EAST ZONE

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

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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

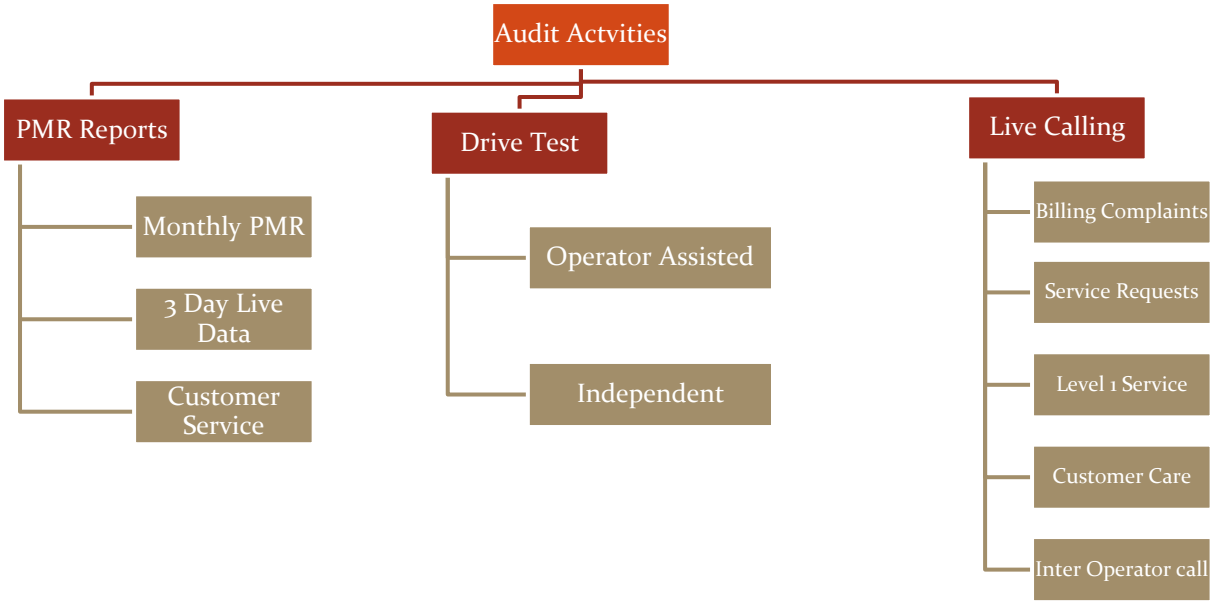
- Audit and Assess the Quality of Services being rendered by Basic (Wireline), Cellular Mobile (Wireless), and Broadband service against the parameters notified by TRAI. (The parameters of Quality of Services (QoS) have been specified by in the respective regulations published by TRAI).
- This report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

2.3 COVERAGE

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

Image Source: BSNL website

2.4 FRAMEWORK USED

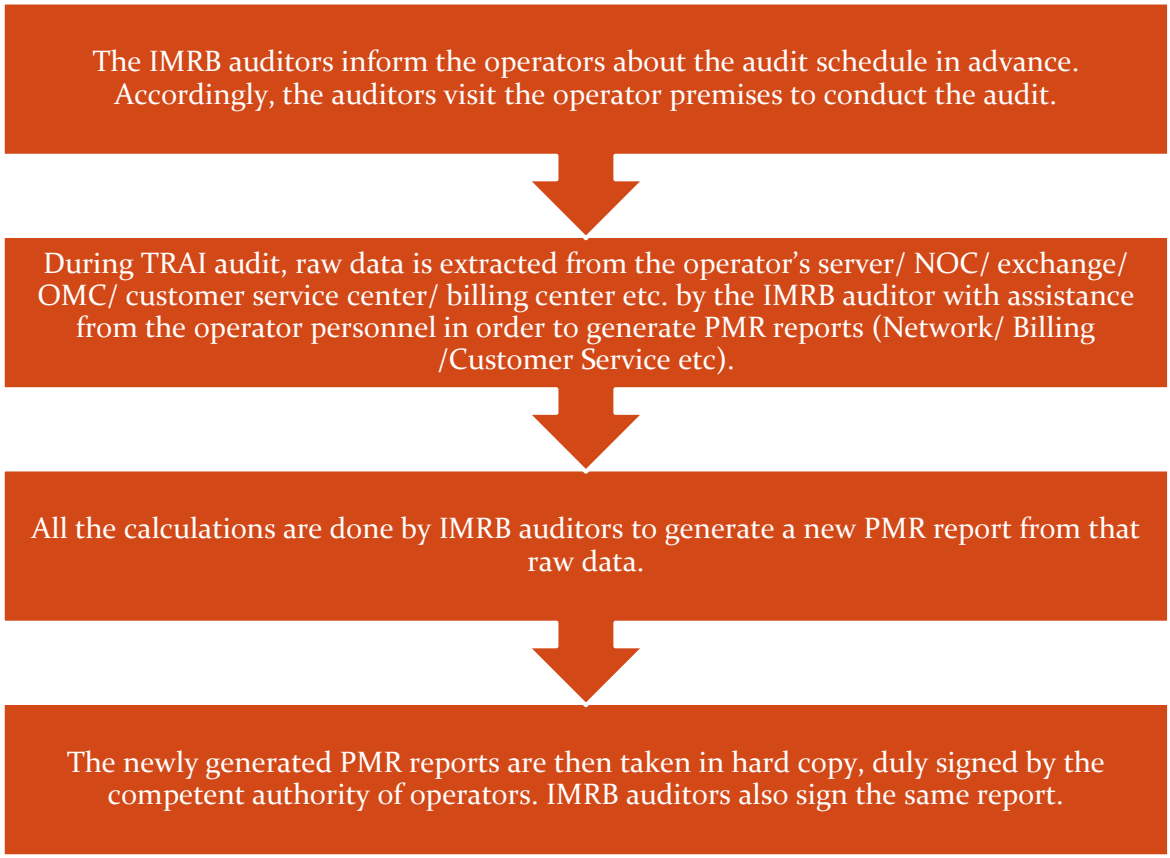


Let's discuss each of the activity in detail and the methodology adopted for each of the module.

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 April 2015 (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

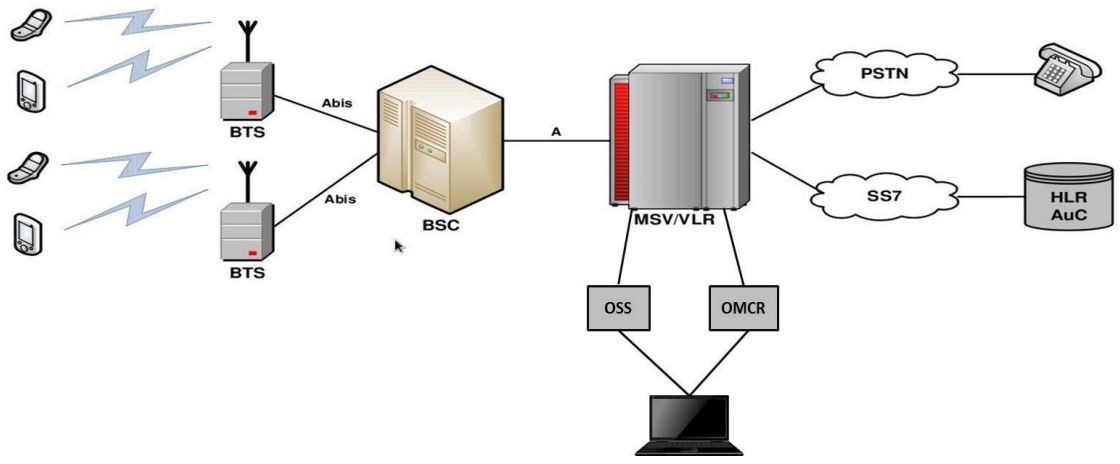
Let us now look at the various parameters involved in the audit reports.

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%

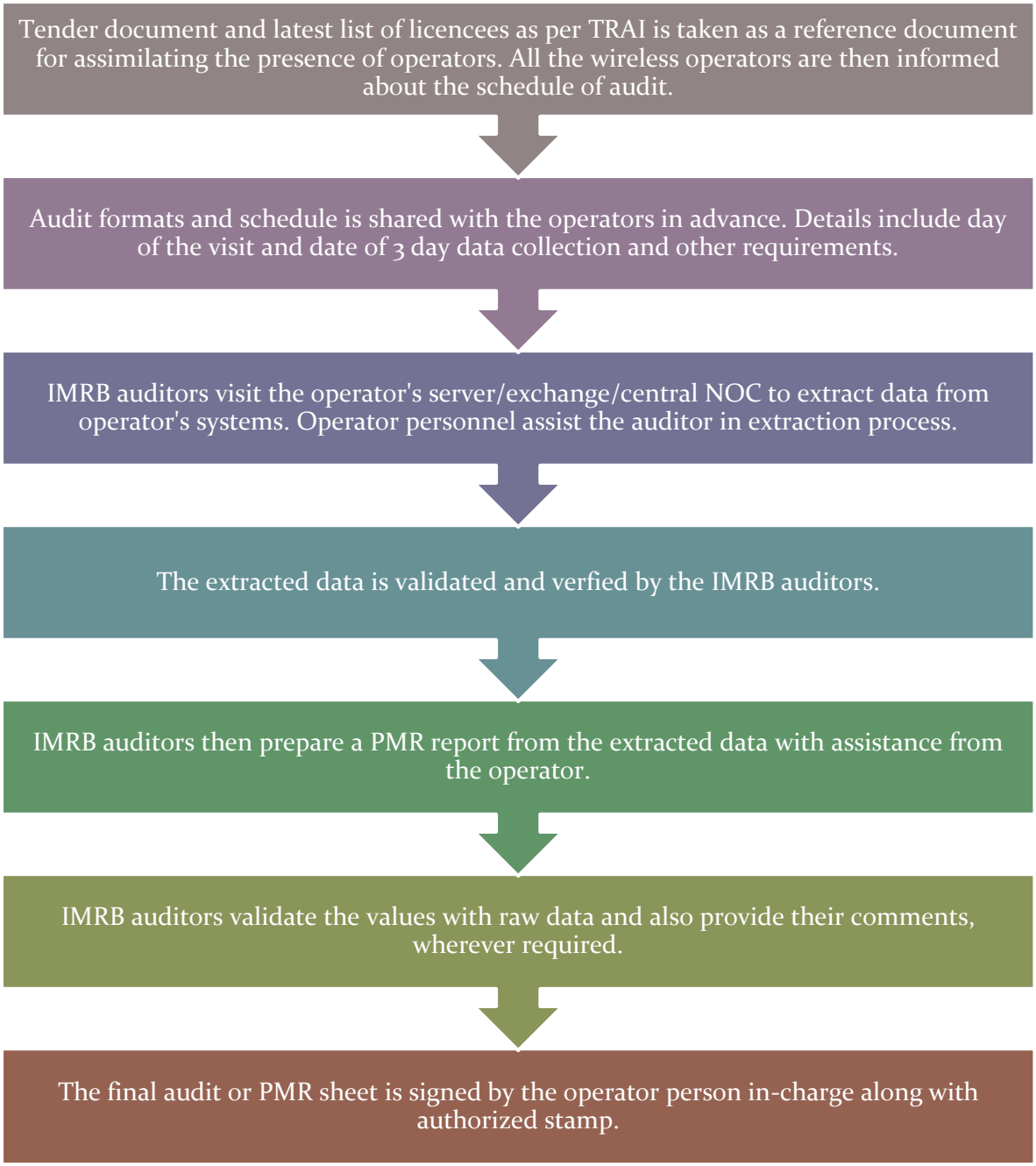
2.4.1.4 POINT OF DATA EXTRACTION

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.

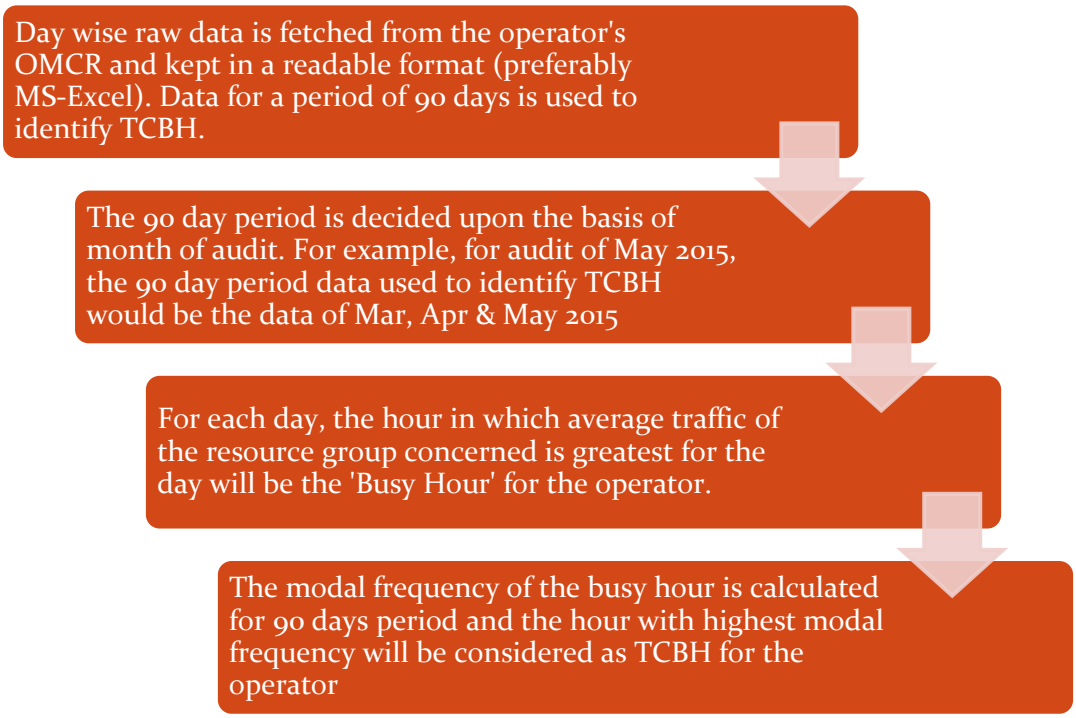
The 3 day live data provides a sample of 9 days in a quarter (3 days each month of a quarter) with hourly performance, which enables the auditor to identify and validate intraday issues for an operator on the QoS network parameters. For example, network congestion being faced by an operator during busy/peak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



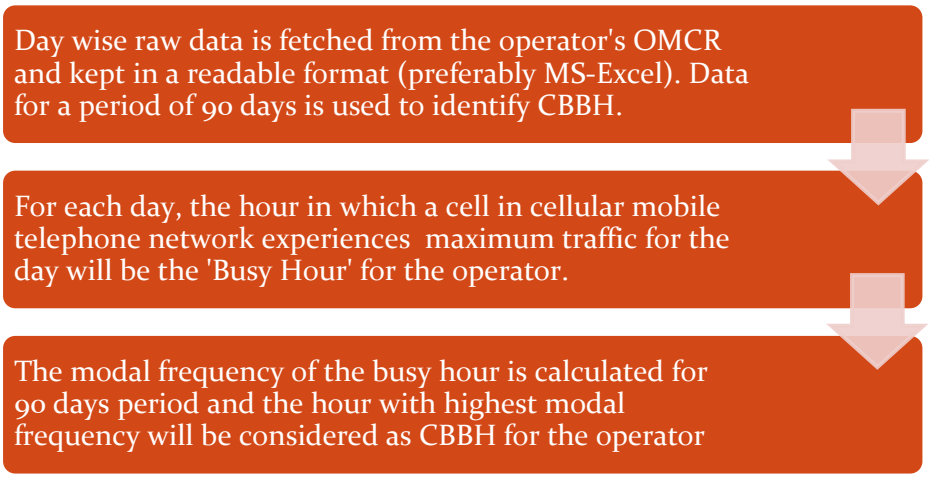
During audit, the auditors identified from the raw data that the TCBH for the operators in AMJ'15 was the time period as given below.

Aircel(DWL)	Airtel	BSNL CDMA	BSNL GSM	Idea	Reliance GSM	Vodafone
19:00-20:00	19:00-20:00	19:00-20:00	18:00-19:00	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 CDMA	BSNL GSM	Idea	Reliance GSM	Vodafone
19:00-20:00	19:00-20:00	19:00-20:00	18:00-19:00	19:00-20:00	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 centre performance (Voice to Voice)	Call centre performance Voice to Voice = (Number of calls answered by operator within 90 seconds/ All calls attempted to connect to the operator) * 100 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 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

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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)	3740660
Airtel	5184900
BSNL CDMA	10559
BSNL GSM	1026300
Idea	863977
Reliance GSM	1962651
Vodafone	3037240

Jun'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 Assam 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)	4.39%	28.19%	93.24%	0.97%	5.08%	1.69%	14.63%	91.37%
Airtel	0.34%	1.61%	93.36%	0.44%	1.47%	1.07%	1.16%	98.35%
BSNL CDMA	18.30%	28.26%	98.39%	NA	0.00%	1.33%	9.57%	84.88%
BSNL GSM	1.87%	1.91%	96.11%	0.87%	1.21%	1.94%	2.95%	95.44%
Idea	1.33%	1.76%	96.90%	0.86%	1.25%	1.63%	1.65%	95.45%
Reliance GSM	0.45%	1.40%	98.48%	0.02%	0.08%	0.67%	0.17%	98.29%
Vodafone	0.65%	1.88%	99.52%	0.16%	0.48%	0.62%	2.56%	98.11%

For Reliance GSM, data is pertaining to Apr'15. Data for May'15 and 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 BSNL CDMA.

Following are the parameter wise observations for wireless operators for Assam circle:

BTSs Accumulated Downtime:

Aircel and BSNL CDMA did not meet the benchmark. Minimum BTS Accumulated downtime was recorded for Airtel at 0.34%.

Worst Affected BTSs Due to Downtime:

Aircel and BSNL CDMA failed to meet the benchmark. Minimum worst affected BTSs due to downtime was recorded for Reliance GSM at 1.40%.

Call Set-up Success Rate (CSSR):

Aircel and Airtel failed to meet the benchmark for CSSR. The maximum CSSR was observed for Vodafone with 99.52%.

Excluding Airtel, all other operators were found to be calculating the parameter as per the norm specified by TRAI, as given in parameter description section. Airtel is using a formula that has not been specified by TRAI or the counter definitions provided by their network service provider (Ericsson). However, this report presents the appropriate CSSR value for Airtel, which was calculated by using the proper counter details (provided in section 8.15.1) by the IMRB auditor during audit.

Network Congestion parameters:

All operators met the benchmark on SDCCH / Paging Channel Congestion. Aircel failed to meet the benchmark for TCH congestion.

Vodafone recorded the best SDCCH / Paging Channel Congestion while BSNL CDMA performed the best on 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 the parameter. Minimum call drop rate was recorded for Vodafone at 0.62%.

Worst Affected Cells Having More than 3% TCH Drop:

Aircel and BSNL CDMA failed to meet the benchmark. Best performance was recorded for Reliance GSM at 0.17%.

Voice Quality

Aircel and BSNL CDMA failed to meet the benchmark. Best performance was recorded for Airtel at 98.35%.

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)	4.86%	31.55%	93.06%	1.09%	5.26%	1.60%	13.71%	91.55%
Airtel	0.33%	1.66%	93.98%	0.43%	1.34%	1.00%	0.95%	98.50%
BSNL CDMA	15.30%	27.98%	98.52%	NA	0.00%	1.49%	8.37%	74.80%
BSNL GSM	1.83%	1.99%	96.06%	0.91%	1.19%	1.97%	2.96%	NDR
Idea	1.84%	1.86%	96.82%	0.98%	1.34%	1.48%	1.44%	95.62%
Reliance GSM	0.45%	1.40%	98.48%	0.02%	0.08%	0.67%	0.17%	98.29%
Vodafone	0.60%	1.92%	99.50%	0.15%	0.50%	0.57%	2.25%	98.22%

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)	4.33%	27.48%	93.98%	0.80%	4.44%	1.71%	13.70%	91.24%
Airtel	0.28%	1.33%	93.56%	0.41%	1.38%	1.11%	1.26%	98.30%
BSNL CDMA	19.48%	28.81%	98.51%	NA	0.00%	1.08%	10.45%	94.56%
BSNL GSM	1.80%	1.99%	96.16%	0.92%	1.29%	1.96%	2.94%	94.36%
Idea	0.92%	1.56%	96.95%	0.85%	1.22%	1.68%	1.87%	95.33%
Reliance GSM	NDR	NDR	NDR	NDR	NDR	NDR	NDR	NDR
Vodafone	0.62%	1.89%	99.49%	0.15%	0.51%	0.63%	2.61%	98.06%

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

3.1.3 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)	3.97%	25.54%	92.69%	1.01%	5.55%	1.77%	16.47%	91.33%
Airtel	0.40%	1.85%	92.53%	0.48%	1.69%	1.10%	1.28%	98.24%
BSNL CDMA	20.13%	27.98%	98.14%	NA	0.00%	1.43%	9.88%	85.29%
BSNL GSM	1.99%	1.75%	96.11%	0.78%	1.15%	1.88%	2.94%	96.52%
Idea	1.22%	1.85%	96.94%	0.74%	1.20%	1.72%	1.63%	95.39%
Reliance GSM	NDR	NDR	NDR	NDR	NDR	NDR	NDR	NDR
Vodafone	0.72%	1.84%	99.57%	0.17%	0.43%	0.66%	2.81%	98.06%

For 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. The table provided below gives a snapshot of the performance of all operators during live measurement.

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)	4.53%	2.99%	96.91%	0.45%	2.19%	1.43%	15.37%	92.69%
Airtel	0.28%	0.00%	93.81%	0.38%	1.33%	1.06%	1.10%	98.33%
BSNL CDMA	18.16%	6.45%	98.49%	NA	0.00%	1.06%	6.95%	84.88%
BSNL GSM	2.04%	0.34%	92.60%	0.38%	1.47%	2.18%	3.24%	95.44%
Idea	1.83%	1.76%	98.68%	0.47%	0.43%	1.28%	1.79%	95.94%
Reliance GSM	4.49%	1.40%	98.50%	0.07%	0.08%	0.65%	0.17%	98.34%
Vodafone	0.69%	0.07%	99.77%	0.16%	0.23%	0.54%	2.63%	99.51%

For Reliance GSM, data is pertaining to Apr'15. Data for May'15 and 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 BSNL CDMA.

BTSs Accumulated Downtime:

Aircel, BSNL CDMA, BSNL GSM and Reliance GSM failed to meet the TRAI specified benchmark. Minimum BTS accumulated downtime was recorded for Airtel at 0.28%.

Worst Affected BTSs Due to Downtime:

Aircel and BSNL CDMA failed to meet the TRAI specified benchmark. Airtel was the best performer with 0.00% worst affected BTSs due to downtime.

Call Set-up Success Rate (CSSR):

During live measurement, Airtel and BSNL GSM failed to meet the benchmark of CSSR. Maximum CSSR was observed for Vodafone with 99.77%.

Excluding Airtel, all other operators were found to be calculating the parameter as per the norm specified by TRAI, as given in parameter description section. Airtel is using a formula that has not been specified by TRAI or the counter definitions provided by their network service provider (Ericsson). However, this report presents the appropriate CSSR value for Airtel, which was calculated by using the proper counter details (provided in section 8.15.1) by the IMRB auditor during audit.

Network Congestion parameters:

All operators met the benchmark on SDCCH / Paging Channel Congestion. Aircel failed to meet the benchmark for TCH congestion.

Vodafone recorded the best SDCCH / Paging Channel Congestion while BSNL CDMA performed the best on 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:

BSNL GSM failed to meet the benchmark for the parameter. Minimum call drop rate was recorded for Vodafone at 0.54%.

Worst Affected Cells Having More than 3% TCH Drop:

Aircel, BSNL CDMA and BSNL GSM failed to meet the benchmark. Best performance was recorded for Reliance GSM at 0.17%.

Voice Quality

Aircel and BSNL CDMA failed to meet the benchmark. Best performance was recorded for Vodafone at 99.51%.

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 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)	4.96%	3.76%	96.58%	0.00%	2.47%	1.35%	12.70%	92.92%
Airtel	0.30%	0.00%	94.24%	0.31%	1.28%	1.03%	0.99%	98.39%
BSNL CDMA	15.25%	4.12%	98.39%	NA	0.00%	0.91%	8.05%	74.80%
BSNL GSM	2.05%	0.44%	92.94%	0.36%	1.28%	2.05%	3.24%	NDR
Idea	1.89%	1.75%	98.75%	0.38%	0.44%	1.17%	1.60%	96.04%
Reliance GSM	4.49%	1.40%	98.50%	0.07%	0.08%	0.65%	0.17%	98.34%
Vodafone	0.60%	0.13%	99.80%	0.13%	0.20%	0.52%	2.41%	98.56%

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)	4.41%	2.60%	97.34%	0.79%	1.81%	1.43%	15.79%	92.55%
Airtel	0.29%	0.00%	93.87%	0.40%	1.30%	1.06%	1.12%	98.37%
BSNL CDMA	17.90%	6.58%	98.40%	NA	0.00%	1.31%	6.50%	94.56%
BSNL GSM	1.98%	0.29%	92.38%	0.42%	1.50%	2.08%	3.24%	94.36%
Idea	1.78%	1.56%	98.75%	0.57%	0.41%	1.30%	1.98%	95.91%
Reliance GSM	NDR	NDR	NDR	NDR	NDR	NDR	NDR	NDR
Vodafone	0.68%	0.03%	99.72%	0.16%	0.28%	0.52%	2.50%	101.58%

For Reliance GSM, data for May'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 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)	4.22%	2.61%	96.80%	0.56%	2.29%	1.52%	17.61%	92.60%
Airtel	0.24%	0.00%	93.31%	0.42%	1.40%	1.10%	1.20%	98.24%
BSNL CDMA	21.34%	8.64%	98.68%	NA	0.00%	0.97%	6.31%	85.29%
BSNL GSM	2.10%	0.29%	92.48%	0.37%	1.62%	2.41%	3.24%	96.52%
Idea	1.81%	1.97%	98.53%	0.45%	0.43%	1.38%	1.78%	95.87%
Reliance GSM	NDR	NDR	NDR	NDR	NDR	NDR	NDR	NDR
Vodafone	0.79%	0.06%	99.79%	0.18%	0.21%	0.59%	2.98%	98.39%

For 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	Response time to customer for assistance	
	%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)	42.00%	58.00%	35.00%	69.33%	100.00%	100.00%
Airtel	76.00%	76.00%	82.00%	70.00%	100.00%	99.00%
BSNL CDMA	NDR	NDR	NDR	81.33%	100.00%	79.00%
BSNL GSM	56.00%	56.00%	76.00%	76.00%	100.00%	76.00%
Idea	77.00%	77.00%	75.00%	74.67%	100.00%	89.00%
Reliance GSM	71.00%	71.00%	76.00%	79.33%	100.00%	100.00%
Vodafone	74.00%	74.00%	82.00%	72.67%	100.00%	94.00%

NDR: Data to conduct live calling for resolution of complaints and service requests was not available at the central billing center of BSNL CDMA. Hence, live calling for these parameters has not been conducted for the operator.

Resolution of billing complaints

As per the consumers (live calling exercise) none of the operators was able to meet the benchmark of resolving 98% complaints within 4 weeks and 100% complaints within 6 weeks.

Complaint/Request Attended to Satisfaction

All operators performed satisfactorily in terms of satisfaction of the customers for service requests. Airtel and Vodafone recorded the best performance at 82%.

Level 1 Service

As per the live calling results, none of the operators met the TRAI benchmark for level 1 service with calls being answered. The details of live calling done for the level 1 service have been provided in the annexure for each operator.

It was also observed that 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 operators met the TRAI benchmark of 95% with most of the operators recording 100% for the parameter.

Customer Care / Helpline Assessment (voice to voice)

BSNL CDMA, BSNL GSM, Idea and Vodafone failed to meet the benchmark for the parameter.

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)	0.09%	0.36%	100.00%	100.00%	100.00%	96.56%	93.78%
Airtel	0.04%	0.01%	100.00%	100.00%	100.00%	99.99%	87.89%
BSNL CDMA	NDR	NDR	NDR	NDR	NDR	NDR	NDR
BSNL GSM	0.01%	0.03%	99.79%	99.79%	100.00%	97.63%	96.01%
Idea	0.24%	0.03%	100.00%	100.00%	100.00%	98.55%	99.52%
Reliance GSM	0.09%	0.01%	100.00%	100.00%	100.00%	98.98%	93.42%
Vodafone	0.30%	0.03%	100.00%	100.00%	100.00%	99.98%	100.00%

NDR: Data to conduct audit for metering and billing, resolution of billing complaints, response time for customer assistance and customer care was not available at the central billing center/ customer service center of BSNL CDMA. Hence, audit for these parameters has not been conducted for the operator.

Metering and Billing Credibility – Postpaid Subscribers

For the billing disputes of postpaid subscribers, it was observed that Idea and Vodafone failed to meet the TRAI benchmark for the parameter. BSNL GSM had the best performance with 0.01% billing disputes.

Metering and Billing Credibility – Prepaid Subscribers

For the prepaid customers, Aircel failed to meet the benchmark of charging disputes. Airtel and Reliance GSM performed the best with 0.01% disputes.

Resolution of billing complaints

All operators met the TRAI benchmark of resolution of billing complaints within 4 weeks. BSNL GSM remained slightly below the benchmark for resolving 100% complaints within 6 weeks.

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

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

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 IVR

All operators met the benchmark of 95% IVR call being attended. Airtel recorded the best performance for the parameter.

Customer Care Percentage of calls answered by the operators (Voice to Voice) within 90 seconds

Aircel, Airtel and Reliance GSM failed to meet the TRAI specified benchmark of 95%. Vodafone recorded the best performance for the parameter.

3.5 INTER OPERATOR CALL ASSESSMENT - CONSOLIDATED

6. Inter Operator Call Assessment							
Inter operator call Assessment To↓ From→	Aircel(DWL)	Airtel	BSNL CDMA	BSNL GSM	Idea	Reliance GSM	Vodafone
Aircel(DWL)	NA	100.00%	98.00%	99.00%	100.00%	99.00%	100.00%
Airtel	87.00%	NA	86.00%	84.00%	100.00%	99.00%	98.00%
BSNL CDMA	89.00%	92.00%	NA	89.00%	91.00%	93.00%	90.00%
BSNL GSM	96.00%	99.00%	100.00%	NA	100.00%	93.00%	99.00%
Idea	99.00%	100.00%	98.00%	100.00%	NA	98.00%	100.00%
Reliance GSM	95.00%	96.00%	100.00%	89.00%	100.00%	NA	99.00%
Vodafone	98.00%	100.00%	98.00%	100.00%	100.00%	99.00%	NA

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

In the inter-operator call assessment, most of the operators faced any problems in connecting to other operators.

4 CRITICAL FINDINGS

PMR Consolidated (Network Parameters)

Aircel and BSNL CDMA failed to meet the benchmark for majority network parameters.

To calculate CSSR, Airtel is using a formula that has not been specified by TRAI or the counter definitions provided by their network service provider (Ericsson). However, this report presents the appropriate CSSR value for Airtel, which was calculated by using the proper counter details (provided in section 8.15.1) by the IMRB auditor during audit.

3 Day Live Measurement (Network Parameters)

Aircel, BSNL CDMA and BSNL GSM failed to meet the benchmark for majority network parameters.

For Worst affected BTS due to downtime, significant difference was observed between PMR & live measurement data for Aircel and BSNL CDMA. 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

None of the operators met the benchmark for complaints resolved within 4 weeks, complaints resolved within 6 weeks and Level 1 services.

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

Idea and Vodafone failed to meet the benchmark of metering and billing credibility for postpaid while Aircel failed to meet the benchmark of metering and billing credibility for prepaid.

It is to be noted that Aircel, Airtel, Idea and Vodafone 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

Aircel, Airtel and Reliance GSM failed to meet the TRAI specified benchmark of answering 95% (voice to voice) calls within 90 seconds.

Drive Test (Operator Assisted)

BSNL CDMA, BSNL GSM and Reliance GSM consistently failed to meet the benchmark of various parameters being tested during the drive tests.

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

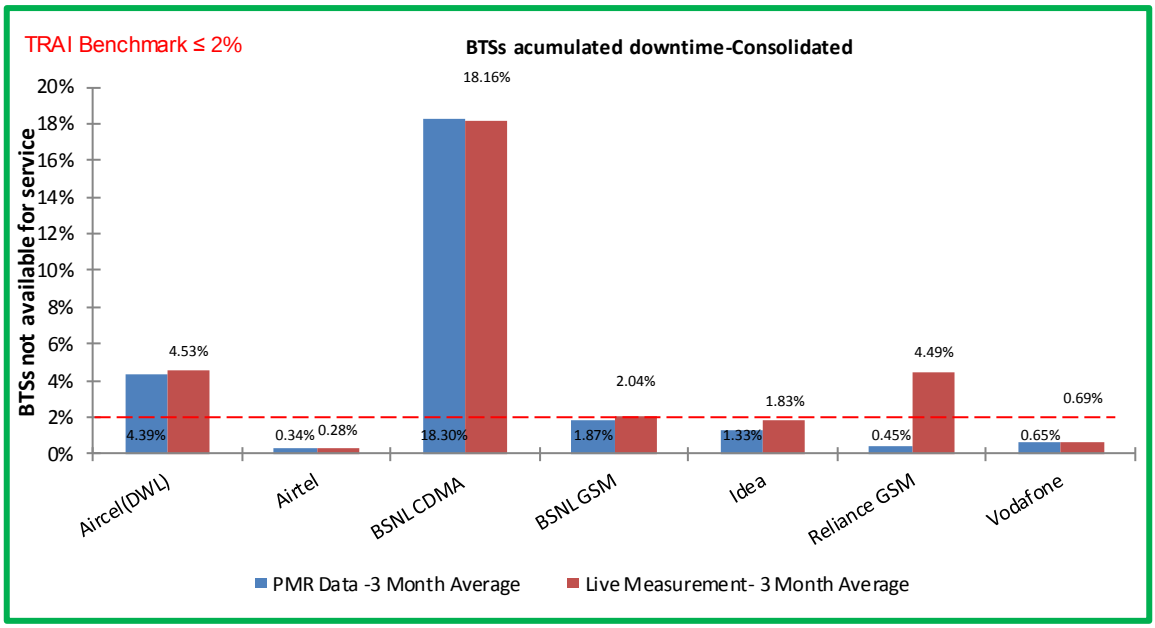
3. **TRAI Benchmark –**

    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.

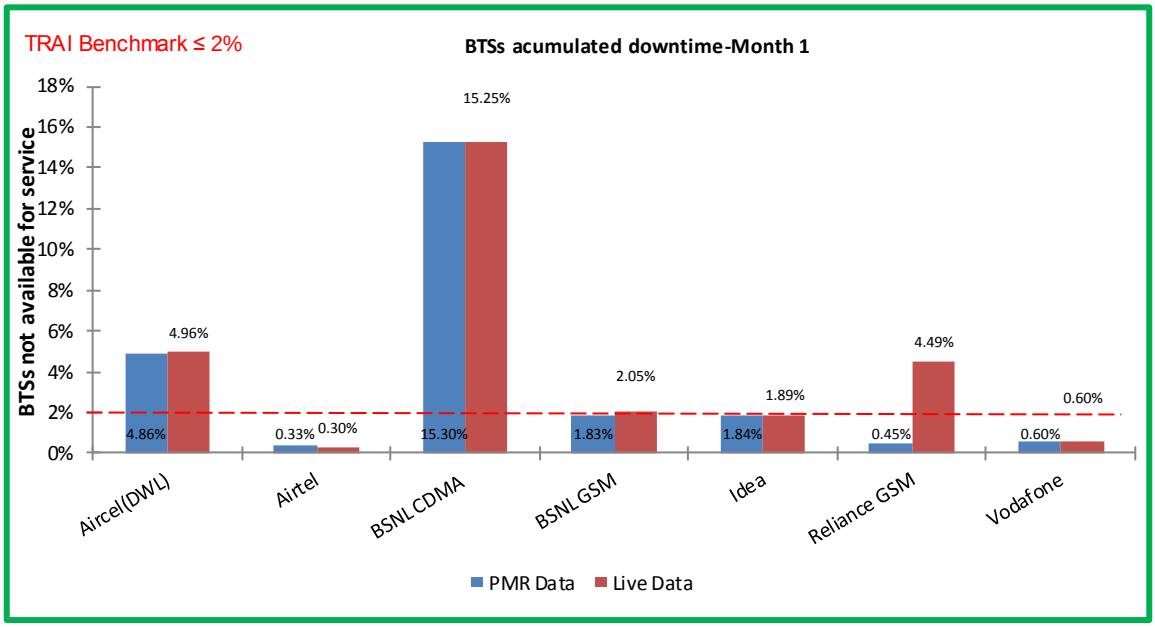
5.1.2 KEY FINDINGS - CONSOLIDATED



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

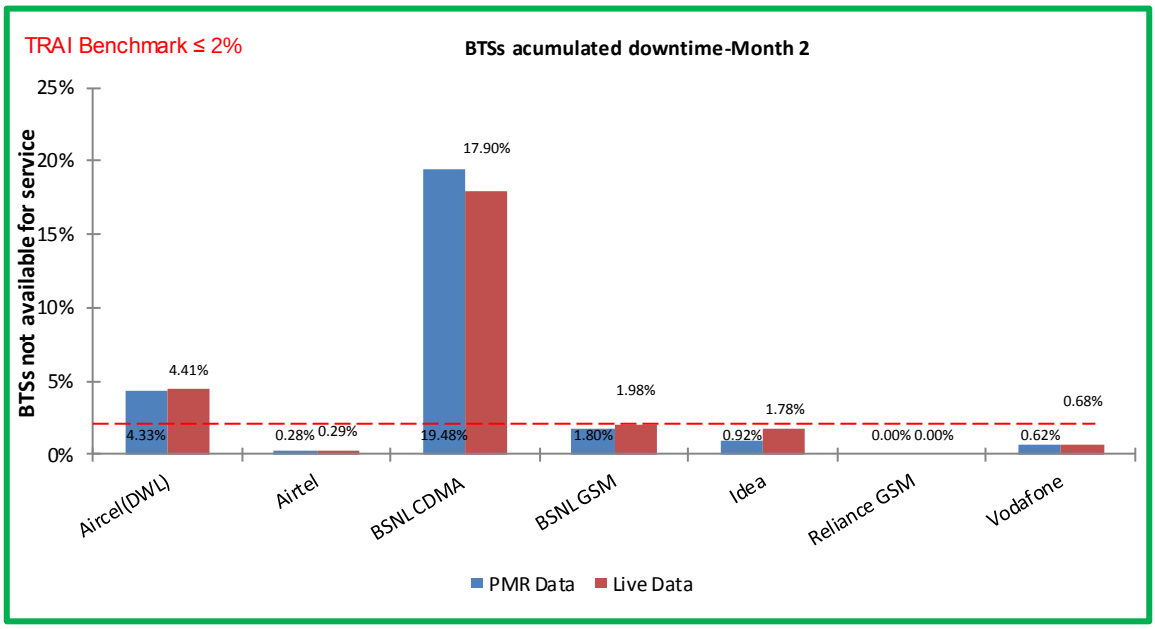
Aircel and BSNL CDMA did not meet the benchmark on aspect of BTS accumulated downtime as per audit/PMR data.

5.1.2.1 KEY FINDINGS – MONTH 1



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

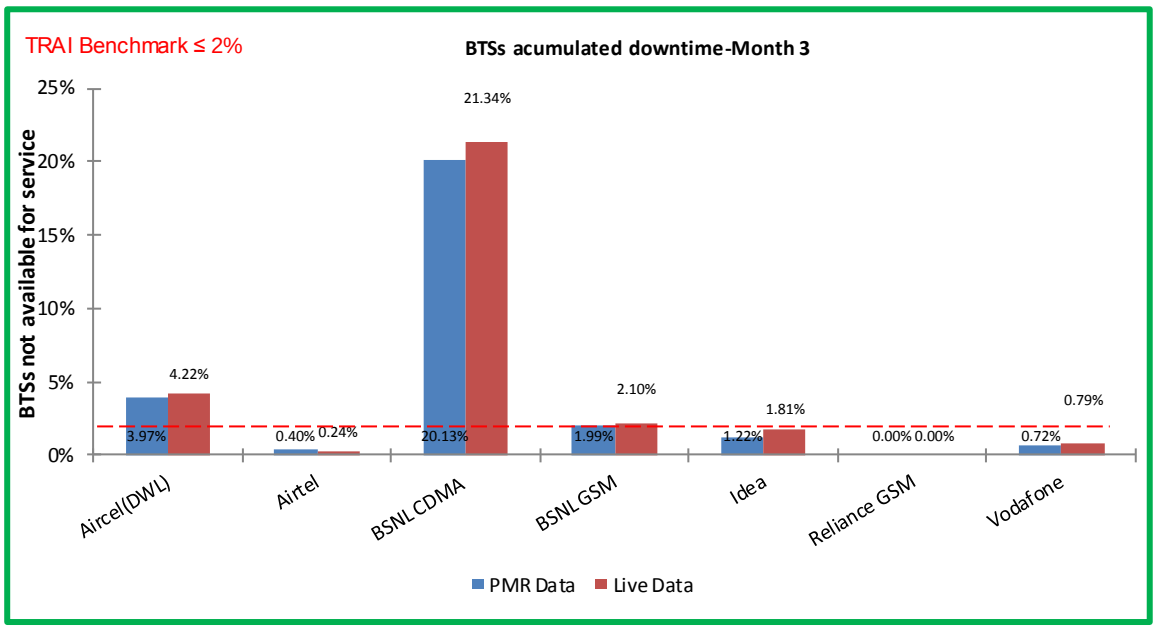
5.1.2.2 KEY FINDINGS – MONTH 2



For Reliance GSM, data for May'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

5.1.2.3 KEY FINDINGS – MONTH 3



For 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.

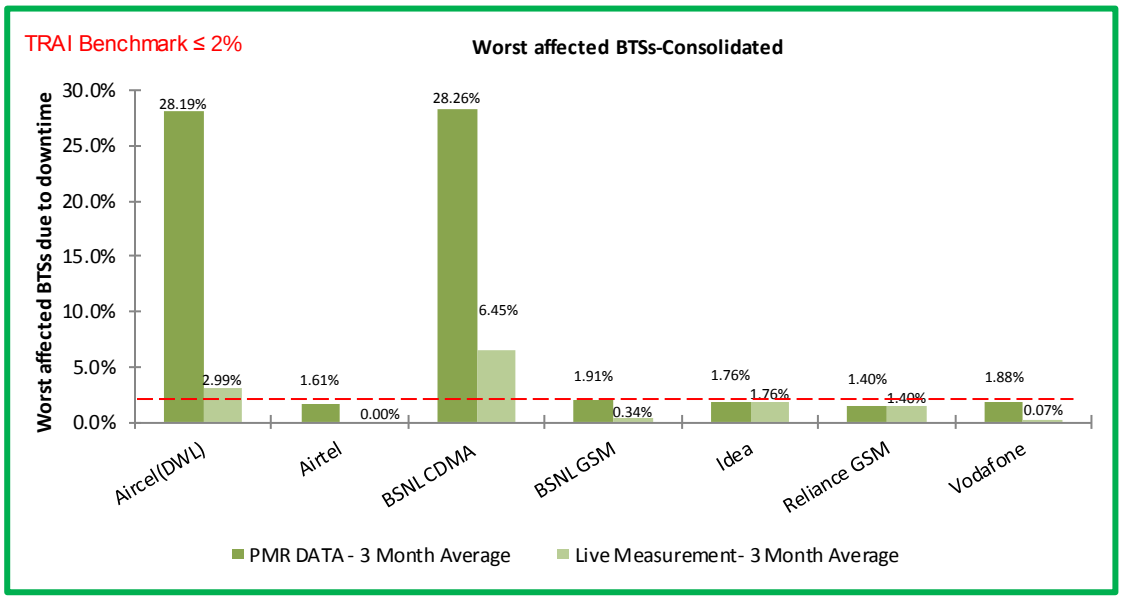
   iii. Data is extracted from system log of the server of the operator. This data is in raw format which is further processed to arrive at the cumulative values.

   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

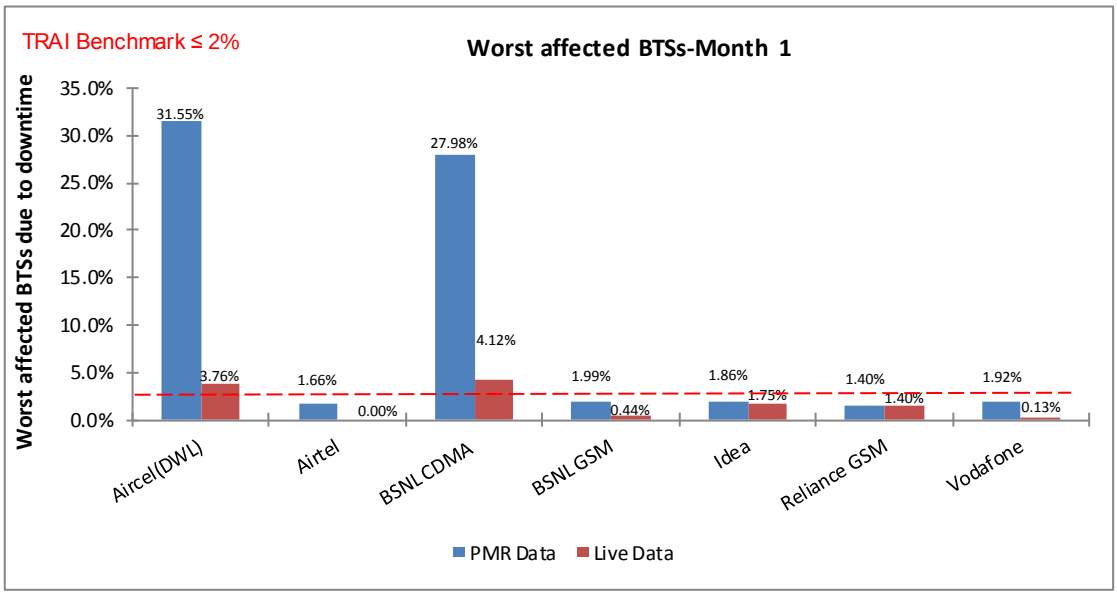


Data Source: Operations and Maintenance Center (OMC) of the operators

Aircel and BSNL CDMA did not meet the benchmark for worst affected BTSs due to downtime as per audit/PMR data.

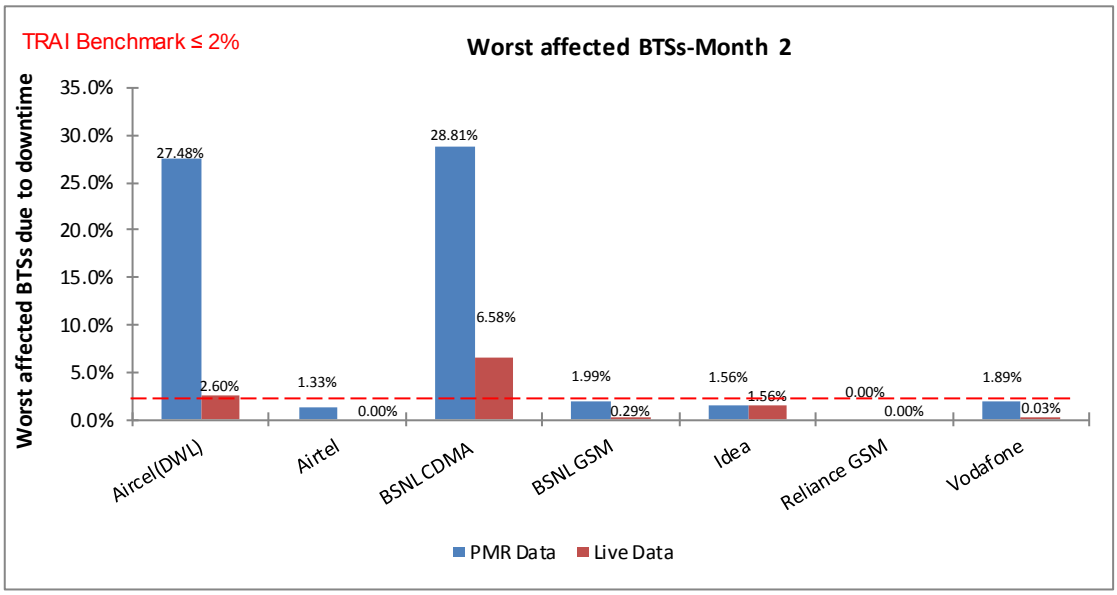
Significant difference was observed between PMR & live measurement data for Aircel and BSNL CDMA. The possible reason for the variation could be the difference in time frame of data as PMR data is for 30 days and live measurement data is for three days.

5.2.2.1 KEY FINDINGS – MONTH 1



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

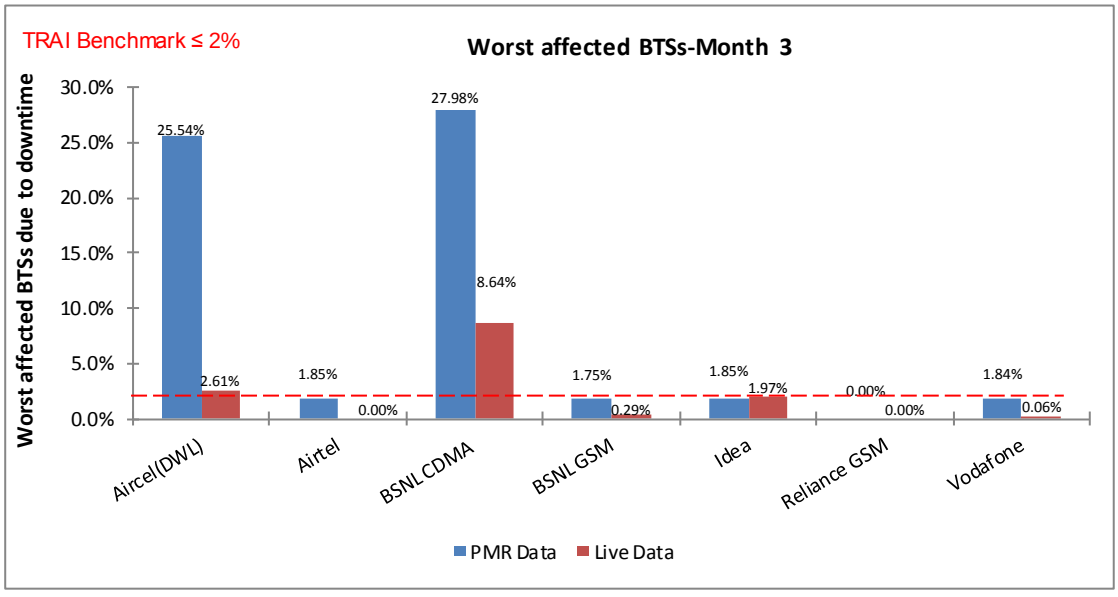
5.2.2.2 KEY FINDINGS – MONTH 2



For Reliance GSM, data for May'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

5.2.2.3 KEY FINDINGS – MONTH 3



For 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

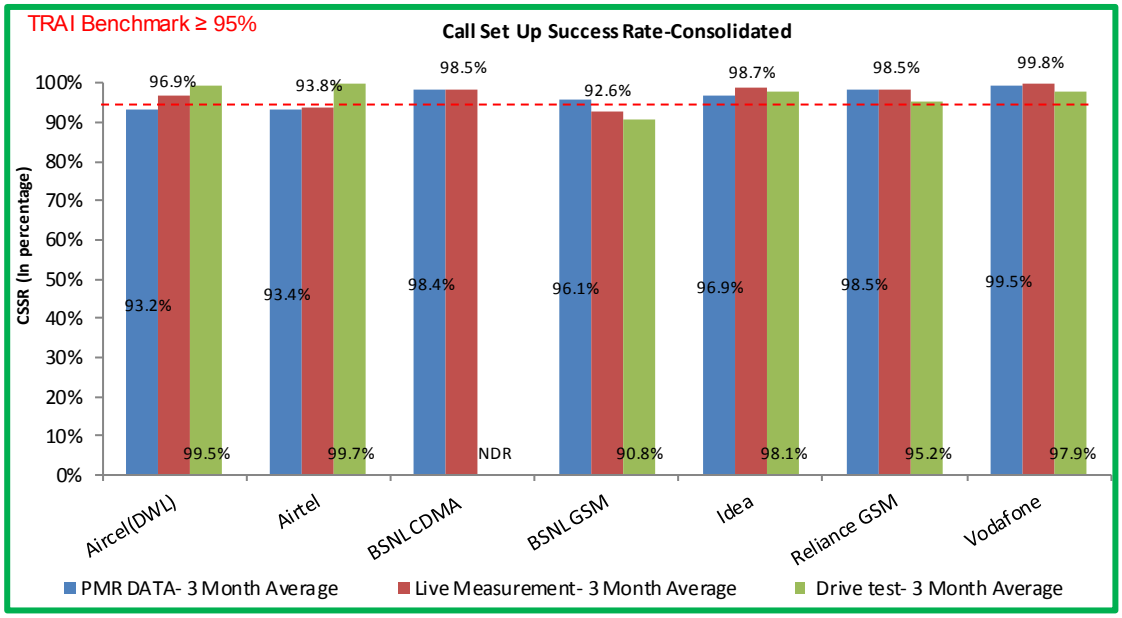
   Call Established means the following events have happened in call setup:-

   - 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

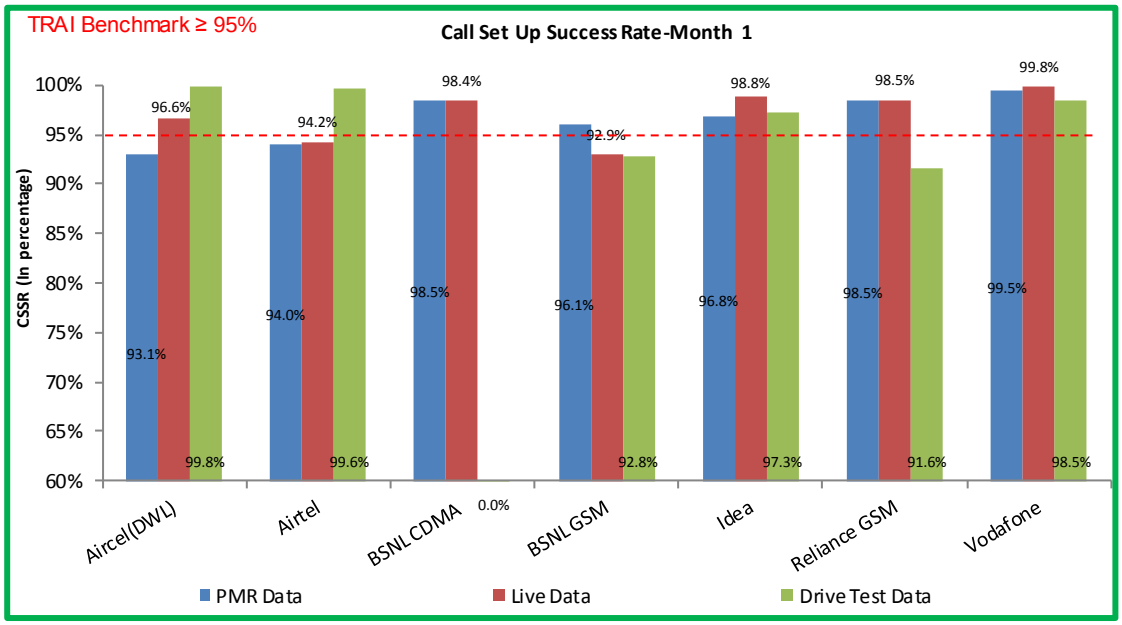


Data Source: Network Operations Center (NOC) of the operators

Aircel and Airtel failed to meet the TRAI benchmark as per audit/PMR data.

