

**EAST
ZONE**

TRAI AUDIT WIRELESS REPORT- ASSAM CIRCLE- OND QUARTER, 2013

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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 4

2.3.2 Drive Test 11

2.3.3 Live Calling 11

2.4 Operators Covered 13

3 Executive Summary 14

3.1 PMR Data - consolidated 14

3.2 3 Day Data - Consolidated 15

3.3 Live Calling Data - Consolidated 17

3.4 Inter Operator Call Assessment - Consolidated 18

4 Detailed Findings - Drive Test Data 19

5 Detailed Findings - Comparison Between PMR Data, 3 Day Live Data and Live Calling Data 33

5.1 BTS Accumulated Downtime 33

5.2 Worst Affected BTS due to downtime 33

5.3 Call Set Up Success Rate 34

5.4 SDCCH/Paging Channel Congestion 34

5.5 TCH Congestion 35

5.6 Call Drop Rate 35

5.7 Voice Quality 36

5.8 CELLS HAVING >3% tch dROP 36

6 Detailed Findings – Non Network Parameters 37

6.1 Billing Disputes-Postpaid 37

6.2 Resolution of Billing Complaints 37

6.3 Period of Applying Credit/Wavier 38

6.4	Call Centre Performance-IVR.....	38
6.5	Call Centre Performance-Voice to Voice.....	39
6.6	Termination/Closure of Service.....	39
6.7	Refund of Deposits After closure.....	40
6.8	Billing Complaints - Prepaid.....	40
7	Annexure	41
7.1	Billing	41
7.2	Customer Care.....	42
7.3	Termination/Closure of Service.....	45
7.4	Refund	45
7.5	Additional Network Related Parametrs.....	46

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.

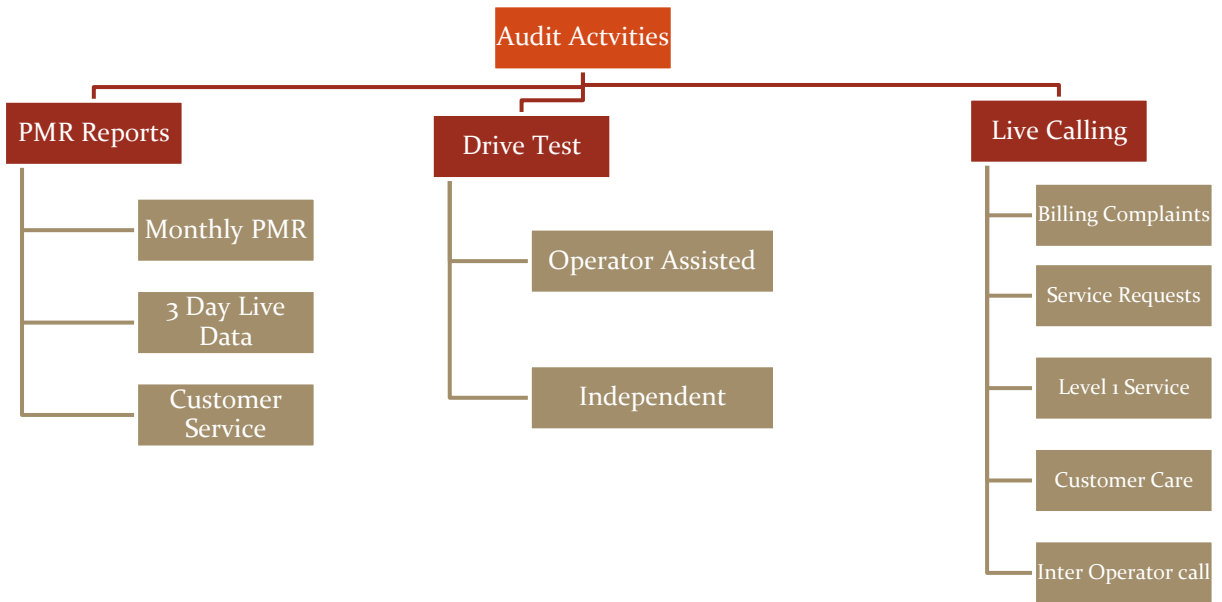
In order to assess the above regulations TRAI has commissioned a third party agency to conduct the audit of the service providers and check the performance of the operators on the various benchmarks set by Telecom Regulatory Authority of India (TRAI).

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 and collected from operators every month. 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

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

Network Availability

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

- ↳ BTSs Accumulated downtime (not available for service)
- ↳ Worst affected BTSs due to downtime

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 upgradation.

- ↳ TRAI Benchmark –

- BTSs Accumulated downtime (not available for service) $\leq 2\%$
- Worst affected BTSs due to downtime $\leq 2\%$

Connection Establishment (Accessibility)

- Definition: The ratio of calls established to total calls is known Call Set-Up Success Rate (CSSR).
- 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
- Computational Methodology: $\text{Calls Established} / \text{Total Call Attempts} * 100$
- TRAI Benchmark: > 95%

Network Congestion Parameters

- 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
- Computational Methodology:
 - ↳ **SDCCH / TCH Congestion%** = $[(A_1 \times C_1) + (A_2 \times C_2) + \dots + (A_n \times C_n)] / (A_1 + A_2 + \dots + A_n)$
 - Where:- A_1 = Number of attempts to establish SDCCH / TCH made on day 1
 - C_1 = Average SDCCH / TCH Congestion % on day 1
 - A_2 = Number of attempts to establish SDCCH / TCH made on day 2
 - C_2 = Average SDCCH / TCH Congestion % on day 2
 - A_n = Number of attempts to establish SDCCH / TCH made on day n
 - C_n = Average SDCCH / TCH Congestion % on day n
 - ↳ **POI Congestion%** = $[(A_1 \times C_1) + (A_2 \times C_2) + \dots + (A_n \times C_n)] / (A_1 + A_2 + \dots + A_n)$
 - Where:- A_1 = POI traffic offered on all POIs (no. of calls) on day 1

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

➤ Benchmark:

↳ **SDCCH Congestion:** < 1%

↳ **TCH Congestion:** < 2%

↳ **POI Congestion:** < 0.5%

Connection Maintenance

- The following parameter would be further sub-divided into Call drop rate and Worst affected cells
- 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
- Computational Methodology: Total Calls Dropped / Total Calls Established x 100
- TRAI Benchmark –
 - ↳ Call drop rate \leq 2%
 - ↳ Worst affected cells having more than 3% TCH drop rate \leq 5%

Voice Quality

➤ Definition:

↳ for GSM service providers the calls having a value of 0 – 4 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 %

➔ Computational Methodology:

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

➔ TRAI Benchmark: > 95%

2.3.1.2 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.

2.3.1.3 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 -

Metering and Billing Credibility

- ➔ Billing complaints includes any of the following complaints related to billing from the point of view of customer:
 - ↪ 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.)

➤ Computational Methodology:

- ↪ **Billing complaints per 100 bills issued** = Total billing complaints** received during the relevant quarter / Total bills generated* during the relevant quarter
- ↪ *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

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 2008) 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.

↪ *** 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.

➤ TRAI Benchmark: 100% within 4 weeks

➤ 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.

Period of refunds / payments due to customers

➤ Computational Methodology:

↪ **Period of all refunds = Maximum value of 'Time taken to refund'**

↪ Where:-Time taken to refund = Date of refund – date of lodging complaint.

➤ TRAI Benchmark:

↪ Termination/Closure of Service: <=7 days

↪ Time taken for refund for deposit after closures: 100% within 60 days

➤ Audit Procedure:

↪ Audit of refund details and complaints (only those resulting in refunds) resolution details used for arriving at the figures reported to TRAI to be conducted.

↪ Operator to provide details of:-

- Dates of lodging of all billing complaints resolved in favour of customer and resulting in requirement of a refund by the operator
- Dates of refund pertaining to all billing complaints 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 9 cities were selected and audited in each quarter, 3 cities each month. Cities were selected on the basis of population. In each licensed service area drive test in three cities, having high population, medium population and low population. The methodology adopted for the drive test-

- ↪ 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 covered the routes including expressways, major and secondary roads/streets, Commercial, residential areas/Commercial estates to check the in-building network performance.
- ↪ 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 telephony networks.
- ↪ The speed of the vehicle was kept at around 30-50 km/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-

- ↪ Coverage-Signal strength
- ↪ Voice quality
- ↪ Call setup success rate
- ↪ Blocked calls
- ↪ Call drop rate

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)	3142241
Airtel	4236310
BSNL CDMA	14450
BSNL GSM	980166
Idea	482527
Reliance GSM	2073416
Vodafone	25,74,847



Not Meeting the benchmark

3 EXECUTIVE SUMMARY

3.1 PMR 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	TCH Congestion	Call Drop Rate (%age)	Worst affected cells having more than 3% TCH drop	%age of connection with good voice quality
Benchmark	≤ 2%	≤ 2%	≥ 95%	≤ 1%	≤ 2%	≤ 2%	≤ 3%	≥ 95%
Aircel(DWL)	0.86%	6.00%	96.32%	0.79%	1.61%	0.88%	3.94%	93.77%
Airtel	0.21%	1.00%	98.59%	0.16%	0.46%	1.21%	1.13%	98.31%
BSNL CDMA	8.27%	26.16%	97.48%	1.21%	0.00%	1.33%	NA	99.23%
BSNL GSM	2.68%	6.14%	92.50%	0.79%	1.44%	1.92%	5.60%	91.32%
Idea	0.54%	0.78%	98.90%	0.06%	0.70%	1.44%	2.19%	95.77%
Reliance GSM	0.30%	1.58%	98.63%	0.02%	0.14%	0.65%	0.08%	98.36%
Vodafone	0.83%	1.97%	99.40%	0.15%	0.60%	0.60%	2.70%	97.89%

BTSS Accumulated Downtime:

In the Assam circle, all operators met the benchmark except BSNL CDMA & BSNL GSM. Maximum BTS Accumulated downtime was recorded for BSNL CDMA with 8.27% and. Reliance GSM had minimum BTS Accumulated downtime of 0.30%.

Worst Affected BTSS Due to Downtime:

All the operators met the benchmark except Aircel, BSNL CDMA & BSNL GSM. Maximum worst affected BTSS due to downtime were recorded for BSNL CDMA 26.16% and Idea had minimum worst affected BTSS due to downtime at 0.78%.

Call Set-up Success Rate (CSSR):

All the operators were comfortably meeting the benchmark on this parameter except BSNL GSM. During the audits the maximum CSSR was observed for Vodafone with 99.40% 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

BSNLCDMA on SDCCH/ Paging Chl. Congestion BSNL CDMA performs the best with 0.0% TCH Congestion. The calculation methodology of these parameters was found to be in complete accordance with what has been specified by TRAI. Both RCOM CDMA and Tata Teleservices measure paging channel utilization. Almost all the operators had 0% POI.

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. The highest call drop was for BSNL GSM with 1.92%, and lowest was for Vodafone with 0.60%.

