



**EAST  
ZONE**

# **TRAI AUDIT WIRELESS REPORT-ORISSA CIRCLE- JFM QUARTER, 2014**

**Prepared By -**



**Prepared For-**



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

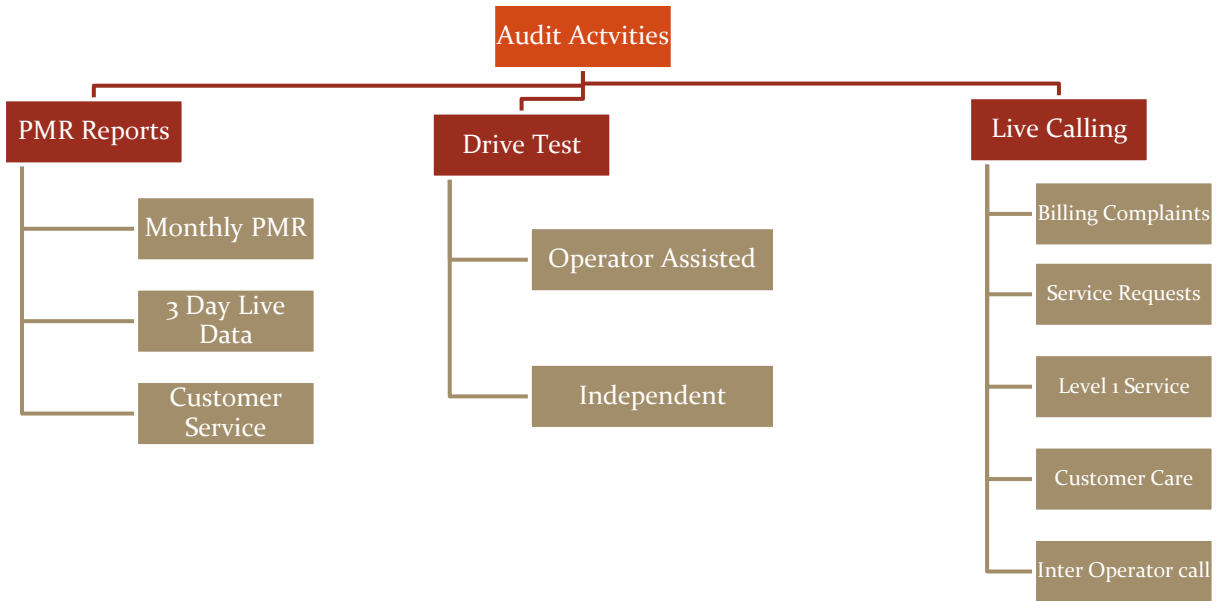
In order to assess the above regulations TRAI has commissioned a third party agency to conduct the audit of the service providers and check the performance of the operators on the various benchmarks set by Telecom Regulatory Authority of India (TRAI).

### 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).

## 2.3 FRAMEWORK USED



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

## 2.3.1 PMR REPORTS

### 2.3.1.1 MONTHLY PMR

This involved calculation of the various Quality of Service parameters through monthly Performance Monitoring Reports (PMR's). The PMR reports were extracted in presence of IMRB representative from the operator's premises for the month of January, February and March. 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

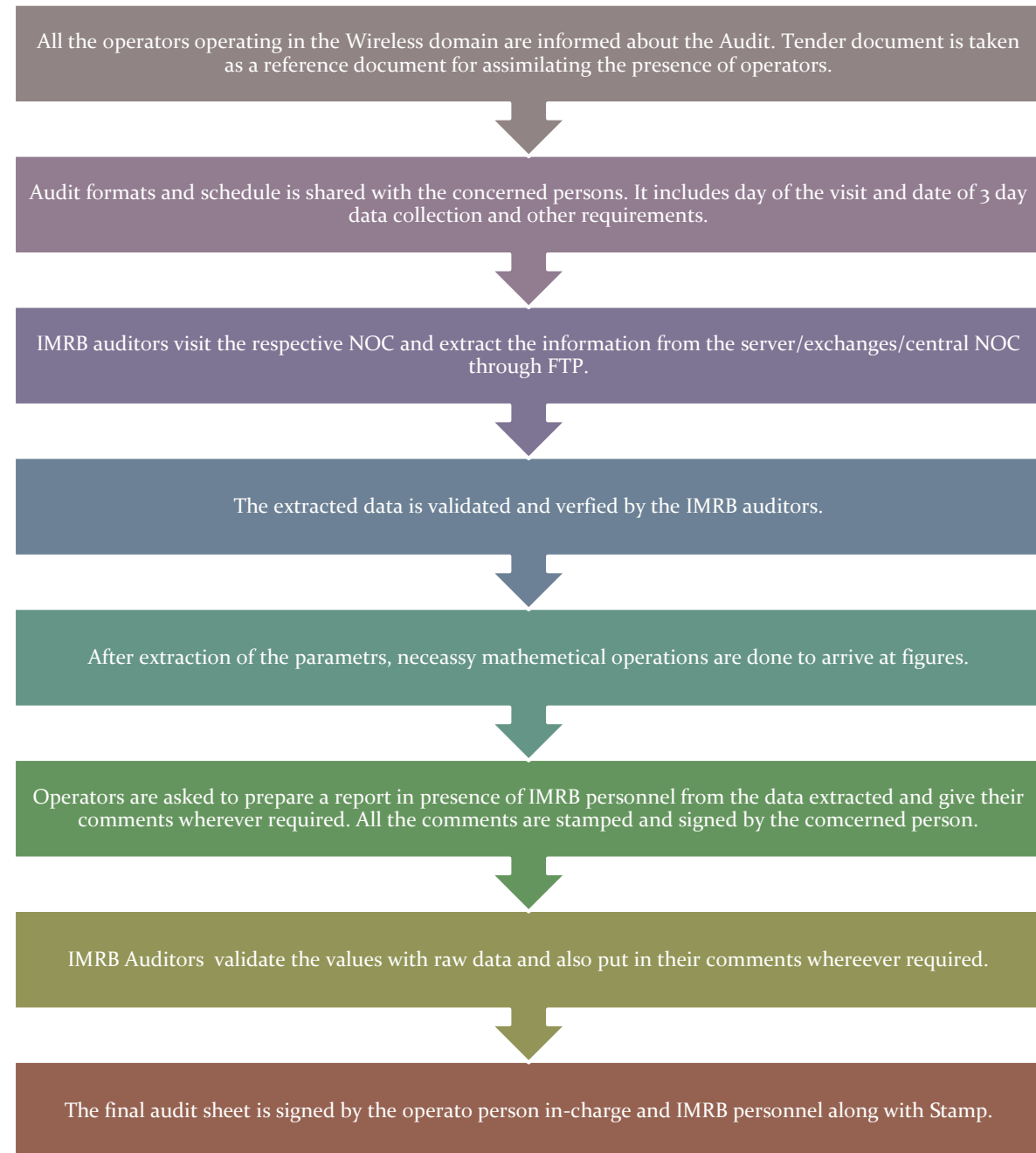
- Call Drop rate
- Worst affected cells having more than 3% TCH drop

#### Voice Quality

- % Connections with good voice quality

### 2.3.1.2 AUDIT PROCEDURE

Below is the key steps followed for extraction of reports at operator premise-



### 2.3.1.3 AUDIT PARAMETERS

#### 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%

#### Customer Service Quality-

Metering and Billing Credibility	
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	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 60 seconds	≥ 90%
Termination/ closure of service	≤ 7 days
Time taken for refund of deposits after closures within 60 days	100%

Let's look at each of the parameter in detail and how the value is calculated-



### 2.3.1.3.1 BTS ACCUMULATED DOWNTIME

⇒ 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 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)  $\leq 2\%$

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 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.

### 2.3.1.3.2 WORST AFFECTED BTS DUE TO DOWNTIME

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 was 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 =** 
$$\frac{\text{(Number of BTSs having accumulated downtime greater than 24 hours in a month)}}{\text{Number of BTS in Licensed Service Area}} * 100$$

3. **TRAI Benchmark –**

- a. Worst affected BTSs due to downtime  $\leq 2\%$

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. Any outage as a result of force majeure were not considered at the time of calculation
- iv. All the BTS having down time greater than 24 hours is assessed and values of BTS accumulated downtime is computed in accordance.

### 2.3.1.3.3 CALL SET-UP SUCCESS RATE (CSSR)

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

2. **Computation Methodology-**

$$(\text{Calls Established} / \text{Total Call Attempts}) * 100$$

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**  $\geq$  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.

#### 2.3.1.3.4 NETWORK CHANNEL CONGESTION- PAGING CHANNEL /TCH CONGESTION/POI

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:**

$$\Rightarrow \text{SDCCH / TCH Congestion \%} = [(A_1 \times C_1) + (A_2 \times C_2) + \dots + (A_n \times C_n)] / (A_1 + A_2 + \dots + A_n)$$

- Where:-A<sub>1</sub> = Number of attempts to establish SDCCH / TCH made on day 1
- C<sub>1</sub> = Average SDCCH / TCH Congestion % on day 1
- A<sub>2</sub> = Number of attempts to establish SDCCH / TCH made on day 2
- C<sub>2</sub> = Average SDCCH / TCH Congestion % on day 2
- A<sub>n</sub> = Number of attempts to establish SDCCH / TCH made on day n
- C<sub>n</sub> = Average SDCCH / TCH Congestion % on day n

$$\Rightarrow \text{POI Congestion \%} = [(A_1 \times C_1) + (A_2 \times C_2) + \dots + (A_n \times C_n)] / (A_1 + A_2 + \dots + A_n)$$

- Where:-A<sub>1</sub> = POI traffic offered on all POIs (no. of calls) on day 1
- C<sub>1</sub> = Average POI Congestion % on day 1
- A<sub>2</sub> = POI traffic offered on all POIs (no. of calls) on day 2
- C<sub>2</sub> = Average POI Congestion % on day 2
- A<sub>n</sub> = POI traffic offered on all POIs (no. of calls) on day n
- C<sub>n</sub> = 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

### 2.3.1.3.5 CALL DROP RATE

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:**  $(\text{Total Calls Dropped} / \text{Total Calls Established}) \times 100$
3. **TRAI Benchmark** -
  - ↳ Call drop rate  $\leq 2\%$
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.

### 2.3.1.3.6 WORST AFFECTED CELLS HAVING MORE THAN 3% TCH DROP

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:**  $(\text{Total number of cells having more than 3\% TCH drop} / \text{Total number of cells in the network}) \times 100$
3. **TRAI Benchmark** -
  - ↳ Worst affected cells having more than 3% TCH drop rate  $\leq 3\%$
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.

### 2.3.1.3.7 VOICE QUALITY

#### 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 its 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

### 2.3.1.4 3 DAY LIVE DATA

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 at the end of the 3<sup>rd</sup> day. The extracted data was analyzed to assess the various QoS parameters.

### 2.3.1.5 CUSTOMER SERVICE PARAMETERS

The Customer Service Quality Parameters include 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 and time taken for refund of security deposit after closures. All the customer service parameters were calculated on the quarterly basis-

Let's look at each of the parameter one by one -

### 2.3.1.5.1 METERING AND BILLING CREDIBILITY

- Billing complaints includes any of the following complaints related to billing from the point of view of customer which include:
  - ↳ Local call charges billed as STD/ISD or vice-versa
  - ↳ Toll free numbers charged
  - ↳ Wrong roaming charges
  - ↳ Call made/received disputed
  - ↳ Wrongly charged extra for some service (SIM replacement charged twice, service not used but charged etc.)
  - ↳ Cheque submitted on time but charged penalty for paying beyond due date (in case customer is not at fault i.e. all those that operator cannot prove that he/she is not lying)
  - ↳ Payment made but not reflected (may be wrongly adjusted to another customer etc.)

All the complaints related to billing as per clause 3.7.2 of QoS regulation of 20<sup>th</sup> March, 2009 were covered.

- Computational Methodology:
  - ↳ **Billing complaints per 100 bills issued** = (Total billing complaints\*\* received during the relevant quarter / Total bills generated\* during the relevant quarter)\*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.
- 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

- Invalid Complaints: Operator has an automated complain log in system, few of the complaints get clarified from the IVRS and rest of calls which are through the V2V, dealt by customer representatives. There are solutions to all possible complaints attended by Customer care representative.

As per the operators, Complaints pertaining to below categories are classified as invalid-

- ↳ Activated VAS service by mistake leading to deduction of Balance
- ↳ Not aware of tariff plan
- ↳ Internet activated leading to deduction in balance
- ↳ Not aware of data charges
- ↳ MMS sent instead of SMS
- ↳ Someone else in the family made some calls due to which balance is deducted
- ↳ Roaming resulting in deduction of balance.
- ↳ Calls made to special numbers
- ↳ Money not credited for recharge, in some cases vendor has not done it correctly leading to complaints

This list is indicative and not exhaustive.

### 2.3.1.5.2 RESOLUTION OF BILLING/CHARGING COMPLAINTS

- Computational Methodology:

- ↳ **%age of billing complaints resolved within 4 weeks**=(Complaints resolved\*\*\* in 4 weeks from date of receipt / Total billing complaints\*\* received during the period) x 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.

- ↳ \*\*\* 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.

- **%age of billing complaints resolved within 4 weeks: 100% within 4 weeks**



- **Period of applying credit/ waiver/adjustment to customer's account from the date of resolution of complaints:** Within One week of resolution of complaints
- **Audit Procedure:**
  - ↳ Audit of ratio of billing complaints resolved to total complaints received during the quarter used for reporting the benchmark to TRAI would be conducted. At the same time we would also conduct random live back checks of complaints.
  - ↳ Percentage of cases where credit/wavier or adjustment is given within one week of resolution of complaints.

### 2.3.1.5.3 PERIOD OF REFUNDS / PAYMENTS DUE TO CUSTOMERS

- **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:**
  - ↳ Termination/Closure of Service: <=7 days
  - ↳ Time taken for refund for deposit after closures: 100% within 60 days
- **Audit Procedure:**
  - ↳ Operator to provide details of:-
    - Dates of lodging of all closure request resolved resulting in requirement of a refund by the operator.
    - Dates of refund pertaining to all closure request received during the relevant quarter
  - ↳ Also random live checks of all subscribers entitled for refund would be conducted

### 2.3.2 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.
- ↪ 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 will be given to those areas where the number of complaints received is on the higher side.
- ↪ We need to define route details so that we cover maximum area in the SSA and try to cover maximum villages and cities within the SSA. We should also try to design the route such that there is no overlap and we can start from the point from where we had left last day(if possible).
- ↪ The route were classified as-
  - With In city
  - Major Roads
  - Highways
  - Shopping complex
  - Office Complex
- ↪ 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 30-50km/hour (around 30 km/hr in case of geographically small cities)
- ↪ 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.

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 -75 to -85 dBm
- ✓ Number of calls with signal strength between -85 to -120 dBm
- ↪ Coverage-Signal strength (CDMA)
  - ✓ Total Ec/Io BINS (A)
  - ✓ Total Ec/Io BINS with less than -15 (B)
  - ✓ Low Interference =  $[1 - (B/A)] \times 100$
- ↪ Voice quality (GSM)
  - ✓ Total Rx Qual Samples- A
  - ✓ Rx Qual samples with 0-5 value - B
  - ✓ %age samples with good voice quality =  $B/A \times 100$
- ↪ 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) =  $B/A \times 100$
  - ✓ %age samples with FER bins having 0-4 value (forward FER) =  $C/A \times 100$
  - ✓ 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) =  $(B/A) \times 100$
- ↪ 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) =  $(B/A) \times 100$

### 2.3.3 LIVE CALLING

#### 2.3.3.1 BILLING COMPLAINTS

All the complaints booked were treated as the total population for selection of samples. From the population a sample of 100 calls was taken. Telephonic Interviews were done with 100 subscribers per service provider for each service in a licensed service area

#### TRAI benchmark-

% of complaints resolved in 4 weeks - 100%

**Metering and billing credibility-Post Paid-** Not more than 0.1% of bills issued should be disputed over a billing cycle

**Metering and billing credibility -- Prepaid -** Not more than 1 complaint per 1000 customers i.e. 0.1% complaints for metering, charging, credit, and validity

**Resolution of billing/ charging complaints - 100%** within 4 weeks

### 2.3.3.2 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.

### 2.3.3.3 LEVEL 1 SERVICE

Level 1 Services include services such as police, fire, ambulance (Emergency services) Test calls were made from all the levels working in a particular SDCA visited. Total sample size (150 per license service area per service per quarter) was equally distributed among the different SDCAs visited, and the distribution among the active levels would be in proportion to the capacity of each level in that SDCA.

