



**EAST  
ZONE**

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

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# 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 ..... 5

2.3.2 Drive Test .....17

2.3.3 Live Calling .....18

2.4 Operators Covered ..... 20

3 Executive Summary ..... 21

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 SDCCH/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 ..... 40

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

6.1 Billing Disputes-Postpaid ..... 40

6.2 Billing Disputes-PREPAID ..... 41

6.3	Resolution of Billing Complaints.....	41
6.4	Period of Applying Credit/Wavier .....	42
6.5	Call Centre Performance-IVR.....	42
6.6	Call Centre Performance-Voice to Voice.....	43
6.7	Termination/Closure of Service.....	43
6.8	Refund of Deposits After closure.....	44
7	Annexure .....	45
7.1	Network Availability .....	45
7.2	Connection Establishment (Accessibility) .....	46
7.3	Connection Maintenance (Retainability).....	47
7.4	Voice quality.....	49
7.5	POI Congestion .....	50
7.6	Metering and Billing credibility.....	51
7.7	Customer Care.....	52
7.8	Drive Test.....	54
7.8.1	January- Manipur.....	54
7.8.2	February- Meghalaya.....	55
7.8.3	March-Arunachal.....	57
7.9	Termination / closure of service.....	58
7.10	Time taken for refund of deposits after closure .....	59
7.11	Additional Network Related parameters.....	59
7.12	Total call made during the drive test.....	61

## 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.

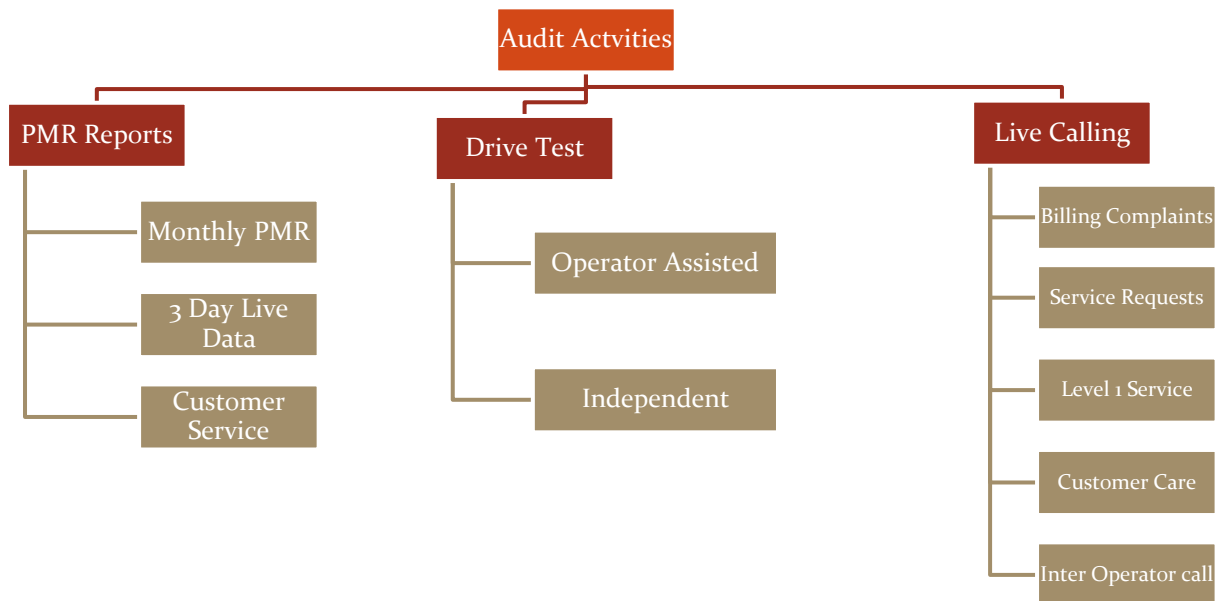
In order to assess the above regulations TRAI has commissioned a third party agency to conduct the audit of the service providers and check the performance of the operators on the various benchmarks set by Telecom Regulatory Authority of India (TRAI).

### 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

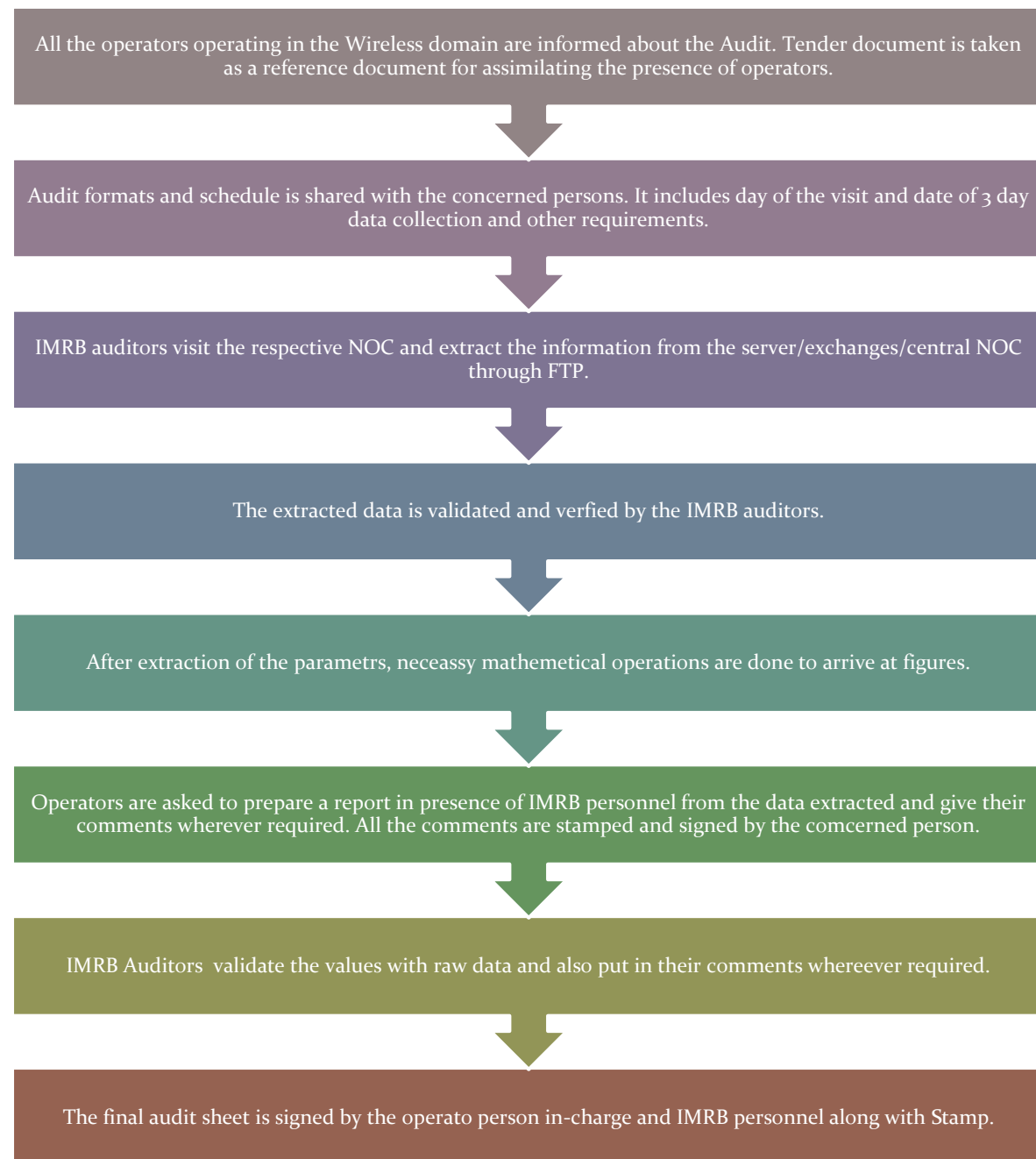
- Call Drop rate
- Worst affected cells having more than 3% TCH drop

#### 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 –**

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

3. **TRAI Benchmark –**

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

4. **Audit Procedure –**

- i. The fault alarm details at the OMC (MSC) for the network outages (due to own network elements and infrastructure service provider end outages) was audited
- ii. All the BTS in service area were considered. Planned outages due to network up gradation, routine maintenance were not considered.
- iii. Any outage as a result of force majeure were not considered at the time of calculation
- iv. All the BTS having down time greater than 24 hours is assessed and values of BTS accumulated downtime is computed in accordance.

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

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

2. **Computation Methodology-**

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

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

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

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

4. **Audit Procedure –**

- ↳ The cell-wise data generated through counters/ MMC available in the switch for traffic measurements
- ↳ CSSR calculation should be measured using OMC generated data only
- ↳ Measurement should be only in Time Consistent Busy Hour (CBBH) period for all days of the week
- ↳ Counter data is extracted from the NOC of the operators.
- ↳ Total calls established include all calls established excluding Signaling blocking, TCH Drop and TCH blocking.
- ↳ The numerator and denominator values are derived from adding the counter values from the MSC.

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

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

- ↳ SDCCCH Level: Stand-alone dedicated control channel
- ↳ TCH Level: Traffic Channel
- ↳ POI Level: Point of Interconnect

## 2. Computational Methodology:

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

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

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

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

## 3. Benchmark:

$$\Rightarrow \text{SDCCH Congestion: } \leq 1\%$$

$$\Rightarrow \text{TCH Congestion: } \leq 2\%$$

$$\Rightarrow \text{POI Congestion: } \leq 0.5\%$$

## 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:

- ↳ **% Connections with good voice quality = (No. of voice samples with good voice quality / Total number of samples) x 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)	1779258
Airtel	3026921
BSNL NE 1 CDMA	No Data
BSNL NE 2 CDMA	26599
BSNL NE 1 GSM	390744
BSNL NE 2 GSM	543838
Idea	325246
Reliance GSM	744597
Vodafone	1045837



Not Meeting the benchmark



Best Performing Operator

### 3 EXECUTIVE SUMMARY

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

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

Name of Service Provider	Network Availability		Connection Establishment (Accessibility)			Connection Maintenance (Retainability)		
	BTSS Accumulated downtime (not available for service)	Worst affected BTSS due to downtime	Call Set-up Success Rate (within licensee's own network)	SDCCH/Paging Chl. Congestion	TCH Congestion	Call Drop Rate (%age)	Worst affected cells having more than 3% TCH drop	%age of connection with good voice quality
Benchmark	≤ 2%	≤ 2%	≥ 95%	≤ 1%	≤ 2%	≤ 2%	≤ 3%	≥ 95%
Aircel(DWL)	2.96%	21.33%	94.08%	0.93%	1.85%	1.64%	20.93%	92.52%
Airtel	0.34%	1.03%	97.00%	0.60%	0.55%	1.06%	0.97%	98.83%
BSNL NE 1 CDMA	NDR	NDR	NDR	NDR	NDR	NDR	NDR	NDR
BSNL NE 2 CDMA	4.02%	6.04%	90.33%	0.66%	1.35%	8.24%	3.13%	98.33%
BSNL NE 1 GSM	5.79%	9.56%	90.96%	0.38%	0.74%	1.50%	3.74%	99.00%
BSNL NE 2 GSM	11.09%	49.74%	82.36%	0.47%	0.92%	4.18%	23.57%	89.36%
Idea	1.61%	1.03%	98.09%	0.18%	1.31%	1.72%	2.33%	96.45%
Reliance GSM	0.39%	1.20%	98.43%	0.02%	0.50%	0.64%	0.06%	98.40%
Vodafone	1.55%	1.88%	99.26%	0.23%	0.74%	0.69%	2.58%	98.18%

**Note:** - it is important to highlight that we did not receive the PMR data from BSNL NE 1 CDMA for any of the month even after sending the repeated mails for the respected person and reminders. Should be considered as non-compliance.

The above table represents the parameter wise observations for Wireless Operators for North East circle:

#### BTSS Accumulated Downtime:

In North East circle Aircel 2.96%, BSNL GSM I 5.79%, BSNL NE II GSM 11.09% and BSNL NE II CDMA 4.02% are not meeting the benchmark. Maximum BTS Accumulated downtime was recorded 11.09% for BSNL NE II GSM and minimum 0.34% for Airtel respectively

#### Worst Affected BTSS Due to Downtime:

Aircel, BSNL NE II CDMA, BSNL GSM I, & BSNL NE II GSM were not able to meet the benchmark. Maximum worst affected BTSS due to downtime were recorded for BSNL NE II GSM 49.74% and Airtel had minimum worst affected BTSS due to downtime at 1.03%.

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

Aircel with 94.08%, BSNL NE II GSM with 82.36%, BSNL GSM I with 90.96% and BSNL CDMA II with 90.33% CSSR, were operators that did not meet the benchmark on this parameter. During the audits the

maximum CSSR was observed for Vodafone with 99.26% of their calls getting completed. All the operators were found to be calculating the parameter as per the norm specified by TRAI. CSSR was established as the ratio of total number of successful call attempts (establishment) to the total number of call attempts made.

### 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 with Reliance GSM experiencing the least congestion both SDCCH Paging TCH congestion parameters. The calculation methodology of these parameters was found to be in complete accordance with what has been specified by TRAI.

### 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 the service providers were found to be meeting the TRAI specified benchmark except for BSNL NE II CDMA & BSNLNE II GSM with maximum call drop rate of 8.24% experienced by BSNL NE II CDMA

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

All the operators met the benchmark except Aircel, BSNL GSM I, BSNL NE II CDMA & BSNL NE II GSM, Maximum Worst Affected Cells Having More than 3% TCH Drop was recorded for BSNL NE II GSM at 23.57% and Reliance GSM had minimum at 0.06%.

### Voice Quality:

During the audit it was found that Aircel and BSNL NE II GSM were not meeting the benchmark in terms of voice quality.

