA and Vodafone failed to meet the benchmark for billing complaints resolved within 4 weeks.

Airtel failed to meet the TRAI benchmark of 95% of calls answered by the call center executives within 90 seconds.

As per live calling conducted for 'level 1' services, a number of Category-I (i.e. mandatory) services were not being operated by most of the operators.

Metering and Billing Credibility

It is to be noted that Aircel, Airtel and Idea have reported high ratio of invalid complaints. Auditors recommend further investigation of the issue independently by TRAI and operators should provide detailed explanation of reasons for reporting majority of their complaints as invalid to TRAI.

Customer Care

Reliance GSM failed to meet the benchmark of calls (voice to voice) being answered by call center executives within 90 seconds during audit.

5 PARAMETER DESCRIPTION & DETAILED FINDINGS - COMPARISON BETWEEN PMR DATA, 3 DAY LIVE DATA AND LIVE CALLING DATA

5.1 BTS ACCUMULATED DOWNTIME

5.1.1 PARAMETER DESCRIPTION

- The parameter of network availability would be measured from following sub-parameters

    1. BTSs Accumulated downtime (not available for service)
    2. Worst affected BTSs due to downtime

1. **Definition - BTSs (Base Transceiver Station) accumulated downtime** (not available for service) shall basically measure the downtime of the BTSs, including its transmission links/circuits during the period of a month, but excludes all planned service downtime for any maintenance or software up gradation. For measuring the performance against the benchmark for this parameter the downtime of each BTS lasting more than 1 hour at a time in a day during the period of a month were considered.

2. **Computation Methodology –**
   BTS accumulated downtime (not available for service) = 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

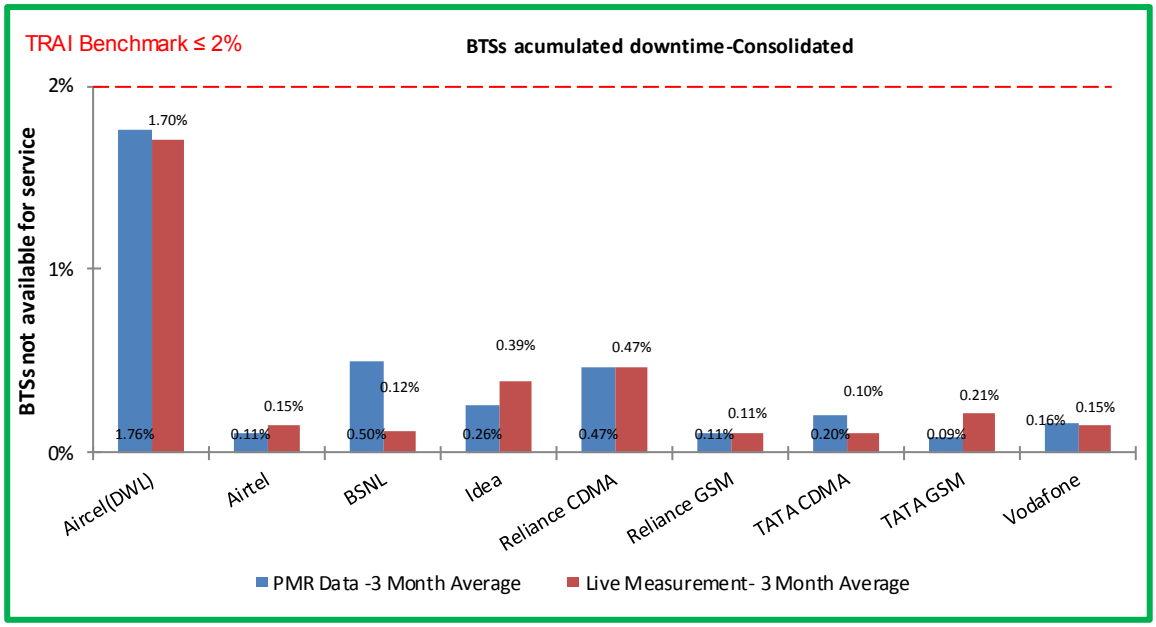
3. **TRAI Benchmark –**

    a. BTSs Accumulated downtime (not available for service) ≤ 2%

4. **Audit Procedure –**

    - The fault alarm details at the OMC (MSC) for the network outages (due to own network elements and infrastructure service provider end outages) was audited
    - All the BTS in service area were considered. Planned outages due to network up gradation, routine maintenance were not considered.
    - Any outage as a result of force majeure were not considered at the time of calculation
    - Data is extracted from system log of the server of the operator. This data is in raw format which is further processed to arrive at the cumulative values.
    - List of operating sites with cell details and ids are taken from the operator.
    - When there is any outage a performance report gets generated in line with that cell resulting and master base of the Accumulated downtime and worst affected BTS due to downtime.

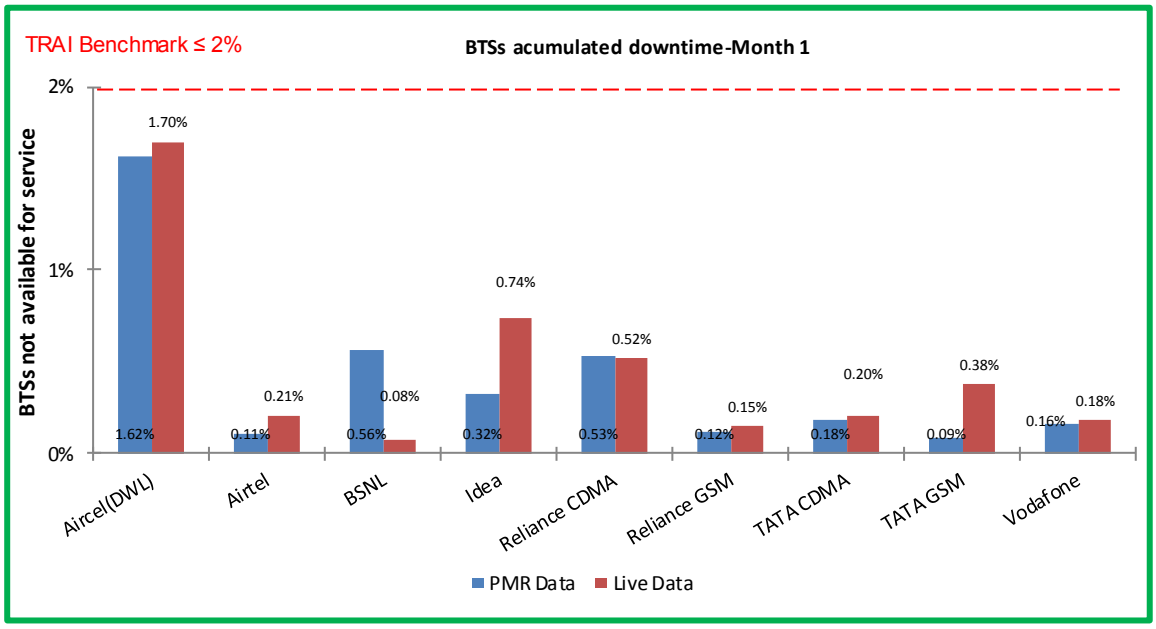
5.1.2 KEY FINDINGS – CONSOLIDATED



Data Source: Operations and Maintenance Center (OMC) of the operators

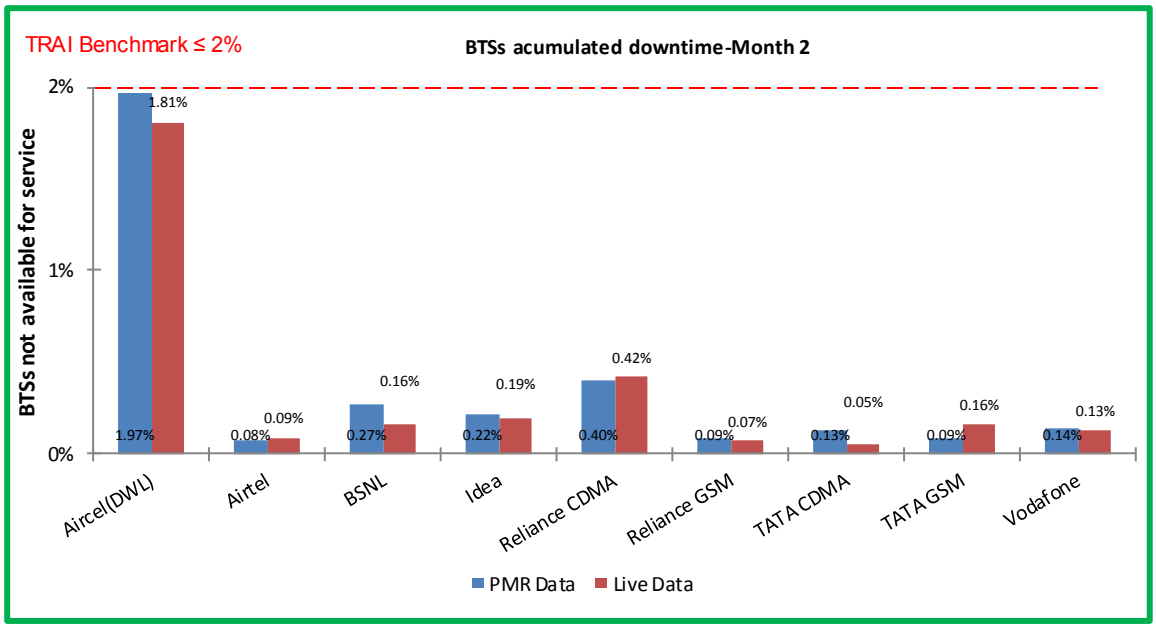
All operators met the TRAI benchmark for the parameter.

5.1.2.1 KEY FINDINGS – MONTH 1



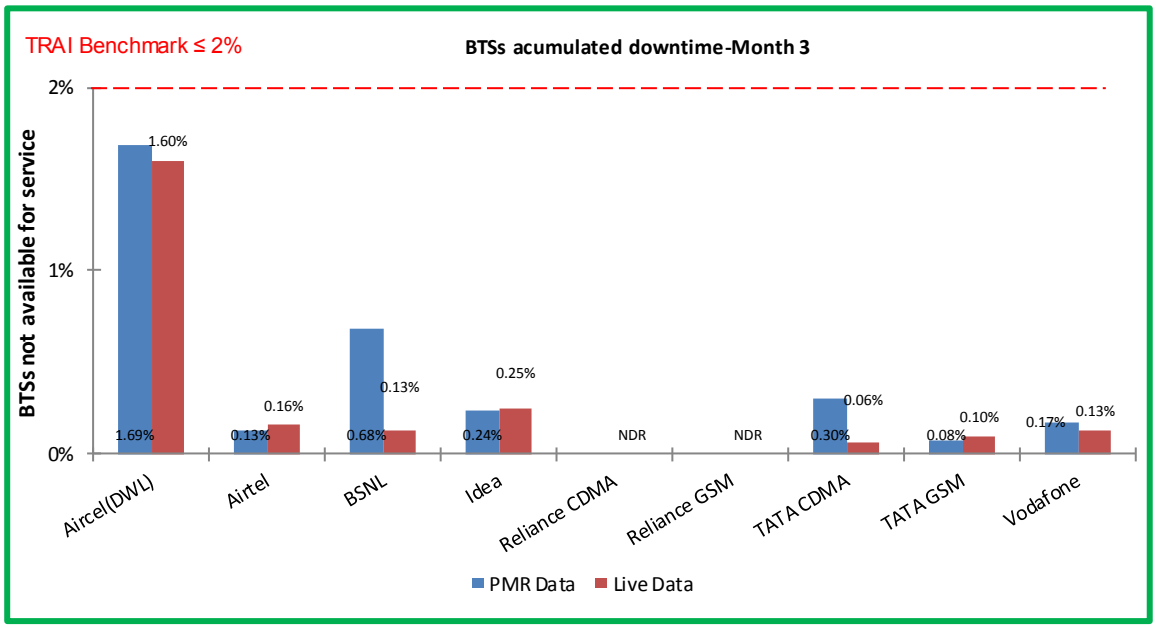
Data Source: Operations and Maintenance Center (OMC) of the operators

5.1.2.2 KEY FINDINGS – MONTH 2



Data Source: Operations and Maintenance Center (OMC) of the operators

5.1.2.3 KEY FINDINGS – MONTH 3



For Reliance CDMA and Reliance GSM, data for Jun'15 could not be audited due to a server issue at operator's end. The same was pre-informed to TRAI by the operator.

Data Source: Operations and Maintenance Center (OMC) of the operators

5.2 WORST AFFECTED BTS DUE TO DOWNTIME

5.2.1 PARAMETER DESCRIPTION

1. **Definition – Worst Affected BTS due to downtime** shall basically measure percentage of BTS having downtime greater than 24 hours in a month. Planned outages were not considered as part while computing.

   For measuring the parameter "Percentage of worst affected BTSs due to downtime" the downtime of each BTS lasting for more than 1 hour at a time in a day during the period of a month was considered.

2. **Computation Methodology –**

   Worst affected BTSs due to downtime = (Number of BTSs having accumulated downtime greater than 24 hours in a month / Number of BTS in Licensed Service Area) * 100

3. **TRAI Benchmark –**

   a. Worst affected BTSs due to downtime ≤ 2%

4. **Audit Procedure –**

   i. The fault alarm details at the OMC (MSC) for the network outages (due to own network elements and infrastructure service provider end outages) was audited

   ii. All the BTS in service area were considered. Planned outages due to network up gradation, routine maintenance were not considered.

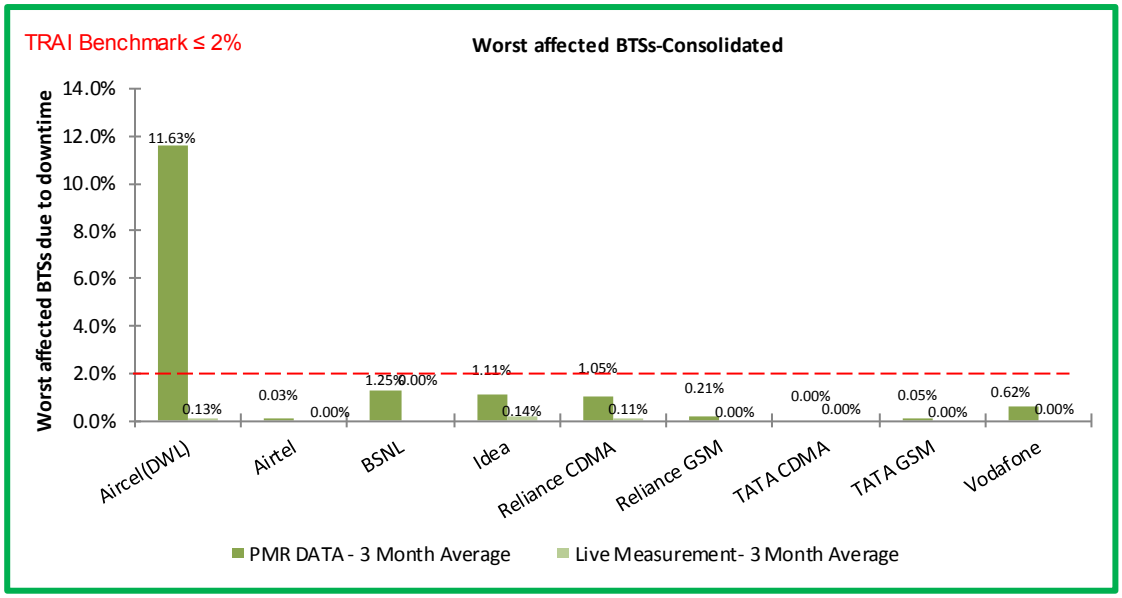
   iii. Data is extracted from system log of the server of the operator. This data is in raw format which is further processed to arrive at the cumulative values.

   iv. Any outage as a result of force majeure was not considered at the time of calculation.

   v. List of operating sites with cell details and ids are taken from the operator.

   vi. All the BTS having down time greater than 24 hours is assessed and values of BTS accumulated downtime is computed in accordance.

5.2.2 KEY FINDINGS – CONSOLIDATED

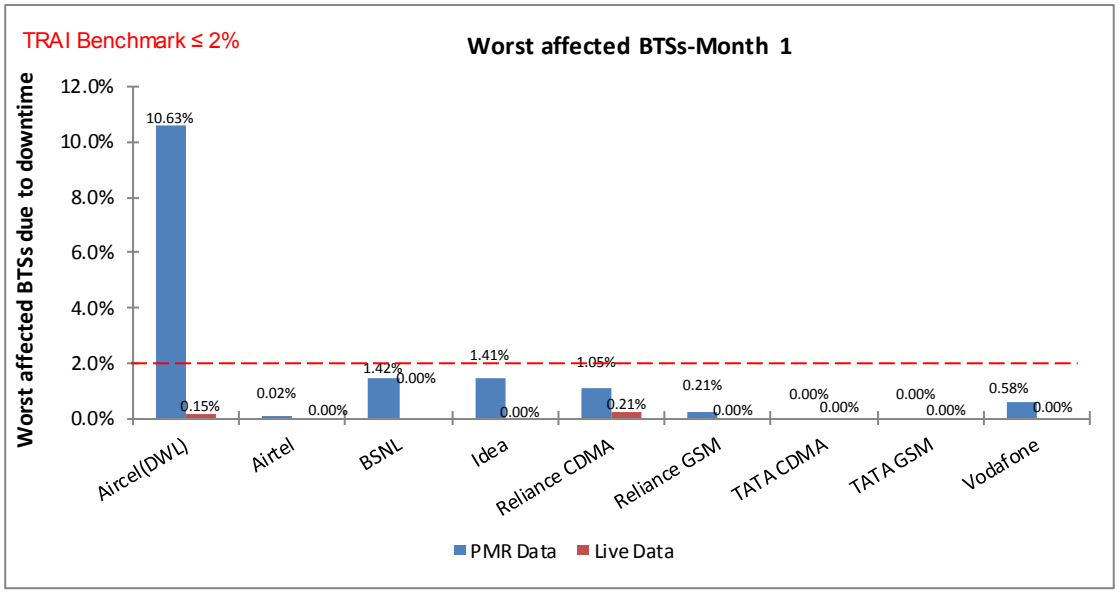


Data Source: Operations and Maintenance Center (OMC) of the operators

Aircel failed to meet the benchmark for the worst affected BTS due to downtime as per PMR data.

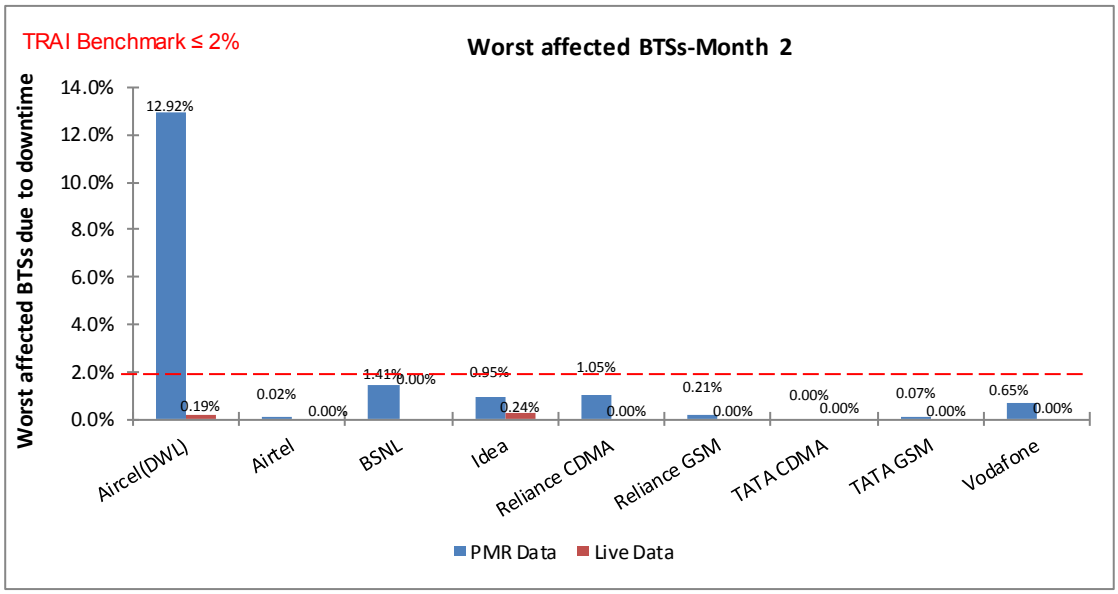
Significant difference was observed between PMR & live measurement data for Aircel. The possible reason for the variation could be the difference in time frame of data as PMR data is for 30 days and live measurement data is for three days.

5.2.2.1 KEY FINDINGS – MONTH 1



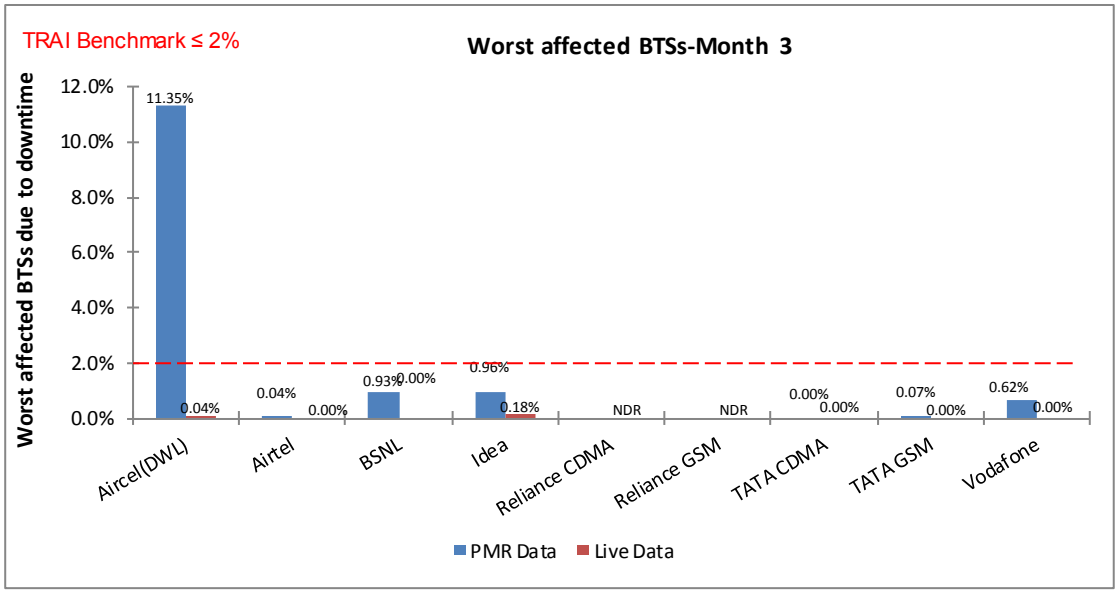
Data Source: Operations and Maintenance Center (OMC) of the operators

5.2.2.2 KEY FINDINGS – MONTH 2



Data Source: Operations and Maintenance Center (OMC) of the operators

5.2.2.3 KEY FINDINGS – MONTH 3



For Reliance CDMA and Reliance GSM, data for Jun'15 could not be audited due to a server issue at operator's end. The same was pre-informed to TRAI by the operator.

Data Source: Operations and Maintenance Center (OMC) of the operators

5.3 CALL SET UP SUCCESS RATE

5.3.1 PARAMETER DESCRIPTION

1. **Definition:** The ratio of successful calls established to total calls is known as Call Set-Up Success Rate (CSSR).
2. **Computation Methodology-**

   (Calls Established / Total Call Attempts) * 100

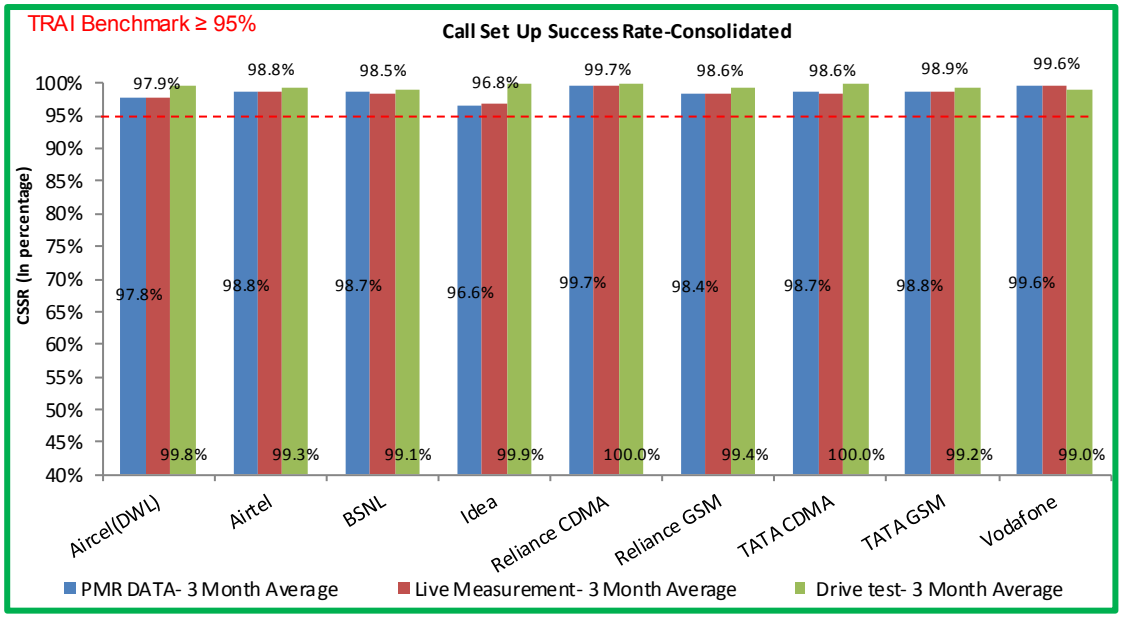
   Call Established means the following events have happened in call setup:-

   - call attempt is made
   - the TCH is allocated
   - the call is routed to the outward path of the concerned MSC

3. **TRAI Benchmark ≥** 95%
4. **Audit Procedure –**

   - The cell-wise data generated through counters/ MMC available in the switch for traffic measurements
   - CSSR calculation should be measured using OMC generated data only
   - Measurement should be only in Time Consistent Busy Hour (CBBH) period for all days of the week
   - Counter data is extracted from the NOC of the operators.
   - Total calls established include all calls established excluding Signaling blocking, TCH Drop and TCH blocking.
   - The numerator and denominator values are derived from adding the counter values from the MSC.

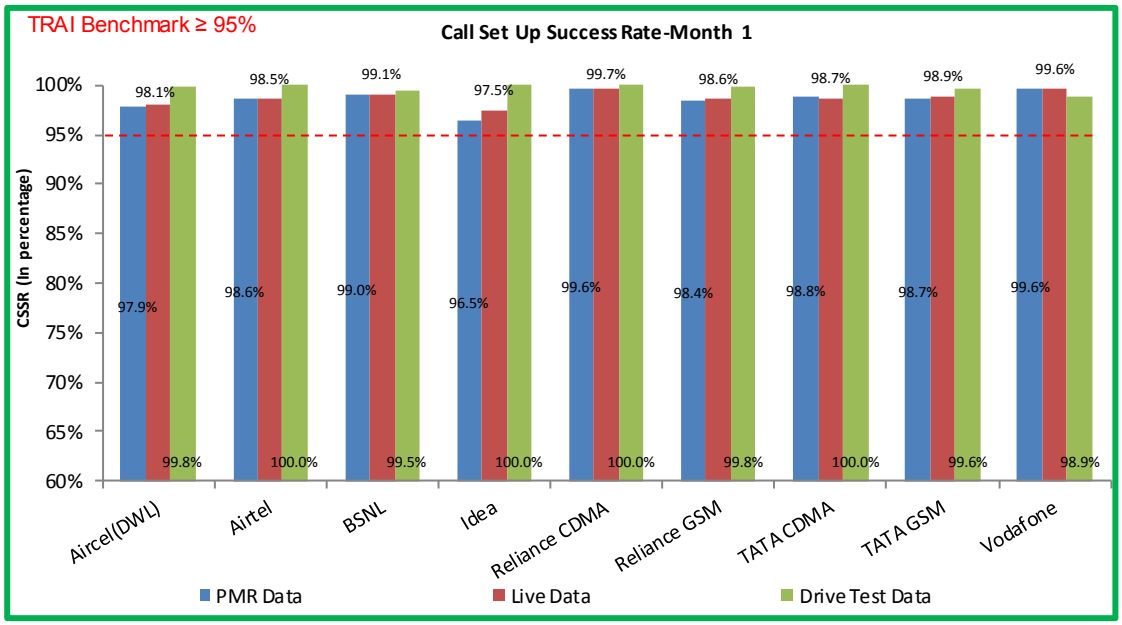
5.3.2 KEY FINDINGS – CONSOLIDATED



Data Source: Network Operations Center (NOC) of the operators and Drive test reports submitted by operators to auditors

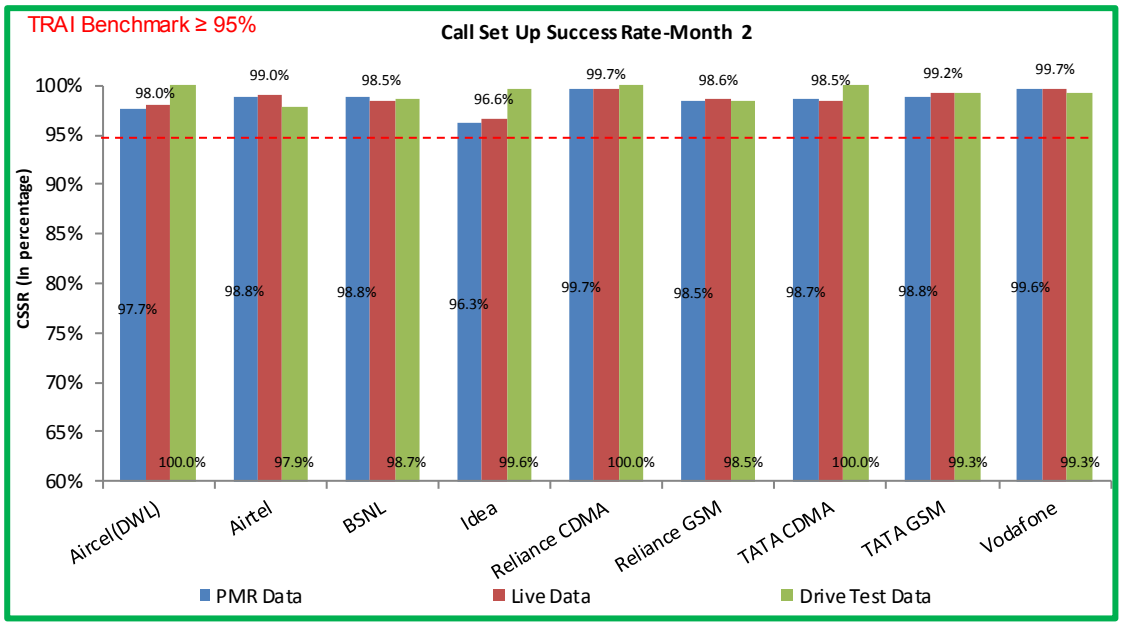
All the operators met the benchmark for CSSR as per PMR data.

5.3.2.1 KEY FINDINGS – MONTH 1



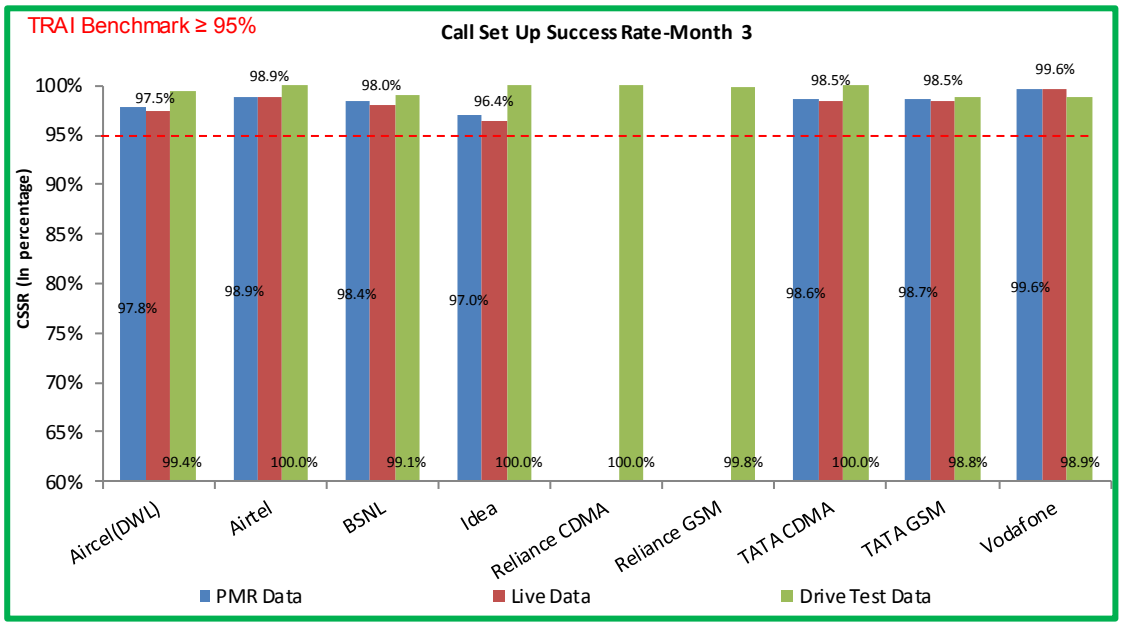
Data Source: Network Operations Center (NOC) of the operators and Drive test reports submitted by operators to auditors

5.3.2.2 KEY FINDINGS – MONTH 2



Data Source: Network Operations Center (NOC) of the operators and Drive test reports submitted by operators to auditors

5.3.2.3 KEY FINDINGS – MONTH 3



For Reliance CDMA and Reliance GSM, data for Jun'15 could not be audited due to a server issue at operator's end. The same was pre-informed to TRAI by the operator.

Data Source: Network Operations Center (NOC) of the operators and Drive test reports submitted by operators to auditors

5.4 NETWORK CHANNEL CONGESTION- PAGING CHANNEL /TCH CONGESTION/POI

5.4.1 PARAMETER DESCRIPTION

1. **Definition:** It means a call is not connected because there is no free channel to serve the call attempt. This parameter represents congestion in the network. It happens at three levels:

   - SDCCH Level: Stand-alone dedicated control channel
   - TCH Level: Traffic Channel
   - POI Level: Point of Interconnect

2. **Computational Methodology:**

   - **SDCCH / TCH Congestion% = [(A1 x C1) + (A2 x C2) +.....+ (An x Cn)] / (A1 + A2 +...+ An)**
     - Where:-A1 = Number of attempts to establish SDCCH / TCH made on day 1
     - C1 = Average SDCCH / TCH Congestion % on day 1
     - A2 = Number of attempts to establish SDCCH / TCH made on day 2
     - C2 = Average SDCCH / TCH Congestion % on day 2
     - An = Number of attempts to establish SDCCH / TCH made on day n
     - Cn = Average SDCCH / TCH Congestion % on day n
   - **POI Congestion% = [(A1 x C1) + (A2 x C2) +.....+ (An x Cn)] / (A1 + A2 +...+ An)**
     - Where:-A1 = POI traffic offered on all POIs (no. of calls) on day 1
     - C1 = Average POI Congestion % on day 1
     - A2 = POI traffic offered on all POIs (no. of calls) on day 2
     - C2 = Average POI Congestion % on day 2
     - An = POI traffic offered on all POIs (no. of calls) on day n
     - Cn = Average POI Congestion % on day n

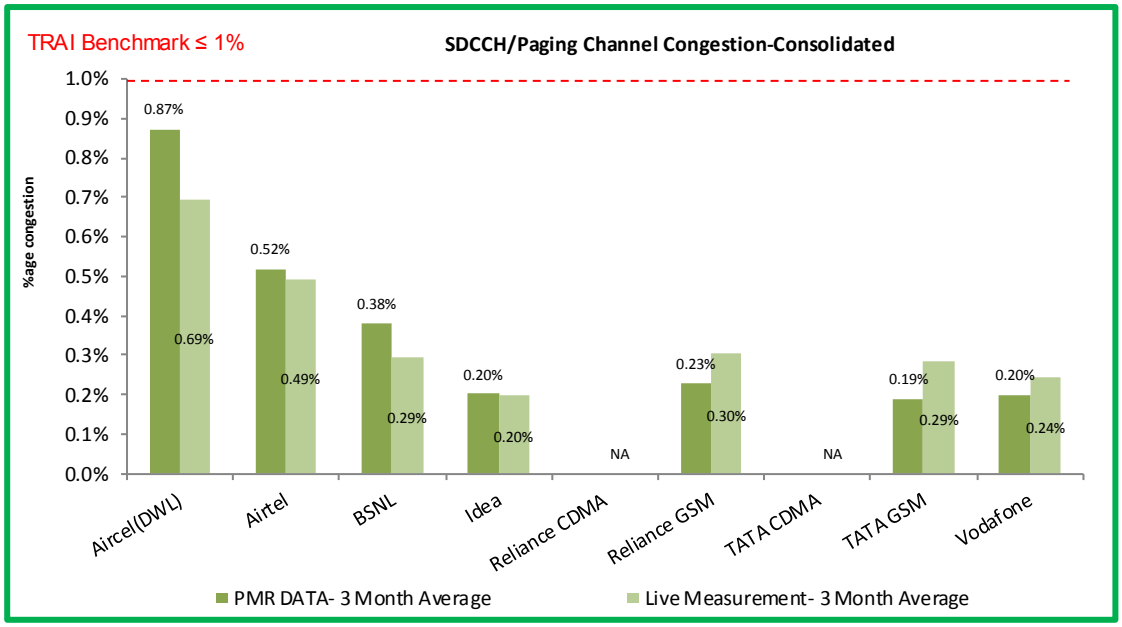
3. **Benchmark:**

   - SDCCH Congestion: ≤ 1%, TCH Congestion: ≤ 2%, POI Congestion: ≤ 0.5%

4. **Audit Procedure –**

   - Audit of the details of SDCCH and TCH congestion percentages computed by the operator (using OMC–Switch data only) would be conducted
   - The operator should be measuring this parameter during Time consistent busy hour (TCBH) only SDCCH

5.4.2 KEY FINDINGS - SDCCH/PAGING CHANNEL CONGESTION (CONSOLIDATED)

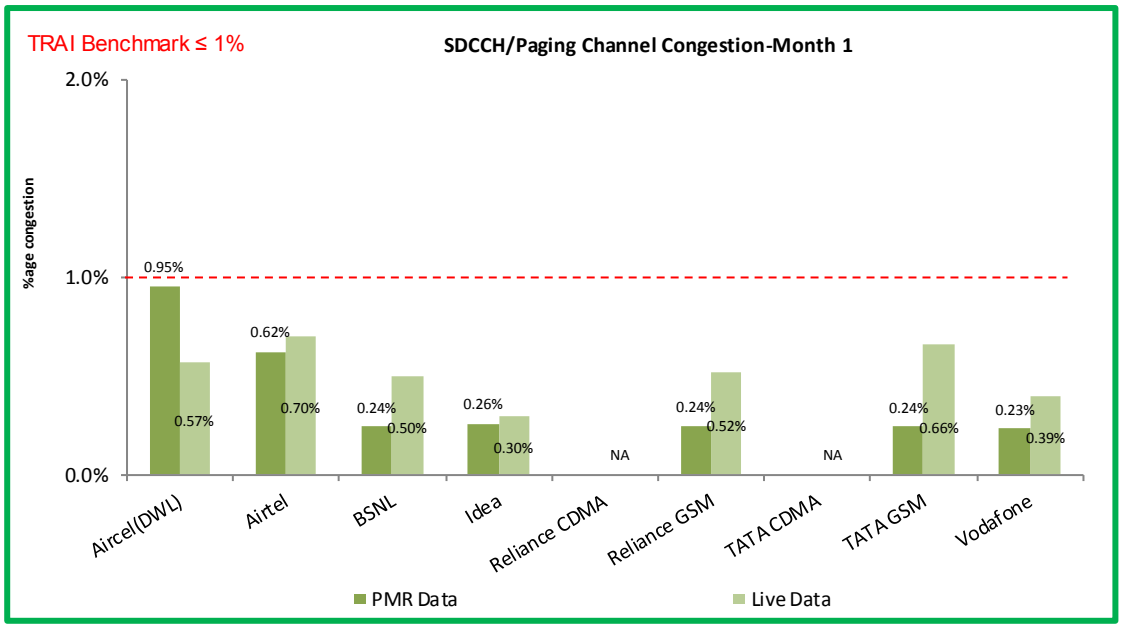


Data Source: Network Operations Center (NOC) of the operators

All the operators met the TRAI benchmark for the parameter.

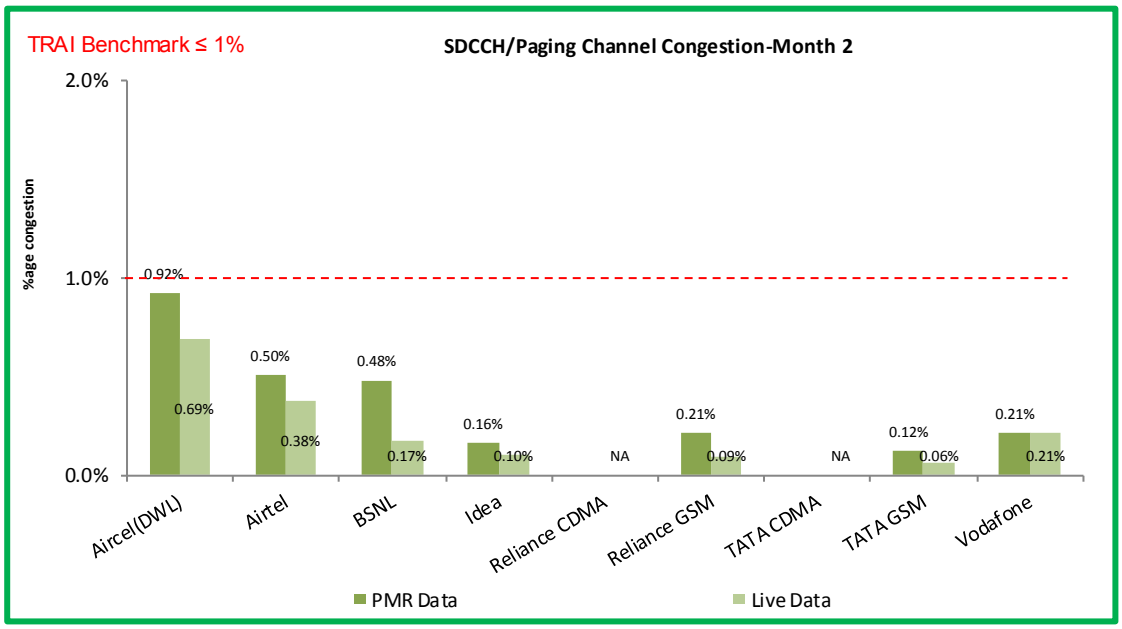
SDCCH/ Paging channel congestion not applicable for CDMA operators. Hence, it has been reported as o% for Reliance CDMA and Tata CDMA.

5.4.2.1 KEY FINDINGS – MONTH 1



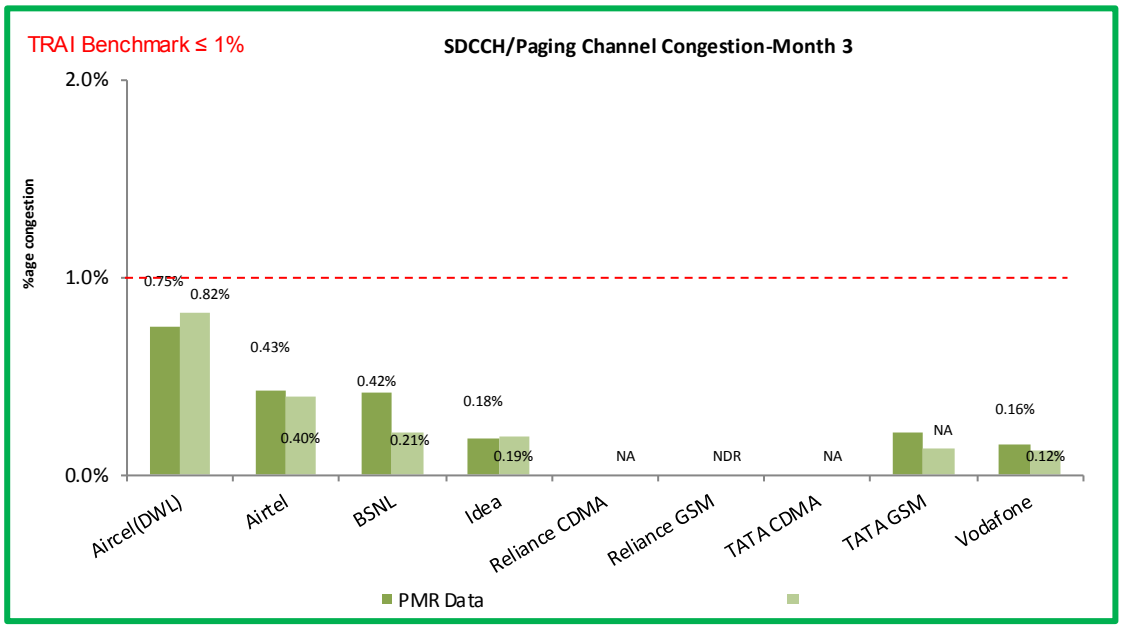
Data Source: Network Operations Center (NOC) of the operators

5.4.2.2 KEY FINDINGS – MONTH 2



Data Source: Network Operations Center (NOC) of the operators

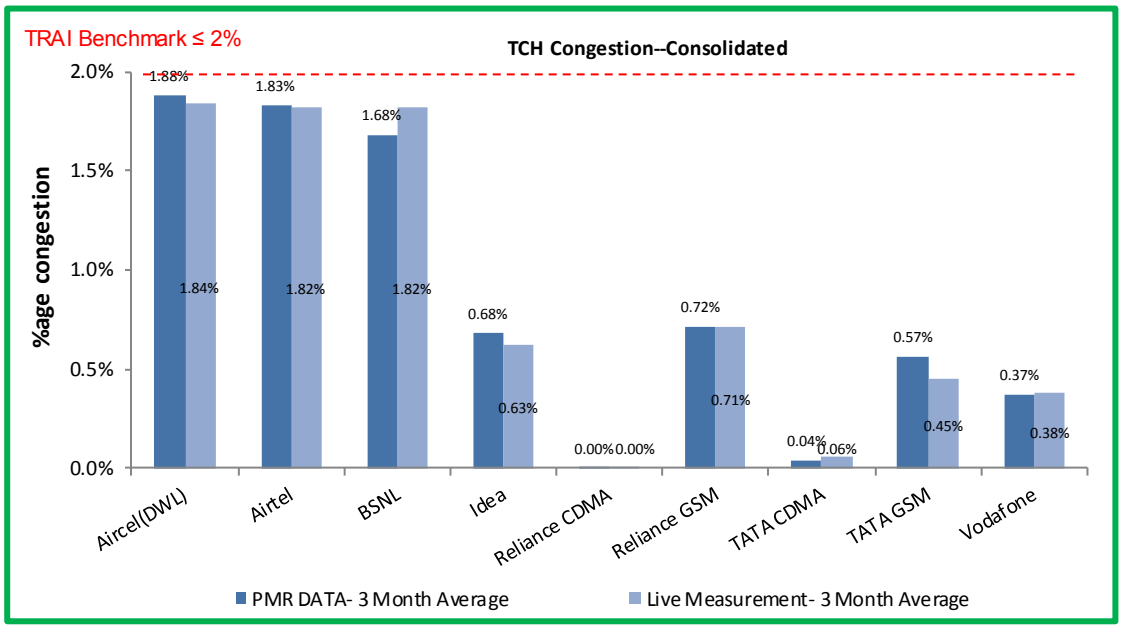
5.4.2.3 KEY FINDINGS – MONTH 3



For Reliance CDMA and Reliance GSM, data for Jun'15 could not be audited due to a server issue at operator's end. The same was pre-informed to TRAI by the operator.

Data Source: Network Operations Center (NOC) of the operators

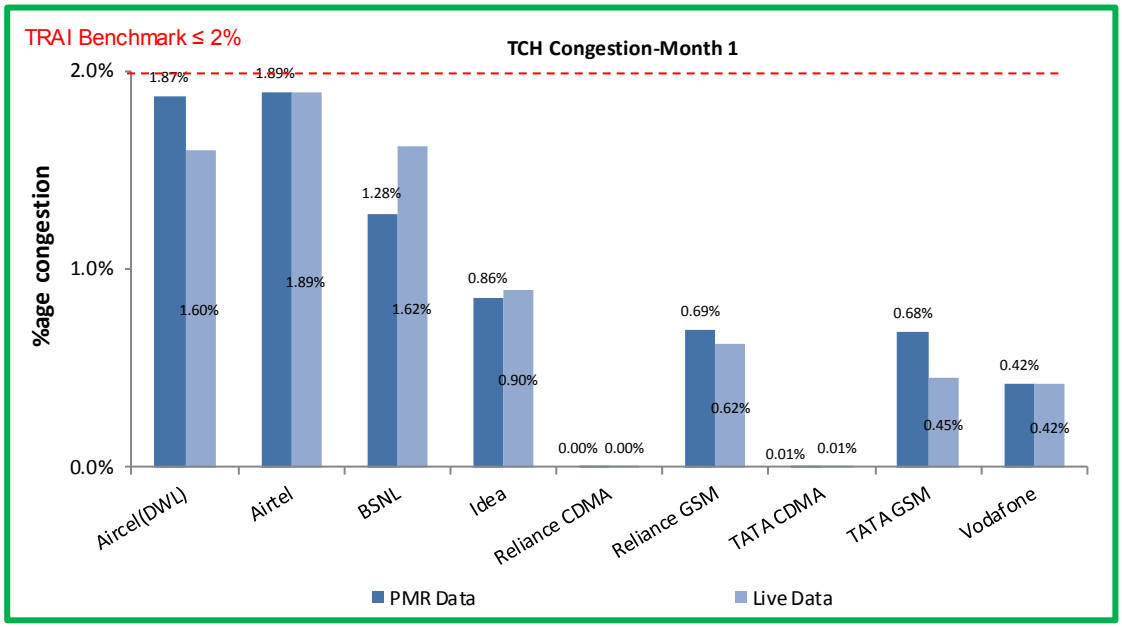
5.4.3 KEY FINDINGS – TCH CONGESTION (CONSOLIDATED)



Data Source: Network Operations Center (NOC) of the operators

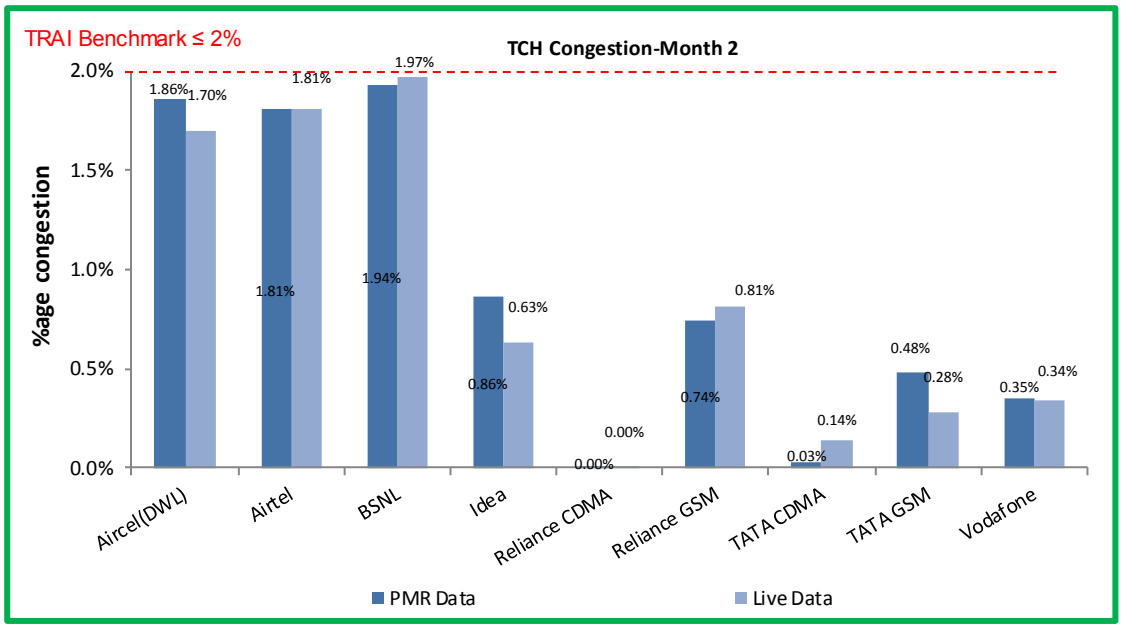
All the operators met the TRAI benchmark for TCH congestion.

5.4.3.1 KEY FINDINGS – MONTH 1



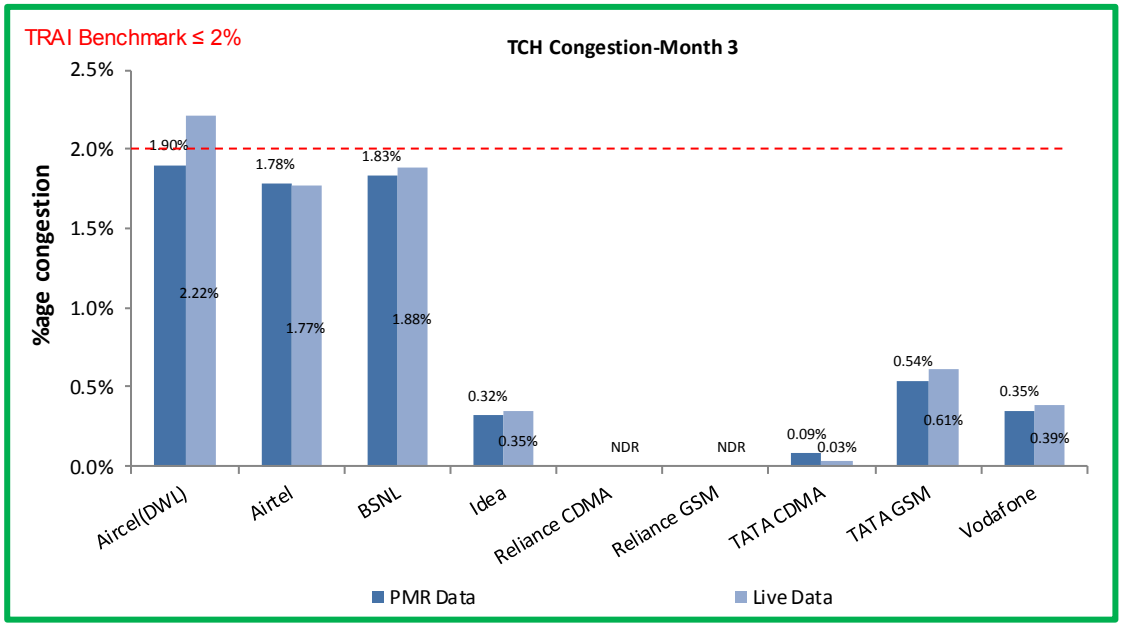
Data Source: Network Operations Center (NOC) of the operators

5.4.3.2 KEY FINDINGS – MONTH 2



Data Source: Network Operations Center (NOC) of the operators

5.4.3.3 KEY FINDINGS – MONTH 3



For Reliance CDMA and Reliance GSM, data for Jun'15 could not be audited due to a server issue at operator's end. The same was pre-informed to TRAI by the operator.

Data Source: Network Operations Center (NOC) of the operators

5.4.4 KEY FINDINGS – POI CONGESTION (CONSOLIDATED)

Audit Results for POI Congestion										
POI congestion	Benchmark	Aircel(DWL)	Airtel	BSNL	Idea	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Vodafone
Total number of working POIs		111	21	13	65	8	8	43	12	47
No. of POIs not meeting benchmark		0	0	0	0	0	0	0	0	0
Total Capacity of all POIs (A) - in erlangs		73899	109735	25000	44625	10050	27524	13756	14005	98377
Traffic served for all POIs (B)- in erlangs		50456	62730	22429	27949	2911	17333	6284	8451	45224
POI congestion	≤ 0.5%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%

Live Measurement Results for POI Congestion										
POI congestion	Benchmark	Aircel(DWL)	Airtel	BSNL	Idea	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Vodafone
Total number of working POIs		111	21	13	65	8	8	43	12	47
No. of POIs not meeting benchmark		0	0	0	0	0	0	0	0	0
Total Capacity of all POIs (A) - in erlangs		74596	109764	25000	45832	10050	27524	13769	14005	98377
Traffic served for all POIs (B)- in erlangs		49026	62832	19161	27739	2913	17925	6293	8325	44237
POI congestion	≤ 0.5%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%

Data Source: Network Operations Center (NOC) of the operators

All the operators met the benchmark of POI congestion as per PMR Data.

5.4.4.1 KEY FINDINGS – MONTH 1

Audit Results for POI Congestion- PMR data-April										
POI congestion	Benchmark	Aircel(DWL)	Airtel	BSNL	Idea	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Vodafone
Total number of working POIs		110	21	13	63	8	8	43	12	46
No. of POIs not meeting benchmark		0	0	0	0	0	0	0	0	0
Total Capacity of all POIs (A) - in erlangs		72492	110159	25000	40347	10050	27524	13664	14005	91717
Traffic served for all POIs (B)- in erlangs		51849	64652	23340	27841	2934	16357	6215	8421	38539
POI congestion	≤ 0.5%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%

Live Measurement Results for POI Congestion- 3 Day data-April										
POI congestion	Benchmark	Aircel(DWL)	Airtel	BSNL	Idea	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Vodafone
Total number of working POIs		110	21	13	63	8	8	43	12	46
No. of POIs not meeting benchmark		0	0	0	0	0	0	0	0	0
Total Capacity of all POIs (A) - in erlangs		73113	110179	25000	40109	10050	27524	13703	14005	91717
Traffic served for all POIs (B)- in erlangs		48499	64736	19962	27217	2916	17143	6364	7979	36131
POI congestion	≤ 0.5%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%

5.4.4.2 KEY FINDINGS – MONTH 2

Audit Results for POI Congestion- PMR data-May										
POI congestion	Benchmark	Aircel(DWL)	Airtel	BSNL	Idea	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Vodafone
Total number of working POIs		110	21	13	64	8	8	43	12	46
No. of POIs not meeting benchmark		0	0	0	0	0	0	0	0	0
Total Capacity of all POIs (A) - in erlangs		73519	109555	25000	40234	10050	27524	13802	14005	91717
Traffic served for all POIs (B)- in erlangs		50583	63354	21993	28174	2889	18309	5775	8551	44771
POI congestion	≤ 0.5%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%

Live Measurement Results for POI Congestion- 3 Day data-May										
POI congestion	Benchmark	Aircel(DWL)	Airtel	BSNL	Idea	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Vodafone
Total number of working POIs		110	21	13	64	8	8	43	12	46
No. of POIs not meeting benchmark		0	0	0	0	0	0	0	0	0
Total Capacity of all POIs (A) - in erlangs		73994	109602	25000	40467	10050	27524	13802	14005	91717
Traffic served for all POIs (B)- in erlangs		49514	63554	18695	28135	2910	18707	5659	8628	43659
POI congestion	≤ 0.5%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%

5.4.4.3 KEY FINDINGS – MONTH 3

Audit Results for POI Congestion- PMR data-June										
POI congestion	Benchmark	Aircel(DWL)	Airtel	BSNL	Idea	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Vodafone
Total number of working POIs		113	21	13	67	NDR	NDR	43	12	48
No. of POIs not meeting benchmark		0	0	0	0	NDR	NDR	0	0	0
Total Capacity of all POIs (A) - in erlangs		75684	109491	25000	53295	NDR	NDR	13802	14005	111698
Traffic served for all POIs (B)- in erlangs		48935	60185	21954	27831	NDR	NDR	6861	8382	52361
POI congestion	≤ 0.5%	0.00%	0.00%	0.00%	0.00%	NDR	NDR	0.00%	0.00%	0.00%

Live Measurement Results for POI Congestion- 3 Day data-June										
POI congestion	Benchmark	Aircel(DWL)	Airtel	BSNL	Idea	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Vodafone
Total number of working POIs		113	21	13	68	NDR	NDR	43	12	48
No. of POIs not meeting benchmark		0	0	0	0	NDR	NDR	0	0	0
Total Capacity of all POIs (A) - in erlangs		76680	109511	25000	56921	NDR	NDR	13802	14005	111698
Traffic served for all POIs (B)- in erlangs		49065	60205	18827	27864	NDR	NDR	6857	8366	52921
POI congestion	≤ 0.5%	0.00%	0.00%	0.00%	0.00%	NDR	NDR	0.00%	0.00%	0.00%

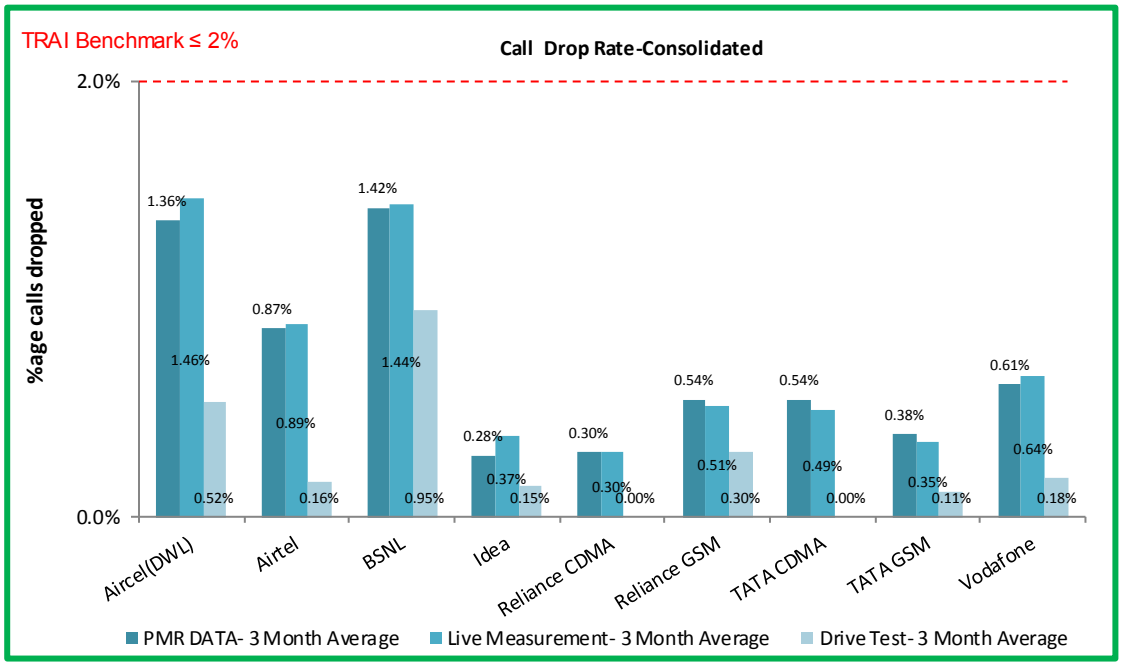
For Reliance CDMA and Reliance GSM, data for Jun'15 could not be audited due to a server issue at operator's end. The same was pre-informed to TRAI by the operator.

5.5 CALL DROP RATE

5.5.1 PARAMETER DESCRIPTION

1. **Definition** - The dropped call rate is the ratio of successfully originated calls that were found to drop to the total number of successfully originated calls that were correctly released.
   - **Total calls dropped** = All calls ceasing unnaturally i.e. due to handover or due to radio loss
   - **Total calls established** = All calls that have TCH allocation during busy hour
2. **Computational Methodology:** (Total Calls Dropped / Total Calls Established) x 100
3. **TRAI Benchmark –**
   - Call drop rate ≤ 2%
4. **Audit Procedure –**
   - Audit of traffic data of the relevant quarter kept in OMC-R at MSCs and used for arriving at CDR was used
   - The operator should only be considering those calls which are dropped during Time consistent busy hour (TCBH) for all days of the relevant quarter.

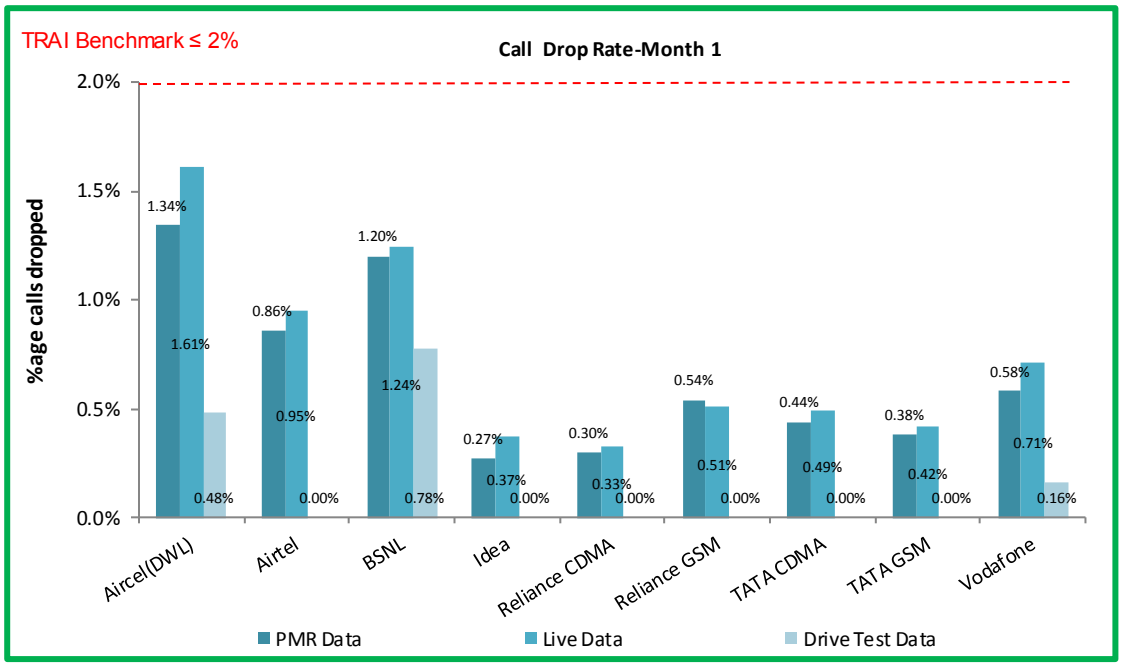
5.5.2 KEY FINDINGS – CONSOLIDATED



Data Source: Network Operations Center (NOC) of the operators and Drive test reports submitted by operators to auditors

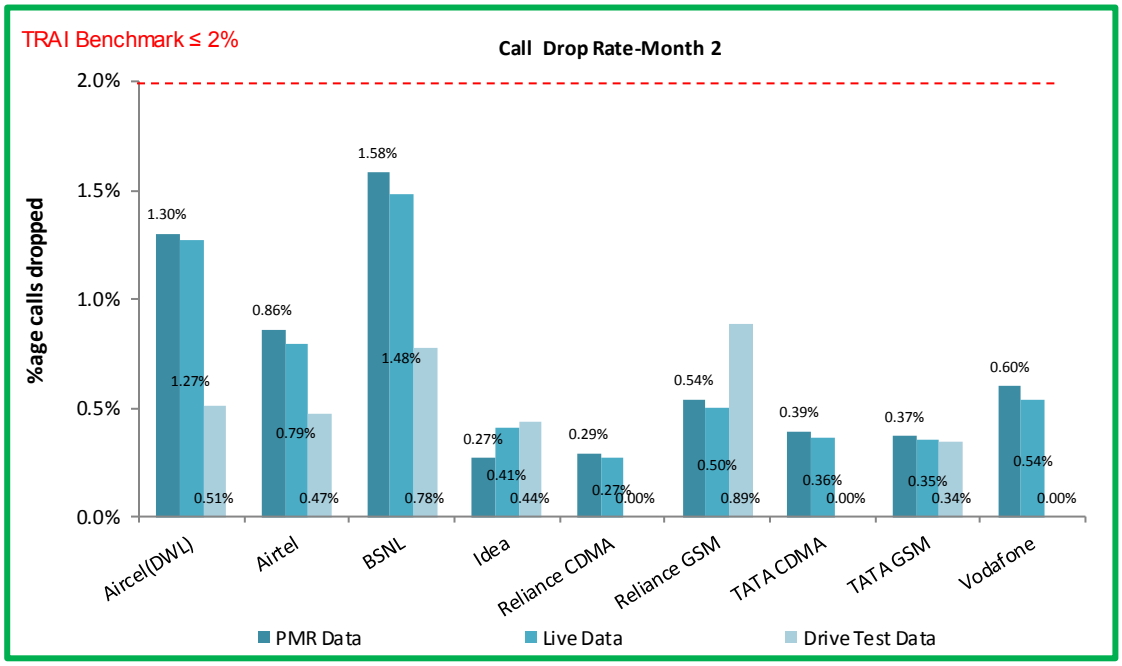
All operators met the benchmark for the parameter.