### 2.3.3.4 CUSTOMER CARE

Overall sample size is 2\*50 calls per service provider per circle at different points of time, to be evenly distributed across the selected exchanges – 50 calls between 10:00 HRS to 13:00 HRS and 50 calls between 15:00 HRS to 17:00 HRS.

The time taken to answer the call through IVR and Customer Care is recorded by the audit agency.

TRAI Benchmark- Response time to the customer for assistance:

- (a) Accessibility of call center/customer care/IVR >= 95%
- (b) % age of calls answered by the operator (voice to voice): within 60 seconds = 90%

### 2.3.3.5 INTER OPERATOR CALL ASSESEMENT

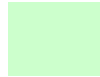
A total of 100 calls per service provider to all the other service providers in a licensed service area were done for the purpose of audit.

## 2.4 OPERATORS COVERED

Operator	Number of Subscriber as per VLR
Aircel(DWL)	2131149
Airtel	7705904
BSNL	389291
Idea	1047953
Reliance CDMA	304276
Reliance GSM	3257877
TATA CDMA	150
TATA GSM	1318963
Vodafone	3039283



Not Meeting the benchmark



Best Performing Operator

### 3 EXECUTIVE SUMMARY

#### 3.1 PMR DATA – 3 MONTHS- CONSOLIDATED

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

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)	0.38%	1.74%	98.84%	0.54%	0.88%	1.13%	2.67%	95.45%
Airtel	0.13%	0.66%	98.72%	0.38%	0.90%	0.86%	0.95%	96.12%
BSNL	0.40%	0.97%	99.58%	0.78%	0.42%	1.04%	0.97%	97.15%
Idea	0.19%	0.57%	99.29%	0.27%	0.18%	0.41%	1.07%	96.52%
Reliance CDMA	0.26%	0.32%	99.46%	0.00%	0.00%	0.11%	1.22%	99.81%
Reliance GSM	0.04%	0.05%	98.32%	0.00%	0.01%	0.55%	0.53%	98.24%
TATA CDMA	0.02%	0.00%	98.75%	0.00%	0.12%	0.58%	1.04%	98.25%
TATA GSM	0.02%	0.00%	99.10%	0.07%	0.29%	0.39%	0.24%	97.88%
Vodafone	0.13%	0.32%	99.42%	0.28%	0.58%	0.64%	2.19%	98.43%

It can be seen that all the operators have comfortably met the TRAI benchmark for the different criteria, some performing exceedingly well than the others. Following are the parameter wise observations for Wireless Operators for Orissa circle:

#### BTs Accumulated Downtime

The audit results showed that on the whole, all the operators met the TRAI specified criteria for the outage due to downtime of the base transceiver stations (BTS). TATA GSM and CDMA performed the best of the lot with near negligible downtime reported, followed by Reliance GSM.

#### Worst Affected BTs Due to Downtime

TATA again was the leader with none of its BTS affected due to the downtime, followed by Reliance GSM. Specific attention is required for the operator Aircel, which although met the TRAI benchmark, reported more than 40 of its stations as worst affected, constituting a near percentage of 1.7%, which is just below the TRAI benchmark.

## Call Set-up Success Rate (CSSR)

All the operators comfortably met the TRAI benchmark for the ratio of successful call attempts to the overall call attempts with an average CSSR at 99.05%. The best performance was recorded for the operator BSNL at 99.58% CSSR, followed by Reliance CDMA at 99.46% and Vodafone at 99.42%. All the operators were found to be calculating the parameter as per the norm specified by TRAI.

## Network Congestion parameters:

In terms of network congestion parameters, all the operators had a congestion ratio within the TRAI specified limits. For the SDCCH/Paging channel congestion, the best performance was recorded for Reliance (CDMA & GSM) with zero congestion reported. This trend continued for the TCH congestions for the operator Reliance with zero congestion for Reliance CDMA and 0.01% congestion for Reliance GSM.

BSNL recorded maximum congestion among the operators, even though it had the highest CSSR with SDCCH/Paging channel congestion at 0.78% and TCH congestion at 0.42%.

The calculation methodology followed by the operators was found to be in complete accordance with what has been specified by TRAI

## Call Drop Rate

All the operators met the TRAI benchmark for the percentage of calls being dropped. The best performance for this parameter was seen for Reliance CDMA at 0.11%. Aircel (DWL) had the highest drop rate at 1.13%, which was close to twice the average drop rate for the circle.

## Worst Affected Cells Having More than 3% TCH Drop:

The audit showed that all operators met the TRAI benchmark for this parameter as well. Airtel had the maximum number of calls with more than 3% TCH, however the call drop rate was less than the average 1.21% for the circle. Aircel showed the maximum call drop rate at 2.67%, followed by Vodafone at 2.19% and Reliance CDMA at 1.22%, all of which were above average CDR. The best performance was seen for TATA GSM at 0.24%.

## Voice Quality

All the operators ensured an appropriate amount of voice quality, above the benchmark. Reliance CDMA reported the best performance at 99.81% while Aircel reported a voice quality of 95.45% which just met the benchmark. All the service providers were measuring this parameter as per the TRAI guidelines

### 3.2 3 DAY DATA – CONSOLIDATED

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

Name of Service Provider	Network Availability		Connection Establishment (Accessibility)			Connection Maintenance (Retainability)		
	BTSs Accumulated downtime (not available for service)	Worst affected BTSs due to downtime	Call Set-up Success Rate (within licensee's own network)	SDCCH/Paging Chl. Congestion (%age)	TCH Congestion (%age)	Call Drop Rate (%age)	Worst affected cells having more than 3% TCH	%age of connection with good voice quality
Benchmark	≤ 2%	≤ 2%	≥ 95%	≤ 1%	≤ 2%	≤ 2%	≤ 3%	≥ 95%
Aircel(DWL)	0.37%	0.01%	98.23%	0.38%	1.44%	1.13%	2.70%	95.44%
Airtel	0.10%	0.01%	98.82%	0.30%	0.77%	0.85%	1.23%	96.15%
BSNL	0.53%	0.10%	99.56%	0.73%	0.44%	0.94%	0.44%	96.76%
Idea	0.07%	0.02%	99.36%	0.26%	0.13%	0.40%	0.99%	96.51%
Reliance CDMA	0.20%	0.00%	99.51%	0.00%	0.00%	0.10%	0.60%	99.85%
Reliance GSM	0.03%	0.00%	98.91%	0.05%	0.09%	0.47%	0.15%	98.43%
TATA CDMA	0.04%	0.00%	98.85%	0.00%	0.10%	0.53%	1.57%	98.25%
TATA GSM	0.26%	0.00%	99.15%	0.03%	0.22%	0.39%	1.68%	97.87%
Vodafone	0.14%	0.05%	99.52%	0.19%	0.48%	0.62%	2.48%	98.49%

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

#### BTSS Accumulated Downtime

The audit live measurement results showed that on the whole, all the operators comfortably met the TRAI specified criteria for the outage due to downtime of the base transceiver stations (BTS). However it differed from the audit data collected with Reliance GSM outperforming TATA CDMA with downtime at 0.03% for the former and 0.04% for the latter.

#### Worst Affected BTSs Due to Downtime

The live measurements showed that TATA and Reliance were the market outperformers with none of its BTS affected due to the downtime. Aircel performed well in the live measurements with only 0.01% of its BTS affected. The difference can be explained through the difference in sample size.

#### Call Set-up Success Rate (CSSR)

All the operators comfortably met the TRAI benchmark for the ratio of successful call attempts to the overall call attempts with an average CSSR at 99.1%. For the live measurements too, the best



performance was recorded for the operator BSNL, Vodafone and Reliance CDMA at 99.56%, 99.52% and 9.51% respectively. TATA GSM too had a CSSR at 99.15% which was above the average for the area.

### Network Congestion parameters

In terms of network congestion parameters, all the operators had a congestion ratio within the TRAI specified limits. For the SDCCH/Paging channel congestion, the best performance was recorded for Reliance(CDMA) with zero congestion reported. This trend continued for the TCH congestions for the operator Reliance CDMA with zero congestion for Reliance CDMA.

In the live measurements as well, BSNL recorded maximum congestion among the operators, even though it had the highest CSSR with SDCCH/Paging channel congestion at 0.73% and TCH congestion at 0.44%, which were comparable to the respective measurements from the audit data.

Airtel also showed a higher TCH congestion at 0.77%

### Call Drop Rate

All the operators met the TRAI benchmark for the percentage of calls being dropped. The best performance for this parameter was seen for Reliance CDMA at 0.1%. Airtel (DWL) had the highest drop rate at 1.13%, which was much above the average call drop date of 0.6%.

### Worst Affected Cells Having More than 3% TCH Drop

The audit showed that all operators met the TRAI benchmark for this parameter as well. Reliance GSM I had the maximum number of calls with more than 3% TCH, however the call drop rate was less than the average 0.6% for the circle. Airtel and Vodafone were the worst affected operators with 2.7% and 2.48% respectively.

### Voice Quality

All the operators ensured an appropriate amount of voice quality with an average of 97.53%, which was above the benchmark. Reliance CDMA reported the best performance at 99.85%. The operators Airtel, Airtel, BSNL and Idea had performance below the average for the circle.

### 3.3 LIVE CALLING DATA - CONSOLIDATED

Name of Service Provider	Metering and Billing	Service Requests	Level 1 Service	Response time to customer for assistance	
	%age complaints resolved within 4 weeks	Complaint /Request attended to Satisfaction	Call answered in 60 seconds	Accessibility of call centre/ customer care	Percentage of calls answered by the operators (voice to voice) within 60 seconds
Benchmark	100%		≥ 95%	≥ 95%	≥ 90%
Aircel(DWL)	98.00%	99.00%	99.33%	100.00%	100.00%
Airtel	98.00%	100.00%	100.00%	100.00%	96.00%
BSNL	89.00%	97.00%	100.00%	100.00%	55.00%
Idea	99.00%	98.00%	98.00%	100.00%	98.00%
Reliance CDMA	98.00%	100.00%	100.00%	100.00%	96.00%
Reliance GSM	99.00%	98.00%	95.33%	100.00%	93.00%
TATA CDMA	NA	100.00%	98.67%	100.00%	100.00%
TATA GSM	100.00%	100.00%	99.33%	100.00%	100.00%
Vodafone	98.00%	99.00%	99.33%	100.00%	99.00%

#### Complaints Resolved within 4 weeks

The live calling results showed that all the operators except TATA GSM failed to meet the TRAI criteria of resolution of billing complaints within 4 weeks. BSNL had the weakest performance with only 89% of the complaints resolved within the 4 weeks.

Note: - No billing complaints registered for TATA CDMA so it is Not Applicable.

#### Complaint/Request Attended to Satisfaction

All the operators performed satisfactorily in terms of satisfaction of the customers for service requests. The operators Airtel, Reliance CDMA, TATA CDMA and TATA GSM showed complete satisfaction for the customers with regards to their requests being attended.

#### Level 1 Service

All the operators met the TRAI benchmark for level 1 service with calls being answered within 60 seconds. The operators Airtel, BSNL and Reliance CDMA outperformed other operators with all calls being answered within 60 seconds.

We have contacted for following numbers Police-100, Fire Station- 101, Ambulance- 108 & 102, 1070, 1077, 1950, 1072, 155388, 155222, 155335, 1098, 1800-103-8181, 1800-233-5577, 1800-2000, 1800-3131-777, 1800-212-3001, 1800-123-2120 which counts all to-gether 150 calls.

#### Accessibility of Call Centre/Customer Care-IVR

For the IVR aspect all the service providers meet the TRAI benchmark with 100% accessibility of all call centers/customer care centers, which was much above the TRAI benchmark of 95%.

### Customer Care / Helpline Assessment

It was seen that the majority of operators comfortably exceeded the TRAI benchmark of 90% of calls answered by the centres within 60 seconds. While TATA and Airtel reported a cent percentage of calls being answered, BSNL had a performance much below the benchmark at 55%.

## 3.4 BILLING AND CUSTOMER CARE - CONSOLIDATED

Name of Service Provider	Billing Disputes		Billing Complaints	Response time to customer for assistance	Customer care	
	Postpaid Subscribers	Prepaid Subscribers	% of complaints resolved in 4 weeks	% of cases where credit/wavier is received within one week	Percentage of calls answered by the operators IVR within 60 seconds	Percentage of calls answered by the operators (voice to voice) within 60 seconds
Benchmark	≤ 0.1%	≤ 0.1%	≥ 100%	≥ 100%	≥ 95%	≥ 90%
Aircel(DWL)	0.01%	0.00%	100.00%	100.00%	89.46%	94.09%
Airtel	0.08%	0.08%	100.00%	100.00%	100.00%	89.21%
BSNL	0.00%	0.02%	100.00%	100.00%	96.00%	94.44%
Idea	0.05%	0.01%	100.00%	100.00%	98.48%	99.21%
Reliance CDMA	0.07%	0.05%	97.45%	100.00%	98.75%	93.09%
Reliance GSM	0.08%	0.09%	100.00%	100.00%	98.95%	88.78%
TATA CDMA	0.01%	0.00%	100.00%	100.00%	99.14%	96.44%
TATA GSM	0.04%	0.00%	100.00%	100.00%	96.55%	94.43%
Vodafone	0.01%	0.05%	100.00%	100.00%	100.00%	94.87%

### Billing Disputes – Postpaid Subscribers

For the postpaid customers, only 0.04% complaints were reported on an average for all the operators within the circle. BSNL performed exceedingly well, with nearly negligible complaints. Airtel and Reliance GSM reported a maximum ratio of complaints at 0.08 %.

### Billing Disputes – Prepaid Subscribers

For the billing disputes for the prepaid subscribers, it was seen that all operators met the benchmark with an average of only 0.03% complaints, which was much within the TRAI benchmark of less than 0.1%. Aircel showed the best performance with negligible complaints

### Billing Complaints -% of complaints resolved in 4 weeks

It was seen that that almost all the operators met the TRAI criteria of resolution of complaint within 4 weeks. The only exception being CDMA with only 97.45% of the complaints being resolved, which was below the TRAI benchmark of 100%.

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

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

### **Customer Care Percentage of calls answered by the operators IVR within 60 seconds**

From the audit it can be seen that on an average 97.48% of the calls were answered by the operators within IVR. Operators Airtel and Vodafone performed much better than its operators with all its calls being answered within the stipulated time. Aircel however refused to meet the benchmark of 95% with only 89.5% of its IVR call being attended within 60 seconds.

### **Customer Care Percentage of calls answered by the operators (Voice to Voice) within 60 seconds**

For the voice to voice calls, an average of 93.84% of the calls was answered within 60 seconds from the total calls. Idea had the highest percentage of calls being answered at more than 99%. However, Airtel and Reliance GSM did not meet the TRAI benchmark with 89.21% and 88.78% respectively.

