



**EAST
ZONE**

TRAI AUDIT WIRELESS REPORT-ASSAM 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 Test16

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 37

5.1 BTS Accumulated Downtime..... 37

5.2 Worst Affected BTS due to downtime 37

5.3 Call Set Up Success Rate..... 38

5.4 SDCCH/Paging Channel Congestion 38

5.5 TCH Congestion..... 39

5.6 Call Drop Rate 39

5.7 Cells having greater than 3% TCH drop40

5.8 Voice Quality40

6 Detailed Findings – Non Network Parameters41

6.1 Billing Disputes-Postpaid41

6.2 Billing Disputes-PREPAID41

6.3	Resolution of Billing Complaints.....	42
6.4	Period of Applying Credit/Wavier	42
6.5	call Centre Performance-IVR.....	43
6.6	Call Centre Performance-Voice to Voice.....	43
6.7	Termination/Closure of Service.....	44
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).....	48
7.4	Voice quality.....	49
7.5	POI Congestion	51
7.6	Metering and Billing credibility.....	52
7.7	Customer Care.....	53
7.8	Drive Test.....	55
7.8.1	JANUARY- JORHAT	55
7.8.2	FEBRUARY- Bongaigaon	56
7.8.3	March- Tezpur	58
7.8.4	CDMA data for signal strength	59
7.9	Termination / closure of service.....	60
7.10	Time taken for refund of deposits after closure	60
7.11	Additional Network Related parameters.....	61
7.12	Total call made during the drive test.....	63

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.

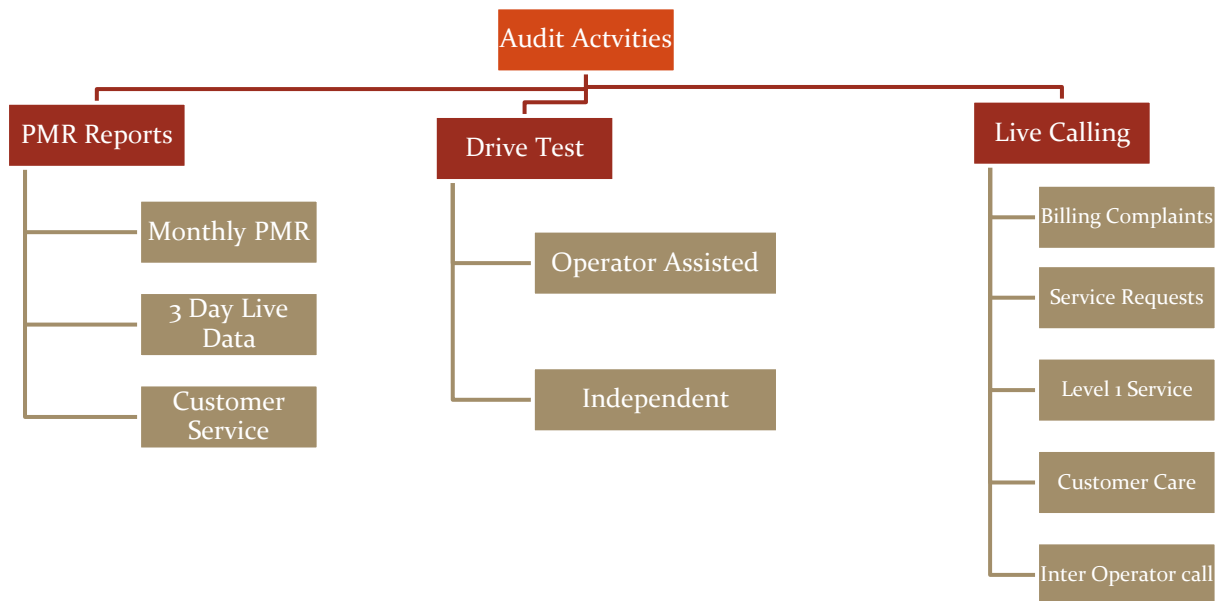
In order to assess the above regulations TRAI has commissioned a third party agency to conduct the audit of the service providers and check the performance of the operators on the various benchmarks set by Telecom Regulatory Authority of India (TRAI).

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:

- ↳ 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:-A₁ = Number of attempts to establish SDCCH / TCH made on day 1
- C₁ = Average SDCCH / TCH Congestion % on day 1
- A₂ = Number of attempts to establish SDCCH / TCH made on day 2
- C₂ = Average SDCCH / TCH Congestion % on day 2
- 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:-A₁ = POI traffic offered on all POIs (no. of calls) on day 1
- C₁ = Average POI Congestion % on day 1
- A₂ = POI traffic offered on all POIs (no. of calls) on day 2
- C₂ = Average POI Congestion % on day 2
- A_n = POI traffic offered on all POIs (no. of calls) on day n
- C_n = Average POI Congestion % on day n

3. Benchmark:

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

4. Audit Procedure –

- ⇒ Audit of the details of SDCCH and TCH congestion percentages computed by the operator (using OMC–Switch data only) would be conducted
- ⇒ The operator should be measuring this parameter during Time consistent busy hour (TCBH) only SDCCH

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 3rd 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 20th 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

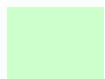
A total of 100 calls per service provider to all the other service providers in a licensed service area were done for the purpose of audit.

2.4 OPERATORS COVERED

Operator	Number of Subscriber as per VLR
Aircel(DWL)	3201226
Airtel	4414554
BSNL CDMA	14131
BSNL GSM	1000757
Idea	555725
Reliance GSM	2068426
Vodafone	2704338



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 Assam circle, with a parameter wise performance evaluation as compared to TRAI benchmark.

Name of Service Provider	Network Availability		Connection Establishment (Accessibility)			Connection Maintenance (Retainability)		
	BTSs Accumulated downtime (not available for service)	Worst affected BTSs due to downtime	Call Set-up Success Rate (within licensee's own network)	SDCCH/Paging Chl. Congestion	TCH Congestion	Call Drop Rate (%age)	Worst affected cells having more than 3% TCH drop	%age of connection with good voice quality
Benchmark	≤ 2%	≤ 2%	≥ 95%	≤ 1%	≤ 2%	≤ 2%	≤ 3%	≥ 95%
Aircel(DWL)	1.78%	11.54%	95.25%	0.93%	2.07%	1.46%	4.75%	92.84%
Airtel	0.21%	1.27%	98.51%	0.22%	0.50%	0.88%	0.90%	98.64%
BSNL CDMA	15.17%	25.76%	97.98%	1.74%	0.00%	1.21%	8.25%	97.40%
BSNL GSM	2.76%	6.01%	95.03%	0.87%	1.35%	2.12%	5.93%	89.47%
Idea	0.53%	0.42%	99.05%	0.08%	0.61%	1.01%	1.58%	95.73%
Reliance GSM	0.30%	1.70%	97.56%	0.03%	0.14%	0.66%	0.05%	98.33%
Vodafone	0.62%	1.92%	99.28%	0.20%	0.72%	0.55%	2.74%	97.95%

Following are the parameter wise observations for Wireless Operators for Assam circle:

BTs Accumulated Downtime:

In Assam circle, all operators meet the benchmark except BSNL CDMA & BSNL GSM. Maximum BTS Accumulated downtime was recorded for BSNL CDMA at 15.17% and minimum BTS Accumulated downtime for Airtel at 0.21%.

Worst Affected BTs Due to Downtime:

All the operators meet the benchmark except Aircel, BSNL CDMA, & BSNL GSM. Maximum worst affected BTs due to downtime were recorded for BSNL CDMA at 25.76% and minimum for Idea at 0.42%.

Call Set-up Success Rate (CSSR):

All operators comfortably met the benchmark on this parameter. During the audits the maximum CSSR was observed for Vodafone with 99.28% 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 except BSNL CDMA on SDCCH / Paging Channel Congestion and Aircel on TCH congestion. 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 BSNL GSM with a call drop rate of 2.12%%.

Worst Affected Cells Having More than 3% TCH Drop:

All the operators met the benchmark except Aircel, BSNL CDMA, & BSNL GSM having 4.75%, 8.25%, and 5.93% as Worst Affected Cells Having More than 3% TCH Drop.

Voice Quality

During the Audit all the parameters was measured according to the TRAI guidelines. The %age of connection with good voice quality was measured as the ratio of total number of calls with voice quality with Rx Qual value 0-5 to the total number of sample calls. Almost all the operators were meeting the benchmark except Aircel & BSNL GSM. The highest %age of connection with good voice quality was recorded by Airtel at 98.64%% and lowest was BSNL GSM at 89.47%

3.2 3 DAY DATA – CONSOLIDATED

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

Name of Service Provider	Network Availability		Connection Establishment (Accessibility)			Connection Maintenance (Retainability)		
	BTSs Accumulated downtime (not available for service)	Worst affected BTSs due to downtime	Call Set-up Success Rate (within licensee's own network)	SDCCH/Paging Chl. Congestion (%age)	TCH Congestion (%age)	Call Drop Rate (%age)	Worst affected cells having more than 3% TCH	%age of connection with good voice quality
Benchmark	≤ 2%	≤ 2%	≥ 95%	≤ 1%	≤ 2%	≤ 2%	≤ 3%	≥ 95%
Aircel(DWL)	1.80%	0.84%	97.42%	0.44%	1.51%	1.00%	7.48%	92.57%
Airtel	0.18%	0.00%	98.31%	0.16%	0.65%	0.88%	0.94%	98.63%
BSNL CDMA	10.77%	3.75%	98.12%	1.48%	0.00%	1.60%	7.71%	96.22%
BSNL GSM	3.16%	2.07%	94.18%	0.68%	2.05%	2.14%	6.44%	92.32%
Idea	0.69%	0.20%	99.22%	0.11%	0.53%	0.91%	1.72%	96.41%
Reliance GSM	0.26%	0.00%	98.89%	0.03%	0.14%	0.65%	0.27%	98.86%
Vodafone	0.55%	0.29%	99.67%	0.13%	0.33%	0.48%	2.63%	98.31%

BTSS Accumulated Downtime:

In Assam circle, all operators met the benchmark except BSNL CDMA at 10.77% & BSNL GSM at 3.16% respectively. Maximum BTS Accumulated downtime was recorded for BSNL CDMA at 10.77% and minimum BTS Accumulated downtime for Airtel at 0.18%.

Worst Affected BTSs Due to Downtime:

All the operators met the benchmark except BSNL CDMA & BSNL GSM. Maximum worst affected BTSs due to downtime were recorded for BSNL CDMA at 3.75% and Airtel & Reliance GSM had no worst affected BTSs due to downtime.

Call Set-up Success Rate (CSSR):

All the operators were comfortably meeting the benchmark on this parameter except BSNL. During the audits the maximum CSSR was observed for Vodafone with 99.67% 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 except BSNL CDMA on SDCCH/ Paging Chl. Congestion BSNL GSM on TCH congestion. 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 the operators were found to be meeting the TRAI specified benchmark except BSNL GSM. The highest call drop was for BSNL GSM with 2.14%, and lowest was for Vodafone with 0.48%.

Worst Affected Cells Having More than 3% TCH Drop:

All the operators met the benchmark except Airtel at 7.48%, BSNL CDMA at 7.71% & BSNL GSM at 6.44%. Maximum Worst Affected Cells Having More than 3% TCH Drop was recorded for BSNL CDMA 7.71%

Voice Quality

During the Audit all the parameters was measured according to the TRAI guidelines. The %age of connection with good voice quality was measured as the ratio of total number of calls with voice quality with Rx Qual value 0-5 to the total number of sample calls. Almost all the operators were meeting the benchmark except Airtel 92.57% & BSNL GSM 92.32%. The highest %age of connection with good voice quality was recorded by Reliance GSM at 98.86% and lowest was BSNL GSM at 92.32%

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)	94.00%	84.00%	91.33%	100.00%	95.00%
Airtel	93.00%	88.00%	90.67%	100.00%	94.00%
BSNL CDMA	NA	NA	90.00%	100.00%	94.00%
BSNL GSM	88.00%	89.00%	87.33%	100.00%	92.00%
Idea	90.00%	89.00%	88.00%	100.00%	89.00%
Reliance GSM	92.00%	91.00%	89.33%	100.00%	88.00%
Vodafone	87.00%	91.00%	89.33%	100.00%	91.00%

Complaints Resolved within 4 weeks

As per the audited records, all the operators resolve the complaints within 4 weeks of registration of complaints however, as per the consumers (live calling exercise) none of the operator was able to meet the benchmark of 100%.

