

Objective Assessment of Quality of Services for (QoS) for Cellular Mobile (Wireless) Service Providers – Bihar 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, 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 fourth 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.**

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1.0 Background

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

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.

This report highlights the findings for the Audit module for Bihar & Jharkhand circle that was covered in period of October –December 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 2011.

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.
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.
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.

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 Centre's (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	STEL	October 2011
Operator 2	Aircel	October 2011
Operator 3	Videocon	October 2011
Operator 4	Idea	October 2011
Operator 5	Etisalat	October 2011
Operator 6	MTS	October 2011
Operator 7	Vodafone	October 2011
Operator 8	Airtel	October 2011
Operator 9	Tata Docomo (GSM)	October 2011
Operator 10	Reliance (GSM)	October 2011
Operator 11	Reliance (CDMA)	October 2011
Operator 12	Tata Indicom (CDMA)	October 2011
Operator 13	Uninor	October 2011
Operator 14	BSNL	October 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 October 2011 to December 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%			≤ 3%	≥ 95%	≤ 0.5%				
STEL	19:00 to 20:00	1525	22465	1.98%	29	1.90%	98.88%	0.31%	0.86%	0.92%	219	4572	4.79%	96.66%	0	68	37435	8913	460694
Aircel	20:00 to 21:00	3494	49593	1.91%	185	5.29%	98.76%	0.12%	0.70%	1.42%	497	10287	4.83%	95.61%	0	132	200419	44029	2124343
Videocon	19:00 to 20:00	12	105	1.18%	0	0.00%	99.00%	0.42%	0.00%	1.02%	0	36	0.00%	98.35%	0	18	10000	1	1690
Idea	20:00 to 21:00	4646	61019	1.77%	89	1.92%	97.45%	0.72%	1.94%	1.86%	385	13904	2.77%	95.31%	0	83	129956	101962	4728030
Etisalat	18:00 to 19:00	63	401	0.85%	1	1.59%	95.04%	0.13%	0.01%	0.45%	5	189	2.65%	98.57%	0	26	1399	52	3870
MTS	19:00 to 20:00	1337	1337	0.13%	1.09	0.08%	99.00%	0.00%	0.78%	0.99%	103	4024	2.56%	98.05%	0	50	60711	16850	524080
Vodafone	18:00 to 19:00	6341	44515	0.94%	511	8.06%	91.47%	2.15%	5.59%	DNP	2929	18927	15.48%	95.72%	0	51	198542	155158	5316100
Airtel	19:00 to 20:00	7215	2918	0.05%	19	0.26%	98.99%	0.40%	0.55%	0.69%	412	21319	1.93%	99.10%	0	48	607510	384448	15184500
Tata Docomo (GSM)	20:00 to 21:00	2030	213	0.01%	0	0.00%	97.32%	0.15%	0.52%	1.03%	277	6084	4.55%	97.36%	0	29	94363	28330	1296249
Reliance (GSM)	20:00 to 21:00	1258	7397	0.79%	33	2.62%	99.03%	0.00%	0.92%	1.46%	45	3774	1.19%	96.17%	0	30	262000	76668	3948867
Reliance (CDMA)	19:00 to 20:00	1258	7397	0.79%	33	2.62%	99.03%	0.00%	0.92%	1.46%	45	3774	1.19%	96.17%	0	30	262000	76668	2185647
Tata Indicom (CDMA)	19:00 to 20:00	1030	915	0.12%	3	0.29%	99.93%	0.00%	0.56%	0.61%	1199	97495	1.23%	DNP	0	242	4714355	524960	874279
Uninor	20:00 to 21:00	2286	23894	1.40%	32	1.40%	98.16%	0.33%	1.03%	1.72%	270	6850	3.94%	96.65%	0	56	87206	68690	1536676
BSNL	19:00 to 20:00	3349	19713	0.79%	1299	38.79%	78.45%	0.81%	1.29%	0.81%	111	2304	4.82%	DNP	0	128	242600	169232	989498

** 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

*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

DNP= Data Not Provided

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
STEL	19:00 to 20:00	19:00 to 20:00
Aircel	20:00 TO 21:00	20:00 TO 21:00
Videocon	19:00 to 20:00	19:00 to 20:00
Idea	20:00 TO 21:00	20:00 TO 21:00
Etisalat	20:00 TO 21:00	18:00 TO 19:00
MTS	19:00 to 20:00	19:00 to 20:00
Vodafone	18:00 TO 19:00	18:00 TO 19:00
Airtel	19:00 to 20:00	19:00 to 20:00
Tata Docomo (GSM)	20:00 TO 21:00	20:00 TO 21:00
Reliance (GSM)	20:00 TO 21:00	20:00 TO 21:00
Reliance (CDMA)	19:00 to 20:00	19:00 to 20:00
Tata Indicom (CDMA)	19:00 to 20:00	19:00 to 20:00
Uninor	20:00 TO 21:00	20:00 TO 21:00
BSNL	19:00 to 20:00	19:00 to 20:00

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

BTSs Accumulated Downtime:

In the Bihar circle, all operators met the benchmark

Call Set-up Success Rate (CSSR):

Vodafone & BSNL did not meet the benchmark on this parameter.

Network Congestion parameters:

Vodafone did not meet the SDCCH and TCH congestion benchmark

Customer Care / Helpline Assessment

During the audit it was found that all the service providers were measuring this parameter as per the TRAI guidelines except Aircel

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 met the TRAI benchmark of 100% with 1 week.

Inter operator calls assessment

Place of Calling: Operator office in Patna for all operators

BSNL Jharkhand: Operator's office in Jharkhand

Inter operator call Assessment To↓ From→	STEL	Aircel	Videocon	Idea	Etisalat	MTS	Vodafone	Airtel	Tata Docomo (GSM)	Reliance (GSM)	Reliance (CDMA)	Uninor	BSNL
Date	23/11/11	14/11/11	21/11/11	15/11/11	7/12/11	1/12/11	2/12/11	16/11/11	6/12/11	7/12/11	12/12/11	18/11/11	25/11/11
STEL	NA	100%	98%	100%	100%	100%	100%	98%	100%	100%	100%	100%	100%
Aircel	100%	NA	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Videocon	100%	100%	NA	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Idea	100%	100%	100%	NA	100%	100%	100%	100%	100%	100%	100%	100%	100%
Etisalat	100%	100%	100%	100%	NA	100%	100%	100%	100%	100%	100%	100%	100%
MTS	100%	100%	100%	100%	100%	NA	100%	100%	100%	100%	100%	100%	100%
Vodafone	100%	100%	100%	100%	100%	100%	NA	100%	100%	100%	100%	100%	100%
Airtel	100%	100%	100%	100%	100%	100%	99%	NA	100%	100%	100%	100%	100%
Tata Docomo (GSM)	100%	100%	100%	100%	100%	100%	100%	100%	NA	100%	100%	99%	100%
Reliance (GSM)	100%	100%	100%	100%	100%	100%	100%	100%	100%	NA	NA	100%	100%
Reliance (CDMA)	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Tata Indicom (CDMA)	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Uninor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	NA	100%
BSNL	100%	100%	98%	100%	100%	100%	100%	100%	100%	100%	100%	100%	NA

 The maximum problem faced by the calling operator to other operators

In the inter-operator call assessment, calls were made from the test SIMs of service provider whose audit was being conducted to all the other service providers. Videocon and Airtel found tough connecting to a STEl number. Videocon also found difficulty in connecting to a BSNL number and Uninor to a TATA Docomo number

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 Dhanbad, Dharbanga, & Muzzafarpur 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 Dhanbad, Dharbanga, & Muzzafarpur along the following route:

	Type of location	Dhanbad	Dharbanga	Muzzafarpur
Outdoor	Periphery of the city	Station to Big Bazaar	Station to Lhariasarai to Hajma Chowk to Income Tax to Station	Aghoria Bazar to Mithanpura to MDDM college to Water Tank to Amar Cinema to Choti Kalyani to Sonapatti
	Congested area	Randhir Verma to Bank More	Dharbhanga Tower Chowk – Neem Chowk Lahria Sarai	Amar Cinema to Motijhil
	Across the city	Bank More to Katras More	Station to temple to Girija Chowk to Darbhanga Tower Chowk – University Crossing	Ramdayalu to RDS college to Agharia Bazaar to Kalyani to Sonapatti to Jhuran Chowk to Maripur to Kalambagh to Aghria Bazaar
Indoor	Office complex	Shri Ram Plaza	Station	Max Mart
	Shopping complex	Big Bazaar	Arvind Hotel (Daarbhanga a Tower Chowk)	Vishal Mega Martz

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

Dhanbad

	B'mark	STEL		Aircel		Idea		MTS		Vodafone		Airtel		Tata Docomo (GSM)		Reliance (GSM)		Reliance (CDMA)		Tata Indicom (CDMA)		Uninor		BSNL	
		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%	98.52%	98.09%	99.61%	98.10%	99.60%	98.22%	92.79%	91.80%	99.11%	97.91%	99.47%	98.14%	98.38%	96.83%	95.60%	94.38%	95.48%	87.63%	95.09%	94.89%	98.73%	97.84%	99.62%	97.43%
CSSR	≥ 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%	99.38%	100.00%	99.38%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
%age Blocked calls		0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Call drop rate	≤ 2%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Hands off success rate		100.00%	100.00%	0.00%	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%	0.00%	100.00%	0.00%	100.00%	

Dharbanga


	B'mark	Aircel		Idea		MTS		Vodafone		Airtel		Tata Docomo (GSM)		Reliance (GSM)		Reliance (CDMA)		Tata Indicom (CDMA)		Uninor	
		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%	98.31%	97.71%	99.23%	95.34%	97.88%	95.50%	97.80%	97.34%	97.81%	96.37%	98.01%	97.61%	98.84%	96.62%	93.18%	87.60%	95.17%	94.22%	98.72%	96.43%
CSSR	≥ 95%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	99.40%	100.00%	100.00%	98.39%	98.08%	100.00%	100.00%	100.00%	99.39%	100.00%	100.00%	100.00%	100.00%
%age Blocked calls		0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Call drop rate	≤ 2%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.65%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Hands off success rate		100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	0.00%	100.00%

Muzzafarpur

	B'mark	Aircel		Idea		MTS		Vodafone		Airtel		Tata Docomo (GSM)		Reliance (GSM)		Reliance (CDMA)		Tata Indicom (CDMA)		Uninor	
		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%	98.93%	97.95%	93.46%	95.92%	94.68%	95.04%	98.07%	96.50%	97.82%	96.62%	97.59%	96.14%	99.80%	96.94%	95.33%	97.57%	95.06%	94.40%	97.69%	96.13%
CSSR	≥ 95%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	98.79%	100.00%	100.00%	100.00%	96.30%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
%age Blocked calls		0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Call drop rate	≤ 2%	0.00%	0.00%	0.00%	0.00%	1.67%	0.67%	0.00%	0.00%	0.00%	0.00%	0.00%	1.88%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Hands off success rate		0.00%	100.00%	100.00%	100.00%	100.00%	99.78%	100.00%	100.00%	0.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	0.00%	100.00%

Some of the operators don't have services in all the cities.

