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

Prepared By -

Prepared For-

IMRB International | eTech

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 September 20, 2009 and Quality of Service of Broadband Service Regulations, 2006 (11 of 2006) dated July 6, 2006 that provide the benchmarks for the parameters on customer perception of service to be achieved by service provider.

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

2.2 OBJECTIVES

The primary objective of the Audit module is to-

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

2.3 COVERAGE

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

Image Source: BSNL website

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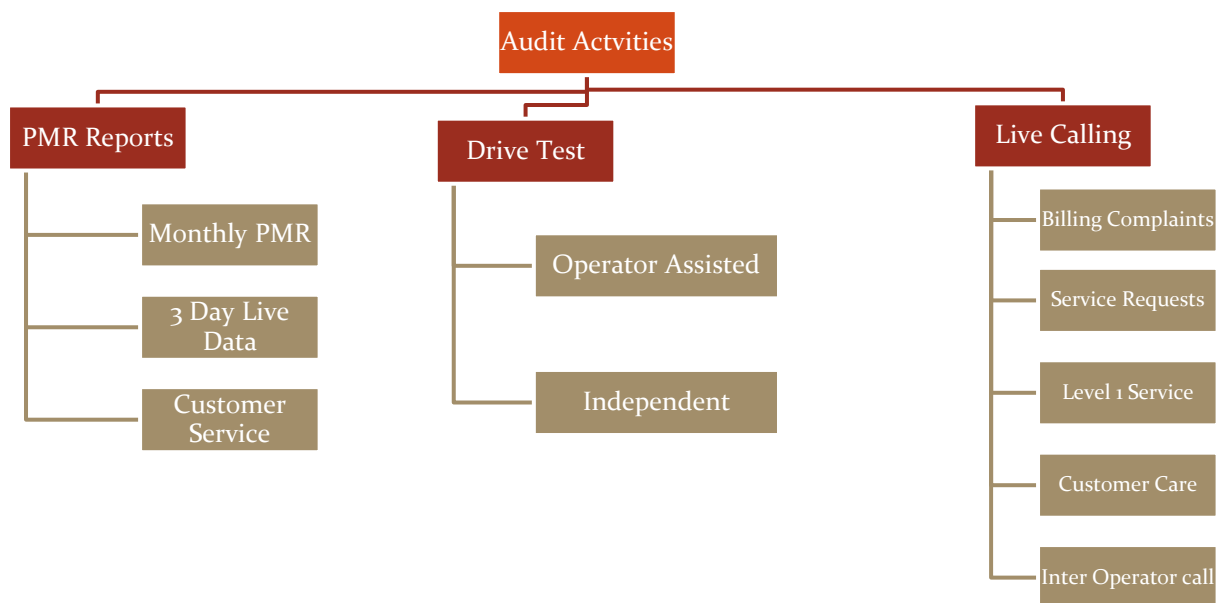
Let's discuss each of the activity in detail and the methodology adopted for each of the module.

2.4.1 PMR REPORTS

2.4.1.1 SIGNIFICANCE AND METHODOLOGY

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

The 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/ Billing /Customer Service etc).

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 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, August 2015 audit data was collected in the month of September 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 September 2015 (JAS'15) was collected in the month of Oct 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 July, August and September 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.
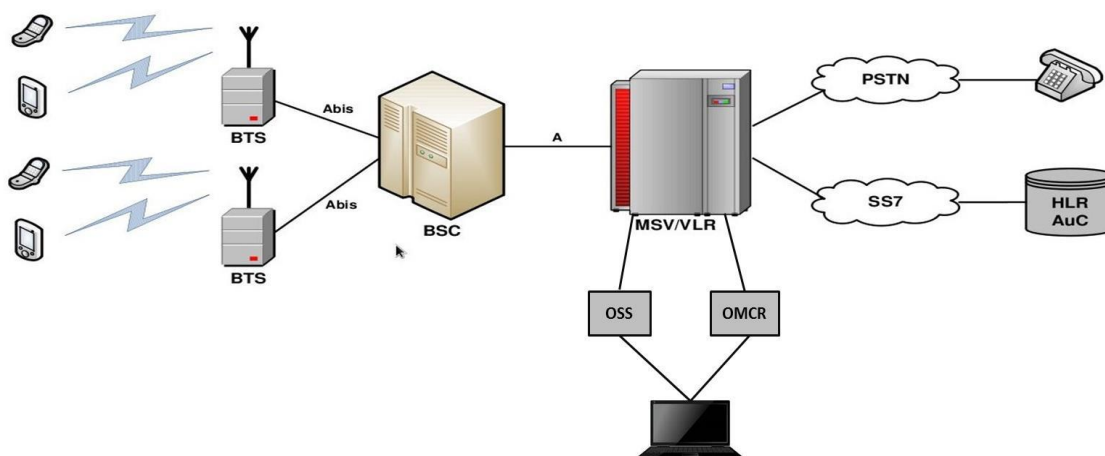
2.4.1.5   STEP BY STEP AUDIT PROCEDURE

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

Tender document and latest list of licencees as per TRAI is taken as a reference document for assimilating the presence of operators. All the wireless operators are then contacted for the purpose of audit.

Audit formats and schedule is shared with the operators in advance. Details include day of the visit and date of 3 day data collection and other requirements.

IMRB auditors visit the operator's server/exchange/central NOC to extract data from operator's systems. Operator personnel assist the auditor in extraction process.

The extracted data is validated and verfied by the IMRB auditors.

IMRB auditors then prepare a PMR report from the extracted data with assistance from the operator.

IMRB auditors validate the values with raw data and also provide their comments, wherever required.

The final audit or PMR sheet is signed by the operator person in-charge along with authorized stamp.

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% = $[(A_1 \times C_1) + (A_2 \times C_2) +.......+ (A_n \times C_n)] / (A_1 + A_2 +...+ A_n)$ Where: A_1 = Number of attempts to establish SDCCH / TCH made on day 1
TCH Congestion	C_1 = Average SDCCH / TCH Congestion % on day 1 A_2 = Number of attempts to establish SDCCH / TCH made on day 2 C_2 = Average SDCCH / TCH Congestion % on day 2 A_n = Number of attempts to establish SDCCH / TCH made on day n C_n = Average SDCCH / TCH Congestion % on day n
POI Congestion	POI Congestion% = $[(A_1 \times C_1) + (A_2 \times C_2) +.......+ (A_n \times C_n)] / (A_1 + A_2 +...+ A_n)$ Where: A_1 = POI traffic offered on all POIs (no. of calls) on day 1 C_1 = Average POI Congestion % on day 1 A_2 = POI traffic offered on all POIs (no. of calls) on day 2 C_2 = Average POI Congestion % on day 2 A_n = POI traffic offered on all POIs (no. of calls) on day n C_n = 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:

Day wise raw data is fetched from the operator's OMCR and kept in a readable format (preferably MS-Excel). Data for a period of 90 days is used to identify TCBH.

The 90 day period is decided upon the basis of month of audit. For example, for audit of Aug 2015, the 90 day period data used to identify TCBH would be the data of Jun, Jul & Aug 2015

For each day, the hour in which average traffic of the resource group concerned is greatest for the day will be the 'Busy Hour' for the operator.

The modal frequency of the busy hour is calculated for 90 days period and the hour with highest modal frequency will be considered as TCBH for the operator

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

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

2.4.1.9   CBBH – SIGNIFICANCE AND SELECTION METHODOLOGY

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

Step by step procedure to identify CBBH for an operator:

Day wise raw data is fetched from the operator's OMCR and kept in a readable format (preferably MS-Excel). Data for a period of 90 days is used to identify CBBH.

For each day, the hour in which a cell in cellular mobile telephone network experiences maximum traffic for the day will be the 'Busy Hour' for the operator.

The 90 day period is decided upon the basis of month of audit. For example, for audit of Aug 2015, the 90 day period data used to identify CBBH would be the data of Jun, Jul and Aug 2015

The modal frequency of the busy hour is calculated for 90 days period and the hour with highest modal frequency will be considered as CBBH for the operator

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 September 2015 (JAS'15) was collected in the month of Oct 2015. To extract the data for customer service parameters for the purpose of audit, IMRB auditors primarily visit the following locations/ departments/ offices at the operator's end.

- Central Billing Center
- Central Customer Service Center

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

The Customer Service Quality Parameters include the following:

- Metering and billing credibility (postpaid and prepaid)
- Resolution of billing/charging complaints

- Period of applying credit/waiver/adjustment to customer's account
- Response time to the customer for assistance
- Termination/closure of service
- Time taken for refund of security deposit after closures.

Most of the customer service parameters were calculated by averaging over the quarter; however billing parameters were calculated by averaging over one billing cycle for a quarter.

All the parameters have been described in detail along with key findings of the parameter in section 6 of the report. The benchmark values for each parameter have been given in the table below.

2.4.1.11   AUDIT PARAMETERS – CUSTOMER SERVICE

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

2.4.1.12   CALCULATION METHODOLOGY – CUSTOMER SERVICE PARAMETERS

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

2.4.2 LIVE CALLING

2.4.2.1 SIGNIFICANCE AND METHODOLOGY

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

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

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

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

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

Live calling activity was carried out during the period of September 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 August 2015 was considered for live calling activity conducted in September 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 September, 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.

In JAS'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

- ꝥ Calls getting connected and answered within by operator's IVR.
- ꝥ % 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.

- ꝥ 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.
- ꝥ Time to answer the call by the operator was assessed from the time interviewer pressed the requisite button for being assisted by the operator.
- ꝥ 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.
- ꝥ Operator Assisted Drive Test
- ꝥ 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-
    o   With In city
    o   Major Roads
    o   Highways
    o   Shopping complex/ Mall
    o   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.

- ꙮ Special emphasis was given to those areas where the number of complaints received were on the higher side, if provided by TRAI.
- ꙮ 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).
- ꙮ The route was classified as-
    - o With In city
    - o Major Roads
    - o Highways
    - o Shopping complex/ Mall
    - o Office Complex/ Government Building
- ꙮ There were no fixed calls which we need to do for within city, major roads and highways, but a minimum of 30 calls in each route, i.e., within city, major roads and highways on each day. For indoors, 20 calls each for shopping and office complex each day preferably in relatively bigger city.
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- ꙮ The speed of the vehicle was kept at around 30 km/hr.
- ꙮ The holding period of each test call was 120 seconds.
- ꙮ A test call was generated 10 seconds after the previous test call is completed.
- ꙮ 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.

- ꙮ 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
- ꙮ 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
- ꙮ Voice quality (GSM)
    - ✓ Total RxQual Samples– A
    - ✓ RxQual samples with 0-5 value – B
    - ✓ %age samples with good voice quality = B/A x 100
- ꙮ 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)	2447855
Airtel	8924350
BSNL	4067135
Idea	1380752
Reliance CDMA	235016
Reliance GSM	4099523
TATA CDMA	96497
TATA GSM	1521562
Vodafone	3305008

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

2.6   COLOUR CODES TO READ THE REPORT

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

3 EXECUTIVE SUMMARY

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

3.1 PMR DATA – 3 MONTHS- CONSOLIDATED

Name of Service Provider	Network Availability		Connection Establishment (Accessibility)			Connection Maintenance (Retainability)		
	BTSs Accumulated downtime (not available for service)	Worst affected BTSs due to downtime	Call Set-up Success Rate (within licensee's own network)	SDCCH/ Paging Chl. Congestion	TCH Congestion	Call Drop Rate (%age)	Worst affected cells having more than 3% TCH drop	%age of connection with good voice quality
Benchmark	≤ 2%	≤ 2%	≥ 95%	≤ 1%	≤ 2%	≤ 2%	≤ 3%	≥ 95%
Aircel(DWL)	1.57%	5.48%	97.37%	0.60%	1.92%	1.65%	12.85%	95.26%
Airtel	0.12%	0.07%	97.34%	0.40%	1.78%	1.04%	1.57%	96.05%
BSNL	0.61%	0.82%	98.86%	0.50%	1.77%	1.82%	3.20%	96.26%
Idea	0.31%	1.23%	99.15%	0.20%	0.28%	0.42%	1.32%	96.75%
Reliance CDMA	0.32%	1.05%	99.69%	NA	0.00%	0.37%	2.23%	99.75%
Reliance GSM	0.06%	0.09%	98.29%	0.16%	0.80%	0.56%	0.09%	98.23%
TATA CDMA	0.31%	0.00%	97.91%	NA	0.03%	0.90%	4.96%	98.25%
TATA GSM	0.15%	0.61%	98.49%	0.34%	0.64%	0.51%	1.76%	97.53%
Vodafone	0.16%	0.51%	99.59%	0.17%	0.41%	0.76%	2.76%	98.38%

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

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

BTSs Accumulated Downtime

All the operators met the TRAI specified criteria for the outage due to downtime of the base transceiver stations (BTS). Reliance GSM performed the best with 0.06% BTS downtime reported.

Worst Affected BTSs Due to Downtime

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

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Call Set-up Success Rate (CSSR)

All the operators met the TRAI benchmark for the ratio of successful call attempts to the overall call attempts. The best performance was recorded for Reliance CDMA at 99.69% CSSR.

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

Network Congestion parameters:

In terms of network congestion parameters, all the operators had a congestion ratio within the TRAI specified limits. For the SDCCH/Paging channel congestion, the best performance was recorded for Reliance GSM with 0.16% congestion. For TCH congestion, Reliance CDMA was the best performer by recording 0.00% TCH congestion.

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

Call Drop Rate

All operators met the benchmark for call drop rate. Reliance CDMA was the best performer with 0.37% call drop rate.

Worst Affected Cells Having More than 3% TCH Drop:

Aircel, BSNL and Tata CDMA failed to meet the benchmark for the parameter. Reliance GSM was the best performer with 0.09% worst affected cells having more than 3% TCH drop.

Voice Quality

All the operators ensured an appropriate amount of voice quality, above the benchmark. Reliance CDMA reported the best performance at 99.75%.

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 – JULY

Name of Service Provider Month July	Network Availability		Connection Establishment (Accessibility)			Connection Maintenance (Retainability)		
	BTSs Accumulated downtime (not available for service)	Worst affected BTSs due to downtime	Call Set-up Success Rate (within licensee's own network)	SDCCH/ Paging Chl. Congestion	TCH Congestion	Call Drop Rate (%age)	Worst affected cells having more than 3% TCH drop	%age of connection with good voice quality
Benchmark	≤ 2%	≤ 2%	≥ 95%	≤ 1%	≤ 2%	≤ 2%	≤ 3%	≥ 95%
Aircel(DWL)	1.90%	7.29%	97.65%	0.71%	1.94%	1.60%	14.42%	95.22%
Airtel	0.13%	0.04%	98.94%	0.41%	1.73%	0.98%	1.38%	96.11%
BSNL	0.68%	0.69%	98.54%	0.62%	1.91%	1.74%	4.02%	96.29%
Idea	0.39%	1.34%	99.15%	0.18%	0.26%	0.41%	1.37%	96.49%
Reliance CDMA	0.05%	0.00%	99.67%	NA	0.00%	0.35%	2.39%	99.72%
Reliance GSM	0.03%	0.05%	98.18%	0.17%	0.87%	0.58%	0.19%	98.26%
TATA CDMA	0.43%	0.00%	97.32%	NA	0.03%	0.96%	5.38%	98.25%
TATA GSM	0.24%	1.26%	98.47%	0.42%	0.65%	0.51%	1.67%	97.52%
Vodafone	0.17%	0.57%	99.64%	0.19%	0.36%	0.80%	2.54%	98.34%

3.1.2   PMR DATA – AUGUST

Name of Service Provider Month August	Network Availability		Connection Establishment (Accessibility)			Connection Maintenance (Retainability)		
	BTSs Accumulated downtime (not available for service)	Worst affected BTSs due to downtime	Call Set-up Success Rate (within licensee's own network)	SDCCH/ Paging Chl. Congestion	TCH Congestion	Call Drop Rate (%age)	Worst affected cells having more than 3% TCH drop	%age of connection with good voice quality
Benchmark	≤ 2%	≤ 2%	≥ 95%	≤ 1%	≤ 2%	≤ 2%	≤ 3%	≥ 95%
Aircel(DWL)	1.42%	5.37%	97.58%	0.29%	1.92%	1.56%	14.07%	95.25%
Airtel	0.11%	0.08%	96.61%	0.37%	1.73%	1.02%	1.52%	96.14%
BSNL	0.23%	0.67%	99.02%	0.74%	1.51%	1.85%	2.93%	96.24%
Idea	0.29%	1.02%	99.09%	0.21%	0.31%	0.43%	1.42%	96.64%
Reliance CDMA	0.48%	1.89%	99.70%	NA	0.00%	0.36%	2.11%	99.76%
Reliance GSM	0.09%	0.11%	98.33%	0.17%	0.80%	0.55%	0.04%	98.23%
TATA CDMA	0.27%	0.00%	98.34%	NA	0.03%	0.98%	5.56%	98.25%
TATA GSM	0.10%	0.28%	98.59%	0.40%	0.55%	0.50%	1.87%	97.52%
Vodafone	0.15%	0.44%	99.61%	0.15%	0.39%	0.73%	2.79%	98.43%

3.1.3 PMR DATA - SEPTEMBER

Name of Service Provider Month June	Network Availability		Connection Establishment (Accessibility)			Connection Maintenance (Retainability)		
	BTSs Accumulated downtime (not available for service)	Worst affected BTSs due to downtime	Call Set-up Success Rate (within licensee's own network)	SDCCH/ Paging Chl. Congestion	TCH Congestion	Call Drop Rate (%age)	Worst affected cells having more than 3% TCH drop	%age of connection with good voice quality
Benchmark	≤ 2%	≤ 2%	≥ 95%	≤ 1%	≤ 2%	≤ 2%	≤ 3%	≥ 95%
Aircel(DWL)	1.39%	3.77%	96.88%	0.80%	1.90%	1.78%	10.07%	95.31%
Airtel	0.13%	0.08%	96.46%	0.42%	1.88%	1.12%	1.81%	95.89%
BSNL	0.91%	1.11%	99.01%	0.14%	1.88%	1.88%	2.66%	96.24%
Idea	0.26%	1.33%	99.21%	0.20%	0.28%	0.42%	1.18%	97.12%
Reliance CDMA	0.42%	1.26%	99.70%	NA	0.00%	0.40%	2.18%	99.77%
Reliance GSM	0.07%	0.11%	98.36%	0.14%	0.73%	0.55%	0.04%	98.20%
TATA CDMA	0.22%	0.00%	98.06%	NA	0.02%	0.76%	3.93%	98.25%
TATA GSM	0.12%	0.28%	98.41%	0.20%	0.73%	0.52%	1.75%	97.56%
Vodafone	0.15%	0.52%	99.53%	0.18%	0.47%	0.75%	2.95%	98.37%

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

3.2   3 DAY DATA – CONSOLIDATED

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

Name of Service Provider	Network Availability		Connection Establishment (Accessibility)			Connection Maintenance (Retainability)		
	BTSs Accumulated downtime (not available for service)	Worst affected BTSs due to downtime	Call Set-up Success Rate (within licensee's own network)	SDCCH/ Paging Chl. Congestion (%age)	TCH Congestion (%age)	Call Drop Rate (%age)	Worst affected cells having more than 3% TCH drop	%age of connection with good voice quality
Benchmark	≤ 2%	≤ 2%	≥ 95%	≤ 1%	≤ 2%	≤ 2%	≤ 3%	≥ 95%
Aircel(DWL)	1.57%	0.52%	97.39%	0.46%	1.69%	1.55%	12.74%	95.22%
Airtel	0.11%	0.00%	97.65%	0.33%	1.78%	1.06%	1.83%	96.04%
BSNL	0.27%	0.00%	99.05%	0.16%	1.72%	1.81%	2.94%	96.27%
Idea	0.27%	0.25%	99.12%	0.18%	0.31%	0.40%	1.16%	96.76%
Reliance CDMA	0.23%	0.00%	99.69%	NA	0.00%	0.34%	2.65%	99.75%
Reliance GSM	0.08%	0.00%	98.31%	0.12%	0.75%	0.53%	0.12%	98.29%
TATA CDMA	0.26%	0.00%	98.08%	NA	0.02%	0.95%	4.77%	98.25%
TATA GSM	0.17%	0.00%	98.60%	0.13%	0.56%	0.49%	1.68%	97.51%
Vodafone	0.13%	0.02%	99.65%	0.20%	0.35%	0.73%	2.65%	98.39%

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

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

BTSs Accumulated Downtime

All operators met the benchmark for BTS accumulated downtime during live measurements. Reliance GSM was the top performer by reporting 0.08% downtime.

Worst Affected BTSs Due to Downtime

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

Call Set-up Success Rate (CSSR)

All operators met the benchmark for CSSR. Reliance CDMA had the best CSSR at 99.69%.

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

Network Congestion parameters

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

For the SDCCH/Paging channel congestion, the best performance was recorded for Reliance GSM with 0.12% congestion. For the TCH congestion, Reliance CDMA was the best performer with 0.00% TCH congestion.

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

Call Drop Rate

All operators met the TRAI benchmark. Reliance CDMA was the best performer with 0.34% call drop rate as per live measurement data.

Worst Affected Cells Having More than 3% TCH Drop

Aircel and Tata CDMA failed to meet the benchmark for the parameter. Reliance GSM was the best performer with 0.12% worst affected cells having more than 3% TCH drop.

Voice Quality

All operators met the TRAI benchmark for voice quality. Reliance CDMA was the best performer with 99.75%.

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 - JULY

Name of Service Provider 3 Day July	Network Availability		Connection Establishment (Accessibility)			Connection Maintenance (Retainability)		
	BTSs Accumulated downtime (not available for service)	Worst affected BTSs due to downtime	Call Set-up Success Rate (within licensee's own network)	SDCCH/ Paging Chl. Congestion	TCH Congestion	Call Drop Rate (%age)	Worst affected cells having more than 3% TCH drop	%age of connection with good voice quality
Benchmark	≤ 2%	≤ 2%	≥ 95%	≤ 1%	≤ 2%	≤ 2%	≤ 3%	≥ 95%
Aircel(DWL)	1.64%	0.71%	97.50%	0.31%	1.39%	1.45%	14.45%	95.24%
Airtel	0.08%	0.00%	99.09%	0.27%	1.73%	0.97%	1.60%	96.13%
BSNL	0.11%	0.00%	99.07%	0.13%	1.62%	1.67%	3.24%	96.38%
Idea	0.26%	0.31%	99.25%	0.18%	0.25%	0.40%	1.22%	96.59%
Reliance CDMA	0.07%	0.00%	99.74%	NA	0.00%	0.31%	2.65%	99.77%
Reliance GSM	0.05%	0.00%	98.04%	0.03%	0.91%	0.57%	0.30%	98.38%
TATA CDMA	0.29%	0.00%	97.21%	NA	0.02%	1.02%	5.48%	98.26%
TATA GSM	0.20%	0.00%	98.74%	0.11%	0.45%	0.47%	1.60%	97.52%
Vodafone	0.13%	0.00%	99.78%	0.31%	0.22%	0.75%	2.21%	98.37%

3.2.2   3 DAY DATA – AUGUST

Name of Service Provider 3 day August	Network Availability		Connection Establishment (Accessibility)			Connection Maintenance (Retainability)		
	BTSs Accumulated downtime (not available for service)	Worst affected BTSs due to downtime	Call Set-up Success Rate (within licensee's own network)	SDCCH/ Paging Chl. Congestion	TCH Congestion	Call Drop Rate (%age)	Worst affected cells having more than 3% TCH drop	%age of connection with good voice quality
Benchmark	≤ 2%	≤ 2%	≥ 95%	≤ 1%	≤ 2%	≤ 2%	≤ 3%	≥ 95%
Aircel(DWL)	1.55%	0.58%	97.71%	0.27%	1.97%	1.40%	13.62%	95.21%
Airtel	0.11%	0.00%	97.48%	0.29%	1.73%	1.03%	1.68%	96.16%
BSNL	0.18%	0.00%	99.01%	0.32%	1.79%	1.92%	2.87%	96.11%
Idea	0.36%	0.22%	99.10%	0.20%	0.36%	0.41%	1.24%	96.64%
Reliance CDMA	0.34%	0.00%	99.70%	NA	0.00%	0.31%	2.81%	99.74%
Reliance GSM	0.12%	0.00%	98.50%	0.13%	0.63%	0.51%	0.02%	98.27%
TATA CDMA	0.21%	0.00%	98.42%	NA	0.03%	0.98%	5.56%	98.25%
TATA GSM	0.17%	0.00%	98.61%	0.10%	0.53%	0.48%	1.77%	97.47%
Vodafone	0.13%	0.03%	99.63%	0.12%	0.37%	0.70%	2.61%	98.42%

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3.2.3 3 DAY DATA - SEPTEMBER

Name of Service Provider 3 Day June	Network Availability		Connection Establishment (Accessibility)			Connection Maintenance (Retainability)		
	BTSs Accumulated downtime (not available for service)	Worst affected BTSs due to downtime	Call Set-up Success Rate (within licensee's own network)	SDCCH/ Paging Chl. Congestion	TCH Congestion	Call Drop Rate (%age)	Worst affected cells having more than 3% TCH drop	%age of connection with good voice quality
Benchmark	≤ 2%	≤ 2%	≥ 95%	≤ 1%	≤ 2%	≤ 2%	≤ 3%	≥ 95%
Aircel(DWL)	1.52%	0.27%	96.97%	0.79%	1.71%	1.80%	10.16%	95.21%
Airtel	0.14%	0.00%	96.38%	0.42%	1.89%	1.19%	2.20%	95.84%
BSNL	0.52%	0.00%	99.07%	0.02%	1.74%	1.83%	2.72%	96.32%
Idea	0.19%	0.22%	99.02%	0.16%	0.33%	0.39%	1.02%	97.04%
Reliance CDMA	0.29%	0.00%	99.63%	NA	0.00%	0.41%	2.50%	99.73%
Reliance GSM	0.06%	0.00%	98.38%	0.21%	0.72%	0.52%	0.04%	98.23%
TATA CDMA	0.29%	0.00%	98.62%	NA	0.01%	0.84%	3.26%	98.25%
TATA GSM	0.13%	0.00%	98.44%	0.17%	0.69%	0.53%	1.66%	97.55%
Vodafone	0.14%	0.03%	99.54%	0.17%	0.46%	0.74%	3.12%	98.37%

3.3   LIVE CALLING DATA – CONSOLIDATED

Name of Service Provider	Resolution of billing complaints		Service Requests	Level 1 Service	Customer Care	
	%age complaints resolved within 4 weeks	%age complaints resolved within 6 weeks	Complaint /Request attended to Satisfaction	Call answered	Accessibility of call centre/ customer care	Percentage of calls answered by the operators within 90 seconds
Benchmark	98.00%	100.00%		≥ 95%	≥ 95%	≥ 95%
Aircel(DWL)	95.00%	100.00%	100.00%	100.00%	100.00%	71.00%
Airtel	91.00%	100.00%	98.00%	98.67%	100.00%	88.00%
BSNL	97.00%	100.00%	100.00%	100.00%	100.00%	75.00%
Idea	94.00%	100.00%	100.00%	100.00%	100.00%	96.00%
Reliance CDMA	97.00%	100.00%	100.00%	100.00%	100.00%	96.00%
Reliance GSM	88.00%	100.00%	95.00%	100.00%	100.00%	77.00%
TATA CDMA	NA	NA	100.00%	100.00%	100.00%	100.00%
TATA GSM	NA	NA	100.00%	100.00%	100.00%	100.00%
Vodafone	98.00%	100.00%	99.00%	100.00%	100.00%	91.00%

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Resolution of billing complaints

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

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

Complaint/Request Attended to Satisfaction

All operators performed well on the parameter, with most of the operators getting 100% satisfaction.

Level 1 Service

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

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

Accessibility of Call Centre/Customer Care-IVR

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

Customer Care / Helpline Assessment

As per live calling, Aircel, Airtel, BSNL, Reliance GSM and Vodafone failed to meet the TRAI benchmark of 95% of calls (voice to voice) answered by the call center executives within 90 seconds.

3.4   BILLING AND CUSTOMER CARE - CONSOLIDATED

Name of Service Provider	Metering and billing credibility		Resolution of billing complaints		Response time to customer for assistance	Customer care	
	Postpaid Subscribers	Prepaid Subscribers	% of complaints resolved in 4 weeks	% of complaints resolved in 6 weeks	% of cases where credit/wavier is received within one week	Percentage of calls answered by the IVR	Percentage of calls answered by the operators (Voice to Voice) Within 90 Seconds
Benchmark	≤ 0.1%	≤ 0.1%	≥ 98%	≥ 100%	≥ 100%	≥ 95%	≥ 95%
Aircel(DWL)	0.01%	0.03%	100.00%	100.00%	100.00%	95.62%	98.10%
Airtel	0.07%	0.01%	100.00%	100.00%	100.00%	99.09%	98.88%
BSNL	0.00%	0.01%	100.00%	100.00%	100.00%	96.13%	96.97%
Idea	0.07%	0.08%	99.89%	100.00%	100.00%	98.63%	99.90%
Reliance CDMA	0.08%	0.02%	100.00%	100.00%	100.00%	97.26%	72.56%
Reliance GSM	0.09%	0.03%	100.00%	100.00%	100.00%	98.02%	82.78%
TATA CDMA	0.00%	0.00%	NA	NA	NA	99.26%	97.61%
TATA GSM	0.00%	0.00%	NA	NA	NA	95.69%	96.50%
Vodafone	0.04%	0.03%	100.00%	100.00%	100.00%	99.96%	99.07%

Metering and billing credibility – Postpaid Subscribers

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

Metering and billing credibility – Prepaid Subscribers

For prepaid as well, all operators met the TRAI benchmark of metering and billing credibility. Tata CDMA and Tata GSM performed the best with 0.00% disputes.

Resolution of Billing Complaints

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

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

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

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

Customer Care Percentage of calls answered by the operators IVR

All operators met the benchmark for calls answered by IVR. Vodafone performed the best by connecting 99.96% of the IVR calls.

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

Reliance CDMA and Reliance GSM failed to meet the benchmark of calls being answered within 90 seconds. Idea was the best performer on the parameter with 99.90%.

3.5 INTER OPERATOR CALL ASSESSMENT - CONSOLIDATED

6. Inter Operator Call Assessment									
Inter operator call Assessment To↓ From→	Aircel(DWL)	Airtel	BSNL	Idea	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Vodafone
Aircel(DWL)	NA	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
Airtel	90.00%	NA	93.50%	93.50%	93.50%	93.50%	96.00%	94.00%	100.00%
BSNL	93.50%	97.00%	NA	94.00%	95.00%	96.00%	97.00%	94.50%	96.00%
Idea	100.00%	100.00%	100.00%	NA	100.00%	100.00%	100.00%	100.00%	100.00%
Reliance CDMA	89.50%	91.50%	91.50%	92.00%	NA	94.00%	93.00%	93.00%	92.00%
Reliance GSM	90.50%	97.00%	90.00%	89.50%	95.50%	NA	87.00%	89.50%	89.00%
TATA CDMA	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	NA	100.00%	100.00%
TATA GSM	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	NA	100.00%
Vodafone	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	NA

Almost all operators found problem in connecting Airtel, BSNL, Reliance CDMA and Reliance GSM, as per live calling done for inter-operator call assessment.

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

4   CRITICAL FINDINGS

PMR Consolidated (Network Parameters)

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

3 Day Live Measurement (Network Parameters)

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

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

Live Calling

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

Aircel, Airtel, BSNL, Reliance GSM and Vodafone failed to meet the TRAI benchmark of 95% of calls answered by the call center executives within 90 seconds.

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

Metering and Billing Credibility

It is to be noted that Aircel, Airtel, Idea, Reliance GSM 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

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

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

5.1 BTS ACCUMULATED DOWNTIME

5.1.1 PARAMETER DESCRIPTION

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

1. BTSs Accumulated downtime (not available for service)

2. Worst affected BTSs due to downtime

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

2. **Computation Methodology –**
   BTS accumulated downtime (not available for service) = **Sum of downtime of BTSs in a month in hours i.e. total outage time of all BTSs in hours during a month / (24 x Number of days in a month x Number of BTSs in the network in licensed service area) x 100**

3. **TRAI Benchmark –**

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

4. **Audit Procedure –**

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

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

   ⮫ Any outage as a result of force majeure were not considered at the time of calculation

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

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

   ⮫ When there is any outage a performance report gets generated in line with that cell resulting and master base of the Accumulated downtime and worst affected BTS due to downtime.

5.1.2 KEY FINDINGS – CONSOLIDATED
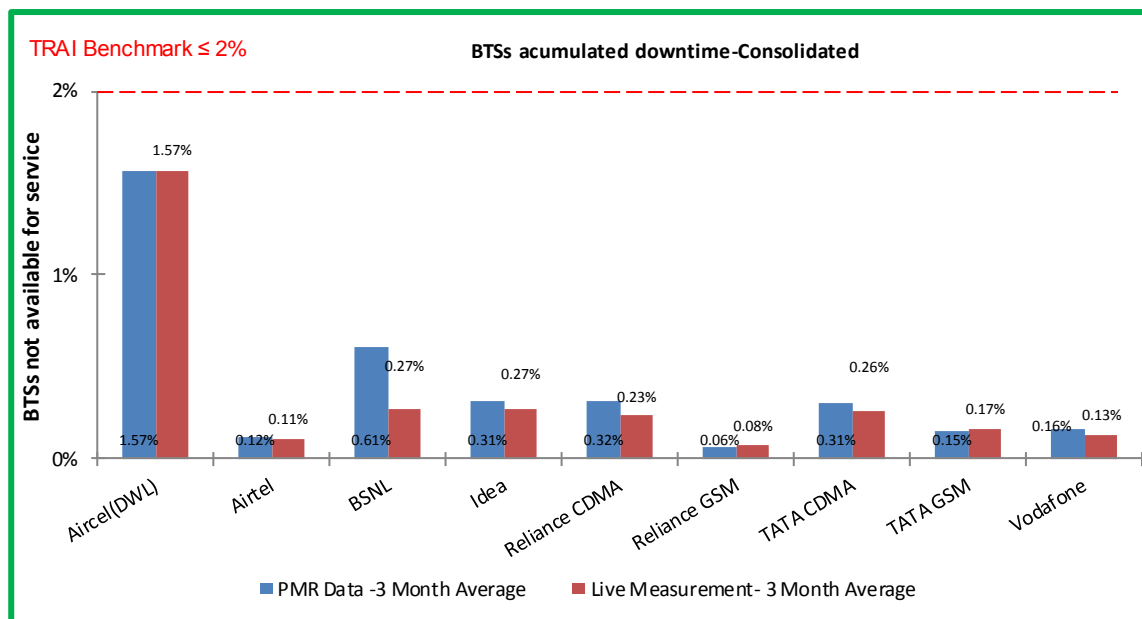
Data Source: Operations and Maintenance Center (OMC) of the operators

All operators met the TRAI benchmark for the parameter.

