REPORT

ON

AUDIT & ASSESSMENT OF QUALITY OF SERVICE

OF

CELLULAR MOBILE TELEPHONE SERVICE

FOR

WEST ZONE – MAHARASHTRA & GOA CIRCLE

Report Period: Jan 2011 – March 2011

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        - *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 Maharashtra & Goa circle. But for parameters such as 'Worst affected cell exceeding 3% TCH drop' and 'BTSs accumulated down time' CBBH (Cell Bouncing Busy Hour) was taken instead of TCBH (Time Consistent Busy Hours) as per the TRAI new regulation 2009. This has resulted in high value for 'Cell exceeding 3% TCH drop' parameter for some of the service providers.

CHAPTER-2: EXECUTIVE SUMMARY

I.   Preface

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

Following are the various operators covered in Maharashtra & Goa 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	Jan-2011	1900-2000 Hrs
2	Airtel Ltd	Jan-2011	1900-2000 Hrs
3	BSNL	Jan-2011	1900-2000 Hrs
4	Etisalat	Jan-2011	1900-2000 Hrs
5	Idea	Jan-2011	1900-2000 Hrs
6	Reliance Communication (GSM)	Jan-2011	1900-2000 Hrs
7	Tata Communications (GSM)	Jan-2011	1900-2000 Hrs
8	Uninor	Jan-2011	1900-2000 Hrs
9	Videocon	Jan-2011	2000-2100 Hrs
10	Vodafone	Jan-2011	1900-2000 Hrs
CDMA Operators			
11	MTS	Jan-2011	1900-2000 Hrs
12	Reliance Communication (CDMA)	Jan-2011	1900-2000 Hrs
13	Tata Communications (CDMA)	Jan-2011	1900-2000 Hrs

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

(A) Cellular Mobile Telephone Services

S/N	Name of Parameter	Bench-mark	Aircel	Airtel	BSNL	Etisalat	Idea	RTL GSM	Tata GSM	Uninor	Video-con	Voda-fone	MTS	TTML CDMA	Rcom CDMA
	3 days Live Data Audit														
			GSM Operators										CDMA Operators		
1	**Connection Establishment (Accessibility)**														
	a) CSSR (Call Setup Success Rate)	>=95%	99.83%	99.02%	98.15%	99.78%	97.26%	99.63%	98.54%	98.54%	98.10%	97.95%	99.42%	98.71%	99.02%
	b) SDCCH/PAGING congestion	<=1%	0.01%	0.00%	0.76%	0.02%	0.76%	0.13%	0.27%	0.13%	0.03%	0.42%	0.00%	NA	N/A
	c) TCH congestion	<=2%	0.00%	0.00%	1.91%	0.00%	1.50%	0.51%	0.79%	0.04%	1.29%	0.94%	0.00%	0.20%	0.77%
2	**Connection maintenance (retainability)**														
	a) CDR	<=2%	0.65%	1.06%	1.33%	1.06%	1.55%	0.30%	0.91%	1.11%	1.25%	0.98%	0.32%	0.82%	0.63%
	b) Worst affected cells>3% TCH drop	<=5%	4.74%	4.80%	4.90%	20.00%	10.14%	3.69%	3.56%	3.89%	0.00%	4.54%	1.26%	1.94%	0.57%
	c) Good voice quality	>=95%	98.30%	98.84%	98.19%	98.59%	97.27%	98.26%	96.38%	96.91%	98.60%	97.05%	NA	NA	NA
3	**No of POIs not meeting benchmark**	<=0.5%	0	0	0	0	0	0	0	0	7	0	2	0	0
4	**Response time to customers for assistance**														
	a) Accessibility of call centre/Customer Care	>=95%	96.44%	100%	100%	NA	97.85%	76.84%	94.43%	100%	100%	100%	100%	94.42%	100%
	b) % call answered by operators(voice to voice) within 60 sec.	>=90%	97.62%	100%	90.0%	98.40%	92.10	91.50%	92.11%	100%	100%	83.0%	95.70%	90.15%	96.0%

NA: Not Applicable, NR: Not Received

From the 3 days live data assessment, it is found that all the operators are meeting the network parameters by and large, except for Etisalat & Idea not meeting the benchmark for "Worst affected cells>3% TCH drop". Videocon & MTS had 7 & 2 POIs respectively with more than 0.5% congestion.

Performance related to customer care data is found to be satisfactory for all the operators except Vodafone not meeting the 90% benchmark for "calls answered by operators (voice-to-voice)".

Month data assessment

S/N	Name of Parameter	Bench-mark	Aircel	Airtel	BSNL	Etisalat	Idea	RTL GSM	Tata GSM	Uninor	Video-con	Voda-fone	MTS	TTML CDMA	Rcom CDMA
One Month Data Audit							GSM Operators						CDMA Operators		
(A)	**Network Service Quality Parameter**														
1	**Network Availability**														
	a) BTS Accumulated Downtime	*<=2%*	0.28%	0.18%	0.99%	3.02%	0.23%	0.37%	0.00%	0.13%	1.43%	0.12%	0.02%	0.04%	0.25%
	b) Worst affected BTSs due to downtime	*<=2%*	0.00%	0.67%	1.30%	23.53%	1.31%	0.86%	0.00%	0.31%	0.00%	0.40%	0.00%	0.04%	0.21%
2	**Connection Establishment (Accessibility)**														
	a) CSSR (Call Setup Success Rate)	*>=95%*	99.81%	98.97%	98.08%	99.78%	97.55%	99.64%	98.19%	98.60%	98.76%	97.99%	99.40%	97.76%	99.23%
	b) SDCCH/PAGING congestion	*<=1%*	0.29%	0.20%	0.72%	2.62%	0.67%	0.17%	0.26%	0.12%	0.11%	0.62%	0.00%	NA	N/A
	c) TCH congestion	*<=2%*	0.02%	0.48%	1.92%	0.00%	1.68%	0.47%	0.78%	0.03%	0.81%	0.94%	0.00%	0.20%	0.47%
3	**Connection maintenance (retainability)**														
	a) CDR	*<=2%*	0.65%	1.11%	1.33%	1.16%	1.63%	0.30%	0.99%	1.15%	0.89%	1.03%	0.31%	1.03%	0.64%
	b) Worst affected cells>3% TCH drop	*<=5%*	4.58%	4.19%	4.87%	14.55%	10.30%	3.81%	3.49%	3.65%	0.00%	4.50%	1.58%	2.64%	0.80%
	c) Good voice quality	*>=95%*	98.40%	98.20%	98.10%	98.13%	97.29%	96.56%	96.56%	96.79%	98.92%	97.02%	NA	NA	NA
4	**No of POIs not meeting benchmark**	*<=0.5%*	0	0	2	4	0	0	0	0	7	0	2	0	0
(B)	**Customer Service Quality Parameters**														
5	**Metering/billing credibility-Post paid**	*<= 0.1%*	0.25%	0.02%	0.00%	NA	0.15%	0.06%	0.05%	NA	NA	0.08%	0.00%	0.08%	0.10%
6	**Metering /billing credibility-Pre paid**	*<= 0.1%*	0.08%	0.01%	0.06%	0.05%	0.05%	0.07%	0.07%	0.11%	0.04%	0.03%	0.10%	0.07%	0.31%
7	**Resolution of billing/ charging complaints**	*100% within 4 weeks*	99.40%	100%	100%	NA	99.88%	100%	99.82%	100%	100%	100%	100%	92%	100%
	a) Period of applying credit/waiver/adjustment to the customers account from the date of resolutions of complaints	*<=1 week*	99.48%	100%	100%	100%	100%	100%	99.95%	100%	100%	100%	100%	99%	100%

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One Month Data Audit		Bench-mark	Aircel	Airtel	BSNL	Etisalat	Idea	RTL GSM	Tata GSM	Uninor	Video-con	Voda-fone	MTS	TTML CDMA	Rcom CDMA
S/N	Name of Parameter		GSM Operators											CDMA Operators	
8	Response time to customers for assistance														
	a) Accessibility of call centre/Customer Care	>=95%	96.88%	100%	100%	97.35%	98.95%	77.78%	95.45%	99.41%	100%	100%	100%	95.95%	100%
	b) % call answered by operators(voice to voice) within 60 sec.	>=90%	87.88%	100%	89.00%	98.42%	93.21%	92%	93.42%	97.00%	100%	90.00%	95.11%	91.10%	89.00%
9	Termination/closure of service	<=7days	60.18%	100%	100%	NA	100%	100%	100%	NA	NA	100%	100%	100%	100%
10	Time taken for refunds of deposits after closures.	100% within 60 days	98.80%	100%	100%	NA	100%	100%	78%	NA	NA	100%	100%	88%	100%

NA: Not Applicable, NR: Not Received

From the month data assessment, it is found that all the operators are meeting the network parameters by and large, except for Etisalat & Idea not meeting the benchmark for "Worst affected cells>3% TCH drop". Also, Etisalat is not meeting the benchmark for "BTS accumulated downtime", "Worst affected BTSs due to Downtime" and "SDCCH congestion". BSNL, Etisalat, Videocon & MTS were found to have POIs with >=0.5% congestion. It was also found that RTL –GSM was not meeting the benchmark   "Accessibility of call centre/Customer Care".

