# Objective Assessment of Quality of Services for (QoS) for Cellular Mobile (Wireless) Service Providers
## West Bengal Circle

# Report: April – May - June, 2012

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A specialist unit of IMRB International

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# Preface

TRAI, the regulatory watch dog for the Quality of Service for the telecom services – Basic (Wireline), Cellular Mobile (Wireless) and Broadband has commissioned this study with the objective of measuring Quality of Services under the parameters as per the published notifications.

The Audit module would assess the Quality of Service of telecom operators Basic (Wireline), Cellular Mobile (Wireless) and Broadband services) by auditing the service level records maintained by the operators, conducting drive tests as well as live measurements and comparing them with quality of service benchmarks stipulated by TRAI.

The Audit module for various circles within the Zones, due the sheer scale of data collection, has been distributed across various quarterly periods. IMRB International Auditors carried out Audits across Orissa, Bihar & Jharkhand, West Bengal, North-East, Assam and Kolkata circles in the second quarter of 2012. **This report details the performance of various service providers in West Bengal circle against Quality of Services benchmarks for various parameters laid down by TRAI in respective regulations for Cellular (Mobile) services.**

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# 1.0 Background

The Telecom Regulatory Authority of India (TRAI) has a critical mandate to protect the interest of telecom consumers in addition to various other functions bestowed upon it. As part of the license conditions to telecom operators, it has the power and authority to measure the Quality of Service provided by various govt. (BSNL & MTNL) and private telecom operators. The parameters that need to be measured for Basic (Wireline) and Cellular Mobile (Wireless) services have been specified in the TRAI notification on Quality of Services of Basic (Wireline) and Cellular Mobile (Wireless) services dated 20th March, 2009. The parameters for Broadband Service have been specified in the TRAI notification for Quality of Services of Broadband Service Regulation, 2006

**Audit module:** To assess the quality of service of telecom operators Basic (Wireline), Cellular Mobile (Wireless) and Broadband services by auditing the service level records maintained by the operators, conducting drive tests as well as live measurements and comparing them with quality of service benchmarks stipulated by TRAI

This report highlights the findings for the Audit module for West Bengal circle that was covered in period of April - June 2012. The verification of records maintained by various operators of Cellular Mobile (Wireless) service was undertaken by the auditors of IMRB International during the period April - June 2012.

*This report highlights the Audit Module findings for "West Bengal" circle for Cellular Mobile services*

## 2.0 Objectives and Methodology

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). Following are the key activities undertaken by Auditors during the Audit process conducted at the operator's premises

*All Network related and Non network related parameters notified by TRAI in various regulations were Audited*

1.  **Verification of the data submitted by service providers:** This involved verification of the quarterly Performance Monitoring Reports (PMR's) and monthly Point of Interconnect (POI) Congestion reports being submitted by various service providers. The raw data in the records maintained by service providers was audited to assess the book keeping methodology.

2.  **Live measurement for three days:** Network performance of service providers was assessed for three days in the month in which the Audit was carried out. Live figures from the server/ NMS software were recorded for various network related parameters.

3.  **Data verification for the month in which Audits were carried out:** Subsequent to the visits for Audit during the live measurement at various Exchanges/ISP Nodes/Exchanges, data for all the network and Non network related parameters was collected from various service providers for the complete month in which the Audit was carried out. Raw data/records pertaining to these were also verified on sample basis to check the veracity of data provided by the operators.

4.  **Drive tests:** Operator assisted drive test were conducted in three cities as per the norms stated in the tender.

5.  **Live calling:** Live testing was done on a sample basis to check efficiency of various parameters

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- Any changes or discrepancies found in the methodology were reported to the service providers and changes were suggested by IMRB Auditors.
- PMR verification was done as per the new parameters being reported to TRAI by all operators.
- Live measurement and 1 month data collection was done as per the new regulations published by TRAI on 20th March, 2009.

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# 3.0 Sampling methodology

### 3.1 Sampling for Cellular Mobile (Wireless) service providers

Data pertaining to 100% of the Gateway MSC's (GMSC's) and Mobile Switching Centres (MSC's) of all the Cellular Mobile Service Providers or Unified Access Service Providers (UASP) was collected and verified in specified circles/service areas. Following are the various operators covered in West Bengal circle

|  | Name of Operator | Month of Audit |
|---|---|---|
| Operator 1 | Idea | May, 2012 |
| Operator 2 | BSNL | May, 2012 |
| Operator 3 | Reliance CDMA | May, 2012 |
| Operator 4 | Reliance GSM | May, 2012 |
| Operator 5 | MTS | May, 2012 |
| Operator 6 | Airtel | May, 2012 |
| Operator 7 | Videocon | May, 2012 |
| Operator 8 | Uninor | May, 2012 |
| Operator 9 | Vodafone | May, 2012 |
| Operator 10 | Tata Tele - CDMA | May, 2012 |
| Operator 11 | Tata Tele - GSM | May, 2012 |
| Operator 12 | Aircel | May, 2012 |

## 4.0 Audit methodology

### 4.1 Cellular Mobile Services

In a nutshell the following activities were done while auditing for various parameters for Cellular Mobile Services:

| S.no | Parameter | AS REPORTED IN PMR | AS FOUND IN ACTUAL RECORDS AFTER VERIFICATION | AS FOUND IN VERIFICATION FOR THE MONTH OF AUDIT | AS FOUND IN 3 DAY LIVE MEASUREMENT DATA | LIVE CALLING | OPERATOR ASSISSTED DRIVE TESTS | INDEPENDENT DRIVE TESTS |
|------|-----------|--------------------|------------------|------------------|------------------|------------------|------------------|------------------|
| A | **Network Performance** | | | | | | | |
| A (i) | BTS accumulated down time | Yes | Yes | Yes | | | | |
| A (ii) | Call setup success rate (within licensee own network) | Yes | Yes | Yes | Yes | | Yes | Yes |
| A (iii) | Blocked Call Rate | Yes | Yes | Yes | Yes | | Yes | Yes |
| A (iv) | Call Drop rate | Yes | Yes | Yes | Yes | | Yes | Yes |
| A (v) | % Connections with good voice quality | Yes | Yes | Yes | | | Yes | Yes |
| A (vi) | Service Coverage | Yes | Yes | Yes | | | Yes | Yes |
| A (vii) | PoI Congestion | Yes | Yes | Yes | | | | |
| B | **Customer Helpline** | | | | | | | |
| B (i) | Response time to the customer for assistance | Yes | Yes | Yes | | Yes | | |
| C | **Billing Complaints** | | | | | | | |
| C (i) | Billing complaints per 100 bills issued | Yes | Yes | Yes | | | | |
| C (ii) | %age of billing complaints resolved within 4 weeks | Yes | Yes | Yes | | Yes | | |
| C (iii) | Period of all refunds/payments due to customers from date of resolution as in (ii) above | Yes | Yes | Yes | | Yes | | |

## 5.0 Executive Summary

The objective assessment of Quality of Services (QoS) was carried out by IMRB International for all the Cellular mobile service providers during the period starting from April 2012 to June 2012 in West Bengal circle. The executive summary encapsulates the key findings of the Audit.

## 5.1 Service provider performance report based on one month data verification: Cellular Mobile Services

| Name of Service Provider | Time Consistent Busy Hour (TCBH) | Network Availability | | | | | Connection Establishment (Accessibility) | | | Connection Maintenance (Retainability) | | | | | POI | Network Traffic Capacity and Utilization | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Total no. of BTSs in the licensed service area | Sum of downtime of BTSs in a month in hours i.e. total outage time of all BTSs in hours during a month | BTSs Accumulated downtime (not available for service) (%age) | No. of BTSs having accumulated downtime of >24 hours in a month | Worst affected BTSs due to downtime (%age) | Call Set-up Success Rate (within licensee's own network) | SDCCH/ Paging Chl. Congestion (%age) | TCH Congestion (%age) | Call Drop Rate (%age) | Total No. of cells exceeding 3% TCH drop (call drop) | Total no. of cells in the network | Worst affected cells having more than 3% TCH drop (call drop) rate (%age) | %age of connection with good voice quality | POI Congestion (No. of POIs not meeting the benchmark) Note :2) | Total number of working POI Service Area wise | Equipped Capacity of Network in respect of Traffic in erlang | Total traffic handled in TCBH in erlang | Total no. of customers served (as per VLR) on last day of the month |
| Benchmark | | | | ≤ 2% | | ≤ 2% | ≥ 95% | ≤ 1% | ≤ 2% | ≤ 2% | | | ≤ 3% | ≥ 95% | ≤ 0.5% | | | | |
| Idea | 19:00 - 20:00 | 2139 | 1809 | 0.11% | 15 | 0.70% | 98.18% | 0.84% | 1.82% | 1.14% | 187 | 6415 | 2.92% | 97.29% | 0.00 | 87 | 49575 | 50963 | 1815516 |
| BSNL | 19:00 - 20:00 | 2542 | 31803 | 1.68% | 50 | 1.97% | 97.72% | 0.65% | 0.88% | 0.65% | 324 | 7428 | 4.36% | 97.53% | 0.00 | 93 | 176000 | 107774 | 1715845 |
| Reliance CDMA | 19:00 - 20:00 | 1079 | 1397 | 0.17% | 3 | 0.28% | 99.28% | 0.00% | 0.12% | 0.20% | 11 | 3237 | 0.34% | 99.18% | 0.00 | 21 | 148000 | 45023 | 1131284 |
| Reliance GSM | 19:00 - 20:00 | 2663 | 2248 | 0.11% | 10 | 0.38% | 98.96% | 0.02% | 0.20% | 0.50% | 25 | 7989 | 0.31% | 98.90% | 0.00 | 21 | 138000 | 107630 | 4952214 |
| MTS | 19:00 - 20:00 | 906 | 444 | 0.07% | 1 | 0.11% | 99.28% | 0.00% | 0.24% | 0.95% | 70 | 3052 | 2.29% | 99.11% | 0.00 | 69 | 109200 | 48207 | 1133362 |
| Airtel | 19:00 - 20:00 | 4787 | 714 | 0.02% | 4 | 0.08% | 99.70% | 0.04% | 0.06% | 0.45% | 131 | 15933 | 0.82% | 99.58% | 0.00 | 31 | 242468 | 201341 | 8229011 |
| Videocon | 19:00 - 20:00 | 31 | 121 | 0.52% | 0 | 0.00% | 98.69% | 0.86% | 0.24% | 1.14% | 0 | 95 | 0.00% | 98.58% | 0.00 | 10 | 5000 | 0 | 150 |
| Uninor | 19:00 - 20:00 | 1934 | 27478 | 1.91% | 38 | 1.96% | 97.62% | 0.23% | 1.81% | 1.49% | 86 | 5808 | 1.48% | 96.74% | 0 | 106 | 79757 | 67831 | 1690705 |
| Vodafone | 19:00 - 20:00 | 6299 | 3635 | 0.08% | 37 | 0.59% | 96.27% | 1.25% | 1.76% | 1.15% | 562 | 18844 | 2.98% | 95.30% | 0.00 | 41 | 302549 | 286096 | 10734069 |
| Tata Tele - CDMA | 19:00 - 20:00 | 628 | 393 | 0.08% | 0 | 0.00% | 98.54% | 0.00% | 0.05% | 0.87% | 54 | 1893 | 2.85% | 99.04% | 0.00 | 150 | 141286 | 18360 | 273493 |
| Tata Tele - GSM | 19:00 - 20:00 | 1412 | 143 | 0.01% | 0 | 0.00% | 98.78% | 0.14% | 0.09% | 0.72% | 3657 | 127080 | 2.88% | 98.15% | 0.00 | 27 | 61652 | 20132 | 889882 |
| Aircel | 19:00 - 20:00 | 2668 | 25525 | 1.29% | 67 | 2.51% | 96.93% | 0.46% | 0.84% | 1.71% | 463 | 7934 | 5.84% | 95.61% | 0.00 | 130 | 125892 | 40741 | 1731971 |

*Details pertaining to these are obtained through operator done drive tests. Results of the operator assisted drive tests are explained in detail in critical findings

** Methodology not in line with QoS

Figures provided on All India basis

Not meeting the benchmark

B'mark = TRAI Benchmark, DNA = Details not available, NA: Not Applicable

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**Critical findings: Cellular Mobile Services**

The audit for cellular mobile service providers were conducted at their respective MSCs in the West Bengal circle apart from Reliance Communication whose audit was conducted at their central NOC at Mumbai.

The audit involved a three stage verification process which consisted of auditing the records of the service providers and verifying the data submitted to TRAI. The second step involved a three day live measurement of all the network parameters. Finally basis the three day live measurement the auditors needed to find out the busy hour for the service provider and collect the hourly data for this busy hour for the month in which the audit was conducted.

**Busy Hour of Various Service Providers**

| Service Provider | Reported Time Consistent Busy Hour | Network Busy Hour found in 3 day live measurement |
|---|---|---|
| Idea | 20:00 to 21:00 hrs | 20:00 to 21:00 hrs |
| BSNL | 19:00 to 20:00 hrs | 19:00 to 20:00 hrs |
| Reliance CDMA | 19:00 to 20:00 hrs | 19:00 to 20:00 hrs |
| Reliance GSM | 19:00 to 20:00 hrs | 19:00 to 20:00 hrs |
| MTS | 20:00 to 21:00 hrs | 20:00 to 21:00 hrs |
| Airtel | 19:00 to 20:00 hrs | 19:00 to 20:00 hrs |
| Videocon | 19:00 to 20:00 hrs | 19:00 to 20:00 hrs |
| Uninor | 20:00 to 21:00 hrs | 21:00 to 21:00 hrs |
| Vodafone | 19:00 to 20:00 hrs | 19:00 to 20:00 hrs |
| Tata Tele - CDMA | 20:00 to 21:00 hrs | 20:00 to 21:00 hrs |
| Tata Tele - GSM | 20:00 to 21:00 hrs | 20:00 to 21:00 hrs |
| Aircel | 20:00 to 21:00 hrs | 20:00 to 21:00 hrs |

The TCBH reported by all the service providers matched the network busy hour calculated by IMRB auditors for the West Bengal circle.

*BTSs Accumulated Downtime:*
In the West Bengal circle, all the operators except Aircel were meeting the benchmark

*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 Airtel with 99.70% 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 except Vodafone for SDCCH congestion were meeting the TRAI specified benchmarks on the congestion parameters. TATA leads the way in network congestion parameters with almost negligible paging as well as traffic channel congestion. The calculation methodology of these parameters was found to be in complete accordance with what has been specified by TRAI. RCOM CDMA, MTS and Tata Teleservices measure paging channel utilization. When the value of this parameter is less than 100%, it is counted as 0% congestion. There were no POIs with congestion more than the benchmark (≤0.5%)

*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 lowest call drop rate was of RCOM CDMS at 0.2% while the highest was for Aircel at 1.71%.

*Connections with good voice quality:*
All the operators are measuring this parameter via their periodic drive tests. However, for some operators these parameters can be obtained at their switch as well. During the audit it was found that all the service providers were measuring this parameter as per the TRAI guidelines.

*Customer Care / Helpline Assessment*
For the accessibility of customer care aspect all the service providers meet the TRAI benchmark except MTS with only 43.34% of calls getting connected and answered (electronically). Further, for voice to voice MTS, Vodafone, and Aircel did not meet the benchmark.

