EAST ZONE

TRAI AUDIT WIRELESS REPORT-BIHAR & JHARKHAND CIRCLE

Prepared By -

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Prepared For-

TRAI

सत्यमेव जयते

Telecom Regulatory Authority of India

(IS/ISO 9001-2008 Certified Organisation)

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2 INTRODUCTION

2.1 ABOUT TRAI

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

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

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

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

2.2 OBJECTIVES

The primary objective of the Audit module is to-

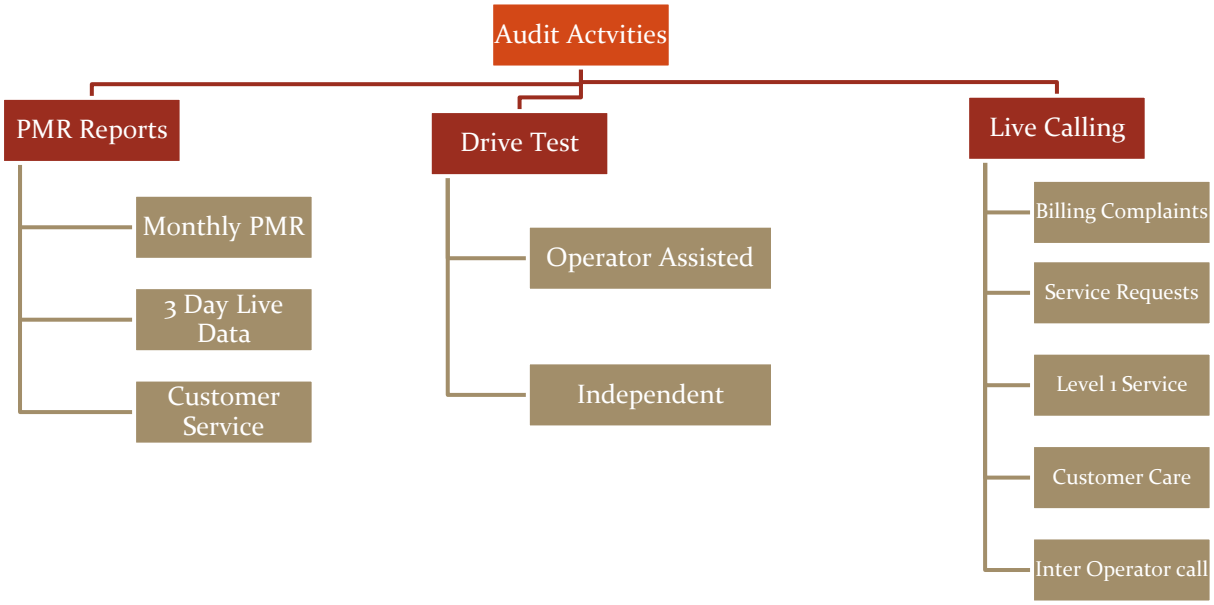
- Audit and Assess the Quality of Services being rendered by Basic (Wireline), Cellular Mobile (Wireless), and Broadband service against the parameters notified by TRAI. (The parameters of Quality of Services (QoS) have been specified by in the respective regulations published by TRAI).
- This report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

2.3 COVERAGE

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

Image Source: BSNL website

2.4 FRAMEWORK USED

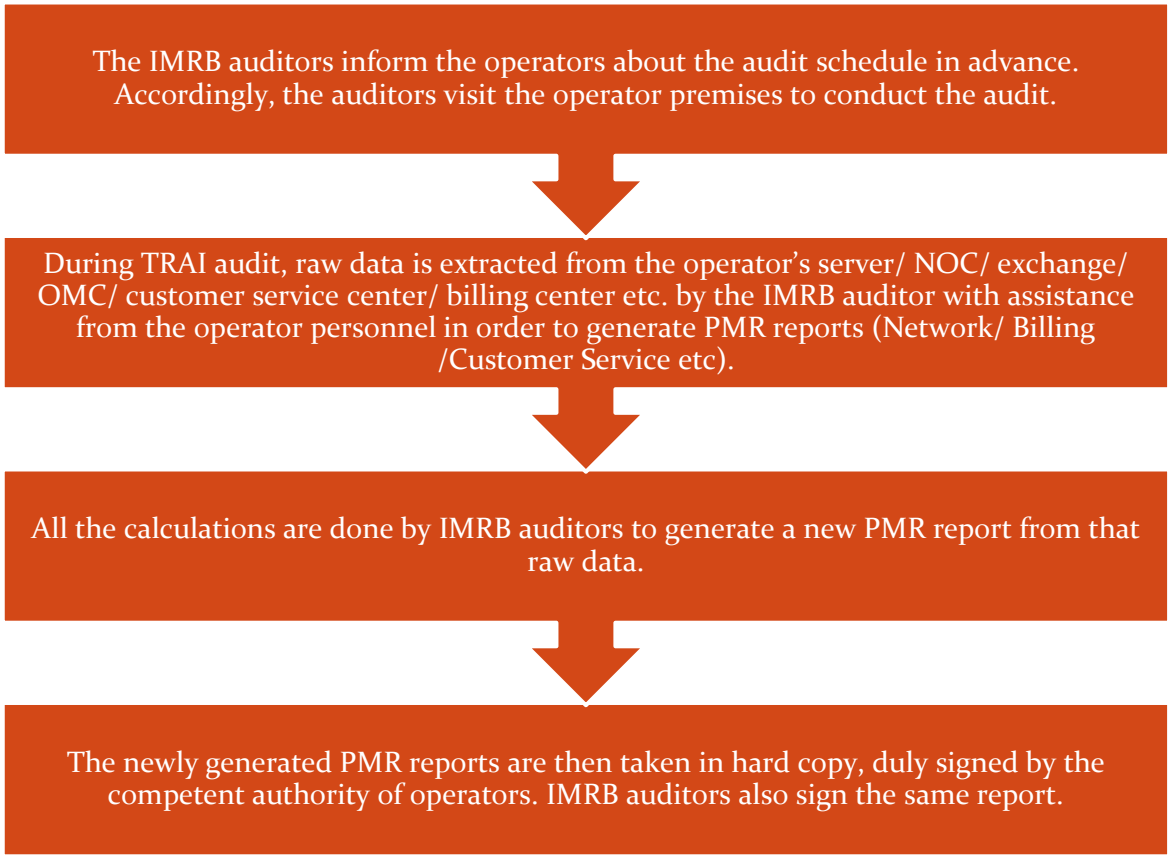


Let's discuss each of the activity in detail and the methodology adopted for each of the module.

2.4.1 PMR REPORTS

2.4.1.1 SIGNIFICANCE AND METHODOLOGY

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



The PMR report for network parameters is taken for each month of the audit quarter and is extracted and verified in the first week of the subsequent month of the audit month. For example, May 2015 audit data was collected in the month of Jun 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 June 2015 (AMJ'15) was collected in the month of July 2015.

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

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

Let us understand these formats in detail.

2.4.1.2 MONTHLY PMR

This involved calculation of the various Quality of Service network parameters through monthly Performance Monitoring Reports (PMR). The PMR reports were generated from the data extracted from operator's systems by the IMRB representative with the assistance of the operator at the operator's premises for the month of April, May and June 2015. The performance of operators on various parameters was assessed against the benchmarks. Parameters include-

Network Availability

- BTS accumulated downtime
- Worst affected BTS due to downtime

Connection Establishment (Accessibility)

- Call Set Up success Rate (CSSR)

Network Congestion Parameters

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

Connection Maintenance

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

Voice Quality

- % Connections with good voice quality

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

2.4.1.3 AUDIT PARAMETERS - NETWORK

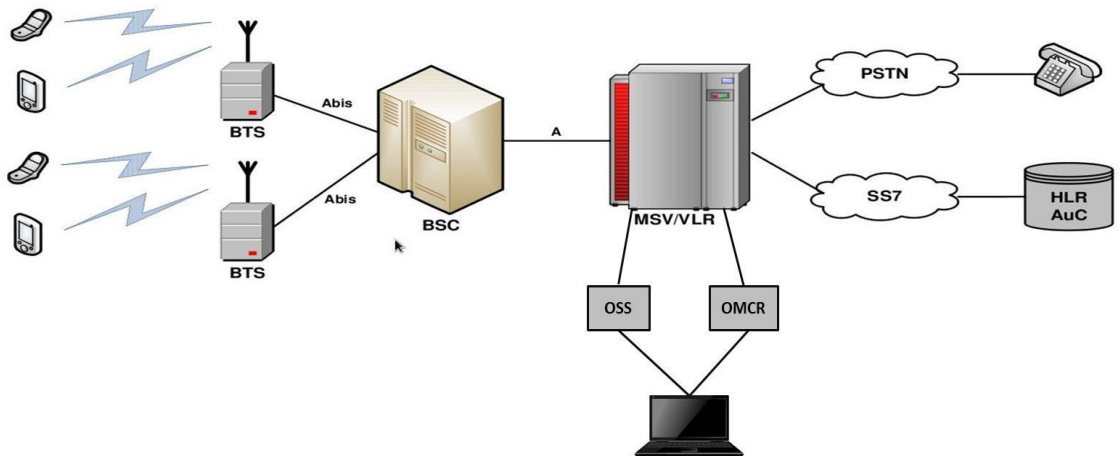
Let us now look at the various parameters involved in the audit reports.

Network Related

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

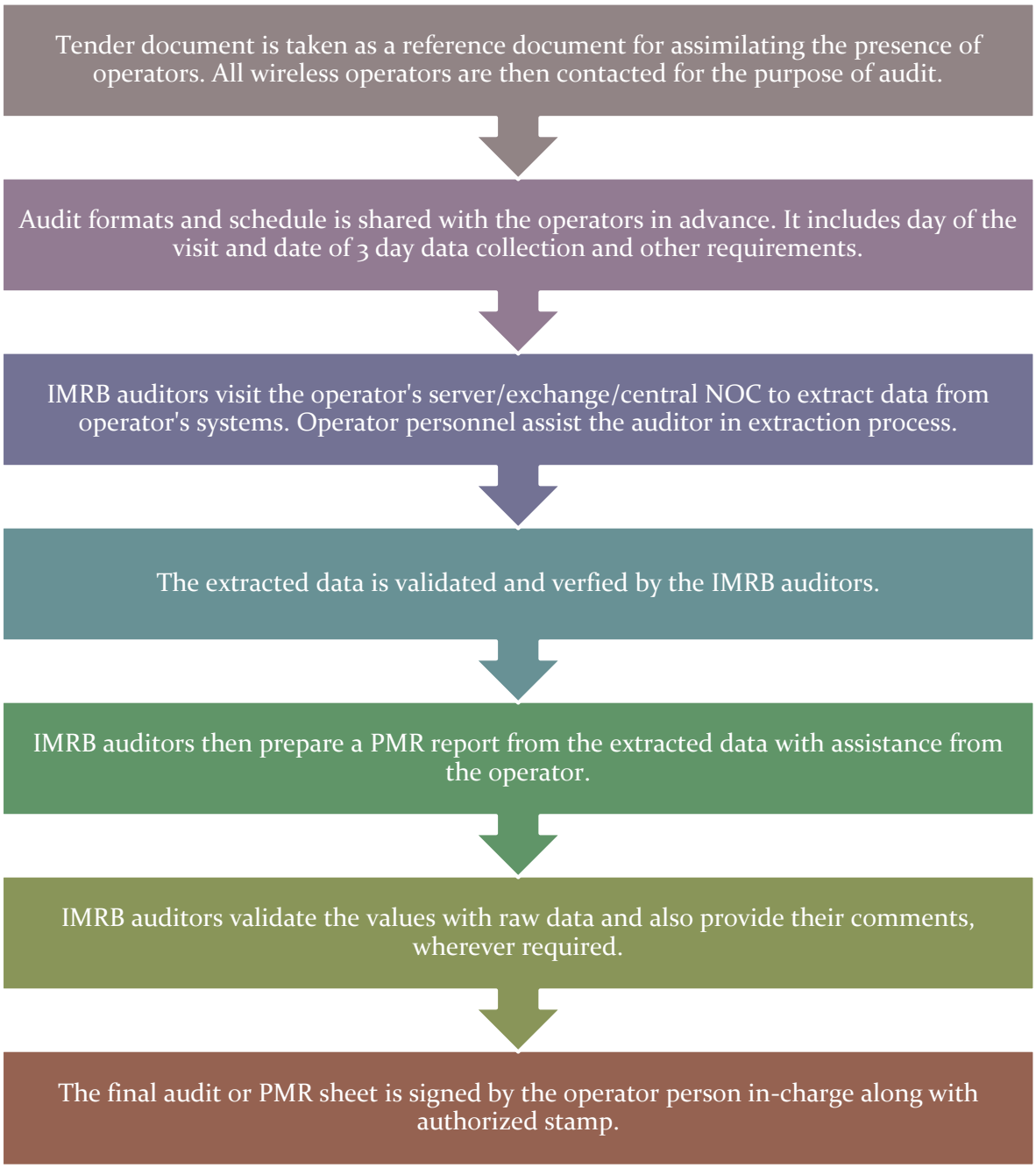
2.4.1.4 POINT OF DATA EXTRACTION

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



2.4.1.5 STEP BY STEP AUDIT PROCEDURE

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



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

2.4.1.6 CALCULATION METHODOLOGY – NETWORK PARAMETERS

Parameter	Calculation Methodology
BTS Accumulated Downtime	Sum of downtime of BTSs in a month in hours i.e. total outage time of all BTSs in hours during a month / (24 x Number of days in a month x Number of BTSs in the network in licensed service area) x 100
Worst Affected BTS Due to Downtime	(Number of BTSs having accumulated downtime greater than 24 hours in a month / Number of BTS in Licensed Service Area) * 100
Call Setup Success Rate	(Calls Established / Total Call Attempts) * 100
SDCCH/ Paging Channel Congestion	SDCCH / TCH Congestion% = [(A1 x C1) + (A2 x C2) +.....+ (An x Cn)] / (A1 + A2 +...+ An) Where: A1 = Number of attempts to establish SDCCH / TCH made on day 1 C1 = Average SDCCH / TCH Congestion % on day 1 A2 = Number of attempts to establish SDCCH / TCH made on day 2 C2 = Average SDCCH / TCH Congestion % on day 2 An = Number of attempts to establish SDCCH / TCH made on day n Cn = Average SDCCH / TCH Congestion % on day n
TCH Congestion	
POI Congestion	POI Congestion% = [(A1 x C1) + (A2 x C2) +.....+ (An x Cn)] / (A1 + A2 +...+ An) Where: A1 = POI traffic offered on all POIs (no. of calls) on day 1 C1 = Average POI Congestion % on day 1 A2 = POI traffic offered on all POIs (no. of calls) on day 2 C2 = Average POI Congestion % on day 2 An = POI traffic offered on all POIs (no. of calls) on day n Cn = Average POI Congestion % on day n
Call Drop Rate	Total Calls Dropped / Total Calls Established x 100
Worst Affected Cells having more than 3% TCH drop	Total number of cells having more than 3% TCH drop during CBBH/ Total number of cells in the LSA x 100
Connections with good voice quality	No. of voice samples with good voice quality / Total number of samples x 100

2.4.1.7 3 DAY LIVE DATA

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

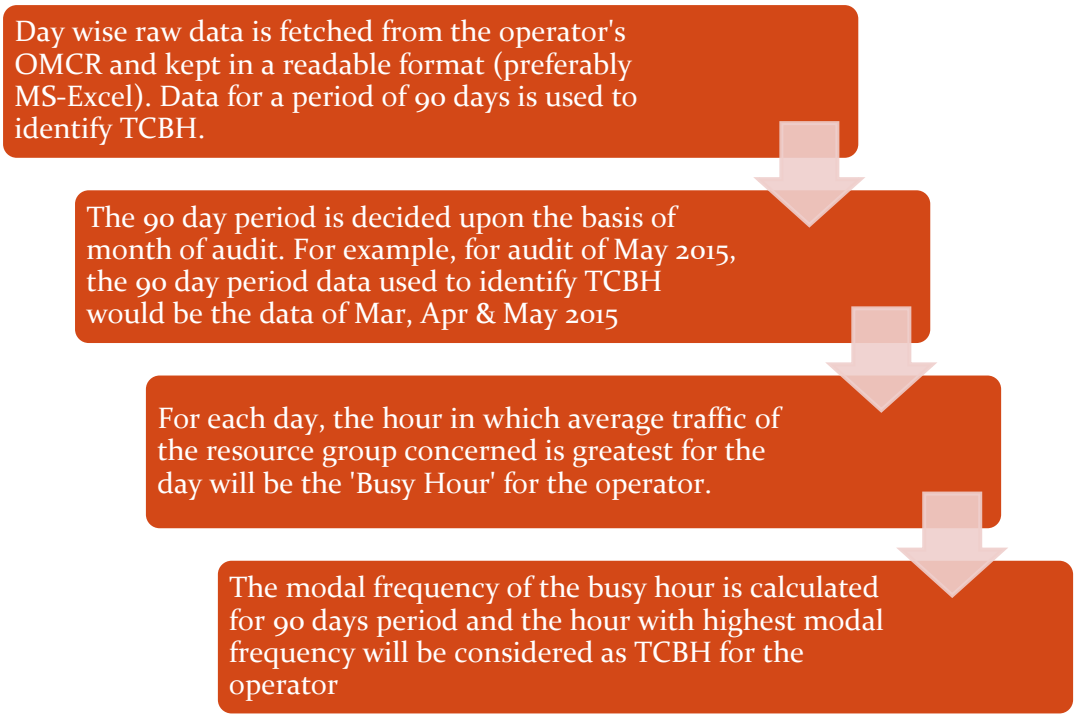
The 3 day live data provides a sample of 9 days in a quarter (3 days each month of a quarter) with hourly performance, which enables the auditor to identify and validate intraday issues for an operator on the QoS network parameters. For example, network congestion being faced by an operator during busy/peak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

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

2.4.1.8 TCBH – SIGNIFICANCE AND SELECTION METHODOLOGY

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

Step by step procedure to identify TCBH for an operator:



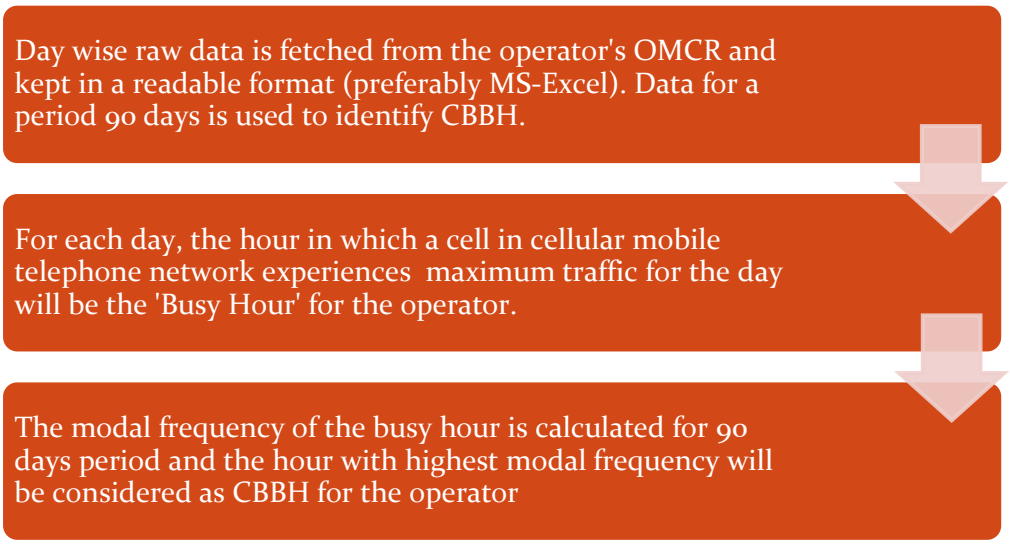
During audit, the auditors identified from the raw data that the TCBH for the operators in AMJ'15 was the time period as given below.

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



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

2.4.1.10 CUSTOMER SERVICE PARAMETERS

The data to generate PMR report for customer service parameters is extracted at the operator premises and verified once every quarter in the subsequent month of the last month of the quarter. For example, data for quarter ending June 2015 (AMJ'15) was collected in the month of July 2015. To extract the data for customer service parameters for the purpose of audit, IMRB auditors primarily visit the following locations/ departments/ offices at the operator's end.

- Central Billing Center
- Central Customer Service Center

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

The Customer Service Quality Parameters include the following:

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

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

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

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2.4.1.11 AUDIT PARAMETERS – CUSTOMER SERVICE

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

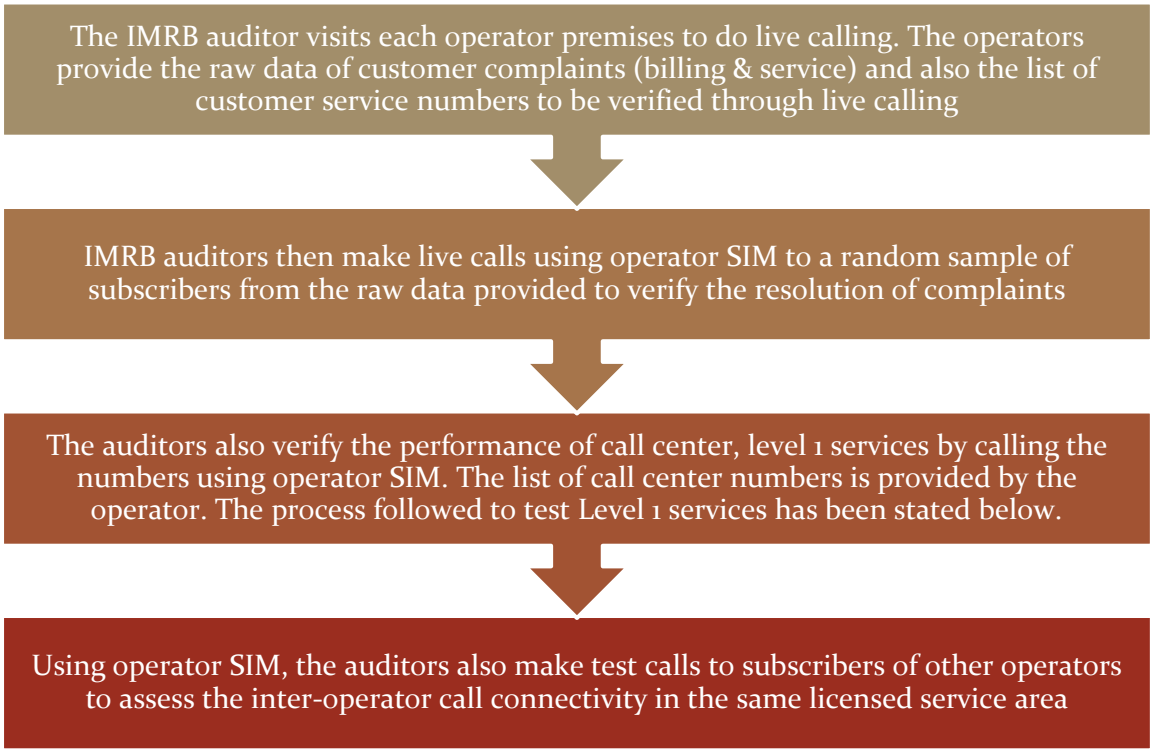
2.4.1.12 CALCULATION METHODOLOGY – CUSTOMER SERVICE PARAMETERS

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

2.4.2 LIVE CALLING

2.4.2.1 SIGNIFICANCE AND METHODOLOGY

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



Live calling activity was carried out during the period of June 2015. The data considered for live calling was for the month prior to the month in which the live calling activity was being conducted. In this case, data of May 2015 was considered for live calling activity conducted in June 2015.

A detailed explanation of each parameter is explained below.

2.4.2.2 BILLING COMPLAINTS

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

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

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

All the complaints related to billing as per clause 3.7.2 of QoS regulation of 20th June, 2009 were considered as population for selection of samples. A complete list of the same has been provided in Section 5.1.1.

TRAI benchmark-

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

2.4.2.3 SERVICE COMPLAINTS REQUESTS

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

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

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

2.4.2.4 LEVEL 1 SERVICE

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

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

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

2.4.2.4.1 PROCESS TO TEST LEVEL 1 SERVICES

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

- Operators might provide a long list of L1 services. To identify emergency L1 service numbers, auditors check if there is any number that starts with code '10' in that list. If auditors find any emergency number in addition to the below list, that number is also tested during live calling.
- On receiving the list, auditors verify it if the below given list of numbers are active in the service provider's network.
- If there are any other additional numbers provided by the operator, auditors also do live calling on those numbers along with below list.
- If any of these numbers is not active, then we would write the same in our report, auditors write in the report.
- Post verifying the list, auditors do live calling by equally distributing the calls among the various numbers and update the results in the live calling sheet.

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

2.4.2.5 CUSTOMER CARE

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

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

The process for this parameter is stated below.

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

2.4.2.6 INTER OPERATOR CALL ASSESEMENT

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

2.4.3 DRIVE TEST

2.4.3.1 SIGNIFICANCE AND METHODOLOGY

Drive test, as the name suggests, is conducted to measure the outdoor coverage in a moving vehicle in a specified network coverage area.
The main purpose of the drive test is to check the health of the mobile network of various operators in the area in terms of coverage (signal strength), voice quality, call drop rate, call set up success rate etc.

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

IMRB conducted two types of drive tests as mentioned below.

- Operator Assisted Drive Test
- Independent Drive Test

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

A detailed explanation of the two methodologies has been provided below.

2.4.3.2 OPERATOR ASSISTED DRIVE TEST

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

- 3 consecutive days drive test in one SSA every month. SSA would be defined as per BSNL and month wise SSA list will be finalized by regional TRAI office.
- On an average, a minimum of 100 kilometers were covered each day
- Route map was designed in such a way that all the major roads, highways and all the important towns and villages were covered as part of audit.
- Special emphasis was given to those areas where the number of complaints received were on the higher side, if provided by TRAI.
- The route is defined in a way that we cover maximum area in the SSA and try to cover maximum villages and cities within the SSA. The route is designed such that there is no overlap of roads and we can start from the point from where we had left last day (if possible).
- The route was classified as-
    - With In city
    - Major Roads
    - Highways
    - Shopping complex/ Mall
    - Office Complex/ Government Building
- There were no fixed calls which we need to do for within city, major roads and highways, but a minimum of 30 calls in each route, i.e., within city, major roads and highways on each day. For indoors, 20 calls each for shopping and office complex each day preferably in relatively bigger city.
- The drive test covered selected cities and adjoining towns/rural areas where the service provider has commenced service, including congested areas and indoor sites.
- The drive test of each mobile network was conducted between 10 am and 8 pm on weekdays.
- The Vehicle used in the drive tests was equipped with the test tool that automatically generates calls on the mobile telephone networks.
- The speed of the vehicle was kept at around 30 km/hr.
- The holding period of each test call was 120 seconds.
- A test call was generated 10 seconds after the previous test call is completed.
- Height of the antenna was kept uniform in case of all service providers.

2.4.3.3 INDEPENDENT DRIVE TEST

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

- A minimum of 100 kilometers was traversed during the independent drive test in a SSA. The SSA would be defined as per BSNL and SSA list will be finalized by regional TRAI office.
- Route map was designed in such a way that all the major roads, highways and all the important towns and villages were covered as part of audit.

- Special emphasis was given to those areas where the number of complaints received were on the higher side, if provided by TRAI.
- The route is defined in a way that we cover maximum area in the SSA and try to cover maximum villages and cities within the SSA. The route is designed such that there is no overlap of roads (if possible).
- The route was classified as-
    - With In city
    - Major Roads
    - Highways
    - Shopping complex/ Mall
    - Office Complex/ Government Building
- There were no fixed calls which we need to do for within city, major roads and highways, but a minimum of 30 calls in each route, i.e., within city, major roads and highways on each day. For indoors, 20 calls each for shopping and office complex each day preferably in relatively bigger city.
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- The speed of the vehicle was kept at around 30 km/hr.
- The holding period of each test call was 120 seconds.
- A test call was generated 10 seconds after the previous test call is completed.
- Height of the antenna was kept uniform in case of all service providers.

2.4.3.4 PARAMETERS EVALUATED DURING DRIVE TEST

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

- Coverage-Signal strength (GSM)
    - ✓ Total calls made (A)
    - ✓ Number of calls with signal strength between 0 to -75 dBm
    - ✓ Number of calls with signal strength between 0 to -85 dBm
    - ✓ Number of calls with signal strength between 0 to -95 dBm
- Coverage-Signal strength (CDMA)
    - ✓ Total Ec/Io BINS (A)
    - ✓ Total Ec/Io BINS with less than –15 (B)
    - ✓ Low Interference = [1 - (B/A)] x 100
- Voice quality (GSM)
    - ✓ Total RxQual Samples– A
    - ✓ RxQual samples with 0-5 value – B
    - ✓ %age samples with good voice quality = B/A x 100
- Voice quality (CDMA)
    - ✓ Total FER BINs (forward FER) – A
    - ✓ FER BINs with 0-2 value (forward FER) – B
    - ✓ FER BINs with 0-4 value (forward FER) – C

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

- Call setup success rate
  - ✓ Total number of call attempts – A
  - ✓ Total Calls successfully established – B
  - ✓ Call success rate (%age) = (B/A) x 100
- Blocked calls
  - ✓ 100% - Call Set up Rate
- Call drop rate
  - ✓ Total Calls successfully established – A
  - ✓ Total calls dropped after being established – B
  - ✓ Call Drop Rate (%age) = (B/A) x 100

2.5 OPERATORS COVERED

Name of Operator	Number of Subscriber as per VLR
Aircel(DWL)	4601854
Airtel	24440452
BSNL	1956884
Idea	9404956
Reliance CDMA	2504985
Reliance GSM	6795205
TATA CDMA	292402
TATA GSM	951646
Uninor	5339290
Vodafone	8039649

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

2.6 COLOUR CODES TO READ THE REPORT

Not Meeting the benchmark

Best Performing Operator

3 EXECUTIVE SUMMARY

The objective assessment of Quality of Service (QoS) carried out by IMRB gives an insight into the overall performance of various operators in the Bihar 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)	3.07%	20.58%	89.65%	1.00%	9.82%	1.61%	10.59%	95.40%
Airtel	0.08%	0.27%	98.49%	0.96%	1.85%	1.63%	2.28%	95.79%
BSNL	13.90%	32.08%	98.26%	2.07%	4.52%	2.66%	8.92%	97.99%
Idea	0.63%	1.84%	95.84%	0.92%	1.91%	1.06%	2.81%	96.79%
Reliance CDMA	0.79%	1.62%	97.29%	NA	0.05%	0.37%	1.42%	99.82%
Reliance GSM	0.11%	0.33%	95.73%	0.78%	0.11%	0.46%	0.09%	97.96%
TATA CDMA	0.19%	0.00%	98.29%	NA	1.14%	0.90%	4.69%	98.21%
TATA GSM	0.29%	1.45%	98.17%	0.31%	0.61%	0.51%	2.79%	97.36%
Uninor	0.29%	0.69%	96.67%	0.68%	2.55%	0.45%	1.22%	94.89%
Vodafone	0.40%	1.33%	99.19%	0.37%	0.81%	0.82%	2.88%	97.86%

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

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

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

BTSs Accumulated Downtime:

Aircel and BSNL did not meet the benchmark. Minimum BTS Accumulated downtime was recorded for Airtel at 0.08%.

Worst Affected BTSs Due to Downtime:

Aircel and BSNL failed to meet the benchmark. Minimum worst affected BTSs due to downtime was recorded for Tata CDMA at 0.00%.

Call Set-up Success Rate (CSSR):

Aircel did not meet the benchmark for CSSR. During the audits, the maximum CSSR was observed for Vodafone with 99.19%.
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:

BSNL failed to meet the benchmark on SDCCH / Paging Channel Congestion as well as TCH congestion. Aircel and Uninor did not meet the benchmark on TCH Congestion.
Tata GSM recorded the best performance on SDCCH / Paging Channel Congestion while Reliance CDMA recorded the best performance on TCH congestion.

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

Call Drop Rate:

BSNL failed to meet the benchmark for the parameter. Minimum call drop rate was recorded for Reliance CDMA at 0.37%.

Worst Affected Cells Having More than 3% TCH Drop:

Aircel, BSNL and Tata CDMA failed to meet the benchmark for the parameter. Best performance was recorded for Reliance GSM at 0.09%.

Voice Quality

Uninor failed to meet the benchmark for voice quality. Best performance was recorded for Reliance CDMA at 99.82%.

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

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

3.1.1 PMR DATA – APRIL

Name of Service Provider Month April	Network Availability		Connection Establishment (Accessibility)			Connection Maintenance (Retainability)		
	BTSs Accumulated downtime (not available for service)	Worst affected BTSs due to downtime	Call Set-up Success Rate (within licensee's own network)	SDCCH/ Paging Chl. Congestion	TCH Congestion	Call Drop Rate (%age)	Worst affected cells having more than 3% TCH drop	%age of connection with good voice quality
Benchmark	≤ 2%	≤ 2%	≥ 95%	≤ 1%	≤ 2%	≤ 2%	≤ 3%	≥ 95%
Aircel(DWL)	3.26%	23.42%	89.77%	0.98%	9.64%	1.60%	10.17%	95.44%
Airtel	0.07%	0.21%	98.31%	0.98%	1.82%	1.91%	2.32%	95.69%
BSNL	14.00%	29.94%	98.17%	2.21%	4.73%	2.71%	9.78%	98.02%
Idea	0.58%	1.87%	95.16%	0.88%	1.90%	0.95%	2.81%	96.78%
Reliance CDMA	0.76%	1.43%	98.00%	NA	0.02%	0.33%	1.40%	99.82%
Reliance GSM	0.10%	0.27%	96.11%	0.81%	0.09%	0.46%	0.09%	97.93%
TATA CDMA	0.20%	0.00%	97.35%	NA	0.52%	0.85%	4.04%	98.24%
TATA GSM	0.29%	1.35%	98.28%	0.27%	0.57%	0.52%	2.59%	97.35%
Uninor	0.23%	0.50%	97.83%	0.57%	1.42%	0.42%	1.10%	94.94%
Vodafone	0.45%	1.67%	99.33%	0.28%	0.67%	0.82%	2.83%	97.73%

3.1.2 PMR DATA – MAY

Name of Service Provider Month May	Network Availability		Connection Establishment (Accessibility)			Connection Maintenance (Retainability)		
	BTSs Accumulated downtime (not available for service)	Worst affected BTSs due to downtime	Call Set-up Success Rate (within licensee's own network)	SDCCH/ Paging Chl. Congestion	TCH Congestion	Call Drop Rate (%age)	Worst affected cells having more than 3% TCH drop	%age of connection with good voice quality
Benchmark	≤ 2%	≤ 2%	≥ 95%	≤ 1%	≤ 2%	≤ 2%	≤ 3%	≥ 95%
Aircel(DWL)	3.03%	18.87%	90.48%	0.95%	9.07%	1.50%	9.68%	95.40%
Airtel	0.08%	0.32%	98.58%	0.96%	1.86%	1.50%	2.26%	95.84%
BSNL	13.48%	32.03%	98.28%	1.97%	4.24%	2.60%	9.49%	97.97%
Idea	0.63%	1.84%	95.81%	0.95%	1.92%	1.02%	2.80%	96.82%
Reliance CDMA	0.82%	1.81%	96.57%	NA	0.07%	0.40%	1.43%	99.81%
Reliance GSM	0.12%	0.39%	95.34%	0.74%	0.12%	0.46%	0.09%	97.98%
TATA CDMA	0.14%	0.00%	99.46%	NA	1.33%	0.91%	4.84%	98.17%
TATA GSM	0.25%	1.45%	98.22%	0.26%	0.61%	0.58%	2.80%	97.38%
Uninor	0.29%	0.84%	97.77%	0.52%	1.45%	0.43%	1.17%	94.87%
Vodafone	0.30%	0.79%	99.23%	0.36%	0.77%	0.80%	2.89%	97.85%

3.1.3 PMR DATA - JUNE

Name of Service Provider Month June	Network Availability		Connection Establishment (Accessibility)			Connection Maintenance (Retainability)		
	BTSs Accumulated downtime (not available for service)	Worst affected BTSs due to downtime	Call Set-up Success Rate (within licensee's own network)	SDCCH/ Paging Chl. Congestion	TCH Congestion	Call Drop Rate (%age)	Worst affected cells having more than 3% TCH drop	%age of connection with good voice quality
Benchmark	≤ 2%	≤ 2%	≥ 95%	≤ 1%	≤ 2%	≤ 2%	≤ 3%	≥ 95%
Aircel(DWL)	2.91%	19.44%	88.69%	1.06%	10.75%	1.72%	11.93%	95.36%
Airtel	0.08%	0.27%	98.59%	0.95%	1.86%	1.49%	2.25%	95.84%
BSNL	14.23%	34.26%	98.33%	2.03%	4.58%	2.67%	7.50%	97.99%
Idea	0.69%	1.81%	96.55%	0.94%	1.90%	1.21%	2.81%	96.77%
Reliance CDMA	NDR	NDR	NDR	NDR	NDR	NDR	NDR	NDR
Reliance GSM	NDR	NDR	NDR	NDR	NDR	NDR	NDR	NDR
TATA CDMA	0.23%	0.00%	98.05%	NA	1.57%	0.94%	5.19%	98.22%
TATA GSM	0.33%	1.56%	98.02%	0.41%	0.65%	0.44%	2.98%	97.35%
Uninor	0.34%	0.74%	94.40%	0.95%	4.77%	0.49%	1.40%	94.86%
Vodafone	0.45%	1.52%	99.00%	0.47%	1.00%	0.85%	2.92%	98.00%

For Reliance CDMA and Reliance GSM, Jun'15 data was not 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.