Note:-NA: Not Applicable; No Billing Complaint DUMP Received from BSNL CDMA even after repeated reminders.

Complaint/Request Attended to Satisfaction

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

Note: -NA: Not Applicable; No Service complaint dump received from operator and we were reported by operator that there is no service complaint dump in the given period for BSNL CDMA.

Level 1 Service

As per the audit results, all the operators are not meeting the TRAI benchmark for level 1 service with calls being answered within 60.

We have contacted the following numbers:

- Fire Services- 101
- Health Services-104
- Ambulance-108
- Police-100

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 is well much above the TRAI benchmark of 95%.

Customer Care / Helpline Assessment

It was observed that the majority of operators comfortably met the TRAI benchmark of 90% of calls answered by the centres within 60 seconds except Idea and Reliance GSM

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)	0.02%	0.01%	100.00%	100.00%	75.52%	77.17%
Airtel	0.00%	0.01%	100.00%	100.00%	100.00%	96.84%
BSNL CDMA	0.07%	0.04%	100.00%	100.00%	NA	59.00%
BSNL GSM	0.01%	0.01%	100.00%	100.00%	75.51%	87.18%
Idea	0.00%	0.00%	100.00%	100.00%	97.22%	98.81%
Reliance GSM	0.10%	0.10%	100.00%	100.00%	98.98%	86.42%
Vodafone	0.11%	0.01%	100.00%	100.00%	96.87%	89.31%

Billing Disputes – Postpaid Subscribers

For the billing disputes of the postpaid subscribers, it was observed that all operators meet the benchmark with an average of only 0.04% complaints which was well within the TRAI benchmark of less than 0.1%. Airtel and Idea showed the best performance with negligible complaints 0.00%.

Billing Disputes – Prepaid Subscribers

For the prepaid customers, all the operators meet the benchmark comfortably. Idea performed well as it did not have even a single billing complaint by its Prepaid subscribers

Billing Complaints -% of complaints resolved in 4 weeks

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

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

All the 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 can be seen that on an average 90.68% of the calls were answered by the operators within IVR. Airtel performed the best with 100% of its calls getting answered in 60 seconds by the IVR. Aircel & BSNL GSM did not meet the benchmark of 95% of its IVR call being attended within 60 seconds.

Note: - BSNL CDMA did not share the report with IMRB, hence it is Not Applicable. BSNL CDMA do not have a separate Customer care, it is clubbed with BSNL GSM.

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

For voice to voice calls, none of the operators was able met the benchmark except Airtel and Idea.

3.5 INTER OPERATOR CALL ASSESSMENT - CONSOLIDATED

Inter operator call Assessment To↓ From→	Aircel(DWL)	Airtel	BSNL CDMA	BSNL GSM	Idea	Reliance GSM	Vodafone
Aircel(DWL)	NA	85.00%	99.00%	95.00%	94.00%	91.00%	91.00%
Airtel	87.00%	NA	100.00%	92.00%	92.00%	93.00%	90.00%
BSNL CDMA	91.00%	93.00%	NA	91.00%	90.00%	95.00%	90.00%
BSNL GSM	89.00%	89.00%	90.00%	NA	91.00%	91.50%	88.00%
Idea	90.00%	91.00%	93.00%	91.00%	NA	92.00%	89.00%
Reliance GSM	91.00%	92.00%	91.00%	89.00%	91.00%	NA	89.00%
Vodafone	89.00%	92.00%	89.00%	91.00%	93.00%	90.00%	NA



Maximum Problem faced by the calling operator to other operator

In the inter-operator call assessment, it can be seen that all the operators faced a little problem in connecting to various operators. Aircel was found to perform better when compared to other operators.

Vodafone found problem in connecting to almost all other operators.

4 DETAILED FINDINGS - DRIVE TEST DATA

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

Month	Name of SSA Covered	Date of Drive Test
January	JORHAT	29th Jan to 31st Jan
February	Bongaigaon	19th Feb, 21st Feb, 28th Feb
March	Tezpur	26th March, 28th March, 29th March
Year	2014	

Route Details – January – Jorhat SSA –

		January		
		Jorhat		
	Type of location	Day 1	Day 2	Day 3
Outdoor	Major Roads	Starting point with National Highway-40 Drive(Periphery ,Congested and across the city, Office Complex and Shopping complex),	City Drive(Periphery, Congested and across the city, , Office Complex and Shopping Complex),	Sibsagar to Nazira via State Highway no-1(covering villages Selekapar, Singhduar, Hahsora, Bokanagar, Senpura, Bharipara, Barduar Par, Balighat)
	Highways	State Highway no-1(covering villages Bengenakhowa, Mission Rd, Teteli Tol, Chaka Dhora)	2. Jorhat to Marioni via State High Way no-1(covering villages Rajabari, Sinnamora, Duklingia, Kotanibari, Dhoda r Ali)	NaZira Town City Drive(Periphery and across the city),
	Within the City	State Highway no-2(covering villages Tenpur, Mission Patty, Jonaki Nagar, Pulibor Tinali, Padumoni, Dhekial Chariali, Gonesh Pukhuri, Kurap Pukhuri)	3. Morioni to Titabor via State High Way no-2(covering villages Hatijuli, Nogadhuli, Letukajan, Pub Ali Nagar, Titabor, Station Tinali, Bibijan Tinali, Naw Ali)	NaZira to Sonari via State Highway no-2(covering villages Simoluguri, Gormur, Khanikor, Tenga Pukhuri, Dol Bagan, Soraideo, Mathurapur, Maibela, Suffry)

Indoor	Office complex	N H Way-37(covering villages Kumar Gaon, Panidihingia,Bongaon, Baduli Para,Misamora,Rongamati ,Santipur,Saringia)	4. Sibsagar to Jorhat via N H Way no-37(covering villages Malo Ali, Santipur, Kumarighat,Padumoni,Hatigarh,Melong,Ladoigarh,Kakojan,Hahsora,Jamuguri,Saring,Santipara)	Sonari Town City Drive(Periphery and across the city),
	Shopping complex			Dimow to Sibsagar via N H Way no-37(covering villages Sepon, Nahoroni,Holokaguri, Kasumari,Dehajan,Borhola,Ikorani, Rajmai,Japisajia,Rajabari, Sukan Pukhuri,Betbari)
				Sibsagar- Via City Drive(Periphery, Congested ,across the city, Office Complex and Shopping Complex)

Drive Test Result – January – Jorhat SSA

Name of SSA	JORHAT	Month	January	Consolidated
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	B'mark	Aircel(DWL)		Airtel		BSNL CDMA		BSNL 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
Signal Strength - 0 to -75 dBm		63.73%	41.71%	50.81%	61.77%	NA		74.30%	22.70%	80.39%	45.86%	59.13%	33.95%	100.00%	79.35%
Signal Strength - 75 to -85 dBm		34.73%	34.06%	44.16%	29.71%			22.76%	41.17%	18.81%	30.53%	38.98%	38.98%	0.00%	13.02%
Signal Strength - 85 to -120 dBm		1.54%	24.23%	5.03%	8.52%			2.94%	36.14%	0.79%	23.61%	1.88%	27.06%	0.00%	7.63%
Voice quality	≥ 95%	98.83%	95.12%	98.75%	96.15%	99.97%	88.81%	96.12%	91.07%	98.85%	96.97%	97.51%	95.37%	98.38%	97.07%
CSSR	≥ 95%	100.00%	98.92%	100.00%	100.00%	100.00%	100.00%	98.33%	97.53%	100.00%	99.55%	99.28%	97.84%	100.00%	98.99%
%age Blocked calls		0.00%	1.07%	0.00%	0.00%	0.00%	0.00%	1.67%	2.47%	0.00%	0.44%	1.06%	2.15%	0.00%	0.76%
Call drop rate	≤ 2%	0.00%	0.00%	0.00%	0.00%	0.00%	10.23%	0.00%	2.42%	0.00%	0.24%	0.00%	1.84%	0.00%	0.00%
Hands off success rate		100.00%	99.31%	100.00%	100.00%	98.67%	99.32%	100.00%	99.67%	100.00%	99.83%	100.00%	97.96%	100.00%	100.00%

% Ec/Io BINS with less than -15	BSNL CDMA	
	In door	Outdoor
	99.88%	94.03%

Voice Quality

All operators meet the benchmark except BSNL CDMA & BSNL GSM in outdoor areas. The benchmark for voice quality is 95%.

Call Set Success Rate (CSSR)

All operators meet the benchmark.

Call Drop Rate

All operators meet the benchmark except BSNL CDMA & BSNL GSM in outdoor areas.

Route Details – February – Bongaigaon SSA –

		February		
		Bongaigaon		
	Type of location	Day 1	Day 2	Day 3
Outdoor	Major Roads	Bilasipara- Major Road.		
	Highways	Dhuburi to Bongaigaon via Kokrajhar with National Highway-31 and 31C Drive	Bongaigaon to Goalpara-via Uttar Salmarawith State Highway-2 and National High Way 31B Drive	Bongaigaon to Nalbari-via Barpeta Rd National High Way 31C and 31 Drive
	With in the City	Kokrajhar with City Drive (Inside the city, Major Road)	Goalpara-City Drive (Inside the city)	Barpeta Rd-City Drive (Inside the city)
Indoor	Office complex			
	Shopping complex	Dhuburi- Starting point with City Drive (Inside the city, Major Road, Office Complex and Shopping complex),	Bongaigaon City Drive ((Inside the city, Major Road, Office Complex and Shopping complex)	Nalbari-City Drive ((Inside the city, Major Road, Office Complex and Shopping complex)

Drive Test Result – February – Bongaigaon SSA

Name of SSA	Bongaigaon	Month	February	Consolidated
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	B'mark	Aircel(DWL)		Airtel		BSNL CDMA		BSNL 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
Signal Strength - 0 to -75 dBm		50.02%	55.63%	68.94%	64.01%	NA		98.13%	47.82%	80.58%	49.69%	40.33%	38.31%	99.44%	79.80%
Signal Strength - 75 to -85 dBm		40.32%	28.82%	27.07%	27.50%			1.65%	27.84%	19.10%	35.32%	53.62%	41.35%	0.56%	13.43%
Signal Strength - 85 to -120 dBm		9.66%	15.55%	3.99%	8.48%			0.22%	24.34%	0.31%	15.00%	6.05%	20.34%	0.00%	6.77%
Voice quality	≥ 95%	99.41%	96.20%	98.91%	96.05%	98.45%	91.31%	98.87%	93.29%	99.54%	97.52%	98.90%	94.60%	99.03%	95.78%
CSSR	≥ 95%	100.00%	99.67%	100.00%	99.85%	93.56%	91.79%	99.00%	93.77%	100.00%	100.00%	100.00%	98.96%	100.00%	99.53%
%age Blocked calls		0.00%	0.33%	0.00%	0.15%	6.44%	8.21%	1.00%	6.23%	0.00%	0.00%	0.00%	1.04%	0.00%	0.46%
Call drop rate	≤ 2%	0.00%	0.12%	0.00%	0.00%	1.39%	2.57%	0.00%	35.72%	0.00%	0.00%	0.58%	0.64%	0.00%	0.00%
Hands off success rate		100.00%	98.86%	50.00%	100.00%	83.33%	99.11%	100.00%	98.78%	100.00%	100.00%	99.78%	97.83%	100.00%	99.81%

% Ec/Io BINS with less than -15	BSNL CDMA	
	In door	Outdoor
	99.84%	96.91%

Voice Quality

All operators meet the benchmark except BSNL CDMA, BSNL GSM, & Reliance GSM in outdoor areas. The benchmark for voice quality is 95%.

Call Set Success Rate (CSSR)

All operators meet the benchmark except BSNL CDMA in both indoor and outdoor area and BSNL GSM in outdoor area.

Call Drop Rate

All operators meet the benchmark except BSNL CDMA & BSNL GSM. We observe that BSNL GSM has the highest call drop rate of 35.72% as compared to other operators in outdoor area.