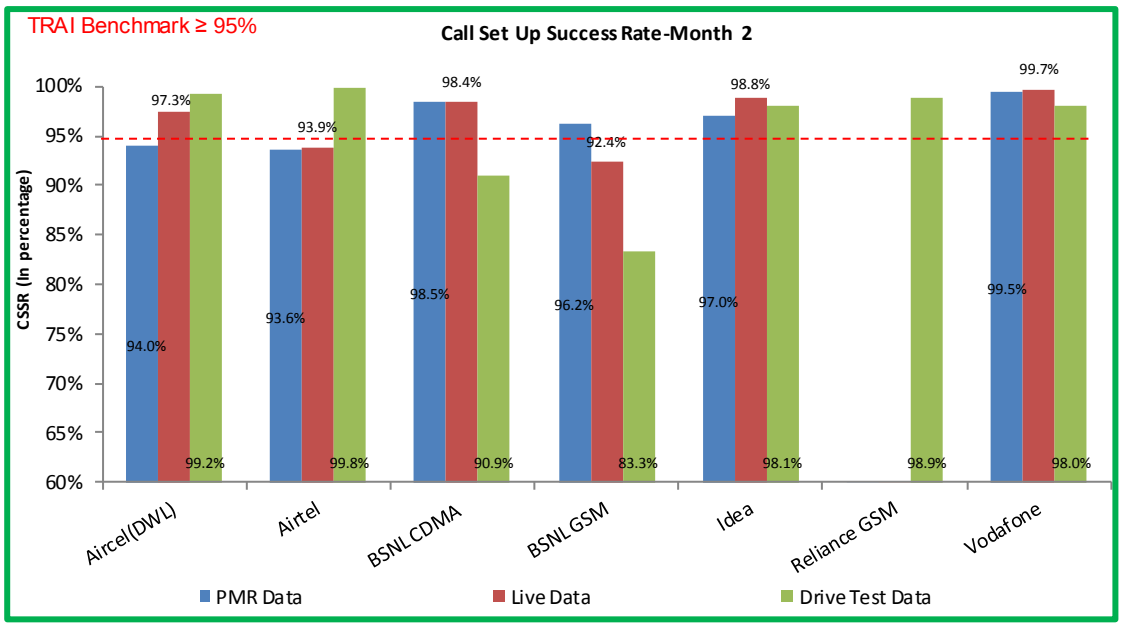
To calculate CSSR, Airtel is using a formula that has not been specified by TRAI or the counter definitions provided by their network service provider (Ericsson). However, this report presents the appropriate CSSR value for Airtel, which was calculated by using the proper counter details (provided in section 8.15.1) by the IMRB auditor during audit.

5.3.2.1 KEY FINDINGS – MONTH 1



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

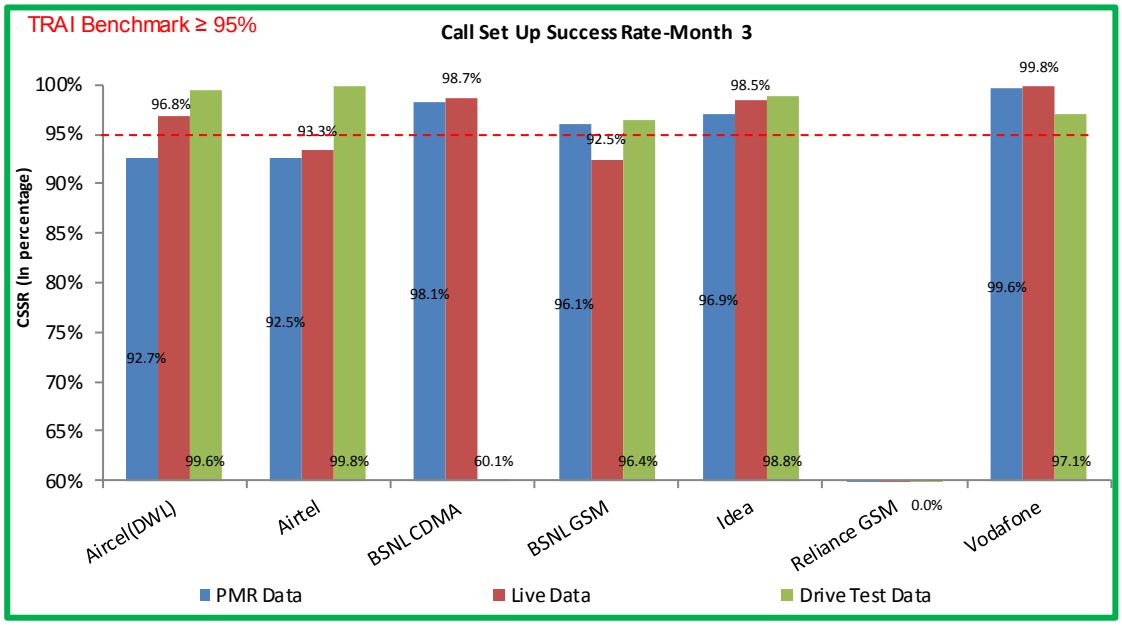
5.3.2.2 KEY FINDINGS – MONTH 2



For Reliance GSM, data for May'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

5.3.2.3 KEY FINDINGS – MONTH 3



For 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.

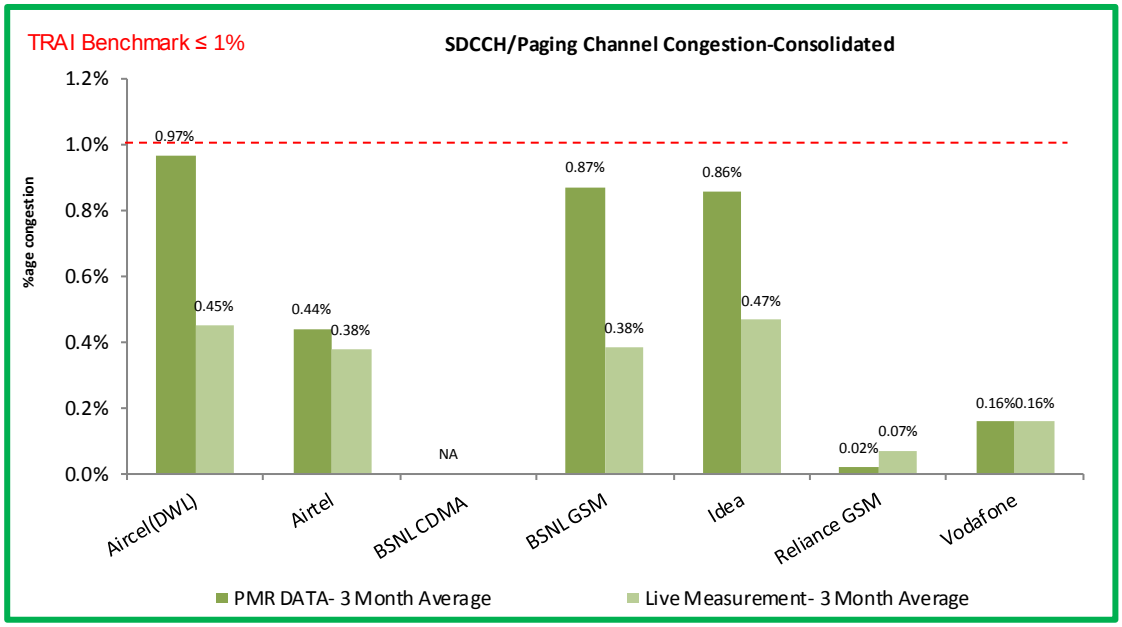
Data Source: Network Operations Center (NOC) of the operators

5.4 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)



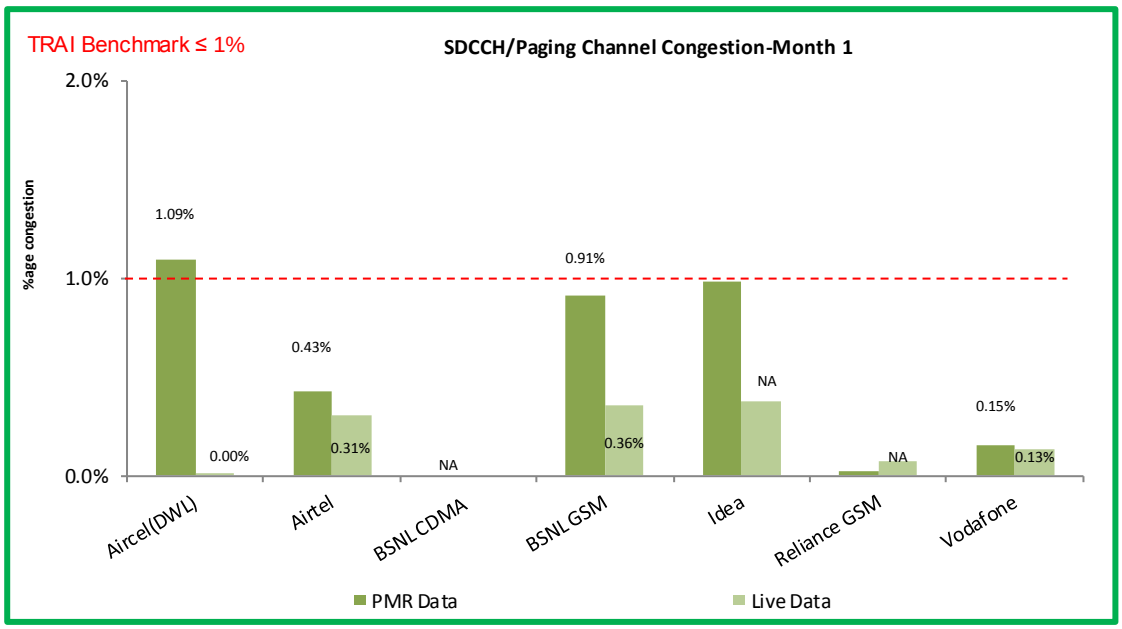
Data Source: Network Operations Center (NOC) of the operators

All operators met the benchmark as per PMR/audit Data.

Significant difference was observed between PMR & live measurement data for Aircel, BSNL GSM and Idea. 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 3 days.

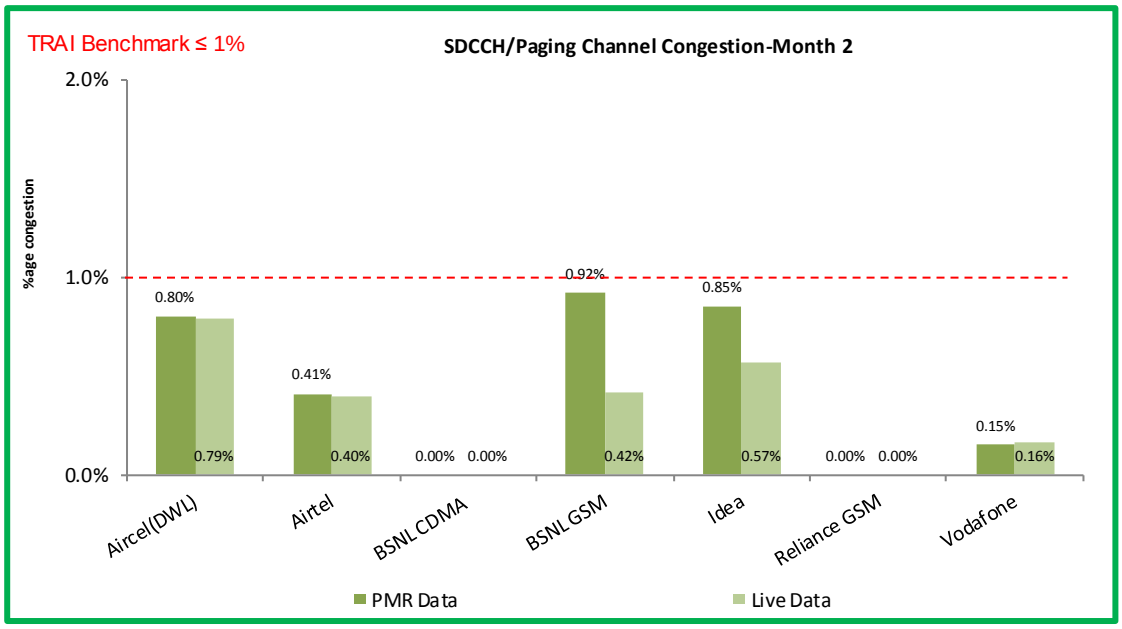
NA: SDCCH/ Paging channel congestion not applicable for CDMA operators. Hence, it has been reported as NA for BSNL CDMA.

5.4.2.1 KEY FINDINGS – MONTH 1



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

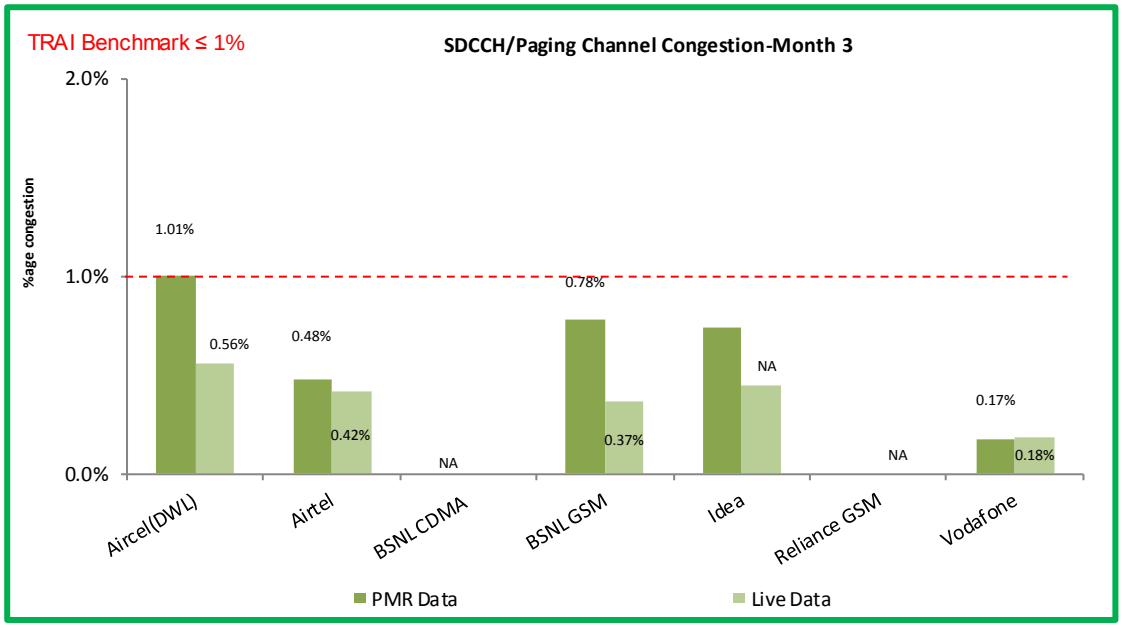
5.4.2.2 KEY FINDINGS – MONTH 2



For Reliance GSM, data for May'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

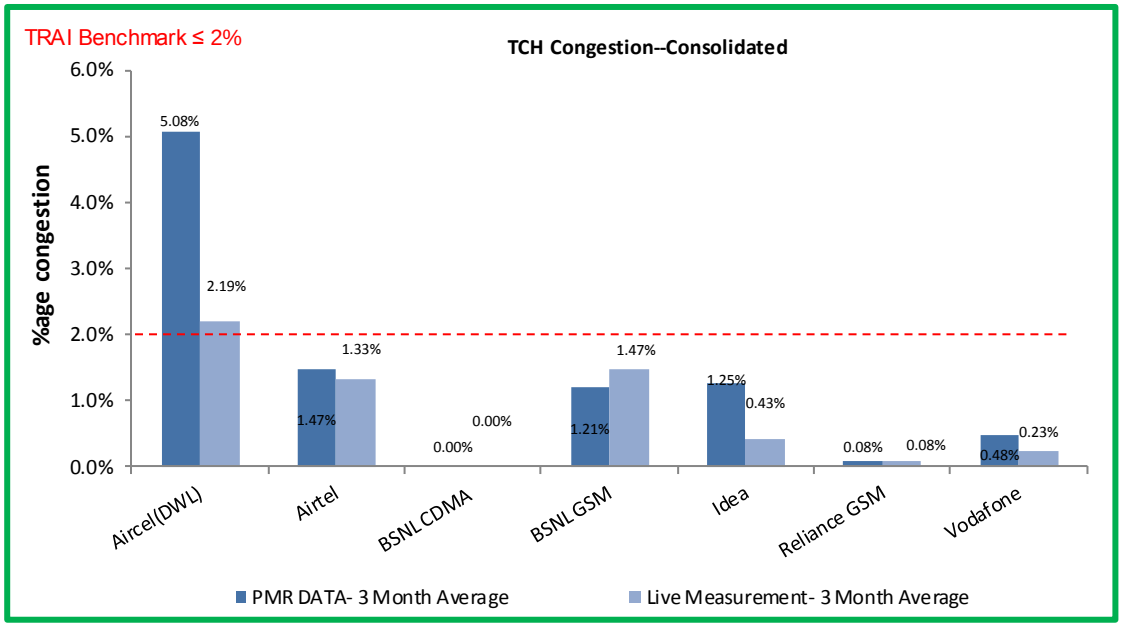
5.4.2.3 KEY FINDINGS – MONTH 3



For 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)

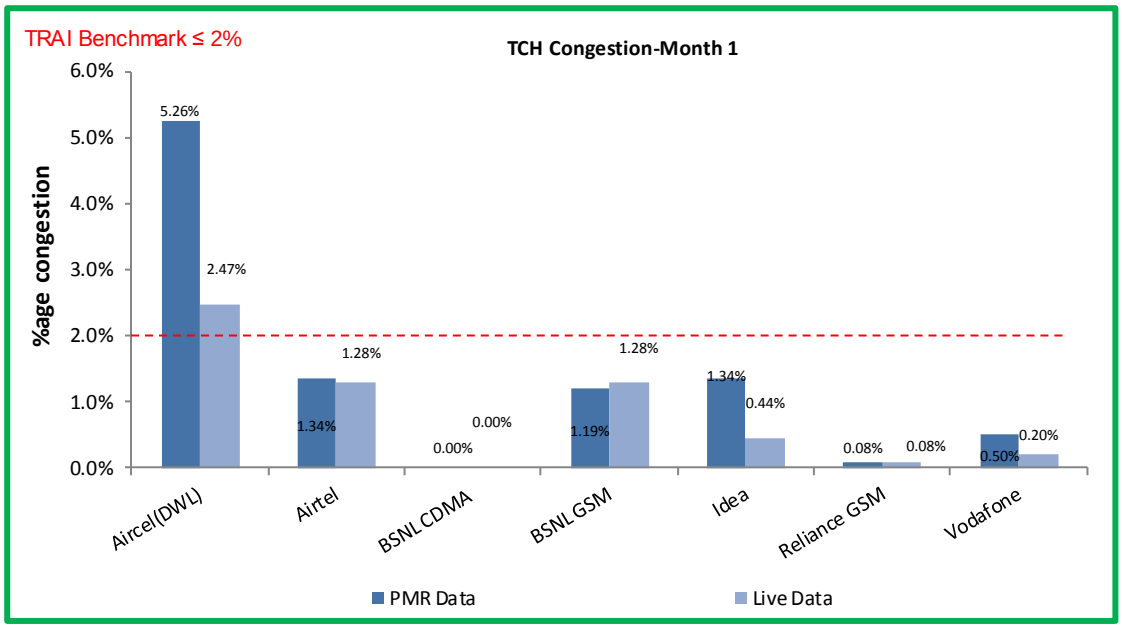


Data Source: Network Operations Center (NOC) of the operators

Aircel failed to meet the benchmark as per audit/PMR report.

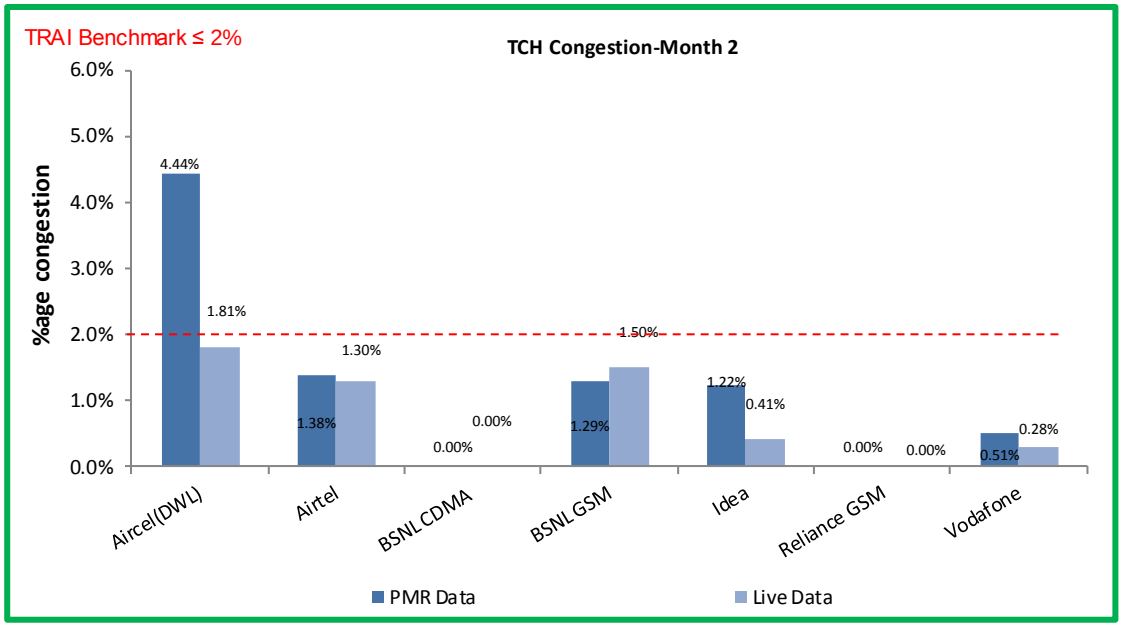
Significant difference was observed between PMR & live measurement data for Aircel, BSNL GSM and Idea. The possible reason for the variation could be the difference in time frame of data as PMR data is for 30 days and live measurement data is for three days.

5.4.3.1 KEY FINDINGS – MONTH 1



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

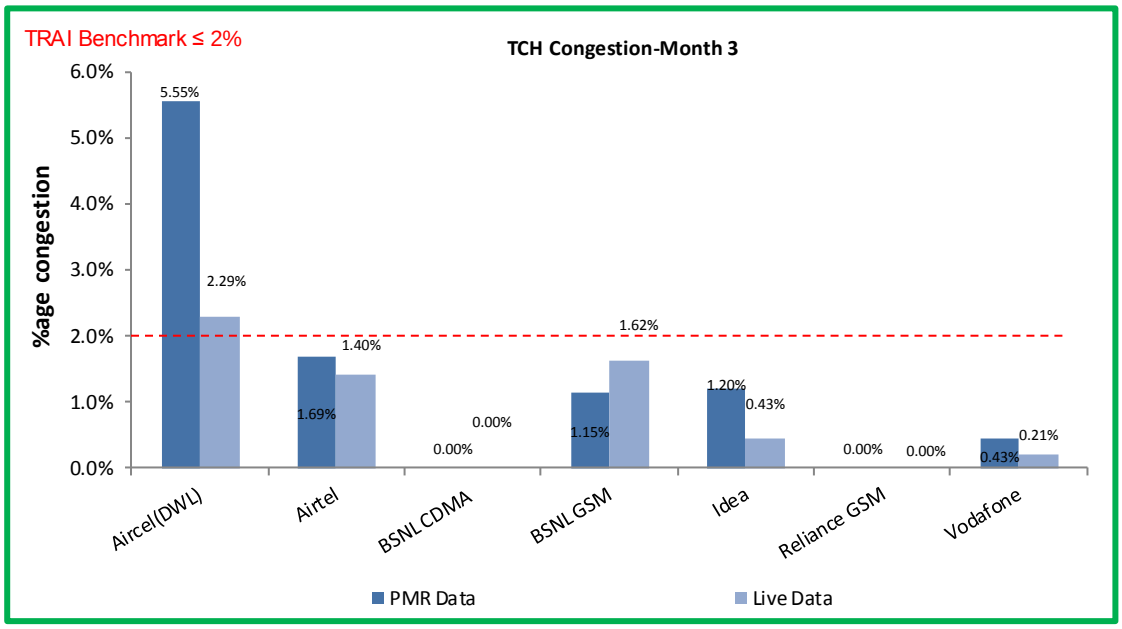
5.4.3.2 KEY FINDINGS – MONTH 2



For Reliance GSM, data for May'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

5.4.3.3 KEY FINDINGS – MONTH 3



For 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) – AVERAGE OF 3 MONTHS

Audit Results for POI Congestion								
POI congestion	Benchmark	Aircel(DWL)	Airtel	BSNL CDMA	BSNL GSM	Idea	Reliance GSM	Vodafone
Total number of working POIs		52	15	NA	19	30	23	29
No. of POIs not meeting benchmark		0	0	NA	0	0	0	0
Total Capacity of all POIs (A) - in erlangs		89145	109341	NA	20579	40011	31804	46932399
Traffic served for all POIs (B)- in erlangs		61594	36356	NA	20203	17359	20586	15958811
POI congestion	≤ 0.5%	0.00%	0.00%	NA	1.67%	0.00%	0.00%	0.00%

Live Measurement Results for POI Congestion								
POI congestion	Benchmark	Aircel(DWL)	Airtel	BSNL CDMA	BSNL GSM	Idea	Reliance GSM	Vodafone
Total number of working POIs		52	15	NA	19	30	23	29
No. of POIs not meeting benchmark		0	0	NA	0	0	0	0
Total Capacity of all POIs (A) - in erlangs		89145	107916	NA	20579	39965	31804	6246195
Traffic served for all POIs (B)- in erlangs		60048	37436	NA	17857	17395	20586	1574975
POI congestion	≤ 0.5%	0.00%	0.00%	NA	0.00%	0.00%	0.00%	0.00%

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

All operators met the benchmark of POI Congestion as per PMR/audit Data.
NA: Auditors were not able to get the POI data from BSNL CDMA as operator uses the POI of BSNL GSM for its connectivity to other operators. As per the operator, their systems were not equipped to provide the POI data specifically for BSNL CDMA.

5.4.4.1 KEY FINDINGS – MONTH 1

Audit Results for POI Congestion- PMR data-April								
POI congestion	Benchmark	Aircel(DWL)	Airtel	BSNL CDMA	BSNL GSM	Idea	Reliance GSM	Vodafone
Total number of working POIs		52	15	NA	19	30	23	28
No. of POIs not meeting benchmark		0	0	NA	0	0	0	0
Total Capacity of all POIs (A) - in erlangs		89146	105469	NA	19643	39132	31804	60492758
Traffic served for all POIs (B)- in erlangs		61457	36124	NA	20087	17874	20586	16232067
POI congestion	≤ 0.5%	0.00%	0.00%	NA	0.02%	0.00%	0.00%	0.00%

Live Measurement Results for POI Congestion- 3 Day data-April								
POI congestion	Benchmark	Aircel(DWL)	Airtel	BSNL CDMA	BSNL GSM	Idea	Reliance GSM	Vodafone
Total number of working POIs		52	15	NA	19	30	23	28
No. of POIs not meeting benchmark		0	0	NA	0	0	0	0
Total Capacity of all POIs (A) - in erlangs		89146	105082	NA	19643	39132	31804	6049243
Traffic served for all POIs (B)- in erlangs		59777	36326	NA	18225	17788	20586	1613356
POI congestion	≤ 0.5%	0.00%	0.00%	NA	0.00%	0.00%	0.00%	0.00%

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

5.4.4.2 KEY FINDINGS – MONTH 2

Audit Results for POI Congestion- PMR data-May								
POI congestion	Benchmark	Aircel(DWL)	Airtel	BSNL CDMA	BSNL GSM	Idea	Reliance GSM	Vodafone
Total number of working POIs		52	15	NA	19	30	NDR	28
No. of POIs not meeting benchmark		0	0	NA	0	0	NDR	0
Total Capacity of all POIs (A) - in erlangs		89146	109401	NA	21047	40451	NDR	64213896
Traffic served for all POIs (B)- in erlangs		61411	36195	NA	22061	17964	NDR	17001472
POI congestion	≤ 0.5%	0.00%	0.00%	NA	5.00%	0.00%	NDR	0.00%

Live Measurement Results for POI Congestion- 3 Day data-May								
POI congestion	Benchmark	Aircel(DWL)	Airtel	BSNL CDMA	BSNL GSM	Idea	Reliance GSM	Vodafone
Total number of working POIs		52	15	NA	19	30	NDR	28
No. of POIs not meeting benchmark		0	0	NA	0	0	NDR	0
Total Capacity of all POIs (A) - in erlangs		89146	105521	NA	21047	40328	NDR	6113799
Traffic served for all POIs (B)- in erlangs		59780	37557	NA	17900	17947	NDR	1655759
POI congestion	≤ 0.5%	0.00%	0.00%	NA	0.00%	0.00%	NDR	0.00%

For Reliance GSM, May15 data is not available 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

5.4.4.3 KEY FINDINGS – MONTH 3

Audit Results for POI Congestion- PMR data-June								
POI congestion	Benchmark	Aircel(DWL)	Airtel	BSNL CDMA	BSNL GSM	Idea	Reliance GSM	Vodafone
Total number of working POIs		52	15	NA	19	30	NDR	31
No. of POIs not meeting benchmark		0	0	NA	0	0	NDR	0
Total Capacity of all POIs (A) - in erlangs		89144	113153	NA	21047	40451	NDR	16090544
Traffic served for all POIs (B)- in erlangs		61912	36749	NA	18462	16239	NDR	14642894
POI congestion	≤ 0.5%	0.00%	0.00%	NA	0.00%	0.00%	NDR	0.00%

Live Measurement Results for POI Congestion- 3 Day data-June								
POI congestion	Benchmark	Aircel(DWL)	Airtel	BSNL CDMA	BSNL GSM	Idea	Reliance GSM	Vodafone
Total number of working POIs		52	15	NA	19	30	NDR	31
No. of POIs not meeting benchmark		0	0	NA	0	0	NDR	0
Total Capacity of all POIs (A) - in erlangs		89144	113144	NA	21047	40435	NDR	6575544
Traffic served for all POIs (B)- in erlangs		60587	38425	NA	17445	16450	NDR	1455809
POI congestion	≤ 0.5%	0.00%	0.00%	NA	0.00%	0.00%	NDR	0.00%

For 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.

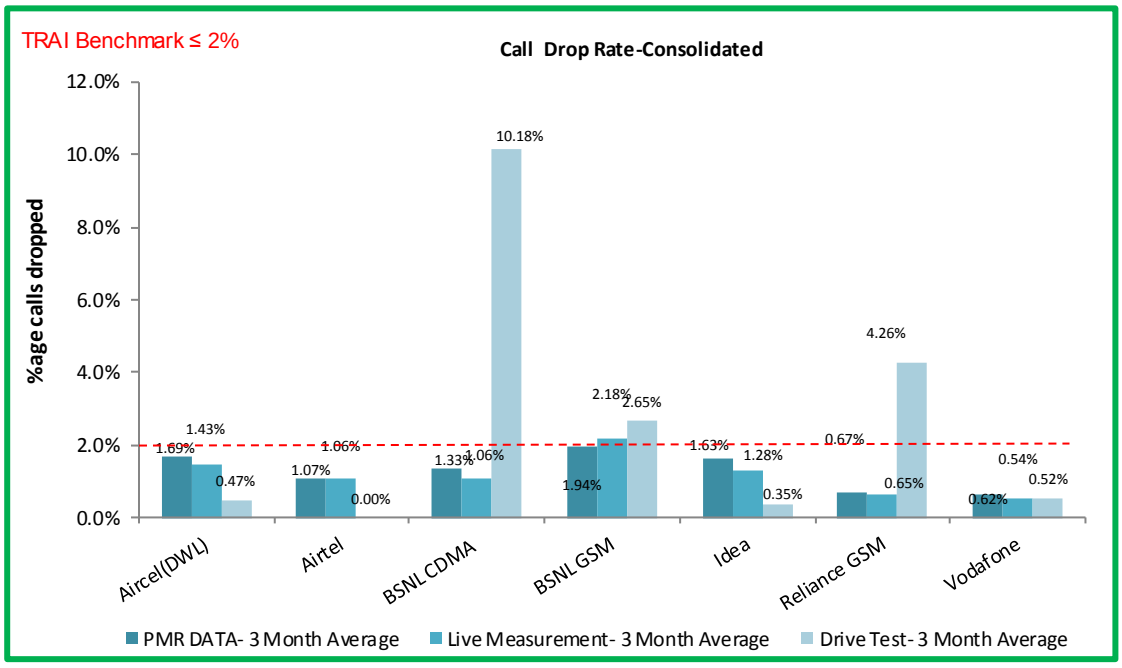
Data Source: Network Operations Center (NOC) of the operators

5.5 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.

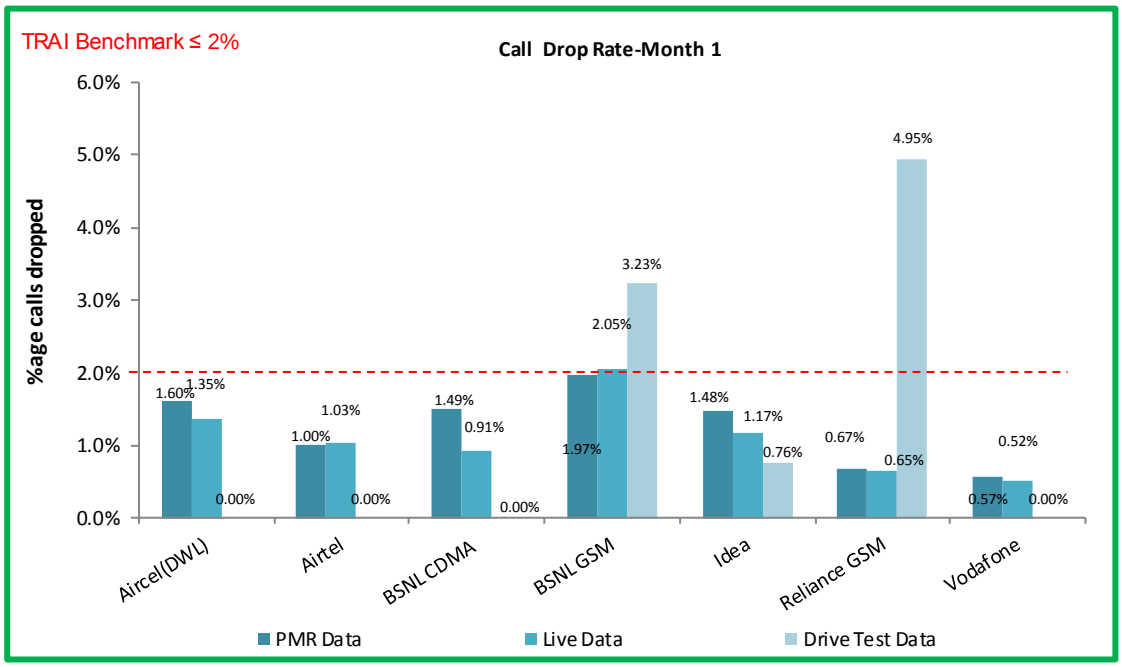
5.5.2 KEY FINDINGS - CONSOLIDATED



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

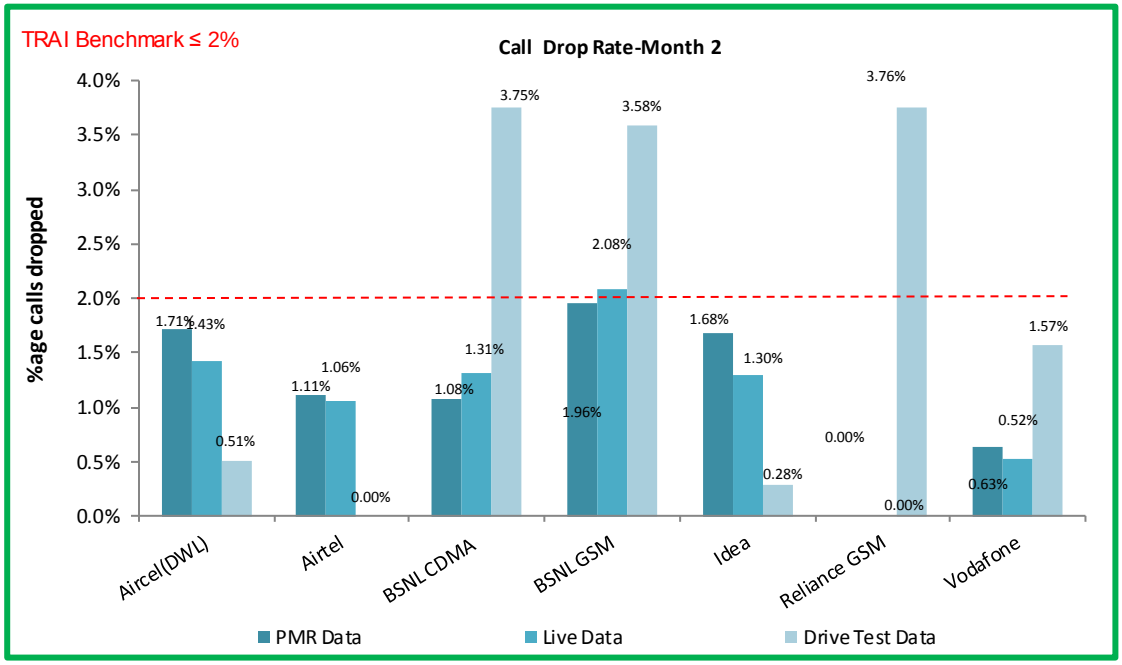
All operators met the benchmark for call drop rate during audit. The call drop rate during drive test was observed to be higher than audit for BSNL CDMA and Reliance GSM.

5.5.2.1 KEY FINDINGS – MONTH 1



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

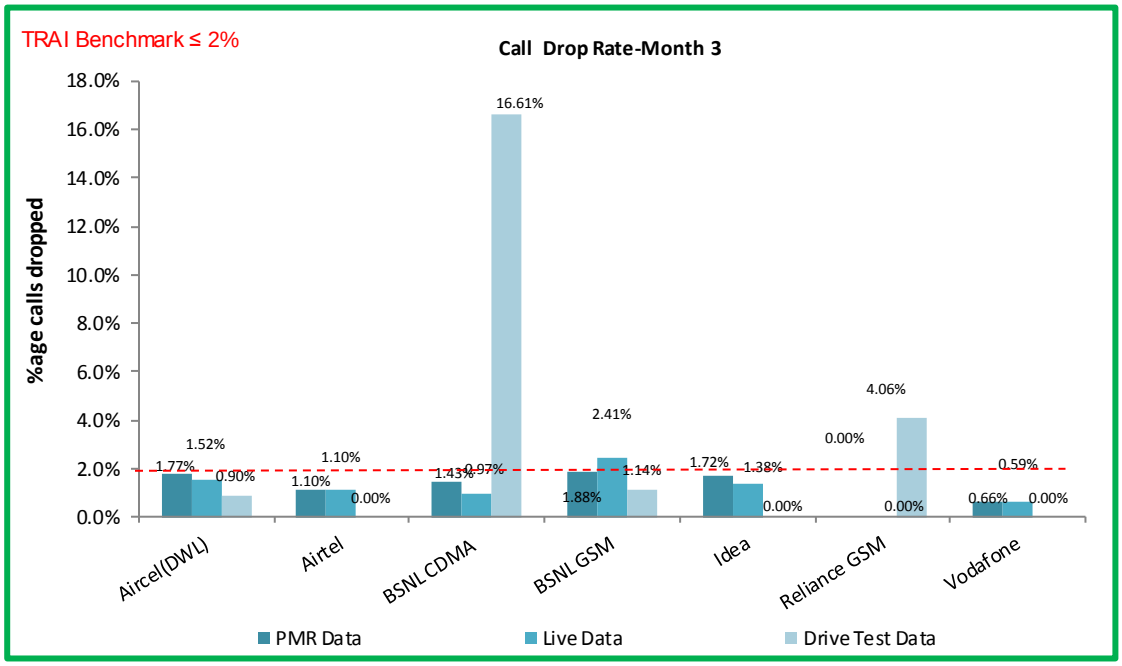
5.5.2.2 KEY FINDINGS – MONTH 2



For Reliance GSM, data for May'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

5.5.2.3 KEY FINDINGS – MONTH 3



For 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

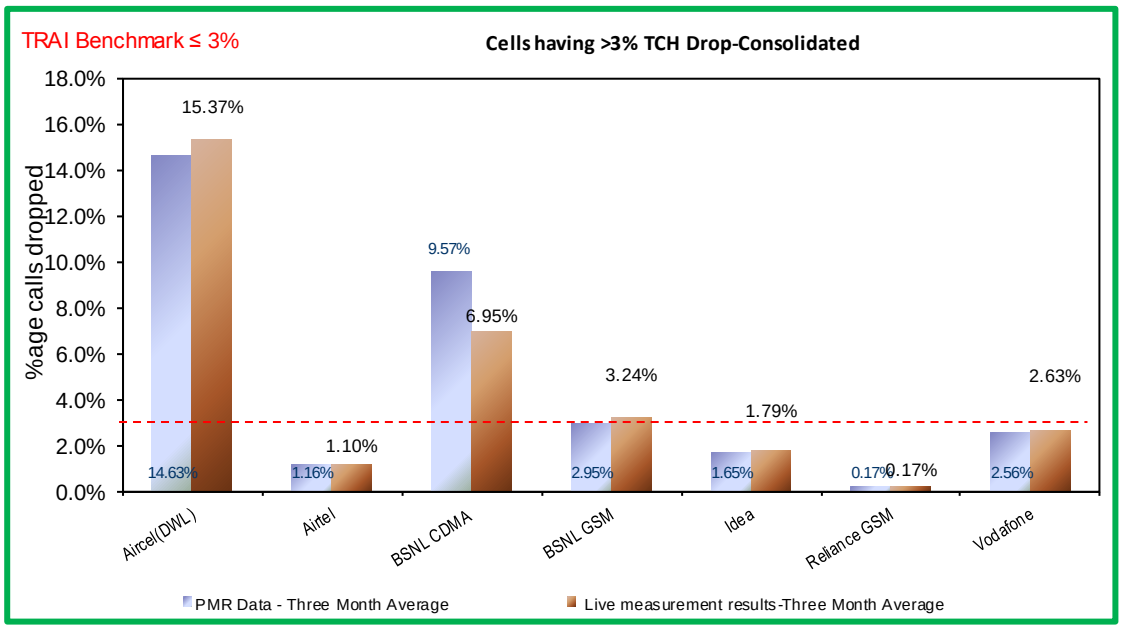
5.6 CELLS HAVING GREATER THAN 3% TCH DROP

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.

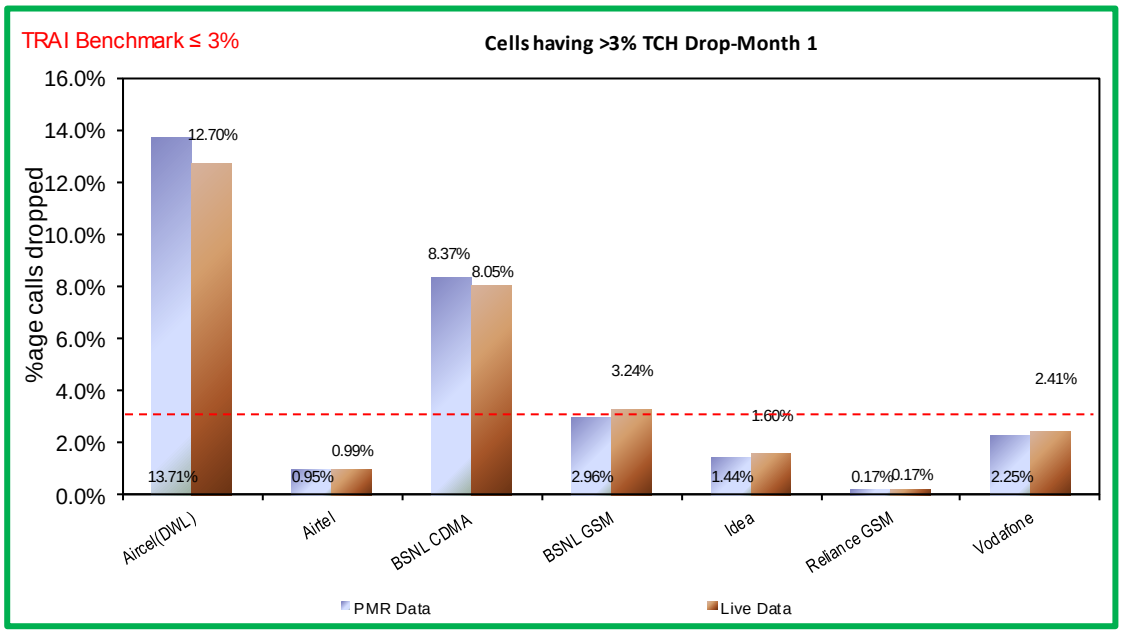
5.6.2 KEY FINDINGS - CONSOLIDATED



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

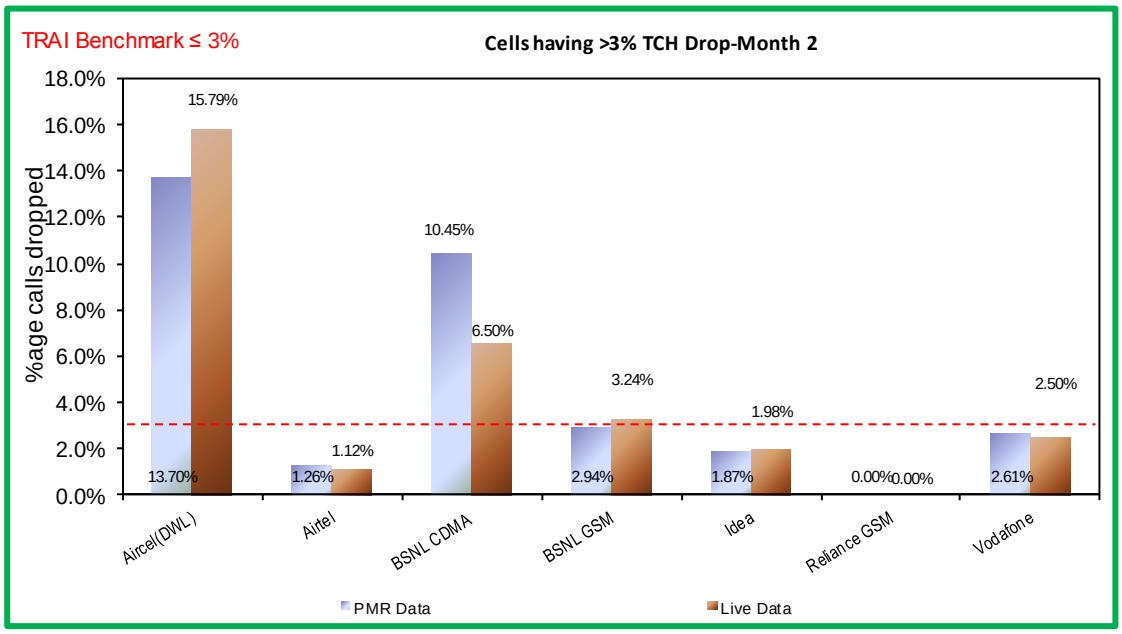
Aircel and BSNL CDMA did not meet the benchmark during audit.

5.6.2.1 KEY FINDINGS – MONTH 1



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

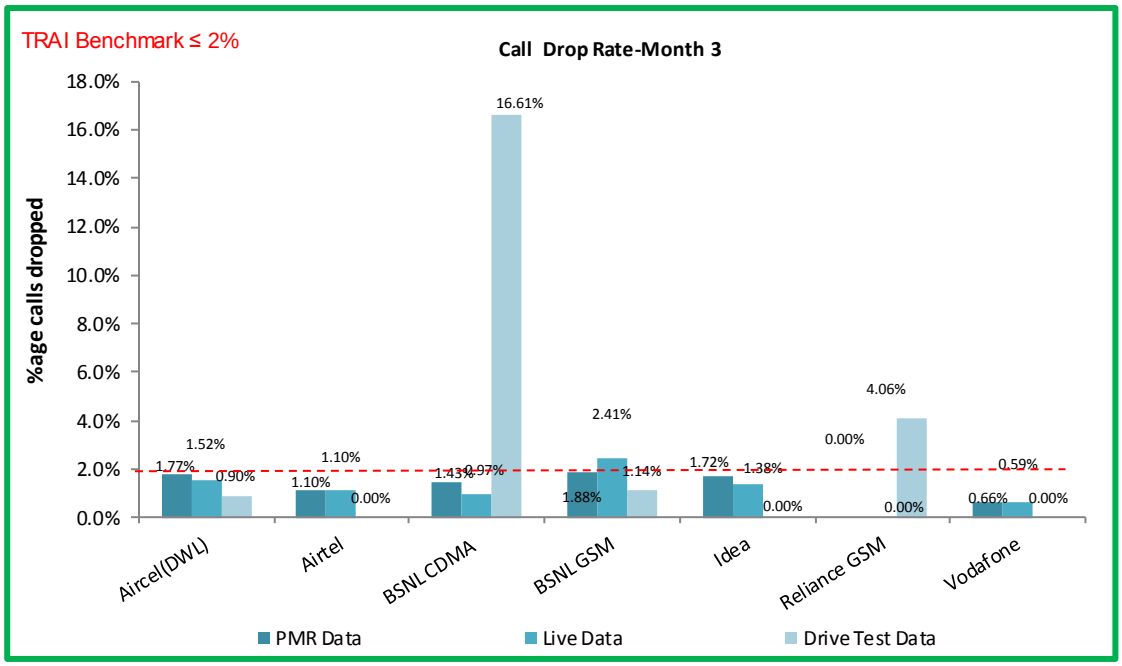
5.6.2.2 KEY FINDINGS – MONTH 2



For Reliance GSM, data for May'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

5.6.2.3 KEY FINDINGS – MONTH 3



For 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**

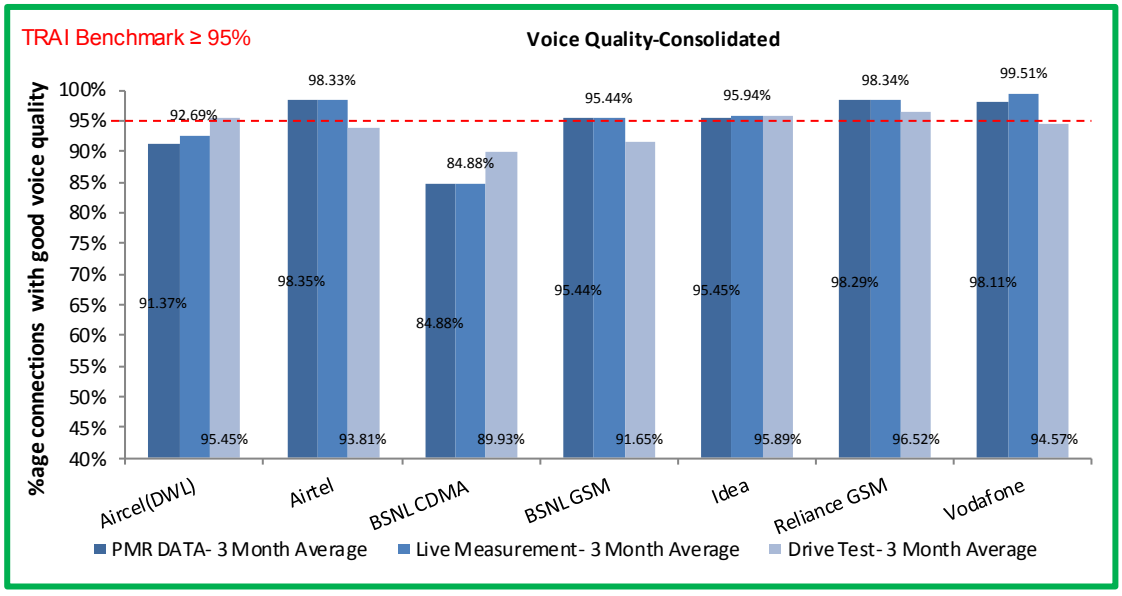
3. **TRAI Benchmark:** ≥ 95%

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.

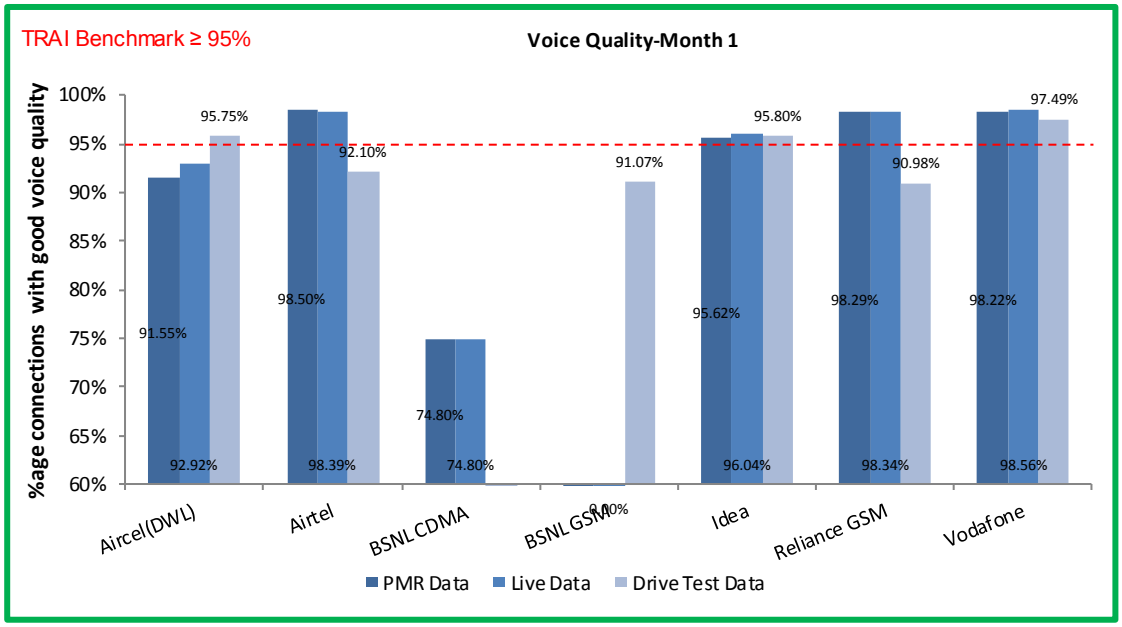
5.7.2 KEY FINDINGS



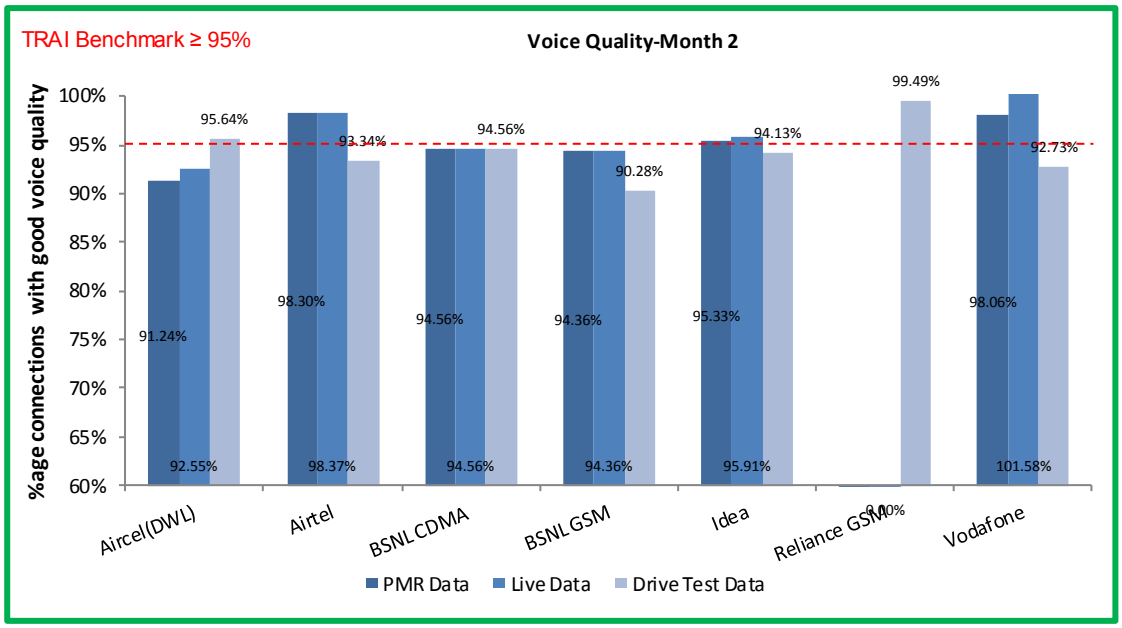
Data Source: Network Operations Center (NOC) of the operators

Aircel and BSNL CDMA were not able to meet the benchmark for Voice quality as per PMR data.