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)	2.96%	No Data	91.31%	0.96%	8.32%	1.46%	9.30%	95.54%
Airtel	0.09%	0.00%	98.55%	0.91%	1.83%	1.56%	2.29%	95.68%
BSNL	9.31%	4.14%	98.05%	1.97%	4.23%	2.91%	6.50%	98.03%
Idea	0.76%	0.06%	96.12%	0.95%	1.84%	1.00%	2.78%	97.08%
Reliance CDMA	0.90%	0.00%	98.11%	NA	0.02%	0.31%	0.00%	99.82%
Reliance GSM	0.11%	0.00%	95.76%	2.60%	0.09%	0.47%	0.00%	97.93%
TATA CDMA	0.19%	0.00%	98.65%	NA	0.28%	0.75%	5.75%	98.22%
TATA GSM	0.36%	0.00%	98.90%	0.38%	0.23%	0.51%	3.52%	97.56%
Uninor	0.32%	0.25%	97.01%	0.72%	2.26%	0.43%	1.10%	94.89%
Vodafone	0.46%	0.00%	99.24%	0.36%	0.76%	0.83%	2.84%	98.08%

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

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

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

BTSs Accumulated Downtime:

During 3 day live measurement, Aircel and BSNL did not meet the benchmark. Minimum BTS Accumulated downtime was recorded for Airtel at 0.09%.

Worst Affected BTSs Due to Downtime:

BSNL failed to meet the benchmark while all other operators performed well on this parameter. Data for Aircel was not audited for the parameter as operator's system is not equipped to provide the data during live measurement.

Call Set-up Success Rate (CSSR):

Aircel did not meet the benchmark for CSSR. During the live measurement, the maximum CSSR was observed for Vodafone with 99.24%.

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:

BSNL and Reliance GSM failed to meet the benchmark on SDCCH / Paging Channel Congestion. Aircel, BSNL and Uninor did not meet the benchmark for TCH congestion.

Vodafone recorded the best performance on SDCCH / Paging Channel Congestion while Reliance CDMA recorded the best performance on TCH congestion.

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

Call Drop Rate:

BSNL failed to meet the benchmark for call drop rate. Minimum call drop rate was recorded for Reliance CDMA at 0.31%.

Worst Affected Cells Having More than 3% TCH Drop:

Aircel, BSNL, Tata CDMA and Tata GSM failed to meet the benchmark for the parameter. Best performance was recorded for Reliance CDMA and Reliance GSM at 0.00%.

Voice Quality

Uninor failed to meet the benchmark. Best performance was recorded for Reliance CDMA at 99.82%.

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

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

3.2.1 3 DAY DATA - APRIL

Name of Service Provider 3 day April	Network Availability		Connection Establishment (Accessibility)			Connection Maintenance (Retainability)		
	BTSs Accumulated downtime (not available for service)	Worst affected BTSs due to downtime	Call Set-up Success Rate (within licensee's own network)	SDCCH/ Paging Chl. Congestion	TCH Congestion	Call Drop Rate (%age)	Worst affected cells having more than 3% TCH drop	%age of connection with good voice quality
Benchmark	≤ 2%	≤ 2%	≥ 95%	≤ 1%	≤ 2%	≤ 2%	≤ 3%	≥ 95%
Aircel(DWL)	3.34%	No Data	92.23%	1.04%	7.42%	1.61%	10.06%	95.59%
Airtel	0.08%	0.00%	98.43%	0.88%	1.78%	1.71%	2.33%	95.67%
BSNL	9.32%	1.33%	98.34%	1.96%	4.49%	2.72%	6.74%	98.07%
Idea	0.83%	0.10%	97.12%	0.97%	1.63%	0.89%	2.79%	97.18%
Reliance CDMA	0.67%	0.00%	98.16%	NA	0.02%	0.29%	0.00%	99.81%
Reliance GSM	0.09%	0.00%	96.34%	2.86%	0.08%	0.48%	0.00%	97.93%
TATA CDMA	0.29%	0.00%	99.24%	NA	0.10%	0.70%	5.39%	98.24%
TATA GSM	0.42%	0.00%	98.87%	0.43%	0.24%	0.49%	4.77%	97.71%
Uninor	0.33%	0.00%	97.95%	0.86%	1.37%	0.43%	1.18%	94.98%
Vodafone	0.67%	0.00%	99.37%	0.32%	0.63%	0.79%	2.67%	98.08%

Data for Aircel was not audited for the parameter as operator's system is not equipped to provide the data during live measurement.

3.2.2 3 DAY DATA – MAY

Name of Service Provider 3 Day May	Network Availability		Connection Establishment (Accessibility)			Connection Maintenance (Retainability)		
	BTSs Accumulated downtime (not available for service)	Worst affected BTSs due to downtime	Call Set-up Success Rate (within licensee's own network)	SDCCH/ Paging Chl. Congestion	TCH Congestion	Call Drop Rate (%age)	Worst affected cells having more than 3% TCH drop	%age of connection with good voice quality
Benchmark	≤ 2%	≤ 2%	≥ 95%	≤ 1%	≤ 2%	≤ 2%	≤ 3%	≥ 95%
Aircel(DWL)	3.16%	No Data	92.42%	0.71%	7.25%	1.13%	7.07%	95.69%
Airtel	0.09%	0.00%	98.65%	0.90%	1.86%	1.52%	2.28%	95.34%
BSNL	8.25%	5.77%	97.48%	1.85%	3.30%	3.37%	6.19%	98.05%
Idea	0.81%	0.06%	96.01%	0.96%	1.92%	0.87%	2.81%	97.17%
Reliance CDMA	1.12%	0.00%	98.05%	NA	0.02%	0.32%	0.00%	99.82%
Reliance GSM	0.12%	0.00%	95.18%	2.33%	0.09%	0.45%	0.00%	97.92%
TATA CDMA	0.12%	0.00%	99.12%	NA	0.28%	0.80%	6.68%	98.25%
TATA GSM	0.38%	0.00%	99.01%	0.62%	0.19%	0.49%	2.80%	97.38%
Uninor	0.30%	0.00%	97.76%	0.51%	1.44%	0.42%	1.12%	94.91%
Vodafone	0.39%	0.00%	99.22%	0.45%	0.78%	0.78%	2.89%	98.10%

Data for Aircel was not audited for the parameter as operator's system is not equipped to provide the data during live measurement.

3.2.3 3 DAY DATA - JUNE

Name of Service Provider 3 day June	Network Availability		Connection Establishment (Accessibility)			Connection Maintenance (Retainability)		
	BTSs Accumulated downtime (not available for service)	Worst affected BTSs due to downtime	Call Set-up Success Rate (within licensee's own network)	SDCCH/ Paging Chl. Congestion	TCH Congestion	Call Drop Rate (%age)	Worst affected cells having more than 3% TCH drop	%age of connection with good voice quality
Benchmark	≤ 2%	≤ 2%	≥ 95%	≤ 1%	≤ 2%	≤ 2%	≤ 3%	≥ 95%
Aircel(DWL)	2.37%	No Data	89.28%	1.14%	10.29%	1.65%	10.77%	95.35%
Airtel	0.09%	0.00%	98.58%	0.95%	1.86%	1.46%	2.27%	96.03%
BSNL	10.36%	5.33%	98.32%	2.11%	4.90%	2.64%	6.58%	97.96%
Idea	0.65%	0.01%	95.24%	0.93%	1.96%	1.25%	2.73%	96.88%
Reliance CDMA	NDR	NDR	NDR	NDR	NDR	NDR	NDR	NDR
Reliance GSM	NDR	NDR	NDR	NDR	NDR	NDR	NDR	NDR
TATA CDMA	0.16%	0.00%	97.58%	NA	0.45%	0.76%	5.19%	98.16%
TATA GSM	0.28%	0.00%	98.82%	0.09%	0.25%	0.54%	2.98%	97.58%
Uninor	0.33%	0.74%	95.31%	0.80%	3.96%	0.43%	1.00%	94.77%
Vodafone	0.33%	0.00%	99.13%	0.32%	0.87%	0.91%	2.95%	98.07%

Data for Aircel was not audited for the parameter as operator's system is not equipped to provide the data during live measurement. For Reliance CDMA and Reliance GSM, Jun'15 data was not audited due to a server issue at operator's end. The same was pre-informed to TRAI by the operator.

3.3 LIVE CALLING DATA - CONSOLIDATED

Name of Service Provider	Resolution of billing complaints		Service Requests	Level 1 Service	Response time to customer for assistance	
	%age complaints resolved within 4 weeks	%age complaints resolved within 6 weeks	Complaint /Request attended to Satisfaction	Call answered	Accessibility of call centre/ customer care	Percentage of calls answered by the operators (voice to voice) within 90 seconds
Benchmark	98.00%	100.00%		≥ 95%	≥ 95%	≥ 95%
Aircel(DWL)	NA	NA	81.00%	88.67%	100.00%	100.00%
Airtel	68.00%	83.00%	87.00%	88.67%	100.00%	100.00%
BSNL	80.00%	80.00%	82.50%	88.00%	100.00%	95.50%
Idea	82.00%	84.00%	87.00%	94.00%	100.00%	99.00%
Reliance CDMA	56.82%	69.32%	72.00%	88.67%	100.00%	80.00%
Reliance GSM	59.00%	81.00%	89.00%	86.67%	100.00%	92.00%
TATA CDMA	67.65%	79.41%	82.00%	94.00%	100.00%	93.00%
TATA GSM	81.00%	81.00%	76.00%	91.33%	100.00%	100.00%
Uninor	90.91%	90.91%	No Data	86.00%	100.00%	100.00%
Vodafone	80.00%	84.00%	83.00%	92.00%	100.00%	94.00%

Resolution of billing complaints

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

Complaint/Request Attended to Satisfaction

All operators performed satisfactorily in terms of satisfaction of the customers for service requests. Reliance GSM recorded the highest satisfaction at 89%.

There was no data of service complaints available with Uninor. Hence the live calling for this parameter was not conducted for AMJ'15.

Level 1 Service

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

Accessibility of Call Centre/Customer Care-IVR

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

Customer Care / Helpline Assessment

Reliance CDMA, Reliance GSM, Tata CDMA and Vodafone failed to meet TRAI benchmark of answering 95% of calls answered by the call centres (voice to voice) within 90 seconds. Aircel, Airtel, Tata GSM and Uninor were the top performers.

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)	0.00%	0.97%	100.00%	100.00%	100.00%	92.15%	97.45%
Airtel	0.09%	0.01%	100.00%	100.00%	100.00%	99.18%	45.35%
BSNL	2.13%	0.02%	98.57%	98.70%	100.00%	97.64%	95.38%
Idea	0.05%	0.04%	100.00%	100.00%	100.00%	98.35%	97.49%
Reliance CDMA	0.10%	0.03%	100.00%	100.00%	100.00%	99.01%	87.58%
Reliance GSM	0.10%	0.02%	100.00%	100.00%	100.00%	98.97%	95.15%
TATA CDMA	0.00%	0.00%	NA	NA	100.00%	99.41%	99.16%
TATA GSM	0.00%	0.00%	100.00%	100.00%	100.00%	95.08%	98.28%
Uninor	NA	0.00%	100.00%	100.00%	100.00%	99.41%	99.04%
Vodafone	0.02%	0.05%	100.00%	100.00%	100.00%	100.00%	96.48%

Note: Uninor does not have postpaid service in Bihar, hence it is recorded as NA in metering and billing of postpaid subscribers.

Metering and billing credibility – Postpaid Subscribers

BSNL did not meet the TRAI benchmark for postpaid metering and billing credibility. Aircel, Tata CDMA and Tata GSM recorded the best performance with 0.00% disputes.

Metering and billing credibility – Prepaid Subscribers

Aircel failed to meet the TRAI benchmark for prepaid metering and billing credibility. Tata CDMA, Tata GSM and Uninor performed the best on this parameter with 0.00% complaints.

Resolution of billing complaints

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

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

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

All the operators met the TRAI benchmark of providing credit or waiver within one week in case of complaints received.

Customer Care Percentage of calls answered by the IVR.

Aircel did not meet the benchmark of 95% of its IVR call being attended Vodafone recorded the best performance for the parameter.

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

Airtel and Reliance CDMA failed to meet the TRAI specified benchmark of 95%. Tata CDMA recorded the best performance for the parameter at 99.16%.

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	Uninor	Vodafone
Aircel(DWL)	NA	98.00%	98.00%	97.00%	98.00%	97.00%	97.00%	98.00%	97.00%	97.00%
Airtel	99.00%	NA	99.00%	99.00%	98.00%	100.00%	96.00%	95.00%	98.00%	98.00%
BSNL	96.00%	98.00%	NA	97.00%	97.00%	96.00%	93.00%	98.00%	96.00%	97.00%
Idea	100.00%	100.00%	96.00%	NA	97.00%	98.00%	97.00%	98.00%	97.00%	97.00%
Reliance CDMA	94.00%	96.00%	94.00%	94.00%	NA	90.00%	96.00%	97.00%	96.00%	94.00%
Reliance GSM	97.00%	96.00%	99.00%	97.00%	94.00%	NA	97.00%	100.00%	99.00%	97.00%
TATA CDMA	92.00%	94.00%	89.00%	96.00%	96.00%	92.00%	NA	94.00%	91.00%	92.00%
TATA GSM	98.00%	98.00%	99.00%	98.00%	98.00%	96.00%	94.00%	NA	98.00%	100.00%
Uninor	100.00%	99.00%	99.00%	98.00%	99.00%	93.00%	98.00%	97.00%	NA	99.00%
Vodafone	99.00%	98.00%	96.00%	97.00%	98.00%	98.00%	99.00%	98.00%	98.00%	NA

Most of the operators faced issues while connecting to other operators.

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 & BSNL are the key concern operators as these failed to meet the benchmark for majority of the network parameters.

3 Day Live Measurement (Network Parameters)

Aircel & BSNL are the key concern operators as these failed to meet the benchmark for majority of the network parameters.

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

Live Calling

None of the operators met the benchmark for resolving billing complaints during live calling.

None of the operators met the TRAI benchmark for level 1 service with calls being answered in 60 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.

Reliance CDMA, Reliance GSM, Tata CDMA and Vodafone failed to meet TRAI benchmark of answering 95% of calls answered by the call centres (voice to voice) within 90 seconds.

Metering and billing credibility

BSNL failed to meet the TRAI benchmark for postpaid while Aircel failed to meet the benchmark for prepaid.

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

Customer Care

Aircel did not meet the benchmark of 95% of its IVR call being attended. Airtel and Reliance CDMA failed to meet the TRAI specified benchmark of answering 95% voice to voice calls within 90 seconds by the operators.

Inter-Operator Call Assessment

Most of the operators faced issues while connecting to other operators.

Drive Test (Operator Assisted)

Aircel, BSNL, Reliance CDMA, Reliance GSM, Tata CDMA, Tata GSM and Uninor consistently failing to meet the benchmark of parameters tested during drive tests.

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

5.1 BTS ACCUMULATED DOWNTIME

5.1.1 PARAMETER DESCRIPTION

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

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

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

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

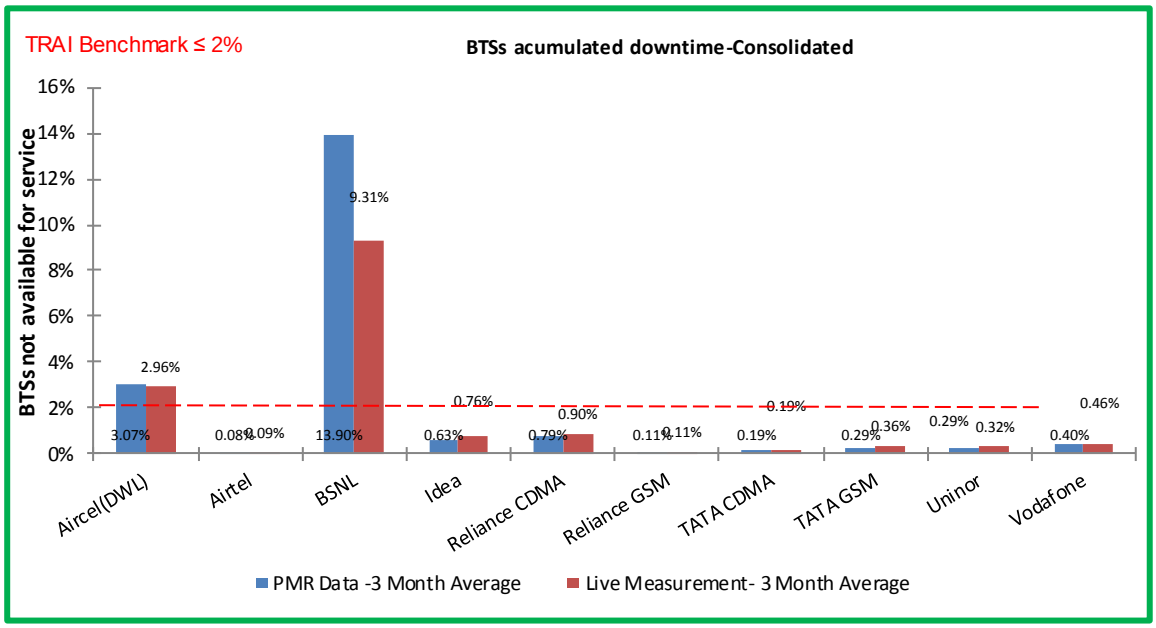
3. **TRAI Benchmark –**

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

4. **Audit Procedure –**

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

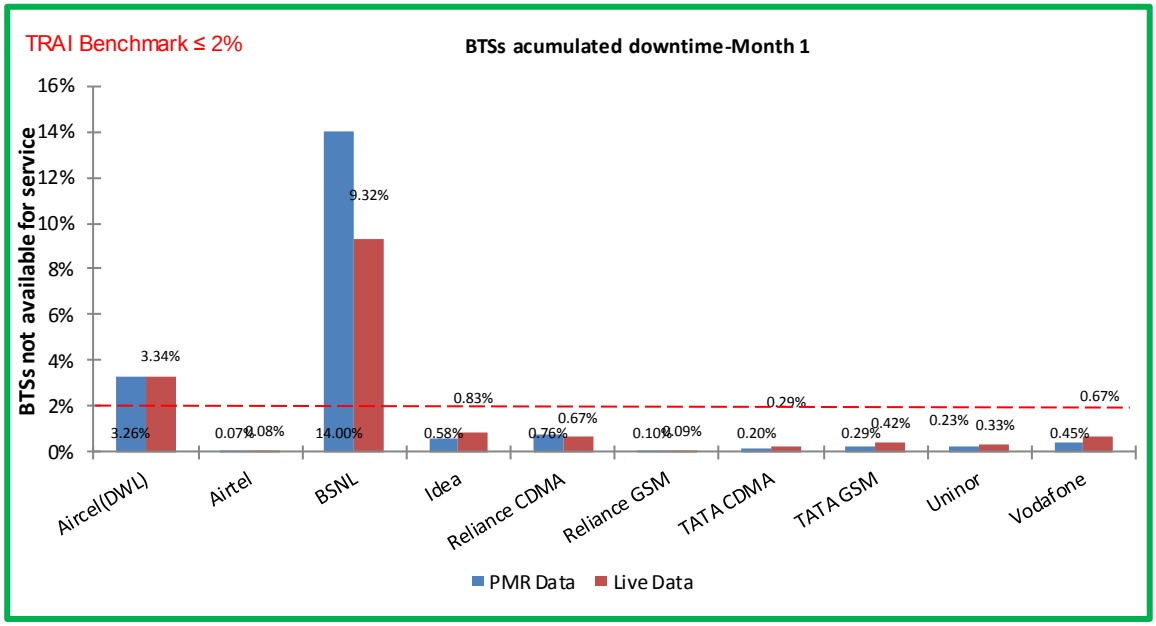
5.1.2 KEY FINDINGS



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

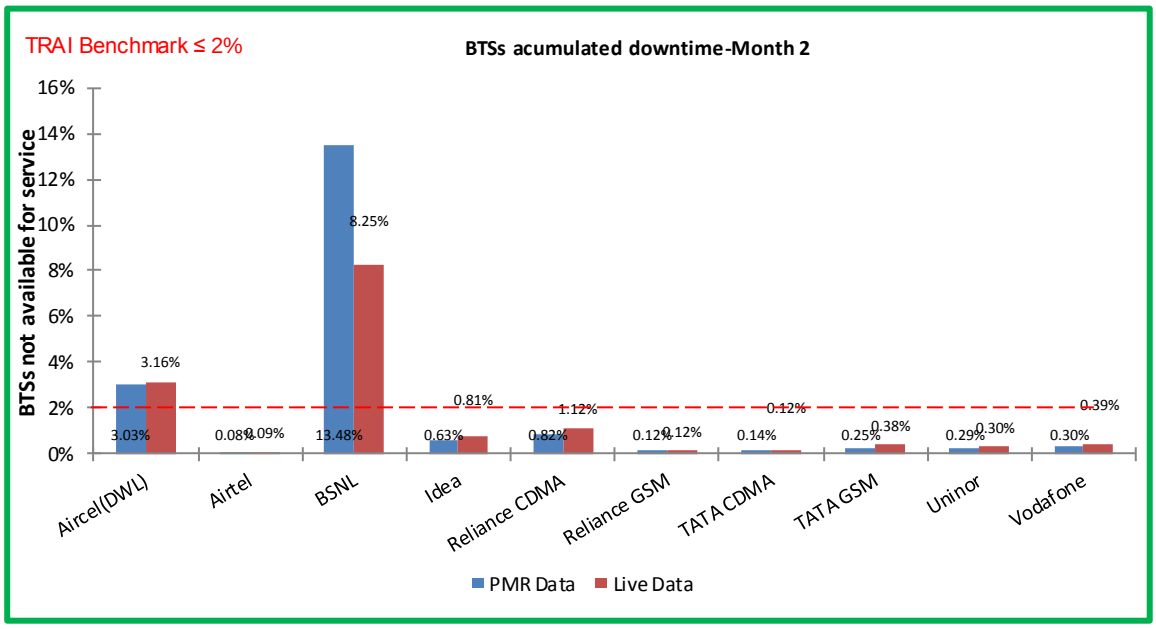
Aircel and BSNL did not meet the benchmark during audit.

5.1.2.1 KEY FINDINGS – MONTH 1



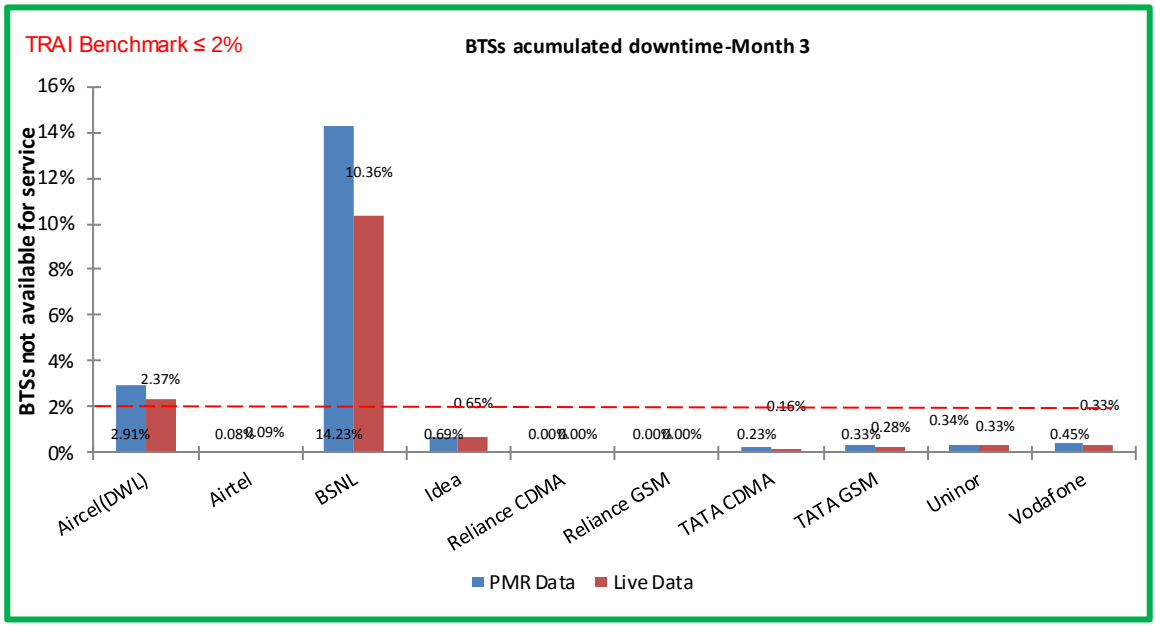
Data Source: Operations and Maintenance Center (OMC) of the operators

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, Jun'15 data was not 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.

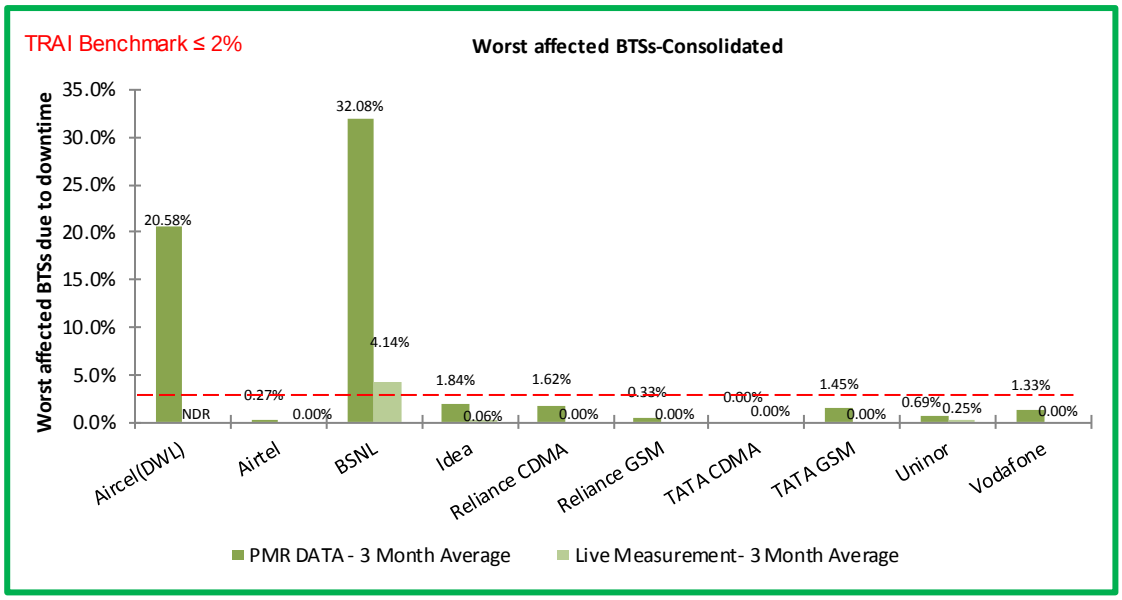
   iii. Data is extracted from system log of the server of the operator. This data is in raw format which is further processed to arrive at the cumulative values.

   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

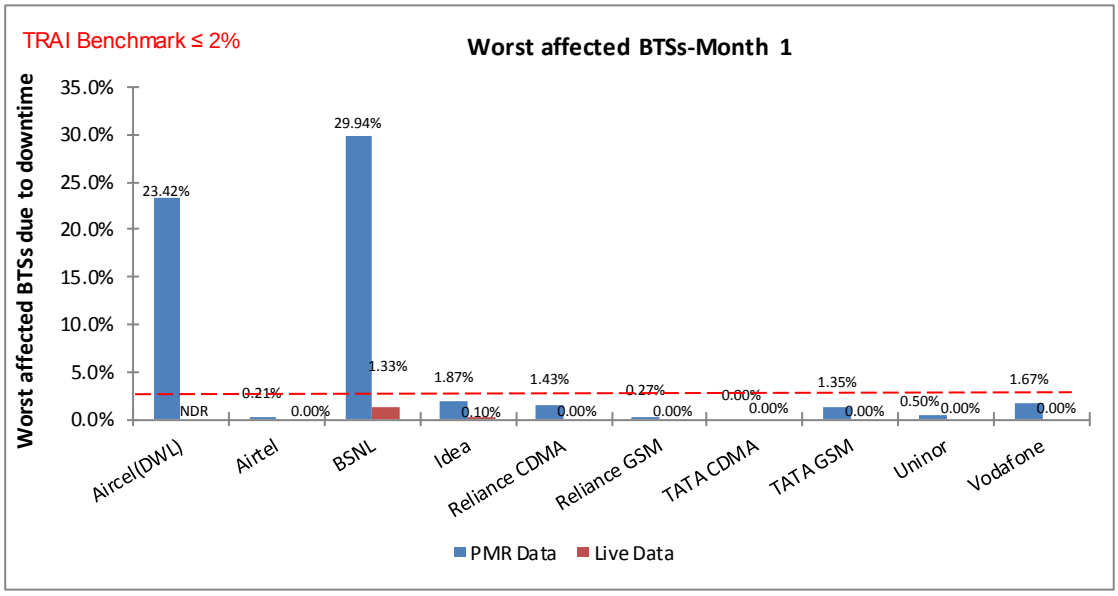


Data Source: Operations and Maintenance Center (OMC) of the operators

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

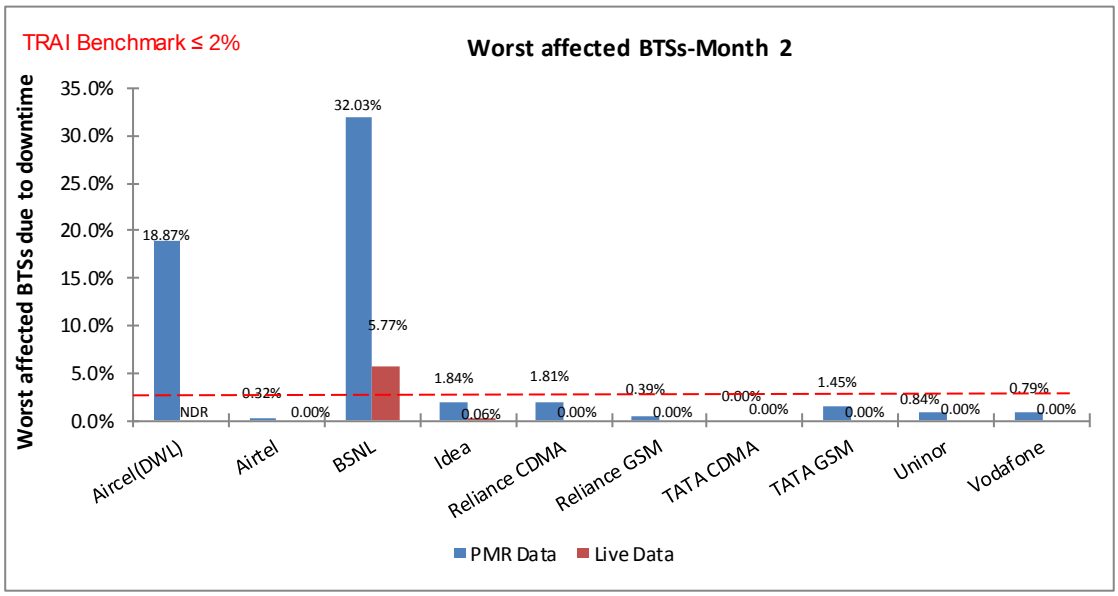
Significant difference was observed between PMR & live measurement data for BSNL. The possible reason for the variation could be the difference in time frame of data as PMR data is for 30 days and live measurement data is for three days.

5.2.2.1 KEY FINDINGS – MONTH 1



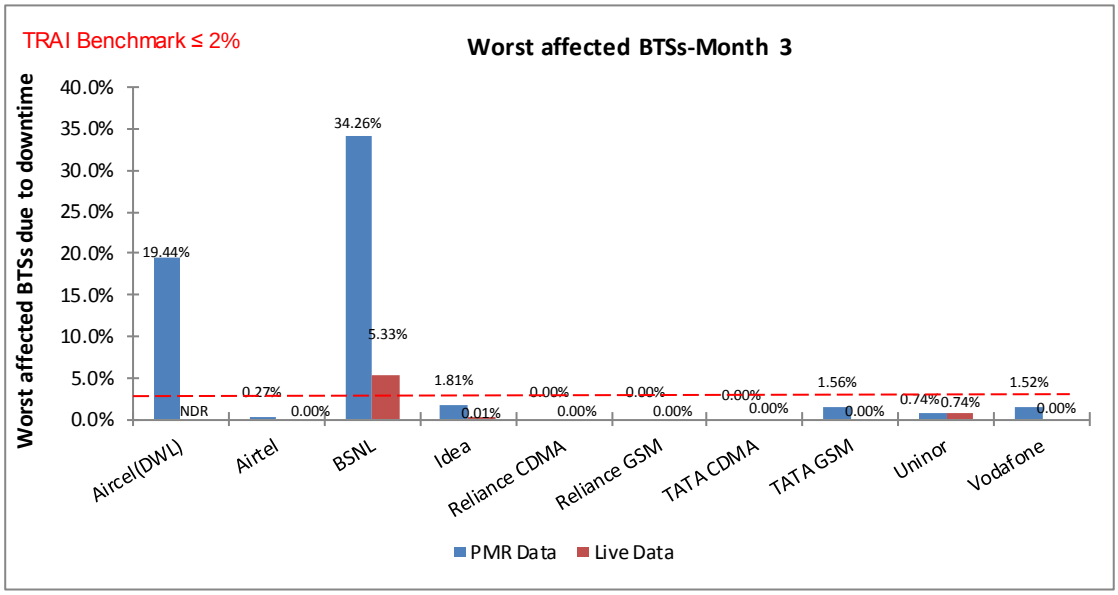
Data Source: Operations and Maintenance Center (OMC) of the operators

5.2.2.2 KEY FINDINGS – MONTH 2



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

5.2.2.3 KEY FINDINGS – MONTH 3



For Reliance CDMA and Reliance GSM, Jun'15 data was not 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

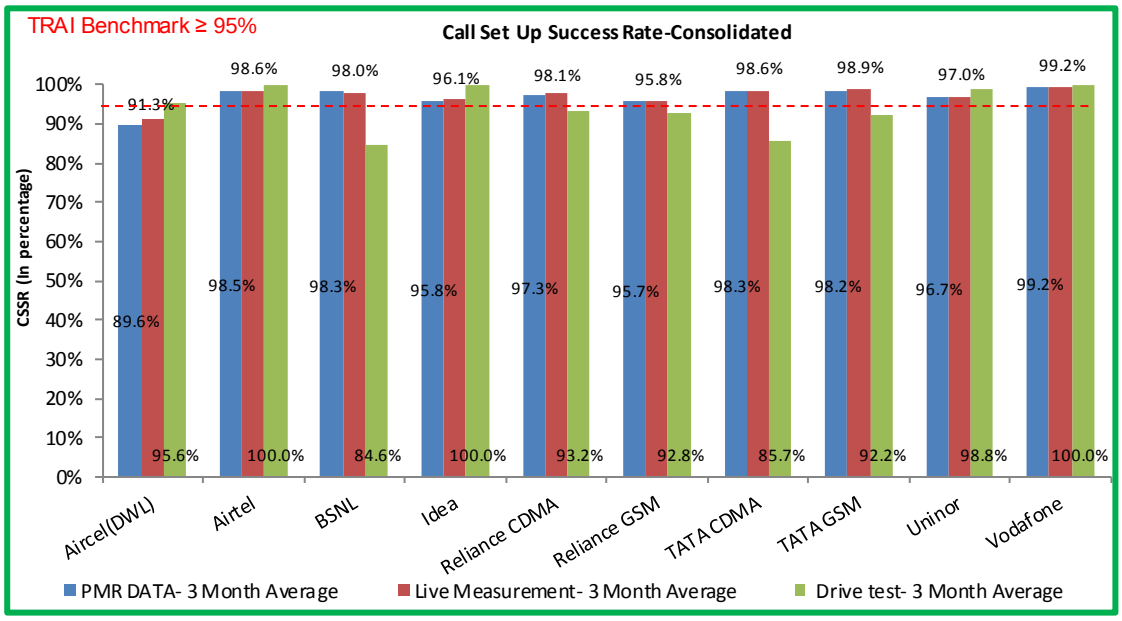
   Call Established means the following events have happened in call setup:-

   - 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.

