

REPORT
ON
AUDIT & ASSESSMENT OF QUALITY OF SERVICE
OF
CELLULAR MOBILE TELEPHONE SERVICES
FOR
WEST ZONE
MADHYA PRADESH - CHHATTISGARHCIRCLE

Report Period: July 2011 – September 2011

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- 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 - Chhattisgarh 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 Madhya Pradesh - Chhattisgarh Circle in 3rd quarter (July-September 2011). The primary data collection and verification of records (PMR data verification – quarterly) maintained by various operators was undertaken for the period January-March 2011.

Following are the various operators covered in Madhya Pradesh - Chhattisgarh 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
GSM Operators			
1	Aircel Ltd	Sept-2011	1900-2000
2	Airtel Ltd	Aug-2011	2000-2100
3	BSNL	Sept-2011	1800-1900
4	Etisalat	Aug-2011	2000-2100
5	Idea	Aug-2011	1900-2000
6	Loop	Aug-2011	1900-2000
7	Reliance Communications	July-2011	1900-2000
8	Tata Communications	Aug-2011	1900-2000
9	Videocon	Aug-2011	2000-2100
10	Vodafone	Aug-2011	2000-2100
CDMA Operators			
11	Reliance Communications	July-2011	1900-2000
12	Tata Communications	Aug-2011	1900-2000

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 CG	BSNL MP	Etisalat	Idea	Loop	RTL GSM	Tata GSM	Video con	Voda fone	Rcom CDMA	Tata CDMA
S/N	Name of Parameter														
1	Network Availability														
	a) BTS Accumulated Downtime	<=2%	0.09%	0.27%	0.21%	1.76%	0.23%	0.65%	0.11%	0.10%	0.04%	0.40%	0.09%	0.03%	0.11%
	b) Worst affected BTSs due to downtime	<=2%	0.00%	0.63%	0.00%	1.95%	0.00%	0.97%	0.00%	0.00%	0.00%	0.36%	0.00%	0.00%	0.00%
2	Connection Establishment (Accessibility)														
	a) CSSR (Call Setup Success Rate)	>=95%	99.67%	99.00%	95.46%	96.16%	99.50%	98.79%	100.00%	99.44%	98.88%	99.26%	98.19%	99.80%	99.74%
	b) SDCCH/PAGING congestion	<=1%	0.21%	0.09%	0.13%	0.26%	0.04%	0.15%	0.00%	0.19%	0.32%	0.03%	0.30%	0.00%	0.00%
	c) TCH congestion	<=2%	0.27%	0.08%	2.24%	1.52%	0.04%	0.23%	0.00%	0.20%	0.42%	0.07%	1.39%	0.00%	0.02%
3	Connection maintenance (retainability)														
	a) CDR	<=2%	0.66%	1.65%	1.56%	1.71%	1.38%	0.79%	0.00%	0.30%	1.22%	0.79%	1.16%	0.37%	0.77%
	b) Worst affected cells>3% TCH drop	<=3%	2.68%	4.17%	14.63%	2.52%	2.94%	2.23%	3.03%	0.41%	2.38%	1.39%	2.94%	0.72%	0.84%
	c) Good voice quality	>=95%	99.49%	95.54%	NP	NP	96.87%	98.68%	99.13%	99.07%	97.64%	98.53%	97.24%	NA	NA
4	No of POI having congestion>=.5%	<=0.5%	0	0	0	1	0	0	0	0	0	0	0	0	0
5	Response time to customers for assistance														
	a) Accessibility of call centre/Customer Care	>=95%	100%	NP	94.0%	91.2%	NP	99.29%	100%	98.97%	100%	100%	100%	98.86%	100%
	b) % call answered by operators(voice to voice) within 60 sec.	>=90%	88.52%	NP	90.16%	NP	NP	96.43%	100%	45.01%	90.85%	97.55%	48.03%	98.18%	93.96%

NA: Not Applicable, NP: Data Not Provided

From the 3 days live data assessment, it is found that most of the operators are meeting the network parameters. Exceptions are noted in a few cases such as Airtel, BSNL-CG & loop not meeting "worst affected cells >3% TCH drop" and BSNL-CG not meeting "TCH congestion". BSNL has 1 POI showing more than 0.5% congestion. BSNL (MP & CG), Tata CDMA & Rcom CDMA have declared that the KPI "%age of connections with good voice quality" is not system generated.

BSNL (CG & MP) is not meeting the benchmark for "Accessibility of call centre/Customer Care" and Airtel, RTL & Vodafone are not meeting the benchmark for "calls answered by operators (voice-to-voice)".

One Month Data Audit		Bench- mark	Airtel	Airtel	BSNL CG	BSNL MP	Etisalat	Idea	Loop	RTL GSM	Tata GSM	Video con	Voda fone	Rcom CDMA	Tata CDMA
S/N	Name of Parameter		GSM Operators										CDMA Operators		
(A)	Network Service Quality Parameter														
1	Network Availability														
	a) BTS Accumulated Downtime	<=2%	0.09%	0.27%	0.21%	1.76%	0.23%	0.65%	0.11%	0.10%	0.04%	0.40%	0.09%	0.03%	0.11%
	b) Worst affected BTSs due to downtime	<=2%	0.00%	0.63%	0.00%	1.95%	0.00%	0.97%	0.00%	0.00%	0.00%	0.36%	0.00%	0.00%	0.00%
	c) Total no. of BTSs in the licensed service area		128	7875	2238	3957	60	7187	11	2596	2500	1395	4083	2127	709
	d) Sum of downtime of BTSs in a month in hours i.e. total outage time of all BTSs in hours during a month		65	10350	1835	55477	85	35473	12.73	1135.00	500.96	2473.02	1363	2012.00	175.12
	e) No. of BTSs having accumulated downtime of >24 hours in a month		0	50	0	77	0	70	0	5	0	5	0	8	0
2	Connection Establishment (Accessibility)														
	a) CSSR (Call Setup Success Rate)	>=95%	99.65%	98.96%	95.45%	96.34%	99.61%	98.76%	95.31%	99.69%	98.86%	99.22%	97.99%	99.76%	99.74%
	b) SDCCH/PAGING congestion	<=1%	0.22%	0.11%	0.12%	0.27%	0.12%	0.14%	0.00%	0.15%	0.32%	0.04%	0.15%	0.00%	0.00%

One Month Data Audit		Bench- mark	Aircel	Airtel	BSNL CG	BSNL MP	Etisalat	Idea	Loop	RTL GSM	Tata GSM	Video con	Voda fone	Rcom CDMA	Tata CDMA
S/N	Name of Parameter		GSM Operators										CDMA Operators		
	c) TCH congestion	<=2%	0.27%	0.09%	2.24%	1.61%	0.01%	0.25%	0.00%	0.06%	0.42%	0.10%	1.40%	0.01%	0.02%
3	Connection maintenance (retainability)														
	a) CDR	<=2%	0.61%	1.75%	1.56%	1.72%	1.53%	0.82%	0.38%	0.29%	1.24%	0.78%	1.17%	0.39%	0.75%
	b) Worst affected cells>3% TCH drop	<=3%	2.32%	2.96%	14.63%	2.64%	3.11%	2.53%	0.00%	0.41%	2.63%	1.37%	2.84%	0.75%	0.76%
	c) Good voice quality	>=95%	98.88%	95.13%	NP	NP	96.50%	98.60%	99.55%	99.01%	97.64%	98.49%	97.42%	NA	NA
4	No of POI having congestion>=5%	<=0.5%	0	0	0	NP	0	0	0	0	0	0	0	0	0
(B)	Customer Service Quality Parameters														
5	Metering/billing credibility-Post paid	<= 0.1%	0.20%	NP	NP	NP	NA	0.14%	NA	0.10%	0.32%	NA	0.22%	0.07%	0.09%
6	Metering /billing credibility-Pre paid	<= 0.1%	NP	NP	NP	NP	NP	0.11%	0.00%	0.03%	0.09%	0.02%	0.04%	0.03%	0.20%
7	Resolution of billing/ charging complaints	100% within 4 weeks	100%	NP	NP	NP	NP	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%	NP	NP	NP	NP	100%	100%	100%	100%	100%	100%	100%	100%
8	Response time to customers for assistance														
	a) Accessibility of call centre/Customer Care	>=95%	100%	NP	89.98%	78.48%	NP	99.26%	100%	98.94%	99.32%	100%	100%	98.89%	99.27%
	b) % call answered by operators(voice to voice) within 60 sec.	>=90%	86.74%	NP	89.62%	NP	NP	97.31%	100%	47.81%	94.41%	99.67%	49.53%	95.75%	94.62%
9	Termination/closure of service	<=7days	100%	NP	NP	NP	NA	100%	NA	100%	100%	NA	100%	100%	100%

<u>One Month Data Audit</u>		Bench- mark	Aircel	Airtel	BSNL CG	BSNL MP	Etisalat	Idea	Loop	RTL GSM	Tata GSM	Video con	Voda fone	Rcom CDMA	Tata CDMA
S/N	Name of Parameter		GSM Operators											CDMA Operators	
10	Time taken for refunds of deposits after closures.	100% within 60 days	100%	NP	NP	NP	NA	100%	NA	100%	91.49%	NA	100%	100%	100%

NA: Not Applicable, NP: Data Not Provided

From the month data assessment, it is found that most of the operators are meeting the network parameters. Exceptions are found in a few cases such as BSNL-CG & Etisalat not meeting "worst affected cells >3% TCH drop" and BSNL-CG not meeting "TCH congestion". BSNL (MP & CG), Tata CDMA & Rcom CDMA have declared that the KPI "%age of connections with good voice quality" is not system generated.

