REPORT

ON

AUDIT & ASSESSMENT OF QUALITY OF SERVICE OF
CELLULAR MOBILE TELEPHONE SERVICE

FOR

WEST ZONE – MP&CG CIRCLE

Report Period: APRIL 2012 – JUNE 2012

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NOT CONDUCTED

CHAPTER-1: INTRODUCTION

I.   Background

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

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

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

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

i)   Create conditions for consumer satisfaction by making known the quality of service, which the service provider is required to provide, and the user has a right to expect.

ii)   Measure the Quality of Service provided by the Service Providers from time to time and to compare them with the norms so as to assess the level of performance.

iii)   Generally protect the interests of consumers of telecommunication services.

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

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

II.   Objectives and Methodology

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

i)   Verification of the data submitted by the service providers to TRAI as part of QoS monitoring reports i.e. Quarterly Performance Monitoring Reports (PMRs) and monthly Point of Interconnection (POI) Congestion Reports with reference to the records maintained by the service provider.

ii)   Verification of the performance of service providers against the Quality of Service benchmarks laid down by TRAI using live measurement for 3 days during the month in which the audit and assessment is carried out.

iii)   Verification of the performance of service providers against the Quality of Service benchmarks laid down by TRAI using the data for the entire month during which the live measurement is carried out.

iv)   Drive tests of the mobile networks both operators assisted and independent drive test (as and where required).

v)   Billing and call center's data verification.

vi)   Live testing of the efficiency of the call center / customer care help line.
vii)   Emergency No. (Level 1) calling done.

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 MP&CG 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.

✓ For Basic Wireline Service, the Network parameter of the QoS TRAI regulations is observed / verified for the 3 days for nearly 5% of the telephone exchanges covering 10% of the SDCA in a Service area.

✓ For Broadband Services audit was conducted for service provider have not baser of more than 10,000 only. Audit data was collected from the centralized NOC or through a remote access to the NOC were collected. Network parameters were also checked from the centralized NOC. MRTG, Cacti and Sandvine software were used for monitoring link utilization. Smoke Ping and Ping Test were used for monitoring Network Latency.

CHAPTER 2: EXECUTIVE SUMMARY

I.   Preface

This report highlights the findings for the audit & assessment of Quality of Service of Cellular Mobile Services in MP&CG Circle in 2nd quarter (April – June 2012). The primary data collection and verification of records (PMR data verification – quarterly) maintained by various operators was undertaken during the period Oct – Dec 2011.

Following are the various operators covered in MP&CG 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	May-2012	1900-2000 Hrs
2	Airtel Ltd	May-2012	1900-2000 Hrs
3	Idea	May-2012	1900-2000 Hrs
4	BSNL(MP)	May-2012	1900-2000 Hrs
5	BSNL(CG)	May-2012	1900-2000 Hrs
6	Reliance Communication	May-2012	1900-2000 Hrs
7	Tata Teleservices Ltd	May-2012	2000-2100 Hrs
8.	Videocon	May-2012	1900-2000 Hrs
9.	Vodafone	May-2012	1900-2000 Hrs
CDMA Operators			
10.	Reliance Communication	May-2012	1900-2000 Hrs
11.	Tata Teleservices Ltd	May-2012	2000-2100 Hrs

All the NSS and BSS systems were considered for audit and assessment for the TCBH hours of individual operators.

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

(A) Cellular Mobile Telephone Services

S/N	Name of Parameter (3 days Live Data Audit)	Bench-mark	Aircel	Airtel	BSNL(MP)	TTSL GSM	Idea	BSNL(CG)	V-fone	Vi-con	Rcom GSM	Tata CDMA	Rcom CDMA
			GSM Operators									CDMA Operators	
(A)-1	**Network Service Quality Parameter**												
	BTS Accumulated Downtime	<=2%	NR	0%	1.99%	0%	1%	0.55%	NR	0.26%	0.21%	0%	0.35%
	Worst affected BTS due to downtime	<=2%	NR	0.02%	1%	0%	0%	0%	NR	0%	0%	0%	0%
1	**Connection Establishment (Accessibility)**												
	a) CSSR (Call Setup Success Rate)	>=95%	99.77%	99.67%	97.61%	99.87%	99.58%	97.73%	98.74%	99.79%	99.64%	99.97%	100.00%
	b) SDCCH/PAGING congestion	<=1%	0.17%	0.15%	0.87%	0.07%	0.10%	0.39%	0.23%	0.08%	0.02%	0%	0.00%
	c) TCH congestion	<=2%	0.06%	0.18%	1.52%	0.06%	0.32%	1.88%	1.03%	0.13%	0.34%	0.03%	0.00%
2	**Connection maintenance (retainability)**												
	a) CDR	<=2%	0.54%	1.01%	1.80%	0.80%	0.55%	1.74%	1.08%	0.73%	0.63%	0.62%	0.05%
	b) Worst affected cells>3% TCH drop	<=3%	2.08%	3.13%	2.87%	2.95%	2.19%	16.33%	1.87%	1.02%	1.17%	0.65%	0.00%
	c) Good voice quality	>=95%	99.04%	96.49%	NA	97.17%	99.09%	NA	97.90%	98.26%	97.96%	NA	99.85%
3	**No of POI having > 0.5% congestion**	>=0.5%	0	0	0	0	0	0	0	0	0	0	0
4	**Response time to customers for assistance**												
	a) Accessibility of call centre/Customer Care	>=95%	NR	95.84%	100%	100%	100%	NR	100%	100.00%	99%	100%	99%
	b) % call answered by operators(voice to voice) within 60 sec.	>=90%	NR	89.42%	100%	97.73%	96%	98.86%	98.10%	96.4%	96.95%	100%	95.64%

NA: Not Applicable, NR: Data Not Reported.

From the 3 days live data assessment, it is found that all the operators are meeting most of the network parameters except for Airtel & BSNL CG for the parameter "Worst affected cells>3% TCH drop".

Performance related to customer care data is found to be satisfactory for all the operators, except Airtel in % call answered by operators (Voice to voice).

NOTE: -- Etisalat & Loop have closed their operation in MP&CG circle.

S/N	Name of Parameter	Bench-mark	Aircel	Airtel	BSNL(MP)	TTSL GSM	Idea	BSNL(CG)	V-fone	Vi-con	Rcom GSM	Tata CDMA	Rcom CDMA
One Month Data Audit													
							GSM Operators					CDMA Operators	
(A)	**Network Service Quality Parameter**												
1	**Network Availability**												
	a) BTS Accumulated Downtime	*<=2%*	0.84%	0.12%	1.92%	0.00%	0.56%	0.43%	0.06%	0.22%	0.19%	0.48%	0.39%
	b) Worst affected BTSs due to downtime	*<=2%*	1.56%	0.25%	1.84%	0.00%	0.39%	1.97%	0.11%	1.36%	0.34%	0.00%	1.11%
2	**Connection Establishment (Accessibility)**												
	a) CSSR (Call Setup Success Rate)	*>=95%*	99.87%	99.64%	97.59%	99.78%	100%	97.73%	98.09%	99.76%	99.60%	99.92%	100.00%
	b) SDCCH/PAGING congestion	*<=1%*	0.09%	0.20%	0.82%	0.12%	0.11%	0.39%	0.23%	0.07%	0.04%	0.01%	0.01%
	c) TCH congestion	*<=2%*	0.04%	0.16%	1.59%	0.10%	0.34%	1.88%	1.68%	0.17%	0.36%	0.07%	0.00%
3	**Connection maintenance (retainability)**												
	a) CDR	*<=2%*	0.53%	0.96%	1.77%	0.80%	0.56%	1.74%	1.08%	0.74%	0.62%	0.66%	0.06%
	b) Worst affected cells>3% TCH drop	*<=3%*	1.56%	1.20%	2.88%	0.96%	2.20%	16.33%	2.43%	1.05%	1.10%	0.71%	0.00%
	c) Good voice quality	*>=95%*	99.08%	97.35%	NA	97.33%	99.09%	NA	97.92%	98.24%	97.99%	NA	99.85%
4	**No of POI having > 0.5% congestion**	*>=0.5%*	0	0	0	0	0	0	0	0	0	0	0
(B)	**Customer Service Quality Parameters**												
5	**Metering/billing credibility-Post paid**	*<= 0.1%*	0.14%	0.01%	0.05%	0.49%	0.04%	NR	0.07%	NA	0.10%	0.10%	0.10%
6	**Metering /billing credibility-Pre paid**	*<= 0.1%*	0.01%	0.01%	0.01%	0.01%	0.00%	NR	0.03%	0.01%	0.09%	0.04%	0.09%
7	**Resolution of billing/ charging complaints**	*100% within 4 weeks*	100%	100%	100%	100%	100%	NR	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%	100%	100%	100%	NR	100%	100%	100%	100%	100%
8	**Response time to customers for assistance**												
	a) Accessibility of call centre/Customer Care	*>=95%*	NR	95.59%	100%	99%	96%	NR	100%	96.30%	99%	98%	99%
	b) % call answered by operators(voice to voice) within 60 sec.	*>=90%*	NR	88.12%	99%	97.00%	90%	NR	98.50%	95.76%	98.15%	83%	96.99%
9	**Termination/closure of service**	*<=7days*	100%	100%	45.22%	100%	100%	100%	100%	NA	100%	100%	100%
10	**Time taken for refunds of deposits after closures.**	*100% within 60 days*	100%	NR	100%	100%	100%	NR	100%	NA	100%	100%	100%

NA: Not Applicable, NP: Data Not Provided

From the month data assessment, it is found that all the operators are meeting most of the network parameters except to BSNL CG for "Worst affected cells>3% TCH drop". In Termination only BSNL(MP) is not meeting the benchmark.

Performance related to customer care data is found to be satisfactory for most of the operators, except for "calls answered by operators (voice-to-voice)"parameter being not met by Airtel & Tata CDMA. For the parameter "Metering /billing credibility-Post paid", Aircel & Tata GSM are not meeting the benchmark.

Operator-Assisted Drive Test

The Operator Assisted Drive Test was conducted at MP&CG Circle for all the operators. Route covered was about around 80-100 Km depending on city areas within the speed limit of 30Km/hr. The cities covered were Ratlam, Satna and Vidhisha. In all the cities, zones were selected for covering different density areas (High, Medium & Low dense areas).

