



**EAST  
ZONE**

# **TRAI AUDIT WIRELESS REPORT-BIHAR & JHARKHAND CIRCLE- OND QUARTER, 2013**



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**Prepared For-**



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## 2 INTRODUCTION

### 2.1 ABOUT TRAI

TRAI's mission is to create and nurture conditions for growth of telecommunications in the country in a manner and at a pace that will enable India to play a leading role in the emerging global information society. One of the main objectives of TRAI is to provide a fair and transparent policy environment which promotes a level playing field and facilitates fair competition.

In pursuance of above objective, TRAI has been issuing regulations, order and directives to deal with the issues or complaints raised by the operators as well as the consumers. These regulations, order and directives have helped the nurture the growth of multi operator multi service- an open competitive market from a government owned monopoly. Also, the directions, orders and regulations issued cover a wide range of subjects including tariff, interconnection and quality of service as well as governance of the Authority.

TRAI initiated a regulation- The Standard of Quality of Service of Basic Telephone Service (Wireline) and Cellular Mobile Telephone Service regulations, 2009 (7 of 2009) dated the March 20, 2009 and Quality of Service of Broadband Service Regulations, 2006 (11 of 2006) dated the October 6, 2006 provide for benchmarks for the parameters on customer perception of service to be achieved by service provider.

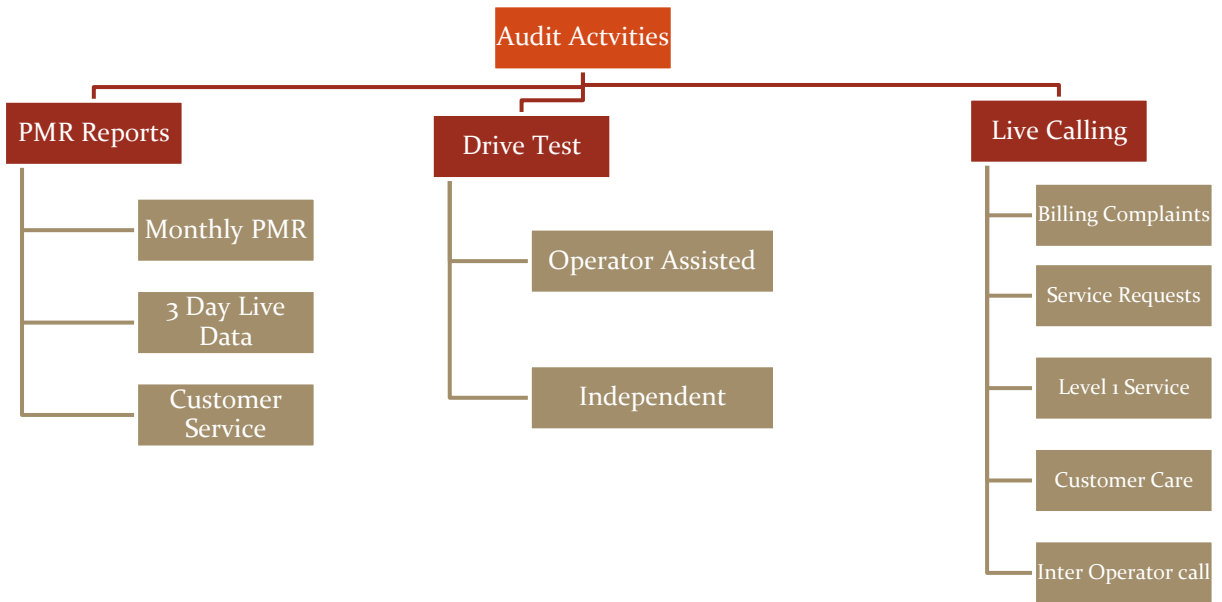
In order to assess the above regulations TRAI has commissioned a third party agency to conduct the audit of the service providers and check the performance of the operators on the various benchmarks set by Telecom Regulatory Authority of India (TRAI).

### 2.2 OBJECTIVES

The primary objective of the Audit module is to-

- Audit and Assess the Quality of Services being rendered by Basic (Wireline), Cellular Mobile (Wireless), and Broadband service against the parameters notified by TRAI. (The parameters of Quality of Services (QoS) have been specified by in the respective regulations published by TRAI).

## 2.3 FRAMEWORK USED



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

### 2.3.1 PMR REPORTS

#### 2.3.1.1 MONTHLY PMR

This involved calculation of the various Quality of Service parameters through monthly Performance Monitoring Reports (PMR's). The PMR reports were extracted 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 3<sup>rd</sup> 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:  $\leq 7$  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/Commercials 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 telephone 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  $\geq 95\%$
- (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
Aircel(DWL)
Airtel
BSNL
Idea
Reliance CDMA
Reliance GSM
TATA CDMA
TATA GSM
Uninor
Vodafone

### 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
<b>Benchmark</b>	≤ 2%	≤ 2%	≥ 95%	≤ 1%	≤ 2%	≤ 2%	≤ 3%	≥ 95%
Aircel(DWL)	1.15%	4.26%	96.73%	0.25%	0.99%	0.51%	3.10%	95.10%
Airtel	0.09%	0.25%	98.70%	0.19%	0.24%	0.50%	1.90%	98.55%
BSNL	1.93%	14.65%	96.39%	1.01%	2.01%	1.88%	7.35%	Na
Idea	0.75%	1.75%	98.61%	0.49%	0.91%	1.25%	2.75%	96.88%
Reliance CDMA	0.32%	0.47%	98.33%	0.00%	0.00%	0.26%	0.23%	99.80%
Reliance GSM	0.11%	0.54%	96.57%	0.17%	0.07%	0.47%	0.12%	97.88%
TATA CDMA	0.17%	0.87%	97.93%	#DIV/0!	0.37%	0.93%	2.78%	98.22%
TATA GSM	0.02%	0.00%	99.12%	0.08%	0.07%	0.45%	0.24%	97.92%
Uninor	0.23%	0.20%	97.27%	0.46%	1.85%	0.64%	1.96%	96.71%
Vodafone	0.46%	1.85%	99.61%	0.12%	0.39%	0.78%	2.33%	97.57%

 Values highlighted in green color represent the best performance in that category for the following operator.

#### BTSS Accumulated Downtime:

In the Bihar circle, all operators met the benchmark. Maximum BTS Accumulated downtime was recorded for BSNL with 1.93%. TATA GSM has the minimum BTS Accumulated downtime of 0.02%.

#### Worst Affected BTSS Due to Downtime:

All the operators met the benchmark except BSNL, Airtel. Maximum worst affected BTSS due to downtime were recorded for BSNL 14.65% and TATA 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. During the audits the maximum CSSR was observed for Vodafone with 99.61% of their calls getting completed. All the operators were found to be calculating the parameter as per the norm specified by TRAI. CSSR was

established as the ratio of total number of successful call attempts (establishment) to the total number of call attempts made.

#### **Network Congestion parameters:**

SDCCH / Paging Channel Congestion, TCH and POI are part of the network congestion parameters. All the operators are meeting the TRAI specified benchmarks on the congestion parameters. Only BSNL was not able to meet the TCH congestion benchmark. 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 1.88%, and lowest was for Tata GSM with 0.45%.

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

All the operators met the benchmark except Aircel & BSNL, Maximum Worst Affected Cells Having More than 3% TCH Drop was recorded for BSNL 7.35% and Reliance GSM had minimum Worst Affected Cells Having More than 3% TCH Drop at 0.12%.


#### **Voice Quality**

During the audit it was found that all the service providers were meeting the benchmark however in terms of voice quality Vodafone and Aircel have relatively lower voice quality as compare to rest of the operators



### 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
<b>Benchmark</b>	≤ 2%	≤ 2%	≥ 95%	≤ 1%	≤ 2%	≤ 2%	≤ 3%	≥ 95%
Aircel(DWL)	1.09%	0.00%	97.55%	0.19%	0.82%	0.51%	1.70%	95.25%
Airtel	0.51%	0.09%	98.69%	0.19%	0.24%	0.49%	1.73%	99.03%
BSNL	2.23%	0.00%	96.35%	1.11%	2.01%	1.84%	2.20%	Data not provided
Idea	0.00%	0.00%	99.15%	0.44%	0.83%	1.04%	2.71%	97.24%
Reliance CDMA	0.61%	0.00%	98.40%	0.00%	0.33%	0.21%	0.13%	99.80%
Reliance GSM	0.16%	0.00%	98.32%	0.19%	0.04%	0.49%	0.05%	98.05%
TATA CDMA	0.70%	0.14%	92.85%	0.00%	0.28%	0.28%	4.25%	98.23%
TATA GSM	1.01%	0.00%	99.12%	0.07%	0.08%	0.45%	2.27%	97.95%
Uninor	0.20%	0.00%	97.22%	0.39%	1.85%	0.63%	1.96%	96.74%
Vodafone	0.43%	0.00%	99.77%	0.08%	0.23%	0.79%	2.44%	97.68%

 Values highlighted in green color represent the best performance in that category for the following operator.

#### BTSS Accumulated Downtime:

In the Bihar circle, all operators met the benchmark. Maximum BTS Accumulated downtime was recorded for BSNL with 2.23%. Idea has the minimum BTS Accumulated downtime of 0.00%.

#### Worst Affected BTSS Due to Downtime:

All the operators met the benchmark except BSNL, Airtel. Maximum worst affected BTSS due to downtime were recorded for BSNL 14.65% and TATA 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 TATA CDMA. During the audits the maximum CSSR was observed for Vodafone with 99.77% 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. Only BSNL was not able to meet the TCH congestion benchmark. 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.

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

All the operators met the benchmark except TATA CDMA, Maximum Worst Affected Cells Having More than 3% TCH Drop was recorded for TATA CDMA 4.25% and Reliance GSM had minimum Worst Affected Cells Having More than 3% TCH Drop at 0.05%.