5.7.2.1 KEY FINDINGS – MONTH 1



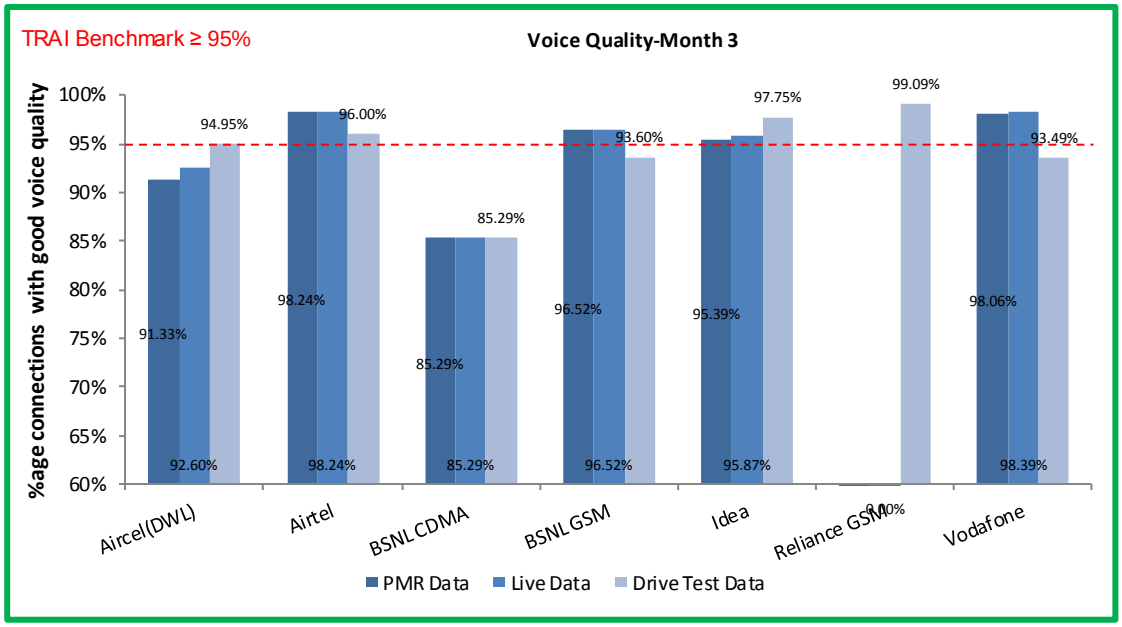
5.7.2.2 KEY FINDINGS – MONTH 2



For Reliance GSM, data for May'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

5.7.2.3 KEY FINDINGS – MONTH 3



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

For Reliance GSM, June'15 data is not available due to a server issue at operator's end. The same was pre-informed to TRAI by the operator.

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 one 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:
  - **Billing complaints per 100 bills issued (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.

- **Charging complaints per 100 subscribers (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%

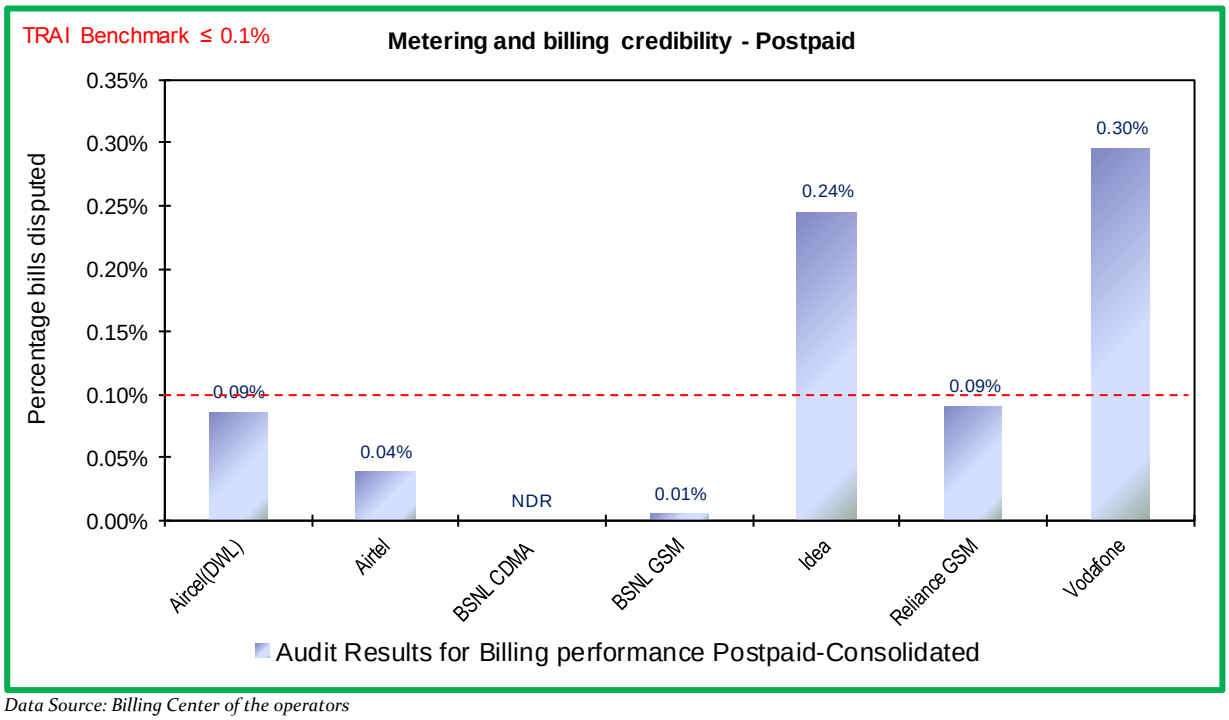
- Audit Procedure:

  - 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

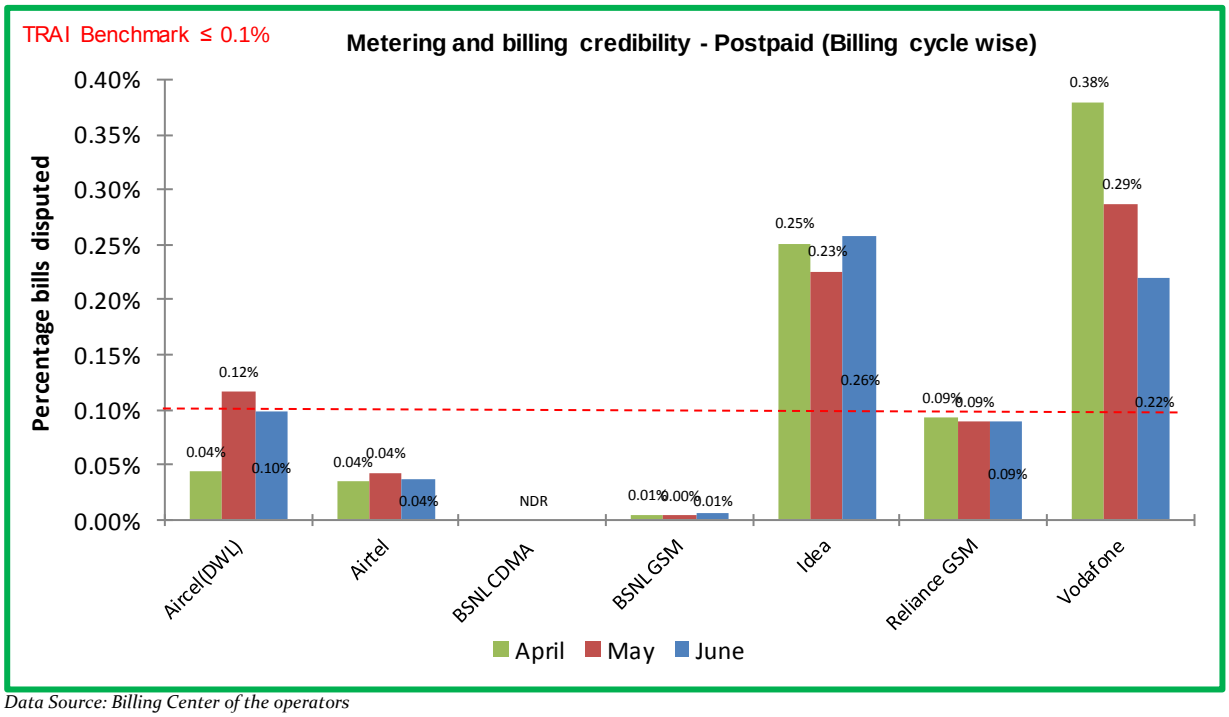
    - For Prepaid, the data of total charging complaints in a quarter would be taken for the purpose of audit

6.1.2 KEY FINDINGS – METERING AND BILLING CREDIBILITY (POSTPAID)



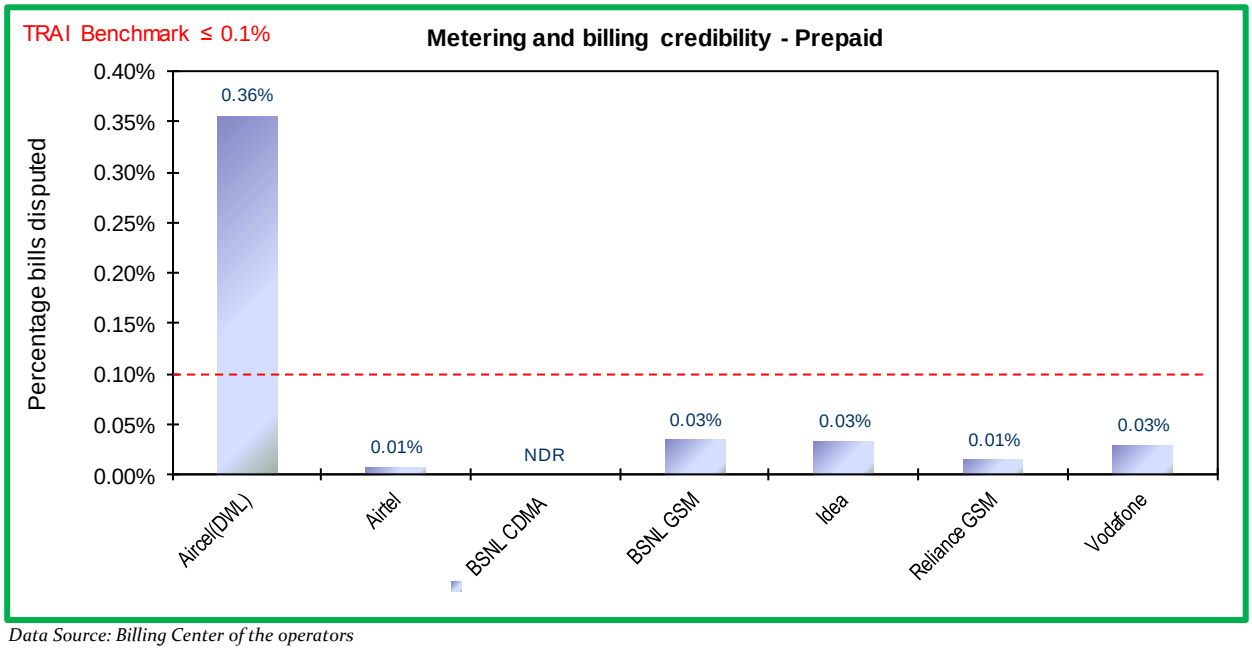
Data Source: Billing Center of the operators

Idea and Vodafone failed to meet the benchmark of 0.1% postpaid metering and billing credibility.



Data Source: Billing Center of the operators

6.1.3 KEY FINDINGS - METERING AND BILLING CREDIBILITY (PREPAID)



Data Source: Billing Center of the operators

Aircel failed to meet the benchmark for metering and billing credibility of prepaid subscribers.

NDR: Data to conduct audit for metering and billing was not available at the central billing center of BSNL CDMA. Hence, audit for the parameter has not been conducted for the operator.

6.2 RESOLUTION OF BILLING/ CHARGING 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:

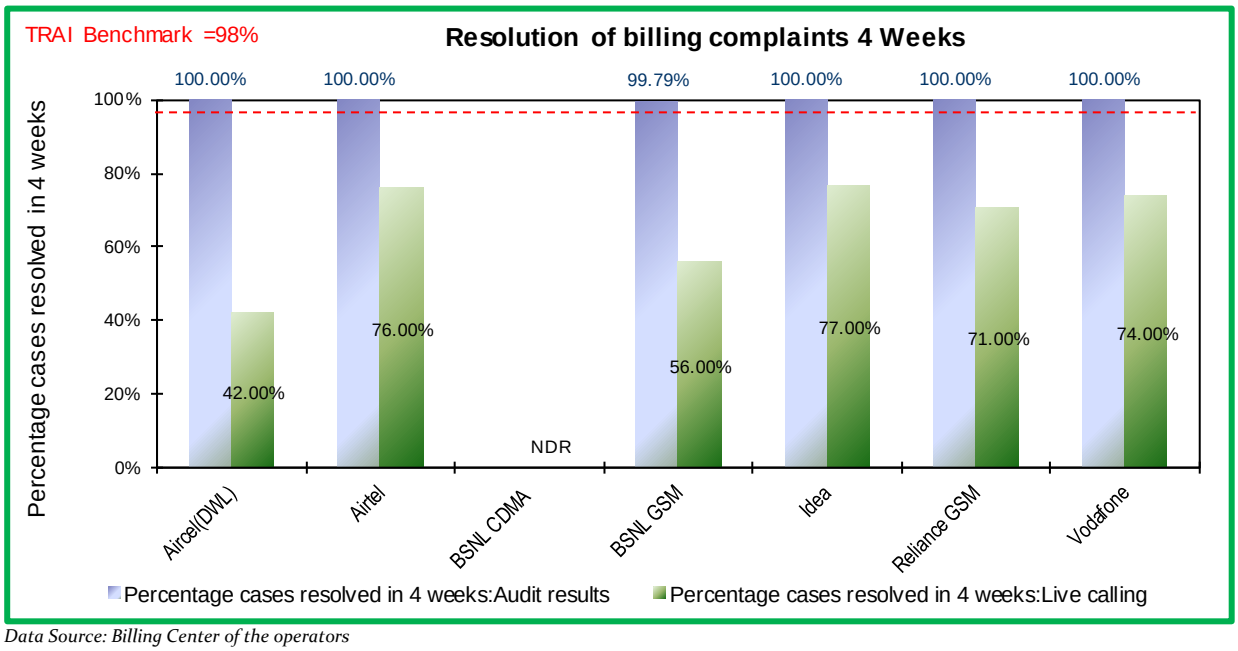
%age of billing complaints (for post-paid customers)/ charging, credit & validity (for pre-paid customers) resolved within 6 weeks =

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

- **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.

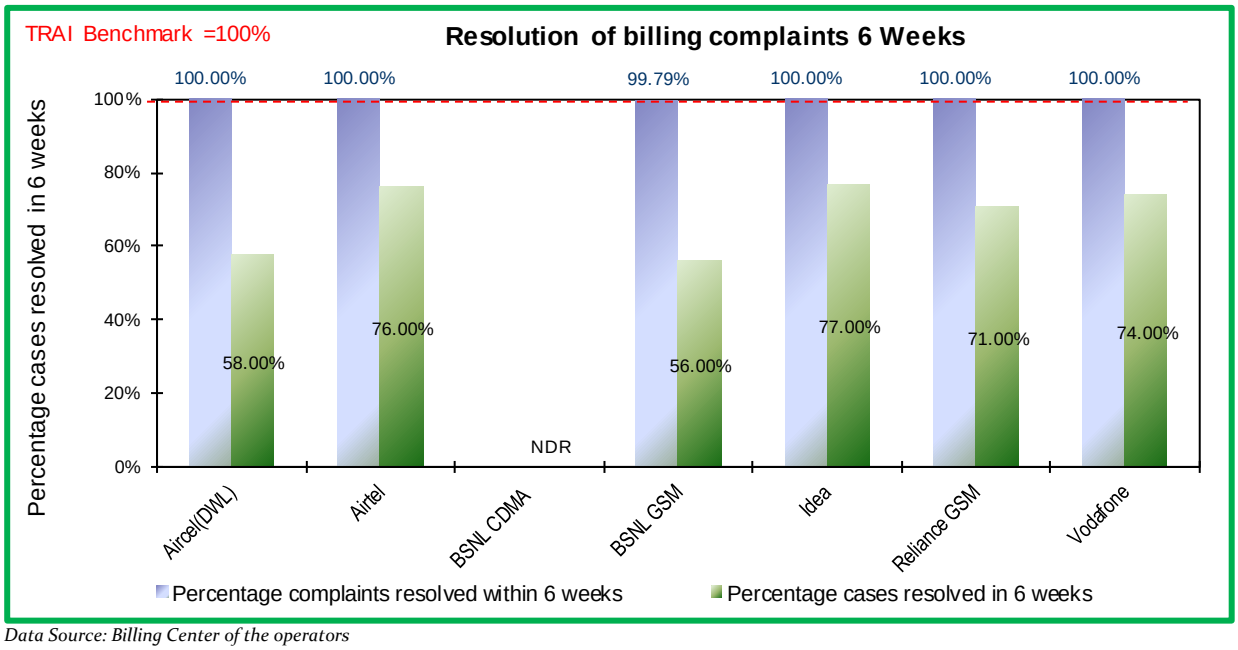
Benchmark: 98% complaints resolved within 4 weeks, 100% within 6 weeks.

6.2.2 KEY FINDINGS - WITHIN 4 WEEKS



Data Source: Billing Center of the operators

6.2.3 KEY FINDINGS WITHIN 6 WEEKS



Data Source: Billing Center of the operators

All operators met the TRAI benchmark of resolution of billing complaints within 4 weeks, while BSNL GSM fell slightly short of the benchmark of resolution of billing complaints within 6 weeks. However, as per live calling done to customers, the performance of all operators was observed to be much below the PMR data.

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

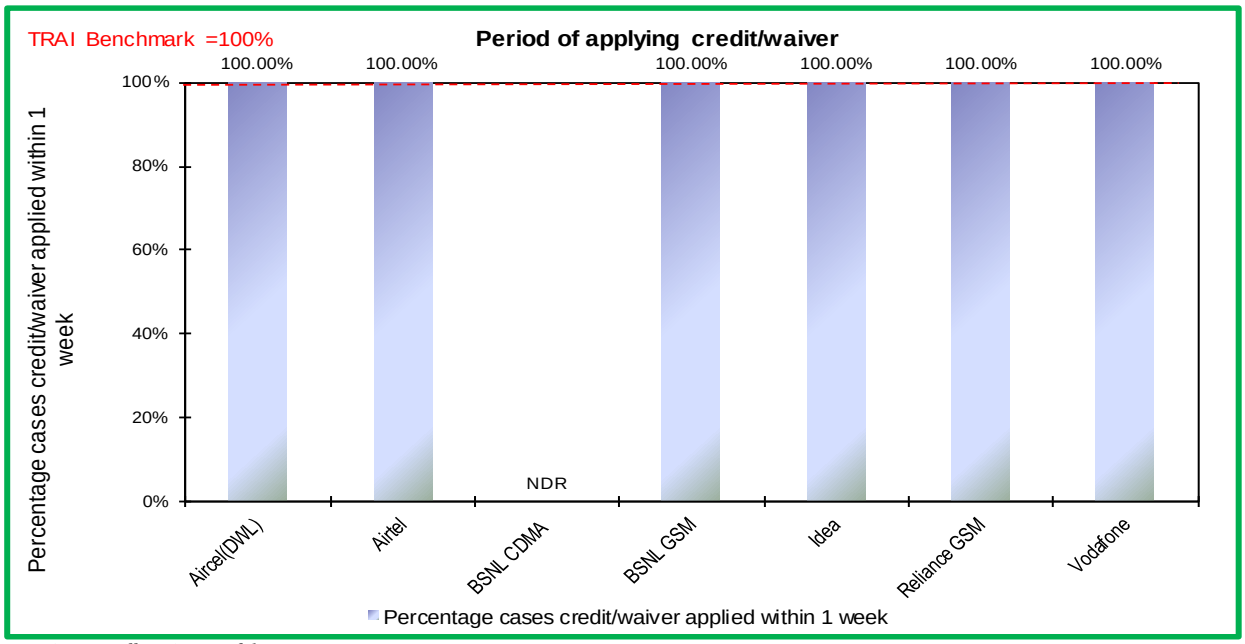
NDR: Data to conduct audit for resolution of billing complaints was not available at the central billing center of BSNL CDMA. Hence, audit for the parameter has not been conducted for the operator.

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 operators met the benchmark for this parameter.

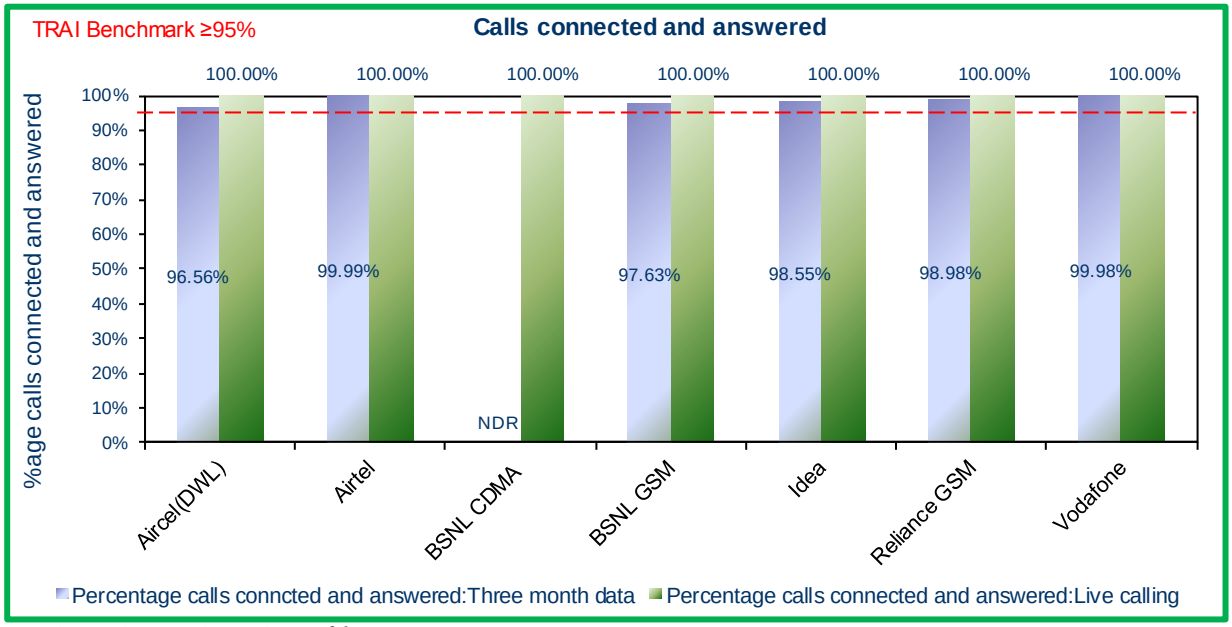
NDR: Data to conduct audit for resolution of billing complaints was not available at the central billing center of BSNL CDMA. Hence, audit for the parameter has not been conducted for the operator.

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

As per PMR data, all operators met the benchmark.

NDR: Data to conduct audit for customer care was not available at the customer service center of BSNL CDMA. Hence, audit for the parameter has not been conducted for the operator.

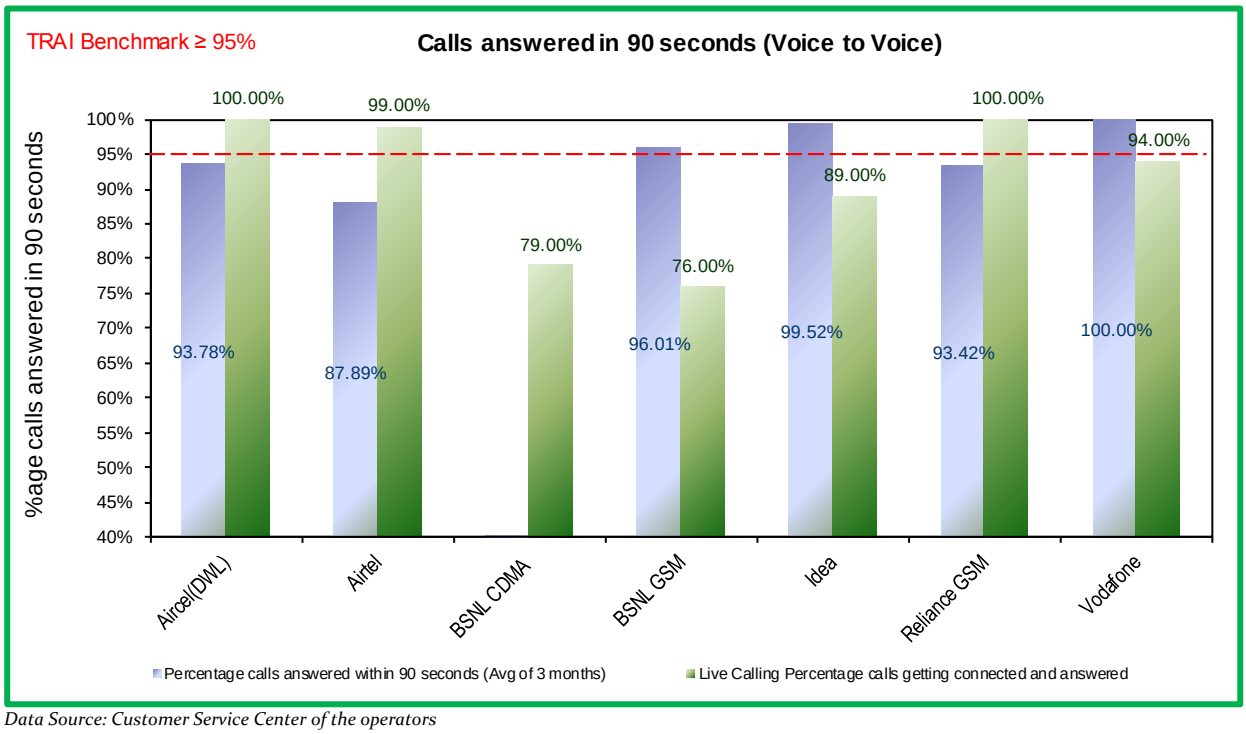
6.5 CALL CENTRE PERFORMANCE-VOICE TO VOICE

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

Benchmark: 95% calls to be answered within 90 seconds

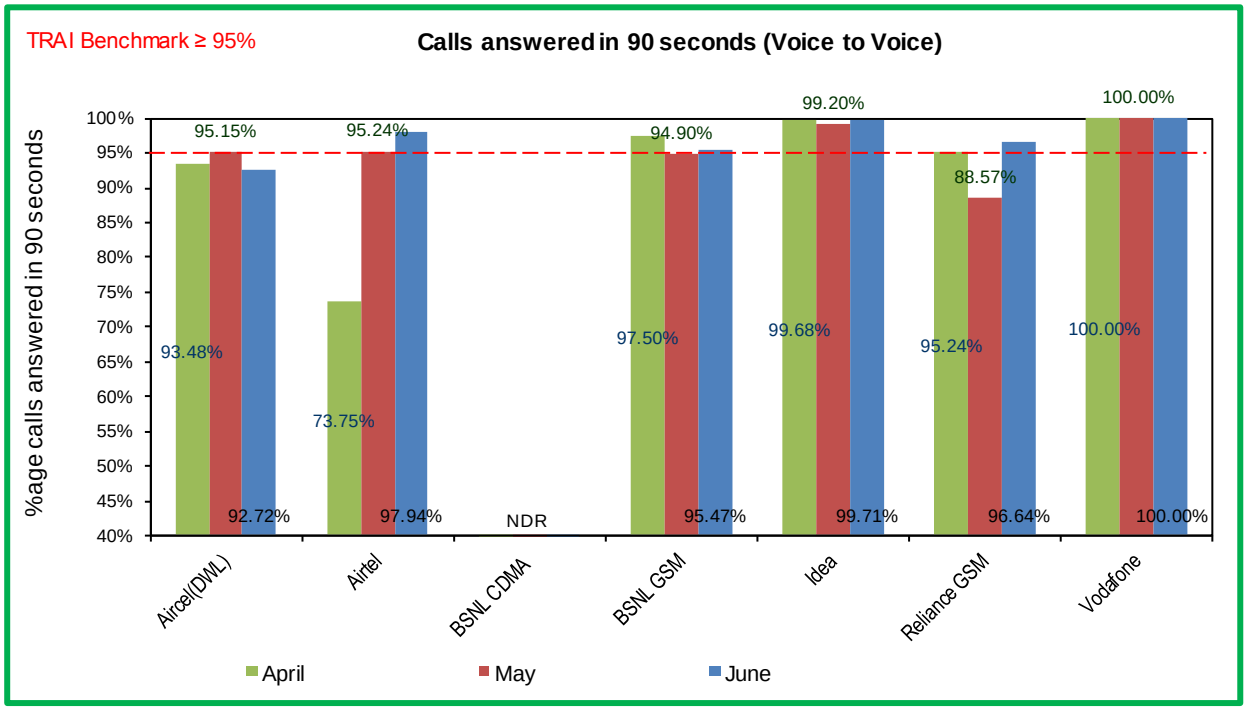
6.5.2 KEY FINDINGS



Data Source: Customer Service Center of the operators

Aircel, Airtel and Reliance GSM were not able to meet the benchmark as per audit. However, as per live calling done to customers, the performance of BSNL GSM, Idea and Vodafone was far inferior to the PMR data.

NDR: Data to conduct audit for customer care was not available at the customer service center of BSNL CDMA. Hence, audit for the parameter has not been conducted for the operator.



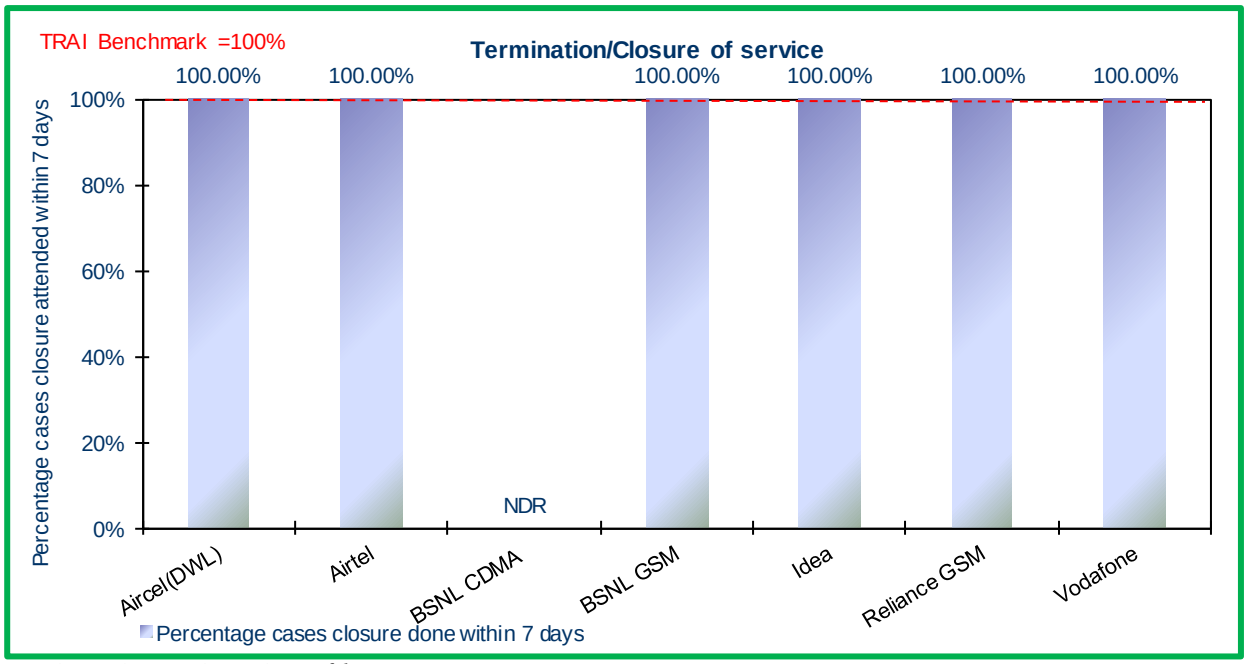
Data Source: Customer Service Center of the operators

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 operators met the TRAI benchmark for the parameter.

NDR: Data to conduct audit for customer care was not available at the customer service center of BSNL CDMA. Hence, audit for the parameter has not been conducted for the operator.

6.7 REFUND OF DEPOSITS AFTER CLOSURE

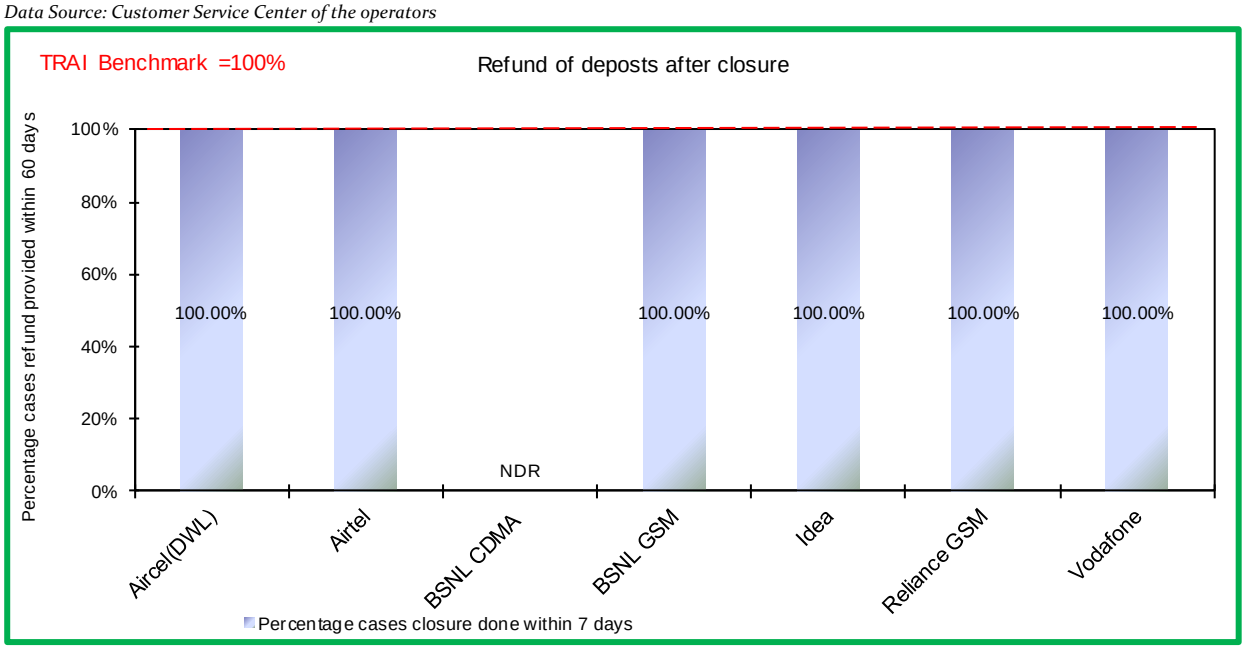
6.7.1 PARAMETER DESCRIPTION

- 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



All operators met the TRAI benchmark for the parameter.

NDR: Data to conduct audit for customer care was not available at the customer service center of BSNL CDMA. Hence, audit for the parameter has not been conducted for the operator.

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 Assam 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 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.

The schedule and operators involved in the operator assisted drive test for Assam circle are given below.

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

7.1.1 APRIL - BONGAIGAON SSA

Month	Name of SSA Covered	Date of Drive Test
April	BONGAIGAON	21st , 22nd & 23rd April'15

7.1.1.1 ROUTE DETAILS - BONGAIGAON SSA

Category	Type of location	Assam-April		
		BONGAIGAON		
		Day 1	Day 2	Day 3
Outdoor	Major Roads	Tamar Hat to Abhayapuri (125 KM) and Abhayapuri Town Drive	Bongaigaon to Nalbari via Barpeta Rd.(114 KM) and Nalbari Town Drive	Dhupdhar to Bongaigaon.(108 KM) and Goalpara Town Drive
	Highways			
	With in the City			
Indoor	Shopping complex			
	Office complex			

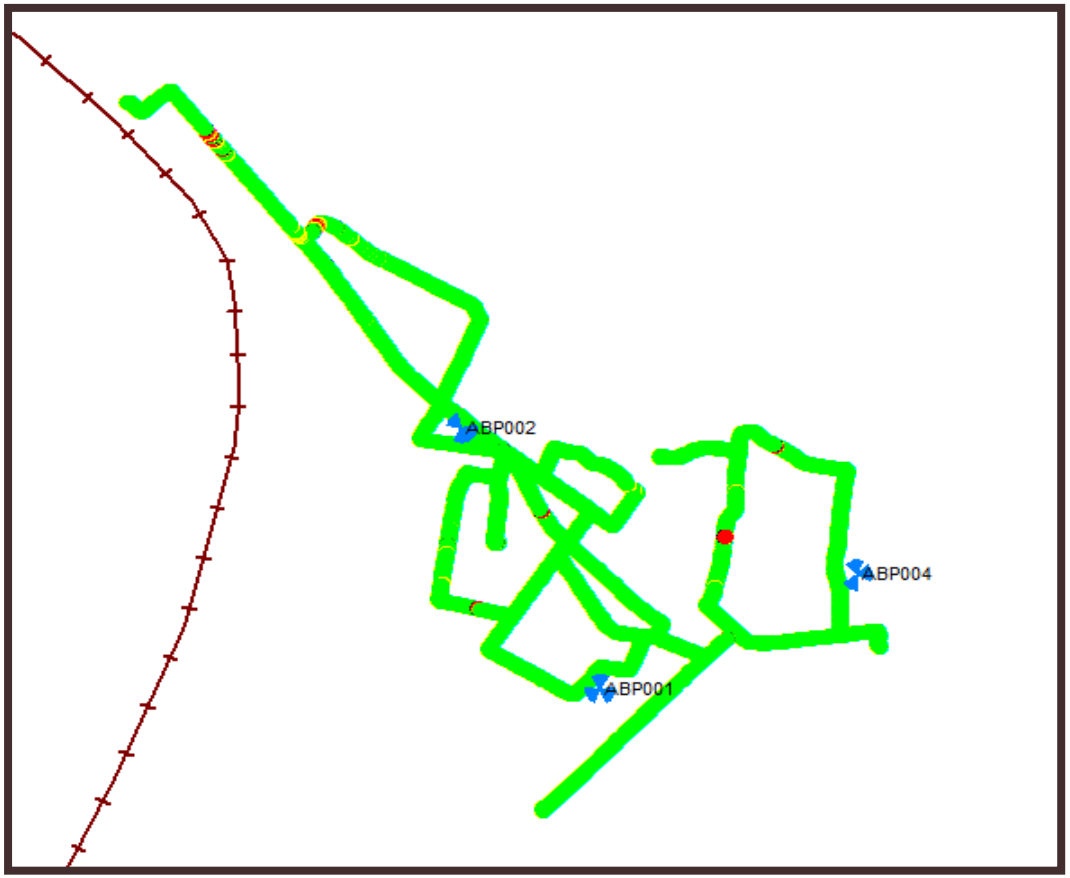
The route maps given in the report are provided for the purpose of identifying the routes traversed during the drive tests. We may observe three different colours (Red/Green/Yellow) of the lines, which signify signal strength; however these maps are for a single operator and have not been referred to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

7.1.1.2 KILOMETERS TRAVELLED- BONGAIGAON SSA

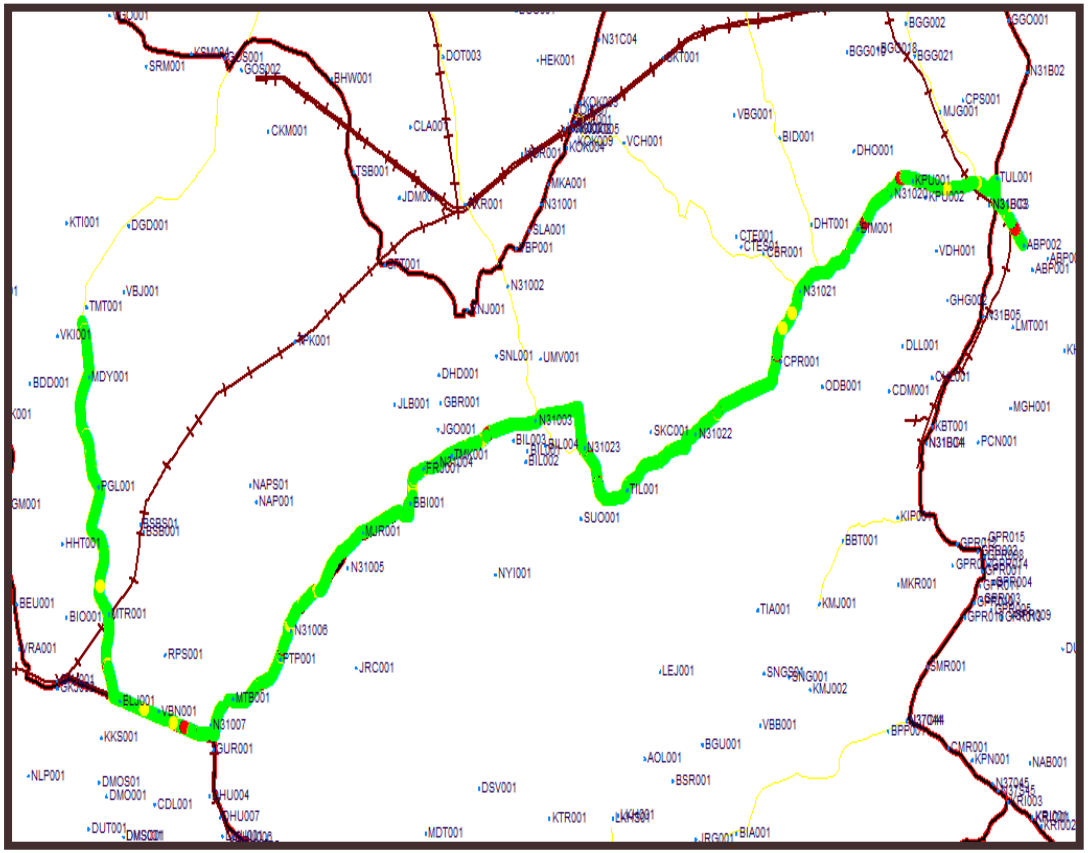
Drive Test - Kilometers Travelled	Day 1	Day 2	Day 3	Total
BONGAIGAON	125	114	108	347

7.1.1.3 ROUTE MAP - BONGAIGAON DAY 1

Day 1 – Within City

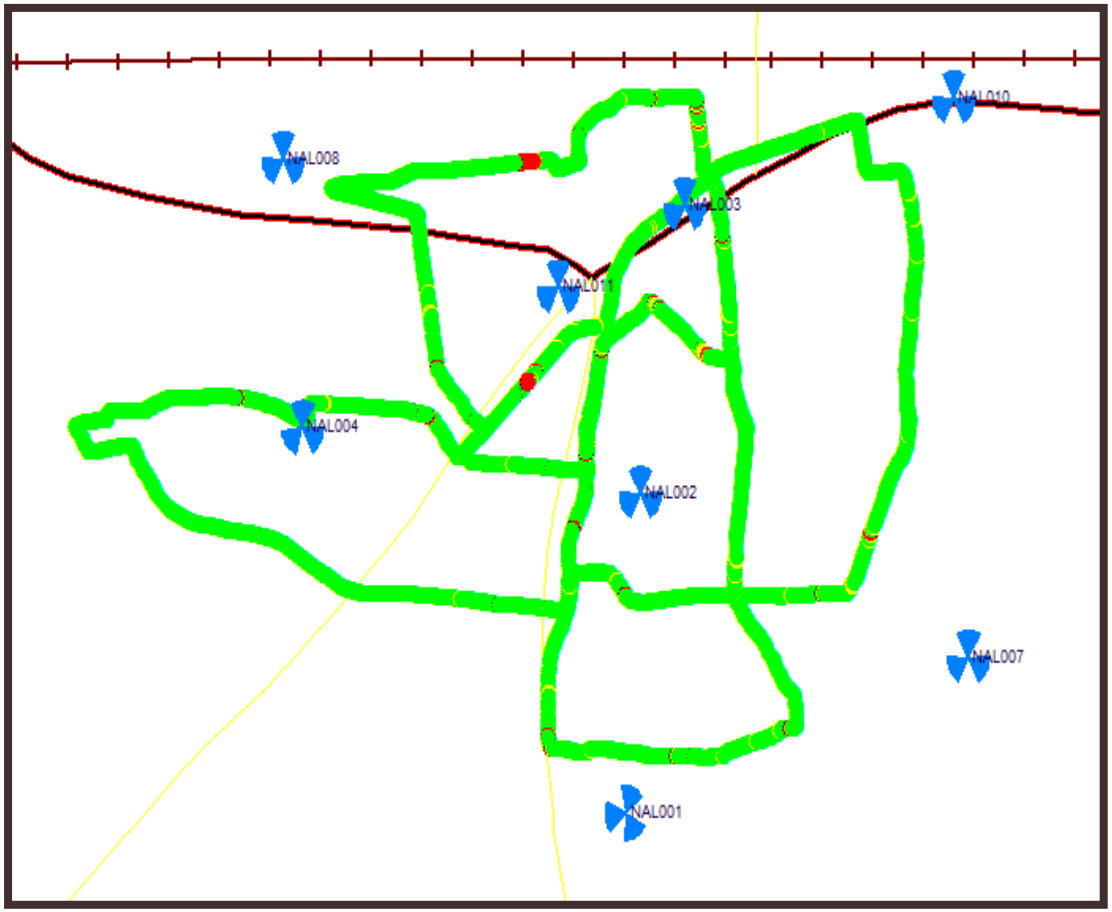


Day 1 – Highways

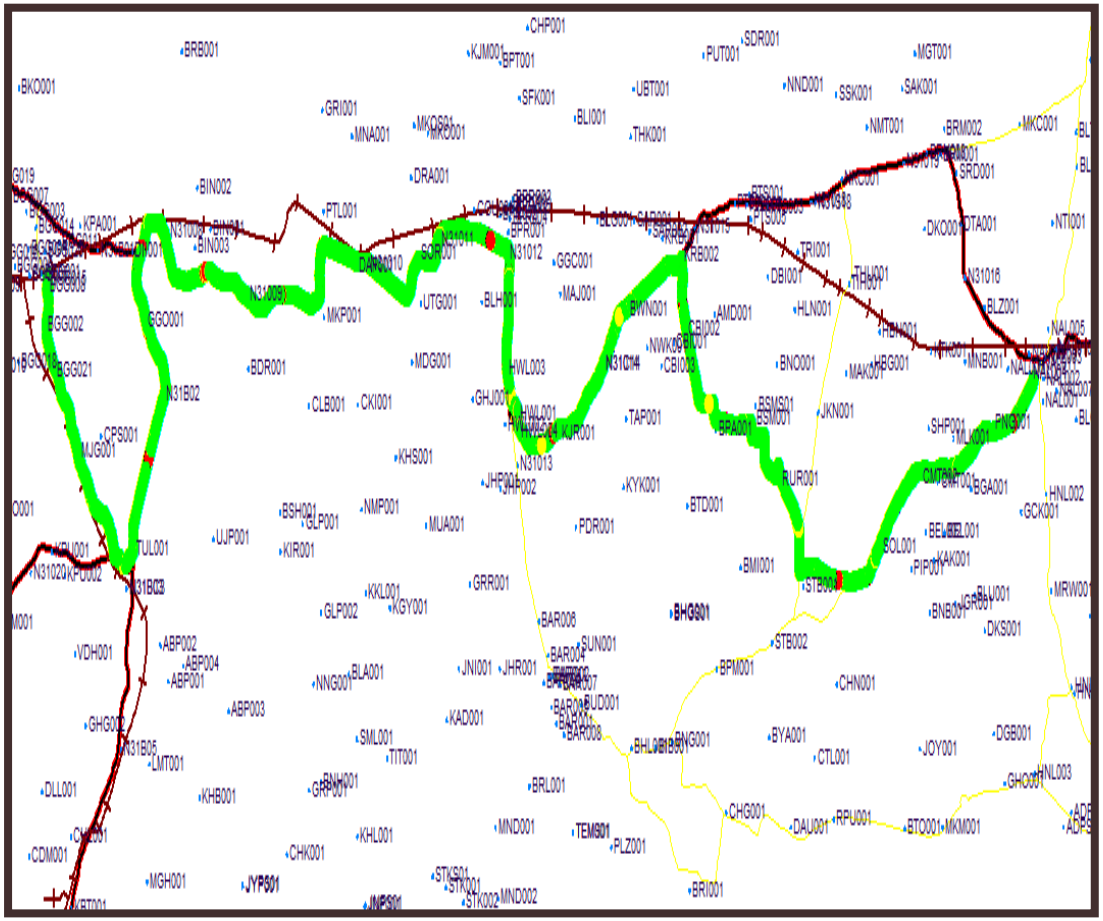


7.1.1.4 ROUTE MAP - BONGAIGAON DAY 2

Day 2 – Within City

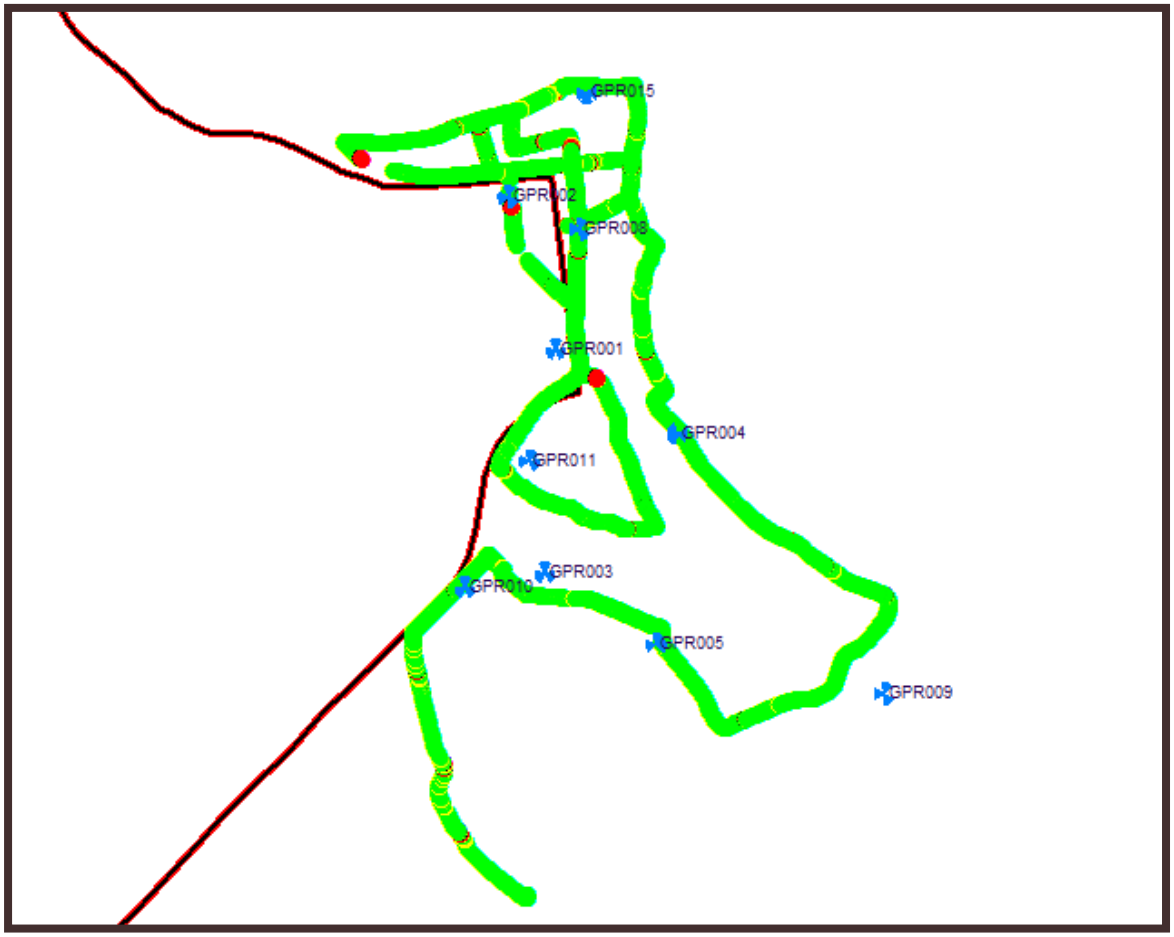


Day 2 – Highways

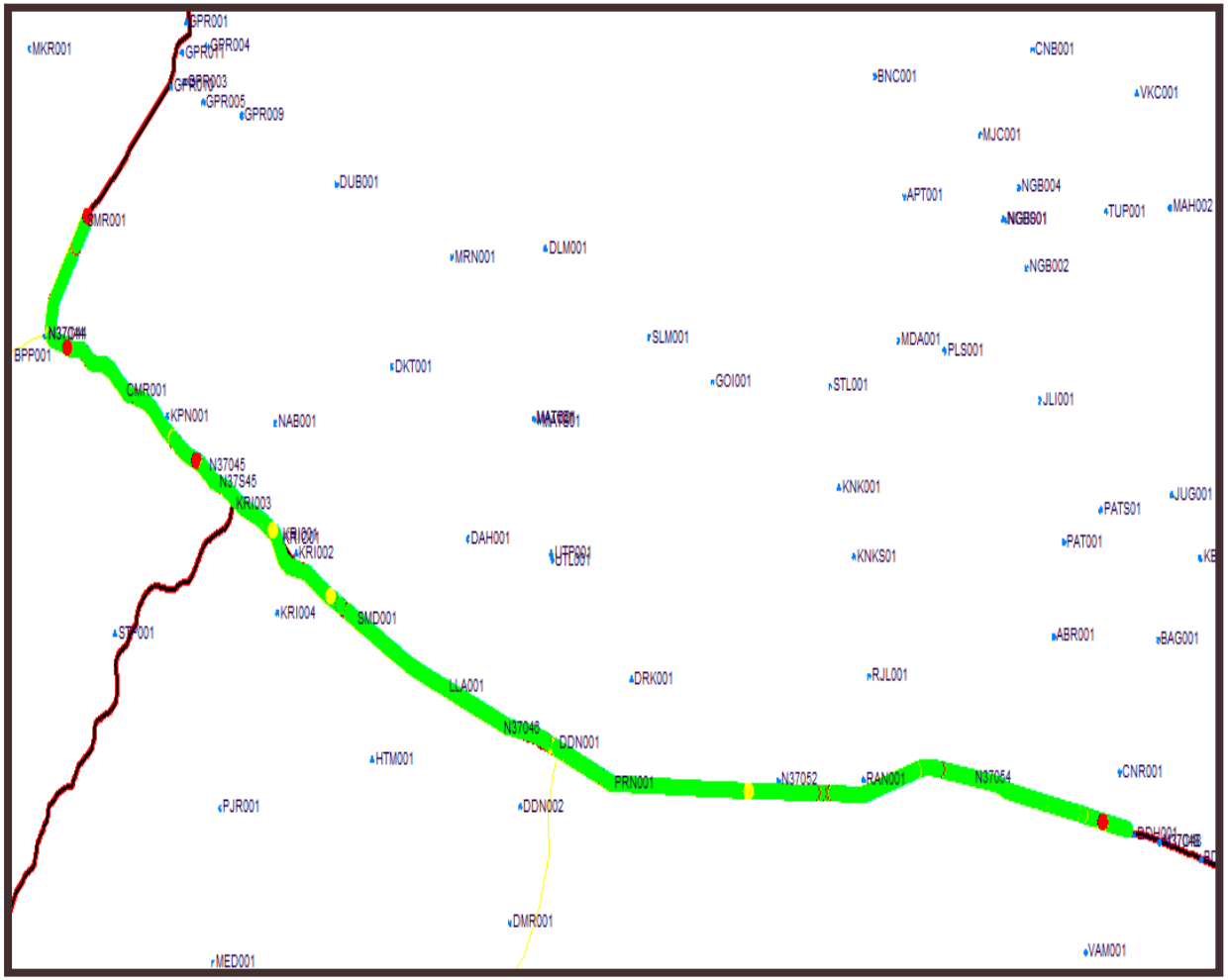


7.1.1.5 ROUTE MAP - BONGAIGAON DAY 3

Day 3 – Within City



Day 3 – Highways



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7.1.1.6 DRIVE TEST RESULTS - BONGAIGAON SSA

	B'mark	Aircel(DWL)		Airtel		BSNL CDMA		BSNL GSM		Idea		Reliance 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
0 to -75 dBm		59.48%	60.80%	55.66%	41.70%	NDR		72.76%	33.70%	43.48%	33.08%	98.81%	31.86%	53.49%	45.51%
0 to -85 dBm		96.14%	88.18%	93.38%	76.17%			99.13%	63.83%	70.59%	62.23%	99.35%	73.41%	97.83%	84.75%
0 to -95 dBm		99.92%	98.92%	99.77%	95.33%			99.97%	85.27%	98.05%	88.33%	100.00%	94.60%	99.90%	97.99%
Voice quality	≥ 95%	98.51%	95.34%	98.80%	91.72%			94.14%	91.37%	99.19%	96.22%	98.76%	90.31%	97.76%	97.25%
CSSR	≥ 95%	100.00%	99.77%	100.00%	99.76%			100.00%	92.01%	100.00%	96.80%	100.00%	92.70%	100.00%	98.77%
%age Blocked calls		0.00%	0.23%	0.00%	0.24%			0.00%	7.99%	0.00%	3.20%	0.00%	5.94%	0.00%	0.61%
Call drop rate	≤ 2%	0.00%	0.00%	0.00%	0.00%			0.00%	3.04%	0.00%	0.84%	0.00%	4.50%	0.00%	0.00%
Hands off success rate		100.00%	100.00%	100.00%	99.75%			100.00%	97.40%	100.00%	98.12%	100.00%	97.17%	100.00%	100.00%

Data Source: Drive test reports submitted by operators to auditors

NDR: BSNL CDMA did not participate in the drive test conducted in April 2015.