Among the Customer Service Quality parameters, many operators have not provided the data. BSNL (MP & CG) is not meeting the benchmark for "Accessibility of call centre/Customer Care" and Aircel, RTL, BSNL-CG & Vodafone are not meeting the benchmark for "calls answered by operators (voice-to-voice)".

Most of the operators have low Billing/Metering Credibility. Tata GSM taken more than 60 days for refund of deposits in some cases and thus does not meet the 100% benchmark.

Operator-Assisted Drive Test

The Operator Assisted Drive Test was conducted in MP-CG circle all the operators. Route covered was about around 100-120Km and for all the operators the same route was followed. The speed limit of 30-35Km/hr was maintained throughout the Drive Test. Zones were selected for covering different density areas (High, Medium & Low dense areas).

SN	Parameter	City Name	Aircel	Airtel	BSNL	Tata GSM	Idea	Voda fone	Video con	Rcom GSM	Tata CDMA	Rcom CDMA
1.1	Blocked Call Rate (<=3%)	JABALPUR	0.00	0.00	0.63	0.00	0.00	3.47	0.00	0.57	0.00	0.54
		GWALIOR	0.00	0.00	1.18	0.00	0.00	0.00	0.00	1.46	0.00	0.95
		UJJAIN	0.00	0.00	0.00	0.00	1.04	4.11	0.00	0.00	0.00	0.00
1.2	Dropped Call Rate (<=2%)	JABALPUR	0.45	0.00	1.25	0.45	0.58	0.00	0.63	0.00	0.00	0.00
		GWALIOR	0.57	0.00	0.00	0.57	0.51	0.00	0.37	0.00	0.00	1.42
		UJJAIN	0.00	0.85	0.00	0.00	0.00	0.00	0.00	0.00	1.09	0.00
1.3	Percentage of connections with good voice quality (=>95%)											
	(i) 0-4 (w/o frequency hopping)	JABALPUR									97.68	96.77
		GWALIOR									98.97	97.44
		UJJAIN									99.36	96.07
	(ii) 0-5 (with frequency hopping)	JABALPUR	95.20	97.19	95.35	95.20	94.46	91.00	98.69	95.20		
		GWALIOR	95.11	95.08	98.79	95.11	94.20	89.00	96.74	96.21		
UJJAIN		95.35	96.00	97.56	95.35	94.09	89.90	99.47	92.37			
1.4	Call Setup Success Rate (>=95%)	JABALPUR	100	100	99.38	100	100	96.53	100	99.43	100	99.46
		GWALIOR	100	100	98.82	100	100	100	100	98.54	100	99.05
		UJJAIN	100	100	100	100	98.96	95.89	100	100	100	100

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

- For the parameter 'Percentage of connections with good voice quality, it is found that Idea & Vodafone are not meeting the benchmark in any of the cities. Rcom GSM is having below benchmark value in Ujjain.
- Blocked call rates are not met by Vodafone in Jabalpur & Ujjain.
- All other operators are meeting all the benchmarks in all the three cities.

Independent Drive Test

.....Submitted as a separate report

CHAPTER-3: AUDIT-PMR VERIFICATION

I. Cellular Mobile Telephone Service

PMR		Bench- mark	Audit	Aircel	Airtel	BSNL	Etisalat	Idea	Loop	Rcom GSM	Tata GSM	Video con	Voda fone	Rcom CDMA	Tata CDMA
S/N	Name of Parameter														
(A)	Network Service Quality Parameter														
1	Network Availability														
	BTS Accumulated Downtime	<=2%	Report	0.02%	0.33%	1.25%	0.82%	1.06%	0.21%	0.10%	0.01%	0.39%	0.14%	0.31%	0.01%
			Verify	0.02%	0.33%	1.25%	0.82%	1.06%	0.21%	0.10%	0.01%	0.39%	0.14%	0.31%	0.01%
	Worst affected BTSs due to downtime	<=2%	Report	0.00%	1.76%	10.80%	6.06%	1.92%	0.01%	0.23%	0.03%	1.62%	0.63%	0.41%	0.00%
			Verify	0.00%	1.76%	10.80%	6.06%	1.92%	0.01%	0.23%	0.03%	1.62%	0.63%	0.41%	0.00%
2	Connection Establishment (Accessibility)														
	CSSR (Call Setup Success Rate)	>=95%	Report	49.84%	98.61%	97%	99.20%	97.28%	92.27%	97.97%	98.11%	97.80%	98.76%	99.87%	99.74%
			Verify	49.84%	98.61%	97%	99.20%	97.28%	92.27%	97.97%	98.11%	97.80%	98.76%	99.87%	99.74%
	SDCCH/PAGING congestion	<=1%	Report	0.01%	0.29%	1.39%	0.08%	0.78%	0.71%	0.87%	0.28%	0.17%	0.21%	0.00%	0.00%
			Verify	0.01%	0.29%	1.39%	0.08%	0.78%	0.71%	0.87%	0.28%	0.17%	0.21%	0.00%	NP
	TCH congestion	<=2%	Report	0.01%	0.49%	6.86%	0.03%	1.04%	0.27%	1.82%	0.31%	0.89%	0.58%	0.12%	0.00%
			Verify	0.01%	0.49%	6.86%	0.03%	1.04%	0.27%	1.82%	0.31%	0.89%	0.58%	0.12%	0.00%

PMR		Bench- mark	Audit	Aircel	Airtel	BSNL	Etisalat	Idea	Loop	Rcom GSM	Tata GSM	Video con	Voda fone	Rcom CDMA	Tata CDMA
S/N	Name of Parameter														
3	Connection maintenance (retainability)														
	CDR	<=2%	Report	0.22%	1.26%	2.34%	1.40%	1.38%	0.01%	1.34%	0.77%	1.13%	1.08%	0.75%	0.24%
			Verify	0.22%	1.26%	2.34%	1.40%	1.38%	0.01%	1.34%	0.77%	1.13%	1.08%	0.75%	0.24%
	Worst affected cells>3% TCH drop	<=5%	Report	1.23%	1.00%	16.61%	14.16%	8.92%	0.26%	2.85%	1.26%	1.63%	2.45%	0.33%	0.00%
			Verify	1.23%	1.00%	16.61%	14.16%	8.92%	0.26%	2.85%	1.26%	1.63%	2.45%	0.33%	0.00%
	Good voice quality	>=95%	Report	95.59%	95.59%	98%	97.37%	96.73%	96.49%	96.77%	98.09%	97.57%	97.22%	98.67%	99.73%
Verify			95.59%	95.59%	98%	97.37%	96.73%	96.49%	96.77%	98.09%	97.57%	97.22%	98.67%	99.73%	
4	POI congestion	<=0.5%	Report	0	0	1	1	0	0	0	0	2	0	0	0
			Verify	0	0	1	1	0	0	0	0	2	0	0	0
(B)	Customer Service Quality Parameters														
5	Metering/billing credibility-Post paid	<=0.1%	Report	0.16%	0.01%	0.01%	NA	NR	0.00%	0.00%	0.29%	NA	0.30%	0.00%	0.06%
			Verify	0.16%	0.01%	0.01%	NA	NR	0.00%	0.00%	0.29%	NA	0.30%	0.00%	0.06%
6	Metering /billing credibility-Pre paid	<=0.1%	Report	0.42%	0.02%	0.10%	0.20%	NR	0.00%	0.02%	0.01%	0.05%	0.06%	0.04%	0.14%
			Verify	0.42%	0.02%	0.10%	0.20%	NR	0.00%	0.02%	0.01%	0.05%	0.06%	0.04%	0.14%
7	Resolution of billing/charging complaints	100% within 4 weeks	Report	100%	100%	100%	100%	NR	Nil	100%	99.80%	100%	100%	100%	100%
			Verify	100%	100%	100%	100%	NR	Nil	100%	99.80%	100%	100%	100%	100%
	Period of applying credit/waiver/adjustment to the customers account from the date of resolutions of complaints	<=1 week	Report	100%	100%	100%	NA	NR	0%	100%	100%	100%	100%	100%	100%
			Verify	100%	100%	100%	NA	NR	0%	100%	100%	100%	100%	100%	100%