## 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
<b>Benchmark</b>	≤ 2%	≤ 2%	≥ 95%	≤ 1%	≤ 2%	≤ 2%	≤ 3%	≥ 95%
Aircel(DWL)	1.40%	0.63%	95.21%	0.71%	1.59%	1.47%	20.31%	92.87%
Airtel	0.20%	0.00%	97.24%	0.52%	0.50%	1.03%	0.91%	98.82%
BSNL NE 1 CDMA	NDR	NDR	NDR	NDR	NDR	NDR	NDR	NDR
BSNL NE 2 CDMA	8.97%	4.38%	94.12%	0.88%	1.31%	1.60%	2.96%	98.01%
BSNL NE 1 GSM	6.28%	5.86%	95.25%	0.35%	0.74%	1.45%	4.36%	99.12%
BSNL NE 2 GSM	21.95%	41.70%	78.41%	0.56%	0.85%	3.59%	19.92%	91.05%
Idea	1.15%	0.79%	99.12%	0.15%	0.44%	1.31%	2.20%	96.75%
Reliance GSM	0.31%	0.00%	98.44%	0.03%	0.47%	0.65%	0.06%	98.42%
Vodafone	1.14%	0.41%	99.61%	0.21%	0.39%	0.60%	2.64%	98.32%

Note: - As mentioned earlier, BSNL NE 1 did not share data for any month.

### BTs Accumulated Downtime:

In the North East circle BSNL NE I GSM, BSNL NE II GSM, and BSNL NE II CDMA do not meet the benchmark. Maximum BTS Accumulated downtime was recorded for and BSNL NE II GSM at 21.95% respectively and minimum for Airtel at 0.20%.

### Worst Affected BTs Due to Downtime:

All the operators met the benchmark except BSNL NE II CDMA, BSNL NE I GSM, and BSNL NE II GSM. Maximum worst affected BTs due to downtime were recorded for BSNL NE II GSM at 41.70% and Airtel and Reliance GSM both had no worst affected BTs due to downtime.

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

Except for BSNL NE II GSM and BSNL NE II CDMA all the operators were comfortably meeting the benchmark on this parameter. During the audits the maximum CSSR was observed for Vodafone with 99.61% of their calls getting completed. All the operators were found to be calculating the parameter as per the norm specified by TRAI. CSSR was established as the ratio of total number of successful call attempts (establishment) to the total number of call attempts made.

### 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. All the operators meet the benchmark on network congestion parameters. The calculation methodology of these parameters was found to be in complete accordance with what has been specified by TRAI.

### 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. Also, all of service providers were found to be meeting the TRAI specified benchmark except for BSNLNE II GSM which has the maximum call drop rate of 3.59%

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

All the operators met the benchmark except Airtel, BSNL NE I GSM & BSNL NE II GSM, Maximum Worst Affected Cells Having More than 3% TCH Drop was recorded for BSNL NE II GSM at 19.92% and Reliance GSM had minimum Worst Affected Cells Having More than 3% TCH Drop at 0.06%.

### Voice Quality:

During the audit it was found that Airtel and BSNL NE II GSM were not meeting the benchmark however in terms of voice quality.



### 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)	93.00%	91.00%	90.00%	100.00%	93.00%
Airtel	91.00%	89.00%	89.33%	100.00%	88.00%
BSNL NE 1 CDMA	NDR	NDR	91.33%	100.00%	86.00%
BSNL NE 2 CDMA	NDR	NDR	91.33%	100.00%	91.00%
BSNL NE 1 GSM	88.00%	89.00%	89.33%	100.00%	87.00%
BSNL NE 2 GSM	88.00%	88.00%	91.33%	100.00%	84.00%
Idea	94.00%	91.00%	90.67%	100.00%	89.00%
Reliance GSM	91.00%	92.00%	91.33%	100.00%	87.00%
Vodafone	93.00%	90.00%	90.00%	100.00%	89.00%

#### Complaints Resolved within 4 weeks

As per the audited records, all the operators resolved the complaints within 4 weeks of registration of complaints. However as per the consumers all the operators were not meeting the benchmark.

**Note: - Service request and Billing complaints data was not received from, from BSNL NE 1 CDMA and BSNL NE2 CDMA. Should be considered as non-compliance.**

#### Complaint/Request Attended to Satisfaction

All the operators performed satisfactorily in terms of satisfaction of the customers for service requests.

**Note: - Service request and Billing complaints data was not received from, from BSNL NE 1 CDMA and BSNL NE2 CDMA. Should be considered as non-compliance.**

#### Level 1 Service

None of the operators were able to meet the benchmark for level 1 service with calls being answered within 60.

We have contacted the following numbers from each operator sim

- Police- 100,
- Fire Station- 101
- Ambulance- 108.

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

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

### Customer Care / Helpline Assessment

It was seen that none of the operators met the TRAI benchmark of 90% of calls answered by the centres within 60 seconds except Aircel.

## 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)	0.00%	0.00%	100.00%	100.00%	95.56%	94.09%
Airtel	0.00%	0.09%	100.00%	100.00%	100.00%	89.30%
BSNL NE 1 CDMA	NDR	NDR	NDR	NDR	NDR	NDR
BSNL NE 2 CDMA	NDR	NDR	NDR	NDR	NDR	NDR
BSNL NE 1 GSM	0.04%	0.02%	100.00%	100.00%	88.09%	94.06%
BSNL NE 2 GSM	0.00%	0.00%	81.82%	100.00%	82.67%	94.00%
Idea	0.00%	0.00%	100.00%	100.00%	97.21%	99.26%
Reliance GSM	0.07%	0.10%	100.00%	100.00%	98.72%	87.92%
Vodafone	0.12%	0.01%	100.00%	100.00%	95.81%	21.09%

### Billing Disputes – Postpaid Subscribers

For the postpaid customers, all the operators meet the benchmark comfortably. Aircel, BSNL NE II GSM, and Idea performed exceedingly well with no complaints.

**Note: - BSNL NE 1 CDMA and BSNL NE2 CDMA did not share any data. Should be considered as non-compliance.**

### Billing Disputes – Prepaid Subscribers

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

**Note: - BSNL NE 1 CDMA and BSNL NE2 CDMA did not share any data. Should be considered as non-compliance.**

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

It was seen that that all the operators met the TRAI criteria of resolution of complaint within 4 weeks except BSNL NE II GSM.

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

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

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

From the audit it can be seen that on an average 94.01% of the calls were answered by the operators within IVR. BSNL NE I GSM I and BSNL NE II GSM did not meet the benchmark of 95% with only 88.09% and 82.67% of its IVR call being attended within 60 seconds.

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

For the voice to voice calls on an average of 82.82% of the calls were answered within 60 seconds. Idea had the highest percentage of calls being answered at more than 99.26%. However, Aircel, Reliance GSM & Vodafone did not meet the TRAI benchmark

### 3.5 INTER OPERATOR CALL ASSESSMENT - CONSOLIDATED

Inter operator call Assessment To↓ From→	Aircel(DWL)	Airtel	BSNL NE 1 CDMA	BSNL NE 2 CDMA	BSNL NE 1 GSM	BSNL NE 2 GSM	Idea	Reliance GSM	Vodafone
Aircel(DWL)	NA	91.00%	94.00%	NA	91.00%	NA	95.00%	86.00%	91.00%
Airtel	92.00%	NA	91.00%	NA	89.00%	NA	89.00%	93.00%	91.00%
BSNL NE 1 CDMA	88.00%	91.00%	NA	NA	89.00%	NA	91.00%	89.00%	88.00%
BSNL NE 2 CDMA	89.00%	88.00%	NA	NA	87.00%	NA	92.00%	93.00%	90.00%
BSNL NE 1 GSM	87.00%	89.00%	89.00%	NA	NA	NA	88.00%	87.00%	92.00%
BSNL NE 2 GSM	86.00%	89.00%	91.00%	NA	NA	NA	91.00%	89.00%	89.00%
Idea	90.00%	89.00%	89.00%	NA	88.00%	NA	NA	90.00%	90.00%
Reliance GSM	89.00%	91.00%	89.00%	NA	88.00%	NA	89.00%	NA	90.00%
Vodafone	91.00%	90.00%	91.00%	NA	91.00%	NA	90.00%	91.00%	NA

 Maximum Problem faced by the calling operator to other operator

In the inter-operator call assessment, it was observed that all operators faced a little problem in connecting to other operators.

BSNL NE I GSM found difficulty in connecting to almost all the operators.

#### 4 DETAILED FINDINGS - DRIVE TEST DATA

The drive test was conducted simultaneously for all the operators present in the North East 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 North East circle-

Month	Name of SSA Covered	Date of Drive Test
January	Manipur	29th Jan to 31st Jan
February	Meghalaya	25th Feb to 27th Feb
March	ARUNACHAL	27th March & 28th March
Year	2014	

**Key Points: -**

- BSNL NE 1 CDMA and BSNL NE 2 CDMA did not participate in the drive test for any of the month during this quarter.
- Drive test happened in BSNL NE 1 GSM area than BSNL NE 2 GSM will be Not Applicable and Vice- Versa, because there will be only one drive test report for any of these two operators for the respected month so according to this statement we have mentioned NA in the tables.
- Signal strength data was not shared by BSNL CDMA.

**Route Details – January – Manipur SSA –**

		January Manipur		
	Type of location	Day 1	Day 2	Day 3
Outdoor	Major Roads	Imphal-Starting point ( across Nambol,Oinam Bazar,Kaindu Bazar) 2. via NH-150.( Highway/Stateway Drive)	Moreh-City Drive( across the city)(across Chikim, Khudengthabi)	Imphal Town with City Drive(Periphery , across the city, Office Complex and Shopping complex),( Across Achanbiagi, Koirengai, Pheidinga, Sekmai Nagar, Konglatumbi,Khoren Tompak, Bongmoul Lhangjol, Kongpokpi, Taphou Kuki) . Via AH-1 (Highway/State way Drive)
	Highways	Bishnupur- Town with City Drive(Periphery , across the city),	Tengnoupal-City Drive( across the city),(Across Sinam,Pallel Mamang	Senapati-City Drive(Periphery and across the city),

		Via NH-150(Highway/State way Drive)	Leiki,Laijing,Irengband) Via (NH-10 Drive)	
	With in the City	Ningthoukhong(Periphery and across the city up to lake) Via NH-150(Highway/State way Drive)	Kakching Town with City Drive(Periphery , across the city, Office Complex and Shopping complex),( Across Leirak Achouba Pareng)	
Indoor	Office complex	Mairang-City Drive(Periphery and across the city),(across Torbang Bazar,Boljang,Khangjong,Kaita Village,K. Salbung,Molnom) Via NH-150 (Highway/State way Drive)	Keirak-City Drive(across the city),( Across uchiwa) Via (NH-10 Drive)	
	Shopping complex	Churachandpur- Town with City Drive(Periphery , across the city, Office Complex and Shopping complex), Back to Imphal	Mayang Imphal City Drive(across the city) to Imphal(across Samurao, Sangaipou Mamang, Makha Lairak) Via (State way Drive) Stay at Imphal	

### Drive Test Result – January – Manipur SSA

Name of SSA	Manipur	Month	January	Consolidated															
	B'mark	Aircel(DWL)		Airtel		BSNL NE 1 CDMA		BSNL NE 2 CDMA		BSNL NE 1 GSM		BSNL NE 2 GSM		Idea		Reliance GSM		Vodafone	
		In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor
Signal Strength –0 to -75 dBm		81.03%	62.63%	62.56%	55.88%	Not Participated	Not Participated	NA	NA	NA	NA	35.59%	34.27%	12.03%	50.81%	81.71%	60.90%	87.99%	61.76%
Signal Strength –75 to -85 dBm		17.88%	25.88%	21.71%	24.81%							48.90%	34.10%	48.99%	31.81%	17.91%	31.46%	11.37%	27.35%
Signal Strength –85 to -120 dBm		1.08%	11.49%	15.73%	19.32%							15.50%	31.63%	38.98%	17.38%	0.38%	7.65%	0.64%	10.89%
Voice quality	≥ 95%	98.45%	92.67%	98.91%	92.69%							97.99%	95.70%	94.85%	96.62%	98.96%	94.30%	98.73%	96.37%
CSSR	≥ 95%	100.00%	98.87%	100.00%	100.00%							95.06%	75.26%	100.00%	99.22%	100.00%	93.51%	98.88%	98.57%
%age Blocked calls		0.00%	1.13%	0.00%	0.00%							4.94%	24.74%	0.00%	0.78%	0.00%	6.49%	1.12%	1.41%
Call drop rate	≤ 2%	0.12%	1.28%	0.00%	0.00%							0.53%	13.19%	0.00%	0.40%	0.00%	1.08%	1.34%	2.15%
Hands off success rate		83.33%	98.90%	100.00%	99.36%							66.27%	77.42%	100.00%	98.53%	100.00%	98.28%	100.00%	100.00%

**Note: - it is important to highlight that in case we are covering BSNL NE 1 GSM area than BSNL NE 2 GSM will be Not Applicable for that month hence values will be 'NA'.**

#### Voice quality:

All the operators were meeting the TRAI benchmark except Aircel, Airtel, BSNL NE 2 GSM and Reliance GSM was not able to meet the benchmark on voice quality in outdoor areas. The benchmark for voice quality is 95%.

#### CSSR:

All operators meet the TRAI benchmark except BSNL NE II GSM and Reliance GSM in outdoor areas.

#### Call drop rate:

All operators meet the TRAI benchmark except BSNL NE II GSM and Vodafone. We observe that BSNL NE II GSM had a high call drop rate of 13.19% in outdoor areas.



