

Objective Assessment of Quality of Services for (QoS) for Cellular Mobile (Wireless) Service Providers

North East Circle

Report: July–August - September - 2011



Prepared for: **Telecom Regulatory Authority of India**

By: **eTech Group@IMRB**

A specialist unit of IMRB International

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 to 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 third quarter of 2011. **This report details the performance of various service providers in North East circle against Quality of Services benchmarks for various parameters laid down by TRAI in respective regulations for Cellular (Mobile) services.**

Table of contents

| | |
|---|-----------|
| 1.0 Background..... | 4 |
| 2.0 Objectives and Methodology | 5 |
| 3.0 Sampling methodology | 6 |
| 4.0 Audit methodology | 7 |
| 4.1 Cellular Mobile Services | 7 |
| 5.0 Executive Summary..... | 8 |
| 5.1 Service provider performance report based on one month data verification | 9 |
| 6.0 Detailed findings – Includes comparison between Live calling/Live measurements and One month data collection | 15 |
| 6.1 Graphical/Tabular Representations for Cellular Mobile Services | 15 |
| 7.0 Compliance reports: Results of Verification of PMR..... | 26 |
| 7.1 Compliance Report Month 1: January 2011 | 26 |
| 7.2 Compliance Report Month 2: February 2011 | 27 |
| 7.3 Compliance Report Month 3: March 2011 | 28 |
| 8.0 Conclusions | 30 |
| 9.0 Annexure - I..... | 31 |
| 9.1 Service provider performance report based on one month data | 31 |
| 9.2 Monthly Point of Interconnection (POI) Congestion Report..... | 31 |
| 9.3 Parameter wise performance reports for Cellular Mobile services..... | 32 |
| 10.0 Annexure – II Detailed Explanation of Audit methodology (Parameter wise)..... | 37 |
| 10.1 Cellular Mobile services | 37 |

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

IMRB has been carrying out this exercise for TRAI since December 2007 to assess the quality of services being provided by Basic (Wireline), Cellular Mobile (Wireless) and Broadband service providers.

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 North East circle that was covered in period of July-Sep 2011. The verification of records maintained by various operators of Cellular Mobile (Wireless) service was undertaken by the auditors of IMRB International during the period Jan-Mar 2011.



This report highlights the Audit Module findings for North East 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 the customer care, inter operator call assessment, Back check calls for service provisioning and fault repair

- 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.
- Separate formats were designed each for Basic (Wireline), Cellular mobile (Wireless) and Broadband services to collect the information on various parameters

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 Centers (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 North East circle

| | Name of Operator |
|------------|-------------------------|
| Operator 1 | Aircel |
| Operator 2 | Airtel |
| Operator 3 | BSNL |
| Operator 4 | Idea |
| Operator 5 | Loop |
| Operator 6 | Reliance |
| Operator 7 | S Tel |
| Operator 8 | Tata Indicom |
| Operator 9 | Vodafone |

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 ASSISTED 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 | | |

{Note: A more detailed explanation of parameter wise audit methodology for Cellular Mobile services is explained in Annexure}

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 July 2011 to September 2011 in North East circle. The executive summary encapsulates the key findings of the Audit by providing: -

- “Service provider performance report” for Cellular mobile service , which gives a glimpse of the performance of various operators against the benchmark specified by TRAI, during the month in which the Audit was carried out by IMRB Auditors
- “Parameter wise critical findings” for Cellular mobile services: This indicates key observations and findings from different activities carried out during the Audit process

5.1 Service provider performance report based on one month data verification

| 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) (%) | No. of BTSs having accumulated downtime of >24 hours in a month | 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 (%) | 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 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% | | | ≤ 5% | ≥ 95% | ≤ 0.5% | | | | |
| Aircel | 19:00 - 20:00 | 1475 | 7546 | 0.69% | 68 | 4.61% | 91.45% | 5.63% | 6.82% | 2.04% | 453 | 4227 | 10.72% | 94.72% | 0 | 36 | 67593 | 51424 | 1548650 |
| Airtel | 19:00 - 20:00 | 1389 | 8937 | 0.86% | 24 | 1.73% | 95.99% | 0.89% | 1.86% | 1.16% | 114 | 4122 | 2.77% | 98.66% | 0 | 51 | 79897 | 61621 | 1506752 |
| BSNL | 19:00 - 20:00 | 646 | 18597 | 3.87% | 71 | 10.99% | 95.82% | 2.44% | 3.77% | 2.92% | 251 | 1927 | 13.03% | 95.58% | 5 | 47 | 68000 | 53661 | 654983 |
| Idea | 19:00 - 20:00 | 385 | 2624 | 0.92% | 6 | 1.56% | 95.50% | 0.88% | 1.23% | 1.93% | 1037 | 34836 | 2.98% | 96.10% | 0 | 25 | 7646 | 5091 | 173795 |
| Loop | 19:00 - 20:00 | 13 | 141 | 1.46% | 0 | 0.00% | 100.00% | 0.00% | 0.00% | 0.00% | 0 | 40 | 0.00% | 100.00% | 0 | 11 | 296 | 0 | 2 |
| Reliance | 19:00 - 20:00 | 584 | 3 | 0.00% | 0 | 0.00% | 98.00% | 0.65% | 0.99% | 0.93% | 32 | 1647 | 1.94% | 98.98% | 0 | 14 | 40000 | 13699 | 445666 |
| S Tel | 20:00 - 21:00 | 106 | 675 | 0.86% | 1 | 0.94% | 99.00% | 0.00% | 0.01% | 0.39% | 15 | 318 | 4.72% | 98.46% | 0 | 14 | 2367 | 197 | 8874 |
| Tata Indicom | 20:00 - 21:00 | 176 | 768 | 0.59% | 10 | 5.68% | 93.90% | 0.00% | 0.00% | 0.34% | 4 | 561 | 0.71% | 98.68% | 0 | 27 | 38417 | 10749 | 41939 |
| Vodafone | 19:00 - 20:00 | 1050 | 3629 | 0.46% | 10 | 0.95% | 97.80% | 0.46% | 1.36% | 1.23% | 125 | 3226 | 3.87% | 97.08% | 0 | 30 | 29735 | 21220 | 647691 |

*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

Critical findings: Cellular Mobile Services

The audit for cellular mobile service providers were conducted at their respective MSCs in the North East 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 |
|------------------|------------------------------------|---|
| Aircel | 20:00-21:00 | 20:00-21:00 |
| Airtel | 20:00-21:00 | 20:00-21:00 |
| BSNL | 19:00-20:00 | 19:00-20:00 |
| Idea | 20:00-21:00 | 20:00-21:00 |
| Loop | 11:00-12:00 | 11:00-12:00 |
| Reliance | 20:00-21:00 | 20:00-21:00 |
| S Tel | 19:00-20:00 | 19:00-20:00 |
| Tata Indicom | 20:00-21:00 | 20:00-21:00 |
| Vodafone | 20:00-21:00 | 20:00-21:00 |

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

BTSs Accumulated Downtime:

In the North East circle, there were outages for BSNL not able to meet the specified benchmark of 2%, which also experienced the highest outage (more than 71) hours in the month of audit. Aircel, BSNL and Tata Indicom were found to be not meeting benchmark for worst affected BTSs (having downtime of more than 24 hours)

Call Set-up Success Rate (CSSR):

All the operators except Aircel and Tata Indicom were comfortably meeting the benchmark on this parameter. During the audits the maximum CSSR was observed for Loop with 100% 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 Airc el and BSNL are meeting the TRAI specified benchmarks on SDCCH/Paging Channel Congestion and TCH. Loop leads the way in network congestion parameters with almost negligible paging as well as traffic channel congestion which may be due to low customer base at this point of time. 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. When the value of this parameter is less than 100%, it is counted as 0% congestion. There were almost no POIs with congestion more than the benchmark ($\leq 0.5\%$) except for 5 POIs for BSNL which were having congestion above TRAI specified benchmark.

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 except Aircel and BSNL were found to be meeting the TRAI specified benchmark. The lowest call drop rate was of Loop at 0% while the highest was for BSNL at 2.92%.

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 operators were measuring this parameter as per the TRAI guidelines. However, Aircel did not meet the TRAI benchmark for voice quality.

Customer Care / Helpline Assessment

For accessibility of call centre/ customer care aspect all the service providers meet the TRAI benchmark except for Idea and S-Tel with S-Tel being the lowest at 50.69%. Aircel, Airtel and Vodafone were not meeting TRAI benchmark for Percentage of calls answered by operators within 60 seconds.

Billing performance

All the operators were found to be meeting the benchmark of $\leq 0.1\%$ 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 except Vodafone meet the TRAI benchmark of 100% with 1 week.

Inter operator calls assessment

| Inter operator call Assessment To ↓ From → | Aircel | Airtel | BSNL | Idea | Loop | Reliance | S Tel | Tata Indicom | Vodafone |
|---|--------|--------|------|------|------|----------|-------|--------------|----------|
| Aircel | NA | 94% | 99% | 100% | 97% | 95% | 100% | 100% | 98% |
| Airtel | 100% | NA | 99% | 100% | 99% | 87% | 100% | 100% | 82% |
| BSNL | 100% | 96% | NA | 100% | 100% | 95% | 90% | 100% | 98% |
| Idea | 100% | 98% | 100% | NA | 98% | 100% | 98% | 100% | 100% |
| Loop | 100% | 100% | 99% | 100% | NA | 100% | 100% | 100% | 100% |
| Reliance | 100% | 95% | 95% | 100% | 97% | NA | 95% | 100% | 100% |
| S Tel | 100% | 94% | 95% | 100% | 96% | 100% | NA | 100% | 100% |
| Tata Indicom | 100% | 97% | 99% | 100% | 99% | 100% | 100% | NA | 97% |
| Vodafone | 100% | 98% | 98% | 100% | 98% | 97% | 96% | 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. Airtel found it tough connecting to Aircel and S-Tel, BSNL found it tough connecting to Reliance and S-Tel, Loop had a tough time connecting to S-Tel, S-Tel had a tough time connecting to BSNL, while both Reliance and Vodafone had a tough time connecting to Airtel.

Results of Operator assisted Drive test

The drive test was conducted simultaneously for all the operators present in the North East circle. There was in total of three drive tests conducted in the circle. These tests were conducted in the cities of Agartala, Imphal and Aizwal. 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 North East 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 North East circle were conducted in the cities of Agartala, Imphal and Aizwal was conducted along the following route:

| | Type of location | Agartala | Imphal | Aizawl |
|---------|-----------------------|---|--|--|
| Outdoor | Periphery of the city | University,Ramthakur College,Jhulanta Bridge,Pratap Ghar,MBB College,Asharam Chm,Chandrapur ISBT,Jail Road,GB Road,Agartala Medical College,Governor House,Assam Riffel,Durga Chm,Ramnagar Road,Police HQ Road,Battala Road,Nagerjala,AD Nagar,ONGC | MG Avenue, Thangmaiband, Sanakeithel, Lamphel, Uripok, Naoremthong, Tera Bazar, Sagolband, Khakeithel, Sayang, Sangaiporo ,FCI Godown, Malom (Airport Road), Tiddim Road, Kwakeithal, Keishampat, Governor Road, Kangla, MG Hall, MG Avenue PWD Office, Hotel Classic, Dharamsala, SS Road, AOC, Hotel Imphal, MG College, Khoman, Lampak, Khorai, Lalong Bazar, Porompat (JNMS), wangkhei Kongba , Khong man, Okram Chuthek, Bashikhong , Khamgei | Chatlang, Bonkong, Ramhlun, Chanmari, Lower zarkawt, Electricveng, Barabazar, Assam Rifles, Tresury, Rajbhawan, Khatlang, Mission veng,Kulikown, khatlaparter street, Tuikul, Dithar, Vivakown, Chanmari |
| | Congested area | ONGC,Netaji Market(Golbazar),TRTC Busstand,L N Bari Road, Ganaraj Chm,Purbasha,Central Jail,Bhagaban Thakur Chm,Lake Chm Bazar,Pragati School. | MG Avenue, PWD , Major Khul, Hotel Nirmala, Dharamsala, SS Hotel, Auto Parking, Flyover, Paona Bazar, Pologround, Laima Complex, State libraray, International Market., Leima Complex | Milenium Point, Zarkawt, Chanmari, Lower Zarkawt, Barabazar, Armveng, College Veng, Tuikhatla, |
| | Across the city | Airport,Usha Bazar,Natun Bazar,Lichu Bagan,Gingeer,Governor House,Circuit House,North Gate,Rajdhani Hotel,Women's College,Ganaraj Chowmuhoni,Motor Stand,Kamaan Chm,Postoffice Chm,Battala,AD Nagar,ONGC,Hapania,Amtali,University | Canchpur, Manipur University, Kawa, Sinjamei, Yais kul, Babo Para, Governor Road, kangla, MG Hall, PWD , Hotel Classic, AOC, Hotel Imphal, Airport Road (Ghar Lane) , Kaw keithal market, Keishphampat traffic lane, Governor Road, Kangla, PWD , Hotel Classic, DM College, Eastern Sector, Chingmeirong, sampakpham, truckers Point | Tuikhatla, Viazadin, Sqaure, Zarkawat, Chanmari, Satlang, Ramlun, Thanpui, ISBT |
| Indoor | Office complex | City Centre | Secretariat | D C Office |
| | Shopping complex | Transport Office(Astabal) | M G Market Complex | Millenium Centre |

* Loop did not participate in any of these drive test due to their limited presence in the circle. Loop does not have their network in the above 3 cities selected for drive test

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

Drive Test – Agartala


| | B'mark | Aircel | | Airtel | | BSNL | | Idea | | Reliance | | S Tel | | Tata Indicom | | 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 |
| Voice quality | ≥ 95% | 98.32% | 98.46% | 98.78% | 97.73% | 95.58% | 34.96% | 98.77% | 96.69% | 97.16% | 96.09% | 99.75% | 97.43% | 97.81% | 92.88% | 92.44% | 92.72% |
| CSSR | ≥ 95% | 100.00% | 100.00% | 100.00% | 100.00% | 100.00% | 99.49% | 100.00% | 100.00% | 100.00% | 97.24% | 100.00% | 96.82% | 100.00% | 99.76% | 100.00% | 100.00% |
| %age Blocked calls | | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.51% | 0.00% | 0.00% | 0.00% | 2.76% | 0.00% | 3.18% | 0.00% | 0.24% | 0.00% | 0.00% |
| Call drop rate | ≤ 2% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.51% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.24% | 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% |

Drive Test – Imphal

| | B'mark | Aircel | | Airtel | | BSNL | | Idea | | Reliance | | Tata Indicom | | Vodafone | |
|------------------------|--------|---------|---------|---------|---------|---------|---------|---------|---------|----------|---------|--------------|---------|----------|---------|
| | | In door | Outdoor | In door | Outdoor | In door | Outdoor | In door | Outdoor | In door | Outdoor | In door | Outdoor | In door | Outdoor |
| Voice quality | ≥ 95% | 99.13% | 92.27% | 98.42% | 98.21% | 95.58% | 73.40% | 98.30% | 93.60% | 96.38% | 95.06% | 95.78% | 91.00% | 99.11% | 93.13% |
| CSSR | ≥ 95% | 100.00% | 96.46% | 100.00% | 100.00% | 89.29% | 84.32% | 100.00% | 100.00% | 100.00% | 98.52% | 100.00% | 99.73% | 100.00% | 100.00% |
| %age Blocked calls | | 0.00% | 3.54% | 0.00% | 0.00% | 10.71% | 15.68% | 0.00% | 0.00% | 0.00% | 1.48% | 0.00% | 0.27% | 0.00% | 0.00% |
| Call drop rate | ≤ 2% | 0.00% | 1.22% | 0.00% | 0.00% | 0.00% | 1.92% | 0.00% | 0.00% | 0.00% | 1.13% | 0.00% | 0.00% | 0.00% | 0.00% |
| Hands off success rate | | 100.00% | 99.53% | 100.00% | 100.00% | 100.00% | 100.00% | 100.00% | 99.39% | 100.00% | 97.98% | 100.00% | 100.00% | 100.00% | 100.00% |