PMR		Bench- mark	Audit	Aircel	Airtel	BSNL	Etisalat	Idea	Loop	Rcom GSM	Tata GSM	Video con	Voda fone	Rcom CDMA	Tata CDMA
S/ N	Name of Parameter														
8	Response time to customers for assistance														
	Accessibility of call centre/Customer Care	>=95%	Report	100%	99%	99%	98.66%	NR	100%	10%	100%	100%	100%	100%	99%
			Verify	100%	99%	99%	98.66%	NR	100%	10%	100%	100%	100%	100%	99%
	% call answered by operators(voice to voice) within 60 sec.	>=90%	Report	94.88%	83%	90%	99.12%	NR	100%	85%	88.30%	92%	72%	97%	93%
Verify			94.88%	83%	90%	99.12%	NR	100%	85%	88.30%	92%	72%	97%	93%	
9	Termination/closure of service														
	No.of requests for Termination / Closure of service complied within 7 days during the quarter	<=7days	Report	100%	100%	100%	NA	NR	Nil	100%	100%	NA	100%	100%	100%
			Verify	100%	100%	100%	NA	NR	Nil	100%	100%	NA	100%	100%	100%
10	Time taken for refunds of deposits after closures.	100% within 60 days	Report	100%	100%	100%	NA	NR	Nil	100%	100%	NA	100%	100%	86%
			Verify	100%	100%	100%	NA	NR	Nil	100%	100%	NA	100%	100%	86%

Critical Analysis (PMR Verification):

- The figures provided by all the operators match the figures obtained on verification in most of the cases.
- BSNL& Etisalat do not meet the benchmark for "Worst affected BTSs".
- Aircel& Loop have low CSSR while BSNL has very high TCH congestion.
- BSNL, Idea & Etisalat have high "worst affected cells >3% TCH drop". BSNL reported a high CDR too.
- Aircel, Tata GSM & Vodafone are found to be not meeting the benchmark for "Metering/Billing Credibility-Postpaid", while Aircel, Etisalat & Tata CDMA are not meeting the benchmark for "Metering/Billing Credibility-Prepaid".
- "% call answered by operators (voice to voice) within 60 sec." benchmark is not met by Airtel, Tata GSM & Vodafone.
- Tata CDMA has taken more than 60 days for refund of deposits after closure of connections in 14% of cases.

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 CG	BSNL MP	Etisalat	Idea	Loop	RTL GSM	Tata GSM	Video con	Voda fone	Rcom CDMA	Tata CDMA	
			GSM Operators											CDMA Operators		
A	Network Service Quality Parameter															
1	Network Availability															
	a) BTS Accumulated Downtime	<=2%	0.09%	0.27%	0.21%	1.76%	0.23%	0.65%	0.11%	0.10%	0.04%	0.40%	0.09%	0.03%	0.11%	
	b) Worst affected BTSs due to downtime	<=2%	0.00%	0.63%	0.00%	1.95%	0.00%	0.97%	0.00%	0.00%	0.00%	0.36%	0.00%	0.00%	0.00%	
	c) Total no. of BTSs in the licensed service area		128	7875	2238	3957	60	7187	11	2596	2500	1395	4083	2127	709	
	d) Sum of downtime of BTSs in a month in hours i.e. total outage time of all BTSs in hours during a month		8.47	1527	332.84	5021	10	3375	0.867	78	65.23	405.18	253	48	56.84	
	e) No. of BTSs having accumulated downtime of >24 hours in a month		0	49	0	25	0	0	0	0	0	4	0	0	0	
1	Connection Establishment (Accessibility)															
	a) CSSR	>=95%	99.67%	99.00%	95.46%	96.16%	99.50%	98.79%	100.00%	99.44%	98.88%	99.26%	98.19%	99.80%	99.74%	

S/N	Name of Parameter	Benchmark	Aircel	Airtel	BSNL CG	BSNL MP	Etisalat	Idea	Loop	RTL GSM	Tata GSM	Video con	Voda fone	Rcom CDMA	Tata CDMA
			GSM Operators										CDMA Operators		
	b) SDCCH/PAGING congestion	<=1%	0.21%	0.09%	0.13%	0.26%	0.04%	0.15%	0.00%	0.19%	0.32%	0.03%	0.30%	0.00%	0.00%
	c) TCH congestion	<=2%	0.27%	0.08%	2.24%	1.52%	0.04%	0.23%	0.00%	0.20%	0.42%	0.07%	1.39%	0.00%	0.02%
2	Connection maintenance														
	a) CDR	<=2%	0.66%	1.65%	1.56%	1.71%	1.38%	0.79%	0.00%	0.30%	1.22%	0.79%	1.16%	0.37%	0.77%
	b) Cells having > 3% TCH drop	<=3%	2.68%	4.17%	14.63%	2.52%	2.94%	2.23%	3.03%	0.41%	2.38%	1.39%	2.94%	0.72%	0.84%
	c) Good voice quality	>=95%	99.49%	95.54%	NP	NP	96.87%	98.68%	99.13%	99.07%	97.64%	98.53%	97.24%	NA	NA
	d) No. of cells > 3% TCH drop		10	999	739	298	5	483	1	32	178	58	356	46	18
	e) Total no. of cells in the network		384	23,956	5,050	11,802	180	21,628	33	7,788	7,494	4,185	12,101	2,127	2,096
3	No of POI having congestion >= .5%	<=0.5%	0	0	0	1	0	0	0	0	0	0	0	0	0
	a) Name of POI not meeting the benchmark		Nil	Nil	Nil	Aircel	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil
	b) Total No. of call attempts on POI (Avg.)		203,306	3,412,786	183,712	514,136	4,740	7,802,896	290	690,901	313,339	4,893	1,468,259	601,747	266,168
	c) Total traffic served on POI (Erlang) (Avg.)		2,335.66	109,160.44	5,654.40	9,821.00	125.70	108,438.23	1.37	22,900.23	7,181.80	105.75	29,275.47	23,918.47	8,511.04
	d) Total No. of circuits on POI		6,373	187,615	8,784	29,776	1,236	206,727	465	38,667	23,647	9,703	39,999	58,604	26,472
	e) Total number of working POI Service Area wise		19	74	8	69	30	307	14	64	28	41	53	106	190
	f) Equipped Capacity of Network in respect of Traffic in erlang		1,524.00	312,069.66	128,400.00	204,000.00	1,476.00	298,506.00	186.70	NP	116,288.07	54,985.00	89,913.00	NP	139,400.00

S/N	Name of Parameter	Benchmark	Aircel	Airtel	BSNL CG	BSNL MP	Etisalat	Idea	Loop	RTL GSM	Tata GSM	Video con	Voda fone	Rcom CDMA	Tata CDMA
			GSM Operators											CDMA Operators	
	g) Total traffic handled in TCBH in erlang		141.69	170,570.68	18,456.28	26,994.20	113.62	252,470.00	0.42	NP	53,775.73	8,652.74	53,399.00	NP	44,948.00
(B)	Customer Service Quality Parameters														
4	Response time to customers for assistance														
	a) Accessibility of call centre	>=95%	100%	NP	94.00%	91.22%	NP	99.29%	100%	99%	100%	100%	100%	99%	100%
	b) % of call answered by operators(voice to voice) within 60 sec	>=90%	88.52%	NP	90.16%	NP	NP	96.43%	100%	45.01%	90.85%	97.55%	48.03%	98.18%	93.96%
	c) No. of call attempts to call centre / customer care nos. during TCBH (Avg)		2,081	NP	5,347	NP	NP	12,817	0	53,792	51,896	543	42,586	44,115	16,894
	d) No. of calls connected and answered successfully to call centre / customer care nos. during TCBH (Avg)		1,842	NP	4,821	NP	NP	12,360	0	24,212	47,148	530	20,452	43,310	15,874

NA: Not Applicable, NP: Data Not Provided

*: Live calling data

Parameter-wise Findings (Live Data Assessment):

The parameter wise key takeouts for the Cellular Mobile Telephone Services providers in Madhya Pradesh - Chhattisgarh Service Area are as given below:-

- **BTS accumulated downtime (benchmark $\leq 2\%$):**All operators are meeting the benchmark with values lying between 0.04% and 1.76%.
- **Worst affected BTSs due to downtime (benchmark $\leq 2\%$):**All operators are meeting the benchmark with values lying between 0% and 1.95%.
- **Call setup success rate (benchmark $\geq 95\%$):** All operators are meeting the benchmark with values lying between 95.46% and 100%.
- **SDCCH/PAGING Channel congestion (benchmark $\leq 1\%$):** All operators are meeting the benchmark with values lying between 0% and 0.32%.
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 meeting the benchmark with values lying between 0% and 1.52% except BSNL-CG with a value of 2.24%.
- **Call drop rate (benchmark $\leq 2\%$):** All operators are meeting the benchmark with values lying between 0% and 1.71%.
- **Cell exceeding 3% TCH drop (benchmark $\leq 3\%$):** Except for Airtel, BSNL-CG & Loop, all the operators are satisfying the benchmark with value in between 0.41% and 2.94%.
- **Connections with good voice quality (benchmark $\geq 95\%$):** CDMA service providers & BSNL have declared that the parameter is not system generated. Other GSM operators are meeting the benchmark with values lying between 95.54% and 99.49%.
- **POI Congestion (benchmark $\leq 0.5\%$):**BSNL-MP shows one POIs with congestion greater than 0.5% Here POI congestion indicates that there were call failure greater than 0.5% on that particular POI. The calls here indicate only those calls which have been seized by the switch and processed. But cases are found where individual POIs are showing high utilization/usage which are managed by overflow technique i.e. 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 $>95\%$):** Except for BSNL, all the operators are meeting the benchmark with values lying between 99.29% to 100%.
- **%age of call answered by operator (Voice to voice) (benchmark $>90\%$):**All operators are meeting the benchmark value of 90% except for Airtel, RTL & Vodafone.