Worst Affected Cells Having More than 3% TCH Drop:

All the operators met the benchmark except Aircel & BSNL GSM, Maximum Worst Affected Cells Having More than 3% TCH Drop was recorded for BSNL GSM 5.60% and Idea had minimum Worst Affected Cells Having More than 3% TCH Drop at 0.08%.

%Age of Connection with Good 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 BSNL CDMA 99.23% and lowest was BSNL GSM 91.32%

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 drop	%age of connection with good voice quality
Benchmark	≤ 2%	≤ 2%	≥ 95%	≤ 1%	≤ 2%	≤ 2%	≤ 3%	≥ 95%
Aircel(DWL)	0.60%	0.21%	96.43%	0.62%	1.60%	0.83%	4.40%	94.21%
Airtel	0.19%	0.00%	98.31%	0.15%	0.67%	1.22%	1.10%	98.33%
BSNL CDMA	4.75%	2.32%	97.39%	0.91%	0.00%	1.37%	0.47%	99.23%
BSNL GSM	3.40%	0.78%	90.59%	0.62%	2.84%	2.06%	5.66%	91.32%
Idea	1.20%	0.64%	99.36%	0.05%	0.30%	1.23%	2.06%	98.54%
Reliance GSM	0.40%	0.00%	98.60%	0.02%	0.14%	0.64%	0.09%	98.33%
Vodafone	0.91%	0.33%	99.72%	0.14%	0.45%	0.55%	1.98%	99.30%

BTSs Accumulated Downtime:

In the Assam circle, all operators met the benchmark except BSNL CDMA & BSNL GSM. Maximum BTS Accumulated downtime was recorded for BSNL CDMA with 4.75% and Airtel had minimum BTS Accumulated downtime of 0.19%.

Worst Affected BTSs Due to Downtime:

All the operators met the benchmark except BSNL CDMA. Maximum worst affected BTSs due to downtime were recorded for BSNL CDMA 2.32% and Airtel & reliance GSM had minimum worst affected BTSs due to downtime at 0.00%.

Call Set-up Success Rate (CSSR):

All the operators were comfortably meeting the benchmark on this parameter except BSNL GSM. During the audits the maximum CSSR was observed for Vodafone with 99.72% 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 on SDCCH/ Paging Chl. Congestion BSNL CDMA performs the best with 0.0% TCH Congestion and the Maximum is BSNL GSM 2.84%. The calculation methodology of these parameters was found to be in complete accordance with what has been specified by TRAI. Both RCOM CDMA and Tata Teleservices measure paging channel utilization. Almost all the operators had 0% POI.

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. The highest call drop was for BSNL GSM with 2.06%, and lowest was for Vodafone with 0.55%.

Worst Affected Cells Having More than 3% TCH Drop:

All the operators met the benchmark except Aircel & BSNL GSM, Maximum Worst Affected Cells Having More than 3% TCH Drop was recorded for BSNL GSM 5.66% and Reliance GSM had minimum Worst Affected Cells Having More than 3% TCH Drop at 0.09%.

%Age of Connection with Good 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 Vodafone 99.30% and lowest was BSNL GSM 91.32%

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)	97.00%	0.00%	100.00%	100.00%	95.00%
Airtel	95.00%	0.00%	100.00%	100.00%	94.00%
BSNL CDMA	NA	0.00%	100.00%	100.00%	93.00%
BSNL GSM	91.18%	0.00%	100.00%	100.00%	94.00%
Idea	87.50%	0.00%	100.00%	100.00%	94.00%
Reliance GSM	92.00%	0.00%	100.00%	100.00%	94.00%
Vodafone	96.00%	0.00%	100.00%	100.00%	95.00%

Complaints Resolved within 4 weeks

As per the audited records, none of the operators were able to resolve the complaints within 4 weeks of registration of complaints.

Customer Care / Helpline Assessment

For the accessibility of customer care aspect all the service providers meet the TRAI benchmark wherein 100% of the calls were answered through IVR.

3.4 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	95%	99%	93%	97%	94%	94%
Airtel	94%	NA	97%	93%	97%	97%	93%
BSNL CDMA	95%	93%	NA	93%	94%	90%	99%
BSNL GSM	94%	93%	94%	NA	93%	94%	94%
Idea	93%	93%	96%	91%	NA	92%	93%
Reliance GSM	95%	96%	97%	93%	94%	NA	95%
Vodafone	94%	94%	98%	94%	95%	94%	NA



Maximum Problem faced by the calling operator to other operator

In the inter-operator call assessment, calls were made from the test SIMs of service provider whose audit was being conducted to all the other service providers. Almost all operators were comfortably able to connect with each other except Reliance GSM and Idea that faced a slight difficulty in connecting to BSNL GSM.

Important Points-

- BSNL CDMA did not provide any data related to

4 DETAILED FINDINGS - DRIVE TEST DATA

The drive test was conducted simultaneously for all the operators present in the Assam circle. There was in total of nine drive tests conducted in the circle in the month of October, November, and December, 2013. 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 dms for in-vehicle and > -95 dbm outdoor routes.

The Drive Test were conducted in below cities-

October-

October	City 1-High Population	City 2-Medium Population	City 3-Low Population
City Name	Guwahati	Barpeta Town	Bongaigaon
Date of Drive Test	23rd October,2013	24th October,2013	25th October,2013

Route Details-

Type of location	Guwahati	Barpeta Town	Bongaigaon
Periphery of the city	Bharalu, Maligaon, Adabari, Jalukbari, Guwahati University, Airport, Jalukbari, NH 37, Boragaon, ISBT, Lokhora, Beltola, Kainadhora Hill, Khanapara, Sixmile, Sixmile, VIP Road, Narengi	SBI office ,BB road ,Barpetabazar, KKRD, joint Dir. Health off., sadarbalokmajaliavidyaloi, BrindabanHati , 1 No. Galiyahati, Nawhati, Ichapurhati, Ganakkuchi, Madhavdevsatra,	BagheswaryMandir, B.Ed College RD, Bagheswary Para, BT Rd, Main Rd, AOC Rd, SP Office, Paglasthan, Social Cultural Centre, Bongaigaon Rly HS School, Old Colony Bongaogaon, Rly Institute, Palpara, Santi Nagar, Pipline Area, Baraf Mill, Natun Bazar, MR Rd, College Rd, Bongaigaon Park, ITI Bongaigaon, Circuit House, Bongaigaon College, Natun Para, APDC Ltd., Natu Para LP school, Bhakhari Vita.
Congested area	Panbazar, Donbosco Main gate, Panbazar Fly over, Paltan Bazar, Ulubari Fly over (above), Bhangagarh Fly Over (below) , Rajgarh Road, Guwahati Commerce, Chanmari Fly Over , Silpukhuri, Guwahati Club, Stadium , BB Boruah College, Ulubari Flyover (Below) , DGP office, Sarabbhati Nepali Mandir , Vishal Megamart, MLN Road, H.B.Road, Fancy Bazar, LOG Hindi H.S, Athgaon, Bharalu	Ganakkuchi, Gandhiali, Santinagar, Kasturagandhibalika school , metuakuchi, BB road , 1 No. Galiyahati, Bhoktarkur , MC collage road, Rhino club, BarpetaBazar, BT road, BarpetasadarPS.PostOffice, Asstt. Excu. Engg.(PWD) office, Barpeta Govt. HS School, Bilortarihati, BT lp school, Barpeta Health center Ramrai stadium, Dakshinhati,	NatunPara, Mahabir Stan, RLY Fly over, AOC Rd, Station Rd, T R Phukan Rd , Kaniska Hotel, B T Rd, BSNL GM Office, Bongaigoan B-ed college, Main Rd, M G Rd, Bus stand, Gandhi Maidan, DC Office Rd, Ram Mandir Rd, Bhakrivitha.
Across the city	Chanmari, R.G. Baruah, Ganeshguri, Hatigaon, Bhetapara, Beltola Tiniali, Last Gate, Ganeshmandir, DPI, Forensic Laboratory, Kahilipara, Lala Ganesh, Sarabbhati, Ulubari, Ulubari Electricity Board, Rupnagar, GMC Bhangarh	Nawhati (Barpetanamghar), 2 no. galiyahati, BB Road, Ketekibari, sankardevshisuniketan, madhyalangi, KK road , janiachowk, LIC office, BarpetaAcadmy, SanjivaniHospital, Zaniarao, Fire Briged office , Milan nagar, MC collage , Jurorampathak Girls school , Naveen ch. das hall, LCN road , Amolapatti, Dr. BK Road , BKK Road,	North Salmara Bgn Rd, Birjhara Mahavidyaloi, Borpara, Brahma Madhab Goriyo Moth, Chilarai Indoor Stadium, Main Rd, Indira Gandhi Rd, AOC Rd, Pagla Stan, Rly Coloni Bongaigoan, G N B Rd, DC Residence, New Bongaigoan
Office complex	Guwahati Medical College	Namghar Market Complex	NEW BONGAIGAON RLY STATION OFFICE
Shopping complex	Big Bazar	SBI office Complex	BUS STAND MARKET

November -

November	City 1-High Population	City 2-Medium Population	City 3-Low Population
City Name	Nagaon	Tezpur	Golaghat
Date of Drive Test	21 st November,2013	22 nd November, 2013	26 th November,2013

Route Details-

Type of location	Nagaon	Tezpur	Golaghat
Periphery of the city	Railway Crossing Nagaon (after sensowa), Lakhinagar, no2 amolapatty, sanimandir road, sms road, dthing road, hoiborgaon railway station, tarunphukan road, l.k road, M.D road, ADP road, Chistianbasti,, Doboka road, poraj bora path, ranigaon, 2 no panigaon, masjid road, panialikesaali, balibhau, nortampanigaon, nagaon polytechnic, nagaonkendriyabidyalaya, difalu, poly road, chayaliamolapatty	Mission Chariali, Keteki Bari, Majgaon, BaruahChariali, NilkamalChariali, NH 37, Dolabari No. 1, BarikaChubuli,Ex. Police Line, Tribeni, NT Road, KamarChuburi,	Office of the DistricFisheres Office, Shantipur, The Union -Op Bank, Poddar Car World, BalyaNiketon, Christian High School, Mission Tiniali, Mission LP School, Alahbad Bank, College Tiniali, 12 Assam Coy NCC, Hem Chandra Goswami Path, SBI Pulibor, Suppt of Excise, Harijan LP School, Namghar, Court Rd, LakhikantaBaruah Rd, GP Road, Amola Patti Tiniali, Alupatti, 2no Town LP School,Tapa Nagar, Blue Valley Kinder Garden,GF Road, Bengenakhoa, Chariali, Arangapara,Rd, Noragaon Rd, Office of Junior Eng. Central Water Commision.
Congested area	natun bazar, north hoiborgaon, laokhowa road, m dev road, AT road, M.D road, masjid road, dhakapatty, GNB road, LNB road, bhuyanpatty,AJB road, khutikotia, A.R.B road, R.R.B road, RKK road, kasalukhava railway gate, motiram bora road, K Ahmed road	Head Post Office, NeherubaliStaium, ASTC, SwahidChariali, New Amolapatty, Hospital Road, Polo Field, Natunpara, LachitChowk, JB Road,	Civil Hospital Rd, Stadium Rd, Golaghat Rd, BSNL Office, IOB, Golaghat District Congress Office,GolakBaruah Memorial Hospital,TownBlika LP School, KushalKonwarTennis Court, Club Mission rd,Krishak Bazar, Tokani Circle, Hospital Rd, No-1 Rail Gate,Golaghat Stadium Rd, Bet Mahal.