Drive Test – Aizwal

| | B'mark | Aircel | | Airtel | | BSNL | | Idea | | Reliance | | Tata Indicom | | Vodafone | |
|------------------------|--------|---------|---------|---------|---------|---------|---------|---------|---------|----------|---------|--------------|---------|----------|---------|
| | | In door | Outdoor | In door | Outdoor | In door | Outdoor | In door | Outdoor | In door | Outdoor | In door | Outdoor | In door | Outdoor |
| Voice quality | ≥ 95% | 99.32% | 97.02% | 99.07% | 97.42% | 86.01% | 89.46% | 99.19% | 96.32% | 98.14% | 95.06% | 96.66% | 91.02% | 99.00% | 93.39% |
| CSSR | ≥ 95% | 100.00% | 97.60% | 100.00% | 100.00% | 89.83% | 91.60% | 100.00% | 98.84% | 100.00% | 98.99% | 100.00% | 98.89% | 100.00% | 100.00% |
| %age Blocked calls | | 0.00% | 2.40% | 0.00% | 0.00% | 10.17% | 8.40% | 0.00% | 1.16% | 0.00% | 1.01% | 0.00% | 1.11% | 0.00% | 0.00% |
| Call drop rate | ≤ 2% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 5.50% | 0.00% | 0.00% | 0.00% | 0.51% | 0.00% | 1.11% | 0.00% | 0.00% |
| Hands off success rate | | 0.00% | 100.00% | 100.00% | 100.00% | 100.00% | 93.62% | 100.00% | 99.12% | 100.00% | 95.44% | 100.00% | 100.00% | 100.00% | 100.00% |

 Not meeting the benchmark

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

ALL SERVICE PROVIDERS

Agartala: There was interference and low signal strength recorded for all operators in the outdoor areas near Agartala Medical College, TRTC Bus stand, AD Nagar while in the indoor areas inadequate coverage was not found in any of the areas.

Imphal: There was interference and low signal strength recorded for all the operators in the outdoor areas of MG Road, Bashikhong, Manipur University, Paona Bazar, Naoremthong, Kaw keithal market, Sangaiporo, kangla while in the indoor areas there was no inadequate coverage or interference recorded.

Aizwal: There was interference and low signal strength recorded for all operators in the outdoor areas of Zarkawt, Mission veng, Kulikown while in the indoor areas interference and inadequate coverage was recorded in Millenium Centre.

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 BSNL, Vodafone and Tata Indicom are not meeting the TRAI benchmark on voice quality for outdoor routes in any of the 3 cities. Also BSNL does not meet the TRAI benchmark on CSSR in Imphal and Aizwal and Call drop rate in Aizwal.

Summary of Live Measurement Results – Cellular Mobile Services

| Name of Service Provider | Network Availability | | Connection Establishment (Accessibility) | | | Connection Maintenance (Retainability) | | | Metering and Billing | Response time to customer for assistance | |
|--------------------------|---|-------------------------------------|--|-------------------------------------|-----------------------|--|---|--|---|--|--|
| | 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 | %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 | ≤ 2% | ≤ 2% | ≥ 95% | ≤ 1% | ≤ 2% | ≤ 2% | ≤ 5% | ≥ 95% | 100% | ≥ 95% | ≥ 90% |
| Aircel | 0.12% | 0.00% | 96.00% | 3.34% | 3.90% | 1.67% | 8.29% | 95.52% | 100.00% | 100.00% | 72.00% |
| Airtel | 0.63% | 0.00% | 98.00% | 0.45% | 0.86% | 1.52% | 1.71% | 98.09% | 96.97% | 100.00% | 90.00% |
| BSNL | 1.84% | 2.16% | 97.37% | 0.77% | 1.92% | 2.15% | 11.70% | 74.59% | 100.00% | 100.00% | 90.00% |
| Idea | 0.09% | 0.00% | 97.25% | 0.65% | 1.63% | 1.84% | 2.86% | 95.66% | 100.00% | 100.00% | 92.00% |
| Loop | 0.72% | 0.00% | 100.00% | 0.00% | 0.00% | 0.00% | 0.00% | NA | NA | 100.00% | 96.00% |
| Reliance | 0.00% | 0.00% | 98.57% | 0.64% | 0.92% | 0.91% | 1.30% | 96.25% | 96.00% | 92.00% | 82.00% |
| S Tel | 0.36% | 0.00% | 99.55% | 0.02% | 0.01% | 0.41% | 2.83% | 98.18% | 100.00% | 100.00% | 0.00% |
| Tata Indicom | 0.27% | 0.00% | 98.33% | 0.00% | 0.01% | 0.35% | 1.36% | 92.73% | 100.00% | 100.00% | 90.00% |
| Vodafone | 0.03% | 0.00% | 99.00% | 0.00% | 0.22% | 1.03% | 4.55% | 93.96% | 94.00% | 100.00% | 100.00% |

■ Not meeting the benchmark

During the three day live measurement and live calling it was found that:

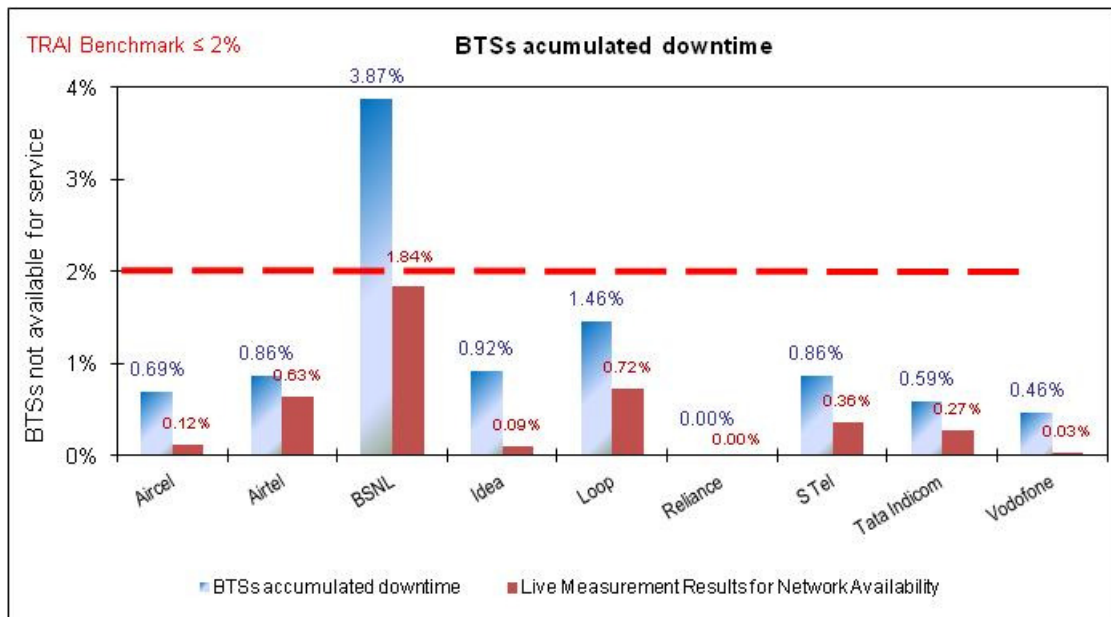
- Aircel was found not to be meeting the TRAI benchmark for SDCCH, TCH, Worst affected cells having more than 3% TCH Drop and percentage of calls answered by the operators within 60 seconds.
- Airtel was found not to be meeting the TRAI benchmark for % complaints resolved within 4 weeks.
- BSNL was found not to be meeting the TRAI benchmark for Worst affected BTSS due to downtime, call drop rate, Worst affected cells having more than 3% TCH Drop and voice quality.

- Reliance was found not to be meeting the TRAI benchmark for % complaints resolved within 4 weeks, accessibility of call centre and percentage of calls answered by the operators within 60 seconds.
- Tata Indicom was found not to be meeting the TRAI benchmark for voice quality.
- Vodafone was found not to be meeting the TRAI benchmark for voice quality and % complaints resolved within 4 weeks.

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



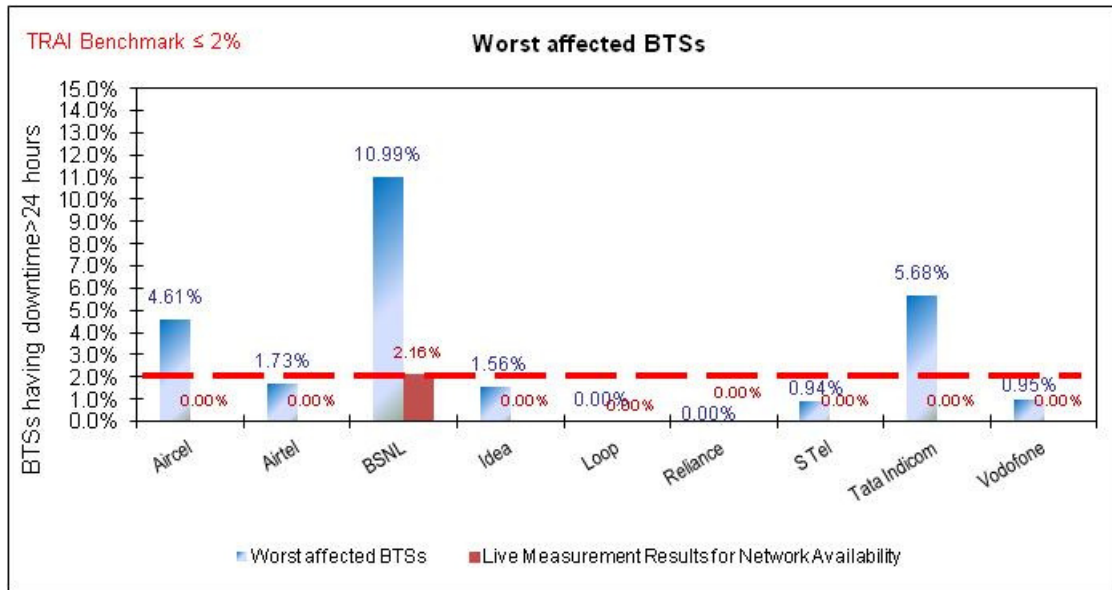
One month

Operator(s) meeting benchmark: Aircel, Airtel, Idea, Loop, Reliance, S Tel, Tata Indicom, Vodafone
 Operator(s) not meeting the benchmark: BSNL

Live measurement

All the operators meet the benchmark

Worst Affected BTSs



One month

Operator(s) meeting benchmark: Airtel, Idea, Loop, Reliance, S Tel, Vodafone

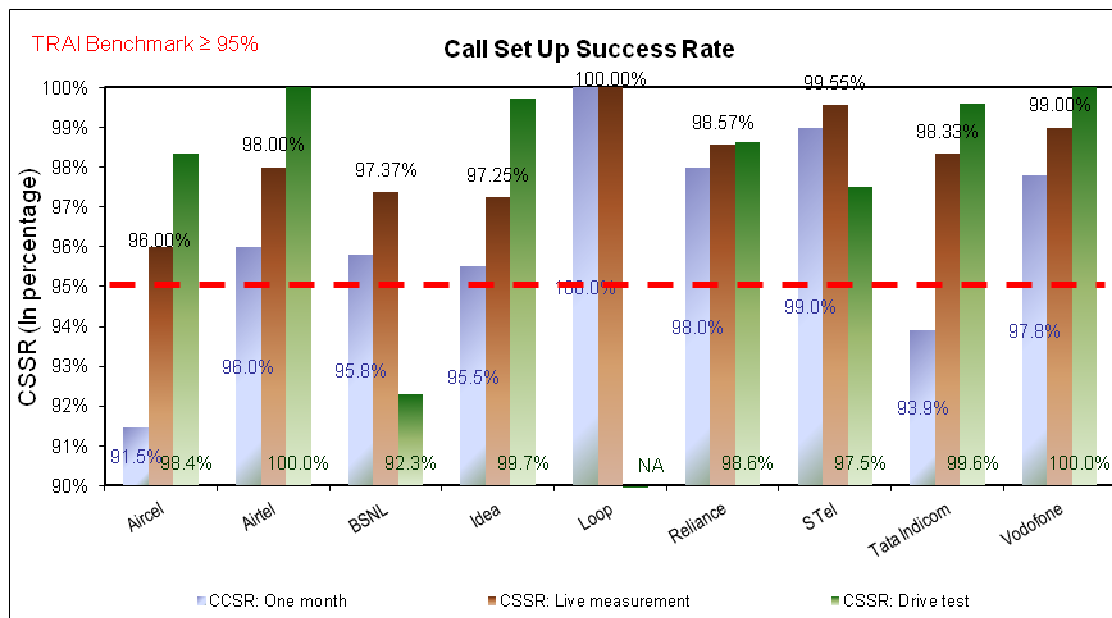
Operator(s) not meeting the benchmark: Aircel, BSNL, Tata Indicom

Live measurement

Operator(s) meeting benchmark: Airtel, Idea, Loop, Reliance, S Tel, Vodafone, Tata Indicom, Aircel

Operator(s) not meeting the benchmark: BSNL

Call Set-up Success Rate (CSSR)



One month

Operator(s) meeting benchmark: Airtel, BSNL, Idea, Loop, Reliance, S Tel, Vodafone

Operator(s) not meeting the benchmark: Aircel, Tata Indicom

Live measurement

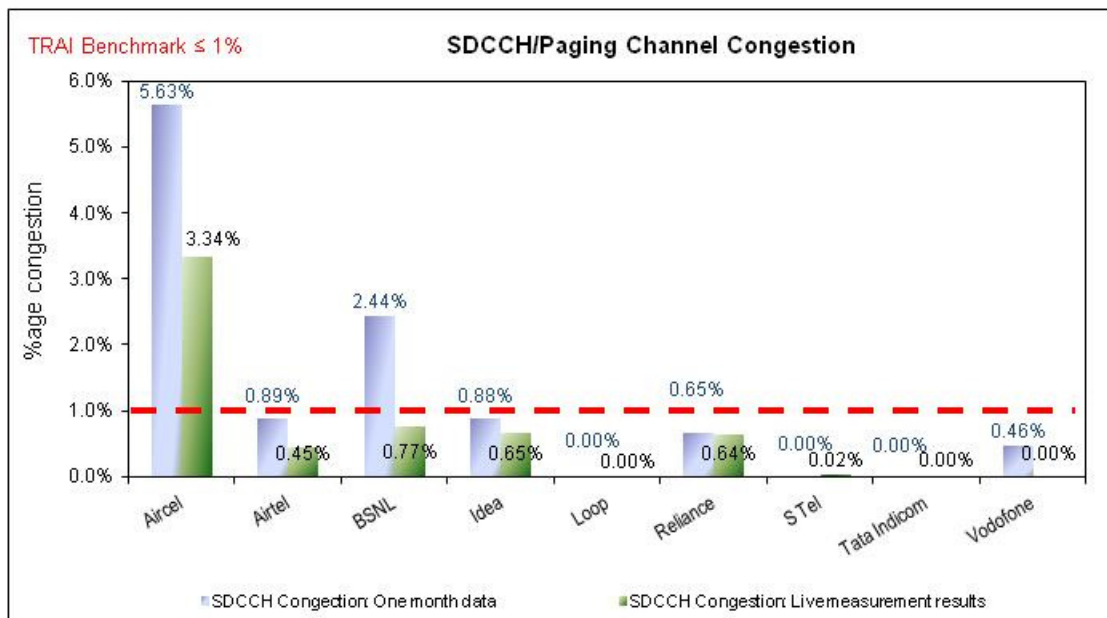
All the operators meet the benchmark

Drive test

Operator(s) meeting benchmark: Aircel, Airtel, Idea, Reliance, S Tel, Tata Indicom, Vodafone