BSNL could not provide data for operator assisted drive tests from log files in Dharbanga and Muzzafarpur

 Not meeting the benchmark


Conclusions:

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

1. Reliance GSM & CDMA , MTS, and TATA CDMA did not meet the TRAI benchmark in Dhanbad areas
2. Reliance CDMA and TATA CDMA did not meet the TRAI benchmark in Dharbhanga areas
3. TATA CDMA Idea, MTS, did not meet the TRAI benchmark in Muzzafarpur areas

Summary of Live Measurement Results – Cellular Mobile Services

Name of Service Provider	Network Availability		Connection Establishment (Accessibility)			Connection Maintenance (Retainability)		
	BTSs Accumulated downtime (not available for service)	Worst affected BTSs due to downtime	Call Set-up Success Rate (within licensee's own network)	SDCCH/ Paging Chl. Congestion (%age)	TCH Congestion (%age)	Call Drop Rate (%age)	Worst affected cells having more than 3% TCH drop	%age of connection with good voice quality
Benchmark	≤ 2%	≤ 2%	≥ 95%	≤ 1%	≤ 2%	≤ 2%	≤ 3%	≥ 95%
STEL	1.97%	0.00%	99.52%	0.15%	0.78%	0.89%	4.97%	98.14%
Aircel	1.33%	0.26%	98.59%	0.13%	0.75%	1.49%	4.61%	98.22%
Videocon	1.43%	0.00%	99.00%	0.09%	0.00%	0.62%	0.00%	NA
Idea	0.34%	0.00%	97.85%	0.63%	1.79%	1.69%	2.56%	96.79%
Etisalat	1.36%	0.00%	95.39%	0.54%	0.01%	0.54%	2.65%	NA
MTS	1.44%	0.15%	99.63%	0.00%	0.01%	0.71%	2.03%	94.06%
Vodafone	0.68%	0.00%	95.33%	0.99%	2.81%	1.91%	15.35%	97.50%
Airtel	0.02%	0.00%	96.47%	0.86%	0.97%	1.90%	2.11%	97.46%
Tata Docomo (GSM)	0.01%	0.00%	96.37%	0.11%	0.45%	0.91%	0.06%	97.24%
Reliance (GSM)	0.89%	0.00%	98.74%	0.00%	0.79%	0.82%	1.56%	97.16%
Reliance (CDMA)	0.89%	0.00%	98.74%	0.00%	0.79%	0.82%	1.56%	94.04%
Tata Indicom (CDMA)	0.02%	0.00%	98.99%	0.00%	0.05%	0.52%	1.27%	94.68%
Uninor	1.41%	0.00%	97.25%	0.33%	1.66%	1.62%	4.14%	97.33%
BSNL	3.26%	2.43%	81.13%	0.60%	0.68%	0.41%	NA	NA

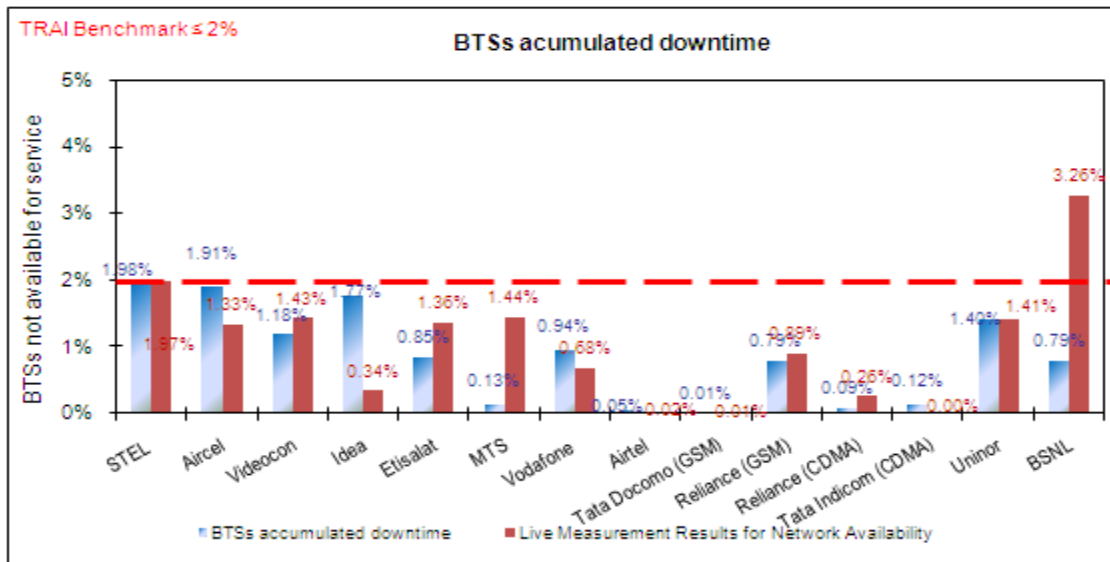
 Not meeting the benchmark

During the three day live measurement, none of the operators met the benchmark for %age complaints resolved within 4 weeks. Further, %age of connection with good voice quality parameter was not met by MTS, Reliance CDMA & TATA CDMA operators

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

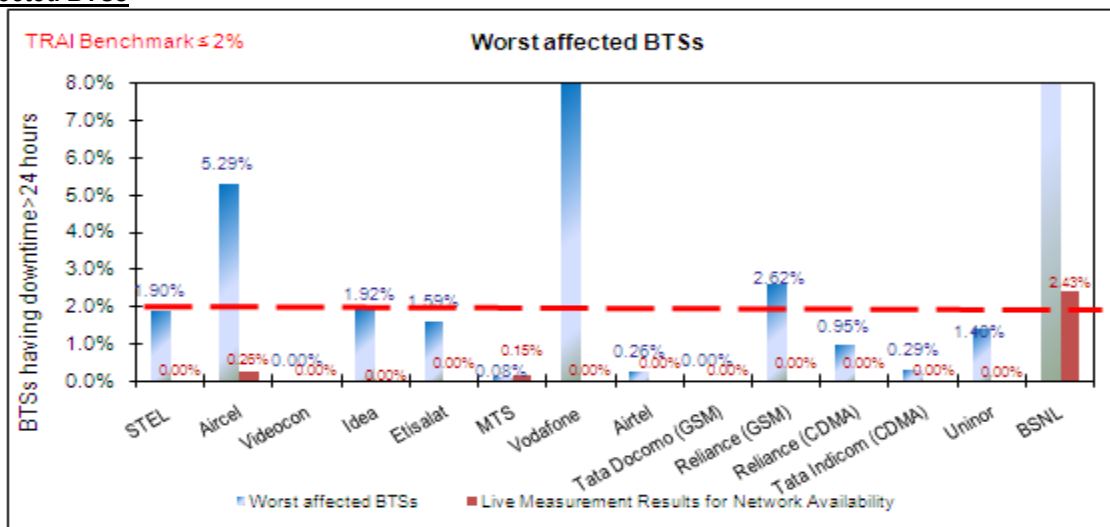
6.1 Graphical/Tabular Representations for Cellular Mobile Services

BTSs Accumulated Downtime



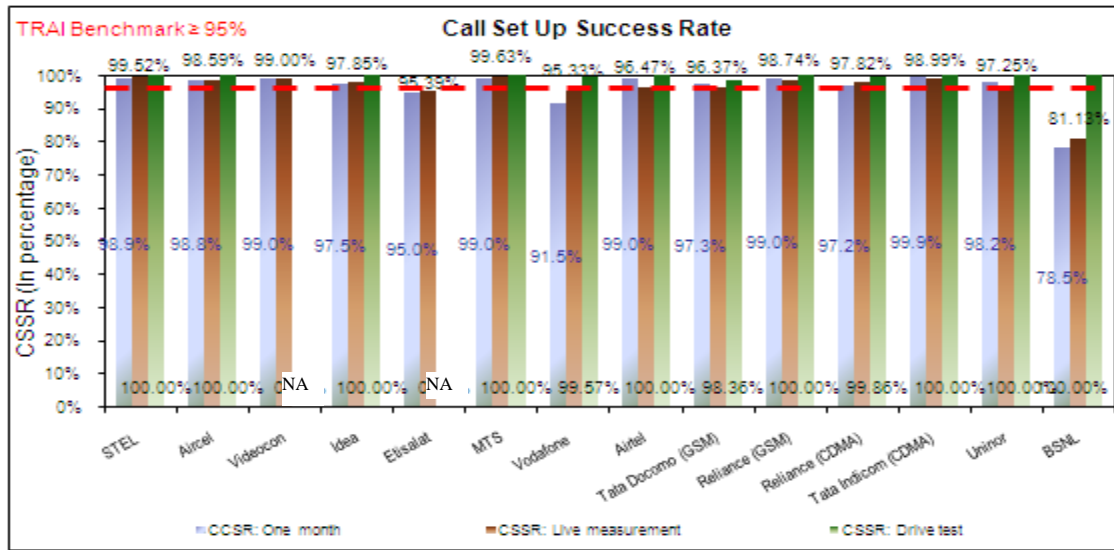
One Month: All the operators meet the benchmark
 Live Measurement: All operators except BSNL meet benchmark

Worst Affected BTSs



One Month: Operator(s) meeting benchmark: STEL , Videocon, Idea, Etisalat, MTS, Airtel, Tata Docomo (GSM), Reliance (GSM), Reliance (CDMA), Uninor
 One Month: Operator(s) not meeting the benchmark: Aircel, Vodafone, Reliance (GSM), Reliance (GSM), BSNL
 Live Measurement: All operators except BSNL meet benchmark

Call Set-up Success Rate (CSSR)



One month

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

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

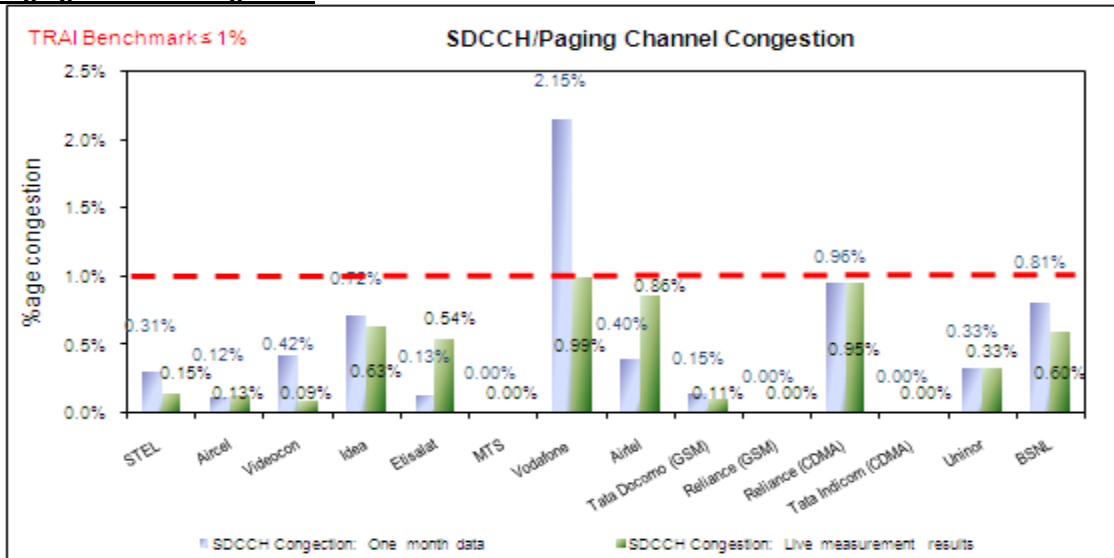
Live measurement

All the operators meet the benchmark

Drive test

All the operators meet the benchmark

SDCCH / Paging Channel Congestion



One month

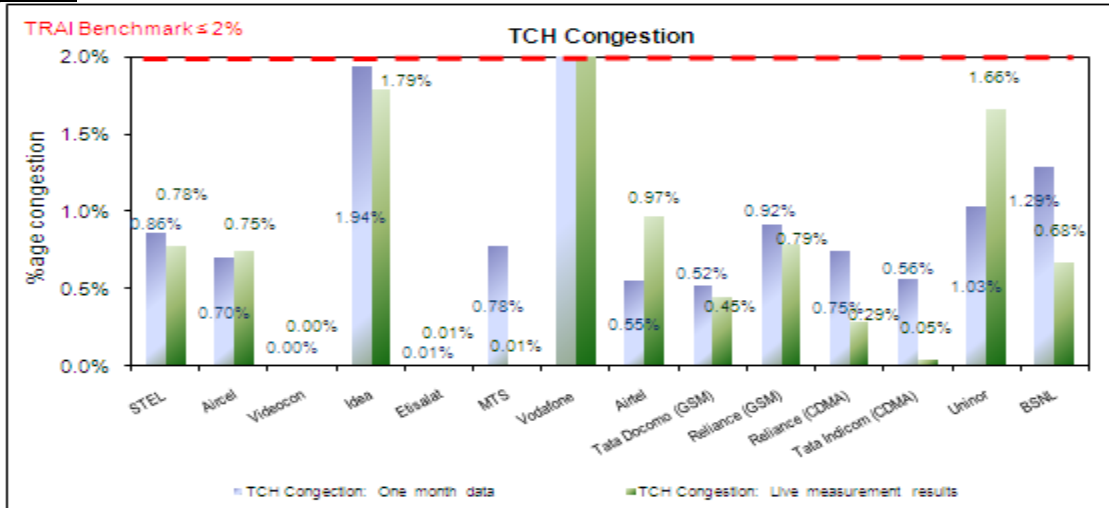
Operator(s) meeting benchmark: STEL, Aircel, Videocon, Idea, Etisalat, MTS, Airtel, Tata Docomo (GSM), Reliance (GSM), Reliance (CDMA), Tata Indicom (CDMA), Reliance (CDMA), Uninor, BSNL

