

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

Report: April – May - June, 2012



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Preface

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

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

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

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1.0 Background

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

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

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



***This report
highlights the Audit
Module findings for
North East circle for
Cellular Mobile
services***

2.0 Objectives and Methodology

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



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

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

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

4.0 Audit methodology

4.1 Cellular Mobile Services

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

S.no	Parameter	AS REPORTED IN PMR	AS FOUND IN ACTUAL RECORDS AFTER VERIFICATION	AS FOUND IN VERIFICATION FOR THE MONTH OF AUDIT	AS FOUND IN 3 DAY LIVE MEASUREMENT DATA	LIVE CALLING	OPERATOR 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 2012 to June 2012 in North East circle. The executive summary encapsulates the key findings of the Audit

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

Name of Service Provider	Time Consistent Busy Hour (TCBH)	Network Availability					Connection Establishment (Accessibility)			Connection Maintenance (Retainability)				POI		Network Traffic Capacity and Utilization			
		Total no. of BTSs in the licensed service area	Sum of downtime of BTSs in a month in hours i.e. total outage time of all BTSs in hours during a month	BTSs Accumulated downtime (not available for service) (%age)	No. of BTSs having accumulated downtime of >24 hours in a month	Worst affected BTSs due to downtime (%age)	Call Set-up Success Rate (within licensee's own network)	SDCCH/Paging Chl. Congestion (%age)	TCH Congestion (%age)	Call Drop Rate (%age)	Total No. of cells exceeding 3% TCH drop (call drop)	Total no. of cells in the network	Worst affected cells having more than 3% TCH drop (call drop) rate (%age)	%age of connection with good voice quality	POI Congestion (No. of POIs not meeting the benchmark) Note :2)	Total number of working POI Service Area wise	Equipped Capacity of Network in respect of Traffic in erlang	Total traffic handled in TCBH in erlang	Total no. of customers served (as per VLR) on last day of the month
Benchmark				≤ 2%		≤ 2%	≥ 95%	≤ 1%	≤ 2%	≤ 2%			≤ 3%	≥ 95%	≤ 0.5%				
Idea	20:00 to 21:00 hrs	467	3423	0.99%	9	1.93%	95.50%	0.84%	1.78%	1.48%	38	1401	2.71%	95.21%	0	25	13284	5729	184387
BSNL	14:00 to 15:00 hrs	727	46945	8.68%	89	12.24%	96.47%	0.76%	1.86%	1.98%	102	2148	4.75%	95.50%	3	57	36000	27761	162230
Reliance GSM	19:00 to 20:00 hrs	651	2326	0.48%	6	0.92%	98.85%	0.02%	0.31%	0.38%	2	1953	0.10%	98.77%	0	14	40000	21186	600183
MTS	19:00 to 20:00 hrs	63	793	1.69%	0	0.00%	98.04%	0.00%	0.00%	0.41%	4	189	2.12%	100.00%	0	14	4200	1	264
Airtel	19:00 to 20:00 hrs	1496	4080	0.37%	11	0.74%	98.69%	0.28%	0.67%	1.04%	62	4442	1.40%	98.90%	0	55	80989	68906	2236059
Uninor	20:00 to 21:00 hrs	100	558	0.75%	1	1.00%	100.00%	0.10%	0.00%	1.11%	7	296	2.36%	98.65%	0	22	1580	1	38
Vodafone	20:00 to 21:00 hrs	1140	9348	1.10%	18	1.58%	97.37%	0.57%	1.45%	0.94%	104	3511	2.96%	97.13%	0	29	26607	22835	795303
Tata Tele - CDMA	20:00 to 21:00 hrs	189	411	0.29%	0	0.00%	99.25%	0.00%	0.30%	0.27%	3	603	0.50%	99.88%	0	28	42394	7156	55071
Aircel	20:00 to 21:00 hrs	1582	6262	0.53%	31	1.96%	97.78%	0.79%	1.26%	1.64%	217	4675	4.64%	95.30%	0	111	113962	50331	1673257

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

** Methodology not in line with QoS

■ Figures provided on All India basis
 ■ Not meeting the benchmark

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

Critical findings: Cellular Mobile Services

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

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

Busy Hour of Various Service Providers

Service Provider	Reported Time Consistent Busy Hour	Network Busy Hour found in 3 day live measurement
Idea	20:00 to 21:00 hrs	20:00 to 21:00 hrs
BSNL	14:00 to 15:00 hrs	14:00 to 15:00 hrs
Reliance GSM	19:00 to 20:00 hrs	19:00 to 20:00 hrs
MTS	19:00 to 20:00 hrs	19:00 to 20:00 hrs
Airtel	19:00 to 20:00 hrs	19:00 to 20:00 hrs
Uninor	20:00 to 21:00 hrs	20:00 to 21:00 hrs
Vodafone	20:00 to 21:00 hrs	20:00 to 21:00 hrs
Tata Tele - CDMA	20:00 to 21:00 hrs	20:00 to 21:00 hrs
Aircel	20:00 to 21:00 hrs	20:00 to 21:00 hrs

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

BTSS Accumulated Downtime:

In the North East circle, all the operators met the benchmark except. BSNL with Worst affected BTSS due to downtime being 12.24%.

Call Set-up Success Rate (CSSR):

All the operators were comfortably meeting the benchmark on this parameter. During the audits the maximum CSSR was observed for Uninor with 100% of their calls getting completed. All the operators were found to be calculating the parameter as per the norm specified by TRAI. CSSR was established as the ratio of total number of successful call attempts (establishment) to the total number of call attempts made.

Network Congestion parameters:

SDCCH / Paging Channel Congestion, TCH and POI are part of the network congestion parameters. All the operators met the TRAI specified benchmarks on the congestion parameters. 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 3 POIs for BSNL GSM.

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 CDMA at 0.27% and highest was for BSNL at 1.98%.

Connections with good voice quality:

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

Customer Care / Helpline Assessment

For the accessibility of customer care aspect all the service providers meet the TRAI benchmark. However, for Voice to Voice parameters a majority of operators were not meeting the benchmark with BSNL falling way short with only 71.57% of calls answered within 60 seconds

Billing performance

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

Inter operator calls assessment

Inter operator call Assessment To ↓ From →	Idea	BSNL	Reliance GSM	MTS	Airtel	Uninor	Vodafone	Tata Tele - CDMA	Aircel
Idea	NA	93%	93%	98%	96%	97%	97%	100%	100%
BSNL	99%	NA	89%	96%	93%	95%	95%	99%	100%
Reliance GSM	99%	85%	NA	95%	93%	96%	93%	98%	100%
MTS	100%	91%	91%	NA	95%	98%	93%	97%	100%
Airtel	96%	91%	98%	100%	NA	99%	95%	100%	94%
Uninor	90%	95%	92%	93%	93%	NA	95%	95%	100%
Vodafone	97%	93%	90%	96%	95%	96%	NA	98%	100%
Tata Tele - CDMA	100%	95%	93%	97%	95%	97%	97%	NA	99%
Aircel	95%	91%	93%	99%	95%	98%	98%	99%	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. RCOM GSM had difficulty in connecting to a BSNL number with 89% of their calls getting completed and vice-versa BSNL faced difficulty in connecting to RCOM GSM with only 85% of calls getting connected.

Details of inter-operator calling are as followed:

Operator	Date	Location
Idea	16 th May, 2012	Guwahati
BSNL	18 th May, 2012	Guwahati
Reliance GSM	21 st May, 2012	Guwahati
MTS	24 th May, 2012	Guwahati
Airtel	25 th May, 2012	Guwahati
Uninor	28 th May, 2012	Guwahati
Vodafone	29 th May, 2012	Guwahati
Tata Indicom (CDMA)	30 th May, 2012	Guwahati
Aircel	31 st May, 2012	Guwahati

Results of Operator assisted Drive test

The drive test was conducted simultaneously for all the operators present in the North East circle. There was in total of three drive tests conducted in the circle. These tests were conducted in the cities of Aizwal, Bishnupur, & Tura. 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 for North East telecom circles were covered.

For measuring voice quality RxQual samples for GSM operators and Frame Error Rate (FERs) for CDMA service providers were measured. RxQual greater than 5 meant that the sample was not of appropriate voice quality and for CDMA operators FERs of more than 4 were considered bad. Call drops were measured by the number of calls that were dropped to the total number of calls established during the drive test. Similarly CSSR was measured as the ratio of total calls established to the total call attempts made. Signal strength was measured in Dbm with strength > -75dbm for indoor, -85 dms for in-vehicle and > -95 dbm outdoor routes.

The drive tests in the North East circle were conducted in the cities of Aizwal, Bishnupur, & Tura was conducted along the following route:

	Type of location	AIZAWL	BISHNUPUR	Tura
Outdoor	Periphery of the city	Thampui, Bawnkwang, Aizwal North High school, Swalihar High School, South Bawnkwang Pastor Qtr, Ramhlun North, Ramhlun south, Anganwadi Worker Training Centre, Govt Republic H.S. School, Electri Veng, Mizoram Cotton Mill, K.C Iron Factory, New Market, Saron Veng, College Veng, Republic Veng, Govt T Ramana College, Khatla, peter Street, Iron Road, dist Civil Supply office, Assam Rifle Head Qtre DRDA Office Aizwal, Mizoram Finance Commission.	Lumsunguan :Youth Centre, Indipendent Church, S.P. Office, Bishnupur Ward No.4, Navodaya Vidyalaya, Major L.Singh Mamorial Play Ground, Loikwipat Lake, DC Office, Vehesun Yuva Kendra, Ecological Park, SBL	.Dist Post Off, Arai Mile, Morning Secondary School, Deputy Director Tourism, Root Land School, Meahla Grey Health Centre, New Tura, Joint Comissioner Excise, JN Road, Civil Hospital, Dermile, St. Anthony School, Dist Medical & Health Office, Tura Scince Centre, LBS LP School, Bengali Girls LP School, DC Office, Tresury Office, Tura Police Reserve Baptist Church, Meghaloya Rural Bank, TD Rd, Satsang Bihar, Meghaloya Godiya Moth, West South Bus Tewrminus.
	Congested area	Millanium Comlex, Zarkhwat, Directorate of School, Govt. Mizo Higher Secondary School, Director or Art and Culture, Chanmari YMA Hall, Hirangbenu College, Chanmari Presbyterian Church, National Instutue of Technology, Chatlang, Bawnkwang, Ramhlun, Industry Peng, PWD Peng, Zorni Baptist Church, Lower Zarkhwat, Bora bazar, Zion Street, Dawrpul, Governor House, Assembly House, City Park, BSNL office, Chief Forest Conservator	State Bank of India, District Hospital, Ward No.4, Silchor Road, Public School, Chasunbari College, Student Union Office, Post Office, Modern School, Ward No.2	Police Club, Police Station, Fire Brigade, Super Market, HDFC Bank, Hawakhana, Garo Hills Motor Worker Union, Dist. Agriculture Office, New Circute House, Tetenkol, Supdt. Of Taxes,Maternity & Child Hospital, Council of Nocmus, Ringrey, Divisional Officer Soil Conservation, Upper Chandmari LP School, Chirstian Girls LP School, SBI Chandmari, Sacred Heart Church, Bakdil.
	Across the city	Prasar Bharati (Akashbani), BSNL office, Treasury office, Good & Civil Supply Consumer Affaire Dept. Vantlang, Assam Rifle Office, Children Guide H.S. School, JCOs Club, Civil Hospital, Zarkhwat, Chanmari, Chatlang Road, Dist Sericulture office, Joint Director Transport, Mizoram Handloom Development Dept.	District Hospital Gate, Bishnupur Bazar, Bishupur High School, Bishnupur Public School, Police Station, Superintendent of Police Office, Bishupur Higher Secondary School, Fire Brigade Office.	Chandmari, Chandmari Beat House, Tura Christian Hospital, Tura Book Room, Christian Girls LP school, Ringrey, District Library, District Medical & Health Office, Babupara, Exicutive Eng PWD, BSNL Office, DC Park, Head Post Office, SP Office, SDO Tura, Meghaloya Co-Op Apex Bank, Council Building, Tura Bazar, BJP Office,