5.5.2.1 KEY FINDINGS – MONTH 1



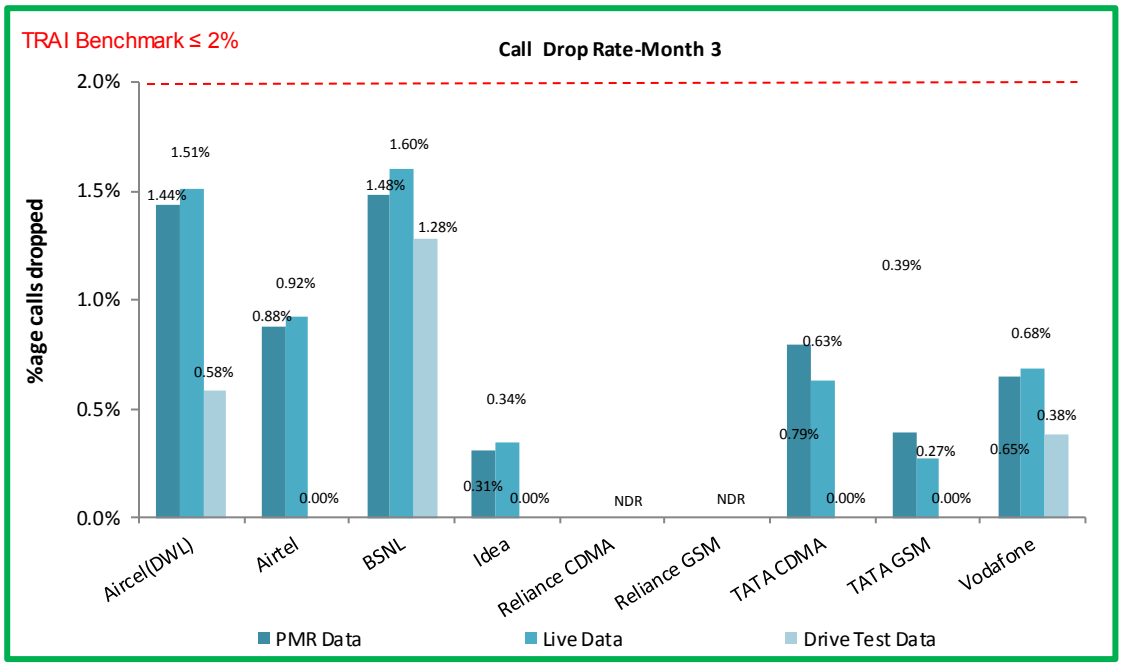
Data Source: Network Operations Center (NOC) of the operators and Drive test reports submitted by operators to auditors

5.5.2.2 KEY FINDINGS – MONTH 2



Data Source: Network Operations Center (NOC) of the operators and Drive test reports submitted by operators to auditors

5.5.2.3 KEY FINDINGS – MONTH 3



For Reliance CDMA and Reliance GSM, data for Jun'15 could not be audited due to a server issue at operator's end. The same was pre-informed to TRAI by the operator.

Data Source: Network Operations Center (NOC) of the operators and Drive test reports submitted by operators to auditors

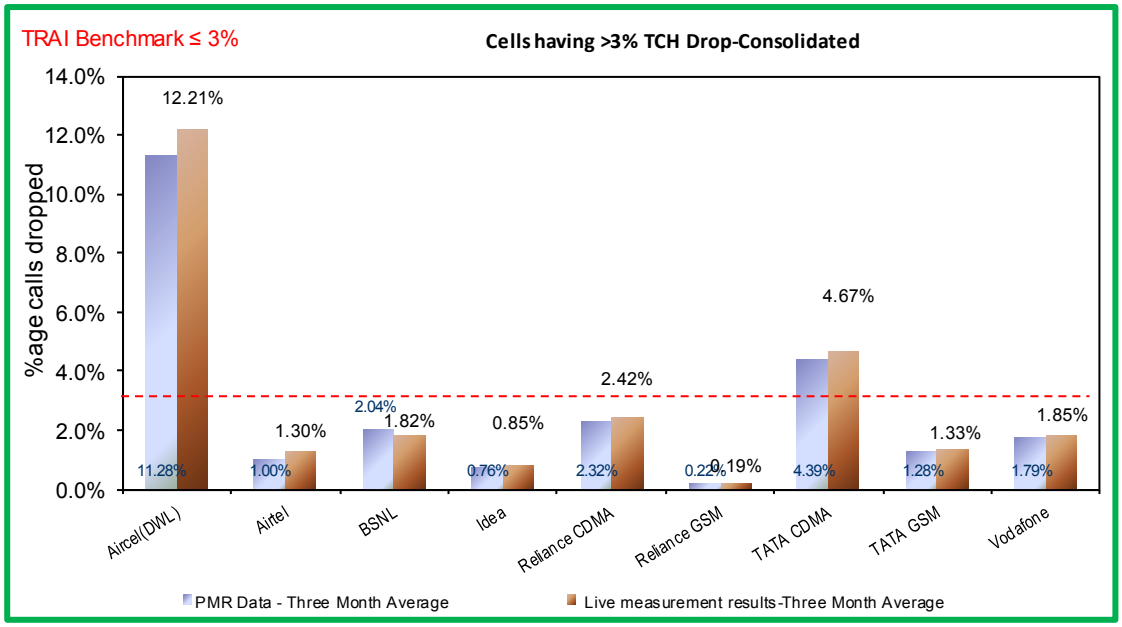
5.6 CELLS HAVING GREATER THAN 3% TCH DROP

5.6.1 PARAMETER DESCRIPTION

1. **Definition- Worst Affected Cells having more than 3% TCH drop** shall measure the ratio of total number of cells in the network to the ratio of cells having more than 3% TCH drop.
2. **Computational Methodology: (Total number of cells having more than 3% TCH drop during CBBH/ Total number of cells in the network) x 100**
3. **TRAI Benchmark –**
   - Worst affected cells having more than 3% TCH drop rate ≤ 3%
4. **Audit Procedure –**
   - Audit of traffic data of the relevant quarter kept in OMC-R at MSCs and used for arriving at CDR would be conducted.

The operator should only be considering those calls which are dropped during Cell Bouncing Busy hour (CBBH) for all days of the relevant quarter.

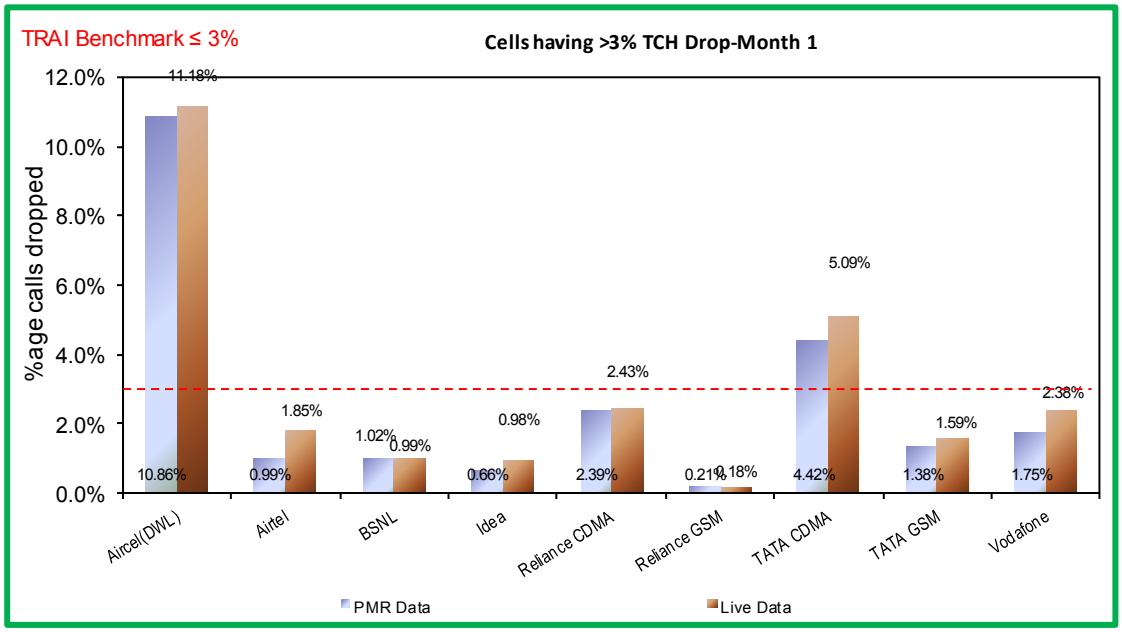
5.6.2 KEY FINDINGS – CONSOLIDATED



Data Source: Network Operations Center (NOC) of the operators

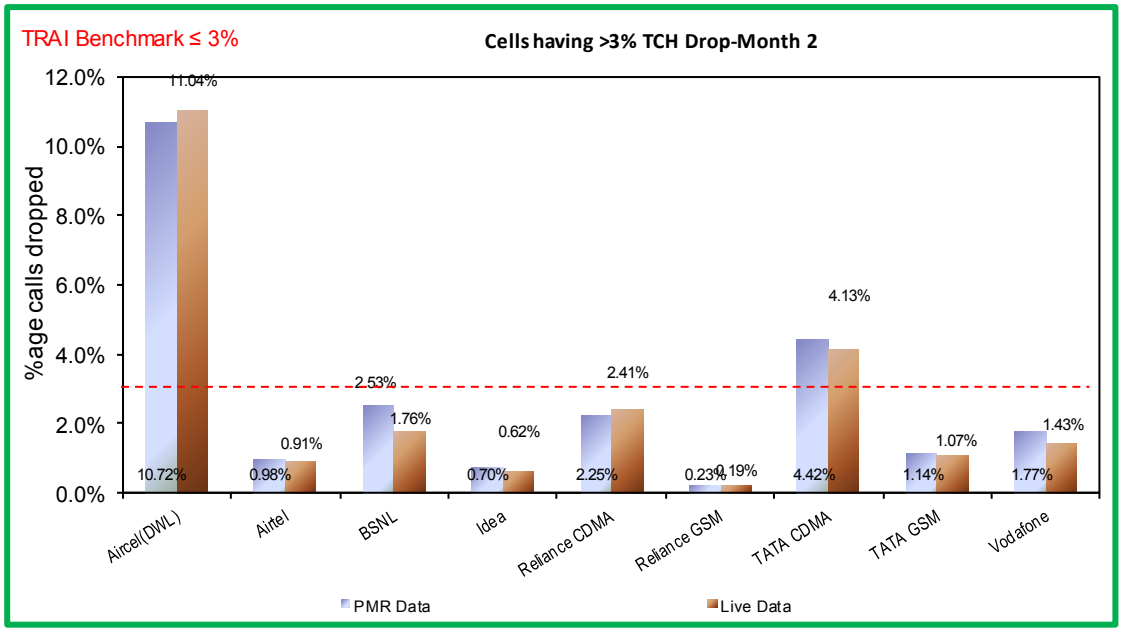
Aircel and Tata CDMA failed to meet the benchmark for the parameter as per PMR data.

5.6.2.1 KEY FINDINGS – MONTH 1



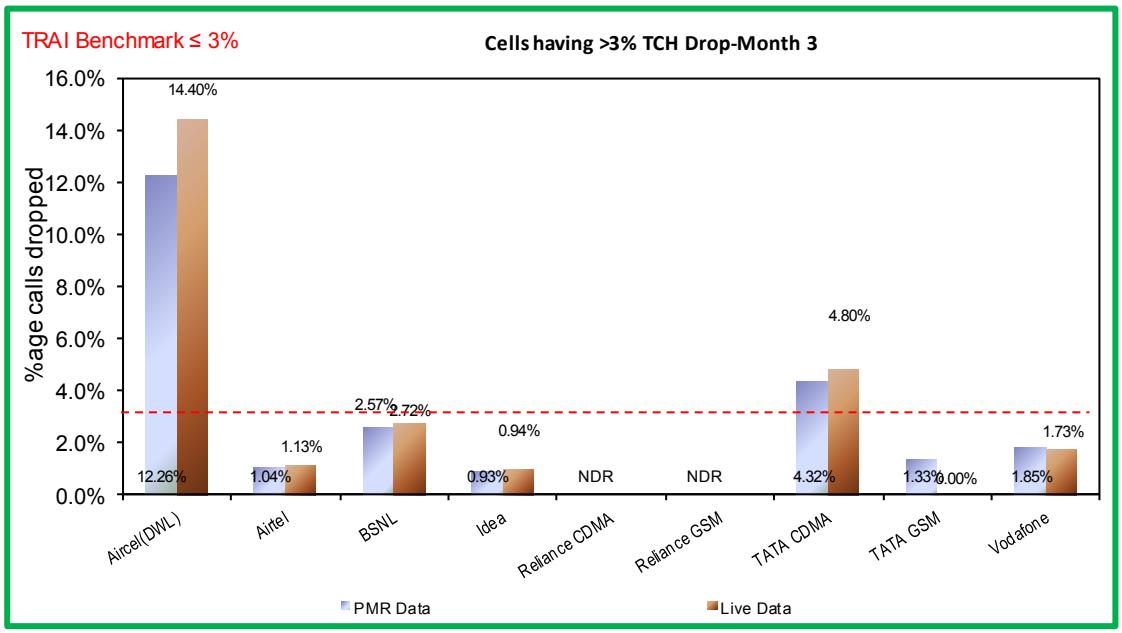
Data Source: Network Operations Center (NOC) of the operators

5.6.2.2 KEY FINDINGS – MONTH 2



Data Source: Network Operations Center (NOC) of the operators

5.6.2.3 KEY FINDINGS – MONTH 3



For Reliance CDMA and Reliance GSM, data for Jun'15 could not be audited due to a server issue at operator's end. The same was pre-informed to TRAI by the operator.

Data Source: Network Operations Center (NOC) of the operators

5.7 VOICE QUALITY

5.7.1 PARAMETER DESCRIPTION

1. **Definition:**

   - for GSM service providers the calls having a value of 0 –5 are considered to be of good quality (on a seven point scale)
   - For CDMA the measure of voice quality is Frame Error Rate (FER). FER is the probability that a transmitted frame will be received incorrectly. Good voice quality of a call is considered when it FER value lies between 0 – 4 %

2. **Computational Methodology:**

   - **% Connections with good voice quality = (No. of voice samples with good voice quality / Total number of samples) x 100**

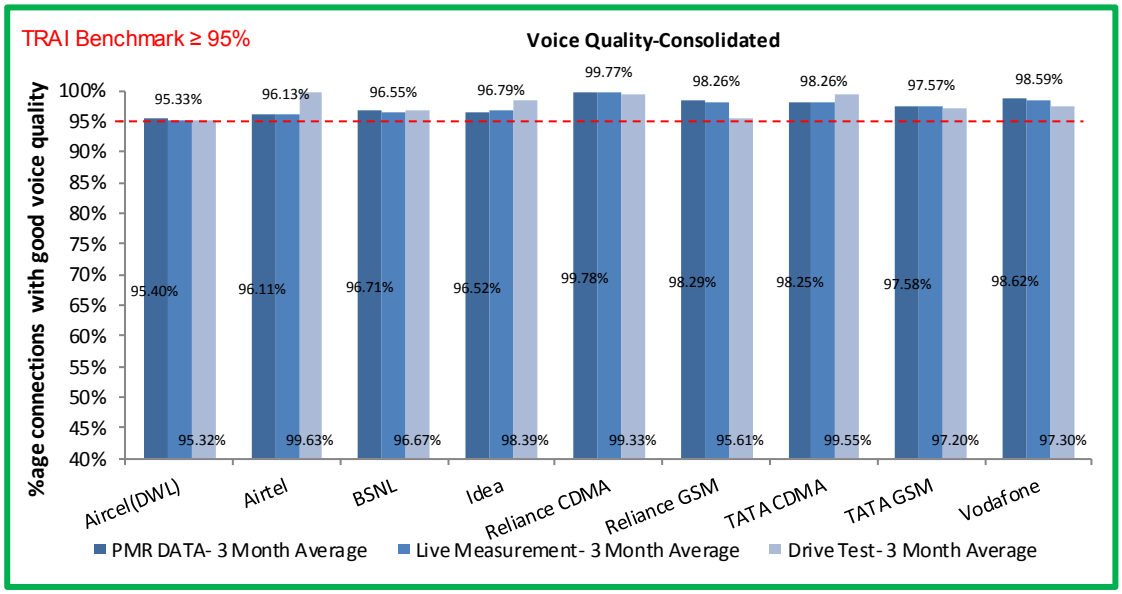
3. **TRAI Benchmark:** ≥ 95%

4. **Audit Procedure –**

   a. A sample of calls would be taken randomly from the total calls established.

   b. The operator should only be considering those calls which are meeting the desired benchmark of good voice quality.

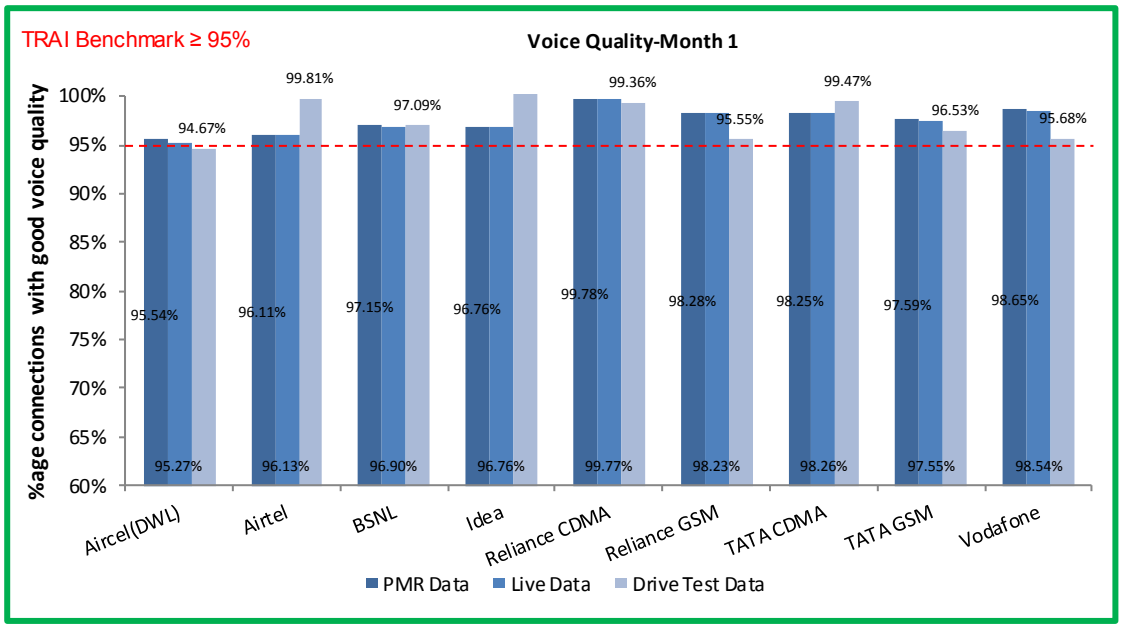
5.7.2 KEY FINDINGS – CONSOLIDATED



Data Source: Network Operations Center (NOC) of the operators and Drive test reports submitted by operators to auditors

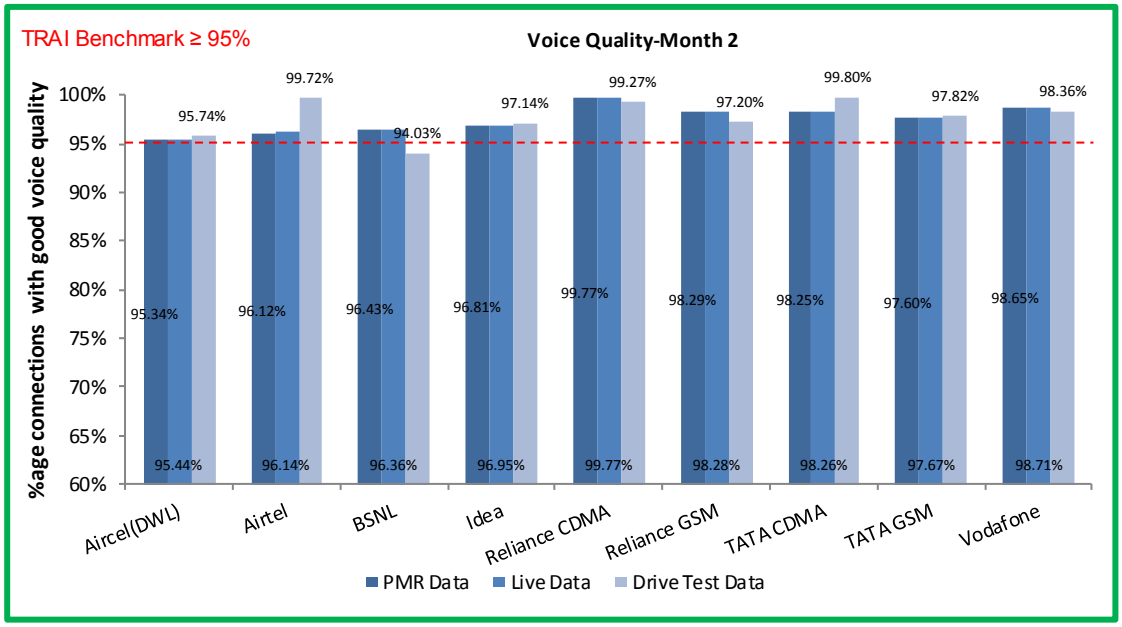
All the operators met the benchmark for Voice Quality with comparable levels among all three methods of data collection.

5.7.2.1 KEY FINDINGS – MONTH 1



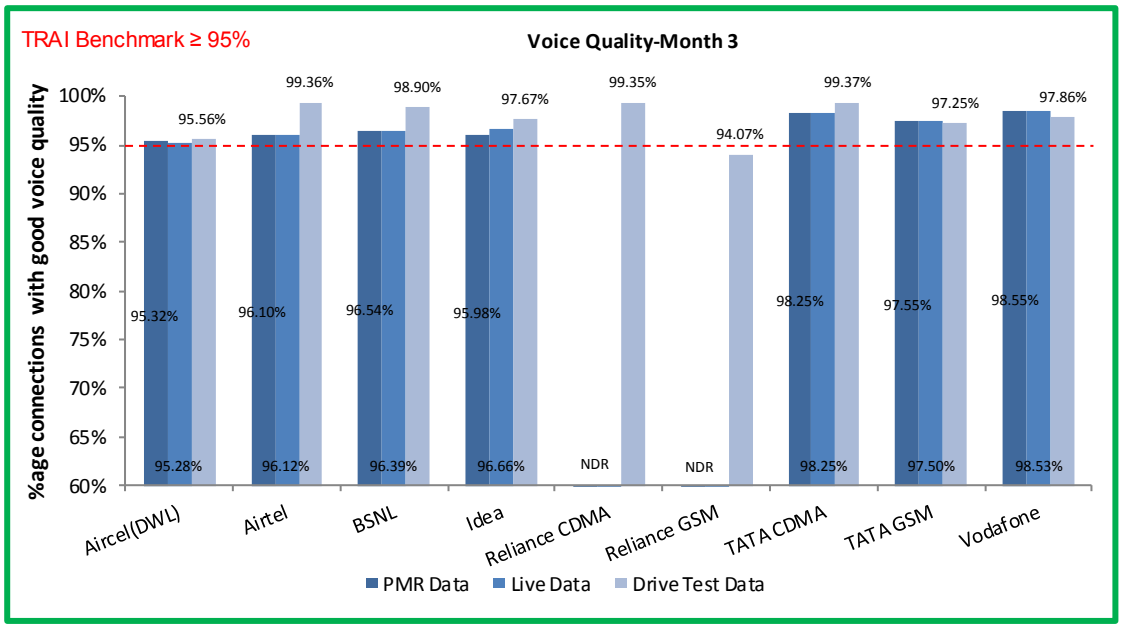
Data Source: Network Operations Center (NOC) of the operators and Drive test reports submitted by operators to auditors

5.7.2.2 KEY FINDINGS – MONTH 2



Data Source: Network Operations Center (NOC) of the operators and Drive test reports submitted by operators to auditors

5.7.2.3 KEY FINDINGS – MONTH 3



For Reliance CDMA and Reliance GSM, data for Jun'15 could not be audited due to a server issue at operator's end. The same was pre-informed to TRAI by the operator.

Data Source: Network Operations Center (NOC) of the operators and Drive test reports submitted by operators to auditors

6 PARAMETER DESCRIPTION AND DETAILED FINDINGS – NON-NETWORK PARAMETERS

6.1 METERING AND BILLING CREDIBILITY

The billing complaints for postpaid are calculated by averaging over a billing cycle in a quarter. For example, there are three billing cycles in a quarter, the data for each billing cycle is calculated separately and then averaged over.

The charging complaints for prepaid are calculated by taking all complaints in a quarter.

6.1.1 PARAMETER DESCRIPTION

All the complaints related to billing/ charging as per clause 3.7.2 of QoS regulation of 20th June, 2009 were covered. The types of billing complaints covered are listed below.

- Payments made and not credited to the subscriber account
- Payment made on time but late payment charge levied wrongly
- Wrong roaming charges
- Double charges
- Charging for toll free services
- Local calls charged/billed as STD/ISD or vice versa
- Calls or messages made disputed
- Validity related complaints
- Credit agreed to be given in resolution of complaint, but not accounted in the bill
- Charging for services provided without consent
- Charging not as per tariff plans or top up vouchers/ special packs etc.
- Overcharging or undercharging

In addition to the above, any billing complaint which leads to billing error, waiver, refund, credit, or any adjustment is also considered as valid billing complaint for calculating the number of disputed bills.

- Computational Methodology:
  - **Metering and billing credibility (Postpaid)** = (Total billing complaints** received during the relevant billing cycle / Total bills generated* during the relevant billing cycle)*100
  - *Operator to include all types of bills generated for customers. This would include printed bills, online bills and any other forms of bills generated

- **Billing complaints here shall include only dispute related issues (including those that may arise because of a lack of awareness at the subscribers' end). It does not include any provisional issues (such as delayed dispatch of billing statements, etc.) in which the operator has opened a ticket internally.

- **Metering and billing credibility (Prepaid)** = (Total charging complaints received during the quarter/ Total number of subscribers reported by the operator at the end of the quarter) * 100

- TRAI Benchmark: <= 0.1%

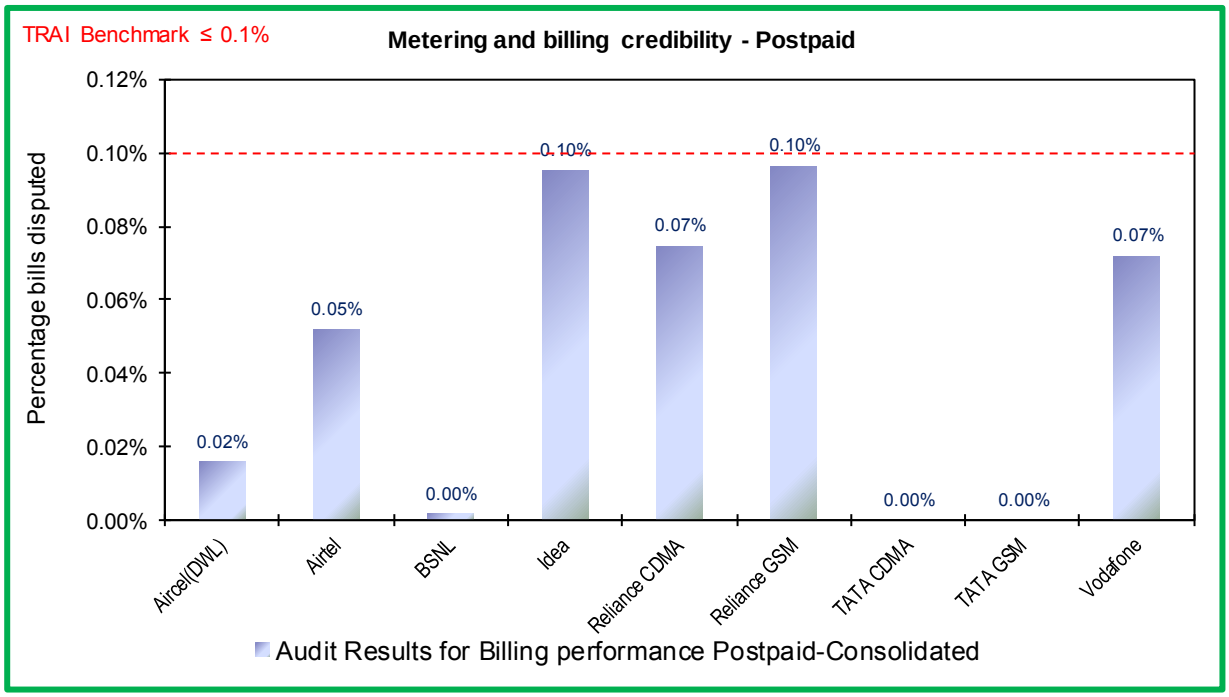
- Audit Procedure:

  - Audit of billing complaint details for the complaints received during the quarter and used for arriving at the benchmark reported to TRAI would be conducted

    - For Postpaid, the total billing complaints would be audited by averaging over billing cycles in a quarter

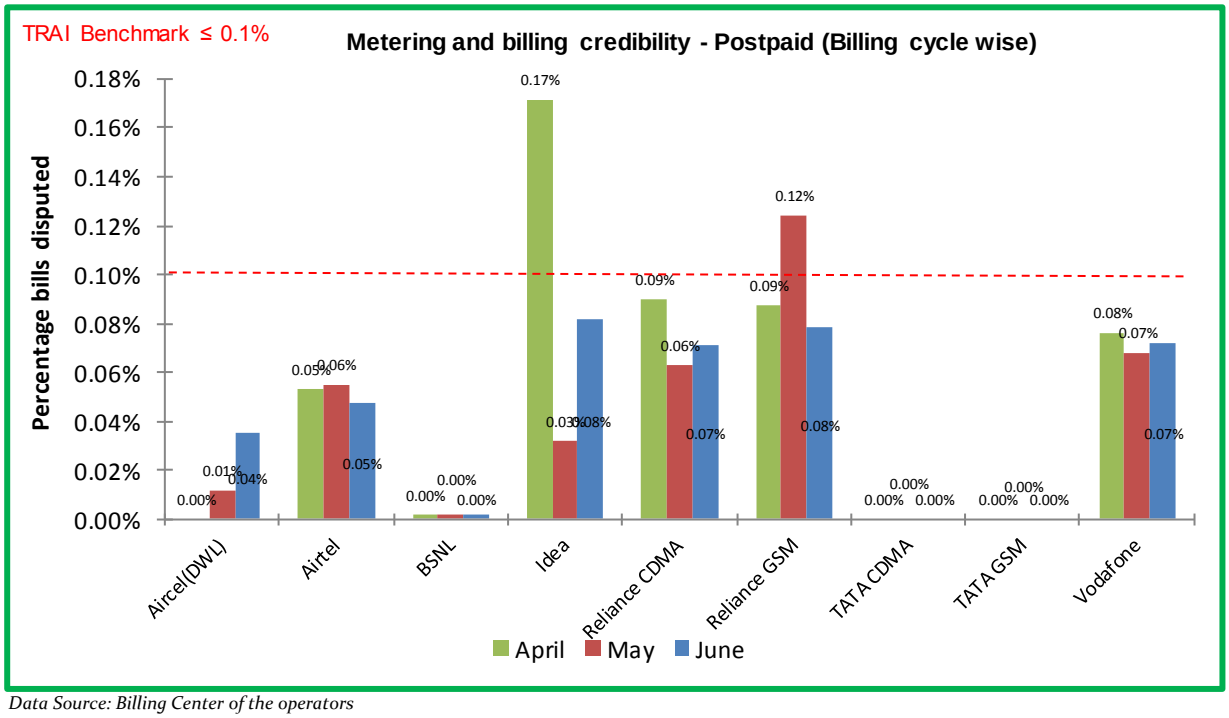
  - For Prepaid, the data of total charging complaints in a quarter would be taken for the purpose of audit

6.1.2 KEY FINDINGS – METERING AND BILLING CREDIBILITY (POSTPAID)



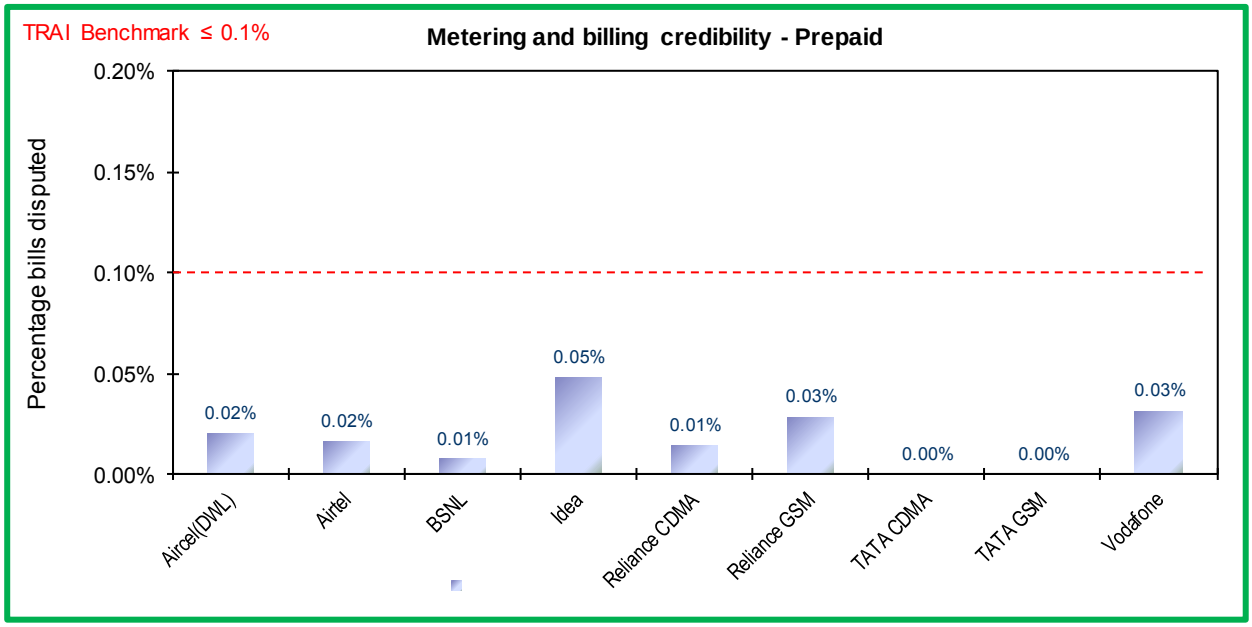
Data Source: Billing Center of the operators

For the postpaid customers, all operators met the TRAI benchmark for the parameter.



Data Source: Billing Center of the operators

6.1.3 KEY FINDINGS - METERING AND BILLING CREDIBILITY (PREPAID)



For the prepaid customers, all operators met the TRAI benchmark for the parameter.

6.2 RESOLUTION OF BILLING COMPLAINTS

6.2.1 PARAMETER DESCRIPTION

Calculation of Percentage resolution of billing complaints

The calculation methodology (given below) as per QoS regulations 2009 (7 of 2009) was followed to - calculate resolution of billing complaints.

Resolution of billing complaints within 4 weeks:

%age of billing complaints (for post-paid customers)/ charging, credit & validity (for pre-paid customers) resolved within 4 weeks =

$$\frac{\text{number of billing complaints for post-paid customers/charging, credit/ validity complaints for pre-paid customers resolved within 4 weeks during the quarter}}{\text{number of billing/charging, credit / validity complaints received during the quarter}} \times 100$$

Resolution of billing complaints within 6 weeks:

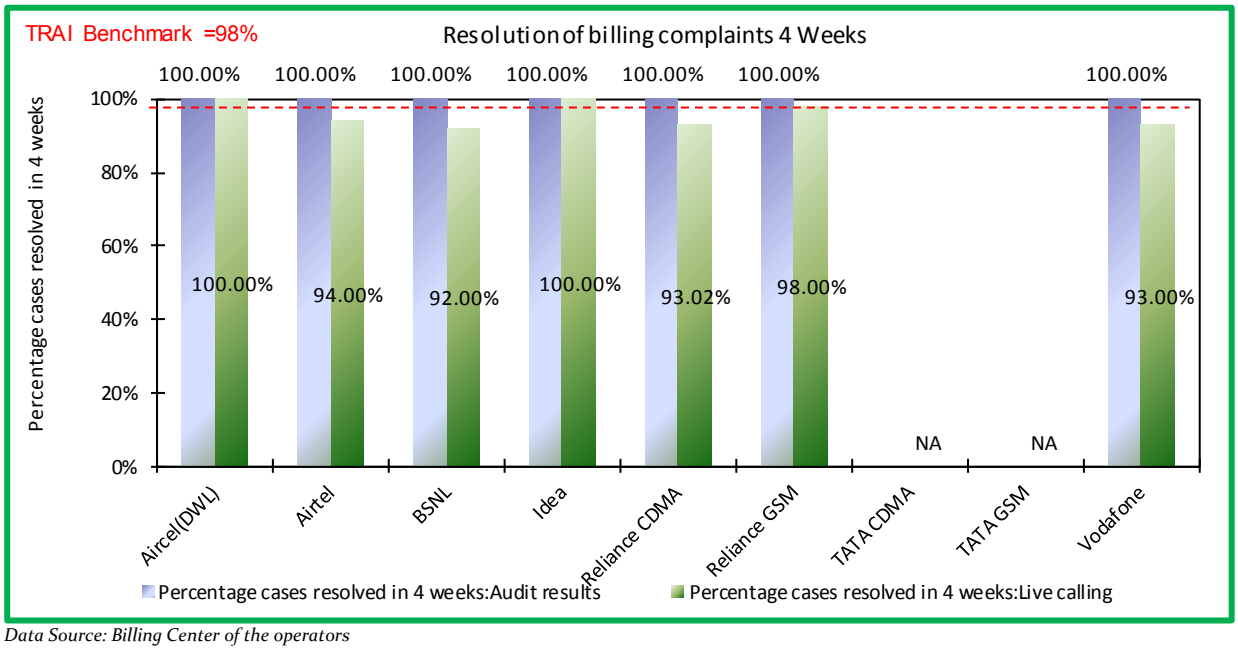
%age of billing complaints (for post-paid customers)/ charging, credit & validity (for pre-paid customers) resolved within 6 weeks =

$$\frac{\text{number of billing complaints for post-paid customers/charging, credit/ validity complaints for pre-paid customers resolved within 6 weeks during the quarter}}{\text{number of billing/charging, credit / validity complaints received during the quarter}} \times 100$$

- **Billing complaints here shall include only dispute related issues (including those that may arise because of a lack of awareness at the subscribers' end). It does not include any provisional issues (such as delayed dispatch of billing statements, etc.) in which the operator has opened a ticket internally. Complaints raised by the consumers to operator are only considered as part of the calculation.
- The complaints that get marked as invalid by the operator are not considered for calculation as those complaints cannot be considered as resolved by the operator.
- *** Date of resolution in this case would refer to the date when a communication has taken place from the operator's end to inform the complainant about the final resolution of the issue / dispute.

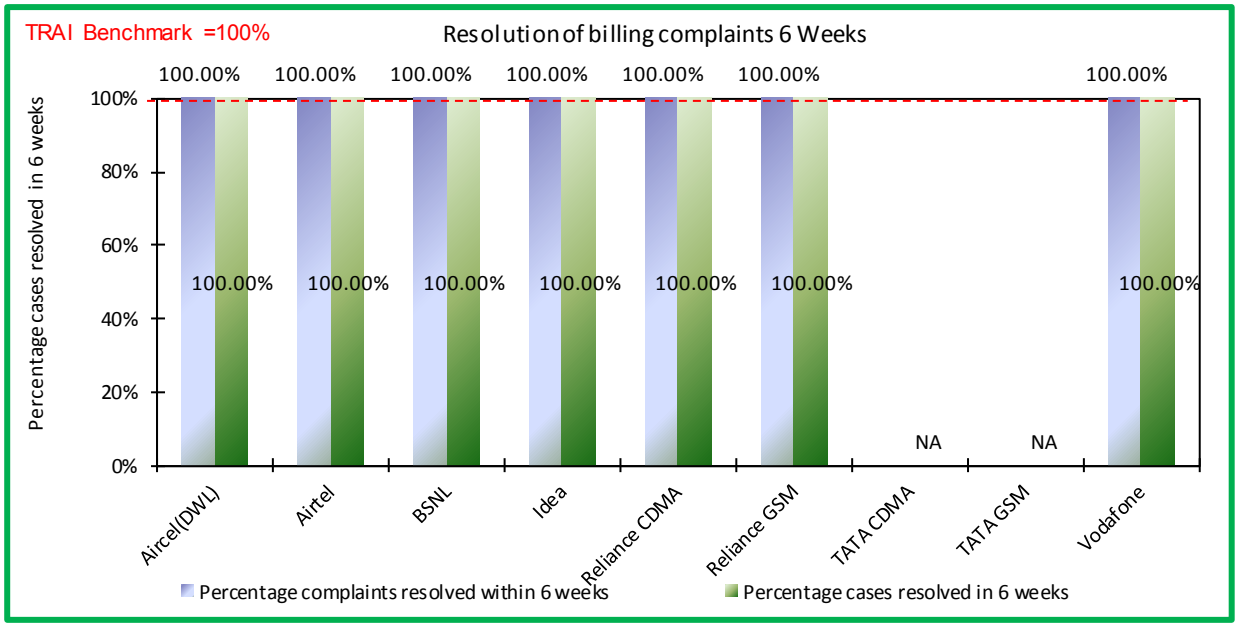
Benchmark: 98% complaints resolved within 4 weeks, 100% within 6 weeks.

6.2.2 KEY FINDINGS FOR 4 WEEKS



Data Source: Billing Center of the operators

6.2.3 KEY FINDINGS FOR 6 WEEKS



Data Source: Billing Center of the operators

NA: There were no billing complaints that were logged by subscribers of Tata CDMA and Tata GSM during the audit period. Hence the parameter is not applicable for these operators.

The audit results showed that all the operators met the TRAI benchmark for resolution of complaints within 4 weeks as well as within 6 weeks.

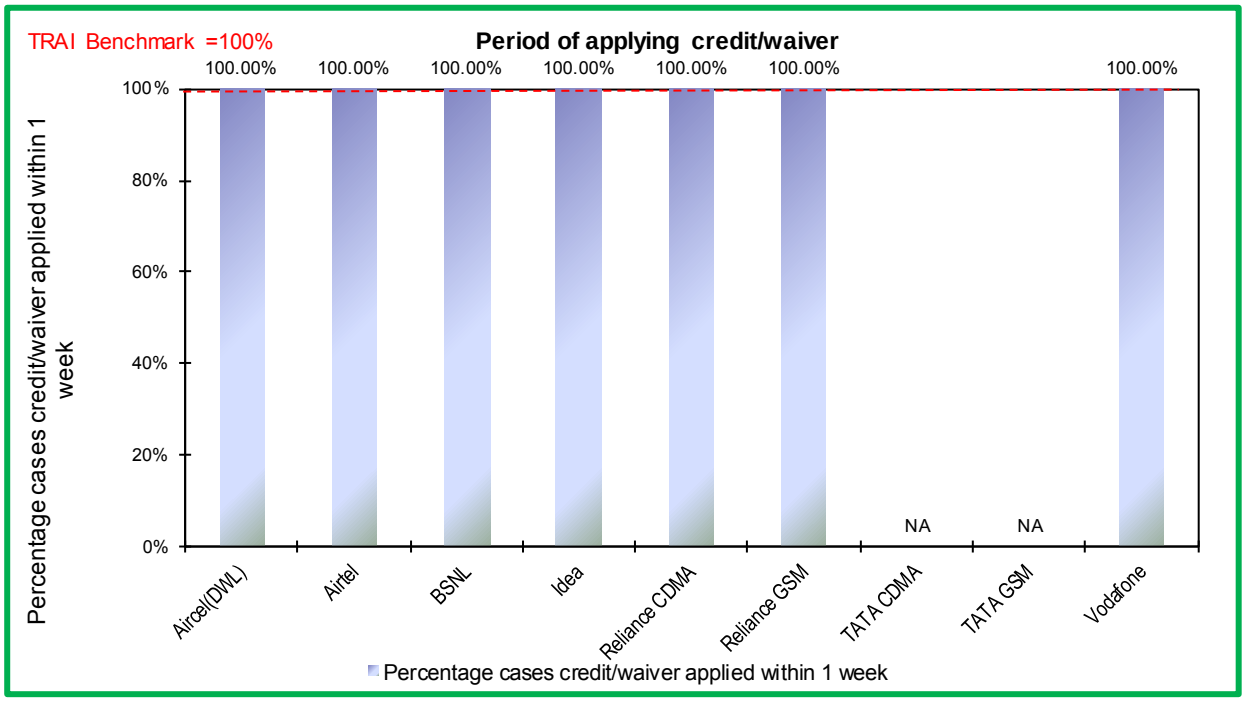
It is to be noted that Aircel, Airtel and Idea have reported high ratio of invalid complaints. Auditors recommend further investigation of the issue independently by TRAI. Further details could be found in annexure (section 8.7).

6.3 PERIOD OF APPLYING CREDIT/WAVIER

6.3.1 PARAMETER DESCRIPTION

- Computational Methodology:
  - **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**
- TRAI Benchmark:
  - Period of applying credit waiver within 7 days: 100%
- Audit Procedure:
  - Operator to provide details of:-
    - List of all eligible cases along with
      - Date of applying credit waiver to all the eligible cases
      - Date of resolution of complaint for all eligible cases

6.3.2 KEY FINDINGS



Data Source: Billing Center of the operators

All the operators met the benchmark of 100% for the parameter.

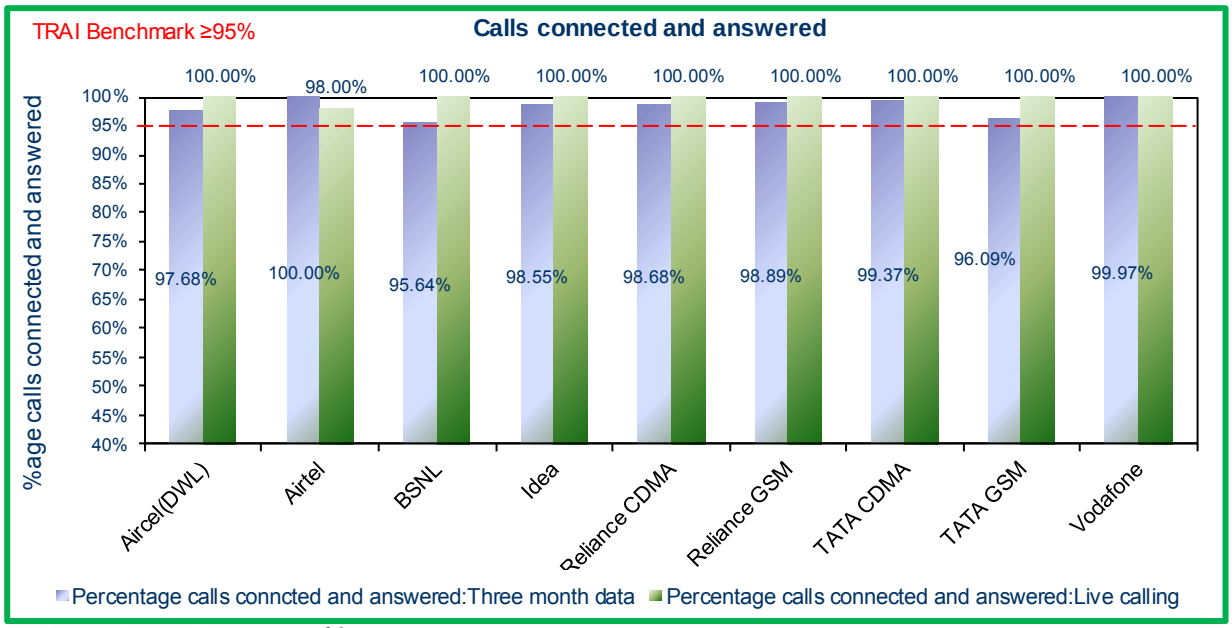
NA: There were no complaints that were logged by subscribers of Tata CDMA and Tata GSM during the audit period. Hence the parameter is not applicable for these operators.

6.4 CALL CENTRE PERFORMANCE-IVR

6.4.1 PARAMETER DESCRIPTION

- Computational Methodology:
  - **Call centre performance IVR = (Number of calls connected and answered by IVR/ All calls attempted to IVR) * 100**
- TRAI Benchmark: >= 95%
- Audit Procedure:
  - Operators provide details of the following from their central call centre/ customer service database:
    - Total calls connected and answered by IVR
    - Total calls attempted to IVR
  - Also live calling is done to test the calls connected and answered by IVR

6.4.2 KEY FINDINGS



Data Source: Customer Service Center of the operators

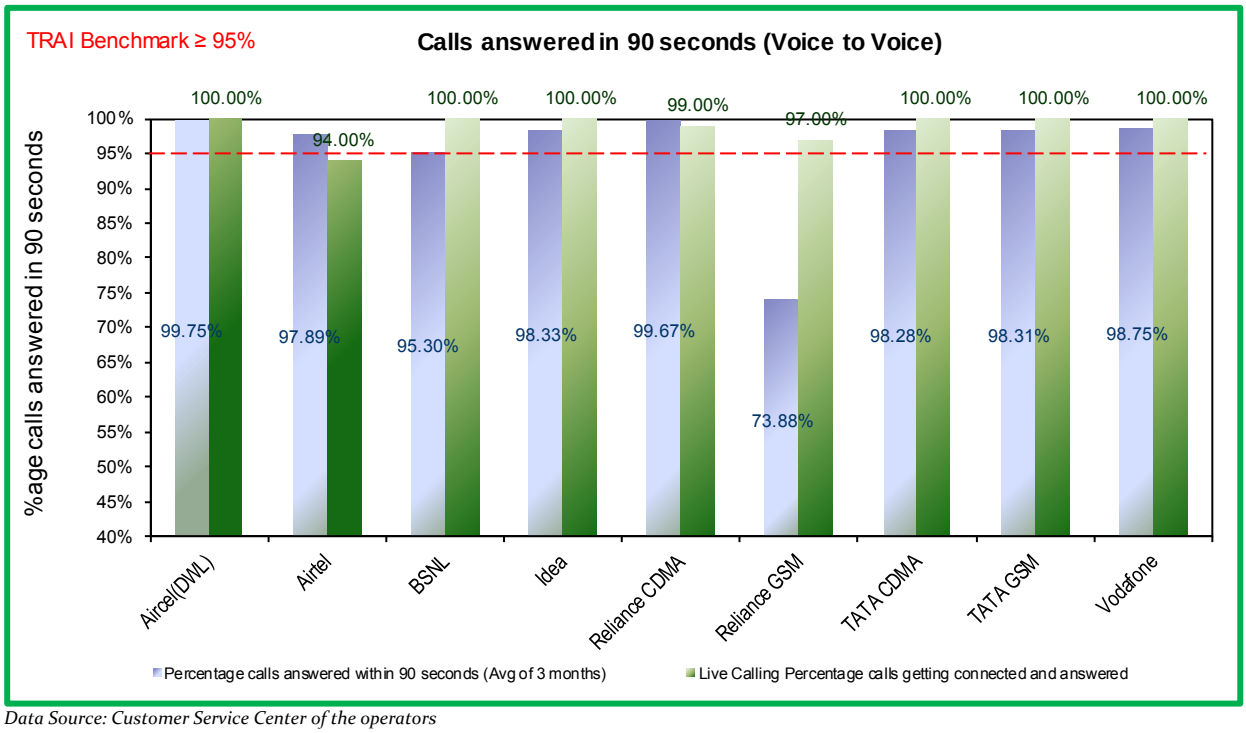
The audit result showed that all operators met the benchmark for the parameter.

6.5 CALL CENTRE PERFORMANCE-VOICE TO VOICE

6.5.1 PARAMETER DESCRIPTION

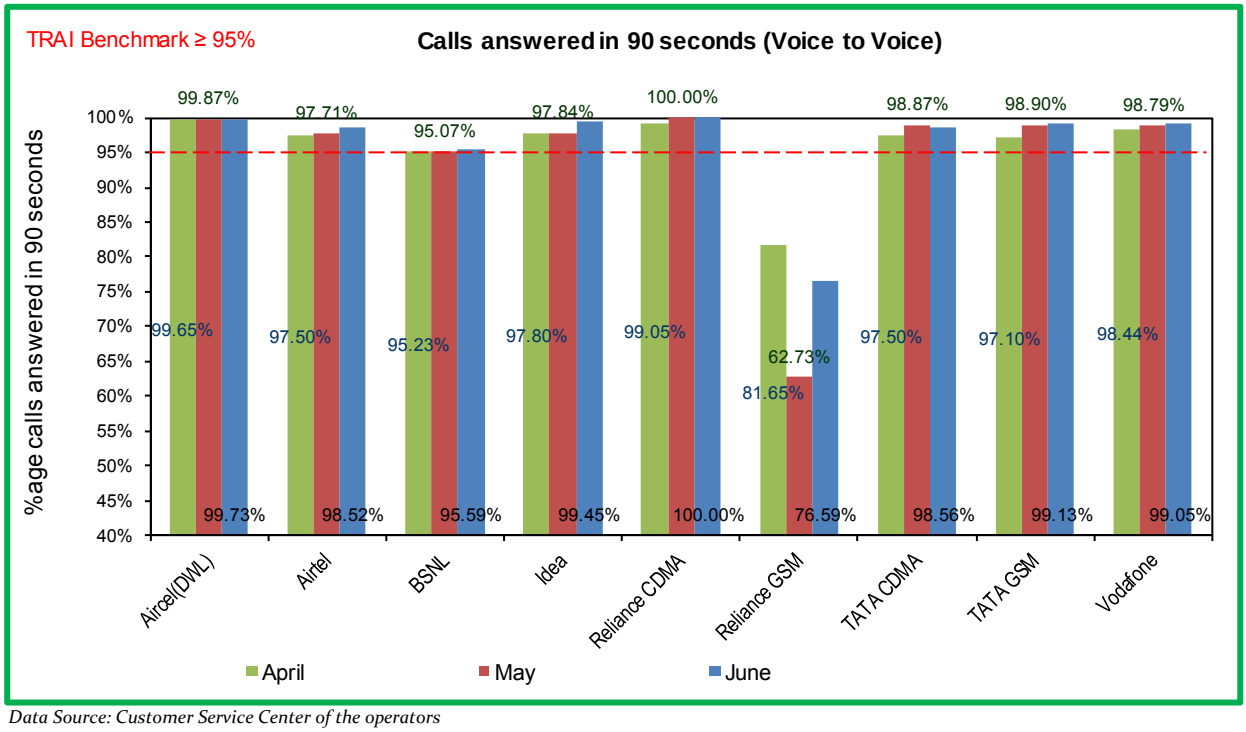
- Computational Methodology:
  - Call centre performance Voice to Voice = (Number of calls answered by operator within 90 seconds/ All calls attempted to connect to the operator) * 100
- Audit Procedure:
  - Operators provide details of the following from their central call centre/ customer service database:
    - Total calls connected and answered by operator within 90 seconds
    - Total calls attempted to connect to the operator
  - Also live calling was done to test the calls answered within 90 seconds by the operator

6.5.2 KEY FINDINGS



Data Source: Customer Service Center of the operators

Reliance GSM failed to meet the benchmark of calls (voice to voice) being answered by call center executives within 90 seconds.



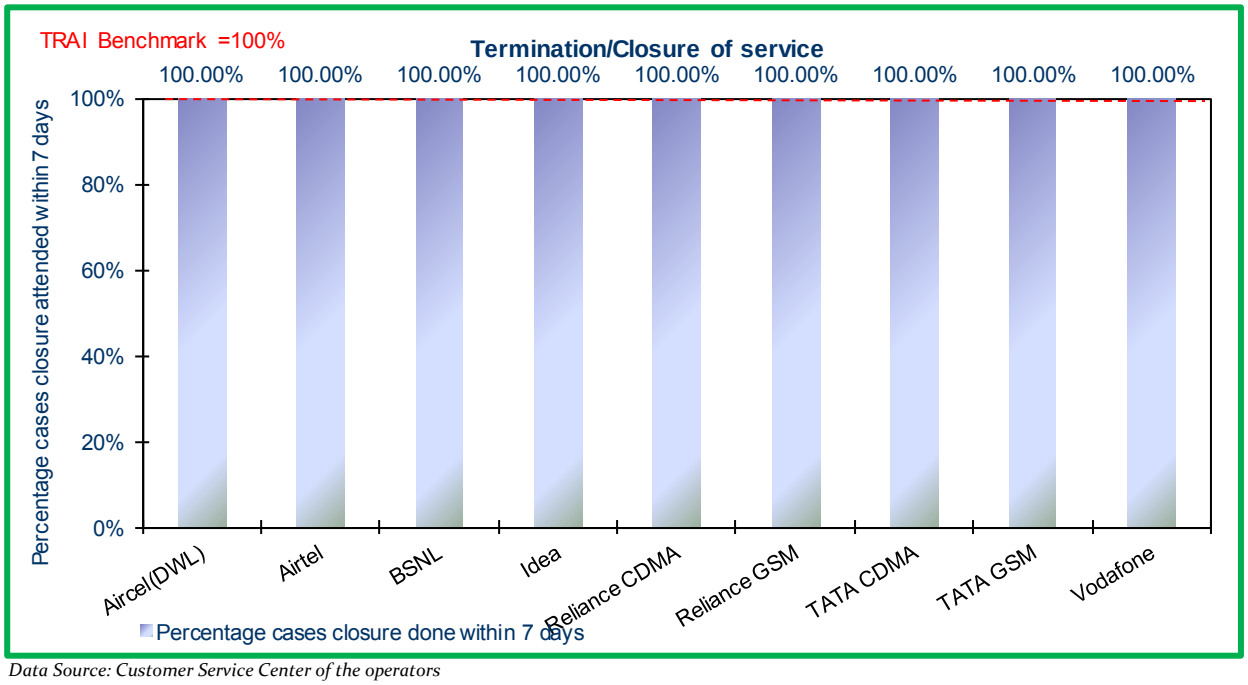
Data Source: Customer Service Center of the operators

6.6 TERMINATION/CLOSURE OF SERVICE

6.6.1 PARAMETER DESCRIPTION

- Computational Methodology:
  - **Time taken for closure of service = (number of closures done within 7 days/ total number of closure requests) * 100**
- TRAI Benchmark:
  - Termination/Closure of Service: <=7 days
- Audit Procedure:
  - Operator provide details of the following from their central billing/CS database:
    - Date of lodging the closure request (all requests in given period)
    - Date of closure of service

6.6.2 KEY FINDINGS



Data Source: Customer Service Center of the operators

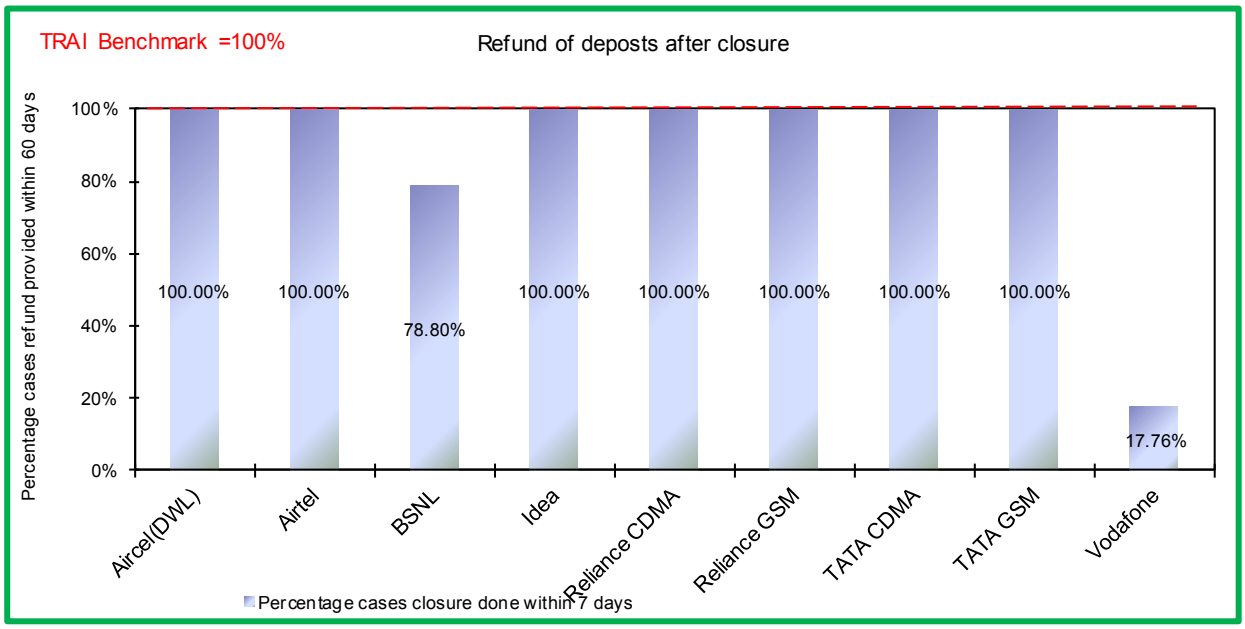
All the operators met the benchmark of 100%.

6.7 REFUND OF DEPOSITS AFTER CLOSURE

6.7.1 PARAMETER DESCRIPTION

- Computational Methodology:
  - **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**
  - Any case where the operators need to return the amount back to consumers post closure of service in form of cheque/cash is considered to be refund.
- TRAI Benchmark:
  - Time taken for refund for deposit after closures: 100% within 60 days
- Audit Procedure:
  - Operator provide details of the following from their central billing/refund database:
    - Dates of completion of all 'closure requests' resulting in requirement of a refund by the operator.
    - Dates of refund pertaining to all closure request received during the relevant quarter

6.7.2 KEY FINDINGS



Data Source: Customer Service Center of the operators

BSNL and Vodafone failed to meet the benchmark for the parameter.

7 DETAILED FINDINGS - DRIVE TEST DATA

7.1 OPERATOR ASSISTED DRIVE TEST

The drive test was conducted simultaneously for all the operators present in the Orissa circle. As per the new directive given by TRAI headquarters, drive test for the month of April, May and June 2015 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 post discussion with TRAI advisors. IMRB auditors were present in vehicles of every operator. The holding period for all test calls was 120 seconds and 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 inappropriate. 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 > -75 dbm for indoor, > -85 dbm for in-vehicle and > -95 dbm for outdoor routes.

The schedule and the operators covered in operator assisted drive test are given below.

Name of Operator
Aircel(DWL)
Airtel
BSNL
Idea
Reliance CDMA
Reliance GSM
TATA CDMA
TATA GSM
Vodafone

7.1.1 APRIL – CUTTACK SSA

Month	Name of SSA Covered	Date of Drive Test
April	CUTTACK	27th, 28th & 29th APR'15

7.1.1.1 ROUTE DETAILS – CUTTACK SSA

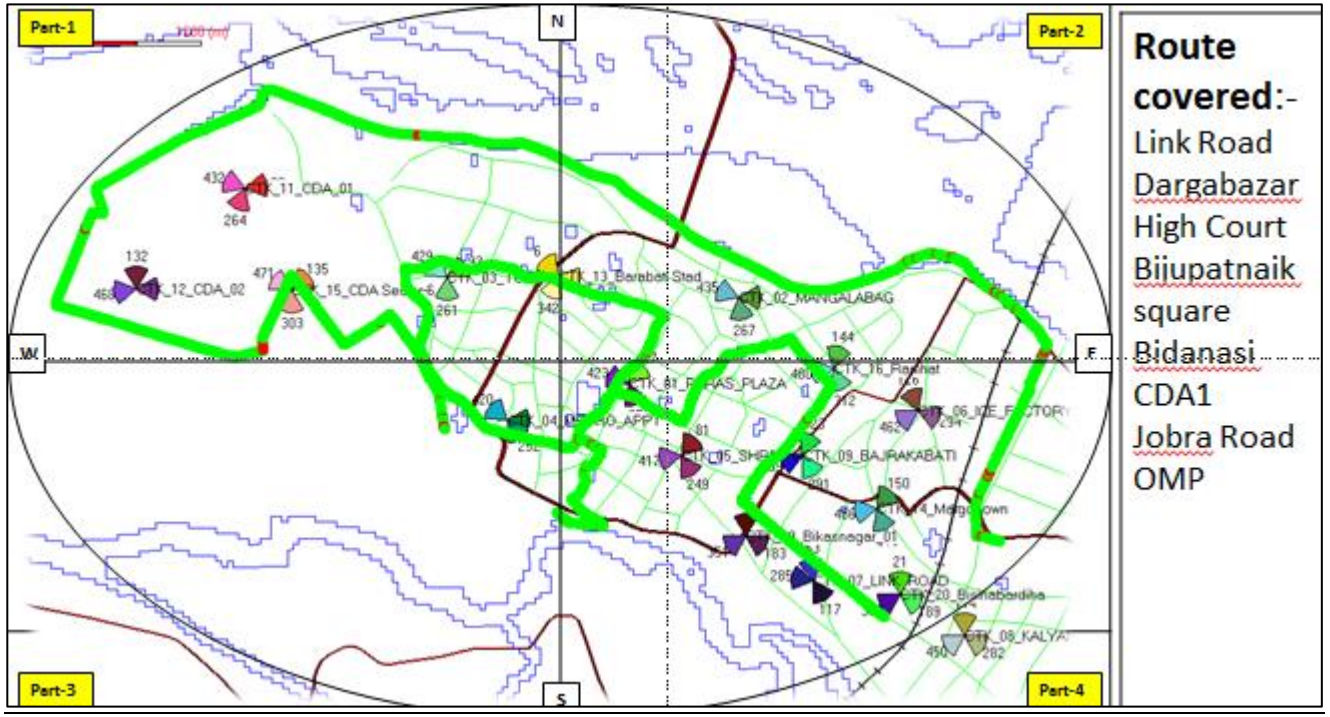
Category	Type of location	Orissa		
		CUTTACK		
		Day 1	Day 2	Day 3
Outdoor	Major Roads	Paradeep City, Mangarajpur, Masakani, Ganaganj, Marshaghai, Kendrapara City, Belarpur, Balichandrapur, Mukundpur, Chandikhol	Jajpur Road, Dhabalagiri, Rahasoi, Kalinga Nagar, Baragadia, Duburi, Gobra ghati	Kendrapara, Gangua, Patamundai, Patrapur, Singri, Aul, Rajkanika, Argalkandia, Singhpur, Fatepur, Binjharpur, Mainda, Japur Town
	Highways	Cuttack City, Kandarpur, Shyampur, Jagannathpur, Raghunath pur,Tirtol, Rehema,Manijagha, Kujang, Paradeep	Cuttack City, Gopinathpur, Chowdwar, Chowdwar Tangi, Chhatia, Chandikhol, Jarka, Barabati, Kuakhia, Suainsahi, Panikoili, Janha, Jajpur Road	Jagatpur, Gujarpur, Paga, Salepur, Nischintkoili, Chandol, Sangua, Kendrapara
	With in the City	Press Chak, Badambadi, Telenga Bazar, Dagarpara, Markat Nagar, CDA Sector-10, Vidanasi, Chandi Square, Buxi Bazar, Bose Chak, Sikharpur, (Cuttack)	Kanheipur, Dhabalagiri, Kanchipur, Durga Colony, Sapagadia, Goshala, Natapada, Gopabhandhu Chak(Jajpur road)	Devidwar, Kalyanpur, Pravakarpur, Taramadina Office, Naharapur, NCC College,(Jajpur town)
Indoor	Shopping complex	BIG BAZAAR CUTTACK	JENA SHOPPING COMPLEX CHANDIKHOL	SHOPPING COMPLEX, SINGHI PUR
	Office complex	BSNL TELEPHONE BHAWAN PARADEEP	BSNL TELEPHONE BHAWAN JAJPUR ROAD	BSNL TELEPHONE BHAWAN KENDRAPARA

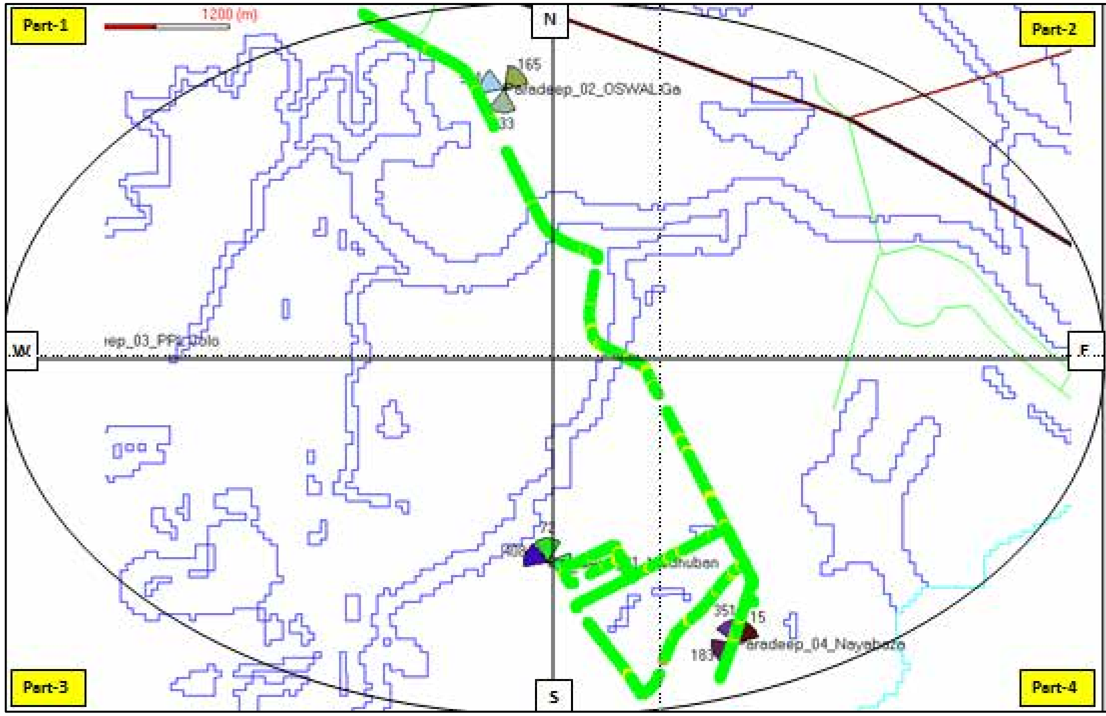
The route maps given in the report are provided for the purpose of identifying the routes traversed during the drive tests. We may observe three different colours (Red/Green/Yellow) of the lines, which signify signal strength; however these maps are for a single operator and have not been referred to any findings in this report. IMRB submits detailed operator wise Drive Test reports separately.

