

**REPORT**  
**ON**  
**AUDIT & ASSESSMENT OF QUALITY OF SERVICE**  
**OF**  
**CELLULAR MOBILE TELEPHONE SERVICE**  
**FOR**  
**WEST ZONE**  
**MADHYA PRADESH & CHHATISGARH CIRCLE**

***Report Period: Jan 2011 – March 2011***

**Telecommunications Consultants India Ltd.**  
TCIL Bhawan, Greater Kailash Part – I  
New Delhi – 110048  
Phone: +91-11-26202020 Fax: +91-1126242266  
Internet: <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) Performance based on data collected from MSCs
- 4) 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.

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 MADHYA PRADESH & CHHATISSGARH 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. This has resulted in high value for 'Cell exceeding 3% TCH drop' parameter for some of the service providers.

## CHAPTER-2: EXECUTIVE SUMMARY

### I. Preface

This report highlights the findings for the audit & assessment of Quality of Service of Cellular Mobile Services in MADHYA PRADESH & CHHATISGARH Circle in 1<sup>st</sup> quarter (January – March 2011). The primary data collection and verification of records (PMR data verification – quarterly) maintained by various operators was undertaken for the period July – September 2010.

Following are the various operators covered in MADHYA PRADESH & CHHATISGARH circle (West Zone) for Cellular Mobile (Wireless) services QoS audit & assessment. The Month of audit & TCBH information is also given below:

Sl.	Name of Service Provider	Month of Audit	TCBH Hour
<b>GSM Operators</b>			
1	Aircel Ltd	Feb-2011	1900-2000 Hrs
2	Airtel Ltd	Feb-2011	1900-2000 Hrs
3	BSNL-MP	Mar-2011	1900-2000 Hrs
4	Idea	Mar-2011	1900-2000 Hrs
5	Etisalat		1900-2000 Hrs
6	Reliance Communication (GSM)	Jan-2011	1900-2000 Hrs
7	Tata Communications (GSM)	Feb-2011	2000-2100 Hrs
8	Loop	Mar-2011	1900-2000 Hrs
9	Videocon	Mar-2011	1900-2000 Hrs
10	BSNL CG	Mar-2011	1900-2000 Hrs
11	Vodafone	Feb-2011	1900-2000 Hrs
<b>CDMA Operators</b>			
12	Reliance Communication (CDMA)	Jan-2011	1900-2000 Hrs
13	Tata Communications (CDMA)	Mar-2011	1900-2000 Hrs

**Note: During MP- CG Audit for Q1 it was found that:**

Aircel is in ICR (Intra-Circle Roaming) with TATA D.

## 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 MP	BSNL CG	Etisalat	Idea	Rcom GSM	Tata GSM	Loop	Video -con	Voda- fone	Rcom CDM A	Tata CDMA
S/ N	Name of Parameter														
1	<b>Connection Establishment (Accessibility)</b>														
	a) CSSR (Call Setup Success Rate)	>=95 %	99.18%	98.64%	95.80%	93.43%	99.91%	97.50%	99.44%	99.18%	97.00%	97.79 %	99.34 %	99.88 %	99.54%
	b) SDCCH/PAGING congestion	<=1%	0.27%	0.24%	1.03%	0.47%	0.17%	0.76%	0.17%	0.27%	0.05%	0.07%	0.21%	0.00%	0.00%
	c) TCH congestion	<=2%	0.30%	0.49%	1.73%	3.46%	0.00%	1.01%	1.65%	0.30%	0.34%	1.22%	0.66%	0.13%	0.00%
2	<b>Connection maintenance (retainability)</b>														
	a) CDR	<=2%	0.85%	1.26%	1.41%	3.34%	1.36%	1.39%	1.26%	0.85%	0.11%	1.19%	0.76%	0.78%	0.30%
	b) Worst affected cells>3% TCH drop	<=5%	4.05%	3.50%	4.40%	39.32%	10.46%	8.43%	3.22%	4.05%	0.00%	9.74%	4.61%	0.28%	0.00%
	c) Good voice quality	>=95 %	98.11%	95.08%	NA	NA	96.14%	96.46%	96.80%	98.11%	99.67%	97.54 %	98.07 %	NA	NA
3	<b>No of POIs not meeting benchmark</b>	<=0.5%	0	0	0	0	0	0	0	0	0	0	0	0	0
4	<b>Response time to customers for assistance</b>														
	a) Accessibility of call centre/Customer Care	>=95 %	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
	b) % call answered by operators(voice to voice) within 60 sec.	>=90 %	95%	97%	95%	95%	98%	95%	96%	100%	100%	95%	100%	97%	96%

NA: Not Applicable, NR: Not Received

From the 3 days live data assessment, it is found that all the operators are meeting the network parameters by and large, except for BSNL-CG not meeting the; benchmark for "CSSR", "TCH congestion", "CDR" & "worst affected cells >3% TCH drop"; BSNL-MP for SDCCH congestion; Etisalat, Idea & Videocon for "worst affected cells >3% TCH drop".

Performance related to customer care data is found to be satisfactory for all the operators.



One Month Data Audit		Bench- mark	Aircel	Airtel	BSNL MP	BSNL CG	Etisala t	Idea	Rcom GSM	Tata GSM	Loop	Video- con	Voda- fone	Rcom CDM A	Tata CDMA
S/ N	Name of Parameter														
(A)	<b>Network Service Quality Parameter</b>														
1	<b>Network Availability</b>														
	a) BTS Accumulated Downtime	<=2%	0.01%	0.35%	1.37%	0.56%	1.20%	1.02%	0.10%	0.01%	0.05%	0.45%	0.05%	0.27%	0.00%
	b) Worst affected BTSs due to downtime	<=2%	0.04%	1.83%	4.35%	4.36%	15.69%	1.93%	0.12%	0.04%	0.00%	2.98%	0.08%	0.09%	0.00%
2	<b>Connection Establishment (Accessibility)</b>														
	a) CSSR (Call Setup Success Rate)	>=95%	99.06%	98.54%	95.92 %	93.43 %	99.16%	97.30 %	99.39 %	99.06%	96.46%	97.99 %	99.33%	99.85 %	99.61%
	b) SDCCH/PAGING congestion	<=1%	0.28%	0.31%	1.00%	0.47%	0.11%	0.82%	0.35%	0.28%	0.07%	0.12%	0.08%	0.00%	0.00%
	c) TCH congestion	<=2%	0.28%	0.54%	2.00%	3.46%	0.01%	1.03%	1.80%	0.28%	0.00%	0.86%	0.67%	0.08%	0.00%
3	<b>Connection maintenance (retainability)</b>														
	a) CDR	<=2%	0.83%	1.27%	1.34%	3.34%	1.35%	1.40%	1.30%	0.83%	0.30%	1.17%	0.78%	0.80%	0.29%
	b) Worst affected cells>3% TCH drop	<=5%	3.86%	0.91%	2.74%	39.32 %	14.38%	8.81%	0.03%	3.86%	0.80%	9.64%	2.73%	0.00%	0.00%
	c) Good voice quality	>=95%	98.08%	95.46%	NA	NA	96.15%	96.80 %	96.81 %	98.08%	99.28%	97.54 %	98.07%	NA	NA
4	No of POIs not meeting benchmark	<=0.5%	0	0	0	0	0	0	0	0	0	0	0	0	0
(B)	<b>Customer Service Quality Parameters</b>														
5	<b>Metering/billing credibility-Post paid</b>	<= 0.1%	0.19%	0.03%	NR	0.00%	NA	0.02%	0.11%	0.23%	NA	NA	0.18%	0.10%	0.00%
6	<b>Metering /billing credibility-Pre paid</b>	<= 0.1%	0.03%	0.02%	NR	0.00%	0.00%	0.00%	0.02%	0.10%	0.00%	0.02%	0.05%	0.09%	0.00%
7	<b>Resolution of billing/charging complaints</b>	100% within 4 weeks	100%	100%	NR	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
	a) Period of applying credit/waiver/adjustment to the customers account from the date of resolutions of complaints	<=1 week	100%	100%	NR	NR	100%	100%	100%	100%	100%	100%	100%	100%	100%
8	<b>Response time to customers for assistance</b>														
	a) Accessibility of call centre/Customer Care	>=95%	100.00 %	100.00 %	NR	NR	NR	97.00 %	NR	100.00 %	100.00 %	95.00 %	100.00 %	NR	100.00%
	b) % call answered by operators(voice to voice)	>=90%	98.10%	95.50%	NR	NR	NR	97.24 %	NR	85.50%	100.00 %	95.00 %	68.30%	NR	98.77%

<b>One Month Data Audit</b>		<b>Bench- mark</b>	<b>Aircel</b>	<b>Airtel</b>	<b>BSNL MP</b>	<b>BSNL CG</b>	<b>Etisala t</b>	<b>Idea</b>	<b>Rcom GSM</b>	<b>Tata GSM</b>	<b>Loop</b>	<b>Video- con</b>	<b>Voda- fone</b>	<b>Rcom CDM A</b>	<b>Tata CDMA</b>
<b>S/ N</b>	<b>Name of Parameter</b>		<b>GSM Operators</b>											<b>CDMA Operators</b>	
	within 60 sec.														
<b>9</b>	<b>Termination/closure of service</b>	<i>&lt;=7days</i>	100%	100%	NR	NR	NR	100%	100%	100%	NA	NA	100%	100%	100%
<b>10</b>	<b>Time taken for refunds of deposits after closures.</b>	<i>100% within 60 days</i>	100%	100%	89%	NR	NR	100%	100%	100%	NA	NA	100%	100%	NR

NA: Not Applicable, NR: Not Received

From the month data assessment, it is found that all the operators are meeting the network parameters by and large. Deviations were found for "Worst affected BTSs due to downtime" (BSNL-MP, BSNL-CG, Etisalat & Videocon), "CSSR" (BSNL-CG), "TCH congestion: (BSNL-CG), "CDR" (BSNL-CG) and "Worst affected cells >3% TCH drop" (BSNL-CG, Etisalat, Idea & Videocon).

