

REPORT
ON
AUDIT & ASSESSMENT OF QUALITY OF SERVICE
OF
CELLULAR MOBILE TELEPHONE SERVICES
FOR
WEST ZONE
MAHARASHTRA -GOA CIRCLE

Report Period: October 2011 – December 2011

Telecommunications Consultants India Ltd.
TCIL Bhawan, Greater Kailash Part – I
New Delhi – 110048
Phone: +91-11-26202020 Fax: +91-1126242266
Internet: <http://www.tcil-india.com>

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- Not conducted for this quarter
- III. Broadband Service Providers
- Not conducted for this quarter

CHAPTER-1: INTRODUCTION

I. Background

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

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

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

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

- i) Create conditions for consumer satisfaction by making known the quality of service, which the service provider is required to provide, and the user has a right to expect.
- ii) Measure the Quality of Service provided by the Service Providers from time to time and to compare them with the norms so as to assess the level of performance.
- iii) Generally protect the interests of consumers of telecommunication services.

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

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

II. Objectives and Methodology

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

- i) Verification of the data submitted by the service providers to TRAI as part of QoS monitoring reports i.e. Quarterly Performance Monitoring Reports (PMRs) and monthly Point of Interconnection (POI) Congestion Reports with reference to the records maintained by the service provider.
- ii) Verification of the performance of service providers against the Quality of Service benchmarks laid down by TRAI using live measurement for 3 days during the month in which the audit and assessment is carried out.
- iii) Verification of the performance of service providers against the Quality of Service benchmarks laid down by TRAI using the data for the entire month during which the live measurement is carried out.
- iv) Drive tests of the mobile networks both operators assisted and independent drive test (as and where required).
- v) Billing and call center's data verification.
- vi) Live testing of the efficiency of the call center / customer care help line.
- vii) Emergency Level-1 live calling

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

Systems audited:-

1. Network Switching Centre (NSS)
2. Base Station Subsystem (BSS)
3. Billing Applications
4. Customer Care applications

Facilities audited:-

1. Billing documents.
2. Customer Care records.

Field data collections carried out:-

1. RF network coverage including KPIs (Key Performance Index)
2. Inter Operator Call Assessment
3. Checking of Customer Billing/Refund Complaints (Random sample)
4. Customer Care efficiency
5. The live calling was made to assess the quality of services for Inter Operator Call Assessment, Customer Billing/Refund Complaints and Customer Care efficiency.

In order to carry out the above scope of work:-

- ✓ TCIL auditors visited all the NSS (Network Sub System) and BSS (Base-station Sub System) to check data for all the operators in their respective service area.
- ✓ All the NSS and BSS data for the relevant details were collected either directly from the centralized NOC or through a remote access to the NOC.
- ✓ The Radio parameters were audited/verified from the data collected from OMC-R (Operation and Maintenance Center – Radio, as part of BSS data).
- ✓ The Drive test was conducted in high, low and medium dense areas including highways, commercial complex and residential areas and special attention was paid for the areas for which TRAI has received complaints.
- ✓ The POI and other network related parameters were audited/verified from the data collected from the OMC-S (Operation and Maintenance Center – Switch as part of NSS data).
- ✓ The data related to Billing and Customer care was checked for the previous month and verified with the customers by calling them on random basis. The process of registration and handling of the complaints was also studied for the various operators. Call centre number were called for measuring the efficiency of the call centre.
- ✓ The inter operator call assessment test was carried out during the time period as is specified in the tender document. TCBH (Time Consistent Busy Hour) is taken after observation of the traffic consistently for 3 days prior to the audit activity.
- ✓ Data has been collected for busy hour of network in case of live assessment & month of audit for all service providers & verified that service providers are providing busy hour data only for QoS service. We found that TCBH hour is matching with network busy hour as provided by service providers for Maharashtra-Goa circle. But for parameters such as 'Worst affected cell exceeding 3% TCH drop' and 'BTSs accumulated down time' CBBH (Cell Bouncing Busy Hour) was taken instead of TCBH (Time Consistent Busy Hours) as per the TRAI new regulation 2009.

CHAPTER-2: EXECUTIVE SUMMARY

I. Preface

This report highlights the findings for the audit & assessment of Quality of Service of Cellular Mobile Services in Maharashtra-Goa Circle in 4th 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 Maharashtra-Goa circle (West Zone) for Cellular Mobile (Wireless) services QoS audit & assessment. The Month of audit & TCBH information is also given below.

Sl.	Name of Service Provider	Month of Audit	TCBH Hour
GSM Operators			
1	Aircel Ltd	Nov-2011	1900-2000 Hrs
2	Airtel Ltd	Nov-2011	2000-2100 Hrs
3	BSNL	Nov-2011	2100-2200 Hrs
4	Etisalat	Nov-2011	1900-2000 Hrs
5	Idea	Nov-2011	2000-2100 Hrs
6	Reliance Communications	Nov-2011	1900-2000 Hrs
7	Tata Communications	Nov-2011	1900-2000 Hrs
8	Uninor	Nov-2011	1900-2000 Hrs
9	Videocon	Nov-2011	1900-2000 Hrs
10	Vodafone	Nov-2011	1900-2000 Hrs
CDMA Operators			
11	MTS	Nov-2011	2000-2100 Hrs
12	Reliance Communications	Nov-2011	1900-2000 Hrs
13	Tata Communications	Nov-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	BSNL	Etisalat	Idea	Rcom GSM	Tata GSM	Uninor	Video con	Voda fone	MTS	Rcom CDMA	Tata CDMA
S/N	Name of Parameter														
1	Network Availability														
	a) BTS Accumulated Downtime	<=2%	0.05%	0.07%	1.46%	1.61%	0.58%	0.60%	0.05%	0.19%	0.86%	0.21%	0.23%	0.02%	0.05%
	b) Worst affected BTSs due to downtime	<=2%	0.00%	0.00%	0.74%	0.00%	0.53%	0.03%	0.00%	0.52%	0.00%	0.31%	0.00%	0.00%	0.00%
2	Connection Establishment (Accessibility)														
	a) CSSR (Call Setup Success Rate)	>=95%	99.76%	99.20%	98.04%	97.70%	97.59%	99.48%	99.13%	96.88%	99.34%	98.26%	99.26%	98.17%	98.39%
	b) SDCCH/PAGING congestion	<=1%	0.02%	0.02%	0.72%	0.06%	0.52%	0.03%	0.23%	0.44%	0.04%	0.68%	0.00%	0.00%	0.00%
	c) TCH congestion	<=2%	0.02%	0.01%	1.80%	1.97%	1.64%	0.06%	0.42%	0.25%	0.00%	0.78%	0.07%	0.07%	0.07%
3	Connection maintenance (retainability)														
	a) CDR	<=2%	0.62%	0.82%	1.90%	1.51%	1.68%	0.56%	0.88%	1.39%	0.75%	1.01%	0.34%	0.72%	1.22%
	b) Worst affected cells>3% TCH drop	<=3%	6.50%	1.41%	4.84%	2.32%	2.73%	0.09%	2.75%	1.82%	0.00%	2.72%	2.89%	0.21%	2.55%
	c) Good voice quality	>=95%	98.27%	99.30%	98.39%	98.15%	97.56%	98.81%	96.88%	96.51%	98.71%	97.58%	NA	98.21%	NA
4	No of POI having >=0.5% congestion	<0.5%	0	0	1	0	0	0	0	1	0	0	0	0	0
5	Response time to customers for assistance														
	a) Accessibility of call centre/Customer Care	>=95%	96.97%	100%	100%	100%	99.18%	98.76%	99.04%	100%	100%	99.93%	96.42%	99.64%	98.85%
	b) % call answered by operators(voice to voice) within 60 sec.	>=90%	92.57%	93.23%	97.99%	95.54%	95.02%	68.86%	95.99%	99.32%	100%	91.53%	90.54%	94.24%	94.31%

NA: Not Applicable, NP: Data Not Provided

From the 3 days live data assessment, it is found that all the operators are meeting the network parameters except for Aircel & BSNL not meeting "worst affected cells >3% TCH drop". BSNL & Uninor have one POI each showing more than 0.5% congestion. Tata CDMA & MTS have 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 Rcom GSM having a very low "%age of calls answered by operator within 60 sec".

One Month Data Audit		Bench- mark	Aircel	Airtel	BSNL	Etisalat	Idea	Rcom GSM	Tata GSM	Uninor	Video con	Voda fone	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%	0.18%	0.07%	1.45%	1.71%	0.44%	0.36%	0.02%	0.16%	1.39%	0.23%	0.17%	0.30%	0.04%
	b) Worst affected BTSs due to downtime	<=2%	0.09%	0.03%	1.86%	4.17%	1.66%	1.47%	0.03%	0.63%	0.00%	1.12%	0.00%	0.73%	0.00%
2	Connection Establishment (Accessibility)														
	a) CSSR (Call Setup Success Rate)	>=95%	99.80%	98.99%	97.98%	99.64%	97.93%	99.49%	98.85%	96.91%	99.46%	98.23%	99.27%	98.40%	98.14%
	b) SDCCH/PAGING congestion	<=1%	0.01%	0.02%	0.78%	1.60%	0.67%	0.05%	0.24%	0.44%	0.05%	0.70%	0.00%	0.00%	0.00%
	c) TCH congestion	<=2%	0.02%	0.06%	1.85%	0.20%	1.36%	0.07%	0.40%	0.23%	0.00%	0.85%	0.09%	0.13%	0.10%
3	Connection maintenance (retainability)														
	a) CDR	<=2%	0.57%	0.72%	1.89%	1.24%	1.67%	0.57%	0.94%	1.40%	0.31%	0.96%	0.31%	0.74%	1.24%
	b) Worst affected cells>3% TCH drop	<=3%	6.26%	1.40%	4.77%	1.90%	2.87%	0.10%	2.82%	1.95%	0.00%	2.72%	2.64%	0.21%	2.62%
	c) Good voice quality	>=95%	98.28%	99.13%	98.10%	98.22%	97.60%	98.80%	96.94%	96.57%	99.11%	97.38%	NA	98.22%	NA
4	No of POI having >=0.5% congestion	<0.5%	0	0	6	0	0	0	0	9	0	0	0	0	0
(B)	Customer Service Quality Parameters														
5	Metering/billing credibility-Post paid	<= 0.1%	0.06%	0.03%	NP	NA	0.07%	0.07%	0.00%	NA	NA	0.12%	0.05%	0.05%	0.00%
6	Metering /billing credibility-Pre paid	<= 0.1%	0.05%	0.00%	NP	0.00%	0.07%	0.07%	0.00%	0.12%	0.00%	0.01%	0.00%	0.05%	0.00%
7	Resolution of billing/ charging complaints	100% within 4 weeks	100%	100%	100%	NA	99.98%	100%	100%	100%	NA	100%	100.00%	100%	100%
	a) Period of applying credit/waiver/adjustment to the customers account from the date of resolutions of complaints	<=1 week	100%	100%	100%	NA	100%	100%	100%	100%	NA	100%	100.00%	100%	100%
8	Response time to customers for assistance														
	a) Accessibility of call centre/Customer Care	>=95%	97.62%	100%	100%	98.92%	99.15%	98.84%	99.17%	100%	100%	99.95%	74.95%	99.55%	98.97%
	b) % call answered by operators(voice to voice) within 60 sec.	>=90%	95.42%	95.41%	99.11%	99.83%	94.53%	80.28%	95.97%	98.30%	100%	92.98%	95.00%	80.35%	94.71%
9	Termination/closure of service	<=7days	98.85%	100%	NP	NA	100%	100%	100%	NA	NA	100%	50%	100%	100%
10	Time taken for refunds of deposits after closures.	100% within 60 days	NA	100%	NP	NA	100%	100%	100%	NA	NA	100%	NA	100%	99.37%