Operator(s) not meeting the benchmark: Vodafone

Live measurement

All the operators meet the benchmark

TCH Congestion



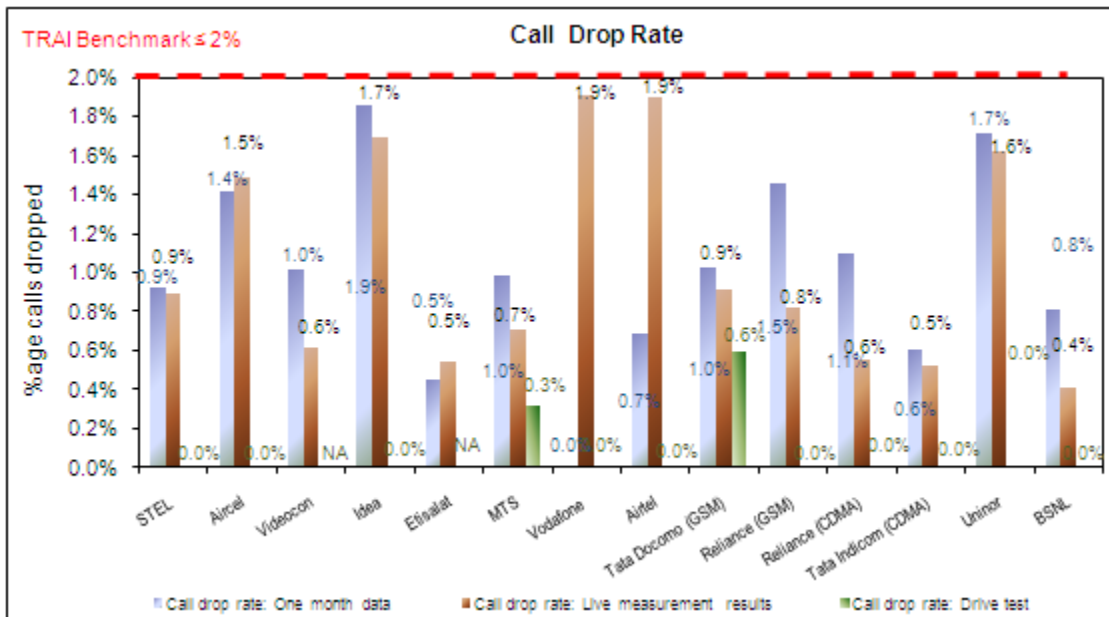
One month

Operator(s) meeting benchmark: STEL, Aircel, Videocon, Idea, Etisalat, MTS, Airtel, Tata Docomo (GSM), Reliance (GSM), Reliance (CDMA), Tata Indicom (CDMA), Reliance (CDMA), Uninor, BSNL
 Operator(s) not meeting the benchmark: Vodafone

Live measurement

Operator(s) meeting benchmark: STEL, Aircel, Videocon, Idea, Etisalat, MTS, Airtel, Tata Docomo (GSM), Reliance (GSM), Reliance (CDMA), Tata Indicom (CDMA), Reliance (CDMA), Uninor, BSNL
 Operator(s) not meeting the benchmark: Vodafone

Call Drop Rate



One month

All the operators meet the benchmark

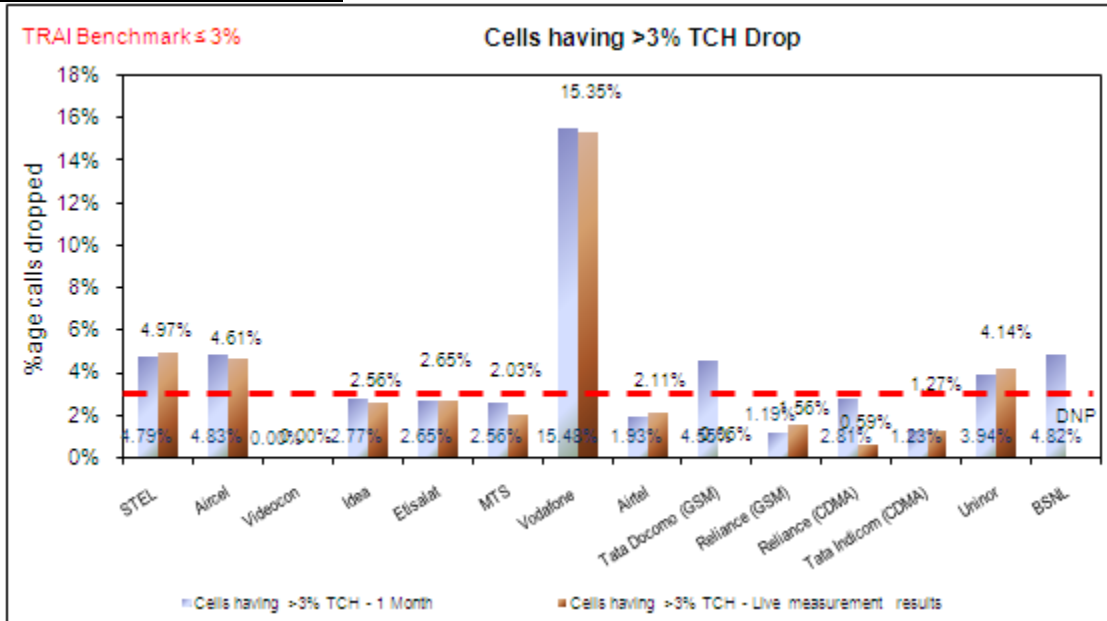
Live measurement

All the operators meet the benchmark

Drive test

All the operators meet the benchmark

Cells with more than 3% TCH Drop Rate



One month

Operator(s) meeting benchmark: Videocon, Idea, Etisalat, MTS, Airtel, Reliance (GSM), Reliance (CDMA), Tata Indicom (CDMA), Reliance (CDMA)

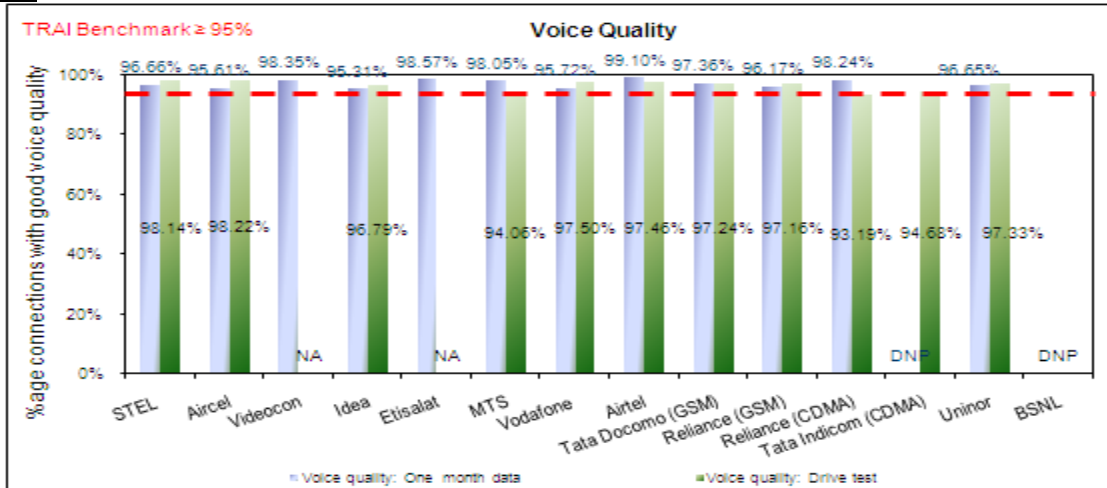
Operator(s) not meeting the benchmark: STEL, Aircel, Vodafone , Tata Docomo (GSM), Uninor, BSNL

Live measurement

Operator(s) meeting benchmark: Videocon, Idea, Etisalat, MTS, Airtel, Tata Docomo (GSM), Reliance (GSM), Reliance (CDMA), Tata Indicom (CDMA), Reliance (CDMA)

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

Voice quality



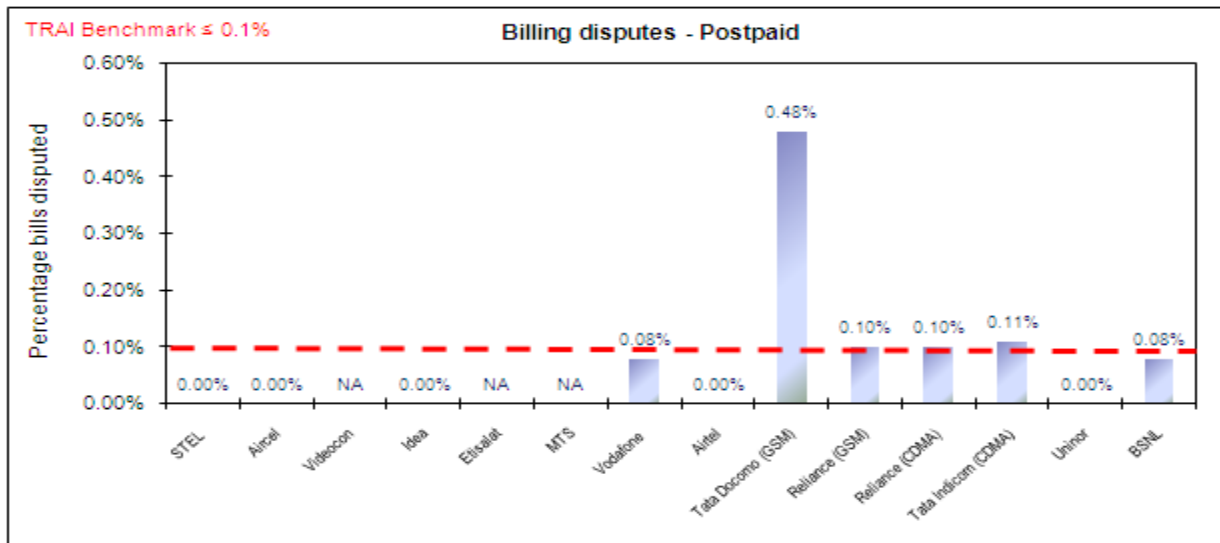
One month

All the operators meet the benchmark

Live measurement (Drive test)

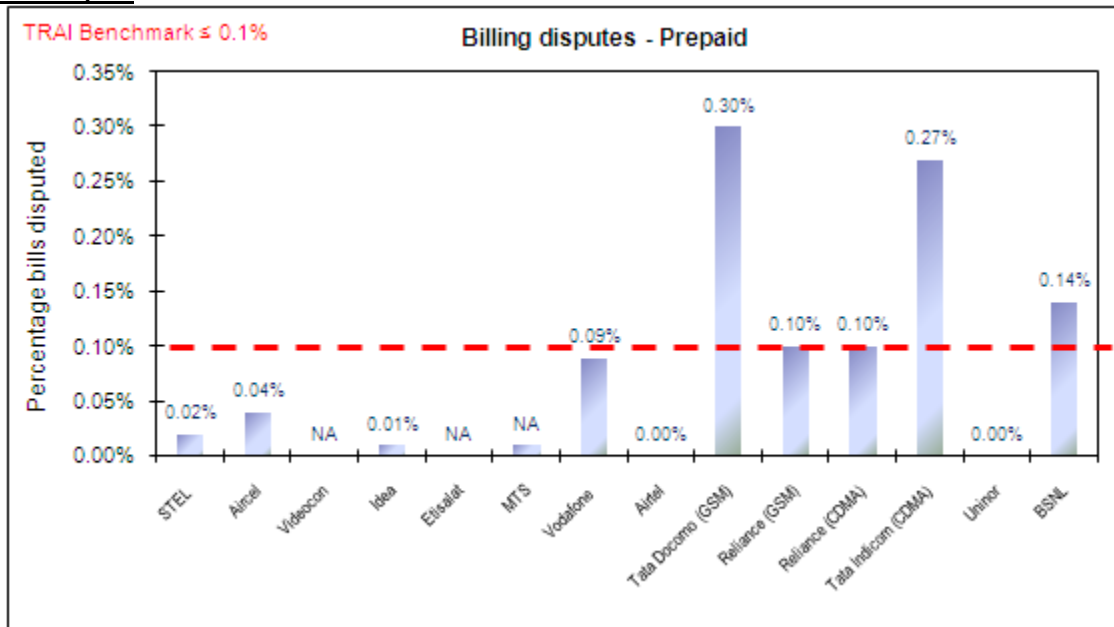
Operator(s) meeting benchmark: STEL , Aircel, Idea, Vodafone , Airtel, Tata Docomo (GSM), Reliance (GSM), Uninor
 Operator(s) not meeting the benchmark: MTS, Reliance (CDMA), Tata Indicom (CDMA), Reliance (CDMA)

Billing Disputes - Postpaid



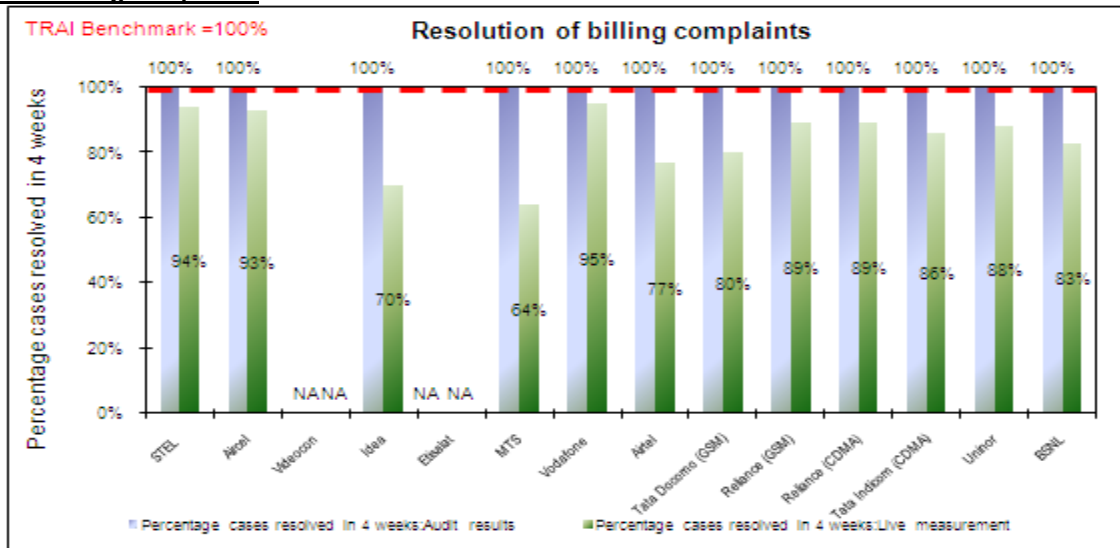
Operator(s) meeting benchmark: Aircel, Idea, Vodafone , Airtel, Reliance (GSM), Reliance (CDMA), Reliance (CDMA), BSNL
 Operator(s) not meeting the benchmark: Tata Docomo (GSM), Tata Indicom (CDMA)

