

**REPORT
ON
AUDIT & ASSESSMENT OF QUALITY OF SERVICE
OF
CELLULAR MOBILE TELEPHONE SERVICE
FOR
NORTH ZONE – UP (EAST) CIRCLE**

Report Period: July 2011 - Sep 2011

Telecommunications Consultants India Ltd.
TCIL Bhawan, Greater Kailash Part – I
New Delhi – 110048
Phone: +91-11-26202020 Fax: +91-1126242266
Website: <http://www.tcil-india.com>

Table of Contents

CHAPTER-1: Introduction

- I. Background
- II. Objectives and Methodology

CHAPTER-2: Executive Summary

- I. Preface
- II. Findings from Quality of Service Audit (Operator wise for each parameter)
 - (A) Cellular Mobile Telephone Service Providers
 - 3 days Live Data Audit
 - One Month Data Audit
 - Operator Assisted Drive Test
 - Independent Drive Test
 - (B) Basic Telephone Service (Wireline) Providers
 - *Not conducted for this quarter*
 - (C) Broadband Service Providers
 - *Not conducted for this quarter*

CHAPTER-3: Audit-PMR data verification results

- I. Cellular Mobile Telephone Service
- II. Basic Service (Wire Line) Service
 - *Not conducted for this quarter*
- III. Broadband Service
 - *Not conducted for this quarter*

CHAPTER-4: Detailed Findings & Analysis

- I. Cellular Mobile Telephone Service
 - (A) **MSC audit**
 - 1) 3 days live measurement data assessment & summarized findings
 - 2) One month audit data report & summarized findings
 - 3) Sample coverage
 - 4) Performance (Graphical Representation)
 - 5) Critical Analysis
 - (B) **Redressal**
 - 1) Sample coverage
 - 2) Performance based on live measurement for three days
 - 3) Live calling to Call Center
 - 4) Level 1 calling
 - 5) Critical Analysis

(C) Inter operator call assessment

- 1) Sample coverage
- 2) Performance based on live measurement
- 3) Critical Analysis

(D) Drive test of the mobile network of service providers

- 1) Sample Coverage
- 2) Performance (for the respective cities)
- 3) Critical Analysis

(E) Independent Drive Test

- 1) Sample coverage
- 2) Performance (for the respective cities)
- 3) Critical Analysis

(F) Compliance report (Status of service providers with respect to the QoS)

- II. Basic Telephone Service (Wireline) Providers
- Not conducted for this quarter
- III. Broadband Service Providers
- Not conducted for this quarter

CHAPTER-1: INTRODUCTION

I. Background

TRAI's mission is to create and nurture conditions for growth of telecommunications in the country in a manner and at a pace, which will enable India to play a leading role in emerging global information society. One of the main objectives of Telecom Regulatory Authority of India (TRAI) is to provide a fair and transparent policy environment, which promotes a level playing field and facilitates fair competition.

In pursuance of above objective TRAI has issued from time to time a large number of regulations, orders and directives to deal with issues coming before it and provided the required direction to the evolution of Indian telecom market from a Government owned monopoly to a multi-operator multi service open competitive market.

The directions, orders and regulations issued cover a wide range of subjects including tariff, interconnection and quality of service as well as governance of the Authority.

The purpose of laying down Quality of Service Parameters is to:

- i) Create conditions for consumer satisfaction by making known the quality of service, which the service provider is required to provide, and the user has a right to expect.
- ii) Measure the Quality of Service provided by the Service Providers from time to time and to compare them with the norms so as to assess the level of performance.
- iii) Generally protect the interests of consumers of telecommunication services.

TRAI has been carrying out regular reviews of the status of quality of service of the networks of all operators. In continuation to these efforts, TRAI has selected through bidding process TCIL as the Audit Agency to audit and assess the Quality of Service rendered by the service providers' namely Basic (Wireline) Services, Cellular Mobile Telephone (Wireless) Services and Broadband Services. The Audit for various telecom circles within the Zones has been distributed across four quarterly periods.

The parameters that need to be measured for Basic and Cellular Mobile Services have been specified in the TRAI notification on Quality of Service of Basic (Wireline) and Cellular Mobile (wireless) Services, 2009. The parameters for Broadband Services have been specified in the TRAI notification for Quality of Services of Broadband Service Regulation, 2006.

II. Objectives and Methodology

The primary objective is to audit and assess the Quality of Service being rendered by Basic, Cellular Mobile & Broadband services against the parameters notified by TRAI. The audit and assessment of Quality of Service is conducted for all the basic service providers, unified access service providers, cellular mobile service providers and ISPs (Internet Service Provider) for basic wireline, Cellular Mobile Telephone Services and broadband service. TCIL has undertaken the following audit works as per the Terms of Reference (TOR):

- i) Verification of the data submitted by the service providers to TRAI as part of QoS monitoring reports i.e. Quarterly Performance Monitoring Reports (PMRs) and monthly Point of Interconnection (POI) Congestion Reports with reference to the records maintained by the service provider.
- ii) Verification of the performance of service providers against the Quality of Service benchmarks laid down by TRAI using live measurement for 3 days during the month in which the audit and assessment is carried out.
- iii) Verification of the performance of service providers against the Quality of Service benchmarks laid down by TRAI using the data for the entire month during which the live measurement is carried out.
- iv) Drive tests of the mobile networks both operators assisted and independent drive test (as and where required).
- v) Billing and call center's data verification.
- vi) Live testing of the efficiency of the call center / customer care help line.
- vii) Emergency (Level 1) call testing

To fulfill the above mentioned Scope of Work audit was performed on different Systems, Facilities and Field data collection.

Systems audited:-

1. Network Switching Centre (NSS)
2. Base Station Subsystem(BSS)
3. Billing Applications
4. Customer Care applications

Facilities audited:-

1. Billing documents.
2. Customer Care records.

Field data collections carried out:-

1. RF network coverage including KPIs (Key Performance Index)
2. Inter Operator Call Assessment
3. Checking of Customer Billing/Refund Complaints (Random sample)
4. Customer Care efficiency
5. The live calling was made to assess the quality of services for Inter Operator Call Assessment, Customer Billing/Refund Complaints and Customer Care efficiency.

In order to carry out the above scope of work:-

- ✓ TCIL auditors visited all the NSS (Network Sub System) and BSS (Base-station Sub System) to check data for all the operators in their respective service area.
- ✓ All the NSS and BSS data for the relevant details were collected either directly from the centralized NOC or through a remote access to the NOC.
- ✓ The Radio parameters were audited/verified from the data collected from OMC-R (Operation and Maintenance Center – Radio, as part of BSS data).
- ✓ The Drive test was conducted in high, low and medium dense areas including highways, commercial complex and residential areas and special attention was paid for the areas for which TRAI has received complaints.
- ✓ The POI and other network related parameters were audited/verified from the data collected from the OMC-S (Operation and Maintenance Center – Switch as part of NSS data).
- ✓ The data related to Billing and Customer care was checked for the previous month and verified with the customers by calling them on random basis. The process of registration and handling of the complaints was also studied for the various operators. Call centre number were called for measuring the efficiency of the call centre.
- ✓ The inter operator call assessment test was carried out during the time period as is specified in the tender document. TCBH (Time Consistent Busy Hour) is taken after observation of the traffic consistently for 3 days prior to the audit activity.
- ✓ Data has been collected for busy hour of network in case of live assessment & month of audit for all service providers & verified that service providers are providing busy hour data only for QoS service. We found that TCBH hour is matching with network busy hour as provided by service providers for UP (East) circle. But for parameters such as 'Worst affected cell exceeding 3% TCH drop' and 'BTSs accumulated down time' CBBH (Cell Bouncing Busy Hour) was taken instead of TCBH (Time Consistent Busy Hours) as per the TRAI new regulation 2009.

CHAPTER-2: EXECUTIVE SUMMARY

I. Preface

This report highlights the findings for the audit & assessment of Quality of Service of Cellular Mobile Services in UP (East) Circle in 3rd quarter (July – Sep 2011). The primary data collection and verification of records (PMR data verification – quarterly) maintained by various operators was undertaken during the period Jan - March 2011.

Following are the various operators covered in UP (East) circle, North Zone for Cellular Mobile (Wireless) services QoS audit & assessment. The Month of audit & TCBH information is also given below:

S/N	Name of Service Provider	Month of Audit	TCBH Hour
GSM Operators			
1	Aircel Ltd	Aug-2011	20 - 21 Hrs
2	Airtel Ltd	Aug-2011	20 - 21 Hrs
3	BSNL	Aug-2011	19 - 20 Hrs
4	Idea	Aug-2011	20 - 21 Hrs
5	Tata Communications (GSM)	Aug-2011	20 - 21 Hrs
6	Vodafone	Aug-2011	20 - 21 Hrs
7	Reliance Communication (GSM)	July-2011	19 - 20 Hrs
8	Uninor	Aug-2011	19 - 20 Hrs
9	Etisalat	Aug-2011	19 - 20 Hrs
10	Videocon	Aug-2011	19 - 20 Hrs
CDMA Operators			
11	MTS (CDMA)	Aug-2011	20 - 21 Hrs
12	Reliance Communication (CDMA)	July-2011	19 - 20 Hrs
13	Tata Communications (CDMA)	Aug-2011	19 - 20 Hrs