Route Details – March – Tezpur SSA –

		March		
		Tezpur		
Type of location		Day 1	Day 2	Day 3
Outdoor	Major Roads			Silapathar to no-2 Takowa Bari NH aproch- Major Road
	Highways	Dumunichowki to Mongaldoi- Starting with NationalHighway-52 Drive	Tezpur(Mission Chariali) to North Lakhimpur via Bishwanath Chariali and Gohpur- with NationalHighway-52 Drive Way.	
	With in the City	Mongaldoi- Inside the city		Silapathar- Inside the city
Indoor	Office complex			
	Shopping complex	Tezpur-Inside the city(Major Road, Office Complex and Shopping complex)	North Lakhimpur-- Inside the city (Major Road, Office Complex and Shopping complex)	Dhemaji-City Drive (Major Road, Office Complex and shopping complex))

Drive Test Result – March – Tezpur SSA

Name of SSA	Tezpur	Month	March	Consolidated
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	B'mark	Aircel(DWL)		Airtel		BSNL CDMA		BSNL 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
Signal Strength - 0 to -75 dBm		72.57%	50.10%	83.21%	59.69%	NA		46.56%	43.13%	44.46%	38.79%	NA	40.90%	99.49%	84.64%
Signal Strength - 75 to -85 dBm		21.20%	31.36%	16.62%	30.80%			30.11%	23.05%	41.92%	25.12%	NA	39.45%	0.51%	12.50%
Signal Strength - 85 to -120 dBm		6.23%	18.54%	0.17%	9.52%			23.33%	33.82%	13.62%	36.09%	NA	19.64%	0.00%	2.86%
Voice quality	≥ 95%	98.89%	95.73%	99.06%	95.78%	96.96%	95.38%	96.51%	93.10%	98.23%	95.80%	NA	94.09%	98.99%	96.35%
CSSR	≥ 95%	100.00%	99.18%	100.00%	100.00%	98.70%	95.77%	99.67%	95.11%	99.86%	99.41%	100.00%	98.31%	98.62%	97.61%
%age Blocked calls		0.00%	0.82%	0.00%	0.00%	1.30%	4.23%	0.33%	4.89%	0.14%	0.59%	0.00%	1.69%	1.38%	2.39%
Call drop rate	≤ 2%	0.00%	0.23%	0.00%	0.00%	18.38%	3.54%	0.67%	1.64%	0.00%	0.00%	0.00%	0.27%	1.01%	0.22%
Hands off success rate		100.00%	100.00%	100.00%	100.00%	100.00%	99.55%	99.00%	95.94%	99.91%	100.00%	99.91%	99.41%	99.21%	98.66%

% Ec/Io BINS with less than -15	BSNL CDMA	
	In door	Outdoor
	95.46%	96.06%

Note: - Due to no network coverage for Reliance GSM in indoor areas we could not generate the values for signal strength and voice quality, hence it is Not Applicable.

Voice Quality

All operators meet the benchmark except BSNL GSM & Reliance GSM in outdoor areas. The benchmark for voice quality is 95%.

Call Set Success Rate (CSSR)

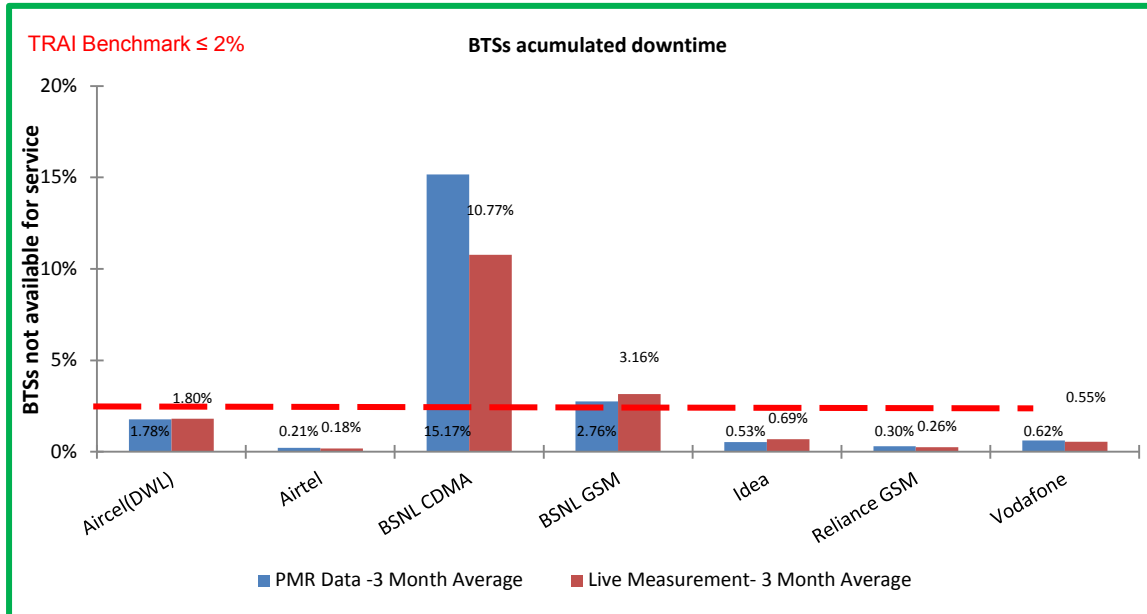
All operators comfortably meet the benchmark.

Call Drop Rate

All operators comfortably meet the benchmark except BSNL CDMA.

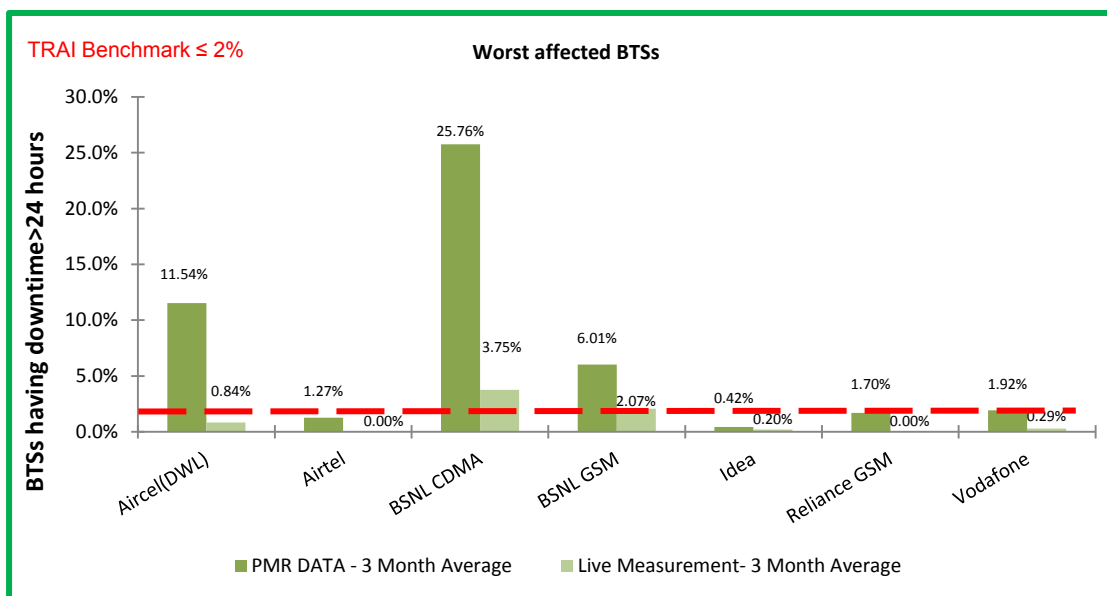
5 DETAILED FINDINGS - COMPARISON BETWEEN PMR DATA, 3 DAY LVE DATA AND LIVE CALLING DATA

5.1 BTS ACCUMULATED DOWNTIME



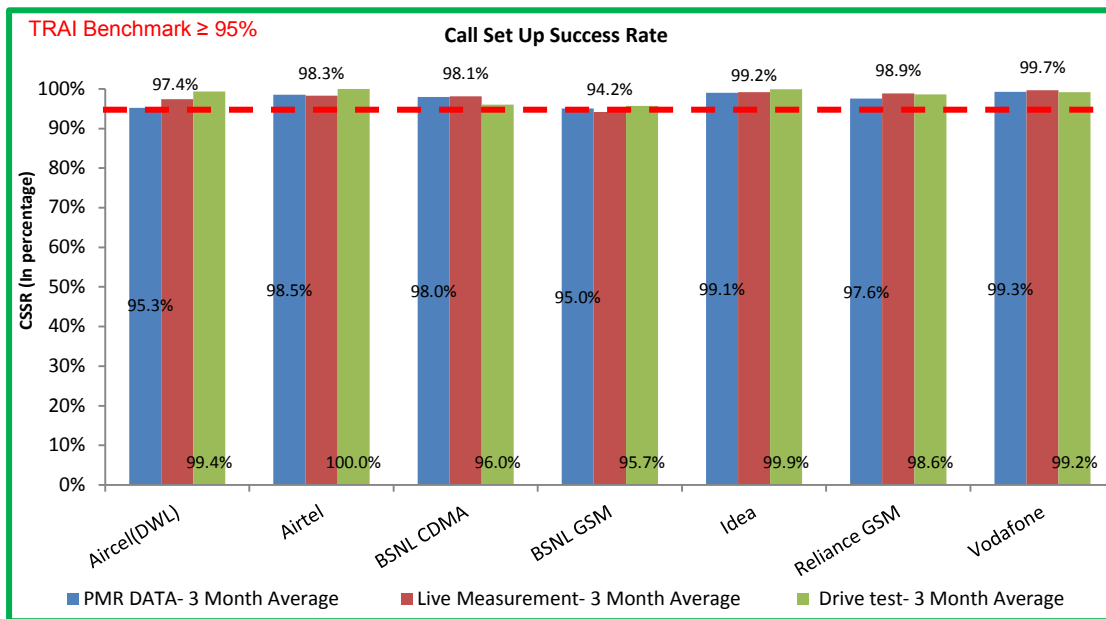
The result of the PMR data and live measurement is almost similar except for BSNL CDMA. Further, both BSNL CDMA as well as BSNL GSM are not able to meet the benchmark on aspect of BTS Accumulated downtime for PMR as well as Live measurement data.

5.2 WORST AFFECTED BTS DUE TO DOWNTIME



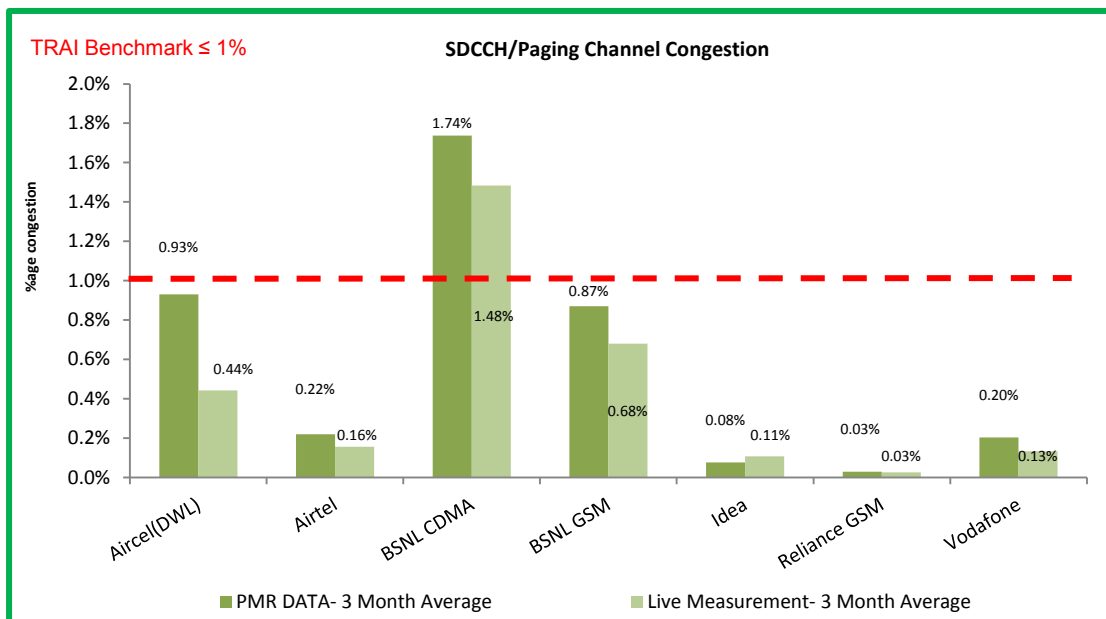
Aircel, BSNL CDMA, and BSNL GSM do not meet the benchmark for worst affected BTSs due to downtime and it is also observed that there is a significant difference between PMR and Live Measurement data for Aircel, BSNL CDMA and BSNL GSM.