Complaints - Prepaid



Operator(s) meeting benchmark: STEL , Aircel, Videocon, Idea, Etisalat, MTS, Vodafone , Airtel, Reliance (GSM), Reliance (CDMA), Reliance (CDMA), Uninor
 Operator(s) not meeting the benchmark: Tata Docomo (GSM), Tata Indicom (CDMA), BSNL

Resolution of billing complaints



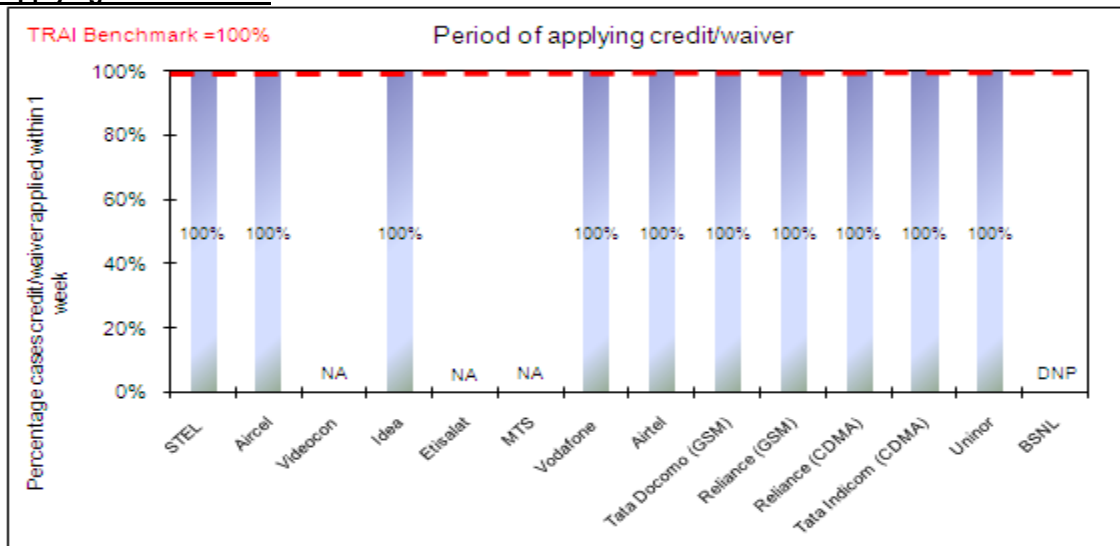
One month

All the operators meet the benchmark

Live measurement

None of the operator meets the benchmark

Period of applying credit / waiver



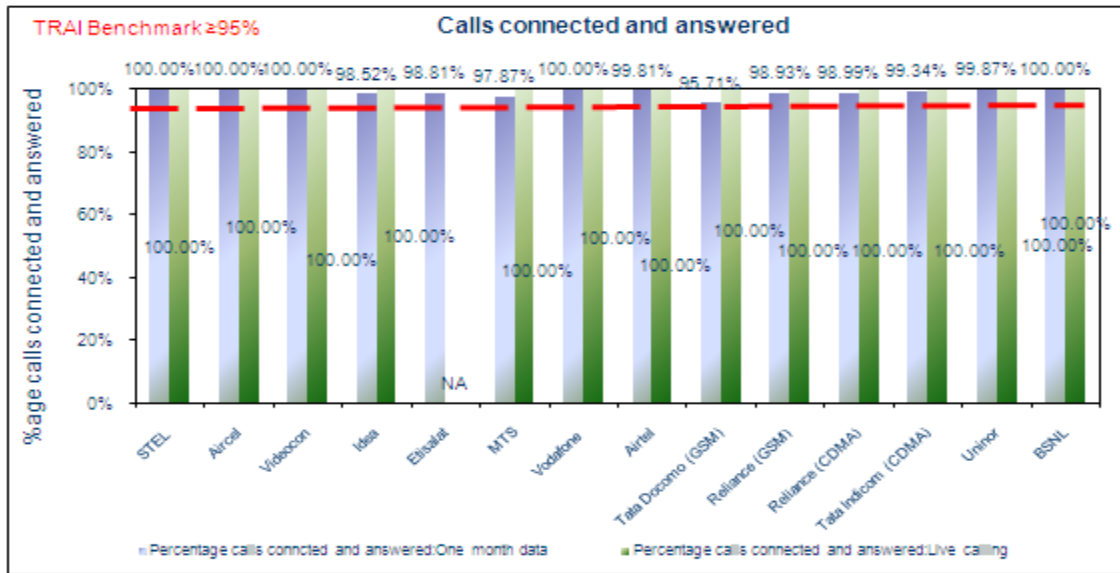
All the operators meet the benchmark

Live calling for billing Complaints

Resolution of billing complaints	Benchmark	STEL	Aircel	Videocon	Idea	Etisalat	MTS	Vodafone	Airtel	Tata Docomo (GSM)	Reliance (GSM)	Reliance (CDMA)	Uninor	BSNL
Total Number of calls made		100	100	NA	100	NA	100	100	100	100	100	100	100	100
Number of cases resolved in 4 weeks		94	93	NA	70	NA	64	95	77	80	89	89	88	83
Percentage cases resolved in four weeks	100%	94%	93%	NA	70%	NA	64%	95%	77%	80%	89%	89%	88%	83%

NA: Commercially not launched

Customer Care / Helpline: Calls answered



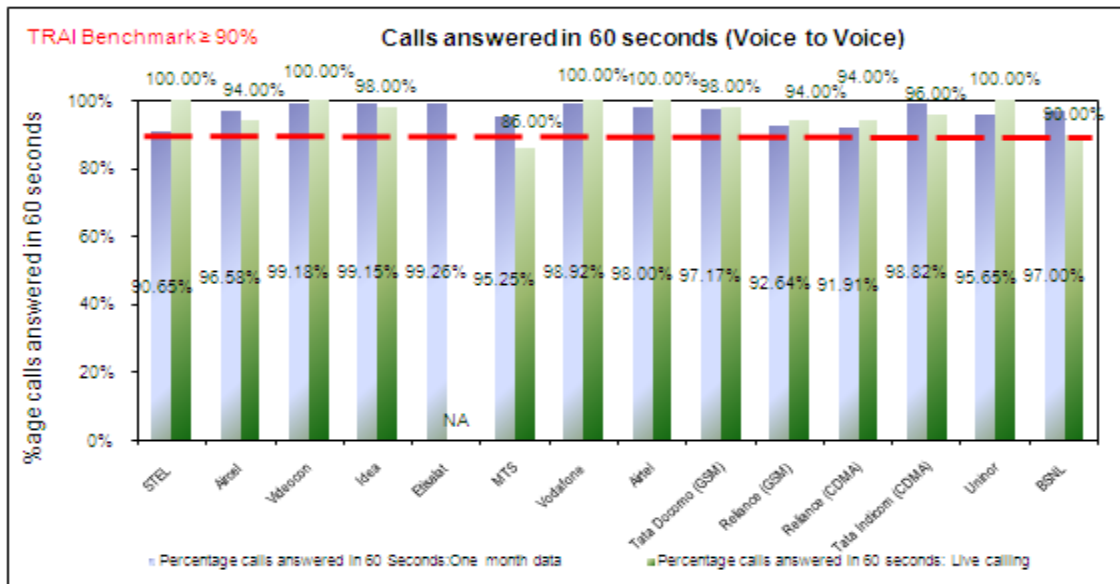
One month

All the operators meet the benchmark

Live calling

All the operators meet the benchmark

Customer Care / Helpline: Calls answered voice to voice



One month

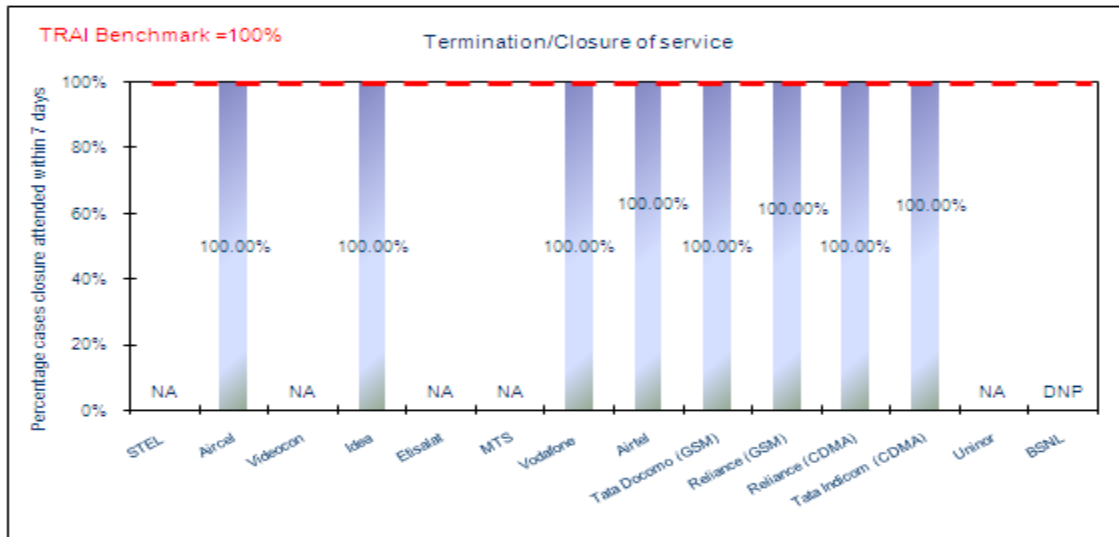
All the operators meet the benchmark

Live calling

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

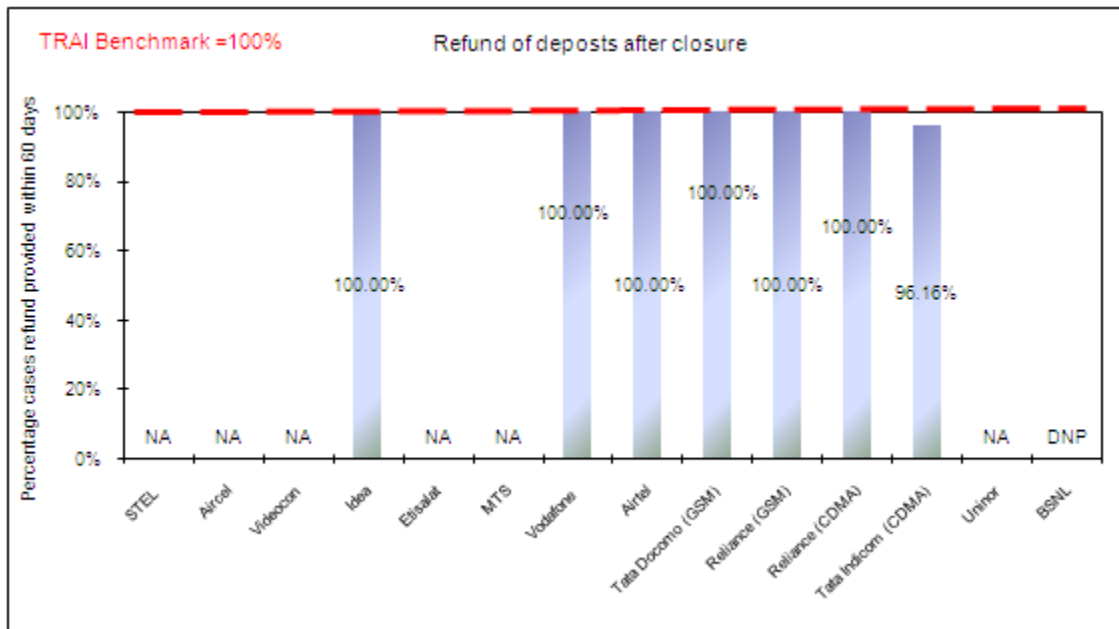
Operator(s) not meeting the benchmark: MTS

Termination / Closure of service



All the operators meet the benchmark

Refund of deposits



Operator(s) meeting benchmark: Idea, Vodafone , Airtel, Tata Docomo (GSM), Reliance (GSM), Reliance (CDMA), Reliance (CDMA)