Operator(s) not meeting the benchmark: BSNL

SDCCH / Paging Channel Congestion



One month

Operator(s) meeting benchmark: Airtel, Idea, Loop, Reliance, S Tel, Tata Indicom, Vodafone

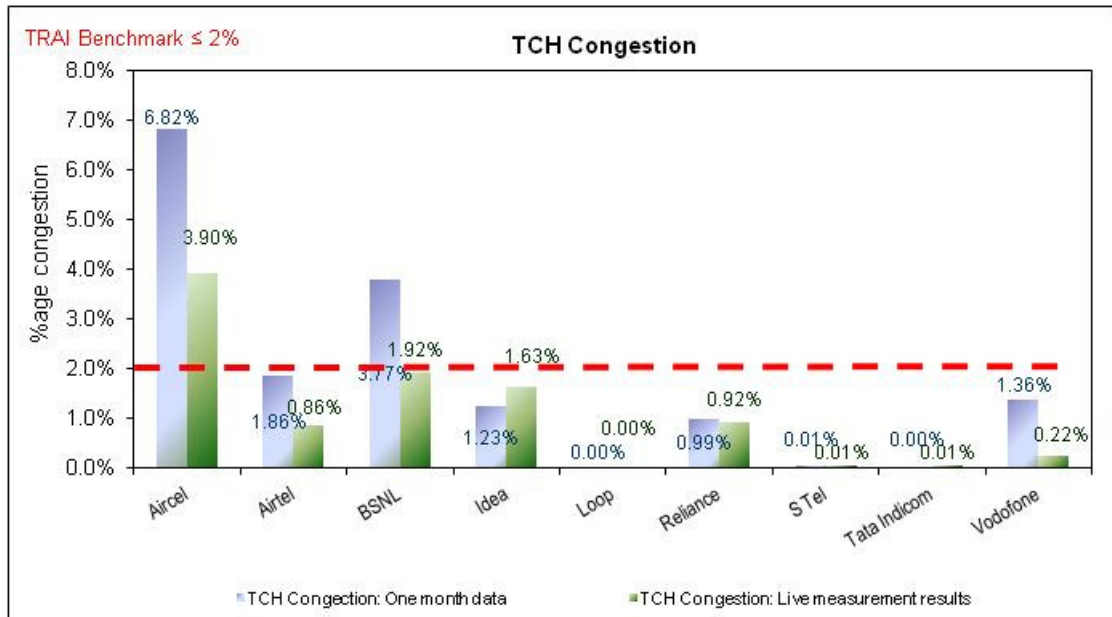
Operator(s) not meeting the benchmark: Aircel, BSNL

Live measurement

Operator(s) meeting benchmark: Airtel, BSNL, Idea, Loop, Reliance, S Tel, Tata Indicom, Vodafone

Operator(s) not meeting the benchmark: Aircel

TCH Congestion



One month

Operator(s) meeting benchmark: Airtel, Idea, Loop, Reliance, S Tel, Tata Indicom, Vodafone

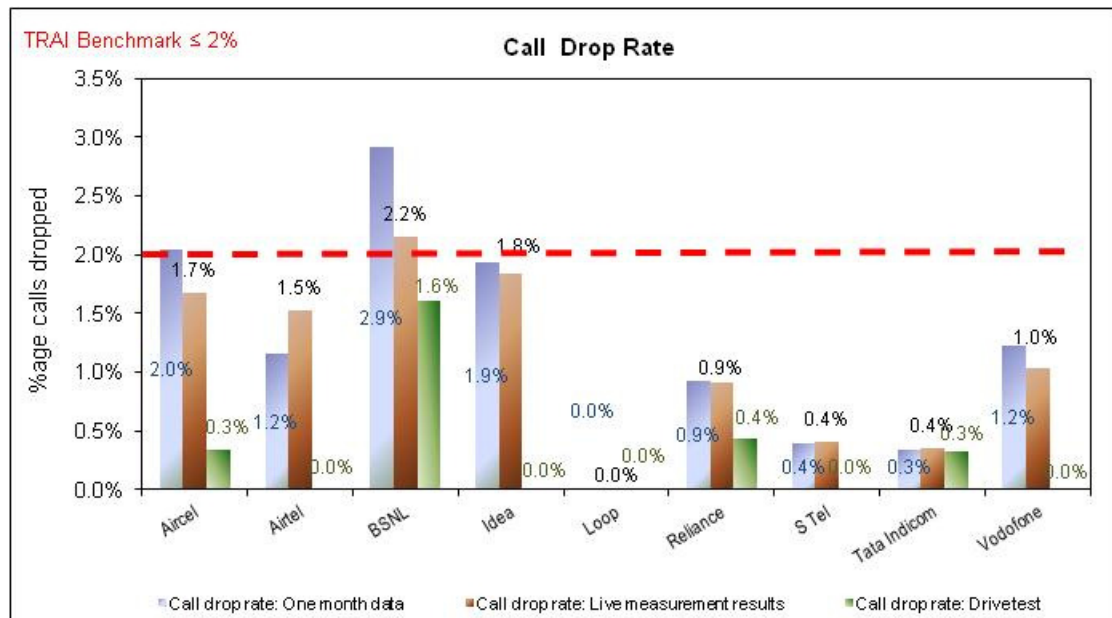
Operator(s) not meeting the benchmark: Aircel, BSNL

Live measurement

Operator(s) meeting benchmark: Airtel, BSNL, Idea, Loop, Reliance, S Tel, Tata Indicom, Vodafone

Operator(s) not meeting the benchmark: Aircel

Call Drop Rate



One month

Operator(s) meeting benchmark: Airtel, Idea, Loop, Reliance, S Tel, Tata Indicom, Vodafone

Operator(s) not meeting the benchmark: Aircel, BSNL

Live measurement

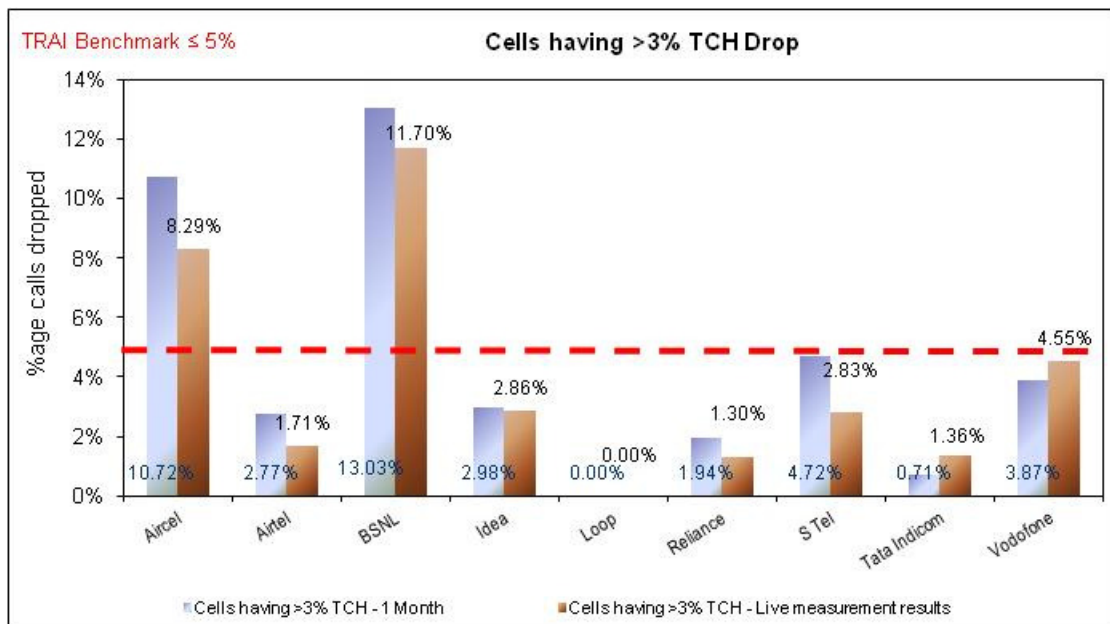
Operator(s) meeting benchmark: Aircel, Airtel, Idea, Loop, Reliance, S Tel, Tata Indicom, Vodafone

Operator(s) not meeting the benchmark: BSNL

Drive test

All the operators meet the benchmark

Cells with more than 3% TCH Drop Rate



One month

Operator(s) meeting benchmark: Airtel, Idea, Loop, Reliance, S Tel, Tata Indicom, Vodafone

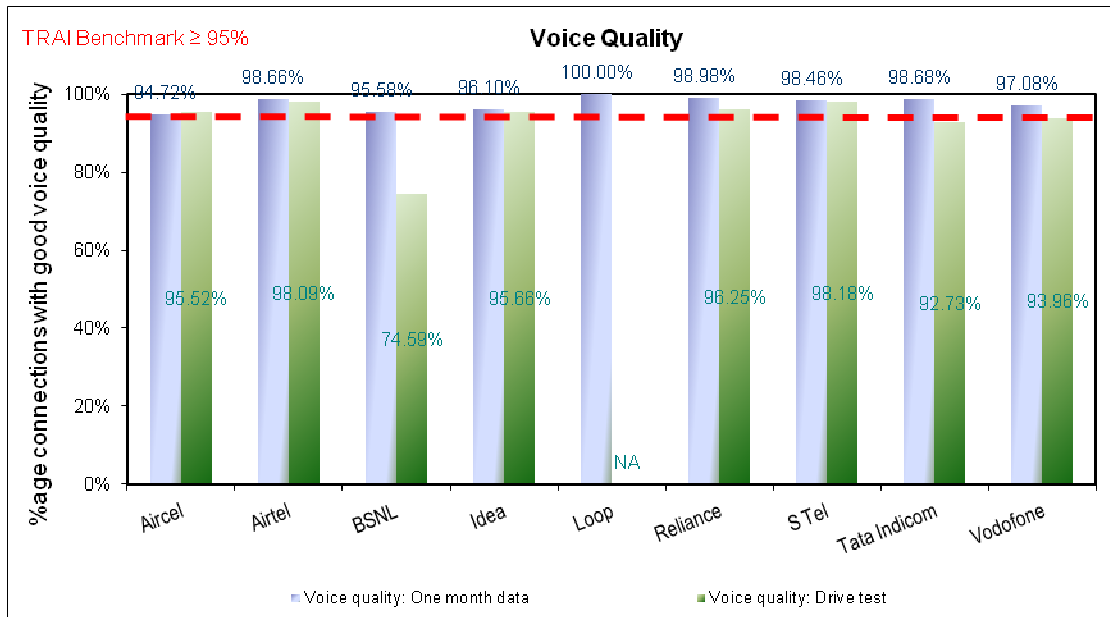
Operator(s) not meeting the benchmark: Aircel, BSNL

Live measurement

Operator(s) meeting benchmark: Airtel, Idea, Loop, Reliance, S Tel, Tata Indicom, Vodafone

Operator(s) not meeting the benchmark: Aircel, BSNL

Voice quality



One month

Operator(s) meeting benchmark: Airtel, BSNL, Idea, Loop, Reliance, S Tel, Tata Indicom, Vodafone

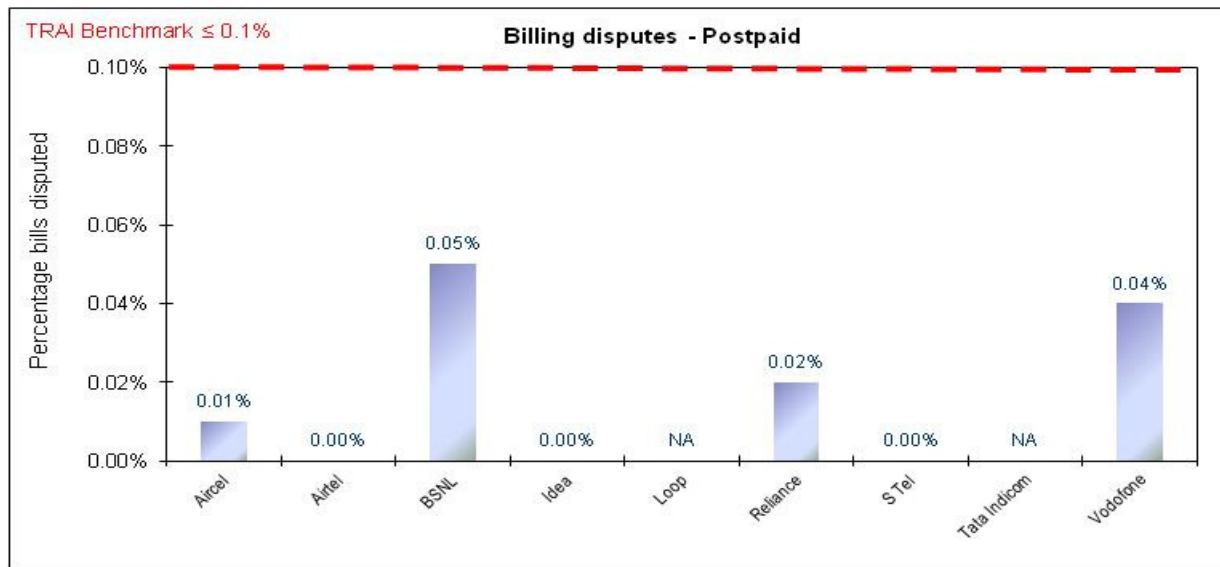
Operator(s) not meeting the benchmark: Aircel

Live measurement (Drive test)