II. Findings from Quality of Service Audit (Operator wise for each parameter)

(A) Cellular Mobile Telephone Services

3 days Live Data Audit	Bench -mark	Aircel	Airtel	BSNL	Etisalat	Idea	Rcom GSM	Tata GSM	Uninor	Videocon	V-fone	MTS	Rcom CDMA	Tata CDMA
GSM Operators											CDMA Operators			
Network Availability														
a) BTS Accumulated Downtime	≤2%	0.34%	0.32%	1.80%	0.88%	0.12%	1.03%	0.09%	1.73%	0.01%	1.61%	0.13%	0.42%	0.06%
b) Worst affected BTSs due to downtime	≤2%	0%	0%	0.01%	0%	0%	0.73%	0%	0.31%	0%	0.29%	0%	0.94%	0%
a) CSSR (Call Setup Success Rate)	≥95%	98.16%	99.02%	96%	98.96%	99.82%	99.57%	98.82%	95.62%	98.33%	98.79%	99.48%	98.91%	98.54%
b) SDCCH/PAGING congestion	≤1%	0.24%	0.23%	0.67%	0.02%	0.89%	0.35%	0.21%	0.51%	0.56%	0.72%	0%	0%	0%
c) TCH congestion	≤2%	0.73%	0.34%	1.32%	0.61%	1.38%	0.77%	1.42%	1.30%	0.50%	1.21%	0%	0.99%	0.04%
Connection maintenance (retainability)														
a) CDR	≤2%	0.69%	1.23%	1.57%	0.33%	1.26%	0.84%	1.37%	1.66%	1.36%	1.58%	0.52%	0.84%	0.67%
b) Worst affected cells>3% TCH drop	≤3%	4.07%	2.86%	3.88%	3.70%	2.78%	2.33%	11.93%	4.70%	1.94%	3.83%	2.70%	1.81%	1.90%
c) Good voice quality	≤95%	96.22%	98.38%	97%	98.92%	95.91%	98.29%	96.42%	95.87%	97.39%	95.90%	99.99%	NA	NA
Number of POI having ≥0.5% POI congestion	≤0.5%	0	0	0	0	0	0	0	5	0	0	0	0	0
Response time to customers for assistance														
a) Accessibility of call centre/Customer Care	≥95%	100%	86.26%	96.56%	100%	100%	99.19%	100%	97.11%	100%	100%	99.16%	98.98%	100%
b) % call answered by operators(voice to voice) within 60 sec.	≥90%	76.50%	84.87%	98.47%	100%	81.70%	96.55%	96.36%	99.67%	100%	99.95%	97.33%	96.56%	92.08%

NA: Not Applicable, NP: Not Provided

From the above 3 days live data assessment table, it is found that the operators are meeting most the network parameter except for the parameter “Worst affected cells >3% TCH drop” it is seen that Aircel, BSNL, Etisalat, Tata (GSM), Uninor & Vodafone are not satisfying the benchmark. Among the Technical Parameters it is also found that for Uninor there are 5 nos. of POIs having > 0.5% congestion. In case of “Good voice quality” RCom (CDMA) & Tata (CDMA) have not provide system generated data. Rest of the operators satisfying the benchmark successfully.

In case of performance related to Customer Care data it is seen that for the parameters “Accessibility of call centre/Customer Care” & “call answered by operators (voice to voice) within 60 sec” Airtel, Aircel, & Idea performance are not satisfactory.

One Month Data Audit		Bench- mark	Aircel	Airtel	BSNL	Etisalat	Idea	Rcom GSM	Tata GSM	Uninor	Videocon	Vodafone	MTS	RCom CDMA	Tata CDMA	
S/N	Name of Parameter		GSM Operators									CDMA Operators				
8	Response time to customers for assistance															
	a) Accessibility of call centre/Customer Care	≥95%	100%	79.19%	96.97%	98.20%	100%	99.01%	99%	95.99%	100%	100%	98.49%	98.98%	99%	
	b) % call answered by operators(voice to voice) within 60 sec.	≥90%	80.07%	86.01%	95.09%	100%	80.19%	87.77%	94%	91.54%	98%	96.47%	96.26%	92.27%	93%	
9	Termination/closure of service	≤7days	95.12%	100%	59%	NA	100%	100%	100%	NA	NA	99.84%	100%	100%	8%	
10	Time taken for refunds of deposits after closures (within 60 days).	100%	100%	100%	100%	NA	100%	100%	100%	NA	NA	100%	100%	100%	100%	

NA: Not Applicable, **NP:** Not Provided

From the above month data assessment table, it is found that a lot of the operators are not meeting the parameter “Worst affected cells>3% TCH drop” under Network Parameters category. Name of the operators for the same are Aircel, BSNL, Etisalat, Tata (GSM), Uninor, Vodafone & MTS. For “TCH congestion” only Uninor is not satisfying the benchmark. Also to be noted that Uninor is found to have 5 nos. of POI under congestion > 0.5%. In case of “Good voice quality” RCom (CDMA) & Tata (CDMA) have not provide system generated data. Rest of the operators satisfying the benchmark successfully.

In case of performance related to Customer Care data it is found that for the parameters “Metering/billing credibility-Post paid” and “Metering/billing credibility-Pre paid” Aircel & Tata (CDMA) are not satisfying the benchmark.

For parameters “Accessibility of call centre/Customer Care” & “calls answered by operators (voice-to-voice) within 60 sec” it is found that Airtel, Aircel, Idea & RCom (GSM) are not satisfying the benchmark.

In case of “Resolution of billing/ charging complaints (within 4 weeks)” & “Termination/closure of service” it is seen that Aircel, BSNL, Vodafone & Tata (CDMA) performance are not satisfactory.

Operator-Assisted Drive Test

The Operator assisted Drive Test was conducted at UP (East) for all the operators. Route covered was about around 80-100Km depending on city areas within the speed limit of 30Km/hr. The cities covered were Allahabad, Jhansi & Gorakhpur. In all the cities, zones were selected in order to cover different density areas (High, Medium & Low).

S/N	Parameter	City Name	Aircel	Airtel	BSNL	Idea	Rcom GSM	Uninor	Videocon	Vodafone	MTS	Rcom CDMA	Tata CDMA
			GSM Operators								CDMA Operators		
1.1	Blocked Call Rate ($\leq 3\%$)	Allahabad	4.8%	0%	0.6%	2.9%	4.6%	3.6%	1.9%	0%	0%	0%	0.7%
		Jhansi	3.5%	0%	0.6%	1.1%	14.7%	2.4%	1.4%	0%	NA	0%	0%
		Gorakhpur	1.4%	0%	0.5%	0%	4.4%	2.1%	1.2%	0%	0%	0%	1.03%
1.2	Dropped Call Rate ($\leq 2\%$)	Allahabad	0.6%	0%	0%	1.9%	0.83%	1.4%	1.9%	0%	0%	0%	2%
		Jhansi	0.9%	0%	1.27%	1.1%	0.78%	0%	0%	0%	NA	2.22%	1.19%
		Gorakhpur	0.7%	0%	0%	0%	0.98%	0%	0.59%	0%	0%	5.17%	1.55%
1.3	% of connections with good voice quality ($\geq 95\%$)												
	(i) 0-4 (w/o frequency hopping)	Allahabad	NA								98.87%	94%	96.06%
		Jhansi	NA								NA	96%	98.30%
		Gorakhpur	NA								99.11%	98%	98.69%
	(ii) 0-5 (with frequency hopping)	Allahabad	93.40%	98.10%	98%	94%	89%	94.22%	95%	100%	NA		
Jhansi		96.40%	96.6%	93%	91.60%	92%	93.92%	95%	96.17%	NA			
Gorakhpur		94.60%	95.2%	98%	96%	94%	93.96%	96%	95.67%	NA			
1.4	Call Setup Success Rate ($\geq 95\%$)	Allahabad	92.77%	99.7%	99.38%	98.06%	95.41%	93.66%	98%	100%	100%	100%	99.33%
		Jhansi	94.73%	100%	96.94%	98.92%	85.28%	95.29%	98.6%	100%	NA	100%	100%
		Gorakhpur	97.12%	100%	99.46%	100%	95.70%	97.26%	99%	98.79%	100%	100%	99%

Key observations as could be derived from the table are as under:

- “Blocked Call Rate” benchmark is not met by Aircel (Allahabad & Jhansi), RCom (GSM) (all 3 cities) & Uninor (Allahabad).
- “Dropped Call Rate” benchmark is not met by RCom (CDMA) in Jhansi and Gorakhpur.
- “% of connection with good voice quality” benchmark is not met by Aircel, BSNL, Idea, RCom (GSM&CDMA) & Uninor in most of the cities.
- “Call Setup Success Rate” benchmark is not met by Aircel (Allahabad & Jhansi), RCom (GSM) in Jhansi & Uninor in Allahabad.

Note: MTS has no service (Spectrum) in Jhansi and similarly Tata (GSM) has no service in Allahabad, Jhansi & Gorakhpur cities. Hence in case of MTS & Tata (GSM) drive test is not applicable in these cities.

Independent Drive Test

.....Submitted as a separate report for this quarter.

