



**EAST  
ZONE**

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

**Prepared By -**



**Prepared For-**



# 1 TABLE OF CONTENTS

2 INTRODUCTION ..... 3

2.1 About TRAI ..... 3

2.2 Objectives ..... 3

2.3 Framework used ..... 4

2.3.1 PMR Reports ..... 4

2.3.2 Drive Test .....16

2.3.3 Live Calling .....18

2.4 Operators Covered ..... 20

3 Executive Summary ..... 20

3.1 PMR Data – 3 Months- consolidated ..... 21

3.2 3 Day Data - Consolidated ..... 22

3.3 Live Calling Data - Consolidated ..... 24

3.4 Billing and customer care – Consolidated ..... 25

3.5 Inter Operator Call Assessment – Consolidated ..... 27

4 Detailed Findings - Drive Test Data ..... 28

5 Detailed Findings - Comparison Between PMR Data, 3 Day Live Data and Live Calling Data ..... 36

5.1 BTS Accumulated Downtime ..... 36

5.2 Worst Affected BTS due to downtime ..... 36

5.3 Call Set Up Success Rate ..... 37

5.4 SDCCCH/Paging Channel Congestion ..... 37

5.5 TCH Congestion ..... 38

5.6 Call Drop Rate ..... 38

5.7 Cells having greater than 3% TCH drop ..... 39

5.8 Voice Quality ..... 39

6 Detailed Findings – Non Network Parameters ..... 40

6.1 Billing Disputes-Postpaid ..... 40

6.2 Billing Disputes-PREPAID ..... 40

6.3 Resolution of Billing Complaints.....41

6.4 Period of Applying Credit/Wavier .....41

6.5 Call centre Performance-IVR..... 42

6.6 Call Centre Performance-Voice to Voice ..... 42

6.7 Termination/Closure of Service..... 43

6.8 Refund of Deposits After closure..... 43

7 Annexure .....44

7.1 Network Availability .....44

7.2 Network Channel Congestion..... 45

7.3 Call Drop Rate .....46

7.4 Voice quality .....48

7.5 POI Congestion .....49

7.6 Metering and Billing credibility..... 50

7.7 Customer Care.....51

7.8 Drive Test..... 52

7.8.1 JANUARY- North Kolkata..... 52

7.8.2 FEBRUARY- South Kolkata..... 54

7.8.3 March- Central Kolkata..... 56

7.8.4 Signal Strength data for CDMA operators ..... 57

7.9 Termination / closure of service..... 58

7.10 Time taken for refund of deposits after closure..... 58

7.11 Additional Network Related parameters ..... 58

7.12 Total call made during the drive test ..... 60

## 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.

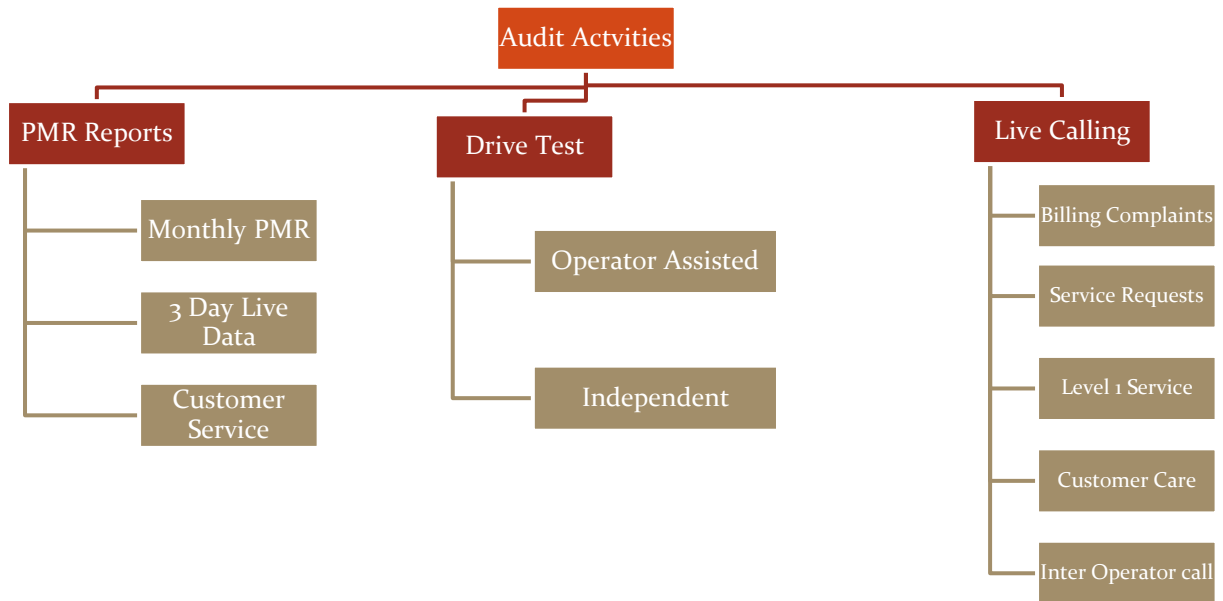
In order to assess the above regulations TRAI has commissioned a third party agency to conduct the audit of the service providers and check the performance of the operators on the various benchmarks set by Telecom Regulatory Authority of India (TRAI).

### 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

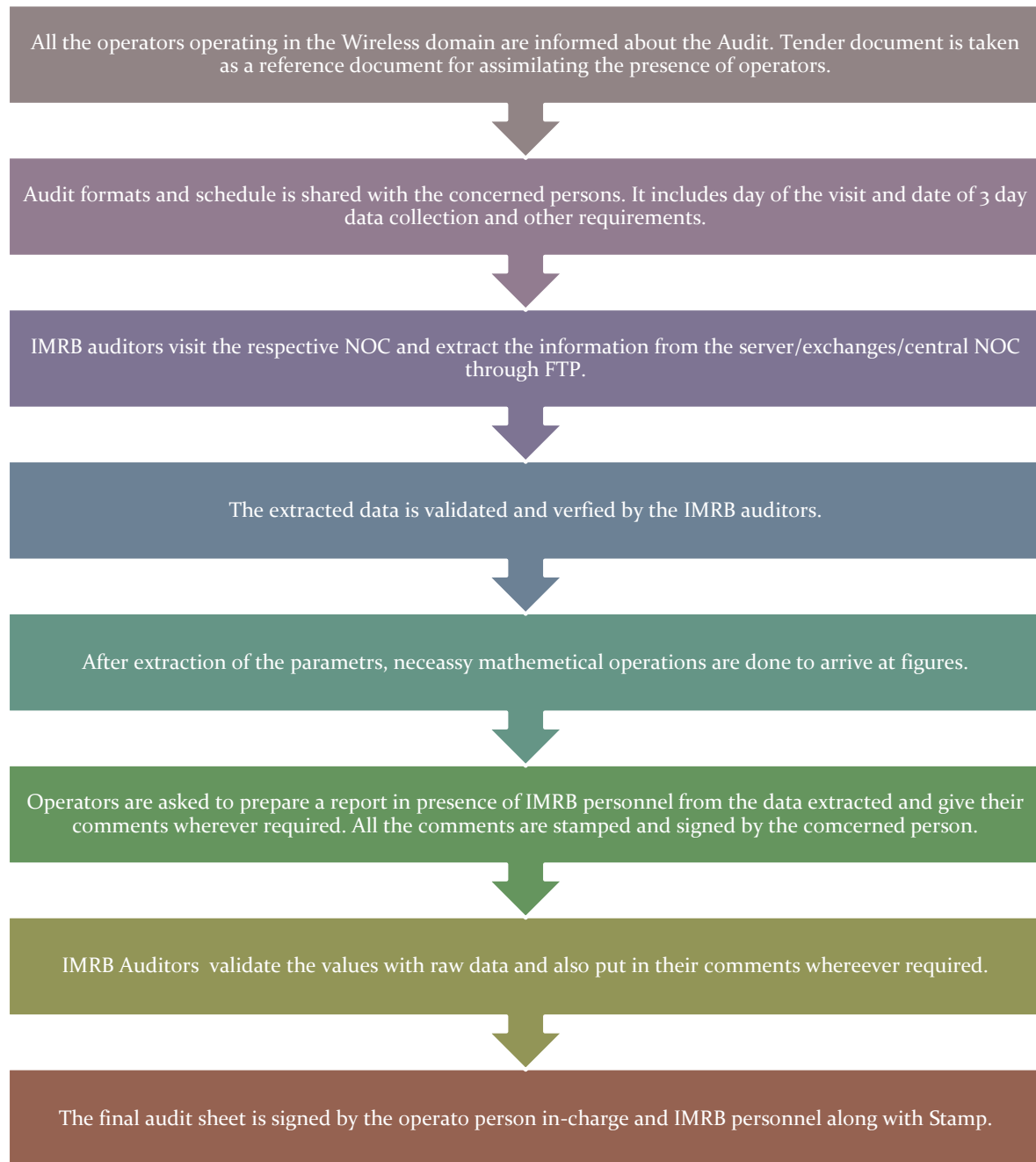
- Call Drop rate
- Worst affected cells having more than 3% TCH drop

#### 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 = (Number of BTSs having accumulated downtime greater than 24 hours in a month / Number of BTS in Licensed Service Area) \* 100**

3. **TRAI Benchmark –**

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

**(Calls Established / Total Call Attempts) \* 100**

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

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

### 3. TRAI Benchmark $\geq 95\%$

#### 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:**

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

- Where:-  $A_1$  = Number of attempts to establish SDCCH / TCH made on day 1
- $C_1$  = Average SDCCH / TCH Congestion % on day 1

- $A_2$  = Number of attempts to establish SDCCH / TCH made on day 2
- $C_2$  = Average SDCCH / TCH Congestion % on day 2
- $A_n$  = Number of attempts to establish SDCCH / TCH made on day n
- $C_n$  = Average SDCCH / TCH Congestion % on day n

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

- Where:- $A_1$  = POI traffic offered on all POIs (no. of calls) on day 1
- $C_1$  = Average POI Congestion % on day 1
- $A_2$  = POI traffic offered on all POIs (no. of calls) on day 2
- $C_2$  = Average POI Congestion % on day 2
- $A_n$  = POI traffic offered on all POIs (no. of calls) on day n
- $C_n$  = Average POI Congestion % on day n

### 3. Benchmark:

- ↳ SDCCH Congestion:  $\leq 1\%$
- ↳ TCH Congestion:  $\leq 2\%$
- ↳ POI Congestion:  $\leq 0.5\%$

### 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:

$$\text{\% Connections with good voice quality} = \left( \frac{\text{No. of voice samples with good voice quality}}{\text{Total number of samples}} \right) \times 100$$

### 3. TRAI Benchmark: $\geq 95\%$

#### 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)	2152779
Airtel	3703012
BSNL	724592
Idea	1271525
MTS	633490
Reliance CDMA	1080357
Reliance GSM	2575286
TATA CDMA	107056
TATA GSM	1843517
Vodafone	4355378



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 Kolkata 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
<b>Benchmark</b>	≤ 2%	≤ 2%	≥ 95%	≤ 1%	≤ 2%	≤ 2%	≤ 3%	≥ 95%
Aircel(DWL)	0.55%	1.83%	98.69%	0.65%	0.88%	0.74%	0.91%	97.52%
Airtel	0.02%	0.01%	99.64%	0.06%	0.07%	0.67%	0.20%	96.38%
BSNL	0.89%	1.98%	98.28%	0.03%	0.01%	1.83%	2.44%	99.80%
Idea	0.12%	0.23%	99.61%	0.06%	0.04%	0.31%	0.94%	97.60%
MTS	0.14%	0.00%	99.79%	0.00%	0.02%	0.55%	0.81%	99.96%
Reliance CDMA	0.08%	0.07%	99.39%	0.00%	0.01%	0.06%	0.14%	99.76%
Reliance GSM	0.12%	0.20%	99.30%	0.01%	0.34%	0.41%	0.03%	98.29%
TATA CDMA	0.11%	0.00%	99.09%	0.00%	0.03%	0.93%	0.80%	99.21%
TATA GSM	0.01%	0.06%	98.53%	0.04%	0.05%	0.70%	1.26%	98.17%
Vodafone	0.03%	0.05%	99.58%	0.05%	0.42%	0.81%	2.58%	97.58%

It can be seen that all the operators have comfortably met the TRAI benchmark for the different criteria's, some performing exceedingly well than the others. Following are the parameter wise observations for Wireless Operators for Kolkata 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 performed the best of the lot with near negligible downtime reported, followed by the BTS for Airtel.

#### Worst Affected BTs Due to Downtime:

During the audit it was found that all the operators meet the benchmark specified by TRAI. MTS and TATA CDMA performed the best as they did not have any downtime due to worst affected BTS.

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

All the operators comfortably meet the TRAI benchmark. The best performance was recorded for the operator MTS at 99.79% CSSR, followed by Idea at 99.62% and Vodafone at 99.58%. All the operators were found to be calculating the parameter as per the norm specified by TRAI.

### Network Congestion parameters:

SDCCH / Paging Channel Congestion, TCH and POI are part of the network congestion parameters. All the operators are meeting the TRAI specified benchmarks on the congestion parameters. Reliance GSM was performing the best on SDCCH congestion parameter and Reliance CDMA on TCH congestion parameter.

### Call Drop Rate:

During the audit it was found that all the service providers were measuring this parameter as per the TRAI guidelines. The call drop rate was measured as the ratio of total calls dropped to the total number of call attempts for all operators. All of service providers were found to be meeting the TRAI specified benchmark with Reliance CDMA performing the best.

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

During the audit it was found that all the service providers were measuring this parameter as per the TRAI guidelines. All the operators were comfortably meeting the benchmark on this parameter. Reliance GSM was performing the best when compared to other service providers.

