REPORT

ON

AUDIT & ASSESSMENT OF QUALITY OF SERVICE

OF

CELLULAR MOBILE TELEPHONE SERVICES

FOR

WEST ZONE
MUMBAI CIRCLE

Report Period: October 2011 – December 2011

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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) Level-1 live calling for emergency services

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 Mumbai circle. But for parameters such as 'Worst affected cell exceeding 3% TCH drop' and 'BTSs accumulated down time' CBBH (Cell Bouncing Busy Hour) was taken instead of TCBH (Time Consistent Busy Hours) as per the TRAI new regulation 2009.

CHAPTER-2: EXECUTIVE SUMMARY

I.   Preface

This report highlights the findings for the audit & assessment of Quality of Service of Cellular Mobile Services in Mumbai Circle in 4rd quarter (October-December 2011). The primary data collection and verification of records (PMR data verification – quarterly) maintained by various operators was undertaken for the period April-June 2011.

Following are the various operators covered in Mumbai 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	Nov-2011	1900-2000 Hrs
2	Airtel Ltd	Nov-2011	1900-2000 Hrs
3	MTNL	Nov-2011	2000-2100 Hrs
4	Tata Communications	Nov-2011	1900-2000 Hrs
5	Idea	Nov-2011	1900-2000 Hrs
6	Etisalat	Nov-2011	1900-2000 Hrs
7	Reliance Communication	Nov-2011	1900-2000 Hrs
8	Loop	Nov-2011	2000-2100 Hrs
9	Vodafone	Nov-2011	1900-2000 Hrs
10	Videocon (ICR with Loop)	Nov-2011	1900-2000 Hrs
11	Uninor	Nov-2011	1900-2000 Hrs
CDMA Operators			
12	Tata Communications	Nov-2011	1900-2000 Hrs
13	MTS	Nov-2011	1900-2000 Hrs
14	Reliance Communication	Nov-2011	1900-2000 Hrs
15	MTNL	Nov-2011	1900-2000 Hrs

MTNL CDMA declared that because of the BAM-SERVER Hardware fault in CDMA exchange, no report could be generated. Therefore, only Customer Service Quality Parameters data audit has been done in this case.

Videocon is in ICR with Loop Telecom in Mumbai.

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	Etisalat	Idea	Loop	MTNL GSM	Rcom GSM	Tata GSM	Uninor	Video con	Voda fone	MTNL CDMA	MTS	Rcom CDMA	Tata CDMA
	3 days Live Data Audit							GSM Operators							CDMA Operators		
	Network Availability																
1	a) BTS Accumulated Downtime	*<=2%*	0.02%	0.01%	0.39%	0.03%	0.03%	0.69%	0.40%	0.02%	0.54%		0.01%		0.06%	0.02%	0.05%
	b) Worst affected BTSs due to downtime	*<=2%*	0.00%	0.00%	1.20%	0.00%	0.00%	0.31%	0.00%	0.00%	0.00%		0.00%		0.00%	0.00%	0.11%
2	**Connection Establishment (Accessibility)**																
	a) CSSR (Call Setup Success Rate)	*>=95%*	98.04%	99.41%	99.80%	99.28%	99.99%	95.63%	99.71%	99.65%	99.10%		99.99%		99.42%	99.20%	99.06%
	b) SDCCH/PAGING congestion	*<=1%*	0.04%	0.01%	0.03%	0.60%	0.14%	0.16%	0.01%	0.14%	0.08%		0.10%		0.00%	0.00%	0.00%
	c) TCH congestion	*<=2%*	0.02%	0.01%	0.00%	0.30%	0.01%	0.11%	0.02%	0.12%	0.02%		0.62%		0.00%	0.49%	0.01%
3	**Connection maintenance (retainability)**																
	a) CDR	*<=2%*	0.73%	0.70%	0.98%	1.44%	0.47%	1.18%	0.58%	0.81%	1.74%		0.86%		0.19%	0.69%	0.65%
	b) Worst affected cells>3% TCH drop	*<=3%*	3.05%	0.26%	0.71%	3.00%	0.34%	1.72%	0.04%	2.07%	2.19%		2.45%		2.09%	0.04%	2.00%
	c) Good voice quality	*>=95%*	98.17%	99.88%	97.79%	98.56%	98.17%	97.50%	99.11%	97.32%	98.23%		97.50%		99.98%	98.53%	NA
4	**No of POI having congestion**	*>=0.5%*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5	**Response time to customers for assistance**																
	a) Accessibility of call centre/Customer Care	*>=95%*	100%	100%	100%	100%	100%	96.36%	99.44%	100%	76.98%	96.80%	100%	95.59%	100%	99.87%	100.00%
	b) % call answered by operators(voice to voice) within 60 sec.	*>=90%*	95.13%	96.44%	100%	96.06%	97.23%	95.73%	91.65%	98.37%	82.27%	100%	90.18%	100%	96.87%	92.52%	97.93%

NA: Not Applicable, NP: Data Not Provided

From the 3 days live data assessment, it is found that most of the operators are meeting the network parameters. Slight deviation is found only in case of Aircel for the parameter "worst affected cells having >3% TCH drop". Tata CDMA has declared the KPI "%age of connections with Good Voice Quality" is not system generated.

Customer care data is found to be satisfactory for all the operators except for Uninor which is missing both the parameters under "Response time to customers".

One Month Data Audit	Bench-mark	Aircel	Airtel	Etisalat	Idea	Loop	MTNL GSM	Rcom GSM	Tata GSM	Uninor	Video con	Voda fone	MTNL CDMA	MTS	Rcom CDMA	Tata CDMA
S/N / **Name of Parameter**							GSM Operators							CDMA Operators		
A **Network Service Quality Parameter**																
1 **Network Availability**																
a) BTS Accumulated Downtime	<=2%	0.01%	0.02%	0.30%	0.02%	0.03%	0.78%	0.40%	0.01%	1.42%		0.01%		0.16%	0.06%	0.03%
b) Worst affected BTSs due to downtime	<=2%	0.00%	0.00%	1.68%	0.00%	0.05%	1.04%	0.00%	0.00%	0.00%		0.00%		0.00%	0.00%	0.22%
2 **Connection Establishment (Accessibility)**																
a) CSSR (Call Setup Success Rate)	>=95%	97.98%	99.52%	99.80%	99.27%	99.97%	95.99%	99.69%	99.60%	99.09%		99.99%		99.38%	99.26%	99.11%
b) SDCCH/PAGING congestion	<=1%	0.06%	0.01%	0.04%	0.09%	0.10%	0.20%	0.02%	0.18%	0.14%		0.19%		0.00%	0.00%	0.00%
c) TCH congestion	<=2%	0.02%	0.03%	0.02%	0.30%	0.03%	0.08%	0.03%	0.13%	0.02%		0.69%		0.01%	0.46%	0.01%
3 **Connection maintenance (retainability)**																
a) CDR	<=2%	0.73%	0.68%	0.89%	1.48%	0.46%	1.04%	0.60%	0.86%	1.71%		0.80%		0.20%	0.58%	0.56%
b) Worst affected cells>3% TCH drop	<=3%	3.04%	0.20%	0.98%	2.98%	0.40%	2.87%	0.05%	2.22%	2.24%		2.67%		2.02%	0.07%	1.97%
c) Good voice quality	>=95%	98.16%	99.58%	97.81%	98.68%	98.19%	98.05%	99.09%	97.42%	98.32%		97.54%		99.73%	98.56%	NA
4 **No of POI having >=0.5% congestion**	<0.5%	0	0	0	0	0	0	0	0	1	0	0		0	0	0
B **Customer Service Quality Parameters**																
5 **Metering/billing credibility-Post paid**	<=0.1%	0.02%	0.00%	NA	0.02%	0.02%	0.06%	0.08%	0.00%	NA	NA	0.14%	0.06%	0.02%	0.05%	0.01%
6 **Metering /billing credibility-Pre paid**	<=0.1%	0.08%	0.00%	0.00%	0.09%	0.01%	0.00%	0.08%	0.00%	0.05%	0.00%	0.02%	0.00%	0.00%	0.03%	0.00%
7 **Resolution of billing/ charging complaints**	100% within 4 weeks	99.27%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
a) Period of applying credit/waiver/adjustment to the customers account from the date of resolutions of complaints	<=1 week	100%	100%	NA	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
8 **Response time to customers for assistance**																
a) Accessibility of call centre/Customer Care	>=95%	97.62%	100%	98.76%	98.97%	98.63%	100%	99.32%	99.00%	77.64%	96.05%	99.86%	NP	95.43%	99.46%	99.66%
b) % call answered by operators(voice to voice) within 60 sec.	>=90%	96.34%	95.41%	99.74%	97.88%	98.56%	98.00%	88.30%	99.39%	NP	100%	87.46%	NP	95.00%	82.47%	88.66%
9 **Termination/closure of service**	<=7days	45.40%	100%	NA	100%	100%	100%	100%	100.00%	NA	NA	100%	100%	100%	100%	NP
10 **Time taken for refunds of deposits after closures.**	100% within 60 days	100%	100%	NA	100%	NA	100%	100%	100%	NA	NA	NP	NA	NA	100%	NP

NA: Not Applicable, NP: Data Not Provided

From the month data assessment, it is found that most of the operators are meeting the network parameters. Deviation is found only in case of Aircel for the parameter "worst affected cells having >3% TCH drop". Tata CDMA has declared the KPI "%age of connections with Good Voice Quality" is not system generated. Uninor has 1 POI with >=0.5% congestion.