CHAPTER-3: AUDIT-PMR VERIFICATION

I. Cellular Mobile Telephone Service

PMR		Bench- mark	Audit	Aircel	Airtel	BSNL	Etisalat	Idea	Rcom GSM	Tata GSM	Uninor	Videocon	Vodafone	MTS	Rcom CDMA	Tata CDMA	
S/N	Name of Parameter			GSM Operators									CDMA Operators				
(A)	Network Service Quality Parameter																
1	Network Availability																
	BTS Accumulated Downtime	≤2%	Reported	0.09%	0.25%	0.56%	4.39%	0.24%	0.49%	0.05%	2.57%	1.19%	0.23%	0%	0.40%	0.03%	
			Verified	0.09%	0.25%	0.56%	4.39%	0.24%	0.49%	0.05%	2.57%	1.19%	0.23%	0%	0.40%	0.03%	
	Worst affected BTSs due to downtime	≤2%	Reported	0.05%	0.74%	3.90%	44.13%	0.08%	1.48%	0.04%	1.82%	1.18%	0.68%	0%	1.20%	0%	
			Verified	0.05%	0.74%	3.90%	44.13%	0.08%	1.48%	0.04%	1.82%	1.18%	0.68%	0%	1.20%	0%	
2	Connection Establishment (Accessibility)																
	CSSR (Call Setup Success Rate)	≥95%	Reported	98.41%	99.20%	97.33%	99.24%	99.63%	99.51%	96.87%	96.13%	97.89%	98.44%	0%	98.53%	99.78%	
			Verified	98.41%	99.20%	97.33%	99.24%	99.63%	99.51%	96.87%	96.13%	97.89%	98.44%	0%	98.53%	99.78%	
	SDCCH/PAGING congestion	≤1%	Reported	0.18%	0.12%	0.70%	0.17%	0.79%	0.34%	0.19%	0.47%	0.44%	0.46%	0%	0%	0%	
			Verified	0.18%	0.12%	0.70%	0.17%	0.79%	0.34%	0.19%	0.47%	0.44%	0.46%	0%	0%	0%	
TCH congestion	≤2%	Reported	0.33%	0.32%	1.47%	0.08%	1.65%	0.59%	1.51%	1.40%	0.48%	0.60%	0%	0.97%	0%		
		Verified	0.33%	0.32%	1.47%	0.08%	1.65%	0.59%	1.51%	1.40%	0.48%	0.60%	0%	0.97%	0%		
3	Connection maintenance (retainability)																
	CDR	≤2%	Reported	0.41%	1.07%	1.60%	0.52%	1.22%	0.30%	1.27%	1.75%	1.42%	1.51%	0%	0.81%	0.12%	
			Verified	0.41%	1.07%	1.60%	0.52%	1.22%	0.30%	1.27%	1.75%	1.42%	1.51%	0%	0.81%	0.12%	
	Worst affected cells>3% TCH drop	≤3%	Reported	2.50%	3.62%	3.50%	2.07%	7.71%	4.54%	3.26%	4.81%	0.69%	5.69%	0%	0.89%	0.04%	
			Verified	2.50%	3.62%	3.50%	2.07%	7.71%	4.54%	3.26%	4.81%	0.69%	5.69%	0%	0.89%	0.04%	
Good voice quality	≥95%	Reported	94.98%	98.44%	97%	97.62%	96.24%	97.83%	95.93%	95.71%	96.40%	96.52%	0%	97.71%	99.78%		
		Verified	94.98%	98.44%	97%	97.62%	96.24%	97.83%	95.93%	95.71%	96.40%	96.52%	0%	97.71%	99.78%		
4	Number of POI having ≥ 0.5% POI congestion	Reported	0	0	0	0	0	0	1	12	11	0	0	0	0		
		Verified	0	0	0	0	0	0	1	12	11	0	0	0	0		
(B)	Customer Service Quality Parameters																
5	Metering/billing credibility-Post paid	≤0.1%	Reported	0.04%	0.02%	0%	NA	NR	0%	0%	NA	NA	0.20%	0%	0%	0.05%	
			Verified	0.04%	0.02%	0%	NA		0%	0%	NA	NA	0.20%	0%	0%	0.05%	
6	Metering /billing credibility-Pre paid	≤0.1%	Reported	0.10%	0.01%	0.07%	0.20%		0.07%	0%	0%	0.09%	0.03%	0.10%	0.06%	0.07%	
			Verified	0.10%	0.01%	0.07%	0.20%		0.07%	0%	0%	0.09%	0.03%	0.10%	0.06%	0.07%	

PMR		Bench- mark	Audit	Aircel	Airtel	BSNL	Etisalat	Idea	Rcom GSM	Tata GSM	Uninor	Videocon	Vodafone	MTS	Rcom CDMA	Tata CDMA		
S/N	Name of Parameter			GSM Operators										CDMA Operators				
7	Resolution of billing/ charging complaints (within 4 weeks)	100%	Reported	100%	100%	100%	100%	NR	100%	100%	100%	100%	100%	100%	100%	100%	100%	
			Verified	100%	100%	100%	100%		100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
	Period of applying credit/waiver/adjustment to the customer's A/C from the date of resolutions of complaints	≤1 week	Reported	100%	100%	100%	NA		100%	100%	NA	100%	100%	100%	100%	100%	100%	100%
			Verified	100%	100%	100%	NA		100%	100%	NA	100%	100%	100%	100%	100%	100%	100%
8	Response time to customers for assistance																	
	Accessibility of call centre/Customer Care	≥95%	Reported	100%	96%	97%	98.44%	NR	44%	100%	95.29%	100%	100%	98%	90.46%	94%		
			Verified	100%	96%	97%	98.44%		44%	100%	95.29%	100%	100%	98%	90.46%	94%		
	% call answered by operators(voice to voice) within 60 sec.	≥90%	Reported	58.25%	82%	97%	98.98%		93%	39%	91.72%	100%	71%	95.10%	94%	72%		
Verified			58.25%	82%	97%	98.98%	93%		39%	91.72%	100%	71%	95.10%	94%	72%			
9	Termination/closure of service																	
	No. of requests for Termination / Closure of service complied within 7 days during the quarter	≤7days	Reported	100%	100%	100%	NA	NR	100%	100%	NA	NA	100%	0%	100%	100%		
			Verified	100%	100%	100%			100%	100%			100%	100%	0%	100%	100%	
10	Time taken for refunds of deposits after closures.(within 60 days)	100%	Reported	100%	100%	100%			100%	100%			100%	100%	100%	100%	0%	100%
			Verified	100%	100%	100%	100%	100%	100%	100%	100%	0%	100%	85%				

Critical Analysis (PMR Verification):

(The figures proved by all the operators match the figures obtained on verification)

- Etisalat & Uninor are not meeting the respective benchmarks for parameter “BTS Accumulated Downtime”.
- BSNL & Etisalat are not meeting the respective benchmarks for parameter “Worst affected BTSs due to downtime”.
- Airtel, BSNL, Idea, RCom (GSM), Tata (GSM), Uninor & Vodafone are not meeting the respective benchmarks for parameter “Worst affected Cells >3% TCH drop”.
- Aircel is not meeting the respective benchmarks for parameter “% of Good voice quality”.
- Tata (GSM), Uninor & Videocon are showing congestion ≥0.5% in 1, 12 & 11 nos. of POIs respectively for the parameter “Number of POI having ≥ 0.5% POI congestion”.
- “Accessibility of call centre/Customer Care” benchmark is not met by RCom (GSM & CDMA) & Tata (CDMA).
- “% call answered by operator (voice to voice) within 60 sec.” benchmark is not met by Aircel, Airtel, Tata (GSM), Vodafone & Tata (CDMA).
- Tata (CDMA) is not meeting the 60 days' benchmark for parameter “Refund of deposits after closure of connection”.

CHAPTER-4: DETAILED FINDINGS & ANALYSIS

I. Cellular Mobile Telephone Service

(A) MSC Audit

(1) 3 Days Live Data Assessment & Summarized Findings

S/N	Name of Parameter	B-mark	Aircel	Airtel	BSNL	Etisalat	Idea	Rcom GSM	Tata GSM	Uninor	Videocon	V-fone	MTS	Rcom CDMA	Tata CDMA
			GSM Operators										CDMA Operators		
A	Network Service Quality Parameter														
	a) BTS Accumulated Downtime	<=2%	0.34%	0.32%	1.80%	0.88%	0.12%	1.03%	0.09%	1.73%	0.01%	1.61%	0.13%	0.42%	0.06%
	b) Worst affected BTSs due to downtime	<=2%	0%	0%	0.01%	0%	0%	0.73%	0%	0.31%	0%	0.29%	0%	0.94%	0%
	c) Total no. of BTSs in the licensed service area		2,581	8,126	6085	33	5,098	3,146	2,526	3,191	419	8,397	321	2,230	841
	d) Sum of downtime of BTSs in a month in hours i.e. total outage time of all BTSs in hours during a month		630	1864	7902	21	436	2,341	158	3,964	4	9,730	31	676	37
	e) No. of BTSs having accumulated downtime of >24 hours in a month		0	0	24	0	0	23	0	10	0	24	0	21	0
	Connection Establishment (Accessibility)														
	a) CSSR	≥95%	98.16%	99.02%	96%	98.96%	99.82%	99.57%	98.82%	95.62%	98.33%	98.79%	99.48%	98.91%	98.54%
	b) SDCCCH/PAGING congestion	≤1%	0.24%	0.23%	0.67%	0.02%	0.89%	0.35%	0.21%	0.51%	0.56%	0.72%	0%	0%	0%
	c) TCH congestion	≤2%	0.73%	0.34%	1.32%	0.61%	1.38%	0.77%	1.42%	1.30%	0.50%	1.21%	0%	0.99%	0.04%
	Connection maintenance														
2	a) CDR	≤2%	0.69%	1.23%	1.57%	0.33%	1.26%	0.84%	1.37%	1.66%	1.36%	1.58%	0.52%	0.84%	0.67%
	b) Cells having > 3% TCH drop	≤3%	4.07%	2.86%	3.88%	3.70%	2.78%	2.33%	11.93%	4.70%	1.94%	3.83%	2.70%	1.81%	1.90%
	c) Good voice quality	≥95%	96.22%	98.38%	97%	98.92%	95.91%	98.29%	96.42%	95.87%	97.39%	95.90%	99.99%	NA	NA
	d) No. of cells > 3% TCH drop		316	691	709	3	426	220	867	449	24	961	17	40	49
	e) Total no. of cells in the network		7,743	24180	18,255	99	15334	9438	7,266	9554	1257	25123	963	2230	2523
3	Number of POI having ≥0.5% POI congestion		0	0	0	0	0	0	0	5	0	0	0	0	0
	a) Name of POI not meeting the benchmark		Nil	Nil	Nil	Nil	Nil	Nil	Nil	Aircel, irtel, BSNL, Vfone, uninor	Nil	Nil	Nil	Nil	Nil
	b) Total No. of circuits on POI		41743	185503	116433	2001	180166	1588623	5278	81999	80686	230868	6457	1588623	72732
	c) Avg No. of call attempts on POI		2282786	16281617	1596786	14489	8165705	1402833	17325	NP	330	16122240	10042	1401771	38442
	d) Avg traffic served on POI (Erlang)		73073	472837	NP	398	97325	56757	318		3	362179	213	56757	41973

S/N	Name of Parameter	Bench mark	Aircel	Airtel	BSNL	Etisalat	Idea	Rcom GSM	Tata GSM	Uninor	Videocon	V-fone	MTS	Rcom CDMA	Tata CDMA
			GSM Operators											CDMA Operators	
	e) Total number of working POI Service Area wise		116	149	84	23	244	109	9	11	30	76	11	109	206
	f) Equipped Capacity of Network in respect of Traffic in erlang		82003	488292	410800	64	212124	NP	119580	NP	16031	452328	25423	NP	202704
	g) Total traffic handled in TCBH in erlang		29541	363649	250905	143	126035	NP	120557	NP	4	348992	2079	NP	34346
(B)	Customer Service Quality Parameters														
4	Response time to customers for assistance														
	a) Accessibility of call centre	≥95%	100%	86.26%	96.56%	100%	100%	99.19%	100%	97.11%	100%	100%	99.16%	98.98%	100%
	b) % of call answered by operators(voice to voice) within 60 sec	≥90%	76.50%	84.87%	98.48%	100%	81.93%	96.56%	96.36%	99.67%	100%	99.95%	97.33%	96.56%	92.03%
	c) No. of call attempts to call centre / customer care nos. during TCBH (Avg)		200	578411	45955	29	236079	122117	109231	230416	2	262100	525	85833	39803
	d) No. of calls connected and answered successfully to call centre / customer care nos. during TCBH (Avg)		153	490917	45253	29	193410	117911	105260	229665	2	261981	511	82884	36630