Performance related to customer care data is found to be satisfactory for most of the operators especially for the parameter "calls answered by operators (voice-to-voice)", except only BSNL , Aircel & Reliance CDMA not meeting the 90% benchmark. Uninor & Reliance CDMA are not meeting the benchmark for "Metering/Billing Credibility (Pre-Paid)". Customer Care / Billing data has not been provided by many operators.

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Operator-Assisted Drive Test

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

SN	Parameter	City Name	Aircel	Airtel	BSNL	Idea	RTL GSM	Tata GSM	Uninor	V-fone	MTS	TTML CDMA	Rcom CDMA
1.1	Blocked Call Rate (<=3%)	PUNE	0.00%	0.00%	1.67%	0.99%	3.11%	0.00%	0.56%	0.00%	0.00%	0.00%	2.99%
		NASHIK	0.00%	0.00%	0.00%	3.81%	0.29%	0.00%	0.84%	0.00%	0.00%	0.00%	2.37%
		AURANGABAD	0.00%	0.00%		1.05%	0.89%	0.00%	0.95%	1.52%	0.00%	0.00%	0.91%
1.2	Dropped Call Rate (<=2%)	PUNE	0.00%	0.65%	0.83%	0.49%	0.89%	0.64%	0.56%	0.00%	0.00%	0.00%	0.00%
		NASHIK	0.00%	0.00%	0.00%	0.00%	0.00%	0.71%	0.84%	0.00%	0.00%	0.00%	0.59%
		AURANGABAD	0.00%	0.00%		0.00%	0.00%	0.77%	0.95%	0.76%	0.00%	0.00%	0.45%
1.3	Percentage of connections with good voice quality (=>95%)												
	(i) 0-4 (w/o frequency hopping)	PUNE									99.22%	96.02%	99.00%
		NASHIK									99.52%	96.58%	97.00%
		AURANGABAD									99.49%	96.58%	98.67%
	(ii) 0-5 (with frequency hopping)	PUNE	97.91%	98.25%	95.50%	92.20%	96.00%	95.09%	95.30%	95.50%			
		NASHIK	96.50%	98.23%	96.50%	98.10%	97.00%	95.03%	96.00%	97.32%			
		AURANGABAD	95.90%	98.06%		93.60%	95.67%	95.04%	96.50%	95.10%			
1.4	Call Setup Success Rate (>=95%)	PUNE	100%	100%	98.33%	99.01%	96.89%	100%	99.44%	100%	100%	100%	97.01%
		NASHIK	100%	100%	100%	96.19%	99.71%	100%	99.16%	100%	100%	100%	97.63%
		AURANGABAD	100%	100%		98.95%	99.11%	100%	99.05%	98.48%	100%	100%	99.09%

NOTE: Etisalat & Videocon are under roll-out obligation and hence, Drive Test was not conducted for these operators.

Key observations as could be derived from the table are as under:
• Blocked Call Rate benchmark is not met by Idea in Nashik (3.81%) and Reliance GSM in Pune (3.11%).
• Idea has less than 95% good voice quality connections in Pune & Aurangabad.

Independent Drive Test

        ---- **Not done for this quarter**

CHAPTER-3: AUDIT-PMR VERIFICATION

I. Cellular Mobile Telephone Service

PMR		Bench-mark	Audit	Aircel	Airtel	BSNL	Etisalat	Idea	RTL GSM	Tata GSM	Uninor	Video-con	Voda-fone	MTS	TTML CDMA	Rcom CDMA
S/N	Name of Parameter			GSM Operators										CDMA Operators		
(A)	Network Service Quality Parameter															
1	Network Availability															
	BTS Accumulated Downtime	<=2%	Reported	0.09%	0.23%	0.87%	0.75%	0.30%	0.25%	0.06%	0.40%	0.30%	0.15%	0.16%	0.05%	0.22%
			Verified	0.09%	0.23%	0.87%	0.75%	0.30%	0.25%	0.06%	0.40%	0.30%	0.15%	0.16%	0.05%	0.22%
	Worst affected BTSs due to downtime	<=2%	Reported	0.14%	1.07%	1.77%	1.96%	1.58%	0.72%	0.07%	0.49%	0.00%	0.63%	0.00%	0.00%	0.23%
			Verified	0.14%	1.07%	1.77%	1.96%	1.58%	0.72%	0.07%	0.49%	0.00%	0.63%	0.00%	0.00%	0.23%
2	Connection Establishment (Accessibility)															
	CSSR (Call Setup Success Rate)	>=95%	Reported	98.83%	98.87%	98.00%	98.23%	96.88%	99.57%	98.98%	98.46%	98.34%	98.10%	99.17%	98.80%	99.07%
			Verified	98.83%	98.87%	98.00%	98.23%	96.88%	99.57%	98.98%	98.46%	98.34%	98.10%	99.17%	98.80%	99.07%
	SDCCH/PAGING congestion	<=1%	Reported	0.02%	0.38%	0.67%	0.36%	0.87%	0.17%	0.24%	0.01%	0.00%	0.51%	0.00%	0.00%	0.00%
			Verified	0.02%	0.38%	0.67%	0.36%	0.87%	0.17%	0.24%	0.01%	0.00%	0.51%	0.00%	0.00%	0.00%
	TCH congestion	<=2%	Reported	0.03%	0.55%	1.80%	0.00%	1.68%	0.59%	1.44%	0.01%	0.00%	1.00%	0.00%	0.61%	0.39%
			Verified	0.03%	0.55%	1.80%	0.00%	1.68%	0.59%	1.44%	0.01%	0.00%	1.00%	0.00%	0.61%	0.39%
3	Connection maintenance (retainability)															
	CDR	<=2%	Reported	0.44%	1.13%	1.30%	1.40%	1.88%	0.31%	0.95%	0.96%	0.56%	1.05%	0.19%	0.78%	0.76%
			Verified	0.44%	1.13%	1.30%	1.40%	1.88%	0.31%	0.95%	0.96%	0.56%	1.05%	0.19%	0.78%	0.76%
	Worst affected cells>3% TCH drop	<=5%	Reported	3.52%	2.27%	5.00%	0.05%	11.29%	1.83%	3.25%	1.37%	0.00%	4.66%	1.16%	2.83%	0.99%
			Verified	3.52%	2.27%	5.00%	0.05%	11.29%	1.83%	3.25%	1.37%	0.00%	4.66%	1.16%	2.83%	0.99%
	Good voice quality	>=95%	Reported	98.02%	98.35%	98.40%	98.23%	96.79%	98.32%	96.86%	95.56%	99.45%	96.53%	99.56%	96.15%	98.39%
			Verified	98.02%	98.35%	98.40%	98.23%	96.79%	98.32%	96.86%	95.56%	99.45%	96.53%	99.56%	96.15%	98.39%
4	Poi congestion	<=0.5%	Reported	0	0	0	0	0	0	0	1	0	0	0	0	0
			Verified	0	0	0	0	0	0	0	1	0	0	0	0	0