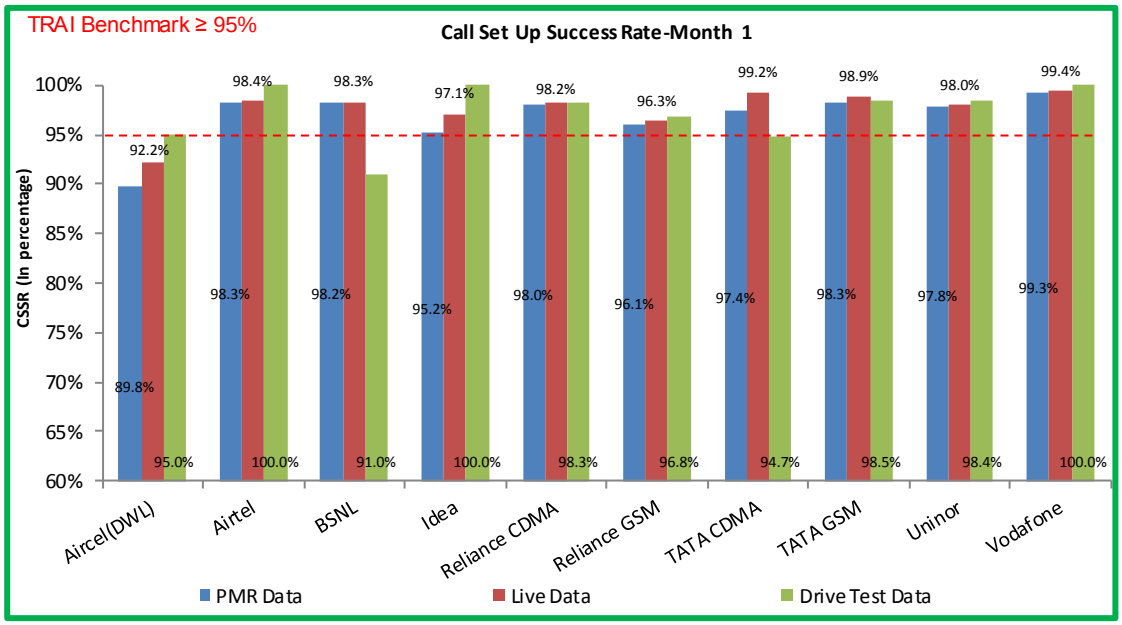
5.3.2 KEY FINDINGS



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

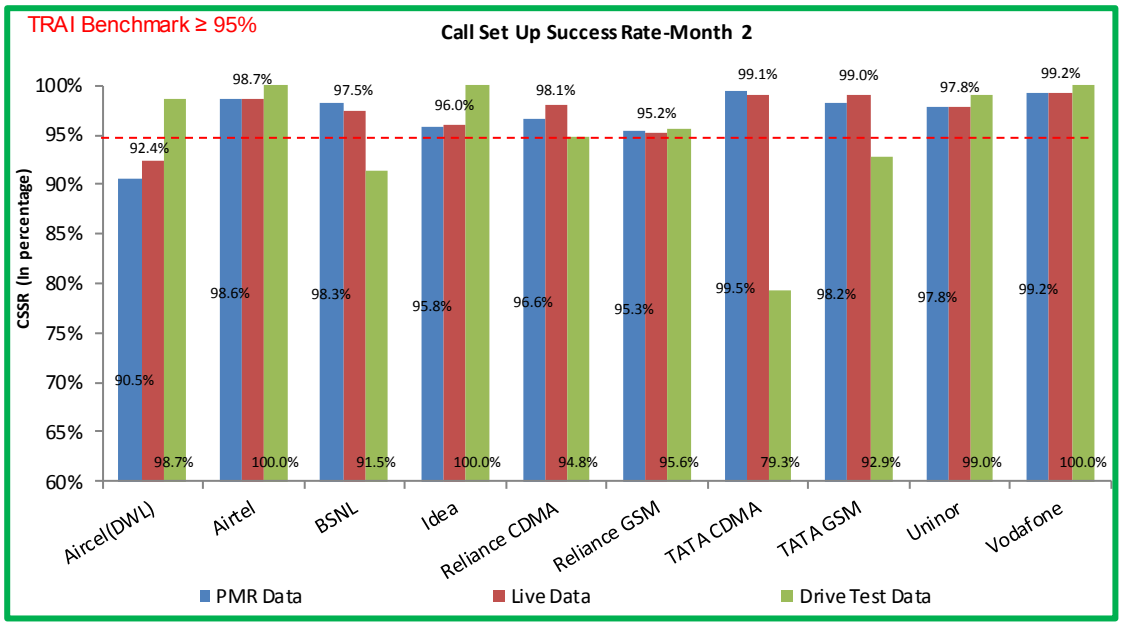
Aircel failed to meet the TRAI benchmark during audit.

5.3.2.1 KEY FINDINGS – MONTH 1



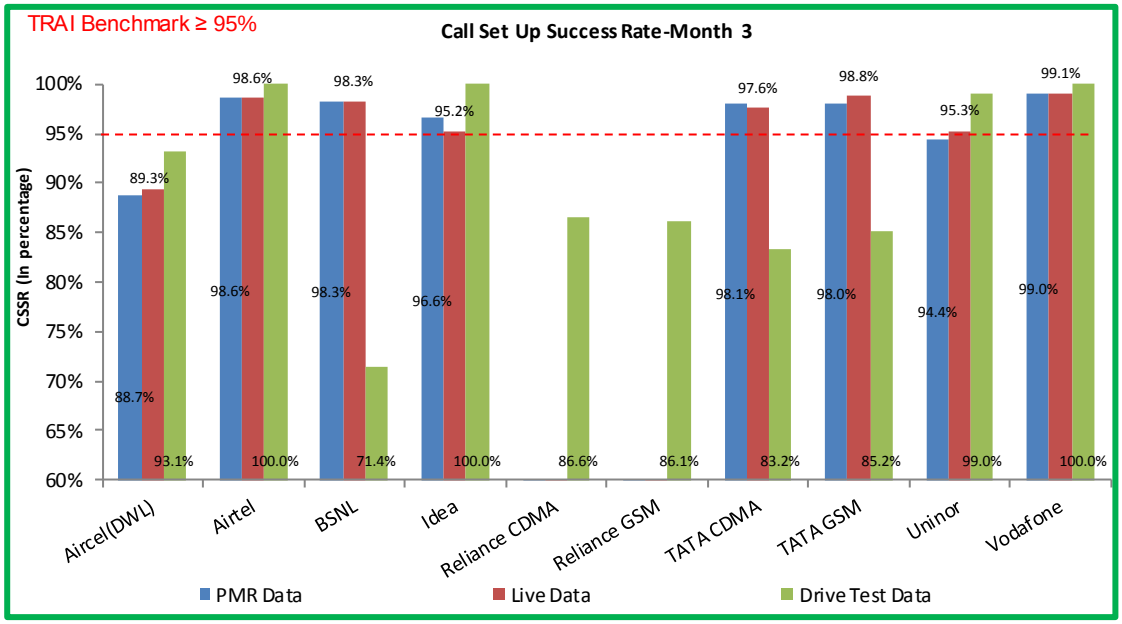
Data Source: Network Operations Center (NOC) of the operators and Drive test reports submitted by operators to auditors

5.3.2.2 KEY FINDINGS – MONTH 2



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

5.3.2.3 KEY FINDINGS – MONTH 3



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

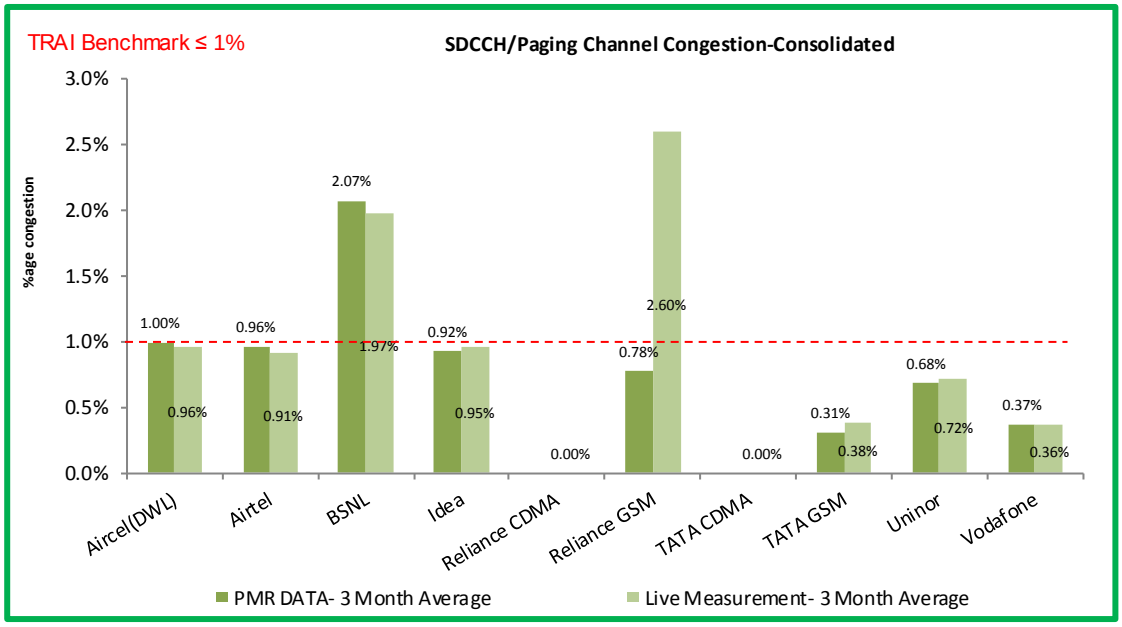
Data Source: Network Operations Center (NOC) of the operators and Drive test reports submitted by operators to auditors

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

5.4.1 PARAMETER DESCRIPTION

1. **Definition:** It means a call is not connected because there is no free channel to serve the call attempt. This parameter represents congestion in the network. It happens at three levels:
   - SDCCH Level: Stand-alone dedicated control channel
   - TCH Level: Traffic Channel
   - POI Level: Point of Interconnect
2. **Computational Methodology:**
   - **SDCCH / TCH Congestion% = [(A1 x C1) + (A2 x C2) +.....+ (An x Cn)] / (A1 + A2 +...+ An)**
     - Where:-A1 = Number of attempts to establish SDCCH / TCH made on day 1
     - C1 = Average SDCCH / TCH Congestion % on day 1
     - A2 = Number of attempts to establish SDCCH / TCH made on day 2
     - C2 = Average SDCCH / TCH Congestion % on day 2
     - An = Number of attempts to establish SDCCH / TCH made on day n
     - Cn = Average SDCCH / TCH Congestion % on day n
   - **POI Congestion% = [(A1 x C1) + (A2 x C2) +.....+ (An x Cn)] / (A1 + A2 +...+ An)**
     - Where:-A1 = POI traffic offered on all POIs (no. of calls) on day 1
     - C1 = Average POI Congestion % on day 1
     - A2 = POI traffic offered on all POIs (no. of calls) on day 2
     - C2 = Average POI Congestion % on day 2
     - An = POI traffic offered on all POIs (no. of calls) on day n
     - Cn = Average POI Congestion % on day n
3. **Benchmark:**
   - SDCCH Congestion: ≤ 1%, TCH Congestion: ≤ 2%, POI Congestion: ≤ 0.5%
4. **Audit Procedure –**
   - Audit of the details of SDCCH and TCH congestion percentages computed by the operator (using OMC–Switch data only) would be conducted
   - The operator should be measuring this parameter during Time consistent busy hour (TCBH) only SDCCH

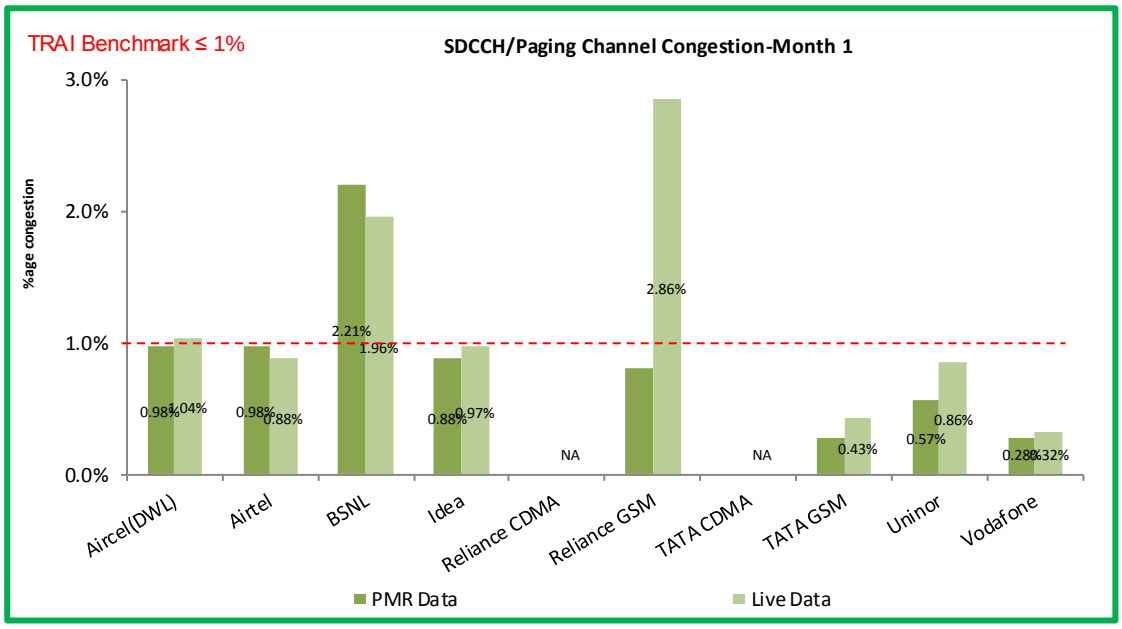
5.4.2 KEY FINDINGS - SDCCH/PAGING CHANNEL CONGESTION



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

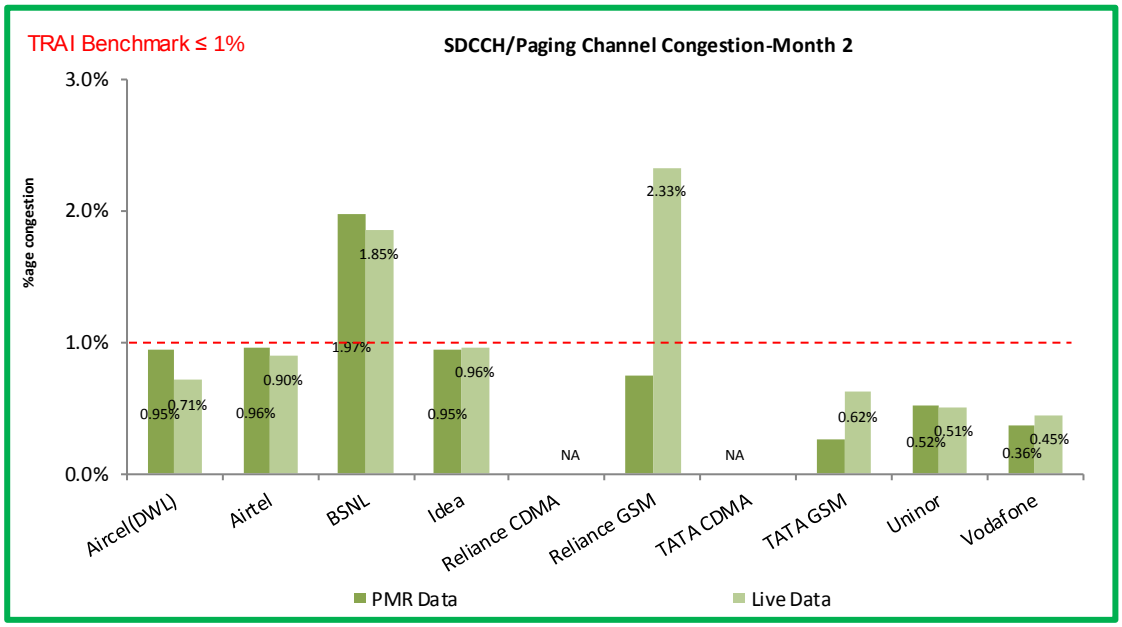
BSNL failed to meet the TRAI benchmark as per PMR data.

5.4.2.1 KEY FINDINGS – MONTH 1



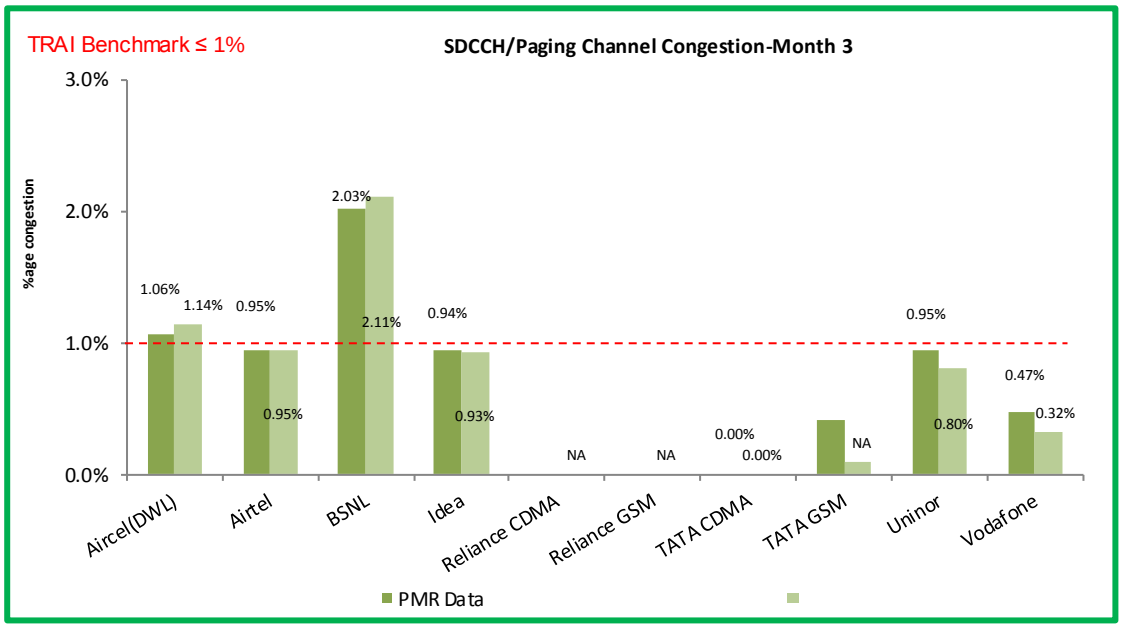
Data Source: Network Operations Center (NOC) of the operators

5.4.2.2 KEY FINDINGS – MONTH 2



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

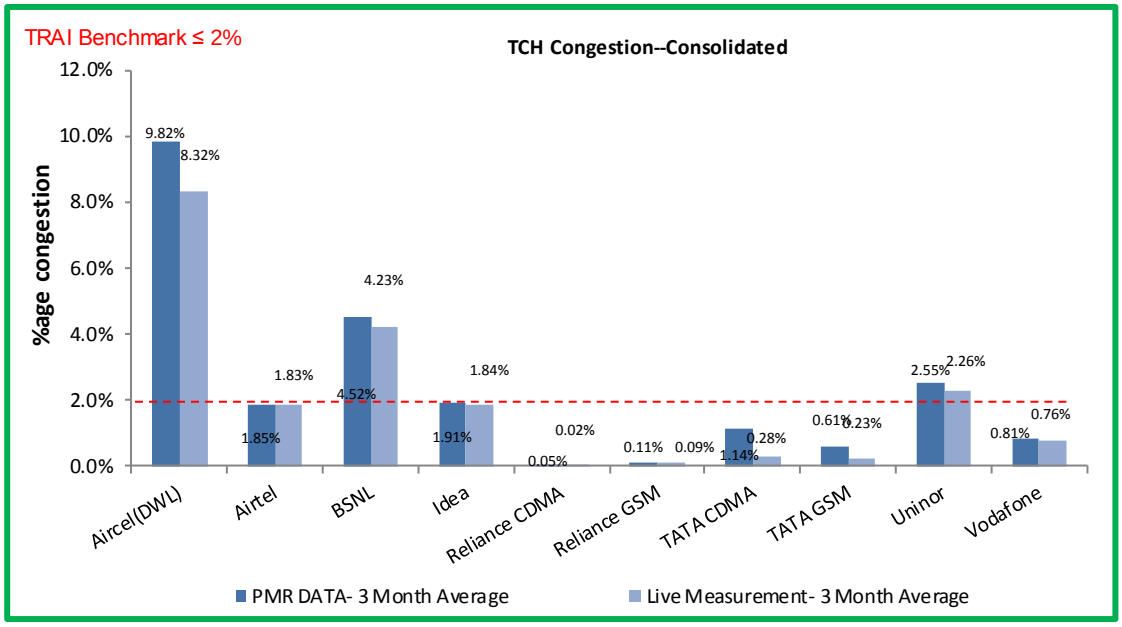
5.4.2.3 KEY FINDINGS – MONTH 3



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

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

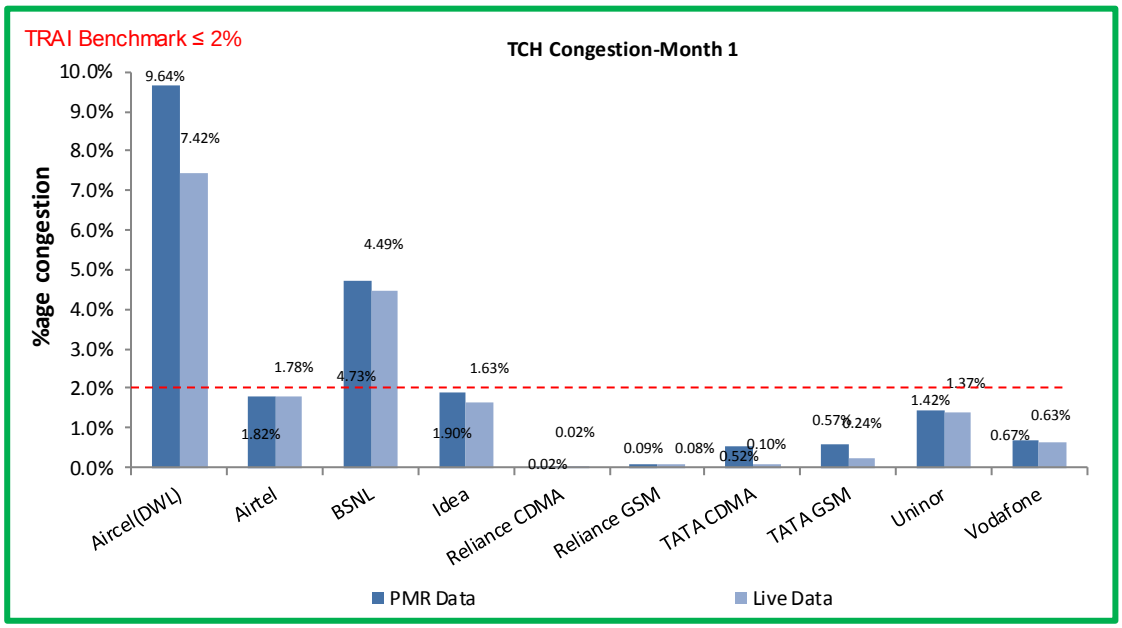
5.4.3 KEY FINDINGS – TCH CONGESTION



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

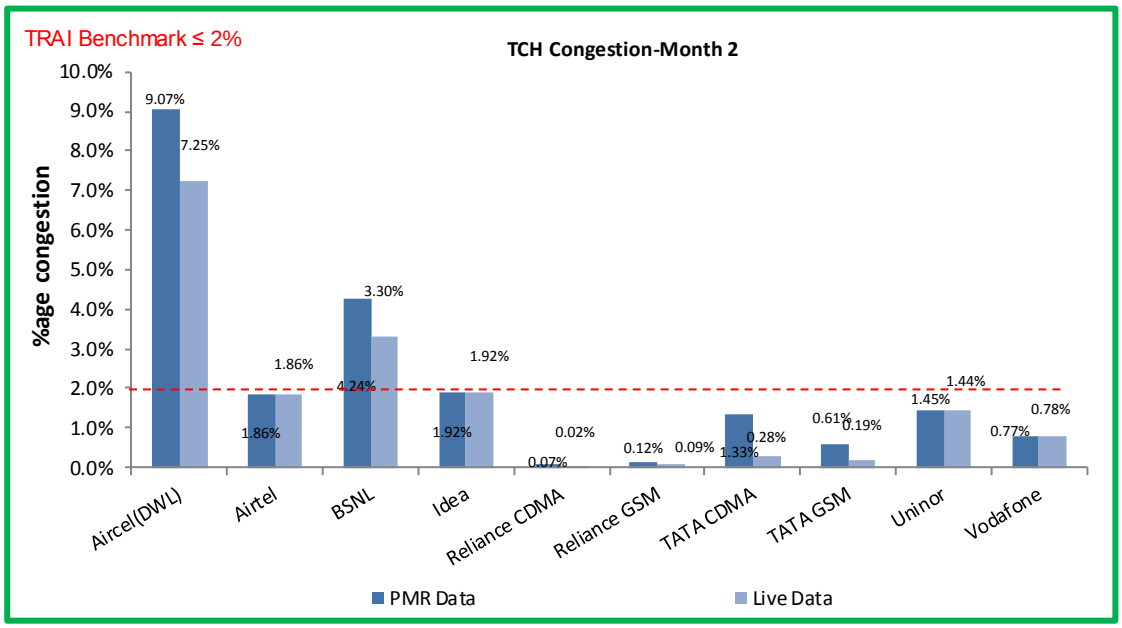
Aircel, BSNL and Uninor failed to meet the benchmark as per PMR data.

5.4.3.1 KEY FINDINGS – MONTH 1



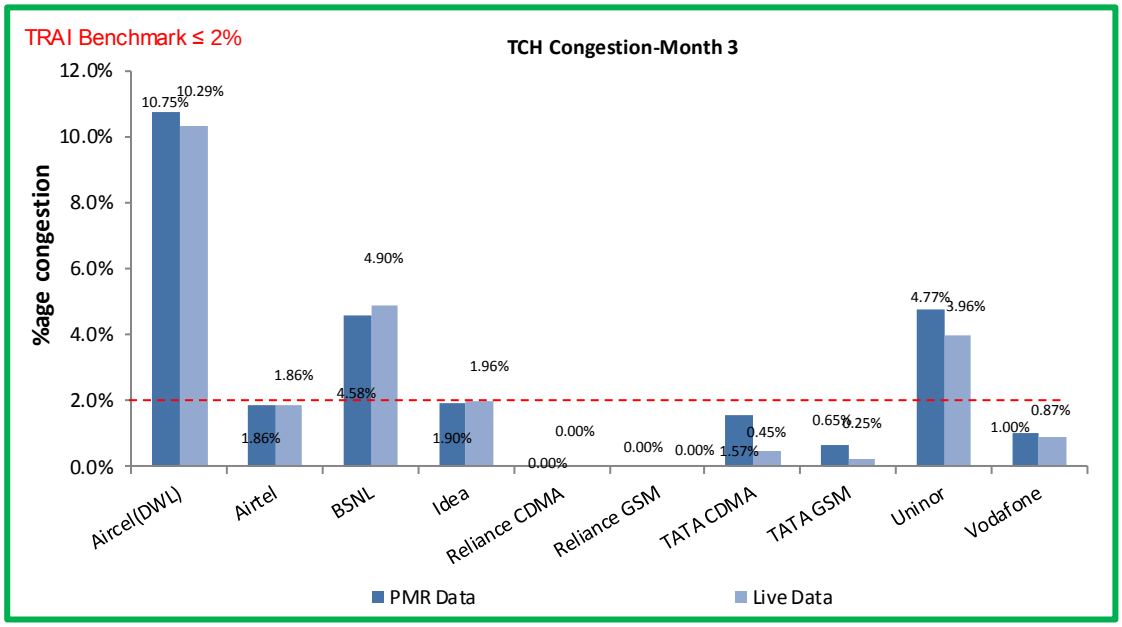
Data Source: Network Operations Center (NOC) of the operators

5.4.3.2 KEY FINDINGS – MONTH 2



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

5.4.3.3 KEY FINDINGS – MONTH 3



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

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

5.4.4 KEY FINDINGS – POI CONGESTION

Audit Results for POI Congestion											
POI congestion	Benchmark	Aircel(DWL)	Airtel	BSNL	Idea	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Uninor	Vodafone
Total number of working POIs		48	824	20	79	145	148	152	19	64	58
No. of POIs not meeting benchmark		0	0	0	0	0	0	0	0	0	0
Total Capacity of all POIs (A) - in erlangs		122136	708738	39540	265800	76044	83501	76646	10537	73768	240972
Traffic served for all POIs (B)- in erlangs		81559	447632	22089	179393	33880	20707	22073	3640	54653	143154
POI congestion	≤ 0.5%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%

Live Measurement Results for POI Congestion											
POI congestion	Benchmark	Aircel(DWL)	Airtel	BSNL	Idea	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Uninor	Vodafone
Total number of working POIs		48	824	20	79	145	148	152	19	64	58
No. of POIs not meeting benchmark		0	0	0	0	0	0	0	0	0	0
Total Capacity of all POIs (A) - in erlangs		121922	1784872	39540	265800	77070	86228	76260	10459	73858	241392
Traffic served for all POIs (B)- in erlangs		80522	1502143	21791	178298	32847	20382	21723	3558	54308	140939
POI congestion	≤ 0.5%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%

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

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

5.4.4.1 KEY FINDINGS – MONTH 1

Audit Results for POI Congestion- PMR data-April											
POI congestion	Benchmark	Aircel(DWL)	Airtel	BSNL	Idea	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Uninor	Vodafone
Total number of working POIs		48	825	15	79	146	148	152	19	64	59
No. of POIs not meeting benchmark		0	0	0	0	0	0	0	0	0	0
Total Capacity of all POIs (A) - in erlangs		121131	702826	29655	260655	75832	81976	76631	10555	73261	241054
Traffic served for all POIs (B)- in erlangs		80363	403712	17288	177589	34381	20661	22225	3763	53120	138955
POI congestion	≤ 0.5%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%

Live Measurement Results for POI Congestion- 3 Day data-April											
POI congestion	Benchmark	Aircel(DWL)	Airtel	BSNL	Idea	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Uninor	Vodafone
Total number of working POIs		48	825	15	79	146	148	152	19	64	59
No. of POIs not meeting benchmark		0	0	0	0	0	0	0	0	0	0
Total Capacity of all POIs (A) - in erlangs		121131	2103915	29655	260655	76912	87294	76774	10595	73602	242424
Traffic served for all POIs (B)- in erlangs		78415	1162715	18265	169778	32761	21189	22750	3701	51757	131952
POI congestion	≤ 0.5%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%

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

5.4.4.2 KEY FINDINGS – MONTH 2

Audit Results for POI Congestion- PMR data-May											
POI congestion	Benchmark	Aircel(DWL)	Airtel	BSNL	Idea	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Uninor	Vodafone
Total number of working POIs		48	821	30	79	143	148	152	19	64	59
No. of POIs not meeting benchmark		0	0	0	0	0	0	0	0	0	0
Total Capacity of all POIs (A) - in erlangs		121599	709779	59310	263931	76255	85025	76677	10532	73550	239341
Traffic served for all POIs (B)- in erlangs		81109	482831	32657	180298	33379	20754	20743	3676	55712	144649
POI congestion	≤ 0.5%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%

Live Measurement Results for POI Congestion- 3 Day data-May											
POI congestion	Benchmark	Aircel(DWL)	Airtel	BSNL	Idea	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Uninor	Vodafone
Total number of working POIs		48	821	30	79	143	148	152	19	64	59
No. of POIs not meeting benchmark		0	0	0	0	0	0	0	0	0	0
Total Capacity of all POIs (A) - in erlangs		121723	2119065	59310	263931	77227	85162	76677	10440	73479	238403
Traffic served for all POIs (B)- in erlangs		78442	1209690	31905	181106	32932	19575	21209	3605	56039	143974
POI congestion	≤ 0.5%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%

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

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	Uninor	Vodafone
Total number of working POIs		48	825	15	79	NDR	NDR	152	19	65	57
No. of POIs not meeting benchmark		0	0	0	0	NDR	NDR	0	0	0	0
Total Capacity of all POIs (A) - in erlangs		123678	713610	29655	272813	NDR	NDR	76631	10524	74494	242522
Traffic served for all POIs (B)- in erlangs		83206	456353	16323	180292	NDR	NDR	23250	3480	55129	145858
POI congestion	≤ 0.5%	0.00%	0.00%	0.00%	0.00%	NDR	NDR	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	Uninor	Vodafone
Total number of working POIs		48	825	15	79	NDR	NDR	152	19	65	57
No. of POIs not meeting benchmark		0	0	0	0	NDR	NDR	0	0	0	0
Total Capacity of all POIs (A) - in erlangs		122912	1131635	29655	272813	NDR	NDR	75329	10341	74494	243350
Traffic served for all POIs (B)- in erlangs		84711	2134024	15202	184010	NDR	NDR	21209	3368	55129	146893
POI congestion	≤ 0.5%	0.00%	0.00%	0.00%	0.00%	NDR	NDR	0.00%	0.00%	0.00%	0.00%

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

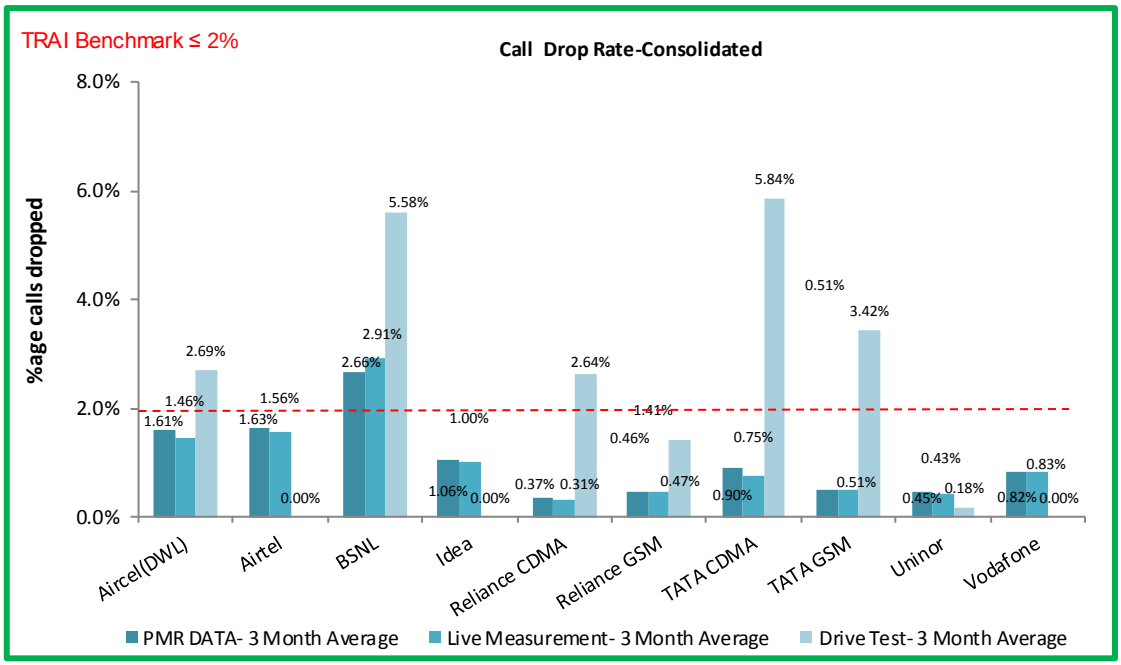
Data Source: Network Operations Center (NOC) of the operators

5.5 CALL DROP RATE

5.5.1 PARAMETER DESCRIPTION

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

5.5.2 KEY FINDINGS

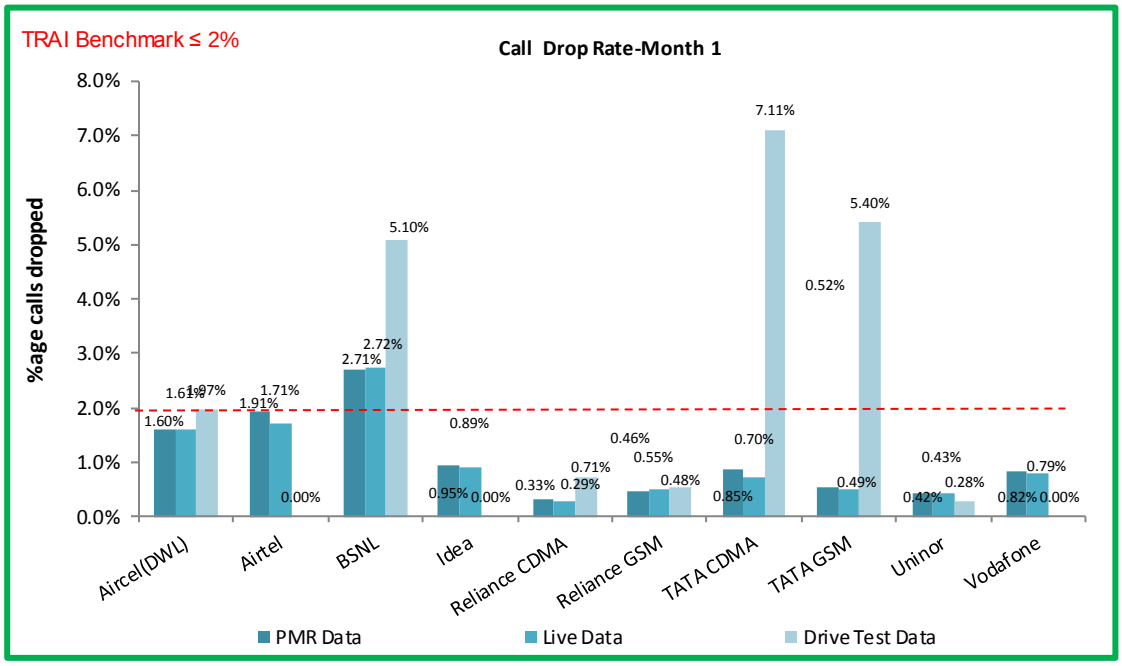


Data Source: Network Operations Center (NOC) of the operators and Drive test reports submitted by operators to auditors

BSNL failed to meet the call drop rate benchmark during audit.