SN	Parameter	City Name	Aircel	Airtel	BSNL	TTSL (GSM)	Idea	V-fone	Vi-cone	Rcom(GSM)	TTSL (CDMA)	Rcom(CDMA)
			GSM Operators								CDMA Operators	
1.1	Blocked Call Rate (<=3%)	Ratlam	0%	1.09%	3.85%	0%	0%	0%	2.22%	0%	0%	0%
		Satna	0%	1.08%	0%	0%	0%	0%	0%	0%	0%	0%
		Vidhisha	0%	0%	1.78%	0%	0%	0%	1.23%	0%	0%	0%
1.2	Dropped Call Rate (<=2%)	Ratlam	0%	0%	0%	0%	1.33%	0%	0%	0%	0%	0%
		Satna	0%	0%	1.00%	0%	1.53%	0%	0%	0%	0%	0%
		Vidhisha	0%	0%	0%	0%	0%	0%	1.35%	0%	0%	0%
1.3	% of connections with good voice quality (=>95%) (i) 0-4 (w/o frequency hopping)	Ratlam									99.46%	99.90%
		Satna									99.36%	99.23%
		Vidhisha									99.86%	99.39%
	(ii) 0-5 (with frequency hopping)	Ratlam	95.58%	95.10%	96%	95.58%	95.08%	95.86%	97.38%	99%		
		Satna	95.09%	95.04%	96.52%	95.09%	97.50%	92.99%	95.05%	99.13%		
		Vidhisha	96.20%	95.26%	81.80%	96.2%	95.98%	93.00%	95.30%	98.99%		
1.4	Call Setup Success Rate (>=95%)	Ratlam	100%	98.91%	96%	100%	100%	100%	97.78%	100%	100%	100%
		Satna	100%	99%	98.48%	100%	100%	100%	100%	100%	100%	100%
		Vidhisha	100%	100%	96.43%	100%	100%	100%	98.76%	100%	100%	100%
1.5	Handover Success Rate (HOSR)	Ratlam	96.60%	99.36%	97.67%	96.60%	98.46%	100%	99.28%	100%	98.94%	100%
		Satna	96.48%	98.00%	98.89%	96.48%	97.97%	100%	99.34%	100%	100%	100%
		Vidhisha	100%	98.95%	98.63%	100%	100%	100%	100%	100%	100%	100%

Key observations as could be derived from the table are as under:
• "Blocked call rate" parameter is not met by BSNL in Ratlam.
• Good Voice quality parameter is not met by BSNL in Vidisha as well as Vodafone in Vidhisha & Satna both.

Independent Drive Test:--

SN	Parameter	Aircel (Ratlam)	BSNL (Morena)	TTSL (Ratlam)	Idea (Khargone)	Vodafone (Hoshangabad)	RCOM (Durg)
1.1	Blocked Call Rate (<=3%)	0%	0%	0%	0%	0%	0%
1.2	Dropped Call Rate (<=2%)	0%	0.00%	0%	0%	0%	0%
1.3	Percentage of connections with good voice quality (=>95%)						
	(i) 0-4 (w/o frequency hopping)						
	(ii) 0-5 (with frequency hopping)	96.04%	95%	96.53%	95.04%	93.82%	95.36%
1.4	Service Coverage						
	In door (>= -75dBm)	79.84%	70%	82.35%	97.82%	63.9%	96.24%
	In-vehicle (>= -85dBm)	99.89%	98%	99.78%	99.84%	96%	99.96%
	Outdoor- in city (>= -95dBm)	100%	100%	100%	100%	99.90%	100%
1.5	Call Setup Success Rate (>=95%)	100%	98%	100%	100%	98.66%	100%
1.6	Handover Success Rate	95%	95.34%	95%	99.35%	98.5%	100%

Observation:-

 All operators are meeting the benchmark, except Vodafone for the parameter "%age of connections with good voice quality" in Hoshangabad**.**

CHAPTER-3: AUDIT-PMR VERIFICATION (Oct 2011—Dec 2011)
Cellular Mobile Service:--

S/N	Name of Parameter	Bench-mark	Audit	Aircel	Airtel	BSNL	Idea	RTL	Tata GSM	Uninor	V-con	V-fone	MTS	Rcom CDMA	Tata CDMA
	PMR						GSM Operators							CDMA Operators	
(A)	**Network Service Quality Parameter**														
	Network Availability														
	BTS Accumulated Downtime	*<=2%*	Reported	0.06%	0.12%	1.28%	0.62%	0.19%	0.02%	0.96%	0.24%	0.09%	0.26%	0.54%	0.02%
			Verified	0.06%	0.12%	1.28%	0.62%	0.19%	0.02%	0.96%	0.24%	0.09%	0.26%	0.54%	0.02%
	Worst affected BTSs due to downtime	*<=2%*	Reported	0.00%	0.43%	1.98%	0.60%	0.78%	0.05%	0.00%	0.96%	0.41%	0.00%	0.92%	0.00%
			Verified	0.00%	0.43%	1.98%	0.60%	0.78%	0.05%	0.00%	0.96%	0.41%	0.00%	0.92%	0.00%
2	**Connection Establishment (Accessibility)**														
	CSSR (Call Setup Success Rate)	*>=95%*	Reported	99.46%	98.98%	96.19%	98.99%	98.98%	97.77%	99.31%	99.21%	98.15%	98.82%	99.37%	99.56%
			Verified	99.46%	98.98%	96.19%	98.99%	98.98%	97.77%	99.31%	99.21%	98.15%	98.82%	99.37%	99.56%
	SDCCH/PAGING congestion	*<=1%*	Reported	0.17%	0.17%	0.81%	0.11%	0.15%	0.26%	0.05%	0.04%	0.33%	0.00%	0.00%	0.00%
			Verified	0.17%	0.17%	0.81%	0.11%	0.15%	0.26%	0.05%	0.04%	0.33%	0.00%	0.00%	0.00%
	TCH congestion	*<=2%*	Reported	0.35%	0.11%	1.69%	0.25%	0.74%	0.42%	0.04%	0.08%	1.16%	0.00%	0.19%	0.00%
			Verified	0.35%	0.11%	1.69%	0.25%	0.74%	0.42%	0.04%	0.08%	1.16%	0.00%	0.19%	0.00%
3	**Connection maintenance (retainability)**														
	CDR	*<=2%*	Reported	0.67%	1.28%	1.98%	0.69%	0.57%	0.96%	0.11%	0.66%	0.99%	0.40%	0.61%	0.65%
			Verified	0.67%	1.28%	1.98%	0.69%	0.57%	0.96%	0.11%	0.66%	0.99%	0.40%	0.61%	0.65%
	Worst affected cells>3% TCH drop	*<=3%*	Reported	3.91%	1.75%	4.71%	2.32%	1.38%	1.59%	2.28%	0.95%	2.77%	2.32%	0.46%	0.41%
			Verified	3.91%	1.75%	4.71%	2.32%	1.38%	1.59%	2.28%	0.95%	2.77%	2.32%	0.46%	0.41%
	Good voice quality	*>=95%*	Reported	99.04%	95.92%	97.86%	98.96%	98.18%	98.09%	99.34%	98.43%	97.83%	98%	98.66%	99.23%
			Verified	99.04%	95.92%	97.86%	98.96%	98.18%	98.09%	99.34%	98.43%	97.83%	98%	98.66%	99.23%

PMR		Bench-mark	Audit	Aircel	Airtel	BSNL	Idea	RTL	Tata GSM	Uninor	V-con	V-fone	MTS	Rcom CDMA	Tata CDMA
S/N	Name of Parameter			GSM Operators										CDMA Operators	
4	No. of POI's having congestion >0.5%		Reported	0	0	0	0	0	0	0	0	0	0	0	0
			Verified	0	0	0	0	0	0	0	0	0	0	0	0
(B)	Customer Service Quality Parameters														
5	Metering/billing credibility-Post paid	<= 0.1%	Reported	0.05%	0.02%	0.00%	0.05%	0.10%	0.02%	0.00%	0.00%	0.16%	0.00%	0.10%	0.01%
			Verified	0.05%	0.02%	0.00%	0.05%	0.10%	0.02%	0.00%	0.00%	0.16%	0.00%	0.10%	0.01%
6	Metering /billing credibility-Pre paid	<= 0.1%	Reported	0.11%	0.02%	0.10%	0.00%	0.05%	0.00%	0.00%	0.06%	0.04%	0.00%	0.07%	0.06%
			Verified	0.11%	0.02%	0.10%	0.00%	0.05%	0.00%	0.00%	0.06%	0.04%	0.00%	0.07%	0.06%
7	Resolution of billing/ charging complaints	100% within 4 weeks	Reported	100%	100%	100%	100%	100%	100%	0%	100%	100%	0%	100%	100%
			Verified	100%	100%	100%	100%	100%	100%	0%	100%	100%	0%	100%	100%
	Period of applying credit/waiver/adjustment to the customers account from the date of resolutions of complaints	<=1 week	Reported	100%	100%	100%	100%	100%	100%	0%	100%	100%	0%	100%	100%
			Verified	100%	100%	100%	100%	100%	100%	0%	100%	100%	0%	100%	100%
8	Response time to customers for assistance														
	Accessibility of call centre/Customer Care	>=95%	Reported	100%	99.92%	99%	96.69%	98.96%	99.00%	100%	98.14%	100%	0.00%	98.98%	98%
			Verified	100%	99.92%	99%	96.69%	98.96%	99.00%	100%	98.14%	100%	0.00%	98.98%	98%
	% call answered by operators(voice to voice) within 60 sec.	>=90%	Reported	86.25%	96.21%	95.00%	83.94%	98.39%	95.00%	95.37%	96.44%	95.37%	0.00%	95.70%	98.00%
			Verified	86.25%	96.21%	95.00%	83.94%	98.39%	95.00%	95.37%	96.44%	95.37%	0.00%	95.70%	98.00%
9	Termination/closure of service														
	No.of requests for Termination / Closure of service complied within 7 days during the quarter	<=7days	Reported	100%	100%	100%	100%	100%	100%	0%	0%	100%	0%	100%	100%
			Verified	100%	100%	100%	100%	100%	100%	0%	0%	100%	0%	100%	100%
10	Time taken for refunds of deposits after closures.	100% within 60 days	Reported	100%	100%	100%	100%	100%	100%	0%	0%	100%	0%	100%	100%
			Verified	100%	100%	100%	100%	100%	100%	0%	0%	100%	0%	100%	100%