7.1.1.2 KILOMETERS TRAVELLED – CUTTACK SSA

7.1.1.3 ROUTE MAP CUTTACK DAY 1

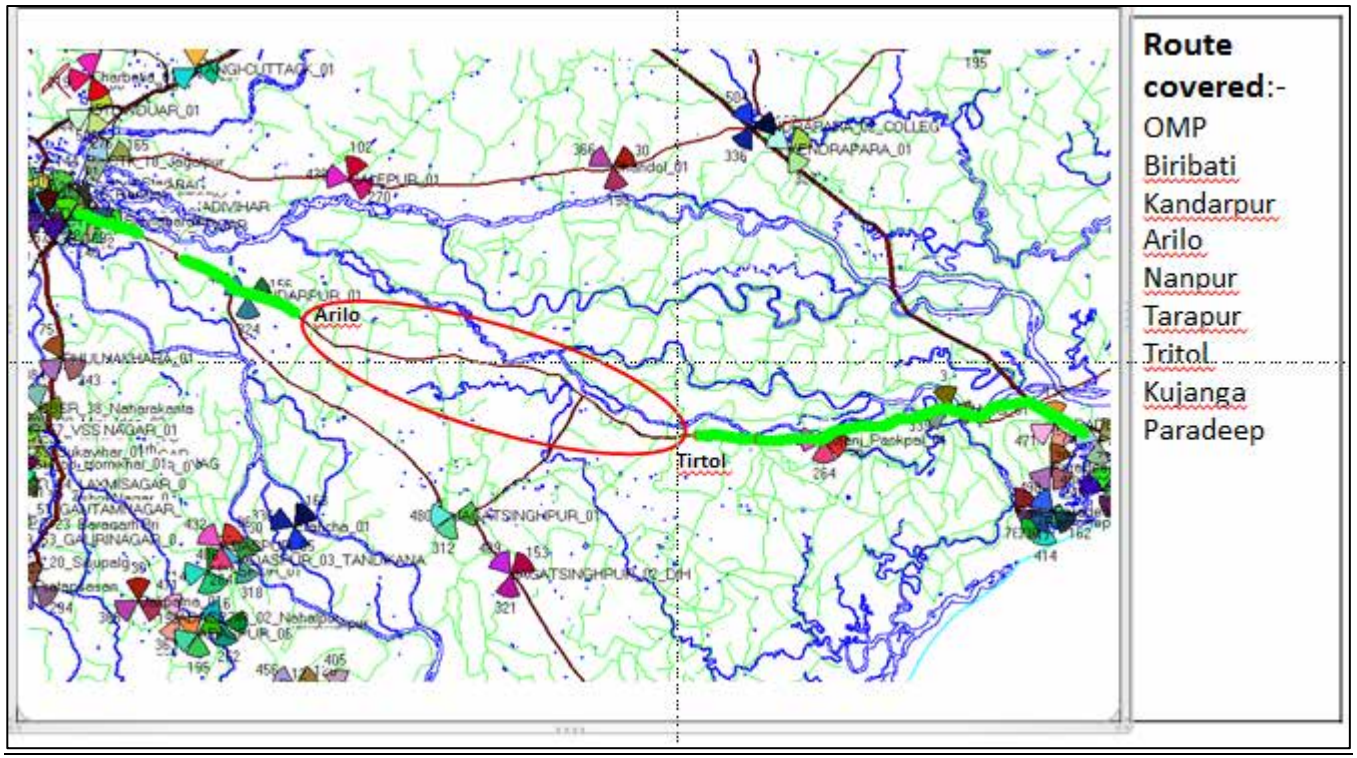
Day 1 – Within City



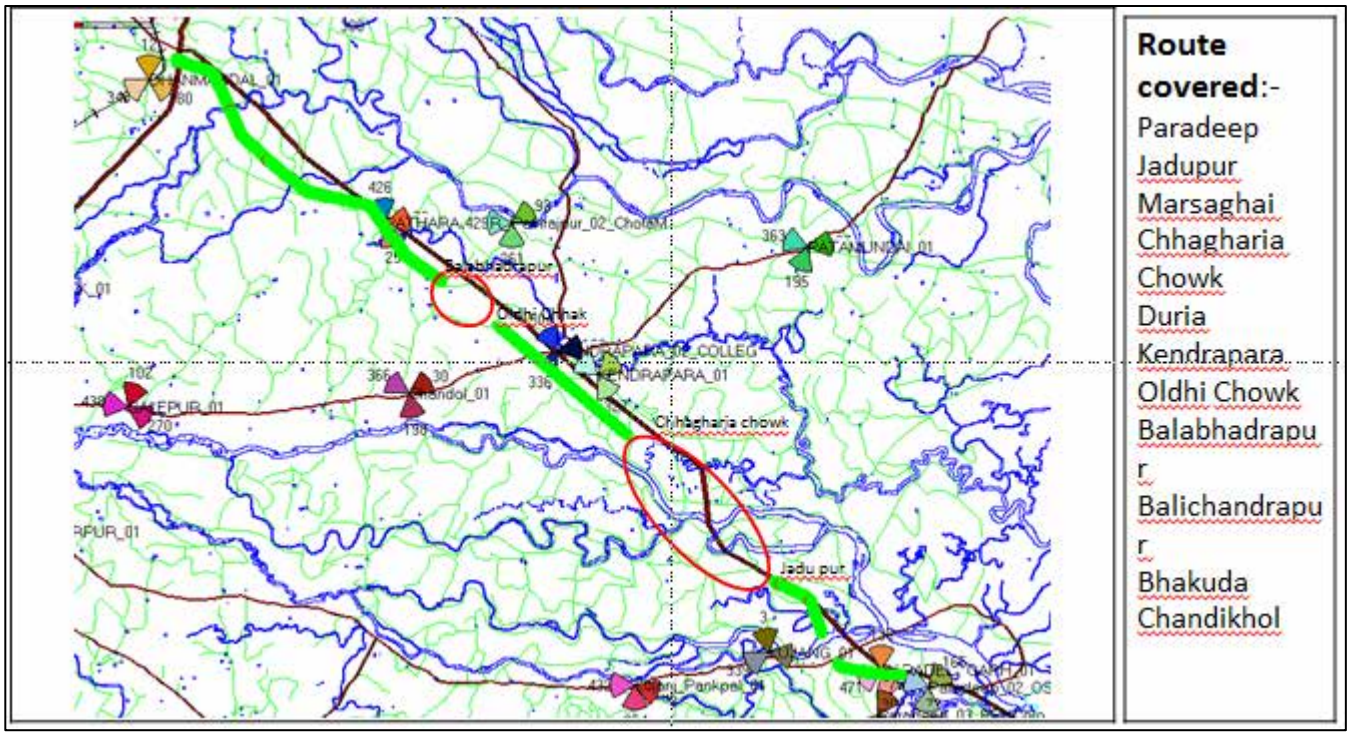


Route covered:-
Biju Patnayak Park
Madhuban Chowk
Bank Colony
Telephone Exchange

Day 1 – Highways

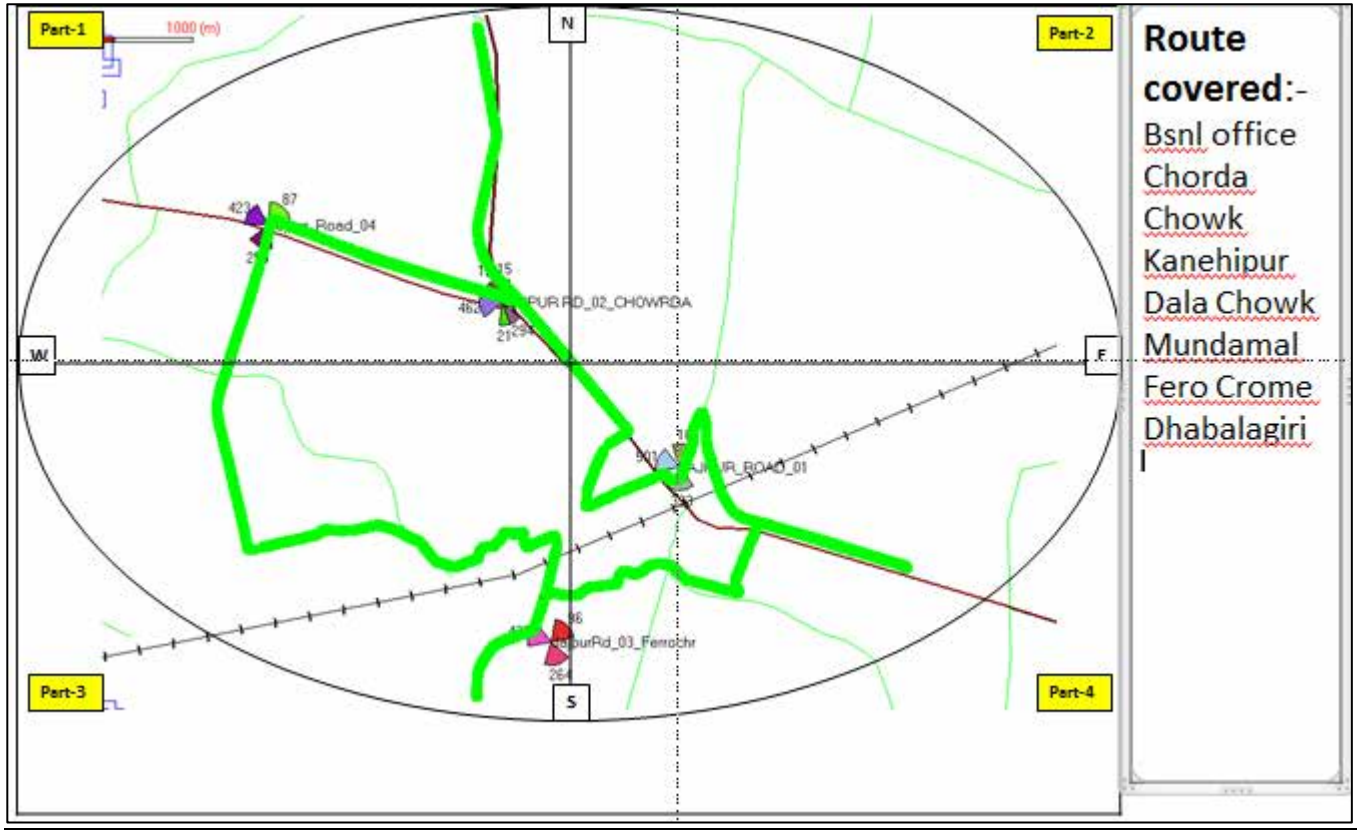


Day 1 – Major Roads

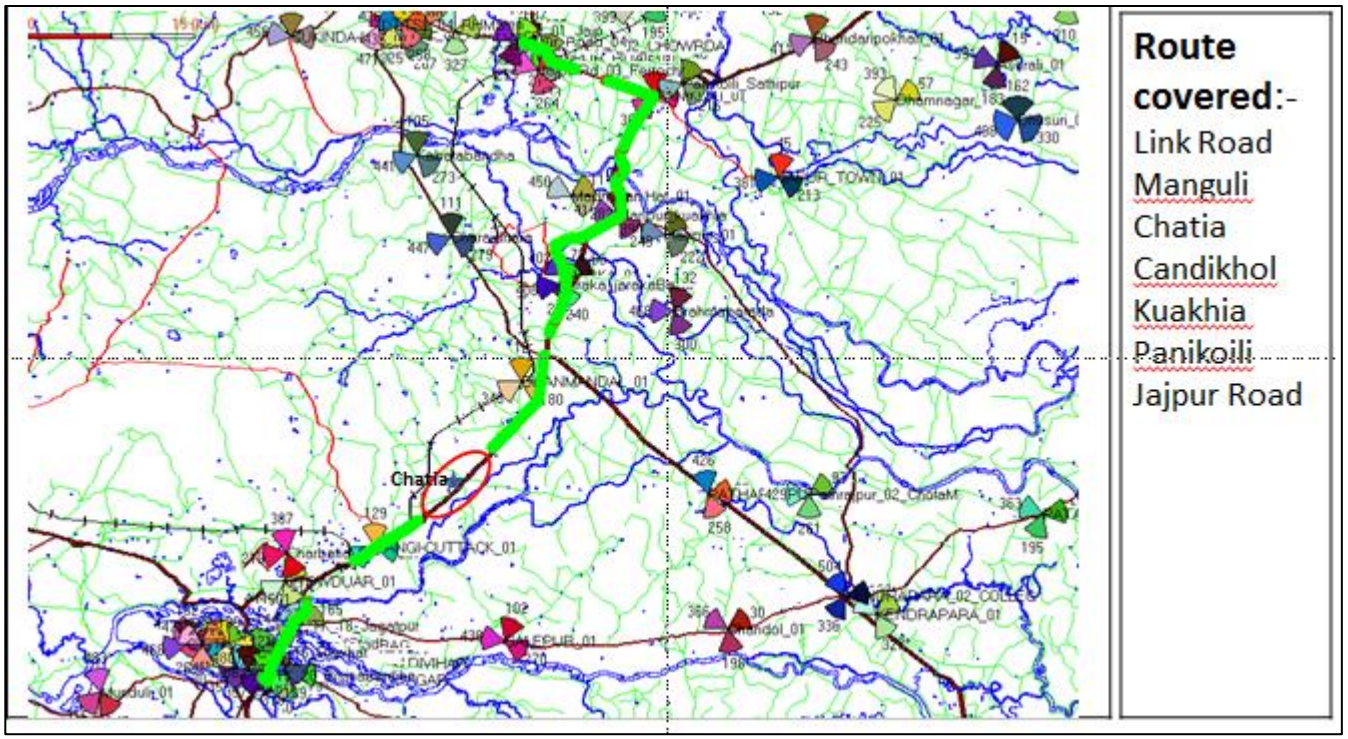


7.1.1.4 ROUTE MAP CUTTACK DAY 2

Day 2 – Within City

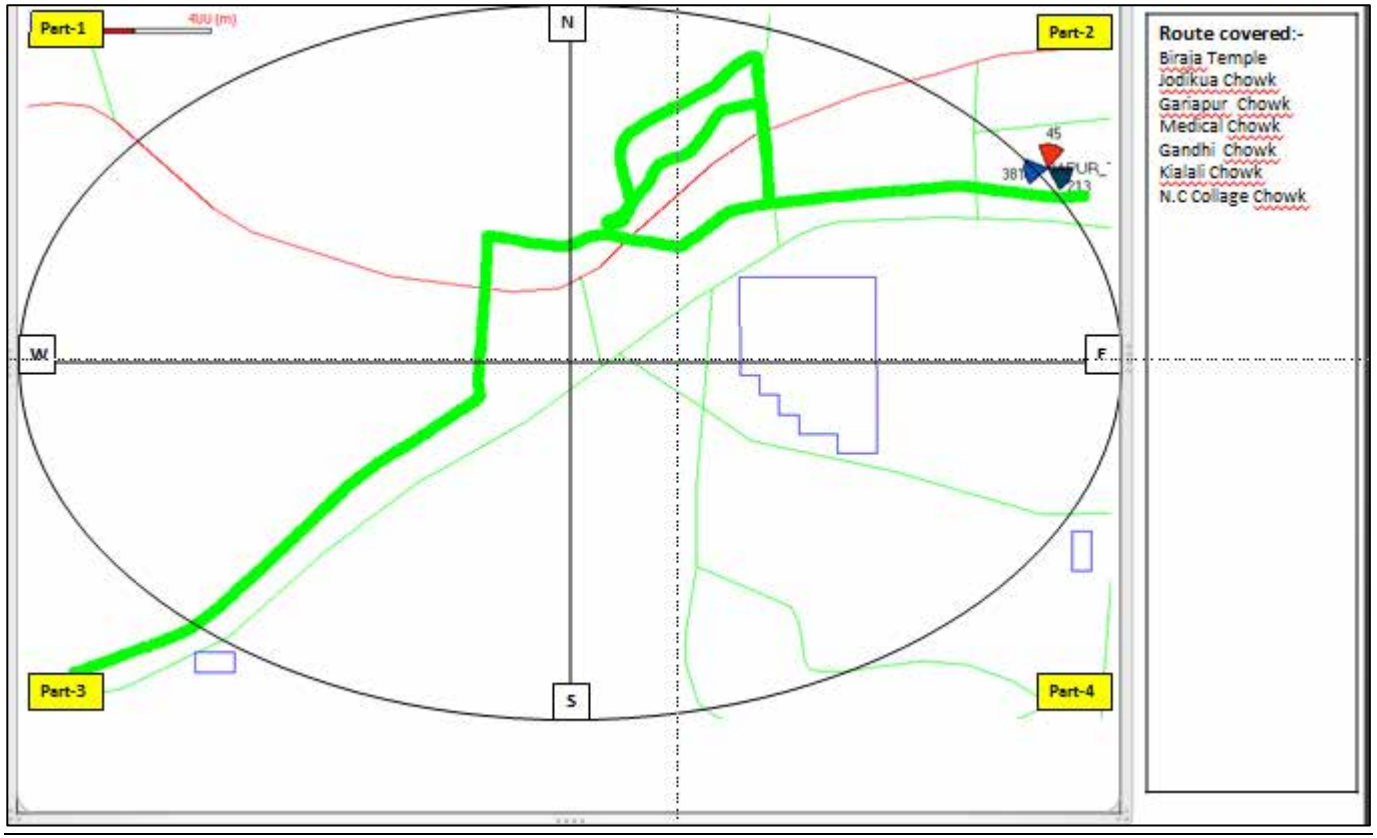


Day 2 – Highways

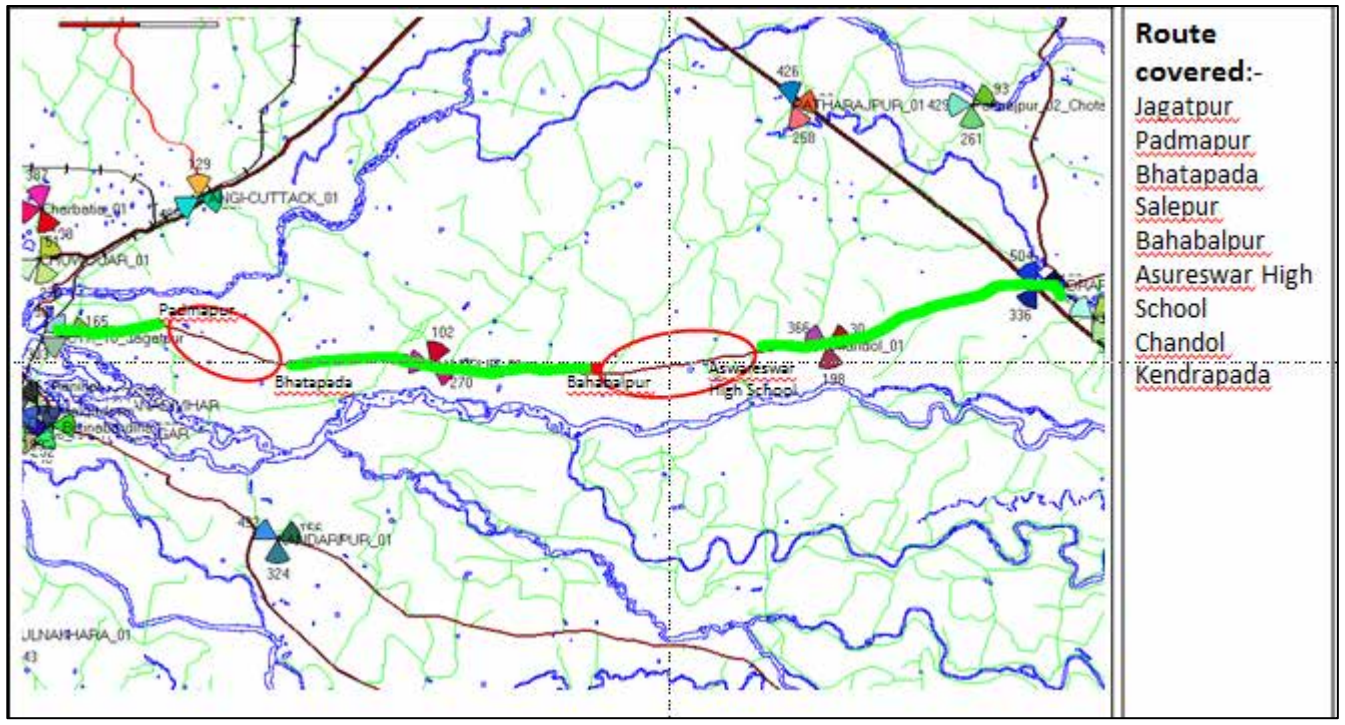


7.1.1.5 ROUTE MAP CUTTACK DAY 3

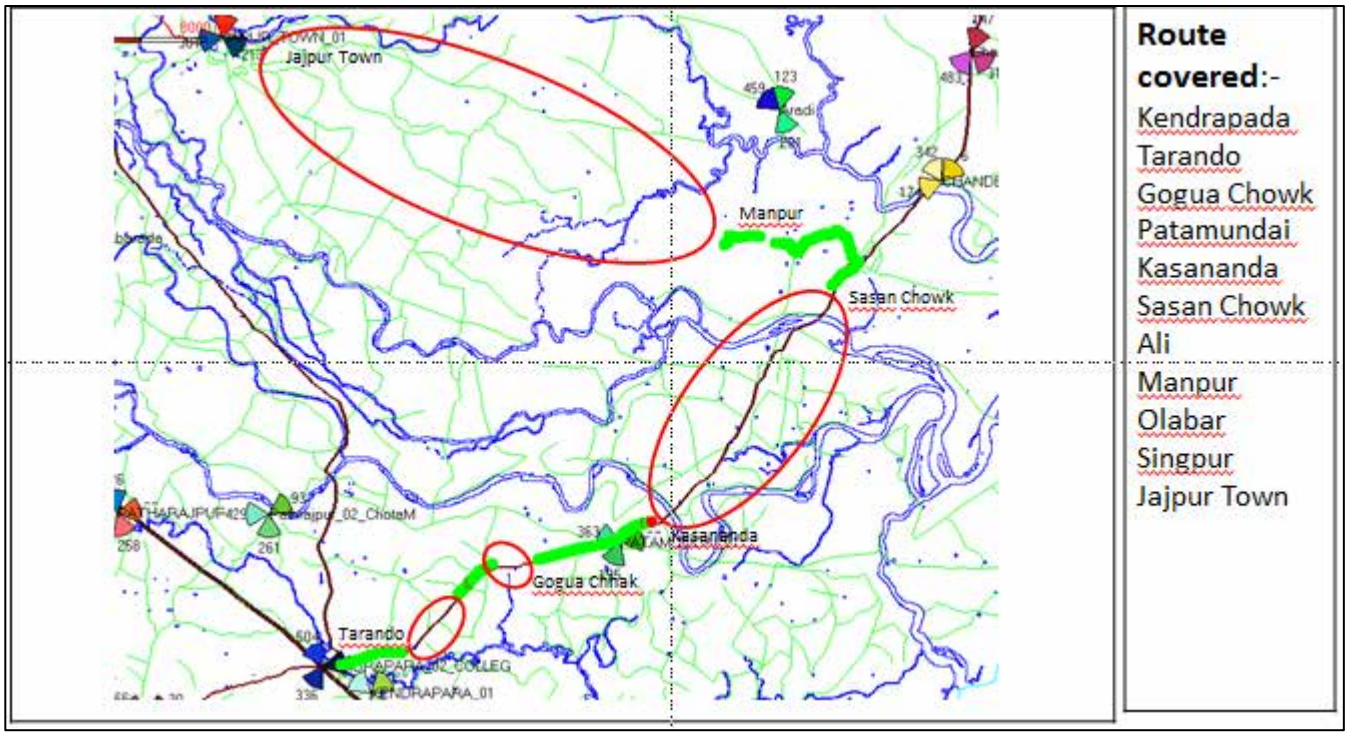
Day 3 – Within City



Day 3 – Highways



Day 3 – Major Roads



7.1.1.6 DRIVE TEST RESULTS – CUTTACK SSA

	B'mark	Aircel(DWL)		Airtel		BSNL		Idea		Reliance CDMA		Reliance GSM		TATA CDMA		TATA GSM		Vodafone	
Parameter's		In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor
0 to -75 dBm		98.86%	84.78%	89.63%	86.60%	99.58%	96.09%	38.59%	63.63%	54.49%	32.75%	39.68%	61.78%	26.16%	55.30%	96.33%	90.59%	30.74%	55.56%
0 to -85 dBm		100.00%	94.23%	99.66%	98.86%	99.98%	99.74%	85.68%	95.53%	86.47%	67.74%	94.37%	90.97%	65.08%	83.89%	99.75%	99.36%	92.88%	93.00%
0 to -95 dBm		100.00%	100.00%	99.93%	99.98%	100.00%	100.00%	99.89%	96.91%	99.99%	95.61%	99.96%	98.96%	97.84%	98.54%	99.96%	99.95%	99.88%	99.65%
Voice quality	≥ 95%	98.71%	95.47%	99.78%	99.84%	98.18%	96.97%	98.26%	100.32%	99.76%	98.97%	97.05%	95.51%	99.71%	99.22%	99.56%	95.45%	98.53%	94.88%
CSSR	≥ 95%	100.00%	99.86%	100.00%	100.00%	99.26%	99.77%	100.00%	100.00%	100.00%	100.00%	100.00%	99.90%	100.00%	100.00%	100.00%	99.58%	100.00%	98.36%
%age Blocked calls		0.00%	0.14%	0.00%	0.00%	0.74%	0.23%	0.00%	0.00%	0.00%	0.00%	0.00%	0.10%	0.00%	0.00%	0.00%	0.42%	0.00%	0.70%
Call drop rate	≤ 2%	0.00%	0.48%	0.00%	0.00%	0.00%	0.83%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.19%
Hands off success rate		100.00%	99.35%	100.00%	88.89%	100.00%	98.48%	100.00%	98.91%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	99.34%

Data Source: Drive test reports submitted by operators to auditors

Voice Quality

Vodafone failed to meet the benchmark for voice quality in outdoor locations.

Call Setup Success Rate (CSSR)

All operators met the benchmark for CSSR in outdoor as well as indoor locations.

Call Drop Rate

All operators met the benchmark for call drop rate in outdoor as well as indoor locations.

7.1.2 MAY – KORAPUT SSA

Month	Name of SSA Covered	Date of Drive Test
May	KORAPUT	26th, 27th & 28th MAY'15

7.1.2.1 ROUTE DETAILS – KORAPUT SSA

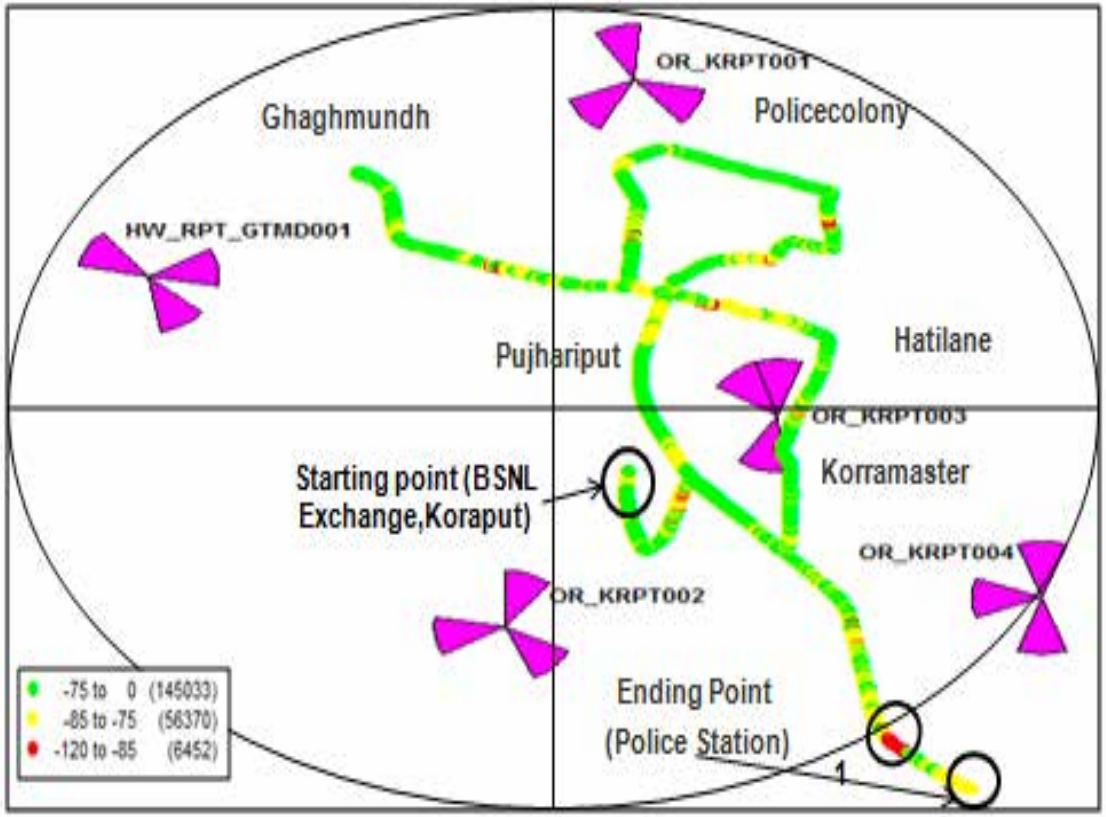
Category	Type of location	Orissa		
		KORAPUT		
		Day 1	Day 2	Day 3
Outdoor	Major Roads	PAPADAHANDI, JATABAL, DABUGAON, JHARIGUDA, CHHATIGUDA, DHODRA, UMARKOT	BOIPARIGUDA, GUPTESHWAR ROAD, MATHPADA, RAMAGIRI	RAYAGADA, KOTHPETA, JK PUR, JHINGLIBADI
	Highways	KORAPUT, DEOGHATI, JEYPORE, AMBAGUDA, BOIRIMUNDA, KAMARA, NAVRANGPUR, HATIBEDA, PAPADHANDI	JEYPORE, DIMLA, BOIRIPADIGUDA, TANGINIGUDA, GOVINDPALLI, MAITHILI, KATAMETA, SINDRIMAL, MALKANAGIRI	KORAPUT, LAXMIPUR, KAKRIGUMA, RAYAGADA
	With in the City	JAGANNATH TEMPLE, GHATIMUNDA, BHUDAN COLONY, WATERSHED OFFICE (KORAPUT)	GANDHI CHOWK, GUDISAHI, JAYA NAGAR, KARANAM, LAXMI TALKIES, PAILO STREET, TELEPHONE EXCHANGE (JEYPORE)	TELEPHONE BHAWAN, KASTURI NAGAR, JUNAPADA COMPLEX, HATA SESIKHAL, RANIGUDA, KARANA STREET, TRUPTI HOTEL (RAYAGADA)
Indoor	Shopping complex	BISESWAR RAY SHOPPING COMPLEX ,KORAPUT	S.N PLAZA,JEYPORE	KRISHNA VENI MARKET COMPLEX,RAYAGADA
	Office complex	BSNL TELEPHONE BHAWAN,KORAPUT	BSNL TELEPHONE EXCHANGE, JEYPORE	BSNL TELEPHONE EXCHANGE,RAYAGADA

The route maps given in the report are provided for the purpose of identifying the routes traversed during the drive tests. We may observe three different colours (Red/Green/Yellow) of the lines, which signify signal strength; however these maps are for a single operator and have not been referred to any findings in this report. IMRB submits detailed operator wise Drive Test reports separately.

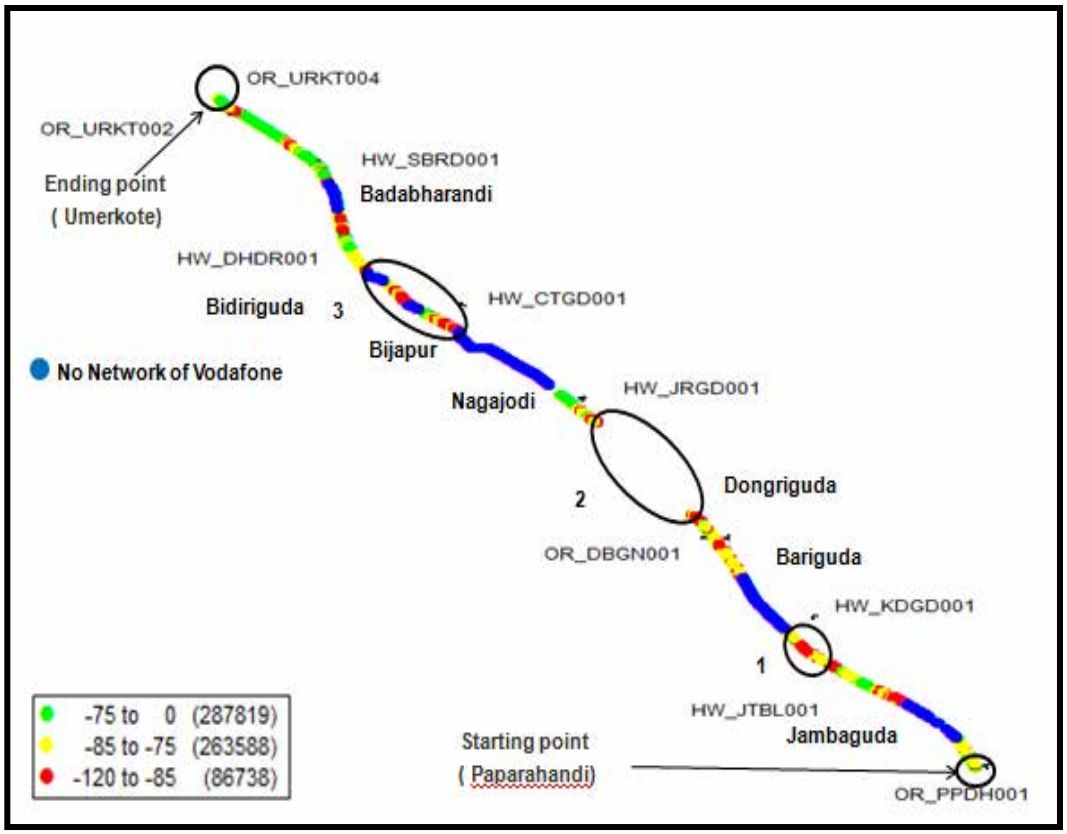
7.1.2.2 KILOMETERS TRAVELLED – KORAPUT SSA

7.1.2.3 ROUTE MAP KORAPUT DAY 1

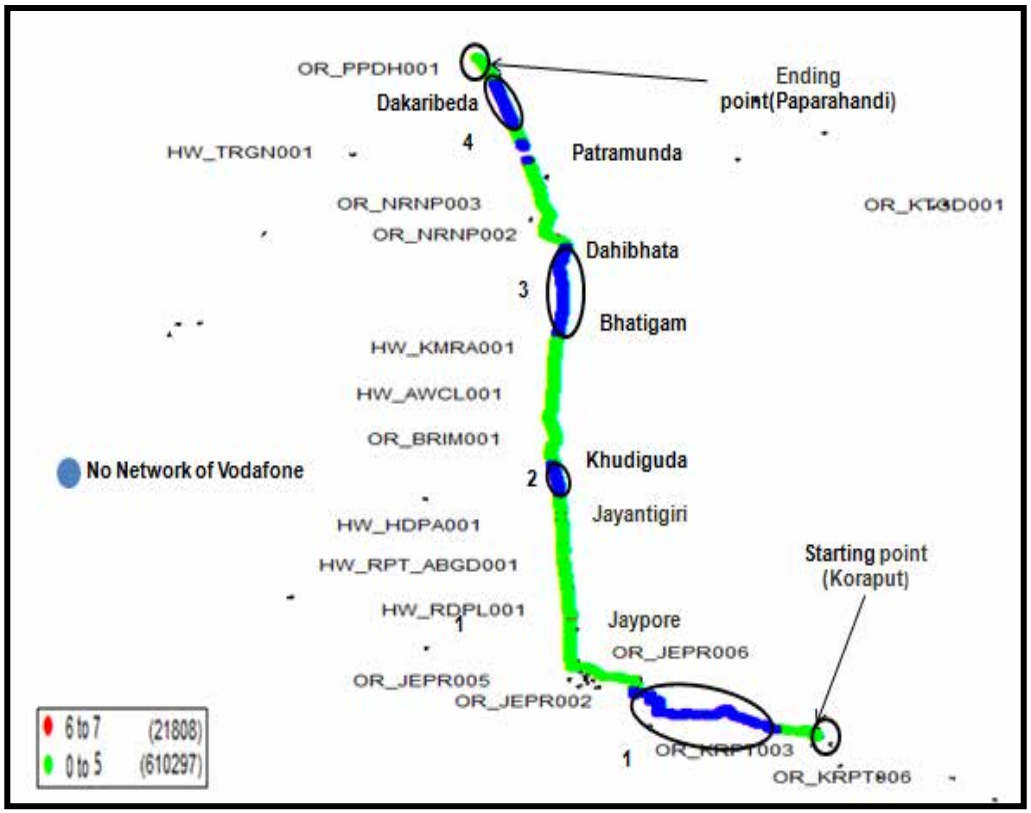
Day 1 – Within City



Day 1 – Major Roads

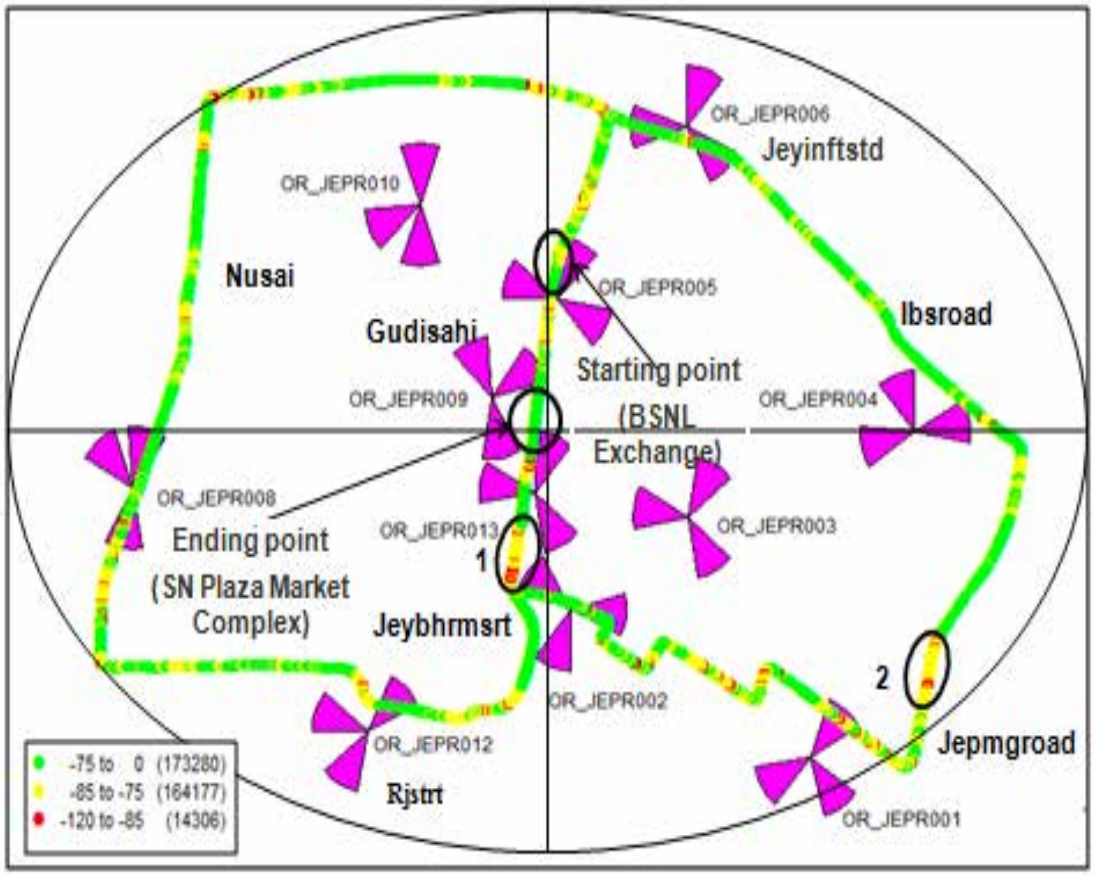


Day 1 – Highways

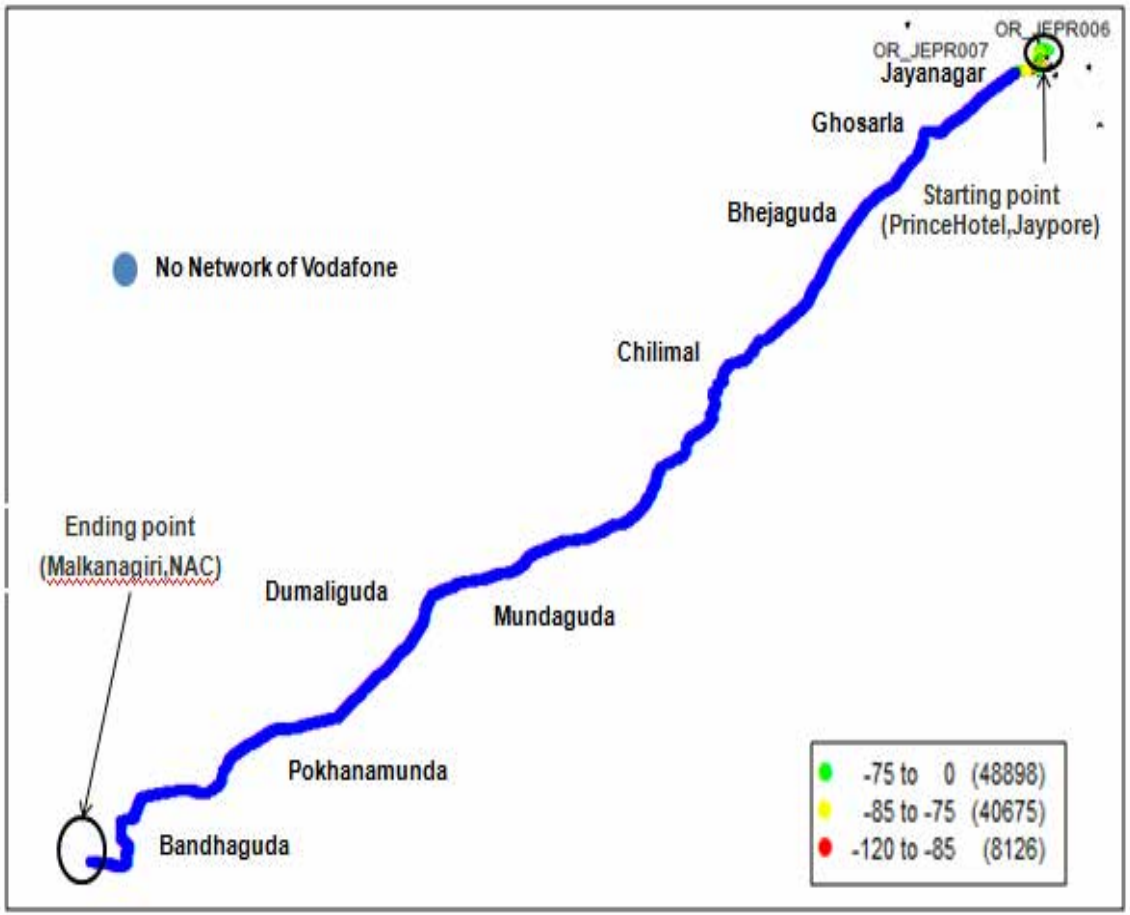


7.1.2.4 ROUTE MAP KORAPUT DAY 2

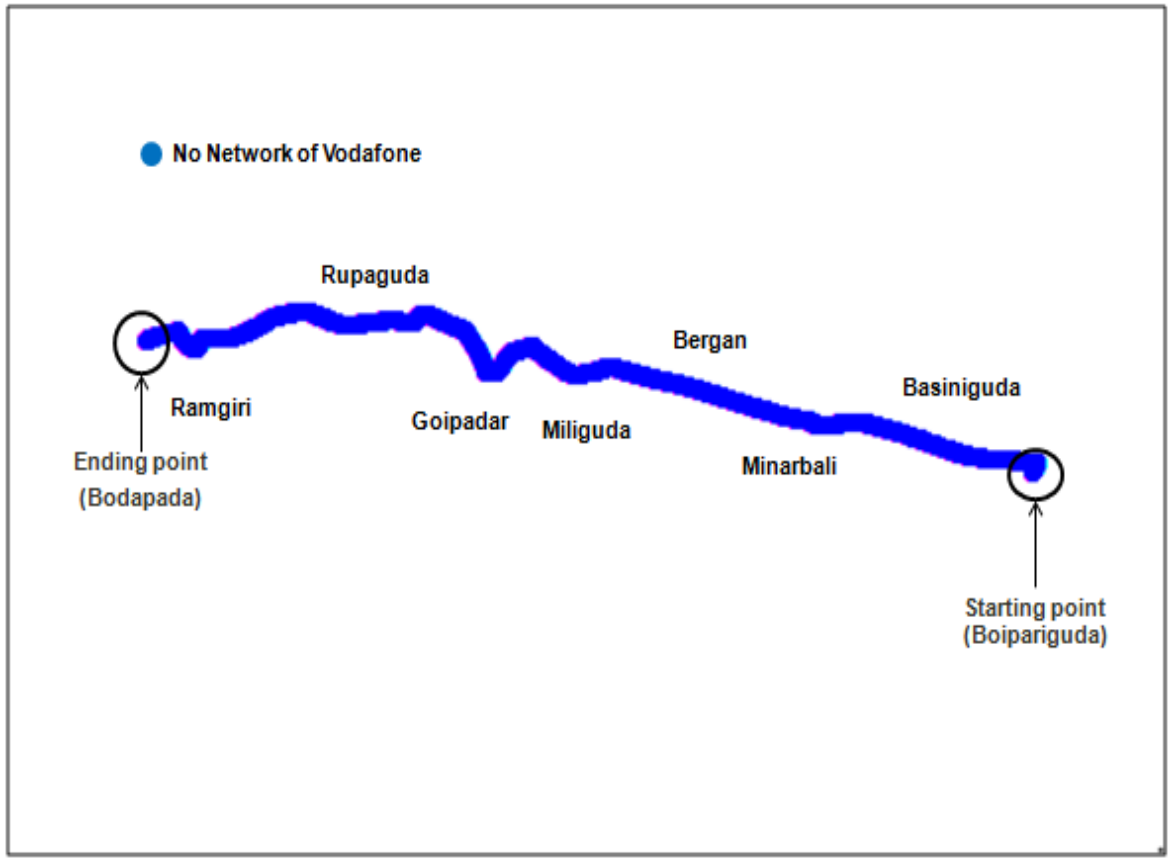
Day 2 – Within City



Day 2 – Highways

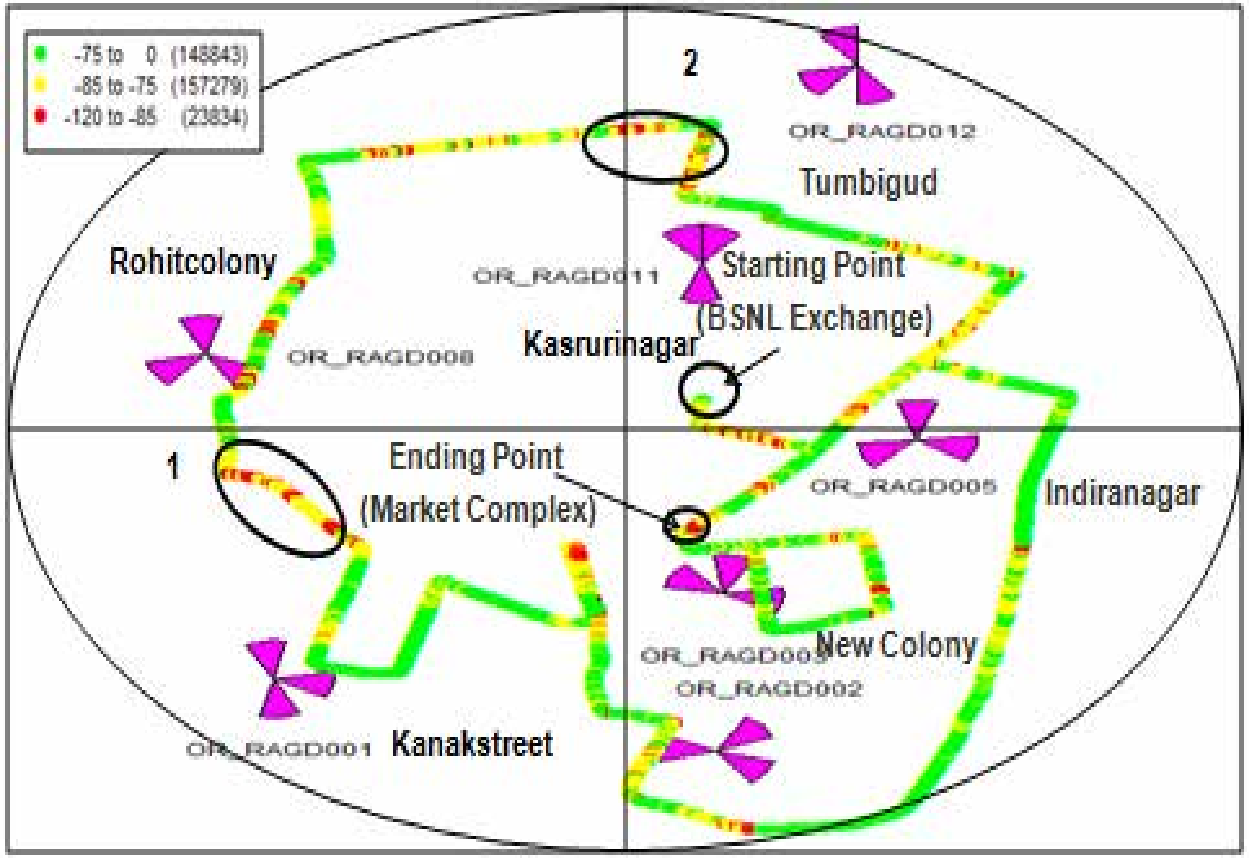


Day 2 – Major Roads

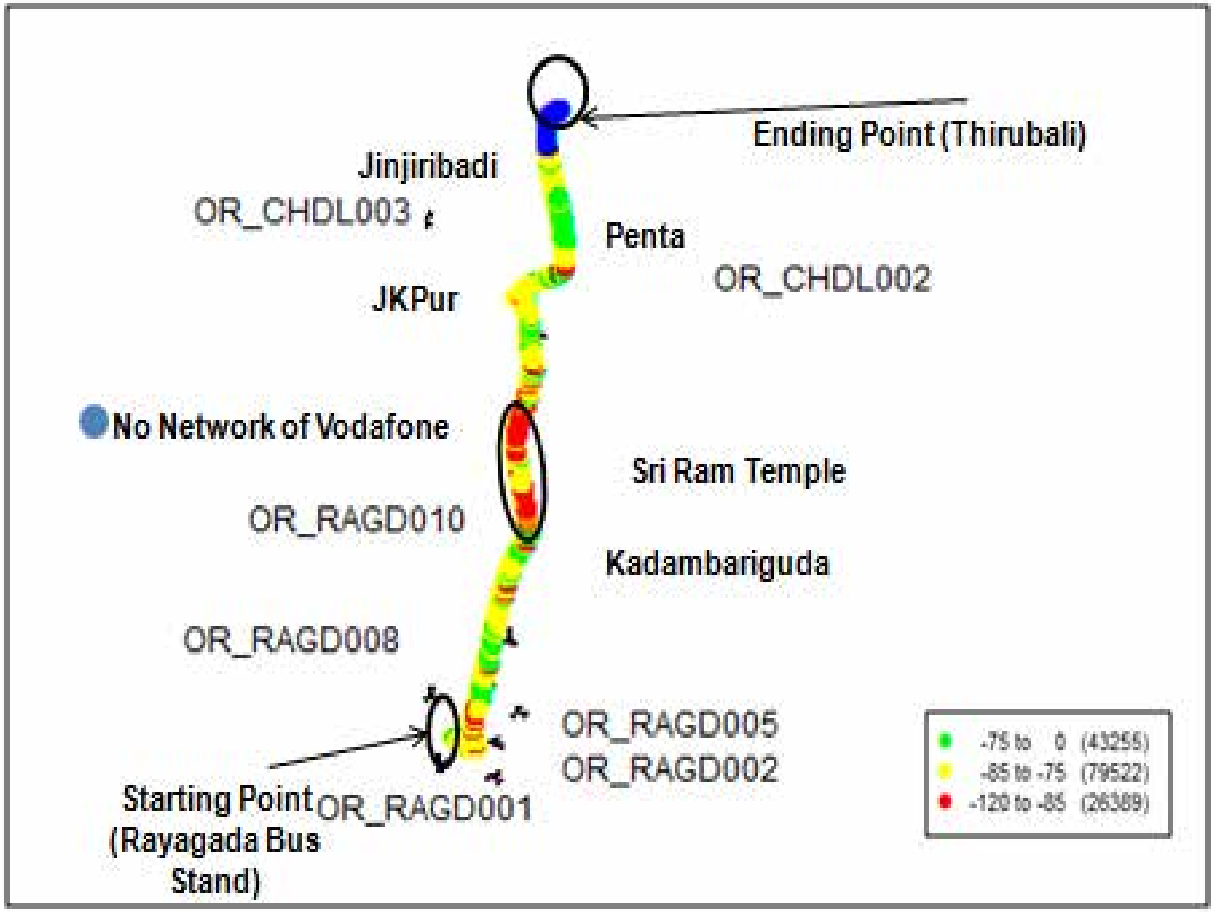


7.1.2.5 ROUTE MAP KORAPUT DAY 3

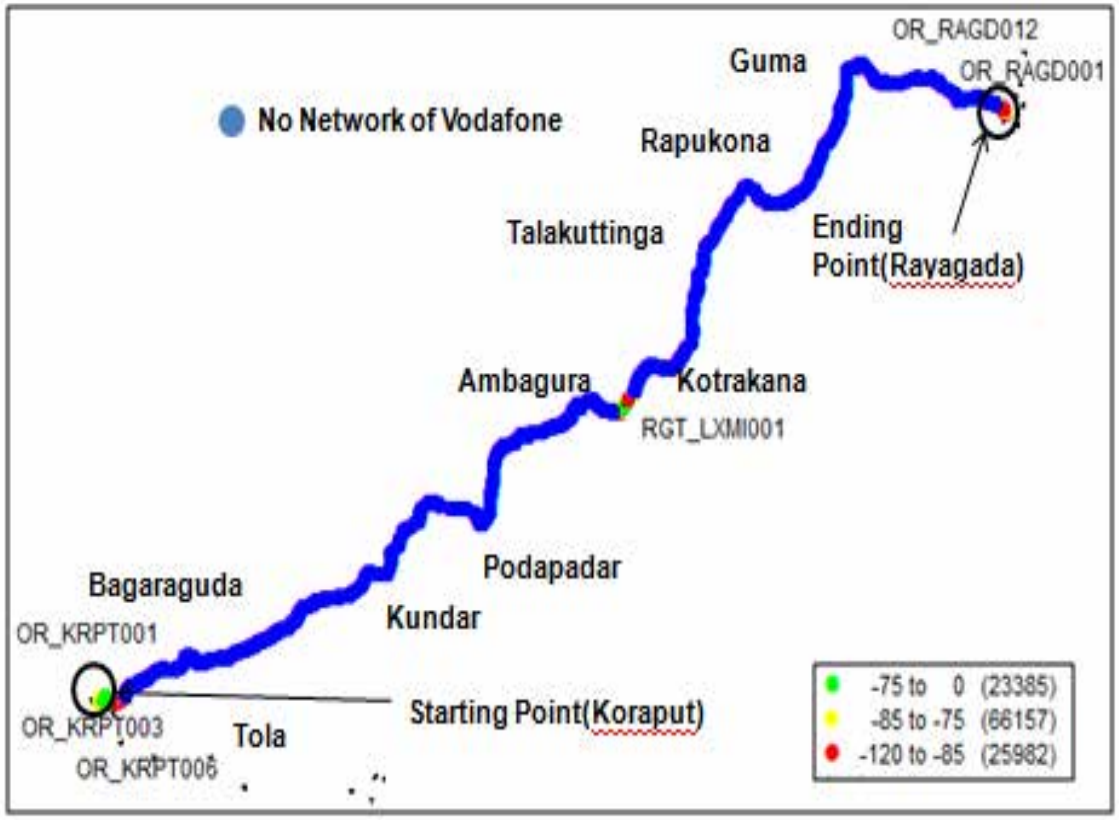
Day 3 – Within City



Day 3 – Major Roads



Day 3 – Highways



7.1.2.6 DRIVE TEST RESULTS – KORAPUT SSA

	B'mark	Aircel(DWL)		Airtel		BSNL		Idea		Reliance CDMA		Reliance GSM		TATA CDMA		TATA GSM		Vodafone	
Parameter's		In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor
0 to -75 dBm		98.86%	87.77%	87.52%	63.00%	87.83%	65.21%	33.54%	60.95%	63.41%	25.98%	37.36%	57.43%	30.00%	53.92%	82.96%	67.38%	49.37%	42.32%
0 to -85 dBm		100.00%	95.84%	99.82%	83.77%	99.98%	80.61%	91.91%	89.87%	69.97%	50.20%	99.65%	68.94%	81.26%	91.43%	99.55%	92.30%	95.69%	87.04%
0 to -95 dBm		100.00%	100.00%	99.99%	96.55%	100.00%	95.91%	99.68%	94.40%	92.03%	78.25%	99.86%	91.60%	99.92%	99.71%	99.97%	99.37%	99.96%	99.17%
Voice quality	≥ 95%	92.65%	96.09%	99.81%	99.72%	95.99%	93.97%	97.52%	96.48%	99.53%	99.02%	99.26%	97.23%	99.89%	99.71%	98.79%	96.69%	99.30%	97.74%
CSSR	≥ 95%	100.00%	100.00%	100.00%	97.44%	99.22%	98.86%	99.26%	100.00%	100.00%	100.00%	100.00%	97.97%	100.00%	100.00%	100.00%	99.01%	100.00%	98.98%
%age Blocked calls		0.00%	0.00%	0.00%	0.00%	0.78%	1.14%	99.26%	0.00%	0.00%	0.00%	0.00%	1.52%	0.00%	0.00%	0.00%	0.99%	0.00%	0.00%
Call drop rate	≤ 2%	0.00%	0.33%	0.00%	0.37%	0.00%	0.72%	0.74%	0.00%	0.00%	0.00%	0.00%	1.29%	0.00%	0.00%	0.00%	0.34%	0.00%	0.00%
Hands off success rate		100.00%	97.26%	100.00%	100.00%	99.35%	97.64%	100.00%	99.34%	100.00%	100.00%	100.00%	97.92%	100.00%	100.00%	100.00%	99.46%	100.00%	100.00%

Data Source: Drive test reports submitted by operators to auditors

Voice Quality

Aircel failed to meet the benchmark for voice quality in indoor locations while BSNL failed to meet the benchmark for voice quality in outdoor locations.

Call Setup Success Rate (CSSR)

All operators met the benchmark for CSSR in outdoor as well as indoor locations.

Call Drop Rate

All operators met the benchmark for call drop rate in outdoor as well as indoor locations.

7.1.3 JUNE – SAMBALPUR SSA

Month	Name of SSA Covered	Date of Drive Test
June	SAMBALPUR	24th ,25th,27th JUN 2015

7.1.3.1 ROUTE DETAILS – SAMBALPUR SSA

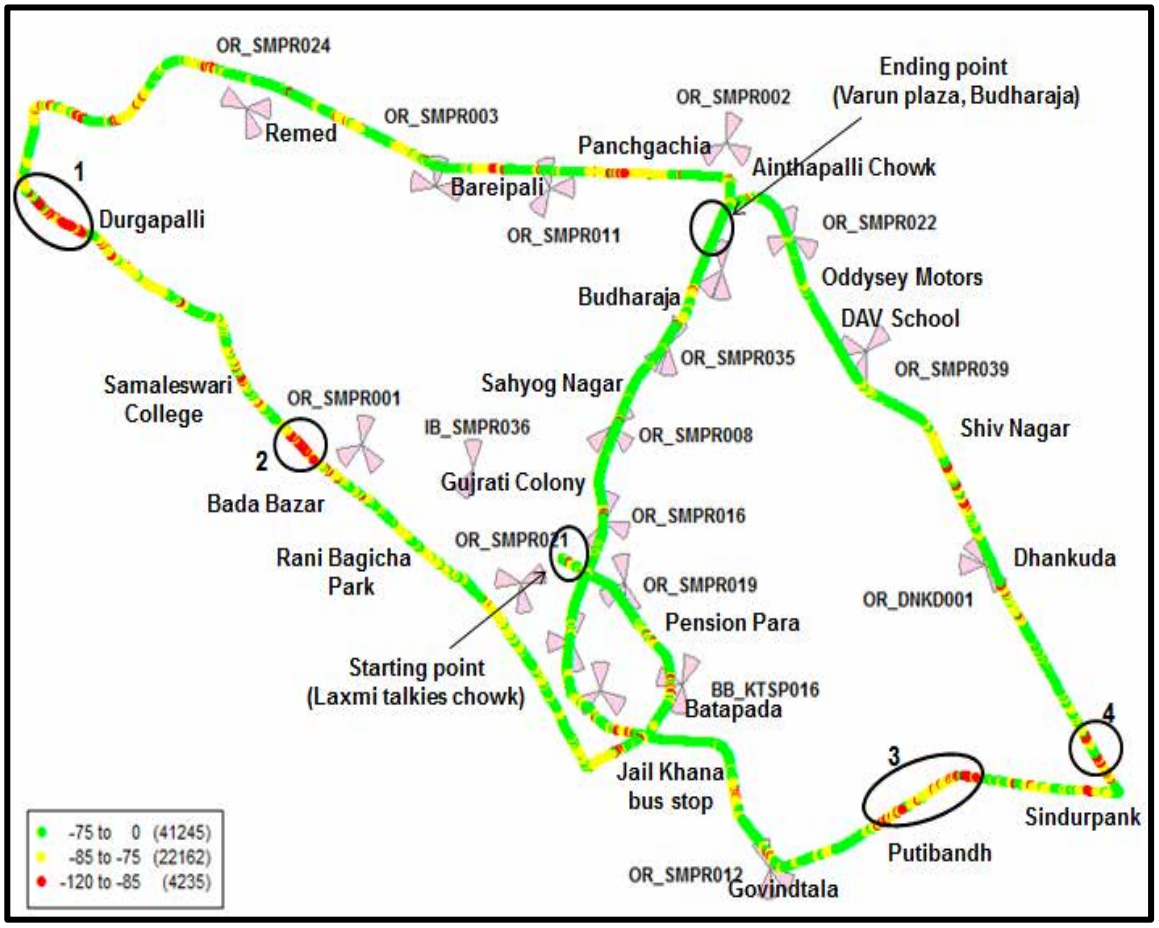
Category	Type of location	Orissa		
		SAMBALPUR		
		Day 1	Day 2	Day 3
Outdoor	Major Roads	emadi chowk to Hirakud	Purunagarh(Deogarh) to Redhakhol	Jharsuguda to Tileibani
	Highways	Remadi chowk to Baragarh	Attapali chowk to Deogarh & Redhakhol to Sambalpur	Sambalpur to Jharsuguda
	With in the City	Sambalpur & Baragarh town	Deogarh town & Redhakhol town	Jharsuguda Town
Indoor	Shopping complex	Varun Plaza Sambalpur	Adikanda market complex Redhakhol	Big Bazar(Jharsuguda)
	Office complex	BSNL Telephone Bhavan(Sambalpur)	BSNL Telephone Exchange(Deogarh)	BSNL Telephone Exchange(Jharsuguda)

The route maps given in the report are provided for the purpose of identifying the routes traversed during the drive tests. We may observe three different colours (Red/Green/Yellow) of the lines, which signify signal strength; however these maps are for a single operator and have not been referred to any findings in this report. IMRB submits detailed operator wise Drive Test reports separately.