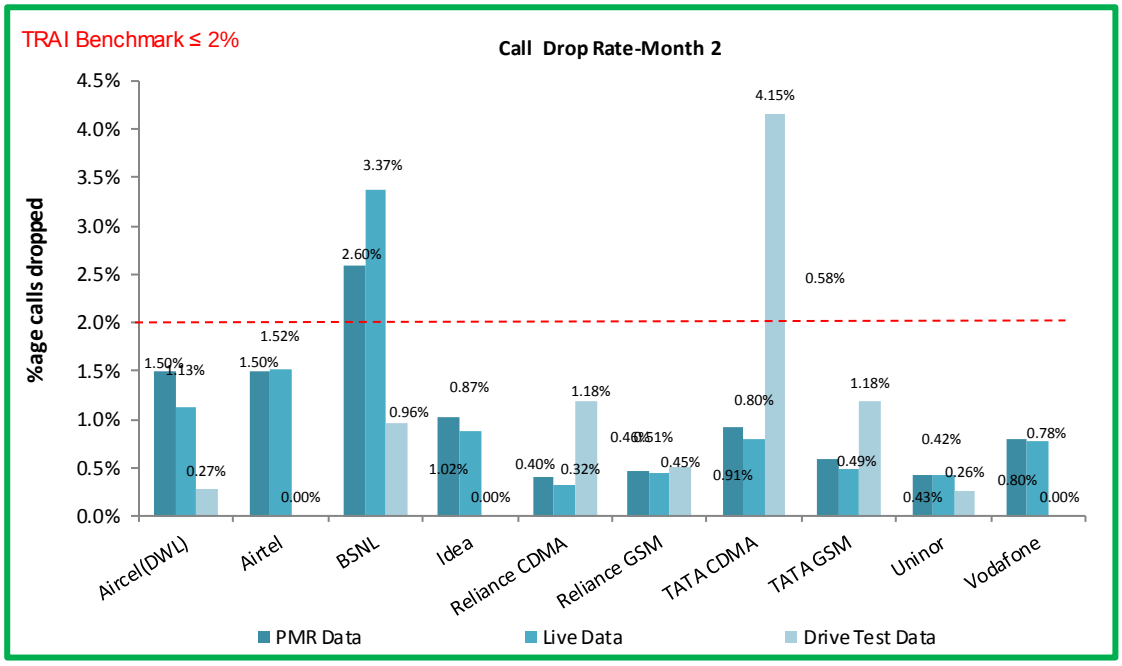
The drive test results showed high call drop rate for Aircel, BSNL, Reliance CDMA, Tata CDMA and Tata GSM.

5.5.2.1 KEY FINDINGS – MONTH 1



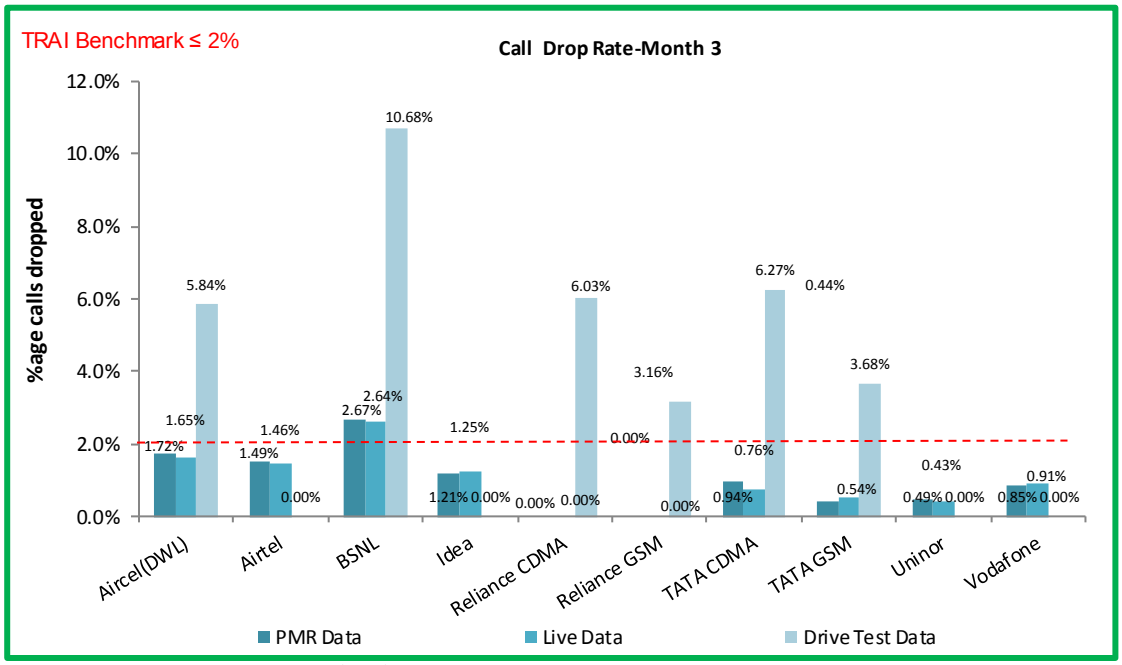
Data Source: Network Operations Center (NOC) of the operators and Drive test reports submitted by operators to auditors

5.5.2.2 KEY FINDINGS – MONTH 2



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

5.5.2.3 KEY FINDINGS – MONTH 3



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

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

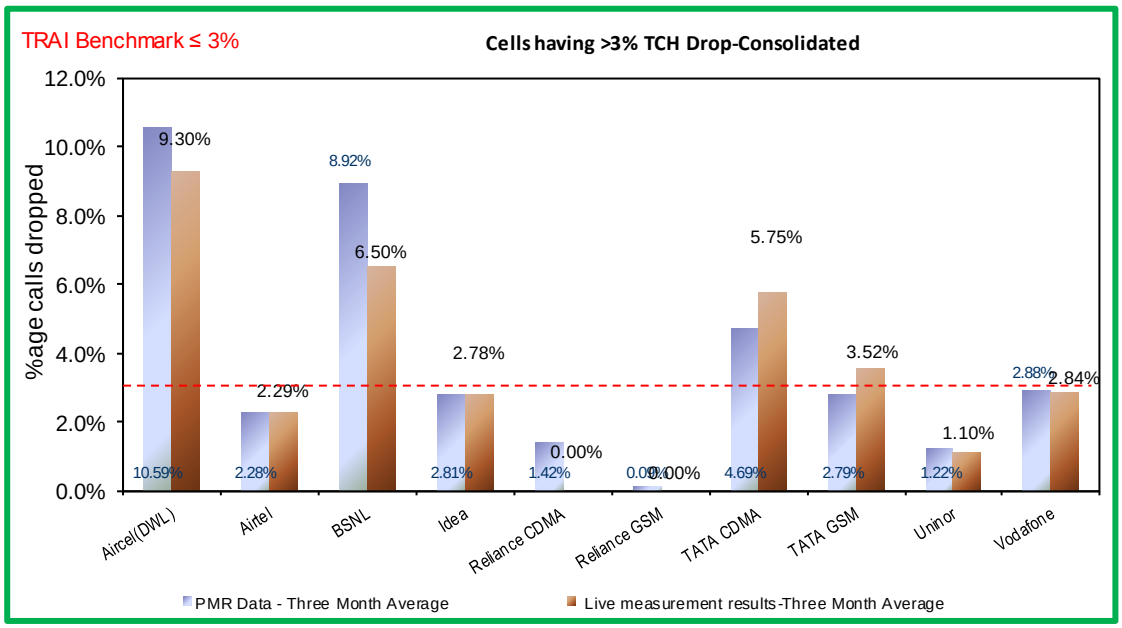
5.6 CELLS HAVING GREATER THAN 3% TCH DROP

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.

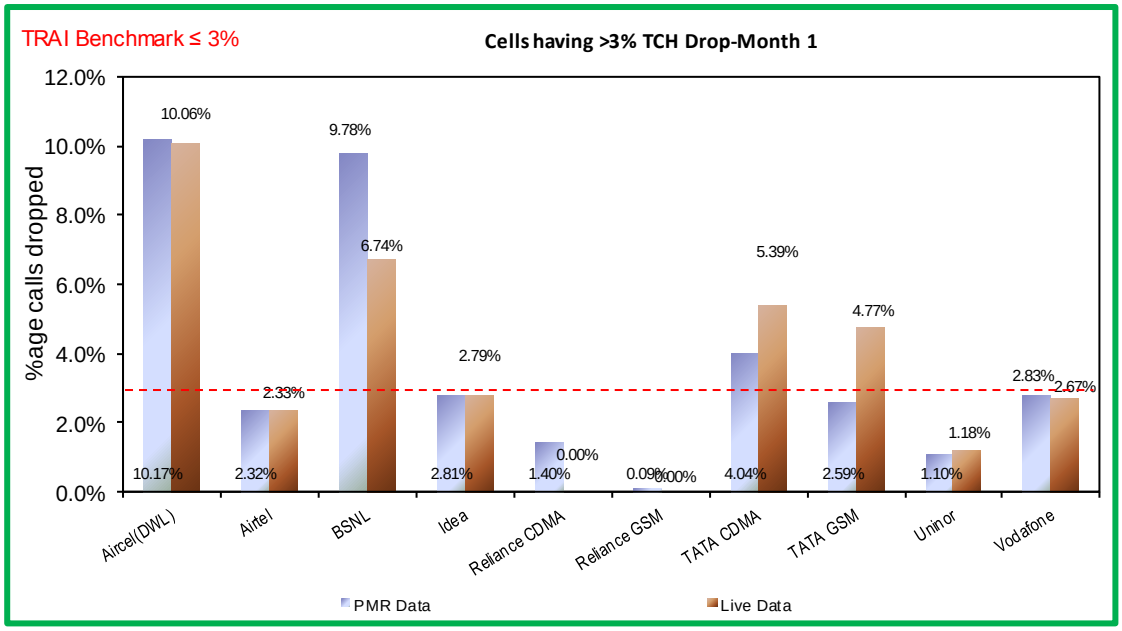
5.6.2 KEY FINDINGS



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

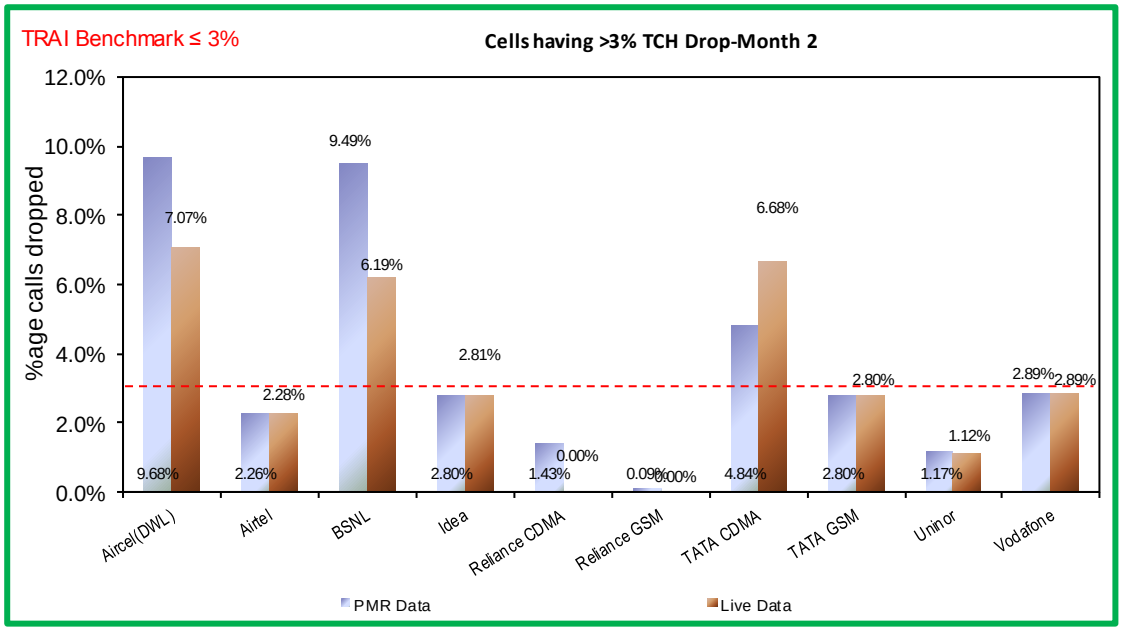
Aircel, BSNL and Tata CDMA failed to meet the benchmark for the parameter as per PMR data.

5.6.2.1 KEY FINDINGS – MONTH 1



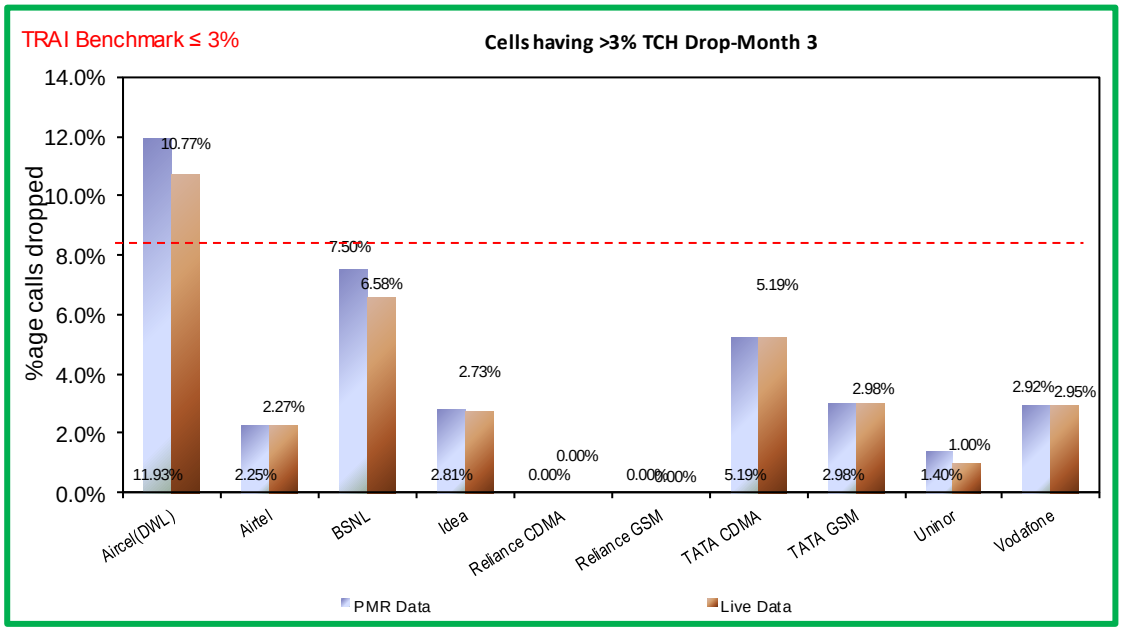
Data Source: Network Operations Center (NOC) of the operators

5.6.2.2 KEY FINDINGS – MONTH 2



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

5.6.2.3 KEY FINDINGS – MONTH 3



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

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

5.7 VOICE QUALITY

5.7.1 PARAMETER DESCRIPTION

1. **Definition:**

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

2. **Computational Methodology:**

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

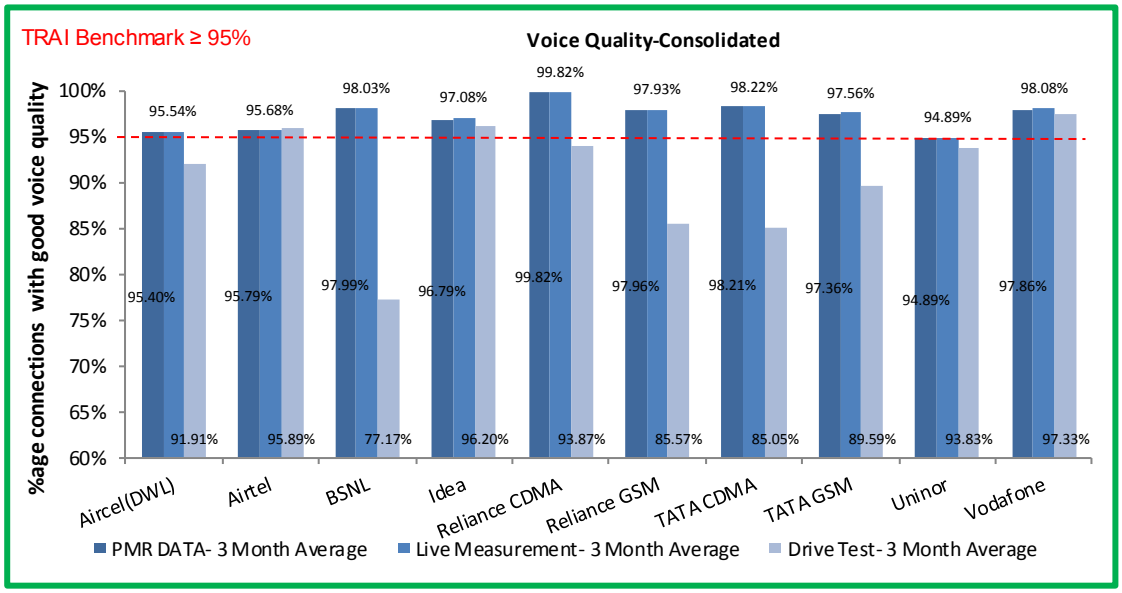
3. **TRAI Benchmark:** ≥ 95%

4. **Audit Procedure –**

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

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

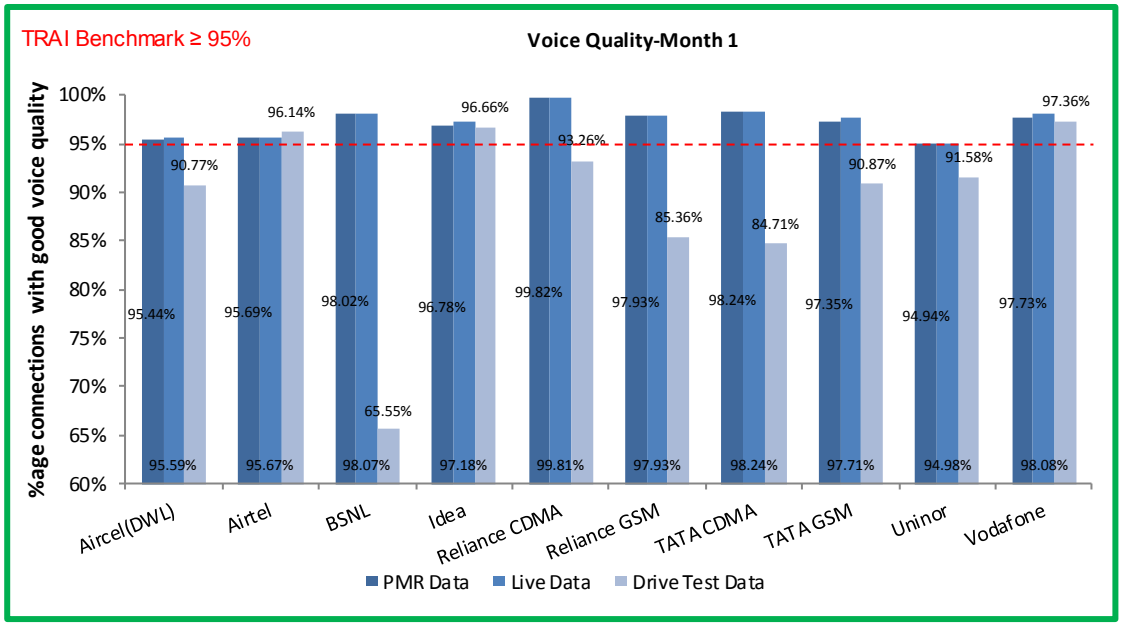
5.7.2 KEY FINDINGS



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

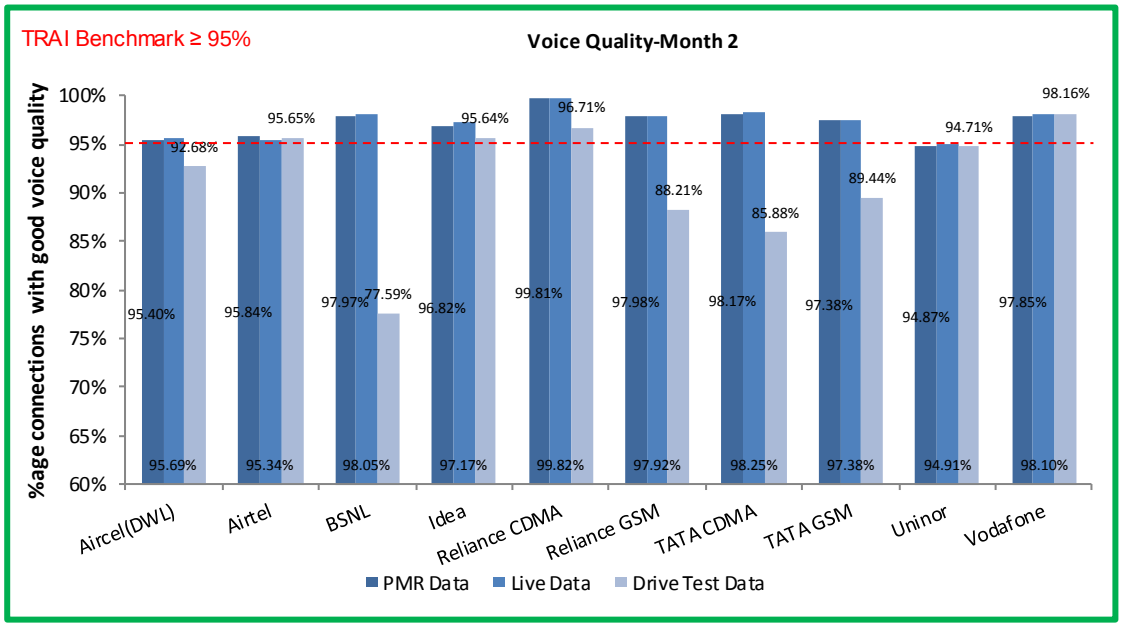
Uninor remained slightly below the benchmark for voice quality during audit.

5.7.2.1 KEY FINDINGS – MONTH 1



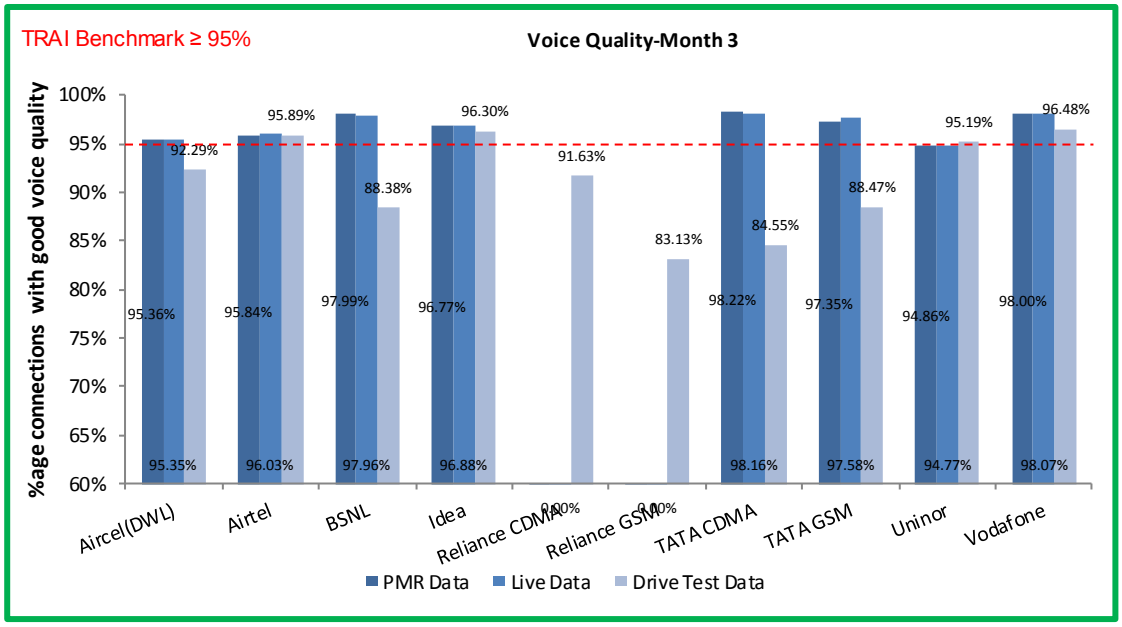
Data Source: Network Operations Center (NOC) of the operators and Drive test reports submitted by operators to auditors

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, Jun'15 data was not audited due to a server issue at operator's end. The same was pre-informed to TRAI by the operator.

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

6 PARAMETER DESCRIPTION AND DETAILED FINDINGS – NON-NETWORK PARAMETERS

6.1 METERING AND BILLING CREDIBILITY

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

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

6.1.1 PARAMETER DESCRIPTION

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

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

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

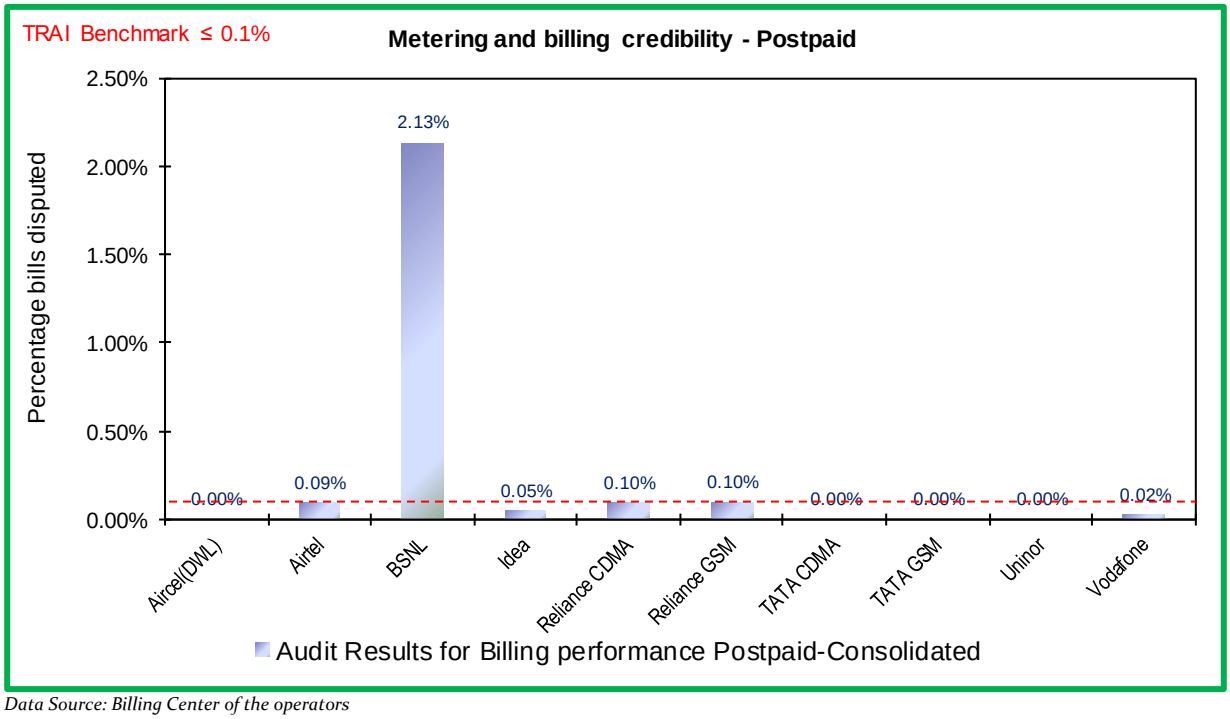
➲ Computational Methodology:

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

- *Operator to include all types of bills generated for customers. This would include printed bills, online bills and any other forms of bills generated
- **Billing complaints here shall include only dispute related issues (including those that may arise because of a lack of awareness at the subscribers' end). It does not include any provisional issues (such as delayed dispatch of billing statements, etc.) in which the operator has opened a ticket internally.
- **Metering and billing credibility (Prepaid)** = (Total charging complaints received during the quarter/ Total number of subscribers reported by the operator at the end of the quarter) * 100

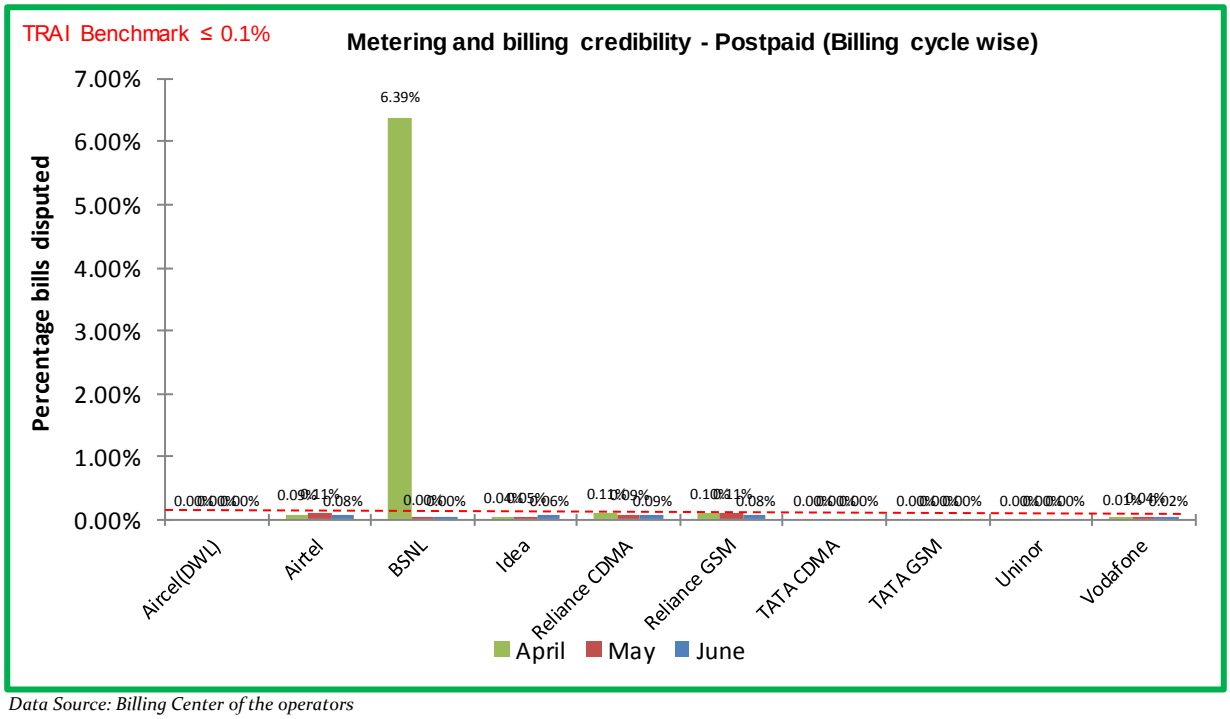
- TRAI Benchmark: <= 0.1%
- Audit Procedure:
  - Audit of billing complaint details for the complaints received during the quarter and used for arriving at the benchmark reported to TRAI would be conducted
    - For Postpaid, the total billing complaints would be audited by averaging over billing cycles in a quarter
  - For Prepaid, the data of total charging complaints in a quarter would be taken for the purpose of audit

6.1.2 KEY FINDINGS – METERING AND BILLING CREDIBILITY (POSTPAID)



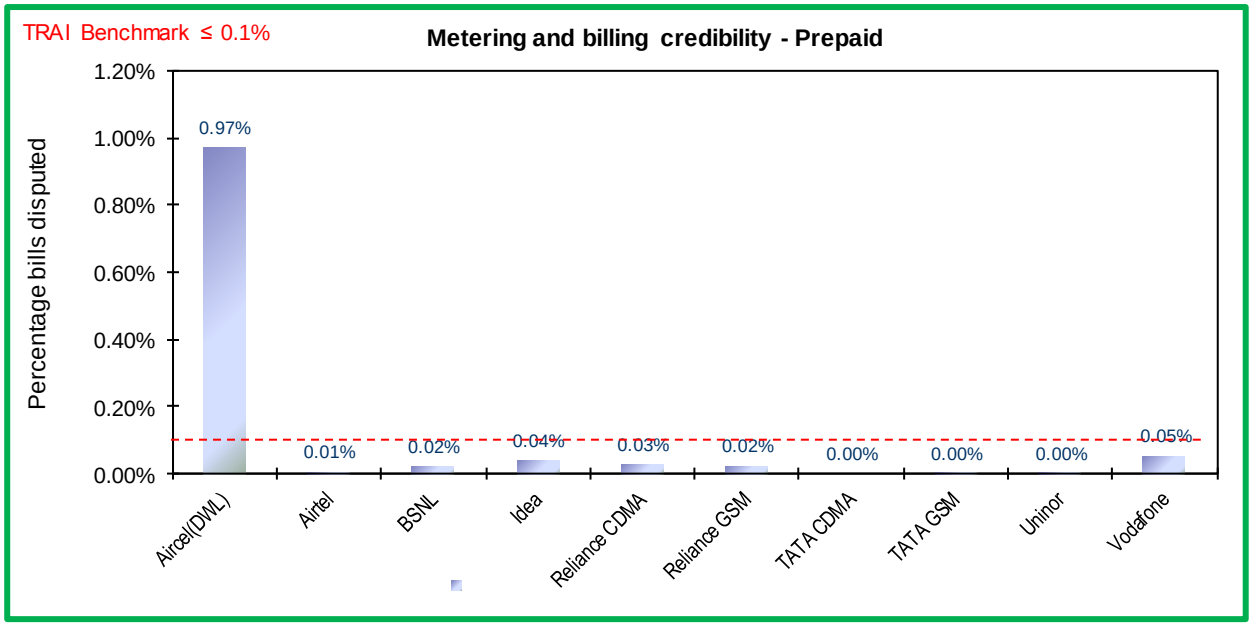
Data Source: Billing Center of the operators

BSNL failed to meet the benchmark for the parameter.