In Metering and Billing credibility (post-paid), Aircel, Reliance GSM, Vodafone & Tata GSM are not meeting the benchmark.

Performance related to customer care data is found to be satisfactory for most of the operators. However, for the parameter "calls answered by operators (voice-to-voice)", Tata GSM (85.5%) & Vodafone (68.3%) have high deviation from the benchmark value of 90%. BSNL-MP has not meet the 100% criteria for "Refund of deposits after closure within 60 days" with a value of 89%.

**Operator-Assisted Drive Test**

The Operator Assisted Drive Test was conducted at Madhya Pradesh & Chhatisgarh 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 Indore, Bhopal and Raipur . In all the cities, zones were selected for covering different density areas (High, Medium & Low dense areas).

SN	Parameter	City Name	Aircel	Airtel	BSNL	Idea	Rcom GSM	Tata GSM	Videocon	Vodafone	Rcom CDMA	Tata CDMA	
			GSM Operators								CDMA Operators		
1.1	Blocked Call Rate (<=3%)	Indore	1.61%	0.00%	6.10%	10.01%	1.61%	0.64%	0.00%	3.95%	1.31%	0.00%	
		Bhopal	1.70%	1.94%	3.40%	0.60%	1.70%	0.57%	0.00%	0.65%	1.12%	0.00%	
		Raipur	1.94%	0.00%	7.70%	1.36%	1.94%	1.16%	0.62%	2.30%	1.14%	0.00%	
1.2	Dropped Call Rate (<=2%)	Indore	0.55%	0.00%	2.30%	1.30%	0.55%	0.21%	0.00%	0.00%	0.49%	0.00%	
		Bhopal	1.13%	1.92%	1.70%	1.46%	1.13%	0.00%	3.61%	0.00%	0.89%	0.00%	
		Raipur	1.28%	0.98%	5.60%	1.02%	1.28%	0.00%	0.62%	0.00%	0.00%	0.00%	
1.3	Percentage of connections with good voice quality (=>95%)												
	(i) 0-4 (w/o frequency hopping)	Indore										98.80%	97.20%
		Bhopal										98.30%	98.24%
		Raipur										96.87%	98.30%
	(ii) 0-5 ( with frequency hopping)	Indore	95.00%	96.00%	78.80%	97.02%	95.00%	96.08%	97.30%	97.30%			
		Bhopal	96.00%	95.60%	95.00%	97.35%	96.00%	97.01%	95.25%	95.25%			
Raipur		96.00%	95.82%	99.50%	96.28%	96.00%	95.95%	95.59%	95.59%				
1.4	Call Setup Success Rate (>=95%)	Indore	98.39%	100%	93.90%	89.99%	98.39%	99.36%	100%	96.05%	98.69%	100%	
		Bhopal	98.30%	98.06%	96.60%	99.40%	98.30%	99.43%	100%	99.35%	98.88%	100%	
		Raipur	98.06%	100%	92.30%	98.64%	98.06%	98.84%	99.38%	97.70%	98.86%	100%	

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

- Blocked Call Rate benchmark is not met by BSNL in any of the cities covered. Idea & Vodafone have high blocked call rate in Indore (10.01% & 3.95% respectively).
- Dropped Call Rate benchmark is not met by BSNL in Indore & Raipur (2.3% & 5.6% respectively) and Videocon in Bhopal (3.61%).
- "%age of Voice quality connections" parameter is not met by BSNL in Indore.
- CSSR benchmark of 95% is not met by BSNL in Indore & Raipur and Idea in Indore.

### Independent Drive Test

The Independent Drive Test was conducted at MP&CG in Indore ,Bhopal & Raipur. Here again, zones were selected for covering different density areas (High, Medium & Low dense areas).

SN	Parameter	City Name	Aircel	Airtel	BSNL	Idea	Rcom GSM	Tata GSM	Videocon	Vodafone
			GSM Operators							
1.1	Blocked Call Rate (<=3%)	Indore	0.0%	0.0%	3.8%	1.7%	0.6%	0.0%	6.0%	0.0%
		Bhopal	0.0%	7.6%	3.8%	1.5%	0.0%	0.0%	3.0%	0.0%
		Raipur	0.0%	1.0%	6.0%	1.0%	1.7%	0.0%	4.0%	1.0%
1.2	Dropped Call Rate (<=2%)	Indore	0.0%	0.0%	1.9%	0.8%	1.5%	0.0%	1.3%	1.2%
		Bhopal	0.0%	8.6%	2.4%	1.5%	2.8%	0.0%	0.0%	0.0%
		Raipur	0.0%	2.0%	5.1%	1.0%	1.3%	0.0%	0.0%	1.0%
1.3	Percentage of connections with good voice quality (=>95%)									
	(i) 0-5 (with frequency hopping)	Indore	95.94%	96.00%	78.70%	95.03%	95.00%	95.94%	95.00%	92.93%
		Bhopal	95.43%	86.00%	84.00%	95.00%	93.00%	95.43%	95.67%	94.00%
		Raipur	95.23%	98.00%	99.50%	95.02%	93.00%	95.23%	97.42%	82.03%
	(ii) 0-4 ( w/o frequency hopping)									

SN	Parameter	City Name	Aircel	Airtel	BSNL	Idea	Rcom GSM	Tata GSM	Videocon	Vodafone
			GSM Operators							
1.4	Call Setup Success Rate (>=95%)	Indore	100%	100%	96.2%	98.3%	99.4%	100%	94.0%	100%
		Bhopal	100%	92.4%	96.2%	98.5%	100%	100%	97.0%	100%
		Raipur	100%	99.0%	94.0%	99.0%	98.3%	100%	96.0%	99.0%

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

- Blocked Call Rate benchmark is not met by BSNL in any of the cities covered. Airtel has high blocked call rate in Bhopal (7.6%) & Videocon in Indore & Raipur (6% & 4% respectively).
- Dropped Call Rate benchmark is not met by Airtel in Bhopal, BSNL in Bhopal & Raipur and Reliance GSM in Bhopal.
- "%age of Voice quality connections" parameter is not met by Vodafone in any of the cities covered. Also, BSNL in Indore; Airtel, BSNL, Reliance GSM in Bhopal and Reliance GSM in Raipur are deviant from the 95% benchmark for this parameter.
- CSSR benchmark of 95% is not met by Airtel in Bhopal, BSNL in Raipur & Videocon in Indore.

## CHAPTER-3: AUDIT-PMR VERIFICATION

### I. Cellular Mobile Telephone Service

PMR		Bench- mark	Audit	Aircel	Airtel	BSNL	Etisala t	Idea	Rcom GSM	Tata GSM	Loop	Video- con	Voda- fone	Rcom CDMA	Tata CDMA	
S/ N	Name of Parameter			GSM Operators										CDMA Operators		
(A)	<b>Network Service Quality Parameter</b>															
1	<b>Network Availability</b>															
	BTS Accumulated Downtime	<=2%	Reported	ICR with TTSL	0.24%	0.97%	0.63%	1.03%	0.11%	0.03%	0.02%	0.60%	0.16%	0.44%	0.01%	
			Verified		0.24%	0.97%	0.63%	1.03%	0.11%	0.03%	0.02%	0.60%	0.16%	0.44%	0.01%	
	Worst affected BTSs due to downtime	<=2%	Reported		1.24%	2.97%	4.17%	1.79%	0.27%	0.06%	0.00%	2.16%	0.55%	0.90%	0.00%	
			Verified		1.24%	2.97%	4.17%	1.79%	0.27%	0.06%	0.00%	2.16%	0.55%	0.90%	0.00%	
2	<b>Connection Establishment (Accessibility)</b>															
	CSSR (Call Setup Success Rate)	>=95%	Reported	ICR with TTSL	98.78%	97.08%	99.41%	97.47%	97.00%	98.72%	95.88%	98.31%	98.38%	99.85%	99.63%	
			Verified		98.78%	97.08%	99.41%	97.47%	97.00%	98.72%	95.88%	98.31%	98.38%	99.85%	99.63%	
	SDCCH/PAGING congestion	<=1%	Reported		0.17%	1.10%	0.15%	0.63%	0.65%	0.26%	0.18%	0.56%	0.16%	0.00%	0.00%	
			Verified		0.17%	1.10%	0.15%	0.63%	0.65%	0.26%	0.18%	0.56%	0.16%	0.00%	0.00%	
	TCH congestion	<=2%	Reported	0.39%	4.46%	0.01%	1.07%	0.78%	0.17%	0.00%	0.46%	0.62%	0.17%	0.01%		
			Verified	0.39%	4.46%	0.01%	1.07%	0.78%	0.17%	0.00%	0.46%	0.62%	0.17%	0.01%		
3	<b>Connection maintenance (retainability)</b>															
	CDR	<=2%	Reported	ICR with TTSL	1.60%	2.08%	1.45%	1.26%	1.08%	0.75%	0.88%	0.74%	1.60%	1.03%	0.51%	
			Verified		1.60%	2.08%	1.45%	1.26%	1.08%	0.75%	0.88%	0.74%	1.60%	1.03%	0.51%	
	Worst affected cells>3% TCH drop	<=5%	Reported		3.40%	13.18%	0.43%	9.41%	2.80%	2.04%	0.02%	3.75%	4.47%	0.43%	0.06%	
			Verified		3.40%	13.18%	0.43%	9.41%	2.80%	2.04%	0.02%	3.75%	4.47%	0.43%	0.06%	
	Good voice quality	>=95%	Reported	97.28%	98.17%	98.13%	95.15%	96.67%	98.06%	97.88%	98.82%	97.25%	98.40%	99.46%		
			Verified	97.28%	98.17%	98.13%	95.15%	96.67%	98.06%	97.88%	98.82%	97.25%	98.40%	99.46%		
4	<b>No of POIs not meeting benchmark</b>	>=0.5%	Reported	1	0	0	0	0	0	0	0	0	0	0	0	
			Verified	1	0	0	0	0	0	0	0	0	0	0	0	
(B)	<b>Customer Service Quality Parameters</b>															
5	<b>Metering/billing credibility-Post paid</b>	<= 0.1%	Reported	4.93%	0.02%	0.01%	NA	0.03%	0.07%	0.00%	NA	NA	0.08%	0.07%	0.06%	
			Verified	4.93%	0.02%	0.01%	NA	0.03%	0.07%	0.00%	NA	NA	0.08%	0.07%	0.06%	
6	<b>Metering /billing credibility-Pre paid</b>	<= 0.1%	Reported	0.10%	0.00%	0.31%	0.27%	0.01%	0.05%	0.00%	0.00%	0.15%	0.05%	0.07%	0.08%	
			Verified	0.10%	0.00%	0.31%	0.27%	0.01%	0.05%	0.00%	0.00%	0.15%	0.05%	0.07%	0.08%	