### Voice Quality

During the audit it was found that all the service providers were meeting the benchmark however in terms of voice quality Vodafone and Aircel have relatively lower voice quality as compare to rest of the operators

## 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
<b>Benchmark</b>	<b>100%</b>		<b>≥ 95%</b>	<b>≥ 95%</b>	<b>≥ 90%</b>
Aircel(DWL)	89.00%	81.00%	84.67%	100.00%	98.00%
Airtel	92.00%	68.00%	90.00%	100.00%	96.00%
BSNL	66.67%	75.90%	85.33%	100.00%	60.00%
Idea	66.67%	84.00%	88.67%	100.00%	98.00%
Reliance CDMA	86.00%	95.00%	88.00%	100.00%	100.00%
Reliance GSM	94.00%	89.00%	90.00%	100.00%	100.00%
TATA CDMA	86.00%	91.00%	90.67%	100.00%	100.00%
TATA GSM	93.00%	87.00%	90.00%	100.00%	97.00%
Uninor	76.19%	No number provided	74.00%	100.00%	100.00%
Vodafone	100.00%	91.00%	90.00%	100.00%	94.00%

## Level 1 Services

None of the operators were able to meet the benchmark on metering and billing (except Vodafone) as well as level 1 services with Uninor performing the poorest.

## Customer Care

IVR has 100% connectivity across the operators however when reaching out to customer care is concerned, BSNL does not meet the benchmark.

### 3.4 INTER OPERATOR CALL ASSESSMENT – CONSOLIDATED

Inter operator call Assessment To↓ From→	Aircel(DWL)	Airtel	BSNL	Idea	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Uninor	Vodafone
Aircel(DWL)	NA	100%	94%	100%	100%	95%	100%	100%	96%	100%
Airtel	99%	NA	100%	100%	100%	100%	100%	99%	100%	100%
BSNL	100%	100%	NA	100%	100%	98%	100%	100%	98%	100%
Idea	99%	100%	99%	NA	100%	100%	100%	99%	100%	100%
Reliance CDMA	100%	98%	100%	100%	NA	100%	100%	100%	100%	99%
Reliance GSM	100%	100%	96%	100%	100%	NA	100%	100%	100%	100%
TATA CDMA	100%	100%	100%	100%	98%	100%	NA	98%	100%	99%
TATA GSM	100%	98%	100%	100%	98%	99%	100%	NA	100%	100%
Uninor	100%	100%	100%	100%	100%	100%	100%	100%	NA	100%
Vodafone	100%	98%	98%	100%	100%	100%	100%	100%	98%	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. Only BSNL, Reliance GSM, and Uninor faced a problem in connecting with Aircel (DWL)



## 4 DETAILED FINDINGS - DRIVE TEST DATA

The drive test was conducted simultaneously for all the operators present in the Bihar & Jharkhand circle. There were 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	Hajipur	Arrah	Jamshedpur
Date of Drive Test	28th October, 2013	25th October,2013	30 <sup>th</sup> October,2013

### Route Details-

Type of location	Hajipur	Arrah	Jamshedpur
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<b>Periphery of the city</b>	Railway Station to Paswan Chowk	Railway Station to Paswan Chowk	Railway Station to Dharhara Bridge
<b>Congested area</b>	Paswan Chowk to Subhas Chowk	Paswan Chowk to Subhas Chowk	Station Road to Ramna Maidan
<b>Across the city</b>	Subhas Chowk to Ramashish Chowk	Subhas Chowk to Ramashish Chowk	Ramna Maidan to Pakri Chowk
<b>Office complex</b>	Hotel Anamika	Hotel Anamika	Ara Station
<b>Shopping complex</b>	Hazipur Station	Hazipur Station	Hotel Park View,Ara

### November -

November	City 1-High Population	City 2-Medium Population	City 3-Low Population
<b>City Name</b>	Patna	Dhanbad	Jehanabad
<b>Date of Drive Test</b>	20 <sup>th</sup> November,2013	26 <sup>h</sup> November, 2013	22 <sup>nd</sup> November,2013

### Route Details-

Type of location	Patna	Dhanbad	Jehanabad

<b>Periphery of the city</b>	SAGUNA MORE –GANDHI MAIDAN	BANK MORE-JHARIYA	Arwal More to Gaya Road Railway Crossing
<b>Congested area</b>		ISM GATE-BANK MORE	Railway Station to Arwal More
<b>Across the city</b>	AGAM KUAN-SAGUNA MORE	RAILWAY STATION-STEEL GATE-BIG BAZAR	Railway Station to Bus Stand
<b>Office complex</b>	BISCOMAN	CITY CENTRE	Civil Court
<b>Shopping complex</b>	P&M MALL	BIG BAZAR	Railway Station

**December -**

November	City 1-High Population	City 2-Medium Population	City 3-Low Population
City Name	Muzaffarpur	Begusarai	Dumka
Date of Drive Test	23 <sup>rd</sup> December,2013	24 <sup>th</sup> December,2013	27 <sup>th</sup> December,2013

**Route Details-**

Type of location	Muzaffarpur	Begusarai	Dumka
Periphery of the city	Chotikalyani to aghoriya Bazar Via mithnpura	Kalimandir to Harhar Mahaddev Chowk	Kewatpara to Vaishno Mandir via krsihna agency
Congested area	Rly stn to Choti Klyani Vis saraiyaganj	Traffic Chowk to Kali mandir chowk	Vaishno Mandir to Tinbazar chowk via kumar para
Across the city	Ramdayalu to Rly stn via Kalam bag chowk	Harhar mahadev Chowk to Traffic Chwk	Police line to Tower Chowk Via Bus stand
Office complex	Rly.Stn.	Rly.Stn.	Vilkas Bhawan
Shopping complex	Hotel Park	V- Mart	V-Mart



4.1.1.1 HAJIPUR-OCTOBER- DRIVE TEST RESULTS

	B'mark	Aircel(DWL)		Airtel		BSNL		Idea		Reliance CDMA		Reliance GSM		TATA CDMA		TATA GSM		Uninor		Vodafone	
		In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor
Voice quality	≥ 95%	98.36%	95.73%	98.36%	95.73%	94.85%	94.87%	95.20%	96.29%	99.82%	99.84%	98.81%	97.41%	89.68%	89.84%	NA		98.40%	97.91%	99.25%	98.73%
CSSR	≥ 95%	100.00%	100.00%	100.00%	100.00%	98.35%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	98.16%	100.00%	100.00%			100.00%	99.35%	100.00%	100.00%
%age Blocked calls		0.00%	0.00%	0.00%	0.00%	1.65%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	1.83%	0.00%	0.00%			0.00%	0.65%	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%	0.93%	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%	100.00%	100.00%	100.00%	100.00%	99.95%	99.96%			100.00%	100.00%	100.00%	100.00%

4.1.1.2 ARRAH-OCTOBER- DRIVE TEST RESULTS

	B'mark	Aircel(DWL)		Airtel		BSNL		Idea		Reliance CDMA		Reliance GSM		TATA CDMA		TATA GSM		Uninor		Vodafone	
		In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor
Voice quality	≥ 95%	98.71%	95.80%	98.71%	95.79%	92.50%	91.67%	96.35%	96.44%	97.20%	99.53%	96.00%	98.00%	96.58%	96.50%	NA		98.90%	96.46%	98.41%	98.60%
CSSR	≥ 95%	100.00%	100.00%	100.00%	100.00%	100.00%	98.33%	100.00%	99.36%	100.00%	99.50%	97.41%	98.72%	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%	1.23%	0.00%	0.64%	0.00%	0.50%	2.59%	1.28%	0.00%	0.00%			0.00%	0.00%	0.00%	0.00%
Call drop rate	≤ 2%	0.00%	0.00%	0.00%	0.66%	0.00%	0.67%	0.00%	0.00%	0.00%	0.00%	0.00%	0.63%	0.00%	0.00%			0.00%	0.00%	0.00%	0.00%
Hands off success rate		100.00%	100.00%	100.00%	98.02%	100.00%	98.33%	100.00%	100.00%	100.00%	100.00%	100.00%	98.81%	0.00%	98.69%			100.00%	100.00%	100.00%	100.00%

### 4.1.1.3 JAMSHEDPUR-OCTOBER- DRIVE TEST RESULTS

	B'mark	AirceI(DWL)		Airtel		BSNL		Idea		Reliance CDMA		Reliance GSM		TATA CDMA		TATA GSM		Uninor		Vodafone	
		In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor
Voice quality	≥ 95%	99.07%	95.70%	99.07%	95.66%			96.17%	98.09%	97.88%	97.50%	97.56%	97.50%	96.29%	93.67%	NA		99.42%	96.40%	99.11%	97.63%
CSSR	≥ 95%	100.00%	100.00%	100.00%	100.00%			100.00%	100.00%	100.00%	100.00%	100.00%	98.82%	100.00%	100.00%			100.00%	100.00%	100.00%	100.00%
%age Blocked calls		0.00%	0.00%	0.00%	0.00%			0.00%	0.00%	0.00%	0.00%	0.00%	1.18%	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%	0.00%	0.00%
Hands off success rate		100.00%	100.00%	100.00%	100.00%			100.00%	100.00%	100.00%	98.34%	100.00%	98.70%	100.00%	100.00%			100.00%	100.00%	100.00%	100.00%

## Key Insights-October

### Hajipur

**Voice quality:** All the operators meet the benchmark set by TRAI except, BSNL and TATA CDM were not able to meet the benchmark on voice quality in both indoor and outdoor areas. The benchmark for voice quality is 95%.

**CSSR:** All the networks comfortably clear the benchmark with Reliance GSM posting the lowest score at 98.16% for the outdoor setting.

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

### Arrah

**Voice quality:** All the operators meet the benchmark set by TRAI except, BSNL were not able to meet the benchmark on voice quality in indoor and outdoor areas. The benchmark for voice quality is 95%.BSNL not meeting the benchmark in both indoor and outdoor areas.