		Bawnkwang Traffic Point, Bawnkwang Lunglei Road, Thuampui		Mount Sinai Secondary School, Dist Agriculture Office, Tetenkol, Tura Civil Hospital, Araimile, College of Information Technology, 120 BN CRPF Head Qtr.
Indoor	Office complex	DRDA office		COUNCIL SHOPPING COMPLEX
	Shopping complex	Aizwal Bus Stand Market		CIVIL HOSPITAL TURA

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

Drive Test – Aizwal


	B'mark	Idea		BSNL		Reliance GSM		Airtel		Vodafone		Tata CDMA		Aircel	
		In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor
Voice quality	≥ 95%	99.52%	96.56%	85.98%	86.37%	100.00%	95.71%	98.93%	95.71%	99.19%	95.31%	99.96%	98.11%	98.62%	97.47%
CSSR	≥ 95%	100.00%	100.00%	100.00%	84.67%	100.00%	98.94%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	99.35%
%age Blocked calls		0.00%	0.00%	0.00%	15.33%	0.00%	1.06%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.65%
Call drop rate	≤ 2%	0.00%	0.60%	0.00%	4.72%	0.00%	0.72%	0.00%	0.00%	0.00%	0.00%	0.90%	0.90%	0.00%	0.65%
Hands off success rate		0.00%	97.62%	96.50%	95.04%	99.15%	96.80%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	98.10%

Drive Test – Bishnupur

	B'mark	Idea		BSNL		Reliance GSM		MTS		Airtel		Uninor		Vodafone		Tata CDMA		Aircel	
		In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor
Voice quality	≥ 95%	98.54%	97.19%	53.62%	49.12%	98.28%	97.44%	99.12%	98.59%	97.07%	95.57%	85.88%	95.16%	98.88%	98.29%	99.78%	99.44%	97.42%	95.16%
CSSR	≥ 95%	100.00%	99.39%	94.92%	80.00%	100.00%	99.58%	100.00%	100.00%	100.00%	100.00%	100.00%	97.35%	100.00%	100.00%	100.00%	100.00%	98.67%	99.38%
%age Blocked calls		0.00%	0.61%	5.08%	20.00%	0.00%	0.42%	0.00%	0.00%	0.00%	0.00%	0.00%	2.65%	0.00%	0.00%	0.00%	0.00%	1.33%	0.62%
Call drop rate	≤ 2%	0.00%	0.00%	0.00%	2.63%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	2.72%	0.00%	0.00%	0.00%	0.00%	1.35%	0.63%
Hands off success rate		100.00%	100.00%	100.00%	100.00%	100.00%	98.84%	100.00%	99.56%	100.00%	100.00%	100.00%	99.13%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%

Drive Test – Tura

	B'mark	Idea		BSNL		Reliance GSM		MTS		Airtel		Vodafone		Tata CDMA		Aircel	
		In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor	In door	Outdoor
Voice quality	≥ 95%	98.69%	95.47%	49.14%	60.87%	98.43%	97.52%	98.24%	98.19%	95.46%	95.83%	99.15%	97.93%	99.88%	98.81%	98.67%	95.80%
CSSR	≥ 95%	100.00%	99.35%	100.00%	74.36%	100.00%	76.08%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	99.38%
%age Blocked calls		0.00%	0.65%	0.00%	25.64%	0.00%	23.92%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.62%
Call drop rate	≤ 2%	0.00%	0.00%	0.00%	3.45%	0.00%	0.48%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.63%
Hands off success rate		0.00%	100.00%	100.00%	99.51%	100.00%	98.65%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	96.77%

 Not meeting the benchmark

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

ALL SERVICE PROVIDERS

Bishnupur: There was interference and low signal strength recorded in areas including Independent Church, Loikwipat Lake, Modern School

Aizwal: Sericulture Office, and DRDA Office Aizwal were locations where inadequate coverage was recorded

Tura: Arai Mile and Mount Sinai Secondary School experienced inadequate coverage in drive test


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.

1. BSNL does not meet the TRAI benchmark on various parameters such as Voice Quality, CSSR, and Call Drop rate in Aizwal, Bishnupur, and Tura

Summary of Live Measurement Results – Cellular Mobile Services

Name of Service Provider	Network Availability		Connection Establishment (Accessibility)			Connection Maintenance (Retainability)		
	BTSs Accumulated downtime (not available for service)	Worst affected BTSs due to downtime	Call Set-up Success Rate (within licensee's own network)	SDCCH/ Paging Chl. Congestion (%age)	TCH Congestion (%age)	Call Drop Rate (%age)	Worst affected cells having more than 3% TCH drop	%age of connection with good voice quality
Benchmark	≤ 2%	≤ 2%	≥ 95%	≤ 1%	≤ 2%	≤ 2%	≤ 3%	≥ 95%
Idea	1.81%	1.27%	98.25%	0.46%	0.87%	1.21%	0.35%	95.29%
BSNL	0.70%	1.83%	96.63%	0.94%	1.97%	1.98%	4.00%	98.00%
Reliance GSM	0.42%	0.00%	98.98%	0.01%	0.23%	0.59%	0.00%	98.42%
MTS	1.25%	0.00%	100.00%	0.00%	0.00%	0.00%	0.00%	100.00%
Airtel	1.74%	0.13%	98.23%	0.36%	0.70%	0.58%	1.96%	95.67%
Uninor	0.82%	0.00%	99.93%	0.18%	0.09%	2.22%	0.00%	NA
Vodafone	1.52%	0.00%	97.61%	0.05%	0.26%	0.96%	2.73%	97.04%
Tata Tele - CDMA	0.03%	0.00%	99.00%	0.00%	0.00%	0.20%	0.12%	99.88%
Aircel	1.29%	0.00%	97.52%	0.89%	1.42%	1.50%	4.83%	95.21%

 Not meeting the benchmark

* Based on operator assisted drive tests conducted by IMRB

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

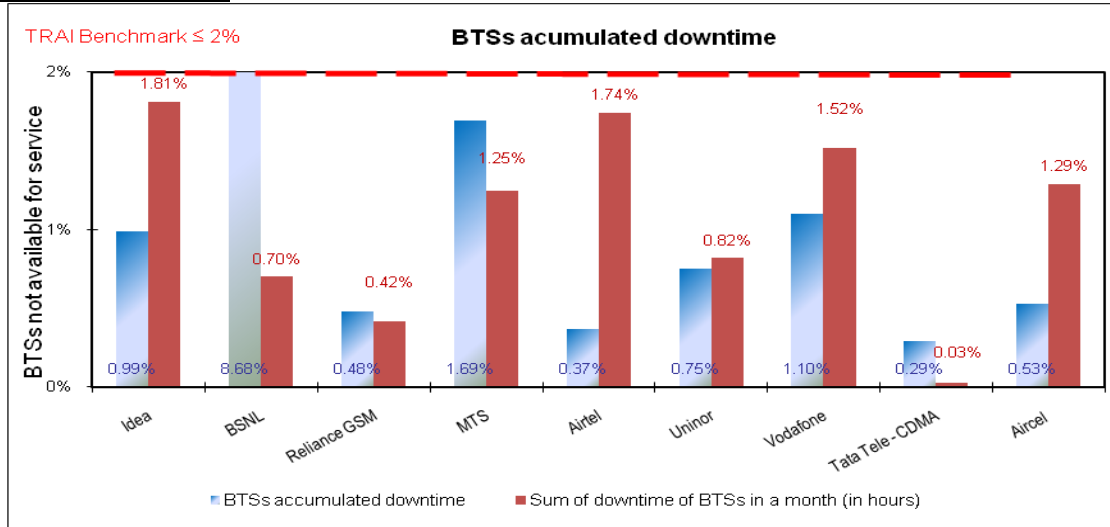
Summary of Live Calling Results – Cellular Mobile Services

Name of Service Provider	Metering and Billing	Response time to customer for assistance	
	%age complaints resolved within 4 weeks	Accessibility of call centre/ customer care	Percentage of calls answered by the operators (voice to voice) within 60 seconds
Benchmark	100%	≥ 95%	≥ 90%
Idea	93.75%	100.00%	88.00%
BSNL	79.50%	100.00%	88.50%
Reliance GSM	84.00%	92.00%	98.00%
MTS	NA	100.00%	100.00%
Airtel	91.00%	100.00%	97.00%
Uninor	NA	100.00%	98.00%
Vodafone	79.00%	100.00%	95.00%
Tata Tele - CDMA	100.00%	100.00%	91.00%
Aircel	94.00%	100.00%	97.00%