		Jyotish Road, Sc Road,	
Across the city	Lakhinagarchariali (Bye Pass Chariali), police reserve, BM road, pratapch road, dimoruguritinali, panigaon,, natun bazar, stadium market, nagaon college & head post office, Nagaon Court, haiborgaon High School, AT road, khutikatiya ,	Dadharabamunchuburi, Majgaon, Nabapur, Rubber Bagan, Darrang College Road, Mahabhairab, LDS Road, Baroholia, LDS Road, Borohia, GNB Road.	BrMahaal, Islam Patti, Golaghat Gymkhana, Tapan Nagar Namghar, Kidskamp School, 2No Town LP School, Tapan Nagar Chariali, GF Rd, HDFC Bank, LakhikantaBaruah Rd, Panch Ali, Amolapatti, Indian Overseas Bank, Hanuman MandirChariali, KK Path, BiplaviBirSankarBaruahUdyan, NatunAmolapatti, Assam Tea Plantation Emp Provident Fund Office, Dist. Computer Centre, GolaghatGovt HS School, Hem Chandra Goswami Path, BishnuMandirGolaghat College Tiniali, Assam Tea Worker Club, ChitraSenKakoti Rd, PrayashAccademy, Deputy Director Eco & States, LakshminathBezbruah Path, Town Balika LP School, Stadium Rd, Golaghat Student Union Off, GDSA Sports Complex, Bus Stand, MaheswarBaruah Music College, Super Market, GD Rd, TokaniCircle, Hindi School, Apollo Hospital Information Centre.
Office complex	ASTC Nagaon office		Civil Hospital
Shopping complex	Stadium Market complex	Vishal Mega Mart	Super Market

December -

November	City 1-High Population	City 2-Medium Population	City 3-Low Population
City Name	Silchar	Jorhat	Karimganj
Date of Drive Test	16 th December,2013	27 th December,2013	22 nd December,2013

Route Details-

Type of location	Nagaon	Tezpur	Golaghat
Periphery of the city	Meherpur, 2nd Link Rd, Ward No 16, Sonai Rd, Sarat Pally, Barak Para, Kanakpur Rd, Nataji School Rd, NS Avenue, AdiSiv Bari, RadhaMadhabJoyoti, Happy Child High School, Balipar Rd, Old Lakhipur Rd, Water Resource Office, Janiganj, Silchor Boys Govt High School, Sadarghat, Water Treatment Plant, KacharZilaParisad, Senior Post Master Office, NidhiBhavan, Station Rd, Fire Brigade Office, KrishtiVivekSangha, Vivekananda Rd, Assam Rifles Industrial Training Centre, R K Mission Rd, Ramkrishana Mission Sew ashram, Ambikapatty, SilchorshmashanGhat, Mehrpur.	BaruahCharali,JailRoad,NiramayHospital,MedicalCollage ,MissionHospital,RhinoHall,Jail,Borbheta,AirportRoad,DCBRoad,Tarajan,Tiniali,AT Road(Tarajan),ISBT(KatakibariPukhuri),Bypass,Baligaon	1. District Fisheries Off, Public Health Eng Office, Play Ground, Church Rd, Presbyterian Church, MTO Office, Thana Rd, SP Residence, Civil Hospital, Hospital Rd, Public HS School, Main Rd, GIC Office, Fire Brigade Office, HDFC Bank, Sambhusagar Park, RabindraNath Girls College, Vivekananda College, Red Cross Society Off, Dist Auditorium, Traffic Br Head Office.
Congested area	SadarGhat, RadhaKunjBibahBhavan, SilchorGovt Boys HS School, Janiganj Bazar, Dewanji Bazar, Premtala, Hospital Rd, PHE Astt. Executive Eng Office, Satindra Mohan Dev Civil Hospital, LochanBairagi Rd, RadhaMadhab Rd, SoniMandir, Bilpar Rd, MazharSarif, Lakhipur Rd, Old LP Road, GMC Rd, Kalibari Road, Diwanjee Bazar, Gopalganj, Panpatti, GolDighi	Lichubari,Assam Agriculture University,PoliceReserve,Jail Road Crossing,AssamRiffel Dog TraningCentre,CheoniGaon,ATRoad,Bypass,BaligaonCharali(Bypass),KaliaChawk,BypassChariali(Kunduguri),R Baruah Public School,ChanliGaon,BhogdoiBridge,NatunBazar,GarAli,T	2. Arvind Hospital, Neheru Yuba Kendra, Satlement Rd, Office of Sattlement Officer, Sattlement Sub PO, Lakshmicharan Rd, Tax Superintendent Off, Assam State Agriculture Devp. Bank, Main Rd, Foreigner Tribunal, DC Off, Dist Computer Centre, Centenary Gate, SBI, RabindraSadan Girls College, Institute of Distance Open Learning, Fire Brigade Office,Joint Director Health, Civil

	Municipal Mall, Nazir Patti, Central Rd, Vishal Mega Mart, Narsingtola, DC Residence, Park Rd, Assam SahityaSabha Office, Tourist Information Centre Office, Rotary Club Silchor, Trunk Rd, Police Guest House, PWD Rd, Central Revenue Office, Circuit House, ASTC Stand, Club Rd, Executive Eng Agriculture, SadarGhat, Dr. BC Roy Memorial Hospital, VIP Rd, Rangpar.	owards ONGC Colony,Comissionar Office(Upper Assam),ChinamaraTiniali	Hospital, Hospital Rd.
Across the city	Rangpur, Shillongpatti, Surendra Memorial College, Steamer Ghat, Malugram, C Gupta Rd, Ward No-2, Itkhola, Ghaniala, Romjan Rd, Executive Eng PWD Office, Idgah Complex, Swamiji Rd, Club Rd, Devdoot Point, Cachar Club Complex, Central Rd, Narsingtola, UBI Regional Office, Nazir Patti, Big Bazar, Premtala, Hospital Rd, NS Avenue, PragatiPalli, Ward No-11, Rangirkhari, Arya Junior College, SBI New Silchor, SudiptaNurshing Home, Hailakandi Rd, Tresury Office New Silchor, RK Roy Memorial Residential School, Meherpur, Link Rd, RadhaMadhab Rd, Nightingel Hospital Kuarpar, Meherpur.	ASTC,BaruahCharali,GitaseePoint,ClubRoad,AssamVally English School, Sadar,Garali, TOKLAI research Centre,AssamSatraMahasabha,Rajabari DTO Office,VishalMarket,KBRoad,NirmalCharali,MarwariPatt y,RajamaidanRoad,MaxMart,JBRoad,RajaMaidan,Malwal i,JB Road Crossing,JogenSaikiaRd,ASTC	3. Konishail, Patharkandi Rd, Railway Gate, Station Rd, Exicutive Water Resource Off, Civil Hospital, GNM School, Hospital Rd, SP Office, Kanthia Baba Kunja, Office of the Assam Police Radio Organisation, MG Road, Main Rd, Municipality Office, DC Residence, Circle Office, Satllement Rd, Dist Fisheries Development Office.
Office complex	BSNL Complex	Vishal megamart	4. MUNINCIPALITY OFFICE COMPLEX
Shopping complex	Vishal Mega Mart	Transport Office(ASTC)	CIVIL HOSPITAL MARKET

4.1.1.1 GUWAHATI-OCTOBER- DRIVE TEST RESULTS

	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
Voice quality	≥ 95%	98.41%	93.93%	98.68%	95.43%	100.00%	93.31%	91.69%	92.08%	99.03%	97.53%	98.04%	96.71%	98.58%	96.28%
CSSR	≥ 95%	100.00%	100.00%	100.00%	100.00%	100.00%	93.09%	100.00%	98.55%	100.00%	98.78%	100.00%	98.48%	100.00%	98.83%
%age Blocked calls		0.00%	0.00%	0.00%	0.00%	0.00%	6.91%	0.00%	1.45%	0.00%	1.22%	0.00%	2.56%	0.00%	1.17%
Call drop rate	≤ 2%	0.00%	0.00%	0.00%	0.00%	1.73%	9.24%	0.00%	4.29%	0.00%	0.00%	0.00%	0.79%	0.00%	0.00%
Hands off success rate		100.00%	97.28%	100.00%	100.00%	100.00%	98.92%	100.00%	100.00%	100.00%	100.00%	0.00%	98.86%	100.00%	100.00%

4.1.1.2 BARPETA TOWN-OCTOBER - DRIVE TEST RESULTS

	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
Voice quality	≥ 95%	98.08%	97.67%	98.95%	98.69%	100.00%	100.00%	91.08%	96.23%	99.53%	99.08%	NA	97.46%	99.85%	98.12%
CSSR	≥ 95%	98.44%	100.00%	100.00%	100.00%	100.00%	97.77%	100.00%	99.24%	100.00%	100.00%	100.00%	100.00%	100.00%	99.17%
%age Blocked calls		1.57%	0.00%	0.00%	0.00%	0.00%	2.23%	0.00%	0.76%	0.00%	0.00%	0.00%	0.00%	0.00%	0.83%
Call drop rate	≤ 2%	0.00%	0.00%	0.00%	0.00%	0.00%	1.42%	0.00%	0.85%	0.00%	0.00%	1.43%	0.00%	0.00%	0.00%
Hands off success rate		100.00%	98.79%	100.00%	100.00%	100.00%	99.65%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%

4.1.1.3 BONGAIGAON-OCTOBER - DRIVE TEST RESULTS

	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
Voice quality	≥ 95%	97.51%	97.02%	98.36%	96.77%	100.00%	99.79%	99.40%	94.98%	99.38%	98.06%	#DIV/0!	98.29%	99.39%	97.34%
CSSR	≥ 95%	100.00%	100.00%	100.00%	100.00%	96.77%	97.01%	98.44%	99.21%	100.00%	100.00%	100.00%	99.33%	98.34%	99.22%
%age Blocked calls		0.00%	0.00%	0.00%	0.00%	3.23%	2.99%	1.57%	0.79%	0.00%	0.00%	0.00%	0.67%	1.67%	0.00%
Call drop rate	≤ 2%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Hands off success rate		100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	50.00%	100.00%	100.00%	100.00%	100.00%	100.00%

Key Insights- October

Guwahati-

Voice quality: BSNL GSM was not able to meet the benchmark on voice quality in both indoor and outdoor areas. The benchmark for voice quality is 95% and BSNL GSM fell short by a few percentages recording 91.69% in indoor setting and 92.07% in the outdoor setting. All networks except BSNL passed the test in the indoor setting while Aircel recorded only 93.93%, thereby falling short

CSSR: All the networks comfortably clear the benchmark with BSNL CDMA posting the lowest score at 93.09% for the indoor setting.