**Route Details – February – Meghalaya SSA –**

		February		
		Meghalaya		
	Type of location	Day 1	Day 2	Day 3
Outdoor	Major Roads		Jowai-City Drive(Major Rd the city)	Shillong- Major Road
	Highways	Starting point with NationalHighway-40 Drive.	Jowai to Shillong via New By-pass High way,Shillong toJowai-Starting point with NationalHighway-44Drive	Shillong to Cherrapunji via Umlimpung with NationalHighway-40 and StateHighway-5 Drive
	With in the City	Nongpoh- City Drive(across the city)		
Indoor	Office complex			
	Shopping complex	Shillong-with City Drive(Inside the city, Office Complex and Shopping complex),		cherrapunji- City Drive(Inside the city, Major Road, Office Complex and Shopping complex)

### Drive Test Result – February – Meghalaya SSA

Name of SSA	Meghalaya	Month	February	Consolidated															
	B'mark	Aircel(DWL)		Airtel		BSNL NE 1 CDMA		BSNL NE 2 CDMA		BSNL NE 1 GSM		BSNL NE 2 GSM		Idea		Reliance GSM		Vodafone	
		In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor
Signal Strength -0 to -75 dBm		96.99%	62.06%	98.03%	73.62%	Not Participated	Not Participated	58.45%	36.37%	NA	NA	42.39%	48.72%	39.70%	48.00%	97.24%	69.79%		
Signal Strength -75 to -85 dBm		2.99%	22.88%	1.84%	16.66%			38.21%	33.96%			47.77%	32.61%	52.32%	24.95%	2.76%	17.72%		
Signal Strength -85 to -120 dBm		0.02%	15.06%	0.13%	9.71%			3.33%	29.67%			9.84%	18.67%	7.98%	27.06%	0.00%	12.50%		
Voice quality	≥ 95%	82.08%	91.61%	99.06%	93.38%			NA	88.93%			99.20%	94.76%	97.03%	91.01%	99.38%	96.65%		
CSSR	≥ 95%	83.33%	96.18%	100.00%	99.87%			97.52%	88.75%			100.00%	100.00%	99.33%	89.01%	100.00%	100.00%		
%age Blocked calls		16.67%	3.82%	0.00%	0.13%			2.48%	11.25%			0.00%	0.00%	0.67%	10.98%	0.00%	0.00%		
Call drop rate	≤ 2%	0.00%	0.73%	0.00%	0.00%			0.00%	8.42%			0.00%	0.00%	0.00%	6.16%	0.00%	0.56%		
Hands off success rate		16.67%	84.63%	100.00%	100.00%			100.00%	99.80%			NA	100.00%	100.00%	95.89%	100.00%	100.00%		

Note: - Drive Test conducted for BSNL NE I GSM so BSNL NE II GSM is Not Applicable.

#### Voice quality:

All the operators were not meeting the TRAI benchmark except Vodafone. The benchmark for voice quality is 95%

#### CSSR:

All the networks meet the TRAI benchmark except Aircel, BSNL NE 2 GSM & Reliance GSM.

#### Call drop rate:

All the operators meet the benchmark except BSNL NE I GSM & Reliance GSM.

**Route Details – March – Arunachal SSA –**

		<b>March</b>		
		<b>Arunachal</b>		
<b>Type of location</b>		<b>Day 1</b>	<b>Day 2</b>	<b>Day 3</b>
<b>Outdoor</b>	<b>Major Roads</b>	Bomdila --Inside the city (Major Road, Office Complex).		
	<b>Highways</b>	Bhalukpung Gate to Bomdila- Starting with stateHighway-229 via Tenga Town	kimin to Ziro - with National Highway-229 Drive.	Ziro to Itanagar via Naharlagoon National High Way 229 and stateway Yupa-Doimukh Rd . Dikrong Power House, khula camp.
	<b>With in the City</b>			Naharlagoon-City Drive(Inside the city)
<b>Indoor</b>	<b>Office complex</b>			
	<b>Shopping complex</b>	Tenga Town - Inside the city (Major Road, Office Complex and Shopping complex)	Ziro and Old Ziro - Inside the city (Major Road, Office Complex and Shopping complex)	Itanagar-City Drive((Inside the city, Major Road, Office Complex and Shopping complex)

### Drive Test Result – March – Arunachal SSA

Name of SSA	ARUNACHAL	Month	March	Consolidated															
	B'mark	Aircel(DWL)		Airtel		BSNL NE 1 CDMA		BSNL NE 2 CDMA		BSNL NE 1 GSM		BSNL NE 2 GSM		Idea		Reliance GSM		Vodafone	
		In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor
Signal Strength --0 to -75 dBm		98.78%	59.97%	99.62%	50.50%	Not Participated	Not Participated	Not Participated	Not Participated	90.98%	56.71%	NA	37.64%	75.00%	66.19%				
Signal Strength --75 to -85 dBm		1.19%	21.91%	0.37%	31.21%					8.97%	18.52%	NA	29.52%	24.62%	21.37%				
Signal Strength --85 to -120 dBm		0.04%	18.12%	0.01%	18.30%					0.05%	24.77%	NA	32.84%	0.38%	12.44%				
Voice quality	≥ 95%	98.45%	94.31%	99.43%	95.65%					99.26%	94.82%	NA	93.16%	96.54%	92.96%				
CSSR	≥ 95%	100.00%	99.09%	100.00%	100.00%					100.00%	100.00%	100.00%	82.86%	100.00%	95.19%				
%age Blocked calls		0.00%	0.91%	0.00%	0.00%					0.00%	0.00%	0.00%	17.14%	0.00%	4.81%				
Call drop rate	≤ 2%	0.00%	2.97%	0.00%	0.00%					0.00%	0.00%	0.00%	25.48%	0.00%	1.31%				
Hands off success rate		100.00%	99.71%	NA	100.00%					100.00%	100.00%	99.32%	97.06%	100.00%	92.79%				

#### Voice quality:

In outdoor area none of the operator met the TRAI benchmark except Airtel. The benchmark for voice quality is 95%

#### CSSR:

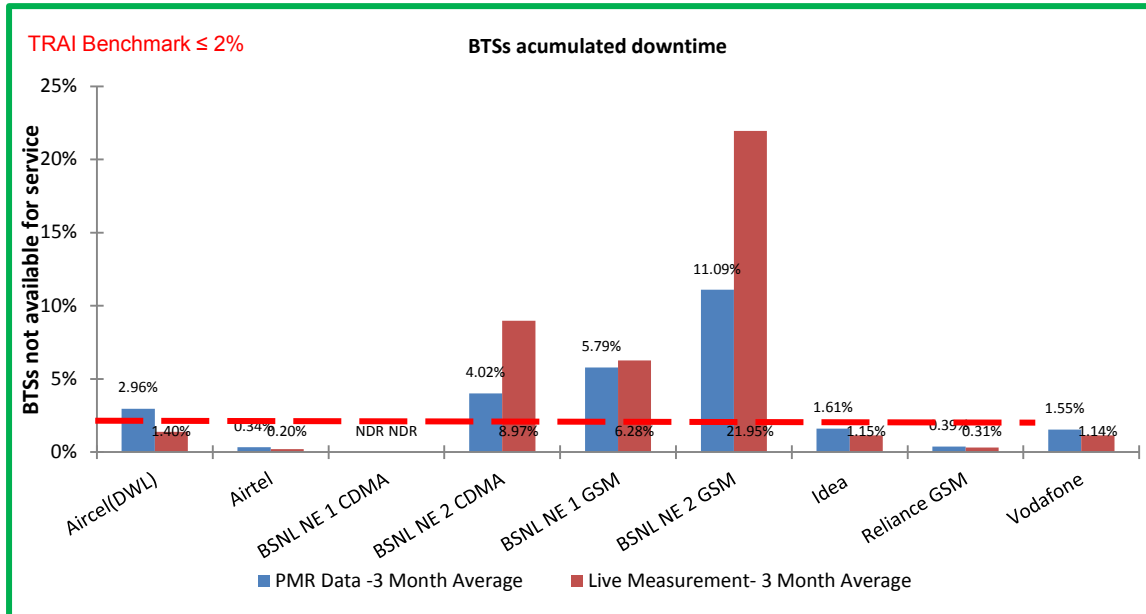
All the networks meet the TRAI benchmark except Reliance GSM in outdoor area.

#### Call drop rate:

All the operators meet the benchmark except Aircel & Reliance GSM both in outdoor areas.

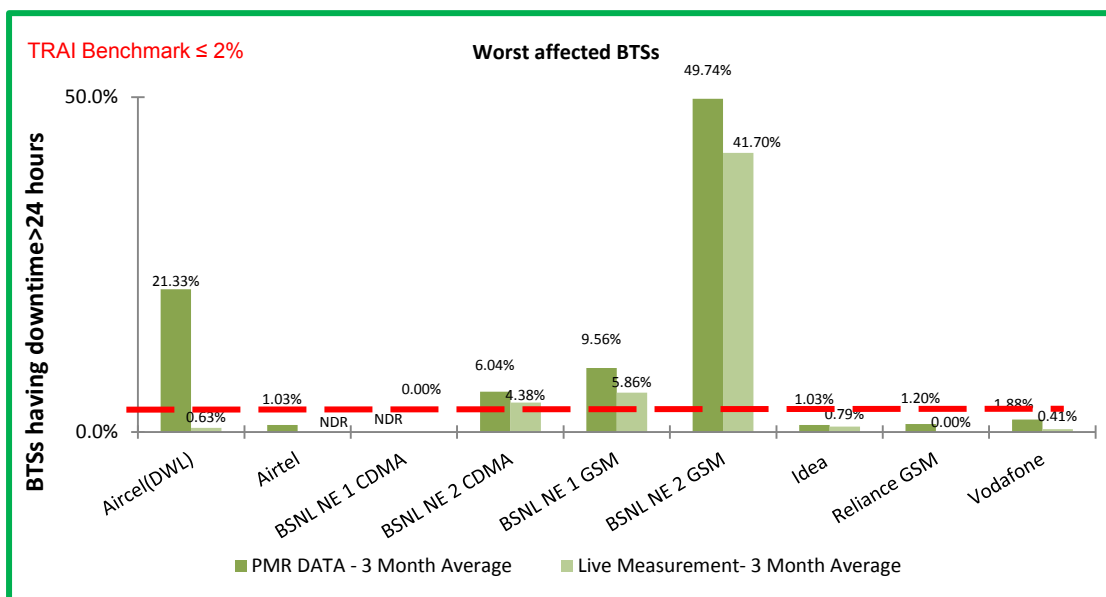
## 5 DETAILED FINDINGS - COMPARISON BETWEEN PMR DATA, 3 DAY LVE DATA AND LIVE CALLING DATA

### 5.1 BTS ACCUMULATED DOWNTIME



All operators met the TRAI benchmark of having BTS downtime less than 2% except Aircel, BSNL NE II CDMA, BSNL NE I GSM and BSNL NE II GSM. The result of the PMR data and live measurement is almost similar except for BSNL NE II GSM where the live measurement showed a higher BTS downtime.

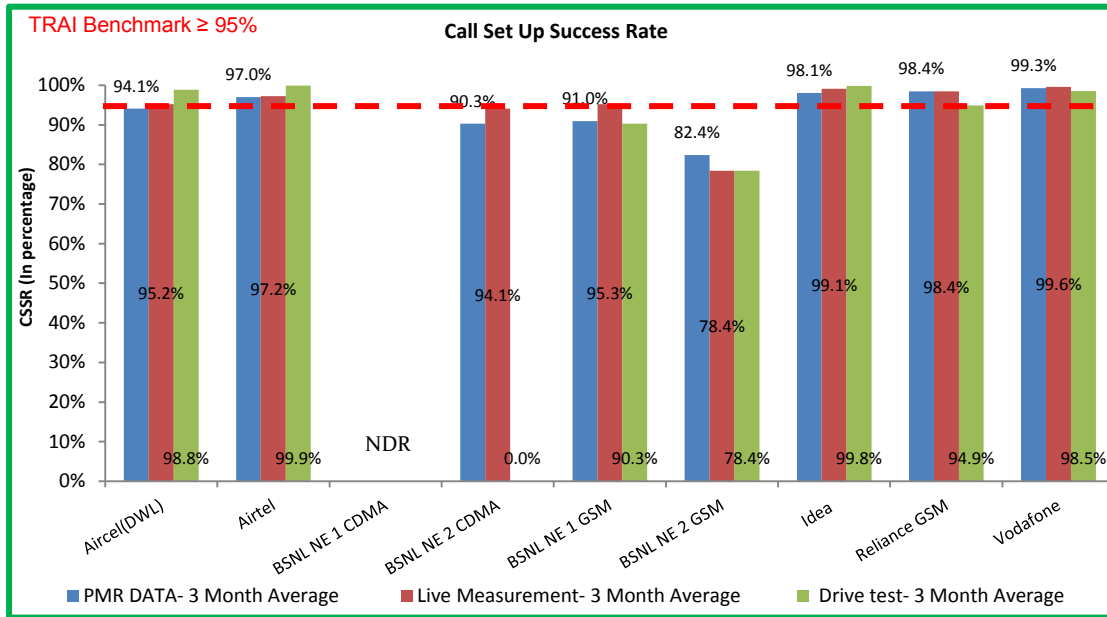
### 5.2 WORST AFFECTED BTS DUE TO DOWNTIME



All the operators meet the benchmark for the worst affected BTS due to downtime except Aircel, BSNL NE II CDMA, BSNL NE I GSM, and BSNL NE II GSM. The PMR data shows a higher value for the worst

affected BTS as compared to the live measurement data and there was a significant difference between PMR and Live Measurement data for Aircel.

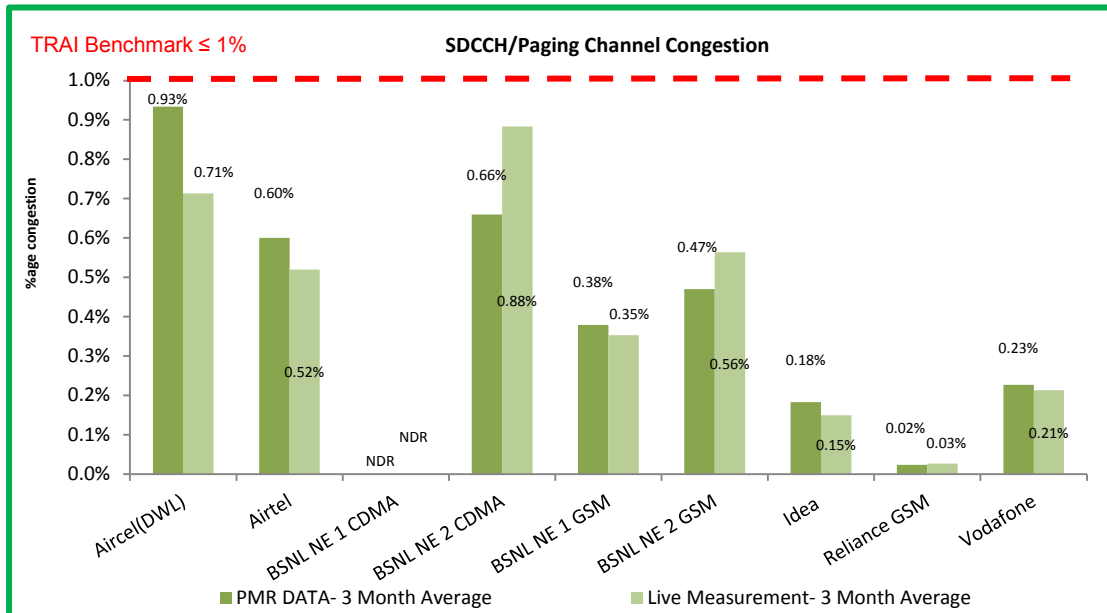
### 5.3 CALL SET UP SUCCESS RATE



NDR: No data received

All the operators are meeting the benchmark across Monthly PMR, Live measurement and Drive Test except Aircel, BSNL NE II CDMA, BSNL NE I GSM and BSNL NE II GSM.