### Voice Quality:

During the audit it was found that all the service providers were meeting the benchmark specified by TRAI however in terms of voice quality MTS was performing the best

## 3.2 3 DAY DATA - CONSOLIDATED

Name of Service Provider	Network Availability		Connection Establishment (Accessibility)			Connection Maintenance (Retainability)		
	BTSs Accumulated downtime (not available for service)	Worst affected BTSs due to downtime	Call Set-up Success Rate (within licensee's own network)	SDCCH/Paging Chl. Congestion (%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)	0.50%	0.38%	97.59%	0.54%	0.86%	0.78%	1.90%	97.51%
Airtel	0.02%	0.00%	99.62%	0.07%	0.09%	0.67%	0.56%	96.41%
BSNL	0.73%	0.16%	96.67%	0.03%	0.01%	1.67%	1.57%	98.15%
Idea	0.13%	0.11%	99.79%	0.04%	0.02%	0.25%	0.04%	98.09%
MTS	0.12%	0.00%	99.85%	0.00%	0.01%	0.36%	0.79%	99.77%
Reliance CDMA	0.10%	0.00%	99.42%	0.00%	0.02%	0.17%	2.34%	99.77%
Reliance GSM	0.12%	0.00%	99.46%	0.01%	0.00%	0.34%	0.00%	98.53%
TATA CDMA	0.15%	0.00%	99.05%	0.00%	0.01%	0.71%	5.40%	99.50%
TATA GSM	0.01%	0.12%	98.67%	0.04%	0.04%	0.69%	4.32%	98.56%
Vodafone	0.03%	0.00%	99.70%	0.05%	0.30%	0.68%	0.00%	97.92%

### BTSS 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 performed the best of the lot with near negligible downtime reported followed by the Airtel.

### **Worst Affected BTSs Due to Downtime:**

During the audit it is found that all the operators' meets the benchmark specified by TRAI, Many Operators were best during the result which recorded 0.00% when compared to other operator's.

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

All the operators comfortably met the TRAI benchmark. The best performance was recorded for the operator MTS at 99.85% CSSR, followed by Idea at 99.79% and Vodafone at 99.70%. All the operators were found to be calculating the parameter as per the norm specified by TRAI.

### **Network Congestion parameters:**

SDCCH / Paging Channel Congestion, TCH and POI are part of the network congestion parameters. All the operators are meeting the TRAI specified benchmarks on the congestion parameters. Reliance GSM was performing the best on SDCCH congestion parameter as well as TCH congestion parameter.

### **Call Drop Rate:**

During the audit it was found that all the service providers were measuring this parameter as per the TRAI guidelines. The call drop rate was measured as the ratio of total calls dropped to the total number of call attempts for all operators. All service providers were found to be meeting the TRAI specified benchmark with Reliance CDMA performing the best with 0.17%.

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

During the audit it was found that all the service providers were measuring this parameter as per the TRAI guidelines. All the operators were comfortably meeting the benchmark on this parameter except TATA CDMA and TATA GSM.

### **Voice Quality:**

During the audit it was found that all the service providers were meeting the benchmark specified by TRAI with MTS and Reliance CDMA performing same and was best when compared to others.



### 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)	100.00%	97.00%	100.00%	100.00%	100.00%
Airtel	80.00%	88.00%	0.00%	100.00%	100.00%
BSNL	79.00%	91.00%	87.33%	100.00%	100.00%
Idea	98.00%	96.00%	0.00%	100.00%	100.00%
MTS	87.00%	94.00%	100.00%	100.00%	99.00%
Reliance CDMA	91.30%	NA	100.00%	100.00%	100.00%
Reliance GSM	98.00%	100.00%	100.00%	100.00%	100.00%
TATA CDMA	89.00%	89.00%	100.00%	100.00%	100.00%
TATA GSM	95.00%	84.00%	100.00%	100.00%	64.00%
Vodafone	100.00%	100.00%	100.00%	100.00%	100.00%

#### Complaints Resolved within 4 weeks

As per the audited records, none of the operators meet the benchmark except for Aircel and Vodafone do not meet the benchmark for

#### Complaint/Request Attended to Satisfaction

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

**Reliance did not share any data for complaint/service requests so calling activity could not be done.**

#### Level 1 Service

All the operators met the TRAI benchmark for level 1 service with calls being answered within 60 seconds except BSNL which recorded below the benchmark 87.33%.

We contacted for following numbers

- 100
- 101
- 105010
- 1051

- 1053
- 105711
- 105777
- 1066
- 1068
- 139
- 102

Please note that we were not able to connect to none of the level 1 service numbers for Idea and Airtel. The calls were not going through to any of the level 1 numbers for these two operators.

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

For the IVR aspect all the service providers meet the TRAI benchmark with 100% connectivity.

### Customer Care / Helpline Assessment

It was seen all operators comfortably meet the TRAI benchmark of 90% of calls except TATA GSM that had only 64% of its calls answered by the operator.

## 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%	0.26%	100.00%	100.00%	97.17%	77.11%
Airtel	0.01%	0.00%	100.00%	100.00%	100.00%	93.12%
BSNL	0.10%	1.11%	100.00%	100.00%	84.26%	71.77%
Idea	0.17%	0.01%	100.00%	100.00%	99.48%	95.60%
MTS	0.05%	0.01%	100.00%	100.00%	99.18%	90.37%
Reliance CDMA	0.10%	0.10%	100.00%	100.00%	99.35%	70.48%
Reliance GSM	0.09%	0.10%	100.00%	100.00%	98.92%	96.43%
TATA CDMA	0.08%	0.00%	100.00%	100.00%	100.00%	96.95%
TATA GSM	0.21%	0.00%	100.00%	100.00%	100.00%	92.65%
Vodafone	0.01%	0.04%	100.00%	100.00%	100.00%	92.15%

### Billing Disputes – Postpaid Subscribers

For the billing disputes for the prepaid subscribers, it is observed that Idea and Tata GSM do not meet the benchmark. Aircel, Airtel, and Vodafone showed the best performance with negligible complaints 0.01%.

### Billing Disputes – Prepaid Subscribers

For the postpaid customers, all the operators meet the benchmark except for Aircel and BSNL. Airtel is best performing with close to 0.00%.

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

All operators meet the TRAI criteria of resolution of complaint within 4 weeks.

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

All operators meet 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 is observed that on an average 97.51% of the calls were answered by the operators within IVR. Except BSNL all other operator met the TRAI benchmark of 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 86.69% of the calls were answered within 60 seconds from the total calls. Aircel, BSNL, and Reliance CDMA did not meet the TRAI benchmark

### 3.5 INTER OPERATOR CALL ASSESSMENT – CONSOLIDATED

Inter operator call Assessment To↓ From→	Aircel(DWL)	Airtel	BSNL	Idea	MTS	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Vodafone
Aircel(DWL)	NA	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
Airtel	100.00%	NA	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
BSNL	100.00%	100.00%	NA	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
Idea	100.00%	100.00%	100.00%	NA	100.00%	100.00%	100.00%	99.50%	99.00%	100.00%
MTS	100.00%	100.00%	100.00%	100.00%	NA	100.00%	100.00%	100.00%	100.00%	100.00%
Reliance CDMA	100.00%	100.00%	100.00%	100.00%	100.00%	NA	100.00%	100.00%	100.00%	100.00%
Reliance GSM	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	NA	100.00%	100.00%	100.00%
TATA CDMA	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	NA	100.00%	100.00%
TATA GSM	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	NA	100.00%
Vodafone	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	NA



Maximum Problem faced by the calling operator to other operator

In the inter-operator call assessment, calls were made from the test SIMs of service provider (whose audit was being conducted) to all the other service providers. All operators were comfortably able to connect with each other.

#### 4 DETAILED FINDINGS - DRIVE TEST DATA

The drive test was conducted simultaneously for all the operators present in the Kolkata circle. As per the new directive given by TRAI headquarters, drive test for the month of January, February and 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 Kolkata circle-

Month	Name of SSA Covered	Date of Drive Test
January	North Kolkata	29th Jan to 31st Jan
February	South Kolkata	25th Feb to 27th Feb
March	Central Kolkata	26th March to 28th March
Year	2014	

**Note: - Before seeing the results for this quarter, it is important to highlight that Vodafone did not share the Signal Strength data for any of the month while submitting the report to IMRB.**

**Route Details – January – North Kolkata SSA**

		January		
		North Kolkata		
	Type of location	Day 1	Day 2	Day 3
Outdoor	Major Roads	Bagbazar-Talapark-Chiria More Via Bt Road-Dunlop-Barrackpore-Barrackpore Station-Ghoshpara Road.	Airport To Nagerbazar More	Bangur-Laketown Service Road-Golaghata-Ultadanga-Saltlake Gate-PNB
	Highways	Barrackpore Ghoshpara Road-Wireless More-Nilganj Via Nilganj Road-Barasat Colony More-Madhyamgram Via Krishnagar Road.	Barrackpur(Kalyani Expway Crossing Wireless Gate)-Kalyani-Nh34-Airport	NA
	With in the City	Madhyamgram To Badu-Kharibari-Old Rajarhat-Rajarhat Main Road-Chinarpark-Baguiati-Laketown Via Vip Road-Jessore Road Lake Town-Belgachia-Shyambazar-Talapark.	Nagerbazar More-Dum Dum Road- Chiria More-Seven Tanks From Bt Road	Pnb-Quality-Laboni-206 Busstand-Karunamoyee-Netaji Statue-Columbia Asia-Stadium-Kadapara-Mani Square-Da Block From Bypass-City Centre1-Fd Block-Ee Block-Wipro More-Technopolis-Unitech-Dps New Town-Sapoorji Palonji Sukhobristi-Tata Eden Court-Aquatica-Eco Park-City Centre2-Sector V-College More- Nicco

				Park
Indoor	Office complex	Barasat City Mall	Mouchak Resturent	City Centre
	Shopping complex	Madhyamgram Municipality	Kalyani Municipality	Unnayan Bhavan

### Drive Test Result – January – North Kolkata SSA

Name of SSA	North Kolkata	Month	January	Consolidated																	
	B'mark	Aircel(DWL)		Airtel		BSNL		Idea		MTS		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	In door	Outdoor
Signal Strength -0 to -75 dBm		65.83%	88.19%	93.26%	99.33%	98.11%	83.93%	43.65%	95.00%	NA	NA	9.88%	64.30%	NA	61.99%	91.08%	NDR	NDR			
Signal Strength --75 to -85 dBm		22.50%	9.78%	6.59%	0.64%	1.81%	13.73%	37.70%	4.13%			70.64%	31.25%		23.22%	7.27%	NDR	NDR			
Signal Strength --85 to -120 dBm		11.67%	2.03%	0.15%	0.03%	0.08%	2.34%	18.65%	0.87%			19.49%	4.45%		14.79%	1.65%	NDR	NDR			
Voice quality	≥ 95%	97.68%	91.92%	97.84%	95.99%	98.62%	97.82%	94.43%	93.11%	99.44%	96.87%	99.99%	98.49%	96.02%	95.52%	97.02%	3289.33%	98.40%	96.13%	97.62%	97.00%
CSSR	≥ 95%	100.00%	99.79%	100.00%	100.00%	100.00%	99.77%	100.00%	99.33%	100.00%	99.83%	100.00%	100.00%	100.00%	99.40%	100.00%	100.00%	100.00%	99.17%	100.00%	100.00%
%age Blocked calls		0.00%	0.21%	0.00%	0.00%	0.00%	0.23%	0.00%	0.67%	0.00%	0.17%	0.00%	0.00%	0.00%	0.59%	0.00%	0.00%	0.00%	0.83%	0.00%	0.00%
Call drop rate	≤ 2%	0.00%	0.13%	0.00%	0.00%	0.00%	0.22%	0.00%	0.15%	0.00%	0.16%	0.00%	0.48%	0.00%	0.86%	0.00%	0.00%	0.00%	0.54%	0.00%	0.00%
Hands off success rate		100.00%	99.94%	100.00%	100.00%	100.00%	99.87%	100.00%	99.92%	66.67%	100.00%	100.00%	99.99%	100.00%	99.53%	100.00%	100.00%	100.00%	99.30%	100.00%	100.00%

January						
% Ec/Io BINS with less than -15	MTS		Reliance CDMA		TATA CDMA	
	In door	Outdoor	In door	Outdoor	In door	Outdoor
	99.81%	98.89%	99.87%	98.95%	98.54%	87.80%

**Voice Quality**

All operators meet the benchmark set by TRAI except Aircel in indoor and Idea in both indoor and outdoor areas.

**Call Set Success Rate (CSSR)**

All operators comfortably meet the benchmark.

**Call Drop Rate**

All operators comfortably meet the benchmark.

**Route Details – February – South Kolkata SSA**

		February		
		South Kolkata		
	Type of location	Day 1	Day 2	Day 3
Outdoor	Major Roads	Sagardighi -Khargram .	Zilla parisad-Nimtalla- Cossimbazar chowk-karbala- Ranibagan .	Baherampur-Swarnamayee Rd- Barrackquare-Laldighi .
	Highways	Baherampur-Sagardighi-Lalgarh court more-Kandi.	Baherampur-khagraghat rd- gokarno chawk-Baherampur- Bhakuri-SargachiBeldanga.	Baherampur-Cosimmbazar- Murshidabad-Bagwangola- Lalgola-Raghunathgunj- Mirjapurmurshidabad.



	With in the City	Sagardighi , kuli-kandi.	Ranibagan-Khagra Market , Beldanga Periphery.	Lalbagh, Raghunathganj.
Indoor	Office complex	Hotel golden inn.	Hotel Samrat.	Hotel Sagnik.
	Shopping complex	Kandi court.	Kasimbazar post office.	PWD Lalbagh.

