REPORT

ON

AUDIT & ASSESSMENT OF QUALITY OF SERVICE

OF

CELLULAR MOBILE TELEPHONE SERVICES

FOR

WEST ZONE - MUMBAI CIRCLE

Report Period: July 2011 – September 2011

Table of Contents

CHAPTER-1: Introduction
- I.   Background
- II. Objectives and Methodology

CHAPTER-2: Executive Summary
- I.   Preface
- II. Findings from Quality of Service Audit (Operator wise for each parameter)

    (A) Cellular Mobile Telephone Service Providers
- 3 days Live Data Audit
- One Month Data Audit
- Operator Assisted Drive Test
- Independent Drive Test

    (B) Basic Telephone Service (Wireline) Providers
        - Not conducted for this quarter

    (C) Broadband Service Providers
        - Not conducted for this quarter

CHAPTER-3: Audit-PMR data verification results

- I.   Cellular Mobile Telephone Service
- II. Basic Service (Wire Line) Service
        - Not conducted for this quarter
- III. Broadband Service
        - Not conducted for this quarter

CHAPTER-4: Detailed Findings & Analysis

- I.   Cellular Mobile Telephone Service

    (A) MSC audit
1) 3 days live measurement data assessment & summarized findings
2) One month audit data report & summarized findings
3) Sample coverage
4) Performance (Graphical Representation)
5) Critical Analysis

    (B) Redressal
1) Sample coverage
2) Performance based on live measurement for three days
3) Live Calling to Call Centers
4) Level 1 Live Calling
5) Critical Analysis

(C) Inter operator call assessment
    1) Sample coverage
    2) Performance based on live measurement
    3) Critical Analysis

(D) Drive test of the mobile network of service providers
    1) Sample Coverage
    2) Performance (for the respective cities)
    3) Critical Analysis

(E) Independent Drive Test
    1) Sample Coverage
    2) Performance (for the respective cities)
    3) Critical Analysis

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

II. Basic Telephone Service (Wireline) Providers
       - *Not conducted for this quarter*

III. Broadband Service Providers
       - Not conducted for this quarter

CHAPTER-1: INTRODUCTION

I.   Background

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

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

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

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

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

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

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

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

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

II. Objectives and Methodology

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

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

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

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

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

v)   Billing and call center's data verification.

vi)   Live testing of the efficiency of the call center / customer care help line.
vii)   Emergency (Level 1)call testing done.

To fulfill the above mentioned Scope of Work audit was performed on different Systems, Facilities and Field data collection.

Systemsaudited:-
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 Mumbaicircle. 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 3rdquarter (July-September 2011). The primary data collection and verification of records (PMR data verification – quarterly) maintained by various operators was undertaken for the period January-March 2011.

Following are the various operators covered in 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	Aug-2011	1900-2000 Hrs
2	Airtel Ltd	Aug-2011	1900-2000 Hrs
3	MTNL	Aug-2011	2000-2100Hrs
4	Tata Communications	Aug-2011	1100-1200 Hrs
5	Idea	Aug-2011	1900-2000 Hrs
6	Etisalat	Aug-2011	1900-2000 Hrs
7	Reliance Communication	July-2011	1900-2000 Hrs
8	Loop	Aug-2011	2000-2100Hrs
9	Vodafone	Aug-2011	1900-2000 Hrs
10	Videocon (ICR with Loop)	Aug-2011	1900-2000 Hrs
11	Uninor	Aug-2011	1900-2000 Hrs
CDMA Operators			
12	Tata Communications	Aug-2011	1100-1200 Hrs
13	MTS	Aug-2011	1900-2000 Hrs
14	Reliance Communication	July-2011	1900-2000 Hrs
15	MTNL	Aug-2011	1900-2000 Hrs

II. Findings from Quality of Service Audit (Operator wise for each parameter)
(A) Cellular Mobile Telephone Services

3 days Live Data Audit		**Bench-mark**	**Aircel**	**Airtel**	**Etisalat**	**Idea**	**Loop**	**MTNL GSM**	**Rcom GSM**	**Tata GSM**	**Unin or**	**Video con**	**Voda fone**	**MTNL CDMA**	**MTS**	**Rcom CDMA**	**Tata CDMA**
S/N	**Name of Parameter**							**GSM Operators**							**CDMA Operators**		
1	**Network Availability**																
	a) BTS Accumulated Downtime	<=2%	0.03%	0.04%	0.46%	0.03%	0.07%	0.71%	0.34%	0.02%	0.04%		0.09%	0.39%	0.11%	0.15%	0.06%
	b) Worst affected BTSs due to downtime	<=2%	0.00%	0.03%	1.44%	0.00%	0.00%	0.43%	0.15%	0.00%	0.00%		0.03%	0.00%	0.00%	0.13%	0.11%
2	**Connection Establishment (Accessibility)**																
	a) CSSR (Call Setup Success Rate)	>=95%	97.95%	99.46%	99.75%	99.20%	99.98%	96.88%	99.36%	99.32%	98.85%	ICR with Loop	99.99%	98.56%	99.64%	99.53%	99.10%
	b) SDCCH/PAGING congestion	<=1%	0.04%	0.02%	0.04%	0.10%	0.19%	0.25%	0.11%	0.32%	0.05%		0.19%	0.58%	0.00%	0.00%	0.00%
	c) TCH congestion	<=2%	0.02%	0.05%	0.02%	0.21%	0.02%	1.49%	0.11%	0.20%	0.10%		0.75%	0.01%	0.02%	0.02%	0.02%
3	**Connection maintenance (retainability)**																
	a) CDR	<=2%	0.87%	0.64%	1.35%	1.19%	0.58%	1.45%	1.13%	1.02%	1.78%		0.86%	1.46%	0.26%	0.28%	0.67%
	b) Worst affected cells>3% TCH drop	<=3%	2.55%	2.30%	2.34%	2.51%	0.31%	1.74%	0.53%	2.32%	2.17%		2.89%	0.06%	2.11%	0.39%	2.36%
	c) Good voice quality	>=95%	97.90%	99.70%	98.01%	98.69%	98.19%	96.10%	99.02%	97.24%	98.25%		98.00%	97.60%	NP	NP	NP
4	**No of POI having congestion(>0.5%)**	<=0.5%	0	0	0	0	0	0	0	0	2	2	0	NP	0	0	0

3 days Live 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			
5	**Response time to customers for assistance**																
	a) Accessibility of call centre/Customer Care	>=95 %	91.55%	100%	98.87%	100%	96.36%	95.92%	99.91%	100%	93.32%	100%	100%	94.87%	95.04%	99.92%	100%
	b) % call answered by operators(voice to voice) within 60 sec.	>=90 %	83.19%	96.12%	99.83%	95.52%	93.71%	95.92%	90.74%	98.31%	86.72%	96.26%	72.59%	100%	76.22%	93.46%	97.58%

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. CDMA operators have declared the KPI "%age of connections with Good Voice Quality" is not system generated. Uninor& Videocon have 2 POIs each with more than 0.5% congestion.
> The parameter "Accessibility of call centre/Customer Care" data is found to be satisfactory for most of the operators except for Aircel, Uninor& MTNL CDMA missing the 95% benchmark. And Aircel, Uninor, Vodafone & MTS missing the 90% benchmark for parameter "%age of calls answered by operator".

One Month Data Audit		Bench-mark	Aircel	Airtel	Etisalat	Idea	Loop	MTNL	Rcom	Tata	Uninor	Video con	Voda fone	MTNL	MTS	Rcom	Tata
S/N	Name of Parameter						GSM Operators							CDMA Operators			
(A)	Network Service Quality Parameter																
1	Network Availability																
	a) BTS Accumulated Downtime	<=2%	0.02%	0.02%	0.30%	0.02%	0.03%	0.70%	0.22%	0.02%	0.04%		0.02%	0.33%	0.09%	0.16%	0.03%
	b) Worst affected BTSs due to downtime	<=2%	0.05%	0.29%	1.80%	0.00%	0.05%	0.64%	0.25%	0.04%	0.00%		0.06%	1.36%	0.00%	0.26%	0.11%
	c) Total no. of BTSs in the licensed service area		2075	3149	834	2355	2083	939	2009	2266	1509		3448	220	458	774	904
	d) Sum of downtime of BTSs in a month in hours i.e. total outage time of all BTSs in hours during a month		302.15	556.02	1850	296	518.43	4869	3320	303	428.54		528.50	537	300	913	171
	e) No. of BTSs having accumulated downtime of >24 hours in a month		1	9	15	0	1	6	5	1	0	ICR with Loop	2	3	0	2	1
2	Connection Establishment (Accessibility)																
	a) CSSR (Call Setup Success Rate)	>=95%	97.78%	99.59%	99.72%	99.19%	99.98%	96.62%	99.20%	99.44%	98.96%		99.99%	98.51%	99.44%	99.65%	99.14%
	b) SDCCH/PAGING congestion	<=1%	0.02%	0.02%	0.12%	0.08%	0.08%	0.78%	0.11%	0.31%	0.04%		0.12%	0.65%	0.00%	0.00%	0.00%
	c) TCH congestion	<=2%	0.02%	0.05%	0.04%	0.22%	0.02%	1.72%	0.21%	0.26%	0.08%		0.97%	0.01%	0.02%	0.07%	0.01%
3	Connection maintenance (retainability)																
	a) CDR	<=2%	0.87%	0.65%	1.26%	1.18%	0.56%	1.48%	1.09%	0.98%	1.70%		0.91%	1.33%	0.26%	0.35%	0.68%
	b) Worst affected cells>3% TCH drop	<=3%	2.59%	2.08%	2.50%	2.56%	0.40%	0.86%	0.51%	2.34%	2.21%		2.89%	0.09%	2.18%	0.39%	2.40%
	c) Good voice quality	>=95%	98.05%	99.68%	97.96%	98.69%	98.18%	96.88%	98.96%	97.25%	98.37%		97.83%	97.69%	NP	NP	NP
4	No of POI having congestion	<=0.5%	0	0	0	0	0	0	0	0	4	2	0	NP	0	0	0
(B)	Customer Service																