S/ N	PMR Name of Parameter	Bench- mark	Audit	Aircel	Airtel	BSNL	Etisala t	Idea	Rcom GSM	Tata GSM	Loop	Video- con	Voda- fone	Rcom CDMA	Tata CDMA	
				GSM Operators										CDMA Operators		
7	<b>Resolution of billing/ charging complaints</b>	100% within 4 weeks	Reported	100.00%	100%	100%	100%	100%	100.0%	100%	NA	100.00%	100%	100%	100%	
			Verified	100.00%	100%	100%	100%	100%	100%	100.0%	100%	NA	100.00%	100%	100%	100%
	Period of applying credit/waiver/adjustment to the customers account from the date of resolutions of complaints	<=1 week	Reported	100.00%	100%	100%	NA	100%	100%	100%	100%	NA	100.00%	100%	100%	100%
			Verified	100.00%	100%	100%	NA	100%	100%	100%	100%	NA	100.00%	100%	100%	100%
8	<b>Response time to customers for assistance</b>	>=95%	Reported	100.00 %	100.00 %	100.00 %	98.71 %	97.00%	60%	100.00 %	100.00 %	100.00 %	100%	98.00%	99.00%	
			Verified	100.00 %	100.00 %	100.00 %	98.71 %	97.00%	60%	100.00 %	100.00 %	100.00 %	100%	98.00%	99.00%	
	% call answered by operators(voice to voice) within 60 sec.	>=90%	Reported	67.99%	96.70%	90.68%	99.64 %	97.38%	63.73%	67.99%	100.00 %	75.00%	93.75%	88.00%	93.88%	
			Verified	67.99%	96.70%	90.68%	99.64 %	97.38%	63.73%	67.99%	100.00 %	75.00%	93.75%	88.00%	93.88%	
9	<b>Termination/closure of service</b>	<=7days	Reported	100.00 %	100.00 %	100.00 %	NA	100.00 %	100.00 %	100.00 %	NA	NA	100.00 %	100.00 %	100.00 %	
			Verified	100.00 %	100.00 %	100.00 %	NA	100.00 %	100.00 %	100.00 %	NA	NA	100.00 %	100.00 %	100.00 %	
10	<b>Time taken for refunds of deposits after closures.</b>	100% within 60 days	Reported	100.00 %	100.00 %	100.00 %	NA	100.00 %	100.00 %	NA	NA	NA	100.00 %	100.00 %	93%	
			Verified	100.00 %	100.00 %	100.00 %	NA	100.00 %	100.00 %	NA	NA	NA	100.00 %	100.00 %	93%	

### Critical Analysis (PMR Verification):

- The figures proved by all the operators match the figures obtained on verification.
- Only Etisalat & BSNL are not meeting the benchmark for the parameter "Worst affected cells>3% TCH drop" with high margins. And also BSNL is not meeting benchmarks in worst affected BTS due to downtime with a value of 2.97%.
- BSNL is not meeting the benchmarks for "SDCCH congestion", "TCH congestion" and "CDR"
- BSNL & Idea are not meeting the benchmark of "worst affected cells >3% TCH drop".
- In case of POI congestion, only Aircel (1%) is not meeting the benchmark.
- In Pre paid connections' metering/billing credibility, BSNL & Etisalat is not meeting the benchmarks.
- "% call answered by operators (voice to voice) within 60 sec." benchmark is not met by Aircel, Tata-GSM, Reliance GSM & Videocon & Tata CDMA.
- "Accessibility of call centre" parameter benchmark is not met by Reliance GSM.

e. Tata-CDMA is not meeting the 60 days' benchmark for "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	Bench- mark	Aircel	Airtel	BSNL MP	BSNL CG	Etisalat	Idea	Rcom GSM	Tata GSM	Loop	Video- con	Voda- fone	Rcom CDMA	Tata CDMA
			GSM Operators											CDMA Operators	
<b>A</b>	<b>Network Service Quality Parameter</b>														
<b>1</b>	<b>Connection Establishment (Accessibility)</b>														
	a) CSSR	$\geq 95\%$	99.18%	98.64%	95.80%	93.43%	99.91%	97.50%	99.44%	99.18%	97.00%	97.79%	99.34%	99.88%	99.54%
	b) SDCCH/PAGING congestion	$\leq 1\%$	0.27%	0.24%	1.03%	0.47%	0.17%	0.76%	0.17%	0.27%	0.05%	0.07%	0.21%	0.00%	0.00%
	c) TCH congestion	$\leq 2\%$	0.30%	0.49%	1.73%	3.46%	0.00%	1.01%	1.65%	0.30%	0.34%	1.22%	0.66%	0.13%	0.00%
<b>2</b>	<b>Connection maintenance</b>														
	a) CDR	$\leq 2\%$	0.85%	1.26%	1.41%	3.34%	1.36%	1.39%	1.26%	0.85%	0.11%	1.19%	0.76%	0.78%	0.30%
	b) Cells having > 3% TCH drop	$\leq 5\%$	4.05%	3.50%	4.40%	39.32%	10.46%	8.43%	3.22%	4.05%	0.00%	9.74%	4.61%	0.28%	0.00%
	c) Good voice quality	$\geq 95\%$	98.11%	95.08%	NA	NA	96.14%	96.46%	96.80%	98.11%	99.67%	97.54%	98.07%	NA	NA
	d) No. of cells > 3% TCH drop		296	811	489	1250	16	1623	250	296	0	361.33	315	6	0
	e) Total no. of cells in the network		7300	7636	11114	3180	153	19057	7788	7300	33	NR	11533	2127	2270
<b>3</b>	<b>No of POIs not meeting benchmark</b>	$\leq 0.5\%$	0	0	0	0	0	0	0	0	0	0	0	0	0
	a) Name of POI not meeting the														



	benchmark														
	b) Total No. of circuits on POI	16650	164252	33505	15123	1185	146529	49083	36665	31	25229	28315	49083	7750	
	c) Avg No. of call attempts on POI	6729	7100121	41849	299162	2998	9041600	742682	102271	36	317723	907615	742682	302132	
	d) Avg traffic served on POI (Erlang)	5909	116762	1866	13863	75	83119	23776	18353	1	15171	17323	23776	7507	
	e) Total number of working POI Service Area wise	53	230	32	12	29	238	107	109	14	92	53	107	175	
	f) Equipped Capacity of Network in respect of Traffic in erlang	107785	295537	127652	5041	1132	228090	89190	107785	115	23654	76096	195210	146780	
	g) Total traffic handled in TCBH in erlang	52194	210169	46751	4518	169	255815	66101	52194	14	401076	36986	55278	55410	

S/N	Name of Parameter	Bench- mark	Aircel	Airtel	BSNL MP	BSNL CG	Etisalat	Idea	Rcom GSM	Tata GSM	Loop	Video- con	Voda- fone	Rcom CDMA	Tata CDMA
			GSM Operators											CDMA Operators	
<b>(B)</b>	<b>Customer Service Quality Parameters</b>														
<b>4</b>	<b>Response time to customers for assistance</b>														
	a) Accessibility of call centre	>=95%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
	b) % of call answered by operators(voice to voice) within 60 sec	>=90%	95.00%	97.00%	95.00%	95.00%	98.00%	95.00%	96.00%	100.00%	100.00%	95.00%	100.00%	97.00%	96.00%
	c) No. of call attempts to call centre / customer care nos. during TCBH (Avg)		100	100	100	100	100	100	100	100	100	100	100	100	100
	d) No. of calls connected and answered successfully to call centre / customer care nos. during TCBH (Avg)		95	96	95	95	98	95	96	95	100	95	100	97	96

NA: Not Applicable, NR: Not Received

### Parameter-wise Findings (Live Data Assessment):

The parameter wise key takeouts for the Cellular Mobile Telephone Services providers in MADHYA PRADESH & CHHATISSGARH Service Area are as given below:-

- **Call setup success rate (benchmark  $\geq 95\%$ ):** All operators, except BSNL-CG, are meeting the benchmark with values lying between 95.80% and 99.91%.
- **SDCCH/PAGING Channel congestion (benchmark  $\leq 1\%$ ):** All operators, except BSNL-MP, are meeting the benchmark with values lying between 0% and 0.76%.  
*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, except BSNL-CG, are meeting the benchmark with values lying between 0% and 1.41%.
- **Call drop rate (benchmark  $\leq 2\%$ ):** All operators, except BSNL-CG, are meeting the benchmark with values lying between 0% and 4.61%.
- **Cell exceeding 3% TCH drop (benchmark  $\leq 5\%$ ):** Except for BSNL-CG, Idea, Etisalat & Videocon, all the operators are satisfying the benchmark with value in between 0% and 4.05%.
- **Connections with good voice quality (benchmark  $\geq 95\%$ ):** CDMA service providers have declared that the parameter is not system generated. Rest of the GSM operators are meeting the benchmark with values lying between 95.08% and 99.67%.
- **POI Congestion (benchmark  $\leq 0.5\%$ ):** No operator has POIs with more than 0.5% congestion. There was no congestion found overall on the POI, but cases were found where individual POIs are showing high utilization/usage. Some are in the range of over 100% though causing no traffic failure due to overflow technique i.e. the extra traffic is carried over by some other operating POI as has been designed to do so.
- **%age of call answered by operator (electronically) (benchmark  $>95$ ):** All operators are meeting the benchmark.
- **%age of call answered by operator (Voice to voice) (benchmark  $>90\%$ ):** All operators are meeting the benchmark.