**CSSR:** All the networks comfortably clear the benchmark.

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

### Jamshedpur

**Voice quality:** All the operators meet the benchmark set by TRAI except, TATA CDMA were not able to meet the benchmark on voice quality in indoor and outdoor areas. The benchmark for voice quality is 95%.TATA CDMA not meeting the benchmark in outdoor areas.

**CSSR:** All the networks comfortably clear the benchmark.

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

#### 4.1.1.4 PATNA-NOVEMBER- DRIVE TEST RESULTS

	B'mark	Aircel(DWL)		Airtel		BSNL		Idea		Reliance CDMA		Reliance GSM		TATA CDMA		TATA GSM		Uninor		Vodafone	
		In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor
Voice quality	≥ 95%	99.22%	97.47%	97.81%	96.78%	99.00%	94.17%	98.75%	91.68%	99.55%	99.39%	99.87%	98.62%	99.63%	99.28%	NA		99.16%	95.26%	99.26%	97.47%
CSSR	≥ 95%	100.00%	100.00%	100.00%	100.00%	100.00%	98.33%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%			100.00%	100.00%	100.00%	100.00%
%age Blocked calls		0.00%	0.00%	0.00%	0.00%	0.00%	1.67%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%			0.00%	0.00%	0.00%	0.00%
Call drop rate	≤ 2%	0.00%	0.00%	0.00%	0.00%	0.00%	1.00%	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%	99.17%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%			100.00%	100.00%	100.00%	100.00%

**4.1.1.5 DHANBAD-NOVEMBER- DRIVE TEST RESULTS**

	B'mark	Aircel(DWL)		Airtel		BSNL		Idea		Reliance CDMA		Reliance GSM		TATA CDMA		TATA GSM		Uninor		Vodafone	
		In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor
Voice quality	≥ 95%	99.54%	98.13%	99.51%	97.96%	96.13%	97.34%	97.87%	97.52%	95.50%	98.00%	95.01%	95.27%	99.90%	99.31%	NA		97.61%	96.35%	99.15%	98.71%
CSSR	≥ 95%	100.00%	100.00%	100.00%	100.00%	91.77%	98.03%	100.00%	100.00%	100.00%	100.00%	100.00%	99.40%	100.00%	100.00%			100.00%	100.00%	100.00%	100.00%
%age Blocked calls		0.00%	0.00%	0.00%	0.00%	8.23%	1.96%	0.00%	0.00%	0.00%	0.00%	0.00%	0.57%	0.00%	0.00%			0.00%	0.00%	0.00%	0.00%
Call drop rate	≤ 2%	0.00%	0.00%	0.00%	0.66%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.55%	0.00%	0.00%			0.00%	0.00%	0.00%	0.00%
Hands off success rate		100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%			100.00%	100.00%	100.00%	100.00%

**4.1.1.6 JEHANABAD -NOVEMBER- DRIVE TEST RESULTS**

	B'mark	Aircel(DWL)		Airtel		BSNL		Idea		Reliance CDMA		Reliance GSM		TATA CDMA		TATA GSM		Uninor		Vodafone	
		In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor
Voice quality	≥ 95%	98.44%	98.60%	99.04%	98.69%	99.00%	97.33%	97.58%	98.17%	97.27%	99.01%	99.50%	95.66%	99.67%	99.93%	NA		96.05%	96.13%	99.42%	99.17%
CSSR	≥ 95%	100.00%	100.00%	100.00%	100.00%	100.00%	98.67%	100.00%	99.34%	100.00%	96.67%	100.00%	99.44%	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%	1.33%	0.00%	0.66%	0.00%	0.00%	0.00%	0.55%	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%	1.04%	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%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%			100.00%	100.00%	100.00%	100.00%

## Key Insights- November

### Patna

**Voice quality:** All the operators meet the benchmark set by TRAI except BSNL and Idea were not able to meet the benchmark on voice quality in outdoor areas. The benchmark for voice quality is 95%.

**CSSR:** All the networks comfortably clear the benchmark.

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

### Dhanbad

**Voice quality:** All the operators meet the benchmark set by TRAI. The benchmark for voice quality is 95%.

**CSSR:** All the networks comfortably clear the benchmark except BSNL not meeting the benchmark which is recorded 91.77% for the indoor setting.

**Call drop rate:** All the networks comfortably clear the benchmarks

### Jehanabad

**Voice quality:** All the operators meet the benchmark set by TRAI. The benchmark for voice quality is 95%.

**CSSR:** All the networks comfortably clear the benchmark.

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

#### 4.1.1.7 MUZZAFARPUR - DECEMBER- DRIVE TEST RESULTS

	B'mark	Aircel(DWL)		Airtel		BSNL		Idea		Reliance CDMA		Reliance GSM		TATA CDMA		TATA GSM		Uninor		Vodafone	
		In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor
Voice quality	≥ 95%	98.96%	98.24%	99.43%	98.16%	88.50%	92.66%	92.29%	91.87%	98.98%	98.99%	99.32%	96.98%	99.98%	98.75%	NA	95.86%	95.74%	97.95%	98.26%	
CSSR	≥ 95%	100.00%	100.00%	100.00%	99.35%	83.00%	90.33%	100.00%	98.70%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%		100.00%	100.00%	100.00%	100.00%	100.00%
%age Blocked calls		0.00%	0.00%	0.00%	0.00%	34.00%	9.66%	0.00%	1.29%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%		0.00%	0.00%	0.00%	0.00%	0.00%
Call drop rate	≤ 2%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%		0.00%	0.00%	0.00%	0.00%	0.00%
Hands off success rate		100.00%	100.00%	100.00%	100.00%	97.00%	99.30%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%		100.00%	100.00%	100.00%	100.00%	100.00%

4.1.1.8 BEGUSARAI - DECEMBER- DRIVE TEST RESULTS

	B'mark	Aircel(DWL)		Airtel		BSNL		Idea		Reliance CDMA		Reliance GSM		TATA CDMA		TATA GSM		Uninor		Vodafone	
		In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor
Voice quality	≥ 95%	99.22%	98.20%	99.11%	97.33%	88.50%	93.00%	98.34%	97.55%	99.57%	98.06%	100.00%	97.10%	99.83%	99.97%	NA	99.36%	96.07%	99.00%	97.50%	
CSSR	≥ 95%	100.00%	100.00%	100.00%	98.05%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%		100.00%	100.00%	100.00%	100.00%	100.00%
%age Blocked calls		0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%		0.00%	0.00%	0.00%	0.00%	0.00%
Call drop rate	≤ 2%	0.00%	0.00%	0.00%	0.66%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%		0.00%	0.00%	0.00%	0.00%	0.00%
Hands off success rate		100.00%	100.00%	97.61%	98.02%	100.00%	99.30%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%		100.00%	100.00%	100.00%	100.00%	100.00%

#### 4.1.1.9 DUMKA- DECEMBER- DRIVE TEST RESULTS

	B'mark	Aircel(DWL)		Airtel		BSNL		Idea		Reliance CDMA		Reliance GSM		TATA CDMA		TATA GSM		Uninor		Vodafone	
		In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor
Voice quality	≥ 95%	99.54%	98.21%	99.54%	99.19%	97.15%	93.16%	99.11%	98.70%	97.64%	99.52%	97.82%	96.72%	NA	NA	98.93%	96.79%	98.70%	98.37%		
CSSR	≥ 95%	100.00%	100.00%	100.00%	98.90%	100.00%	92.17%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%			100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
%age Blocked calls		0.00%	0.00%	0.00%	0.00%	0.00%	7.83%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%			0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Call drop rate	≤ 2%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%			0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Hands off success rate		100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%			100.00%	100.00%	100.00%	100.00%	100.00%	100.00%

### Key Insights- December

#### Muzzafarpur

**Voice quality:** All the operators meet the benchmark set by TRAI except BSNL and Idea were not able to meet the benchmark on voice quality in indoor and outdoor areas. The benchmark for voice quality is 95%. BSNL and Idea not meeting the benchmark in both indoor and outdoor areas.

**CSSR:** All the networks comfortably clear the benchmark except BSNL not meeting the benchmark in both indoor and outdoor areas.

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

#### BEGUSARAI

**Voice quality:** All the operators meet the benchmark set by TRAI except BSNL was not able to meet the benchmark on voice quality in indoor and outdoor areas. The benchmark for voice quality is 95%.

**CSSR:** All the networks comfortably clear the benchmark.

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

## DUMKA

**Voice quality:** All the operators meet the benchmark set by TRAI except BSNL were not able to meet the benchmark on voice quality in outdoor areas. The benchmark for voice quality is 95%.BSNL not meeting the benchmark in outdoor areas.