One Month Data Audit		Bench-mark	Aircel	Airtel	Etisalat	Idea	Loop	MTNL	Rcom	Tata	Uninor	Video con	Voda fone	MTNL	MTS	Rcom	Tata
S/N	Name of Parameter		GSM Operators												CDMA Operators			
	Quality Parameters																
5	**Metering/billing credibility-Post paid**	*<= 0.1%*	0.03%	0.02%	NA	0.34%	0.03%	0.08%	0.10%	0.08%	NA	NA	0.15%	0.05%	0.12%	0.09%	0.06%
6	**Metering /billing credibility-Pre paid**	*<= 0.1%*	0.03%	0.00%	0.03%	0.11%	0.02%	0.00%	0.10%	0.01%	0.18%	0.01%	0.02%	0.00%	0.01%	0.03%	0.02%
7	**Resolution of billing/ charging complaints**	*100% within 4 weeks*	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	98%	100%	100%	100%	100%
	a) Period of applying credit/waiver/adjustment to the customer's account from the date of resolutions of complaints	*<=1 week*	100%	100%	100%	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%*	87.41 %	100%	98.95%	100%	98.82 %	96.84 %	99.29 %	99.51 %	94.25%	97.90%	99.96 %	NP	96.84 %	99.85%	100%
	b) % call answered by operators(voice to voice) within 60 sec.	*>=90%*	78.77 %	96.54 %	99.32%	97.82 %	97.88 %	94.53 %	83.84 %	99.56 %	82.19%	97.87%	66.48 %	NP	74.96 %	91.84%	99.58%
9	**Termination/closure of service**	*<=7days*	100%	100%	NA	100%	100%	100%	100%	NP	NA	NA	100%	100%	100%	100%	NP
10	**Time taken for refunds of deposits after closures.**	*100% within 60 days*	100%	100%	NA	100%	100%	100%	100%	NP	NA	NA	100%	100%	100%	100%	NP

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. However, MTS & Tata CDMA have declared the KPI "%age of connections with Good Voice Quality" is not system generated. Also, Rcom CDMA & Tata CDMA has provided data for Paging congestion. Uninor& Videocon have POIs with more than 0.5% congestion.

> Customer care data is found to be satisfactory for most of the operators except for Aircel &Uninor missing the 95% benchmark for the parameter "Accessibility of call centre/Customer Care" and Aircel, Rcom GSM, Uninor, Vodafone & MTS missing the 90% benchmark for "%age of calls answered by operator". Slight deviation was found again in case of Vodafone for not resolving 100% complaints within 4 weeks.

> Idea, Vodafone, MTS &Uninor have low Billing/Metering Credibility for Post/Pre-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 was selected for covering different density areas (High, Medium & Low dense areas).

SN	Parameter	City Name	Aircel	Airtel	MTNL	Docomo	Idea	Etsalat	RTL	Loop	V-fone	Unitech	TTML	MTS	Rcom	MTNL
			GSM Operators										CDMA Operators			
1.1	Blocked Call Rate (<=3%)	Mumbai	0.00%	2.63%	5.41%	0.00%	0.00%	1.07%	0.92%	0.64%	0.53%	0.75%	0.00%	0.00%	0.00%	1.96%
1.2	Dropped Call Rate (<=2%)	Mumbai	0.52%	1.80%	2.86%	0.52%	0.00%	1.08%	0.93%	0.65%	0.00%	0.00%	1.01%	0.58%	1.01%	2.00%
1.3	Percentage of connections with good voice quality (=>95%)															
	(i) 0-4 (w/o frequency hopping)	Mumbai	NA										96.13%	100%	98.43%	90.45%
	(ii) 0-5 (with frequency hopping)	Mumbai	93.82%	96.38%	97.06%	97.91%	87.87%	96.00%	95.43%	95.76%	95.26%	91.12%	NA			
1.4	Call Setup Success Rate (>=95%)	Mumbai	100%	97.37%	94.59%	100%	100%	98.93%	99.08%	99.36%	99.47%	99.25%	100%	100%	100%	98.04%

Key observations as could be derived from the table are as under:
- 'Blocked Call Rate' & 'Dropped Call Rate' benchmarks are 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.
- CSSR is not met by MTNL GSM by a slight margin.

Independent Drive Test
      --- Not done in this quarter

CHAPTER-3: AUDIT-PMR VERIFICATION

I. Cellular Mobile Telephone Service

S/N	PMR / Name of Parameter	Bench-mark	Audit	Aircel	Airtel	Etisalat	Idea	Loop	MTNL	Rcom	Tata	Uninor	Voda fone	MTS	Rcom	Tata
				GSM Operators										CDMA Operators		
A	**Network Service Quality Parameter**															
1	**Network Availability**															
	BTS Accumulated Downtime	<=2%	Report	0.04%	0.04%	1.53%	0.02%	0.09%	0.79%	0.19%	0.02%	0.02%	0.02%	0.03%	0.20%	0.03%
			Verify	0.04%	0.04%	1.53%	0.02%	0.09%	0.79%	0.19%	0.02%	0.02%	0.02%	0.03%	0.20%	0.03%
	Worst affected BTSs due to downtime	<=2%	Report	0.05%	0.26%	6.48%	0.00%	0.48%	1.13%	0.19%	0.11%	0.00%	0.10%	0.00%	0.09%	0.22%
			Verify	0.05%	0.26%	6.48%	0.00%	0.48%	1.13%	0.19%	0.11%	0.00%	0.10%	0.00%	0.09%	0.22%
2	**Connection Establishment (Accessibility)**															
	CSSR (Call Setup Success Rate)	>=95%	Report	98.47%	99.16%	99.10%	99.32%	99.07%	98.37%	99.65%	98.94%	99.21%	99.72%	99.38%	99.51%	99.06%
			Verify	98.47%	99.16%	99.10%	99.32%	99.07%	98.37%	99.65%	98.94%	99.21%	99.72%	99.38%	99.51%	99.06%
	SDCCH/PAGING congestion	<=1%	Report	0.13%	0.03%	0.00%	0.12%	0.19%	0.55%	0.17%	0.32%	0.02%	0.16%	0.00%	0.00%	0.00%
			Verify	0.13%	0.03%	0.00%	0.12%	0.19%	0.55%	0.17%	0.32%	0.02%	0.16%	0.00%	0.00%	0.00%
	TCH congestion	<=2%	Report	0.01%	0.08%	0.40%	0.17%	0.13%	1.76%	0.11%	0.30%	0.01%	0.32%	0.00%	0.30%	0.06%
			Verify	0.01%	0.08%	0.40%	0.17%	0.13%	1.76%	0.11%	0.30%	0.01%	0.32%	0.00%	0.30%	0.06%
3	**Connection maintenance (retainability)**															
	CDR	<=2%	Report	0.83%	0.86%	1.83%	1.18%	0.68%	1.73%	0.30%	0.84%	0.61%	0.73%	0.16%	0.54%	0.49%
			Verify	0.83%	0.86%	1.83%	1.18%	0.68%	1.73%	0.30%	0.84%	0.61%	0.73%	0.16%	0.54%	0.49%
	Worst affected cells>3% TCH drop	<=5%	Report	2.42%	0.67%	14.49%	5.70%	0.55%	2.26%	0.52%	2.34%	1.14%	1.05%	0.94%	0.26%	1.91%
			Verify	2.42%	0.67%	14.49%	5.70%	0.55%	2.26%	0.52%	2.34%	1.14%	1.05%	0.94%	0.26%	1.91%
	Good voice quality	>=95%	Report	98.15%	98.61%	98.31%	98.84%	97.77%	96.76%	97.76%	97.08%	98.36%	98.63%	99.37%	98.79%	96.93%
			Verify	98.15%	98.61%	98.31%	98.84%	97.77%	96.76%	97.76%	97.08%	98.36%	98.63%	99.37%	98.79%	96.93%
4	**POI congestion**	<=0.5%	Report	1	0	5	0	0	0	0	0	2	0	0	0	0
			Verify	1	0	5	0	0	0	0	0	2	0	0	0	0