*Billing performance*
All the operators were found to be meeting the benchmark of ≤ 0.1% complaints registered per 100 bills issued and the benchmark of 100% billing complaints being resolved within 4 weeks. In all cases where customers were due for refund, all the service providers met the TRAI benchmark of 100% with 1 week.

*Inter operator calls assessment*

| Inter operator call Assessment To↓                                  From→ | Idea | BSNL | Reliance GSM | MTS | Airtel | Videocon | Uninor | Vodafone | Tata Tele - CDMA | Tata Tele - GSM | Aircel |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Idea | NA | 100% | 100% | 100% | 100% | NA | 100% | 100% | 100% | 100% | 100% |
| BSNL | 100% | NA | 100% | 100% | 100% | NA | 100% | 100% | 100% | 100% | 100% |
| Reliance CDMA | 100% | 100% | 100% | 100% | 100% | NA | 100% | 100% | 100% | 100% | 100% |
| Reliance GSM | 100% | 100% | NA | 100% | 100% | NA | 100% | 100% | 100% | 100% | 100% |
| MTS | 100% | 100% | 100% | NA | 100% | NA | 100% | 100% | 100% | 100% | 100% |
| Airtel | 100% | 100% | 100% | 100% | NA | NA | 100% | 100% | 100% | 100% | 100% |
| Videocon | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| Uninor | 100% | 100% | 100% | 100% | 100% | NA | NA | 100% | 100% | 100% | 100% |
| Vodafone | 100% | 100% | 100% | 100% | 100% | NA | 100% | NA | 100% | 100% | 100% |
| Tata Tele - CDMA | 100% | 100% | 100% | 100% | 100% | NA | 100% | 100% | NA | 100% | 100% |
| Tata Tele - GSM | 100% | 100% | 100% | 100% | 100% | NA | 100% | 100% | 100% | NA | 100% |
| Aircel | 100% | 100% | 100% | 100% | 100% | NA | 100% | 100% | 100% | 100% | NA |

The maximum problem faced by the calling operator to other operators

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

| Operator | Date | Location |
|---|---|---|
| Idea | 14th May, 2012 | Bengal |
| BSNL | 15th May, 2012 | Bengal |
| Reliance CDMA | 16th May, 2012 | Bengal |
| Reliance GSM | 17th May, 2012 | Bengal |
| MTS | 17th May, 2012 | Bengal |
| Airtel | 22nd May, 2012 | Bengal |
| Videocon | 22nd May, 2012 | Bengal |
| Uninor | 22nd May, 2012 | Bengal |
| Vodafone | 27th  May, 2012 | Bengal |
| Tata Tele – CDMA | 29th May, 2012 | Bengal |
| Tata Tele – GSM | 30th May, 2012 | Bengal |
| Aircel | 31st May, 2012 | Bengal |

*Results of Operator assisted Drive test*

The drive test was conducted simultaneously for all the operators present in the West Bengal circle. There was in total of three drive tests conducted in the circle. These tests were conducted in the cities of Purulia, Malda, Midnapur. IMRB auditors were present in vehicles of every operator. A sample of 15 – 30 test calls were made along each of the routes. The holding period for all test calls was between 120 seconds to 180 seconds. The drive test vehicle across all routes plied at a speed of less than 20 km per hour. Taking into consideration the route that was taken for the drive test; most of the major areas West Bengal telecom circles were covered.

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-vehile and > -95 dbm outdoor routes.

The drive tests in the West Bengal circle were conducted in the cities of Purulia, Malda, Midnapur was conducted along the following route:

| | Type of location | Purulia | Malda | Midnapur |
|---|---|---|---|---|
| **Outdoor** | Periphery of the city | Dulmi Bandh-along the Highway-right turn-Sri Balagi agro industries-Ranchi Road Crossing to Overbridge-Gochala More to Sunil Pertol Pump (Mishti Mahal) | Gour More - Bulbuli More | Station Road, LIC More, Kirani Choti, Dharmamore, Amtala |
| | Congested area | Puruliya Railway Station- Bus Stand More-Taxi Stand-Gorkha Ground-Eidgha-Poka Bandh-Kapar Gali-Bal Bharti School-Around Saheb Bandh-Subhas Park | Mokbampur, Sarbamongala Plly, Mahesh Mati, Gour Bazar | Jaganath mandir, Baadtala chowk, College more, Judge Court Road |
| | Across the city | Along state highway-take state highway from Poka Bandh, left and right along state highway-Huda to Jhalda Road | Railway Station to Government Bus Stand, Ramkrishnaplly to Gour More | Station Road, Kiranitala, Judge court Road, Jagganath Road |
| **Indoor** | Office complex | Zilla Parishad Office | Hotel Continental | Judge Court |
| | Shopping complex | Hotel Akash | Collector office | Hindustan Hotel |

The tables given below gives a glimpse of the results of the operator assisted drive test:

### Drive Test – Purulia

| | B'mark | Idea | | BSNL | | Reliance CDMA | | Reliance GSM | | Airtel | | Vodafone | | Tata Tele - CDMA | | Tata Tele - GSM | | Aircel | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 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% | 97.31% | 97.31% | 99.63% | 94.55% | 99.20% | 98.72% | 96.48% | 95.11% | 97.11% | 97.85% | 98.09% | 95.12% | 96.93% | 97.72% | 99.33% | 97.63% | 96.65% | 96.18% |
| CSSR | ≥ 95% | 100.00% | 100.00% | 100.00% | 93.29% | 100.00% | 100.00% | 100.00% | 99.33% | 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% |
| Call drop rate | ≤ 2% | 0.00% | 0.00% | 0.00% | 5.23% | 0.00% | 0.00% | 0.00% | 0.67% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.67% |
| Hands off success rate | | 100% | 100.00% | 1000.0% | 100.00% | 100.00% | 100.00% | 100.00% | 98.95% | 100.00% | 100.00% | 100.00% | 100.00% | 100.00% | 100.00% | 100% | 100.00% | 100.00% | 100.00% |

### Drive Test –Malda

| | B'mark | Idea | | BSNL | | Reliance CDMA | | Reliance GSM | | MTS | | Airtel | | Vodafone | | Tata Tele - CDMA | | Tata Tele - GSM | | Aircel | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 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% | 97.69% | 96.65% | 99.87% | 98.35% | 98.76% | 99.14% | 97.84% | 95.40% | 99.76% | 99.58% | 99.16% | 96.03% | 96.70% | 95.28% | 97.15% | 96.33% | 99.41% | 97.15% | 100.00% | 97.26% |
| CSSR | ≥ 95% | 100.00% | 100.00% | 96.77% | 97.44% | 100.00% | 100.00% | 100.00% | 100.00% | 100.00% | 100.00% | 100.00% | 100.00% | 100.00% | 100.00% | 100.00% | 100.00% | 100.00% | 100.00% | 100.00% | 100.00% |
| %age Blocked calls | | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% |
| Call drop rate | ≤ 2% | 0.00% | 1.33% | 0.00% | 1.32% | 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% | 99.84% | 100.00% | 100.00% | 100.00% | 100.00% | 100.00% | 100.00% | 100.00% | 100.00% | 100.00% | 100.00% | 100.00% | 100.00% |

### Drive Test – Midnapur

| | B'mark | Idea | | BSNL | | Reliance CDMA | | Reliance GSM | | MTS | | Airtel | | Vodafone | | Tata Tele - CDMA | | Tata Tele - GSM | | Aircel | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 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% | 99.29% | 100.00% | 94.24% | 95.79% | 100.00% | 99.18% | 98.79% | 95.39% | 99.61% | 98.17% | 96.68% | 95.60% | 98.50% | 95.58% | 99.21% | 97.81% | 99.41% | 97.15% | 96.55% | 96.04% |
| CSSR | ≥ 95% | 100.00% | 100.00% | 98.36% | 76.77% | 100.00% | 100.00% | 100.00% | 100.00% | 100.00% | 100.00% | 100.00% | 100.00% | 100.00% | 100.00% | 100.00% | 100.00% | 100.00% | 100.00% | 100.00% | 100.00% |
| %age Blocked calls | | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% |
| Call drop rate | ≤ 2% | 0.00% | 0.00% | 0.00% | 13.82% | 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% | 0.67% |
| Hands off success rate | | 100.00% | 100.00% | 100.00% | 91.24% | 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% |

☐ Not meeting the benchmark

15

Following were the areas where the signal strength was found to be inadequate for the operators:

### ALL SERVICE PROVIDERS

**Purulia:** Inadequate coverage and interference was recorded in areas such as Gorkah Ground, Poka Bandh, Dulmi Band, and Huda More

**Mednipore:** Natun Bazar, Jaganath Mandir were two locations experiencing inadequate coverage and interference

**Malda:** Gour More, Ramkrishna Pally, and Mahes Mati locations experienced inadequate coverage and interference

**Conclusions:**
Drive test was conducted by IMRB with the help of service providers to measure this parameter. In the drive test it was found that all the operators meet the TRAI benchmark except the following.

1. BSNL does not meet the TRAI benchmark for various parameters in Purulia and Midnapur cities

## Summary of Live Measurement Results – Cellular Mobile Services

| 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% |
| **Idea** | 0.05% | 0.37% | 98.93% | 0.17% | 0.25% | 1.05% | 0.41% | 97.83% |
| **BSNL** | 0.15% | 0.17% | 97.00% | 0.60% | 0.86% | 0.02% | 2.65% | 97.46% |
| **Reliance CDMA** | 0.40% | 0.00% | 98.58% | 0.00% | 0.01% | 0.03% | 0.09% | 100.00% |
| **Reliance GSM** | 0.25% | 0.00% | 99.01% | 0.01% | 0.13% | 0.60% | 0.19% | 99.20% |
| **MTS** | 0.18% | 0.00% | 99.27% | 0.00% | 0.67% | 0.71% | 2.10% | 99.63% |
| **Airtel** | 0.02% | 0.00% | 99.59% | 0.05% | 0.10% | 0.49% | 0.82% | 99.59% |
| **Videocon** | 1.16% | 0.00% | 99.31% | 0.00% | 0.00% | 0.27% | 0.00% | 99.09% |
| **Uninor** | 1.14% | 0.00% | 97.43% | 0.25% | 1.80% | 1.41% | 1.48% | 96.78% |
| **Vodafone** | 0.13% | 0.00% | 97.16% | 0.77% | 1.41% | 1.10% | DNP | 95.25% |
| **Tata Tele - CDMA** | 0.04% | 0.00% | 98.88% | 0.00% | 0.03% | 0.81% | 2.95% | 99.04% |
| **Tata Tele - GSM** | 0.05% | 0.00% | 97.79% | 0.09% | 0.18% | 0.74% | 2.71% | 97.56% |
| **Aircel** | 1.55% | 0.00% | 98.38% | 0.26% | 0.24% | 1.39% | 5.71% | 96.09% |

DNP: Data not provided by the operator

☐ Not meeting the benchmark

* Based on operator assisted drive tests conducted by IMRB

During the three day live measurement, all operators except were found to be meeting the TRAI benchmark on all the parameters.

## Summary of Live Calling Results – Cellular Mobile Services

| Name of Service Provider | Metering and Billing | Response time to customer for assistance | |
| --- | --- | --- | --- |
| | %age complaints resolved within 4 weeks | Accessibility of call centre/ customer care | Percentage of calls answered by the operators (voice to voice) within 60 seconds |
| Benchmark | 100% | ≥ 95% | ≥ 90% |
| Idea | 92.00% | 100.00% | 88.00% |
| BSNL | 71.00% | 100.00% | 84.00% |
| Reliance CDMA | 95.00% | 100.00% | 87.00% |
| Reliance GSM | 95.00% | 100.00% | 91.00% |
| MTS | NA | 100.00% | 88.00% |
| Airtel | 69.00% | 100.00% | 92.00% |
| Videocon | NA | NA | NA |
| Uninor | 92.45% | 100.00% | 89.00% |
| Vodafone | 98.00% | 100.00% | 95.00% |
| Tata Tele - CDMA | 30.77% | 100.00% | 88.00% |
| Tata Tele - GSM | NA | 100.00% | 88.00% |
| Aircel | 95.00% | 100.00% | 90.00% |

# 6.0 Detailed findings – Includes comparison between Live calling/Live measurements and One month data collection

## 6.1 Graphical/Tabular Representations for Cellular Mobile Services

### BTSs Accumulated Downtime
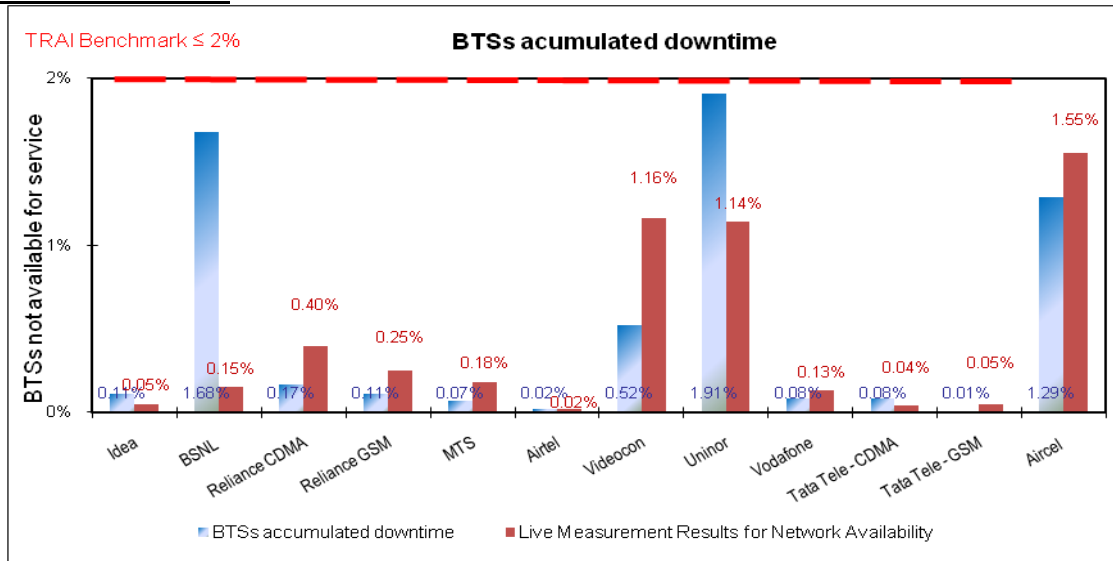


**One month**

All the operators meet the benchmark

**Live measurement**

All the operators meet the benchmark

### Worst Affected BTSs

**One month**
Operator(s) meeting benchmark: Idea, BSNL , Reliance CDMA, Reliance GSM, MTS, Airtel, Videocon, Uninor, Vodafone, Tata Tele - CDMA, Tata Tele - GSM
Operator(s) not meeting the benchmark: Aircel

**Live measurement**

All the operators meet the benchmark

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



**One month**

All the operators meet the benchmark

**Live measurement**

All the operators meet the benchmark

**Drive test**
Operator(s) meeting benchmark: Idea, Reliance CDMA, Reliance GSM, MTS, Airtel, Vodafone, Tata Tele - CDMA, Tata Tele - GSM, Aircel
Operator(s) not meeting the benchmark: BSNL