### Drive Test Result – February – South Kolkata SSA

Name of SSA	South Kolkata	Month	February	Consolidated																		
	B'mark	Aircel(DWL)		Airtel		BSNL		Idea		MTS		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	In door	Outdoor	
Signal Strength - 0 to -75 dBm		66.67%	79.76%	100.00%	95.92%	98.09%	94.41%	69.32%	97.38%	NA		NA		58.21%	71.84%	NA		85.37%	87.90%	NDR	NDR	
Signal Strength -75 to -85 dBm		30.00%	17.03%	0.00%	3.86%	1.85%	4.45%	29.01%	2.36%	NA		NA		36.87%	25.92%	NA		13.92%	11.00%	NDR	NDR	
Signal Strength -85 to -120 dBm		3.33%	3.21%	0.00%	0.22%	0.06%	1.14%	1.67%	0.27%	NA		NA		4.92%	2.24%	NA		0.71%	1.09%	NDR	NDR	
Voice quality	≥ 95%	97.90%	92.51%	98.53%	95.65%	99.51%	98.97%	97.29%	94.09%	99.37%	95.45%	99.98%	98.89%	98.13%	96.35%	99.01%	95.70%	98.96%	95.05%	99.23%	98.17%	
CSSR	≥ 95%	100.00%	99.29%	100.00%	100.00%	100.00%	100.00%	100.00%	98.74%	100.00%	99.82%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	99.13%	100.00%	100.00%	
%age Blocked calls		0.00%	0.71%	0.00%	0.00%	0.00%	0.00%	0.00%	1.26%	0.00%	0.18%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.87%	0.00%	0.00%	
Call drop rate	≤ 2%	0.00%	0.54%	0.00%	0.00%	0.00%	0.00%	0.00%	0.58%	0.00%	0.98%	0.00%	0.13%	0.00%	0.29%	0.00%	0.00%	0.00%	0.82%	0.00%	0.00%	
Hands off success rate		100.00%	99.73%	100.00%	100.00%	96.67%	100.00%	100.00%	99.71%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	88.89%	66.67%	88.26%	100.00%	100.00%	

February						
% Ec/Io BINS with less than -15	MTS		Reliance CDMA		TATA CDMA	
	In door	Outdoor	In door	Outdoor	In door	Outdoor
	99.68%	97.41%	99.93%	98.90%	99.91%	98.88%

### Voice Quality

All the operators meet the benchmark set by TRAI except Aircel and Idea which are not meeting the benchmark in outdoor areas.

### Call Set Success Rate (CSSR)

All operators comfortably meet the benchmark.

### Call Drop Rate

All operators comfortably meet the benchmark.

### Route Details – March – Central Kolkata SSA

		March		
		Central Kolkata		
Type of location		Day 1	Day 2	Day 3
Outdoor	Major Roads	MEHR ALI ROAD – PARK STREET – JL NEHRU ROAD – THEATER ROAD – PARK CIRCUS CROSSING – APC ROAD – PRACHI.	ENTALLY – CONVENT ROAD – PALMAR BAZAAR – BELEGHATA MAIN ROAD – SALES TAX.	BELEGHATA BUILDING MORE – JORA MANDIR – CIT MORE – ALOCHAYA – KHALPOOL – CONVENT ROAD – MOULALI.
	Highways	BIDYAPATI SETU – RAJABAZAAR – KHANNA – HATIBAGAN – HASTINGS – RED ROAD – AJC BOSE ROAD – MOULALI.	BELEGHATA MUNSI BAZAAR – CIT MORE – PHOOLBAGAAN – KANKURGACHI – MANICKTALA MORE – VIVEKANANDA ROAD – GIRISH PARK MORE – CENTRAL	PARCK CIRCUS – 4 NO BRIDGE – SCIENCE CITY – CHINGRIGHATA – BOSE PUKUR – RUBY – PANCHANNA GRAM.

	With in the City	AVENUE – CHANDNI – MADAN ST. – LINDSAY STREET.		
		BIDHAN SARANI – DUFF STREET – VIVEKANANDA ROAD – AMHERST STREET – COLLEGE STREET – MG ROAD – PAGAYA PATTI – BRABOURNE ROAD – BBD BUS STOP – STRAND ROAD.	NEW MARKET – FREE SCHOOL STREET SUDDER STREET – JL NEHRU ROAD – EDEN GARDENS – DHARMATALA KC DAS – LENIN SARANI – SASI BHUSAN DEY STREET – BANK OF INDIA MORE – BB GANGULY STREET – COLLEGE STREET – BIDHAN SARANI – BEADON STEET – NIMTALA GHAT.	PHILIPS MORE – ANANDAPALIT – DARGAH ROAD – CONGRESS EXHIBITION ROAD – SYED AMIR ALI AVENUE – BALLYGUNGE STATION – PICNIC GARDEN – BALLYGUNGE PLACE – BROAD STREET – SHAMSHUL HUDDA – FAZUL HAQUE SARANI.
Indoor	Office complex	FUSION RESTAURANT	SHREERAM ARCADE	SANJHA CHULHA
	Shopping complex	KOLKATA CORPORATION	BELEGHATA SALES TAX	ENTALLY POLICE STATION

### Drive Test Result – March – Central Kolkata SSA

Name of SSA	Central Kolkata	Month	March	Consolidated																	
	B'mark	Aircel(DWL)		Airtel		BSNL		Idea		MTS		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	In door	Outdoor
Signal Strength -0 to -75 dBm		100.00%	99.78%	100.00%	100.00%	100.00%	98.27%	94.17%	99.53%	NA		NA		86.43%	85.43%	NA		40.01%	56.64%	NDR	NDR
Signal Strength -75 to -85 dBm		0.00%	0.22%	0.00%	0.00%	0.00%	1.73%	5.83%	0.47%	NA		NA		11.98%	14.26%	NA		51.90%	39.23%	NDR	NDR
Signal Strength -85 to -120 dBm		0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	NA		NA		1.59%	0.30%	NA		8.09%	4.13%	NDR	NDR
Voice quality	≥ 95%	94.93%	88.64%	98.40%	96.30%	99.63%	99.69%	97.31%	94.00%	99.10%	97.04%	99.99%	99.17%	98.88%	94.83%	97.61%	97.51%	98.68%	96.03%	98.62%	97.42%
CSSR	≥ 95%	100.00%	99.85%	100.00%	100.00%	100.00%	100.00%	100.00%	99.42%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	99.36%	99.71%	100.00%	100.00%
Usage Blocked calls		0.00%	0.15%	0.00%	0.00%	0.00%	0.00%	0.00%	0.58%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.64%	0.29%	0.00%	0.00%
Call drop rate	≤ 2%	0.79%	0.65%	0.00%	0.00%	0.00%	0.17%	0.00%	0.22%	0.00%	0.00%	0.00%	0.00%	0.23%	0.15%	0.00%	0.00%	0.00%	0.17%	0.00%	0.00%
Hands off success rate		99.89%	99.75%	100.00%	100.00%	100.00%	100.00%	100.00%	99.89%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	97.53%	100.00%	100.00%

March						
% Ec/to BINS with less than -15	MTS		Reliance CDMA		TATA CDMA	
	In door	Outdoor	In door	Outdoor	In door	Outdoor
	99.54%	99.16%	99.92%	99.70%	99.84%	99.39%

#### Voice Quality

All the operators meet the benchmark set by TRAI except Aircel, Idea, and Reliance GSM that are not able to meet the benchmark.

#### Call Set Success Rate (CSSR)

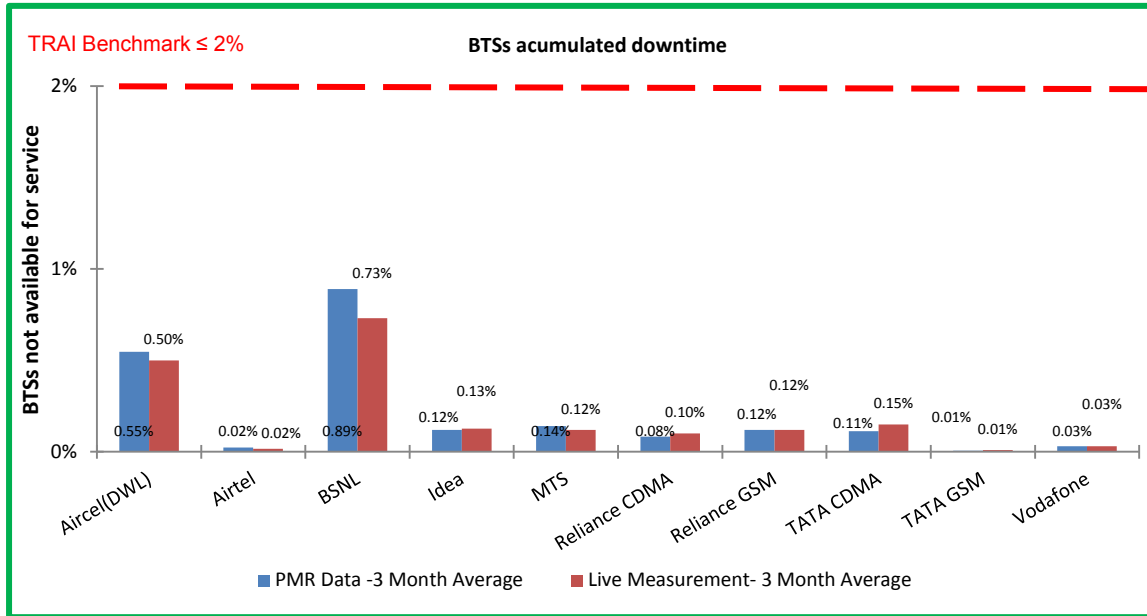
All operators comfortably meet the benchmark.

#### Call Drop Rate

All operators comfortably meet the benchmark.

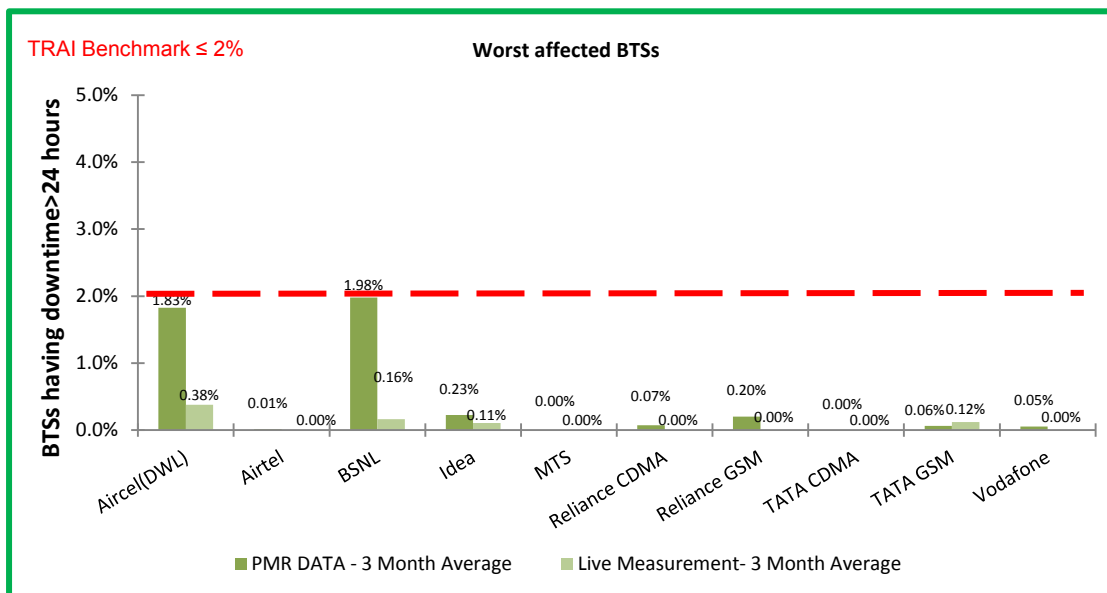
## 5 DETAILED FINDINGS - COMPARISON BETWEEN PMR DATA, 3 DAY LVE DATA AND LIVE CALLING DATA

### 5.1 BTS ACCUMULATED DOWNTIME



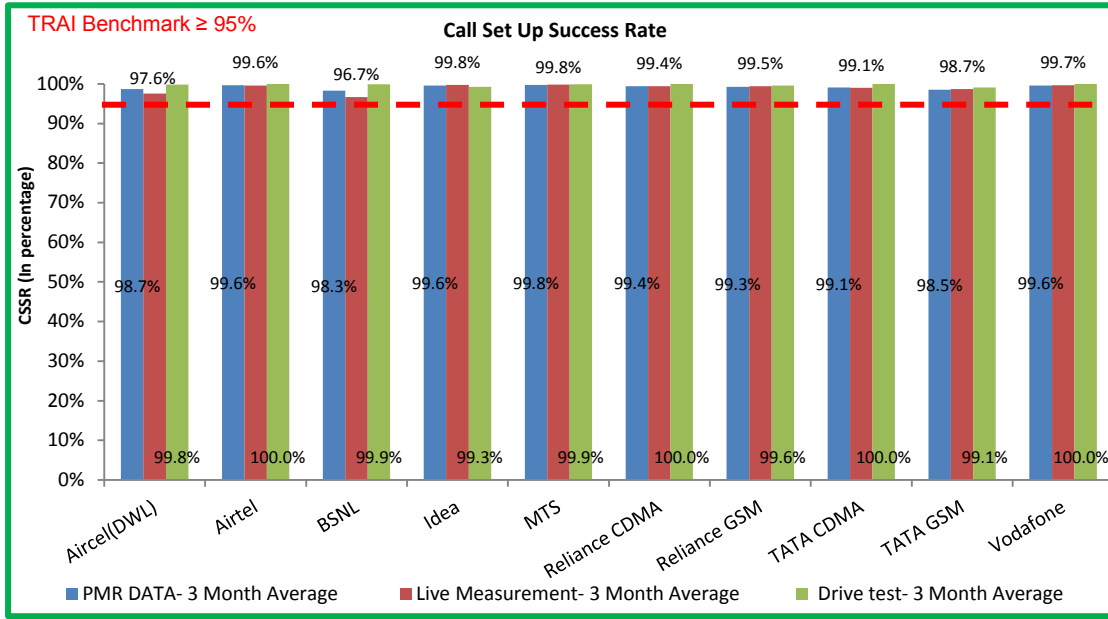
All operators meet the TRAI benchmark of having BTS downtime less than 2%. Both PMR and Live measurement data are similar in almost all the operators.