Call drop rate: For the outdoor setting, BSNL CDMA, BSNL GSM and Reliance GSM fail to clear the benchmark.

Barpeta –

Voice quality: BSNL GSM was not able to meet the benchmark on voice quality in the outdoor areas. The benchmark for voice quality is 95% and BSNL GSM recorded 91.08% thereby falling short of 95%.

CSSR: All networks comfortably meets the benchmark.

Call drop rate: All networks comfortably meets the benchmark.

Bongaigaon-

Voice quality: BSNL GSM was not able to meet the benchmark on voice quality in the outdoor areas. The benchmark for voice quality is 95% and BSNL GSM fell short recording 94.98%.

CSSR: All the networks comfortably clear the benchmark.

Call drop rate: All the networks comfortably clear the benchmark.

4.1.1.4 NAGAON-NOVEMBER- DRIVE TEST RESULTS

	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
Voice quality	≥ 95%	96.97%	97.43%	98.97%	96.67%	100.00%	100.00%	95.70%	93.97%	99.58%	97.40%	NA	96.70%	99.28%	97.20%
CSSR	≥ 95%	100.00%	98.79%	100.00%	98.84%	98.34%	96.12%	98.57%	98.13%	100.00%	99.36%	100.00%	100.00%	100.00%	100.00%
%age Blocked calls		0.00%	1.21%	0.00%	1.16%	1.67%	3.88%	1.43%	1.87%	0.00%	0.64%	0.00%	0.00%	0.00%	0.00%
Call drop rate	≤ 2%	0.00%	0.00%	0.00%	0.53%	0.00%	0.65%	0.00%	0.00%	0.00%	0.00%	0.00%	1.16%	0.00%	0.00%
Hands off success rate		100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	98.56%	100.00%	100.00%

4.1.1.5 TEZPUR-NOVEMBER - DRIVE TEST RESULTS

	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
Voice quality	≥ 95%	99.29%	96.39%	97.30%	96.18%	100.00%	99.79%	93.88%	89.74%	98.12%	97.80%	NA	96.96%	99.67%	97.59%
CSSR	≥ 95%	100.00%	100.00%	100.00%	99.57%	96.77%	97.01%	100.00%	98.42%	100.00%	100.00%	100.00%	99.44%	100.00%	100.00%
%age Blocked calls		0.00%	0.00%	0.00%	0.43%	3.23%	2.99%	0.00%	1.58%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Call drop rate	≤ 2%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.38%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Hands off success rate		100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	99.14%	100.00%	100.00%

4.1.1.6 GOLAGHAT-NOVEMBER- DRIVE TEST RESULTS

	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
Voice quality	≥ 95%	97.05%	97.60%	99.60%	98.20%	100.00%	99.62%	98.77%	92.60%	98.03%	97.71%	NA	96.54%	99.43%	98.39%
CSSR	≥ 95%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	96.93%	96.87%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
%age Blocked calls		0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	3.08%	3.13%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Call drop rate	≤ 2%	0.00%	0.00%	0.00%	0.00%	1.67%	0.67%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Hands off success rate		100.00%	100.00%	NA	100.00%	100.00%	99.28%	100.00%	100.00%	NA	100.00%	100.00%	100.00%	100.00%	100.00%

Key Insights- November

Nagaon-

Voice quality: BSNL GSM was not able to meet the benchmark on voice quality in outdoor areas. The benchmark for voice quality is 95% and BSNL GSM fell short by a few percentages recording 93.97% in the outdoor setting

CSSR: All the networks comfortably clear the benchmark.

Call drop rate: All networks cleared the benchmark

Tezpur –

Voice quality: BSNL GSM was not able to meet the benchmark on voice quality in both indoor and outdoor areas. The benchmark for voice quality is 95% and BSNL GSM fell short by a few percentages recording 93.88 % in indoor setting and 89.74% in the outdoor setting

CSSR: All the networks comfortably clear the benchmark.

Call drop rate: All networks cleared the benchmark

Golaghat-

Voice quality: BSNL GSM was not able to meet the benchmark on voice quality in outdoor areas. The benchmark for voice quality is 95% and BSNL GSM fell short by a few percentages recording 92.60% in the outdoor setting

CSSR: All the networks comfortably clear the benchmark.

Call drop rate: All the networks comfortably clear the benchmark.

4.1.1.7 SILCHAR - DECEMBER- DRIVE TEST RESULTS

	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
Voice quality	≥ 95%	98.73%	95.45%	98.70%	96.48%	99.93%	99.73%	96.08%	97.61%	98.08%	97.38%	NA	98.81%	98.50%	96.80%
CSSR	≥ 95%	100.00%	99.44%	100.00%	100.00%	100.00%	99.29%	100%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
%age Blocked calls		0.00%	0.56%	0.00%	0.00%	0.00%	0.71%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Call drop rate	≤ 2%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Hands off success rate		100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%

4.1.1.8 JORHAT - DECEMBER- DRIVE TEST RESULTS

	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
Voice quality	≥ 95%	99.15%	95.68%	99.20%	95.13%	100.00%	99.46%	93.19%	87.97%	99.37%	97.33%	99.59%	96.55%	99.58%	96.05%
CSSR	≥ 95%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	99.29%	100.00%	100.00%	100.00%	100.00%	98.65%	99.07%
%age Blocked calls		0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	1.35%	0.93%
Call drop rate	≤ 2%	0.00%	0.62%	0.00%	0.00%	0.00%	2.85%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Hands off success rate		100.00%	98.17%	100.00%	100.00%	99.79%	99.78%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%

4.1.1.9 KARIMGANJ - DECEMBER- DRIVE TEST RESULTS

	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	
Voice quality	≥ 95%	97.48%	95.70%	99.06%	96.52%	99.36%	98.23%	96.43%	98.76%	NA		NA	99.35%	98.69%	96.93%	
CSSR	≥ 95%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	97.28%	98.44%			97.80%	100.00%	100.00%	100.00%	100.00%
%age Blocked calls		0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	3.06%	1.72%			2.21%	0.00%	0.00%	0.00%	0.00%
Call drop rate	≤ 2%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%			0.00%	0.00%	0.00%	0.00%	0.00%
Hands off success rate		100.00%	100.00%	NA	100.00%	100.00%	100.00%	0.00%	0.00%			100.00%	100.00%	100.00%	100.00%	100.00%

Key Insights- December

Silichar-

Voice quality: Benchmark for voice quality is 95% and all networks comfortably perform better than this.

CSSR: All the networks comfortably clear the benchmark.

Call drop rate: All networks cleared the benchmark

Jorhat –.

Voice quality: BSNL GSM was not able to meet the benchmark on voice quality in both indoor and outdoor areas. The benchmark for voice quality is 95% and BSNL GSM fell short by a few percentages recording 93.19 % in indoor setting and 87.97% in the outdoor setting

CSSR: All the networks comfortably clear the benchmark.

Call drop rate: All networks cleared the benchmark except BSNL CDMA in outdoor areas which records 2.85% which is higher than the benchmark of 2%

Karimganj- All operators meet all the benchmark.

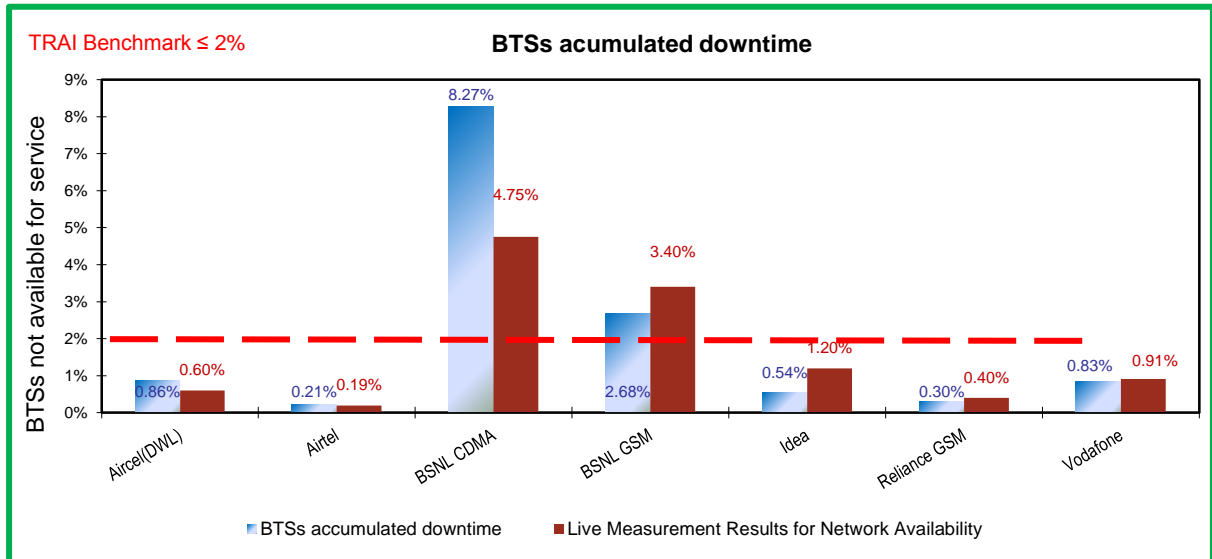
Voice quality: Benchmark for voice quality is 95% and all networks comfortably perform better than this.

CSSR: All the networks comfortably clear the benchmark.