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

6.1 Graphical/Tabular Representations for Cellular Mobile Services

BTSs Accumulated Downtime



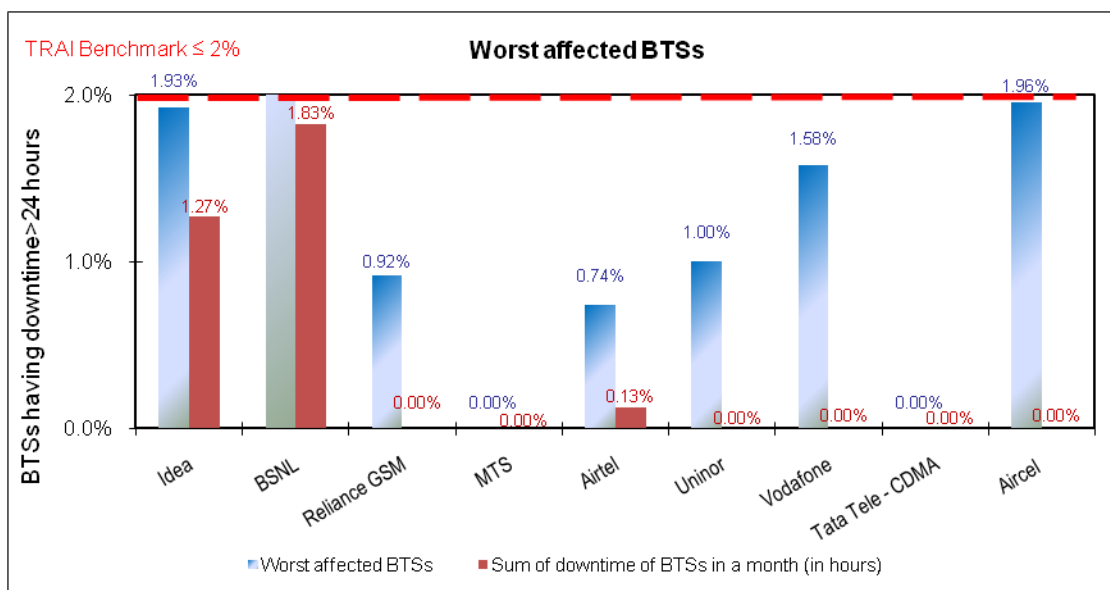
One month

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

Live measurement

All the operators meet the benchmark

Worst Affected BTSs



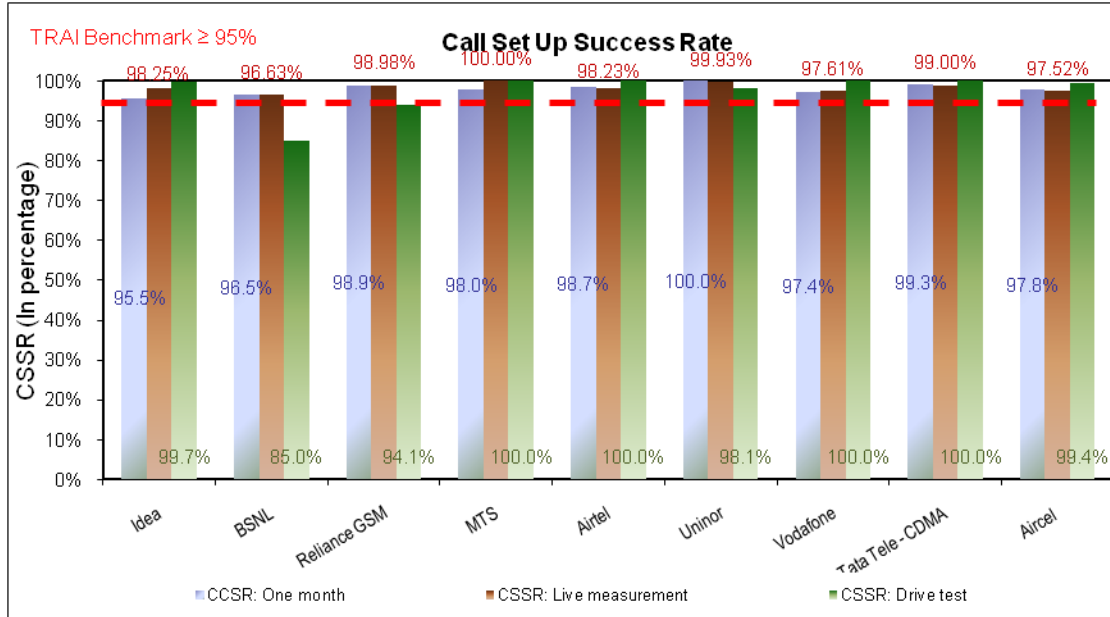
One month

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

Live measurement

All the operators meet the benchmark

Call Set-up Success Rate (CSSR)



One month

All the operators meet the benchmark

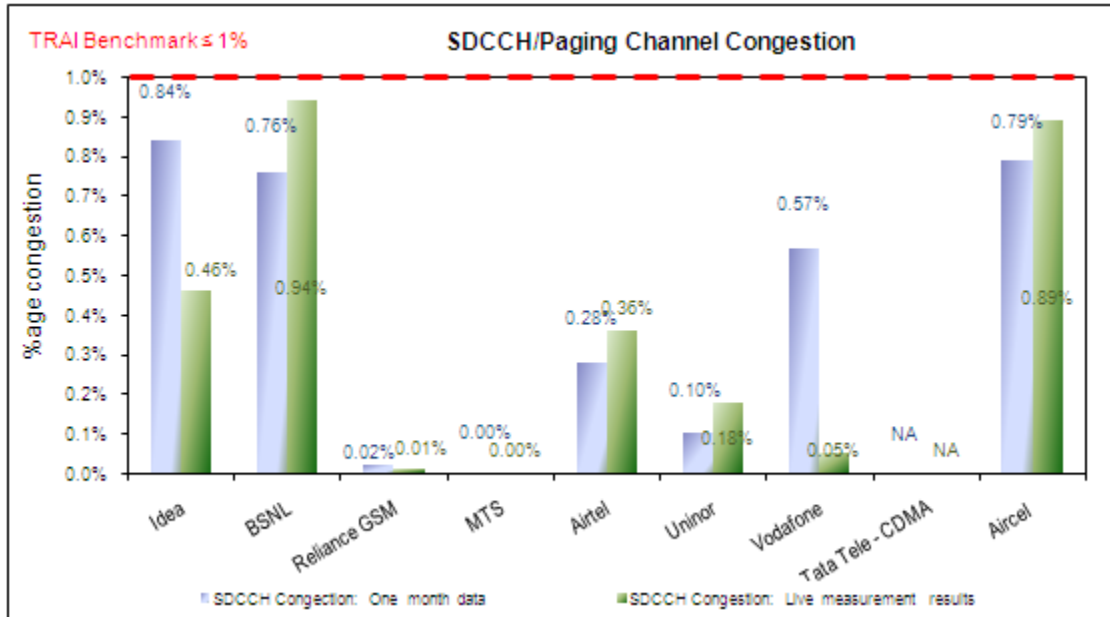
Live measurement

All the operators meet the benchmark

Drive test

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

SDCCH / Paging Channel Congestion



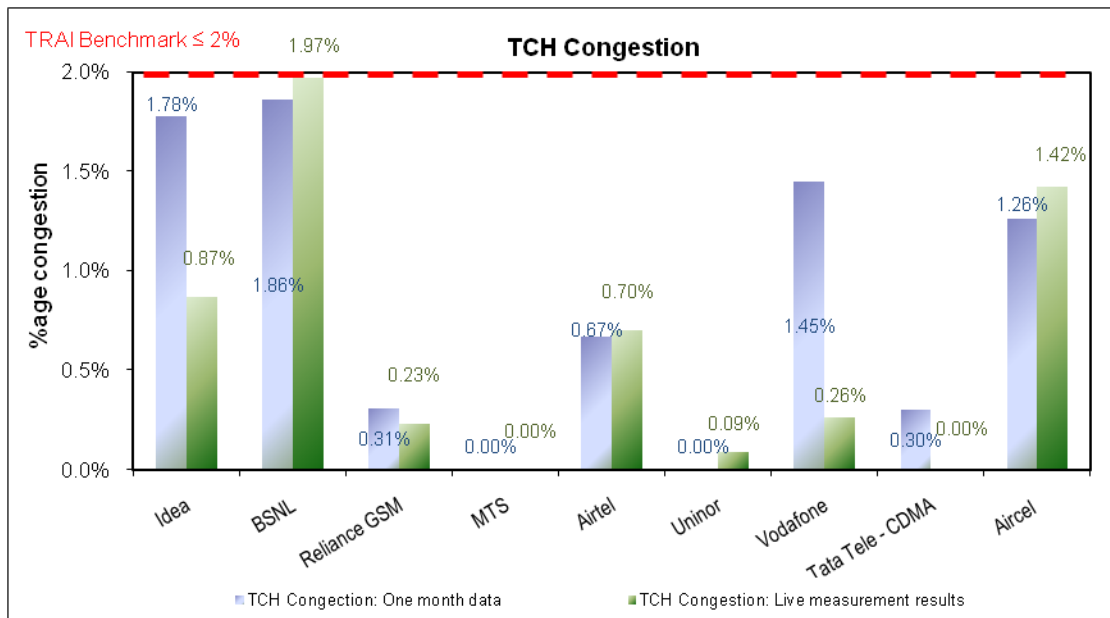
One month

All the operators meet the benchmark

Live measurement

All the operators meet the benchmark

TCH Congestion



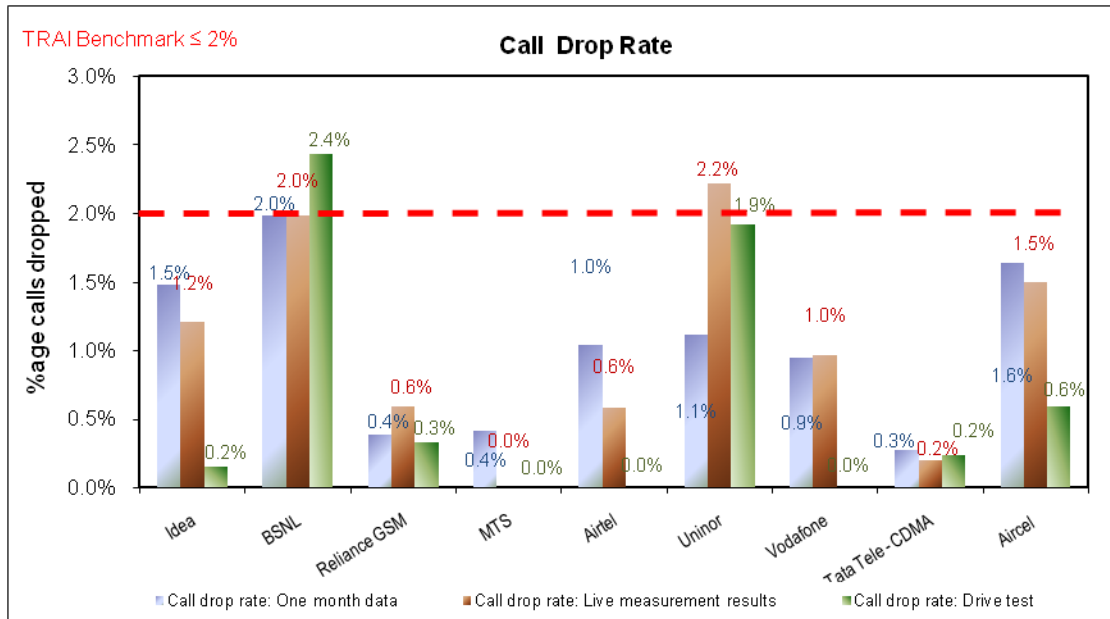
One month

All the operators meet the benchmark

Live measurement

All the operators meet the benchmark

Call Drop Rate



One month

All the operators meet the benchmark

Live measurement

Operator(s) meeting benchmark: Idea, BSNL, Reliance GSM, MTS, Airtel, Vodafone, Tata Tele - CDMA, Aircel

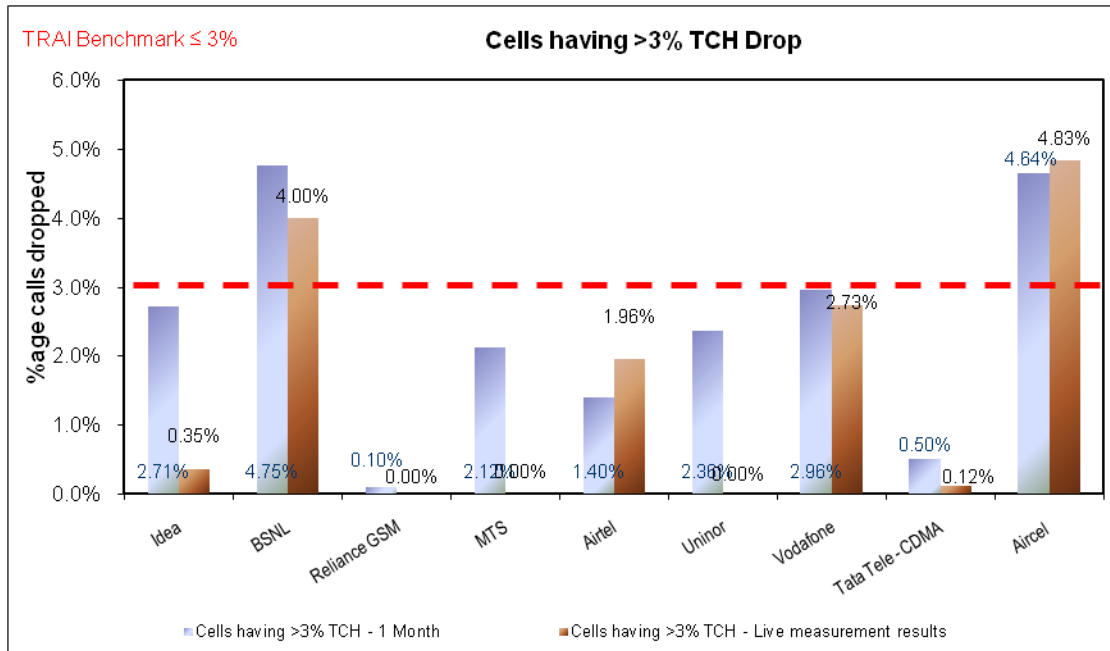
Operator(s) not meeting the benchmark: Uninor