S/N	Name of Parameter	Benchmark	Aircel	Airtel	BSNL CG	BSNL MP	Etisalat	Idea	Loop	RTL GSM	Tata GSM	Videocon	Vodafone	Rcom CDMA	Tata CDMA
			GSM Operators										CDMA Operators		
	b) Total No. of call attempts on POI (Avg.)		204,627	3,291,634	190,288	NP	4,631	7,859,411	267	690,901	310,085	5,465	1,941,411	601,134	248,846
	c) Total traffic served on POI (Erlang) (Avg.)		3,209	105,307	5,962	NP	128	110,214	1	22,900	7,101	115	32,203	23,904	8,326
	d) Total No. of circuits on POI		6,373	187,615	8,784	NP	1,236	206,727	465	38,667	23,647	9,703	39,999	58,240	26,472
	e) Total number of working POI Service Area wise		19	74	8	NP	30	307	14	64	28	41	53	106	190
5	Network Data														
	a) Equipped Capacity of Network Erlang		1,524.00	312,069.66	128,400.00	204,000.00	1,476.00	298,506.00	186.70	NP	116,288.07	54,985.00	89,913.00	NP	139,400.00
	b) Total traffic in TCBH in erlang (Avg.)		141.69	175,358.14	19,039.00	27,975.36	114.45	251,384.00	0.47	NP	51,173.99	10,443.91	55,842.68	NP	43,846.52
	c) Total no. of customers served (as per VLR) on last day of the month		409,030	8,281,101	685,562	1,626,681	NR	11,925,877	28	NP	2,031,132	395,208	2,222,975	NP	468,995
(B)	Customer Service Quality Parameters														
6	Metering/billing credibility-Post paid	$\leq 0.1\%$	0.20%	NP	NP	NP	NA	0.14%	NA	0.10%	0.32%	NA	0.22%	0.07%	0.09%
	a) No. of bills issued during the period		1,490	NP	NP	88,005	NA	203,655	NA	55,601	21,450	NA	22,365	129,575	43,171
	b) No. of bills disputed including billing complaints during the period		3	NP	NP	NP	NA	288	NA	55	68	NA	50	97	41
7	Metering /billing credibility-Pre paid	$\leq 0.1\%$	NP	NP	NP	NP	NP	0.11%	0.00%	0.03%	0.09%	0.02%	0.04%	0.03%	0.20%
	a) No. of charging / credit / validity complaints during the quarter		NP	NP	NP	NP	NP	12,792	0	1,936	3,674	202	1,348	1,140	3,532
	b) Total no. of pre-paid customers at the end of the quarter		NP	NP	NP	2,834,178	57,814	12,012,776	102	7,491,454	4,088,940	1,201,641	3,303,027	4,148,641	1,733,174

S/N	Name of Parameter	Benchmark	Aircel	Airtel	BSNL CG	BSNL MP	Etisalat	Idea	Loop	RTL GSM	Tata GSM	Video con	Voda fone	Rcom CDMA	Tata CDMA
			GSM Operators											CDMA Operators	
8	Resolution of billing/charging complaints	100% within 4 weeks	100%	NP	NP	NP	NP	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		300	NP	NP	NP	NP	13,080	0	1,991	3,742	1,005	1,398	1,237	3,573
	b) Total no. of billing (post paid) and charging, credit / validity (pre paid) complaints received during the quarter		300	NP	NP	NP	NP	13,080	0	1,991	3,742	1,005	1,398	1,237	3,573
	c) No. of billing complaints (post paid) and charging, credit/validity complaints (pre paid) resolved in favour of the customer during the quarter		100	NP	NP	NP	NP	666	0	221	1	202	460	250	260
	d) No. of complaints disposed on account of not considered as valid complaints during the quarter		200	NP	NP	NP	NP	12,414	0	1,770	3,741	803	938	987	3,313
	e) Period of applying credit/waiver/adjustment to the customers account from the date of resolutions of complaints	<=1 week	100%	NP	NP	NP	NP	100%	100%	100%	100%	100%	100%	100%	100%
9	Response time to customers for assistance														
	a) Accessibility of call centre/Customer Care	>=95%	100.00%	NP	89.98%	78.48%	NP	99.26%	100.00%	98.94%	99.32%	100.00%	100.00%	98.89%	99.27%
	b) % call answered by operators(voice to voice) within 60 sec.	>=90%	86.74%	NP	89.62%	NP	NP	97.31%	100.00%	47.81%	94.41%	99.67%	49.53%	95.75%	94.62%

S/N	Name of Parameter	Benchmark	Aircel	Airtel	BSNL CG	BSNL MP	Etisalat	Idea	Loop	RTL GSM	Tata GSM	Video con	Voda fone	Rcom CDMA	Tata CDMA
			GSM Operators										CDMA Operators		
	c) Total no. of call attempts to call centre & customer care nos. during TCBH (Avg.).		1,986	NP	5,548	NP	NP	12,436	102	642,950	54,111	542	47,389	439,768	14,250
	d) No. of calls connected and answered successfully to call centre & customer care nos. during TCBH (Avg.).		1,723	NP	4,972	NP	NP	12,101	102	307,374	51,084	541	23,471	421,072	13,483
10	Termination/closure of service	<i><=7days</i>	100%	NP	NP	NP	NA	100%	NA	100%	100%	NA	100%	100%	100%
	a) Total No. of requests for Termination / Closure of service received during the quarter		17	NP	NP	NP	NA	1,719	NA	164	290	NA	394	314	957
	b) No.of requests for Termination / Closure of service complied within 7 days during the quarter		17	NP	NP	NP	NA	1,719	NA	164	290	NA	394	314	957
11	Time taken for refunds of deposits after closures.	<i>100% within 60 days</i>	100%	NP	NP	NP	NA	100%	NA	100.00%	91.49%	NA	100%	100%	100%

NA: Not Applicable, NP: Data Not Provided

Parameter-wise Findings (Month Data Assessment):

The parameter wise key takeouts for the Cellular Mobile Telephone Services providers in Madhya Pradesh - Chhattisgarh Service Area are as given below:-

- **BTS accumulated downtime (benchmark $\leq 2\%$):** All operators are meeting the benchmark with values lying between 0.03% and 1.76%.
- **Worst affected BTSs due to downtime (benchmark $\leq 2\%$):** All operators are meeting the benchmark with values lying between 0% and 1.95%.
- **Call setup success rate (benchmark $\geq 95\%$):** All operators are meeting the benchmark with values lying between 95.31% and 99.74%.
- **SDCCH/PAGING Channel congestion (benchmark $\leq 1\%$):** All operators are meeting the benchmark with values lying between 0% and 0.32%. Tata CDMA has not provided the data.
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 meeting the benchmark with values lying between 0% and 1.61% except for BSNL-CG with a value of 2.24%.
- **Call drop rate (benchmark $\leq 2\%$):** All operators are meeting the benchmark with values lying between 0.29% and 1.75%.
- **Cell exceeding 3% TCH drop (benchmark $\leq 5\%$):** Except for BSNL & Etisalat, all the operators are satisfying the benchmark with value in between 0% and 2.96%.
- **Connections with good voice quality (benchmark $\geq 95\%$):** CDMA service providers have declared that the parameter is not system generated. GSM operators are meeting the benchmark with values lying between 95.13% and 99.55%.
- **POI Congestion (benchmark $\leq 0.5\%$):** No operator is POIs with congestion greater than 0.5%. Here POI congestion indicates that there were call failure greater than 0.5% on that particular POI. The calls here indicate only those calls which have been already being seized by the switch and processed. But cases were found where individual POIs are showing high utilization/usage which are managed by overflow technique i.e. extra traffic is carried over by some other operating POI as has been designed to do so. BSNL-MP has not provided month data.
- **%age of call answered by operator (electronically) (benchmark $>95\%$):** Except for BSNL, all the operators are meeting the benchmark with values lying between 98.89% and 100%.
- **%age of call answered by operator (Voice to voice) (benchmark $>90\%$):** Aircel, RTL, BSNL-CG & Vodafone are not meeting the benchmark value.
- **Metering and billing credibility-Post paid (benchmark $\leq 0.1\%$):** Except for Aircel, Idea, Tata GSM & Vodafone, all other operators are meeting the benchmark.
- **Metering and billing credibility-Pre paid (benchmark $\leq 0.1\%$):** Except for Idea & Tata CDMA, all the operators are meeting the benchmark.
- **Resolution of billing/ charging complaints (benchmark 100% within 4 weeks):** Many operators have not provided data. Rest of the operators have met the benchmark.
- **Termination/Closure of service (Benchmark ≤ 7 days):** Many operators have not provided data. Rest of the operators have met the benchmark.
- **Time taken for refunds of deposits after closures (benchmark 100% within ≤ 60 days):** Tata GSM took more than 60 days for refund in 4 cases out of 47 cases and thus has failed to meet the benchmark of 100%.