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. Deviations are found in a few cases such as Etisalat having a high %age of 'worst affected BTSs due to downtime' and Aircel & BSNL having high %age of 'Worst affected cells>3% TCH drop'. BSNL & Uninor have POIs showing more than 0.5% congestion.

Performance related to customer service data is also found to be satisfactory for most of the operators. Rcom GSM & CDMA have low "%age of calls answered by operator within 60 sec". Deviation was found in case of Aircel & MTS for taking >7 days for "termination/closure of service", Idea for taking more than 4 weeks for "resolution of billing/charging complaints" and Tata CDMA for taking more than 1 week for "adjustment of credit/waiver".

Idea & Vodafone have low Billing/Metering Credibility for Post-paid & Pre-Paid connections respectively.

Operator-Assisted Drive Test

The Operator Assisted Drive Test was conducted in Maharashtra-Goa circle for all the operators. The speed limit of 30-35Km/hr was maintained throughout the Drive Test. Zones were selected for covering different density areas (High, Medium & Low dense areas).

SN	Parameter	City Name	Aircel	Airtel	BSNL	Idea	Rcom GSM	Tata GSM	Uninor	Voda fone	MTS	Rcom CDMA	Tata CDMA
			GSM Operators						CDMA Operators				
1.1	Blocked Call Rate (<=3%)	Pune	0.00%	0.00%	1.43%	1.43%	1.26%	0.00%	2.96%	0.59%	0.68%	0.74%	0.00%
		Ahmednagar	0.00%	0.00%	1.64%	0.97%	0.00%	0.00%	0.84%	0.00%	0.00%	1.05%	0.00%
		Panjim	0.00%	0.00%	3.03%	6.59%	1.39%	0.00%	1.54%	6.17%	0.00%	1.39%	0.00%
1.2	Dropped Call Rate (<=2%)	Pune	0.63%	0.00%	1.45%	0.75%	1.27%	0.71%	0.78%	0.60%	0.68%	0.75%	0.00%
		Ahmednagar	0.00%	0.00%	0.83%	0.00%	0.00%	1.49%	0.85%	0.00%	0.90%	0.00%	0.00%
		Panjim	0.00%	0.00%	1.56%	1.27%	0.00%	1.27%	0.00%	5.63%	1.43%	0.00%	1.27%
1.3	Percentage of connections with good voice quality (>=95%)												
	(i) 0-4 (w/o frequency hopping)	Pune									96.55%	99.00%	97.34%
		Ahmednagar									99.78%	100%	98.47%
		Panjim									99.69%	99.00%	95.22%
	(ii) 0-5 (with frequency hopping)	Pune	96.63%	96.90%	95.60%	91.70%	94.00%	95.67%	96.60%	95.30%			
		Ahmednagar	96.95%	98.20%	79.20%	93.10%	96.00%	95.05%	97.00%	96.20%			
Panjim		97.43%	97.80%	97.20%	95.80%	96.00%	95.21%	98.40%	91.00%				
1.4	Call Setup Success Rate (>=95%)	Pune	100%	100%	98.57%	98.57%	98.74%	100%	97.04%	99.41%	99.32%	99.26%	100%
		Ahmednagar	100%	100%	98.36%	99.03%	100%	100%	99.16%	100%	100%	98.95%	100%
		Panjim	100%	100%	96.97%	93.41%	98.61%	100%	98.46%	93.83%	100%	98.61%	100%

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

- 'Blocked Call Rate' benchmark is not met by BSNL, Idea & Vodafone in Panjim.
- 'Dropped Call Rate' benchmark is not met by Vodafone in Panjim.
- Below benchmark performance for the parameter '%age of connections with good voice quality' is found in case of Idea & Rcom GSM in Pune, BSNL & Idea in Ahmednagar and Vodafone in Panjim.
- Idea and Vodafone have low CSSR in Panjim.

Independent Drive Test

The Independent Drive Test was conducted in Maharashtra-Goa circle for the operators given by TRAI except for Aircel (Jalgaon) and MTS (Mahabaleshwar) since these two operators are in ICR with Tata in the respective cities.

SN	Parameter	UNINOR	IDEA	BSNL	BSNL
		Mahabaleshwar	Sangli	Sangli	Nanded
1.1	Blocked Call Rate (<=3%)	0.00%	0.00%	1.80%	1.55%
1.2	Dropped Call Rate (<=2%)	0.00%	0.00%	0.00%	0.82%
1.3	Percentage of connections with good voice quality (=>95%)				
	0-5 (with frequency hopping)	99.70%	94.80%	92.60%	90.90%
1.4	Call Setup Success Rate (>=95%)	100%	100%	98.20%	98.45%

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

- A below benchmark performance was observed in case of Idea in Sangli and BSNL in both Sangli & Nanded for '%age of connections with good voice quality'.

CHAPTER-3: AUDIT-PMR VERIFICATION RESULTS

I. Cellular Mobile Telephone Service

PMR		Bench- mark	Audit	Aircel	Airtel	BSNL	Etisalat	Idea	Rcom GSM	Tata GSM	Uninor	Video con	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%	0.12%	0.99%	0.37%	0.37%	0.00%	0.03%	0.15%	0.86%	0.19%	0.03%	0.00%	0.03%
			Verified	0.07%	0.12%	0.99%	0.37%	0.37%	0.00%	0.03%	0.15%	0.86%	0.19%	0.03%	0.00%	0.03%
	Worst affected BTSs due to downtime	<=2%	Reported	0.08%	0.30%	1.54%	0.05%	1.75%	0.01%	0.02%	0.67%	0.00%	0.64%	0.00%	0.00%	0.03%
Verified			0.08%	0.30%	1.54%	0.05%	1.75%	0.01%	0.02%	0.67%	0.00%	0.64%	0.00%	0.00%	0.03%	
2	Connection Establishment (Accessibility)															
	CSSR (Call Setup Success Rate)	>=95%	Reported	100%	99%	0%	99%	98%	100%	99%	98%	97%	98%	99%	100%	98%
			Verified	100%	99%	NP	99%	98%	100%	99%	98%	97%	98%	99%	100%	98%
	SDCCH/PAGING congestion	<=1%	Reported	0.02%	0.12%	0.82%	0.33%	0.78%	0.00%	0.16%	0.02%	0.46%	0.01%	0.00%	0.00%	0.00%
			Verified	0.02%	0.12%	0.82%	0.33%	0.78%	0.00%	0.16%	0.02%	0.46%	0.01%	0.00%	0.00%	0.00%
	TCH congestion	<=2%	Reported	0.02%	0.20%	1.77%	0.01%	1.53%	0.00%	0.20%	0.10%	0.77%	0.01%	0.00%	0.00%	0.20%
Verified			0.02%	0.20%	1.77%	0.01%	1.53%	0.00%	0.20%	0.10%	0.77%	0.01%	0.00%	0.00%	0.20%	
3	Connection maintenance (retainability)															
	CDR	<=2%	Reported	0.45%	0.99%	1.75%	0.54%	1.16%	0.00%	0.94%	1.37%	0.53%	0.01%	0.25%	0.00%	0.99%
			Verified	0.45%	0.99%	1.75%	0.54%	1.16%	0.00%	0.94%	1.37%	0.53%	0.01%	0.25%	0.00%	0.99%
	Worst affected cells>3% TCH drop	<=3%	Reported	0.03%	0.02%	4.83%	5.94%	2.83%	0.00%	2.47%	4.36%	0.00%	0.03%	1.71%	0.00%	2.52%
			Verified	0.03%	0.02%	4.83%	5.94%	2.83%	0.00%	2.47%	4.36%	0.00%	0.03%	1.71%	0.00%	2.52%
	Good voice quality	>=95%	Reported	98%	99%	98%	98%	97%	98%	97%	97%	99%	97%	100%	99%	96%
Verified			98%	99%	98%	98%	97%	98%	97%	97%	99%	97%	100%	99%	96%	
4	POI congestion	<=0.5%	Reported	0	0	0	0	0	0	0	0.67	0	0	0	0	0
			Verified	0	0	0	0	0	0	0	0	0.67	0	0	0	0