Operator(s) not meeting the benchmark: Tata Indicom (CDMA)

Inter operator calls assessment

Place of Calling: Operator office in Patna for all operators
 BSNL Jharkhand: Operators office in Jharkhand

Inter operator call Assessment To↓ From→	STEL	Aircel	Videocon	Idea	Etisalat	MTS	Vodafone	Airtel	Tata Docomo (GSM)	Reliance (GSM)	Reliance (CDMA)	Uninor	BSNL
Date	23/11/11	14/11/11	21/11/11	15/11/11	7/12/11	1/12/11	2/12/11	16/11/11	6/12/11	7/12/11	12/12/11	18/11/11	25/11/11
STEL	NA	100%	98%	100%	100%	100%	100%	98%	100%	100%	100%	100%	100%
Aircel	100%	NA	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Videocon	100%	100%	NA	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Idea	100%	100%	100%	NA	100%	100%	100%	100%	100%	100%	100%	100%	100%
Etisalat	100%	100%	100%	100%	NA	100%	100%	100%	100%	100%	100%	100%	100%
MTS	100%	100%	100%	100%	100%	NA	100%	100%	100%	100%	100%	100%	100%
Vodafone	100%	100%	100%	100%	100%	100%	NA	100%	100%	100%	100%	100%	100%
Airtel	100%	100%	100%	100%	100%	100%	99%	NA	100%	100%	100%	100%	100%
Tata Docomo (GSM)	100%	100%	100%	100%	100%	100%	100%	100%	NA	100%	100%	99%	100%
Reliance (GSM)	100%	100%	100%	100%	100%	100%	100%	100%	100%	NA	NA	100%	100%
Reliance (CDMA)	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Tata Indicom (CDMA)	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Uninor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	NA	100%
BSNL	100%	100%	98%	100%	100%	100%	100%	100%	100%	100%	100%	100%	NA

 The maximum problem faced by the calling operator to other operators

In the inter-operator call assessment, calls were made from the test SIMs of service provider whose audit was being conducted to all the other service providers. Videocon and Airtel found tough connecting to a STel number. Videocon also found difficulty in connecting to a BSNL number and Uninor to a TATA Docomo number

7.0 Compliance reports: Results of Verification of PMR

7.1 Cellular Mobile services

Month of April

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	Equippe d Capacity of Network in respect of Traffic in erlang	Total traffic handled in TCHB in erlang	Total no. of customer serves (as per VLR) on last day of the month	
Benchmark			≤ 2%		≤ 2%	≥ 95%	≤ 1%	≤ 2%	≤ 2%			≤ 3%	≥ 95%						
STEL	PMR	1523	20789	1.83%	28	1.84%	98.39%	0.45%	1.70%	0.46%	189	4566	4.10%	97.10%	0	DNP	0	0	0
	IMR B	NA	20789	1.83%	28	1.84%	98.39%	0.45%	1.70%	0.46%	189	4566	4.14%	97.07%	0	71	37221	12294	578138
Aircel	PMR	3448	21245	0.86%	0	0.00%	98.05%	0.35%	1.45%	1.16%	1000	10335	9.68%	95.93%	0	DNP	201254	60051	2237122
	IMR B	3448	21244	0.86%	235	6.82%	98.05%	0.35%	1.45%	1.16%	1000	10335	9.68%	95.93%	0	128	201254	60050	2237122
Videococ n	PMR	12	51	0.6%	0	0.00%	98.42%	0.44%	0.00%	1.30%	1	36	2.78%	99.25%	0	24	10000	5.94	1762
	IMR B	12	51	0.6%	0	0.00%	98.42%	0.44%	0.00%	1.30%	1	36	2.78%	99.25%	0	24	10000	5.94	1762
Idea	PMR	4204	32264	1.07%	63	1.50%	97.78%	0.88%	1.88%	1.51%	470	12578	3.73%	95.88%	0	DNP	114878	108816	4022201
	IMR B	4204	32264	1.07%	63	1.50%	97.78%	0.88%	1.88%	1.51%	470	12578	3.73%	95.88%	0	85	114878	108815	4022201
Etisalat	PMR	61	1836.69	0.93%	1	1.64%	95.38%	0.07%	0.00%	0.48%	7	180	3.89%	98.51%	0	DNP	1331.74	80.84	2773
	IMR B	61	407.7	0.93%	1	1.64%	95.38%	0.07%	0.00%	0.48%	7	180	3.89%	98.51%	0	30	1331.74	80.84	2773
MTS	PMR	1306	18347	1.88%	17	1.30%	99.00%	0.00%	0.12%	0.74%	91	3919	2.32%	98.00%	0	46	60711	10288	312589
	IMR B	1306	18347	1.88%	17	1.30%	99.00%	0.00%	0.12%	0.74%	21	3919	0.53%	98.00%	0	46	60711	10288	312589
Vodafone	PMR	5767	26469	0.63%	96	1.7%	93.10%	2.31%	4.22%	1.70%	1842	17283	10.66%	95.8%	0	DNP	156730	133348	4451882
	IMR B	5767	26469	0.63%	96	1.7%	93.10%	2.31%	4.22%	1.70%	1842	17283	10.66%	95.8%	0	51	156729	133348	4451882
Airtel	PMR	7052	4492	0.09%	42	0.60%	97.40%	0.87%	1.21%	1.82%	502	20592	2.44%	96.52%	0	0	573305	451223	1480942

																				7
	IMR B	7052	4492	0.09%	42	0.60%	97.40%	0.87%	1.21%	1.82%	502	20592	2.44%	96.52%	0	48	573305	451223	14809427	
Tata Docomo (GSM)	PMR	2003	65	0.00%	0	0.00%	97.65%	0.2%	0.59%	0.39%	49	6001	0.82%	96.79%	0	DNP	66371	30405	1171817	
	IMR B	2003	64.78	0.00%	0	0.00%	97.65%	0.2%	0.59%	0.39%	49	6001	0.82%	96.79%	0	9	66371	30405	1171817	
Reliance (GSM)	PMR	2934	3013	0.14%	18	0.61%	97.27%	0.84%	1.05%	1.57%	115	8802	1.30%	98.61%	0	22	148000	104938	3055415	
	IMR B	2934	3013	0.14%	18	0.61%	97.27%	0.84%	1.05%	1.57%	115	8802	1.30%	98.61%	0	22	148000	104938	3055415	
Reliance (CDMA)	PMR	2423	10739	0.61%	25	1.03%	99.68%	0.00%	1.05%	0.85%	25	2423	1.03%	96.56%	0	30	262000	94530	2318111	
	IMR B	2423	10739	0.61%	25	1.03%	99.68%	0.00%	1.05%	0.85%	25	2423	1.03%	96.56%	0	30	262000	94530	2318111	
Tata Indicom (CDMA)	PMR	1043	952.37	0.13%	2	0.19%	99.65%	0.00%	0.04%	0.32%	52	3177	1.64%	99.40%	0	DNP	200862.00	47836	1044018	
	IMR B	1043	952	0.13%	2	0.19%	99.65%	0.00%	0.04%	0.32%	52	3177	1.64%	99.40%	0	230	200862	47836	1044018	
Uninor	PMR	2034	17664	1.21%	0	0.00%	96.37%	0.46%	1.51%	1.35%	256	6087	4.2%	96.80%	0	DNP	66700	55599	1094798	
	IMR B	2034	17664	1.20%	0	0.00%	96.37%	0.46%	1.51%	1.35%	256	6087	4.2%	96.80%	0	68	66700	55598	1094798	
BSNL	PMR	3295	62851	1.08%	179	1.86%	97.00%	0.55%	1.35%	1.35%	453	9795	4.84%	97.00%	1	197	262600	159888	3584845	
	IMR B	3295	62851	1.08%	179	1.86%	97.00%	0.55%	1%	1.35%	453	9795	4.84%	97.00%	1	197	262600	159888	3584845	

Month of May

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 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 (%age)	%age connection with good voice quality	Point of interconnection (POI) Congestion	Total number of working POI Service Area wise	Equip ped Capacity of Network in respect of Traffic in erlang	Total traffic handled in TCH B in erlang	Total no. of customer serves (as per VLR) on last day of the month	
Benchmark			≤ 2%		≤ 2%	≥ 95%	≤ 1%	≤ 2%	≤ 2%			≤ 3%	≥ 95%						
STEL	PMR	1525	19564	1.72%	28	1.84%	98%	0.96%	1.85%	0.47%	204	4572	4.46%	97.07%	0	DNP	37251	13178	640513
	IMRB	NA	19564	1.72%	28	1.84%	98%	0.96%	1.85%	0.47%	204	4572	4.46%	97.07%	0	69	37251	13178	640513

Aircel	PM R	3448	45051	1.76%	604	17.52 %	98.11 %	0.49%	1.41%	1.21 %	1060	10335	10.26 %	96.00%	0	DNP	199419	58531	2262861
	IM RB	3448	45051	1.76%	604	17.52 %	98.10 %	0.49%	1.41%	1.21 %	1060	10335	10.26 %	95.00%	0	128	199419	58531	2262861
Video con	PM R	12	143	0.2%	0	0.00%	99.04 %	0.37%	2.00%	1.43 %	0	36	0.00 %	99.18%	0	24	10000	12.03	2666
	IM RB	12	143	1.6%	0	0.00%	99.0%	0.37%	0.02%	1.43 %	0	36	0.00 %	99.00%	0	24	10000	12.03	2666
Idea	PM R	4248	39156	1.24%	48	1.13%	97.86 %	0.89%	1.85%	1.43 %	376	12710	2.95 %	95.63%	0	DNP	118843	111259	4312431
	IM RB	4248	39156	1.24%	48	1.13%	97.86 %	0.89%	1.85%	1.43 %	376	12710	2.95 %	95.63%	0	85	118843	111259	4312431
Etisalat	PM R	63	203	0.43%	1	1.59%	95.63 %	0.02%	0.01%	0.40 %	6	189	3.17 %	98.56%	0	DNP	1399	95.29	6066
	IM RB	63	202.54	0.43%	1	1.59%	95.63 %	0.02%	0.01%	0.40 %	6	189	3.17 %	98.56%	0	26	1398.79	95.29	6066
MTS	PM R	1312	17733	1.81%	22	1.67%	99.04 %	0.00%	0.20%	0.80 %	177	3943	4.49 %	99.42%	0	46	60711	11882	346104
	IM RB	1312	17733	1.81%	22	1.67%	99.04 %	0.00%	0.20%	0.80 %	177	3943	4.49 %	99.42%	0	46	60711	11882	346104
Vodafone	PM R	5767	26469	0.63%	96	1.66%	93.10 %	2.31%	4.22%	1.70 %	1842	17283	10.66 %	95.8%	0	DNP	156730	133348	4451882
	IM RB	5800	22236	0.51%	90	1.55%	87.93 %	4.66%	7.30%	1.68 %	1965	16991	11.56 %	96.0%	0	51	157608	140148	4686808
Airtel	PM R	7077	4190	0.10%	39	0.60%	97.89 %	0.89%	0.89%	1.40 %	516	20811	2.50 %	96.72%	0	0	581720	435353	15235520
	IM RB	7077	4190	0.10%	39	0.60%	97.89 %	0.89%	0.89%	1.40 %	516	20811	2.50 %	96.72%	0	48	581720	435353	15235520
Tata Docomo (GSM)	PM R	1989	1582	0.11%	9	0.45%	97.53 %	0.2%	0.51%	0.46 %	60	5959	0.10 %	96.51%	0	DNP	86294	32259	1201600
	IM RB	1989	1581	0.11%	9	0.45%	97.53 %	0.2%	0.51%	0.46 %	60	5959	1.01 %	96.51%	0	29	86294	32259	1201600
Reliance (GSM)	PM R	2934	3339	0.15%	27	0.92%	97.8%	0.89%	1.14%	1.50 %	107	8802	1.21 %	98.61%	0	22	148000	105093	3141610
	IM RB	2934	3339	0.15%	27	1%	98%	0.89%	1.14%	1.50 %	107	8802	1.21 %	99%	0	22	148000	105093	3141610
Reliance (CDMA)	PM R	2423	11942	0.66%	41	1.69%	99.59 %	0.00%	1.05%	0.98 %	28	2423	1.15 %	96.56%	0	30	262000	93605	2301855
	IM RB	2423	11942	0.66%	41	1.69%	99.59 %	0.00%	1.05%	0.98 %	28	2423	1.15 %	96.56%	0	30	262000	93605	2301855
Tata Indicom (CDMA)	PM R	1043	1034.46	0.13%	2	0.19%	99.57 %	0.00%	0.60%	0.38 %	55	3177	0.17 %	99.37%	0	DNP	292658	50912	1046555
	IM RB	1043	1034	0.13%	2	0.19%	99.57 %	0.00%	0.06%	0.38 %	55	3177	1.73 %	99.37%	0	238	292658	50912	1046555