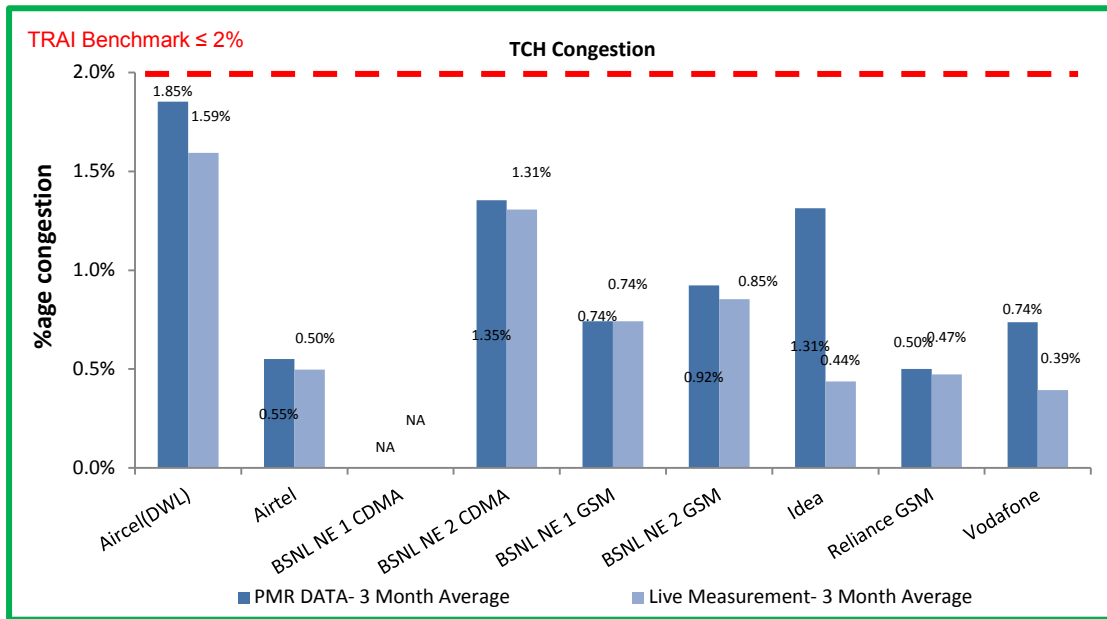
### 5.4 SDCCH/PAGING CHANNEL CONGESTION



NDR: No data received

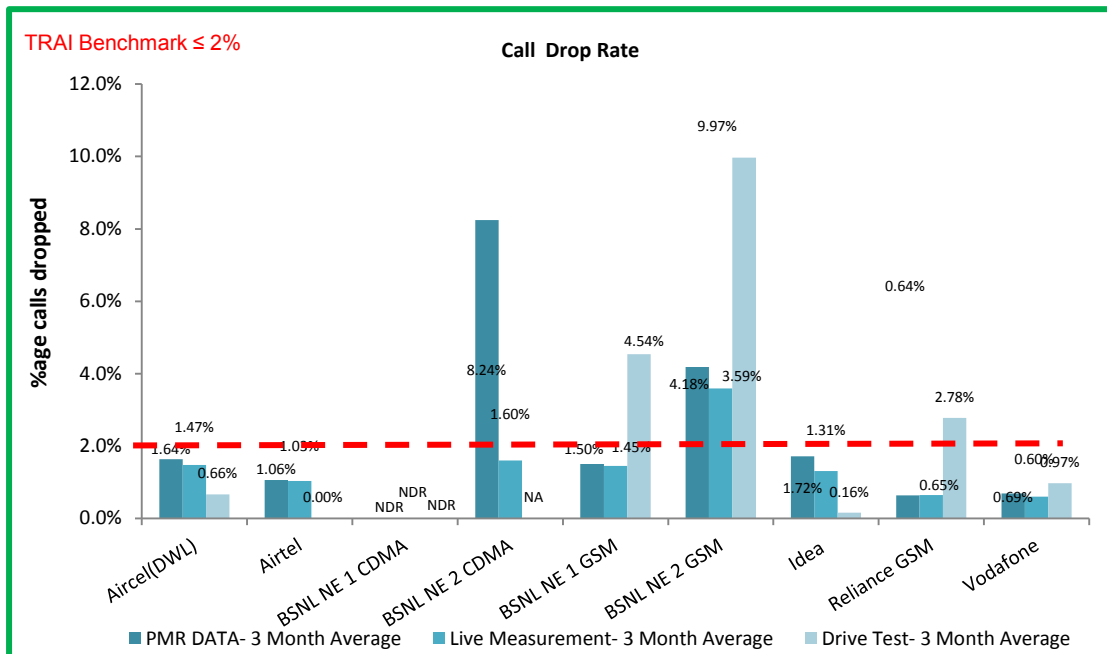
All operators comfortably meet the benchmark.

### 5.5 TCH CONGESTION



All operators comfortably meet the benchmark. We observe that Aircel has the highest TCH congestion both in PMR data as well as live measurement.

### 5.6 CALL DROP RATE



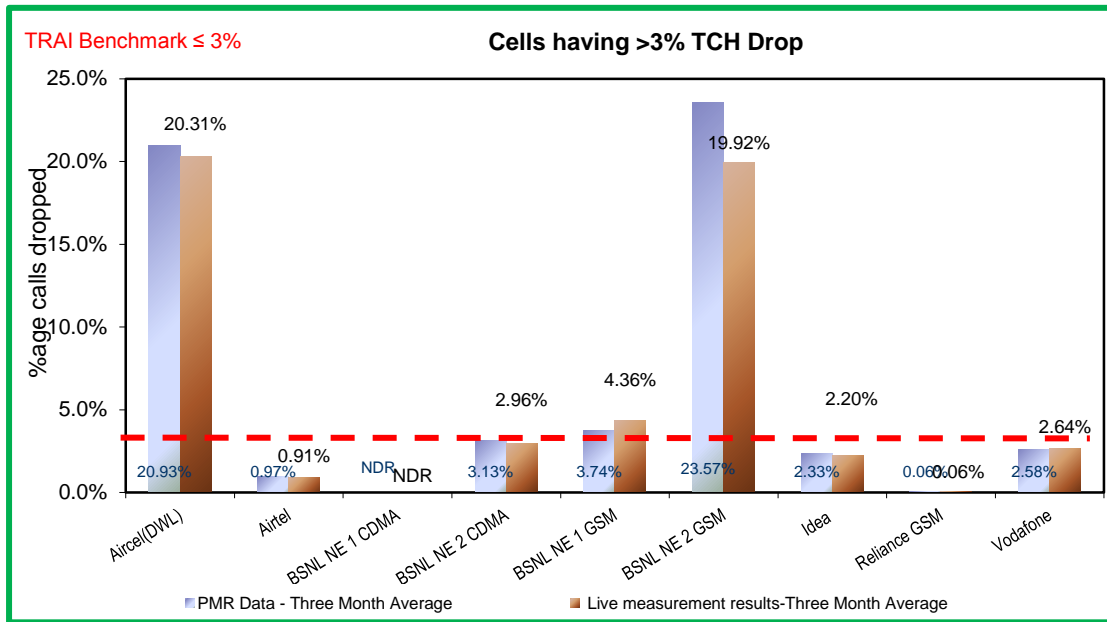
NDR: No data received

All operators meet the benchmark except BSNL NE II CDMA, BSNL NE I GSM, BSNL NE II GSM & Reliance GSM.

We observe that BSNL NE II GSM is not able to meet the benchmark for all the three methods namely PMR data, Live measurement, and Drive test.

There was significant difference between PMR data, Live measurement and Drive test for BSNL NE 2 CDMA, BSNL NE 1 GSM, BSNL NE 2 GSM and Reliance GSM.

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

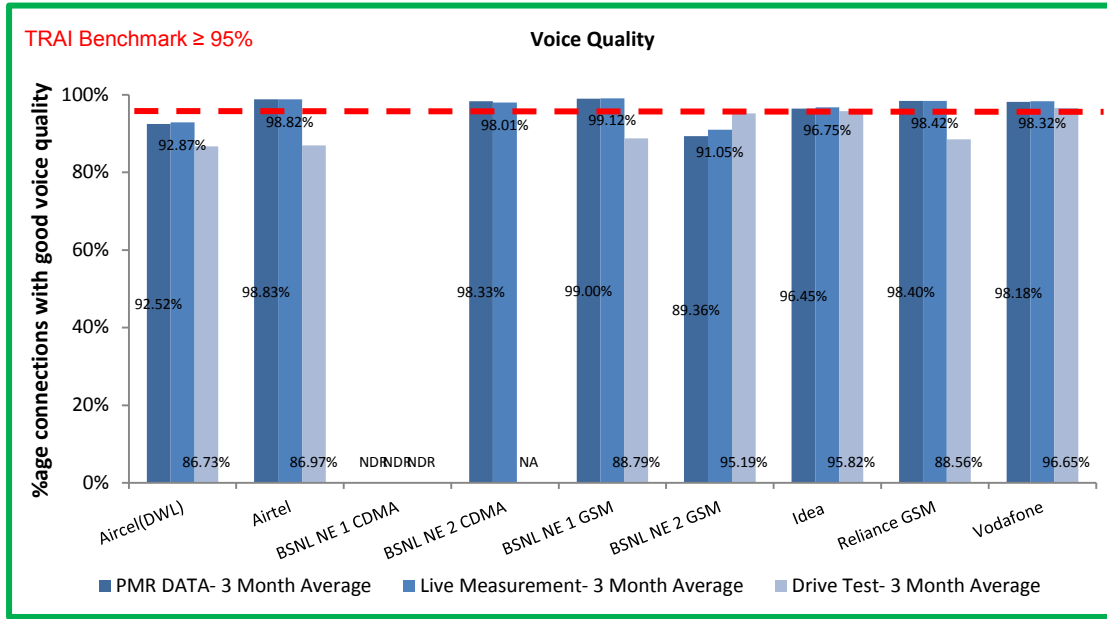


NDR: No data received

All the operators meet the benchmark except Aircel, BSNL NE II CDMA, BSNL NE I GSM, & BSNL NE II GSM. We observe that Aircel and BSNL NE II GSM fail to meet the benchmark by a high margin.



## 5.8 VOICE QUALITY

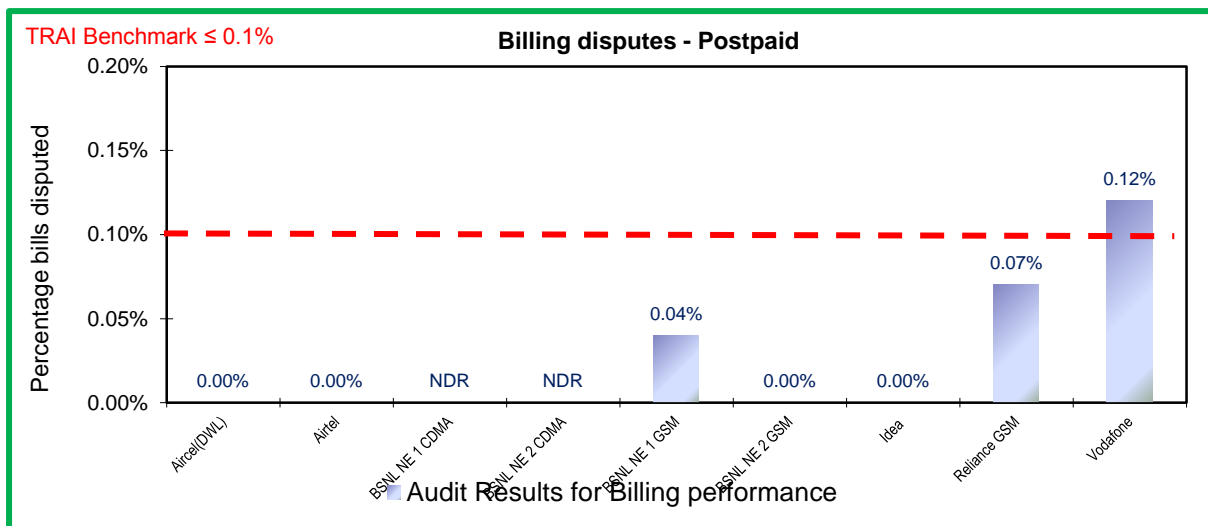


NDR: No data received

All the operators meet the benchmark except Aircel and BSNL NE II GSM for both PMR and Live measurement data. Further, for drive test data Aircel, Airtel, BSNL NE I GSM, and Reliance GSM do not meet the benchmark on Drive test data.