### SDCCH / Paging Channel Congestion
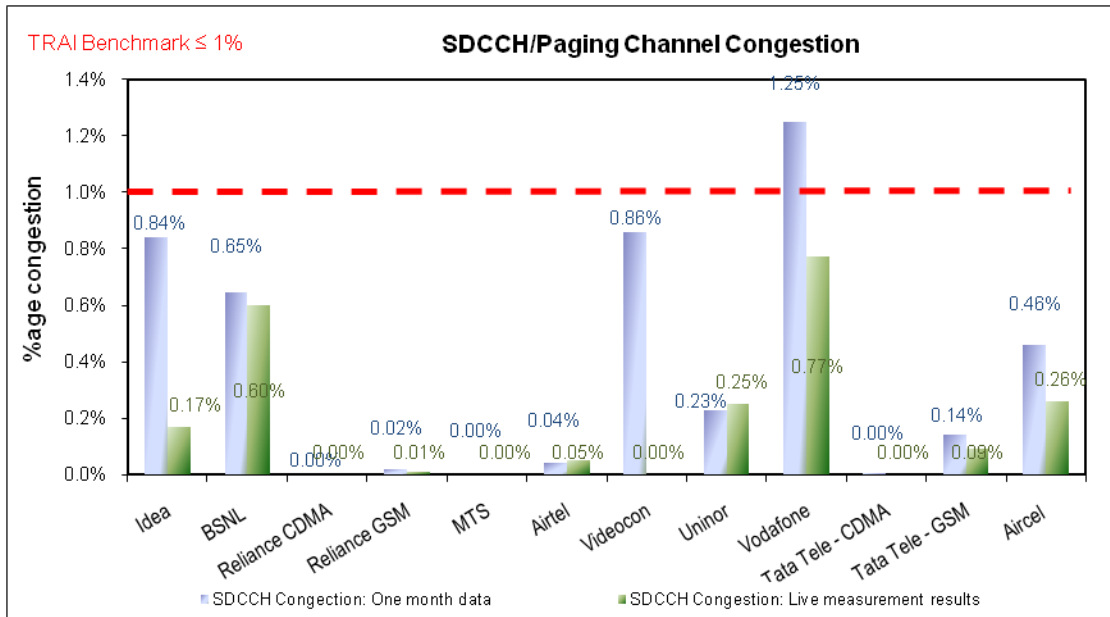


**One month**
Operator(s) meeting benchmark: Idea, BSNL, Reliance CDMA, Reliance GSM, MTS, Airtel, Videocon, Uninor, Tata Tele - CDMA, Tata Tele - GSM, Aircel
Operator(s) not meeting the benchmark: Vodafone

**Live measurement**

All the operators meet the benchmark

### TCH Congestion

**One month**

All the operators meet the benchmark

**Live measurement**

All the operators meet the benchmark

**Call Drop Rate**



**One month**

All the operators meet the benchmark

**Live measurement**

All the operators meet the benchmark

**Drive test**
Operator(s) meeting benchmark: Idea, Reliance CDMA, Reliance GSM, MTS, Airtel, Vodafone, Tata Tele - CDMA, Tata Tele - GSM, Aircel
Operator(s) not meeting the benchmark: BSNL

## Cells with more than 3% TCH Drop Rate
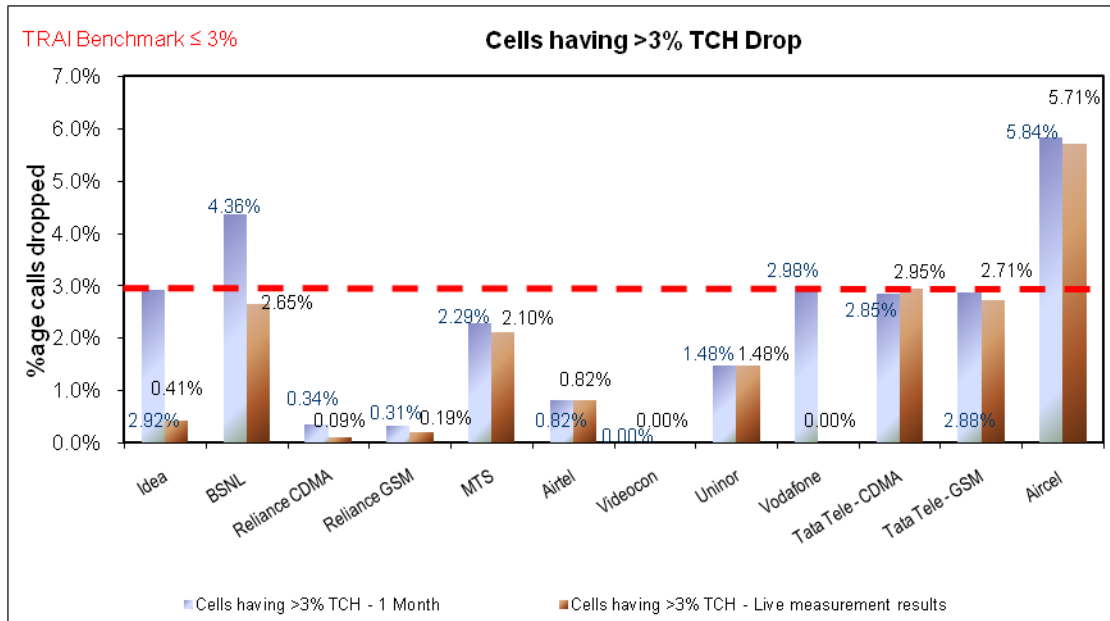


**One month**
Operator(s) meeting benchmark: Idea, Reliance CDMA, Reliance GSM, MTS, Airtel, Videocon, Uninor, Vodafone, Tata Tele - CDMA, Tata Tele - GSM
Operator(s) not meeting the benchmark: BSNL , Aircel

**Live measurement**
Operator(s) meeting benchmark: Idea, BSNL , Reliance CDMA, Reliance GSM, MTS, Airtel, Videocon, Uninor, Tata Tele - CDMA, Tata Tele - GSM
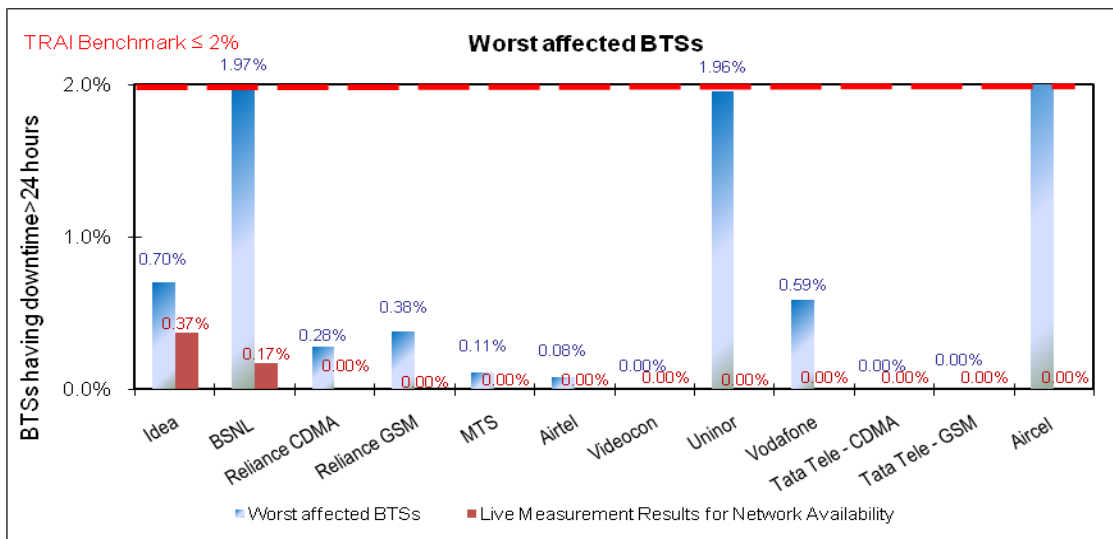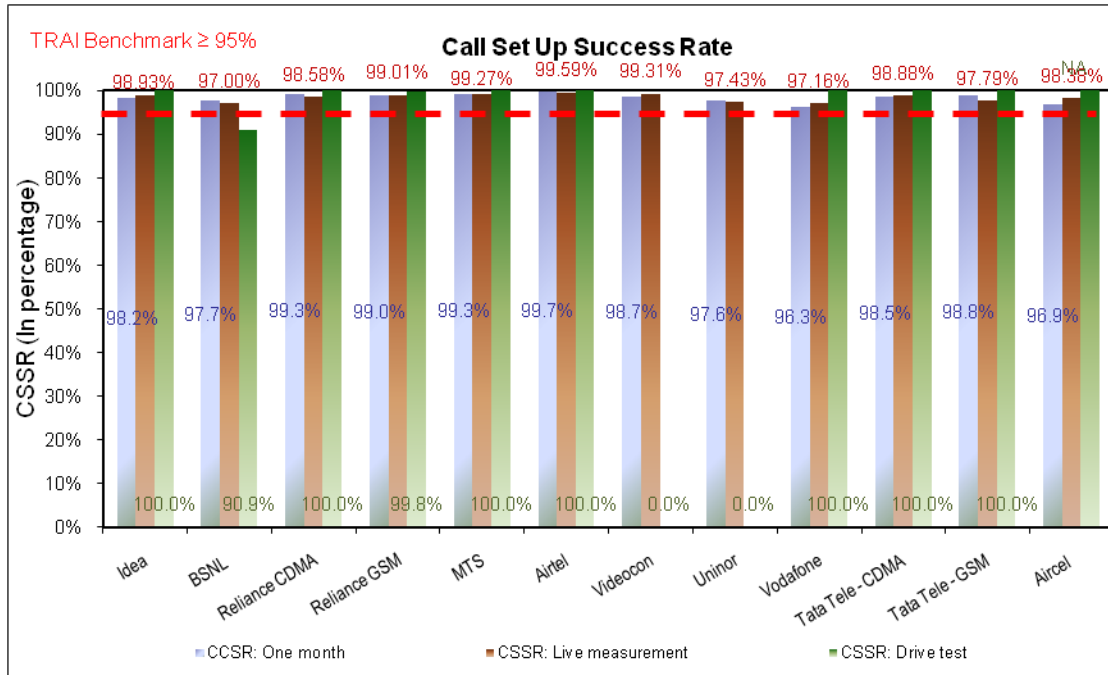Operator(s) not meeting the benchmark: Aircel

## Voice quality
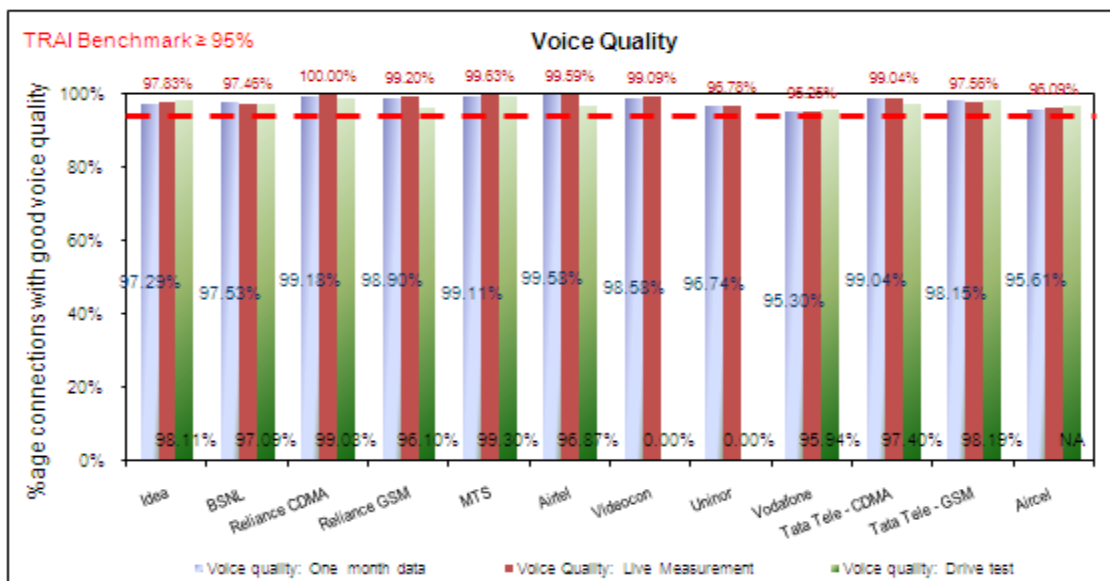
**One month**

All the operators meet the benchmark

**Live measurement**

All the operators meet the benchmark

**Drive test**

All the operators meet the benchmark

**Billing Disputes - Postpaid**
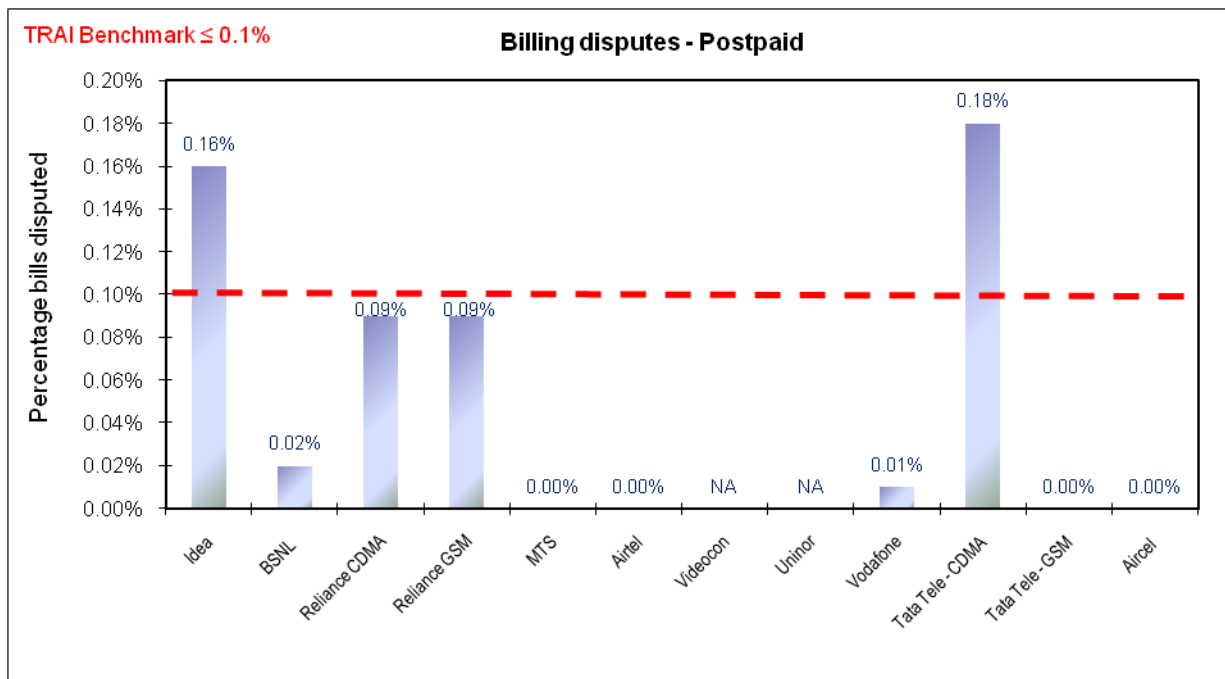


NA: Not Applicable

Operator(s) meeting benchmark: BSNL , Reliance CDMA, Reliance GSM, MTS, Airtel, Vodafone, Tata Tele - GSM, Aircel
Operator(s) not meeting the benchmark: Idea, Tata Tele - CDMA