5.1.2.1 KEY FINDINGS – MONTH 1
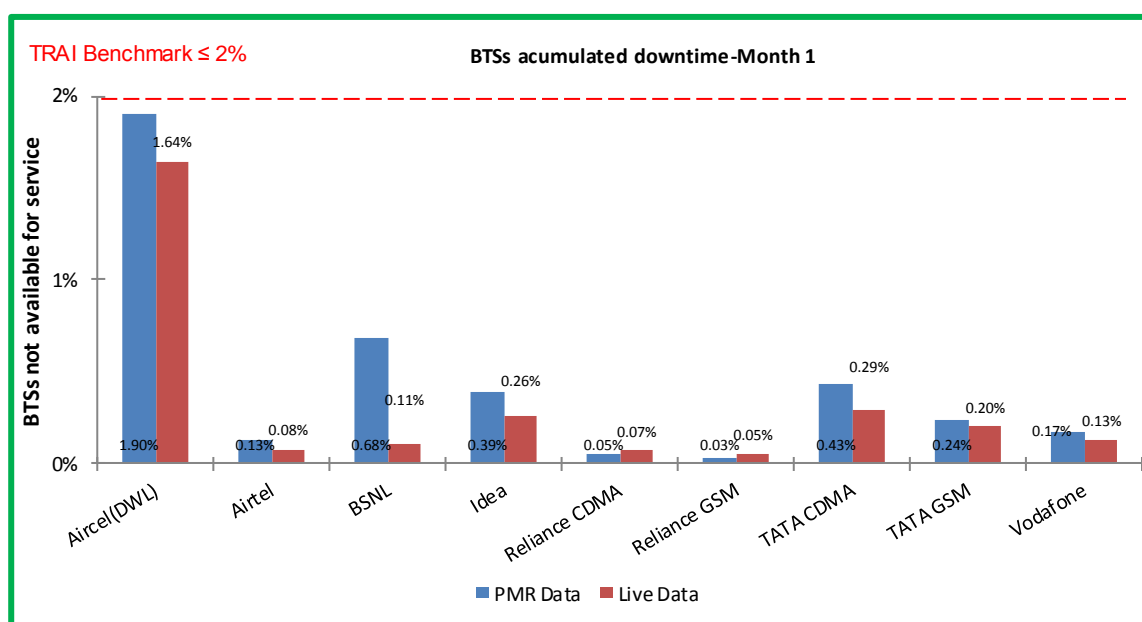
Data Source: Operations and Maintenance Center (OMC) of the operators

5.1.2.2   KEY FINDINGS – MONTH 2
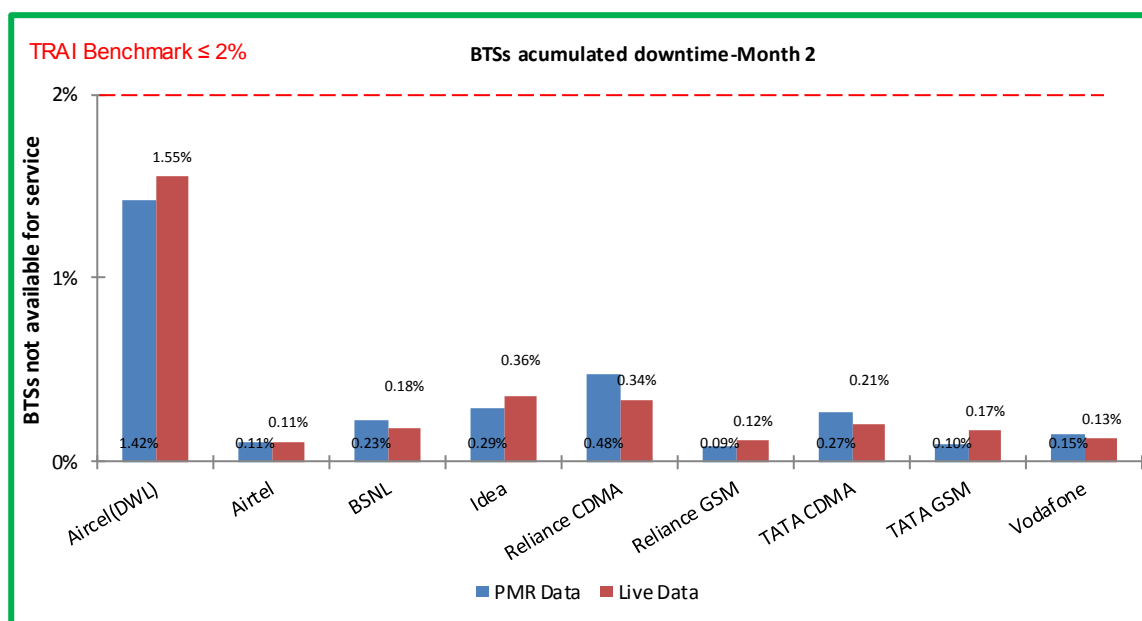
Data Source: Operations and Maintenance Center (OMC) of the operators

5.1.2.3   KEY FINDINGS – MONTH 3
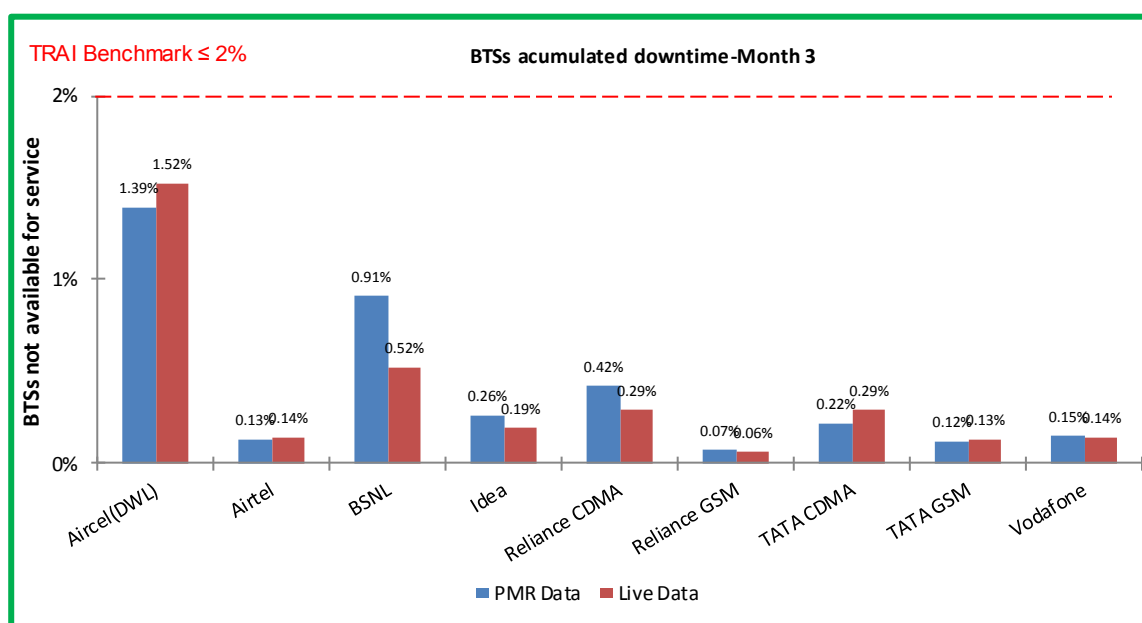
For Reliance CDMA and Reliance GSM, data for Jun'15 could not be audited due to a server issue at operator's end. The same was pre-informed to TRAI by the operator.

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

5.2 WORST AFFECTED BTS DUE TO DOWNTIME

5.2.1 PARAMETER DESCRIPTION

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

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

2. **Computation Methodology –**

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

3. **TRAI Benchmark –**

   a. Worst affected BTSs due to downtime ≤ 2%

4. **Audit Procedure –**

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

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

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

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

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

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

5.2.2 KEY FINDINGS – CONSOLIDATED
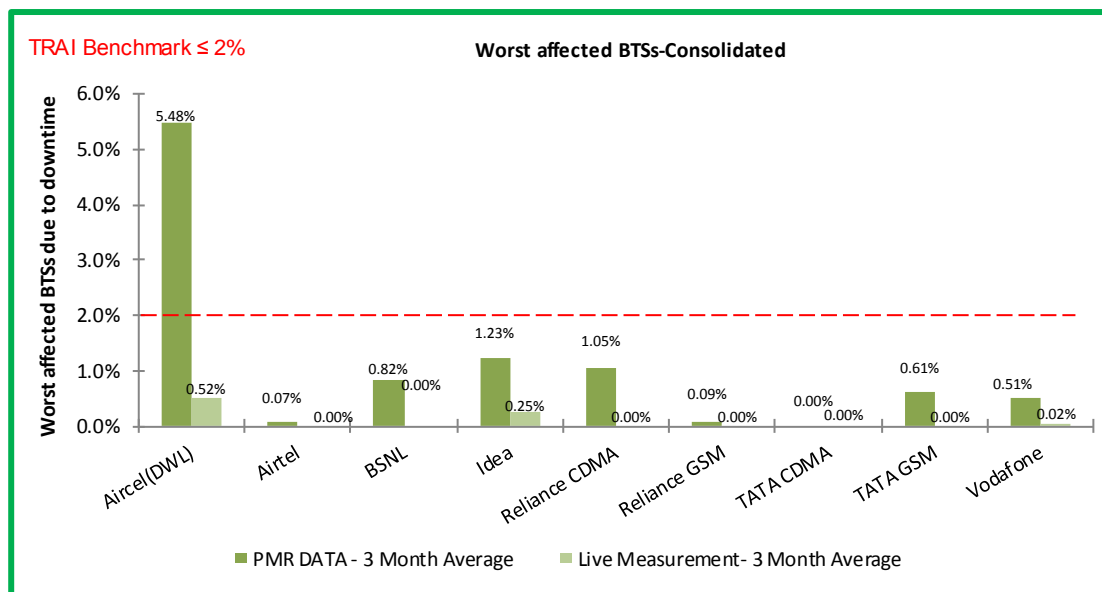
Data Source: Operations and Maintenance Center (OMC) of the operators

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

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

5.2.2.1   KEY FINDINGS – MONTH 1
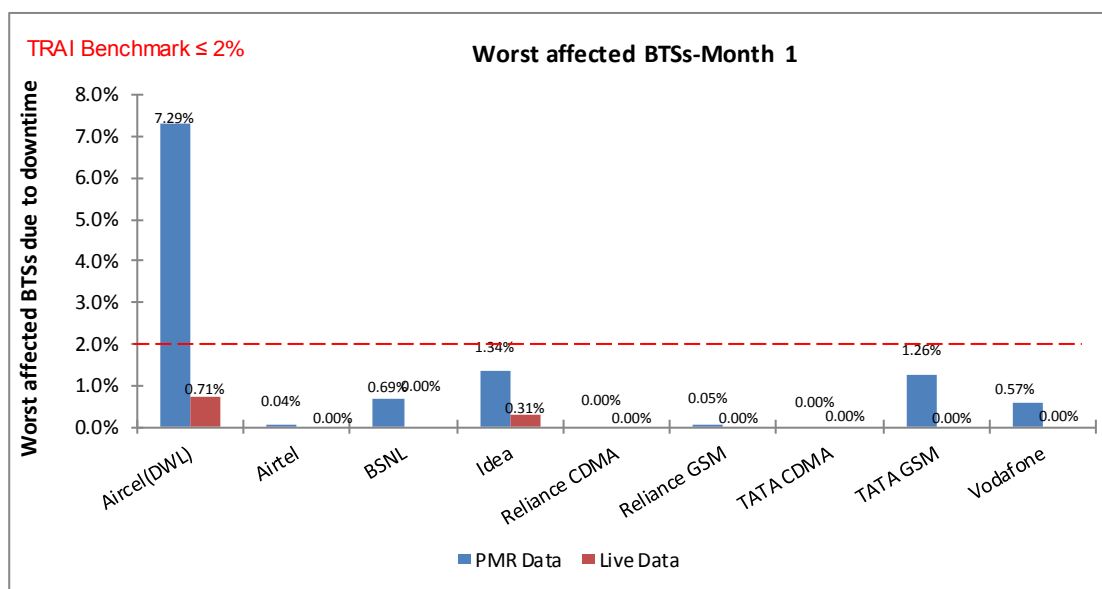
Data Source: Operations and Maintenance Center (OMC) of the operators

5.2.2.2   KEY FINDINGS – MONTH 2

TRAI Benchmark ≤ 2%

Worst affected BTSs-Month 2
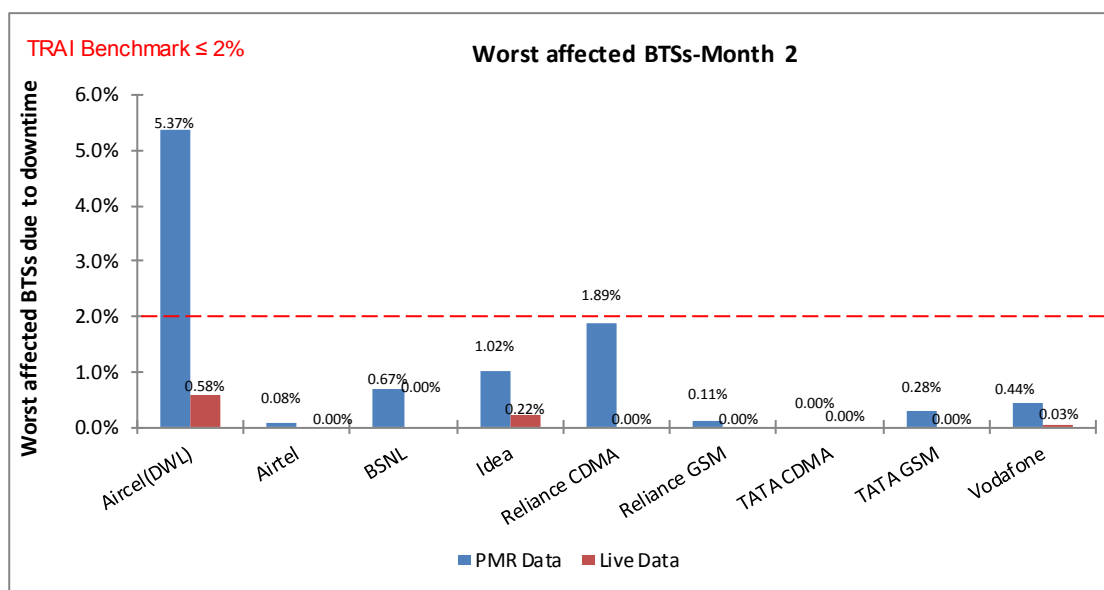
Data Source: Operations and Maintenance Center (OMC) of the operators

5.2.2.3   KEY FINDINGS – MONTH 3
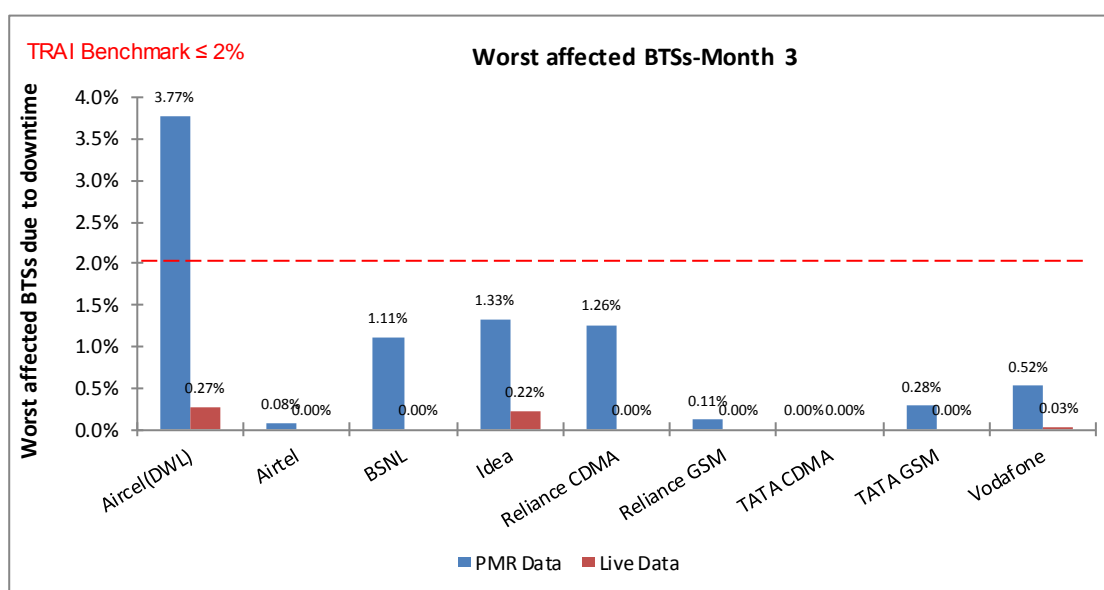
TRAI Benchmark ≤ 2%

Worst affected BTSs-Month 3

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

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

5.3 CALL SET UP SUCCESS RATE

5.3.1 PARAMETER DESCRIPTION

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

2. **Computation Methodology-**

   (Calls Established / Total Call Attempts) * 100

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

   ↳ call attempt is made

   ↳ the TCH is allocated

   ↳ the call is routed to the outward path of the concerned MSC

3. **TRAI Benchmark ≥** 95%

4. **Audit Procedure** –

   ↳ The cell-wise data generated through counters/ MMC available in the switch for traffic measurements

   ↳ CSSR calculation should be measured using OMC generated data only

   ↳ Measurement should be only in Time Consistent Busy Hour (CBBH) period for all days of the week

   ↳ Counter data is extracted from the NOC of the operators.

   ↳ Total calls established include all calls established excluding Signaling blocking, TCH Drop and TCH blocking.

   ↳ The numerator and denominator values are derived from adding the counter values from the MSC.

5.3.2 KEY FINDINGS – CONSOLIDATED
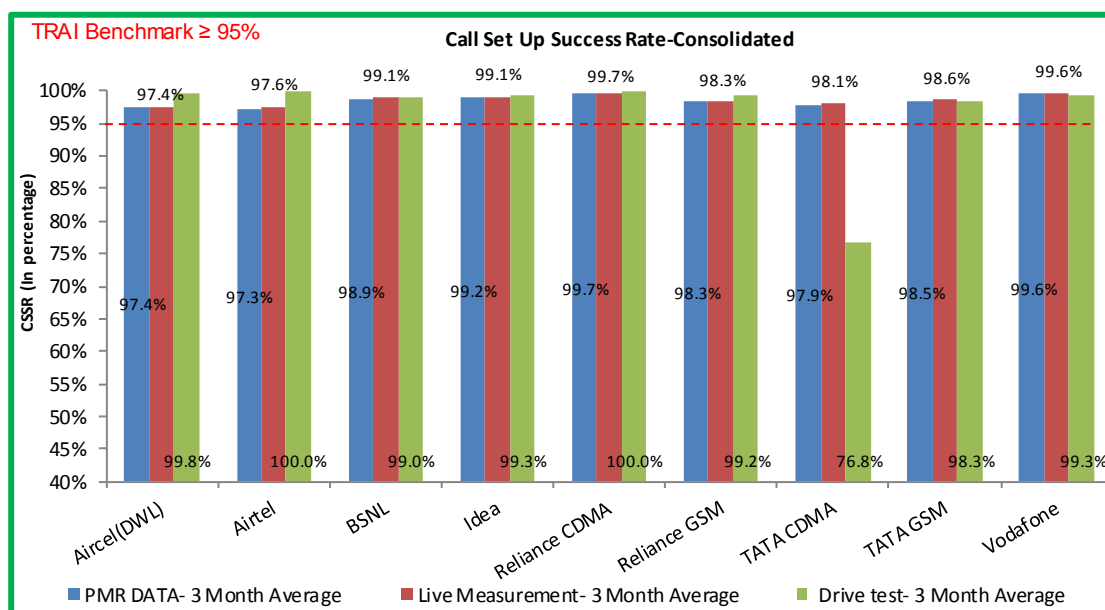
TRAI Benchmark ≥ 95%

Call Set Up Success Rate-Consolidated

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

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

5.3.2.1 KEY FINDINGS – MONTH 1
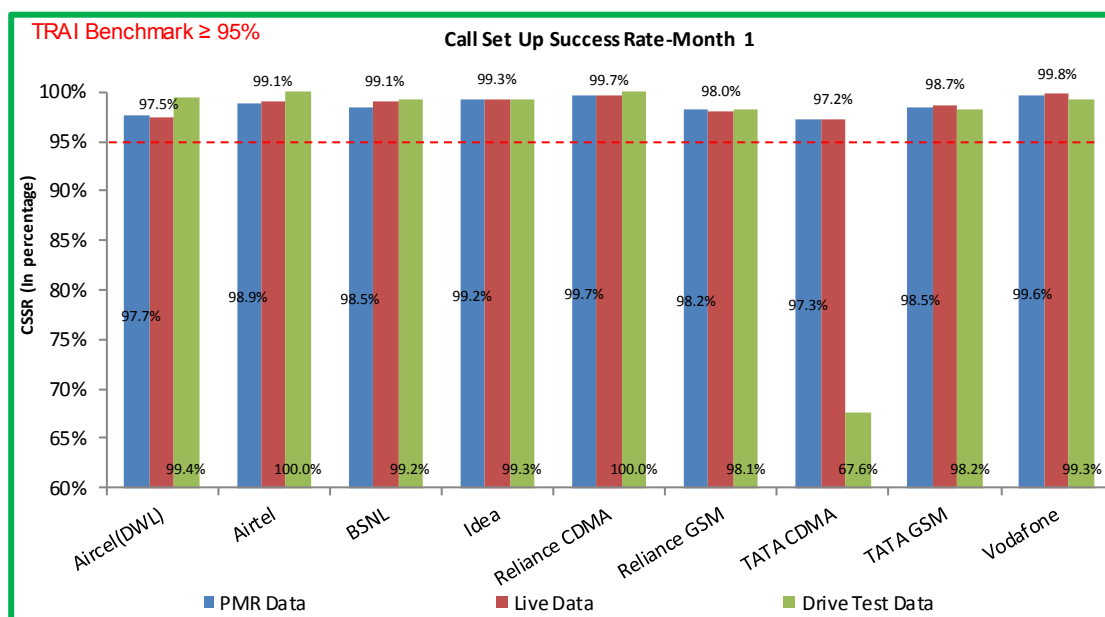
TRAI Benchmark ≥ 95%

Call Set Up Success Rate-Month 1

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

5.3.2.2   KEY FINDINGS – MONTH 2
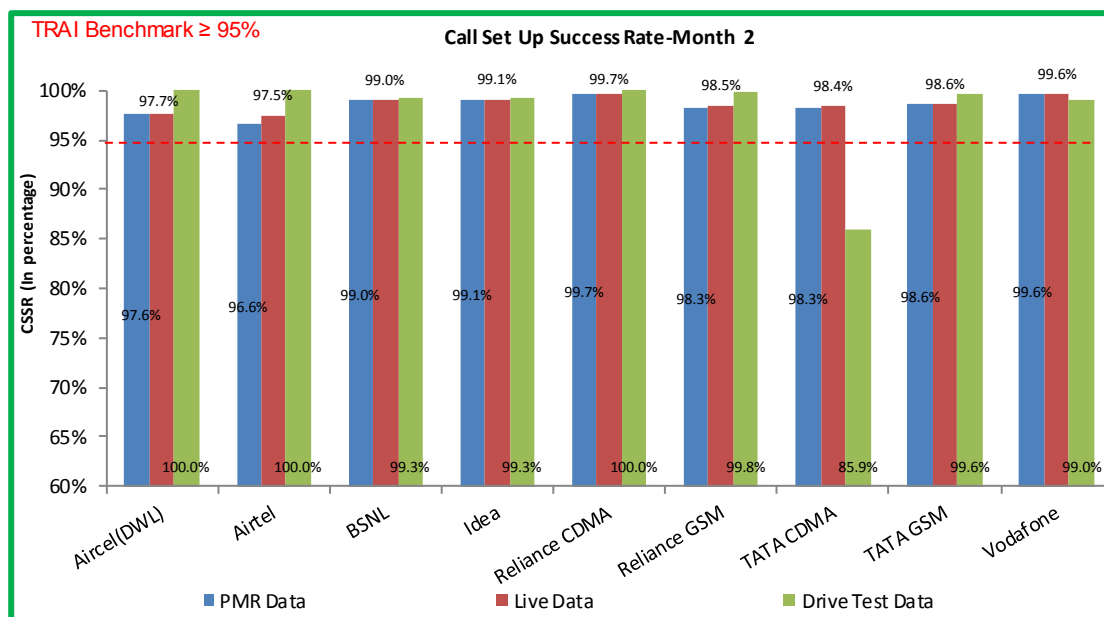
Data Source: Network Operations Center (NOC) of the operators and Drive test reports submitted by operators to auditors

5.3.2.3   KEY FINDINGS – MONTH 3
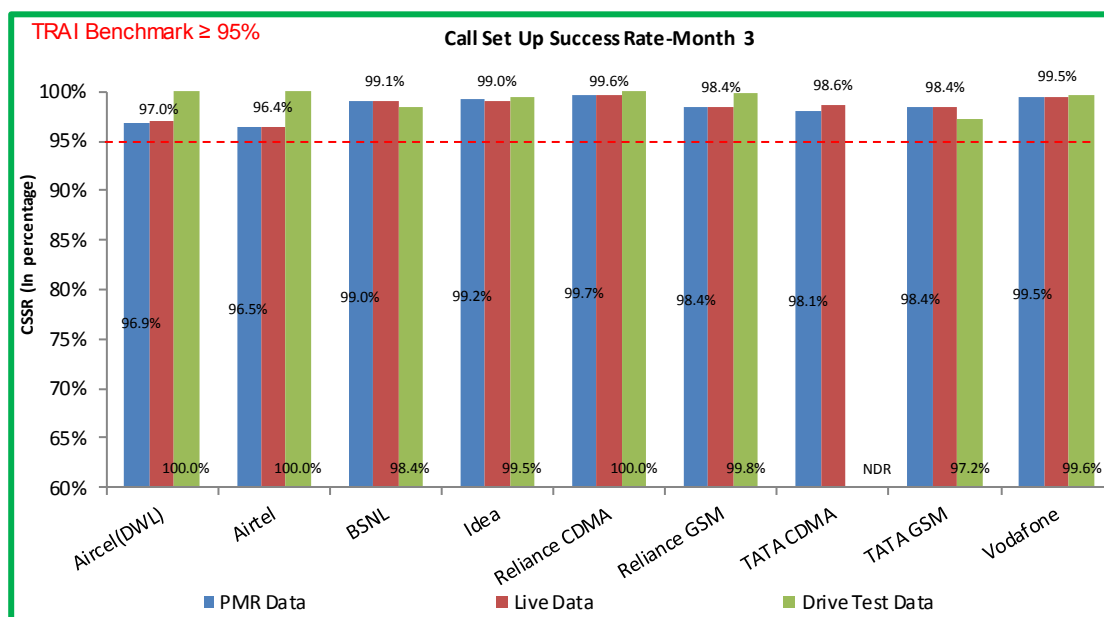
For Reliance CDMA and Reliance GSM, data for Jun'15 could not be audited due to a server issue at operator's end. The same was pre-informed to TRAI by the operator.

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

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

5.4.1 PARAMETER DESCRIPTION

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

   - SDCCH Level: Stand-alone dedicated control channel

   - TCH Level: Traffic Channel

   - POI Level: Point of Interconnect

2. **Computational Methodology:**

   - **SDCCH / TCH Congestion% = $[(A_1 \times C_1) + (A_2 \times C_2) + \ldots + (A_n \times C_n)] / (A_1 + A_2 + \ldots + A_n)$**

     - Where:- A_1 = Number of attempts to establish SDCCH / TCH made on day 1

     - C_1 = Average SDCCH / TCH Congestion % on day 1

     - A_2 = Number of attempts to establish SDCCH / TCH made on day 2

     - C_2 = Average SDCCH / TCH Congestion % on day 2

     - A_n = Number of attempts to establish SDCCH / TCH made on day n

     - C_n = Average SDCCH / TCH Congestion % on day n

   - **POI Congestion% = $[(A_1 \times C_1) + (A_2 \times C_2) + \ldots + (A_n \times C_n)] / (A_1 + A_2 + \ldots + A_n)$**

     - Where:- A_1 = POI traffic offered on all POIs (no. of calls) on day 1

     - C_1 = Average POI Congestion % on day 1

     - A_2 = POI traffic offered on all POIs (no. of calls) on day 2

     - C_2 = Average POI Congestion % on day 2

     - A_n = POI traffic offered on all POIs (no. of calls) on day n

     - C_n = Average POI Congestion % on day n

3. **Benchmark:**

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

4. **Audit Procedure** –

   - Audit of the details of SDCCH and TCH congestion percentages computed by the operator (using OMC–Switch data only) would be conducted

   - The operator should be measuring this parameter during Time consistent busy hour (TCBH) only SDCCH

5.4.2 KEY FINDINGS - SDCCH/PAGING CHANNEL CONGESTION (CONSOLIDATED)
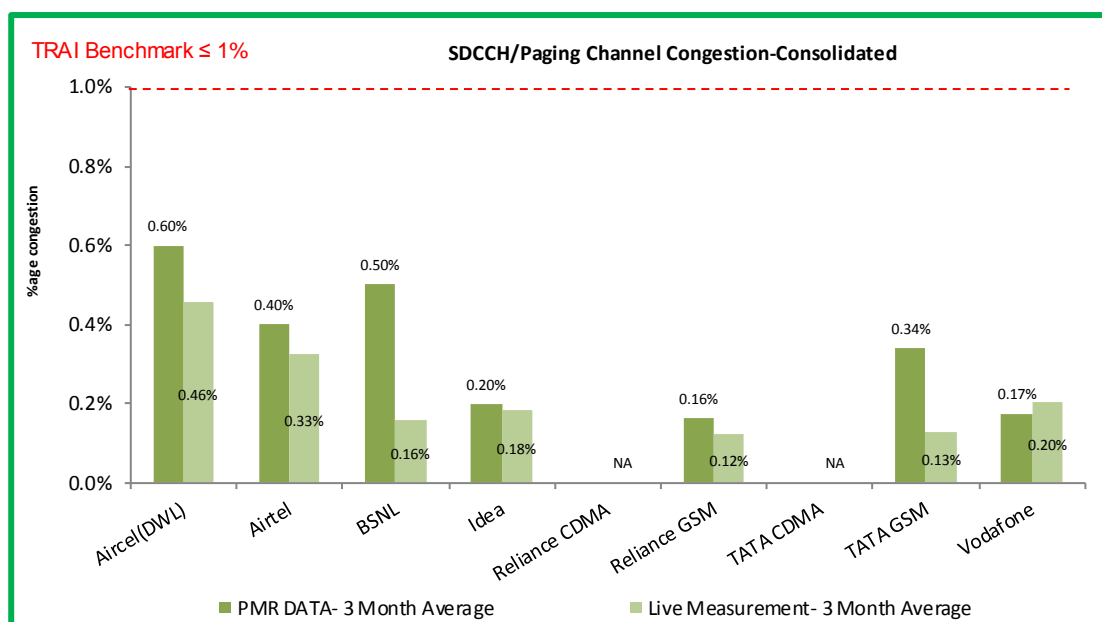
Data Source: Network Operations Center (NOC) of the operators

All the operators met the TRAI benchmark for the parameter.

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

5.4.2.1   KEY FINDINGS – MONTH 1
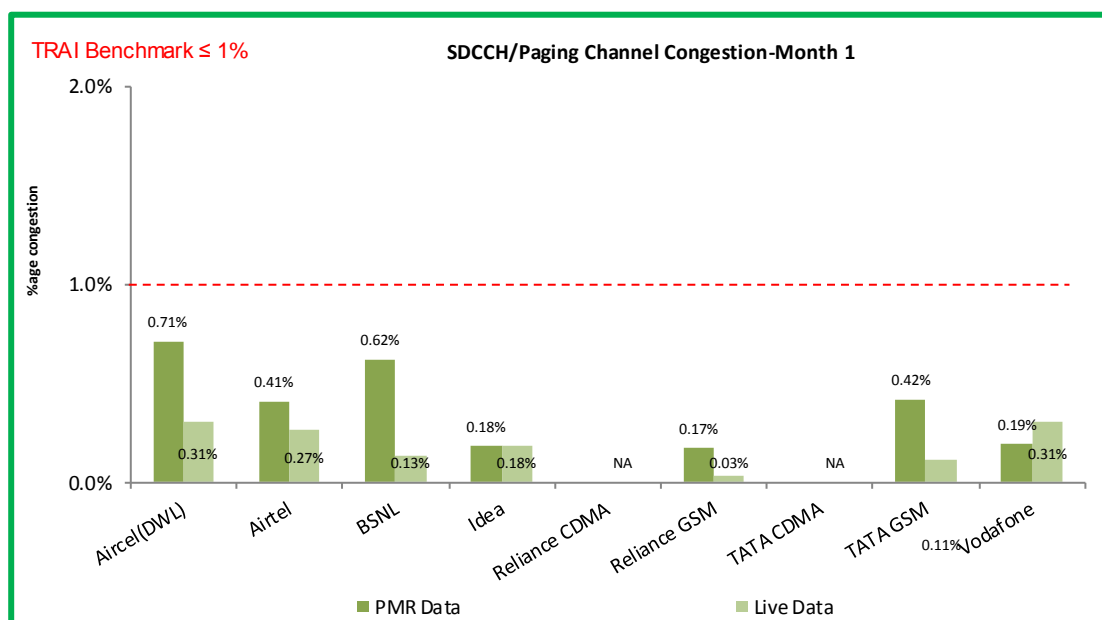
Data Source: Network Operations Center (NOC) of the operators

5.4.2.2 KEY FINDINGS – MONTH 2

TRAI Benchmark ≤ 1%

SDCCH/Paging Channel Congestion-Month 2
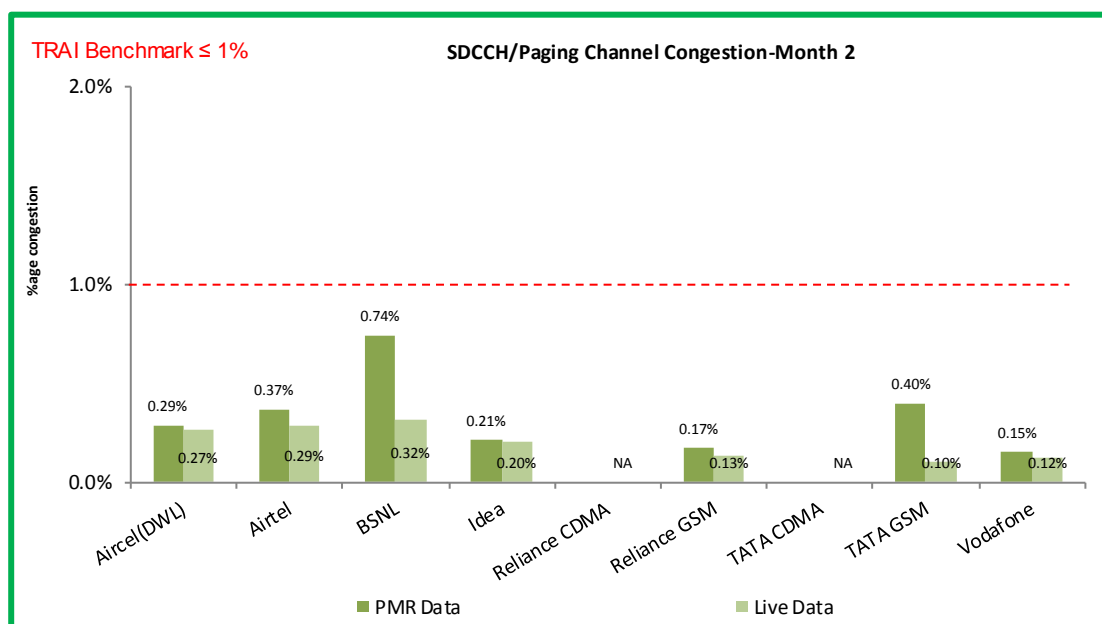
Data Source: Network Operations Center (NOC) of the operators

5.4.2.3 KEY FINDINGS – MONTH 3

TRAI Benchmark ≤ 1%

SDCCH/Paging Channel Congestion-Month 3
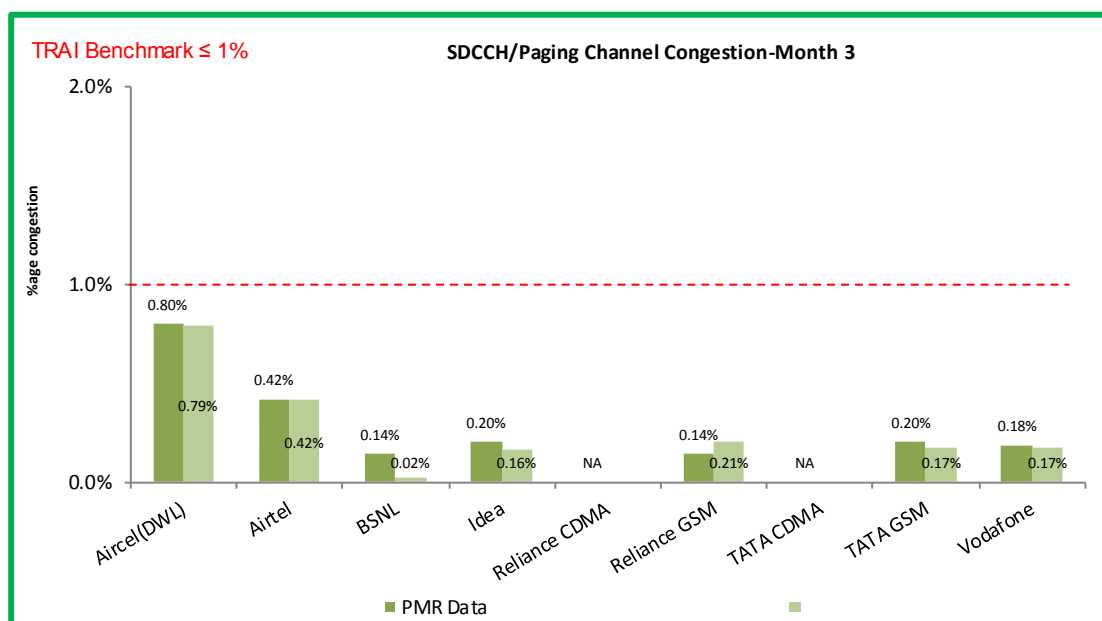
Data Source: Network Operations Center (NOC) of the operators

5.4.3   KEY FINDINGS – TCH CONGESTION (CONSOLIDATED)
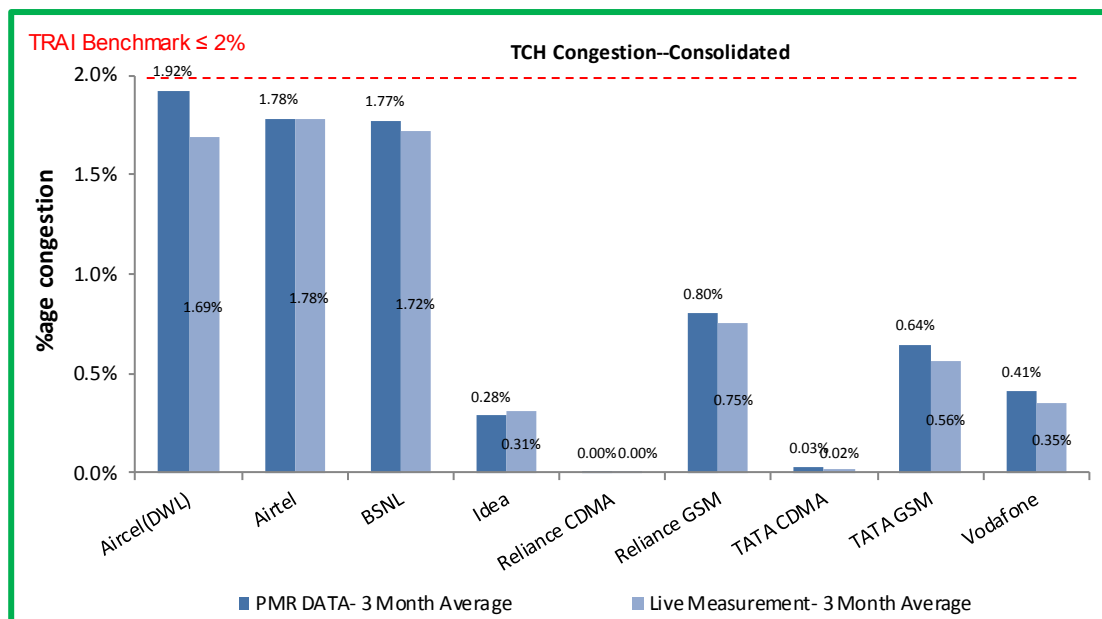
TRAI Benchmark ≤ 2%

TCH Congestion--Consolidated

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

All the operators met the TRAI benchmark for TCH congestion.