## 6 DETAILED FINDINGS – NON NETWORK PARAMETERS

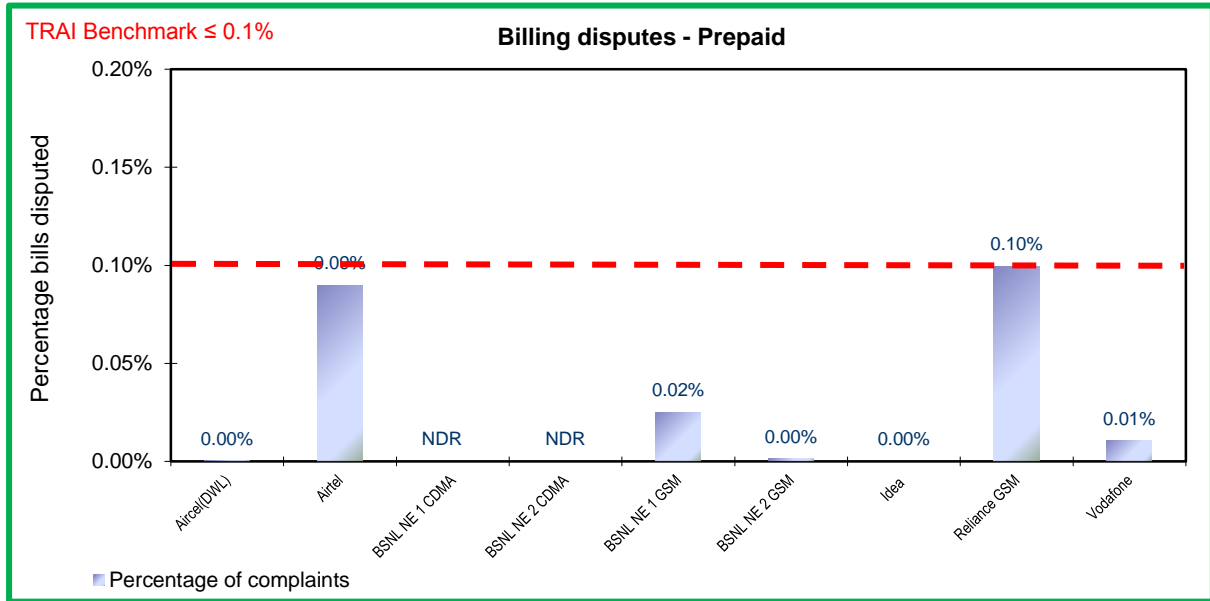
### 6.1 BILLING DISPUTES-POSTPAID



NDR: No data received

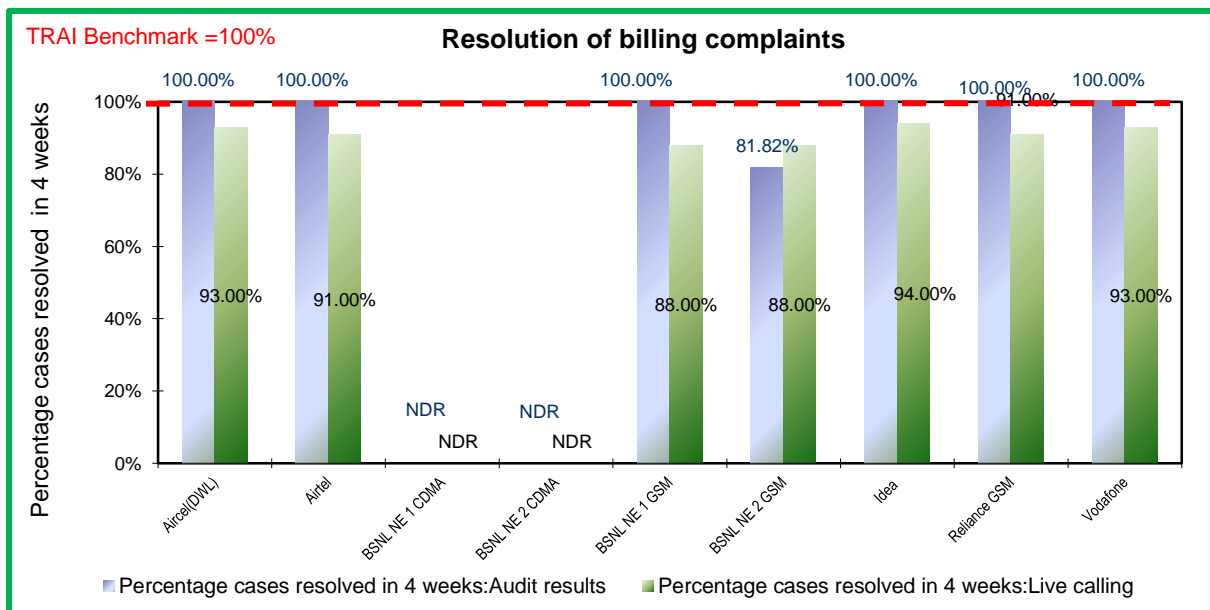
All operators meet the TRAI benchmark for percentage billing disputes for postpaid except Vodafone.

## 6.2 BILLING DISPUTES-PREPAID



All the operators met the TRAI benchmark for percentage billing disputes for postpaid.

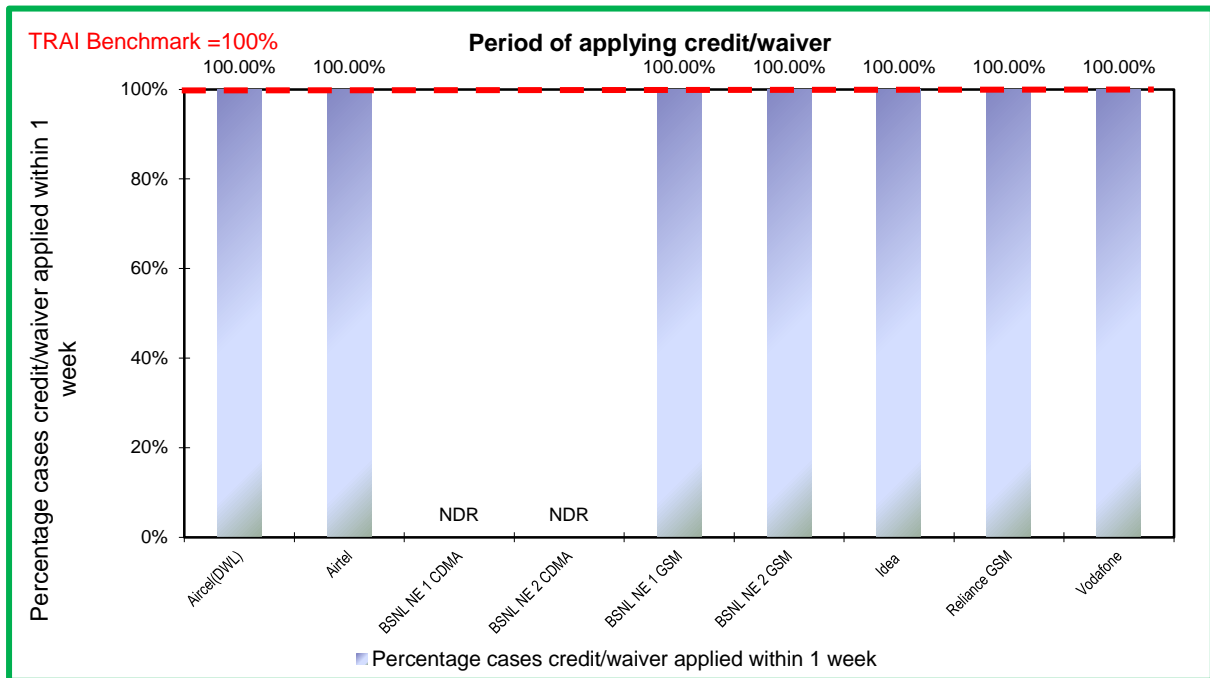
## 6.3 RESOLUTION OF BILLING COMPLAINTS



NDR: No data received

The audit results showed that all the operators met the TRAI benchmark for 100% resolution of complaints within four weeks. However, in live calling it was observed that none of the operator actually met the benchmark set by TRAI.

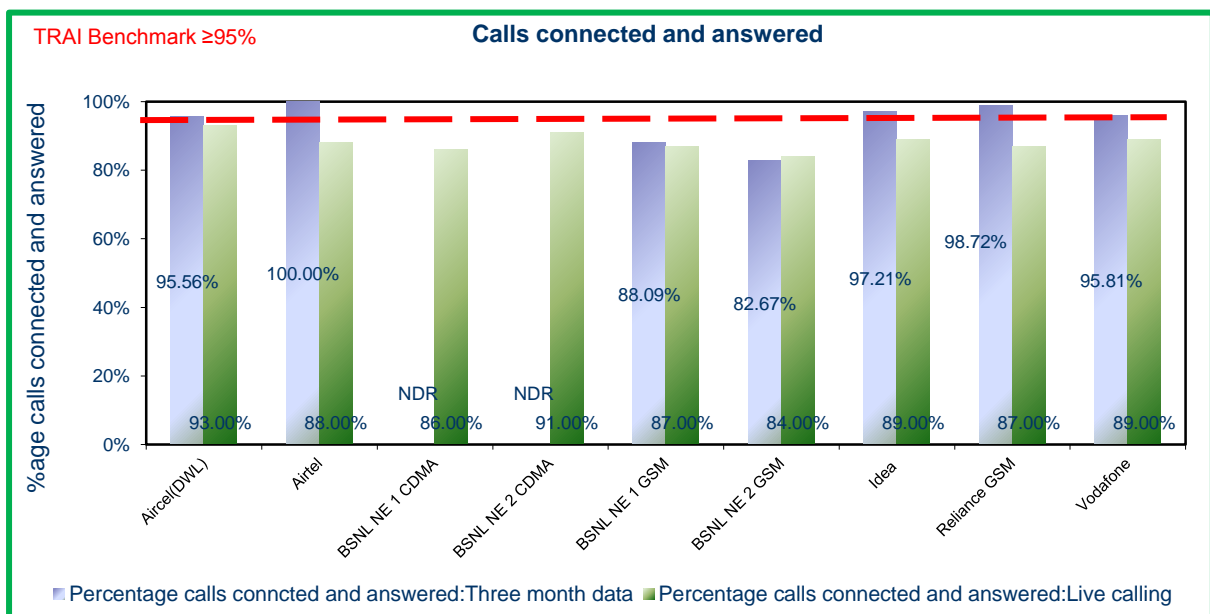
### 6.4 PERIOD OF APPLYING CREDIT/WAVIER



NDR: No data received

All operators meet the benchmark.

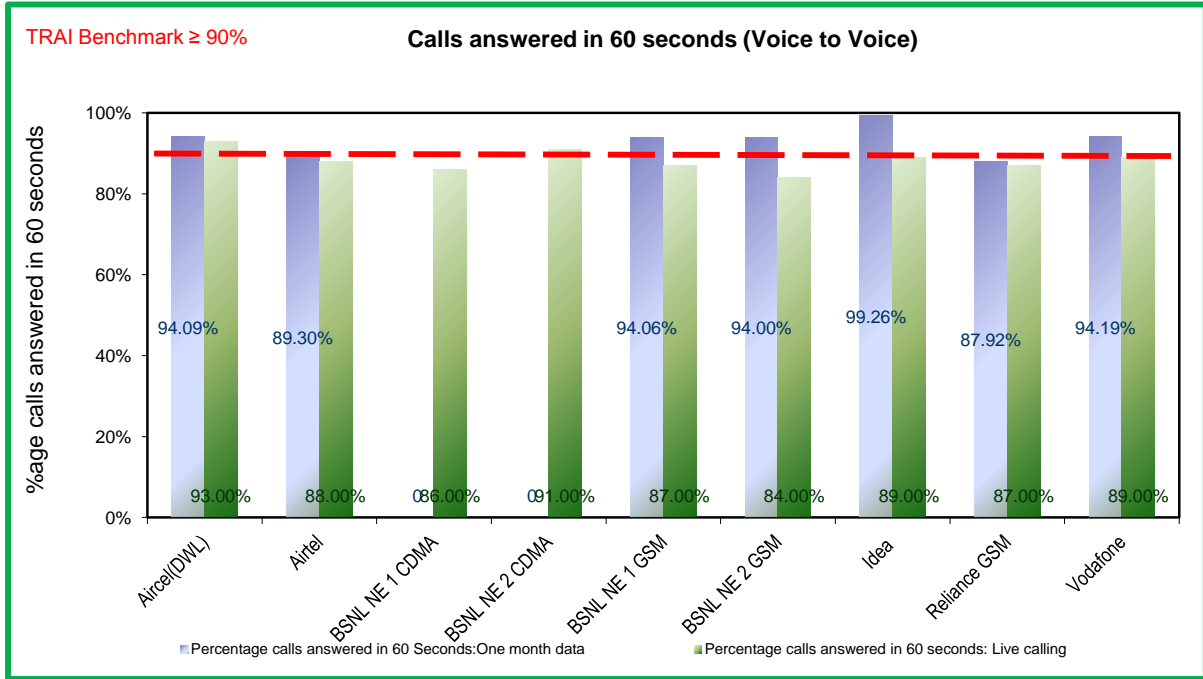
### 6.5 CALL CENTRE PERFORMANCE-IVR



NDR: No data received

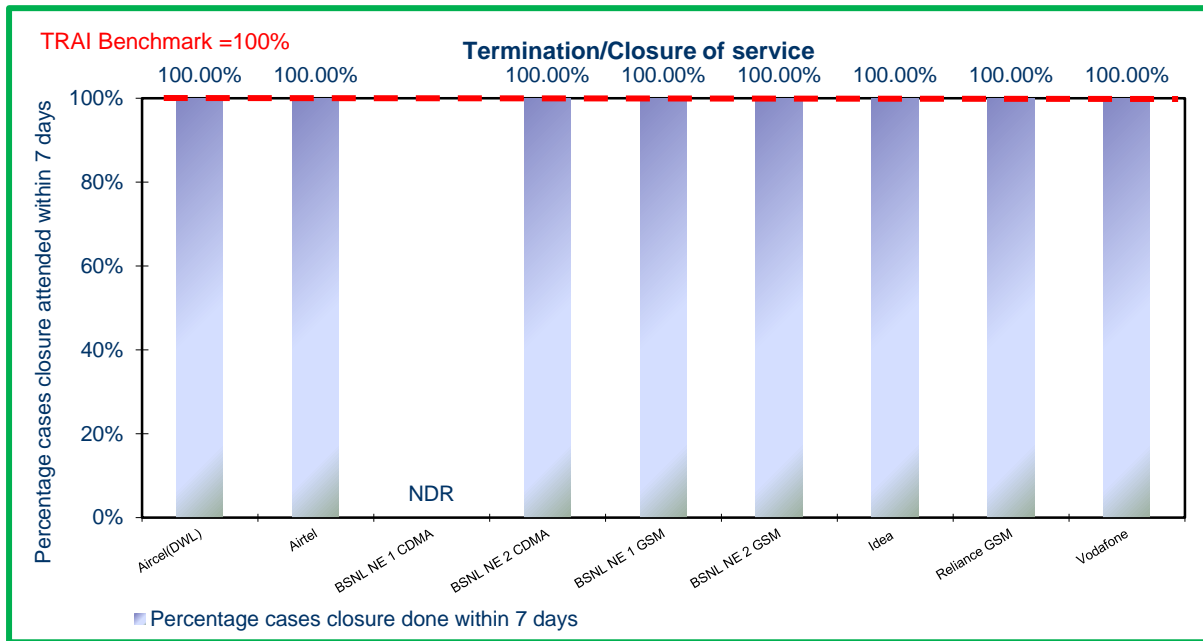
None of the operator meets the benchmark for live measurement data. For PMR data only Aircel, Airtel, Idea, Reliance GSM & Vodafone have met the benchmark.