### 5.2 WORST AFFECTED BTS DUE TO DOWNTIME



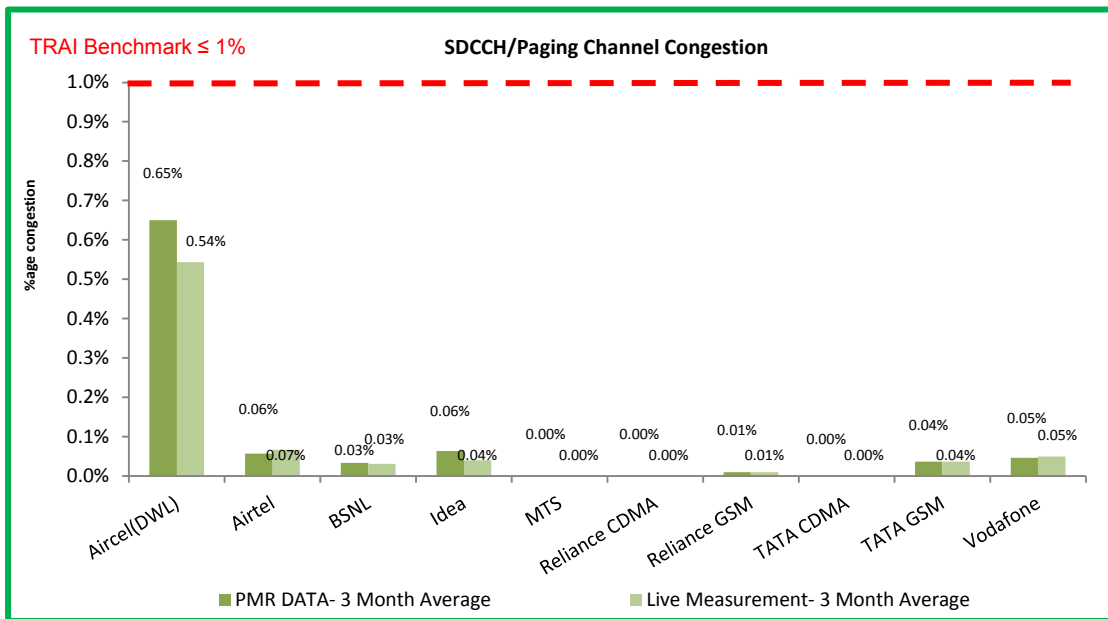
All operators meet the benchmark for the worst affected BTS due to downtime. Although BSNL and Airtel meet the benchmark on PMR data however their performance is low when compared to other operators and there was a significant difference between PMR and Live Measurement data for the same.

### 5.3 CALL SET UP SUCCESS RATE



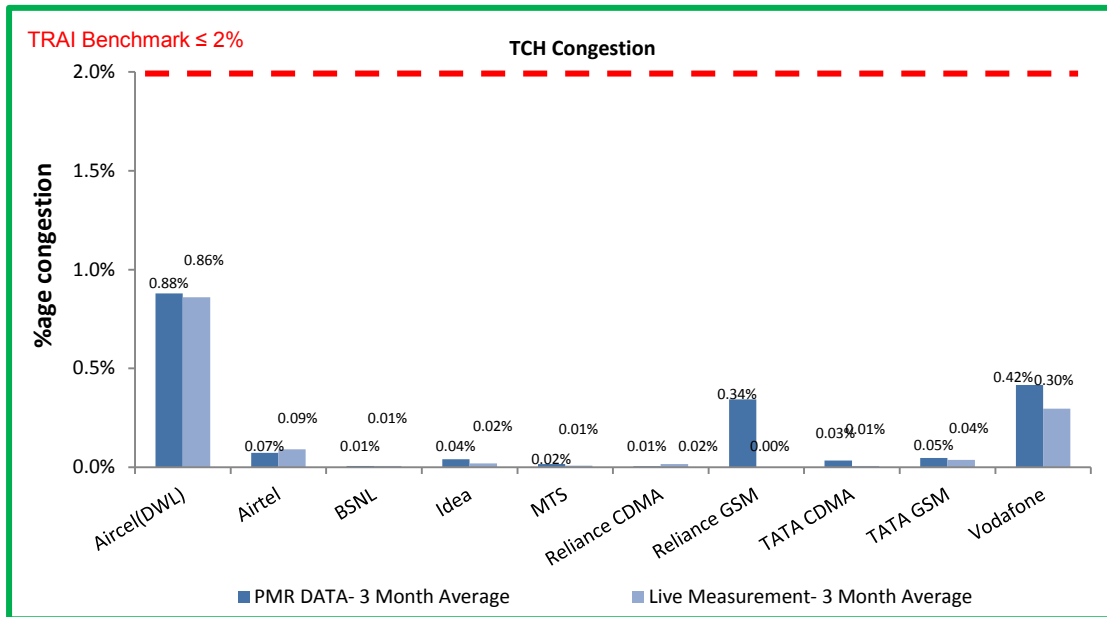
All operators are meeting the benchmark across Monthly PMR, Live measurement, and Drive Test.

### 5.4 SDCCH/PAGING CHANNEL CONGESTION



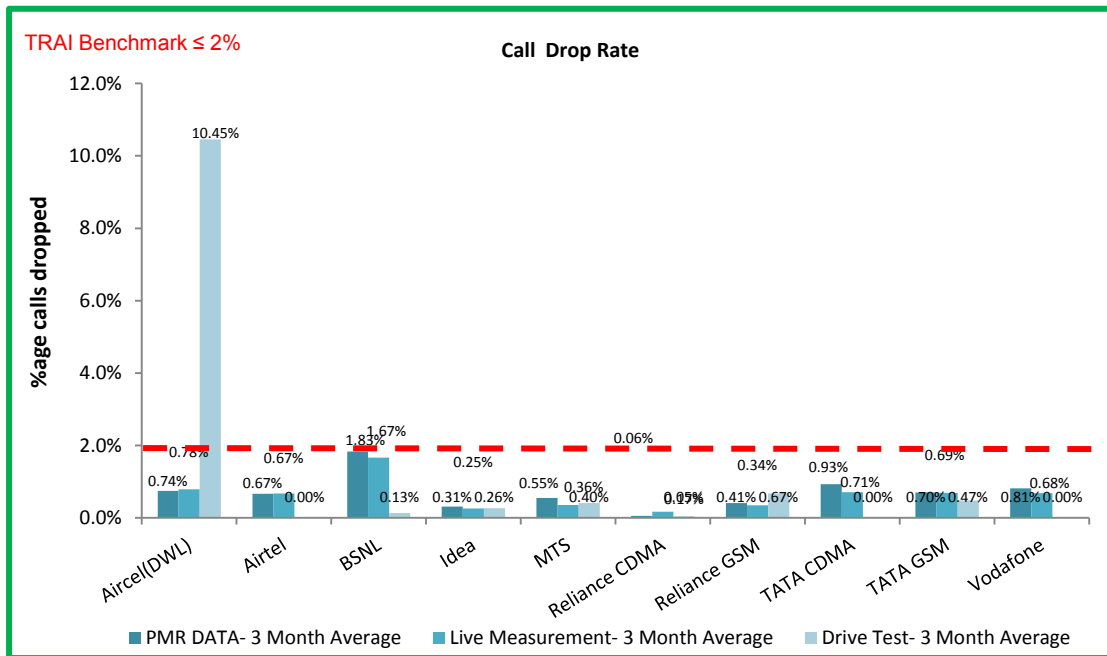
All operators meet the benchmark with almost similar results for the PMR data and the live measurement.

### 5.5 TCH CONGESTION



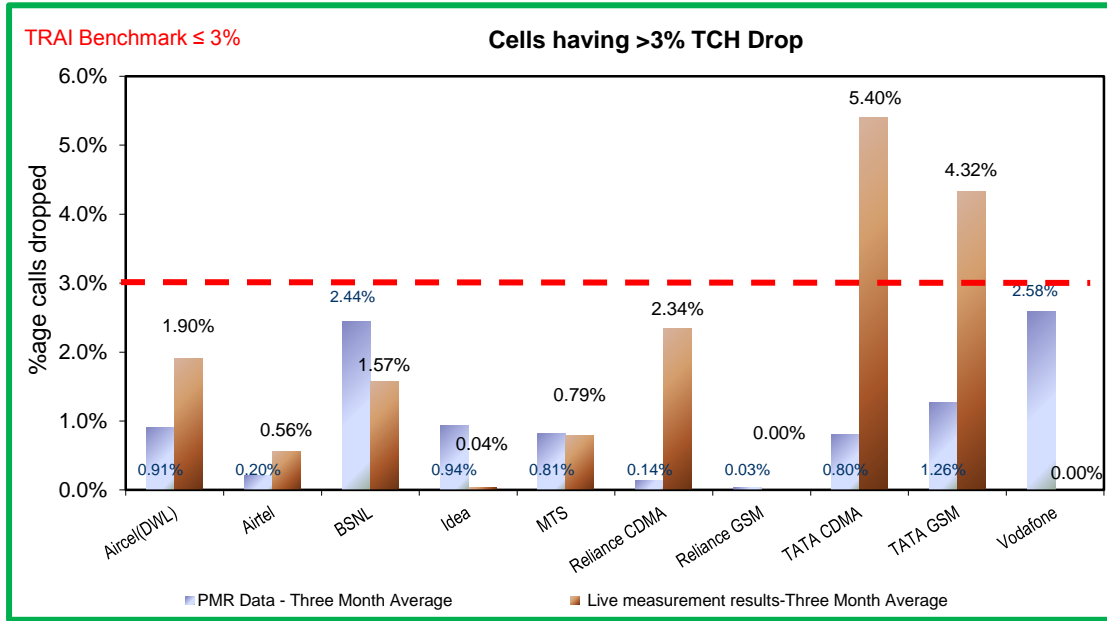
All the operators meet the benchmark, there was significant difference between the PMR Data and Live measurement for Reliance GSM.

### 5.6 CALL DROP RATE



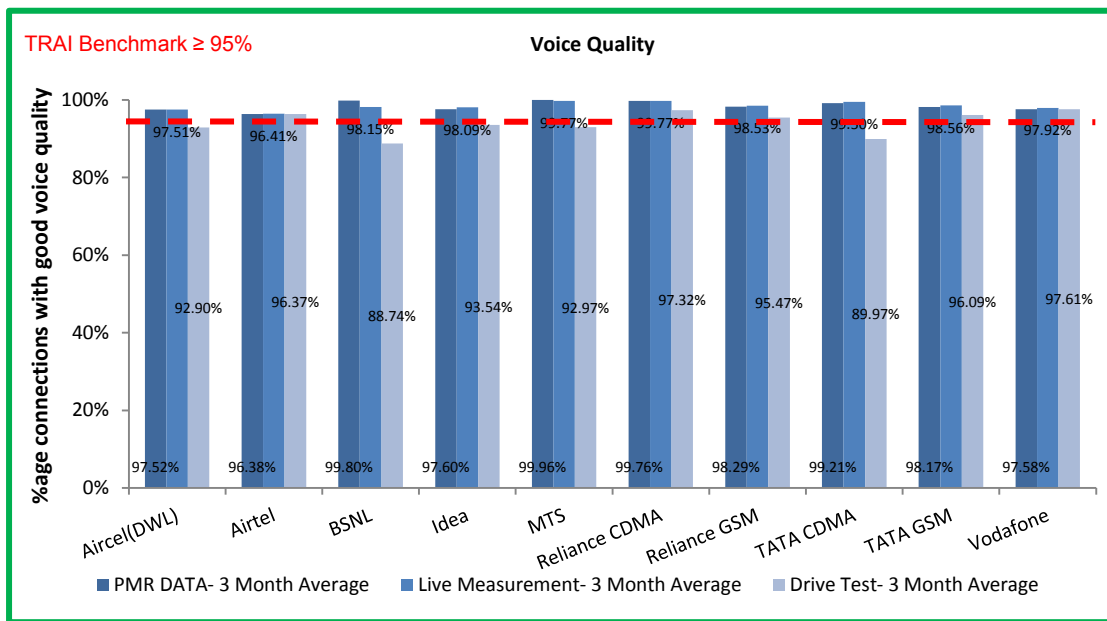
All the operators meet the benchmark specified by TRAI except Airtel that fails meet the benchmark for drive test segment only

### 5.7 CELLS HAVING GREATER THAN 3% TCH DROP



All the operators meet the benchmark for cells having more than 3% TCH drop for PMR data. There is a considerable difference in Three month and Live data for all the operators especially for TATA CDMA and TATA GSM which fail to meet the benchmark for live measurement method.

### 5.8 VOICE QUALITY

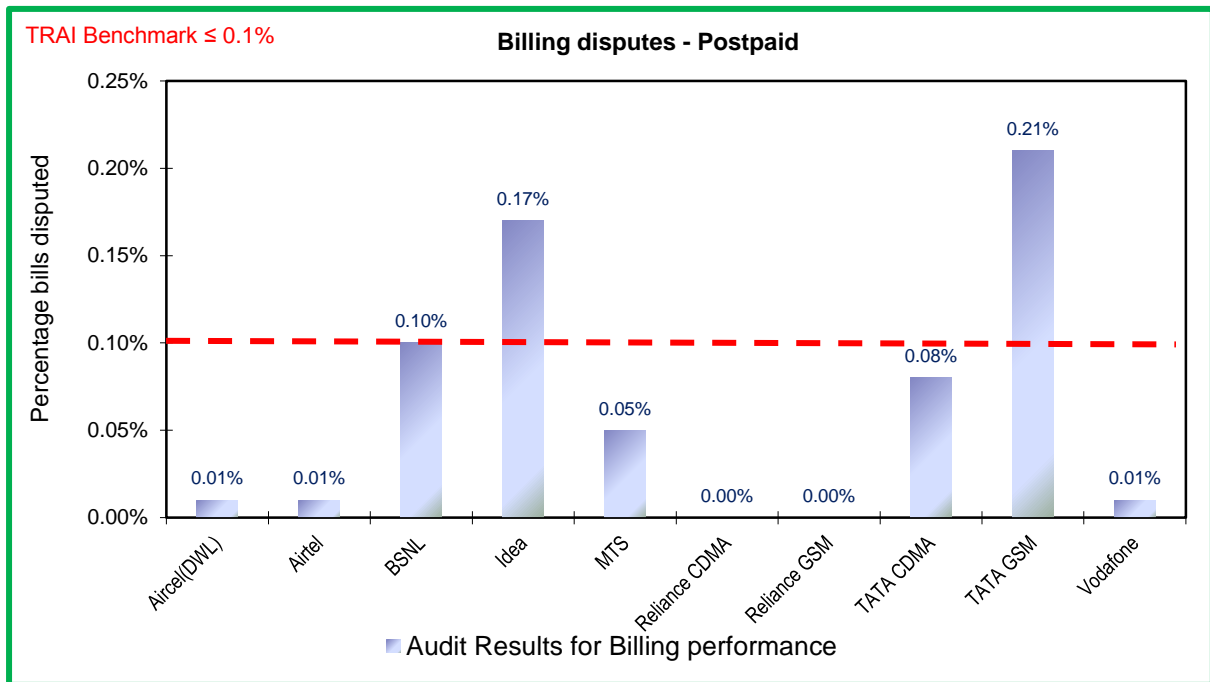


All the operators meet the benchmark for PMR and Live data but for drive test Airtel, BSNL, Idea, MTS, and TATA CDMA operators do not meet the benchmark.