5.4.3.1   KEY FINDINGS – MONTH 1
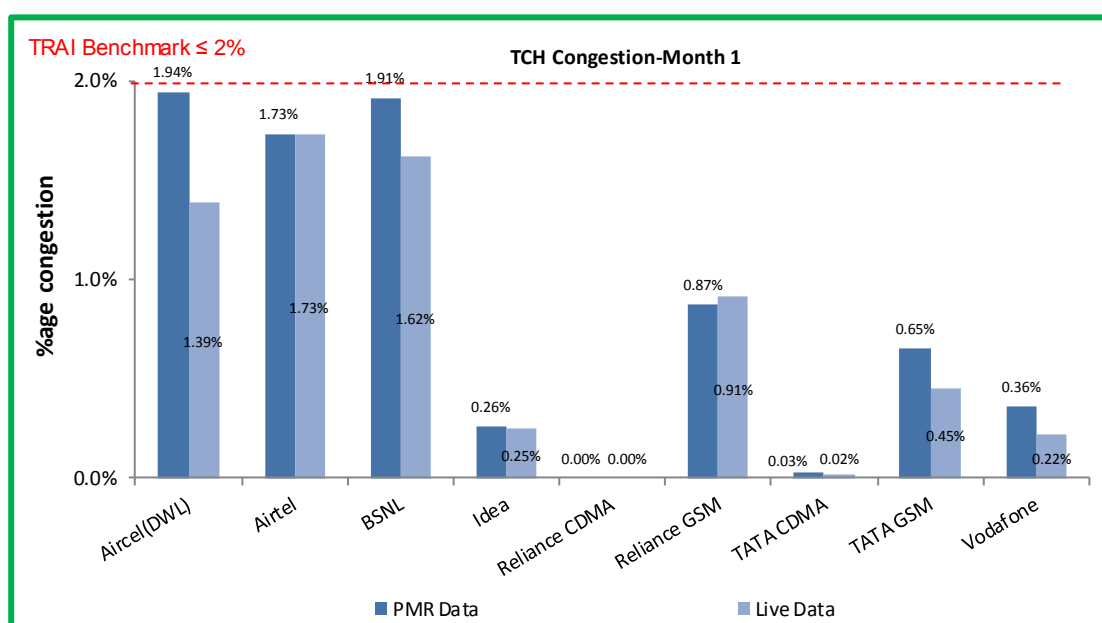
TRAI Benchmark ≤ 2%

TCH Congestion-Month 1

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

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5.4.3.2 KEY FINDINGS – MONTH 2

TRAI Benchmark ≤ 2%

TCH Congestion-Month 2

PMR Data values: Aircel(DWL) 1.92%, Airtel 1.73%, BSNL 1.51%, Idea 0.31%, Reliance CDMA 0.00%, Reliance GSM 0.80%, TATA CDMA 0.03%, TATA GSM 0.55%, Vodafone 0.39%

Live Data values: Aircel(DWL) 1.92%, Airtel 1.73%, BSNL 1.79%, Idea 0.36%, Reliance CDMA 0.00%, Reliance GSM 0.63%, TATA CDMA 0.03%, TATA GSM 0.53%, Vodafone 0.37%

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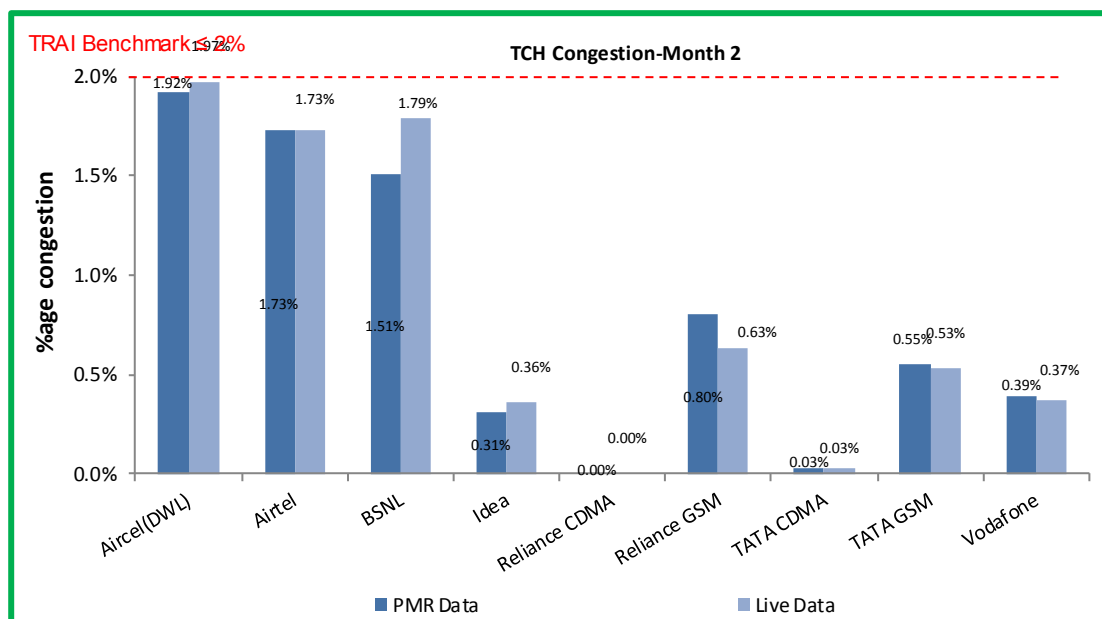
Data Source: Network Operations Center (NOC) of the operators

5.4.3.3 KEY FINDINGS – MONTH 3

TRAI Benchmark ≤ 2%

TCH Congestion-Month 3

PMR Data values: Aircel(DWL) 1.90%, Airtel 1.88%, BSNL 1.88%, Idea 0.28%, Reliance CDMA 0.00%, Reliance GSM 0.73%, TATA CDMA 0.02%, TATA GSM 0.73%, Vodafone 0.47%

Live Data values: Aircel(DWL) 1.71%, Airtel 1.89%, BSNL 1.74%, Idea 0.33%, Reliance CDMA 0.00%, Reliance GSM 0.72%, TATA CDMA 0.01%, TATA GSM 0.69%, Vodafone 0.46%

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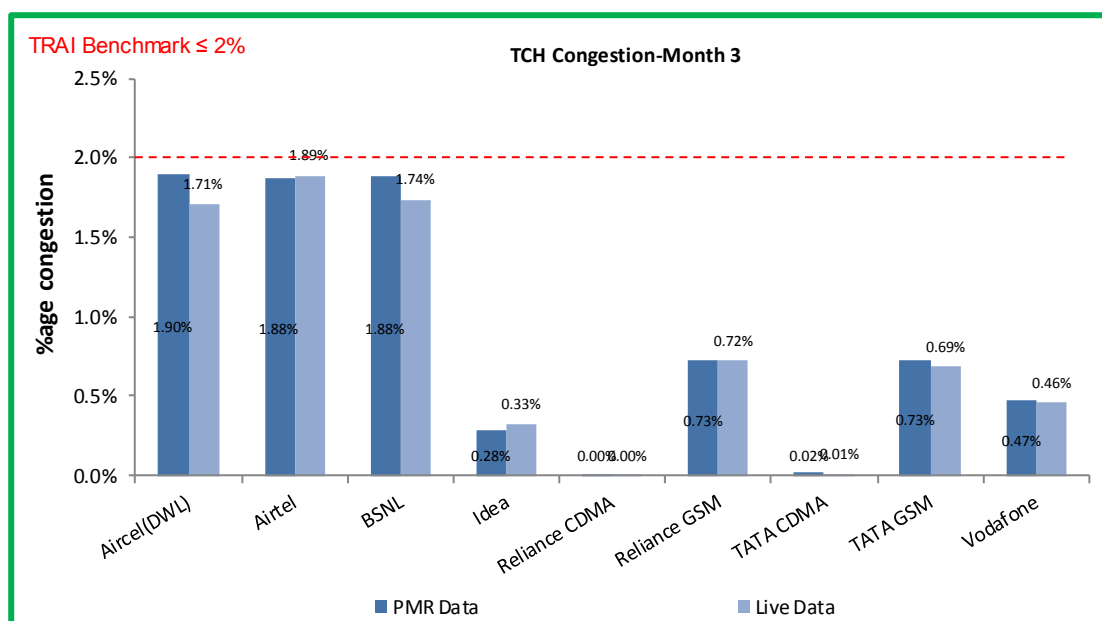
Data Source: Network Operations Center (NOC) of the operators

5.4.4 KEY FINDINGS – POI CONGESTION (CONSOLIDATED)

Audit Results for POI Congestion										
POI congestion	Benchmark	Aircel(DWL)	Airtel	BSNL	Idea	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Vodafone
Total number of working POIs		113	21	13	69	8	8	43	12	48
No. of POIs not meeting benchmark		0	0	0	0	0	0	0	0	0
Total Capacity of all POIs (A) - in erlangs		75374	107020	24244	44535	10050	31382	13800	14005	115611
Traffic served for all POIs (B)- in erlangs		46422	58316	20474	27110	2165	19258	6959	7737	51298
POI congestion	≤ 0.5%	0.00%	0.00%	0.00%	-0.16%	0.00%	0.00%	0.00%	0.00%	0.00%

Live Measurement Results for POI Congestion										
POI congestion	Benchmark	Aircel(DWL)	Airtel	BSNL	Idea	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Vodafone
Total number of working POIs		113	21	13	69	8	8	43	12	48
No. of POIs not meeting benchmark		0	0	0	0	0	0	0	0	0
Total Capacity of all POIs (A) - in erlangs		75446	107026	24244	44692	10050	27512	13800	14005	115611
Traffic served for all POIs (B)- in erlangs		46137	58378	19106	27337	2235	16873	6986	7555	52393
POI congestion	≤ 0.5%	0.00%	0.00%	0.00%	-0.16%	0.00%	0.00%	0.00%	0.00%	0.00%

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

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

IMRB International   eTech

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

5.4.4.1   KEY FINDINGS – MONTH 1

Audit Results for POI Congestion- PMR data-July									
POI congestion	Benchmark	Aircel(DWL)	Airtel	BSNL	Idea	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Vodafone
Total number of working POIs		113	21	13	69	NDR	NDR	43	12	48
No. of POIs not meeting benchmark		0	0	0	0	NDR	NDR	0	0	0
Total Capacity of all POIs (A) - in erlangs		75214	108504	25000	47977	NDR	NDR	13805	14005	115211
Traffic served for all POIs (B)- in erlangs		48401	56630	21305	26144	NDR	NDR	6960	7920	51436
POI congestion	≤ 0.5%	0.00%	0.00%	0.00%	0.00%	NDR	NDR	0.00%	0.00%	0.00%

Live Measurement Results for POI Congestion- 3 Day data-July									
POI congestion	Benchmark	Aircel(DWL)	Airtel	BSNL	Idea	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Vodafone
Total number of working POIs		113	21	13	69	NDR	NDR	43	12	48
No. of POIs not meeting benchmark		0	0	0	0	NDR	NDR	0	0	0
Total Capacity of all POIs (A) - in erlangs		75412	108548	25000	47974	NDR	NDR	13805	14005	115211
Traffic served for all POIs (B)- in erlangs		47551	56660	19938	25625	NDR	NDR	6886	7657	52170
POI congestion	≤ 0.5%	0.00%	0.00%	0.00%	0.00%	NDR	NDR	0.00%	0.00%	0.00%

5.4.4.2 KEY FINDINGS – MONTH 2

Audit Results for POI Congestion- PMR data-August									
POI congestion	Benchmark	Aircel(DWL)	Airtel	BSNL	Idea	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Vodafone
Total number of working POIs		113	21	13	68	8	8	43	12	48
No. of POIs not meeting benchmark		0	0	0	0	0	0	0	0	0
Total Capacity of all POIs (A) - in erlangs		75428	106352	25000	43048	10050	27796	13811	14005	115715
Traffic served for all POIs (B)- in erlangs		46436	58202	19972	26241	2164	16538	6933	7707	51113
POI congestion	≤0.5%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%

Live Measurement Results for POI Congestion- 3 Day data-August									
POI congestion	Benchmark	Aircel(DWL)	Airtel	BSNL	Idea	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Vodafone
Total number of working POIs		113	21	13	68	8	8	43	12	48
No. of POIs not meeting benchmark		0	0	0	0	0	0	0	0	0
Total Capacity of all POIs (A) - in erlangs		75419	106330	25000	43261	10050	27796	13811	14005	115715
Traffic served for all POIs (B)- in erlangs		45899	58295	20001	26160	2254	16350	6953	7213	52085
POI congestion	≤0.5%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%

5.4.4.3 KEY FINDINGS – MONTH 3

Audit Results for POI Congestion- PMR data-June										
POI congestion	Benchmark	Aircel(DWL)	Airtel	BSNL	Idea	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Vodafone
Total number of working POIs		113	21	13	71	8	8	43	12	48
No. of POIs not meeting benchmark		0	0	0	0	0	0	0	0	0
Total Capacity of all POIs (A) - in erlangs		75478	106205	22733	42581	10050	34968	13786	14005	115907
Traffic served for all POIs (B)- in erlangs		44427	60118	20146	28946	2166	21978	6984	7585	51346
POI congestion	≤ 0.5%	0.00%	0.00%	0.00%	-0.47%	0.00%	0.00%	0.00%	0.00%	0.00%

Live Measurement Results for POI Congestion- 3 Day data-June										
POI congestion	Benchmark	Aircel(DWL)	Airtel	BSNL	Idea	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Vodafone
Total number of working POIs		113	21	13	71	8	8	43	12	48
No. of POIs not meeting benchmark		0	0	0	0	0	0	0	0	0
Total Capacity of all POIs (A) - in erlangs		75508	106198	22733	42839	10050	27228	13783	14005	115907
Traffic served for all POIs (B)- in erlangs		44960	60178	17380	30227	2216	17395	7118	7794	52922
POI congestion	≤ 0.5%	0.00%	0.00%	0.00%	-0.47%	0.00%	0.00%	0.00%	0.00%	0.00%

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

5.5 CALL DROP RATE

5.5.1 PARAMETER DESCRIPTION

1. **Definition** - The dropped call rate is the ratio of successfully originated calls that were found to drop to the total number of successfully originated calls that were correctly released.

   ⤷ **Total calls dropped** = All calls ceasing unnaturally i.e. due to handover or due to radio loss

   ⤷ **Total calls established** = All calls that have TCH allocation during busy hour

2. **Computational Methodology:** (**Total Calls Dropped** / **Total Calls Established) x 100**

3. **TRAI Benchmark** –

   ⤷ Call drop rate ≤ 2%

4. **Audit Procedure** –

   ⤷ Audit of traffic data of the relevant quarter kept in OMC-R at MSCs and used for arriving at CDR was used

   ⤷ The operator should only be considering those calls which are dropped during Time consistent busy hour (TCBH) for all days of the relevant quarter.

5.5.2 KEY FINDINGS – CONSOLIDATED

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

All operators met the benchmark for the parameter.

5.5.2.1   KEY FINDINGS – MONTH 1

TRAI Benchmark ≤ 2%

Call Drop Rate-Month 1

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

5.5.2.2   KEY FINDINGS – MONTH 2
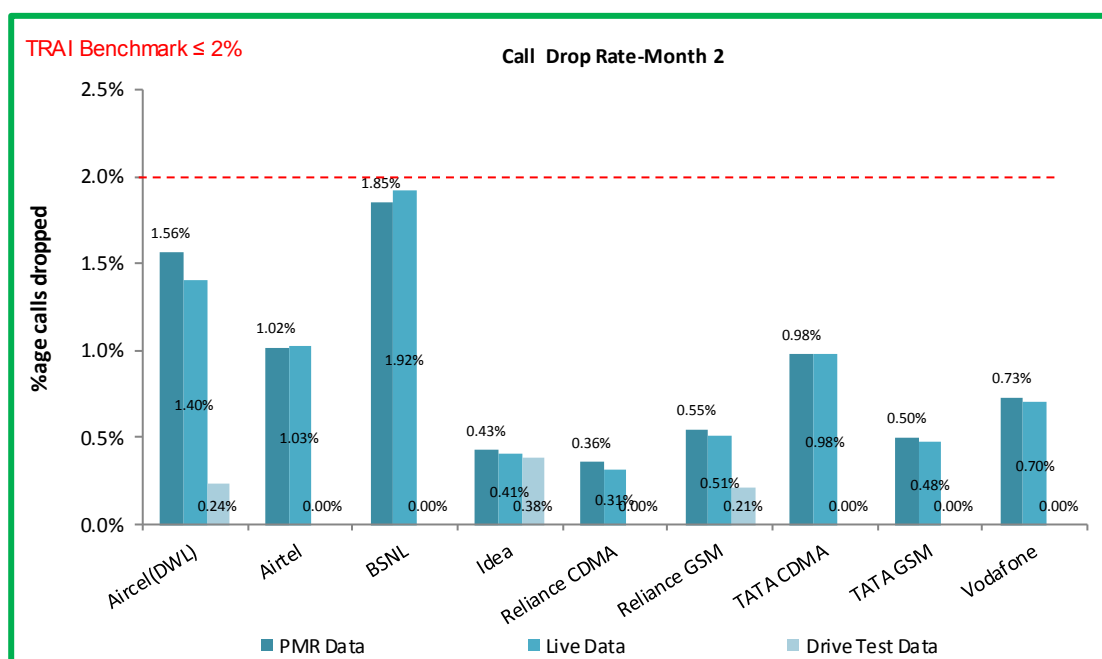
TRAI Benchmark ≤ 2%

Call Drop Rate-Month 2

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

5.5.2.3 KEY FINDINGS – MONTH 3
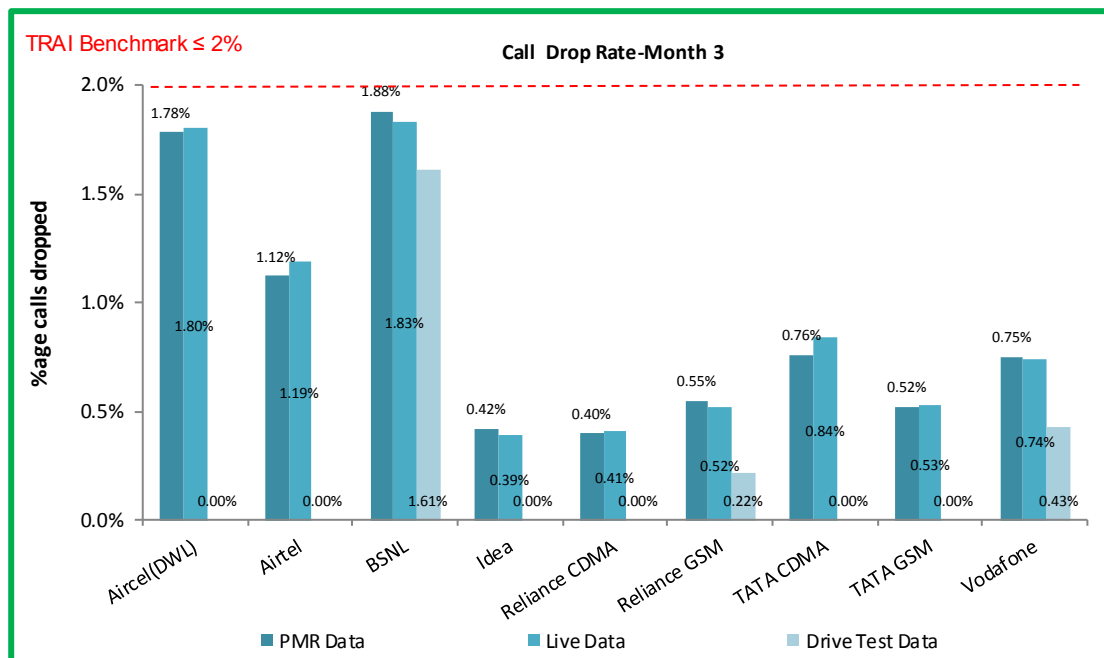
For Reliance CDMA and Reliance GSM, data for Jun'15 could not be audited due to a server issue at operator's end. The same was pre-informed to TRAI by the operator.

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

5.6 CELLS HAVING GREATER THAN 3% TCH DROP

5.6.1 PARAMETER DESCRIPTION

1. **Definition- Worst Affected Cells having more than 3% TCH drop** shall measure the ratio of total number of cells in the network to the ratio of cells having more than 3% TCH drop.

2. **Computational Methodology:** (**Total number of cells having more than 3% TCH drop during CBBH**/ **Total number of cells in the network) x 100**

3. **TRAI Benchmark –**

   ✏ Worst affected cells having more than 3% TCH drop rate ≤ 3%

4. **Audit Procedure –**

   ✏ Audit of traffic data of the relevant quarter kept in OMC-R at MSCs and used for arriving at CDR would be conducted.

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

5.6.2 KEY FINDINGS – CONSOLIDATED
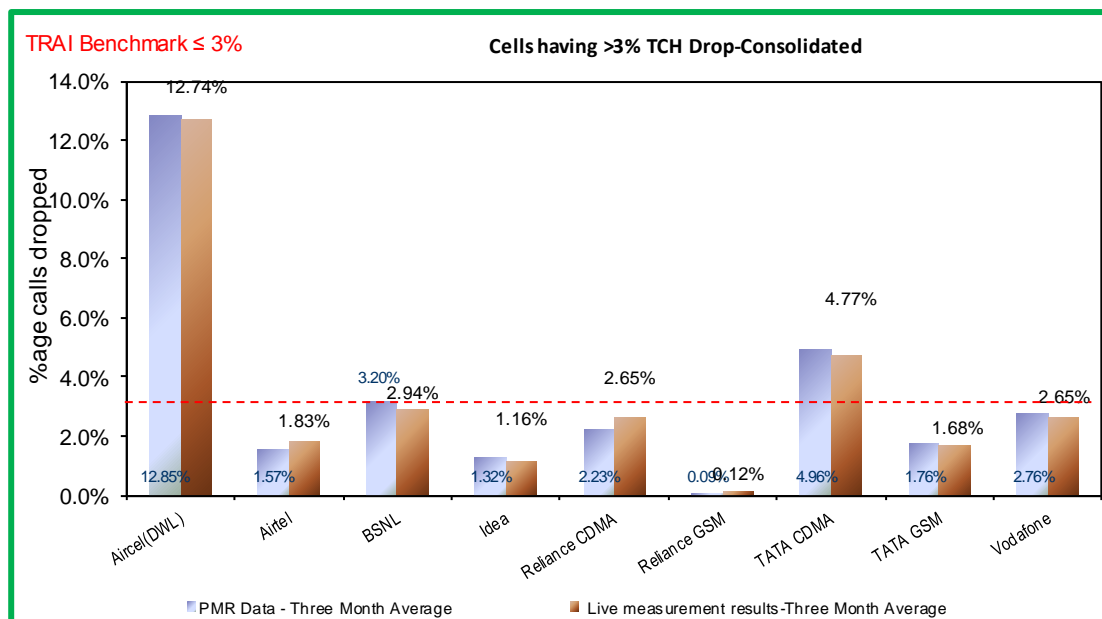
Data Source: Network Operations Center (NOC) of the operators

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

5.6.2.1 KEY FINDINGS – MONTH 1
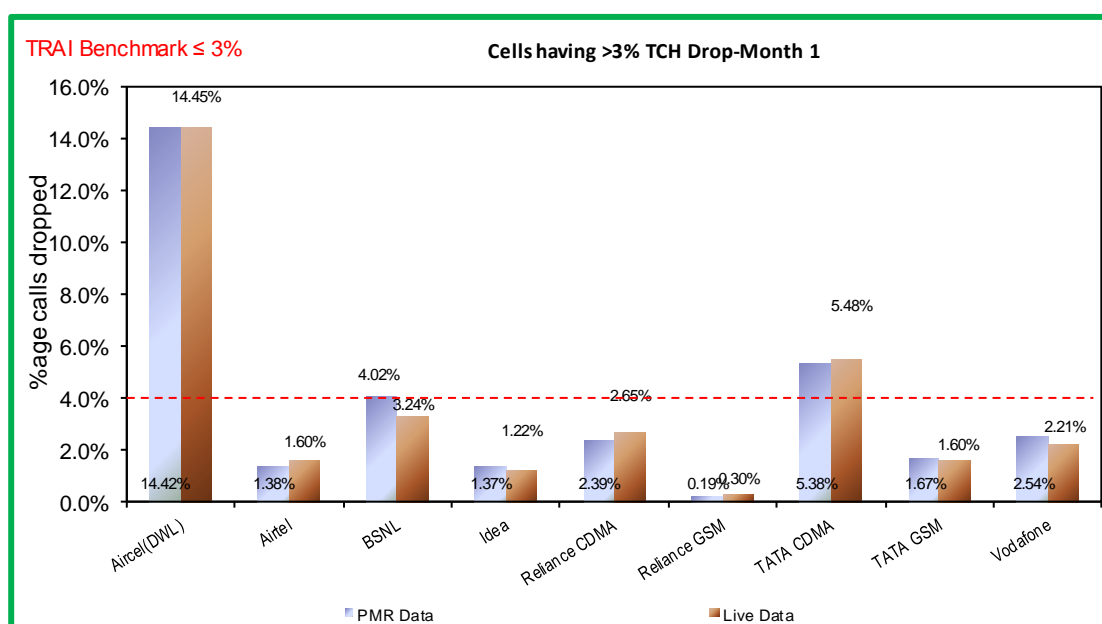
Data Source: Network Operations Center (NOC) of the operators

5.6.2.2 KEY FINDINGS – MONTH 2

TRAI Benchmark ≤ 3%

Cells having >3% TCH Drop-Month 2
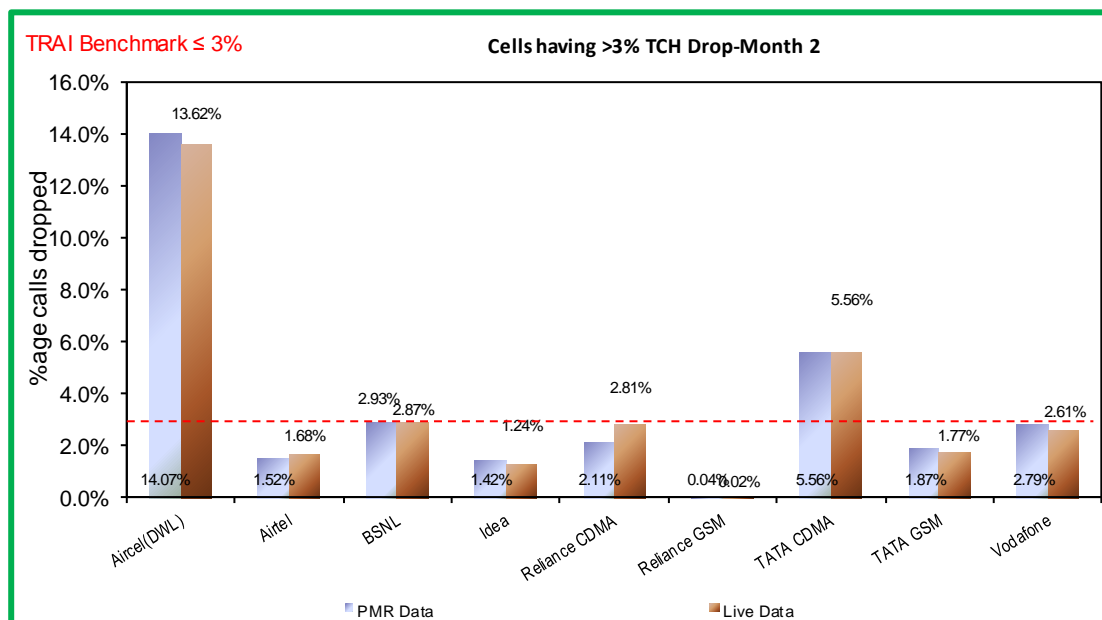
Data Source: Network Operations Center (NOC) of the operators

5.6.2.3 KEY FINDINGS – MONTH 3
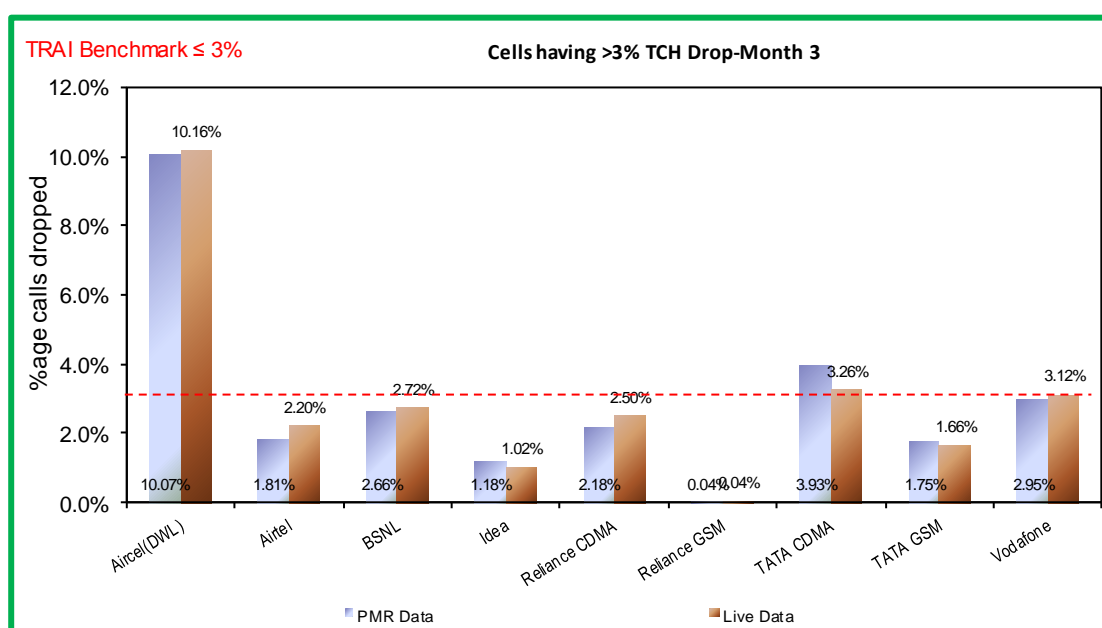
TRAI Benchmark ≤ 3%

Cells having >3% TCH Drop-Month 3

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

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

5.7   VOICE QUALITY

5.7.1   PARAMETER DESCRIPTION

1. **Definition:**

   ↳ for GSM service providers the calls having a value of 0 –5 are considered to be of good quality (on a seven point scale)

   ↳ For CDMA the measure of voice quality is Frame Error Rate (FER). FER is the probability that a transmitted frame will be received incorrectly. Good voice quality of a call is considered when it FER value lies between 0 – 4 %

2. **Computational Methodology:**

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

3. **TRAI Benchmark:** ≥ 95%

4. **Audit Procedure** –

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

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

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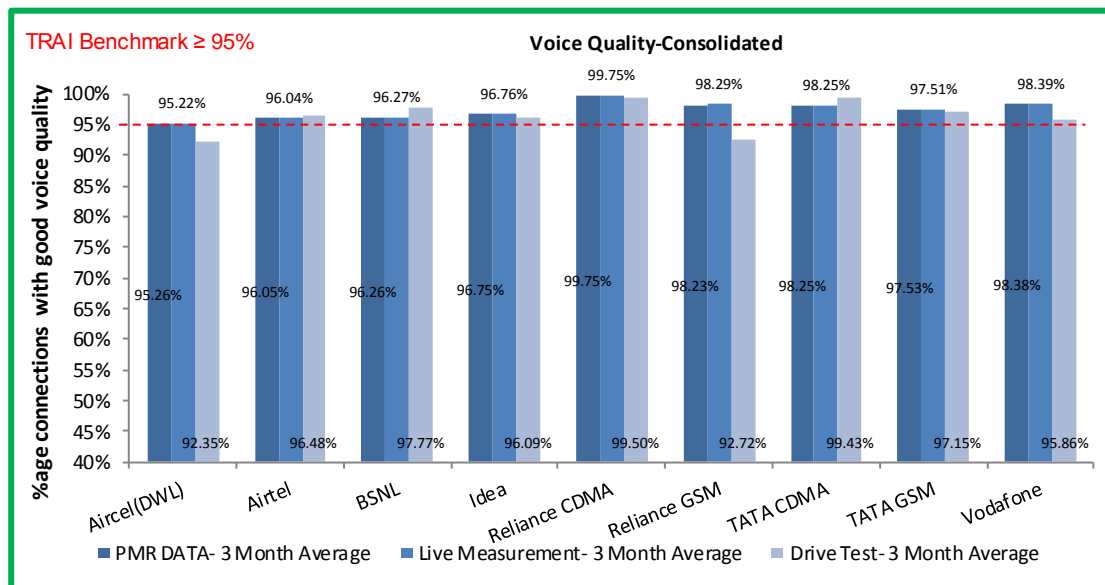
Data Source: Network Operations Center (NOC) of the operators and Drive test reports submitted by operators to auditors

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

5.7.2.1   KEY FINDINGS – MONTH 1
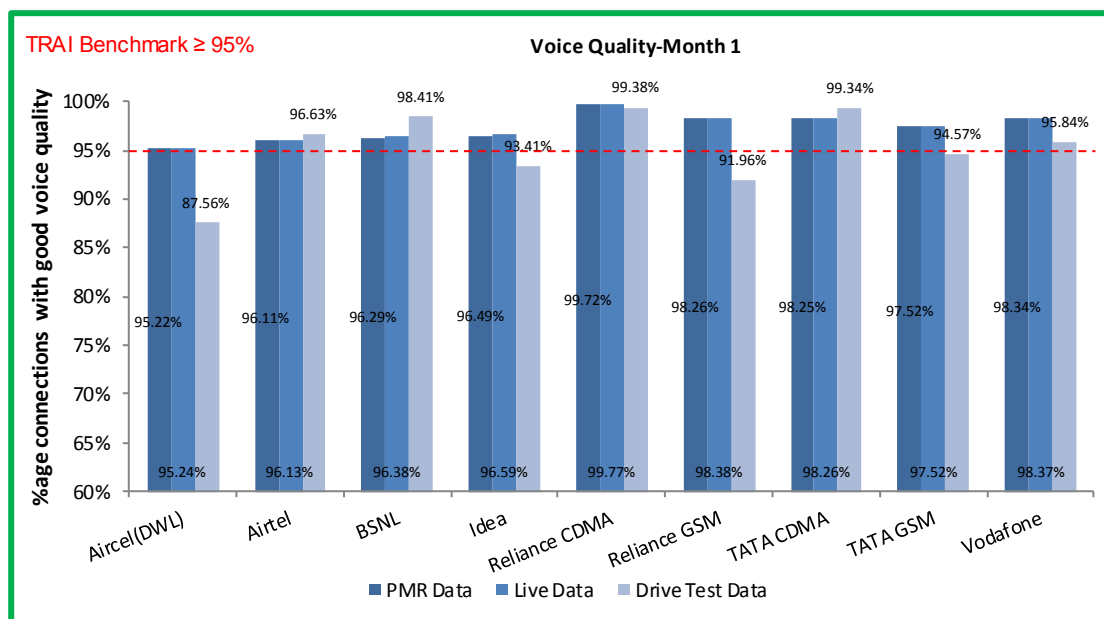
Data Source: Network Operations Center (NOC) of the operators and Drive test reports submitted by operators to auditors