Call drop rate: All networks cleared the benchmark

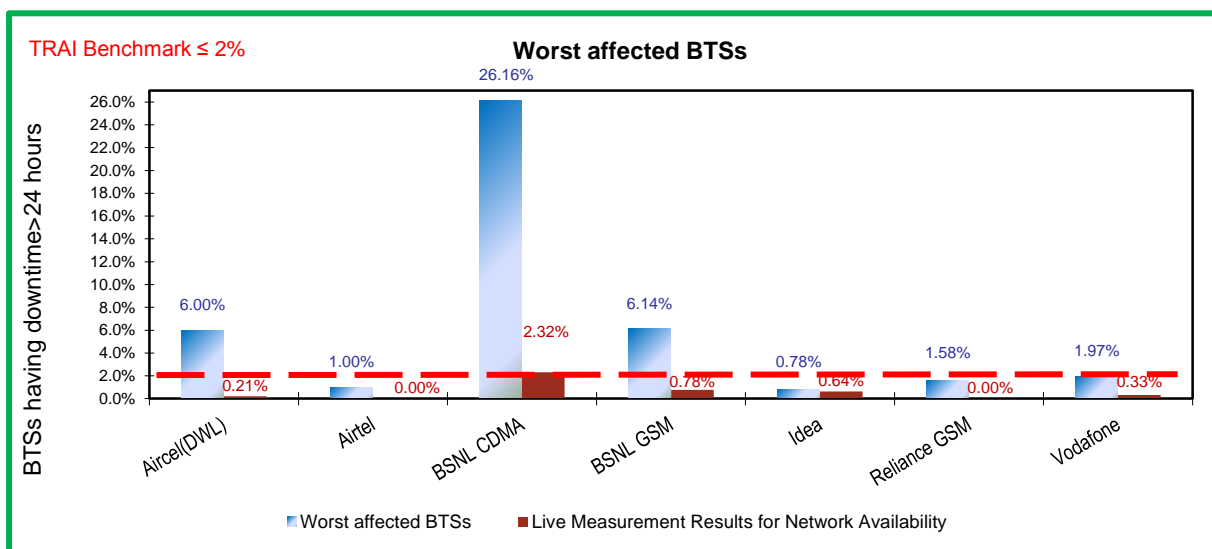
5 DETAILED FINDINGS - COMPARISON BETWEEN PMR DATA, 3 DAY LVE DATA AND LIVE CALLING DATA

5.1 BTS ACCUMULATED DOWNTIME



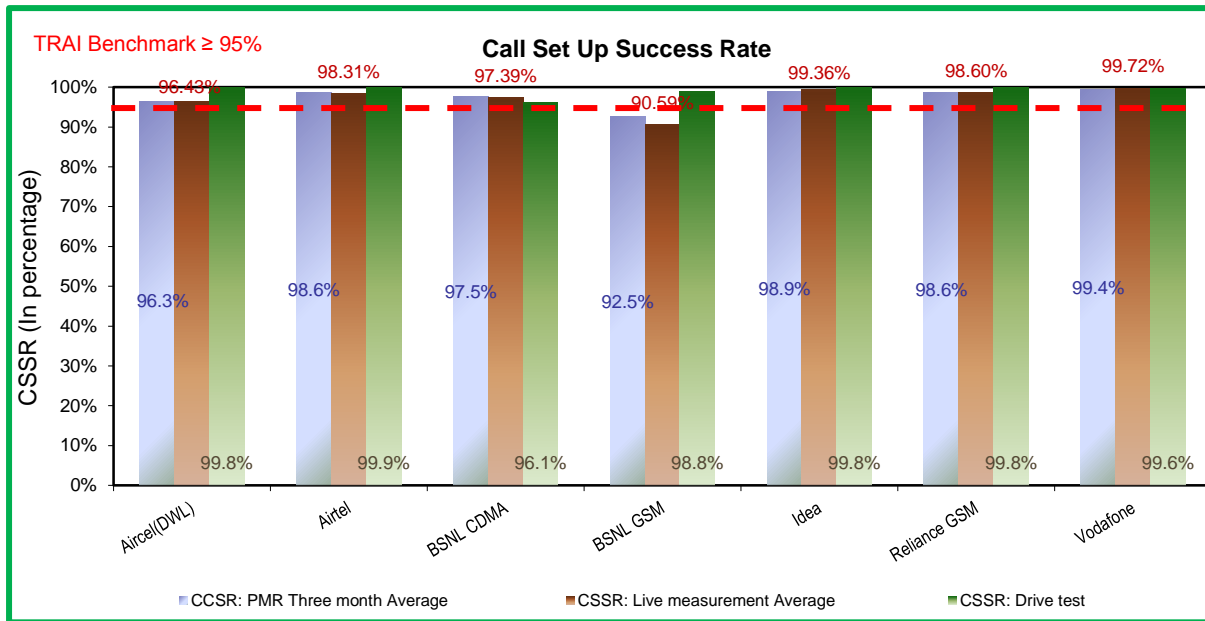
The result of the PMR data and live measurement is almost similar except for BSNL CDMA. Further, both BSNL CDMA as well as GSM is not able to meet the benchmark on aspect of BTS Accumulated downtime.

5.2 WORST AFFECTED BTS DUE TO DOWNTIME



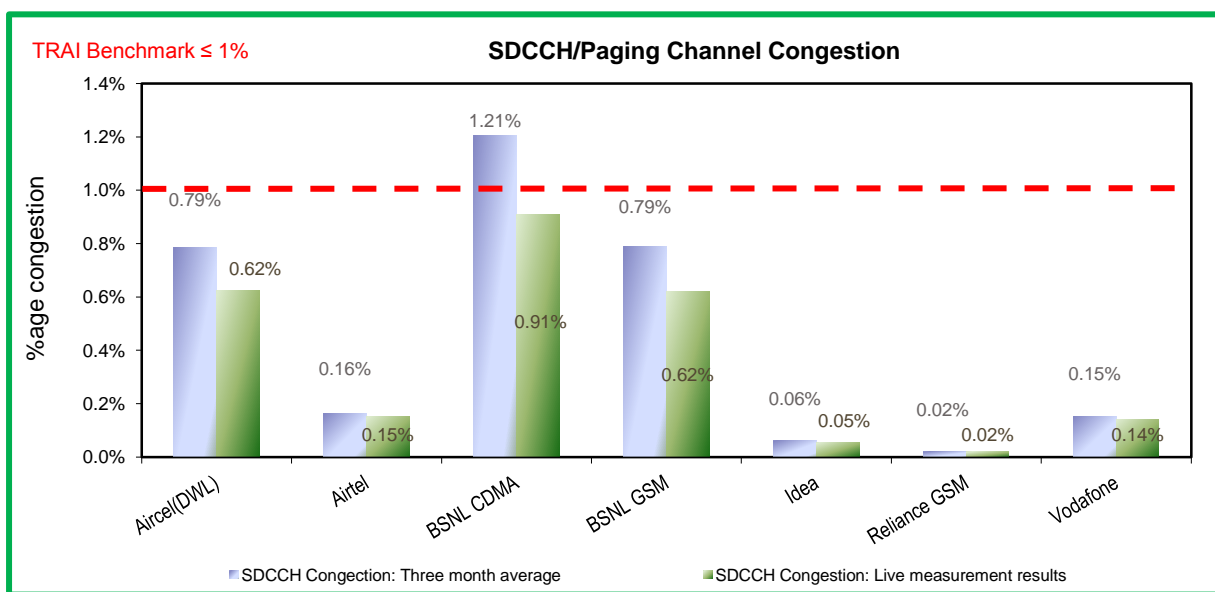
Aircel, BSNL CDMA, and BSNL GSM do not meet the benchmark for worst affected BTSs. BSNL CDMA has more than a quarter of its BTSs experiencing downtime.

5.3 CALL SET UP SUCCESS RATE



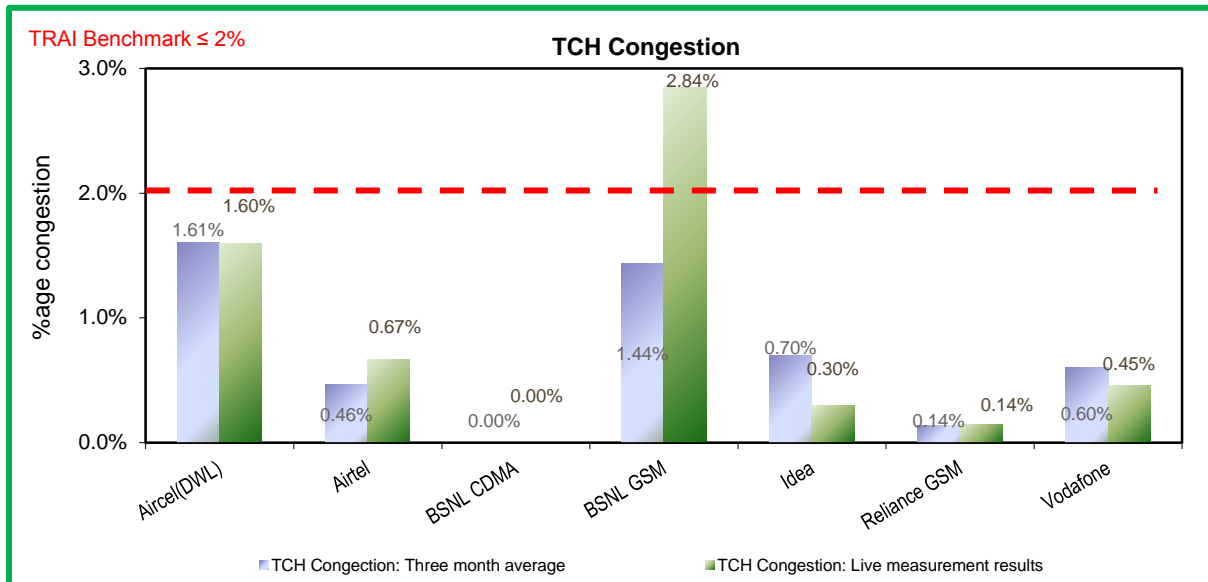
Only BSNL GSM is not able to meet the benchmark for Call Setup Success rate for three month average data as well as liver data.

5.4 SDCCH/PAGING CHANNEL CONGESTION



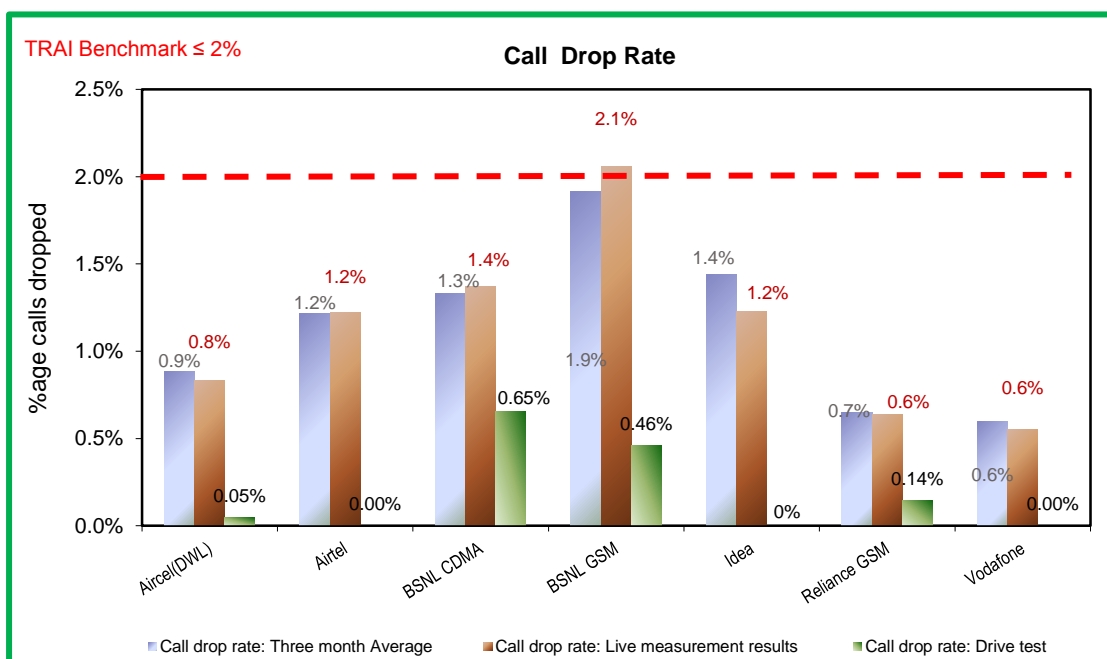
Only BSNL CDMA is not able to meet the benchmark for SDCCH/Paging Channel Congestion for three month average.