A few deviations were also noticed in the customer care data. Aircel has resolved 99.27% billing/charging complaints within 4 weeks and terminated only 45.4% connections of the total requests received. Uninor is missing the 95% benchmark for the parameter "Accessibility of call centre/Customer Care" and Rcom GSM & CDMA, Vodafone & Tata CDMA are missing the 90% benchmark for "%age of calls answered by operator within 60 sec".

Vodafone has low Billing Credibility for Post-Paid connections.

Operator-Assisted Drive Test.

The Operator Assisted Drive Test was conducted in Mumbai circle for all the operators. Route covered was about around 200 Km and for all the operators the same route was followed. The speed limit of 40-45Km/hr was maintained throughout the Drive Test. Zones were selected for covering different density areas (High, Medium & Low dense areas).

SN	Parameter	Aircel	Airtel	MTNL GSM	Tata GSM	Idea	Etisalat	Rcom GSM	Loop	Voda fone	Uninor	Tata CDMA	MTS	Rcom CDMA	MTNL CDMA
		GSM Operators										CDMA Operators			
1.1	Blocked Call Rate (<=3%)	0.56%	4.28%	2.84%	0.00%	0.00%	1.62%	0.54%	1.32%	1.74%	1.24%	0.62%	1.79%	0.00%	0.59%
1.2	Dropped Call Rate (<=2%)	0.56%	0.53%	2.84%	1.01%	0.00%	0.00%	0.00%	0.66%	0.58%	0.41%	0.00%	0.00%	0.00%	2.38%
1.3	Percentage of connections with good voice quality (=>95%) (i) 0-4 (w/o frequency hopping)											96.47%	99.22%	98.90%	89.57%
	(ii) 0-5 (with frequency hopping)	92.58%	96.96%	95.50%	95.62%	88.70%	96.00%	95.90%	95.05%	95.80%	93.54%				
1.4	Call Setup Success Rate (>=95%)	99.44%	95.72%	97.16%	100%	100%	98.38%	99.46%	98.68%	98.26%	98.76%	99.38%	98.21%	100%	99.41%

Key observations as could be derived from the table are as under:
• 'Blocked Call Rate' benchmark is not met by Airtel.
• 'Dropped Call Rate' benchmark is not met by MTNL GSM.
• For the parameter '%age of connections with good voice quality', it is found that Aircel, Idea, Uninor & MTNL CDMA are not meeting the prescribed benchmark.

Independent Drive Test
--- Not done in this quarter

CHAPTER-3: AUDIT-PMR VERIFICATION RESULTS

I. Cellular Mobile Telephone Service

	PMR	Bench-mark	Audit	Aircel	Airtel	Etisalat	Idea	Loop	MTNL	Rcom GSM	Tata GSM	Uninor	Voda fone	MTS	Rcom CDMA	Tata CDMA
S/N	Name of Parameter			GSM Operators										CDMA Operators		
(A)	**Network Service Quality Parameter**															
1	**Network Availability**															
	BTS Accumulated Downtime	*<=2%*	Reported	0.07%	0.03%	0.06%	0.02%	0.00%	0.00%	0.00%	0.03%	0.07%	0.04%	0.02%	0.00%	0.01%
			Verified	0.07%	0.03%	0.06%	0.02%	0.00%	0.00%	0.00%	0.03%	0.07%	0.04%	0.02%	0.00%	0.01%
	Worst affected BTSs due to downtime	*<=2%*	Reported	0.02%	0.16%	0.39%	0.00%	0.00%	0.00%	0.00%	0.05%	0.00%	0.02%	0.00%	0.00%	0.04%
			Verified	0.02%	0.16%	0.39%	0.00%	0.00%	0.00%	0.00%	0.05%	0.00%	0.02%	0.00%	0.00%	0.04%
2	**Connection Establishment (Accessibility)**															
	CSSR (Call Setup Success Rate)	*>=95%*	Reported	99%	100%	98%	99%	99%	66%	99%	99%	99%	100%	98%	100%	99%
			Verified	99%	100%	98%	99%	99%	66%	99%	99%	99%	100%	98%	100%	99%
	SDCCH/PAGING congestion	*<=1%*	Reported	0.07%	0.01%	0.03%	0.07%	0.10%	0.00%	0.00%	0.23%	0.04%	0.00%	0.00%	0.00%	0.00%
			Verified	0.07%	0.01%	0.03%	0.07%	0.10%	0.00%	0.00%	0.23%	0.04%	0.00%	0.00%	0.00%	0.00%
	TCH congestion	*<=2%*	Reported	0.01%	0.03%	0.60%	0.15%	0.00%	0.01%	0.00%	0.24%	0.02%	0.00%	0.00%	0.00%	0.20%
			Verified	0.01%	0.03%	0.60%	0.15%	0.00%	0.01%	0.00%	0.24%	0.02%	0.00%	0.00%	0.00%	0.20%
3	**Connection maintenance (retainability)**															
	CDR	*<=2%*	Reported	0.78%	0.78%	0.47%	1.19%	0.01%	0.02%	0.01%	0.98%	1.09%	0.01%	0.12%	0.00%	0.58%
			Verified	0.78%	0.78%	0.47%	1.19%	0.01%	0.02%	0.01%	0.98%	1.09%	0.01%	0.12%	0.00%	0.58%
	Worst affected cells>3% TCH drop	*<=5%*	Reported	0.02%	0.00%	6.80%	2.75%	0.00%	0.03%	0.00%	2.27%	1.53%	0.02%	1.63%	0.01%	1.85%
			Verified	0.02%	0.00%	6.80%	2.75%	0.00%	0.03%	0.00%	2.27%	1.53%	0.02%	1.63%	0.01%	1.85%
	Good voice quality	*>=95%*	Reported	98%	99%	98%	99%	98%	97%	99%	97%	98%	98%	99%	99%	96%
			Verified	98%	99%	98%	99%	98%	97%	99%	97%	98%	98%	99%	99%	96%
4	**POI congestion**	*<=0.5%*	Reported	1.00	0.00	2.00	0.00	1.00	0.00	0.00	0.00	0.33	0.00	0.00	0.00	0.00
			Verified	1.00	0.00	2.00	0.00	1.00	0.00	0.00	0.00	NP	0.00	0.00	0.00	0.00

S/N	Name of Parameter	Bench-mark	Audit	Aircel	Airtel	Etisalat	Idea	Loop	MTNL	Rcom GSM	Tata GSM	Uninor	Voda fone	MTS	Rcom CDMA	Tata CDMA
								GSM Operators							CDMA Operators	
(B)	**Customer Service Quality Parameters**															
5	**Metering/billing credibility-Post paid**	<= 0.1%	Reported	0.08%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.10%	0.00%	0.00%
			Verified	0.08%	0.00%	NA	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.10%	0.00%	0.00%
6	**Metering /billing credibility-Pre paid**	<= 0.1%	Reported	0.01%	0.00%	0.01%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.08%	0.00%	0.00%
			Verified	0.01%	0.00%	0.01%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.08%	0.00%	0.00%
7	**Resolution of billing/ charging complaints**	100% within 4 weeks	Reported	100%	100%	100%	100%	86%	100%	100%	100%	0%	100%	100%	100%	100%
			Verified	100%	100%	100%	100%	86%	100%	100%	100%	NA	100%	100%	100%	100%
	Period of applying credit/waiver/adjustment to the customer's account from the date of resolutions of complaints	<=1 week	Reported	100%	100%	0%	100%	100%	100%	100%	100%	0%	100%	100%	100%	77%
			Verified	100%	100%	NA	100%	100%	100%	100%	100%	NA	100%	100%	100%	77%
8	**Response time to customers for assistance**															
	Accessibility of call centre/Customer Care	>=95%	Reported	100%	99%	1%	98%	98%	96%	100%	99%	98%	100%	99%	100%	99%
			Verified	100%	99%	NP	98%	98%	96%	100%	99%	98%	100%	99%	100%	99%
	% call answered by operators(voice to voice) within 60 sec.	>=90%	Reported	95%	90%	1%	90%	97%	92%	94%	92%	98%	82%	97%	91%	84%
			Verified	95%	90%	NP	90%	97%	92%	94%	92%	98%	82%	97%	91%	84%
9	**Termination/closure of service**															
	No.of requests for Termination / Closure of service complied within 7 days during the quarter	<=7days	Reported	100%	100%	0%	100%	100%	100%	100%	100%	0%	100%	100%	100%	100%
			Verified	100%	100%	NA	100%	100%	100%	100%	100%	NA	100%	100%	100%	100%
10	**Time taken for refunds of deposits after closures.**	100% within 60 days	Reported	100%	100%	0%	100%	100%	20%	100%	100%	0%	100%	NA	100%	99%
			Verified	100%	100%	NA	100%	100%	20%	100%	100%	NA	100%	NA	100%	99%

The figures provided by all the operators match the figures obtained on verification.