7.1.3.2 KILOMETERS TRAVELLED – SAMBALPUR SSA

7.1.3.3 ROUTE MAP SAMBALPUR DAY 1

Day 1 – Within City



Day 1 – Major Roads

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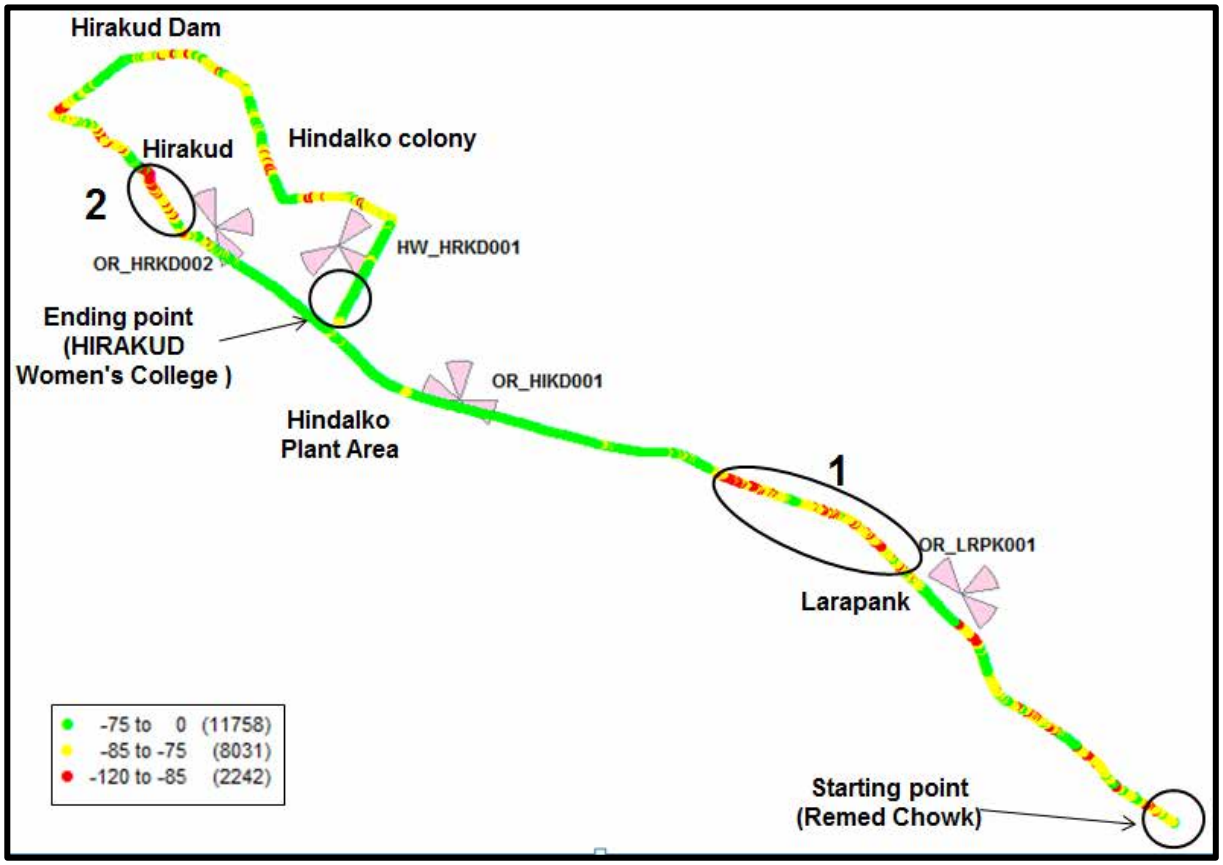
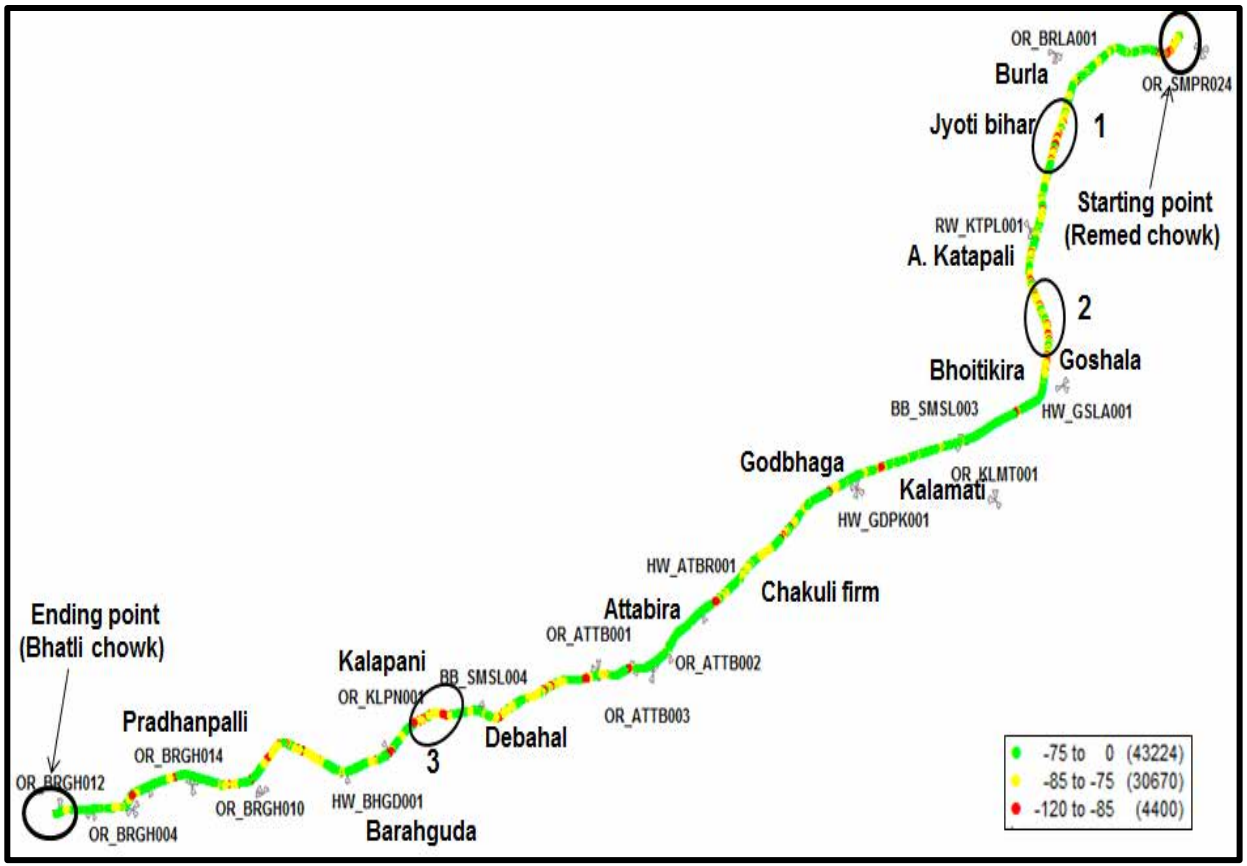
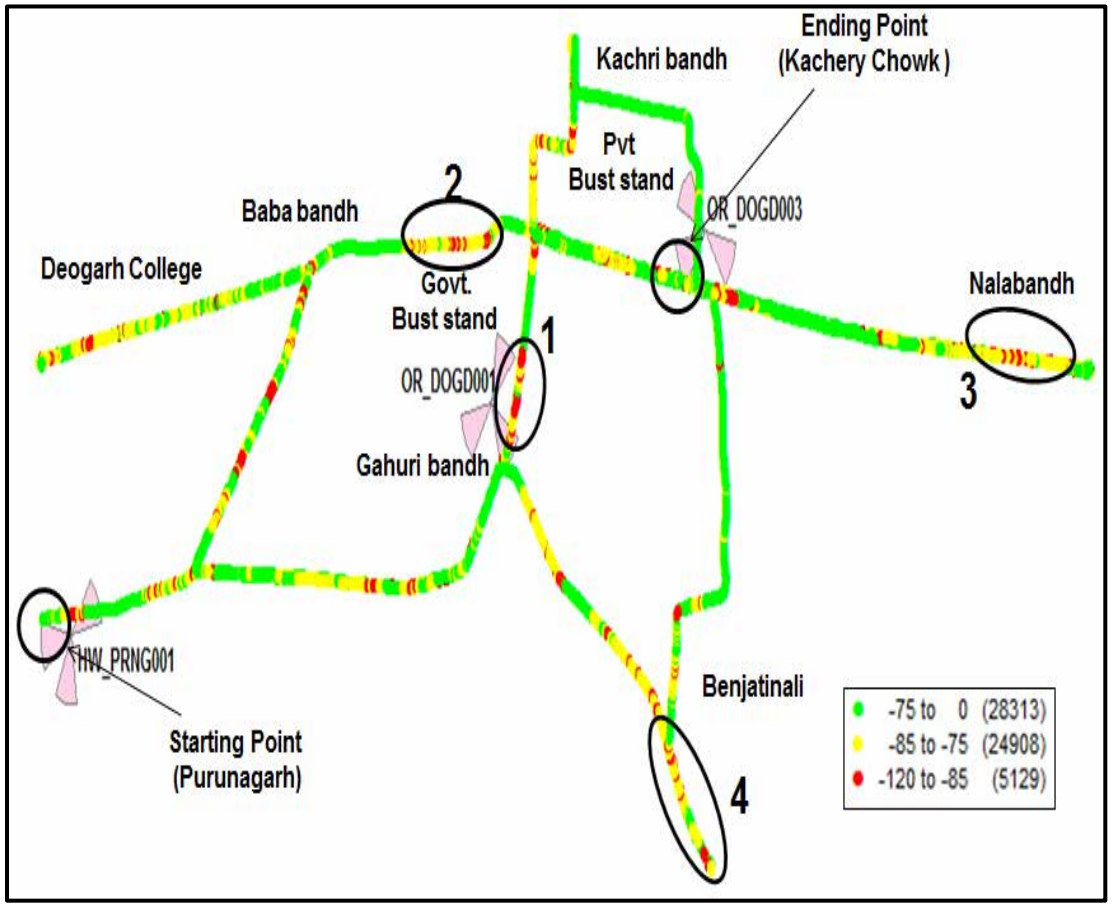


Day 1 – Highways

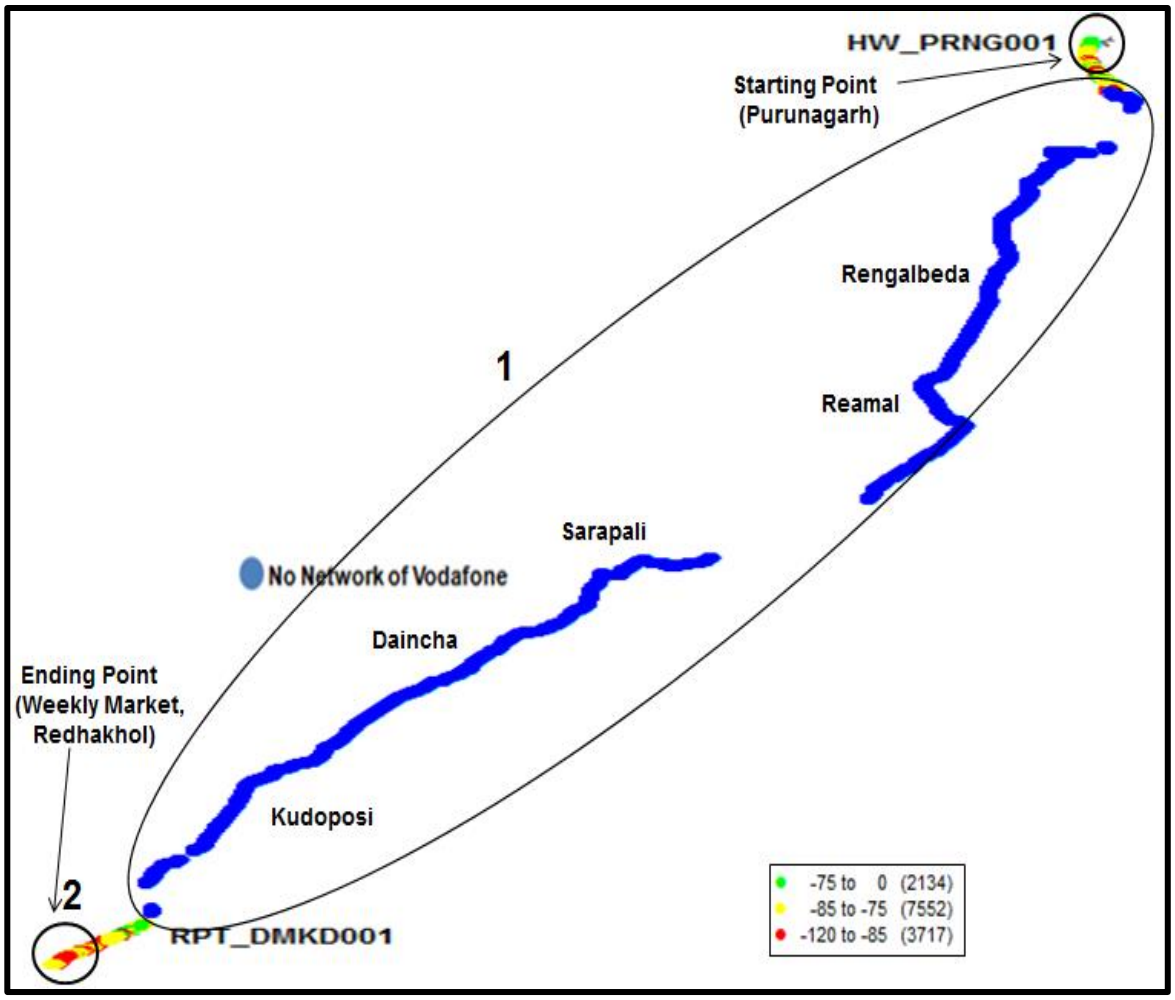


7.1.3.4 ROUTE MAP SAMBALPUR DAY 2

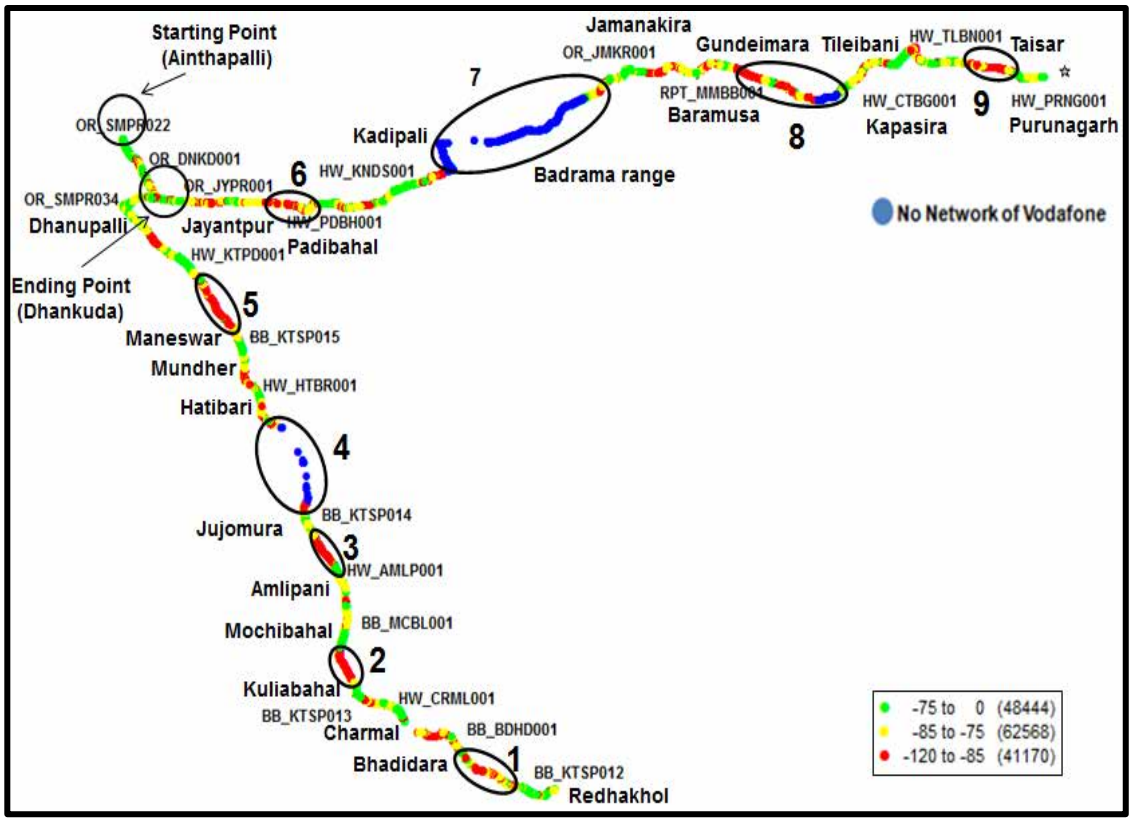
Day 2 – Within City



Day 2 – Major Roads

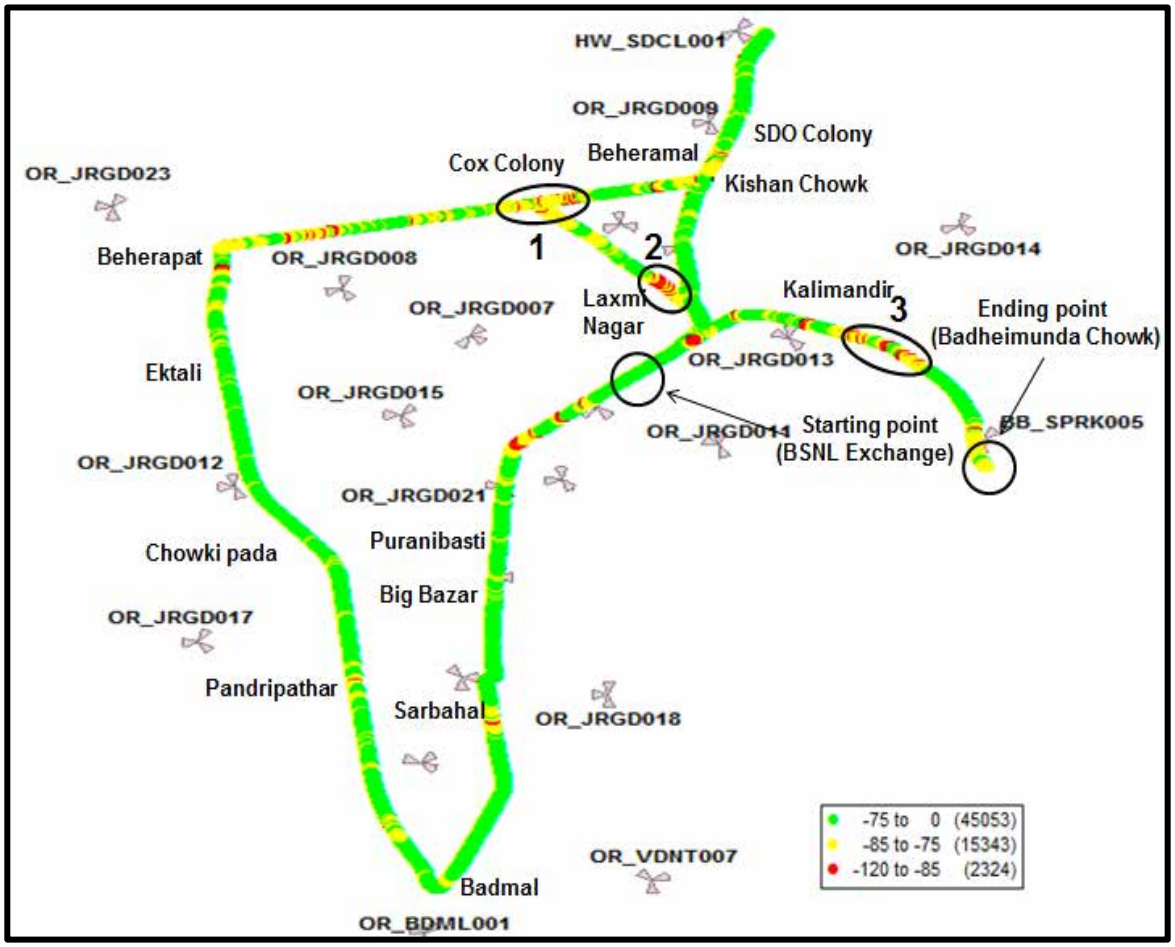


Day 2 – Highways

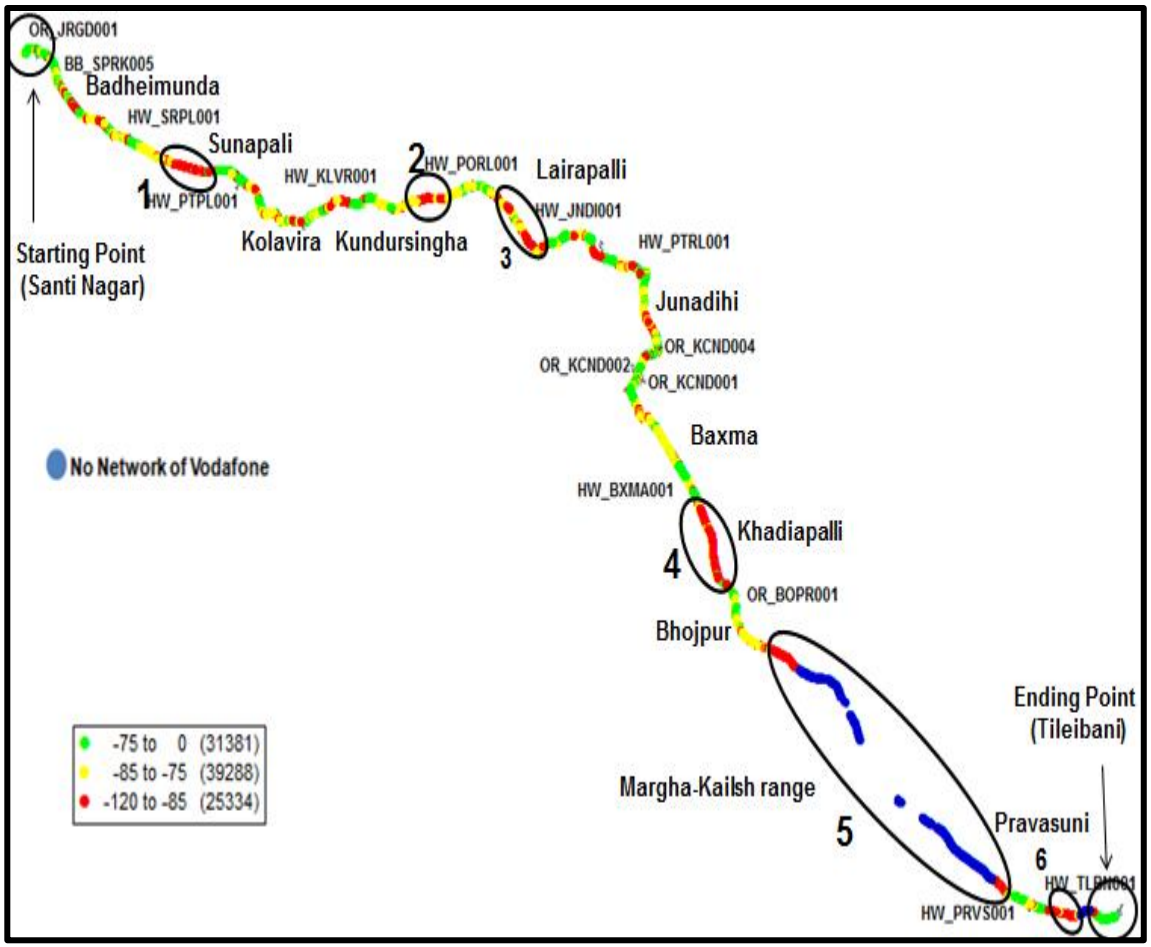


7.1.3.5 ROUTE MAP SAMBALPUR DAY 3

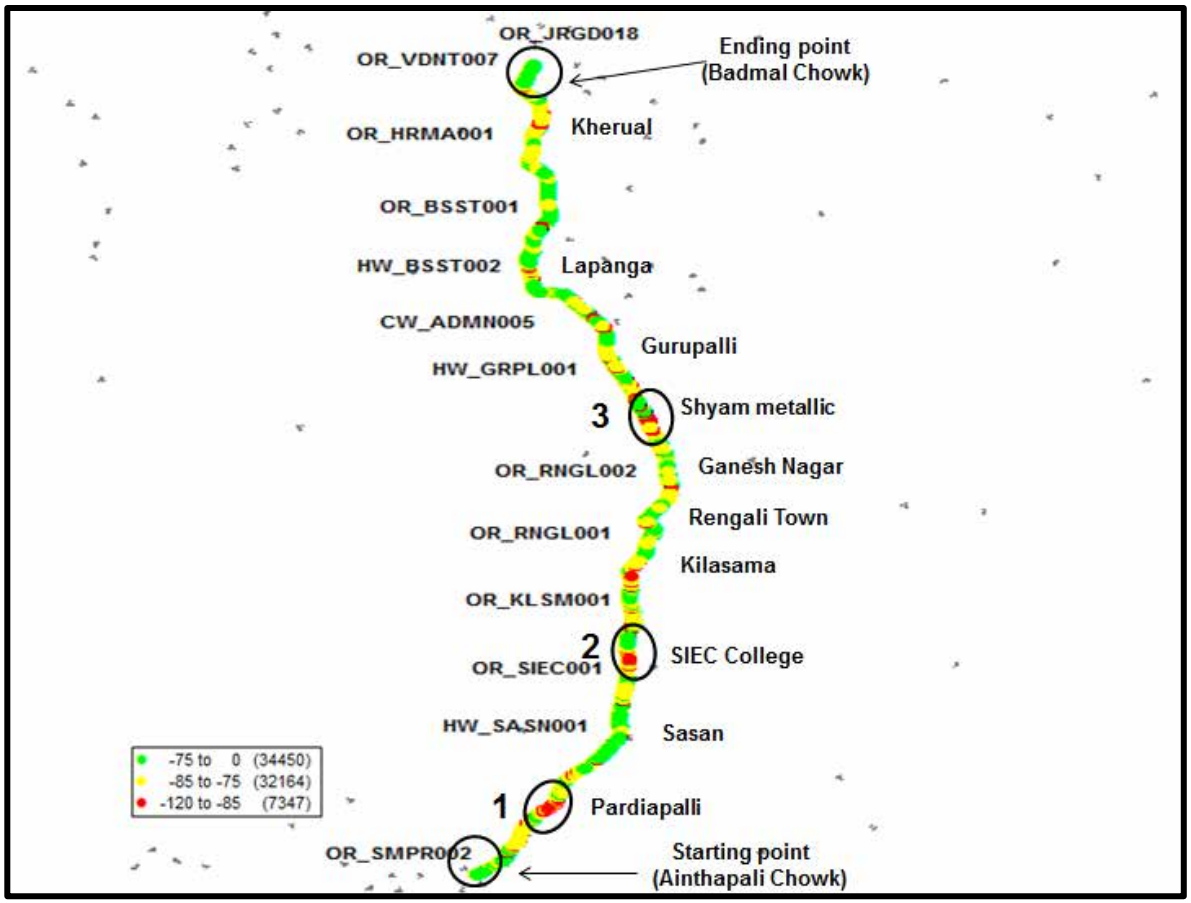
Day 3 – Within City



Day 3 – Major Roads



Day 3 – Highways



7.1.3.6 DRIVE TEST RESULTS – SAMBALPUR SSA

	B'mark	Aircel(DWL)		Airtel		BSNL		Idea		Reliance CDMA		Reliance GSM		TATA CDMA		TATA GSM		Vodafone	
Parameter's		In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor
0 to -75 dBm		63.77%	50.42%	78.89%	72.83%	95.00%	69.00%	69.95%	67.51%	16.85%	29.29%	56.24%	49.74%	29.68%	47.31%	71.86%	68.74%	65.44%	47.00%
0 to -85 dBm		100.00%	78.37%	98.94%	93.46%	100.00%	88.22%	99.06%	97.84%	45.16%	57.92%	87.15%	84.42%	98.95%	78.14%	97.50%	93.10%	97.58%	86.17%
0 to -95 dBm		100.00%	100.00%	99.99%	98.32%	100.00%	98.00%	100.00%	99.49%	88.11%	86.57%	99.87%	91.02%	100.00%	99.99%	99.90%	99.55%	99.99%	97.50%
Voice quality	≥ 95%	97.83%	94.90%	99.48%	99.34%	99.59%	98.88%	98.33%	97.47%	99.33%	99.37%	97.99%	94.33%	99.94%	98.81%	98.60%	97.28%	99.66%	97.55%
CSSR	≥ 95%	100.00%	99.57%	100.00%	100.00%	100.00%	99.07%	100.00%	100.00%	100.00%	100.00%	100.00%	99.75%	100.00%	100.00%	100.00%	98.10%	100.00%	98.84%
%age Blocked calls		0.00%	0.43%	0.00%	0.00%	0.00%	0.36%	133.33%	0.00%	0.00%	0.00%	0.00%	0.25%	0.00%	0.00%	0.00%	1.18%	0.00%	0.00%
Call drop rate	≤ 2%	0.00%	0.80%	0.00%	0.00%	0.00%	1.48%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.56%
Hands off success rate		100.00%	97.75%	100.00%	88.89%	100.00%	98.86%	100.00%	98.28%	100.00%	100.00%	100.00%	100.00%	100.00%	99.94%	100.00%	98.96%	100.00%	99.75%

Data Source: Drive test reports submitted by operators to auditors

Voice Quality

Aircel and Reliance GSM failed to meet the benchmark for voice quality in outdoor locations.

Call Setup Success Rate (CSSR)

All operators met the benchmark for CSSR in outdoor as well as indoor locations.

Call Drop Rate

All operators met the benchmark for call drop rate in outdoor as well as indoor locations.

7.2 INDEPENDENT DRIVE TEST

The independent drive test was conducted for all the operators present in the Orissa circle. As per the new directive given by TRAI headquarters, drive test were conducted at a SSA level. A minimum of 100 kilometers were traversed 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 post discussion with TRAI advisors. The holding period for all test calls was 120 seconds and 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 > -75 dbm for indoor, -85 dbm for in-vehicle and > -95 dbm outdoor routes.

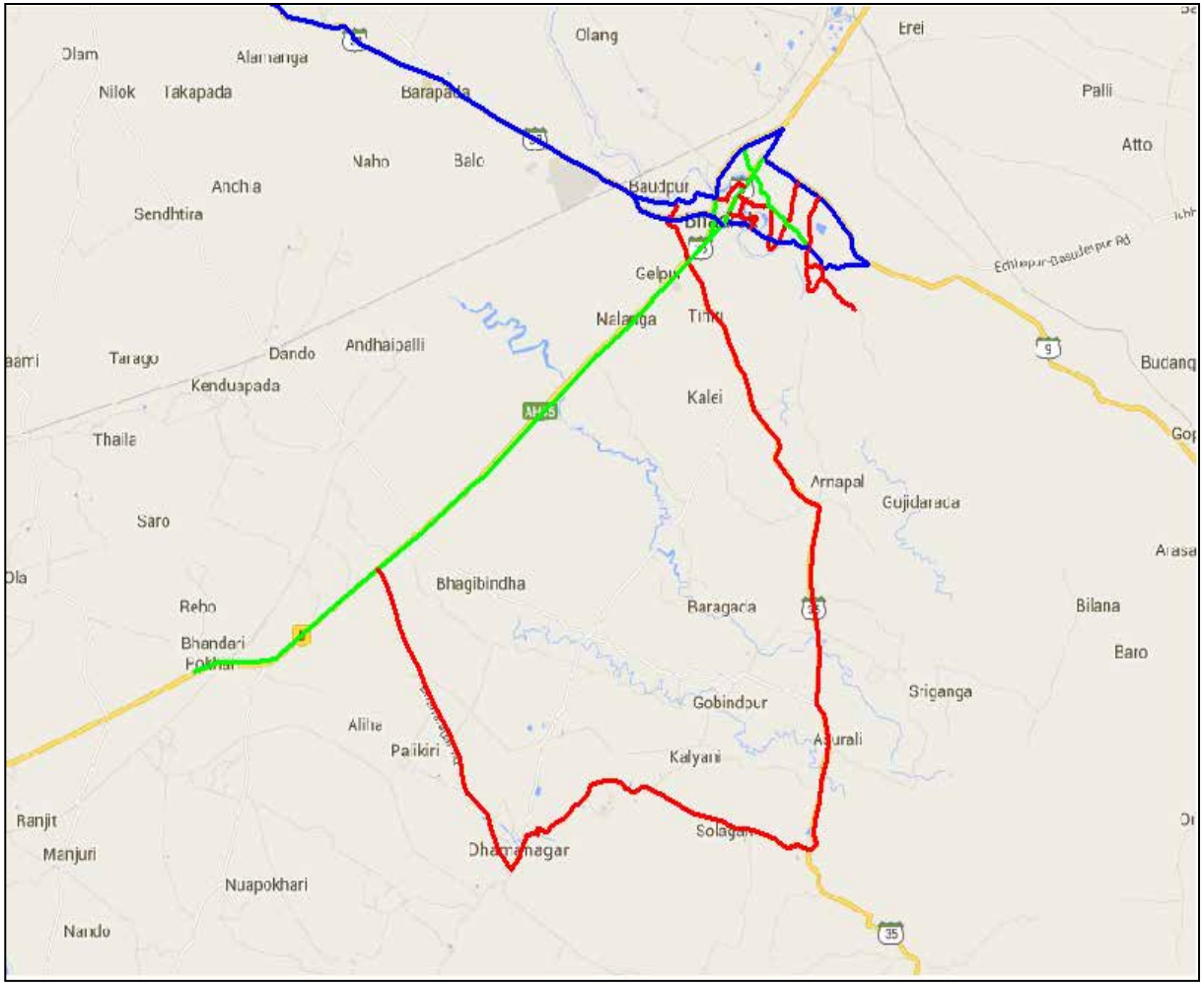
7.2.1 BHADRAK

Name of the City	Bhadrak
Date of Drive Test	16th Jun' 15
Name of the circle	Odisha

Drive Test - Kilometers Travelled	Total
Bhadrak	102

Bhadrak	Outdoor Routes			Indoor Routes	
	Within City	Major Road	Highway	Office Complex	Shopping Complex
Route Details	Gouri Shankar Gas Station-Bhadrak Bus Stand-Sriya Sagar-Rajghat Square-Nokia Priority-Bhadrak Jail-Town Hall Square-Khemka Bazaar-Puruna Bus Stand-Tahasil Rd-Puruna Bazar Police Station-Sai Mandir-Barikpur Bus Stop	Mujahid-e-Millat-Katnapai Padia Rasta-Block Chhaka Bus Stop-Broiler Farm-mantravasuli temple-Shiva Mandira-Dillo Chhaka Bus Stand-Uchapada Square Bus Stop-Ananda Bazar-Aradi Chhaka Bus Stop-Samaraipur-Jama Masjid	Vishal Mega Mart-ICICI Bank ATM-National Highway 5-Bankashi-Motel Chhack Bus Stop-Puruna Bazar Chhak-Khanquah Sharif-Bharat Mata Temple-IncomeTax office-Arihant Academy-Jasoda Traders-BIET	Tahasildar Office	Hotel Anchal,Near NH5

Independent Drive Test Route Details – BHADRAK SSA



Blue colour road represents Periphery of the city
Red colour road represents Congested Area
Green colour road represents Across the city

Independent Drive Test Result – BHADRAK SSA

	B'mark	Aircel		Airtel		BSNL		Idea		Reliance CDMA		Reliance GSM		TATA CDMA		TATA GSM		Vodafone	
		In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor
Signal Strength - 0 to -75 dBm		27.30%	20.03%	42.50%	57.87%	65.70%	43.43%	88.35%	43.60%	95.00%	19.47%	96.80%	38.77%	80.20%	36.67%	29.65%	36.00%	59.20%	42.17%
Signal Strength - 0 to -85 dBm		95.10%	66.43%	96.75%	93.80%	99.35%	84.40%	99.85%	80.07%	100.00%	51.53%	99.95%	76.07%	100.00%	81.47%	95.15%	77.70%	98.80%	89.77%
Signal Strength - 0 to -95 dBm		100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
Voice quality	≥ 95%	96.99%	84.64%	96.45%	91.06%	83.13%	84.74%	96.17%	80.02%	99.97%	90.22%	98.77%	89.14%	98.49%	92.72%	75.79%	86.88%	90.04%	92.91%
CSSR	≥ 95%	88.92%	85.91%	100.00%	100.00%	100.00%	100.00%	100.00%	98.63%	100.00%	97.33%	100.00%	91.19%	100.00%	95.56%	94.00%	93.43%	100.00%	97.34%
%age Blocked calls		11.08%	14.09%	0.00%	0.00%	0.00%	0.00%	0.00%	1.37%	0.00%	2.67%	0.00%	8.81%	0.00%	4.44%	6.00%	6.57%	0.00%	2.66%
Call drop rate	≤ 2%	0.00%	5.79%	0.00%	0.00%	0.00%	4.92%	0.00%	1.65%	0.00%	2.80%	7.14%	6.22%	0.00%	1.72%	4.55%	1.55%	0.00%	0.00%
Hands off success rate		100.00%	99.43%	100.00%	97.21%	100.00%	91.70%	100.00%	97.06%	100.00%	100.00%	100.00%	97.58%	100.00%	100.00%	94.81%	97.47%	100.00%	99.64%

Voice Quality

Operators who have not met the benchmark for Voice Quality in Indoor are BSNL, Tata GSM and Vodafone and for Outdoor Aircel, Airtel, BSNL, Idea, Reliance CDMA ,Reliance GSM, Tata CDMA, Tata GSM and Vodafone.

Call Setup Success Rate (CSSR)

Operators who have not met the benchmark for CSSR in Indoor are Aircel and Tata GSM and for Outdoor are Aircel, Reliance GSM and Tata GSM.

Call Drop Rate

Operators who have not met the benchmark for Call Drop Rate in Indoor are Reliance GSM and Tata GSM and for Outdoor are Aircel, BSNL and Reliance CDMA

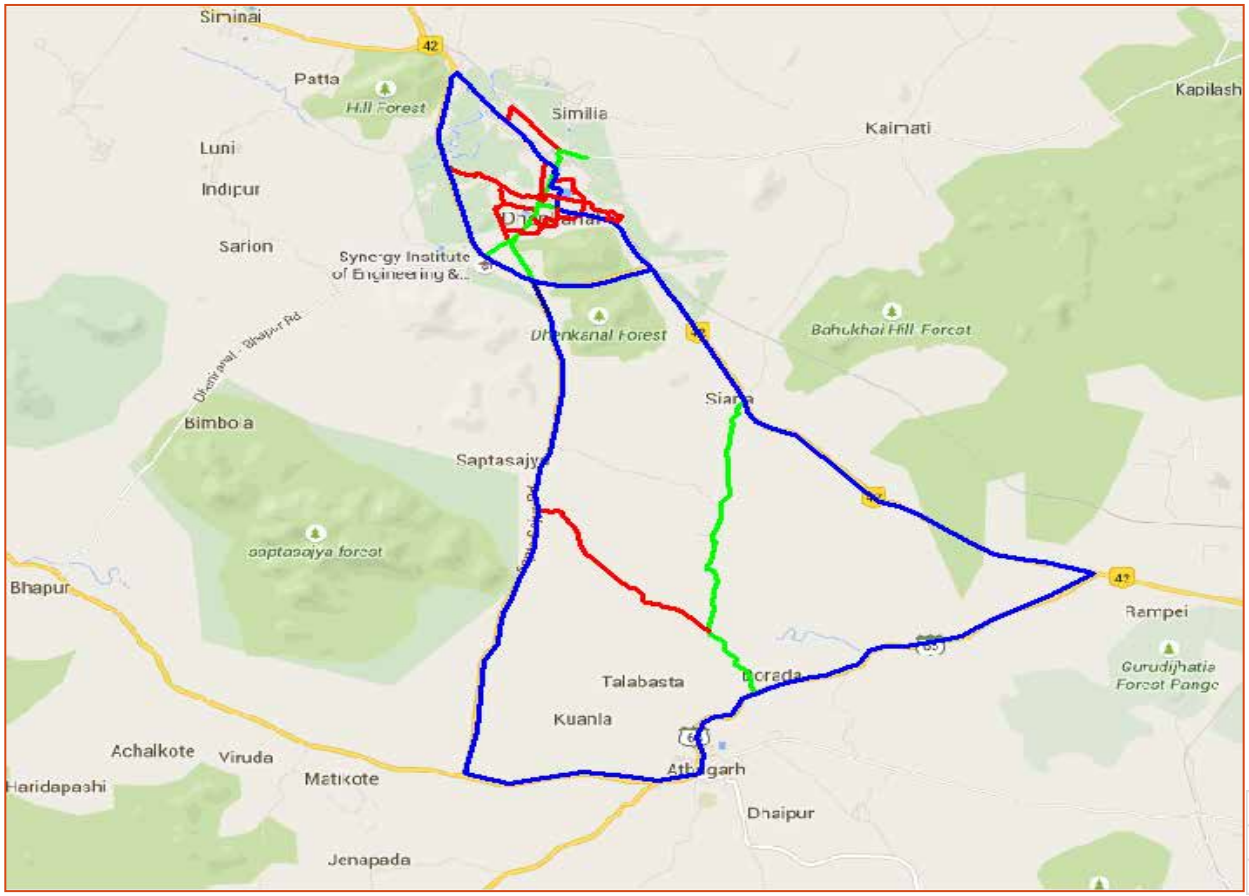
7.2.2 DHENKANAL

Name of the City	Dhenkanal
Date of Drive Test	11th Jun' 15
Name of the circle	Odisha

Drive Test - Kilometers Travelled	Total
Dhenkanal	102

Dhenkanal	Outdoor Routes			Indoor Routes	
	Within City	Major Road	Highway	Office Complex	Shopping Complex
Route Details	Gobindpur-Dorada Rd-Sankarpur-Laxmiprasad Bhawan-UDAYASHASHI BHABAN-MAA BAND-Jai Hanuman Mandir-Celebration-Old Bus Stand Chowk-Saudamini Smruti-Ganesh Bazar Chowk Bidyapitha-College Rd	Bishnu Tea Stall-Badagila-Odisha Gramya Bank-Manipur-Sadei Bereni Rd-Badrapali-Jenasahu Patna-Jagannath Steel Traders-SBI ATM-Nachhipura-Bhaina Shop-Sakuntala-Dhenkanal Girls' High School-Jagannath Rd-Siddaha Balaram Temple	Baji Chowk Farmer's Market-MAHADEV GANAPATI HONDA-Angel Broking-Tea store-lemon mobile seal&service-Mahisapat Bus Stop-Hotel Nirupama-Sundarshuni Temple-Sky Automobiles-Jharan Banadurga Temple-Khuntuni Chhaka-Dhirapatana	Regional Transport Office	Ganesh Bazar

Independent Drive Test Route Details – DHENKANAL SSA



Blue colour road represents Periphery of the city
Red colour road represents Congested Area
Green colour road represents Across the city

Independent Drive Test Result – DHENKANAL SSA

	B'mark	Aircel		Airtel		BSNL		Idea		Reliance CDMA		Reliance GSM		TATA CDMA		TATA GSM		Vodafone	
		In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor
Signal Strength - 0 to -75 dBm		72.30%	24.87%	52.30%	47.03%	99.75%	56.60%	96.00%	38.50%	48.95%	15.53%	59.70%	47.50%	50.05%	27.83%	79.40%	22.27%	28.15%	33.90%
Signal Strength - 0 to -85 dBm		99.65%	67.73%	95.10%	85.47%	100.00%	84.23%	99.95%	76.83%	89.95%	36.57%	92.15%	79.07%	50.55%	58.57%	99.70%	68.00%	92.75%	80.73%
Signal Strength - 0 to -95 dBm		100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
Voice quality	≥ 95%	96.19%	85.37%	92.47%	86.21%	97.66%	84.63%	99.30%	82.81%	99.96%	83.91%	98.45%	87.65%	97.39%	88.28%	97.11%	85.09%	98.58%	92.69%
CSSR	≥ 95%	100.00%	93.94%	100.00%	91.71%	100.00%	81.31%	100.00%	99.28%	100.00%	87.17%	97.73%	72.02%	100.00%	98.72%	95.45%	88.37%	100.00%	89.10%
%age Blocked calls		0.00%	6.06%	0.00%	8.29%	0.00%	18.69%	0.00%	0.72%	0.00%	12.83%	2.27%	27.98%	0.00%	1.28%	4.55%	11.63%	0.00%	10.90%
Call drop rate	≤ 2%	0.00%	6.87%	2.27%	2.80%	0.00%	2.63%	0.00%	1.87%	0.00%	13.87%	2.38%	1.55%	2.38%	5.75%	0.00%	2.66%	0.00%	1.64%
Hands off success rate		100.00%	99.15%	100.00%	97.86%	100.00%	99.54%	100.00%	99.37%	100.00%	100.00%	100.00%	75.93%	100.00%	100.00%	100.00%	91.59%	100.00%	99.57%

Voice Quality

Operators who have not met the benchmark for Voice Quality in Indoor are Airtel and for Outdoor Aircel, Airtel, BSNL, Idea, Reliance CDMA ,Reliance GSM, Tata CDMA, Tata GSM and Vodafone.

Call Setup Success Rate (CSSR)

Operators who have not met the benchmark for CSSR in Outdoor are Aircel, Airtel, BSNL, Reliance CDMA, Reliance GSM, Tata GSM and Vodafone.

Call Drop Rate

Operators who have not met the benchmark for Call Drop Rate in Indoor are Airtel. Reliance GSM and Tata CDMA and for Outdoor are Aircel, Airtel, BSNL, Reliance CDMA, Tata CDMA and Tata GSM.

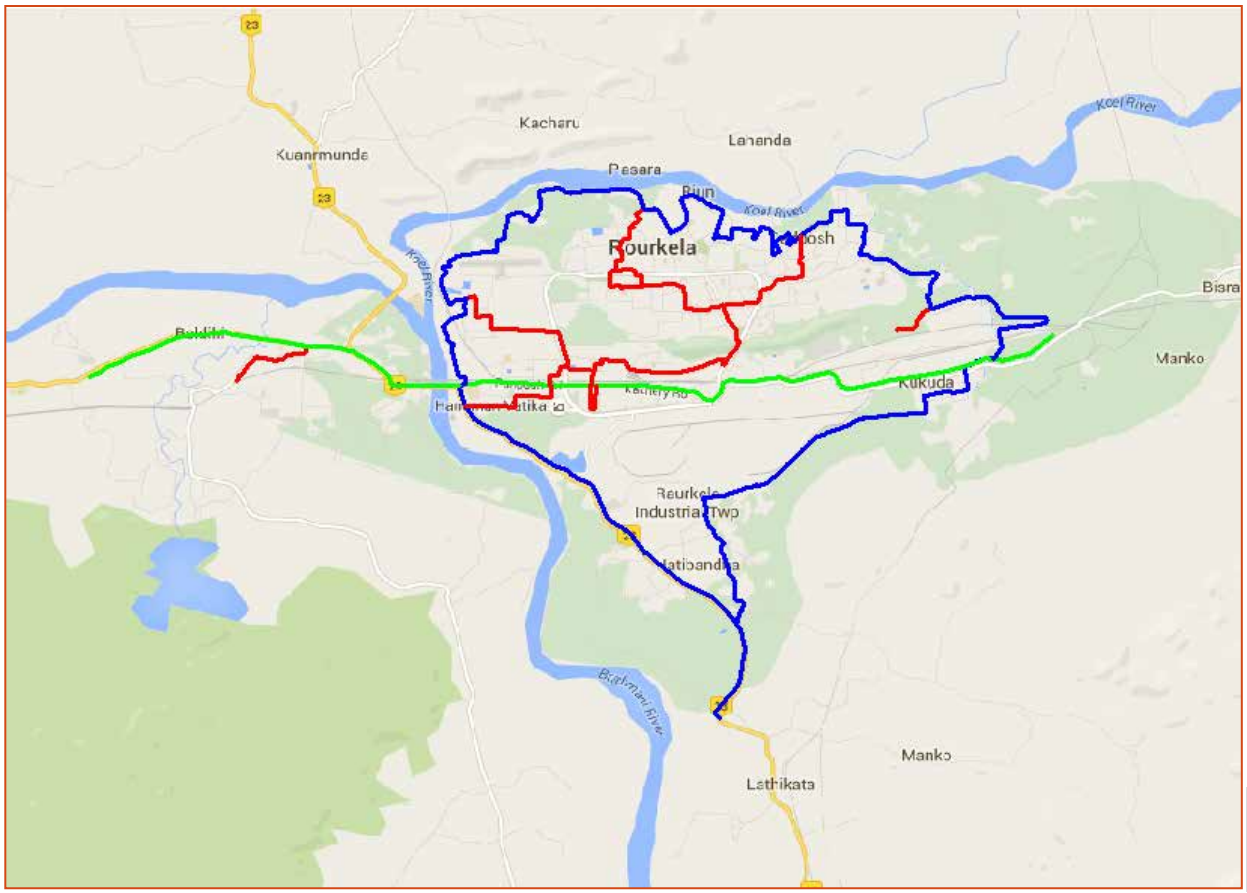
7.2.3 ROURKELA

Name of the City	Rourkela
Date of Drive Test	19th & 20th Jun' 15
Name of the circle	Odisha

Drive Test - Kilometers Travelled	Total
Rourkela	121

Rourkela	Outdoor Routes			Indoor Routes	
	Within City	Major Road	Highway	Office Complex	Shopping Complex
Route Details	Shree Bharat Motors Ltd.-Chhabra Ford-Jalan Automobiles-Bpcl Petrol Pump-Hotel Pahadi Bar-Shree Jagannath Motors-Gurdwara Vedvyas-T.C.I Bus Stop-Panposh Post Office-Panposh Rd-Suruchi Bazar-S.T.I Chowk-Orrisa Electricals-Shanti Tower-Diesel Colony Chowk	Ambica Birsa Munda Hospital-ICICI Bank ATM-S.T.I Chowk-Basanti Chowk-Ring Road-Chend Chowk-JJ Nac Market Chowk-Gokul Sweets & Snacks-Amrit Sagar-Uditnagar Children's Park-Kali Temple-GEL Church-NAC Market	Dhabaleswar Housing Complex-Bharat Petroleum-Tarkera Siva Temple-Deogaon Jagannath Temple-Fetcol Petrol Pump-Rangila Chowk-HP Petrol Pump-Naudera Village-Pragati Public School-Budhbir ITI-Ethel's Bridal-IMS-Fashion Bazar-Omfed Rd-Panposh Ashram	CESCO,Near Urban Cooperative Bank,Uditnagar	Hotel Swosti,Near Railway Station

Independent Drive Test Route Details – ROURKELA SSA



Blue colour road represents Periphery of the city
Red colour road represents Congested Area
Green colour road represents Across the city

Independent Drive Test Result – ROURKELA SSA

	B'mark	Aircel		Airtel		BSNL		Idea		Reliance CDMA		Reliance GSM		TATA CDMA		TATA GSM		Vodafone	
		In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor
Signal Strength - 0 to -75 dBm		79.75%	46.17%	50.25%	30.70%	27.90%	34.60%	70.75%	24.63%	1.05%	20.63%	41.25%	36.23%	93.70%	38.47%	58.55%	33.80%	35.45%	34.37%
Signal Strength - 0 to -85 dBm		99.80%	72.57%	95.80%	71.97%	83.50%	84.33%	99.35%	64.17%	79.95%	47.37%	90.60%	70.17%	100.00%	77.07%	98.50%	75.53%	94.30%	84.30%
Signal Strength - 0 to -95 dBm		100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
Voice quality	≥ 95%	98.93%	84.36%	90.59%	82.75%	90.29%	84.33%	89.96%	75.51%	99.92%	93.03%	96.05%	86.43%	97.11%	90.37%	88.29%	83.65%	88.97%	90.54%
CSSR	≥ 95%	100.00%	86.61%	90.91%	94.61%	97.83%	98.43%	97.73%	92.23%	100.00%	97.13%	100.00%	83.24%	100.00%	98.83%	100.00%	93.31%	100.00%	96.38%
%age Blocked calls		0.00%	13.39%	9.09%	5.39%	2.17%	1.57%	2.27%	7.77%	0.00%	2.87%	0.00%	16.76%	0.00%	1.17%	0.00%	6.69%	0.00%	3.62%
Call drop rate	≤ 2%	0.00%	4.16%	0.00%	1.15%	0.00%	1.65%	0.00%	0.35%	0.00%	4.32%	0.00%	1.98%	0.00%	3.84%	0.00%	2.29%	0.00%	1.63%
Hands off success rate		100.00%	94.84%	100.00%	96.49%	100.00%	97.64%	100.00%	99.68%	100.00%	100.00%	99.32%	97.82%	100.00%	100.00%	98.68%	98.19%	100.00%	98.80%

Voice Quality

Operators who have not met the benchmark for Voice Quality in Indoor are Airtel, BSNL, Idea, Tata GSM and Vodafone and for Outdoor Aircel, Airtel, BSNL, Idea, Reliance CDMA ,Reliance GSM, Tata CDMA, Tata GSM and Vodafone.

Call Setup Success Rate (CSSR)

Operators who have not met the benchmark for CSSR in Indoor are Airtel and for Outdoor are Aircel, Airtel, Idea, Reliance GSM and Tata GSM.

Call Drop Rate

Operators who have not met the benchmark for Call Drop Rate in Outdoor are Aircel, Reliance CDMA, Tata CDMA and Tata GSM.

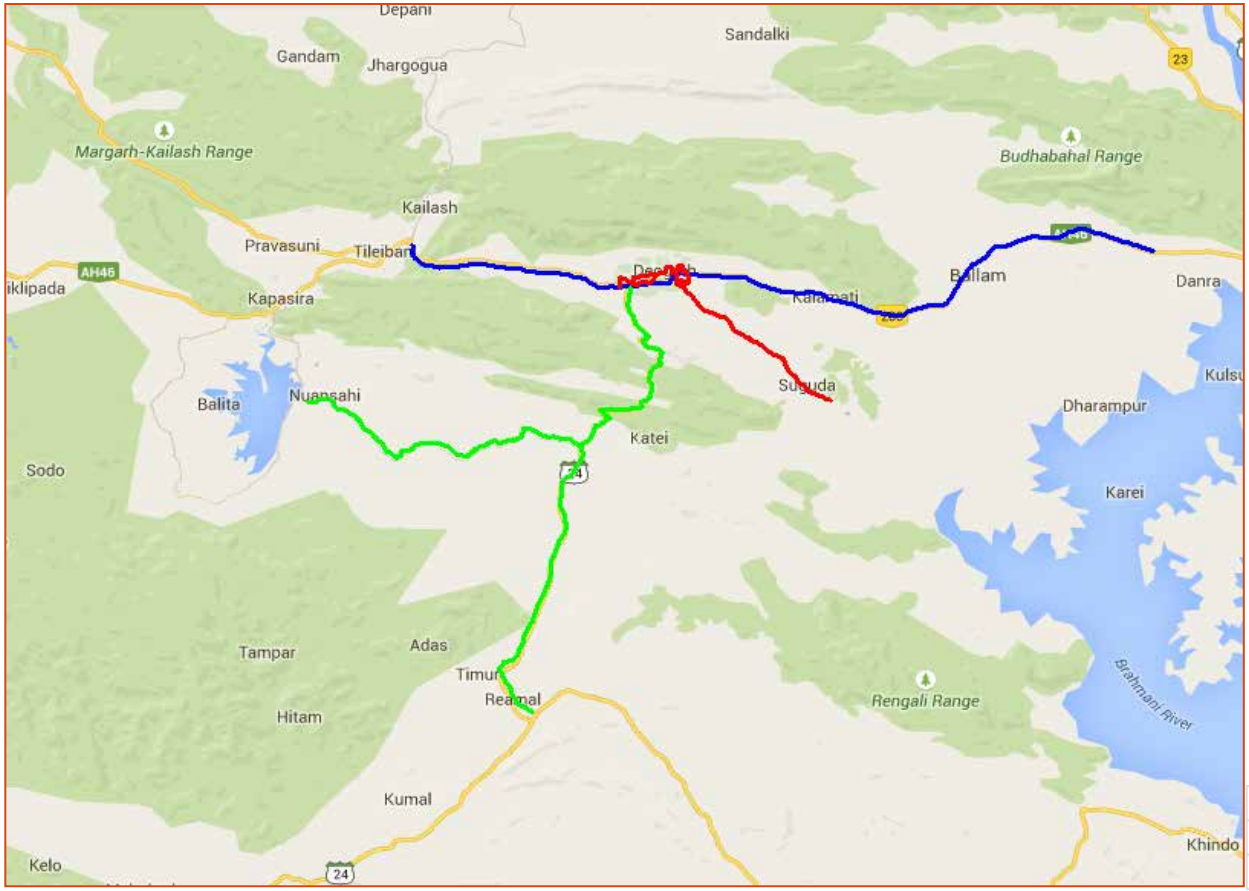
7.2.4 DEOGARH

Name of the City	Deogarh
Date of Drive Test	22nd Jun' 15
Name of the circle	Odisha

Drive Test - Kilometers Travelled	Total
Deogarh	100

Deogarh	Outdoor Routes			Indoor Routes	
	Within City	Major Road	Highway	Office Complex	Shopping Complex
Route Details	Phulapatharakhola-State Highway 24-Bandhakhol-Pendarakhol-Gohira Dam Rd-Madhyapur-Nuansahi-Kaunsipali-Dangaghat-Rengalbeda-Begunianali-Badkumarkhol-Medinipur-Badbahal-Khairapali	Gundicha Temple-Deogarh College-Boys Upper Primary School-HDFC Bank Branch / ATM-Rajbati Palace-Benjatinali-Suguda Road-Samtara Pali-Khuntiapali Rd	Ramchandrapur-Kuraibahal-Tainsar-Phulapatharakhola-Petrol Pump-Indira Gandhi Stadium-Gokaneswar Temple-Radha Krishna Temple-R B D High School-Hotel Mamta Palace-Deogarh Park-Tiwari Hotel-Nalabandha-Uni-Tech Fuel Point-Phulapatharakhola-Kalamati-Ballam-Chakrapali	Deogarh Post Office	Mamta Palace Market

Independent Drive Test Route Details – DEOGARH SSA



Independent Drive Test Result – DEOGARH SSA

	B'mark	Aircel		Airtel		BSNL		Idea		Reliance CDMA		Reliance GSM		TATA CDMA		TATA GSM		Vodafone	
		In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor
Signal Strength - 0 to -75 dBm		41.65%	17.87%	89.20%	38.90%	50.45%	21.03%	99.55%	48.33%	51.65%	18.27%	11.40%	14.30%	16.85%	5.53%	12.50%	12.83%	40.90%	31.37%
Signal Strength - 0 to -85 dBm		97.55%	54.93%	99.90%	75.70%	90.00%	55.93%	100.00%	75.13%	82.25%	46.70%	77.95%	55.77%	33.15%	13.80%	91.05%	54.03%	92.45%	74.90%
Signal Strength - 0 to -95 dBm		100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
Voice quality	≥ 95%	99.25%	82.33%	94.20%	88.41%	98.87%	78.05%	NA	NA	99.92%	84.94%	96.96%	81.51%	NA	NA	97.74%	81.99%	99.39%	84.73%
CSSR	≥ 95%	97.62%	100.00%	100.00%	93.87%	100.00%	94.02%	NA	NA	89.29%	97.92%	97.62%	92.53%	NA	NA	100.00%	94.96%	100.00%	94.28%
%age Blocked calls		2.38%	0.00%	0.00%	6.13%	0.00%	5.98%	NA	NA	10.71%	2.08%	2.38%	7.47%	NA	NA	0.00%	5.04%	0.00%	5.72%
Call drop rate	≤ 2%	0.00%	5.80%	0.00%	0.85%	0.00%	8.06%	NA	NA	0.00%	14.57%	2.50%	6.72%	NA	NA	0.00%	4.32%	0.00%	10.82%
Hands off success rate		100.00%	100.00%	100.00%	98.02%	100.00%	100.00%	NA	NA	100.00%	100.00%	100.00%	100.00%	NA	NA	100.00%	100.00%	100.00%	100.00%

No call attempt due to no coverage in Idea & TATA CDMA

Voice Quality

Operators who have not met the benchmark for Voice Quality in Indoor are Airtel and for Outdoor Aircel, Airtel, BSNL, Reliance CDMA, Reliance GSM, Tata GSM and Vodafone.

Call Setup Success Rate (CSSR)

Operators who have not met the benchmark for CSSR in Indoor are Reliance CDMA and for Outdoor are Airtel, BSNL, Reliance GSM, Tata GSM and Vodafone.

Call Drop Rate

Operators who have not met the benchmark for Call Drop Rate in Indoor are Reliance GSM and for Outdoor are Aircel, BSNL, Reliance CDMA, Tata GSM and Vodafone.

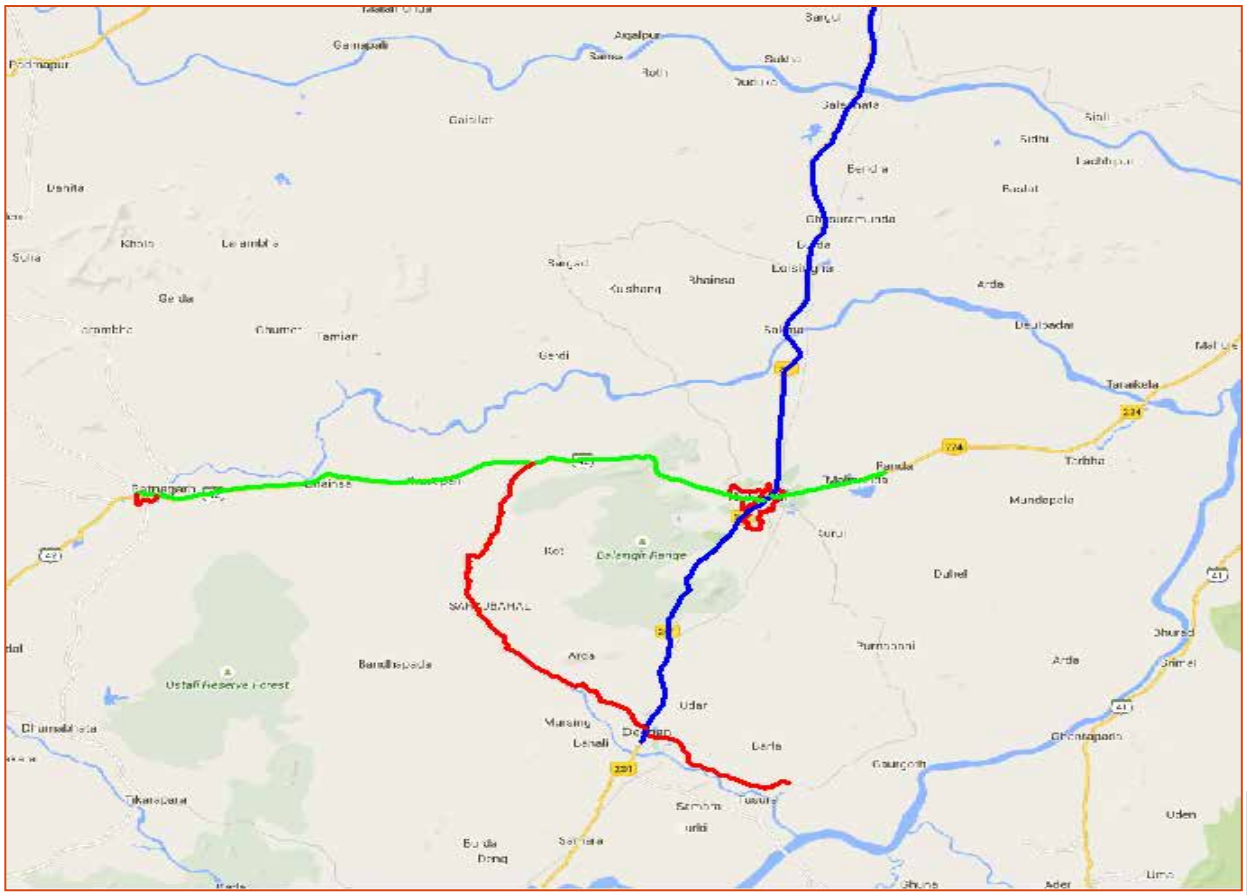
7.2.5 BALANGIR

Name of the City	Balangir
Date of Drive Test	24th Jun' 15
Name of the circle	Odisha

Drive Test - Kilometers Travelled	Total
Balangir	167

Central Kolkata	Outdoor Routes			Indoor Routes	
	Within City	Major Road	Highway	Office Complex	Shopping Complex
Route Details	State Bank Of India Bazar Branch-Rammandir-Ramji Chowk-Patnagarh Haat-Rampur Bus Stop-Chitadunguri-Bhainsa-Gangaram Traders-Dhulusar-Barpita-Gedabanji-Laltikra Chawok-Shantipara Chawk	Baladev Vihar Park-Raman's-Kadopada Rd-Dairy Farm-Haatpada Para Chowk-Beer Bar-Bolangir Public School-Women's College-Bolangir Satsang Vihar-Circuit House-Government Ayurved College and Hospital-Bolangir District jail-Bhutiarbahal	Minerva Automobiles pvt-Head Post Office-pizzahouse-Radio Station-Forest Park-Food Craft Institute-Bhanpur-Mathkhai Devi Mandir-Sagarpali-Jarasingha-Reebok Showroom-Amarnath HONDA-Laxmi Sales-Shankarbhoji-Indian Bank-Rampur	Balangir Post Office	Hotel Sahoo

Independent Drive Test Route Details – BALANGIR SSA



Blue colour road represents Periphery of the city
Red colour road represents Congested Area
Green colour road represents Across the city

Independent Drive Test Result – BALANGIR SSA

	B'mark	Aircel		Airtel		BSNL		Idea		Reliance CDMA		Reliance GSM		TATA CDMA		TATA GSM		Vodafone	
		In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor
Signal Strength - 0 to -75 dBm		59.20%	45.83%	61.55%	54.53%	41.55%	25.93%	36.80%	22.93%	95.50%	4.13%	21.30%	21.03%	96.15%	26.47%	73.70%	22.27%	99.55%	41.73%
Signal Strength - 0 to -85 dBm		98.10%	76.40%	93.90%	88.43%	96.45%	68.37%	77.20%	59.10%	99.90%	19.77%	90.60%	59.33%	100.00%	55.73%	99.90%	51.37%	100.00%	78.00%
Signal Strength - 0 to -95 dBm		100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
Voice quality	≥ 95%	91.84%	87.26%	94.51%	88.29%	72.90%	81.43%	89.84%	78.05%	100.00%	74.58%	92.45%	85.76%	97.57%	91.00%	96.95%	85.45%	99.76%	91.09%
CSSR	≥ 95%	100.00%	97.22%	100.00%	98.67%	97.83%	100.00%	100.00%	96.99%	100.00%	89.22%	100.00%	87.74%	100.00%	100.00%	100.00%	93.33%	100.00%	76.88%
%age Blocked calls		0.00%	2.78%	0.00%	1.33%	2.17%	0.00%	0.00%	3.01%	0.00%	10.78%	0.00%	12.26%	0.00%	0.00%	0.00%	6.67%	0.00%	23.12%
Call drop rate	≤ 2%	0.00%	2.87%	0.00%	0.62%	4.55%	3.14%	0.00%	0.85%	0.00%	1.39%	0.00%	3.01%	0.00%	5.74%	0.00%	2.28%	0.00%	2.82%
Hands off success rate		84.65%	97.62%	100.00%	97.19%	100.00%	96.54%	100.00%	100.00%	100.00%	100.00%	99.79%	99.29%	100.00%	100.00%	100.00%	97.75%	100.00%	93.32%

Voice Quality

Operators who have not met the benchmark for Voice Quality in Indoor are Aircel, Airtel, BSNL, Idea and Reliance GSM and for Outdoor Aircel, Airtel, BSNL, Idea, Reliance CDMA ,Reliance GSM, Tata CDMA, Tata GSM and Vodafone.

Call Setup Success Rate (CSSR)

Operators who have not met the benchmark for CSSR in Outdoor are Reliance CDMA, Reliance GSM, Tata GSM and Vodafone.

Call Drop Rate

Operators who have not met the benchmark for Call Drop Rate in Indoor are BSNL and for Outdoor are Aircel, BSNL, Tata CDMA, Tata GSM and Vodafone.

8 ANNEXURE

For Reliance CDMA and Reliance GSM, data is pertaining to Apr'15 and May'15. Data for Jun'15 could not be audited due to a server issue at operator's end. The same was pre-informed to TRAI by the operator.