NA: Not Applicable, NP: Not Provided

Parameter wise Findings (Live Data Assessment):

The parameter wise key takeouts for the Cellular Mobile Telephone Services providers in UP (East) Service Area is as given below:-

- ***BTS accumulated downtime (benchmark $\leq 2\%$):***
All operators are satisfying the benchmark with values laying between 0.01% and 1.80%.
- ***Worst affected BTSs due to downtime (benchmark $\leq 2\%$):***
All operators are satisfying the benchmark with values laying between 0% and 0.73%.
- ***Call setup success rate (benchmark $\geq 95\%$):*** All operators are satisfying the benchmark with values laying between 95.62% and 99.82%.
- ***SDCCH/PAGING Channel congestion (benchmark $\leq 1\%$):*** All operators are satisfying the benchmark with values laying between 0% and 0.89%.
Note: CDMA operators have provided the data for Paging Channel congestion and GSM operators provided SDCCH Channel congestion.
- ***TCH congestion (benchmark $\leq 2\%$):*** All operators are satisfying the benchmark with values laying between 0% and 1.42%.
- ***Call drop rate (benchmark $\leq 2\%$):*** All operators are satisfying the benchmark with values laying between 0.33% and 1.66%.
- ***Cell exceeding 3% TCH drop (benchmark $\leq 3\%$):*** Except for Aircel, BSNL, Etisalat, Tata (GSM), Uninor & Vodafone, rest of the operators are satisfying the benchmark with value in between 1.81% and 2.86%.
- ***Connections with good voice quality (benchmark $\geq 95\%$):*** RCom CDMA & Tata (CDMA) service providers have declared that the parameter is not system generated. Rests of operators are satisfying the benchmark with values laying between 95.87% and 99.99%.
- ***Number of POI having $\geq 0.5\%$ POI congestion:*** All the operators satisfying the benchmark except Uninor showing high POI congestion in 5 nos. of POIs.
- ***%age of call answered by operator (electronically) (benchmark $>95\%$):*** Except Airtel (86.30%) rests of the operators are satisfying the benchmark with values laying between 96.56% to 100%.
- ***%age of call answered by operator (Voice to voice) (benchmark $>90\%$):*** All the operators are satisfying the benchmark except for Aircel, Airtel & Idea, not satisfying the benchmark value of 90%.

(2) Month Data Assessment & Summarized Findings

S/N	Name of Parameter	Bench mark	Aircel	Airtel	BSNL	Etisalat	Idea	Rcom GSM	Tata GSM	Uninor	Videocon	V-fone	MTS	Rcom CDMA	Tata CDMA
			GSM Operators										CDMA Operators		
(A)	Network Service Quality Parameter														
1	Network Availability														
	a) BTS Accumulated Downtime	≤2%	0.28%	0.35%	0.79%	1.60%	0.17%	1.02%	0.13%	1.81%	1.37%	0.15%	0.23%	0.30%	0.07%
	b) Worst affected BTSs due to downtime	≤2%	1.86%	0.63%	0.003%	0%	0.18%	1.59%	0%	1.91%	1.43%	0.61%	0%	1.57%	0%
	c) Total no. of BTSs in the licensed service area		2581	8,126	0.85%	33	5,098	3,146	2,526	3,191	419	8397	321	2,230	841
	d) Sum of downtime of BTSs in a month in hours i.e. total outage time of all BTSs in hours during a month		5379	21,080	35800	393	6,486	12,159	2,437	43,022	4,272	9565	546	5,040	461
	e) No. of BTSs having accumulated downtime of >24 hours in a month		48	51	140	0	9	50	0	61	6	51	0	35	0
2	Connection Establishment (Accessibility)														
	a) CSSR (Call Setup Success Rate)	≥95%	98.31%	99.20%	97%	98.93%	99.85%	99.53%	98.81%	95.92%	98.38%	98.65%	99.35%	98.85%	98.64%
	b) SDCCH/PAGING congestion	≤1%	0.07%	0.12%	0.70%	0.07%	0.93%	0.42%	0.26%	0.59%	0.39%	0.68%	0%	0%	0%
	c) TCH congestion	≤2%	0.45%	0.33%	1.50%	0.12%	1.30%	0.85%	1.34%	2.04%	0.12%	1.34%	0%	0.98%	0.05%
3	Connection maintenance (retainability)														
	a) CDR	≤2%	0.70%	1.21%	1.60%	0.52%	1.38%	0.79%	1.39%	1.95%	1.26%	1.56%	0.66%	0.84%	0.66%
	b) Worst affected cells>3% TCH drop	≤3%	4.43%	2.85%	4.00%	4.04%	2.93%	2.23%	12.47%	4.84%	2.01%	4.48%	3.33%	1.89%	1.95%
	c) Good voice quality	>=95%	96.37%	98.39%	96%	98.72%	95.83%	98.26%	96.39%	95.88%	97.34%	95.90%	99.99%	NA	NA
	d) Total No. of cells exceeding 3% TCH drop (call drop)		344	688	730	4	449	210	905	461	25	1,126	32	42	50
	e) Total no. of cells in the network		7,743	24,180	18255	99	15,334	9,438	7,266	9,554	1,257	25,123	963	2,230	2,523
4	Number of POI having ≥0.5% POI congestion	<= .5%	0	0	0	0	0	0	0	5	0	0	0	0	0
	a) Name of POI not meeting the benchmark		Nil	Nil	Nil	Nil	Nil	Nil	Nil	Aircel, Airtel, BSNL, v-fone, Uninor	Nil	Nil	Nil	Nil	Nil
	b) Total No. of call attempts on POI (Avg.)		22326648	166027950	1646452	142262	73450779	14358247	151501	689430	4011	162371116	103774	1435247	413961
	c) Total traffic served on POI (Erlang) (Avg.)		2265276	4826407	27290	4070	95555	575095	2,846	28684	96	NP	2215	575095	422686
	d) Total No. of circuits on POI		41743	185503	116433	2001	180166	1588623	5278	81999	80686	230868	6457	1588623	72732
	e) Total number of working POI Service Area wise		116	149	84	23	244	109	9	11	30	76	11	109	206
	f) Capacity of POI		42547	NP	NP	1675	171816	1447113	4996	NP	46849	214306	6058	1447113	15085

S/ N	Name of Parameter	Bench mark	Aircel	Airtel	BSNL	Etisalat	Idea	Rcom GSM	Tata GSM	Uninor	Videocon	V-fone	MTS	Rcom CDMA	Tata CDMA	
			GSM Operators										CDMA Operators			
5	Network Data															
	a) Equipped Capacity of Network Erlang		82003	488292	410800	64	212124	NP	119580	NP	16031	452328	25423	NP	202704	
	b) Total traffic in TCBH in erlang (Avg.)		29541	363649	250905	143	126035	NP	120557	NP	4	348992	2079	NP	34346	
	c) Total no. of customers served (as per VLR) on last day of the month		1254054	12352516	4252859	8809	5707735	NP	1558381	2397921	1705	11736729	117196	NP	518804	
(B)	Customer Service Quality Parameters															
5	Metering/billing credibility-Post paid	≤0.1%	0.10%	0.01%	0.01%	NA	0.02%	0.09%	0.06%	NA	NA	0.09%	0%	0.07%	0.001%	
	a) No. of bills issued during the period		1959	58023	104211	NA	37623	5321	10590	NA	NA	204866	503	118604	67910	
	b) No. of bills disputed including billing complaints during the period		2	6	15	NA	9	5	6	NA	NA	191	0	80	1	
6	Metering /billing credibility-Pre paid	≤0.1%	0.03%	0.003%	0.005%	0.003%	0.02%	0.08%	0.08%	0.03%	0%	0.03%	0.09%	0.05%	0.2%	
	a) No. of charging / credit / validity complaints during the quarter		580	505	450	1	1498	5590	2504	1417	0	4418	153	2465	4008	
	b) Total no. of pre-paid customers at the end of the quarter		2167345	16177042	9535463	38289	7717723	6866112	3060380	4410249	19999	14037713	175608	5140226	1731512	
7	Resolution of billing/ charging complaints(within 4 weeks)	100%	99.66%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	
	a) No. of billing/(post paid) and charging, credit/validity (pre paid) complaints resolved within 4 weeks during the quarter		580	511	465	1	1507	5595	2510	1417	0	25543	153	2545	4111	
	b) Total no. of billing (post paid) and charging, credit / validity (pre paid) complaints received during the quarter		582	511	465	1	1507	5595	2510	1417	0	25543	153	2545	4111	
	c) No. of billing complaints (post paid) and charging, credit/ validity complaints (pre paid) resolved in favour of the customer during the quarter		3	511	465	0	637	489	1	119	0	4609	149	568	296	
	d) No. of complaints disposed on account of not considered as valid complaints during the quarter		577	0	0	1	870	5106	2509	1298	0	20934	4	1977	3815	
	e) Period of applying credit/waiver/adjustment to the customer's account from the date of resolutions of complaints	≤1week	≥1 week	≤1 week	≤1 week	≤1week	≤1 week	≤1week	≤1 week	≤1 week	≤1 week	≤1 week	≤1 week	≤1 week	≤1 week	≤1 week