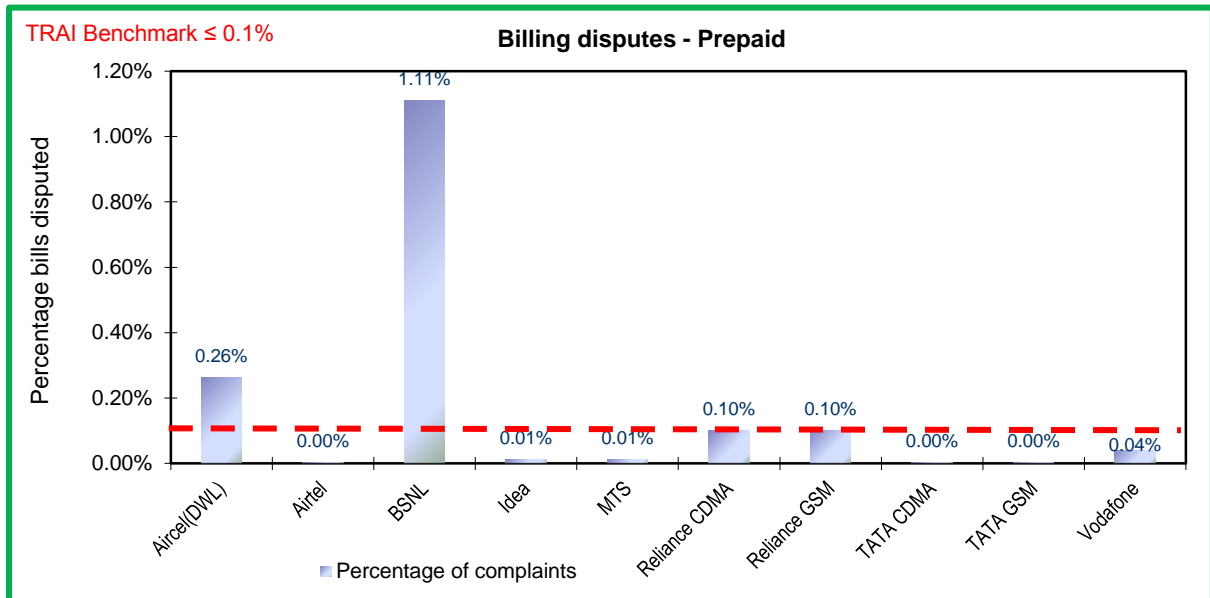
## 6 DETAILED FINDINGS – NON NETWORK PARAMETERS

### 6.1 BILLING DISPUTES-POSTPAID



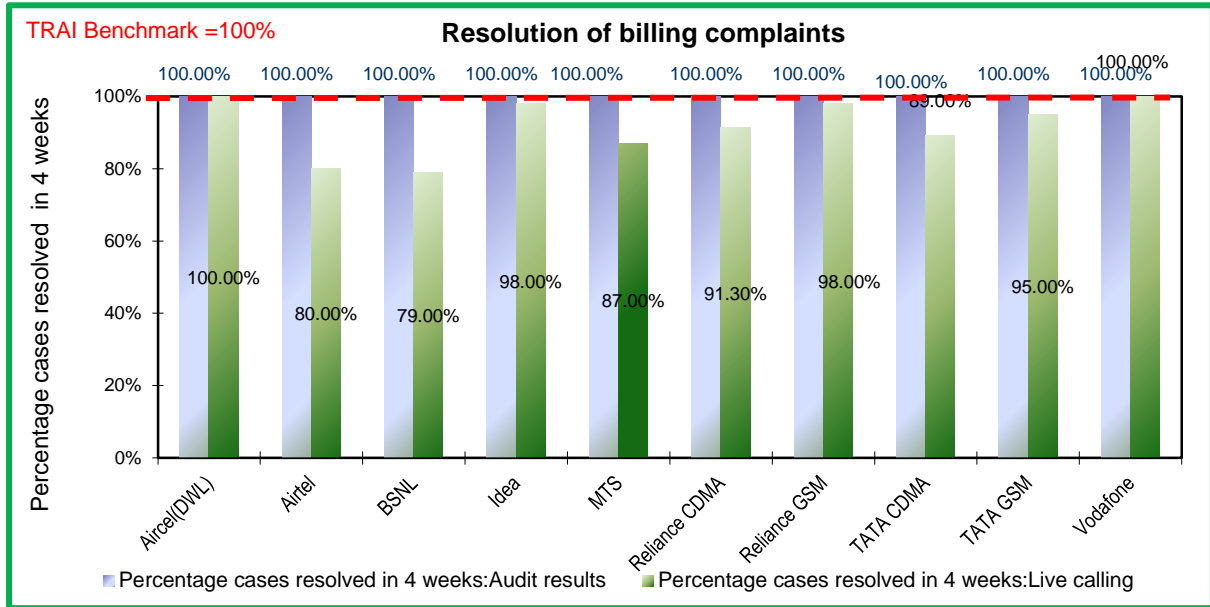
All operators meet the TRAI benchmark for percentage billing disputes for postpaid except Idea and TATA GSM.

### 6.2 BILLING DISPUTES-PREPAID



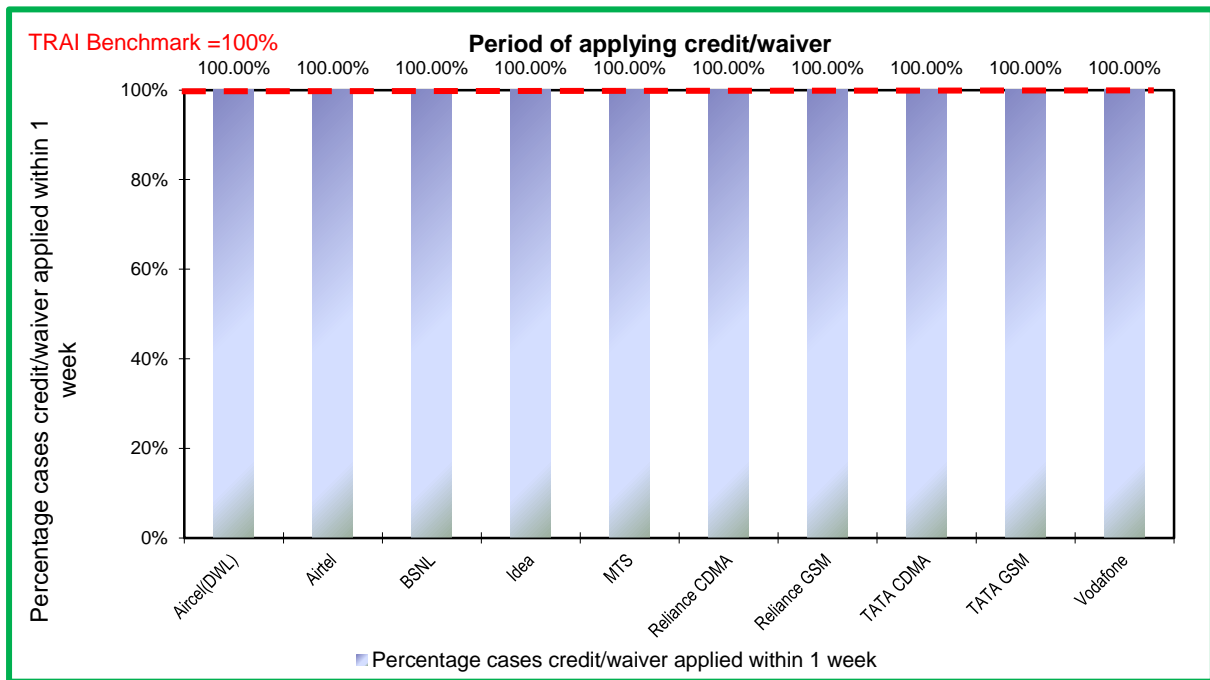
All operators meet the TRAI benchmark for percentage billing disputes for prepaid except Aircel and BSNL.

### 6.3 RESOLUTION OF BILLING COMPLAINTS



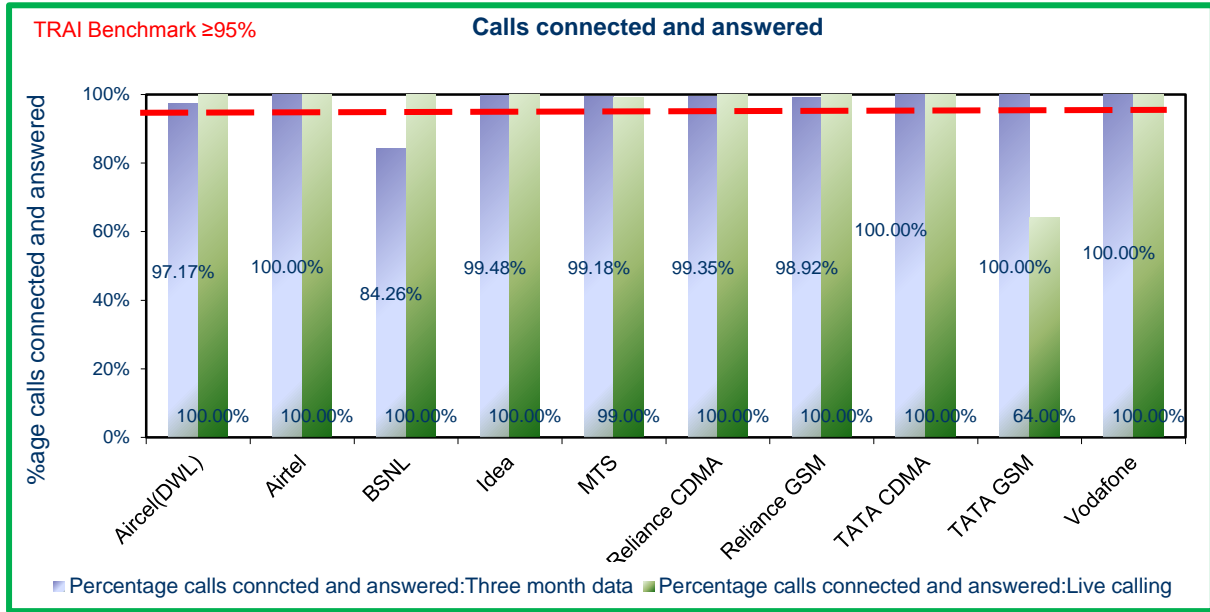
The audit results showed that all the operators meet the TRAI benchmark for 100% resolution of complaints within four weeks. However, for live calling case none of the operator is able to meet the benchmark except Aircel and Vodafone.

### 6.4 PERIOD OF APPLYING CREDIT/WAVIER



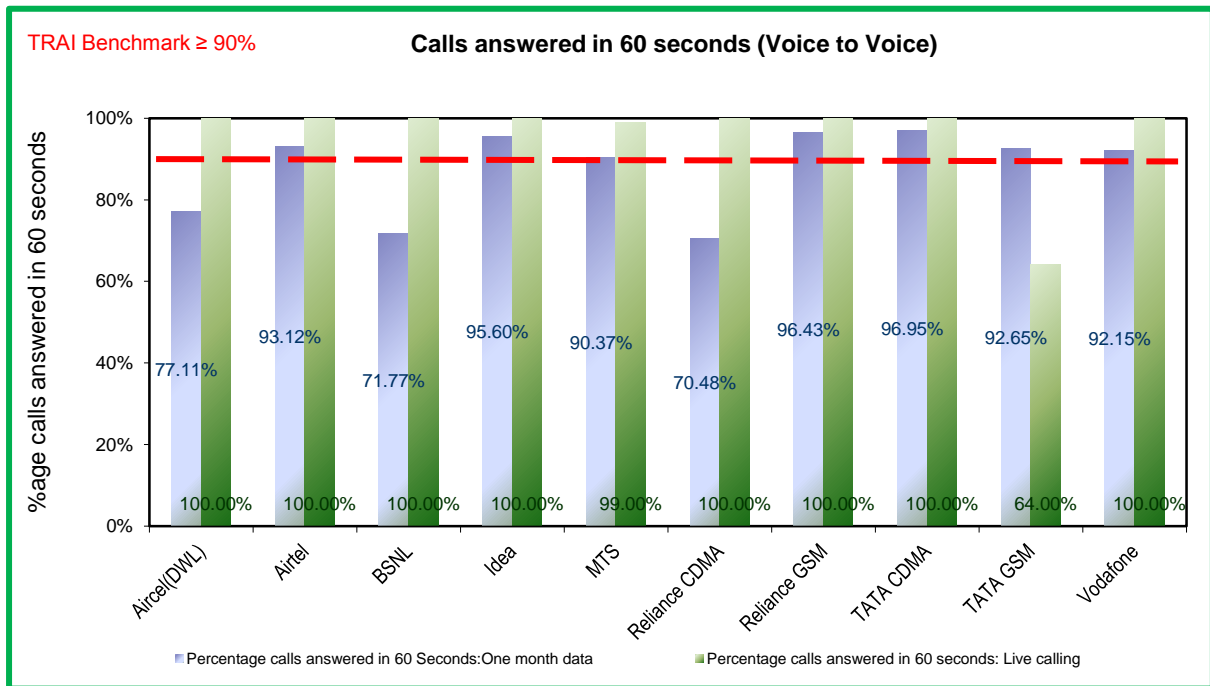
All operators meet the benchmark.

