
Objective Assessment of Quality of Services for (QoS) for Cellular Mobile (Wireless) Service Providers – Bihar & Jharkhand Circle

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Preface

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

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

The Audit module for various circles within the Zones, due the sheer scale of data collection, have been distributed across various quarterly periods. IMRB International Auditors carried out Audits across Orissa, Bihar & Jharkhand, West Bengal, North-East, Assam and Kolkata circles in the second quarter of 2011. **This report details the performance of various service providers in Bihar & Jharkhand circle against Quality of Services benchmarks for various parameters laid down by TRAI in respective regulations for Cellular (Mobile) services.**

Table of contents

	<u>Page no.</u>
1.0 Background.....	4
2.0 Objectives and Methodology.....	5
3.0 Sampling methodology.....	6
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: Cellular Mobile Services 9	8
6.0 Detailed findings – Includes comparison between Live calling/Live measurements and One month data collection.....	17
6.1 Graphical/Tabular Representations for Cellular Mobile Services.....	17
7.0 Compliance reports: Results of Verification of PMR.....	28
7.1 Cellular Mobile services.....	28
8.0 Conclusions.....	31
9.0 Annexure - I.....	32
9.1 Service provider performance report based on one month data.....	32
9.2 Monthly Point of Interconnection (POI) Congestion Report.....	32
9.3 Parameter wise performance reports for Cellular Mobile services.....	34

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 Bihar & Jharkhand circle that was covered in period of April-June 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 Oct-Dec 2010.



This report highlights the Audit Module findings for “Bihar & Jharkhand” circle for Cellular Mobile services

2.0 Objectives and Methodology

The primary objective of the Audit module is to Audit and Assess the Quality of Services being rendered by Basic (Wireline), Cellular Mobile (Wireless), and Broadband service against the parameters notified by TRAI. (The parameters of Quality of Services (QoS) have been specified by in the respective regulations published by TRAI). Following are the key activities undertaken by Auditors during the Audit process conducted at the operator's premises



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

1. **Verification of the data submitted by service providers:** This involved verification of the quarterly Performance Monitoring Reports (PMR's) and monthly Point of Interconnect (POI) Congestion reports being submitted by various service providers. The raw data in the records maintained by service providers was audited to assess the book keeping methodology.
2. **Live measurement for three days:** Network performance of service providers was assessed for three days in the month in which the Audit was carried out. Live figures from the server/ NMS software were recorded for various network related parameters.
3. **Data verification for the month in which Audits were carried out:** Subsequent to the visits for Audit during the live measurement at various Exchanges/ISP Nodes/Exchanges, data for all the network and Non network related parameters was collected from various service providers for the complete month in which the Audit was carried out. Raw data/records pertaining to these were also verified on sample basis to check the veracity of data provided by the operators.
4. **Drive tests:** Operator assisted drive test were conducted in three cities as per the norms stated in the tender.
5. **Live calling:** Live testing was done on a sample basis to check efficiency of various parameters

- 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 Centres (MSC's) of all the Cellular Mobile Service Providers or Unified Access Service Providers (UASP) was collected and verified in specified circles/service areas. Following are the various operators covered in Bihar & Jharkhand circle

	Name of Operator	Month of Audit
Operator 1	Aircel	April, 2011
Operator 2	Airtel	April, 2011
Operator 3	BSNL	April, 2011
Operator 4	Etisalat	April, 2011
Operator 5	Idea	April, 2011
Operator 6	MTS	April, 2011
Operator 7	Reliance CDMA	April, 2011
Operator 8	Reliance GSM	April, 2011
Operator 9	S-Tel	May, 2011
Operator 10	Tata Docomo	April, 2011
Operator 11	Tata Indicom	April, 2011
Operator 12	Uninor	April, 2011
Operator 13	Vodafone	April, 2011

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		

5.0 Executive Summary

The objective assessment of Quality of Services (QoS) was carried out by IMRB International for all the Cellular mobile service providers during the period starting from April 2011 to June 2011 in Bihar & Jharkhand 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: Cellular Mobile Services

Name of Service Provider	Time Consistent Busy Hour (TCBH)	Network Availability					Connection Establishment (Accessibility)			Connection Maintenance (Retainability)				POI		Network Traffic Capacity and Utilization			
		Total no. of BTSs in the licensed service area	Sum of downtime of BTSs in a month in hours i.e. total outage time of all BTSs in hours during a month	BTSS Accumulated downtime (not available for service) (%age)	No. of BTSS having accumulated downtime of >24 hours in a month	Worst affected BTSS due to downtime (%age)	Call Set-up Success Rate (within licensee's own network)	SDCCH/ Paging Chl. Congestion (%age)	TCH Congestion (%age)	Call Drop Rate (%age)	Total No. of cells exceeding 3% TCH drop (call drop)	Total no. of cells in the network	Worst affected cells having more than 3% TCH drop (call drop) rate (%age)	%age of connection with good voice quality	POI Congestion (No. of POIs not meeting the benchmark) Note :2)	Total number of working POI Service Area wise	Equipped Capacity of Network in respect of Traffic in erlang	Total traffic handled in TCBH in erlang	Total no. of customers served (as per VLR) on last day of the month
Benchmark				≤ 2%		≤ 2%	≥ 95%	≤ 1%	≤ 2%	≤ 2%			≤ 5%	≥ 95%	≤ 0.5%				
Aircel	19:00 - 20:00	3479	21245	0.82%	235	6.75%	98.05%	0.35%	1.44%	1.16%	1000	10335	9.68%	95.87%	0	44	201254	60051	2216650
Airtel	19:00 - 20:00	7052	4492	0.09%	42	0.60%	97.43%	0.87%	1.21%	1.81%	502	20592	2.44%	96.52%	0	48	577583	451223	14809427
BSNL	19:00 - 20:00	3295	62851	2.56%	179	5.43%	96.95%	0.43%	1.10%	1.43%	446	8644	5.16%	96.57%	1	197	262600	159888	3584845
Etisalat	19:00 - 20:00	61	408	0.90%	1	1.64%	95.38%	0.07%	0.00%	0.48%	7	183	3.83%	98.51%	0	30	1332	81	2773
Idea	19:00 - 20:00	4204	32264	1.03%	63	1.50%	98.00%	0.88%	1.88%	1.52%	470	12578	3.74%	95.88%	0	85	114879	108816	4037099
MTS	19:00 - 20:00	1295	18347	1.90%	17	1.31%	99.20%	0.00%	0.12%	0.74%	91	3919	2.32%	99.60%	0	46	60711	10288	312589
Reliance CDMA	20:00 - 21:00	2423	10739	0.60%	25	1.03%	99.68%	0.00%	3.44%	0.85%	25	2423	1.02%	96.56%	0	39	262000	94530	2272672
Reliance GSM	20:00 - 21:00	2934	3013	0.14%	18	0.61%	97.00%	0.84%	0.80%	1.56%	115	8802	1.31%	98.56%	0	22	148000	104938	3039016
S-Tel	19:00 - 20:00	1523	20789	1.83%	28	1.84%	98.30%	0.46%	1.70%	0.46%	189	4566	4.14%	97.08%	1	64	37221	12294	578138
Tata Docomo	19:00 - 20:00	2003	65	0.00%	0	0.00%	97.00%	0.19%	0.59%	0.39%	49	6001	0.82%	96.57%	0	9	66371	30405	1171817
Tata Indicom	20:00 - 21:00	1043	953	0.12%	2	0.19%	99.65%	0.00%	0.04%	0.32%	52	3177	1.64%	99.40%	0	236	200862	47836	1044018
Uninor	19:00 - 20:00	2034	17664	1.17%	0	0.00%	96.37%	0.46%	1.51%	1.35%	256	6087	4.21%	96.80%	22	68	66700	55599	1094798
Vodafone	19:00 - 20:00	5767	26469	0.62%	96	1.66%	93.10%	2.31%	4.20%	1.70%	1842	17283	10.66%	95.84%	0	51	156730	133348	4451882

*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 Bihar & Jharkhand 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	19:00 - 20:00	19:00 - 20:00
Airtel	19:00 - 20:00	19:00 - 20:00
BSNL	19:00 - 20:00	19:00 - 20:00
Etisalat	19:00 - 20:00	19:00 - 20:00
Idea	19:00 - 20:00	19:00 - 20:00
MTS	19:00 - 20:00	19:00 - 20:00
Reliance CDMA	20:00 - 21:00	20:00 - 21:00
Reliance GSM	20:00 - 21:00	20:00 - 21:00
S-Tel	19:00 - 20:00	20:00 - 21:00
Tata Docomo	19:00 - 20:00	19:00 - 20:00
Tata Indicom	20:00 - 21:00	20:00 - 21:00
Uninor	19:00 - 20:00	19:00 - 20:00
Vodafone	19:00 - 20:00	19:00 - 20:00

The TCBH reported by all the service providers except S-Tel matched the network busy hour calculated by IMRB auditors for the Bihar & Jharkhand circle.

BTSs Accumulated Downtime:

In the Bihar & Jharkhand circle, BSNL experienced the highest outage in the month of audit, while Aircel had the highest no. of BTS(more than 235) having accumulated downtime of >24 hours in a month.

Call Set-up Success Rate (CSSR):

All the operators except Vodafone were comfortably meeting the benchmark on this parameter. During the audits the maximum CSSR was observed for Reliance CDMA with 99.68% 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 Reliance CDMA and Vodafone for Traffic channel congestion are meeting the TRAI specified benchmarks on the congestion parameters. Reliance CDMA and Vodafone do not meet the TRAI specified benchmark with a Traffic Channel congestion of 3.44% and 4.2%, which was found during the one month data collected for the month of audit. Etisalat leads the way in network congestion parameters with almost negligible paging as well as traffic channel congestion. The calculation methodology of these parameters was found to be in complete accordance with what has been specified by TRAI. 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 1 POIs for BSNL, 1 for S-Tel and 22 for Uninor.

Call Drop Rate:

During the audit it was found that all the service providers were measuring this parameter as per the TRAI guidelines. The call drop rate was measured as the ratio of total calls dropped to the total number of call attempts for all operators. Also, all of service providers were found to be meeting the TRAI specified benchmark. The lowest call drop rate was of Tata Indicom at 0.32% while the highest was for Airtel at 1.81%.

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 month audit it was found that all the service providers were measuring this parameter as per the TRAI guidelines and are meeting the TRAI benchmark for voice quality.

Customer Care / Helpline Assessment


For the accessibility of customer care aspect all the service providers meet the TRAI benchmark. Airtel, BSNL, Reliance GSM, Tata Docomo, Uninor and Vodafone do not meet the benchmark for the month of audit for the percentage of calls answered by the operators (voice to voice) within 60 seconds.

Billing performance

Except Tata Docomo(for postpaid) and Etisalat(for prepaid) all the operators were found to be meeting the benchmark of ≤ 0.1% complaints registered per 100 bills issued and the benchmark of 100% billing complaints being resolved within 4 weeks. In all cases where customers were due for refund, all the service providers except MTS meet the TRAI benchmark of 100% with 1 week.

Inter operator calls assessment

Inter operator call Assessment To↓ From→	Airtel	Airtel	BSNL	Etisalat	Idea	MTS	Reliance CDMA	Reliance GSM	S-Tel	Tata Docomo	Tata Indicom	Uninor	Vodafone
Airtel	NA	100%	100%	100%	100%	97%	100%	100%	100%	99%	100%	91%	100%
Airtel	100%	NA	100%	100%	100%	98%	99%	100%	89%	100%	100%	79%	100%
BSNL	100%	99%	NA	100%	100%	97%	96%	100%	92%	100%	100%	98%	93%
Etisalat	95%	99%	100%	NA	100%	100%	100%	100%	91%	98%	100%	100%	100%
Idea	100%	100%	100%	100%	NA	96%	100%	100%	100%	100%	99%	100%	97%
MTS	93%	99%	100%	100%	96%	NA	99%	100%	94%	100%	99%	97%	100%
Reliance CDMA	100%	100%	100%	100%	100%	98%	NA	100%	98%	100%	100%	100%	98%
Reliance GSM	100%	100%	100%	100%	100%	100%	100%	NA	99%	100%	100%	97%	100%
S-Tel	93%	99%	100%	100%	97%	95%	100%	100%	NA	100%	99%	98%	100%
Tata Docomo	95%	89%	100%	100%	98%	99%	100%	100%	100%	NA	99%	99%	98%
Tata Indicom	100%	95%	100%	100%	100%	96%	100%	100%	100%	100%	NA	100%	100%
Uninor	93%	95%	100%	100%	96%	94%	99%	100%	97%	100%	100%	NA	100%
Vodafone	100%	99%	100%	100%	100%	97%	99%	100%	99%	100%	100%	100%	NA

 Inter calling among operators which faced heavy problems

In the inter-operator call assessment, calls were made from the test SIMs of service provider whose audit was being conducted to all the other service providers. Almost all service providers except BSNL, Reliance GSM and Etisalat had difficulty in connecting to the number of one or the other service provider. For most of the service providers it was difficult connecting to MTS, S-Tel and Uninor.