Voice Quality

BSNL GSM failed to meet the benchmark in outdoor as well as indoor locations. Airtel and Reliance GSM did not meet the benchmark in outdoor locations.

Call Set Success Rate (CSSR)

BSNL GSM and Reliance GSM failed to meet the benchmark for CSSR in outdoor locations.

Call Drop Rate

BSNL GSM and Reliance GSM failed to meet the benchmark for call drop rate in outdoor locations.

7.1.2 MAY – NAGAON SSA

Month	Name of SSA Covered	Date of Drive Test
May	NAGAON	19th, 20th & 21st May'15

7.1.2.1 ROUTE DETAILS – NAGAON SSA

Category	Type of location	Assam-May		
		NAGAON		
		Day 1	Day 2	Day 3
Outdoor	Major Roads	Lumding to Hamren(100 KM) and LUMDING Town Drive	Hamren to Nagaon .(91 KM) and NAGAON Town Drive(via burhapatia, kampur town,chaparmukh,roha)	Nagaon to Jagiroad .(104 KM) and MARIGAON Town Drive(via Dhing, Moirabari)
	Highways			
	With in the City			
Indoor	Shopping complex			
	Office complex			

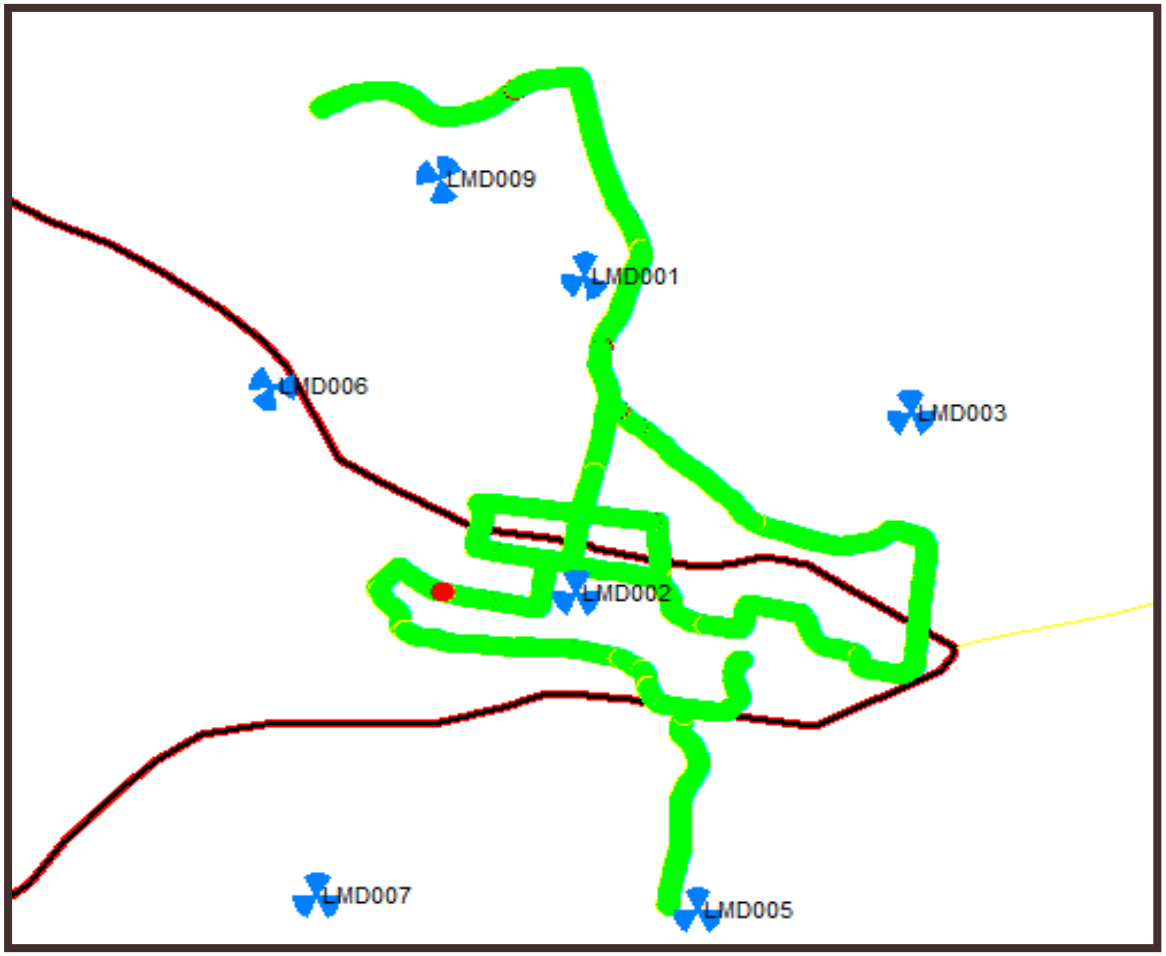
The route maps given in the report are provided for the purpose of identifying the routes traversed during the drive tests. We may observe three different colours (Red/Green/Yellow) of the lines, which signify signal strength; however these maps are for a single operator and have not been referred to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

7.1.2.2 KILOMETERS TRAVELLED– NAGAON SSA

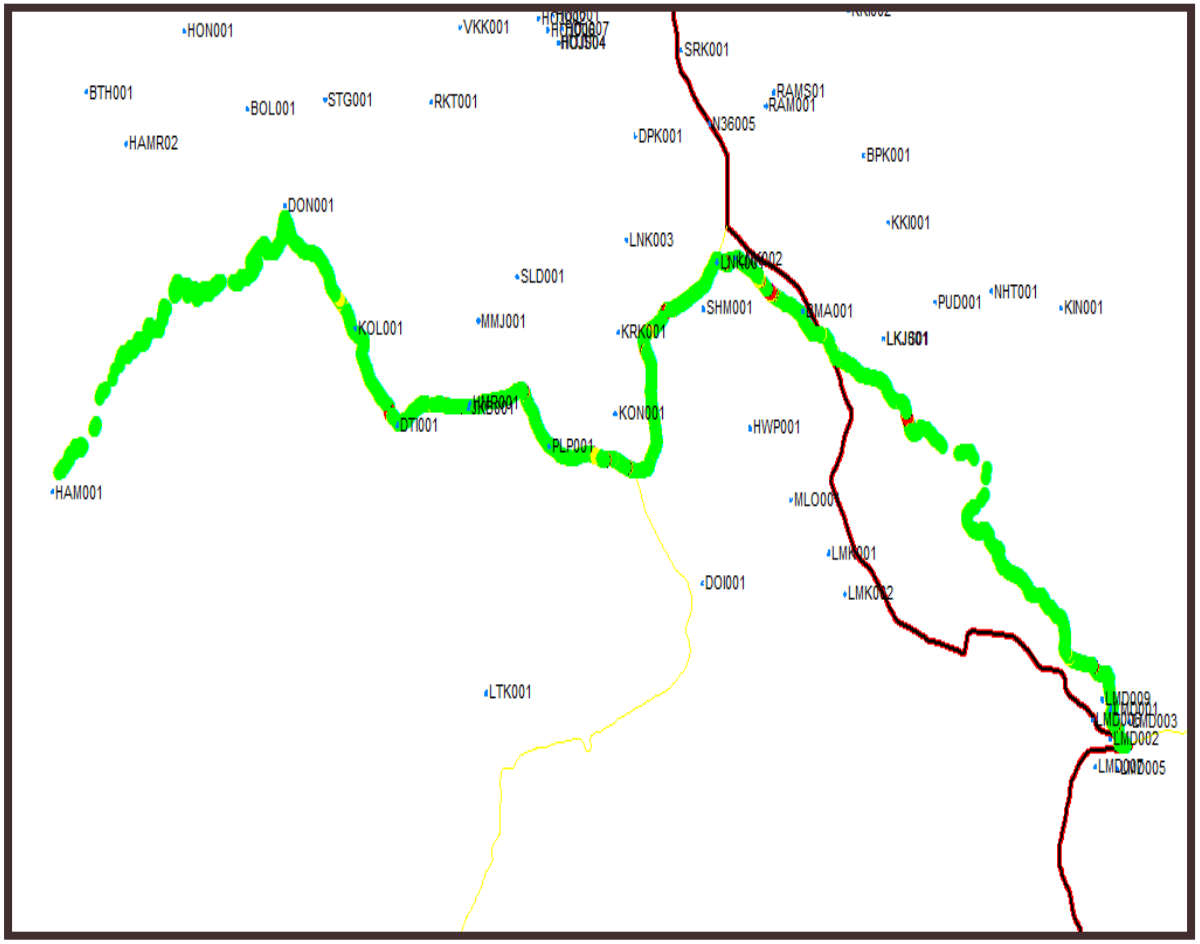
Drive Test - Kilometers Travelled	Day 1	Day 2	Day 3	Total
NAGAON	100	91	104	295

7.1.2.3 ROUTE MAP NAGAON DAY 1

Day 1 – Within City



Day 1 – Highways

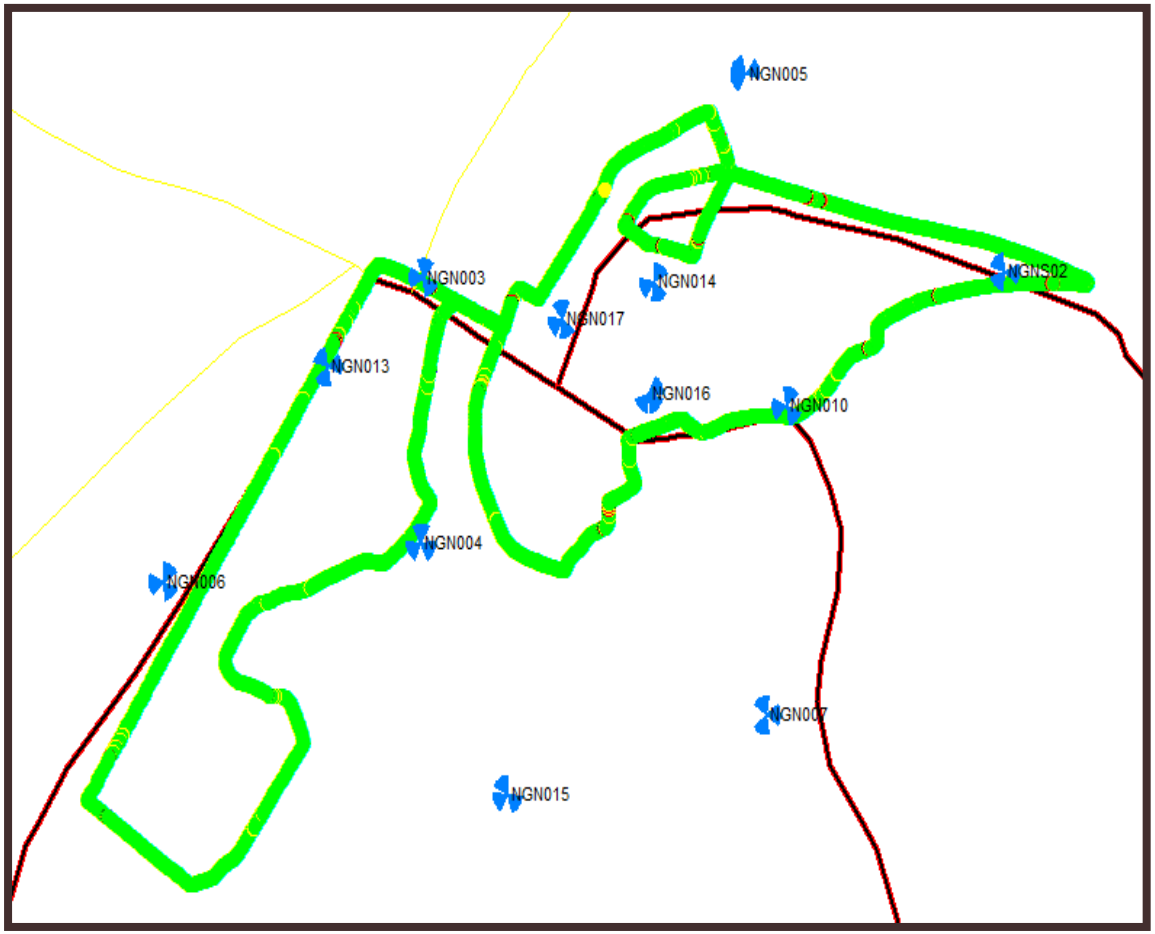


IMRB International | eTech

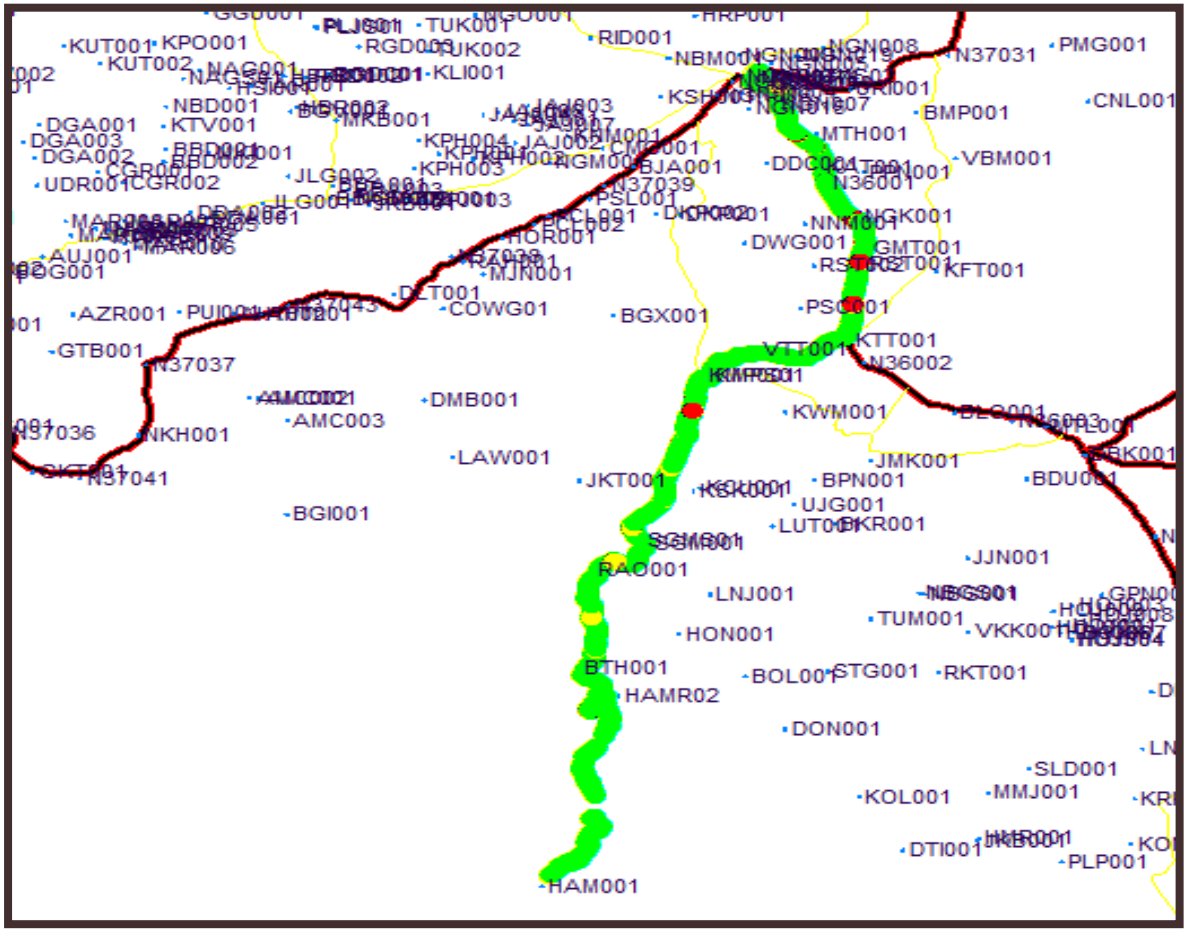
TRAI
Telecom Regulatory Authority of India
(IS/ISO 9001-2008 Certified Organisation)

7.1.2.4 ROUTE MAP NAGAON DAY 2

Day 2 – Within City

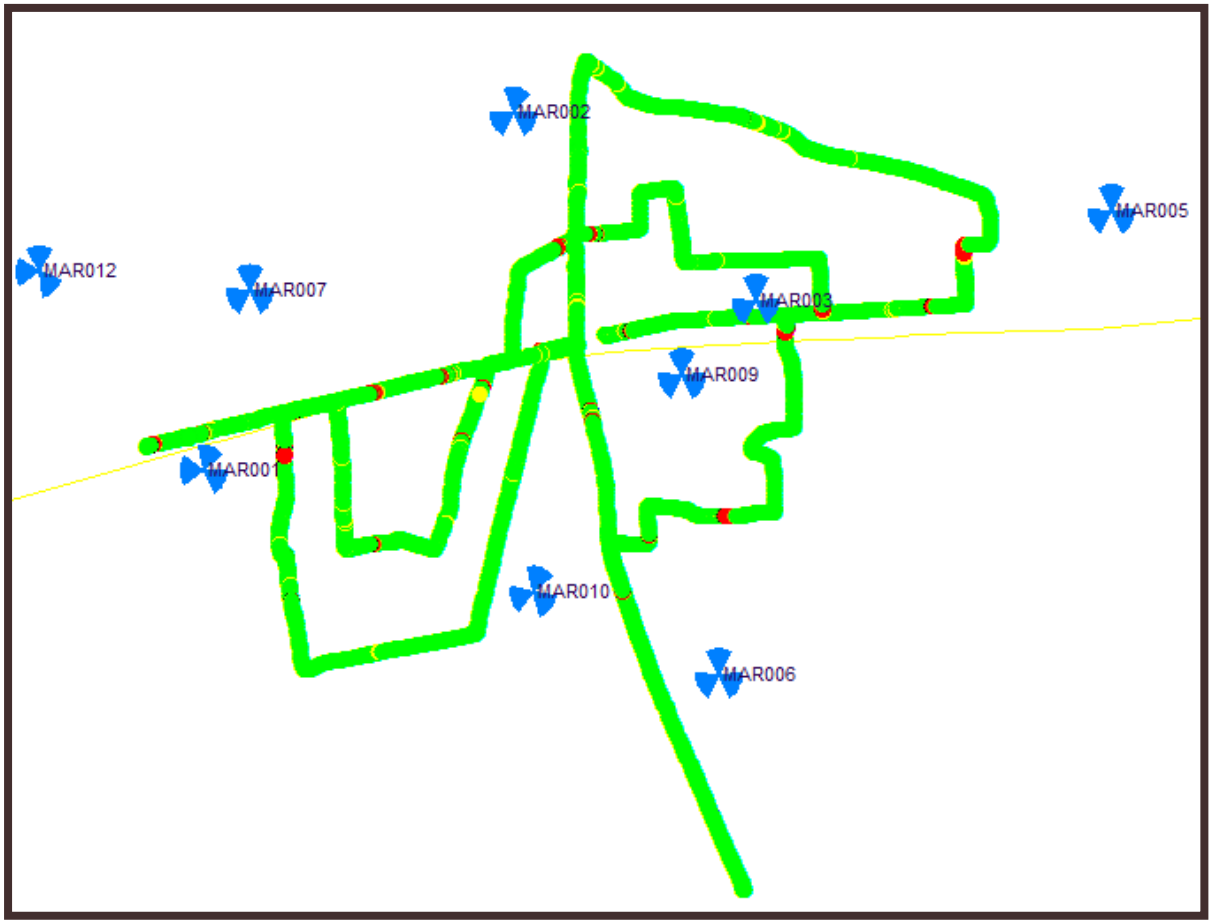


Day 2 – Highways

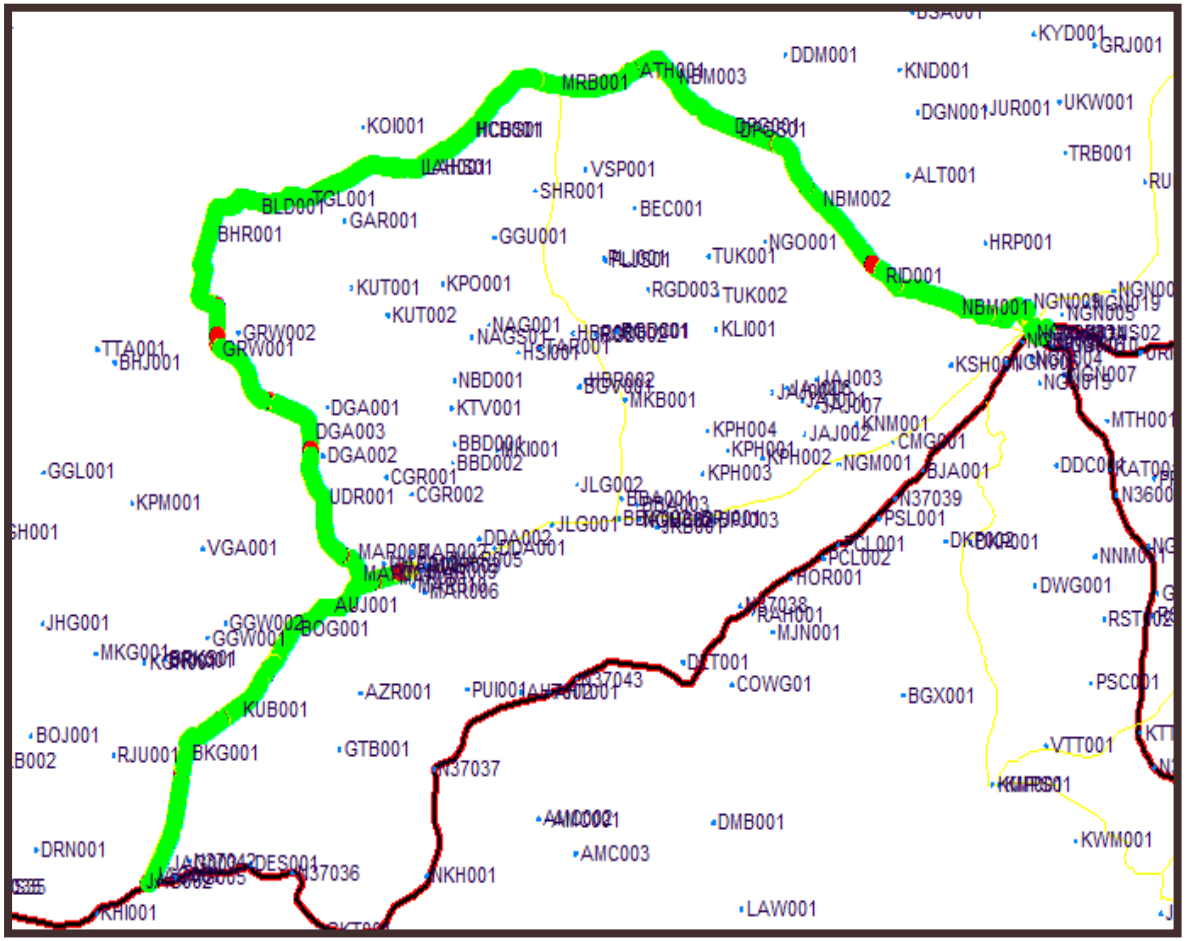


7.1.2.5 ROUTE MAP NAGAON DAY 3

Day 3 – Within City



Day 3 – Highways



7.1.2.6 DRIVE TEST RESULTS – NAGAON SSA

	B'mark	Aircel(DWL)		Airtel		BSNL CDMA		BSNL GSM		Idea		Reliance 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
0 to -75 dBm		94.56%	67.17%	78.86%	29.43%	98.05%	39.93%	69.00%	21.33%	66.00%	32.16%	57.13%	39.70%	61.21%	44.77%
0 to -85 dBm		99.91%	87.05%	99.53%	68.61%	99.54%	63.30%	95.90%	58.00%	93.54%	70.52%	97.41%	72.35%	98.52%	78.85%
0 to -95 dBm		100.00%	97.20%	99.98%	91.99%	100.00%	89.36%	100.00%	87.17%	99.70%	92.99%	99.99%	90.58%	99.96%	94.24%
Voice quality	≥ 95%	98.36%	95.13%	99.21%	92.70%	97.52%	93.91%	95.37%	89.65%	99.28%	93.81%	99.96%	99.34%	93.85%	92.46%
CSSR	≥ 95%	100.00%	99.20%	100.00%	99.80%	97.85%	92.38%	95.07%	83.84%	100.00%	97.52%	100.00%	98.45%	100.00%	97.68%
%age Blocked calls		0.00%	0.80%	0.00%	0.20%	2.15%	7.62%	5.45%	16.16%	0.00%	2.48%	0.00%	1.55%	0.00%	2.32%
Call drop rate	≤ 2%	0.00%	0.50%	0.00%	0.00%	0.00%	4.14%	0.00%	3.63%	0.00%	0.31%	0.00%	4.92%	0.00%	1.75%
Hands off success rate		100.00%	100.00%	100.00%	99.85%	99.69%	99.41%	98.97%	93.84%	100.00%	99.60%	100.00%	99.81%	100.00%	99.59%

Data Source: Drive test reports submitted by operators to auditors

Voice Quality

Vodafone failed to meet the benchmark in outdoor as well as indoor locations. Airtel, BSNL CDMA, BSNL GSM and Idea did not meet the benchmark in outdoor locations.

Call Set Success Rate (CSSR)

BSNL CDMA and BSNL GSM failed to meet the benchmark for CSSR in outdoor as well as indoor locations.

Call Drop Rate

BSNL CDMA, BSNL GSM and Reliance GSM failed to meet the benchmark for call drop rate in outdoor locations.

7.1.3 JUNE – TEZPUR SSA

Month	Name of SSA Covered	Date of Drive Test
June	TEZPUR	16th, 17th & 18st June'15

7.1.3.1 ROUTE DETAILS – TEZPUR SSA

Category	Type of location	Assam-June		
		TEZPUR		
		Day 1	Day 2	Day 3
Outdoor	Major Roads	1Bezera to Mangaldoi via Dimakuchi Mazor Rd Drive.(106 KM) and	Mangaldoi to Jamugurihat H.Way Drive.(146 KM) and	Jamugurihat to Bandardewa H.Way Drive.(130 KM) and
	Highways	MANGALDOI TOWN Drive	TEZPUR TOWN Drive	BISHWANATH CHARIALI TOWN Drive
	With in the City			
Indoor	Shopping complex			
	Office complex			

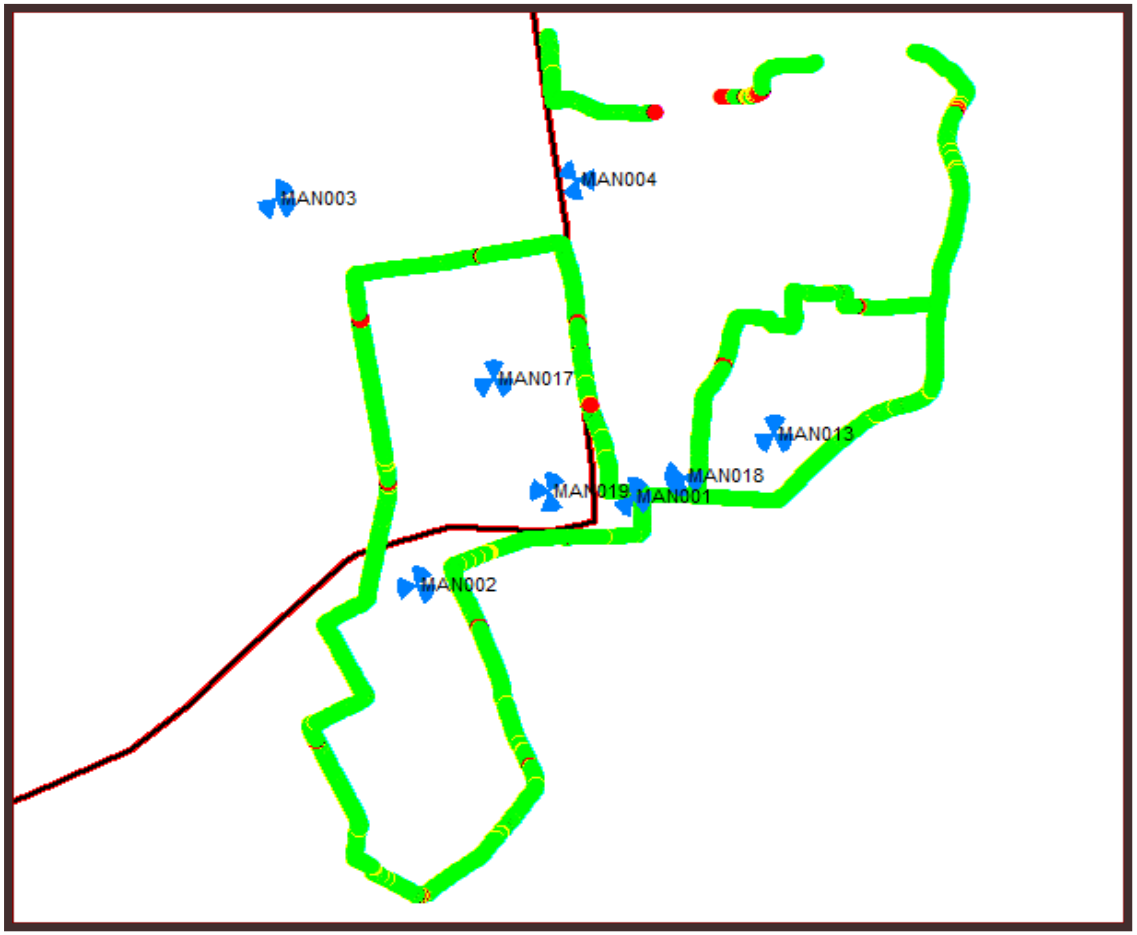
The route maps given in the report are provided for the purpose of identifying the routes traversed during the drive tests. We may observe three different colours (Red/Green/Yellow) of the lines, which signify signal strength; however these maps are for a single operator and have not been referred to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

7.1.3.2 KILOMETERS TRAVELLED – TEZPUR SSA

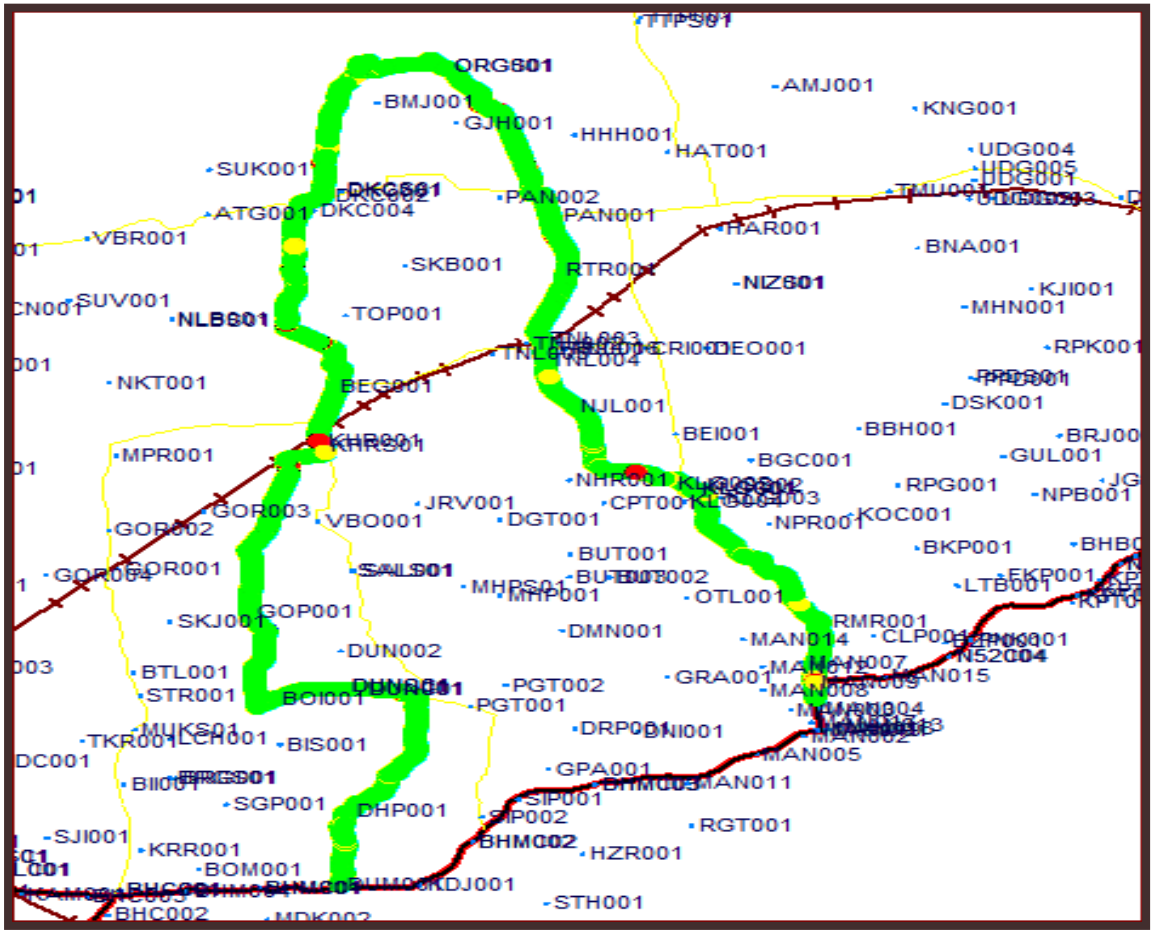
Drive Test - Kilometers Travelled	Day 1	Day 2	Day 3	Total
TEZPUR	106	146	130	382

7.1.3.3 ROUTE MAP TEZPUR DAY 1

Day 1 – Within City

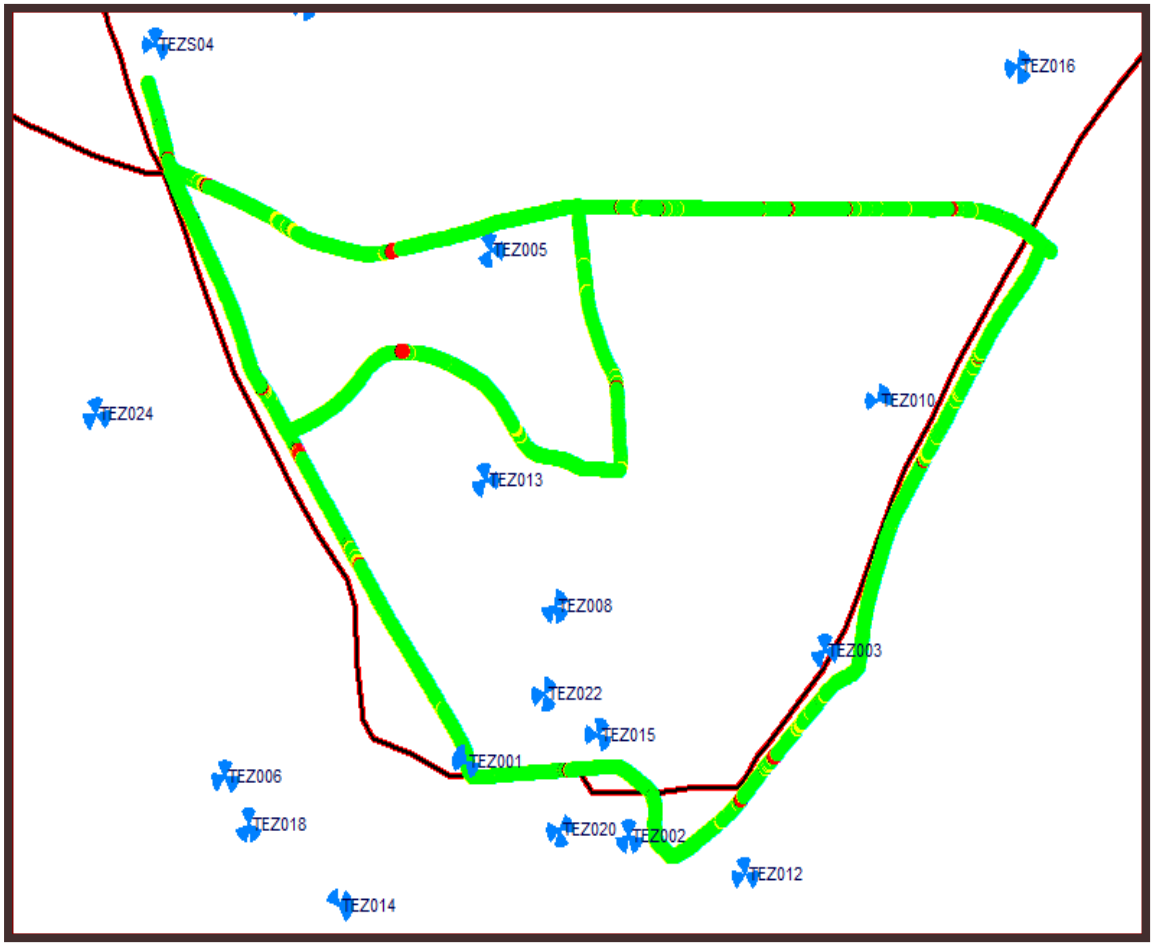


Day 1 – Highways

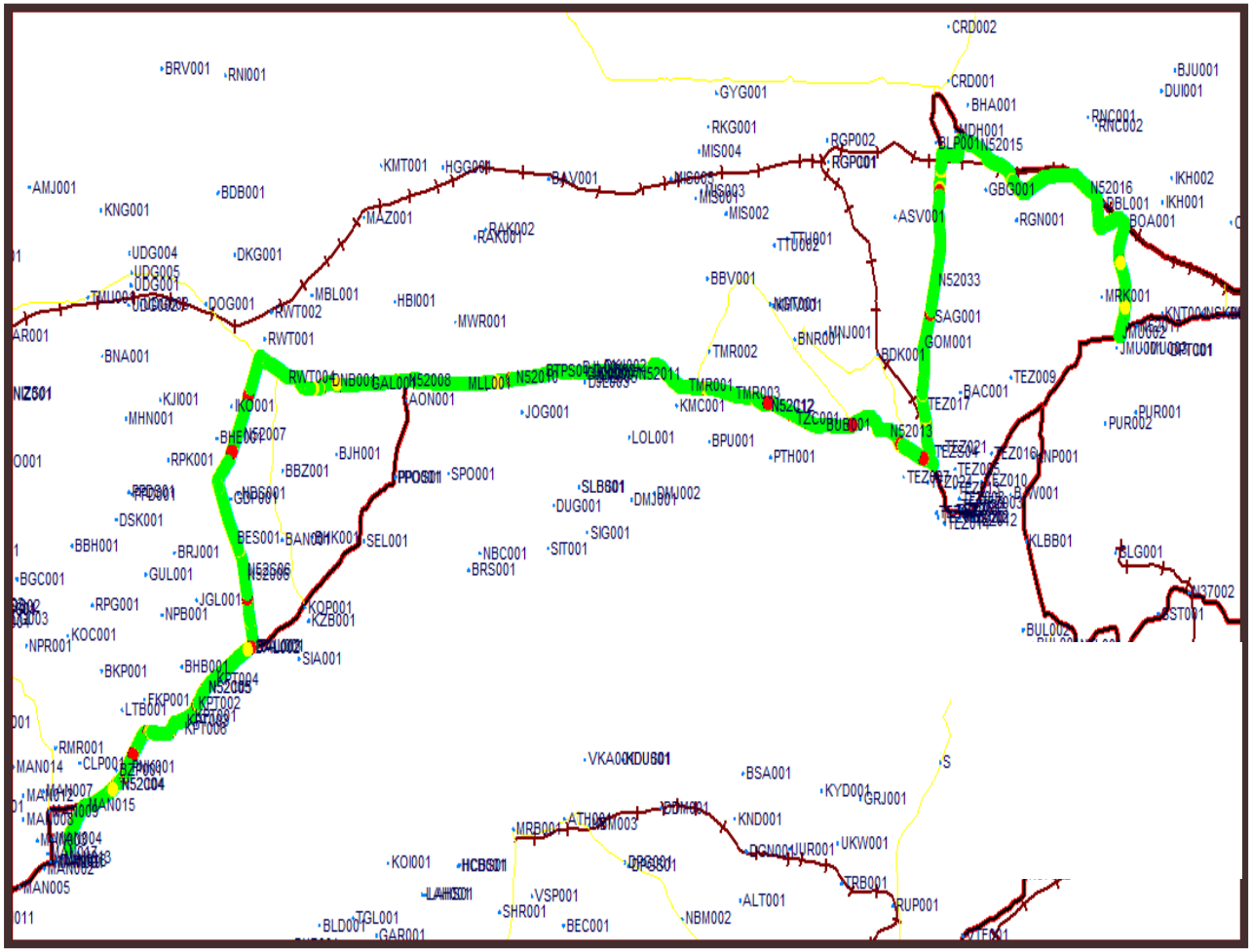


7.1.3.4 ROUTE MAP TEZPUR DAY 2

Day 2 – Within City

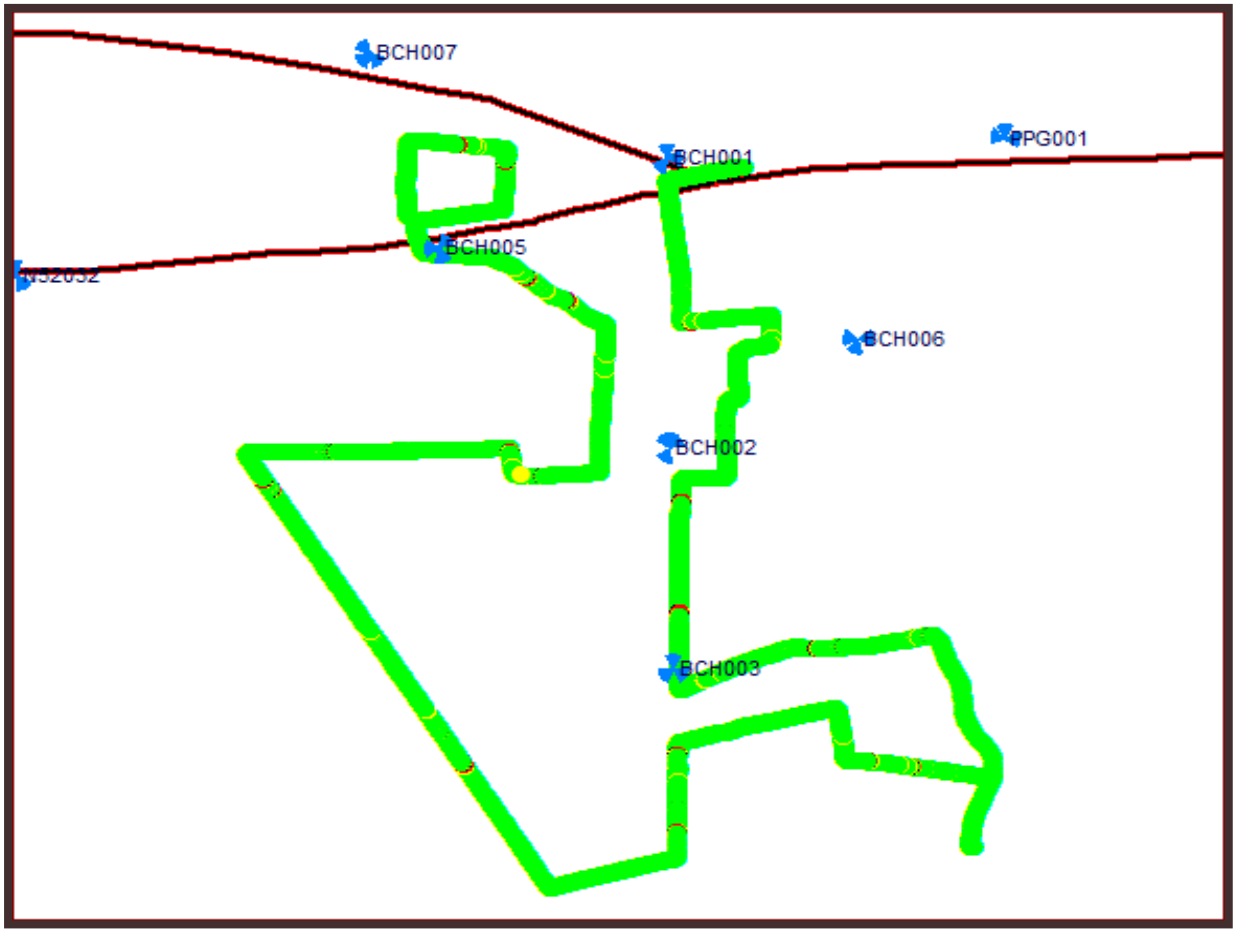


Day 2 – Highways

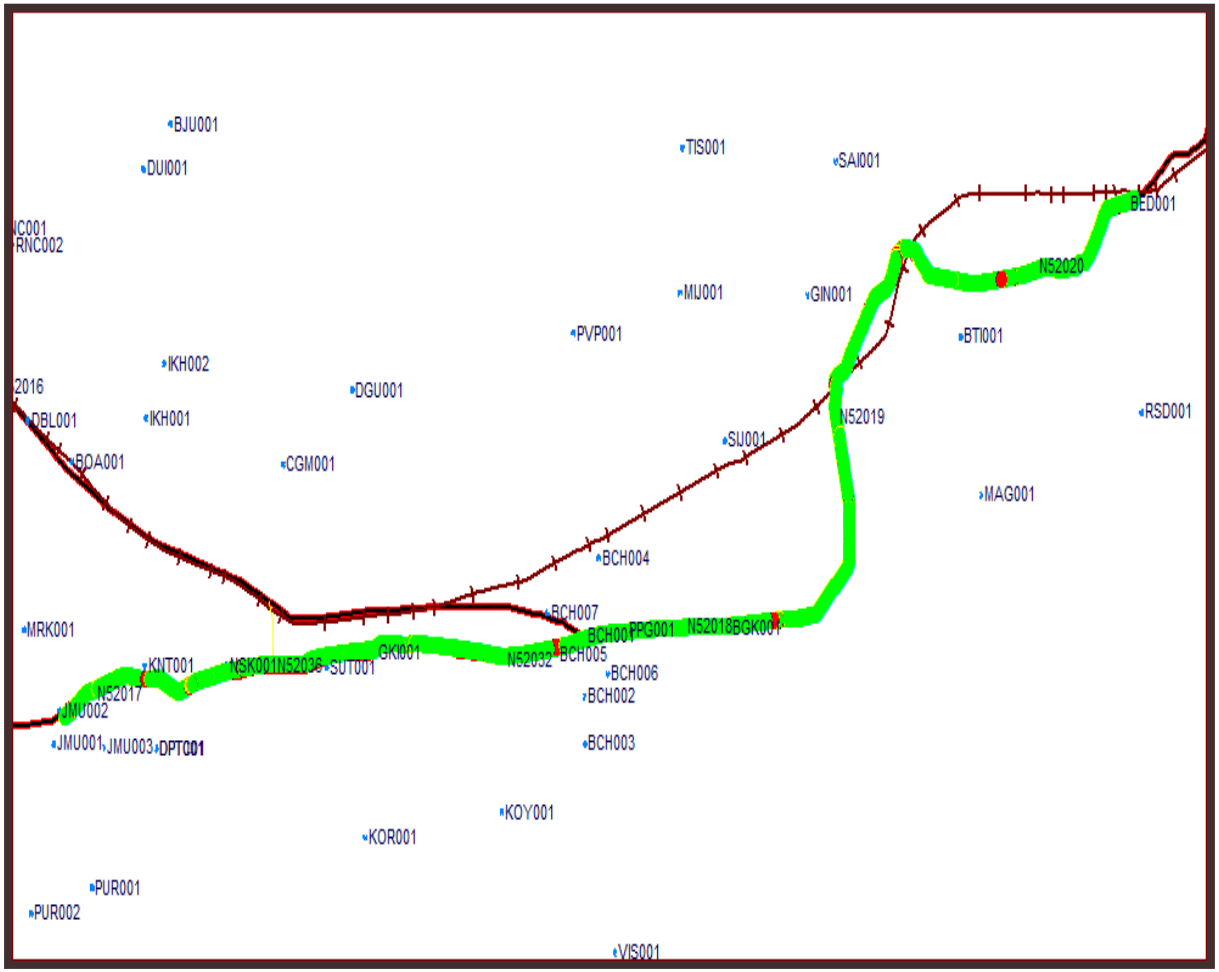


7.1.3.5 ROUTE MAP TEZPUR DAY 3

Day 3 – Within City



Day 3 – Highways



7.1.3.6 DRIVE TEST RESULTS – TEZPUR SSA

	B'mark	Aircel(DWL)		Airtel		BSNL CDMA		BSNL GSM		Idea		Reliance 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
0 to -75 dBm		74.58%	72.19%	98.71%	59.01%	0.00%	15.70%	92.61%	23.82%	35.34%	35.37%	60.70%	42.44%	11.95%	26.71%
0 to -85 dBm		96.47%	93.08%	99.93%	85.71%	0.00%	14.38%	98.53%	44.30%	80.45%	63.96%	95.12%	72.33%	81.70%	69.32%
0 to -95 dBm		99.94%	99.43%	99.98%	97.32%	7.01%	53.82%	100.00%	80.49%	98.34%	88.44%	97.22%	89.99%	96.88%	92.62%
Voice quality	≥ 95%	97.65%	95.16%	99.20%	95.62%	100.00%	80.33%	97.31%	92.91%	99.21%	97.33%	99.14%	99.09%	98.36%	92.82%
CSSR	≥ 95%	100.00%	99.56%	100.00%	99.83%	100.00%	75.63%	97.62%	96.47%	100.00%	98.73%	92.59%	95.94%	100.00%	97.36%
%age Blocked calls		0.00%	0.44%	0.00%	0.17%	0.00%	23.99%	2.38%	3.53%	0.00%	1.27%	4.94%	3.31%	0.00%	2.30%
Call drop rate	≤ 2%	0.00%	0.60%	0.00%	0.00%	0.00%	18.48%	0.00%	1.32%	0.00%	0.00%	1.59%	4.29%	0.00%	0.00%
Hands off success rate		100.00%	100.00%	100.00%	99.80%	100.00%	99.50%	100.00%	97.17%	100.00%	98.84%	96.43%	99.59%	100.00%	100.00%

Data Source: Drive test reports submitted by operators to auditors

Voice Quality

BSNL CDMA, BSNL GSM and Vodafone failed to meet the benchmark for voice quality in outdoor areas.

Call Set Success Rate (CSSR)

BSNL CDMA failed to meet the benchmark for CSSR in outdoor locations while Reliance GSM did not meet the benchmark in indoor locations.

Call Drop Rate

BSNL CDMA and Reliance failed to meet the benchmark for call drop rate in outdoor locations.

7.2 INDEPENDENT DRIVE TEST

The independent drive test was conducted for all the operators present in the Kolkata 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.