PMR		Bench- mark	Audit	Aircel	Airtel	BSNL	Etisalat	Idea	Rcom GSM	Tata GSM	Uninor	Video con	Voda fone	MTS	Rcom CDMA	Tata CDMA
S/N	Name of Parameter			GSM Operators										CDMA Operators		
(B)	Customer Service Quality Parameters															
5	Metering/billing credibility-Post paid	<= 0.1%	Reported	0.04%	0.00%	0.01%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.09%	0.00%	0.00%
			Verified	0.04%	0.00%	0.01%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.09%	0.00%
6	Metering /billing credibility-Pre paid	<= 0.1%	Reported	0.01%	0.00%	0.04%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.10%	0.00%	0.00%
			Verified	0.01%	0.00%	0.04%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.10%	0.00%	0.00%
7	Resolution of billing/ charging complaints	100% within 4 weeks	Reported	100%	100%	100%	0%	100%	100%	100%	0%	100%	100%	100%	100%	100%
			Verified	100%	100%	100%	NA	100%	100%	100%	NA	100%	100%	100%	100%	100%
	Period of applying credit/waiver/adjustment to the customers account from the date of resolutions of complaints	<=1 week	Reported	100%	100%	100%	0%	100%	100%	100%	0%	100%	100%	100%	100%	100%
			Verified	100%	100%	100%	NA	100%	100%	100%	NA	100%	100%	100%	100%	100%
8	Response time to customers for assistance	>=95%	Reported	100%	99%	100%	1%	99%	43%	99%	98%	97%	100%	97%	100%	78%
			Verified	100%	99%	100%	NP	99%	43%	99%	98%	97%	100%	97%	100%	78%
	% call answered by operators(voice to voice) within 60 sec.	>=90%	Reported	94%	91%	89%	1%	92%	90%	93%	93%	95%	91%	97%	94%	77%
			Verified	94%	91%	89%	NP	92%	90%	93%	93%	95%	91%	97%	94%	77%
9	Termination/closure of service	<=7days	Reported	100%	100%	100%	0.00%	100%	100%	100%	0.00%	0.00%	100%	100%	100%	100%
			Verified	100%	100%	100%	NA	100%	100%	100%	NA	NA	100%	100%	100%	100%
10	Time taken for refunds of deposits after closures.	100% within 60 days	Reported	100%	100%	100%	0.00%	100%	100%	99%	0.00%	0.00%	100%	NA	100%	100%
			Verified	100%	100%	100%	NA	100%	100%	99%	NA	NA	100%	NA	100%	100%

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	BSNL	Etisalat	Idea	Rcom GSM	Tata GSM	Uninor	Video con	Voda fone	MTS	Rcom CDMA	Tata CDMA
			GSM Operators										CDMA Operators		
A	Network Service Quality Parameter														
1	Network Availability														
	a) BTS Accumulated Downtime	<=2%	0.05%	0.07%	1.46%	1.61%	0.58%	0.60%	0.05%	0.19%	0.86%	0.21%	0.23%	0.02%	0.05%
	b) Worst affected BTSs due to downtime	<=2%	0.00%	0.00%	0.74%	0.00%	0.53%	0.03%	0.00%	0.52%	0.00%	0.31%	0.00%	0.00%	0.00%
	c) Total no. of BTSs in the licensed service area		2192	8810	6657	24	8485	3612	3849	2861	21	7848	623	2198	2321
	d) Sum of downtime of BTSs in a month in hours i.e. total outage time of all BTSs in hours during a month		81	467.86	7008	27.8	3549.32	1564	128.45	397.85	13.03	1194.51	101.55	371	88.72
	e) No. of BTSs having accumulated downtime of >24 hours in a month		0	0	49	0	45	1	0	15	0	24	0	0	0
2	Connection Establishment (Accessibility)														
	a) CSSR	>=95%	99.76%	99.20%	98.04%	97.70%	97.59%	99.48%	99.13%	96.88%	99.34%	98.26%	99.26%	98.17%	98.39%
	b) SDCCH/PAGING congestion	<=1%	0.02%	0.02%	0.72%	0.06%	0.52%	0.03%	0.23%	0.44%	0.04%	0.68%	0.00%	0.00%	0.00%
	c) TCH congestion	<=2%	0.02%	0.01%	1.80%	1.97%	1.64%	0.06%	0.42%	0.25%	0.00%	0.78%	0.07%	0.07%	0.07%
3	Connection maintenance														
	a) CDR	<=2%	0.62%	0.82%	1.90%	1.51%	1.68%	0.56%	0.88%	1.39%	0.75%	1.01%	0.34%	0.72%	1.22%
	b) Cells having > 3% TCH drop	<=3%	6.50%	1.41%	4.84%	2.32%	2.73%	0.09%	2.75%	1.82%	0.00%	2.72%	2.89%	0.21%	2.55%
	c) Good voice quality	>=95%	98.27%	99.30%	98.39%	98.15%	97.56%	98.81%	96.88%	96.51%	98.71%	97.58%	NA	98.21%	NA
	d) No. of cells > 3% TCH drop		426	368	971	2	686	10	318	152	0	640	54	4	185
S/N	Name of Parameter	Bench-	Aircel	Airtel	BSNL	Etisalat	Idea	Rcom	Tata	Uninor	Video	Voda	MTS	Rcom	Tata

	mark	GSM Operators										CDMA Operators			
	e) Total no. of cells in the network		6,551	26,085	20,054	72	25,106	10,836	11,544	8,371	63	23,520	1,882	6,594	7,258
4	No of POI having >=0.5% congestion	<0.5%	0	0	1	0	0	0	0	1	0	0	0	0	0
	a) Name of POI not meeting the benchmark		Nil	Nil	Vodafone 9787	Nil	Nil	Nil	Nil	Cellone (I/O) Pune	Nil	Nil	Nil	Nil	Nil
	b) Total No. of call attempts on POI (Avg.)		238,552	5,012,746	1,853,668	5,998	13,128,461	1,068,371	752,065	1,782,123	74	63,057,803	288,299	597,836	1,629,703
	c) Total traffic served on POI (Erlang) (Avg.)		5,469	109,259	53,818	184	200,871	28,644	20,821	42,199	101	81,074	6,233	17,914	37,238
	d) Total No. of circuits on POI		14,092	174,915	83,767	991	383,221	71,516	47,526	61,714	379	126,195	22,030	39,721	97,274
	e) Total number of working POI Service Area wise		73	369	47	16	399	155	208	100	12	229	66	101	425
	f) Equipped Capacity of Network in respect of Traffic in erlang		65,744	357,198	248,859	533	410,096	144,000	161,125	96,630	15,000	313,670	28,560	290,000	724,996
	g) Total traffic handled in TCBH in erlang		11,781	239,614	107,958	55	324,266	NP	83,222	77,019	3	279,085	8,603	NP	134,093
(B)	Customer Service Quality Parameter														
5	Response time to customers for assistance														
	a) Accessibility of call centre	>=95%	96.97%	100%	100%	100%	99.18%	98.76%	99.04%	100%	100%	99.93%	96.42%	99.64%	98.85%
	b) % of call answered by operators(voice to voice) within 60 sec	>=90%	92.57%	93.23%	97.99%	95.54%	95.02%	68.86%	95.99%	99.32%	100%	91.53%	90.54%	94.24%	94.31%
	c) No. of call attempts to call centre / customer care nos. during TCBH (Avg)		13,854	121,836	82,851	75	193,298	29,206	43,561	34,959	4	112,764	5,834	8,321	19,537
	d) No. of calls connected and answered successfully to call centre / customer care nos. during TCBH (Avg)		12,824	113,584	81,188	71	183,668	20,110	41,815	34,723	4	103,213	5,282	7,842	18,426

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 Maharashtra-Goa Service Area are as given below:-

- **BTS accumulated downtime (benchmark $\leq 2\%$):** All operators are meeting the benchmark with values lying between 0.0% and 1.61%.
- **Worst affected BTSs due to downtime (benchmark $\leq 2\%$):** All operators are meeting the benchmark with values lying between 0% and 0.74%.
- **Call setup success rate (benchmark $\geq 95\%$):** All operators are meeting the benchmark with values lying between 96.88% and 99.76%.
- **SDCCH/PAGING Channel congestion (benchmark $\leq 1\%$):** All operators are meeting the benchmark with values lying between 0% and 0.72%.
Note: CDMA operators have provided the data for Paging Channel congestion and GSM operators provided SDCCH Channel congestion.
- **TCH congestion (benchmark $\leq 2\%$):** All operators are meeting the benchmark with values lying between 0% and 1.97%.
- **Call drop rate (benchmark $\leq 2\%$):** All operators are meeting the benchmark with values lying between 0.34% and 1.90%.
- **Cell exceeding 3% TCH drop (benchmark $\leq 3\%$):** Except for Aircel & BSNL, all the operators are satisfying the benchmark with value in between 0% and 2.89%.
- **Connections with good voice quality (benchmark $\geq 95\%$):** Tata CDMA & MTS have declared that the parameter is not system generated. Other operators are meeting the benchmark with values lying between 96.51% and 99.3%.
- **POI Congestion (benchmark $\leq 0.5\%$):** BSNL & Uninor show one POI each 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 $>95\%$):** All the operators are meeting the benchmark with values lying between 96.42% to 100%.
- **%age of call answered by operator (Voice to voice) (benchmark $>90\%$):** All operators, except Rcom GSM, are meeting the benchmark value of 90%.