Results of Operator assisted Drive test

The drive test was conducted simultaneously for all the operators present in the Bihar & Jharkhand circle. There was in total of three drive tests conducted in the circle. These tests were conducted in the cities of Patna, Ranchi and Arrah. 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 Bihar & Jharkhand 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 Bihar & Jharkhand circle were conducted in the cities of Patna, Ranchi and Arrah was conducted along the following route:

	Type of location	Patna	Ranchi	Arrah
Outdoor	Peiphery of the city	Zero Mile to Saguna Mode	Patel Chowk to Booty Mode	Mohaniya More to Railway Station
	Congested area	Gandhi Maidan to Gaye Ghat	Lalpur Chowk to Birsa Chowk	Overbridge to S.B.College
	Across the city	Saguna Mode to Maurya Lok	Argora Chowk to Hehal	Railway Station to Overbridge
Indoor	Office complex	Twin Tower	Hari Om Tower	Near Ramna Maidan
	Shopping complex	Maurya Lok	Capitol Hill	Hotel Park View

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

Drive Test – Patna


	B'mark	Aircel		Airtel		BSNL		Etisalat		Idea		MTS		Reliance CDMA		Reliance GSM		S-Tel		Tata Docomo		Tata Indicom		Uninor		Vodafone	
		In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor
Voice quality	≥ 95%	99.67%	96.75%	98.72%	98.35%	96.43%	94.53%	NA	NA	95.55%	94.04%	99.38%	97.49%	96.19%	85.74%	97.32%	91.09%	99.72%	95.13%	NA	NA	99.40%	98.90%	98.53%	95.32%	97.83%	95.85%
CSSR	≥ 95%	100.00%	100.00%	100.00%	100.00%	100.00%	98.08%	NA	NA	100.00%	99.35%	98.33%	99.33%	97.10%	100.00%	99.44%	96.77%	100.00%	100.00%	NA	NA	100.00%	100.00%	100.00%	98.68%	100.00%	100.00%
%age Blocked calls		0.00%	0.00%	0.00%	0.00%	0.00%	1.92%	NA	NA	0.00%	0.65%	1.67%	0.67%	2.90%	0.00%	0.56%	3.23%	0.00%	0.00%	NA	NA	0.00%	0.00%	0.00%	1.32%	0.00%	0.00%
Call drop rate	≤ 2%	0.00%	0.00%	0.00%	0.00%	0.00%	3.27%	NA	NA	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.67%	0.00%	0.00%	NA	NA	0.00%	0.00%	0.00%	0.67%	0.00%	0.00%
Hands off success rate		100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	NA	NA	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	NA	NA	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%

Drive Test – Ranchi

	B'mark	Aircel		Airtel		BSNL		Etisalat		Idea		MTS		Reliance CDMA		Reliance GSM		S-Tel		Tata Docomo		Tata Indicom		Uninor		Vodafone	
		In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor
Voice quality	≥ 95%	97.28%	98.15%	99.13%	98.90%	96.40%	90.99%	NA	NA	95.77%	95.01%	99.94%	97.39%	99.98%	99.18%	98.94%	95.81%	98.33%	97.28%	97.90%	95.31%	99.96%	99.58%	97.56%	96.30%	98.80%	96.98%
CSSR	≥ 95%	100.00%	98.90%	100.00%	100.00%	100.00%	100.00%	NA	NA	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	99.44%	100.00%	100.00%	100.00%	99.36%	100.00%	100.00%	100.00%	98.73%	100.00%	100.00%
%age Blocked calls		0.00%	1.10%	0.00%	0.00%	0.00%	0.00%	NA	NA	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.56%	0.00%	0.00%	0.00%	0.64%	0.00%	0.00%	0.00%	1.27%	0.00%	0.00%
Call drop rate	≤ 2%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	NA	NA	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Hands off success rate		100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	NA	NA	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%

Drive Test – Arrah

	B'mark	Aircel		Airtel		BSNL		Etisalat		Idea		MTS		Reliance CDMA		Reliance GSM		S-Tel		Tata Docomo		Tata Indicom		Uninor		Vodafone	
		In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor
Voice quality	≥ 95%	98.78%	96.77%	98.16%	98.14%	95.82%	93.08%	NA	NA	98.12%	92.02%	99.68%	98.98%	98.31%	95.23%	94.48%	93.83%	98.02%	96.22%	NA	NA	100.00%	99.48%	98.72%	94.63%	98.45%	98.42%
CSSR	≥ 95%	100.00%	99.35%	100.00%	100.00%	100.00%	98.69%	NA	NA	98.46%	100.00%	100.00%	100.00%	100.00%	100.00%	98.41%	97.40%	100.00%	100.00%	NA	NA	100.00%	100.00%	98.31%	98.03%	100.00%	100.00%
%age Blocked calls		0.00%	0.65%	0.00%	0.00%	0.00%	1.31%	NA	NA	1.54%	0.00%	0.00%	0.00%	0.00%	0.00%	1.59%	2.60%	0.00%	0.00%	NA	NA	0.00%	0.00%	1.69%	1.97%	0.00%	0.00%
Call drop rate	≤ 2%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	NA	NA	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	2.00%	0.00%	0.00%	0.00%	NA	NA	0.00%	0.00%	1.34%	1.72%	0.00%	0.00%
Hands off success rate		100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	NA	NA	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	NA	NA	100.00%	100.00%	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

Patna: There was interference and low signal strength recorded for most of the operators in the outdoor areas near Khajpura Shiv Temple, Bye Pass, Near Beur Jail, Near Mahendru, Near Saguna More, Bari Road, Gola Road while in the indoor areas inadequate coverage was not found in any of the areas.

Ranchi: There was interference and low signal strength recorded for most of the operators in the outdoor areas of Harmu, near Mecon, Deepatoli, Ratu Road, Amrood Bagan, Harbala Road, Ratan Talkies while in the indoor areas there was no inadequate coverage or interference recorded.

Arrah: There was interference and low signal strength recorded for most of the operators in the outdoor areas of civil lines area, mohaniya road, near SB college, near Dharhara bridge, near railway station, Maula Bagh, Sital Tola, Bihari Mill while in the indoor areas no interference and inadequate coverage was recorded.


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:

1. BSNL didn't meet the TRAI benchmark for voice quality in all the 3 cities where drive test was conducted. Whereas Idea and Reliance GSM did not meet the voice quality benchmark in Patna and Arrah, Reliance CDMA did not meet the voice quality benchmark in Patna, S-Tel did not meet the voice quality benchmark in Ranchi and Uninor did not meet the voice quality benchmark in Arrah.
2. BSNL did not meet the TRAI benchmark for Call Drop Rate in Patna.

Summary of Live Measurement Results – Cellular Mobile Services

Name of Service Provider	Connection Establishment (Accessibility)			Connection Maintenance (Retainability)			Metering and Billing	Response time to customer for assistance	
	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	≥ 95%	≤ 1%	≤ 2%	≤ 2%	≤ 5%	≥ 95%	100%	≥ 95%	≥ 90%
Aircel	97.56%	0.27%	2.02%	1.07%	8.77%	97.62%	76.00%	100.00%	98.00%
Airtel	98.37%	0.62%	1.04%	1.25%	2.28%	98.52%	100.00%	100.00%	100.00%
BSNL	90.30%	0.40%	0.91%	1.44%	5.26%	92.92%	71.05%	100.00%	58.00%
Etisalat	96.41%	0.04%	0.06%	0.46%	3.17%	NA	100.00%	100.00%	100.00%
Idea	98.00%	0.58%	0.71%	1.03%	3.51%	95.34%	73.00%	100.00%	92.00%
MTS	99.29%	0.00%	0.09%	1.08%	9.31%	98.49%	60.00%	100.00%	64.00%
Reliance CDMA	99.61%	0.00%	0.87%	0.91%	2.48%	96.32%	33.33%	100.00%	82.00%
Reliance GSM	98.00%	0.00%	0.69%	1.06%	1.46%	93.61%	80.00%	100.00%	96.00%
S-Tel	98.30%	0.81%	0.02%	0.42%	4.24%	92.60%	66.67%	100.00%	22.00%
Tata Docomo	98.06%	0.20%	0.53%	0.96%	0.86%	96.01%	53.33%	100.00%	100.00%
Tata Indicom	98.43%	0.00%	0.99%	0.51%	0.88%	99.45%	83.33%	100.00%	100.00%
Uninor	96.21%	0.14%	0.44%	1.45%	4.21%	96.24%	60.00%	100.00%	100.00%
Vodafone	88.55%	3.89%	7.39%	1.76%	7.06%	97.28%	73.33%	100.00%	96.00%

 Not meeting the benchmark

* Based on operator assisted drive tests conducted by IMRB

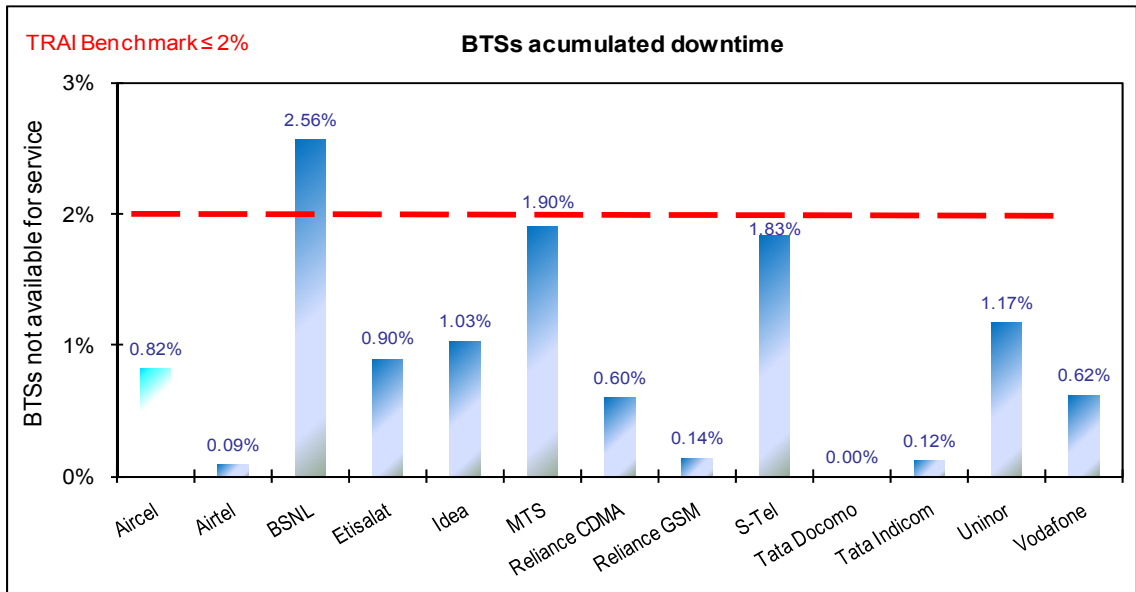
During the three day live measurement, it was found that:

1. BSNL and Vodafone are not meeting the TRAI benchmark for CSSR
2. Vodafone is not meeting the TRAI benchmark for Paging Channel Congestion.
3. Aircel and Vodafone are not meeting the TRAI benchmark for TCH Congestion.
4. All service providers are meeting the TRAI benchmark for call drop.
5. Aircel, BSNL, MTS and Vodafone are not meeting the TRAI benchmark for Worst affected cells having more than 3% TCH drop.
6. BSNL, Reliance GSM and S-Tel are not meeting the TRAI benchmark for voice quality.
7. Except Airtel and Etisalat no other service provider is meeting the TRAI benchmark 100% for complaints resolved within 4 weeks.
8. BSNL, MTS, Reliance CDMA and S-Tel do not meet the benchmark for the month of audit for the percentage of calls answered by the operators (voice to voice) within 60 seconds.