### 3.5 INTER OPERATOR CALL ASSESSMENT - CONSOLIDATED

Inter operator call Assessment To↓ From→	Aircel(DWL)	Airtel	BSNL	Idea	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Vodafone
Aircel(DWL)	NA	99.00%	97.00%	97.00%	98.00%	100.00%	97.00%	97.00%	100.00%
Airtel	99.00%	NA	99.00%	98.00%	99.00%	98.00%	100.00%	100.00%	97.00%
BSNL	97.00%	84.00%	NA	94.00%	98.00%	94.00%	96.00%	95.00%	96.00%
Idea	99.00%	100.00%	99.00%	NA	95.00%	98.00%	97.00%	93.00%	95.00%
Reliance CDMA	100.00%	100.00%	97.00%	99.00%	NA	99.00%	100.00%	100.00%	100.00%
Reliance GSM	100.00%	98.00%	100.00%	96.00%	99.00%	NA	100.00%	100.00%	98.00%
TATA CDMA	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	NA	100.00%	100.00%
TATA GSM	100.00%	100.00%	100.00%	97.00%	100.00%	100.00%	100.00%	NA	100.00%
Vodafone	100.00%	100.00%	99.00%	100.00%	99.00%	98.00%	100.00%	100.00%	NA

 Maximum Problem faced by the calling operator to other operator

In the inter-operator call assessment, it can be seen that all the operators faced a little problem in connecting to various operators. The operators TATA CDMA and Aircel had maximum of full connectivity while making a call to other operators. In regards to the calls made to an operator, TATA CDMA showed 100% connectivity.

The maximum problem was faced in connecting to BSNL 84% success from the operator Airtel and 98% from Reliance GSM. Another weak intra operator connectivity was seen in calling Idea from TATA GSM with only 93% being connected.

## 4 DETAILED FINDINGS - DRIVE TEST DATA

The drive test was conducted simultaneously for all the operators present in the Orissa circle. As per the new directive given by TRAI headquarters, drive test for the month of January, February & March, 2014 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.

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

Below is the schedule of the drive test for the Orissa circle-

Month	Name of SSA Covered	Date of Drive Test
January	Bolangir	29th Jan to 31st Jan
February	BARIPADA	25th Feb to 28th Feb
March	Bhubaneswar	24th March to 26th March
Year	2014	

**Route Details – January – Bolangir SSA**

		January		
		Bolangir		
	Type of location	Day 1	Day 2	Day 3
Outdoor	Major Roads			Bolangir-Sonepur-Boudh-Purunacuttack
	Highways	Bolangir-Patnagarh-Belpada, Kantabanjee-Titlagarh-Saintala-Deogaon-Bolangir		
	With in the City	PR High School-Bus Stand, Medical Road, Santipada, Patnagarh		
Indoor	Office complex	Suruchi Bazaar, Bolangir	Goel Super Bazaar, Kantabanjee	Padmini Market Complex, Sonepur
	Shopping complex	Doorsanchar Bhawan, Bolangir	BSNL Telephone Exchange, Kantabanjee	BSNL Telephone Exchange, Sonepur

### Drive Test Result – January – Bolangir SSA

Name of SSA	Bolangir	Month	January	Consolidated															
	B'mark	Aircel(DWL)		Airtel		BSNL		Idea		Reliance CDMA		Reliance GSM		TATA CDMA		TATA GSM		Vodafone	
		In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor
Signal Strength -0 to -75 dBm		94.76%	93.90%	96.47%	75.09%	93.47%	58.61%	95.86%	80.51%	NA		22.03%	37.38%	NA		87.27%	68.11%	84.18%	72.91%
Signal Strength --75 to -85 dBm		5.10%	5.33%	3.43%	19.45%	6.22%	25.86%	4.12%	13.75%	NA		51.95%	35.58%	NA		11.83%	22.91%	14.64%	14.97%
Signal Strength --85 to -120 dBm		0.14%	0.77%	0.10%	5.54%	0.31%	15.53%	0.02%	5.74%	NA		26.02%	27.04%	NA		0.90%	8.98%	1.18%	12.12%
Voice quality	≥ 95%	98.53%	95.70%	98.93%	97.77%	95.56%	92.67%	99.03%	96.64%	97.50%	88.55%	97.85%	86.66%	99.99%	92.79%	99.88%	95.42%	98.50%	97.33%
CSR	≥ 95%	100.00%	98.56%	100.00%	98.49%	95.89%	83.35%	100.00%	100.00%	100.00%	82.55%	100.00%	92.88%	100.00%	97.46%	100.00%	98.98%	97.83%	92.33%
%age Blocked calls		0.00%	1.44%	0.00%	1.51%	4.11%	16.65%	0.00%	0.00%	0.00%	17.48%	0.00%	7.12%	0.00%	2.54%	0.00%	1.02%	2.17%	7.67%
Call drop rate	≤ 2%	0.00%	1.86%	0.00%	1.04%	0.00%	1.00%	0.00%	0.00%	0.00%	1.09%	0.00%	3.42%	0.00%	10.15%	0.00%	0.00%	1.73%	0.87%
Hands off success rate		100.00%	100.00%	100.00%	97.78%	100.00%	99.17%	100.00%	100.00%	100.00%	100.00%	100.00%	98.92%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%

### Signal Strength

January				
% Ec/Io BINS with less than -15	Reliance CDMA		TATA CDMA	
	In door	Outdoor	In door	Outdoor
	0.02%	3.87%	99.99%	49.05%

### Voice Quality

From the drive test conducted, it can be seen that while all operators meet the voice quality benchmark for indoors, the same was not true for outdoor locations.



For the **indoor locations**, operators TATA CDMA, TATA GSM and Idea performed well with more than 99% voice quality, while BSNL just met the benchmark at 95.56%. For the **outdoor locations**, the operators Reliance CDMA, Reliance GSM, BSNL and TATA CDMA did not meet the benchmark. Airtel was the leader in voice quality for outdoor locations

### Call Set Success Rate (CSSR)

It was seen that the overall CSSR in the indoor locations was much better than the outdoor locations, with a majority of operators having 100% CSSR. The only exceptions were BSNL at 95.56% and Vodafone at 97.83%, which met the TRAI benchmark.

For the outdoor locations, the average CSSR was a little over 93% which was below the TRAI benchmark. While Idea performed well with 100% CSSR, operators such as BSNL, Reliance CDMA, Reliance GSM and Vodafone did not meet the TRAI benchmark.

### Call Drop Rate

For the indoor locations, all the operators had a call drop rate of 0% with only exception being Vodafone at 1.73%, which was a little below the TRAI benchmark. For the outdoor locations, Idea and TATA GSM were the only operators with zero percent calls dropped. Operators TATA CDMA and Reliance GSM failed to meet the TRAI benchmark with high call drop rates at 10.15% and 3.42% respectively.

### Route Details – February – Baripada SSA

		February		
		Baripada		
	Type of location	Day 1	Day 2	Day 3
Outdoor	Major Roads			Station Bazar, KC Circle, Podaashtia, Karanjia, Sankerko, Dukura, Khunta, Udala, Kaptipada, Jaidida, Sanadei, Sarat,

				Champajhar, Thakurmunda, Akhapan, Kendumundi, Karanjia
	Highways		Station Bazar, Palbani Circle, Dargadhai Circle, Murgabadi Circle, Kuchei, Kuliana, Budhamara, Jharpokhoria, Seemanta Engg College, Bangriposhi, Dwarshuni Ghati, Bisoi, Manada, Jashipur, Tangabilla	
	With in the City	Station Bazar, Palbani, Manchabandha, Takatpur, Dargadhai Sqr, Raghunathpur, Laxhmiposhi, Rani Bhol, Murgabadi Sqr, Bhugudapata, Kuchei, Bhajapur, Badabazar, KC Circle, Podaashtia, Karanjia, Madhuban, Tulsichaura, Baghda RD, Busstand, Main Market, College RD, Prafulla Nagar, Waliganj, LIC Colony, Kalimandir Sahi, Mantry Chawk, Policeline, Fire Station Sqr, Kachiri Market, Parad Padia, Damdarpur.		
Indoor	Office complex	Vishal Mega Mart . Murgabadi Golai , BARIPADA	JASHIPUR Main Market	KARANJIA Market
	Shopping complex	BSNL OFFICE . Madhuban BARIPADA	Telephone Bhawan , Bangirposhi	BSNL Office , UDALA

### Drive Test Result – February – Baripada SSA

Name of SSA	BARIPADA	Month	February	Consolidated																
	B'mark	Aircel(DWL)		Airtel		BSNL		Idea		Reliance CDMA		Reliance GSM		TATA CDMA		TATA GSM		Vodafone		
		In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor	
Signal Strength -0 to -75 dBm		69.09%	34.04%	98.61%	66.33%	97.30%	91.01%	95.81%	73.75%	NA		73.98%	54.21%	NA		64.97%	58.44%	78.67%	77.81%	
Signal Strength --75 to -85 dBm		29.16%	30.36%	1.39%	19.43%	2.65%	6.61%	3.80%	26.08%	NA		21.06%	28.85%	NA		30.10%	25.62%	13.94%	15.34%	
Signal Strength --85 to -120 dBm		1.76%	35.60%	0.00%	14.24%	0.06%	2.38%	0.39%	0.18%	NA		4.96%	16.94%	NA		4.93%	15.94%	7.39%	6.84%	
Voice quality	≥ 95%	98.35%	88.63%	99.58%	97.37%	96.33%	89.87%	99.02%	96.54%	98.28%	95.31%	98.03%	96.28%	100.00%	54.49%	98.45%	95.18%	97.17%	85.67%	
CSSR	≥ 95%	100.00%	93.35%	100.00%	98.68%	100.00%	96.68%	100.00%	100.00%	100.00%	99.06%	100.00%	99.35%	100.00%	93.35%	97.92%	88.67%	94.83%	99.33%	
%age Blocked calls		0.00%	6.64%	0.00%	1.32%	0.00%	3.31%	0.00%	0.00%	0.00%	0.94%	0.00%	0.65%	0.00%	6.65%	2.08%	11.33%	5.17%	0.67%	
Call drop rate	≤ 2%	0.00%	4.38%	0.00%	1.32%	0.00%	2.23%	0.00%	0.00%	0.00%	1.17%	0.00%	0.16%	0.00%	9.70%	0.00%	0.61%	0.00%	0.00%	
Hands off success rate		97.06%	90.66%	100.00%	98.38%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	99.39%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	

### Signal Strength

February				
% Ec/Io BINS with less than -15	Reliance CDMA		TATA CDMA	
	In door	Outdoor	In door	Outdoor
	0.00%	1.72%	100.00%	46.98%

### VOICE QUALITY

For the month February as well, it can be seen that the voice quality for operators was better for indoor location as compared to the outdoor locations

For the indoor locations, operator Idea continues to provide more than 99% voice quality with Airtel being the only other operator. TATA CDMA was the only operator which did not meet the TRAI benchmark with a voice quality of 36.32%, which was less than 1/4<sup>th</sup> of the benchmark. For the outdoor locations as well TATA CDMA did not meet the TRAI benchmark with a quality of 33.33%. Other operators that did not perform up to the mark for outdoor locations were Aircel, BSNL and Vodafone

### CALL SET SUCCESS RATE (CSSR)

For the indoor locations, the operator TATA CDMA did not meet the benchmark with only one-third calls being successfully set up, followed by Vodafone with a CSSR of 94.83%(just below the benchmark of 95%). All the other operators had a CSSR of 98% and above.

For the outdoor locations, the average CSSR was a little over 93% which was below the TRAI benchmark. Idea again performed well with 100% CSSR, whereas operators such as TATA CDMA, TATA GSM and Aircel did not meet the benchmark with a CSSR of 62.23%, 88.67% and 93.35% respectively.

### CALL DROP RATE

For the indoor locations, all the operators had a call drop rate of 0%. For the outdoor locations, Idea and Vodafone were the only operators with zero percent calls dropped. Operators TATA CDMA, Aircel and BSNL failed to meet the TRAI benchmark with high call drop rates at 6.47%, 4.38% and 2.23% respectively.

### Route Details – March – Bhubaneswar SSA

March				
Bhubaneswar				
	Type of location	Day 1	Day 2	Day 3
Outdoor	Major Roads		Jayadev Vihar-Rasulgarh-Kalpana Square-Balakari-Dhauri Square-Pipili Bypass-Sakhigopal-Chandanpur-Gop-Batamangala-Talabania-GHITM College Square-Balighai Square-Konark-Pipili	
	Highways			Jayadev Vihar-Baramunda-Khurda-Nachuni-Balugaon-Chilika
	With in the City	New Puri By-Pass-Samantraypur-Old Town-Kalpana-Airport-Ganganagar-Power House-Jayadev Vihar-Nalco Square-Chandrasekharpur-Patia-VSS Nagar-Acharya Vihar-Vani Vihar		
Indoor	Office complex	Pal Heights, Jayadev Vihar	New Market Complex, Sakhogopal	New Market Complex
	Shopping complex	IDCO Towers, Rupali	BSNL Telephone Exchange, Konark	BSNL Telephone Exchange, Banapur

### Drive Test Result – March – Bhubaneswar SSA

Name of SSA	Bhubaneswar	Month	March	Consolidated															
	B'mark	Aircel(DWL)		Airtel		BSNL		Idea		Reliance CDMA		Reliance GSM		TATA CDMA		TATA GSM		Vodafone	
		In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor
Signal Strength - 0 to -75 dBm		89.34%	73.85%	100.00%	87.94%	97.07%	85.07%	77.50%	83.91%	NA		30.11%	60.95%	NA		76.16%	70.51%	88.70%	92.56%
Signal Strength -75 to -85 dBm		7.10%	14.79%	0.00%	10.86%	2.93%	10.00%	22.47%	15.89%	NA		60.82%	29.16%	NA		23.23%	20.85%	11.30%	5.72%
Signal Strength -85 to -120 dBm		3.56%	11.35%	0.00%	1.20%	0.00%	4.94%	0.03%	0.20%	NA		9.07%	9.88%	NA		0.61%	8.64%	0.00%	1.72%
Voice quality	≥ 95%	99.31%	93.07%	99.28%	97.08%	99.09%	84.26%	96.54%	95.60%	97.21%	92.08%	96.97%	93.26%	99.78%	95.15%	98.65%	94.32%	99.49%	95.80%
CSR	≥ 95%	100.00%	100.00%	100.00%	100.00%	100.00%	97.69%	100.00%	100.00%	100.00%	100.00%	98.61%	100.00%	100.00%	98.93%	99.28%	97.41%	100.00%	98.79%
%age Blocked calls		0.00%	0.00%	0.00%	0.00%	0.00%	2.30%	0.00%	0.00%	0.00%	0.00%	1.39%	0.00%	0.00%	1.07%	0.73%	2.59%	0.00%	1.21%
Call drop rate	≤ 2%	0.00%	0.76%	0.00%	0.00%	0.00%	1.98%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	2.00%	0.00%	1.89%	0.00%	0.26%
Hands off success rate		NA	99.11%	100.00%	98.66%	100.00%	97.96%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	99.88%

### SIGNAL STRENGTH

March				
% Ec/Io BINS with less than -15	Reliance CDMA		TATA CDMA	
	In door	Outdoor	In door	Outdoor
	99.96%	99.16%	99.86%	98.71%

## VOICE QUALITY

From the drive test conducted, it can be seen that while all operators meet the voice quality benchmark for indoors, the same was not true for outdoor locations.

For the indoor locations, a majority of the operators had a voice quality of greater than 99% with only exceptions being Idea, Reliance and TATA CDMA. For the outdoor locations, the operators BSNL had the weakest voice quality at 84.26%. Other operators that did not meet the benchmark were Reliance CDMA, Aircel, Reliance GSM and TATA GSM at 92.08%, 93.07%, 93.26% and 94.32% respectively.

## CALL SET SUCCESS RATE (CSSR)

It was seen that the overall CSSR in the indoor locations was much better than the outdoor locations, with a majority of operators having 100% CSSR. The only exceptions were Reliance GSM at 98.61% and Vodafone at 99.28%, which met the TRAI benchmark.