Data Source: Billing Center of the operators

6.1.3 KEY FINDINGS - METERING AND BILLING CREDIBILITY (PREPAID)



Data Source: Billing Center of the operators

Aircel failed to meet the TRAI benchmark for the parameter.

6.2 RESOLUTION OF BILLING COMPLAINTS

6.2.1 PARAMETER DESCRIPTION

Calculation of Percentage resolution of billing complaints

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

Resolution of billing complaints within 4 weeks:

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

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

Resolution of billing complaints within 6 weeks:

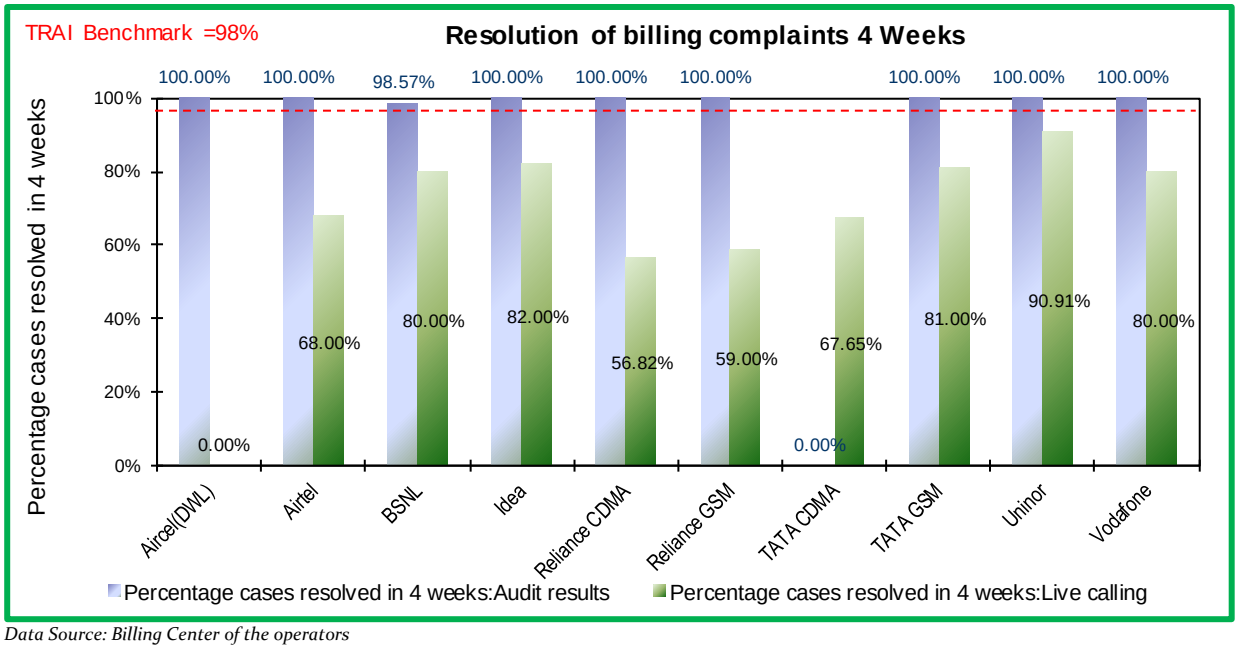
%age of billing complaints (for post-paid customers)/ charging, credit & validity (for pre-paid customers) resolved within 6 weeks =

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

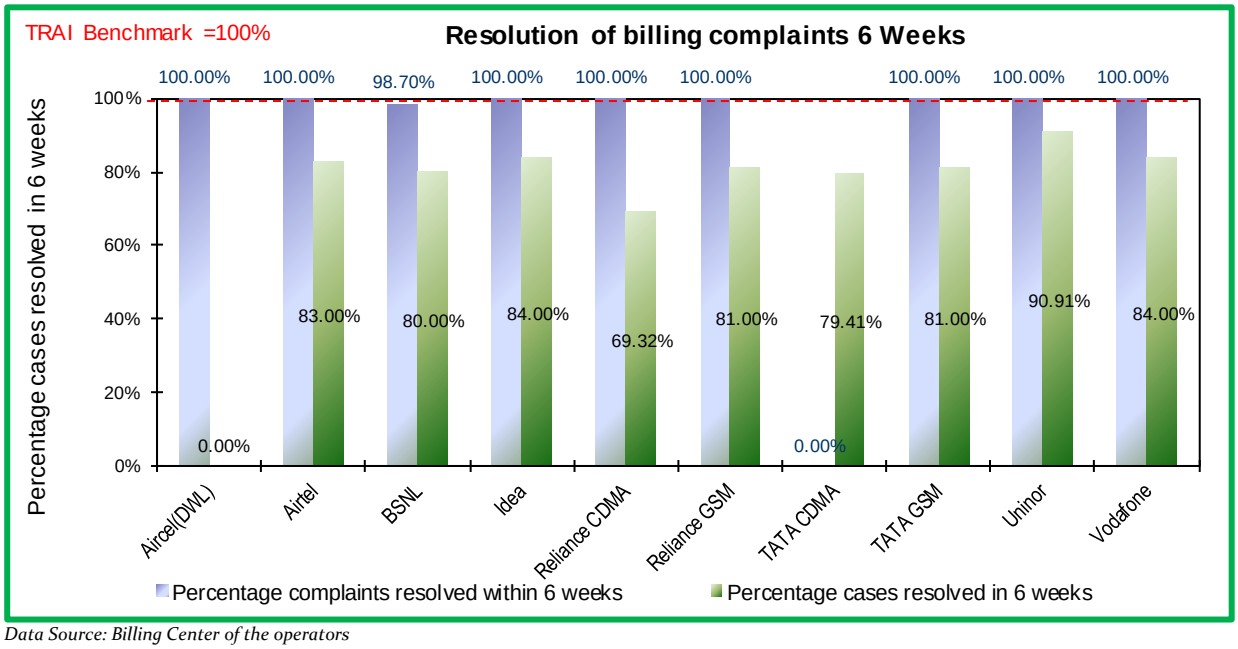
- **Billing complaints here shall include only dispute related issues (including those that may arise because of a lack of awareness at the subscribers' end). It does not include any provisional issues (such as delayed dispatch of billing statements, etc.) in which the operator has opened a ticket internally.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

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

6.2.2 KEY FINDINGS



Data Source: Billing Center of the operators



Data Source: Billing Center of the operators

BSNL failed to meet the TRAI benchmark for resolving billing complaints within 6 weeks.

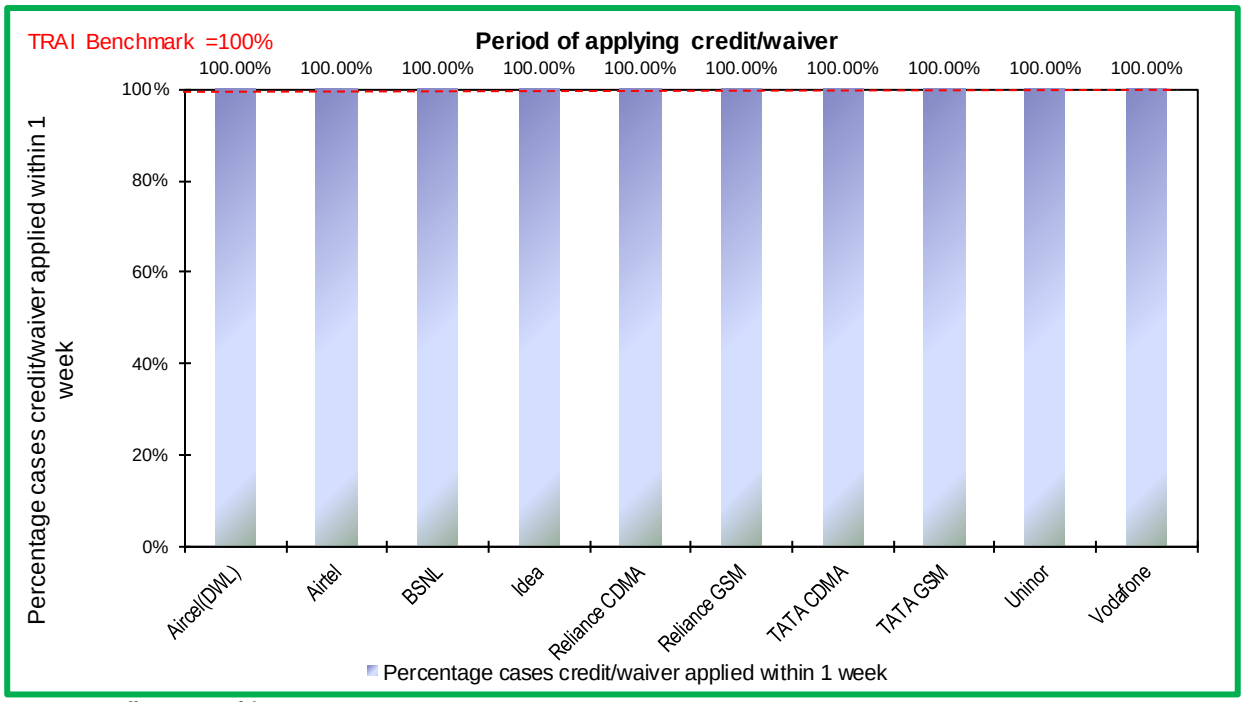
It is to be noted that Aircel, Airtel, Idea and Vodafone have reported high ratio of invalid complaints. Auditors recommend further investigation of the issue independently by TRAI. For details, kindly refer to the annexure (section 8.7).

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

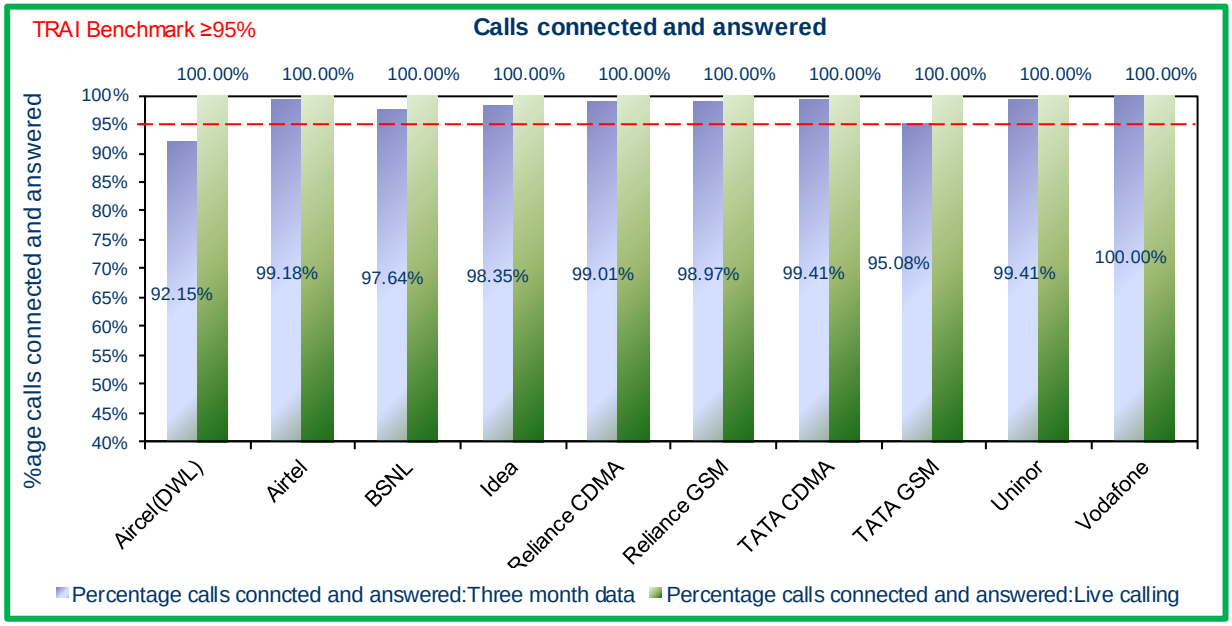
All the operators met the TRAI benchmark for the parameter.

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: Billing Center of the operators

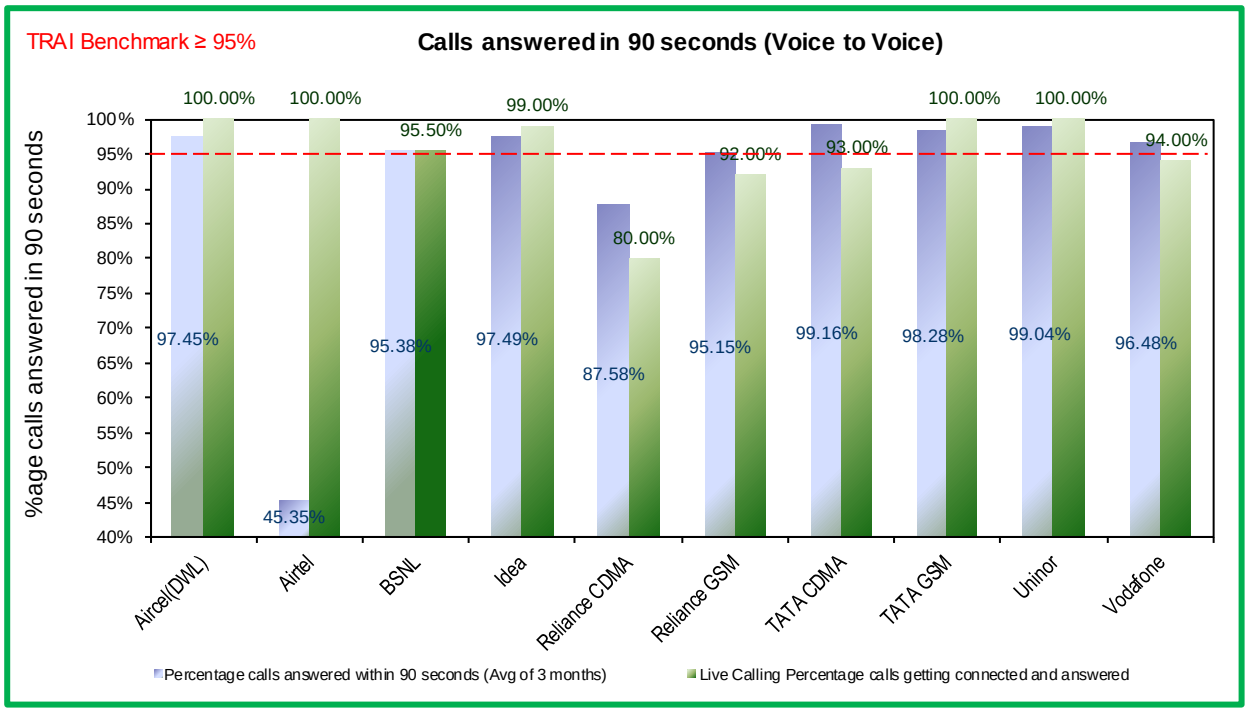
Aircel failed to meet the benchmark as per audit data.

6.5 CALL CENTRE PERFORMANCE-VOICE TO VOICE

6.5.1 PARAMETER DESCRIPTION

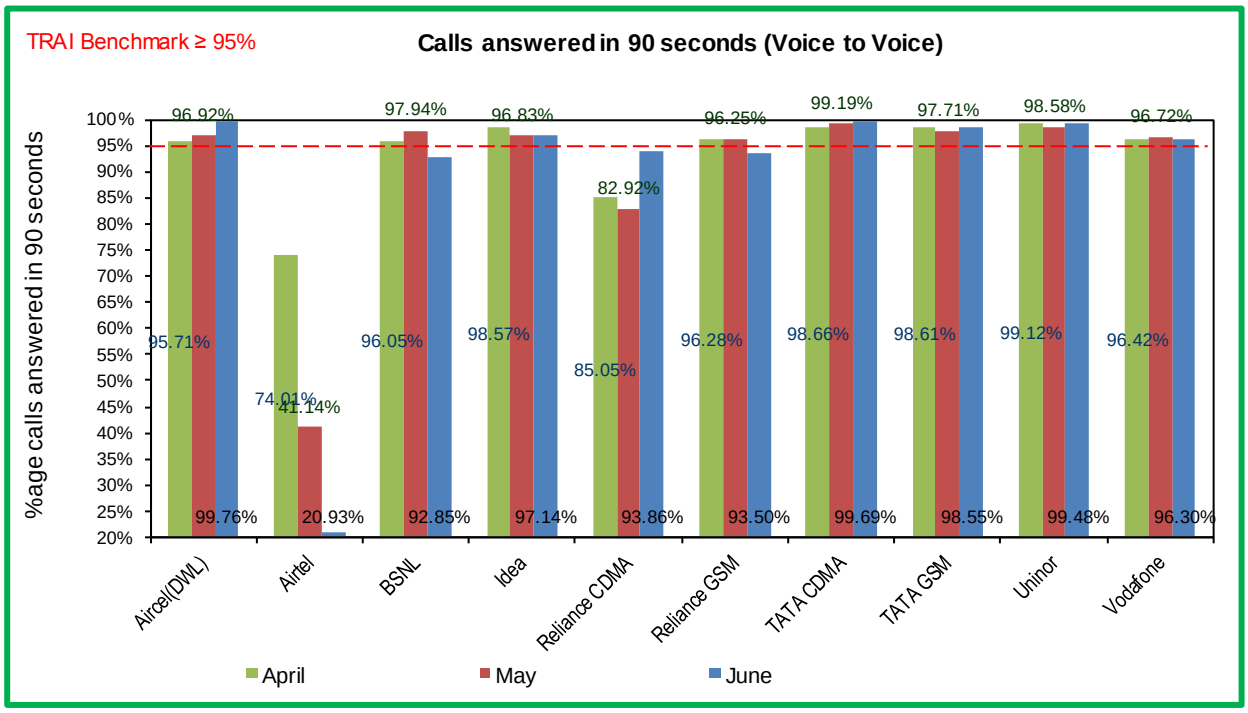
- Computational Methodology:
  - Call centre performance Voice to Voice = (Number of calls answered by operator within 90 seconds/ All calls attempted to connect to the operator) * 100
- Audit Procedure:
  - Operators provide details of the following from their central call centre/ customer service database: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

Airtel and Reliance CDMA failed to meet the benchmark during audit for Calls answered (Voice to Voice) as per audit.



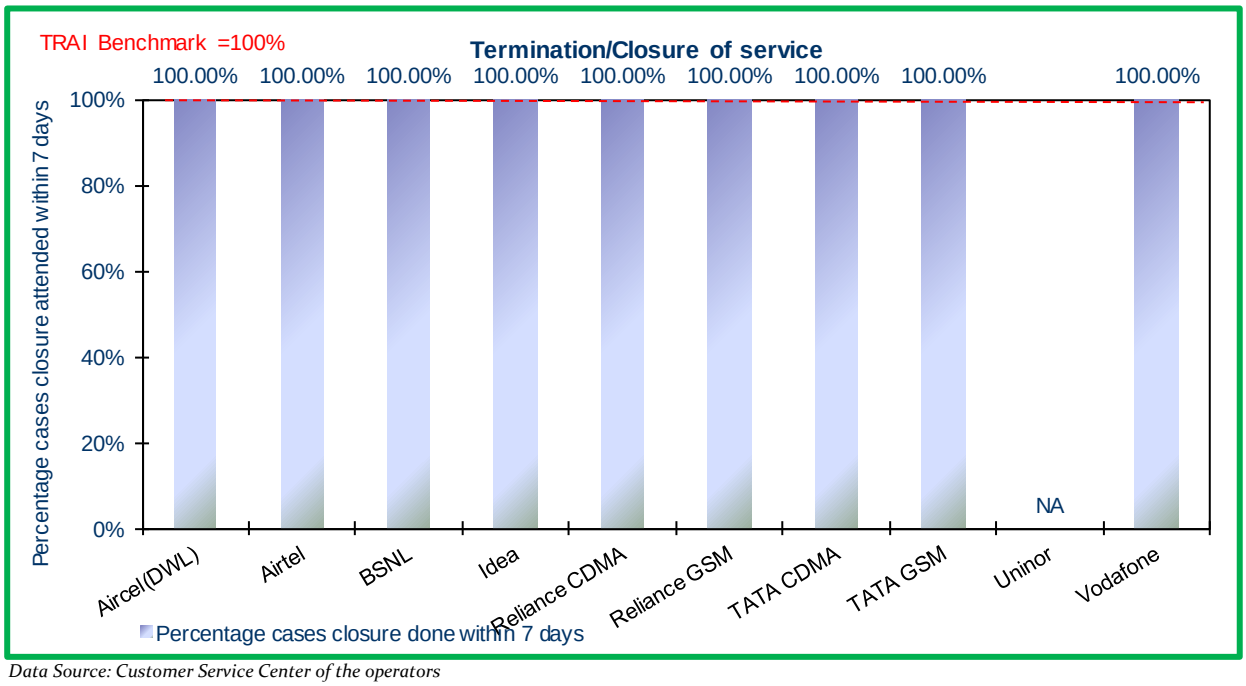
Data Source: Customer Service Center of the operators

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.

NA: Uninor did not have any data of closures within their system during audit.

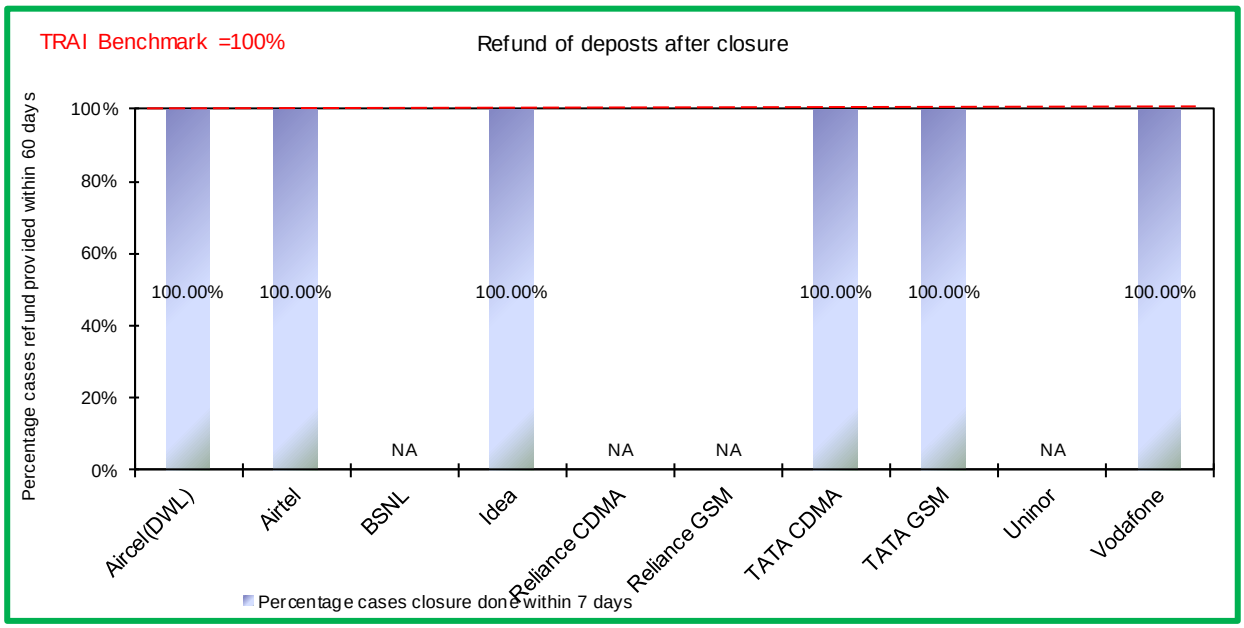
6.7 REFUND OF DEPOSITS AFTER CLOSURE

6.7.1 PARAMETER DESCRIPTION

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

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

6.7.2 KEY FINDINGS



Data Source: Billing Center of the operators

All operators met the TRAI benchmark for the parameter.

NA: BSNL, Reliance CDMA and Reliance GSM did not have any data regarding refunds within their system during audit. Uninor does not have postpaid service available in the circle.

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 Bihar circle. As per the new directive given by TRAI headquarters, drive test for the month of April, May and June, 2015 were conducted at a SSA level. Drive test was conducted for three days in each SSA and the selection of routes ensured that the maximum towns, villages, highways are covered as part of drive test. The routes were selected on basis of the complaints received from the customers. 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 Bihar circle are given below.

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

7.1.1 APRIL – MUNGER SSA

Month	Name of SSA Covered	Date of Drive Test
April	Munger	28-04-2015 to 30-04-2015

7.1.1.1 ROUTE DETAILS – MUNGER SSA

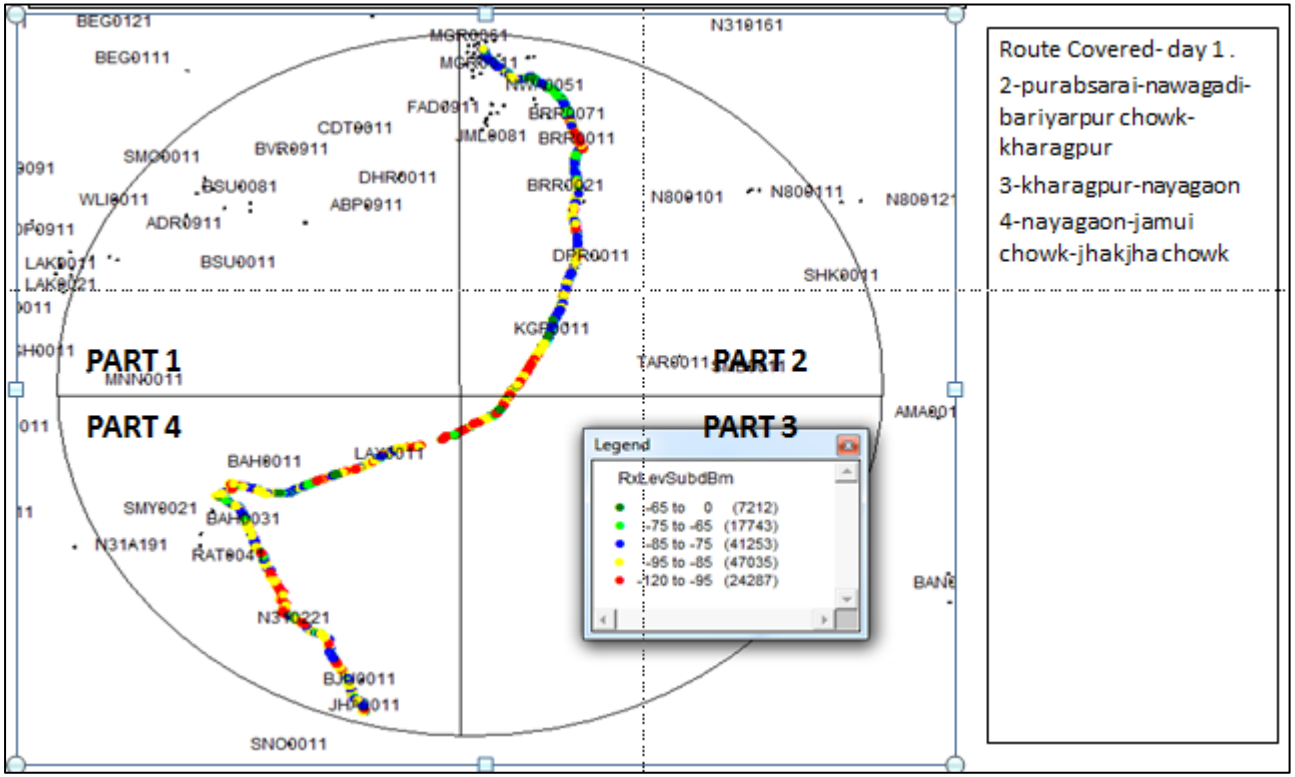
Category	Type of location	Bihar		
		Munger		
		Day 1	Day 2	Day 3
Outdoor	Major Roads	Bariarpur to Nayagaon to Jamui Bypass	Lakhisarai to Jamui to Khaira to Mangobandar	Jamui Chowk to Sikandra to Seikhpura to Barbigha
	Highways	Nauagadhi to Bariarpur,Jamui Bypass to Jhajha	Bindwara More to Suryagarha to Lakhisarai	Barbigha to Sarmera to Mokama(Bata Chowk)
	With in the City	PurabSarai (Munger) to Nauagadhi	ITC Gate(Munger) to Bindwara More	Bidyapith Chowk (Lakhisarai) to Jamui Chowk
Indoor	Shopping complex	Dist. Court	NA	NA
	Office complex	NA	Hotel Raj Palace	

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.

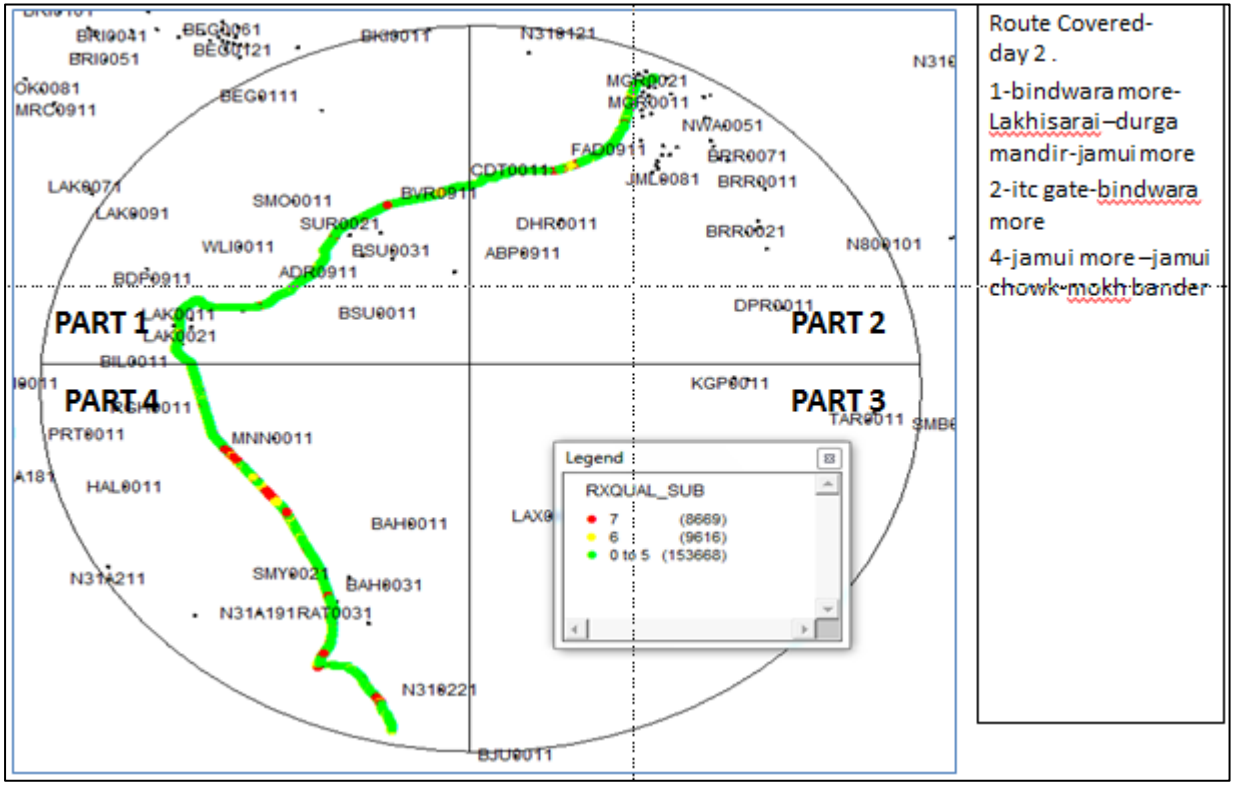
7.1.1.2 KIILOMETERS TRAVELLED– MUNGER SSA

Drive Test - Kilometers Travelled	Day 1	Day 2	Day 3	Total
Munger	101	110	106	317

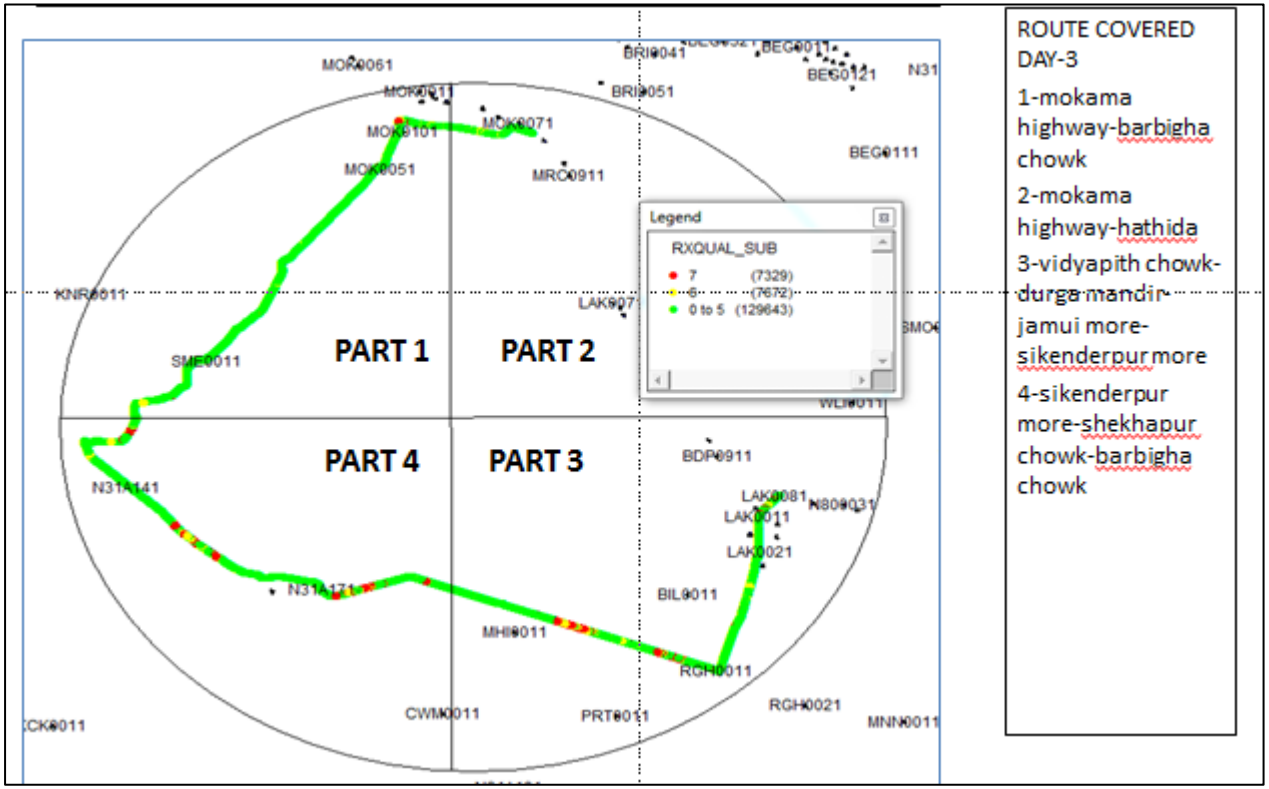
7.1.1.3 ROUTE MAP MUNGER DAY 1



7.1.1.4 ROUTE MAP MUNGER DAY 2



7.1.1.5 ROUTE MAP MUNGER DAY 3



7.1.1.6 DRIVE TEST RESULTS – MUNGER SSA

	B'mark	Aircel(DWL)		Airtel		BSNL		Idea		Reliance CDMA		Reliance GSM		TATA CDMA		TATA GSM		Uninor		Vodafone	
Parameter's		In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor
0 to -75 dBm		90.28%	30.27%	86.03%	74.44%	92.23%	47.25%	53.42%	39.19%	14.16%	18.44%	47.82%	31.65%	40.73%	7.32%	30.37%	23.00%	90.90%	36.85%	50.12%	37.74%
0 to -85 dBm		99.85%	69.33%	99.66%	94.96%	100.00%	79.13%	97.79%	88.79%	78.36%	36.91%	83.69%	67.95%	51.53%	21.63%	39.38%	46.92%	99.70%	72.06%	96.05%	83.92%
0 to -95 dBm		100.00%	99.94%	100.00%	99.28%	100.00%	100.00%	99.95%	98.65%	99.93%	61.97%	98.75%	90.23%	77.48%	40.93%	68.05%	71.05%	100.00%	99.89%	99.94%	96.54%
Voice quality	≥ 95%	97.99%	89.35%	96.34%	96.12%	98.48%	67.42%	98.71%	96.80%	99.91%	86.61%	93.61%	82.71%	88.71%	80.71%	95.91%	90.29%	98.42%	89.85%	98.33%	97.26%
CSSR	≥ 95%	100.00%	93.92%	100.00%	100.00%	100.00%	90.80%	100.00%	100.00%	100.00%	97.18%	100.00%	97.31%	100.00%	97.00%	100.00%	98.23%	100.00%	98.54%	100.00%	100.00%
%age Blocked calls		0.00%	1.18%	0.00%	0.00%	0.00%	6.28%	0.00%	0.00%	0.00%	2.12%	0.00%	2.69%	0.00%	19.03%	0.00%	2.28%	0.00%	1.23%	0.00%	0.00%
Call drop rate	≤ 2%	0.00%	2.53%	0.00%	0.00%	0.00%	5.62%	0.00%	0.00%	0.00%	1.26%	0.00%	0.78%	11.43%	4.45%	0.00%	6.43%	0.00%	0.24%	0.00%	0.00%
Hands off success rate		100.00%	97.67%	100.00%	100.00%	100.00%	90.09%	100.00%	99.60%	100.00%	100.00%	100.00%	100.00%	91.28%	87.42%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%

Data Source: Drive test reports submitted by operators to auditors

Voice Quality

Reliance GSM and Tata CDMA failed to meet the benchmark for Voice Quality in indoor as well as outdoor locations. Aircel, BSNL, Tata GSM and Uninor failed to meet the benchmark in outdoor locations.