5.7.2.2   KEY FINDINGS – MONTH 2
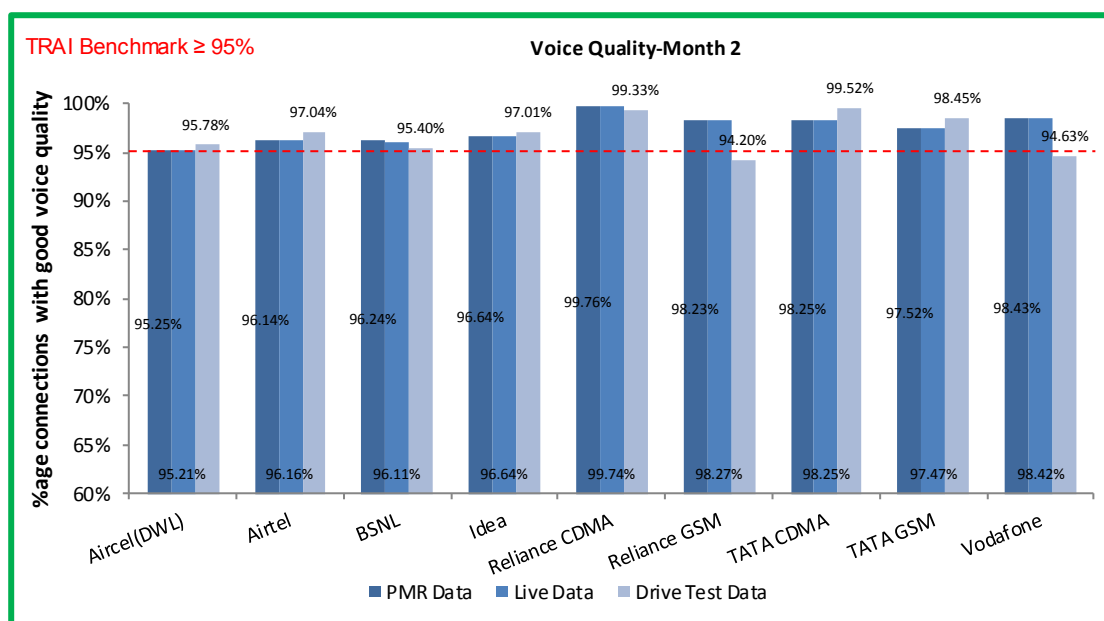
Data Source: Network Operations Center (NOC) of the operators and Drive test reports submitted by operators to auditors
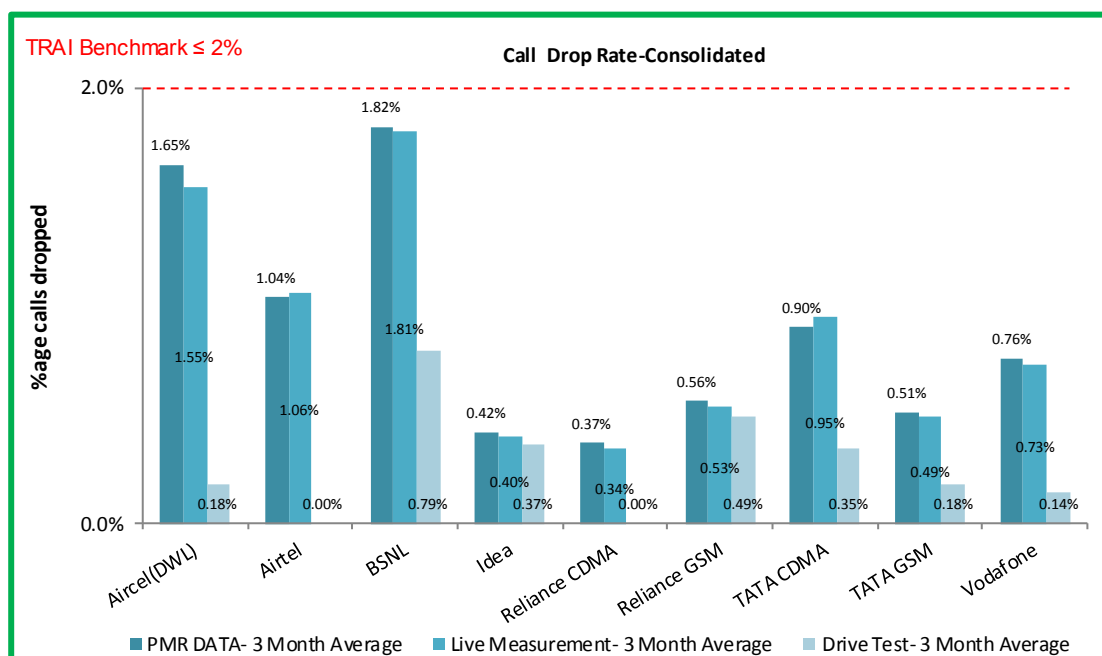
5.7.2.3 KEY FINDINGS – MONTH 3
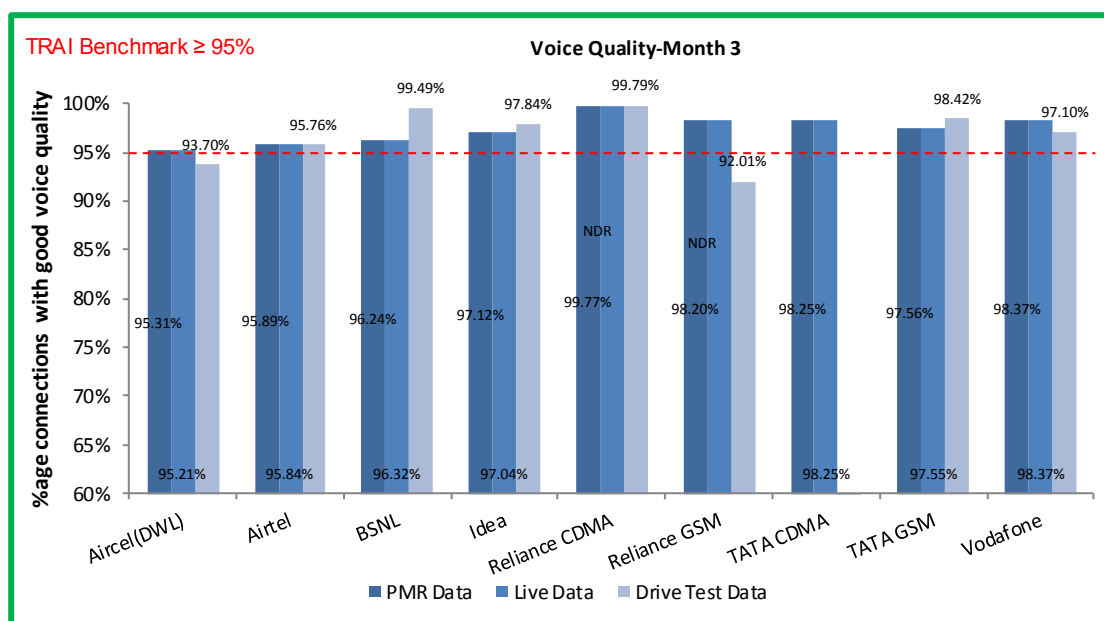
For Reliance CDMA and Reliance GSM, data for Jun'15 could not be audited due to a server issue at operator's end. The same was pre-informed to TRAI by the operator.
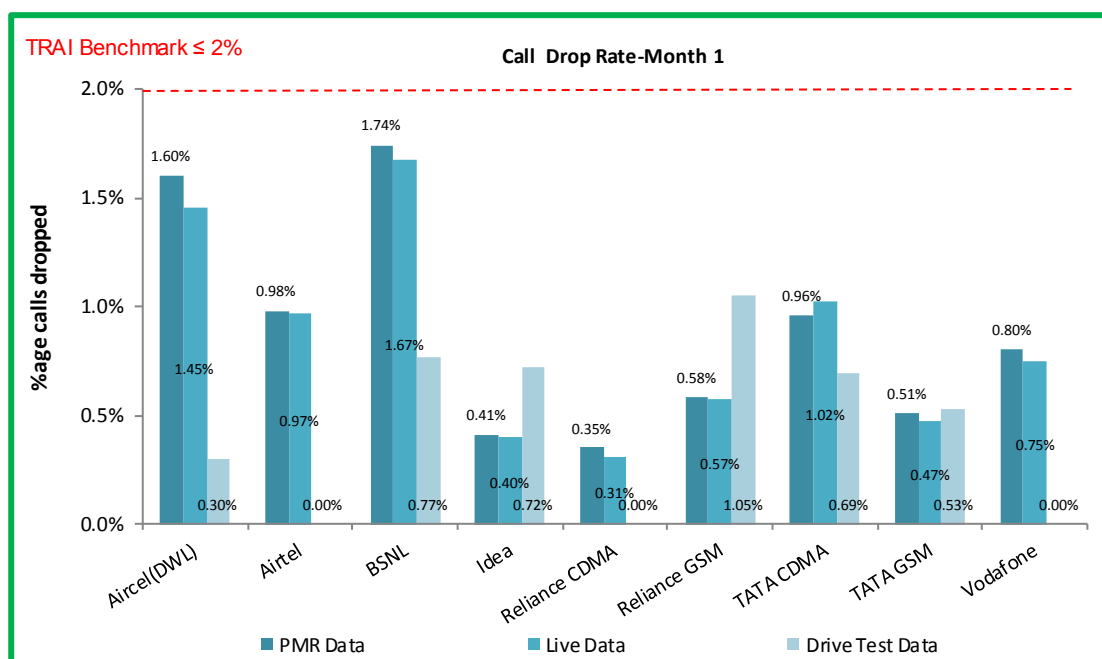
Data Source: Network Operations Center (NOC) of the operators and Drive test reports submitted by operators to auditors

6   PARAMETER DESCRIPTION AND DETAILED FINDINGS – NON-NETWORK PARAMETERS

6.1   METERING AND BILLING CREDIBILITY

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

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

6.1.1   PARAMETER DESCRIPTION

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

- ↳ Payments made and not credited to the subscriber account

- ↳ Payment made on time but late payment charge levied wrongly

- ↳ Wrong roaming charges

- ↳ Double charges

- ↳ Charging for toll free services

- ↳ Local calls charged/billed as STD/ISD or vice versa

- ↳ Calls or messages made disputed

- ↳ Validity related complaints

- ↳ Credit agreed to be given in resolution of complaint, but not accounted in the bill

- ↳ Charging for services provided without consent

- ↳ Charging not as per tariff plans or top up vouchers/ special packs etc.

- ↳ Overcharging or undercharging

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

- ⮑ Computational Methodology:

    - ↳ **Metering and billing credibility (Postpaid)** = (Total billing complaints** received during the relevant billing cycle / Total bills generated* during the relevant billing cycle)*100

    - ↳ *Operator to include all types of bills generated for customers. This would include printed bills, online bills and any other forms of bills generated

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

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

➲ TRAI Benchmark: <= 0.1%

➲ Audit Procedure:

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

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

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

6.1.2 KEY FINDINGS – METERING AND BILLING CREDIBILITY (POSTPAID)
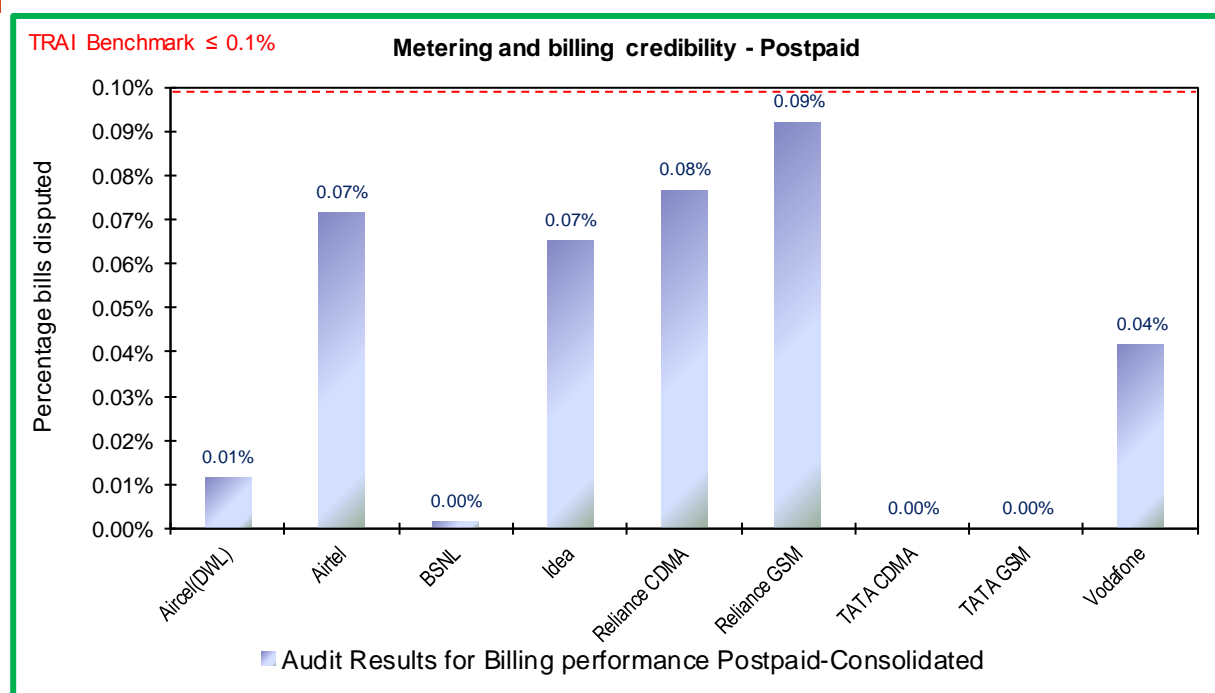
Data Source: Billing Center of the operators

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

Metering and billing credibility - Postpaid (Billing cycle wise)
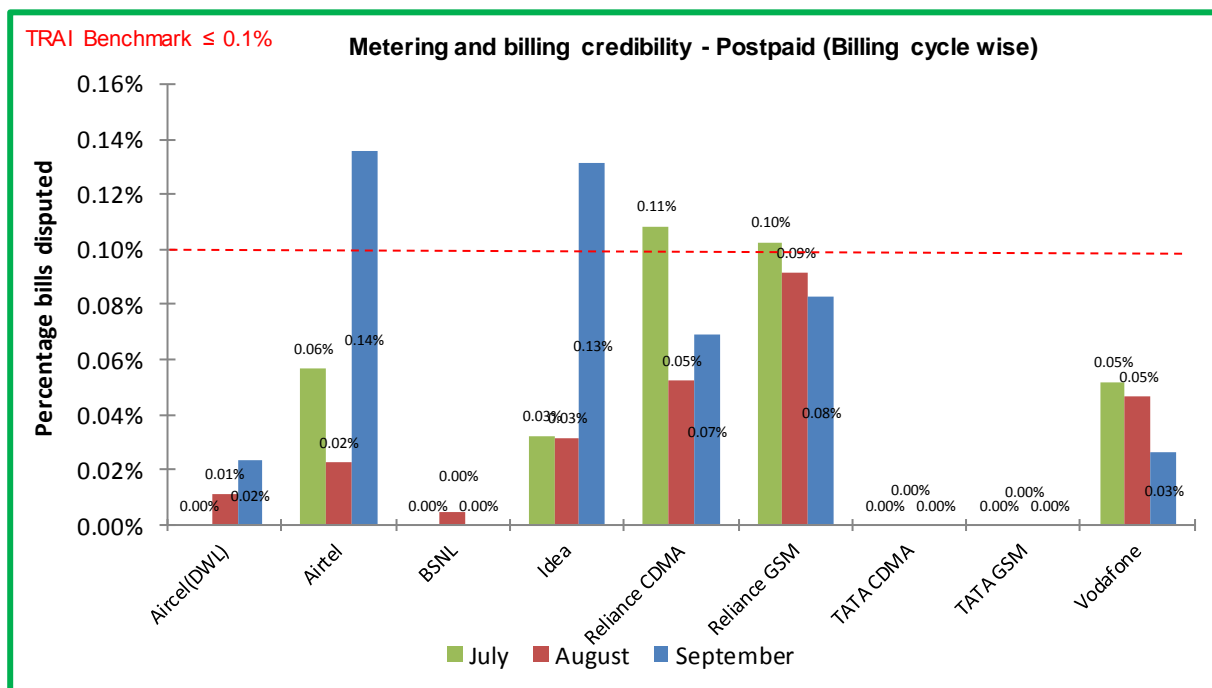
TRAI Benchmark ≤ 0.1%

Data Source: Billing Center of the operators

6.1.3 KEY FINDINGS - METERING AND BILLING CREDIBILITY (PREPAID)

Metering and billing credibility - Prepaid
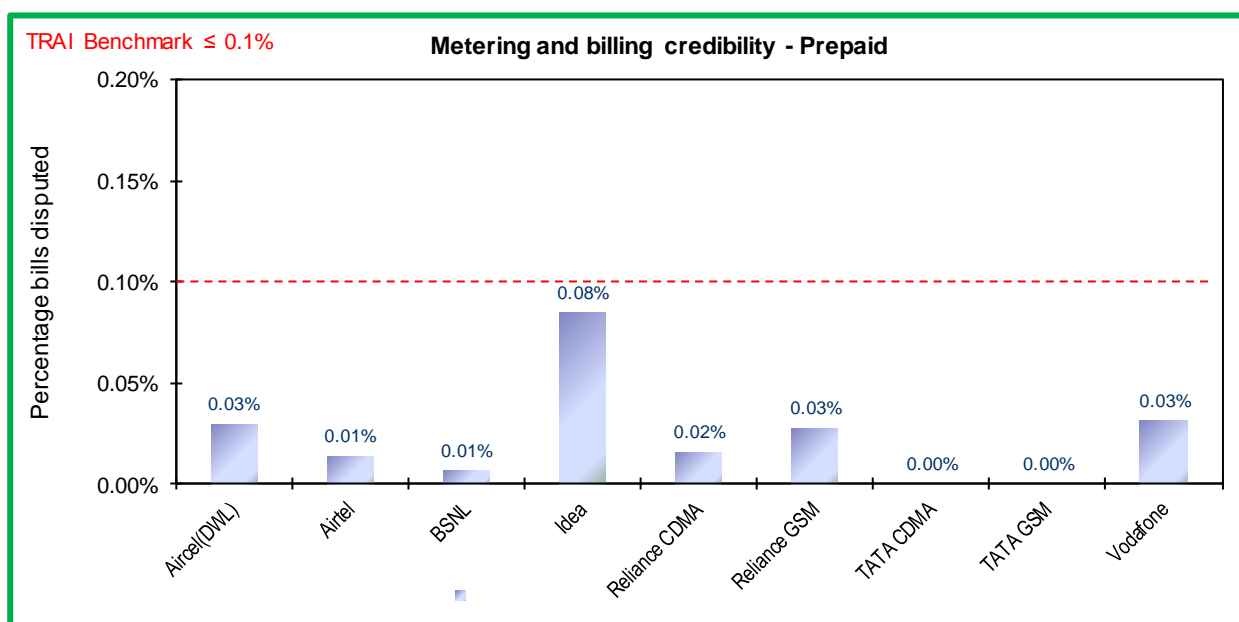
TRAI Benchmark ≤ 0.1%

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

6.2   RESOLUTION OF BILLING COMPLAINTS

6.2.1   PARAMETER DESCRIPTION

Calculation of Percentage resolution of billing complaints

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

Resolution of billing complaints within 4 weeks:

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

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

Resolution of billing complaints within 6 weeks:

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

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

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

✥   The complaints that get marked as invalid by the operator are not considered for calculation as those complaints cannot be considered as resolved by the operator.

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

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

6.2.2 KEY FINDINGS FOR 4 WEEKS
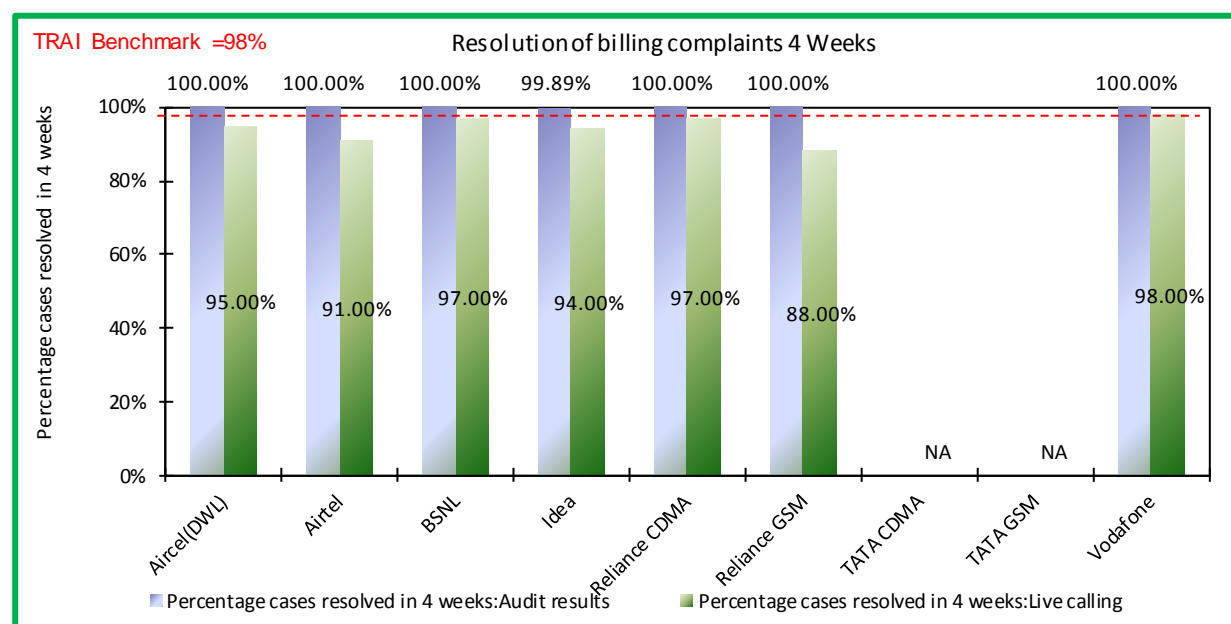
Data Source: Billing Center of the operators

6.2.3 KEY FINDINGS FOR 6 WEEKS
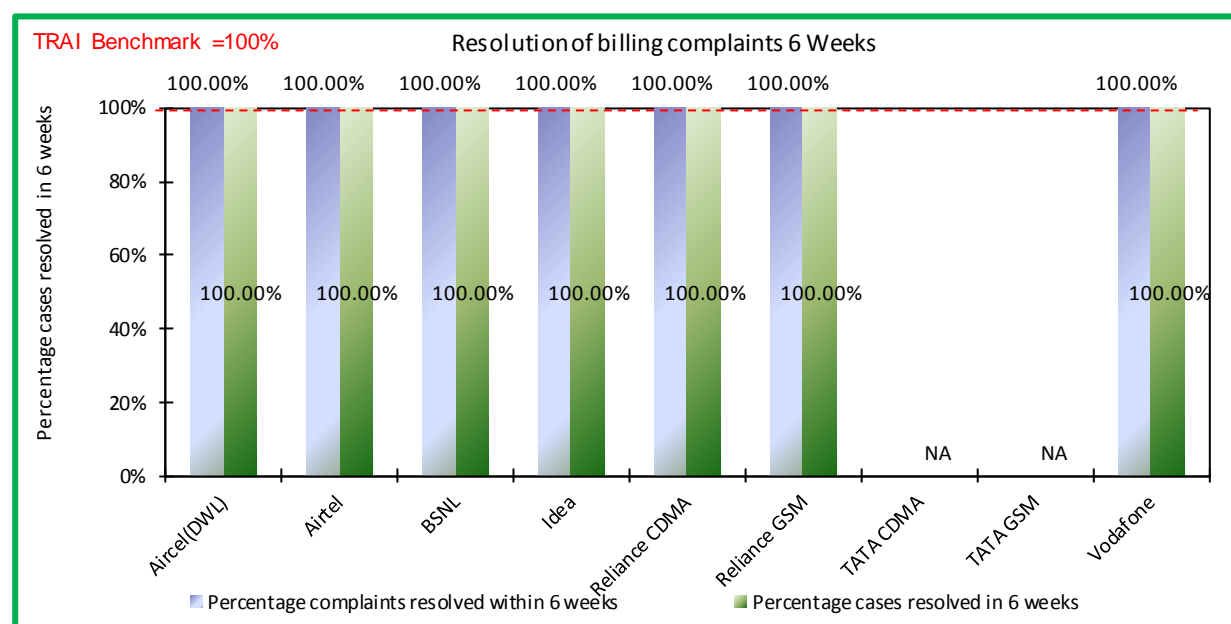
Data Source: Billing Center of the operators

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

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

However, during live calling, it was observed that Aircel, Airtel, BSNL, Idea, Reliance CDMA and Reliance GSM did not meet the TRAI benchmark of resolving 98% complaints within 4 weeks.

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

6.3 PERIOD OF APPLYING CREDIT/WAVIER

6.3.1 PARAMETER DESCRIPTION

⮑ Computational Methodology:

↳ **Period of applying credit waiver = (number of cases where credit waiver is applied within 7 days/ total number of cases eligible for credit waiver) * 100**

⮑ TRAI Benchmark:

↳ Period of applying credit waiver within 7 days: 100%

⮑ Audit Procedure:

↳ Operator to provide details of:-

⮑ List of all eligible cases along with

‣ Date of applying credit waiver to all the eligible cases

‣ Date of resolution of complaint for all eligible cases

6.3.2 KEY FINDINGS
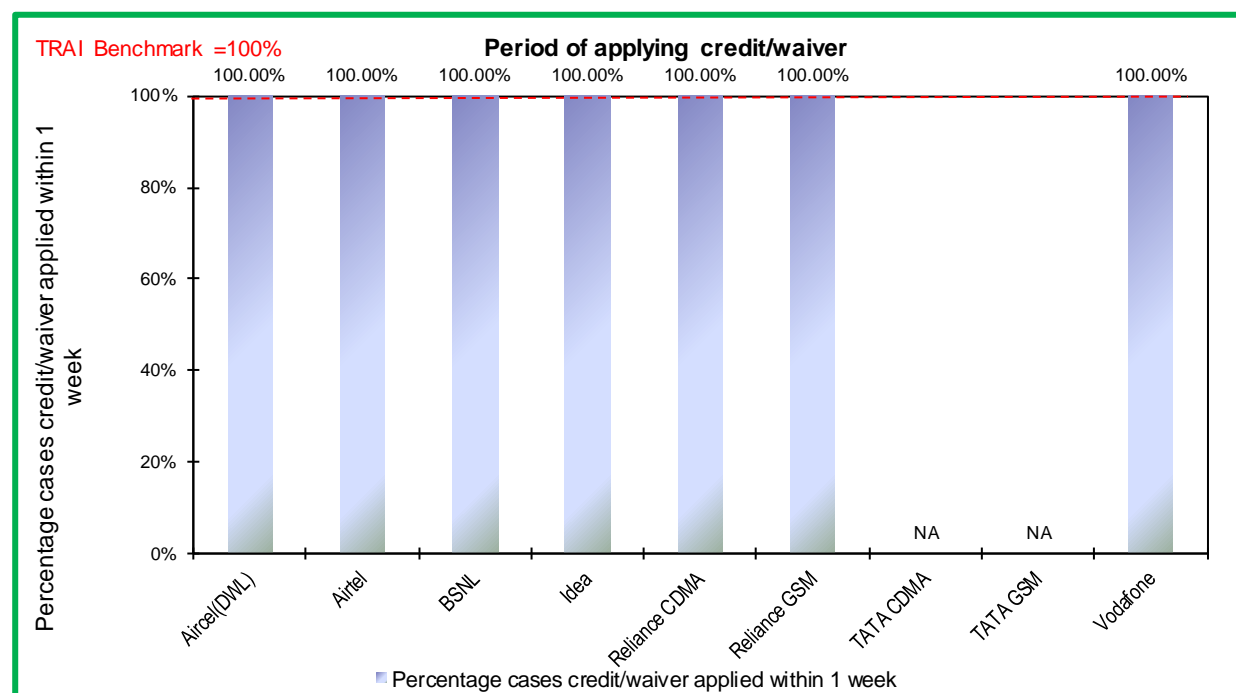
Data Source: Billing Center of the operators

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

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

6.4   CALL CENTRE PERFORMANCE-IVR

6.4.1   PARAMETER DESCRIPTION

⮩ Computational Methodology:

   ↳ **Call centre performance IVR = (Number of calls connected and answered by IVR/ All calls attempted to IVR) * 100**

⮩ TRAI Benchmark: >= 95%

⮩ Audit Procedure:

   ↳ Operators provide details of the following from their central call centre/ customer service database:

      ‣ Total calls connected and answered by IVR

      ‣ Total calls attempted to IVR

   ↳ Also live calling is done to test the calls connected and answered by IVR

6.4.2 KEY FINDINGS
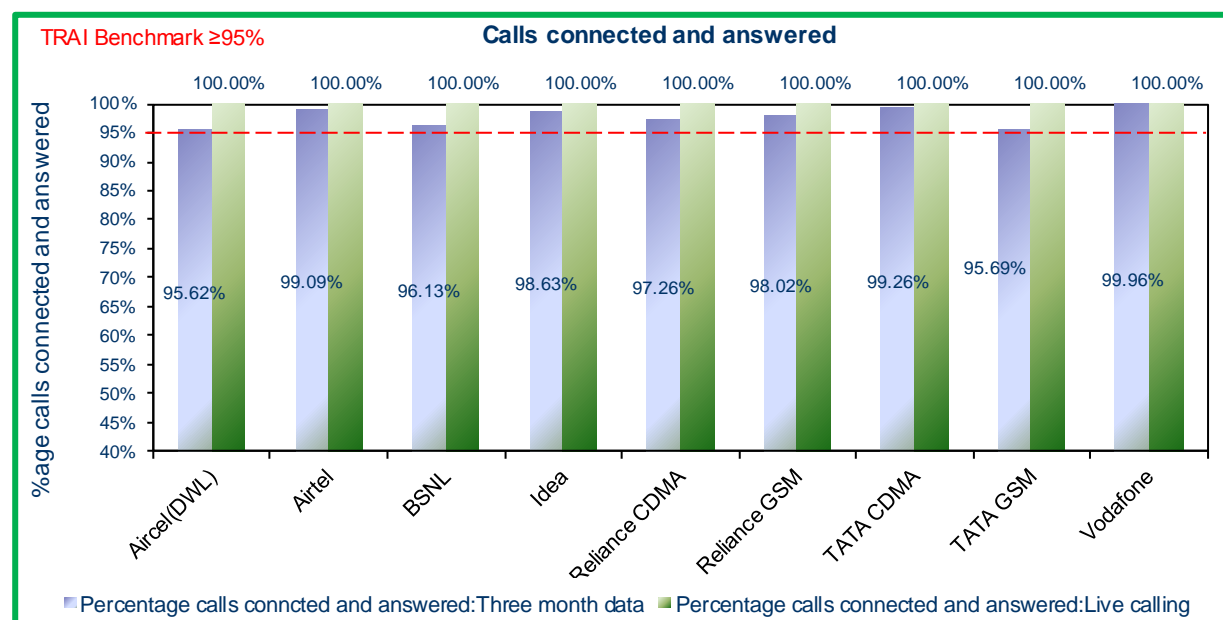
Data Source: Customer Service Center of the operators

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

6.5 CALL CENTRE PERFORMANCE-VOICE TO VOICE

6.5.1 PARAMETER DESCRIPTION

⊃ Computational Methodology:

↳ Call centre performance Voice to Voice = (Number of calls answered by operator within 90 seconds/ All calls attempted to connect to the operator) * 100

⊃ Audit Procedure:

↳ Operators provide details of the following from their central call centre/ customer service database:

‣ Total calls connected and answered by operator within 90 seconds

‣ Total calls attempted to connect to the operator

↳ Also live calling was done to test the calls answered within 90 seconds by the operator

6.5.2 KEY FINDINGS
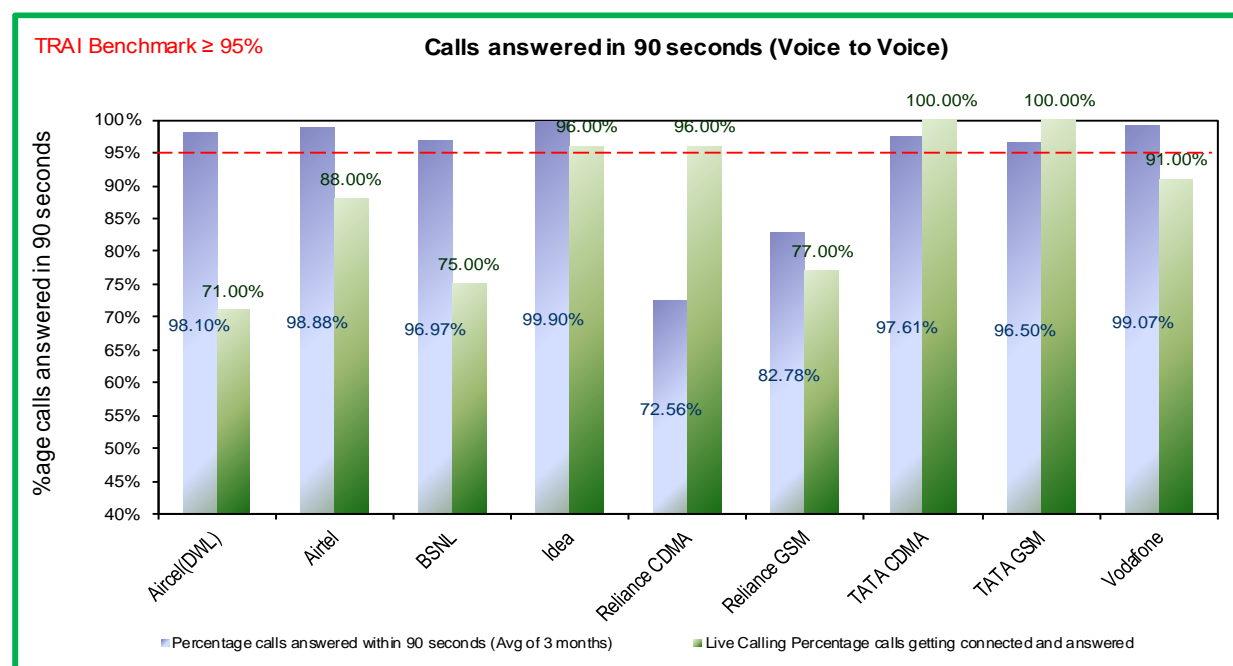
Data Source: Customer Service Center of the operators

As per PMR Audit, Reliance CDMA and Reliance GSM failed to meet the benchmark of calls (voice to voice) being answered by call center executives within 90 seconds.

During live calling, Aircel, Airtel, BSNL, Reliance GSM and Vodafone failed to meet the TRAI benchmark of 95% of calls answered by the call center executives within 90 seconds.
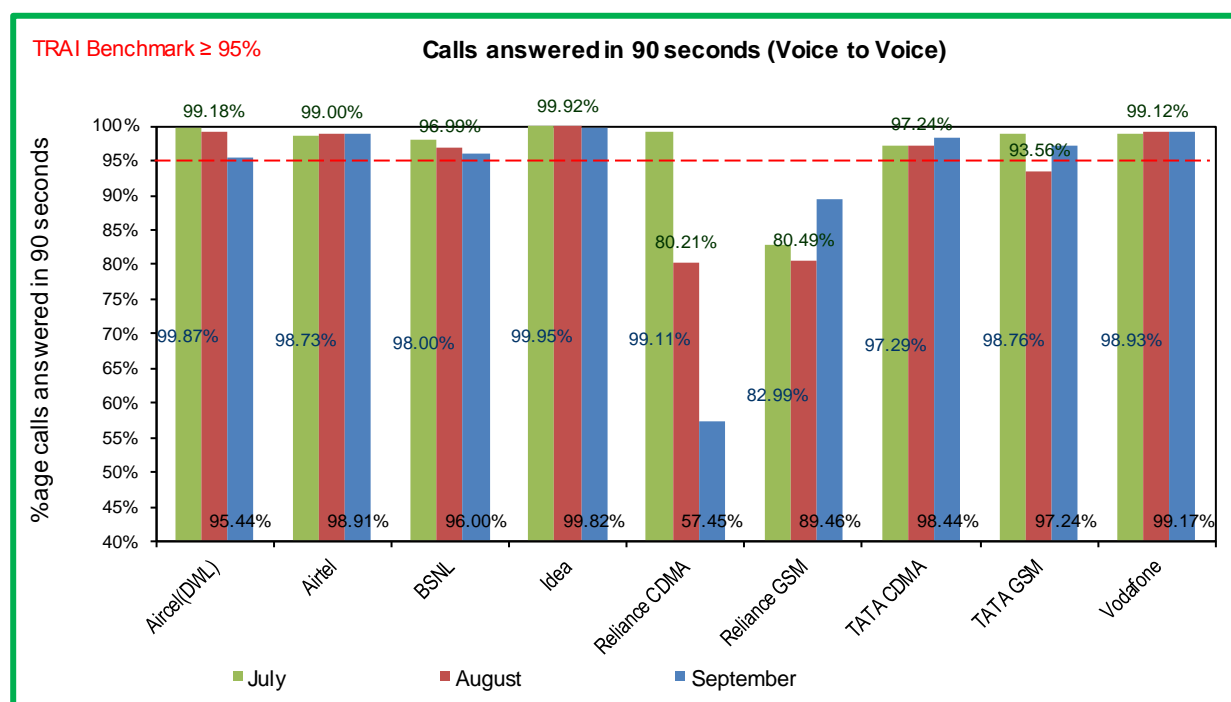
Data Source: Customer Service Center of the operators

6.6 TERMINATION/CLOSURE OF SERVICE

6.6.1 PARAMETER DESCRIPTION

- ➲ Computational Methodology:

  - ↳ **Time taken for closure of service = (number of closures done within 7 days/ total number of closure requests) * 100**

- ➲ TRAI Benchmark:

  - ↳ Termination/Closure of Service: <=7 days

- ➲ Audit Procedure:

  - ↳ Operator provide details of the following from their central billing/CS database:

    - ➲ Date of lodging the closure request (all requests in given period)

    - ➲ Date of closure of service

6.6.2 KEY FINDINGS
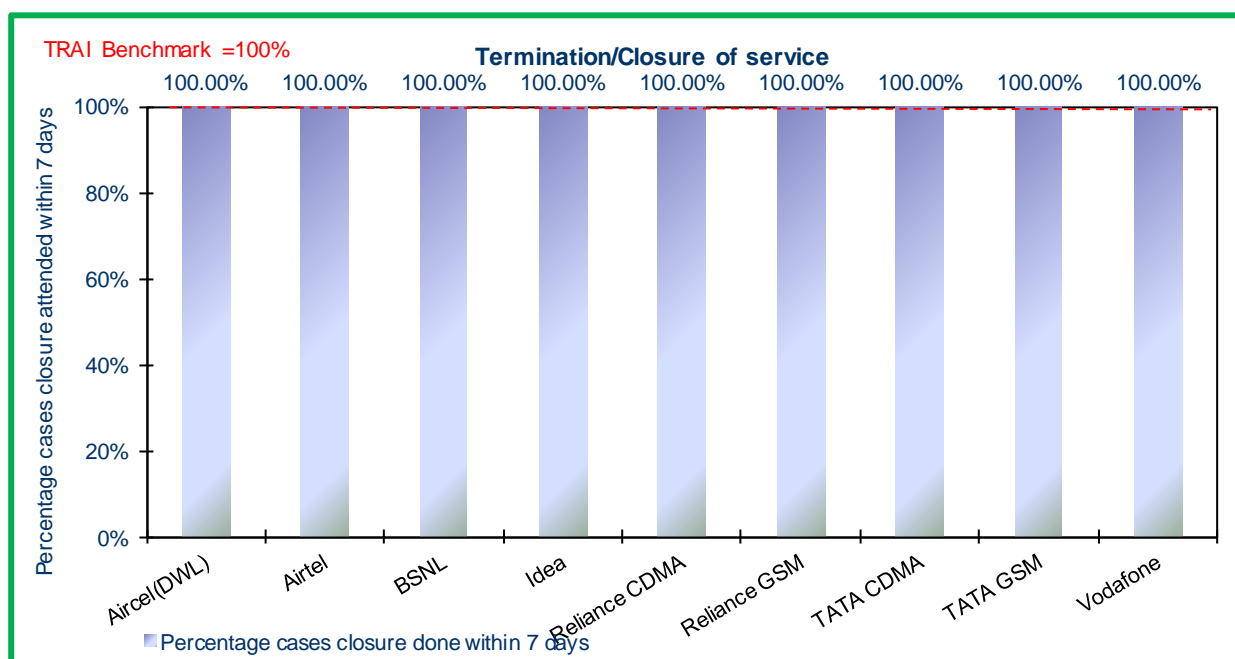
Data Source: Customer Service Center of the operators

All the operators met the benchmark of 100%.

6.7   REFUND OF DEPOSITS AFTER CLOSURE

6.7.1 PARAMETER DESCRIPTION

- ➲ Computational Methodology:

    - ✎ **Time taken for refund for deposit after closures = (number of cases of refund after closure done within 60 days/ total number of cases of refund after closure) * 100**

    - ✎ Any case where the operators need to return the amount back to consumers post closure of service in form of cheque/cash is considered to be refund.

- ➲ TRAI Benchmark:

    - ✎ Time taken for refund for deposit after closures: 100% within 60 days

- ➲ Audit Procedure:

    - ✎ Operator provide details of the following from their central billing/refund database:

        - ➲ Dates of completion of all 'closure requests' resulting in requirement of a refund by the operator.