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)	TTSL GSM	Idea	BSNL(CG)	V-fone	Vi-con	Rcom GSM	Tata CDMA	Rcom CDMA
							GSM Operators					CDMA Operators	
(A)-1	Network Service Quality Parameter												
	BTS Accumulated Downtime	<=2%	NR	0%	1.99%	0%	0.57%	0.55%	NR	0.26%	0.21%	0%	0.35%
	Worst affected BTS due to downtime	<=2%	NR	0.02%	0.73%	0%	0%	0%	NR	0%	0%	0%	0%
	Sum of downtime of BTSs in a month i.e. total outage time of all BTSs in hours during a month		NR	535.183	5904.569	0	3129.3	923.868	NR	275.9328	622.6416	5.1336	499.716
	No. of BTSs having accumulated downtime of >24 hours in a month		NR	1.6518	30.0833	0	0	2.7996	NR	0	0	0	0
2	Connection Establishment (Accessibility)												
	a) CSSR	>=95%	99.77%	99.67%	97.61%	99.87%	100%	97.73%	98.74%	99.79%	99.64%	99.97%	100.00%
	b) SDCCH/PAGING congestion	<=1%	0.17%	0.15%	0.87%	0.07%	0.10%	0.39%	0.23%	0.08%	0.02%	0.00%	0.00%
	c) TCH congestion	<=2%	0.06%	0.18%	1.52%	0.06%	0.32%	1.88%	1.03%	0.13%	0.34%	0.03%	0.00%
3	Connection maintenance												
	a) CDR	<=2%	0.54%	1.01%	1.80%	0.80%	0.55%	1.74%	1.08%	0.73%	0.63%	0.62%	0.05%
	b) Cells having > 3% TCH drop	<=3%	2.08%	3.13%	2.87%	2.95%	2.19%	16.33%	1.87%	1.02%	1.17%	0.65%	0.00%
	c) Good voice quality	>=95%	99.04%	96.49%	NA	97.17%	99.09%	NA	97.90%	98.26%	97.96%	NA	99.85%
	d) No. of cells > 3% TCH drop		8	797	280	245	508	1,032	247	45	144	14	0
	e) Total no. of cells in the network		384	25,459	9,764	8,316	23,179	6,321	13,216	4,395	12,354	2,107	5,549
4	No of POI having > 0.5% congestion	>=0.5%	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
	b) Total No. of circuits on POI		7,516	208,189	13,184	32,837	205,246	9,404	67,763	8,347	69,827	23293	33,530
	c) Avg No. of call attempts on POI		11,757	52,050	7,770	11,306	28,208	26,565	37,506	3,618	1,538,875	1675	368,218
	d) Avg traffic served on POI (Erlang)		185	1,677	212	292	424	783	623	97	49,110	38.47	14,002

S/N	Name of Parameter	Bench mark	Aircel	Airtel	BSNL(MP)	TTSL GSM	Idea	BSNL(CG)	V-fone	Vi-con	Rcom GSM	Tata CDMA	Rcom CDMA
			GSM Operators									CDMA Operators	
	e) Total number of working POI Service Area wise		20	76	11	31	280	8	56	32	45	1,103	51
	f) Equipped Capacity of Network in respect of Traffic in erlang		2,126	322,570	NR	NR	331,366	58,635	106,356	58,917	251,000	1,162,773	176,000
	g) Total traffic handled in TCBH in erlang		488	183015	45464	1756153	337867	26538	75705	22968	155773	143869	119294
(B)	**Customer Service Quality Parameters**												
5	**Response time to customers for assistance**												
	a) Accessibility of call centre	*>=95%*	NR	95.84%	100%	100%	100%	NR	100%	100.00%	99%	100%	99%
	b) % of call answered by operators(voice to voice) within 60 sec	*>=90%*	NR	89.42%	100%	97.73%	96%	98.86%	98.10%	96.4%	96.95%	100%	95.64%
	c) No. of call attempts to call centre / customer care nos. during TCBH (Avg)		NR	531,949	100	254,711	100	141,765	42,320	21,884	13,959	100	6,514
	d) No. of calls connected and answered successfully to call centre / customer care nos. during TCBH (Avg)		NR	475,661	100	248,919	96	140,147	41,517	21,097	13,534	100	6,230

NA: Not Applicable, NP: Data Not Provided

Parameter-wise Findings (Live Data Assessment):

The parameter wise key takeouts for the Cellular Mobile Telephone Services providers in MP& CG Circle Service Area are as given below:-

➢ **BTS Accumulated Downtime (benchmark <= 2%):** All operators are meeting the benchmark with values lying between 0% and 1.99%.

➢ **Worst affected BTSs due to Downtime (benchmark <= 2%):** All operators are meeting the benchmark with values lying between 0% and 0.73%.

➢ **Call Setup Success Rate (CSSR) (benchmark >= 95%):** All operators are meeting the benchmark with values lying between 97.61% and 100%.

➢ **SDCCH/PAGING Channel congestion (benchmark <= 1%):** All operators, are meeting the benchmark with values lying between 0% and 0.87%.
Note: CDMA operators have provided the data for Paging Channel congestion and GSM operators provided SDCCH Channel congestion.

➢ **TCH congestion (benchmark <= 2%):** All operators are meeting the benchmark with values lying between 0% and 1.88% .

➢ **Call Drop Rate (CDR) (benchmark <= 2%):** All the operators are meeting the benchmark with values lying between 0.05% and 1.80%.

➢ **Cell exceeding 3% TCH drop (benchmark <= 3%):** Airtel & BSNL(CG) are not satisfying the benchmark with a value 3.13% & 16.33% , rest of the operators are meeting the benchmark .

➢ **Connections with good voice quality (benchmark >= 95%):** BSNL (MP&CG) and TTSL (CDMA) has declared that the parameter is not system generated rest all CDMA & GSM operators are meeting the benchmark respectively.

➢ **No of POI > 0.5%Congestion (benchmark >= 0.5%):** None of the operators are having POIs more than 0.5% congestion. There was congestion found on the POIs in general, but was under the benchmark of 0.5%. Cases were found where individual POIs were showing high utilization/usage and some were 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 the operators are meeting the benchmark with values lying between 95.84% to 100%. Aircel & BSNL (CG) has not reported this parameter.

➢ **%age of call answered by operator (Voice to voice) (benchmark >90%): %):** All the operators are meeting the benchmarks with a value lying between 95.64% to 100%. Aircel has not reported this parameter.

(2) Month Data Assessment & Summarized Findings

S/N	Name of Parameter	Bench mark	Aircel	Airtel	BSNL (MP)	TTSL GSM	Idea	BSNL (CG)	V-fone	Vi-con	Rcom GSM	Tata CDMA	Rcom CDMA
							GSM Operators					CDMA Operators	
(A)	**Network Service Quality Parameter**												
1	**Network Availability**												
	a) BTS Accumulated Downtime	<=2%	0.84%	0.12%	1.92%	0.00%	0.56%	0.43%	0.06%	0.22%	0.19%	0.48%	0.39%
	b) Worst affected BTSs due to downtime	<=2%	1.56%	0.25%	1.84%	0.00%	0.39%	1.97%	0.11%	1.36%	0.34%	0.00%	1.11%
	c) Total no. of BTSs in the licensed service area		128	8,259	4,121	2,767	7,625	2,333	4,457	1,474	4,118	13	1,983
	d) Sum of downtime of BTSs in a month in hours i.e. total outage time of all BTSs in hours during a month		802	7,266	58,815	65	31,950	7,378	1,908	2,421	5,671	46.3	5,795
	e) No. of BTSs having accumulated downtime of >24 hours in a month		2	21	76	0	30	46	5	20	14	0	22
2	**Connection Establishment (Accessibility)**												
	a) CSSR (Call Setup Success Rate)	>=95%	99.87%	99.64%	97.59%	99.78%	99.55%	97.73%	98.09%	99.76%	99.60%	99.92%	100.00%
	b) SDCCH/PAGING congestion	<=1%	0.09%	0.20%	0.82%	0.12%	0.11%	0.39%	0.23%	0.07%	0.04%	0.01%	0.01%
	c) TCH congestion	<=2%	0.04%	0.16%	1.59%	0.10%	0.34%	1.88%	1.68%	0.17%	0.36%	0.07%	0.00%
3	**Connection maintenance (retainability)**												
	a) CDR	<=2%	0.53%	0.96%	1.77%	0.80%	0.56%	1.74%	1.08%	0.74%	0.62%	0.66%	0.06%
	b) Worst affected cells>3% TCH drop	<=3%	1.56%	1.20%	2.88%	0.96%	2.20%	16.33%	2.43%	1.05%	1.10%	0.71%	0.00%
	c) Good voice quality	>=95%	99.08%	97.35%	NA	97.33%	99.09%	NA	97.92%	98.24%	97.99%	NA	99.85%
	d) Total No. of cells exceeding 3% TCH drop (call drop)		6	306	282	80	509	1,032	321	46	136	15	0
	e) Total no. of cells in the network		384	25,459	9,764	8,316	23,179	6,321	13,216	4,395	12,354	2107	5,549
4	**No of POI having > 0.5% congestion**	>=0.5%	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
	b) Total No. of call attempts on POI (Avg.)		13,586	51,919	0	11,184	28,961	26,565	41,485	3,652	1,466,588	1700	349,379
	c) Total traffic served on POI (Erlang) (Avg.)		220	1,675	0	291	431	783	696	97	47,447	38.34	13,545
	d) Total No. of circuits on POI		7,516	208,189	13,184	32,837	205,246	9,404	67,763	8,347	69,827	23293	33,530
	e) Total number of working POI Service Area wise		20	76	11	31	280	8	56	32	45	1103	51
	f) Capacity of POI		7,385	200,570	11,483	31,672	198,828	9,404	1,814	7,626	63,517	19615	29,989
5	**Network Data**												
	a) Equipped Capacity of Network Erlang		2,126	322,570	NR	NR	331,366	58,635	106,356	58,917	251,000	1162773	176,000
	b) Total traffic in TCBH in erlang (Avg.)		488	183,015	45,464	1,756,153	337,867	26,538	75,705	22,968	155,773	143869	119,294
	c) Total no. of customers served (as per VLR) on last day of the month		489,546	8,713,941	1,859,091	2,807,241	14,238,770	813,683	3,201,775	537,578	6,701,897	400821	2,583,574
(B)	**Customer Service Quality Parameters**												
5	**Metering/billing credibility-Post paid**	<= 0.1%	0.14%	0.01%	0.05%	0.49%	0.04%	NR	0.07%	NA	0.10%	0.10%	0.10%
	a) No. of bills issued during the period		3,665	111,570	90,745	26,400	277,016	NR	37,618	NA	65,758	40376	120,833
	b) No. of bills disputed including billing complaints during the period		5	13	46	130	107	NR	28	NA	65	40	120
6	**Metering /billing credibility-Pre paid**	<= 0.1%	0.01%	0.01%	0.01%	0.01%	0.00%	NR	0.03%	0.01%	0.09%	0.04%	0.09%
	a) No. of charging / credit / validity complaints during the quarter		63	636	289	235	519	NR	1,152	156	6,777	314	4,118