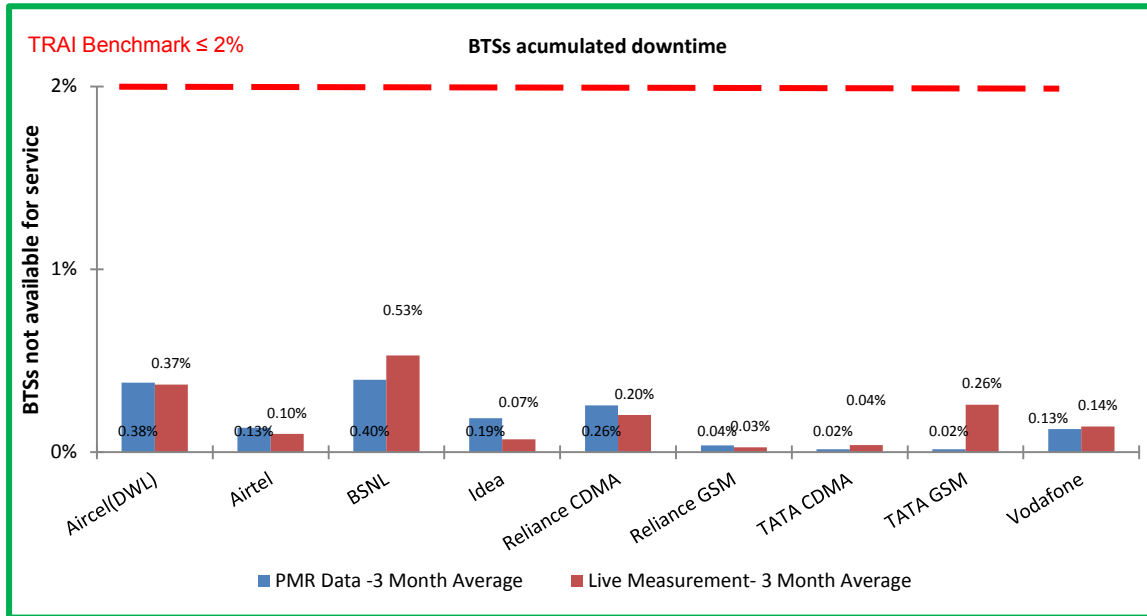
For the outdoor locations as well many operators had a 100% CSSR with exceptions being BSNL, TATA CDMA, TATA GSM and Vodafone with CSSR at 97.69%, 98.93%, 97.41% and 98.79% respectively.

## CALL DROP RATE

TRAI has specified the call drop rate to be less than 2% for all operators at all locations. It was seen that for the indoor locations, all the operators had a call drop rate of 0%. For the outdoor locations, TATA CDMA has a call drop rate which is beyond the TRAI benchmark while BSNL had a call drop rate of 1.98%, which is just below the benchmark.

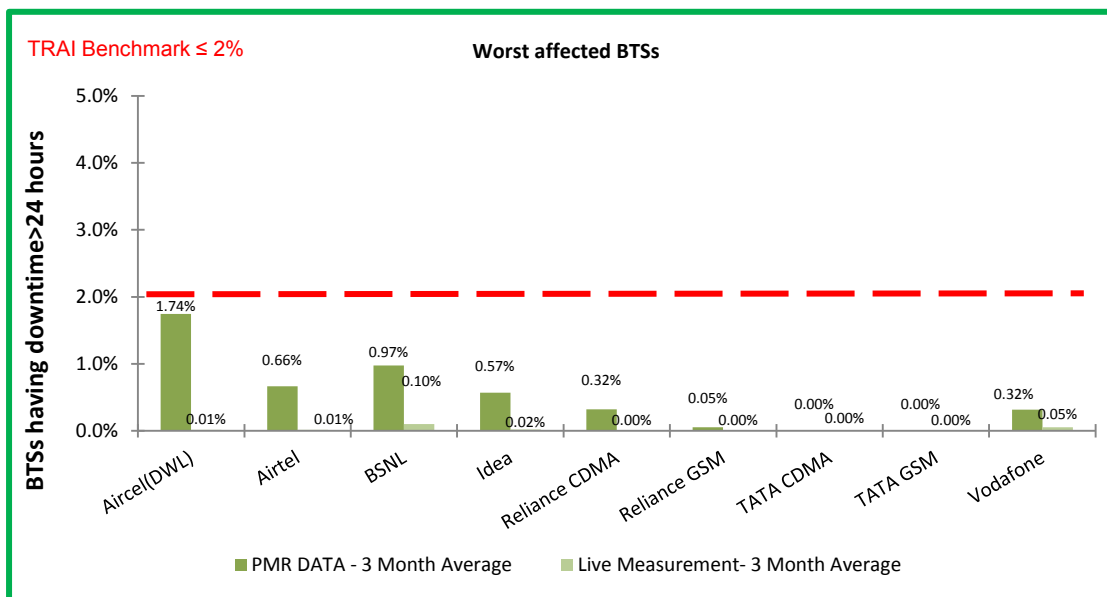
## 5 DETAILED FINDINGS - COMPARISON BETWEEN PMR DATA, 3 DAY LVE DATA AND LIVE CALLING DATA

### 5.1 BTS ACCUMULATED DOWNTIME



All the operators met the TRAI benchmark of having BTS downtime less than 2%. The result of the PMR data and live measurement were almost similar except for TATA GSM where the live measurement showed a higher BTS downtime.

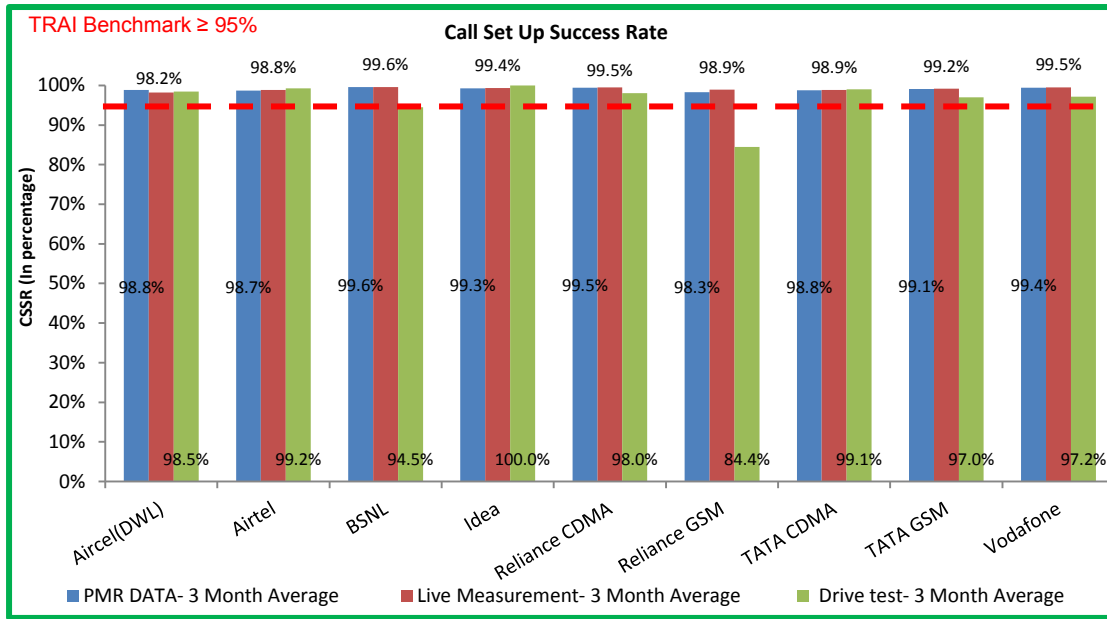
### 5.2 WORST AFFECTED BTS DUE TO DOWNTIME



All the operators meet the benchmark for the worst affected BTS due to downtime. The PMR data shows a higher value for the worst affected BTS as compared to the live measurement data and there is a significant difference between PMR and Live measurement data for Aircel and BSNL.

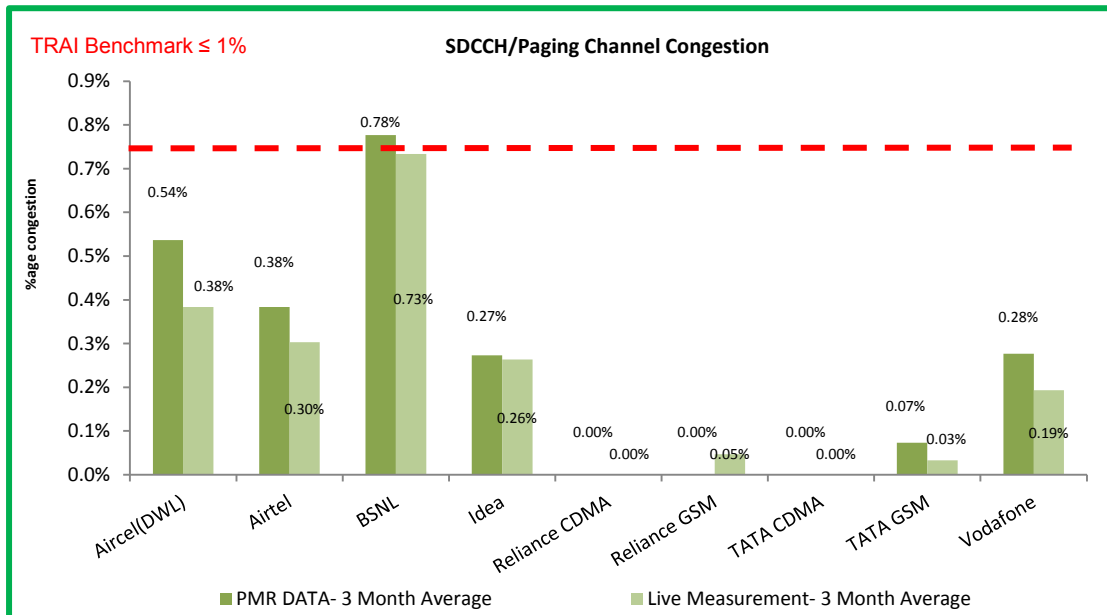


### 5.3 CALL SET UP SUCCESS RATE



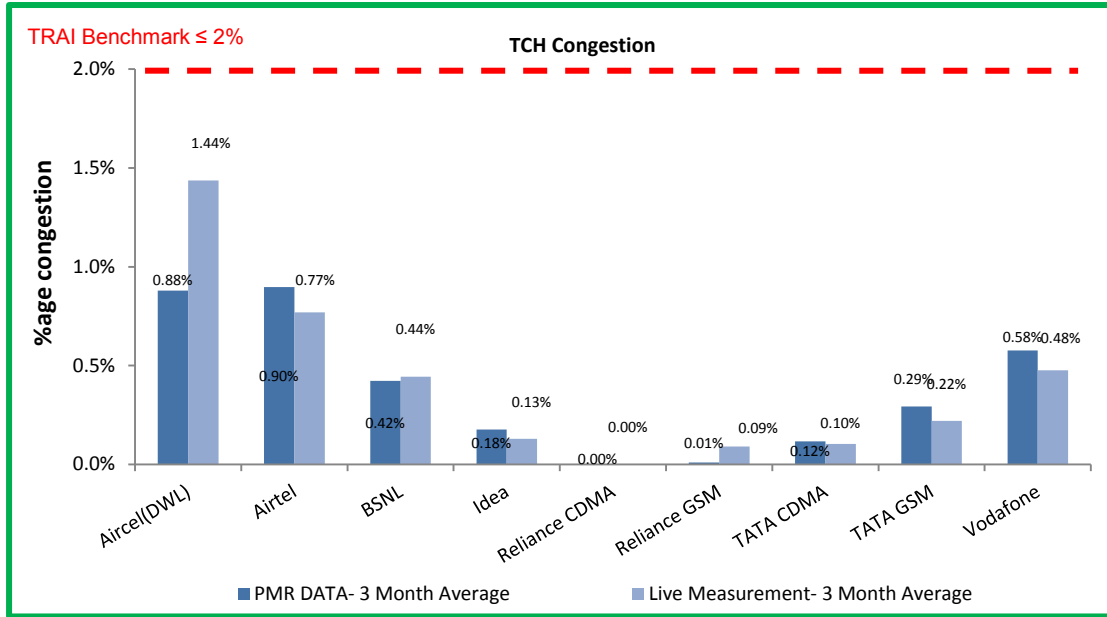
All the operators are meeting the benchmark across Monthly PMR, Live measurement and Drive Test. There is no significant difference for CSSR found except for Reliance GSM which had a lower CSSR for the drive test

### 5.4 SDCCH/PAGING CHANNEL CONGESTION



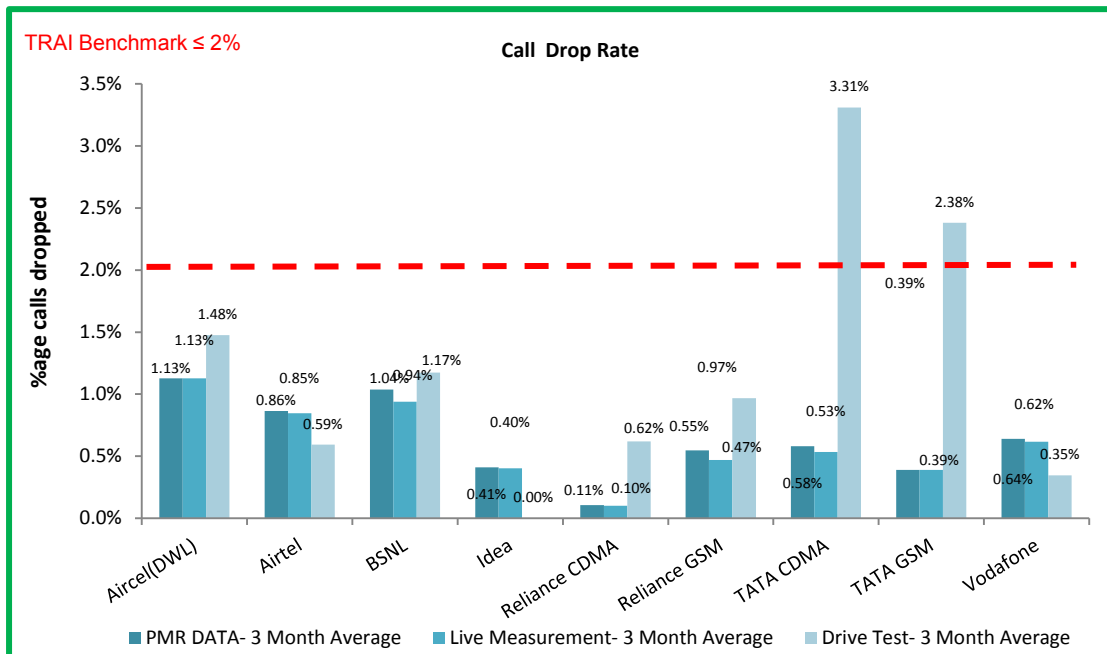
All the operators meet the benchmark, with almost similar results for the PMR data and the live measurement. Exceptions were seen for the operator Aircel, Airtel, TATA GSM and Vodafone with PMR Data.