S/N	Name of Parameter	Bench mark	Aircel	Airtel	BSNL	Etisalat	Idea	Rcom GSM	Tata GSM	Uninor	Videocon	Vodafone	MTS	Rcom CDMA	Tata CDMA
			GSM Operators										CDMA Operators		
(B)	Customer Service Quality Parameters														
8	Response time to customers for assistance														
	a) Accessibility of call centre/Customer Care	≥95%	100%	79.19%	96.97%	98.20%	100%	99.01%	99%	95.99%	100%	100%	98.49%	98.98%	99%
	b) % call answered by operators(voice to voice) within 60 sec.	≥90%	80.07%	86.01%	95.09%	100%	80.19%	87.77%	94%	91.54%	98%	96.47%	96.26%	92.27%	93%
	c) Total no. of call attempts to call centre & customer care nos. during TCBH (Avg.).		118152	6385675	64092	267	2487792	1231073	1139354	2531193	44400	4265847	5770	931883	344007
	d) No. of calls connected and answered successfully to call centre & customer care nos. during TCBH (Avg.).		94600	5492533	60949	267	1995050	1080535	1073686	2317109	392	4115295	5554	859894	319498
9	Termination/closure of service	≤7days	95.12%	100%	59%	NA	100%	100%	100%	NA	NA	99.84%	100%	100%	8%
	a) Total No. of requests for Termination / Closure of service received during the quarter		41	329	480		124	19	125			1852	0	333	729
	b) No.of requests for Termination / Closure of service complied within 7 days during the quarter		39	329	284		124	19	125			1849	0	333	58
10	Time taken for refunds of deposits after closures.(within 60 days)	100%	100%	100%	100%		100%	100%	100%			100%	100%	100%	100%

NA: Not Applicable, NP: Not Provided

Parameter-wise Findings (Month Data Assessment):

The parameter wise key takeouts for the Cellular Mobile Telephone Services providers in UP (East) Service Area is as given below:-

- **BTS accumulated downtime (benchmark $\leq 2\%$):**
All operators are satisfying the benchmark with values laying between 0.07% and 1.81%.
- **Worst affected BTSs due to downtime (benchmark $\leq 2\%$):**
All operators are satisfying the benchmark with values laying between 0% and 1.91%.
- **Call setup success rate (benchmark $\geq 95\%$):**
All operators are satisfying the benchmark with values laying between 95.92% and 99.85%.
- **SDCCH/PAGING Channel congestion (benchmark $\leq 1\%$):**
All operators are satisfying the benchmark with values laying between 0% and 0.93%.
Note: CDMA operators have provided the data for Paging Channel congestion and GSM operators provided SDCCH Channel congestion.
- **TCH congestion (benchmark $\leq 2\%$):**
All operators are satisfying the benchmark with values laying between 0% and 1.34% except Uninor is not meeting the benchmark with the value of 2.04%.
- **Call drop rate (benchmark $\leq 2\%$):**
All operators are satisfying the benchmark with values laying between 0.52% and 1.95%.
- **Cell exceeding 3% TCH drop (benchmark $\leq 5\%$):**
Except Aircel, BSNL, Etisalat, TATA (GSM), Uninor, Vodafone & MTS rest of the operators are satisfying the benchmark with value in between 1.89% and 2.93%.
- **Connections with good voice quality (benchmark $\geq 95\%$):**
RCom (CDMA) & Tata (CDMA) service providers have declared that the parameter is not system generated. Rests of operators are satisfying the benchmark with values laying between 95.83% and 99.99%.
- **Number of POI having $\geq 0.5\%$ POI congestion:**
All the operators satisfying the benchmark except Uninor show high POI congestion in 5 nos. of POIs.
- **%age of call answered by operator (electronically) (benchmark $> 95\%$):**
Except Airtel, all the operators are satisfying the benchmark with values laying between 96.97% and 100%.
- **%age of call answered by operator (Voice to voice) (benchmark $> 90\%$):**
Except Aircel, Airtel, Idea & RCom (GSM), all the operators are satisfying the benchmark with values laying between 91.94% & 100%.
- **Metering and billing credibility-Post paid (benchmark $\leq 0.1\%$):**
Except Aircel, all other operators are satisfying the benchmark.
- **Metering and billing credibility-Pre paid (benchmark $\leq 0.1\%$):**
Except Tata (CDMA), all the operators are satisfying the benchmark.
- **Resolution of billing/ charging complaints (benchmark 100% within 4 weeks):**
Except Aircel, all operators are satisfying the benchmark.
- **Termination/Closure of service (Benchmark ≤ 7 days):**
Except Aircel, Airtel, BSNL, Vodafone & Tata (CDMA), rest operators are satisfying the benchmark.
- **Time taken for refunds of deposits after closures (benchmark 100% within ≤ 60 days):**
All the operators are satisfying the benchmark.

(3) Sample Coverage

Switches/BSC/BTS details of operators:

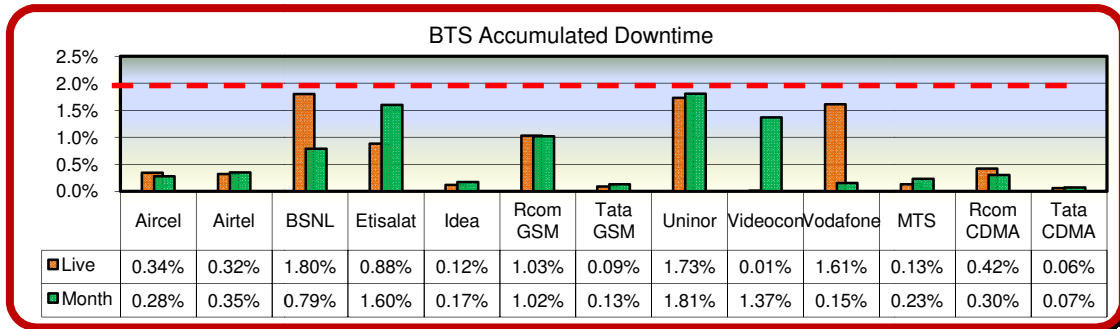
S/N	Name of Service Provider	No. of MSC	No. of BSC	No. of BTS
GSM Operators				
1	Aircel Ltd	3	22	2583
2	Airtel Ltd	39	91	8126
3	BSNL	25	101	6085
4	Etisalat	1	5	33
5	Idea	8	38	5098
6	Reliance Communication (GSM)	4	17	3146
7	Tata Communications (GSM)	4	22	2402
8	Vodafone	20	132	8397
9	Videocon	3	6	419
10	Uninor	7	20	3191
CDMA Operators				
11	MTS (CDMA)	1	1	321
12	Reliance Communication (CDMA)	14	11	2230
13	Tata Communications (CDMA)	5	10	841

(4) Performance (Graphical Representation)

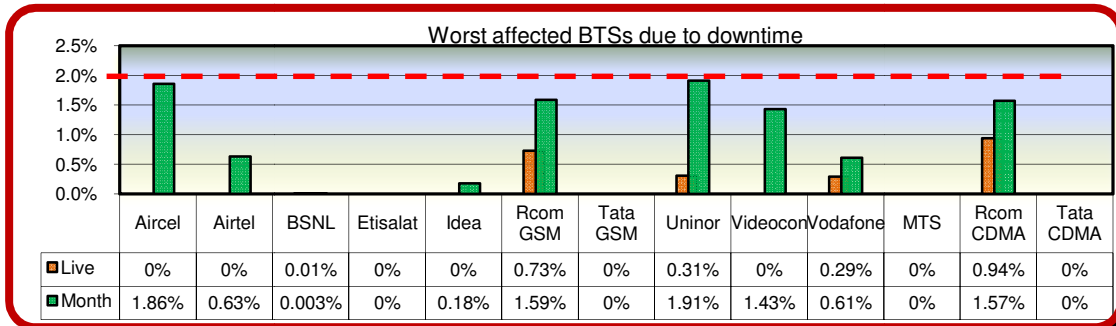
Comparison between Live measurements and One month data Audit – Cellular Mobile Telephone Services

A) NETWORK PERFORMANCE

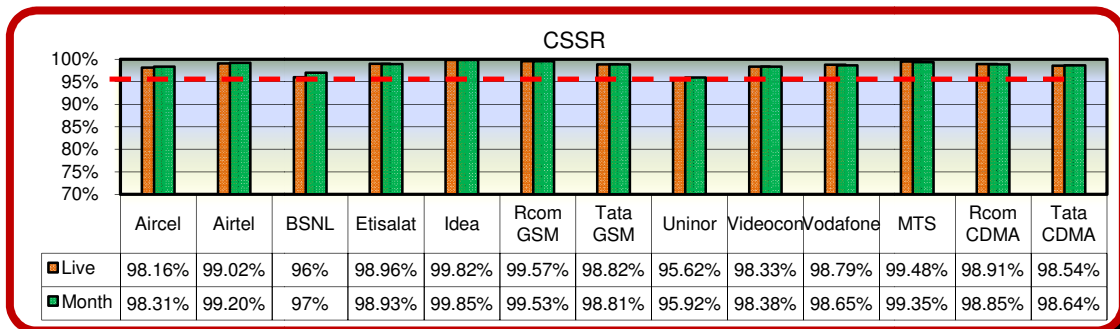
I. (a) *BTS accumulated downtime (benchmark ≤2%)*: All operators are satisfying the TRAI benchmarks (≥95 %) in both live & month of audit.



(b) *Worst affected BTSs due to downtime (benchmark ≤2%)*: All operators are satisfying the TRAI benchmark (≥95 %) in both live & month of audit.