8.1 NETWORK AVAILABILITY

Audit Results for Network Availability										
	Benchmark	Aircel(DWL)	Airtel	BSNL	Idea	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Vodafone
Number of BTSs in the licensed service area		8018	14730	1279	6359	950	3738	1017	4261	11483
Sum of downtime of BTSs in a month (in hours)		102864	11437	4683	12027	3254	2786	1503	2695	13108
BTSs accumulated downtime (not available for service)	≤ 2%	1.76%	0.11%	0.50%	0.26%	0.47%	0.11%	0.20%	0.09%	0.16%
Number of BTSs having accumulated downtime >24 hours		933	4	16	70	10	8	0	2	71
Worst affected BTSs due to downtime	≤ 2%	11.63%	0.03%	1.25%	1.11%	1.05%	0.21%	0.00%	0.05%	0.62%
Live Measurement- BTSs accumulated downtime										
	Benchmark	Aircel(DWL)	Airtel	BSNL	Idea	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Vodafone
Number of BTSs in the licensed service area		8018	14642	1279	6359	950	3738	1017	4261	11483
Sum of downtime of BTSs in a month (in hours)		9836	1608	114	1772	322	298	77	659	1213
BTSs accumulated downtime (not available for service)	≤ 2%	1.70%	0.15%	0.12%	0.39%	0.47%	0.11%	0.10%	0.21%	0.15%
Number of BTSs having accumulated downtime >24 hours		10	0	0	9	1	0	0	0	0
Live Mesurement - Worst affected BTSs due to downtime	≤ 2%	0.13%	0.00%	0.00%	0.14%	0.11%	0.00%	0.00%	0.00%	0.00%

Data Source: Operations and Maintenance Center (OMC) of the operators

8.2 CONNECTION ESTABLISHMENT (ACCESSIBILITY)

Audit Results for CSSR, SDCCH and TCH congestion

CSSR	Benchmark	Aircel(DWL)	Airtel	BSNL	Idea	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Vodafone
CSSR	≥ 95%	97.78%	98.79%	98.71%	96.59%	99.68%	98.41%	98.72%	98.75%	99.63%
SDCCH/Paging channel congestion	≤ 1%	0.87%	0.52%	0.38%	0.20%	NA	0.23%	NA	0.19%	0.20%
TCH congestion	≤ 2%	1.88%	1.83%	1.68%	0.68%	0.00%	0.72%	0.04%	0.57%	0.37%

Live measurement results for CSSR, SDCCH and TCH congestion

CSSR	Benchmark	Aircel(DWL)	Airtel	BSNL	Idea	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Vodafone
CSSR	≥ 95%	97.87%	98.82%	98.54%	96.84%	99.70%	98.56%	98.57%	98.85%	99.62%
SDCCH/Paging channel congestion	≤ 1%	0.69%	0.49%	0.29%	0.20%	NA	0.30%	NA	0.29%	0.24%
TCH congestion	≤ 2%	1.84%	1.82%	1.82%	0.63%	0.00%	0.71%	0.06%	0.45%	0.38%

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

CSSR	Benchmark	Aircel(DWL)	Airtel	BSNL	Idea	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Vodafone
Total number of call attempts		1170	1569	1789	1244	1177	1379	914	1237	1457
Total number of successful calls established		1167	1560	1773	1243	1177	1372	914	1228	1442
CSSR	≥ 95%	99.75%	99.29%	99.08%	99.85%	100.00%	99.38%	100.00%	99.24%	99.03%
%age blocked calls		0.25%	0.71%	0.92%	0.15%	0.00%	0.62%	0.00%	0.76%	0.97%

8.3 CONNECTION MAINTENANCE (RETAINABILITY)

Audit Results for Call drop rate and for number of cells having more than 3% TCH										
Call drop rate	Benchmark	Aircel(DWL)	Airtel	BSNL	Idea	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Vodafone
Total number of calls established		321010940	1149751193	213916512	164476129	11739476	123055605	24435050	195405811	345454896
Total number of calls dropped		4362037	9917618	2659789	467133	34893	665834	121137	741017	2109290
Call drop rate	≤ 2%	1.36%	0.87%	1.42%	0.28%	0.30%	0.54%	0.54%	0.38%	0.61%
Cells having more than 3% TCH	Benchmark	Aircel(DWL)	Airtel	BSNL	Idea	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Vodafone
Total number of cells in the network		23468	46784	3904	19089	2850	11294	3123	12864	34309
Total number of cells having more than 3% TCH		2647	469	80	146	66	25	137	165	614
Worst affected cells having more than 3% TCH	≤ 3%	11.28%	1.00%	2.04%	0.76%	2.32%	0.22%	4.39%	1.28%	1.79%

Live measurement results for Call drop rate and for number of cells having more than 3% TCH										
Call drop rate	Benchmark	Aircel(DWL)	Airtel	BSNL	Idea	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Vodafone
Total number of calls established		30836093	114157860	22479311	15936204	1247323	11641238	2655567	22433893	34238590
Total number of calls dropped		450755	1014139	286467	59442	3772	59078	12885	75593	220891
Call drop rate	≤ 2%	1.46%	0.89%	1.44%	0.37%	0.30%	0.51%	0.49%	0.35%	0.64%
Cells having more than 3% TCH	Benchmark	Aircel(DWL)	Airtel	BSNL	Idea	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Vodafone
Total number of cells in the network		23468	46775	3942	19089	2850	11294	3123	12864	34309
Total number of cells having more than 3% TCH		2864	605	72	162	69	21	146	114	634
Worst affected cells having more than 3% TCH	≤ 3%	12.21%	1.30%	1.82%	0.85%	2.42%	0.19%	4.67%	1.33%	1.85%

Data Source: Network Operations Center (NOC) of the operators

Drive test results for Call drop rate (Average of three drive tests)										
Call drop rate	Benchmark	Aircel(DWL)	Airtel	BSNL	Idea	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Vodafone
Total number of calls established		1169	1569	1776	1245	1177	1376	914	1228	1444
Total number of calls dropped		6	2	17	1	0	3	0	1	3
Call drop rate	≤ 2%	0.52%	0.16%	0.95%	0.15%	0.00%	0.30%	0.00%	0.11%	0.18%

Data Source: Drive test reports submitted by operators to auditors

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8.4 VOICE QUALITY

Audit Results for Voice quality										
Voice quality	Benchmark	Aircel(DWL)	Airtel	BSNL	Idea	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Vodafone
Total number of sample calls		43907654857	184176378925	43337866223	22306639897	NA	6987519746	27146784450	33950890267	62974880026
Total number of calls with good voice quality		41886982329	177018177938	42067001361	21532723162	NA	6867562354	26672085679	33129781994	62102547599
%age calls with good voice quality	≥ 95%	95.40%	96.11%	96.71%	96.52%	99.78%	98.29%	98.25%	97.58%	98.62%

Live measurement results for Voice quality										
Voice quality	Benchmark	Aircel(DWL)	Airtel	BSNL	Idea	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Vodafone
Total number of sample calls		4343504532	17893429169	4405007938	2201197822	NA	724082338	2709888248	3316993500	6205840172
Total number of calls with good voice quality		4140959545	17201027168	4265613893	2130649747	NA	711447122	2662596657	3236462207	6118695766
%age calls with good voice quality	≥ 95%	95.33%	96.13%	96.55%	96.79%	99.77%	98.26%	98.26%	97.57%	98.59%

Drive test results for Voice quality (Average of three drive tests)										
Voice quality	Benchmark	Aircel(DWL)	Airtel	BSNL	Idea	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Vodafone
Total number of sample calls		1631275	181157	595049	2042872	NA	166635	NA	2304588	6183428
Total number of calls with good voice quality		1552978	180491	579471	2020655	NA	159206	NA	2237925	6046602
%age calls with good voice quality	≥ 95%	95.32%	99.63%	96.67%	98.39%	99.33%	95.61%	99.55%	97.20%	97.30%

Data Source: Network Operations Center (NOC) of the operators and Drive test reports submitted by operators to auditors

NA: Reliance CDMA and Tata CDMA do not provide the numerator and denominator values for the parameter. As per the operators, it is not feasible to generate the values in their current system.

8.5 POI CONGESTION

Audit Results for POI Congestion										
POI congestion	Benchmark	Aircel(DWL)	Airtel	BSNL	Idea	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Vodafone
Total number of working POIs		111	21	13	65	8	8	43	12	47
No. of POIs not meeting benchmark		0	0	0	0	0	0	0	0	0
Total Capacity of all POIs (A) - in erlangs		73899	109735	25000	44625	10050	27524	13756	14005	98377
Traffic served for all POIs (B)- in erlangs		50456	62730	22429	27949	2911	17333	6284	8451	45224
POI congestion	≤ 0.5%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%

Live Measurement Results for POI Congestion										
POI congestion	Benchmark	Aircel(DWL)	Airtel	BSNL	Idea	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Vodafone
Total number of working POIs		111	21	13	65	8	8	43	12	47
No. of POIs not meeting benchmark		0	0	0	0	0	0	0	0	0
Total Capacity of all POIs (A) - in erlangs		74596	109764	25000	45832	10050	27524	13769	14005	98377
Traffic served for all POIs (B)- in erlangs		49026	62832	19161	27739	2913	17925	6293	8325	44237
POI congestion	≤ 0.5%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%

Data Source: Network Operations Center (NOC) of the operators

8.6 TOTAL CALL MADE DURING THE DRIVE TEST-VOICE QUALITY

April									
Voice quality	Aircel(DWL)	Airtel	BSNL	Idea	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Vodafone
Total number of sample calls	714869	70052	238527	1013176	NA	102292	NA	917831	1145861
May									
Voice quality	Aircel(DWL)	Airtel	BSNL	Idea	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Vodafone
Total number of sample calls	274850	49284	96906	348244	NA	30017	NA	572159	4115003
June									
Voice quality	Aircel(DWL)	Airtel	BSNL	Idea	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Vodafone
Total number of sample calls	641556	61821	259616	681452	NA	34326	NA	814598	922564

Data Source: Drive test reports submitted by operators to auditor

8.7 METERING AND BILLING CREDIBILITY

Audit Results for Billing performance Postpaid-Consolidated										
Billing Performance	Benchmark	Aircel(DWL)	Airtel	BSNL	Idea	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Vodafone
Metering and billing credibility - Postpaid (Avg of 3 billing cycles)										
Metering and billing credibility - Postpaid										
Total bills generated during the period		25126	125337	181273	18818	42800	94302	10900	51833	141543
Total number of bills disputed		4	65	3	18	32	91	0	0	102
Total number of valid billing complaints		1	14	3	2	22	3	0	0	90
Total complaints considered invalid		3	51	0	16	10	88	0	0	12
Percentage bills disputed (Avg of 3 billing cycles)	≤ 0.1%	0.02%	0.05%	0.00%	0.10%	0.07%	0.10%	0.00%	0.00%	0.07%
April										
Total bills generated during the first billing cycle		8231	41520	60265	6418	14459	30913	3757	17361	45862
Total number of bills disputed in first billing cycle		0	22	1	11	13	27	0	0	35
Total number of valid billing complaints (billing cycle 1)		0	5	1	2	13	0	0	0	34
Total complaints considered invalid (billing cycle 1)		0	17	0	9	0	27	0	0	1
Percentage bills disputed (first billing cycle)	≤ 0.1%	0.00%	0.05%	0.00%	0.17%	0.09%	0.09%	0.00%	0.00%	0.08%

Data Source: Billing Center of the operators

May										
Total bills generated during the second billing cycle		8401	41668	60409	6291	14357	31483	3597	17323	46953
Total number of bills disputed in second billing cycle		1	23	1	2	9	39	0	0	32
Total number of valid billing complaints (billing cycle 2)		0	6	1	0	9	3	0	0	30
Total complaints considered invalid (billing cycle 2)		1	17	0	2	0	36	0	0	2
Percentage bills disputed (second billing cycle)	≤ 0.1%	0.01%	0.06%	0.00%	0.03%	0.06%	0.12%	0.00%	0.00%	0.07%
June										
Total bills generated during the third billing cycle		8494	42149	60599	6109	13984	31906	3546	17149	48728
Total number of bills disputed in third billing cycle		3	20	1	5	10	25	0	0	35
Total number of valid billing complaints (billing cycle 3)		1	3	1	0	0	0	0	0	26
Total complaints considered invalid (billing cycle 3)		2	17	0	5	10	25	0	0	9
Percentage bills disputed (third billing cycle)	≤ 0.1%	0.04%	0.05%	0.00%	0.08%	0.07%	0.08%	0.00%	0.00%	0.07%

Metering and billing credibility - Prepaid										
Performance prepaid	Benchmark	Aircel(DWL)	Airtel	BSNL	Idea	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Vodafone
Total number of charging complaints (valid) - sum of 3 months		95	624	593	549	83	2975	0	0	2586
Total complaints considered invalid (sum of 3 months)		2421	3850	156	1362	45	427	0	0	726
Total number of charging complaints (sum of 3 months)		2516	4474	749	1911	128	3402	0	0	3312
Total no of customers served (Sum of 3 months)		12201756	27279066	9927335	3967567	874563	11882864	485588	7392554	10460633
Percentage of charging complaints disputed	≤ 0.1%	0.02%	0.02%	0.01%	0.05%	0.01%	0.03%	0.00%	0.00%	0.03%

Data Source: Billing Center of the operators

Resolution of billing complaints (Postpaid+Prepaid)-Consolidated										
Billing Performance	Benchmark	Aircel(DWL)	Airtel	BSNL	Idea	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Vodafone
Total number of billing/charging complaints		2520	4539	752	1929	160	3490	0	0	3414
Total number of complaints resolved in favour of customer		96	638	596	551	115	3060	0	0	2676
Total complaints considered invalid		2424	3901	156	1378	45	430	0	0	738
Number of complaints resolved in 4 weeks		96	638	596	551	115	3060	0	0	2676
Percentage complaints resolved within 4 weeks	≥ 98%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	NA	NA	100.00%
Number of complaints resolved in 6 weeks		96	638	596	551	115	3060	0	0	2676
Percentage complaints resolved within 6 weeks	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	NA	NA	100.00%
Period of applying credit / waiver										
Total number of complaints where credit/waiver is required		96	638	596	551	115	3060	0	0	276
Percentage cases in which credit/waiver was received within 1	100%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	NA	NA	100.00%

Data Source: Billing Center of the operators

Data Source: Billing Center of the operators

Live calling results for resolution of billing complaints										
Resolution of billing complaints	Benchmark	Aircel(DWL)	Airtel	BSNL	Idea	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Vodafone
Total Number of calls made		82	100	100	100	43	100	NA	NA	100
Number of cases resolved in 4 weeks		82	94	92	100	40	98	NA	NA	93
Percentage cases resolved in 4 weeks	≥ 98%	100.00%	94.00%	92.00%	100.00%	93.02%	98.00%	NA	NA	93.00%
Number of cases resolved in 6 weeks		82	100	100	100	43	100	NA	NA	100
Percentage cases resolved in 6 weeks	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	NA	NA	100.00%

Data Source: Live calls made by auditors from operator's network

NA: Live calling for Tata CDMA and Tata GSM was not conducted due to non-availability of base of complaints.

Live calls for Aircel are below target due to low base of billing complaints for the operator.

8.8 CUSTOMER CARE

Audit results for customer care (IVR and voice-to-Voice) -Consolidated										
Customer Care Assessment	Benchmark	Aircel(DWL)	Airtel	BSNL	Idea	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Vodafone
Total number of call attempts to customer care for assistance		12659210	2932256	2118255	4377608	139501	3519992	23643	452558	7728047
Number of calls getting connected and answered (electronically)		12365247	2932256	2025969	4314325	137660	3481034	23495	434846	7725386
Percentage calls getting connected and answered	≥ 95%	97.68%	100.00%	95.64%	98.55%	98.68%	98.89%	99.37%	96.09%	99.97%

Data Source: Customer Service Center of the operators

Audit results for customer care (voice-to-Voice)- (Avg of 3 months)-Consolidated										
Customer Care Assessment	Benchmark	Aircel(DWL)	Airtel	BSNL	Idea	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Vodafone
Total Number of calls received (3 months)		2927970	4160840	1355197	1387299	32557	1130059	16839	659911	2596444
Total Number of calls answered within 90 seconds (3 months)		2920612	4072918	1291515	1364076	32448	834839	16550	648773	2564105
Percentage calls answered within 90 seconds (Avg of 3 months)	≥ 95%	99.75%	97.89%	95.30%	98.33%	99.67%	73.88%	98.28%	98.31%	98.75%
April										
Total calls received (Month 1)		1003091	1500630	453574	485472	11428	423166	6073	240293	892051
Total calls answered within 90 seconds (Month 1)		999534	1463079	431939	474809	11319	345514	5921	233325	878123
% calls answered within 90 seconds (Month 1)	≥ 95%	99.65%	97.50%	95.23%	97.80%	99.05%	81.65%	97.50%	97.10%	98.44%
May										
Total calls received (Month 2)		1005622	1346779	440565	470463	10021	375889	5681	222386	837853
Total calls answered within 90 seconds (Month 2)		1004345	1315902	418848	460297	10021	235801	5617	219941	827707
% calls answered within 90 seconds (Month 2)	≥ 95%	99.87%	97.71%	95.07%	97.84%	100.00%	62.73%	98.87%	98.90%	98.79%
June										
Total calls received (Month 3)		919257	1313431	461058	431364	11108	331004	5085	197232	866540
Total calls answered within 90 seconds (Month 3)		916733	1293937	440728	428970	11108	253524	5012	195507	858275
% calls answered within 90 seconds (Month 3)	≥ 95%	99.73%	98.52%	95.59%	99.45%	100.00%	76.59%	98.56%	99.13%	99.05%

Data Source: Customer Service Center of the operators

Live calling results for customer care (IVR)										
Customer Care Assessment	Benchmark	Aircel(DWL)	Airtel	BSNL	Idea	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Vodafone
Total number of call attempts to customer care for assistance		100	100	100	100	100	100	100	100	100
Number of calls getting connected and answered (electronically)		100	98	100	100	100	100	100	100	100
Percentage calls getting connected and answered	≥ 95%	100.00%	98.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%

Live calling results for customer care (Voice to Voice)										
Customer Care Assessment	Benchmark	Aircel(DWL)	Airtel	BSNL	Idea	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Vodafone
Total Number of calls received		100	100	100	100	100	100	100	100	100
Total Number of calls getting connected and answered		100	94	100	100	99	97	100	100	100
Live Calling Percentage calls getting connected and answered	≥ 95%	100.00%	94.00%	100.00%	100.00%	99.00%	97.00%	100.00%	100.00%	100.00%

Data Source: Live calls made by auditors from operator's network

8.9 TERMINATION / CLOSURE OF SERVICE

Audit results for termination / closure of service-Consolidated										
Termination	Benchmark	Aircel(DWL)	Airtel	BSNL	Idea	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Vodafone
Total number of closure request		329	296	217	100	98	338	272	1085	349
Number of requests attended within 7 days		329	296	217	100	98	338	272	1085	349
Percentage cases in which termination done within 7 days	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%

Data Source: Customer Service Center of the operators

8.10 TIME TAKEN FOR REFUND OF DEPOSITS AFTER CLOSURE

Audit results for refund of deposits-Consolidated										
Refund	Benchmark	Aircel(DWL)	Airtel	BSNL	Idea	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Vodafone
Total number of cases requiring refund of deposits		267	88	217	99	146	212	41	201	2883
Total number of cases where refund was made within 60 days		267	88	171	99	146	212	41	201	512
Percentage cases in which refund was receive within 60 days	100.00%	100.00%	100.00%	78.80%	100.00%	100.00%	100.00%	100.00%	100.00%	17.76%

Data Source: Customer Service Center of the operators

8.11 ADDITIONAL NETWORK RELATED PARAMETERS

Audit Results for Total Traffic Handled in Erlang									
Traffic in Erlang	Aircel(DWL)	Airtel	BSNL	Idea	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Vodafone
Eqipped capacity of the network	132281	1201166	40000	72010	53000	98000	63919	83452	113632
Total taffic handled in erlang during TCBH	87332	285131	13507	43029	7779	62069	6202	49020	95511
Total no. of customers served (as per VLR)	2495446	8857371	4044641	1344249	249456	3876436	103162	1534814	3322005

Data Source: Network Operations Center (NOC) of the operators

8.12 LIVE CALLING RESULTS FOR RESOLUTION OF SERVICE REQUESTS

Live calling results for resolution of service requests									
Resolution of service requests	Aircel(DWL)	Airtel	BSNL	Idea	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Vodafone
Total Number of calls made	100	100	100	100	100	100	100	100	100
Number of cases resolved to satisfaction	100	95	97	98	97	99	100	100	97
Percentage cases resolved in four weeks	100.00%	95.00%	97.00%	98.00%	97.00%	99.00%	100.00%	100.00%	97.00%

Data Source: Live calls made by auditors from operator's network

8.13 LIVE CALLING RESULTS FOR LEVEL 1 SERVICES

Live calling for level 1 services										
Level 1 services		Aircel(DWL)	Airtel	BSNL	Idea	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Vodafone
Total no. of calls made		150	150	150	150	150	150	150	150	150
Calls answered		150	148	150	150	150	150	150	150	150
% of calls connected	≥ 95%	100.00%	98.67%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%

Data Source: Live calls made by auditors from operator's network

8.14 DETAILS - LEVEL 1 SERVICES CALLS

All the numbers given in mandatory list in Section 2.4.2.4.1 were tested. The following table provides the numbers that are activated for each operator. A tick (✔) for an operator signifies that the number was active for the operator.

Live calls were made to the active numbers to test the calls answered. The details of the same have been given below for each operator.

Aircel					
Level 1 Number	Type of Service	Working	Not Working	Calls Made	Calls Connected
100	Police	✓		11	11
101	Fire	✓		11	11
102	Ambulance	✓		11	11
104	Health Information Helpline				
108	Emergency and Disaster Management Helpline	✓		11	11
138	All India Helpine for Passangers		×		
149	Public Road Transport Utility Service		×		
181	Chief Minister Helpline		×		
182	Indian Railway Security Helpline	✓		11	11
1033	Road Accident Management Service	✓		11	11
1037	Public Grievance Cell DoT Hq as 'Telecom Consumer Grievance Redressal Helpline'		×		
1056	Emergency Medical Services		×		
106X	State of the Art Hospitals		×		
1063	Public Grievance Cell DoT Hq		×		
1064	Anti Corruption Helpline	✓		12	12
1070	Relief Commission for Natural Calamities		×		
1071	Air Accident Helpline		×		
1072	Rail Accident Helpline	✓		12	12
1073	Road Accident Helpline		×		
1077	Control Room for District Collector	✓		12	12
1090	Call Alart (Crime Branch)		×		
1091	Women Helpline		×		
1097	National AIDS Helpline to NACO	✓		12	12
1099	Central Accident and Trauma Services (CATS)		×		
10580	Educationa & 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	✓		12	12
155304	Municipal Corporations		×		
155214	Labour Helpline		×		
1903	Sashastra Seema Bal (SSB)	✓		12	12

1909	National Do Not Call Registry	✓		12	12
1912	Complaint of Electricity		×		
1916	Drinking Water Supply		×		
1950	Election Commission of India		×		

Airtel

Level 1 Number	Type of Service	Working	Not Working	Calls Made	Calls Connected
100	Police	✓		11	11
101	Fire	✓		11	11
102	Ambulance	✓		11	11
104	Health Information Helpline				
108	Emergency and Disaster Management Helpline	✓		11	11
138	All India Helpine for Passangers	✓			
149	Public Road Transport Utility Service		×		
181	Chief Minister Helpline		×		
182	Indian Railway Security Helpline	✓		11	11
1033	Road Accident Management Service	✓		11	11
1037	Public Grievance Cell DoT Hq as 'Telecom Consumer Grievance Redressal Helpline'		×		
1056	Emergency Medical Services		×		
106X	State of the Art Hospitals		×		
1063	Public Grievance Cell DoT Hq		×		
1064	Anti Corruption Helpline	✓		11	11
1070	Relief Commission for Natural Calamities	✓		11	11
1071	Air Accident Helpline		×		
1072	Rail Accident Helpline	✓		11	11
1073	Road Accident Helpline		×		
1077	Control Room for District Collector	✓		11	11
1090	Call Alart (Crime Branch)		×		
1091	Women Helpline		×		
1097	National AIDS Helpline to NACO	✓		10	9
1099	Central Accident and Trauma Services (CATS)		×		
10580	Educationa & 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	✓		10	10
155304	Municipal Corporations		×		
155214	Labour Helpline		×		
1903	Sashastra Seema Bal (SSB)	✓		10	9
1909	National Do Not Call Registry	✓		10	10
1912	Complaint of Electricity		×		
1916	Drinking Water Supply		×		
1950	Election Commission of India		×		

BSNL					
Level 1 Number	Type of Service	Working	Not Working	Calls Made	Calls Connected
100	Police	✓		12	12
101	Fire	✓		12	12
102	Ambulance	✓		12	12
104	Health Information Helpline				
108	Emergency and Disaster Management Helpline	✓		12	12
138	All India Helpine for Passangers	✓		12	12
149	Public Road Transport Utility Service		×		
181	Chief Minister Helpline		×		
182	Indian Railway Security Helpline	✓		12	12
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		×		
1063	Public Grievance Cell DoT Hq		×		
1064	Anti Corruption Helpline		×		
1070	Relief Commission for Natural Calamities	✓		12	12
1071	Air Accident Helpline		×		
1072	Rail Accident Helpline	✓		11	11
1073	Road Accident Helpline		×		
1077	Control Room for District Collector		×		
1090	Call Alart (Crime Branch)		×		
1091	Women Helpline	✓		11	11
1097	National AIDS Helpline to NACO	✓		11	11
1099	Central Accident and Trauma Services (CATS)		×		
10580	Educationa & 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	✓		11	11
155304	Municipal Corporations		×		
155214	Labour Helpline		×		
1903	Sashastra Seema Bal (SSB)		×		
1909	National Do Not Call Registry	✓		11	11
1912	Complaint of Electricity		×		
1916	Drinking Water Supply		×		
1950	Election Commission of India	✓		11	11

Idea					
Level 1 Number	Type of Service	Working	Not Working	Calls Made	Calls Connected
100	Police	✓		10	10
101	Fire	✓		9	9
102	Ambulance	✓		9	9
104	Health Information Helpline				
108	Emergency and Disaster Management Helpline	✓		9	9
138	All India Helpine for Passangers	✓		9	9
149	Public Road Transport Utility Service		×		
181	Chief Minister Helpline		×		
182	Indian Railway Security Helpline		×		
1033	Road Accident Management Service	✓		9	9
1037	Public Grievance Cell DoT Hq as 'Telecom Consumer Grievance Redressal Helpline'		×		
1056	Emergency Medical Services		×		
106X	State of the Art Hospitals		×		
1063	Public Grievance Cell DoT Hq		×		
1064	Anti Corruption Helpline	✓		9	9
1070	Relief Commission for Natural Calamities	✓		9	9
1071	Air Accident Helpline		×		
1072	Rail Accident Helpline	✓		9	9
1073	Road Accident Helpline	✓			
1077	Control Room for District Collector	✓		9	9
1090	Call Alart (Crime Branch)		×		
1091	Women Helpline		×		
1097	National AIDS Helpline to NACO	✓		9	9
1099	Central Accident and Trauma Services (CATS)		×		
10580	Educationa & 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	✓		10	10
1514	National Career Service(NCS)		×		
15100	Free Legal Service Helpline		×	10	10
155304	Municipal Corporations		×		
155214	Labour Helpline		×		
1903	Sashastra Seema Bal (SSB)	✓		10	10
1909	National Do Not Call Registry	✓		10	10
1912	Complaint of Electricity		×		
1916	Drinking Water Supply		×		
1950	Election Commission of India	✓		10	10

Reliance CDMA					
Level 1 Number	Type of Service	Working	Not Working	Calls Made	Calls Connected
100	Police	✓		10	10
101	Fire	✓		9	9
102	Ambulance	✓		9	9
104	Health Information Helpline		×		
108	Emergency and Disaster Management Helpline	✓		9	9
138	All India Helpine for Passangers	✓		9	9
149	Public Road Transport Utility Service		×		
181	Chief Minister Helpline		×		
182	Indian Railway Security Helpline		×		
1033	Road Accident Management Service	✓		9	9
1037	Public Grievance Cell DoT Hq as 'Telecom Consumer Grievance Redressal Helpline'		×		
1056	Emergency Medical Services		×		
106X	State of the Art Hospitals		×		
1063	Public Grievance Cell DoT Hq		×		
1064	Anti Corruption Helpline	✓		9	9
1070	Relief Commission for Natural Calamities	✓		9	9
1071	Air Accident Helpline		×		
1072	Rail Accident Helpline	✓		9	9
1073	Road Accident Helpline	✓			
1077	Control Room for District Collector	✓		9	9
1090	Call Alart (Crime Branch)		×		
1091	Women Helpline		×		
1097	National AIDS Helpline to NACO	✓		9	9
1099	Central Accident and Trauma Services (CATS)		×		
10580	Educationa & 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	✓		10	10
1514	National Career Service(NCS)		×		
15100	Free Legal Service Helpline		×	10	10
155304	Municipal Corporations		×		
155214	Labour Helpline		×		
1903	Sashastra Seema Bal (SSB)	✓		10	10
1909	National Do Not Call Registry	✓		10	10
1912	Complaint of Electricity		×		
1916	Drinking Water Supply		×		
1950	Election Commission of India	✓		10	10

Reliance GSM					
Level 1 Number	Type of Service	Working	Not Working	Calls Made	Calls Connected
100	Police	✓		10	10
101	Fire	✓		9	9
102	Ambulance	✓		9	9
104	Health Information Helpline		×		
108	Emergency and Disaster Management Helpline	✓		9	9
138	All India Helpine for Passangers	✓		9	9
149	Public Road Transport Utility Service		×		
181	Chief Minister Helpline		×		
182	Indian Railway Security Helpline		×		
1033	Road Accident Management Service	✓		9	9
1037	Public Grievance Cell DoT Hq as 'Telecom Consumer Grievance Redressal Helpline'		×		
1056	Emergency Medical Services		×		
106X	State of the Art Hospitals		×		
1063	Public Grievance Cell DoT Hq		×		
1064	Anti Corruption Helpline	✓		9	9
1070	Relief Commission for Natural Calamities	✓		9	9
1071	Air Accident Helpline		×		
1072	Rail Accident Helpline	✓		9	9
1073	Road Accident Helpline	✓			
1077	Control Room for District Collector	✓		9	9
1090	Call Alart (Crime Branch)		×		
1091	Women Helpline		×		
1097	National AIDS Helpline to NACO	✓		9	9
1099	Central Accident and Trauma Services (CATS)		×		
10580	Educationa & 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	✓		10	10
1514	National Career Service(NCS)		×		
15100	Free Legal Service Helpline		×	10	10
155304	Municipal Corporations		×		
155214	Labour Helpline		×		
1903	Sashastra Seema Bal (SSB)	✓		10	10
1909	National Do Not Call Registry	✓		10	10
1912	Complaint of Electricity		×		
1916	Drinking Water Supply		×		
1950	Election Commission of India	✓		10	10

TATA CDMA					
Level 1 Number	Type of Service	Working	Not Working	Calls Made	Calls Connected
100	Police	✓		8	8
101	Fire	✓		8	8
102	Ambulance	✓		8	8
104	Health Information Helpline		×		
108	Emergency and Disaster Management Helpline	✓		8	8
138	All India Helpine for Passangers	✓		8	8
149	Public Road Transport Utility Service		×		
181	Chief Minister Helpline		×		
182	Indian Railway Security Helpline		×		
1033	Road Accident Management Service	✓		8	8
1037	Public Grievance Cell DoT Hq as 'Telecom Consumer Grievance Redressal Helpline'	✓			
1056	Emergency Medical Services		×		
106X	State of the Art Hospitals	✓		8	8
1063	Public Grievance Cell DoT Hq	✓		8	8
1064	Anti Corruption Helpline	✓		8	8
1070	Relief Commission for Natural Calamities	✓		8	8
1071	Air Accident Helpline		×		
1072	Rail Accident Helpline	✓		7	7
1073	Road Accident Helpline	✓		7	7
1077	Control Room for District Collector	✓		7	7
1090	Call Alart (Crime Branch)	✓		7	7
1091	Women Helpline	✓		7	7
1097	National AIDS Helpline to NACO	✓		7	7
1099	Central Accident and Trauma Services (CATS)		×		
10580	Educationa & 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	✓		7	7
1514	National Career Service(NCS)		×		
15100	Free Legal Service Helpline	✓		7	7
155304	Municipal Corporations		×		
155214	Labour Helpline		×		
1903	Sashastra Seema Bal (SSB)		×		
1909	National Do Not Call Registry	✓		7	7
1912	Complaint of Electricity		×		
1916	Drinking Water Supply		×		
1950	Election Commission of India	✓		7	7

TATA GSM					
Level 1 Number	Type of Service	Working	Not Working	Calls Made	Calls Connected
100	Police	✓		8	8
101	Fire	✓		8	8
102	Ambulance	✓		8	8
104	Health Information Helpline		×		
108	Emergency and Disaster Management Helpline	✓		8	8
138	All India Helpine for Passangers	✓		8	8
149	Public Road Transport Utility Service		×		
181	Chief Minister Helpline		×		
182	Indian Railway Security Helpline		×		
1033	Road Accident Management Service	✓		8	8
1037	Public Grievance Cell DoT Hq as 'Telecom Consumer Grievance Redressal Helpline'	✓			
1056	Emergency Medical Services		×		
106X	State of the Art Hospitals	✓		8	8
1063	Public Grievance Cell DoT Hq	✓		8	8
1064	Anti Corruption Helpline	✓		8	8
1070	Relief Commission for Natural Calamities	✓		8	8
1071	Air Accident Helpline		×		
1072	Rail Accident Helpline	✓		7	7
1073	Road Accident Helpline	✓		7	7
1077	Control Room for District Collector	✓		7	7
1090	Call Alart (Crime Branch)	✓		7	7
1091	Women Helpline	✓		7	7
1097	National AIDS Helpline to NACO	✓		7	7
1099	Central Accident and Trauma Services (CATS)		×		
10580	Educationa & 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	✓		7	7
1514	National Career Service(NCS)		×		
15100	Free Legal Service Helpline	✓		7	7
155304	Municipal Corporations		×		
155214	Labour Helpline		×		
1903	Sashastra Seema Bal (SSB)		×		
1909	National Do Not Call Registry	✓		7	7
1912	Complaint of Electricity		×		
1916	Drinking Water Supply		×		
1950	Election Commission of India	✓		7	7

Vodafone					
Level 1 Number	Type of Service	Working	Not Working	Calls Made	Calls Connected
100	Police	✓		12	12
101	Fire	✓		12	12
102	Ambulance	✓		12	12
104	Health Information Helpline		×		
108	Emergency and Disaster Management Helpline	✓		12	12
138	All India Helpine for Passangers	✓		12	12
149	Public Road Transport Utility Service		×		
181	Chief Minister Helpline		×		
182	Indian Railway Security Helpline		×		
1033	Road Accident Management Service	✓		12	12
1037	Public Grievance Cell DoT Hq as 'Telecom Consumer Grievance Redressal Helpline'		×		
1056	Emergency Medical Services		×		
106X	State of the Art Hospitals		×		
1063	Public Grievance Cell DoT Hq		×		
1064	Anti Corruption Helpline	✓		12	12
1070	Relief Commission for Natural Calamities	✓		12	12
1071	Air Accident Helpline		×		
1072	Rail Accident Helpline	✓		11	11
1073	Road Accident Helpline		×		
1077	Control Room for District Collector		×		
1090	Call Alart (Crime Branch)		×		
1091	Women Helpline	✓		11	11
1097	National AIDS Helpline to NACO	✓		11	11
1099	Central Accident and Trauma Services (CATS)		×		
10580	Educationa & 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	✓		11	11
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	✓		11	11
1912	Complaint of Electricity		×		
1916	Drinking Water Supply		×		
1950	Election Commission of India		×		

Data Source: Live calls made by auditors from operator's network

8.15 COUNTER DETAILS

Sl 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))**

8.15.1 ERICSSON

Ericsson provides network support to Aircel, BSNL, Reliance GSM and Reliance CDMA in the circle.

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

8.15.2 NSN (NOKIA SIEMENS NETWORKS)

NSN provides network support to Airtel and Vodafone in the circle.

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)

8.15.3 HUAWEI

Huawei provides network support to Idea in the circle.

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[%]

8.15.4 ZTE

ZTE provides network support to Tata GSM, Tata CDMA and BSNL in the circle.

1. Connection Establishment (Accessibility)

A. CALL SETUP SUCCESS RATE:

KPI is calculated as Average over the month at TCBH

((1-C900060053/(C900060003+C900060010+C900060038))*(1-
((C900060005+C900060011+C900060039)/(C900060003+C900060010+C900060038)))*(1-
((C900060020+C900060031+C900060043+C900060047)/(C900060019+C900060030+C900060042+C900060046
))*(1-
(C900060018+C900060029+C900060037+C900060135+C900060200+C900060211)/(C900060017+C900060028
+C900060036+C900060018+C900060029+C900060037+C900060235+C900060199+C900060210+C900060135
+C900060200+C900060211)))*100

Where,

C900060053	Number of SDCCH drops
C900060003	Number of SDCCH seizure attempts for assignment
C900060010	Number of signaling TCH/F seizure attempts for assignment
C900060038	Number of signaling TCH/H seizure attempts for assignment
C900060005	Number of SDCCH seizure failure for assignment
C900060011	Number of signaling TCH/F seizure failure for assignment
C900060039	Number of signaling TCH/H seizure failure for assignment
C900060020	Number of voice TCH/F seizure failure for assignment
C900060031	Number of data TCH/F seizure failure for assignment
C900060043	Number of voice TCH/H seizure failure for assignment
C900060047	Number of data TCH/H seizure failure for assignment
C900060019	Number of voice TCH/F seizure attempts for assignment
C900060030	Number of data TCH/F seizure attempts for assignment
C900060042	Number of voice TCH/H seizure attempts for assignment
C900060046	Number of data TCH/H seizure attempts for assignment
C900060018	Number of signaling TCH/F assignment failure for assignment
C900060029	Number of voice TCH/F assignment failure for assignment

C900060037	Number of data TCH/F assignment failure
C900060135	Number of signaling TCH/H assignment failure
C900060200	Number of Voice TCH/H assignment failure
C900060211	Number of data TCH/H assignment failure
C900060017	Number of signaling TCH/F assignment success for assignment
C900060028	Number of voice TCH/F assignment success
C900060036	Number of data TCH/F assignment success
C900060235	Number of signaling TCH/H assignment success
C900060199	Number of Voice TCH/H assignment success
C900060210	Number of data TCH/H assignment success

B. SDCCH BLOCKING:

KPI is calculated as Average over the month at TCBH

(C900060005+C900060011+C900060039)/(C900060003+C900060010+C900060038)

Where,

C900060005	Number of SDCCH seizure failure for assignment
C900060011	Number of signaling TCH/F seizure failure for assignment
C900060039	Number of signaling TCH/H seizure failure for assignment
C900060003	Number of SDCCH seizure attempts for assignment
C900060010	Number of signaling TCH/F seizure attempts for assignment
C900060038	Number of signaling TCH/H seizure attempts for assignment

C. TCH BLOCKING:

KPI is calculated as Average over the month at TCBH

(C900060020+C900060031+C900060043+C900060047)/(C900060019+C900060030+C900060042+C900060046)

Where,

C900060020	Number of voice TCH/F seizure failure for assignment
C900060031	Number of data TCH/F seizure failure for assignment
C900060043	Number of voice TCH/H seizure failure for assignment
C900060047	Number of data TCH/H seizure failure for assignment
C900060019	Number of voice TCH/F seizure attempts for assignment

C900060030	Number of data TCH/F seizure attempts for assignment
C900060042	Number of voice TCH/H seizure attempts for assignment
C900060046	Number of data TCH/H seizure attempts for assignment

2. Connection Maintenance (Retainability)

A. TCH drop:

KPI is calculated as Average over the month at TCBH

(C900060054+C900060055)/(C900060028+C900060036+C900060199+C900060210+C900060098+C900060102 -(C900060094+C900060095))

Where,

C900060054	Number of TCH/F drops
C900060055	Number of TCH/H drops
C900060028	Number of voice TCH/F assignment success
C900060036	Number of data TCH/F assignment success
C900060199	Number of Voice TCH/H assignment success
C900060210	Number of data TCH/H assignment success
C900060098	Number of BSC-controlled inter-cell incoming handover success
C900060102	Number of MSC-controlled incoming handover success
C900060094	Number of BSC-controlled inter-cell outgoing handover success
C900060095	Number of MSC-controlled outgoing handover

C900060030	Number of data TCH/F seizure attempts for assignment
C900060042	Number of voice TCH/H seizure attempts for assignment
C900060046	Number of data TCH/H seizure attempts for assignment

2. Connection Maintenance (Retainability)

A. TCH drop:

KPI is calculated as Average over the month at TCBH

(C900060054+C900060055)/(C900060028+C900060036+C900060199+C900060210+C900060098+C900060102 -(C900060094+C900060095))

Where,

C900060054	Number of TCH/F drops
C900060055	Number of TCH/H drops
C900060028	Number of voice TCH/F assignment success
C900060036	Number of data TCH/F assignment success
C900060199	Number of Voice TCH/H assignment success
C900060210	Number of data TCH/H assignment success
C900060098	Number of BSC-controlled inter-cell incoming handover success
C900060102	Number of MSC-controlled incoming handover success
C900060094	Number of BSC-controlled inter-cell outgoing handover success
C900060095	Number of MSC-controlled outgoing handover

B. Total No. of cells exceeding 3% TCH drop (call drop):

Total no of cells with TCH drop>3%

C. Total No. of cells in the Network:

Active cell from last day of the month.

D. Worst affected cells having more than 3% TCH drop (call drop) rate:

(Total no. of cells with TCH drop>3%/Total no. of cells of on air sites)*100

E. %age of Connection with Good Voice Quality:

KPI is calculated as Average over the month at TCBH

(C900060074+C900060075+C900060076+C900060077+C900060078+C900060079)/(C900060074+C900060075+C900060076+C900060077+C900060078+C900060079+C900060080+C900060081)*100

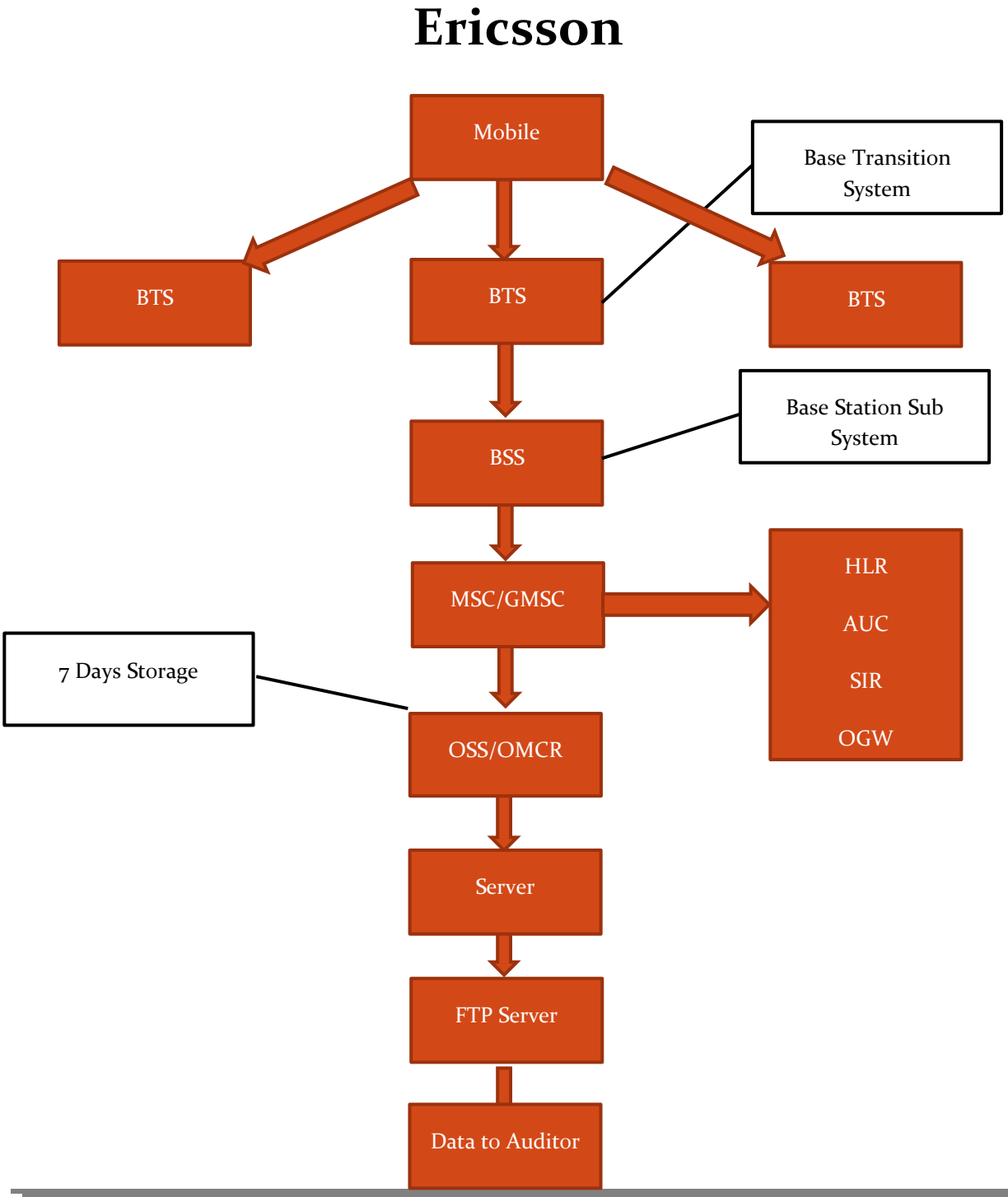
Where,

C900060074	Number of samples with DL RQ = 0
C900060075	Number of samples with DL RQ = 1
C900060076	Number of samples with DL RQ = 2
C900060077	Number of samples with DL RQ = 3
C900060078	Number of samples with DL RQ = 4
C900060079	Number of samples with DL RQ = 5
C900060079	Number of samples with DL RQ = 5
C900060080	Number of samples with DL RQ = 6
C900060081	Number of samples with DL RQ = 7

8.16 BLOCK SCHEMATIC DIAGRAMS

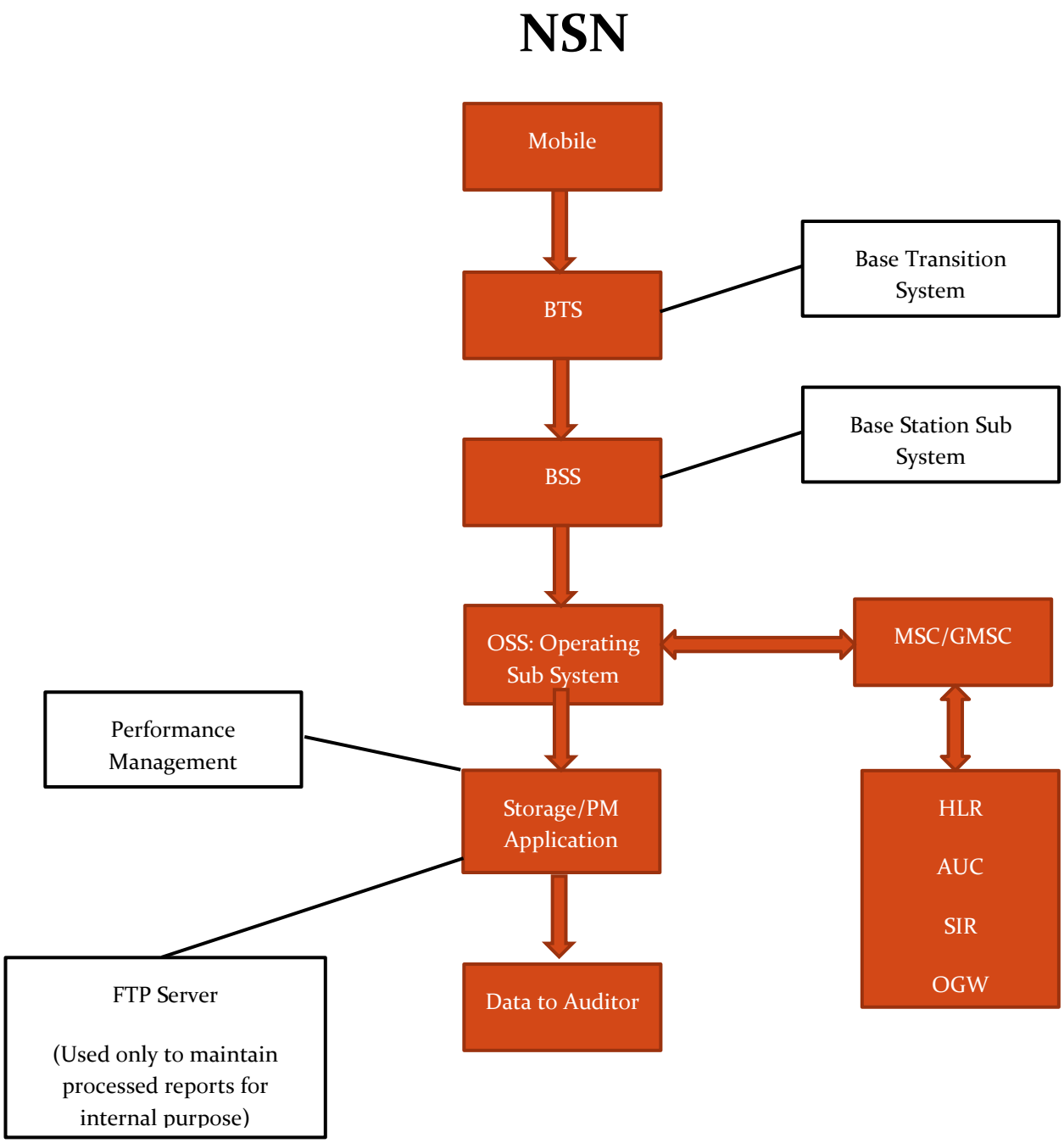
8.16.1 ERICSSON

Ericsson provides network support to Aircel, BSNL, Reliance GSM and Reliance CDMA in the circle.



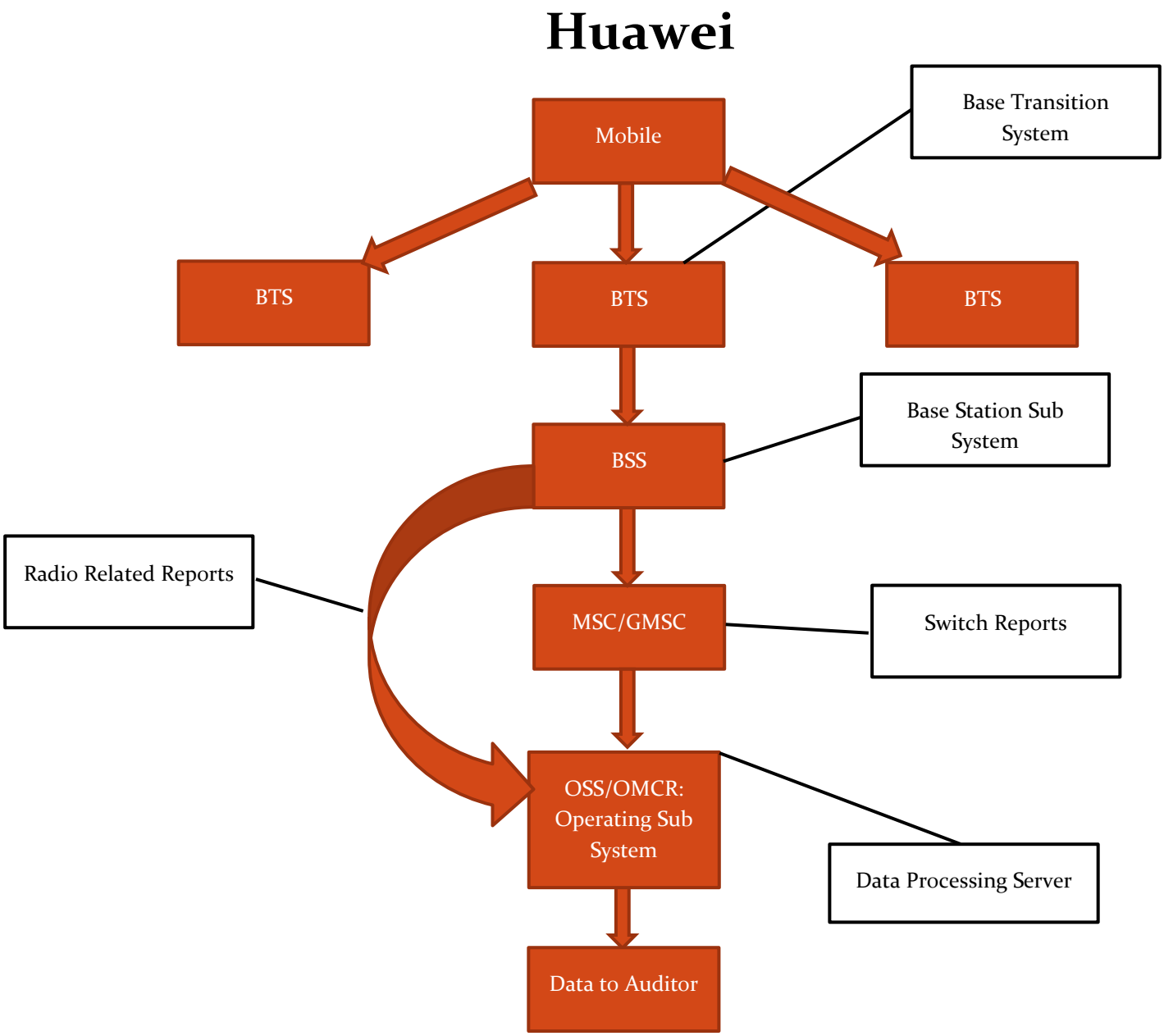
8.16.2 NSN (NOKIA SIEMENS NETWORKS)

NSN provides network support to Airtel and Vodafone in the circle.



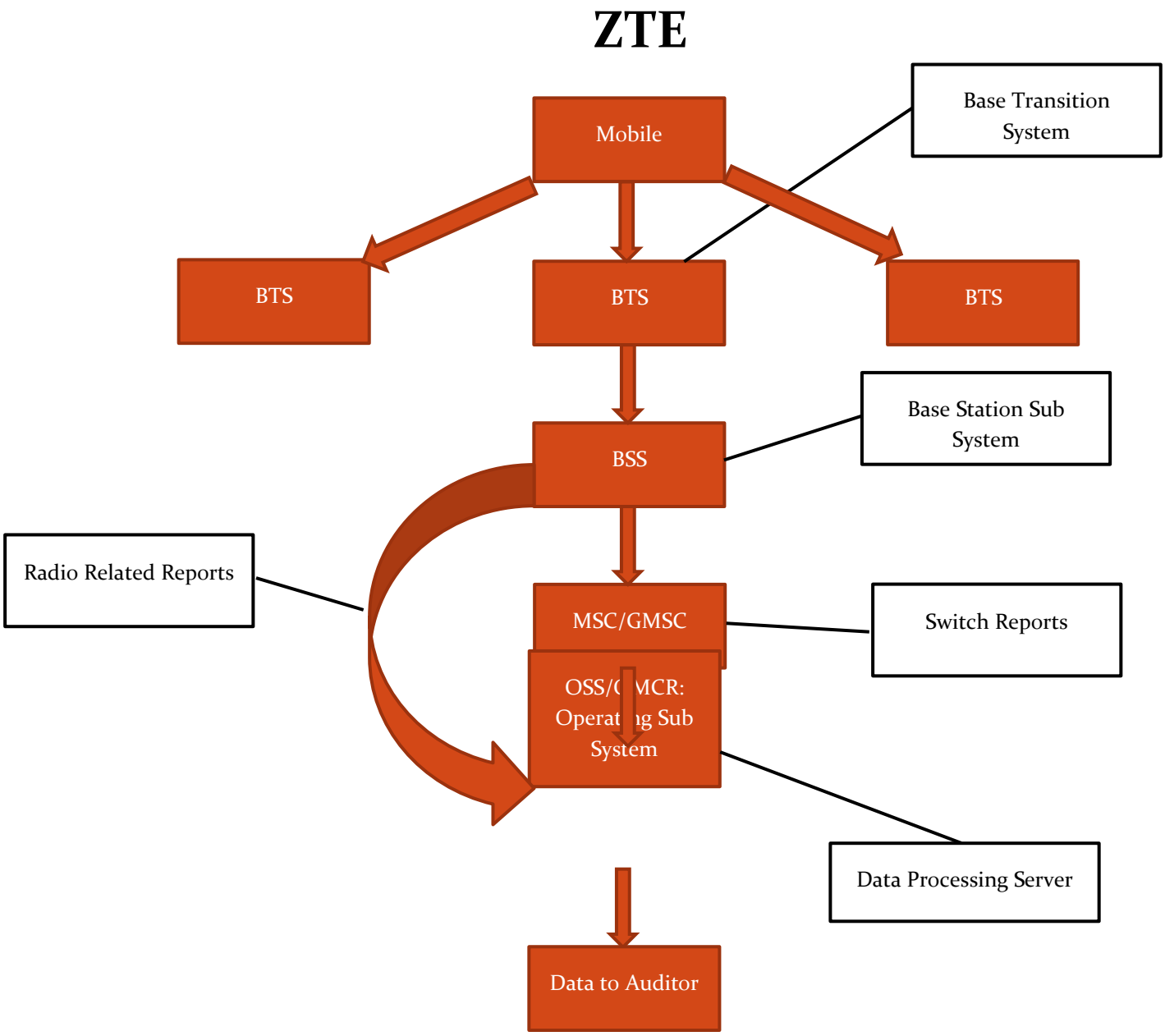
8.16.3 HUAWEI

Huawei provides network support to Idea in the circle.



8.16.4 ZTE

ZTE provides network support to Tata GSM, Tata CDMA and BSNL in the circle.



9 ANNEXURE – APRIL 2015

Audit Results for Network Availability- PMR data-April										
	Benchmark	Aircel(DWL)	Airtel	BSNL	Idea	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Vodafone
Number of BTSs in the licensed service area		2671	4884	423	2054	475	1869	339	1421	3805
Sum of downtime of BTSs in a month (in hours)		31235	3749	1711	4729	1823	1574	437	962	4371
BTSs accumulated downtime (not available for service)	≤ 2%	1.62%	0.11%	0.56%	0.32%	0.53%	0.12%	0.18%	0.09%	0.16%
Number of BTSs having accumulated downtime >24 hours		284	1	6	29	5	4	0	0	22
Worst affected BTSs due to downtime	≤ 2%	10.63%	0.02%	1.42%	1.41%	1.05%	0.21%	0.00%	0.00%	0.58%
Live Measurement Results for Network Availability- 3 Day live data-April										
	Benchmark	Aircel(DWL)	Airtel	BSNL	Idea	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Vodafone
Number of BTSs in the licensed service area		2671	4815	423	2054	475	1869	339	1421	3805
Sum of downtime of BTSs in a month (in hours)		3262	739	23	1088	177	205	48	386	506
BTSs accumulated downtime (not available for service)	≤ 2%	1.70%	0.21%	0.08%	0.74%	0.52%	0.15%	0.20%	0.38%	0.18%
Number of BTSs having accumulated downtime >24 hours		4	0	0	0	1	0	0	0	0
Worst affected BTSs due to downtime	≤ 2%	0.15%	0.00%	0.00%	0.00%	0.21%	0.00%	0.00%	0.00%	0.00%

Audit Results for CSSR, SDCCH and TCH congestion- PMR data-April										
CSSR	Benchmark	Aircel(DWL)	Airtel	BSNL	Idea	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Vodafone
CSSR	≥ 95%	97.87%	98.64%	98.99%	96.47%	99.64%	98.36%	98.83%	98.67%	99.58%
SDCCH/Paging channel congestion	≤ 1%	0.95%	0.62%	0.24%	0.26%	NA	0.24%	NA	0.24%	0.23%
TCH congestion	≤ 2%	1.87%	1.89%	1.28%	0.86%	0.00%	0.69%	0.01%	0.68%	0.42%

Live measurement results for CSSR, SDCCH and TCH congestion- 3 Day Data-April										
CSSR	Benchmark	Aircel(DWL)	Airtel	BSNL	Idea	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Vodafone
CSSR	≥ 95%	98.09%	98.55%	99.11%	97.47%	99.70%	98.57%	98.68%	98.88%	99.58%
SDCCH/Paging channel congestion	≤ 1%	0.57%	0.70%	0.50%	0.30%	NA	0.52%	NA	0.66%	0.39%
TCH congestion	≤ 2%	1.60%	1.89%	1.62%	0.90%	0.00%	0.62%	0.01%	0.45%	0.42%

Drive test results for CSSR (Average of three drive tests) and blocked calls- Drive Test Data-April										
CSSR	Benchmark	Aircel(DWL)	Airtel	BSNL	Idea	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Vodafone
Total number of call attempts		629	596	641	606	557	610	453	535	629
Total number of successful calls established		628	596	638	606	557	609	453	533	622
CSSR	≥ 95%	99.84%	100.00%	99.53%	100.00%	100.00%	99.84%	100.00%	99.63%	98.89%
%age blocked calls		0.16%	0.00%	0.47%	0.00%	0.00%	0.16%	0.00%	0.37%	1.11%

Audit Results for Call drop rate and for number of cells having more than 3% TCH-PMR data-April										
Call drop rate	Benchmark	Aircel(DWL)	Airtel	BSNL	Idea	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Vodafone
Total number of calls established		112146878	380348758	188407155	55365514	5833077	58070639	9762432	64125387	118647619
Total number of calls dropped		1502106	3256069	2269284	150923	17788	313161	43414	244756	688022
Call drop rate	≤ 2%	1.34%	0.86%	1.20%	0.27%	0.30%	0.54%	0.44%	0.38%	0.58%
Cells having more than 3% TCH	Benchmark	Aircel(DWL)	Airtel	BSNL	Idea	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Vodafone
Total number of cells in the network		7811	15342	1276	6166	1425	5647	1041	4290	11366
Total number of cells having more than 3% TCH		848	152	13	41	34	12	46	59	199
Worst affected cells having more than 3% TCH	≤ 3%	10.86%	0.99%	1.02%	0.66%	2.39%	0.21%	4.42%	1.38%	1.75%
Live measurement results for Call drop rate and for number of cells having more than 3% TCH- 3 Day data-April										
Call drop rate	Benchmark	Aircel(DWL)	Airtel	BSNL	Idea	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Vodafone
Total number of calls established		10702891	39562005	19964538	5624173	639382	5304231	843839	6462621	12358633
Total number of calls dropped		171785	376031	247879	20798	2109	27196	4159	27389	87981
Call drop rate	≤ 2%	1.61%	0.95%	1.24%	0.37%	0.33%	0.51%	0.49%	0.42%	0.71%
Cells having more than 3% TCH	Benchmark	Aircel(DWL)	Airtel	BSNL	Idea	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Vodafone
Total number of cells in the network		7811	15377	1311	6166	1425	5647	1041	4290	11366
Total number of cells having more than 3% TCH		873	285	13	61	35	10	53	68	271
Worst affected cells having more than 3% TCH	≤ 3%	11.18%	1.85%	0.99%	0.98%	2.43%	0.18%	5.09%	1.59%	2.38%

Drive test results for Call drop rate (Average of three drive tests) - Drive Test Data-April										
Call drop rate	Benchmark	Aircel(DWL)	Airtel	BSNL	Idea	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Vodafone
Total number of calls established		628	596	638	607	557	609	453	533	623
Total number of calls dropped		3	0	5	0	0	0	0	0	1
Call drop rate	≤ 2%	0.48%	0.00%	0.78%	0.00%	0.00%	0.00%	0.00%	0.00%	0.16%

Audit Results for Voice quality -PMR Data-April										
Voice quality	Benchmark	Aircel(DWL)	Airtel	BSNL	Idea	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Vodafone
Total number of sample calls		14100669449	63264949248	37804777714	7643319791	NA	3244277629	9612667926	11520564734	20658756751
Total number of calls with good voice quality		13471948755	60806424096	36728470490	7395839209	NA	3188364543	9444569417	11243312911	20379292403
%age calls with good voice quality	≥ 95%	95.54%	96.11%	97.15%	96.76%	99.78%	98.28%	98.25%	97.59%	98.65%

Live measurement results for Voice quality-3 Day data-April										
Voice quality	Benchmark	Aircel(DWL)	Airtel	BSNL	Idea	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Vodafone
Total number of sample calls		1332839546	6101466017	3858255028	698739817	NA	366395337	957142171	1116488939	2000959793
Total number of calls with good voice quality		1269844714	5865452935	3738669417	676074852	NA	359923415	940452825	1089154395	1971734865
%age calls with good voice quality	≥ 95%	95.27%	96.13%	96.90%	96.76%	99.77%	98.23%	98.26%	97.55%	98.54%

Drive test results for Voice quality (Average of three drive tests) - DT data-April										
Voice quality	Benchmark	Aircel(DWL)	Airtel	BSNL	Idea	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Vodafone
Total number of sample calls		714869	70052	238527	1013176	NA	102292	NA	917831	1145861
Total number of calls with good voice quality		676765	69919	231582	1016798	NA	97741	NA	886021	1096379
%age calls with good voice quality	≥ 95%	94.67%	99.81%	97.09%	100.36%	99.36%	95.55%	99.47%	96.53%	95.68%

Audit Results for POI Congestion- PMR data-April										
POI congestion	Benchmark	Aircel(DWL)	Airtel	BSNL	Idea	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Vodafone
Total number of working POIs		110	21	13	63	8	8	43	12	46
No. of POIs not meeting benchmark		0	0	0	0	0	0	0	0	0
Total Capacity of all POIs (A) - in erlangs		72492	110159	25000	40347	10050	27524	13664	14005	91717
Traffic served for all POIs (B)- in erlangs		51849	64652	23340	27841	2934	16357	6215	8421	38539
POI congestion	≤ 0.5%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%

Live Measurement Results for POI Congestion- 3 Day data-April										
POI congestion	Benchmark	Aircel(DWL)	Airtel	BSNL	Idea	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Vodafone
Total number of working POIs		110	21	13	63	8	8	43	12	46
No. of POIs not meeting benchmark		0	0	0	0	0	0	0	0	0
Total Capacity of all POIs (A) - in erlangs		73113	110179	25000	40109	10050	27524	13703	14005	91717
Traffic served for all POIs (B)- in erlangs		48499	64736	19962	27217	2916	17143	6364	7979	36131
POI congestion	≤ 0.5%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%

10 ANNEXURE – MAY 2015

Audit Results for Network Availability- PMR data-May										
	Benchmark	Aircel(DWL)	Airtel	BSNL	Idea	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Vodafone
Number of BTSs in the licensed service area		2678	4912	426	2110	475	1869	339	1421	3829
Sum of downtime of BTSs in a month (in hours)		39237	3041	870	3449	1430	1212	332	910	3979
BTSs accumulated downtime (not available for service)	≤ 2%	1.97%	0.08%	0.27%	0.22%	0.40%	0.09%	0.13%	0.09%	0.14%
Number of BTSs having accumulated downtime >24 hours		346	1	6	20	5	4	0	1	25
Worst affected BTSs due to downtime	≤ 2%	12.92%	0.02%	1.41%	0.95%	1.05%	0.21%	0.00%	0.07%	0.65%
Live Measurement Results for Network Availability- 3 Day live data-May										
	Benchmark	Aircel(DWL)	Airtel	BSNL	Idea	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Vodafone
Number of BTSs in the licensed service area		2678	4905	426	2110	475	1869	339	1421	3829
Sum of downtime of BTSs in a month (in hours)		3494	312	51	283	145	92	13	167	360
BTSs accumulated downtime (not available for service)	≤ 2%	1.81%	0.09%	0.16%	0.19%	0.42%	0.07%	0.05%	0.16%	0.13%
Number of BTSs having accumulated downtime >24 hours		5	0	0	5	0	0	0	0	0
Worst affected BTSs due to downtime	≤ 2%	0.19%	0.00%	0.00%	0.24%	0.00%	0.00%	0.00%	0.00%	0.00%

Audit Results for CSSR, SDCCH and TCH congestion- PMR data-May										
CSSR	Benchmark	Aircel(DWL)	Airtel	BSNL	Idea	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Vodafone
CSSR	≥ 95%	97.67%	98.81%	98.77%	96.28%	99.73%	98.46%	98.73%	98.84%	99.65%
SDCCH/Paging channel congestion	≤ 1%	0.92%	0.50%	0.48%	0.16%	NA	0.21%	NA	0.12%	0.21%
TCH congestion	≤ 2%	1.86%	1.81%	1.94%	0.86%	0.00%	0.74%	0.03%	0.48%	0.35%

Live measurement results for CSSR, SDCCH and TCH congestion- 3 Day Data-May										
CSSR	Benchmark	Aircel(DWL)	Airtel	BSNL	Idea	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Vodafone
CSSR	≥ 95%	98.04%	98.97%	98.50%	96.60%	99.70%	98.56%	98.51%	99.17%	99.66%
SDCCH/Paging channel congestion	≤ 1%	0.69%	0.38%	0.17%	0.10%	NA	0.09%	NA	0.06%	0.21%
TCH congestion	≤ 2%	1.70%	1.81%	1.97%	0.63%	0.00%	0.81%	0.14%	0.28%	0.34%

Drive test results for CSSR (Average of three drive tests) and blocked calls- Drive Test Data-May										
CSSR	Benchmark	Aircel(DWL)	Airtel	BSNL	Idea	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Vodafone
Total number of call attempts		197	422	518	229	244	339	170	295	295
Total number of successful calls established		197	413	511	228	244	334	170	293	293
CSSR	≥ 95%	100.00%	97.87%	98.65%	99.56%	100.00%	98.53%	100.00%	99.32%	99.32%
%age blocked calls		0.00%	2.13%	1.35%	0.44%	0.00%	1.47%	0.00%	0.68%	0.68%

Audit Results for Call drop rate and for number of cells having more than 3% TCH-PMR data-May										
Call drop rate	Benchmark	Aircel(DWL)	Airtel	BSNL	Idea	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Vodafone
Total number of calls established		109365271	399651324	13490936	57001095	5906399	64984966	9617264	65738940	117891154
Total number of calls dropped		1423083	3425871	212824	153569	17105	352673	37629	242135	710717
Call drop rate	≤ 2%	1.30%	0.86%	1.58%	0.27%	0.29%	0.54%	0.39%	0.37%	0.60%
Cells having more than 3% TCH	Benchmark	Aircel(DWL)	Airtel	BSNL	Idea	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Vodafone
Total number of cells in the network		7842	15687	1306	6334	1425	5647	1041	4290	11438
Total number of cells having more than 3% TCH		841	154	33	44	32	13	46	49	202
Worst affected cells having more than 3% TCH	≤ 3%	10.72%	0.98%	2.53%	0.70%	2.25%	0.23%	4.42%	1.14%	1.77%
Live measurement results for Call drop rate and for number of cells having more than 3% TCH- 3 Day data-May										
Call drop rate	Benchmark	Aircel(DWL)	Airtel	BSNL	Idea	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Vodafone
Total number of calls established		10448580	38128336	1347885	5333990	607941	6337007	1001230	6242110	11257484
Total number of calls dropped		133054	302541	19920	21776	1663	31882	3637	21734	60942
Call drop rate	≤ 2%	1.27%	0.79%	1.48%	0.41%	0.27%	0.50%	0.36%	0.35%	0.54%
Cells having more than 3% TCH	Benchmark	Aircel(DWL)	Airtel	BSNL	Idea	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Vodafone
Total number of cells in the network		7842	15666	1306	6334	1425	5647	1041	4290	11438
Total number of cells having more than 3% TCH		866	143	23	39	34	11	43	46	164
Worst affected cells having more than 3% TCH	≤ 3%	11.04%	0.91%	1.76%	0.62%	2.41%	0.19%	4.13%	1.07%	1.43%

Drive test results for Call drop rate (Average of three drive tests) - Drive Test Data-May										
Call drop rate	Benchmark	Aircel(DWL)	Airtel	BSNL	Idea	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Vodafone
Total number of calls established		197	422	511	229	244	337	170	293	293
Total number of calls dropped		1	2	4	1	0	3	0	1	0
Call drop rate	≤ 2%	0.51%	0.47%	0.78%	0.44%	0.00%	0.89%	0.00%	0.34%	0.00%

Audit Results for Voice quality -PMR Data-May										
Voice quality	Benchmark	Aircel(DWL)	Airtel	BSNL	Idea	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Vodafone
Total number of sample calls		15422633293	61885878515	2919393025	7616260008	NA	3743242117	9126628249	11394026414	21838008914
Total number of calls with good voice quality		14704363233	59485328715	2815266277	7372941868	NA	3679197811	8967136518	11120456438	21542903505
%age calls with good voice quality	≥ 95%	95.34%	96.12%	96.43%	96.81%	99.77%	98.29%	98.25%	97.60%	98.65%

Live measurement results for Voice quality-3 Day data-May										
Voice quality	Benchmark	Aircel(DWL)	Airtel	BSNL	Idea	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Vodafone
Total number of sample calls		1525207614	5913929196	282687534	778204758	NA	357687001	884767759	1071697829	2129997810
Total number of calls with good voice quality		1455725088	5685486994	272403152	754487259	NA	351523707	869362059	1046712676	2102555346
%age calls with good voice quality	≥ 95%	95.44%	96.14%	96.36%	96.95%	99.77%	98.28%	98.26%	97.67%	98.71%

Drive test results for Voice quality (Average of three drive tests) - DT data-May										
Voice quality	Benchmark	Aircel(DWL)	Airtel	BSNL	Idea	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Vodafone
Total number of sample calls		274850	49284	96906	348244	NA	30017	NA	572159	4115003
Total number of calls with good voice quality		263129	49146	91122	338296	NA	29176	NA	559669	4047399
%age calls with good voice quality	≥ 95%	95.74%	99.72%	94.03%	97.14%	99.27%	97.20%	99.80%	97.82%	98.36%

Audit Results for POI Congestion- PMR data-May										
POI congestion	Benchmark	Aircel(DWL)	Airtel	BSNL	Idea	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Vodafone
Total number of working POIs		110	21	13	64	8	8	43	12	46
No. of POIs not meeting benchmark		0	0	0	0	0	0	0	0	0
Total Capacity of all POIs (A) - in erlangs		73519	109555	25000	40234	10050	27524	13802	14005	91717
Traffic served for all POIs (B)- in erlangs		50583	63354	21993	28174	2889	18309	5775	8551	44771
POI congestion	≤ 0.5%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%

Live Measurement Results for POI Congestion- 3 Day data-May										
POI congestion	Benchmark	Aircel(DWL)	Airtel	BSNL	Idea	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Vodafone
Total number of working POIs		110	21	13	64	8	8	43	12	46
No. of POIs not meeting benchmark		0	0	0	0	0	0	0	0	0
Total Capacity of all POIs (A) - in erlangs		73994	109602	25000	40467	10050	27524	13802	14005	91717
Traffic served for all POIs (B)- in erlangs		49514	63554	18695	28135	2910	18707	5659	8628	43659
POI congestion	≤ 0.5%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%

11 ANNEXURE – JUNE 2015

For Reliance CDMA and Reliance GSM, data for Jun'15 could not be audited due to a server issue at operator's end. The same was pre-informed to TRAI by the operator.