(3) Sample Coverage

Switches/BSC/BTS details of operators:

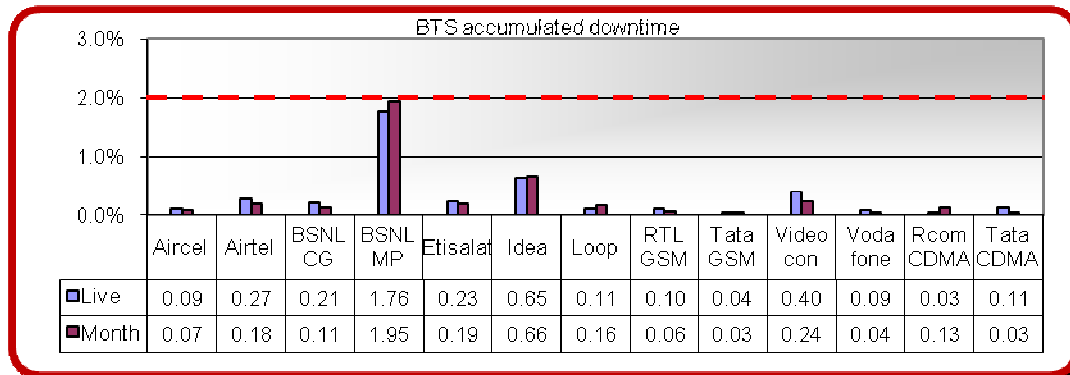
Sl.	Name of Service Provider	No. of MSC	No. of BSC	No. of BTS
GSM Operators				
1	Aircel Ltd (ICR with Tata)	1	2	128
2	Airtel Ltd	18	141	7875
3	BSNL CG	2	43	2238
4	BSNL MP	9	88	3957
5	Idea	27	52	7187
6	Tata Communications	3	24	2500
7	Reliance Communications	6	110	2596
8	Etisalat	1	1	60
9	Videocon	1	9	1395
10	Vodafone	4	40	4083
11	Loop	1	1	11
CDMA Operators				
12	Tata Communications	4	8	708
13	Reliance Communications	4	79	2127

(4) Performance (Graphical Representation)

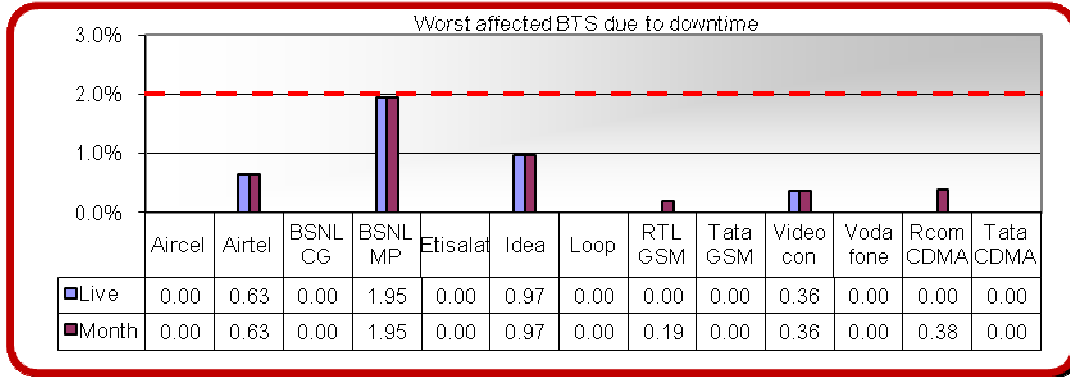
Comparison between Live measurements and One month data Audit – Cellular Mobile Telephone Services

A) NETWORK PERFORMANCE

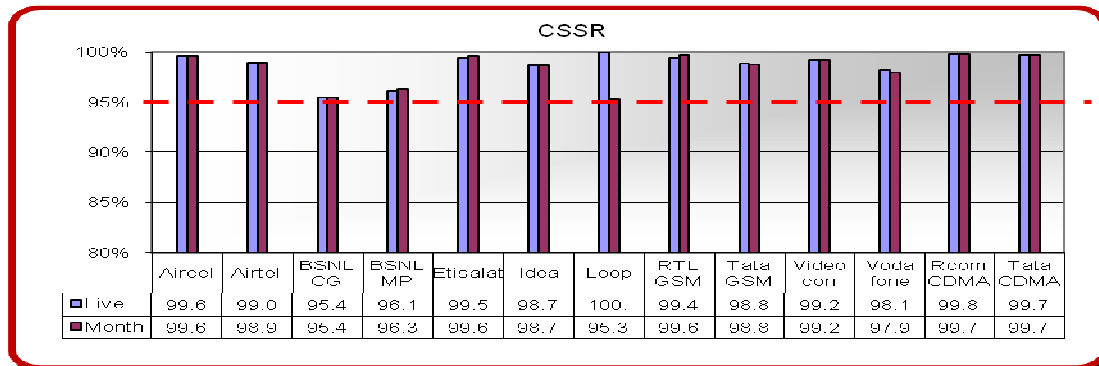
- I. BTS Accumulated Downtime:** All operators are meeting the TRAI benchmark for both one month data and 3 days live data taken in the month of audit.



Worst affected BTS due to Downtime: All operators are meeting the TRAI benchmark for both one month data and 3 days live data taken in the month of audit.

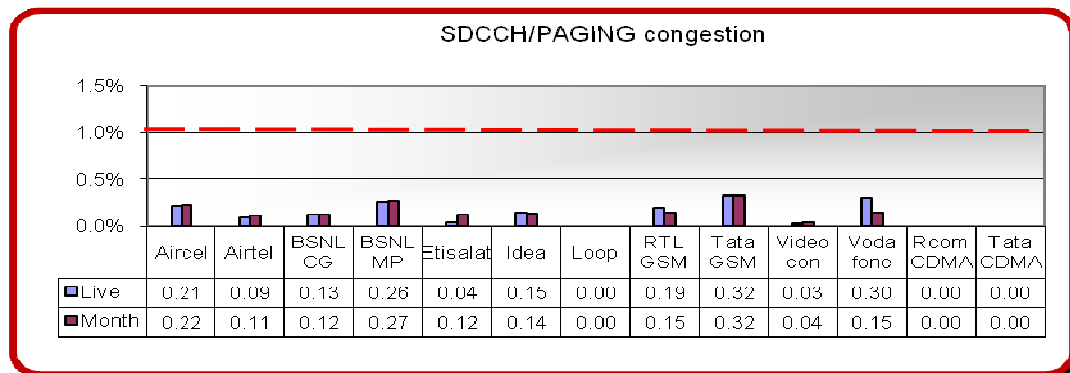


II. Call setup success rate: All operators are meeting the TRAI benchmarks ($\geq 95\%$) for both one month data and 3 days live data taken in the month of audit.

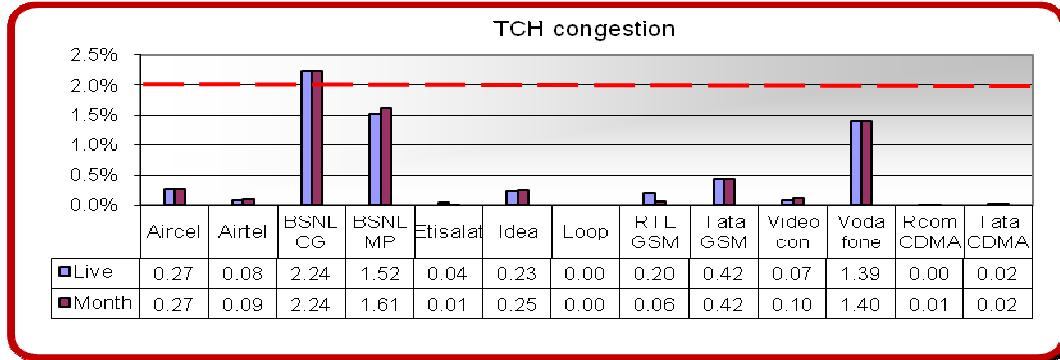


III. Blocked call rate:

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.