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

CHAPTER-4: DETAILED FINDINGS & ANALYSIS

I. Cellular Mobile Telephone Service

(A) MSC Audit

(1) 3 Days Live Data Assessment & Summarized Findings

S/N	Name of Parameter	Bench-mark	Aircel	Airtel	Etisalat	Idea	Loop	MTNL GSM	Rcom GSM	Tata GSM	Uninor	Video con	Voda fone	MTNL CDMA	MTS	Rcom CDMA	Tata CDMA
							GSM Operators								CDMA Operators		
A	Network Service Quality Parameter																
1	Network Availability																
	a) BTS Accumulated Downtime	<=2%	0.02%	0.01%	0.39%	0.03%	0.03%	0.69%	0.40%	0.02%	0.54%		0.01%		0.06%	0.02%	0.05%
	b) Worst affected BTSs due to downtime	<=2%	0.00%	0.00%	1.20%	0.00%	0.00%	0.31%	0.00%	0.00%	0.00%		0.00%		0.00%	0.00%	0.11%
	c) Total no. of BTSs in the licensed service area		2075	3261	835	2457	2148	957	2182	2331	1506		3491		478	2507	918
	d) Sum of downtime of BTSs in a month in hours i.e. total outage time of all BTSs in hours during a month		31.85	13.76	234	61.8	47.58	478	624	26.8	584.14		18.41		21.99	38	34.45
	e) No. of BTSs having accumulated downtime of >24 hours in a month		0	0	10	0	0	3	0	0	0		0		0	0	1
1	Connection Establishment (Accessibility)																
	a) CSSR	>=95%	98.04%	99.41%	99.80%	99.28%	99.99%	95.63%	99.71%	99.65%	99.10%		99.99%		99.42%	99.20%	99.06%
	b) SDCCH/PAGING congestion	<=1%	0.04%	0.01%	0.03%	0.60%	0.14%	0.16%	0.01%	0.14%	0.08%		0.10%		0.00%	0.00%	0.00%
	c) TCH congestion	<=2%	0.02%	0.01%	0.00%	0.30%	0.01%	0.11%	0.02%	0.12%	0.02%		0.62%		0.00%	0.49%	0.01%
2	Connection maintenance																
	a) CDR	<=2%	0.73%	0.70%	0.98%	1.44%	0.47%	1.18%	0.58%	0.81%	1.74%		0.86%		0.19%	0.69%	0.65%
	b) Cells having > 3% TCH drop	<=3%	3.05%	0.26%	0.71%	3.00%	0.34%	1.72%	0.04%	2.07%	2.19%		2.45%		2.09%	0.04%	2.00%
	c) Good voice quality	>=95%	98.17%	99.88%	97.79%	98.56%	98.17%	97.50%	99.11%	97.32%	98.23%		97.50%		99.98%	98.53%	NA
	d) No. of cells > 3% TCH drop		177	21	18	198	20	45	3	134	98		209		30	1	55
	e) Total no. of cells in the network		5,813	8,165	2,490	6,610	5,941	2,616	6,546	6,487	4,467		8,535		1,436	2,529	2,754

S/N	Name of Parameter	Bench-mark	Aircel	Airtel	Etisalat	Idea	Loop	MTNL GSM	Rcom GSM	Tata GSM	Uninor	Video con	Voda fone	MTNL CDMA	MTS	Rcom CDMA	Tata CDMA
			GSM Operators											CDMA Operators			
3	No of POI having congestion	>=0.5 %	0	0	0	0	0	0	0	0	0	0	0		0	0	0
	a) Name of POI not meeting the benchmark		Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil		Nil	Nil	Nil
	b) Total No. of call attempts on POI (Avg.)		467,919	2,529,560	64,455	2,121,949	699,610	424,882	463,051	1,140,880	998,426	192,731	0		81,133	526,989	1,140,880
	c) Total traffic served on POI (Erlang) (Avg.)		9,273	70,568	1,655	65,160	19,492	10,245	15,659	28,828	19,523	3,852	0		1,709	19,510	28,828
	d) Total No. of circuits on POI		13,761	124,167	11,350	120,909	55,139	33,708	45,484	69,825	38,930	9,913	277,096		11,604	46,643	69,825
	e) Total number of working POI Service Area wise		55	552	22	289	63	43	106	182	95	40	288		44	116	182
	f) Equipped Capacity of Network in respect of Traffic in erlang		68,899	175,807	19,113	85,198	166,440	1,721,954	72,000	78,909	45,686	166,440	205,495		42,000	196,000	408,442
	g) Total traffic handled in TCBH in erlang		18,828	99,620	1,875	68,243	65,994	550,464	60,186	31,846	25,642	66,735	171,259		3,558	121,985	105,028
(B)	Customer Service Quality Parameters																
4	Response time to customers for assistance																
	a) Accessibility of call centre	>=95%	100%	100%	100%	100%	100%	96.36%	99.44 %	100%	76.98%	96.80 %	100%	95.59 %	100%	99.87%	100%
	b) % of call answered by operators(voice to voice) within 60 sec	>=90%	95.13%	96.44%	100%	96.06%	97.23%	95.73%	91.65 %	98.37%	82.27%	100%	90.18%	100%	96.87 %	92.52%	97.93%
	c) No. of call attempts to call centre / customer care nos. during TCBH (Avg)		12,853	108,843	3,060	14,826	34,852	10,229	17,620	8,421	21,614	8,345	57,623	793	48,394	4,812	3,045
	d) No. of calls connected and answered successfully to call centre / customer care nos. during TCBH (Avg)		12,227	104,963	3,060	14,242	33,887	9,792	16,149	8,284	17,782	8,345	51,962	793	46,879	4,452	2,982

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 Mumbai Service Area are as given below:-

➢ **BTS accumulated downtime (benchmark <=2%):** All operators are meeting the benchmark with values lying between 0.01% and 0.69%.
➢ **Worst affected BTSs due to downtime (benchmark <= 2%):** All operators are meeting the benchmark with values lying between 0% and 1.2%.
➢ **Call setup success rate (benchmark >= 95%):** All operators are meeting the benchmark with values lying between 95.63% and 99.99%.
➢ **SDCCH/PAGING Channel congestion (benchmark <= 1%):** All operators are meeting the benchmark with values lying between 0% and 0.6%.
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 0.01% and 0.62%.
➢ **Call drop rate (benchmark <= 2%):** All operators are meeting the benchmark with values lying between 0.19% and 1.74%.
➢ **Cell exceeding 3% TCH drop (benchmark <= 3%):** Except Aircel, which marginally missed the benchmark, all the operators are satisfying the benchmark with value in between 0.04% and 3%.
➢ **Connections with good voice quality (benchmark >= 95%):** Tata CDMA has declared that the parameter is not system generated. Other operators are meeting the benchmark with values lying between 97.32% and 99.98%.
➢ **POI Congestion (benchmark <= 0.5%):** No operator shows any POI with congestion greater than 0.5% Here POI congestion indicates that there were call failure greater than 0.5% on that particular POI. The calls here indicate only those calls which have been seized by the switch and processed. But cases are found where individual POIs are showing high utilization/usage which are managed by overflow technique i.e. extra traffic is carried over by some other operating POI as has been designed to do so.
➢ **%age of call answered by operator (electronically) (benchmark >95%):** Except Uninor, all the operators are meeting the benchmark with value 100%.
➢ **%age of call answered by operator (Voice to voice) (benchmark >90%):** All operators, except Uninor, are meeting the benchmark value of 90%.

(2) Month Data Assessment & Summarized Findings

S/N	Name of Parameter	Bench-mark	Aircel	Airtel	Etisalat	Idea	Loop	MTNL GSM	Rcom GSM	Tata GSM	Uninor	Video con	Voda fone	MTNL CDMA	MTS	Rcom CDMA	Tata CDMA
									GSM Operators						CDMA Operators		
A	Network Service Quality Parameter																
1	Network Availability																
	a) BTS Accumulated Downtime	<=2%	0.01%	0.02%	0.30%	0.02%	0.03%	0.78%	0.40%	0.01%	1.42%		0.01%		0.16%	0.06%	0.03%
	b) Worst affected BTSs due to downtime	<=2%	0.00%	0.00%	1.68%	0.00%	0.05%	1.04%	0.00%	0.00%	0.00%		0.00%		0.00%	0.00%	0.22%
	c) Total no. of BTSs in the licensed service area		2,075	3,261	835	2,457	2,148	957	2,182	2,331	1,506		3,491		478	2,507	918
	d) Sum of downtime of BTSs in a month in hours i.e. total outage time of all BTSs in hours during a month		141	431	1,845	344	515	5,559	6,462	153	15,896		240		553	1,142	176
	e) No. of BTSs having accumulated downtime of >24 hours in a month		0	0	14	0	1	10	0	0	0		0		0	0	2
2	Connection Establishment (Accessibility)																
	a) CSSR (Call Setup Success Rate)	>=95%	97.98%	99.52%	99.80%	99.27%	99.97%	95.99%	99.69%	99.60%	99.09%		99.99%		99.38%	99.26%	99.11%
	b) SDCCH/PAGING congestion	<=1%	0.06%	0.01%	0.04%	0.09%	0.10%	0.20%	0.02%	0.18%	0.14%		0.19%		0.00%	0.00%	0.00%
	c) TCH congestion	<=2%	0.02%	0.03%	0.02%	0.30%	0.03%	0.08%	0.03%	0.13%	0.02%		0.69%		0.01%	0.46%	0.01%
3	Connection maintenance (retainability)																
	a) CDR	<=2%	0.73%	0.68%	0.89%	1.48%	0.46%	1.04%	0.60%	0.86%	1.71%		0.80%		0.20%	0.58%	0.56%
	b) Worst affected cells>3% TCH drop	<=3%	3.04%	0.20%	0.98%	2.98%	0.40%	2.87%	0.05%	2.22%	2.24%		2.67%		2.02%	0.07%	1.97%
	c) Good voice quality	>=95%	98.16%	99.58%	97.81%	98.68%	98.19%	98.05%	99.09%	97.42%	98.32%		97.54%		99.73%	98.56%	NA
	d) Total No. of cells exceeding 3% TCH drop (call drop)		177	16	24	197	24	75	3	144	100		228		29	2	54
	e) Total no. of cells in the network		5,813	8,165	2,490	6,610	5,941	2,616	6,546	6,487	4,467		8,535		1,436	2,529	2,754