5.3 CALL SET UP SUCCESS RATE



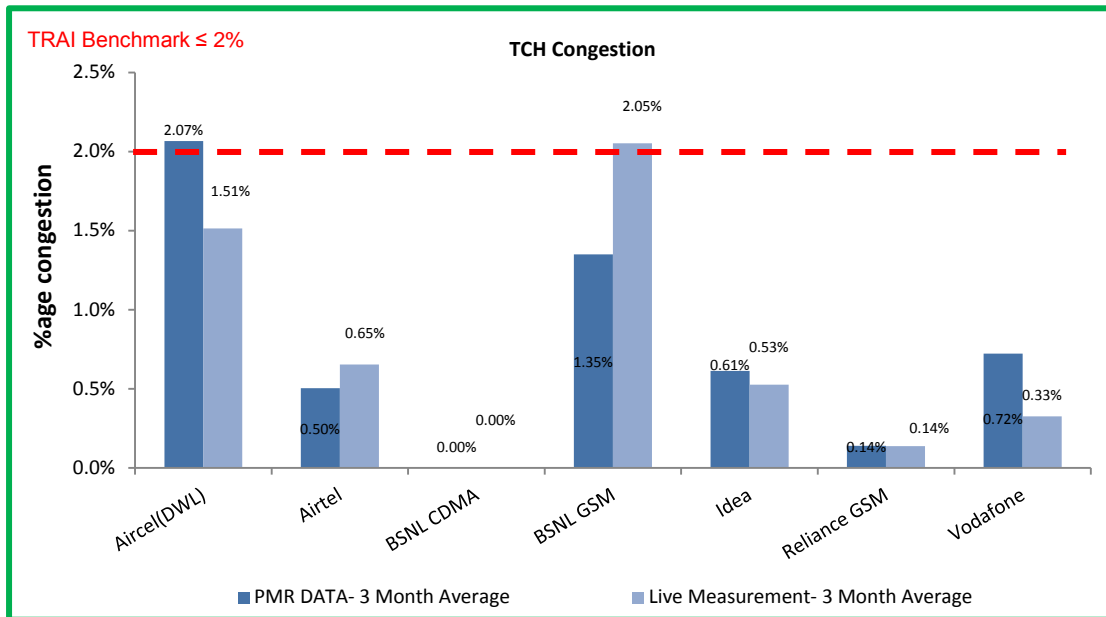
Only BSNL GSM in Live measurement is not able to meet the benchmark for Call Setup Success rate for Live measurement data.

5.4 SDCCH/PAGING CHANNEL CONGESTION



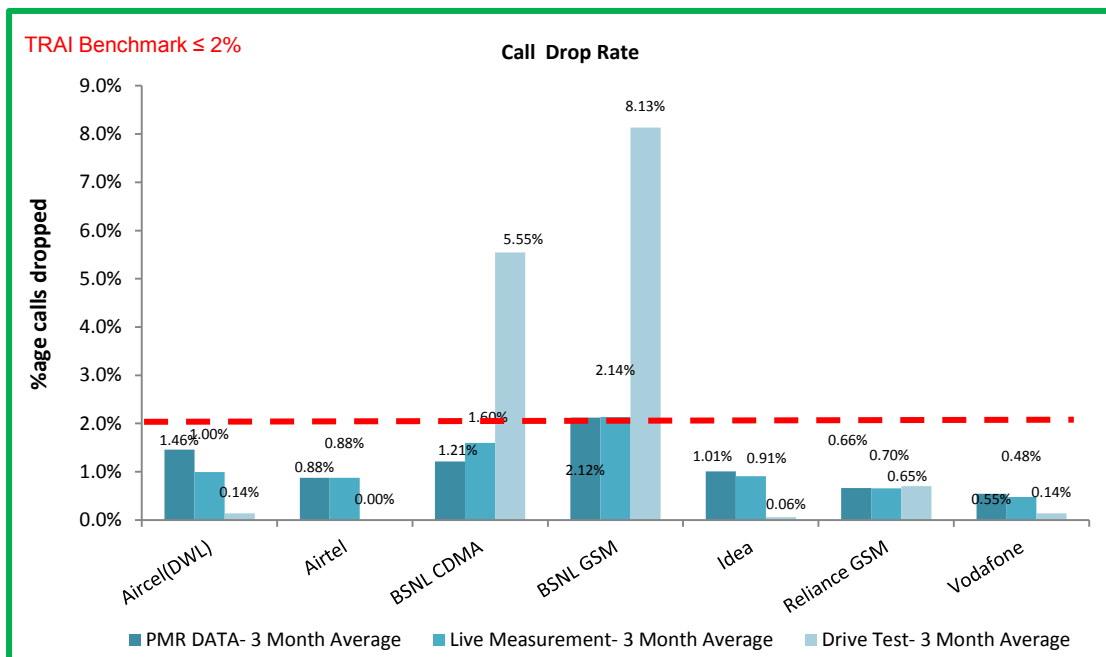
All operators meet the benchmark except BSNL CDMA for both PMR Data and Live measurement.

5.5 TCH CONGESTION



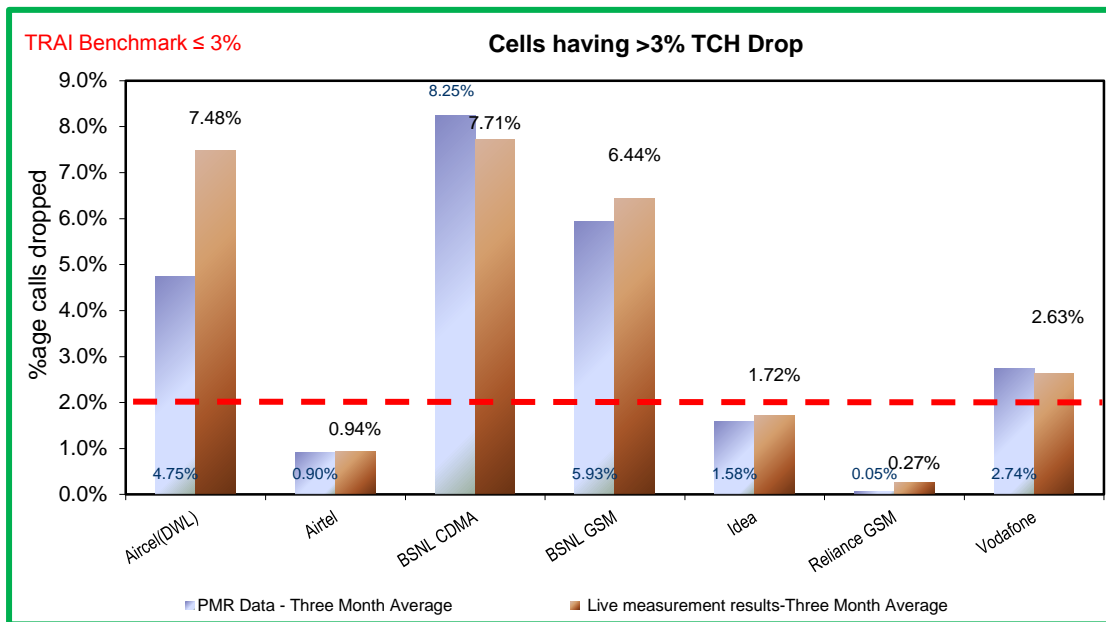
Only Aircel and BSNL GSM are not able to meet the benchmark in TCH Congestion and it is also observed that there is a significant difference between PMR and Live Measurement data for BSNL GSM.

5.6 CALL DROP RATE



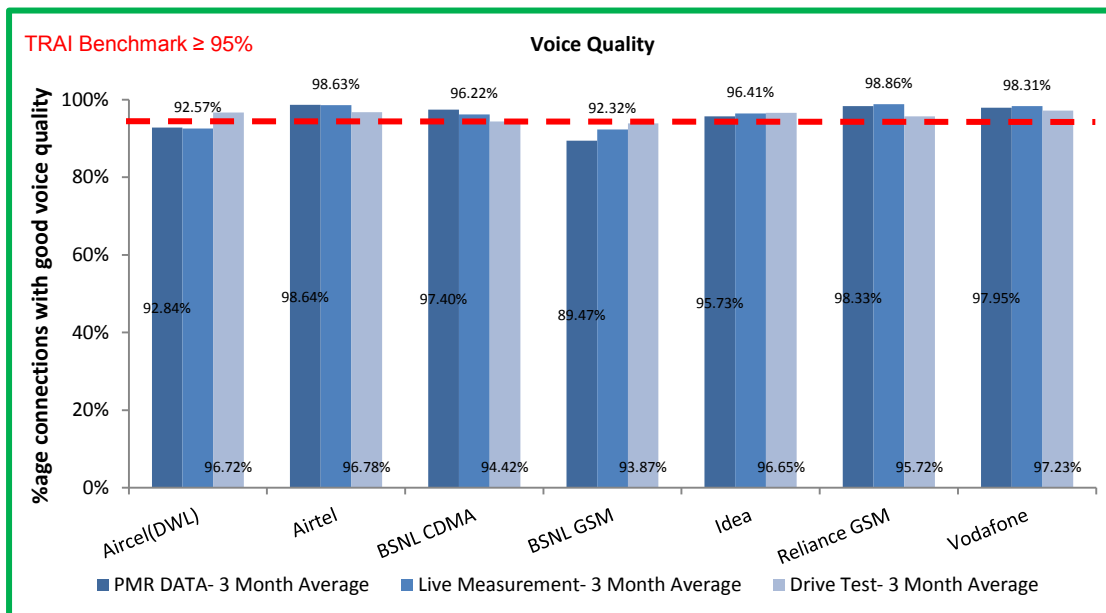
All operators comfortably meet the benchmark except BSNL GSM and BSNL CDMA, where BSNL CDMA not meeting the Benchmark for Drive Test and BSNL GSM not meet for all the three parameters.

5.7 CELLS HAVING GREATER THAN 3% TCH DROP



Aircel, BSNL CDMA, BSNL GSM, and Vodafone do not meet the benchmark for both PMR and live measurement data.

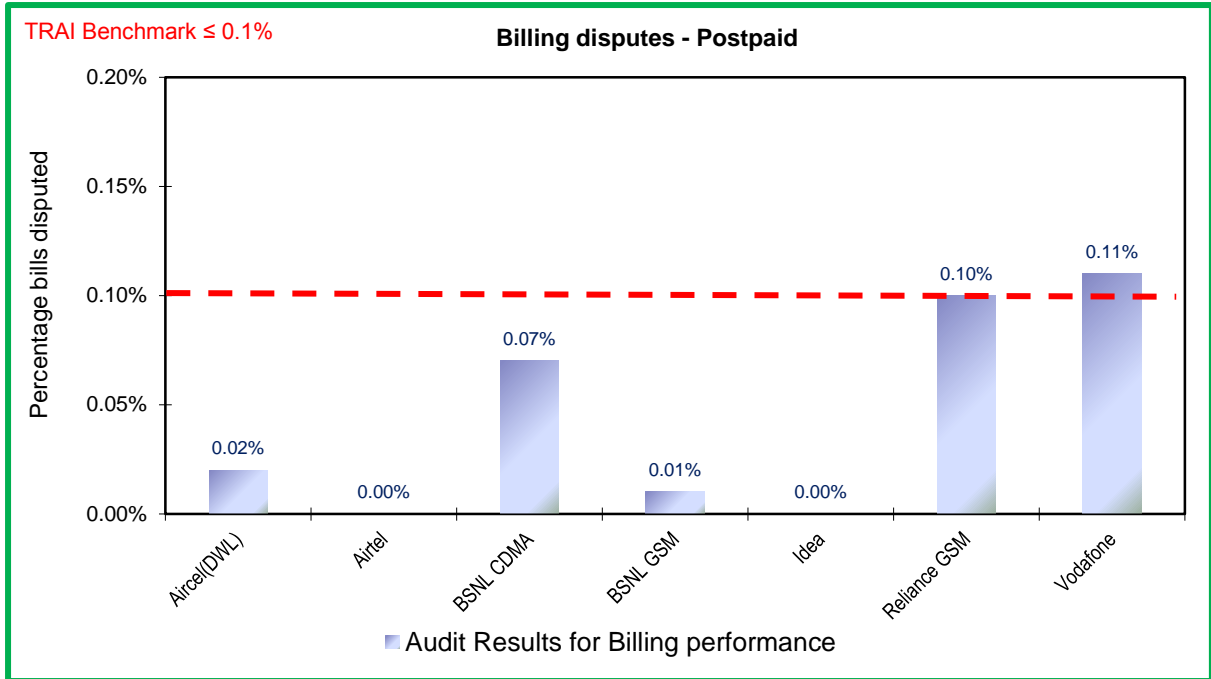
5.8 VOICE QUALITY



Aircel and BSNL GSM are not able to meet the benchmark for Voice quality for namely three months average and live measurement methods.