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

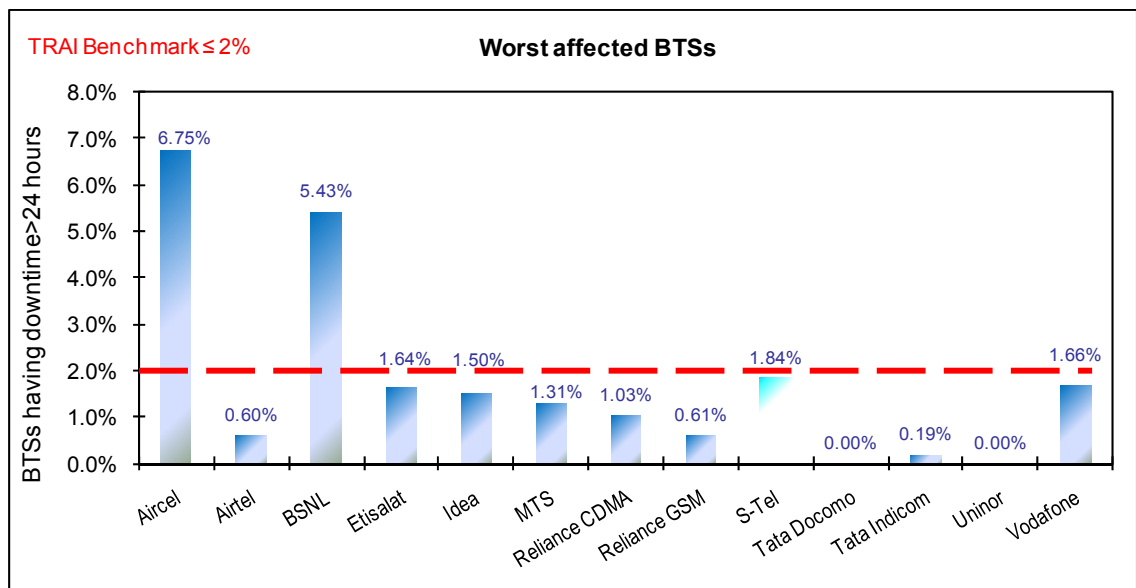
BTSS Accumulated Downtime



Operator(s) meeting benchmark: Aircel, Airtel, Etisalat, Idea, MTS, Reliance CDMA, Reliance GSM, S-Tel, Tata Docomo, Tata Indicom, Uninor, Vodafone

Operator(s) not meeting the benchmark: BSNL

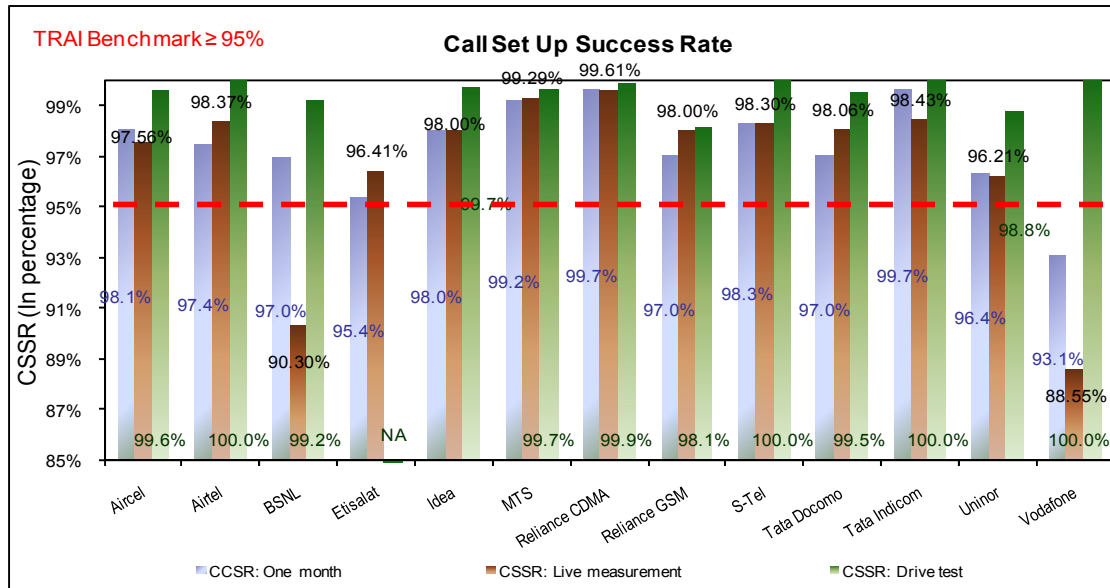
Worst Affected BTSS



Operator(s) meeting benchmark: Airtel, Etisalat, Idea, MTS, Reliance CDMA, Reliance GSM, S-Tel, Tata Docomo, Tata Indicom, Uninor, Vodafone

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

Call Set-up Success Rate (CSSR)



One month

Operator(s) meeting benchmark: Aircel, Airtel, BSNL, Etisalat, Idea, MTS, Reliance CDMA, Reliance GSM, S-Tel, Tata Docomo, Tata Indicom, Uninor

Operator(s) not meeting the benchmark: Vodafone

Live measurement

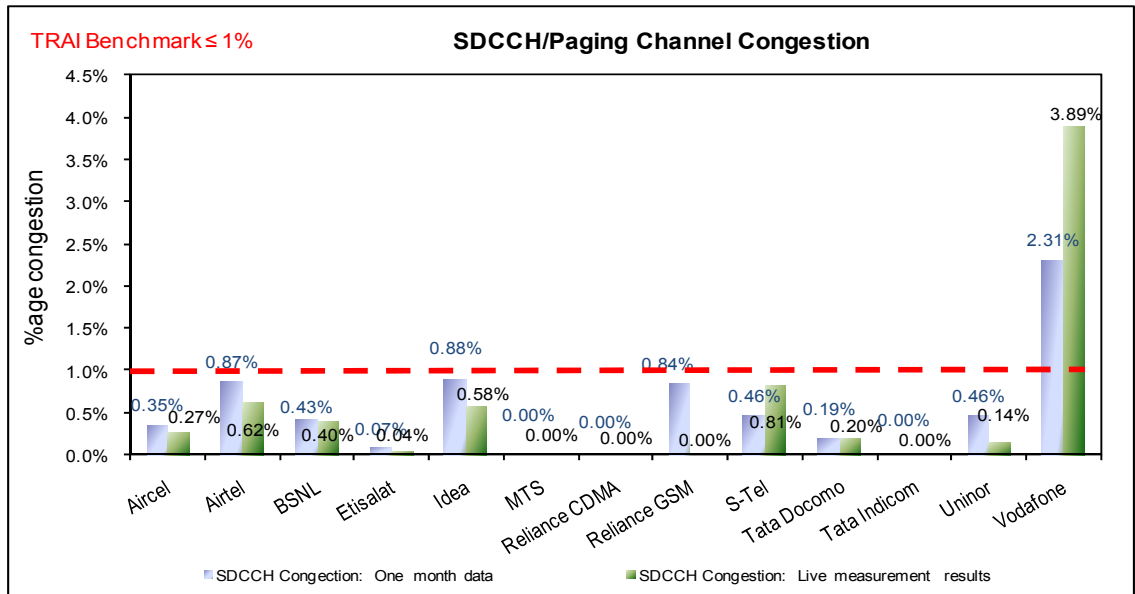
Operator(s) meeting benchmark: Aircel, Airtel, Etisalat, Idea, MTS, Reliance CDMA, Reliance GSM, S-Tel, Tata Docomo, Tata Indicom, Uninor

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

Drive test

All the operators meet the benchmark

SDCCH / Paging Channel Congestion



One month

Operator(s) meeting benchmark: Aircel, Airtel, BSNL, Etisalat, Idea, MTS, Reliance CDMA, Reliance GSM, S-Tel, Tata Docomo, Tata Indicom, Uninor

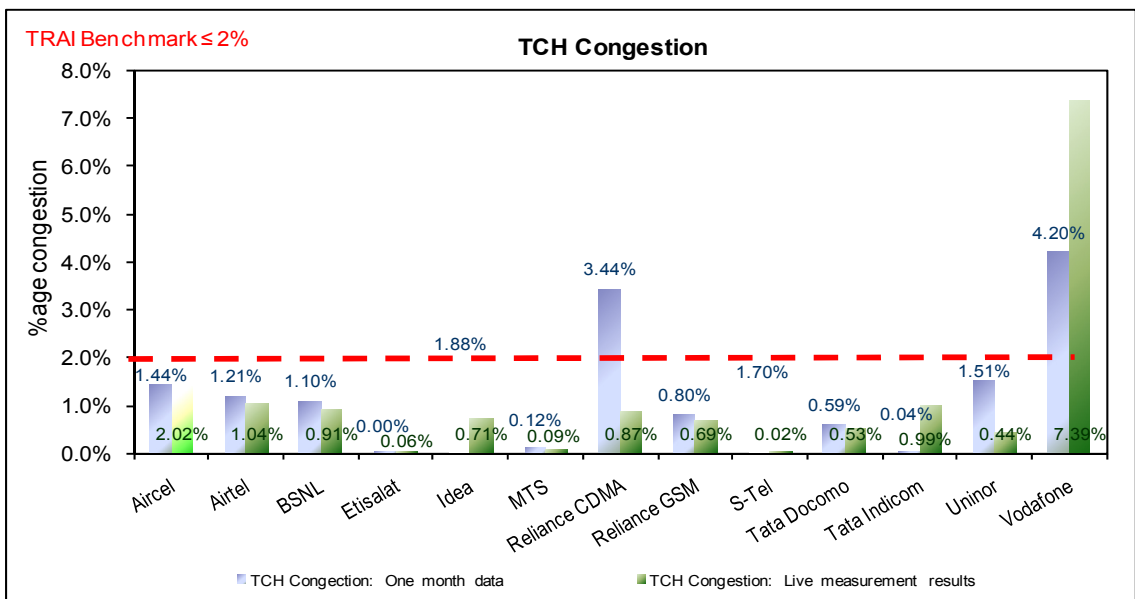
Operator(s) not meeting the benchmark: Vodafone

Live measurement

Operator(s) meeting benchmark: Aircel, Airtel, BSNL, Etisalat, Idea, MTS, Reliance CDMA, Reliance GSM, S-Tel, Tata Docomo, Tata Indicom, Uninor

Operator(s) not meeting the benchmark: Vodafone

TCH Congestion



One month

Operator(s) meeting benchmark: Aircel, Airtel, BSNL, Etisalat, Idea, MTS, Reliance GSM, S-Tel, Tata Docomo, Tata Indicom, Uninor

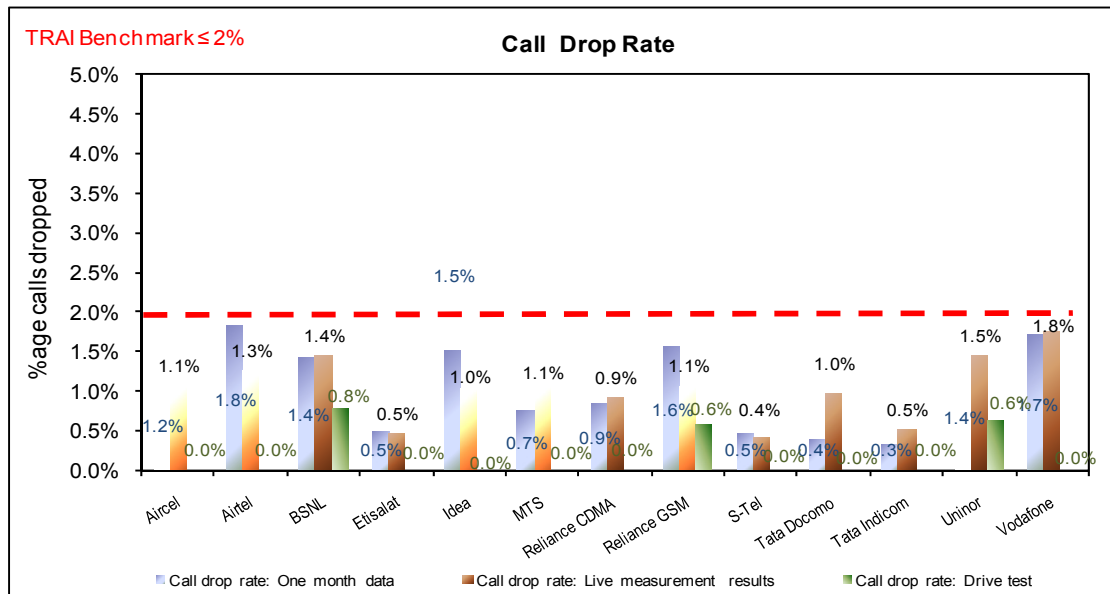
Operator(s) not meeting the benchmark: Reliance CDMA, Vodafone

Live measurement

Operator(s) meeting benchmark: Airtel, BSNL, Etisalat, Idea, MTS, Reliance CDMA, Reliance GSM, S-Tel, Tata Docomo, Tata Indicom, Uninor