S/N	Name of Parameter	Bench-mark	Aircel	Airtel	Etisalat	Idea	Loop	MTNL GSM	Rcom GSM	Tata GSM	Uninor	Video con	Voda fone	MTNL CDMA	MTS	Rcom CDMA	Tata CDMA
								GSM Operators							CDMA Operators		
4	**No of POI having congestion**	>=0.5%	0	0	0	0	0	0	0	0	1	0	0		0	0	0
	a) Name of POI not meeting the benchmark		Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Mh-Uninor	Nil	Nil		Nil	Nil	Nil
	b) Total No. of call attempts on POI (Avg.)		456,038	2,559,452	92,459	2,166,326	687,955	NP	646,420	1,153,018	1,154,669	183,139	2,714,350		79,390	511,938	1,153,018
	c) Total traffic served on POI (Erlang) (Avg.)		8,957	68,276	2,598	65,519	19,304	NP	22,606	28,762	22,004	3,675	108,164		1,670	19,072	28,762
	d) Total No. of circuits on POI		13,761	124,167	11,350	120,772	55,139	34,170	45,486	69,670	38,930	9,913	277,096		11,604	46,639	69,670
	e) Total number of working POI Service Area wise		55	552	22	289	63	43	106	182	95	40	288		44	116	182
5	**Network Data**																
	a) Equipped Capacity of Network Erlang		68,899	175,807	19,113	85,198	166,440	1,721,954	72,000	78,909	45,686	166,440	205,495		42,000	196,000	408,442
	b) Total traffic in TCBH in erlang (Avg.)		18,330	96,747	1,686	69,039	65,604	552,749	64,158	28,777	25,376	65,604	175,558		3,579	121,047	106,927
	c) Total no. of customers served (as per VLR) on last day of the month		564,633	3,044,291	811,993	2,135,168	1,283,474	NP	2,771,149	1,036,897	692,355	423,273	2,628,938		122,813	3,059,733	940,028
B	**Customer Service Quality Parameters**																
6	**Metering/billing credibility-Post paid**	<=0.1%	0.02%	0.00%	NA	0.02%	0.02%	0.06%	0.08%	0.00%	NA	NA	0.14%	0.06%	0.02%	0.05%	0.01%
	a) No. of bills issued during the period		29,166	397,829	NA	192,698	310,696	135,782	66,570	60,001	NA	NA	1,502,981	15,741	4,047	528,784	448,414
	b) No. of bills disputed including billing complaints during the period		7	15	NA	42	63	86	53	1	NA	NA	2,177	10	1	278	44
7	**Metering /billing credibility-Pre paid**	<=0.1%	0.08%	0.00%	0.00%	0.09%	0.01%	0.00%	0.08%	0.00%	0.05%	0.00%	0.02%	0.00%	0.00%	0.03%	0.00%
	a) No. of charging / credit / validity complaints during the quarter		953	32	0	2,107	361	54	3,546	0	651	5	824	1	10	1,142	2
	b) Total no. of pre-paid customers at the end of the quarter		1,158,118	4,141,646	433,451	2,367,262	3,206,666	1,410,605	4,385,265	2,510,758	1,264,735	1,093,281	4,627,120	75,642	728,203	3,356,544	2,886,580

S/N	Name of Parameter	Bench-mark	Aircel	Airtel	Etisalat	Idea	Loop	MTNL GSM	Rcom GSM	Tata GSM	Uninor	Video con	Voda fone	MTNL CDMA	MTS	Rcom CDMA	Tata CDMA
						GSM Operators									CDMA Operators		
8	**Resolution of billing/ charging complaints**	*100% within 4 weeks*	99.27%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
	a) No. of billing/(post paid) and charging, credit/validity (pre paid) complaints resolved within 4 weeks during the quarter		953	1,004	35	2,149	639	183	4,451	284	784	569	3,001	11	35	2,696	747
	b) Total no. of billing (post paid) and charging, credit / validity (pre paid) complaints received during the quarter		960	1,004	35	2,149	639	183	4,451	284	784	569	3,001	11	35	2,696	747
	c) No. of billing complaints (post paid) and charging, credit/ validity complaints (pre paid) resolved in favour of the customer during the quarter		31	47	0	2,149	424	140	3,599	1	651	5	3,001	11	11	1,420	46
	d) No. of complaints disposed on account of not considered as valid complaints during the quarter		929	957	35	0	215	43	852	283	133	564	0	0	24	1,276	701
	e) Period of applying credit/waiver/adjustment to the customers account from the date of resolutions of complaints	*<=1 week*	100%	100%	NA	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
9	**Response time to customers for assistance**																
	a) Accessibility of call centre/Customer Care	*>=95%*	97.62%	100%	98.76%	98.97%	98.63%	100%	99.32%	99.00%	77.64%	96.05%	99.86%	NP	95.43%	99.46%	99.66%
	b) % call answered by operators(voice to voice) within 60 sec.	*>=90%*	96.34%	95.41%	99.74%	97.88%	98.56%	98.00%	88.30%	99.39%	NP	100%	87.46%	NP	95.00%	82.47%	88.66%
	c) Total no. of call attempts to call centre & customer care nos. during TCBH (Avg.).		13,782	232,895	42,004	16,176	37,139	NP	16,241	7,354	NP	8,552	53,532	NP	51,195	4,300	3,368
	d) No. of calls connected and answered successfully to call centre & customer care nos. during TCBH (Avg.).		13,278	222,210	41,894	15,834	36,603	NP	14,341	7,308	NP	8,552	46,817	NP	48,635	3,546	2,986

S/N	Name of Parameter	Bench-mark	Aircel	Airtel	Etisalat	Idea	Loop	MTNL GSM	Rcom GSM	Tata GSM	Uninor	Video con	Voda fone	MTNL CDMA	MTS	Rcom CDMA	Tata CDMA
								GSM Operators							CDMA Operators		
10	**Termination/closure of service**	*<=7days*	45.40 %	100%	NA	100%	100%	100%	100%	100.00%	NA	NA	100%	100%	100%	100%	NP
	a) Total No. of requests for Termination / Closure of service received during the quarter		348	201	NA	1,182	695	1,003	584	606	NA	NA	6,471	2,444	15	2,909	NP
	b) No.of requests for Termination / Closure of service complied within 7 days during the quarter		158	201	NA	1,182	695	1,003	584	606	NA	NA	6,471	2,444	15	2,909	NP
11	**Time taken for refunds of deposits after closures.**	*100% within 60 days*	100%	100%	NA	100%	NA	100%	100%	100%	NA	NA	NP	NA	NA	100%	NP

NA: Not Applicable, NP: Data Not Provided

Parameter-wise Findings (Month Data Assessment):

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

➢ **BTS accumulated downtime (benchmark <=2%):** All operators are meeting the benchmark with values lying between 0.01% and 1.42%.

➢ **Worst affected BTSs due to downtime (benchmark <= 2%):** All operators are meeting the benchmark with values lying between 0% and 1.68%.

➢ **Call setup success rate (benchmark >= 95%):** All operators are meeting the benchmark with values lying between 95.99% and 99.99%.

➢ **SDCCH/PAGING Channel congestion (benchmark <= 1%):** All operators are meeting the benchmark with values lying between 0% and 0.20%.
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 0.01% and 0.69%.

➢ **Call drop rate (benchmark <= 2%):** All operators are meeting the benchmark with values lying between 0.20% and 1.71%.

➢ **Cell exceeding 3% TCH drop (benchmark <= 5%):** Except Aircel, which has missed the benchmark marginally (3.04%), all the operators are satisfying the benchmark with value in between 0.05% and 2.98%.

➢ **Connections with good voice quality (benchmark >= 95%):** Tata CDMA has declared that the parameter is not system generated. Other operators are meeting the benchmark with values lying between 97.42% and 99.73%.