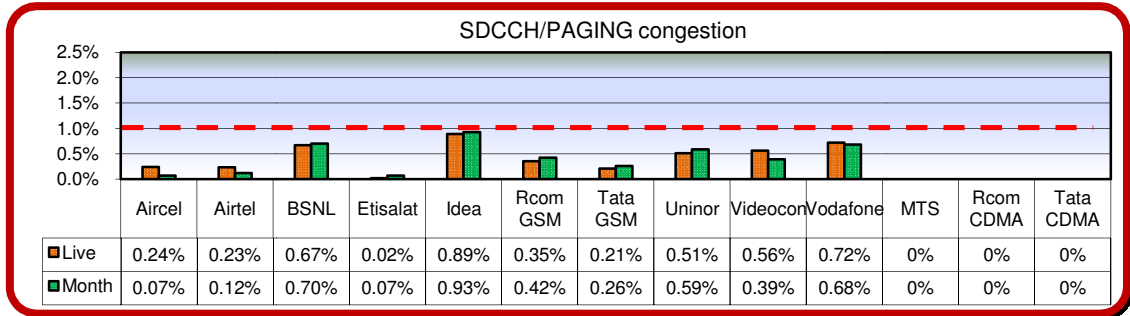


II. *Call setup success rate*: All operators are satisfying the TRAI benchmark (≥95 %) in both live & month of audit.

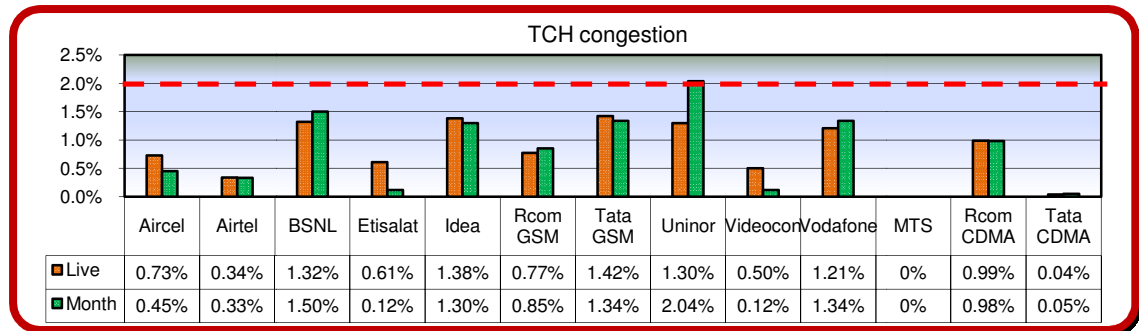


III. Blocked call rate:

SDCCH congestion: All operators are satisfying the TRAI benchmarks ($\leq 1\%$) in both live & month of audit.

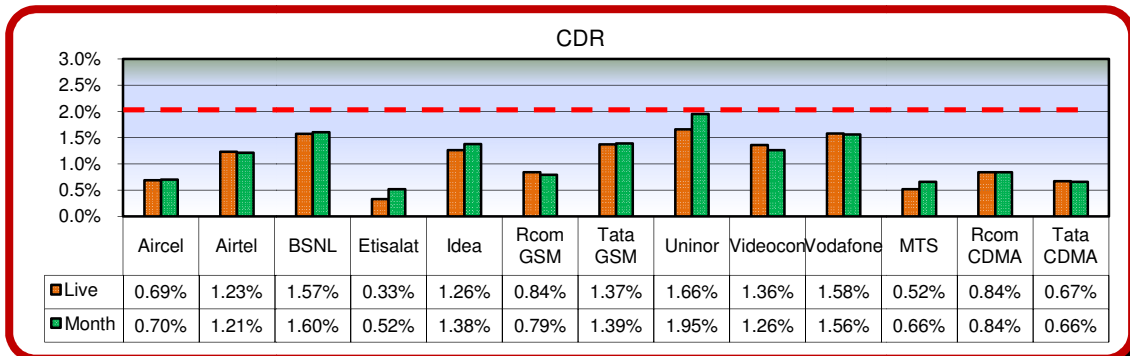


TCH congestion: Except for Uninor in one-month of audit rest of the operators are satisfying the TRAI benchmarks ($\leq 2\%$) in both live & month of audit

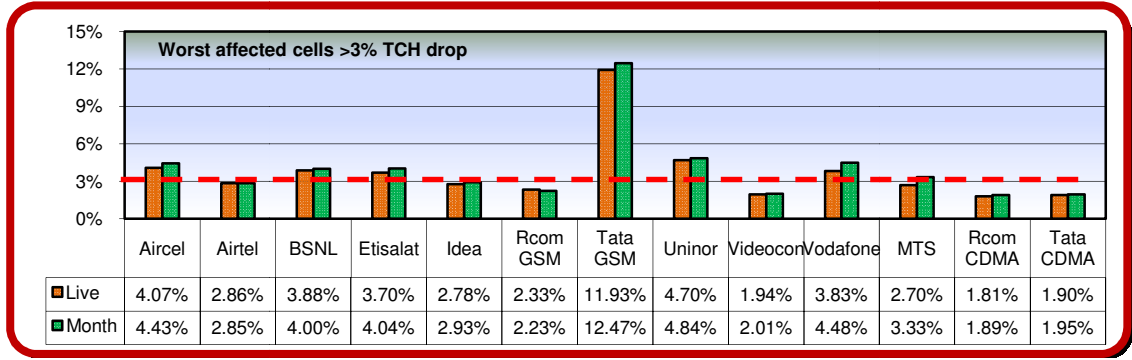


IV. Connection Maintainability (Retainability):

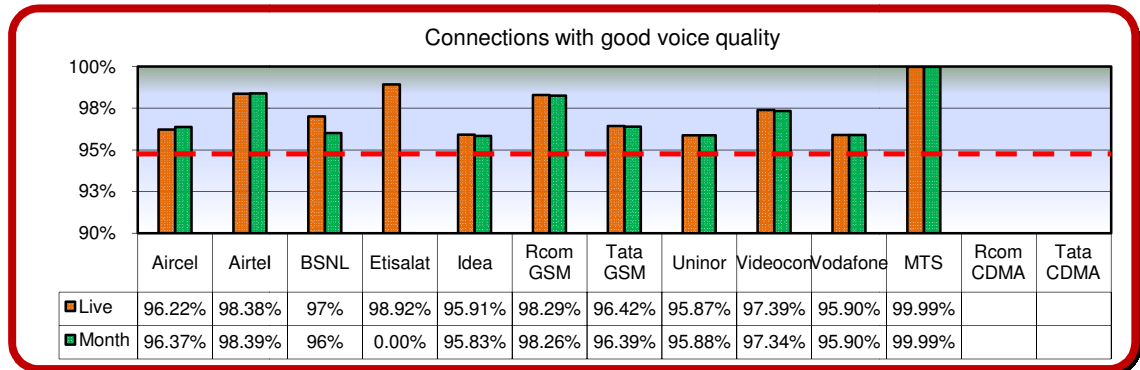
Call drop rate: All operators are satisfying the TRAI benchmarks ($\leq 2\%$) in both live & month of audit.



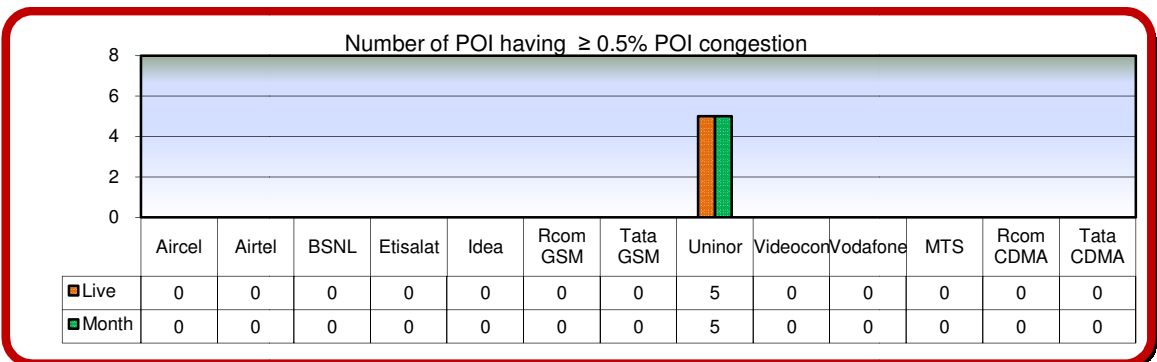
Worst affected Cell exceeding 3% TCH Drop: Aircel, BSNL, Etisalat, TATA (GSM), Uninor, Vodafone & MTS are found not satisfying the benchmark of $\leq 3\%$. Rests of the operators are satisfying the benchmark for both cases.



Percentage of connections with good voice quality: All operators are satisfying the TRAI benchmarks ($\geq 95\%$) in both live & month of audit. RCom (CDMA) & Tata (CDMA) have not provided the system generated data.



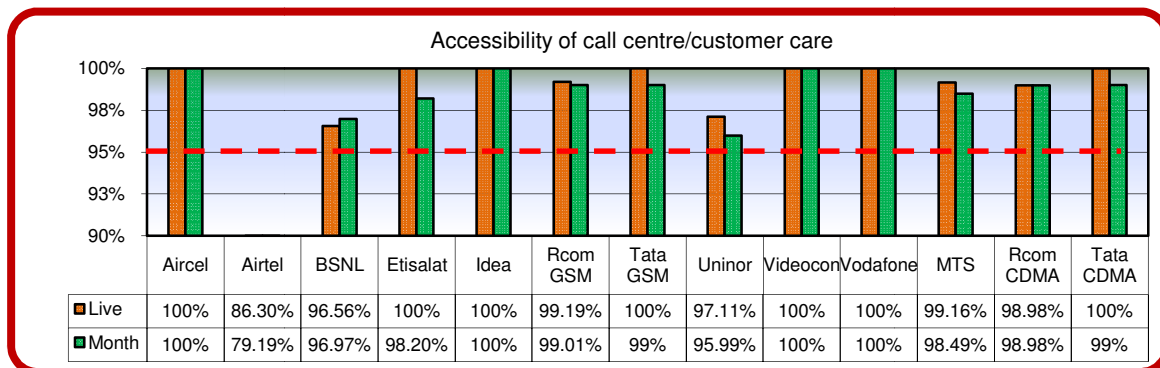
POI Congestion: For both live and month data, In 5 nos. of POIs, Uninor is found not satisfying the benchmark $\geq 0.5\%$. Rests of the operators are satisfying the benchmark for both cases.