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

Call Drop Rate



One month

All the operators meet the benchmark

Live measurement

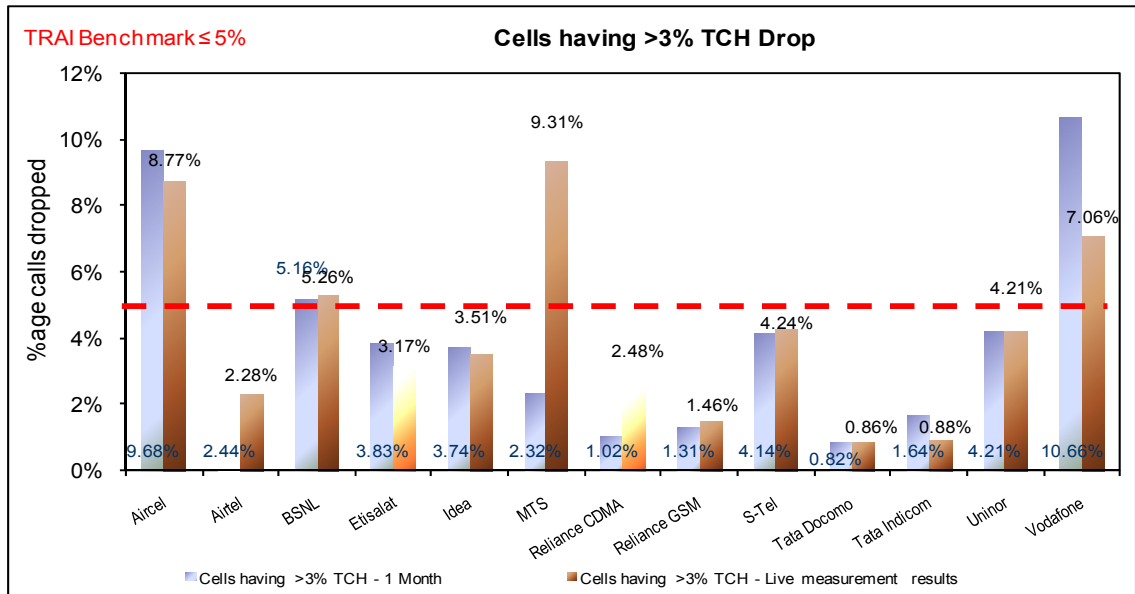
All the operators meet the benchmark

Drive test

Operator(s) meeting benchmark: Aircel, Airtel, BSNL, MTS, Reliance CDMA, Reliance GSM, S-Tel, Tata Docomo, Tata Indicom, Uninor, Vodafone

Operator(s) not meeting the benchmark: Idea

Cells with more than 3% TCH Drop Rate



One month

Operator(s) meeting benchmark: Airtel, Etisalat, Idea, MTS, Reliance CDMA, Reliance GSM, S-Tel, Tata Docomo, Tata Indicom, Uninor

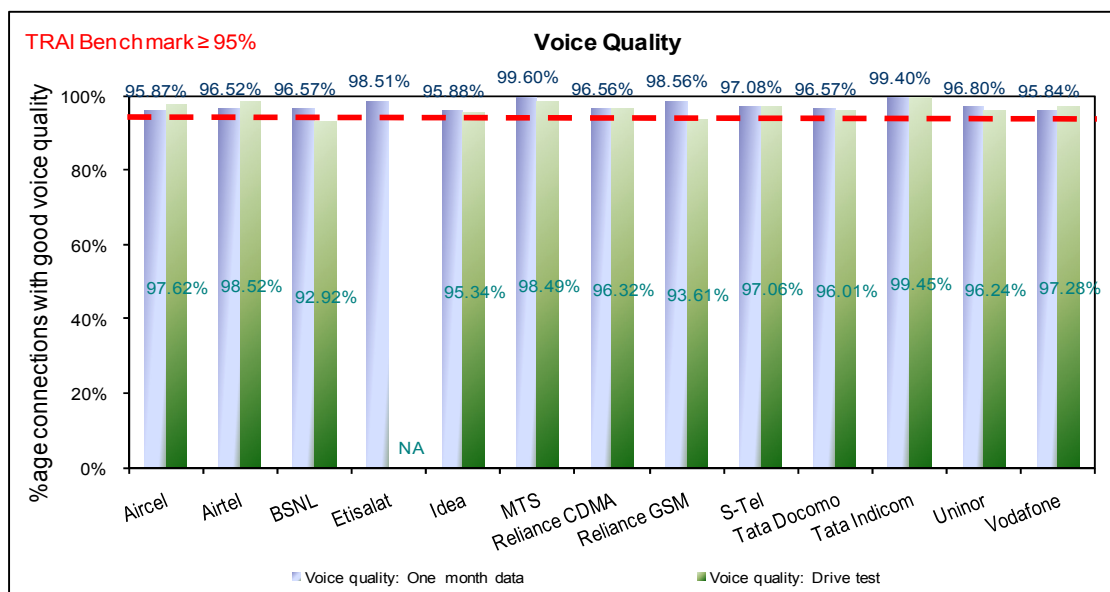
Operator(s) not meeting the benchmark: Aircel, BSNL, Vodafone

Live measurement

Operator(s) meeting benchmark: Airtel, Etisalat, Idea, Reliance CDMA, Reliance GSM, S-Tel, Tata Docomo, Tata Indicom, Uninor

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

Voice quality



One month

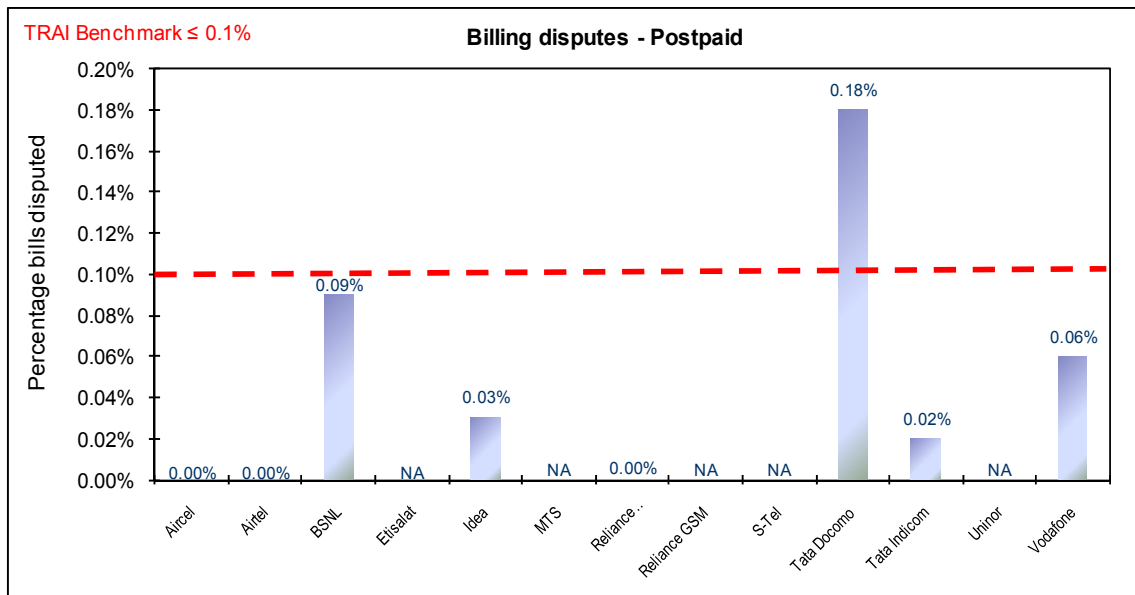
All the operators meet the benchmark

Live measurement (Drive test)

Operator(s) meeting benchmark: Aircel, Airtel, Idea, MTS, Reliance CDMA, Tata Docomo, Tata Indicom, Uninor, Vodafone

Operator(s) not meeting the benchmark: BSNL, Reliance GSM, S-Tel

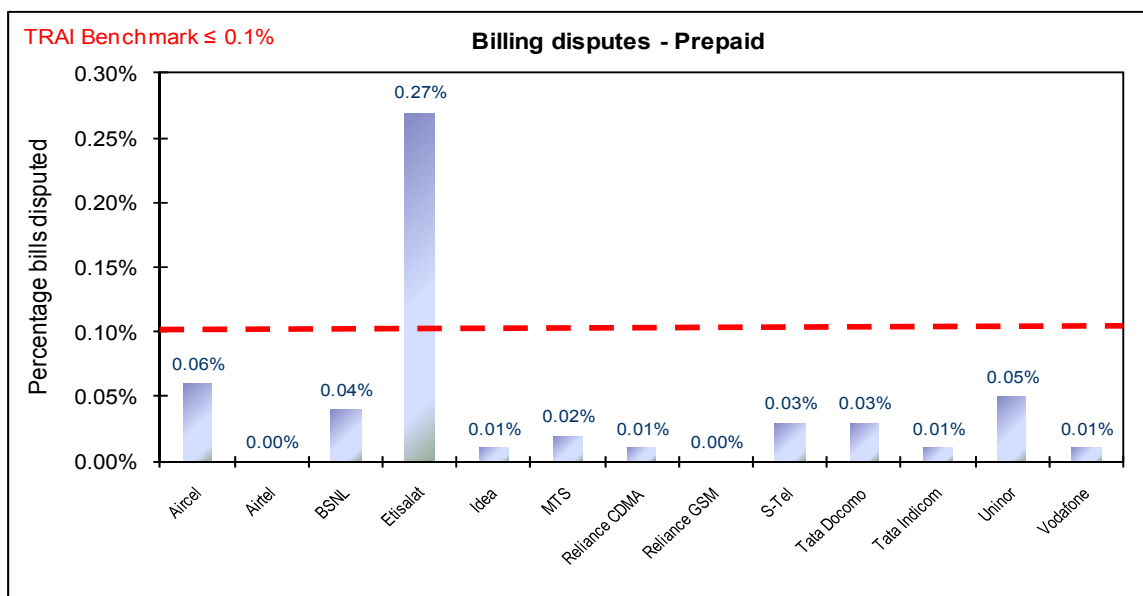
Billing Disputes - Postpaid



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

Operator(s) not meeting the benchmark: Tata Docomo

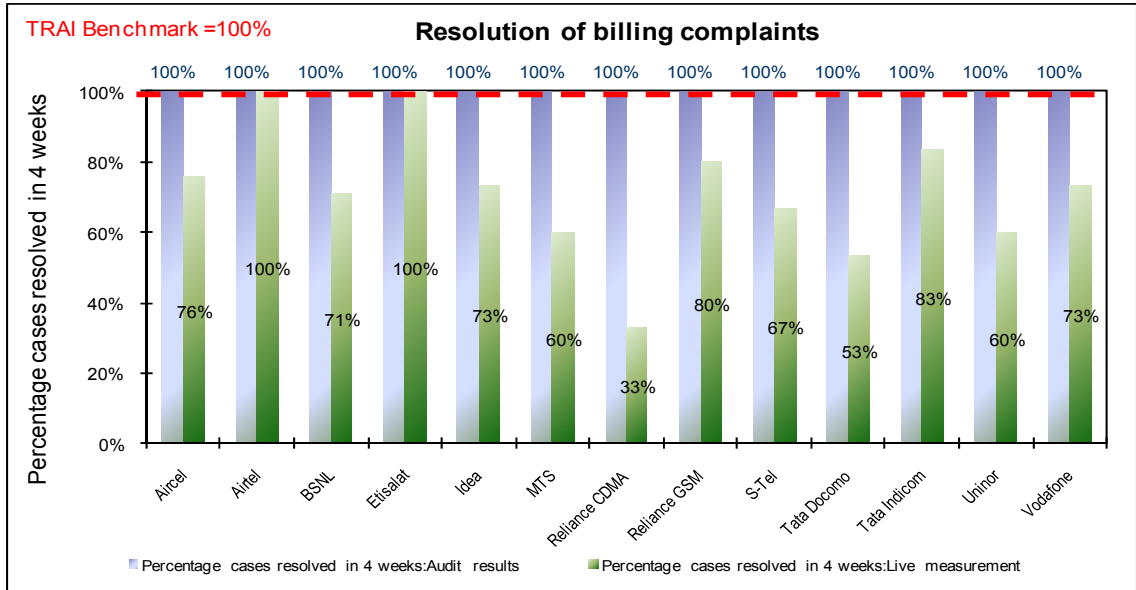
Complaints - Prepaid



Operator(s) meeting benchmark: Aircel, Airtel, BSNL, Idea, MTS, Reliance CDMA, Reliance GSM, S-Tel, Tata Docomo, Tata Indicom, Uninor, Vodafone

Operator(s) not meeting the benchmark: Etisalat

Resolution of billing complaints



One month

All the operators meet the benchmark

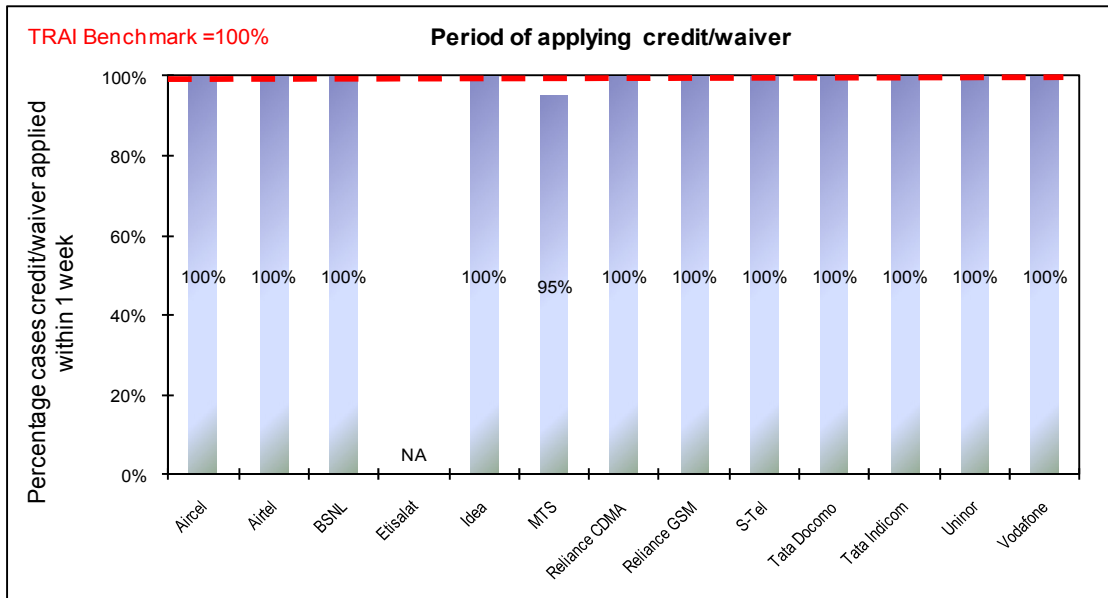
Live measurement

Operator(s) meeting benchmark: Airtel, Etisalat

Drive Test

Operator(s) not meeting the benchmark: Aircel, BSNL, Idea, MTS, Reliance CDMA, Reliance GSM, S-Tel, Tata Docomo, Tata Indicom, Uninor, Vodafone