## 5.5 TCH CONGESTION



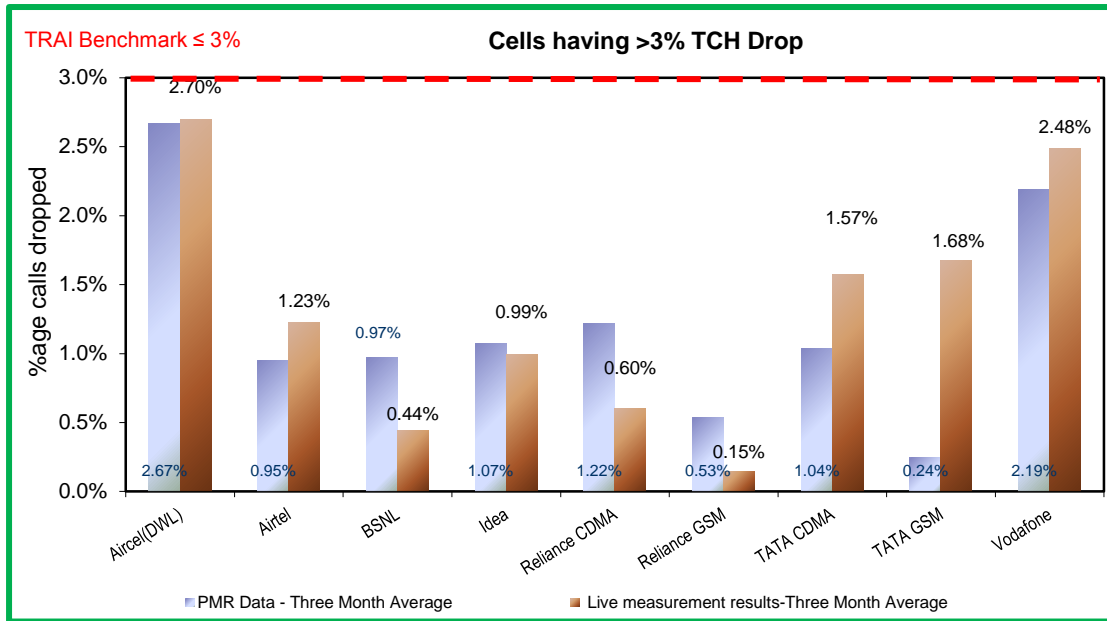
Though all the operators met the benchmark, there was significant difference between the PMR Data and Live measurement. Only Aircel & Reliance GSM showed a higher TCH congestion in live measurement at 1.6 times and 9 times respectively, while for the other operators the TCH congestion in the PMR data was higher

## 5.6 CALL DROP RATE



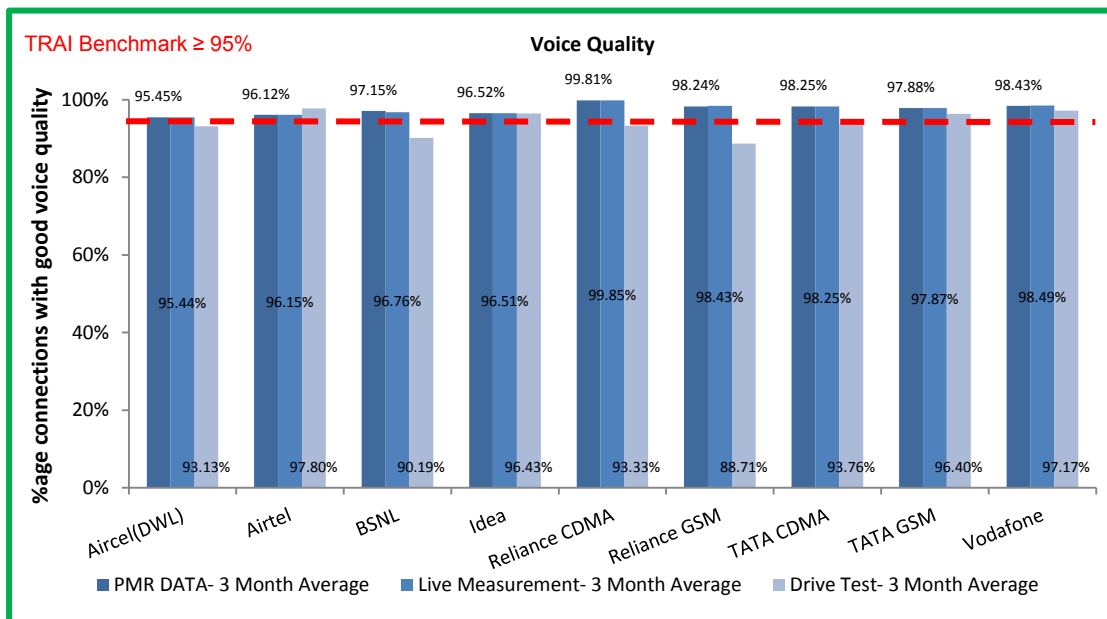
The different methods showed comparable results for the call drop rate TATA (GSM and CDMA) was another operator where the drive test showed a higher call drop rate.

## 5.7 CELLS HAVING GREATER THAN 3% TCH DROP



All the operators have met the benchmark for cells having more than 3% TCH drop. There is a considerable difference in Three month and Live data for all the operators, especially for Reliance CDMA, Reliance GSM, TATA CDMA and TATA GSM.

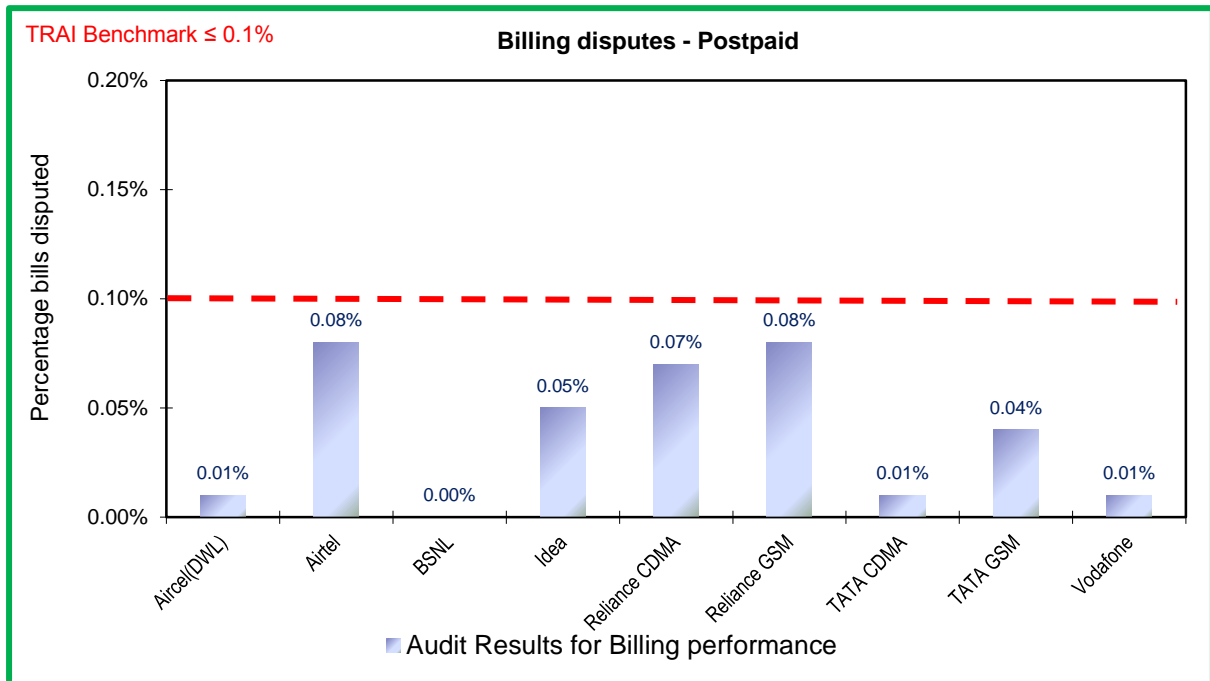
## 5.8 VOICE QUALITY



All the three methods showed comparable results for voice quality. Only the operators Aircel, BSNL, Reliance CDMA and Reliance GSM did not meet the benchmark in the drive test with voice quality less than 95%.

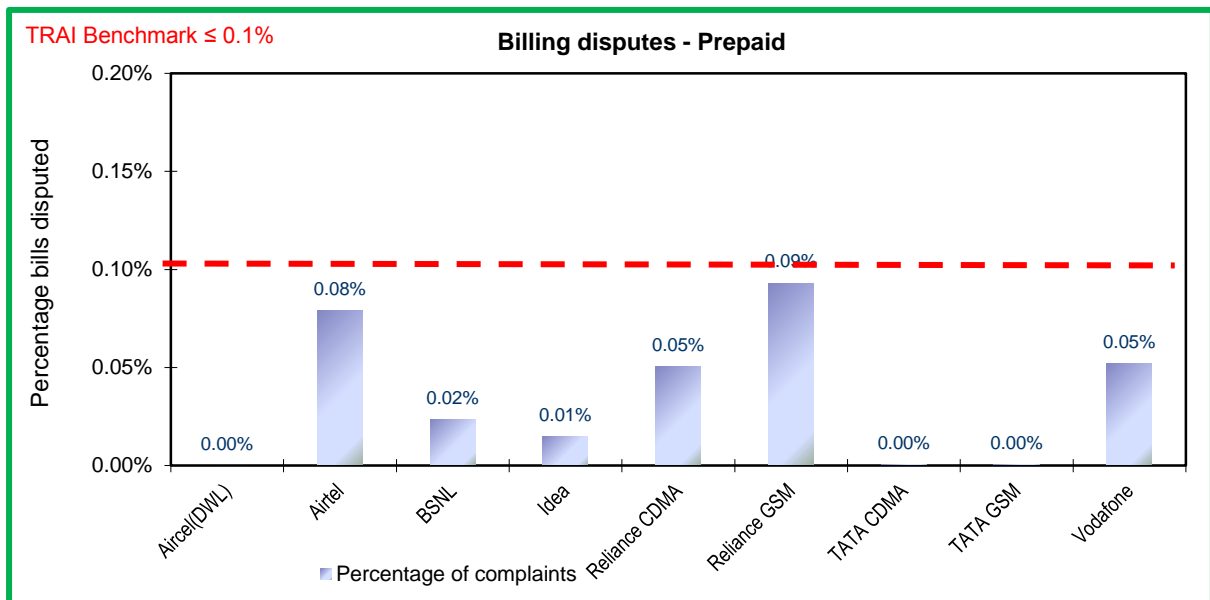
## 6 DETAILED FINDINGS – NON NETWORK PARAMETERS

### 6.1 BILLING DISPUTES-POSTPAID



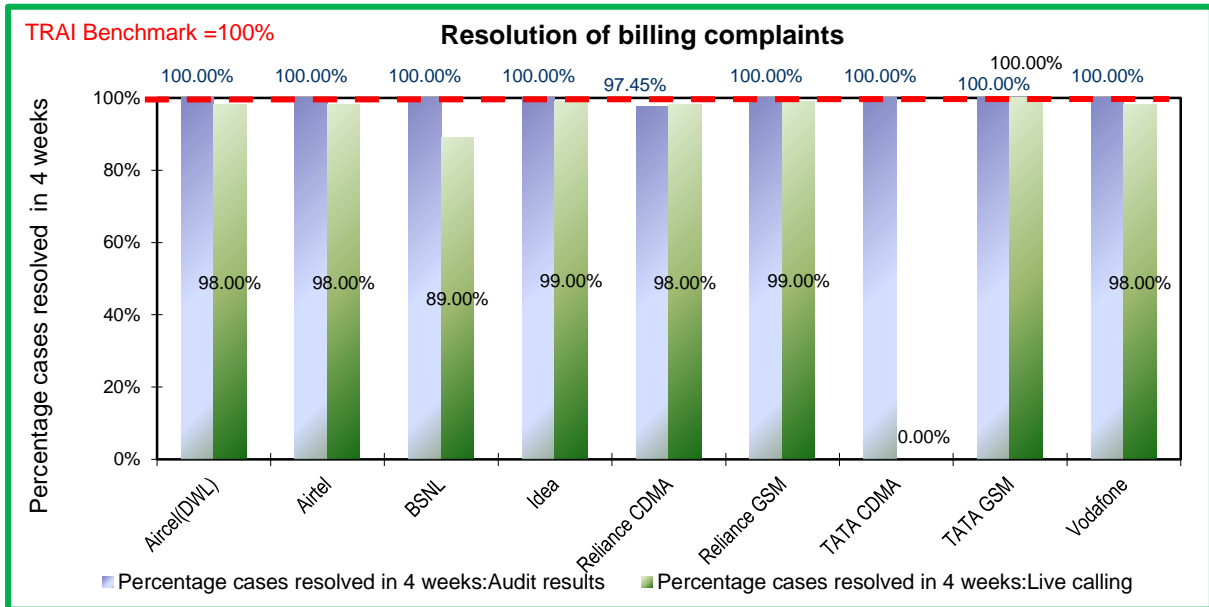
All the operators met the TRAI benchmark for percentage billing disputes for postpaid. Operators Airtel and Reliance GSM require special attention with 0.8% disputes each, which is near the benchmark.

### 6.2 BILLING DISPUTES-PREPAID



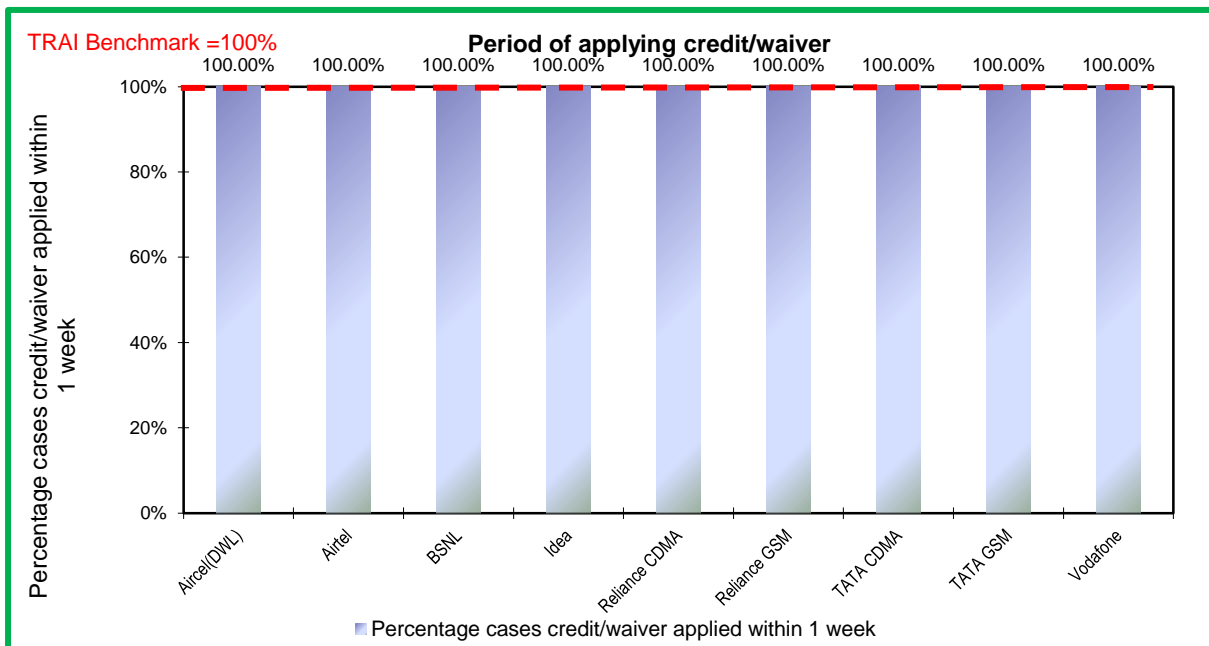
All the operators met the TRAI benchmark for percentage billing disputes for prepaid. Operators Reliance GSM and Airtel and require special attention with percentage disputes at 0.9% and 0.8% respectively.