(2) One Month Data Assessment & Summarized Findings

S/ N	Name of Parameter	Bench- mark	Aircel	Airtel	BSNL	Etisala t	Idea	Rcom GSM	Tata GSM	Uninor	Video con	Voda fone	MTS	Rcom CDMA	Tata CDMA
			GSM Operators										CDMA Operators		
A	Network Service Quality Parameter														
1	Network Availability														
	a) BTS Accumulated Downtime	<=2%	0.18%	0.07%	1.45%	1.71%	0.44%	0.36%	0.02%	0.16%	1.39%	0.23%	0.17%	0.30%	0.04%
	b) Worst affected BTSs due to downtime	<=2%	0.09%	0.03%	1.86%	4.17%	1.66%	1.47%	0.03%	0.63%	0.00%	1.12%	0.00%	0.73%	0.00%
	c) Total no. of BTSs in the licensed service area		2,192	8,810	6,657	24	8,485	3,612	3,849	2,861	21	7,848	623	2,198	2,321
	d) Sum of downtime of BTSs in a month in hours i.e. total outage time of all BTSs in hours during a month		2,814	4,151	69,527	295	27,010	9,233	535	3,278	210	13,015	769	4,801	724
	e) No. of BTSs having accumulated downtime of >24 hours in a month		2	3	124	1	141	53	1	18	0	88	0	16	0
2	Connection Establishment (Accessibility)														
	a) CSSR (Call Setup Success Rate)	>=95%	99.80%	98.99%	97.98%	99.64%	97.93%	99.49%	98.85%	96.91%	99.46%	98.23%	99.27%	98.40%	98.14%
	b) SDCCH/PAGING congestion	<=1%	0.01%	0.02%	0.78%	1.60%	0.67%	0.05%	0.24%	0.44%	0.05%	0.70%	0.00%	0.00%	0.00%
	c) TCH congestion	<=2%	0.02%	0.06%	1.85%	0.20%	1.36%	0.07%	0.40%	0.23%	0.00%	0.85%	0.09%	0.13%	0.10%
3	Connection maintenance (retainability)														
	a) CDR	<=2%	0.57%	0.72%	1.89%	1.24%	1.67%	0.57%	0.94%	1.40%	0.31%	0.96%	0.31%	0.74%	1.24%
	b) Worst affected cells>3% TCH drop	<=3%	6.26%	1.40%	4.77%	1.90%	2.87%	0.10%	2.82%	1.95%	0.00%	2.72%	2.64%	0.21%	2.62%
	c) Good voice quality	>=95%	98.28%	99.13%	98.10%	98.22%	97.60%	98.80%	96.94%	96.57%	99.11%	97.38%	NA	98.22%	NA
	d) Total No. of cells exceeding 3% TCH drop (call drop)		410	365	956	1	720	11	325	163	0	639	50	7	190
	e) Total no. of cells in the network		6,551	26,085	20,054	72	25,106	10,836	11,544	8,371	63	23,520	1,882	6,594	7,258
4	No of POI having >=0.5% congestion	<0.5%	0	0	6	0	0	0	0	9	0	0	0	0	0

S/ N	Name of Parameter	Bench- mark	Aircel	Airtel	BSNL	Etisala t	Idea	Rcom GSM	Tata GSM	Uninor	Video con	Voda fone	MTS	Rcom CDMA	Tata CDMA	
			GSM Operators										CDMA Operators			
	a) Name of POI not meeting the benchmark		Nil	Nil	Idea9220, TTML 9633, Vodafone 9787, Reliance 5487, Reliance CDMA UASL, Reliance GSM	Nil	Nil	Nil	Nil	Nil	Rcom-CDMA (I/O) Pune & Solapur, TTSL NLD (I/O) &(O) Pune, Airtel & Idea(O) Pune, Vodafone NLD (I/O) & Access Pune, Cellone (I/O) Pune	Nil	Nil	Nil	Nil	Nil
	b) Total No. of call attempts on POI (Avg.)		240,728	5,070,607	1,827,927	1,878	12,903,553	1,052,330	695,712	1,730,573	70	64,956,805	284,894	581,446	1,515,188	
	c) Total traffic served on POI (Erlang) (Avg.)		5,555	109,286	52,614	59	196,572	28,522	20,151	41,120	84	82,352	6,083	17,664	34,692	
	d) Total No. of circuits on POI		14,092	176,428	84,030	991	383,221	71,578	47,526	62,473	379	125,948	22,030	39,878	97,274	
	e) Total number of working POI Service Area wise		73	374	48	16	399	155	208	100	12	229	66	101	425	
5	Network Data															
	a) Equipped Capacity of Network Erlang		65,744	357,198	248,859	533	410,096	144,000	161,125	96,630	15,000	313,670	28,560	290,000	724,996	
	b) Total traffic in TCBH in erlang (Avg.)		11,644	239,549	108,696	56	325,365	133,677	80,867	75,108	3	279,429	8,259	95,589	126,005	
	c) Total no. of customers served (as per VLR) on last day of the month		492,960	7,966,507	3,882,356	4,601	13,858,321	4,368,400	2,669,882	2,235,421	474	10,876,422	312,689	2,232,123	2,443,737	
(B)	Customer Service Quality Parameters															
6	Metering/billing credibility-Post paid	<= 0.1%	0.06%	0.03%	NP	NA	0.07%	0.07%	0.00%	NA	NA	0.12%	0.05%	0.05%	0.00%	
	a) No. of bills issued during the period		12,421	624,172	NP	NA	832,758	39,850	35,258	NA	NA	494,140	1,465	298,954	211,778	

S/ N	Name of Parameter	Bench- mark	Aircel	Airtel	BSNL	Etisala t	Idea	Rcom GSM	Tata GSM	Uninor	Video con	Voda fone	MTS	Rcom CDMA	Tata CDMA
			GSM Operators										CDMA Operators		
	b) No. of bills disputed including billing complaints during the period		7	168	24	NA	618	26	1	NA	NA	602	1	153	6
7	Metering /billing credibility-Pre paid	<i><= 0.1%</i>	0.05%	0.00%	NP	0.00%	0.07%	0.07%	0.00%	0.12%	0.00%	0.01%	0.00%	0.05%	0.00%
	a) No. of charging / credit / validity complaints during the quarter		616	578	5,334	0	9,691	4,634	0	3,632	0	1,250	18	1,590	62
	b) Total no. of pre-paid customers at the end of the quarter		1,137,669	21,680,965	NP	30,417	13,309,963	6,942,804	4,810,749	3,057,231	13,577	11,729,588	608,217	3,097,210	4,817,214
8	Resolution of billing/ charging complaints	<i>100% within 4 weeks</i>	100%	100%	100%	NA	99.98%	100%	100%	100%	NA	100%	100%	100%	100%
	a) No. of billing/(post paid) and charging, credit/validity (pre paid) complaints resolved within 4 weeks during the quarter		1,003	42,344	9,860	0	24,531	6,981	2,363	3,763	0	1,852	48	3,395	3,626
	b) Total no. of billing (post paid) and charging, credit / validity (pre paid) complaints received during the quarter		1,003	42,344	9,860	0	24,536	6,981	2,363	3,763	0	1,852	48	3,395	3,626
	c) No. of billing complaints (post paid) and charging, credit/ validity complaints (pre paid) resolved in favour of the customer during the quarter		623	746	5,358	0	10,309	4,660	1	3,632	0	1,852	19	1,743	68
	d) No. of complaints disposed on account of not considered as valid complaints during the quarter		380	41,598	4,502	0	14,227	2,321	2,362	131	0	0	29	1,652	3,558
	e) Period of applying credit/waiver/adjustment to the customers account from the date of resolutions of complaints	<i><=1 week</i>	100%	100%	100%	NA	100%	100%	100%	100%	100%	NA	100%	100%	100%

S/ N	Name of Parameter	Bench- mark	Aircel	Airtel	BSNL	Etisala t	Idea	Rcom GSM	Tata GSM	Uninor	Video con	Voda fone	MTS	Rcom CDMA	Tata CDMA
			GSM Operators										CDMA Operators		
9	Response time to customers for assistance														
	a) Accessibility of call centre/Customer Care	>=95%	97.62%	100%	100%	98.92%	99.15%	98.84%	99.17%	100%	100%	99.95%	74.95%	99.55%	98.97%
	b) % call answered by operators(voice to voice) within 60 sec.	>=90%	95.42%	95.41%	99.11%	99.83%	94.53%	80.28%	95.97%	98.30%	100%	92.98%	95.00%	80.35%	94.71%
	c) Total no. of call attempts to call centre & customer care nos. during TCBH (Avg.).		13,371	124,929	80,998	77	194,223	31,438	44,990	29,431	19	138,754	4,089	7,291	17,258
	d) No. of calls connected and answered successfully to call centre & customer care nos. during TCBH (Avg.).		12,759	124,929	80,281	77	183,602	25,238	43,176	28,931	19	129,020	3,885	5,858	16,345
10	Termination/closure of service	<=7days	98.85%	100%	NP	NA	100%	100%	100%	NA	NA	100%	50%	100%	100%
	a) Total No. of requests for Termination / Closure of service received during the quarter		174	3,572	NP	NA	5,206	182	483	NA	NA	1,921	2	1,329	2,271
	b) No. of requests for Termination / Closure of service complied within 7 days during the quarter		172	3,572	NP	NA	5,206	182	483	NA	NA	1,921	1	1,329	2,271
11	Time taken for refunds of deposits after closures.	100% within 60 days	NA	100%	NP	NA	100%	100%	100%	NA	NA	100%	NA	100%	99.37%

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 Maharashtra-Goa Service Area are as given below:-

- **BTS accumulated downtime (benchmark <=2%):** All operators are meeting the benchmark with values lying between 0.02% and 1.71%.
- **Worst affected BTSs due to downtime (benchmark <= 2%):** Except Etisalat, all operators are meeting the benchmark with values lying between 0% and 1.86%.
- **Call setup success rate (benchmark >= 95%):** All operators are meeting the benchmark with values lying between 96.91% and 99.8%.
- **SDCCH/PAGING Channel congestion (benchmark <= 1%):** All operators are meeting the benchmark with values lying between 0% and 1.6%.
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% and 1.85%.
- **Call drop rate (benchmark <= 2%):** All operators are meeting the benchmark with values lying between 0.31% and 1.89%.
- **Cell exceeding 3% TCH drop (benchmark <= 5%):** Except for Aircel & BSNL, all the operators are satisfying the benchmark with value in between 0% and 2.87%.
- **Connections with good voice quality (benchmark >= 95%):** Tata CDMA & MTS have declared that the parameter is not system generated. Other operators are meeting the benchmark with values lying between 96.57% and 99.13%.
- **POI Congestion (benchmark <= 0.5%):** BSNL & Uninor show 6 and 9 nos. of POIs respectively 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%):** All the operators, except MTS, are meeting the benchmark with values lying between 97.62% and 100%.
- **%age of call answered by operator (Voice to voice) (benchmark >90%):** Rcom GSM & CDMA are not meeting the benchmark value.
- **Metering and billing credibility-Post paid (benchmark <= 0.1%):** Except for Vodafone, all other operators are meeting the benchmark.
- **Metering and billing credibility-Pre paid (benchmark <= 0.1%):** Except for Uninor, all the operators are meeting the benchmark.
- **Resolution of billing/ charging complaints (benchmark 100% within 4 weeks):** Only Idea is showing a little deviation. It took more than 4 weeks to resolve 5 complaints out of 24,536 complaints received.
- **Termination/Closure of service (Benchmark <= 7 days):** All operators, except Aircel & MTS, have satisfied the benchmark. Aircel took more than 7 days to close 2 connections out of 174 requests received. MTS terminated 1 connection out of 2 requests received within 7 days.
- **Time taken for refunds of deposits after closures (benchmark 100% within <=60 days):** Only Tata CDMA is showing a little deviation. It did not made refunds in 9 cases out of 1423 applicable cases within 60 days. The parameter is not applicable in case of Aircel & MTS as they had no refund cases in the month.