➢ **POI Congestion (benchmark <= 0.5%):** Uninor has one POI with congestion greater than 0.5% Here POI congestion indicates that there were call failure greater than 0.5% on that particular POI. The calls here indicate only those calls which have been seized by the switch and processed. But cases are found where individual POIs are showing high utilization/usage which are managed by overflow technique i.e. extra traffic is carried over by some other operating POI as has been designed to do so.

➢ **%age of call answered by operator (electronically) (benchmark >95%):** Except for Uninor, all the operators are meeting the benchmark with values lying between 95.43% and 100%.

➢ **%age of call answered by operator (Voice to voice) (benchmark >90%):** Rcom GSM & CDMA, Vodafone & Tata CDMA are not meeting the benchmark value.

➢ **Metering and billing credibility-Post paid (benchmark <= 0.1%):** Except for Vodafone, all the operators are meeting the benchmark.

➢ **Metering and billing credibility-Pre paid (benchmark <= 0.1%):** All the operators are meeting the benchmark.

➢ **Resolution of billing/ charging complaints (benchmark 100% within 4 weeks):** Only Aircel is showing deviation. It failed to resolve 7 complaints out of total 960 within the stipulated time of 4 weeks.

➢ **Termination/Closure of service (Benchmark <= 7 days):** All operators have satisfied the benchmark except Aircel. Only 158 connections out of 348 requests received were terminated.

➢ **Time taken for refunds of deposits after closures (benchmark 100% within <=60 days):** All operators have satisfied the benchmark. This parameter is not applicable to MTS, MTNL CDMA & Loop Telecom as there were no refund cases for these operators.

(3) Sample Coverage

Switches/BSC/BTS details of operators:

Sl.	Name of Service Provider	No. of MSC/ GMSC	No. of BSC	No. of BTS
GSM Operators				
1	Aircel Ltd	2	21	2074
2	Airtel Ltd	12	68	3261
3	MTNL GSM	5	43	957
4	Tata Communications	4	15	2331
5	Idea	6	22	2457
6	Etisalat	1	9	843
7	Reliance Communication	3	11	2182
8	Loop	3	23	2148
9	Vodafone	20	62	3491
10	Videocon (ICR with Loop)	3	23	2148
11	Uninor	3	14	1506
CDMA Operators				
12	Tata Communications	3	6	904
13	MTS	1	2	478
14	Reliance Communication	12	11	843
15	MTNL	2	3	220

(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 benchmark for both one month data and 3 days live data taken in the month of audit.

	Aircel	Airtel	Etisalat	Idea	Loop	MTNL GSM	Rcom GSM	Tata GSM	Uninor	Voda fone	MTS	Rcom CDMA	Tata CDMA
Live	0.02%	0.01%	0.39%	0.03%	0.03%	0.69%	0.40%	0.02%	0.54%	0.01%	0.06%	0.02%	0.05%
Month	0.01%	0.02%	0.30%	0.02%	0.03%	0.78%	0.40%	0.01%	1.42%	0.01%	0.16%	0.06%	0.03%
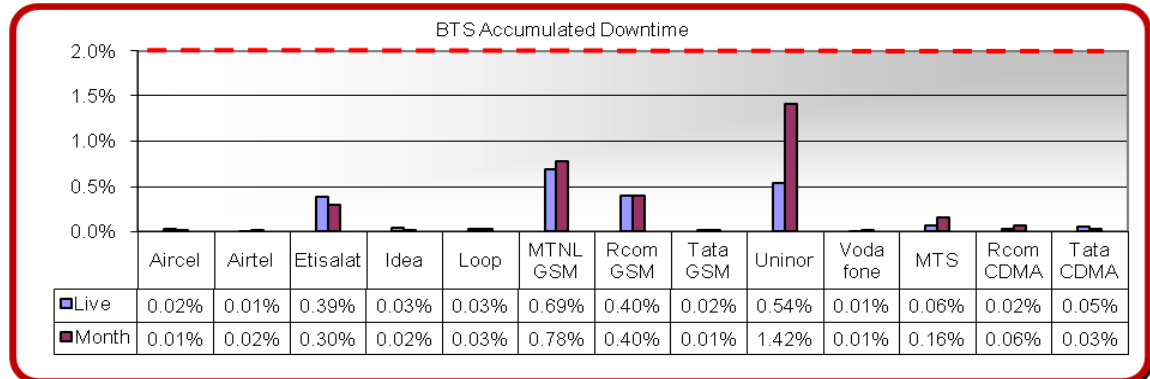
Worst affected BTS due to Downtime: All operators are meeting the TRAI benchmark for both one month data and 3 days live data taken in the month of audit.

	Aircel	Airtel	Etisalat	Idea	Loop	MTNL GSM	Rcom GSM	Tata GSM	Uninor	Voda fone	MTS	Rcom CDMA	Tata CDMA
Live	0.00%	0.00%	1.20%	0.00%	0.00%	0.31%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.11%
Month	0.00%	0.00%	1.68%	0.00%	0.05%	1.04%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.22%
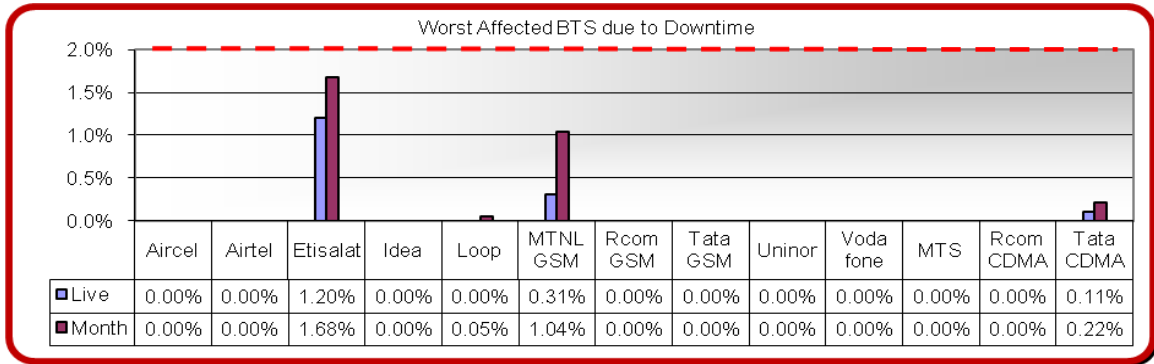
Call setup success rate: All operators are meeting the TRAI benchmarks (>= 95 %) for both one month data and 3 days live data taken in the month of audit.

	Aircel	Airtel	Etisalat	Idea	Loop	MTNL GSM	Rcom GSM	Tata GSM	Uninor	Voda fone	MTS	Rcom CDMA	Tata CDMA
Live	98.04	99.41	99.80	99.28	99.99	95.63	99.71	99.65	99.10	99.99	99.42	99.20	99.06
Month	97.98	99.52	99.80	99.27	99.97	95.99	99.69	99.60	99.09	99.99	99.38	99.26	99.11

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 month of audit.

	Aircel	Airtel	Etisalat	Idea	Loop	MTNL GSM	Rcom GSM	Tata GSM	Uninor	Voda fone	MTS	Rcom CDMA	Tata CDMA
Live	0.04%	0.01%	0.03%	0.60%	0.14%	0.16%	0.01%	0.14%	0.08%	0.10%	0.00%	0.00%	0.00%
Month	0.06%	0.01%	0.04%	0.09%	0.10%	0.20%	0.02%	0.18%	0.14%	0.19%	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.

	Aircel	Airtel	Etisalat	Idea	Loop	MTNL GSM	Rcom GSM	Tata GSM	Uninor	Voda fone	MTS	Rcom CDMA	Tata CDMA
Live	0.02%	0.01%	0.00%	0.30%	0.01%	0.11%	0.02%	0.12%	0.02%	0.62%	0.00%	0.49%	0.01%
Month	0.02%	0.03%	0.02%	0.30%	0.03%	0.08%	0.03%	0.13%	0.02%	0.69%	0.01%	0.46%	0.01%

Connection Maintainability (Retainability):