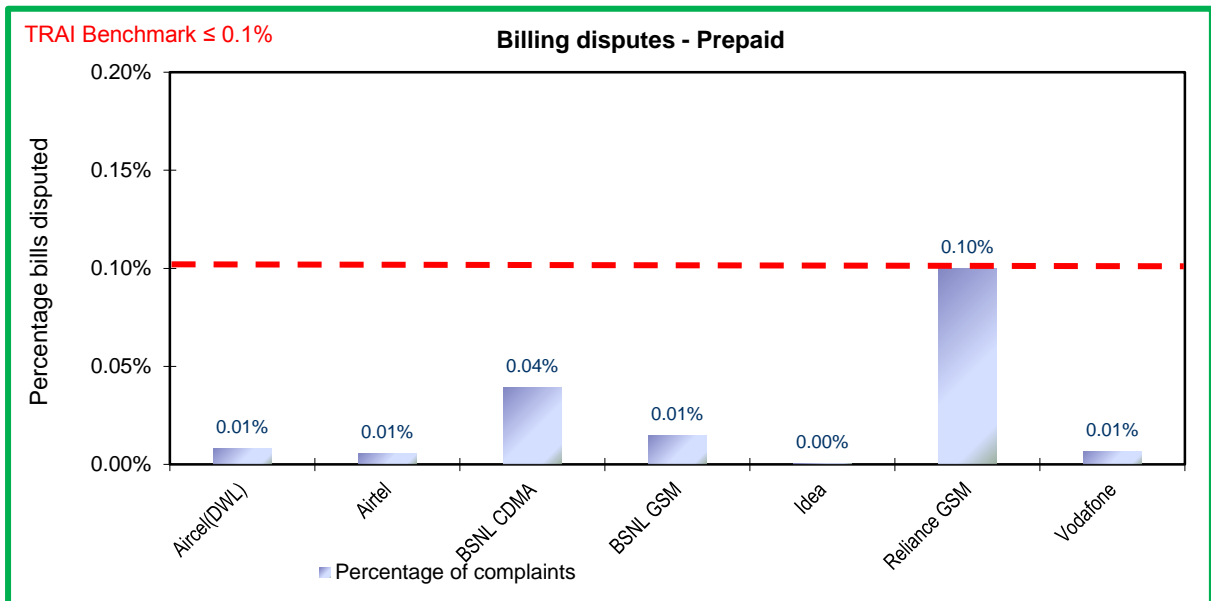
6 DETAILED FINDINGS – NON NETWORK PARAMETERS

6.1 BILLING DISPUTES-POSTPAID



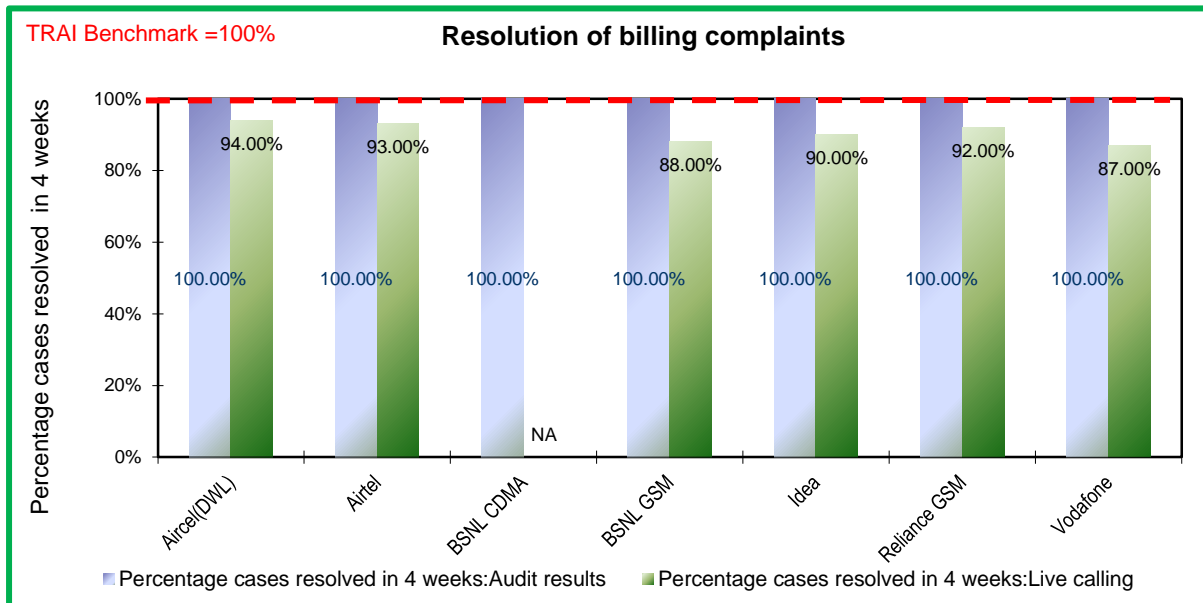
All the operators meet the TRAI benchmark for percentage billing disputes for postpaid except Vodafone.

6.2 BILLING DISPUTES-PREPAID



All the operators meet the TRAI benchmark for percentage billing disputes for prepaid.

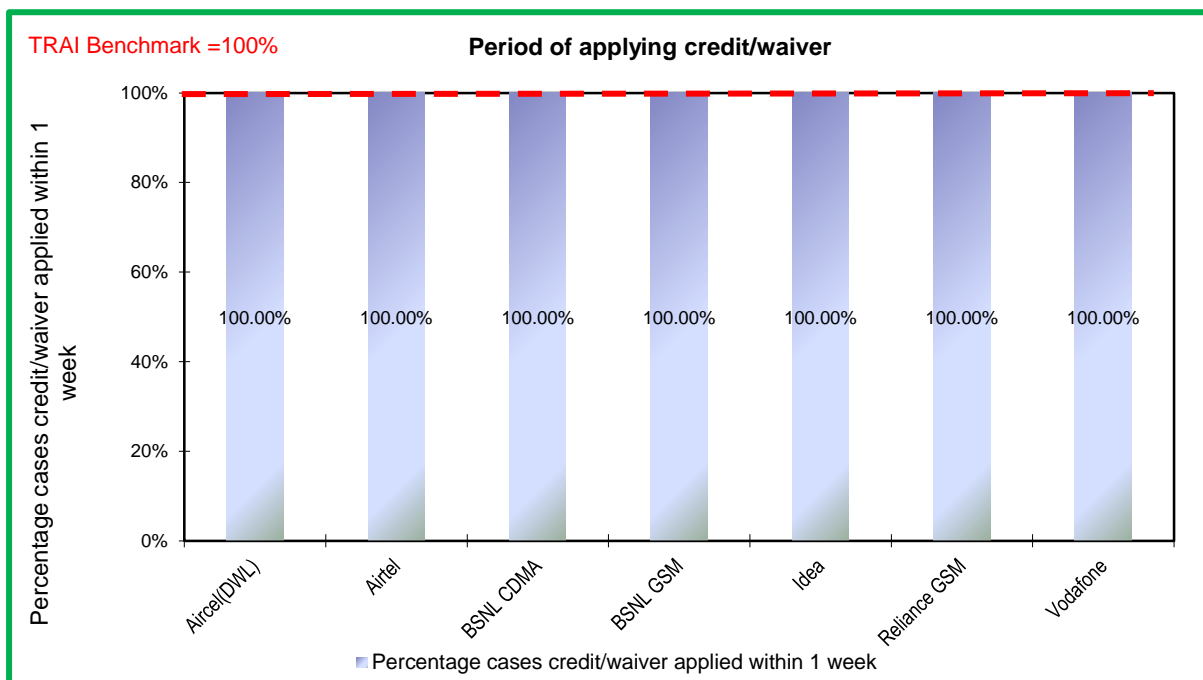
6.3 RESOLUTION OF BILLING COMPLAINTS



All operators meet the benchmark for PMR data. However, in case of live calling none of the operator was able to meet the benchmark.

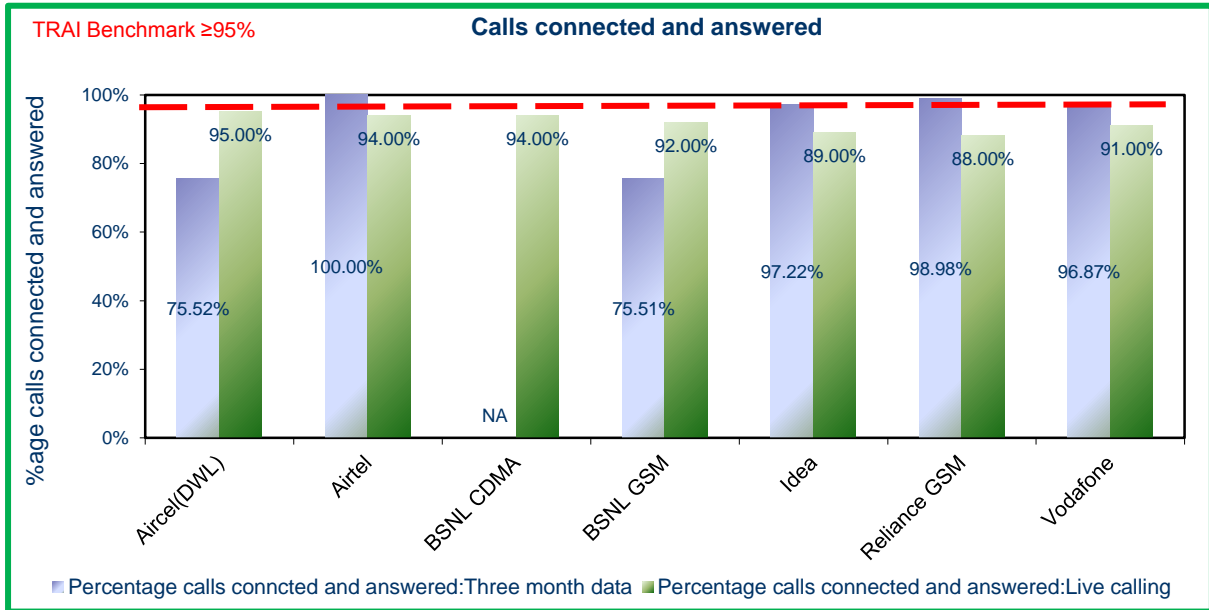
Note: - No billing complaint registered for the given period for BSNL CDMA

6.4 PERIOD OF APPLYING CREDIT/WAVIER



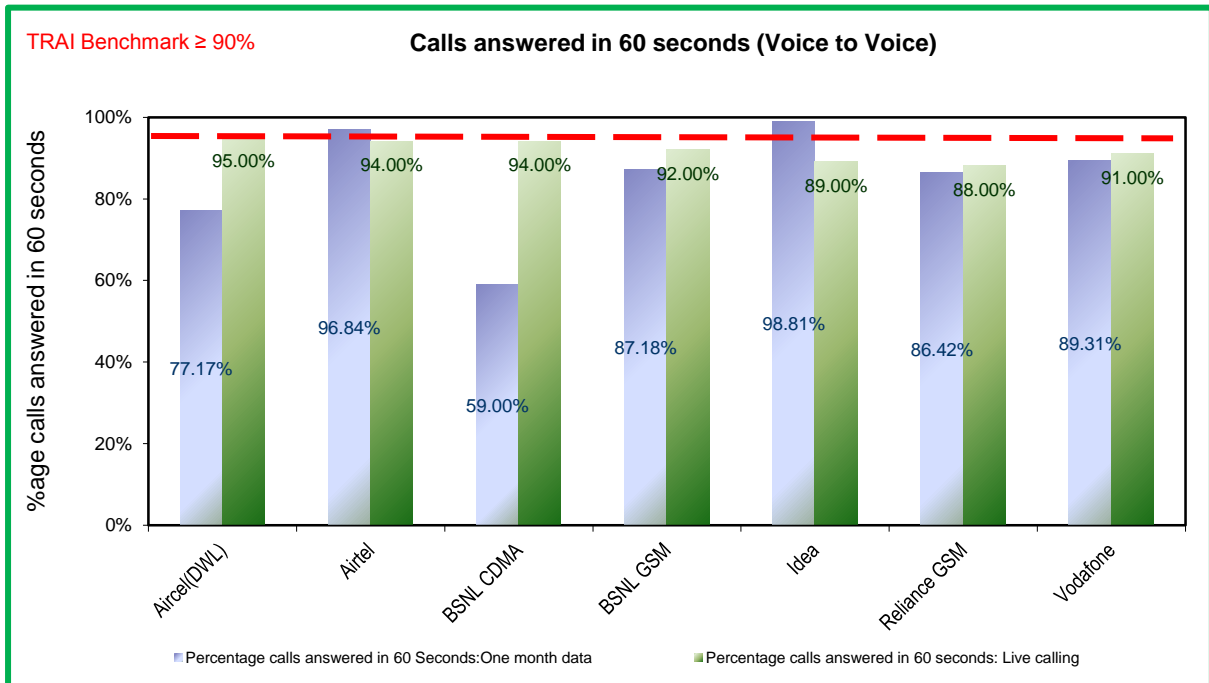
All operators meet the benchmark.