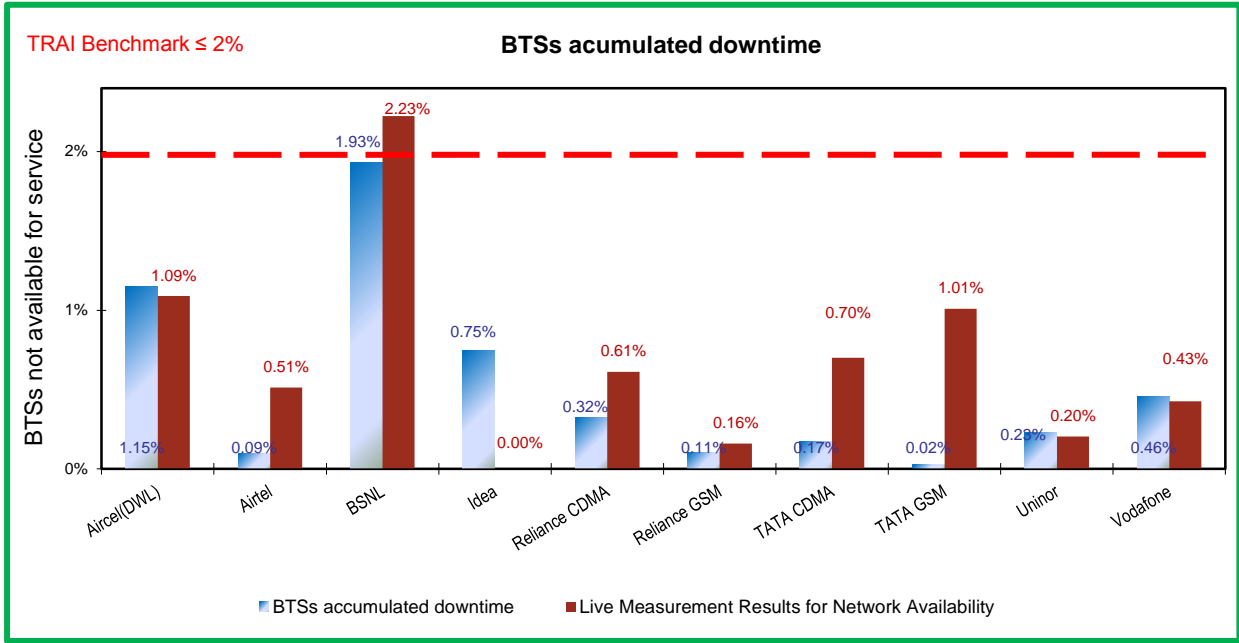
**CSSR:** All the networks comfortably clear the benchmark except BSNL not meeting the benchmark in both outdoor areas.

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



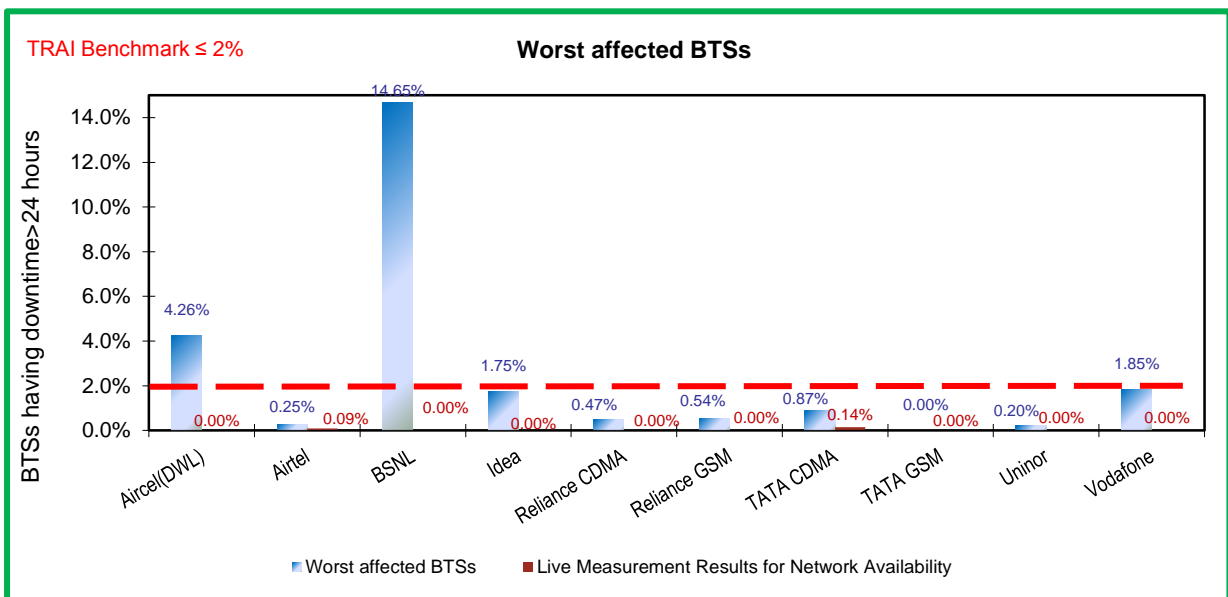
## 5 DETAILED FINDINGS - COMPARISON BETWEEN PMR DATA, 3 DAY LVE DATA AND LIVE CALLING DATA

### 5.1 BTS ACCUMULATED DOWNTIME



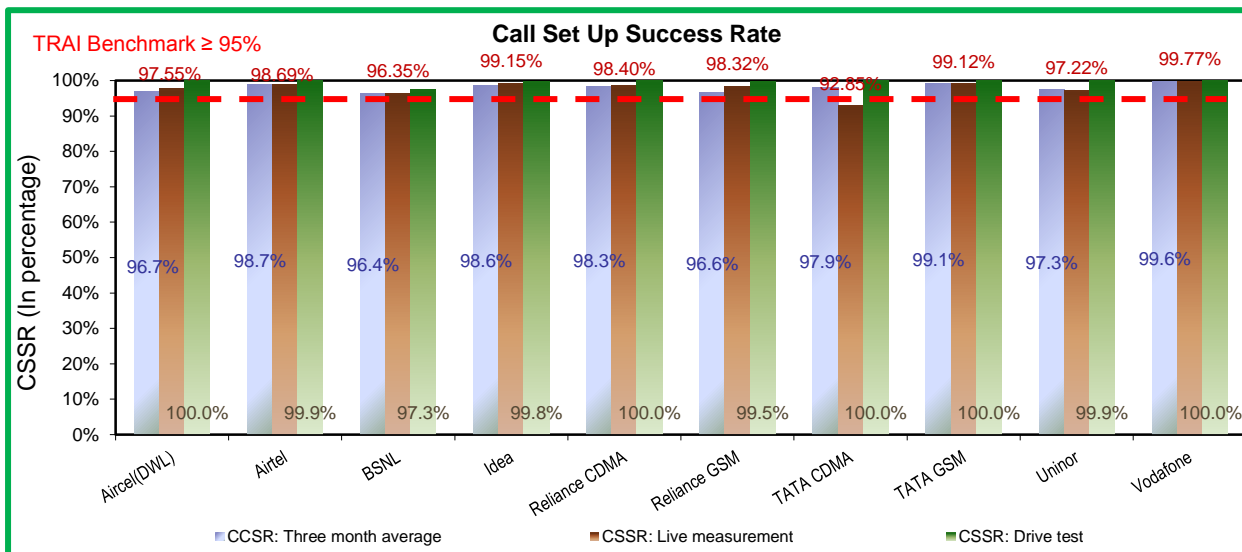
Only BSNL is not able to meet the benchmark on aspect of BTS live measurement.

### 5.2 WORST AFFECTED BTS DUE TO DOWNTIME



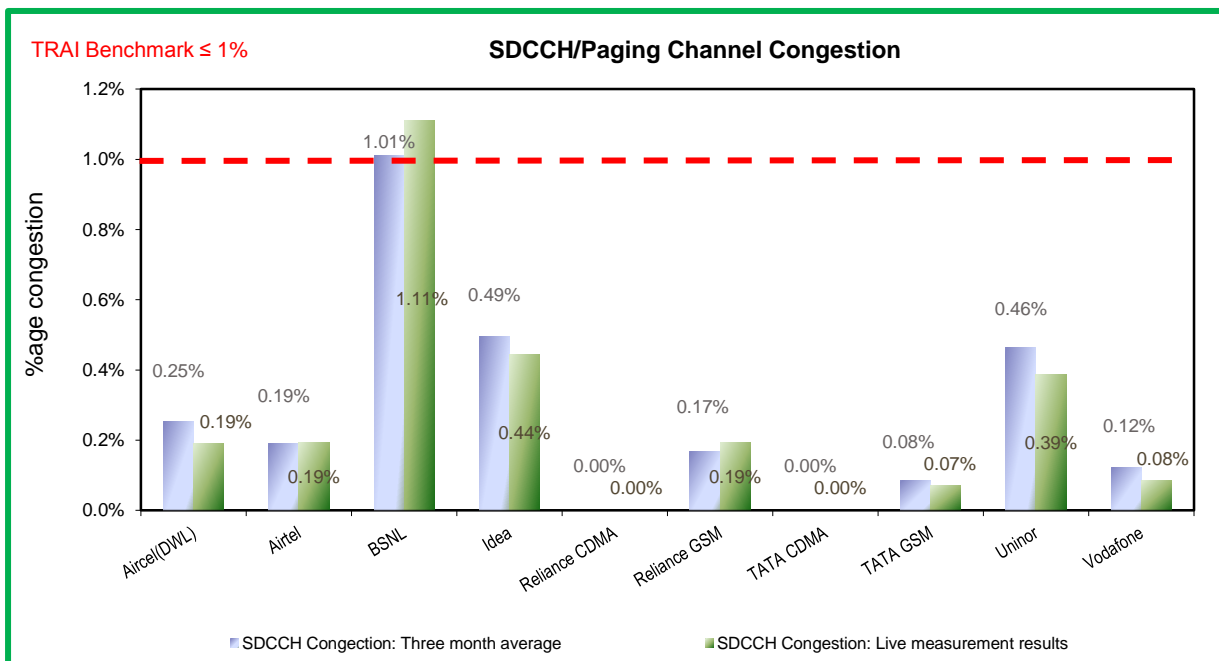
All operators meet the benchmark except Aircel & BSNL.