### 6.3 RESOLUTION OF BILLING COMPLAINTS



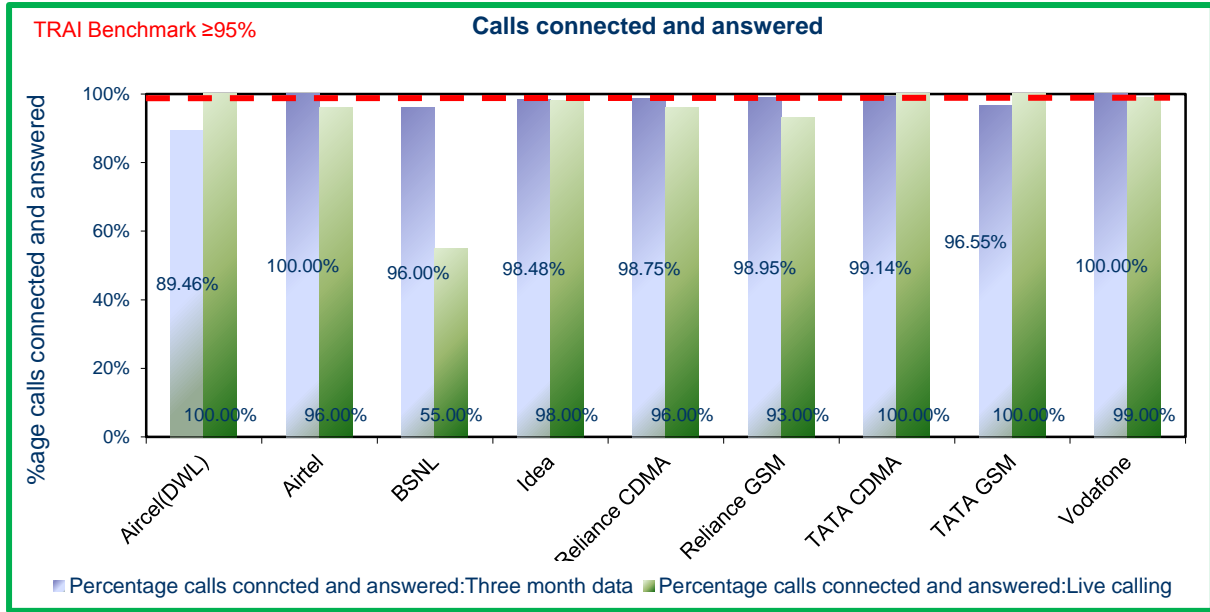
The audit results showed that all the operators met the TRAI benchmark for 100% resolution of complaints within four weeks. However, the live calling showed a performed less than the benchmark set by TRAI, with 0% resolution for TATA CDMA.

### 6.4 PERIOD OF APPLYING CREDIT/WAIVER



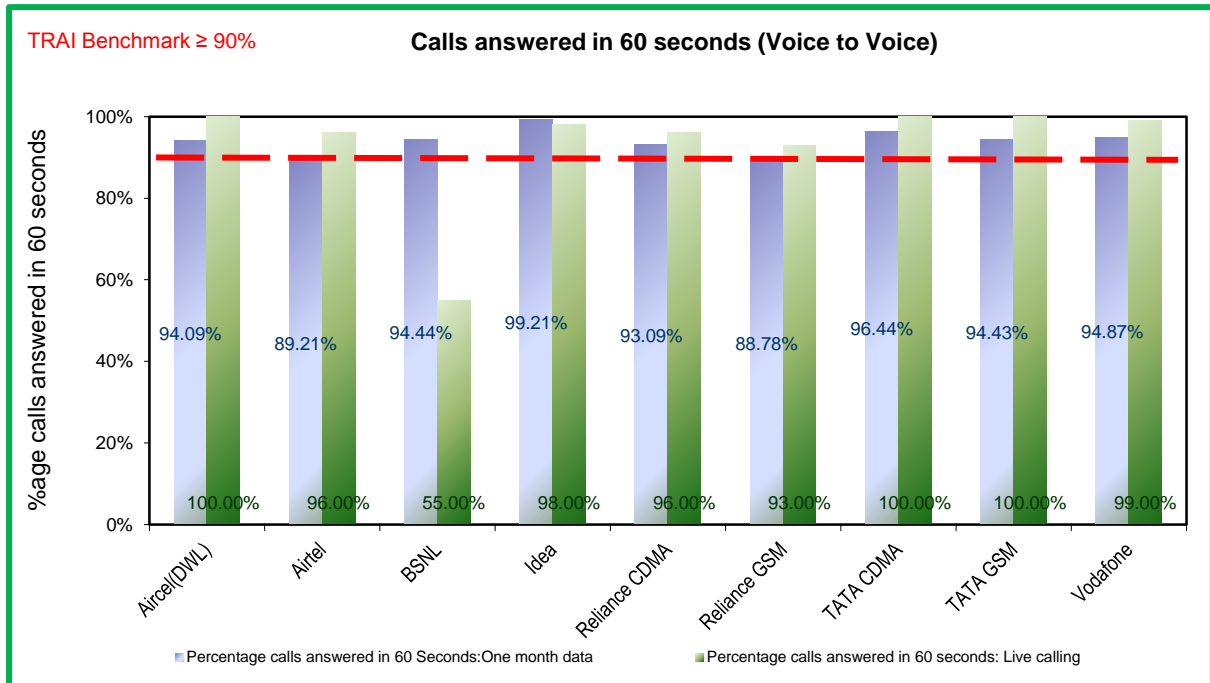
All the operators meet the benchmark.

## 6.5 ALL CENTRE PERFORMANCE-IVR



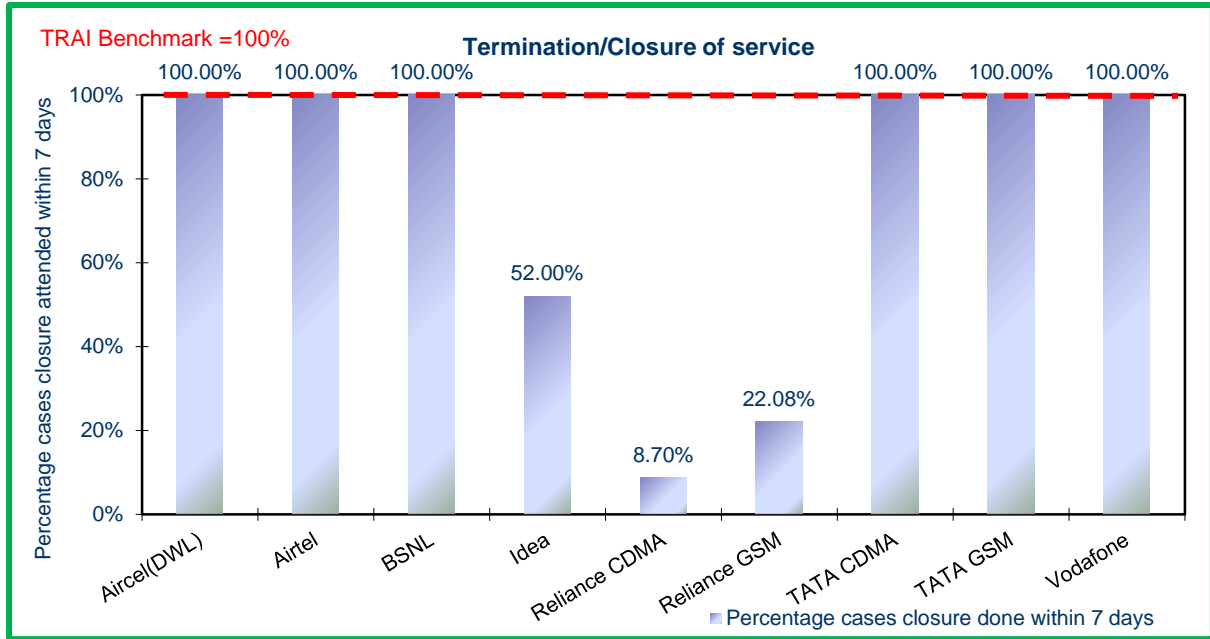
The audit result showed that the operator Aircel does not meet the benchmark, while Vodafone and Airtel have 100% performance. The live measurements show Reliance GSM and BSNL do not meet the benchmark. BSNL had a maximum difference between the PMR results and live measurement results with the latter a little more than half the former.

## 6.6 CALL CENTRE PERFORMANCE-VOICE TO VOICE



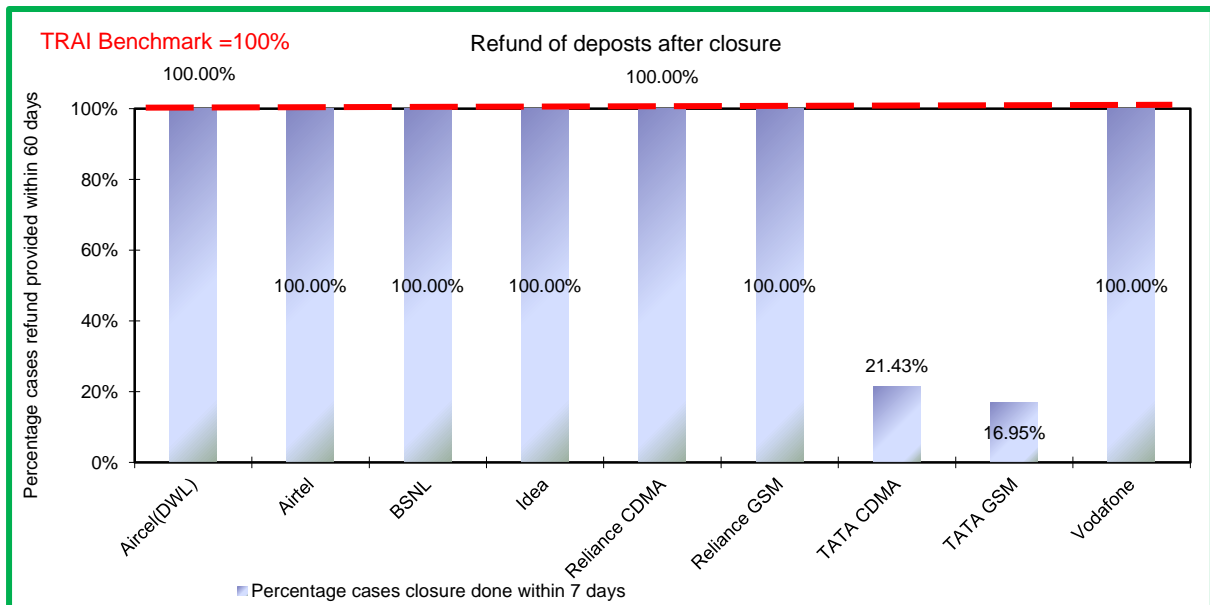
All the operators showed a similar performance in the audit results and live measurement, with the exception of BSNL. The BSNL live measurements showed only 55% of the calls being connected and answered, which was much below the 90% benchmark.

## 6.7 TERMINATION/CLOSURE OF SERVICE



The operators Idea, Reliance CDMA and Reliance GSM did not meet the benchmark, with closure rate of 52%, 8.7% and 22.08% respectively.

## 6.8 REFUND OF DEPOSITS AFTER CLOSURE



TATA was the operator which did not meet the benchmark for refund of deposits within 60 days post closure of service. TATA CDMA showed a percentage of 21.43% and TATA GSM 16.95%, which was significantly short from the benchmark.

## 7 ANNEXURE

### 7.1 NETWORK AVAILABILITY

Audit Results for Network Availability										
	Benchmark	Aircel(DWL)	Airtel	BSNL	Idea	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Vodafone
Number of BTSs in the licensed service area		2562.00	4526.67	1989.00	1774.33	738.33	2167.67	344.00	1498.00	3480.00
Sum of downtime of BTSs in a month (in hours)		7203.71	4434.22	5866.00	2482.91	1412.49	587.09	44.54	221.33	3340.76
BTSS accumulated downtime (not available for service)	≤ 2%	0.38%	0.13%	0.40%	0.19%	0.26%	0.04%	0.02%	0.02%	0.13%
Number of BTSs having accumulated downtime >24 hours		44.67	30.00	19.33	10.00	2.33	1.00	0.00	0.00	11.00
Worst affected BTSs due to downtime	≤ 2%	1.74%	0.66%	0.97%	0.57%	0.32%	0.05%	0.00%	0.00%	0.32%
Live Measurement- BTSs accumulated downtime										
	Benchmark	Aircel(DWL)	Airtel	BSNL	Idea	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Vodafone
Number of BTSs in the licensed service area		2562.00	4525.00	1989.00	1733.00	738.33	2167.67	344.00	1064.67	3476.00
Sum of downtime of BTSs in a month (in hours)		688.27	426.80	759.00	88.24	107.54	44.80	10.21	76.41	354.50
(not available for service)	≤ 2%	0.37%	0.10%	0.53%	0.07%	0.20%	0.03%	0.04%	0.26%	0.14%
Number of BTSs having accumulated downtime >24 hours		0.33	0.67	2.00	0.33	0.00	0.00	0.00	0.00	1.67
Live Measurement - Worst affected BTSs due to downtime	≤ 2%	0.01%	0.01%	0.10%	0.02%	0.00%	0.00%	0.00%	0.00%	0.05%



## 7.2 CONNECTION ESTABLISHMENT (ACCESSIBILITY)

Audit Results for CSSR, SDCCH and TCH congestion										
CSSR	Benchmark	Aircel(DWL)	Airtel	BSNL	Idea	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Vodafone
CSSR	≥ 95%	98.84%	98.72%	99.58%	99.29%	99.46%	98.32%	98.75%	99.10%	99.42%
SDCCH congestion	Benchmark	Aircel(DWL)	Airtel	BSNL	Idea	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Vodafone
SDCCH/Paging channel congestion	≤ 1%	0.54%	0.38%	0.78%	0.27%	NA	0.00%	NA	0.07%	0.28%
TCH congestion	Benchmark	Aircel(DWL)	Airtel	BSNL	Idea	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Vodafone
TCH congestion	≤ 2%	0.88%	0.90%	0.42%	0.18%	0.00%	0.01%	0.12%	0.29%	0.58%
Live measurement results for CSSR, SDCCH and TCH congestion										
CSSR	Benchmark	Aircel(DWL)	Airtel	BSNL	Idea	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Vodafone
CSSR	≥ 95%	98.23%	98.82%	99.56%	99.36%	99.51%	98.91%	98.85%	99.15%	99.52%
SDCCH congestion	Benchmark	Aircel(DWL)	Airtel	BSNL	Idea	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Vodafone
SDCCH/Paging channel congestion	≤ 1%	0.38%	0.30%	0.73%	0.26%	NA	0.05%	NA	0.03%	0.19%
TCH congestion	Benchmark	Aircel(DWL)	Airtel	BSNL	Idea	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Vodafone
TCH congestion	≤ 2%	1.44%	0.77%	0.44%	0.13%	0.00%	0.09%	0.10%	0.22%	0.48%

Drive test results for CSSR (Average of three drive tests) and blocked calls										
CSSR	Benchmark	Aircel(DWL)	Airtel	BSNL	Idea	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Vodafone
Total number of call attempts		508.67	547.67	489.67	465.33	458.33	528.67	262.67	477.33	551.33
Total number of successful calls established		501.67	543.33	460.33	465.33	450.67	454.33	259.67	463.00	534.67
CSSR	≥ 95%	98.47%	99.25%	94.47%	100.00%	98.05%	84.43%	99.06%	96.98%	97.17%
Blocked calls	Benchmark	Aircel(DWL)	Airtel	BSNL	Idea	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Vodafone
%age blocked calls		1.53%	0.75%	5.53%	0.00%	1.95%	15.57%	0.94%	3.02%	2.83%

### 7.3 CONNECTION MAINTENANCE (RETAINABILITY)

Audit Results for Call drop rate and for number of cells having more than 3% TCH										
Call drop rate	Benchmark	Aircel(DWL)	Airtel	BSNL	Idea	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Vodafone
Total number of calls established		94519384.67	338719349.67	201277114.00	34641346.00	7517983.00	67693725.67	8822732.00	48810721.67	111432823.67
Total number of calls dropped		1066329.33	2925903.33	2097060.33	142829.33	8212.67	370979.67	51485.00	189649.00	712610.33
Call drop rate	≤ 2%	1.13%	0.86%	1.04%	0.41%	0.11%	0.55%	0.58%	0.39%	0.64%
Cells having more than 3% TCH	Benchmark	Aircel(DWL)	Airtel	BSNL	Idea	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Vodafone
Total number of cells in the network		5094.00	9553.33	555.67	3596.33	1479.33	4335.33	710.33	3015.33	6993.00
Total number of cells having more than 3% TCH		2624.00	4830.00	337.33	1792.00	761.67	23.01	360.67	1512.67	3610.33
Worst affected cells having more than 3% TCH	≤ 3%	2.67%	0.95%	0.97%	1.07%	1.22%	0.53%	1.04%	0.24%	2.19%