### 6.6 CALL CENTRE PERFORMANCE-VOICE TO VOICE



In one month method only Airtel and Vodafone have not met the benchmark whereas for live calling none of the operator is able to meet the benchmark except Aircel and BSNL NE II CDMA.

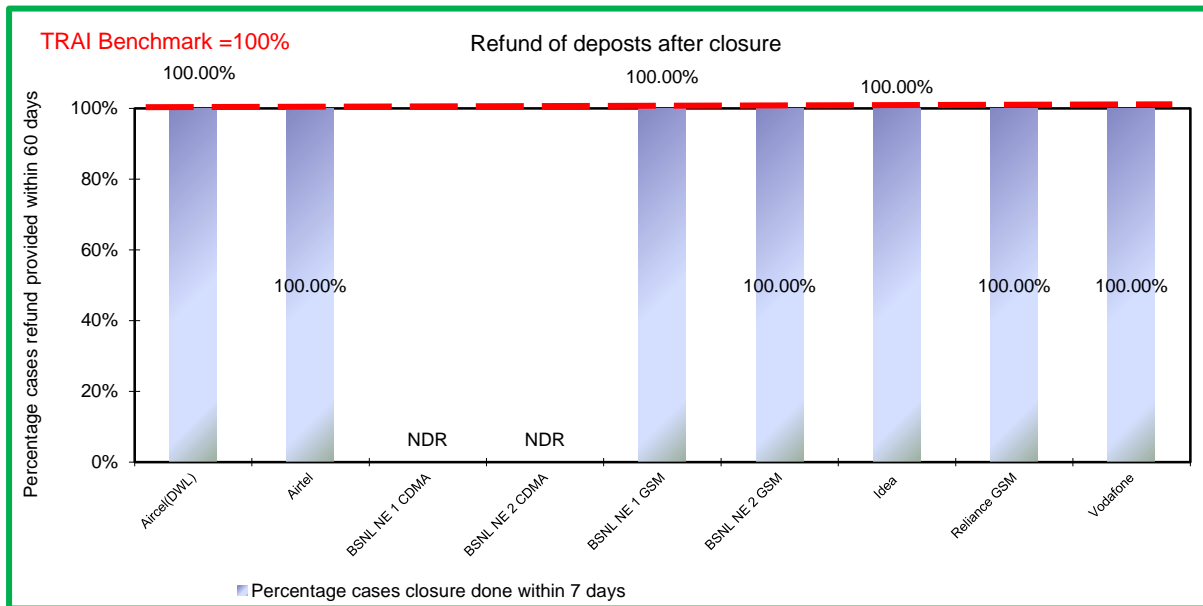
### 6.7 TERMINATION/CLOSURE OF SERVICE



NDR: No data received

All operators meet the benchmark.

### 6.8 REFUND OF DEPOSITS AFTER CLOSURE



NDR: No data received

All the operators meet the benchmark.

## 7 ANNEXURE

### 7.1 NETWORK AVAILABILITY

Audit Results for Network Availability										
	Benchmark	Aircel(DWL)	Airtel	BSNL NE 1 CDMA	BSNL NE 2 CDMA	BSNL NE 1 GSM	BSNL NE 2 GSM	Idea	Reliance GSM	Vodafone
Number of BTSs in the licensed service area		1697.00	1875.33	NDR	529.67	386.67	468.67	713.33	720.00	1361.00
Sum of downtime of BTSs in a month (in hours)		37418.53	4698.33	NDR	11463.00	12537.00	38662.67	8553.33	2089.33	15626.22
BTSs accumulated downtime (not available for service)	≤ 2%	2.96%	0.34%	NDR	4.02%	5.79%	11.09%	1.61%	0.39%	1.55%
Number of BTSs having accumulated downtime >24 hours		361.67	19.33	NDR	20.00	26.00	233.33	7.33	8.67	25.67
Worst affected BTSs due to downtime	≤ 2%	21.33%	1.03%	NDR	6.04%	9.56%	49.74%	1.03%	1.20%	1.88%
Live Measurement- BTSs accumulated downtime										
	Benchmark	Aircel(DWL)	Airtel	BSNL NE 1 CDMA	BSNL NE 2 CDMA	BSNL NE 1 GSM	BSNL NE 2 GSM	Idea	Reliance GSM	Vodafone
Number of BTSs in the licensed service area		1693.67	1861.67	NDR	529.67	386.67	468.67	713.33	720.00	1344.67
Sum of downtime of BTSs in a month (in hours)		3050.16	341.00	NDR	4952.67	1375.33	8502.00	882.67	204.67	1650.24
(not available for service)	≤ 2%	1.40%	0.20%	NDR	8.97%	6.28%	21.95%	1.15%	0.31%	1.14%
Number of BTSs having accumulated downtime >24 hours		10.67	0.00	NDR	15.33	17.00	195.33	5.67	0.00	5.67
Live Mesurement - Worst affected BTSs due to downtime	≤ 2%	0.63%	0.00%	NDR	4.38%	5.86%	41.70%	0.79%	0.00%	0.41%

## 7.2 CONNECTION ESTABLISHMENT (ACCESSIBILITY)

Audit Results for CSSR, SDCCH and TCH congestion										
CSSR	Benchmark	Aircel(DWL)	Airtel	BSNL NE 1 CDMA	BSNL NE 2 CDMA	BSNL NE 1 GSM	BSNL NE 2 GSM	Idea	Reliance GSM	Vodafone
CSSR	≥ 95%	94.08%	97.00%	NDR	90.33%	90.96%	82.36%	98.09%	98.43%	99.26%
SDCCH congestion	Benchmark	Aircel(DWL)	Airtel	BSNL NE 1 CDMA	BSNL NE 2 CDMA	BSNL NE 1 GSM	BSNL NE 2 GSM	Idea	Reliance GSM	Vodafone
SDCCH/Paging channel congestion	≤ 1%	0.93%	0.60%	NDR	0.66%	0.38%	0.47%	0.18%	0.02%	0.23%
TCH congestion	Benchmark	Aircel(DWL)	Airtel	BSNL NE 1 CDMA	BSNL NE 2 CDMA	BSNL NE 1 GSM	BSNL NE 2 GSM	Idea	Reliance GSM	Vodafone
TCH congestion	≤ 2%	1.85%	0.55%	NDR	1.35%	0.74%	0.92%	1.31%	0.50%	0.74%
Live measurement results for CSSR, SDCCH and TCH congestion										
CSSR	Benchmark	Aircel(DWL)	Airtel	BSNL NE 1 CDMA	BSNL NE 2 CDMA	BSNL NE 1 GSM	BSNL NE 2 GSM	Idea	Reliance GSM	Vodafone
CSSR	≥ 95%	95.21%	97.24%	NDR	94.12%	95.25%	78.41%	99.12%	98.44%	99.61%
SDCCH congestion	Benchmark	Aircel(DWL)	Airtel	BSNL NE 1 CDMA	BSNL NE 2 CDMA	BSNL NE 1 GSM	BSNL NE 2 GSM	Idea	Reliance GSM	Vodafone
SDCCH/Paging channel congestion	≤ 1%	0.71%	0.52%	NDR	0.88%	0.35%	0.56%	0.15%	0.03%	0.21%
TCH congestion	Benchmark	Aircel(DWL)	Airtel	BSNL NE 1 CDMA	BSNL NE 2 CDMA	BSNL NE 1 GSM	BSNL NE 2 GSM	Idea	Reliance GSM	Vodafone
TCH congestion	≤ 2%	1.59%	0.50%	NDR	1.31%	0.74%	0.85%	0.44%	0.47%	0.39%

Drive test results for CSSR (Average of three drive tests) and blocked calls										
CSSR	Benchmark	Aircel(DWL)	Airtel	BSNL NE 1 CDMA	BSNL NE 2 CDMA	BSNL NE 1 GSM	BSNL NE 2 GSM	Idea	Reliance GSM	Vodafone
Total number of call attempts		459.33	463.67	NDR	NDR	537.00	384.00	285.33	361.33	486.00
Total number of successful calls established		453.33	463.33	NDR	NDR	485.00	301.00	284.67	339.33	480.00
CSSR	≥ 95%	98.84%	99.94%	NDR	NDR	90.32%	78.39%	99.84%	94.88%	98.52%
Blocked calls	Benchmark	Aircel(DWL)	Airtel	BSNL NE 1 CDMA	BSNL NE 2 CDMA	BSNL NE 1 GSM	BSNL NE 2 GSM	Idea	Reliance GSM	Vodafone
%age blocked calls		1.16%	0.06%	NDR	NDR	9.68%	21.61%	0.16%	5.12%	1.48%

### 7.3 CONNECTION MAINTENANCE (RETAINABILITY)

Audit Results for Call drop rate and for number of cells having more than 3% TCH										
Call drop rate	Benchmark	Aircel(DWL)	Airtel	BSNL NE 1 CDMA	BSNL NE 2 CDMA	BSNL NE 1 GSM	BSNL NE 2 GSM	Idea	Reliance GSM	Vodafone
Total number of calls established		83231919.00	98068236.67	NDR	59433262.67	35482023.67	165445696.33	8718061.33	23198566.00	1017404.07
Total number of calls dropped		1266167.67	1040487.00	NDR	2176564.33	553082.67	4884266.67	148836.33	147855.33	6991.56
Call drop rate	≤ 2%	1.64%	1.06%	NDR	8.24%	1.50%	4.18%	1.72%	0.64%	0.69%
Cells having more than 3% TCH	Benchmark	Aircel(DWL)	Airtel	BSNL NE 1 CDMA	BSNL NE 2 CDMA	BSNL NE 1 GSM	BSNL NE 2 GSM	Idea	Reliance GSM	Vodafone
Total number of cells in the network		3795.67	3747.33	NDR	843.00	832.00	1030.67	1441.33	1434.67	2792.00
Total number of cells having more than 3% TCH		2287.33	1891.00	NDR	679.67	196.00	671.33	749.67	717.67	1479.00
Worst affected cells having more than 3% TCH	≤ 3%	20.93%	0.97%	NDR	3.13%	3.74%	23.57%	2.33%	0.06%	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 NE 1 CDMA	BSNL NE 2 CDMA	BSNL NE 1 GSM	BSNL NE 2 GSM	Idea	Reliance GSM	Vodafone
Total number of calls established		35741290.33	10568153.00	NDR	9234319.00	3270122.00	2980551.00	11910533.33	2542471.00	603514.19
Total number of calls dropped		504364.67	109411.00	NDR	173552.00	52997.00	109428.67	154144.00	16360.00	3642.78
Call drop rate	≤ 2%	1.47%	1.03%	NDR	1.60%	1.45%	3.59%	1.31%	0.65%	0.60%
Cells having more than 3% TCH	Benchmark	Aircel(DWL)	Airtel	BSNL NE 1 CDMA	BSNL NE 2 CDMA	BSNL NE 1 GSM	BSNL NE 2 GSM	Idea	Reliance GSM	Vodafone
Total number of cells in the network		3736.33	3706.00	NDR	841.89	830.33	857.00	1443.33	1434.67	2744.33
Total number of cells having more than 3% TCH		2264.67	1887.67	NDR	678.33	199.44	628.33	744.67	717.67	1441.33
Worst affected cells having more than 3% TCH	≤ 3%	20.31%	0.91%	NDR	2.96%	4.36%	19.92%	2.20%	0.06%	2.64%
Drive test results for Call drop rate (Average of three drive tests)										
Call drop rate	Benchmark	Aircel(DWL)	Airtel	BSNL NE 1 CDMA	BSNL NE 2 CDMA	BSNL NE 1 GSM	BSNL NE 2 GSM	Idea	Reliance GSM	Vodafone
Total number of calls established		453.33	463.33	NDR	NDR	485.00	301.00	276.00	339.33	480.33
Total number of calls dropped		3.00	0.00	NDR	NDR	22.00	30.00	0.67	10.00	5.00
Call drop rate	≤ 2%	0.66%	0.00%	NDR	NDR	4.54%	9.97%	0.16%	2.78%	0.97%