## Complaints - Prepaid
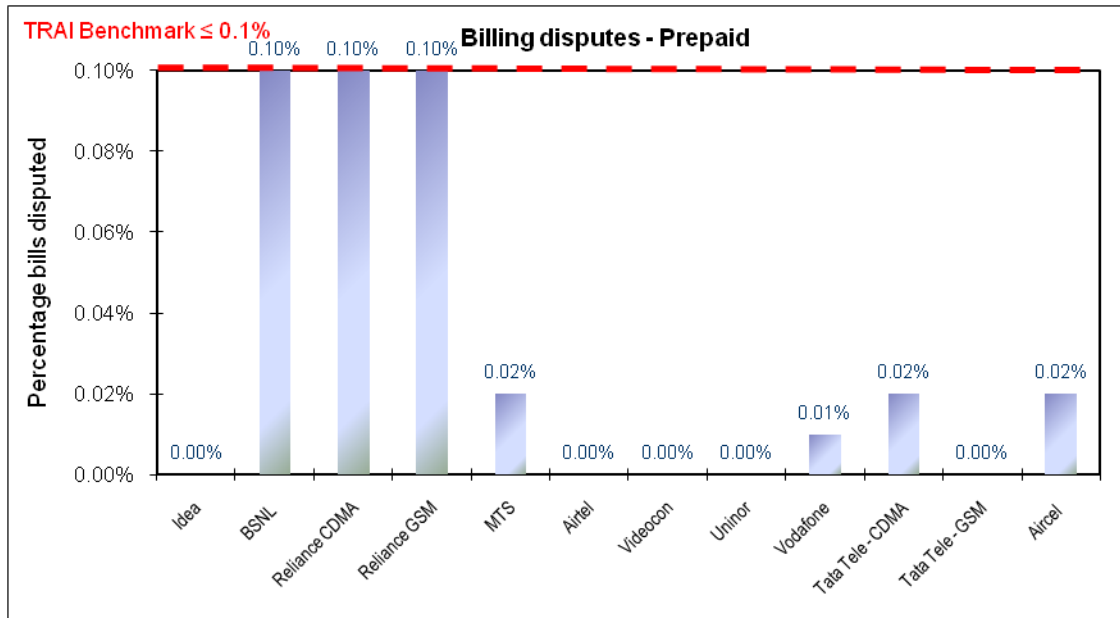


All the operators meet the benchmark

## Resolution of billing complaints
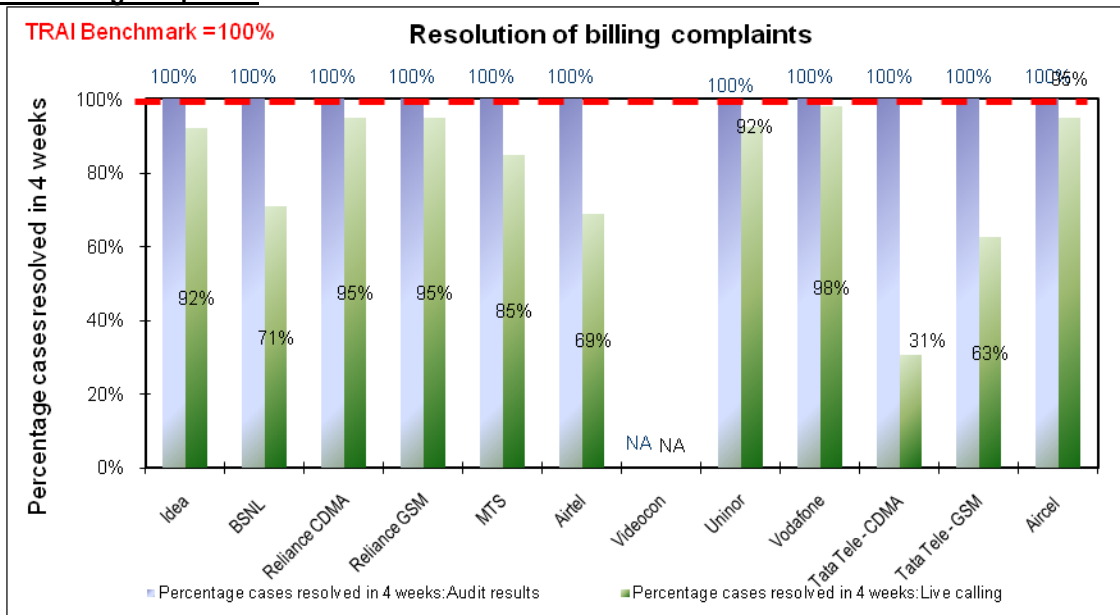


NA: Not Applicable

**One month**

All the operators meet the benchmark

**Live calling**
None of the operator meets the benchmark
**Period of applying credit / waiver**
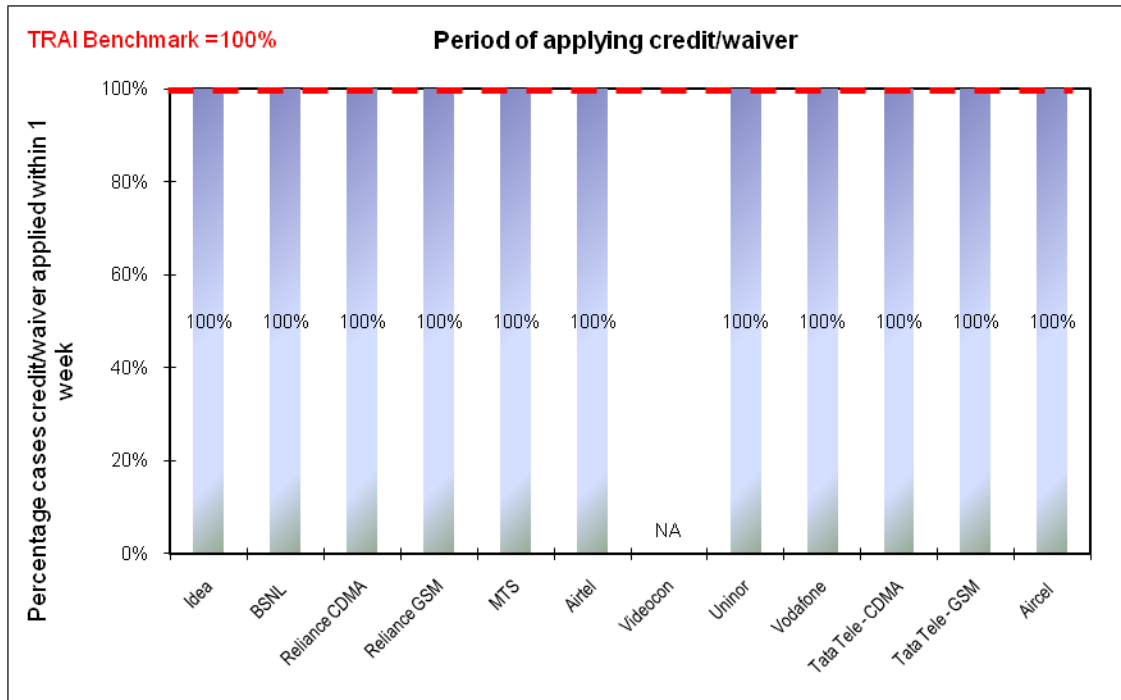


NA: Not Applicable

All the operators meet the benchmark

**Live calling for billing Complaints**

| Resolution of billing complaints | Benchmark | Idea | BSNL | Reliance CDMA | Reliance GSM | MTS | Airtel | Videocon | Uninor | Vodafone | Tata Tele - CDMA | Tata Tele - GSM | Aircel |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Total Number of calls made | | 100 | 63 | 100 | 100 | 100 | 100 | NA | 53 | 100 | 13 | 16 | 100 |
| Number of cases resolved in 4 weeks | | 92 | 45 | 95 | 95 | 85 | 69 | NA | 49 | 98 | 4 | 10 | 95 |
| Percentage cases resolved in four weeks | 100% | 92% | 71% | 95% | 95% | 85% | 69% | NA | 92% | 98% | 31% | 63% | 95% |

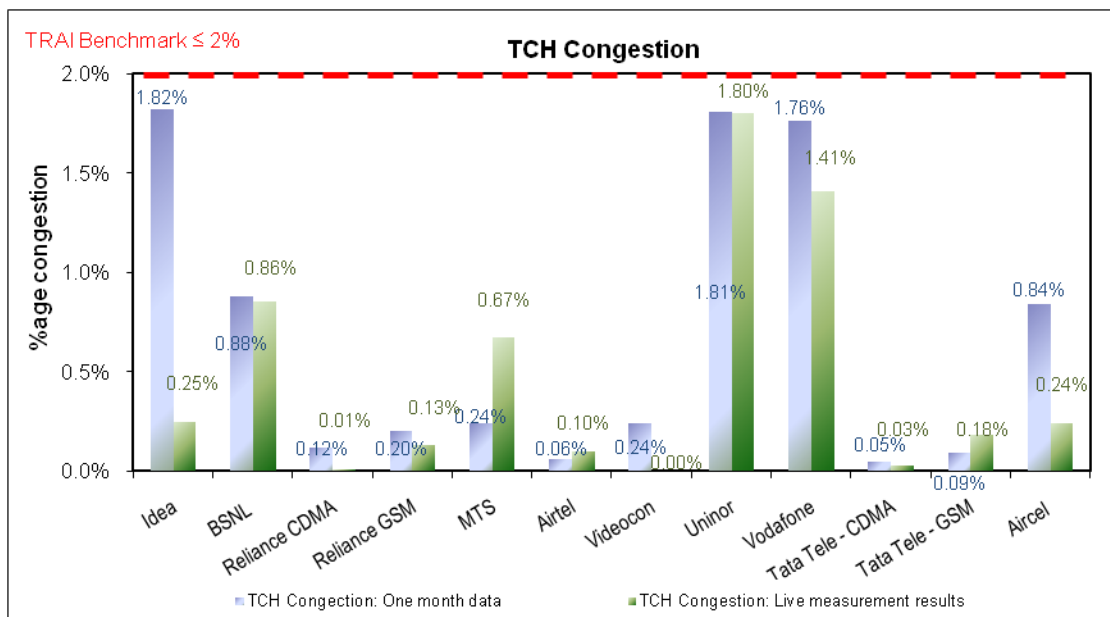**Customer Care / Helpline: Calls answered**
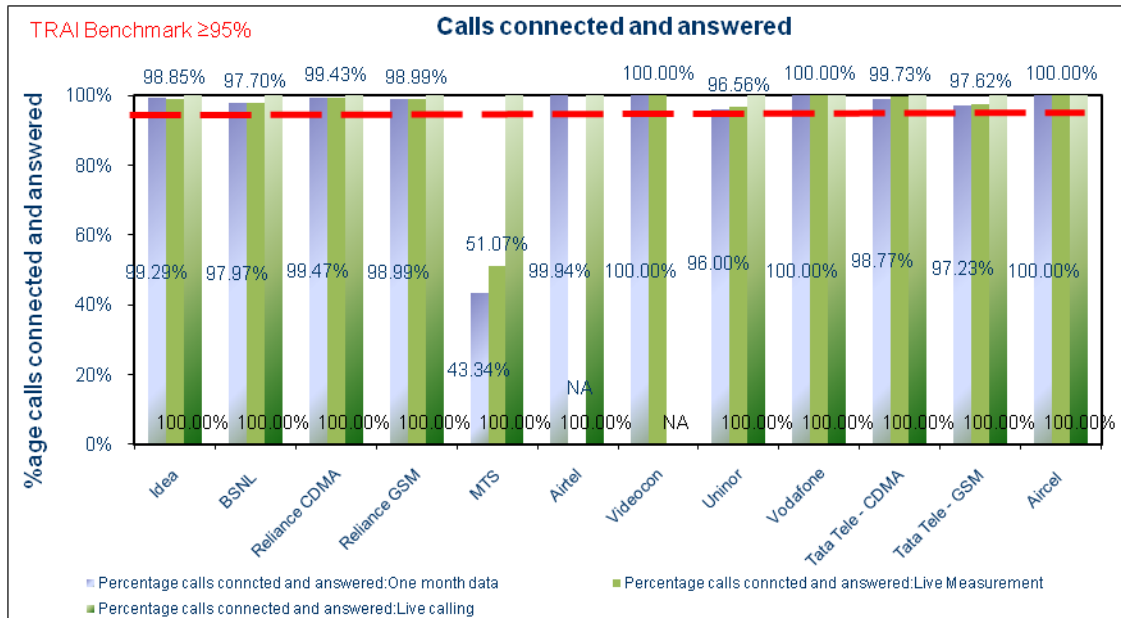


**One month**
Operator(s) meeting benchmark: Idea, BSNL , Reliance CDMA, Reliance GSM, Airtel, Videocon, Uninor, Vodafone, Tata Tele - CDMA, Tata Tele - GSM, Aircel
Operator(s) not meeting the benchmark: MTS

**Live measurement**
Operator(s) meeting benchmark: Idea, BSNL , Reliance CDMA, Reliance GSM, Videocon, Uninor, Vodafone, Tata Tele - CDMA, Tata Tele - GSM, Aircel
Operator(s) not meeting the benchmark: MTS