S/N	Name of Parameter	Bench-mark	Audit	Aircel	Airtel	BSNL	Etisalat	Idea	RTL GSM	Tata GSM	Uninor	Video-con	Voda-fone	MTS	TTML CDMA	Rcom CDMA
	PMR								GSM Operators						CDMA Operators	
(B)	**Customer Service Quality Parameters**															
5	**Metering/billing credibility-Post paid**	*<= 0.1%*	Reported	0.21%	0.02%	0.00%	NA	0.11%	0.08%	0.07%	NA	NA	0.14%	NA	0.04%	0.07%
			Verified	0.21%	0.02%	0.00%	NA	0.11%	0.08%	0.07%	NA	NA	0.14%	NA	0.04%	0.07%
6	**Metering /billing credibility-Pre paid**	*<= 0.1%*	Reported	0.04%	0.03%	0.10%	0.60%	0.09%	0.04%	0.03%	0.34%	0.00%	0.07%	0.00%	0.02%	0.03%
			Verified	0.04%	0.03%	0.10%	0.60%	0.09%	0.04%	0.03%	0.34%	0.00%	0.07%	0.00%	0.02%	0.03%
7	**Resolution of billing/ charging complaints**	*100% within 4 weeks*	Reported	100%	100%	100%	100%	100%	100.0%	100.0%	100.0%	NA	100%	100%	94%	100%
			Verified	100%	100%	100%	100%	100%	100.0%	100.0%	100.0%	NA	100%	100%	94%	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%	100%	NA	NA	100%	100%	100%	100%
			Verified	100%	100%	100%	100%	100%	100%	100%	NA	NA	100%	100%	100%	100%
8	**Response time to customers for assistance**															
	Accessibility of call centre/Customer Care	*>=95%*	Reported	100.00%	100.00%	100.00%	98.35%	99.00%	81%	96%	92%	100%	100%	97%	96.00%	98.00%
			Verified	100.00%	100.00%	100.00%	98.35%	99.00%	81%	96%	92%	100%	100%	97%	96.00%	98.00%
	% call answered by operators(voice to voice) within 60 sec.	*>=90%*	Reported	89.29%	67.20%	90.70%	99.27%	95.01%	98.00%	96.95%	67.32%	100.00%	69.49%	82.00%	93.58%	92.00%
			Verified	89.29%	67.20%	90.70%	99.27%	95.01%	98.00%	96.95%	67.32%	100.00%	69.49%	82.00%	93.58%	92.00%
9	**Termination/closure of service**															
	No.of requests for Termination / Closure of service complied within 7 days during the quarter	*<=7days*	Reported	62.00%	100.00%	100.00%	NA	100.00%	100.00%	100.00%	NA	NA	100.00%	100.00%	100.00%	100.00%
			Verified	62.00%	100.00%	100.00%	NA	100.00%	100.00%	100.00%	NA	NA	100.00%	100.00%	100.00%	100.00%
10	**Time taken for refunds of deposits after closures.**	*100% within 60 days*	Reported	100%	100%	100%	NA	100%	100%	81%	NA	NA	64%	100%	90%	100%
			Verified	100%	100%	100%	NA	100%	100%	81%	NA	NA	64%	100%	90%	100%

Critical Analysis (PMR Verification):

a. The figures proved by all the operators match the figures obtained on verification.

b. Only Idea is not meeting the benchmark for the parameter "Worst affected cells>3% TCH drop" with high margins.

c. In case of POI congestion, Uninor (1%) is not meeting the benchmark.

d. Etisalat & Uninor are not meeting the benchmark for "Metering/Billing Credibility-Prepaid".

e. Aircel, Idea & Videocon are not meeting the benchmark for "Metering/Billing Credibility-Postpaid".

f. Aceesibility of Uninor & Reliance GSM Customer Care Centre is very poor.

g. "% call answered by operators(voice to voice) within 60 sec." benchmark is not met by Aircel, Airtel, Uninor, Vodafone & MTS.

h. 100% termination/closure of service within 7 days is not met by Aircel.

i. 100% refund within 60 days of closures is not met by Vodafone, Tata GSM & CDMA.

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	Etisalat	Idea	RTL GSM	Tata GSM	Uninor	Video-con	Voda-fone	MTS	TTML CDMA	Rcom CDMA
			GSM Operators										CDMA Operators		
A	Network Service Quality Parameter														
1	Connection Establishment (Accessibility)														
	a) CSSR	>=95%	99.83%	99.02%	98.15%	99.78%	97.26%	99.63%	98.54%	98.54%	98.10%	97.95%	99.42%	98.71%	99.02%
	b) SDCCH/PAGING congestion	<=1%	0.01%	0.00%	0.76%	0.02%	0.76%	0.13%	0.27%	0.13%	0.03%	0.42%	0.00%	NA	N/A
	c) TCH congestion	<=2%	0.00%	0.00%	1.91%	0.00%	1.50%	0.51%	0.79%	0.04%	1.29%	0.94%	0.00%	0.20%	0.77%
2	Connection maintenance														
	a) CDR	<=2%	0.65%	1.06%	1.33%	1.06%	1.55%	0.30%	0.91%	1.11%	1.25%	0.98%	0.32%	0.82%	0.63%
	b) Cells having > 3% TCH drop	<=5%	4.74%	4.80%	4.90%	20.00%	10.14%	3.69%	3.56%	3.89%	0.00%	4.54%	1.26%	1.94%	0.57%
	c) Good voice quality	>=95%	98.30%	98.84%	98.19%	98.59%	97.27%	98.26%	96.38%	96.91%	98.60%	97.05%	NA	NA	NA
	d) No. of cells > 3% TCH drop		243	1,193	958	10	2,199	153	1,018	258	0	915	0	20	13
	e) Total no. of cells in the network		5,739	24,992	19,500	51	21,680	9,801	84	6,673	15	20,362	0	6,828	2,410
3	No of POIs not meeting benchmark	<=0.5%	0	0	0	0	0	0	0	0	7	0	2	0	0
	a) Name of POI not meeting the benchmark														
	b) Total No. of circuits on POI		3,96,056	46,56,716	3,46,881	3,642	2,98,587	91,913	47,953	20,832	2,100	28,86,354	14,100	89,122	91,913
	c) Avg No. of call attempts on POI		0	15,797	28,00,978	294	30,360	14,71,302	5,643	8,91,756	9,962	28,885	3,655	5,364	14,71,302
	d) Avg traffic served on POI (Erlang)		91	317	46,604	7	434	42,719	130	14,714	1,189	503	3,993	108	42,719

S/N	Name of Parameter	Bench-mark	Aircel	Airtel	BSNL	Etisalat	Idea	RTL GSM	Tata GSM	Uninor	Video-con	Voda-fone	MTS	TTML CDMA	Rcom CDMA
			GSM Operators										CDMA Operators		
	e) Total number of working POI Service Area wise		1,953	397	265	39	377	253	172	49	44	3,753	63	359	253
	f) Equipped Capacity of Network in respect of Traffic in erlang		63,110	3,40,643	2,49,378	378	3,43,369	1,03,170	11,00,048	62,340	42	2,83,995	28,560	18,93,342	3,18,897
	g) Total traffic handled in TCBH in erlang		10,860	2,29,286	1,06,508	51	3,31,683	57,888	7,36,276	21,037	46	2,38,822	5,117	13,85,803	90,526
(B)	Customer Service Quality Parameters														
4	Response time to customers for assistance														
	a) Accessibility of call centre	>=95%	96.44%	100%	100%	NA	97.85%	76.84%	94.43%	100%	100%	100%	100%	94.42%	100%
	b) % of call answered by operators(voice to voice) within 60 sec	>=90%	97.62%	100%	90.0%	98.40%	92.10	91.50%	92.11%	100%	100%	83.00%	95.70%	90.15%	96.00%
	c) No. of call attempts to call centre / customer care nos. during TCBH (Avg)		NR	100	3,57,367	NR	NR	NR	NR	100	102	0	100	NR	0
	d) No. of calls connected and answered successfully to call centre / customer care nos. during TCBH (Avg)		NR	100	1	NR	NR	NR	NR	100	102	0	100	NR	0

NA: Not Applicable, NR: Not Received

Parameter-wise Findings (Live Data Assessment):

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

➢ **Call setup success rate (benchmark >= 95%):** All operators are meeting the benchmark with values lying between 97.26% and 99.83%.

➢ **SDCCH/PAGING Channel congestion (benchmark <= 1%):** All operators are meeting the benchmark with values lying between 0% and 0.76%.
Note: CDMA operators have provided the data for Paging Channel congestion and GSM operators provided SDCCH Channel congestion.

➢ **TCH congestion (benchmark <= 2%):** All operators are meeting the benchmark with values lying between 0& and 1.91%.

➢ **Call drop rate (benchmark <= 2%):** All operators, are meeting the benchmark with values lying between 0.3% and 1.55%.

➢ **Cell exceeding 3% TCH drop (benchmark <= 5%):** Except for Etisalat & Idea, all the operators are satisfying the benchmark with value in between 0% and 4.9%.

➢ **Connections with good voice quality (benchmark >= 95%):** All the operators are meeting the benchmark with values lying between 96.38% and 99.41%. Tata & Reliance CDMA have declared that this KPI is not system generated.

➢ **POI Congestion (benchmark <= 0.5%):** Videocon & MTS have POIs with more than 0.5% congestion. There was no congestion found overall on the POI, but cases were found where individual POIs are showing high utilization/usage. Some are in the range of over 100% though causing no traffic failure due to overflow technique i.e. the extra traffic is carried over by some other operating POI as has been designed to do so.