S/N (PMR)	Name of Parameter	Bench-mark	Audit	Aircel	Airtel	Etisalat	Idea	Loop	MTNL	Rcom	Tata	Uninor	Voda fone	MTS	Rcom	Tata
				GSM Operators										CDMA Operators		
B	**Customer Service Quality Parameters**															
5	**Metering/billing credibility-Post paid**	*<= 0.1%*	Report	0.02%	0.02%	NA		0.00%	0.001%	0.00%	0.24%	NA	0.00%	0.00%	0.00%	0.09%
			Verify	0.02%	0.02%			0.00%	0.001%	0.00%	0.24%		0.00%	0.00%	0.00%	0.09%
6	**Metering /billing credibility-Pre paid**	*<= 0.1%*	Report	0.05%	0.01%	0.40%		0.04%	0.08%	0.08%	0.02%	0.00%	0.00%	0.07%	0.04%	0.02%
			Verify	0.05%	0.01%	0.40%		0.04%	0.08%	0.08%	0.02%	0.00%	0.00%	0.07%	0.04%	0.02%
7	**Resolution of billing/ charging complaints**	*100% within 4 weeks*	Report	100%	100%	100%		100%	100%	100%	100%	100%	100%	100%	100%	93%
			Verify	100%	100%	100%		100%	100%	100%	100%	100%	100%	100%	100%	93%
	Period of applying credit/waiver/adjustment to the customers account from the date of resolutions of complaints	*<=1 week*	Report	100%	100%	NA	NR	100%	100%	100%	100%	NA	100%	100%	100%	99.22%
			Verify	100%	100%			100%	100%	100%	100%		100%	100%	100%	99.22%
8	**Response time to customers for assistance**															
	Accessibility of call centre/Customer Care	*>=95 %*	Report	100%	99%	98.77%		97%	78.39%	100%	100%	98.26%	99%	95.00%	100%	96%
			Verify	100%	99%	98.77%		97%	78.39%	100%	100%	98.26%	99%	95.00%	100%	96%
	% call answered by operators(voice to voice) within 60 sec.	*>=90 %*	Report	86.66%	71%	99.22%		96%	80%	93%	88.25%	95.82%	72%	90.33%	96%	93%
			Verify	86.66%	71%	99.22%		96%	80%	93%	88.25%	95.82%	72%	90.33%	96%	93%
9	**Termination/closure of service**															
	No.of requests for Termination / Closure of service complied within 7 days during the quarter	*<=7days*	Report	93%	100%	NA		100%	100%	100%	100%	NA	100%	100%	100%	100%
			Verify	93%	100%			100%	100%	100%	100%		100%	100%	100%	100%
10	**Time taken for refunds of deposits after closures.**	*100% within 60 days*	Report	100%	100%			100%	100%	100%	100%		100%	0%	100%	84%
			Verify	100%	100%			100%	100%	100%	100%		100%	100%	100%	84%

Critical Analysis (PMR Verification):

- The figures provided by all the operators match the figures obtained on verification in most of the cases.
- Etisalat is not meeting the benchmarks for "Worst affected BTSs due to downtime" and "worst affected cells >3% TCH drop".
- Idea is also not meeting the benchmark for "worst affected Cells >3% TCH drop".
- Etisalat &Uninor have 5 & 2 POIs with more than 0.5% congestion.
- Tata GSM is found to be not meeting the benchmark for the parameter "Metering/Billing Credibility-Postpaid", while Etisalat is not meeting the benchmark for "Metering/Billing Credibility-Prepaid".
- The parameter "% call answered by operators (voice to voice) within 60 sec." benchmark is not met by Aircel, Airtel, MTNL, Tata GSM & Vodafone.
- The parameters for "Resolution of billing/charging complaints" are not met by Tata CDMA.
- Tata CDMA takes more than 60 days for refund of deposits.
- Aircel is taking more than 7 days for termination/closure of services in 7% cases.
- The parameter "Accessibility of call centre" is below the benchmark in case of MTNL

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	Rcom	Tata	Uninor	Video con	Voda fone	MTNL	MTS	Rcom	Tata
								GSM Operators							CDMA Operators		
A	Network Service Quality Parameter																
1	Network Availability																
	a) BTS Accumulated Downtime	<=2%	0.03%	0.04%	0.46%	0.03%	0.07%	0.71%	0.34%	0.02%	0.04%		0.09%	0.39%	0.11%	0.15%	0.06%
	b) Worst affected BTSs due to downtime	<=2%	0.00%	0.03%	1.44%	0.00%	0.00%	0.43%	0.15%	0.00%	0.00%		0.03%	0.00%	0.00%	0.13%	0.11%
	c) Total no. of BTSs in the licensed service area		2075	3149	834	2355	2083	939	2009	2266	1509	ICR with Loop	3448	220	458	774	904
	d) Sum of downtime of BTSs in a month in hours i.e. total outage time of all BTSs in hours during a month		50.75	100.62	278.45	58.41	102.68	482	495	35	42.35		211.34	62	36	84	41
	e) No. of BTSs having accumulated downtime of >24 hours in a month		0	1	12	0	0	4	3	0	0		1	0	0	1	1

S/N	Name of Parameter	Bench-mark	Aircel	Airtel	Etisalat	Idea	Loop	MTNL	Rcom	Tata	Uninor	Video con	Voda fone	MTNL	MTS	Rcom	Tata
								GSM Operators							CDMA Operators		
	Connection Establishment (Accessibility)																
	a) CSSR	>=95%	97.95%	99.46%	99.75%	99.20%	99.98%	96.88%	99.36%	99.32%	98.85%		99.99%	98.56%	99.64%	99.53%	99.10%
	b) SDCCH/PAGING congestion	<=1%	0.04%	0.02%	0.04%	0.10%	0.19%	0.25%	0.11%	0.32%	0.05%		0.19%	0.58%	0.00%	0.00%	0.00%
	c) TCH congestion	<=2%	0.02%	0.05%	0.02%	0.21%	0.02%	1.49%	0.11%	0.20%	0.10%		0.75%	0.01%	0.02%	0.02%	0.02%
2	**Connection maintenance**											ICR with Loop					
	a) CDR	<=2%	0.87%	0.64%	1.35%	1.19%	0.58%	1.45%	1.13%	1.02%	1.78%		0.86%	1.46%	0.26%	0.28%	0.67%
	b) Cells having > 3% TCH drop	<=3%	2.55%	2.30%	2.34%	2.51%	0.31%	1.74%	0.53%	2.32%	2.17%		2.89%	0.06%	2.11%	0.39%	2.36%
	c) Good voice quality	>=95%	97.90%	99.70%	98.01%	98.69%	98.19%	96.10%	99.02%	97.24%	98.25%		98.00%	97.60%	NP	NP	NP
	d) No. of cells > 3% TCH drop		148	182	58	168	18	44	31	144	97		243	2	29	3	64
	e) Total no. of cells in the network		5,787	7,891	2,483	6,688	5,760	2,550	5,898	6,209	4,473		8,415	2,640	1,374	774	2,712
3	**No of POI having congestion**	<=0.5%	0	0	0	0	0	0	0	0	2	2	0	NP	0	0	0
	a) Name of POI not meeting the benchmark		Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Uninor, VSNL	MTNL	Nil	NP	Nil	Nil	Nil
	b) Total No. of call attempts on POI (Avg.)		514,535	1,874,932	96,948	63,521	75,643	222,492	1,258,635	39,251	724,349	79,819	0	NP	85,886	1,258,635	1,216,779
	c) Total traffic served on POI (Erlang) (Avg.)		8,581	34,791	2,581	1,854	19,985	6,811	42,698	8,959	18,636	4,418	0	NP	1,894	42,698	26,877
	d) Total No. of circuits on POI		28,249	77,340	11,473	117,922	64,698	24,942	95,742	70,459	27,235	10,748	235,182	1,375	11,444	95,742	70,459

S/N	Name of Parameter	Bench-mark	Aircel	Airtel	Etisalat	Idea	Loop	MTNL	Rcom	Tata	Uninor	Video con	Voda fone	MTNL	MTS	Rcom	Tata
			GSM Operators											CDMA Operators			
	e) Total number of working POI Service Area wise		77	243	22	279	69	72	245	185	45	57	516	11	42	245	185
	f) Equipped Capacity of Network in respect of Traffic in erlang		68,218	169,864	18,862	80,724	143,207	1,721,954	NP	76,233	45,024	143,207	191,246	36,000	42,000	NP	393,354
	g) Total traffic handled in TCBH in erlang		16,826	100,604	2,967	68,243	64,398	1,826	NP	29,853	23,177	67,845	171,259	1,046	3,691	NP	102,634
B	**Customer Service Quality Parameters**																
4	**Response time to customers for assistance**																
	a) Accessibility of call centre	>=95 %	91.55%	100%	98.87%	100%	96.36%	95.92%	99.91%	100%	93.32%	100%	100%	94.87 %	95.04 %	99.92%	100%
	b) % of call answered by operators(voice to voice) within 60 sec	>=90 %	83.19%	96.12%	99.83%	95.52%	93.71%	95.92%	90.74%	98.31%	86.72%	96.26%	72.59%	100%	76.22 %	93.46%	97.58%
	c) No. of call attempts to call centre / customer care nos. during TCBH (Avg)		20,847	43,254	2,423	17,823	29,873	8,335	16,684	8,562	13,842	16,284	48,935	312	7,821	8,769	5,204
	d) No. of calls connected and answered successfully to call centre / customer care nos. during TCBH (Avg)		17,342	41,574	2,419	17,025	27,993	7,996	15,138	8,417	12,004	15,675	35,521	296	5,961	8,195	5,078

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 0.02% and 0.71%.