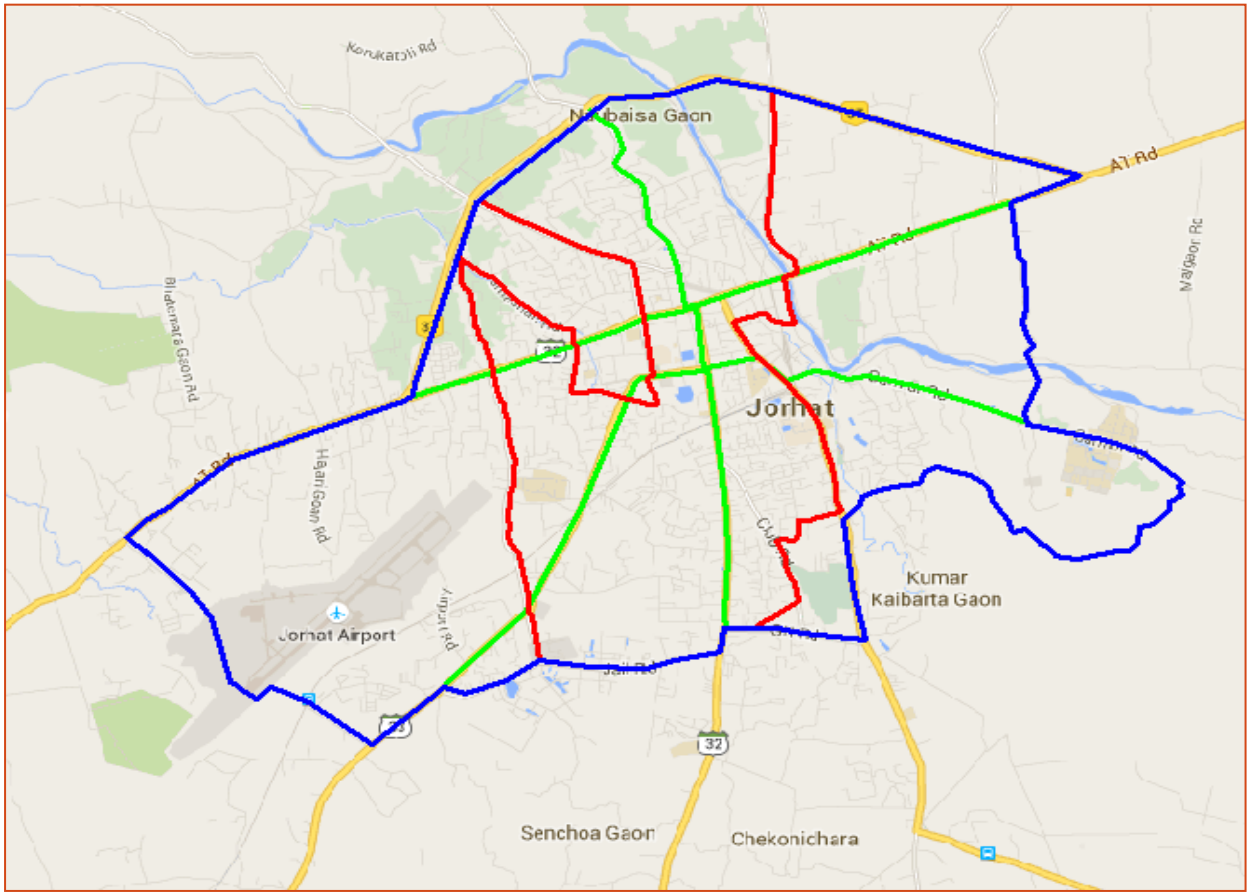
7.2.1 JORHAT

Name of the City	Jorhat
Date of Drive Test	11th & 12th May' 15
Name of the circle	Assam

Drive Test - Kilometers Travelled	Total
Jorhat	110

Jorhat	Outdoor Routes			Indoor Routes	
	Within City	Major Road	Highway	Office Complex	Shopping Complex
Route Details	AT Rd-Bishnuram Boorah Hall-Earl Grey Hotel-KB rd-Jorhat Civil Hospital-Ganesh Gogoi Kabita Kanan-Green Park-Suzuki Dealer-Sanjivini Hospital-Na Ali-Central College	JK Sailia Homeopathic College-NANDANS' GUESTHOUSE-Garali Rd-Nemati Rd-THINK iOTA Coaching Classes-Merryland High School-JB CollegeRd-Janata Ghat-Asian Tvs Agency	Cental College-JEC Rd-Meriani Rd-Assam Agricultural University-Rowriah Railway Station-AT Rd-Earl Grey Hotel-Central College-B.D. Store-GH Rd-Bypass Rd	Assam State Corporation,Jorhat	Phukan Market

Independent Drive Test Route Details – JORHAT 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 – JORHAT SSA

	B'mark	Aircel		Airtel		BSNL CDMA		BSNL GSM		Idea		Reliance GSM		Vodafone	
		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		59.85%	41.37%	32.80%	40.00%	94.70%	25.23%	53.60%	32.77%	85.00%	33.10%	7.70%	6.20%	88.05%	30.70%
Signal Strength - 0 to -85 dBm		99.25%	82.70%	70.40%	77.67%	100.00%	67.67%	97.80%	73.67%	99.85%	71.87%	59.25%	46.27%	99.85%	81.23%
Signal Strength - 0 to -95 dBm		100.00%	100.00%	99.95%	100.00%	100.00%	100.00%	100.00%	99.97%	100.00%	100.00%	100.00%	99.97%	100.00%	100.00%
Voice quality	≥ 95%	97.29%	88.55%	97.20%	85.10%	99.04%	76.06%	88.00%	82.08%	99.26%	85.33%	99.32%	82.92%	97.86%	91.86%
CSSR	≥ 95%	100.00%	95.95%	100.00%	98.53%	100.00%	74.82%	100.00%	97.01%	97.92%	98.02%	100.00%	95.08%	100.00%	95.49%
%age Blocked calls		0.00%	4.05%	0.00%	1.47%	0.00%	25.18%	0.00%	2.99%	2.08%	1.98%	0.00%	4.92%	0.00%	4.51%
Call drop rate	≤ 2%	0.00%	1.91%	0.00%	6.39%	0.00%	8.38%	2.17%	5.63%	0.00%	3.20%	0.00%	6.72%	0.00%	2.59%
Hands off success rate		100.00%	98.23%	100.00%	99.32%	100.00%	100.00%	100.00%	96.34%	100.00%	100.00%	100.00%	99.10%	100.00%	88.67%

Voice Quality

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

Call Set Success Rate (CSSR)

Operators who have not met the benchmark for CSSR in Outdoor are BSNL CDMA.

Call Drop Rate

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

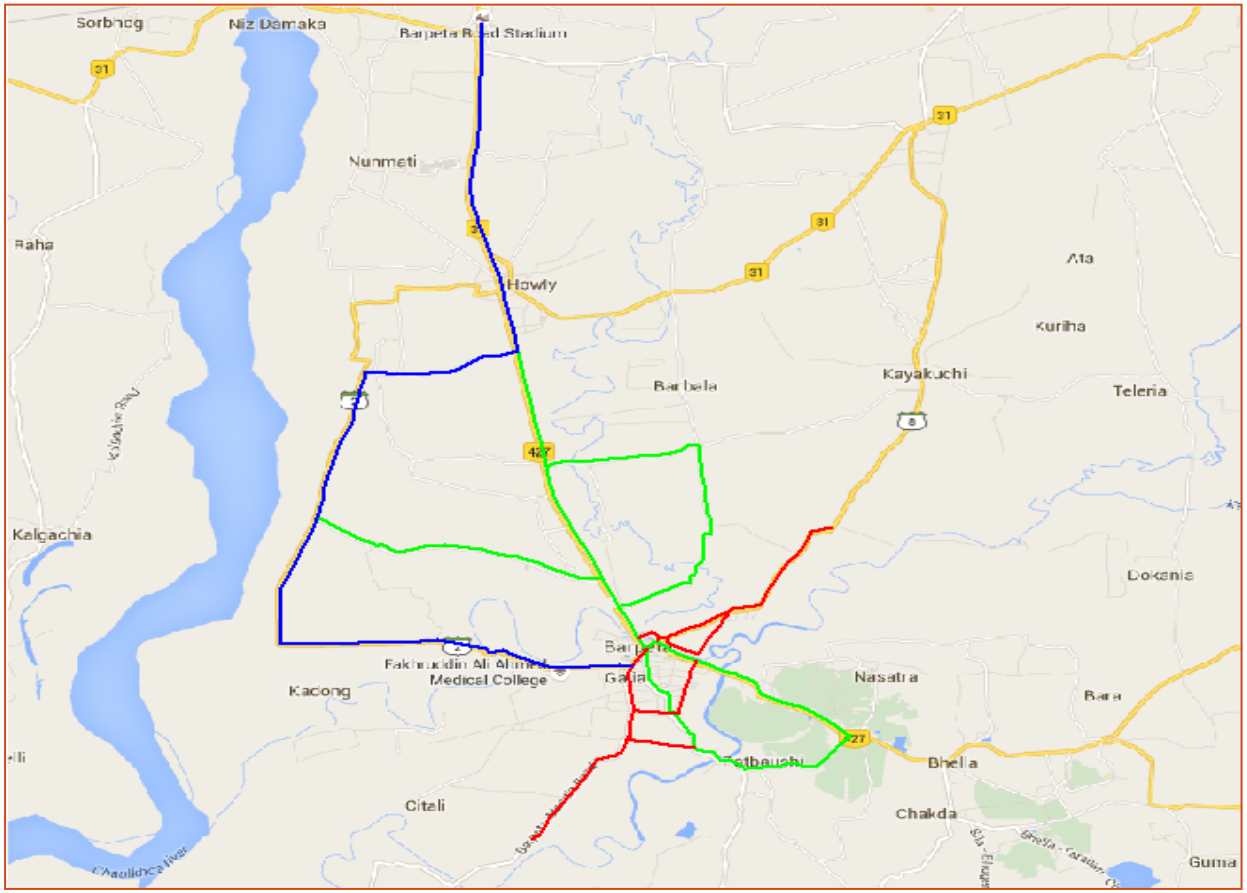
7.2.2 BARPETA

Name of the City	Barpeta
Date of Drive Test	6th Jun'15
Name of the circle	Assam

Drive Test - Kilometers Travelled	Total
Barpeta	112

Barpeta	Outdoor Routes			Indoor Routes	
	Within City	Major Road	Highway	Office Complex	Shopping Complex
Route Details	Baniara Para Bazar-Bilartari Hati-Barpeta-Howly Rd-Dhakalia Para-Datta Kuchi-Sonkuchi-Ranga Pani-St. Teresa School-North Barpeta Jama Masjid-Barpeta Police Station-Bilartari Hati-Tourism Guesthouse-Keotkuchi	Barpeta Kayakuchi Bhabanipur Rd-Muslimpatty-Bar Association-Ethos Junior College-Joti Gaon-Barpeta Town- Dangarkuchi-Super Market-Shiv Mandir-District Library Auditorium-AD Car Washing Center-Mandia Gaon-Barpeta Mandia Rd-R.P Rd	Barpeta Howly Rd-B.H College-NRL-Howly Junior College-Howli DCC-Khandakar Para Bazar-Mowamari-Kumulli Para-Udmari-Barpeta Hospital Jania Rd-Salekura-Galalmari-Barpeta Civll Hosoital & Medical College-Sanjibani Hospital	Superintendent Of Police	Silagudi Market

Independent Drive Test Route Details – BARPETA 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 – BARPETA SSA

	B'mark	Aircel		Airtel		BSNL CDMA		BSNL GSM		Idea		Reliance GSM		Vodafone	
		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		53.85%	34.50%	11.65%	32.57%	64.40%	12.17%	36.05%	20.50%	0.45%	25.53%	14.85%	23.20%	36.15%	29.43%
Signal Strength - 0 to -85 dBm		96.85%	70.13%	56.60%	71.97%	97.35%	36.30%	91.65%	55.40%	22.50%	57.03%	75.25%	60.67%	94.75%	74.70%
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%
Voice quality	≥ 95%	95.53%	80.60%	96.93%	82.14%	99.75%	86.22%	91.00%	81.35%	93.09%	83.36%	96.15%	86.98%	96.00%	90.09%
CSSR	≥ 95%	100.00%	95.80%	100.00%	97.95%	100.00%	94.02%	85.42%	85.56%	100.00%	96.92%	89.58%	86.44%	100.00%	100.00%
%age Blocked calls		0.00%	4.20%	0.00%	2.05%	0.00%	5.98%	14.58%	14.44%	0.00%	3.08%	10.42%	13.56%	0.00%	0.00%
Call drop rate	≤ 2%	0.00%	6.21%	0.00%	6.55%	0.00%	4.41%	2.94%	1.59%	0.00%	13.28%	0.00%	7.92%	2.00%	0.00%
Hands off success rate		100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	98.21%	94.56%	100.00%	100.00%	100.00%	77.61%	100.00%	100.00%

Voice Quality

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

Call Set Success Rate (CSSR)

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

Call Drop Rate

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

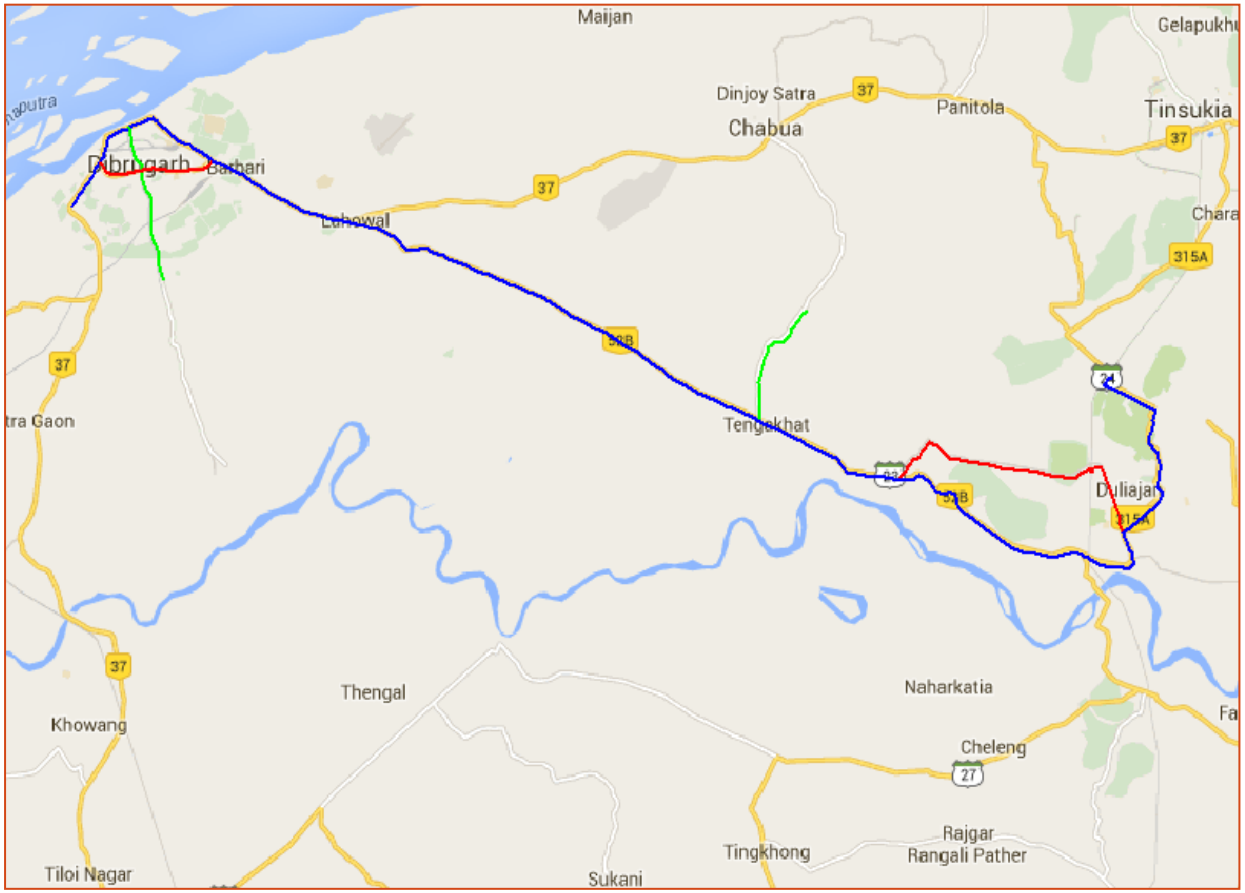
7.2.3 DIBRUGARH AND DULAIJAN

Name of the City	Dibrugarh & Dulaijan
Date of Drive Test	4th Jun'15
Name of the circle	Assam

Drive Test - Kilometers Travelled	Total
Dibrugarh & Dulaijan	105

Dibrugarh	Outdoor Routes			Indoor Routes	
	Within City	Major Road	Highway	Office Complex	Shopping Complex
Route Details	Tengakhat H.S.School-Bangalipara-Fakiragram Rd-Tengakhat Bazaar-H2O RestoBar-Kaziranga Tours-Hanuman Temple-Shankardev Hospital-Dibrugarh Development Authority Market Complex-Income Tax Bldg-NSSO(FOD)-Nirmaligaon	Dibrugarh Town-RKB Path-Thana Chariali-KG Gogoi Path-Dibrugarh Hanumanbax Surajmall Kanoi College-Sampoorna kendriya Vidyalaya-Milan Nagar Out post-Tingrai Chariali-Duliajan-Dibrugarh Rd-Tiwari Gola	AT Rd-Rasaraj Lakshinath Bezbaruah Children Park-Dibrugarh Gymkhana Club-Dibrugarh Government Girls Higher Secondary School-Brahmaputra Valley Cadets Academy-Aastha Hospital-Naliapool Jumma Masjid-Jagannath Temple-Sharma Hotel	District Agriculture Office	Hotel Ketki

Independent Drive Test Route Details – DIBRUGARH and DULAIJAN 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 – DIBRUGARH and DULAIJAN SSA

	B'mark	Aircel		Airtel		BSNL CDMA		BSNL GSM		Idea		Reliance GSM		Vodafone	
		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		41.00%	41.00%	66.10%	39.90%	44.05%	19.60%	75.75%	32.47%	35.75%	37.33%	54.55%	32.40%	73.15%	42.57%
Signal Strength - 0 to -85 dBm		74.35%	77.17%	96.90%	74.53%	98.95%	55.53%	99.85%	77.17%	97.30%	77.33%	92.90%	75.07%	99.45%	83.13%
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%
Voice quality	≥ 95%	91.93%	85.85%	97.68%	81.40%	99.54%	92.02%	88.19%	76.47%	97.61%	88.79%	97.87%	91.39%	92.21%	91.47%
CSSR	≥ 95%	95.45%	98.33%	100.00%	98.41%	100.00%	96.14%	100.00%	95.21%	100.00%	98.61%	100.00%	95.04%	100.00%	98.96%
%age Blocked calls		4.55%	1.67%	0.00%	1.59%	0.00%	3.86%	0.00%	4.79%	0.00%	1.39%	0.00%	4.96%	0.00%	1.04%
Call drop rate	≤ 2%	0.00%	2.74%	0.00%	7.99%	0.00%	7.30%	0.00%	13.03%	0.00%	5.20%	0.00%	0.60%	0.00%	0.00%
Hands off success rate		100.00%	92.87%	100.00%	97.10%	100.00%	100.00%	100.00%	98.88%	100.00%	100.00%	100.00%	98.03%	100.00%	100.00%

Voice Quality

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

Call Set Success Rate (CSSR)

All operators have met the benchmark.

Call Drop Rate

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

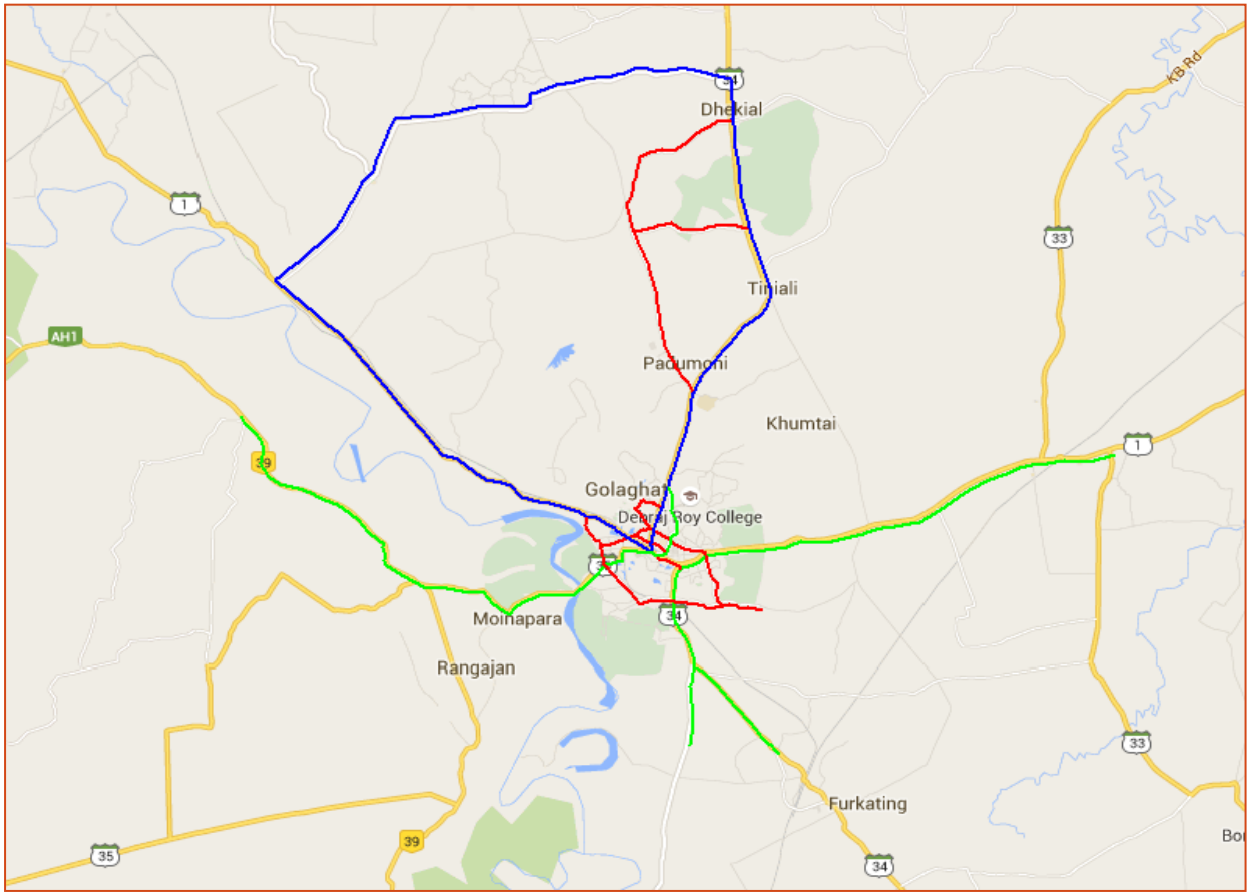
7.2.4 GOLAGHAT

Name of the City	Golaghat
Date of Drive Test	3rd Jun'15
Name of the circle	Assam

Drive Test - Kilometers Travelled	Total
Golaghat	110

Golaghat	Outdoor Routes			Indoor Routes	
	Within City	Major Road	Highway	Office Complex	Shopping Complex
Route Details	satsang kendra golaghat-Eeshwar Systems-Bengenakhowa GF Rd-PNB ATM-Janakalyan Namghar-Dadu's Broiler-GD Rd-Cane furniture Market-Jamuna Park-NES Golaghat-Hamdoi Primary School-SANJIV TEA PVT	Narakanwar-Betioni Dak-Ghar Chariali-Senchowa Ali Rd-Molia Gaon-Chetia Gaon-UBI ATM-Tenpur-Bhoga Gaon-Magistrate Colony-Golaghat Stadium-GF Rd-Assam Gramin Vikas Bank-Shiv Mandir-Bangaon-Auto World-Gogoi Poultry	Town Hindi High School-Tokani Circle-Dhodar Ali Road-Gosain Satra Gaon-Magistrate Colony-Boating Park-Mission Church-Dergaon Golaghat Rd-Pulibor Tinali-Dhekial Jama Masjid-Dhekial Tiniali-Dhekial Badulipar Rd-Betioni Bagan Chariali-Melamora Naam Ghar	Municipality Office	DD Road Market

Independent Drive Test Route Details – GOLAGHAT 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 – GOLAGHAT SSA

	B'mark	Aircel		Airtel		BSNL CDMA		BSNL GSM		Idea		Reliance GSM		Vodafone	
		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		48.75%	36.43%	10.70%	28.97%	50.90%	23.90%	27.55%	17.00%	0.15%	30.53%	38.25%	24.30%	23.25%	37.83%
Signal Strength - 0 to -85 dBm		83.65%	66.73%	73.65%	63.60%	100.00%	55.17%	85.85%	54.27%	32.10%	63.37%	96.30%	67.73%	87.25%	79.07%
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%
Voice quality	≥ 95%	94.63%	77.16%	91.03%	77.51%	99.09%	87.96%	98.96%	74.60%	87.75%	82.44%	87.71%	87.03%	97.78%	92.24%
CSSR	≥ 95%	100.00%	94.05%	100.00%	98.02%	100.00%	82.81%	100.00%	90.05%	100.00%	91.84%	95.00%	90.49%	100.00%	100.00%
%age Blocked calls		0.00%	5.95%	0.00%	1.98%	0.00%	17.19%	0.00%	9.95%	0.00%	8.16%	5.00%	9.51%	0.00%	0.00%
Call drop rate	≤ 2%	0.00%	8.36%	0.00%	10.99%	0.00%	6.97%	0.00%	6.48%	0.00%	4.07%	0.00%	0.98%	0.00%	0.00%
Hands off success rate		100.00%	100.00%	100.00%	95.11%	100.00%	100.00%	100.00%	97.22%	100.00%	100.00%	100.00%	97.75%	100.00%	100.00%

Voice Quality

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

Call Set Success Rate (CSSR)

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

Call Drop Rate

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

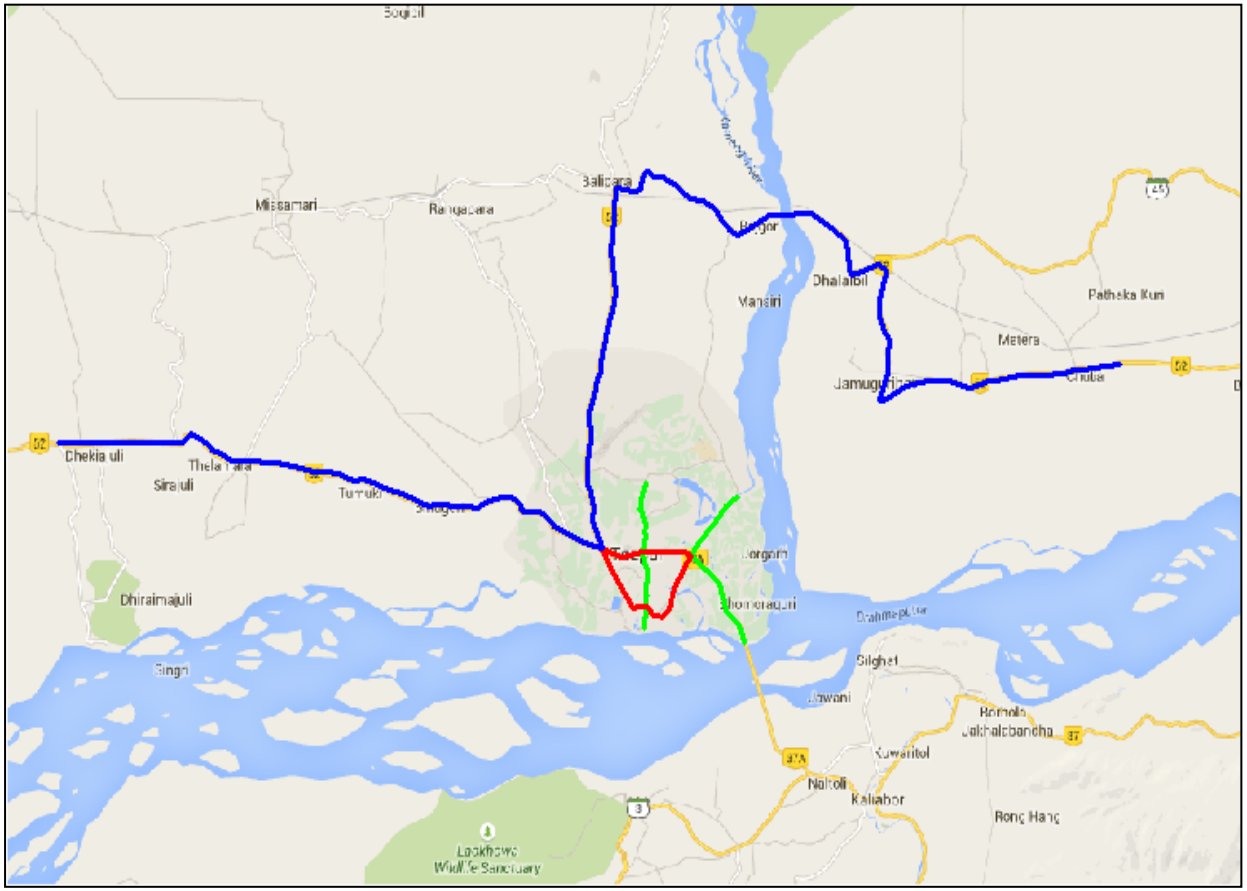
7.2.5 SONITPUR

Name of the City	Sonitpur
Date of Drive Test	11th May & 2nd July' 15
Name of the circle	Assam

Drive Test - Kilometers Travelled	Total
sonitpur	105

Sonitpur	Outdoor Routes			Indoor Routes	
	Within City	Major Road	Highway	Office Complex	Shopping Complex
Route Details	Varatok-Daranga College-Hatipilkhana-Trimurty Udyan-Hotel Royal Regency -Ex policeline Rd-Sunrise Hostel-Mahabhairab Puruwa Rd-Dhanua Nagar Petrol Pump-Patiachubri-Dekachuburi-Batamari	Hotel KF-Tezpur Main Road-Edupur Society-DK Rd-Dolab-NH37A-Hotel KF-Guriya Mutt-Kanaklata Civil Hospital-Ex Police Line Rd-Dholabari Masjid-Tezpur Mission Hospital-Gajraj Park-Paruwa Daily Bazar	Thelamara Police Station-Sonitpur Oil Depot-Tezpur Medical College-Dipota Post Office-USHA PAHAR-Bharat Petroleum Petrol Pump-Haleshwar Temple-Pak Bil-Bam Gaon-Akabasti Bangali-Gudamghat Gaon Kachari-Debendranagar Khonamukh-Gorali	Ministry Of Defence	Gajraj Market Place

Independent Drive Test Route Details – SONITPUR 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 – SONITPUR SSA

	B'mark	Aircel		Airtel		BSNL CDMA		BSNL GSM		Idea		Reliance GSM		Vodafone	
		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		60.45%	35.70%	8.50%	29.57%	52.50%	10.80%	41.95%	37.80%	45.20%	35.73%	61.00%	17.50%	19.05%	22.97%
Signal Strength - 0 to -85 dBm		99.55%	79.87%	68.40%	73.80%	93.95%	35.80%	84.30%	75.30%	96.90%	73.10%	98.95%	58.60%	91.95%	77.23%
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%
Voice quality	≥ 95%	91.60%	76.34%	96.44%	79.99%	96.95%	73.05%	87.84%	86.24%	91.81%	84.79%	94.82%	82.90%	97.92%	92.62%
CSSR	≥ 95%	100.00%	95.60%	100.00%	100.00%	98.15%	93.47%	93.27%	93.94%	100.00%	99.15%	100.00%	91.91%	100.00%	100.00%
%age Blocked calls		0.00%	4.40%	0.00%	0.00%	1.85%	6.53%	6.73%	6.06%	0.00%	0.85%	0.00%	8.09%	0.00%	0.00%
Call drop rate	≤ 2%	0.00%	7.69%	0.00%	4.19%	0.00%	8.90%	0.00%	2.94%	0.00%	3.83%	0.00%	1.40%	0.00%	0.00%
Hands off success rate		100.00%	98.15%	100.00%	98.97%	100.00%	100.00%	93.33%	97.98%	100.00%	100.00%	100.00%	96.30%	100.00%	100.00%

Voice Quality

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

Call Set Success Rate (CSSR)

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

Call Drop Rate

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

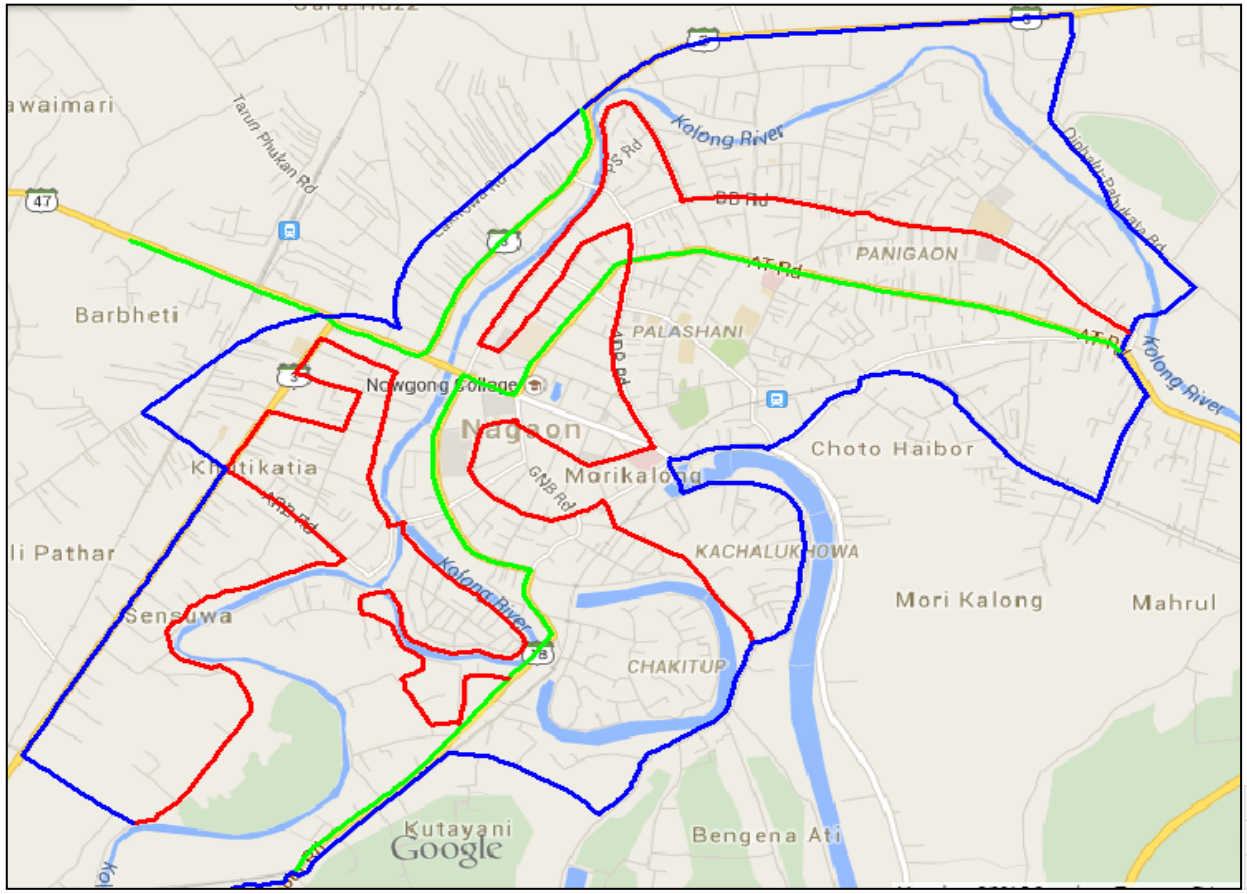
7.2.6 NAGAON

Name of the City	Nagaon
Date of Drive Test	9th May' 15
Name of the circle	Assam

Drive Test - Kilometers Travelled	Total
Nagaon	100

Nagaon	Outdoor Routes			Indoor Routes	
	Within City	Major Road	Highway	Office Complex	Shopping Complex
Route Details	Sree Sree Shani Mandir-Alaka Restaurant-Hotel Star-Stadium Market-State Bank of India-Naamghar-Marwari Panchayat Bhawan-Divyajyoti Cinema Hall	Bishnu Rabha Path-Nowgong PolytechnicArka-Arya Bibah BhawanAmolapatty Kali Mandir-Maina Parijat-Apex Bank-Amit Education-BM Rd-ADP Rd-NAGAON CIVIL HOSPITAL(BHUGESWAR PHUKANANI C H)	shiv mandir-Lakhowa Rd-Laxmi Store-H.B. Sons-Old AT Rd-Sani Mandir Rd-Lakhinagar Chariali Bus Stop-Akash Hyundai, Nagaon-Sialmari Bazar-Sankar Nagar Rd-Dimoruguri Bridge-Diphalu Tiniali Bus Stop	Police Reserve Headquarter	A.T Road, Haibargaon, Near Taxi Stand

Independent Drive Test Route Details – NAGAON 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 – NAGAON SSA

	B'mark	Aircel		Airtel		BSNL CDMA		BSNL GSM		Idea		Reliance GSM		Vodafone	
		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		99.45%	64.57%	77.40%	26.70%	19.25%	8.70%	84.70%	40.07%	71.50%	27.23%	81.95%	41.93%	46.55%	28.83%
Signal Strength - 0 to -85 dBm		100.00%	94.33%	99.80%	75.43%	67.05%	37.27%	99.15%	83.73%	99.35%	62.73%	99.40%	80.93%	97.20%	80.63%
Signal Strength - 0 to -95 dBm		100.00%	100.00%	99.95%	100.00%	100.00%	100.00%	100.00%	100.00%	99.95%	100.00%	99.95%	99.97%	100.00%	99.97%
Voice quality	≥ 95%	95.56%	83.91%	92.35%	82.33%	97.49%	86.02%	90.45%	86.26%	98.60%	87.08%	93.83%	84.62%	92.95%	90.01%
CSSR	≥ 95%	100.00%	100.00%	93.10%	98.37%	100.00%	97.76%	95.83%	90.47%	100.00%	99.05%	94.64%	94.05%	88.71%	89.37%
%age Blocked calls		0.00%	0.00%	6.90%	1.63%	0.00%	2.24%	4.17%	9.53%	0.00%	0.95%	5.36%	5.95%	11.29%	10.63%
Call drop rate	≤ 2%	0.00%	2.78%	0.00%	4.25%	0.00%	0.74%	0.00%	1.10%	0.00%	2.84%	0.00%	2.92%	0.00%	1.33%
Hands off success rate		100.00%	95.96%	100.00%	96.21%	100.00%	100.00%	100.00%	93.68%	100.00%	100.00%	97.30%	94.85%	100.00%	97.47%

Voice Quality

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

Call Set Success Rate (CSSR)

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

Call Drop Rate

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

8 ANNEXURE – CONSOLIDATED

For Reliance GSM, data is pertaining to Apr'15. Data for May'15 and 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 CDMA	BSNL GSM	Idea	Reliance GSM	Vodafone
Number of BTSs in the licensed service area		8059	9984	729	4095	4263	1567	9393
Sum of downtime of BTSs in a month (in hours)		257219	24414	97210	55837	40710	5068	44279
BTSs accumulated downtime (not available for service)	≤ 2%	4.39%	0.34%	18.30%	1.87%	1.33%	0.45%	0.65%
Number of BTSs having accumulated downtime >24 hours		2272	161	206	78	75	22	177
Worst affected BTSs due to downtime	≤ 2%	28.19%	1.61%	28.26%	1.91%	1.76%	1.40%	1.88%

Live Measurement- BTSs accumulated downtime								
	Benchmark	Aircel(DWL)	Airtel	BSNL CDMA	BSNL GSM	Idea	Reliance GSM	Vodafone
Number of BTSs in the licensed service area		8059	9921	729	4095	4079	1567	9363
Sum of downtime of BTSs in a month (in hours)		26286	1980	9533	6017	5370	5068	4653
BTSs accumulated downtime (not available for service)	≤ 2%	4.53%	0.28%	18.16%	2.04%	1.83%	4.49%	0.69%
Number of BTSs having accumulated downtime >24 hours		241	0	47	14	72	22	7
Live Mesurement - Worst affected BTSs due to downtime	≤ 2%	2.99%	0.00%	6.45%	0.34%	1.76%	1.40%	0.07%

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 CDMA	BSNL GSM	Idea	Reliance GSM	Vodafone
CSSR	≥ 95%	93.24%	93.36%	98.39%	96.11%	96.90%	98.48%	99.52%
SDCCH/Paging channel congestion	≤ 1%	0.97%	0.44%	NA	0.87%	0.86%	0.02%	0.16%
TCH congestion	≤ 2%	5.08%	1.47%	0.00%	1.21%	1.25%	0.08%	0.48%

Live measurement results for CSSR, SDCCH and TCH congestion

CSSR	Benchmark	Aircel(DWL)	Airtel	BSNL CDMA	BSNL GSM	Idea	Reliance GSM	Vodafone
CSSR	≥ 95%	96.91%	93.81%	98.49%	92.60%	98.68%	98.50%	99.77%
SDCCH/Paging channel congestion	≤ 1%	0.45%	0.38%	NA	0.38%	0.47%	0.07%	0.16%
TCH congestion	≤ 2%	2.19%	1.33%	0.00%	1.47%	0.43%	0.08%	0.23%

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

CSSR	Benchmark	Aircel(DWL)	Airtel	BSNL CDMA	BSNL GSM	Idea	Reliance GSM	Vodafone
Total number of call attempts		1351	1405	1070	1565	1100	876	1342
Total number of successful calls established		1345	1401	812	1431	1078	828	1314
CSSR	≥ 95%	99.53%	99.72%	NA	90.85%	98.06%	95.25%	97.85%
%age blocked calls		0.47%	0.28%	24.52%	9.15%	1.94%	4.76%	2.15%

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

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 CDMA	BSNL GSM	Idea	Reliance GSM	Vodafone
Total number of calls established		570964288	606578740	1638332	1214536141	98760312	65845658	12334043
Total number of calls dropped		9688310	6489530	21953	23525977	1605543	441637	76594
Call drop rate	≤ 2%	1.69%	1.07%	1.33%	1.94%	1.63%	0.67%	0.62%
Cells having more than 3% TCH	Benchmark	Aircel(DWL)	Airtel	BSNL CDMA	BSNL GSM	Idea	Reliance GSM	Vodafone
Total number of cells in the network		23996	29908	2061	11943	12789	4798	28262
Total number of cells having more than 3% TCH		3510	347	197	352	211	8	722
Worst affected cells having more than 3% TCH	≤ 3%	14.63%	1.16%	9.57%	2.95%	1.65%	0.17%	2.56%

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 CDMA	BSNL GSM	Idea	Reliance GSM	Vodafone
Total number of calls established		618744071	60515517	150561	114060453	110467374	6752654	6423791
Total number of calls dropped		8874795	645323	1601	2484861	1417868	43985	34822
Call drop rate	≤ 2%	1.43%	1.06%	1.06%	2.18%	1.28%	0.65%	0.54%
Cells having more than 3% TCH	Benchmark	Aircel(DWL)	Airtel	BSNL CDMA	BSNL GSM	Idea	Reliance GSM	Vodafone
Total number of cells in the network		23948	29852	2061	11943	12237	4798	28178
Total number of cells having more than 3% TCH		3680	329	143	387	219	8	741
Worst affected cells having more than 3% TCH	≤ 3%	15.37%	1.10%	6.95%	3.24%	1.79%	0.17%	2.63%

Drive test results for Call drop rate (Average of three drive tests)								
Call drop rate	Benchmark	Aircel(DWL)	Airtel	BSNL CDMA	BSNL GSM	Idea	Reliance GSM	Vodafone
Total number of calls established		1345	1401	820	1431	1078	1176	1282
Total number of calls dropped		6	0	71	33	4	51	6
Call drop rate	≤ 2%	0.47%	0.00%	10.18%	2.65%	0.35%	4.26%	0.52%

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

8.4 VOICE QUALITY

Audit Results for Voice quality								
Voice quality	Benchmark	Aircel(DWL)	Airtel	BSNL CDMA	BSNL GSM	Idea	Reliance GSM	Vodafone
Total number of sample calls		60010941619	64431582814	74115	68233	11684425232	NA	2177948009
Total number of calls with good voice quality		54834259076	63366963075	65821	64864	11152286517	NA	2136868417
%age calls with good voice quality	≥ 95%	91.37%	98.35%	84.88%	95.44%	95.45%	98.29%	98.11%

Live measurement results for Voice quality								
Voice quality	Benchmark	Aircel(DWL)	Airtel	BSNL CDMA	BSNL GSM	Idea	Reliance GSM	Vodafone
Total number of sample calls		60235431406	6389062431	74115	68233	11727535098	NA	1037860283
Total number of calls with good voice quality		55830959293	6282647550	65821	64864	11251217284	NA	1032713561
%age calls with good voice quality	≥ 95%	92.69%	98.33%	84.88%	95.44%	95.94%	98.34%	99.51%

Drive test results for Voice quality (Average of three drive tests)								
Voice quality	Benchmark	Aircel(DWL)	Airtel	BSNL CDMA	BSNL GSM	Idea	Reliance GSM	Vodafone
Total number of sample calls		2069457	2091037	63880	1601592	NA	984163	2257723
Total number of calls with good voice quality		1975474	1959519	58165	1466193	NA	916912	2140472
%age calls with good voice quality	≥ 95%	95.45%	93.81%	89.93%	91.65%	95.89%	96.52%	94.57%

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

8.5 POI CONGESTION

Audit Results for POI Congestion								
POI congestion	Benchmark	Aircel(DWL)	Airtel	BSNL CDMA	BSNL GSM	Idea	Reliance GSM	Vodafone
Total number of working POIs		52	15	NA	19	30	23	29
No. of POIs not meeting benchmark		0	0	NA	0	0	0	0
Total Capacity of all POIs (A) - in erlangs		89145	109341	NA	20579	40011	31804	46932399
Traffic served for all POIs (B)- in erlangs		61594	36356	NA	20203	17359	20586	15958811
POI congestion	≤ 0.5%	0.00%	0.00%	NA	1.67%	0.00%	0.00%	0.00%

Live Measurement Results for POI Congestion								
POI congestion	Benchmark	Aircel(DWL)	Airtel	BSNL CDMA	BSNL GSM	Idea	Reliance GSM	Vodafone
Total number of working POIs		52	15	NA	19	30	23	29
No. of POIs not meeting benchmark		0	0	NA	0	0	0	0
Total Capacity of all POIs (A) - in erlangs		89145	107916	NA	20579	39965	31804	6246195
Traffic served for all POIs (B)- in erlangs		60048	37436	NA	17857	17395	20586	1574975
POI congestion	≤ 0.5%	0.00%	0.00%	NA	0.00%	0.00%	0.00%	0.00%

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

NA: Auditors were not able to get the POI data from BSNL CDMA as operator uses the POI of BSNL GSM for its connectivity to other operators. As per the operator, their systems were not equipped to provide the POI data specifically for BSNL CDMA.

8.6 TOTAL CALL MADE DURING THE DRIVE TEST-VOICE QUALITY

April							
Voice quality	Aircel(DWL)	Airtel	BSNL CDMA	BSNL GSM	Idea	Reliance GSM	Vodafone
Total number of sample calls	755346	824395	NDR	431310	729387	725739	878735
May							
Voice quality	Aircel(DWL)	Airtel	BSNL CDMA	BSNL GSM	Idea	Reliance GSM	Vodafone
Total number of sample calls	643066	590909	39726	662239	534113	133240	713554
June							
Voice quality	Aircel(DWL)	Airtel	BSNL CDMA	BSNL GSM	Idea	Reliance GSM	Vodafone
Total number of sample calls	671045	675733	24154	508043	549150	125184	665434

Data Source: Drive test reports submitted by operators to auditors

NDR: BSNL CDMA did not participate in the drive test conducted in April 2015.

8.7 METERING AND BILLING CREDIBILITY

Audit Results for Billing performance Postpaid-Consolidated								
Billing Performance	Benchmark	Aircel(DWL)	Airtel	BSNL CDMA	BSNL GSM	Idea	Reliance GSM	Vodafone
Metering and billing credibility - Postpaid (Avg of 3 billing cycles)								
Metering and billing credibility - Postpaid								
Total bills generated during the period		219889	218319	NDR	629203	40487	344219	248728
Total number of bills disputed		190	84	NDR	32	99	312	732
Total number of valid billing complaints		7	18	NDR	32	3	305	406
Total complaints considered invalid		183	66	NDR	0	96	7	326
Percentage bills disputed (Avg of 3 billing cycles)	≤ 0.1%	0.09%	0.04%	NDR	0.01%	0.24%	0.09%	0.30%
April								
Total bills generated during the first billing cycle		73038	73309	NDR	210192	12736	113334	81692
Total number of bills disputed in first billing cycle		32	26	NDR	11	32	106	310
Total number of valid billing complaints (billing cycle 1)		1	8	NDR	11	1	99	217
Total complaints considered invalid (billing cycle 1)		31	18	NDR	0	31	7	93
Percentage bills disputed (first billing cycle)	≤ 0.1%	0.04%	0.04%	NDR	0.01%	0.25%	0.09%	0.38%

Data Source: Billing Center of the operators

May								
Total bills generated during the second billing cycle		73028	72194	NDR	209658	14167	114569	82514
Total number of bills disputed in second billing cycle		85	31	NDR	9	32	103	237
Total number of valid billing complaints (billing cycle 2)		6	4	NDR	9	0	103	105
Total complaints considered invalid (billing cycle 2)		79	27	NDR	0	32	0	132
Percentage bills disputed (second billing cycle)	≤ 0.1%	0.12%	0.04%	NDR	0.00%	0.23%	0.09%	0.29%
June								
Total bills generated during the third billing cycle		73823	72816	NDR	209353	13584	116316	84522
Total number of bills disputed in third billing cycle		73	27	NDR	12	35	103	185
Total number of valid billing complaints (billing cycle 3)		0	6	NDR	12	2	103	84
Total complaints considered invalid (billing cycle 3)		73	21	NDR	0	33	0	101
Percentage bills disputed (third billing cycle)	≤ 0.1%	0.10%	0.04%	NDR	0.01%	0.26%	0.09%	0.22%

Data Source: Billing Center of the operators

NDR: Data to conduct audit for metering and billing was not available at the central billing center of BSNL CDMA. Hence, audit for the parameter has not been conducted for the operator.

Metering and billing credibility - Prepaid								
Performance prepaid	Benchmark	Aircel(DWL)	Airtel	BSNL CDMA	BSNL GSM	Idea	Reliance GSM	Vodafone
Total number of charging complaints (valid) - sum of 3 months		7	45	NDR	921	360	753	1217
Total complaints considered invalid (sum of 3 months)		47098	1153	NDR	10	523	199	1510
Total number of charging complaints (sum of 3 months)		47105	1198	NDR	931	883	952	2727
Total no of customers served (Sum of 3 months)		13260042	15579631	NDR	2730911	2659368	6670706	9414727
Percentage of charging complaints disputed	≤ 0.1%	0.36%	0.01%	NDR	0.03%	0.03%	0.01%	0.03%

Data Source: Billing Center of the operators

Resolution of billing complaints (Postpaid+Prepaid)-Consolidated								
Billing Performance	Benchmark	Aircel(DWL)	Airtel	BSNL CDMA	BSNL GSM	Idea	Reliance GSM	Vodafone
Total number of billing/charging complaints		47295	1282	NDR	963	982	1264	3459
Total number of complaints resolved in favour of customer		14	63	NDR	953	363	1058	1623
Total complaints considered invalid		47281	1219	NDR	10	619	206	1836
Number of complaints resolved in 4 weeks		14	63	NDR	951	363	1058	1623
Percentage complaints resolved within 4 weeks	≥ 98%	100.00%	100.00%	NDR	99.79%	100.00%	100.00%	100.00%
Number of complaints resolved in 6 weeks		14	63	NDR	951	363	1058	1623
Percentage complaints resolved within 6 weeks	100%	100.00%	100.00%	NDR	99.79%	100.00%	100.00%	100.00%
Period of applying credit / waiver								
Total number of complaints where credit/waiver is required		14	63	NDR	941	358	1058	1005
Percentage cases in which credit/waiver was received within 1	100%	100.00%	100.00%	NDR	100.00%	100.00%	100.00%	100.00%

Data Source: Billing Center of the operators

Live calling results for resolution of billing complaints								
Resolution of billing complaints	Benchmark	Aircel(DWL)	Airtel	BSNL CDMA	BSNL GSM	Idea	Reliance GSM	Vodafone
Total Number of calls made		100	100	NDR	100	100	100	100
Number of cases resolved in 4 weeks		42	76	NDR	56	77	71	74
Percentage cases resolved in 4 weeks	≥ 98%	42.00%	76.00%	NDR	56.00%	77.00%	71.00%	74.00%
Number of cases resolved in 6 weeks		58	76	NDR	56	77	71	74
Percentage cases resolved in 6 weeks	100.00%	58.00%	76.00%	NDR	56.00%	77.00%	71.00%	74.00%

Data Source: Billing Center of the operators

NDR: Data to conduct live calling for metering and billing was not available at the central billing center of BSNL CDMA. Hence, live calling for the parameter has not been conducted 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 CDMA	BSNL GSM	Idea	Reliance GSM	Vodafone
Total number of call attempts to customer care for assistance		16746862	2115062	NDR	1027173	3904760	7148550	9892619
Number of calls getting connected and answered (electronically)		16170887	2114917	NDR	1002833	3848131	7075960	9891051
Percentage calls getting connected and answered	≥ 95%	96.56%	99.99%	NDR	97.63%	98.55%	98.98%	99.98%

Audit results for customer care (voice-to-Voice)- (Avg of 3 months)-Consolidated								
Customer Care Assessment	Benchmark	Aircel(DWL)	Airtel	BSNL CDMA	BSNL GSM	Idea	Reliance GSM	Vodafone
Total Number of calls received (3 months)		2749358	2110343	NDR	778550	961667	2173893	2873258
Total Number of calls answered within 90 seconds (3 months)		2578240	1854702	NDR	747520	957045	2030795	2873258
Percentage calls answered within 90 seconds (Avg of 3 months)	≥ 95%	93.78%	87.89%	NDR	96.01%	99.52%	93.42%	100.00%
April								
Total calls received (Month 1)		890549	803632	NDR	277391	325235	824280	956335
Total calls answered within 90 seconds (Month 1)		832518	592668	NDR	270456	324183	785041	956335
% calls answered within 90 seconds (Month 1)	≥ 95%	93.48%	73.75%	NDR	97.50%	99.68%	95.24%	100.00%
May								
Total calls received (Month 2)		914637	656397	NDR	243394	338351	724671	959535
Total calls answered within 90 seconds (Month 2)		870270	625125	NDR	230980	335633	641835	959535
% calls answered within 90 seconds (Month 2)	≥ 95%	95.15%	95.24%	NDR	94.90%	99.20%	88.57%	100.00%
June								
Total calls received (Month 3)		944172	650314	NDR	257765	298081	624942	957388
Total calls answered within 90 seconds (Month 3)		875452	636909	NDR	246084	297229	603919	957388
% calls answered within 90 seconds (Month 3)	≥ 95%	92.72%	97.94%	NDR	95.47%	99.71%	96.64%	100.00%

Data Source: Customer Service Center of the operators

NDR: Data to conduct audit for customer care was not available at the customer service center of BSNL CDMA. Hence, audit for the parameter has not been conducted for the operator.