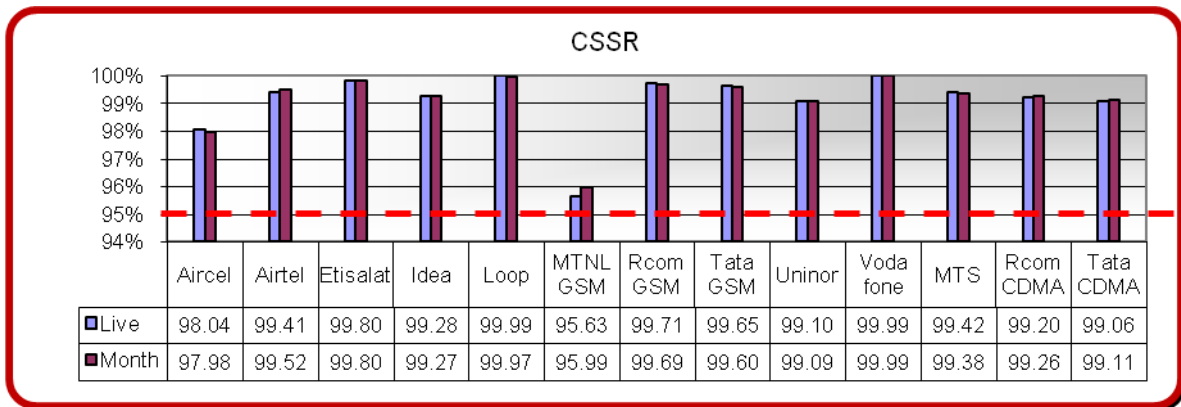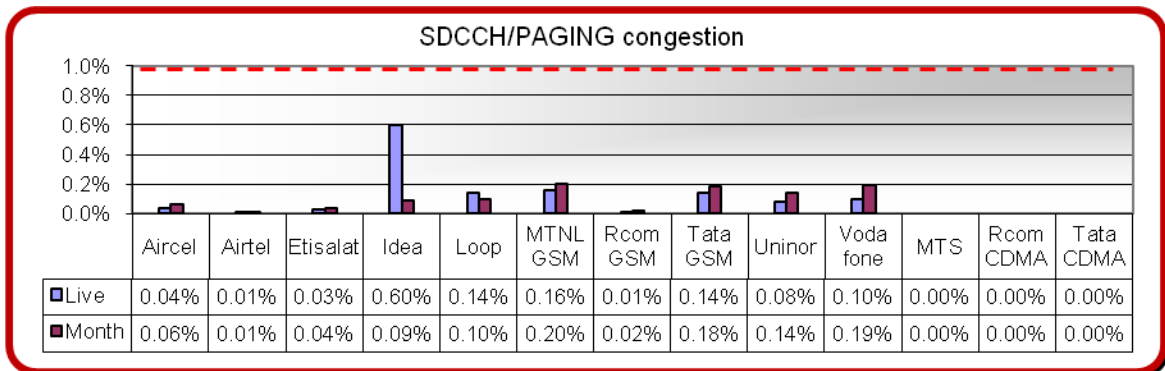**Call drop rate:** All operators are meeting the TRAI benchmarks (<=2%) for both one month data and 3 days live data taken in the month of audit.

	Aircel	Airtel	Etisalat	Idea	Loop	MTNL GSM	Rcom GSM	Tata GSM	Uninor	Voda fone	MTS	Rcom CDMA	Tata CDMA
Live	0.73%	0.70%	0.98%	1.44%	0.47%	1.18%	0.58%	0.81%	1.74%	0.86%	0.19%	0.69%	0.65%
Month	0.73%	0.68%	0.89%	1.48%	0.46%	1.04%	0.60%	0.86%	1.71%	0.80%	0.20%	0.58%	0.56%

Worst affected Cell exceeding 3% TCH Drop: For both live and month data, all the operators are meeting the benchmark for both cases except Aircel, which is missing the benchmark marginally.

	Aircel	Airtel	Etisalat	Idea	Loop	MTNL GSM	Rcom GSM	Tata GSM	Uninor	Voda fone	MTS	Rcom CDMA	Tata CDMA
Live	3.05%	0.26%	0.71%	3.00%	0.34%	1.72%	0.04%	2.07%	2.19%	2.45%	2.09%	0.04%	2.00%
Month	3.04%	0.20%	0.98%	2.98%	0.40%	2.87%	0.05%	2.22%	2.24%	2.67%	2.02%	0.07%	1.97%

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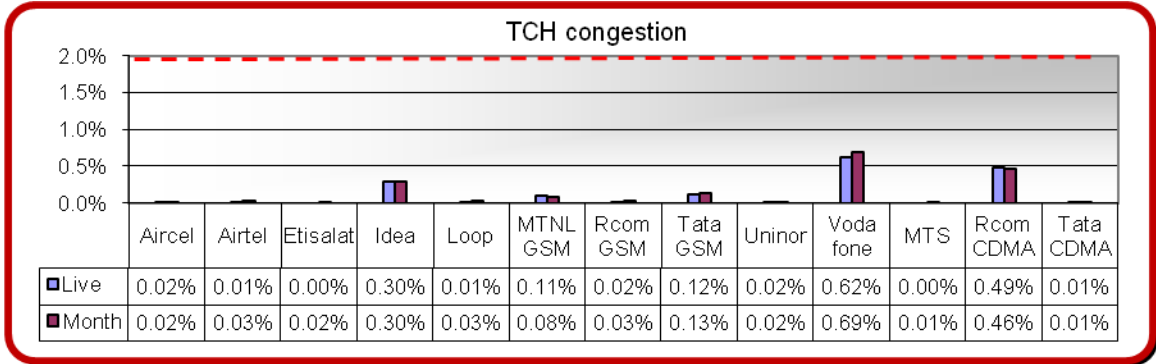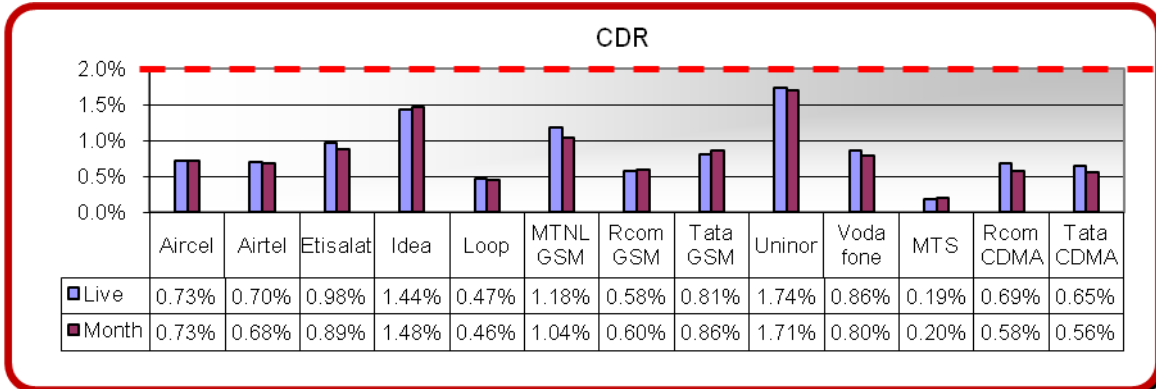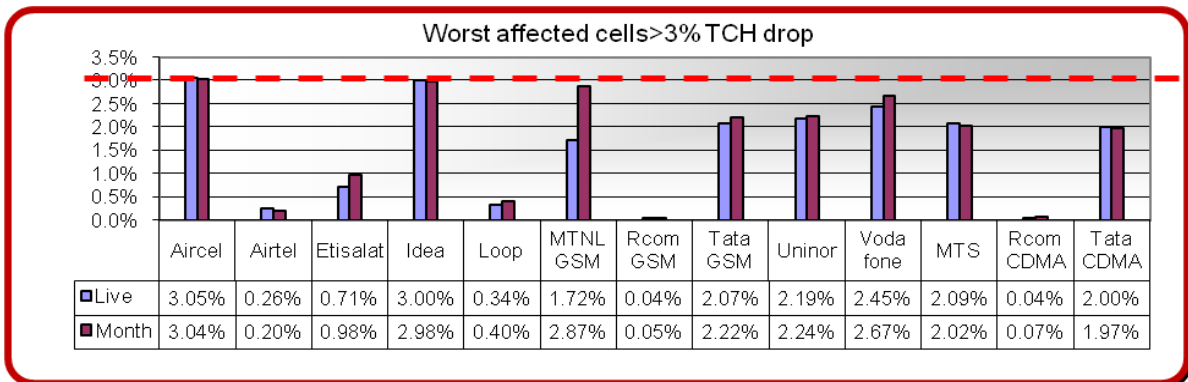

	Aircel	Airtel	Etisalat	Idea	Loop	MTNL GSM	Rcom GSM	Tata GSM	Uninor	Voda fone	MTS	Rcom CDMA
Live	98.17%	99.88%	97.79%	98.56%	98.17%	97.50%	99.11%	97.32%	98.23%	97.50%	99.98%	98.53%
Month	98.16%	99.58%	97.81%	98.68%	98.19%	98.05%	99.09%	97.42%	98.32%	97.54%	99.73%	98.56%

POI Congestion: Uninor is found to have a POI with >=0.5% congestion for month data.