### 5.3 CALL SETUP SUCCESS RATE



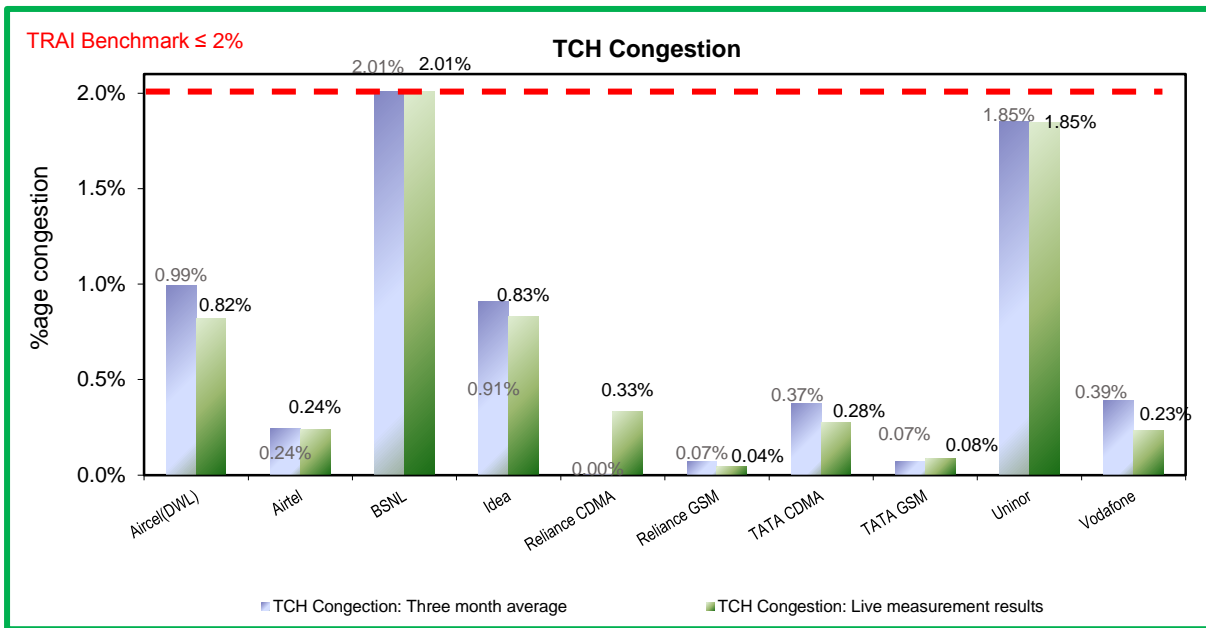
All operators meet the benchmark.

### 5.4 SDCCH/PAGING CHANNEL CONGESTION



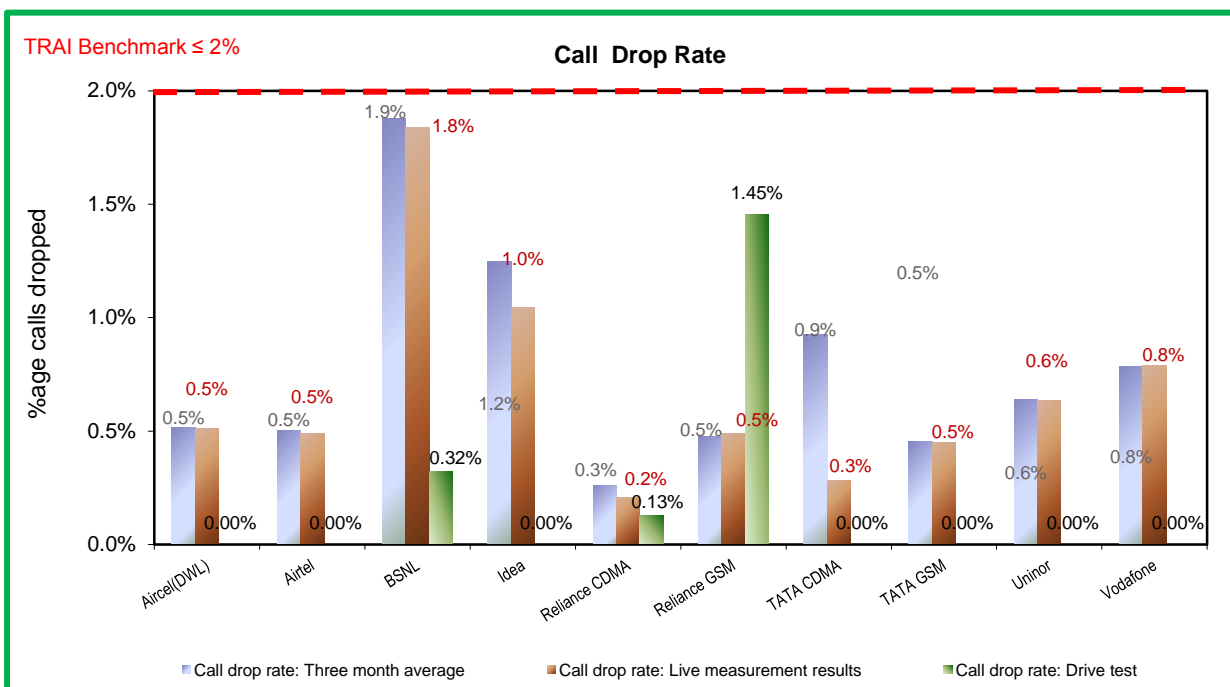
All operators meet the SDCCH/Paging Channel Congestion benchmark except BSNL which narrowly misses the benchmark both for three month and live measurement.

### 5.5 TCH CONGESTION



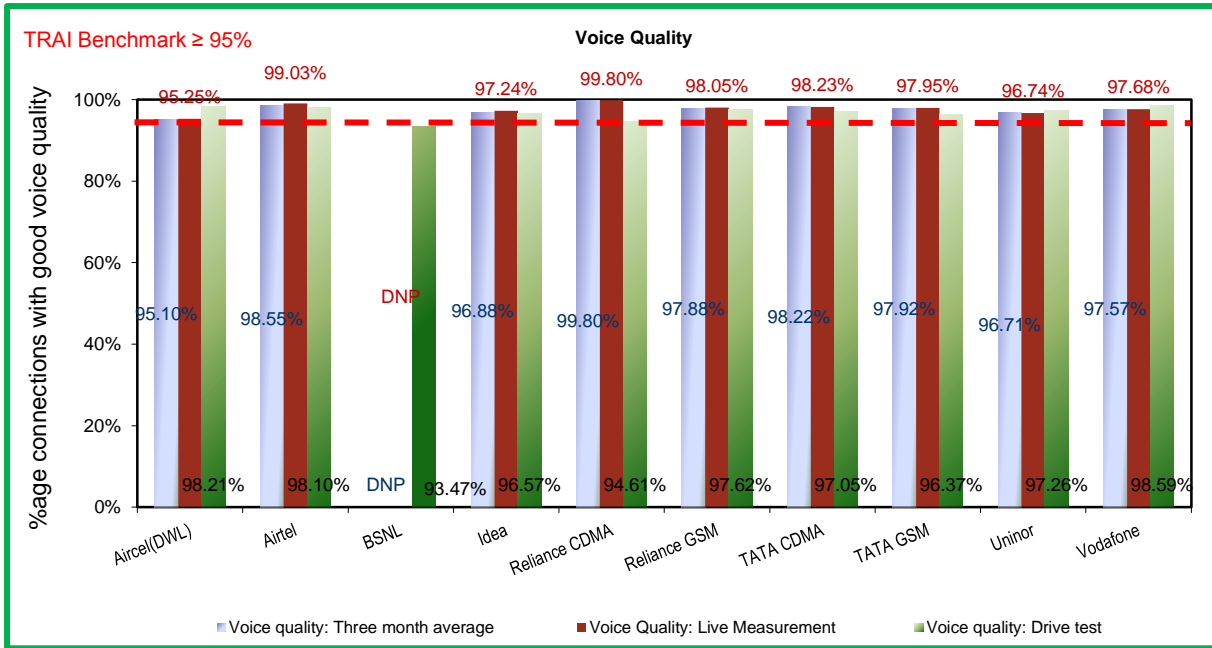
All operators meet the TCH Congestion benchmark except BSNL which very narrowly misses it.

### 5.6 CALL DROP RATE



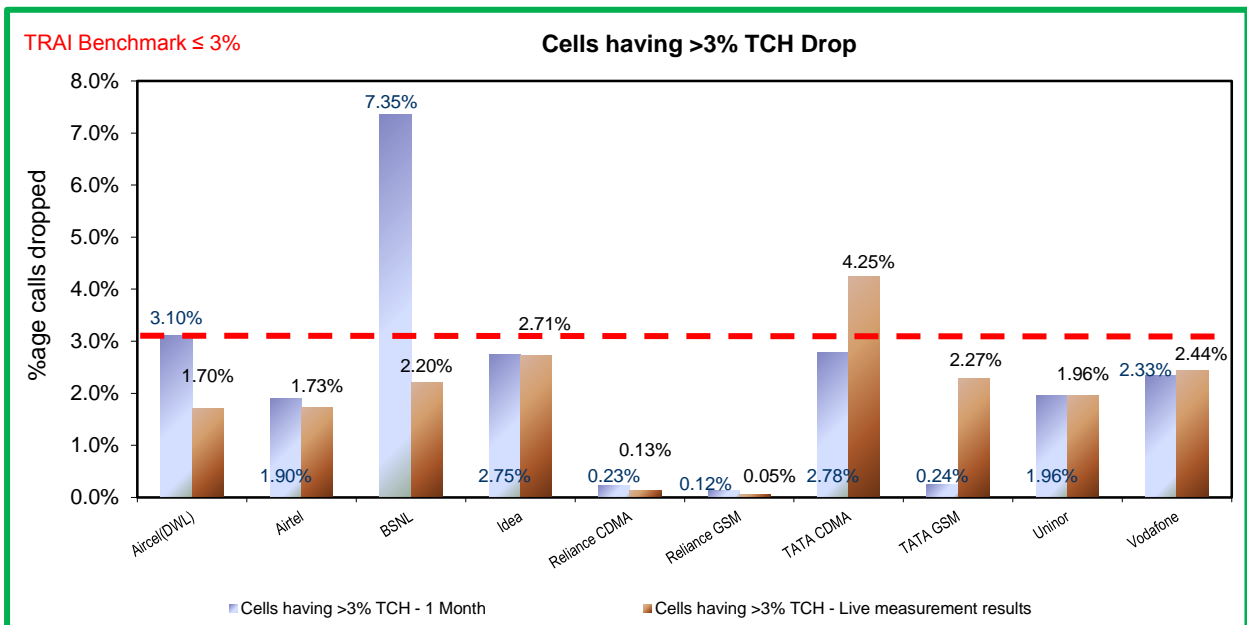
All operators meet the benchmark and BSNL has the highest call drop rate vis-à-vis other operators.