No.	Parameter	Benchmark											
	b) Total no. of pre-paid customers at the end of the quarter		1,018,147	11,808,494	2,940,438	4,472,363	15,910,225	NR	4,099,452	1,250,776	7,674,726	711,920	4,375,479
7	**Resolution of billing/ charging complaints**	*100% within 4 weeks*	100%	100%	100%	100%	100%	NR	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		100%	100%	100%	100%	100%	NR	100%	100%	100%	100%	100%
	b) Total no. of billing (post paid) and charging, credit / validity (pre paid) complaints received during the quarter		68	649	335	365	626	NR	1,180	156	6,842	354	4,238
	c) No. of billing complaints (post paid) and charging, credit/ validity complaints (pre paid) resolved in favour of the customer during the quarter		64	649	335	3	626	NR	832	156	4,471	1	3,327
	d) No. of complaints disposed on account of not considered as valid complaints during the quarter		16,563	3,717	0	362	5,407	NR	348	0	2,371	353	911
	e) Period of applying credit/waiver/adjustment to the customers account from the date of resolutions of complaints	*<=1 week*	100%	100%	100%	100%	100%	NR	100%	100%	100%	100%	100%
8	**Response time to customers for assistance**												
	a) Accessibility of call centre/Customer Care	*>=95%*	NR	95.59%	100%	99%	96%	NR	100%	96.30%	99%	98%	99%
	b) % call answered by operators(voice to voice) within 60 sec.	*>=90%*	NR	88.12%	99%	97%	90%	NR	98.50%	95.76%	98.15%	83.00%	96.99%
	c) Total no. of call attempts to call centre & customer care nos. during TCBH (Avg.).		NR	103907	181895	559347	2212961	NR	300816	108762	6,598,553	130,455	1470390
	d) No. of calls connected and answered successfully to call centre & customer care nos. during TCBH (Avg.).		NR	98,864	180,888	555,677	2,134,447	NR	300,816	104,733	6,519,271	127,888	1,455,003
9	**Termination/closure of service**	*<=7days*	100%	NR	45.22%	100%	100%	NR	100%	NA	100%	100%	100%
	a) Total No. of requests for Termination / Closure of service received during the quarter		42	NR	482	845	1,721	NR	755	NA	177	1,237	551
	b) No.of requests for Termination / Closure of service complied within 7 days during the quarter		42	NR	218	845	1,721	NR	755	NA	177	1,237	551
10	**Time taken for refunds of deposits after closures.**	*100% within 60 days*	100%	NR	100%	100%	100%	NR	100%	NA	100%	100%	100%

Parameter-wise Findings (Month Data Assessment):

The parameter wise key takeouts for the Cellular Mobile Telephone Services providers in MP&CG Circle Service Area are as given below:-

- **BTS accumulated downtime (benchmark <=2%):** All operators are meeting the benchmark with values lying between 0% and 1.92%.
- **Worst affected BTSs due to downtime (benchmark <= 2%):** All operators are meeting the benchmark with values lying between 0% and 1.97%.
- **Call setup success rate (benchmark >= 95%):** All operators are meeting the benchmark with values lying between 97.73% and 100%.
- **SDCCH/PAGING Channel congestion (benchmark <= 1%):** All operators are meeting the benchmark with values lying between 0.01% and 0.39%.
  Note: CDMA operators have provided the data for Paging Channel congestion and GSM operators provided SDCCH Channel congestion.
- **TCH congestion (benchmark <= 2%):** All operators are meeting the benchmark with values lying between 0% and 1.88%.
- **Call drop rate (benchmark <= 2%):** Rest of the operators are meeting the benchmark with values lying between 0.06% and 1.77%.
- **Cell exceeding 3% TCH drop (benchmark <= 3%):** All operators are meeting the benchmark, Except (CG) with a value 16.33%..
.
- **Connections with good voice quality (benchmark >= 95%):** All the GSM & CDMA operators are meeting the benchmark, Except BSNL(MP&CG) and TTSL CDMA who have declared that this parameter is not system generated.

- **No of POI > 0.5%Congestion (benchmark >= 0.5%):** None of the operators are having POIs more than 0.5% congestion. There was congestion found on the POIs in general, but was under the benchmark of 0.5%. Cases were found where individual POIs were showing high utilization/usage and some were 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%):** Except Aircel, and BSNL (CG) who has not reported this parameter, rest all the operators are meeting the benchmark.

- **%age of call answered by operator (Voice to voice) (benchmark >90%):** All the operators are meeting the benchmark except to Airtel & Tata CDMA. Aircel and BSNL (CG) has not reported this parameter

- **Metering and billing credibility-Post paid (benchmark <= 0.1%):** Rest of the operators are meeting the benchmark. Except Aircel and TTSL (GSM) deviating with a value of 0.14% and 0.49% .
- **Metering and billing credibility-Pre paid (benchmark <= 0.1%):** All the operators are meeting the benchmark. Except BSNL (CG) , who has not reported this parameter.
- **Resolution of billing/ charging complaints (benchmark 100% within 4 weeks):** All operators are meeting the benchmark.
- **Termination/Closure of service (Benchmark <= 7 days):** All operators have satisfied the benchmark, except BSNL (MP) which is deviating from benchmark.
- **Time taken for refunds of deposits after closures (benchmark 100% within <=60 days):** All operators have satisfied the benchmark

(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	1	2	128
2	Airtel Ltd	18	141	8539
3	BSNL(MP)	9	88	4121
4	Idea	30	56	7625
5	BSNL (CG)	3	44	2333
6	Reliance Communication	9	51	4118
7	Tata Teleservices Ltd.	4	25	2767
8	Videocon	1	9	1474
9	Vodafone	4	43	4457
	CDMA Operators			
10.	Reliance Communication	6	8	1983
11.	Tata Teleservices Ltd.	4	8	713

(4) **Performance (Graphical Representation)**

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

A)   NETWORK PERFORMANCE

BTS Accumulated Downtime: All operators are meeting the TRAI benchmarks (<= 2 %) for both one month data and 3 days live data taken in the month of audit , except Aircel & Vodafone who have not reported live data.

	Aircel	Airtel	BSNL (MP)	TTSL GSM	Idea	BSNL (CG)	V-fone	Vi-con	Rcom GSM	Tata CDMA	Rcom CDMA
Live		0.09%	1.99%	0.00%	0.57%	0.55%		0.26%	0.21%	0.01%	0.35%
Month	0.84%	0.12%	1.92%	0.00%	0.56%	0.43%	0.06%	0.22%	0.19%	0.01%	0.39%
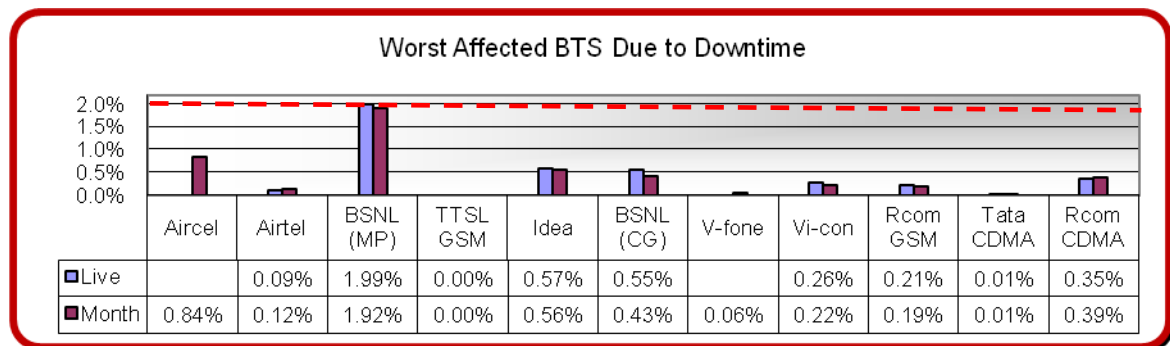
Worst Affected BTS Due to Downtime: All operators are meeting the TRAI benchmarks (<= 2 %) for both one month data and 3 days live data taken in the month of audit. Aircel & Vodafone has not reported this parameter for Live part.

Worst Affected BTS Due to Downtime

	Aircel	Airtel	BSNL (MP)	TTSL GSM	Idea	BSNL (CG)	V-fone	Vi-con	Rcom GSM	Tata CDMA	Rcom CDMA
Live		0.02%	0.73%	0.00%	0.00%	0.12%		0.00%	0.00%	0.00%	0.00%
Month	1.56%	0.25%	1.84%	0.00%	0.39%	1.97%	0.11%	1.36%	0.34%	0.00%	1.11%
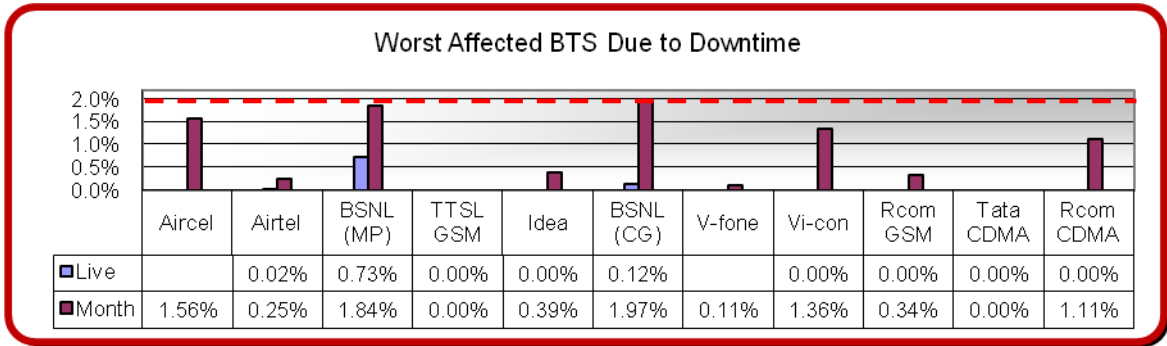
Call Setup Success Rate (CSSR): All operators are meeting the TRAI benchmarks (>= 95 %) for both one month data and 3 days live data taken in the month of audit

Call Setup Success Rate

	Aircel	Airtel	BSNL (MP)	TTSL GSM	Idea	BSNL (CG)	V-fone	Vi-con	Rcom GSM	Tata CDMA	Rcom CDMA
Live	99.77%	99.67%	97.61%	99.87%	99.58%	97.73%	98.74%	99.79%	99.64%	99.97%	100.00%
Month	99.87%	99.64%	97.59%	99.78%	99.55%	97.73%	98.09%	99.76%	99.60%	99.92%	100.00%

Blocked call rate:

SDCCH congestion (%): All operators are meeting the TRAI benchmarks (<= 1 %) for both one month data and 3 days live data taken in the audit.