Operator(s) meeting benchmark: Aircel, Airtel, Idea, Reliance, S Tel

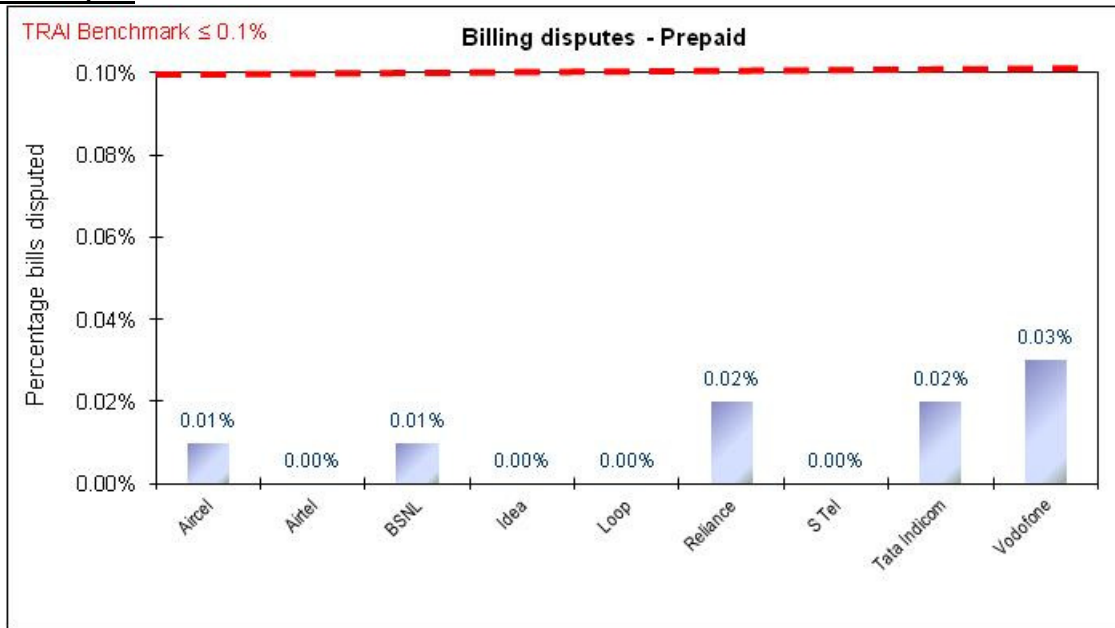
Operator(s) not meeting the benchmark: BSNL, Tata Indicom, Vodafone

Billing Disputes - Postpaid



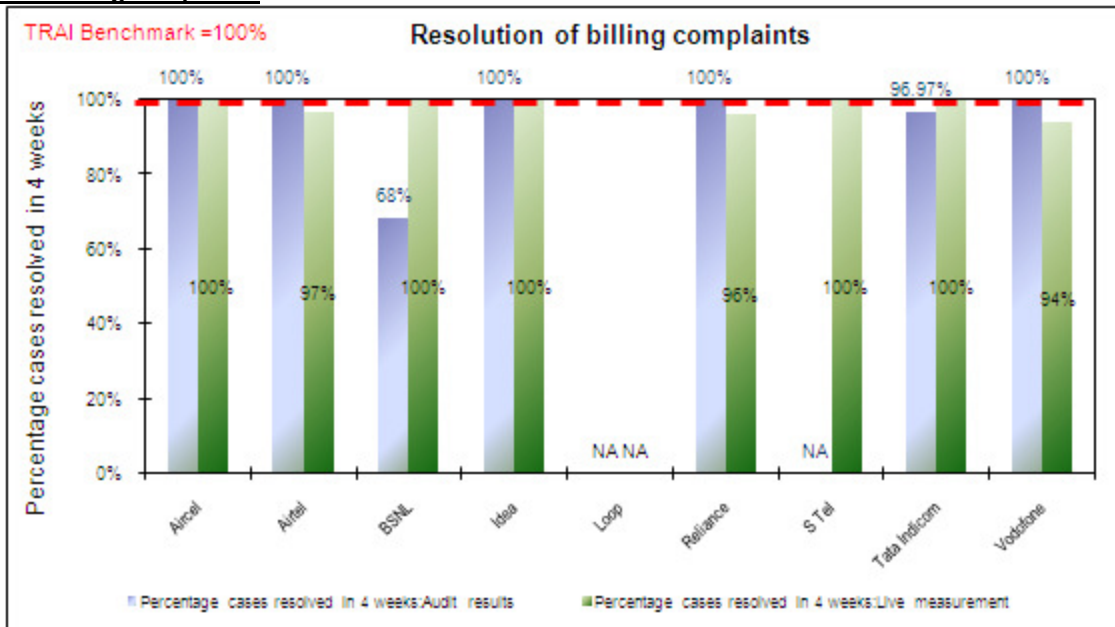
All the operators meet the benchmark

Complaints - Prepaid



All the operators meet the benchmark

Resolution of billing complaints



One month

Operator(s) meeting benchmark: Aircel, Airtel, Idea, Reliance, Vodafone

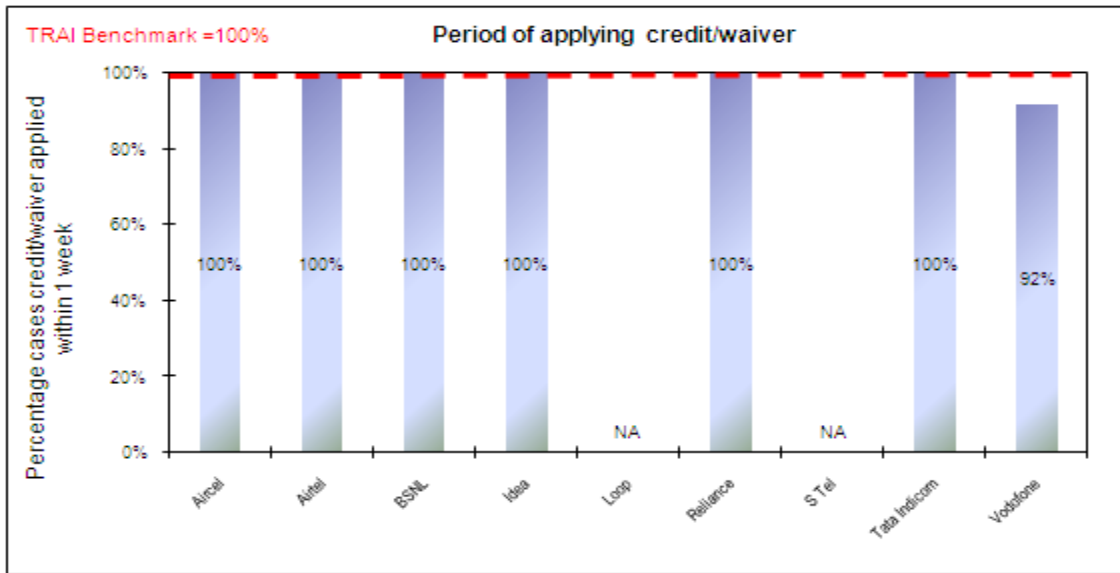
Operator(s) not meeting the benchmark: BSNL, Tata Indicom

Live measurement

Operator(s) meeting benchmark: Aircel, BSNL, Idea, S Tel, Tata Indicom

Operator(s) not meeting the benchmark: Airtel, Reliance, Vodafone

Period of applying credit / waiver

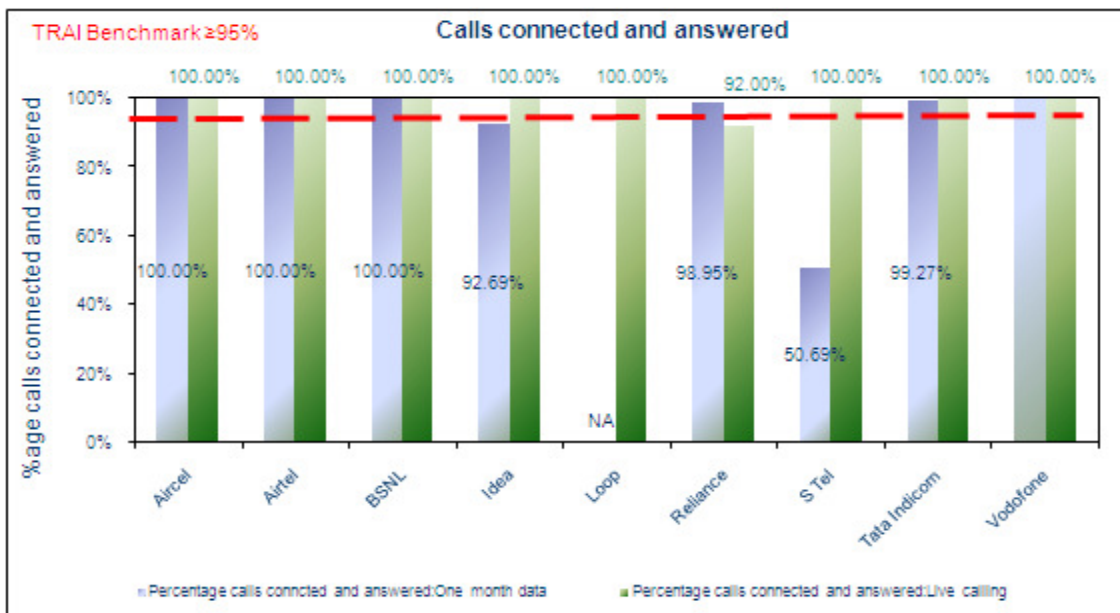


Operator(s) meeting benchmark: Aircel, Airtel, BSNL, Idea, Reliance, Tata Indicom
 Operator(s) not meeting the benchmark: Vodafone

Live calling for billing Complaints

| Resolution of billing complaints | Benchmark | Aircel | Airtel | BSNL | Idea | Loop | Reliance | S Tel | Tata Indicom | Vodafone |
|---|-----------|--------|--------|------|------|------|----------|-------|--------------|----------|
| Total Number of calls made | | 34 | 33 | 2 | 3 | NA | 50 | 3 | 34 | 50 |
| Number of cases resolved in 4 weeks | | 34 | 32 | 2 | 3 | NA | 48 | 3 | 34 | 47 |
| Percentage cases resolved in four weeks | 100% | 100% | 97% | 100% | 100% | NA | 96% | 100% | 100% | 94% |

Customer Care / Helpline: Calls answered



One month

Operator(s) meeting benchmark: Aircel, Airtel, BSNL, Reliance, Tata Indicom, Vodafone

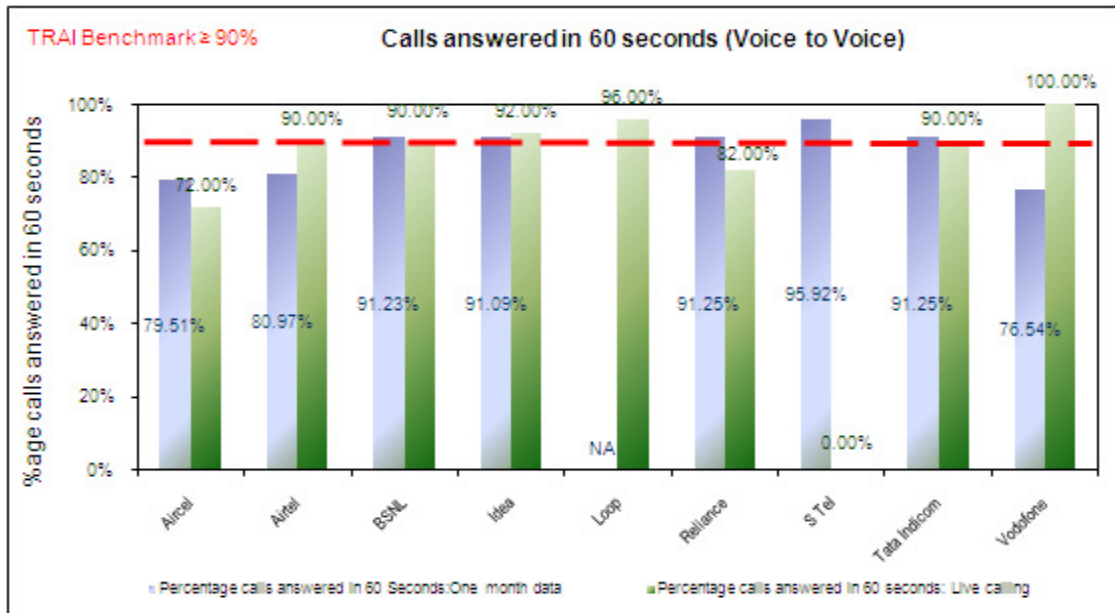
Operator(s) not meeting the benchmark: Idea, S Tel

Live measurement

Operator(s) meeting benchmark: Aircel, Airtel, BSNL, Idea, Loop, S Tel, Tata Indicom, Vodafone

Operator(s) not meeting the benchmark: Reliance

Customer Care / Helpline: Calls answered voice to voice



One month

Operator(s) meeting benchmark: BSNL, Idea, Reliance, S Tel, Tata Indicom

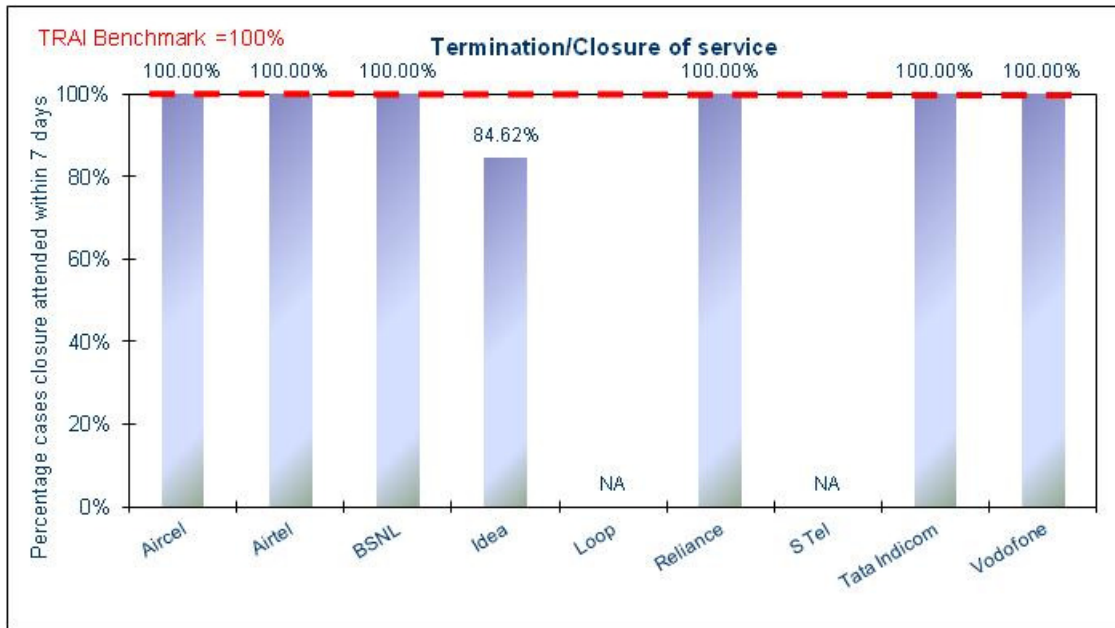
Operator(s) not meeting the benchmark: Aircel, Airtel, Vodafone