Call Set Success Rate (CSSR)

Aircel and BSNL were not able to meet the CSSR benchmark in outdoor areas.

Call Drop Rate

Tata CDMA failed to meet the benchmark for call drop rate in indoor as well as outdoor locations. Aircel, BSNL and Tata GSM were not able to meet the benchmark in outdoor areas.

7.1.2 MAY – MUZAFFARPUR SSA

Month	Name of SSA Covered	Date of Drive Test
May	Muzaffarpur	27-05-2015 to 29-05-2015

7.1.2.1 ROUTE DETAILS – MUZAFFARPUR SSA

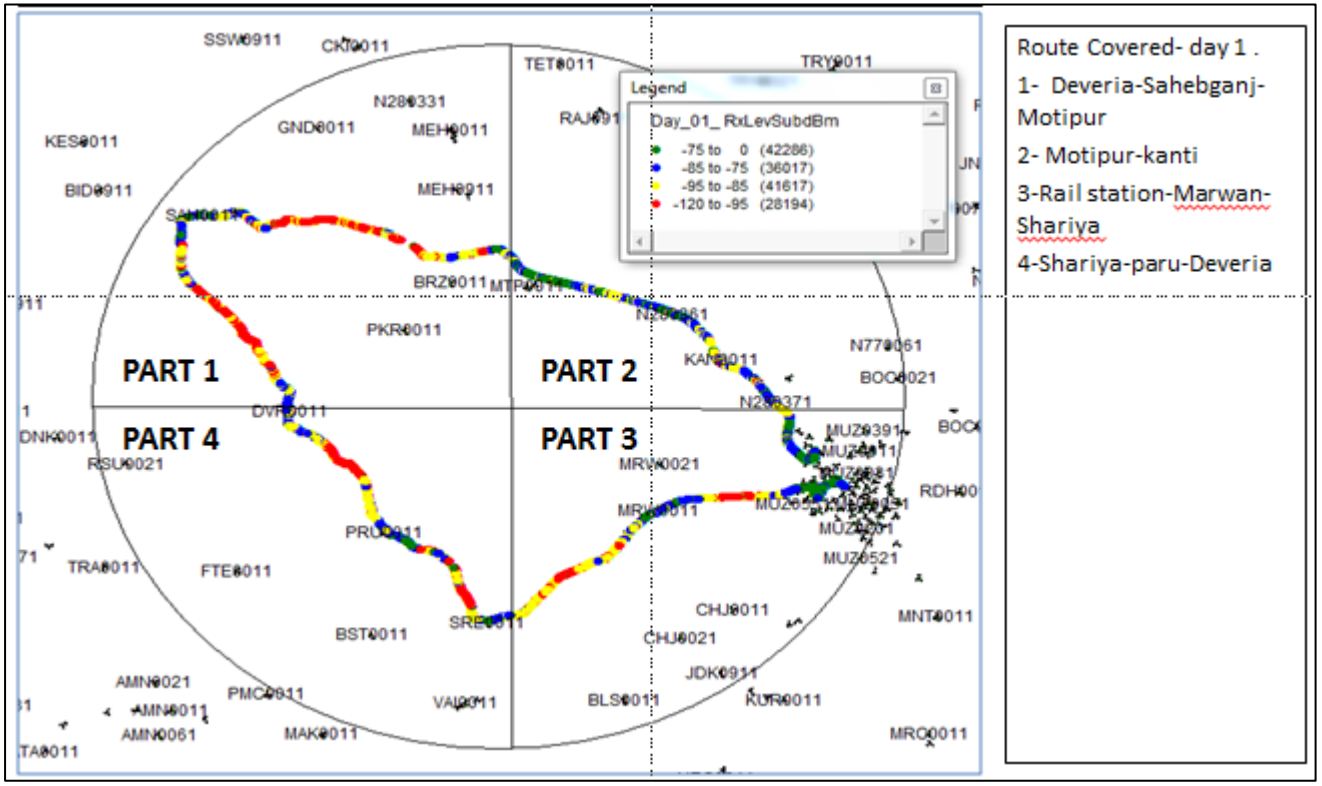
Category	Type of location	Bihar		
		Muzaffarpur		
		Day 1	Day 2	Day 3
Outdoor	Major Roads	Patahi Chowk to Sahebganj to motipur	Dholi to Jandaha	Sitamarhi to minapur NH 77
	Highways	Moti pur to Muzaffarpur Beria Goalambar	Kacchi pakki to Dholi & Jandaha to Hajipur	Medical chowk to sitamadhi
	With in the City	Railway staion to patahi chowk	Railway Station to kachhi pakki	Railway Station to Medical Chowk
Indoor	Shopping complex	Vishal Megamart	NA	NA
	Office complex	NA	Park Hotel	NA

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.

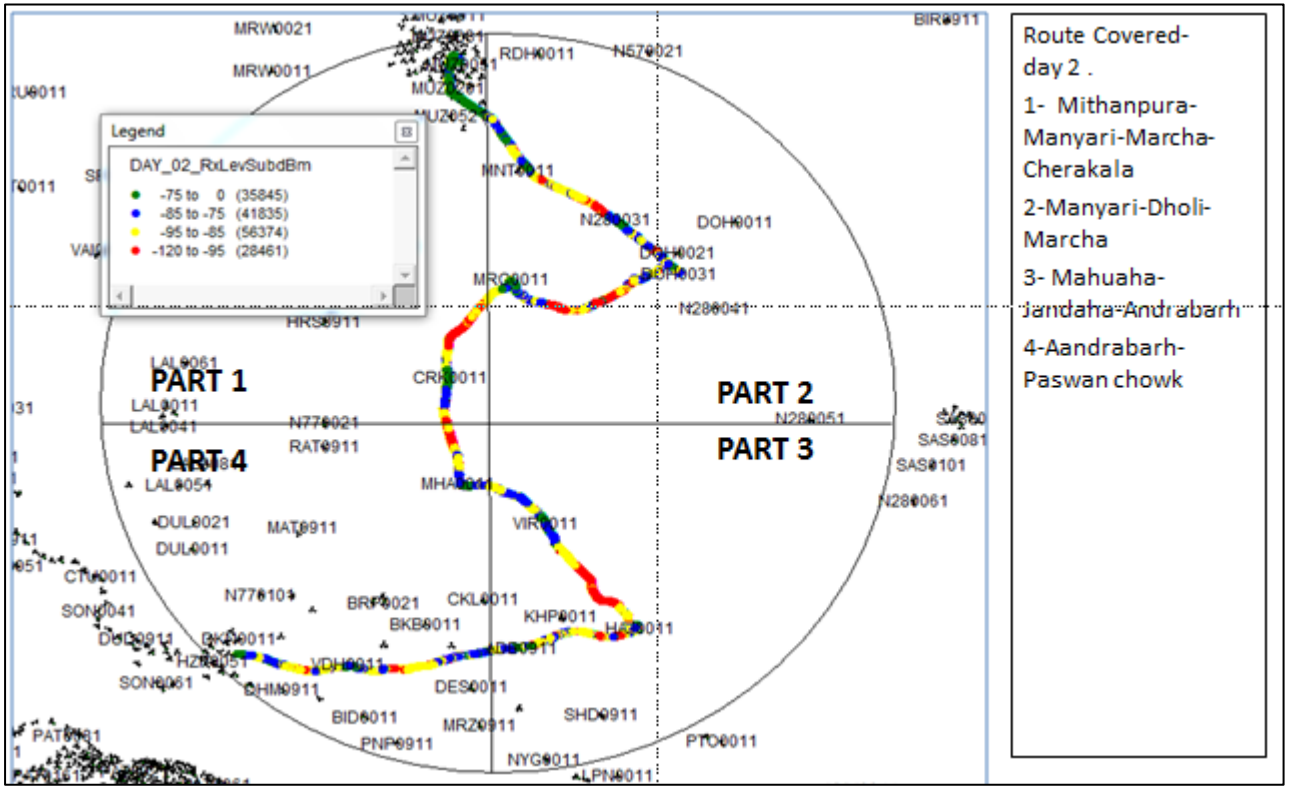
7.1.2.2 KILOMETERS TRAVELLED– MUZAFFARPUR SSA

Drive Test - Kilometers Travelled	Day 1	Day 2	Day 3	Total
Muzaffarpur	120	125	135	380

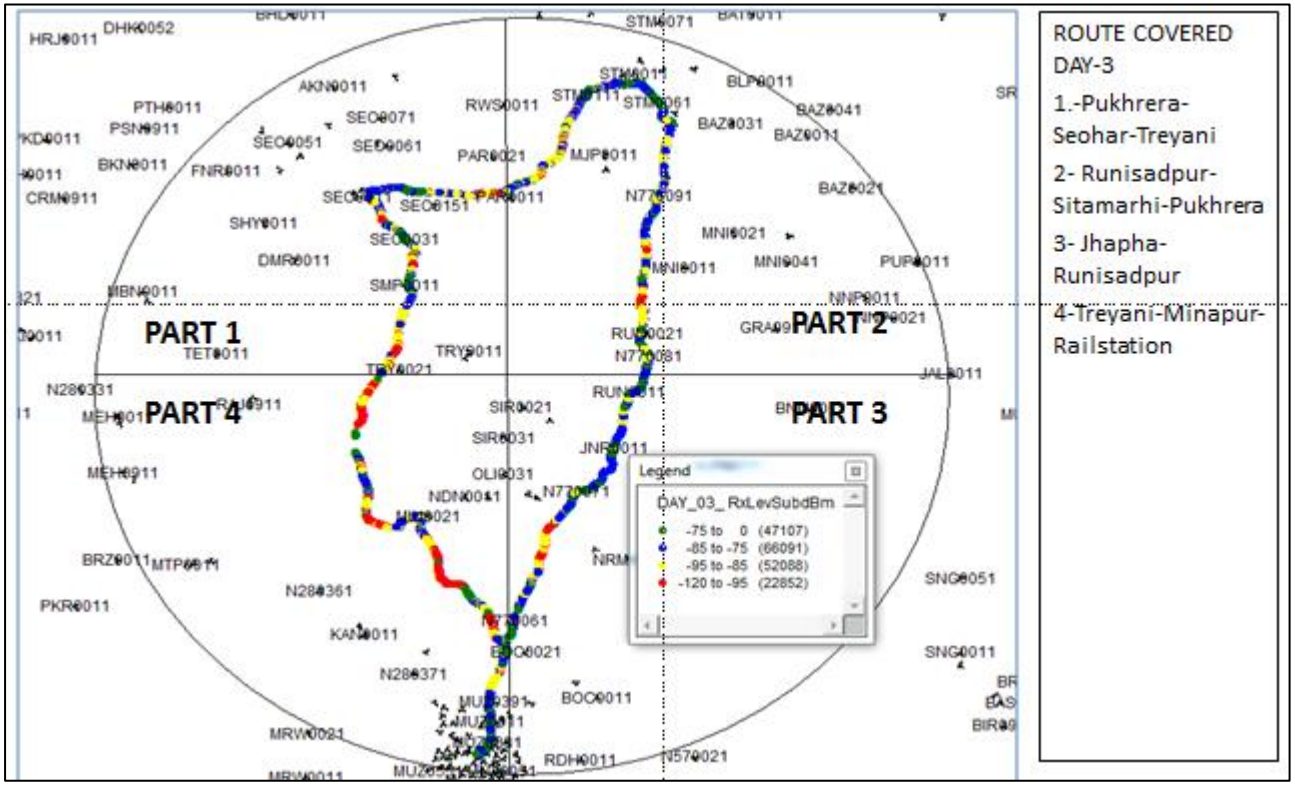
7.1.2.3 ROUTE MAP MUZAFFARPUR DAY 1



7.1.2.4 ROUTE MAP MUZAFFARPUR DAY 2



7.1.2.5 ROUTE MAP MUZAFFARPUR DAY 3



7.1.2.6 DRIVE TEST RESULTS – MUZAFFARPUR SSA

	B'mark	Aircel(DWL)		Airtel		BSNL		Idea		Reliance CDMA		Reliance GSM		TATA CDMA		TATA GSM		Uninor		Vodafone	
Parameter's		In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor
0 to -75 dBm		86.77%	39.06%	62.81%	74.49%	75.91%	44.94%	18.13%	14.76%	98.76%	30.07%	78.30%	31.50%	40.73%	7.99%	71.23%	43.24%	90.20%	57.54%	33.15%	61.99%
0 to -85 dBm		99.91%	71.90%	75.45%	97.37%	99.94%	77.37%	44.36%	39.75%	100.00%	62.43%	98.70%	74.26%	51.53%	22.08%	99.77%	75.21%	100.00%	82.18%	95.35%	89.22%
0 to -95 dBm		99.99%	99.99%	88.06%	99.85%	100.00%	100.00%	70.68%	66.53%	100.00%	86.37%	100.00%	92.41%	77.48%	45.15%	100.00%	94.43%	100.00%	100.00%	100.00%	100.00%
Voice quality	≥ 95%	97.41%	92.24%	97.43%	95.37%	96.53%	77.87%	98.18%	96.05%	99.75%	93.67%	94.50%	90.51%	91.71%	80.05%	95.40%	88.27%	98.66%	94.05%	99.14%	97.87%
CSSR	≥ 95%	100.00%	98.08%	100.00%	100.00%	94.12%	92.45%	100.00%	100.00%	98.48%	96.07%	100.00%	96.56%	100.00%	93.68%	100.00%	90.35%	100.00%	98.89%	100.00%	100.00%
%age Blocked calls		0.00%	1.92%	0.00%	0.00%	5.88%	7.55%	0.00%	0.00%	1.52%	3.93%	0.00%	3.44%	0.00%	0.00%	0.00%	9.50%	0.00%	1.11%	0.00%	0.00%
Call drop rate	≤ 2%	0.00%	0.18%	0.00%	0.00%	0.00%	1.13%	0.00%	0.00%	0.00%	0.68%	0.00%	0.46%	0.00%	4.51%	0.00%	1.49%	0.00%	0.62%	0.00%	0.00%
Hands off success rate		100.00%	98.81%	100.00%	100.00%	100.00%	96.60%	100.00%	99.49%	100.00%	100.00%	100.00%	99.51%	100.00%	100.00%	100.00%	96.59%	100.00%	98.81%	100.00%	100.00%

Data Source: Drive test reports submitted by operators to auditors

Voice Quality

Reliance GSM and Tata CDMA failed to meet the benchmark for Voice Quality in indoor as well as outdoor locations. Aircel, BSNL, Reliance CDMA, Tata GSM and Uninor failed to meet the benchmark in outdoor locations.

Call Set Success Rate (CSSR)

BSNL failed to meet the benchmark for CSSR in indoor as well as outdoor locations. Tata CDMA and Tata GSM did not meet the CSSR benchmark in outdoor areas.

Call Drop Rate

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

7.1.3 JUNE – SAHARSA SSA

Month	Name of SSA Covered	Date of Drive Test
June	Saharsa	24-06-2015 to 26-06-2015

7.1.3.1 ROUTE DETAILS – SAHARSA SSA

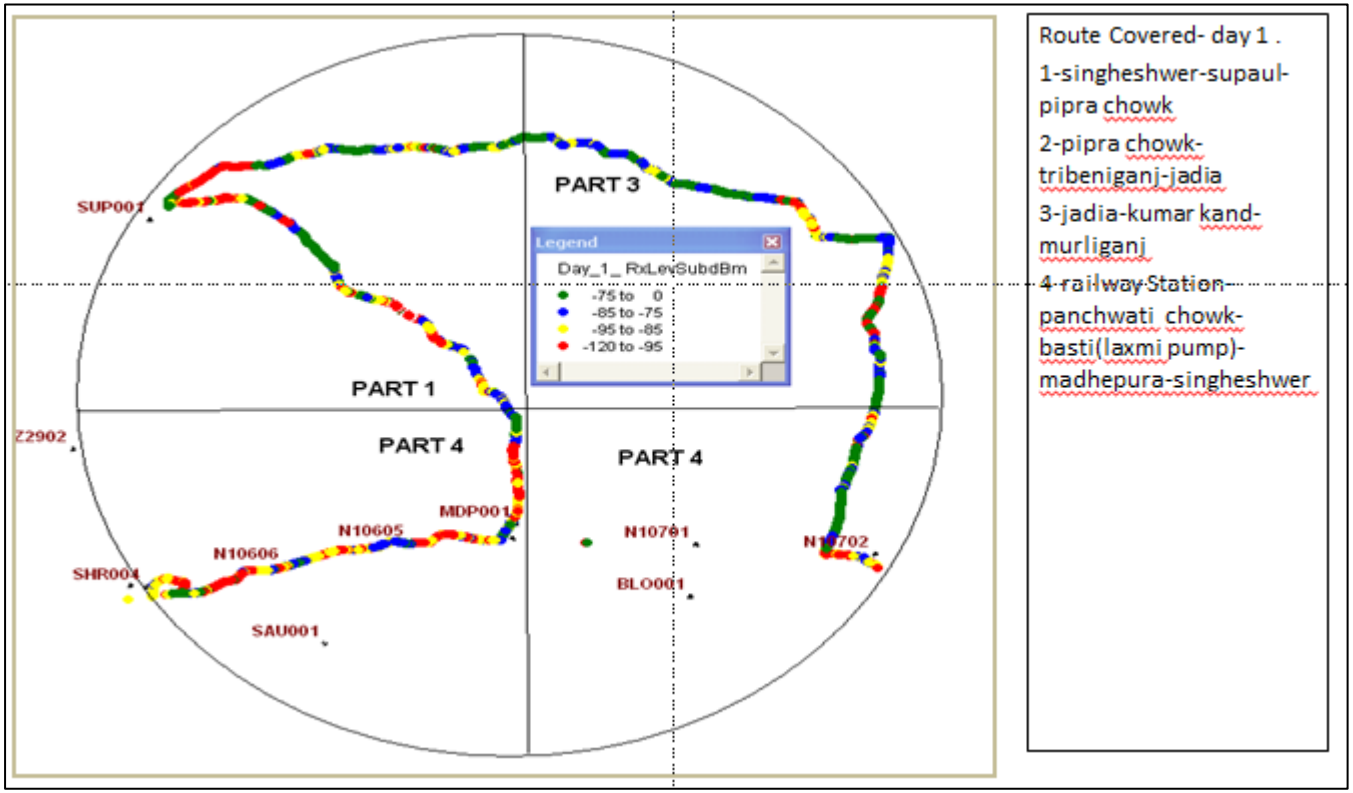
Category	Type of location	Bihar		
		Saharsa		
		Day 1	Day 2	Day 3
Outdoor	Major Roads	Saharsa Basti to Madhepura to Singheshwar	Saharsa to Simri Bakhtiyarpur to Alamnagar to Bihariganj	Saharsa to Bihra Panchayat to Supaul to Sariagarh Bhaptiyahi
	Highways	Singheshwar to Supaul to Pipra to Jadia to Murliganj	Bihariganj to Murliganj to Madhepura	Saraigarh Bhaptiyhai to Simrahi to Pipra to Singheshwar
	With in the City	Sharsa to Panchwati to Basti(Dolly Petrol Pump)	Madhepura Bus Stand to College Chowk to Bus Stand	Saharsa to Batraha to NayaBazar to Matyasgandha to Thana Chowk to Mhaveer Chowk to Refugee Chowk
Indoor	Shopping complex	V Mart	NA	NA
	Office complex	NA	Dist. Court	

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

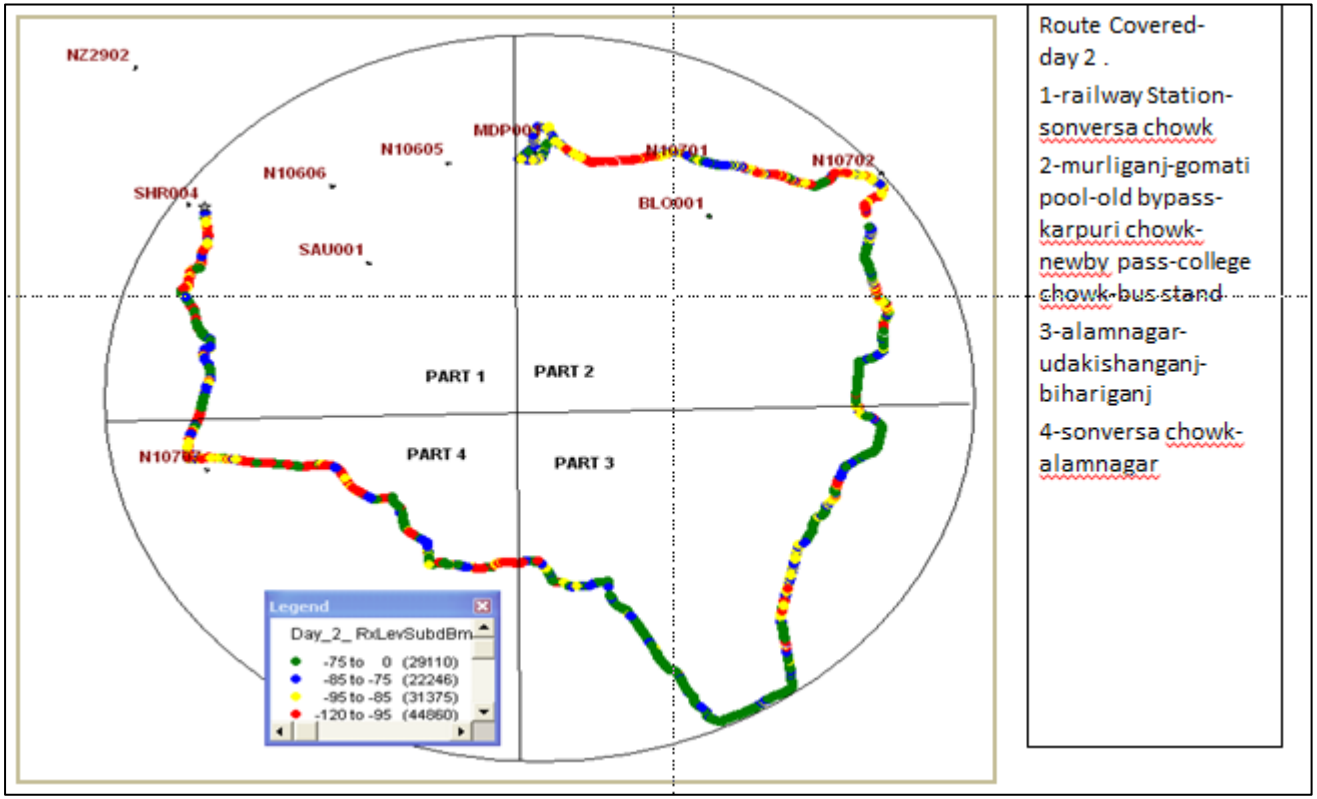
7.1.3.2 KILOMETERS TRAVELLED– SAHARSA SSA

Drive Test - Kilometers Travelled	Day 1	Day 2	Day 3	Total
Saharsha	133	135	130	398

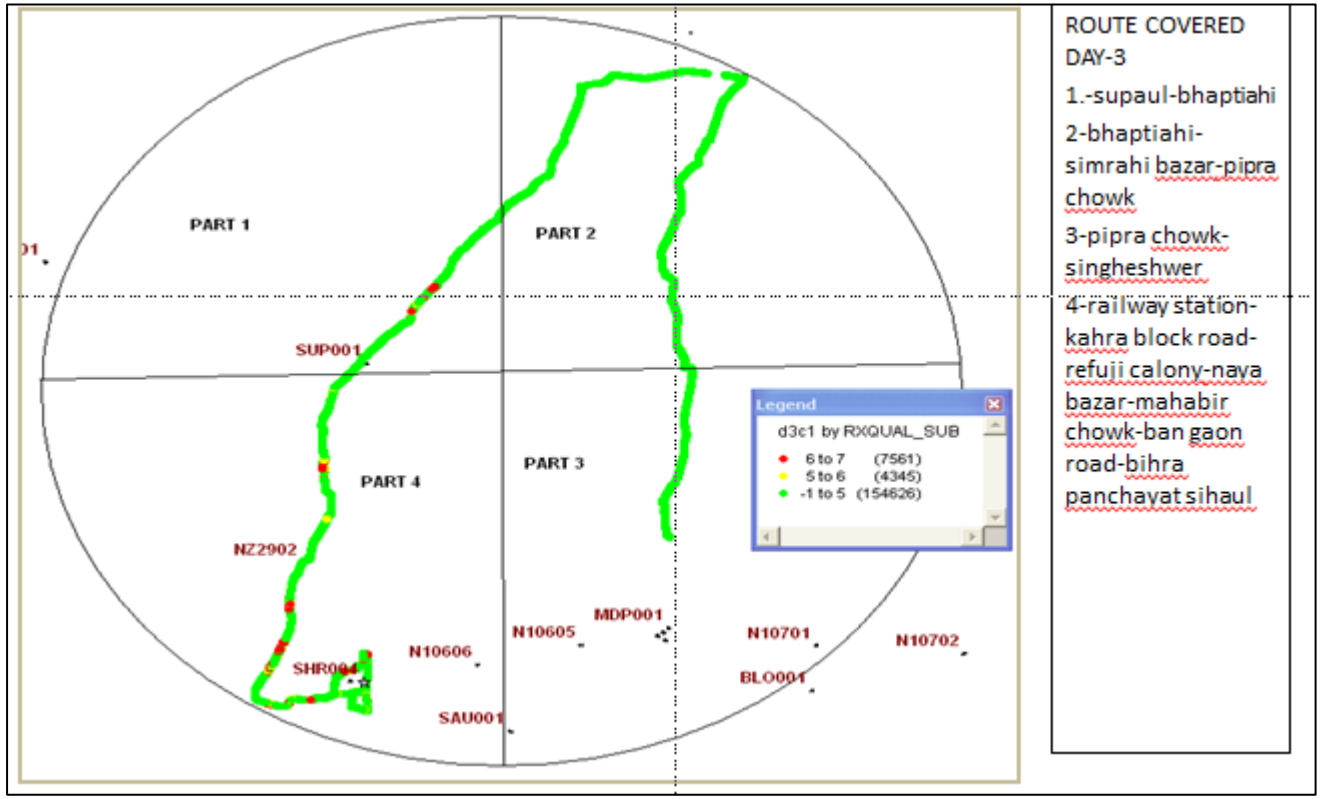
7.1.3.3 ROUTE MAP SAHARSA DAY 1



7.1.3.4 ROUTE MAP SAHARSA DAY 2



7.1.3.5 ROUTE MAP SAHARSA DAY 3



7.1.3.6 DRIVE TEST RESULTS – SAHARSA SSA

	B'mark	Aircel(DWL)		Airtel		BSNL		Idea		Reliance CDMA		Reliance GSM		TATA CDMA		TATA GSM		Uninor		Vodafone	
Parameter's		In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor
0 to -75 dBm		7.76%	20.26%	95.25%	55.72%	66.00%	39.33%	80.46%	58.67%	44.95%	14.55%	3.40%	27.25%	13.45%	15.14%	29.51%	21.45%	80.73%	50.89%	28.11%	47.17%
0 to -85 dBm		49.51%	39.51%	99.37%	88.08%	88.00%	69.78%	99.08%	86.47%	96.84%	34.13%	76.98%	57.39%	34.68%	46.64%	93.68%	50.96%	98.61%	79.51%	85.42%	79.90%
0 to -95 dBm		96.97%	72.95%	100.00%	98.58%	100.00%	99.78%	99.95%	97.48%	100.00%	66.83%	100.00%	81.30%	99.99%	100.00%	99.78%	78.04%	100.00%	100.00%	98.67%	93.42%
Voice quality	≥ 95%	99.14%	83.13%	98.75%	95.52%	93.38%	87.78%	95.41%	96.36%	100.00%	83.25%	98.20%	85.33%	89.89%	79.21%	92.56%	88.41%	97.64%	94.78%	98.57%	96.21%
CSSR	≥ 95%	100.00%	90.64%	100.00%	100.00%	86.67%	71.74%	100.00%	100.00%	100.00%	89.83%	98.44%	87.81%	100.00%	94.59%	100.00%	80.71%	100.00%	98.86%	100.00%	100.00%
%age Blocked calls		0.00%	7.77%	0.00%	0.00%	3.33%	15.52%	0.00%	0.00%	0.00%	10.49%	1.56%	12.01%	0.00%	0.00%	0.00%	19.16%	0.00%	1.14%	0.00%	0.00%
Call drop rate	≤ 2%	0.00%	8.21%	0.00%	0.00%	0.00%	13.98%	0.00%	0.00%	0.00%	5.33%	0.00%	2.99%	0.00%	5.33%	0.00%	4.38%	0.00%	0.00%	0.00%	0.00%
Hands off success rate		100.00%	100.00%	100.00%	100.00%	100.00%	85.79%	100.00%	100.00%	100.00%	100.00%	100.00%	95.97%	98.76%	96.78%	100.00%	88.62%	100.00%	98.68%	100.00%	100.00%

Data Source: Drive test reports submitted by operators to auditors

Voice Quality

BSNL, Tata CDMA and Tata GSM failed to meet the benchmark for voice quality in indoor as well as outdoor locations. Aircel, Reliance CDMA, Reliance GSM and Uninor failed to meet the benchmark in outdoor locations.

Call Set Success Rate (CSSR)

BSNL failed to meet the benchmark for CSSR in indoor as well as outdoor locations. Aircel, Reliance CDMA, Reliance GSM, Tata CDMA and Tata GSM were not able to meet the CSSR benchmark in outdoor areas.

Call Drop Rate

Aircel, BSNL, Reliance CDMA, Reliance GSM, Tata GSM and Tata CDMA failed to meet the benchmark in outdoor locations.

7.2 INDEPENDENT DRIVE TEST

The independent drive test was conducted for all the operators present in the Bihar & Jharkhand circle. As per the new directive given by TRAI headquarters, drive test were conducted at a SSA level. A minimum of 100 kilometers were traversed in each SSA and the selection of routes ensured that the maximum towns, villages, highways are covered as part of drive test. The routes were selected post discussion with TRAI advisors. The holding period for all test calls was 120 seconds and gap between calls was 10 seconds.

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

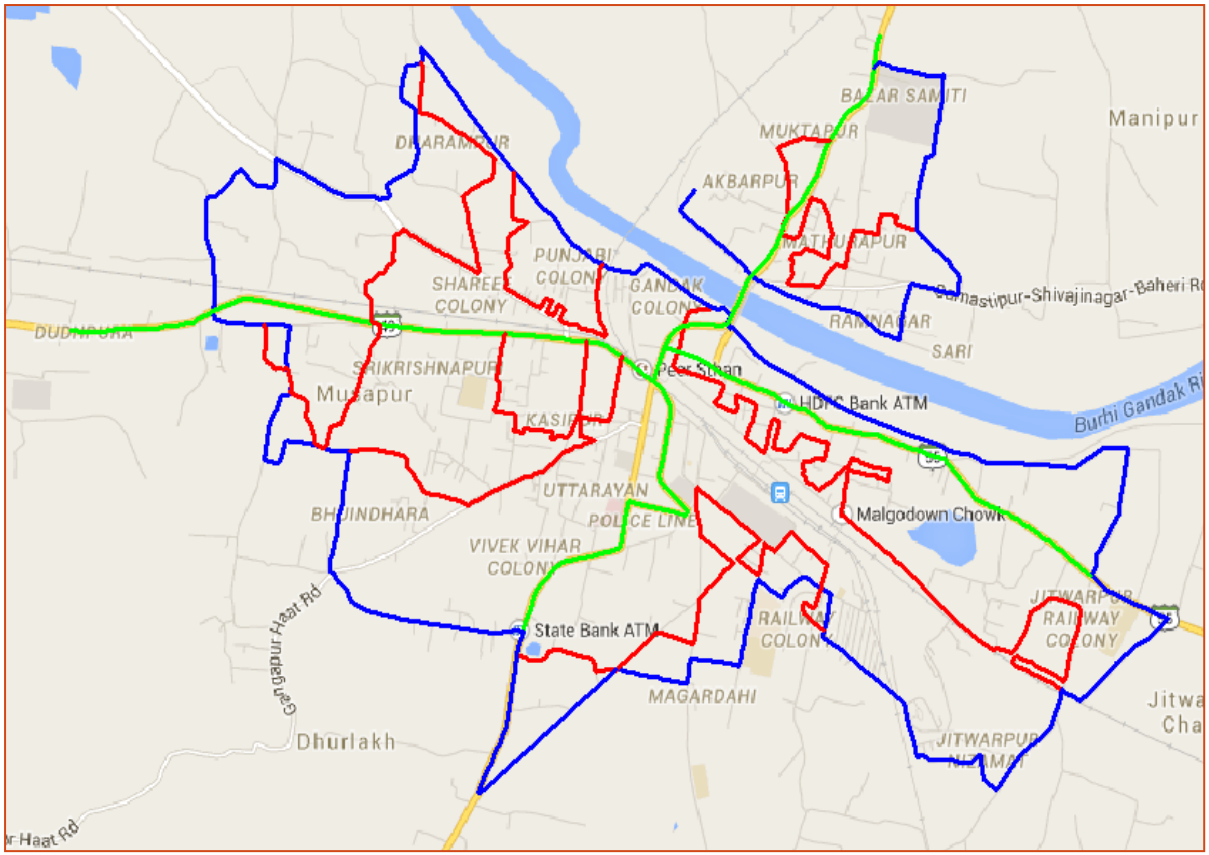
7.2.1 SAMASTIPUR

Name of the City	Samastipur
Date of Drive Test	25th & 26th Aprl' 15
Name of the circle	Bihar

Drive Test - Kilometers Travelled	Day 1	Day 2	Total
Samastipur	33	23	56

Samastipur	Outdoor Routes			Indoor Routes	
	Within City	Major Road	Highway	Office Complex	Shopping Complex
Route Details	Nikhil Kirana Store-New Hindustan Electronic and Electronic-Samastipur Kshetriya Gramin Bank-Peer Sthan-Budhi Gandak Bridge-HDFC Bank ATM	Azad Nagar Rd-Malgodown Chowk-Magardahi Rd-Prayas Jan Shikshan Sansthan-Super Baazar-Dharampur high school-Renu Drugs Stores	Samastipur-Shivajinagar-Baheri Rd-State Bank ATM-Muzaffarpur-Pusa-Samastipur Rd-Punjab National Bank	Banijya Bhawan	Stadium Market

Independent Drive Test Route Details – Samastipur



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

Independent Drive Test Results – Samastipur

	B'mark	Aircel		Airtel		BSNL		Idea		Reliance CDMA		Reliance GSM		TATA CDMA		TATA GSM		UNINOR		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	In door	Outdoor
Signal Strength - 0 to -75 dBm		93.70%	21.57%	66.60%	36.07%	48.90%	12.17%	51.60%	34.50%	69.50%	26.17%	39.95%	16.73%	88.05%	26.03%	69.10%	11.77%	73.15%	45.47%	68.90%	30.07%
Signal Strength - 0 to -85 dBm		99.45%	51.77%	98.35%	75.27%	98.50%	51.27%	97.65%	84.13%	100.00%	69.33%	97.40%	59.30%	98.50%	56.00%	98.20%	43.30%	99.80%	88.17%	99.50%	73.80%
Signal Strength - 0 to -95 dBm		100.00%	99.97%	100.00%	100.00%	99.95%	100.00%	100.00%	99.97%	100.00%	99.97%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
Voice quality	≥ 95%	95.85%	86.51%	93.10%	86.17%	90.36%	75.29%	78.06%	89.91%	98.84%	94.05%	92.49%	78.91%	99.30%	67.25%	91.37%	86.95%	82.39%	83.12%	93.72%	87.35%
CSSR	≥ 95%	95.65%	82.94%	100.00%	95.39%	97.73%	85.49%	100.00%	98.25%	100.00%	95.20%	97.73%	87.98%	100.00%	95.68%	44.35%	47.71%	100.00%	97.78%	100.00%	86.23%
%age Blocked calls		4.35%	17.06%	0.00%	4.61%	2.27%	14.51%	0.00%	1.75%	0.00%	4.80%	2.27%	12.02%	0.00%	4.32%	55.65%	52.29%	0.00%	2.22%	0.00%	13.77%
Call drop rate	≤ 2%	0.00%	2.84%	0.00%	2.09%	0.00%	5.86%	0.00%	0.00%	0.00%	0.00%	7.14%	7.67%	0.00%	6.93%	0.00%	4.82%	0.00%	1.58%	0.00%	4.54%
Hands off success rate		100.00%	98.12%	100.00%	98.44%	100.00%	91.28%	95.28%	100.00%	100.00%	100.00%	100.00%	71.16%	100.00%	100.00%	98.75%	99.21%	100.00%	99.54%	100.00%	100.00%
Large number of call attempt due to incoming messages in TATA GSM																					

Voice Quality

Airtel, BSNL, Idea, Reliance GSM, TATA GSM, Uninor and Vodafone failed to meet the benchmark in indoor as well as outdoor areas. Aircel, Reliance CDMA and Tata CDMA did not meet the voice quality benchmark in outdoor areas.