Drive test

Operator(s) meeting benchmark: Idea, Reliance GSM, MTS, Airtel, Uninor, Vodafone, Tata Tele - CDMA, Aircel

Operator(s) not meeting the benchmark: BSNL

Cells with more than 3% TCH Drop Rate



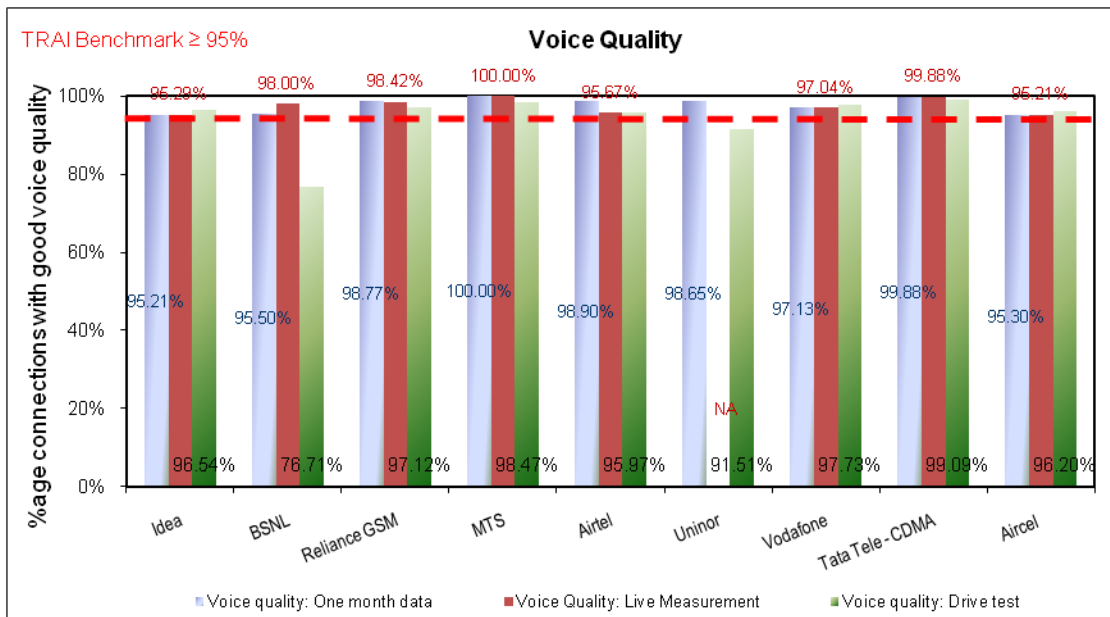
One month

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

Live measurement

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

Voice quality



One month

All the operators meet the benchmark

Live measurement

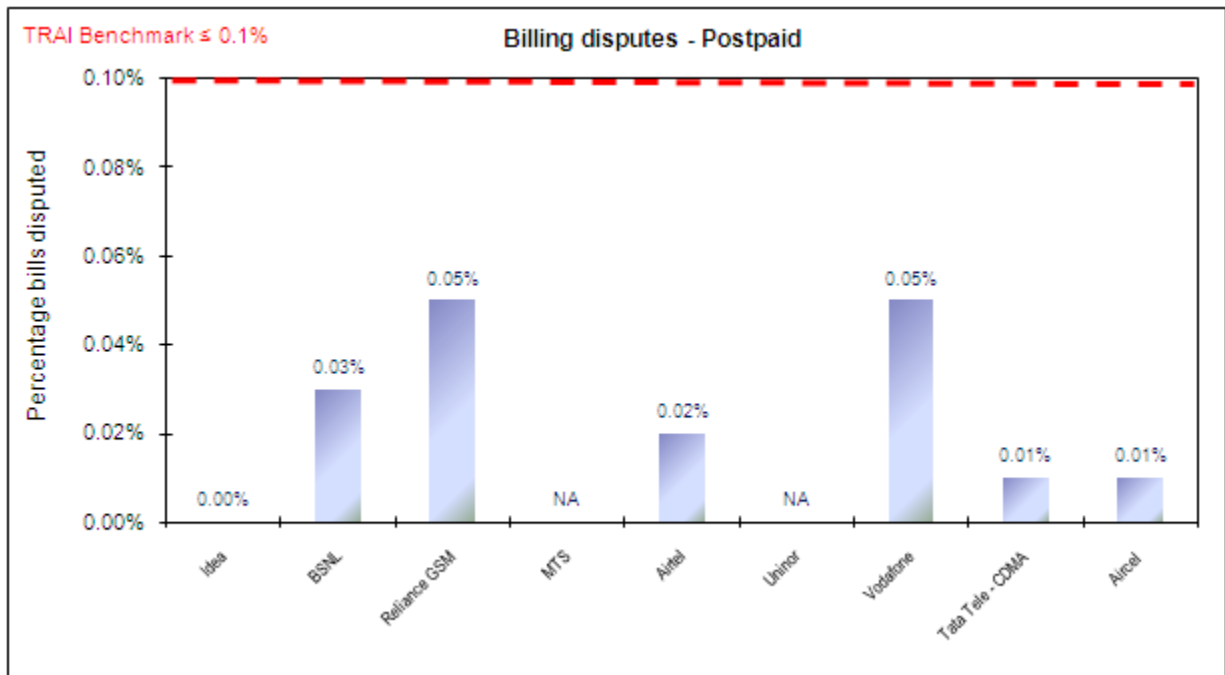
All the operators meet the benchmark

Drive test

Operator(s) meeting benchmark: Idea, Reliance GSM, MTS, Airtel, Vodafone, Tata Tele - CDMA, Aircel

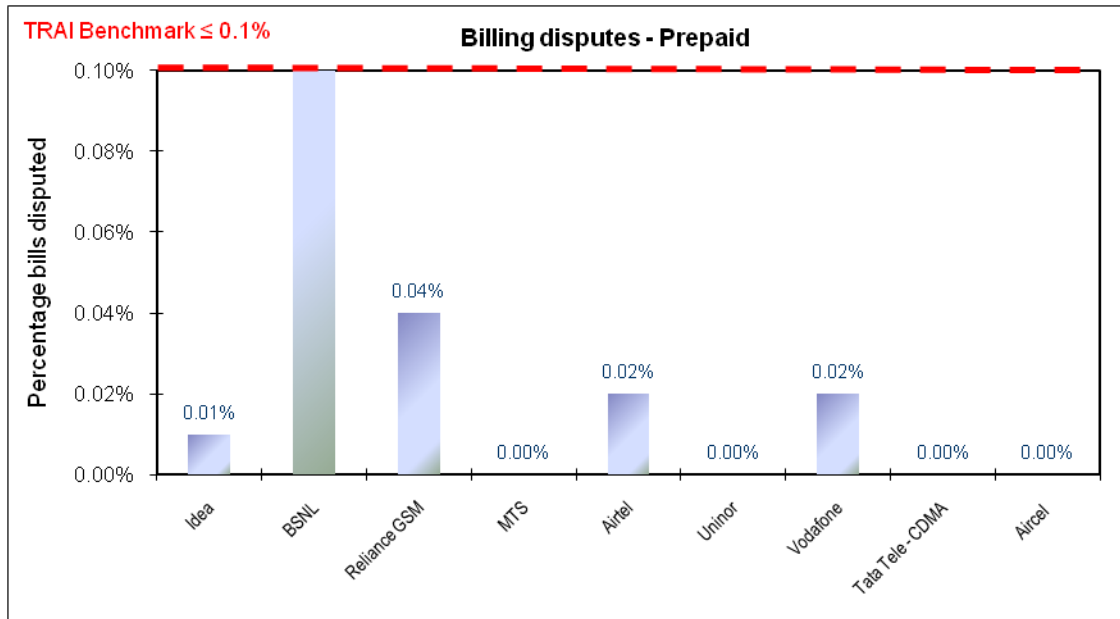
Operator(s) not meeting the benchmark: BSNL, Uninor