Period of applying credit / waiver



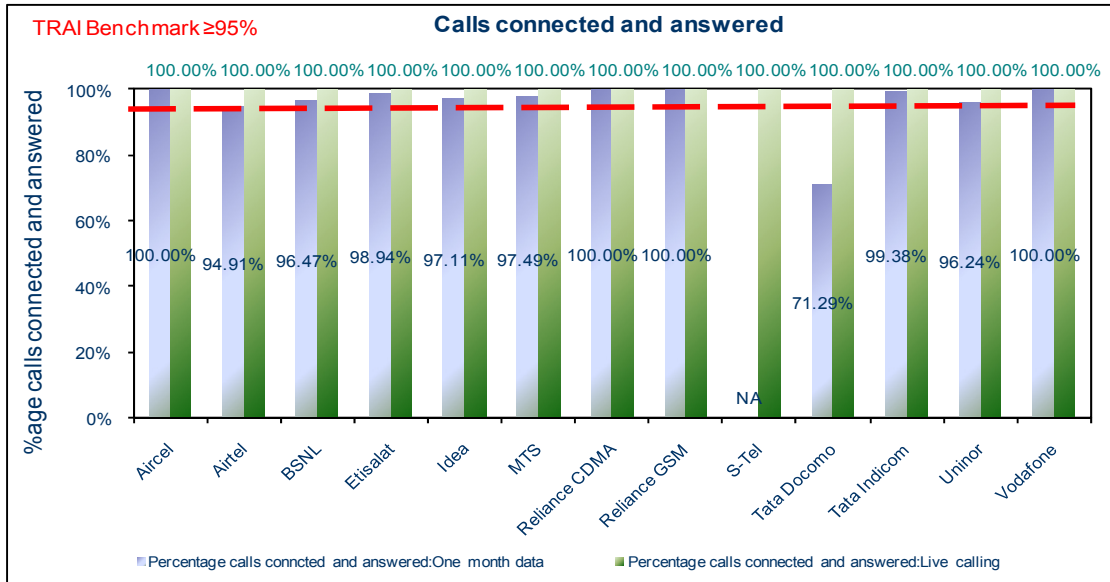
Operator(s) meeting benchmark: Aircel, Airtel, BSNL, Idea, Reliance CDMA, S-Tel, Tata Docomo, Tata Indicom, Uninor, Vodafone, Reliance GSM

Operator(s) not meeting the benchmark: MTS

Live calling for billing Complaints

Resolution of billing complaints	Benchmark	Aircel	Airtel	BSNL	Etisalat	Idea	MTS	Reliance CDMA	Reliance GSM	S-Tel	Tata Docomo	Tata Indicom	Uninor	Vodafone
Total Number of calls made		25	5	38	10	30	30	30	30	30	30	30	30	30
Number of cases resolved in 4 weeks		19	5	27	10	22	18	10	24	20	16	25	18	22
Percentage cases resolved in four weeks	100%	76%	100%	71%	100%	73%	60%	33%	80%	67%	53%	83%	60%	73%

Customer Care / Helpline: Calls answered



One month

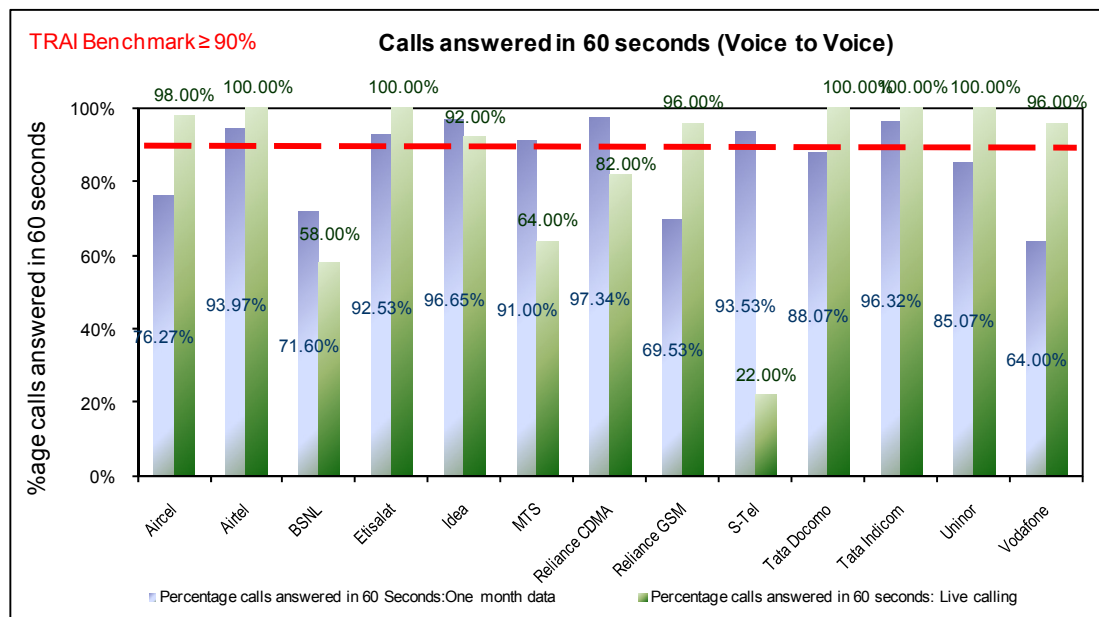
Operator(s) meeting benchmark: Aircel, BSNL, Etisalat, Idea, MTS, Reliance CDMA, Reliance GSM, Tata Indicom, Uninor, Vodafone

Operator(s) not meeting the benchmark: Airtel, Tata Docomo

Live measurement

All the operators meet the benchmark

Customer Care / Helpline: Calls answered voice to voice



One month

Operator(s) meeting benchmark: Airtel, Etisalat, Idea, MTS, Reliance CDMA, S-Tel, Tata Indicom

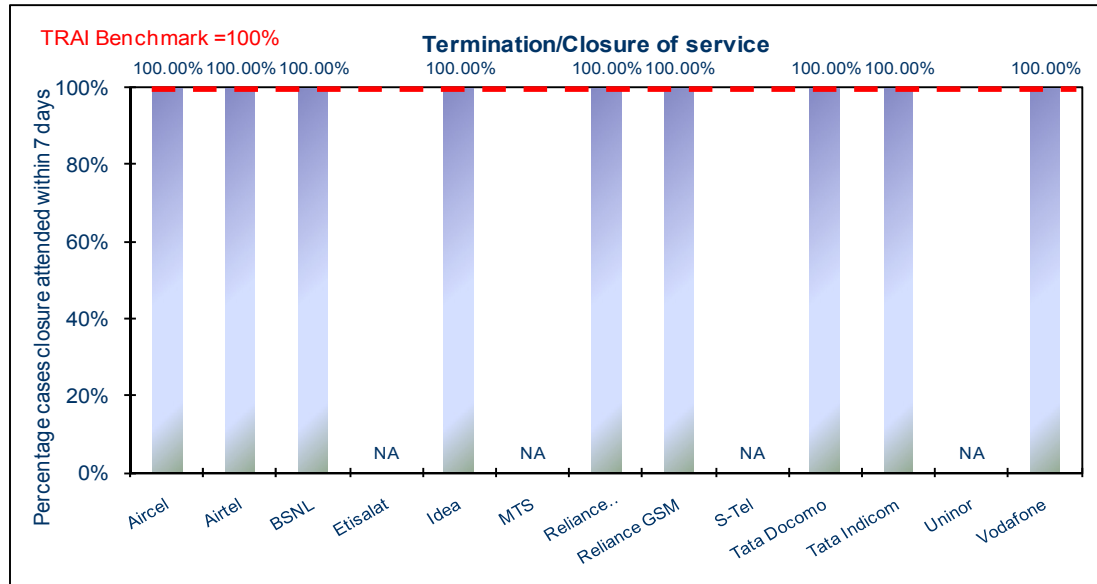
Operator(s) not meeting the benchmark: Aircel, BSNL, Reliance GSM, Tata Docomo, Uninor, Vodafone

Live measurement

Operator(s) meeting benchmark: Aircel, Airtel, Etisalat, Idea, Reliance GSM, Tata Docomo, Tata Indicom, Uninor, Vodafone

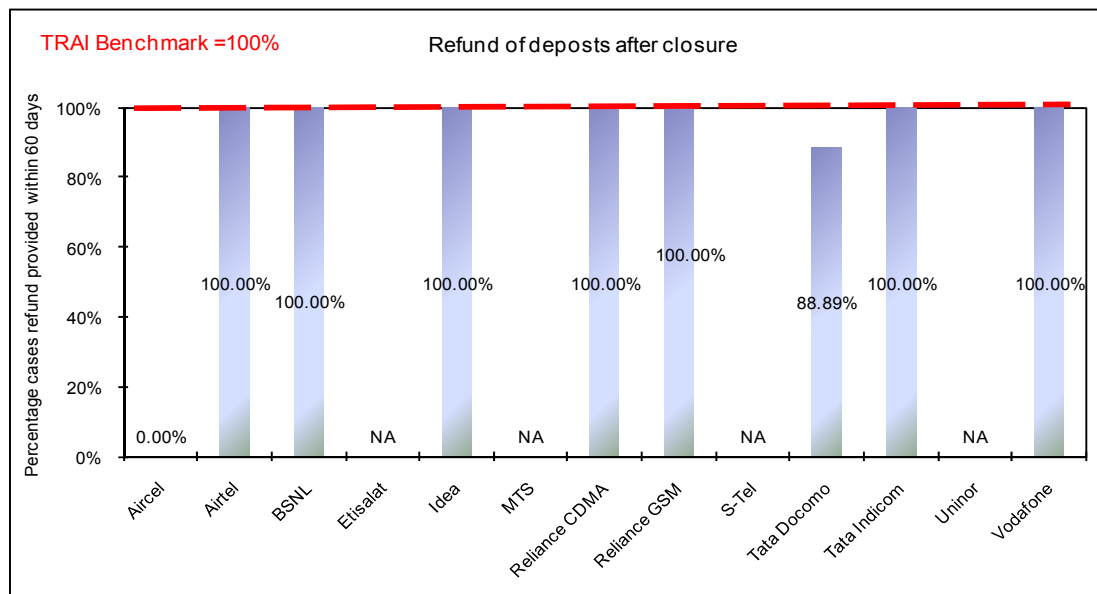
Operator(s) not meeting the benchmark: BSNL, MTS, Reliance CDMA, S-Tel

Termination / Closure of service



All the operators meet the benchmark


Refund of deposits



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

Inter operator calls assessment

Inter operator call Assessment To↓ From→	Aircel	Airtel	BSNL	Etisalat	Idea	MTS	Reliance CDMA	Reliance GSM	S-Tel	Tata Docomo	Tata Indicom	Uninor	Vodafone
Aircel	NA	100%	100%	100%	100%	97%	100%	100%	100%	99%	100%	91%	100%
Airtel	100%	NA	100%	100%	100%	98%	99%	100%	89%	100%	100%	79%	100%
BSNL	100%	99%	NA	100%	100%	97%	96%	100%	92%	100%	100%	98%	93%
Etisalat	95%	99%	100%	NA	100%	100%	100%	100%	91%	98%	100%	100%	100%
Idea	100%	100%	100%	100%	NA	96%	100%	100%	100%	100%	99%	100%	97%
MTS	93%	99%	100%	100%	96%	NA	99%	100%	94%	100%	99%	97%	100%
Reliance CDMA	100%	100%	100%	100%	100%	98%	NA	100%	98%	100%	100%	100%	98%
Reliance GSM	100%	100%	100%	100%	100%	100%	100%	NA	99%	100%	100%	97%	100%
S-Tel	93%	99%	100%	100%	97%	95%	100%	100%	NA	100%	99%	98%	100%
Tata Docomo	95%	89%	100%	100%	98%	99%	100%	100%	100%	NA	99%	99%	98%
Tata Indicom	100%	95%	100%	100%	100%	96%	100%	100%	100%	100%	NA	100%	100%
Uninor	93%	95%	100%	100%	96%	94%	99%	100%	97%	100%	100%	NA	100%
Vodafone	100%	99%	100%	100%	100%	97%	99%	100%	99%	100%	100%	100%	NA

 The problems 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. Almost all service providers except BSNL, Reliance GSM and Etisalat had difficulty in connecting to the number of one or the other service provider. For most of the service providers it was difficult connecting to MTS, S-Tel and Uninor.