### 5.7 VOICE QUALITY



In Drive test only BSNL is unable to meet the voice quality benchmark.

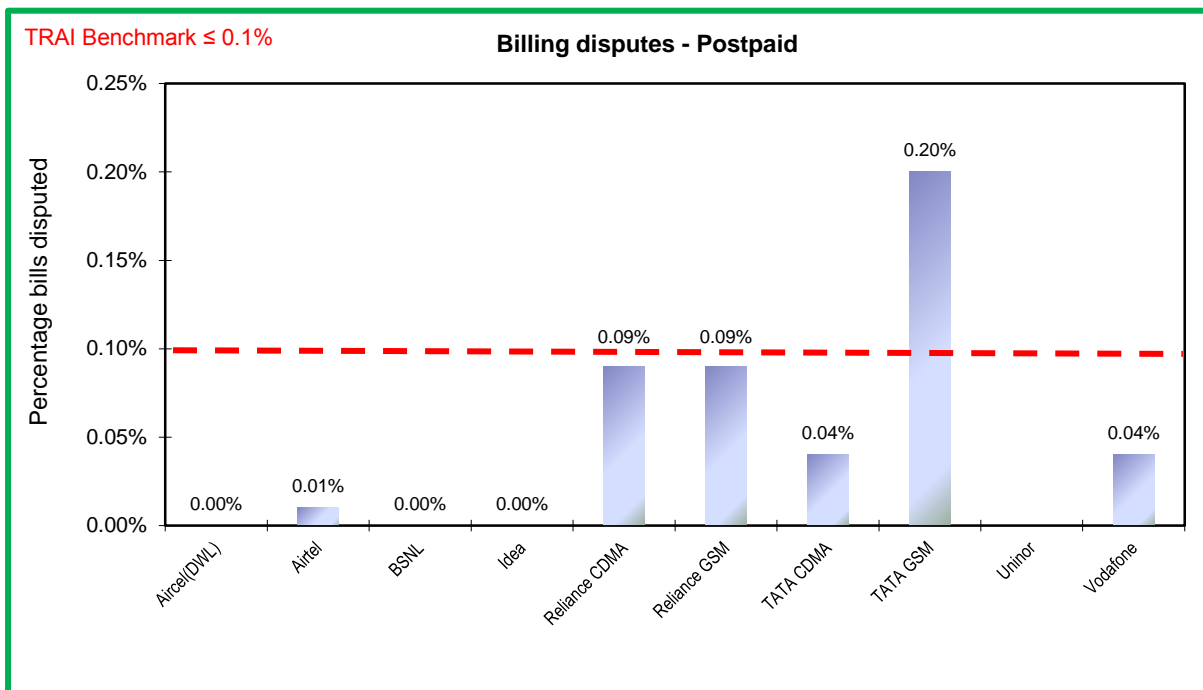
### 5.8 CELLS HAVING >3% TCH DROP



Aircel, BSNL, and Tata CDMA do not meet the cells having >3% TCH drop benchmark.

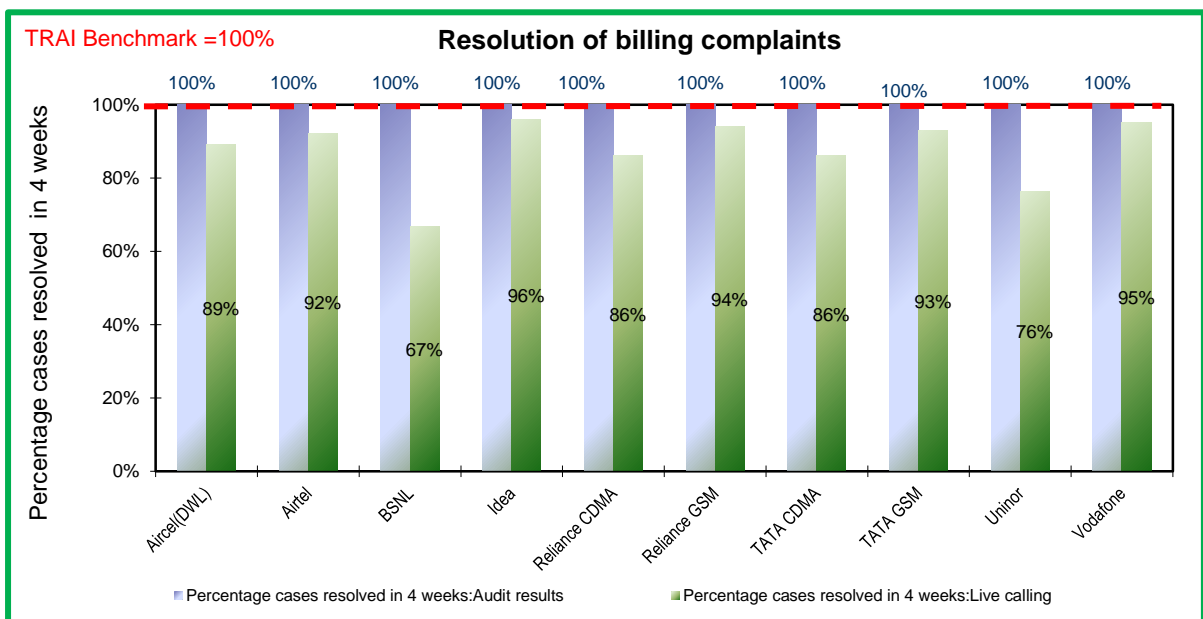
## 6 DETAILED FINDINGS – NON NETWORK PARAMETERS

### 6.1 BILLING DISPUTES-POSTPAID



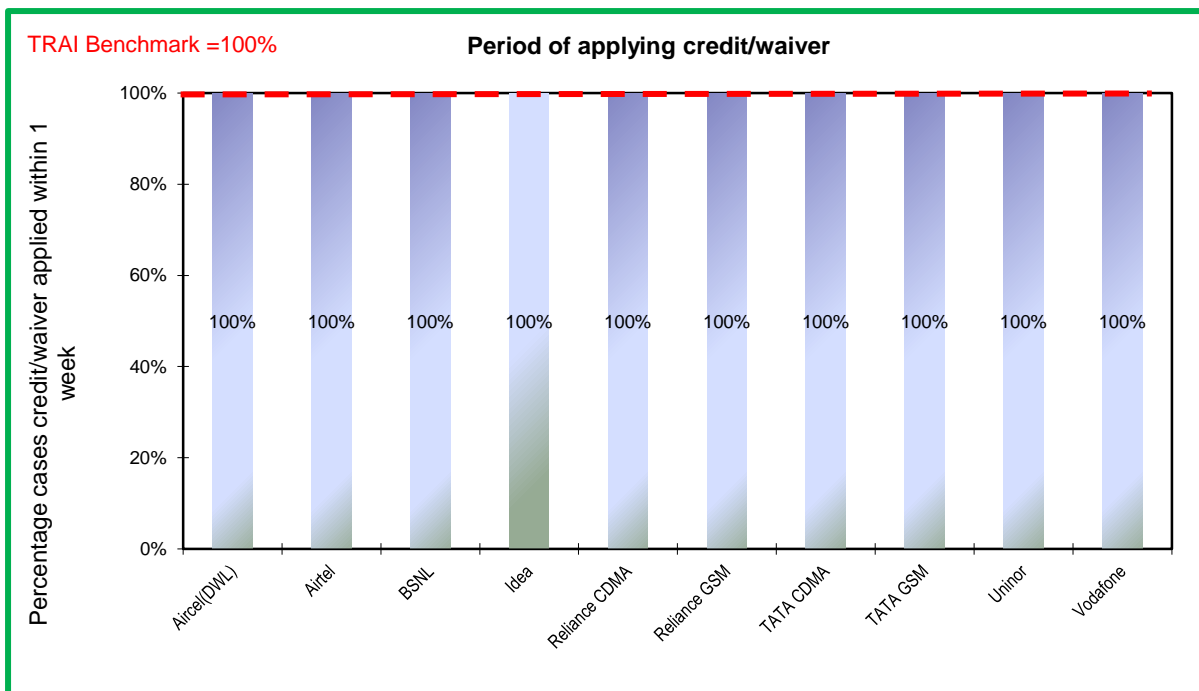
All operators meet the benchmark except Tata GSM.