Billing Disputes - Postpaid



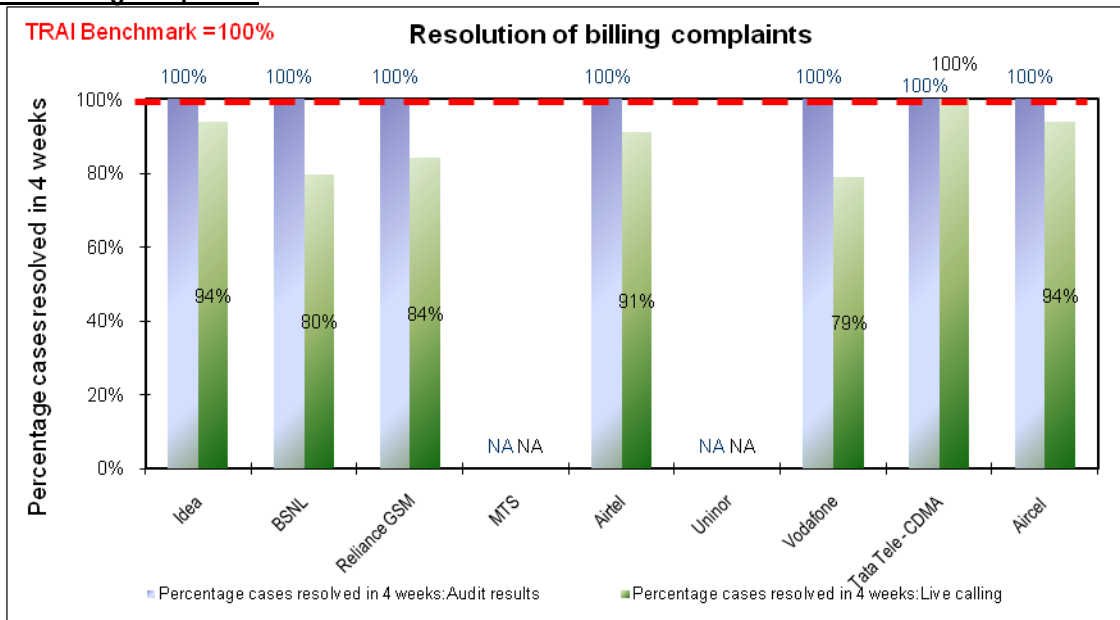
All the operators meet the benchmark

Complaints - Prepaid



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

Resolution of billing complaints



One month

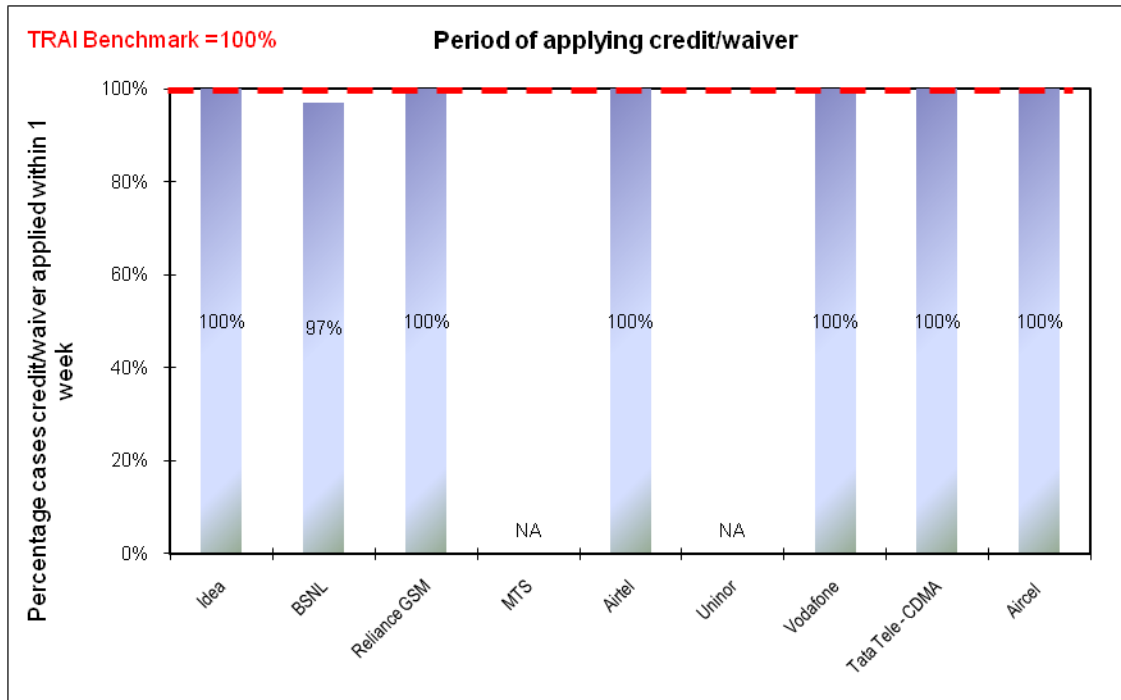
All the operators meet the benchmark

Live calling

Operator(s) meeting benchmark: Tata Tele - CDMA

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

Period of applying credit / waiver



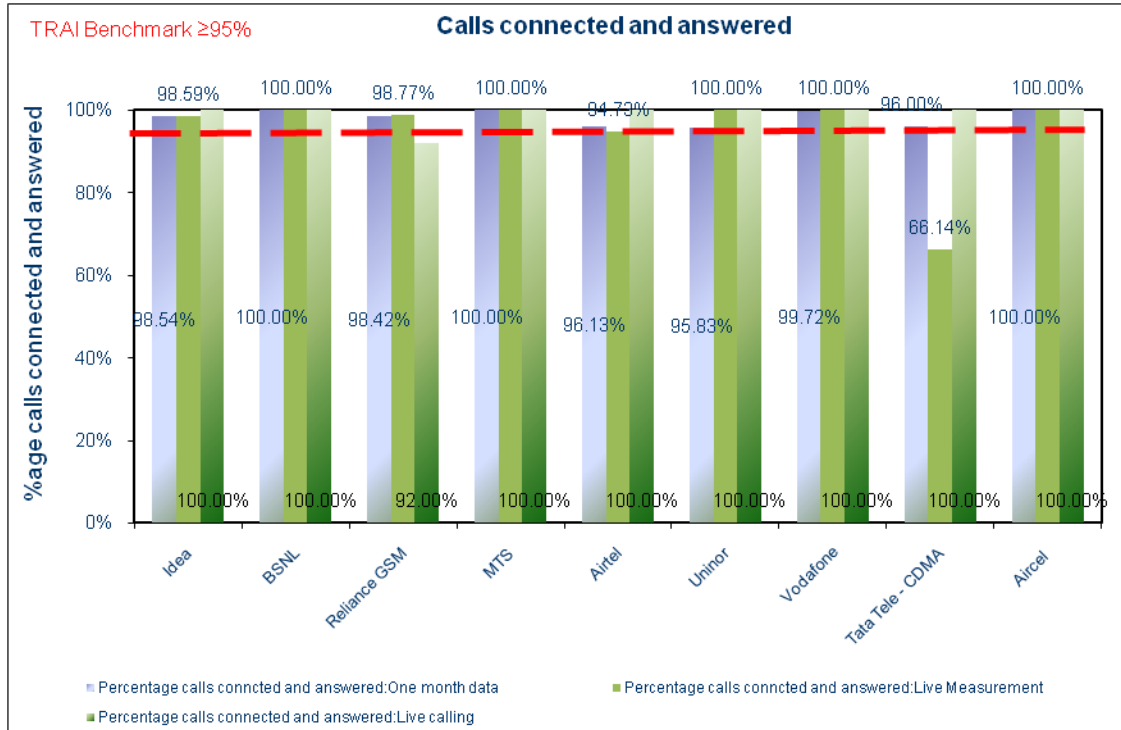
Operator(s) meeting benchmark: Idea, Reliance GSM, Airtel, Vodafone, Tata Tele - CDMA, Aircel

Operator(s) not meeting the benchmark: BSNL

Live calling for billing Complaints

Resolution of billing complaints	Benchmark	Idea	BSNL	Reliance GSM	MTS	Airtel	Uninor	Vodafone	Tata Tele - CDMA	Aircel
Total Number of calls made		32	200	100	NA	100	NA	100	3	100
Number of cases resolved in 4 weeks		30	159	84	NA	91	NA	79	3	94
Percentage cases resolved in four weeks	100%	94%	80%	84%	NA	91%	NA	79%	100%	94%

Customer Care / Helpline: Calls answered



One month

All the operators meet the benchmark

Live measurement

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

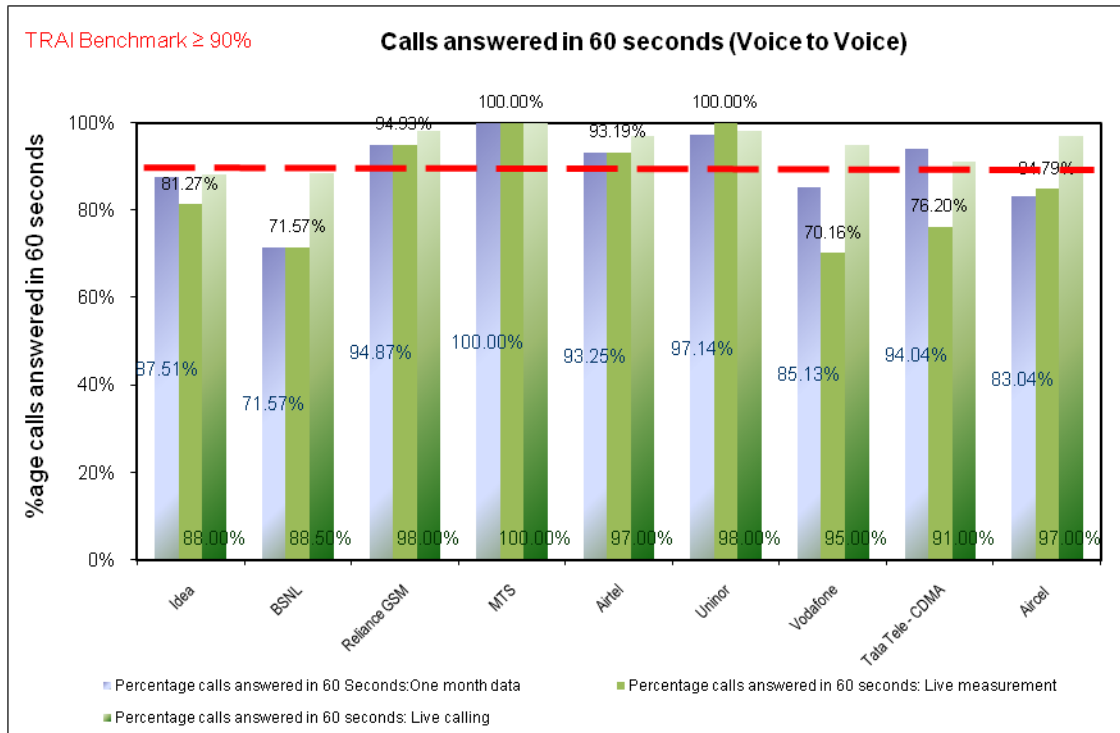
Operator(s) not meeting the benchmark: Airtel, Tata Tele - CDMA

Live calling

Operator(s) meeting benchmark: Idea, BSNL, MTS, Airtel, Uninor, Vodafone, Tata Tele - CDMA, Aircel

Operator(s) not meeting the benchmark: Reliance GSM

Customer Care / Helpline: Calls answered voice to voice



One month

Operator(s) meeting benchmark: Reliance GSM, MTS, Airtel, Uninor, Tata Tele - CDMA

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

Live measurement

Operator(s) meeting benchmark: Reliance GSM, MTS, Airtel, Uninor

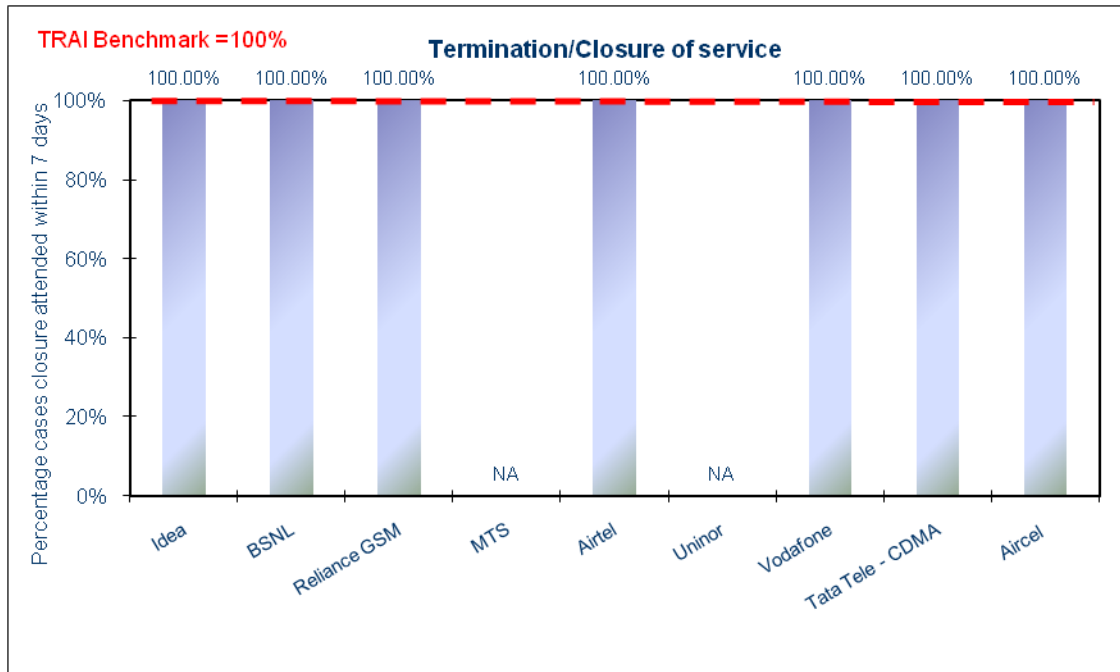
Operator(s) not meeting the benchmark: Idea, BSNL, Vodafone, Tata Tele - CDMA, Aircel