## (2) Month Data Assessment & Summarized Findings

S/N	Name of Parameter	Bench- mark	Aircel	Airtel	BSNL MP	BSNL CG	Etisalat	Idea	Rcom GSM	Tata GSM	Loop	Video- con	Voda- fone	Rcom CDMA	Tata CDMA
			GSM Operators											CDMA Operators	
(A)	<b>Network Service Quality Parameter</b>														
1	<b>Network Availability</b>														
	a) BTS Accumulated Downtime	<=2%	0.01%	0.35%	1.37%	0.56%	1.20%	1.02%	0.10%	0.01%	0.05%	0.45%	0.05%	0.27%	0.00%
	b) Worst affected BTSs due to downtime	<=2%	0.04%	1.83%	4.35%	4.36%	15.69%	1.93%	0.12%	0.04%	0.00%	2.98%	0.08%	0.09%	0.00%
	c) Total no. of BTSs in the licensed service area		2437	7636	3929	2039	51	6367	2596	2437	11	1238	3897	2127	766
	d) Sum of downtime of BTSs in a month in hours i.e. total outage time of all BTSs in hours during a month		220	18198	40092	8506	456	48154	1873	220	4	4154	1297	4310	2
	e) No. of BTSs having accumulated downtime of >24 hours in a month		1	140	171	89	8	123	3	1	0	37	3	2	0
2	<b>Connection Establishment (Accessibility)</b>														
	a) CSSR (Call Setup Success Rate)	>=95%	99.06%	98.54%	95.92%	93.43%	99.16%	97.30%	99.39%	99.06%	96.46%	97.99%	99.33%	99.85%	99.61%
	b) SDCCH/PAGING congestion	<=1%	0.28%	0.31%	1.00%	0.47%	0.11%	0.82%	0.35%	0.28%	0.07%	0.12%	0.08%	0.00%	0.00%
	c) TCH congestion	<=2%	0.28%	0.54%	2.00%	3.46%	0.01%	1.03%	1.80%	0.28%	0.00%	0.86%	0.67%	0.08%	0.00%
3	<b>Connection maintenance (retainability)</b>														
	a) CDR	<=2%	0.83%	1.27%	1.34%	3.34%	1.35%	1.40%	1.30%	0.83%	0.30%	1.17%	0.78%	0.80%	0.29%
	b) Worst affected cells>3% TCH drop	<=5%	3.86%	0.91%	2.74%	39.32%	14.38%	8.81%	0.03%	3.86%	0.80%	9.64%	2.73%	0.00%	0.00%
	c) Good voice quality	>=95%	98.08%	95.46%	NA	NA	96.15%	96.80%	96.81%	98.08%	99.28%	97.54%	98.07%	NA	NA
	d) Total No. of cells exceeding 3% TCH drop (call drop)		282	211	304	NR	22	1679	246	282	8	362	3	7	0
	e) Total no. of cells in the network		7300	7636	11114	3180	153	19057	7788	7300	33	NR	11533	2127	2270

S/N	Name of Parameter	Bench- mark	Aircel	Airtel	BSNL MP	BSNL CG	Etisalat	Idea	Rcom GSM	Tata GSM	Loop	Video- con	Voda- fone	Rcom CDMA	Tata CDMA
			GSM Operators											CDMA Operators	
4	No of POIs not meeting benchmark	<=0.5%	0	0	0	0	0	0	0	0	0	0	0	0	0
	a) Name of POI not meeting the benchmark		Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil
	b) Total No. of call attempts on POI (Avg.)		6685	7170877	629552	71441	4229	7355386	677677	289958	498	8137244	835372	677677	1644574
	c) Total traffic served on POI (Erlang) (Avg.)		5789	117749	23085	4518	152	78291	21537	19190	3	401076	16490	21537	70173
	d) Total No. of circuits on POI		16650	164252	33505	15123	1185	146529	49083	36665	31	25229	28315	49083	7750
	e) Total number of working POI Service Area wise		53	230	32	12	29	238	107	109	14	92	53	107	175
	f) Capacity of POI		16603	48218	29728	NR	837	140669	45236	33590	NR	NR	28204	45236	6852
5	<b>Network Data</b>														
	a) Equipped Capacity of Network Erlang		107785	295537	127652	5041	1132	228090	89190	107785	115	23654	76096	195210	146780
	b) Total traffic in TCBH in erlang (Avg.)		52194	210169	46751	4518	169	255815	66101	52194	14	401076	36986	55278	55410
	c) Total no. of customers served (as per VLR) on last day of the month		342454	8331903	146740*	663033	9211	10362077	NR	1815640	13	598732	1482720	NR	570090
<b>(B)</b>	<b>Customer Service Quality Parameters</b>														
5	<b>Metering/billing credibility-Post paid</b>	<= 0.1%	0.19%	0.03%	NR	0.00%	NA	0.02%	0.11%	0.23%	NA	NA	0.18%	0.10%	0.00%
	a) No. of bills issued during the period		1041	379161	92338	19673	NA	171183	43489	16601	NA	NA	19930	158734	53000
	b) No. of bills disputed including billing complaints during the period		2	1097	NR	1	NA	30	47	46	NA	NA	37	162	33
6	<b>Metering /billing credibility-Pre paid</b>	<= 0.1%	0.03%	0.02%	NR	0.00%	0.00%	0.00%	0.02%	0.10%	0.00%	0.02%	0.05%	0.09%	0.00%
	a) No. of charging / credit / validity complaints during the quarter		190	11465	NR	648	2	918	1471	4339	0	179	1494	387	3103
	b) Total no. of pre-paid customers at the end of the quarter		702746	7291028	2859445	1028162	30110	10173144	6247800	4082880	88	1017627	2587354	4084649	1391905

S/N	Name of Parameter	Bench- mark	Aircel	Airtel	BSNL MP	BSNL CG	Etisalat	Idea	Rcom GSM	Tata GSM	Loop	Video- con	Voda- fone	Rcom CDMA	Tata CDMA
			GSM Operators											CDMA Operators	
7	<b>Resolution of billing/ charging complaints</b>	<i>100% within 4 weeks</i>	100%	100%	NR	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		19	12562	NR	649	2	948	1518	4385	0	3408	1531	549	6038
	b) Total no. of billing (post paid) and charging, credit / validity (pre paid) complaints received during the quarter		19	12562	NR	649	2	948	1518	4385	0	3408	1531	549	6038
	c) No. of billing complaints (post paid) and charging, credit/ validity complaints (pre paid) resolved in favour of the customer during the quarter		16	1313	NR	NR	0	0	70	17	0	NR	159	341	3136
	d) No. of complaints disposed on account of not considered as valid complaints during the quarter		1	11249	NR	NR	2	9609	1448	4368	0	NR	1372	208	43
	e) Period of applying credit/waiver/adjustment to the customers account from the date of resolutions of complaints	<i>&lt;=1 week</i>	100%	100%	NR	NR	100%	100%	100%	100%	100%	100%	100%	100%	100%

S/N	Name of Parameter	Bench- mark	Aircel	Airtel	BSNL MP	BSNL CG	Etisalat	Idea	Rcom GSM	Tata GSM	Loop	Video- con	Voda- fone	Rcom CDMA	Tata CDMA
			GSM Operators											CDMA Operators	
8	<b>Response time to customers for assistance</b>														
	a) Accessibility of call centre/Customer Care	>=95%	100.00%	100.00%	NR	NR	NR	97.00%	NR	100.00%	100.00%	95.00%	100.00%	NR	100.00%
	b) % call answered by operators(voice to voice) within 60 sec.	>=90%	98.10%	95.50%	NR	NR	NR	97.24%	NR	85.50%	100.00%	95.00%	68.30%	NR	98.77%
	c) Total no. of call attempts to call centre & customer care nos. during TCBH (Avg.).		24164	64874	NR	NR	NR	1065551	NR	581391	10	67559	693963	NR	504485
	d) No. of calls connected and answered successfully to call centre & customer care nos. during TCBH (Avg.).		23704	61961	NR	NR	NR	1034791	NR	497255	10	66138	473505	NR	498315
9	<b>Termination/closure of service</b>	<=7days	100%	100%	NR	NR	NA	100%	100%	100%	NA	NA	100%	100%	100%
	a) Total No. of requests for Termination / Closure of service received during the quarter		15	4240	237	NR	NA	1244	52	352	NA	NA	881	439	NR
	b) No.of requests for Termination / Closure of service complied within 7 days during the quarter		15	4240	211	NR	NA	1244	52	352	NA	NA	881	439	NR
10	<b>Time taken for refunds of deposits after closures.</b>	100% within 60 days	100%	100%	89%	NR	NA	100%	100%	100%	NA	NA	100%	100%	NR

NA: Not Applicable, NR: Not Received

\* The VLR count of BSNL MP is only for Bhopal city.