        - ➲ Dates of refund pertaining to all closure request received during the relevant quarter

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6.7.2 KEY FINDINGS

TRAI Benchmark =100%   Refund of deposts after closure
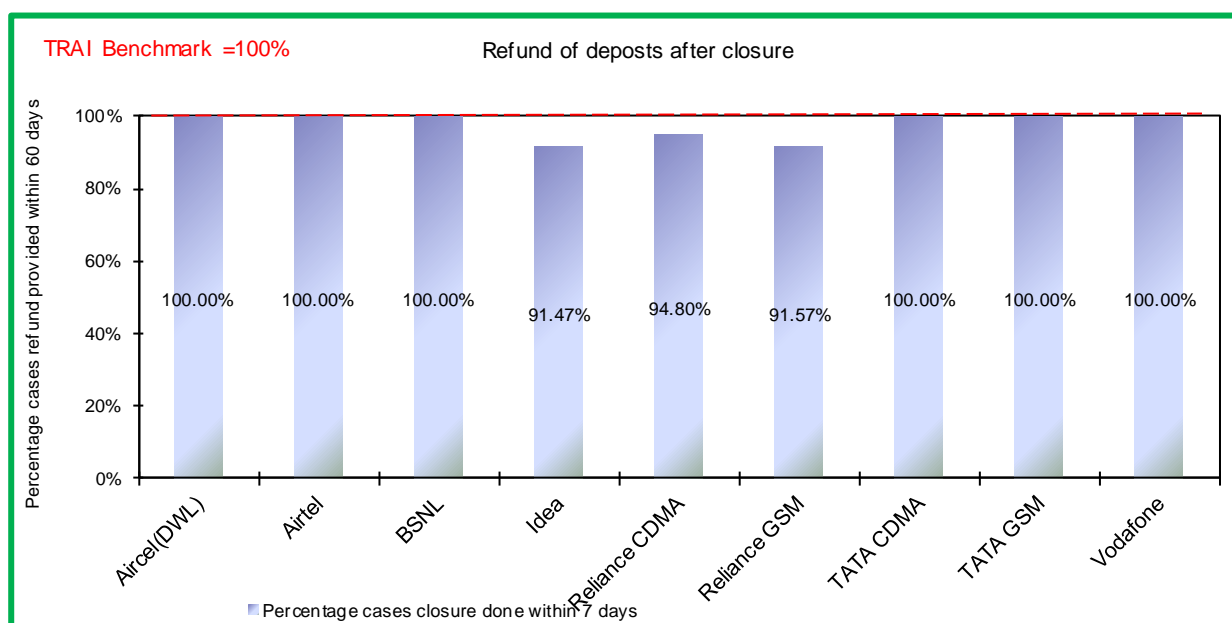
Data Source: Customer Service Center of the operators

During audit, it was found that Idea, Reliance CDMA and Reliance GSM failed to meet the benchmark for the parameter.

7   DETAILED FINDINGS - DRIVE TEST DATA

7.1   OPERATOR ASSISTED DRIVE TEST

The drive test was conducted simultaneously for all the operators present in the Orissa circle. As per the new directive given by TRAI headquarters, drive test for the month of July, August and September 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 Orissa circle are given below.

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

7.1.1 JULY - BERHAMPUR SSA

Month	Name of SSA Covered	Date of Drive Test
July	BERHAMPUR	22nd to 24th July 2015

7.1.1.1   ROUTE DETAILS - BERHAMPUR SSA

Category	Type of location	Orissa BERHAMPUR		
		Day 1	Day 2	Day 3
Outdoor	Major Roads	Bhajanagar-Belguntha-Ballipadar-Aska.	R.udyagari-Khajuripada-Lanjipadar-Narayanpur.Jajpur,Paralakhemundi	Gopalpur over bridge-Berhampur unversity-AD ARMY COLLEGE-Karapalli-Mayfair-Gopalpur
	Highways	Berhampur-Hinjlikatu-Aska-Kanheipalli-Jilundi-Bhajanagar-	Berhampur-Digaphandi-Pudamari-Luhagadi-Chandrgiri-R.udyagiri-	Gopalpur over bridge-Kalam college-Tata industries-Chhtrapur-Palur junction-Humma-Rambha-Balugaon-INS chilika.
	With in the City	By pass bausalundi-Police station-Jail-Bustand-Bsnl office-K.S.U.B.COLLEGE-NAC bhajanagar market complex.	Bsnl office-Circuit House-Medical-Laxmi Talkies-Bustand-k.c.Road-Jajpur(Paralakhemundi).	Berhampur Bsnl office-Tata bench squre-Gopalpur Junction-Andhapasar road-Ist gate-Gate bazaar-Sai complex)----(Chhtrapur By pass-Railway station-Chhtrapur court-chhtrapur By pass Road
Indoor	Shopping complex	Upendra bhanja Market Complex, Bhajanagar	Paralakhumndi new bus stand market complex	SAI, Market Complex,Berhampur
	Office complex	BSNL Telephone Bhawan,Aska.	BSNL Telephone Exchange,Paralakhemundi	BSNL Telephone Exchange-Berhampur,

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- BERHAMPUR SSA

Drive Test - Kilometers Travelled	Day 1	Day 2	Day 3	Total
Behrampur	142	210	128	480

7.1.1.3   ROUTE MAP - BERHAMPUR DAY 1
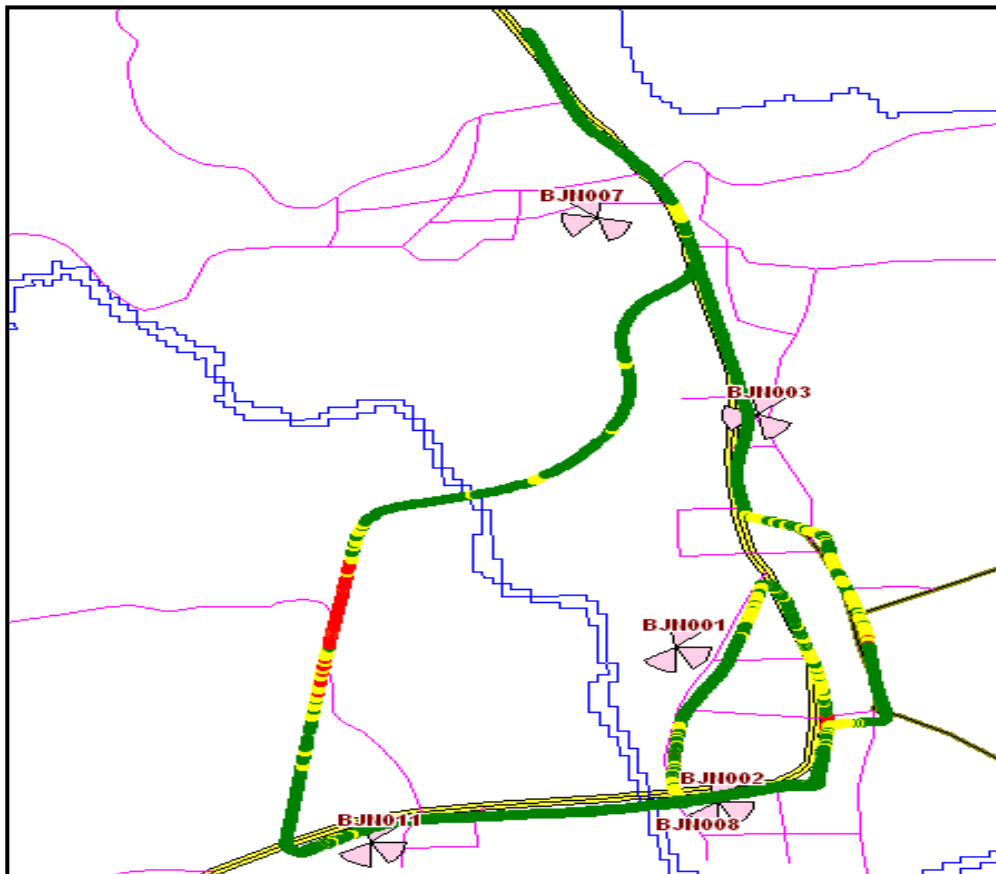
SSA ROUTE COVERED

1. KISANGADIA
2. SANAPAHURI
3. BUNSARUNDI
4. BHANJANAGAR
5. BUSTAND
6. MEDICAL

7.1.1.4 ROUTE MAP - BERHAMPUR DAY 2
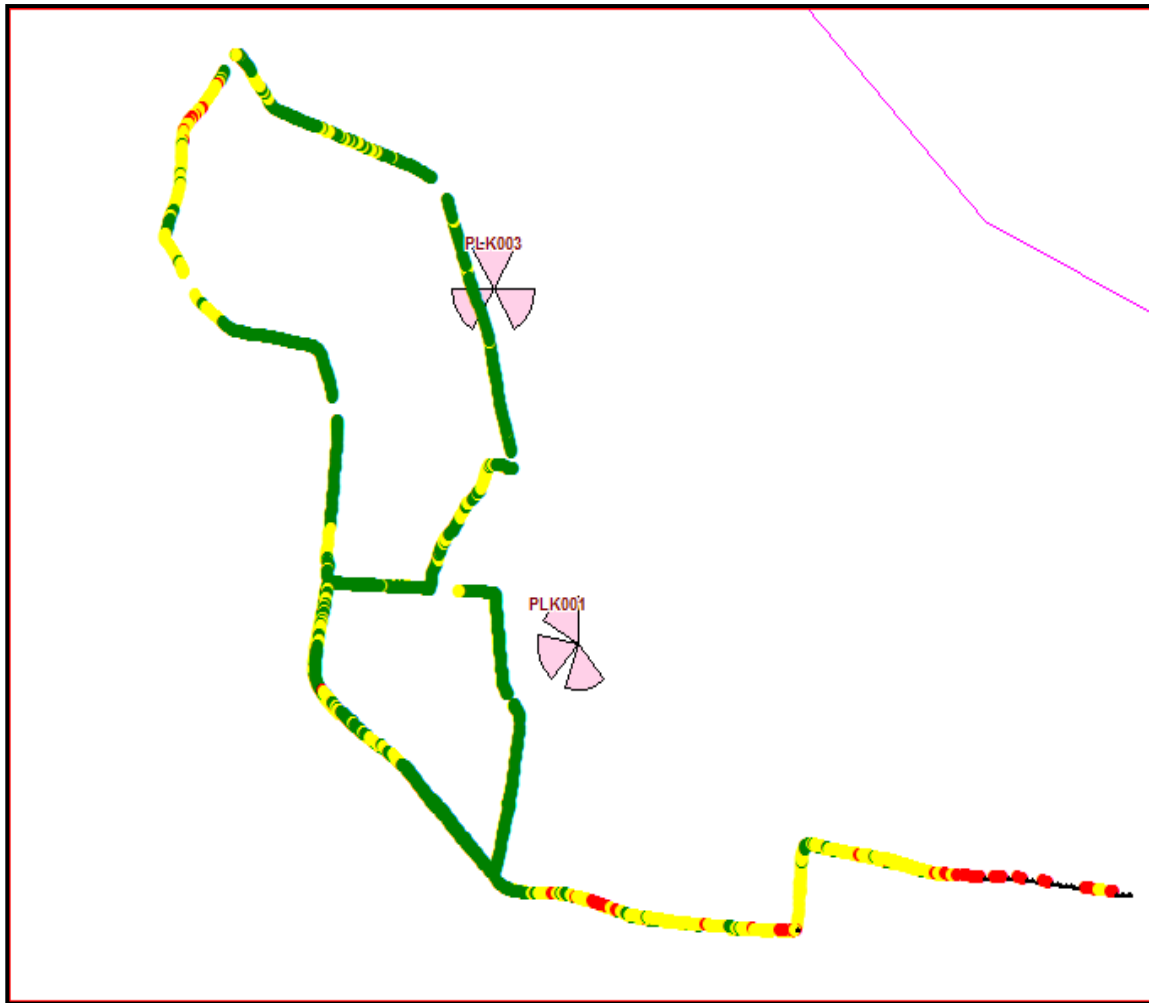
SSA ROUTE COVERED

1. SKCG COLLEGE
2. GOVT. HOSPITAL
3. BUS STAND
4. PALACE ROAD
5. SOFIA LODGE

7.1.1.5   ROUTE MAP - BERHAMPUR DAY 3
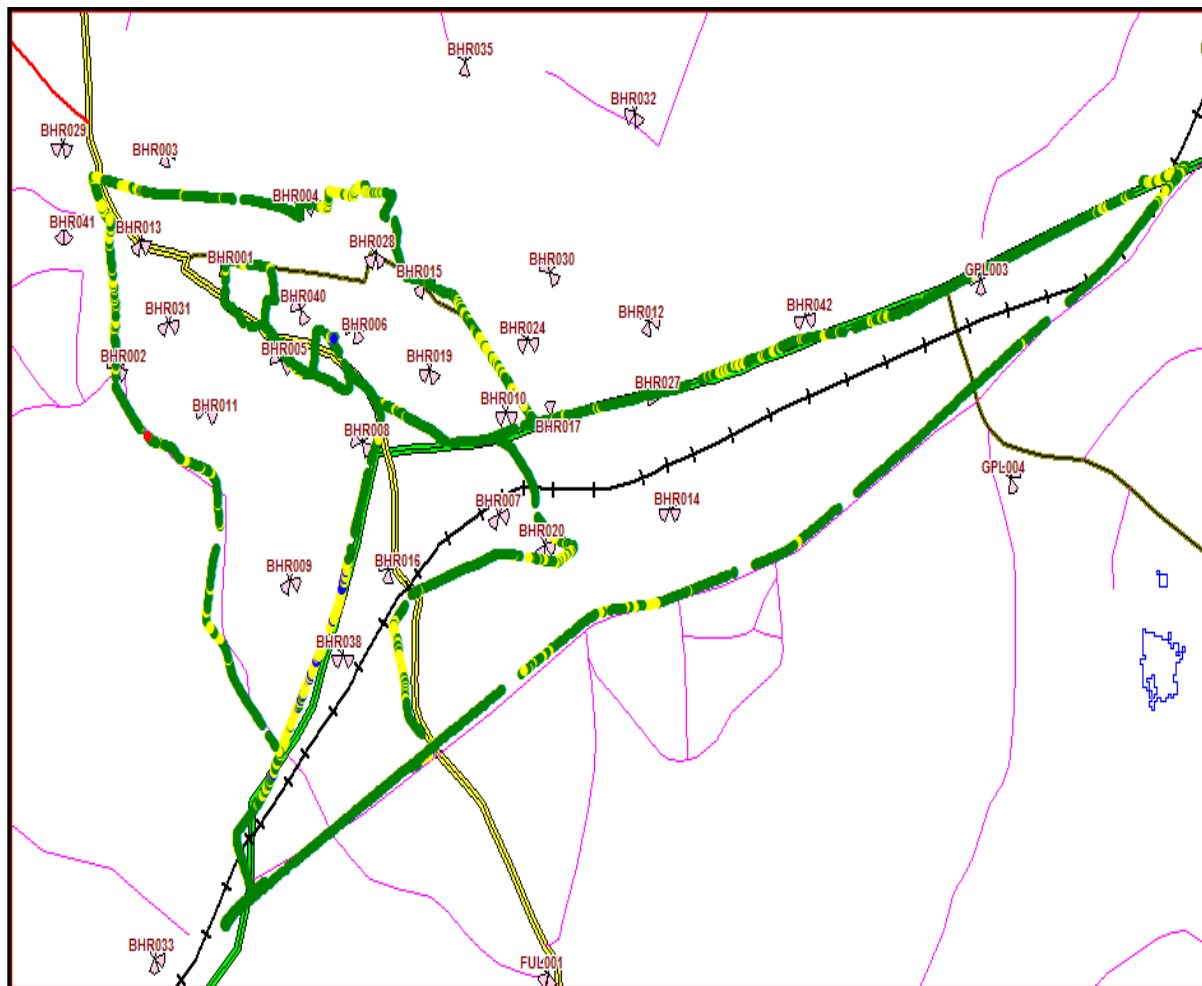
SSA- ROUTE COVERED

1. BERHAMPUR

2. GANDHI NAGAR

3. GOPAL PALLI

4. HOUSING BOARD COLONY

5. BIJIPUR

6. BUS STAND

7. RAILWAY STATION

8. BADA BAZAR

9. SANA BAZAR

7.1.1.6   DRIVE TEST RESULTS - BERHAMPUR SSA

Parameter's	B'mark	Aircel(DWL)		Airtel		BSNL		Idea		Reliance CDMA		Reliance GSM		TATA CDMA		TATA GSM		Vodafone	
		In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor
0 to -75 dBm		96.33%	79.63%	83.87%	65.72%	75.00%	75.80%	64.29%	57.56%	32.59%	28.27%	53.57%	41.80%	20.88%	73.98%	30.74%	46.21%	42.21%	39.32%
0 to -85 dBm		100.00%	98.88%	98.82%	91.11%	83.33%	92.50%	98.05%	97.31%	82.63%	55.16%	98.13%	77.64%	97.98%	97.51%	95.28%	88.60%	93.78%	166.94%
0 to -95 dBm		100.00%	100.00%	99.91%	96.93%	91.67%	98.45%	100.00%	99.19%	99.98%	90.80%	99.99%	90.10%	100.00%	99.95%	99.84%	97.46%	99.87%	98.96%
Voice quality	≥ 95%	97.42%	87.73%	98.72%	96.29%	99.75%	97.57%	86.93%	96.61%	99.24%	99.52%	98.32%	89.46%	99.80%	98.88%	97.23%	92.84%	97.90%	95.67%
CSSR	≥ 95%	100.00%	99.18%	100.00%	100.00%	100.00%	99.31%	100.00%	99.41%	100.00%	100.00%	100.00%	97.05%	97.92%	100.00%	100.00%	95.02%	100.00%	95.98%
%age Blocked calls		0.00%	1.39%	0.00%	0.00%	0.00%	0.69%	0.00%	12.84%	0.00%	0.00%	0.00%	2.95%	0.00%	0.00%	0.00%	5.61%	0.00%	0.19%
Call drop rate	≤ 2%	0.00%	0.22%	0.00%	0.00%	0.00%	0.75%	0.00%	0.59%	0.00%	0.00%	0.00%	1.68%	2.08%	0.00%	0.00%	0.41%	0.00%	0.00%
Hands off success rate		100.00%	100.00%	100.00%	100.00%	100.00%	98.60%	100.00%	99.54%	100.00%	100.00%	100.00%	99.78%	100.00%	100.00%	100.00%	98.05%	100.00%	99.89%

Data Source: Drive test reports submitted by operators to auditors

Voice Quality

Aircel, Reliance GSM and Tata GSM did not meet the benchmark in outdoor locations. Idea failed to meet the benchmark in indoor locations.

Call Set Success Rate (CSSR)

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

Call Drop Rate

Tata CDMA failed to meet the benchmark for call drop rate in indoor locations.

7.1.2   AUGUST – BALASORE SSA

Month	Name of SSA Covered	Date of Drive Test
August	BALASORE	19th to 21st August 2015

7.1.2.1   ROUTE DETAILS – BALASORE SSA

Category	Type of location	Orissa BALASORE		
		Day 1	Day 2	Day 3
Outdoor	Major Roads	Rudra Gopalpur chawk,Basta,Darada, Jamsuli,Singla	Jamjhadi, Basudevpur, Chandimal,Bideipur,Bali munda, Kuamara,Dhamra.	Chandbali Bypass Chawk,Dolosahi,Bilana,Sah eednagar,Kothar, Dhusuri,Betaligaon,Aradi Kothar,Dobal, Dhamnagar Highway Chawk.
	Highways	Rudra Gopalpur,Haldipada, Basta, Balasore, Soro, Jamjhadi	Jamjhadi, Markona,Ranital,Charam pa, Bhadrak	Dhamnagar,Barikpur, Uttaraband, Akhupada
	With in the City	City-1: Remuna golei, Bus stand, FM Golei, Station Sqr, ITI Sqr, Kuruda,Bhuin sahi,Makalpur CITY-2: Daily marketGandhi chowk,BSNL office,Basta	CITY-1: BSNL Office, Basudevpur,college chawk,main road, Deuli, CITY-2:Bus stand,Main road, port,Dhamara	Mathasahi, Railway Station, Pramanik Nagar, Bidhan Apartment, Jagannathpur,Chandan Bazar,Bonth chawk,Chandbali bypass.
Indoor	Shopping complex	New Market Complex, Balasore	Nilamani Market Complex, Basudevpur	Gupta Market Complex, Bhadrak
	Office complex	BSNL Telephone Bhawan, Balasore	BSNL Telephone Bhawan, Basudevpur	BSNL Telephone kendra, Bhadrak

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– BALASORE SSA

Drive Test - Kilometers Travelled	Day 1	Day 2	Day 3	Total
Balasore	130	118	157	405

7.1.2.3 ROUTE MAP BALASORE DAY 1
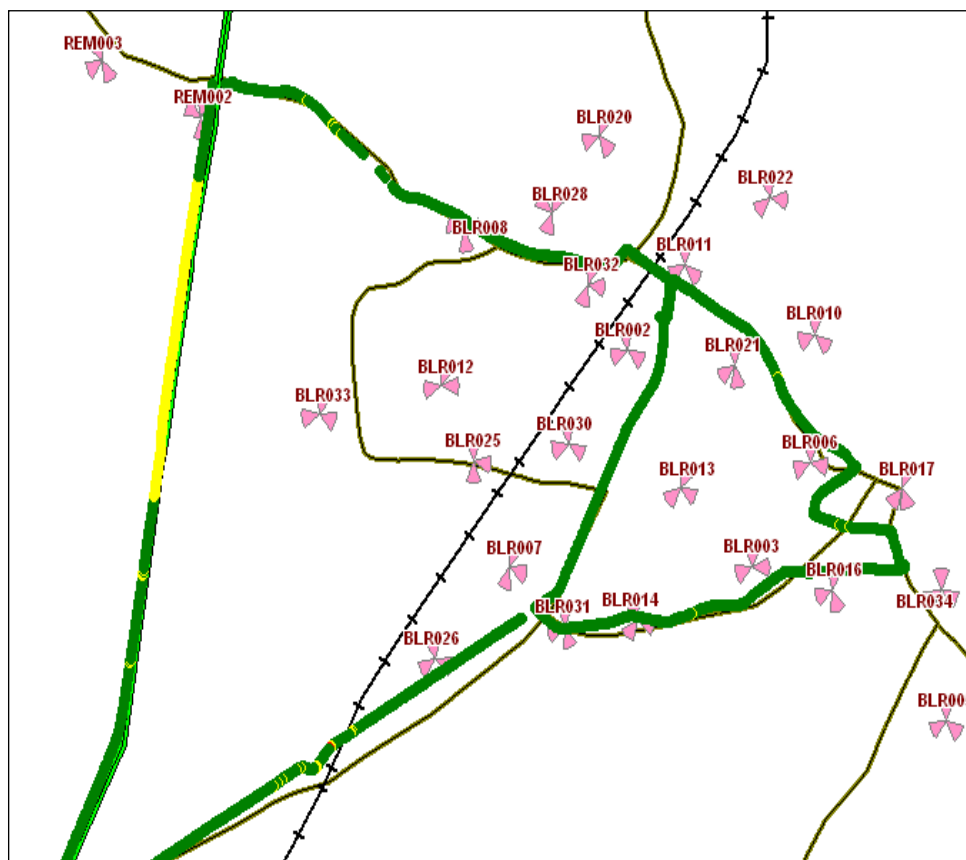
SSA- ROUTE COVERED

1. REMUNA GOLAI

2. SAHADEVKHUNTA

3. BUS STAND

4. FAKIR MOHAN GOLAI

5. FANDI CHOWK

6. CINEMA HALL CHOWK

7. ITI CHOWK.

8. KURUDA GOLEI

7.1.2.4   ROUTE MAP BALASORE DAY 2

SSA ROUTE COVERED

1. VASUDEBPUR

2. COLLEGE ROAD

3. BUS STAND

4. THANA CHOWK

5. MAIN MARKET

6. PANCHAYAT OFFICE

7. MARKET END

7.1.2.5   ROUTE MAP BALASORE DAY 3
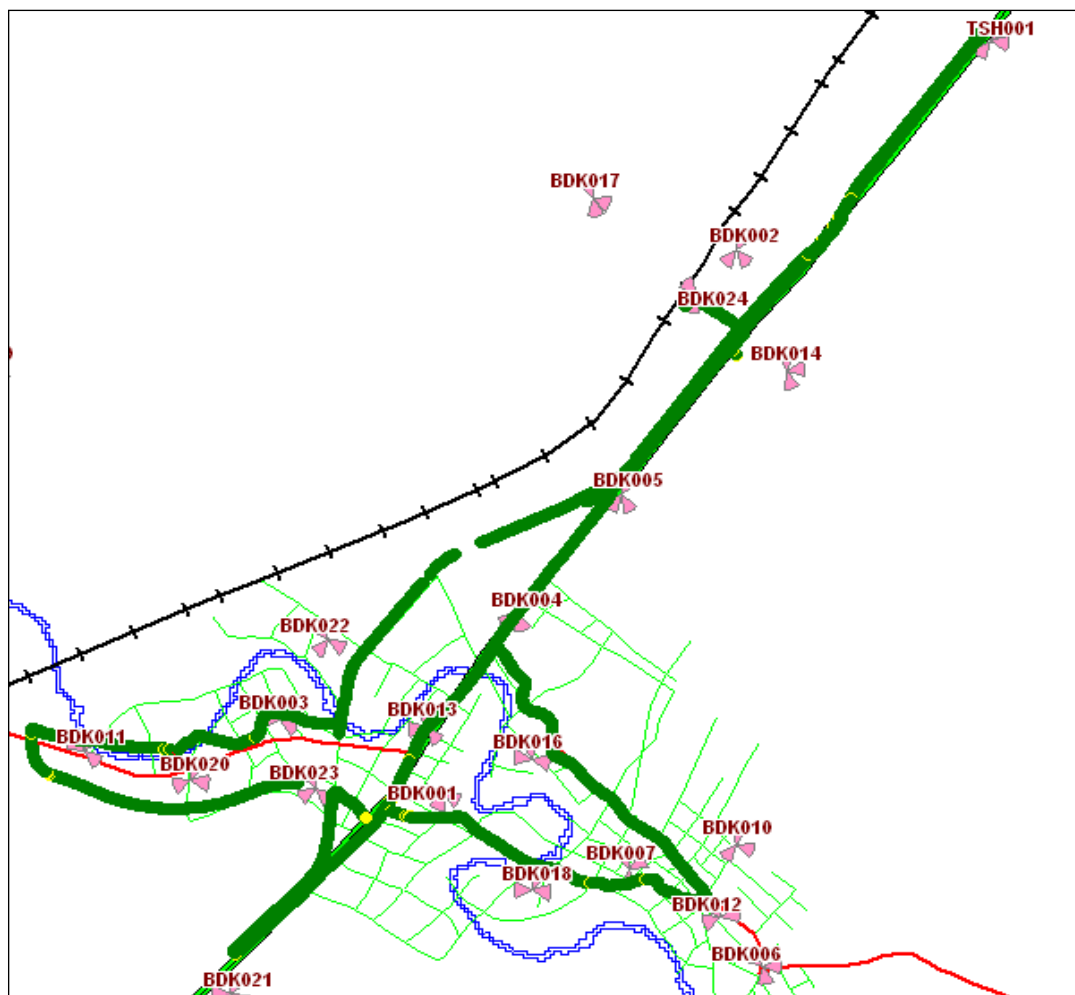
SSA ROUTE COVERED

1. BANTA CHOWK

2. JANUGARIJ

3. JAGANNTHPUR

4. CHARAMPA

5. SALANDI BYPASS

6. POWER HOUSE CHOWK

7. PURUNA BAZAR

8. KUANASA

9. KACHERI ROAD

7.1.2.6   DRIVE TEST RESULTS – BALASORE SSA

Parameter's	B'mark	Aircel(DWL) In door	Aircel(DWL) Outdoor	Airtel In door	Airtel Outdoor	BSNL In door	BSNL Outdoor	Idea In door	Idea Outdoor	Reliance CDMA In door	Reliance CDMA Outdoor	Reliance GSM In door	Reliance GSM Outdoor	TATA CDMA In door	TATA CDMA Outdoor	TATA GSM In door	TATA GSM Outdoor	Vodafone In door	Vodafone Outdoor
0 to -75 dBm		98.86%	87.67%	92.60%	86.30%	70.24%	44.49%	58.14%	49.11%	84.81%	37.41%	57.44%	40.63%	21.53%	57.07%	83.38%	77.19%	38.36%	36.67%
0 to -85 dBm		100.00%	96.01%	98.74%	98.85%	97.45%	81.57%	91.44%	96.99%	98.95%	66.69%	95.96%	74.34%	94.91%	91.65%	99.81%	97.11%	96.02%	84.78%
0 to -95 dBm		100.00%	100.00%	99.75%	99.91%	99.87%	98.00%	99.53%	99.14%	100.00%	91.02%	99.94%	90.26%	100.00%	99.96%	100.00%	99.93%	99.90%	98.22%
Voice quality	≥ 95%	92.65%	95.47%	98.46%	96.85%	95.54%	95.13%	98.19%	96.53%	99.64%	99.02%	98.45%	94.84%	99.53%	99.51%	99.52%	97.93%	98.08%	93.24%
CSSR	≥ 95%	100.00%	100.00%	100.00%	100.00%	99.35%	99.37%	100.00%	99.28%	100.00%	100.00%	100.00%	99.84%	100.00%	100.00%	100.00%	99.42%	100.00%	98.72%
%age Blocked calls		0.00%	0.00%	0.00%	0.00%	0.65%	0.45%	0.00%	0.72%	0.00%	0.00%	0.00%	0.16%	0.00%	0.00%	0.00%	0.58%	0.00%	0.00%
Call drop rate	≤ 2%	0.00%	0.16%	0.00%	0.00%	0.00%	0.00%	0.00%	0.30%	0.00%	0.00%	0.00%	0.16%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Hands off success rate		100.00%	98.06%	100.00%	100.00%	99.68%	97.09%	100.00%	99.58%	100.00%	100.00%	100.00%	99.67%	100.00%	100.00%	100.00%	85.74%	100.00%	99.42%

Data Source: Drive test reports submitted by operators to auditors

Voice Quality

Aircel failed to meet the benchmark in indoor locations. Reliance GSM and Vodafone did not meet the benchmark in outdoor locations.

Call Set Success Rate (CSSR)

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

Call Drop Rate

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

7.1.3 SEPTEMBER – BHAWANIPATNA SSA

Month	Name of SSA Covered	Date of Drive Test
September	Bhawanipatna	23rd tO 25th Sep'2015

7.1.3.1 ROUTE DETAILS – BHAWANIPATNA SSA

Category	Type of location	Orissa Bhawanipatna		
		Day 1	Day 2	Day 3
Outdoor	Major Roads	Moter,Ranamala,Bijmara, Pipilaguda,Jaypatna	Udyanbandha,Kandetara	Amatha,Tundala,Kharmala,Palma,Mrampur , Bhawanipatna
	Highways	Bhawanipatna Bus stand, Pardespada, Badili, Badapada, Jhunagara, Moter, Kokosara	Bhawanipatna, Kalaguda, Mugudhapala, Thukula, Lohrapali, Nuapada, Janga, Kharian Road	Bhawanipatna, Utahlla, Kesinga, Kasurpada, Ghatapada, Amatho
	With in the City	Bhawanipatna Town and Jhunagara Town	Nuapada Town	Kesinga Town
Indoor	Shopping complex	Puspa Market Complex ,Jhunagara	Koushalya Market Complex,Rajkhairia	Mahavir Market Complex,Kesinga
	Office complex	Telephone Bhawan,Bhawanipatna	Telephone Exchange,Nuapada	Telephone Exchange ,Kesinga

The route maps given in the report are provided for the purpose of identifying the routes traversed during the drive tests. We August 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 – BHAWANIPATNA SSA

Drive Test - Kilometers Travelled	Day 1	Day 2	Day 3	Total
Bhawanipatna	134	186	159	479

7.1.3.3   ROUTE MAP BHAWANIPATNA DAY 1
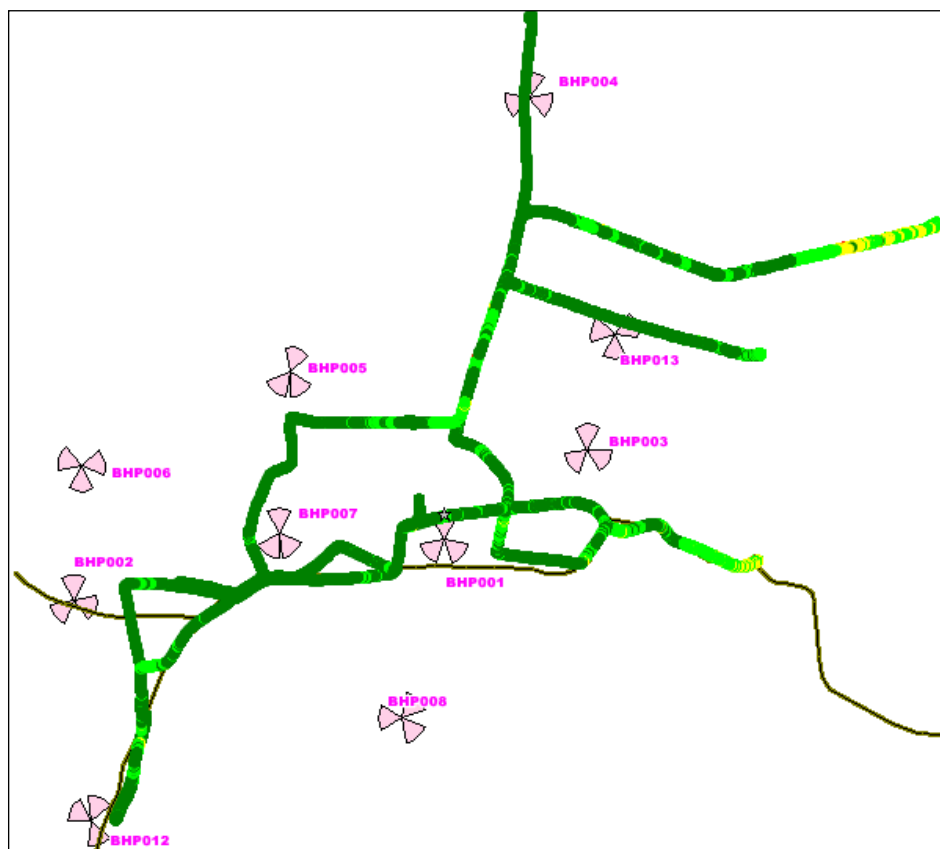
SSA Route Covered

1.Bhawanipatna Bus stand

2.Kesinga Road

3.Tarini Hostel

4.Arati Appartment

5.Collectariate

6..Cinema hall Chowk.