	Aircel	Airtel	BSNL (MP)	TTSL GSM	Idea	BSNL (CG)	V-fone	Vi-con	Rcom GSM	Tata CDMA	Rcom CDMA
Live	0.17%	0.15%	0.87%	0.07%	0.10%	0.39%	0.23%	0.08%	0.02%	0.00%	0.00%
Month	0.09%	0.20%	0.82%	0.12%	0.11%	0.39%	0.23%	0.07%	0.04%	0.01%	0.00%

TCH congestion (%): All operators are meeting the TRAI benchmarks (<= 2%) for both one month data and 3 days live data.

	Aircel	Airtel	BSNL (MP)	TTSL GSM	Idea	BSNL (CG)	V-fone	Vi-con	Rcom GSM	Tata CDMA	Rcom CDMA
Live	0.06%	0.18%	1.52%	0.06%	0.32%	1.88%	1.03%	0.13%	0.34%	0.03%	0.002%
Month	0.04%	0.16%	1.59%	0.10%	0.34%	1.88%	1.68%	0.17%	0.36%	0.07%	0.003%
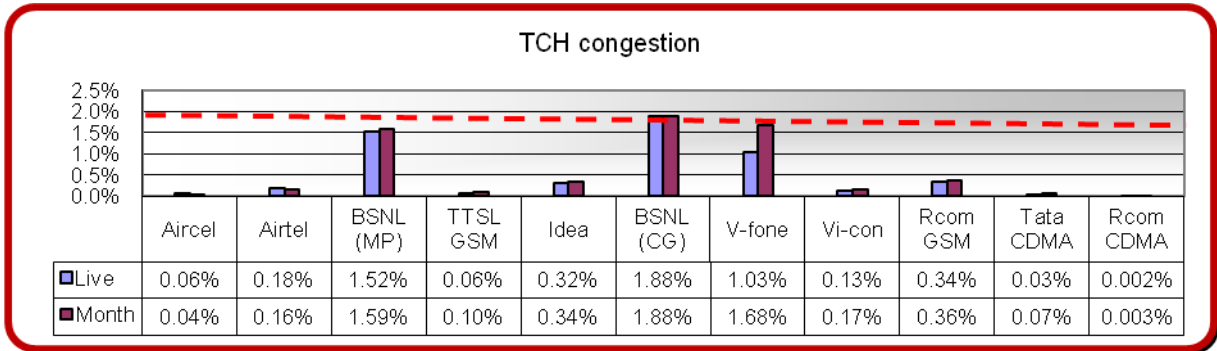
Connection Maintainability (Retain ability):

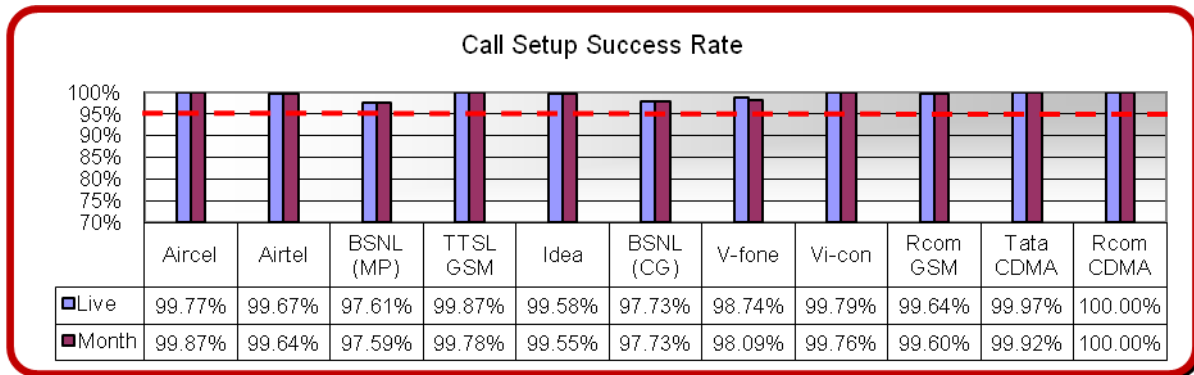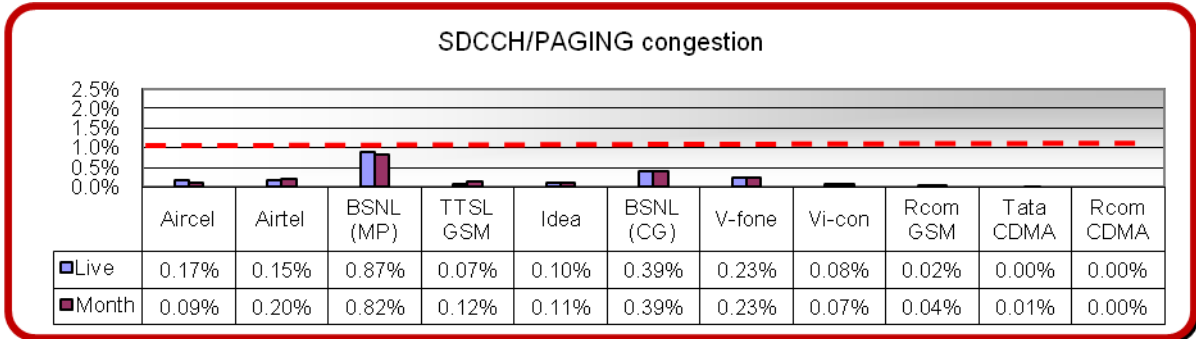**Call Drop Rate (CDR) (%):** All the operators are meeting the TRAI benchmarks (<=2%) for both one month data and 3 days live data taken in the month of audit.

	Aircel	Airtel	BSNL (MP)	TTSL GSM	Idea	BSNL (CG)	V-fone	Vi-con	Rcom GSM	Tata CDMA	Rcom CDMA
Live	0.54%	1.01%	1.80%	0.80%	0.55%	1.74%	1.08%	0.73%	0.63%	0.62%	0.05%
Month	0.53%	0.96%	1.77%	0.80%	0.56%	1.74%	1.08%	0.74%	0.62%	0.66%	0.06%
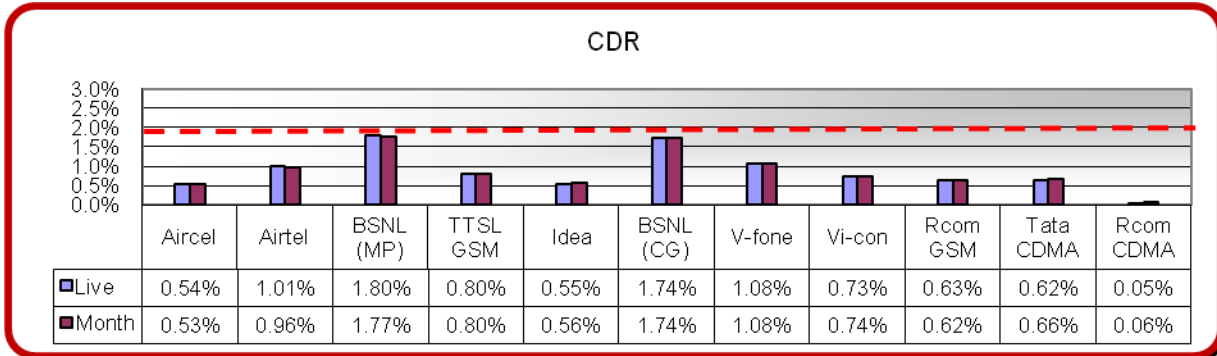
Worst affected Cell exceeding 3% TCH Drop: All the operators are meeting the TRAI benchmarks (<= 3%) for both one month data and 3 days live data. Except BSNL (CG) in both Live & Month and Airtel is in Live only.
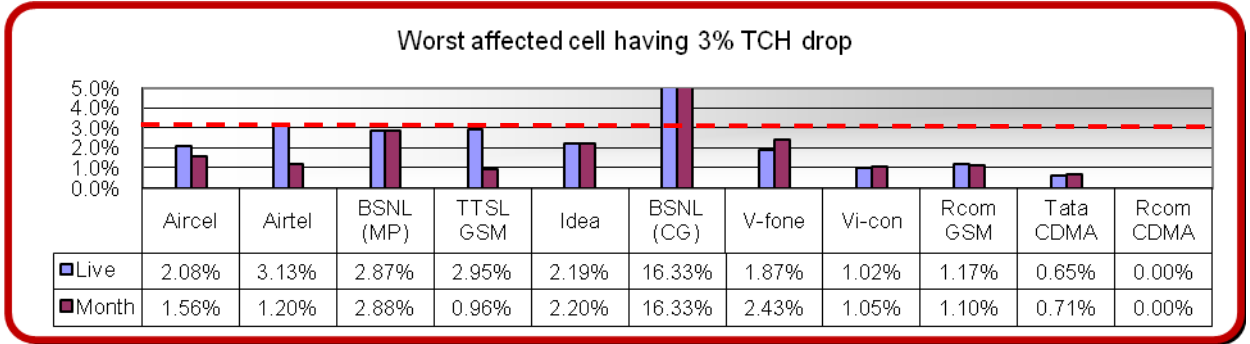
Worst affected cell having 3% TCH drop

	Aircel	Airtel	BSNL (MP)	TTSL GSM	Idea	BSNL (CG)	V-fone	Vi-con	Rcom GSM	Tata CDMA	Rcom CDMA
Live	2.08%	3.13%	2.87%	2.95%	2.19%	16.33%	1.87%	1.02%	1.17%	0.65%	0.00%
Month	1.56%	1.20%	2.88%	0.96%	2.20%	16.33%	2.43%	1.05%	1.10%	0.71%	0.00%

Percentage of connections with good voice quality (benchmark >= 95%): All the operators are meeting the TRAI benchmarks (=> 95%) for both one month data and 3 days live data. BSNL (MP&CG) & TTSL (CDMA) which has not provided the data as data is not generated from the system.