Live calling

Operator(s) meeting benchmark: Reliance GSM, MTS, Airtel, Uninor, Vodafone, Tata Tele - CDMA, Aircel

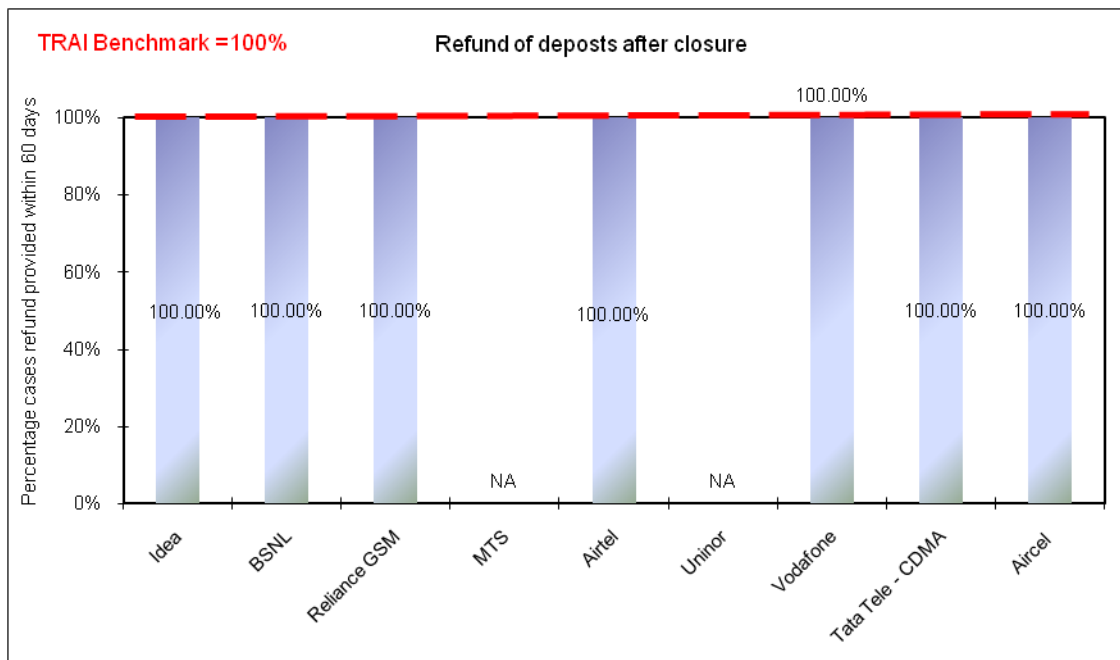
Operator(s) not meeting the benchmark: Idea, BSNL

Termination / Closure of service



All the operators meet the benchmark


Refund of deposits



All the operators meet the benchmark

Inter operator calls assessment

Inter operator call Assessment To ↓ From →	Idea	BSNL	Reliance GSM	MTS	Airtel	Uninor	Vodafone	Tata Tele - CDMA	Aircel
Idea	NA	93%	93%	98%	96%	97%	97%	100%	100%
BSNL	99%	NA	89%	96%	93%	95%	95%	99%	100%
Reliance GSM	99%	85%	NA	95%	93%	96%	93%	98%	100%
MTS	100%	91%	91%	NA	95%	98%	93%	97%	100%
Airtel	96%	91%	98%	100%	NA	99%	95%	100%	94%
Uninor	90%	95%	92%	93%	93%	NA	95%	95%	100%
Vodafone	97%	93%	90%	96%	95%	96%	NA	98%	100%
Tata Tele - CDMA	100%	95%	93%	97%	95%	97%	97%	NA	99%
Aircel	95%	91%	93%	99%	95%	98%	98%	99%	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. RCOM GSM had difficulty in connecting to a BSNL number with 89% of their calls getting completed and vice-versa BSNL faced difficulty in connecting to RCOM GSM with only 85% of calls getting connected.

7.0 Compliance reports: Results of Verification of PMR

7.1 Cellular Mobile services

Name of Service Provider	Network Availability					Connection Establishment			Connection Maintenance (Retainability)				POI	Network Traffic Capacity				
	Total no. of BTSs in the licensed service area	Sum of downtime of BTSs in a month in hours i.e. total outage time of all BTSs in hours during a month	BTSs accumulated downtime (not available for service) (%)	No. of BTSs having accumulated downtime of >24 hours in a month	Worst affected BTSs due to downtime (%)	Call Set-up Success Rate (within licensee's own network)	SDCCH/Paging chl. Congestion (%)	TCH Congestion (%)	Call Drop Rate (%)	Total No. of cells exceeding 3% TCH drop (call drop)	Total no. of cells in the network	Worst affected cells having more than 3% TCH drop (call drop) rate (%)	%age connection with good voice quality	Point of interconnection (POI) Congestion	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%					
Idea	PMR	407	2652.33333	0.89%	8	1.96%	98.00%	0.40%	1.47%	1.74%	35	1222	2.86%	95.28%	0	10407	6041.9	171761
	IMR B	407	2652.33333	0.89%	8	1.96%	98.00%	0.40%	1.47%	1.74%	35	1222	2.86%	95.28%	0	10407	6041.7	171761
BSNL	PMR	1137	19684	2.38%	164	5.63%	95.83%	1.78%	2.37%	2.15%	242	3339	7.18%	96.82%	0	121333	77089.3	963162
	IMR B	1137	19684	2.38%	164	5.63%	95.83%	1.78%	2.37%	2.15%	242	3339	7.18%	96.82%	0	121333	77089.3	963162
Reliance GSM	PMR	626	1218	0.26%	6	1.00%	98.07%	0.29%	1.16%	0.76%	46	1879	2.44%	98.58%	0	40000	17498.7	DNP
	IMR B	626	1218	0.26%	6	1.01%	98.08%	0.30%	1.17%	0.77%	46	1879	2.45%	98.58%	0	40000	17499.0	DNP
MTS	PMR	63	563	1.17%	0	0.00%	100.00%	0.00%	0.00%	0.00%	0	189	0.00%	100.00%	0	2908	1.9	102
	IMR B	63	563	1.22%	0	0.00%	100.00%	0.00%	0.00%	0.00%	0	189	0.00%	100.00%	0	4200	1.9	102
Airtel	PMR	1441	7687	0.72%	27	1.90%	95.60%	0.81%	1.63%	1.37%	108	4278	2.52%	98.64%	0	81807	60995.4	1935314
	IMR B	1441	7687	0.72%	27	1.90%	95.60%	0.80%	1.63%	1.37%	108	4278	2.52%	98.64%	0	81798	60995.0	1935314
Uninor	PMR	66	113	0.23%	0	0.00%	99.55%	0.04%	0.00%	0.09%	0	194	0.00%	96.33%	0	579	2.0	10
	IMR B	66	113	0.23%	0	0.00%	99.55%	0.04%	0.00%	0.09%	0	194	0.00%	99.87%	0	579	2.0	10
Vodafone	PMR	1096	5488	0.76%	11	0.97%	98.46%	0.27%	0.73%	0.82%	98	3395	2.90%	97.25%	0	25447	21399.1	731998
	IMR B	1096	5488	0.76%	11	0.97%	98.46%	0.27%	0.73%	0.82%	114	3395	3.36%	97.25%	0	25447	21399.3	731998
Tata Tele - CDMA	PMR	181	150	0.11%	0	0.00%	99.00%	0.00%	0.08%	0.35%	1	580	0.11%	99.59%	0	41984	7610.0	56616
	IMR	181	150	0.11%	0	0.00%	99.00%	0.00%	0.08%	0.35%	1	580	0.11%	99.59%	0	41984	7610.0	56616

Quality of Service – Audit module report for “North East” Circle for Cellular Mobile Services


	B																		
Aircel	PMR	1479	5142	0.47%	27	1.83%	96.71%	0.77%	1.75%	1.89%	197	4321	4.56%	95.31%	0	106628	53187.8	1607027	
	IMR B	1479	5142	0.47%	27	1.83%	96.71%	0.77%	1.75%	1.89%	197	4321	4.56%	95.31%	0	106628	53187.8	1607027	

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 / post paid and charging, credit / validity (pre-paid) complaints resolved in favor 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		
Idea	PMR	0.00%	2,809	0	0.00%	1	617,329	100.00%	379	379	2	377	100.00%	96.10%	63,438	60,967	94.00%	98.44%	65	1	33.33%
	IMRB	0.00%	2809	0	0.00%	1	617329	100.00%	379	379	2	377	100.00%	96.10%	63438	60967	94.00%	98.44%	65	1	33.33%
BSNL	PMR	0.18%	185,326	222	0.12%	2482	789,772	69.50%	2704	2704	116	863	108.00%	100.00%	62,382	62,075	90.32%	100.00%	124	124	100.00%
	IMRB	0.18%	185326	222	0.12%	2482	789772	69.50%	2704	2704	116	863	108.00%	100.00%	62382	62075	90.32%	100.00%	124	124	100.00%
Reliance GSM	PMR	0.01%	51962	4	0.02%	169	857939	100.00%	510	510	173	337	100.00%	99.00%	2499501	2526067	92.00%	100.00%	29	29	100.00%
	IMRB	0.01%	51962	4	0.02%	168.667	857939	100.00%	510	510	173	337	100.00%	98.95%	2499501	2526067	91.73%	100.00%	29	29	100.00%
MTS	PMR	0.00%	0	0	0.00%	0	150	0.00%	0	0	0	0	0.00%	100.00%	1	1	90.00%	0.00%	0	0	0.00%
	IMRB	0.00%	0	0	0.00%	0	108	0.00%	0	0	0	0	0.00%	100.00%	1	1	100.00%	0.00%	0	0	0.00%
Airtel	PMR	0.00%	129427	2	0.01%	4	7057720	100.00%	6	707	6	701	100.00%	100.00%	1158691	1156291	97.00%	100.00%	432	432	100.00%
	IMRB	0.00%	129427	34	0.00%	673	7057720	100.00%	6	707	6	701	100.00%	99.71%	1623973	1577860	94.49%	100.00%	434	434	100.00%
Uninor	PMR	NA	NA	NA	NA	NA	36	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	IMRB	NA	NA	NA	NA	NA	36	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Vodafone	PMR	0.15%	40916	63	0.06%	1570	922766	100.00%	1633	1633	1580	53	100.00%	100.00%	54512	34046	86.00%	100.00%	144	144	100.00%
	IMRB	0.15%	40916	63	0.06%	1570	922766	100.00%	1633	1633	1580	53	100.00%	100.00%	235679	195763	86.00%	100.00%	144	144	100.00%

Quality of Service – Audit module report for “North East” Circle for Cellular Mobile Services


Tata Tele - CDMA	PMR	0.00%	46616	28	0.01%	16	57921	100.00%	44	44	3	41	100.00%	96.00%	18176	17416	98.00%	100.00%	649	649	100.00%
	IMRB	0.00%	46616	28	0.01%	16	57921	100.00%	44	44	3	41	100.00%	96.00%	18176	17416	98.00%	100.00%	649	649	100.00%
Aircel	PMR	0.01%	70974	4	0.02%	484	2381547	100.00%	488	488	488	0	100.00%	100.00%	141577	124494	89.37%	100.00%	185	185	100.00%
	IMRB	0.01%	70974	4	0.02%	484	2220444	100%	488	488	488	0	100.00%	100.00%	141577	124494	89.37%	100%	185	185	100%