➢ **Worst affected BTSs due to downtime (benchmark <= 2%):**All operators are meeting the benchmark with values lying between 0% and 1.44%.

➢ **Call setup success rate (benchmark >= 95%):** All operators are meeting the benchmark with values lying between 96.88% and 99.99%.

➢ **SDCCH/PAGING Channel congestion (benchmark <= 1%):** All operators are meeting the benchmark with values lying between 0% and 0.58%.
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 1.49%.

➢ **Call drop rate (benchmark <= 2%):** All operators are meeting the benchmark with values lying between 0.26% and 1.78%.

➢ **Cell exceeding 3% TCH drop (benchmark <= 3%):**All the operators are satisfying the benchmark with value in between 0.06% and 2.89%.

➢ **Connections with good voice quality (benchmark >= 95%):**CDMA service providers have declared that the parameter is not system generated. GSM operators are meeting the benchmark with values lying between 96.1% and 99.7%.

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

➢ *%age of call answered by operator (electronically) (benchmark >95%):* Except for Aircel, Uninor& MTNL CDMA, all the operators are meeting the benchmark with values lying between 95.04% to 100%.

➢ *%age of call answered by operator (Voice to voice) (benchmark >90%):*Most of the operators are meeting the benchmark value of 90% except for Aircel, Uninor, Vodafone& MTS.

(2) One Month Audit Data Report& Summarized Findings

S/N	Name of Parameter	Bench mark	Aircel	Airtel	Etisalat	Idea	Loop	MTNL	Rcom	Tata	Uninor	Video con	Vod a fone	MTNL	MTS	Rcom	Tata
			GSM Operators											CDMA Operators			
A	**Network Service Quality Parameter**																
1	**Network Availability**																
	a) BTS Accumulated Downtime	<=2%	0.02%	0.02%	0.30%	0.02%	0.03%	0.70%	0.22%	0.02%	0.04%		0.02%	0.33%	0.09%	0.16%	0.03%
	b) Worst affected BTSs due to downtime	<=2%	0.05%	0.29%	1.80%	0.00%	0.05%	0.64%	0.25%	0.04%	0.00%		0.06%	1.36%	0.00%	0.26%	0.11%
	c) Total no. of BTSs in the licensed service area		2,075	3,149	834	2,355	2,083	939	2,009	2,266	1,509		3,448	220	458	774	904
	d) Sum of downtime of BTSs in a month in hours i.e. total outage time of all BTSs in hours during a month		302	556	1,850	296	518	4,869	3,320	303	429	ICR with Loop	529	537	300	913	171
	e) No. of BTSs having accumulated downtime of >24 hours in a month		1	9	15	0	1	6	5	1	0		2	3	0	2	1
2	**Connection Establishment (Accessibility)**																
	a) CSSR (Call Setup Success Rate)	>=95%	97.78%	99.59%	99.72%	99.19%	99.98%	96.62%	99.20%	99.44%	98.96%		99.99%	98.51%	99.44%	99.65%	99.14%
	b) SDCCH/PAGING congestion	<=1%	0.02%	0.02%	0.12%	0.08%	0.08%	0.78%	0.11%	0.31%	0.04%		0.12%	0.65%	0.00%	0.00%	0.00%
	c) TCH congestion	<=2%	0.02%	0.05%	0.04%	0.22%	0.02%	1.72%	0.21%	0.26%	0.08%		0.97%	0.01%	0.02%	0.07%	0.01%

S/N	Name of Parameter	Bench mark	Aircel	Airtel	Etisalat	Idea	Loop	MTNL	Rcom	Tata	Uninor	Video con	Voda fone	MTNL	MTS	Rcom	Tata
			GSM Operators											CDMA Operators			
3	Connection maintenance (retainability)																
	a) CDR	<=2%	0.87%	0.65%	1.26%	1.18%	0.56%	1.48%	1.09%	0.98%	1.70%		0.91%	1.33%	0.26 %	0.35%	0.68 %
	b) Worst affected cells>3% TCH drop	<=3%	2.59%	2.08%	2.50%	2.56%	0.40%	0.86%	0.51%	2.34%	2.21%		2.89%	0.09%	2.18 %	0.39%	2.40 %
	c) Good voice quality	>=95%	98.05%	99.68%	97.96%	98.69%	98.18%	96.88 %	98.96 %	97.25 %	98.37%	ICR with Loop	97.83 %	97.69 %	NP	NP	NP
	d) Total No. of cells exceeding 3% TCH drop (call drop)		150	164	62	171	23	22	30	145	99		243	2	30	3	65
	e) Total no. of cells in the network		5,787	7,891	2,483	6,688	5,760	2,550	5,898	6,209	4,473		8,415	2,640	1,374	774	2,712
4	No of POI having congestion	<=0.5 %	0	0	0	0	0	0	0	0	4	2	0	NP	0	0	0
	a) Name of POI not meeting the benchmark		Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Uninor, VSNL, TTSL, MTNL	MTNL	Nil	NP	Nil	Nil	Nil
	b) Total No. of call attempts on POI (Avg.)		436,096	1,846,1 56	85,463	70,418	772,957	179,09 1	1,274, 774	37,38 5	621,080	79,885	3,090,3 80	NP	84,77 5	1,274, 774	1,158 ,948
	c) Total traffic served on POI (Erlang) (Avg.)		8,720	34,131	2,743	2,038	21,328	6,106	41,43 9	8,867	15,788	4,495	123,5 23	NP	1,83 3	41,43 9	26,6 00
	d) Total No. of circuits on POI		28,249	77,340	11,473	117,922	64,698	24,942	94,26 9	70,45 9	27,235	10,748	235,18 2	1,375	11,44 4	94,26 9	70,45 9
	e) Total number of working POI Service Area wise		77	243	22	279	69	72	245	185	45	57	516	11	42	245	185

S/N	Name of Parameter	Bench mark	Aircel	Airtel	Etisalat	Idea	Loop	MTNL	Rcom	Tata	Uninor	Video con	Voda fone	MTNL	MTS	Rcom	Tata
			GSM Operators											CDMA Operators			
5	**Network Data**																
	a) Equipped Capacity of Network Erlang		68,218	169,864	18,862	80,724	143,207	1,721,954	NP	76,233	45,024	143,207	191,246	36,000	42,000	NP	393,354
	b) Total traffic in TCBH in erlang (Avg.)		17,122	96,474	3,074	68,706	67,043	1,908	NP	31,075	21,710	67,043	170,681	1,124	3,509	NP	103,595
	c) Total no. of customers served (as per VLR) on last day of the month		600,404	2,881,571	104,805	1,950,498	1,291,848	857,894	NP	1,143,081	606,442	511,587	4,381,989	39,880	119,200	NP	986,045
B	**Customer Service Quality Parameters**																
6	**Metering/billing credibility-Post paid**	<= 0.1%	0.03%	0.02%	NA	0.34%	0.03%	0.08%	0.10%	0.08%	NA	NA	0.15%	0.05%	0.12%	0.09%	0.06%
	a) No. of bills issued during the period		27,199	417,971	NA	17,443	304,022	157,761	59,502	41,431	NA	NA	1,442,450	16,885	2,465	547,778	397,963
	b) No. of bills disputed including billing complaints during the period		7	80	NA	59	81	130	59	33	NA	NA	2,115	8	3	479	226
7	**Metering /billing credibility-Pre paid**	<= 0.1%	0.03%	0.00%	0.03%	0.11%	0.02%	0.00%	0.10%	0.01%	0.18%	0.01%	0.02%	0.00%	0.01%	0.03%	0.02%
	a) No. of charging / credit / validity complaints during the quarter		397	93	129	2,424	524	62	4,061	342	2,090	169	987	0	50	920	601
	b) Total no. of pre-paid customers at the end of the quarter		1,147,052	11,235,600	406,507	2,147,079	2,856,241	1,402,265	4,061,537	2,577,626	1,176,628	1,437,765	4,555,978	75,484	763,689	3,330,514	3,046,259