7.Police Station

8.Gandhi Chowak

Day 1 – Within City-2
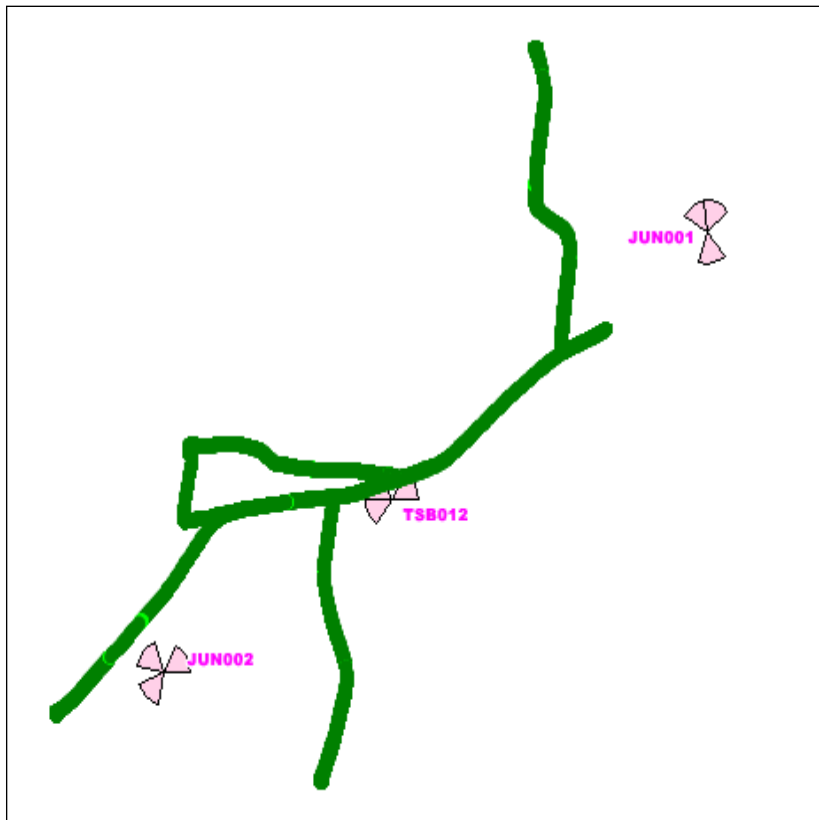
SSA Route Covered

1.Bus Stand

2.Post Office

3.MJ Road

4.Old Bus Stand

5.New Bus Stand

Day 1 – Major Roads
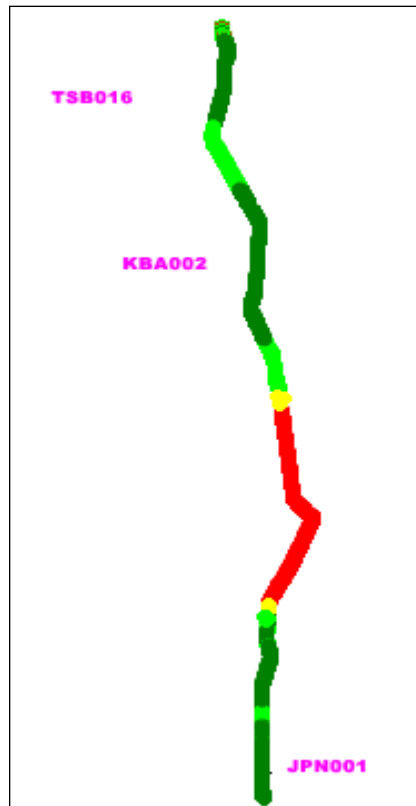
SSA Route Covered

1.Moter

2.Ranamal

3.Bijmara

4.Piplaguda

5.Jaypatna

Day 1 – Highways
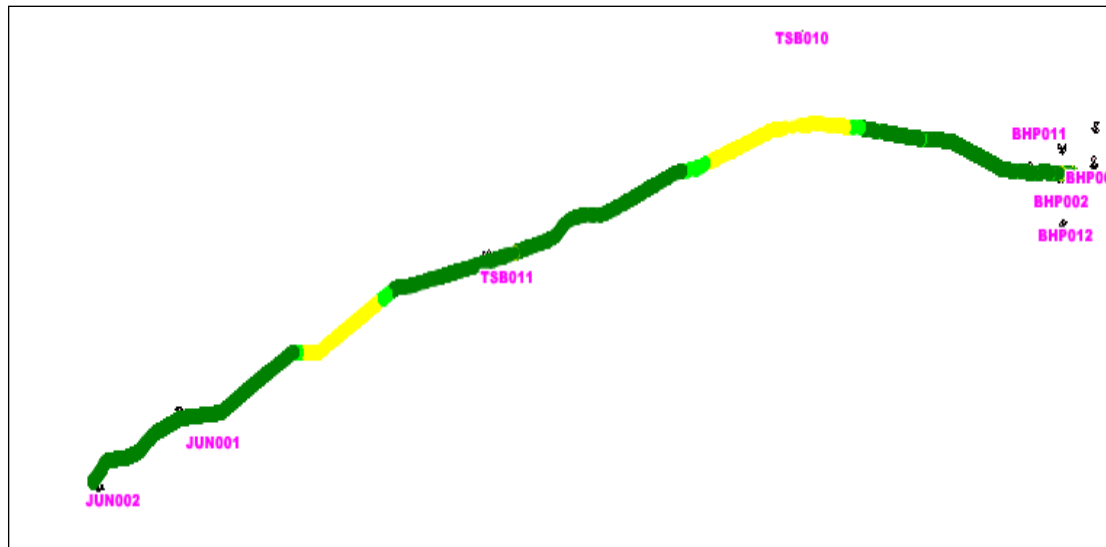
SSA Route Covered

1.Bus Stand

2.Paradesa Pada

3.Baduli

4.Jhunagara Forest Checkgate

5.Banamalipur

6.Indian Oil Petrolpump

Day 1 – Highways-2
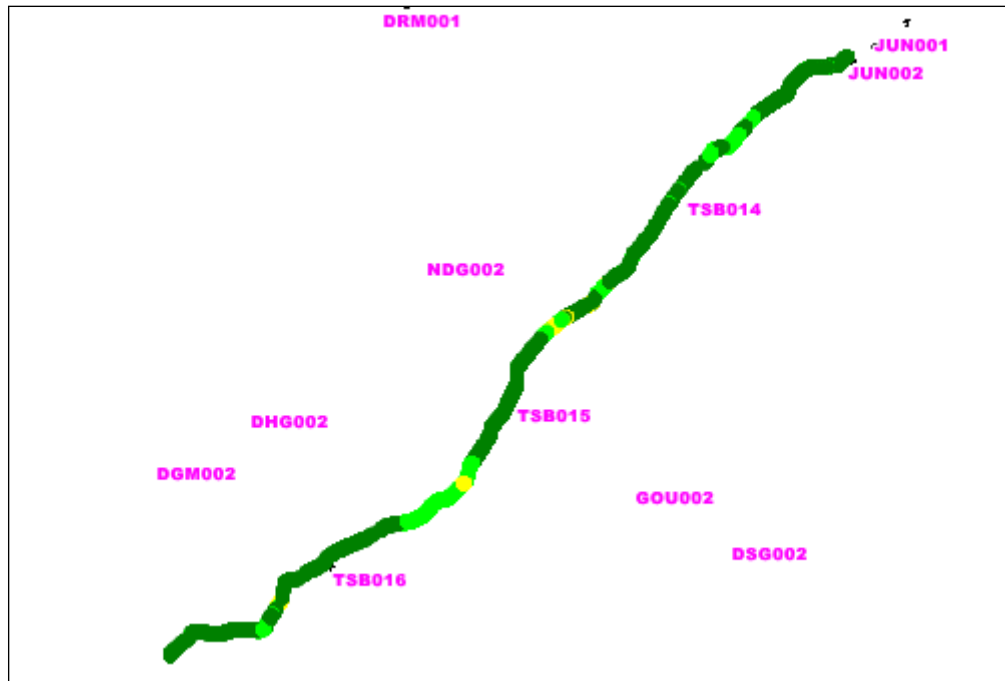
SSA Route Covered

1.Baladimala

2.Charbahal

3.Charbahal

4.Moter

5.Badapada

6.Kokasara

7.1.3.4 ROUTE MAP BHAWANIPATNA DAY 2

Day 2 – Within City
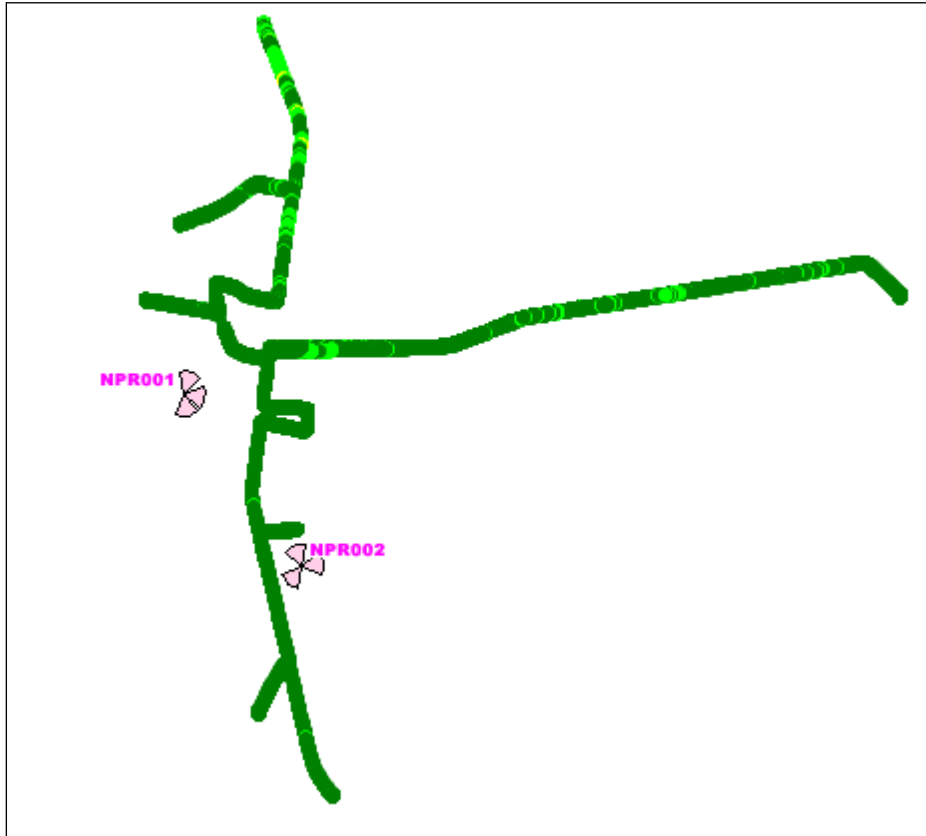
SSA Route Covered

1.Utkal Gramya Bank

2.Putara

3.Bikasnagar

4.Regional Office

5.Sital UP school

Day 2 – Highways
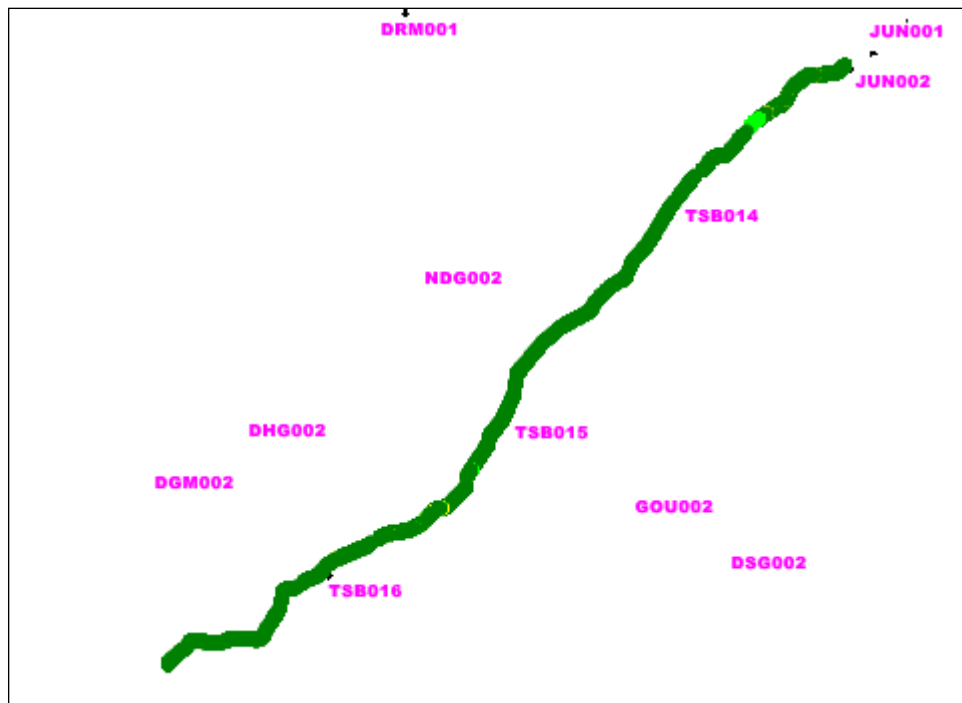
SSA Route Covered
1.Baladimala
2.Charbahal
3.Charbahal
4.Moter
5.Badapada
6.Kokasara

Day 2 – Highways-2
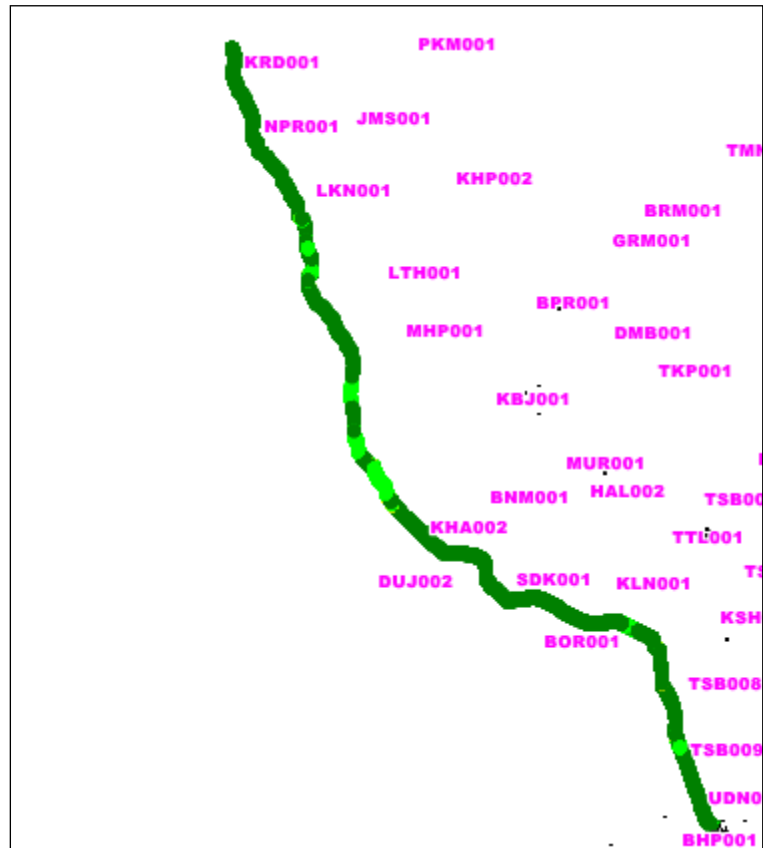
SSA Route Covered

1.LifeWorth Hospital

2.kKalaguda

3.Mugudhapala

4.Badapara

5.Thukula

6.Nuapada

7.Janga

7.1.3.5   ROUTE MAP BHAWANIPATNA DAY 3

Day 3 – Highways
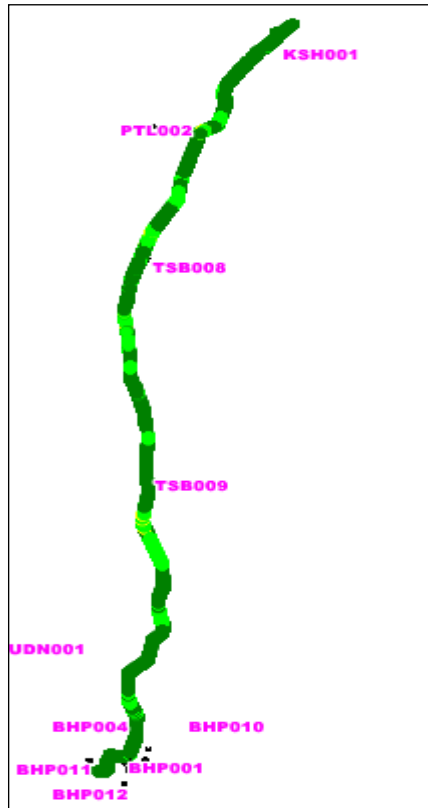
SSA Route Covered

1.Bhawanipatna Bus Stand

2.Mitali Transformer Ltd

.

3.Hindustan Petrolpump

4.Uthala

5.Kesinga Railway Station

7.1.3.6 DRIVE TEST RESULTS – BHAWANIPATNA SSA

Parameter's	B'mark	Aircel(DWL) In door	Aircel(DWL) Outdoor	Airtel In door	Airtel Outdoor	BSNL In door	BSNL Outdoor	Idea In door	Idea Outdoor	Reliance CDMA In door	Reliance CDMA Outdoor	Reliance GSM In door	Reliance GSM Outdoor	TATA CDMA In door	TATA CDMA Outdoor	TATA GSM In door	TATA GSM Outdoor	Vodafone In door	Vodafone Outdoor
0 to -75 dBm		85.48%	76.89%	77.24%	71.51%	87.44%	63.73%	33.02%	56.50%	51.15%	48.27%	60.95%	23.09%			90.19%	73.86%	56.04%	40.67%
0 to -85 dBm		91.78%	90.17%	99.27%	94.22%	99.53%	83.28%	68.09%	95.28%	92.42%	70.22%	97.30%	63.30%			99.43%	97.38%	95.59%	75.84%
0 to -95 dBm		100.00%	100.00%	100.00%	99.55%	100.00%	97.23%	97.66%	98.51%	100.00%	91.94%	99.86%	82.26%	NDR		99.68%	99.27%	99.65%	93.07%
Voice quality	≥ 95%	89.26%	91.74%	96.61%	95.68%	99.95%	99.57%	98.98%	96.52%	99.97%	99.61%	99.70%	91.96%			99.20%	97.88%	99.42%	96.41%
CSSR	≥ 95%	100.00%	100.00%	100.00%	100.00%	98.55%	98.78%	100.00%	99.64%	100.00%	100.00%	100.00%	99.71%			100.00%	94.15%	100.00%	99.63%
%age Blocked calls		0.00%	0.00%	0.00%	0.00%	1.45%	0.78%	0.00%	0.36%	0.00%	0.00%	0.00%	0.29%			0.00%	0.52%	0.00%	0.37%
Call drop rate	≤ 2%	0.00%	0.00%	0.00%	0.00%	0.00%	1.42%	0.00%	0.00%	0.00%	0.00%	0.00%	0.30%			0.00%	0.00%	0.00%	0.56%
Hands off success rate		98.44%	98.67%	100.00%	88.89%	100.00%	99.42%	99.44%	99.75%	100.00%	100.00%	100.00%	100.00%			100.00%	87.50%	100.00%	100.00%

Data Source: Drive test reports submitted by operators to auditors

Voice Quality

Aircel failed to meet the benchmark for voice quality in outdoor as well as indoor locations. Reliance GSM failed to meet the benchmark in outdoor locations.

Call Setup Success Rate (CSSR)

Tata GSM failed to meet the benchmark for CSSR in outdoor locations.

Call Drop Rate

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

8 ANNEXURE

8.1 NETWORK AVAILABILITY

Audit Results for Network Availability										
	Benchmark	Aircel(DWL)	Airtel	BSNL	Idea	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Vodafone
Number of BTSs in the licensed service area		7909	14963	1333	6748	1425	5607	1019	4266	11619
Sum of downtime of BTSs in a month (in hours)		91525	13465	5924	15684	3288	2579	2330	4970	13407
BTSs accumulated downtime (not available for service)	≤ 2%	1.57%	0.12%	0.61%	0.31%	0.32%	0.06%	0.31%	0.15%	0.16%
Number of BTSs having accumulated downtime >24 hours		434	10	11	83	15	5	0	26	59
Worst affected BTSs due to downtime	≤ 2%	5.48%	0.07%	0.82%	1.23%	1.05%	0.09%	0.00%	0.61%	0.51%
Live Measurement- BTSs accumulated downtime										
	Benchmark	Aircel(DWL)	Airtel	BSNL	Idea	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Vodafone
Number of BTSs in the licensed service area		7909	14928	1333	6748	1425	5607	1019	4266	11619
Sum of downtime of BTSs in a month (in hours)		8950	1194	260	1312	240	305	190	510	1110
BTSs accumulated downtime (not available for service)	≤ 2%	1.57%	0.11%	0.27%	0.27%	0.23%	0.08%	0.26%	0.17%	0.13%
Number of BTSs having accumulated downtime >24 hours		41	0	0	17	0	0	0	0	2
Live Mesurement - Worst affected BTSs due to downtime	≤ 2%	0.52%	0.00%	0.00%	0.25%	0.00%	0.00%	0.00%	0.00%	0.02%

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

8.2 CONNECTION ESTABLISHMENT (ACCESSIBILITY)

Audit Results for CSSR, SDCCH and TCH congestion

CSSR	Benchmark	Aircel(DWL)	Airtel	BSNL	Idea	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Vodafone
CSSR	≥ 95%	97.37%	97.34%	98.86%	99.15%	99.69%	98.29%	97.91%	98.49%	99.59%
SDCCH/Paging channel congestion	≤ 1%	0.60%	0.40%	0.50%	0.20%	NA	0.16%	NA	0.34%	0.17%
TCH congestion	≤ 2%	1.92%	1.78%	1.77%	0.28%	0.00%	0.80%	0.03%	0.64%	0.41%

Live measurement results for CSSR, SDCCH and TCH congestion

CSSR	Benchmark	Aircel(DWL)	Airtel	BSNL	Idea	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Vodafone
CSSR	≥ 95%	97.39%	97.65%	99.05%	99.12%	99.69%	98.31%	98.08%	98.60%	99.65%
SDCCH/Paging channel congestion	≤ 1%	0.46%	0.33%	0.16%	0.18%	NA	0.12%	NA	0.13%	0.20%
TCH congestion	≤ 2%	1.69%	1.78%	1.72%	0.31%	0.00%	0.75%	0.02%	0.56%	0.35%

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

CSSR	Benchmark	Aircel(DWL)	Airtel	BSNL	Idea	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Vodafone
Total number of call attempts		956	1582	1504	1139	1025	1416	493	1198	1422
Total number of successful calls established		954	1582	1489	1131	1025	1405	397	1180	1412
CSSR	≥ 95%	99.80%	100.00%	98.97%	99.34%	100.00%	99.24%	76.76%	98.34%	99.30%
%age blocked calls		0.20%	0.00%	1.03%	0.66%	0.00%	0.76%	23.25%	1.66%	0.70%

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8.3 CONNECTION MAINTENANCE (RETAINABILITY)

Audit Results for Call drop rate and for number of cells having more than 3% TCH										
Call drop rate	Benchmark	Aircel(DWL)	Airtel	BSNL	Idea	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Vodafone
Total number of calls established		259697579	1035201275	36334162	145857111	10412803	111495812	11556195	157218951	337843948
Total number of calls dropped		4258453	10748804	662385	616028	39211	615972	105810	799883	2568972
Call drop rate	≤ 2%	1.65%	1.04%	1.82%	0.42%	0.37%	0.56%	0.90%	0.51%	0.76%

Cells having more than 3% TCH	Benchmark	Aircel(DWL)	Airtel	BSNL	Idea	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Vodafone
Total number of cells in the network		23165	47800	4098	20253	4275	16941	3127	12881	34750
Total number of cells having more than 3% TCH		2980	751	131	268	95	15	155	227	960
Worst affected cells having more than 3% TCH	≤ 3%	12.85%	1.57%	3.20%	1.32%	2.23%	0.09%	4.96%	1.76%	2.76%

Live measurement results for Call drop rate and for number of cells having more than 3% TCH										
Call drop rate	Benchmark	Aircel(DWL)	Airtel	BSNL	Idea	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Vodafone
Total number of calls established		27235365	100816942	3638973	14227968	960490	12226746	1377062	15694545	32795949
Total number of calls dropped		423043	1071274	65670	57051	3291	63776	13096	77590	238926
Call drop rate	≤ 2%	1.55%	1.06%	1.81%	0.40%	0.34%	0.53%	0.95%	0.49%	0.73%

Cells having more than 3% TCH	Benchmark	Aircel(DWL)	Airtel	BSNL	Idea	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Vodafone
Total number of cells in the network		23165	47695	4117	20253	3755	14936	3127	12881	34750
Total number of cells having more than 3% TCH		2954	872	121	235	100	14	149	216	920
Worst affected cells having more than 3% TCH	≤ 3%	12.74%	1.83%	2.94%	1.16%	2.65%	0.12%	4.77%	1.68%	2.65%

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(IS/ISO 9001-2008 Certified Organisation)

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

Drive test results for Call drop rate (Average of three drive tests)										
Call drop rate	Benchmark	Aircel(DWL)	Airtel	BSNL	Idea	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Vodafone
Total number of calls established		970	1606	1493	1135	1025	1405	493	1177	1375
Total number of calls dropped		2	0	11	5	0	7	1	2	2
Call drop rate	≤ 2%	0.18%	0.00%	0.79%	0.37%	0.00%	0.49%	0.35%	0.18%	0.14%

Data Source: Drive test reports submitted by operators to auditors

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8.4   VOICE QUALITY

Audit Results for Voice quality										
Voice quality	Benchmark	Aircel(DWL)	Airtel	BSNL	Idea	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Vodafone
Total number of sample calls		41586180677	178805111675	8526700622	22330245385	NA	6388158833	24531920055	31926044242	61007747660
Total number of calls with good voice quality		39614400462	171741805556	8207424614	21605313585	NA	6274279409	24102455576	31138686827	60018856842
%age calls with good voice quality	≥ 95%	95.26%	96.05%	96.26%	96.75%	99.75%	98.23%	98.25%	97.53%	98.38%

Live measurement results for Voice quality										
Voice quality	Benchmark	Aircel(DWL)	Airtel	BSNL	Idea	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Vodafone
Total number of sample calls		4090376135	17662038063	858645686	2259219688	NA	834606628	2352347971	3146531175	6007296678
Total number of calls with good voice quality		3894863707	16963343508	826623502	2186146964	NA	820103068	2311228802	3068410060	5910444856
%age calls with good voice quality	≥ 95%	95.22%	96.04%	96.27%	96.76%	99.75%	98.29%	98.25%	97.51%	98.39%

Drive test results for Voice quality (Average of three drive tests)										
Voice quality	Benchmark	Aircel(DWL)	Airtel	BSNL	Idea	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Vodafone
Total number of sample calls		799373	191303	1216947	1723634	NA	180503	NA	1749404	4675954
Total number of calls with good voice quality		755272	184578	1170780	1655812	NA	167408	NA	1703384	4482793
%age calls with good voice quality	≥ 95%	92.35%	96.48%	97.77%	96.09%	99.50%	92.72%	99.43%	97.15%	95.86%

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

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

8.5 POI CONGESTION

Audit Results for POI Congestion									
POI congestion	Benchmark	Aircel(DWL)	Airtel	BSNL	Idea	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Vodafone
Total number of working POIs		113	21	13	69	8	8	43	12	48
No. of POIs not meeting benchmark		0	0	0	0	0	0	0	0	0
Total Capacity of all POIs (A) - in erlangs		75374	107020	24244	44535	10050	31382	13800	14005	115611
Traffic served for all POIs (B)- in erlangs		46422	58316	20474	27110	2165	19258	6959	7737	51298
POI congestion	≤ 0.5%	0.00%	0.00%	0.00%	-0.16%	0.00%	0.00%	0.00%	0.00%	0.00%

Live Measurement Results for POI Congestion									
POI congestion	Benchmark	Aircel(DWL)	Airtel	BSNL	Idea	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Vodafone
Total number of working POIs		113	21	13	69	8	8	43	12	48
No. of POIs not meeting benchmark		0	0	0	0	0	0	0	0	0
Total Capacity of all POIs (A) - in erlangs		75446	107026	24244	44692	10050	27512	13800	14005	115611
Traffic served for all POIs (B)- in erlangs		46137	58378	19106	27337	2235	16873	6986	7555	52393
POI congestion	≤ 0.5%	0.00%	0.00%	0.00%	-0.16%	0.00%	0.00%	0.00%	0.00%	0.00%

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

8.6   TOTAL CALL MADE DURING THE DRIVE TEST-VOICE QUALITY

July									
Voice quality	Aircel(DWL)	Airtel	BSNL	Idea	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Vodafone
Total number of sample calls	36309	60232	103554	519087	NA	87371	NA	483885	2888536
August									
Voice quality	Aircel(DWL)	Airtel	BSNL	Idea	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Vodafone
Total number of sample calls	408569	67162	950537	910689	NA	62763	NA	730533	860826
September									
Voice quality	Aircel(DWL)	Airtel	BSNL	Idea	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Vodafone
Total number of sample calls	354495	63909	162856	293858	NA	30369	NA	534986	926592

Data Source: Drive test reports submitted by operators to auditor

8.7 METERING AND BILLING CREDIBILITY

Audit Results for Billing performance Postpaid-Consolidated										
Billing Performance	Benchmark	Aircel(DWL)	Airtel	BSNL	Idea	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Vodafone
Metering and billing credibility - Postpaid (Avg of 3 billing cycles)										
Metering and billing credibility - Postpaid										
Total bills generated during the period		25880	131063	181866	19313	40144	114034	11732	50707	154146
Total number of bills disputed		3	95	3	13	31	105	0	0	64
Total number of valid billing complaints		1	29	3	5	22	69	0	0	58
Total complaints considered invalid		2	66	0	8	9	36	0	0	6
Percentage bills disputed (Avg of 3 billing cycles)	≤ 0.1%	0.01%	0.07%	0.00%	0.07%	0.08%	0.09%	0.00%	0.00%	0.04%
July										
Total bills generated during the first billing cycle		8535	42336	60739	6167	13826	37054	3439	16947	49994
Total number of bills disputed in first billing cycle		0	24	0	2	15	38	0	0	26
Total number of valid billing complaints (billing cycle 1)		0	1	0	1	15	34	0	0	25
Total complaints considered invalid (billing cycle 1)		0	23	0	1	0	4	0	0	1
Percentage bills disputed (first billing cycle)	≤ 0.1%	0.00%	0.06%	0.00%	0.03%	0.11%	0.10%	0.00%	0.00%	0.05%

Data Source: Billing Center of the operators

August									
Total bills generated during the second billing cycle		8713	43693	60737	6310	13315	38260	3385	16779	51563
Total number of bills disputed in second billing cycle		1	10	3	2	7	35	0	0	24
Total number of valid billing complaints (billing cycle 2)		0	0	3	1	7	35	0	0	21
Total complaints considered invalid (billing cycle 2)		1	10	0	1	0	0	0	0	3
Percentage bills disputed (second billing cycle)	≤ 0.1%	0.01%	0.02%	0.00%	0.03%	0.05%	0.09%	0.00%	0.00%	0.05%
September									
Total bills generated during the third billing cycle		8632	45034	60390	6836	13003	38720	4908	16981	52589
Total number of bills disputed in third billing cycle		2	61	0	9	9	32	0	0	14
Total number of valid billing complaints (billing cycle 3)		1	28	0	3	0	0	0	0	12
Total complaints considered invalid (billing cycle 3)		1	33	0	6	9	32	0	0	2
Percentage bills disputed (third billing cycle)	≤ 0.1%	0.02%	0.14%	0.00%	0.13%	0.07%	0.08%	0.00%	0.00%	0.03%

Metering and billing credibility - Prepaid										
Performance prepaid	Benchmark	Aircel(DWL)	Airtel	BSNL	Idea	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Vodafone
Total number of charging complaints (valid) - sum of 3 months		66	392	600	888	109	1892	0	0	2103
Total complaints considered invalid (sum of 3 months)		3691	3429	41	2548	29	1542	0	0	1174
Total number of charging complaints (sum of 3 months)		3757	3821	641	3436	138	3434	0	0	3277
Total no of customers served (Sum of 3 months)		12828744	27732486	10435545	4072861	873168	12381401	159294	2573149	10536020
Percentage of charging complaints disputed	≤ 0.1%	0.03%	0.01%	0.01%	0.08%	0.02%	0.03%	0.00%	0.00%	0.03%

Data Source: Billing Center of the operators

Resolution of billing complaints (Postpaid+Prepaid)-Consolidated										
Billing Performance	Benchmark	Aircel(DWL)	Airtel	BSNL	Idea	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Vodafone
Total number of billing/charging complaints		3759	3888	644	3446	169	3539	0	0	3341
Total number of complaints resolved in favour of customer		66	398	603	893	140	1993	0	0	2161
Total complaints considered invalid		3693	3490	41	2553	29	1546	0	0	1180
Number of complaints resolved in 4 weeks		66	398	603	892	140	1993	0	0	2161
Percentage complaints resolved within 4 weeks	≥ 98%	100.00%	100.00%	100.00%	99.89%	100.00%	100.00%	NA	NA	100.00%
Number of complaints resolved in 6 weeks		66	398	603	893	140	1993	0	0	2161
Percentage complaints resolved within 6 weeks	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	NA	NA	100.00%
Period of applying credit / waiver										
Total number of complaints where credit/waiver is required		66	398	603	893	140	1993	0	0	2161
Percentage cases in which credit/waiver was received within 1	100%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	NA	NA	100.00%

Data Source: Billing Center of the operators

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.

Live calling results for resolution of billing complaints										
Resolution of billing complaints	Benchmark	Aircel(DWL)	Airtel	BSNL	Idea	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Vodafone
Total Number of calls made		100	100	100	100	100	100	NA	NA	100
Number of cases resolved in 4 weeks		95	91	97	94	97	88	NA	NA	98
Percentage cases resolved in 4 weeks	≥ 98%	95.00%	91.00%	97.00%	94.00%	97.00%	88.00%	NA	NA	98.00%
Number of cases resolved in 6 weeks		100	100	100	100	100	100	NA	NA	100
Percentage cases resolved in 6 weeks	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	NA	NA	100.00%

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

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

8.8   CUSTOMER CARE

Audit results for customer care (IVR and voice-to-Voice) -Consolidated										
Customer Care Assessment	Benchmark	Aircel(DWL)	Airtel	BSNL	Idea	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Vodafone
Total number of call attempts to customer care for assistance		13289085	2691296	2472821	4620580	21008	747221	18615	427496	7012880
Number of calls getting connected and answered (electronically)		12707258	2666727	2377242	4557099	20432	732417	18478	409080	7010325
Percentage calls getting connected and answered	≥ 95%	95.62%	99.09%	96.13%	98.63%	97.26%	98.02%	99.26%	95.69%	99.96%

Data Source: Customer Service Center of the operators

Audit results for customer care (voice-to-Voice)- (Avg of 3 months)-Consolidated										
Customer Care Assessment	Benchmark	Aircel(DWL)	Airtel	BSNL	Idea	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Vodafone
Total Number of calls received (3 months)		2808672	3971005	1476438	1429643	31182	571984	14308	619604	2739341
Total Number of calls answered within 90 seconds (3 months)		2755344	3926568	1431730	1428149	22626	473494	13966	597928	2713908
Percentage calls answered within 90 seconds (Avg of 3 months)	≥ 95%	98.10%	98.88%	96.97%	99.90%	72.56%	82.78%	97.61%	96.50%	99.07%
July										
Total calls received (Month 1)		889993	1377885	474173	485232	9617	392186	5123	215465	909557
Total calls answered within 90 seconds (Month 1)		888804	1360441	464690	484966	9531	325479	4984	212792	899787
% calls answered within 90 seconds (Month 1)	≥ 95%	99.87%	98.73%	98.00%	99.95%	99.11%	82.99%	97.29%	98.76%	98.93%
August										
Total calls received (Month 2)		943567	1305695	491620	487184	3098	143059	5009	213193	918191
Total calls answered within 90 seconds (Month 2)		935874	1292684	476821	486801	2485	115148	4871	199455	910117
% calls answered within 90 seconds (Month 2)	≥ 95%	99.18%	99.00%	96.99%	99.92%	80.21%	80.49%	97.24%	93.56%	99.12%
September										
Total calls received (Month 3)		975112	1287425	510645	457227	18467	36739	4176	190946	911593
Total calls answered within 90 seconds (Month 3)		930666	1273443	490219	456382	10610	32867	4111	185681	904004
% calls answered within 90 seconds (Month 3)	≥ 95%	95.44%	98.91%	96.00%	99.82%	57.45%	89.46%	98.44%	97.24%	99.17%

Data Source: Customer Service Center of the operators

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Live calling results for customer care (IVR)

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

Live calling results for customer care (Voice to Voice)

Customer Care Assessment	Benchmark	Aircel(DWL)	Airtel	BSNL	Idea	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Vodafone
Total Number of calls received		100	100	100	100	100	100	100	100	100
Total Number of calls getting connected and answered		71	88	75	96	96	77	100	100	91
Live Calling Percentage calls getting connected and answered	≥ 95%	71.00%	88.00%	75.00%	96.00%	96.00%	77.00%	100.00%	100.00%	91.00%

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

8.9   TERMINATION / CLOSURE OF SERVICE

Audit results for termination / closure of service-Consolidated										
Termination	Benchmark	Aircel(DWL)	Airtel	BSNL	Idea	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Vodafone
Total number of closure request		401	290	232	131	86	348	228	1233	409
Number of requests attended within 7 days		401	290	232	131	86	348	228	1233	409
Percentage cases in which termination done within 7 days	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%

Data Source: Customer Service Center of the operators

8.10   TIME TAKEN FOR REFUND OF DEPOSITS AFTER CLOSURE

Audit results for refund of deposits-Consolidated										
Refund	Benchmark	Aircel(DWL)	Airtel	BSNL	Idea	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Vodafone
Total number of cases requiring refund of deposits		253	75	227	129	269	415	50	193	904
Total number of cases where refund was made within 60 days		253	75	227	118	255	380	50	193	904
Percentage cases in which refund was receive within 60 days	100.00%	100.00%	100.00%	100.00%	91.47%	94.80%	91.57%	100.00%	100.00%	100.00%

Data Source: Customer Service Center of the operators

8.11 ADDITIONAL NETWORK RELATED PARAMETERS

Audit Results for Total Traffic Handled in Erlang									
Traffic in Erlang	Aircel(DWL)	Airtel	BSNL	Idea	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Vodafone
Eqipped capacity of the network	128734	309072	40000	72010	53000	98000	63959	84090	114434
Total taffic handled in erlang during TCBH	79534	270161	135881	43323	6397	59438	4629	45381	93704
Total no. of customers served (as per VLR)	2447855	8924350	4067135	1380752	235016	4099523	96497	1521562	3305008

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

8.12 LIVE CALLING RESULTS FOR RESOLUTION OF SERVICE REQUESTS

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

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

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8.13   LIVE CALLING RESULTS FOR LEVEL 1 SERVICES

Live calling for level 1 services									
Level 1 services		**Aircel(DWL)**	**Airtel**	**BSNL**	**Idea**	**Reliance CDMA**	**Reliance GSM**	**TATA CDMA**	**TATA GSM**	**Vodafone**
Total no. of calls made		150	150	150	150	150	150	150	150	151
Calls answered		150	148	150	150	150	150	150	150	151
% of calls connected	≥ 95%	100.00%	98.67%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%

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

8.14   DETAILS - LEVEL 1 SERVICES CALLS

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

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

Aircel					
Level 1 Number	Type of Service	Working	Not Working	Calls Made	Calls Connected
100	Police	✓		11	11
101	Fire	✓		11	11
102	Ambulance	✓		11	11
104	Health Information Helpline				
108	Emergency and Disaster Management Helpline	✓		11	11
138	All India Helpine for Passangers		✗		
149	Public Road Transport Utility Service		✗		
181	Chief Minister Helpline		✗		
182	Indian Railway Security Helpline	✓		11	11
1033	Road Accident Management Service	✓		11	11
1037	Public Grievance Cell DoT Hq as 'Telecom Consumer Grievance Redressal Helpline'		✗		
1056	Emergency Medical Services		✗		
106X	State of the Art Hospitals		✗		
1063	Public Grievance Cell DoT Hq		✗		
1064	Anti Corruption Helpline	✓		12	12
1070	Relief Commission for Natural Calamities		✗		
1071	Air Accident Helpline		✗		
1072	Rail Accident Helpline	✓		12	12
1073	Road Accident Helpline		✗		
1077	Control Room for District Collector	✓		12	12
1090	Call Alart (Crime Branch)		✗		
1091	Women Helpline		✗		
1097	National AIDS Helpline to NACO	✓		12	12
1099	Central Accident and Trauma Services (CATS)		✗		
10580	Educationa & Vocational Guidance and Counselling		✗		
10589	Mother and Child Tracking (MCTH)		✗		
10740	Central Pollution Control Board		✗		
10741	Pollution Control Board		✗		
1511	Police Related Service for all Metro Railway Project		✗		
1512	Prevention of Crime in Railway		✗		
1514	National Career Service(NCS)		✗		
15100	Free Legal Service Helpline	✓		12	12
155304	Municipal Corporations		✗		
155214	Labour Helpline		✗		
1903	Sashastra Seema Bal (SSB)	✓		12	12

Level 1 Number	Type of Service	Working	Not Working	Calls Made	Calls Connected
1909	National Do Not Call Registry	✓		12	12
1912	Complaint of Electricity		✗		
1916	Drinking Water Supply		✗		
1950	Election Commission of India		✗		

Airtel					
Level 1 Number	Type of Service	Working	Not Working	Calls Made	Calls Connected
100	Police	✓		11	11
101	Fire	✓		11	11
102	Ambulance	✓		11	11
104	Health Information Helpline				
108	Emergency and Disaster Management Helpline	✓		11	11
138	All India Helpine for Passangers	✓			
149	Public Road Transport Utility Service		✗		
181	Chief Minister Helpline		✗		
182	Indian Railway Security Helpline	✓		11	11
1033	Road Accident Management Service	✓		11	11
1037	Public Grievance Cell DoT Hq as 'Telecom Consumer Grievance Redressal Helpline'		✗		
1056	Emergency Medical Services		✗		
106X	State of the Art Hospitals		✗		
1063	Public Grievance Cell DoT Hq		✗		
1064	Anti Corruption Helpline	✓		11	11
1070	Relief Commission for Natural Calamities	✓		11	11
1071	Air Accident Helpline		✗		
1072	Rail Accident Helpline	✓		11	11
1073	Road Accident Helpline		✗		
1077	Control Room for District Collector	✓		11	11
1090	Call Alart (Crime Branch)		✗		
1091	Women Helpline		✗		
1097	National AIDS Helpline to NACO	✓		10	9
1099	Central Accident and Trauma Services (CATS)		✗		
10580	Educationa & Vocational Guidance and Counselling		✗		
10589	Mother and Child Tracking (MCTH)		✗		
10740	Central Pollution Control Board		✗		
10741	Pollution Control Board		✗		
1511	Police Related Service for all Metro Railway Project		✗		
1512	Prevention of Crime in Railway		✗		
1514	National Career Service(NCS)		✗		
15100	Free Legal Service Helpline	✓		10	10
155304	Municipal Corporations		✗		
155214	Labour Helpline		✗		
1903	Sashastra Seema Bal (SSB)	✓		10	9
1909	National Do Not Call Registry	✓		10	10
1912	Complaint of Electricity		✗		
1916	Drinking Water Supply		✗		
1950	Election Commission of India		✗		