➢ **%age of call answered by operator (electronically) (benchmark >95):** All operators are meeting the benchmark with value of 100%.

➢ **%age of call answered by operator (Voice to voice) (benchmark >90%):** Except for Vodafone with a value of 83%, all the operators are satisfying the benchmark with value in between 90% and 100%.

(2) Month Data Assessment & Summarized Findings

S/N	Name of Parameter	Bench-mark	Aircel	Airtel	BSNL	Etisalat	Idea	RTL GSM	Tata GSM	Uninor	Video-con	Voda-fone	MTS	TTML CDMA	Rcom CDMA
			GSM Operators										CDMA Operators		
(A)	Network Service Quality Parameter														
1	Network Availability														
	a) BTS Accumulated Downtime	<=2%	0.28%	0.18%	0.99%	3.02%	0.23%	0.37%	0.00%	0.13%	1.43%	0.12%	0.02%	0.04%	0.25%
	b) Worst affected BTSs due to downtime	<=2%	0.00%	0.67%	1.30%	23.53%	1.31%	0.86%	0.00%	0.31%	0.00%	0.40%	0.00%	0.04%	0.21%
	c) Total no. of BTSs in the licensed service area		1,920	8,465	6,370	17	7,324	3,267	3,297	2,229	5	6,786	317	2,343	2,410
	d) Sum of downtime of BTSs in a month in hours i.e. total outage time of all BTSs in hours during a month		402	18,485	46,976	382	12,635	8,798	508	2,121	53	6,018	43	636	4,112
	e) No. of BTSs having accumulated downtime of >24 hours in a month		0	57	83	4	96	28	0	7	0	27	0	1	5
2	Connection Establishment (Accessibility)														
	a) CSSR (Call Setup Success Rate)	>=95%	99.81%	98.97%	98.08%	99.78%	97.55%	99.64%	98.19%	98.60%	98.76%	97.99%	99.40%	97.76%	99.23%
	b) SDCCH/PAGING congestion	<=1%	0.29%	0.20%	0.72%	2.62%	0.67%	0.17%	0.26%	0.12%	0.11%	0.62%	0.00%	NA	N/A
	c) TCH congestion	<=2%	0.02%	0.48%	1.92%	0.00%	1.68%	0.47%	0.78%	0.03%	0.81%	0.94%	0.00%	0.20%	0.47%
3	Connection maintenance (retainability)														
	a) CDR	<=2%	0.65%	1.11%	1.33%	1.16%	1.63%	0.30%	0.99%	1.15%	0.89%	1.03%	0.31%	1.03%	0.64%
	b) Worst affected cells>3% TCH drop	<=5%	4.58%	4.19%	4.87%	14.55%	10.30%	3.81%	3.49%	3.65%	0.00%	4.50%	1.58%	2.64%	0.80%
	c) Good voice quality	>=95%	98.40%	98.20%	98.10%	98.13%	97.29%	96.56%	96.56%	96.79%	98.92%	97.02%	NA	NA	NA
	d) Total No. of cells exceeding 3% TCH drop (call drop)		240	1,036	949	7	2,232	177	337	359	0	907	0	180	19
	e) Total no. of cells in the network		5,739	24,992	19,500	51	21,680	9,801	84	6,673	15	20,362	0	6,828	2,410

S/N	Name of Parameter	Bench-mark	Aircel	Airtel	BSNL	Etisalat	Idea	RTL GSM	Tata GSM	Uninor	Video-con	Voda-fone	MTS	TTML CDMA	Rcom CDMA
							GSM Operators							CDMA Operators	
4	No of POIs not meeting benchmark	<=0.5%	0	0	2	4	0	0	0	0	7	0	2	0	0
	a) Name of POI not meeting the benchmark														
	b) Total No. of call attempts on POI (Avg.)		3,468	15,144	0	2,578	27,721	14,54,159	5,293	10,43,573	0	26,632	3,461	5,045	14,54,159
	c) Total traffic served on POI (Erlang) (Avg.)		86	309	0	59	509	41,811	122	13,728	0	475	3,788	125	41,811
	d) Total No. of circuits on POI		3,96,056	46,56,716	3,46,881	3,642	2,98,587	91,913	47,953	20,832	2,100	28,86,354	14,100	89,122	91,913
	e) Total number of working POI Service Area wise		1,953	397	265	39	377	253	172	49	44	3,753	63	359	253
	f) Capacity of POI		197.00	433	36,195	85	2,85,847	82,783	42,865	18,832	1,607.79	28,00,123	12,242.60	80,062	82,783.00
5	Network Data														
	a) Equipped Capacity of Network Erlang		63,110	3,40,643	2,49,378	378	3,43,369	1,03,170	11,00,048	62,340	42	2,83,995	28,560	18,93,342	3,18,897
	b) Total traffic in TCBH in erlang (Avg.)		10,860	2,29,286	1,06,508	51	3,31,683	57,888	7,36,276	21,037	46	2,38,822	5,117	13,85,803	90,526
	c) Total no. of customers served (as per VLR) on last day of the month		4,93,259	78,67,289	39,33,507	2,466	1,18,62,719	NA	19,27,314	8,04,194	1,006	4,89,750	2,26,014	27,23,605	N/P
(B)	Customer Service Quality Parameters														
5	Metering/billing credibility-Post paid	<= 0.1%	0.25%	0.02%	0.00%	NA	0.15%	0.06%	0.05%	NA	NA	0.08%	0.00%	NR	0.10%
	a) No. of bills issued during the period		NR	3,564	6,143	NA	NR	NR	NR	1,663	4	3,000	340	NR	966
	b) No. of bills disputed including billing complaints during the period		NR	2,93,15,662	51,70,541	NA	NR	NR	NR	15,51,833	9,980	97,86,206	3,36,618	NR	30,86,249

S/N	Name of Parameter	Bench-mark	Aircel	Airtel	BSNL	Etisalat	Idea	RTL GSM	Tata GSM	Uninor	Video-con	Voda-fone	MTS	TTML CDMA	Rcom CDMA
			GSM Operators											CDMA Operators	
6	Metering /billing credibility-Pre paid	<= 0.1%	0.08%	0.01%	0.06%	NR	NR	0.07%	0.07%	0.11%	0.04%	0.03%	0.10%	0.08%	0.31%
	a) No. of charging / credit / validity complaints during the quarter		NR	3,564	6,143	NR	NR	NR	NR	1,663	4	3,000	340	NR	966
	b) Total no. of pre-paid customers at the end of the quarter		NR	2,93,15,662	51,70,541	NR	NR	NR	NR	15,51,833	9,980	97,86,206	3,36,618	NR	30,86,249
7	Resolution of billing/ charging complaints	100% within 4 weeks	99.40%	100%	100%	NA	99.88%	NR	NR	100%	100%	100%	100%	NR	100%
	a) No. of billing/(post paid) and charging, credit/validity (pre paid) complaints resolved within 4 weeks during the quarter		NR	3,705	1	NR	NR	NR	NR	1,663	4	334	340	NR	0
	b) Total no. of billing (post paid) and charging, credit / validity (pre paid) complaints received during the quarter		NR	3,705	0	NR	NR	NR	NR	1,663	4	3,334	340	NR	0
	c) No. of billing complaints (post paid) and charging, credit/ validity complaints (pre paid) resolved in favour of the customer during the quarter		NR	3,705	3,396	NR	NR	NR	NR	1,663	0	2,458	226	NR	101
	d) No. of complaints disposed on account of not considered as valid complaints during the quarter		NR	3,705	3,331	NR	NR	NR	NR	0	4	876	90	NR	1,188
	e) Period of applying credit/waiver/adjustment to the customers account from the date of resolutions of complaints	<=1 week	99.48%	100%	< 1 week	100%	100%	100%	99.95%	100%	100%	100%	100%	99.10%	100%