Live measurement

Operator(s) meeting benchmark: Airtel, BSNL, Idea, Loop, Tata Indicom, Vodafone

Operator(s) not meeting the benchmark: Aircel, Reliance, S Tel

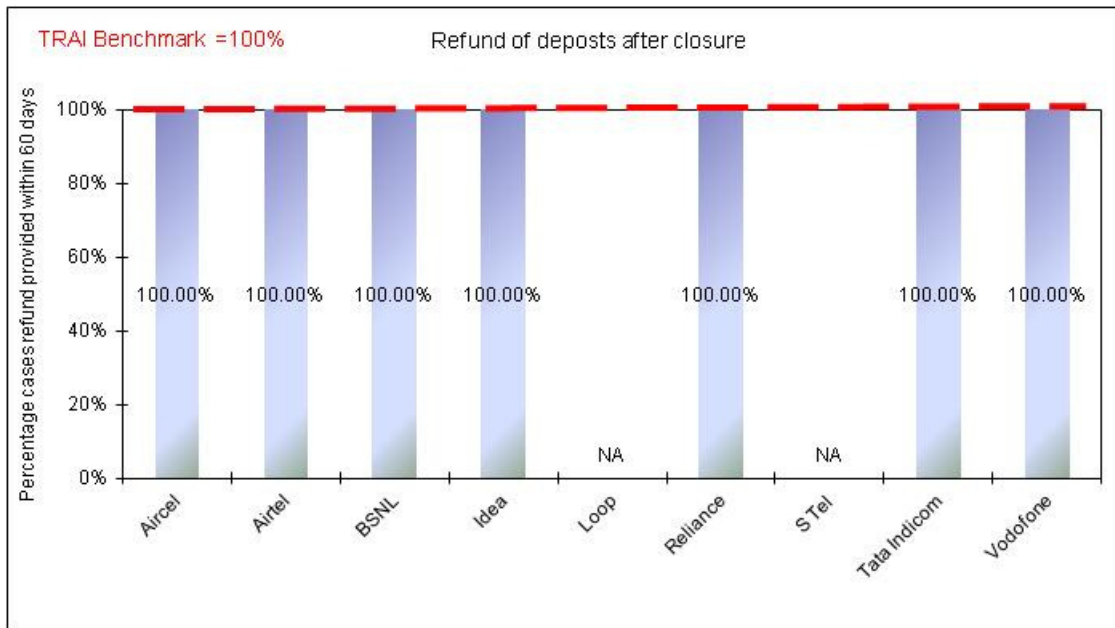
Termination / Closure of service



Operator(s) meeting benchmark: Aircel, Airtel, BSNL, Reliance, Tata Indicom, Vodafone

Operator(s) not meeting the benchmark: Idea

Refund of deposits



All the operators meet the benchmark

Inter operator calls assessment

| Inter operator call Assessment To↓ From → | Aircel | Airtel | BSNL | Idea | Loop | Reliance | S Tel | Tata Indicom | Vodafone |
|--|--------|--------|------|------|------|----------|-------|--------------|----------|
| Aircel | NA | 94% | 99% | 100% | 97% | 95% | 100% | 100% | 98% |
| Airtel | 100% | NA | 99% | 100% | 99% | 87% | 100% | 100% | 82% |
| BSNL | 100% | 96% | NA | 100% | 100% | 95% | 90% | 100% | 98% |
| Idea | 100% | 98% | 100% | NA | 98% | 100% | 98% | 100% | 100% |
| Loop | 100% | 100% | 99% | 100% | NA | 100% | 100% | 100% | 100% |
| Reliance | 100% | 95% | 95% | 100% | 97% | NA | 95% | 100% | 100% |
| S Tel | 100% | 94% | 95% | 100% | 96% | 100% | NA | 100% | 100% |
| Tata Indicom | 100% | 97% | 99% | 100% | 99% | 100% | 100% | NA | 97% |
| Vodafone | 100% | 98% | 98% | 100% | 98% | 97% | 96% | 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. Airtel found it tough connecting to Aircel and S-Tel, BSNL found it tough connecting to Reliance and S-Tel, Loop had a tough time connecting to S-Tel, S-Tel had a tough time connecting to BSNL, while both Reliance and Vodafone had a tough time connecting to Airtel.

7.0 Compliance reports: Results of Verification of PMR

7.1 Compliance Report Month 1: January 2011

| 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 | Total number of working POI Service Area wise | 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% | | | ≤ 5% | ≥ 95% | | | | | | |
| Aircel | PMR | 1444 | 9838 | 0.92% | 124 | 8.59% | 91.28% | 5.20% | 7.63% | 2.01% | 815 | 4153 | 19.63% | 91.93% | 1 | 38 | 101139 | 54867 | 1438336 |
| | IMRB | 1444 | 9838 | 0.92% | 124 | 8.59% | 91.28% | 5.20% | 7.63% | 2.04% | 815 | 4153 | 19.63% | 91.93% | 1 | 40 | 67593 | 42734 | 1438336 |
| Airtel | PMR | 1329 | 11537 | 1.17% | 51 | 3.84% | 95.99% | 0.99% | 1.96% | 1.72% | 162 | 3933 | 4.12% | 97.85% | 1 | 42 | 76026 | 61277 | 1688591 |
| | IMRB | 1329 | 11537 | 1.17% | 51 | 3.84% | 95.99% | 0.99% | 1.96% | 1.72% | 162 | 3933 | 4.12% | 97.85% | 1 | 42 | 76025 | 61277 | 1410204 |
| BSNL | PMR | 989 | 19267 | 2.72% | 103 | 6.59% | 96.00% | 1.89% | 2.45% | 2.54% | 237 | 2894 | 8.39% | 97.00% | 0 | 54 | 120000 | 44029 | 887471 |
| | IMRB | 580 | 22036 | 5.11% | 60 | 10.34% | 96.59% | 2.30% | 2.86% | 2.62% | 240 | 1700 | 14.12% | 96.00% | 0 | 38 | 66000 | 46689 | 598104 |
| Idea | PMR | 351 | 3592 | 1.38% | 0 | 0.00% | 96.77% | 0.22% | 1.75% | 1.71% | 205 | 1053 | 19.47% | 97.06% | 0 | 23 | 7794 | 3643 | 122633 |
| | IMRB | 351 | 3592 | 1.38% | 0 | 0.00% | 96.77% | 0.22% | 1.75% | 1.71% | 6355 | 32643 | 19.47% | 97.06% | 0 | 23 | 7794 | 3643 | 122633 |
| Loop | PMR | 13 | 14.23 | 0.15% | 0 | 0.00% | 98.92% | 0.00% | 0.00% | 0.00% | 0 | 40 | 0.00% | 100.00% | 0 | 11 | 296.08 | 1.79 | 3 |
| | IMRB | 13 | 14.23 | 0.15% | 0 | 0.00% | 98.92% | 0.00% | 0.00% | 0.00% | 0 | 40 | 0.00% | 100.00% | 0 | 11 | 296 | 1.79 | 3 |
| Reliance | PMR | 481 | 574 | 0.17% | 3 | 0.63% | 97.73% | 0.85% | 1.46% | 1.12% | 67 | 1443 | 4.65% | 95.04% | 0 | 14 | 40000 | 13769 | NA |
| | IMRB | 481 | 574 | 0.17% | 3 | 0.63% | 97.73% | 0.85% | 1.46% | 1.12% | 67 | 1443 | 4.65% | 95.04% | 0 | 14 | 40000 | 13769 | NA |
| S Tel | PMR | 106 | 488 | 0.62% | 1 | 0.94% | 99.21% | 0.00% | 0.05% | 0.49% | 15 | 318 | 4.72% | 97.91% | 0 | 18 | 2215 | 135 | 7860 |
| | IMRB | 106 | 488 | 0.62% | 1 | 0.94% | 99.62% | 0.00% | 0.05% | 0.49% | 15 | 318 | 4.72% | 97.91% | 0 | 18 | 2215 | 135 | 7860 |
| Tata Indicom | PMR | 170 | 403 | 0.32% | 0 | 0.00% | 99.71% | 0.00% | 0.00% | 0.22% | 0 | 513 | 0.00% | 99.63% | 0 | 27 | 21033 | 3064 | 43308 |
| | IMRB | 170 | 403 | 0.32% | 0 | 0.00% | 99.71% | 0.00% | 0.00% | 0.22% | 0 | 513 | 0.00% | 99.92% | 0 | 27 | 21033 | 3084 | 43308 |
| Vodafone | PMR | 805 | 2386 | 0.39% | 4 | 0.50% | 97.87% | 0.25% | 1.60% | 1.22% | 112 | 2502 | 4.48% | 97.65% | 0 | 28 | 21651 | 17097 | 478818 |
| | IMRB | 805 | 2386 | 0.39% | 4 | 0.50% | 97.87% | 0.24% | 1.60% | 1.22% | 112 | 2502 | 4.48% | 97.65% | 0 | 28 | 21651 | 17097 | 478818 |

7.2 Compliance Report Month 2: February 2011

| 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 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 | Total number of working POI Service Area wise | 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% | | | ≤ 5% | ≥ 95% | | | | | | |
| Aircel | PMR | 1448 | 16816 | 1.73% | 217 | 14.99% | 89.22% | 13.68% | 9.66% | 2.29% | 718 | 4165 | 17.25% | 91.60% | 1 | 45 | 101513 | 49887 | 1440284 |
| | IMRB | 1448 | 16816 | 1.73% | 217 | 14.99% | 89.22% | 13.68% | 9.66% | 2.29% | 718 | 4165 | 17.25% | 91.60% | 1 | 45 | 67593 | 46265 | 1440284 |
| Airtel | PMR | 1344 | 11349 | 1.26% | 56 | 4.17% | 95.16% | 0.83% | 1.91% | 1.66% | 124 | 3977 | 3.12% | 98.71% | 1 | 42 | 77778 | 62630 | 1804717 |
| | IMRB | 1344 | 11349 | 1.26% | 56 | 4.17% | 95.16% | 0.83% | 1.91% | 1.66% | 124 | 3977 | 3.12% | 98.71% | 1 | 42 | 77778 | 62630 | 1804717 |
| BSNL | PMR | 1005 | 15243 | 2.21% | 103 | 6.49% | 96.00% | 1.75% | 2.37% | 2.39% | 228 | 2957 | 7.92% | 97.00% | 0 | 54 | 120000 | 37696 | 794769 |
| | IMRB | 590 | 18534 | 4.22% | 63 | 10.68% | 96.00% | 2.17% | 3.34% | 2.63% | 224 | 1745 | 12.84% | 96.70% | 0 | 38 | 66000 | 39955 | 489269 |
| Idea | PMR | 360 | 3159 | 1.31% | 0 | 0.00% | 96.16% | 0.57% | 1.90% | 1.95% | 5878 | 30240 | 19.44% | 96.57% | 0 | 23 | 7128 | 4130.06 | 143275 |
| | IMRB | 360 | 3159 | 1.31% | 0 | 0.00% | 96.16% | 0.57% | 1.90% | 1.95% | 5878 | 30240 | 19.44% | 96.57% | 0 | 23 | 7128 | 4130.06 | 143275 |
| Loop | PMR | 13 | 15 | 0.18% | 0 | 0.00% | 98.67% | 0.00% | 0.00% | 0.00% | 0 | 40 | 0.00% | 100.00% | 0 | 11 | 296 | 1.092 | 1 |
| | IMRB | 13 | 15 | 0.18% | 0 | 0.00% | 98.67% | 0.00% | 0.00% | 0.00% | 0 | 40 | 0.00% | 100.00% | 0 | 11 | 296 | 1.092 | 1 |
| Reliance | PMR | 549 | 370 | 0.10% | 0 | 0.00% | 96.27% | 0.85% | 1.58% | 1.38% | 17 | 1647 | 1.03% | 95.00% | 0 | 14 | 40000 | 14359 | NA |
| | IMRB | 549 | 370 | 0.10% | 0 | 0.00% | 96.27% | 0.85% | 1.58% | 1.38% | 17 | 1647 | 1.03% | 95.00% | 0 | 14 | 40000 | 14359 | NA |
| S Tel | PMR | 106 | 390 | 0.55% | 0 | 0.00% | 99.05% | 0.00% | 0.02% | 0.38% | 15 | 318 | 4.72% | 98.60% | 0 | 18 | 2238 | 191 | 11047 |
| | IMRB | 106 | 390 | 0.55% | 0 | 0.00% | 99.05% | 0.00% | 0.02% | 0.38% | 15 | 318 | 4.72% | 98.60% | 0 | 18 | 2238 | 191 | 11047 |
| Tata Indicom | PMR | 171 | 604 | 0.53% | 1 | 0.58% | 99.69% | 0.00% | 0.07% | 0.31% | 2 | 516 | 0.39% | 99.69% | 0 | 28 | 21156 | 2635 | 43090 |
| | IMRB | 171 | 604 | 0.53% | 1 | 0.58% | 99.69% | 0.00% | 0.07% | 0.31% | 2 | 516 | 0.39% | 99.85% | 0 | 28 | 21156 | 2835 | 43090 |
| Vodafone | PMR | 845 | 1672 | 0.29% | 5 | 0.59% | 97.09% | 0.80% | 1.84% | 1.12% | 114 | 2604 | 4.38% | 97.53% | 0 | 28 | 22719 | 17671 | 498935 |
| | IMRB | 845 | 1672 | 0.29% | 5 | 0.59% | 97.09% | 0.80% | 1.84% | 1.12% | 114 | 2604 | 4.38% | 97.53% | 0 | 28 | 22719 | 17671 | 498935 |

7.3 Compliance Report Month 3: March 2011

| 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 | Total number of working POI Service Area wise | 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% | | | ≤ 5% | ≥ 95% | | | | | | |
| Aircel | PMR | 1454 | 16891 | 1.56% | 210 | 14.44% | 88.90% | 9.62% | 10.03% | 2.06% | 712 | 4183 | 17.02% | 91.75% | 0 | 45 | 102011 | 52986 | 1417861 |
| | IMRB | 1454 | 16891 | 1.56% | 210 | 14.44% | 88.90% | 9.62% | 10.03% | 2.06% | 712 | 4183 | 17.02% | 91.75% | 0 | 45 | 67593 | 49367 | 1417861 |
| Airtel | PMR | 1350 | 11531 | 1.10% | 61 | 4.50% | 95.20% | 1.00% | 2.00% | 1.60% | 116 | 3996 | 2.90% | 99.60% | 1 | 42 | 77764 | 62336.2 | 1730900 |
| | IMRB | 1350 | 11531 | 1.15% | 61 | 4.52% | 95.24% | 0.99% | 1.98% | 1.64% | 116 | 3996 | 2.90% | 99.65% | 1 | 42 | 77764 | 62336 | 1730900 |
| BSNL | PMR | 1039 | 11986 | 1.60% | 99 | 5.50% | 96.00% | 1.10% | 2.05% | 2.35% | 150 | 3086 | 4.95% | 97.00% | 0 | 54 | 120000 | 45297 | 858283 |
| | IMRB | 609 | 14857 | 3.28% | 55 | 9.03% | 96.60% | 1.41% | 3.01% | 2.53% | 142 | 1829 | 7.76% | 96.40% | 0 | 40 | 66000 | 47270 | 548325 |
| Idea | PMR | 363 | 3050 | 1.13% | 0 | 0.00% | 97.81% | 0.84% | 1.84% | 1.91% | 4958 | 33759 | 14.69% | 96.82% | 0 | 24 | 7209.18 | 4615.65 | 151617 |
| | IMRB | 363 | 3050 | 1.13% | 0 | 0.00% | 97.81% | 0.84% | 1.84% | 1.91% | 4958 | 33759 | 14.69% | 96.82% | 0 | 24 | 7209.18 | 4615.65 | 151617 |
| Loop | PMR | 13 | 159.45 | 1.83% | 0 | 0.00% | 98.48% | 0.00% | 0.00% | 0.00% | 0 | 40 | 0.00% | 100.00% | 0 | 11 | 296.06 | 0.08 | 5 |
| | IMRB | 13 | 159.45 | 1.83% | 0 | 0.00% | 98.00% | 0.00% | 0.00% | 0.00% | 0 | 40 | 0.00% | 100.00% | 0 | 11 | 296.06 | 0.08 | 5 |
| Reliance | PMR | 549 | 568 | 0.13% | 2 | 0.36% | 96.98% | 0.81% | 1.46% | 1.41% | 21 | 1647 | 1.27% | 95.36% | 0 | 14 | NA | NA | NA |
| | IMRB | 549 | 568 | 0.13% | 2 | 0.36% | 96.98% | 0.81% | 1.46% | 1.41% | 21 | 1647 | 1.27% | 95.36% | 0 | 14 | NA | NA | NA |
| S Tel | PMR | 106 | 1005 | 1.27% | 0 | 0.00% | 99.01% | 0.01% | 0.07% | 0.37% | 14 | 318 | 4.40% | 98.36% | 0 | 18 | 2367 | 244 | 9883 |
| | IMRB | 106 | 1005 | 1.27% | 0 | 0.00% | 99.50% | 0.01% | 0.07% | 0.37% | 14 | 318 | 4.40% | 98.36% | 0 | 18 | 2367 | 244 | 9883 |
| Tata Indicom | PMR | 171 | 607 | 0.48% | 1 | 0.58% | 99.69% | 0.00% | 0.02% | 0.31% | 1 | 519 | 0.19% | 99.71% | 0 | 28 | 21279 | 3021 | 43937 |
| | IMRB | 171 | 607 | 0.48% | 1 | 0.58% | 99.69% | 0.00% | 0.02% | 0.31% | 1 | 519 | 0.19% | 99.84% | 0 | 28 | 21279 | 3020 | 43937 |
| Vodafone | PMR | 890 | 3454 | 0.51% | 7 | 0.79% | 97.49% | 0.51% | 1.68% | 1.14% | 115 | 2752 | 4.18% | 97.39% | 0 | 29 | 24621 | 18506 | 573339 |
| | IMRB | 890 | 3454 | 0.51% | 7 | 0.79% | 97.49% | 0.51% | 1.68% | 1.14% | 115 | 2752 | 4.18% | 97.39% | 0 | 29 | 24621 | 18506 | 573339 |