	Name of Parameter	Bench mark	Aircel	Airtel	Etisalat	Idea	Loop	MTNL	Rcom	Tata	Uninor	Video con	Voda fone	MTNL	MTS	Rcom	Tata
			GSM Operators											CDMA Operators			
8	**Resolution of billing/ charging complaints**	*100% within 4 weeks*	100%	100%	100%	100%	100%	100%	100%	100 %	100%	100%	98%	100%	100%	100%	100%
	a) No. of billing/(post paid) and charging, credit/validity (pre paid) complaints resolved within 4 weeks during the quarter		404	173	129	2,483	605	192	4,120	375	2,090	169	3,102	8	53	1,399	827
	b) Total no. of billing (post paid) and charging, credit / validity (pre paid) complaints received during the quarter		404	173	129	2,483	605	192	4,120	375	2,090	169	3,102	8	53	1,399	827
	c) No. of billing complaints (post paid) and charging, credit/ validity complaints (pre paid) resolved in favour of the customer during the quarter		54	173	128	2,483	432	192	170	47	902	169	3,102	8	20	153	238
	d) No. of complaints disposed on account of not considered as valid complaints during the quarter		350	0	1	0	173	0	3,950	328	1,188	0	0	0	33	1,246	589
	e) Period of applying credit/waiver/adjustment to the customers account from the date of resolutions of complaints	*<=1 week*	100%	100%	100%	100%	100%	100%	100%	100 %	100%	100%	100%	100%	100%	100%	100%

S/N	Name of Parameter	Bench mark	Aircel	Airtel	Etisalat	Idea	Loop	MTNL	Rcom	Tata	Uninor	Video con	Voda fone	MTNL	MTS	Rcom	Tata
			GSM Operators											CDMA Operators			
9	Response time to customers for assistance																
	a) Accessibility of call centre/Customer Care	>=95%	87.41%	100%	98.95%	100%	98.82 %	96.84 %	99.29 %	99.51 %	94.25%	97.90 %	99.96 %	NP	96.84 %	99.85%	100%
	b) % call answered by operators(voice to voice) within 60 sec.	>=90%	78.77%	96.54%	99.32%	97.82%	97.88 %	94.53 %	83.84 %	99.56 %	82.19%	97.87 %	66.48 %	NP	74.96 %	91.84%	99.58 %
	c) Total no. of call attempts to call centre& customer care nos. during TCBH (Avg.).		19,429	45,767	2,649	15,980	31,131	8,952	16,792	8,397	15,733	15,710	55,881	NP	6,602	8,605	5,008
	d) No. of calls connected and answered successfully to call centre& customer care nos. during TCBH (Avg.).		15,304	44,182	2,631	15,632	30,472	8,462	14,078	8,360	12,932	15,375	37,151	NP	4,949	7,903	4,987
10	Termination/closure of service	<=7days	100%	100%	NA	100%	100%	100%	100%	NP	NA	NA	100%	100%	100%	100%	NP
	a) Total No. of requests for Termination / Closure of service received during the quarter		263	3,270	NA	1,675	1,387	875	499	NP	NA	NA	7,027	2,548	2	2,571	NP
	b) No.of requests for Termination / Closure of service complied within 7 days during the quarter		263	3,270	NA	1,675	1,387	875	499	NP	NA	NA	7,027	2,548	2	2,571	NP
11	Time taken for refunds of deposits after closures.	100% within 60 days	100%	100%	NA	100%	100%	100%	100%	NP	NA	NA	100%	100%	100%	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 0.02% and 0.7%.
➢ **Worst affected BTSs due to downtime (benchmark <= 2%):**Except Etisalat, all operators are meeting the benchmark with values lying between 0% and 1.8%.
➢ **Call setup success rate (benchmark >= 95%):** All operators are meeting the benchmark with values lying between 96.62% and 99.99%.
➢ **SDCCH/PAGING Channel congestion (benchmark <= 1%):** All operators are meeting the benchmark with values lying between 0% and 0.78%.
   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 1.72%.
➢ **Call drop rate (benchmark <= 2%):** All operators are meeting the benchmark with values lying between 0.26% and 1.7%.
➢ **Cell exceeding 3% TCH drop (benchmark <= 5%):**All the operators are satisfying the benchmark with value in between 0.09% and 2.89%.
➢ **Connections with good voice quality (benchmark >= 95%):** CDMA service providers have declared that the parameter is not system generated. GSM operators are meeting the benchmark with values lying between 96.88% and 99.68%.
➢ **POI Congestion (benchmark <= 0.5%):**Uninor& Videocon show a few high POIs with congestion greater than 0.5% Here POI congestion indicates that there were call failure greater than 0.5% on that particular POI. The calls here indicate only those calls which have been seized by the switch and processed. But cases are found where individual POIs are showing high utilization/usage which are managed by overflow technique i.e. extra traffic is carried over by some other operating POI as has been designed to do so.
➢ *%***age of call answered by operator (electronically) (benchmark >95%):** Except for Aircel &Uninor, all the operators are meeting the benchmark with values lying between 96.84% and 100%.
➢ *%***age of call answered by operator (Voice to voice) (benchmark >90%):**Aircel, Rcom GSM, Uninor, Vodafone & MTSare not meeting the benchmark value.
➢ **Metering and billing credibility-Post paid (benchmark <= 0.1%):** Except for Idea, Vodafone &MTS, all other operators are meeting the benchmark.
➢ **Metering and billing credibility-Pre paid (benchmark <= 0.1%):** Except for Idea &Uninor, all the operators are meeting the benchmark.
➢ **Resolution of billing/ charging complaints (benchmark 100% within 4 weeks):**Only Vodafone is showing a little deviation.
➢ **Termination/Closure of service (Benchmark <= 7 days):** All operatorshave satisfied the benchmark.
➢ **Time taken for refunds of deposits after closures (benchmark 100% within <=60 days):** All operatorshave satisfied the benchmark.
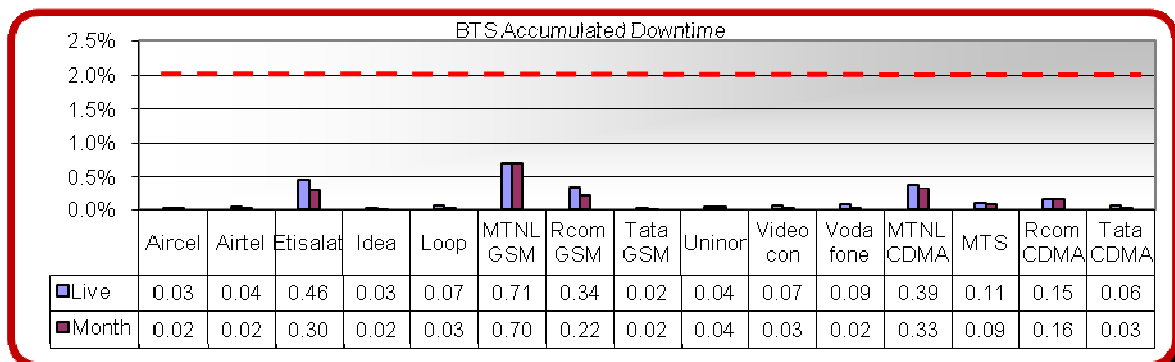
**(3) Sample Coverage**

Switches/BSC/BTS details of operators:

Sl.	Name of Service Provider	No. of MSC	No. of BSC	No. of BTS
	GSM Operators			
1	Aircel Ltd	2	21	2075
2	Airtel Ltd	9	64	3149
3	MTNL GSM	5	38	939
4	Tata Communications	3	15	2226
5	Idea	6	22	2355
6	Etsalat	1	9	834
7	Reliance Communication	2	11	2009
8	Loop	2	20	2083
9	Vodafone	17	62	3448
10	Videocon	2	11	2083
11	Uninor	2	14	1509
	CDMA Operators			
12	Tata Communications	3	6	904
13	MTS	1	2	458
14	Reliance Communication	2	11	774
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*(Videocon is on ICR with Loop Telecom)*

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	Video con	Voda fone	MTNL CDMA	MTS	Rcom CDMA	Tata CDMA
Live	0.03	0.04	0.46	0.03	0.07	0.71	0.34	0.02	0.04	0.07	0.09	0.39	0.11	0.15	0.06
Month	0.02	0.02	0.30	0.02	0.03	0.70	0.22	0.02	0.04	0.03	0.02	0.33	0.09	0.16	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.
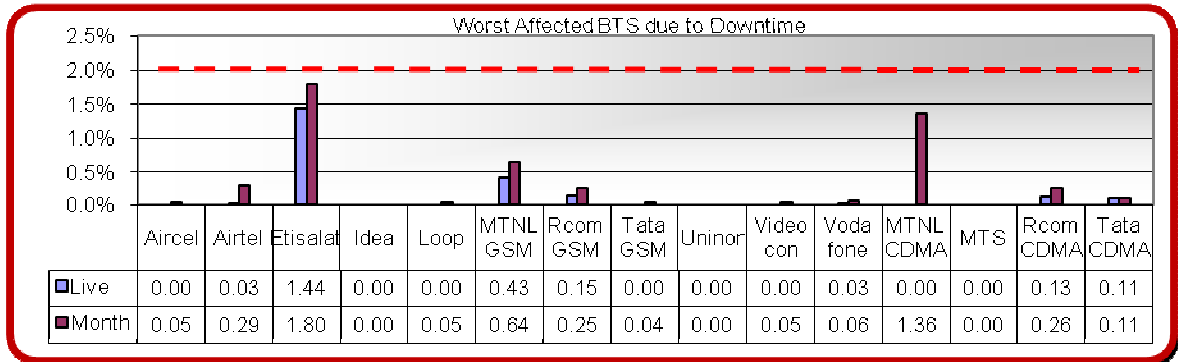
Call setup success rate: All operators are meeting the TRAI benchmarks (>= 95 %) for both one month data and 3 days live data taken in the month of audit.