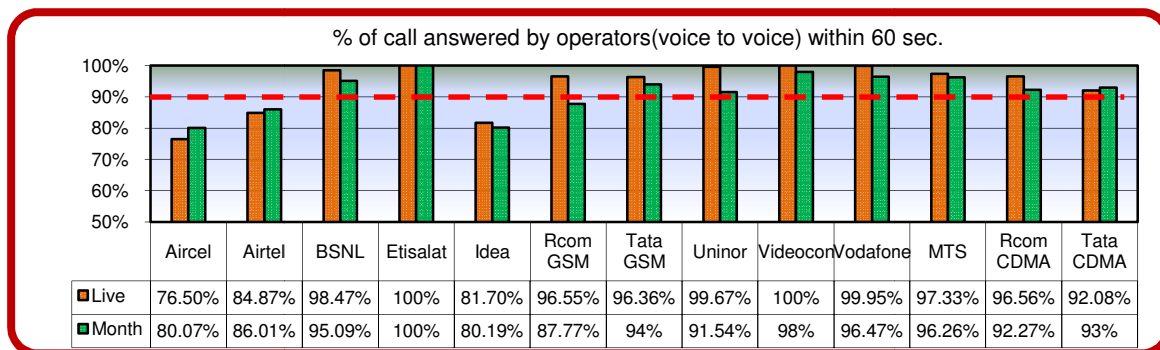
B) CUSTOMER SERVICE QUALITY PARAMETERS

(A) Response time to the customer for assistance:

Percentage of call answered (Electronically): Except Airtel, rest of the operators are satisfying the TRAI benchmarks ($\geq 95\%$) in both live & month of audit.



Percentage of call answered by operators (Voice to voice) within 60 sec: Aircel, Airtel, Idea & RCom (GSM) do not meet the 90% benchmark against this parameter.



(5) Critical Analysis

The above comparative study between live data & month data shows similar trends & consistency in both the cases. However, inconsistency in live & month data was found for parameter “%age of calls answered by operator” for Aircel, Airtel, Idea & RCom (GSM).

Under network parameter “Worst affected cells>3% TCH drop” it is found that Aircel, BSNL, Etisalat, TATA (GSM), Uninor, Vodafone & MTS performance are not satisfactory.

In case of “Number of POI having $\geq 0.5\%$ POI congestion” it is found that only Uninor shows high POI Congestion

(B) Redressal

(1) **Sample coverage:** A sample of billing complaints was taken for each operator and calls were made for assessing the resolution of billing/charging complaints within 4 weeks as claimed by the respective operators.

(2) Performance (live calling for billing complaints)

Calling Operator	Aircel	Airtel	BSNL	Etisalat	Idea	Rcom GSM	Tata GSM	Uninor	Videocon	Vodafone	MTS	Rcom CDMA	Tata CDMA
Total No. of Calls Attempted	100	100	100	1	100	100	100	100	-	100	100	100	100
Total No. of calls Answered	65	470	58	1	13	45	39	34	-	29	56	41	48
Cases resolved with 4 weeks	65	470	58	1	13	45	39	34	-	29	56	41	48
%age of cases resolved	100%	100%	100%	100%	100%	100%	100%	100%	-	100%	100%	100%	100%

Note: The difference between call attempts and call answer is because of either Number busy, No response, or out of reach in the Network.

(3) Live calling to Call Center

Calling Operator	Aircel	Airtel	BSNL	Etisalat	Idea	Rcom GSM	Tata GSM	Uninor	Videocon	Vodafone	MTS	Rcom CDMA	Tata CDMA	
Call Centre No.	121	121	1503	121	12345	333	121	198	121	111	155	*333	121	
Total No. of Calls Attempted	100	100	100	No service in Lucknow	100	100	100	100	No service in Lucknow	100	100	100	100	
Total No. of calls connected to IVR	100	100	100		100	100	100	100		100	100	100	100	100
Calls got connected to agent within 60 Sec	77	87	95		82	96	97	97		99	96	96	96	94
%age of calls got answered	77%	87%	95%		82%	96%	97%	97%		99%	96%	96%	96%	94%

(4) Level 1 calling: Allahabad

Lucknow, UP(East) Circle	Emergency no.	No. of calls made	Aircel	Airtel	BSNL	Etisalat	Idea	Rcom GSM	Tata GSM	Uninor	Videocon	Vodafone	MTS	Rcom CDMA	Tata CDMA	
	100	2	2	2	2	No service in Lucknow	2	2	2	2	No service in Lucknow	2	2	2	2	
	101	2	2	2	2		2	2	2	2		2	2	2	2	2
	102	2	2	2	2		2	2	2	2		2	2	2	2	2

Level 1 calling: Jhansi

Jhansi, UP(East) Circle	Emergency no.	No. of calls made	Aircel	Airtel	BSNL	Etisalat	Idea	Rcom GSM	Tata GSM	Uninor	Videocon	Vodafone	MTS	Rcom CDMA	Tata CDMA
	100	2	2	2	2	No service	2	2	2	2	No service	2	2	2	2
	101	2	2	2	2		2	2	2	2		2	2	2	2
	102	2	2	2	2		2	2	2	2		2	2	2	2

Level 1 calling: Gorakhpur

Gorakhpur, UP(East) Circle	Emergency no.	No. of calls made	Aircel	Airtel	BSNL	Etisalat	Idea	Rcom GSM	Tata GSM	Uninor	Videocon	Vodafone	MTS	Rcom CDMA	Tata CDMA
	100	2	2	2	2	No service	2	2	2	2	No service	2	2	2	2
	101	2	2	2	2		2	2	2	2		2	2	2	2
	102	2	2	2	2		2	2	2	2		2	2	2	2

(1) Critical Analysis

Random numbers were selected from the operators' database of billing/metering complaints and calls were made to the customers to get their feedback for complaint redressal. It was found that the operators had made refunds in 100% cases as claimed by their records.

As per test result of operator's Call Center it was found that Aircel, Airtel & Idea performance are below benchmark level. In UP (East) a conclusion may be derived that call center calls are only getting failure after IVR call process stage whereas for IVR call there are no failure for any of the operators.

Level 1 calling i.e. emergency call are getting connected in UP (East) circle, as shown in the table above.

(C) Inter operator call assessment**(1) Sample coverage**

A sample of 2x50 test calls per Service Providers with in the licensed service area (UP (East) Circle) were made between 1100 to 1400 hrs and between 1600 to 1900 hrs.

(2) Performance based on live measurement

Calling Operator	Aircel	Airtel	BSNL	Etisalat	Idea	Rcom GSM	Tata GSM	Uninor	Videocon	Vodafone	MTS	Rcom CDMA	Tata CDMA
Aircel	-	98%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Airtel	100%	-	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
BSNL	100%	91%	-	81%	98%	88%	83%	71%	100%	100%	100%	97%	95%
Etisalat	67%	72%	78%	-	96%	91%	89%	69%	97%	100%	100%	98%	100%
Idea	100%	100%	100%	100%	-	100%	100%	100%	100%	100%	100%	100%	100%
Reliance (GSM)	89%	92%	74%	100%	100%	-	88%	76%	100%	100%	100%	100%	100%
Tata (GSM)	99%	100%	100%	100%	100%	100%	-	100%	100%	100%	100%	100%	100%
Uninor	83%	81%	89%	78%	100%	94%	90%	-	83%	91%	100%	89%	100%
Videocon	98%	100%	100%	83%	100%	91%	100%	100%	-	100%	100%	100%	97%
Vodafone	100%	100%	100%	100%	100%	100%	100%	100%	100%	-	100%	100%	100%
MTS	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	-	100%	100%
Reliance (CDMA)	93%	100%	87%	72%	100%	100%	91%	83%	91%	100%	100%	-	86%
Tata (CDMA)	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	-

(3) Critical Analysis

In the inter-operator call assessment test, calls were made from one operator to other operators so as to check congestion on both the operators' network. In such cases, the radio part, switch part & the POI in-between the operators are involved and hence if any congestion is found in the network, it may be due to any of these parts. The result shows that there is not much congestion on the operator networks.

(D) Drive test of the mobile network of service providers**(1) Sample Coverage**

The Operator Assisted Drive Test was conducted at UP (East) for all the operators. Route covered was about around 300Km depending on city areas within the speed limit of 40Km/hr.

Drive Test Locations**Allahabad**

HIGH DENSE: Grand hotel-mannor-Rajroopur-Kareli-Rambagh-medical-allopiabag-Bagambari-allapur-bank rd-mumforganj-taraffic chauraha-rajapur-High court

MEDIUM DENSE: Hirahalwai-Ashok nagar-Rajapur-YMC school-Ekanki kunj-Hotel ajay-SN Tower- Tashkant marg-Katra-Cooper road

LOW DENSE: Lauther Road-George town-Tagore town-Labour Chauraha-Hanuman mandir-Medical-Colonelganj-Muir road-Dharbanga colony

Jhansi

HIGH DENSE: Lohamandi, Khanderao gate, BKD chauraha, sadar bazar jhansi

MEDIUM DENSE: Khati baba, avas vikas, Nagra, shipri, Chitra churaha

LOW DENSE: Madical College, bus stand, Kanpur Gwalior Bypass

Gorakhpur

HIGH DENSE: Transportnagar,Basantpur,akarganj,yadavcomplex,betiya,hariomngar, Kalimandi, civilline, dharnesh, univercity, gantaghar

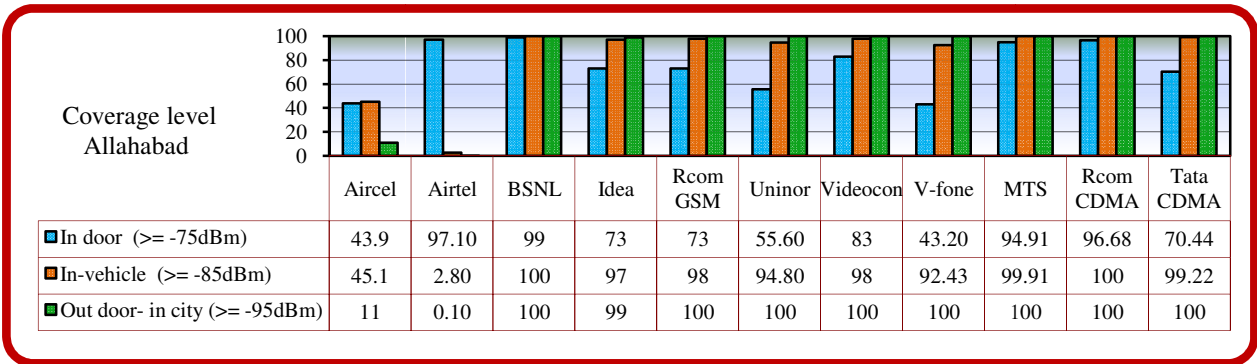
MEDIUM DENSE: Rajendra, gorakhnathsrasulpur, Rapti, Humaynpur, Indralok, Daudpur, mohaddi, Enggcollege, bichiya, shivpur