Connections with good voice quality

	Aircel	Airtel	TTSL GSM	Idea	V-fone	Vi-con	Rcom GSM	Rcom CDMA
Live	99.04%	96.49%	97.17%	99.09%	97.90%	98.26%	97.96%	99.85%
Month	99.08%	97.35%	97.33%	99.09%	97.92%	98.24%	97.99%	99.85%
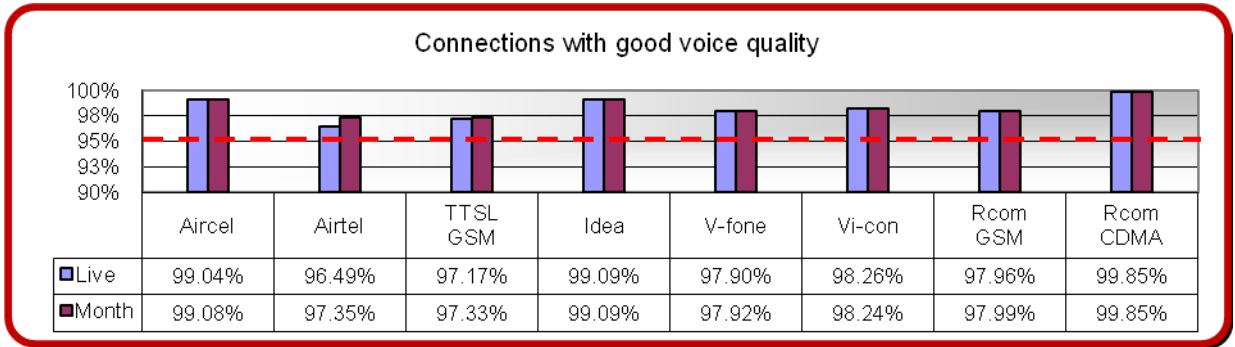
No of POI having > 0.5% Congestion: None of the operators are having POIs above 0.5% congestion (>= 0.5%) for both one month data and 3 days live data.

No of POI having > 0.5% congestion

	Aircel	Airtel	BSNL (MP)	TTSL GSM	Idea	BSNL (CG)	V-fone	Vi-con	Rcom GSM	Tata CDMA	Rcom CDMA
Live	0	0	0	0	0	0	0	0	0	0	0
Month	0	0	0	0	0	0	0	0	0	0	0
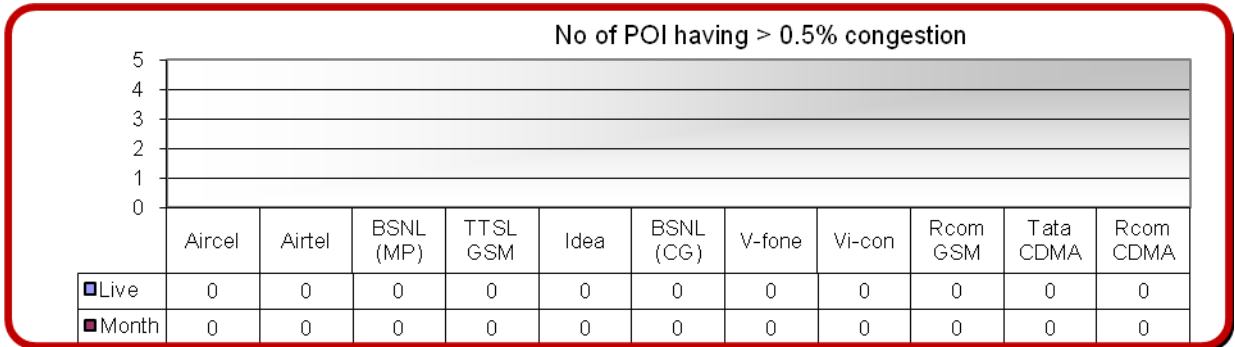
CUSTOMER SERVICE QUALITY PARAMETERS

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. Aircel & BSNL (CG) has not reported the value for this parameter in live and Month data both.

Accessibility of call centre/customer care

	Airtel	BSNL (MP)	TTSL GSM	Idea	V-fone	Vi-con	Rcom GSM	Tata CDMA	Rcom CDMA
Live	95.84%	100%	100%	100%	100%	100.00%	99%	100%	99%
Month	95.59%	100%	99%	96%	100%	96.30%	99%	98%	99%
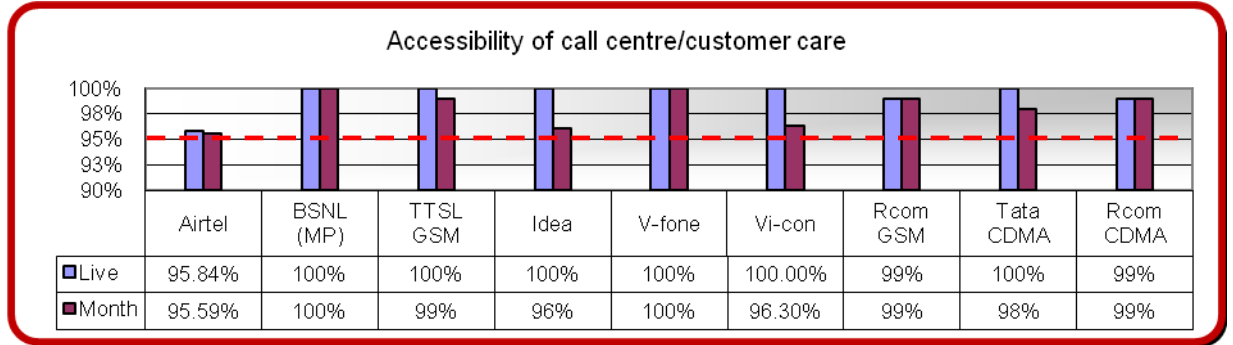
Percentage of call answered by operators (Voice to voice) within 60 sec: All the operators are meeting the benchmark Except for Airtel as well as Aircel who has not reported in both Month & Live cases, where as BSNL(CG) has not reported in only Month case.
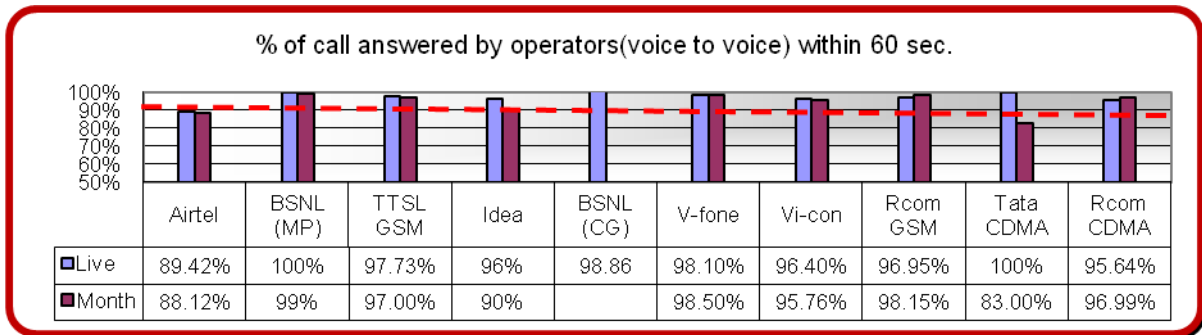

% of call answered by operators(voice to voice) within 60 sec.

	Airtel	BSNL (MP)	TTSL GSM	Idea	BSNL (CG)	V-fone	Vi-con	Rcom GSM	Tata CDMA	Rcom CDMA
Live	89.42%	100%	97.73%	96%	98.86	98.10%	96.40%	96.95%	100%	95.64%
Month	88.12%	99%	97.00%	90%		98.50%	95.76%	98.15%	83.00%	96.99%

(5)   **Critical Analysis**

From the data table it can be seen that only Airtel & BSNL(CG) are not complying the benchmark for the parameter of 'Worst affected cells have more than 3% TCH drop rate' with high margins. This may have happened due to mainly in the change adopted for calculating the parameter considering CBBH instead of TCBH, which reflects more practical way of calculating TCH drop keeping in view customer satisfaction.

Regarding Metering & Billing for postpaid service, Aircel and TTSL (GSM) are having the higher value in comparison to other .Rest all operators are found to be performing quite well in terms of meeting the benchmark (<= 95%) .

 In case of POI congestion all the operators are performing quite well in terms of meeting the benchmark (<= 0.5%). It is noticed that most of the operators are having individual POI satisfying the benchmark.   But in some case overflows on individual POI are noticed causing traffic diversions to obtain the net result for POI congestion.
Performance related to customer care data for Accessibility of call centre parameter, all operators are meeting the benchmarks, except Aircel & BSNL(CG) who has not reported this parameter in both month & live data. For % of voice to voice call parameter is found to be un satisfactory for Airtel only. As far as Aircel & BSNL (CG) is concerned they are not reported any value for this parameter in both Live & Month part.