5.5 TCH CONGESTION



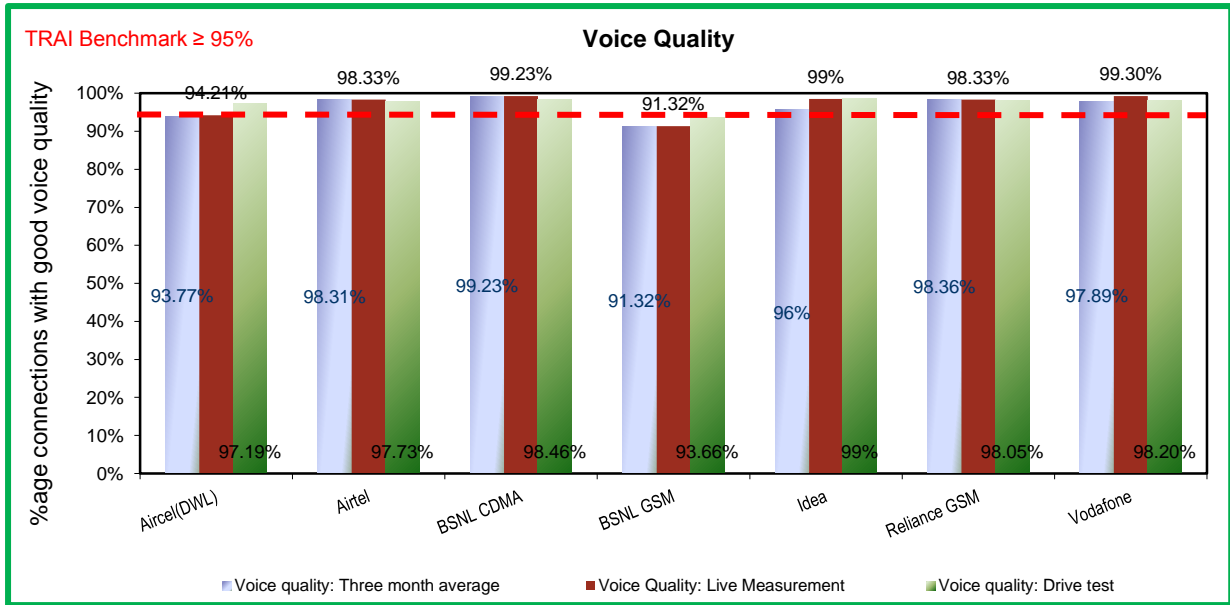
Only BSNL GSM is not able to meet the benchmark TCH Congestion for live measurement.

5.6 CALL DROP RATE



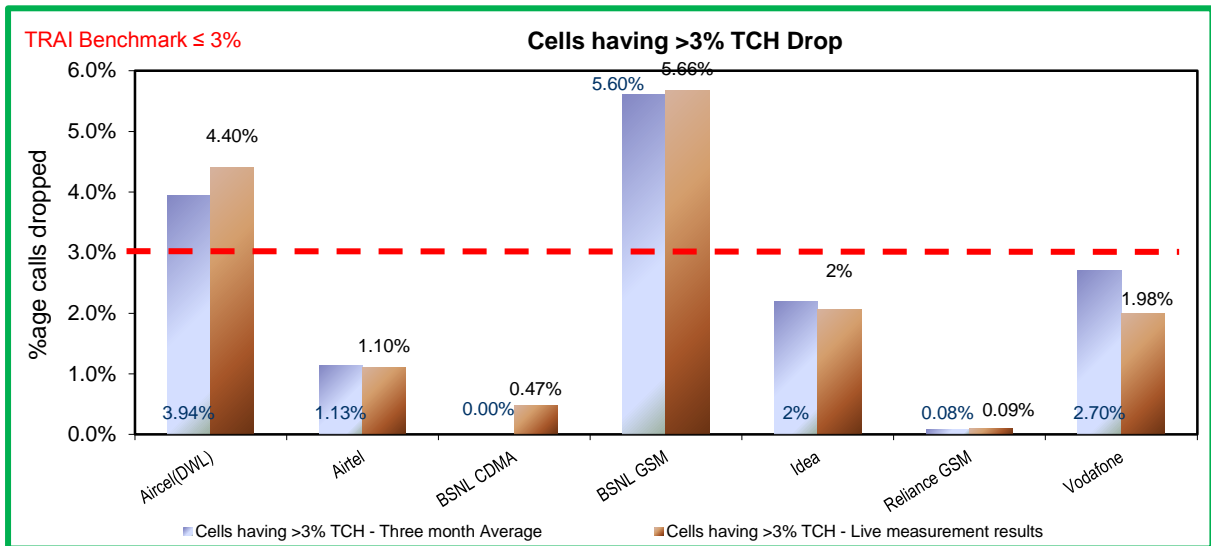
Only BSNL GSM is not able to meet the benchmark for Call Drop rate for live measurement.

5.7 VOICE QUALITY



BSNL GSM is not able to meet the benchmark for Voice quality for rate for all three data points namely Three months average, Live measurement and drive test.

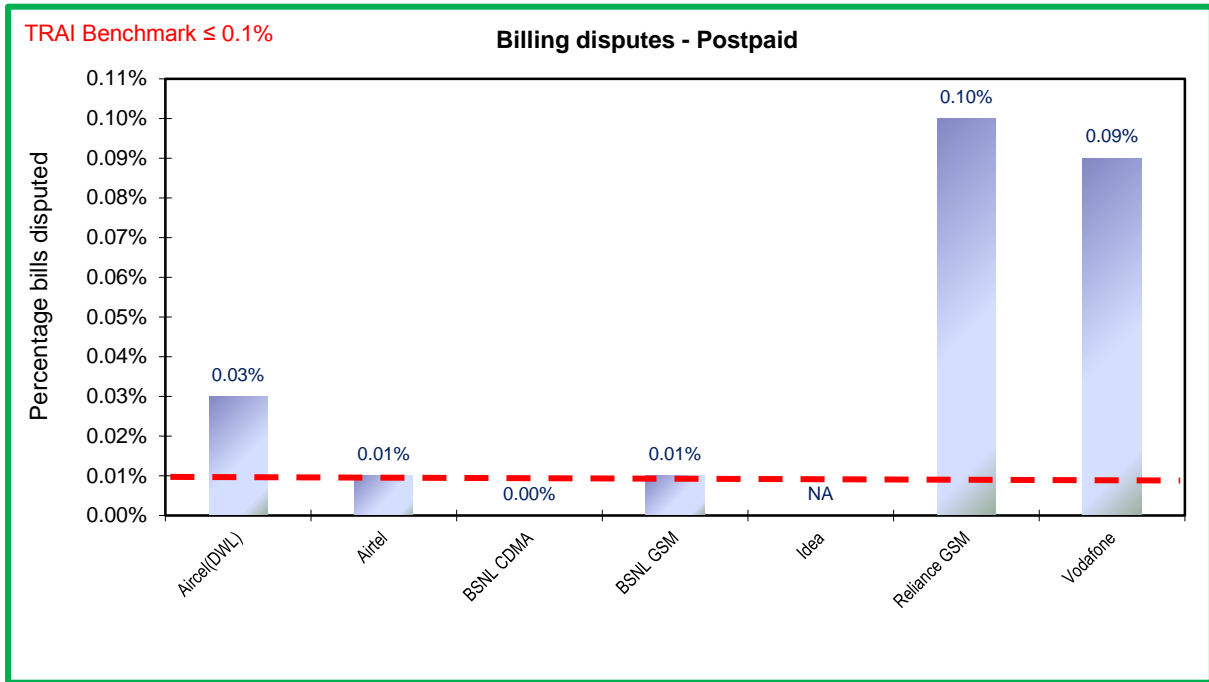
5.8 CELLS HAVING >3% TCH DROP



Both Airtel and BSNL GSM do not meet the benchmark for both Three month and live measurement data.

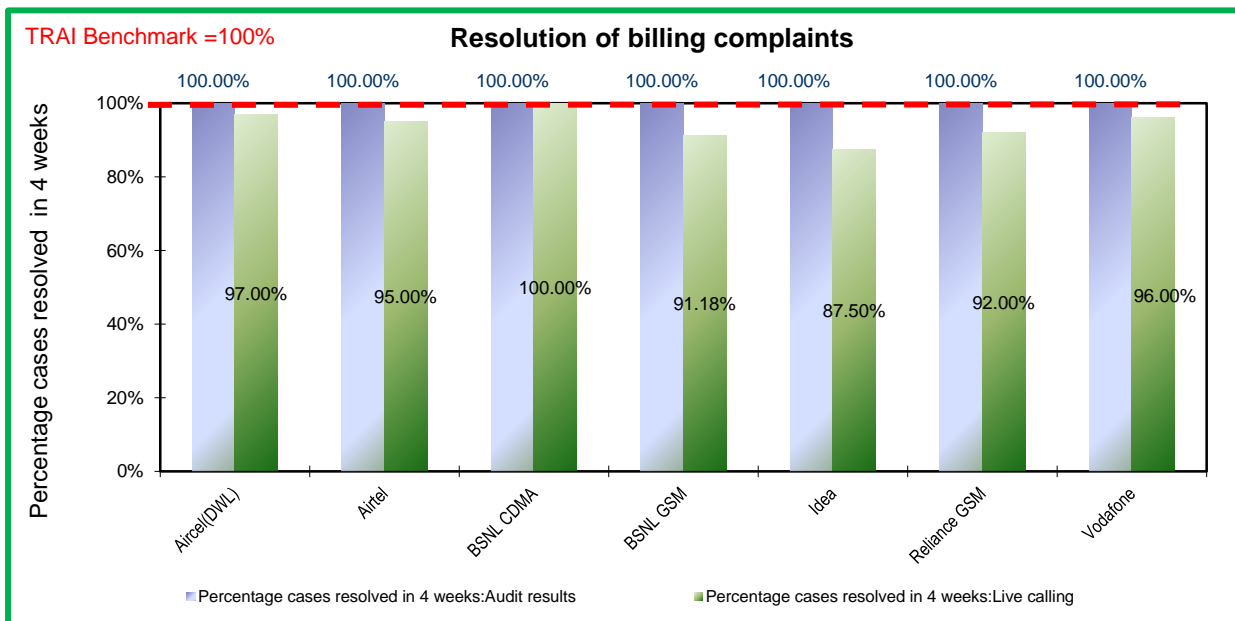
6 DETAILED FINDINGS – NON NETWORK PARAMETERS