### 6.2 RESOLUTION OF BILLING COMPLAINTS



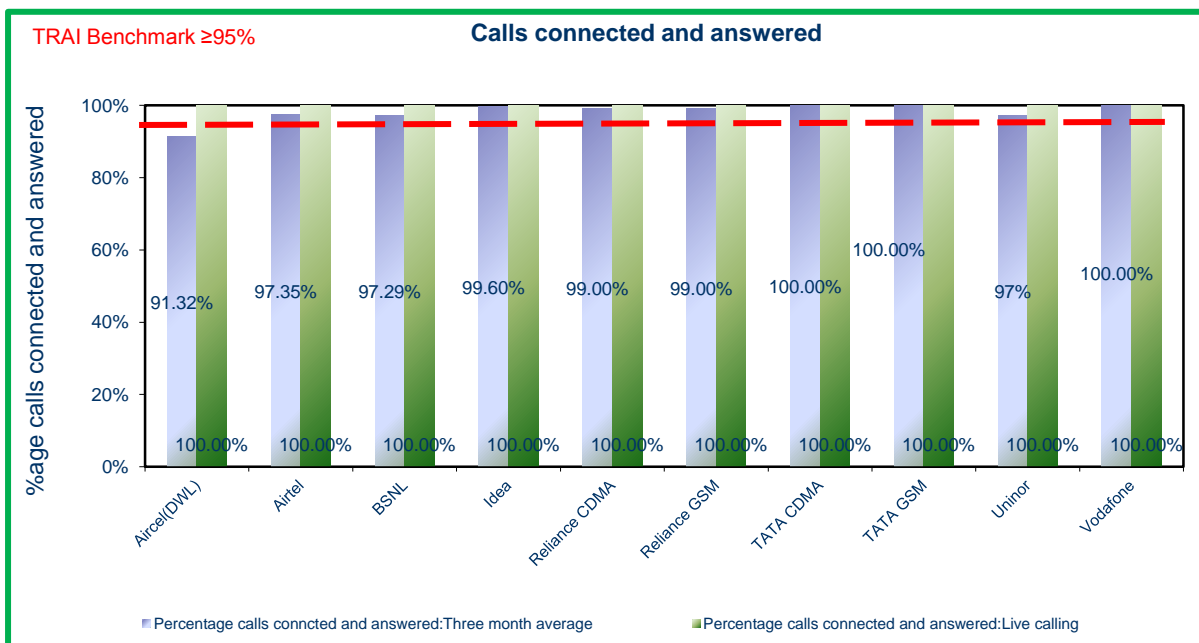
In live calling none of the operator is able to meet the benchmark for resolution of billing complaints. With BSNL performing the poorest

### 6.3 PERIOD OF APPLYING CREDIT/WAVIER



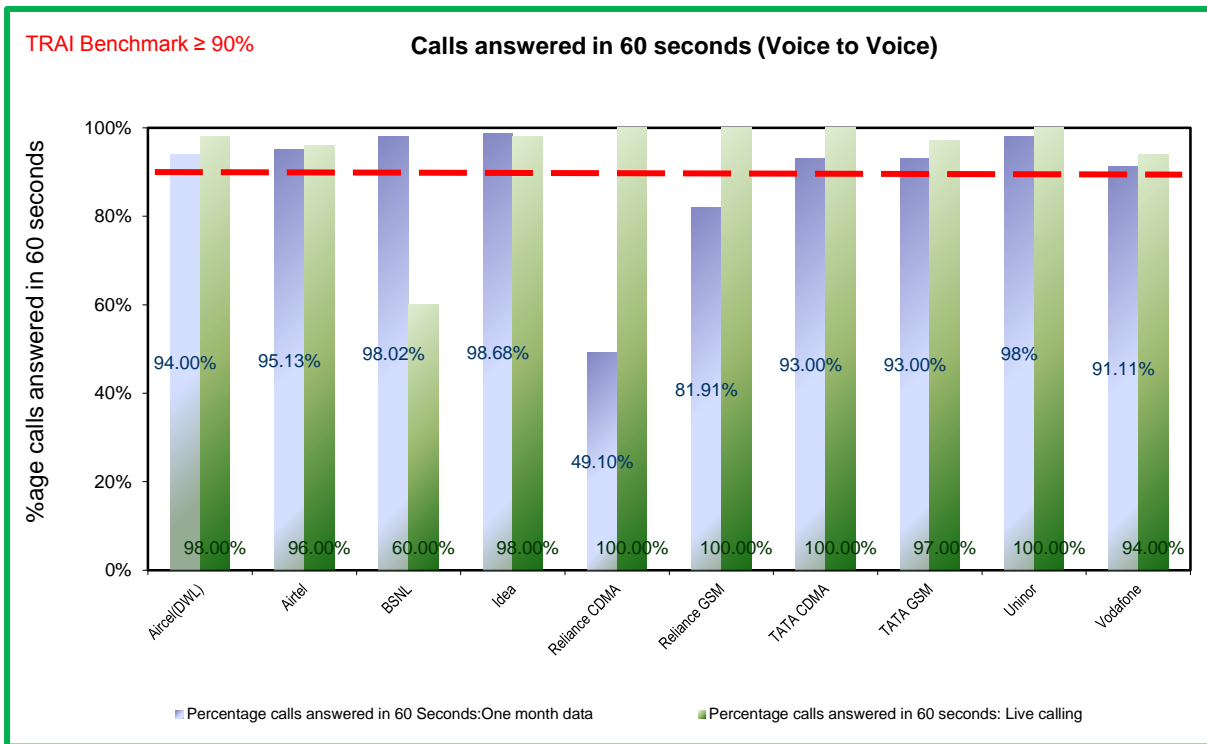
All operators meet the benchmark.

### 6.4 CALL CENTRE PERFORMANCE-IVR



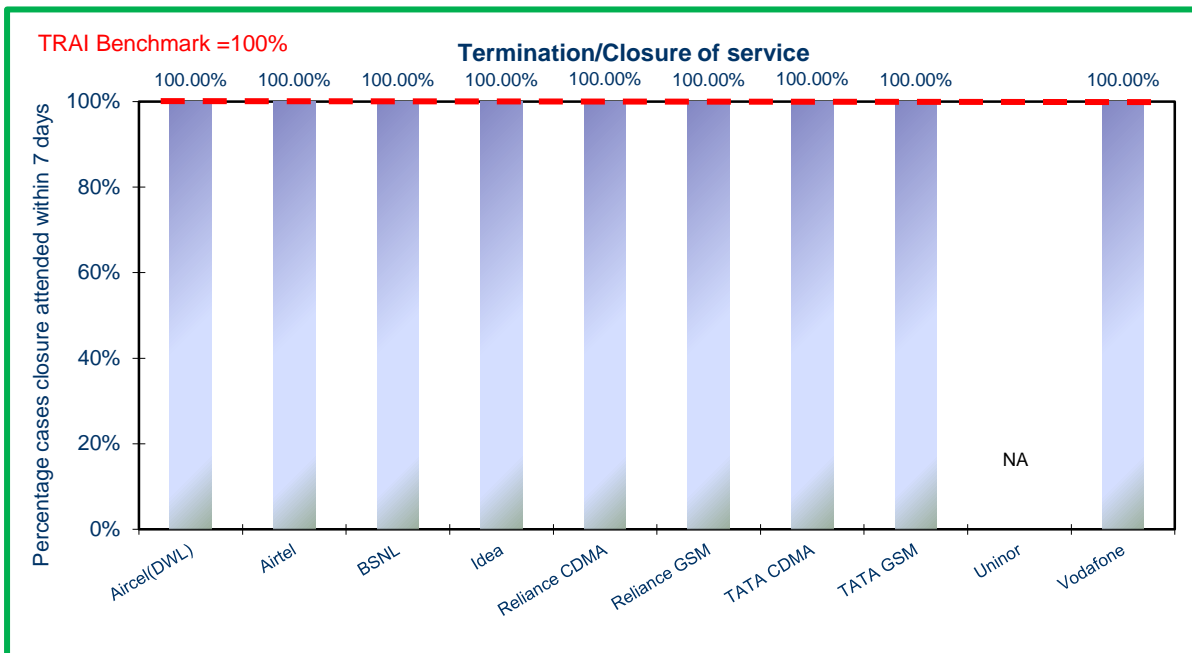
All operators meet the benchmark except Aircel for three month Audit data.

### 6.5 CALL CENTRE PERFORMANCE-VOICE TO VOICE



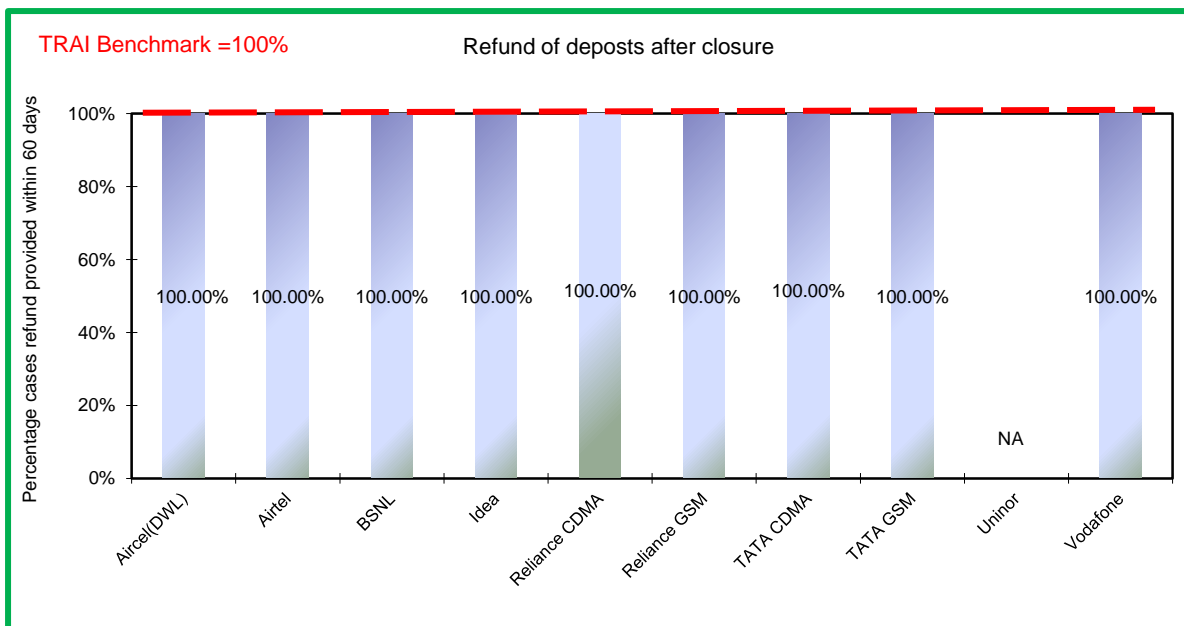
Reliance CDMA has performed the poorest when it comes to answering the calls through IVR for three month data.