Call Set Success Rate (CSSR)

Tata GSM failed to meet the benchmark in indoor as well as outdoor areas. Aircel, BSNL, Reliance GSM, and Vodafone did not meet the CSSR benchmark in outdoor areas.

Call Drop Rate

Reliance GSM failed to meet the benchmark in indoor as well as outdoor areas. Aircel, Airtel, BSNL, Tata GSM and Vodafone did not meet the benchmark for call drop rate in outdoor areas.

8 ANNEXURE – CONSOLIDATED

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

8.1 NETWORK AVAILABILITY

Audit Results for Network Availability											
	Benchmark	Aircel(DWL)	Airtel	BSNL	Idea	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Uninor	Vodafone
Number of BTSs in the licensed service area		8661	27972	10982	20825	3086	6748	1214	2887	9681	26325
Sum of downtime of BTSs in a month (in hours)		193281	15083	1111307	96161	17764	5377	1679	6120	20298	76935
BTSs accumulated downtime (not available for service)	≤ 2%	3.07%	0.08%	13.90%	0.63%	0.79%	0.11%	0.19%	0.29%	0.29%	0.40%
Number of BTSs having accumulated downtime >24 hours		1782	75	3523	383	50	22	0	42	67	349
Worst affected BTSs due to downtime	≤ 2%	20.58%	0.27%	32.08%	1.84%	1.62%	0.33%	0.00%	1.45%	0.69%	1.33%
Live Measurement- BTSs accumulated downtime											
	Benchmark	Aircel(DWL)	Airtel	BSNL	Idea	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Uninor	Vodafone
Number of BTSs in the licensed service area		8661	27972	10982	20669	3086	6748	1214	2887	9681	26325
Sum of downtime of BTSs in a month (in hours)		18409	1713	73638	11421	1997	532	164	747	2240	8784
BTSs accumulated downtime (not available for service)	≤ 2%	2.96%	0.09%	9.31%	0.76%	0.90%	0.11%	0.19%	0.36%	0.32%	0.46%
Number of BTSs having accumulated downtime >24 hours		No Data	0	456	12	0	0	0	0	24	0
Live Mesurement - Worst affected BTSs due to downtime	≤ 2%	No Data	0.00%	4.14%	0.06%	0.00%	0.00%	0.00%	0.00%	0.25%	0.00%

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

8.2 CONNECTION ESTABLISHMENT (ACCESSIBILITY)

Audit Results for CSSR, SDCCH and TCH congestion

CSSR	Benchmark	Aircel(DWL)	Airtel	BSNL	Idea	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Uninor	Vodafone
CSSR	≥ 95%	89.65%	98.49%	98.26%	95.84%	97.29%	95.73%	98.29%	98.17%	96.67%	99.19%
SDCCH/Paging channel congestion	≤ 1%	1.00%	0.96%	2.07%	0.92%	NA	0.78%	NA	0.31%	0.68%	0.37%
TCH congestion	≤ 2%	9.82%	1.85%	4.52%	1.91%	0.05%	0.11%	1.14%	0.61%	2.55%	0.81%

Live measurement results for CSSR, SDCCH and TCH congestion

CSSR	Benchmark	Aircel(DWL)	Airtel	BSNL	Idea	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Uninor	Vodafone
CSSR	≥ 95%	91.31%	98.55%	98.05%	96.12%	98.11%	95.76%	98.65%	98.90%	97.01%	99.24%
SDCCH/Paging channel congestion	≤ 1%	0.96%	0.91%	1.97%	0.95%	NA	2.60%	NA	0.38%	0.72%	0.36%
TCH congestion	≤ 2%	8.32%	1.83%	4.23%	1.84%	0.02%	0.09%	0.28%	0.23%	2.26%	0.76%

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	Uninor	Vodafone
Total number of call attempts		976	1373	1306	1611	1462	1188	1279	1186	1225	1346
Total number of successful calls established		936	1373	1100	1611	1352	1102	1090	1101	1210	1346
CSSR	≥ 95%	95.60%	100.00%	84.61%	100.00%	93.24%	92.85%	85.74%	92.19%	98.75%	100.00%
%age blocked calls		4.40%	0.00%	15.39%	0.00%	6.76%	7.15%	14.26%	7.81%	1.25%	0.00%

Data Source: Drive test reports submitted by operators to auditors

8.3 CONNECTION MAINTENANCE (RETAINABILITY)

Audit Results for Call drop rate and for number of cells having more than 3% TCH											
Call drop rate	Benchmark	Aircel(DWL)	Airtel	BSNL	Idea	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Uninor	Vodafone
Total number of calls established		484831676	2751280568	136428459	977473900	125332938	317062276	49502707	92691165	644754372	811228192
Total number of calls dropped		7766104	44946761	83366199	10364363	460083	1459577	447471	467036	2858999	6697841
Call drop rate	≤ 2%	1.61%	1.63%	2.66%	1.06%	0.37%	0.46%	0.90%	0.51%	0.45%	0.82%
Cells having more than 3% TCH	Benchmark	Aircel(DWL)	Airtel	BSNL	Idea	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Uninor	Vodafone
Total number of cells in the network		25740	84144	32851	62805	9258	20324	3918	8566	29064	79079
Total number of cells having more than 3% TCH		2727	1918	3079	1763	131	18	184	239	356	2275
Worst affected cells having more than 3% TCH	≤ 3%	10.59%	2.28%	8.92%	2.81%	1.42%	0.09%	4.69%	2.79%	1.22%	2.88%
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	Uninor	Vodafone
Total number of calls established		16055395	6520987522	11508747	93416007	12882966	27882082	58089013	94457568	64535475	79943411
Total number of calls dropped		231574	101827628	7955506	932424	39435	130106	434892	477392	275113	660069
Call drop rate	≤ 2%	1.46%	1.56%	2.91%	1.00%	0.31%	0.47%	0.75%	0.51%	0.43%	0.83%
Cells having more than 3% TCH	Benchmark	Aircel(DWL)	Airtel	BSNL	Idea	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Uninor	Vodafone
Total number of cells in the network		25611	252432	32851	62328	9258	20324	3921	8557	29062	79079
Total number of cells having more than 3% TCH		2378	5784	2137	1730	0	0	226	301	320	2245
Worst affected cells having more than 3% TCH	≤ 3%	9.30%	2.29%	6.50%	2.78%	0.00%	0.00%	5.75%	3.52%	1.10%	2.84%

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	Uninor	Vodafone
Total number of calls established		936	1373	1108	1611	1360	1100	1205	1101	1210	1346
Total number of calls dropped		22	0	58	0	39	15	69	40	2	0
Call drop rate	≤ 2%	2.69%	0.00%	5.58%	0.00%	2.64%	1.41%	5.84%	3.42%	0.18%	0.00%

Data Source: Drive test reports submitted by operators to auditors

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	Uninor	Vodafone
Total number of sample calls		69979039136	452074907996	23537	171287674195	NA	15430582208	236697049869	15154218406	112027762293	145597387051
Total number of calls with good voice quality		66760600466	433055984092	23065	165788553550	NA	15114443124	232470688743	14754301631	106303878657	142488303145
%age calls with good voice quality	≥ 95%	95.40%	95.79%	97.99%	96.79%	99.82%	97.96%	98.21%	97.36%	94.89%	97.86%

Live measurement results for Voice quality											
Voice quality	Benchmark	Aircel(DWL)	Airtel	BSNL	Idea	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Uninor	Vodafone
Total number of sample calls		2238806042	34406903281	4144	16696782151	NA	1151206838	151311870871	15145877458	10760077371	14124888068
Total number of calls with good voice quality		2138990190	32960816415	4062	16208638183	NA	1127291828	148601565162	14776558974	10209737795	13853703689
%age calls with good voice quality	≥ 95%	95.54%	95.68%	98.03%	97.08%	99.82%	97.93%	98.22%	97.56%	94.89%	98.08%

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	Uninor	Vodafone
Total number of sample calls		1483605	2465413	859126	2202890	NA	767741	NA	1617826	1601614	1687219
Total number of calls with good voice quality		1363742	2364252	728346	2116753	NA	655534	NA	1448773	1504860	1635471
%age calls with good voice quality	≥ 95%	91.91%	95.89%	77.17%	96.20%	93.87%	85.57%	85.05%	89.59%	93.83%	97.33%

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

NA: On the aspect of Voice quality, auditors could get only the overall value from Reliance CDMA. Current equipment used by Reliance does not have capability to fetch these parameters. During drive test, voice quality is taken from FER rate for CDMA operators. Hence it is NA for Reliance CDMA and Tata CDMA.

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	Uninor	Vodafone
Total number of working POIs		48	824	20	79	145	148	152	19	64	58
No. of POIs not meeting benchmark		0	0	0	0	0	0	0	0	0	0
Total Capacity of all POIs (A) - in erlangs		122136	708738	39540	265800	76044	83501	76646	10537	73768	240972
Traffic served for all POIs (B)- in erlangs		81559	447632	22089	179393	33880	20707	22073	3640	54653	143154
POI congestion	≤ 0.5%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%

Live Measurement Results for POI Congestion											
POI congestion	Benchmark	Aircel(DWL)	Airtel	BSNL	Idea	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Uninor	Vodafone
Total number of working POIs		48	824	20	79	145	148	152	19	64	58
No. of POIs not meeting benchmark		0	0	0	0	0	0	0	0	0	0
Total Capacity of all POIs (A) - in erlangs		121922	1784872	39540	265800	77070	86228	76260	10459	73858	241392
Traffic served for all POIs (B)- in erlangs		80522	1502143	21791	178298	32847	20382	21723	3558	54308	140939
POI congestion	≤ 0.5%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%

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

8.6 TOTAL CALL MADE DURING THE DRIVE TEST-VOICE QUALITY

April										
Voice quality	Aircel(DWL)	Airtel	BSNL	Idea	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Uninor	Vodafone
Total number of sample calls	515964	770313	127916	302495	NA	466742	NA	488656	480228	681303
May										
Voice quality	Aircel(DWL)	Airtel	BSNL	Idea	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Uninor	Vodafone
Total number of sample calls	602592	742617	15845	856485	NA	135646	NA	596288	502063	95734
June										
Voice quality	Aircel(DWL)	Airtel	BSNL	Idea	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Uninor	Vodafone
Total number of sample calls	365049	952483	715365	1043910	NA	165353	NA	532882	619323	910182

Data Source: Drive test reports submitted by operators to auditors

NA: During drive test, voice quality is taken from FER rate for CDMA operators. Hence it is NA for Reliance CDMA and Tata CDMA.

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	Uninor	Vodafone
Metering and billing credibility - Postpaid (Avg of 3 billing cycles)											
Metering and billing credibility - Postpaid											
Total bills generated during the period		5797	284760	92417	52634	223924	142816	29700	35200	NA	201376
Total number of bills disputed		0	266	1942	26	213	137	0	0	NA	50
Total number of valid billing complaints		0	42	1941	9	213	137	0	0	NA	26
Total complaints considered invalid		0	224	1	17	0	0	0	0	NA	24
Percentage bills disputed (Avg of 3 billing cycles)	≤ 0.1%	0.00%	0.09%	2.13%	0.05%	0.10%	0.10%	0.00%	0.00%	NA	0.02%
April											
Total bills generated during the first billing cycle		1940	107123	30359	17689	74879	47675	10005	11993	NA	62647
Total number of bills disputed in first billing cycle		0	98	1940	7	81	47	0	0	NA	9
Total number of valid billing complaints (billing cycle 1)		0	24	1940	2	81	47	0	0	NA	3
Total complaints considered invalid (billing cycle 1)		0	74	0	5	0	0	0	0	NA	6
Percentage bills disputed (first billing cycle)	≤ 0.1%	0.00%	0.09%	6.39%	0.04%	0.11%	0.10%	0.00%	0.00%	NA	0.01%

May											
Total bills generated during the second billing cycle		2010	90101	31100	17548	75120	47463	9833	11634	NA	65661
Total number of bills disputed in second billing cycle		0	96	1	8	69	51	0	0	NA	25
Total number of valid billing complaints (billing cycle 2)		0	10	1	4	69	51	0	0	NA	16
Total complaints considered invalid (billing cycle 2)		0	86	0	4	0	0	0	0	NA	9
Percentage bills disputed (second billing cycle)	≤ 0.1%	0.00%	0.11%	0.00%	0.05%	0.09%	0.11%	0.00%	0.00%	NA	0.04%
June											
Total bills generated during the third billing cycle		1847	87536	30958	17397	73925	47678	9862	11573	NA	73068
Total number of bills disputed in third billing cycle		0	72	1	11	63	39	0	0	NA	16
Total number of valid billing complaints (billing cycle 3)		0	8	0	3	63	39	0	0	NA	7
Total complaints considered invalid (billing cycle 3)		0	64	1	8	0	0	0	0	NA	9
Percentage bills disputed (third billing cycle)	≤ 0.1%	0.00%	0.08%	0.00%	0.06%	0.09%	0.08%	0.00%	0.00%	NA	0.02%
Metering and billing credibility - Prepaid											
Performance prepaid	Benchmark	Aircel(DWL)	Airtel	BSNL	Idea	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Uninor	Vodafone
Total number of charging complaints (valid)		1	646	371	4077	1350	4558	0	2	115	4638
Total complaints considered invalid		181770	4411	95	7179	577	0	0	0	0	8683
Total number of charging complaints		181771	5057	466	11256	1927	4558	0	2	115	13321
Total no of customers served		18748195	76120695	2147408	28458206	7689431	20609712	1422136	5242586	21631332	25628205
Percentage of charging complaints disputed	≤ 0.1%	0.97%	0.01%	0.02%	0.04%	0.03%	0.02%	0.00%	0.00%	0.00%	0.05%

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	Uninor	Vodafone
Total number of billing/charging complaints		181771	5323	2407	11282	2140	4695	0	2	38	13371
Total number of complaints resolved in favour of customer		1	688	2313	4086	1563	4695	0	2	38	4664
Total complaints considered invalid		181770	4635	96	7196	577	0	0	0	0	8707
Number of complaints resolved in 4 weeks		1	688	2280	4086	1563	4695	0	2	38	4664
Percentage complaints resolved within 4 weeks	≥ 98%	100.00%	100.00%	98.57%	100.00%	100.00%	100.00%	NA	100.00%	100.00%	100.00%
Number of complaints resolved in 6 weeks		1	688	2283	4086	1563	4695	0	2	38	4664
Percentage complaints resolved within 6 weeks	100%	100.00%	100.00%	98.70%	100.00%	100.00%	100.00%	NA	100.00%	100.00%	100.00%
Period of applying credit / waiver											
Total number of complaints where credit/waiver is required		1	688	2067	4086	1563	4695	0	2	NA	4664
Percentage cases in which credit/waiver was received within 1	100%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%

Data Source: Billing Center of the operators

Live calling results for resolution of billing complaints											
Resolution of billing complaints	Benchmark	Aircel(DWL)	Airtel	BSNL	Idea	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Uninor	Vodafone
Total Number of calls made		NA	100	100	100	88	100	34	100	33	100
Number of cases resolved in 4 weeks		NA	68	80	82	50	59	23	81	30	80
Percentage cases resolved in 4 weeks	≥ 98%	NA	68.00%	80.00%	82.00%	56.82%	59.00%	67.65%	81.00%	90.91%	80.00%
Number of cases resolved in 6 weeks		NA	83	80	84	61	81	27	81	30	84
Percentage cases resolved in 6 weeks	100.00%	NA	83.00%	80.00%	84.00%	69.32%	81.00%	79.41%	81.00%	90.91%	84.00%

Data Source: Billing Center of the operators

Data Source: Billing Center of the operators

It is to be noted that Aircel, Airtel, Idea, Tata CDMA, Tata 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.

Data Source: Billing Center of the operators

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	Uninor	Vodafone
Total number of call attempts to customer care for assistance		27525679	8512487	329386	47237372	4611153	7648937	72733	364575	21235898	25981560
Number of calls getting connected and answered (electronically)		25364367	8443034	321597	46458150	4565694	7570007	72303	346655	21109935	25981560
Percentage calls getting connected and answered	≥ 95%	92.15%	99.18%	97.64%	98.35%	99.01%	98.97%	99.41%	95.08%	99.41%	100.00%

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	Uninor	Vodafone
Total Number of calls received (3 months)		4599177	14213170	353354	12140401	1002039	4012973	77510	481253	7127086	7801607
Total Number of calls answered within 90 seconds (3 months)		4481790	6445639	337037	11835361	877536	3818200	76859	472976	7058853	7526990
Percentage calls answered within 90 seconds (Avg of 3 months)	≥ 95%	97.45%	45.35%	95.38%	97.49%	87.58%	95.15%	99.16%	98.28%	99.04%	96.48%
April											
Total calls received (Month 1)		1535209	4726901	112893	3867799	332776	1205375	26207	161879	2485769	2693936
Total calls answered within 90 seconds (Month 1)		1469306	3498603	108430	3812448	283011	1160547	25856	159628	2463815	2597390
% calls answered within 90 seconds (Month 1)	≥ 95%	95.71%	74.01%	96.05%	98.57%	85.05%	96.28%	98.66%	98.61%	99.12%	96.42%
May											
Total calls received (Month 2)		1554079	4758830	104758	4179021	307490	1180281	28188	165186	2466903	2596736
Total calls answered within 90 seconds (Month 2)		1506242	1957692	102605	4046494	254975	1136079	27959	161396	2431918	2511500
% calls answered within 90 seconds (Month 2)	≥ 95%	96.92%	41.14%	97.94%	96.83%	82.92%	96.25%	99.19%	97.71%	98.58%	96.72%
June											
Total calls received (Month 3)		1509889	4727439	135703	4093581	361773	1627317	23115	154188	2174414	2510935
Total calls answered within 90 seconds (Month 3)		1506242	989344	126002	3976419	339550	1521574	23044	151952	2163120	2418100
% calls answered within 90 seconds (Month 3)	≥ 95%	99.76%	20.93%	92.85%	97.14%	93.86%	93.50%	99.69%	98.55%	99.48%	96.30%

Data Source: Customer Service Center of the operators

Live calling results for customer care (IVR)											
Customer Care Assessment	Benchmark	Aircel(DWL)	Airtel	BSNL	Idea	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Uninor	Vodafone
Total number of call attempts to customer care for assistance		100	100	200	100	100	100	100	100	100	100
Number of calls getting connected and answered (electronically)		100	100	200	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%	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	Uninor	Vodafone
Total Number of calls received		100	100	200	100	100	100	100	100	100	100
Total Number of calls getting connected and answered		100	100	191	99	80	92	93	100	100	94
Live Calling Percentage calls getting connected and answered	≥ 95%	100.00%	100.00%	95.50%	99.00%	80.00%	92.00%	93.00%	100.00%	100.00%	94.00%

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

8.9 TERMINATION / CLOSURE OF SERVICE

Audit results for termination / closure of service-Consolidated											
Termination	Benchmark	Aircel(DWL)	Airtel	BSNL	Idea	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Uninor	Vodafone
Total number of closure request		69	1204	4	1236	354	769	494	789	NA	1725
Number of requests attended within 7 days		69	1204	4	1236	354	769	494	789	NA	1725
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%	NA	100.00%

Data Source: Customer Service Center of the operators

NA: BSNL did not have any data of closures within their system during audit.

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	Uninor	Vodafone
Total number of cases requiring refund of deposits		19	181	NDR	124	NDR	NDR	159	165	NA	325
Total number of cases where refund was made within 60 days		19	181	NDR	124	NDR	NDR	159	165	NA	325
Percentage cases in which refund was receive within 60 days	100.00%	100.00%	100.00%	NDR	100.00%	NDR	NDR	100.00%	100.00%	NA	100.00%

Data Source: Customer Service Center of the operators

Note: - Uninor does not offer postpaid services in the circle.

NA: BSNL did not have any data of closures within their system during audit.

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	Uninor	Vodafone
Eqipped capacity of the network	159991	759813	185050	207190	146000	235000	70675	48791	173486	254751
Total taffic handled in erlang during TCBH	143686	612471	105229	271360	77881	133957	16407	23654	216955	219238
Total no. of customers served (as per VLR)	4601854	24440452	1956884	9404956	2504985	6795205	292402	951646	5339290	8039649

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	Uninor	Vodafone
Total Number of calls made	100	100	200	100	100	100	100	100	No Data	100
Number of cases resolved to satisfaction	81	87	165	87	72	89	82	76	No Data	83
Percentage cases resolved in four weeks	81.00%	87.00%	82.50%	87.00%	72.00%	89.00%	82.00%	76.00%	No Data	83.00%

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

8.13 LIVE CALLING RESULTS FOR LEVEL 1 SERVICES

Live calling for level 1 services											
Level 1 services		Aircel(DWL)	Airtel	BSNL	Idea	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Uninor	Vodafone
Total no. of calls made		150	150	300	150	150	150	150	150	150	150
Calls answered		133	133	264	141	133	130	141	137	129	138
% of calls connected	≥ 95%	88.67%	88.67%	88.00%	94.00%	88.67%	86.67%	94.00%	91.33%	86.00%	92.00%

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

8.14 DETAILS - LEVEL 1 SERVICES CALLS

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.

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	✓		14	13
101	Fire	✓		14	13
102	Ambulance	✓		14	13
104	Health Information Helpline	✓		14	13
108	Emergency and Disaster Management Helpline	✓		14	11
138	All India Helpine for Passangers	✓		14	11
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	✓		14	10
1514	National Career Service(NCS)		×		
15100	Free Legal Service Helpline	✓		13	10
155304	Municipal Corporations		×		
155214	Labour Helpline	✓		13	13
1903	Sashastra Seema Bal (SSB)	✓		13	13

1909	National Do Not Call Registry	✓		13	13
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	✓		14	13
101	Fire	✓		14	13
102	Ambulance	✓		14	13
104	Health Information Helpline	✓		14	13
108	Emergency and Disaster Management Helpline	✓		14	11
138	All India Helpine for Passangers	✓		14	11
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	✓		14	10
1514	National Career Service(NCS)		×		
15100	Free Legal Service Helpline	✓		13	10
155304	Municipal Corporations		×		
155214	Labour Helpline	✓		13	13
1903	Sashastra Seema Bal (SSB)	✓		13	13
1909	National Do Not Call Registry	✓		13	13
1912	Complaint of Electricity		×		
1916	Drinking Water Supply		×		

1950	Election Commission of India		×		
BSNL					
Level 1 Number	Type of Service	Working	Not Working	Calls Made	Calls Connected
100	Police	✓		30	30
101	Fire	✓		30	26
102	Ambulance	✓		30	28
104	Health Information Helpline	✓		30	26
108	Emergency and Disaster Management Helpline				
138	All India Helpine for Passangers	✓		30	28
149	Public Road Transport Utility Service		×		
181	Chief Minister Helpline		×		
182	Indian Railway Security Helpline		×		
1033	Road Accident Management Service	✓		30	26
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	✓		30	22
1071	Air Accident Helpline		×		
1072	Rail Accident Helpline		×		
1073	Road Accident Helpline		×		
1077	Control Room for District Collector	✓		30	24
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	✓		30	28
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	✓	×	30	26

Idea					
Level 1 Number	Type of Service	Working	Not Working	Calls Made	Calls Connected
100	Police	✓		10	10
101	Fire	✓		10	10
102	Ambulance	✓		9	9
104	Health Information Helpline	✓		9	9
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	✓		7	7
1033	Road Accident Management Service	✓		7	7
1037	Public Grievance Cell DoT Hq as 'Telecom Consumer Grievance Redressal Helpline'		×		
1056	Emergency Medical Services		×		
106X	State of the Art Hospitals		×		
1063	Public Grievance Cell DoT Hq		×		
1064	Anti Corruption Helpline		×		
1070	Relief Commission for Natural Calamities	✓		10	10
1071	Air Accident Helpline	✓		10	10
1072	Rail Accident Helpline	✓		10	10
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	✓		10	9
1514	National Career Service(NCS)		×		
15100	Free Legal Service Helpline	✓		10	8
155304	Municipal Corporations		×		
155214	Labour Helpline	✓		10	9
1903	Sashastra Seema Bal (SSB)	✓		10	8
1909	National Do Not Call Registry	✓		10	7
1912	Complaint of Electricity		×		
1916	Drinking Water Supply		×		
1950	Election Commission of India		×		

Reliance CDMA					
Level 1 Number	Type of Service	Working	Not Working	Calls Made	Calls Connected
100	Police	✓		15	15
101	Fire	✓		15	13
102	Ambulance	✓		15	14
104	Health Information Helpline	✓		15	13
108	Emergency and Disaster Management Helpline	✓		15	14
138	All India Helpine for Passangers	✓		15	14
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	✓		15	11
1071	Air Accident Helpline		×		
1072	Rail Accident Helpline		×		
1073	Road Accident Helpline		×		
1077	Control Room for District Collector	✓		15	12
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	✓		15	14
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	✓	×	15	13

Reliance GSM					
Level 1 Number	Type of Service	Working	Not Working	Calls Made	Calls Connected
100	Police		×		
101	Fire		×		
102	Ambulance		×		
104	Health Information Helpline		×		
108	Emergency and Disaster Management Helpline	✓		30	28
138	All India Helpine for Passangers			30	27
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	✓		30	30
1071	Air Accident Helpline		×		
1072	Rail Accident Helpline		×		
1073	Road Accident Helpline		×		
1077	Control Room for District Collector	✓		20	15
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	✓		20	17
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	✓	×	20	13

TATA CDMA					
Level 1 Number	Type of Service	Working	Not Working	Calls Made	Calls Connected
100	Police		×		
101	Fire		×		
102	Ambulance		×		
104	Health Information Helpline	✓		20	20
108	Emergency and Disaster Management Helpline			20	20
138	All India Helpine for Passangers			20	20
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	✓		10	10
1071	Air Accident Helpline	✓		10	10
1072	Rail Accident Helpline		×		
1073	Road Accident Helpline		×		
1077	Control Room for District Collector	✓		10	7
1090	Call Alart (Crime Branch)		×		
1091	Women Helpline		×		
1097	National AIDS Helpline to NACO	✓		10	7
1099	Central Accident and Trauma Services (CATS)	✓		10	7
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	✓		20	20
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	✓	×	10	10
1950	Election Commission of India	✓	×	10	10

TATA GSM					
Level 1 Number	Type of Service	Working	Not Working	Calls Made	Calls Connected
100	Police	✓		20	20
101	Fire	✓		10	5
102	Ambulance	✓		10	10
104	Health Information Helpline	✓		20	20
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	✓		10	10
1071	Air Accident Helpline	✓		10	10
1072	Rail Accident Helpline		×		
1073	Road Accident Helpline		×		
1077	Control Room for District Collector	✓		10	7
1090	Call Alart (Crime Branch)		×		
1091	Women Helpline		×		
1097	National AIDS Helpline to NACO	✓		10	7
1099	Central Accident and Trauma Services (CATS)	✓		10	8
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	✓		20	20
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	✓	×	10	10
1950	Election Commission of India	✓	×	10	10

Uninor					
Level 1 Number	Type of Service	Working	Not Working	Calls Made	Calls Connected
100	Police	✓		20	15
101	Fire	✓		10	5
102	Ambulance	✓		10	10
104	Health Information Helpline	✓		10	10
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	✓		10	7
1037	Public Grievance Cell DoT Hq as 'Telecom Consumer Grievance Redressal Helpline'		×		
1056	Emergency Medical Services		×		
106X	State of the Art Hospitals		×		
1063	Public Grievance Cell DoT Hq		×		
1064	Anti Corruption Helpline		×		
1070	Relief Commission for Natural Calamities	✓		10	10
1071	Air Accident Helpline	✓		10	10
1072	Rail Accident Helpline		×		
1073	Road Accident Helpline		×		
1077	Control Room for District Collector	✓		10	7
1090	Call Alart (Crime Branch)		×		
1091	Women Helpline		×		
1097	National AIDS Helpline to NACO	✓		10	7
1099	Central Accident and Trauma Services (CATS)	✓		10	8
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	✓		20	20
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	✓	×	10	10
1950	Election Commission of India	✓	×	10	10

Vodafone					
Level 1 Number	Type of Service	Working	Not Working	Calls Made	Calls Connected
100	Police	✓		10	9
101	Fire	✓		10	8
102	Ambulance	✓		9	9
104	Health Information Helpline	✓		9	9
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	✓		7	7
1033	Road Accident Management Service	✓		7	7
1037	Public Grievance Cell DoT Hq as 'Telecom Consumer Grievance Redressal Helpline'		×		
1056	Emergency Medical Services		×		
106X	State of the Art Hospitals		×		
1063	Public Grievance Cell DoT Hq		×		
1064	Anti Corruption Helpline		×		
1070	Relief Commission for Natural Calamities	✓		10	10
1071	Air Accident Helpline	✓		10	10
1072	Rail Accident Helpline	✓		10	10
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	✓		10	9
1514	National Career Service(NCS)		×		
15100	Free Legal Service Helpline	✓		10	8
155304	Municipal Corporations		×		
155214	Labour Helpline	✓		10	9
1903	Sashastra Seema Bal (SSB)	✓		10	8
1909	National Do Not Call Registry	✓		10	7
1912	Complaint of Electricity		×		
1916	Drinking Water Supply		×		
1950	Election Commission of India		×		

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

8.15 COUNTER DETAILS

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

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

8.15.1 ERICSSON

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

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

Ericsson Counters

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

8.15.2 NSN (NOKIA SIEMENS NETWORKS)

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

HUAWEI CDMA		
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 BSNL, Tata GSM and Tata CDMA 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