Live measurement results for Call drop rate and for number of cells having more than 3% TCH										
Call drop rate	Benchmark	Aircel(DWL)	Airtel	BSNL	Idea	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Vodafone
Total number of calls established		9495436.33	34237510.00	20222133.00	3606925.33	10579320.33	85165863.00	959238.33	4904947.67	11197504.67
Total number of calls dropped		107154.00	288966.00	191859.00	14507.33	10528.33	402961.67	5110.00	19169.00	68747.67
Call drop rate	≤ 2%	1.13%	0.85%	0.94%	0.40%	0.10%	0.47%	0.53%	0.39%	0.62%
Cells having more than 3% TCH	Benchmark	Aircel(DWL)	Airtel	BSNL	Idea	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Vodafone
Total number of cells in the network		5068.33	9558.67	543.67	3457.00	1477.67	4336.00	712.33	3031.33	6977.67
Total number of cells having more than 3% TCH		2625.67	4857.67	334.33	1790.33	749.67	2176.33	364.33	1560.33	3644.33
Worst affected cells having more than 3% TCH	≤ 3%	2.70%	1.23%	0.44%	0.99%	0.60%	0.15%	1.57%	1.68%	2.48%
Drive test results for Call drop rate (Average of three drive tests)										
Call drop rate	Benchmark	Aircel(DWL)	Airtel	BSNL	Idea	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Vodafone
Total number of calls established		501.67	547.33	460.33	465.33	555.67	515.33	259.67	461.00	535.00
Total number of calls dropped		7.00	3.33	5.33	0.00	3.67	5.67	7.00	11.33	2.00
Call drop rate	≤ 2%	1.48%	0.59%	1.17%	0.00%	0.62%	0.97%	3.31%	2.38%	0.35%

## 7.4 VOICE QUALITY

Audit Results for Voice quality										
Voice quality	Benchmark	Aircel(DWL)	Airtel	BSNL	Idea	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Vodafone
Total number of sample calls		11585002043.00	48499513639.67	309519.67	4156360282.33	NA	2171244808.50	12395065468.00	9166879500.67	20142318225.67
Total number of calls with good voice quality		11057529509.00	46614730800.33	296356.33	4011551069.33	NA	2133276512.00	12178486725.67	8972696691.67	19824978987.00
%age calls with good voice quality	≥ 95%	95.45%	96.12%	97.15%	96.52%	99.81%	98.24%	98.25%	97.88%	98.43%
Live measurement results for Voice quality										
Voice quality	Benchmark	Aircel(DWL)	Airtel	BSNL	Idea	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Vodafone
Total number of sample calls		1211438185.33	4818786275.00	59769.33	432857314.00	NA	2894195212.00	1299482283.00	943254192.00	2051269305.00
Total number of calls with good voice quality		1156252335.67	4633104593.67	57801.00	417723486.33	NA	2848613815.00	1276748769.33	923099932.00	2020212749.67
%age calls with good voice quality	≥ 95%	95.44%	96.15%	96.76%	96.51%	99.85%	98.43%	98.25%	97.87%	98.49%
Drive test results for Voice quality (Average of three drive tests)										
Voice quality	Benchmark	Aircel(DWL)	Airtel	BSNL	Idea	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Vodafone
Total number of sample calls		619905.00	557001.67	841840.00	507053.33	24242.33	59839.67	59087.67	818389.67	982019.67
Total number of calls with good voice quality		579227.33	543542.00	761847.00	488391.67	22909.33	53654.33	56083.33	789634.67	954949.67
%age calls with good voice quality	≥ 95%	93.13%	97.80%	90.19%	96.43%	93.33%	88.71%	93.76%	96.40%	97.17%

Note: - Reliance CDMA is not sharing the Numerator and denominator values for any of the month hence it is Not Applicable. As per the operator it is not feasible to generate the values.

## 7.5 POI CONGESTION

Audit Results for POI Congestion										
POI congestion	Benchmark	Aircel(DWL)	Airtel	BSNL	Idea	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Vodafone
Total number of working POIs		97.33	22.00	13.00	59.00	8.00	8.00	44.00	11.00	46.00
No. of POIs not meeting benchmark		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total Capacity of all POIs (A) - in erlangs		1851986.92	109023.67	25000.00	968385.13	10738.40	27575.67	419399.12	332081.58	2734358.97
Traffic served for all POIs (B)- in erlangs		1268846.37	63862.00	24513.11	608122.94	5862.23	19215.99	198452.77	157311.08	1318452.66
POI congestion	≤ 0.5%	0.00%	0.00%	0.04%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%

Live Measurement Results for POI Congestion										
POI congestion	Benchmark	Aircel(DWL)	Airtel	BSNL	Idea	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Vodafone
Total number of working POIs		97.33	22.00	13.00	59.00	8.00	8.00	44.00	11.00	46.00
No. of POIs not meeting benchmark		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total Capacity of all POIs (A) - in erlangs		4480184.51	103572.56	25000.00	77351.49	10966.46	27575.68	13851.85	33204.09	270629.37
Traffic served for all POIs (B)- in erlangs		1383562.43	60259.55	23645.90	50382.35	3887.21	19212.12	6866.64	16105.11	134668.10
POI congestion	≤ 0.5%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%

## 7.6 METERING AND BILLING CREDIBILITY

Audit Results for Billing performance										
Billing Performance	Benchmark	Aircel(DWL)	Airtel	BSNL	Idea	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Vodafone
Billing disputes - Postpaid										
Total bills generated during the period		19155.00	64239.00	178197.00	20514.00	54765.00	80455.00	61712.00	32780.00	100205.00
Total number of bills disputed		1.00	49.00	2.00	11.00	40.00	62.00	7.00	14.00	14.00
Percentage bills disputed	≤ 0.1%	0.01%	0.08%	0.00%	0.05%	0.07%	0.08%	0.01%	0.04%	0.01%
Billing disputes - Prepaid										
Number of complaints related to charging, credit & validity		2.00	12002.00	2244.00	503.00	548.00	10670.00	2.00	45.00	5223.00
Total number of prepaid customers in that period		3631853.00	15169900.00	9566229.00	3378926.00	1087055.00	11474755.00	641973.00	6774123.00	10038444.00
Percentage of complaints	≤ 0.1%	0.00%	0.08%	0.02%	0.01%	0.05%	0.09%	0.00%	0.00%	0.05%
Resolution of billing complaints										
Total number of billing/charging complaints		3.00	12051.00	2246.00	514.00	588.00	10732.00	9.00	59.00	5237.00
Total complaints considered invalid		860.00	11752.00	1894.00	1487.00	143.00	372.00	9.00	57.00	7.00
Number of complaints resolved in 4 weeks from date of receipt for complaints listed in 5.3.1		3.00	12051.00	2246.00	514.00	573.00	10732.00	9.00	59.00	5237.00
Percentage complaints resolved within 4 weeks of date of receipt	100.00%	100.00%	100.00%	100.00%	100.00%	97.45%	100.00%	100.00%	100.00%	100.00%
Period of applying credit / waiver										
Percentage cases in which credit/waiver was received within 1 week	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%

Note: - No billing complaints registered for TATA CDMA hence it is Not Applicable.

Live calling results for resolution of billing complaints										
Resolution of billing complaints	Benchmark	Aircel(DWL)	Airtel	BSNL	Idea	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Vodafone
Total Number of calls made		100.00	100.00	100.00	100.00	100.00	100.00	NA	17.00	100.00
Number of cases resolved in 4 weeks		98.00	98.00	89.00	99.00	98.00	99.00	NA	17.00	98.00
Percentage cases resolved in four weeks	100.00%	98.00%	98.00%	89.00%	99.00%	98.00%	99.00%	NA	100.00%	98.00%

## 7.7 CUSTOMER CARE

Audit results for customer care (IVR and voice-to-Voice)										
Customer Care Assessment	Benchmark	Aircel(DWL)	Airtel	BSNL	Idea	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Vodafone
Total number of call attempts to customer care for assistance		12037748.00	31026556.00	2606318.00	262604.00	295954.00	5379273.00	362254.00	5232867.00	5868119.00
Number of calls getting connected and answered (electronically)		10769388.00	31026556.00	2502177.00	258623.00	292266.00	5322600.00	359137.00	5052469.00	5867887.00
Percentage calls getting connected and answered	≥ 95%	89.46%	100.00%	96.00%	98.48%	98.75%	98.95%	99.14%	96.55%	100.00%
Number of calls getting transferred to the operator (voice to voice)		2761192.00	4872026.00	1432214.00	1047879.00	51695.00	1411720.00	47063.00	1209030.00	2299751.00
Number of calls answered by operator (voice to voice) within 60 seconds		2598092.00	4346266.00	1352622.00	1039625.00	48122.00	1253340.00	45387.00	1141741.00	2181840.00
Percentage calls answered within 60 seconds (V2V)	≥ 90%	94.09%	89.21%	94.44%	99.21%	93.09%	88.78%	96.44%	94.43%	94.87%



Live calling results for customer care (IVR)										
Customer Care Assessment	Benchmark	Aircel(DWL)	Airtel	BSNL	Idea	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Vodafone
Total number of call attempts to customer care for assistance		100.00	100.00	100.00	100.00	100.00	100.00	50.00	50.00	100.00
Number of calls getting connected and answered (electronically)		100.00	100.00	100.00	100.00	100.00	100.00	50.00	50.00	100.00
Percentage calls getting connected and answered	≥ 95%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
Live calling results for customer care (Voice to Voice)										
Customer Care Assessment	Benchmark	Aircel(DWL)	Airtel	BSNL	Idea	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Vodafone
Total Number of calls received		100.00	100.00	100.00	100.00	100.00	100.00	50.00	50.00	100.00
Total Number of calls getting connected and answered		100.00	96.00	55.00	98.00	96.00	93.00	50.00	50.00	99.00
Percentage calls getting connected and answered	≥ 95%	100.00%	96.00%	55.00%	98.00%	96.00%	93.00%	100.00%	100.00%	99.00%

## 7.8 DRIVE TEST

### 7.8.1 JANUARY-BOLANGIR

Name of SSA	Bolangir	Month	January	Day	One															
	B'mark	Aircel(DWL)		Airtel		BSNL		Idea		Reliance CDMA		Reliance GSM		TATA CDMA		TATA GSM		Vodafone		
		In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor	
Signal Strength --0 to -75 dBm		98.45%	94.00%	94.51%	72.38%	96.22%	83.21%	96.20%	85.37%	NA		24.39%	53.13%	NA		87.08%	67.41%	91.21%	52.14%	
Signal Strength --75 to -85 dBm		1.44%	5.40%	5.29%	24.52%	3.40%	12.69%	3.80%	11.99%	NA		46.38%	38.02%	NA		12.58%	21.73%	8.79%	18.57%	
Signal Strength --85 to -120 dBm		0.11%	0.60%	0.20%	3.33%	0.39%	4.09%	0.00%	2.64%	NA		29.23%	8.85%	NA		0.35%	10.87%	0.00%	29.29%	
Voice quality	≥ 95%	96.50%	96.10%	98.91%	99.96%	97.36%	95.27%	98.33%	96.60%	95.13%	80.89%	95.38%	89.87%	99.99%	98.21%	99.89%	93.87%	98.50%	98.00%	
CSR	> 95%	100.00%	99.37%	100.00%	100.00%	96.77%	95.30%	100.00%	100.00%	100.00%	89.34%	100.00%	91.84%	100.00%	96.74%	100.00%	98.47%	98.00%	97.00%	
%age Blocked calls		0.00%	0.62%	0.00%	0.00%	3.24%	4.70%	0.00%	0.00%	0.00%	10.76%	0.00%	8.16%	0.00%	3.26%	0.00%	1.53%	2.00%	3.00%	
Call drop rate	≤ 2%	0.00%	1.89%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	1.77%	0.00%	3.37%	0.00%	0.00%	2.00%	0.60%	
Hands off success rate		100.00%	100.00%	100.00%	99.61%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	98.85%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	

Name of SSA	Bolangir	Month	January	Day	Two															
	B'mark	Aircel(DWL)		Airtel		BSNL		Idea		Reliance CDMA		Reliance GSM		TATA CDMA		TATA GSM		Vodafone		
		In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor	
Signal Strength --0 to -75 dBm		92.50%	93.70%	97.39%	66.67%	87.03%	48.71%	92.40%	76.90%	NA		36.03%	28.51%	NA		82.13%	70.60%	89.58%	82.95%	
Signal Strength --75 to -85 dBm		7.19%	5.52%	2.54%	22.17%	12.67%	29.84%	7.55%	14.45%	NA		44.63%	31.81%	NA		16.35%	21.48%	8.33%	12.40%	
Signal Strength --85 to -120 dBm		0.31%	0.78%	0.07%	11.15%	0.30%	21.45%	0.05%	8.65%	NA		19.34%	39.68%	NA		1.52%	7.92%	2.08%	4.65%	
Voice quality	≥ 95%	99.42%	95.00%	98.21%	96.34%	94.34%	92.61%	99.38%	96.64%	98.04%	88.62%	98.63%	83.56%	NA	97.65%	99.87%	98.53%	99.00%	95.00%	
CSR	≥ 95%	100.00%	97.98%	100.00%	96.23%	95.45%	79.54%	100.00%	100.00%	100.00%	60.08%	100.00%	96.47%	NA	100.00%	100.00%	100.00%	97.50%	83.00%	
%age Blocked calls		0.00%	2.02%	0.00%	3.76%	4.55%	20.46%	0.00%	0.00%	0.00%	39.92%	0.00%	3.52%	NA	0.00%	0.00%	0.00%	2.50%	17.00%	
Call drop rate	≤ 2%	0.00%	2.00%	0.00%	1.61%	0.00%	1.90%	0.00%	0.00%	0.00%	2.37%	0.00%	6.70%	NA	4.35%	0.00%	0.00%	0.00%	1.40%	
Hands off success rate		100.00%	100.00%	100.00%	96.20%	100.00%	98.60%	100.00%	100.00%	100.00%	100.00%	100.00%	99.00%	NA	100.00%	100.00%	100.00%	100.00%	100.00%	

Note: - TATA CDMA do not have the coverage in indoor areas hence it is mentioned has no data.

Name of SSA	Bolangir	Month	January	Day	Three															
	B'mark	Aircel(DWL)		Airtel		BSNL		Idea		Reliance CDMA		Reliance GSM		TATA CDMA		TATA GSM		Vodafone		
		In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor	
Signal Strength--0 to -75 dBm		93.33%	94.00%	97.50%	86.20%	97.15%	43.91%	98.98%	79.28%	NA		5.68%	30.50%	NA		92.61%	66.34%	71.74%	83.64%	
Signal Strength--75 to -85 dBm		6.67%	5.07%	2.47%	11.66%	2.60%	35.05%	1.01%	14.81%	NA		64.83%	36.93%	NA		6.56%	25.52%	26.79%	13.94%	
Signal Strength--85 to -120 dBm		0.00%	0.93%	0.03%	2.13%	0.25%	21.04%	0.01%	5.92%	NA		29.48%	32.57%	NA		0.83%	8.15%	1.47%	2.42%	
Voice quality	≥ 95%	99.68%	96.00%	99.68%	97.02%	94.99%	90.12%	99.39%	96.68%	99.34%	96.15%	99.55%	86.55%	NA		82.52%	99.89%	93.87%	98.00%	99.00%
CSR	≥ 95%	100.00%	98.33%	100.00%	99.25%	95.45%	75.20%	100.00%	100.00%	100.00%	98.24%	100.00%	90.32%	NA		95.65%	100.00%	98.47%	98.00%	97.00%
%age Blocked calls		0.00%	1.67%	0.00%	0.75%	4.55%	24.79%	0.00%	0.00%	0.00%	1.76%	0.00%	9.67%	NA		4.35%	0.00%	1.53%	2.00%	3.00%
Call drop rate	≤ 2%	0.00%	1.69%	0.00%	1.50%	0.00%	1.09%	0.00%	0.00%	0.00%	0.89%	0.00%	1.78%	NA		22.73%	0.00%	0.00%	3.20%	0.60%
Hands off success rate		NA	100.00%	100.00%	97.54%	NA	98.90%	100.00%	100.00%	100.00%	100.00%	100.00%	98.90%	NA		100.00%	100.00%	100.00%	100.00%	100.00%

Note: - TATA CDMA do not have the coverage in indoor areas hence it is mentioned has no data.