6.5 CALL CENTRE PERFORMANCE-IVR



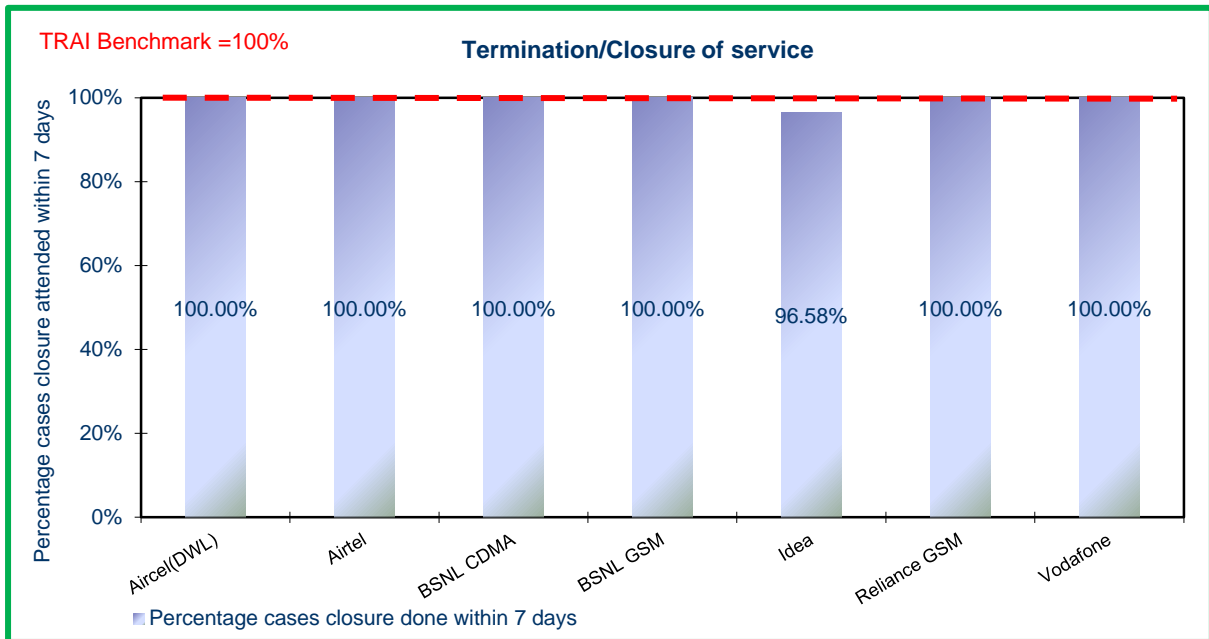
In three month data Aircel and BNSL GSM are not able to meet the benchmark. For live calling we observe that none of the operator was able to meet the benchmark except Airtel.

6.6 CALL CENTRE PERFORMANCE-VOICE TO VOICE



No operator is able to meet the benchmark for one month or live calling except Airtel and Idea which met the benchmark only for One month data.

6.7 TERMINATION/CLOSURE OF SERVICE



All operators meet the benchmark.

6.8 REFUND OF DEPOSITS AFTER CLOSURE



All operators meet the benchmark.

7 ANNEXURE

7.1 NETWORK AVAILABILITY

Audit Results for Network Availability								
	Benchmark	Aircel(DWL)	Airtel	BSNL CDMA	BSNL GSM	Idea	Reliance GSM	Vodafone
Number of BTSs in the licensed service area		2472	3070	242	1337	1281	1626	2722
Sum of downtime of BTSs in a month (in hours)		32731	4871	27588	27400	5058	3687	12490
BTSs accumulated downtime (not available for service)	≤ 2%	1.78%	0.21%	15.17%	2.76%	0.53%	0.30%	0.62%
Number of BTSs having accumulated downtime >24 hours		285	39	62	80	5	28	52
Worst affected BTSs due to downtime	≤ 2%	11.54%	1.27%	25.76%	6.01%	0.42%	1.70%	1.92%

Live Measurement- BTSs accumulated downtime								
	Benchmark	Aircel(DWL)	Airtel	BSNL CDMA	BSNL GSM	Idea	Reliance GSM	Vodafone
Number of BTSs in the licensed service area		2463.00	3032.00	939.67	1337.33	1147.67	1626.00	2722.00
Sum of downtime of BTSs in a month (in hours)		3193.67	389.33	2573.67	3038.38	572.67	304.67	1072.92
(not available for service)	≤ 2%	1.80%	0.18%	10.77%	3.16%	0.69%	0.26%	0.55%
Number of BTSs having accumulated downtime >24 hours		20.67	0.00	9.50	27.67	2.33	0.00	8.00
Live Mesurement - Worst affected BTSs due to downtime	≤ 2%	0.84%	0.00%	3.75%	2.07%	0.20%	0.00%	0.29%

7.2 CONNECTION ESTABLISHMENT (ACCESSIBILITY)

Audit Results for CSSR, SDCCH and TCH congestion								
CSSR	Benchmark	Aircel(DWL)	Airtel	BSNL CDMA	BSNL GSM	Idea	Reliance GSM	Vodafone
CSSR	≥ 95%	95.25%	98.51%	97.98%	95.03%	99.05%	97.56%	99.28%
SDCCH congestion	Benchmark	Aircel(DWL)	Airtel	BSNL CDMA	BSNL GSM	Idea	Reliance GSM	Vodafone
SDCCH/Paging channel congestion	≤ 1%	0.93%	0.22%	1.74%	0.87%	0.08%	0.03%	0.20%
TCH congestion	Benchmark	Aircel(DWL)	Airtel	BSNL CDMA	BSNL GSM	Idea	Reliance GSM	Vodafone
TCH congestion	≤ 2%	2.07%	0.50%	0.00%	1.35%	0.61%	0.14%	0.72%

Live measurement results for CSSR, SDCCH and TCH congestion								
CSSR	Benchmark	Aircel(DWL)	Airtel	BSNL CDMA	BSNL GSM	Idea	Reliance GSM	Vodafone
CSSR	≥ 95%	97.42%	98.31%	98.12%	94.18%	99.22%	98.89%	99.67%
SDCCH congestion	Benchmark	Aircel(DWL)	Airtel	BSNL CDMA	BSNL GSM	Idea	Reliance GSM	Vodafone
SDCCH/Paging channel congestion	≤ 1%	0.44%	0.16%	1.48%	0.68%	0.11%	0.03%	0.13%
TCH congestion	Benchmark	Aircel(DWL)	Airtel	BSNL CDMA	BSNL GSM	Idea	Reliance GSM	Vodafone
TCH congestion	≤ 2%	1.51%	0.65%	0.00%	2.05%	0.53%	0.14%	0.33%

Drive test results for CSSR (Average of three drive tests) and blocked calls								
CSSR	Benchmark	Aircel(DWL)	Airtel	BSNL CDMA	BSNL GSM	Idea	Reliance GSM	Vodafone
Total number of call attempts		694	696	812	972	557	690	693
Total number of successful calls established		690	696	780	923	556	681	687
CSSR	≥ 95%	99.37%	99.95%	96.02%	95.74%	99.89%	98.59%	99.15%
Blocked calls	Benchmark	Aircel(DWL)	Airtel	BSNL CDMA	BSNL GSM	Idea	Reliance GSM	Vodafone
%age blocked calls		0.63%	0.05%	3.98%	4.26%	0.11%	1.41%	0.85%

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 CDMA	BSNL GSM	Idea	Reliance GSM	Vodafone
Total number of calls established		211326079	181354018	464832	513628372	18031569	97444937	3912654
Total number of calls dropped		2789140	1588954	6645	502722783	181831	646101	21311
Call drop rate	≤ 2%	1.46%	0.88%	1.21%	2.12%	1.01%	0.66%	0.55%
Cells having more than 3% TCH	Benchmark	Aircel(DWL)	Airtel	BSNL CDMA	BSNL GSM	Idea	Reliance GSM	Vodafone
Total number of cells in the network		5003	6193	687	2730	2313	3314	5545
Total number of cells having more than 3% TCH		2701	3106	61	1474	1185	1658	225
Worst affected cells having more than 3% TCH	≤ 3%	4.75%	0.90%	8.25%	5.93%	1.58%	0.05%	2.74%

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 CDMA	BSNL GSM	Idea	Reliance GSM	Vodafone
Total number of calls established		294390118	18375265	46076	53245358	21385126	9840169	2036952
Total number of calls dropped		2662535	161276	753	52111896	193059	64221	9755
Call drop rate	≤ 2%	1.00%	0.88%	1.60%	2.14%	0.91%	0.65%	0.48%
Cells having more than 3% TCH	Benchmark	Aircel(DWL)	Airtel	BSNL CDMA	BSNL GSM	Idea	Reliance GSM	Vodafone
Total number of cells in the network		5055	6087	475	2739	2317	3316	5541
Total number of cells having more than 3% TCH		2817	3101	54	1485	1187	1668	2878
Worst affected cells having more than 3% TCH	≤ 3%	7.48%	0.94%	7.71%	6.44%	1.72%	0.27%	2.63%

Drive test results for Call drop rate (Average of three drive tests)								
Call drop rate	Benchmark	Aircel(DWL)	Airtel	BSNL CDMA	BSNL GSM	Idea	Reliance GSM	Vodafone
Total number of calls established		690	696	799	923	559	681	689
Total number of calls dropped		1	0	46	41	0	5	1
Call drop rate	≤ 2%	0.14%	0.00%	5.55%	8.13%	0.06%	0.70%	0.14%

7.4 VOICE QUALITY

Audit Results for Voice quality								
Voice quality	Benchmark	Aircel(DWL)	Airtel	BSNL CDMA	BSNL GSM	Idea	Reliance GSM	Vodafone
Total number of sample calls		16475283175	18017050602	58260	61137	2151754770	14904678588	679606551
Total number of calls with good voice quality		15295918878	17772135265	56853	54466	2059358809	14656088796	665650194
%age calls with good voice quality	≥ 95%	92.84%	98.64%	97.40%	89.47%	95.73%	98.33%	97.95%

Live measurement results for Voice quality								
Voice quality	Benchmark	Aircel(DWL)	Airtel	BSNL CDMA	BSNL GSM	Idea	Reliance GSM	Vodafone
Total number of sample calls		9039317646	1822442418	35897	82958	2345572182	1509533045	336708818
Total number of calls with good voice quality		8345651761	1797512778	34540	77370	2261173536	1485629260	331025979
%age calls with good voice quality	≥ 95%	92.57%	98.63%	96.22%	92.32%	96.41%	98.86%	98.31%

Drive test results for Voice quality (Average of three drive tests)								
Voice quality	Benchmark	Aircel(DWL)	Airtel	BSNL CDMA	BSNL GSM	Idea	Reliance GSM	Vodafone
Total number of sample calls		964529	985922	64148	1021005	691997	664652	1296289
Total number of calls with good voice quality		932826	954134	60523	958697	668425	634465	1259852
%age calls with good voice quality	≥ 95%	96.72%	96.78%	94.42%	93.87%	96.65%	95.72%	97.23%