S/N	Name of Parameter	Bench-mark	Aircel	Airtel	BSNL	Etisalat	Idea	RTL GSM	Tata GSM	Uninor	Video-con	Voda-fone	MTS	TTML CDMA	Rcom CDMA
			GSM Operators										CDMA Operators		
8	Response time to customers for assistance														
	a) Accessibility of call centre/Customer Care	>=95%	96.88%	100%	100%	97.35%	98.95%	77.78%	95.45%	99.41%	100%	100%	100%	95.95%	100%
	b) % call answered by operators(voice to voice) within 60 sec.	>=90%	87.88%	100%	89.00%	98.42%	93.21%	92%	93.42%	97.00%	100%	90.00%	95.11%	91.10%	89.00%
	c) Total no. of call attempts to call centre & customer care nos. during TCBH (Avg.).		NR	48,62,630	3,43,915	NR	NR	NR	NR	49,747	3	2,86,301	20,663	NR	4,27,102
	d) No. of calls connected and answered successfully to call centre & customer care nos. during TCBH (Avg.).		NR	48,62,630	16,108	NR	NR	NR	NR	49,454	3	2,43,131	20,663	NR	3,61,565
9	Termination/closure of service	<=7days	60.80%	100%	100%	NA	100%	100%	100%	NA	NA	100%	100%	100%	100%
	a) Total No. of requests for Termination / Closure of service received during the quarter		NR	660	4,163	NA	NR	NR	NR	NA	NA	1,942	0	NR	1,510
	b) No.of requests for Termination / Closure of service complied within 7 days during the quarter		NR	660	4,163	NA	NR	NR	NR	NA	NA	1,942	0	NR	1,510
10	Time taken for refunds of deposits after closures.	100% within 60 days	98.88%	100%	100%	NA	100%	100%	78%	NA	NA	100%	100%	78%	100%

NA: Not Applicable, NR: Not Received

Parameter-wise Findings (Month Data Assessment):

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

➢ **BTS accumulated downtime (benchmark <=2%):** All operators, except Etisalat, are meeting the benchmark with values lying between 0% and 1.43%.
➢ **Worst affected BTSs due to downtime (benchmark <= 2%):** All operators, except Etisalat, are meeting the benchmark with values lying between 0% and 1.31%.
➢ **Call setup success rate (benchmark >= 95%):** All operators are meeting the benchmark with values lying between 97.55% and 99.81%.
➢ **SDCCH/PAGING Channel congestion (benchmark <= 1%):** All operators, except Etisalat, are meeting the benchmark with values lying between 0% and 0.72%.
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 1.92%.
➢ **Call drop rate (benchmark <= 2%):** All operators are meeting the benchmark with values lying between 0.3% and 1.63%.
➢ **Cell exceeding 3% TCH drop (benchmark <= 5%):** All the operators, except Etisalat & Idea, are satisfying the benchmark with value in between 0% and 4.87%.
➢ **Connections with good voice quality (benchmark >= 95%):** Tata & Reliance CDMA have declared that the parameter is not system generated. Rest of the operators are meeting the benchmark with values lying between 96.56% and 98.92%.
➢ **POI Congestion (benchmark <= 0.5%):** BSNL, Etisalat, Videocon & MTS were found to have POIs with >=0.5% congestion. There was no congestion found overall on the POI, but cases were found where individual POIs are showing high utilization/usage. Some are in the range of over 100% though causing no traffic failure due to overflow technique i.e. the extra traffic is carried over by some other operating POI as has been designed to do so.
➢ **%age of call answered by operator (electronically) (benchmark >95%):** All operators are meeting the benchmark with values lying between 99.41% to 100%.
➢ **%age of call answered by operator (Voice to voice) (benchmark >90%):** All operators, except BSNL & Reliance CDMA, are meeting the benchmark.
➢ **Metering and billing credibility-Post paid (benchmark <= 0.1%):** All other operators are meeting the benchmark.
➢ **Metering and billing credibility-Pre paid (benchmark <= 0.1%):** Except for Uninor & Reliance CDMA with values of 0.11% & 0.31% respectively, all the operators are meeting the benchmark.
➢ **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.
➢ **Time taken for refunds of deposits after closures (benchmark 100% within <=60 days):** All operators have satisfied the benchmark.

(1)   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	3	14	1920
2	Airtel Ltd	13	134	8470
3	BSNL	14	146	3517
4	Etisalat	1	4	17
5	Idea	29	60	7324
6	Reliance Communication (GSM)	4	24	3267
7	Tata Communications (GSM)	7	30	3297
8	Uninor	2	21	2229
9	Videocon	1	1	5
10	Vodafone	17	97	6786
	CDMA Operators			
11	MTS (CDMA)	1	-	317
12	Reliance Communication (CDMA)	10	-	2410
13	Tata Communications (CDMA)	13	-	2343

(2)   Performance (Graphical Representation)

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

A)   NETWORK PERFORMANCE

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

	Aircel	Airtel	BSNL	Etisal	Idea	RTL	Tata	Unino	Video	V-	MTS	TTML	Rcom
Live	99.83	99.02	98.15	99.78	97.26	99.63	98.54	98.54	98.10	97.95	99.42	98.71	99.02
Month	99.81	98.97	98.08	99.78	97.55	99.64	98.19	98.60	98.76	97.99	99.40	97.76	99.23
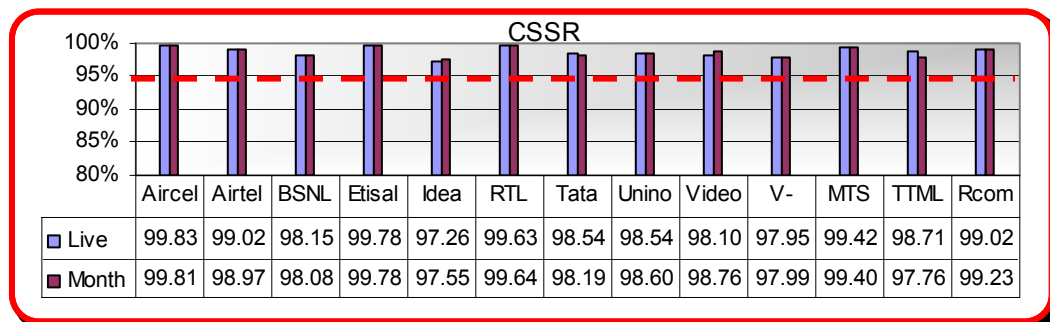
II.   Blocked call rate:

SDCCH congestion (%): All operators, except Etisalat in live data audit, are meeting the TRAI benchmarks (<= 1 %) for both one month data and 3 days live data taken in the month of audit.
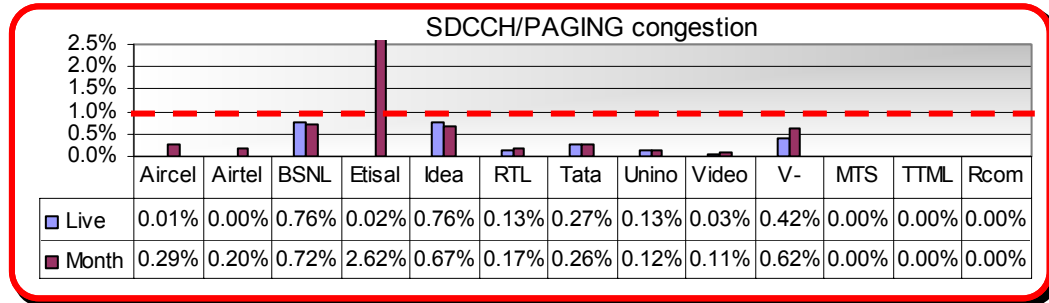
SDCCH/PAGING congestion	Aircel	Airtel	BSNL	Etisal	Idea	RTL	Tata	Unino	Video	V-	MTS	TTML	Rcom
Live	0.01%	0.00%	0.76%	0.02%	0.76%	0.13%	0.27%	0.13%	0.03%	0.42%	0.00%	0.00%	0.00%
Month	0.29%	0.20%	0.72%	2.62%	0.67%	0.17%	0.26%	0.12%	0.11%	0.62%	0.00%	0.00%	0.00%

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

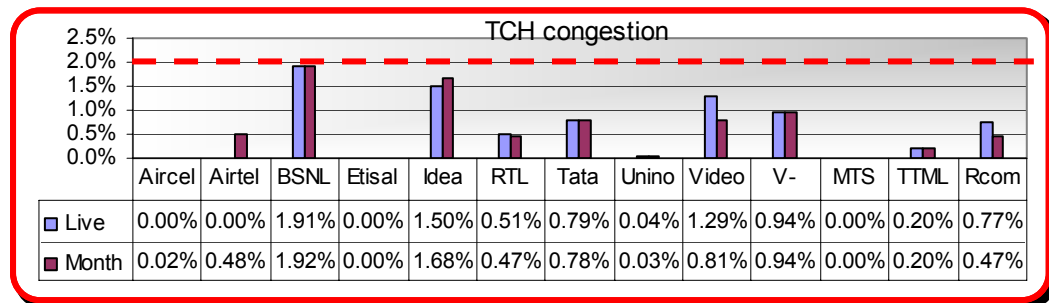| TCH congestion	Aircel	Airtel	BSNL	Etisal	Idea	RTL	Tata	Unino	Video	V-	MTS	TTML	Rcom
Live	0.00%	0.00%	1.91%	0.00%	1.50%	0.51%	0.79%	0.04%	1.29%	0.94%	0.00%	0.20%	0.77%
Month	0.02%	0.48%	1.92%	0.00%	1.68%	0.47%	0.78%	0.03%	0.81%	0.94%	0.00%	0.20%	0.47%

III.   Connection Maintainability (Retainability):

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

CDR	Aircel	Airtel	BSNL	Etisal	Idea	RTL	Tata	Unino	Video	V-	MTS	TTML	Rcom
Live	0.65%	1.06%	1.33%	1.06%	1.55%	0.30%	0.91%	1.11%	1.25%	0.98%	0.32%	0.82%	0.63%
Month	0.65%	1.11%	1.33%	1.16%	1.63%	0.30%	0.99%	1.15%	0.89%	1.03%	0.31%	1.03%	0.64%

Worst affected Cell exceeding 3% TCH Drop: Etisalat & Idea are not meeting the benchmark in both live & month data audit with high margins. Rest of the operators are meeting the benchmark for both cases.