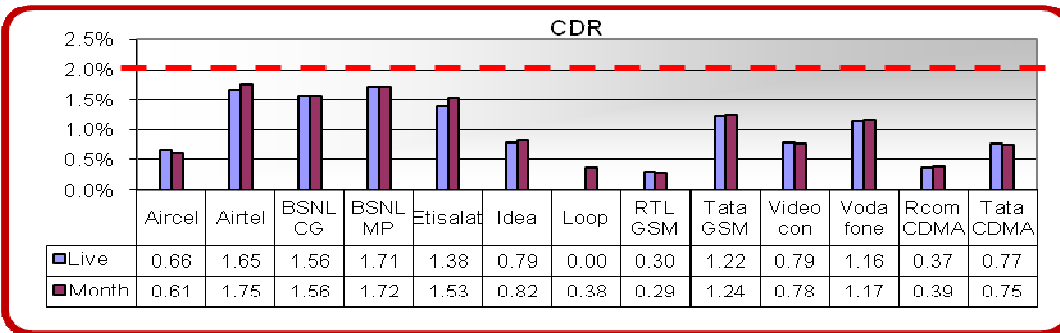


TCH congestion: All operators, except BSNL-CG, are meeting the TRAI benchmarks ($\leq 2\%$) for both one month data and 3 days live data taken in the month of audit.

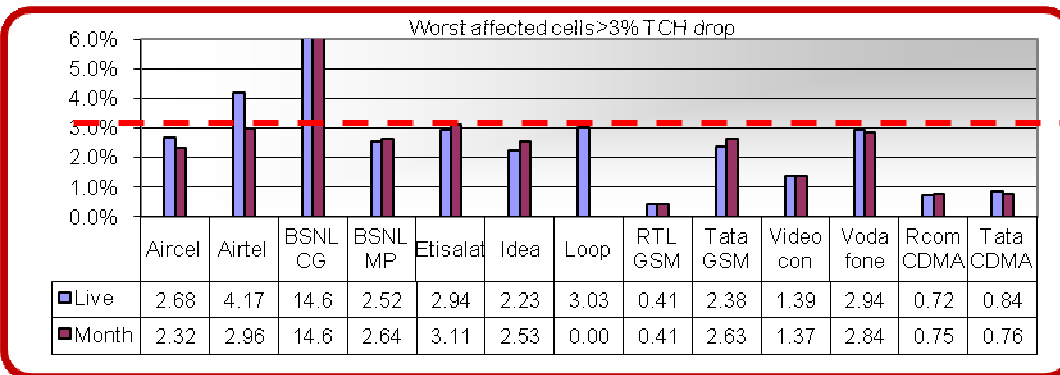


IV. Connection Maintainability (Retainability):

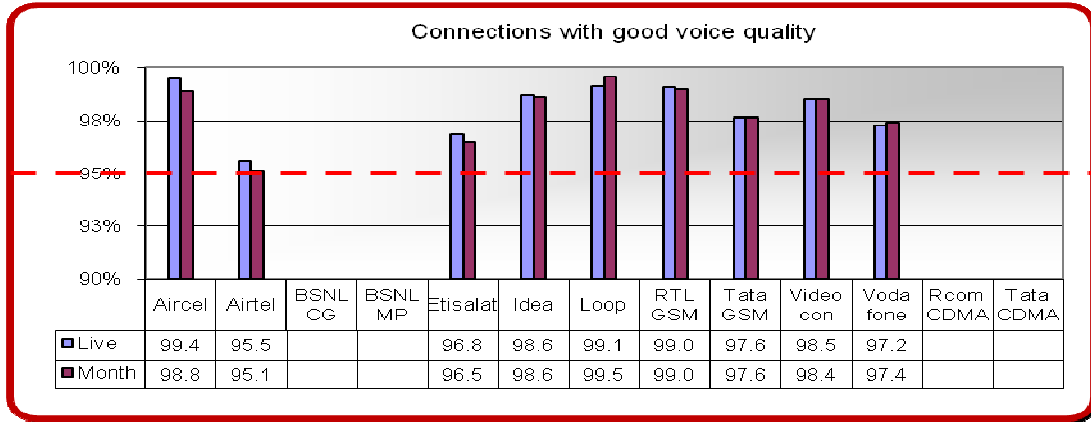
Call drop rate: All operators are meeting the TRAI benchmarks ($\leq 2\%$) for both one month data and 3 days live data taken in the month of audit.



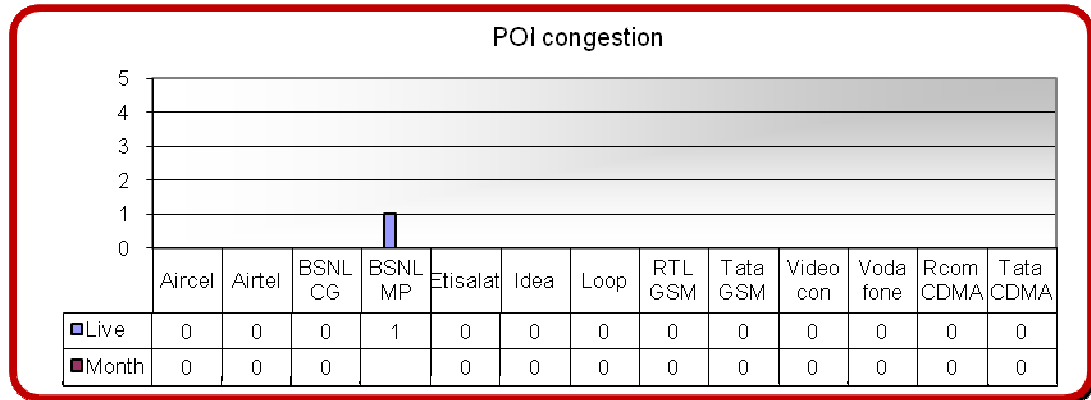
Worst affected Cell exceeding 3% TCH Drop: For both live and month data, BSNL-CG is found not meeting the benchmark of $\leq 3\%$ by very high margins. Airtel & Loop have below benchmark performance in live audit and Etisalat in month data.



Percentage of connections with good voice quality: 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. CDMA operators have declared that this parameter is not system generated. BSNL has not provided the data against this KPI.



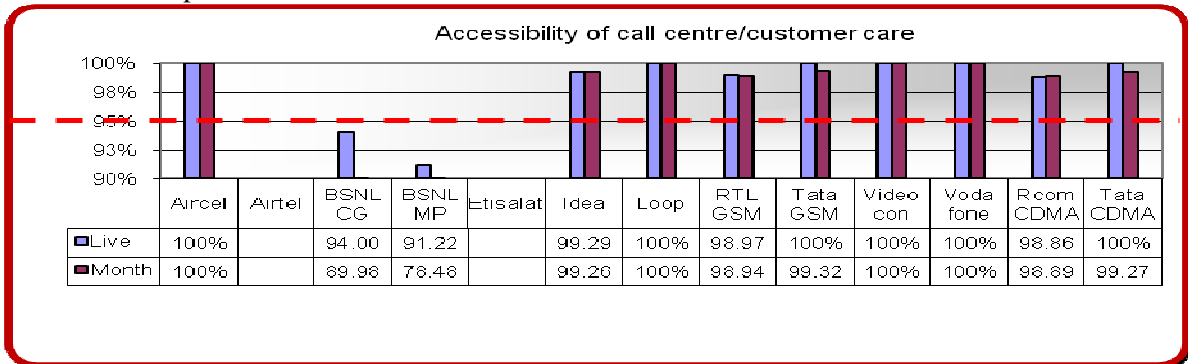
POI Congestion: BSNL-MP has one POI with $\geq 0.5\%$ congestion in live data and it as not provided the month data. Rest of the operators don't have such POIs.