Live calling results for customer care (IVR)								
Customer Care Assessment	Benchmark	Aircel(DWL)	Airtel	BSNL CDMA	BSNL GSM	Idea	Reliance GSM	Vodafone
Total number of call attempts to customer care for assistance		100	100	100	100	100	100	100
Number of calls getting connected and answered (electronically)		100	100	100	100	100	100	100
Percentage calls getting connected and answered	≥ 95%	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 CDMA	BSNL GSM	Idea	Reliance GSM	Vodafone
Total Number of calls received		100	100	100	100	100	100	100
Total Number of calls getting connected and answered		100	99	79	76	89	100	94
Live Calling Percentage calls getting connected and answered	≥ 95%	100.00%	99.00%	79.00%	76.00%	89.00%	100.00%	94.00%

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 CDMA	BSNL GSM	Idea	Reliance GSM	Vodafone
Total number of closure request		961	1341	NDR	854	504	775	864
Number of requests attended within 7 days		961	1341	NDR	854	504	775	864
Percentage cases in which termination done within 7 days	100.00%	100.00%	100.00%	NDR	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 CDMA	BSNL GSM	Idea	Reliance GSM	Vodafone
Total number of cases requiring refund of deposits		760	221	NDR	890	245	778	1900
Total number of cases where refund was made within 60 days		760	221	NDR	890	245	778	1900
Percentage cases in which refund was receive within 60 days	100.00%	100.00%	100.00%	NDR	100.00%	100.00%	100.00%	100.00%

Data Source: Billing Center of the operators

NDR: Data to conduct audit for customer care was not available at the customer service center of BSNL CDMA. Hence, audit for the parameter has not been conducted for the operator.

8.11 ADDITIONAL NETWORK RELATED PARAMETERS

Audit Results for Total Traffic Handled in Erlang

Traffic in Erlang	Aircel(DWL)	Airtel	BSNL CDMA	BSNL GSM	Idea	Reliance GSM	Vodafone
Eqipped capacity of the network	190882	149027	33750	108000	35531	132000	113478
Total taffic handled in erlang during TCBH	129747	140901	175	18462	25668	54266	101663
Total no. of customers served (as per VLR)	3740660	5184900	10559	1026300	863977	1962651	3037240

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 CDMA	BSNL GSM	Idea	Reliance GSM	Vodafone
Total Number of calls made	100	100	NDR	100	100	100	100
Number of cases resolved to satisfaction	35	82	NDR	76	75	76	82
Percentage cases resolved in four weeks	35.00%	82.00%	NDR	76.00%	75.00%	76.00%	82.00%

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

NDR: Data to conduct live calling for customer care was not available at the customer service center of BSNL CDMA. Hence, live calling for the parameter has not been conducted for the operator.

8.13 LIVE CALLING RESULTS FOR LEVEL 1 SERVICES

Live calling for level 1 services								
Level 1 services		Aircel(DWL)	Airtel	BSNL CDMA	BSNL GSM	Idea	Reliance GSM	Vodafone
Total no. of calls made		150	150	150	150	150	150	150
Calls answered		104	105	122	114	112	119	109
% of calls connected	≥ 95%	69.33%	70.00%	81.33%	76.00%	74.67%	79.33%	72.67%

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

8.14 LEVEL 1 SERVICE CALLS MADE

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	✓	☐	10	6
101	Fire	✓	☐	10	6
102	Ambulance	✓	☐	10	6
104	Health Information Helpline	✓	☐	10	7
108	Emergency and Disaster Management Helpline	✓	☐	10	7
138	All India Helpline for Passengers	✓	☐	10	5
149	Public Road Transport Utility Service	☐	×		
181	Chief Minister Helpline	☐	×		
182	Indian Railway Security Helpline	✓	☐	7	5
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	✓	☐	8	6
1071	Air Accident Helpline	☐	×		
1072	Rail Accident Helpline	☐	×		
1073	Road Accident Helpline	✓	☐	8	5
1077	Control Room for District Collector	☐	×		
1090	Call Alert (Crime Branch)	☐	×		
1091	Women Helpline	☐	×		
1097	National AIDS Helpline to NACO	✓	☐	9	6
1099	Central Accident and Trauma Services (CATS)	☐	×		
10580	Educational & Vocational Guidance and Counselling	☐	×		
10589	Mother and Child Tracking (MCTH)	☐	×		
10740	Central Pollution Control Board	☐	×		
10741	Pollution Control Board	☐	×		
1511	Police Related Service for all Metro Railway Project	☐	×		
1512	Prevention of Crime in Railway	✓	☐	9	7
1514	National Career Service(NCS)	✓	☐	8	8
15100	Free Legal Service Helpline	✓	☐	7	5
155304	Municipal Corporations	☐	×		
155214	Labour Helpline	✓	☐	8	5

1903	Sashastra Seema Bal (SSB)	✓		9	7
1909	National Do Not Call Registry	✓		8	7
1912	Complaint of Electricity	✓		9	6
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	8
101	Fire	✓		11	8
102	Ambulance	✓		11	7
104	Health Information Helpline	✓		11	8
108	Emergency and Disaster Management Helpline	✓		11	7
138	All India Helpline for Passengers	✓		11	8
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	✓		11	8
1071	Air Accident Helpline		×		
1072	Rail Accident Helpline	✓		11	7
1073	Road Accident Helpline		×		
1077	Control Room for District Collector	✓		11	9
1090	Call Alert (Crime Branch)		×		
1091	Women Helpline		×		
1097	National AIDS Helpline to NACO	✓		11	7
1099	Central Accident and Trauma Services (CATS)		×		
10580	Educational & Vocational Guidance and Counselling		×		
10589	Mother and Child Tracking (MCTH)	✓			
10740	Central Pollution Control Board		×		
10741	Pollution Control Board	✓			
1511	Police Related Service for all Metro Railway Project		×		
1512	Prevention of Crime in Railway	✓		10	7
1514	National Career Service(NCS)		×		
15100	Free Legal Service Helpline		×		
155304	Municipal Corporations		×		
155214	Labour Helpline	✓		10	7
1903	Sashastra Seema Bal (SSB)	✓		10	7
1909	National Do Not Call Registry	✓		10	7
1912	Complaint of Electricity		×		

1916	Drinking Water Supply	☐	×		
1950	Election Commission of India	☐	×		

BSNL CDMA

Level 1 Number	Type of Service	Working	Not Working	Calls Made	Calls Connected
100	Police	✓	☐	17	15
101	Fire	✓	☐		
102	Ambulance	☐	×		
104	Health Information Helpline	☐	×	17	13
108	Emergency and Disaster Management Helpline	✓	☐	17	14
138	All India Helpline for Passengers	☐	×		
149	Public Road Transport Utility Service	☐	×		
181	Chief Minister Helpline	☐	×		
182	Indian Railway Security Helpline	☐	×	17	13
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	✓	☐	17	14
1071	Air Accident Helpline	☐	×		
1072	Rail Accident Helpline	☐	×		
1073	Road Accident Helpline	✓	☐	17	14
1077	Control Room for District Collector	☐	×		
1090	Call Alert (Crime Branch)	☐	×		
1091	Women Helpline	☐	×		
1097	National AIDS Helpline to NACO	✓	☐	16	14
1099	Central Accident and Trauma Services (CATS)	☐	×		
10580	Educational & Vocational Guidance and Counselling	☐	×		
10589	Mother and Child Tracking (MCTH)	☐	×		
10740	Central Pollution Control Board	☐	×		
10741	Pollution Control Board	☐	×		
1511	Police Related Service for all Metro Railway Project	☐	×		
1512	Prevention of Crime in Railway	☐	×		
1514	National Career Service(NCS)	☐	×		
15100	Free Legal Service Helpline	☐	×		
155304	Municipal Corporations	☐	×		
155214	Labour Helpline	☐	×		
1903	Sashastra Seema Bal (SSB)	✓	☐	16	13
1909	National Do Not Call Registry	✓	☐	16	12
1912	Complaint of Electricity	☐	×		
1916	Drinking Water Supply	☐	×		
1950	Election Commission of India	☐	×		

BSNL GSM					
Level 1 Number	Type of Service	Working	Not Working	Calls Made	Calls Connected
100	Police	✓	☐	10	7
101	Fire	✓	☐	10	8
102	Ambulance	✓	☐	10	8
104	Health Information Helpline	✓	☐	10	9
108	Emergency and Disaster Management Helpline	✓	☐	10	8
138	All India Helpline for Passengers	✓	☐	10	8
149	Public Road Transport Utility Service	☐	×		
181	Chief Minister Helpline	☐	×		
182	Indian Railway Security Helpline	✓	☐	10	8
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	✓	☐	10	8
1071	Air Accident Helpline	☐	×		
1072	Rail Accident Helpline	☐	×		
1073	Road Accident Helpline	☐	×		
1077	Control Room for District Collector	✓	☐	10	7
1090	Call Alert (Crime Branch)	✓	☐	10	8
1091	Women Helpline	☐	×		
1097	National AIDS Helpline to NACO	✓	☐	10	8
1099	Central Accident and Trauma Services (CATS)	☐	×		
10580	Educational & Vocational Guidance and Counselling	☐	×		
10589	Mother and Child Tracking (MCTH)	☐	×		
10740	Central Pollution Control Board	☐	×		
10741	Pollution Control Board	☐	×		
1511	Police Related Service for all Metro Railway Project	☐	×		
1512	Prevention of Crime in Railway	☐	×		
1514	National Career Service(NCS)	☐	×		
15100	Free Legal Service Helpline	✓	☐	10	6
155304	Municipal Corporations	☐	×		
155214	Labour Helpline	☐	×		
1903	Sashastra Seema Bal (SSB)	✓	☐	10	7
1909	National Do Not Call Registry	✓	☐	10	7
1912	Complaint of Electricity	✓	☐	10	7
1916	Drinking Water Supply	☐	×		
1950	Election Commission of India	☐	×		

Idea					
Level 1 Number	Type of Service	Working	Not Working	Calls Made	Calls Connected
100	Police	✓	☐	11	8
101	Fire	✓	☐	11	8
102	Ambulance	✓	☐	11	8
104	Health Information Helpline	✓	☐	11	8
108	Emergency and Disaster Management Helpline	✓	☐	11	8
138	All India Helpline for Passengers	✓	☐	11	9
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	✓	☐	11	9
1071	Air Accident Helpline	☐	×		
1072	Rail Accident Helpline	☐	×		
1073	Road Accident Helpline	☐	×		
1077	Control Room for District Collector	✓	☐	11	7
1090	Call Alert (Crime Branch)	☐	×		
1091	Women Helpline	☐	×		
1097	National AIDS Helpline to NACO	✓	☐	11	8
1099	Central Accident and Trauma Services (CATS)	☐	×		
10580	Educational & Vocational Guidance and Counselling	☐	×		
10589	Mother and Child Tracking (MCTH)	☐	×		
10740	Central Pollution Control Board	☐	×		
10741	Pollution Control Board	☐	×		
1511	Police Related Service for all Metro Railway Project	☐	×		
1512	Prevention of Crime in Railway	✓	☐	11	8
1514	National Career Service(NCS)	☐	×		
15100	Free Legal Service Helpline	✓	☐	10	8
155304	Municipal Corporations	☐	×		
155214	Labour Helpline	☐	×		
1903	Sashastra Seema Bal (SSB)	✓	☐	10	8
1909	National Do Not Call Registry	✓	☐	10	8
1912	Complaint of Electricity	✓	☐	10	7
1916	Drinking Water Supply	☐	×		
1950	Election Commission of India	☐	×		

Reliance GSM					
Level 1 Number	Type of Service	Working	Not Working	Calls Made	Calls Connected
100	Police	✓	☐	11	8
101	Fire	✓	☐	11	8
102	Ambulance	✓	☐	11	8
104	Health Information Helpline	✓	☐	11	8
108	Emergency and Disaster Management Helpline	✓	☐	11	7
138	All India Helpline for Passengers	✓	☐	11	8
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	✓	☐	11	9
1071	Air Accident Helpline	☐	×		
1072	Rail Accident Helpline	☐	×		
1073	Road Accident Helpline	☐	×		
1077	Control Room for District Collector	✓	☐	11	7
1090	Call Alert (Crime Branch)	☐	×		
1091	Women Helpline	☐	×		
1097	National AIDS Helpline to NACO	✓	☐	11	8
1099	Central Accident and Trauma Services (CATS)	☐	×		
10580	Educational & Vocational Guidance and Counselling	☐	×		
10589	Mother and Child Tracking (MCTH)	☐	×		
10740	Central Pollution Control Board	☐	×		
10741	Pollution Control Board	☐	×		
1511	Police Related Service for all Metro Railway Project	☐	×		
1512	Prevention of Crime in Railway	✓	☐	11	8
1514	National Career Service(NCS)	☐	×		
15100	Free Legal Service Helpline	☐	×		
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	✓	☐	10	10
1916	Drinking Water Supply	✓	☐	10	10
1950	Election Commission of India	☐	×		

Vodafone					
Level 1 Number	Type of Service	Working	Not Working	Calls Made	Calls Connected
100	Police	✓		11	8
101	Fire	✓		11	8
102	Ambulance	✓		11	8
104	Health Information Helpline	✓		11	8
108	Emergency and Disaster Management Helpline	✓		11	8
138	All India Helpline for Passengers	✓		11	7
149	Public Road Transport Utility Service		×		
181	Chief Minister Helpline		×		
182	Indian Railway Security Helpline	✓		11	7
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	✓		11	8
1071	Air Accident Helpline		×		
1072	Rail Accident Helpline		×		
1073	Road Accident Helpline		×		
1077	Control Room for District Collector	✓		10	7
1090	Call Alert (Crime Branch)		×		
1091	Women Helpline		×		
1097	National AIDS Helpline to NACO	✓		10	8
1099	Central Accident and Trauma Services (CATS)		×		
10580	Educational & Vocational Guidance and Counselling		×		
10589	Mother and Child Tracking (MCTH)		×		
10740	Central Pollution Control Board		×		
10741	Pollution Control Board		×		
1511	Police Related Service for all Metro Railway Project		×		
1512	Prevention of Crime in Railway		×		
1514	National Career Service(NCS)		×		
15100	Free Legal Service Helpline				
155304	Municipal Corporations		×		
155214	Labour Helpline	✓		10	8
1903	Sashastra Seema Bal (SSB)	✓		10	8
1909	National Do Not Call Registry	✓		11	8
1912	Complaint of Electricity	✓		11	8
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

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, Airtel, Idea, BSNL and Reliance GSM 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 Vodafone in the circle.

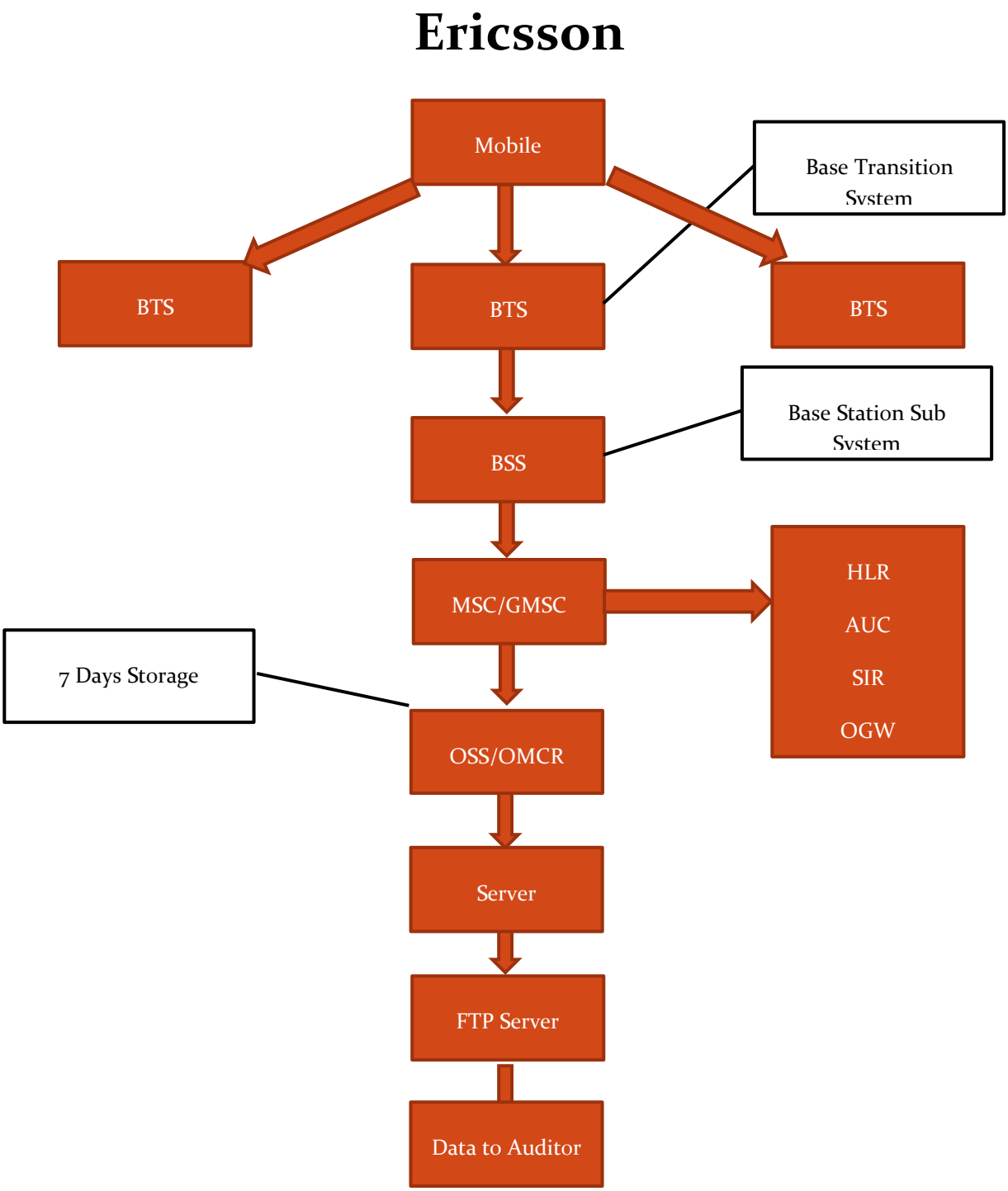
Sl No.	KPI	NSN
1	CSSR= (No of established Calls / No of Attempted Calls)%	CSSR= 100-100*((SDCCH_BUSY_ATT)-(TCH_SEIZ_DUE_SDCCH_CON) + (SDCCH_RADIO_FAIL)+(SDCCH_RF_OLD_HO)+(SDCCH_USER_ACT)+(SDCCH_BCSU_RESET)+(SDCCH_NETW_ACT)+(SDCCH_BTS_FAIL)+(SDCCH_LAPD_FAIL)+ (BLCK_8I_NOM)/ {(CH_REQ_MSG_REC)+(PACKET_CH_REQ)}-{(GHOST_CCCH_RES)-(REJ_SEIZ_ATT_DUE_DIST)}
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)

8.16 BLOCK SCHEMATIC DIAGRAMS

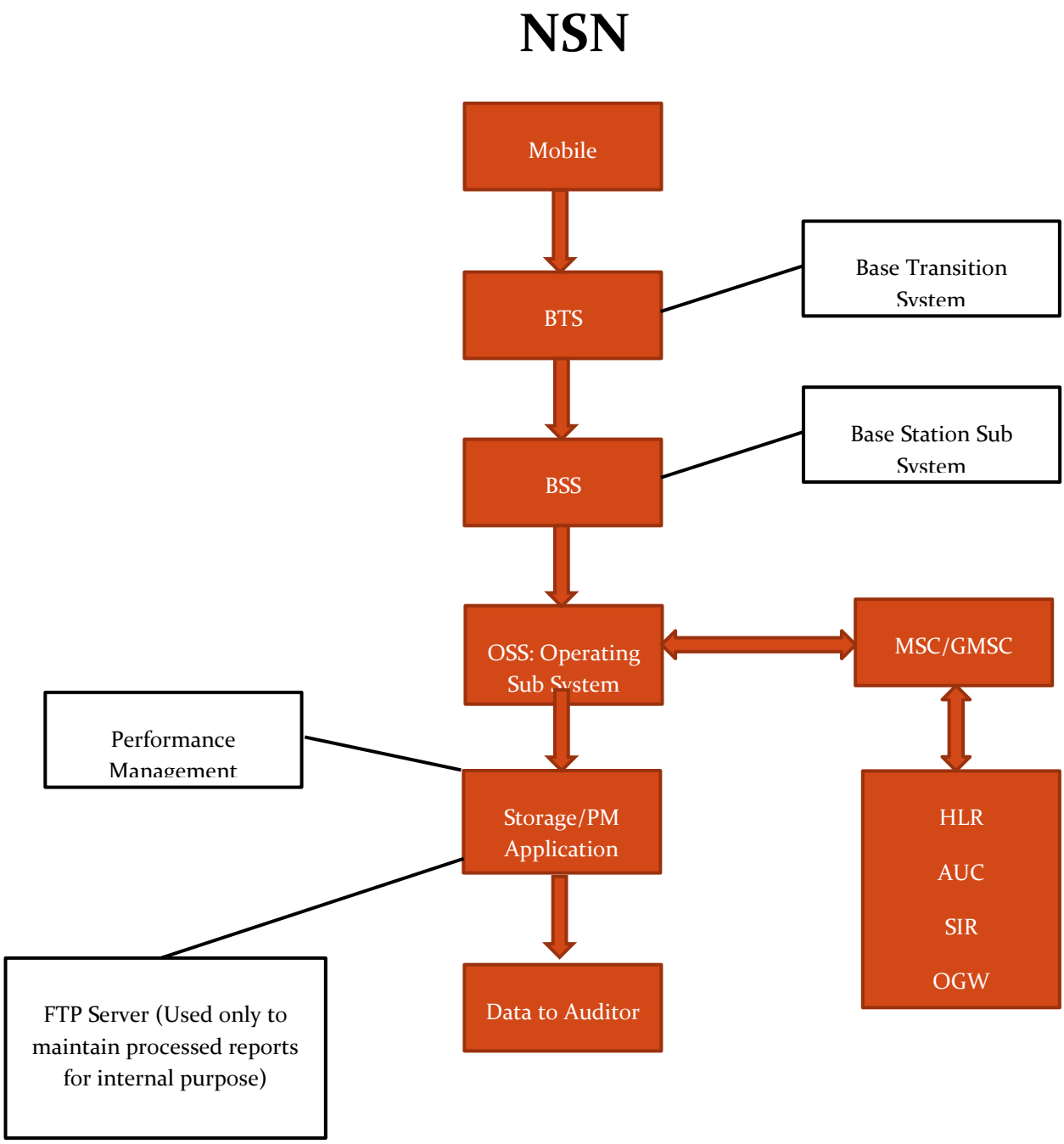
8.16.1 ERICSSON

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



8.16.2 NSN (NOKIA SIEMENS NETWORKS)

NSN provides network support to Vodafone in the circle.



9 ANNEXURE – APRIL

Audit Results for Network Availability- PMR data-April								
	Benchmark	Aircel(DWL)	Airtel	BSNL CDMA	BSNL GSM	Idea	Reliance GSM	Vodafone
Number of BTSs in the licensed service area		2691	3305	243	1360	1344	1567	3121
Sum of downtime of BTSs in a month (in hours)		94135	7810	26764	17890	17799	5068	13588
BTSs accumulated downtime (not available for service)	≤ 2%	4.86%	0.33%	15.30%	1.83%	1.84%	0.45%	0.60%
Number of BTSs having accumulated downtime >24 hours		849	55	68	27	25	22	60
Worst affected BTSs due to downtime	≤ 2%	31.55%	1.66%	27.98%	1.99%	1.86%	1.40%	1.92%
Live Measurement Results for Network Availability- 3 Day live data-April								
	Benchmark	Aircel(DWL)	Airtel	BSNL CDMA	BSNL GSM	Idea	Reliance GSM	Vodafone
Number of BTSs in the licensed service area		2687	3297	243	1360	1312	1567	3121
Sum of downtime of BTSs in a month (in hours)		9595	716	2668	2005	1788	5068	1350
BTSs accumulated downtime (not available for service)	≤ 2%	4.96%	0.30%	15.25%	2.05%	1.89%	4.49%	0.60%
Number of BTSs having accumulated downtime >24 hours		101	0	10	6	23	22	4
Worst affected BTSs due to downtime	≤ 2%	3.76%	0.00%	4.12%	0.44%	1.75%	1.40%	0.13%

Audit Results for CSSR, SDCCH and TCH congestion- PMR data-April								
CSSR	Benchmark	Aircel(DWL)	Airtel	BSNL CDMA	BSNL GSM	Idea	Reliance GSM	Vodafone
CSSR	≥ 95%	93.06%	93.98%	98.52%	96.06%	96.82%	98.48%	99.50%
SDCCH/Paging channel congestion	≤ 1%	1.09%	0.43%	NA	0.91%	0.98%	0.02%	0.15%
TCH congestion	≤ 2%	5.26%	1.34%	0.00%	1.19%	1.34%	0.08%	0.50%

Live measurement results for CSSR, SDCCH and TCH congestion- 3 Day Data-April								
CSSR	Benchmark	Aircel(DWL)	Airtel	BSNL CDMA	BSNL GSM	Idea	Reliance GSM	Vodafone
CSSR	≥ 95%	96.58%	94.24%	98.39%	92.94%	98.75%	98.50%	99.80%
SDCCH/Paging channel congestion	≤ 1%	0.00%	0.31%	NA	0.36%	0.38%	0.07%	0.13%
TCH congestion	≤ 2%	2.47%	1.28%	0.00%	1.28%	0.44%	0.08%	0.20%

Drive test results for CSSR (Average of three drive tests) and blocked calls- Drive Test Data-April								
CSSR	Benchmark	Aircel(DWL)	Airtel	BSNL CDMA	BSNL GSM	Idea	Reliance GSM	Vodafone
Total number of call attempts		514	505	NDR	334	407	526	540
Total number of successful calls established		513	503	NDR	310	396	482	532
CSSR	≥ 95%	99.81%	99.60%	NDR	92.81%	97.30%	91.63%	98.52%
%age blocked calls		0.19%	0.40%	NDR	7.19%	2.70%	8.37%	1.48%

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 CDMA	BSNL GSM	Idea	Reliance GSM	Vodafone
Total number of calls established		183694180	194534519	647862	414428769	32782930	65845658	4114764
Total number of calls dropped		2945454	1941182	9678	8164247	484891	441637	23600
Call drop rate	≤ 2%	1.60%	1.00%	1.49%	1.97%	1.48%	0.67%	0.57%
Cells having more than 3% TCH	Benchmark	Aircel(DWL)	Airtel	BSNL CDMA	BSNL GSM	Idea	Reliance GSM	Vodafone
Total number of cells in the network		7994	9925	687	3981	4032	4798	9395
Total number of cells having more than 3% TCH		1096	94	58	118	58	8	211
Worst affected cells having more than 3% TCH	≤ 3%	13.71%	0.95%	8.37%	2.96%	1.44%	0.17%	2.25%

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 CDMA	BSNL GSM	Idea	Reliance GSM	Vodafone
Total number of calls established		202685378	19485230	50142	35772455	37349422	6752654	2192666
Total number of calls dropped		2744139	200380	454	733335	437737	43985	11363
Call drop rate	≤ 2%	1.35%	1.03%	0.91%	2.05%	1.17%	0.65%	0.52%
Cells having more than 3% TCH	Benchmark	Aircel(DWL)	Airtel	BSNL CDMA	BSNL GSM	Idea	Reliance GSM	Vodafone
Total number of cells in the network		7983	9921	687	3981	3936	4798	9386
Total number of cells having more than 3% TCH		1014	98	55	129	63	8	226
Worst affected cells having more than 3% TCH	≤ 3%	12.70%	0.99%	8.05%	3.24%	1.60%	0.17%	2.41%
Drive test results for Call drop rate (Average of three drive tests) - Drive Test Data-April								
Call drop rate	Benchmark	Aircel(DWL)	Airtel	BSNL CDMA	BSNL GSM	Idea	Reliance GSM	Vodafone
Total number of calls established		513	503	NDR	310	396	485	532
Total number of calls dropped		0	0	NDR	10	3	24	0
Call drop rate	≤ 2%	0.00%	0.00%	NDR	3.23%	0.76%	4.95%	0.00%

Audit Results for Voice quality -PMR Data-April								
Voice quality	Benchmark	Aircel(DWL)	Airtel	BSNL CDMA	BSNL GSM	Idea	Reliance GSM	Vodafone
Total number of sample calls		19891644596	21788045846	10235	NDR	3795072699	9921482087	728577504
Total number of calls with good voice quality		18210420714	21460905511	7656	NDR	3628871509	9752111131	715592420
%age calls with good voice quality	≥ 95%	91.55%	98.50%	74.80%	NDR	95.62%	98.29%	98.22%

Live measurement results for Voice quality-3 Day data-April								
Voice quality	Benchmark	Aircel(DWL)	Airtel	BSNL CDMA	BSNL GSM	Idea	Reliance GSM	Vodafone
Total number of sample calls		19812300813	2144170229	10235	NDR	3908826139	977248598	354319143
Total number of calls with good voice quality		18409924657	2109700596	7656	NDR	3753853358	960978839	349213632
%age calls with good voice quality	≥ 95%	92.92%	98.39%	74.80%	NDR	96.04%	98.34%	98.56%

Drive test results for Voice quality (Average of three drive tests) - DT data-April								
Voice quality	Benchmark	Aircel(DWL)	Airtel	BSNL CDMA	BSNL GSM	Idea	Reliance GSM	Vodafone
Total number of sample calls		755346	824395	NDR	431310	729387	725739	878735
Total number of calls with good voice quality		723274	759294	NDR	392789	698746	660306	856692
%age calls with good voice quality	≥ 95%	95.75%	92.10%	NDR	91.07%	95.80%	90.98%	97.49%

Audit Results for POI Congestion- PMR data-April								
POI congestion	Benchmark	Aircel(DWL)	Airtel	BSNL CDMA	BSNL GSM	Idea	Reliance GSM	Vodafone
Total number of working POIs		52	15	NA	19	30	23	28
No. of POIs not meeting benchmark		0	0	NA	0	0	0	0
Total Capacity of all POIs (A) - in erlangs		89146	105469	NA	19643	39132	31804	60492758
Traffic served for all POIs (B)- in erlangs		61457	36124	NA	20087	17874	20586	16232067
POI congestion	≤ 0.5%	0.00%	0.00%	NA	0.02%	0.00%	0.00%	0.00%

Live Measurement Results for POI Congestion- 3 Day data-April								
POI congestion	Benchmark	Aircel(DWL)	Airtel	BSNL CDMA	BSNL GSM	Idea	Reliance GSM	Vodafone
Total number of working POIs		52	15	NA	19	30	23	28
No. of POIs not meeting benchmark		0	0	NA	0	0	0	0
Total Capacity of all POIs (A) - in erlangs		89146	105082	NA	19643	39132	31804	6049243
Traffic served for all POIs (B)- in erlangs		59777	36326	NA	18225	17788	20586	1613356
POI congestion	≤ 0.5%	0.00%	0.00%	NA	0.00%	0.00%	0.00%	0.00%

10 ANNEXURE – MAY

For 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-May								
	Benchmark	Aircel(DWL)	Airtel	BSNL CDMA	BSNL GSM	Idea	Reliance GSM	Vodafone
Number of BTSs in the licensed service area		2686	3319	243	1360	1409	NDR	3126
Sum of downtime of BTSs in a month (in hours)		86433	6907	35218	18213	9681	NDR	14444
BTSs accumulated downtime (not available for service)	≤ 2%	4.33%	0.28%	19.48%	1.80%	0.92%	NDR	0.62%
Number of BTSs having accumulated downtime >24 hours		738	44	70	27	22	NDR	59
Worst affected BTSs due to downtime	≤ 2%	27.48%	1.33%	28.81%	1.99%	1.56%	NDR	1.89%
Live Measurement Results for Network Availability- 3 Day live data-May								
	Benchmark	Aircel(DWL)	Airtel	BSNL CDMA	BSNL GSM	Idea	Reliance GSM	Vodafone
Number of BTSs in the licensed service area		2691	3305	243	1360	1347	NDR	3120
Sum of downtime of BTSs in a month (in hours)		8544	691	3132	1938	1729	NDR	1536
BTSs accumulated downtime (not available for service)	≤ 2%	4.41%	0.29%	17.90%	1.98%	1.78%	NDR	0.68%
Number of BTSs having accumulated downtime >24 hours		70	0	16	4	21	NDR	1
Worst affected BTSs due to downtime	≤ 2%	2.60%	0.00%	6.58%	0.29%	1.56%	NDR	0.03%

Audit Results for CSSR, SDCCH and TCH congestion- PMR data-May								
CSSR	Benchmark	Aircel(DWL)	Airtel	BSNL CDMA	BSNL GSM	Idea	Reliance GSM	Vodafone
CSSR	≥ 95%	93.98%	93.56%	98.51%	96.16%	96.95%	NDR	99.49%
SDCCH/Paging channel congestion	≤ 1%	0.80%	0.41%	NA	0.92%	0.85%	NDR	0.15%
TCH congestion	≤ 2%	4.44%	1.38%	0.00%	1.29%	1.22%	NDR	0.51%

Live measurement results for CSSR, SDCCH and TCH congestion- 3 Day Data-May								
CSSR	Benchmark	Aircel(DWL)	Airtel	BSNL CDMA	BSNL GSM	Idea	Reliance GSM	Vodafone
CSSR	≥ 95%	97.34%	93.87%	98.40%	92.38%	98.75%	NDR	99.72%
SDCCH/Paging channel congestion	≤ 1%	0.79%	0.40%	NA	0.42%	0.57%	NDR	0.16%
TCH congestion	≤ 2%	1.81%	1.30%	0.00%	1.50%	0.41%	NDR	0.28%

Drive test results for CSSR (Average of three drive tests) and blocked calls- Drive Test Data-May								
CSSR	Benchmark	Aircel(DWL)	Airtel	BSNL CDMA	BSNL GSM	Idea	Reliance GSM	Vodafone
Total number of call attempts		393	469	549	503	368	350	391
Total number of successful calls established		390	468	499	419	361	346	383
CSSR	≥ 95%	99.24%	99.79%	90.89%	83.30%	98.10%	98.86%	97.95%
%age blocked calls		0.76%	0.21%	9.11%	16.70%	1.90%	1.14%	2.05%

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 CDMA	BSNL GSM	Idea	Reliance GSM	Vodafone
Total number of calls established		197184027	209830947	547571	399639043	34977878	NDR	4160204
Total number of calls dropped		3375592	2324233	5923	7832925	587764	NDR	26208
Call drop rate	≤ 2%	1.71%	1.11%	1.08%	1.96%	1.68%	NDR	0.63%
Cells having more than 3% TCH	Benchmark	Aircel(DWL)	Airtel	BSNL CDMA	BSNL GSM	Idea	Reliance GSM	Vodafone
Total number of cells in the network		7994	9954	687	3981	4227	NDR	9429
Total number of cells having more than 3% TCH		1096	125	72	117	79	NDR	246
Worst affected cells having more than 3% TCH	≤ 3%	13.70%	1.26%	10.45%	2.94%	1.87%	NDR	2.61%

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 CDMA	BSNL GSM	Idea	Reliance GSM	Vodafone
Total number of calls established		211996537	20298808	49742	40974218	36208238	NDR	2137139
Total number of calls dropped		3032998	215973	653	852264	470440	NDR	11159
Call drop rate	≤ 2%	1.43%	1.06%	1.31%	2.08%	1.30%	NDR	0.52%
Cells having more than 3% TCH	Benchmark	Aircel(DWL)	Airtel	BSNL CDMA	BSNL GSM	Idea	Reliance GSM	Vodafone
Total number of cells in the network		7980	9944	687	3981	4041	NDR	9386
Total number of cells having more than 3% TCH		1260	111	45	129	80	NDR	235
Worst affected cells having more than 3% TCH	≤ 3%	15.79%	1.12%	6.50%	3.24%	1.98%	NDR	2.50%
Drive test results for Call drop rate (Average of three drive tests) - Drive Test Data-May								
Call drop rate	Benchmark	Aircel(DWL)	Airtel	BSNL CDMA	BSNL GSM	Idea	Reliance GSM	Vodafone
Total number of calls established		390	468	507	419	361	346	383
Total number of calls dropped		2	0	19	15	1	13	6
Call drop rate	≤ 2%	0.51%	0.00%	3.75%	3.58%	0.28%	3.76%	1.57%

Audit Results for Voice quality -PMR Data-May								
Voice quality	Benchmark	Aircel(DWL)	Airtel	BSNL CDMA	BSNL GSM	Idea	Reliance GSM	Vodafone
Total number of sample calls		20378928769	21814925418	39726	46030	3823824308	NDR	730977534
Total number of calls with good voice quality		18594243465	21443136888	37564	43433	3645316006	NDR	716805629
%age calls with good voice quality	≥ 95%	91.24%	98.30%	94.56%	94.36%	95.33%	NDR	98.06%

Live measurement results for Voice quality-3 Day data-May								
Voice quality	Benchmark	Aircel(DWL)	Airtel	BSNL CDMA	BSNL GSM	Idea	Reliance GSM	Vodafone
Total number of sample calls		20409874228	2122516324	39726	46030	3921341910	NDR	343523817
Total number of calls with good voice quality		18888506323	2087865777	37564	43433	3761048362	NDR	348959110
%age calls with good voice quality	≥ 95%	92.55%	98.37%	94.56%	94.36%	95.91%	NDR	101.58%

Drive test results for Voice quality (Average of three drive tests) - DT data-May								
Voice quality	Benchmark	Aircel(DWL)	Airtel	BSNL CDMA	BSNL GSM	Idea	Reliance GSM	Vodafone
Total number of sample calls		643066	590909	39726	662239	534113	133240	713554
Total number of calls with good voice quality		615039	551525	37564	597886	502783	132566	661649
%age calls with good voice quality	≥ 95%	95.64%	93.34%	94.56%	90.28%	94.13%	99.49%	92.73%

Audit Results for POI Congestion- PMR data-May								
POI congestion	Benchmark	Aircel(DWL)	Airtel	BSNL CDMA	BSNL GSM	Idea	Reliance GSM	Vodafone
Total number of working POIs		52	15	NA	19	30	NDR	28
No. of POIs not meeting benchmark		0	0	NA	0	0	NDR	0
Total Capacity of all POIs (A) - in erlangs		89146	109401	NA	21047	40451	NDR	64213896
Traffic served for all POIs (B)- in erlangs		61411	36195	NA	22061	17964	NDR	17001472
POI congestion	≤ 0.5%	0.00%	0.00%	NA	5.00%	0.00%	NDR	0.00%

Live Measurement Results for POI Congestion- 3 Day data-May								
POI congestion	Benchmark	Aircel(DWL)	Airtel	BSNL CDMA	BSNL GSM	Idea	Reliance GSM	Vodafone
Total number of working POIs		52	15	NA	19	30	NDR	28
No. of POIs not meeting benchmark		0	0	NA	0	0	NDR	0
Total Capacity of all POIs (A) - in erlangs		89146	105521	NA	21047	40328	NDR	6113799
Traffic served for all POIs (B)- in erlangs		59780	37557	NA	17900	17947	NDR	1655759
POI congestion	≤ 0.5%	0.00%	0.00%	NA	0.00%	0.00%	NDR	0.00%

11 ANNEXURE – JUNE

For 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 CDMA	BSNL GSM	Idea	Reliance GSM	Vodafone
Number of BTSs in the licensed service area		2682	3360	243	1375	1510	NDR	3146
Sum of downtime of BTSs in a month (in hours)		76651	9697	35228	19734	13230	NDR	16246
BTSs accumulated downtime (not available for service)	≤ 2%	3.97%	0.40%	20.13%	1.99%	1.22%	NDR	0.72%
Number of BTSs having accumulated downtime >24 hours		685	62	68	24	28	NDR	58
Worst affected BTSs due to downtime	≤ 2%	25.54%	1.85%	27.98%	1.75%	1.85%	NDR	1.84%

Live Measurement Results for Network Availability- 3 Day live data-June

	Benchmark	Aircel(DWL)	Airtel	BSNL CDMA	BSNL GSM	Idea	Reliance GSM	Vodafone
Number of BTSs in the licensed service area		2681	3319	243	1375	1420	NDR	3122
Sum of downtime of BTSs in a month (in hours)		8147	573	3733	2075	1853	NDR	1766
BTSs accumulated downtime (not available for service)	≤ 2%	4.22%	0.24%	21.34%	2.10%	1.81%	NDR	0.79%
Number of BTSs having accumulated downtime >24 hours		70	0	21	4	28	NDR	2
Worst affected BTSs due to downtime	≤ 2%	2.61%	0.00%	8.64%	0.29%	1.97%	NDR	0.06%

Audit Results for CSSR, SDCCH and TCH congestion- PMR data-June								
CSSR	Benchmark	Aircel(DWL)	Airtel	BSNL CDMA	BSNL GSM	Idea	Reliance GSM	Vodafone
CSSR	≥ 95%	92.69%	92.53%	98.14%	96.11%	96.94%	NDR	99.57%
SDCCH/Paging channel congestion	≤ 1%	1.01%	0.48%	NA	0.78%	0.74%	NDR	0.17%
TCH congestion	≤ 2%	5.55%	1.69%	0.00%	1.15%	1.20%	NDR	0.43%

Live measurement results for CSSR, SDCCH and TCH congestion- 3 Day Data-June								
CSSR	Benchmark	Aircel(DWL)	Airtel	BSNL CDMA	BSNL GSM	Idea	Reliance GSM	Vodafone
CSSR	≥ 95%	96.80%	93.31%	98.68%	92.48%	98.53%	NDR	99.79%
SDCCH/Paging channel congestion	≤ 1%	0.56%	0.42%	NA	0.37%	0.45%	NDR	0.18%
TCH congestion	≤ 2%	2.29%	1.40%	0.00%	1.62%	0.43%	NDR	0.21%

Drive test results for CSSR (Average of three drive tests) and blocked calls- Drive Test Data-June								
CSSR	Benchmark	Aircel(DWL)	Airtel	BSNL CDMA	BSNL GSM	Idea	Reliance GSM	Vodafone
Total number of call attempts		444	431	521	728	325	NDR	411
Total number of successful calls established		442	430	313	702	321	NDR	399
CSSR	≥ 95%	99.55%	99.77%	60.08%	96.43%	98.77%	NDR	97.08%
%age blocked calls		0.45%	0.23%	39.92%	3.57%	1.23%	NDR	2.92%

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 CDMA	BSNL GSM	Idea	Reliance GSM	Vodafone
Total number of calls established		190086081	202213274	442899	400468330	30999504	NDR	4059075
Total number of calls dropped		3367264	2224115	6352	7528805	532888	NDR	26786
Call drop rate	≤ 2%	1.77%	1.10%	1.43%	1.88%	1.72%	NDR	0.66%
Cells having more than 3% TCH	Benchmark	Aircel(DWL)	Airtel	BSNL CDMA	BSNL GSM	Idea	Reliance GSM	Vodafone
Total number of cells in the network		8008	10029	687	3981	4530	NDR	9438
Total number of cells having more than 3% TCH		1319	128	68	117	74	NDR	265
Worst affected cells having more than 3% TCH	≤ 3%	16.47%	1.28%	9.88%	2.94%	1.63%	NDR	2.81%

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 CDMA	BSNL GSM	Idea	Reliance GSM	Vodafone
Total number of calls established		204062156	20731479	50677	37313780	36909714	NDR	2093986
Total number of calls dropped		3097658	228970	494	899262	509691	NDR	12300
Call drop rate	≤ 2%	1.52%	1.10%	0.97%	2.41%	1.38%	NDR	0.59%
Cells having more than 3% TCH	Benchmark	Aircel(DWL)	Airtel	BSNL CDMA	BSNL GSM	Idea	Reliance GSM	Vodafone
Total number of cells in the network		7985	9987	687	3981	4260	NDR	9406
Total number of cells having more than 3% TCH		1406	120	43	129	76	NDR	280
Worst affected cells having more than 3% TCH	≤ 3%	17.61%	1.20%	6.31%	3.24%	1.78%	NDR	2.98%
Drive test results for Call drop rate (Average of three drive tests) - Drive Test Data-June								
Call drop rate	Benchmark	Aircel(DWL)	Airtel	BSNL CDMA	BSNL GSM	Idea	Reliance GSM	Vodafone
Total number of calls established		442	430	313	702	321	345	367
Total number of calls dropped		4	0	52	8	0	14	0
Call drop rate	≤ 2%	0.90%	0.00%	16.61%	1.14%	0.00%	4.06%	0.00%

Audit Results for Voice quality -PMR Data-June								
Voice quality	Benchmark	Aircel(DWL)	Airtel	BSNL CDMA	BSNL GSM	Idea	Reliance GSM	Vodafone
Total number of sample calls		19740368254	20828611550	24154	22203	4065528225	NDR	718392971
Total number of calls with good voice quality		18029594897	20462920676	20601	21431	3878099002	NDR	704470368
%age calls with good voice quality	≥ 95%	91.33%	98.24%	85.29%	96.52%	95.39%	NDR	98.06%

Live measurement results for Voice quality-3 Day data-June								
Voice quality	Benchmark	Aircel(DWL)	Airtel	BSNL CDMA	BSNL GSM	Idea	Reliance GSM	Vodafone
Total number of sample calls		20013256365	2122375878	24154	22203	3897367049	NDR	340017323
Total number of calls with good voice quality		18532528313	2085081177	20601	21431	3736315564	NDR	334540819
%age calls with good voice quality	≥ 95%	92.60%	98.24%	85.29%	96.52%	95.87%	NDR	98.39%

Drive test results for Voice quality (Average of three drive tests) - DT data-June								
Voice quality	Benchmark	Aircel(DWL)	Airtel	BSNL CDMA	BSNL GSM	Idea	Reliance GSM	Vodafone
Total number of sample calls		671045	675733	24154	508043	549150	125184	665434
Total number of calls with good voice quality		637161	648700	20601	475518	536788	124040	622131
%age calls with good voice quality	≥ 95%	94.95%	96.00%	85.29%	93.60%	97.75%	99.09%	93.49%

Audit Results for POI Congestion- PMR data-June								
POI congestion	Benchmark	Aircel(DWL)	Airtel	BSNL CDMA	BSNL GSM	Idea	Reliance GSM	Vodafone
Total number of working POIs		52	15	NA	19	30	NDR	31
No. of POIs not meeting benchmark		0	0	NA	0	0	NDR	0
Total Capacity of all POIs (A) - in erlangs		89144	113153	NA	21047	40451	NDR	16090544
Traffic served for all POIs (B)- in erlangs		61912	36749	NA	18462	16239	NDR	14642894
POI congestion	≤ 0.5%	0.00%	0.00%	NA	0.00%	0.00%	NDR	0.00%

Live Measurement Results for POI Congestion- 3 Day data-June								
POI congestion	Benchmark	Aircel(DWL)	Airtel	BSNL CDMA	BSNL GSM	Idea	Reliance GSM	Vodafone
Total number of working POIs		52	15	NA	19	30	NDR	31
No. of POIs not meeting benchmark		0	0	NA	0	0	NDR	0
Total Capacity of all POIs (A) - in erlangs		89144	113144	NA	21047	40435	NDR	6575544
Traffic served for all POIs (B)- in erlangs		60587	38425	NA	17445	16450	NDR	1455809
POI congestion	≤ 0.5%	0.00%	0.00%	NA	0.00%	0.00%	NDR	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

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

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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 Assam 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: BSNL Website

1.4 AUDIT PROCESS AND OPERATOR SELECTION

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

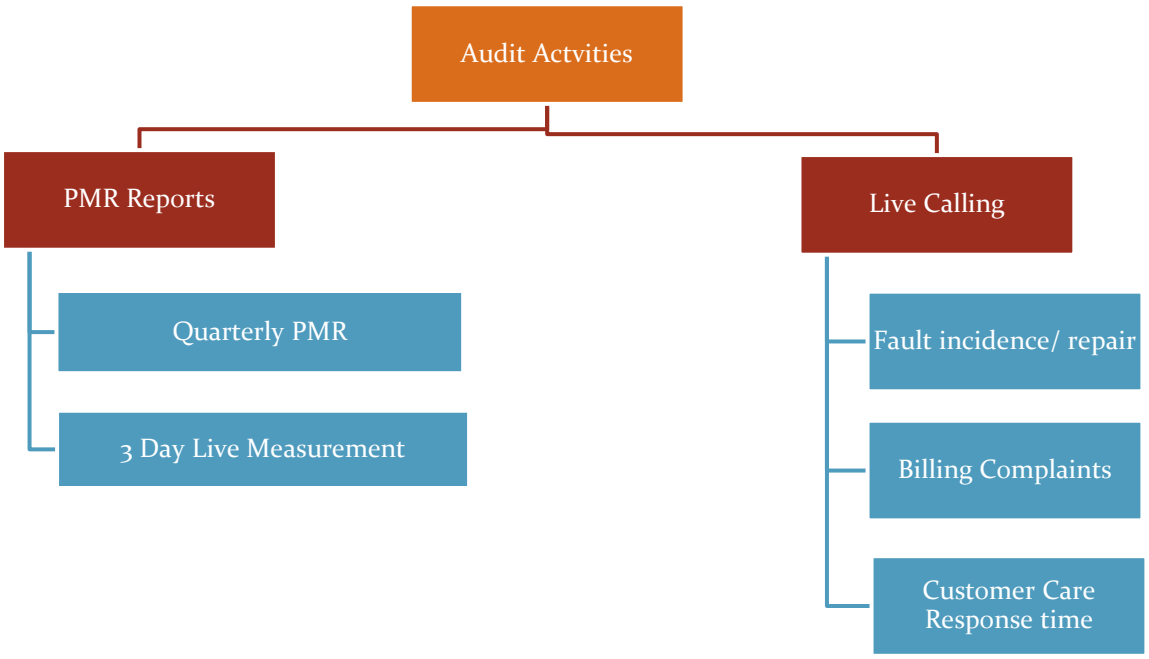
- The operators have been assimilated as per TRAI guidelines given in QoS tender document 2013 and latest list of licensees (with more than 10,000 subscriber in their LSAs) provided by TRAI.
- To conduct the audit, IMRB auditors contacted the broadband operators given in the list below to conduct the audit in Assam circle for the AMJ 2015 quarter.
    - BSNL
    - Broadband Pacenet
    - Citycom Networks
    - Siti Cable

- From the above mentioned operators, Citycom Networks informed the auditors in writing 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
    - Broadband Pacenet
    - Siti Cable

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

- 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.

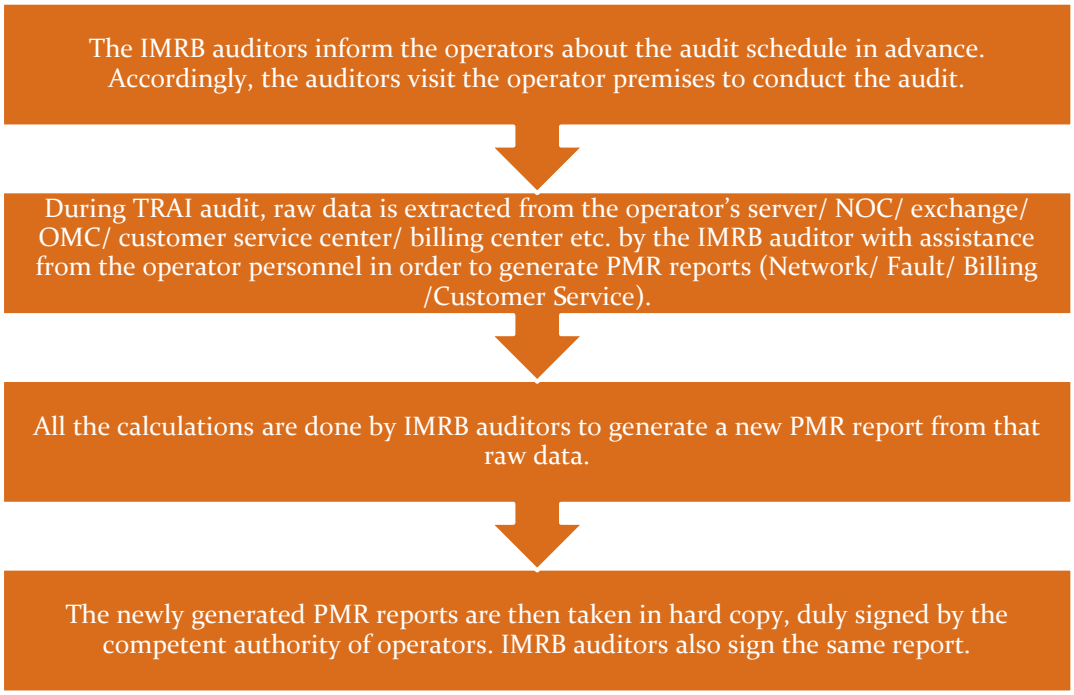
1.5 FRAMEWORK USED



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.

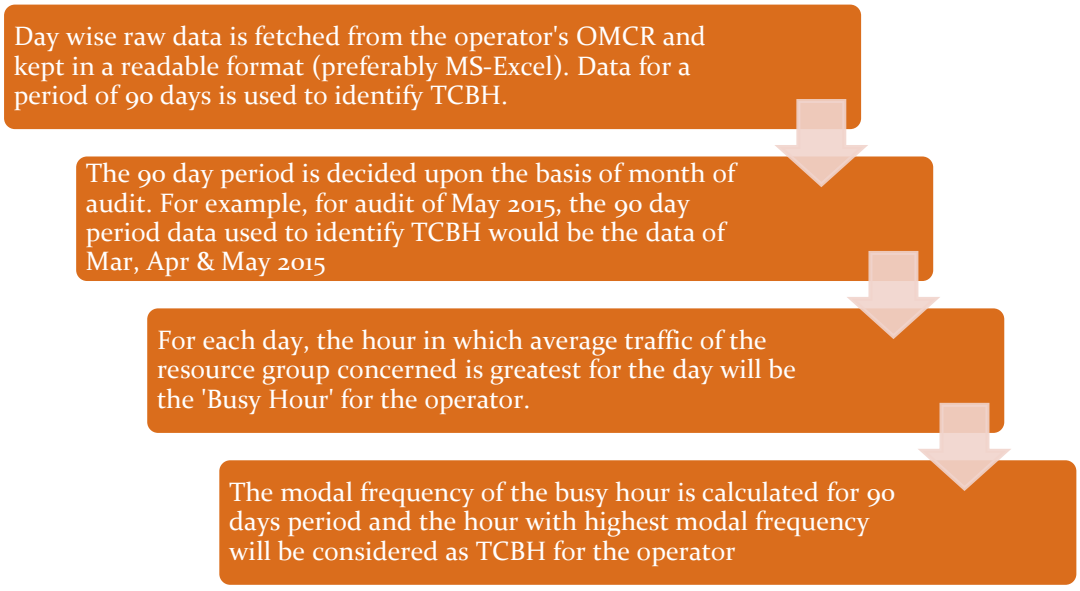
- Bandwidth Utilization
- Broadband download speed
- Service Availability/ Uptime
- Network Latency/ Packet Loss

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	Pacenet	Siti
12:00 -13:00	11:00 -12:00	14:00 - 15:00

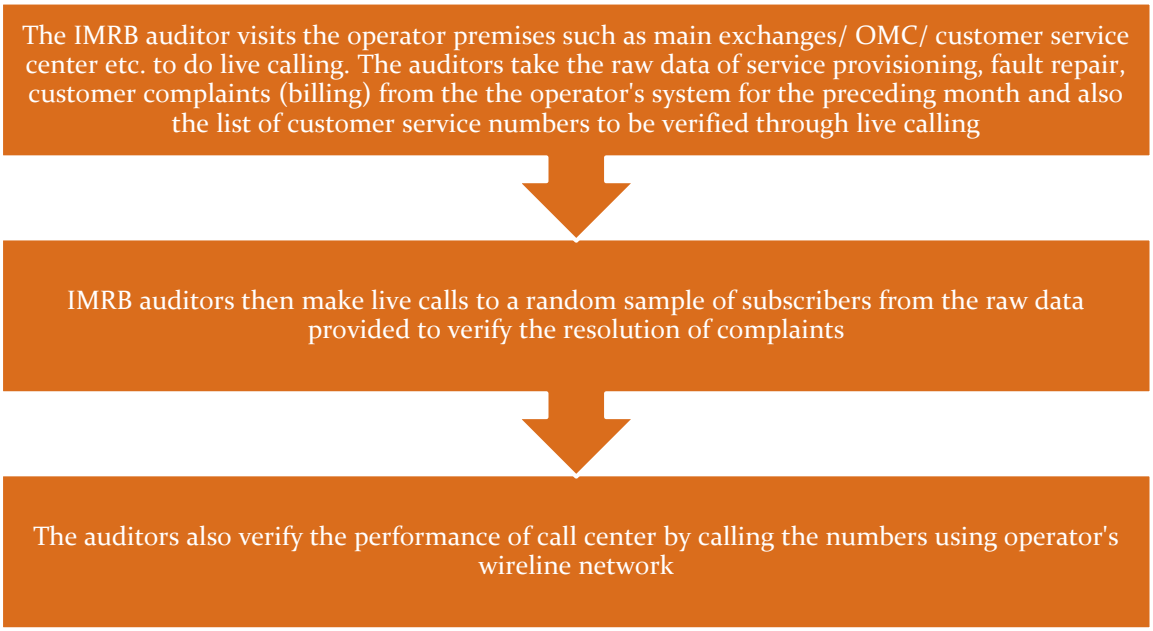
The data for network parameters has been taken as per the TCBH identified by the auditor for the operators.