6.1 BILLING DISPUTES-POSTPAID



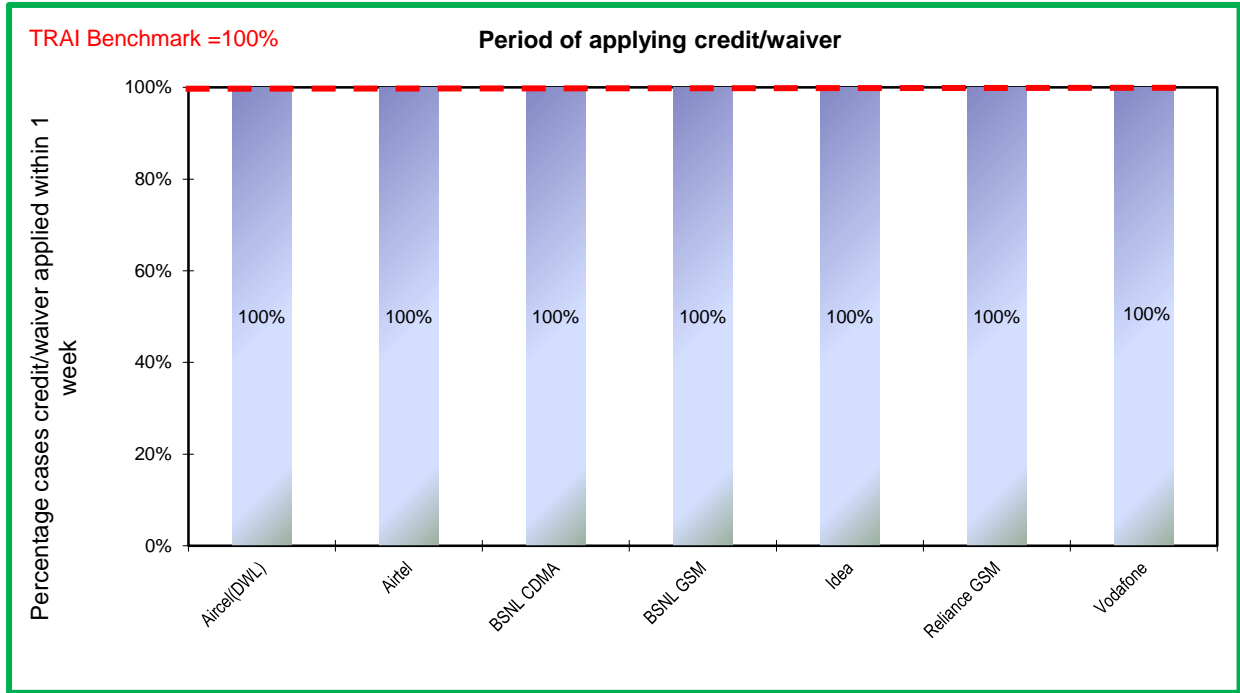
Aircel, Reliance GSM, and Vodafone do not meet the benchmark for billing disputes postpaid.

6.2 RESOLUTION OF BILLING COMPLAINTS



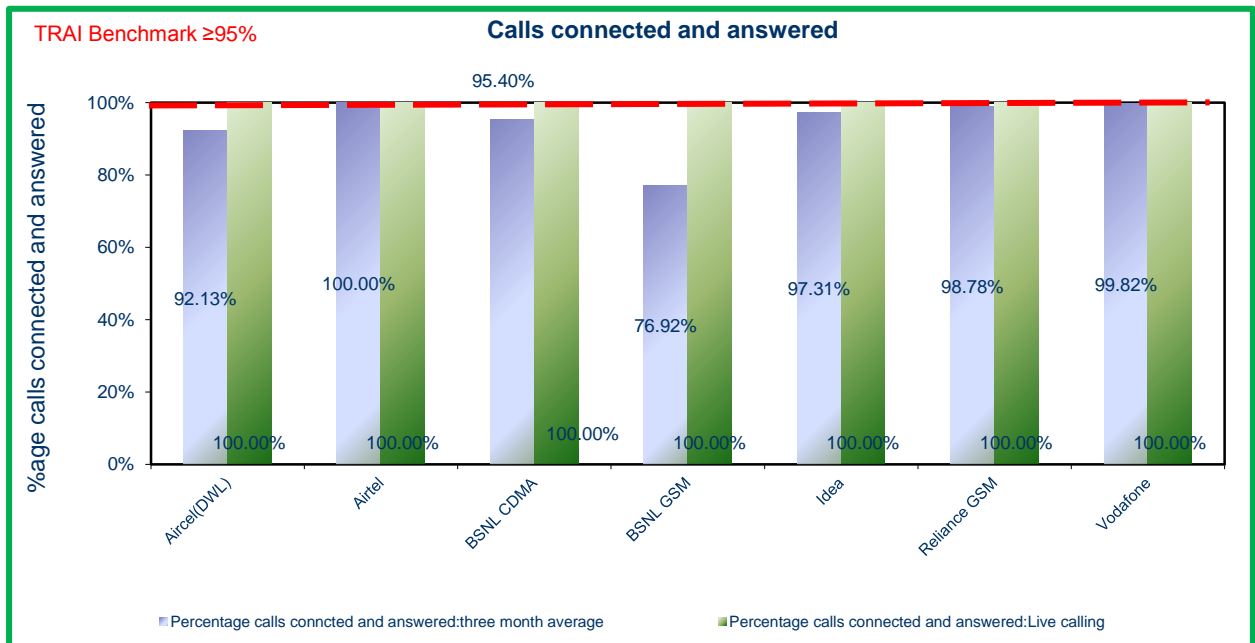
In live measurement none of the operator is able to meet the benchmark for resolution of billing complaints.

6.3 PERIOD OF APPLYING CREDIT/WAVIER



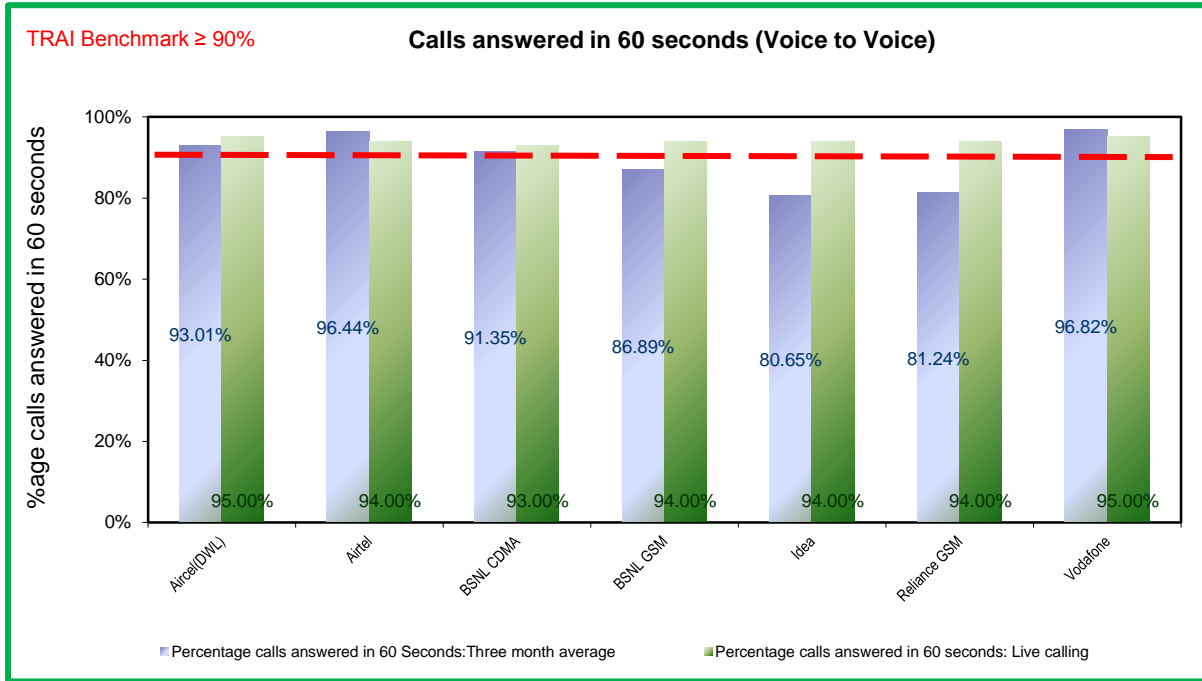
All operators meet the benchmark.

6.4 CALL CENTRE PERFORMANCE-IVR



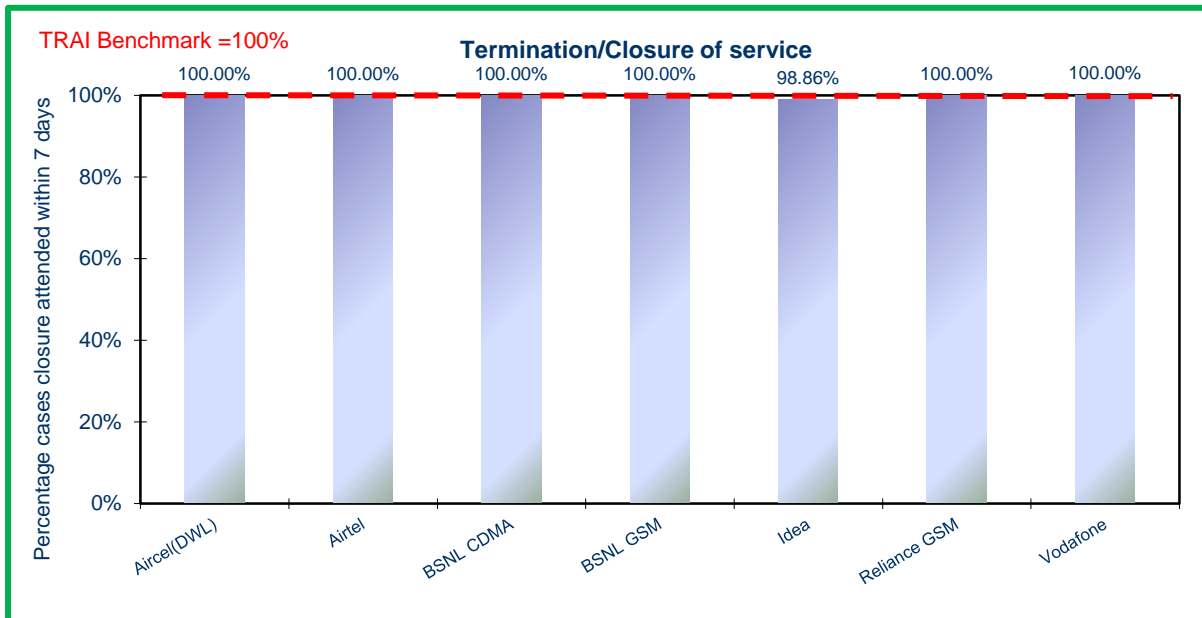
None of the operators is able to meet the benchmark for call center performance through IVR with BSNL GSM performing the poorest.