**Live calling**

All the operators meet the benchmark

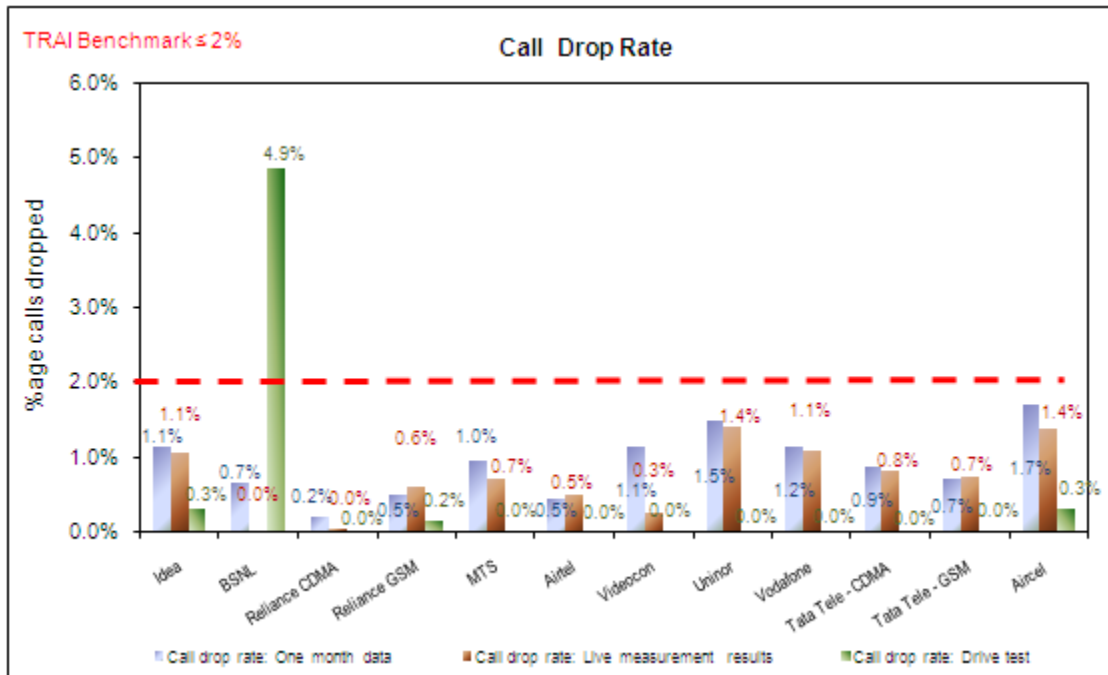## Customer Care / Helpline: Calls answered voice to voice
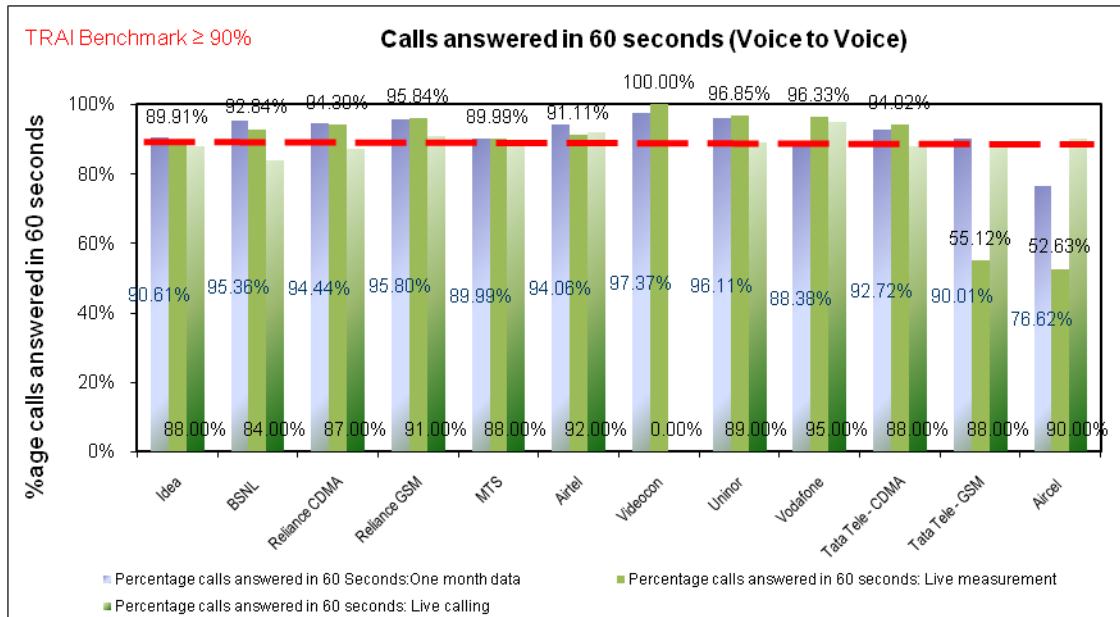


**One month**
Operator(s) meeting benchmark: Idea, BSNL, Reliance CDMA, Reliance GSM, Airtel, Videocon, Uninor, Tata Tele - CDMA, Tata Tele - GSM
Operator(s) not meeting the benchmark: MTS, Vodafone, Aircel

**Live measurement**
Operator(s) meeting benchmark: BSNL, Reliance CDMA, Reliance GSM, Airtel, Videocon, Uninor, Vodafone, Tata Tele - CDMA
Operator(s) not meeting the benchmark: Idea, MTS, Tata Tele - GSM, Aircel

**Live calling**
Operator(s) meeting benchmark: Reliance GSM, Airtel, Vodafone, Aircel
Operator(s) not meeting the benchmark: Idea, BSNL, Reliance CDMA, MTS, Uninor, Tata Tele - CDMA, Tata Tele - GSM

## Termination / Closure of service
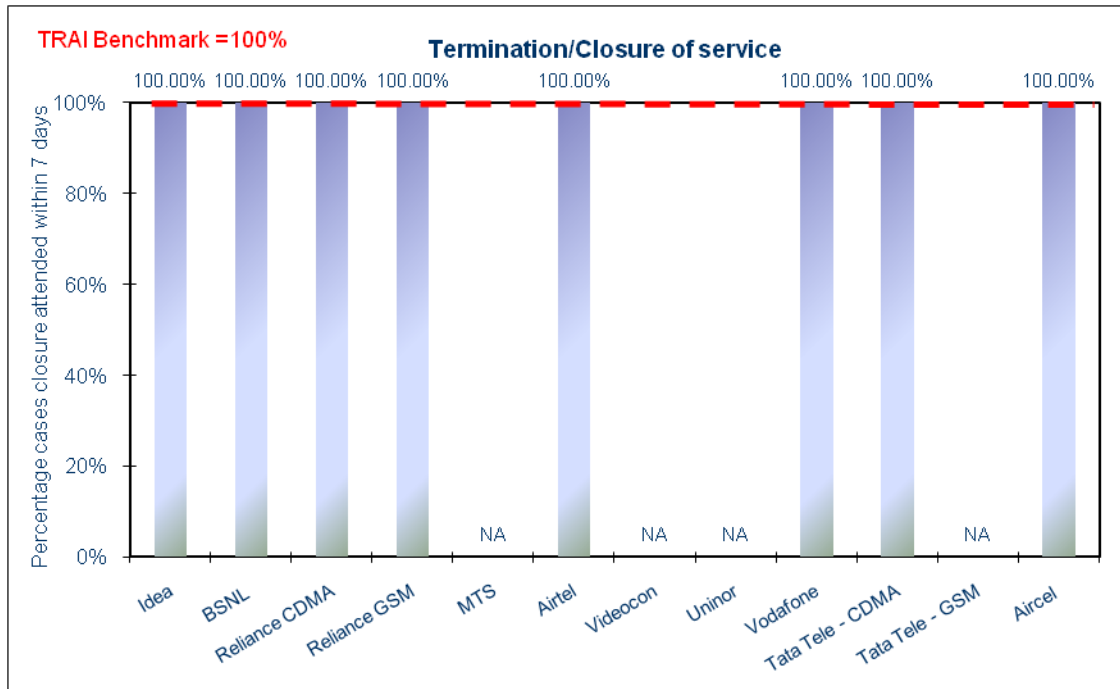


NA: Not Applicable

All the operators meet the benchmark

## Refund of deposits
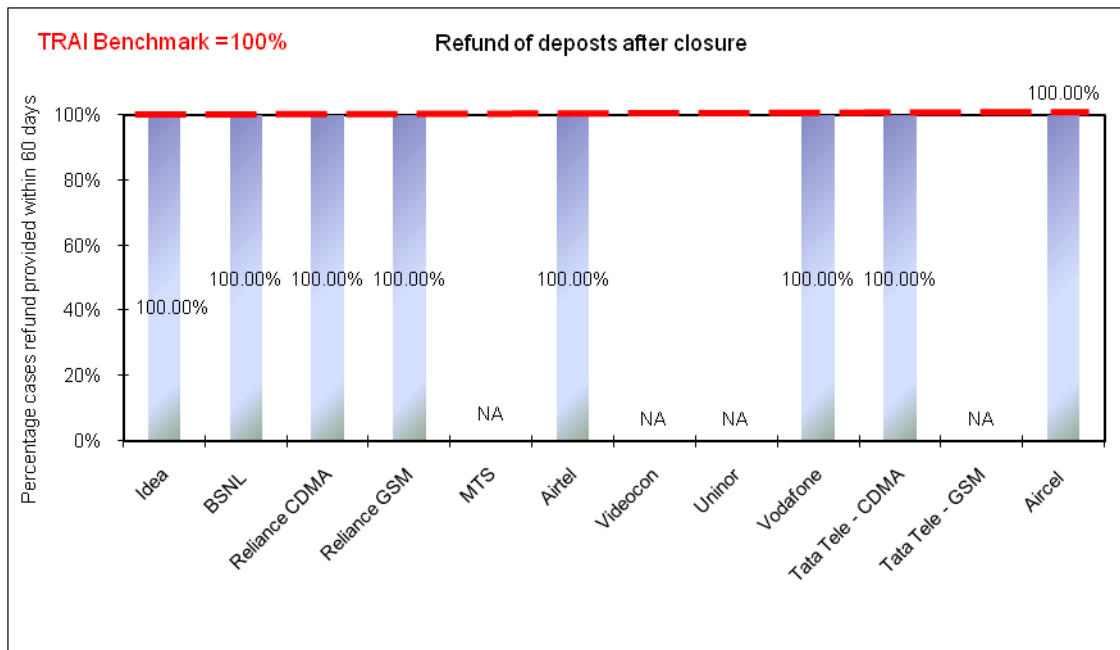


NA: Not Applicable

All the operators meet the benchmark

*Inter operator calls assessment*

| Inter operator call Assessment To↓            From→ | Idea | BSNL | Reliance GSM | MTS | Airtel | Videocon | Uninor | Vodafone | Tata Tele - CDMA | Tata Tele - GSM | Aircel |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Idea | NA | 100% | 100% | 100% | 100% | NA | 100% | 100% | 100% | 100% | 100% |
| BSNL | 100% | NA | 100% | 100% | 100% | NA | 100% | 100% | 100% | 100% | 100% |
| Reliance CDMA | 100% | 100% | 100% | 100% | 100% | NA | 100% | 100% | 100% | 100% | 100% |
| Reliance GSM | 100% | 100% | NA | 100% | 100% | NA | 100% | 100% | 100% | 100% | 100% |
| MTS | 100% | 100% | 100% | NA | 100% | NA | 100% | 100% | 100% | 100% | 100% |
| Airtel | 100% | 100% | 100% | 100% | NA | NA | 100% | 100% | 100% | 100% | 100% |
| Videocon | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| Uninor | 100% | 100% | 100% | 100% | 100% | NA | NA | 100% | 100% | 100% | 100% |
| Vodafone | 100% | 100% | 100% | 100% | 100% | NA | 100% | NA | 100% | 100% | 100% |
| Tata Tele - CDMA | 100% | 100% | 100% | 100% | 100% | NA | 100% | 100% | NA | 100% | 100% |
| Tata Tele - GSM | 100% | 100% | 100% | 100% | 100% | NA | 100% | 100% | 100% | NA | 100% |
| Aircel | 100% | 100% | 100% | 100% | 100% | NA | 100% | 100% | 100% | 100% | NA |

The maximum problem faced by the calling operator to other operators

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

## 7.0 Compliance reports: Results of Verification of PMR

### 7.1 Cellular Mobile services

| Name of Service Provider | | Network Availability | | | | | Connection Establishment | | | Connection Maintenance (Retainability) | | | | | POI | Network Traffic Capacity | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Total no. of BTSs in the licensed service area | Sum of downtime of BTSs in a month in hours i.e. total outage time of all BTSs in hours during a month | BTSs Accumulated downtime (not available for service) (%age) | No. of BTSs having accumulated downtime of >24 hours in a month | Worst affected BTSs due to downtime (%age) | Call Set-up Success Rate (within licensee's own network) | SDCCH/Paging chl. Congestion (%age) | TCH Congestion (%age) | Call Drop Rate (%age) | Total No. of cells exceeding 3% TCH drop (call drop | Total no. of cells in the network | Worst affected cells having more than 3% TCH drop (call drop) rate (%age) | %age connection with good voice quality | Point of interconnection (POI) Congestion | Equipped Capacity of Network in respect of Traffic in erlang | Total traffic handled in TCHB in erlang | Total no. of customer serves (as per VLR) on last day of the month |
| Benchmark | | | | ≤ 2% | | ≤ 2% | ≥ 95% | ≤ 1% | ≤ 2% | ≤ 2% | | | ≤ 3% | ≥ 95% | | | | |
| Idea | PMR | 2039 | 1299.81111 | 0.09% | 15 | 0.72% | 97.73% | 0.35% | 1.01% | 1.21% | 163 | 6115 | 2.67% | 96.13% | 0 | 47355 | 31832.8 | 1379950 |
| | IMRB | 2039 | 1300 | 0.09% | 15 | 0.72% | 97.73% | 0.35% | 1.01% | 1.21% | 163 | 6115 | 2.67% | 96.13% | 0 | 47355 | 31833.0 | 1379950 |
| BSNL | PMR | 2653 | 22797 | 1.31% | 51 | 2.08% | 96.80% | 0.46% | 0.85% | 1.29% | 338 | 7749 | 4.74% | 97.39% | 0 | 186667 | 122943.5 | 1845641 |
| | IMRB | 2528 | 21538 | 1.26% | 48 | 2.02% | 97.50% | 0.55% | 0.86% | 1.05% | 320 | 7384 | 4.60% | 97.62% | 0 | 166667 | 109203.0 | 1710085 |
| Reliance CDMA | PMR | 1056 | 1072 | 0.14% | 1 | 0.10% | 98.92% | 0.00% | 0.21% | 0.87% | 11 | 3167 | 0.36% | 98.19% | 0 | 148000 | 42884.9 | DNP |
| | IMRB | 1056 | 1072 | 0.14% | 1 | 0.10% | 98.92% | 0.00% | 0.21% | 0.87% | 11 | 3167 | 0.36% | 98.19% | 0 | 148000 | 42884.9 | DNP |
| Reliance GSM | PMR | 2541 | 3928 | 0.18% | 20 | 0.77% | 98.47% | 0.21% | 0.90% | 0.94% | 138 | 7624 | 1.79% | 98.40% | 0 | 107333 | 83141.0 | DNP |
| | IMRB | 2541 | 3928 | 0.21% | 20 | 0.80% | 98.47% | 0.22% | 0.90% | 0.95% | 138 | 7624 | 1.82% | 98.41% | 0 | 107333 | 83141.3 | DNP |
| MTS | PMR | 858 | 1258 | 0.20% | 6 | 0.66% | 98.77% | 0.00% | 0.20% | 0.90% | 54 | 2825 | 1.91% | 98.30% | 0 | 77700 | 38244.2 | 1032763 |
| | IMRB | 858 | 1258 | 0.20% | 6 | 0.68% | 98.77% | 0.00% | 0.20% | 0.90% | 54 | 2825 | 1.90% | 98.30% | 0 | 77700 | 38244.0 | 1032763 |
| Airtel | PMR | 4666 | 2055 | 0.06% | 12 | 0.25% | 98.80% | 0.24% | 0.85% | 1.55% | 394 | 15036 | 2.62% | 98.78% | 0 | 229443 | 170019.3 | 7354488 |
| | IMRB | 4666 | 2055 | 0.06% | 12 | 0.25% | 98.80% | 0.24% | 0.85% | 1.55% | 394 | 15036 | 2.62% | 98.78% | 0 | 229443 | 170019.3 | 7354488 |
| Videocon | PMR | 3 | 9 | 0.43% | 0 | 0.00% | 99.45% | 0.30% | 0.06% | 1.40% | 0 | 10 | 0.00% | 98.81% | 0 | 5000 | 5.7 | 653 |
| | IMRB | 3 | 9 | 0.43% | 0 | 0.00% | 99.45% | 0.30% | 0.06% | 1.40% | 0 | 10 | 0.00% | 98.81% | 0 | 5000 | 5.7 | 653 |
| Uninor | PMR | 1897 | 24218 | 1.73% | 29 | 1.55% | 96.26% | 0.60% | 1.88% | 1.68% | 164 | 5700 | 2.89% | 95.77% | 6 | 71129 | 62139.7 | 1473234 |