### 7.8.2 FEBRUARY-BARIPADA

Name of SSA	BARIPADA	Month	February	Day	One														
	B'mark	Aircel(DWL)		Airtel		BSNL		Idea		Reliance CDMA		Reliance GSM		TATA CDMA		TATA GSM		Vodafone	
		In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor
Signal Strength--0 to -75 dBm		70.76%	48.78%	97.92%	80.00%	98.42%	95.90%	95.90%	75.89%	NA		85.60%	65.48%	NA		79.06%	50.86%	50.00%	61.86%
Signal Strength--75 to -85 dBm		28.37%	32.23%	2.08%	15.86%	1.58%	3.69%	4.10%	24.07%	NA		13.84%	27.13%	NA		20.13%	26.02%	31.82%	24.74%
Signal Strength--85 to -120 dBm		0.87%	18.99%	0.00%	4.14%	0.00%	0.41%	0.00%	0.03%	NA		0.56%	7.40%	NA		0.81%	23.12%	18.18%	13.40%
Voice quality	≥ 95%	97.98%	89.56%	99.95%	99.86%	96.50%	95.50%	99.30%	96.86%	97.45%	95.73%	96.90%	95.53%	NA		99.63%	95.66%	99.00%	98.00%
CSR	≥ 95%	100.00%	100.00%	100.00%	98.62%	100.00%	98.65%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	NA		97.92%	83.51%	100.00%	100.00%
%age Blocked calls		0.00%	0.00%	0.00%	1.38%	0.00%	1.34%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	NA		2.08%	16.48%	0.00%	0.00%
Call drop rate	≤ 2%	0.00%	1.49%	0.00%	1.38%	0.00%	2.04%	0.00%	0.00%	0.00%	0.67%	0.00%	0.00%	NA		0.00%	0.00%	0.00%	0.00%
Hands off success rate		94.12%	94.80%	100.00%	97.51%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	99.45%	NA		100.00%	100.00%	100.00%	100.00%

Note: - TATA CDMA had no coverage while conducting the drive test hence it is Not Applicable.

Name of SSA	BARIPADA	Month	February	Day	Two														
	B'mark	Aircel(DWL)		Airtel		BSNL		Idea		Reliance CDMA		Reliance GSM		TATA CDMA		TATA GSM		Vodafone	
		In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor
Signal Strength -0 to -75 dBm		66.83%	25.35%	100.00%	61.96%	95.65%	94.36%	94.53%	69.27%	NA		52.07%	47.84%	NA		33.88%	54.71%	94.00%	81.15%
Signal Strength --75 to -85 dBm		28.96%	28.02%	0.00%	23.91%	4.18%	2.98%	4.30%	30.29%			34.40%	32.97%			52.82%	29.91%	6.00%	13.93%
Signal Strength --85 to -120 dBm		4.21%	46.63%	0.00%	14.13%	0.17%	2.65%	1.17%	0.44%			13.52%	19.19%			13.30%	15.37%	0.00%	4.92%
Voice quality	≥ 95%	98.73%	88.32%	99.73%	95.59%	96.85%	91.00%	97.88%	96.58%	97.39%	94.82%	97.99%	96.06%	NA	20.17%	99.65%	95.97%	98.50%	64.00%
CSSR	≥ 95%	100.00%	94.93%	100.00%	98.91%	100.00%	93.80%	100.00%	100.00%	100.00%	98.91%	100.00%	99.29%	NA	100.00%	95.83%	84.54%	100.00%	98.00%
%age Blocked calls		0.00%	5.06%	0.00%	1.09%	0.00%	6.20%	0.00%	0.00%	0.00%	1.09%	0.00%	0.71%	NA	0.00%	4.17%	15.46%	0.00%	2.00%
Call drop rate	≤ 2%	0.00%	5.30%	0.00%	1.09%	0.00%	2.19%	0.00%	0.00%	0.00%	1.10%	0.00%	0.36%	NA	14.30%	0.00%	1.10%	0.00%	0.00%
Hands off success rate		NA	78.57%	100.00%	97.62%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	99.05%	NA	100.00%	100.00%	100.00%	100.00%	100.00%

Name of SSA	BARIPADA	Month	February	Day	Three														
	B'mark	Aircel(DWL)		Airtel		BSNL		Idea		Reliance CDMA		Reliance GSM		TATA CDMA		TATA GSM		Vodafone	
		In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor
Signal Strength -0 to -75 dBm		69.67%	28.00%	97.92%	57.04%	97.81%	82.77%	96.99%	76.08%	NA		84.27%	49.30%	NA		81.96%	69.75%	92.00%	90.44%
Signal Strength --75 to -85 dBm		30.13%	30.82%	2.08%	18.52%	2.19%	13.16%	3.01%	23.86%			14.92%	26.45%			17.36%	20.92%	4.00%	7.35%
Signal Strength --85 to -120 dBm		0.20%	41.19%	0.00%	24.44%	0.00%	4.07%	0.00%	0.06%			0.80%	24.24%			0.67%	9.33%	4.00%	2.21%
Voice quality	≥ 95%	98.36%	88.00%	99.06%	96.67%	95.65%	83.10%	99.87%	96.18%	100.00%	95.39%	99.20%	97.27%	100.00%	88.80%	96.07%	93.91%	94.00%	95.00%
CSSR	≥ 95%	100.00%	85.13%	100.00%	98.52%	100.00%	97.59%	100.00%	100.00%	100.00%	98.28%	100.00%	98.75%	100.00%	86.70%	100.00%	97.95%	84.50%	100.00%
%age Blocked calls		0.00%	14.86%	0.00%	1.48%	0.00%	2.40%	0.00%	0.00%	0.00%	1.72%	0.00%	1.25%	0.00%	13.30%	0.00%	2.05%	15.50%	0.00%
Call drop rate	≤ 2%	0.00%	6.34%	0.00%	1.48%	0.00%	2.46%	0.00%	0.00%	0.00%	1.75%	0.00%	0.12%	0.00%	5.10%	0.00%	0.72%	0.00%	0.00%
Hands off success rate		100.00%	98.61%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	99.68%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%

### 7.8.3 MARCH-BHUBANESWAR

Name of SSA	Bhubaneswar	Month	March	Day	One															
	B'mark	Aircel(DWL)		Airtel		BSNL		Idea		Reliance CDMA		Reliance GSM		TATA CDMA		TATA GSM		Vodafone		
		In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor	
Signal Strength --0 to -75 dBm		100.00%	84.40%	100.00%	96.95%	96.83%	90.91%	93.31%	93.47%	NA		62.58%	84.01%	NA		59.26%	69.53%	93.18%	87.84%	
Signal Strength --75 to -85 dBm		0.00%	11.35%	0.00%	3.05%	3.16%	6.35%	6.69%	6.47%			35.76%	15.55%			39.11%	25.44%	6.82%	10.14%	
Signal Strength --85 to -120 dBm		0.00%	4.26%	0.00%	0.00%	0.00%	2.76%	0.00%	0.07%			1.66%	0.44%			1.63%	5.03%	0.00%	2.03%	
Voice quality	≥ 95%	99.59%	95.20%	99.89%	96.95%	100.00%	83.42%	96.09%	95.63%	98.03%	95.96%	95.71%	96.12%	99.60%	93.51%	97.28%	91.44%	99.20%	95.00%	
CSR	≥ 95%	100.00%	100.00%	100.00%	100.00%	100.00%	97.56%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	99.20%	100.00%	99.17%	100.00%	97.70%	
%age Blocked calls		0.00%	0.00%	0.00%	0.00%	0.00%	2.43%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.80%	0.00%	0.83%	0.00%	2.30%	
Call drop rate	≤ 2%	0.00%	0.00%	0.00%	0.00%	0.00%	1.67%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.80%	0.00%	1.68%	0.00%	0.78%	
Hands off success rate		NA	99.68%	100.00%	99.40%	100.00%	97.73%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	99.63%	

Name of SSA	Bhubaneswar	Month	March	Day	Two															
	B'mark	Aircel(DWL)		Airtel		BSNL		Idea		Reliance CDMA		Reliance GSM		TATA CDMA		TATA GSM		Vodafone		
		In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor	
Signal Strength --0 to -75 dBm		82.61%	60.69%	100.00%	75.54%	94.58%	83.27%	80.08%	83.14%	NA		16.26%	49.68%	NA		98.38%	53.90%	72.92%	93.75%	
Signal Strength --75 to -85 dBm		10.87%	19.31%	0.00%	20.86%	5.42%	11.16%	19.85%	16.73%			76.27%	36.38%			1.59%	25.58%	27.08%	3.13%	
Signal Strength --85 to -120 dBm		6.52%	20.00%	0.00%	3.60%	0.00%	5.57%	0.07%	0.14%			7.47%	13.94%			0.04%	20.52%	0.00%	3.13%	
Voice quality	≥ 95%	99.01%	90.00%	98.01%	96.75%	97.26%	89.63%	97.17%	95.48%	96.58%	89.92%	99.41%	91.03%	99.95%	94.93%	99.09%	96.24%	99.81%	97.00%	
CSR	≥ 95%	100.00%	100.00%	100.00%	100.00%	100.00%	96.82%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	97.83%	97.76%	100.00%	98.66%	
%age Blocked calls		0.00%	0.00%	0.00%	0.00%	0.00%	3.18%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	2.18%	2.24%	0.00%	1.34%	
Call drop rate	≤ 2%	0.00%	1.30%	0.00%	0.00%	0.00%	1.63%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	2.70%	0.00%	1.52%	0.00%	0.00%	
Hands off success rate		NA	98.33%	100.00%	98.52%	100.00%	97.91%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	

Name of SSA	Bhubaneswar	Month	March	Day	Three														
	B'mark	Aircel(DWL)		Airtel		BSNL		Idea		Reliance CDMA		Reliance GSM		TATA CDMA		TATA GSM		Vodafone	
		In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor
Signal Strength -0 to -75 dBm		85.42%	76.47%	NA	91.35%	99.80%	81.02%	59.11%	75.12%	NA		11.50%	49.17%	NA		70.85%	88.11%	100.00%	96.09%
Signal Strength --75 to -85 dBm		10.42%	13.73%	NA	8.65%	0.20%	12.49%	40.86%	24.48%	NA		70.43%	35.56%	NA		28.99%	11.52%	0.00%	3.91%
Signal Strength --85 to -120 dBm		4.17%	9.80%	NA	0.00%	0.00%	6.49%	0.03%	0.41%	NA		18.07%	15.26%	NA		0.15%	0.37%	0.00%	0.00%
Voice quality	≥ 95%	99.33%	94.00%	99.94%	97.55%	100.00%	79.72%	96.37%	95.70%	97.03%	90.36%	95.79%	92.62%	99.80%	97.01%	99.59%	95.28%	99.45%	95.40%
CSSR	≥ 95%	100.00%	100.00%	100.00%	100.00%	100.00%	98.70%	100.00%	100.00%	100.00%	100.00%	95.84%	100.00%	100.00%	97.60%	100.00%	95.29%	100.00%	100.00%
%age Blocked calls		0.00%	0.00%	0.00%	0.00%	0.00%	1.30%	0.00%	0.00%	0.00%	0.00%	4.17%	0.00%	0.00%	2.40%	0.00%	4.70%	0.00%	0.00%
Call drop rate	≤ 2%	0.00%	0.98%	0.00%	0.00%	0.00%	2.63%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	2.50%	0.00%	2.47%	0.00%	0.00%
Hands off success rate		NA	99.33%	100.00%	98.05%	NA	98.23%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%

### 7.8.4 CDMA DATA FOR SIGNAL STRENGTH

Month	% Ec/Io BINS with less than -15	Day 1				Day 2				Day 3			
		Reliance CDMA		TATA CDMA		Reliance CDMA		TATA CDMA		Reliance CDMA		TATA CDMA	
		In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor
January		0.00%	0.48%	99.99%	98.70%	0.02%	9.50%	No Coverage	19.30%	0.03%	1.63%	No Coverage	29.15%
February		0.00%	0.62%	No Coverage	10.96%	0.00%	3.08%	No Coverage	89.30%	0.00%	1.48%	100.00%	40.68%
March		99.93%	99.56%	99.77%	99.37%	99.97%	99.09%	99.89%	98.48%	99.98%	98.84%	99.92%	98.28%

## 7.9 TERMINATION / CLOSURE OF SERVICE

Audit results for termination / closure of service										
Termination	Benchmark	Aircel(DWL)	Airtel	BSNL	Idea	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Vodafone
Total number of closure request		57.00	598.00	121.00	75.00	23.00	77.00	513.00	488.00	213.00
Number of requests attended within 7 days		57.00	598.00	121.00	39.00	2.00	17.00	513.00	488.00	213.00
Percentage cases in which termination done within 7 days	100.00%	100.00%	100.00%	100.00%	52.00%	8.70%	22.08%	100.00%	100.00%	100.00%

## 7.10 TIME TAKEN FOR REFUND OF DEPOSITS AFTER CLOSURE

Audit results for refund of deposits										
Refund	Benchmark	Aircel(DWL)	Airtel	BSNL	Idea	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Vodafone
Total number of cases requiring refund of deposits		93.00	16.00	80.00	41.00	150.00	84.00	28.00	177.00	13.00
Total number of cases where refund was made within 60 days		93.00	16.00	80.00	41.00	150.00	84.00	6.00	30.00	13.00
Percentage cases in which refund was receive within 60 days	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	21.43%	16.95%	100.00%

## 7.11 ADDITIONAL NETWORK RELATED PARAMETERS

Audit Results for Total Traffic Handled in Erlang										
Traffic in Erlang		Aircel(DWL)	Airtel	BSNL	Idea	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Vodafone
Equipped capacity of the network		122331.88	301975.07	16000.00	42826.00	53000.00	92000.00	65436.00	81205.00	108212.00
Total traffic handled in erlang during TCBH		76532.71	202704.06	15421.00	26510.95	10809.00	76011.61	10747.00	41295.00	97710.76
Total number of customers as per VLR										
		Aircel(DWL)	Airtel	BSNL	Idea	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Vodafone
Total no. of customers served (as per VLR)		2131149.00	7705904.00	389291.00	1047953.00	304276.00	3257877.00	154432.00	1318963.00	3039283.00



Live calling for level 1 services										
Level 1 services		Aircel(DWL)	Airtel	BSNL	Idea	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Vodafone
Total no. of calls made		150.00	150.00	150.00	150.00	150.00	150.00	150.00	150.00	150.00
Calls answered in 60 sec		149.00	150.00	150.00	147.00	150.00	143.00	148.00	149.00	149.00
Calls answered after 60 sec		99.33%	100.00%	100.00%	98.00%	100.00%	95.33%	98.67%	99.33%	99.33%
% of calls connected in 60 seconds		99.33%	100.00%	100.00%	98.00%	100.00%	95.33%	98.67%	99.33%	99.33%
Live calling results for resolution of service requests										
Resolution of service requests	Benchmark	Aircel(DWL)	Airtel	BSNL	Idea	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Vodafone
Total Number of calls made		100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Number of cases resolved to satisfaction		99.00	100.00	97.00	98.00	100.00	98.00	100.00	100.00	99.00
Percentage cases resolved in four weeks		99.00%	100.00%	97.00%	98.00%	100.00%	98.00%	100.00%	100.00%	99.00%

## 7.12 TOTAL CALL MADE DURING THE DRIVE TEST

January									
	Aircel	Airtel	BSNL	Idea	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Vodafone
Total No of calls made	566	625	552	522	678	629	480	484	585
February									
	Aircel	Airtel	BSNL	Idea	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Vodafone
Total No of calls made	420	512	460	394	490	458	69	475	512
March									
	Aircel	Airtel	BSNL	Idea	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Vodafone
Total No of calls made	526	506	457	480	369	499	423	473	505

Note: - IMRB International, ensures minimum of 100 km is travelled on each day.



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