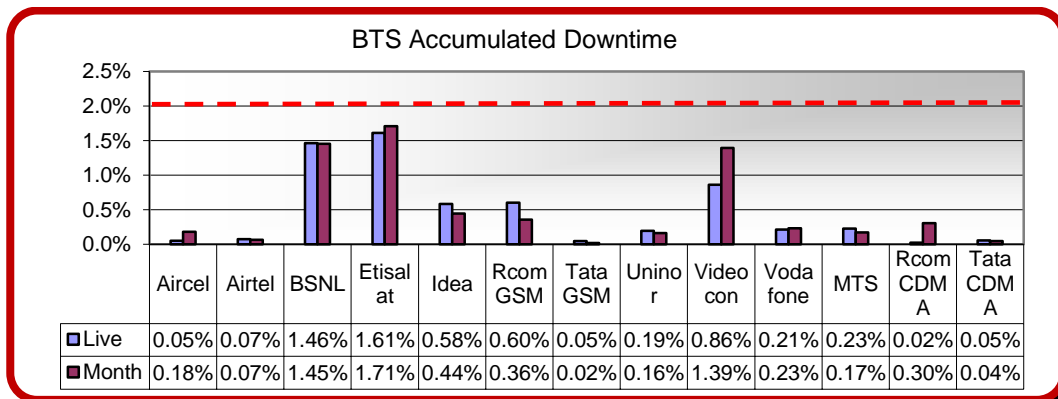
(3) Sample Coverage

Switches/BSC/BTS details of operators:

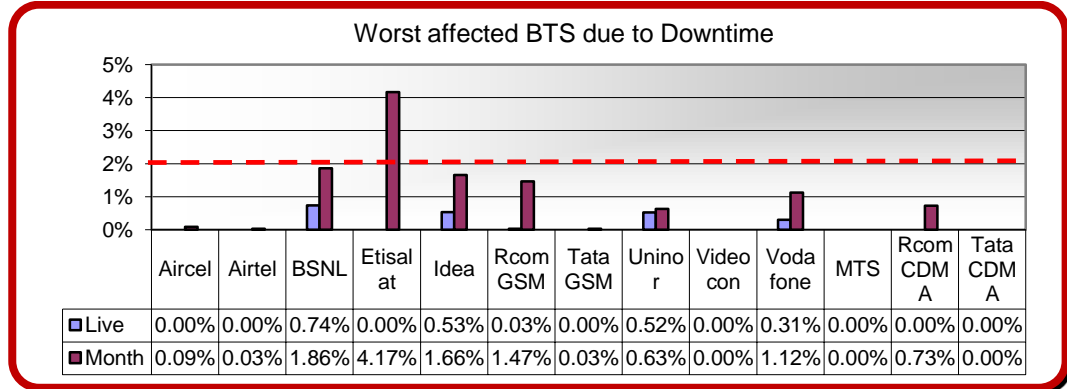
Sl.	Name of Service Provider	No. of MSC/GMSC	No. of BSC	No. of BTS
GSM Operators				
1	Aircel Ltd	3	15	2192
2	Airtel Ltd	21	139	8810
3	BSNL	14	146	6657
4	Etisalat	1	1	24
5	Idea	39	74	8485
6	Reliance Communications	5	24	3612
7	Tata Communications	4	31	3849
8	Uninor	3	21	2861
9	Videocon	1	1	21
10	Vodafone	17	102	7748
CDMA Operators				
11	MTS	1	3	623
12	Reliance Communications	12	10	2198
13	Tata Communications	11	21	2321

(4) Performance (Graphical Representation)**Comparison between Live measurements and One month data Audit – Cellular Mobile Telephone Services****A) NETWORK PERFORMANCE**

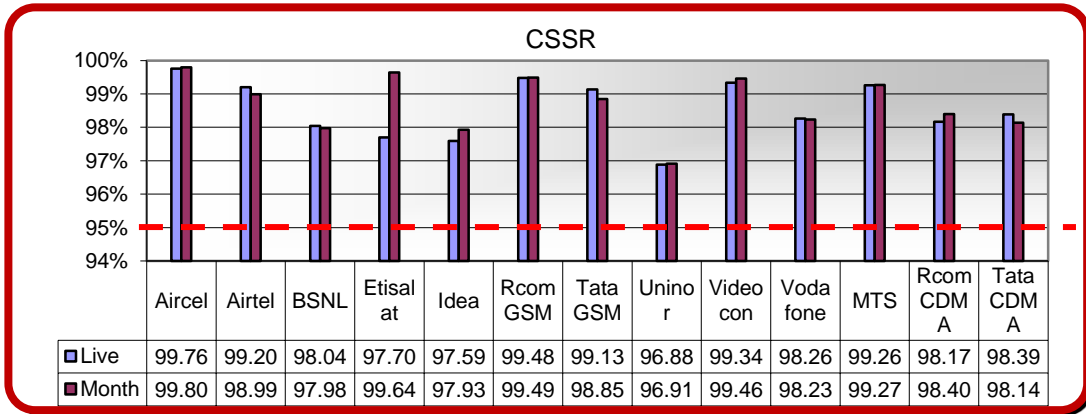
BTS Accumulated Downtime: All operators are meeting the TRAI benchmark for both one month data and 3 days live data taken in the month of audit.



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 except for Etisalat in month data.

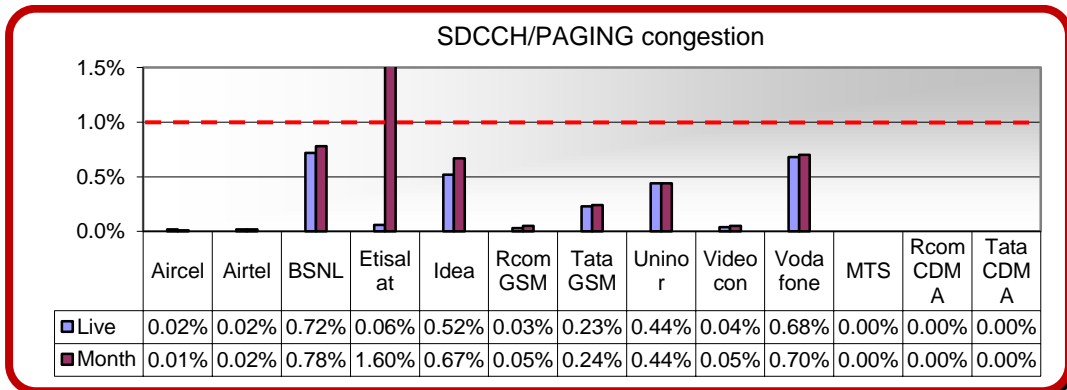


Call setup success rate: All operators are meeting the TRAI benchmarks ($\geq 95\%$) for both one month data and 3 days live data taken in the month of audit.

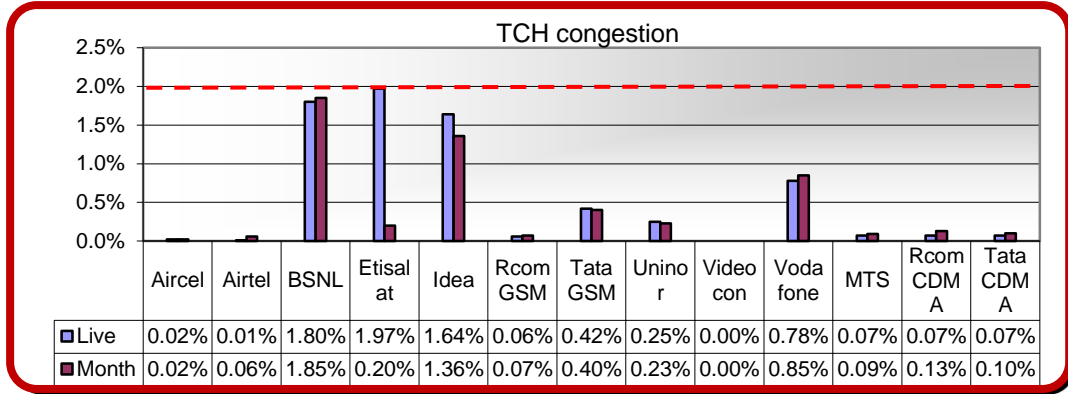


Blocked call rate:

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

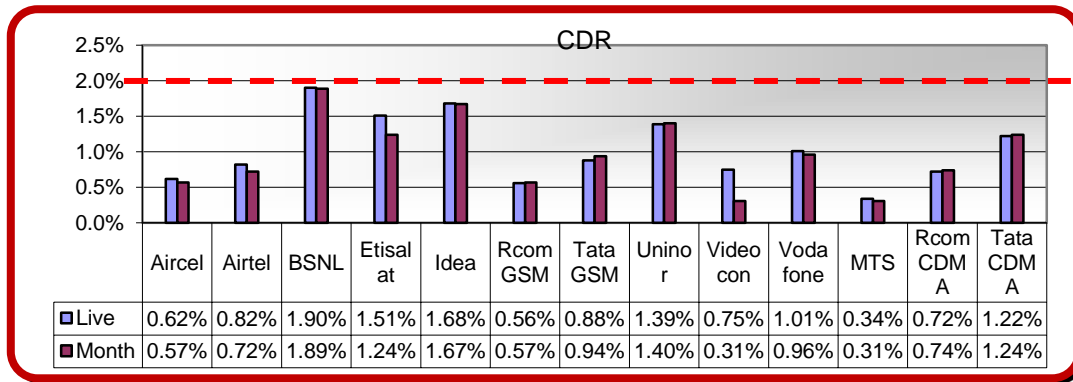


TCH congestion: All operators are meeting the TRAI benchmarks ($\leq 2\%$) for both one month data and 3 days live data taken in the month of audit.