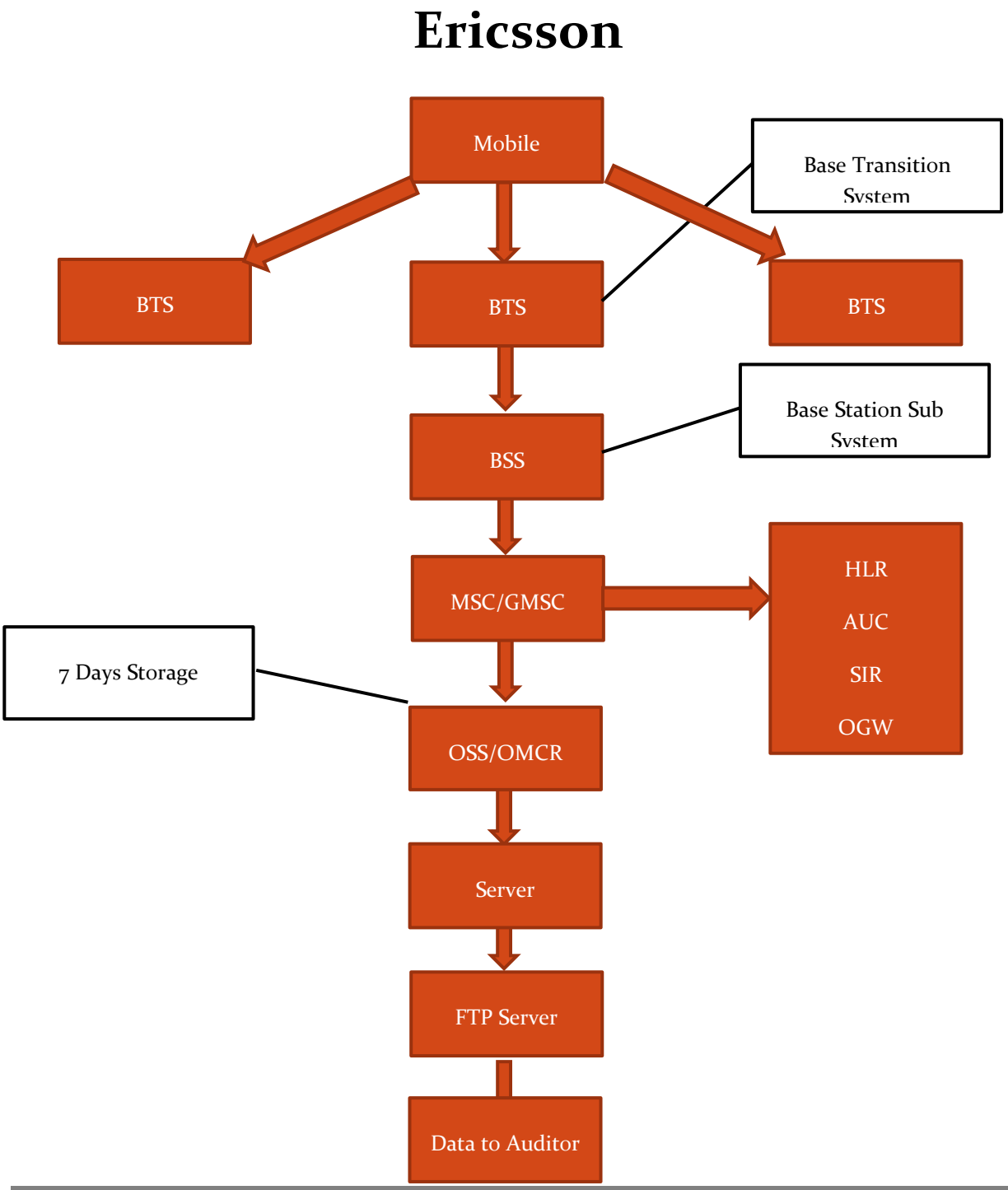
Where,

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

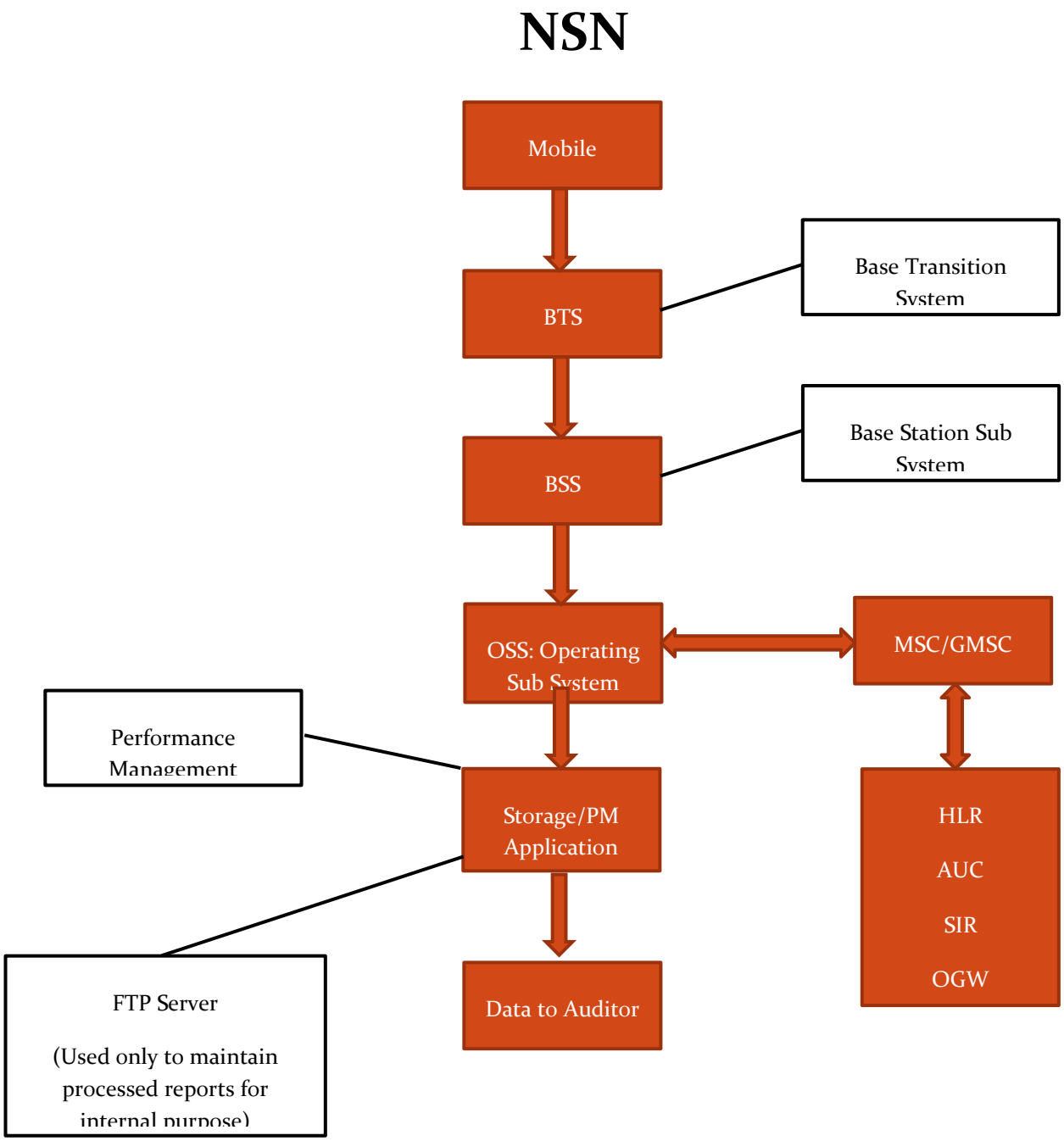
8.16.1 ERICSSON

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



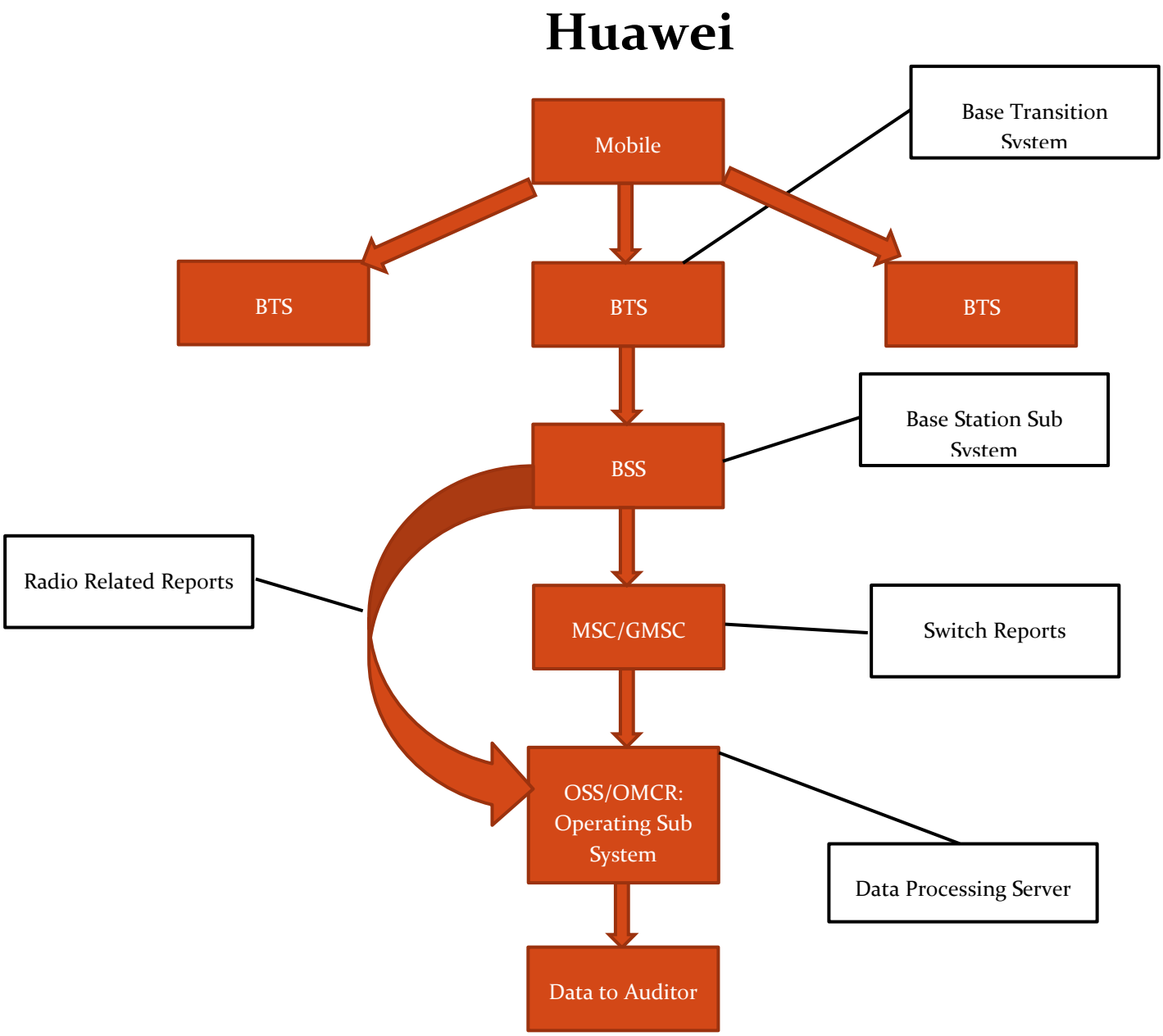
8.16.2 NSN (NOKIA SIEMENS NETWORKS)

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



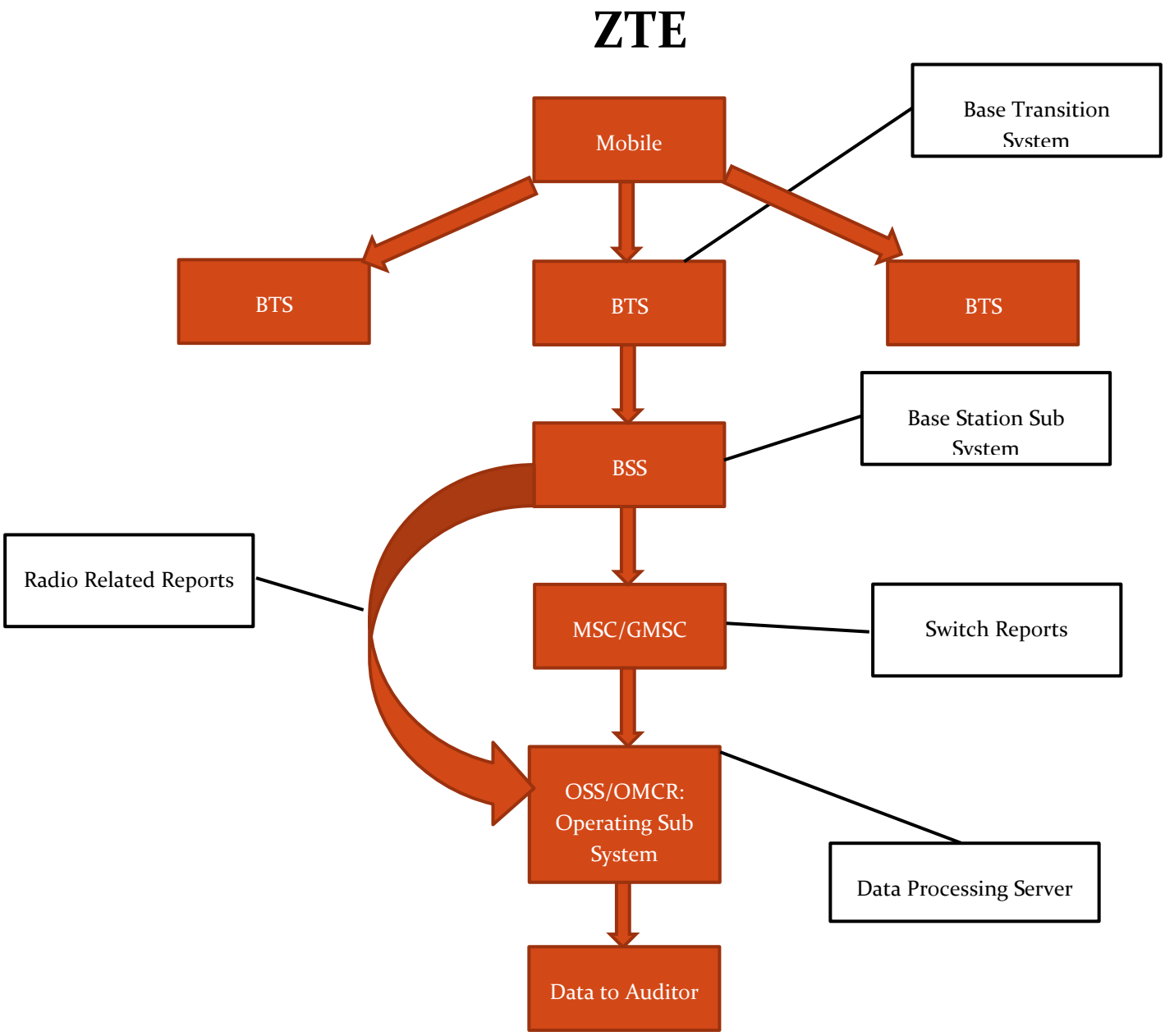
8.16.3 HUAWEI

Huawei provides network support to Uninor in the circle.



8.16.4 ZTE

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



9 ANNEXURE – APRIL

Audit Results for Network Availability- PMR data-April											
	Benchmark	Aircel(DWL)	Airtel	BSNL	Idea	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Uninor	Vodafone
Number of BTSs in the licensed service area		2878	9321	3651	6850	1543	3374	398	961	3228	8744
Sum of downtime of BTSs in a month (in hours)		67607	4686	368042	28483	8397	2359	585	2019	5365	28422
BTSs accumulated downtime (not available for service)	≤ 2%	3.26%	0.07%	14.00%	0.58%	0.76%	0.10%	0.20%	0.29%	0.23%	0.45%
Number of BTSs having accumulated downtime >24 hours		674	20	1093	128	22	9	0	13	16	146
Worst affected BTSs due to downtime	≤ 2%	23.42%	0.21%	29.94%	1.87%	1.43%	0.27%	0.00%	1.35%	0.50%	1.67%
Live Measurement Results for Network Availability- 3 Day live data-April											
	Benchmark	Aircel(DWL)	Airtel	BSNL	Idea	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Uninor	Vodafone
Number of BTSs in the licensed service area		2878	9321	3651	6834	1543	3374	398	961	3223	8744
Sum of downtime of BTSs in a month (in hours)		6913	540	24509	4108	748	229	82	290	766	4206
BTSs accumulated downtime (not available for service)	≤ 2%	3.34%	0.08%	9.32%	0.83%	0.67%	0.09%	0.29%	0.42%	0.33%	0.67%
Number of BTSs having accumulated downtime >24 hours		No Data	0	49	7	0	0	0	0	0	0
Worst affected BTSs due to downtime	≤ 2%	No Data	0.00%	1.33%	0.10%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%

Audit Results for CSSR, SDCCH and TCH congestion- PMR data-April											
CSSR	Benchmark	Aircel(DWL)	Airtel	BSNL	Idea	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Uninor	Vodafone
CSSR	≥ 95%	89.77%	98.31%	98.17%	95.16%	98.00%	96.11%	97.35%	98.28%	97.83%	99.33%
SDCCH/Paging channel congestion	≤ 1%	0.98%	0.98%	2.21%	0.88%	NA	0.81%	NA	0.27%	0.57%	0.28%
TCH congestion	≤ 2%	9.64%	1.82%	4.73%	1.90%	0.02%	0.09%	0.52%	0.57%	1.42%	0.67%

Live measurement results for CSSR, SDCCH and TCH congestion- 3 Day Data-April											
CSSR	Benchmark	Aircel(DWL)	Airtel	BSNL	Idea	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Uninor	Vodafone
CSSR	≥ 95%	92.23%	98.43%	98.34%	97.12%	98.16%	96.34%	99.24%	98.87%	97.95%	99.37%
SDCCH/Paging channel congestion	≤ 1%	1.04%	0.88%	1.96%	0.97%	NA	2.86%	NA	0.43%	0.86%	0.32%
TCH congestion	≤ 2%	7.42%	1.78%	4.49%	1.63%	0.02%	0.08%	0.10%	0.24%	1.37%	0.63%

Drive test results for CSSR (Average of three drive tests) and blocked calls- Drive Test Data-April											
CSSR	Benchmark	Aircel(DWL)	Airtel	BSNL	Idea	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Uninor	Vodafone
Total number of call attempts		320	394	388	439	422	376	380	470	365	420
Total number of successful calls established		304	394	353	439	415	364	360	463	359	420
CSSR	≥ 95%	95.00%	100.00%	90.98%	100.00%	98.34%	96.81%	94.74%	98.51%	98.36%	100.00%
%age blocked calls		5.00%	0.00%	9.02%	0.00%	1.66%	3.19%	5.26%	1.49%	1.64%	0.00%

Audit Results for Call drop rate and for number of cells having more than 3% TCH-PMR data-April											
Call drop rate	Benchmark	Aircel(DWL)	Airtel	BSNL	Idea	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Uninor	Vodafone
Total number of calls established		154116886	919989696	44512164	323684541	61945206	158808148	16507311	29646331	211304631	259377946
Total number of calls dropped		2467130	17593750	29131273	3076700	205826	736649	140993	153414	884661	2131648
Call drop rate	≤ 2%	1.60%	1.91%	2.71%	0.95%	0.33%	0.46%	0.85%	0.52%	0.42%	0.82%
Cells having more than 3% TCH	Benchmark	Aircel(DWL)	Airtel	BSNL	Idea	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Uninor	Vodafone
Total number of cells in the network		8517	28038	10917	20648	4629	10162	1304	2858	9691	26263
Total number of cells having more than 3% TCH		866	651	1068	581	65	9	53	74	107	742
Worst affected cells having more than 3% TCH	≤ 3%	10.17%	2.32%	9.78%	2.81%	1.40%	0.09%	4.04%	2.59%	1.10%	2.83%
Live measurement results for Call drop rate and for number of cells having more than 3% TCH- 3 Day data-April											
Call drop rate	Benchmark	Aircel(DWL)	Airtel	BSNL	Idea	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Uninor	Vodafone
Total number of calls established		4907384	2062267064	3729528	30570395	6489986	14801462	22736320	35552250	21234860	25760862
Total number of calls dropped		78988	35322981	2693216	271811	18755	71556	158873	174776	90887	202293
Call drop rate	≤ 2%	1.61%	1.71%	2.72%	0.89%	0.29%	0.48%	0.70%	0.49%	0.43%	0.79%
Cells having more than 3% TCH	Benchmark	Aircel(DWL)	Airtel	BSNL	Idea	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Uninor	Vodafone
Total number of cells in the network		8578	84114	10917	20600	4629	10162	1307	2849	9674	26263
Total number of cells having more than 3% TCH		863	1956	736	575	0	0	71	136	114	702
Worst affected cells having more than 3% TCH	≤ 3%	10.06%	2.33%	6.74%	2.79%	0.00%	0.00%	5.39%	4.77%	1.18%	2.67%

Drive test results for Call drop rate (Average of three drive tests) - Drive Test Data-April											
Call drop rate	Benchmark	Aircel(DWL)	Airtel	BSNL	Idea	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Uninor	Vodafone
Total number of calls established		304	394	353	439	421	362	380	463	359	420
Total number of calls dropped		6	0	18	0	3	2	27	25	1	0
Call drop rate	≤ 2%	1.97%	0.00%	5.10%	0.00%	0.71%	0.55%	7.11%	5.40%	0.28%	0.00%

Audit Results for Voice quality -PMR Data-April											
Voice quality	Benchmark	Aircel(DWL)	Airtel	BSNL	Idea	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Uninor	Vodafone
Total number of sample calls		22709723818	142166943870	9505	56344608621	NA	8012519568	52249790690	4993494876	36771055152	46082789204
Total number of calls with good voice quality		21675020338	136041815550	9317	54527809128	NA	7846577873	51331988052	4861140371	34911711956	45036005299
%age calls with good voice quality	≥ 95%	95.44%	95.69%	98.02%	96.78%	99.82%	97.93%	98.24%	97.35%	94.94%	97.73%

Live measurement results for Voice quality-3 Day data-April											
Voice quality	Benchmark	Aircel(DWL)	Airtel	BSNL	Idea	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Uninor	Vodafone
Total number of sample calls		735242378	13706276113	1191	5370635414	NA	767112288	67451886055	5935960509	3510472600	4335169317
Total number of calls with good voice quality		702840470	13113469326	1168	5219065619	NA	751202774	66264787745	5799959259	3334081751	4251811895
%age calls with good voice quality	≥ 95%	95.59%	95.67%	98.07%	97.18%	99.81%	97.93%	98.24%	97.71%	94.98%	98.08%

Drive test results for Voice quality (Average of three drive tests) - DT data-April											
Voice quality	Benchmark	Aircel(DWL)	Airtel	BSNL	Idea	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Uninor	Vodafone
Total number of sample calls		515964	770313	127916	302495	NA	466742	NA	488656	480228	681303
Total number of calls with good voice quality		468339	740609	83847	292384	NA	398418	NA	444036	439798	663320
%age calls with good voice quality	≥ 95%	90.77%	96.14%	65.55%	96.66%	93.26%	85.36%	84.71%	90.87%	91.58%	97.36%

Audit Results for POI Congestion- PMR data-April											
POI congestion	Benchmark	Aircel(DWL)	Airtel	BSNL	Idea	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Uninor	Vodafone
Total number of working POIs		48	825	15	79	146	148	152	19	64	59
No. of POIs not meeting benchmark		0	0	0	0	0	0	0	0	0	0
Total Capacity of all POIs (A) - in erlangs		121131	702826	29655	260655	75832	81976	76631	10555	73261	241054
Traffic served for all POIs (B)- in erlangs		80363	403712	17288	177589	34381	20661	22225	3763	53120	138955
POI congestion	≤ 0.5%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%

Live Measurement Results for POI Congestion- 3 Day data-April											
POI congestion	Benchmark	Aircel(DWL)	Airtel	BSNL	Idea	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Uninor	Vodafone
Total number of working POIs		48	825	15	79	146	148	152	19	64	59
No. of POIs not meeting benchmark		0	0	0	0	0	0	0	0	0	0
Total Capacity of all POIs (A) - in erlangs		121131	2103915	29655	260655	76912	87294	76774	10595	73602	242424
Traffic served for all POIs (B)- in erlangs		78415	1162715	18265	169778	32761	21189	22750	3701	51757	131952
POI congestion	≤ 0.5%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%

10 ANNEXURE – MAY

Audit Results for Network Availability- PMR data-May											
	Benchmark	Aircel(DWL)	Airtel	BSNL	Idea	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Uninor	Vodafone
Number of BTSs in the licensed service area		2877	9325	3656	6915	1543	3374	408	963	3229	8759
Sum of downtime of BTSs in a month (in hours)		64871	5232	366747	32649	9367	3018	419	1805	6952	19640
BTSs accumulated downtime (not available for service)	≤ 2%	3.03%	0.08%	13.48%	0.63%	0.82%	0.12%	0.14%	0.25%	0.29%	0.30%
Number of BTSs having accumulated downtime >24 hours		543	30	1171	127	28	13	0	14	27	69
Worst affected BTSs due to downtime	≤ 2%	18.87%	0.32%	32.03%	1.84%	1.81%	0.39%	0.00%	1.45%	0.84%	0.79%
Live Measurement Results for Network Availability- 3 Day live data-May											
	Benchmark	Aircel(DWL)	Airtel	BSNL	Idea	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Uninor	Vodafone
Number of BTSs in the licensed service area		2877	9325	3656	6867	1543	3374	408	963	3229	8759
Sum of downtime of BTSs in a month (in hours)		6539	590	21707	4028	1249	303	35	261	699	2479
BTSs accumulated downtime (not available for service)	≤ 2%	3.16%	0.09%	8.25%	0.81%	1.12%	0.12%	0.12%	0.38%	0.30%	0.39%
Number of BTSs having accumulated downtime >24 hours		No Data	0	211	4	0	0	0	0	0	0
Worst affected BTSs due to downtime	≤ 2%	No Data	0.00%	5.77%	0.06%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%

Audit Results for CSSR, SDCCH and TCH congestion- PMR data-May											
CSSR	Benchmark	Aircel(DWL)	Airtel	BSNL	Idea	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Uninor	Vodafone
CSSR	≥ 95%	90.48%	98.58%	98.28%	95.81%	96.57%	95.34%	99.46%	98.22%	97.77%	99.23%
SDCCH/Paging channel congestion	≤ 1%	0.95%	0.96%	1.97%	0.95%	NA	0.74%	NA	0.26%	0.52%	0.36%
TCH congestion	≤ 2%	9.07%	1.86%	4.24%	1.92%	0.07%	0.12%	1.33%	0.61%	1.45%	0.77%

Live measurement results for CSSR, SDCCH and TCH congestion- 3 Day Data-May											
CSSR	Benchmark	Aircel(DWL)	Airtel	BSNL	Idea	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Uninor	Vodafone
CSSR	≥ 95%	92.42%	98.65%	97.48%	96.01%	98.05%	95.18%	99.12%	99.01%	97.76%	99.22%
SDCCH/Paging channel congestion	≤ 1%	0.71%	0.90%	1.85%	0.96%	NA	2.33%	NA	0.62%	0.51%	0.45%
TCH congestion	≤ 2%	7.25%	1.86%	3.30%	1.92%	0.02%	0.09%	0.28%	0.19%	1.44%	0.78%

Drive test results for CSSR (Average of three drive tests) and blocked calls- Drive Test Data-May											
CSSR	Benchmark	Aircel(DWL)	Airtel	BSNL	Idea	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Uninor	Vodafone
Total number of call attempts		380	420	457	569	445	408	458	365	382	382
Total number of successful calls established		375	420	418	569	422	390	363	339	378	382
CSSR	≥ 95%	98.68%	100.00%	91.47%	100.00%	94.83%	95.59%	79.26%	92.88%	98.95%	100.00%
%age blocked calls		1.32%	0.00%	8.53%	0.00%	5.17%	4.41%	20.74%	7.12%	1.05%	0.00%

Audit Results for Call drop rate and for number of cells having more than 3% TCH-PMR data-May											
Call drop rate	Benchmark	Aircel(DWL)	Airtel	BSNL	Idea	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Uninor	Vodafone
Total number of calls established		170342119	961388678	47959622	338159809	63387732	158254128	16555631	27775805	223668625	274465695
Total number of calls dropped		2547143	14396648	29175896	3460681	254257	722928	151282	159959	956351	2206114
Call drop rate	≤ 2%	1.50%	1.50%	2.60%	1.02%	0.40%	0.46%	0.91%	0.58%	0.43%	0.80%
Cells having more than 3% TCH	Benchmark	Aircel(DWL)	Airtel	BSNL	Idea	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Uninor	Vodafone
Total number of cells in the network		8626	28051	10936	20856	4629	10162	1307	2854	9693	26312
Total number of cells having more than 3% TCH		835	635	1038	583	66	9	63	80	113	760
Worst affected cells having more than 3% TCH	≤ 3%	9.68%	2.26%	9.49%	2.80%	1.43%	0.09%	4.84%	2.80%	1.17%	2.89%
Live measurement results for Call drop rate and for number of cells having more than 3% TCH- 3 Day data-May											
Call drop rate	Benchmark	Aircel(DWL)	Airtel	BSNL	Idea	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Uninor	Vodafone
Total number of calls established		6009011	2431285522	3599684	33244826	6392980	13080620	15254261	35984745	21799923	27070039
Total number of calls dropped		68042	36916830	2706916	290276	20680	58550	122599	177893	92491	210357
Call drop rate	≤ 2%	1.13%	1.52%	3.37%	0.87%	0.32%	0.45%	0.80%	0.49%	0.42%	0.78%
Cells having more than 3% TCH	Benchmark	Aircel(DWL)	Airtel	BSNL	Idea	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Uninor	Vodafone
Total number of cells in the network		8626	84153	10936	20710	4629	10162	1307	2854	9695	26312
Total number of cells having more than 3% TCH		610	1919	677	582	0	0	87	80	109	760
Worst affected cells having more than 3% TCH	≤ 3%	7.07%	2.28%	6.19%	2.81%	0.00%	0.00%	6.68%	2.80%	1.12%	2.89%

Drive test results for Call drop rate (Average of three drive tests) - Drive Test Data-May											
Call drop rate	Benchmark	Aircel(DWL)	Airtel	BSNL	Idea	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Uninor	Vodafone
Total number of calls established		375	420	418	569	425	390	458	339	378	382
Total number of calls dropped		1	0	4	0	5	2	19	4	1	0
Call drop rate	≤ 2%	0.27%	0.00%	0.96%	0.00%	1.18%	0.51%	4.15%	1.18%	0.26%	0.00%

Audit Results for Voice quality -PMR Data-May											
Voice quality	Benchmark	Aircel(DWL)	Airtel	BSNL	Idea	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Uninor	Vodafone
Total number of sample calls		23941802908	157822006922	8272	58638398756	NA	7418062640	53415503559	5226400825	38383124261	48909419004
Total number of calls with good voice quality		22840267235	151252231898	8104	56774336230	NA	7267865251	52438263399	5089461427	36413519490	47856922712
%age calls with good voice quality	≥ 95%	95.40%	95.84%	97.97%	96.82%	99.81%	97.98%	98.17%	97.38%	94.87%	97.85%

Live measurement results for Voice quality-3 Day data-May											
Voice quality	Benchmark	Aircel(DWL)	Airtel	BSNL	Idea	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Uninor	Vodafone
Total number of sample calls		724143448	4573562123	1333	5702154334	NA	384094550	18862267858	5226400825	3662138283	4766619746
Total number of calls with good voice quality		692934532	4360518189	1307	5540904251	NA	376089054	18532668592	5089461427	3475793941	4675841651
%age calls with good voice quality	≥ 95%	95.69%	95.34%	98.05%	97.17%	99.82%	97.92%	98.25%	97.38%	94.91%	98.10%

Drive test results for Voice quality (Average of three drive tests) - DT data-May											
Voice quality	Benchmark	Aircel(DWL)	Airtel	BSNL	Idea	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Uninor	Vodafone
Total number of sample calls		602592	742617	15845	856485	NA	135646	NA	596288	502063	95734
Total number of calls with good voice quality		558506	710281	12294	819135	NA	119660	NA	533320	475499	93971
%age calls with good voice quality	≥ 95%	92.68%	95.65%	77.59%	95.64%	96.71%	88.21%	85.88%	89.44%	94.71%	98.16%

Audit Results for POI Congestion- PMR data-May											
POI congestion	Benchmark	Aircel(DWL)	Airtel	BSNL	Idea	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Uninor	Vodafone
Total number of working POIs		48	821	30	79	143	148	152	19	64	59
No. of POIs not meeting benchmark		0	0	0	0	0	0	0	0	0	0
Total Capacity of all POIs (A) - in erlangs		121599	709779	59310	263931	76255	85025	76677	10532	73550	239341
Traffic served for all POIs (B)- in erlangs		81109	482831	32657	180298	33379	20754	20743	3676	55712	144649
POI congestion	≤ 0.5%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%

Live Measurement Results for POI Congestion- 3 Day data-May											
POI congestion	Benchmark	Aircel(DWL)	Airtel	BSNL	Idea	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Uninor	Vodafone
Total number of working POIs		48	821	30	79	143	148	152	19	64	59
No. of POIs not meeting benchmark		0	0	0	0	0	0	0	0	0	0
Total Capacity of all POIs (A) - in erlangs		121723	2119065	59310	263931	77227	85162	76677	10440	73479	238403
Traffic served for all POIs (B)- in erlangs		78442	1209690	31905	181106	32932	19575	21209	3605	56039	143974
POI congestion	≤ 0.5%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%

11 ANNEXURE – JUNE

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

Audit Results for Network Availability- PMR data-June											
	Benchmark	Aircel(DWL)	Airtel	BSNL	Idea	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Uninor	Vodafone
Number of BTSs in the licensed service area		2906	9326	3675	7060	NDR	NDR	408	963	3224	8822
Sum of downtime of BTSs in a month (in hours)		60803	5165	376518	35029	NDR	NDR	675	2296	7982	28873
BTSs accumulated downtime (not available for service)	≤ 2%	2.91%	0.08%	14.23%	0.69%	NDR	NDR	0.23%	0.33%	0.34%	0.45%
Number of BTSs having accumulated downtime >24 hours		565	25	1259	128	NDR	NDR	0	15	24	134
Worst affected BTSs due to downtime	≤ 2%	19.44%	0.27%	34.26%	1.81%	NDR	NDR	0.00%	1.56%	0.74%	1.52%
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	Uninor	Vodafone
Number of BTSs in the licensed service area		2906	9326	3675	6968	NDR	NDR	408	963	3229	8822
Sum of downtime of BTSs in a month (in hours)		4957	582	27422	3286	NDR	NDR	46	196	775	2099
BTSs accumulated downtime (not available for service)	≤ 2%	2.37%	0.09%	10.36%	0.65%	NDR	NDR	0.16%	0.28%	0.33%	0.33%
Number of BTSs having accumulated downtime >24 hours		No Data	0	196	1	NDR	NDR	0	0	24	0
Worst affected BTSs due to downtime	≤ 2%	No Data	0.00%	5.33%	0.01%	NDR	NDR	0.00%	0.00%	0.74%	0.00%

Audit Results for CSSR, SDCCH and TCH congestion- PMR data-June											
CSSR	Benchmark	Aircel(DWL)	Airtel	BSNL	Idea	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Uninor	Vodafone
CSSR	≥ 95%	88.69%	98.59%	98.33%	96.55%	NDR	NDR	98.05%	98.02%	94.40%	99.00%
SDCCH/Paging channel congestion	≤ 1%	1.06%	0.95%	2.03%	0.94%	NDR	NDR	NA	0.41%	0.95%	0.47%
TCH congestion	≤ 2%	10.75%	1.86%	4.58%	1.90%	NDR	NDR	1.57%	0.65%	4.77%	1.00%

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	Uninor	Vodafone
CSSR	≥ 95%	89.28%	98.58%	98.32%	95.24%	NDR	NDR	97.58%	98.82%	95.31%	99.13%
SDCCH/Paging channel congestion	≤ 1%	1.14%	0.95%	2.11%	0.93%	NDR	NDR	NA	0.09%	0.80%	0.32%
TCH congestion	≤ 2%	10.29%	1.86%	4.90%	1.96%	NDR	NDR	0.45%	0.25%	3.96%	0.87%

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	Uninor	Vodafone
Total number of call attempts		276	559	461	603	595	404	441	351	478	544
Total number of successful calls established		257	559	329	603	515	348	367	299	473	544
CSSR	≥ 95%	93.12%	100.00%	71.37%	100.00%	86.55%	86.14%	83.22%	85.19%	98.95%	100.00%
%age blocked calls		6.88%	0.00%	28.63%	0.00%	13.45%	13.86%	16.78%	14.81%	1.05%	0.00%

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	Uninor	Vodafone
Total number of calls established		160372671	869902194	43956673	315629550	NDR	NDR	16439765	35269029	209781116	277384551
Total number of calls dropped		2751831	12956363	25059030	3826982	NDR	NDR	155196	153663	1017987	2360079
Call drop rate	≤ 2%	1.72%	1.49%	2.67%	1.21%	NDR	NDR	0.94%	0.44%	0.49%	0.85%
Cells having more than 3% TCH	Benchmark	Aircel(DWL)	Airtel	BSNL	Idea	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Uninor	Vodafone
Total number of cells in the network		8597	28055	10998	21301	NDR	NDR	1307	2854	9680	26504
Total number of cells having more than 3% TCH		1026	632	973	599	NDR	NDR	68	85	136	773
Worst affected cells having more than 3% TCH	≤ 3%	11.93%	2.25%	7.50%	2.81%	NDR	NDR	5.19%	2.98%	1.40%	2.92%
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	Uninor	Vodafone
Total number of calls established		5139000	2027434936	4179535	29600786	NDR	NDR	20098432	22920573	21500692	27112510
Total number of calls dropped		84544	29587817	2555374	370337	NDR	NDR	153420	124723	91735	247419
Call drop rate	≤ 2%	1.65%	1.46%	2.64%	1.25%	NDR	NDR	0.76%	0.54%	0.43%	0.91%
Cells having more than 3% TCH	Benchmark	Aircel(DWL)	Airtel	BSNL	Idea	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Uninor	Vodafone
Total number of cells in the network		8407	84165	10998	21018	NDR	NDR	1307	2854	9693	26504
Total number of cells having more than 3% TCH		905	1909	724	573	NDR	NDR	68	85	97	783
Worst affected cells having more than 3% TCH	≤ 3%	10.77%	2.27%	6.58%	2.73%	NDR	NDR	5.19%	2.98%	1.00%	2.95%

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	Uninor	Vodafone
Total number of calls established		257	559	337	603	514	348	367	299	473	544
Total number of calls dropped		15	0	36	0	31	11	23	11	0	0
Call drop rate	≤ 2%	5.84%	0.00%	10.68%	0.00%	6.03%	3.16%	6.27%	3.68%	0.00%	0.00%

Audit Results for Voice quality -PMR Data-June											
Voice quality	Benchmark	Aircel(DWL)	Airtel	BSNL	Idea	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Uninor	Vodafone
Total number of sample calls		23327512410	152085957204	5760	56304666818	NDR	NDR	131031755620	4934322705	36873582880	50605178843
Total number of calls with good voice quality		22245312893	145761936644	5644	54486408192	NDR	NDR	128700437292	4803699833	34978647211	49595375134
%age calls with good voice quality	≥ 95%	95.36%	95.84%	97.99%	96.77%	NDR	NDR	98.22%	97.35%	94.86%	98.00%

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	Uninor	Vodafone
Total number of sample calls		779420216	16127065045	1620	5623992403	NDR	NDR	64997716958	3983516124	3587466488	5023099005
Total number of calls with good voice quality		743215188	15486828900	1587	5448668313	NDR	NDR	63804108825	3887138288	3399862103	4926050143
%age calls with good voice quality	≥ 95%	95.35%	96.03%	97.96%	96.88%	NDR	NDR	98.16%	97.58%	94.77%	98.07%

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	Uninor	Vodafone
Total number of sample calls		365049	952483	715365	1043910	NA	165353	NA	532882	619323	910182
Total number of calls with good voice quality		336897	913362	632205	1005234	NA	137456	NA	471417	589563	878180
%age calls with good voice quality	≥ 95%	92.29%	95.89%	88.38%	96.30%	91.63%	83.13%	84.55%	88.47%	95.19%	96.48%

Audit Results for POI Congestion- PMR data-June											
POI congestion	Benchmark	Aircel(DWL)	Airtel	BSNL	Idea	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Uninor	Vodafone
Total number of working POIs		48	825	15	79	NDR	NDR	152	19	65	57
No. of POIs not meeting benchmark		0	0	0	0	NDR	NDR	0	0	0	0
Total Capacity of all POIs (A) - in erlangs		123678	713610	29655	272813	NDR	NDR	76631	10524	74494	242522
Traffic served for all POIs (B)- in erlangs		83206	456353	16323	180292	NDR	NDR	23250	3480	55129	145858
POI congestion	≤ 0.5%	0.00%	0.00%	0.00%	0.00%	NDR	NDR	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	Uninor	Vodafone
Total number of working POIs		48	825	15	79	NDR	NDR	152	19	65	57
No. of POIs not meeting benchmark		0	0	0	0	NDR	NDR	0	0	0	0
Total Capacity of all POIs (A) - in erlangs		122912	1131635	29655	272813	NDR	NDR	75329	10341	74494	243350
Traffic served for all POIs (B)- in erlangs		84711	2134024	15202	184010	NDR	NDR	21209	3368	55129	146893
POI congestion	≤ 0.5%	0.00%	0.00%	0.00%	0.00%	NDR	NDR	0.00%	0.00%	0.00%	0.00%

12 ABBREVIATIONS

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

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

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