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.



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. DSLAM is considered as POP as it is being considered to have direct connectivity to the internet
- 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: 703
As per sampling criteria, at least 5% POPs to be selected for audit should be: 35
However, to maintain a geographical spread and due to presence of multiple DSLAM sites at one exchange, the auditors have selected 71 sites.

Total SDCAs present in the circle: 46
As per sampling criteria, 10% SDCAs selected for audit: 5.
To maintain a geographical spread, actual SDCAs selected: 10
A list of the SDCAs selected for audit has been given below.

Nalbari	Silchar
Dibrugarh	Guwahati
Rangia	Mangaldoi
Bijoynagar	Tezpur
Hailakandi	Tinsukia

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

EXCHANGE	DSLAM Sites
BELSORE	1
CHAMATA	1
NALBARI	2
BARBARUA	1
DINJAN	1
GRAHAMBAZAR	3
HIJUGURI	1
KHALIAMARI	6
MAKUM ROAD	1
MOHANBARI	3
TINSUKIA	2
BAIHATA	1
BEZERA	1
BIJOYNAGAR	1
BOKO	1
CHAYGAON	1
DISPUR	6
HAJO	1
KAMALPUR	1
MIRZA	1
PANBAZAR	9
RANGIYA	2
RNY MARKET	1
ALGAPUR	1
AMBICAPATTY	2
HAILAKANDI	2
KALAİN	1
KUMBHIRGRAM	1
MEHERPUR	2
N.S.AVENUE	2
PANCHGRAM	1
SADARGHAT	2
JOYMOTIPATHAR-TZP OCB	3
MANGALDOI	3
MISSION CHARALI	2
SIPAJHAR	1
SIRAJULI	1
THELEMARA	1
TOTAL	**73**

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	Pacenet	Siti
Service provsioning uptime				
Percentage connections provided within 15 days	100%	100.00%	100.00%	100.00%
Fault repair restoration time				
Percentage faults repaired by next working days	≥ 90%	93.36%	100.00%	93.33%
Percentage faults repaired within three working days	≥ 99%	99.85%	100.00%	100.00%
Billing performance				
Metering and billing credibility	< 2%	0.00%	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%	NA	NA	NA
Customer care/helpline assessment (Voice to Voice)				
Percentage calls answered within 60 seconds	≥ 60%	94.54%	100.00%	85.00%
Percentage calls answered within 90 seconds	≥ 80%	95.53%	100.00%	91.67%
Bandwidth utilisation/Throughput				
Intra network links (POP to ISP Node)		NDR	1	1
Upstream Bandwidth (ISP Node to NIXI/NAP/IGSP)		NDR	100	50
Percentage bandwidth utilised on upstream links	< 80%	NDR	75.00%	80.00%
Broadband download speed	≥ 80%	83.64%	91.20%	94.00%
Service availability/uptime	≥ 98%	99.83%	99.95%	99.86%
Packet loss	< 1%	NDR	0.00%	0.20%
Network Latency				
POP/ISP Node to NIXI	< 120 msec	NDR	9	64
ISP node to NAP port (Terrestrial)	< 350 msec	NDR	NA	96

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 Assam circle.

2.1.1 SERVICE PROVISIONING/ ACTIVATION TIME

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

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 met by all operators.

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 Broadband Pacenet and Siti Cable did not log any billing complaints. Hence, resolution of billing complaints is not applicable for the operators.

None of the operators had any billing dispute that required a refund.

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

Siti cable failed to meet 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 for these parameters from BSNL.

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	Pacenet	Siti
Bandwidth utilisation/Throughput				
Intra network links (POP to ISP Node)		NDR	1	1
Upstream Bandwidth (ISP Node to NIXI/NAP/IGSP)		NDR	100	50
Percentage bandwidth utilised on upstream links	< 80%	NDR	75.00%	84.00%
Broadband download speed	≥ 80%	78.81%	88.33%	95.00%
Service availability/uptime	≥ 98%	100.00%	99.95%	99.86%
Packet loss	< 1%	NDR	0.00%	0.20%
Network Latency				
POP/ISP Node to NIXI	< 120 msec	NDR	9	66
ISP node to NAP port (Terrestrial)	< 350 msec	NDR	NA	104

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, 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

Siti cable failed to meet the benchmark for bandwidth utilized on upstream links during live measurement.

BSNL failed to meet the benchmark for broadband download speed while Broadband Pacenet and Siti Cable met the benchmark of providing committed broadband download speed as per live measurement.

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

2.2.2 NETWORK LATENCY

During live measurement, Broadband Pacenet and Siti Cable met the benchmark for network latency parameters.

2.3 LIVE CALLING

Parameters	Benchmarks	BSNL	Pacenet	Siti
Service provsioning uptime				
Percentage connections provided within 15 days	100%	100.00%	100.00%	100.00%
Fault repair restoration time				
Percentage faults repaired by next working days	≥ 90%	76.87%	100.00%	100.00%
Percentage faults repaired within three working days	≥ 99%	94.03%	100.00%	100.00%
Billing performance				
%age of billing complaints resolved in 4 weeks	≥ 98%	NA	NA	NA
%age of billing complaints resolved in 6 weeks	100%	NA	NA	NA
Customer care/helpline assessment (Voice to Voice)				
Percentage calls answered within 60 seconds	≥ 60%	42.68%	65.00%	80.00%
Percentage calls answered within 90 seconds	≥ 80%	67.14%	100.00%	100.00%

2.3.1 SERVICE PROVISIONING/ ACTIVATION TIMES

All operators met the benchmark of providing 100% new connections within the TRAI stipulated timeline of 15 days.

2.3.2 FAULT REPAIR/ RESTORATION

BSNL 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

NA: Live calling for BSNL, Broadband Pacenet and Siti 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, BSNL failed to meet 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.

Fault Repair

The benchmark of repairing 90% faults within the next day of receiving complaints was met by all operators. All operators met the benchmark for repairing faults within three working days as per audit data.

However, as per live calls made to subscribers, BSNL remained short of both the fault repair benchmarks for the parameter.

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.

However, during live calling performance of BSNL was observed to be below the benchmark.

Bandwidth Utilization/ Throughput

Siti cable failed to meet the benchmark for bandwidth utilization on upstream links during audit and live measurement.

Broadband download speed

BSNL failed to meet the benchmark for download speed during live measurement.

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.

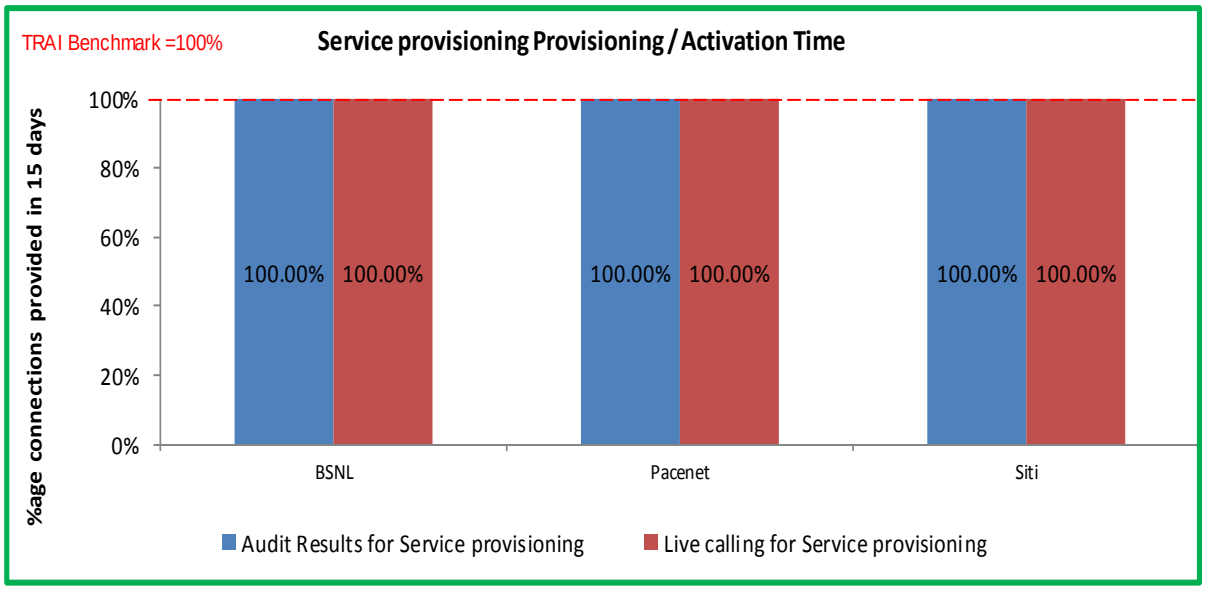
- Also, problems relating to customer owned equipment such as PC, LAN Card/ USB Port and internal wiring or non-availability of such equipment were excluded from the calculation of this parameter.

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.

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

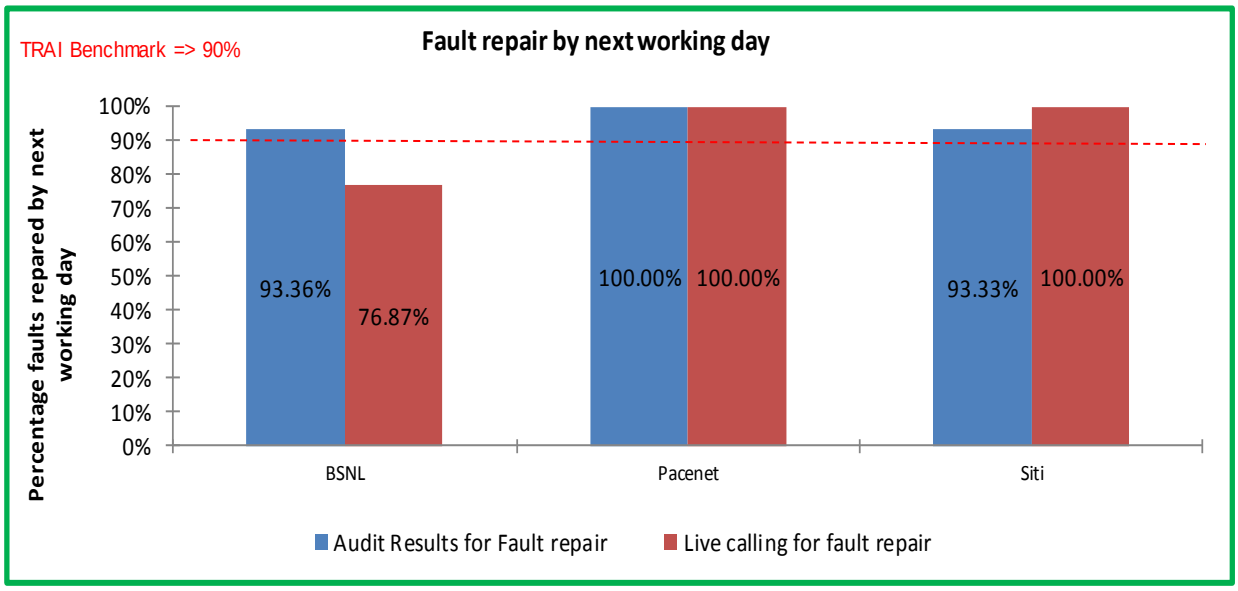
- Only the complaints registered till the close of the business hours of the day are to be taken into account. All the complaints registered after the business hours are to be considered as being registered in the next day business hours

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%.

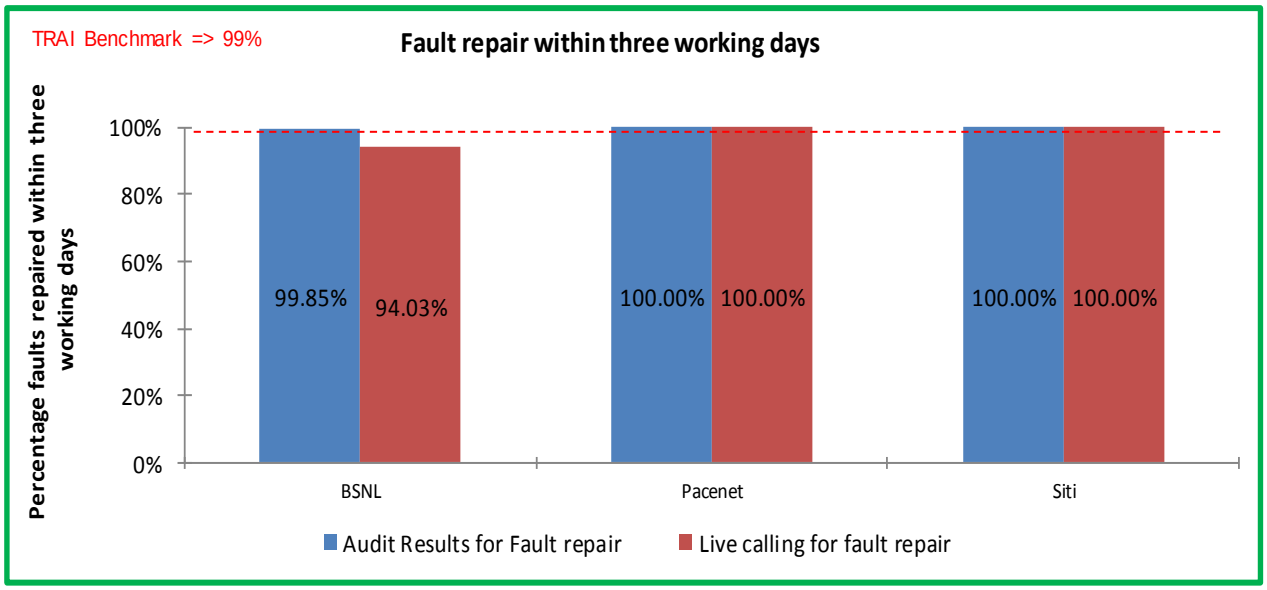
4.2.2 DETAILED FINDINGS - FAULT REPAIR WITHIN NEXT WORKING DAY



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

The benchmark of repairing 90% faults within the next day of receiving complaints was met by all operators as per audit. However, as per live calls made to subscribers, BSNL remained short of the benchmark for the parameter.

4.2.3 DETAILED FINDINGS - FAULT REPAIR WITHIN 3 WORKING DAYS



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

All operators met the benchmark for repairing 99% faults within three working days as per audit data. However, as per live calls made to subscribers, BSNL remained short of the benchmark for the parameter.

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

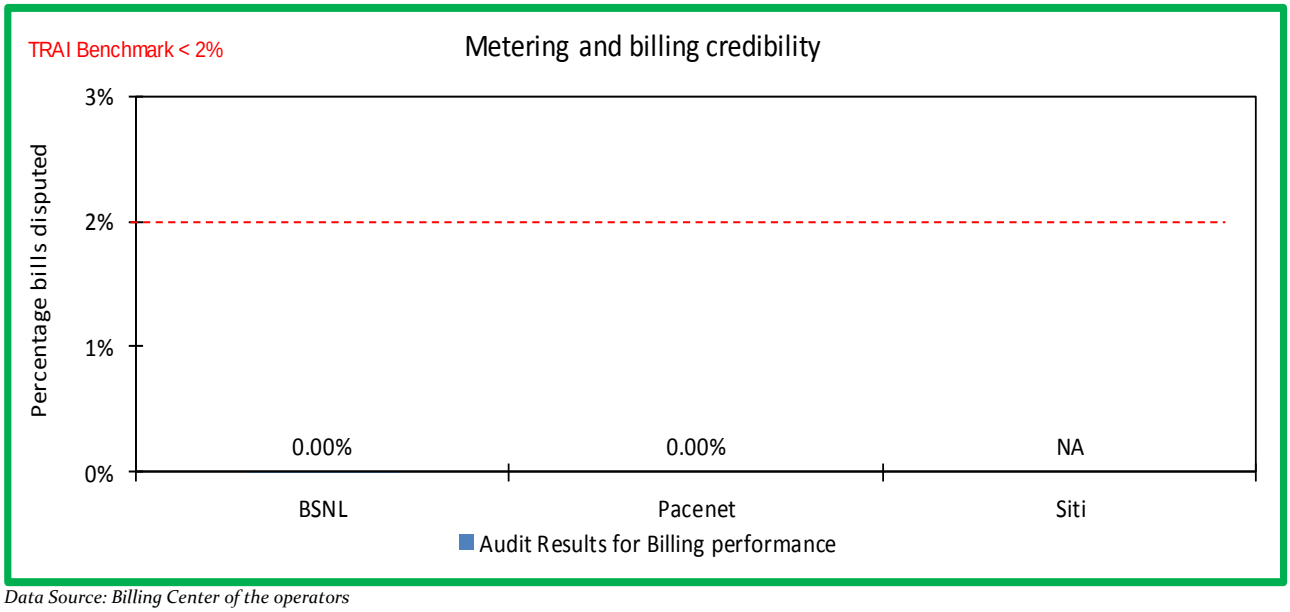
The calculation methodology (given below) as per QoS regulations 2009 (7 of 2009) was followed to calculate incidence of billing complaints.

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

- *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.

NA: Siti Cable has prepaid broadband service in the circle. Hence the parameter is not applicable for the operator.

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 =

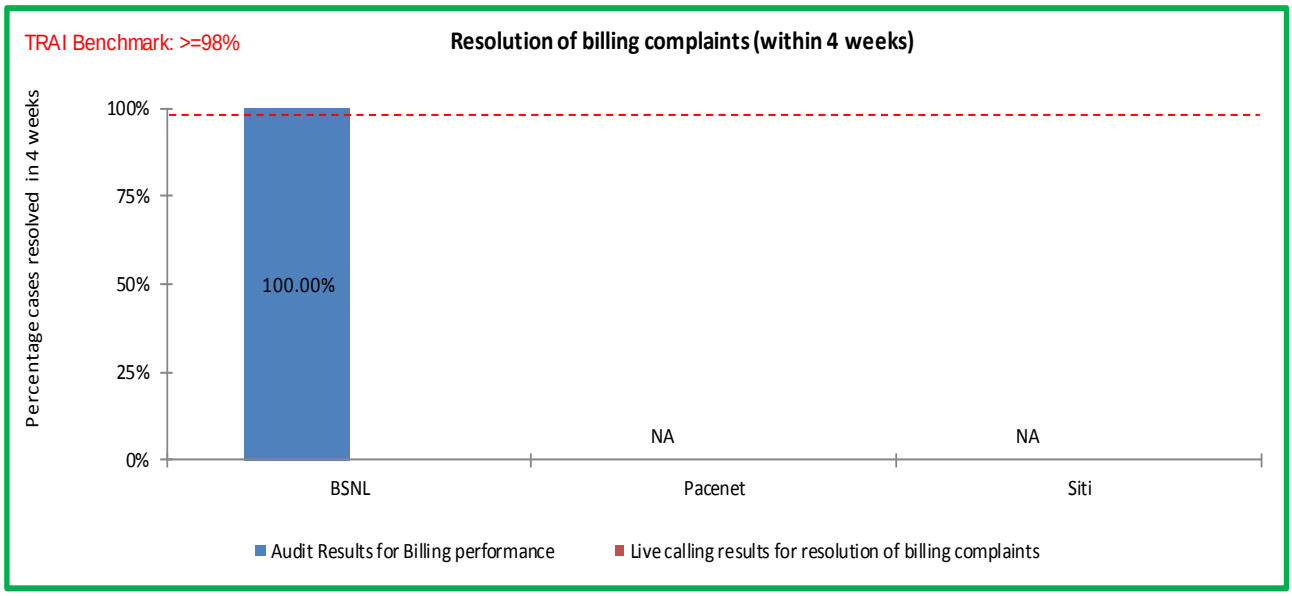
$$\frac{\text{number of billing complaints for post-paid customers/charging, credit/ validity complaints for pre-paid customers resolved within 6 weeks during the quarter}}{\text{number of billing/charging, credit / validity complaints received during the quarter}} \times 100$$

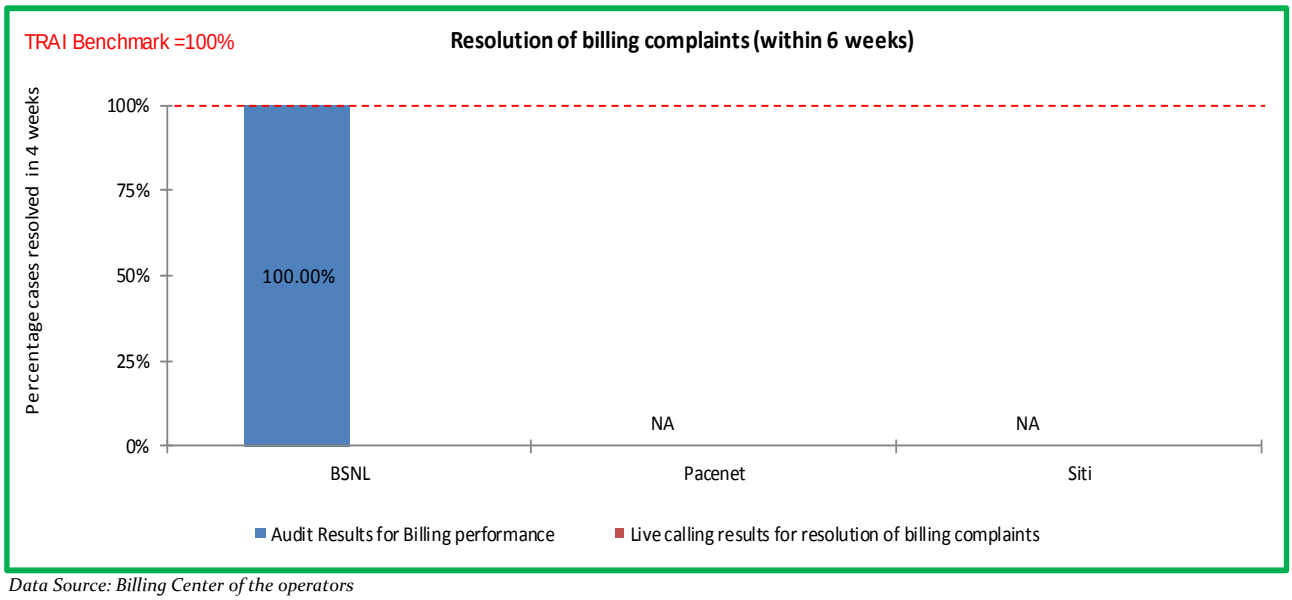
- **Billing complaints here shall include only dispute related issues (including those that may arise because of a lack of awareness at the subscribers' end). It does not include any provisional issues (such as delayed dispatch of billing statements, etc.) in which the operator has opened a ticket internally.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

BSNL met the benchmark for the parameter.

NA: Subscribers of Broadband Pacenet and Siti Cable did not log any billing complaints. Hence, resolution of billing complaints is not applicable for the operators. Also, live calling for resolution of billing complaints for all operators 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

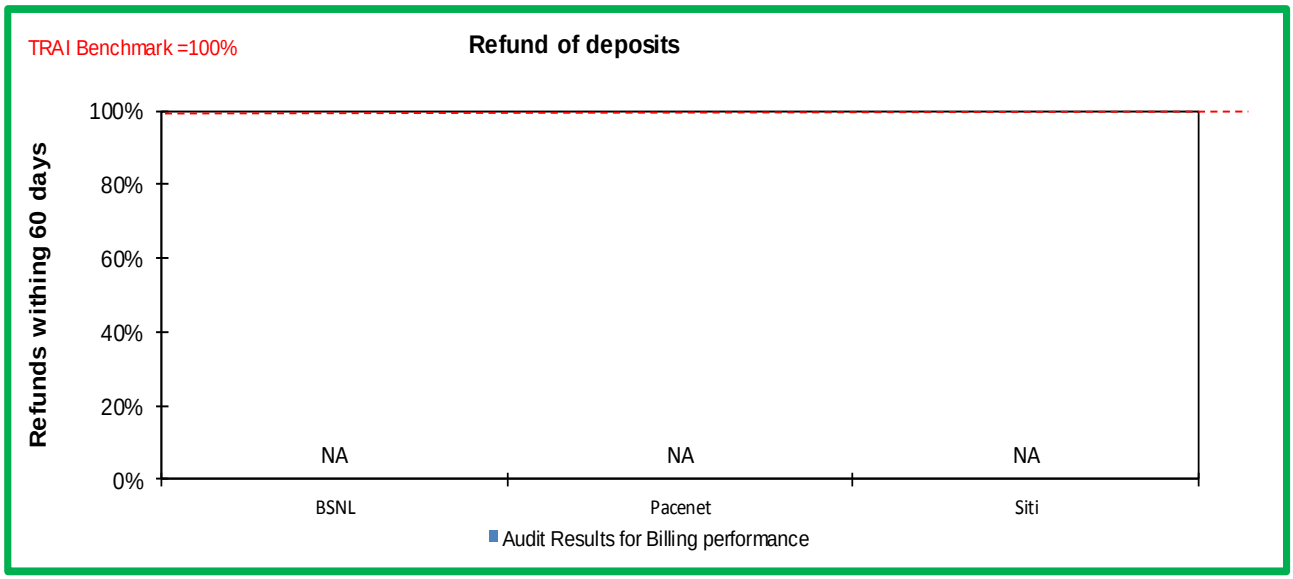
- Date of closure is considered to be the date on which the connection is discontinued in the service provider database of active customers

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



NA: BSNL, Broadband Pacenet and Siti cable 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

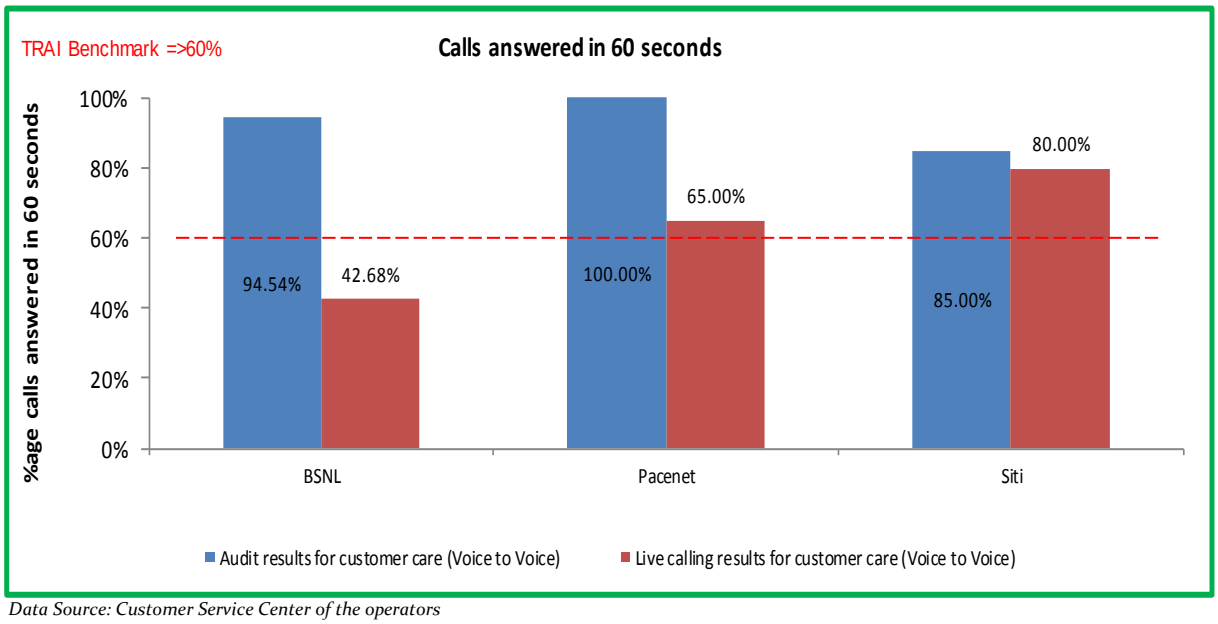
%age of calls answered by operator (voice to voice) within n seconds = *(Number of calls where time taken for operator to respond* >= n sec / Total number of calls where an attempt to route to the operator was made) x 100)*.*

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

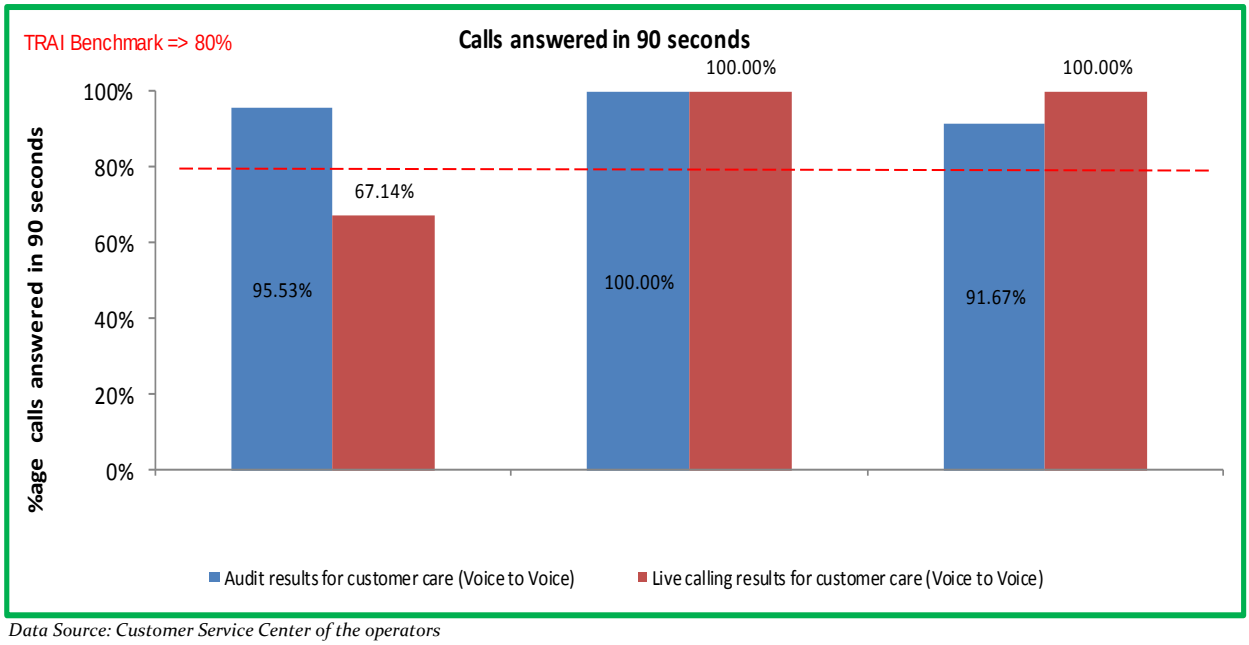
- Calls answered within 60 seconds => 60 %
- Calls answered within 90 seconds => 80%

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. However, during live calling performance of BSNL was observed to be below the benchmark.

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	Pacenet	Siti
Intra-network links (POP to ISP Node)				
Total number of intra network links		NDR	1	1
No of Intra network found to be above 90%				
Total number of upstream links		NDR	3	0
Total International Bandwidth available from ISP Node to IGSP/NIXI/NAP (In Mbps)		NDR	100	50
Total International Bandwidth utilised during peak hours		NDR	75	40
Percentage Bandwidth utilisation during peak hours (In Mbps)	<80%	NDR	75.00%	80.00%
No of Intra network found to be above 90%		NDR	No	Yes
>>				
Live measurment results for Bandwidth Utilization				
Bandwidth utilization	Benchmark	BSNL	Pacenet	Siti
Intra-network links (POP to ISP Node)				
Total number of intra network links		NDR	1	1
International Bandwidth				
Total number of upstream links		NDR	3	0
Total International Bandwidth available from ISP Node to IGSP/NIXI/NAP (In Mbps)		NDR	100	50
Total International Bandwidth utilised during peak hours		NDR	75	42
Percentage Bandwidth utilisation during peak hours (In Mbps)	<80%	NDR	75.00%	84.00%
No of Intra network found to be above 90%		NDR	No	Yes

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

Siti cable failed to meet the benchmark for bandwidth utilization during audit and live measurement.

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	Pacenet	Siti
Total average committed download speed (In Mbps) (A)		5.5	5	1
Total average download speed observed during TCBH (In Mbps) (B)		4.6	4.56	0.94
%age subscribed speed available to the subscriber during TCBH (B/A)*100	≥ 80%	83.64%	91.20%	94.00%

>>

Live measurement results for broadband download speed				
Broadband download speed	Benchmark	BSNL	Pacenet	Siti
Total committed download speed to the sample subscribers (In Mbps) (A)		6.0	5.4	1
Total average download speed observed during TCBH (In Mbps) (B)		4.7	4.77	0.95
%age subscribed speed available to the subscriber during TCBH (B/A)*100	≥ 80%	78.81%	88.33%	95.00%

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. However, BSNL failed to meet the benchmark during live measurement.

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

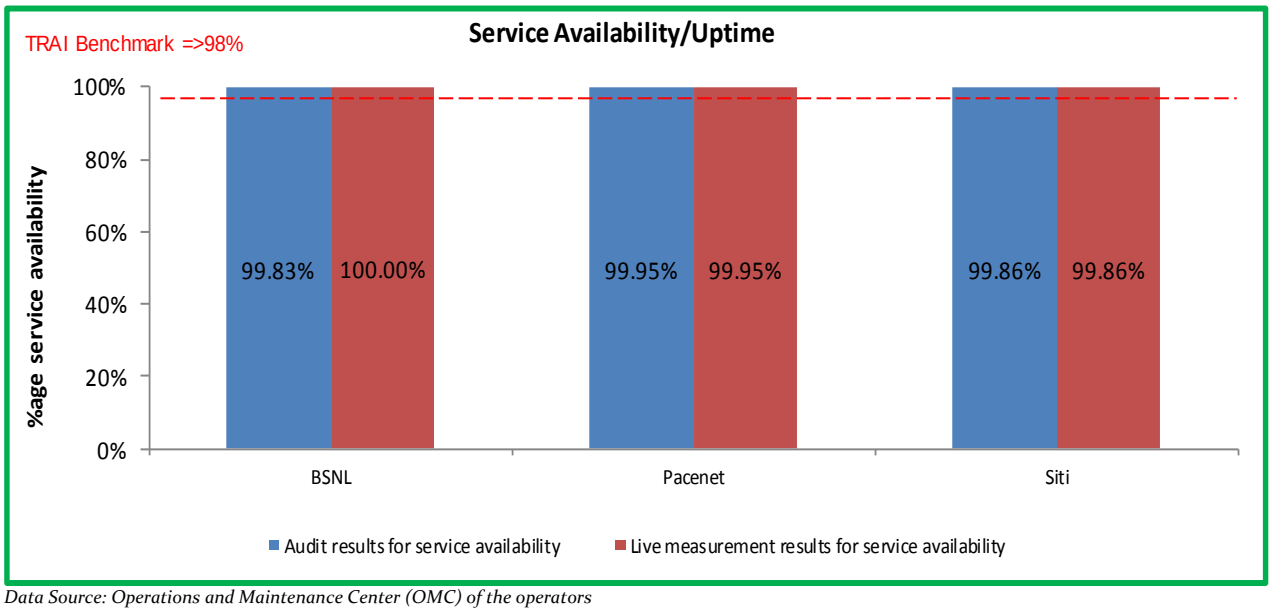
- Total downtime for all users, including the LAN switches, Routers, Servers, etc. at ISP Node and connectivity to upstream service provider are to be included
- Planned outages for routine maintenance of the system are excluded from the calculation of service availability/uptime

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	Pacenet	Siti
Packet Loss (Percentage)	< 1%	NDR	0.00%	0.20%
Network Latency				
From user reference point at POP/ISP Node to IGSP/ NIXI (msec)	<120msec	NDR	9	64
From user reference point at ISP Gateway Node to nearest NAP Port (Terrestrial) (In msec)	<350msec	NDR	NA	96
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	Pacenet	Siti
Packet Loss (Percentage)	< 1%	NDR	0.00%	0.20%
Network Latency				
From user reference point at POP/ISP Node to IGSP/ NIXI (msec)	<120msec	NDR	9	66
From user reference point at ISP Gateway Node to nearest NAP Port (Terrestrial) (In msec)	<350msec	NDR	NA	104
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

Broadband Pacenet and Siti cable 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	Pacenet	Siti
Total connections registered during the period		2577	200	29
Number of connections provided within 15 days		2577	200	29
Percentage of connections provided within 15 days	100%	100.00%	100.00%	100.00%
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	Pacenet	Siti
Total connections registered during the period		240	100	11
Number of connections provided within 15 days		240	100	11
Percentage of connections provided within 15 days	100%	100.00%	100.00%	100.00%

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

Note: Live calls less than target for Siti cable due to low base of service provisioning repair requests.

5.2 FAULT REPAIR/ RESTORATION

Audit Results for Fault repair				
Fault repair	Benchmark	BSNL	Pacenet	Siti
Total No. of faults registered during the period		10542	7	45
No. of faults repaired by next working day during the period		9842	7	42
Percentage of faults repaired by next working day during the period	≥ 90%	93.36%	100.00%	93.33%
No. of faults repaired within 3 days during the period		10526	7	45
Percentage of faults repaired within 3 days during the period	≥ 99%	99.85%	100.00%	100.00%
No. of cases with faults pending for >3 days		NA	NA	NA
>>				
Rent rebate	Benchmark	BSNL	Pacenet	Siti
Percentage of cases where rent rebate for >3 days was given	100%	NA	NA	NA
>>				
Live calling for fault repair				
Fault repair	Benchmark	BSNL	Pacenet	Siti
Total Number of calls made to subscribers		402	4	28
Number of cases where faults were repaired by next working day		309	4	28
Percentage cases where faults were repaired by next working day	≥ 90%	76.87%	100.00%	100.00%
Number of cases where faults were repaired within 3 days		378	4	28
Percentage cases where faults were repaired within 3 days	≥ 99%	94.03%	100.00%	100.00%

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

Note: Live calls less than target for Broadband Pacenet and Siti Cable due to low base of fault repair requests.

5.3 BILLING PERFORMANCE – METERING AND BILLING CREDIBILITY

Audit Results for Billing performance				
Billing Performance	Benchmark	BSNL	Pacenet	Siti
Billing diputes				
Total bills generated during the period		77343	840	0
Total number of bills disputed		2	0	0
Percentage bills disputed (Avg of 3 billing cycles)	≤ 2%	0.00%	0.00%	0.00%
Total bills generated during the first billing cycle		28453	280	NA
Total number of bills disputed in first billing cycle		1	0	NA
Percentage bills disputed (first billing cycle)	≤ 2%	0.00%	0.00%	NA
Total bills generated during the second billing cycle		28433	280	NA
Total number of bills disputed in second billing cycle		1	0	NA
Percentage bills disputed (second billing cycle)	≤ 2%	0.00%	0.00%	NA
Total bills generated during the third billing cycle		20457	280	NA
Total number of bills disputed in third billing cycle		0	0	NA
Percentage bills disputed (third billing cycle)	≤ 2%	0.00%	0.00%	NA
Resolution of billing complaints				
Total number of complaints		2	NA	NA
Total complaints resolved in 4 weeks from date of receipt		2	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		2	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		NA	NA	NA
Total number of cases where credit/waiver was made within 60 days		NA	NA	NA
Percentage cases in which credit/waiver was received within 60 days	100%	NA	NA	NA

Data Source: Billing Center of the operators

NA: Subscribers of Broadband Pacenet and Siti Cable 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	Pacenet	Siti
Total Number of calls made		0	0	NA
Number of cases resolved in 4 weeks		NA	NA	NA
Percentage cases resolved in 4 weeks	≥ 98%	NA	NA	NA
Number of cases resolved in 6 weeks		NA	NA	NA
Percentage cases resolved in 6 weeks	100%	NA	NA	NA

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

NA: Live calling for BSNL, Broadband Pacenet and Siti 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

Calls Answered within 60 seconds				
Customer Care Assessment	Benchmark	BSNL	Pacenet	Siti
Total Number of calls received		16423	300	180
Total Number of calls answered within 60 seconds		15527	300	153
Percentage calls answered within 60 seconds	≥ 60%	94.54%	100.00%	85.00%
Calls Answered within 90 seconds				
Total Number of calls received		16423	300	180
Total Number of calls answered within 90 seconds		15689	300	165
Percentage calls answered within 90 seconds	≥ 80%	95.53%	100.00%	91.67%

Data Source: Customer Service Center of the operators

Live calling results for customer care (Voice to Voice)				
Customer Care Assessment	Benchmark	BSNL	Pacenet	Siti
Total Number of calls received		560	100	100
Total Number of calls answered within 60 seconds		239	65	80
Percentage calls answered within 60 seconds	≥ 60%	42.68%	65.00%	80.00%
Total Number of calls answered within 90 seconds		376	100	100
Percentage calls answered within 90 seconds	≥ 80%	67.14%	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	Pacenet	Siti
Intra-network links (POP to ISP Node)				
Total number of intra network links		NDR	1	1
No of Intra network found to be above 90%				
Total number of upstream links		NDR	3	0
Total International Bandwidth available from ISP Node to IGSP/NIXI/NAP (In Mbps)		NDR	100	50
Total International Bandwidth utilised during peak hours		NDR	75	40
Percentage Bandwidth utilisation during peak hours (In Mbps)	<80%	NDR	75.00%	80.00%
No of Intra network found to be above 90%		NDR	No	Yes
Live measurment results for Bandwidth Utilization				
Bandwidth utilization	Benchmark	BSNL	Pacenet	Siti
Intra-network links (POP to ISP Node)				
Total number of intra network links		NDR	1	1
International Bandwidth				
Total number of upstream links		NDR	3	0
Total International Bandwidth available from ISP Node to IGSP/NIXI/NAP (In Mbps)		NDR	100	50
Total International Bandwidth utilised during peak hours		NDR	75	42
Percentage Bandwidth utilisation during peak hours (In Mbps)	<80%	NDR	75.00%	84.00%
No of Intra network found to be above 90%		NDR	No	Yes

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	Pacenet	Siti
Total average committed download speed (In Mbps) (A)		5.5	5	1
Total average download speed observed during TCBH (In Mbps) (B)		4.6	4.56	0.94
%age subscribed speed available to the subscriber during TCBH (B/A)*100	≥ 80%	83.64%	91.20%	94.00%

>>

Live measurement results for broadband download speed				
Broadband download speed	Benchmark	BSNL	Pacenet	Siti
Total committed download speed to the sample subscribers (In Mbps) (A)		6.0	5.4	1
Total average download speed observed during TCBH (In Mbps) (B)		4.7	4.77	0.95
%age subscribed speed available to the subscriber during TCBH (B/A)*100	≥ 80%	78.81%	88.33%	95.00%

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	Pacenet	Siti
Total Operational Hours		2184	2184	2106
Total Downtime		3.79	1	3
Total time when the service was available		2180.21	2183	2103
Service Availability Uptime in Percentage	≥ 98%	99.83%	99.95%	99.86%

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Live measurement results for service availability				
Service Availability	Benchmark	BSNL	Pacenet	Siti
Total Operational Hours		72	2184	2106
Total Downtime		00	1	3
Total time when the service was available		72	2183.0	2103
Service Availability Uptime in Percentage	≥ 98%	100.00%	99.95%	99.86%

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	Pacenet	Siti
Packet Loss (Percentage)	< 1%	NDR	0.00%	0.20%
Network Latency				
From user reference point at POP/ISP Node to IGSP/ NIXI (msec)	<120msec	NDR	9	64
From user reference point at ISP Gateway Node to nearest NAP Port (Terrestrial) (In msec)	<350msec	NDR	NA	96
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	Pacenet	Siti
Packet Loss (Percentage)	< 1%	NDR	0.00%	0.20%
Network Latency				
From user reference point at POP/ISP Node to IGSP/ NIXI (msec)	<120msec	NDR	9	66
From user reference point at ISP Gateway Node to nearest NAP Port (Terrestrial) (In msec)	<350msec	NDR	NA	104
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	Pacenet	Siti
Capacity		111888	800	500
Total No of customers served (Jun 2015)		48142	280	92

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

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EAST ZONE

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

Prepared By -

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Prepared For-

TRAI

Telecom Regulatory Authority of India

(IS/ISO 9001-2008 Certified Organisation)

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1 INTRODUCTION

1.1 About TRAI

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

In pursuance of above objective, TRAI has been issuing regulations, order and directives to deal with the issues or complaints raised by the operators as well as the consumers. These regulations, order and directives have helped to nurture the growth of multi operator multi service - an open competitive market from a government owned monopoly. Also, the directions, orders and regulations issued cover a wide range of subjects including tariff, interconnection and quality of service as well as governance of the Authority.

TRAI initiated a regulation - The Standard of Quality of Service of Basic Telephone Service (Wireline) and Cellular Mobile Telephone Service regulations, 2009 (7 of 2009) dated 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 Assam 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

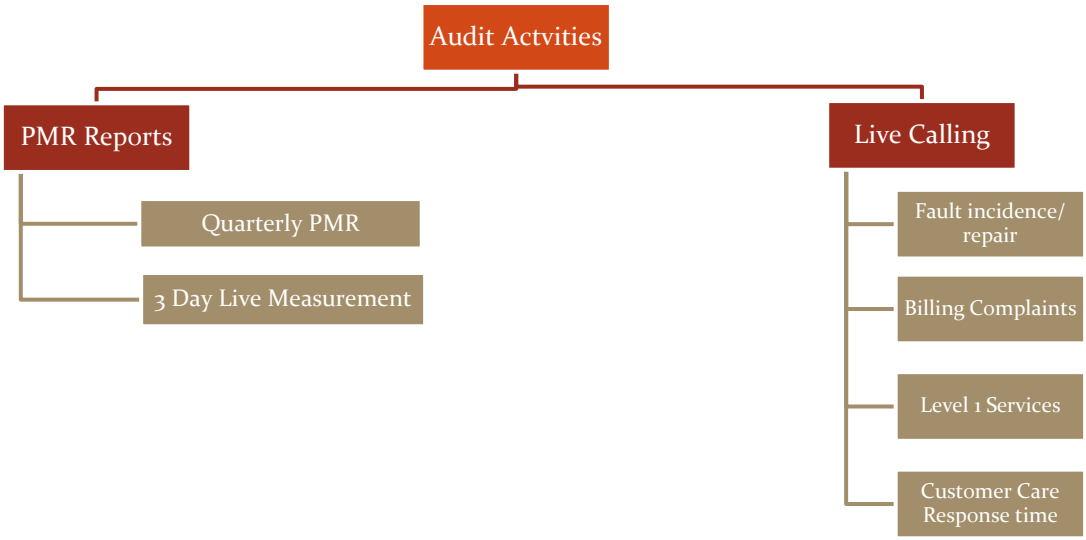
1.4 AUDIT PROCESS

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 Assam for the AMJ 2015 quarter.
    - BSNL
    - Bharti Airtel
    - Reliance
    - Tata Teleservices
    - Vodafone
- Bharti Airtel informed the auditors about non-presence of their services in Assam circle. Tata Teleservices and Reliance updated the auditors of not having license in the circle.
- Hence, the auditors selected the following operators to conduct audit in Assam circle.
    - BSNL
    - Vodafone
- 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

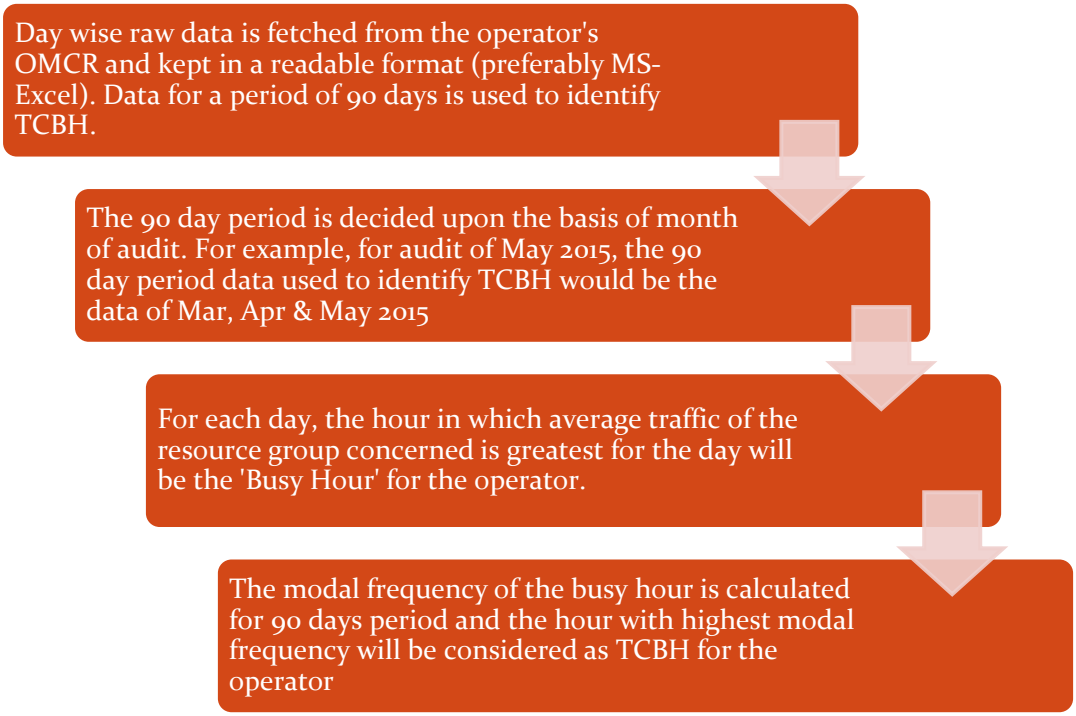
- Call Completion Rate (CCR)
- Answer to Seizure Ratio (ASR)
- POI (Point of Interconnection) Congestion

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.

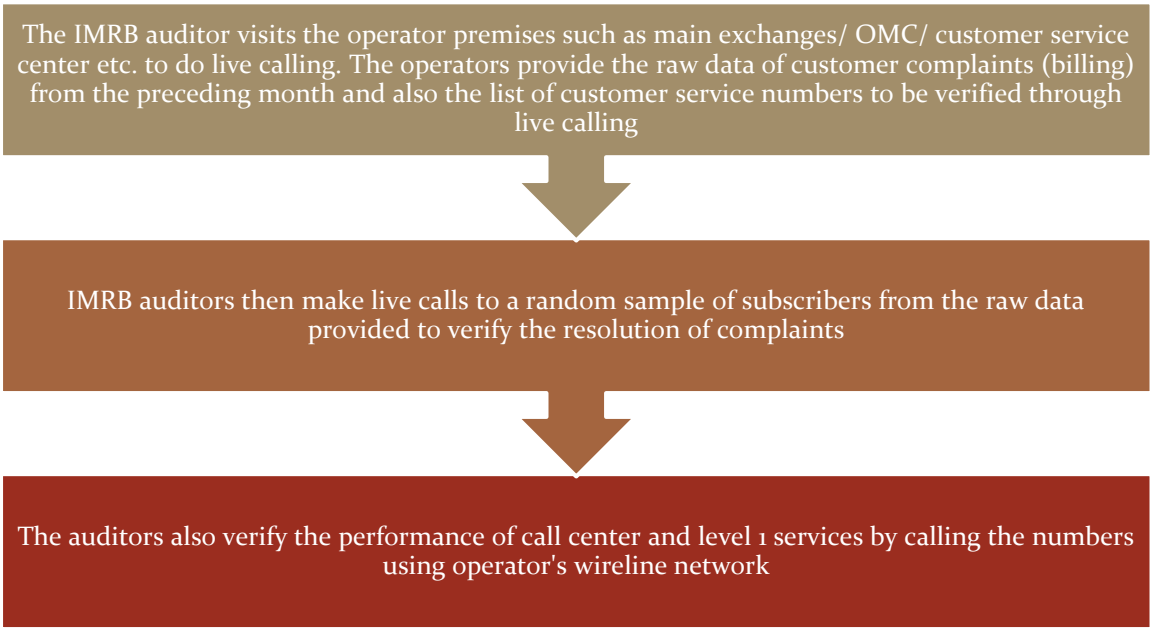
BSNL	Vodafone
15:00 - 16:00	17:00 - 18:00

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 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 576 exchanges in Assam circle. We are supposed to select a minimum of 5% (29 exchanges) as our sample. To maintain the geographical and urban-rural spread, a total of 30 exchanges have been selected for the audit.

Urban Exchanges Selected: 21

Rural Exchanges Selected: 9

Total SDCAs present in the circle: 46
As per sampling criteria, 10% SDCAs selected for audit: 5
To maintain geographical spread, actual SDCAs selected: 10
A list of the SDCAs selected for audit has been given below.

Nalbari	Silchar
Dibrugarh	Guwahati
Rangia	Mangaldoi
Bijoynagar	Tezpur
Hailakandi	Tinsukia

1.6.1.1 EXCHANGES SELECTED AS PER SAMPLING PLAN – BSNL

EXCHANGE	TYPE	EXCHANGE	TYPE
NALBARI	URBAN	SADARGHAT	URBAN
TIHU	URBAN	DHEKIAJULI	URBAN
GRAHAMBAZAR	URBAN	DOLABARI	URBAN
KHALIAMARI	URBAN	GOROIMARI	URBAN
MAKUM ROAD	URBAN	JOYMOTIPATHAR-TZP OCB	URBAN
TINSUKIA	URBAN	MANGALDOI	URBAN
DISPUR	URBAN	LAHOAL	RURAL
PANJABARI	URBAN	BAIHATA	RURAL
RANGIYA	URBAN	BIJOYNAGAR	RURAL
SILPUKURI	URBAN	MIRZA	RURAL
ULUBARI (OCB)	URBAN	ALGAPUR	RURAL
AMBICAPATTY	URBAN	KALAIN	RURAL
HAILAKANDI	URBAN	SIPAJHAR	RURAL
MEHERPUR	URBAN	THELEMARA	RURAL
PANCHGRAM	URBAN	CHAMATA	RURAL

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 Assam circle, with a parameter wise performance evaluation as compared to TRAI benchmark.