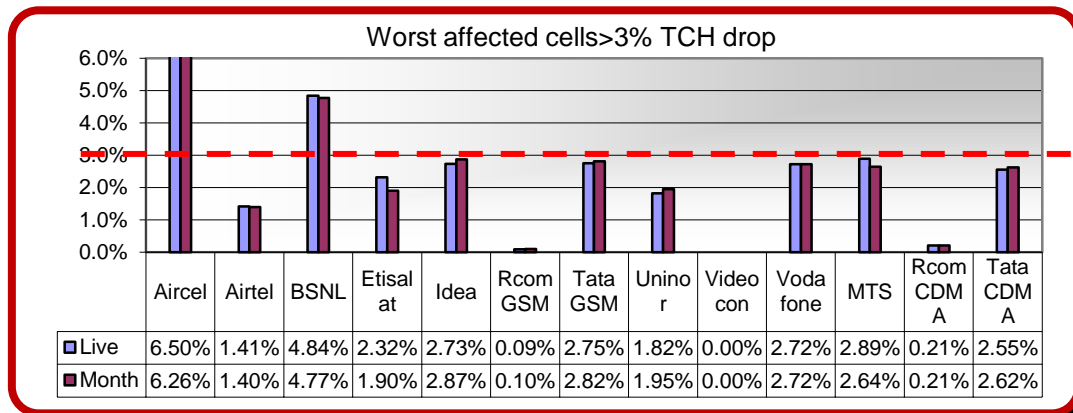


Connection Maintainability (Retainability):

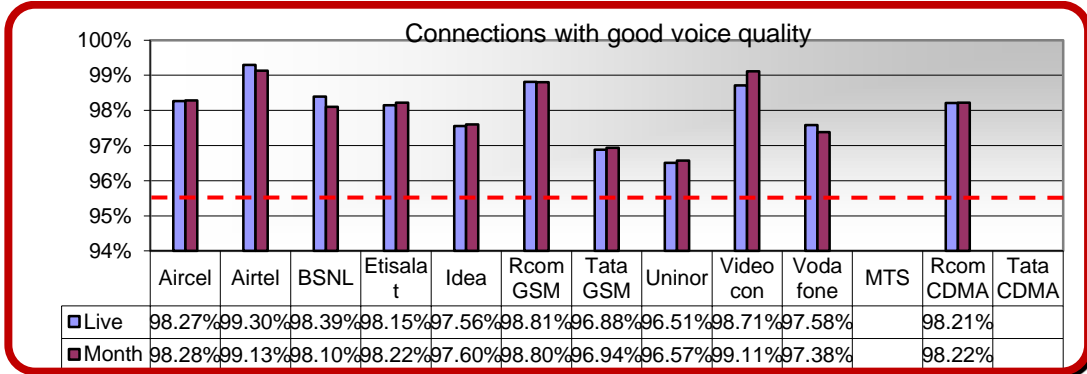
Call drop rate: All operators are meeting the TRAI benchmarks ($\leq 2\%$) for both one month data and 3 days live data taken in the month of audit.



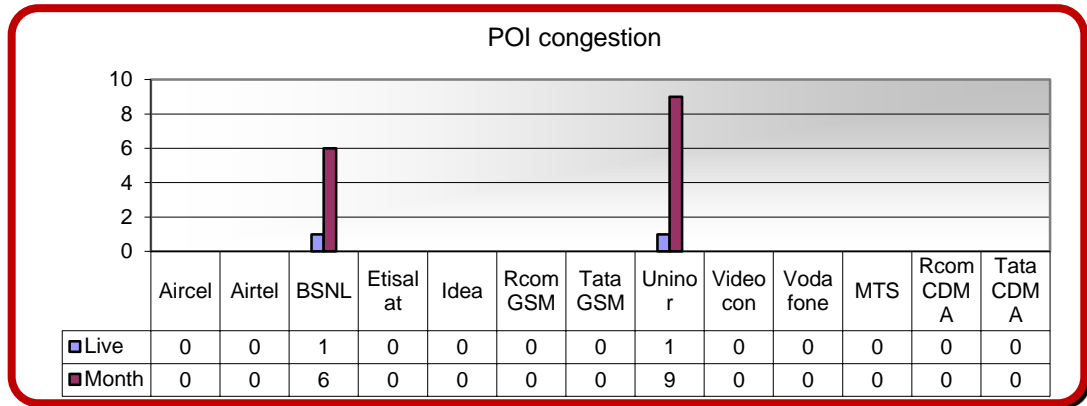
Worst affected Cell exceeding 3% TCH Drop: For both live and month data, Aircel & BSNL are found not meeting the benchmark of $\leq 3\%$. Rest of the operators are meeting the benchmark for both cases.



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

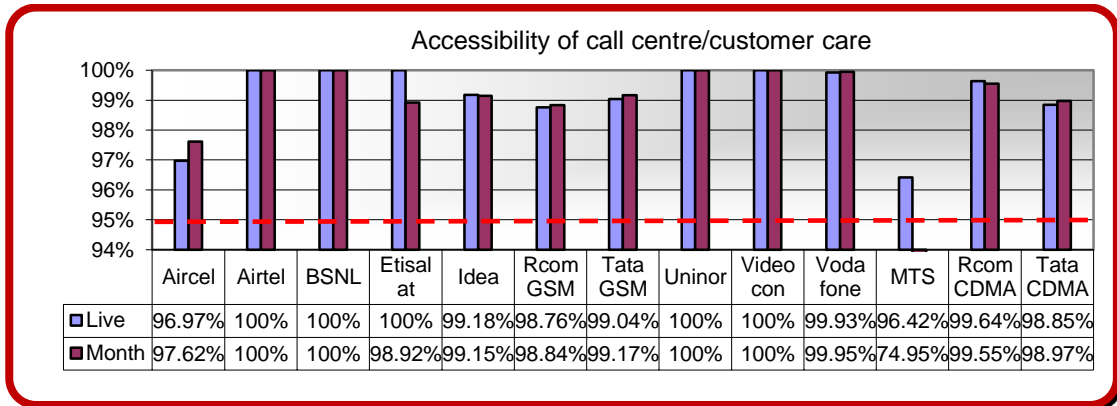


POI Congestion: BSNL & Uninor & Videocon are found to have POIs with $\geq 0.5\%$ congestion.

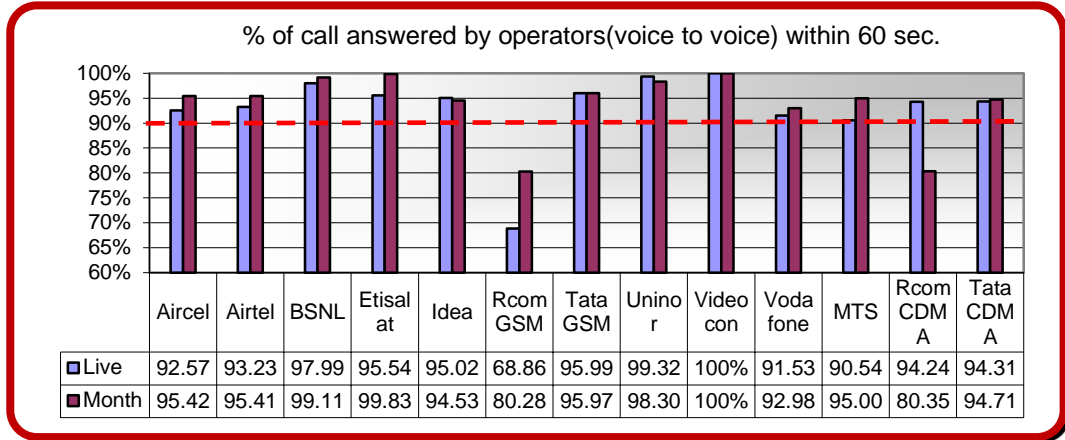


B) CUSTOMER SERVICE QUALITY PARAMETERS

Percentage of call answered (Electronically): All operators, except MTS, are meeting the TRAI benchmarks ($\geq 95\%$) for both one month data and 3 days live data taken in the month of audit.



Percentage of call answered by operators (Voice to voice) within 60 sec: Rcom GSM & CDMA do not meet the 90% benchmark against this parameter.



(5) Critical Analysis

The above comparative study between live data & month data shows similar trends & consistency in both the cases except for Etisalat in CSSR & SDCCH / TCH congestion. Etisalat has also shown a very high value for “worst affected BTSs due to downtime”. Aircel & BSNL have a high value against the “worst affected cells >3% TCH drop” parameter.

While Rcom GSM has very low %age of calls answered by operator within 60 sec. in both live & month data, Rcom CDMA shows a low value in case of month data only. The accessibility of call centre in case of MTS is exceptionally low.

(B) Redressal**(1) Sample coverage**

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

(2) Performance based on live calling for billing complaints

Calling Operator	Aircel	Airtel	BSNL	Idea	Tata GSM	Uninor	Vodafone	MTS	Tata CDMA
Total No. of Calls Attempted	100	100	100	100	1	100	100	19	68
Total No. of calls Answered	20	18	15	23	0	34	26	6	15
Cases resolved with 4 weeks	20	18	15	23	0	34	26	6	15
%age of cases resolved	100%	100%	100%	100%	NA	100%	100%	100%	100%

(3) Live Calling to Call Centers

Calling Operator	Aircel	Airtel	BSNL	Etisalat	Idea	Rcom GSM	Tata GSM	Uninor	Videocon	Vodafone	MTS	Rcom CDMA	Tata CDMA
Calls Attempted	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
%age of calls connected to IVR	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Calls got connected to agent within 60 Sec	92	94	93	92	92	96	93	98	99	91	96	93	92
%age of calls got answered by agent in 60 sec.	92%	94%	93%	92%	92%	96%	93%	98%	99%	91%	96%	93%	92%

(4) Level-1 Live Calling

Emergency Calls were made in Maharashtra-Goa circle for each city and results are tabulated below

Emergency no.	Calls Attempted	Aircel	Airtel	BSNL	Etisalat	Idea	Rcom GSM	Tata GSM	Uninor	Videocon	Vodafone	MTS	Rcom	Tata
Pune														
100	1	1	1	1	1	1	1	1	1	1	1	1	1	1
101	1	1	1	1	1	1	1	1	1	1	1	1	1	1
102	1	1	1	1	1	1	1	0	1	1	0	1	1	0
139	2	2	2	2	2	2	2	2	2	2	2	2	2	2
Ahmednagar														
100	1	1	1	1	1	1	1	1	1	1	1	1	1	1
101	1	1	1	1	1	1	1	1	1	1	1	1	1	1
102	1	1	1	1	1	1	1	1	1	1	1	1	1	1
139	2	2	2	2	2	2	2	2	2	2	2	2	2	2
Panjim														
100	1	1	1	1	1	1	1	1	1	1	1	1	1	1
101	1	1	1	1	1	1	1	1	1	1	1	1	1	1
102	1	1	1	1	1	1	1	1	1	1	1	1	1	1
139	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. 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.