## 7.4 VOICE QUALITY

Audit Results for Voice quality										
Voice quality	Benchmark	Aircel(DWL)	Airtel	BSNL NE 1 CDMA	BSNL NE 2 CDMA	BSNL NE 1 GSM	BSNL NE 2 GSM	Idea	Reliance GSM	Vodafone
Total number of sample calls		9314420047.33	13266288070.00	NDR	90.00	80.00	72444634.67	2586522885.00	4850665821.67	182978928.82
Total number of calls with good voice quality		8612789157.00	13110864844.33	NDR	88.33	79.00	61708022.33	2494594114.33	4773190823.33	179651363.84
%age calls with good voice quality	≥ 95%	92.52%	98.83%	NDR	98.33%	99.00%	89.36%	96.45%	98.40%	98.18%
Live measurement results for Voice quality										
Voice quality	Benchmark	Aircel(DWL)	Airtel	BSNL NE 1 CDMA	BSNL NE 2 CDMA	BSNL NE 1 GSM	BSNL NE 2 GSM	Idea	Reliance GSM	Vodafone
Total number of sample calls		3783607512.67	1352150016.33	NDR	136.67	110.00	719890.67	2569285807.00	474304777.67	94436345.99
Total number of calls with good voice quality		3520638650.33	1336177730.67	NDR	133.33	108.33	584743.67	2485485554.33	466834800.67	92852384.66
%age calls with good voice quality	≥ 95%	92.87%	98.82%	NDR	98.01%	99.12%	91.05%	96.75%	98.42%	98.32%
Drive test results for Voice quality (Average of three drive tests)										
Voice quality	Benchmark	Aircel(DWL)	Airtel	BSNL NE 1 CDMA	BSNL NE 2 CDMA	BSNL NE 1 GSM	BSNL NE 2 GSM	Idea	Reliance GSM	Vodafone
Total number of sample calls		624783.33	727198.33	NDR	NDR	12385.00	111767.00	309922.33	539098.33	804172.67
Total number of calls with good voice quality		561733.00	658823.33	NDR	NDR	10996.87	106394.00	296949.67	499955.33	778207.33
%age calls with good voice quality	≥ 95%	86.73%	86.97%	NDR	NDR	88.79%	95.19%	95.82%	88.56%	96.65%

## 7.5 POI CONGESTION

Audit Results for POI Congestion										
POI congestion	Benchmark	Aircel(DWL)	Airtel	BSNL NE 1 CDMA	BSNL NE 2 CDMA	BSNL NE 1 GSM	BSNL NE 2 GSM	Idea	Reliance GSM	Vodafone
Total number of working POIs		37	25	NDR	28	21	0	27	14	31
No. of POIs not meeting benchmark		0.00	0.00	NDR	1.33	1.00	0.00	0.00	0.00	0.00
Total Capacity of all POIs (A) - in erlangs		39177.00	62311.00	NDR	19383.22	14537.42	0.00	11648.00	8483.16	12938199.58
Traffic served for all POIs (B)- in erlangs		26148.21	21192.67	NDR	10551.07	8112.61	0.00	7453.00	5397.26	5407628.81
POI congestion	≤ 0.5%	0.00%	0.00%	NDR	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 NE 1 CDMA	BSNL NE 2 CDMA	BSNL NE 1 GSM	BSNL NE 2 GSM	Idea	Reliance GSM	Vodafone
Total number of working POIs		37	25	NDR	28	21	0	27	14	31
No. of POIs not meeting benchmark		0.00	0.00	NDR	1.33	1.00	0.00	0.00	0.00	0.00
Total Capacity of all POIs (A) - in erlangs		39177.00	62469.67	NDR	19383.22	14537.42	0.00	11613.00	8360.48	439405.76
Traffic served for all POIs (B)- in erlangs		23827.42	21784.67	NDR	10620.38	8451.44	0.00	7634.00	5572.06	188299.17
POI congestion	≤ 0.5%	0.00%	0.00%	NDR	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 NE 1 CDMA	BSNL NE 2 CDMA	BSNL NE 1 GSM	BSNL NE 2 GSM	Idea	Reliance GSM	Vodafone
Billing disputes - Postpaid										
Total bills generated during the period		25144.00	41782.00	NDR	NDR	69784.00	65250.00	1594.00	14358.00	40617.00
Total number of bills disputed		1.00	0.00	NDR	NDR	29.00	1.00	0.00	10.00	50.00
Percentage bills disputed	≤ 0.1%	0.00%	0.00%	NDR	NDR	0.04%	0.00%	0.00%	0.07%	0.12%
Billing disputes - Prepaid										
Number of complaints related to charging, credit & validity		6.00	273.00	NDR	NDR	155.00	10.00	0.00	959.00	354.00
Total number of prepaid customers in that period		2317005.00	304118.00	NDR	NDR	621606.00	684261.00	349936.00	963765.00	3410957.00
Percentage of complaints	≤ 0.1%	0.00%	0.09%	NDR	NDR	0.02%	0.00%	0.00%	0.10%	0.01%
Resolution of billing complaints										
Total number of billing/charging complaints		7.00	273.00	NDR	NDR	184.00	11.00	0.00	969.00	394.00
Total complaints considered invalid		96	759	NDR	NDR	27.00	2.00	4.00	4.00	29.00
Number of complaints resolved in 4 weeks from date of receipt for complaints listed in 5.3.1		7.00	273.00	NDR	NDR	184.00	9.00	0.00	969.00	394.00
Percentage complaints resolved within 4 weeks of date of receipt	100%	100.00%	100.00%	NDR	NDR	100.00%	81.82%	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%	NDR	NDR	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 NE 1 CDMA	BSNL NE 2 CDMA	BSNL NE 1 GSM	BSNL NE 2 GSM	Idea	Reliance GSM	Vodafone
Total Number of calls made		100.00	100.00	NA	NA	100.00	100.00	100.00	100.00	100.00
Number of cases resolved in 4 weeks		93.00	91.00	NA	NA	88.00	88.00	94.00	91.00	93.00
Percentage cases resolved in four weeks	100.00%	93.00%	91.00%	NA	NA	88.00%	88.00%	94.00%	91.00%	93.00%

## 7.7 CUSTOMER CARE

Audit results for customer care (IVR and voice-to-Voice)										
Customer Care Assessment	Benchmark	Aircel(DWL)	Airtel	BSNL NE 1 CDMA	BSNL NE 2 CDMA	BSNL NE 1 GSM	BSNL NE 2 GSM	Idea	Reliance GSM	Vodafone
Total number of call attempts to customer care for assistance		1799129.00	269664.00	NDR	NDR	277227.00	163689.00	29075.00	503998.00	59805.00
Number of calls getting connected and answered (electronically)		1719281.00	269664.00	NDR	NDR	244204.00	135323.00	28265.00	497552.00	57299.00
Percentage calls getting connected and answered	≥ 95%	95.56%	100.00%	NDR	NDR	88.09%	82.67%	97.21%	98.72%	95.81%
Number of calls getting transferred to the operator (voice to voice)		219347.00	377037.00	NDR	NDR	134130.00	135323.00	80428.00	129223.00	957681.00
Number of calls answered by operator (voice to voice) within 60 seconds		206391.00	336711.00	NDR	NDR	126157.00	127204.00	79834.00	113615.00	902005.00
Percentage calls answered within 60 seconds (V2V)	≥ 90%	94.09%	89.30%	NDR	NDR	94.06%	94.00%	99.26%	87.92%	94.19%

Live calling results for customer care (IVR)										
Customer Care Assessment	Benchmark	Aircel(DWL)	Airtel	BSNL NE 1 CDMA	BSNL NE 2 CDMA	BSNL NE 1 GSM	BSNL NE 2 GSM	Idea	Reliance 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
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
Percentage calls getting connected and answered	≥ 95%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
Live calling results for customer care (Voice to Voice)										
Customer Care Assessment	Benchmark	Aircel(DWL)	Airtel	BSNL NE 1 CDMA	BSNL NE 2 CDMA	BSNL NE 1 GSM	BSNL NE 2 GSM	Idea	Reliance 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
Total Number of calls getting connected and answered		93.00	88.00	86.00	91.00	87.00	84.00	89.00	87.00	89.00
Percentage calls getting connected and answered	≥ 95%	93.00%	88.00%	86.00%	91.00%	87.00%	84.00%	89.00%	87.00%	89.00%

## 7.8 DRIVE TEST

### 7.8.1 JANUARY- MANIPUR

Name of SSA	Manipur	Month	January	Day	One														
	B'mark	Aircel(DWL)		Airtel		BSNL NE 1 CDMA		BSNL NE 2 CDMA		BSNL NE 1 GSM		BSNL NE 2 GSM		Idea		Reliance GSM		Vodafone	
		In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor
Signal Strength -0 to -75 dBm		58.53%	57.65%	92.15%	67.08%	Not Participated	Not Participated	NA				7.42%	12.56%	28.92%	40.97%	99.63%	59.29%	100.00%	70.11%
Signal Strength --75 to -85 dBm		38.34%	32.32%	7.46%	20.91%							79.40%	41.40%	28.67%	37.00%	0.36%	32.80%	0.00%	23.81%
Signal Strength --85 to -120 dBm		3.13%	10.03%	0.39%	12.01%							13.19%	46.04%	42.40%	22.03%	0.01%	7.92%	0.00%	6.08%
Voice quality	≥ 95%	98.45%	87.11%	99.13%	93.31%							99.79%	95.68%	97.80%	95.40%	98.22%	94.14%	99.35%	96.60%
CSSR	≥ 95%	100.00%	97.83%	100.00%	100.00%							85.19%	70.45%	100.00%	99.41%	100.00%	98.34%	100.00%	97.33%
%age Blocked calls		0.00%	2.17%	0.00%	0.00%							14.82%	29.54%	0.00%	0.58%	0.00%	1.66%	0.00%	2.67%
Call drop rate	≤ 2%	0.00%	1.06%	0.00%	0.00%							0.00%	1.77%	0.00%	1.19%	0.00%	0.00%	0.00%	0.66%
Hands off success rate		50.00%	98.01%	100.00%	99.68%							0.00%	78.53%	100.00%	98.61%	100.00%	99.15%	100.00%	100.00%

Name of SSA	Manipur	Month	January	Day	Two														
	B'mark	Aircel(DWL)		Airtel		BSNL NE 1 CDMA		BSNL NE 2 CDMA		BSNL NE 1 GSM		BSNL NE 2 GSM		Idea		Reliance GSM		Vodafone	
		In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor
Signal Strength -0 to -75 dBm		86.46%	66.06%	20.28%	37.37%	Not Participated	Not Participated	NA				40.00%	27.77%	1.61%	48.62%	45.87%	47.30%	67.31%	54.56%
Signal Strength --75 to -85 dBm		13.45%	24.89%	33.16%	32.79%							55.00%	39.19%	70.80%	31.16%	53.01%	43.82%	30.77%	31.17%
Signal Strength --85 to -120 dBm		0.09%	9.05%	46.56%	29.84%							5.00%	33.05%	27.59%	20.22%	1.13%	8.88%	1.92%	14.27%
Voice quality	≥ 95%	98.45%	98.31%	98.64%	92.21%							99.59%	96.16%	96.10%	98.32%	99.65%	95.27%	98.90%	96.66%
CSSR	≥ 95%	100.00%	98.79%	100.00%	100.00%							100.00%	79.38%	100.00%	98.24%	100.00%	88.14%	100.00%	99.66%
%age Blocked calls		0.00%	1.21%	0.00%	0.00%							0.00%	20.62%	0.00%	1.75%	0.00%	11.85%	0.00%	0.33%
Call drop rate	≤ 2%	0.00%	0.00%	0.00%	0.00%							0.00%	8.69%	0.00%	0.00%	0.00%	1.80%	0.00%	2.23%
Hands off success rate		100.00%	98.68%	100.00%	100.00%							100.00%	89.45%	100.00%	100.00%	100.00%	97.74%	100.00%	100.00%

Name of SSA	Manipur	Month	January	Day	Three														
	B'mark	Aircel(DWL)		Airtel		BSNL NE 1 CDMA		BSNL NE 2 CDMA		BSNL NE 1 GSM		BSNL NE 2 GSM		Idea		Reliance GSM		Vodafone	
		In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor
Signal Strength -0 to -75 dBm		98.12%	64.19%	75.24%	63.18%	Not Participated	Not Participated	NA	NA	59.36%	62.48%	5.57%	62.83%	99.62%	76.10%	96.67%	60.62%		
Signal Strength -75 to -85 dBm		1.86%	20.41%	24.51%	20.72%					12.32%	21.72%	47.50%	27.27%	0.37%	17.76%	3.33%	27.06%		
Signal Strength -85 to -120 dBm		0.03%	15.40%	0.25%	16.10%					28.33%	15.80%	46.93%	9.90%	0.01%	6.14%	0.00%	12.32%		
Voice quality	≥ 95%	98.45%	92.58%	98.95%	92.56%					94.58%	95.26%	90.65%	96.15%	99.02%	93.50%	97.95%	95.86%		
CSR	≥ 95%	100.00%	100.00%	100.00%	100.00%					100.00%	75.95%	100.00%	100.00%	100.00%	94.04%	96.65%	98.73%		
%age Blocked calls		0.00%	0.00%	0.00%	0.00%					0.00%	24.05%	0.00%	0.00%	0.00%	5.95%	3.35%	1.23%		
Call drop rate	≤ 2%	0.35%	2.78%	0.00%	0.00%					1.58%	29.10%	0.00%	0.00%	0.00%	1.45%	4.03%	3.55%		
Hands off success rate		100.00%	100.00%	100.00%	98.41%					98.81%	64.27%	100.00%	96.97%	100.00%	97.96%	100.00%	100.00%		

### 7.8.2 FEBRUARY- MEGHALAYA

Name of SSA	Meghalaya	Month	February	Day	One																
	B'mark	Aircel(DWL)		Airtel		BSNL NE 1 CDMA		BSNL NE 2 CDMA		BSNL NE 1 GSM		BSNL NE 2 GSM		Idea		Reliance GSM		Vodafone			
		In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor		
Signal Strength -0 to -75 dBm		93.70%	76.78%	99.81%	85.10%	Not Participated	Not Participated	NA	NA	37.70%	34.73%	NA	NA	10.71%	50.80%	53.73%	53.13%	91.72%	81.59%		
Signal Strength -75 to -85 dBm		6.26%	19.85%	0.17%	12.28%					62.30%	42.34%			71.53%	31.39%	42.95%	24.69%	8.28%	12.66%		
Signal Strength -85 to -120 dBm		0.03%	3.37%	0.02%	2.62%					0.00%	22.93%			17.76%	17.81%	3.33%	22.17%	0.00%	5.75%		
Voice quality	≥ 95%	98.45%	93.03%	99.15%	96.04%					NA	91.38%			99.18%	93.81%	98.62%	90.69%	99.44%	96.42%		
CSR	≥ 95%	100.00%	96.23%	100.00%	99.61%					96.42%	94.30%			100.00%	100.00%	98.00%	93.65%	100.00%	100.00%		
%age Blocked calls		0.00%	3.77%	0.00%	0.39%					3.58%	5.70%			0.00%	0.00%	2.00%	6.35%	0.00%	0.00%		
Call drop rate	≤ 2%	0.00%	0.00%	0.00%	0.00%					0.00%	0.92%			0.00%	0.00%	0.00%	4.49%	0.00%	0.00%		
Hands off success rate		50.00%	94.05%	NA	100.00%					100.00%	99.74%			NA	100.00%	100.00%	98.60%	100.00%	100.00%		