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BSNL					
Level 1 Number	Type of Service	Working	Not Working	Calls Made	Calls Connected
100	Police	✓		12	12
101	Fire	✓		12	12
102	Ambulance	✓		12	12
104	Health Information Helpline				
108	Emergency and Disaster Management Helpline	✓		12	12
138	All India Helpine for Passangers	✓		12	12
149	Public Road Transport Utility Service		✗		
181	Chief Minister Helpline		✗		
182	Indian Railway Security Helpline	✓		12	12
1033	Road Accident Management Service		✗		
1037	Public Grievance Cell DoT Hq as 'Telecom Consumer Grievance Redressal Helpline'		✗		
1056	Emergency Medical Services		✗		
106X	State of the Art Hospitals		✗		
1063	Public Grievance Cell DoT Hq		✗		
1064	Anti Corruption Helpline		✗		
1070	Relief Commission for Natural Calamities	✓		12	12
1071	Air Accident Helpline		✗		
1072	Rail Accident Helpline	✓		11	11
1073	Road Accident Helpline		✗		
1077	Control Room for District Collector		✗		
1090	Call Alart (Crime Branch)		✗		
1091	Women Helpline	✓		11	11
1097	National AIDS Helpline to NACO	✓		11	11
1099	Central Accident and Trauma Services (CATS)		✗		
10580	Educationa & Vocational Guidance and Counselling		✗		
10589	Mother and Child Tracking (MCTH)		✗		
10740	Central Pollution Control Board		✗		
10741	Pollution Control Board		✗		
1511	Police Related Service for all Metro Railway Project		✗		
1512	Prevention of Crime in Railway		✗		
1514	National Career Service(NCS)		✗		
15100	Free Legal Service Helpline	✓		11	11
155304	Municipal Corporations		✗		
155214	Labour Helpline		✗		
1903	Sashastra Seema Bal (SSB)		✗		
1909	National Do Not Call Registry	✓		11	11
1912	Complaint of Electricity		✗		
1916	Drinking Water Supply		✗		
1950	Election Commission of India	✓		11	11

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Level 1 Number	Type of Service	Working	Not Working	Calls Made	Calls Connected
	Idea				
100	Police	✓		10	10
101	Fire	✓		9	9
102	Ambulance	✓		9	9
104	Health Information Helpline				
108	Emergency and Disaster Management Helpline	✓		9	9
138	All India Helpine for Passangers	✓		9	9
149	Public Road Transport Utility Service		✘		
181	Chief Minister Helpline		✘		
182	Indian Railway Security Helpline		✘		
1033	Road Accident Management Service	✓		9	9
1037	Public Grievance Cell DoT Hq as 'Telecom Consumer Grievance Redressal Helpline'		✘		
1056	Emergency Medical Services		✘		
106X	State of the Art Hospitals		✘		
1063	Public Grievance Cell DoT Hq		✘		
1064	Anti Corruption Helpline	✓		9	9
1070	Relief Commission for Natural Calamities	✓		9	9
1071	Air Accident Helpline		✘		
1072	Rail Accident Helpline	✓		9	9
1073	Road Accident Helpline	✓			
1077	Control Room for District Collector	✓		9	9
1090	Call Alart (Crime Branch)		✘		
1091	Women Helpline		✘		
1097	National AIDS Helpline to NACO	✓		9	9
1099	Central Accident and Trauma Services (CATS)		✘		
10580	Educationa & Vocational Guidance and Counselling		✘		
10589	Mother and Child Tracking (MCTH)		✘		
10740	Central Pollution Control Board		✘		
10741	Pollution Control Board		✘		
1511	Police Related Service for all Metro Railway Project		✘		
1512	Prevention of Crime in Railway	✓		10	10
1514	National Career Service(NCS)		✘		
15100	Free Legal Service Helpline		✘	10	10
155304	Municipal Corporations		✘		
155214	Labour Helpline		✘		
1903	Sashastra Seema Bal (SSB)	✓		10	10
1909	National Do Not Call Registry	✓		10	10
1912	Complaint of Electricity		✘		
1916	Drinking Water Supply		✘		
1950	Election Commission of India	✓		10	10

Reliance CDMA					
Level 1 Number	Type of Service	Working	Not Working	Calls Made	Calls Connected
100	Police	✓		10	10
101	Fire	✓		9	9
102	Ambulance	✓		9	9
104	Health Information Helpline		✗		
108	Emergency and Disaster Management Helpline	✓		9	9
138	All India Helpine for Passangers	✓		9	9
149	Public Road Transport Utility Service		✗		
181	Chief Minister Helpline		✗		
182	Indian Railway Security Helpline		✗		
1033	Road Accident Management Service	✓		9	9
1037	Public Grievance Cell DoT Hq as 'Telecom Consumer Grievance Redressal Helpline'		✗		
1056	Emergency Medical Services		✗		
106X	State of the Art Hospitals		✗		
1063	Public Grievance Cell DoT Hq		✗		
1064	Anti Corruption Helpline	✓		9	9
1070	Relief Commission for Natural Calamities	✓		9	9
1071	Air Accident Helpline		✗		
1072	Rail Accident Helpline	✓		9	9
1073	Road Accident Helpline	✓			
1077	Control Room for District Collector	✓		9	9
1090	Call Alart (Crime Branch)		✗		
1091	Women Helpline		✗		
1097	National AIDS Helpline to NACO	✓		9	9
1099	Central Accident and Trauma Services (CATS)		✗		
10580	Educationa & Vocational Guidance and Counselling		✗		
10589	Mother and Child Tracking (MCTH)		✗		
10740	Central Pollution Control Board		✗		
10741	Pollution Control Board		✗		
1511	Police Related Service for all Metro Railway Project		✗		
1512	Prevention of Crime in Railway	✓		10	10
1514	National Career Service(NCS)		✗		
15100	Free Legal Service Helpline		✗	10	10
155304	Municipal Corporations		✗		
155214	Labour Helpline		✗		
1903	Sashastra Seema Bal (SSB)	✓		10	10
1909	National Do Not Call Registry	✓		10	10
1912	Complaint of Electricity		✗		
1916	Drinking Water Supply		✗		
1950	Election Commission of India	✓		10	10

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Reliance GSM					
Level 1 Number	Type of Service	Working	Not Working	Calls Made	Calls Connected
100	Police	✓		10	10
101	Fire	✓		9	9
102	Ambulance	✓		9	9
104	Health Information Helpline		✗		
108	Emergency and Disaster Management Helpline	✓		9	9
138	All India Helpine for Passangers	✓		9	9
149	Public Road Transport Utility Service		✗		
181	Chief Minister Helpline		✗		
182	Indian Railway Security Helpline		✗		
1033	Road Accident Management Service	✓		9	9
1037	Public Grievance Cell DoT Hq as 'Telecom Consumer Grievance Redressal Helpline'		✗		
1056	Emergency Medical Services		✗		
106X	State of the Art Hospitals		✗		
1063	Public Grievance Cell DoT Hq		✗		
1064	Anti Corruption Helpline	✓		9	9
1070	Relief Commission for Natural Calamities	✓		9	9
1071	Air Accident Helpline		✗		
1072	Rail Accident Helpline	✓		9	9
1073	Road Accident Helpline	✓			
1077	Control Room for District Collector	✓		9	9
1090	Call Alart (Crime Branch)		✗		
1091	Women Helpline		✗		
1097	National AIDS Helpline to NACO	✓		9	9
1099	Central Accident and Trauma Services (CATS)		✗		
10580	Educationa & Vocational Guidance and Counselling		✗		
10589	Mother and Child Tracking (MCTH)		✗		
10740	Central Pollution Control Board		✗		
10741	Pollution Control Board		✗		
1511	Police Related Service for all Metro Railway Project		✗		
1512	Prevention of Crime in Railway	✓		10	10
1514	National Career Service(NCS)		✗		
15100	Free Legal Service Helpline		✗	10	10
155304	Municipal Corporations		✗		
155214	Labour Helpline		✗		
1903	Sashastra Seema Bal (SSB)	✓		10	10
1909	National Do Not Call Registry	✓		10	10
1912	Complaint of Electricity		✗		
1916	Drinking Water Supply		✗		
1950	Election Commission of India	✓		10	10

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TATA CDMA					
Level 1 Number	Type of Service	Working	Not Working	Calls Made	Calls Connected
100	Police	✓		8	8
101	Fire	✓		8	8
102	Ambulance	✓		8	8
104	Health Information Helpline		✗		
108	Emergency and Disaster Management Helpline	✓		8	8
138	All India Helpine for Passangers	✓		8	8
149	Public Road Transport Utility Service		✗		
181	Chief Minister Helpline		✗		
182	Indian Railway Security Helpline		✗		
1033	Road Accident Management Service	✓		8	8
1037	Public Grievance Cell DoT Hq as 'Telecom Consumer Grievance Redressal Helpline'	✓			
1056	Emergency Medical Services		✗		
106X	State of the Art Hospitals	✓		8	8
1063	Public Grievance Cell DoT Hq	✓		8	8
1064	Anti Corruption Helpline	✓		8	8
1070	Relief Commission for Natural Calamities	✓		8	8
1071	Air Accident Helpline		✗		
1072	Rail Accident Helpline	✓		7	7
1073	Road Accident Helpline	✓		7	7
1077	Control Room for District Collector	✓		7	7
1090	Call Alart (Crime Branch)	✓		7	7
1091	Women Helpline	✓		7	7
1097	National AIDS Helpline to NACO	✓		7	7
1099	Central Accident and Trauma Services (CATS)		✗		
10580	Educationa & Vocational Guidance and Counselling		✗		
10589	Mother and Child Tracking (MCTH)		✗		
10740	Central Pollution Control Board		✗		
10741	Pollution Control Board		✗		
1511	Police Related Service for all Metro Railway Project		✗		
1512	Prevention of Crime in Railway	✓		7	7
1514	National Career Service(NCS)		✗		
15100	Free Legal Service Helpline	✓		7	7
155304	Municipal Corporations		✗		
155214	Labour Helpline		✗		
1903	Sashastra Seema Bal (SSB)		✗		
1909	National Do Not Call Registry	✓		7	7
1912	Complaint of Electricity		✗		
1916	Drinking Water Supply		✗		
1950	Election Commission of India	✓		7	7

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	TATA GSM				
Level 1 Number	Type of Service	Working	Not Working	Calls Made	Calls Connected
100	Police	✓		8	8
101	Fire	✓		8	8
102	Ambulance	✓		8	8
104	Health Information Helpline		✗		
108	Emergency and Disaster Management Helpline	✓		8	8
138	All India Helpine for Passangers	✓		8	8
149	Public Road Transport Utility Service		✗		
181	Chief Minister Helpline		✗		
182	Indian Railway Security Helpline		✗		
1033	Road Accident Management Service	✓		8	8
1037	Public Grievance Cell DoT Hq as 'Telecom Consumer Grievance Redressal Helpline'	✓			
1056	Emergency Medical Services		✗		
106X	State of the Art Hospitals	✓		8	8
1063	Public Grievance Cell DoT Hq	✓		8	8
1064	Anti Corruption Helpline	✓		8	8
1070	Relief Commission for Natural Calamities	✓		8	8
1071	Air Accident Helpline		✗		
1072	Rail Accident Helpline	✓		7	7
1073	Road Accident Helpline	✓		7	7
1077	Control Room for District Collector	✓		7	7
1090	Call Alart (Crime Branch)	✓		7	7
1091	Women Helpline	✓		7	7
1097	National AIDS Helpline to NACO	✓		7	7
1099	Central Accident and Trauma Services (CATS)		✗		
10580	Educationa & Vocational Guidance and Counselling		✗		
10589	Mother and Child Tracking (MCTH)		✗		
10740	Central Pollution Control Board		✗		
10741	Pollution Control Board		✗		
1511	Police Related Service for all Metro Railway Project		✗		
1512	Prevention of Crime in Railway	✓		7	7
1514	National Career Service(NCS)		✗		
15100	Free Legal Service Helpline	✓		7	7
155304	Municipal Corporations		✗		
155214	Labour Helpline		✗		
1903	Sashastra Seema Bal (SSB)		✗		
1909	National Do Not Call Registry	✓		7	7
1912	Complaint of Electricity		✗		
1916	Drinking Water Supply		✗		
1950	Election Commission of India	✓		7	7

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Vodafone					
Level 1 Number	Type of Service	Working	Not Working	Calls Made	Calls Connected
100	Police	✓		12	12
101	Fire	✓		12	12
102	Ambulance	✓		12	12
104	Health Information Helpline		✗		
108	Emergency and Disaster Management Helpline	✓		12	12
138	All India Helpine for Passangers	✓		12	12
149	Public Road Transport Utility Service		✗		
181	Chief Minister Helpline		✗		
182	Indian Railway Security Helpline		✗		
1033	Road Accident Management Service	✓		12	12
1037	Public Grievance Cell DoT Hq as 'Telecom Consumer Grievance Redressal Helpline'		✗		
1056	Emergency Medical Services		✗		
106X	State of the Art Hospitals		✗		
1063	Public Grievance Cell DoT Hq		✗		
1064	Anti Corruption Helpline	✓		12	12
1070	Relief Commission for Natural Calamities	✓		12	12
1071	Air Accident Helpline		✗		
1072	Rail Accident Helpline	✓		11	11
1073	Road Accident Helpline		✗		
1077	Control Room for District Collector		✗		
1090	Call Alart (Crime Branch)		✗		
1091	Women Helpline	✓		11	11
1097	National AIDS Helpline to NACO	✓		11	11
1099	Central Accident and Trauma Services (CATS)		✗		
10580	Educationa & Vocational Guidance and Counselling		✗		
10589	Mother and Child Tracking (MCTH)		✗		
10740	Central Pollution Control Board		✗		
10741	Pollution Control Board		✗		
1511	Police Related Service for all Metro Railway Project		✗		
1512	Prevention of Crime in Railway	✓		11	11
1514	National Career Service(NCS)		✗		
15100	Free Legal Service Helpline		✗		
155304	Municipal Corporations		✗		
155214	Labour Helpline		✗		
1903	Sashastra Seema Bal (SSB)		✗		
1909	National Do Not Call Registry	✓		11	11
1912	Complaint of Electricity		✗		
1916	Drinking Water Supply		✗		
1950	Election Commission of India		✗		

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

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8.14.1 SDCA WISE LEVEL 1 SERVICE CALLS MADE FOR MANDATORY SERVICES

Operator Name	BALANGIR					
	100		101		102	
	Calls Made	Calls Connected	Calls Made	Calls Connected	Calls Made	Calls Connected
Aircel(DWL)	3	3	3	3	3	3
Airtel	3	3	3	3	3	3
BSNL	3	3	3	3	3	3
Idea	2	2	2	2	2	2
Reliance CDMA	2	2	2	2	2	2
Reliance GSM	2	2	2	2	2	2
TATA CDMA	2	2	2	2	2	2
TATA GSM	2	2	2	2	2	2
Vodafone	3	3	3	3	3	3
Operator Name	ANGUL					
	100		101		102	
	Calls Made	Calls Connected	Calls Made	Calls Connected	Calls Made	Calls Connected
Aircel(DWL)	3	3	3	3	3	3
Airtel	2	2	2	2	2	2
BSNL	3	3	3	3	3	3
Idea	3	3	3	3	3	3
Reliance CDMA	3	3	3	3	3	3
Reliance GSM	3	3	3	3	3	3
TATA CDMA	2	2	2	2	2	2
TATA GSM	2	2	2	2	2	2
Vodafone	3	3	3	3	3	3
Operator Name	Chandbali					
	100		101		102	
	Calls Made	Calls Connected	Calls Made	Calls Connected	Calls Made	Calls Connected
Aircel(DWL)	3	3	3	3	3	3
Airtel	3	3	3	3	3	3
BSNL	3	3	3	3	3	3
Idea	3	3	2	2	2	2
Reliance CDMA	3	3	2	2	2	2
Reliance GSM	3	3	2	2	2	2
TATA CDMA	2	2	2	2	2	2
TATA GSM	2	2	2	2	2	2
Vodafone	3	3	3	3	3	3
Operator	Berbampur					

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Name	100		101		102	
	Calls Made	Calls Connected	Calls Made	Calls Connected	Calls Made	Calls Connected
Aircel(DWL)	2	2	2	2	2	2
Airtel	3	3	3	3	3	3
BSNL	3	3	3	3	3	3
Idea	2	2	2	2	2	2
Reliance CDMA	2	2	2	2	2	2
Reliance GSM	2	2	2	2	2	2
TATA CDMA	2	2	2	2	2	2
TATA GSM	2	2	2	2	2	2
Vodafone	3	3	3	3	3	3

8.15   COUNTER DETAILS

Sl No.	KPI	Formula with Counter Description
1	CSSR= (No of established Calls / No of Attempted Calls)%	*No of established Calls =* ([Assignment Requests]-([Failed Assignments (Signaling Channel)]+[Failed Assignments during MOC on the A Interface (Including Directed Retry)]+[Failed Assignments during MTC on the A Interface (Including Directed Retry)]+[Failed Assignments during Emergency Call on the A Interface (Including Directed Retry)] +[Failed Assignments during Call Re-establishment on the A Interface (Including Directed Retry)]+[Failed Mode Modify Attempts (MOC) (TCHF)]+[Failed Mode Modify Attempts (MTC) (TCHF)]+[Failed Mode Modify Attempts (Emergency Call) (TCHF)]+[Failed Mode Modify Attempts (Call Re-establishment) (TCHF)]+[Failed Mode Modify Attempts (MOC) (TCHH)]+[Failed Mode Modify Attempts (MTC) (TCHH)]+[Failed Mode Modify Attempts (Call Re-establishment) (TCHH)])))/*No of Attempted Calls =* ([Assignment Requests (Signaling Channel) (TCH)] + [Assignment Requests (Signaling Channel) (SDCCH)] + [Assignment Requests (TCHF Only)] + [Assignment Requests (TCHH Only)] + [Assignment Requests (TCHF Preferred, Channel Type Unchangeable)] + [Assignment Requests (TCHH Preferred, Channel Type Unchangeable)] + [Assignment Requests (TCHF or TCHH, Channel Type Unchangeable)] + [Assignment Requests (TCHF Preferred, Channel Type Changeable)] + [Assignment Requests (TCHH Preferred, Channel Type Changeable)] + [Assignment Requests (TCHF or TCHH, Channel Type Changeable)])
2	SDCCH congestion= (SDCCH Failure/SDCCH attempts)%	*SDCCH Failure=* ([Channel Assignment Failures (All Channels Busy or Channels Unconfigured) in Immediate Assignment Procedure (SDCCH)] + [Failed Internal Intra-Cell Handovers (No Channel Available) (SDCCH)] + [Number of Unsuccessful Incoming Internal Inter-Cell Handovers (No Channel Available) (SDCCH)] + [Failed Incoming External Inter-Cell Handovers (No Channel Available) (SDCCH)])/*SDCCH attempts =* ([Channel Assignment Requests in Immediate Assignment Procedure (SDCCH)] + [Internal Intra-Cell Handover Requests (SDCCH)] + [Number of Incoming Internal Inter-Cell Handover Requests (SDCCH) (900/850/810-900/850/810)] + [Number of Incoming Internal Inter-Cell Handover Requests (SDCCH) (1800/1900-1800/1900)] + [Number of Incoming Internal Inter-Cell Handover Requests (SDCCH) (900/850/810-1800/1900)] + [Number of Incoming Internal Inter-Cell Handover Requests (SDCCH) (1800/1900-900/850/810)] + [Incoming External Inter-Cell Handover Requests (SDCCH) (900/850/810-900/850/810)] + [Incoming External Inter-Cell Handover Requests (SDCCH) (1800/1900-1800/1900)] + [Incoming External Inter-Cell Handover Requests (SDCCH) (900/850/810-1800/1900)] + [Incoming External Inter-Cell Handover Requests (SDCCH) (1800/1900-900/850/810)])
3	TCH congestion= (TCH Failures /TCH Attempts)%	*TCH Failures=* ((Failed TCH Seizures due to Busy TCH (Signaling Channel)+([Failed Assignments (First Assignment, No Channel Available in Assignment Procedure)]+[Failed Assignments (First Assignment, No Channel Available in Directed Retry Procedure)]+[Failed Assignments (Reconnection to Old Channels, No Channel Available in Assignment)]+[Failed Assignments (Reconnection to Old Channels, No Channel Available in Directed Retry)]))/*TCH Attempts =* ([Assignment Requests (Signaling Channel) (TCH)] + [Assignment Requests (Signaling Channel) (SDCCH)] + [Assignment Requests (TCHF Only)] + [Assignment Requests (TCHH Only)] + [Assignment Requests (TCHF Preferred, Channel Type Unchangeable)] + [Assignment Requests (TCHH Preferred, Channel Type Unchangeable)] + [Assignment Requests (TCHF or TCHH, Channel Type Unchangeable)] + [Assignment Requests (TCHF Preferred, Channel Type Changeable)] + [Assignment Requests (TCHH Preferred, Channel Type Changeable)] + [Assignment Requests (TCHF or TCHH, Channel Type Changeable)])

4	**Call Drop Rate= (The total no of dropped calls*100)/Total no of calls successfully established (where traffic channel is allotted)**	*The total no of dropped calls=* ([Call Drops on Radio Interface in Stable State (Traffic Channel)] + [Call Drops on Radio Interface in Handover State (Traffic Channel)] + [Call Drops Due to No MR from MS for a Long Time (Traffic Channel)] + [Call Drops due to Abis Terrestrial Link Failure (Traffic Channel)] + [Call Drops due to Equipment Failure (Traffic Channel)] + [Call Drops due to Forced Handover (Traffic Channel)] + [Call Drops due to local switching Start Failure] + [Call Drops due to Failures to Return to Normal Call from local switching])/*Total no of calls successfully established (where traffic channel is allotted) =* ([Assignment Requests]-([Failed Assignments (Signaling Channel)]+[Failed Assignments during MOC on the A Interface (Including Directed Retry)]+[Failed Assignments during MTC on the A Interface (Including Directed Retry)]+[Failed Assignments during Emergency Call on the A Interface (Including Directed Retry)] +[Failed Assignments during Call Re-establishment on the A Interface (Including Directed Retry)]+[Failed Mode Modify Attempts (MOC) (TCHF)]+[Failed Mode Modify Attempts (MTC) (TCHF)]+[Failed Mode Modify Attempts (Emergency Call) (TCHF)]+[Failed Mode Modify Attempts (Call Re-establishment) (TCHF)]+[Failed Mode Modify Attempts (MOC) (TCHH)]+[Failed Mode Modify Attempts (MTC) (TCHH)]+[Failed Mode Modify Attempts (Call Re-establishment) (TCHH)])
5	**Call Drop Rate= (No of cells having call drop rate >3% during CBBH in a month*100)/Total no of cells in the licensed service area**	**Above formula with counters being used in CBBH.**
6	**Connection with good quality voice= (Connection with good quality voice/Total voice samples)%**	*Connection with good quality voice =* ((Number of MRs on Downlink TCHF (Receive Quality Rank 0)+Number of MRs on Downlink TCHF (Receive Quality Rank 1)+Number of MRs on Downlink TCHF (Receive Quality Rank 2)+Number of MRs on Downlink TCHF (Receive Quality Rank 3)+Number of MRs on Downlink TCHF (Receive Quality Rank 4)+Number of MRs on Downlink TCHF (Receive Quality Rank 5)+Number of MRs on Downlink TCHH (Receive Quality Rank 0)+Number of MRs on Downlink TCHH (Receive Quality Rank 1)+Number of MRs on Downlink TCHH (Receive Quality Rank 2)+Number of MRs on Downlink TCHH (Receive Quality Rank 3)+Number of MRs on Downlink TCHH (Receive Quality Rank 4)+Number of MRs on Downlink TCHH (Receive Quality Rank 5)) /*Total voice samples=* ((Number of MRs on Downlink TCHF (Receive Quality Rank 0)+Number of MRs on Downlink TCHF (Receive Quality Rank 1)+Number of MRs on Downlink TCHF (Receive Quality Rank 2)+Number of MRs on Downlink TCHF (Receive Quality Rank 3)+Number of MRs on Downlink TCHF (Receive Quality Rank 4)+Number of MRs on Downlink TCHF (Receive Quality Rank 5)+Number of MRs on Downlink TCHF (Receive Quality Rank 6)+Number of MRs on Downlink TCHF (Receive Quality Rank 7)+Number of MRs on Downlink TCHH (Receive Quality Rank 0)+:Number of MRs on Downlink TCHH (Receive Quality Rank 1)+Number of MRs on Downlink TCHH (Receive Quality Rank 2)+Number of MRs on Downlink TCHH (Receive Quality Rank 3)+Number of MRs on Downlink TCHH (Receive Quality Rank 4)+Number of MRs on Downlink TCHH (Receive Quality Rank 5)+Number of MRs on Downlink TCHH (Receive Quality Rank 6)+Number of MRs on Downlink TCHH (Receive Quality Rank 7))

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8.15.1 ERICSSON

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

Sl No.	KPI	Ericsson
1	**CSSR= (No of established Calls / No of Attempted Calls)%**	CSSR (No of established Calls / No of Attempted Calls)=(TCASSALL/TASSALL)*100
2	**SDCCH congestion= (SDCCH Failure/SDCCH attempts)%**	SDCCH congestion (SDCCH Failure/SDCCH attempts)% = (CCONGS/CCALLS)*100
3	**TCH congestion= (TCH Failures /TCH Attempts)%**	TCH congestion (TCH Failures /TCH Attempts)%= (CNRELCONG+TNRELCONG)/TASSALL)*100
4	**Call Drop Rate= (The total no of dropped calls*100)/Total no of calls successfully established (where traffic channel is allotted)**	Call Drop Rate (Total no dropped calls/No of established calls)%= (TNDROP)/TCASSALL*100
5	**Call Drop Rate= (No of cells having call drop rate >3% during CBBH in a month*100)/Total no of cells in the licensed service area**	Above formula with counters being used in CBBH.
6	**Connection with good quality voice= (Connection with good quality voice/Total voice samples)%**	Connection with good quality voice (Connection with good quality voice samples 0-5 /Total voice samples)= 100 * (QUAL50DL + QUAL40DL + QUAL30DL + QUAL20DL + QUAL10DL + QUAL00DL) / (QUAL70DL + QUAL60DL + QUAL50DL + QUAL40DL + QUAL30DL + QUAL20DL + QUAL10DL + QUAL00DL)

Ericsson Counters

Counter	Counter Description
TCASSALL	Number of assignment complete messages on TCH for all MS classes
TASSALL	Number of first assignment attempts on TCH for all MS classes.
CNRELCONG	Number of released connections on SDCCH due to TCH or Transcoder (TRA) congestion.
TNRELCONG	Number of released TCH signalling connections due to transcoder resource congestion during immediate assignment on TCH

CCONGS	Congestion counter for SDCCH. Stepped per congested allocation attempt.
CCALLS	Channel allocation attempt counter on SDCCH.
TNDROP	The total number of dropped TCH Connections.
QUAL00DL	Number of quality 0 reported on downlink.
QUAL10DL	Number of quality 1 reported on downlink.
QUAL20DL	Number of quality 2 reported on downlink.
QUAL30DL	Number of quality 3 reported on downlink.
QUAL40DL	Number of quality 4 reported on downlink.
QUAL50DL	Number of quality 5 reported on downlink.
QUAL60DL	Number of quality 6 reported on downlink.
QUAL70DL	Number of quality 7 reported on downlink.

8.15.2 NSN (NOKIA SIEMENS NETWORKS)

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

Sl No.	KPI	NSN
1	CSSR= (No of established Calls / No of Attempted Calls)%	CSSR= 100-100*((SDCCH_BUSY_ATT)-(TCH_SEIZ_DUE_SDCCH_CON) + (SDCCH_RADIO_FAIL)+(SDCCH_RF_OLD_HO)+(SDCCH_USER_ACT)+(SDCCH_BCSU_RESET)+(SDCCH_NETW_ACT)+(SDCCH_BTS_FAIL)+(SDCCH_LAPD_FAIL)+ (BLCK_8I_NOM)/ {(CH_REQ_MSG_REC)+(PACKET_CH_REQ)}-{(GHOST_CCCH_RES)-(REJ_SEIZ_ATT_DUE_DIST)}
2	SDCCH congestion= (SDCCH Failure/SDCCH attempts)%	SDCCH congestion = (sdcch_busy_att - .tch_seiz_due_sdcch_con)/{(CH_REQ_MSG_REC)+(PACKET_CH_REQ)}-{(GHOST_CCCH_RES)-(REJ_SEIZ_ATT_DUE_DIST)}
3	TCH congestion= (TCH Failures /TCH Attempts)%	TCH congestion = BLCK_8I_NOM / {(TCH_NORM_SEIZ)+(MSC_I_SDCCH_TCH_AT)+(BSC_I_SDCCH_TCH_AT)}

4	Call Drop Rate= (The total no of dropped calls*100)/Total no of calls successfully established (where traffic channel is allotted)	TCH Drop = (drop_after_tch_assign)-(tch_re_est_release) / {(TCH_NORM_SEIZ)+(MSC_I_SDCCH_TCH_AT)+(BSC_I_SDCCH_TCH_AT)}
5	Call Drop Rate= (No of cells having call drop rate >3% during CBBH in a month*100)/Total no of cells in the licensed service area	Above formula with counters being used in CBBH.
6	Connection with good quality voice= (Connection with good quality voice/Total voice samples)%	Connection with good quality voice= (FREQ_DL_QUAL0+FREQ_DL_QUAL1+FREQ_DL_QUAL2+FREQ_DL_QUAL3+FREQ_DL_QUAL4+FREQ_DL_QUAL5) / (FREQ_DL_QUAL0+FREQ_DL_QUAL1+FREQ_DL_QUAL2+FREQ_DL_QUAL3+FREQ_DL_QUAL4+FREQ_DL_QUAL5+FREQ_DL_QUAL6+FREQ_DL_QUAL7)

8.15.3 HUAWEI

Huawei provides network support to Idea in the circle.

HUAWEI		
SR .NO	KPI	HUAWEI FORMULA
1	CALL SETUP SUCCES (NUM)	[Successful CS IS-95 Orig Call Setups + Successful CS IS-2000 Orig Call Setups + Successful CS IS-95 Term Call Setups + Successful CS IS-2000 Term Call Setups] ([1157628567] + [1157628587] + [1157628568] + [1157628588])
2	CALL SETUP SUCCES (DEN)	[CS IS-95 Orig Attempts + CS IS-2000 Orig Attempts + CS IS-95 Term Attempts + CS IS-2000 Term Attempts] ([1157628553] + [1157628573] + [1157628554] + [1157628574])

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

8.15.4 ZTE

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

1. Connection Establishment (Accessibility)

A. CALL SETUP SUCCESS RATE:

KPI is calculated as Average over the month at TCBH

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

Where,

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

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

B. SDCCH BLOCKING:

KPI is calculated as Average over the month at TCBH

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

Where,

C900060005   Number of SDCCH seizure failure for assignment

C900060011   Number of signaling TCH/F seizure failure for assignment

C900060039   Number of signaling TCH/H seizure failure for assignment

C900060003   Number of SDCCH seizure attempts for assignment

C900060010   Number of signaling TCH/F seizure attempts for assignment

C900060038   Number of signaling TCH/H seizure attempts for assignment

C. TCH BLOCKING:

KPI is calculated as Average over the month at TCBH

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

Where,

C900060020   Number of voice TCH/F seizure failure for assignment

C900060031   Number of data TCH/F seizure failure for assignment

C900060043   Number of voice TCH/H seizure failure for assignment

C900060047   Number of data TCH/H seizure failure for assignment

C900060019   Number of voice TCH/F seizure attempts for assignment

C900060030   Number of data TCH/F seizure attempts for assignment

C900060042   Number of voice TCH/H seizure attempts for assignment

C900060046   Number of data TCH/H seizure attempts for assignment

2. Connection Maintenance (Retainability)

A. TCH drop:

KPI is calculated as Average over the month at TCBH

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

Where,

C900060054   Number of TCH/F drops

C900060055   Number of TCH/H drops

C900060028   Number of voice TCH/F assignment success

C900060036   Number of data TCH/F assignment success

C900060199   Number of Voice TCH/H assignment success

C900060210   Number of data TCH/H assignment success

C900060098   Number of BSC-controlled inter-cell incoming handover success

C900060102   Number of MSC-controlled incoming handover success

C900060094   Number of BSC-controlled inter-cell outgoing handover success

C900060095   Number of MSC-controlled outgoing handover

C900060030   Number of data TCH/F seizure attempts for assignment

C900060042   Number of voice TCH/H seizure attempts for assignment

C900060046   Number of data TCH/H seizure attempts for assignment

2. Connection Maintenance (Retainability)

A. TCH drop:

KPI is calculated as Average over the month at TCBH

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

Where,

C900060054   Number of TCH/F drops

C900060055   Number of TCH/H drops

C900060028   Number of voice TCH/F assignment success

C900060036   Number of data TCH/F assignment success

C900060199   Number of Voice TCH/H assignment success

C900060210   Number of data TCH/H assignment success

C900060098   Number of BSC-controlled inter-cell incoming handover success

C900060102   Number of MSC-controlled incoming handover success

C900060094   Number of BSC-controlled inter-cell outgoing handover success

C900060095   Number of MSC-controlled outgoing handover

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

Total no of cells with TCH drop>3%

C. Total No. of cells in the Network:

Active cell from last day of the month.

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

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

E. %age of Connection with Good Voice Quality:

KPI is calculated as Average over the month at TCBH

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

Where,

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

8.16 BLOCK SCHEMATIC DIAGRAMS

8.16.1 ERICSSON

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

Ericsson
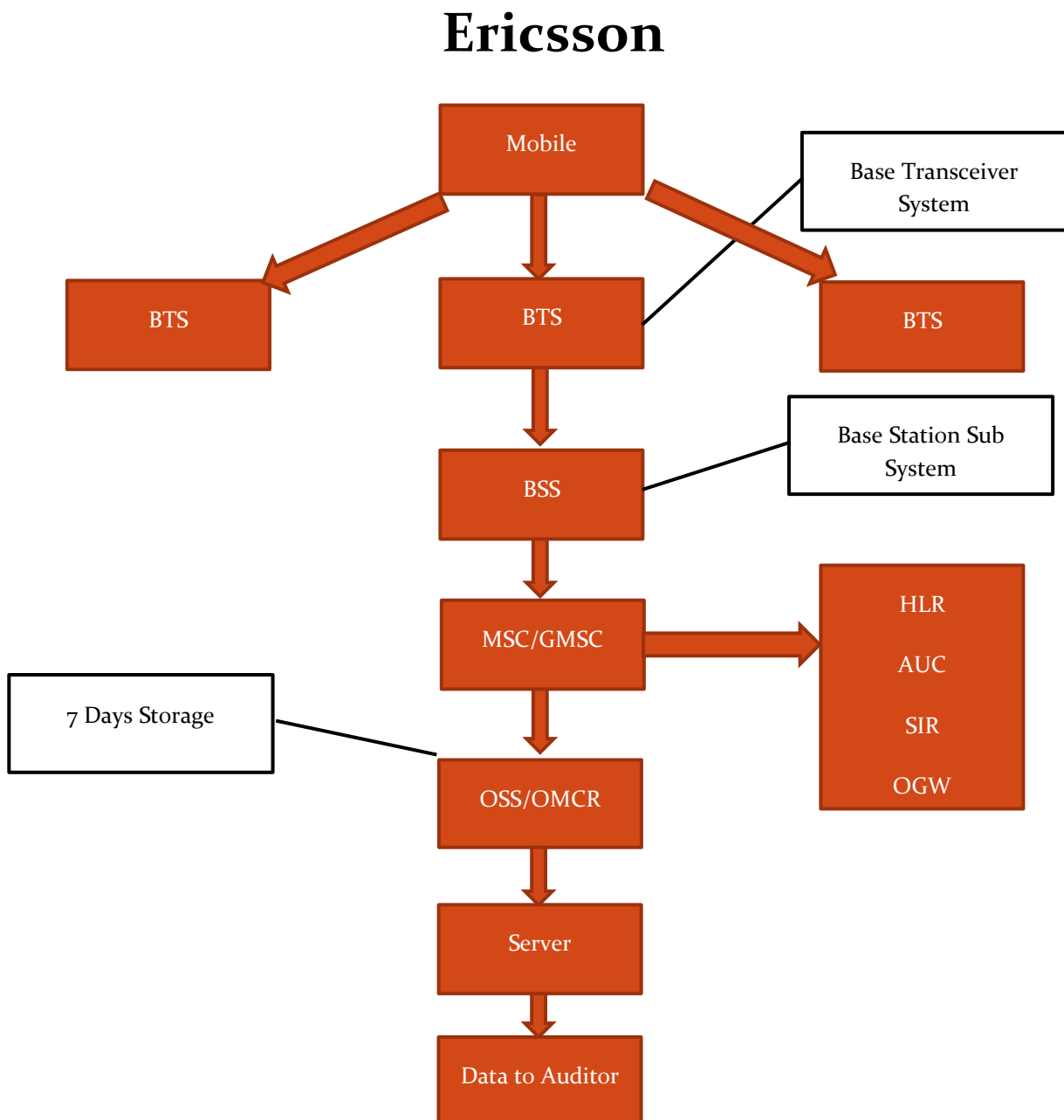
8.16.2 NSN (NOKIA SIEMENS NETWORKS)

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

NSN
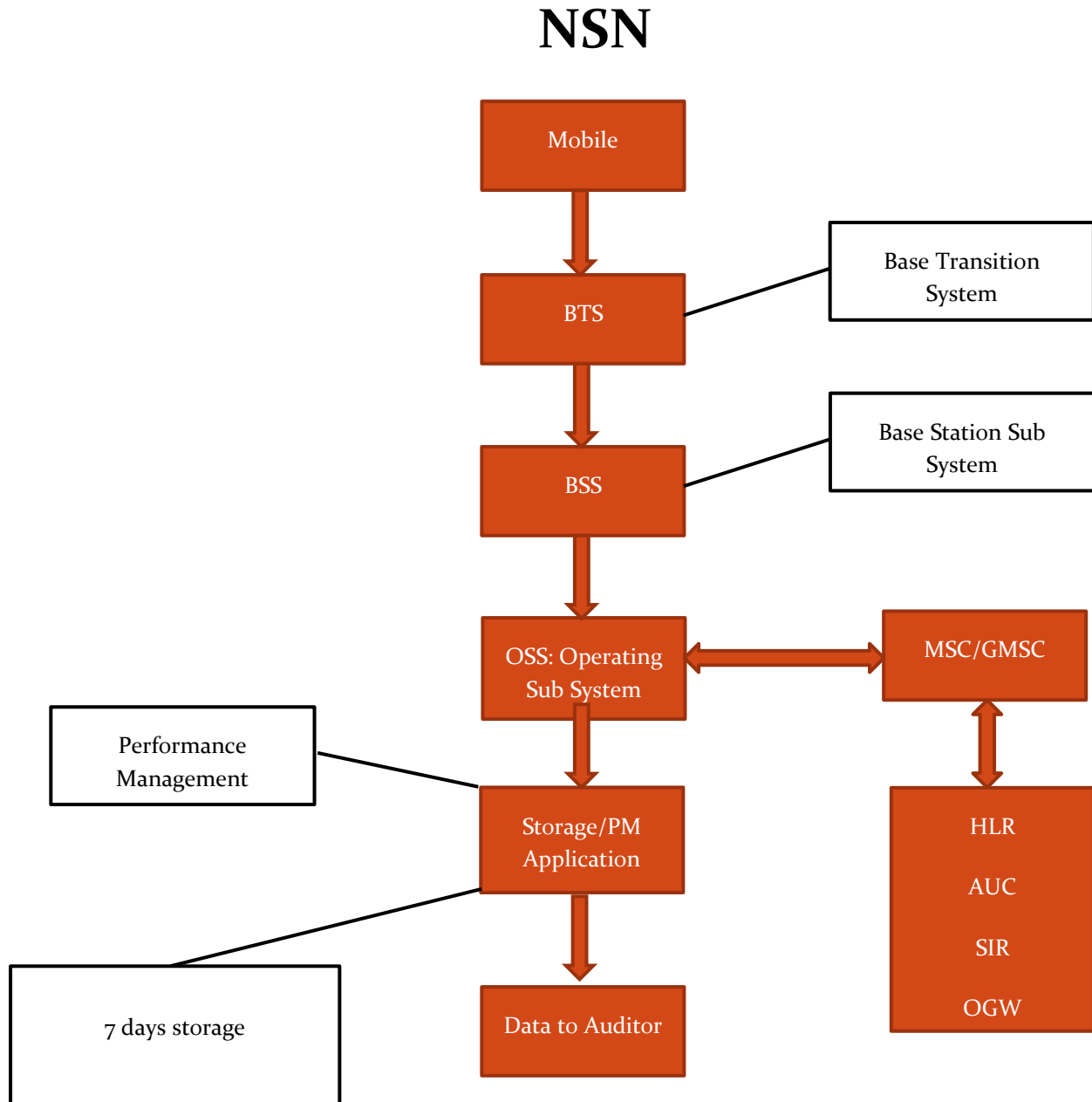
8.16.3 HUAWEI

Huawei provides network support to Uninor in the circle.