	Aircel	Airtel	Etisalat	Idea	Loop	MTNL GSM	Rcom GSM	Tata GSM	Uninor	Video con	Voda fone	MTS	Rcom CDMA	Tata CDMA
Live	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Month	0	0	0	0	0	0	0	0	1	0	0	0	0	0

B)   CUSTOMER SERVICE QUALITY PARAMETERS

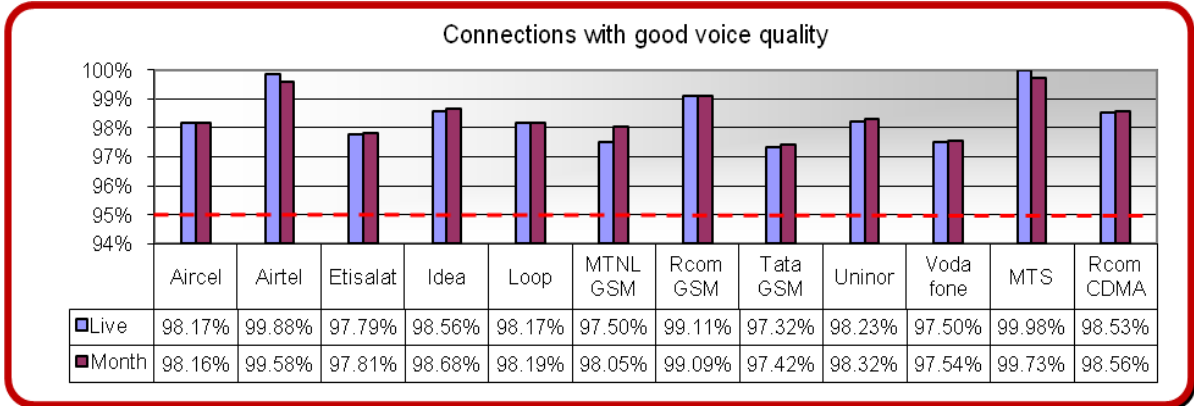**Percentage of call answered (Electronically):** All operators are meeting the TRAI benchmarks (>= 95%) for both one month data and 3 days live data taken in the month of audit except for Uninor.
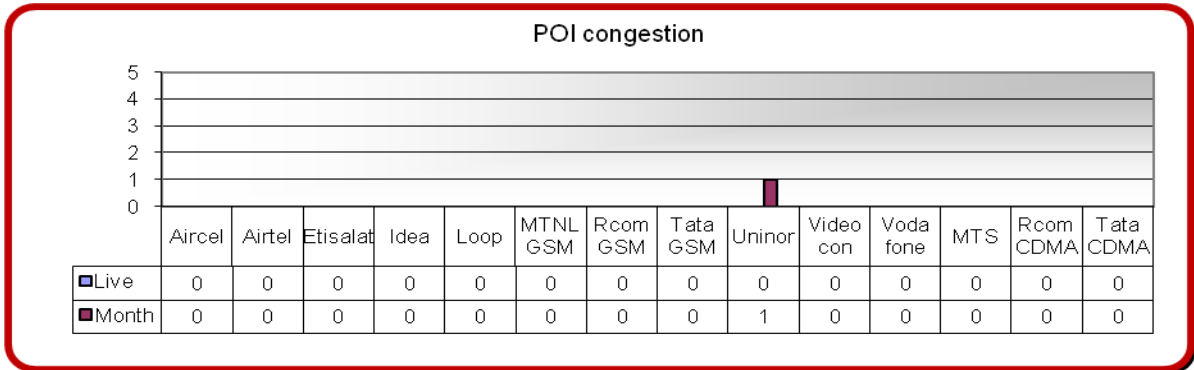

	Aircel	Airtel	Etisalat	Idea	Loop	MTNL GSM	Rcom GSM	Tata GSM	Uninor	Video con	Voda fone	MTNL CDMA	MTS	Rcom CDMA	Tata CDMA
Live	100.	100.	100.	100.	100.	96.3	99.4	100.	76.9	96.8	100.	95.5	100.	99.8	100.
Month	97.6	100.	98.7	98.9	98.6	100.	99.3	99.0	77.6	96.0	99.8		95.4	99.4	99.6
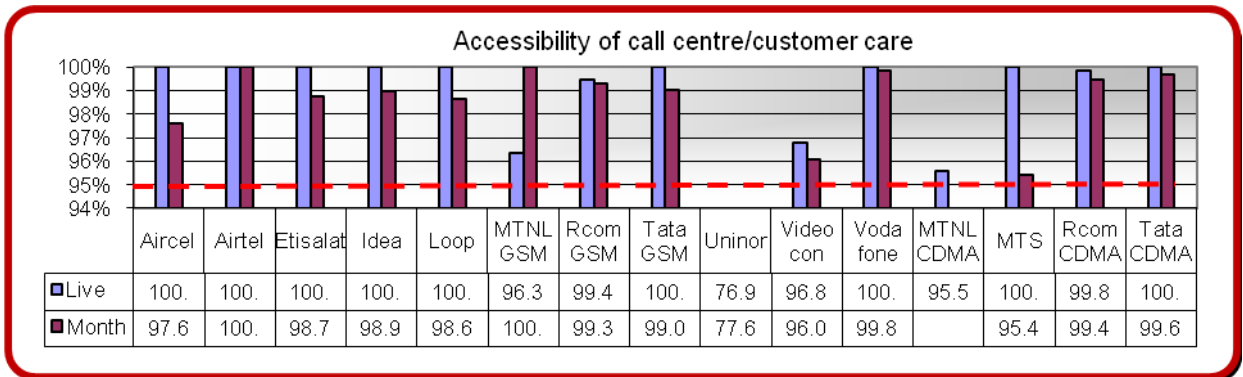
Percentage of call answered by operators (Voice to voice) within 60 sec: Uninor does not meet the 90% benchmark against this parameter in both live & month data. Rcom GSM & CDMA, Vodafone and Tata CDMA are not meeting in month data.

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

	Aircel	Airtel	Etisalat	Idea	Loop	MTNL GSM	Rcom GSM	Tata GSM	Uninor	Video con	Voda fone	MTNL CDMA	MTS	Rcom CDMA	Tata CDMA
Live	95.1	96.4	100.	96.0	97.2	95.7	91.6	98.3	82.2	100.	90.1	100.	96.8	92.5	97.9
Month	96.3	95.4	99.7	97.8	98.5	98.0	88.3	99.3		100.	87.4		95.0	82.4	88.6
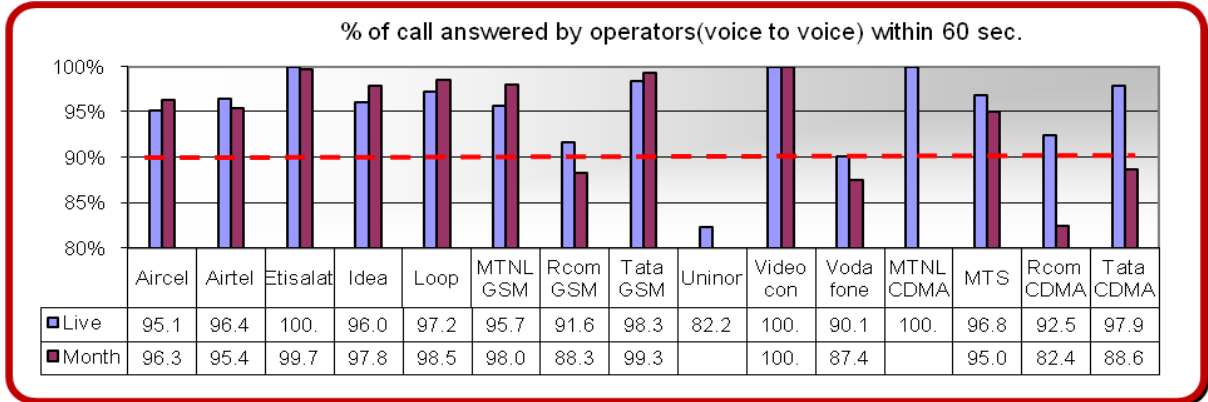
(5) Critical Analysis

The above comparative study between live data & month data shows similar trends & consistency in both the cases. Uninor shows one POI with high congestion. Here POI congestion refers to that call failure was greater than 0.5% on that particular POI. MTNL CDMA could not provide data for audit.

Uninor has very low performance for "Response time for assistance" parameters. Rcom GSM & CDMA, Tata CDMA and Vodafone have poor performance for the parameter "calls answered by operator within 60 sec".

(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

Calling Operator	Aircel	Airtel	MTNL GSM	Tata GSM	Idea	Rcom GSM	Loop	Vodafone	Videocon	Uninor	Tata CDMA	MTS	Rcom CDMA	MTNL CDMA
Call Attempts	31	47	100	1	100	100	100	100	5	100	46	11	100	11
Calls Answered	11	8	25	0	37	38	48	40	3	47	25	6	42	4
Cases resolved with 4 weeks	11	8	25	0	37	38	48	40	3	47	25	6	42	4
%age of cases resolved	100%	100%	100%	NA	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%

(3) Live Calling to Call Centers

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

(4) Level-1 Live Calling (Mumbai)

Emergency no.	Calls Attempted	Aircel	Airtel	MTNL	Etisalat	Idea	Rcom GSM	Tata GSM	Uninor	Videocon	Vodafone	MTS	Rcom CDMA	Tata CDMA	Loop
100 (Police)	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
101 (Fire)	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
108/102 (ambulance)	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
139 (IR)	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5

(5) Critical Analysis

Random numbers were selected from the operators' available database of billing/metering complaints and calls were made to the customers to get their feedback for complaint redressal. No proper response could be obtained in many of the call attempts made (no answer, number not reachable, customer busy, customer not available on phone, customer does not remember about the complaint redressal etc.). However, there was a congruence found in customer feedback and the operators' records wherever a proper response was obtained.

Satisfactory results were found for all the operators during live calling to their respective call centers.