6.5 CALL CENTRE PERFORMANCE-VOICE TO VOICE



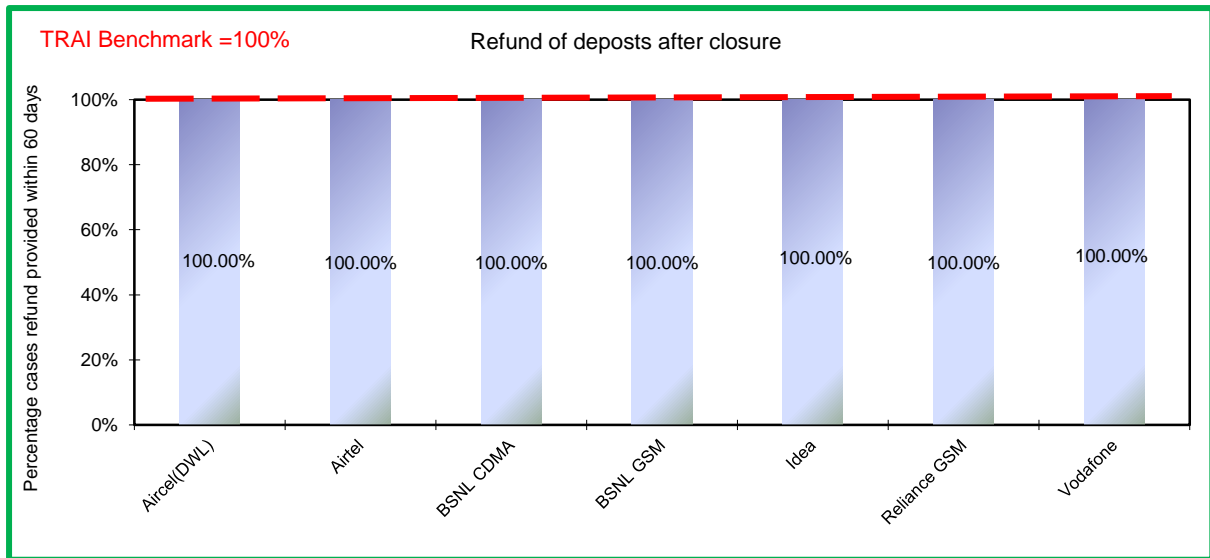
All operators meet the benchmark except Idea and Reliance GSM for three month average.

6.6 TERMINATION/CLOSURE OF SERVICE



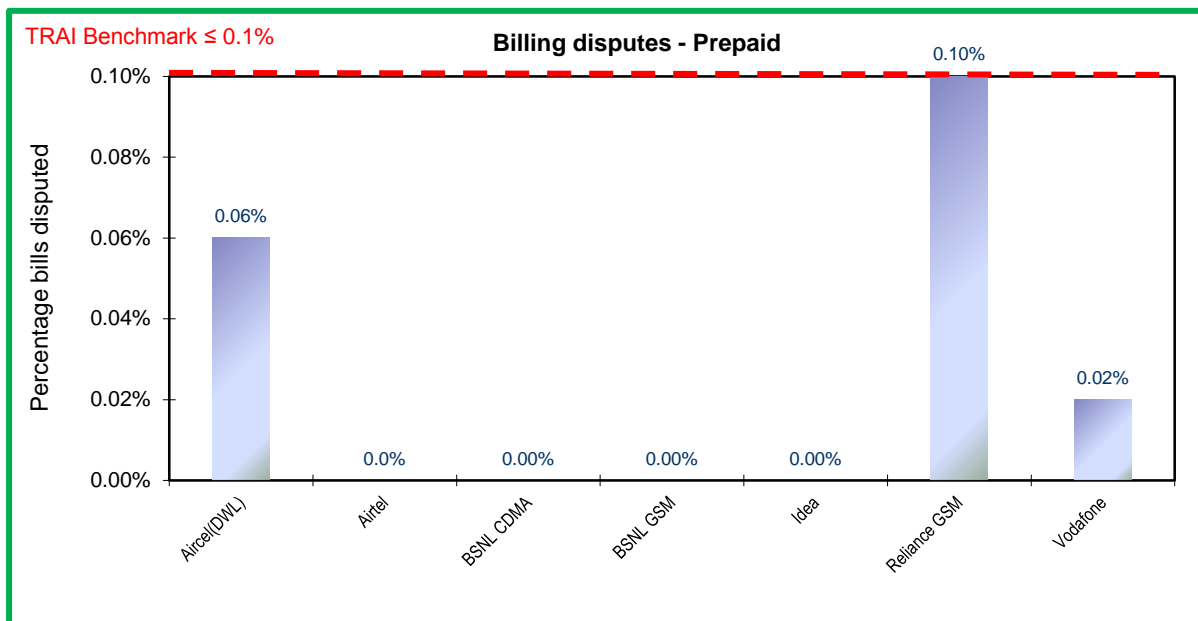
All operators meet the benchmark.

6.7 REFUND OF DEPOSITS AFTER CLOSURE



All operators meet the benchmark.

6.8 BILLING COMPLAINTS - PREPAID



All operators meet the benchmark, however, Reliance GSM has the highest percentage of billing disputes.

7 ANNEXURE

7.1 BILLING

Billing Performance	Benchmark	Aircel(DWL)	Airtel	BSNL CDMA	BSNL GSM	Idea	Reliance GSM	Vodafone
Billing disputes - Post-paid								
Total bills generated during the period		66624	83,129	57282	706845	10617	315537	56832
Total number of bills disputed		23	11	0	66	0	306	51
Percentage bills disputed	≤ 0.1%	0.03%	0.01%	100.00%	0.01%	0.00%	0.10%	0.09%
Billing disputes - Prepaid								
Number of complaints related to charging, credit & validity		217	192	0	43	1	2482	480
Total number of prepaid customers in that period		360616	42,45,752	50327	888362	483188	2473679	2617359
Percentage of complaints	≤ 0.1%	0.06%	0.0%	100.00%	0.00%	0.00%	0.10%	0.02%
Resolution of billing complaints								
Total number of billing/charging complaints		240	203	0	43	1	2788	531
Total complaints considered invalid		1187	921	0	17	13	164	65
Number of complaints resolved in 4 weeks from date of receipt for complaints listed in 5.3.1		240	203	0	43	1	2788	531

Percentage complaints resolved within 4 weeks of date of receipt	100%	100.00%	100.00%	100%	100.00%	100.00%	100.00%	100.00%
Period of applying credit / waiver								
Total number of complaints where credit/waiver is required		154	203	0	64	1	2624	124
Percentage cases in which credit/waiver was received within 1 week	100%	100%	100%	0%	100%	100%	100%	100%

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	100	0	34	88	100	100
Number of cases resolved in 4 weeks		97	95	0	31	77	92	96
Percentage cases resolved in four weeks	100%	97.00%	95.00%	100%	91.18%	87.50%	92.00%	96.00%

7.2 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		5408427	656345	109	181593	65692	9522283	3119078

Number of calls getting connected and answered (electronically)		4982691	656345	104	139679	63924	9406525	3113435
Percentage calls getting connected and answered	≥ 95%	92.13%	100.00%	95%	76.92%	97.31%	98.78%	99.82%
Number of calls getting transferred to the operator (voice to voice)		1030084	1011287	104	782638	250392	902576	954071
Number of calls answered by operator (voice to voice) within 60 seconds		958126	975240	95	680066	201932	733291	923745
Percentage calls answered within 60 seconds (V2V)	≥ 90%	93.01%	96.44%	91.35%	86.89%	80.65%	81.24%	96.82%

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	100	100	100	100	100	100
Total Number of calls answered within 60 seconds		95	94	93	94	94	94	95
Percentage calls answered within 60 seconds	≥ 90%	95.00%	94.00%	93.00%	94.00%	94.00%	94.00%	95.00%

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 calls received		100	100	100	100	100	100	100
Total Number of calls getting connected and answered		100	100	100	100	100	100	100
Percentage calls getting connected and answered	≥ 95%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%

Level 1 services		Aircel(DWL)	Airtel	BSNL CDMA	BSNL GSM	Idea	Reliance GSM	Vodafone
Total no. of calls made		150	150	150	150	150	150	150
Calls answered in 60 sec		150	150	150	150	150	150	150
Calls answered after 60 sec		100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%

Live calling results for resolution of service requests

Resolution of service requests		Aircel(DWL)	Airtel	BSNL CDMA	BSNL GSM	Idea	Reliance GSM	Vodafone
Total Number of calls made		100	100	100	100	100	100	100
Number of cases resolved to satisfaction		100	100	100	100	100	100	100
Percentage cases resolved in four weeks		100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%

7.3 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		206	248	1928	1235	88	693	110
Number of requests attended within 7 days		206	248	1928	1235	87	693	110
Percentage cases in which termination done within 7 days	100%	100.00%	100.00%	100.00%	100.00%	98.86%	100.00%	100.00%

7.4 REFUND

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		361	97	428	532	78	396	163
Total number of cases where refund was made within 60 days		361	97	428	532	78	396	163
Percentage cases in which refund was receive within 60 days	100%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%

7.5 ADDITIONAL NETWORK RELATED PARAMETERS

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		193265.96	148938	33750	108000	26767.59	132000	99442
Total traffic handled in erlang during TCBH		99780.67	129732	202.30	20521	11486.31	66605.82	89256

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)		3142241	4236310	14450	980166	482527	2073416	25,74,847

Audit Results for POI Congestion

POI congestion	Benchmark	Aircel(DWL)	Airtel	BSNL CDMA	BSNL GSM	Idea	Reliance GSM	Vodafone
Total number of working POIs		45.7	23.3	0.0	19.0	2800%	14.0	28.0
No. of POIs not meeting benchmark		0.0	0.0	0.0	0.0	0%	0.0	0.0
Total Capacity of all POIs (A) - in erlangs		85990.1	108973.1	0.0	19471.9	1555867%	27938.6	55664575.9
Traffic served for all POIs (B)- in erlangs		50575.3	28502.3	0.0	19990.7	959794%	15455.3	13794824.5
POI congestion	≤ 0.5%	0.00%	0.00%	0.00%	2.33%	0%	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		45.7	23.3	0.0	19.0	28.0	14.0	28.0
No. of POIs not meeting benchmark		0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Capacity of all POIs (A) - in erlangs		86025.3	108113.0	0.0	19471.9	15567.6	27950.9	4174760.3
Traffic served for all POIs (B)- in erlangs		50310.3	29260.7	0.0	18476.0	9424.7	13224.2	1052363.4
POI congestion	≤ 0.5%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%



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