7.4 Cellular Mobile services: Compliance Report January – March 2011

| 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 resolved in favour of the customer during the quarter | 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 / Closure of service complied within 7 days | Total No. of request for Termination / Closure of service received during the quarter | No. of requests for Termination / Closure of service complied within 7 days during the quarter | Time taken for refund of deposits after closure |
| Benchmark | | ≤ 0.1% | | | ≤ 0.1% | | 100% within 4 weeks | | | | | 100% Within 1 week | ≥ 95% | | | ≥ 90% | 100% within 7 days | | | 100% within 60 days | |
| Aircel | PMR | 0.04% | 67744 | 29 | 0.19% | 3743 | 2001924 | 100% | 3746 | 3746 | 794 | 2952 | 100% | 100% | 142268 | 132393 | 91.8% | 100% | 146 | 146 | 100% |
| | IMRB | 0.04% | 67744 | 29 | 0.19% | 3743 | 2001924 | 100% | 3746 | 3746 | 794 | 2952 | 100% | 100% | 142268 | 132393 | 91.8% | 100% | 146 | 146 | 100% |
| Airtel | PMR | 0.00% | 121248 | 1 | 0.00% | 0 | 6717141 | 100% | 1 | 5650 | 1 | 5649 | 100% | 100% | 17865014 | 17864985 | 77.0% | 100% | 595 | 595 | 100% |
| | IMRB | 0.00% | 121248 | 2 | 0.00% | 0 | 6717141 | 100% | 1 | 5651 | 2 | 5649 | 100% | 100% | 17865014 | 17864985 | 77.0% | 100% | 1037 | 1037 | 100% |
| BSNL | PMR | 0.01% | 189124 | 18 | 0.05% | 367 | 729757 | 96% | 339 | 354 | 339 | 0 | 100% | 100% | 415565 | 415515 | 100.0% | 94% | 3706 | 3498 | 100% |
| | IMRB | 0.01% | 189124 | 18 | 0.05% | 367 | 729757 | 96% | 339 | 354 | 339 | 0 | 100% | 100% | 415565 | 415515 | 100.0% | 94% | 3706 | 3498 | 100% |
| Idea | PMR | 0.00% | 3230 | 0 | 0.02% | 117 | 529419 | 100% | 134 | 134 | 117 | 17 | 100% | 95% | 45917 | 43803 | 87.0% | 100% | 63 | 63 | 100% |
| | IMRB | 0.00% | 3230 | 0 | 0.02% | 117 | 529419 | 100% | 134 | 134 | 117 | 17 | 100% | 95% | 45917 | 43803 | 87.0% | 100% | 63 | 63 | 100% |
| Loop | PMR | 0.00% | 0 | 0 | 0.00% | 0 | 5 | 0% | 0 | 0 | 0 | 0 | NA | 100% | 0 | 0 | 100.0% | NA | 0 | 0 | NA |
| | IMRB | 0.00% | 0 | 0 | 0.00% | 0 | 5 | 0% | 0 | 0 | 0 | 0 | NA | 100% | 0 | 0 | 100.0% | NA | 0 | 0 | NA |
| Reliance | PMR | 0.03% | 62209 | 18 | 0.02% | 121 | 610052 | 100% | 382 | 382 | 58 | 58 | 100% | 71% | 262426 | 185685 | 99% | 100% | 62 | 62 | 100% |
| | IMRB | 0.03% | 62209 | 18 | 0.02% | 121 | 610052 | 100% | 382 | 382 | 58 | 58 | 100% | 71% | 262426 | 185685 | 99% | 100% | 62 | 62 | 100% |
| S Tel | PMR | NA | NA | NA | 0.01% | 3 | 31553 | 100% | 3 | 3 | 0 | 3 | 100% | 98% | 0 | 18581 | 98% | NA | NA | NA | NA |
| | IMRB | NA | NA | NA | 0.01% | 3 | 31553 | 100% | 3 | 3 | 0 | 3 | 100% | 98% | 0 | 18581 | 98% | NA | NA | NA | NA |
| Tata Indicom | PMR | 0.02% | 17680 | 3 | 0.01% | 4 | 69399 | 100% | 24 | 24 | 7 | 17 | 100% | 96% | 27437 | 26435 | 91.0% | 100% | 441 | 441 | 100% |
| | IMRB | 0.02% | 17680 | 3 | 0.01% | 4 | 69399 | 100% | 24 | 24 | 7 | 17 | 100% | 96% | 27437 | 26435 | 91.0% | 100% | 441 | 441 | 100% |
| Vodafone | PMR | 0.15% | 37730 | 57 | 0.01% | 337 | 750331 | 100% | 394 | 394 | 379 | 15 | 100% | 100.00% | 39047 | 24536 | 86.0% | 100% | 290 | 290 | 100% |
| | IMRB | 0.15% | 37730 | 57 | 0.01% | 337 | 750331 | 100% | 394 | 394 | 379 | 15 | 100% | 100.00% | 39047 | 24536 | 86.0% | 100% | 290 | 290 | 100% |



Figures do not match with those reported in PMR



Figures verified on all India basis



Not meeting benchmark

B'mark = TRAI Benchmark, DNA = Details not available

8.0 Conclusions

8.1 Cellular Mobile services

1. Aircel does not meet the benchmark for worst affected BTSs due to downtime, Call Set-up Success Rate, SDCCH/ Paging chl. Congestion, TCH Congestion, Call Drop Rate, Worst affected cells having more than 3% TCH drop rate, connection with good voice quality and metering and billing (Prepaid) parameter.
2. Airtel does not meet the benchmark for worst affected BTSs due to downtime and Percentage of calls answered by the operators (voice to voice) within 60 seconds.
3. BSNL does not meet the benchmark for BTSs Accumulated downtime, Worst affected BTSs due to downtime, , SDCCH/ Paging chl. Congestion, TCH Congestion, Call Drop Rate and Worst affected cells having more than 3% TCH drop rate.
4. Idea does not meet the benchmark for worst affected cells having more than 3% TCH drop and Percentage of calls answered by the operators (voice to voice) within 60 seconds.
5. Reliance does not meet the benchmark for Accessibility of call centre/ customer care.
6. Vodafone does not meet the benchmark for Metering and billing credibility - post paid and Percentage of calls answered by the operators (voice to voice) within 60 seconds.
7. There were some minor variations found for some operators in their PMR submitted which may be due to rounding off error

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% | ≤ 5% | ≥ 95% | ≤ 0.1% | ≤ 0.1% | 100% | 100% | ≥ 95% | ≥ 90% | 100% | 100% |
| Aircel | 0.69% | 4.61% | 91.45% | 5.63% | 6.82% | 2.04% | 10.72% | 94.72% | 0.01% | 0.01% | 100.00% | 100.00% | 100.00% | 79.51% | 100.00% | 100.00% |
| Airtel | 0.86% | 1.73% | 95.99% | 0.89% | 1.86% | 1.16% | 2.77% | 98.66% | 0.00% | 0.00% | 100.00% | 100.00% | 100.00% | 80.97% | 100.00% | 100.00% |
| BSNL | 3.87% | 10.99% | 95.82% | 2.44% | 3.77% | 2.92% | 13.03% | 95.58% | 0.05% | 0.01% | 68.42% | 100.00% | 100.00% | 91.23% | 100.00% | 100.00% |
| Idea | 0.92% | 1.56% | 95.50% | 0.88% | 1.23% | 1.93% | 2.98% | 96.10% | 0.00% | 0.00% | 100.00% | 100.00% | 92.69% | 91.09% | 84.62% | 100.00% |
| Loop | 1.46% | 0.00% | 100.00% | 0.00% | 0.00% | 0.00% | 0.00% | 100.00% | NA | 0.00% | NA | NA | NA | NA | NA | NA |
| Reliance | 0.00% | 0.00% | 98.00% | 0.65% | 0.99% | 0.93% | 1.94% | 98.98% | 0.02% | 0.02% | 100.00% | 100.00% | 98.95% | 91.25% | 100.00% | 100.00% |
| S Tel | 0.86% | 0.94% | 99.00% | 0.00% | 0.01% | 0.39% | 4.72% | 98.46% | NA | 0.00% | NA | NA | 50.69% | 95.92% | NA | NA |
| Tata Indicom | 0.59% | 5.68% | 93.90% | 0.00% | 0.00% | 0.34% | 0.71% | 98.68% | 0.00% | 0.02% | 96.97% | 100.00% | 99.27% | 91.25% | 100.00% | 100.00% |
| Vodafone | 0.46% | 0.95% | 97.80% | 0.46% | 1.36% | 1.23% | 3.87% | 97.08% | 0.04% | 0.03% | 100.00% | 92.00% | 429.13% | 76.54% | 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 |
|------------------------------|--|------------------------------|-----------------------------------|--------------------------------------|---------------------|---|
| Aircel | All POI's meeting TRAI specified benchmark | | | | | |
| Airtel | All POI's meeting TRAI specified benchmark | | | | | |
| BSNL | IDEA | 153 | 34140 | 152.84 | 44.77 | POI under augmentation |
| | Airtel outgoing | 1949 | 235758 | 1943.7 | 70 | POI under augmentation |
| | Vodafone | 1083 | 152124 | 1071.18 | 7.9 | POI under augmentation |
| Idea | All POI's meeting TRAI specified benchmark | | | | | |
| Loop | All POI's meeting TRAI specified benchmark | | | | | |
| Reliance | All POI's meeting TRAI specified benchmark | | | | | |
| S Tel | All POI's meeting TRAI specified benchmark | | | | | |
| Tata Indicom | All POI's meeting TRAI specified benchmark | | | | | |
| Vodafone | All POI's meeting TRAI specified benchmark | | | | | |

9.3 Parameter wise performance reports for Cellular Mobile services

1. Network Availability

Audit Results for Network Availability

| | Benchmark | Aircel | Airtel | BSNL | Idea | Loop | Reliance | S Tel | Tata Indicom | Vodafone |
|---|-----------|--------|--------|--------|-------|-------|----------|-------|--------------|----------|
| Number of BTSs in the licensed service area | | 1475 | 1389 | 646 | 385 | 13 | 584 | 106 | 176 | 1050 |
| Sum of downtime of BTSs in a month (in hours) | | 7546 | 8937 | 18597 | 2624 | 141 | 3 | 675 | 768 | 3629 |
| BTSs accumulated downtime (not available for service) | ≤ 2% | 0.69% | 0.86% | 3.87% | 0.92% | 1.46% | 0.00% | 0.86% | 0.59% | 0.46% |
| Number of BTSs having accumulated downtime >24 hours | | 68 | 24 | 71 | 6 | 0 | 0 | 1 | 10 | 10 |
| Worst affected BTSs due to downtime | ≤ 2% | 4.61% | 1.73% | 10.99% | 1.56% | 0.00% | 0.00% | 0.94% | 5.68% | 0.95% |

Live Measurement Results for Network Availability

| | Benchmark | Aircel | Airtel | BSNL | Idea | Loop | Reliance | S Tel | Tata Indicom | Vodafone |
|---|-----------|--------|--------|-------|-------|-------|----------|-------|--------------|----------|
| Number of BTSs in the licensed service area | | 1475 | 1389 | 649 | 387 | 13 | 589 | 106 | 176 | 1054 |
| Sum of downtime of BTSs in a month (in hours) | | 1325 | 6512 | 8901 | 256 | 70 | 0 | 282 | 356 | 245 |
| BTSs accumulated downtime (not available for service) | ≤ 2% | 0.12% | 0.63% | 1.84% | 0.09% | 0.72% | 0.00% | 0.36% | 0.27% | 0.03% |
| Number of BTSs having accumulated downtime >24 hours | | 0 | 0 | 14 | 0 | 0 | 0 | 0 | 0 | 0 |
| Worst affected BTSs due to downtime | ≤ 2% | 0.00% | 0.00% | 2.16% | 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 | Aircel | Airtel | BSNL | Idea | Loop | Reliance | S Tel | Tata Indicom | Vodafone |
|------|-----------|--------|--------|--------|--------|---------|----------|--------|--------------|----------|
| CSSR | ≥ 95% | 91.45% | 95.99% | 95.82% | 95.50% | 100.00% | 98.00% | 99.00% | 93.90% | 97.80% |

| SDCCH congestion | Benchmark | Aircel | Airtel | BSNL | Idea | Loop | Reliance | S Tel | Tata Indicom | Vodafone |
|---------------------------------|-----------|--------|--------|-------|-------|-------|----------|-------|--------------|----------|
| SDCCH/Paging channel congestion | ≤ 1% | 5.63% | 0.89% | 2.44% | 0.88% | 0.00% | 0.65% | 0.00% | 0.00% | 0.46% |

| TCH congestion | Benchmark | Aircel | Airtel | BSNL | Idea | Loop | Reliance | S Tel | Tata Indicom | Vodafone |
|----------------|-----------|--------|--------|-------|-------|-------|----------|-------|--------------|----------|
| TCH congestion | ≤ 2% | 6.82% | 1.86% | 3.77% | 1.23% | 0.00% | 0.99% | 0.01% | 0.00% | 1.36% |