7.0 Compliance reports: Results of Verification of PMR

7.1 Cellular Mobile services


Name of Service Provider	Network Availability					Connection Establishment			Connection Maintenance (Retainability)				POI			
	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	
Benchmark			≤ 2%		≤ 2%	≥ 95%	≤ 1%	≤ 2%	≤ 2%			≤ 5%	≥ 95%			
Aircel	PMR	3345	12043	0.49%	110	3.29%	98.39%	0.19%	0.92%	1.70%	1576	10181	15.48%	94.95%	1	44
	IMRB	3345	12043	0.49%	110	3.29%	98.39%	0.19%	0.92%	1.70%	1576	10181	15.48%	94.95%	1	44
Airtel	PMR	6523	5593.5	0.12%	39.5	0.61%	97.40%	0.72%	1.59%	1.57%	613	19504	3.15%	98.64%	1	48
	IMRB	6523	5593.5	0.12%	39.5	0.61%	97.40%	0.72%	1.59%	1.57%	613	19504	3.15%	98.64%	1	48
BSNL	PMR	3237	61756	1.28%	161	1.83%	97.00%	0.45%	1.17%	1.32%	449	9622	5.09%	97.00%	1	208
	IMRB	3245	61602	2.63%	159	4.28%	96.84%	0.43%	1.00%	1.61%	449	9645	5.08%	96.57%	1	204
Etisalat	PMR	32	1449.15	6.09%	3	9.38%	99.75%	0.39%	0.00%	0.20%	2	95	2.11%	98.89%	0	20
	IMRB	32	1449.15	6.09%	3	8.00%	99.79%	0.39%	0.00%	0.20%	2	95	2.11%	98.89%	0	20
Idea	PMR	3826	29070	1.03%	52	1.36%	98.22%	0.71%	1.75%	1.45%	466	11567	4.03%	95.56%	0	83
	IMRB	3826	29070	1.03%	52	1.36%	98.22%	0.71%	1.75%	1.45%	466	11567	4.03%	95.56%	0	83
MTS	PMR	1294	17572.62	1.82%	22	1.70%	99.27%	0.00%	0.03%	0.22%	38	3882	0.98%	99.50%	0	35
	IMRB	1294	17572.62	1.82%	22	1.70%	99.27%	0.00%	0.03%	0.22%	38	3882	0.98%	99.50%	0	35
Reliance CDMA	PMR	2423	10520	0.60%	25	1.02%	99.65%	0.00%	1.54%	0.89%	14	2423	0.56%	96.30%	0	39
	IMRB	2423	10520	0.60%	25	1.02%	99.00%	0.00%	1.55%	0.89%	13	2423	0.54%	96.30%	0	39
Reliance GSM	PMR	2934	5579	0.26%	37.33	1.27%	97.51%	0.87%	1.45%	1.35%	222	8802	2.52%	95.83%	0	22
	IMRB	2934	5579	0.26%	37.33	1.27%	97%	0.87%	1.46%	1.35%	222	8802	2.52%	95.83%	0	22
S-Tel	PMR	1426	19726.67	1.88%	21	1.49%	97.22%	0.50%	0.55%	0.34%	209	4270	4.91%	97.21%	5	DNA
	IMRB	1426	19726.67	1.88%	21	1.49%	97.22%	0.50%	0.55%	0.34%	209	4270	4.91%	97.21%	5	53
Tata Docomo	PMR	1908	237	2.00%	0	0.00%	97.22%	0.07%	0.47%	0.99%	133	5721	2.34%	96.61%	0	9
	IMRB	1908	237	2.00%	0	0.00%	97.22%	0.07%	0.47%	0.99%	133	5721	2.34%	96.61%	0	9
Tata Indicom	PMR	1079	808	0.10%	1	0.09%	99.74%	0.00%	0.03%	0.34%	1	3257	0.03%	99.73%	0	212
	IMRB	1079	808	0.10%	1	0.09%	99.74%	0.00%	0.03%	0.34%	1	3257	0.03%	99.73%	0	212
Uninor	PMR	1842	3121.97	0.23%	4	0.21%	97.87%	0.27%	0.32%	1.67%	270	5505	4.90%	96.54%	16	DNA
	IMRB	1842	3121.97	0.23%	4	0.21%	97.87%	0.27%	0.32%	1.67%	270	5505	4.90%	96.54%	16	64
Vodafone	PMR	5028	16878.67	0.45%	74.67	1.48%	96.52%	1.16%	2.61%	1.30%	1157	15068	7.68%	96.18%	0	46
	IMRB	5028	16878.67	0.45%	74.67	1.48%	95.85%	1.16%	2.61%	1.30%	1157	15068	7.68%	96.18%	0	46

Name of Service Provider		Metering and Billing												Response time to the customer for assistance			Termination/ closure of service				
		Metering and billing credibility - post paid	No. of bills issued during the period	No. of bills disputed including billing complaints during the period	Metering and billing credibility - pre paid	No. of charging / credit / validity complaints during the quarter	Total no. of pre-paid customers at the end of the quarter	Resolution of billing/charging complaints	No. of billing/ (post-paid) and charging, credit / validity (pre-paid) complaints resolved within 4 weeks during the quarter	Total no. of billing (post-paid) and charging, credit / validity (pre-paid)complaints received during the quarter	No. of billing complaints (post paid) and charging, credit / validity complaints (pre paid) resolved in 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	0.00%	3359	0	0.47%	19491	4177475	100%	14109	14109	13020	1089	100%	100%	313927	291016	54.3%	100%	12	12	100%
	IMRB	0.00%	3359	0	0.47%	19491	4177475	100%	14109	14109	13020	1089	100%	100%	313927	291016	54.3%	100%	12	12	100%
Airtel	PMR	0.03%	67387	17	0.00%	27	51789865	100%	44	44	44	0	100%	94%	166702847	157277665	84.0%	100%	291	291	100%
	IMRB	0.03%	67387	17	0.00%	27	51789865	100%	44	44	44	0	100%	94%	166702847	157277665	84.0%	100%	291	291	100%
BSNL	PMR	0.07%	98455	71	0.05%	4169	5217787	100%	3922	4242	3908	12	100%	100%	2670248	2504364	93.0%	100%	895	895	100%
	IMRB	0.06%	96964	80	0.07%	4126	5209010	100%	4206	4206	370	3836	100%	96.89%	3841268	3675443	93.4%	95%	265	265	100%
Etisalat	PMR	NA	NA	NA	0.00%	6	4141	100%	6	6	0	6	NA	99%	1736	1601	92.2%	NA	NA	NA	NA
	IMRB	NA	NA	NA	0.00%	6	4141	100%	6	6	0	6	NA	99%	1736	1601	92.2%	NA	NA	NA	NA
Idea	PMR	0.03%	19027	5	0.01%	727	12095921	100%	732	732	732	3963	100%	98%	2120398	2079448	94.0%	100%	197	197	100%
	IMRB	0.03%	19027	5	0.01%	727	12095921	100%	732	732	732	3963	100%	98%	2120398	2079448	94.0%	100%	197	197	100%
MTS	PMR	NA	NA	NA	0.10%	610	639617	100%	610	610	594	16	100%	98%	51023	49270	96.6%	NA	NA	NA	NA
	IMRB	NA	NA	NA	0.10%	610	639617	100%	610	610	594	16	100%	98%	51023	49270	96.6%	NA	NA	NA	NA
Reliance CDMA	PMR	0.09%	225983	1264	0.06%	8626	3497185	100%	27141	27141	6134	21007	100%	100%	731042	731042	100.0%	100%	785	785	100%
	IMRB	0.04%	225483	1264	0.06%	1977	3497185	100%	27141	27141	6134	21007	100%	100%	731042	731042	100%	100%	2440	2440	100%
Reliance GSM	PMR	0.07%	12131	40	0.04%	7997	4302696	100%	24030	24030	4713	19317	100%	84%	193082	163497	47.0%	100%	65	65	100%
	IMRB	0.07%	12131	9	0.04%	1568	4302696	100%	24030	24030	4713	19317	100%	85%	2739081	1298243	47%	100%	21	21	100%
S-Tel	PMR	NA	NA	NA	0.06%	736	1206467	100%	2207	2207	7	2200	100%	95%	1113754	1058066	95.0%	NA	NA	NA	NA
	IMRB	NA	NA	NA	0.06%	736	1206467	100%	2207	2207	7	2200	100%	95%	1113754	1058066	95.0%	NA	NA	NA	NA


Quality of Service – Audit module report for Bihar & Jharkhand Circle

Tata Docomo	PMR	0.05%	9767	23	0.00%	6223	3127419	100%	6246	6246	16	6230	100%	95%	1223169	1149868	88.0%	100%	173	173	NA
	IMRB	0.05%	9767	23	0.00%	6223	3127419	100%	6246	6246	16	6230	100%	95%	1223169	1149868	88.0%	100%	173	173	64%
Tata Indicom	PMR	0.04%	101725	37	0.05%	1557	2834814	100%	1739	1741	1594	146	100%	99%	1085008	1070619	96.0%	100%	1839	1839	89%
	IMRB	0.04%	101725	37	0.05%	1557	2834814	100%	1739	1741	1594	146	100%	99%	1085008	1070619	96.0%	100%	1839	1839	89%
Uninor	PMR	NA	NA	NA	0.10%	226800	2155143	100%	2268	2268	NA	NA	NA	91%	7349952	6651233	82.9%	NA	NA	NA	NA
	IMRB	NA	NA	NA	0.10%	226800	2155143	100%	2268	2268	0	2268	100%	91%	7349952	6651233	82.9%	NA	NA	NA	NA
Vodafone	PMR	0.10%	24022	24	0.01%	1361	4549557	100%	1385	1385	1396	36	100%	100%	594493	501017	97.0%	100%	1206	1206	91%
	IMRB	0.10%	24022	24	0.01%	1361	4549557	100%	1385	1385	1396	36	100%	100%	594493	501017	97.0%	100%	1206	1206	91%

 Figures do not match with those reported in PMR

 Figures verified on all India basis

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

 Not meeting benchmark

8.0 Conclusions

8.1 Cellular Mobile services

1. In case of Aircel, worst affected BTS due to downtime, worst affected cells having more than 3% TCH Drop, voice quality, Metering and billing credibility - pre paid and percentage of calls answered by the operators (voice to voice) within 60 seconds is not meeting the benchmarks defined by TRAI.
2. In case of Airtel and Reliance GSM, Accessibility of call centre/ customer care and percentage of calls answered by the operators (voice to voice) within 60 seconds is not meeting the benchmarks defined by TRAI.
3. In case of BSNL, BTS Accumulated Downtime, worst affected BTS due to downtime, worst affected cells having more than 3% TCH Drop and Termination/Closures is not meeting the benchmarks defined by TRAI. Moreover, the figures reported by BSNL for CSSR, Paging channel congestion, TCH Congestion, Call drop, worst affected cells having more than 3% TCH Drop, voice quality, Metering and billing credibility - pre paid, , Metering and billing credibility – post, Resolution of billing/charging complaints, Accessibility of call centre/ customer care, percentage of calls answered by the operators (voice to voice) within 60 seconds, %age request for Termination / Closure of service complied within 7 days and Metering and Billing credibility(Prepaid and Postpaid) does not match the figures obtained on verification.
4. In case of Etisalat, BTS Accumulated Downtime and worst affected BTS due to downtime is not meeting the benchmarks defined by TRAI. Moreover, the figures reported by Etisalat for CSSR does not match the figures obtained on verification.
5. In case of Vodafone, Paging Channel Congestion, TCH Congestion and worst affected cells having more than 3% TCH Drop is not meeting the benchmarks defined by TRAI.
6. In case of Tata Docomo, worst affected cells having more than 3% TCH Drop and Time taken for refund of deposits after closure is not meeting the benchmarks defined by TRAI.
7. In case of Tata Indicom, Time taken for refund of deposits after closure is not meeting the benchmarks defined by TRAI.
8. In case of Uninor, Accessibility of call centre/ customer care and percentage of calls answered by the operators (voice to voice) within 60 seconds is not meeting the benchmarks defined by TRAI. Moreover, the figures reported by Uninor for worst affected cells having more than 3% TCH Drop is not meeting the benchmarks defined by TRAI.
9. In case of Vodafone, Time taken for refund of deposits after closure is not meeting the benchmarks defined by TRAI. Moreover, the figures reported by Vodafone for CSSR is not meeting the benchmarks defined by TRAI.
10. The figures reported by Reliance CDMA for CSSR, TCH Congestion, worst affected cells having more than 3% TCH Drop and Metering and billing credibility - pre paid is not meeting the benchmarks defined by TRAI.
11. Moreover, the figures reported by Reliance GSM for CSSR and TCH Congestion is not meeting the benchmarks defined by TRAI.