Audit Results for Network Availability- PMR data-June										
	Benchmark	Aircel(DWL)	Airtel	BSNL	Idea	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Vodafone
Number of BTSs in the licensed service area		2669	4934	430	2195	NDR	NDR	339	1419	3849
Sum of downtime of BTSs in a month (in hours)		32392	4646	2102	3849	NDR	NDR	734	824	4758
BTSs accumulated downtime (not available for service)	≤ 2%	1.69%	0.13%	0.68%	0.24%	NDR	NDR	0.30%	0.08%	0.17%
Number of BTSs having accumulated downtime >24 hours		303	2	4	21	NDR	NDR	0	1	24
Worst affected BTSs due to downtime	≤ 2%	11.35%	0.04%	0.93%	0.96%	NDR	NDR	0.00%	0.07%	0.62%
Live Measurement Results for Network Availability- 3 Day live data-June										
	Benchmark	Aircel(DWL)	Airtel	BSNL	Idea	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Vodafone
Number of BTSs in the licensed service area		2669	4922	430	2195	NDR	NDR	339	1419	3849
Sum of downtime of BTSs in a month (in hours)		3080	557	40	401	NDR	NDR	16	106	347
BTSs accumulated downtime (not available for service)	≤ 2%	1.60%	0.16%	0.13%	0.25%	NDR	NDR	0.06%	0.10%	0.13%
Number of BTSs having accumulated downtime >24 hours		1	0	0	4	NDR	NDR	0	0	0
Worst affected BTSs due to downtime	≤ 2%	0.04%	0.00%	0.00%	0.18%	NDR	NDR	0.00%	0.00%	0.00%

Audit Results for CSSR, SDCCH and TCH congestion- PMR data-June										
CSSR	Benchmark	Aircel(DWL)	Airtel	BSNL	Idea	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Vodafone
CSSR	≥ 95%	97.78%	98.91%	98.37%	97.01%	NDR	NDR	98.60%	98.73%	99.65%
SDCCH/Paging channel congestion	≤ 1%	0.75%	0.43%	0.42%	0.18%	NA	NDR	NA	0.21%	0.16%
TCH congestion	≤ 2%	1.90%	1.78%	1.83%	0.32%	NDR	NDR	0.09%	0.54%	0.35%

Live measurement results for CSSR, SDCCH and TCH congestion- 3 Day Data-June										
CSSR	Benchmark	Aircel(DWL)	Airtel	BSNL	Idea	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Vodafone
CSSR	≥ 95%	97.47%	98.94%	98.03%	96.43%	NDR	NDR	98.52%	98.51%	99.61%
SDCCH/Paging channel congestion	≤ 1%	0.82%	0.40%	0.21%	0.19%	NA	NDR	NA	0.13%	0.12%
TCH congestion	≤ 2%	2.22%	1.77%	1.88%	0.35%	NDR	NDR	0.03%	0.61%	0.39%

Drive test results for CSSR (Average of three drive tests) and blocked calls- Drive Test Data-June										
CSSR	Benchmark	Aircel(DWL)	Airtel	BSNL	Idea	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Vodafone
Total number of call attempts		344	551	630	409	376	430	291	407	533
Total number of successful calls established		342	551	624	409	376	429	291	402	527
CSSR	≥ 95%	99.42%	100.00%	99.05%	100.00%	100.00%	99.77%	100.00%	98.77%	98.87%
%age blocked calls		0.58%	0.00%	0.95%	0.00%	0.00%	0.23%	0.00%	1.23%	1.13%

Audit Results for Call drop rate and for number of cells having more than 3% TCH-PMR data-June										
Call drop rate	Benchmark	Aircel(DWL)	Airtel	BSNL	Idea	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Vodafone
Total number of calls established		99498791	369751111	12018421	52109520	NDR	NDR	5055354	65541484	108916123
Total number of calls dropped		1436848	3235678	177681	162641	NDR	NDR	40094	254126	710551
Call drop rate	≤ 2%	1.44%	0.88%	1.48%	0.31%	NDR	NDR	0.79%	0.39%	0.65%
Cells having more than 3% TCH	Benchmark	Aircel(DWL)	Airtel	BSNL	Idea	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Vodafone
Total number of cells in the network		7815	15755	1322	6589	NDR	NDR	1041	4284	11505
Total number of cells having more than 3% TCH		958	163	34	61	NDR	NDR	45	57	213
Worst affected cells having more than 3% TCH	≤ 3%	12.26%	1.04%	2.57%	0.93%	NDR	NDR	4.32%	1.33%	1.85%
Live measurement results for Call drop rate and for number of cells having more than 3% TCH- 3 Day data-June										
Call drop rate	Benchmark	Aircel(DWL)	Airtel	BSNL	Idea	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Vodafone
Total number of calls established		9684622	36467519	1166888	4978041	NDR	NDR	810498	9729162	10622473
Total number of calls dropped		145916	335567	18668	16868	NDR	NDR	5089	26470	71968
Call drop rate	≤ 2%	1.51%	0.92%	1.60%	0.34%	NDR	NDR	0.63%	0.27%	0.68%
Cells having more than 3% TCH	Benchmark	Aircel(DWL)	Airtel	BSNL	Idea	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Vodafone
Total number of cells in the network		7815	15732	1325	6589	NDR	NDR	1041	4284	11505
Total number of cells having more than 3% TCH		1125	177	36	62	NDR	NDR	50	NA	199
Worst affected cells having more than 3% TCH	≤ 3%	14.40%	1.13%	2.72%	0.94%	NDR	NDR	4.80%	NA	1.73%

Drive test results for Call drop rate (Average of three drive tests) - Drive Test Data-June										
Call drop rate	Benchmark	Aircel(DWL)	Airtel	BSNL	Idea	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Vodafone
Total number of calls established		344	551	627	409	376	430	291	402	528
Total number of calls dropped		2	0	8	0	0	0	0	0	2
Call drop rate	≤ 2%	0.58%	0.00%	1.28%	0.00%	0.00%	0.00%	0.00%	0.00%	0.38%

Audit Results for Voice quality -PMR Data-June										
Voice quality	Benchmark	Aircel(DWL)	Airtel	BSNL	Idea	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Vodafone
Total number of sample calls		14384352115	59025551162	2613695484	7047060098	NDR	NDR	8407488275	11036299119	20478114361
Total number of calls with good voice quality		13710670341	56726425127	2523264594	6763942085	NDR	NDR	8260379744	10766012645	20180351691
%age calls with good voice quality	≥ 95%	95.32%	96.10%	96.54%	95.98%	NDR	NDR	98.25%	97.55%	98.55%

Live measurement results for Voice quality-3 Day data-June										
Voice quality	Benchmark	Aircel(DWL)	Airtel	BSNL	Idea	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Vodafone
Total number of sample calls		1485457372	5878033956	264065376	724253247	NDR	NDR	867978318	1128806732	2074882569
Total number of calls with good voice quality		1415389743	5650087239	254541324	700087636	NDR	NDR	852781773	1100595136	2044405555
%age calls with good voice quality	≥ 95%	95.28%	96.12%	96.39%	96.66%	NDR	NDR	98.25%	97.50%	98.53%

Drive test results for Voice quality (Average of three drive tests) - DT data-June										
Voice quality	Benchmark	Aircel(DWL)	Airtel	BSNL	Idea	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Vodafone
Total number of sample calls		641556	61821	259616	681452	NA	34326	NA	814598	922564
Total number of calls with good voice quality		613084	61426	256767	665561	NA	32289	NA	792235	902824
%age calls with good voice quality	≥ 95%	95.56%	99.36%	98.90%	97.67%	99.35%	94.07%	99.37%	97.25%	97.86%

Audit Results for POI Congestion- PMR data-June										
POI congestion	Benchmark	Aircel(DWL)	Airtel	BSNL	Idea	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Vodafone
Total number of working POIs		113	21	13	67	NDR	NDR	43	12	48
No. of POIs not meeting benchmark		0	0	0	0	NDR	NDR	0	0	0
Total Capacity of all POIs (A) - in erlangs		75684	109491	25000	53295	NDR	NDR	13802	14005	111698
Traffic served for all POIs (B)- in erlangs		48935	60185	21954	27831	NDR	NDR	6861	8382	52361
POI congestion	≤ 0.5%	0.00%	0.00%	0.00%	0.00%	NDR	NDR	0.00%	0.00%	0.00%

Live Measurement Results for POI Congestion- 3 Day data-June										
POI congestion	Benchmark	Aircel(DWL)	Airtel	BSNL	Idea	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Vodafone
Total number of working POIs		113	21	13	68	NDR	NDR	43	12	48
No. of POIs not meeting benchmark		0	0	0	0	NDR	NDR	0	0	0
Total Capacity of all POIs (A) - in erlangs		76680	109511	25000	56921	NDR	NDR	13802	14005	111698
Traffic served for all POIs (B)- in erlangs		49065	60205	18827	27864	NDR	NDR	6857	8366	52921
POI congestion	≤ 0.5%	0.00%	0.00%	0.00%	0.00%	NDR	NDR	0.00%	0.00%	0.00%

12 ABBREVIATIONS

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

1. TRAI – Telecom Regulatory Authority of India
2. QoS – Quality of Service
3. AMJ'15 – Refers to the quarter of April, May and June 2015
4. IMRB – Refers to IMRB International, the audit agency for this report
5. SSA – Secondary Switching Area
6. NOC – Network Operation Center
7. OMC – Operations and Maintenance Center
8. MSC – Mobile Switching Center
9. PMR – Performance Monitoring Reports
10. TCBH – Time Consistent Busy Hour
11. CBBH - Cell Bouncing Busy Hour
12. BTS – Base Transceiver Station
13. CSSR – Call Setup Success Rate
14. TCH – Traffic Channel
15. SDCCH – Standalone Dedicated Control Channel
16. CDR – Call Drop Rate
17. FER – Frame Error Rate
18. SIM – Subscriber Identity Module
19. GSM – Global System for Mobile
20. CDMA – Code Division Multiple Access
21. NA – Not Applicable
22. NC – Non Compliance
23. POI – Point of Interconnection
24. IVR – Interactive Voice Response
25. STD – Standard Trunk Dialing
26. ISD – International Subscriber Dialing

SCO 47, 5th Floor, Old Judicial Complex, Sector 15
Part 1, Gurgaon, Haryana – 122001

+91 (124) 4217300

www.imrbint.com

EAST ZONE

TRAI AUDIT BROADBAND REPORT – ORISSA - AUDIT OF AMJ QUARTER, 2015

Prepared By -

IMRB International | eTech

Prepared For-

TRAI

Telecom Regulatory Authority of India

(IS/ISO 9001-2008 Certified Organisation)

TABLE OF CONTENTS

1. INTRODUCTION

1.1 About TRAI

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

In pursuance of above objective, TRAI has been issuing regulations, order and directives to deal with the issues or complaints raised by the operators as well as the consumers. These regulations, order and directives have helped to nurture the growth of multi operator multi service - an open competitive 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 March 20, 2009 and Quality of Service of Broadband Service Regulations, 2006 (11 of 2006) dated January 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 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).

1.3 COVERAGE

The broadband audit was conducted in Orissa circle. For BSNL, a geographical spread among the SDCAs and POPs was maintained. For other operators, the audit was conducted for all SDCAs at overall level.

Image Source: Internet

1.4 AUDIT PROCESS AND OPERATOR SELECTION

As per TRAI guidelines, the Broadband Audit for a circle is conducted once every year.

- The operators have been assimilated as per TRAI guidelines given in QoS tender document 2013 and latest list of licensees (with more than 10,000 subscriber in their LSAs) provided by TRAI.

- To conduct the audit, IMRB auditors contacted the broadband operators given in the list below to conduct the audit in Orissa circle for the AMJ 2015 quarter.
    - BSNL
    - Broadband Pacenet
    - Noida Software
    - Ortel Communications
    - Reliance
    - Tata Communications
    - Tata Teleservices
    - Siti Cable

- From the above mentioned operators, Broadband Pacenet, Noida software, Tata Communications, Tata Teleservices and Siti Cable informed the auditors in about non-presence of any subscribers in the circle, despite having a license for the same.

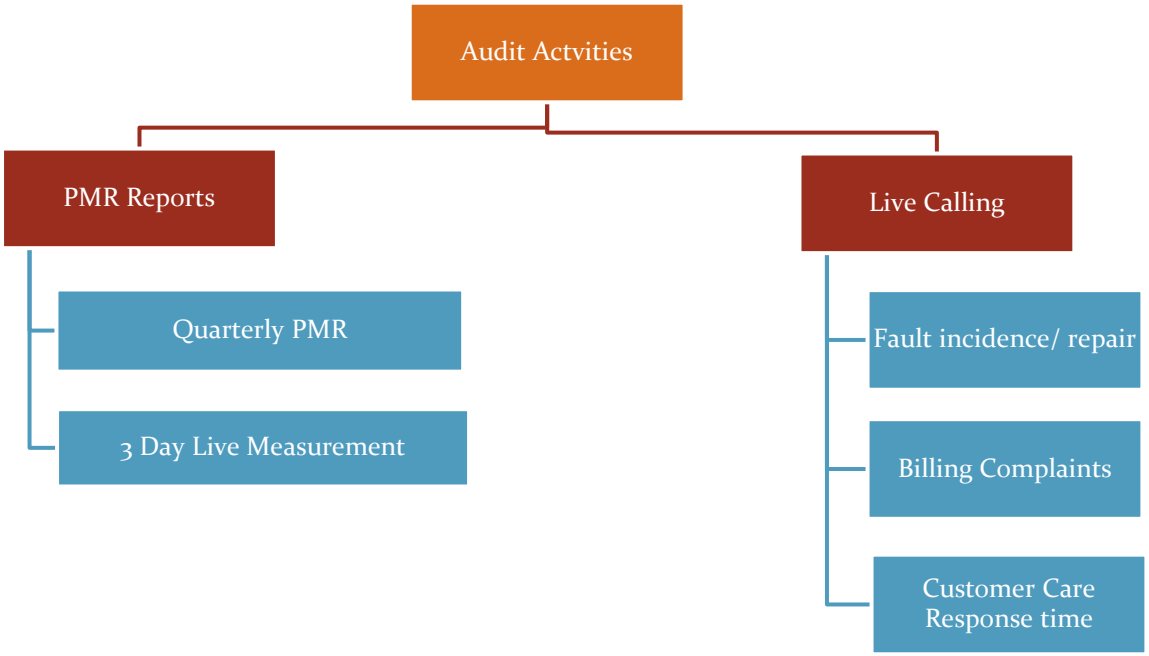
- Hence, the audit has been conducted for the remaining 3 operators as listed below.
    - BSNL
    - Ortel Communications
    - Reliance

- The PMR was generated from the raw data pertaining to Apr, May and Jun 2015 (AMJ'15), which was extracted by auditor from the operator's systems during the audit conducted in the month of Jul 2015.

- Live calling activity was carried out during the period of Jun 2015. The data considered for live calling was for the month prior to the live calling month. In this round of audit, May 2015 data was considered for live calling for all operators.

- 3 day live measurement activity was carried out on working days during the month of Jun 2015. The data for the last three working days from the date of live measurement was extracted from operator's systems and audited by the auditors.

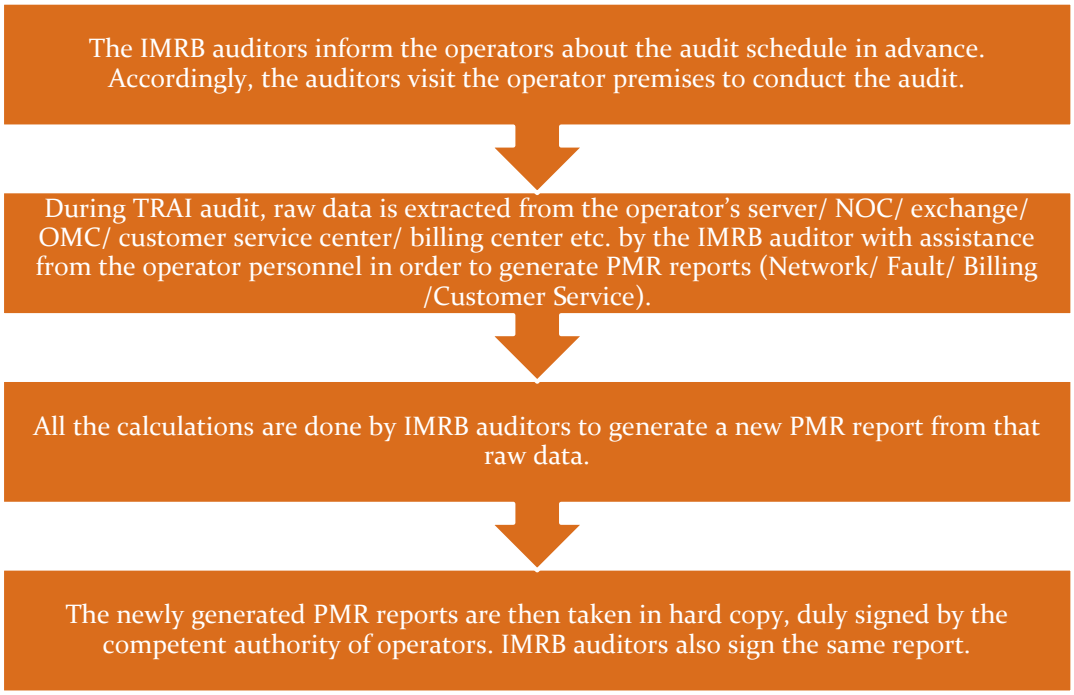
1.5 FRAMEWORK USED



1.5.1 PMR REPORTS - SIGNIFICANCE AND METHODOLOGY

The significance of PMR or Performance Monitoring Reports is to assess the various Quality of Service (QoS) parameters involved in the Broadband services, which indicate the overall health of service for an operator.

To verify the QoS performance of the operators, TRAI has appointed IMRB as their auditor in East Zone to conduct QoS audit of operators. The steps involved in the audit have been given below.



The raw data extracted is then used to generate PMR reports in the following formats.

- Quarterly PMR
- 3 Day Live Measurement Data

Let us understand these formats in detail.

This report has been prepared from the raw data extracted for the period of AMJ'15 during Jul 2015.

1.5.1.1 QUARTERLY PMR REPORT – PARAMETERS REVIEWED

The main purpose of quarterly PMR report is to verify the following key QoS parameters on quarterly basis as per the methodology stated above in section 1.4.

- Service Provisioning
- Fault incidence/clearance related statistic
- Billing Performance (Metering and billing credibility)
- Resolution of billing complaints
- Response time to customer for assistance
- Bandwidth Utilization
- Broadband download speed
- Service Availability/ Uptime
- Network Latency/ Packet Loss

1.5.1.2 3 DAY LIVE MEASUREMENT - SIGNIFICANCE AND METHODOLOGY

The main purpose of 3 day live measurement is to evaluate the following parameters on intraday basis. The auditors visit the sample exchanges (in case of BSNL) and main exchanges (in case of other operators) to collect the 3 day live data for the following parameters.

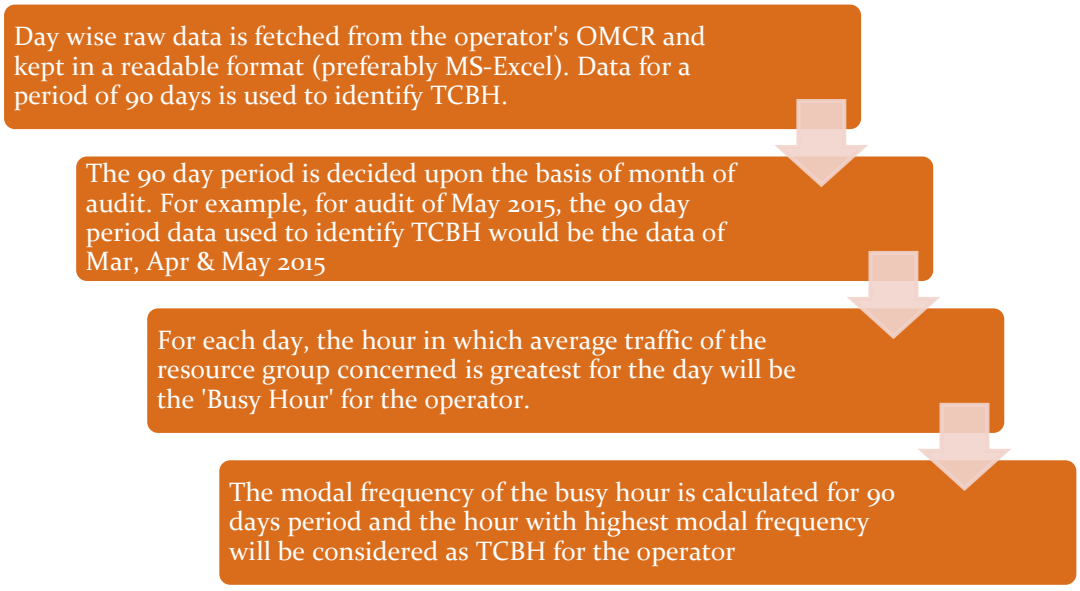
- Bandwidth Utilization
- Broadband download speed
- Service Availability/ Uptime
- Network Latency/ Packet Loss

While the quarterly PMR report provides an overall view of the performance of QoS parameters, the 3 day live data helps looking at intraday performance on the above given parameters. All the calculations are then done on the basis of that raw data of 3 days.

1.5.1.3 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.

Step by step procedure to identify TCBH for an operator:



During audit, the auditors identified following TCBHs from the raw data collected from the operators for the quarter of AMJ'15.

BSNL	Ortel	Reliance
11:00 - 12:00	18:00 - 19:00	15:00 - 16:00

The data for network parameters has been taken as per the TCBH identified by the auditor for the operators.

1.5.2 LIVE CALLING - SIGNIFICANCE AND METHODOLOGY

The main purpose of live calling is to verify the performance of following parameters by doing test calls to the subscribers/ specific numbers.

- Service Provisioning
- Fault incidence/clearance related statistic
- Resolution of billing complaints
- Response time to customer for assistance

The process of conducting live calling has been stated below.

The IMRB auditor visits the operator premises such as main exchanges/ OMC/ customer service center etc. to do live calling. The auditors take the raw data of service provisioning, fault repair, customer complaints (billing) from the the operator's system for the preceding month and also the list of customer service numbers to be verified through live calling

IMRB auditors then make live calls to a random sample of subscribers from the raw data provided to verify the resolution of complaints

The auditors also verify the performance of call center by calling the numbers using operator's wireline network

Let us now discuss the methodology of live calling for each parameter in detail.

1.5.2.1 SERVICE PROVISIONING

Live calling for service provisioning is done to verify the following.

- Number of connections provided in 15 days from customer request

Live Calling Process:

- Auditors request the operator to provide the database of all the subscribers who requested for a new connection in one month prior to IMRB auditor visit
- 100 Calls per service provider are made to customers or in case of BSNL, 10% or 30 per SDCA by randomly selecting from the database provided by operator
- Auditors check and record whether the connection was provided to customers within the timeframes as mentioned in the benchmark

Benchmark:

- New connections provided within 15 days: 100%

1.5.2.2 FAULT CLEARANCE

Live calling for fault clearance is done to verify the following.

- Fault repair by next working day
- Fault repair within 3 working days

Live Calling Process:

- Auditors request the operator to provide the database of all the subscribers who reported Faults in one month prior to IMRB auditor visit
- Calls are made to up to 10% or 100 complainants, whichever is less, per service provider or in case of BSNL, if there are more than 1 SDCAs selected for the sample, 10% or 30 complainants per sample SDCA by randomly selecting from the list provided by operator.
- Auditors check and record whether the fault was corrected within the timeframes as mentioned in the benchmark

Benchmarks:

- Fault repair by next working day: =>90%
- Fault repair within 3 working days: =>99%

1.5.2.3 RESOLUTION OF 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 IMRB 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.

Benchmarks:

98% complaints resolved within 4 weeks, 100% complaints resolved within 6 weeks

1.5.2.4 RESPONSE TIME TO CUSTOMER FOR ASSISTANCE

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

- % age of calls answered by operator (voice to voice) within 60 seconds: In 60% of the cases or more
- % age of calls answered by operator (voice to voice) within 90 seconds: In 80% of the cases or more

The process for this parameter is stated below.

- Overall sample size was 100 calls per service provider per circle at different points of time, evenly distributed across the selected exchanges – 50 calls between 1000 HRS to 1300 HRS and 50 calls between 1500 HRS to 1700 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.

1.6 SAMPLING METHODOLOGY

- As per audit tender regulations, to conduct the Broadband audit for BSNL, auditors need to devise a sampling plan as given below
  - A minimum sample of 5% Point of Presence (POP) of ISP should be spread across at least 10% of SDCA's in the telecom circle
  - As per TRAI instructions, a DSLAM site was considered as a point of presence for the operator.
- The sampling plan was finalized as per TRAI guidelines. The details of sampling plan have been provided below in section 1.5.1 of the report
- As per tender guidelines, no sampling activity was required in case of operators other than BSNL. Hence, the audit for operators other than BSNL has been conducted by taking the data for entire circle (all exchanges/ POPs combined).

Audit for BSNL has been conducted for the data pertaining to selected POPs in the sampling plan.

1.6.1 SAMPLING PLAN - BSNL

Total DSLAM sites (POPs) available in the circle: 1896
As per sampling criteria, at least 5% POPs to be selected for audit should be: 95

However, to maintain a geographical spread and due to presence of multiple DSLAM sites at one exchange, the auditors have selected 132 sites.

Total SDCAs present in the circle: 124
As per sampling criteria, 10% SDCAs selected for audit: 12.4

To maintain a geographical spread, actual SDCAs selected: 14
A list of the SDCAs selected for audit has been given below.

S. No.	SDCA
1	ANGUL
2	CHHENDIPADA
3	DHENKANAL
4	NAYAGARH
5	BHUBANESWAR
6	KHURDA
7	RAYAGADA
8	ROURKELA
9	SAMBALPUR
10	BALASORE
11	BHADRAK
12	BERHAMPUR
13	BOLANGIR
14	JAJPUR ROAD

The DSLAM sites selected for the purpose of audit have been given below.

S. No.	REV.DIST.	SDCA	PARENTED TO	EXCHANGE	DSLAM Sites
1	ANGUL	ANGUL		NALCONAGAR	5
2	ANGUL	CHHENDIPADA	NALCO	BAGEDIA	1
3	ANGUL	CHHENDIPADA	NALCO	CHHENDIPADA	2
4	ANGUL	CHHENDIPADA	NALCO	JSPL(Nisa)	2
5	ANGUL	CHHENDIPADA	NALCO	KOSALA	1
6	DHENKANAL	DHENKANAL		DHENKANAL	4
7	DHENKANAL	DHENKANAL	DHENKANAL	GOVINDAPUR	2
8	DHENKANAL	DHENKANAL	DHENKANAL	KAIMATI	2
9	DHENKANAL	DHENKANAL	DHENKANAL	PINGUA	1
10	DHENKANAL	DHENKANAL	DHENKANAL	SANKARPUR	1
11	NAYAGARH	NAYAGARH		NAYAGARH	4
12	NAYAGARH	NAYAGARH	NAYAGARH	ITAMATI	1
13	NAYAGARH	NAYAGARH	NAYAGARH	ODAGAON	2
14	NAYAGARH	NAYAGARH	NAYAGARH	SARANKULA	1
15	KHURDA	BHUBANESWAR		BHUBANESWAR	8
16	KHURDA	BHUBANESWAR	BHUBANESWAR OCB	BALIANTA	1
17	KHURDA	BHUBANESWAR	BHUBANESWAR OCB	BALIPATNA	2
18	KHURDA	BHUBANESWAR	BHUBANESWAR OCB	BHINGARPUR	1
19	KHURDA	BHUBANESWAR	BHUBANESWAR OCB	DARUTHENGA	1
20	KHURDA	KHURDA		KHURDA	5
21	KHURDA	KHURDA	KHURDA	BAGHAMARI	2
22	KHURDA	KHURDA	KHURDA	BEGUNIA	1
23	KHURDA	KHURDA	KHURDA	NARANGARH	1
24	KHURDA	KHURDA	KHURDA	RAJSUNAKHELA	2
25	RAYAGADA	RAYAGADA		RAYAGADA	4
26	RAYAGADA	RAYAGADA	RAYAGADA	J.K PUR	1
27	RAYAGADA	RAYAGADA	RAYAGADA	ANTAMADA	2
28	RAYAGADA	RAYAGADA	RAYAGADA	MUKUNDPUR	1
29	RAYAGADA	RAYAGADA	RAYAGADA	SIKARPAI	1
30	SUNDARGARH	ROURKELA		ROURKELA T/S	6
31	SUNDARGARH	ROURKELA	ROURKELA XL	KUARMUNDA	2
32	SUNDARGARH	ROURKELA	ROURKELA XL	LATHIKATA	1

33	SUNDARGARH	ROURKELA	ROURKELA XL	BIRMITRAPUR	3
34	SUNDARGARH	ROURKELA	ROURKELA XL	BISHRA	1
35	SAMBALPUR	SAMBALPUR		SAMBALPUR	3
36	SAMBALPUR	SAMBALPUR	SAMBALPUR XL	CHIPILIMA	2
37	SAMBALPUR	SAMBALPUR	SAMBALPUR XL	GOSHALA	1
38	SAMBALPUR	SAMBALPUR	SAMBALPUR XL	SASON	2
39	SAMBALPUR	SAMBALPUR	SAMBALPUR XL	RENGALI	1
40	BALASORE	BALASORE		BALASORE	5
41	BALASORE	BALASORE	BALASORE	BALGOPALPUR	1
42	BALASORE	BALASORE	BALASORE	CHANDIPUR	2
43	BALASORE	BALASORE	BALASORE	NAGRAM	1
44	BALASORE	BALASORE	BALASORE	RAJBERHAMPUR	1
45	BHADRAK	BHADRAK		BHADRAK MAIN	4
46	BHADRAK	BHADRAK	BHADRAK	ARNAPAL	2
47	BHADRAK	BHADRAK	BHADRAK	BANTA	1
48	BHADRAK	BHADRAK	BHADRAK	DOLASAHI	2
49	BHADRAK	BHADRAK	BHADRAK	TIHIDI	1
50	GANJAM	BERHAMPUR		BERHAMPUR	5
51	GANJAM	BERHAMPUR	BERHAMPUR 5ESS	KUKUDAKHANDI	1
52	GANJAM	BERHAMPUR	BERHAMPUR 5ESS	JARADAGADA	2
53	GANJAM	BERHAMPUR	BERHAMPUR 5ESS	JAYANTIPUR	1
54	GANJAM	BERHAMPUR	BERHAMPUR 5ESS	PATRAPUR	1
55	BOLANGIR	BOLANGIR		BOLANGIR	4
56	BOLANGIR	BOLANGIR	BOLANGIR CDOT	CHANDANABHATI	1
57	BOLANGIR	BOLANGIR	BOLANGIR CDOT	CHHATAMAKHANA	2
58	BOLANGIR	BOLANGIR	BOLANGIR CDOT	CHUDAPALI	1
59	BOLANGIR	BOLANGIR	BOLANGIR CDOT	DEOGAON	1
60	JAJPUR	JAJPUR ROAD		JAJPUR ROAD	3
61	JAJPUR	JAJPUR ROAD	JAJPUR ROAD	JAKHAPURA	2
62	JAJPUR	JAJPUR ROAD	JAJPUR ROAD	KALIAPANI	1
63	JAJPUR	JAJPUR ROAD	JAJPUR ROAD	KORAI	2
64	JAJPUR	JAJPUR ROAD	JAJPUR ROAD	PANIKOILI	1

1.7 COLOUR CODE TO READ THE REPORT

Not Meeting the benchmark

1.8 AUDIT METHODOLOGY

As per audit tender, following table explains the audit methodology for Broadband services. Here, a YES signifies that the mentioned parameter gets audited by the given audit method (PMR/ Live Measurement/ Live Calling).

	Parameters	Quarterly PMR Data	3 day live measurement	Live calling
1	**Service Provisioning/ Activation time**	YES		YES
2	**Fault Repair/ Restoration Time**	YES		YES
3	**Billing Performance**			
(i)	Billing Complaints per 100 Bills issued	YES		
(ii)	%age of billing complaints resolved in four weeks	YES		Yes
(iii)	Refund of deposits after closure within 60 days	YES		
4	**Response time to the customer for assistance(Voice to Voice)**			
(i)	*Within 60 seconds > 60%*	YES		YES
(ii)	*Within 90 seconds > 80%*	YES		YES
5	**Bandwidth Utilization/ Throughput:**			
	A) Bandwidth Utilization			
-	POP to ISP gateway Node [Intra – network] Links	YES	YES	
-	ISP Gateway Node to IGSP / NIXI Node upstream Link(s) for international connectivity	YES	YES	
	B) Broadband Connection Speed (Download)	YES	YES	
6	**Service Availability/Uptime**	YES	YES	
7	**Packet Loss**	YES	YES	
8	**Network Latency for wired broadband access)**			
(i)	*User reference point at POP / ISP Gateway Note to International Gateway (IGSP/NIXI)*	YES	YES	
(ii)	*User reference point at ISP Gateway Node to International nearest NAP port abroad (Satellite)*	YES	YES	
(iii)	*User reference point at ISP Gateway Node to International nearest NAP port abroad (Satellite)*	YES	YES	

2. EXECUTIVE SUMMARY

2.1 PMR QUARTERLY DATA – AMJ'15

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

Parameters	Benchmarks	BSNL	Ortel	Reliance
Service provsioning uptime				
Percentage connections provided within 15 days	100%	100.00%	100.00%	NA
Fault repair restoration time				
Percentage faults repaired by next working days	≥ 90%	69.14%	91.44%	95.88%
Percentage faults repaired within three working days	≥ 99%	88.36%	99.12%	100.00%
Billing performance				
Billing complaints per 100 bills issued	< 2%	0.14%	0.00%	0.00%
%age of billing complaints resolved in 4 weeks	≥ 98%	100.00%	NA	NA
%age of billing complaints resolved in 6 weeks	100%	100.00%	NA	NA
%age cases in which refund of deposits after closure was made in 60 days	100%	87.64%	NA	NA
Customer care/helpline assessment (Voice to Voice)				
Percentage calls answered within 60 seconds	≥ 60%	97.48%	92.15%	100.00%
Percentage calls answered within 90 seconds	≥ 80%	97.94%	99.15%	100.00%
Bandwidth utilisation/Throughput				
Intra network links (POP to ISP Node)		NDR	3	1
Upstream Bandwidth (ISP Node to NIXI/NAP/IGSP)		NDR	2248	26000
Percentage bandwidth utilised on upstream links	< 80%	NDR	69.84%	22.82%
Broadband download speed	≥ 80%	85.71%	86.75%	87.89%
Service availability/uptime	≥ 98%	99.91%	99.99%	99.86%
Packet loss	< 1%	0.63%	0.00%	0.00%
Network Latency				
POP/ISP Node to NIXI	< 120 msec	NDR	35	53
ISP node to NAP port (Terrestrial)	< 350 msec	NDR	66	138

NA: Parameters not applicable for the operators.

NDR: No data received. Audit of BSNL at its NOC for Bandwidth Utilization and Network Latency is yet to be conducted. Auditors have contacted the NOC of BSNL well in advance, however, the operator is yet to provide an appointment to IMRB auditors to conduct audit at BSNL NOC.

Following are the parameter wise observations for the operators in Orissa circle.

2.1.1 SERVICE PROVISIONING/ ACTIVATION TIME

As per audit, all operators met the benchmark for providing new connections within 15 days.

NA: In the audit period, no new connection was registered with Reliance.

2.1.2 FAULT REPAIR/ RESTORATION

The benchmark of repairing 90% faults within the next day and 99% faults within next three days of receiving complaints was not met by BSNL.

2.1.3 BILLING PERFORMANCE

As per audit, all operators met the benchmark for metering and billing credibility.

BSNL met the benchmark for resolution of billing complaints within 4 weeks as well as within 6 weeks.

NA: Subscribers of Ortel and Reliance did not log any billing complaints. Hence, resolution of billing complaints is not applicable for the operators.

BSNL failed to meet the benchmark of providing refund within 60 days of closure of service.

2.1.4 RESPONSE TIME TO CUSTOMER FOR ASSISTANCE

All operators met the benchmark for answering 60% calls within 60 seconds and 80% calls within 90 seconds as per audit.

2.1.5 BANDWIDTH UTILIZATION AND THROUGHPUT

All operators met the benchmark for bandwidth utilized on upstream links during audit.

All operators met the benchmark for service availability time as per audit.

NDR: No data has been received from BSNL related to bandwidth utilization as stated above.

2.1.6 NETWORK LATENCY

All operators met the benchmark for Network Latency parameters.

NDR: No data has been received for these parameters from BSNL.

2.2 LIVE MEASUREMENT

Parameters	Benchmarks	BSNL	Ortel	Reliance
Bandwidth utilisation/Throughput				
Intra network links (POP to ISP Node)		NDR	3	1
Upstream Bandwidth (ISP Node to NIXI/NAP/IGSP)		NDR	2248	21000
Percentage bandwidth utilised on upstream links	< 80%	NDR	69.57%	29.11%
Broadband download speed	≥ 80%	88.46%	96.61%	89.00%
Service availability/uptime	≥ 98%	100.00%	100.00%	100.00%
Packet loss	< 1%	0.58%	0.00%	0.00%
Network Latency				
POP/ISP Node to NIXI	< 120 msec	NDR	35	54
ISP node to NAP port (Terrestrial)	< 350 msec	NDR	64	140

NDR: No data received. Audit of BSNL at its NOC for Bandwidth Utilization and Network Latency is yet to be conducted. Auditors have contacted the NOC of BSNL well in advance, however, the operator is yet to provide an appointment to IMRB auditors to conduct audit at BSNL NOC.

2.2.1 BANDWIDTH UTILIZATION AND THROUGHPUT

Ortel and Reliance met the benchmark for bandwidth utilized on upstream links during live measurement.

All operators met the benchmark of providing committed broadband download speed as per live measurement.

All operators met the benchmark for service availability time as per live measurement.

2.2.2 NETWORK LATENCY

During live measurement, Ortel and Reliance met the benchmark for network latency parameters.

2.3 LIVE CALLING

Parameters	Benchmarks	BSNL	Ortel	Reliance
Service provsioning uptime				
Percentage connections provided within 15 days	100%	97.50%	94.00%	NA
Fault repair restoration time				
Percentage faults repaired by next working days	≥ 90%	70.00%	87.00%	91.00%
Percentage faults repaired within three working days	≥ 99%	86.34%	98.00%	99.00%
Billing performance				
%age of billing complaints resolved in 4 weeks	≥ 98%	76.00%	NA	NA
%age of billing complaints resolved in 6 weeks	100%	92.00%	NA	NA
Customer care/helpline assessment (Voice to Voice)				
Percentage calls answered within 60 seconds	≥ 60%	88.00%	100.00%	100.00%
Percentage calls answered within 90 seconds	≥ 80%	96.00%	100.00%	100.00%

NA: Parameters not applicable for the operators.

2.3.1 SERVICE PROVISIONING/ ACTIVATION TIMES

As per live calling, BSNL and Ortel failed to meet the benchmark of providing 100% new connections within the TRAI stipulated timeline of 15 days.

2.3.2 FAULT REPAIR/ RESTORATION

BSNL and Ortel failed to meet the benchmark of repairing 90% faults within next working day as well repairing 99% faults within 3 days.

2.3.3 BILLING PERFORMANCE

BSNL failed to meet the benchmark for resolution of billing complaints within 4 weeks as well as within 6 weeks.

NA: Live calling for Ortel and Reliance for 'resolution of billing complaints' has not been conducted due to very low/ zero base of billing complaints for the operators.

2.3.4 RESPONSE TIME TO CUSTOMER FOR ASSISTANCE

As per live calling, all operators met both the benchmarks for customer care promptness parameters.

3. CRITICAL FINDINGS

Service Provisioning

As per audit, all operators met the benchmark for providing new connections within 15 days. However, as per live calls made to subscribers, BSNL and Ortel remained short of the benchmark of the parameter.

Fault Repair

The benchmark of repairing 90% faults within the next day and 99% faults within next three days of receiving complaints was not met by BSNL.

However, as per live calls made to subscribers, BSNL and Ortel failed to meet both the fault repair benchmarks for the parameter.

Resolution of billing complaints

As per audit, BSNL met the benchmark for resolution of billing complaints within 4 weeks as well as within 6 weeks. However, it was observed during live calling that the performance of BSNL was below the benchmark of the parameter.

Refund of deposits after closure

BSNL failed to meet the benchmark of providing 100% refunds within 60 days of closure.

4. DETAILED FINDINGS - COMPARISON BETWEEN PMR DATA AND LIVE MEASUREMENT/ CALLING DATA

4.1 SERVICE PROVISIONING/ ACTIVATION TIME

4.1.1 PARAMETER EXPLANATION

4.1.1.1 AUDIT PROCEDURE

IMRB Auditors verified and collected data pertaining to number of applications received at the service provider's level in the following time frames:-

- Number of applications received at the service provider's level
- Number of connections provided within 15 days
- Number of connections provided after 15 days

Live Calling: -

- At least 10% of the subscribers who had requested for new connections in month prior to Audit were called to check whether connection was provided in 15 days

Data for the parameter was extracted from OMC (Operations and Maintenance Center) of the operators.

4.1.1.2 COMPUTATIONAL METHODOLOGY

- Technically Non Feasible (TNF) cases such as unavailability of Broadband infrastructure/ equipment in the Area or Spare Capacity i.e. Broadband Ports including equipment to be installed at the customer premises for activating Broadband connection were excluded from the calculation of this parameter.

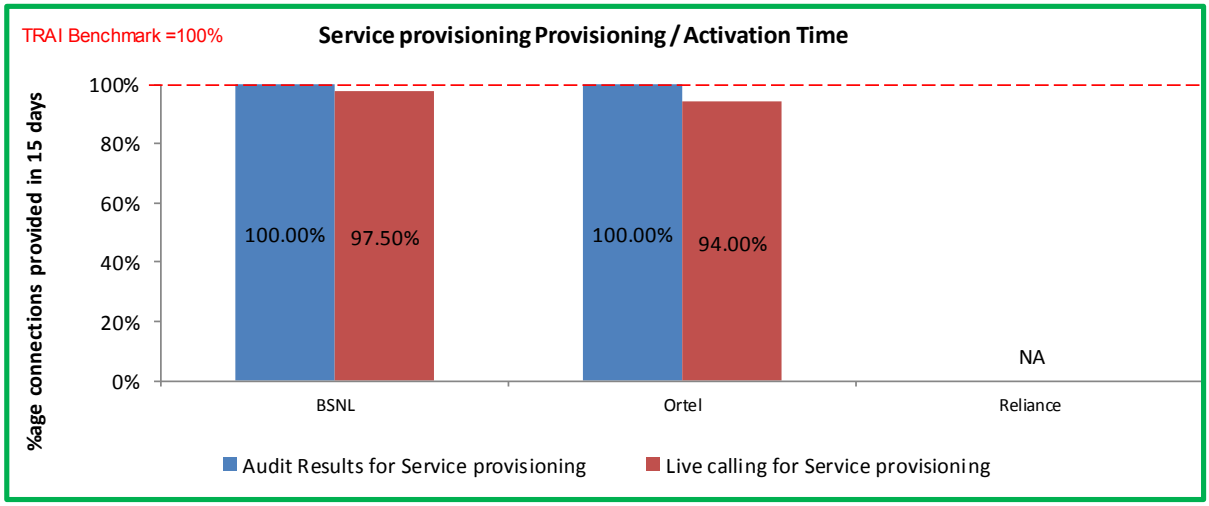
- Also, problems relating to customer owned equipment such as PC, LAN Card/ USB Port and internal wiring or non-availability of such equipment were excluded from the calculation of this parameter.

Percentage connections provided within X working days = *No of connections provided within X working days/ Total number of connections registered during the period * 100*

4.1.1.3 BENCHMARK

100 % cases in =<15 working days.

4.1.2 DETAILED FINDINGS - SERVICE PROVISONING



Data Source: OMC (Operations and Maintenance Center) of the operators

As per audit, all operators met the benchmark for providing new connections within 15 days. However, during live calling it was observed that BSNL and Ortel failed to meet the benchmark of providing 100% new connections within the TRAI stipulated timeline of 15 days.

NA: In the audit period, no new connection was registered with Reliance.

4.2 FAULT REPAIR/ RESTORATION TIME

4.2.1 PARAMETER EXPLANATION

4.2.1.1 AUDIT PROCEDURE

IMRB Auditors to verify and collect data pertaining to number of fault received and also number of faults cleared at the service provider's level in the following time frames:-

- Number of faults cleared within 24 hours
- Number of cleared in more than 1 day but less than 3 days
- Number of cleared in more than 3 days

Live calling: -

- Live calling is done to verify 'Fault repair by next working day', 'Fault repair within 3 working days' and 'Fault repair in more than 3 working days'
- Interviewers ensure that operator provided a list of all the subscribers who reported Faults in one month prior to IMRB staff visit
- Calls are made to up to 10% or 100 complainants, whichever is less, per service provider or in case of BSNL, if there are more than 1 SDCAs selected for the sample, 10% or 30 complainants per sample SDCA by randomly selecting from the list provided by operator.
- Auditors check and record whether the fault was corrected within the timeframes as mentioned in the benchmark

Data for the parameter was extracted from OMC (Operations and Maintenance Center) of the operators.

4.2.1.2 COMPUTATIONAL METHODOLOGY

- The time period for fault repair starts from the time when the fault is reported to the service provider either through customer care help line or in person by the subscriber

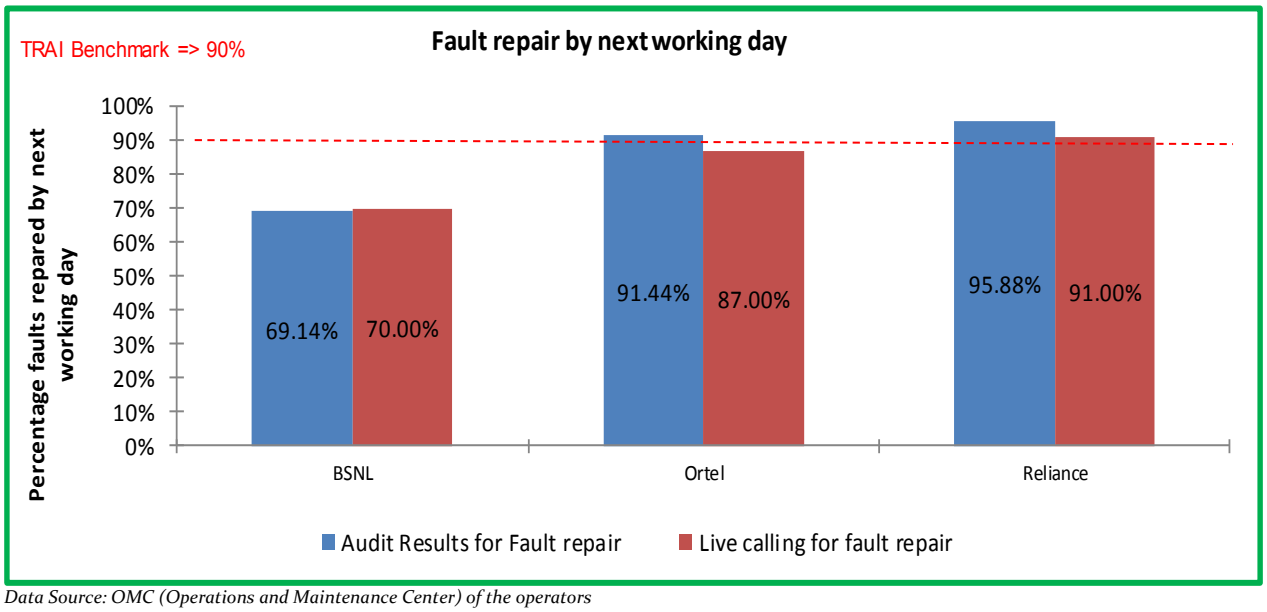
- Only the complaints registered till the close of the business hours of the day are to be taken into account. All the complaints registered after the business hours are to be considered as being registered in the next day business hours

Fault incidence = *(Total no of faults repaired in X working days /Total number of faults reported during the period)*100*

4.2.1.3 BENCHMARK

- By next working day: => 90% and within 3 working days: => 99%.

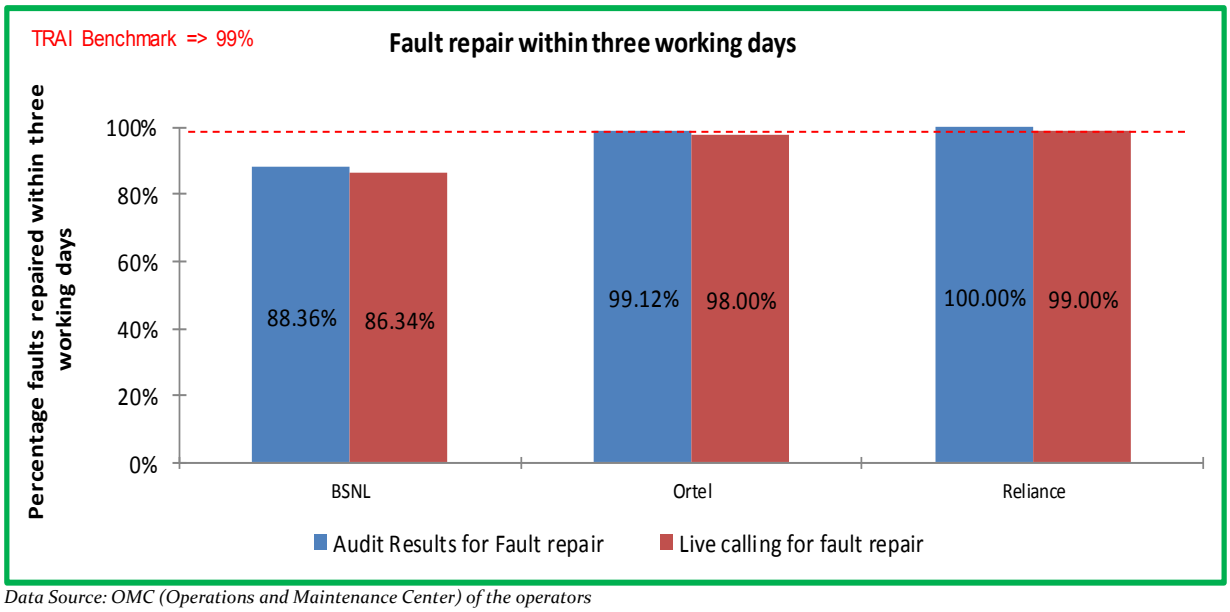
4.2.2 DETAILED FINDINGS - FAULT REPAIR WITHIN NEXT WORKING DAY



Data Source: OMC (Operations and Maintenance Center) of the operators

BSNL failed to meet the benchmark for the parameter as per audit and live calling. Ortel also failed to meet the benchmark during live calling.

4.2.3 DETAILED FINDINGS - FAULT REPAIR WITHIN 3 WORKING DAYS



Data Source: OMC (Operations and Maintenance Center) of the operators

BSNL failed to meet the benchmark for the parameter as per audit and live calling. Ortel also failed to meet the benchmark during live calling.

4.3 METERING AND BILLING CREDIBILITY

4.3.1 PARAMETER EXPLANATION – BILLING COMPLAINTS

All the complaints related to billing as per clause 3.7.2 of QoS regulation of 20th March, 2009 were covered. The types of billing complaints covered are listed below.

- Payments made and not credited to the subscriber account
- Payment made on time but late payment charge levied wrongly
- Double charges
- Credit agreed to be given in resolution of complaint, but not accounted in the bill
- Charging for services provided without consent
- Charging not as per tariff plans
- Overcharging or undercharging

In addition to the above, any billing complaint which leads to billing error, waiver, refund, credit, or any adjustment is also considered as a billing complaint for calculating the number of disputed bills.

4.3.1.1 AUDIT PROCEDURE

IMRB Auditors to verify and collect data pertaining to –

- Number of Billing complaints received at the service provider's level
- Last billing cycle stated should be such that due date for payment of bills must be beyond the date when this form is filled.
- Include all types of bills generated for customers. This could include online as well as other forms of bills presentation including printed bills
- Billing complaint is any of written complaint/ personal visit/ telephonic complaint related to: Excess metering/ wrong tariff scheme charged, Payment made in time but charged penalty/ not reflected in next bill, Last payment not reflected in bill, Adjustment/ waiver not done, Anything else related to bills, Toll free numbers charged etc.
- Billing complaints resolution database, with opening and closing date of complaint to identify the time taken to resolve a complaint

Live calling:

- Auditors request the operator provided the database of all the subscribers who reported billing complaints in one month prior to IMRB auditor visit. In case of BSNL, data for the complaints from the subscribers belonging to the sample exchanges is requested specifically. In case the sample data is too low to fulfill the target calls, auditors may call subscribers whose complaints got resolved in other months of the same audit period.
- 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.

Raw data for the parameter was extracted from central billing center of the operators.

4.3.1.2 COMPUTATIONAL METHODOLOGY – METERING AND BILLING CREDIBILITY

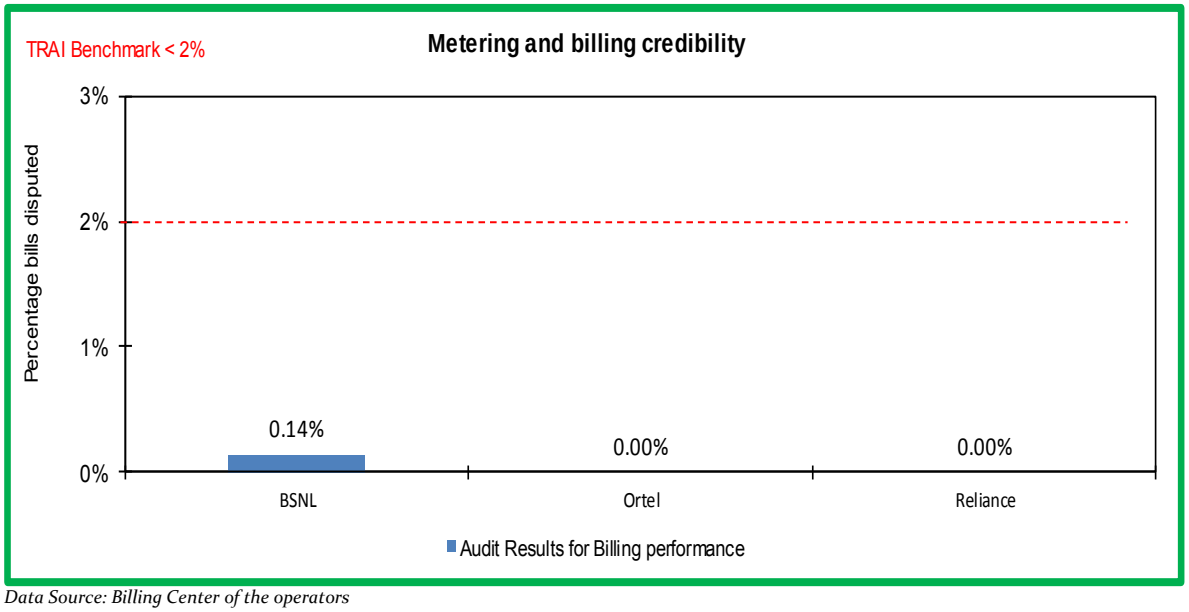
The calculation methodology (given below) as per QoS regulations 2009 (7 of 2009) was followed to calculate incidence of billing complaints.

$$\text{Billing complaints (\%)} = \frac{\text{total number of disputed bills X 100}}{\text{total number of bills issued during one billing cycle.}}$$

- *Operator to include all types of bills generated for customers. This would include printed bills, online bills and any other forms of bills generated
- **Billing complaints here shall include only dispute related issues (including those that may arise because of a lack of awareness at the subscribers' end). It does not include any provisional issues (such as delayed dispatch of billing statements, etc.) in which the operator has opened a ticket internally.

TRAI Benchmark: < 2%

4.3.1.3 METERING AND BILLING CREDIBILITY – AUDIT FINDINGS



Data Source: Billing Center of the operators

All operators met the benchmark for the parameter.

4.3.1.4 COMPUTATIONAL METHODOLOGY – RESOLUTION OF BILLING COMPLAINTS

- **Calculation of Percentage resolution of billing complaints**

The calculation methodology (given below) as per QoS regulations 2009 (7 of 2009) and TRAI guidelines (Received on Sep 08, 2014) was followed to calculate resolution of billing complaints.

Resolution of billing complaints within 4 weeks:

%age of billing complaints (for post-paid customers)/ charging, credit & validity (for pre-paid customers) resolved within 4 weeks =

$$\frac{\text{number of billing complaints for post-paid customers/charging, credit/ validity complaints for pre-paid customers resolved within 4 weeks during the quarter}}{\text{number of billing/charging, credit / validity complaints received during the quarter}} \times 100$$

Resolution of billing complaints within 6 weeks:

%age of billing complaints (for post-paid customers)/ charging, credit & validity (for pre-paid customers) resolved within 6 weeks =

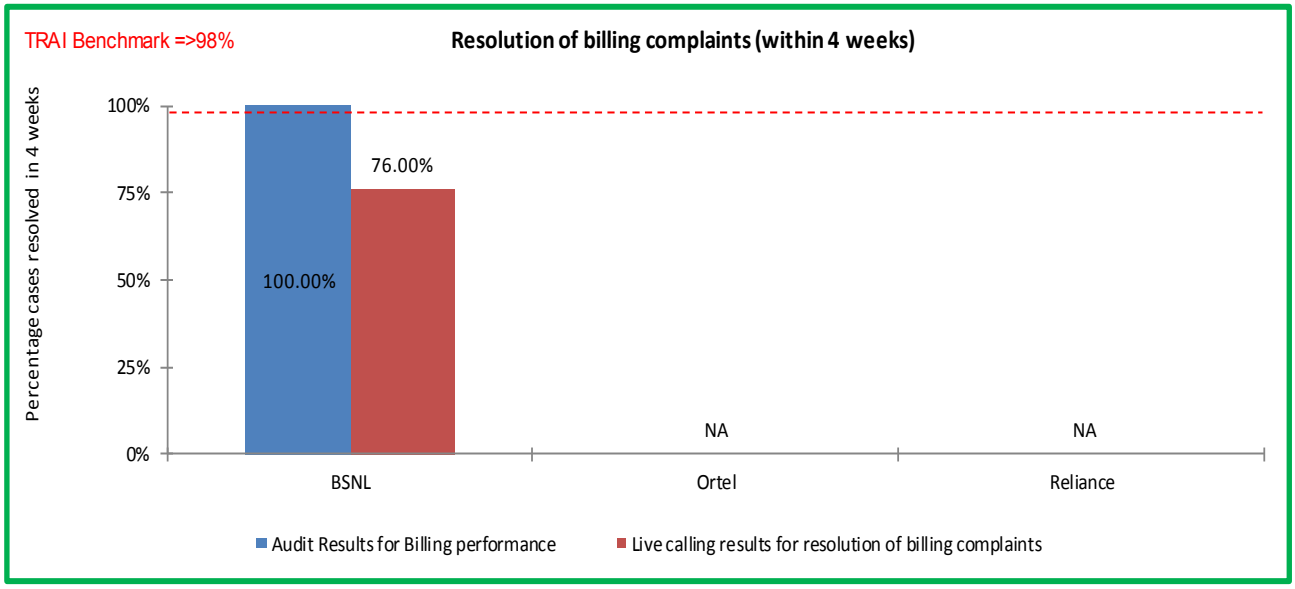
$$\frac{\text{number of billing complaints for post-paid customers/charging, credit/ validity complaints for pre-paid customers resolved within 6 weeks during the quarter}}{\text{number of billing/charging, credit / validity complaints received during the quarter}} \times 100$$

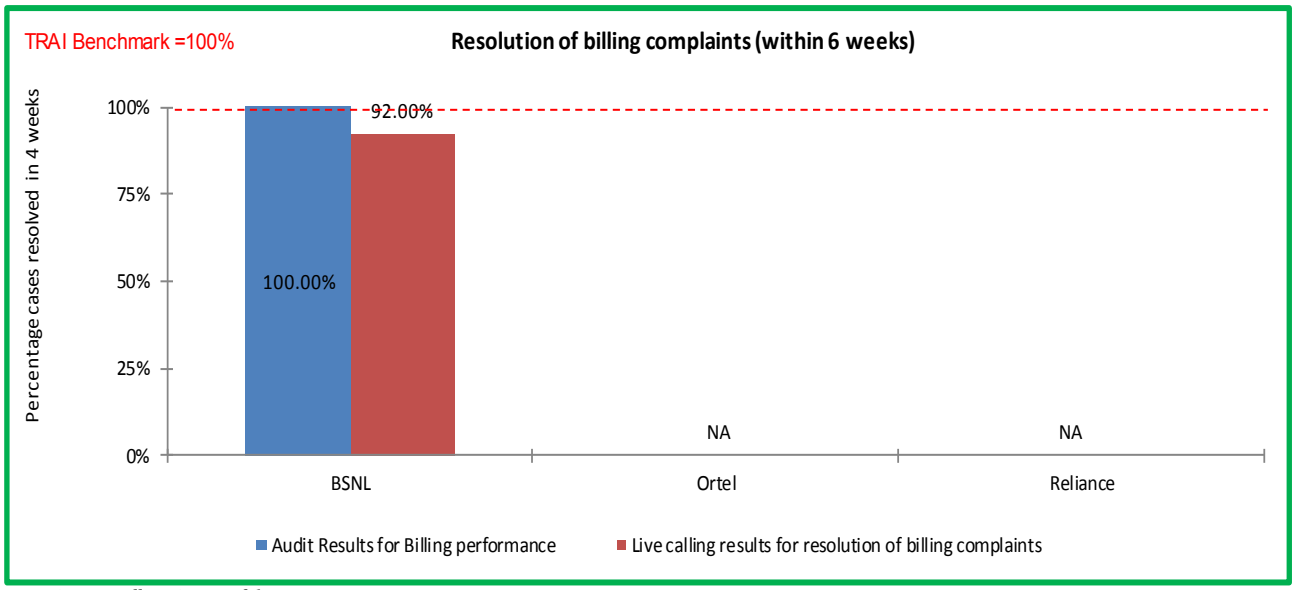
- **Billing complaints here shall include only dispute related issues (including those that may arise because of a lack of awareness at the subscribers' end). It does not include any provisional issues (such as delayed dispatch of billing statements, etc.) in which the operator has opened a ticket internally. Complaints raised by the consumers to operator are only considered as part of the calculation.
- The complaints that get marked as invalid by the operator are not considered for calculation as those complaints cannot be considered as resolved by the operator.

↳ *** Date of resolution in this case would refer to the date when a communication has taken place from the operator's end to inform the complainant about the final resolution of the issue / dispute.

Benchmark: 98% complaints resolved within 4 weeks, 100% within 6 weeks.

4.3.1.5 RESOLUTION OF BILLING COMPLAINTS – AUDIT FINDINGS





Data Source: Billing Center of the operators

As per audit, BSNL met the benchmark for resolution of billing complaints within 4 weeks as well as within 6 weeks. However, it was observed during live calling that the performance of BSNL was below the benchmark of the parameter.

NA: Subscribers of Ortel and Reliance did not log any billing complaints. Hence, resolution of billing complaints is not applicable for these operators. Also, live calling for resolution of billing complaints for Ortel and Reliance has not been conducted due to low/ zero base billing complaints for the operators.

4.4 TIME TAKEN TO REFUND AFTER CLOSURE

4.4.1 PARAMETER EXPLANATION

4.4.1.1 AUDIT PROCEDURE

IMRB Auditors collected and verified data pertaining to -

- Number of cases requiring refund of deposits
- Number of cases where refund was made within 60 days
- %age cases where refund was made within 60 days.