7.5 POI CONGESTION

Audit Results for POI Congestion								
POI congestion	Benchmark	Aircel(DWL)	Airtel	BSNL CDMA	BSNL GSM	Idea	Reliance GSM	Vodafone
Total number of working POIs		47	23	0	19	28	18	28
No. of POIs not meeting benchmark		0	0	0	0	0	0	0
Total Capacity of all POIs (A) - in erlangs		85209.41	110285.33	0.00	19471.90	17799.04	31184.01	54392655.46
Traffic served for all POIs (B)- in erlangs		54862.86	31887.00	0.00	20969.53	12225.97	21015.97	14153121.79
POI congestion	≤ 0.5%	0.00%	0.00%	0.00%	0.07%	0.00%	0.00%	0.00%
Live Measurement Results for POI Congestion								
POI congestion	Benchmark	Aircel(DWL)	Airtel	BSNL CDMA	BSNL GSM	Idea	Reliance GSM	Vodafone
Total number of working POIs		48	23	0	19	28	16	28
No. of POIs not meeting benchmark		0	0	0	0	0	0	0
Total Capacity of all POIs (A) - in erlangs		85209.41	109057.00	0.00	19471.90	17493.22	31190.99	5539801.16
Traffic served for all POIs (B)- in erlangs		54780.19	32321.67	0.00	18628.00	12239.78	21417.29	1425339.86
POI congestion	≤ 0.5%	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 CDMA	BSNL GSM	Idea	Reliance GSM	Vodafone
Billing disputes - Postpaid								
Total bills generated during the period		203129.00	71308.00	17357.00	677459.00	11422.00	106317.00	133385.00
Total number of bills disputed		38.00	2.00	12.00	39.00	0.00	102.00	150.00
Percentage bills disputed	≤ 0.1%	0.02%	0.00%	0.07%	0.01%	0.00%	0.10%	0.11%
Billing disputes - Prepaid								
Number of complaints related to charging, credit & validity		293.00	230.00	20.00	136.00	2.00	2390.00	522.00
Total number of prepaid customers in that period		3668068.00	4349340.00	51347.00	930495.00	568846.00	2393388.00	8141694.00
Percentage of complaints	≤ 0.1%	0.01%	0.01%	0.04%	0.01%	0.00%	0.10%	0.01%
Resolution of billing complaints								
Total number of billing/charging complaints		331.00	239.00	32.00	175.00	2.00	2492.00	672.00
Total complaints considered invalid		5600.00	665.00	0	3.00	23	57	77.00
Number of complaints resolved in 4 weeks from date of receipt for complaints listed in 5.3.1		331.00	239.00	32.00	175.00	2.00	2492.00	672.00
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%
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%

Note: - No billing complaint registered for the given period for BSNL CDMA hence it is Not Applicable

Live calling results for resolution of billing complaints								
Resolution of billing complaints	Benchmark	Aircel(DWL)	Airtel	BSNL CDMA	BSNL GSM	Idea	Reliance GSM	Vodafone
Total Number of calls made		100.00	100.00	NA	100.00	100.00	100.00	100.00
Number of cases resolved in 4 weeks		94.00	93.00	NA	88.00	90.00	92.00	87.00
Percentage cases resolved in four weeks	100.00%	94.00%	93.00%	NA	88.00%	90.00%	92.00%	87.00%

7.7 CUSTOMER CARE

Audit results for customer care (IVR and voice-to-Voice)								
Customer Care Assessment	Benchmark	Aircel(DWL)	Airtel	BSNL CDMA	BSNL GSM	Idea	Reliance GSM	Vodafone
Total number of call attempts to customer care for assistance		20050087.00	684110.00	NA	180443.00	92132.00	2709576.00	303605.00
Number of calls getting connected and answered (electronically)		15141648.00	684110.00	NA	136255.00	89569.00	2681815.00	294115.00
Percentage calls getting connected and answered	≥ 95%	75.52%	100.00%	NA	75.51%	97.22%	98.98%	96.87%
Number of calls getting transferred to the operator (voice to voice)		2809686.00	1050893.00	683.00	753482.00	215053.00	635874.00	1072360.00
Number of calls answered by operator (voice to voice) within 60 seconds		2168216.00	1017706.00	403.00	656916.00	212488.00	549499.00	957681.00
Percentage calls answered within 60 seconds (V2V)	≥ 90%	77.17%	96.84%	59.00%	87.18%	98.81%	86.42%	89.31%

Note: - No data received from BSNL CDMA even after sending the repeated follow up mails, hence it is Not Applicable.

Live calling results for customer care (IVR)								
Customer Care Assessment	Benchmark	Aircel(DWL)	Airtel	BSNL CDMA	BSNL 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
Number of calls getting connected and answered (electronically)		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%
Live calling results for customer care (Voice to Voice)								
Customer Care Assessment	Benchmark	Aircel(DWL)	Airtel	BSNL CDMA	BSNL GSM	Idea	Reliance GSM	Vodafone
Total Number of calls received		100.00	100.00	100.00	100.00	100.00	100.00	100.00
Total Number of calls getting connected and answered		95.00	94.00	94.00	92.00	89.00	88.00	91.00
Percentage calls getting connected and answered	≥ 95%	95.00%	94.00%	94.00%	92.00%	89.00%	88.00%	91.00%

7.8 DRIVE TEST

7.8.1 JANUARY- JORHAT

Name of SSA	JORHAT	Month	January	Day	One										
	B'mark	Aircel(DWL)		Airtel		BSNL CDMA		BSNL 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
Signal Strength -0 to -75 dBm		43.98%	49.52%	50.44%	59.61%	NA		85.74%	26.71%	62.14%	44.14%	47.93%	42.30%	100.00%	79.89%
Signal Strength -75 to -85 dBm		52.45%	28.14%	41.65%	31.76%			13.47%	41.95%	35.64%	35.87%	51.54%	38.27%	0.00%	11.08%
Signal Strength -85 to -120 dBm		3.57%	22.34%	7.92%	8.63%			0.79%	31.33%	2.22%	19.99%	0.53%	19.43%	0.00%	9.03%
Voice quality	≥ 95%	98.51%	95.63%	99.05%	96.13%	99.94%	94.28%	99.60%	91.33%	97.91%	98.16%	97.25%	96.40%	99.38%	97.15%
CSSR	≥ 95%	100.00%	99.14%	100.00%	100.00%	100.00%	100.00%	96.55%	98.32%	100.00%	100.00%	99.39%	99.37%	100.00%	100.00%
%age Blocked calls		0.00%	0.85%	0.00%	0.00%	0.00%	0.00%	3.45%	1.68%	0.00%	0.00%	1.61%	0.63%	0.00%	0.00%
Call drop rate	≤ 2%	0.00%	0.00%	0.00%	0.00%	0.00%	7.81%	0.00%	2.29%	0.00%	0.00%	0.00%	0.69%	0.00%	0.00%
Hands off success rate		100.00%	100.00%	100.00%	100.00%	100.00%	99.31%	100.00%	100.00%	100.00%	100.00%	100.00%	98.06%	100.00%	100.00%

Name of SSA	JORHAT	Month	January	Day	Two										
	B'mark	Aircel(DWL)		Airtel		BSNL CDMA		BSNL 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
Signal Strength -0 to -75 dBm		74.32%	45.71%	51.05%	67.67%	NA		67.61%	29.22%	99.26%	55.75%	81.43%	33.53%	100.00%	84.55%
Signal Strength -75 to -85 dBm		25.03%	32.87%	43.72%	24.90%			30.87%	40.49%	0.69%	24.06%	18.57%	41.41%	0.00%	12.40%
Signal Strength -85 to -120 dBm		0.65%	21.42%	5.23%	7.43%			1.51%	30.29%	0.05%	20.18%	0.00%	25.06%	0.00%	3.04%
Voice quality	≥ 95%	98.83%	94.16%	98.66%	96.15%	100.00%	93.30%	92.19%	88.07%	99.60%	95.43%	98.24%	95.26%	99.59%	96.34%
CSSR	≥ 95%	100.00%	98.69%	100.00%	100.00%	100.00%	100.00%	98.44%	97.16%	100.00%	100.00%	98.44%	96.24%	100.00%	99.18%
%age Blocked calls		0.00%	1.30%	0.00%	0.00%	0.00%	0.00%	1.56%	2.84%	0.00%	0.00%	1.56%	3.75%	0.00%	0.81%
Call drop rate	≤ 2%	0.00%	0.00%	0.00%	0.00%	0.00%	16.50%	0.00%	2.41%	0.00%	0.71%	0.00%	2.40%	0.00%	0.00%
Hands off success rate		100.00%	97.94%	100.00%	100.00%	98.78%	99.05%	100.00%	100.00%	100.00%	99.48%	100.00%	98.13%	100.00%	100.00%

Name of SSA	JORHAT	Month	January	Day	Three										
	B'mark	Aircel(DWL)		Airtel		BSNL CDMA		BSNL 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
Signal Strength - 0 to -75 dBm		72.89%	29.90%	50.93%	58.03%	NA		69.56%	12.15%	79.78%	37.69%	48.04%	26.04%	100.00%	73.62%
Signal Strength -75 to -85 dBm		26.71%	41.16%	47.12%	32.47%			23.94%	41.06%	20.10%	31.64%	46.84%	37.27%	0.00%	15.57%
Signal Strength -85 to -120 dBm		0.39%	28.94%	1.95%	9.49%			6.51%	46.78%	0.11%	30.66%	5.12%	36.70%	0.00%	10.81%
Voice quality	≥ 95%	99.14%	95.57%	98.54%	96.18%	99.96%	78.85%	96.58%	93.82%	99.05%	97.32%	97.05%	94.46%	96.17%	97.72%
CSSR	≥ 95%	100.00%	98.92%	100.00%	100.00%	100.00%	100.00%	100.00%	97.10%	100.00%	98.66%	100.00%	97.91%	100.00%	97.79%
%age Blocked calls		0.00%	1.07%	0.00%	0.00%	0.00%	0.00%	0.00%	2.90%	0.00%	1.33%	0.00%	2.08%	0.00%	1.47%
Call drop rate	≤ 2%	0.00%	0.00%	0.00%	0.00%	0.00%	6.39%	0.00%	2.56%	0.00%	0.00%	0.00%	2.42%	0.00%	0.00%
Hands off success rate		100.00%	100.00%	100.00%	100.00%	97.22%	99.60%	100.00%	99.00%	100.00%	100.00%	100.00%	97.70%	100.00%	100.00%

7.8.2 FEBRUARY- BONGAIGAON

Name of SSA	Bongaigaon	Month	February	Day	One										
	B'mark	Aircel(DWL)		Airtel		BSNL CDMA		BSNL 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
Signal Strength - 0 to -75 dBm		51.59%	47.74%	75.54%	57.49%	NA		99.34%	52.84%	98.86%	58.13%	22.27%	30.26%	100.00%	81.98%
Signal Strength -75 to -85 dBm		47.31%	33.69%	21.69%	34.04%			0.49%	23.12%	0.78%	29.69%	62.35%	45.91%	0.00%	8.56%
Signal Strength -85 to -120 dBm		1.10%	18.56%	2.77%	8.47%			0.17%	24.04%	0.35%	12.18%	15.38%	23.84%	0.00%	9.46%
Voice quality	≥ 95%	99.52%	97.23%	99.57%	96.00%	97.80%	89.64%	98.26%	93.04%	99.80%	97.37%	98.90%	95.28%	99.22%	95.78%
CSSR	≥ 95%	100.00%	100.00%	100.00%	99.55%	80.68%	94.44%	100.00%	93.71%	100.00%	100.00%	100.00%	100.00%	100.00%	99.31%
%age Blocked calls		0.00%	0.00%	0.00%	0.45%	19.33%	5.56%	0.00%	6.29%	0.00%	0.00%	0.00%	0.00%	0.00%	0.69%
Call drop rate	≤ 2%	0.00%	0.00%	0.00%	0.00%	4.17%	2.49%	0.00%	2.69%	0.00%	0.00%	0.00%	1.05%	0.00%	0.00%
Hands off success rate		100.00%	97.33%	100.00%	100.00%	100.00%	99.00%	100.00%	98.01%	NA	100.00%	100.00%	97.86%	100.00%	100.00%