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

Good results were also found in case of Level-1 calling for emergency nos. 100, 101 & 102 except in case of Tata & Vodafone where 102 could not be reached in Pune. The 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 (Maharashtra-Goa Circle) were made between 1100 to 1400 hrs and between 1600 to 1900 hrs.

(2) Performance based on live calling

Calling Operator	Aircel	Airtel	BSNL	Idea	Rcom GSM	Tata GSM	Uninor	Vodafone	MTS	Rcom CDMA	Tata CDMA
Aircel	-	100%	90%	100%	100%	90%	95%	90%	90%	100%	95%
Airtel	95%	-	85%	90%	90%	85%	90%	98%	95%	100%	100%
BSNL	95%	90%	-	100%	85%	95%	90%	90%	100%	95%	90%
Idea	100%	95%	100%	-	100%	95%	95%	100%	85%	100%	98%
Rcom GSM	90%	95%	95%	100%	-	90%	95%	100%	100%	98%	100%
Tata GSM	95%	100%	90%	100%	90%	-	90%	95%	95%	100%	100%
Uninor	98%	100%	85%	100%	100%	90%	-	95%	95%	100%	85%
Vodafone	100%	90%	100%	100%	95%	100%	100%	-	85%	90%	90%
MTS	85%	100%	98%	98%	90%	95%	90%	100%	-	90%	90%
Rcom CDMA	100%	90%	100%	90%	95%	85%	90%	100%	100%	-	90%
Tata CDMA	90%	100%	95%	90%	100%	100%	95%	85%	100%	95%	-

(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 results are tabulated above and there was congestion found in cases such as MTS-Aircel, Tata CDMA-Vodafone, Uninor-Tata CDMA etc. There is not much congestion found on the operator networks.

(D) Drive test of the mobile network of service providers**(1) Sample Coverage**

The Operator Assisted Drive Test was conducted in Maharashtra-Goa circle for all the operators. The speed limit of 30-35Km/hr was maintained throughout the Drive Test. Zones were selected for covering different density areas (High, Medium & Low dense areas).

Drive Test Locations***PUNE (100 Km)***

HIGH DENSE:	Swargate, Tilak Road, Karve Road, Kothrud, Unuiversity Road, RTO, Kalyani Nagar
MEDIUM DENSE:	Bosari, Chandni Chowk, Pashan Road, Aundh, Shivaji Nagar, Nagar Road, Airport Road, Viman Nagar, B.T. Kawade Road, Magarpatta City, Hadapsar
LOW DENSE:	Bhavdhan, Ram Nagar, Yerwada, Kharadi, Fursungi

AHMEDNAGAR (60 Km)

HIGH DENSE:	Telephone Bhawan, Savedi Road, Bengal Chowk Road, Bmudgali, Juna Bazar, Chirle Road, Aadte Bazar, Bus Station
MEDIUM DENSE:	Bholegaon Phata, Gulmohar Road, Tanakpur, Bhingar, Mahanagar Palika, Dist Court, Chowpati Karwar, Tilak Road, Nagar Kalyan Road
LOW DENSE:	MIDC, Pipeline Road, Bhanan Nagar, Maliwada, Shivle Road, Ketvade

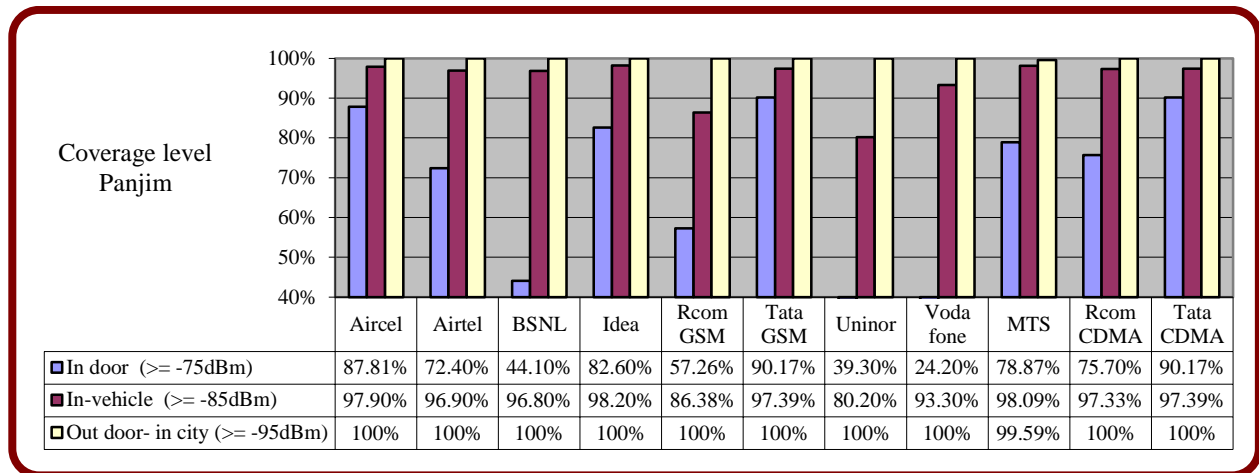
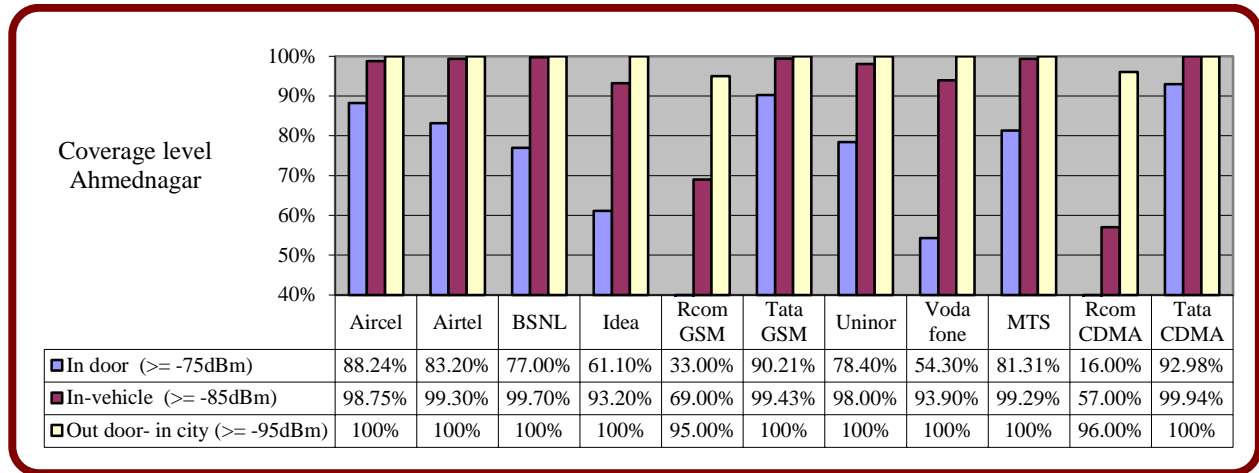
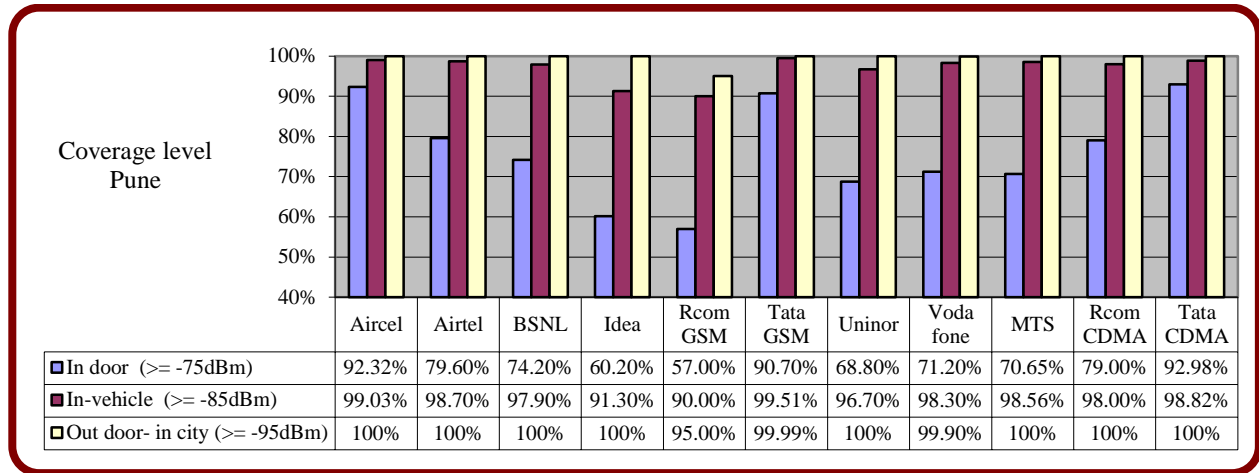
PANJIM (50 Km)

HIGH DENSE:	Patto Bridge, Church Square, Dr. Atmaram Borkar Road, 18 June Road, Cunha Riviera Road, MG Road, Don Bosco Road, Gama Pinto Road, Panjim-Mapusa Highway
MEDIUM DENSE:	D.B. Bandodkar Marg, Signal Training Centre, Tonce Coranzalem, St. Inez
LOW DENSE:	Altihno, Mala, Nevgi Nagar, Collectorate Office, Dona Paula