Data for the parameter was extracted from central billing center of the operators.

4.4.1.2 COMPUTATIONAL METHODOLOGY

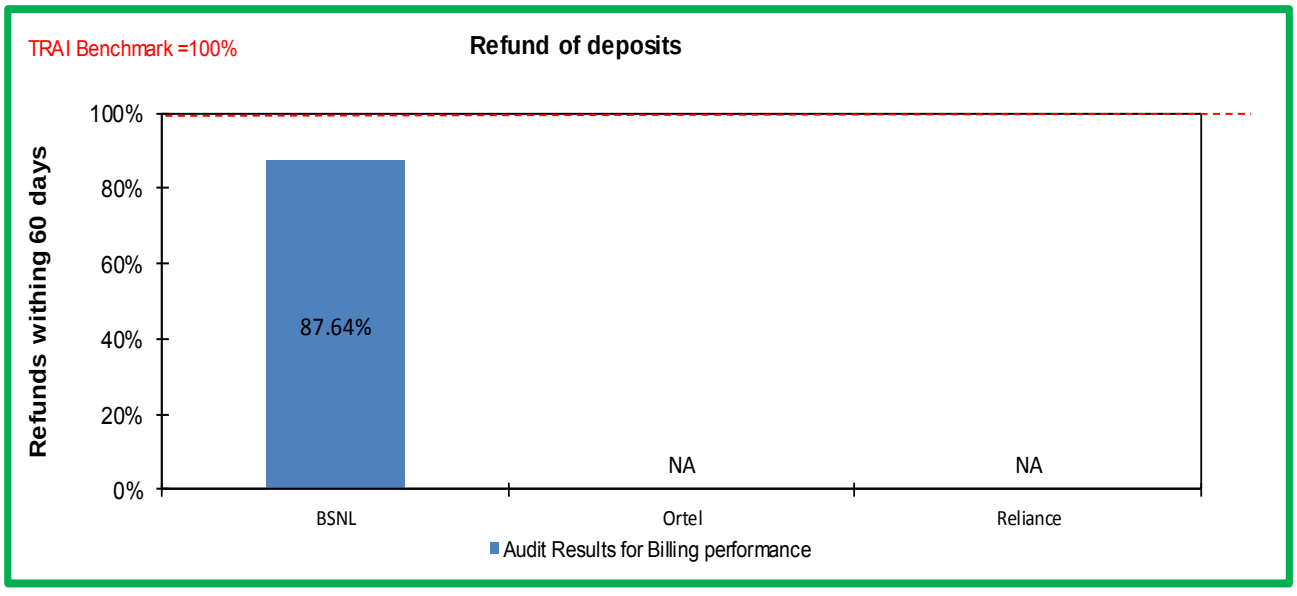
- Date of closure is considered to be the date on which the connection is discontinued in the service provider database of active customers

Time taken to refund = Date of refund – Date of closure

4.4.1.3 BENCHMARK

- 100% cases in less than 60 days

4.4.2 DETAILED FINDINGS - REFUND OF DEPOSITS



BSNL failed to meet the benchmark for the parameter.

NA: Ortel and Reliance had no cases where a refund was applicable.

4.5 RESPONSE TIME TO CUSTOMER FOR ASSISTANCE

4.5.1 PARAMETER EXPLANATION

4.5.1.1 AUDIT PROCEDURE

IMRB Auditors collected and verified data pertaining to

- Number of calls received by the operator
- Number and percentage calls answered within 60 seconds
- Number and percentage calls answered within 80 seconds

Live calling:

- Overall 100 number of live calls at different points of time were made in a licensed service area/circle for each service provider to assess the efficiency of the call center

Data for the parameter was extracted from central customer service center of the operators.

4.5.1.2 COMPUTATIONAL METHODOLOGY

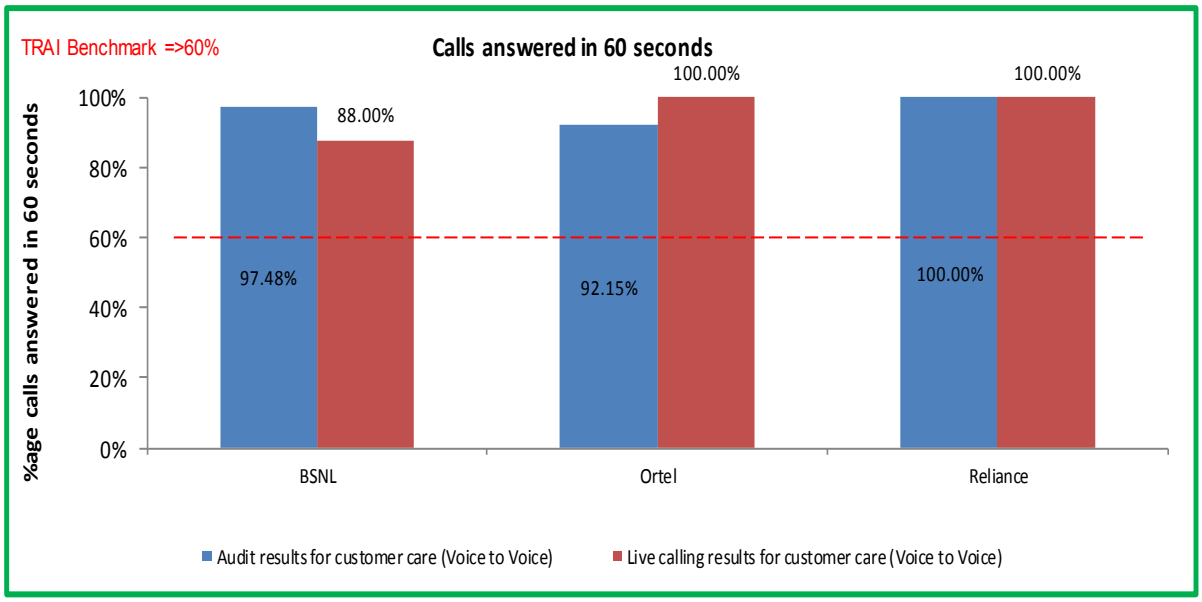
%age of calls answered by operator (voice to voice) within n seconds = *(Number of calls where time taken for operator to respond* >= n sec / Total number of calls where an attempt to route to the operator was made) x 100)*.*

Time taken for operator to respond = Time when an operator responds to a call – Time when the relevant code to reach the operator is dialled

4.5.1.3 BENCHMARK

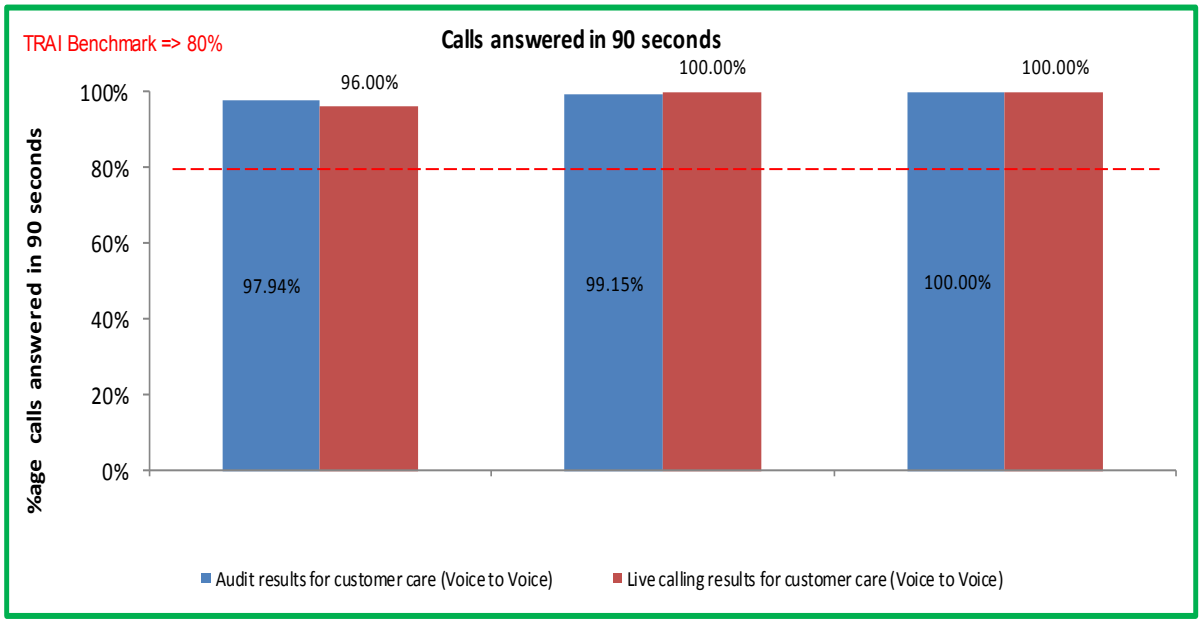
- Calls answered within 60 seconds => 60 %
- Calls answered within 90 seconds => 80%

4.5.2 DETAILED FINDINGS - CALL ANSWERED WITHIN 60 SECONDS



Data Source: Customer Service Center of the operators

4.5.3 DETAILED FINDINGS - CALL ANSWERED WITHIN 90 SECONDS



Data Source: Customer Service Center of the operators

All operators met the benchmark for answering 60% calls within 60 seconds and 80% calls within 90 seconds as per audit.

4.6 BANDWIDTH UTILIZATION & DOWNLOAD SPEED

4.6.1 PARAMETER EXPLANATION – BANDWIDTH UTILIZATION

4.6.1.1 AUDIT PROCEDURE

IMRB Auditors verified and collected data pertaining to –

POP to ISP gateway Node [Intra – network] Links

- Auditors to verify and collect data pertaining to Total Bandwidth available and Total Bandwidth utilized during TCBH at some of the sample intra network links (POP to ISP Node) on each of the three days of live measurement separately
- Total Bandwidth available and Total bandwidth utilized during at the sample links TCBH for the complete month of audit
- Total number of intra network links having >90% bandwidth utilization during the month of Audit

ISP Gateway Node to IGSP / NIXI Node upstream Link's) for international connectivity

- Total number of upstream links for International connectivity
- Total number of links having Bandwidth > 90%Total Bandwidth available and Total Bandwidth utilized on all the upstream links during TCBH (POP to ISP Node) on each of the three days of live measurement separately
- Total Bandwidth available and Total bandwidth utilized at all the international links during TCBH for the complete month of audit (Also obtain details separately for the days)

Data for the parameter was extracted from NOC (Network Operations Center) of the operators.

4.6.1.2 COMPUTATIONAL METHODOLOGY

Percentage Bandwidth available on the link = *Total Bandwidth* utilised in TCBH for the period/ Total Bandwidth Available during the period*100*

4.6.1.3 BENCHMARK

- < 80% link(s)/route bandwidth utilization during peak hours (TCBH).
- If on any link(s)/route bandwidth utilization exceeds 90%, then network is considered to have congestion. For this additional provisioning of bandwidth on immediate basis, but not later than one month is mandated.

4.6.2 DETAILED FINDINGS – BANDWIDTH UTILIZATION

Audit results for Bandwidth Utilization				
Bandwidth utilization	Benchmark	BSNL	Ortel	Reliance
Intra-network links (POP to ISP Node)				
Total number of intra network links		NDR	3	1
No of Intra network found to be above 90%				
Total number of upstream links		NDR	3	1
Total International Bandwidth available from ISP Node to IGSP/NIXI/NAP (In Mbps)		NDR	2248	26000
Total International Bandwidth utilised during peak hours		NDR	1570	5933
Percentage Bandwidth utilisation during peak hours (In Mbps)	<80%	NDR	69.84%	22.82%
No of Intra network found to be above 90%		NDR	No	No

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Live measurment results for Bandwidth Utilization				
Bandwidth utilization	Benchmark	BSNL	Ortel	Reliance
Intra-network links (POP to ISP Node)				
Total number of intra network links		NDR	3	1
International Bandwidth				
Total number of upstream links		NDR	3	1
Total International Bandwidth available from ISP Node to IGSP/NIXI/NAP (In Mbps)		NDR	2248	21000
Total International Bandwidth utilised during peak hours		NDR	1564	6114
Percentage Bandwidth utilisation during peak hours (In Mbps)	<80%	NDR	69.57%	29.11%
No of Intra network found to be above 90%		NDR	No	No

Data Source: Network Operations Center (NOC) of the operators

Ortel and Reliance met the benchmark for bandwidth utilization during audit.

NDR: No data received. Audit of BSNL at its NOC for Bandwidth Utilization is yet to be conducted. Auditors have contacted the NOC of BSNL, however, the operator is yet to provide an appointment to IMRB auditors to conduct audit at BSNL NOC.

4.6.3 PARAMETER EXPLANATION - BROADBAND DOWNLOAD SPEED

4.6.3.1 AUDIT PROCEDURE

Auditors collected and verified the following information from the operator's system.

- Total committed download speed to the all subscribers (In Mbps) (A)
- Total average download speed observed during TCBH (In Mbps)

Live Calling/ Measurement:

- Details of live customers were obtained from the service providers
- Overall 50 numbers of live calls at were made during peak hours (TCBH) in a licensed service area/circle for each service provider to assess the download speed available to subscribers. A download measurement software tool provided by the service providers was used for the same

- Details of total committed download speed and speed available to the users were recorded for each of the subscriber

4.6.3.2 COMPUTATIONAL METHODOLOGY

- The download speed for one customer is calculated by the download speed measurement software using the formula provided below:

Data Download Speed = Size of test file (data) in ISP server/ Transmission time required for error free transfer of the entire data

Percentage download speed available was calculated as = Sum of total speed available for 50 customers/Total committed download speed for 50 customers*100

4.6.3.3 BENCHMARK

Subscribed broadband connection speed to be met >= 80% from ISP Node to user

Data for the parameter was taken from "Download measurement software" installed in the server at ISP Node of the operators.

4.6.4 DETAILED FINDINGS – BROADBAND DOWNLOAD SPEED

Audit results for broadband download speed				
Broadband download speed	Benchmark	BSNL	Ortel	Reliance
Total average committed download speed (In Mbps) (A)		2.8	1.51	1.9
Total average download speed observed during TCBH (In Mbps) (B)		2.4	1.31	1.67
%age subscribed speed available to the subscriber during TCBH (B/A)*100	≥ 80%	85.71%	86.75%	87.89%

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Live measurement results for broadband download speed				
Broadband download speed	Benchmark	BSNL	Ortel	Reliance
Total committed download speed to the sample subscribers (In Mbps) (A)		2.6	97.34	2
Total average download speed observed during TCBH (In Mbps) (B)		2.3	94.04	1.78
%age subscribed speed available to the subscriber during TCBH (B/A)*100	≥ 80%	88.46%	96.61%	89.00%

Service availability/uptime

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Audit results for service availability				
Service Availability	Benchmark	BSNL	Ortel	Reliance
Total Operational Hours		2184	2184	2184
Total Downtime		2	0	3
Total time when the service was available		2182	2184	2181
Service Availability Uptime in Percentage	≥ 98%	99.91%	99.99%	99.86%

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Live measurement results for service availability				
Service Availability	Benchmark	BSNL	Ortel	Reliance
Total Operational Hours		72	72	72
Total Downtime		0	0	0
Total time when the service was available		72.0	72.0	72.0
Service Availability Uptime in Percentage	≥ 98%	100.00%	100.00%	100.00%

Data Source: Download measurement software installed in the server at ISP Node of the operators

All operators met the benchmark of providing committed broadband download speed as per audit.

4.7 SERVICE AVAILABILITY/UPTIME

4.7.1.1 AUDIT PROCEDURE

IMRB Auditors verified and collected data pertaining to –

- Total operational hrs.
- Total downtime hrs.

- The above mentioned data was obtained and verified separately for three days in which the live measurement was carried out, Month in which audit was carried out/

Data for the parameter was extracted from OMC (Operations and Maintenance Center) of the operators.

4.7.1.2 COMPUTATIONAL METHODOLOGY

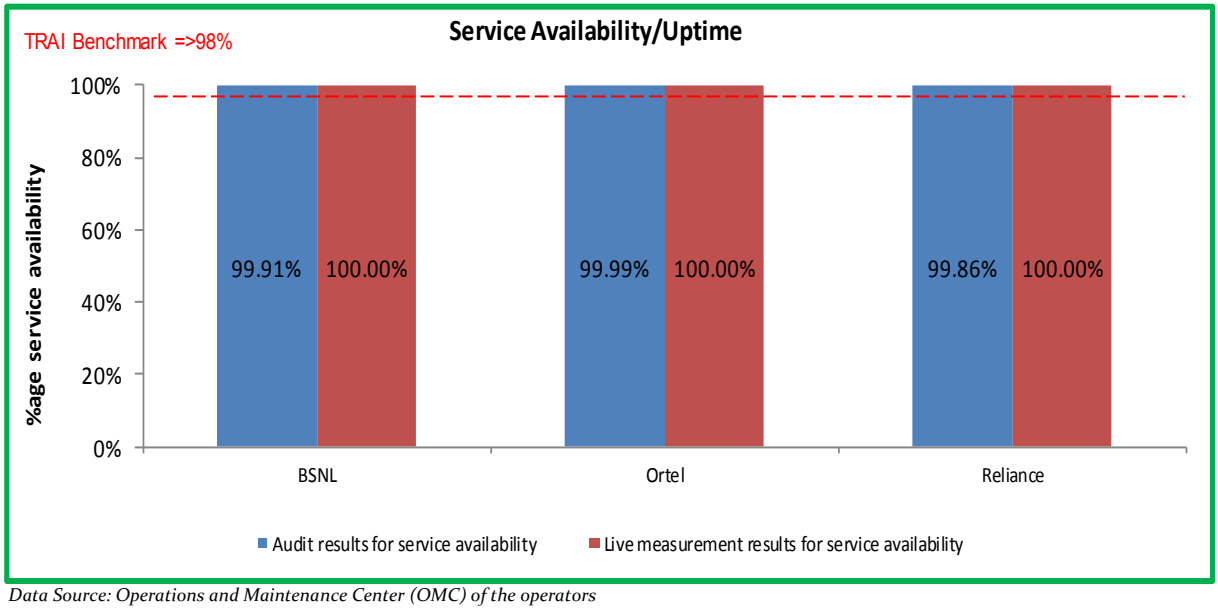
- Total downtime for all users, including the LAN switches, Routers, Servers, etc. at ISP Node and connectivity to upstream service provider are to be included
- Planned outages for routine maintenance of the system are excluded from the calculation of service availability/uptime

Service availability/Uptime = *(Total operational hours – Total Downtime hrs)*100 / Total operational hours*

4.7.1.3 BENCHMARK

- =>98% with effect from quarter ending September 2007 and onwards

4.7.2 DETAILED FINDINGS - SERVICE AVAILABILITY



Data Source: Operations and Maintenance Center (OMC) of the operators

All operators met the benchmark for service availability time as per audit.

4.8 NETWORK LATENCY & PACKET LOSS

4.8.1 PARAMETER EXPLANATION - NETWORK LATENCY

Network Latency: Network Latency is the measure of duration of a round trip for a data packet between specific source and destination Router Port/ Customer Premises Equipment (CPE).

4.8.1.1 AUDIT PROCEDURE

IMRB Auditors verified and collected data pertaining to:

- Records maintained for ping tests conducted during the period
- Smoked ping test (wherever available) results for the period
- Results of live ping tests conducted during three day live measurement and month of Audit (During peak hours)
- Live ping tests were conducting by selecting a minimum of three user reference test points at POP/ISP Node in each circle

Data for the parameter was extracted from NOC (Network Operations Center) of the operators.

4.8.1.2 COMPUTATIONAL METHODOLOGY

- Latency is the measure of duration of a round trip for a data packet between specific source and destination Router Port/Customer Premises Equipment (CPE). The round trip delay for the ping packets from ISP premises to the IGSP premises to the IGSP/NIXI gateway and to the nearest NAP port abroad are measured by computing delay for 1000 pings of 64 bytes each (Pings are to be sent subsequent to acknowledgement received for the same for previous ping)
- Service provider needs to carry out such tests daily during Time Consistent Busy Hour(TCBH) and report the average results for the month in the performance monitoring report to TRAI
- Minimum sample reference points for each service area shall be three in number or multiple reference points if required

Hence the formula for network latency would be Network latency for X days= *Total round trip time for all the ping packets transmitted in X days /No of days during the period*

4.8.1.3 BENCHMARK

- < 120 msec from user reference point at POP/ISP Node to International Gateway
- < 350 msec from User reference point at ISP Gateway Node to International nearest NAP port (Terrestrial)
- < 800 msec from User reference point at ISP Gateway Node to International nearest Nap port (Satellite)

4.8.2 PARAMETER EXPLANATION – PACKET LOSS

Packet Loss: Packet loss is the percentage of packets lost to the total packets transmitted between two designated CPE/ Router Ports.

4.8.2.1 AUDIT PROCEDURE

IMRB Auditors verified and collected data pertaining to –

- Records maintained for ping tests conducted during the period
- Smoked ping test (wherever available) results for the period
- Results of live ping tests conducted during three day live measurement and month of Audit (During TCBH)

- Live ping tests were conducting by selecting a minimum of three user reference test points at POP/ISP Node in each circle

Data for the parameter was extracted from NOC (Network Operations Center) of the operators.

4.8.2.2 COMPUTATIONAL METHODOLOGY

- Packet loss is the percentage of packets lost to total packets transmitted between two designated Customer Premises Equipment's/Router ports. It is the measurement of packet lost from the broadband customer (User) configuration/User reference point at POP/ISP Node to IGSP/NIXI Gateway and to the nearest NAP port abroad
- The packet loss is measured by computing the percent packet loss of 1000 pings of 64 byte packet each.
- Service provider needs to carry out such tests daily during Time Consistent Busy Hour(TCBH) and report the average results for the month in the performance monitoring report to TRAI
- Minimum sample reference points for each service area were three in number or multiple reference points if required

Hence Packet loss is computed by the formula: *(Total number of ping packets lost during the period/Total number of ping packets transmitted)* 100*

4.8.2.3 BENCHMARK

- Packets Loss <1 %

4.8.3 DETAILED FINDINGS - NETWORK LATENCY / PACKET LOSS

Audit results for Latency and packet loss				
Network Latency and Packet Loss	Benchmark	BSNL	Ortel	Reliance
Packet Loss (Percentage)	< 1%	0.63%	0.00%	0.00%
Network Latency				
From user reference point at POP/ISP Node to IGSP/ NIXI (msec)	<120msec	NDR	35	53
From user reference point at ISP Gateway Node to nearest NAP Port (Terrestrial) (In msec)	<350msec	NDR	66	138
From user reference point at ISP Gateway Node to nearest NAP Port (Terrestrial) (In msec)	<800msec	NDR	NA	NA

>>

Live measurement results for Latency and packet loss				
Network Latency and Packet Loss	Benchmark	BSNL	Ortel	Reliance
Packet Loss (Percentage)	< 1%	0.58%	0.00%	0.00%
Network Latency				
From user reference point at POP/ISP Node to IGSP/ NIXI (msec)	<120msec	NDR	35	54
From user reference point at ISP Gateway Node to nearest NAP Port (Terrestrial) (In msec)	<350msec	NDR	64	140
From user reference point at ISP Gateway Node to nearest NAP Port (Terrestrial) (In msec)	<800msec	NDR	NA	NA

Data Source: Network Operations Center (NOC) of the operators

Ortel and Reliance met the benchmark for network latency related parameters.

NDR: No data received. Audit of BSNL at its NOC for Network Latency is yet to be conducted. Auditors have contacted the NOC of BSNL, however, the operator is yet to provide an appointment to IMRB auditors to conduct audit at BSNL NOC.

5. ANNEXURE – AMJ'15

5.1 SERVICE PROVISIONING

Audit Results for Service provisioning				
	Benchmark	BSNL	Ortel	Reliance
Total connections registered during the period		2520	1756	0
Number of connections provided within 15 days		2520	1756	NA
Percentage of connections provided within 15 days	100%	100.00%	100.00%	NA
Number of connections provided after 15 days of registration of demand		NA	NA	NA
percentage of connections provided after 15 days of registration of demand	100%	NA	NA	NA
Number of customers to whom credit is given for delayed connections		NA	NA	NA
Percentage of customers to whom credit is given for delayed connections	100%	NA	NA	NA

>>

Live calling for Service provisioning				
	Benchmark	BSNL	Ortel	Reliance
Total connections registered during the period		400	100	NA
Number of connections provided within 15 days		390	94	NA
Percentage of connections provided within 15 days	100%	97.50%	94.00%	NA

Data Source: Operations and Maintenance Center (OMC) of the operators

NA: In the audit period, no new connection was registered with Reliance.

5.2 FAULT REPAIR/ RESTORATION

Audit Results for Fault repair				
Fault repair	Benchmark	BSNL	Ortel	Reliance
Total No. of faults registered during the period		13994	50837	243
No. of faults repaired by next working day during the period		9675	46487	233
Percentage of faults repaired by next working day during the period	≥ 90%	69.14%	91.44%	95.88%
No. of faults repaired within 3 days during the period		12365	50388	243
Percentage of faults repaired within 3 days during the period	≥ 99%	88.36%	99.12%	100.00%
No. of cases with faults pending for >3 days		1629	449	0

>>

Rent rebate	Benchmark	BSNL	Ortel	Reliance
Percentage of cases where rent rebate for >3 days was given	100%	100%	100%	NA

>>

Live calling for fault repair				
Fault repair	Benchmark	BSNL	Ortel	Reliance
Total Number of calls made to subscribers		410	100	100
Number of cases where faults were repaired by next working day		287	87	91
Percentage cases where faults were repaired by next working day	≥ 90%	70.00%	87.00%	91.00%
Number of cases where faults were repaired within 3 days		354	98	99
Percentage cases where faults were repaired within 3 days	≥ 99%	86.34%	98.00%	99.00%

Data Source: Operations and Maintenance Center (OMC) of the operators and live calls conducted by the auditors from operator's network

5.3 BILLING PERFORMANCE – METERING AND BILLING CREDIBILITY

Audit Results for Billing performance				
Billing Performance	Benchmark	BSNL	Ortel	Reliance
Billing diputes				
Total bills generated during the period		180021	76090	1375
Total number of bills disputed		255	0	0
Percentage bills disputed (Avg of 3 billing cycles)	≤ 2%	0.14%	0.00%	0.00%
Total bills generated during the first billing cycle		60193	25467	449
Total number of bills disputed in first billing cycle		75	0	0
Percentage bills disputed (first billing cycle)	≤ 2%	0.12%	0.00%	0.00%
Total bills generated during the second billing cycle		59954	25310	460
Total number of bills disputed in second billing cycle		89	0	0
Percentage bills disputed (second billing cycle)	≤ 2%	0.15%	0.00%	0.00%
Total bills generated during the third billing cycle		59874	25313	466
Total number of bills disputed in third billing cycle		91	0	0
Percentage bills disputed (third billing cycle)	≤ 2%	0.15%	0.00%	0.00%
Resolution of billing complaints				
Total number of complaints		255	0	0
Total complaints resolved in 4 weeks from date of receipt		255	NA	NA
Percentage complaints resolved within 4 weeks of date of receipt	≥ 98%	100.00%	NA	NA
Total complaints resolved in 6 weeks from date of receipt		255	NA	NA
Percentage complaints resolved within 6 weeks of date of receipt	100%	100.00%	NA	NA
Refund of deposits				
Total number of cases requiring refund		178	NA	NA
Total number of cases where refund was made within 60 days		156	NA	NA
Percentage cases in which refund was received within 60 days	100%	87.64%	NA	NA

Data Source: Billing Center of the operators

NA: Subscribers of Ortel and Reliance did not log any billing complaints. Hence, resolution of billing complaints is not applicable for the operators.

Live calling results for resolution of billing complaints				
Resolution of billing complaints	Benchmark	BSNL	Ortel	Reliance
Total Number of calls made		100	NA	NA
Number of cases resolved in 4 weeks		76	NA	NA
Percentage cases resolved in 4 weeks	≥ 98%	76.00%	NA	NA
Number of cases resolved in 6 weeks		92	NA	NA
Percentage cases resolved in 6 weeks	100%	92.00%	NA	NA

Data Source: Live calls conducted by the auditors from operator's network

NA: Live calling for Ortel and Reliance for 'resolution of billing complaints' has not been conducted due to low/ zero base of billing complaints for the operators.

5.4 RESPONSE TIME TO THE CUSTOMER FOR ASSISTANCE

Audit results for customer care (Voice to Voice)				
Calls Answered within 60 seconds				
Customer Care Assessment	Benchmark	BSNL	Ortel	Reliance
Total Number of calls received		162381	337449	21465
Total Number of calls answered within 60 seconds		158283	310956	21465
Percentage calls answered within 60 seconds	≥ 60%	97.48%	92.15%	100.00%
Calls Answered within 90 seconds				
Total Number of calls received		162381	337449	21465
Total Number of calls answered within 90 seconds		159033	334576	21465
Percentage calls answered within 90 seconds	≥ 80%	97.94%	99.15%	100.00%

Data Source: Customer Service Center of the operators

Live calling results for customer care (Voice to Voice)				
Customer Care Assessment	Benchmark	BSNL	Ortel	Reliance
Total Number of calls received		300	100	100
Total Number of calls answered within 60 seconds		264	100	100
Percentage calls answered within 60 seconds	≥ 60%	88.00%	100.00%	100.00%
Total Number of calls answered within 90 seconds		288	100	100
Percentage calls answered within 90 seconds	≥ 80%	96.00%	100.00%	100.00%

Data Source: Live calls conducted by the auditors from operator's network

5.5 BANDWIDTH UTILIZATION

Audit results for Bandwidth Utilization				
Bandwidth utilization	Benchmark	BSNL	Ortel	Reliance
Intra-network links (POP to ISP Node)				
Total number of intra network links		NDR	3	1
No of Intra network found to be above 90%				
Total number of upstream links		NDR	3	1
Total International Bandwidth available from ISP Node to IGSP/NIXI/NAP (In Mbps)		NDR	2248	26000
Total International Bandwidth utilised during peak hours		NDR	1570	5933
Percentage Bandwidth utilisation during peak hours (In Mbps)	<80%	NDR	69.84%	22.82%
No of Intra network found to be above 90%		NDR	No	No

>>

Live measurment results for Bandwidth Utilization				
Bandwidth utilization	Benchmark	BSNL	Ortel	Reliance
Intra-network links (POP to ISP Node)				
Total number of intra network links		NDR	3	1
International Bandwidth				
Total number of upstream links		NDR	3	1
Total International Bandwidth available from ISP Node to IGSP/NIXI/NAP (In Mbps)		NDR	2248	21000
Total International Bandwidth utilised during peak hours		NDR	1564	6114
Percentage Bandwidth utilisation during peak hours (In Mbps)	<80%	NDR	69.57%	29.11%
No of Intra network found to be above 90%		NDR	No	No

Data Source: Network Operations Center (NOC) of the operators

NDR: No data received. Audit of BSNL at its NOC for Bandwidth Utilization is yet to be conducted. Auditors have contacted the NOC of BSNL, however, the operator is yet to provide an appointment to IMRB auditors to conduct audit at BSNL NOC.

5.6 BROADBAND DOWNLOAD SPEED

Audit results for broadband download speed				
Broadband download speed	Benchmark	BSNL	Ortel	Reliance
Total average committed download speed (In Mbps) (A)		2.8	1.51	1.9
Total average download speed observed during TCBH (In Mbps) (B)		2.4	1.31	1.67
%age subscribed speed available to the subscriber during TCBH (B/A)*100	≥ 80%	85.71%	86.75%	87.89%

>>

Live measurement results for broadband download speed				
Broadband download speed	Benchmark	BSNL	Ortel	Reliance
Total committed download speed to the sample subscribers (In Mbps) (A)		2.6	97.34	2
Total average download speed observed during TCBH (In Mbps) (B)		2.3	94.04	1.78
%age subscribed speed available to the subscriber during TCBH (B/A)*100	≥ 80%	88.46%	96.61%	89.00%

Data Source: Download measurement software installed in the server at ISP Node of the operators

5.7 SERVICE AVAILABILITY/ UPTIME

Audit results for service availability				
Service Availability	Benchmark	BSNL	Ortel	Reliance
Total Operational Hours		2184	2184	2184
Total Downtime		2	0	3
Total time when the service was available		2182	2184	2181
Service Availability Uptime in Percentage	≥ 98%	99.91%	99.99%	99.86%

>>

Live measurement results for service availability				
Service Availability	Benchmark	BSNL	Ortel	Reliance
Total Operational Hours		72	72	72
Total Downtime		0	0	0
Total time when the service was available		72.0	72.0	72.0
Service Availability Uptime in Percentage	≥ 98%	100.00%	100.00%	100.00%

Data Source: Operations and Maintenance Center (OMC) of the operators

5.8 NETWORK LATENCY / PACKET LOSS

Audit results for Latency and packet loss				
Network Latency and Packet Loss	Benchmark	BSNL	Ortel	Reliance
Packet Loss (Percentage)	< 1%	0.63%	0.00%	0.00%
Network Latency				
From user reference point at POP/ISP Node to IGSP/ NIXI (msec)	<120msec	NDR	35	53
From user reference point at ISP Gateway Node to nearest NAP Port (Terrestrial) (In msec)	<350msec	NDR	66	138
From user reference point at ISP Gateway Node to nearest NAP Port (Terrestrial) (In msec)	<800msec	NDR	NA	NA

>>

Live measurement results for Latency and packet loss				
Network Latency and Packet Loss	Benchmark	BSNL	Ortel	Reliance
Packet Loss (Percentage)	< 1%	0.58%	0.00%	0.00%
Network Latency				
From user reference point at POP/ISP Node to IGSP/ NIXI (msec)	<120msec	NDR	35	54
From user reference point at ISP Gateway Node to nearest NAP Port (Terrestrial) (In msec)	<350msec	NDR	64	140
From user reference point at ISP Gateway Node to nearest NAP Port (Terrestrial) (In msec)	<800msec	NDR	NA	NA

Data Source: Network Operations Center (NOC) of the operators

NDR: No data received. Audit of BSNL at its NOC for Network Latency is yet to be conducted. Auditors have contacted the NOC of BSNL, however, the operator is yet to provide an appointment to IMRB auditors to conduct audit at BSNL NOC.

5.9 TOTAL CAPACITY AND SUBSCRIBERS

Capacity and Subscribers				
		BSNL	Ortel	Reliance
Capacity		35760	32000	1000
Total No of customers served (Jun 2015)		60338	25371	460

Data Source: Operations and Maintenance Center (OMC) of the operators

SCO 47, 5th Floor, Old Judicial Complex, Sector 15

Part 1, Gurgaon, Haryana – 122001

✆+91 (124) 4217300

www.imrbint.com

EAST ZONE

TRAI AUDIT WIRELINE REPORT – ORISSA CIRCLE - AUDIT OF AMJ QUARTER, 2015

Prepared By -

IMRB International | eTech

Prepared For-

TRAI

Telecom Regulatory Authority of India

(IS/ISO 9001-2008 Certified Organisation)

TABLE OF CONTENTS

1 INTRODUCTION

1.1 About TRAI

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

In pursuance of above objective, TRAI has been issuing regulations, order and directives to deal with the issues or complaints raised by the operators as well as the consumers. These regulations, order and directives have helped to nurture the growth of multi operator multi service - an open competitive 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 March 20, 2009 and Quality of Service of Broadband Service Regulations, 2006 (11 of 2006) dated January 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 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).

1.3 COVERAGE

The wireline audit was conducted in Orissa circle. For BSNL, geographical spread among SDCAs and exchanges was maintained. For other operators, the audit was conducted for all exchanges at overall level.

Image Source: BSNL Website

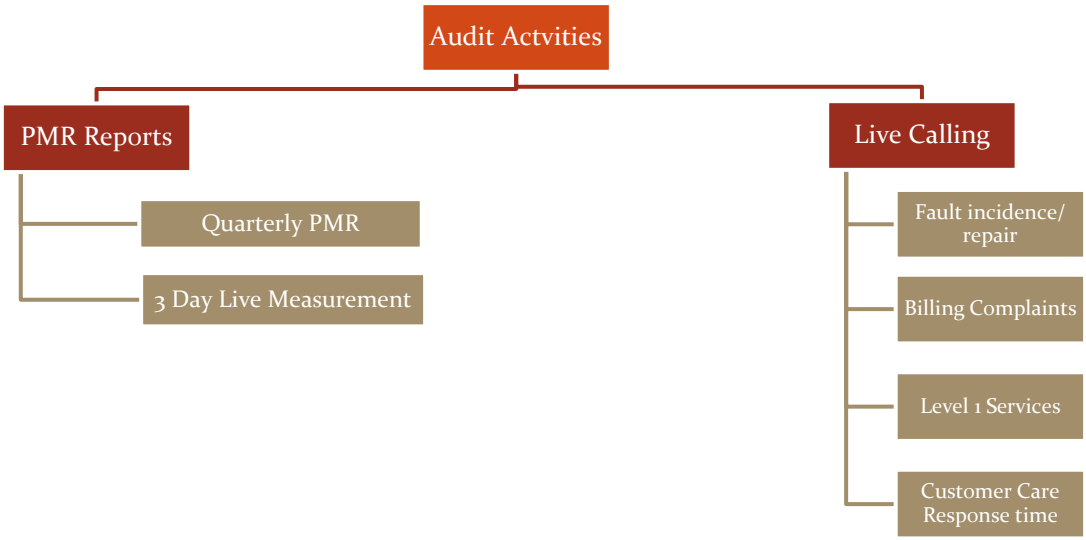
1.4 AUDIT PROCESS

As per TRAI guidelines, the Wireline Audit for a circle is conducted for one quarter once every year.

- The operators have been assimilated as per TRAI guidelines given in QoS tender document 2013 and latest list of licensees provided by TRAI.
- IMRB auditors contacted the following wireline operators to conduct the audit in Orissa for the AMJ 2015 quarter.
    - BSNL
    - Bharti Airtel
    - Reliance
    - Tata Teleservices
    - Vodafone
- Bharti Airtel and Vodafone informed the auditors about non-presence of their services in Orissa circle.
- Hence, the auditors selected the following operators to conduct audit in Orissa circle.
    - BSNL
    - Reliance
    - Tata Teleservices

- The PMR was generated from the raw data pertaining to Apr, May and Jun 2015 (AMJ'15), which was collected from the operator during the audit conducted in the month of Jul 2015.
- Live calling and 3 day live measurement activity was carried out during the month of Jun 2015. The data considered for live calling was for the month prior to the month in which the live calling activity was being conducted. For example, data of May 2015 was considered for live calling activity conducted in Jun 2015.

1.5 FRAMEWORK USED



1.5.1 PMR REPORTS - SIGNIFICANCE AND METHODOLOGY

The significance of PMR or Performance Monitoring Reports is to assess the various Quality of Service (QoS) parameters involved in the Basic (Wireline) telephone services, which indicate the overall health of service for an operator. The operators submit these PMR reports to TRAI time on time as per instructions from TRAI.

To verify the QoS performance of the operators, TRAI has appointed IMRB as their auditor in East Zone to conduct QoS audit of operators. The steps involved in the audit have been given below.

The IMRB auditors inform the operators about the audit schedule in advance. Accordingly, the auditors visit the operator premises to conduct the audit.

During TRAI audit, raw data is extracted from the operator's server/ NOC/ exchange/ OMC/ customer service center/ billing center etc. by the IMRB auditor with assistance from the operator personnel in order to generate PMR reports (Network/ Fault/ Billing /Customer Service).

All the calculations are done by IMRB auditors to generate a new PMR report from that raw data.

The newly generated PMR reports are then taken in hard copy, duly signed by the competent authority of operators. IMRB auditors also sign the same report.

The raw data extracted is then used to generate PMR reports in the following formats.

- Quarterly PMR
- 3 Day Live Measurement Data

Let us understand these formats in detail.

1.5.1.1 QUARTERLY PMR REPORT – PARAMETERS REVIEWED

The main purpose of quarterly PMR report is to verify the following key QoS parameters on quarterly basis as per the methodology stated above in section 1.4.

- Fault incidence/clearance related statistic
- Mean Time to Repair (MTTR)
- Call Completion Rate (CCR)
- Answer to Seizure Ratio (ASR)
- POI (Point of Interconnection) Congestion
- Metering and billing credibility
- Resolution of billing complaints
- Customer care promptness
- Time taken to refund of deposits after closure

1.5.1.2 3 DAY LIVE MEASUREMENT – METHODOLOGY AND PARAMETERS REVIEWED

The main purpose of 3 day live measurement is to evaluate the following parameters on intraday basis. The auditors visit the sample exchanges (in case of BSNL) and main exchanges (in case of other operators) to collect the 3 day live data for the following parameters

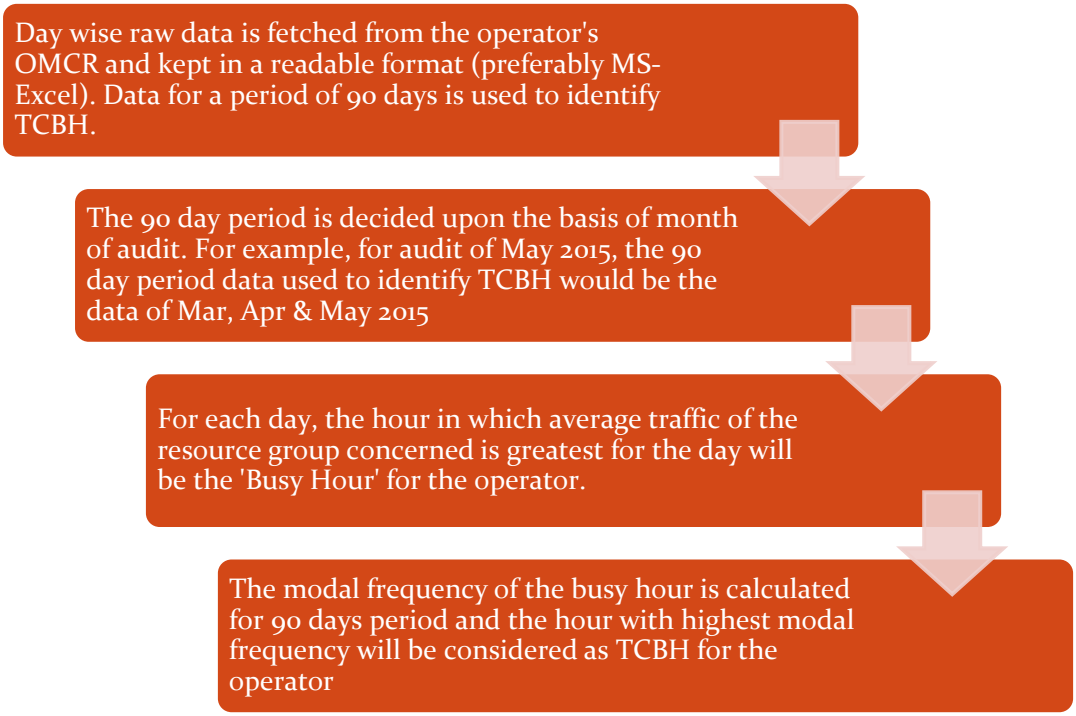
- Call Completion Rate (CCR)
- Answer to Seizure Ratio (ASR)
- POI (Point of Interconnection) Congestion

While the quarterly PMR report provides an overall view of the performance of QoS parameters, the 3 day live data helps looking at intraday performance on the above given parameters. All the calculations are then done on the basis of that raw data of 3 days.

1.5.1.3 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.

Step by step procedure to identify TCBH for an operator:



During audit, the auditors identified from the raw data that the TCBH for the operators in AMJ'15 was the time period as given below.

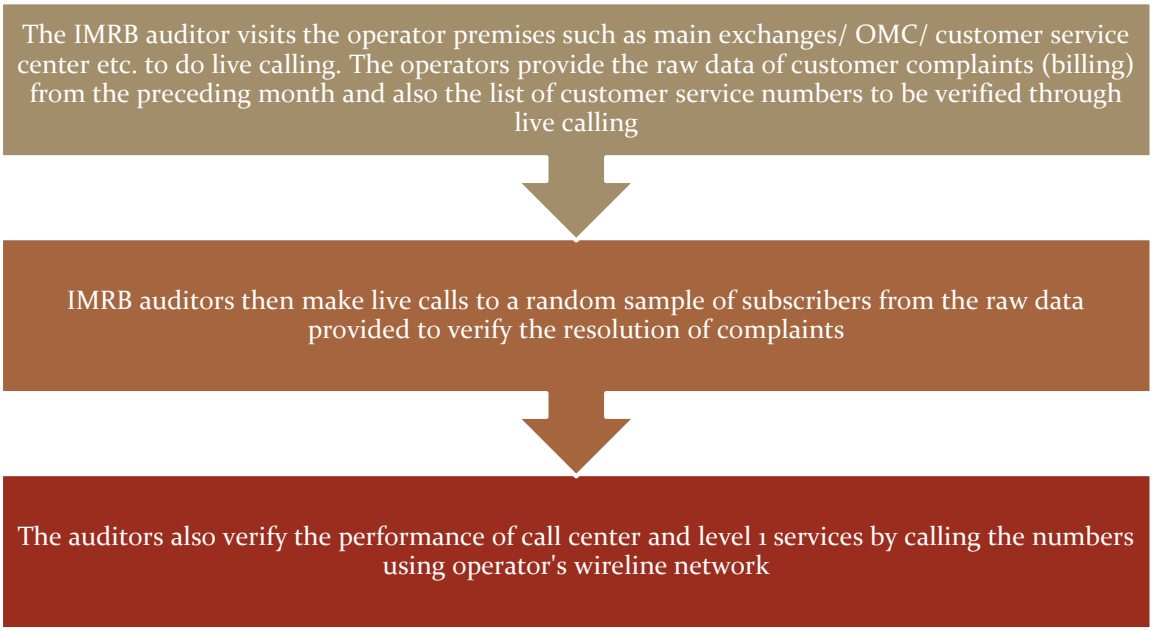
BSNL	Reliance	Tata
16:00 - 17:00	18:00 - 19:00	17:00 - 18:00

1.5.2 LIVE CALLING - SIGNIFICANCE AND METHODOLOGY

The main purpose of live calling is to verify the performance of following parameters by doing test calls to the subscribers/ specific numbers.

- Fault clearance
- Resolution of billing complaints
- Response time to the customer for assistance
- Level 1 services

The process of conducting live calling has been stated below.



Let us now discuss the methodology of live calling for each parameter in detail.

1.5.2.1 FAULT CLEARANCE

Live calling for fault clearance is done to verify the following.

- Fault repair by next working day - for both Urban and Rural Exchanges
- Fault repair within 5 working days – Urban Exchanges
- Fault repair within 7 working days – Rural Exchanges

- Auditors request the operator to provide the database of all the subscribers who reported Faults in one month prior to IMRB auditor visit
- Calls are made to up to 10% or 100 complainants, whichever is less, per service provider or in case of BSNL, if there are more than 1 SDCAs selected for the sample, 10% or 30 complainants per sample SDCA by randomly selecting from the list provided by operator.
- Auditors check and record whether the fault was corrected within the timeframes as mentioned in the benchmark

Benchmark:

- Fault repair by next working day (Urban Exchanges): =>85%
- Fault repair by next working day (Rural Exchanges): =>75%
- Fault repair within 5 working days (Urban Exchanges): =100%
- Fault repair within 7 working days (Rural Exchanges): =100%

1.5.2.2 RESOLUTION OF 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 IMRB 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.

Benchmark:

98% complaints resolved within 4 weeks, 100% complaints resolved within 6 weeks

1.5.2.3 RESPONSE TIME TO CUSTOMER FOR ASSISTANCE

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

- Calls getting connected and answered:
- % 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 1000 HRS to 1300 HRS and 50 calls between 1500 HRS to 1700 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.

1.5.2.4 LEVEL 1 SERVICE

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 network to test the accessibility and efficiency of Level 1 services on an operator's network.

A minimum of 300 test calls were made per service provider in the quarter. In case of BSNL, calls were equally distributed among SDCAs (Short Distance Charging Area) visited for the purpose of live calling.

In AMJ'15, IMRB has conducted the live calling to the list of Level 1 services provided by TRAI as per the NNP (National Numbering Plan).

1.5.2.4.1 PROCESS TO TEST LEVEL 1 SERVICES

- On visiting the operator's premises (Exchange/Central Server etc.), auditors ask the operator authorized personnel to provide a list of Level 1 services being active in their service. The list should contain a description of the numbers along with dialing code.
- Operators might provide a long 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 Code	Description	L1 Code	Description
100	Police	1090	Call Alart (Crime Branch)
101	Fire	1091	Women Helpline
102	Ambulance	1097	National AIDS Helpline to NACO
104	Health Information Helpline	1099	Central Accident and Trauma Services (CATS)
108	Emergency and Disaster Management Helpline	10580	Educationa & Vocational Guidance and Counselling
138	All India Helpine for Passangers	10589	Mother and Child Tracking (MCTH)
149	Public Road Transport Utility Service	10740	Central Pollution Control Board
181	Chief Minister Helpline	10741	Pollution Control Board
182	Indian Railway Security Helpline	1511	Police Related Service for all Metro Railway Project
1033	Road Accident Management Service	1512	Prevention of Crime in Railway
1037	Public Grievance Cell DoT Hq as 'Telecom Consumer Grievance Redressal Helpline'	1514	National Career Service(NCS)
1056	Emergency Medical Services	15100	Free Legal Service Helpline
106X	State of the Art Hospitals	155304	Municipal Corporations
1063	Public Grievance Cell DoT Hq	155214	Labour Helpline
1064	Anti Corruption Helpline	1903	Sashastra Seema Bal (SSB)
1070	Relief Commission for Natural Calamities	1909	National Do Not Call Registry
1071	Air Accident Helpline	1912	Complaint of Electricity
1072	Rail Accident Helpline	1916	Drinking Water Supply
1073	Road Accident Helpline	1950	Election Commission of India
1077	Control Room for District Collector		

1.5.3 AUDIT METHODOLOGY

As per audit tender, following table explains the audit methodology for Basic (Wireline) services. Here, a YES signifies that the mentioned parameter gets audited by the given audit method (PMR/ Live Measurement/ Live Calling).

Sl. No.	Parameters	PMR	Live measurement	Live calling
1	Fault incidence/clearance related statistic	YES		
1.1	- Total number of faults registered per month	YES		
1.2	- Fault repair by next working day (Urban and Rural)	YES		YES
1.3.1	- Fault repair within 5 working days (Urban)	YES		YES
1.3.2	- Fault repair within 7 working days (Rural)	YES		YES
1.4	Mean Time to Repair (MTTR)	YES		
2	Call Completion Rate (CCR)	YES	YES	
3	Answer to Seizure Ratio (ASR)	YES	YES	
4	POI Congestion	YES	YES	
5	Metering and billing credibility – postpaid	YES		YES
5.1	Metering and billing credibility – prepaid	YES		YES
6	Customer service promptness	YES		
6.1	- Processing closure request	YES		
7	Response time to customer	YES		
7.1	- While call is getting connected and answered	YES		YES
7.2	- While call is answered by operator (voice to voice)	YES		YES
8	Level 1 Services			YES
9	Time taken to refund of deposits after closure	YES		

The audit methodology for each parameter has been explained along with the findings of same.

1.5.4 MEASUREMENT METHODOLOGY

As per audit tender, following table explains the measurement methodology in terms of time period consideration for various parameters involved in audit of Basic (Wireline) services.

Sl. No.	Parameters	Averaged over a period
1	Fault incidence	One Quarter
1.1	- Total number of faults registered per month	One Quarter
1.2	- Fault repair by next working day (Urban and Rural)	One Quarter
1.3.1	- Fault repair within 5 working days (Urban)	One Quarter
1.3.2	- Fault repair within 7 working days (Rural)	One Quarter
1.4	- Mean Time to Repair (MTTR)	One Quarter
2	Call Completion Rate (CCR)	One Quarter
3	Answer to Seizure Ratio (ASR)	One Quarter
4	POI Congestion	One Month
5	Metering and billing credibility – postpaid	One Billing Cycle
5.1	Metering and billing credibility – prepaid	One Quarter
6	Customer care promptness	One Quarter
6.1	- Processing closure request	One Quarter
7	Response time to customer	One Quarter
7.1	- While call is getting connected and answered	One Quarter
7.2	- While call is answered by operator (voice to voice) within 90 seconds	One Quarter
8	Time taken to refund of deposits after closure	One Quarter

1.6 SAMPLING METHODOLOGY

- For BSNL, a minimum sample of 5% of the total exchanges was spread across 10% of SDCA's in the entire service area for the purpose of audit, live calling and live measurement.
- The sampling plan for BSNL was finalized as per TRAI guidelines. The details of sampling plan are given below.
- As per tender guidelines, there was no sampling activity involved in case of other operators.

Audit for BSNL has been conducted on the basis of data pertaining to sample SDCAs and exchanges.

1.6.1 SAMPLING PLAN – BSNL

There are a total of 1086 exchanges in Orissa circle. We are supposed to select a minimum of 5% (54 exchanges) as our sample. To maintain the geographical and urban-rural spread, a total of 64 exchanges have been selected for the audit.

Urban Exchanges Selected: 14

Rural Exchanges Selected: 50

Total SDCAs present in the circle: 124
As per sampling criteria, 10% SDCAs selected for audit: 12.4
To maintain geographical spread, actual SDCAs selected: 14
A list of the SDCAs selected for audit has been given below.

S. No.	SDCA
1	ANGUL
2	CHHENDIPADA
3	DHENKANAL
4	NAYAGARH
5	BHUBANESWAR
6	KHURDA
7	RAYAGADA
8	ROURKELA
9	SAMBALPUR
10	BALASORE
11	BHADRAK
12	BERHAMPUR
13	BOLANGIR
14	JAJPUR ROAD

1.6.1.1 EXCHANGES SELECTED AS PER SAMPLING PLAN – BSNL

S. No.	REV.DIST.	SDCA	PARENTED TO	EXCHANGE	U/R
1	ANGUL	ANGUL		NALCONAGAR	U
2	ANGUL	CHHENDIPADA	NALCO	BAGEDIA	R
3	ANGUL	CHHENDIPADA	NALCO	CHHENDIPADA	R
4	ANGUL	CHHENDIPADA	NALCO	JSPL(Nisa)	R
5	ANGUL	CHHENDIPADA	NALCO	KOSALA	R
6	DHENKANAL	DHENKANAL		DHENKANAL	U
7	DHENKANAL	DHENKANAL	DHENKANAL	GOVINDAPUR	R
8	DHENKANAL	DHENKANAL	DHENKANAL	KAIMATI	R
9	DHENKANAL	DHENKANAL	DHENKANAL	PINGUA	R
10	DHENKANAL	DHENKANAL	DHENKANAL	SANKARPUR	R
11	NAYAGARH	NAYAGARH		NAYAGARH	U
12	NAYAGARH	NAYAGARH	NAYAGARH	ITAMATI	R
13	NAYAGARH	NAYAGARH	NAYAGARH	ODAGAON	R
14	NAYAGARH	NAYAGARH	NAYAGARH	SARANKULA	R
15	KHURDA	BHUBANESWAR		BHUBANESWAR	U
16	KHURDA	BHUBANESWAR	BHUBANESWAR OCB	BALIANTA	R
17	KHURDA	BHUBANESWAR	BHUBANESWAR OCB	BALIPATNA	R
18	KHURDA	BHUBANESWAR	BHUBANESWAR OCB	BHINGARPUR	R
19	KHURDA	BHUBANESWAR	BHUBANESWAR OCB	DARUTHENGA	R
20	KHURDA	KHURDA		KHURDA	U
21	KHURDA	KHURDA	KHURDA	BAGHAMARI	R
22	KHURDA	KHURDA	KHURDA	BEGUNIA	R
23	KHURDA	KHURDA	KHURDA	NARANGARH	R
24	KHURDA	KHURDA	KHURDA	RAJSUNAKHELA	R
25	RAYAGADA	RAYAGADA		RAYAGADA	U
26	RAYAGADA	RAYAGADA	RAYAGADA	J.K PUR	R
27	RAYAGADA	RAYAGADA	RAYAGADA	ANTAMADA	R
28	RAYAGADA	RAYAGADA	RAYAGADA	MUKUNDPUR	R
29	RAYAGADA	RAYAGADA	RAYAGADA	SIKARPAI	R
30	SUNDARGARH	ROURKELA		ROURKELA T/S	U
31	SUNDARGARH	ROURKELA	ROURKELA XL	KUARMUNDA	R
32	SUNDARGARH	ROURKELA	ROURKELA XL	LATHIKATA	R
33	SUNDARGARH	ROURKELA	ROURKELA XL	BIRMITRAPUR	U
34	SUNDARGARH	ROURKELA	ROURKELA XL	BISHRA	R
35	SAMBALPUR	SAMBALPUR		SAMBALPUR	U
36	SAMBALPUR	SAMBALPUR	SAMBALPUR XL	CHIPILIMA	R
37	SAMBALPUR	SAMBALPUR	SAMBALPUR XL	GOSHALA	R
38	SAMBALPUR	SAMBALPUR	SAMBALPUR XL	SASON	R
39	SAMBALPUR	SAMBALPUR	SAMBALPUR XL	RENGALI	R
40	BALASORE	BALASORE		BALASORE	U
41	BALASORE	BALASORE	BALASORE	BALGOPALPUR	R
42	BALASORE	BALASORE	BALASORE	CHANDIPUR	R
43	BALASORE	BALASORE	BALASORE	NAGRAM	R
44	BALASORE	BALASORE	BALASORE	RAJBERHAMPUR	R
45	BHADRAK	BHADRAK		BHADRAK MAIN	U
46	BHADRAK	BHADRAK	BHADRAK	ARNAPAL	R
47	BHADRAK	BHADRAK	BHADRAK	BANTA	R
48	BHADRAK	BHADRAK	BHADRAK	DOLASAHI	R

49	BHADRAK	BHADRAK	BHADRAK	TIHIDI	R
50	GANJAM	BERHAMPUR		BERHAMPUR	U
51	GANJAM	BERHAMPUR	BERHAMPUR 5ESS	KUKUDAKHANDI	R
52	GANJAM	BERHAMPUR	BERHAMPUR 5ESS	JARADAGADA	R
53	GANJAM	BERHAMPUR	BERHAMPUR 5ESS	JAYANTIPUR	R
54	GANJAM	BERHAMPUR	BERHAMPUR 5ESS	PATRAPUR	R
55	BOLANGIR	BOLANGIR		BOLANGIR	U
56	BOLANGIR	BOLANGIR	BOLANGIR CDOT	CHANDANABHATI	R
57	BOLANGIR	BOLANGIR	BOLANGIR CDOT	CHHATAMAKHANA	R
58	BOLANGIR	BOLANGIR	BOLANGIR CDOT	CHUDAPALI	R
59	BOLANGIR	BOLANGIR	BOLANGIR CDOT	DEOGAON	R
60	JAJPUR	JAJPUR ROAD		JAJPUR ROAD	U
61	JAJPUR	JAJPUR ROAD	JAJPUR ROAD	JAKHAPURA	R
62	JAJPUR	JAJPUR ROAD	JAJPUR ROAD	KALIAPANI	R
63	JAJPUR	JAJPUR ROAD	JAJPUR ROAD	KORAI	R
64	JAJPUR	JAJPUR ROAD	JAJPUR ROAD	PANIKOILI	R

1.7 COLOUR CODE TO READ THE REPORT

Not Meeting the benchmark

2 EXECUTIVE SUMMARY

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

2.1 PMR (PERFORMANCE MONITORING REPORT) DATA – AMJ'15

Parameters	Benchmarks	BSNL	Reliance	Tata
Faults incidences (No. of faults/100 Subs./month) - averaged for the quarter	≤7	3.75	0.56	0.14
% of faults repaired by next working day	≥ 85% (Urban)	72.99%	100.00%	93.94%
% of faults repaired within 5 days	100% (Urban)	97.45%	100.00%	100.00%
Percentage of faults repaired by next working day during the quarter	≥ 75% (Rural)	54.97%	NA	NA
Percentage of faults repaired within 7 days during the quarter	100% (Rural)	95.98%	NA	NA
Faults pending for> 3days and ≤7 days	Rent rebate of 7 days	100.00%	NA	NA
Faults pending for > 7 days and ≤15 days	Rent rebate of 15 days	100.00%	NA	NA
Faults pending for > 15 days	Rent rebate of 1 month	100.00%	NA	NA
Mean Time to Repair (MTTR)	≤ 10 Hrs	19.36	7.50	6.91
Call Completion Rate (CCR)	≥ 55%	60.97%	NA	99.98%
Answer to Seizure ratio (ASR)	≥ 75%	NA	82.69%	NA
No. of POIs with congestion > 0.5%	≤ 0.5%	0.00%	0.00%	NA
Metering and billing credibility - Number of bills disputed during the quarter	≤ 0.1%	0.07%	0.00%	0.03%
Resolution of billing complaints within 4 weeks	≥ 98%	89.13%	NA	100.00%
Percentage complaints resolved within 6 weeks of date of receipt	100%	96.74%	NA	100.00%
Period of applying credit / waiver within 1 week	100%	100.00%	NA	NA
Closure within 7 days	100%	98.05%	NA	NA
Refund of deposits within 60 days of closure of service	100%	78.80%	NA	NA

Response time to customer for assistance	Benchmarks	BSNL	Reliance	Tata
% age calls getting connected and answered	≥ 95%	99.05%	96.40%	97.41%
Percentage of calls answered by the operators (voice to voice) within 90 seconds	≥ 95%	96.57%	98.37%	95.24%

NA: Parameters not applicable for the operators.

In case of POI for Tata, there is no direct POI from Wireline MSC. All Calls are getting routed via InterMSC TGs with GSM/ CDMA MSCs. So, Total number of working POI is not present in the wireline system of Tata. The operator system is not equipped to provide the POI data separately for wireline.

Following are the parameter wise observations for the operators in Orissa circle:

2.1.1 FAULT INCIDENCE / CLEARANCE STATISTICS

All operators met the benchmark for fault incidence.

In urban areas, BSNL failed to meet the benchmark of fault repair within next day, while the operator was able to meet the benchmark of fault repair within 5 days in urban areas. Reliance and Tata met the benchmark of fault repair parameters in urban areas.

In rural areas, BSNL failed to meet the benchmark of fault repair within next day as well within 7 days.

BSNL failed to meet the benchmark for the Mean time to repair (MTTR).

BSNL met the benchmark for rent rebate parameters. Rent rebate not applicable for Reliance & Tata as all faults were repaired within stipulated time.

2.1.2 CALL COMPLETION RATE (CCR)

BSNL & Tata met the benchmark of 55% CCR.

NA: Reliance does not use CCR as a measure of traffic.

2.1.3 ANSWER TO SEIZURE RATIO (ASR)

Reliance met the benchmark of 75% ASR.

NA: BSNL & Tata do not use ASR (Answer to seizure ratio) as a measure of traffic.

2.1.4 POI (POINT OF INTERCONNECTION) CONGESTION

BSNL & Reliance met the benchmark with 0% POIs with congestion.

NA: In case of POI for Tata, there is no direct POI from Wireline MSC. All Calls are getting routed via InterMSC TGs with GSM/ CDMA MSCs. So, Total number of working POI is not present in the wireline system of Tata. The operator system is not equipped to provide the POI data separately for wireline.

2.1.5 METERING AND BILLING CREDIBILITY

All operators met the benchmark for metering and billing credibility.

2.1.6 RESOLUTION OF BILLING COMPLAINTS

BSNL failed to meet the benchmark for resolution of billing complaints within 4 weeks and within 6 weeks. Tata met the benchmark for the parameter during the audit period.

NA: Parameter not applicable for Reliance as no billing complaints were logged in the audit period.

2.1.7 PERIOD OF APPLYING CREDIT/ WAIVER

BSNL met the benchmark for the parameter.

NA: Reliance and Tata had no cases where credit/ waiver was required during the audit period.

2.1.8 CLOSURE WITHIN 7 DAYS

BSNL failed to meet the benchmark for the parameter.

NA: Reliance and Tata did not have any closure request during the audit period.

2.1.9 REFUND OF DEPOSIT WITHIN 60 DAYS FROM CLOSURE

BSNL failed to meet the benchmark for the parameter.

NA: Reliance and Tata did not have any closure request during the audit period.

2.1.10 RESPONSE TIME TO CUSTOMER FOR ASSISTANCE

All operators met the TRAI benchmark in terms of number of IVR calls being connected and answered.

The benchmark of 95% of voice to voice calls answered within stipulated time of 90 seconds was also met by all operators.

2.2 3 DAY LIVE MEASUREMENT

Parameters	Benchmarks	BSNL	Reliance	Tata
Call Completion Rate (CCR)	≥ 55%	90.08%	NA	99.98%
Answer to Seizure ratio (ASR)	≥ 75%	NA	81.97%	NA
POI Congestion	≤ 0.5%	0.00%	0.00%	NA

Let us now review the various parameters involved during live measurement.

2.2.1 CALL COMPLETION RATE (CCR)

BSNL & Tata met the benchmark of 55% CCR.

NA: Reliance does not use CCR as a measure of traffic.

2.2.2 ANSWER TO SEIZURE RATIO (ASR)

Reliance met the benchmark of 75% ASR.

NA: BSNL & Tata do not use ASR (Answer to seizure ratio) as a measure of traffic.

2.2.3 POI (POINT OF INTERCONNECTION) CONGESTION

BSNL & Reliance met the benchmark with o% POIs with congestion.

NA: In case of POI for Tata, there is no direct POI from Wireline MSC. All Calls are getting routed via InterMSC TGs with GSM/ CDMA MSCs. So, Total number of working POI is not present in the wireline system of Tata. The operator system is not equipped to provide the POI data separately for wireline.

2.3 LIVE CALLING

Parameters	Benchmarks	BSNL	Reliance	Tata
Fault Repair/ Clearance				
% of faults repaired by next working day	≥ 85% (Urban)	82.38%	90.00%	95.00%
Percentage cases where faults were repaired by next working day	≥ 75% (Rural)	72.07%	NA	NA
% of faults repaired within 5 days	100% (Urban)	94.76%	100.00%	100.00%
Percentage cases where faults were repaired within 7 days	100% (Rural)	97.52%	NA	NA
Resolution of billing complaints				
Resolution of billing complaints within 4 weeks	≥ 98%	86.00%	NA	100.00%
Percentage complaints resolved within 6 weeks of date of receipt	100%	94.00%	NA	100.00%
Response time to customer for assistance				
% age calls getting connected and answered	≥ 95%	96.00%	78.00%	98.00%
% age call answered by operator in 90 seconds	≥ 95%	87.40%	76.00%	100.00%
Level 1 Services				
% age calls made to Level 1 services getting answered	≥ 90%	99.20%	91.00%	98.67%

2.3.1 FAULTS REPAIR/ CLEARANCE

BSNL failed to meet the benchmark of fault repair within next day in urban as well as rural areas.

BSNL also did not meet the benchmark of fault repair within 5 days in urban areas and fault repair within 7 days in rural areas.

Reliance and Tata met the benchmark of fault repair parameters in urban areas.

NA: Reliance and Tata do not have presence in rural areas.

2.3.2 RESOLUTION OF BILLING COMPLAINTS

During live calling, it was observed that BSNL failed to meet the benchmark of resolving complaints within 4 weeks as well as within 6 weeks. Tata met the benchmark for resolution of billing complaints.

Live calling for Reliance was not conducted as there were no complaints reported for the operator in the audit period.

2.3.3 RESPONSE TIME TO CUSTOMER FOR ASSISTANCE

During live calling, it was observed that Reliance did not meet the benchmark of 95% IVR calls getting connected and answered.

BSNL and Reliance failed to meet the benchmark of 95% calls getting answered (voice to voice) within 90 seconds.

2.3.4 LEVEL 1 SERVICES

All operators met the benchmark for Level 1 services. The category 1 (restricted) services were tested from different SDCAs. The details of live calling can be found in the annexure (Section 5.8).

It has been observed that a number of Category-I (i.e. mandatory) services were not being operated by the operators.

3 CRITICAL FINDINGS - AMJ'15

Fault Incidence/ Clearance Statistic

In urban areas, BSNL failed to meet the benchmark of fault repair within next day. In rural areas, BSNL failed to meet the benchmark of fault repair within next day as well within 7 days.

BSNL also failed to meet the benchmark for the Mean time to repair (MTTR).

Point of interconnection (POI)

In case of POI for Tata, there is no direct POI from Wireline MSC. All Calls are getting routed via InterMSC TGs with GSM/ CDMA MSCs. So, Total number of working POI is not present in the wireline system of Tata. The operator system is not equipped to provide the POI data separately for wireline.

Resolution of billing complaints

BSNL failed to meet the benchmark for resolution of billing complaints within 4 weeks and within 6 weeks.