Name of SSA	Bongaigaon	Month	February	Day	Two										
	B'mark	Aircel(DWL)		Airtel		BSNL CDMA		BSNL 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
Signal Strength - 0 to -75 dBm		21.32%	51.09%	58.70%	66.25%	NA		96.92%	42.80%	56.35%	53.60%	41.45%	35.91%	98.33%	76.47%
Signal Strength --75 to -85 dBm		51.14%	28.69%	37.50%	24.18%			2.81%	32.57%	43.19%	36.06%	56.51%	44.41%	1.67%	14.94%
Signal Strength --85 to -120 dBm		27.54%	20.22%	3.80%	9.58%			0.27%	24.64%	0.45%	10.34%	2.04%	19.68%	0.00%	8.59%
Voice quality	≥ 95%	99.51%	96.08%	98.23%	95.85%	99.85%	90.94%	99.48%	93.54%	99.33%	97.96%	99.13%	95.32%	98.57%	95.57%
CSSR	≥ 95%	100.00%	99.38%	100.00%	100.00%	100.00%	85.15%	98.00%	93.84%	100.00%	100.00%	100.00%	97.30%	100.00%	99.29%
%age Blocked calls		0.00%	0.62%	0.00%	0.00%	0.00%	14.85%	2.00%	6.16%	0.00%	0.00%	0.00%	2.70%	0.00%	0.71%
Call drop rate	≤ 2%	0.00%	0.37%	0.00%	0.00%	0.00%	2.55%	0.00%	68.75%	0.00%	0.00%	0.00%	0.50%	0.00%	0.00%
Hands off success rate		100.00%	99.24%	0.00%	100.00%	50.00%	99.28%	NA	99.56%	100.00%	100.00%	100.00%	98.04%	100.00%	99.44%

Name of SSA	Bongaigaon	Month	February	Day	Three										
	B'mark	Aircel(DWL)		Airtel		BSNL CDMA		BSNL 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
Signal Strength - 0 to -75 dBm		77.14%	68.04%	72.60%	68.30%	NA		No Data Received		86.53%	37.33%	57.26%	48.76%	100.00%	80.96%
Signal Strength --75 to -85 dBm		22.52%	24.08%	22.01%	24.30%					13.33%	40.21%	42.01%	33.74%	0.00%	16.78%
Signal Strength --85 to -120 dBm		0.35%	7.87%	5.39%	7.41%					0.14%	22.46%	0.73%	17.50%	0.00%	2.26%
Voice quality	≥ 95%	99.22%	95.29%	98.93%	96.30%	97.72%	93.34%			99.48%	97.22%	98.68%	93.20%	99.32%	96.00%
CSSR	≥ 95%	100.00%	99.64%	100.00%	100.00%	100.00%	95.78%			100.00%	100.00%	100.00%	99.57%	100.00%	100.00%
%age Blocked calls		0.00%	0.36%	0.00%	0.00%	0.00%	4.22%			0.00%	0.00%	0.00%	0.43%	0.00%	0.00%
Call drop rate	≤ 2%	0.00%	0.00%	0.00%	0.00%	0.00%	2.67%			0.00%	0.00%	1.73%	0.38%	0.00%	0.00%
Hands off success rate		100.00%	100.00%	NA	100.00%	100.00%	99.05%	100.00%	100.00%	99.33%	97.60%	100.00%	100.00%		

Note: - We did not receive the BSNL GSM drive Test report for Day 3 even after sending repeated mails from our side hence it is declared has data not received

7.8.3 MARCH- TEZPUR

Name of SSA	Tezpur	Month	March	Day	One										
	B'mark	Aircel(DWL)		Airtel		BSNL CDMA		BSNL 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
Signal Strength -0 to -75 dBm		97.88%	54.83%	82.79%	65.43%	NA		53.21%	43.95%	93.86%	51.61%	NA	43.27%	100.00%	84.87%
Signal Strength --75 to -85 dBm		2.10%	31.76%	17.03%	27.40%			21.26%	22.31%	6.08%	24.02%	NA	41.20%	0.00%	14.21%
Signal Strength --85 to -120 dBm		0.01%	13.41%	0.17%	7.16%			25.53%	33.74%	0.06%	24.37%	NA	15.53%	0.00%	0.93%
Voice quality	≥ 95%	98.57%	95.11%	99.23%	96.74%	91.06%	93.53%	92.60%	93.83%	99.76%	96.24%	NA	95.40%	98.74%	96.17%
CSSR	≥ 95%	100.00%	100.00%	100.00%	100.00%	96.09%	95.57%	100.00%	98.41%	100.00%	100.00%	100.00%	99.57%	95.85%	98.44%
%age Blocked calls		0.00%	0.00%	0.00%	0.00%	3.91%	4.43%	0.00%	1.59%	0.00%	0.00%	0.00%	0.43%	4.15%	1.56%
Call drop rate	≤ 2%	0.00%	0.00%	0.00%	0.00%	3.91%	3.39%	0.00%	2.12%	0.00%	0.00%	0.00%	0.00%	3.03%	0.66%
Hands off success rate		100.00%	100.00%	100.00%	100.00%	100.00%	99.78%	98.44%	93.69%	100.00%	100.00%	99.72%	99.73%	100.00%	99.42%

Name of SSA	Tezpur	Month	March	Day	Two										
	B'mark	Aircel(DWL)		Airtel		BSNL CDMA		BSNL 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
Signal Strength -0 to -75 dBm		54.31%	58.18%	92.30%	56.90%	NA		25.92%	49.92%	8.29%	43.25%	NA	42.31%	98.48%	83.39%
Signal Strength --75 to -85 dBm		33.22%	28.97%	7.67%	33.49%			40.61%	24.65%	71.24%	28.64%	NA	38.85%	1.52%	11.55%
Signal Strength --85 to -120 dBm		12.47%	12.85%	0.03%	9.61%			33.47%	25.43%	20.47%	28.11%	NA	18.84%	0.00%	5.06%
Voice quality	≥ 95%	99.41%	94.81%	99.35%	95.34%	99.82%	96.97%	98.68%	94.60%	99.54%	95.64%	NA	96.02%	99.24%	95.49%
CSSR	≥ 95%	100.00%	98.33%	100.00%	100.00%	100.00%	97.86%	100.00%	90.47%	100.00%	100.00%	100.00%	96.69%	100.00%	99.41%
%age Blocked calls		0.00%	1.67%	0.00%	0.00%	0.00%	2.14%	0.00%	9.53%	0.00%	0.00%	0.00%	3.31%	0.00%	0.59%
Call drop rate	≤ 2%	0.00%	0.69%	0.00%	0.00%	51.22%	1.10%	0.00%	1.49%	0.00%	0.00%	0.00%	0.36%	0.00%	0.00%
Hands off success rate		100.00%	100.00%	NA	100.00%	100.00%	99.70%	100.00%	96.07%	100.00%	100.00%	100.00%	98.75%	100.00%	99.14%

Name of SSA	Tezpur	Month	March	Day	Three										
	B'mark	Aircel(DWL)		Airtel		BSNL CDMA		BSNL 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
Signal Strength -0 to -75 dBm		65.52%	37.30%	74.54%	56.72%	NA		60.55%	35.51%	31.23%	21.51%	NA	37.13%	100.00%	85.66%
Signal Strength --75 to -85 dBm		28.27%	33.34%	25.16%	31.50%			28.45%	22.20%	48.44%	22.70%	NA	38.31%	0.00%	11.75%
Signal Strength --85 to -120 dBm		6.20%	29.35%	0.30%	11.78%			10.99%	42.28%	20.33%	55.78%	NA	24.56%	0.00%	2.60%
Voice quality	≥ 95%	98.69%	97.27%	98.59%	95.25%	100.00%	95.64%	98.25%	90.87%	95.40%	95.52%	NA	90.85%	99.01%	97.38%
CSSR	≥ 95%	100.00%	99.22%	100.00%	100.00%	100.00%	93.87%	99.02%	96.45%	99.57%	98.22%	100.00%	98.67%	100.00%	94.99%
%age Blocked calls		0.00%	0.78%	0.00%	0.00%	0.00%	6.13%	0.98%	3.55%	0.43%	1.78%	0.00%	1.33%	0.00%	5.01%
Call drop rate	≤ 2%	0.00%	0.00%	0.00%	0.00%	0.00%	6.13%	2.00%	1.33%	0.00%	0.00%	0.00%	0.46%	0.00%	0.00%
Hands off success rate		100.00%	100.00%	100.00%	100.00%	100.00%	99.17%	98.56%	98.06%	99.73%	100.00%	100.00%	99.76%	97.62%	97.44%

7.8.4 CDMA DATA FOR SIGNAL STRENGTH

January	Day 1		Day 2		Day 3	
	BSNL CDMA		BSNL CDMA		BSNL CDMA	
	In door	Outdoor	In door	Outdoor	In door	Outdoor
% Ec/Io BINS with less than -15	99.84%	95.06%	99.90%	95.11%	99.90%	91.91%
February	Day 1		Day 2		Day 3	
	BSNL CDMA		BSNL CDMA		BSNL CDMA	
	In door	Outdoor	In door	Outdoor	In door	Outdoor
% Ec/Io BINS with less than -15	99.55%	97.79%	100.00%	95.08%	99.97%	97.86%
March	Day 1		Day 2		Day 3	
	BSNL CDMA		BSNL CDMA		BSNL CDMA	
	In door	Outdoor	In door	Outdoor	In door	Outdoor
% Ec/Io BINS with less than -15	87.31%	95.08%	99.67%	96.58%	99.40%	96.51%

7.9 TERMINATION / CLOSURE OF SERVICE

Audit results for termination / closure of service								
Termination	Benchmark	Aircel(DWL)	Airtel	BSNL CDMA	BSNL GSM	Idea	Reliance GSM	Vodafone
Total number of closure request		780.00	299.00	242.00	1267.00	146.00	211.00	1374.00
Number of requests attended within 7 days		780.00	299.00	242.00	1267.00	141.00	211.00	1374.00
Percentage cases in which termination done within 7 days	100.00%	100.00%	100.00%	100.00%	100.00%	96.58%	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 CDMA	BSNL GSM	Idea	Reliance GSM	Vodafone
Total number of cases requiring refund of deposits		884.00	151.00	119.00	319.00	83.00	383.00	581.00
Total number of cases where refund was made within 60 days		884.00	151.00	119.00	319.00	83.00	383.00	581.00
Percentage cases in which refund was receive within 60 days	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%

7.11 ADDITIONAL NETWORK RELATED PARAMETERS

Audit Results for Total Traffic Handled in Erlang								
Traffic in Erlang		Aircel(DWL)	Airtel	BSNL CDMA	BSNL GSM	Idea	Reliance GSM	Vodafone
Equipped capacity of the network		195684.28	148458.00	33750	108000.00	26587.00	132000.00	106361.00
Total traffic handled in erlang during TCBH		11078095.00	134322.00	169.72	22168.38	14921.00	70642.91	99458.00

Total number of customers as per VLR								
		Aircel(DWL)	Airtel	BSNL CDMA	BSNL GSM	Idea	Reliance GSM	Vodafone
Total no. of customers served (as per VLR)		3201226.00	4414554.00	14131.00	1000757.00	555725.00	2068426.00	2704338.00

Live calling for level 1 services								
Level 1 services		Aircel(DWL)	Airtel	BSNL CDMA	BSNL GSM	Idea	Reliance GSM	Vodafone
Total no. of calls made		150.00	150.00	150.00	150.00	150.00	150.00	150.00
Calls answered in 60 sec		143.00	136.00	135.00	131.00	132.00	134.00	134.00
Calls answered after 60 sec		95.33%	90.67%	90.00%	87.33%	88.00%	89.33%	89.33%

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

Note: - No Service Request registered for the given period for BSNL CDMA, hence it is Not Applicable.

7.12 TOTAL CALL MADE DURING THE DRIVE TEST

January							
	Aircel	Airtel	BSNL CDMA	BSNL GSM	Idea	RTL	Vodafone
Total No of calls made	629	628	684	610	606	648	638
February							
	Aircel	Airtel	BSNL CDMA	BSNL GSM	Idea	RTL	Vodafone
Total No of calls made	735	732	684	443	472	717	698
March							
	Aircel	Airtel	BSNL CDMA	BSNL GSM	Idea	RTL	Vodafone
Total No of calls made	718	728	1069	1862	592	706	744

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



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