### Parameter-wise Findings (Month Data Assessment):

The parameter wise key takeouts for the Cellular Mobile Telephone Services providers in MADHYA PRADESH & CHHATISSGARH Service Area are as given below:-

- **BTS accumulated downtime (benchmark  $\leq 2\%$ ):** All operators are meeting the benchmark with values lying between 0.05% and 2.99%.
- **Worst affected BTSs due to downtime (benchmark  $\leq 2\%$ ):** All operators, except BSNL-MP, BSNL-CG, Etisalat & Videocon, are meeting the benchmark with values lying between 0% and 1.93%, respectively.
- **Call setup success rate (benchmark  $\geq 95\%$ ):** All operators, except BSNL-CG, are meeting the benchmark with values lying between 95.92% and 99.85%.
- **SDCCH/PAGING Channel congestion (benchmark  $\leq 1\%$ ):** All operators are meeting the benchmark with values lying between 0% and 1%.  
*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, except BSNL-CG, are meeting the benchmark with values lying between 0% and 2%.
- **Call drop rate (benchmark  $\leq 2\%$ ):** All operators, except BSNL-CG, are meeting the benchmark with values lying between 0.29% and 1.40%.
- **Cell exceeding 3% TCH drop (benchmark  $\leq 5\%$ ):** All operators are meeting the benchmark with values lying between 0% and 3.86%, except BSNL-CG, Etisalat, Idea & Videocon.
- **Connections with good voice quality (benchmark  $\geq 95\%$ ):** CDMA service providers have declared that the parameter is not system generated. Rest of the GSM operators are meeting the benchmark with values lying between 95.46% and 99.28%.
- **POI Congestion (benchmark  $\leq 0.5\%$ ):** There was no congestion found overall on the POI, but cases were found where individual POIs are showing high utilization/usage. Some are in the range of over 100% though causing no traffic failure due to overflow technique i.e. the extra traffic is carried over by some other operating POI as has been designed to do so.
- **%age of call answered by operator (electronically) (benchmark  $>95\%$ ):** All operators are meeting the benchmark.
- **%age of call answered by operator (Voice to voice) (benchmark  $>90\%$ ):** All operators are meeting the benchmark, except for Tata GSM (85.5%) & Vodafone (68.3%).
- **Metering and billing credibility-Post paid (benchmark  $\leq 0.1\%$ ):** All other operators are meeting the benchmark, except Aircel, Reliance GSM, Vodafone & Tata GSM
- **Metering and billing credibility-Pre paid (benchmark  $\leq 0.1\%$ ):** All the operators are meeting the benchmark with values lying between 0% and 0.02%.
- **Resolution of billing/ charging complaints (benchmark 100% within 4 weeks):** All operators are meeting the benchmark.
- **Termination/Closure of service (Benchmark  $\leq 7$  days** All operators are meeting the benchmark.
- **Time taken for refunds of deposits after closures (benchmark 100% within  $\leq 60$  days):** All operators are meeting the benchmark except for BSNL-MP with a value of 89%.



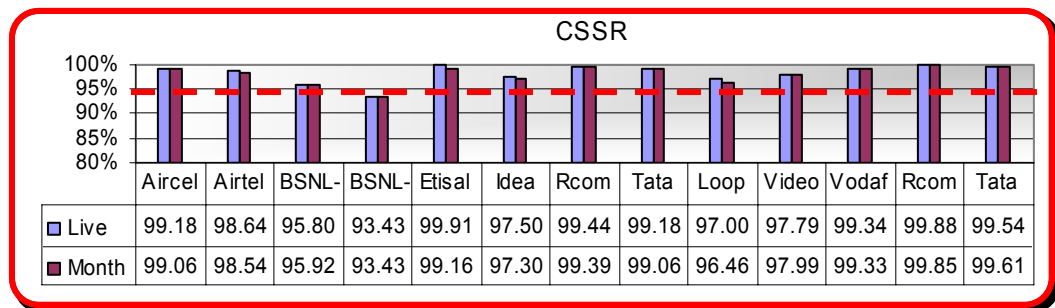
**(1) Sample Coverage**

Switches/BSC/BTS details of operators:

Sl.	Name of Service Provider	No. of MSC	No. of BSC	No. of BTS
<b>GSM Operators</b>				
1	Aircel Ltd	4	24	2437
2	Airtel Ltd	18	137	7636
3	BSNL	7	87	3929
4.	Etisalat			
5	Idea	26	49	6367
6	Reliance Communication (GSM)	7	92	2596
7	Tata Communications (GSM)	4	24	2437
8	Loop	1	1	11
9	Videocon	1	8	1238
10	BSNL CG			
11	Vodafone	4	41	3897
<b>CDMA Operators</b>				
12	Reliance Communication (CDMA)	6	-	2127
13	Tata Communications (CDMA)	4	-	766

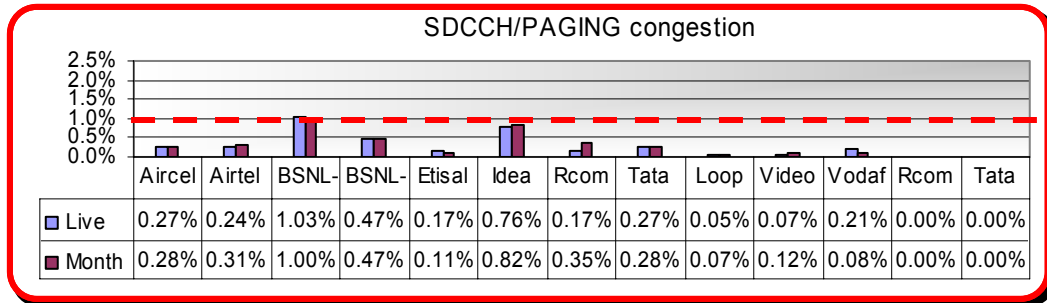
**(2) Performance (Graphical Representation)****Comparison between Live measurements and One month data Audit – Cellular Mobile Telephone Services****A) NETWORK PERFORMANCE**

- I. Call setup success rate:** All operators are meeting the TRAI benchmarks ( $\geq 95\%$ ) for both one month data and 3 days live data taken in the month of audit.

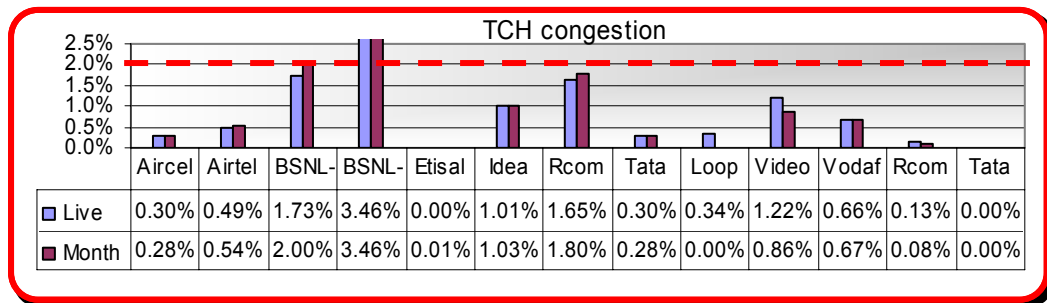


**II. Blocked call rate:**

**SDCCH congestion (%):** All operators are meeting the TRAI benchmarks ( $\leq 1\%$ ) for both one month data and 3 days live data taken in the month of audit, except for BSNL-MP in live data.

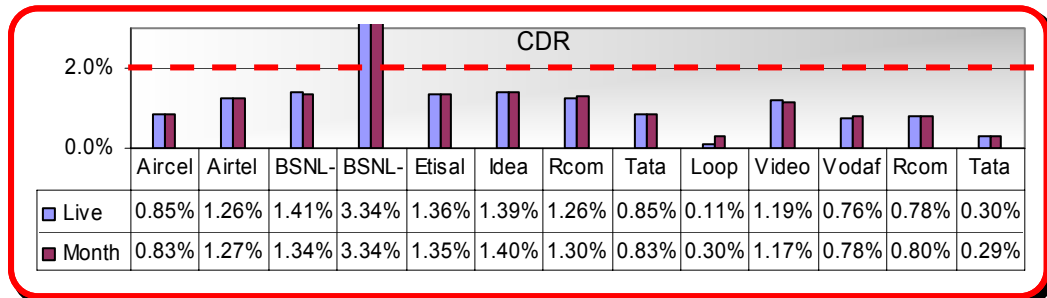


**TCH congestion (%):** All operators are meeting the TRAI benchmarks ( $\leq 2\%$ ) for both one month data and 3 days live data taken in the month of audit, except for BSNL-MP in live data.

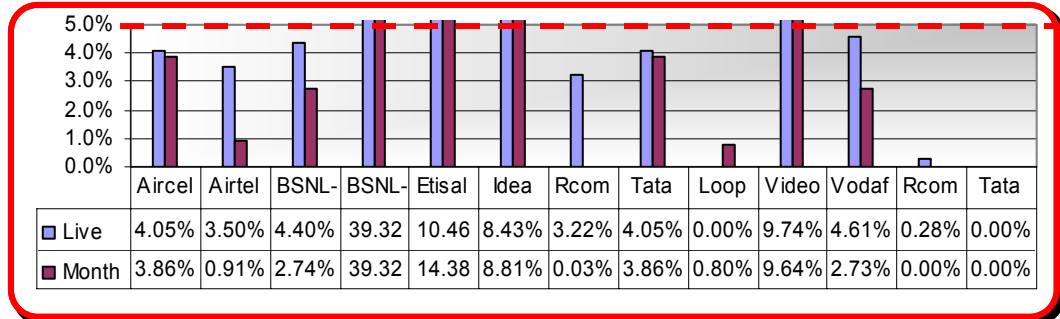


**III. Connection Maintainability (Retainability):**

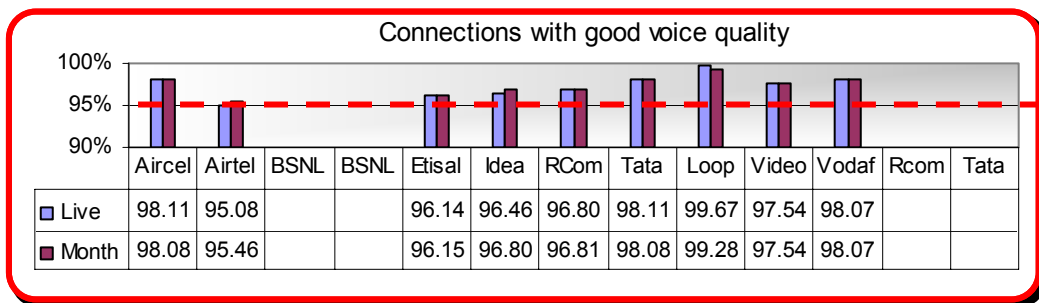
**Call drop rate (%):** All operators are meeting the TRAI benchmarks ( $\leq 2\%$ ) for both one month data and 3 days live data taken in the month of audit, except for BSNL-MP.