Closure within 7 days

The benchmark of completing 100% closure requests within 7 days was not met by BSNL.

Refund of deposit after closure

The benchmark of refunding 100% deposits within 60 days was not met by BSNL.

Live Calling

As per live calling, BSNL failed to meet the benchmark of fault repair within next day in urban as well as rural areas. BSNL also did not meet the benchmark of fault repair within 5 days in urban areas and fault repair within 7 days in rural areas.

BSNL failed to meet the benchmark of resolving complaints within 4 weeks as well as within 6 weeks.

Reliance did not meet the benchmark of 95% IVR calls getting connected and answered.

BSNL & Reliance failed to meet the benchmark of 95% calls getting answered (voice to voice) within 90 seconds.

As per live calling conducted for 'level 1' services, a number of Category-I (i.e. mandatory) services were not being operated by the operators.

4 PARAMETER EXPLANATION AND DETAILED FINDINGS - COMPARISON BETWEEN PMR AND LIVE CALLING/ MEASUREMENT DATA

4.1 FAULT INCIDENCE/ CLEARANCE RELATED SERVICES

4.1.1 PARAMETER EXPLANATION

4.1.1.1 DEFINITION

Fault Incidence: This parameter quantifies the number of faults registered per 100 subscribers/ per month for a wireline service provider in a quarter.

Fault Clearance/Repair: This parameter quantifies the number of faults repaired within a stipulated period of time (within a day, within 5 days – urban, within 7 days – rural) in the quarter

Mean Time to Repair (MTTR): It is the average of total time taken to repair for all faults reported in a quarter

4.1.1.2 AUDIT PROCEDURE

IMRB Auditors to verify and collect data pertaining to number of fault received and also number of faults cleared at the service provider's level in the following time frames:-

- Number of faults cleared within 24 hours (Urban & Rural)
- Number of cleared in more than 1 day but less than 5 days (Urban)
- Number of cleared in more than 5 days but less than 7 days (Urban)
- Number of cleared in more than 1 day but less than 7 days (Rural)
- Number of cleared in more than 7 days but less than 15 days (Urban & Rural)
- Number of cleared in more than 15 days (Urban & Rural)

The mean time to repair (in hours) is also calculated by averaging the total time of repair for each customer.

Live calling: -

- Live calling was done to verify the following
  - Fault repair by next working day - for both Urban and Rural Exchanges
  - Fault repair within 5 working days – Urban Exchanges
  - Fault repair within 7 working days – Rural Exchanges
- Auditors ensured that the operator provided a list of all the subscribers who reported Faults in one month prior to IMRB auditor visit

- Calls are made to up to 10% or 100 complainants, whichever is less, per service provider or in case of BSNL, if there are more than 1 SDCAs selected for the sample, 10% or 30 complainants per sample SDCA by randomly selecting from the list provided by operator.
- Auditors checked and recorded whether the fault was corrected within the timeframes as mentioned in the benchmark

4.1.1.3 COMPUTATIONAL METHODOLOGY

The calculation methodology (given below) as per QoS regulations 2009 (7 of 2009) was followed for calculating fault related parameters.

Fault Incidence:

$$\text{Fault incidences – No. of faults/100 subscriber/month} = \frac{\text{Total number of faults in the Quarter (3 months)}}{\text{Total No. of DELs at the end of the Quarter}} \times \frac{100}{3}$$

Here, DEL or Direct Exchange Line would be the subscribers of wireline services.

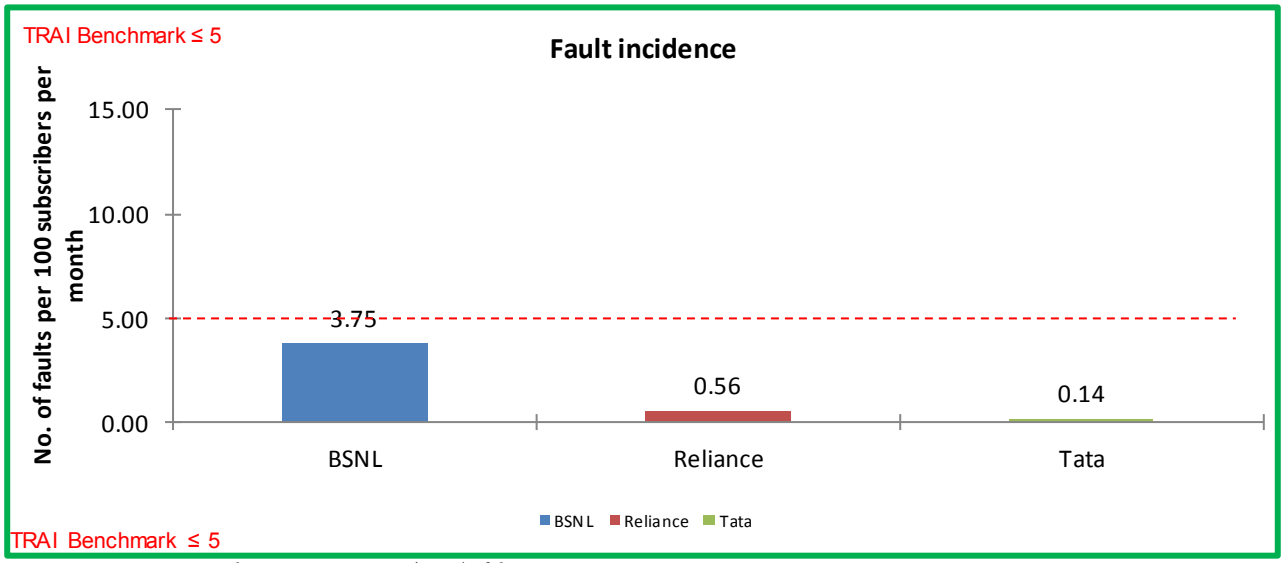
MTTR (Mean Time to Repair):

$$\text{Mean Time to Repair} = \frac{\text{sum of duration of each repair time in hours for all the fault incidences in a Quarter (3 months)}}{\text{Total number of fault incidences in a Quarter (3 months)}}$$

4.1.1.4 BENCHMARK

- Total number of faults registered per month: <=5 complaints per 100 subscribers
- Fault repair:
  - Fault repair by next working day (Urban Exchanges): =>85%
  - Fault repair by next working day (Rural Exchanges): =>75%
  - Fault repair within 5 working days (Urban Exchanges): =100%
  - Fault repair within 7 working days (Rural Exchanges): =100%
- Mean Time to Repair: 10 hours

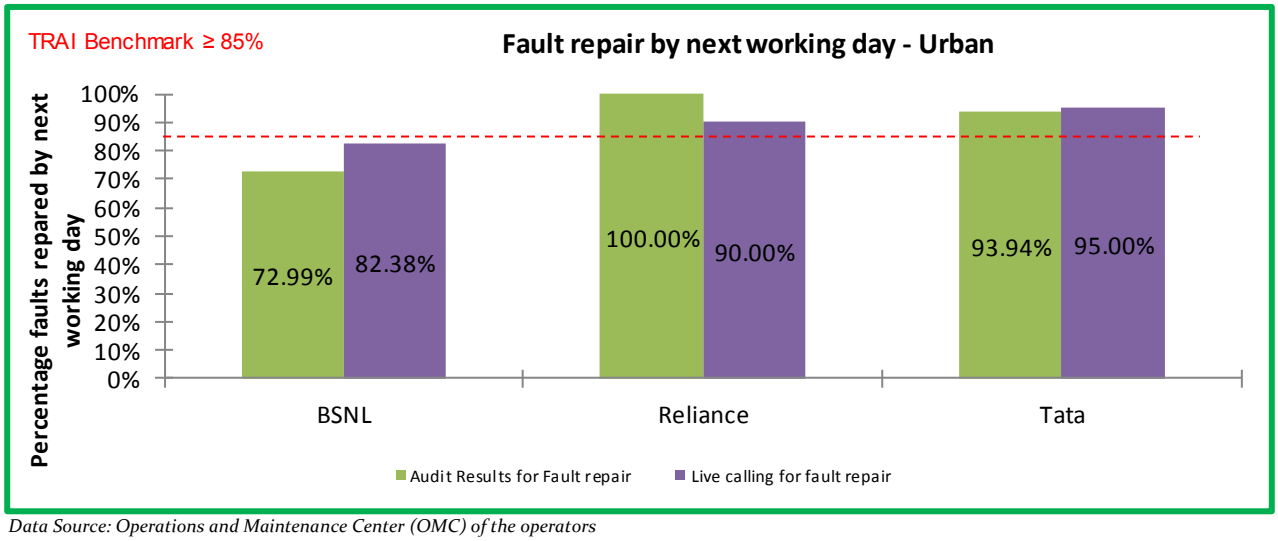
4.1.2 DETAILED FINDINGS - FAULT INCIDENCE



Data Source: Operations and Maintenance Center (OMC) of the operators

All operators met the benchmark for fault incidence.

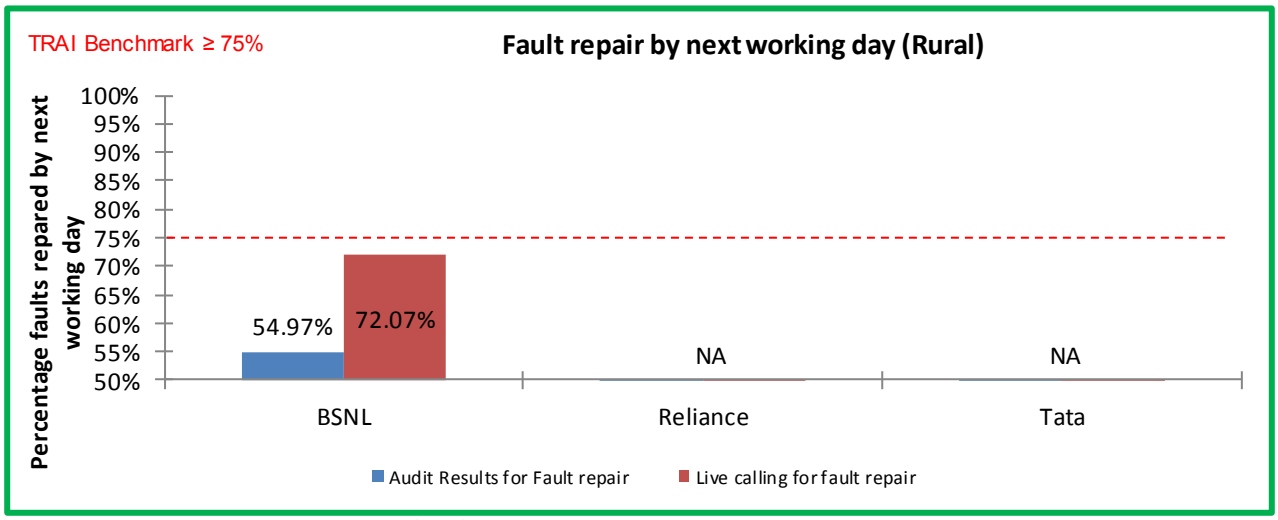
4.1.3 DETAILED FINDINGS - FAULT REPAIR BY NEXT DAY (URBAN)



Data Source: Operations and Maintenance Center (OMC) of the operators

In urban areas, BSNL failed to meet the benchmark of fault repair within next day.

4.1.1 DETAILED FINDINGS - FAULT REPAIR BY NEXT DAY (RURAL)

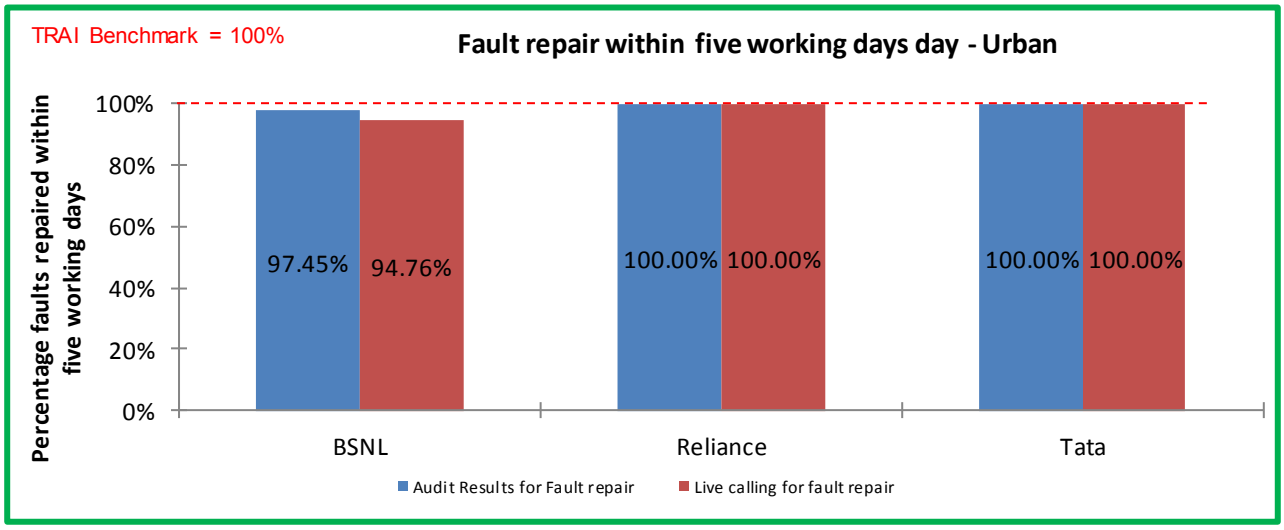


Data Source: Operations and Maintenance Center (OMC) of the operators

BSNL failed to meet the benchmark of fault repair within next day in rural areas.

NA: Reliance and Tata do not have network presence in rural and hilly areas.

4.1.2 FINDINGS - FAULT REPAIR WITHIN FIVE WORKING DAYS (URBAN)

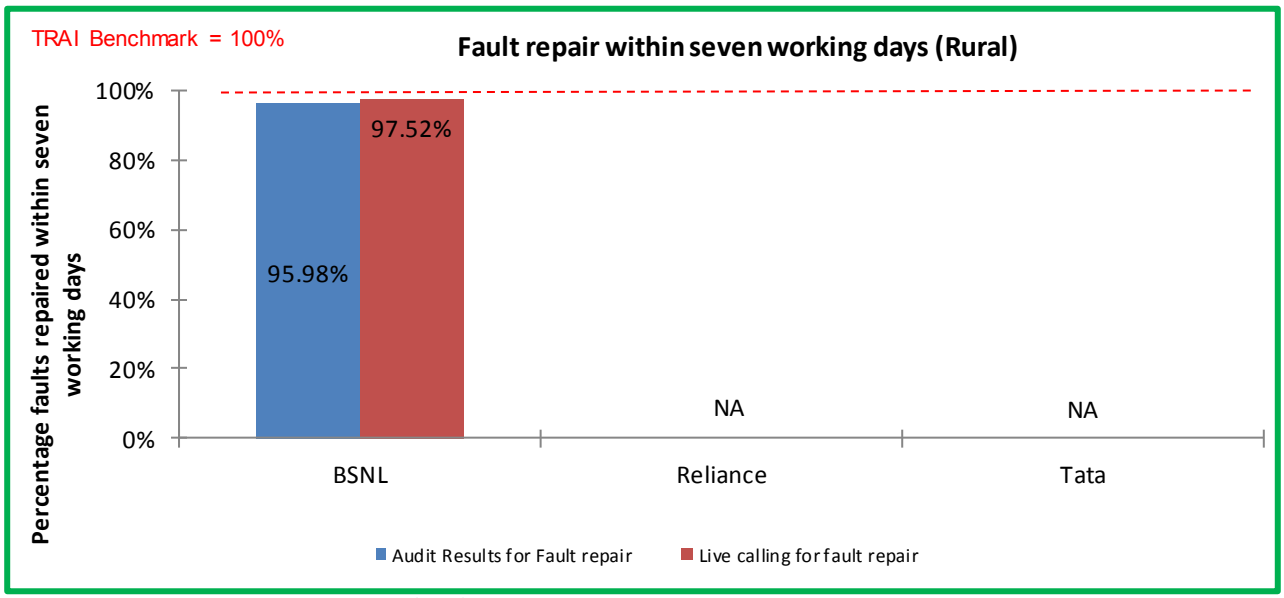


Data Source: Operations and Maintenance Center (OMC) of the operators

BSNL failed to meet the benchmark of fault repair within five working days in urban areas. Also, during live calling the performance of the operator was slightly below the audit results.

Reliance and Tata met the benchmark for the parameter.

4.1.1 FINDINGS - FAULT REPAIR WITHIN SEVEN WORKING DAYS (RURAL)

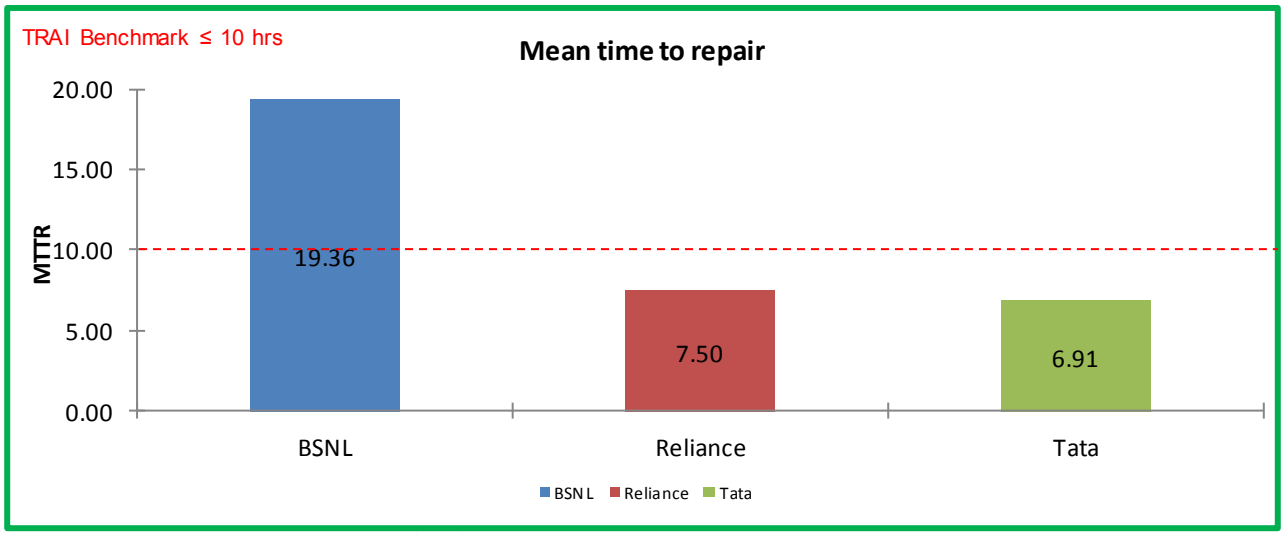


Data Source: Operations and Maintenance Center (OMC) of the operators

BSNL failed to meet the benchmark for parameter as per audit as well as live calling.

NA: Reliance and Tata do not have network presence in rural and hilly areas.

4.1.2 DETAILED FINDINGS - MEAN TIME TO REPAIR



Data Source: Operations and Maintenance Center (OMC) of the operators

BSNL failed the meet the benchmark for MTTR while Reliance and Tata met the benchmark for the parameter.

4.2 CALL COMPLETION RATE

4.2.1 PARAMETER EXPLANATION

4.2.1.1 DEFINITION

Call Completion Rate (CCR) is defined as the ratio of the number of successful calls to the number of call attempts.

- A variety of reasons such as called line busy, no answer and congestion in the network as well as subscriber behavior like premature release, wrong dialing etc. are responsible for the failure. Congestion or blocking occurs due to either common control equipment overload condition in the exchange or congestion in the trunk circuit /junction group to handle the calls.

4.2.1.2 AUDIT PROCEDURE

IMRB Auditors verified and collected data pertaining to Sample Traffic Data during Time Consistent Busy Hour (TCBH). These details were collected separately for

- Three days in which live measurement was carried out
- For the complete quarter in which audit was carried out

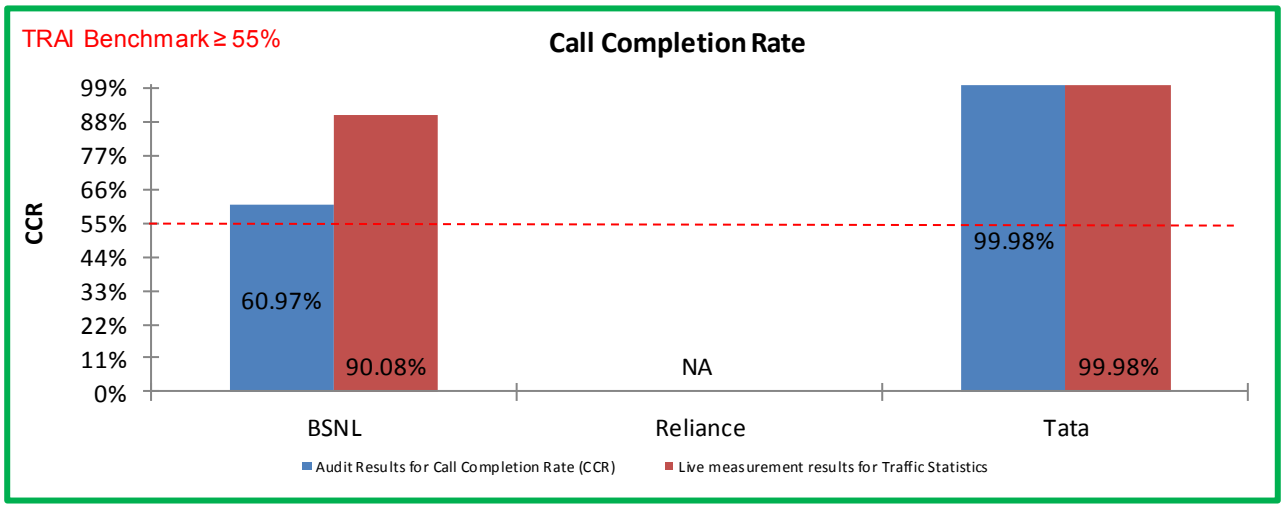
4.2.1.3 COMPUTATIONAL METHODOLOGY

CCR = [(Call attempts – Calls blocked)/Call attempts] X 100

4.2.1.4 BENCHMARK

- Call Completion Rate (CCR) within local network: More than 55%

4.2.2 DETAILED FINDINGS - CALL COMPLETION RATE



Data Source: Network Operations Center (NOC) of the operators

BSNL & Tata met the benchmark of 55% CCR during audit as well as live measurement.

NA: Reliance does not use CCR as a measure of traffic.

4.3 ANSWER TO SEIZURE RATIO

4.3.1 PARAMETER EXPLANATION

Due to the difference in the Network Architecture with various service providers, there is a constraint in the measurement of the local network Call Completion Rate for some of the service providers.

- The service providers who cannot measure and report Call Completion Rate due to constraint in network architecture measure and report their performance on Answer to Seizure Ratio. The measurement is made during Time Consistent Busy Hour.

Reliance Communications is furnishing the data of the parameter. Answer Seizure Ratio (ASR) in place of local Call Completion Rate.

"Answer Seizure Ratio" or ASR is generally defined as the ratio of calls answered to the calls processed by the switch.

4.3.1.1 AUDIT PROCEDURE

IMRB Auditors verified and collected data pertaining to Sample Traffic Data during Time Consistent Busy Hour (TCBH). These details were collected separately for

- Three days in which live measurement was carried out
- For the complete quarter in which audit was carried out

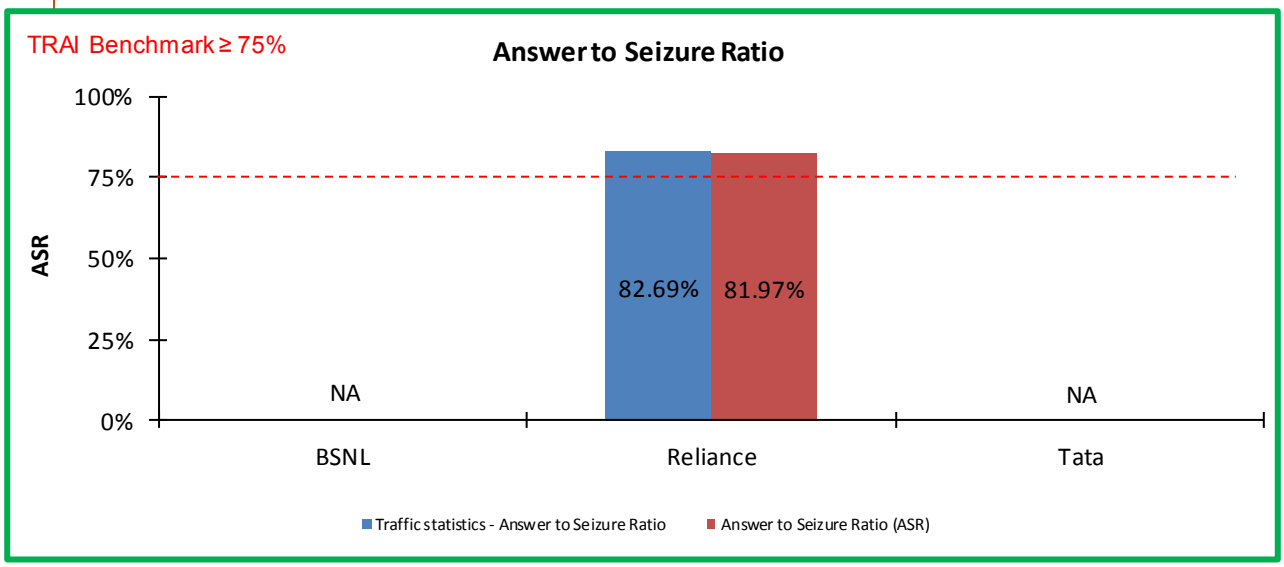
4.3.1.2 COMPUTATIONAL METHODOLOGY

ASR = [(Call attempts – Calls blocked)/Total Calls Processed by the switch] X 100

4.3.1.3 BENCHMARK

- Answer to Seizure Ration (ASR) within local network: More than 75%

4.3.2 DETAILED FINDINGS – ANSWER TO SEIZURE RATIO



Reliance met the benchmark for the parameter during audit as well as live measurement.

NA: BSNL & Tata do not use ASR (Answer to seizure ratio) as a measure of traffic.

4.4 METERING AND BILLING CREDIBILITY

4.4.1 PARAMETER EXPLANATION

All the complaints related to billing as per clause 3.7.2 of QoS regulation of 20th March, 2009 were covered. The types of billing complaints covered are listed below.

- Payments made and not credited to the subscriber account
- Payment made on time but late payment charge levied wrongly
- Double charges
- Charging for toll free services
- Local calls charged/billed as STD/ISD or vice versa
- Calls made disputed
- Credit agreed to be given in resolution of complaint, but not accounted in the bill

- Charging for services provided without consent
- Charging not as per tariff plans
- Overcharging or undercharging

In addition to the above, any billing complaint which leads to billing error, waiver, refund, credit, or any adjustment is also considered as a valid billing complaint for calculating the number of disputed bills.

4.4.1.1 AUDIT PROCEDURE

IMRB Auditors to verify and collect data pertaining to –

- Number of Billing complaints received at the service provider's level
- Last billing cycle stated should be such that due date for payment of bills must be beyond the date when this form is filled.
- Include all types of bills generated for customers. This could include online as well as other forms of bills presentation including printed bills
- Billing complaint is any of written complaint/ personal visit/ telephonic complaint related to: Excess metering/ wrong tariff scheme charged, Payment made in time but charged penalty/ not reflected in next bill, Last payment not reflected in bill, Adjustment/ waiver not done, Anything else related to bills, Toll free numbers charged etc.
- Billing complaints resolution database, with opening and closing date of complaint to identify the time taken to resolve a complaint

Live calling:

- Auditors request the operator provided the database of all the subscribers who reported billing complaints in one month prior to IMRB 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.

Benchmarks:

- 98% complaints resolved within 4 weeks, 100% complaints resolved within 6 weeks

4.4.1.2 COMPUTATIONAL METHODOLOGY – METERING AND BILLING CREDIBILITY

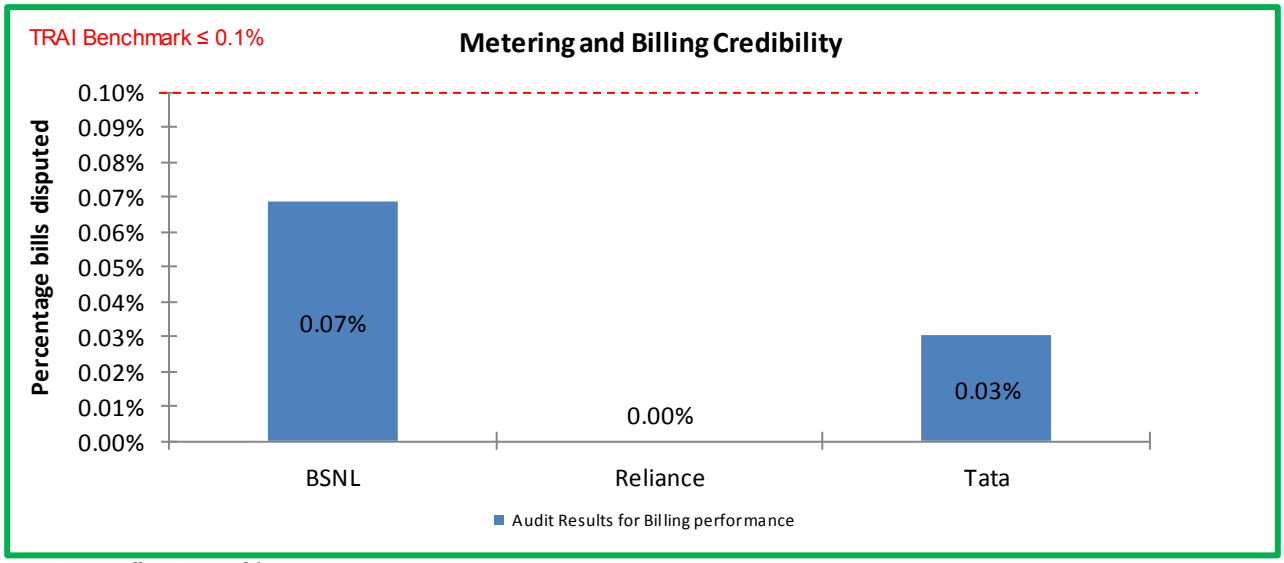
The calculation methodology (given below) as per QoS regulations 2009 (7 of 2009) was followed to calculate incidence of billing complaints.

$$\text{Billing complaints (\%)} = \frac{\text{total number of disputed bills X 100}}{\text{total number of bills issued during one billing cycle.}}$$

- *Operator to include all types of bills generated for customers. This would include printed bills, online bills and any other forms of bills generated
- **Billing complaints here shall include only dispute related issues (including those that may arise because of a lack of awareness at the subscribers' end). It does not include any provisional issues (such as delayed dispatch of billing statements, etc.) in which the operator has opened a ticket internally.

TRAI Benchmark: < 0.1%

4.4.1.3 METERING AND BILLING CREDIBILITY – AUDIT FINDINGS



Data Source: Billing Center of the operators

All operators met the benchmark for the parameter.

4.4.1.4 COMPUTATIONAL METHODOLOGY – RESOLUTION OF BILLING COMPLAINTS

- **Calculation of Percentage resolution of billing complaints**

The calculation methodology (given below) as per QoS regulations 2009 (7 of 2009) and TRAI guidelines (Received on Sep 08, 2015) was followed to calculate resolution of billing complaints.

Resolution of billing complaints within 4 weeks:

%age of billing complaints (for post-paid customers)/ charging, credit & validity (for pre-paid customers) resolved within 4 weeks =

$$\frac{\text{number of billing complaints for post-paid customers/charging, credit/ validity complaints for pre-paid customers resolved within 4 weeks during the quarter}}{\text{number of billing/charging, credit / validity complaints received during the quarter}} \times 100$$

Resolution of billing complaints within 6 weeks:

%age of billing complaints (for post-paid customers)/ charging, credit & validity (for pre-paid customers) resolved within 6 weeks =

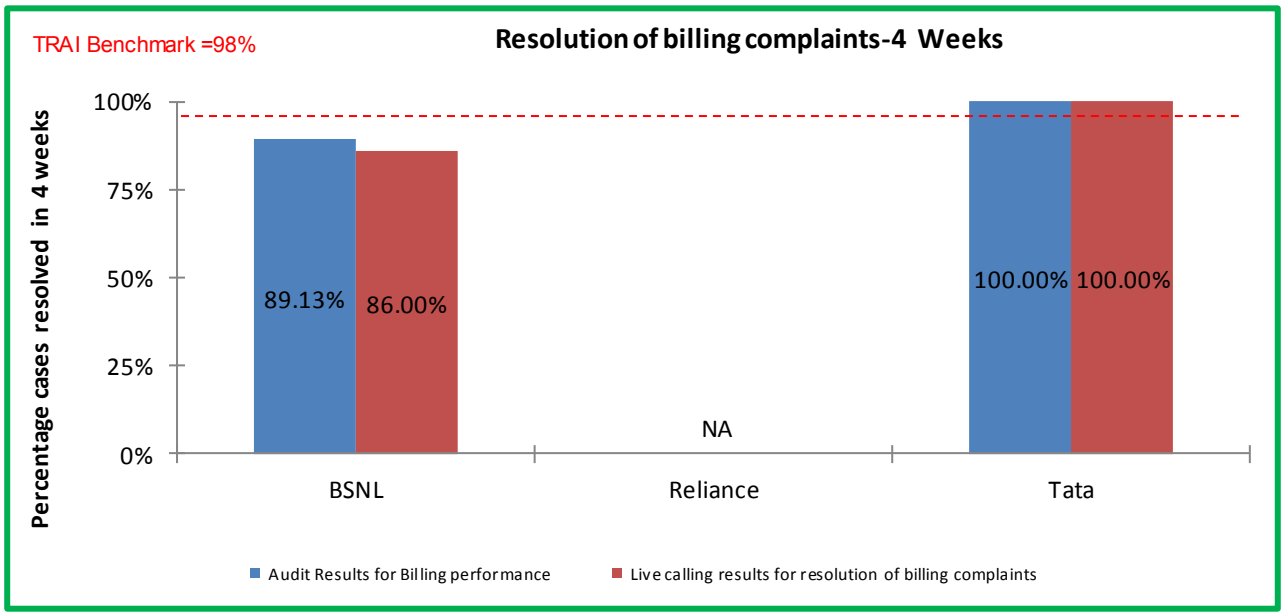
$$\frac{\text{number of billing complaints for post-paid customers/charging, credit/ validity complaints for pre-paid customers resolved within 6 weeks during the quarter}}{\text{number of billing/charging, credit / validity complaints received during the quarter}} \times 100$$

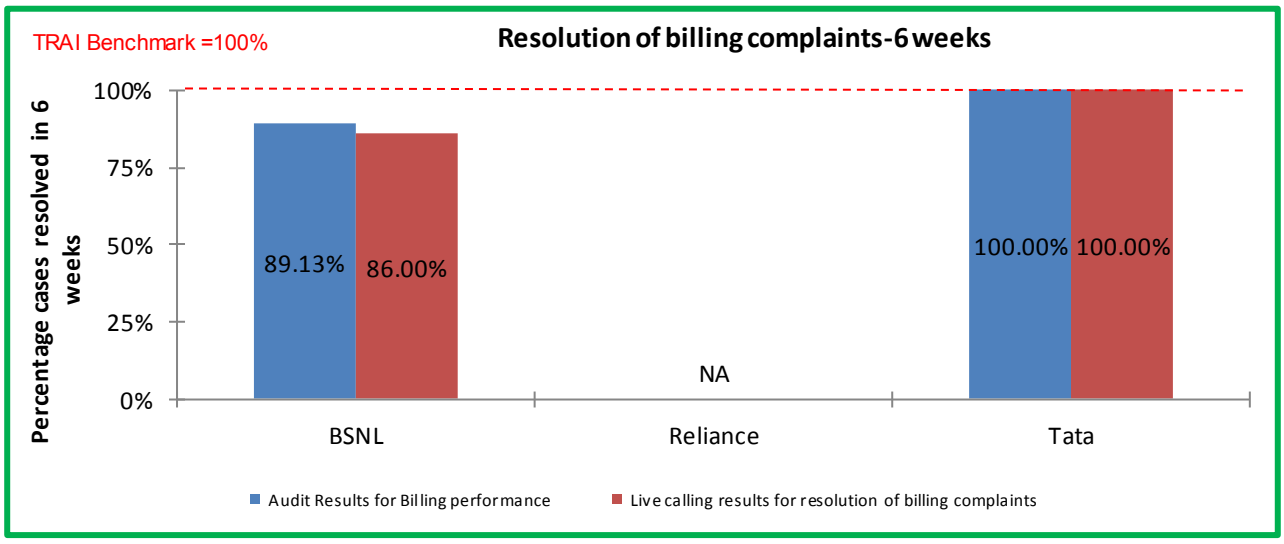
- **Billing complaints here shall include only dispute related issues (including those that may arise because of a lack of awareness at the subscribers' end). It does not include any provisional issues (such as delayed dispatch of billing statements, etc.) in which the operator has opened a ticket internally. Complaints raised by the consumers to operator are only considered as part of the calculation.
- The complaints that get marked as invalid by the operator are not considered for calculation as those complaints cannot be considered as resolved by the operator.

↳ *** Date of resolution in this case would refer to the date when a communication has taken place from the operator's end to inform the complainant about the final resolution of the issue / dispute.

Benchmark: 98% complaints resolved within 4 weeks, 100% within 6 weeks.

4.4.1.5 RESOLUTION OF BILLING COMPLAINTS – AUDIT FINDINGS





As per audit conducted, BSNL failed to meet the benchmark for resolution of billing complaints within 4 weeks and within 6 weeks. BSNL also failed to meet the benchmark during live calling.

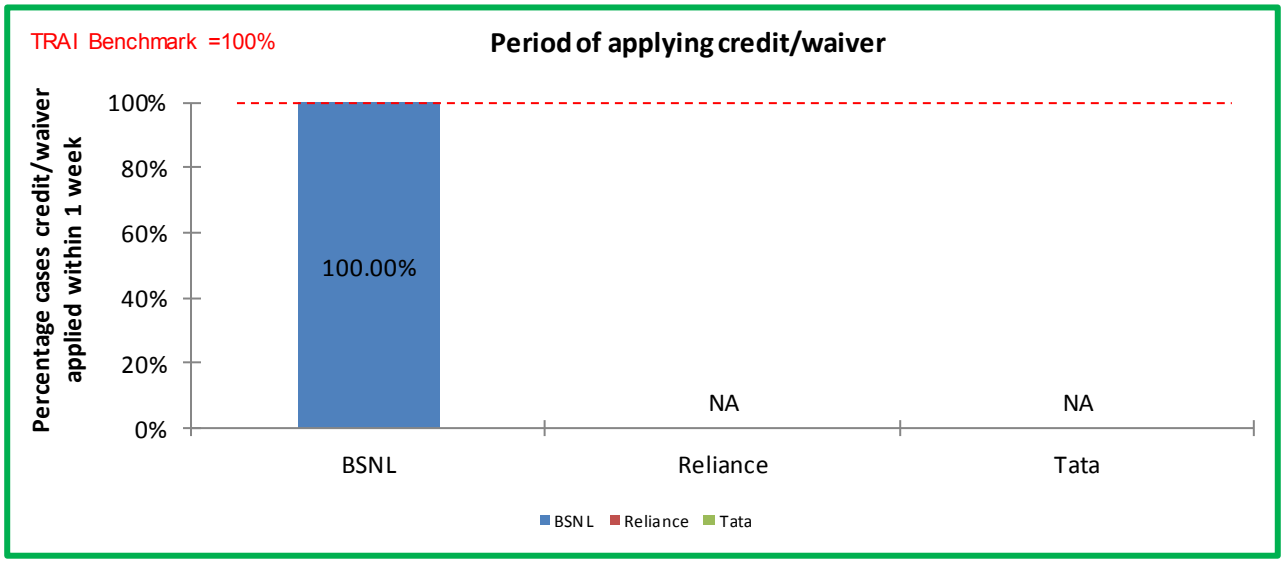
NA: Parameter not applicable for Reliance as no billing complaints were logged in the audit period.

4.4.1.6 COMPUTATION METHODOLOFY - PERIOD OF APPLYING CREDIT WAIVER

This parameter measures whether all refunds in the form of credit/ waiver/ adjustment are made within 7 days from the date of resolution of complaint.

- Computational Methodology:
  - 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
- TRAI Benchmark:
  - Period of applying credit waiver within 7 days: 100%
- Audit Procedure:
  - Operator to provide details of:-
    - Dates of applying credit waiver to all the eligible cases.
    - Dates of lodging the request for applying credit waiver for all eligible cases

4.4.1.7 PERIOD OF APPLYING CREDIT WAIVER – AUDIT FINDINGS



BSNL met the benchmark for the parameter.
NA: Reliance and Tata had no cases where credit/ waiver was required during the audit period.

4.5 RESPONSE TIME TO CUSTOMER

4.5.1 PARAMETER EXPLANATION

Following two sub-parameters are covered for this parameter:

- Accessibility of Call Centre: The percentage of calls getting connected and answered by the call center. Not more than 5% calls shall encounter busy signal, no reply or any other failure in getting connected to the IVR.

- % age of calls answered by operators (voice to voice) within stipulated time: Not more than 5% calls shall encounter busy signal, no reply or any other failure in getting connected to the call center executive.

4.5.1.1 AUDIT PROCEDURE

- IMRB auditors collect the data for time taken to connect a customer's call both to the IVR as well as to a customer care executive.
- All the supplementary services that have any kind of human intervention are to be covered here. It also includes the IVR assisted services.

Live calling:

- Overall sample size was 100 calls per service provider per circle at different points of time, evenly distributed across the selected exchanges – 50 calls between 1000 HRS to 1300 HRS and 50 calls between 1500 HRS to 1700 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.

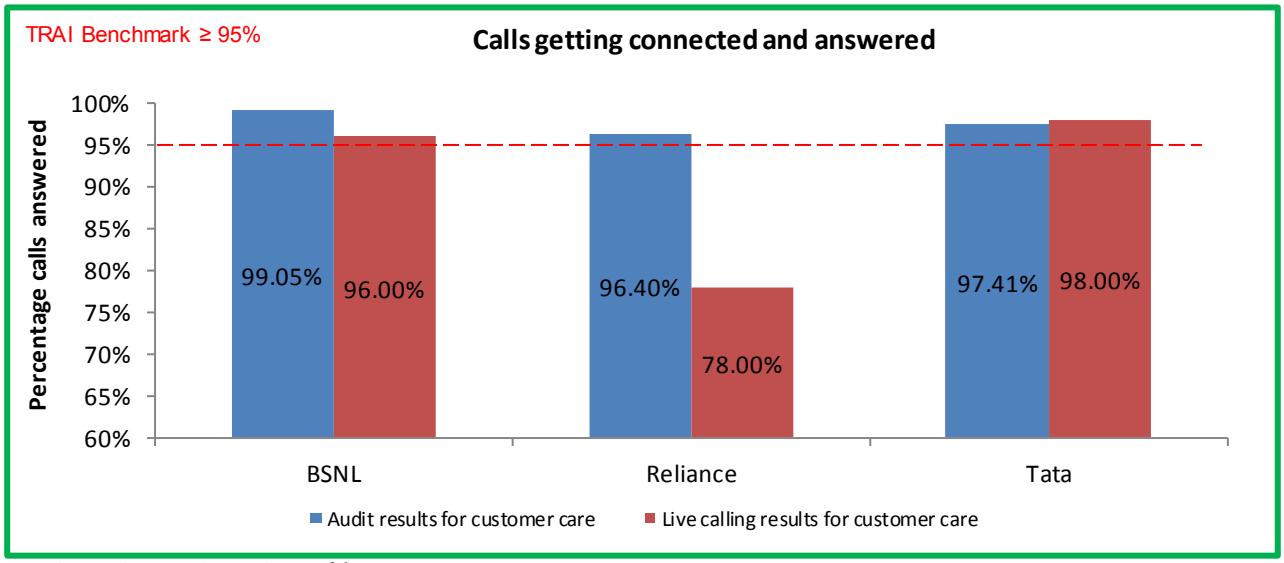
4.5.1.2 COMPUTATIONAL METHODOLOGY

- **Percentage of calls answered in a specified time = (Total no. of calls answered within that specified time / Total no. of calls dialed for a particular service)*100**

4.5.1.3 BENCHMARK

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

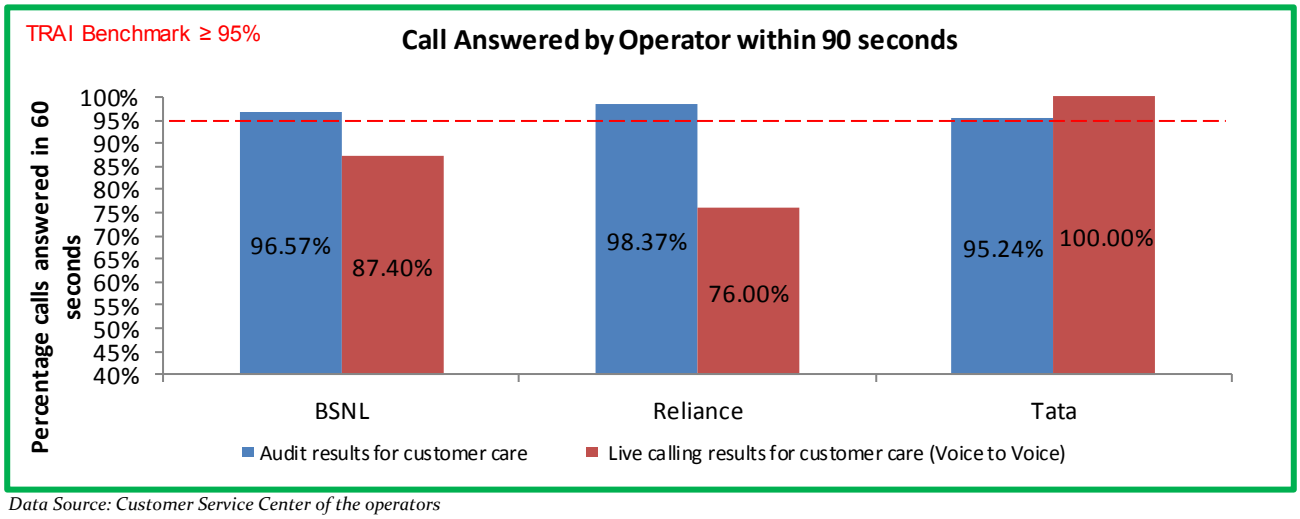
4.5.2 CALLS GETTING CONNECTED AND ANSWERED



Data Source: Customer Service Center of the operators

All operators met the TRAI benchmark in terms of number of IVR calls being connected and answered. However, during live calling, performance of Reliance was below the benchmark level.

4.5.3 CALL ANSWERED BY OPERATOR WITHIN 90 SECONDS



Data Source: Customer Service Center of the operators

The benchmark of 95% of voice to voice calls answered within stipulated time of 90 seconds was met by all operators. However, during live calling it was observed that BSNL and Reliance failed to meet the benchmark.

4.6 CUSTOMER CARE PROMPTNESS

4.6.1 PARAMETER EXPLANATION

4.6.1.1 AUDIT PROCEDURE

IMRB Auditors collected and verified data pertaining to -

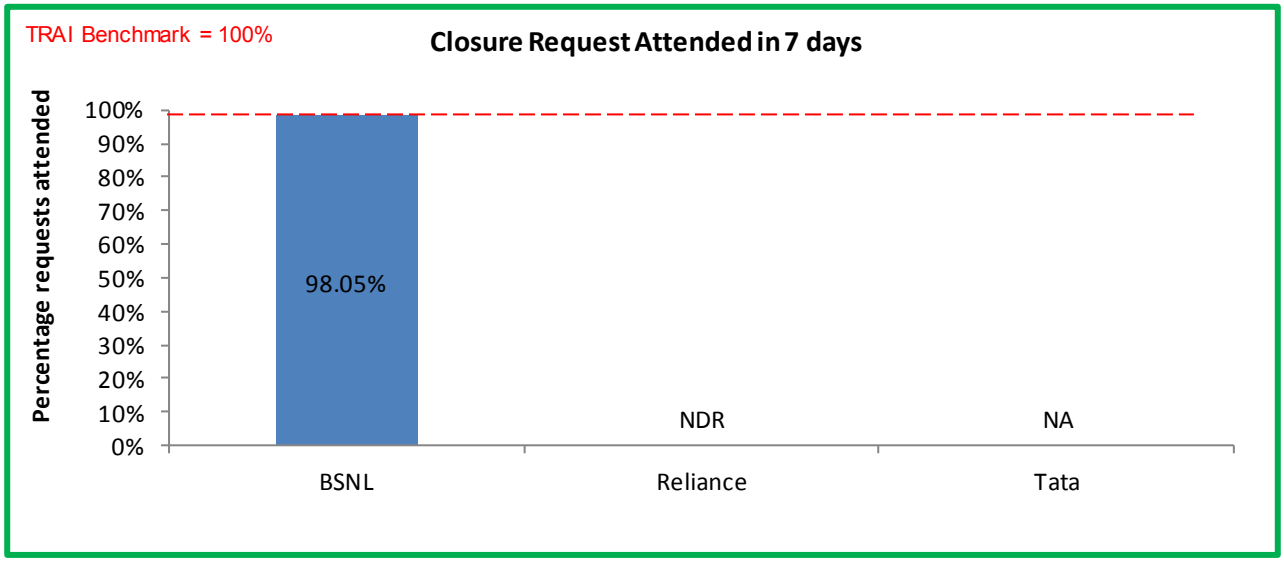
Processing of closure request (Following key points were taken care of while verifying the data)

- The operator includes all Requests for volunteer Permanent Closure and External (shifts to other exchanges) Shift requests received at their exchange.
- DNP (due to Non – payment) cases are excluded.
- All holidays are excluded for calculating 7 days.
- Closure requests attended in the previous months are excluded
- The period for closure starts from the time of submission of application by the subscriber.

4.6.1.2 BENCHMARK

- Processing of closure requests within 7 days = 100%

4.6.2 FINDINGS - CLOSURE REQUEST ATTENDED IN 7 DAYS



Data Source: Customer Service Center of the operators

BSNL failed to meet the benchmark for the parameter.

NA: Reliance and Tata did not have any closure request during the audit period.

4.7 TIME TAKEN TO REFUND DEPOSIT AFTER CLOSURE

4.7.1 PARAMETER EXPLANATION

4.7.1.1 AUDIT PROCEDURE

IMRB Auditors verified and collected data pertaining to -

- Cases requiring refund of deposits after closure are to be included.
- Time taken starts from the date on which the closure is made by the service provider and ends at the date on which refund is received by the customer

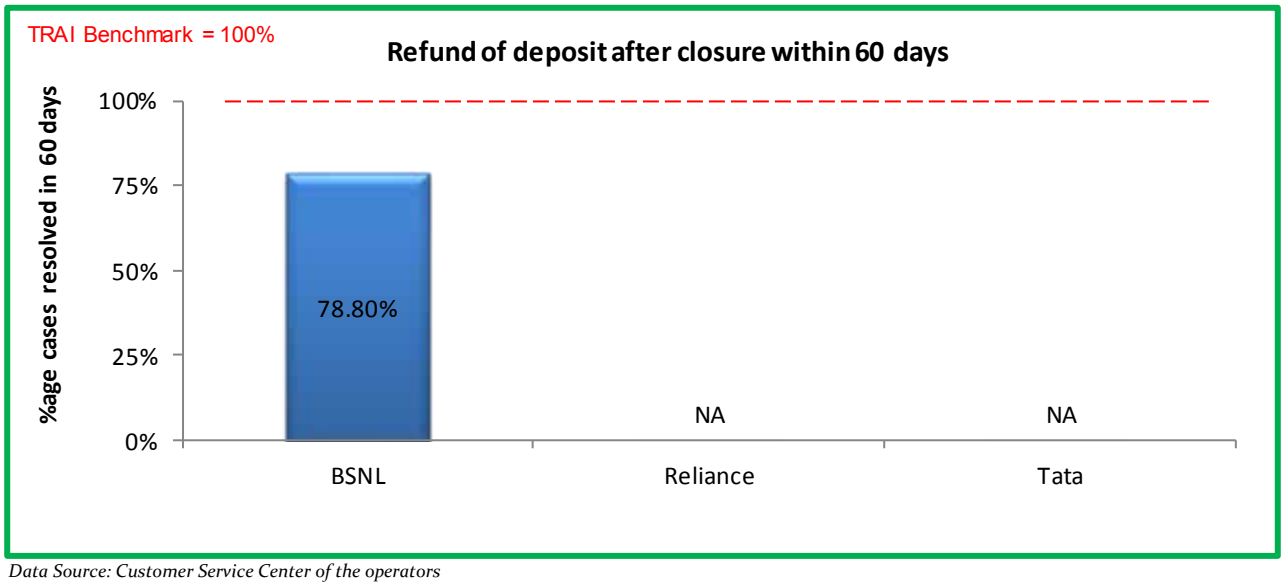
4.7.1.2 COMPUTATIONAL METHODOLOGY

- **Percentage of cases where refund has been made within stipulated time = (Total no. of cases where refund was made within stipulated time/ Total no. of cases requiring refunds)*100**

4.7.1.3 BENCHMARK

- Time taken to refund = 100% within 60 days

4.7.2 FINDINGS - REFUND OF DEPOSIT AFTER CLOSURE WITHIN 60 DAYS



Data Source: Customer Service Center of the operators

BSNL failed to meet the benchmark for the parameter.

NA: Reliance and Tata did not have any closure request during the audit period.

5 ANNEXURE – AMJ'15

5.1 FAULT INCIDENCE / CLEARANCE STATISTIC

Audit Results for Fault repair				
Fault incidences	Benchmark	BSNL	Reliance	Tata
Faults incidences (Urban)	≤ 7	3.75	0.56	0.14
Fault repair (Urban areas)	Benchmark	BSNL	Reliance	Tata
Total No. of faults registered during the quarter		75684	45	33
No. of faults repaired by next working day during the quarter		55244	45	31
Percentage of faults repaired by next working day during the quarter	≥ 85%	72.99%	100.00%	93.94%
No. of faults repaired within 5 days during the quarter		73752	45	33
Percentage of faults repaired within 5 days during the quarter	100%	97.45%	100.00%	100.00%
Fault repair (Rural & Hilly areas)	Benchmark	BSNL	Reliance	Tata
Total No. of faults registered during the quarter		3578	NA	NA
No. of faults repaired by next working day during the quarter		1967	NA	NA
Percentage of faults repaired by next working day during the quarter	≥ 75%	54.97%	NA	NA
No. of faults repaired within 7 days during the quarter		3434	NA	NA
Percentage of faults repaired within 7 days during the quarter	100%	95.98%	NA	NA

Data Source: Operations and Maintenance Center (OMC) of the operators

Rent rebate	Benchmark	BSNL	Reliance	Tata
No. of cases with faults pending for >5 days and ≤7 days		1932	NA	NA
Out of these number of cases where rent rebate for 7 days was given		1932	NA	NA
Percentage of cases where rent rebate for 7 days was given	100%	100.00%	NA	NA
No. of cases with faults pending for >7 days and ≤15 days		712	NA	NA
Out of these number of cases where rent rebate for 15 days was given		712	NA	NA
Percentage of cases where rent rebate for 15 days was given	100%	100%	NA	NA
No. of cases with faults pending for ≥15 days		351	NA	NA
Out of these number of cases where rent rebate for 30 days was given		351	NA	NA
Percentage of cases where rent rebate for 30 days was given	100%	100.00%	NA	NA
MTTR (Urban + Rural)	Benchmark	BSNL	Reliance	Tata
Mean time taken to repair the fault in hours	≤ 10 Hrs	19.36	7.50	6.91

Data Source: Operations and Maintenance Center (OMC) of the operators

NA: Rent rebate not applicable for Reliance & Tata as all faults were repaired within stipulated time.

Live calling for fault repair				
Urban area	Benchmark	BSNL	Reliance	Tata
Total Number of calls made		420	30	20
Number of cases where faults were repaired by next working day		346	27	19
Percentage cases where faults were repaired by next working day	≥ 85%	82.38%	90.00%	95.00%
Number of cases where faults were repaired within 5 days		398	30	20
Percentage cases where faults were repaired within 5 days	100%	94.76%	100.00%	100.00%
Fault Repair (Rural & Hilly areas)	Benchmark	BSNL	Reliance	Tata
Total Number of calls made		1450	NA	NA
Number of cases where fauls were repaired by next working day		1045	NA	NA
Percentage cases where faults were repaired by next working day	≥ 75%	72.07%	NA	NA
Number of cases where faults were repaired within 7 days		1414	NA	NA
Percentage cases where faults were repaired within 7 days	100%	97.52%	NA	NA

Data Source: Live calls made by auditors from operator's network

NA: Reliance and Tata do not have network presence in rural and hilly areas.

Number of calls made for fault repair lower than target due to low base of fault repair incidences.

5.2 TRAFFIC STATISTICS

Audit Results for Call Completion Rate (CCR)				
Traffic statistics - Call Completion Rate	Benchmark	BSNL	Reliance	Tata
Total local call attempts		10247917	NA	924411
Total number of successful local calls		6248173	NA	924240
Call Completion Rate (CCR) in the local network	≥ 55%	60.97%	NA	99.98%
Traffic statistics - Answer to Seizure Ratio	Benchmark	BSNL	Reliance	Tata
Total number of calls processed by the switch		NA	42226	NA
Total number of calls answered		NA	34915	NA
Answer to Seizure Ratio (ASR)	≥ 75%	NA	82.69%	NA
Live measurement results for Traffic Statistics				
Traffic statistics - Call Completion Rate	Benchmark	BSNL	Reliance	Tata
Total local call attempts		53056	NA	36936
Total number of successful local calls		47795	NA	36930
Call Completion Rate (CCR) in the local network	≥ 55%	90.08%	NA	99.98%
Traffic statistics - Answer to Seizure Ratio	Benchmark	BSNL	Reliance	Tata
Total number of calls processed by the switch		NA	1337	NA
Total number of calls answered		NA	1096	NA
Answer to Seizure Ratio (ASR)	≥ 75%	NA	81.97%	NA

Data Source: Network Operations Center (NOC) of the operators

NA: Reliance does not use CCR (Call Completion Rate) while BSNL and Tata do not use ASR (Answer to seizure ratio) as a measure of traffic.

5.3 POI CONGESTION

Audit Results for POI Congestion - Consolidated				
POI congestion	Benchmark	BSNL	Reliance	Tata
Total capacity of all POIs (Average of 3 months)		2773	1024	NA
Served traffic for all POI's (Average of 3 months)		1245	40	NA
Traffic failed on all POI's (Average of 3 months)	≤ 0.5%	0.00%	0.00%	NA
POI congestion	Benchmark	BSNL	Reliance	Tata
No. of POIs not meeting benchmark (Avg. of 3 months)		0	0	NA
Total number of working POIs (Avg. of 3 months)		98	25	NA
Audit Results for POI Congestion - April				
POI congestion	Benchmark	BSNL	Reliance	Tata
Total capacity of all POIs		2745	1024	NA
Served traffic for all POI's		1234	38	NA
Traffic failed on all POI's	≤ 0.5%	0.00%	0.00%	NA
POI congestion	Benchmark	BSNL	Reliance	Tata
No. of POIs not meeting benchmark		0	0	NA
Total number of working POIs		97	25	NA
Audit Results for POI Congestion - May				
POI congestion	Benchmark	BSNL	Reliance	Tata
Total capacity of all POIs		2788	1024	NA
Served traffic for all POI's		1226	40	NA
Traffic failed on all POI's	≤ 0.5%	0.00%	0.00%	NA
POI congestion	Benchmark	BSNL	Reliance	Tata
No. of POIs not meeting benchmark		0	0	NA
Total number of working POIs		97	25	NA
Audit Results for POI Congestion - June				
POI congestion	Benchmark	BSNL	Reliance	Tata
Total capacity of all POIs		2786	1024	NA
Served traffic for all POI's		1275	41	NA
Traffic failed on all POI's	≤ 0.5%	0.00%	0.00%	NA
POI congestion	Benchmark	BSNL	Reliance	Tata
No. of POIs not meeting benchmark		0	0	NA
Total number of working POIs		99	25	NA

Data Source: Network Operations Center (NOC) of the operators

Live measurement results for POI congestion				
POI congestion	Benchmark	BSNL	Reliance	Tata
Total capacity of all POIs		2786	1024	NA
Served traffic for all POI's		1298	11	NA
Traffic failed on all POI's	≤ 0.5%	0.00%	0.00%	NA
POI congestion	Benchmark	BSNL	Reliance	Tata
No. of POIs not meeting benchmark		0	0	NA
Total number of working POIs		99	25	NA

Data Source: Network Operations Center (NOC) of the operators

NA: In case of POI for Tata, there is no direct POI from Wireline MSC. All Calls are getting routed via InterMSC TGs with GSM/ CDMA MSCs. So, Total number of working POI is not present in the wireline system of Tata. The operator system is not equipped to provide the POI data separately for wireline.

5.4 METERING AND BILLING CREDIBILITY

Audit Results for Billing performance				
Billing Performance	Benchmark	BSNL	Reliance	Tata
Billing diputes				
Total bills generated during the quarter		572621	426	16414
Total number of bills disputed		393	0	5
Percentage bills disputed (Average of 3 billing cycles)	≤ 0.1%	0.07%	0.00%	0.03%
Audit Results for Billing performance - Billing Cycle Wise				
Total bills generated (Cycle 1)		187604	142	5482
Total number of bills disputed (Cycle 1)		123	0	1
Percentage bills disputed (Cycle 1)	≤ 0.1%	0.07%	0.00%	0.02%
Total bills generated (Cycle 2)		197453	142	5482
Total number of bills disputed (Cycle 2)		181	0	3
Percentage bills disputed (Cycle 2)	≤ 0.1%	0.09%	0.00%	0.05%
Total bills generated (Cycle 3)		187564	142	5450
Total number of bills disputed (Cycle 3)		89	0	1
Percentage bills disputed (Cycle 3)	≤ 0.1%	0.05%	0.00%	0.02%
Resolution of billing complaints				
Total number of billing/charging complaints		276	NA	8
Total complaints resolved in 4 weeks from date of receipt		246	NA	8
Percentage complaints resolved within 4 weeks of date of receipt	≥ 98%	89.13%	NA	100.00%
Total complaints resolved in 6 weeks from date of receipt		267	NA	8
Percentage complaints resolved within 6 weeks of date of receipt	100%	96.74%	NA	100.00%

Data Source: Billing Center of the operators

NA: Resolution of complaints parameter not applicable for Reliance as no billing complaints were logged in the audit period for the operator.

Period of applying credit / waiver				
No. of complaints resolved in favour of the customer during the quarter		267	NA	NA
No. of complaints disposed on account of not considered as valid complaints		0	NA	NA
Percentage cases in which credit/waiver was received within 1 week	100%	100.00%	NA	NA

Data Source: Billing Center of the operators

NA: Reliance & Tata had no cases where credit/ waiver was required during the audit period.

Live calling results for resolution of billing complaints				
Resolution of billing complaints	Benchmark	BSNL	Reliance	Tata
Total Number of calls made		100	NA	4
Number of cases resolved in 4 weeks		86	NA	4
Percentage cases resolved in 4 weeks	≥ 98%	86.00%	NA	100.00%
Total complaints resolved in 6 weeks from date of receipt		94	NA	4
Percentage complaints resolved within 6 weeks of date of receipt	100%	94.00%	NA	100.00%

NA: Live calling for Reliance was not conducted as there were no complaints reported for the operator in the audit period.

5.5 RESPONSE TIME TO THE CUSTOMER FOR ASSISTANCE

Audit results for customer care				
Customer Care Assessment	Benchmark	BSNL	Reliance	Tata
Total no. of call attempts to call centre / customer care nos.		267450	43444	56477
No. of calls connected and answered successfully to call centre / customer care nos.		264920	41878	55012
Percentage of calls getting connected and answered electronically	≥ 95%	99.05%	96.40%	97.41%
Audit results for customer care (voice to voice)				
Total no. of call attempts to call centre / customer care (voice to voice)		261640	41878	55012
No. of calls connected and answered successfully to call centre / customer care nos.		252660	41197	52394
Percentage of calls answered by the operators (voice to voice) within 90 seconds (Avg of 3 months)	≥ 95%	96.57%	98.37%	95.24%

Data Source: Customer Service Center of the operators

Live calling results for customer care				
Customer Care Assessment	Benchmark	BSNL	Reliance	Tata
Total Number of calls made		1000.00	100.00	100.00
Total Number of calls getting connected and answered		960.00	78.00	98.00
Percentage calls getting connected and answered	≥ 95%	96.00%	78.00%	98.00%

Live calling results for customer care (Voice to Voice)				
Customer Care Assessment	Benchmark	BSNL	Reliance	Tata
Total Number of calls received		1000	100	100
Total Number of calls answered within 90 seconds		874	76	100
Percentage calls answered within 90 seconds	≥ 95%	87.40%	76.00%	100.00%

Data Source: Live calls made by auditors from operator's network

5.6 CUSTOMER CARE - PROMPTNESS IN ATTENDING CUSTOMER REQUEST

Audit Results for Closure Requests				
Closure Requests	Benchmark	BSNL	Reliance	Tata
Total no. of requests received for Closures		154	NA	NA
Total no. of requests for closures attended within 7 days		151	NA	NA
Percentage of requests for closures attended within 7 days	100%	98.05%	NA	NA
Total no. of requests for closures not attended or attended beyond 7 days		3	NA	NA

Data Source: Customer Service Center of the operators

NA: Reliance and Tata did not have any closure request during the audit period.

5.7 TIME TAKEN FOR REFUND OF DEPOSITS AFTER CLOSURE

Audit results for refund of deposits				
Refund	Benchmark	BSNL	Reliance	Tata
Total number of cases requiring refund of deposits		184.00	NA	NA
Total number of cases where refund was made within 60 days		145.00	NA	NA
Percentage cases in which refund was receive within 60 days	100%	78.80%	NA	NA

Data Source: Billing Center of the operators

NA: Reliance and Tata did not have any closure request during the audit period.

5.8 LIVE CALLING FOR LEVEL 1 SERVICES

Live calling for level 1 services				
Level 1 services	Benchmark	BSNL	Reliance	Tata
Total no. of calls made		3000.00	300.00	300.00
Calls answered		2976.00	273.00	296.00
Percentage of Calls answered	≥ 90%	99.20%	91.00%	98.67%

Data Source: Live calling conducted by auditors from operator's network

5.8.1 EXCHANGE WISE LIVE CALLS MADE FOR LEVEL 1 SERVICES - BSNL

Live calling for Level 1 services					
SSA	BERHAMPUR	JARADAGADA	JAYANTIPUR	KUKUDAKHANDI	PATRAPUR
Total no. of calls made	300	300	300	300	300
Calls answered	300	300	300	300	300
SSA	BALIANTA	BALIPATANA	BHINGARPUR	BHUBANESWAR MAIN	DARUTHENGA
Total no. of calls made	300	300	300	300	300
Calls answered	294	297	292	300	293

5.9 EXCHANGE CAPACITY AND SUBSCRIBERS – SAMPLE EXCHANGES

Exchange capacity and Subscribers				
Exchange Capacity & Subscribers		BSNL	Reliance	Tata
Equipped Capacity of the exchange (in erlangs)		31090	64000	3000
Total number of customers served		219845	2999	7795

Data Source: Operations and Maintenance Center (OMC) of the operators

5.10 ABBREVIATIONS

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

1. TRAI – Telecom Regulatory Authority of India
2. QoS – Quality of Service
3. AMJ'15 – Refers to the quarter of Apr, May and Jun 2015
4. IMRB – Refers to IMRB International, the audit agency for this report
5. NOC – Network Operation Center
6. OMC – Operations and Maintenance Center
7. SDCA – Short Distance Charging Area
8. PMR – Performance Monitoring Reports
9. MTTR - Mean Time to Repair faults
10. TCBH – Time Consistent Busy Hour
11. CCR – Call Completion Rate
12. ASR – Answer to Seizure Ratio
13. NA – Not Applicable
14. NC – Non Compliance
15. POI – Point of Interconnection
16. IVR – Interactive Voice Response
17. DEL – Direct Exchange Line
18. STD – Standard Trunk Dialing
19. ISD – International Subscriber Dialing

SCO 47, 5th Floor, Old Judicial Complex, Sector 15
Part 1, Gurgaon, Haryana – 122001

+91 (124) 4217300

www.imrbint.com