Uninor	PM R	2173	25409	1.57%	38	2%	98%	0.52%	1.05%	1.27%	331	6531	5.07%	96%	0	DNP	71674	59536	1177573
	IM RB	2173	25409	1.57%	38	2%	98%	0.52%	1.05%	1.27%	331	6531	5.00%	96%	0	63	71674	59536	1177573
BSNL	PM R	3302	61122	1.02%	172	1.77%	97.00%	0.43%	1%	1.50%	440	98.16	5.00%	97.00%	2	DNP	262600	158797	3535311
	IM RB	3302	61122	1.02%	172	1.77%	97.00%	0.43%	1%	1.50%	440	98.16	5.00%	97.00%	2	DNP	262600	158797	3535311

Month of June

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)	SDCC H/ 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	Equip ed Capacity of Network in respect of Traffic in erlang	Total traffic handled in TCH in erlang	Total no. of customer serves (as per VLR) on last day of the month	
Benchmark			≤ 2%		≤ 2%	≥ 95%	≤ 1%	≤ 2%	≤ 2%			≤ 3%	≥ 95%						
STEL	PM R	1525	22399	1.97%	28	1.83%	98.29%	0.60%	1.90%	0.52%	220	4572	4.81%	96.73%	0	DNP	37208	13189	714359
	IM RB	NA	22399	1.97%	28	1.83%	98.00%	0.60%	1.90%	0.52%	220	4572	4.81%	96.73%	0	69	37208	13189	714359
Aircel	PM R	3493	28358	1.13%	373	10.68%	98.46%	0.34%	1.03%	1.36%	788	10338	7.62%	95.52%	0	DNP	200807	54639	2193410
	IM RB	3493	28358	1.13%	373	10.68%	98.46%	0.34%	1.03%	1.36%	788	10338	7.62%	95.52%	0	128	200807	54639	2193410
Video con	PM R	12	82	0.9%	0	0.00%	99.19%	0.24%	0.02%	1.27%	0	36	0.00%	99.28%	0	24	10000	6.89	2183
	IM RB	12	82	0.9%	0	0.00%	99.00%	0.24%	0.02%	1.31%	0	36	0.00%	99.00%	0	24	10000	6.89	2183

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Idea	PM R	4298	55267	1.79%	63	1.47%	97.79%	0.94%	1.95%	1.57%	376	12860	2.92%	95.60%	0	DNP	120537	94282	4285618
	IM RB	4298	55267	1.79%	63	1.47%	97.79%	0.94%	1.95%	1.57%	376	12860	2.92%	95.60%	0	85	120537	94282	4285618
Etisalat	PM R	63	188.24	0.41%	0	0.00%	95.79%	0.03%	0.01%	0.48%	6	189	3.17%	98.47%	0	DNP	1398.79	78.8	5447
	IM RB	63	188.24	0.41%	0	0.00%	95.79%	0.03%	0.01%	0.48%	6	189	3.17%	98.47%	0	26	1398.79	78.8	5447
MTS	PM R	1324	18871	1.75%	0	0.00%	98.91%	0.00%	0.17%	1.10%	191	3872	4.81%	NA	0	46	60711	12956	376334
	IM RB	1324	16671	1.74%	8	0.60%	98.00%	0.00%	0.16%	1.14%	191	3972	4.80%	97.83%	0	46	60711	12956	376334
Vodafone	PM R	5861	21878	0.51%	97	1.80%	98.05%	4.11%	7.45%	2.22%	2988	17401	17.17%	96.09%	0	DNP	166394	139790	4682023
	IM RB	5861	21878	0.51%	97	1.80%	88.00%	4.10%	7.45%	2.22%	2988	17401	17.17%	96.09%	0	51	166394	139789	4682023
Airtel	PM R	7064	3912	0.10%	34	0.50%	98.01%	0.90%	0.87%	1.36%	501	20459	2.40%	98.09%	0	0	695767	414061	14831368
	IM RB	7064	3912	0.10%	34	0.50%	98.01%	0.90%	0.87%	1.36%	501	20459	2.40%	98.09%	0	48	695767	414061	14831368
Tata Docomo (GSM)	PM R	1990	3033	0.21%	20	1.01%	97.55%	0.3%	0.23%	0.46%	75	5962	1.26%	96.40%	0	DNP	86775	28127	1243158
	IM RB	1990	3032	0.20%	20	1.01%	97.55%	0.3%	0.23%	0.46%	75	5962	1.26%	96.40%	0	29	86775	28127	1243158
Reliance (GSM)	PM R	2934	1418	0.06%	42	1.43%	97.87%	0.86%	1.21%	1.38%	232	8802	2.63%	98.89%	0	22	148000	105410	3238201
	IM RB	2934	1418	0.06%	42	1.43%	97.87%	0.86%	1.21%	1.38%	232	8802	2.63%	98.89%	0	22	148000	105410	3238201
Reliance (CDMA)	PM R	2423	19205	1.10%	44	1.81%	99.65%	0.00%	1.01%	0.82%	51	2423	2.10%	96.73%	0	30	262000	91011	2278402
	IM RB	2423	19205	1.10%	44	1.81%	99.65%	0.00%	1.01%	0.82%	51	2423	2.10%	96.73%	0	30	262000	91011	2278402
Tata Indicom (CDMA)	PM R	1043	852.16	0.11%	2	0.19%	99.62%	0.00%	0.30%	0.31%	11	3177	0.35%	99.52%	0	DNP	292658	50878	1000457
	IM RB	1043	852	0.11%	2	0.19%	99.62%	NA	0.03%	0.31%	11	3177	0.35%	99.52%	0	240	292658	50878	1000457
Uninor	PM R	2241	37904	2.35%	54	2%	9700%	33.00%	1.67%	1.77%	352	6711	5.25%	96%	0	DNP	73639	53190	1237371
	IM RB	2241	37904	2.35%	54	2%	97%	0.33%	1.67%	1.77%	352	6711	5.24%	96%	0	63	73639	53190	1237371
BSNL	PM R	3306	59445	0.94%	167	1.76%	97.25%	0.49%	1%	1.70%	439	9828	4.66%	97.00%	2	DNP	262600	118275	3683281
	IM RB	3306	59445	0.94%	167	1.76%	97.25%	0.49%	1%	1.70%	439	9828	4.66%	97.00%	2	DNP	262600	118275	3683281

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 complaints 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 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	adjustment to customer's account from the date of resolution of	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	
STEL	PMR	NA	NA	NA	0.00%	1510	1897964	100%	1510	1510	485	1025	100%	99.00%	829070	779106	94.00%	0%	0	0	0%
	IMRB	NA	NA	NA	0.01%	1510	1897964	100%	1510	1510	485	1025	100%	99.00%	829070	779106	94.00%	0%	0	0	0%
Aircel	PMR	0%	4032	0	0.24%	11591	4842128	100%	11591	11591	4821	6770	100%	100%	396143	330519	82.67%	100%	22	22	100%
	IMRB	0.00%	4032	0	0.24%	11591	4919503	100%	11591	11591	4821	6770	100%	100%	391327	332288	88.00%	100%	19	19	100%
Videocon	PMR	NA	NA	NA	0.08%	13	16897	100%	13	13	12	1	100%	97%	1223	1182	95.08%	100%	0	0	NA
	IMRB	NA	NA	NA	0.08%	13	16897	100%	13	13	12	1	100%	97%	1223	1182	95.08%	100%	0	0	NA
Idea	PMR	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	IMRB	0.05%	20431	0.11	0.77%	1110	14432843	100%	1121	1121	137	915	100%	96%	4719144	4547966	96.37%	100%	336	336	100%
Etisalat	PMR	NA	NA	NA	0.20%	73	26518	73%	73	73	0	73	NA	98.76%	15956	8604	99.13%	NA [#]	NA [#]	NA [#]	NA [#]
	IMRB	NA	NA	NA	0.20%	73	26518	73%	73	73	0	73	NA	98.76%	15956	8604	99.13%	NA [#]	NA [#]	NA [#]	NA [#]
MTS	PMR	0.00%	0	0	0.50%	519	1030600	100%	519	519	484	35	100%	100%	83140	73203	90.00%	DNP	DNP	DNP	DNP
	IMRB	NA	NA	NA	0.00%	519	1030600	100%	519	519	484	35	100%	100%	83140	73203	77.00%	NA*	NA*	NA*	NA*
Vodafone	PMR	0.06%	24660	16	0.01%	1758	5236539	100%	1774	3107	1774	1333	100%	100%	376648	316027	74.00%	100%	1252	1252	100%
	IMRB	0.06%	24660	0.16	0.01%	1758	5244148	100%	1774	3107	1774	1333	100%	100%	376648	316027	74.00%	100%	1252	1252	100%
Airtel	PMR	0%	70729	5	0%	31	58841836	100%	36	11642	36	11606	100%	97%	184241199	179466014	94.00%	100%	253	253	100%
	IMRB	0%	70729	5	0%	31	58841836	100%	36	11642	36	11606	100%	97%	184241199	179466014	94.00%	100%	253	253	100%
Tata Docomo (GSM)	PMR	0%	12560	42	0.00%	3934	3395554	100%	3976	3976	0	3976	100%	96%	1470258	1386424	91.00%	100%	160	160	67%
	IMRB	0.01%	12560	42	0.00%	3934	3395554	100%	3976	3976	0	3976	100%	96%	1470258	1386424	91.00%	100%	160	160	67%
Reliance	PMR	0.08%	18167	14	0.09%	4522	5167489	100%	13579	13579	1097	12482	100%	83%	341947	279291	80.00%	100%	38	38	100%

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(GSM)	IMRB	0.08%	18167	14	0.09%	4522	5167489	100%	13579	13579	1097	12482	100%	83%	341947	279291	80.00%	100%	38	38	100%
Reliance (CDMA)	PMR	0%	211930	214	0%	2695	3610176	100%	8300	8300	1053	7247	100%	100.00%	469192	469192	95.00%	100%	542	542	100%
	IMRB	0%	211930	214	0.07%	2695	3610176	100%	8300	8300	1053	7247	100%	100.00%	469192	469192	95.00%	100%	542	542	100%
Tata Indicom (CDMA)	PMR	0.02%	112362	21	0.01%	889	6876922	100%	2344	2344	910	1435	100%	100%	729861	727271	96.00%	100%	2013	2013	100%
	IMRB	0.00%	184026	310	0.00%	8500	2706454	100%	8810	8810	292	8208	100%	100%	7273158	7273158	100.00%	100%	863	863	91%
Uninor	PMR	NA	NA	NA	10%	4271	2954606	100%	4270	4271	NA	NA	NA	96.00%	15752044	15173295	92.00%	NA*	NA*	NA*	NA*
	IMRB	NA	NA	NA	0.00%	383	3426728	100%	383	383	NA	NA	NA	96.00%	15752044	15173295	98.00%	NA*	NA*	NA*	NA*
BSNL	PMR	0%	156466	132	0.27%	7565	5412655	100%	2121	7711	2109	12	100%	100%	4185639	3881366	91.00%	100%	1134	1134	100%
	IMRB	0%	156466	132	0.27%	7565	5412655	100%	2121	7711	2109	12	100%	100%	4185639	3881366	91.00%	100%	1134	1134	100%

DNP= Data Not Provided


*The operator does not have postpaid subscribers

#commercially not launched

 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

Month of April

1. Vodafone did not meet CSSR, SDCCH/ Paging chl. Congestion (%age), TCH Congestion (%age) benchmarks.
2. STel, Aircel, Idea, Etisalat, Vodafone, Uninor and BSNL do not meet benchmark for Worst affected cells having more than 3% TCH drop (call drop) rate

Month of May

1. Aircel did not meet Worst affected BTSs due to downtime (%age) benchmark
2. Vodafone did not meet CSSR, SDCCH/ Paging chl. Congestion (%age), TCH Congestion (%age) benchmarks.
3. STel, Aircel, Etisalat, MTS, Vodafone, Uninor and BSNL do not meet benchmark for Worst affected cells having more than 3% TCH drop (call drop) rate

Month of June

1. Aircel & Uninor did not meet Worst affected BTSs due to downtime (%age) benchmark
2. Vodafone did not meet CSSR, SDCCH/ Paging chl. Congestion (%age), TCH Congestion (%age), and call drop rate benchmarks.
3. STel, Aircel, Etisalat, MTS, Vodafone, Uninor and BSNL do not meet benchmark for Worst affected cells having more than 3% TCH drop (call drop) rate