LOW DENSE: Bhagara, nausad, mohaddipur, awas vikas, nandnagar, rajendra, bhagwaanpur, Gang par, raptinagar)

2) Performance (for the respective cities)

S/N	Parameter	City Name	Aircel	Airtel	BSNL	Idea	Rcom GSM	Uninor	Videocon	V-fone	MTS	Rcom CDMA	Tata CDMA	
			GSM Operators									CDMA Operators		
1.1	Call Attempts	Allahabad	166	212	162	103	240	221	155	174	271	180	150	
		Jhansi	114	111	158	93	129	85	145	116	NA	116	84	
		Gorakhpur	139	166	185	140	205	146	169	155	189	212	194	
1.2	Blocked Call Rate (≤3%)	Allahabad	4.8%	0%	0.6%	2.9%	4.6%	3.6%	1.9%	0%	0%	0%	0.7%	
		Jhansi	3.5%	0%	0.6%	1.1%	14.7%	2.4%	1.4%	0%	NA	0%	0%	
		Gorakhpur	1.4%	0%	0.5%	0%	4.4%	2.1%	1.2%	0%	0%	0%	1.03%	
1.3	Dropped Call Rate (≤2%)	Allahabad	0.6%	0%	0%	1.9%	0.83%	1.4%	1.9%	0%	0%	0%	2%	
		Jhansi	0.9%	0%	1.27%	1.1%	0.78%	0%	0%	0%	NA	2.22%	1.19%	
		Gorakhpur	0.7%	0%	0%	0%	0.98%	0%	0.59%	0%	0%	5.17%	1.55%	
1.4	% of connections with good voice quality (≥95%)													
	(i) 0-4 (w/o frequency hopping)	Allahabad	NA									98.87%	94%	96.06%
		Jhansi	NA									NA	96%	98.30%
		Gorakhpur	NA									99.11%	98%	98.69%
	(ii) 0-5 (with frequency hopping)	Allahabad	93.40%	98.10%	98%	94%	89%	94.22%	95%	100%	NA			
		Jhansi	96.40%	96.6%	93%	91.60%	92%	93.92%	95%	96.17%	NA			
Gorakhpur		94.60%	95.2%	98%	96%	94%	93.96%	96%	95.67%	NA				
1.5	Service Coverage													
	In door (≥ -75dBm)	Allahabad	43.9	97.10	99	73	73	55.60	83	43.20	94.91	96.68	70.44	
		Jhansi	34.4	91	61.53	88.10	33	72.90	71	82.13	NA	47.20	45.22	
		Gorakhpur	60.6	99	98	79	46	74.50	86	73.83	96.50	52.66	80.55	
	In-vehicle (≥ -85dBm)	Allahabad	45.1	2.80	100	97	98	94.80	98	92.43	99.91	100	99.22	
		Jhansi	49.2	7.90	33.44	99.40	78	98.50	90	97.67	NA	80	99.50	
		Gorakhpur	33.8	90	100	98	86	97.70	95	98.40	99.95	80.76	99.16	
	Outdoor- in city (≥ -95dBm)	Allahabad	11	0.10	100	99	100	100	100	100	100	100	100	
		Jhansi	16.4	1.10	4.70	100	94	100	100	99.73	NA	98	100	
Gorakhpur		5.6	0.10	100	100	99	100	100	100	100	95	100		
1.6	CSSR (≥95%)	Allahabad	92.77%	99.7%	99.38%	98.06%	95.41%	93.66%	98%	100%	100%	100%	99.33%	
		Jhansi	94.73%	100%	96.94%	98.92%	85.28%	95.29%	98.6%	100%	NA	100%	100%	
		Gorakhpur	97.12%	100%	99.46%	100%	95.70%	97.26%	99%	98.79%	100%	100%	99%	

Graphical Representation (Allahabad):

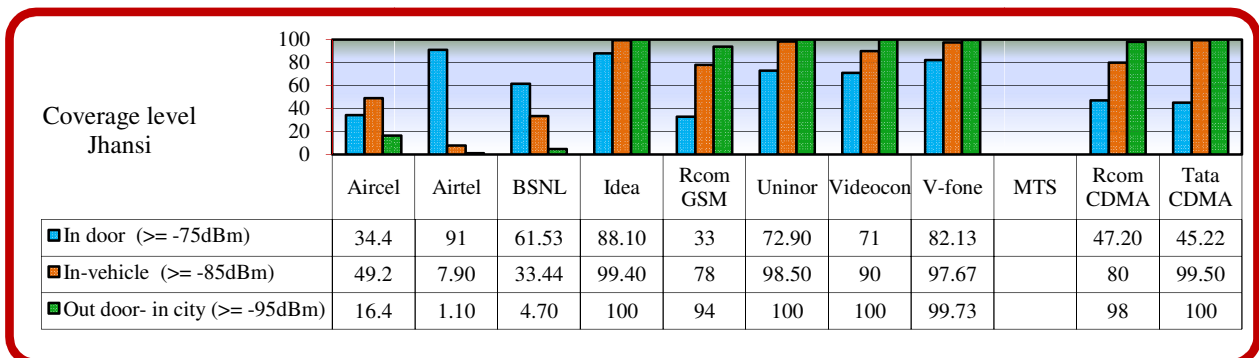


Critical Analysis

The drive test data was found to be satisfactory for most of the parameters. However, a few deviations found are listed below:

- For parameter “Blocked Call Rate” Aircel, RCom (GSM&CDMA) & Uninor are not satisfying the benchmark.
- For parameter “Percentage of connections with good voice quality” Aircel, Idea, RCom (GSM) & Uninor are not satisfying the benchmark.
- For parameter “CSSR” Aircel & Uninor are not satisfying the benchmark.

Graphical Representation (Jhansi):

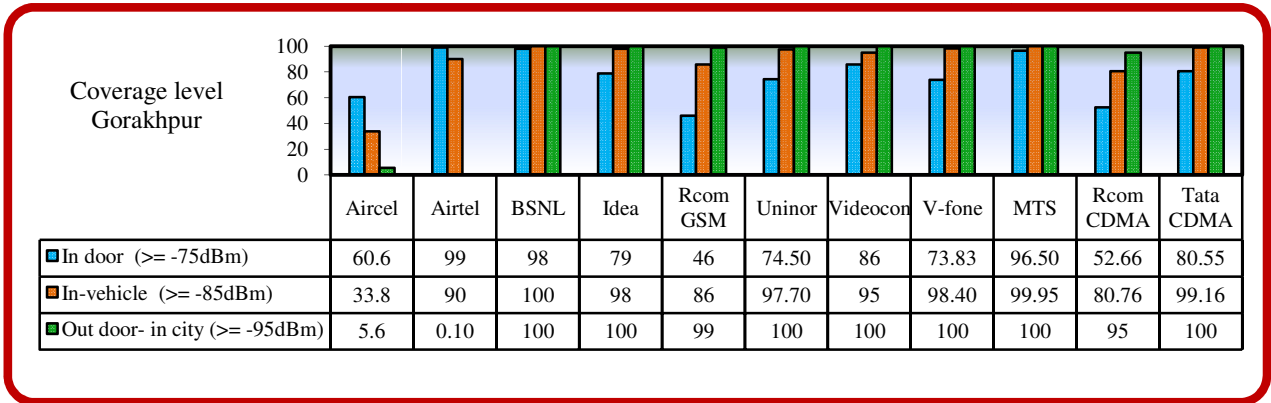


(3) Critical Analysis

The drive test data was found to be satisfactory for most of the parameters. However, a few deviations found are listed below:

- For parameter “Blocked Call Rate” Aircel & RCom (GSM) are not satisfying the benchmark.
- For parameter “Dropped Call Rate” RCom (CDMA) is not satisfying benchmark.
- For parameter “Percentage of connections with good voice quality” BSNL, Idea, RCom(GSM) & Uninor are not satisfying benchmark.
- For parameter “CSSR” Aircel & RCom (GSM) are not satisfying the benchmark.

Graphical Representation (Gorakhpur):



Critical Analysis

The drive test data was found to be satisfactory for most of the parameters. However, a few deviations found are listed below:

- For parameter “Blocked Call Rate” RCom (GSM) is not satisfying the benchmark.
- For parameter “Dropped Call Rate” RCom (CDMA) is not satisfying benchmark.
- For parameter “Percentage of connections with good voice quality” Aircel, RCom (GSM) & Uninor are not satisfying the benchmark.

Note: MTS has no service (Spectrum) in Jhansi and similarly Tata (GSM) also has no service in Allahabad, Jhansi & Gorakhpur cities. so in case of MTS & Tata (GSM) drive test is not applicable in these cities.

(E) Independent Drive Test
.....Submitted as a separate report

(F) Compliance report (Status of service providers with respect to the QoS)

From live, month and PMR findings, it can be concluded that on an average, performance of the operators in the service area (UP (East)) is satisfactory for the **Network Parameters**. However only for the parameter “*Worst affected cells > 3% TCH drop*” it is found that Aircel, BSNL, Etisalat, TATA (GSM), Uninor, Vodafone & MTS performance are not satisfactory.

In case of “*Number of POI having $\geq 0.5\%$ POI congestion*” it is found that only Uninor is showing more than 0.5% congestion in 5 nos. of POIs.

Under **Customer Service Quality Parameter** “*operator answered calls (voice-to-voice) within 60 sec*” parameter Aircel, Airtel, Idea & RCom (GSM) are not fulfilling TRAI benchmark of $\geq 90\%$.

Regarding “*Resolution of billing/ charging complaints*” issues, Aircel is not fulfilling TRAI benchmark of $\geq 100\%$ with a small margin.

During Drive Tests

High “*Blocked Call Rates*” were found in case of Aircel, RCom (GSM) & Uninor.

High “*Dropped Call Rates*” were found in case of RCom (CDMA).

“*%age of connections with good voice quality*” parameter is not met by Aircel, BSNL, Idea, Uninor & RCom (GSM&CDMA).

“*CSSR*” parameter is not satisfying by Aircel, RCom (GSM) & Uninor.

III. Basic Telephone Service (Wireline) Providers

.....Audit not done for this quarter

IV. Broadband Service Providers

.....Audit not done for this quarter