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.

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	Video con	Voda fone	MTNL CDMA	MTS	Rcom CDMA	Tata CDMA
Live	0.02	0.05	0.02	0.21	0.02	1.49	0.11	0.20	0.10	0.02	0.75	0.01	0.02	0.02	0.02
Month	0.02	0.05	0.04	0.22	0.02	1.72	0.21	0.26	0.08	0.02	0.97	0.01	0.02	0.07	0.01

Connection Maintainability (Retainability):

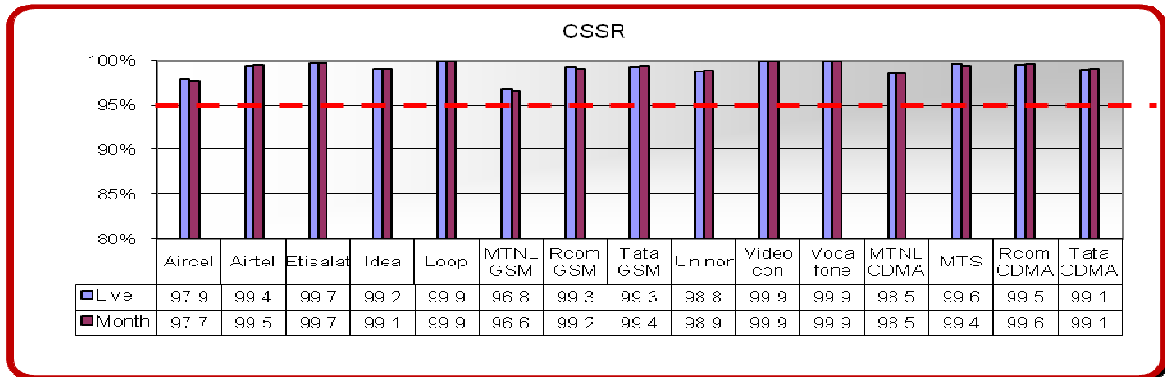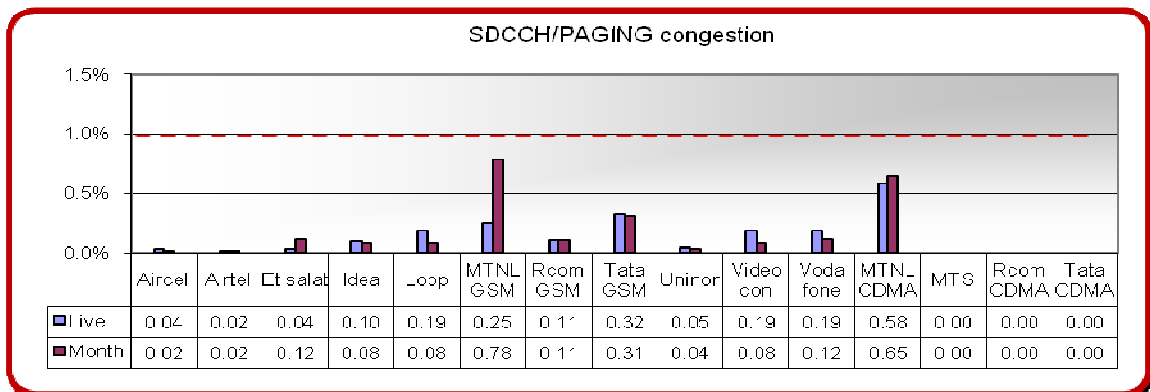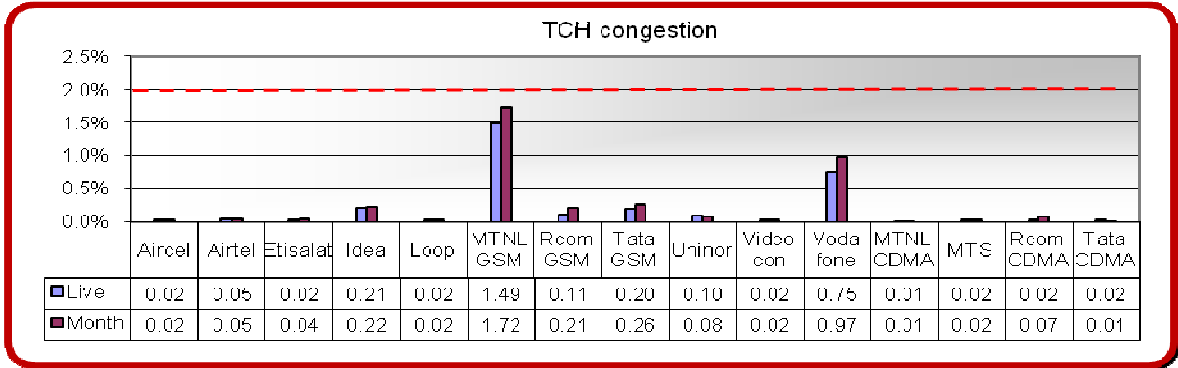**Call drop rate:** All operators are meeting the TRAI benchmarks (<=2%) for both one month data and 3 days live data taken in the month of audit.

	Aircel	Airtel	Etisalat	Idea	Loop	MTNL GSM	Rcom GSM	Tata GSM	Uninor	Video con	Voda fone	MTNL CDMA	MTS	Rcom CDMA	Tata CDMA
Live	0.87	0.64	1.35	1.19	0.58	1.45	1.13	1.02	1.78	0.58	0.86	1.46	0.26	0.28	0.67
Month	0.87	0.65	1.26	1.18	0.56	1.48	1.09	0.98	1.70	0.56	0.91	1.33	0.26	0.35	0.68

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

	Aircel	Airtel	Etisalat	Idea	Loop	MTNL GSM	Rcom GSM	Tata GSM	Uninor	Video con	Voda fone	MTNL CDMA	MTS	Rcom CDMA	Tata CDMA
Live	2.55	2.30	2.34	2.51	0.31	1.74	0.53	2.32	2.17	0.31	2.89	0.06	2.11	0.39	2.36
Month	2.59	2.08	2.50	2.53	0.40	0.86	0.51	2.34	2.21	0.40	2.89	0.09	2.18	0.39	2.40

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. CDMA operators have declared that this parameter is not system generated.
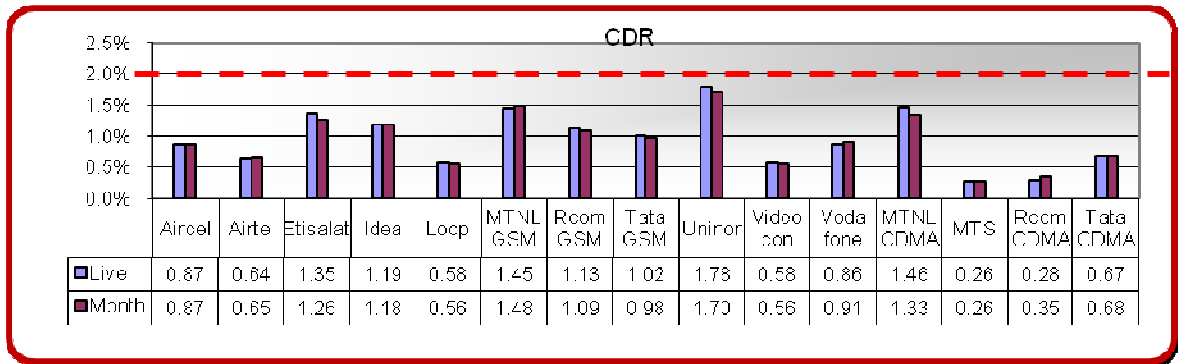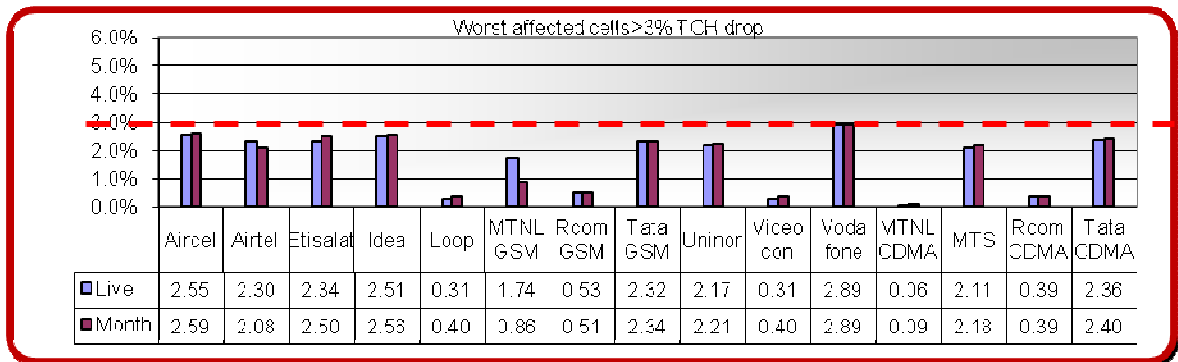