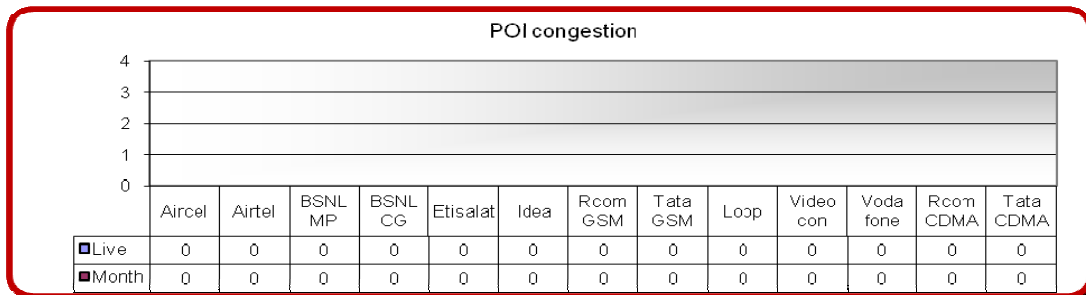
**Worst affected Cell exceeding 3% TCH Drop:** For both live and month data, BSNL-MP with a value of 39.32% & 39.32%, Etisalat with a value 10.46% and 14.38%, Idea with values of 8.43% and 8.81% and Videocon with a value of 9.74% and 9.64% are found not meeting the benchmark of  $\leq 5\%$ . Rest of the operators are meeting the benchmark for both cases.



**Percentage of connections with good voice quality (benchmark  $\geq 95\%$ ):** All operators are meeting the TRAI benchmarks ( $\Rightarrow 95\%$ ) for both one month data and 3 days live data taken in the month of audit.



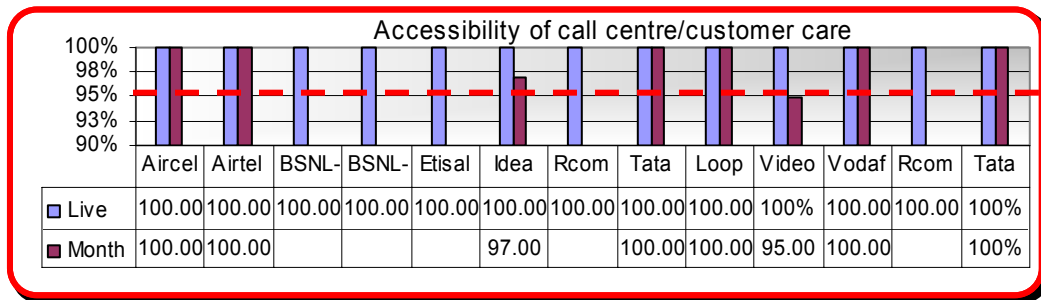
**POI Congestion:** All operators are meeting the TRAI benchmarks ( $\leq 0.5\%$ ) for both one month data and 3 days live data taken in the month of audit.



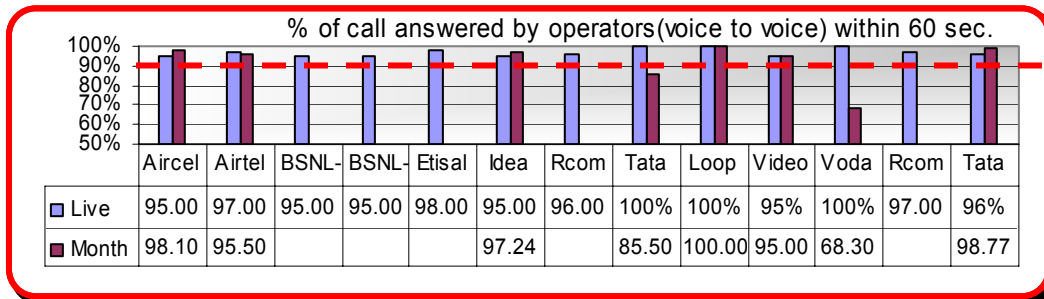
B) CUSTOMER SERVICE QUALITY PARAMETERS

(A) Response time to the customer for assistance:

**Percentage of call answered (Electronically):** All operators are meeting the TRAI benchmarks ( $\geq 95\%$ ) for both one month data & live data audit.



**Percentage of call answered by operators (Voice to voice) within 60 sec:** For Live data, all operators are meeting the benchmark. For month data, only Tata GSM & Vodafone are not meeting the benchmark.



(3) Critical Analysis

The above comparative study between live data & month data shows similar trends in both the cases. However, inconsistency in live & month data was found for parameters like “worst affected cells >3% TCH drop” in Airtel, BSNL-MP, Reliance GSM & Vodafone and “%age of calls answered by operator” in Tata GSM & Vodafone.

**(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	BSNLM P	BSNL CG	Idea	Reliance (GSM)	Tata (GSM)	Videocon	Vodafone	Reliance (CDMA)	Tata (CDMA)
<b>Total No. of calls</b>	50	100	-	50	100	40	70	40	60	80	30
<b>Cases resolved with 4 weeks</b>	50	100	-	50	100	40	70	40	60	80	30
<b>%age of cases resolved</b>	100%	100%	-	100%	100%	100%	100%	100%	100%	100%	100%

**(3) Live calling to Call center:**

Fifty nos. of calls were made at Bhopal in each half and below given no. of calls got connected to the call center within 60 Sec.

	Calls made	OPERATORS NAME											
		Aircel	Airtel	BSNL	Etisalat	Idea	Rcom	Tata	Loop	Videocon	Vodafone	Rcom	Tata
		GSM										CDMA	
1ST HALF (10AM TO 01 PM)	50	44	43	47	40	44	45	44	47	44	40	44	44
2ND HALF (04PM TO 07 PM)	50	43	38	41	38	40	34	40	42	39	27	36	38
In % age		87.00	81.00	88.00	78.00	84.00	79.00	84.00	89.00	83.00	67.00	80.00	82.00

**(4) Level 1 Calling:** Level 1 calling such as calling at emergency no. (Police, Fire, Hospital), Railway enquiry system etc were made in few nos. so as to check the service of such short codes. In Bhopal & Raipur it was found to be functional.

**(5) 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.

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

A sample of 2x50 test calls per Service Providers with in the licensed service area (MP & CG Circle) were made between 1900-2100 hrs so that TCBH hours for all the operators were covered.

**(2) Performance based on live measurement**

Calling Operator	Aircel	Airtel	BSNL- MP	BSNL- CG	Etisalat	Idea	Reliance (GSM)	Tata (GSM)	Videocon	Vodafone	Loop	Reliance (CDMA)	Tata (CDMA)
<b>Aircel</b>	-	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
<b>Airtel</b>	100%	-	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
<b>BSNL</b>	100%	100%	-	100%	100%	100%	98%	100%	100%	100%	100%	100%	100%
<b>Etisalat</b>	100%	100%	100%	-	-	100%	100%	100%	100%	100%	100%	99%	100%
<b>Idea</b>	100%	99%	100%	100%	100%	-	100%	100%	100%	100%	100%	100%	100%
<b>Reliance (GSM)</b>	100%	100%	100%	100%	100%	100%	-	100%	100%	100%	100%	100%	100%
<b>Tata (GSM)</b>	95%	93%	100%	100%	100%	100%	96%	-	100%	100%	100%	100%	100%
<b>Videocon</b>	100%	96%	94%	100%	100%	100%	97%	100%	-	98%	100%	100%	98%
<b>Vodafone</b>	99%	100%	100%	100%	100%	100%	100%	100%	100%	-	100%	100%	100%
<b>Loop</b>	100%	100%	100%	100%	100%	100%	96%	100%	100%	100%	-	100%	100%
<b>BSNL CG</b>	100%	98%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
<b>Reliance (CDMA)</b>	100%	100%	100%	-	100%	100%	100%	100%	100%	100%	100%	-	100%
<b>Tata (CDMA)</b>	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 Madhya Pradesh & Chhatissgarh circle for all the operators. Route covered was about around 80-100Km depending on city areas within the speed limit of 30Km/hr.

**Drive Test Locations*****INDORE***

LOW DENSE: Bandganga, Palasia, pardesipura.  
 MEDIUM DENSE: Sudama Nagar, Vijay Nagar, Satna sangeta  
 HIGH DENSE: Rajwada, Malharganj, Siya ganj., Bus stand

***BHOPAL***

LOW DENSE: Ashok garden, subhash nagar, MP nagar., New market  
 MEDIUM DENSE: Saket Nagar, Habibganj,Dus no,11no,12no.  
 HIGH DENSE: Budhwara, Mangalwara,Jincy square, Bus Stand.