### 6.5 CALL CENTRE PERFORMANCE-IVR



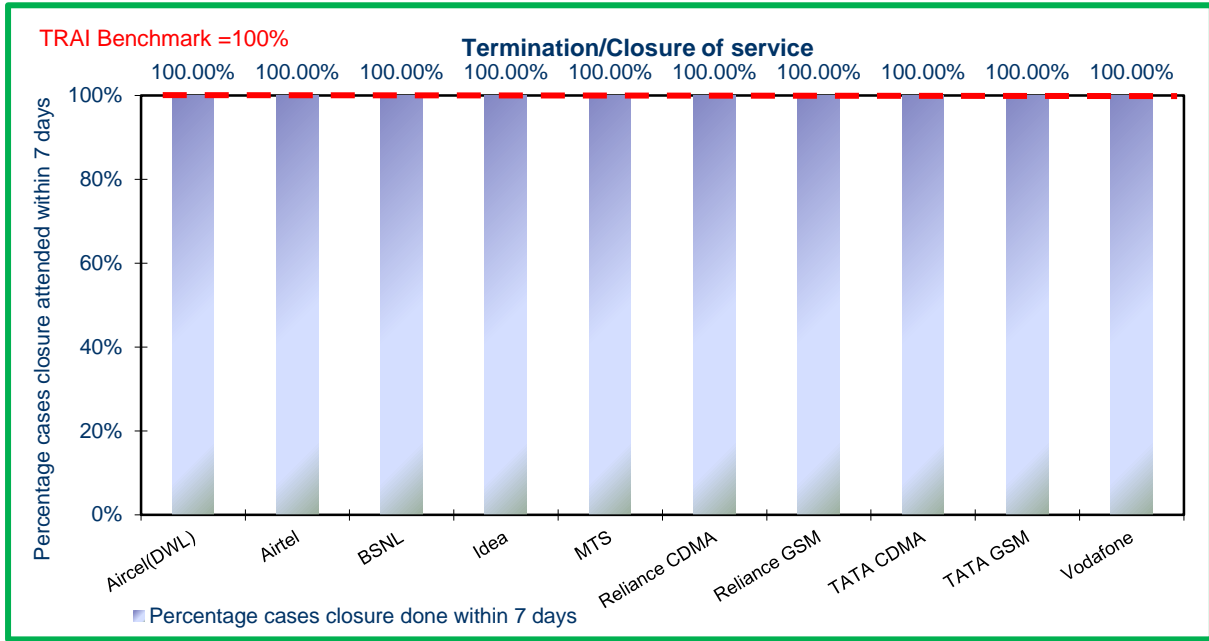
All operators meet the benchmark except BSNL in 3 month data and TATA GSM in live calling.

### 6.6 CALL CENTRE PERFORMANCE-VOICE TO VOICE



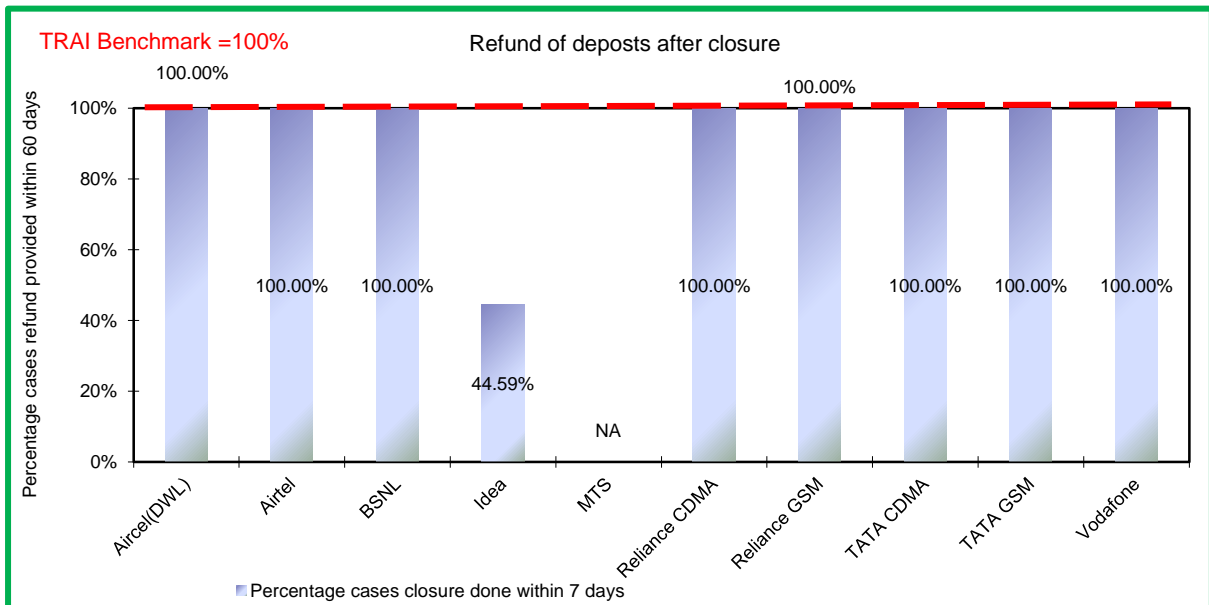
Except Aircel and BSNL in one month data and Tata GSM in live calling all other operator meet the TRAI laid down benchmark.

### 6.7 TERMINATION/CLOSURE OF SERVICE



All operators meet the benchmark.

### 6.8 REFUND OF DEPOSITS AFTER CLOSURE



All operators meet the benchmark except Idea.

## 7 ANNEXURE

### 7.1 NETWORK AVAILABILITY

Audit Results for Network Availability											
	Benchmark	Aircel(DWL)	Airtel	BSNL	Idea	MTS	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Vodafone
Number of BTSs in the licensed service area		1934.00	2250.00	1216.00	1902.67	536.00	484.00	1649.00	142.00	1687.33	2407.33
Sum of downtime of BTSs in a month (in hours)		7849.33	376.70	8209.00	1717.33	559.68	301.01	1462.33	117.20	101.31	552.67
BTSs accumulated downtime (not available for service)	≤ 2%	0.55%	0.02%	0.89%	0.12%	0.14%	0.08%	0.12%	0.11%	0.01%	0.03%
Number of BTSs having accumulated downtime >24 hours		35.33	0.33	24.00	4.33	0.00	0.33	3.33	0.00	1.00	1.33
Worst affected BTSs due to downtime	≤ 2%	1.83%	0.01%	1.98%	0.23%	0.00%	0.07%	0.20%	0.00%	0.06%	0.05%
Live Measurement- BTSs accumulated downtime											
	Benchmark	Aircel(DWL)	Airtel	BSNL	Idea	MTS	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Vodafone
Number of BTSs in the licensed service area		1939.67	2245.00	1219.67	1889.67	536.00	484.33	1649.00	142.00	1685.67	2399.33
Sum of downtime of BTSs in a month (in hours)		701.00	24.90	642.33	172.33	45.18	34.44	141.59	15.23	12.91	54.25
(not available for service)	≤ 2%	0.50%	0.02%	0.73%	0.13%	0.12%	0.10%	0.12%	0.15%	0.01%	0.03%
Number of BTSs having accumulated downtime >24 hours		7.33	0.00	2.00	2.00	0.00	0.00	0.00	0.00	2.00	0.00
Live Mesurement - Worst affected BTSs due to downtime	≤ 2%	0.38%	0.00%	0.16%	0.11%	0.00%	0.00%	0.00%	0.00%	0.12%	0.00%

## 7.2 NETWORK CHANNEL CONGESTION

Audit Results for CSSR, SDCCH and TCH congestion											
CSSR	Benchmark	Aircel(DWL)	Airtel	BSNL	Idea	MTS	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Vodafone
CSSR	≥ 95%	98.69%	99.64%	98.28%	99.61%	99.79%	99.39%	99.30%	99.09%	98.53%	99.58%
SDCCH congestion	Benchmark	Aircel(DWL)	Airtel	BSNL	Idea	MTS	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Vodafone
SDCCH/Paging channel congestion	≤ 1%	0.65%	0.06%	0.03%	0.06%	0.00%	0.00%	0.01%	0.00%	0.04%	0.05%
TCH congestion	Benchmark	Aircel(DWL)	Airtel	BSNL	Idea	MTS	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Vodafone
TCH congestion	≤ 2%	0.88%	0.07%	0.01%	0.04%	0.02%	0.01%	0.34%	0.03%	0.05%	0.42%
Live measurement results for CSSR, SDCCH and TCH congestion											
CSSR	Benchmark	Aircel(DWL)	Airtel	BSNL	Idea	MTS	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Vodafone
CSSR	≥ 95%	97.59%	99.62%	96.67%	99.79%	99.85%	99.42%	99.46%	99.05%	98.67%	99.70%
SDCCH congestion	Benchmark	Aircel(DWL)	Airtel	BSNL	Idea	MTS	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Vodafone
SDCCH/Paging channel congestion	≤ 1%	0.54%	0.07%	0.03%	0.04%	0.00%	0.00%	0.01%	0.00%	0.04%	0.05%
TCH congestion	Benchmark	Aircel(DWL)	Airtel	BSNL	Idea	MTS	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Vodafone
TCH congestion	≤ 2%	0.86%	0.09%	0.01%	0.02%	0.01%	0.02%	0.00%	0.01%	0.04%	0.30%

Drive test results for CSSR (Average of three drive tests) and blocked calls											
CSSR	Benchmark	Aircel(DWL)	Airtel	BSNL	Idea	MTS	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Vodafone
Total number of call attempts		530.67	632.33	595.67	619.67	577.67	679.33	701.33	578.00	693.33	551.67
Total number of successful calls established		529.67	632.33	595.33	615.00	577.00	679.33	697.67	578.00	687.33	551.67
CSSR	≥ 95%	99.81%	100.00%	99.92%	99.26%	99.89%	100.00%	99.55%	100.00%	99.13%	100.00%
Blocked calls	Benchmark	Aircel(DWL)	Airtel	BSNL	Idea	MTS	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Vodafone
%age blocked calls		0.19%	0.00%	0.08%	0.74%	0.11%	0.00%	0.45%	0.00%	0.87%	0.00%

### 7.3 CALL DROP RATE

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	MTS	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Vodafone
Total number of calls established		82301930.33	112917023.33	581568.00	41917427.00	21438578.33	24899870.00	36281146.67	3051022.33	53865066.00	123167580.00
Total number of calls dropped		611004.67	752291.33	10549.67	131438.00	116789.67	14049.67	149585.00	28375.67	376992.67	997367.33
Call drop rate	≤ 2%	0.74%	0.67%	1.83%	0.31%	0.55%	0.06%	0.41%	0.93%	0.70%	0.81%
Cells having more than 3% TCH	Benchmark	Aircel(DWL)	Airtel	BSNL	Idea	MTS	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Vodafone
Total number of cells in the network		3869.33	4246.67	2286.67	116649.00	1184.00	969.00	3298.67	306.33	3338.33	4100.33
Total number of cells having more than 3% TCH		1962.67	2128.33	1186.00	53444.00	600.00	484.00	1649.00	154.67	1699.67	2134.67
Worst affected cells having more than 3% TCH	≤ 3%	0.91%	0.20%	2.44%	0.94%	0.81%	0.14%	0.03%	0.80%	1.26%	2.58%

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	MTS	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Vodafone
Total number of calls established		8666648.33	11487984.00	522725.67	52083897.67	30739355.33	24329554.00	47848638.67	3978797.00	71831417.33	177743537.00
Total number of calls dropped		67974.33	77245.33	8716.00	132773.00	110005.67	15821.00	163097.00	28346.33	495888.67	1211788.33
Call drop rate	≤ 2%	0.78%	0.67%	1.67%	0.25%	0.36%	0.17%	0.34%	0.71%	0.69%	0.68%
Cells having more than 3% TCH	Benchmark	Aircel(DWL)	Airtel	BSNL	Idea	MTS	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Vodafone
Total number of cells in the network		3884.33	12718.33	2270.00	269313.00	1185.00	980.00	3298.33	313.67	4719.67	0.00
Total number of cells having more than 3% TCH		1993.00	6401.00	1169.33	134791.67	598.33	504.00	1647.67	168.33	203.00	0.00
Worst affected cells having more than 3% TCH	≤ 3%	1.90%	0.56%	1.57%	0.04%	0.79%	2.34%	0.00%	5.40%	4.32%	0.00%
Drive test results for Call drop rate (Average of three drive tests)											
Call drop rate	Benchmark	Aircel(DWL)	Airtel	BSNL	Idea	MTS	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Vodafone
Total number of calls established		532.67	627.67	595.67	615.00	577.33	681.67	697.33	578.00	687.00	551.67
Total number of calls dropped		52.67	0.00	0.67	1.67	2.67	0.33	5.00	0.00	3.33	0.00
Call drop rate	≤ 2%	10.45%	0.00%	0.13%	0.26%	0.40%	0.05%	0.67%	0.00%	0.47%	0.00%



## 7.4 VOICE QUALITY

Audit Results for Voice quality											
Voice quality	Benchmark	Aircel(DWL)	Airtel	BSNL	Idea	MTS	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Vodafone
Total number of sample calls		14800058598.33	18173554828.00	7000.00	5227317201.67	21438578.33	NA	5390965871.67	191542710.67	8986936920.67	17144022016.00
Total number of calls with good voice quality		14433557758.67	17515450788.00	6986.00	5101529899.33	21429419.67	NA	5298440315.00	190032032.33	8821490549.67	16728697246.67
%age calls with good voice quality	≥ 95%	97.52%	96.38%	99.80%	97.60%	99.96%	99.76%	98.29%	99.21%	98.17%	97.58%
Live measurement results for Voice quality											
Voice quality	Benchmark	Aircel(DWL)	Airtel	BSNL	Idea	MTS	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Vodafone
Total number of sample calls		1578640178.33	1838565729.00	670.67	6299486236.33	NA	NA	7235264932.33	241955952.00	14856368260.67	15672831933.00
Total number of calls with good voice quality		1539092784.67	1772593190.67	658.33	6178778850.33	NA	NA	7129046669.33	240787542.73	14643910110.33	21376052485.00
%age calls with good voice quality	≥ 95%	97.51%	96.41%	98.15%	98.09%	NA	99.77%	98.53%	99.50%	98.56%	97.92%
Drive test results for Voice quality (Average of three drive tests)											
Voice quality	Benchmark	Aircel(DWL)	Airtel	BSNL	Idea	MTS	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Vodafone
Total number of sample calls		512916.00	154344.00	960715.67	846234.67	19043.33	71368.67	55884.67	57045.33	147236.00	144736.33
Total number of calls with good voice quality		471921.33	148727.33	859603.33	792027.00	17722.00	69496.00	53372.33	52541.67	141417.33	141370.67
%age calls with good voice quality	≥ 95%	92.90%	96.37%	88.74%	93.54%	92.97%	97.32%	95.47%	89.97%	96.09%	97.61%

Note: -Reliance GSM is not sharing the bases for calculating the voice quality. It is same across all the circles.