 Figures do not match with those reported in PMR

 Figures verified on all India basis

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

NA: Not Applicable

 Not meeting benchmark

8.0 Conclusions

8.1 Cellular Mobile services

1. The figures reported by all the operators on all parameters completely match the figures obtained on verification except for MTS and Aircel for Total no. of pre-paid customers at the end of the quarter, and Airtel for Total no. of call attempts to call centre / customer care nos. during TCBH
2. BSNL does not meet the benchmark for various parameters like BTS accumulated downtime, worst affected BTS due to downtime, SDCCH congestion, TCH congestion, and call drop rate

There were some minor variations found for some operators in their PMR submitted which may be due to rounding off error

9.0 Annexure - I

9.1 Service provider performance report based on one month data

Name of Service Provider	Network Availability		Connection Establishment (Accessibility)			Connection Maintenance (Retainability)			Metering and Billing				Response time to customer for assistance		Termination / closure of service	
	BTSs Accumulated downtime (not available for service)	Worst affected BTSs due to downtime	Call Set-up Success Rate (within licensee's own network)	SDCCH/Paging Chl. Congestion	TCH Congestion	Call Drop Rate (%age)	Worst affected cells having more than 3% TCH drop	%age of connection with good voice quality	Metering and billing credibility (Postpaid)	Metering and billing credibility (Prepaid)	%age complaints resolved within 4 weeks	Period of applying credit/waiver less than 1 week	Accessibility of call centre/ customer care	Percentage of calls answered by operators within 60 sec	%age requests for Termination complied within 7 days	Refund of deposits after closure within 60 days
Benchmark	≤ 2%	≤ 2%	≥ 95%	≤ 1%	≤ 2%	≤ 2%	≤ 3%	≥ 95%	≤ 0.1%	≤ 0.1%	100%	100%	≥ 95%	≥ 90%	100%	100%
Idea	0.99%	1.93%	95.50%	0.84%	1.78%	1.48%	2.71%	95.21%	0.00%	0.01%	100.00%	100.00%	98.54%	87.51%	100.00%	100.00%
BSNL	8.68%	12.24%	96.47%	0.76%	1.86%	1.98%	4.75%	95.50%	0.03%	0.39%	100.00%	97.00%	100.00%	71.57%	100.00%	100.00%
Reliance GSM	0.48%	0.92%	98.85%	0.02%	0.31%	0.38%	0.10%	98.77%	0.05%	0.04%	100.00%	100.00%	98.42%	94.87%	100.00%	100.00%
MTS	1.69%	0.00%	98.04%	0.00%	0.00%	0.41%	2.12%	100.00%	NA	0.00%	NA	NA	100.00%	100.00%	NA	NA
Airtel	0.37%	0.74%	98.69%	0.28%	0.67%	1.04%	1.40%	98.90%	0.02%	0.02%	100.00%	100.00%	96.13%	93.25%	100.00%	100.00%
Uninor	0.75%	1.00%	100.00%	0.10%	0.00%	1.11%	2.36%	98.65%	NA	0.00%	NA	NA	95.83%	97.14%	NA	NA
Vodafone	1.10%	1.58%	97.37%	0.57%	1.45%	0.94%	2.96%	97.13%	0.05%	0.02%	100.00%	100.00%	99.72%	85.13%	100.00%	100.00%
Tata Tele - CDMA	0.29%	0.00%	99.25%	0.00%	0.30%	0.27%	0.50%	99.88%	0.01%	0.00%	100.00%	100.00%	96.00%	94.04%	100.00%	100.00%
Aircel	0.53%	1.96%	97.78%	0.79%	1.26%	1.64%	4.64%	95.30%	0.01%	0.00%	100.00%	100.00%	100.00%	83.04%	100.00%	100.00%

9.2 Monthly Point of Interconnection (POI) Congestion Report

Name of the Service Provider	Name of POI not meeting the benchmark	Total No. of circuits on POI	Total No. of call attempts on POI	Total traffic served on POI (Erlang)	% of Congestion POI	Action already taken/ action plan for meeting the benchmark
Idea	0	0	0	0	0	0
BSNL	Guwahati TAX	489	39034	482.62	19.5	Traffic Rerouted
	AIRTEL MSC	3897	499084	3886.8	50	Augmentation Approved, work in Progress
	Shilliong BSC	988	59266	975	7	Augmented
Reliance GSM	0	0	0	0	0	0
MTS	0	0	0	0	0	0
Airtel	0	0	0	0	0	0
Videocon	0	0	0	0	0	0
S Tel	0	0	0	0	0	0
Uninor	0	0	0	0	0	0
Vodafone	0	0	0	0	0	0
Tata Tele - CDMA	0	0	0	0	0	0
Aircel	0	0	0	0	0	0

9.3 Parameter wise performance reports for Cellular Mobile services

1. Network Availability

Audit Results for Network Availability

	Benchmark	Idea	BSNL	Reliance GSM	MTS	Airtel	Uninor	Vodafone	Tata Tele - CDMA	Aircel
Number of BTSs in the licensed service area		467	727	651	63	1496	100	1140	189	1582
Sum of downtime of BTSs in a month (in hours)		3423	46945	2326	793	4080	558	9348	411	6262
BTSs accumulated downtime (not available for service)	≤ 2%	0.99%	8.68%	0.48%	1.69%	0.37%	0.75%	1.10%	0.29%	0.53%
Number of BTSs having accumulated downtime >24 hours		9	89	6	0	11	1	18	0	31
Worst affected BTSs due to downtime	≤ 2%	1.93%	12.24%	0.92%	0.00%	0.74%	1.00%	1.58%	0.00%	1.96%

	Benchmark	Idea	BSNL	Reliance GSM	MTS	Airtel	Uninor	Vodafone	Tata Tele - CDMA	Aircel
Number of BTSs in the licensed service area		473	728	651	63	1494	100	1140	189	1633
Sum of downtime of BTSs in a month (in hours)		614.83	3772	199	57	1876	59	1246	4	1512
BTSs accumulated downtime (not available for service)	≤ 2%	1.81%	0.70%	0.42%	1.25%	1.74%	0.82%	1.52%	0.03%	1.29%
Number of BTSs having accumulated downtime >24 hours		6	13	0	0	2	0	0	0	0
Worst affected BTSs due to downtime	≤ 2%	1.27%	1.83%	0.00%	0.00%	0.13%	0.00%	0.00%	0.00%	0.00%

2. Connection Establishment (Accessibility)

Audit Results for CSSR, SDCCH and TCH congestion

CSSR	Benchmark	Idea	BSNL	Reliance GSM	MTS	Airtel	Uninor	Vodafone	Tata Tele - CDMA	Aircel
CSSR	≥ 95%	95.50%	96.47%	98.85%	98.04%	98.69%	100.00%	97.37%	99.25%	97.78%

SDCCH congestion	Benchmark	Idea	BSNL	Reliance GSM	MTS	Airtel	Uninor	Vodafone	Tata Tele - CDMA	Aircel
SDCCH/Paging channel congestion	≤ 1%	0.84%	0.76%	0.02%	0.00%	0.28%	0.10%	0.57%	0.00%	0.79%

TCH congestion	Benchmark	Idea	BSNL	Reliance GSM	MTS	Airtel	Uninor	Vodafone	Tata Tele - CDMA	Aircel
TCH congestion	≤ 2%	1.78%	1.86%	0.31%	0.00%	0.67%	0.00%	1.45%	0.30%	1.26%

Live measurement results for CSSR, SDCCH and TCH congestion

CSSR	Benchmark	Idea	BSNL	Reliance GSM	MTS	Airtel	Uninor	Vodafone	Tata Tele - CDMA	Aircel
CSSR	≥ 95%	98.25%	96.63%	98.98%	100.00%	98.23%	99.93%	97.61%	99.00%	97.52%

SDCCH congestion	Benchmark	Idea	BSNL	Reliance GSM	MTS	Airtel	Uninor	Vodafone	Tata Tele - CDMA	Aircel
SDCCH/Paging channel congestion	≤ 1%	0.46%	0.94%	0.01%	0.00%	0.36%	0.18%	0.05%	0.00%	0.89%

TCH congestion	Benchmark	Idea	BSNL	Reliance GSM	MTS	Airtel	Uninor	Vodafone	Tata Tele - CDMA	Aircel
TCH congestion	≤ 2%	0.87%	1.97%	0.23%	0.00%	0.70%	0.09%	0.26%	0.00%	1.42%

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

CSSR	Benchmark	Idea	BSNL	Reliance GSM	MTS	Airtel	Uninor	Vodafone	Tata Tele - CDMA	Aircel
Total number of call attempts		674	620	918	420	716	212	672	1322	681
Total number of successful calls established		672	527	864	420	716	208	672	1322	677
CSSR	≥ 95%	99.70%	85.00%	94.12%	100.00%	100.00%	98.11%	100.00%	100.00%	99.41%

Blocked calls	Benchmark	Idea	BSNL	Reliance GSM	MTS	Airtel	Uninor	Vodafone	Tata Tele - CDMA	Aircel
%age blocked calls		0.30%	15.00%	5.88%	0.00%	0.00%	1.89%	0.00%	0.00%	0.59%

3. Connection Maintenance (Retainability)

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

Call drop rate	Benchmark	Idea	BSNL	Reliance GSM	MTS	Airtel	Uninor	Vodafone	Tata Tele - CDMA	Aircel
Total number of calls established		6186159	420007571	20929171	1453	93161861	360	1030238	1924611	131275293
Total number of calls dropped		91748	8311427	79907	6	969108	4	9721	5239	2149191
Call drop rate	≤ 2%	1.48%	1.98%	0.38%	0.41%	1.04%	1.11%	0.94%	0.27%	1.64%

Cells having more than 3% TCH	Benchmark	Idea	BSNL	Reliance GSM	MTS	Airtel	Uninor	Vodafone	Tata Tele - CDMA	Aircel
Total number of cells in the network		1401	2148	1953	189	4442	296	3511	603	4675
Total number of cells having more than 3% TCH		38	102	2	4	62	7	104	3	217
Worst affected cells having more than 3% TCH	≤ 3%	2.71%	4.75%	0.10%	2.12%	1.40%	2.36%	2.96%	0.50%	4.64%

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

Call drop rate	Benchmark	Idea	BSNL	Reliance GSM	MTS	Airtel	Uninor	Vodafone	Tata Tele - CDMA	Aircel
Total number of calls established		8179519	14590624	26962920	176	10032808	45	1085106	2929542	13623405
Total number of calls dropped		98785	289424	159044	0	57951	1	10438	5900	204939

Call drop rate	≤ 2%	1.21%	1.98%	0.59%	0.00%	0.58%	2.22%	0.96%	0.20%	1.50%
Cells having more than 3% TCH	Benchmark	Idea	BSNL	Reliance GSM	MTS	Airtel	Uninor	Vodafone	Tata Tele - CDMA	Aircel
Total number of cells in the network		1419	2151	1953	189	4442	296	3515	2500	14250
Total number of cells having more than 3% TCH		5	86	0	0	87	0	96	3	688
Worst affected cells having more than 3% TCH	≤ 3%	0.35%	4.00%	0.00%	0.00%	1.96%	0.00%	2.73%	0.12%	4.83%