Satisfactory results were also found in case of Level-1 calling for emergency nos. except in case of Aircel for 102. These calls were found to land in the neighboring areas from where the calls were being made.

(C) Inter operator call assessment

(1) Sample coverage

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

(2) Performance based on live calling

Calling Operator	Aircel	Airtel	MTNL GSM	Tata GSM	Idea	Etisalat	Rcom GSM	Loop	Vodafone	Videocon	Uninor	Tata CDMA	MTS	Rcom CDMA	MTNL CDMA
Aircel	-	100%	100%	100%	100%	100%	100%	100%	90%	85%	100%	100%	95%	100%	100%
Airtel	100%	-	100%	100%	100%	100%	90%	100%	100%	100%	100%	100%	100%	100%	100%
MTNL GSM	90%	100%	-	100%	100%	90%	100%	100%	100%	90%	100%	100%	100%	100%	100%
Tata GSM	100%	100%	100%	-	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	95%
Idea	100%	100%	85%	100%	-	100%	100%	100%	100%	100%	100%	95%	100%	90%	100%
Etisalat	95%	100%	100%	100%	100%	-	100%	90%	100%	100%	100%	100%	100%	100%	100%
Rcom GSM	100%	100%	100%	100%	100%	90%	-	100%	100%	100%	100%	100%	100%	100%	90%
Loop	100%	100%	100%	100%	100%	100%	100%	-	100%	100%	100%	90%	100%	95%	100%
Vodafone	100%	90%	100%	100%	90%	100%	100%	100%	-	90%	100%	100%	90%	100%	100%
Videocon	100%	95%	100%	100%	100%	100%	100%	100%	100%	-	95%	100%	100%	100%	100%
Uninor	100%	100%	100%	100%	90%	100%	100%	100%	95%	100%	-	100%	100%	100%	85%
Tata CDMA	90%	100%	100%	100%	100%	100%	100%	100%	100%	100%	90%	-	100%	100%	100%
MTS	100%	100%	100%	100%	100%	90%	100%	100%	100%	100%	100%	100%	-	90%	100%
Rcom CDMA	100%	100%	100%	85%	100%	90%	95%	100%	100%	100%	100%	100%	100%	-	100%
MTNL CDMA	100%	100%	95%	100%	95%	100%	100%	100%	100%	95%	100%	100%	90%	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. A little congestion was found in a few cases such as MTNL GSM-Aircel, Etisalat-Loop, Rcom CDMA- Tata GSM etc. as tabulated above.

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

(1) Sample Coverage

The Operator Assisted Drive Test was conducted at Mumbai for all the operators. Route covered was about around 200 Km within the speed limit of 40-45 Km/hr.

Drive Test Locations

HIGH DENSE: Western Express Highway from Bandra to Borivali, Bandra to Nariman Point via Dadar, Worli Naka, Haji Ali, Peddar Road, Babulnath Road, Charni Raod, Marine Drive, Trident Hotel

MEDIUM DENSE: CST to Thane via Eastern Express Highway, Turbhe, Konkan Bhawan, Kalamboli, Shilphata, Kalyan

LOW DENSE: Andheri, Vesrova, Lokhandwala, Oshiwara Link Road

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

SN	Parameter	Aircel	Airtel	MTNL GSM	Tata GSM	Idea	Etisalat	Rcom GSM	Loop	Voda fone	Uninor	Tata CDMA	MTS	Rcom CDMA	MTNL CDMA
		GSM Operators										CDMA Operators			
1.1	Call Attempts	180	187	176	197	163	185	185	152	172	241	162	168	189	168
1.2	Blocked Call Rate (<=3%)	0.56%	4.28%	2.84%	0.00%	0.00%	1.62%	0.54%	1.32%	1.74%	1.24%	0.62%	1.79%	0.00%	0.59%
1.3	Dropped Call Rate (<=2%)	0.56%	0.53%	2.84%	1.01%	0.00%	0.00%	0.00%	0.66%	0.58%	0.41%	0.00%	0.00%	0.00%	2.38%
1.4	Percentage of connections with good voice quality (=>95%)														
	(i) 0-4 (w/o frequency hopping)											96.47%	99.22%	98.90%	89.57%
	(ii) 0-5 (with frequency hopping)	92.58%	96.96%	95.50%	95.62%	88.70%	96.00%	95.90%	95.05%	95.80%	93.54%				
1.5	Service Coverage														
	In door (>= -75dBm)	71.28%	82.67%	54.00%	98.24%	99.83%	71.00%	64.10%	75.00%	74.93%	90.43%	97.19%	70.78%	95.79%	39.73%
	In-vehicle (>= -85dBm)	96.51%	97.00%	87.83%	99.95%	99.97%	90.00%	89.88%	96.95%	95.26%	99.33%	100%	93.81%	98.85%	79.33%
	Out door- in city (>= -95dBm)	99.94%	100%	98.57%	99.97%	100%	99.00%	100%	100%	99.74%	100%	100%	100%	100%	98.43%
1.6	Call Setup Success Rate (>=95%)	99.44%	95.72%	97.16%	100%	100%	98.38%	99.46%	98.68%	98.26%	98.76%	99.38%	98.21%	100%	99.41%

Graphical Representation

	Aircel	Airtel	MTNL GSM	Tata GSM	Idea	Etisalat	Rcom GSM	Loop	Voda fone	Uninor	Tata CDMA	MTS	Rcom CDMA	MTNL CDMA
In door (>=-75dBm)	71.28	82.67	54.00	98.24	99.83	71.00	64.10	75.00	74.93	90.43	97.19	70.78	95.79	39.73
In-vehicle (>=-85dBm)	96.51	97.00	87.83	99.95	99.97	90.00	89.88	96.95	95.26	99.33	100%	93.81	98.85	79.33
Out door- in city (>=-95dBm)	99.94	100%	98.57	99.97	100%	99.00	100%	100%	99.74	100%	100%	100%	100%	98.43

Coverage level Mumbai
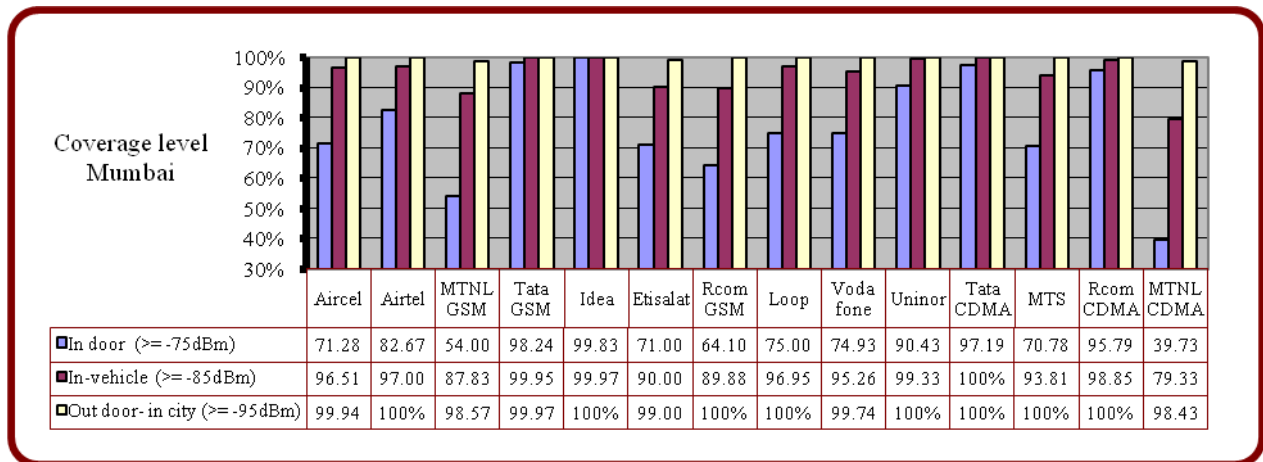
(3)   Critical Analysis

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 Airtel.
- 'Dropped Call Rate' benchmark is not met by MTNL GSM.
- For the parameter '%age of connections with good voice quality', it is found that Aircel, Idea, Uninor & MTNL CDMA are not meeting the prescribed benchmark.
- Among all the operators, MTNL was found to have relatively lower values for in-door coverage.

(E) Independent Drive Test
       …….. Not done in this quarter

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

From live, month and Drive Tests findings, it can be concluded that on an average, performance of the operators in the service area (Mumbai) is satisfactory for **Network Parameters**.

Under **Response Time to Customer for Assistance** parameters, Uninor is having a poor performance. Rcom GSM & CDMA, Vodafone & Tata CDMA also have poor performance for "%age of calls answered by operator". Slight deviation was found again in case of Aircel for not resolving 100% complaints within 4 weeks and for not closing service of requested connections within 7 days.

Vodafone has low Billing Credibility for Post-paid connections.

During **Drive Tests**, the performance of Airtel & MTNL GSM was found to be below benchmark for Blocked Call & CDR respectively. Also, Aircel, Idea, Uninor & MTNL CDMA didn't fare well in 'good voice quality connections'.

IV.   Basic Telephone Service (Wireline) Providers
   ……...Audit not done for this quarter

V. Broadband Service Providers
   ……...Audit not done for this quarter