	Aircel	Airtel	Etisalat	Idea	Loop	MTNL GSM	Rcom GSM	Tata GSM	Uninor	Video con	Voda fone	MTNL CDMA	MTS	Rcom CDMA	Tata CDMA
Live	97.9	99.7	98.0	98.6	98.1	96.1	99.0	97.2	98.2	98.1	98.0	97.6			
Month	98.0	99.6	97.9	98.6	98.1	96.8	98.9	97.2	98.3	98.1	97.8	97.6			

POI Congestion: Uninor& Videocon are found to have POIs with >=0.5% congestion.

	Aircel	Airtel	Etisalat	Idea	Loop	MTNL GSM	Rcom GSM	Tata GSM	Uninor	Video con	Voda fone	MTNL CDMA	MTS	Rcom CDMA	Tata CDMA
Live	0	0	0	0	0	0	0	0	2	2	0		0	0	0
Month	0	0	0	0	0	0	0	0	4	2	0		0	0	0

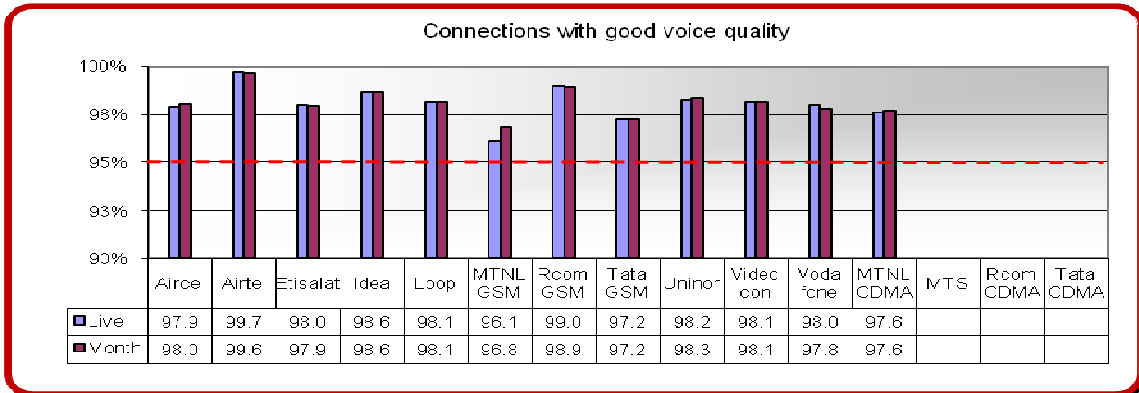B)   CUSTOMER SERVICE QUALITY PARAMETERS

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 Aircel &Uninor in both live and month data audit and MTNL CDMA in live data. MTNL CDMA has not provided month data.
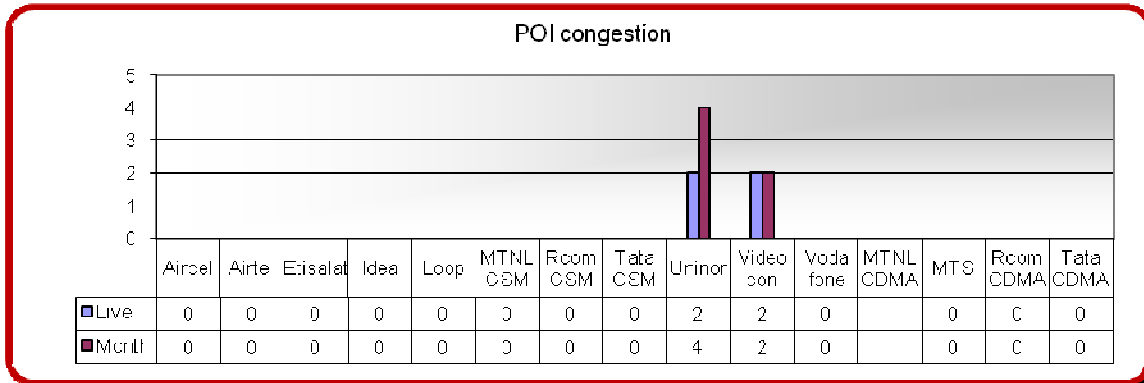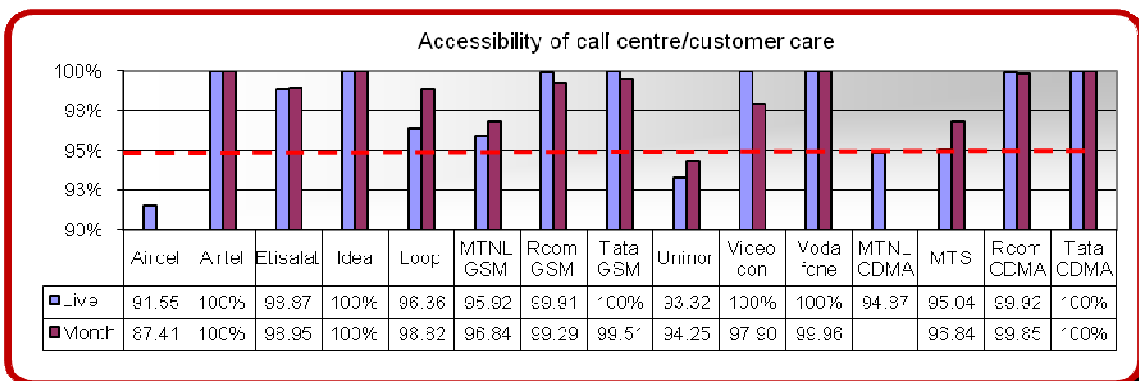

	Aircel	Airtel	Etisalat	Idea	Loop	MTNL GSM	Rcom GSM	Tata GSM	Uninor	Video con	Voda fone	MTNL CDMA	MTS	Rcom CDMA	Tata CDMA
Live	91.55	100%	98.87	100%	96.36	95.92	99.91	100%	93.32	100%	100%	94.37	95.04	99.92	100%
Month	87.41	100%	98.95	100%	98.82	96.84	99.29	99.51	94.25	97.90	99.96		96.84	99.85	100%

Percentage of call answered by operators (Voice to voice) within 60 sec: Aircel, MTS, Vodafone&Uninor do not meet the 90% benchmark against this parameter in both live &month data. Rcom GSM is not meeting in month data. MTNL CDMA has not provided month data.

	Aircel	Airte	Etisalat	Idea	Loop	MTN_ GSM	Rcom GSM	Tata GSM	Uninor	Video con	Voda fone	MTNL CDMA	MTS	Rcom CDMA	Tata CDMA
Live	83.1	96.1	99.3	95.5	93.7	95.9	90.7	98.3	86.7	96.2	72.5	100%	76.2	93.4	97.5
Month	78.7	96.5	99.3	97.8	97.8	94.5	83.8	99.5	82.1	97.8	66.4		74.9	91.8	99.5
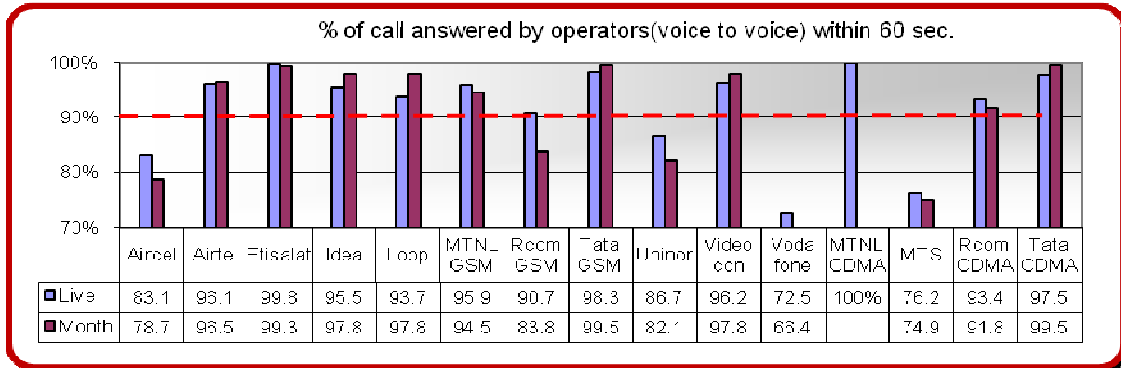
(5) Critical Analysis

The above comparative study between live data & month data shows similar trends & consistency in both the cases. Uninor& Videocon show a few POIs with high congestion. Here POI congestion refers to that call failure was greater than 0.5% on that particular POI. Aircel &Uninor have below benchmark performance for both the "Response time for assistance" parameters.