### 6.6 TERMINATION/CLOSURE OF SERVICE



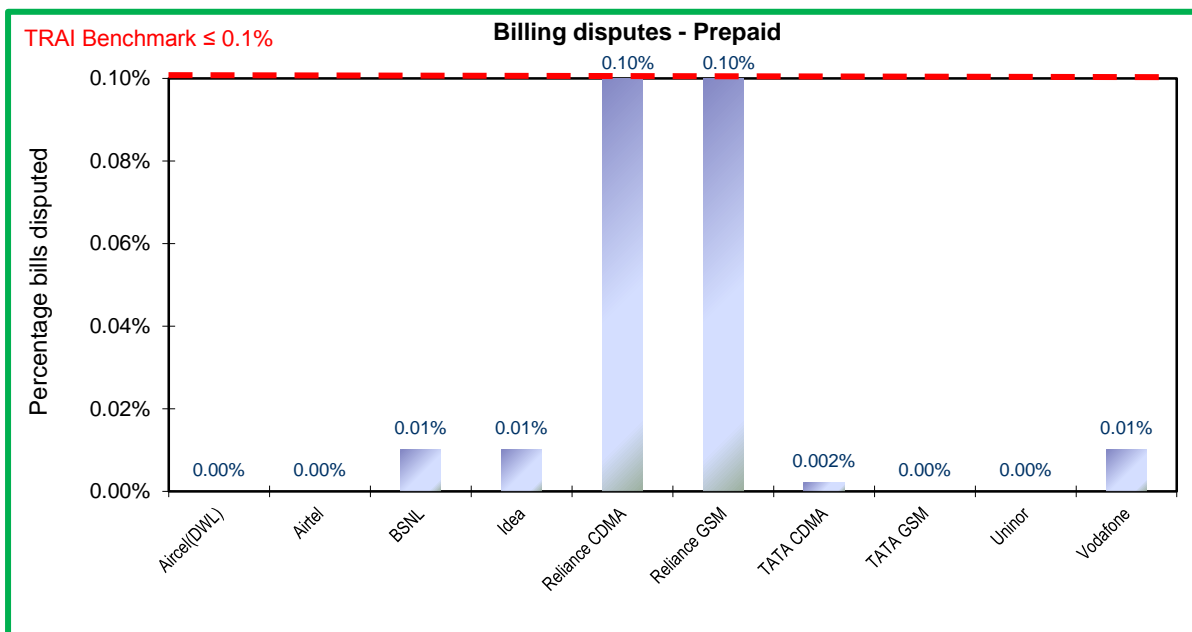
All operators meet the benchmark.

### 6.7 REFUND OF DEPOSITS AFTER CLOSURE



All operators meet the benchmark.

### 6.8 BILLING COMPLAINTS - PREPAID



All operators meet the benchmark; Both Reliance CDMA & GSM have the highest percentage of billing disputes.



## 7 ANNEXURE

### 7.1 BILLING

#### Audit Results for Billing performance

Billing Performance	Benchmark	Aircel(DWL)	Airtel	BSNL	Idea	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Uninor	Vodafone
<b>Billing disputes - Postpaid</b>											
Total bills generated during the period		1870	132708	72214	17559	75968	30482	29830	6952	NA	29547
Total number of bills disputed		0	8	0	0	72	28	13	14		12
Percentage bills disputed	≤ 0.1%	0.00%	0.01%	0.00%	0.00%	0.09%	0.09%	0.04%	0.20%		0.04%
<b>Billing disputes - Prepaid</b>											
Number of complaints related to charging, credit & validity		7	794	102	860	2615	6082	22	119	0	717
Total number of prepaid customers in that period		4769018	20877362	2013313	6238030	2640938	6094095	1066809	2740400	154	6958256
Percentage of complaints	≤ 0.1%	0.00%	0.00%	0.01%	0.01%	0.10%	0.10%	0.00%	0.00%	0.00%	0.01%
<b>Resolution of billing complaints</b>											
Total number of billing/charging complaints		7	802	100	2140	2687	6110	35	133	154	729
Total complaints considered invalid		14053	6673	102	1280	0	0	0	130	0	0
Number of complaints resolved in 4 weeks from date of receipt for complaints listed in 5.3.1		7	7475	0		2687	6110	35	0	154	729
Percentage complaints resolved within 4 weeks of date of receipt	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
<b>Period of applying credit / waiver</b>											

Total number of complaints where credit/waiver is required		7	802	102	860	2687	6110	0	0	154	729
Percentage cases in which credit/waiver was received within 1 week	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%

## Live calling results for resolution of billing complaints

Resolution of billing complaints	Benchmark	Aircel(DWL)	Airtel	BSNL	Idea	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Uninor	Vodafone
Total Number of calls made		100	100	60	100	100	100	100	100	21	100
Number of cases resolved in 4 weeks		89	92	40	96	86	94	86	93	16	95
Percentage cases resolved in four weeks	100%	89%	92%	67%	96%	86%	94%	86%	93%	76%	95%

## 7.2 CUSTOMER CARE

## Audit results for customer care (IVR and voice-to-Voice)

Customer Care Assessment	Benchmark	Aircel(DWL)	Airtel	BSNL	Idea	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Uninor	Vodafone
Total number of call attempts to customer care for assistance		7860290	2441957	6230634	394762	4752620	4752620	66464	284150	6230634	7054559
Number of calls getting connected and answered (electronically)		7178280	2377248	6061614	393179	4705309	4705309	66464	284150	6061614	7054559
Percentage calls getting connected and answered	≥ 95%	91.32%	97.35%	97.29%	99.60%	99.00%	99.00%	100.00%	100.00%	97%	100.00%
Number of calls getting transferred to the operator (voice to voice)		1793120	5215273	1514507	2715532	NA	NA	61996	282929	1514507	2576882
Number of calls answered by operator (voice to voice) within 60 seconds		1685533	4961435	1484506	2679659	NA	NA	57656	263124	1484506	2347748

Percentage calls answered within 60 seconds (V2V)	≥ 90%	94.00%	95.13%	98.02%	98.68%	49.10%	81.91%	93.00%	93.00%	98%	91.11%
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## Live calling results for customer care (IVR)

Customer Care Assessment	Benchmark	Aircel(DWL)	Airtel	BSNL	Idea	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Uninor	Vodafone
Total Number of calls received		100	100	100	100	100	100	100	100	100	100
Total Number of calls getting connected and answered		100	100	100	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%	100.00%	100.00%	100.00%

## Live calling results for customer care (Voice to Voice)

Customer Care Assessment	Benchmark	Aircel(DWL)	Airtel	BSNL	Idea	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Uninor	Vodafone
Total Number of calls received		100	100	100	100	100	100	100	100	100	100
Total Number of calls answered within 60 seconds		98	96	60	98	100	100	100	97	100	94
Percentage calls answered within 60 seconds	≥ 90%	98.00%	96.00%	60.00%	98.00%	100.00%	100.00%	100.00%	97.00%	100.00%	94.00%

## Live calling for level 1 services

Level 1 services		Aircel(DWL)	Airtel	BSNL	Idea	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Uninor	Vodafone
Total no. of calls made		150	150	150	150	150	150	150	150	150	150
Calls answered in 60 sec		127	135	128	133	132	135	136	135	111	135
Percentage of calls answered in 60 seconds		85%	90%	85%	89%	88%	90%	91%	90%	74%	90%

## Live calling results for resolution of service requests

Resolution of service requests	Benchmark	Aircel(DWL)	Airtel	BSNL	Idea	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Uninor	Vodafone
Total Number of calls made		100	100	83	100	100	100	100	100	Data not shared	100
Number of cases resolved to satisfaction		81	68	63	84	95	89	91	87		91
Percentage cases resolved in four weeks		81%	68%	76%	84%	95%	89%	91%	87%		91%

## 7.3 TERMINATION/CLOSURE OF SERVICE

## Audit results for termination / closure of service

Termination	Benchmark	Aircel(DWL)	Airtel	BSNL	Idea	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Uninor	Vodafone
Total number of closure request		7	366	3	79	106	172	337	73	NA	220
Number of requests attended within 7 days		7	366	3	79	106	172	337	73		220
Percentage cases in which termination done within 7 days	100%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%		100.00%

## 7.4 REFUND

### Audit results for refund of deposits

Refund	Benchmark	Aircel(DWL)	Airtel	BSNL	Idea	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Uninor	Vodafone
Total number of cases requiring refund of deposits		20	25	0	29	0	0	14	17	NA	74
Total number of cases where refund was made within 60 days		20	25	0	29	0	0	14	17		74
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%	100.00%		100.00%

## 7.5 ADDITIONAL NETWORK RELATED PARAMETRS

### Audit Results for POI Congestion

POI congestion	Benchmark	Aircel(DWL)	Airtel	BSNL	Idea	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Uninor	Vodafone
Total number of working POIs		51.0	742.0	328.0	76.0	0.0	0.0	205.0	NA	53.0	58.0
No. of POIs not meeting benchmark		0.0	0.0	0.0	0.0	0.0	0.0	0.0	NA	0.0	0.0
Total Capacity of all POIs (A) - in erlangs		52030.8	585190.4	NA	196896.0	0.0	0.0	77208.1	292910.5	48963.7	227391.9
Traffic served for all POIs (B)- in erlangs		88004.0	343056.7	2455853.5	103791.7	0.0	0.0	25047.9	118596.3	34054.9	118653.5
POI congestion	≤ 0.5%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	16.63%

### Live Measurement Results for POI Congestion

POI congestion	Benchmark	Aircel(DWL)	Airtel	BSNL	Idea	Reliance CDMA	Reliance GSM	TATA CDMA	TATA GSM	Uninor	Vodafone
Total number of working POIs		51.0	370.5	334.0	76.0	0.0	0.0	206.3	19.0	52.7	58.0

No. of POIs not meeting benchmark		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Capacity of all POIs (A) - in erlangs		51686.9	293144.0	NA	196781.0	0.0	0.0	77208.2	31127.6	49273.4	227900.3
Traffic served for all POIs (B)- in erlangs		87899.3	174641.9	199580.0	99509.3	0.0	0.0	25127.6	11101.0	34695.9	113270.1
POI congestion	≤ 0.5%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%



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