Huawei
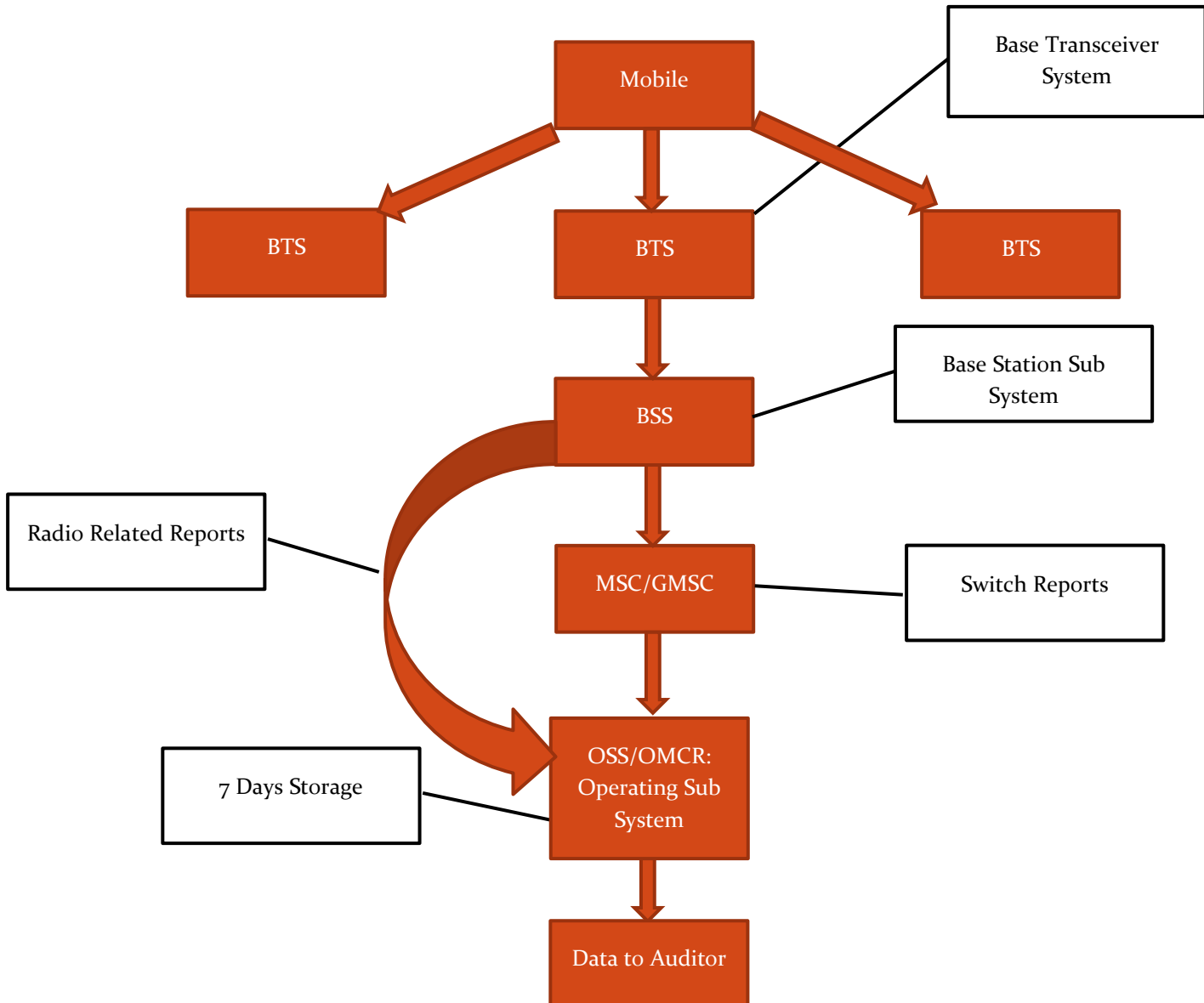
8.16.4 ZTE

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

ZTE

```
                                Mobile
                                  │
        ┌─────────────────────────┼─────────────────────────┐
        ▼                         ▼                          ▼
      BTS                        BTS                        BTS
                                  │
                                  ▼
                                 BSS ──────── Base Station Sub System
                                  │
                                  ▼
                              MSC/GMSC ────── Switch Reports
                                  │
                                  ▼
                           OSS/OMCR:
                         Operating Sub
                            System
                                  │
                                  ▼
                          Data Processing
                              Server
                                  │
                                  ▼
                          Data to Auditor
```

Base Transceiver System

Radio Related Reports

7 Days Storage
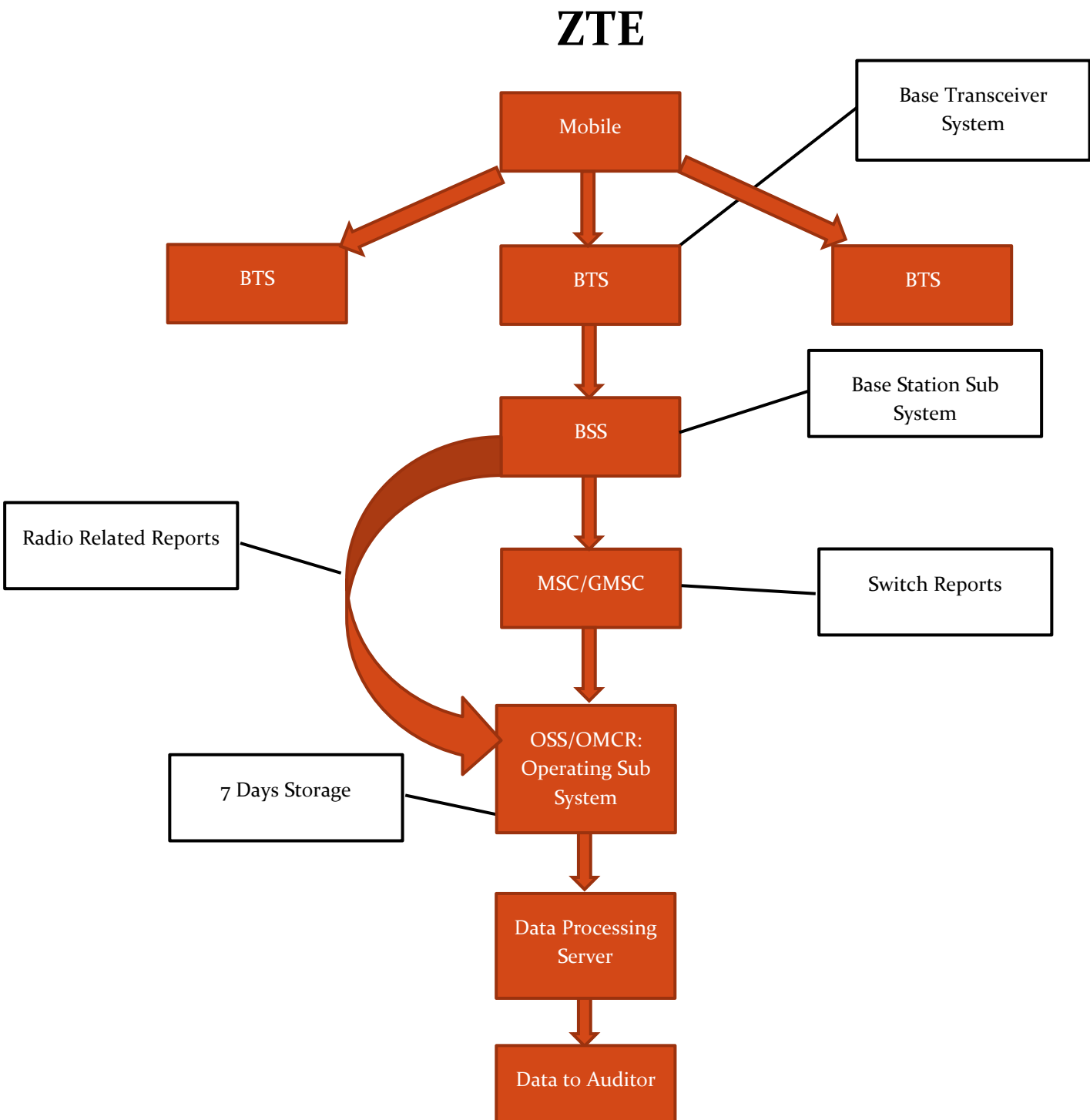
9 ANNEXURE – JULY 2015

Audit Results for Network Availability- PMR data-July										
	Benchmark	Aircel(DWL)	Airtel	BSNL	Idea	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Vodafone
Number of BTSs in the licensed service area		2674	4960	436	2238	475	1869	339	1425	3866
Sum of downtime of BTSs in a month (in hours)		37712	4645	2210	6529	160	382	1093	2596	4822
BTSs accumulated downtime (not available for service)	≤ 2%	1.90%	0.13%	0.68%	0.39%	0.05%	0.03%	0.43%	0.24%	0.17%
Number of BTSs having accumulated downtime >24 hours		195	2	3	30	0	1	0	18	22
Worst affected BTSs due to downtime	≤ 2%	7.29%	0.04%	0.69%	1.34%	0.00%	0.05%	0.00%	1.26%	0.57%
Live Measurement Results for Network Availability- 3 Day live data-July										
	Benchmark	Aircel(DWL)	Airtel	BSNL	Idea	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Vodafone
Number of BTSs in the licensed service area		2674	4941	436	2238	475	1869	339	1425	3866
Sum of downtime of BTSs in a month (in hours)		3165	279	35	426	24	64	70	201	355
BTSs accumulated downtime (not available for service)	≤ 2%	1.64%	0.08%	0.11%	0.26%	0.07%	0.05%	0.29%	0.20%	0.13%
Number of BTSs having accumulated downtime >24 hours		19	0	0	7	0	0	0	0	0
Worst affected BTSs due to downtime	≤ 2%	0.71%	0.00%	0.00%	0.31%	0.00%	0.00%	0.00%	0.00%	0.00%

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Audit Results for CSSR, SDCCH and TCH congestion- PMR data-July

CSSR	Benchmark	Aircel(DWL)	Airtel	BSNL	Idea	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Vodafone
CSSR	≥ 95%	97.65%	98.94%	98.54%	99.15%	99.67%	98.18%	97.32%	98.47%	99.64%
SDCCH/Paging channel congestion	≤ 1%	0.71%	0.41%	0.62%	0.18%	NA	0.17%	NA	0.42%	0.19%
TCH congestion	≤ 2%	1.94%	1.73%	1.91%	0.26%	0.00%	0.87%	0.03%	0.65%	0.36%

Live measurement results for CSSR, SDCCH and TCH congestion- 3 Day Data-July

CSSR	Benchmark	Aircel(DWL)	Airtel	BSNL	Idea	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Vodafone
CSSR	≥ 95%	97.50%	99.09%	99.07%	99.25%	99.74%	98.04%	97.21%	98.74%	99.78%
SDCCH/Paging channel congestion	≤ 1%	0.31%	0.27%	0.13%	0.18%	NA	0.03%	NA	0.11%	0.31%
TCH congestion	≤ 2%	1.39%	1.73%	1.62%	0.25%	0.00%	0.91%	0.02%	0.45%	0.22%

Drive test results for CSSR (Average of three drive tests) and blocked calls- Drive Test Data-July

CSSR	Benchmark	Aircel(DWL)	Airtel	BSNL	Idea	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Vodafone
Total number of call attempts		336	481	526	416	379	483	145	392	425
Total number of successful calls established		334	481	522	413	379	474	98	385	422
CSSR	≥ 95%	99.40%	100.00%	99.24%	99.28%	100.00%	98.14%	67.59%	98.21%	99.29%
%age blocked calls		0.60%	0.00%	0.76%	0.72%	0.00%	1.86%	32.41%	1.79%	0.71%

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Audit Results for Call drop rate and for number of cells having more than 3% TCH-PMR data-July

Call drop rate	Benchmark	Aircel(DWL)	Airtel	BSNL	Idea	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Vodafone
Total number of calls established		95399931	362197685	12779937	49233746	1334591	12870577	4137828	54913459	109945117
Total number of calls dropped		1525752	3561675	222225	204057	4715	74609	39919	281453	881971
Call drop rate	≤ 2%	1.60%	0.98%	1.74%	0.41%	0.35%	0.58%	0.96%	0.51%	0.80%

Cells having more than 3% TCH	Benchmark	Aircel(DWL)	Airtel	BSNL	Idea	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Vodafone
Total number of cells in the network		7834	15843	1344	6717	1425	5647	1041	4302	11562
Total number of cells having more than 3% TCH		1130	219	54	92	34	11	56	72	294
Worst affected cells having more than 3% TCH	≤ 3%	14.42%	1.38%	4.02%	1.37%	2.39%	0.19%	5.38%	1.67%	2.54%

Live measurement results for Call drop rate and for number of cells having more than 3% TCH- 3 Day data-July

Call drop rate	Benchmark	Aircel(DWL)	Airtel	BSNL	Idea	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Vodafone
Total number of calls established		8980119	33827093	1242151	4511505	306388	1525253	487255	5188086	10297309
Total number of calls dropped		130344	329579	20728	18033	959	8627	4973	24566	76866
Call drop rate	≤ 2%	1.45%	0.97%	1.67%	0.40%	0.31%	0.57%	1.02%	0.47%	0.75%

Cells having more than 3% TCH	Benchmark	Aircel(DWL)	Airtel	BSNL	Idea	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Vodafone
Total number of cells in the network		7834	15782	1360	6717	905	3642	1041	4302	11562
Total number of cells having more than 3% TCH		1132	253	44	82	24	11	57	69	256
Worst affected cells having more than 3% TCH	≤ 3%	14.45%	1.60%	3.24%	1.22%	2.65%	0.30%	5.48%	1.60%	2.21%

Drive test results for Call drop rate (Average of three drive tests) - Drive Test Data-July

Call drop rate	Benchmark	Aircel(DWL)	Airtel	BSNL	Idea	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Vodafone
Total number of calls established		334	505	522	416	379	474	145	374	422
Total number of calls dropped		1	0	4	3	0	5	1	2	0
Call drop rate	≤ 2%	0.30%	0.00%	0.77%	0.72%	0.00%	1.05%	0.69%	0.53%	0.00%

Audit Results for Voice quality -PMR Data-July

Voice quality	Benchmark	Aircel(DWL)	Airtel	BSNL	Idea	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Vodafone
Total number of sample calls		14728584548	59962089490	2910919771	7305165198	NA	486482712	8725237314	11087104041	20338042346
Total number of calls with good voice quality		14024693198	57632191968	2802814919	7049008637	NA	478001563	8572562888	10812062880	20000667423
%age calls with good voice quality	≥ 95%	95.22%	96.11%	96.29%	96.49%	99.72%	98.26%	98.25%	97.52%	98.34%

Live measurement results for Voice quality-3 Day data-July

Voice quality	Benchmark	Aircel(DWL)	Airtel	BSNL	Idea	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Vodafone
Total number of sample calls		1412222846	5717071804	290922886	727678562	NA	69002994	854412466	1051020292	1948345831
Total number of calls with good voice quality		1345060545	5495707493	280394120	702839105	NA	67881997	839507590	1025001435	1916648505
%age calls with good voice quality	≥ 95%	95.24%	96.13%	96.38%	96.59%	99.77%	98.38%	98.26%	97.52%	98.37%

Drive test results for Voice quality (Average of three drive tests) - DT data-July

Voice quality	Benchmark	Aircel(DWL)	Airtel	BSNL	Idea	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Vodafone
Total number of sample calls		36309	60232	103554	519087	NA	87371	NA	483885	2888536
Total number of calls with good voice quality		31793	58204	101909	484856	NA	80346	NA	457630	2768488
%age calls with good voice quality	≥ 95%	87.56%	96.63%	98.41%	93.41%	99.38%	91.96%	99.34%	94.57%	95.84%

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Audit Results for POI Congestion- PMR data-July

POI congestion	Benchmark	Aircel(DWL)	Airtel	BSNL	Idea	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Vodafone
Total number of working POIs		113	21	13	69	NDR	NDR	43	12	48
No. of POIs not meeting benchmark		0	0	0	0	NDR	NDR	0	0	0
Total Capacity of all POIs (A) - in erlangs		75214	108504	25000	47977	NDR	NDR	13805	14005	115211
Traffic served for all POIs (B)- in erlangs		48401	56630	21305	26144	NDR	NDR	6960	7920	51436
POI congestion	≤ 0.5%	0.00%	0.00%	0.00%	0.00%	NDR	NDR	0.00%	0.00%	0.00%

Live Measurement Results for POI Congestion- 3 Day data-July

POI congestion	Benchmark	Aircel(DWL)	Airtel	BSNL	Idea	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Vodafone
Total number of working POIs		113	21	13	69	NDR	NDR	43	12	48
No. of POIs not meeting benchmark		0	0	0	0	NDR	NDR	0	0	0
Total Capacity of all POIs (A) - in erlangs		75412	108548	25000	47974	NDR	NDR	13805	14005	115211
Traffic served for all POIs (B)- in erlangs		47551	56660	19938	25625	NDR	NDR	6886	7657	52170
POI congestion	≤ 0.5%	0.00%	0.00%	0.00%	0.00%	NDR	NDR	0.00%	0.00%	0.00%

10 ANNEXURE – AUGUST 2015

Audit Results for Network Availability- PMR data-August										
	Benchmark	Aircel(DWL)	Airtel	BSNL	Idea	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Vodafone
Number of BTSs in the licensed service area		2607	4986	447	2255	475	1869	340	1420	3872
Sum of downtime of BTSs in a month (in hours)		27532	4131	770	4933	1695	1298	694	1098	4356
BTSs accumulated downtime (not available for service)	≤ 2%	1.42%	0.11%	0.23%	0.29%	0.48%	0.09%	0.27%	0.10%	0.15%
Number of BTSs having accumulated downtime >24 hours		140	4	3	23	9	2	0	4	17
Worst affected BTSs due to downtime	≤ 2%	5.37%	0.08%	0.67%	1.02%	1.89%	0.11%	0.00%	0.28%	0.44%
Live Measurement Results for Network Availability- 3 Day live data-August										
	Benchmark	Aircel(DWL)	Airtel	BSNL	Idea	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Vodafone
Number of BTSs in the licensed service area		2607	4976	447	2255	475	1869	340	1420	3872
Sum of downtime of BTSs in a month (in hours)		2910	399	57	581	117	159	50	171	356
BTSs accumulated downtime (not available for service)	≤ 2%	1.55%	0.11%	0.18%	0.36%	0.34%	0.12%	0.21%	0.17%	0.13%
Number of BTSs having accumulated downtime >24 hours		15	0	0	5	0	0	0	0	1
Worst affected BTSs due to downtime	≤ 2%	0.58%	0.00%	0.00%	0.22%	0.00%	0.00%	0.00%	0.00%	0.03%

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Audit Results for CSSR, SDCCH and TCH congestion- PMR data-August

CSSR	Benchmark	Aircel(DWL)	Airtel	BSNL	Idea	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Vodafone
CSSR	≥ 95%	97.58%	96.61%	99.02%	99.09%	99.70%	98.33%	98.34%	98.59%	99.61%
SDCCH/Paging channel congestion	≤ 1%	0.29%	0.37%	0.74%	0.21%	NA	0.17%	NA	0.40%	0.15%
TCH congestion	≤ 2%	1.92%	1.73%	1.51%	0.31%	0.00%	0.80%	0.03%	0.55%	0.39%

Live measurement results for CSSR, SDCCH and TCH congestion- 3 Day Data-August

CSSR	Benchmark	Aircel(DWL)	Airtel	BSNL	Idea	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Vodafone
CSSR	≥ 95%	97.71%	97.48%	99.01%	99.10%	99.70%	98.50%	98.42%	98.61%	99.63%
SDCCH/Paging channel congestion	≤ 1%	0.27%	0.29%	0.32%	0.20%	NA	0.13%	NA	0.10%	0.12%
TCH congestion	≤ 2%	1.97%	1.73%	1.79%	0.36%	0.00%	0.63%	0.03%	0.53%	0.37%

Drive test results for CSSR (Average of three drive tests) and blocked calls- Drive Test Data-August

CSSR	Benchmark	Aircel(DWL)	Airtel	BSNL	Idea	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Vodafone
Total number of call attempts		411	563	537	531	431	486	348	482	498
Total number of successful calls established		411	563	533	527	431	485	299	480	493
CSSR	≥ 95%	100.00%	100.00%	99.26%	99.25%	100.00%	99.79%	85.92%	99.59%	99.00%
%age blocked calls		0.00%	0.00%	0.74%	0.75%	0.00%	0.21%	14.08%	0.41%	1.00%

Audit Results for Call drop rate and for number of cells having more than 3% TCH-PMR data-August									
Call drop rate	Benchmark	Aircel(DWL)	Airtel	BSNL	Idea	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Vodafone
Total number of calls established		85365693	350091390	12003503	47993449	4657321	50113310	4299649	52537687	115699378
Total number of calls dropped		1330528	3559619	222588	208496	16698	276593	42046	261980	841157
Call drop rate	≤ 2%	1.56%	1.02%	1.85%	0.43%	0.36%	0.55%	0.98%	0.50%	0.73%

Cells having more than 3% TCH	Benchmark	Aircel(DWL)	Airtel	BSNL	Idea	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Vodafone
Total number of cells in the network		7638	15931	1365	6768	1425	5647	1043	4289	11580
Total number of cells having more than 3% TCH		1075	242	40	96	30	2	58	80	323
Worst affected cells having more than 3% TCH	≤ 3%	14.07%	1.52%	2.93%	1.42%	2.11%	0.04%	5.56%	1.87%	2.79%

Live measurement results for Call drop rate and for number of cells having more than 3% TCH- 3 Day data-August									
Call drop rate	Benchmark	Aircel(DWL)	Airtel	BSNL	Idea	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Vodafone
Total number of calls established		8970321	33922109	1183703	4500871	350930	5248437	460547	5344932	11310350
Total number of calls dropped		125708	348060	22745	18677	1081	26779	4514	25452	79479
Call drop rate	≤ 2%	1.40%	1.03%	1.92%	0.41%	0.31%	0.51%	0.98%	0.48%	0.70%

Cells having more than 3% TCH	Benchmark	Aircel(DWL)	Airtel	BSNL	Idea	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Vodafone
Total number of cells in the network		7638	15903	1361	6768	1425	5647	1043	4289	11580
Total number of cells having more than 3% TCH		1040	267	39	84	40	1	58	76	302
Worst affected cells having more than 3% TCH	≤ 3%	13.62%	1.68%	2.87%	1.24%	2.81%	0.02%	5.56%	1.77%	2.61%

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Drive test results for Call drop rate (Average of three drive tests) - Drive Test Data-August

Call drop rate	Benchmark	Aircel(DWL)	Airtel	BSNL	Idea	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Vodafone
Total number of calls established		411	563	537	527	431	485	348	480	493
Total number of calls dropped		1	0	0	2	0	1	0	0	0
Call drop rate	≤ 2%	0.24%	0.00%	0.00%	0.38%	0.00%	0.21%	0.00%	0.00%	0.00%

Audit Results for Voice quality -PMR Data-August

Voice quality	Benchmark	Aircel(DWL)	Airtel	BSNL	Idea	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Vodafone
Total number of sample calls		14044001267	60970204694	2871302341	7472706085	NA	2702088798	8209372442	10623889863	20679839916
Total number of calls with good voice quality		13376877761	58616450638	2763446553	7221625266	NA	2654386199	8065578996	10360419281	20354727203
%age calls with good voice quality	≥ 95%	95.25%	96.14%	96.24%	96.64%	99.76%	98.23%	98.25%	97.52%	98.43%

Live measurement results for Voice quality-3 Day data-August

Voice quality	Benchmark	Aircel(DWL)	Airtel	BSNL	Idea	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Vodafone
Total number of sample calls		1385068166	5994257035	286543085	731818045	NA	374050169	771735474	1049205953	2045052224
Total number of calls with good voice quality		1318698645	5764223325	275399068	707235546	NA	367590667	758246278	1022710180	2012810004
%age calls with good voice quality	≥ 95%	95.21%	96.16%	96.11%	96.64%	99.74%	98.27%	98.25%	97.47%	98.42%

Drive test results for Voice quality (Average of three drive tests) - DT data-August

Voice quality	Benchmark	Aircel(DWL)	Airtel	BSNL	Idea	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Vodafone
Total number of sample calls		408569	67162	950537	910689	NA	62763	NA	730533	860826
Total number of calls with good voice quality		391324	65173	906852	883439	NA	59121	NA	719233	814584
%age calls with good voice quality	≥ 95%	95.78%	97.04%	95.40%	97.01%	99.33%	94.20%	99.52%	98.45%	94.63%

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Audit Results for POI Congestion- PMR data-August									
POI congestion	Benchmark	Aircel(DWL)	Airtel	BSNL	Idea	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Vodafone
Total number of working POIs		113	21	13	68	8	8	43	12	48
No. of POIs not meeting benchmark		0	0	0	0	0	0	0	0	0
Total Capacity of all POIs (A) - in erlangs		75428	106352	25000	43048	10050	27796	13811	14005	115715
Traffic served for all POIs (B)- in erlangs		46436	58202	19972	26241	2164	16538	6933	7707	51113
POI congestion	≤ 0.5%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%

Live Measurement Results for POI Congestion- 3 Day data-August									
POI congestion	Benchmark	Aircel(DWL)	Airtel	BSNL	Idea	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Vodafone
Total number of working POIs		113	21	13	68	8	8	43	12	48
No. of POIs not meeting benchmark		0	0	0	0	0	0	0	0	0
Total Capacity of all POIs (A) - in erlangs		75419	106330	25000	43261	10050	27796	13811	14005	115715
Traffic served for all POIs (B)- in erlangs		45899	58295	20001	26160	2254	16350	6953	7213	52085
POI congestion	≤ 0.5%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%

11 ANNEXURE – SEPTEMBER 2015

Audit Results for Network Availability- PMR data-June										
	Benchmark	Aircel(DWL)	Airtel	BSNL	Idea	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Vodafone
Number of BTSs in the licensed service area		2628	5017	450	2255	475	1869	340	1421	3881
Sum of downtime of BTSs in a month (in hours)		26281	4688	2944	4222	1433	899	543	1277	4229
BTSs accumulated downtime (not available for service)	≤ 2%	1.39%	0.13%	0.91%	0.26%	0.42%	0.07%	0.22%	0.12%	0.15%
Number of BTSs having accumulated downtime >24 hours		99	4	5	30	6	2	0	4	20
Worst affected BTSs due to downtime	≤ 2%	3.77%	0.08%	1.11%	1.33%	1.26%	0.11%	0.00%	0.28%	0.52%
Live Measurement Results for Network Availability- 3 Day live data-June										
	Benchmark	Aircel(DWL)	Airtel	BSNL	Idea	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Vodafone
Number of BTSs in the licensed service area		2628	5011	450	2255	475	1869	340	1421	3881
Sum of downtime of BTSs in a month (in hours)		2875	516	168	306	98	83	70	138	399
BTSs accumulated downtime (not available for service)	≤ 2%	1.52%	0.14%	0.52%	0.19%	0.29%	0.06%	0.29%	0.13%	0.14%
Number of BTSs having accumulated downtime >24 hours		7	0	0	5	0	0	0	0	1
Worst affected BTSs due to downtime	≤ 2%	0.27%	0.00%	0.00%	0.22%	0.00%	0.00%	0.00%	0.00%	0.03%

Audit Results for CSSR, SDCCH and TCH congestion- PMR data-June

CSSR	Benchmark	Aircel(DWL)	Airtel	BSNL	Idea	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Vodafone
CSSR	≥ 95%	96.88%	96.46%	99.01%	99.21%	99.70%	98.36%	98.06%	98.41%	99.53%
SDCCH/Paging channel congestion	≤ 1%	0.80%	0.42%	0.14%	0.20%	NA	0.14%	NA	0.20%	0.18%
TCH congestion	≤ 2%	1.90%	1.88%	1.88%	0.28%	0.00%	0.73%	0.02%	0.73%	0.47%

Live measurement results for CSSR, SDCCH and TCH congestion- 3 Day Data-June

CSSR	Benchmark	Aircel(DWL)	Airtel	BSNL	Idea	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Vodafone
CSSR	≥ 95%	96.97%	96.38%	99.07%	99.02%	99.63%	98.38%	98.62%	98.44%	99.54%
SDCCH/Paging channel congestion	≤ 1%	0.79%	0.42%	0.02%	0.16%	NA	0.21%	NA	0.17%	0.17%
TCH congestion	≤ 2%	1.71%	1.89%	1.74%	0.33%	0.00%	0.72%	0.01%	0.69%	0.46%

Drive test results for CSSR (Average of three drive tests) and blocked calls- Drive Test Data-June

CSSR	Benchmark	Aircel(DWL)	Airtel	BSNL	Idea	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Vodafone
Total number of call attempts		209	538	441	192	215	447	NDR	324	499
Total number of successful calls established		209	538	434	191	215	446	NDR	315	497
CSSR	≥ 95%	100.00%	100.00%	98.41%	99.48%	100.00%	99.78%	NDR	97.22%	99.60%
%age blocked calls		0.00%	0.00%	1.59%	0.52%	0.00%	0.22%	NDR	2.78%	0.40%

Audit Results for Call drop rate and for number of cells having more than 3% TCH-PMR data-June									
Call drop rate	**Benchmark**	**Aircel(DWL)**	**Airtel**	**BSNL**	**Idea**	**Reliance CDMA**	**Reliance GSM**	**TATA CDMA**	**TATA GSM**	**Vodafone**
Total number of calls established		78931955	322912200	11550722	48629916	4420891	48511925	3118718	49767805	112199453
Total number of calls dropped		1402173	3627510	217572	203475	17798	264770	23845	256450	845844
Call drop rate	≤ 2%	1.78%	1.12%	1.88%	0.42%	0.40%	0.55%	0.76%	0.52%	0.75%

Cells having more than 3% TCH	Benchmark	Aircel(DWL)	Airtel	BSNL	Idea	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Vodafone
Total number of cells in the network		7693	16026	1389	6768	1425	5647	1043	4290	11608
Total number of cells having more than 3% TCH		775	290	37	80	31	2	41	75	343
Worst affected cells having more than 3% TCH	≤ 3%	10.07%	1.81%	2.66%	1.18%	2.18%	0.04%	3.93%	1.75%	2.95%

Live measurement results for Call drop rate and for number of cells having more than 3% TCH- 3 Day data-June									
Call drop rate	**Benchmark**	**Aircel(DWL)**	**Airtel**	**BSNL**	**Idea**	**Reliance CDMA**	**Reliance GSM**	**TATA CDMA**	**TATA GSM**	**Vodafone**
Total number of calls established		9284925	33067740	1213119	5215592	303172	5453056	429260	5161527	11188290
Total number of calls dropped		166991	393635	22197	20341	1251	28370	3609	27572	82581
Call drop rate	≤ 2%	1.80%	1.19%	1.83%	0.39%	0.41%	0.52%	0.84%	0.53%	0.74%

Cells having more than 3% TCH	Benchmark	Aircel(DWL)	Airtel	BSNL	Idea	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Vodafone
Total number of cells in the network		7693	16010	1396	6768	1425	5647	1043	4290	11608
Total number of cells having more than 3% TCH		782	352	38	69	36	2	34	71	362
Worst affected cells having more than 3% TCH	≤ 3%	10.16%	2.20%	2.72%	1.02%	2.50%	0.04%	3.26%	1.66%	3.12%

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Drive test results for Call drop rate (Average of three drive tests) - Drive Test Data-June

Call drop rate	Benchmark	Aircel(DWL)	Airtel	BSNL	Idea	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Vodafone
Total number of calls established		225	538	434	192	215	446	NDR	323	460
Total number of calls dropped		0	0	7	0	0	1	NDR	0	2
Call drop rate	≤ 2%	0.00%	0.00%	1.61%	0.00%	0.00%	0.22%	NDR	0.00%	0.43%

Audit Results for Voice quality -PMR Data-June

Voice quality	Benchmark	Aircel(DWL)	Airtel	BSNL	Idea	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Vodafone
Total number of sample calls		12813594862	57872817491	2744478510	7552374102	NA	3199587323	7597310299	10215050338	19989865398
Total number of calls with good voice quality		12212829503	55493162950	2641163142	7334679682	NA	3141891647	7464313692	9966204666	19663462216
%age calls with good voice quality	≥ 95%	95.31%	95.89%	96.24%	97.12%	99.77%	98.20%	98.25%	97.56%	98.37%

Live measurement results for Voice quality-3 Day data-June

Voice quality	Benchmark	Aircel(DWL)	Airtel	BSNL	Idea	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Vodafone
Total number of sample calls		1293085123	5950709224	281179715	799723081	NA	391553465	726200031	1046304930	2013898623
Total number of calls with good voice quality		1231104517	5703412690	270830314	776072313	NA	384630404	713474934	1020698445	1980986347
%age calls with good voice quality	≥ 95%	95.21%	95.84%	96.32%	97.04%	99.73%	98.23%	98.25%	97.55%	98.37%

Drive test results for Voice quality (Average of three drive tests) - DT data-June

Voice quality	Benchmark	Aircel(DWL)	Airtel	BSNL	Idea	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Vodafone
Total number of sample calls		354495	63909	162856	293858	NA	30369	NA	534986	926592
Total number of calls with good voice quality		332155	61201	162019	287517	NA	27941	NA	526521	899721
%age calls with good voice quality	≥ 95%	93.70%	95.76%	99.49%	97.84%	99.79%	92.01%	NDR	98.42%	97.10%

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Audit Results for POI Congestion- PMR data-June									
POI congestion	Benchmark	Aircel(DWL)	Airtel	BSNL	Idea	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Vodafone
Total number of working POIs		113	21	13	71	8	8	43	12	48
No. of POIs not meeting benchmark		0	0	0	0	0	0	0	0	0
Total Capacity of all POIs (A) - in erlangs		75478	106205	22733	42581	10050	34968	13786	14005	115907
Traffic served for all POIs (B)- in erlangs		44427	60118	20146	28946	2166	21978	6984	7585	51346
POI congestion	≤ 0.5%	0.00%	0.00%	0.00%	-0.47%	0.00%	0.00%	0.00%	0.00%	0.00%

Live Measurement Results for POI Congestion- 3 Day data-June									
POI congestion	Benchmark	Aircel(DWL)	Airtel	BSNL	Idea	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Vodafone
Total number of working POIs		113	21	13	71	8	8	43	12	48
No. of POIs not meeting benchmark		0	0	0	0	0	0	0	0	0
Total Capacity of all POIs (A) - in erlangs		75508	106198	22733	42839	10050	27228	13783	14005	115907
Traffic served for all POIs (B)- in erlangs		44960	60178	17380	30227	2216	17395	7118	7794	52922
POI congestion	≤ 0.5%	0.00%	0.00%	0.00%	-0.47%	0.00%	0.00%	0.00%	0.00%	0.00%

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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. JAS'15 – Refers to the quarter of July, August and September 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