Live measurement results for CSSR, SDCCH and TCH congestion

| CSSR | Benchmark | Aircel | Airtel | BSNL | Idea | Loop | Reliance | S Tel | Tata Indicom | Vodafone |
|------|-----------|--------|--------|--------|--------|---------|----------|--------|--------------|----------|
| CSSR | ≥ 95% | 96.00% | 98.00% | 97.37% | 97.25% | 100.00% | 98.57% | 99.55% | 98.33% | 99.00% |

| SDCCH congestion | Benchmark | Aircel | Airtel | BSNL | Idea | Loop | Reliance | S Tel | Tata Indicom | Vodafone |
|---------------------------------|-----------|--------|--------|-------|-------|-------|----------|-------|--------------|----------|
| SDCCH/Paging channel congestion | ≤ 1% | 3.34% | 0.45% | 0.77% | 0.65% | 0.00% | 0.64% | 0.02% | 0.00% | 0.00% |

| TCH congestion | Benchmark | Aircel | Airtel | BSNL | Idea | Loop | Reliance | S Tel | Tata Indicom | Vodafone |
|----------------|-----------|--------|--------|-------|-------|-------|----------|-------|--------------|----------|
| TCH congestion | ≤ 2% | 3.90% | 0.86% | 1.92% | 1.63% | 0.00% | 0.92% | 0.01% | 0.01% | 0.22% |

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

| CSSR | Benchmark | Aircel | Airtel | BSNL | Idea | Loop | Reliance | S Tel | Tata Indicom | Vodafone |
|--|-----------|--------|---------|--------|--------|------|----------|--------|--------------|----------|
| Total number of call attempts | | 908 | 801 | 675 | 708 | NA | 940 | 282 | 1514 | 720 |
| Total number of successful calls established | | 893 | 801 | 623 | 706 | NA | 927 | 275 | 1508 | 720 |
| CSSR | ≥ 95% | 98.35% | 100.00% | 92.30% | 99.72% | NA | 98.62% | 97.52% | 99.60% | 100.00% |

| Blocked calls | Benchmark | Aircel | Airtel | BSNL | Idea | Loop | Reliance | S Tel | Tata Indicom | Vodafone |
|--------------------|-----------|--------|--------|-------|-------|------|----------|-------|--------------|----------|
| %age blocked calls | | 1.65% | 0.00% | 7.70% | 0.28% | NA | 1.38% | 2.48% | 0.40% | 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 | Aircel | Airtel | BSNL | Idea | Loop | Reliance | S Tel | Tata Indicom | Vodafone |
|-----------------------------------|-----------|-----------|----------|----------|---------|-------|----------|--------|--------------|----------|
| Total number of calls established | | 137011025 | 95676626 | 17741404 | 7089761 | 20 | 16477031 | 426533 | 1852024 | 988005 |
| Total number of calls dropped | | 2798633 | 1109849 | 518645 | 137162 | 0 | 153023 | 1652 | 6365 | 12134 |
| Call drop rate | ≤ 2% | 2.04% | 1.16% | 2.92% | 1.93% | 0.00% | 0.93% | 0.39% | 0.34% | 1.23% |

| Cells having more than 3% TCH | Benchmark | Aircel | Airtel | BSNL | Idea | Loop | Reliance | S Tel | Tata Indicom | Vodafone |
|---|-----------|--------|--------|--------|-------|-------|----------|-------|--------------|----------|
| Total number of cells in the network | | 4227 | 4122 | 1927 | 34836 | 40 | 1647 | 318 | 561 | 3226 |
| Total number of cells having more than 3% TCH | | 453 | 114 | 251 | 1037 | 0 | 32 | 15 | 4 | 125 |
| Worst affected cells having more than 3% TCH | ≤ 5% | 10.72% | 2.77% | 13.03% | 2.98% | 0.00% | 1.94% | 4.72% | 0.71% | 3.87% |

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

| Call drop rate | Benchmark | Aircel | Airtel | BSNL | Idea | Loop | Reliance | S Tel | Tata Indicom | Vodafone |
|-----------------------------------|-----------|-----------|----------|---------|---------|-------|----------|--------|--------------|----------|
| Total number of calls established | | 149603623 | 96758000 | 3777073 | 7745033 | 11 | 22553856 | 482493 | 185322 | 940559 |
| Total number of calls dropped | | 2496495 | 1470235 | 81029 | 142729 | 0 | 205061 | 1960 | 645 | 9649 |
| Call drop rate | ≤ 2% | 1.67% | 1.52% | 2.15% | 1.84% | 0.00% | 0.91% | 0.41% | 0.35% | 1.03% |

| Cells having more than 3% TCH | Benchmark | Aircel | Airtel | BSNL | Idea | Loop | Reliance | S Tel | Tata Indicom | Vodafone |
|---|-----------|--------|--------|--------|-------|-------|----------|-------|--------------|----------|
| Total number of cells in the network | | 12768 | 12366 | 675 | 83592 | 40 | 1767 | 318 | 516 | 3255 |
| Total number of cells having more than 3% TCH | | 1059 | 211 | 79 | 2392 | 0 | 23 | 9 | 7 | 148 |
| Worst affected cells having more than 3% TCH | ≤ 5% | 8.29% | 1.71% | 11.70% | 2.86% | 0.00% | 1.30% | 2.83% | 1.36% | 4.55% |

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

| Call drop rate | Benchmark | Aircel | Airtel | BSNL | Idea | Loop | Reliance | S Tel | Tata Indicom | Vodafone |
|-----------------------------------|-----------|--------|--------|-------|-------|------|----------|-------|--------------|----------|
| Total number of calls established | | 894 | 801 | 623 | 707 | NA | 908 | 275 | 1514 | 721 |
| Total number of calls dropped | | 3 | 0 | 10 | 0 | NA | 4 | 0 | 5 | 0 |
| Call drop rate | ≤ 2% | 0.34% | 0.00% | 1.61% | 0.00% | NA | 0.44% | 0.00% | 0.33% | 0.00% |

4. Voice quality

Audit Results for Voice quality

| Voice quality | Benchmark | Aircel | Airtel | BSNL | Idea | Loop | Reliance | S Tel | Tata Indicom | Vodafone |
|---|-----------|------------|-------------|--------|-----------|---------|------------|----------|--------------|-----------|
| Total number of sample calls | | 8991445045 | 22124340912 | 181 | 807035483 | 573 | 1239772090 | 20608963 | 7325 | 149263944 |
| Total number of calls with good voice quality | | 8516714533 | 21828486904 | 173 | 775545536 | 573 | 1227128263 | 20291573 | 7228 | 144907425 |
| %age calls with good voice quality | ≥ 95% | 94.72% | 98.66% | 95.58% | 96.10% | 100.00% | 98.98% | 98.46% | 98.68% | 97.08% |

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

| Voice quality | Benchmark | Aircel | Airtel | BSNL | Idea | Loop | Reliance | S Tel | Tata Indicom | Vodafone |
|---|-----------|--------|--------|--------|--------|------|----------|--------|--------------|----------|
| Total number of sample calls | | 763204 | 784508 | 228678 | 570322 | NA | 332103 | 232090 | 37323 | 841312 |
| Total number of calls with good voice quality | | 729000 | 769525 | 170574 | 545597 | NA | 319651 | 227868 | 34609 | 790526 |
| %age calls with good voice quality | ≥ 95% | 95.52% | 98.09% | 74.59% | 95.66% | NA | 96.25% | 98.18% | 92.73% | 93.96% |

5. POI Congestion


Audit Results for POI Congestion

| POI congestion | Benchmark | Aircel | Airtel | BSNL | Idea | Loop | Reliance | S Tel | Tata Indicom | Vodafone |
|---|-----------|--------|--------|----------|---------|-------|----------|-------|--------------|------------|
| Total number of working POIs | | 36 | 51 | 47 | 25 | 11 | 14 | 14 | 27 | 30 |
| No. of POIs not meeting benchmark | | 0 | 0 | 5 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Capacity of all POIs (A) - in erlangs | | 34977 | 44151 | 30000 | 6975.36 | 247.5 | 6405 | 947 | 2890 | 13204190 |
| Traffic served for all POIs (B)- in erlangs | | 24958 | 28968 | 28249.02 | 3671.06 | 2.11 | 4130 | 115 | 662.61 | 3957642.85 |
| POI congestion | ≤ 0.5% | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |

Live measurement results for POI congestion

6. Inter Operator Call Assessment

| Inter operator call Assessment To↓ From → | Aircel | Airtel | BSNL | Idea | Loop | Reliance | S Tel | Tata Indicom | Vodafone |
|--|--------|--------|------|------|------|----------|-------|--------------|----------|
| Aircel | NA | 94% | 99% | 100% | 97% | 95% | 100% | 100% | 98% |
| Airtel | 100% | NA | 99% | 100% | 99% | 87% | 100% | 100% | 82% |
| BSNL | 100% | 96% | NA | 100% | 100% | 95% | 90% | 100% | 98% |
| Idea | 100% | 98% | 100% | NA | 98% | 100% | 98% | 100% | 100% |
| Loop | 100% | 100% | 99% | 100% | NA | 100% | 100% | 100% | 100% |
| Reliance | 100% | 95% | 95% | 100% | 97% | NA | 95% | 100% | 100% |
| S Tel | 100% | 94% | 95% | 100% | 96% | 100% | NA | 100% | 100% |
| Tata Indicom | 100% | 97% | 99% | 100% | 99% | 100% | 100% | NA | 97% |
| Vodafone | 100% | 98% | 98% | 100% | 98% | 97% | 96% | 100% | NA |

 The maximum problem faced by the calling operator to other operators

7. Metering and Billing credibility

Audit Results for Billing performance

| Billing Performance | Benchmark | Aircel | Airtel | BSNL | Idea | Loop | Reliance | S Tel | Tata Indicom | Vodafone |
|---|-----------|--------|--------|--------|------|------|----------|-------|--------------|----------|
| Billing diputes - Postpaid | | | | | | | | | | |
| Total bills generated during the period | | 23019 | 41656 | 117933 | 810 | NA | 17015 | NA | 19264 | 13059 |

| | | | | | | | | | | |
|--|--------|---------|---------|--------|--------|-------|--------|-------|--------|--------|
| Total number of bills disputed | | 2 | 2 | 57 | 0 | NA | 3 | NA | 0 | 5 |
| Percentage bills disputed | ≤ 0.1% | 0.01% | 0.00% | 0.05% | 0.00% | NA | 0.02% | NA | 0.00% | 0.04% |
| Billing disputes - Prepaid | | | | | | | | | | |
| Number of complaints related to charging, credit & validity | | 203 | 0 | 78 | 0 | 0 | 173 | 0 | 13 | 268 |
| Total number of prepaid customers in that period | | 2078522 | 2223378 | 923618 | 215693 | 20 | 714723 | 41121 | 81778 | 849994 |
| Percentage of complaints | ≤ 0.1% | 0.01% | 0.00% | 0.01% | 0.00% | 0.00% | 0.02% | 0.00% | 0.02% | 0.03% |
| Resolution of billing complaints | | | | | | | | | | |
| Total number of billing/charging complaints | | 180 | 1137 | 95 | 295 | 0 | 176 | 3 | 33 | 124 |
| Total complaints considered invalid | | 9 | 1135 | 30 | 290 | 0 | 159 | 3 | 6 | 78 |
| Number of complaints resolved in 4 weeks from date of receipt for complaints listed in 5.3.1 | | 180 | 1137 | 65 | 295 | 0 | 176 | NA | 32 | 124 |
| Percentage complaints resolved within 4 weeks of date of receipt | 100% | 100% | 100% | 68% | 100% | NA | 100% | NA | 96.97% | 100% |
| Period of applying credit / waiver | | | | | | | | | | |
| Total number of complaints where credit/waiver is required | | 171 | 2 | 2 | 5 | 0 | 17 | 0 | NA | 48 |
| Percentage cases in which credit/waiver was received within 1 week | 100% | 100% | 100% | 100% | 100% | NA | 100% | NA | 100% | 92% |

Live calling results for resolution of billing complaints

| Resolution of billing complaints | Benchmark | Aircel | Airtel | BSNL | Idea | Loop | Reliance | S Tel | Tata Indicom | Vodafone |
|---|-----------|--------|--------|------|------|------|----------|-------|--------------|----------|
| Total Number of calls made | | 34 | 33 | 2 | 3 | NA | 50 | 3 | 34 | 50 |
| Number of cases resolved in 4 weeks | | 34 | 32 | 2 | 3 | NA | 48 | 3 | 34 | 47 |
| Percentage cases resolved in four weeks | 100% | 100% | 97% | 100% | 100% | NA | 96% | 100% | 100% | 94% |

8. Customer Care

Audit results for customer care

| Customer Care Assessment | Benchmark | Aircel | Airtel | BSNL | Idea | Loop | Reliance | S Tel | Tata Indicom | Vodafone |
|---|-----------|---------|---------|---------|--------|------|----------|--------|--------------|----------|
| Total number of call attempts to customer care for assistance | | 1963684 | 2898233 | 414579 | 321128 | 0 | 777723 | 18228 | 82835 | 233758 |
| Number of calls getting connected and answered (electronically) | | 1963684 | 2898233 | 414579 | 297667 | 0 | 769572 | 9240 | 82231 | 1003131 |
| Percentage calls getting connected and answered | ≥ 95% | 100.00% | 100.00% | 100.00% | 92.69% | NA | 98.95% | 50.69% | 99.27% | 429.13% |
| Number of calls getting transferred to the operator (voice to voice) | | 516401 | 624456 | 123227 | 62950 | 0 | 162841 | 7380 | 16647 | 149872 |
| Number of calls answered by operator (voice to voice) within 60 seconds | | 410594 | 505604 | 112420 | 57341 | 0 | 148587 | 7079 | 15191 | 114705 |
| Percentage calls answered within 60 seconds (V2V) | ≥ 90% | 79.51% | 80.97% | 91.23% | 91.09% | NA | 91.25% | 95.92% | 91.25% | 76.54% |

Live calling results for customer care

| Customer Care Assessment | Benchmark | Aircel | Airtel | BSNL | Idea | Loop | Reliance | S Tel | Tata Indicom | Vodafone |
|--------------------------------|-----------|--------|--------|------|------|------|----------|-------|--------------|----------|
| Total Number of calls received | | 50 | 50 | 100 | 50 | 50 | 50 | 50 | 50 | 50 |

| | | | | | | | | | | |
|--|-------|---------|---------|---------|---------|---------|--------|---------|---------|---------|
| Total Number of calls getting connected and answered | | 50 | 50 | 100 | 50 | 50 | 46 | 50 | 50 | 50 |
| Percentage calls getting connected and answered | ≥ 95% | 100.00% | 100.00% | 100.00% | 100.00% | 100.00% | 92.00% | 100.00% | 100.00% | 100.00% |

Live calling results for customer care (Voice to Voice)

| Customer Care Assessment | Benchmark | Aircel | Airtel | BSNL | Idea | Loop | Reliance | S Tel | Tata Indicom | Vodafone |
|--|-----------|--------|--------|--------|--------|--------|----------|-------|--------------|----------|
| Total Number of calls received | | 50 | 50 | 100 | 50 | 50 | 50 | 50 | 50 | 50 |
| Total Number of calls answered within 60 seconds | | 36 | 45 | 90 | 46 | 48 | 41 | 0 | 45 | 50 |
| Percentage calls answered within 60 seconds | ≥ 90% | 72.00% | 90.00% | 90.00% | 92.00% | 96.00% | 82.00% | 0.00% | 90.00% | 100.00% |