## 7.5 POI CONGESTION

Audit Results for POI Congestion											
POI congestion	Benchmark	Aircel(DWL)	Airtel	BSNL	Idea	MTS	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Vodafone
Total number of working POIs		34.67	31.00	90.33	81.00	45.00	12.00	27.00	53.00	46.00	40.00
No. of POIs not meeting benchmark		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total Capacity of all POIs (A) - in erlangs		51398.75	75999.30	576081.00	54251.53	37268.32	8153.00	11028.67	27797.50	26228.67	178187.00
Traffic served for all POIs (B)- in erlangs		30256.95	58662.78	14196.33	23861.25	13544.14	4318.67	6521.33	12194.93	14812.33	87876.00
POI congestion	≤ 0.5%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Live Measurement Results for POI Congestion											
POI congestion	Benchmark	Aircel(DWL)	Airtel	BSNL	Idea	MTS	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Vodafone
Total number of working POIs		34.67	31.00	90.67	80.67	44.67	6.00	18.00	56.00	45.67	40.00
No. of POIs not meeting benchmark		0.00	0.00	0.33	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total Capacity of all POIs (A) - in erlangs		51750.11	227571.91	577764.67	54173.33	37147.94	4076.50	7198.67	27946.71	26164.50	178464.33
Traffic served for all POIs (B)- in erlangs		31242.78	117243.83	14290.00	24095.00	13706.11	2750.00	4432.00	12524.68	14868.33	88606.33
POI congestion	≤ 0.5%	0.00%	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	MTS	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Vodafone
Billing disputes - Postpaid											
Total bills generated during the period		22094.00	1271913.00	94821.00	72138.00	61086.00	254366.00	163752.00	356168.00	84013.00	2518051.00
Total number of bills disputed		2.00	101.00	98.00	124.00	29.00	242.00	153.00	282.00	178.00	185.00
Percentage bills disputed	≤ 0.1%	0.01%	0.01%	0.10%	0.17%	0.05%	0.10%	0.09%	0.08%	0.21%	0.01%
Billing disputes - Prepaid											
Number of complaints related to charging, credit & validity		7671.00	115.00	8214.00	450.00	222.00	3208.00	7653.00	17.00	92.00	1536.00
Total number of prepaid customers in that period		2927596.00	10371817.00	740689.00	3812981.00	1993578.00	3256013.00	7665140.00	1197210.00	7114266.00	3958791.00
Percentage of complaints	≤ 0.1%	0.26%	0.00%	1.11%	0.01%	0.01%	0.10%	0.10%	0.00%	0.00%	0.04%
Resolution of billing complaints											
Total number of billing/charging complaints		7673.00	216.00	8312.00	574.00	251.00	3450.00	7806.00	299.00	270.00	1721.00
Total complaints considered invalid		75607.00	7411.00	971.00	2945.00	66.00	247	0	277.00	260.00	1280.00
Number of complaints resolved in 4 weeks from date of receipt for complaints listed in 5.3.1		7673.00	216.00	8312.00	574.00	251.00	3450.00	7806.00	299.00	270.00	1721.00
Percentage complaints resolved within 4 weeks of date of receipt	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	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%	100.00%

Live calling results for resolution of billing complaints											
Resolution of billing complaints	Benchmark	Aircel(DWL)	Airtel	BSNL	Idea	MTS	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Vodafone
Total Number of calls made		31.00	100.00	100.00	100.00	100.00	23.00	100.00	100.00	100.00	100.00
Number of cases resolved in 4 weeks		31.00	80.00	79.00	98.00	87.00	21.00	98.00	89.00	95.00	100.00
Percentage cases resolved in four weeks	100.00%	100.00%	80.00%	79.00%	98.00%	87.00%	91.30%	98.00%	89.00%	95.00%	100.00%

## 7.7 CUSTOMER CARE

Audit results for customer care (IVR and voice-to-Voice)											
Customer Care Assessment	Benchmark	Aircel(DWL)	Airtel	BSNL	Idea	MTS	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Vodafone
Total number of call attempts to customer care for assistance		8167063.00	10679348.00	1509874.00	324035.00	1700346.00	1687636	6995031	86345.00	942629.00	8567172.00
Number of calls getting connected and answered (electronically)		7936176.00	10679348.00	1272253.00	322354.00	1686472.00	1676659	6919527	86345.00	942629.00	8567172.00
Percentage calls getting connected and answered	≥ 95%	97.17%	100.00%	84.26%	99.48%	99.18%	99.35%	98.92%	100.00%	100.00%	100.00%
Number of calls getting transferred to the operator (voice to voice)		2834880.00	2207341.00	645502.00	1391958.00	784713.00	511965	5227577	85047.00	923407.00	2756698.00
Number of calls answered by operator (voice to voice) within 60 seconds		2185986.00	2055556.00	463276.00	1330658.00	709145.00	360825	5041186	82453.00	855581.00	2540161.00
Percentage calls answered within 60 seconds (V2V)	≥ 90%	77.11%	93.12%	71.77%	95.60%	90.37%	70.48%	94.62%	96.95%	92.65%	92.15%

Live calling results for customer care (IVR)											
Customer Care Assessment	Benchmark	Aircel(DWL)	Airtel	BSNL	Idea	MTS	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	100.00	100.00	100.00	100.00
Number of calls getting connected and answered (electronically)		100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	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%	100.00%
Live calling results for customer care (Voice to Voice)											
Customer Care Assessment	Benchmark	Aircel(DWL)	Airtel	BSNL	Idea	MTS	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	100.00	100.00	100.00	100.00
Total Number of calls getting connected and answered		100.00	100.00	100.00	100.00	99.00	100.00	100.00	100.00	64.00	100.00
Percentage calls getting connected and answered	≥ 95%	100.00%	100.00%	100.00%	100.00%	99.00%	100.00%	100.00%	100.00%	64.00%	100.00%

## 7.8 DRIVE TEST

Note: - Before seeing the results for this quarter, it is important to highlight that Vodafone did not share the Signal Strength data for any of the month while submitting the report for IMRB even after contacting the respected person operator failed to share the data.

### 7.8.1 JANUARY- NORTH KOLKATA

Name of SSA	North Kolkata	Month	January	Day	One																
	B*mark	Aircel(DWL)		Airtel		BSNL		Idea		MTS		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	In door	Outdoor
Signal Strength -0 to -75 dBm		50.00%	92.42%	96.88%	99.73%	97.01%	83.40%	1.34%	94.60%	NA	NA	NA	NA	2.15%	63.78%	NA	NA	52.57%	90.28%	NDR	NDR
Signal Strength --75 to -85 dBm		35.00%	6.82%	3.12%	0.27%	2.99%	13.41%	43.35%	4.96%					66.01%	29.63%			45.11%	8.42%	NDR	NDR
Signal Strength --85 to -120 dBm		15.00%	0.76%	0.00%	0.01%	0.00%	3.19%	55.32%	0.44%					31.84%	6.59%			2.32%	1.30%	NDR	NDR
Voice quality	≥ 95%	98.05%	93.16%	97.55%	95.89%	98.61%	97.57%	90.38%	91.96%	99.45%	95.98%	100.00%	98.92%	97.17%	95.82%	98.07%	97.00%	99.12%	95.57%	98.10%	97.30%
CSSR	≥ 95%	100.00%	99.37%	100.00%	100.00%	100.00%	99.63%	100.00%	98.31%	100.00%	99.50%	100.00%	100.00%	100.00%	99.14%	100.00%	100.00%	100.00%	98.68%	100.00%	100.00%
%age Blocked calls		0.00%	0.63%	0.00%	0.00%	0.00%	0.37%	0.00%	1.68%	0.00%	0.50%	0.00%	0.00%	0.00%	0.86%	0.00%	0.00%	0.00%	1.32%	0.00%	0.00%
Call drop rate	≤ 2%	0.00%	0.00%	0.00%	0.00%	0.00%	0.36%	0.00%	0.45%	0.00%	0.49%	0.00%	0.00%	0.00%	0.29%	0.00%	0.00%	0.00%	1.31%	0.00%	0.00%
Hands off success rate		100.00%	100.00%	100.00%	100.00%	100.00%	99.76%	100.00%	99.77%	0.00%	100.00%	100.00%	100.00%	100.00%	98.76%	100.00%	100.00%	100.00%	98.17%	100.00%	100.00%

Name of SSA	North Kolkata	Month	January	Day	Two																
	B*mark	Aircel(DWL)		Airtel		BSNL		Idea		MTS		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	In door	Outdoor
Signal Strength -0 to -75 dBm		100.00%	86.41%	89.12%	99.20%	100.00%	85.71%	43.33%	92.02%	NA	NA	NA	NA	18.09%	64.89%	NA	NA	79.91%	86.39%	NDR	NDR
Signal Strength --75 to -85 dBm		0.00%	10.46%	10.89%	0.78%	0.00%	11.34%	56.08%	5.81%					69.25%	30.58%			19.90%	10.11%	NDR	NDR
Signal Strength --85 to -120 dBm		0.00%	3.14%	0.00%	0.02%	0.00%	2.95%	0.60%	2.17%					12.66%	4.53%			0.20%	3.50%	NDR	NDR
Voice quality	≥ 95%	99.25%	90.36%	97.98%	95.91%	98.64%	96.23%	95.62%	92.85%	99.87%	96.70%	99.98%	97.44%	96.05%	94.82%	97.09%	95.65%	98.92%	94.60%	97.10%	97.40%
CSSR	≥ 95%	100.00%	100.00%	100.00%	100.00%	100.00%	99.68%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	99.07%	100.00%	100.00%	100.00%	99.41%	100.00%	100.00%
%age Blocked calls		0.00%	0.00%	0.00%	0.00%	0.00%	0.32%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.92%	0.00%	0.00%	0.00%	0.59%	0.00%	0.00%
Call drop rate	≤ 2%	0.00%	0.39%	0.00%	0.00%	0.00%	0.31%	0.00%	0.00%	0.00%	0.00%	0.00%	1.43%	0.00%	2.29%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Hands off success rate		100.00%	99.81%	100.00%	100.00%	100.00%	99.85%	100.00%	100.00%	100.00%	100.00%	100.00%	99.97%	100.00%	99.83%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%

Name of SSA	North Kolkata	Month	January	Day	Three																
	B'mark	Aircel(DWL)		Airtel		BSNL		Idea		MTS		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	In door	Outdoor
Signal Strength -0 to -75 dBm		47.50%	85.74%	93.79%	99.06%	97.32%	82.69%	86.29%	98.39%	NA		NA		9.39%	64.23%	NA		53.51%	96.58%	NDR	NDR
Signal Strength --75 to -85 dBm		32.50%	12.07%	5.77%	0.88%	2.44%	16.45%	13.67%	1.60%	NA		NA		76.66%	33.54%	NA		4.64%	3.28%	NDR	NDR
Signal Strength --85 to -120 dBm		20.00%	2.19%	0.45%	0.06%	0.23%	0.86%	0.04%	0.01%	NA		NA		13.95%	2.22%	NA		41.86%	0.14%	NDR	NDR
Voice quality	≥ 95%	95.75%	92.25%	97.99%	96.18%	98.60%	99.65%	97.30%	94.52%	99.01%	97.94%	100.00%	99.12%	94.86%	95.93%	95.89%	65.35%	97.16%	98.23%	97.65%	96.30%
CSSR	≥ 95%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	99.67%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	99.41%	100.00%	100.00%
%age Blocked calls		0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.33%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.59%	0.00%	0.00%
Call drop rate	≤ 2%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.30%	0.00%	0.00%
Hands off success rate		100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	NA	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	99.73%	100.00%	100.00%