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	0.82%	6.75%	98.05%	0.35%	1.44%	1.16%	9.68%	95.87%	0.00%	0.06%	100.00%	100.00%	100.00%	76.27%	100.00%	NA
Airtel	0.09%	0.60%	97.43%	0.87%	1.21%	1.25%	2.44%	96.52%	0.00%	0.00%	100.00%	100.00%	94.91%	93.97%	100.00%	100.00%
BSNL	2.56%	5.43%	96.95%	0.43%	1.10%	1.43%	5.16%	96.57%	0.09%	0.04%	100.00%	100.00%	96.47%	71.60%	100.00%	100.00%
Etisalat	0.90%	1.64%	95.38%	0.07%	0.00%	0.48%	3.83%	98.51%	NA	0.27%	100.00%	NA	98.94%	92.53%	NA	NA
Idea	1.03%	1.50%	98.00%	0.88%	1.88%	1.52%	3.74%	95.88%	0.03%	0.01%	100.00%	100.00%	97.11%	96.65%	100.00%	100.00%
MTS	1.90%	1.31%	99.20%	0.00%	0.12%	0.74%	2.32%	99.60%	NA	0.02%	100.00%	95.00%	97.49%	91.00%	NA	NA
Reliance CDMA	0.60%	1.03%	99.68%	0.00%	3.44%	0.85%	1.02%	96.56%	0.00%	0.01%	100.00%	100.00%	100.00%	97.34%	100.00%	100.00%
Reliance GSM	0.14%	0.61%	97.00%	0.84%	0.80%	1.56%	1.31%	98.56%	NA	0.00%	100.00%	100.00%	100.00%	69.53%	100.00%	100.00%
S-Tel	1.83%	1.84%	98.30%	0.46%	1.70%	0.46%	4.14%	97.08%	NA	0.03%	100.00%	100.00%	NA	93.53%	NA	NA
Tata Docomo	0.00%	0.00%	97.00%	0.19%	0.59%	0.39%	0.82%	96.57%	0.18%	0.03%	100.00%	100.00%	71.29%	88.07%	100.00%	88.89%
Tata Indicom	0.12%	0.19%	99.65%	0.00%	0.04%	0.32%	1.64%	99.40%	0.02%	0.01%	100.00%	100.00%	99.38%	96.32%	100.00%	100.00%
Uninor	1.17%	0.00%	96.37%	0.46%	1.51%	1.35%	4.21%	96.80%	NA	0.05%	100.00%	100.00%	96.24%	85.07%	NA	NA
Vodafone	0.62%	1.66%	93.10%	2.31%	4.20%	1.70%	10.66%	95.84%	0.06%	0.01%	100.00%	100.00%	100.00%	64.00%	100.00%	100.00%

S-Tel did not provide the value for customer care access stating that they do not have the means of measuring this parameter and do not provide the value to TRAI.

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	Bharti Airtel	108 E1	200505	2608	16.65%	Congestion is due to faulty 28E1s due to Airtel. Augmentation of STM-1 is under progress
Etisalat	All POI's meeting TRAI specified benchmark					
Idea	All POI's meeting TRAI specified benchmark					
MTS	All POI's meeting TRAI specified benchmark					

Reliance CDMA	All POI's meeting TRAI specified benchmark					
Reliance GSM	All POI's meeting TRAI specified benchmark					
S-Tel	LOBRM1ATM4	61	2199	57.92	1.49	5 E1s augmentation plan
Tata Docomo	All POI's meeting TRAI specified benchmark					
Tata Indicom	All POI's meeting TRAI specified benchmark					
Uninor	Aircel (I/O) Patna	309	66717	308.6388889	65.84	Augmentation in progress
	Airtel GSM GCS 3 (O) Patna	92	82355	92	95.90	Port augmentation pending from Airtel
	BSNL L1 (I/O)	513	94821	509.8611111	69.84	Augmentation in progress
	TATA CDMA (O) Patna	278	30037	276.4722222	40.25	Augmentation in progress
	TTSL NLD (I/O)	679	75780	669.6944444	8.59	Augmentation in progress
	VSNL NLD (I/O) Patna	618	36528	578.0833333	3.08	Augmentation in progress
	Airtel GSM GCS 2 (O) Patna	154	55028	154	90.63	Port augmentation pending from Airtel
	Idea(O)	557	157870	551.6666667	81.46	Augmentation in progress
	TATA GSM(O) Patna	61	16670	60.83333333	68.75	Augmentation in progress
	BSNL L1 (I/O) Patliputra	15	1475	7.472222222	1.76	Augmentation in progress
	Reliance CDMA Danapur (I/O)	464	26153	410.8055556	0.53	
	TTSL NLD (I/O) Patna	835	89744	833	35.11	Augmentation in progress
	Vodafone POI Rukanpura (O)	1145	122411	1143.75	45.86	Augmentation in progress
	Airtel POI Bhagalpur (O)	154	68012	153.9444444	91.87	Port augmentation pending from Airtel
	Airtel O/G (Biscomaan) Patna	215	73617	214.9722222	90.87	Port augmentation pending from Airtel
	Airtel GCS 4, Muzaffarpur (O)	185	67109	184.9444444	91.26	Port augmentation pending from Airtel
	Airtel GCS 5, Muzaffarpur (O)	309	133967	308.9722222	91.68	Port augmentation pending from Airtel
	Airtel Muzaffarpur GCS 6	463	220078	462.9722222	93.33	Port augmentation pending from Airtel
	Airtel Marwari Awas	153	76232	152.9722222	93.61	Port augmentation pending from Airtel
	Aircel (I/O) Ranchi	494	29989	388.5	7.78	Augmentation in progress
RANCL1 L2 Tax(I/O)	308	505	8.611111111	6.46	Augmentation in progress	
VSNL NLD (I/O) Ranchi	122	7474	107.1944444	22.50	Augmentation in progress	
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	Etisalat	Idea	MTS	Reliance CDMA	Reliance GSM	S-Tel	Tata Docomo	Tata Indicom	Uninor	Vodafone
Number of BTSs in the licensed service area		3479	7052	3295	61	4204	1295	2423	2934	1523	2003	1043	2034	5767
Sum of downtime of BTSs in a month (in hours)		21245	4492.00	62851	408	32264	18347	10739	3013	20789	64.78	952.62	17664	26469
BTSs accumulated downtime (not available for service)	≤ 2%	0.82%	0.09%	2.56%	0.90%	1.03%	1.90%	0.60%	0.14%	1.83%	0.00%	0.12%	1.17%	0.62%
Number of BTSs having accumulated downtime >24 hours		235	42	179	1	63	17	25	18	28	0	2	0	96
Worst affected BTSs due to downtime	≤ 2%	6.75%	0.60%	5.43%	1.64%	1.50%	1.31%	1.03%	0.61%	1.84%	0.00%	0.19%	0.00%	1.66%

2. Connection Establishment (Accessibility)

Audit Results for CSSR, SDCCH and TCH congestion

CSSR	Benchmark	Aircel	Airtel	BSNL	Etisalat	Idea	MTS	Reliance CDMA	Reliance GSM	S-Tel	Tata Docomo	Tata Indicom	Uninor	Vodafone
CSSR	≥ 95%	98.05%	97.43%	96.95%	95.38%	98.00%	99.20%	99.68%	97.00%	98.30%	97.00%	99.65%	96.37%	93.10%

SDCCH congestion	Benchmark	Aircel	Airtel	BSNL	Etisalat	Idea	MTS	Reliance CDMA	Reliance GSM	S-Tel	Tata Docomo	Tata Indicom	Uninor	Vodafone
SDCCH/Paging channel congestion	≤ 1%	0.35%	0.87%	0.43%	0.07%	0.88%	0.00%	0.00%	0.84%	0.46%	0.19%	0.00%	0.46%	2.31%

TCH congestion	Benchmark	Aircel	Airtel	BSNL	Etisalat	Idea	MTS	Reliance CDMA	Reliance GSM	S-Tel	Tata Docomo	Tata Indicom	Uninor	Vodafone
TCH congestion	≤ 2%	1.44%	1.21%	1.10%	0.00%	1.88%	0.12%	3.44%	0.80%	1.70%	0.59%	0.04%	1.51%	4.20%

Live measurement results for CSSR, SDCCH and TCH congestion

CSSR	Benchmark	Aircel	Airtel	BSNL	Etisalat	Idea	MTS	Reliance CDMA	Reliance GSM	S-Tel	Tata Docomo	Tata Indicom	Uninor	Vodafone
CSSR	≥ 95%	97.56%	98.37%	90.30%	96.41%	98.00%	99.29%	99.61%	98.00%	98.30%	98.06%	98.43%	96.21%	88.55%

SDCCH congestion	Benchmark	Aircel	Airtel	BSNL	Etisalat	Idea	MTS	Reliance CDMA	Reliance GSM	S-Tel	Tata Docomo	Tata Indicom	Uninor	Vodafone
SDCCH/Paging channel congestion	≤ 1%	0.27%	0.62%	0.40%	0.04%	0.58%	0.00%	0.00%	0.00%	0.81%	0.20%	0.00%	0.14%	3.89%

TCH congestion	Benchmark	Aircel	Airtel	BSNL	Etisalat	Idea	MTS	Reliance CDMA	Reliance GSM	S-Tel	Tata Docomo	Tata Indicom	Uninor	Vodafone
TCH congestion	≤ 2%	2.02%	1.04%	0.91%	0.06%	0.71%	0.09%	0.87%	0.69%	0.02%	0.53%	0.99%	0.44%	7.39%

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

CSSR	Benchmark	Aircel	Airtel	BSNL	Etisalat	Idea	MTS	Reliance CDMA	Reliance GSM	S-Tel	Tata Docomo	Tata Indicom	Uninor	Vodafone
Total number of call attempts		672	634	642	NA	660	630	742	688	700	216	631	645	660
Total number of successful calls established		669	634	637	NA	658	628	741	675	700	215	631	637	660
CSSR	≥ 95%	99.55%	100.00%	99.22%	NA	99.70%	99.68%	99.87%	98.11%	100.00%	99.54%	100.00%	98.76%	100.00%

Blocked calls	Benchmark	Aircel	Airtel	BSNL	Etisalat	Idea	MTS	Reliance CDMA	Reliance GSM	S-Tel	Tata Docomo	Tata Indicom	Uninor	Vodafone
%age blocked calls		0.45%	0.00%	0.78%	NA	0.30%	0.32%	0.13%	1.89%	0.00%	0.46%	0.00%	1.24%	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	Etisalat	Idea	MTS	Reliance CDMA	Reliance GSM	S-Tel	Tata Docomo	Tata Indicom	Uninor	Vodafone
Total number of calls established		4010719	732070585	DNA	152746	165319493	15466148	113656231	56568182	39016448	38130915	2784285	78008647	DNA
Total number of calls dropped		46581	718762439	DNA	737	2508959	114449	964305	884569	179364	148721	9007	1054231	DNA
Call drop rate	≤ 2%	1.16%	1.81%	1.43%	0.48%	1.52%	0.74%	0.85%	1.56%	0.46%	0.39%	0.32%	1.35%	1.70%

Cells having more than 3% TCH	Benchmark	Aircel	Airtel	BSNL	Etisalat	Idea	MTS	Reliance CDMA	Reliance GSM	S-Tel	Tata Docomo	Tata Indicom	Uninor	Vodafone
Total number of cells in the network		10335	20592	8644	183	12578	3919	2423	8802	4566	6001	3177	6087	17283
Total number of cells having more than 3% TCH		1000	502	446	7	470	91	24.8	115	189	49	52	256	1842
Worst affected cells having more than 3% TCH	≤ 5%	9.68%	2.44%	5.16%	3.83%	3.74%	2.32%	1.02%	1.31%	4.14%	0.82%	1.64%	4.21%	10.66%

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

Call drop rate	Benchmark	Aircel	Airtel	BSNL	Etisalat	Idea	MTS	Reliance CDMA	Reliance GSM	S-Tel	Tata Docomo	Tata Indicom	Uninor	Vodafone
Total number of calls established		4250015	297641009.3	7204117	13771	204808532	16026849	2186654	2125359	4738826	18396953	120123592	100994765	DNA
Total number of calls dropped		45583	3707384	103961	64	2117568	173090	19899	22528	20133	176997	614833	1466258	DNA
Call drop rate	≤ 2%	1.07%	1.25%	1.44%	0.46%	1.03%	1.08%	0.91%	1.06%	0.42%	0.96%	0.51%	1.45%	1.76%