# Quality of Service – Audit module report for "West Bengal" Circle- Cellular Mobile (Wireless) Service Providers

| | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | IMRB | 1897 | 24218 | 1.73% | 29 | 1.55% | 96.26% | 0.59% | 1.88% | 1.66% | 176 | 5527 | 2.02% | 95.47% | 0 | 71129 | 62139.7 | 1473234 |
| Vodafone | PMR | 6180 | 1300 | 0.03% | 7 | 0.12% | 97.27% | 0.52% | 1.26% | 1.43% | 716 | 18494 | 3.87% | 95.19% | 0 | 284940 | 251089.9 | 9963676 |
| | IMRB | 6180 | 1300 | 0.03% | 7 | 0.12% | 97.27% | 0.52% | 1.26% | 1.43% | 716 | 18494 | 3.87% | 95.19% | 0 | 284940 | 251089.9 | 9963676 |
| Tata Tele - CDMA | PMR | 628 | 347 | 0.07% | 0 | 0.05% | 99.28% | 0.00% | 0.02% | 0.52% | 13 | 1883 | 0.69% | 99.24% | 0 | 145878 | 15745.3 | 300696 |
| | IMRB | 628 | 347 | 0.07% | 0 | 0.05% | 99.28% | 0.00% | 0.02% | 0.52% | 13 | 1883 | 0.69% | 99.24% | 0 | 145878 | 15745.3 | 300696 |
| Tata Tele - GSM | PMR | 1412 | 156 | 0.01% | 0 | 0.00% | 98.54% | 0.11% | 0.11% | 0.94% | 204 | 4234 | 4.81% | 97.18% | 0 | 58949 | 15121.2 | 807494 |
| | IMRB | 1412 | 156 | 0.01% | 0 | 0.00% | 98.54% | 0.11% | 0.11% | 0.94% | 204 | 4234 | 4.81% | 97.18% | 0 | 58949 | 15121.0 | 807494 |
| Aircel | PMR | 2637 | 4928 | 0.25% | 35 | 1.32% | 96.71% | 0.77% | 0.94% | 1.58% | 393 | 7911 | 4.97% | 95.86% | 0 | 129438 | 30042.5 | 1440505 |
| | IMRB | 2637 | 4928 | 0.24% | 35 | 1.32% | 96.71% | 0.77% | 0.94% | 1.58% | 393 | 7911 | 4.97% | 95.86% | 0 | 129438 | 30042.7 | 1431354 |

DNP: Data not provided by operator

Not meeting benchmark

| Name of Service Provider | | Metering and Billing | | | | | | | | | | | | Response time to the customer for assistance | | | | Termination/ closure of service | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Metering and billing credibility - post paid | No. of bills issued during the period | No. of bills disputed including billing complaints during the period | Metering and billing credibility - pre paid | No. of charging / credit / validity complaints during the quarter | Total no. of pre-paid customers at the end of the quarter | Resolution of billing/charging complaints | No. of billing (post-paid) and charging, credit / validity (pre-paid) complaints resolved within 4 weeks during the quarter | Total no. of billing (post-paid) and charging, credit / validity (pre-paid) complaints received during the quarter | No. of billing complaints (post paid) and charging, credit / validity complaints (pre paid) resolved in favor | No. of complaints disposed on account of not considered as valid complaints during the quarter | Period of applying credit / waiver / adjustment to customer/s account from the date of resolution of complaints | Accessibility of call centre/ customer care | Total no. of call attempts to call centre / customer care nos. during TCBH (Note) | No. of calls connected and answered successfully to call centre / customer care nos. during TCBH (Note) | Percentage of calls answered by the operators (voice to voice) within 60 seconds | %age request for Termination / Clouse of service complied within 7 days | Total No. of request for Termination / Closure of service received during the quarter |
| Benchmark | | < 0.1% | | | < 0.1% | | | 100% within 4 weeks | | | | | 100% Within 1 week | > 95% | | | > 90% | 100% within 7 days | |
| Idea | PMR | 0.00% | 2,566 | 1 | 0.00% | 737 | 5,329,212 | 100.00% | 3277 | 3277 | 738 | 2539 | 100.00% | 100.00% | 977,764 | 972,922 | 91.00% | 100.00% | 146 |
| | IMRB | 0.04% | 2566 | 1 | 0.01% | 737 | 5329212 | 100.00% | 3277 | 3277 | 738 | 2539 | 100.00% | 99.50% | 977764 | 972922 | 91.26% | 100.00% | 138 |
| BSNL | PMR | 0.02% | 153902 | 67 | 0.31% | 19876 | 3624581 | 100.00% | 17342 | 17255 | 8690 | 8565 | 100.00% | 100.00% | 163735 | 161516 | 99.50% | 100.00% | 428 |
| | IMRB | 0.03% | 144612 | 54 | 0.61% | 19871 | 3423694 | 100.00% | 17324 | 17237 | 8672 | 8565 | 100.00% | 100.00% | 163735 | 161516 | 99.29% | 100.00% | 390 |
| Reliance | PMR | 0.10% | 41609 | 40 | 0.10% | 1943 | 1972358 | 100.00% | 5869 | 5869 | 5830 | 39 | 100.00% | 98.00% | 1548190 | 1523362 | 97.00% | 100.00% | 41609 |

| Operator | | C1 | C2 | C3 | C4 | C5 | C6 | C7 | C8 | C9 | C10 | C11 | C12 | C13 | C14 | C15 | C16 | C17 | C18 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CDMA | IMRB | 0.10% | 41609 | 40 | 0.10% | 1943 | 1972358 | 100.00% | 5869 | 5869 | 5830 | 39 | 100.00% | 98.00% | 1548190 | 1523362 | 97.00% | 100.00% | 41609 |
| Reliance GSM | PMR | 0.08% | 18044 | 15 | 0.10% | 5353 | 5277504 | 100.00% | 16073 | 16073 | 16051 | 22 | 100.00% | 99.00% | 8139865 | 8222970 | 97.00% | 100.00% | 261 |
| Reliance GSM | IMRB | 0.08% | 18044 | 15 | 0.10% | 5353 | 5277504 | 100.00% | 16073 | 16073 | 16051 | 22 | 100.00% | 99.00% | 8139865 | 8222970 | 97.00% | 100.00% | 261 |
| MTS | PMR | NA | 1020 | 0 | 813 | 0 | 1677432 | 100.00% | 813 | 813 | 813 | 0 | 100.00% | 100.00% | 314651 | 287293 | 91.00% | NA | NA |
| MTS | IMRB | NA | 1020 | 0 | 813 | 0 | 1677432 | 100.00% | 813 | 813 | 813 | 0 | 100.00% | 100.00% | 314651 | 287293 | 91.00% | NA | NA |
| Airtel | PMR | 0.01% | 78335 | 4 | 0.00% | 1433 | 31484422 | 100.00% | 1437 | 10670 | 1437 | 9233 | 100.00% | 100.00% | 5188207 | 5184307 | 92.00% | 100.00% | 431 |
| Airtel | IMRB | 0.01% | 78335 | 4 | 0.00% | 1433 | 31484422 | 100.00% | 1437 | 10670 | 1437 | 9233 | 100.00% | 99.92% | 5188207 | 5184307 | 95.68% | 100.00% | 431 |
| Videocon | PMR | NA | NA | NA | 0.00% | 0 | 19902 | 100.00% | 0 | 0 | 0 | 0 | 100.00% | 99.00% | 325 | 322 | 99.00% | NA | NA |
| Videocon | IMRB | NA | NA | NA | 0.00% | 0 | 19902 | 100.00% | 0 | 0 | 0 | 0 | 100.00% | 99.08% | 325 | 322 | 99.22% | NA | NA |
| Uninor | PMR | NA | NA | NA | 0.01% | 401 | 2696791 | 98.00% | 392 | 401 | DNP | DNP | DNP | 96.00% | 2137808 | 2048468 | 96.00% | | |
| Uninor | IMRB | NA | NA | NA | 0.01% | 367 | 3542995 | 100.00% | 367 | 367 | 367 | 0 | 100.00% | 97.00% | 909145 | 882382 | 97.00% | NA | NA |
| Vodafone | PMR | 0.00% | 274782 | 17 | 0.00% | 4181 | 11467377 | 100.00% | 4198 | 4198 | 1962 | 2236 | 100.00% | 100.00% | 1169539 | 1062865 | 96.00% | 100.00% | 2822 |
| Vodafone | IMRB | 0.00% | 274782 | 17 | 0.00% | 4181 | 11467377 | 100.00% | 4198 | 4198 | 1962 | 2236 | 100.00% | 100.00% | 41010937 | 41010937 | 92.00% | 100.00% | 2822 |
| Tata Tele - CDMA | PMR | 0.00% | 489 | 268 | 0.01% | 995 | 445705 | 100.00% | 1372 | 1372 | 67 | 1305 | 100.00% | 99.00% | 159584 | 157642 | 99.00% | 100.00% | 685 |
| Tata Tele - CDMA | IMRB | 0.02% | 63558 | 377 | 0.01% | 995 | 445705 | 100.00% | 1372 | 1372 | 67 | 1305 | 100.00% | 99.00% | 159584 | 157642 | 99.00% | 100.00% | 685 |
| Tata Tele - GSM | PMR | 0.00% | 489 | 268 | 0.00% | 590 | 2669829 | 100.00% | 858 | 858 | 78 | 780 | 100.00% | 97.00% | 1034697 | 998908 | 97.00% | 100.00% | 1183 |
| Tata Tele - GSM | IMRB | 0.00% | 489 | 268 | 0.00% | 590 | 2669829 | 100.00% | 858 | 858 | 78 | 780 | 100.00% | 97.00% | 1034697 | 998908 | 97.00% | 100.00% | 0 |
| Aircel | PMR | 0.00% | 4894 | 0 | 0.11% | 3230 | 3071277 | 100.00% | 3230 | 3230 | 214 | 3016 | 100.00% | 100.00% | 287961 | 261525 | 92.00% | 100.00% | 54 |
| Aircel | IMRB | 0.00% | 4894 | 0 | 0.10% | 3230 | 3206433 | 100% | 3230 | 3230 | 214 | 3016 | 100.00% | 100.00% | 472987 | 437868 | 91.75% | 100% | 54 |

DNP: Data not provided by operator

Figures do not match with those reported in PMR

Figures verified on all India basis

B'mark = TRAI Benchmark, NA = Not Applicable

Not meeting benchmark

## 8.0 Conclusions

### 8.1 Cellular Mobile services

1. The figures reported by all the operators on all parameters completely match the figures obtained on verification except for Vodafone & Aircel in Total no. of call attempts to call centre / customer care nos. during TCBH
2. Further, BSNL was not meeting the benchmark on many parameters including Metering and billing credibility - pre paid, and Worst affected BTSs due to downtime (%age)
3. Also, Worst affected cells having more than 3% TCH drop (call drop) rate parameter was not met by BSNL, Vodafone, Tata GSM, and Aircel.

## 9.0 Annexure - I

### 9.1 Service provider performance report based on one month data

| Name of Service Provider | Network Availability | | Connection Establishment (Accessibility) | | | Connection Maintenance (Retainability) | | | Metering and Billing | | | | Response time to customer for assistance | | Termination / closure of service | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 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 | Metering and billing credibility (Postpaid) | Metering and billing credibility (Prepaid) | %age complaints resolved within 4 weeks | Period of applying credit/waiver less than 1 week | Accessibility of call centre/ customer care | Percentage of calls answered by operators within 60 sec | %age requests for Termination complied within 7 days | Refund of deposits after closure within 60 days |
| Benchmark | ≤ 2% | ≤ 2% | ≥ 95% | ≤ 1% | ≤ 2% | ≤ 2% | ≤ 3% | ≥ 95% | ≤ 0.1% | ≤ 0.1% | 100% | 100% | ≥ 95% | ≥ 90% | 100% | 100% |
| Idea | 0.11% | 0.70% | 98.18% | 0.84% | 1.82% | 1.14% | 2.92% | 97.29% | 0.16% | 0.00% | 100.00% | 100.00% | 99.29% | 90.61% | 100.00% | 100.00% |
| BSNL | 1.68% | 1.97% | 97.72% | 0.65% | 0.88% | 0.65% | 4.36% | 97.53% | 0.02% | 0.10% | 100.00% | 100.00% | 97.97% | 95.36% | 100.00% | 100.00% |
| Reliance CDMA | 0.17% | 0.28% | 99.28% | 0.00% | 0.12% | 0.20% | 0.34% | 99.18% | 0.09% | 0.10% | 100.00% | 100.00% | 99.47% | 94.44% | 100.00% | 100.00% |
| Reliance GSM | 0.11% | 0.38% | 98.96% | 0.02% | 0.20% | 0.50% | 0.31% | 98.90% | 0.09% | 0.10% | 100.00% | 100.00% | 98.99% | 95.80% | 100.00% | 100.00% |
| MTS | 0.07% | 0.11% | 99.28% | 0.00% | 0.24% | 0.95% | 2.29% | 99.11% | 0.00% | 0.02% | 100.00% | 100.00% | 43.34% | 89.99% | NA | NA |
| Airtel | 0.02% | 0.08% | 99.70% | 0.04% | 0.06% | 0.45% | 0.82% | 99.58% | 0.00% | 0.00% | 100.00% | 100.00% | 99.94% | 94.06% | 100.00% | 100.00% |
| Videocon | 0.52% | 0.00% | 98.69% | 0.86% | 0.24% | 1.14% | 0.00% | 98.58% | NA | 0.00% | NA | NA | 100.00% | 97.37% | NA | NA |
| Uninor | 1.91% | 1.96% | 97.62% | 0.23% | 1.81% | 1.49% | 1.48% | 96.74% | NA | 0.00% | 100.00% | 100.00% | 96.00% | 96.11% | NA | NA |
| Vodafone | 0.08% | 0.59% | 96.27% | 1.25% | 1.76% | 1.15% | 2.98% | 95.30% | 0.01% | 0.01% | 100.00% | 100.00% | 100.00% | 88.38% | 100.00% | 100.00% |
| Tata Tele - CDMA | 0.08% | 0.00% | 98.54% | 0.00% | 0.05% | 0.87% | 2.85% | 99.04% | 0.18% | 0.02% | 100.00% | 100.00% | 98.77% | 92.72% | 100.00% | 100.00% |
| Tata Tele - GSM | 0.01% | 0.00% | 98.78% | 0.14% | 0.09% | 0.72% | 2.88% | 98.15% | 0.00% | 0.00% | 100.00% | 100.00% | 97.23% | 90.01% | NA | NA |
| Aircel | 1.29% | 2.51% | 96.93% | 0.46% | 0.84% | 1.71% | 5.84% | 95.61% | 0.00% | 0.02% | 100.00% | 100.00% | 100.00% | 76.62% | 100.00% | 100.00% |