### 7.8.2 FEBRUARY- SOUTH KOLKATA

Name of SSA	South Kolkata	Month	February	Day	One																
	B'mark	Aircel(DWL)		Airtel		BSNL		Idea		MTS		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	In door	Outdoor
Signal Strength -0 to -75 dBm		10.00%	70.51%	100.00%	97.28%	97.88%	96.59%	60.47%	97.42%	NA		NA		37.50%	62.43%	NA		92.49%	90.63%	NDR	NDR
Signal Strength --75 to -85 dBm		80.00%	23.66%	0.00%	2.72%	1.94%	3.10%	39.53%	2.13%	NA		NA		52.50%	35.27%	NA		7.51%	8.38%	NDR	NDR
Signal Strength --85 to -120 dBm		10.00%	5.83%	0.00%	0.00%	0.18%	0.31%	0.00%	0.46%	NA		NA		10.00%	2.30%	NA		0.00%	0.98%	NDR	NDR
Voice quality	≥ 95%	99.55%	92.63%	98.61%	95.71%	99.71%	97.88%	98.17%	95.32%	99.66%	95.82%	99.96%	98.88%	98.01%	96.12%	99.82%	95.27%	98.82%	95.09%	99.60%	97.90%
CSSR	≥ 95%	100.00%	98.88%	100.00%	100.00%	100.00%	100.00%	100.00%	99.54%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	98.23%	100.00%	100.00%
%age Blocked calls		0.00%	1.12%	0.00%	0.00%	0.00%	0.00%	0.00%	0.46%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	1.77%	0.00%	0.00%
Call drop rate	≤ 2%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.46%	0.00%	0.43%	0.00%	0.40%	0.00%	0.44%	0.00%	0.00%	0.00%	0.42%	0.00%	0.00%
Hands off success rate		100.00%	100.00%	100.00%	100.00%	90.00%	100.00%	100.00%	99.67%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	98.79%	100.00%	100.00%

Name of SSA	South Kolkata	Month	February	Day	Two																
	B'mark	Aircel(DWL)		Airtel		BSNL		Idea		MTS		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	In door	Outdoor
Signal Strength - 0 to -75 dBm		95.00%	85.01%	100.00%	96.86%	98.25%	92.05%	97.50%	97.62%	NA		NA		37.14%	73.10%	NA		66.28%	92.19%	NDR	NDR
Signal Strength --75 to -85 dBm		5.00%	14.26%	0.00%	2.49%	1.75%	6.90%	2.50%	2.04%	NA		NA		58.10%	24.37%	NA		31.60%	7.79%	NDR	NDR
Signal Strength --85 to -120 dBm		0.00%	0.72%	0.00%	0.65%	0.00%	1.06%	0.00%	0.34%	NA		NA		4.76%	2.54%	NA		2.12%	0.02%	NDR	NDR
Voice quality	≥ 95%	98.60%	94.47%	99.13%	96.13%	99.76%	99.62%	97.25%	94.28%	98.44%	96.90%	100.00%	99.24%	99.09%	97.74%	97.72%	96.73%	98.43%	96.27%	99.40%	97.83%
CSSR	≥ 95%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	98.19%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	99.66%	100.00%	100.00%
%age Blocked calls		0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	1.81%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.34%	0.00%	0.00%
Call drop rate	≤ 2%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.72%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Hands off success rate		100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	99.69%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	67.43%	100.00%	100.00%
Name of SSA	South Kolkata	Month	February	Day	Three																
	B'mark	Aircel(DWL)		Airtel		BSNL		Idea		MTS		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	In door	Outdoor
Signal Strength - 0 to -75 dBm		95.00%	83.76%	100.00%	93.63%	98.15%	94.59%	50.00%	97.10%	NA		NA		100.00%	79.98%	NA		97.35%	80.88%	NDR	NDR
Signal Strength --75 to -85 dBm		5.00%	13.17%	0.00%	6.37%	1.85%	3.35%	45.00%	2.90%	NA		NA		0.00%	18.13%	NA		2.65%	16.83%	NDR	NDR
Signal Strength --85 to -120 dBm		0.00%	3.07%	0.00%	0.00%	0.00%	2.06%	5.00%	0.00%	NA		NA		0.00%	1.88%	NA		0.00%	2.28%	NDR	NDR
Voice quality	≥ 95%	95.55%	90.43%	97.87%	95.12%	99.05%	99.40%	96.45%	92.67%	100.00%	93.64%	99.98%	98.55%	97.29%	95.20%	99.50%	95.10%	99.65%	93.78%	98.70%	98.77%
CSSR	≥ 95%	100.00%	98.99%	100.00%	100.00%	100.00%	100.00%	100.00%	98.48%	100.00%	99.45%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	99.49%	100.00%	100.00%
%age Blocked calls		0.00%	1.01%	0.00%	0.00%	0.00%	0.00%	0.00%	1.52%	0.00%	0.55%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.51%	0.00%	0.00%
Call drop rate	≤ 2%	0.00%	1.62%	0.00%	0.00%	0.00%	0.00%	0.00%	0.55%	0.00%	2.50%	0.00%	0.00%	0.00%	0.42%	0.00%	0.00%	0.00%	2.05%	0.00%	0.00%
Hands off success rate		100.00%	99.20%	100.00%	100.00%	100.00%	100.00%	100.00%	99.78%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	66.67%	100.00%	0.00%	98.57%	100.00%	100.00%



**7.8.3 MARCH- CENTRAL KOLKATA**

Name of SSA	Central Kolkata	Month	March	Day	One																	
	B'mark	Aircel(DWL)		Airtel		BSNL		Idea		MTS		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	In door	Outdoor	
Signal Strength -0 to -75 dBm		100.00%	100.00%	100.00%	100.00%	100.00%	96.62%	100.00%	99.21%	NA		NA		97.50%	90.58%	NA		54.33%	48.90%	NDR	NDR	
Signal Strength --75 to -85 dBm		0.00%	0.00%	0.00%	0.00%	0.00%	3.38%	0.00%	0.79%	NA		NA		2.50%	8.97%	NA		39.58%	46.02%	NDR	NDR	
Signal Strength --85 to -120 dBm		0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	NA		NA		0.00%	0.46%	NA		6.09%	5.08%	NDR	NDR	
Voice quality	≥ 95%	91.20%	85.83%	97.87%	96.09%	99.55%	99.52%	97.41%	93.15%	99.77%	96.76%	99.98%	98.33%	98.94%	93.60%	97.61%	97.12%	98.51%	94.75%	99.35%	96.63%	
CSSR	≥ 95%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	98.55%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	98.08%	99.50%	100.00%	100.00%	
%age Blocked calls		0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	1.45%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	1.92%	0.50%	0.00%	0.00%	
Call drop rate	≤ 2%	2.38%	1.96%	0.00%	0.00%	0.00%	0.52%	0.00%	0.65%	0.00%	0.00%	0.00%	0.00%	0.69%	0.00%	0.00%	0.00%	0.00%	0.51%	0.00%	0.00%	
Hands off success rate		99.68%	99.26%	100.00%	100.00%	100.00%	100.00%	100.00%	99.67%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	94.53%	100.00%	100.00%	
Name of SSA	Central Kolkata	Month	March	Day	Two																	
	B'mark	Aircel(DWL)		Airtel		BSNL		Idea		MTS		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	In door	Outdoor	
Signal Strength -0 to -75 dBm		100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	99.38%	NA		NA		64.29%	75.15%	NA		52.57%	77.38%	NDR	NDR	
Signal Strength --75 to -85 dBm		0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.62%	NA		NA		30.95%	24.85%	NA		45.16%	21.51%	NDR	NDR	
Signal Strength --85 to -120 dBm		0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	NA		NA		4.76%	0.00%	NA		2.27%	1.12%	NDR	NDR	
Voice quality	≥ 95%	99.30%	88.66%	99.48%	96.20%	99.52%	99.67%	98.83%	94.59%	99.34%	96.61%	100.00%	99.28%	99.68%	95.44%	98.20%	97.56%	98.50%	97.16%	98.30%	97.70%	
CSSR	≥ 95%	100.00%	99.56%	100.00%	100.00%	100.00%	100.00%	100.00%	99.70%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	99.64%	100.00%	100.00%	
%age Blocked calls		0.00%	0.44%	0.00%	0.00%	0.00%	0.00%	0.00%	0.30%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.36%	0.00%	0.00%	
Call drop rate	≤ 2%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.23%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	
Hands off success rate		100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	99.36%	100.00%	100.00%	

Name of SSA	Central Kolkata	Month	March	Day	Three																
	B'mark	Aircel(DWL)		Airtel		BSNL		Idea		MTS		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	In door	Outdoor
Signal Strength -0 to -75 dbm		100.00%	99.33%	100.00%	100.00%	100.00%	98.20%	82.50%	100.00%	NA	NA	NA	NA	97.50%	90.58%	NA	NA	13.14%	43.64%	NDR	NDR
Signal Strength --75 to -85 dbm		0.00%	0.67%	0.00%	0.00%	0.00%	1.80%	17.50%	0.00%					2.50%	8.97%			70.95%	50.17%	NDR	NDR
Signal Strength --85 to -120 dbm		0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%					0.00%	0.46%			15.91%	6.18%	NDR	NDR
Voice quality	≥ 95%	94.30%	91.43%	97.87%	96.60%	99.83%	99.87%	95.69%	94.26%	98.18%	97.76%	99.98%	99.90%	98.01%	95.46%	97.03%	97.85%	99.03%	96.19%	98.20%	97.93%
CSSR	≥ 95%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
%age Blocked calls		0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Call drop rate	≤ 2%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.21%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Hands off success rate		100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	98.70%	100.00%	100.00%

### 7.8.4 SIGNAL STRENGTH DATA FOR CDMA OPERATORS

January	% Ec/Io BINS with less than -15	Day 1						Day2						Day 3					
		MTS		Reliance CDMA		TATA CDMA		MTS		Reliance CDMA		TATA CDMA		MTS		Reliance CDMA		TATA CDMA	
		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
		99.92%	99.18%	99.83%	99.29%	99.86%	99.35%	99.74%	98.49%	99.83%	98.17%	99.88%	97.85%	99.56%	99.34%	99.94%	99.37%	95.89%	66.20%
February	% Ec/Io BINS with less than -15	Day 1						Day2						Day 3					
		MTS		Reliance CDMA		TATA CDMA		MTS		Reliance CDMA		TATA CDMA		MTS		Reliance CDMA		TATA CDMA	
		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
		99.74%	98.49%	99.92%	98.56%	99.85%	98.26%	99.32%	99.23%	99.90%	99.56%	99.88%	99.20%	99.97%	99.94%	99.09%	98.58%	99.87%	99.20%
March	% Ec/Io BINS with less than -15	Day 1						Day2						Day 3					
		MTS		Reliance CDMA		TATA CDMA		MTS		Reliance CDMA		TATA CDMA		MTS		Reliance CDMA		TATA CDMA	
		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
		98.85%	98.85%	99.94%	99.59%	100.00%	99.16%	99.96%	98.83%	99.89%	99.56%	99.98%	99.32%	99.82%	99.79%	99.94%	99.95%	99.55%	99.69%

## 7.9 TERMINATION / CLOSURE OF SERVICE

Audit results for termination / closure of service											
Termination	Benchmark	Aircel(DWL)	Airtel	BSNL	Idea	MTS	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Vodafone
Total number of closure request		232.00	5188.00	3430.00	3324.00	1082.00	1672.00	3739.00	3316.00	1397.00	17812.00
Number of requests attended within 7 days		232.00	5188.00	3430.00	3324.00	1082.00	1672.00	3739.00	3316.00	1397.00	17812.00
Percentage cases in which termination done within 7 days	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	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	MTS	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Vodafone
Total number of cases requiring refund of deposits		224.00	316.00	126.00	222.00	NA	1934.00	2645.00	129.00	379.00	26075.00
Total number of cases where refund was made within 60 days		224.00	316.00	126.00	99.00	NA	1934.00	2645.00	129.00	379.00	26075.00
Percentage cases in which refund was receive within 60 days	100.00%	100.00%	100.00%	100.00%	44.59%	NA	100.00%	100.00%	100.00%	100.00%	100.00%

Note: - MTS do have postpaid customers hence refund of deposits is Not Applicable.

## 7.11 ADDITIONAL NETWORK RELATED PARAMETERS

Audit Results for Total Traffic Handled in Erlang											
Traffic in Erlang		Aircel(DWL)	Airtel	BSNL	Idea	MTS	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Vodafone
Equipped capacity of the network		77386.00	119208.88	112000.00	48990.00	50400.00	56000.00	88000.00	18942.00	87669.10	125769
Total traffic handled in erlang during TCBH		72719.00	87151.50	55458.00	32633.00	20941.89	34086.10	51843.88	4370.00	45256.00	105177
Total number of customers as per VLR											
		Aircel(DWL)	Airtel	BSNL	Idea	MTS	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Vodafone
Total no. of customers served (as per VLR)		2152779.00	3703012.00	724592.00	1271525.00	633490.00	1080357.00	2575286.00	107056.00	1843517.00	4355378
Live calling for level 1 services											
Level 1 services		Aircel(DWL)	Airtel	BSNL	Idea	MTS	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	150.00
Calls answered in 60 sec		150.00	0.00	131.00	0.00	150.00	150.00	150.00	150.00	150.00	150.00
Calls answered after 60 sec		100.00%	0.00%	87.33%	0.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%

Please note that we were not able to connect to none of the level 1 service numbers for Idea and Airtel. The calls were not going through to any of the level 1 numbers for these two operators.

Live calling results for resolution of service requests											
Resolution of service requests	Benchmark	Aircel(DWL)	Airtel	BSNL	Idea	MTS	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Vodafone
Total Number of calls made		100.00	100.00	100.00	100.00	100.00	NA	100.00	100.00	100.00	100.00
Number of cases resolved to satisfaction		97.00	88.00	91.00	96.00	94.00	NA	100.00	89.00	84.00	100.00
Percentage cases resolved in four weeks		97.00%	88.00%	91.00%	96.00%	94.00%	NA	100.00%	89.00%	84.00%	100.00%

Note: -Reliance DMA did not share the data for this quarter

### 7.12 TOTAL CALL MADE DURING THE DRIVE TEST

January										
	Aircel	Airtel	BSNL	Idea	MTS	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Vodafone
Total No of calls made	518	587	402	522	499	626	819	462	676	410
February										
	Aircel	Airtel	BSNL	Idea	MTS	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Vodafone
Total No of calls made	465	687	690	675	691	731	684	684	766	626
March										
	Aircel	Airtel	BSNL	Idea	MTS	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Vodafone
Total No of calls made	609	623	695	662	543	681	601	588	638	619

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



8, Balaji Estate, Guru RavidassMarg,  
New Delhi, DL 110 019, India  
☎+91 (11) 4269 7800

[www.imrbint.com](http://www.imrbint.com)