(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	MTNL GSM	Tata GSM	Idea	Etisalat	Rcom GSM	Loop	Vodafone	Videocon	Uninor	Tata CDMA	MTS	Rcom CDMA	MTNL CDMA
Call Attempts	100	100	100	100	100	100	100	100	100	100	100	100	53	100	8
Calls Answered	96	97	94	96	97	94	95	94	96	94	93	98	53	95	8
Cases resolved with 4 weeks	96	97	93	95	95	93	94	92	95	93	91	98	53	95	8
%age of cases resolved	100%	100%	99%	99%	98%	99%	99%	98%	99%	99%	98%	100%	100%	100%	100%

3) Live Calling to Call Centre

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	107	100	100	100	100	100
Calls connected to IVR	100	100	100	100	100	100	100	100	107	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	99	100	100	100	100	103	100	100	100	99	98
%age of calls got answered by agent in 60 sec.	100%	100%	100%	99%	100%	100%	100%	100%	96%	100%	100%	100%	99%	98%

4) Level-1 Live Calling

Emergency no.	No. of calls made	Aircel	Airtel	MTNL GSM	Idea	Etisalat	Rcom GSM	Loop	Vodafone	Videocon	Uninor	Tata CDMA	MTS	Rcom CDMA	MTNL CDMA
100	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
101	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
102	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
1098	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
139	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2

5) Critical Analysis

➢ Random numbers were selected from the operators' available database of billing/metering complaints and calls were made to the customers to get their feedback for complaint redressal.

➢ Majority of the calls were not successful for various reasons such as customer not reachable, number busy or switched off etc. Among the successful calls, it was found that the operators had made refunds in 100% in most of the cases as claimed by their records.

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

(C) Inter operator call assessment

(1) Sample coverage

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

(2) Performance based on live measurement

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%	85%	100%	100%	100%	100%	100%	100%	100%	100%
MTNL GSM	85%	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%	85%	-	100%	100%	100%	100%	100%	100%	100%	90%
Loop	100%	100%	100%	100%	100%	100%	100%	-	100%	100%	100%	85%	100%	95%	100%
Vodafone	100%	85%	100%	100%	85%	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%	85%	-	100%	100%	100%
MTS	100%	100%	100%	100%	100%	90%	100%	100%	100%	100%	100%	100%	-	85%	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%	90%	100%	100%	85%	100%	-

(3) Critical Analysis

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

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

1. Sample Coverage

The Operator Assisted Drive Test was conducted at Mumbai for all the operators. Route covered was about around 100-120 Km depending on city areas within the speed limit of 30-35 Km/hr.

Drive Test Locations

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

MEDIUM DENSE: CST to Turbhe via Eastern express highway

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

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

SN	Parameter	Aircel	Airtel	MTNL	Docomo	Idea	Etsalat	RTL	Loop	V-fone	Unitech	TTML	MTS	Rcom	MTNL
		GSM Operators										CDMA Operators			
1.1	Call Attempts	194	114	148	191	186	187	218	156	190	268	198	173	198	102
1.2	Blocked Call Rate (<=3%)	0.00%	2.63%	5.41%	0.00%	0.00%	1.07%	0.92%	0.64%	0.53%	0.75%	0.00%	0.00%	0.00%	1.96%
1.3	Dropped Call Rate (<=2%)	0.52%	1.80%	2.86%	0.52%	0.00%	1.08%	0.93%	0.65%	0.00%	0.00%	1.01%	0.58%	1.01%	2.00%
1.4	Percentage of connections with good voice quality (=>95%)														
	(i) 0-4 (w/o frequency hopping)											96.13%	100%	98.43%	90.45%
	(ii) 0-5 (with frequency hopping)	93.82%	96.38%	97.06%	97.91%	87.87%	96%	95.43%	95.76%	95.26%	91.12%				
1.5	Service Coverage														
	In door (>= -75dBm)	58.98%	78.98%	47.23%	99.31%	97.37%	86%	62.62%	60.66%	71.36%	88.08%	96.71%	79.27%	92.81%	50.50%
	In-vehicle (>= -85dBm)	91.40%	96.67%	85.47%	99.97%	99.93%	98%	91.18%	92.63%	93.78%	98.95%	99.84%	93.98%	99.25%	82.70%
	Out door- in city (>= -95dBm)	99.50%	99.84%	98.37%	99.99%	100%	100%	100%	100%	99.54%	100%	100%	100%	100%	99.43%
1.6	Call Setup Success Rate (>=95%)	100%	97.37%	94.59%	100%	100%	98.93%	99.08%	99.36%	99.47%	99.25%	100%	100%	100%	98.04%

Graphical Representation

Coverage level Mumbai	Aircel	Airtel	MTNL GSM	Doco mo	Idea	Etisa lat	RTL	Loop	Voda fone	Uni tech	TTML	MTS	Rcom CDMA	MTNL CDMA
Indoor (>= -75 dBm)	58.98%	78.98%	47.23%	99.31%	97.37%	86%	62.62%	60.66%	71.36%	88.08%	96.71%	79.27%	92.81%	50.50%
In-vehicle (>= -85 dBm)	91.40%	96.67%	85.47%	99.97%	99.93%	98%	91.18%	92.63%	93.78%	98.95%	99.84%	93.98%	99.25%	82.70%
Outdoor-in city (>= -95 dBm)	99.50%	99.84%	98.37%	99.99%	100%	100%	100%	100%	99.54%	100%	100%	100%	100%	99.43%
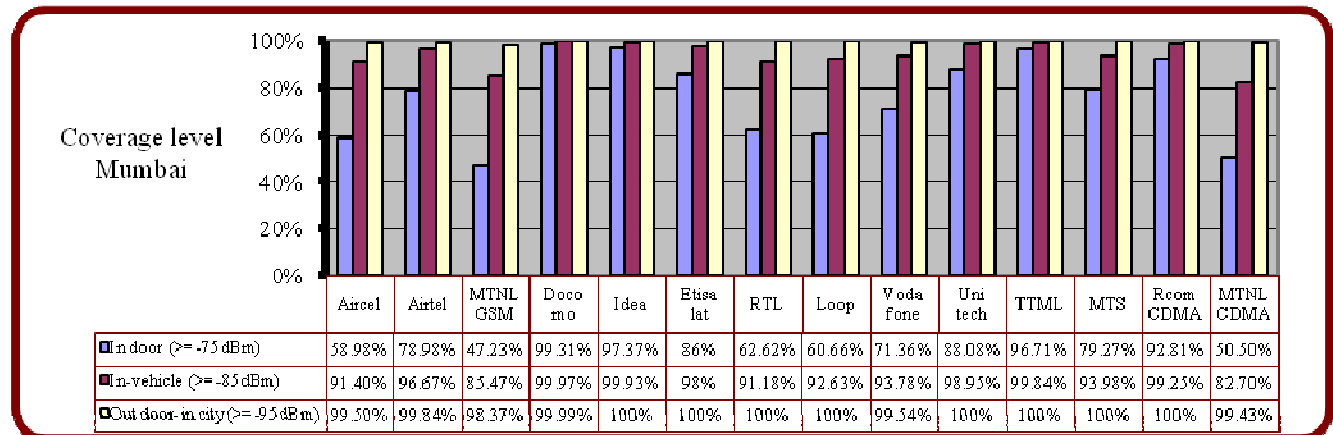
(3) Critical Analysis

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' & 'Dropped Call Rate' benchmarks are 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.
- CSSR is not met by MTNL GSM by a slight margin.
- For MTNL CDMA, some call drops were observed in Kalwa-Airoli as site was not operational during drive test.

(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, Aircel &Uninor missing the 95% benchmark for the parameter "Accessibility of call centre/Customer Care" and Aircel, Rcom GSM, Uninor, Vodafone & MTS missing the 90% benchmark for "%age of calls answered by operator". Slight deviation was found again in case of Vodafone for not resolving 100% complaints within 4 weeks.

➢ Idea, Vodafone, MTS &Uninor have low Billing/Metering Credibility for Post/Pre-Paid connections.

➢ During **Drive Tests**, the performance of MTNL GSM was found to be below benchmark for all the KPIs except for "%age of good voice quality connections". However, Aircel, Idea, Uninor& MTNL CDMA didn't fare well in this KPI.

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

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