Cells having more than 3% TCH	Benchmark	Aircel	Airtel	BSNL	Etisalat	Idea	MTS	Reliance CDMA	Reliance GSM	S-Tel	Tata Docomo	Tata Indicom	Uninor	Vodafone
Total number of cells in the network		10338	20833	8438	189	12553	3973	2423	9039	4572	5950	3177	6153	17283
Total number of cells having more than 3% TCH		907	476	444	6	441	370	60	132	194	51	28	259	1221
Worst affected cells having more than 3% TCH	≤ 5%	8.77%	2.28%	5.26%	3.17%	3.51%	9.31%	2.48%	1.46%	4.24%	0.86%	0.88%	4.21%	7.06%

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

Call drop rate	Benchmark	Aircel	Airtel	BSNL	Etisalat	Idea	MTS	Reliance CDMA	Reliance GSM	S-Tel	Tata Docomo	Tata Indicom	Uninor	Vodafone
Total number of calls established		669	634	637	NA	658	630	742	676	700	215	631	637	660
Total number of calls dropped		0	0	5	NA	0	0	0	4	0	0	0	4	0
Call drop rate	≤ 2%	0.00%	0.00%	0.78%	NA	0.00%	0.00%	0.00%	0.59%	0.00%	0.00%	0.00%	0.63%	0.00%

4. Voice quality**Audit Results for Voice quality**

Voice quality	Benchmark	Aircel	Airtel	BSNL	Etisalat	Idea	MTS	Reliance CDMA	Reliance GSM	S-Tel	Tata Docomo	Tata Indicom	Uninor	Vodafone
Total number of sample calls		9595213504	88118675398	DNA	12850988	22157004973	504	113875782	56568182	39016448	5989592048	26577	129819006488	DNA
Total number of calls with good voice quality		9198664431	85049500242	DNA	12659372	21245041704	502	109962775	55753600	37875281	5784403048	26418	125662519052	DNA
%age calls with good voice quality	≥ 95%	95.87%	96.52%	96.57%	98.51%	95.88%	99.60%	96.56%	98.56%	97.08%	96.57%	99.40%	96.80%	95.84%

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

Voice quality	Benchmark	Aircel	Airtel	BSNL	Etisalat	Idea	MTS	Reliance CDMA	Reliance GSM	S-Tel	Tata Docomo	Tata Indicom	Uninor	Vodafone
Total number of sample calls		1166127	3003899	520738	NA	471441	33315	53111	867624	1128629	354704	143122	1024708	934677
Total number of calls with good voice quality		1138318	2959494	483883	NA	449492	32812	51157	812174	1045435	340546	142340	986197	909291
%age calls with good voice quality	≥ 95%	97.62%	98.52%	92.92%	NA	95.34%	98.49%	96.32%	93.61%	97.06%	96.01%	99.45%	96.24%	97.28%


5. POI Congestion**Audit Results for POI Congestion**

POI congestion	Benchmark	Aircel	Airtel	BSNL	Etisalat	Idea	MTS	Reliance CDMA	Reliance GSM	S-Tel	Tata Docomo	Tata Indicom	Uninor	Vodafone
Total number of working POIs		44	48	197	30	85	46	39	22	64	9	236	68	51
No. of POIs not meeting benchmark		0	0	1	0	0	0	0	0	1	0	0	22	0
Total Capacity of all POIs (A) - in erlangs		61484	415166	DNA	1017.09	124583.58	15972	262000	148	16303.57	26488.86	76568	26781	108575
Traffic served for all POIs (B)- in erlangs		36630	347975	DNA	55.04	78162.48	7679	57406	73	9522.93	17478	36901.26	20420	84432
POI congestion	≤ 0.5%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%

Live measurement results for POI congestion

6. Inter Operator Call Assessment

Inter operator call Assessment To↓ From→	Aircel	Airtel	BSNL	Etisalat	Idea	MTS	Reliance CDMA	Reliance GSM	S-Tel	Tata Docomo	Tata Indicom	Uninor	Vodafone
Aircel	NA	100%	100%	100%	100%	97%	100%	100%	100%	99%	100%	91%	100%
Airtel	100%	NA	100%	100%	100%	98%	99%	100%	89%	100%	100%	79%	100%
BSNL	100%	99%	NA	100%	100%	97%	96%	100%	92%	100%	100%	98%	93%
Etisalat	95%	99%	100%	NA	100%	100%	100%	100%	91%	98%	100%	100%	100%
Idea	100%	100%	100%	100%	NA	96%	100%	100%	100%	100%	99%	100%	97%
MTS	93%	99%	100%	100%	96%	NA	99%	100%	94%	100%	99%	97%	100%
Reliance CDMA	100%	100%	100%	100%	100%	98%	NA	100%	98%	100%	100%	100%	98%
Reliance GSM	100%	100%	100%	100%	100%	100%	100%	NA	99%	100%	100%	97%	100%
S-Tel	93%	99%	100%	100%	97%	95%	100%	100%	NA	100%	99%	98%	100%
Tata Docomo	95%	89%	100%	100%	98%	99%	100%	100%	100%	NA	99%	99%	98%
Tata Indicom	100%	95%	100%	100%	100%	96%	100%	100%	100%	100%	NA	100%	100%
Uninor	93%	95%	100%	100%	96%	94%	99%	100%	97%	100%	100%	NA	100%
Vodafone	100%	99%	100%	100%	100%	97%	99%	100%	99%	100%	100%	100%	NA

 The problems faced by the calling operator to other operators

7. Metering and Billing credibility

Audit Results for Billing performance

Billing Performance	Benchmark	Aircel	Airtel	BSNL	Etisalat	Idea	MTS	Reliance CDMA	Reliance GSM	S-Tel	Tata Docomo	Tata Indicom	Uninor	Vodafone
Billing diputes – Postpaid														
Total bills generated during the period		1296	23592	47688	NA	6496	NA	76164	6937	NA	3939	36530	NA	8272
Total number of bills disputed		0	1	44	NA	2	NA	3	0	NA	7	6	NA	5
Percentage bills disputed	≤ 0.1%	0.00%	0.00%	0.09%	NA	0.03%	NA	0.00%	NA	NA	0.18%	0.02%	NA	0.06%
Billing diputes - Prepaid														
Number of complaints related to charging, credit & validity		2925	13	2487	53	287	192	335	62	423	1135	221	1254	354
Total number of prepaid customers in that period		4748431	19595741	5550379	19793	4726385	856879	3539418	4780681	1626127	3257016	2742958	2653372	5094157
Percentage of complaints	≤ 0.1%	0.06%	0.00%	0.04%	0.27%	0.01%	0.02%	0.01%	0.00%	0.03%	0.03%	0.01%	0.05%	0.01%
Resolution of billing complaints														
Total number of billing/charging complaints		2580	9	1338	38	1269	122	430	452	370	889	534	1254	2672
Total complaints considered invalid		1180	16023	1298	38	1007	32	157	255	367	881	307	0	767
Number of complaints resolved in 4 weeks from date of receipt for complaints listed in 5.3.1		2580	9	1338	38	1269	122	273	197	370	889	534	1254	2672
Percentage complaints resolved within 4 weeks of date of receipt	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Period of applying credit / waiver														
Total number of complaints where credit/waiver is required		902	9	40	0	220	19	2.73	1.97	3	8	227	1254	57
Percentage cases in which credit/waiver was received within 1 week	100%	100%	100%	100%	NA	100%	95%	100%	100%	100%	100%	100%	100%	100%

Live calling results for resolution of billing complaints

Resolution of billing complaints	Benchmark	Aircel	Airtel	BSNL	Etisalat	Idea	MTS	Reliance CDMA	Reliance GSM	S-Tel	Tata Docomo	Tata Indicom	Uninor	Vodafone
Total Number of calls made		25	5	38	10	30	30	30	30	30	30	30	30	30
Number of cases resolved in 4 weeks		19	5	27	10	22	18	10	24	20	16	25	18	22
Percentage cases resolved in four weeks	100%	76%	100%	71%	100%	73%	60%	33%	80%	67%	53%	83%	60%	73%

8. Customer Care**Audit results for customer care**

Customer Care Assessment	Benchmark	Aircel	Airtel	BSNL	Etisalat	Idea	MTS	Reliance CDMA	Reliance GSM	S-Tel	Tata Docomo	Tata Indicom	Uninor	Vodafone
Total number of call attempts to customer care for assistance		145257	69843975	3406862	5656	1590327	21445	1857372	1823820	NA	637746	3428845	5300333	134406
Number of calls getting connected and answered (electronically)		145257	66286310	3286473	5596	1544347	20906	1857372	1823820	NA	454654	3407559	5100872	134406
Percentage calls getting connected and answered	≥ 95%	100.00%	94.91%	96.47%	98.94%	97.11%	97.49%	100.00%	100.00%	NA	71.29%	99.38%	96.24%	100.00%
Number of calls getting transferred to the operator (voice to voice)		145257	6480054	578547	3347	2545289	NA	608327	1282563	406947	158079	1103927	1844303	130237
Number of calls answered by operator (voice to voice) within 60 seconds		110790	6089556	414238	3097	2459986	NA	592174	891736	380610	139228	1063327	1569002	83351
Percentage calls answered within 60 seconds (V2V)	≥ 90%	76.27%	93.97%	71.60%	92.53%	96.65%	91.00%	97.34%	69.53%	93.53%	88.07%	96.32%	85.07%	64.00%

Live calling results for customer care

Customer Care Assessment	Benchmark	Aircel	Airtel	BSNL	Etisalat	Idea	MTS	Reliance CDMA	Reliance GSM	S-Tel	Tata Docomo	Tata Indicom	Uninor	Vodafone
Total Number of calls received		50	50	50	50	50	50	50	50	50	50	50	50	50
Total Number of calls getting connected and answered		50	50	50	50	50	50	50	50	50	50	50	50	50
Percentage calls getting connected and answered	≥ 95%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%

Live calling results for customer care (Voice to Voice)

Customer Care Assessment	Benchmark	Aircel	Airtel	BSNL	Etisalat	Idea	MTS	Reliance CDMA	Reliance GSM	S-Tel	Tata Docomo	Tata Indicom	Uninor	Vodafone
Total Number of calls received		50	50	100	50	50	50	50	50	50	50	50	50	50
Total Number of calls answered within 60 seconds		49	50	58	50	46	32	41	48	11	50	50	50	48
Percentage calls answered within 60 seconds	≥ 90%	98.00%	100.00%	58.00%	100.00%	92.00%	64.00%	82.00%	96.00%	22.00%	100.00%	100.00%	100.00%	96.00%

9. Termination / closure of service

Audit results for termination / closure of service

Termination	Benchmark	Aircel	Airtel	BSNL	Etisalat	Idea	MTS	Reliance CDMA	Reliance GSM	S-Tel	Tata Docomo	Tata Indicom	Uninor	Vodafone
Total number of closure request		6	90	970	0	90	NA	278	6	NA	61	133	NA	351
Number of requests attended within 7 days		6	90	970	0	90	NA	278	6	NA	61	133	NA	351
Percentage cases in which termination done within 7 days	100%	100.00%	100.00%	100.00%	NA	100.00%	NA	100.00%	100.00%	NA	100.00%	100.00%	NA	100.00%

Audit results for refund of deposits

Refund	Benchmark	Aircel	Airtel	BSNL	Etisalat	Idea	MTS	Reliance CDMA	Reliance GSM	S-Tel	Tata Docomo	Tata Indicom	Uninor	Vodafone
Total number of cases requiring refund of deposits		0	13	59	0	33	NA	177	24	NA	45	14	NA	8
Total number of cases where refund was made within 60 days		0	13	59	0	33	NA	177	24	NA	40	14	NA	8
Percentage cases in which refund was receive within 60 days	100%	NA	100.00%	100.00%	NA	100.00%	NA	100.00%	100.00%	NA	88.89%	100.00%	NA	100.00%

11. Additional Network Related parameters

Audit Results for Total Traffic Handled in Erlang

Traffic in Erlang	Benchmark	Aircel	Airtel	BSNL	Etisalat	Idea	MTS	Reliance CDMA	Reliance GSM	S-Tel	Tata Docomo	Tata Indicom	Uninor	Vodafone
Equipped capacity of the network		201254	577583.143	262600	1331.74	114878.777	60711	262000	148000	37221	66371	200862	66700.08	156729.65
Total traffic handled in erlang during TCBH		60051	451223.34	159888	80.84	108815.6601	10288.07	94530	104938	12294	30405	47836	55598.98	133348.383

Total number of customers as per VLR

	Benchmark	Aircel	Airtel	BSNL	Etisalat	Idea	MTS	Reliance CDMA	Reliance GSM	S-Tel	Tata Docomo	Tata Indicom	Uninor	Vodafone
Total no. of customers served (as per VLR)		2216650	14809427	3584845	2773	4037099	312589	2272672	3039016	578138	1171817	1044018	1094798	4451882