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 (with licensee's own network)	SDCCH/Paging Chl. Congestion	TCH Congestion	Call Drop Rate (%age)	Worst affected cells having more than 3% TCH drop	%age of connection with good voice quality	Metering and billing credibility (Postpaid)	Metering and billing credibility (Prepaid)	%age complaints resolved within 4 weeks	Period of applying credit/waiver less than 1 week	Accessibility of call centre/customer care	Percentage of calls answered by operators within 60 sec	%age requests for Termination complied within 7 days	Refund of deposits after closure within 60 days
Benchmark	≤ 2%	≤ 2%	≥ 95%	≤ 1%	≤ 2%	≤ 2%	≤ 3%	≥ 95%	≤ 0.1%	≤ 0.1%	100%	100%	≥ 95%	≥ 90%	100%	100%
STEL	1.98%	1.90%	98.88%	0.31%	0.86%	0.92%	4.79%	96.66%	NA	0.02%	100.00%	100.00%	0.00%	90.65%	NA	NA
Aircel	1.91%	5.29%	98.76%	0.12%	0.70%	1.42%	4.83%	95.61%	0.00%	0.04%	100.00%	100.00%	100.00%	96.58%	NA	NA
Videocon	1.18%	0.00%	99.00%	0.42%	0.00%	1.02%	0.00%	98.35%	NA	0.00%	NA	NA	100.00%	99.18%	NA	NA
Idea	1.77%	1.92%	97.45%	0.72%	1.94%	1.86%	2.77%	95.31%	0.00%	0.01%	100.00%	100.00%	98.52%	99.15%	100.00%	100.00%
Etisalat	0.85%	1.59%	95.04%	0.13%	0.01%	0.45%	2.65%	98.57%	NA	0.00%	NA	NA	98.81%	99.26%	NA	NA
MTS	0.13%	0.08%	99.00%	0.00%	0.78%	0.99%	2.56%	98.05%	NA	0.01%	100.00%	NA	97.87%	95.25%	NA	NA
Vodafone	0.94%	8.06%	91.47%	2.15%	5.59%	DNP*	15.48%	95.72%	0.08%	0.09%	100.00%	100.00%	100.00%	98.92%	100.00%	100.00%
Airtel	0.05%	0.26%	98.99%	0.40%	0.55%	0.69%	1.93%	99.10%	0.00%	0.00%	100.00%	100.00%	99.81%	98.00%	100.00%	100.00%
Tata Docomo (GSM)	0.01%	0.00%	97.32%	0.15%	0.52%	1.03%	4.55%	97.36%	0.48%	0.30%	100.00%	100.00%	95.71%	97.17%	100.00%	100.00%
Reliance (GSM)	0.79%	2.62%	99.03%	0.00%	0.92%	1.46%	1.19%	96.17%	0.10%	0.10%	100.00%	100.00%	98.93%	92.64%	100.00%	100.00%
Reliance (CDMA)	0.79%	2.62%	99.03%	0.00%	0.92%	1.46%	1.19%	96.17%	0.10%	0.10%	100.00%	100.00%	98.93%	92.64%	100.00%	100.00%
Tata Indicom (CDMA)	0.12%	0.29%	99.93%	0.00%	0.56%	0.61%	1.23%	NA	0.11%	0.27%	100.00%	100.00%	99.34%	98.82%	100.00%	96.16%
Uninor	1.40%	1.40%	98.16%	0.33%	1.03%	1.72%	3.94%	96.65%	NA	0.00%	100.00%	100.00%	99.87%	95.65%	NA	NA
BSNL	0.79%	38.79%	78.45%	0.81%	1.29%	0.81%	4.82%	NA	0.08%	0.14%	100.00%	DNP	100.00%	97.00%	NA	NA

DNP: Data not provide by operator

NA: No postpaid customers

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
STEL						All POI meeting benchmark
Aircel						All POI meeting benchmark
Videocon						All POI meeting benchmark
Idea						All POI meeting benchmark
Etisalat						All POI meeting benchmark
MTS						All POI meeting benchmark
Vodafone						All POI meeting benchmark

Airtel	All POI meeting benchmark
Tata Docomo (GSM)	All POI meeting benchmark
Reliance (GSM)	All POI meeting benchmark
Reliance (CDMA)	All POI meeting benchmark
Tata Indicom (CDMA)	All POI meeting benchmark
Uninor	All POI meeting benchmark
BSNL	All POI meeting benchmark

9.3 Parameter wise performance reports for Cellular Mobile services

1. Network Availability

Audit Results for Network Availability

	Benchmark	STEL	Aircel	Videocoin	Idea	Etisalat	MTS	Vodafone	Airtel	Tata Docomo (GSM)	Reliance (GSM)	Reliance (CDMA)	Uninor	BSNL
Number of BTSs in the licensed service area		1525	3494	12	4646	63	1337	6341	7215	2030	1258	2431	2286	3349
Sum of downtime of BTSs in a month (in hours)		22465	49593	105	61019	401	1337	44515	2918	213	7397	1592	23894	19713
BTSs accumulated downtime (not available for service)	≤ 2%	1.98%	1.91%	1.18%	1.77%	0.85%	0.13%	0.94%	0.05%	0.01%	0.79%	0.09%	1.40%	0.79%
Number of BTSs having accumulated downtime >24 hours		29	185	0	89	1	1.09	511	19	0	33	23	32	1299
Worst affected BTSs due to downtime	≤ 2%	1.90%	5.29%	0.00%	1.92%	1.59%	0.08%	8.06%	0.26%	0.00%	2.62%	0.95%	1.40%	38.79%

Live Measurement Results for Network Availability

	Benchmark	STEL	Aircel	Videocoin	Idea	Etisalat	MTS	Vodafone	Airtel	Tata Docomo (GSM)	Reliance (GSM)	Reliance (CDMA)	Uninor	BSNL
Number of BTSs in the licensed service area		1525	3484	12	4765	63	1345	6341	7129	2030	1262	2473	2250	2143
Sum of downtime of BTSs in a month (in hours)		2166	3331	12.34	1181	62	1393.84	3113	99	13	810	464	2281	5025
BTSs accumulated downtime (not available for service)	≤ 2%	1.97%	1.33%	1.43%	0.34%	1.36%	1.44%	0.68%	0.02%	0.01%	0.89%	0.26%	1.41%	3.26%
Number of BTSs having accumulated downtime >24 hours		0	9	0	0	0	2	0	0	0	0	0	0	52
Worst affected BTSs due to downtime	≤ 2%	0.00%	0.26%	0.00%	0.00%	0.00%	0.15%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	2.43%

2. Connection Establishment (Accessibility)

Audit Results for CSSR, SDCCH and TCH congestion

CSSR	Benchmark	STEL	Aircel	Videocon	Idea	Etisalat	MTS	Vodafone	Airtel	Tata Docomo (GSM)	Reliance (GSM)	Reliance (CDMA)	Uninor	BSNL
CSSR	≥ 95%	98.88%	98.76%	99.00%	97.45%	95.04%	99.00%	91.47%	98.99%	97.32%	99.03%	97.24%	98.16%	78.45%

SDCCH congestion	Benchmark	STEL	Aircel	Videocon	Idea	Etisalat	MTS	Vodafone	Airtel	Tata Docomo (GSM)	Reliance (GSM)	Reliance (CDMA)	Uninor	BSNL
SDCCH/Paging channel congestion	≤ 1%	0.31%	0.12%	0.42%	0.72%	0.13%	0.00%	2.15%	0.40%	0.15%	0.00%	0.96%	0.33%	0.81%

TCH congestion	Benchmark	STEL	Aircel	Videocon	Idea	Etisalat	MTS	Vodafone	Airtel	Tata Docomo (GSM)	Reliance (GSM)	Reliance (CDMA)	Uninor	BSNL
TCH congestion	≤ 2%	0.86%	0.70%	0.00%	1.94%	0.01%	0.78%	5.59%	0.55%	0.52%	0.92%	0.75%	1.03%	1.29%

Live measurement results for CSSR, SDCCH and TCH congestion

CSSR	Benchmark	STEL	Aircel	Videocon	Idea	Etisalat	MTS	Vodafone	Airtel	Tata Docomo (GSM)	Reliance (GSM)	Reliance (CDMA)	Uninor	BSNL
CSSR	≥ 95%	99.52%	98.59%	99.00%	97.85%	95.39%	99.63%	95.33%	96.47%	96.37%	98.74%	97.82%	97.25%	81.13%

SDCCH congestion	Benchmark	STEL	Aircel	Videocon	Idea	Etisalat	MTS	Vodafone	Airtel	Tata Docomo (GSM)	Reliance (GSM)	Reliance (CDMA)	Uninor	BSNL
SDCCH/Paging channel congestion	≤ 1%	0.15%	0.13%	0.09%	0.63%	0.54%	0.00%	0.99%	0.86%	0.11%	0.00%	0.95%	0.33%	0.60%

TCH congestion	Benchmark	STEL	Aircel	Videocon	Idea	Etisalat	MTS	Vodafone	Airtel	Tata Docomo (GSM)	Reliance (GSM)	Reliance (CDMA)	Uninor	BSNL
TCH congestion	≤ 2%	0.78%	0.75%	0.00%	1.79%	0.01%	0.01%	2.81%	0.97%	0.45%	0.79%	0.29%	1.66%	0.68%

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

CSSR	Benchmark	STEL	Aircel	Videocon	Idea	Etisalat	MTS	Vodafone	Airtel	Tata Docomo (GSM)	Reliance (GSM)	Reliance (CDMA)	Uninor	BSNL
Total number of call attempts		210	630	NA	639	NA	630	699	640	669	772	700	632	224
Total number of successful calls established		210	630	NA	639	NA	630	696	640	658	772	699	632	224
CSSR	≥ 95%	100.00%	100.00%	NA	100.00%	NA	100.00%	99.57%	100.00%	98.36%	100.00%	99.86%	100.00%	100.00%

Blocked calls	Benchmark	STEL	Aircel	Videocon	Idea	Etisalat	MTS	Vodafone	Airtel	Tata Docomo (GSM)	Reliance (GSM)	Reliance (CDMA)	Uninor	BSNL
%age blocked calls		0.00%	0.00%	NA	0.00%	NA	0.00%	0.43%	0.00%	1.64%	0.00%	0.14%	0.00%	0.00%

3. Connection Maintenance (Retainability)

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

Call drop rate	Benchmark	STEL	Aircel	Videocon	Idea	Etisalat	MTS	Vodafone	Airtel	Tata Docomo (GSM)	Reliance (GSM)	Reliance (CDMA)	Uninor	BSNL
Total number of calls established		20524157	111727501	7272	167655463	86841	29996005	NA	608555490	515389059	51867503	47028187	83266257	1266200

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

Total number of calls dropped		188636	1583447	74	3113777	389	296961	NA	4226813	5312994	755781	518717	1428939	10193
Call drop rate	≤ 2%	0.92%	1.42%	1.02%	1.86%	0.45%	0.99%	NA	0.69%	1.03%	1.46%	1.10%	1.72%	0.81%

Cells having more than 3% TCH	Benchmark	STEL	Aircel	Videocon	Idea	Etisalat	MTS	Vodafone	Airtel	Tata Docomo (GSM)	Reliance (GSM)	Reliance (CDMA)	Uninor	BSNL
Total number of cells in the network		4572	10287	36	13904	189	4024	18927	21319	6084	3774	7293	6850	2304
Total number of cells having more than 3% TCH		219	497	0	385	5	103	2929	412	277	45	205	270	111
Worst affected cells having more than 3% TCH	≤ 3%	4.79%	4.83%	0.00%	2.77%	2.65%	2.56%	15.48%	1.93%	4.55%	1.19%	2.81%	3.94%	4.82%

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

Call drop rate	Benchmark	STEL	Aircel	Videocon	Idea	Etisalat	MTS	Vodafone	Airtel	Tata Docomo (GSM)	Reliance (GSM)	Reliance (CDMA)	Uninor	BSNL
Total number of calls established		1637423	3859337	23891	15082747	9746	35542512	DNP	24220104	50739290	72235201	56556377	9846474	2383014
Total number of calls dropped		14544	57384	149	255014	53	252352	DNP	460277	460296	588983	309548	159524	9698
Call drop rate	≤ 2%	0.89%	1.49%	0.62%	1.69%	0.54%	0.71%	1.91%	1.90%	0.91%	0.82%	0.55%	1.62%	0.41%

Cells having more than 3% TCH	Benchmark	STEL	Aircel	Videocon	Idea	Etisalat	MTS	Vodafone	Airtel	Tata Docomo (GSM)	Reliance (GSM)	Reliance (CDMA)	Uninor	BSNL
Total number of cells in the network		4572	10300	36	14261	189	4092	19146	21335	6087	3786	7419	6745	DNP
Total number of cells having more than 3% TCH		227	475	0	365	5	83	2939	450	3	59	44	279	DNP
Worst affected cells having more than 3% TCH	≤3%	4.97%	4.61%	0.00%	2.56%	2.65%	2.03%	15.35%	2.11%	0.06%	1.56%	0.59%	4.14%	NA

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

Call drop rate	Benchmark	STEL	Aircel	Videocon	Idea	Etisalat	MTS	Vodafone	Airtel	Tata Docomo (GSM)	Reliance (GSM)	Reliance (CDMA)	Uninor	BSNL
Total number of calls established		210	630	NA	637	NA	630	696	640	663	772	700	632	DNP
Total number of calls dropped		0	0	NA	0	NA	2	0	0	4	0	0	0	DNP
Call drop rate	≤ 2%	0.00%	0.00%	NA	0.00%	NA	0.32%	0.00%	0.00%	0.60%	0.00%	0.00%	0.00%	NA