***RAIPUR***

LOW DENSE: Mana , Mandiharsud  
 MEDIUM DENSE: Pota, Tatibandh, bus stand.  
 HIGH DENSE: Sadar, Sunder Nagar, Govind nagar.

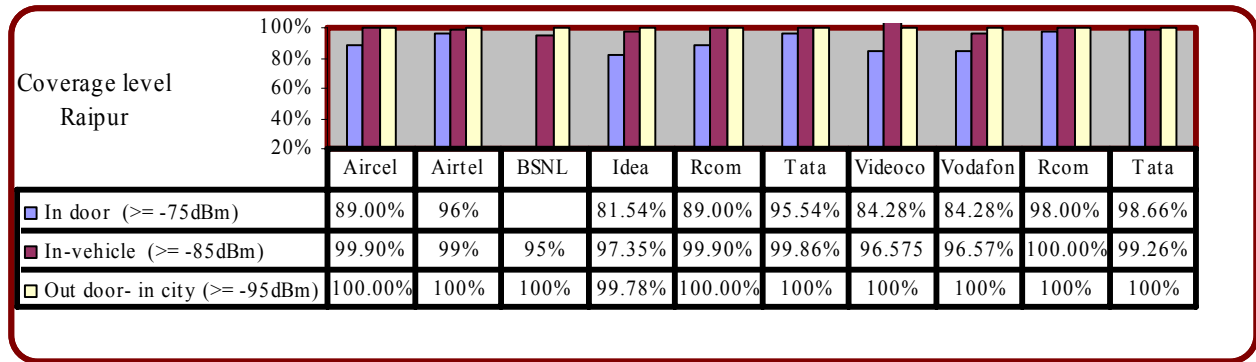
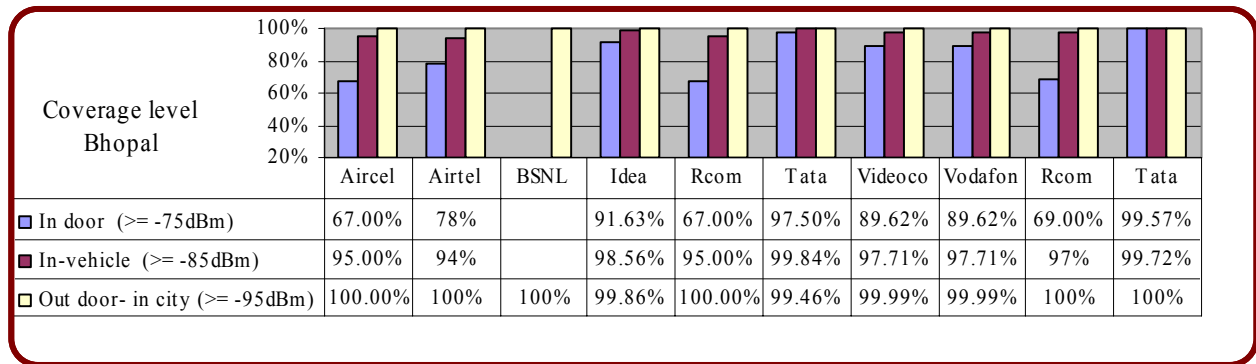
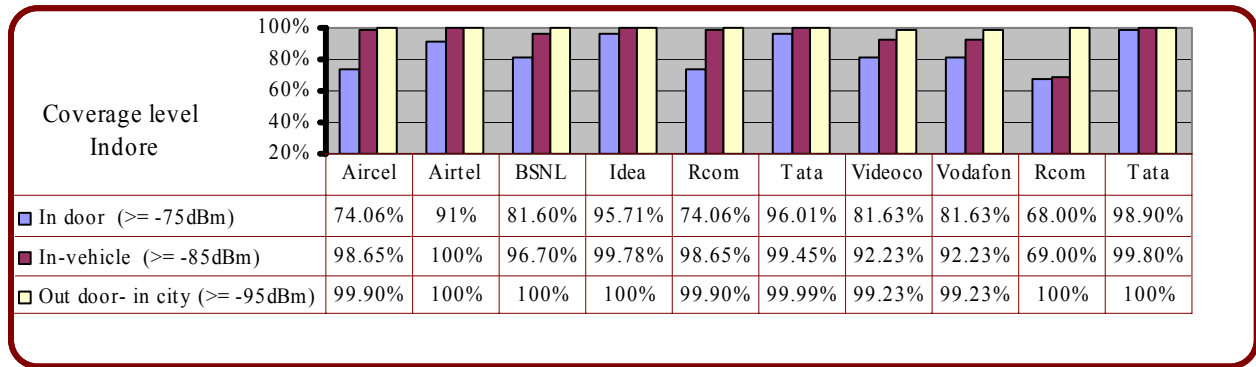
## 2) Performance (for the respective cities)

SN	Parameter	City Name	Aircel	Airtel	BSNL	Idea	Rcom GSM	Tata GSM	Videocon	Vodafone	Rcom CDMA	Tata CDMA
			GSM Operators								CDMA Operators	
1.1	Call Attempts	Indore	186	169	131	222	186	140	211	152	205	144
		Bhopal	176	208	117	257	176	123	83	167	179	195
		Raipur	228	204	193	323	228	104	159	130	264	212
1.2	Blocked Call Rate (<=3%)	Indore	1.61%	0%	6.10%	10.01%	1.61%	0.64%	0%	3.95%	1.31%	0%
		Bhopal	1.70%	1.94%	3.40%	0.60%	1.70%	0.57%	0%	0.65%	1.12%	0%
		Raipur	1.94%	0%	7.70%	1.36%	1.94%	1.16%	0.62%	2.30%	1.14%	0%
1.3	Dropped Call Rate (<=2%)	Indore	0.55%	0%	2.30%	1.30%	0.55%	0.21%	0%	0%	0.49%	0%
		Bhopal	1.13%	1.92%	1.70%	1.46%	1.13%	0%	3.61%	0%	1%	0%
		Raipur	1.28%	0.98%	5.60%	1.02%	1.28%	0%	0.62%	0%	0.00%	0%
1.4	Percentage of connections with good voice quality (>=95%)											
	(i) 0-4 (w/o frequency hopping)	Indore									98.80%	97.20%
		Bhopal									98.30%	98.24%
		Raipur									96.87%	98.30%
	(ii) 0-5 ( with frequency hopping)	Indore	95.00%	96%	78.80%	97.02%	95.00%	96.08%	97.30%	97.30%		
		Bhopal	96.00%	95.60%	95.00%	97.35%	96.00%	97.01%	95.25%	95.25%		
Raipur		96.00%	95.82%	99.50%	96.28%	96.00%	95.95%	95.59%	95.59%			
1.5	Service Coverage											
	In door (>= -75dBm)	Indore	74.06%	91%	81.60%	95.71%	74.06%	96.01%	81.63%	81.63%	68.00%	98.90%
		Bhopal	67.00%	78%		91.63%	67.00%	97.50%	89.62%	89.62%	69.00%	99.57%
		Raipur	89.00%	96%		81.54%	89.00%	95.54%	84.28%	84.28%	98.00%	98.66%
	In-vehicle (>= -85dBm)	Indore	98.65%	100%	96.70%	99.78%	98.65%	99.45%	92.23%	92.23%	69.00%	99.80%
		Bhopal	95.00%	94%		98.56%	95.00%	99.84%	97.71%	97.71%	97%	99.72%
		Raipur	99.90%	99%	95%	97.35%	99.90%	99.86%	96.575	96.57%	100.00%	99.26%
	Out door- in city (>= -95dBm)	Indore	99.90%	100%	100%	100%	99.90%	99.99%	99.23%	99.23%	100%	100%
		Bhopal	100.00%	100%	100%	99.86%	100.00%	99.46%	99.99%	99.99%	100%	100%
Raipur		100.00%	100%	100%	99.78%	100.00%	100%	100%	100%	100%	100%	



SN	Parameter	City Name	Aircel	Airtel	BSNL	Idea	Rcom GSM	Tata GSM	Videocon	Vodafone	Rcom CDMA	Tata CDMA
			GSM Operators								CDMA Operators	
1.6	Call Setup Success Rate (>=95%)	Indore	98.39%	100.00%	93.90%	89.99%	98.39%	99.36%	100.00%	96.05%	98.69%	100.00%
		Bhopal	98.30%	98.06%	96.60%	99.40%	98.30%	99.43%	100.00%	99.35%	98.88%	100.00%
		Raipur	98.06%	100.00%	92.30%	98.64%	98.06%	98.84%	99.38%	97.70%	98.86%	100.00%

## Graphical Representation



### (3) Critical Analysis

- Blocked Call Rate benchmark is not met by BSNL in any of the cities covered. Idea & Vodafone have high blocked call rate in Indore (10.01% & 3.95% respectively).
- Dropped Call Rate benchmark is not met by BSNL in Indore & Raipur (2.3% & 5.6% respectively) and Videocon in Bhopal (3.61%).
- "%age of Voice quality connections" parameter is not met by BSNL in Indore.
- CSSR benchmark of 95% is not met by BSNL in Indore & Raipur & Idea in Indore.

**(E) Independent Drive Test****(1) Sample Coverage**

The Independent Drive Test was conducted at Madhya Pradesh & Chhatissgarh operators assisted drive test was over for respective operators. Route cover was about around 80-100Km depending on city areas within the speed limit of 30Km/hr.

**Drive Test Locations*****INDORE***

LOW DENSE: Bandganga, Palasia, pardesipura.  
 MEDIUM DENSE: Sudama Nagar, Vijay Nagar, Satna sangeta  
 HIGH DENSE: Rajwada, Malharganj, Siya ganj., Bus stand

***BHOPAL***

LOW DENSE: Ashok garden, subhash nagar, MP nagar., New market  
 MEDIUM DENSE: Saket Nagar, Habibganj, Dus no, 11no, 12no.  
 HIGH DENSE: Budhwara, Mangalwara, Jincy square, Bus Stand.