9. Termination / closure of service

Audit results for termination / closure of service

| Termination | Benchmark | Aircel | Airtel | BSNL | Idea | Loop | Reliance | S Tel | Tata Indicom | Vodafone |
|--|-----------|---------|---------|---------|--------|------|----------|-------|--------------|----------|
| Total number of closure request | | 66 | 452 | 629 | 26 | NA | 17 | NA | 188 | 72 |
| Number of requests attended within 7 days | | 66 | 452 | 629 | 22 | NA | 17 | NA | 188 | 72 |
| Percentage cases in which termination done within 7 days | 100% | 100.00% | 100.00% | 100.00% | 84.62% | NA | 100.00% | NA | 100.00% | 100.00% |

Audit results for refund of deposits

| Refund | Benchmark | Aircel | Airtel | BSNL | Idea | Loop | Reliance | S Tel | Tata Indicom | Vodafone |
|---|-----------|---------|---------|---------|---------|------|----------|-------|--------------|----------|
| Total number of cases requiring refund of deposits | | 54 | 82 | 98 | 7 | NA | 87 | NA | 6 | 256 |
| Total number of cases where refund was made within 60 days | | 54 | 82 | 98 | 7 | NA | 87 | NA | 6 | 256 |
| Percentage cases in which refund was receive within 60 days | 100% | 100.00% | 100.00% | 100.00% | 100.00% | NA | 100.00% | NA | 100.00% | 100.00% |

11. Additional Network Related parameters

| Audit Results for Total Traffic Handled in Erlang | | | | | | | | | | |
|---|--|--------|--------|-------|---------|-------|----------|-------|--------------|----------|
| Traffic in Erlang | | Aircel | Airtel | BSNL | Idea | Loop | Reliance | S Tel | Tata Indicom | Vodafone |
| Equipped capacity of the network | | 67593 | 79897 | 68000 | 7646 | 296 | 40000 | 2367 | 38417 | 29735.36 |
| Total traffic handled in erlang during TCBH | | 51424 | 61621 | 53661 | 5090.95 | 0.242 | 13699 | 197 | 10748.95 | 21220.1 |

Total number of customers as per VLR

| | | Aircel | Airtel | BSNL | Idea | Loop | Reliance | S Tel | Tata Indicom | Vodafone |
|--|--|---------|---------|--------|--------|------|----------|-------|--------------|----------|
| Total no. of customers served (as per VLR) | | 1548650 | 1506752 | 654983 | 173795 | 2 | 445666 | 8874 | 41939 | 647691 |

10.0 Annexure – II Detailed Explanation of Audit methodology (Parameter wise)

10.1 Cellular Mobile services

| 1. Accumulated Downtime of the Network | |
|---|---|
| Computational Methodology as per QoS definition | <p>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.</p> <p>Computational Methodology:</p> <ul style="list-style-type: none"> BTSS Accumulated downtime = $\frac{\text{Sum of downtime of BTSS in a month in hours}}{\text{i.e. total outage time of all BTSS in hours during a month} \times 100}$ $24 \times \text{No. of days in the month} \times \text{No. of BTSS in the network in the licensed service area}$ <ul style="list-style-type: none"> Worst affected BTSS due to downtime = $\frac{\text{No. of BTSS having accumulated downtime } > 24 \text{ hours in a month} \times 100}{\text{Total No. of BTSS in the network in the licensed service area}}$ |
| Benchmark | <ul style="list-style-type: none"> BTSS Accumulated downtime (not available for service) $\leq 2\%$ Worst affected BTSS due to downtime $\leq 2\%$ |
| Audit Procedure | <p>IMRB auditors collected and verified data pertaining to:</p> <p>The fault alarm details at the OMC (MSC) for the network outages (due to own network elements and infrastructure service provider end outages) used for arriving at the benchmark reported to TRAI were audit</p> |

| 2. Call Set-Up Success Rate (CSSR) | |
|---|--|
| Computational Methodology as per QoS definition | <p>The ratio of calls established to total calls is known CSSR.</p> <p>Call Established means the following events have happened in call setup:-</p> <ul style="list-style-type: none"> call attempt is made the TCH is allocated the call is routed to the outward path of the concerned MSC <p>Computational Methodology: $\text{Calls Established} / \text{Total Call Attempts} \times 100$</p> |
| Benchmark | > 95% |
| Audit Procedure | <p>IMRB auditors collected and verified data pertaining to</p> <ul style="list-style-type: none"> The cell-wise data generated through counters/ MMC available in the switch for traffic measurements was verified by the auditors CSSR calculation was measured using OMC generated data only Measurement was done only in Time Consistent Busy Hour (TCBH) period for all days of the week |

| 3. Network Congestion Parameters | |
|---|---|
| Computational Methodology as per QoS definition | <p>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:</p> <ul style="list-style-type: none"> ↳ SDCCH Level: Stand-alone dedicated control channel ↳ TCH Level: Traffic Channel ↳ POI Level: Point of Interconnect <p>Computational Methodology:</p> <ul style="list-style-type: none"> ↳ SDCCH / TCH Congestion% = $[(A1 \times C1) + (A2 \times C2) + \dots + (An \times Cn)] / (A1 + A2 + \dots + An)$ <ul style="list-style-type: none"> ● Where:-A1 = Number of attempts to establish SDCCH / TCH made on day 1 ● C1 = Average SDCCH / TCH Congestion % on day 1 ● A2 = Number of attempts to establish SDCCH / TCH made on day 2 ● C2 = Average SDCCH / TCH Congestion % on day 2 ● An = Number of attempts to establish SDCCH / TCH made on day n ● Cn = Average SDCCH / TCH Congestion % on day n ↳ POI Congestion% = $[(A1 \times C1) + (A2 \times C2) + \dots + (An \times Cn)] / (A1 + A2 + \dots + An)$ <ul style="list-style-type: none"> ● Where:-A1 = POI traffic offered on all POIs (no. of calls) on day 1 ● C1 = Average POI Congestion % on day 1 ● A2 = POI traffic offered on all POIs (no. of calls) on day 2 ● C2 = Average POI Congestion % on day 2 ● An = POI traffic offered on all POIs (no. of calls) on day n ● Cn = Average POI Congestion % on day n |
| Benchmark | <p>SDCCH Congestion: ≤ 1% TCH Congestion: ≤ 2% POI Congestion: ≤ 0.5%</p> |
| Audit Procedure | <p>IMRB Auditors collected and verified records pertaining to:</p> <ul style="list-style-type: none"> ↳ Audit of the details of SDCCH and TCH congestion percentages computed by the operator (using OMC–Switch data only) was conducted ↳ The operator should be measuring this parameter during Time consistent busy hour (TCBH) only SDCCH ↳ The POI details were verified from the switch for all the links of the operators |

| 4. Call Drop Rate | |
|---|---|
| Computational Methodology as per QoS definition | <p>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</p> <ul style="list-style-type: none"> ↳ 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 <p>Computational Methodology: Total Calls Dropped / Total Calls Established x 100</p> |
| Benchmark | <p>≤ 2%</p> |
| Audit Procedure | <p>IMRB Auditors collected and verified records pertaining to:</p> <ul style="list-style-type: none"> ↳ Audit of traffic data of the relevant quarter kept in OMC-R at MSCs and used for arriving at CDR was conducted. ↳ The operator should only be considering those calls which are dropped during Time consistent busy hour (TCBH) for all days of the relevant quarter |

| 5. Connections with Good Voice Quality | |
|--|---|
| Computational Methodology as per QoS definition | <p>Definition:</p> <ul style="list-style-type: none"> ↳ 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 it FER value lies between 0 – 4 % <p>Computational Methodology:</p> <ul style="list-style-type: none"> ↳ % Connections with good voice quality = (No. of voice samples with good voice quality / Total number of samples) x 100 |
| Benchmark | ≥ 95% |
| Audit Procedure | <p>IMRB Auditors collected and verified records pertaining to:</p> <p>Audit would be conducted based on the details of periodic drive tests conducted at different part of the network during Time consistent busy hour (TCBH) and used to arrive at the benchmarks reported to TRAI.</p> <p>Procedures that were to be followed by operator for obtaining relevant details for computing this parameter were audited</p> <ul style="list-style-type: none"> ↳ Operator to conduct <u>at least one</u> drive test using standard drive test equipment every week during TCBH ↳ Each drive test should evenly cover the following 5 types of locations: ↳ 3 Outdoor (Periphery of the city, Congested Area, Across the City), and 2 Indoor (Office Complex and Shopping Complex) ↳ 2 minute long calls to be initiated and held throughout the drive test ↳ The speed of the vehicle should be kept at around 50km/hr. (around 30 km/hr in case of geographically small cities) – This was ensured during the drive tests conducted by IMRB Auditors ↳ RxQual / FER samples generated during the drive test collected by the operator were verified ↳ <i>Measurements using Engineering handsets were not acceptable</i> ↳ All the operators were not maintaining this data at the switch level |

| 6. Service Coverage | |
|---|--|
| <p>Computational Methodology as per QoS definition</p> | <p>Definition:</p> <ul style="list-style-type: none"> ↪ The level of signal available in a particular part of a city is known as signal strength. <p>Computational Methodology:</p> <ul style="list-style-type: none"> ↪ Service Coverage for route type x = $[(N1 \times CSS1) + (N2 \times CSS2) + \dots + (Nn \times CSSn)] / (N1 + N2 + \dots + Nn)$ ↪ Where:-N1 = Number of calls on type of route x made in drive test 1 ↪ CSS1 = Average coverage signal strength on type of route x in drive test 1 (in dBm) ↪ N2 = Number of calls on type of route x made in drive test 2 ↪ CSS2 = Average coverage signal strength on type of route x in drive test 2 (in dBm) ↪ Nn = Number of calls on type of route x made in drive test n ↪ CSSn = Average coverage signal strength on type of route x in drive test n (in dBm) |
| <p>Benchmark</p> | <p>Indoor >= -75 dBm In-vehicle >= -85 dBm Outdoor – in city >= -95 dBm</p> |
| <p>Audit Procedure</p> | <p>IMRB Auditors collected and verified call centre records pertaining to:</p> <ul style="list-style-type: none"> ↪ Audit was conducted based on the details of periodic drive tests conducted at different part of the network during Time consistent busy hour (TCBH) which were used to arrive at the benchmarks reported to TRAI. ↪ Procedures were verified that were to be followed by operator for obtaining relevant details for computing this parameter:- <ul style="list-style-type: none"> ↪ Operator to conduct at least one drive test using standard drive test equipment* every week during Time consistent busy hour (TCBH). ↪ Each drive test should evenly cover the following 5 types of locations: – <ul style="list-style-type: none"> ↪ 3 Outdoor (Periphery of the city, Congested Area, Across the City), and ↪ 2 Indoor (Office Complex and Shopping Complex) ↪ <i>Measurements using Engineering handsets were not acceptable</i> |

| 7. Response time to customer | |
|----------------------------------|--|
| Computational Methodology | <p>To connect to Customer care: The time taken to connect a person (as soon as he presses call) to the IVR of the service provider</p> <p>To connect to operator: The time taken to connect a person (as soon as he presses 9) to the customer care executive</p> <p>Computational Methodology:</p> <ul style="list-style-type: none"> • % age of calls getting connected = $\frac{\text{Total number of calls getting connected}}{\text{Total number of calls made}} \times 100$ • % age of calls answered within 60 sec (voice to voice) = $\frac{\text{Total number of calls answered within 60 seconds}}{\text{Total number of calls made}} \times 100$ |
| Benchmark | <ul style="list-style-type: none"> ↔ % age of calls getting connected and answered ≥ 95% ↔ % age of calls answered by operator (voice to voice) within 60 seconds ≥ 90% |
| Audit Procedure | <p>-IMRB auditors made test calls from the exchanges to the operator's customer care / helpline / toll free numbers. They will record the time taken to connect a customer's call both to the IVR as well as to a customer care executive.</p> <p>- All the supplementary services that have any kind of human intervention are to be covered here. It also includes the IVR assisted services.</p> <p>- Time to answer the call by the operator should be taken from the time auditor has pressed the requisite button for being assisted by the operator.</p> <p>Live calling: -</p> <p>- Overall sample size is 2*50 calls per service provider per circle at different points of time, evenly distributed across the selected exchanges – 50 calls between 1000 HRS to 1300 HRS and 50 calls between 1500 HRS to 1700 HRS</p> <p>- Time to answer the call by the operator was assessed from the time interviewer pressed the requisite button for being assisted by the operator.</p> <p>- All the supplementary services that have any kind of human intervention are to be covered here. It also includes the IVR assisted services.</p> |

| 8.1 Billing complaints per 100 bills issued | |
|--|---|
| Computational Methodology as per QoS definition | <p>Billing complaints includes any of the following complaints related to billing from the point of view of customer:</p> <ul style="list-style-type: none"> • 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.) <p>Billing complaints per 100 bills issued = Total billing complaints** received during the relevant quarter / Total bills generated* during the relevant quarter</p> <p>* All types of bills generated for customers i.e. printed bills, online bills and any other forms of bills generated are to be included</p> <p>** <u>Only</u> dispute related issues (including those that may arise because of a lack of awareness at the subscribers' end) are to be included. It does not include any provisional issues (such as delayed dispatch of billing statements, etc.) in which the operator has opened a ticket internally.</p> |
| Benchmark | < 0.1% billing complaints per 100 bills |
| Audit Procedure | <p>IMRB auditors collected and verified data pertaining to</p> <ul style="list-style-type: none"> - Number of bills generated - Number of billing complaints received - %age complaints per 100 bills |

| 8.2 Resolution of billing complaints | |
|--|--|
| Computational Methodology as per QoS definition | <p>%age of billing complaints resolved within 4 weeks=(Complaints resolved in 4 weeks from date of receipt / Total billing complaints received during the relevant period) x 100</p> <p><u>Only</u> dispute related issues (including those that may arise because of a lack of awareness at the subscribers' end) are to be included. It does not include any provisional issues (such as delayed dispatch of billing statements, etc.) in which the operator has opened a ticket internally.</p> <p>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.</p> |
| Benchmark | 100% cases to be resolved within 4 weeks |
| Audit Procedure | <p>IMRB Auditors collected and verified data pertaining to</p> <ul style="list-style-type: none"> - Total number of billing complaints/bills disputed - Number of complaints resolved in 4 weeks <p>Live calling :- Overall 100 number of live calls made in a licensed service area/circle for each service provider. However in certain cases the sample could not be achieved as bills disputed (prior to the month of Audit) were found to be less than 100</p> |

| 8.3 Period of refunds / payments due to customers | |
|--|--|
| Computational Methodology as per QoS definition | Period of all refunds = Maximum value of 'Time taken to refund' where:-Time taken to refund = Date of refund – date of complaint resolution |
| Benchmark | 100% cases in less than 1 week |
| Audit Procedure | <p>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.</p> <p>Operator to provide details of:-</p> <ul style="list-style-type: none"> • <u>Dates of resolution</u> of all billing complaints resolved in favour of customer and resulting in requirement of a refund by the operator • <u>Dates of refund</u> pertaining to all billing complaints received during the relevant quarter <p>Also random live checks of all subscribers entitled for refund were conducted</p> |