	Aircel	Airtel	BSNL	Etisal	Idea	RTL	Tata	Unino	Video	V-	MTS	TTML	Rcom
Live	4.74%	4.80%	4.90%	20.00	10.14	3.69%	3.56%	3.89%	0.00%	4.54%	1.26%	1.94%	0.57%
Month	4.58%	4.19%	4.87%	14.55	10.30	3.81%	3.49%	3.65%	0.00%	4.50%	1.58%	2.64%	0.80%

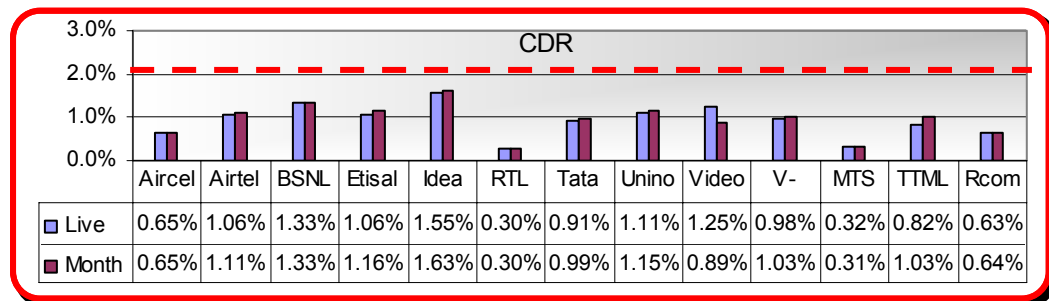**Percentage of connections with good voice quality (benchmark >= 95%):** All operators are meeting the TRAI benchmarks (=> 95%) for both one 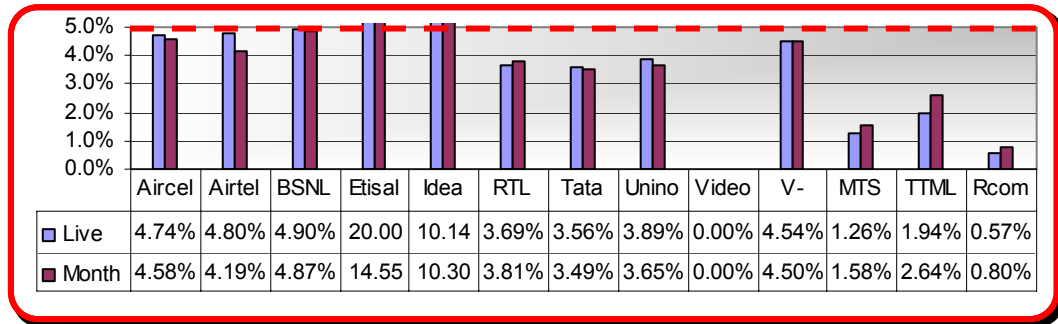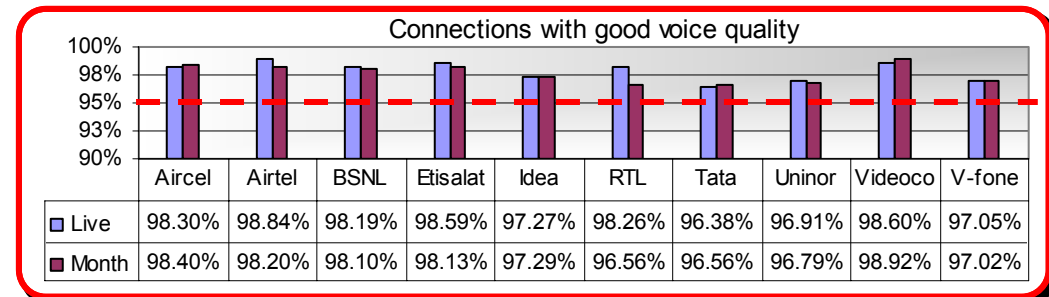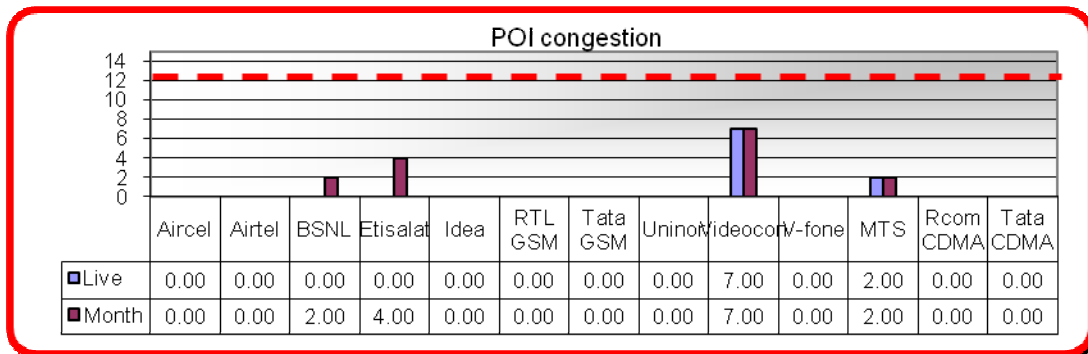month data and 3 days live data taken in the month of audit. CDMA operators have declared that this KPI is not system generated.

Connections with good voice quality

	Aircel	Airtel	BSNL	Etisalat	Idea	RTL	Tata	Uninor	Videoco	V-fone
Live	98.30%	98.84%	98.19%	98.59%	97.27%	98.26%	96.38%	96.91%	98.60%	97.05%
Month	98.40%	98.20%	98.10%	98.13%	97.29%	96.56%	96.56%	96.79%	98.92%	97.02%

POI Congestion: BSNL, Etisalat, Videocon & MTS have POIs with >=0.5% congestion.

POI congestion

	Aircel	Airtel	BSNL	Etisalat	Idea	RTL GSM	Tata GSM	Uninor	Videocon	V-fone	MTS	Rcom CDMA	Tata CDMA
Live	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	7.00	0.00	2.00	0.00	0.00
Month	0.00	0.00	2.00	4.00	0.00	0.00	0.00	0.00	7.00	0.00	2.00	0.00	0.00

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 (>= 95%) for both one month data and 3 days live data taken in the month of audit.
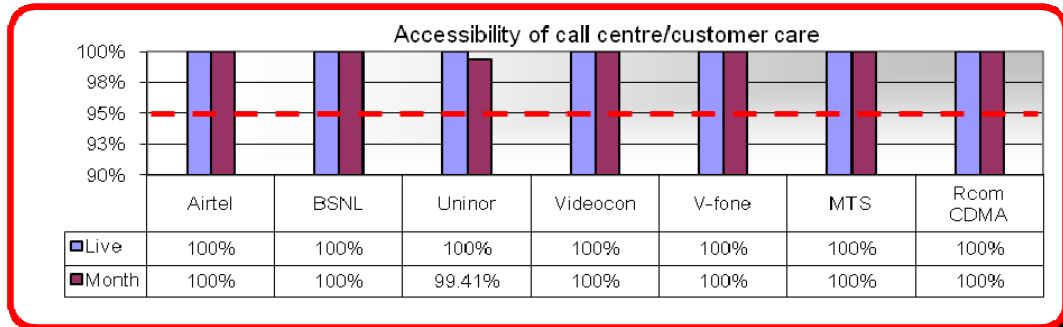
Percentage of call answered by operators (Voice to voice) within 60 sec: For month data, BSNL & Rcom CDMA are not meeting the benchmark. Rest of the operators are meeting the benchmark.
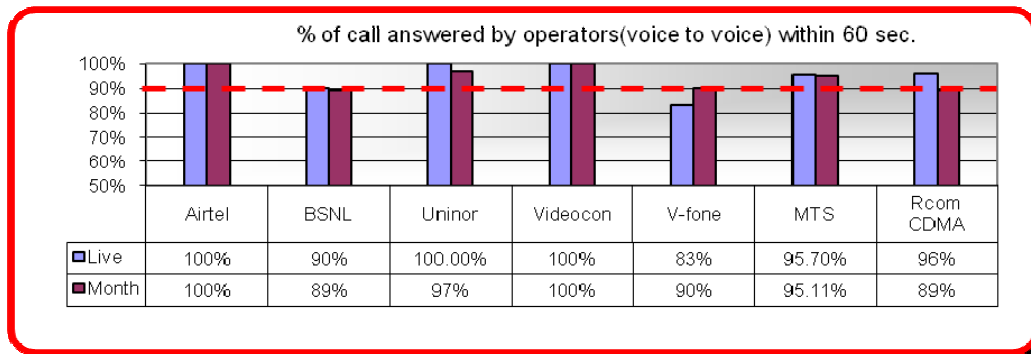
(3) Critical Analysis