### 9.2 Monthly Point of Interconnection (POI) Congestion Report

| Name of the Service Provider | Name of POI not meeting the benchmark | Total No. of circuits on POI | Total No. of call attempts on POI | Total traffic served on POI (Erlang) | % of Congestion POI | Action already taken/ action plan for meeting the benchmark |
|---|---|---|---|---|---|---|
| Idea | 0 | 0 | 0 | 0 | 0 | 0 |
| BSNL | 0 | 0 | 0 | 0 | 0 | 0 |
| Reliance CDMA | 0 | 0 | 0 | 0 | 0 | 0 |
| Reliance GSM | 0 | 0 | 0 | 0 | 0 | 0 |
| MTS | 0 | 0 | 0 | 0 | 0 | 0 |
| Airtel | 0 | 0 | 0 | 0 | 0 | 0 |
| Videocon | 0 | 0 | 0 | 0 | 0 | 0 |
| Uninor | 0 | 0 | 0 | 0 | 0 | 0 |
| Vodafone | 0 | 0 | 0 | 0 | 0 | 0 |
| Tata Tele - CDMA | 0 | 0 | 0 | 0 | 0 | 0 |
| Tata Tele - GSM | 0 | 0 | 0 | 0 | 0 | 0 |
| Aircel | 0 | 0 | 0 | 0 | 0 | 0 |

## 9.3 Parameter wise performance reports for Cellular Mobile services

**1. Network Availability**

## Audit Results for Network Availability

| | Benchmark | Idea | BSNL | Reliance CDMA | Reliance GSM | MTS | Airtel | Videocon | Uninor | Vodafone | Tata Tele - CDMA | Tata Tele - GSM | Aircel |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Number of BTSs in the licensed service area | | 2139 | 2542 | 1079 | 2663 | 906 | 4787 | 31 | 1934 | 6299 | 628 | 1412 | 2668 |
| Sum of downtime of BTSs in a month (in hours) | | 1809 | 31803 | 1397 | 2248 | 444 | 714 | 120.63 | 27478 | 3635 | 393 | 143 | 25525 |
| BTSs accumulated downtime (not available for service) | ≤ 2% | 0.11% | 1.68% | 0.17% | 0.11% | 0.07% | 0.02% | 0.52% | 1.91% | 0.08% | 0.08% | 0.01% | 1.29% |
| Number of BTSs having accumulated downtime >24 hours | | 15 | 50 | 3 | 10 | 1 | 4 | 0 | 38 | 37 | 0 | 0 | 67 |
| Worst affected BTSs due to downtime | ≤ 2% | 0.70% | 1.97% | 0.28% | 0.38% | 0.11% | 0.08% | 0.00% | 1.96% | 0.59% | 0.00% | 0.00% | 2.51% |

| | Benchmark | Idea | BSNL | Reliance CDMA | Reliance GSM | MTS | Airtel | Videocon | Uninor | Vodafone | Tata Tele - CDMA | Tata Tele - GSM | Aircel |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Number of BTSs in the licensed service area | | 2139 | 2418 | 1079 | 2663 | 895 | 4967 | 31 | 1934 | 6299 | 628 | 1412 | 2651 |
| Sum of downtime of BTSs in a month (in hours) | | 84.08 | 2622 | 313 | 484 | 118 | 68 | 26 | 1583 | 571 | 19.98 | 54.57 | 2958 |
| BTSs accumulated downtime (not available for service) | ≤ 2% | 0.05% | 0.15% | 0.40% | 0.25% | 0.18% | 0.02% | 1.16% | 1.14% | 0.13% | 0.04% | 0.05% | 1.55% |
| Number of BTSs having accumulated downtime >24 hours | | 8 | 4 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Worst affected BTSs due to downtime | ≤ 2% | 0.37% | 0.17% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% |

**2. Connection Establishment (Accessibility)**

## Audit Results for CSSR, SDCCH and TCH congestion

| CSSR | Benchmark | Idea | BSNL | Reliance CDMA | Reliance GSM | MTS | Airtel | Videocon | Uninor | Vodafone | Tata Tele - CDMA | Tata Tele - GSM | Aircel |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CSSR | ≥ 95% | 98.18% | 97.72% | 99.28% | 98.96% | 99.28% | 99.70% | 98.69% | 97.62% | 96.27% | 98.54% | 98.78% | 96.93% |

| SDCCH congestion | Benchmark | Idea | BSNL | Reliance CDMA | Reliance GSM | MTS | Airtel | Videocon | Uninor | Vodafone | Tata Tele - CDMA | Tata Tele - GSM | Aircel |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SDCCH/Paging channel congestion | ≤ 1% | 0.84% | 0.65% | 0.00% | 0.02% | 0.00% | 0.04% | 0.86% | 0.23% | 1.25% | 0.00% | 0.14% | 0.46% |

| TCH congestion | Benchmark | Idea | BSNL | Reliance CDMA | Reliance GSM | MTS | Airtel | Videocon | Uninor | Vodafone | Tata Tele - CDMA | Tata Tele - GSM | Aircel |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| TCH congestion | ≤ 2% | 1.82% | 0.88% | 0.12% | 0.20% | 0.24% | 0.06% | 0.24% | 1.81% | 1.76% | 0.05% | 0.09% | 0.84% |

## Live measurement results for CSSR, SDCCH and TCH congestion

| CSSR | Benchmark | Idea | BSNL | Reliance CDMA | Reliance GSM | MTS | Airtel | Videocon | Uninor | Vodafone | Tata Tele - CDMA | Tata Tele - GSM | Aircel |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CSSR | ≥ 95% | 98.93% | 97.00% | 98.58% | 99.01% | 99.27% | 99.59% | 99.31% | 97.43% | 97.16% | 98.88% | 97.79% | 98.38% |

| SDCCH congestion | Benchmark | Idea | BSNL | Reliance CDMA | Reliance GSM | MTS | Airtel | Videocon | Uninor | Vodafone | Tata Tele - CDMA | Tata Tele - GSM | Aircel |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SDCCH/Paging channel congestion | ≤ 1% | 0.17% | 0.60% | 0.00% | 0.01% | 0.00% | 0.05% | 0.00% | 0.25% | 0.77% | 0.00% | 0.09% | 0.26% |

| TCH congestion | Benchmark | Idea | BSNL | Reliance CDMA | Reliance GSM | MTS | Airtel | Videocon | Uninor | Vodafone | Tata Tele - CDMA | Tata Tele - GSM | Aircel |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| TCH congestion | ≤ 2% | 0.25% | 0.86% | 0.01% | 0.13% | 0.67% | 0.10% | 0.00% | 1.80% | 1.41% | 0.03% | 0.18% | 0.24% |

## Drive test results for CSSR (Average of three drive tests) and blocked calls

| CSSR | Benchmark | Idea | BSNL | Reliance CDMA | Reliance GSM | MTS | Airtel | Videocon | Uninor | Vodafone | Tata Tele - CDMA | Tata Tele - GSM | Aircel |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Total number of call attempts | | 630 | 701 | 630 | 630 | 420 | 630 | NA | NA | 630 | 650 | 660 | 630 |
| Total number of successful calls established | | 630 | 637 | 630 | 629 | 420 | 630 | NA | NA | 630 | 650 | 660 | 630 |
| CSSR | ≥ 95% | 100.00% | 90.87% | 100.00% | 99.84% | 100.00% | 100.00% | NA | NA | 100.00% | 100.00% | 100.00% | 100.00% |

| Blocked calls | Benchmark | Idea | | Reliance CDMA | Reliance GSM | MTS | Airtel | Videocon | Uninor | Vodafone | Tata Tele - CDMA | Tata Tele - GSM | Aircel |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| %age blocked calls | | 0.00% | 9.13% | 0.00% | 0.16% | 0.00% | 0.00% | NA | NA | 0.00% | 0.00% | 0.00% | 0.00% |

**3. Connection Maintenance (Retainability)**

## Audit Results for Call drop rate and for number of cells having more than 3% TCH

| Call drop rate | Benchmark | Idea | BSNL | Reliance CDMA | Reliance GSM | MTS | Airtel | Videocon | Uninor | Vodafone | Tata Tele - CDMA | Tata Tele - GSM | Aircel |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Total number of calls established | | 54935271 | 2668892718 | 28972818 | 109747024 | 66318172 | 293371631 | 968 | 73581733 | 14015017 | 17303947 | 25100244 | 56959295 |
| Total number of calls dropped | | 626571 | 17216083 | 28914873 | 543363 | 628971 | 1309489 | 11 | 1096395 | 161761 | 150533 | 179796 | 972600 |
| Call drop rate | ≤ 2% | 1.14% | 0.65% | 0.20% | 0.50% | 0.95% | 0.45% | 1.14% | 1.49% | 1.15% | 0.87% | 0.72% | 1.71% |

| Cells having more than 3% TCH | Benchmark | Idea | BSNL | Reliance CDMA | Reliance GSM | MTS | Airtel | Videocon | Uninor | Vodafone | Tata Tele - CDMA | Tata Tele - GSM | Aircel |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Total number of cells in the network | | 6415 | 7428 | 3237 | 7989 | 3052 | 15933 | 95 | 5808 | 18844 | 1893 | 127080 | 7934 |
| Total number of cells having more than 3% TCH | | 187 | 324 | 11 | 25 | 70 | 131 | 0 | 86 | 562 | 54 | 3657 | 463 |
| Worst affected cells having more than 3% TCH | ≤ 3% | 2.92% | 4.36% | 0.34% | 0.31% | 2.29% | 0.82% | 0.00% | 1.48% | 2.98% | 2.85% | 2.88% | 5.84% |

## Live measurement results for Call drop rate and for number of cells having more than 3% TCH

| Call drop rate | Benchmark | Idea | BSNL | Reliance CDMA | Reliance GSM | MTS | Airtel | Videocon | Uninor | Vodafone | Tata Tele - CDMA | Tata Tele - GSM | Aircel |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Total number of calls established | | 64239974 | 208877405 | 30381526 | 100892166 | 6271493 | 27300350 | 368 | 7162712 | 13087454 | 4731490 | 2584419 | 60951092 |
| Total number of calls dropped | | 673315 | 1297740 | 9674 | 605257 | 44713 | 133035 | 1 | 101179 | 143746 | 38169 | 19153 | 846011 |
| Call drop rate | ≤ 2% | 1.05% | 0.02% | 0.03% | 0.60% | 0.71% | 0.49% | 0.27% | 1.41% | 1.10% | 0.81% | 0.74% | 1.39% |

| Cells having more than 3% TCH | Benchmark | Idea | BSNL | Reliance CDMA | Reliance GSM | MTS | Airtel | Videocon | Uninor | Vodafone | Tata Tele - CDMA | Tata Tele - GSM | Aircel |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Total number of cells in the network | | 6415 | 7428 | 3237 | 7989 | 3043 | 47841 | 95 | 5808 | 18903 | 5700 | 12708 | 7879 |
| Total number of cells having more than 3% TCH | | 26 | 197 | 3 | 15 | 64 | 394 | 0 | 86 | DNP | 168 | 345 | 450 |
| Worst affected cells having more than 3% TCH | ≤ 3% | 0.41% | 2.65% | 0.09% | 0.19% | 2.10% | 0.82% | 0.00% | 1.48% | DNP | 2.95% | 2.71% | 5.71% |

## Drive test results for Call drop rate (Average of three drive tests)

| Call drop rate | Benchmark | Idea | BSNL | Reliance CDMA | Reliance GSM | MTS | Airtel | Videocon | Uninor | Vodafone | Tata Tele - CDMA | Tata Tele - GSM | Aircel |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Total number of calls established | | 630 | 637 | 630 | 630 | 420 | 630 | NA | NA | 630 | 650 | 660 | 630 |
| Total number of calls dropped | | 2 | 31 | 0 | 1 | 0 | 0 | NA | NA | 0 | 0 | 0 | 2 |
| Call drop rate | ≤ 2% | 0.32% | 4.87% | 0.00% | 0.16% | 0.00% | 0.00% | NA | NA | 0.00% | 0.00% | 0.00% | 0.32% |

**4. Voice quality**

## Audit & Live measurement Results for Voice quality

| Voice quality | Benchmark | Idea | BSNL | Reliance CDMA | Reliance GSM | MTS | Airtel | Videocon | Uninor | Vodafone | Tata Tele - CDMA | Tata Tele - GSM | Aircel |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Total number of sample calls | | 8046216257 | 10126 | 101987123 | 18518091739 | 66318172 | 38677800345 | 284370 | 12346010490 | 1986091767 | 9318 | 8652871295 | 7913976294 |
| Total number of calls with good voice quality | | 7827765268 | 9876 | 101155627 | 18314688465 | 65730967 | 38517215385 | 280336 | 11943530575 | 1892682689 | 9229 | 8493203006 | 7566630377 |
| %age calls with good voice quality | ≥ 95% | 97.29% | 97.53% | 99.18% | 98.90% | 99.11% | 99.58% | 98.58% | 96.74% | 95.30% | 99.04% | 98.15% | 95.61% |

| Voice quality | Benchmark | Idea | BSNL | Reliance CDMA | Reliance GSM | MTS | Airtel | Videocon | Uninor | Vodafone | Tata Tele - CDMA | Tata Tele - GSM | Aircel |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Total number of sample calls | | 8962670422 | 985 | 106305040 | NA | 69309678 | 40481156026 | 41619 | 1288954612 | 1995245095 | 11380 | 936623988 | 8066648736 |
| Total number of calls with good voice quality | | 8767862736 | 960 | 106305040 | NA | 69052267 | 40315792892 | 41241 | 1247450273 | 1900552964 | 11271 | 913798728 | 7751405009 |
| %age calls with good voice quality | ≥ 95% | 97.83% | 97.46% | 100.00% | 99.20% | 99.63% | 99.59% | 99.09% | 96.78% | 95.25% | 99.04% | 97.56% | 96.09% |

## Drive test results for Voice quality (Average of three drive tests)

| Voice quality | Benchmark | Idea | BSNL | Reliance CDMA | Reliance GSM | MTS | Airtel | Videocon | Uninor | Vodafone | Tata Tele - CDMA | Tata Tele - GSM | Aircel |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Total number of sample calls | | 910520 | 46410 | 57153 | 838483 | 39924 | 1179874 | NA | NA | 1035370 | 39635 | 1085500 | 1035992 |
| Total number of calls with good voice quality | | 893349 | 45058 | 56596 | 805801 | 39645 | 1142930 | NA | NA | 993366 | 38605 | 1065892 | 1003661 |
| %age calls with good voice quality | ≥ 95% | 98.11% | 97.09% | 99.03% | 96.10% | 99.30% | 96.87% | NA | NA | 95.94% | 97.40% | 98.19% | 96.88% |

**5. POI Congestion**

## Audit Results for POI Congestion

| POI congestion | Benchmark | Idea | BSNL | Reliance CDMA | Reliance GSM | MTS | Airtel | Videocon | Uninor | Vodafone | Tata Tele - CDMA | Tata Tele - GSM | Aircel |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Total number of working POIs | | 87 | 93 | 21 | 21 | 69 | 31 | 11 | 105 | 41 | 150 | 27 | 130 |
| No. of POIs not meeting benchmark | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 |
| Total Capacity of all POIs (A) - in erlangs | | 71453 | 52119 | 755226.8 | 1125528.0 | 1060535 | 101615 | 26.29 | 62489 | 239506 | 40489 | 13124 | 47876 |
| Traffic served for all POIs (B)- in erlangs | | 45281.44 | 22504 | 348538.8 | 893280.4 | 636020 | 61701 | 1.43 | 38701 | 139413 | 18816 | 6611 | 18572 |
| POI congestion | ≤ 0.5% | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |

## Live measurement results for POI congestion

| POI congestion | Benchmark | Idea | BSNL | Reliance CDMA | Reliance GSM | MTS | Airtel | Videocon | Uninor | Vodafone | Tata Tele - CDMA | Tata Tele - GSM | Aircel |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Total number of working POIs | | 87 | 93 | 21 | 21 | 69 | 31 | 10 | 106 | 41 | 150 | 27 | 130 |
| No. of POIs not meeting benchmark | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 8 | 0 | 0 | 0 | 0 |
| Total Capacity of all POIs (A) - in erlangs | | 76010 | 52119 | 49724.0 | 111901.06 | 103116.19 | 288196 | 27.02 | 63340 | 230063 | 39992 | 12812 | 48095 |
| Traffic served for all POIs (B)- in erlangs | | 43822.11 | 22140 | 22048.8 | 89407.84 | 60976.21 | 194029 | 0.76 | 38658 | 130416 | 8015 | 6899 | 19965 |
| POI congestion | ≤ 0.5% | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |

**6. Inter Operator Call Assessment**

| Inter operator call Assessment To↓                From→ | Idea | BSNL | Reliance GSM | MTS | Airtel | Videocon | Uninor | Vodafone | Tata Tele - CDMA | Tata Tele - GSM | Aircel |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Idea | NA | 100% | 100% | 100% | 100% | NA | 100% | 100% | 100% | 100% | 100% |
| BSNL | 100% | NA | 100% | 100% | 100% | NA | 100% | 100% | 100% | 100% | 100% |
| Reliance CDMA | 100% | 100% | 100% | 100% | 100% | NA | 100% | 100% | 100% | 100% | 100% |
| Reliance GSM | 100% | 100% | NA | 100% | 100% | NA | 100% | 100% | 100% | 100% | 100% |
| MTS | 100% | 100% | 100% | NA | 100% | NA | 100% | 100% | 100% | 100% | 100% |
| Airtel | 100% | 100% | 100% | 100% | NA | NA | 100% | 100% | 100% | 100% | 100% |
| Videocon | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| Uninor | 100% | 100% | 100% | 100% | 100% | NA | NA | 100% | 100% | 100% | 100% |
| Vodafone | 100% | 100% | 100% | 100% | 100% | NA | 100% | NA | 100% | 100% | 100% |
| Tata Tele - CDMA | 100% | 100% | 100% | 100% | 100% | NA | 100% | 100% | NA | 100% | 100% |
| Tata Tele - GSM | 100% | 100% | 100% | 100% | 100% | NA | 100% | 100% | 100% | NA | 100% |
| Aircel | 100% | 100% | 100% | 100% | 100% | NA | 100% | 100% | 100% | 100% | NA |

<span style="background-color:orange">      </span>   The maximum problem faced by the calling operator to other operators

**7. Metering and Billing credibility**

## Audit Results for Billing performance

| Billing Performance | Benchmark | Idea | BSNL | Reliance CDMA | Reliance GSM | MTS | Airtel | Videocon | Uninor | Vodafone | Tata Tele - CDMA | Tata Tele - GSM | Aircel |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Billing diputes - Postpaid** | | | | | | | | | | | | | |
| Total bills generated during the period | | 612 | 43015 | 12735 | 7476 | 1238 | 29930 | NA | NA | 98955 | 22740 | 583 | 1986 |
| Total number of bills disputed | | 1 | 8 | 12 | 7 | 0 | 0 | NA | NA | 12 | 42 | 0 | 0 |
| Percentage bills disputed | ≤ 0.1% | 0.16% | 0.02% | 0.09% | 0.09% | 0.00% | 0.00% | NA | NA | 0.01% | 0.18% | 0.00% | 0.00% |
| **Billing disputes - Prepaid** | | | | | | | | | | | | | |
| Number of complaints related to charging, credit & validity | | 96 | 3375 | 2018 | 5741 | 321 | 227 | 0 | 73 | 600 | 111 | 97 | 848 |
| Total number of prepaid customers in that period | | 2238757 | 3462351 | 2018506 | 5741211 | 1930479 | 11108517 | 17209 | 4015527 | 11644436 | 473876 | 2689215 | 3417360 |
| Percentage of complaints | ≤ 0.1% | 0.00% | 0.10% | 0.10% | 0.10% | 0.02% | 0.00% | 0.00% | 0.00% | 0.01% | 0.02% | 0.00% | 0.02% |
| **Resolution of billing complaints** | | | | | | | | | | | | | |
| Total number of billing/charging complaints | | 676 | 3420 | 2030 | 5748 | 321 | 2882 | 0 | 73 | 612 | 153 | 97 | 848 |
| Total complaints considered invalid | | 579 | 226 | 400 | 2 | 0 | 227 | 0 | 0 | 423 | 133 | 86 | 801 |
| Number of complaints resolved in 4 weeks from date of receipt for complaints listed in 5.3.1 | | 676 | 3077 | 2030 | 5748 | 321 | 227 | NA | 73 | 612 | 153 | 97 | 848 |
| Percentage complaints resolved within 4 weeks of date of receipt | 100% | 100% | 100% | 100% | 100% | 100% | 100% | NA | 100% | 100% | 100% | 100% | 100% |
| **Period of applying credit / waiver** | | | | | | | | | | | | | |
| Total number of complaints where credit/waiver is required | | 97 | 144 | 1630 | 5746 | 321 | 227 | NA | 73 | 189 | 20 | 11 | 47 |
| Percentage cases in which credit/waiver was received within 1 week | 100% | 100% | 100% | 100% | 100% | 100% | 100% | NA | 100% | 100% | 100% | 100% | 100% |

## Live calling results for resolution of billing complaints

| Resolution of billing complaints | Benchmark | Idea | BSNL | Reliance CDMA | Reliance GSM | MTS | Airtel | Videocon | Uninor | Vodafone | Tata Tele - CDMA | Tata Tele - GSM | Aircel |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Total Number of calls made | | 100 | 63 | 100 | 100 | 100 | 100 | NA | 53 | 100 | 13 | 16 | 100 |
| Number of cases resolved in 4 weeks | | 92 | 45 | 95 | 95 | 85 | 69 | NA | 49 | 98 | 4 | 10 | 95 |
| Percentage cases resolved in four weeks | 100% | 92% | 71% | 95% | 95% | 85% | 69% | NA | 92% | 98% | 31% | 63% | 95% |

**8. Customer Care**

## Audit results for customer care

| Customer Care Assessment | Benchmark | Idea | BSNL | Reliance CDMA | Reliance GSM | MTS | Airtel | Videocon | Uninor | Vodafone | Tata Tele - CDMA | Tata Tele - GSM | Aircel |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Total number of call attempts to customer care for assistance | | 457671 | 1250666 | 905214 | 4334328 | 2836481 | 2076126 | 90 | 821693 | 11280453 | 1691835 | 3946318 | 2700915 |
| Number of calls getting connected and answered | | 454426 | 1225262 | 900391 | 4290374 | 1229260 | 2074855 | 90 | 788785 | 11280453 | 1670951 | 3837058 | 2700915 |

| | Benchmark | Idea | BSNL | Reliance CDMA | Reliance GSM | MTS | Airtel | Videocon | Uninor | Vodafone | Tata Tele - CDMA | Tata Tele - GSM | Aircel |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| (electronically) | | | | | | | | | | | | | |
| Percentage calls getting connected and answered | ≥ 95% | 99.29% | 97.97% | 99.47% | 98.99% | 43.34% | 99.94% | 100.00% | 96.00% | 100.00% | 98.77% | 97.23% | 100.00% |
| Number of calls getting transferred to the operator (voice to voice) | | 690697 | 658779 | 295183 | 1127952 | 1392445 | 3372044 | 76 | 1385190 | 3379265 | 86904 | 728909 | 1402095 |
| Number of calls answered by operator (voice to voice) within 60 seconds | | 625835 | 628201 | 278769 | 1080574 | 1253061 | 3171806 | 74 | 1331358 | 2986494 | 80579 | 656125 | 1074273 |
| Percentage calls answered within 60 seconds (V2V) | ≥ 90% | 90.61% | 95.36% | 94.44% | 95.80% | 89.99% | 94.06% | 97.37% | 96.11% | 88.38% | 92.72% | 90.01% | 76.62% |

## Live measurement results for customer care

| Customer Care Assessment | Benchmark | Idea | BSNL | Reliance CDMA | Reliance GSM | MTS | Airtel | Videocon | Uninor | Vodafone | Tata Tele - CDMA | Tata Tele - GSM | Aircel |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Total number of call attempts to customer care for assistance | | 63971 | 134501 | 96147 | 417442 | 297491 | NA | 4 | 118220 | 1145786 | 40865 | 458267 | 371888 |
| Number of calls getting connected and answered (electronically) | | 63234 | 131409 | 95601 | 413211 | 151921 | NA | 4 | 114158 | 1145786 | 40754 | 447341 | 371888 |
| Percentage calls getting connected and answered | ≥ 95% | 98.85% | 97.70% | 99.43% | 98.99% | 51.07% | NA | 100.00% | 96.56% | 100.00% | 99.73% | 97.62% | 100.00% |
| Number of calls getting transferred to the operator (voice to voice) | | 68584 | 70227 | 26343 | 108768 | 145570 | 341080 | 4 | 147925 | 325221 | 8282 | 79274 | 191347 |
| Number of calls answered by operator (voice to voice) within 60 seconds | | 61661 | 65196 | 24842 | 104239 | 130998 | 310767 | 4 | 143269 | 313274 | 7787 | 43694 | 100707 |
| Percentage calls answered within 60 seconds (V2V) | ≥ 90% | 89.91% | 92.84% | 94.30% | 95.84% | 89.99% | 91.11% | 100.00% | 96.85% | 96.33% | 94.02% | 55.12% | 52.63% |

## Live calling results for customer care

| Customer Care Assessment | Benchmark | Idea | BSNL | Reliance CDMA | Reliance GSM | MTS | Airtel | Videocon | Uninor | Vodafone | Tata Tele - CDMA | Tata Tele - GSM | Aircel |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Total Number of calls received | | 100 | 100 | 100 | 100 | 100 | 100 | NA | 100 | 100 | 100 | 100 | 100 |
| Total Number of calls getting connected and answered | | 100 | 100 | 100 | 100 | 100 | 100 | NA | 100 | 100 | 100 | 100 | 100 |
| Percentage calls getting connected and answered | ≥ 95% | 100.00% | 100.00% | 100.00% | 100.00% | 100.00% | 100.00% | NA | 100.00% | 100.00% | 100.00% | 100.00% | 100.00% |

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

| Customer Care Assessment | Benchmark | Idea | BSNL | Reliance CDMA | Reliance GSM | MTS | Airtel | Videocon | Uninor | Vodafone | Tata Tele - CDMA | Tata Tele - GSM | Aircel |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Total Number of calls received | | 100 | 100 | 100 | 100 | 100 | 100 | NA | 100 | 100 | 100 | 100 | 100 |
| Total Number of calls answered within 60 seconds | | 88 | 84 | 87 | 91 | 88 | 92 | NA | 89 | 95 | 88 | 88 | 90 |
| Percentage calls answered within 60 seconds | ≥ 90% | 88.00% | 84.00% | 87.00% | 91.00% | 88.00% | 92.00% | NA | 89.00% | 95.00% | 88.00% | 88.00% | 90.00% |

| Operator | WB |
|---|---|
| Aircel | 121 |
| Airtel | 121 |
| BSNL | 9434024365 |
| Idea | 12345 |
| MTS | 91531555155 |
| Reliance CDMA | *222/*333 |
| Reliance GSM | *222/*333 |
| Tata Indicom | 9231012345 |
| Tata Docomo | 9038012345 |
| Vodafone | 111 |
| Uninor | 9126091260 |

**9. Termination / closure of service**

## Audit results for termination / closure of service

| Termination | Benchmark | Idea | BSNL | Reliance CDMA | Reliance GSM | MTS | Airtel | Videocon | Uninor | Vodafone | Tata Tele - CDMA | Tata Tele - GSM | Aircel |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Total number of closure request | | 30 | 143 | 81 | 80 | 0 | 165 | 0 | 0 | 1032 | 278 | 0 | 16 |
| Number of requests attended within 7 days | | 30 | 143 | 81 | 80 | 0 | 165 | 0 | 0 | 1032 | 278 | 0 | 16 |
| Percentage cases in which termination done within 7 days | 100% | 100.00% | 100.00% | 100.00% | 100.00% | NA | 100.00% | NA | NA | 100.00% | 100.00% | NA | 100.00% |

## Audit results for refund of deposits

| Refund | Benchmark | Idea | BSNL | Reliance CDMA | Reliance GSM | MTS | Airtel | Videocon | Uninor | Vodafone | Tata Tele - CDMA | Tata Tele - GSM | Aircel |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Total number of cases requiring refund of deposits | | 1 | 149 | 72 | 29 | 0 | 29 | 0 | 0 | 669 | 9 | 0 | 0 |
| Total number of cases where refund was made within 60 days | | 1 | 149 | 72 | 29 | 0 | 29 | 0 | 0 | 669 | 9 | 0 | NA |
| Percentage cases in which refund was receive within 60 days | 100% | 100.00% | 100.00% | 100.00% | 100.00% | NA | 100.00% | NA | NA | 100.00% | 100.00% | NA | 100.00% |

| 11. Additional Network Related parameters | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Audit Results for Total Traffic Handled in Erlang** | | | | | | | | | | | | | |
| Traffic in Erlang | | Idea | BSNL | Reliance CDMA | Reliance GSM | MTS | Airtel | Videocon | Uninor | Vodafone | Tata Tele - CDMA | Tata Tele - GSM | Aircel |
| Equipped capacity of the network | | 49575 | 176000 | 148000 | 138000 | 109200 | 242468 | 5000 | 79757 | 302549 | 141286 | 61652 | 125892 |
| Total traffic handled in erlang during TCBH | | 50963 | 107773.56 | 45023 | 107630 | 48206.62 | 201341 | 0.29 | 67831 | 286096 | 18360 | 20132 | 40741 |

| Total number of customers as per VLR | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Idea | BSNL | Reliance CDMA | Reliance GSM | MTS | Airtel | Videocon | Uninor | Vodafone | Tata Tele - CDMA | Tata Tele - GSM | Aircel |
| Total no. of customers served (as per VLR) | | 1815516 | 1715845 | 1131284 | 4952214 | 1133362 | 8229011 | 150 | 1690705 | 10734069 | 273493 | 889882 | 1731971 |

| Level 1 services | | Idea | BSNL | Reliance CDMA | Reliance GSM | MTS | Airtel | Videocon | Uninor | Vodafone | Tata Tele - CDMA | Tata Tele - GSM | Aircel |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Total no. of calls made | | 150 | 150 | 150 | 150 | 150 | 150 | NA | 150 | 150 | 150 | 150 | 150 |
| Calls answered in 60 sec | | 150 | 150 | 150 | 150 | 150 | 150 | NA | 150 | 150 | 150 | 150 | 150 |
| Calls answered after 60 sec | | 0 | 0 | 0 | 0 | 0 | 0 | NA | 0 | 0 | 0 | 0 | 0 |

A total of 150 calls were made including 50 each at these numbers respectively:

- o 100
- o 101
- o 102

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