Name of SSA	Meghalaya	Month	February	Day	Two														
	B'mark	Aircel(DWL)		Airtel		BSNL NE 1 CDMA		BSNL NE 2 CDMA		BSNL NE 1 GSM		BSNL NE 2 GSM		Idea		Reliance GSM		Vodafone	
		In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor
Signal Strength -0 to -75 dBm		97.26%	52.58%	96.43%	64.45%	Not Participated	Not Participated	45.65%	37.47%	NA	NA	74.06%	53.99%	64.35%	45.54%	100.00%	64.94%		
Signal Strength --75 to -85 dBm		2.70%	24.46%	3.57%	23.84%			44.35%	28.89%			24.02%	34.50%	26.42%	22.96%	0.00%	19.74%		
Signal Strength --85 to -120 dBm		0.04%	22.96%	0.00%	11.71%			10.00%	33.64%			1.92%	11.51%	9.22%	31.50%	0.00%	15.32%		
Voice quality	≥ 95%	98.45%	87.95%	99.04%	92.22%			NA	89.70%			99.22%	95.28%	97.35%	91.77%	99.31%	96.43%		
CSSR	≥ 95%	100.00%	98.57%	100.00%	100.00%			100.00%	89.33%			100.00%	100.00%	100.00%	89.57%	100.00%	100.00%		
%age Blocked calls		0.00%	1.43%	0.00%	0.00%			0.00%	10.67%			0.00%	0.00%	0.00%	10.42%	0.00%	0.00%		
Call drop rate	≤ 2%	0.00%	1.63%	0.00%	0.00%			0.00%	3.25%			0.00%	0.00%	0.00%	11.26%	0.00%	1.67%		
Hands off success rate		0.00%	63.19%	100.00%	100.00%			100.00%	99.67%			NA	100.00%	100.00%	93.06%	100.00%	100.00%		

Name of SSA	Meghalaya	Month	February	Day	Three														
	B'mark	Aircel(DWL)		Airtel		BSNL NE 1 CDMA		BSNL NE 2 CDMA		BSNL NE 1 GSM		BSNL NE 2 GSM		Idea		Reliance GSM		Vodafone	
		In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor
Signal Strength -0 to -75 dBm		100.00%	56.82%	97.85%	71.33%	Not Participated	Not Participated	92.00%	36.92%	NA	NA	NA	41.37%	1.02%	45.31%	100.00%	62.83%		
Signal Strength --75 to -85 dBm		0.00%	24.33%	1.77%	13.86%			8.00%	30.65%			NA	31.94%	87.58%	27.20%	0.00%	20.74%		
Signal Strength --85 to -120 dBm		0.00%	18.85%	0.38%	14.81%			0.00%	32.43%			NA	26.70%	11.40%	27.49%	0.00%	16.43%		
Voice quality	≥ 95%	49.34%	93.84%	98.99%	91.89%			NA	85.71%			NA	95.20%	95.12%	90.57%	99.40%	97.10%		
CSSR	≥ 95%	50.00%	93.75%	100.00%	100.00%			96.15%	82.63%			NA	100.00%	100.00%	83.81%	100.00%	100.00%		
%age Blocked calls		50.00%	6.25%	0.00%	0.00%			3.85%	17.37%			NA	0.00%	0.00%	16.18%	0.00%	0.00%		
Call drop rate	≤ 2%	0.00%	0.56%	0.00%	0.00%			0.00%	21.09%			NA	0.00%	0.00%	2.72%	0.00%	0.00%		
Hands off success rate		0.00%	96.63%	100.00%	100.00%			100.00%	100.00%			NA	100.00%	100.00%	96.00%	100.00%	100.00%		

### 7.8.3 MARCH-ARUNACHAL

Name of SSA	ARUNACHAL	Month	March	Day	One														
	B'mark	Aircel(DWL)		Airtel		BSNL NE 1 CDMA		BSNL NE 2 CDMA		BSNL NE 1 GSM		BSNL NE 2 GSM		Idea		Reliance GSM		Vodafone	
		In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor
Signal Strength - 0 to -75 dBm		No Coverage		No Coverage		Not Participated		Not Participated		Not Participated		Not Participated		No Coverage		No Coverage		No Coverage	
Signal Strength --75 to -85 dBm		No Coverage		No Coverage		Not Participated		Not Participated		Not Participated		Not Participated		No Coverage		No Coverage		No Coverage	
Signal Strength --85 to -120 dBm		No Coverage		No Coverage		Not Participated		Not Participated		Not Participated		Not Participated		No Coverage		No Coverage		No Coverage	
Voice quality	≥ 95%	No Coverage		No Coverage		Not Participated		Not Participated		Not Participated		Not Participated		No Coverage		No Coverage		No Coverage	
CSSR	≥ 95%	No Coverage		No Coverage		Not Participated		Not Participated		Not Participated		Not Participated		No Coverage		No Coverage		No Coverage	
%age Blocked calls		No Coverage		No Coverage		Not Participated		Not Participated		Not Participated		Not Participated		No Coverage		No Coverage		No Coverage	
Call drop rate	≤ 2%	No Coverage		No Coverage		Not Participated		Not Participated		Not Participated		Not Participated		No Coverage		No Coverage		No Coverage	
Hands off success rate		No Coverage		No Coverage		Not Participated		Not Participated		Not Participated		Not Participated		No Coverage		No Coverage		No Coverage	

Name of SSA	ARUNACHAL	Month	March	Day	Two														
	B'mark	Aircel(DWL)		Airtel		BSNL NE 1 CDMA		BSNL NE 2 CDMA		BSNL NE 1 GSM		BSNL NE 2 GSM		Idea		Reliance GSM		Vodafone	
		In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor
Signal Strength - 0 to -75 dBm		98.81%	55.42%	99.25%	41.74%	Not Participated		Not Participated		Not Participated		Not Participated		No Coverage		NA	31.66%	50.00%	57.89%
Signal Strength --75 to -85 dBm		1.15%	20.41%	0.73%	29.15%	Not Participated		Not Participated		Not Participated		Not Participated		No Coverage		NA	20.55%	49.24%	26.90%
Signal Strength --85 to -120 dBm		0.03%	24.17%	0.02%	29.11%	Not Participated		Not Participated		Not Participated		Not Participated		No Coverage		NA	47.79%	0.76%	15.21%
Voice quality	≥ 95%	98.62%	95.51%	99.75%	96.19%	Not Participated		Not Participated		Not Participated		Not Participated		No Coverage		NA	91.73%	99.77%	95.58%
CSSR	≥ 95%	100.00%	100.00%	100.00%	100.00%	Not Participated		Not Participated		Not Participated		Not Participated		No Coverage		NA	66.66%	100.00%	98.08%
%age Blocked calls		0.00%	0.00%	0.00%	0.00%	Not Participated		Not Participated		Not Participated		Not Participated		No Coverage		NA	33.34%	0.00%	1.93%
Call drop rate	≤ 2%	0.00%	0.00%	0.00%	0.00%	Not Participated		Not Participated		Not Participated		Not Participated		No Coverage		NA	50.00%	0.00%	1.00%
Hands off success rate		100.00%	99.42%	NA	100.00%	Not Participated		Not Participated		Not Participated		Not Participated		No Coverage		NA	NA	100.00%	85.58%

Name of SSA	ARUNACHAL	Month	March	Day	Three															
	B'mark	Aircel(DWL)		Airtel		BSNL NE 1 CDMA		BSNL NE 2 CDMA		BSNL NE 1 GSM		BSNL NE 2 GSM		Idea		Reliance GSM		Vodafone		
		In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor	
Signal Strength -0 to -75 dBm		98.74%	64.51%	100.00%	59.25%	Not Participated	Not Participated	Not Participated	Not Participated	90.98%	56.71%	NA	43.62%	100.00%	74.49%					
Signal Strength --75 to -85 dBm		1.22%	23.42%	0.00%	33.26%					8.97%	18.52%	NA	38.49%	0.00%	15.84%					
Signal Strength --85 to -120 dBm		0.04%	12.07%	0.00%	7.48%					0.05%	24.77%	NA	17.90%	0.00%	9.68%					
Voice quality	≥ 95%	98.29%	93.12%	99.11%	95.11%					99.26%	94.82%	NA	94.58%	93.31%	90.34%					
CSSR	≥ 95%	100.00%	98.18%	100.00%	100.00%					100.00%	100.00%	100.00%	99.06%	100.00%	92.31%					
%age Blocked calls		0.00%	1.82%	0.00%	0.00%					0.00%	0.00%	0.00%	0.95%	0.00%	7.69%					
Call drop rate	≤ 2%	0.00%	5.94%	0.00%	0.00%					0.00%	0.00%	0.00%	0.96%	0.00%	1.62%					
Hands off success rate		100.00%	100.00%	NA	100.00%					100.00%	100.00%	99.32%	97.06%	100.00%	100.00%					

### 7.9 TERMINATION / CLOSURE OF SERVICE

Audit results for termination / closure of service										
Termination	Benchmark	Aircel(DWL)	Airtel	BSNL NE 1 CDMA	BSNL NE 2 CDMA	BSNL NE 1 GSM	BSNL NE 2 GSM	Idea	Reliance GSM	Vodafone
Total number of closure request		60.00	171.00	NDR	18.00	94.00	62.00	26.00	16.00	718.00
Number of requests attended within 7 days		60.00	171.00	NDR	18.00	94.00	62.00	26.00	16.00	718.00
Percentage cases in which termination done within 7 days	100.00%	100.00%	100.00%	NDR	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 NE 1 CDMA	BSNL NE 2 CDMA	BSNL NE 1 GSM	BSNL NE 2 GSM	Idea	Reliance GSM	Vodafone
Total number of cases requiring refund of deposits		135.00	151.00	NDR	NDR	87.00	91.00	19.00	50.00	240.00
Total number of cases where refund was made within 60 days		135.00	151.00	NDR	NDR	87.00	91.00	19.00	50.00	240.00
Percentage cases in which refund was received within 60 days	100.00%	100.00%	100.00%	NDR	NDR	100.00%	100.00%	100.00%	100.00%	100.00%

## 7.11 ADDITIONAL NETWORK RELATED PARAMETERS

Audit Results for Total Traffic Handled in Erlang										
Traffic in Erlang		Aircel(DWL)	Airtel	BSNL NE 1 CDMA	BSNL NE 2 CDMA	BSNL NE 1 GSM	BSNL NE 2 GSM	Idea	Reliance GSM	Vodafone
Equipped capacity of the network		105718.95	92351.00	NDR	16875.00	60000.00	52000.00	19099.00	40000.00	35939.24
Total traffic handled in erlang during TCBH		5612416.00	83694.00	NDR	1129.24	41700.00	13412.50	9235.00	22409.00	27059.79
Total number of customers as per VLR										
		Aircel(DWL)	Airtel	BSNL NE 1 CDMA	BSNL NE 2 CDMA	BSNL NE 1 GSM	BSNL NE 2 GSM	Idea	Reliance GSM	Vodafone
Total no. of customers served (as per VLR)		1779258.00	3026921.00	NDR	26599.00	390744.00	543838.00	325246.00	744597.00	1045837.00

Live calling for level 1 services										
Level 1 services		Aircel(DWL)	Airtel	BSNL NE 1 CDMA	BSNL NE 2 CDMA	BSNL NE 1 GSM	BSNL NE 2 GSM	Idea	Reliance GSM	Vodafone
Total no. of calls made		150.00	150.00	150.00	150.00	150.00	150.00	150.00	150.00	150.00
Calls answered in 60 sec		135.00	134.00	137.00	137.00	134.00	137.00	136.00	137.00	135.00
Calls answered after 60 sec		90.00%	89.33%	91.33%	91.33%	89.33%	91.33%	90.67%	91.33%	90.00%
% of calls connected in 60 seconds		0.9	0.8933	0.9133	0.9133	0.8933	0.9133	0.9067	0.9133	0.9
Live calling results for resolution of service requests										
Resolution of service requests	Benchmark	Aircel(DWL)	Airtel	BSNL NE 1 CDMA	BSNL NE 2 CDMA	BSNL NE 1 GSM	BSNL NE 2 GSM	Idea	Reliance GSM	Vodafone
Total Number of calls made		100.00	100.00	NDR	NDR	100.00	100.00	100.00	100.00	100.00
Number of cases resolved to satisfaction		91.00	89.00	NDR	NDR	89.00	88.00	91.00	92.00	90.00
Percentage cases resolved in four weeks		0.91	0.89	NDR	NDR	0.89	0.88	0.91	0.92	0.90

## 7.12 TOTAL CALL MADE DURING THE DRIVE TEST

January									
	Aircel	Airtel	BSNL NE 1 CDMA	BSNL NE 2 CDMA	BSNL NE 1 GSM	BSNL NE 2 GSM	Idea	RTL	Vodafone
Total No of calls made	451	489	NP	NP	NA	384	425	460	579
February									
	Aircel	Airtel	BSNL NE 1 CDMA	BSNL NE 2 CDMA	BSNL NE 1 GSM	BSNL NE 2 GSM	Idea	RTL	Vodafone
Total No of calls made	627	590	NP	NP	537	NA	298	490	553
March									
	Aircel	Airtel	BSNL NE 1 CDMA	BSNL NE 2 CDMA	BSNL NE 1 GSM	BSNL NE 2 GSM	Idea	RTL	Vodafone
Total No of calls made	300	312	NP	NP	NP	NP	133	134	326

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



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