The above comparative study between live data & month data shows similar trends in both the cases. However, inconsistency in live & month data was found for parameter "SDCCH congestion" for Etisalat.

B) Redressal

(1)   Sample coverage:

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

(2) Performance (live calling for billing complaints)

Calling Operator	Aircel	Airtel	BSNL	Etisalat	Idea	Reliance (GSM)	Tata (GSM)	Uninor	Videocon	Vodafone	MTS	Reliance (CDMA)	Tata (CDMA)
Total No. of calls	5	10	14	1	10	5	5	10	7	10	7	5	5
Cases resolved with 4 weeks	5	10	14	1	10	5	5	10	7	10	7	5	5
%age of cases resolved	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%

(3) Live calling to Call center:

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

	OPERATORS NAME												
	Aircel	Airtel	BSNL	Etisalat	Idea	Rcom	Tata	Video-con	Voda-fone	Uninor	MTS	Rcom	TTML
	GSM											CDMA	
1ST HALF (10AM TO 01 PM)	45	47	46	47	44	28	44	47	40	47	47	47	44
2ND HALF (04PM TO 07 PM)	38	44	34	42	37	38	40	42	37	40	41	37	42
In % age	83.00	91.00	80.00	89.00	81.00	66.00	84.00	89.00	77.00	87.00	88.00	84.00	86.00

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

(5) Critical Analysis

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

(B)   Inter operator call assessment

(1)   Sample coverage

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

(2)   Performance based on live measurement

Calling Operator	Aircel	Airtel	BSNL	Etisalat	Idea	Reliance (GSM)	Tata (GSM)	Uninor	Videocon	Vodafone	MTS	Reliance (CDMA)	Tata (CDMA)
Aircel	-	100%	98%	100%	100%	100%	100%	100%	100%	100%	97%	100%	100%
Airtel	100%	-	99%	100%	98%	100%	100%	100%	100%	99%	100%	100%	100%
BSNL	100%	99%	-	100%	100%	98%	100%	100%	100%	100%	100%	100%	100%
Etisalat	100%	100%	100%	-	100%	100%	100%	100%	100%	100%	100%	97%	100%
Idea	100%	100%	100%	100%	-	100%	100%	100%	100%	100%	100%	100%	100%
Reliance (GSM)	100%	100%	100%	100%	100%	-	100%	100%	100%	100%	100%	100%	100%
Tata (GSM)	99%	98%	100%	100%	100%	99%	-	97%	100%	100%	100%	100%	100%
Uninor	100%	100%	100%	100%	100%	100%	100%	-	100%	100%	100%	100%	100%
Videocon	100%	100%	83%	100%	100%	100%	100%	100%	-	99%	100%	100%	99%
Vodafone	99%	100%	100%	100%	100%	100%	100%	98%	100%	-	100%	100%	100%
MTS	100%	100%	100%	100%	100%	100%	100%	98%	100%	100%	-	100%	100%
Reliance (CDMA)	100%	100%	100%	100%	100%	100%	100%	98%	100%	100%	100%	-	100%
Tata (CDMA)	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	-

(3)   Critical Analysis

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

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

(1) Sample Coverage

The Operator Assisted Drive Test was conducted at Maharashtra & Goa 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

PUNE

LOW DENSE: Hinjewadi, Old Mumbai Highway, Part of PCMC, Hadapsar, Sasane Nagar, Kharadi Bypass, Kalepadal, Solapur Road
MEDIUM DENSE: S B Road, Shivaji Nagar, Baner Road, Aundh, Nigdi Pradhikaran, Chaphekar Chowk, Viman Nagar, Wadgaon sheri
HIGH DENSE: Peth Area, Swargate

NASHIK

LOW DENSE: Trimbak road, Jail Road, CIDCO, Indira nagar
MEDIUM DENSE: College road, Mahatma nagar
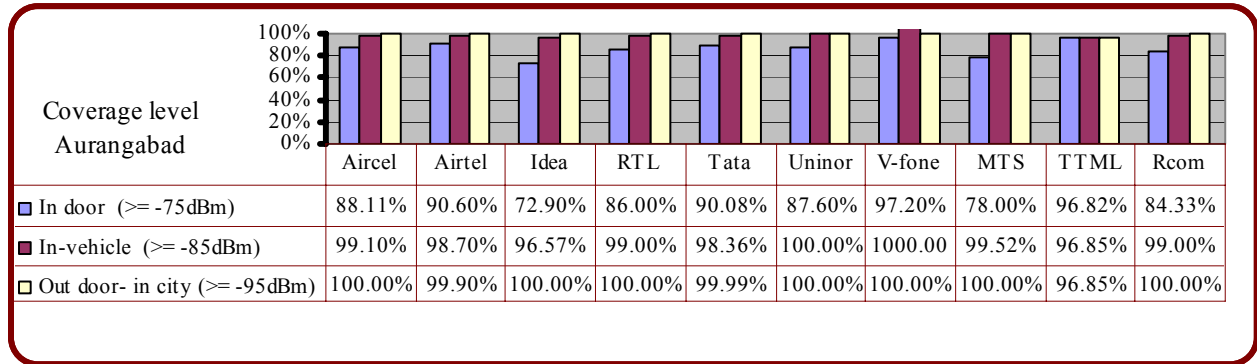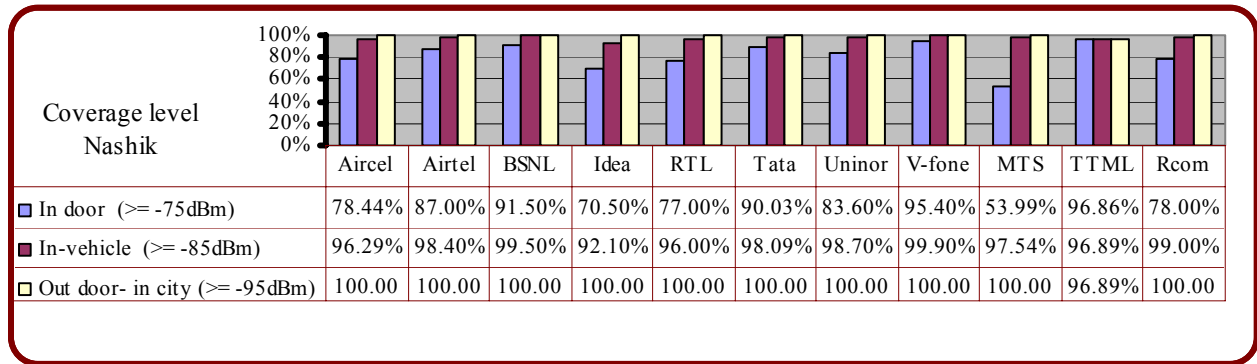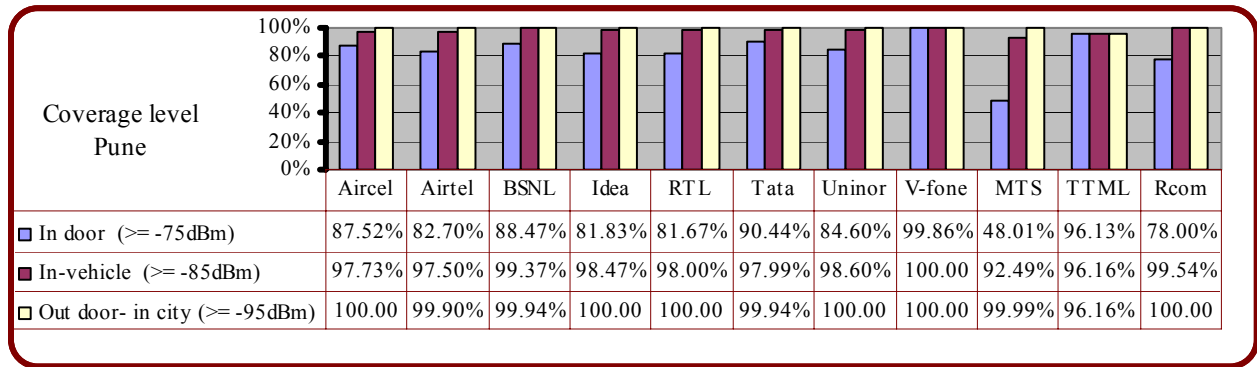HIGH DENSE: Peth area