(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 based on Live calling for Billing Complaints

Calling Operator	Aircel	Airtel	Idea	Rcom GSM	TTSL GSM	Vi-con	V-fon	BSNL (MP)	Rcom CDMA	TTSL CDMA
Total No. of calls attempted	60	100	100	100	100	80	100	70	100	90
Total No. of calls answered	50	80	87	85	80	67	90	57	95	80
Cases resolved with 4 weeks	50	80	87	85	80	67	90	57	95	80
%age of cases resolved	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%

(3) Live calling to call centre (Bhopal / Indore)

Calling Operator	Aircel	Airtel	Idea	Bsnl (MP)	Tata GSM	Rcom GSM	Videocon	Vodafone	Bsnl (CG)	Rcom CDMA	Tata CDMA
Call Centre No.	121/198	121/198	198/12345	1500	121	*222/*333	121	111/198	1500	*222/*333	121
Total No. of Calls Attempted	100	100	100	100	100	100	100	100	100	100	100
Total No. of calls connected to IVR	100	100	100	100	100	100	100	100	100	100	100
Calls got connected to agent within 60 Sec	95	97	94	93	87	80	93	96	95	96	70
%age of calls got answered	95%	97%	94%	93%	87%	80%	93%	96%	95%	96%	70%

(4)Level 1 live calling (Ratlam)

Emergency No.	No. of calls made	Airtel	Aircel	Idea	Tata (GSM)	Vodafone	Tata (CDMA)	BSNL (MP)	Room (GSM)	Room (CDMA)	BSNL (CG)	Videocon
100	2	2	2	2	2	2	2	2	2	2	2	2
101	2	NW	NW	NW	NW	NW	NW	NW	NW	NW	NW	NW
102/108	2	2	2	2	2	2	2	2	2	2	2	2
139	2	2	2	2	2	2	2	2	2	2	2	2

Level 1 live calling (Satna)

Emergency No.	No. of calls made	Airtel	Aircel	Idea	Tata (GSM)	Vodafone	Tata (CDMA)	BSNL (MP)	Room (GSM)	Room (CDMA)	BSNL (CG)	Videocon
100	2	2	2	2	2	2	2	2	2	2	2	2
101	2	NW	NW	NW	NW	NW	NW	NW	NW	NW	NW	NW
102/108	2	2	2	2	2	2	2	2	2	2	2	2
139	2	2	2	2	2	2	2	2	2	2	2	2

Level 1 live calling (Vidhisha)

Emergency No.	No. of calls made	Airtel	Aircel	Idea	Tata (GSM)	Vodafone	Tata (CDMA)	BSNL (MP)	Room (GSM)	Room (CDMA)	BSNL (CG)	Videocon
100	2	2	2	2	2	2	2	2	2	2	2	2
101	2	NW	NW	NW	NW	NW	NW	NW	NW	NW	NW	NW
102/108	2	2	2	2	2	2	2	2	2	2	2	2
139	2	2	2	2	2	2	2	2	2	2	2	2

NW:- Not Working.

(5)Critical Analysis :

Random numbers were selected (for whom refund were given) 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. During call testing to call centre all the operators are satisfactory during the calling. As far as Emergency no's calling is concerned, all the operators got connected with all the emergency nos, except emergency no's -101, which is not connected in all the 3 cities by the operators ,except BSNL ..

(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 to 2000 hrs and between 2000 to 2100 hrs so that TCBH hours for all the operators were covered.

(2)   Performance based on live Calling (Lucknow)

Calling Operator	Aircel	Airtel	Idea	Uninor	BSNL	TTSL(GSM)	RTL GSM	V-Fone	MTS	TATA CDMA	RCom CDMA
Aircel	-	96%	95%	100%	100%	100%	100%	100%	100%	100%	100%
Airtel	100%	-	100%	98%	100%	100%	99%	100%	98%	98%	100%
Idea	100%	100%	-	100%	95%	100%	100%	99%	100%	100%	98%
Uninor	100%	100%	100%	-	100%	96%	96%	100%	100%	97%	100%
BSNL	100%	100%	100%	99%	-	97%	100%	100%	98%	100%	100%
RTL GSM	100%	100%	100%	100%	100%	100%	-	95%	96%	100%	96%
TTSL GSM	100%	100%	100%	98%	100%	-	100%	100%	94%	95%	100%
V- Fone	100%	100%	96%	100%	100%	99%	100%	-	96%	100%	100%
MTS	100%	100%	99%	95%	90%	93%	95%	97%	-		
TATA CDMA	97%	100%	100%	97%	100%	100%	97%	98%	92%	-	97%
RCom CDMA	100%	100%	100%	100%	100%	100%	100%	96%	95%	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 network.

(D) Drive Test of the Mobile Network of Service Providers:

SN	Parameter	City Name	Aircel	Airtel	BSNL	Idea	Uninor	Rcom (GSM)	TTSL (GSM)	Vodafone	Rcom (CDMA)	TTSL (CDMA)
						GSM Operators					CDMA Operators	
1.1	Call Attempts	Ratlam	75	92	78	75	96	66	90	86	63	87
		Satna	87	93	66	87	110	100	89	90	99	129
		Vidhisha	77	63	56	77	66	110	81	70	74	65
1.2	Blocked Call Rate (<=3%)	Ratlam	0.00%	1.09%	3.85%	0.00%	0.00%	0.00%	2.22%	0.00%	0.00%	0.00%
		Satna	0.00%	1.08%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
		Vidhisha	0.00%	0.00%	1.78%	0.00%	0.00%	0.00%	1.23%	0.00%	0.00%	0.00%
1.3	Dropped Call Rate (<=2%)	Ratlam	0.00%	0.00%	1.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
		Satna	0.00%	0.00%	0.00%	0.00%	0.00%	1.00%	0.00%	0.00%	0.00%	0.00%
		Vidhisha	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
1.4	Percentage of connections with good voice quality (=>95%)											
	(i) 0-4 (w/o frequency hopping)	Ratlam									99.46%	99.90%
		Satna									99.36%	99.23%
		Vidhisha									99.86%	99.39%
	(ii) 0-5 (with frequency hopping)	Ratlam	95.58%	95.10%	96%	95.58%	95.08%	95.86%	97.38%	99%		
		Satna	95.09%	95.04%	96.52%	95.09%	97.50%	92.99%	95.05%	99.13%		
		Vidhisha	96.20%	95.26%	81.80%	96.2%	95.98%	93.00%	95.30%	98.99%		
1,5	Service Coverage											
	In door (>= -75dBm)	Ratlam	83.43%	90.00%	68.40%	83.43%	91.32%	84.73%	44.04%	93.18%	83.29%	96.76%
		Satna	89.46%	85.00%	64.89%	89.46%	95.52%	66.47%	47.40%	87%	80.29%	83%
		Vidhisha	84.25%	91.50%	49.10%	84.25%	97.91%	65%	65.90%	75.00%	76.83%	73%
	In-vehicle (>= -85dBm)	Ratlam	99.91%	100%	96.20%	99.91%	99.06%	90.20%	85.97%	99.88%	99.51%	99.93%
		Satna	99.88%	98.00%	96.06%	99.88%	99.50%	97.34%	89.60%	99%	99.36%	98%
		Vidhisha	99.02%	99.13%	89.50%	99.02%	100%	97.00%	95.70%	98%	97.36%	89%
	Out door- in city (>= -95dBm)	Ratlam	100%	100%	100%	100%	100%	99.68%	99.02%	100%	100%	100%
		Satna	100%	100%	99%	100%	99.98%	100%	99.27%	100%	100%	100%
		Vidhisha	99.99%	100%	100%	99%	100%	100%	99.95%	100%	99%	97%
1.6	Call Setup Success Rate (>=95%)	Ratlam	100%	98.91%	96%	100%	100%	100%	97.78%	100%	100%	100%
		Satna	100%	99%	98.48%	100%	100%	100%	100%	100%	100%	100%
		Vidhisha	100%	100%	96.43%	100%	100%	100%	98.76%	100%	100%	100%
1.7	Handover Success Rate (HOSR)	Ratlam	96.60%	99.36%	97.67%	96.60%	98.46%	100%	99.28%	100%	98.94%	100%
		Satna	96.48%	98.00%	98.89%	96.48%	97.97%	100%	99.34%	100%	100%	100%
		Vidhisha	100%	98.95%	98.63%	100%	100%	100%	100%	100%	100%	100%

Key observations as could be derived from the table are as under:
• Good Voice quality parameter is not met by BSNL in Vidhisha   and Vodafone in Satna & Vidhisha. Rest all operators are meeting the benchmark in these 3 cities.

(1) Sample Coverage

The Operator Assisted Drive Test was conducted at MP&CG 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

RATLAM

HIGH DENSE   Ghas Bazar, chandni chowk, lakkarpita rd.
MEDIUM DENSE: Sahar sarai , subhas marg, rajendra nagar, naharpura
LOW DENSE: Indiranagar , Alkapuri , Nirala nagar, Jai road, kasturbanagar...
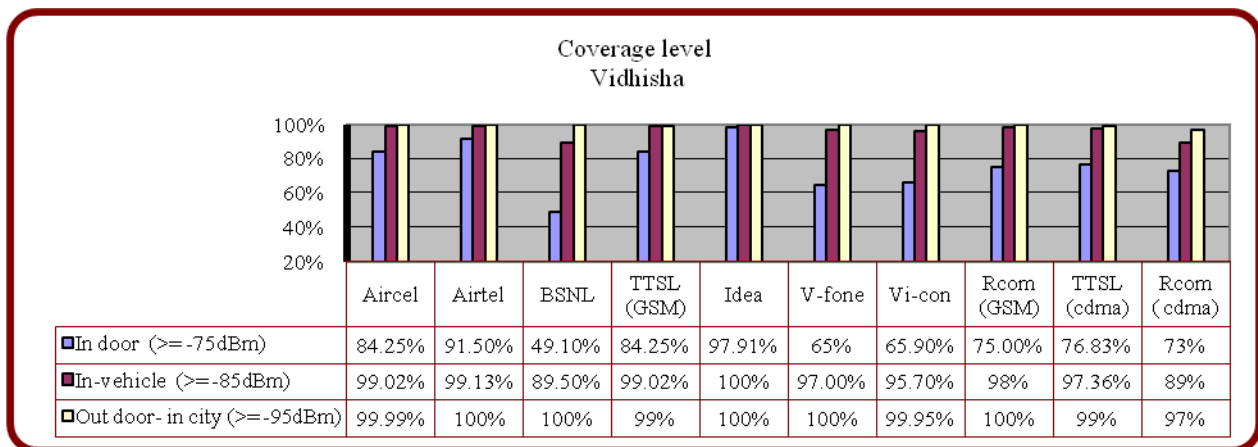
SATNA

HIGH DENSE: Tikuria road ,Mandi bari, Manish market,chowk bazaar.
MEDIUM DENSE: Rewa highway , Bypass road, Jawahar nagar, Prem nagar..
LOW DENSE: Civil lines, Birla road, Central jail road,Umeritola.

VIDHISHA

HIGH DENSE: City center, Hospital rd.,Bus stand , Tilak chowk
MEDIUM DENSE   Dandapura , Paraipura , Kiri mohalla, veerhaqikat rai marg..   .