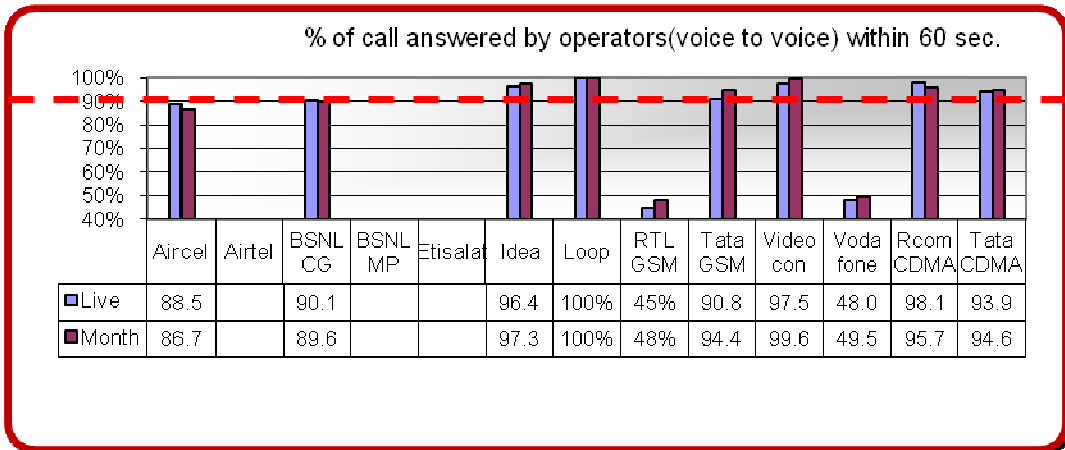
B) CUSTOMER SERVICE QUALITY PARAMETERS

(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 and 3 days live data taken in the month of audit except for BSNL.



Percentage of call answered by operators (Voice to voice) within 60 sec: Aircel, RTL & Vodafone do not meet the 90% benchmark against this parameter. BSNL-CG has missed the benchmark marginally during the month.



(5) Critical Analysis

The above comparative study between live data & month data shows similar trends & consistency in both the cases except for Airtel & Loop showing high variations for “worst affected cells $>3\%$ TCH drop”. BSNL-CG has shown a very high value for “worst affected cells $>3\%$ TCH drop”. RTL & Vodafone have a very poor performance for “%age of calls answered by operator”.

(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 CG	BSNL MP	Etisalat	Idea	Loop	RTL GSM	Tata GSM	Videocon	Vodafone	Rcom CDMA	Tata CDMA	
Total No. of Calls Attempted	1	Billing Data Not Provided					100	No Complaints	100	1	100	100	100	100
Total No. of calls Answered	1						98		96	1	95	97	96	98
Cases resolved with 4 weeks	1						97		95	1	93	97	95	98
%age of cases resolved	100%						99%		99%	100%	98%	100%	99%	100%

(3) Live Calling to Call Centre

Calling Operator	Aircel	Airtel	BSNL	Etisalat	Idea	Rcom GSM	Tata GSM	LOOP	Videocon	Vodafone	Rcom CDMA	Tata CDMA
Calls Attempted	100	100	100	100	100	100	100	100	100	100	100	100
Calls connected to IVR	98	100	96	98	100	98	100	96	96	100	96	100
Calls got connected to agent within 60 Sec	98	100	96	98	100	98	100	96	96	100	96	100
%age of calls got answered by agent in 60 sec.	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%

(4)Level-1 Live Calling

Emergency no.	No. of calls made	Aircel	Airtel	BSNL	Etisalat	Idea	Rcom GSM	Tata GSM	LOOP	Videocon	Vodafone	Rcom CDMA	Tata CDMA
Jabalpur													
100	1	1	1	1	1	1	1	1	1	1	1	1	1
101	1	1	1	1	1	1	1	1	1	1	1	1	1
102	1	1	1	1	1	1	1	1	1	1	1	1	1
139	1	1	1	1	1	1	1	1	1	1	1	1	1
Gwalior													
100	1	1	1	1	1	1	1	1	1	1	1	1	1
101	1	1	1	1	1	1	1	1	1	1	1	1	1
102	1	1	1	1	1	1	1	1	1	1	1	1	1
139	1	1	1	1	1	1	1	1	1	1	1	1	1
Ujjain													
100	1	1	1	1	1	1	1	1	1	1	1	1	1
101	1	1	1	1	1	1	1	1	1	1	1	1	1
102	1	1	1	1	1	1	1	1	1	1	1	1	1
139	1	1	1	1	1	1	1	1	1	1	1	1	1

(5)Critical Analysis

Random numbers were selected from the operators' available database of billing/metering complaints and calls were made to the customers to get their feedback for complaint redressal. Majority of the calls were not successful for various reasons such as customer not reachable, number busy or switched off etc. Among the successful calls, it was found that the operators had made refunds in 100% in most of the cases as claimed by their records. It may be noted that only 1 call has been made in case of Aircel & Tata GSM since as per their respective records, they have 1 valid complaint each (ref. Ch-4.I.(A).(2)).

Good results were found for all the operators during live calling to their respective call centres. Similar result was found in case of Level-1 calling for emergency nos. 100, 101 & 102. However, most of the operators have no access to other helpline numbers such as 1098, 1091 etc as tabulated above.

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

A sample of 2x50 test calls per Service Providers with in the licensed service area (Madhya Pradesh - Chhattisgarh 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	Idea	Rcom GSM	Tata GSM	Loop	Etisalat	Videocon	Vodafone	Rcom CDMA	Tata CDMA
Aircel	-	100%	80%	100%	100%	90%	80%	90%	85%	100%	100%	100%
Airtel	80%	-	90%	90%	100%	100%	100%	100%	90%	95%	100%	100%
BSNL	90%	100%	-	100%	100%	100%	90%	80%	100%	100%	85%	95%
Idea	100%	100%	100%	-	100%	100%	100%	100%	100%	90%	100%	100%
Rcom GSM	100%	100%	85%	100%	-	100%	80%	100%	90%	100%	100%	100%
Tata GSM	95%	100%	95%	100%	100%	-	80%	100%	90%	100%	95%	100%
Loop	80%	100%	100%	100%	100%	100%	-	75%	100%	100%	100%	85%
Etisalat	85%	100%	80%	100%	100%	90%	100%	-	100%	100%	100%	100%
Videocon	80%	100%	100%	90%	100%	100%	90%	100%	-	80%	100%	100%
Vodafone	90%	95%	100%	100%	100%	100%	80%	100%	100%	-	100%	90%
Rcom CDMA	100%	80%	100%	100%	90%	100%	100%	100%	100%	98%	-	100%
Tata CDMA	100%	100%	95%	100%	100%	90%	100%	80%	100%	100%	90%	-

(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 - Chhattisgarh for all the operators. Route covered was about around 100-120 Km depending on city areas within the speed limit of 30-35 Km/hr.

Drive Test Locations***JABALPUR***

LOW DENSE: Vijaynagar, JagdumbaColoney, Medical, Garha, Pachpdei,
DuttArcade
MEDIUM DENSE: Shastri Nagar,
ShastriBridge, Raddichoki, Adhartaal, Milloganj, Ialmaati
HIGH DENSE: GhantaGhar, Kamayani Gate, Wardhmaan Bus Stand, Napier
Town, YadavColony, AshaSadon, Wriht town

GWALIOR

LOW DENSE: Cantonment Area, Hurwali
MEDIUM DENSE: ChandravaniNaka, High Court, KundanNagar
HIGH DENSE: Gudda-GuddiNaka, Kagzi
Bazaar, Didwanaoli, Chetakpuri, PhulBaug, MotiMahal, GolPahariya,
Transport Nagar, City
Centre, Madhoganj, TansenNagar, HaziraGoleMandir, PintooPark,
AnupamNagar