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

Parameters	Benchmarks	BSNL	Vodafone
Faults incidences (No. of faults/100 Subs./month) - averaged for the quarter	≤7	3.62	1.97
% of faults repaired by next working day	≥ 85% (Urban)	87.19%	95.40%
% of faults repaired within 5 days	100% (Urban)	100.00%	100.00%
Percentage of faults repaired by next working day during the quarter	≥ 75% (Rural)	84.29%	NA
Percentage of faults repaired within 7 days during the quarter	100% (Rural)	100.00%	NA
Faults pending for> 3days and ≤7 days	Rent rebate of 7 days	NA	NA
Faults pending for > 7 days and ≤15 days	Rent rebate of 15 days	NA	NA
Faults pending for > 15 days	Rent rebate of 1 month	NA	NA
Mean Time to Repair (MTTR)	≤ 10 Hrs	3.87	2.53
Call Completion Rate (CCR)	≥ 55%	68.00%	96.62%
Answer to Seizure ratio (ASR)	≥ 75%	NA	NA
No. of POIs with congestion > 0.5%	≤ 0.5%	0.00%	NA
Metering and billing credibility - Number of bills disputed during the quarter	≤ 0.1%	0.07%	0.00%
Resolution of billing complaints within 4 weeks	≥ 98%	95.90%	NA
Percentage complaints resolved within 6 weeks of date of receipt	100%	100.00%	NA
Period of applying credit / waiver	≤ 1 week	NA	NA
Closure within 7 days	100%	100.00%	NA
Refund of deposits within 60 days of closure of service	100%	81.46%	NA
Response time to customer for assistance	Benchmarks	BSNL	Vodafone
% age calls getting connected and answered	≥ 95%	96.77%	99.57%
Percentage of calls answered by the operators (voice to voice) within 90 seconds	≥ 95%	69.02%	100.00%

NA: Parameters not applicable for the operators.

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

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

2.1.1 FAULT INCIDENCE / CLEARANCE STATISTICS

BSNL and Vodafone met the benchmark for fault incidence.

BSNL and Vodafone met the benchmark of fault repair within next day and within 5 days in urban areas. BSNL also met the benchmark for fault repair within next day and within 7 days in rural areas.

BSNL and Vodafone met the benchmark for the Mean time to repair (MTTR).

Rent rebate not applicable for BSNL & Vodafone as all faults were repaired within stipulated time.

2.1.2 CALL COMPLETION RATE (CCR)

BSNL & Vodafone met the benchmark for CCR.

2.1.3 ANSWER TO SEIZURE RATIO (ASR)

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

2.1.4 POI (POINT OF INTERCONNECTION) CONGESTION

BSNL met the benchmark by reporting o% POIs with congestion.

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

2.1.5 METERING AND BILLING CREDIBILITY

BSNL and Vodafone 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; however the operator was able to meet the benchmark for resolution of billing complaints within 6 weeks.

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

2.1.7 PERIOD OF APPLYING CREDIT/ WAIVER

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

2.1.8 CLOSURE WITHIN 7 DAYS

BSNL met the benchmark for the parameter.

NA: Vodafone 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: Vodafone did not have any closure request during the audit period.

2.1.10 RESPONSE TIME TO CUSTOMER FOR ASSISTANCE

BSNL & Vodafone 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 not met by BSNL while Vodafone was able to meet the benchmark for the parameter.

2.2 3 DAY LIVE MEASUREMENT

Parameters	Benchmarks	BSNL	Vodafone
Call Completion Rate (CCR)	≥ 55%	76.99%	96.37%
Answer to Seizure ratio (ASR)	≥ 75%	NA	NA
POI Congestion	≤ 0.5%	0.00%	NA

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

2.2.1 CALL COMPLETION RATE (CCR)

BSNL & Vodafone met the benchmark for the parameter during live measurement.

2.2.2 ANSWER TO SEIZURE RATIO (ASR)

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

2.2.3 POI (POINT OF INTERCONNECTION) CONGESTION

BSNL met the benchmark by reporting 0% POIs with congestion.

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

2.3 LIVE CALLING

Parameters	Benchmarks	BSNL	Vodafone
Fault Repair/ Clearance			
% of faults repaired by next working day	≥ 85% (Urban)	78.69%	100.00%
Percentage cases where faults were repaired by next working day	≥ 75% (Rural)	77.36%	NA
% of faults repaired within 5 days	100% (Urban)	91.75%	100.00%
Percentage cases where faults were repaired within 7 days	100% (Rural)	86.79%	NA
Resolution of billing complaints			
Resolution of billing complaints within 4 weeks	≥ 98%	83.00%	NA
Percentage complaints resolved within 6 weeks of date of receipt	100%	91.00%	NA
Response time to customer for assistance			
% age calls getting connected and answered	≥ 95%	95.33%	100.00%
% age call answered by operator in 90 seconds	≥ 95%	39.33%	89.00%
Level 1 Services			
% age calls made to Level 1 services getting answered	≥ 90%	66.58%	98.00%

2.3.1 FAULTS REPAIR/ CLEARANCE

BSNL failed to meet the benchmark of fault repair within next day in urban 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. Vodafone met the benchmark of fault repair within next day and within 5 days in urban areas.

NA: Vodafone does 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. Live calling for Vodafone 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 BSNL & Vodafone met the benchmark of 95% IVR calls getting calls connected and answered. However, both operators failed to meet the benchmark of 95% calls getting answered (voice to voice) within 90 seconds.

2.3.4 LEVEL 1 SERVICES

BSNL failed to meet 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.

3 CRITICAL FINDINGS - AMJ'15

Resolution of billing complaints

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

Refund of deposit after closure

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

Response time for customer assistance

The benchmark of 95% of voice to voice calls answered within stipulated time of 90 seconds was not met by BSNL.

Live Calling

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

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

BSNL failed to meet the benchmark for Level 1 services.

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.

In case of POI for Vodafone, there is no direct POI from Wireline MSC. All Calls are getting routed via InterMSC TGs with GSM MSCs. So, Total number of working POI is not present in the wireline system of Vodafone.

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.

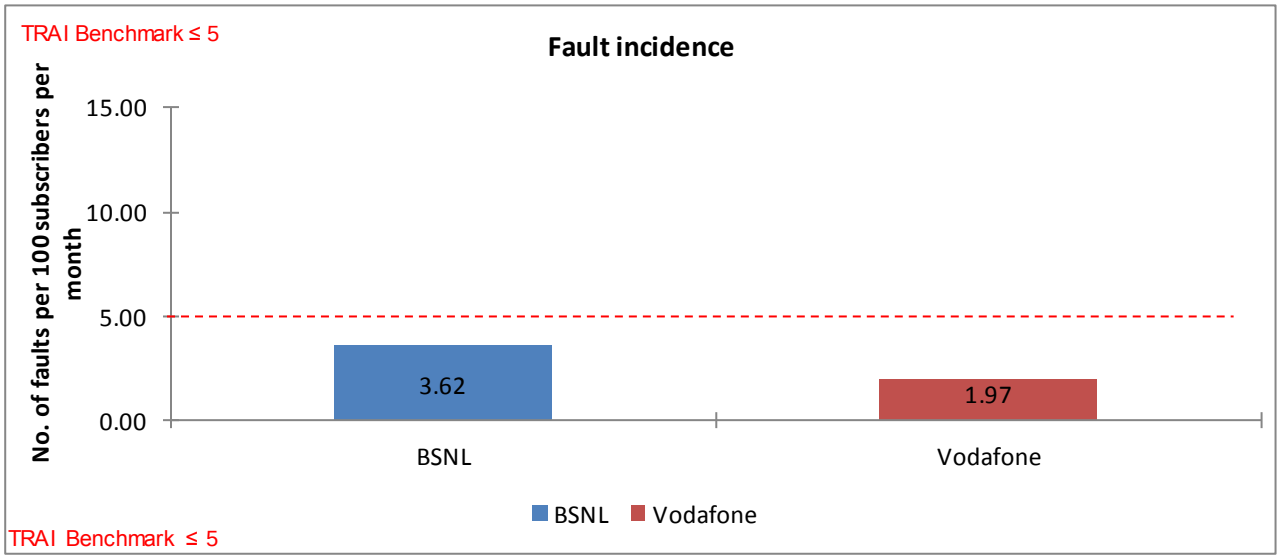
MTTR (Mean Time to Repair):

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

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

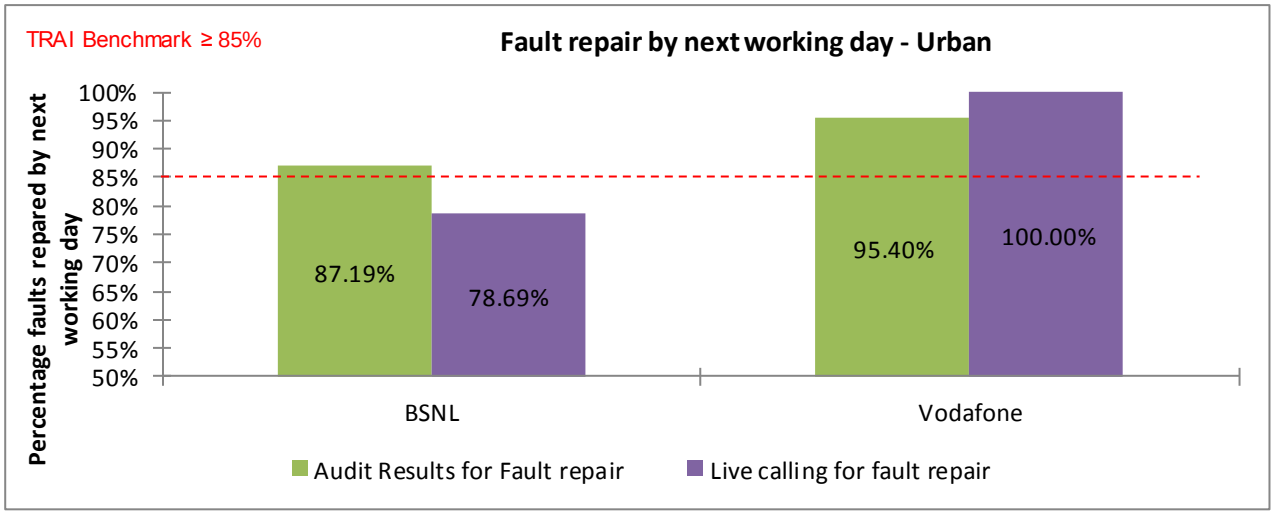
4.1.2 DETAILED FINDINGS - FAULT INCIDENCE



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

BSNL and Vodafone met the benchmark for fault incidence.

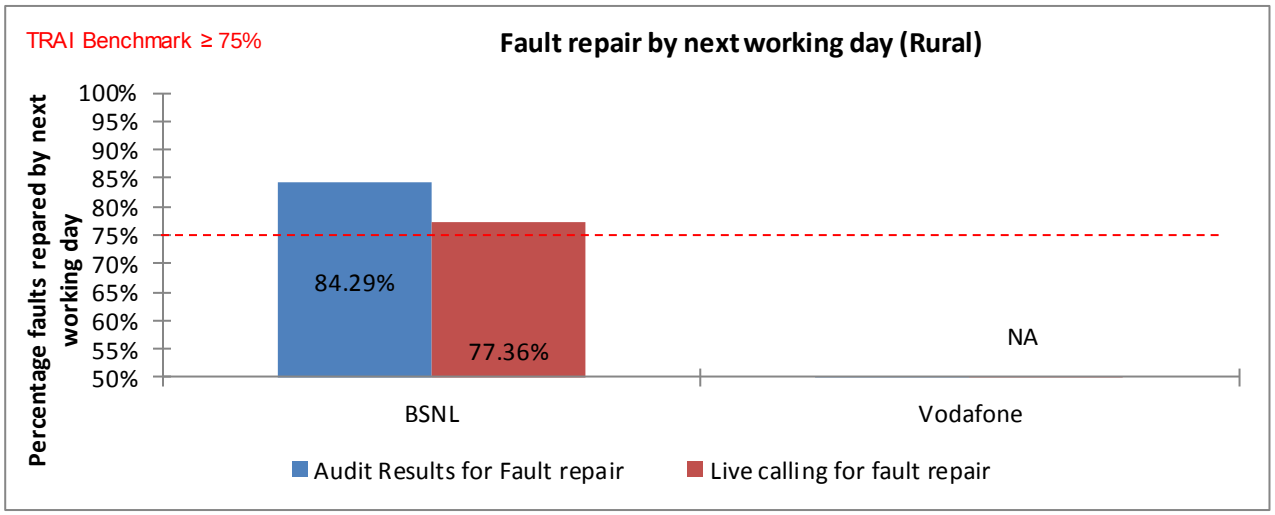
4.1.3 DETAILED FINDINGS - FAULT REPAIR BY NEXT DAY (URBAN)



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

BSNL & Vodafone met the benchmark of fault repair within next day in urban areas as per audit. However, during live calling, performance of BSNL was below the benchmark level.

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

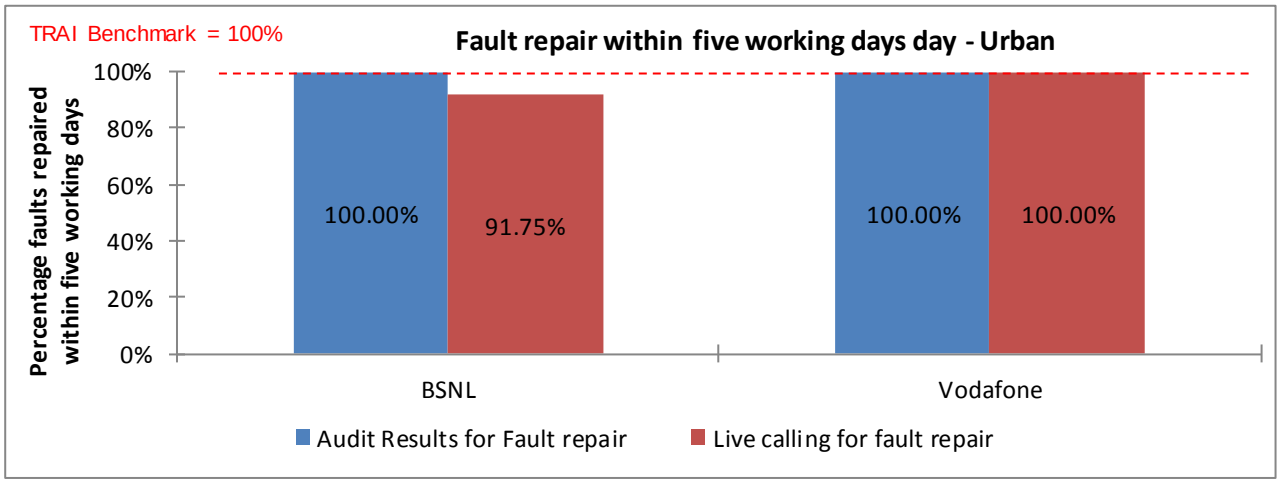


Data Source: Operations and Maintenance Center (OMC) of the operators

BSNL met the benchmark of fault repair within next day in rural areas.

NA: Vodafone does not have network presence in rural and hilly areas.

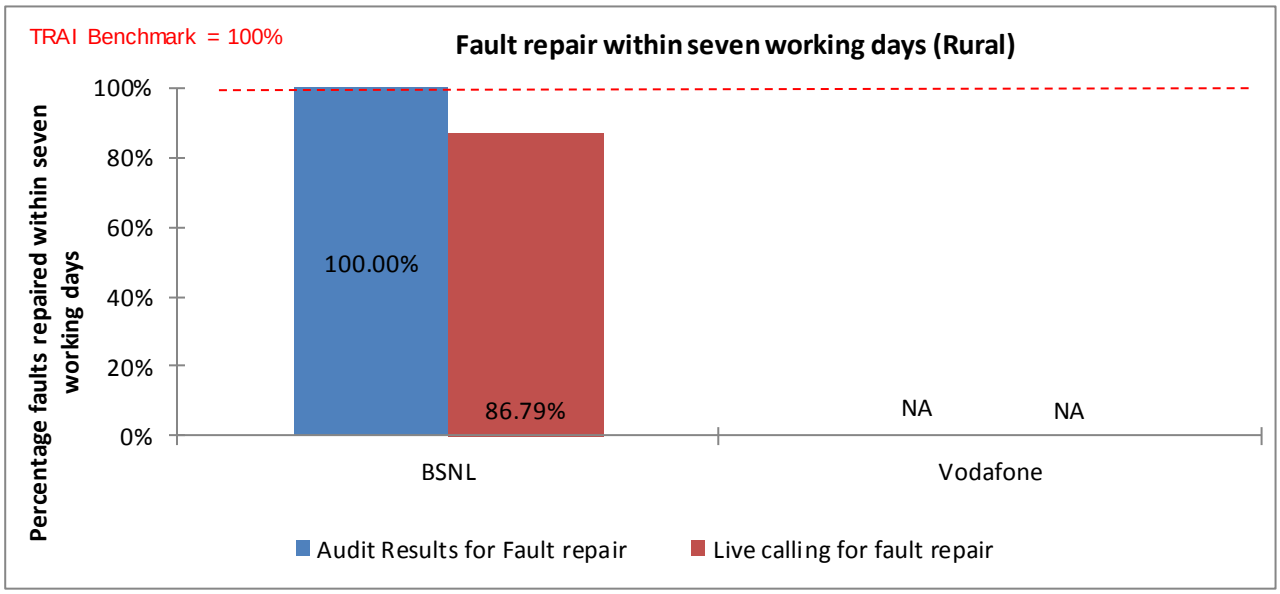
4.1.5 FINDINGS - FAULT REPAIR WITHIN FIVE WORKING DAYS (URBAN)



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

BSNL & Vodafone met the benchmark of fault repair within 5 days in urban areas as per audit. However, during live calling, performance of BSNL was below the benchmark level.

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

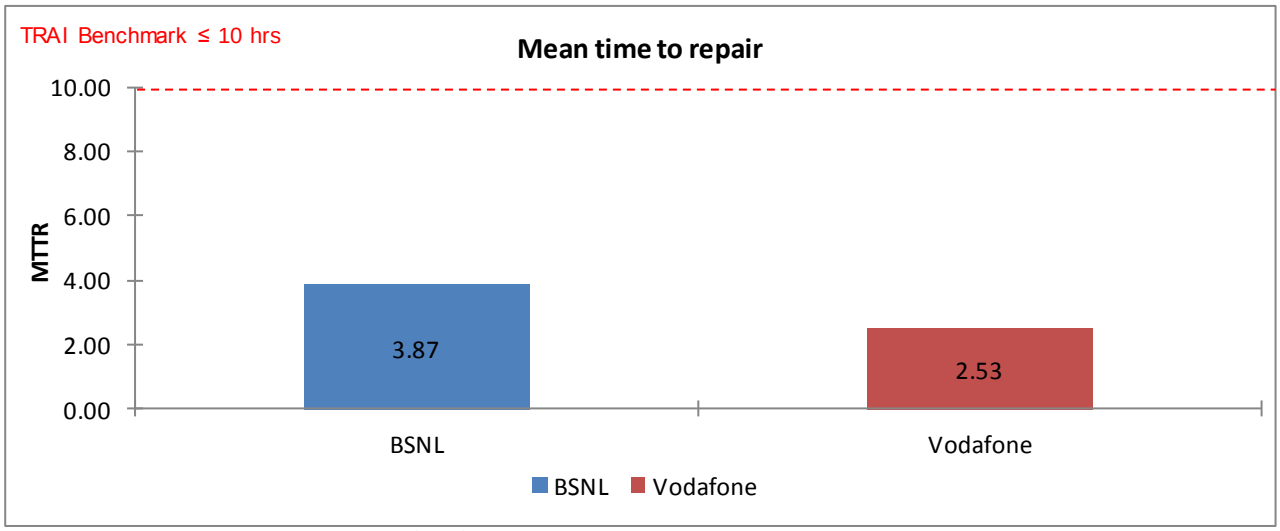


Data Source: Operations and Maintenance Center (OMC) of the operators

BSNL met the benchmark for parameter as per audit data. However, during live calling, performance of BSNL was below the benchmark level.

NA: Vodafone does not have network presence in rural and hilly areas.

4.1.7 DETAILED FINDINGS - MEAN TIME TO REPAIR



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

BSNL and Vodafone 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

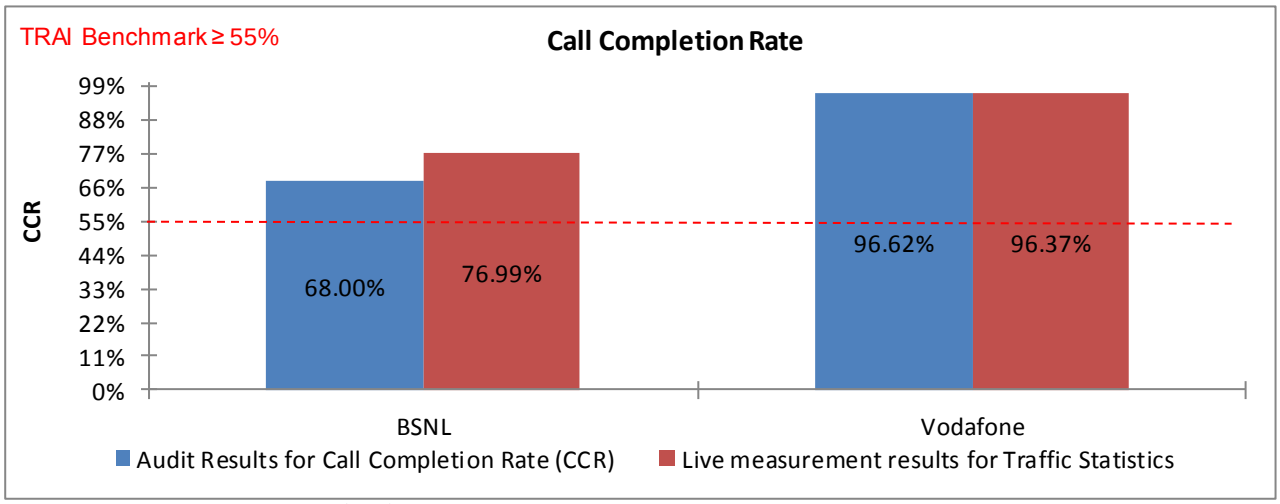
4.2.1.3 COMPUTATIONAL METHODOLOGY

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

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

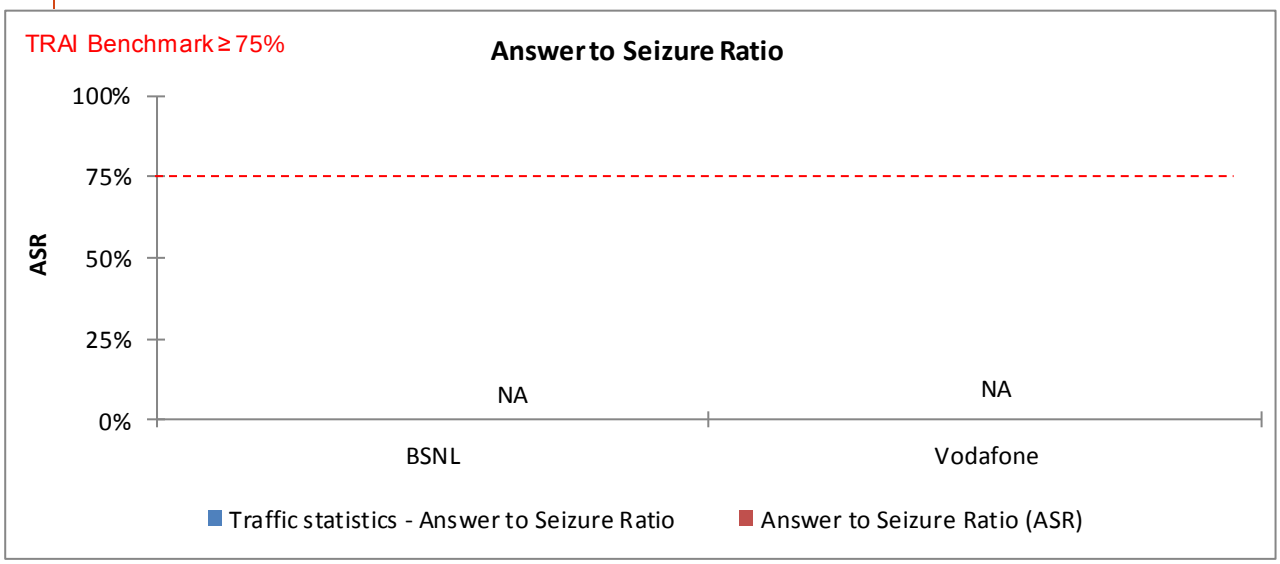
4.3.1.2 COMPUTATIONAL METHODOLOGY

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



NA: BSNL & Vodafone 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

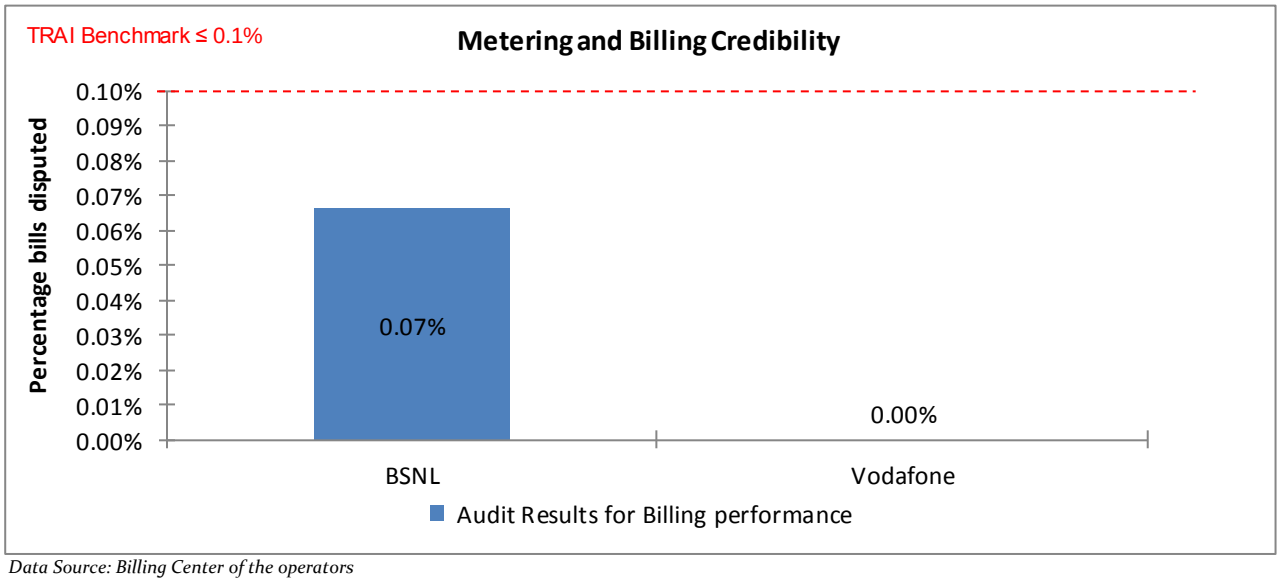
The calculation methodology (given below) as per QoS regulations 2009 (7 of 2009) was followed to calculate incidence of billing complaints.

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

- *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

BSNL and Vodafone 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 =

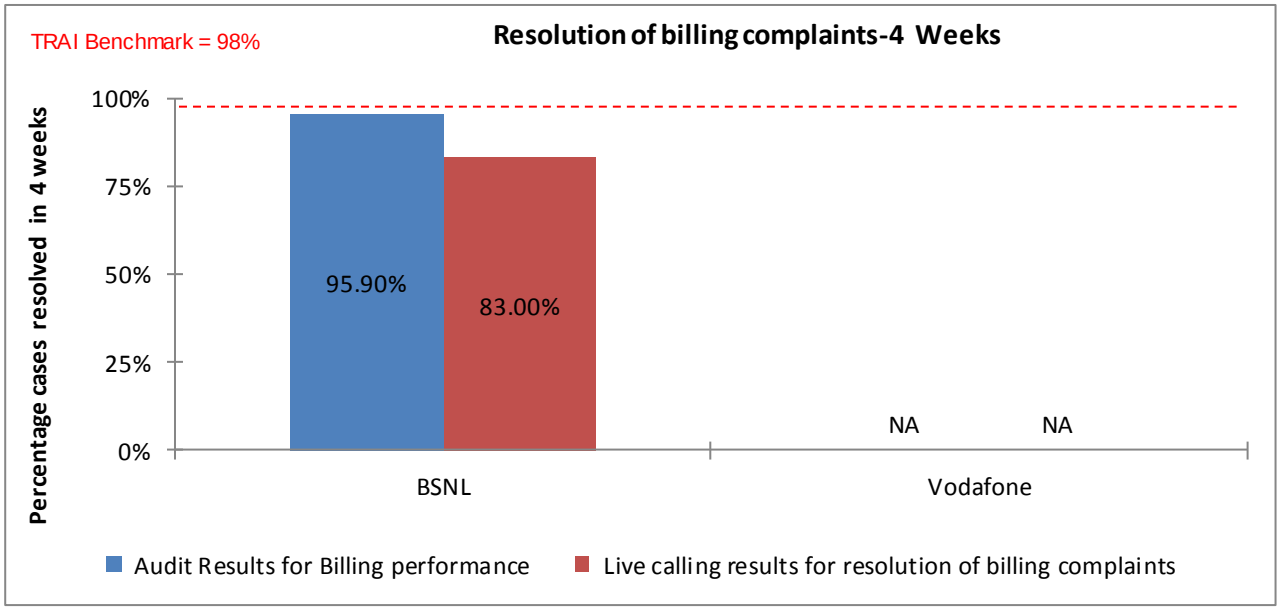
$$\frac{\text{number of billing complaints for post-paid customers/charging, credit/ validity complaints for pre-paid customers resolved within 6 weeks during the quarter}}{\text{number of billing/charging, credit / validity complaints received during the quarter}} \times 100$$

- **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.

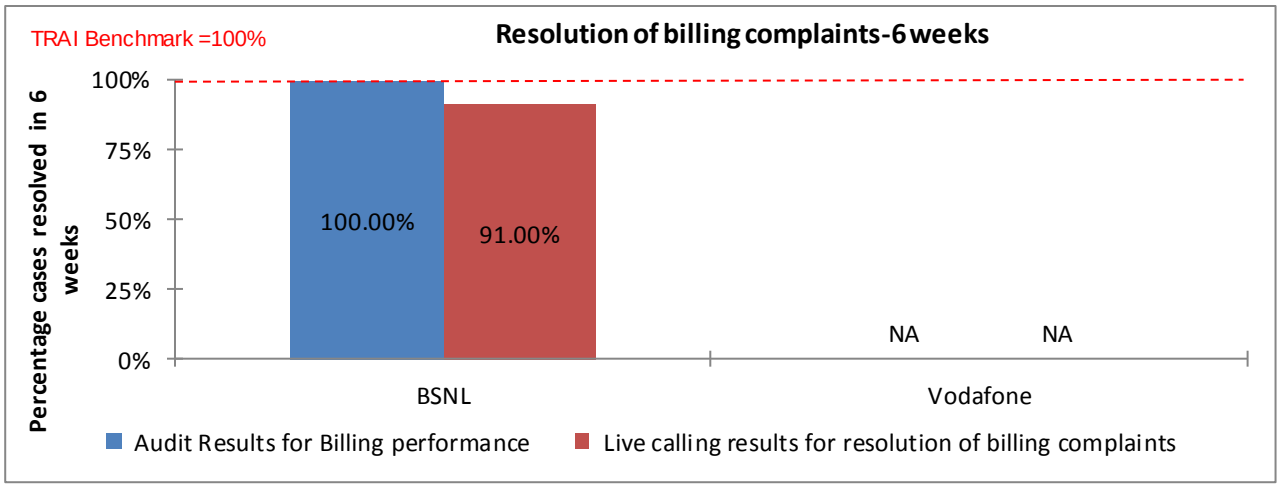
↳ *** Date of resolution in this case would refer to the date when a communication has taken place from the operator's end to inform the complainant about the final resolution of the issue / dispute.

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

4.4.1.5 RESOLUTION OF BILLING COMPLAINTS – AUDIT FINDINGS



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



BSNL met the benchmark for the parameter as per audit data. However, during live calling, it was observed that BSNL failed to meet the benchmark of resolving complaints within 6 weeks.

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

4.4.1.6 COMPUTATION METHODOLOGY - 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.

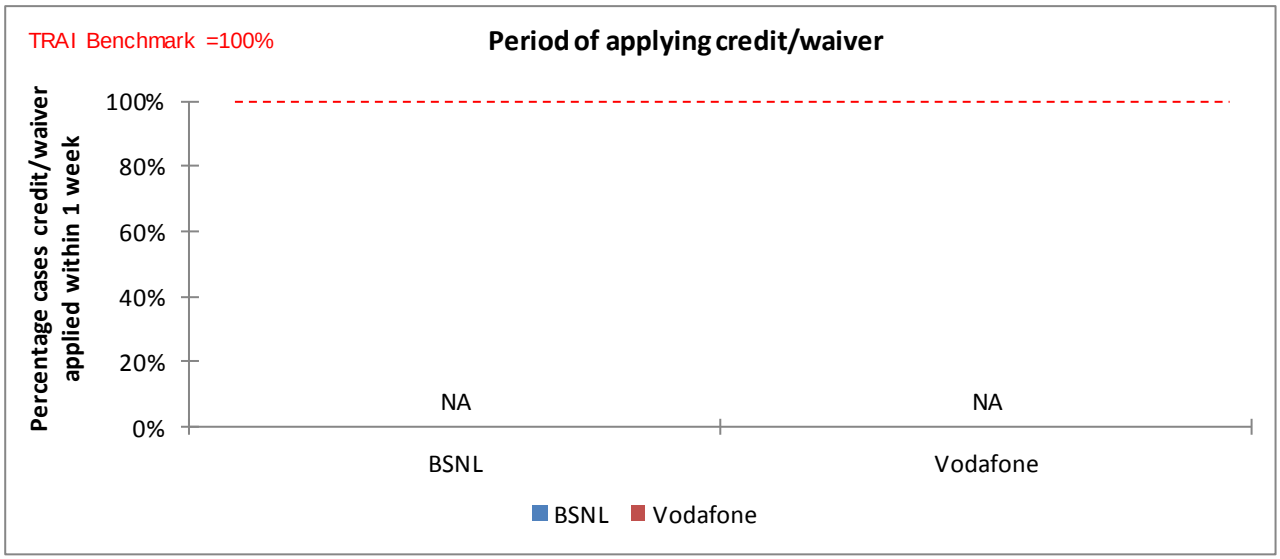
- Computational Methodology:

- 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



NA: BSNL and Vodafone 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.

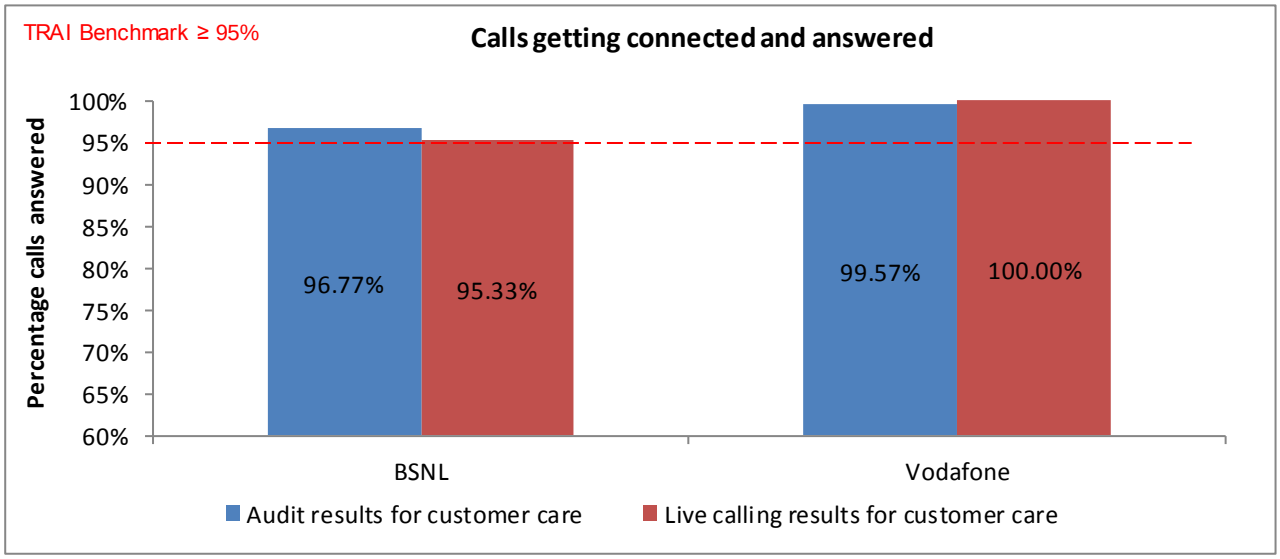
4.5.1.2 COMPUTATIONAL METHODOLOGY

- **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

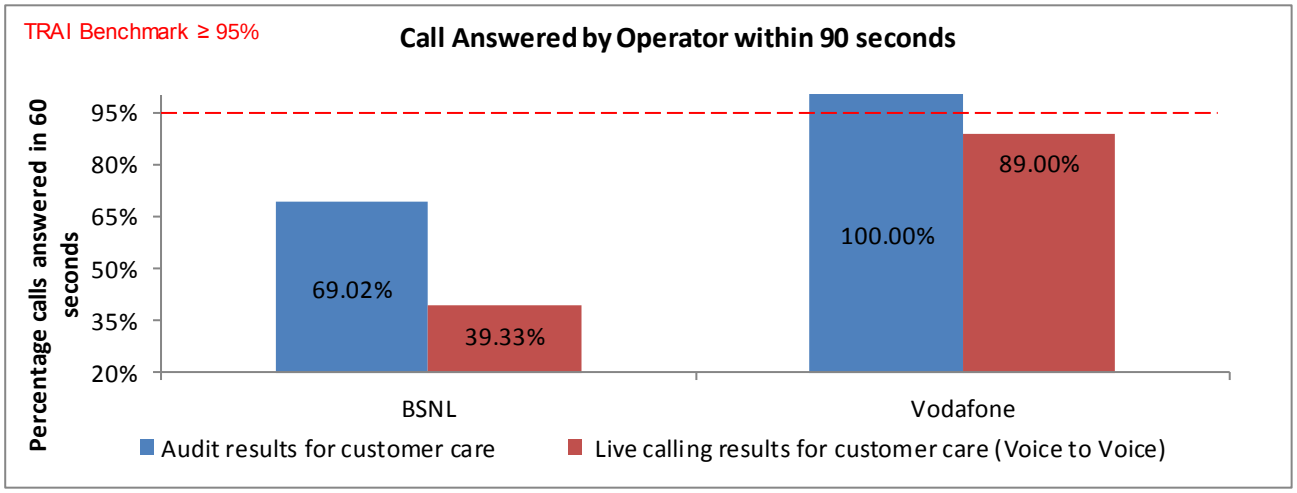
4.5.2 CALLS GETTING CONNECTED AND ANSWERED



Data Source: Customer Service Center of the operators

BSNL and Vodafone met the TRAI benchmark in terms of number of IVR calls being connected and answered.

4.5.3 CALL ANSWERED BY OPERATOR WITHIN 90 SECONDS



Data Source: Customer Service Center of the operators

The benchmark of getting 95% of voice to voice calls answered within stipulated time of 90 seconds was not met by BSNL during audit as well as live calling.

Vodafone met the benchmark for the parameter during audit, however it remained below the benchmark during live calling.

4.6 CUSTOMER CARE PROMPTNESS

4.6.1 PARAMETER EXPLANATION

4.6.1.1 AUDIT PROCEDURE

IMRB Auditors collected and verified data pertaining to -

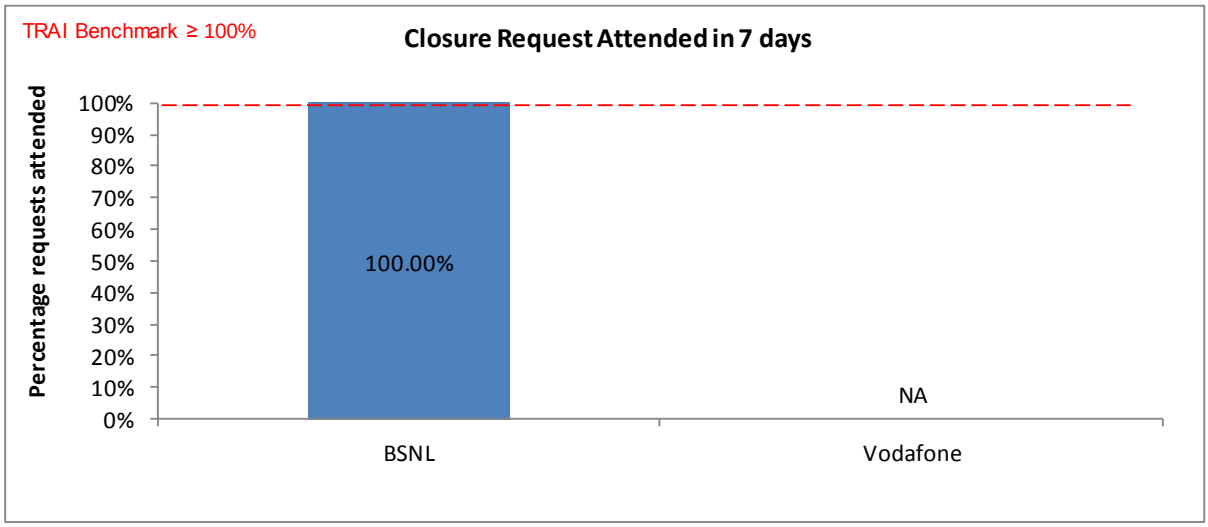
Processing of closure request (Following key points were taken care of while verifying the data)

- 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 met the benchmark for the parameter.

NA: The parameter is not applicable for Vodafone as there were no closure requests made 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

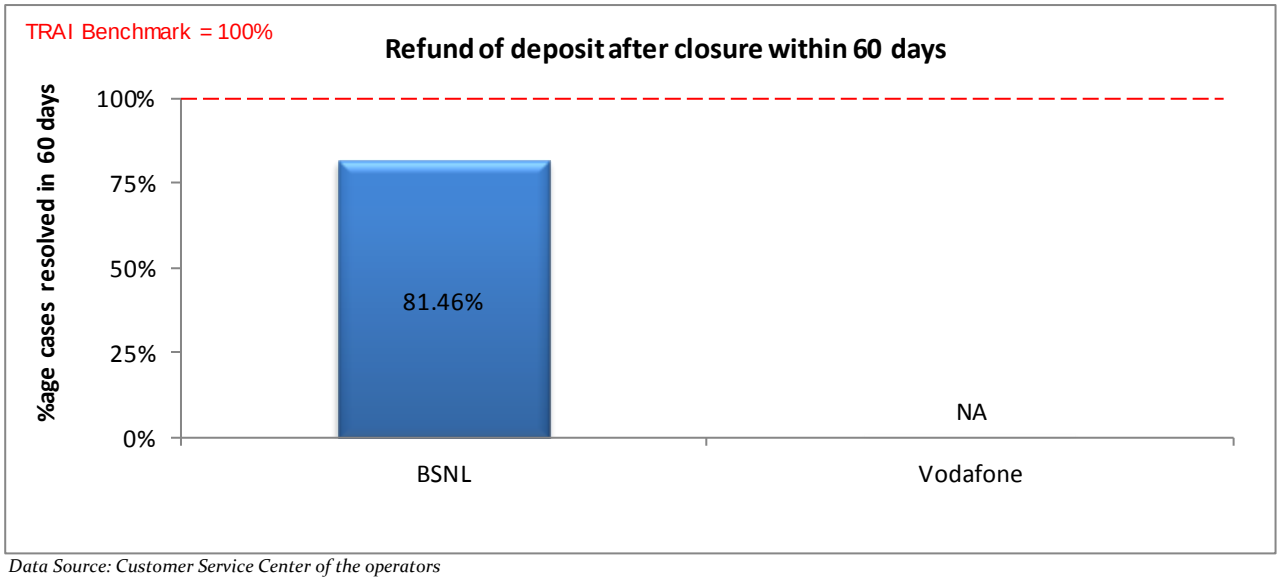
4.7.1.2 COMPUTATIONAL METHODOLOGY

- **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: Vodafone 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	Vodafone
Faults incidences (Urban)	≤ 7	3.62	1.97
Fault repair (Urban areas)	Benchmark	BSNL	Vodafone
Total No. of faults registered during the quarter		14361	87
No. of faults repaired by next working day during the quarter		12522	83
Percentage of faults repaired by next working day during the quarter	≥ 85%	87.19%	95.40%
No. of faults repaired within 5 days during the quarter		14361	87
Percentage of faults repaired within 5 days during the quarter	100%	100.00%	100.00%

Audit Results for Fault repair			
Fault incidences	Benchmark	BSNL	Vodafone
Faults incidences (Urban)	≤ 7	3.62	1.97
Fault repair (Urban areas)	Benchmark	BSNL	Vodafone
Total No. of faults registered during the quarter		14361	87
No. of faults repaired by next working day during the quarter		12522	83
Percentage of faults repaired by next working day during the quarter	≥ 85%	87.19%	95.40%
No. of faults repaired within 5 days during the quarter		14361	87
Percentage of faults repaired within 5 days during the quarter	100%	100.00%	100.00%

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

Audit Results for Fault repair			
Fault incidences	Benchmark	BSNL	Vodafone
Faults incidences (Urban)	≤ 7	3.62	1.97
Fault repair (Urban areas)	Benchmark	BSNL	Vodafone
Total No. of faults registered during the quarter		14361	87
No. of faults repaired by next working day during the quarter		12522	83
Percentage of faults repaired by next working day during the quarter	≥ 85%	87.19%	95.40%
No. of faults repaired within 5 days during the quarter		14361	87
Percentage of faults repaired within 5 days during the quarter	100%	100.00%	100.00%

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

Rent rebate	Benchmark	BSNL	Vodafone
No. of cases with faults pending for >5 days and ≤7 days		NA	NA
Out of these number of cases where rent rebate for 7 days was given		NA	NA
Percentage of cases where rent rebate for 7 days was given	100%	NA	NA
No. of cases with faults pending for >7 days and ≤15 days		NA	NA
Out of these number of cases where rent rebate for 15 days was given		NA	NA
Percentage of cases where rent rebate for 15 days was given	100%	NA	NA
No. of cases with faults pending for ≥15 days		NA	NA
Out of these number of cases where rent rebate for 30 days was given		NA	NA
Percentage of cases where rent rebate for 30 days was given	100%	NA	NA

NA: Rent rebate not applicable for BSNL and Vodafone as all fault were repaired by the operator within five days in urban areas and within seven days in rural areas.

Live calling for fault repair			
Urban area	Benchmark	BSNL	Vodafone
Total Number of calls made		291	40
Number of cases where faults were repaired by next working day		229	40
Percentage cases where faults were repaired by next working day	≥ 85%	78.69%	100.00%
Number of cases where faults were repaired within 5 days		267	40
Percentage cases where faults were repaired within 5 days	100%	91.75%	100.00%
Fault Repair (Rural & Hilly areas)	Benchmark	BSNL	Vodafone
Total Number of calls made		53.00	NA
Number of cases where fauls were repaired by next working day		41.00	NA
Percentage cases where faults were repaired by next working day	≥ 75%	77.36%	NA
Number of cases where faults were repaired within 7 days		46.00	NA
Percentage cases where faults were repaired within 7 days	100%	86.79%	NA

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

NA: Vodafone does not have network presence in rural and hilly areas.

5.2 TRAFFIC STATISTICS

Audit Results for Call Completion Rate (CCR)			
Traffic statistics - Call Completion Rate	Benchmark	BSNL	Vodafone
Total local call attempts		4859755	671812
Total number of successful local calls		3304451	649101
Call Completion Rate (CCR) in the local network	≥ 55%	68.00%	96.62%
Traffic statistics - Answer to Seizure Ratio	Benchmark	BSNL	Vodafone
Total number of calls processed by the switch		NA	NA
Total number of calls answered		NA	NA
Answer to Seizure Ratio (ASR)	≥ 75%	NA	NA
Live measurement results for Traffic Statistics			
Traffic statistics - Call Completion Rate	Benchmark	BSNL	Vodafone
Total local call attempts		503948	59865
Total number of successful local calls		387998	57694
Call Completion Rate (CCR) in the local network	≥ 55%	76.99%	96.37%
Traffic statistics - Answer to Seizure Ratio	Benchmark	BSNL	Vodafone
Total number of calls processed by the switch		NA	NA
Total number of calls answered		NA	NA
Answer to Seizure Ratio (ASR)	≥ 75%	NA	NA

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

NA: BSNL and Vodafone 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	Vodafone
Total capacity of all POIs (Average of 3 months)		28054	NA
Served traffic for all POI's (Average of 3 months)		18308	NA
Traffic failed on all POI's (Average of 3 months)	≤ 0.5%	0.00%	NA
POI congestion	Benchmark	BSNL	Vodafone
No. of POIs not meeting benchmark (Avg. of 3 months)		0	NA
Total number of working POIs (Avg. of 3 months)		15	NA
Audit Results for POI Congestion - April			
POI congestion	Benchmark	BSNL	Vodafone
Total capacity of all POIs		28146	NA
Served traffic for all POI's		18684	NA
Traffic failed on all POI's	≤ 0.5%	0.00%	NA
POI congestion	Benchmark	BSNL	Vodafone
No. of POIs not meeting benchmark		0	NA
Total number of working POIs		15	NA

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

Audit Results for POI Congestion - May			
POI congestion	Benchmark	BSNL	Vodafone
Total capacity of all POIs		28994	NA
Served traffic for all POI's		18752	NA
Traffic failed on all POI's	≤ 0.5%	0.00%	NA
POI congestion	Benchmark	BSNL	Vodafone
No. of POIs not meeting benchmark		0	NA
Total number of working POIs		15	NA
Audit Results for POI Congestion - June			
POI congestion	Benchmark	BSNL	Vodafone
Total capacity of all POIs		27022	NA
Served traffic for all POI's		17488	NA
Traffic failed on all POI's	≤ 0.5%	0.00%	NA
POI congestion	Benchmark	BSNL	Vodafone
No. of POIs not meeting benchmark		0	NA
Total number of working POIs		15	NA
Live measurement results for POI congestion			
POI congestion	Benchmark	BSNL	Vodafone
Total capacity of all POIs		27022	NA
Served traffic for all POI's		18564	NA
Traffic failed on all POI's	≤ 0.5%	0.00%	NA
POI congestion	Benchmark	BSNL	Vodafone
No. of POIs not meeting benchmark		0	NA
Total number of working POIs		15	NA

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

NA: In case of POI for Vodafone, there is no direct POI from Wireline MSC. All Calls are getting routed via InterMSC TGs with GSM MSCs. So, Total number of working POI is not present in the wireline system of Vodafone. 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	Vodafone
Billing diputes			
Total bills generated during the quarter		368201	114
Total number of bills disputed		244	0
Percentage bills disputed (Average of 3 billing cycles)	≤ 0.1%	0.07%	0.00%
Audit Results for Billing performance - Billing Cycle Wise			
Total bills generated (Cycle 1)		123851	38
Total number of bills disputed (Cycle 1)		50	0
Percentage bills disputed (Cycle 1)	≤ 0.1%	0.04%	0.00%
Total bills generated (Cycle 2)		123432	38
Total number of bills disputed (Cycle 2)		94	0
Percentage bills disputed (Cycle 2)	≤ 0.1%	0.08%	0.00%
Total bills generated (Cycle 3)		120918	38
Total number of bills disputed (Cycle 3)		100	0
Percentage bills disputed (Cycle 3)	≤ 0.1%	0.08%	0.00%
Resolution of billing complaints			
Total number of billing/charging complaints		244	NA
Total complaints resolved in 4 weeks from date of receipt		234	NA
Percentage complaints resolved within 4 weeks of date of receipt	≥ 98%	95.90%	NA
Total complaints resolved in 6 weeks from date of receipt		234	NA
Percentage complaints resolved within 6 weeks of date of receipt	100%	100.00%	NA

Data Source: Billing Center of the operators

NA: Resolution of complaints parameter not applicable for Vodafone 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		NA	NA
No. of complaints disposed on account of not considered as valid complaints		NA	NA
Percentage cases in which credit/waiver was received within 1 week	100%	NA	NA
Number of cases resolved in 6 weeks		NA	NA
Percentage cases resolved in 6 weeks	100%	NA	NA

Data Source: Billing Center of the operators

NA: BSNL & Vodafone 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	Vodafone
Total Number of calls made		100	NA
Number of cases resolved in 4 weeks		83	NA
Percentage cases resolved in 4 weeks	≥ 98%	83.00%	NA
Total complaints resolved in 6 weeks from date of receipt		91	NA
Percentage complaints resolved within 6 weeks of date of receipt	100%	91.00%	NA

Live calling for Vodafone 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	Vodafone
Total no. of call attempts to call centre / customer care nos.		14322	2797
No. of calls connected and answered successfully to call centre / customer care nos.		13859	2785
Percentage of calls getting connected and answered electronically	≥ 95%	96.77%	99.57%
Audit results for customer care (voice to voice)			
Total no. of call attempts to call centre / customer care (voice to voice)		11435	2785
No. of calls connected and answered successfully to call centre / customer care nos.		7893	2785
Percentage of calls answered by the operators (voice to voice) within 90 seconds (Avg of 3 months)	≥ 95%	69.02%	100.00%

Data Source: Customer Service Center of the operators

5.6 CUSTOMER CARE - PROMPTNESS IN ATTENDING CUSTOMER REQUEST

Audit Results for Closure Requests			
Closure Requests	Benchmark	BSNL	Vodafone
Total no. of requests received for Closures		7746	NA
Total no. of requests for closures attended within 7 days		7746	NA
Percentage of requests for closures attended within 7 days	100%	100.00%	NA
Total no. of requests for closures not attended or attended beyond 7 days		NA	NA

Data Source: Customer Service Center of the operators

NA: Vodafone 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	Vodafone
Total number of cases requiring refund of deposits		205.00	NA
Total number of cases where refund was made within 60 days		167.00	NA
Percentage cases in which refund was receive within 60 days	100%	81.46%	NA

Data Source: Billing Center of the operators

NA: Vodafone 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	Vodafone
Total no. of calls made		3106.00	200.00
Calls answered		2068.00	196.00
Percentage of Calls answered	≥ 90%	66.58%	98.00%

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

5.8.1 SSA WISE LIVE CALLS MADE FOR LEVEL 1 SERVICES - BSNL

Live calling for Level 1 services					
	(Bongaigaon SSA)	(Tezpur SSA)	(Dibrugarh SSA)	(Silchar SSA)	(Kamrup SSA)
Total no. of calls made	257	723	619	842	551
Calls answered	178	495	401	537	378

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

5.9 EXCHANGE CAPACITY AND SUBSCRIBERS – SAMPLE EXCHANGES

Exchange capacity and Subscribers			
Exchange Capacity & Subscribers		BSNL	Vodafone
Equipped Capacity of the exchange (in erlangs)		568966	10000
Total number of customers served		165359	4410

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 January, February and March 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

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