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

SN	Parameter	City Name	Aircel	Airtel	BSNL	Idea	Rcom GSM	Tata GSM	Uninor	Voda fone	MTS	Rcom CDMA	Tata CDMA
			GSM Operators						CDMA Operators				
1.1	Call Attempts	Pune	158	116	140	140	159	141	135	169	148	135	151
		Ahmednagar	94	89	122	103	99	134	119	96	111	95	162
		Panjim	71	114	66	91	72	79	65	81	70	72	79
1.2	Blocked Call Rate (<=3%)	Pune	0.00%	0.00%	1.43%	1.43%	1.26%	0.00%	2.96%	0.59%	0.68%	0.74%	0.00%
		Ahmednagar	0.00%	0.00%	1.64%	0.97%	0.00%	0.00%	0.84%	0.00%	0.00%	1.05%	0.00%
		Panjim	0.00%	0.00%	3.03%	6.59%	1.39%	0.00%	1.54%	6.17%	0.00%	1.39%	0.00%
1.3	Dropped Call Rate (<=2%)	Pune	0.63%	0.00%	1.45%	0.75%	1.27%	0.71%	0.78%	0.60%	0.68%	0.75%	0.00%
		Ahmednagar	0.00%	0.00%	0.83%	0.00%	0.00%	1.49%	0.85%	0.00%	0.90%	0.00%	0.00%
		Panjim	0.00%	0.00%	1.56%	1.27%	0.00%	1.27%	0.00%	5.63%	1.43%	0.00%	1.27%
1.4	Percentage of connections with good voice quality (=>95%)												
	(i) 0-4 (w/o frequency hopping)	Pune									96.55%	99.00%	97.34%
		Ahmednagar									99.78%	100%	98.47%
		Panjim									99.69%	99.00%	95.22%
	(ii) 0-5 (with frequency hopping)	Pune	96.63%	96.90%	95.60%	91.70%	94.00%	95.67%	96.60%	95.30%			
		Ahmednagar	96.95%	98.20%	79.20%	93.10%	96.00%	95.05%	97.00%	96.20%			
Panjim		97.43%	97.80%	97.20%	95.80%	96.00%	95.21%	98.40%	91.00%				
1.5	Service Coverage												
	In door (>= -75dBm)	Pune	92.32%	79.60%	74.20%	60.20%	57.00%	90.70%	68.80%	71.20%	70.65%	79.00%	92.98%
		Ahmednagar	88.24%	83.20%	77.00%	61.10%	33.00%	90.21%	78.40%	54.30%	81.31%	16.00%	92.98%
		Panjim	87.81%	72.40%	44.10%	82.60%	57.26%	90.17%	39.30%	24.20%	78.87%	75.70%	90.17%
	In-vehicle (>= -85dBm)	Pune	99.03%	98.70%	97.90%	91.30%	90.00%	99.51%	96.70%	98.30%	98.56%	98.00%	98.82%
		Ahmednagar	98.75%	99.30%	99.70%	93.20%	69.00%	99.43%	98.00%	93.90%	99.29%	57.00%	99.94%
		Panjim	97.90%	96.90%	96.80%	98.20%	86.38%	97.39%	80.20%	93.30%	98.09%	97.33%	97.39%
	Out door- in city (>= -95dBm)	Pune	100%	100%	100%	100%	95.00%	99.99%	100%	99.90%	100%	100%	100%
		Ahmednagar	100%	100%	100%	100%	95.00%	100%	100%	100%	100%	96.00%	100%
Panjim		100%	100%	100%	100%	100%	100%	100%	100%	99.59%	100%	100%	
1.6	Call Setup Success Rate (>=95%)	Pune	100%	100%	98.57%	98.57%	98.74%	100%	97.04%	99.41%	99.32%	99.26%	100%
		Ahmednagar	100%	100%	98.36%	99.03%	100%	100%	99.16%	100%	100%	98.95%	100%
		Panjim	100%	100%	96.97%	93.41%	98.61%	100%	98.46%	93.83%	100%	98.61%	100%

Graphical Representation



(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:

- i) 'Blocked Call Rate' benchmark is not met by BSNL, Idea & Vodafone in Panjim.
- ii) 'Dropped Call Rate' benchmark is not met by Vodafone in Panjim.
- iii) Below benchmark performance for the parameter '%age of connections with good voice quality', is found in case of Idea & Rcom GSM in Pune, BSNL & Idea in Ahmednagar and Vodafone in Panjim.
- iv) Idea and Vodafone have low CSSR in Panjim.
- v) Exceptionally low indoor coverage was recorded in case of Rcom GSM & CDMA in Ahmednagar and BSNL, Uninor & Vodafone in Panjim.

(E) Independent Drive Test**(6) Sample Coverage**

Independent Tests were conducted in the Maharashtra-Goa circle as per the list given by TRAI except for Aircel (Jalgaon) and MTS (Mahabaleshwar) since these two operators are in ICR with Tata in the respective cities. The city-wise radio coverage with call testing was performed individually for each service provider through drive test activity.

Drive Test Locations***MAHABALESHWAR (30 Km)***

Masjid Road, Fountain Hotel, Tanu Patel Street, Mahavitran Office, Mumbai-Pratapgarh Road, Lodwick Point, Khadi Gramoudhyog office, Central Railway Officer Guest House, Laymen School of Theology, Bee Keeping Centre, Nagar Palika, Post Office, Panchayat Smaiti, Tahsildar Office, Gramin Rugnalaya, Custom Inspection Office

SANGLI (80 Km)

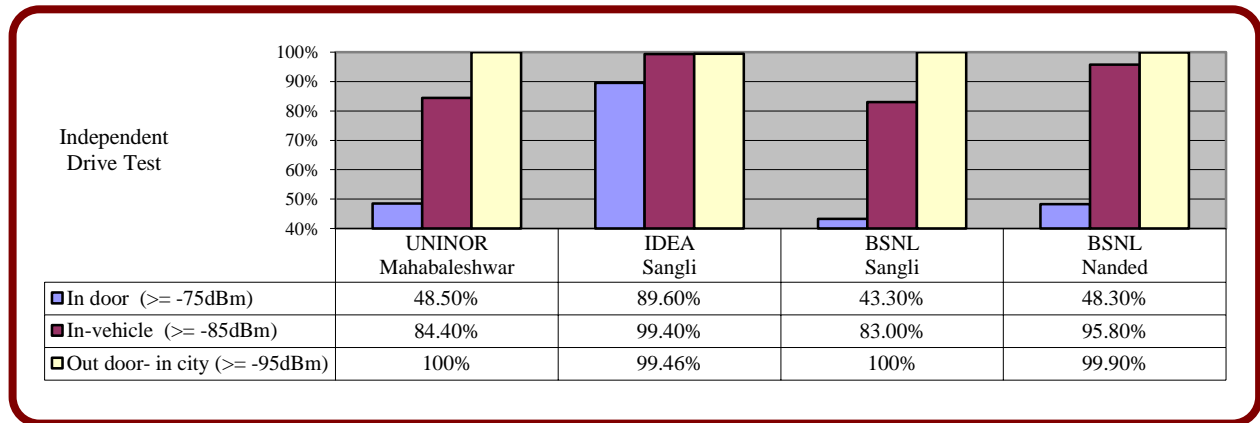
Bus Stand, 100 feet Road, Peth, Yashwant Nagar, Azad Chowk, Gulmohar Colony, Vishram Bagh, Ganesh Nagar, Dhamni Road, Railway Station, Laxmi Nagar, Police Headquarters, Market Yard, Mahavir Udhyan, Kanbaug, Mahavir Nagar, Patel chowk, Risala Road, Datta Nagar

NANDED (100 Km)

Bus stand, Airport, MGM College, Gurudwara Temple, Sarafa Bazar, Old Mondha Bazar, Nanded MIDC, Bhgya Nagar (Residential Area), SP office (District Headquarters), Swami Ramanand Thirth University, VIP Road, Railway Station, Traserar Bazar Area, Gurudwara Yatri Niwas, Doctor Line Area, Wajegaon Town, Vishnupuri

(2) Performance (for the respective cities) - Independent Drive Test

SN	Parameter	UNINOR	IDEA	BSNL	BSNL
		Mahabaleshwar	Sangli	Sangli	Nanded
1.1	Call Attempts	19	108	111	129
1.2	Blocked Call Rate (<=3%)	0.00%	0.00%	1.80%	1.55%
1.3	Dropped Call Rate (<=2%)	0.00%	0.00%	0.00%	0.82%
1.4	Percentage of connections with good voice quality (=>95%)				
	0-5 (with frequency hopping)	99.70%	94.80%	92.60%	90.90%
1.5	Service Coverage				
	In door (>= -75dBm)	48.50%	89.60%	43.30%	48.30%
	In-vehicle (>= -85dBm)	84.40%	99.40%	83.00%	95.80%
	Outdoor- in city (>= -95dBm)	100%	99.46%	100%	99.90%
1.6	Call Setup Success Rate (>=95%)	100%	100%	98.20%	98.45%

**(3) Critical Analysis**

The drive test data was found to be satisfactory for most of the parameters. Following are the observations made during the drive tests:

- i) A below benchmark performance was observed in case of Idea in Sangli and BSNL in both Sangli & Nanded for '%age of connections with good voice quality'.
- ii) Variations were noticed in case of coverage level. For example, BSNL got 43.3% samples in Sangli which may be used in-door. This considerably increased for In-vehicle & outdoor connections. Similar cases were found for BSNL in Nanded and Uninor in Mahabaleshwar.

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

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

Tough Etisalat is having poor performance for a few parameters such as ‘worst affected BTSs due to downtime’, it is to be noted that only 1 of its 24 BTSs was down for more than 24 hours in the entire month, which eventually led to the high %age of value against this parameter. Its performance cannot be adjudged against other big operators.

Aircel & BSNL have very high %age of cells having >3% TCH drop. Also, BSNL & Uninor show a few POIs with congestion >=0.5%.

Under **Response Time to Customer for Assistance** parameters, Rcom GSM & CDMA have below benchmark performance.

Regarding **Metering/Billing Credibility** issues, Vodafone & Uninor have shown a value slightly deviating from the prescribed benchmark. Minor deviations were found for Tata CDMA in refund cases, Idea in resolution of complaints within 4 weeks and Aircel in closure of service. MTS terminated one connection against the 2 total requests received and hence its value against the benchmark dropped considerably to just 50%.

During **Drive Tests**, the performance of Vodafone was found to be below benchmark for all the KPIs in Panjim. BSNL & Idea too had higher blocked call rates in Panjim..

II. Basic Telephone Service (Wireline) Providers

.....Audit not done for this quarter

III. Broadband Service Providers

.....Audit not done for this quarter