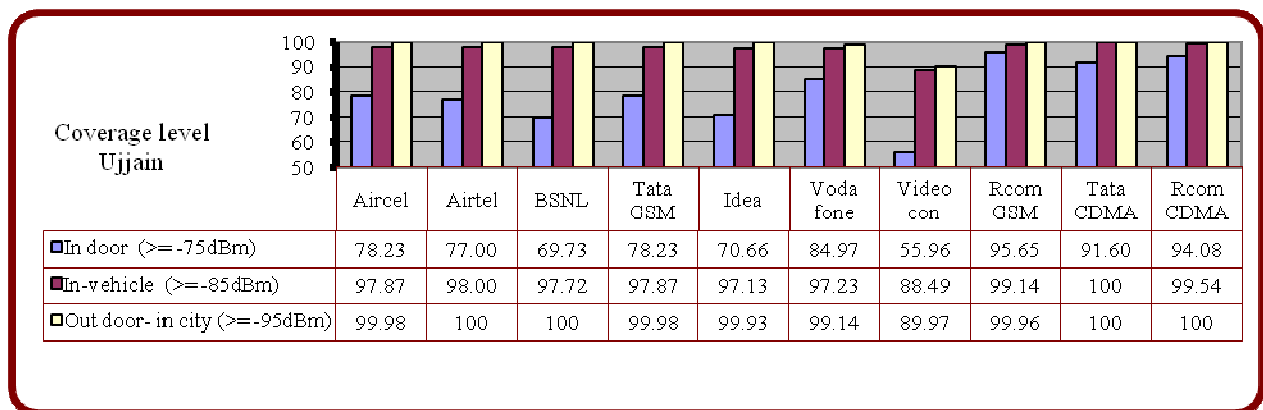
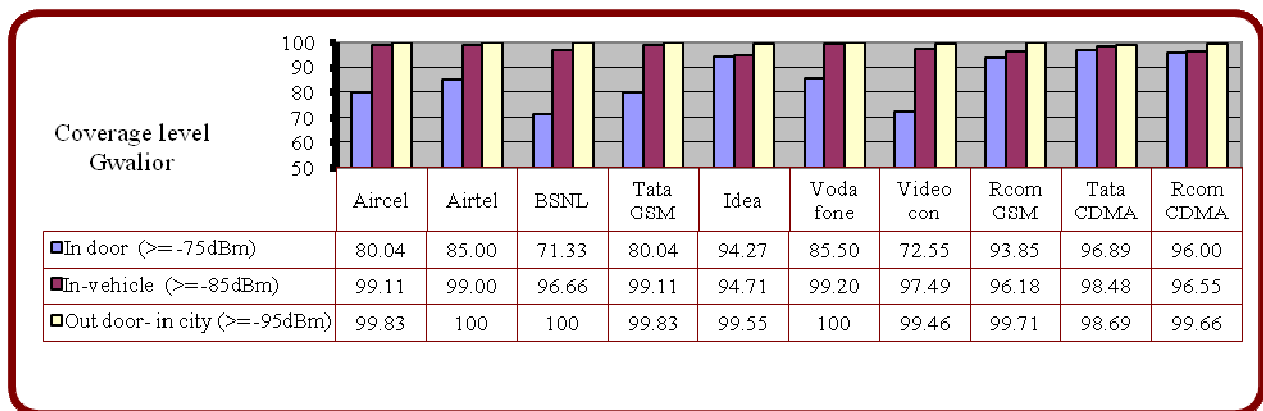
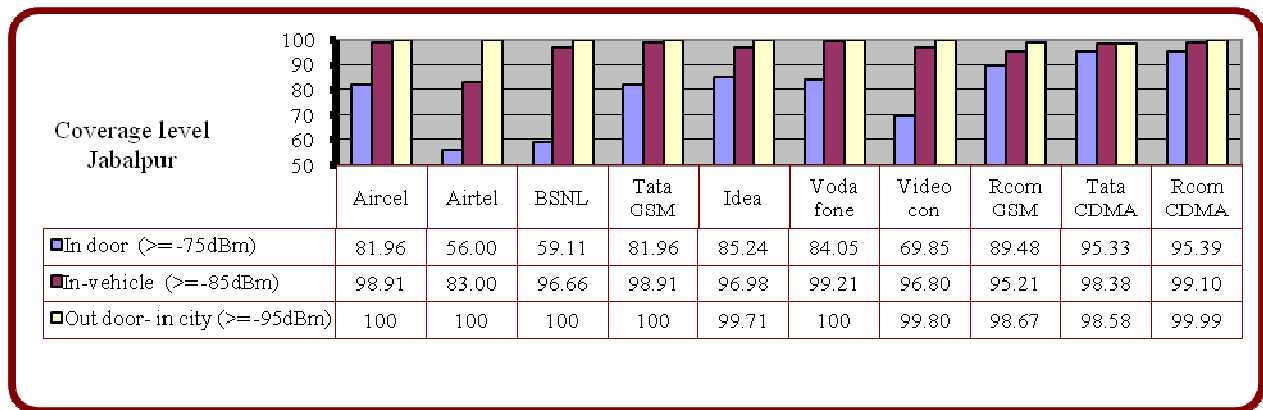
UJJAIN

LOW DENSE: MakshiRoad, LalGate, SethiNagar, AnushriColony,
RajeevshriNagar, JoytiNagar, Keshav Nagar, Indore Highway
MEDIUM DENSE: ShastriNagar, Sindhi Colony, Rishi Nagar, MahanandaNagar,
VedNagar, Nanakheda
HIGH DENSE: Piplinaka, Mahesh Nagar, Indira
Nagar, AnkpathMarg, ChamundaNaka, Thopkhana, DewasGate,
Ramaghat, Indore Gate

2) Performance (for the respective cities) - Operator Assisted Drive Test

SN	Parameter	City Name	Aircel	Airtel	BSNL	Tata GSM	Idea	Voda fone	Video con	Rcom GSM	Tata CDMA	Rcom CDMA
1.1	Call Attempts	JABALPUR	222	208	160	222	173	173	159	175	174	185
		GWALIOR	175	185	170	175	195	193	270	206	142	211
		UJJAIN	81	117	103	81	96	73	87	92	89	88
1.2	Blocked Call Rate (<=3%)	JABALPUR	0.00	0.00	0.63	0.00	0.00	3.47	0.00	0.57	0.00	0.54
		GWALIOR	0.00	0.00	1.18	0.00	0.00	0.00	0.00	1.46	0.00	0.95
		UJJAIN	0.00	0.00	0.00	0.00	1.04	4.11	0.00	0.00	0.00	0.00
1.3	Dropped Call Rate (<=2%)	JABALPUR	0.45	0.00	1.25	0.45	0.58	0.00	0.63	0.00	0.00	0.00
		GWALIOR	0.57	0.00	0.00	0.57	0.51	0.00	0.37	0.00	0.00	1.42
		UJJAIN	0.00	0.85	0.00	0.00	0.00	0.00	0.00	1.09	0.00	0.00
1.4	Percentage of connections with good voice quality (=>95%)											
	(i) 0-4 (w/o frequency hopping)	JABALPUR									97.68	96.77
		GWALIOR									98.97	97.44
		UJJAIN									99.36	96.07
	(ii) 0-5 (with frequency hopping)	JABALPUR	95.20	97.19	95.35	95.20	94.46	91.00	98.69	95.20		
		GWALIOR	95.11	95.08	98.79	95.11	94.20	89.00	96.74	96.21		
UJJAIN		95.35	96.00	97.56	95.35	94.09	89.90	99.47	92.37			
1.5	Service Coverage											
	In door (>= -75dBm)	JABALPUR	81.96	56.00	59.11	81.96	85.24	84.05	69.85	89.48	95.33	95.39
		GWALIOR	80.04	85.00	71.33	80.04	94.27	85.50	72.55	93.85	96.89	96.00
		UJJAIN	78.23	77.00	69.73	78.23	70.66	84.97	55.96	95.65	91.60	94.08
	In-vehicle (>= -85dBm)	JABALPUR	98.91	83.00	96.66	98.91	96.98	99.21	96.80	95.21	98.38	99.10
		GWALIOR	99.11	99.00	96.66	99.11	94.71	99.20	97.49	96.18	98.48	96.55
		UJJAIN	97.87	98.00	97.72	97.87	97.13	97.23	88.49	99.14	100	99.54
	Out door- in city (>= -95dBm)	JABALPUR	100	100	100	100	99.71	100	99.80	98.67	98.58	99.99
		GWALIOR	99.83	100	100	99.83	99.55	100	99.46	99.71	98.69	99.66
UJJAIN		99.98	100	100	99.98	99.93	99.14	89.97	99.96	100	100	
1.6	Call Setup Success Rate (>=95%)	JABALPUR	100	100	99.38	100	100	96.53	100	99.43	100	99.46
		GWALIOR	100	100	98.82	100	100	100	100	98.54	100	99.05
		UJJAIN	100	100	100	100	98.96	95.89	100	100	100	100

Graphical Representation



(3) Critical Analysis

The drive test data was found to be satisfactory for most of the parameters. However, for the parameter 'Percentage of connections with good voice quality,' it is found that Idea & Vodafone are not meeting the benchmark in any of the cities. Rcom GSM is having below benchmark value in Ujjain. Vodafone is not meeting the benchmarks for "Blocked Call rate" & "Dropped Call Rate" in Jabalpur.

Independent Drive Test

.....Submitted as a separate report

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

From live, month and Drive Tests findings, it can be concluded that on an average, performance of the operators in the service area (Madhya Pradesh - Chhattisgarh) is by and large satisfactory for **Network Parameters**. However, BSNL-CG is not meeting the benchmark for “Worst affected cells>3% TCH drop” by very high margins. Airtel & Loop showed a high value for this KPI during the live audit, but the value was considerably improved during the month. However, the performance of Etisalat was just the opposite in this case. It marginally achieved the benchmark value during the live audit but missed it in month data. BSNL-CG has a higher TCH congestion value.

BSNL-MP has a POI with more than 0.5% congestion.

Under **Response Time to Customer for Assistance** parameters, the performance of Rcom GSM & Vodafone is very poor. Airtel & BSNL-CG too have a below benchmark performance in this case. The customer care of BSNL has poor accessibility.

Regarding **Metering/Billing Credibility** issues, Airtel, Idea, Tata GSM & Vodafone have shown a below benchmark value for Post-paid connections. Similar result has been found for Airtel & Tata CDMA for pre-paid connections.

During **Drive Tests**, Vodafone & Idea are found to have less than 95% good voice quality connections in all the three cities. Rcom GSM too has such a poor performance in Ujjain.

III. Basic Telephone Service (Wireline) Providers

.....Audit not done for this quarter

IV. Broadband Service Providers

.....Audit not done for this quarter