AURANGABAD

LOW DENSE: CIDCO, Usmanpura, Beed Bypass Road, Garkheda, Bus Stand, Chikahlthana
MEDIUM DENSE: Hudco, Jalna Road, Usmanpura
HIGH DENSE: Gulmandi,Shahganj,Nirala Bazar,Bhadkal Gate

SN	Parameter	City Name	Aircel	Airtel	BSNL	Idea	RTL GSM	Tata GSM	Uninor	V-fone	MTS	TTML CDMA	Rcom CDMA
			GSM Operators								CDMA Operators		
1.1	Call Attempts	PUNE	168	155	120	203	225	157	180	200	175	141	234
		NASHIK	142	167	133	105	339	140	119	100	127	140	169
		AURANGABAD	87	161		95	448	130	105	132	135	120	220
1.2	Blocked Call Rate (<=3%)	PUNE	0.00%	0.00%	1.67%	0.99%	3.11%	0.00%	0.56%	0.00%	0.00%	0.00%	2.99%
		NASHIK	0.00%	0.00%	0.00%	3.81%	0.29%	0.00%	0.84%	0.00%	0.00%	0.00%	2.37%
		AURANGABAD	0.00%	0.00%		1.05%	0.89%	0.00%	0.95%	1.52%	0.00%	0.00%	0.91%
1.3	Dropped Call Rate (<=2%)	PUNE	0.00%	0.65%	0.83%	0.49%	0.89%	0.64%	0.56%	0.00%	0.00%	0.00%	0.00%
		NASHIK	0.00%	0.00%	0.00%	0.00%	0.00%	0.71%	0.84%	0.00%	0.00%	0.00%	0.59%
		AURANGABAD	0.00%	0.00%		0.00%	0.00%	0.77%	0.95%	0.76%	0.00%	0.00%	0.45%
1.4	Percentage of connections with good voice quality (=>95%)												
	(i) 0-4 (w/o frequency hopping)	PUNE									99.22%	96.02%	99.00%
		NASHIK									99.52%	96.58%	97.00%
		AURANGABAD									99.49%	96.58%	98.67%
	(ii) 0-5 (with frequency hopping)	PUNE	97.91%	98.25%	95.50%	92.20%	96.00%	95.09%	95.30%	95.50%			
		NASHIK	96.50%	98.23%	96.50%	98.10%	97.00%	95.03%	96.00%	97.32%			
		AURANGABAD	95.90%	98.06%		93.60%	95.67%	95.04%	96.50%	95.10%			
1,5	Service Coverage												
	In door (>= -75dBm)	PUNE	87.52%	82.70%	88.47%	81.83%	81.67%	90.44%	84.60%	99.86%	48.01%	96.13%	78.00%
		NASHIK	78.44%	87.00%	91.50%	70.50%	77.00%	90.03%	83.60%	95.40%	53.99%	96.86%	78.00%
		AURANGABAD	88.11%	90.60%		72.90%	86.00%	90.08%	87.60%	97.20%	78.00%	96.82%	84.33%
	In-vehicle (>= -85dBm)	PUNE	97.73%	97.50%	99.37%	98.47%	98.00%	97.99%	98.60%	100.00%	92.49%	96.16%	99.54%
		NASHIK	96.29%	98.40%	99.50%	92.10%	96.00%	98.09%	98.70%	99.90%	97.54%	96.89%	99.00%
		AURANGABAD	99.10%	98.70%		96.57%	99.00%	98.36%	100%	100%	99.52%	96.85%	99.00%
	Out door- in city (>= -95dBm)	PUNE	100%	99.90%	99.94%	100%	100%	99.94%	100%	100%	99.99%	96.16%	100%
		NASHIK	100%	100%	100%	100%	100%	100.00%	100%	100%	100%	96.89%	100%
		AURANGABAD	100%	99.90%		100%	100%	99.99%	100%	100%	100%	96.85%	100%
1.6	Call Setup Success Rate (>=95%)	PUNE	100%	100%	98.33%	99.01%	96.89%	100%	99.44%	100%	100%	100%	97.01%
		NASHIK	100%	100%	100%	96.19%	99.71%	100%	99.16%	100%	100%	100%	97.63%
		AURANGABAD	100%	100%		98.95%	99.11%	100%	99.05%	98.48%	100%	100%	99.09%

NOTE: Etisalat & Videocon are under roll-out obligation and hence, Drive Test was not conducted for these operators.

Graphical Representation

Coverage level Pune	Aircel	Airtel	BSNL	Idea	RTL	Tata	Uninor	V-fone	MTS	TTML	Rcom
◼ In door (>= -75dBm)	87.52%	82.70%	88.47%	81.83%	81.67%	90.44%	84.60%	99.86%	48.01%	96.13%	78.00%
◼ In-vehicle (>= -85dBm)	97.73%	97.50%	99.37%	98.47%	98.00%	97.99%	98.60%	100.00	92.49%	96.16%	99.54%
▢ Out door- in city (>= -95dBm)	100.00	99.90%	99.94%	100.00	100.00	99.94%	100.00	100.00	99.99%	96.16%	100.00

Coverage level Nashik	Aircel	Airtel	BSNL	Idea	RTL	Tata	Uninor	V-fone	MTS	TTML	Rcom
◼ In door (>= -75dBm)	78.44%	87.00%	91.50%	70.50%	77.00%	90.03%	83.60%	95.40%	53.99%	96.86%	78.00%
◼ In-vehicle (>= -85dBm)	96.29%	98.40%	99.50%	92.10%	96.00%	98.09%	98.70%	99.90%	97.54%	96.89%	99.00%
▢ Out door- in city (>= -95dBm)	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	96.89%	100.00

Coverage level Aurangabad	Aircel	Airtel	Idea	RTL	Tata	Uninor	V-fone	MTS	TTML	Rcom
◼ In door (>= -75dBm)	88.11%	90.60%	72.90%	86.00%	90.08%	87.60%	97.20%	78.00%	96.82%	84.33%
◼ In-vehicle (>= -85dBm)	99.10%	98.70%	96.57%	99.00%	98.36%	100.00%	1000.00	99.52%	96.85%	99.00%
▢ Out door- in city (>= -95dBm)	100.00%	99.90%	100.00%	100.00%	99.99%	100.00%	100.00%	100.00%	96.85%	100.00%

(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:

- Blocked Call Rate benchmark is not met by Idea in Nashik (3.81%) and Reliance GSM in Pune (3.11%).
- Idea has less than 95% good voice quality connections in Pune & Aurangabad.

(D)   Independent Drive Test

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

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

From live, month, PMR and Drive Tests findings, it can be concluded that on an average, performance of the operators in the service area (Maharashtra & Goa) is by and large satisfactory for **Network Parameters**. However, the benchmark of <=5% for "worst affected cells >3% TCH drop" is not met by Etisalat & Idea. Moreover, Etisalat is not meeting the benchmark for "BTS accumulated downtime", "Worst affected BTSs due to Downtime" and "SDCCH congestion" during the month of audit. BSNL, Etisalat, Videocon & MTS have POIs with more than 0.5% congestion.

Under **Customer Service Quality Parameter** "operator answered calls (voice-to-voice) within 60 seconds" parameter it is found that Vodafone is not fulfilling TRAI benchmark of >=90% in live data audit and BSNL & Reliance CDMA in month audit.

Regarding **Metering/Billing Credibility** issues, Uninor & Reliance CDMA show below benchmark value for Pre-paid connections.

During **Drive Tests**, high Blocked Call Rates were found in case of Idea in Nashik and Reliance GSM in Pune. Idea has less than 95% good voice quality connections in Pune & Aurangabad.

III.   Basic Telephone Service (Wireline) Providers
> *……..Audit not done for this quarter*

IV.   Broadband Service Providers
> *……..Audit not done for this quarter*