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

Call drop rate	Benchmark	Idea	BSNL	Reliance GSM	MTS	Airtel	Uninor	Vodafone	Tata Tele - CDMA	Aircel
Total number of calls established		674	534	913	420	716	208	672	1321	677
Total number of calls dropped		1	13	3	0	0	4	0	3	4
Call drop rate	≤ 2%	0.15%	2.43%	0.33%	0.00%	0.00%	1.92%	0.00%	0.23%	0.59%

4. Voice quality

Audit & Live measurement Results for Voice quality

Voice quality	Benchmark	Idea	BSNL	Reliance GSM	MTS	Airtel	Uninor	Vodafone	Tata Tele - CDMA	Aircel
Total number of sample calls		1007513234	200	4285461781	1453	7757	98167	160750277	9941	8027281898
Total number of calls with good voice quality		959234156	191	4232772185	1453	7672	96843	156140233	9929	7649879690
%age calls with good voice quality	≥ 95%	95.21%	95.50%	98.77%	100.00%	98.90%	98.65%	97.13%	99.88%	95.30%

Voice quality	Benchmark	Idea	BSNL	Reliance GSM	MTS	Airtel	Uninor	Vodafone	Tata Tele - CDMA	Aircel
Total number of sample calls		962908235	100	DNP	176	173926	NA	166711335	2500	796883462
Total number of calls with good voice quality		917584236	98	DNP	176	166398	NA	161772562	2497	758749630
%age calls with good voice quality	≥ 95%	95.29%	98.00%	98.42%	100.00%	95.67%	NA	97.04%	99.88%	95.21%

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

Voice quality	Benchmark	Idea	BSNL	Reliance GSM	MTS	Airtel	Uninor	Vodafone	Tata Tele - CDMA	Aircel
Total number of sample calls		470704	246453	944515	12878	589877	273647	735098	29132	478170
Total number of calls with good voice quality		454404	189051	917273	12681	566096	250404	718430	28867	459980
%age calls with good voice quality	≥ 95%	96.54%	76.71%	97.12%	98.47%	95.97%	91.51%	97.73%	99.09%	96.20%

5. POI Congestion

Audit Results for POI Congestion

POI congestion	Benchmark	Idea	BSNL	Reliance GSM	MTS	Airtel	Uninor	Vodafone	Tata Tele - CDMA	Aircel
Total number of working POIs		25	57	14	14	55	22	29	28	37
No. of POIs not meeting benchmark		0	3	0	0	0	0	0	0	0
Total Capacity of all POIs (A) - in erlangs		7299.28	35000	267220.7	377.66	52633	314.79	16345785.6	2998.0	36392.0
Traffic served for all POIs (B)- in erlangs		4139.86	29392	161641.2	1.14	33263	0.85	4343313.3	741.3	25189.0
POI congestion	≤ 0.5%	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00

Live measurement results for POI congestion

POI congestion	Benchmark	Idea	BSNL	Reliance GSM	MTS	Airtel	Uninor	Vodafone	Tata Tele - CDMA	Aircel
Total number of working POIs		25	57	14	14	55	22	29	28	111
No. of POIs not meeting benchmark		0	1	0	0	0	0	0	0	0
Total Capacity of all POIs (A) - in erlangs		7594.27	35000	28286.09	377.66	52943	314.79	545498	2998	109176
Traffic served for all POIs (B)- in erlangs		4510.28	27711	17784.71	1.3	33394	0.83	149658	602	73374
POI congestion	≤ 0.5%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

6. Inter Operator Call Assessment

Inter operator call Assessment To↓ From →	Idea	BSNL	Reliance GSM	MTS	Airtel	Uninor	Vodafone	Tata Tele - CDMA	Aircel
Idea	NA	93%	93%	98%	96%	97%	97%	100%	100%
BSNL	99%	NA	89%	96%	93%	95%	95%	99%	100%
Reliance GSM	99%	85%	NA	95%	93%	96%	93%	98%	100%
MTS	100%	91%	91%	NA	95%	98%	93%	97%	100%
Airtel	96%	91%	98%	100%	NA	99%	95%	100%	94%
Uninor	90%	95%	92%	93%	93%	NA	95%	95%	100%
Vodafone	97%	93%	90%	96%	95%	96%	NA	98%	100%
Tata Tele - CDMA	100%	95%	93%	97%	95%	97%	97%	NA	99%
Aircel	95%	91%	93%	99%	95%	98%	98%	99%	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	Idea	BSNL	Reliance GSM	MTS	Airtel	Uninor	Vodafone	Tata Tele - CDMA	Aircel
Billing disputes - Postpaid										
Total bills generated during the period		846	101816	16838	NA	40775	NA	13966	14859	22954
Total number of bills disputed		0	33	8	NA	7	NA	7	2	3
Percentage bills disputed	≤ 0.1%	0.00%	0.03%	0.05%	NA	0.02%	NA	0.05%	0.01%	0.01%
Billing disputes - Prepaid										
Number of complaints related to charging, credit & validity		32	3282	409	0	529	0	164	1	99
Total number of prepaid customers in that period		213666	852312	960714	143	2746597	36	927813	55980	2306557
Percentage of complaints	≤ 0.1%	0.01%	0.39%	0.04%	0.00%	0.02%	0.00%	0.02%	0.00%	0.00%
Resolution of billing complaints										
Total number of billing/charging complaints		32	1989	417	NA	536	NA	171	3	102
Total complaints considered invalid		32	1953	156	NA	519	NA	7	3	3
Number of complaints resolved in 4 weeks from date of receipt for complaints listed in 5.3.1		0	1989	417	NA	17	NA	164	3	102
Percentage complaints resolved within 4 weeks of date of receipt	100%	100%	100%	100%	NA	100%	NA	100%	100%	100%
Period of applying credit / waiver										
Total number of complaints where credit/waiver is required		0	2	261	NA	17	NA	138	0	9
Percentage cases in which credit/waiver was received within 1 week	100%	100%	97%	100%	NA	100%	NA	100%	100%	100%

Live calling results for resolution of billing complaints

Resolution of billing complaints	Benchmark	Idea	BSNL	Reliance GSM	MTS	Airtel	Uninor	Vodafone	Tata Tele - CDMA	Aircel
Total Number of calls made		32	200	100	NA	100	NA	100	3	100
Number of cases resolved in 4 weeks		30	159	84	NA	91	NA	79	3	94
Percentage cases resolved in four weeks	100%	94%	80%	84%	NA	91%	NA	79%	100%	94%

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

Customer Care Assessment	Benchmark	Idea	BSNL	Reliance GSM	MTS	Airtel	Uninor	Vodafone	Tata Tele - CDMA	Aircel
Total number of call attempts to customer care for assistance		15085	762392	671353	16	4059333	24	703476	63475	1562583
Number of calls getting connected and answered (electronically)		14865	762392	660756	16	3902133	23	701509	60934	1562583
Percentage calls getting connected and answered	≥ 95%	98.54%	100.00%	98.42%	100.00%	96.13%	95.83%	99.72%	96.00%	100.00%
Number of calls getting transferred to the operator (voice to voice)		62648	246292	119551	13	403618	35	222921	5835	362545
Number of calls answered by operator (voice to voice) within 60 seconds		54822	176270	113418	13	376381	34	189762	5487	301075
Percentage calls answered within 60 seconds (V2V)	≥ 90%	87.51%	71.57%	94.87%	100.00%	93.25%	97.14%	85.13%	94.04%	83.04%

Live measurement results for customer care

Customer Care Assessment	Benchmark	Idea	BSNL	Reliance GSM	MTS	Airtel	Uninor	Vodafone	Tata Tele - CDMA	Aircel
Total number of call attempts to customer care for assistance		24585	762392	72836	2	431059	5	77234	4067	150763
Number of calls getting connected and answered (electronically)		24239	762392	71938	2	408332	5	77233	2690	150763
Percentage calls getting connected and answered	≥ 95%	98.59%	100.00%	98.77%	100.00%	94.73%	100.00%	100.00%	66.14%	100.00%
Number of calls getting transferred to the operator (voice to voice)		5722	246292	12391	1	40895	7	27357	1105	36793
Number of calls answered by operator (voice to voice) within 60 seconds		4650	176270	11763	1	38111	7	19195	842	31196
Percentage calls answered within 60 seconds (V2V)	≥ 90%	81.27%	71.57%	94.93%	100.00%	93.19%	100.00%	70.16%	76.20%	84.79%

Live calling results for customer care

Customer Care Assessment	Benchmark	Idea	BSNL	Reliance GSM	MTS	Airtel	Uninor	Vodafone	Tata Tele - CDMA	Aircel
Total Number of calls received		100	100	100	100	100	100	100	100	100
Total Number of calls getting connected and answered		100	100	92	100	100	100	100	100	100
Percentage calls getting connected and answered	≥ 95%	100.00%	100.00%	92.00%	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	Idea	BSNL	Reliance GSM	MTS	Airtel	Uninor	Vodafone	Tata Tele - CDMA	Aircel
Total Number of calls received		100	200	100	100	100	100	100	100	100
Total Number of calls answered within 60 seconds		88	177	98	100	97	98	95	91	97
Percentage calls answered within 60 seconds	≥ 90%	88.00%	88.50%	98.00%	100.00%	97.00%	98.00%	95.00%	91.00%	97.00%

Operator	Customer Care No.
Idea	12345
BSNL	1503
Reliance GSM	9864098640, 333
MTS	9147155155
Airtel	198
Uninor	9123091230
Vodafone	111, 9706097060
Tata Indicom (CDMA)	121
Aircel	9854012345

9. Termination / closure of service**Audit results for termination / closure of service**

Termination	Benchmark	Idea	BSNL	Reliance GSM	MTS	Airtel	Uninor	Vodafone	Tata Tele - CDMA	Aircel
Total number of closure request		8	16	19	NA	150	NA	32	349	50
Number of requests attended within 7 days		8	16	19	NA	150	NA	32	349	50
Percentage cases in which termination done within 7 days	100%	100.00%	100.00%	100.00%	NA	100.00%	NA	100.00%	100.00%	100.00%

Audit results for refund of deposits

Refund	Benchmark	Idea	BSNL	Reliance GSM	MTS	Airtel	Uninor	Vodafone	Tata Tele - CDMA	Aircel
Total number of cases requiring refund of deposits		1	16	34	NA	44	NA	73	34	63
Total number of cases where refund was made within 60 days		1	16	34	NA	44	NA	73	34	63
Percentage cases in which refund was received within 60 days	100%	100.00%	100.00%	100.00%	NA	100.00%	NA	100.00%	100.00%	100.00%

11. Additional Network Related parameters										
Audit Results for Total Traffic Handled in Erlang										
Traffic in Erlang		Idea	BSNL	Reliance GSM	MTS	Airtel	Uninor	Vodafone	Tata Tele - CDMA	Aircel
Equipped capacity of the network		13284	36000	40000	4200	80989	1580	26607	42394	113962
Total traffic handled in erlang during TCBH		5729	27761.45	21186	1.19	68906	0.69	22835	7156	50331

Total number of customers as per VLR										
		Idea	BSNL	Reliance GSM	MTS	Airtel	Uninor	Vodafone	Tata Tele - CDMA	Aircel
Total no. of customers served (as per VLR)		184387	162230	600183	264	2236059	38	795303	55071	1673257

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

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

- 100
- 101
- 108