***RAIPUR***

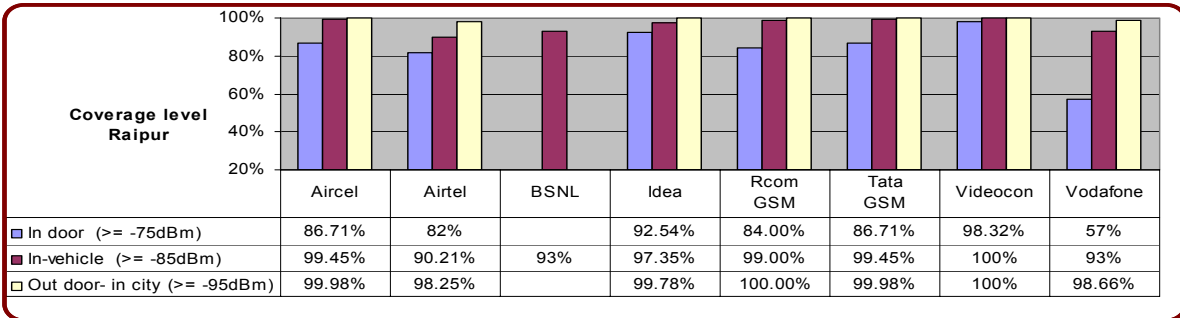
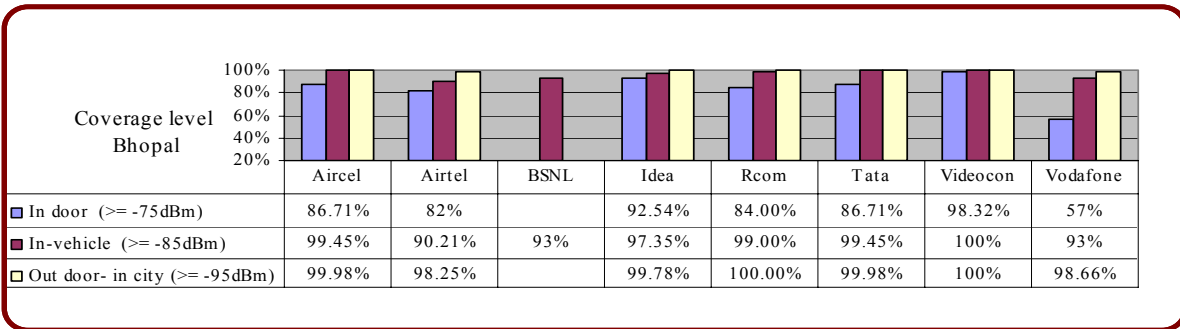
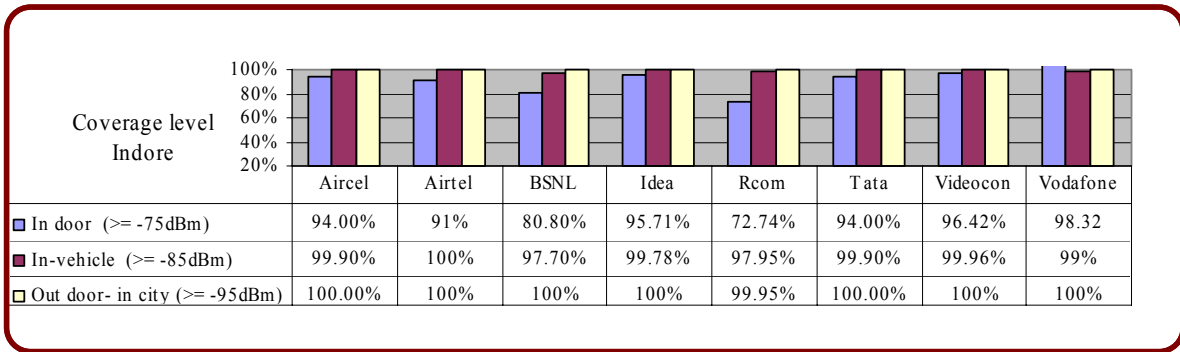
LOW DENSE: Mana , Mandiharsud  
 MEDIUM DENSE: Pota, Tatibandh, bus stand.  
 HIGH DENSE: Sadar, Sunder Nagar, Govind nagar.

## 2) Performance (for the respective cities)

SN	Parameter	City Name	Aircel	Airtel	BSNL	Idea	Rcom GSM	Tata GSM	Videocon	Vodafone
			GSM Operators							
1.1	Call Attempts	Indore	150	169	157	118	174	150	154	165
		Bhopal	190	157	159	137	146	190	211	132
		Raipur	130	121	198	97	223	130	187	112
1.2	Blocked Call Rate (<=3%)	Indore	0.00%	0.00%	3.82%	1.69%	0.56%	0.00%	6.00%	0.00%
		Bhopal	0.00%	7.60%	3.77%	1.46%	0.00%	0.00%	3.00%	0.00%
		Raipur	0.00%	1.00%	6.00%	1.03%	1.69%	0.00%	4.00%	1.00%
1.3	Dropped Call Rate (<=2%)	Indore	0.00%	0.00%	1.91%	0.84%	1.50%	0.00%	1.29%	1.21%
		Bhopal	0.00%	8.60%	2.38%	1.50%	2.80%	0.00%	0.00%	0.00%
		Raipur	0.00%	2.00%	5.05%	1.03%	1.34%	0.00%	0.00%	1.00%
1.4	Percentage of connections with good voice quality (>=95%)									
	(i) 0-4 (w/o frequency hopping)									
	(ii) 0-5 ( with frequency hopping)	Indore	95.94%	96%	78.70%	95.03%	95.00%	95.94%	95.00%	92.93%
		Bhopal	95.43%	86%	84%	95%	93.00%	95.43%	95.67%	94%
		Raipur	95.23%	98%	99.50%	95.02%	93.00%	95.23%	97.42%	82.03%
1.5	Service Coverage									
	In door (>= -75dBm)	Indore	94.00%	91%	80.80%	95.71%	72.74%	94.00%	96.42%	98.32
		Bhopal	87.31%	43%	79%	91.63%	85%	87.31%	97.21%	77%
		Raipur	86.71%	82%		92.54%	84.00%	86.71%	98.32%	57%
	In-vehicle (>= -85dBm)	Indore	99.90%	100%	97.70%	99.78%	97.95%	99.90%	99.96%	99%
		Bhopal	33.00%	80%	94%	98.56%	92%	33.00%	100%	90%
		Raipur	99.45%	90.21%	93%	97.35%	99.00%	99.45%	100%	93%
	Out door- in city (>= -95dBm)	Indore	100.00%	100%	100%	100%	99.95%	100.00%	100%	100%
		Bhopal	99.99%	100%	96%	99.86%	97%	99.99%	100%	99%
Raipur		99.98%	98.25%		99.78%	100.00%	99.98%	100%	98.66%	

SN	Parameter	City Name	Aircel	Airtel	BSNL	Idea	Rcom GSM	Tata GSM	Videocon	Vodafone
			GSM Operators							
1.6	Call Setup Success Rate (>=95%)	Indore	100%	100%	96.2%	98.3%	99.4%	100%	94.0%	100%
		Bhopal	100%	92.4%	96.2%	98.5%	100%	100%	97.0%	100%
		Raipur	100%	99.0%	94.0%	99.0%	98.3%	100%	96.0%	99.0%

## Graphical Representation



### (3) Critical Analysis

- Blocked Call Rate benchmark is not met by BSNL in any of the cities covered. Airtel has high blocked call rate in Bhopal (7.6%) & Videocon in Indore & Raipur (6% & 4% respectively).
- Dropped Call Rate benchmark is not met by Airtel in Bhopal, BSNL in Bhopal & Raipur and Reliance GSM in Bhopal.
- "%age of Voice quality connections" parameter is not met by Vodafone in any of the cities covered. Also, BSNL in Indore; Airtel, BSNL, Reliance GSM in Bhopal and Reliance GSM in Raipur are deviant from the 95% benchmark for this parameter.
- CSSR benchmark of 95% is not met by Airtel in Bhopal, BSNL in Raipur & Videocon in Indore.

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

From live, month, PMR and Drive Tests findings, it can be concluded that on an average, performance of the operators in the service area (MP&CG) is by and large satisfactory for **Network Parameters**, except for "Worst affected BTSs due to downtime" (BSNL-MP, BSNL-CG, Etisalat & Videocon), "CSSR" (BSNL-CG), "TCH congestion: (BSNL-CG), , "CDR" (BSNL-CG) for month data audit and additionally "SDCCH congestion" (BSNL-MP) for live data audit. No POI congestion was found on the network for any of the operator for this quarter.

Under **Customer Service Quality Parameter** "operator answered calls (voice-to-voice) within 60 seconds" parameter it is found that most of the operators are fulfilling TRAI benchmark of  $\geq 90\%$ . Apart from this, the "Refund of deposits after closure within 60 days" parameter benchmark is not met by BSNL-MP.

In Metering and Billing credibility (post-paid), Aircel, Reliance GSM, Vodafone & Tata GSM are not meeting the benchmark.

During **Drive Tests**, high Blocked Call Rates were found in case of BSNL (Indore, Bhopal & Raipur), Airtel (Bhopal) and Videocon (Indore & Raipur). "%age of Voice quality connections" parameter is not met in Indore by BSNL & Vodafone; in Bhopal by Airtel, BSNL, Reliance GSM & Vodafone and in Raipur by Reliance GSM & Vodafone.

**III. Basic Telephone Service (Wireline) Providers**

*.....Audit not done for this quarter*

**IV. Broadband Service Providers**

*.....Audit not done for this quarter*