LOW DENSE: Durga nagar, Keshav nagar, pitalmil chauraha, sagar road..

(2) Graphical Representation

The Radio coverage level as was found in the operator assisted drive test result is shown graphical below:

Coverage level Ratlam

	Aircel	Airtel	BSNL	TTSL (GSM)	Idea	V-fone	Vi-con	Rcom (GSM)	TTSL (cdma)	Rcom (cdma)
In door (>=-75dBm)	83.43%	90.00%	68.40%	83.43%	91.32%	84.73%	44.04%	93.18%	83.29%	96.76%
In-vehicle (>=-85dBm)	99.91%	100%	96.20%	99.91%	99.06%	90.20%	85.97%	99.88%	99.51%	99.93%
Out door- in city (>=-95dBm)	100%	100%	100%	100%	100%	99.68%	99.02%	100%	100%	100%

Coverage level Satna

	Aircel	Airtel	BSNL	TTSL (GSM)	Idea	V-fone	Vi-con	Rcom (GSM)	TTSL (cdma)	Rcom (cdma)
In door (>=-75dBm)	89.46%	85.00%	64.89%	89.46%	95.52%	66.47%	47.40%	87%	80.29%	83%
In-vehicle (>=-85dBm)	99.88%	98.00%	96.06%	99.88%	99.50%	97.34%	89.60%	99%	99.36%	98%
Out door- in city (>=-95dBm)	100%	100%	99%	100%	99.98%	100%	99.27%	100%	100%	100%

Coverage level Vidhisha

	Aircel	Airtel	BSNL	TTSL (GSM)	Idea	V-fone	Vi-con	Rcom (GSM)	TTSL (cdma)	Rcom (cdma)
In door (>=-75dBm)	84.25%	91.50%	49.10%	84.25%	97.91%	65%	65.90%	75.00%	76.83%	73%
In-vehicle (>=-85dBm)	99.02%	99.13%	89.50%	99.02%	100%	97.00%	95.70%	98%	97.36%	89%
Out door- in city (>=-95dBm)	99.99%	100%	100%	99%	100%	100%	99.95%	100%	99%	97%

(3)   Critical Analysis

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

- Good Voice quality parameter is not met by BSNL in Vidhisha   and Vodafone in Satna & Vidhisha. Rest all operators are meeting the benchmark in these 3 cities

- Aircel is having an ICR agreement with TTSL in MP&CG Circle.
  .

Operators are found satisfying the TRAI benchmark for almost all the parameters such as Blocked Call Rate, Dropped Call rate & Call setup Success Rate.
During Drive Test of BSNL in Vidhisha, some RF coverage issue was found in some areas as well as Vodafone is also having some coverage issue in Satna & Vidhisha. Due to this reason Voice Quality effected over there.

NOTE—Etisalat & Loop have closed their operation in MP&CG circle..

(E) Independent Drive Test :-

1.) Sample Coverage

The Operator Assisted Drive Test was conducted at MP&CG 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

HOSHANGABAD (Vodafone)

HIGH DENSE: Rly stn, govt hospital , Etwara bazaar, sadar bazaar...
MEDIUM DENSE   police stn area, DM office , koti bazaar, Saat rasta
LOW DENSE: Sindhi colony, fire brigade office area .

RATLAM(TTSL & Aircel)

HIGH DENSE   Ghas Bazar, chandni chowk, lakkarpita rd.
MEDIUM DENSE: Sahar sarai , subhas marg, rajendra nagar, naharpura
LOW DENSE: Indiranagar , Alkapuri , Nirala nagar, Jai road, kasturbanagar.

KHARGONE (Idea)

HIGH DENSE: Radha ullav market, old hospital road, bus stand road, MG road..
MEDIUM DENSE   Khandwa road , nutan nagar, bistan road, aurangapura..   .
LOW DENSE: Shivshakti nagar , sri nath colony , Jawahar marg, Saraswati nagar.

DURG (RCOM)

HIGH DENSE: Saket colony , ganj pura, laxmi nagar,sadar bazaar..
MEDIUM DENSE   Smriti nagar,pulgaon naka ,anand nagar , mahavir nagar,kelabdri.
LOW DENSE: Borsi colony ,asha nagar, arya nagar adarsh nagar.

MORENA (BSNL)
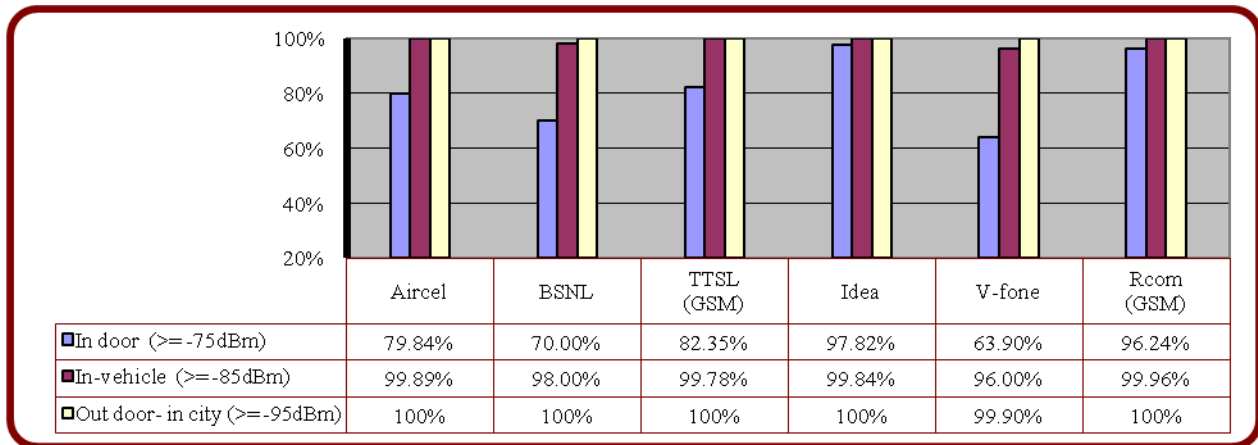
HIGH DENSE: Station road , main market ,barai chauraha,galla mandi.
MEDIUM DENSE   Vivekanand colony , Jail road , Nehru park ,porsa rd..   .
LOW DENSE: Agra road ,Sriram colony, Jora highway, MS road.

2) Performance (for the respective cities)

SN	Parameter	Aircel (Ratlam)	BSNL (Morena)	TTSL (Ratlam)	Idea (Khargone)	Vodafone (Hoshangabad)	RCOM (Durg)
1.1	Call Attempts	71	49	73	122	75	78
1.2	Blocked Call Rate (<=3%)	0%	0%	0%	0%	0%	0%
1.3	Dropped Call Rate (<=2%)	0%	0.00%	0%	0%	0%	0%
1.4	Percentage of connections with good voice quality (=>95%)						
	(i) 0-4 (w/o frequency hopping)						
	(ii) 0-5 (with frequency hopping)	96.04%	95%	96.53%	95.04%	93.82%	95.36%
1.5	Service Coverage						
	In door (>= -75dBm)	79.84%	70%	82.35%	97.82%	63.9%	96.24%
	In-vehicle (>= -85dBm)	99.89%	98%	99.78%	99.84%	96%	99.96%
	Outdoor- in city (>= -95dBm)	100%	100%	100%	100%	99.90%	100%
1.6	Call Setup Success Rate (>=95%)	100%	98%	100%	100%	98.66%	100%
1.7	Handover Success Rate	95%	95.34%	95%	99.35%	98.5%	100%

Graphical Representation

The Radio coverage level as was found in the operator assisted drive test result is shown graphical below

	Aircel	BSNL	TTSL (GSM)	Idea	V-fone	Rcom (GSM)
In door (>=-75dBm)	79.84%	70.00%	82.35%	97.82%	63.90%	96.24%
In-vehicle (>=-85dBm)	99.89%	98.00%	99.78%	99.84%	96.00%	99.96%
Out door- in city (>=-95dBm)	100%	100%	100%	100%	99.90%	100%

(3)Critical Analysis

The Independent drive test data was found to be satisfactory for all the operators in their respected cities in MP&CG circle, except Vodafone in Hoshangabad city, not met the quality parameter.
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- Etisalat & Loop have closed its operation in MP&CG circle.

During Drive Test of Vodafone in Hoshangabad, some RF coverage issue was found in Some area . Due to this reason voice Quality affect over their.
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(F)   Compliance report (Status of service providers with respect to the QoS)

From live & month audit findings, it can be concluded that performance of the operators in the service area MP&CG is satisfactory for **Network Parameters**. However all operators are meeting the benchmark in SDCCH congestion & Call Drop Rate parameter as well as TCH congestion parameter. Airtel & BSNL (CG) are not complying the benchmark for the parameter of 'Worst affected cells have more than 3% TCH drop rate' with high margins. This may have happened due to mainly in the change adopted for calculating the parameter considering CBBH instead of TCBH, which reflects more practical way of calculating TCH drop keeping in view customer satisfaction.

Regarding **Metering/Billing Credibility** Service in post-Paid section Aircel and TTSL (GSM) are having the higher value in comparison to other .Rest all operators are found to be performing quite well in terms of meeting the benchmark ($<= 95\%$) .
In Prepaid service all the operators are meeting the benchmark
 Aircel is having an ICR agreement with TTSL in MP&CG Circle.

POI congestion is found to be satisfactory for all the operators for both month and live measurement.

Under **Customer Service Quality** section, benchmark for the parameter Accessibility of call centre parameter all the operators are meeting the benchmark. However Aircel & BSNL (CG) have not provided the data for Live & Month Part. As far as % of voice to voice call parameter, Airtel is not meeting the benchmark.Aircel & BSNL (CG) not reported the data for this parameter. It is found to be un satisfactory for Airtel & TTSL (GSM). As far as Termination cases is Concerned, only BSNL is not complying the benchmarks in comparison to other.
.   During **Drive Tests**,
 Good Voice quality parameter is not met by BSNL in Vidhisha   and Vodafone in Satna & Vidhisha. Rest all operators are meeting the benchmark in these 3 cities.
 Operators are found satisfying the TRAI benchmark for almost all the parameters such as Blocked Call Rate, Dropped Call rate & Call setup Success Rate. Due to some coverage issue of Vodafone in Hoshangabad, Quality affect over their.