4. Voice quality

Audit Results for Voice quality

Voice quality	Benchmark	STEL	Aircel	Videocon	Idea	Etisalat	MTS	Vodafone	Airtel	Tata Docomo (GSM)	Reliance (GSM)	Reliance (CDMA)	Uninor	BSNL
Total number of sample calls		1145879897	7341435512	1069406	24157831348	77548603	514	DNP	92120424906	9620663926	160478351	2946267565	1.60293E+11	DNP
Total number of calls with good voice quality		1107580033	7019405797	1051797	23023708107	76442556	504	DNP	91292883985	9366820125	154328821	2894354807	1.54924E+11	DNP
%age	≥ 95%	96.66%	95.61%	98.35%	95.31%	98.57%	98.05%	95.72%	99.10%	97.36%	96.17%	98.24%	96.65%	NA

calls with good voice quality														
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Drive test results for Voice quality (Average of three drive tests)

Voice quality	Benchmark	STEL	Aircel	Videocon	Idea	Etisalat	MTS	Vodafone	Airtel	Tata Docomo (GSM)	Reliance (GSM)	Reliance (CDMA)	Uninor	BSNL
Total number of sample calls		390725	1134475	NA	1037149	NA	28196	1205855	1147724	1166544	121342	40996	1431633	DNP
Total number of calls with good voice quality		383442	1114230	NA	1003824	NA	26520	1175688	1118615	1134333	117897	38206	1393429	DNP
%age calls with good voice quality	≥ 95%	98.14%	98.22%	NA	96.79%	NA	94.06%	97.50%	97.46%	97.24%	97.16%	93.19%	97.33%	NA

5. POI Congestion

Audit Results for POI Congestion

POI congestion	Benchmark	STEL	Aircel	Videocon	Idea	Etisalat	MTS	Vodafone	Airtel	Tata Docomo (GSM)	Reliance (GSM)	Reliance (CDMA)	Uninor	BSNL
Total number of working POIs		68	132	18	83	26	50	51	48	29	30	22	56	128
No. of POIs not meeting benchmark		1	0	0	0	0	0	0	0	0	0	0	10	1
Total Capacity of all POIs (A) - in erlangs		18479	63741	19	150765	1124.85	24403	141061	477418	29789	1328467	850397	40519	64000
Traffic served for all POIs (B) - in erlangs		9146	32026.94	2.42	77440	34.03	12320	84048	307925	16061	603808	425222	20757	48474
POI congestion	≤ 0.5%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Live measurement results for POI congestion

6. Inter Operator Call Assessment

Place of Calling: Operator office in Patna for all operators

BSNL Jharkhand: Operators office in Jharkhand

Inter operator call Assessment To↓ From→	STEL	Aircel	Videocon	Idea	Etisalat	MTS	Vodafone	Airtel	Tata Docomo (GSM)	Reliance (GSM)	Reliance (CDMA)	Uninor	BSNL
Date	23/11/11	14/11/11	21/11/11	15/11/11	7/12/11	1/12/11	2/12/11	16/11/11	6/12/11	7/12/11	12/12/11	18/11/11	25/11/11
STEL	NA	100%	98%	100%	100%	100%	100%	98%	100%	100%	100%	100%	100%
Aircel	100%	NA	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Videocon	100%	100%	NA	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Idea	100%	100%	100%	NA	100%	100%	100%	100%	100%	100%	100%	100%	100%
Etisalat	100%	100%	100%	100%	NA	100%	100%	100%	100%	100%	100%	100%	100%
MTS	100%	100%	100%	100%	100%	NA	100%	100%	100%	100%	100%	100%	100%
Vodafone	100%	100%	100%	100%	100%	100%	NA	100%	100%	100%	100%	100%	100%
Airtel	100%	100%	100%	100%	100%	100%	99%	NA	100%	100%	100%	100%	100%
Tata Docomo (GSM)	100%	100%	100%	100%	100%	100%	100%	100%	NA	100%	100%	99%	100%
Reliance (GSM)	100%	100%	100%	100%	100%	100%	100%	100%	100%	NA	NA	100%	100%
Reliance (CDMA)	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Tata Indicom (CDMA)	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Uninor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	NA	100%
BSNL	100%	100%	98%	100%	100%	100%	100%	100%	100%	100%	100%	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	STEL	Aircel	Videocon	Idea	Etisalat	MTS	Vodafone	Airtel	Tata Docomo (GSM)	Reliance (GSM)	Reliance (CDMA)	Uninor	BSNL
Billing disputes - Postpaid														
Total bills generated during the period		NA	2310	NA	7100	NA	NA	8774	26389	6008	65985	8362	NA	26547
Total number of bills disputed		NA	0	NA	0	NA	NA	7	0	29	65	8	NA	20
Percentage bills disputed	≤ 0.1%	NA	0.00%	NA	0.00%	NA	NA	0.08%	0.00%	0.48%	0.10%	0.10%	NA	0.08%
Billing disputes - Prepaid														
Number of complaints related to charging, credit & validity		363	1775	0	768	0	209	4831	2	7112	3491	5636	53	7974
Total number of prepaid customers in that period		1968524	4984982	20437	5204065	35827	1394956	5479478	20554975	2392033	3491871	5636483	3848452	5765521
Percentage of complaints	≤ 0.1%	0.02%	0.04%	0.00%	0.01%	0.00%	0.01%	0.09%	0.00%	0.30%	0.10%	0.10%	0.00%	0.14%
Resolution of billing complaints														
Total number of billing/charging complaints		363	1775	NA	768	NA	247	2492	2283	7141	3556	5644	53	7674
Total complaints considered invalid		130	984	NA	669	NA	19	697	2281	7132	55	0	0	
Number of complaints resolved in 4 weeks from date of receipt for complaints listed in 5.3.1		363	1775	NA	768	NA	209	2492	2283	7141	3556	5644	53	7674
Percentage complaints resolved within 4 weeks of date of receipt	100%	100%	100%	NA	100%	NA	100%	100%	100%	100%	100%	100%	100%	100%
Period of applying credit / waiver														
Total number of complaints where credit/waiver is required		233	791	0	1	NA	0	965	200%	9	3501	5644	53	DNP
Percentage cases in which credit/waiver was received within 1 week	100%	100%	100%	NA	100%	NA	NA	100%	100%	100%	100%	100%	100%	DNP

Live calling results for resolution of billing complaints

Resolution of billing complaints	Benchmark	STEL	Aircel	Videocon	Idea	Etisalat	MTS	Vodafone	Airtel	Tata Docomo (GSM)	Reliance (GSM)	Reliance (CDMA)	Uninor	BSNL
Total Number of calls made		100	100	NA	100	NA	100	100	100	100	100	100	100	100
Number of cases resolved in 4 weeks		94	93	NA	70	NA	64	95	77	80	89	89	88	83
Percentage cases resolved in four weeks	100%	94%	93%	NA	70%	NA	64%	95%	77%	80%	89%	89%	88%	83%

8. Customer Care

Audit results for customer care

Customer Care Assessment	Benchmark	STEL	Aircel	Videocon	Idea	Etisalat	MTS	Vodafone	Airtel	Tata Docomo (GSM)	Reliance (GSM)	Reliance (CDMA)	Uninor	BSNL
Total number of call attempts to customer care for assistance		1319737	4039951	1118	708388	2848	461216	9046783	2855777	4984256	1020137	3156987	1244302	1432406
Number of calls getting connected and answered (electronically)		1319737	4039951	1118	697937	2814	451406	9046783	2850492	4770464	1009219	3125005	1242715	1432406
Percentage calls getting connected and answered	≥ 95%	100.00	100.00%	100.00%	98.52%	98.81%	97.87%	100.00%	99.81%	95.71%	98.93%	98.99%	99.87%	100.00%
Number of calls getting transferred to the operator (voice to voice)		290111	1385806	487	2484547	1489	461216	81929	5269930	1199102	466223	2138145	5837279	DNA
Number of calls answered by operator (voice to voice) within 60 seconds		262996	1338394	483	2463484	1478	439297	81042	5176111	1165181	431916	1965241	5583627	DNA
Percentage calls answered within 60 seconds (V2V)	≥ 90%	90.65%	96.58%	99.18%	99.15%	99.26%	95.25%	98.92%	98.00%	97.17%	92.64%	91.91%	95.65%	97.00%

Live calling results for customer care

Customer Care Assessment	Benchmark	STEL	Aircel	Videocon	Idea	Etisalat	MTS	Vodafone	Airtel	Tata Docomo (GSM)	Reliance (GSM)	Reliance (CDMA)	Uninor	BSNL
Total Number of calls made		100	100	100	100	NA	100	100	100	100	100	100	100	100
Total Number of calls getting connected and answered		100	100	100	100	NA	100	100	100	100	100	100	100	100
Percentage calls getting connected and answered	≥ 95%	100.00%	100.00%	100.00%	100.00%	NA	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	STEL	Aircel	Videocon	Idea	Etisalat	MTS	Vodafone	Airtel	Tata Docomo (GSM)	Reliance (GSM)	Reliance (CDMA)	Uninor	BSNL
Total Number of calls made		100	100	100	100	NA	100	100	100	100	100	100	100	100
Total Number of calls answered within 60 seconds		100	94	100	98	NA	86	100	100	2	94	94	100	90
Percentage calls answered within 60 seconds	≥ 90%	100.00%	94.00%	100.00%	98.00%	NA	86.00%	100.00%	100.00%	2.00%	94.00%	94.00%	100.00%	90.00%

Following are the details of the numbers at which the calls were made

Name of operator	Customer Care number
Aircel	121
Idea	12345
Airtel	121
Uninor	121
Videocon	121
S tel	1212
BSNL BIHAR	121
BSNL Ranchi	121
MTS	155
Vodafone	121

Tata indicom	121
Tata docomo	121
Etisalat	Not commercially launched
Reliance GSM	*333
Reliance CDMA	*333

9. Termination / closure of service

Audit results for termination / closure of service

Termination	Benchmark	STEL	Aircel	Videocon	Idea	Etisalat	MTS	Vodafone	Airtel	Tata Docomo (GSM)	Reliance (GSM)	Reliance (CDMA)	Uninor	BSNL
Total number of closure request		NA	8	0	79	NA	NA	207	108	84	226	28	NA	DNP
Number of requests attended within 7 days		NA	8	0	79	NA	NA	207	108	84	226	28	NA	DNP
Percentage cases in which termination done within 7 days	100%	NA	NA	NA	100.00%	NA	NA	100.00%	100.00%	100.00%	100.00%	100.00%	NA	NA

Audit results for refund of deposits

Refund	Benchmark	STEL	Aircel	Videocon	Idea	Etisalat	MTS	Vodafone	Airtel	Tata Docomo (GSM)	Reliance (GSM)	Reliance (CDMA)	Uninor	BSNL
Total number of cases requiring refund of deposits		NA	0	0	12	NA	NA	25	9	20	337	73	NA	DNP
Total number of cases where refund was made within 60 days		NA	0	0	12	NA	NA	25	9	20	337	73	NA	DNP
Percentage cases in which refund was receive within 60 days	100%	NA	NA	NA	100.00%	NA	NA	100.00%	100.00%	100.00%	100.00%	100.00%	NA	NA

Additional Network Related parameters

Audit Results for Total Traffic Handled in Erlang														
Traffic in Erlang		STEL	Aircel	Videocon	Idea	Etisalat	MTS	Vodafone	Airtel	Tata Docomo (GSM)	Reliance (GSM)	Reliance (CDMA)	Uninor	BSNL
Equipped capacity of the network		37435	200419	10000	129956	1398.791	60711	198542	607510	94363	262000	148000	87206	242600
Total traffic handled in erlang during TCBH		8913	44029	0.57	101962	51.86	16849.65	155158	384448	28330	76668	103220	68690	169232

Total number of customers as per VLR														
		STEL	Aircel	Videocon	Idea	Etisalat	MTS	Vodafone	Airtel	Tata Docomo (GSM)	Reliance (GSM)	Reliance (CDMA)	Uninor	BSNL
Total no. of customers served (as per VLR)		460694	2124343	1690	4728030	3870	524080	5316100	15184500	1296249	3948867	3948867	1536676	989498

L1 services calling

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

- 108
- 101
- 102

Live calling for Level 1 services	Benchmark	STEL	Aircel	Videocoin	Idea	Etisalat	MTS	Vodafone	Airtel	Tata Docomo (GSM)	Reliance (GSM)	Reliance (CDMA)	Uninor	BSNL
Total no. of calls made		150	150	NA	150	NA	150	150	150	150	150	150	150	150
Calls answered in 60 sec		150	142	NA	140	NA	61	150	54	147	128	128	70	150
Percentage of calls answered in 60 seconds	100%	100.00%	94.67%	NA	93.33%	NA	NA	NA	NA	98.00%	85.33%	85.33%	NA	100.00%
